National Aeronautics and
Space Administration

FINAL ENVIRONMENTAL ASSESSMENT FOR APOLLO/SATURN V CENTER IMPROVEMENTS

NASA John F. Kennedy Space Center
Kennedy Space Center, FL 32899

May 2026

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTICE: KSC-2026-04

National Environmental Policy Act: Kennedy Space Center (KSC) Apollo/Saturn V Center Improvements Environmental Assessment (EA), Kennedy Space Center, Florida

AGENCY: National Aeronautics and Space Administration (NASA)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: Pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code 4321, et seq.); and NASA policy and procedures, 14 CFR Part 1216, et seq.; NASA Procedural Requirements (NPR) for Implementing NEPA and Executive Order 12114 (NPR 8580.1), NASA has prepared an EA to evaluate potential impacts on the natural and human environment associated with the Proposed Action, Improvements to the Apollo/Saturn V Center at KSC, Florida. The purpose of the Proposed Action is to enhance the visitor experience by accommodating additional visitors associated with future launch viewings and improving employee safety by reducing wildlife exposure at the existing employee parking areas.

DATE: This proposed action may proceed as of the date of signature of this FONSI.

ADDRESSES: Written comments or questions should be addressed to:

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NASA Kennedy Space Center
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A copy of the final EA is available by contacting Mr. Brooks at the address above, electronic mail address, or telephone indicated herein.

PUBLIC and STAKEHOLDER ENGAGEMENT: The EA and FONSI are available on the KSC public facing website: https://public.ksc.nasa.gov/environmental/nepa-documents/. NASA also provided the draft EA to the Florida State Clearinghouse for review.

DESCRIPTION OF THE PROPOSED ACTION: The EA addresses the Proposed Action and the No Action alternative of implementing a phased approach of improvements proposed at the Apollo/Saturn V Center. The Proposed Action is needed to provide employees and visitors with safe and continued access to

NASA's history and launch viewing areas consistent with the KSC Master Plan and existing concession agreement between Delaware North Companies Parks & Resorts and KSC.

Under the Proposed Action, NASA would implement a series of improvement projects across seven designated areas, including installation of artificial grass, tree removal, bleacher expansion, and a concrete pad for food truck operations; new fencing, paving, and potential solar lighting to enhance safety and reduce wildlife intrusion; expanded employee parking and additional lighting for nighttime operations; growth of retail storage capacity; construction of an emergency egress walkway; relocation of the food concession to improve visitor flow; and expansion of the visitor viewing area through a new grandstand with box seating. These coordinated improvements aim to enhance safety, support operational needs, and maintain the long-term functionality of facilities within the Apollo/Saturn V Center.

Under the No Action Alternative, the proposed Apollo/Saturn V Improvements would not be implemented.

ENVIRONMENTAL CONSEQUENCES: The EA evaluates the portions of the KSC environment relevant to the Proposed Action and the No Action Alternative. Assessed resource areas include transportation, utilities, air quality, land use, biological and cultural resources, geology and soils, noise, water resources, and socioeconomics. Potential impacts were identified and classified as none, negligible, or minor.

Construction activities under the Proposed Action would result in no adverse impacts on transportation, air quality, or land use; negligible impacts on utilities, biological resources, and geology and soils; negligible to minor impacts on noise, floodplains, groundwater, and surface waters; minor adverse impacts on cultural resources; and minor beneficial impacts on socioeconomics.

During operations, the Proposed Action would result in no adverse impacts on transportation, land use, cultural resources, geology and soils, noise, or groundwater; negligible adverse impacts on utilities, air quality, biological resources, and socioeconomics; and negligible to minor adverse impacts on floodplains and surface waters.

CONCLUSION: Based on the analysis in the final EA, and the implementation of best management practices, NASA has determined that the environmental impacts associated with implementing the Proposed Action would not result in a significant effect on the natural, biological, or physical environment. Applicable federal, state, and local laws and regulations will be followed. This FONSI incorporates by reference the EA and provides the necessary analysis for concluding that an Environmental Impact Statement pursuant to NEPA is not required, and this FONSI is hereby submitted.

RESPONSIBLE OFFICIAL:

Brian Hughes

Digitally signed by Brian Hughes
Date: 2026.06.22 09:41:29 -04'00'

Brian Hughes
Director, NASA John F. Kennedy Space Center

FINAL ENVIRONMENTAL ASSESSMENT FOR NASA JOHN F. KENNEDY SPACE CENTER APOLLO/SATURN V CENTER IMPROVEMENTS

Lead Agency: National Aeronautics and Space Administration (NASA)

Proposed Action: Apollo/Saturn V Center Improvements

For Further Information: James Brooks
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Date: May 2026

Abstract: This Environmental Assessment (EA) assesses the proposed implementation of improvements at the Apollo/Saturn V Center to enhance the visitor experience by accommodating additional visitors associated with future launch viewings and improving employee safety by reducing wildlife exposure at the existing employee parking areas. In accordance with the National Environmental Policy Act (NEPA), NASA prepared this EA to evaluate the potential environmental effects of implementing a phased approach to improvements proposed at the Apollo/Saturn V Center. The Proposed Action is needed to provide employees and visitors with safe and continued access to NASA's history and launch viewing areas consistent with the KSC Master Plan and existing concession agreement between Delaware North Companies Parks & Resorts and KSC. The potential effects to numerous resource areas resulting from the implementation of the Proposed Action and No Action Alternative are presented.

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (Title 42 of the United States Code [USC] Sections 4321–4347), as amended by the Fiscal Responsibility Act of 2023 (Public Law 118-5), National Aeronautics and Space Administration (NASA) Procedures for Implementing NEPA (14 Code of Federal Regulations Part 1216), and NASA Procedural Requirements (NPR) for implementing NEPA (NASA NPR 8580.1).

This EA addresses the Proposed Action, which is also the Preferred Alternative, and the No Action Alternative. The purpose of the Proposed Action is to implement various improvement projects at seven areas within the Apollo/Saturn V Center boundaries at the Kennedy Space Center (KSC). These improvement projects would enhance the visitor experience by accommodating a projected 2,000 to 3,000 additional visitors annually to the Apollo/Saturn V Center and improving employee safety by reducing wildlife exposure at the existing employee parking areas. The Proposed Action is needed to provide employees and visitors with safe and continued access to NASA's history and launch viewing areas consistent with the KSC Master Plan and existing concession agreement between Delaware North Companies Parks & Resorts and KSC. Under the Proposed Action, the following improvement projects would be completed at the Apollo/Saturn V Center:

- **Project Area 1**: Install artificial grass, remove trees on the north end, expand the existing permanent bleachers, and install a concrete pad for food truck use. These improvements would address persistent safety issues with visitor exposure to fire ants and localized destruction of surface areas due to wild hogs uprooting the landscape.
- **Project Area 2**: Install fencing along the Banana River to Astronaut Road, pave the dirt plot near the existing circular drive where dumpsters and cars are located, and possibly install solar streetlamps on the south side of the road for launch parking safety. This additional fencing would prevent wildlife from entering the work area and creating employee safety risks.
- **Project Area 3**: Increase employee parking spaces on the west side of the circular drive in the wooded area between the building and dirt road and install solar streetlamps along Astronaut Road. These improvements would enhance the employee experience and increase safety during nighttime launch preparations. The developed area would include the upland wooded area between the building and dirt road.
- **Project Area 4**: Expand the existing retail storage area and small concrete pad.
- **Project Area 5**: Install a concrete walkway approximately 4 feet (1.2 meters) wide for emergency egress. This improvement would include clearing and grading a small area in Area 5 west to the dirt road adjacent to the railroad track.
- **Project Area 6**: Relocate the existing food concession area to the south end of the bleachers next to the existing restrooms to enhance the visitor experience.
- **Project Area 7**: Expand the viewing area by constructing a grandstand area consisting of box seats at the top of the existing bleachers.

Under the No Action Alternative, the proposed Apollo/Saturn V improvements would not be completed, and the employee and visitor experience would not be enhanced. The No Action Alternative would not meet the purpose and need for the Proposed Action; however, as required by NEPA, the No Action Alternative was carried forward for analysis and would be used to analyze the consequences of not undertaking the Proposed Action. The No Action Alternative serves to establish a comparative baseline for environmental analysis.

Potential environmental effects from the Proposed Action and No Action Alternatives were analyzed and classified into one of five levels of potential effects: none (i.e., no effect), negligible, minor, moderate, or major. Table ES-1 summarizes the potential environmental effects.

Table ES-1 Summary of Potential Environmental Effects to Resource Areas

Resource Area	No Action	Proposed Action
Transportation	The Proposed Action would not occur. No adverse effects to transportation would occur.	Effects to transportation from constructing projects under the Proposed Action would occur in seven areas within the Apollo/Saturn V Center area in temporary phases over a 15-year construction period. Due to the limited scope and footprint of each improvement project, the amount of construction equipment, construction personnel, and construction time needed is minimal. Therefore, no adverse effects on transportation would occur from construction activities. Since no changes to staffing levels are proposed and the relatively small increase in visitors would continue to access the Apollo/Saturn V Center via buses from the KSC Visitor Complex (VC), no adverse effects on transportation would occur during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in negligible adverse effects to transportation.
Utilities	The Proposed Action would not occur. No adverse effects to utility demand would occur.	Due to the limited scope and footprint of each improvement project and construction occurring over a 15-year period, the overall utility demand for each improvement project is expected to be negligible. Therefore, negligible adverse effects to utility demand would occur from construction activities. Since no changes to staffing levels are proposed and any increase in increased visitors were previously assessed in the 2024 Programmatic EA for the Implementation of a 15-Year Development Plan at the KSC VC and Launch Complex 39 (LC-39) Viewing Gantry, negligible adverse effects on utilities would occur during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in negligible adverse effects to utility demand.

Table ES-1 Summary of Potential Environmental Effects to Resource Areas

Resource Area	No Action	Proposed Action
Air Quality	The Proposed Action would not occur. No new emissions associated with construction or operational activities and no adverse effects to air quality would occur.	Effects to air quality from construction of projects under the Proposed Action would occur in seven areas within the Apollo/Saturn V Center area in temporary phases over a 15-year construction period. During these minor construction activities, temporary emissions from construction equipment, vehicular traffic, and fugitive dust emissions would occur. This would temporarily affect local air quality, with particulate matter being the greatest emission. These emissions would be mitigated using standard best management practices (BMPs) typically used for construction projects, including inspecting and maintaining equipment, turning off idling vehicles and equipment, using new equipment when practicable, and developing and implementing a dust control plan. As such, negligible adverse effects would occur to air quality from construction activities. Following construction, operational-related emissions would continue to occur similar to baseline conditions. As such, negligible adverse effects to air quality would occur during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in minor adverse effects to air quality.
Land Use	The Proposed Action would not occur. No adverse effects to land use would occur.	The Proposed Action would be consistent with the existing and future land use and visual character of the area; therefore, no adverse effect to land use would occur from construction activities or the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in no adverse effects to land use.
Biological Resources	The Proposed Action would not occur. No effects to biological resources would occur.	The Proposed Action is limited in scope, the footprint of each improvement project is small, and the site is already disturbed and an active attraction. As a result, negligible adverse effects to biological resources would occur from construction and operational activities. Combining the Proposed Action with other reasonably foreseeable actions would result in negligible adverse effects to biological resources.
Cultural Resources	The Proposed Action would not occur. No effects to cultural resources would occur.	The Proposed Action has the potential to adversely affect known historic properties during construction activities. Adverse effects would be considered minor. Operational activities would not require disturbance to the historic properties; therefore, no adverse effects on the cultural resources would occur during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions may result in minor adverse effects to cultural resources.

Table ES-1 Summary of Potential Environmental Effects to Resource Areas

Resource Area	No Action	Proposed Action
Geology and Soils	The Proposed Action would not occur. No adverse effects to geologic strata or soils would occur.	Effects to geologic strata and soils would occur as a result of removing vegetation, regrading, and installing footers (specific to the bleacher expansion in Area 7). However, the limited scope would result in negligible adverse effects to geologic strata or soils of the local area or region. Additionally, standard BMPs would be implemented during construction to control stormwater runoff and prevent erosion. Therefore, negligible adverse effects to geologic strata or soils would occur from construction activities. Operational activities would not require the disturbance to the upper soil strata layers; therefore, no adverse effects on the geologic strata or soils of the local area or region would occur during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in no adverse effects to geologic strata or soils.
Noise	The Proposed Action would not occur. No adverse effects from noise would occur.	Ambient noise levels are expected to increase during construction activities; however, noise would be intermittent and temporary and would not exceed any noise thresholds. Additionally, standard BMPs would be implemented to reduce effects from noise exposure to include ensuring all equipment has manufacturer's recommended noise-abatement measures intact, inspecting construction equipment, turning off idling equipment, and performing work during normal business hours. Therefore, negligible to minor adverse effects from noise would occur during construction activities. Following construction, a return to ambient noise levels is expected; therefore, no adverse effects from noise is expected during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in minor adverse effects from noise.

Table ES-1 Summary of Potential Environmental Effects to Resource Areas

Resource Area	No Action	Proposed Action
Water Resources	The Proposed Action would not occur. No adverse effects to water resources would occur.	Project Areas 1 and 2 occur in the Zone AE floodplain; however, no net fill is proposed in Project Area 1, and less than 1 acre (0.40 hectare) of floodplain impact would potentially occur in Project Area 2 for the proposed parking area. If dewatering is required, the contractor would prepare and submit a dewatering plan to the KSC Remediation Program for review and approval. Before installing fencing in Project Area 2 along the Banana River, BMPs would be used to minimize adverse effects. Specific to stormwater generated during construction activities in all areas, St. Johns River Water Management District (SJRWMD) regulations would be followed, and BMPs would be used to reduce non-point source pollution as well as stormwater pollution via pollution prevention. Construction activities would have negligible to minor adverse effects on floodplains, groundwater, and surface water during construction activities. The installation of artificial grass in Project Area 1 would have no impact on stormwater infiltration, and the long-term stormwater from the proposed paving in Project Areas 2, 3, 4, 5, 6, and 7 would be routed to existing stormwater ponds. Therefore, no adverse effects on groundwater and negligible to minor adverse effects on floodplains and surface water would occur from the operational phases of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions would result in negligible to minor adverse effects to groundwater and surface water.
Socioeconomics	The Proposed Action would not occur. No adverse effects to socioeconomics would occur.	The minor and short-term nature of the proposed improvement projects would not result in a long-term impact on the local housing market or local economy. However, a temporary short-term increase in the local workforce may occur, which would have a beneficial impact on the local economy. Therefore, a minor beneficial effect to socioeconomics would occur during construction activities. Since no changes to staffing levels are proposed and any increase in increased visitors were previously assessed in the 2024 Programmatic EA for the Implementation of a 15-Year Development Plan at the KSC VC, and LC-39 Viewing Gantry, negligible effects to socioeconomics would occur during the operational phase of the Proposed Action. Combining the Proposed Action with other reasonably foreseeable actions, the short- and long-term minor beneficial socioeconomic effects are not significant.

As part of the Proposed Action, BMPs would be employed to lessen potential effects by avoiding, minimizing, or reducing/eliminating effects. These BMPs are existing requirements for the Proposed Action; ongoing, regularly occurring practices; and/or not unique to this Proposed Action. In addition to the BMPs, minimization and/or mitigation measures will be implemented to reduce the adverse effects to

wetlands and cultural resources; specifically, the following mitigation measures are incorporated into the Proposed Action:

- Isolated wetland impacts will be mitigated via the purchase of private wetland mitigation credits in accordance with SJRWMD regulations.
- To minimize and/or mitigate potential adverse impacts to cultural resources, the Florida State Historic Preservation Officer and Tribes will be consulted.

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ACRONYMS AND ABBREVIATIONS

µg/m^3	micrograms per cubic meter of air
AADT	Average Annual Daily Traffic
ARPA	Archaeological Resource Protection Act
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice(s)
CCSFS	Cape Canaveral Space Force Station
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Cm	centimeter(s)
CO	carbon monoxide
CRM	Cultural Resources Manager
dB	decibel
dBA	A-weighted decibels
EA	Environmental Assessment
EIS	Environmental Impact Statements
EO	Executive Order
ERP	Environmental Resource Permit
FAC	Florida Administrative Code
FAA	Federal Aviation Administration
FAS	Floridan aquifer system
FC	Federal Candidate
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FE	Federally Endangered
FLUCCS	Florida Land Use, Cover, and Forms Classification System
FMSF	Florida Master Site File
FONSI	Finding of No Significant Impact
FPL	Florida Power & Light
FT	Federally Threatened
FT (S/A)	Federally Threatened Similarity of Appearance
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
IAS	Intermediate Aquifer System
ICRMP	Integrated Cultural Resources Management Plan
IRL	Indian River Lagoon
km	kilometer
km2	square kilometer(s)
KSC	Kennedy Space Center
kV	kilovolt
LC-39	Launch Complex 39
LLF	Launch and Landing Facility
m2	square meter(s)
MINWR	Merritt Island National Wildlife Refuge
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves and Repatriation Act
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMHC	non-methane hydrocarbon
NO2	nitrogen dioxide
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPR	NASA Procedural Requirement
NRHP	National Register of Historic Places
O_3	ozone
ODS	ozone depleting substance
OFW	Outstanding Florida Water
OSHA	Occupational Safety and Health Administration
Pb	lead
PFAS	per- and polyfluoroalkyl substances
PM	particulate matter
PM10	particulate matter 10 micrometers or less in diameter
PM2.5	particulate matter 2.5 micrometers or less in diameter
ppb	parts per billion
ppm	parts per million
RWWTF	Regional Wastewater Treatment Facility
SAS	surficial aquifer system
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SJRWMD	St. Johns River Water Management District
SO_2	sulfur dioxide
SR	State Road
ST	State Threatened
SWPPP	Stormwater Pollution Prevention Plan
USC	US Code
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
VC	Visitor Complex
VOC	volatile organic compounds.
ZAP	Zone of Archaeological Potential

1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The National Aeronautics and Space Administration (NASA) prepared this Environmental Assessment (EA) to evaluate the potential environmental effects from the implementation of various improvement projects at seven areas within the Apollo/Saturn V Center boundaries, which is part of the John F. Kennedy Space Center (KSC) Visitor Complex (VC). The Proposed Action would support NASA's visitor program.

This EA is in accordance with the National Environmental Policy Act (NEPA) of 1969 (Title 42 of the United States Code [USC] Sections 4321–4347), as amended by the Fiscal Responsibility Act of 2023 (Public Law 118-5); NASA Procedures for Implementing NEPA (14 Code of Federal Regulations Part 1216); and NASA Procedural Requirements (NPR) for implementing NEPA (NASA NPR 8580.1).

1.2 LOCATION

KSC is on Merritt Island in Brevard and Volusia Counties, Florida, north-northwest of Cape Canaveral on the Atlantic Ocean, midway between Miami and Jacksonville on Florida's Space Coast, approximately 50 miles (81 kilometers [km]) east of Orlando. It is 34 miles (55 km) long and approximately 6 miles (10 km) wide. The total KSC land and water area jurisdiction is approximately 139,436 acres (56,429 hectares) (NASA 2020).

The Apollo/Saturn V Center is approximately 3.9 miles (6.3 km) west of Launch Complexes 39A and 39B (LC-39A/B) in a restricted area and is only accessible as part of the KSC Bus Tour. The Center is home to the Saturn V, the largest rocket ever flown and used for the Apollo program, as well as various exhibits (Photographs 1 through 3) (KSC Visitor Center 2026).

Photograph 1 Entrance to Saturn V Exhibit Building

Photograph 2 Launch Viewing Bleachers

Photograph 3 East Lawn

1.3 BACKGROUND

NASA's visitor program dates to 1963 when Congressman Olin Teague, then Chairman of the House Subcommittee on Manned Space Flight, asked the NASA Administrator to create a visitor program (NASA 2025a). What started out as a drive-through tour at the (now referred to as) neighboring Cape Canaveral Space Force Station (CCSFS) on Sunday afternoons developed into a 42-acre (17.0 hectares) Visitor Complex offering daily tours in August 1967 (NASA 2025a). The VC includes exhibits, displays, historic spacecraft, space memorabilia, and two IMAX theaters and supports tour buses. In 2023, 72 space

coast launches occurred with over 1.6 million total visitors to the KSC VC (NASA 2024a). Of those visitors, 1.3 million were out-of-state, which contributed to $123.7 million in out-of-state visitor spending (NASA 2024a). A total of 11,144 workers supported Florida spaceport operations in 2023, including 2,021 NASA civil servants, 5,053 NASA contractor employees, 2,768 commercial launch provider employees, 214 other spaceport tenant employees, and 1,088 VC employees; these jobs generated $1.84 billion in labor income (NASA 2024a).

Delaware North Companies Parks & Resorts began managing the KSC VC in May 1995 (Delaware North 2025). The current concession agreement (NNK10OT01C) between NASA and Delaware North began in May 2010. The concession agreement provides Delaware North with preferential rights to conduct revenue-producing concession activities associated with the KSC Public Visitor Program with the intent to showcase space exploration to the general public.

1.4 PURPOSE AND NEED

The Proposed Action is to implement various improvement projects at seven areas within the Apollo/ Saturn V Center boundaries (Figure 1-1 and 1-2). These improvement projects would enhance the visitor experience by accommodating a projected 2,000 to 3,000 additional visitors annually to the Apollo/ Saturn V Center and improving employee safety by reducing wildlife exposure at the existing employee parking areas. The Proposed Action is needed to provide employees and visitors with safe and continued access to NASA's history and launch viewing areas consistent with the KSC Master Plan and existing concession agreement (NNK10OT01C) between Delaware North and KSC.

1.5 PUBLIC AND STAKEHOLDER INVOLVEMENT

The EA and Finding of No Significant Impact will be available on the KSC public website (https://public.ksc.nasa.gov/environmental/nepa-documents/).

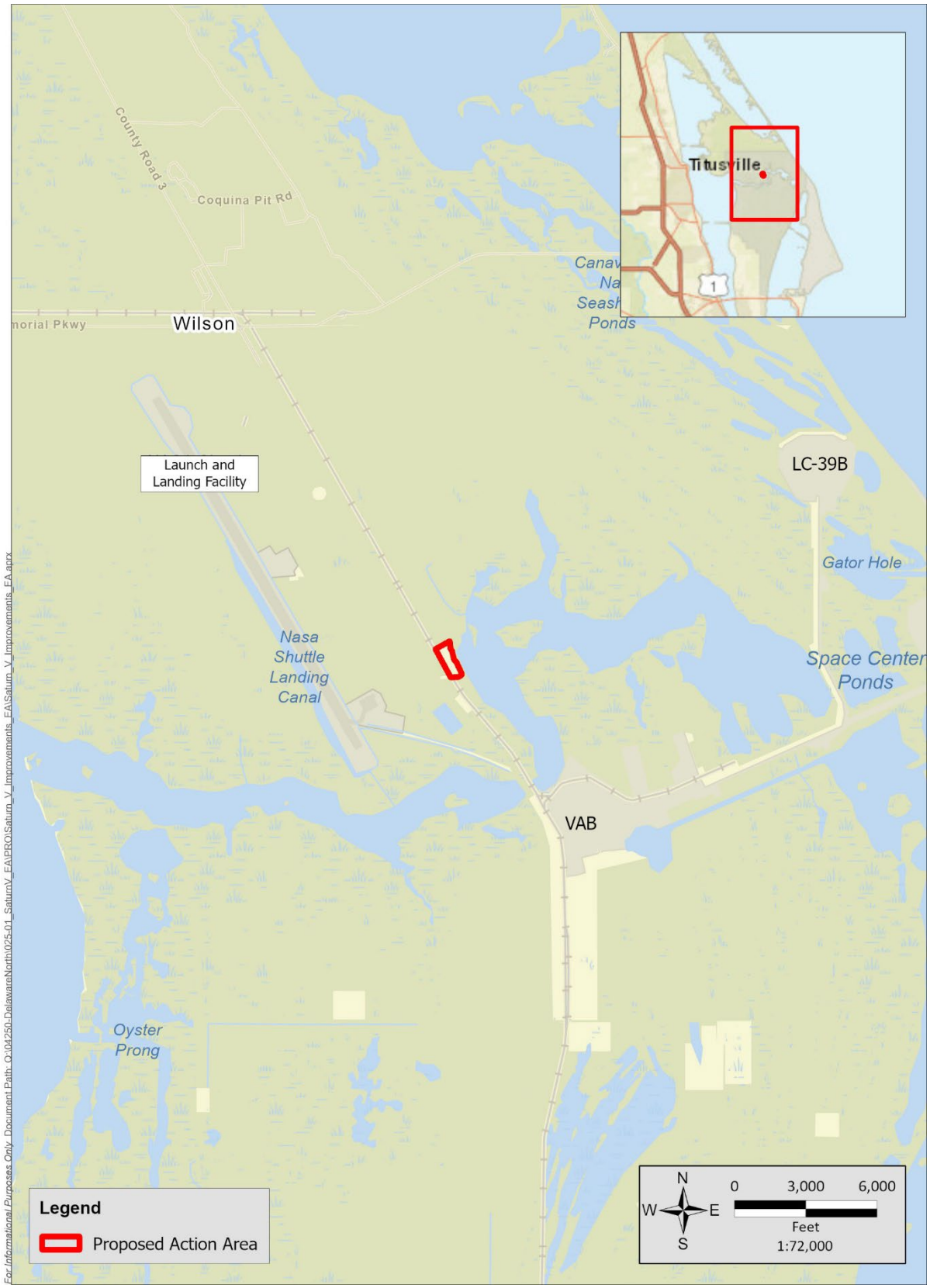

Figure 1-1 Regional Location Map

Figure 1-2 Proposed Action Aerial Map

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2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action would implement the following improvement projects within the Apollo/Saturn V Center boundaries (Figure 2-1):

- **Project Area 1**: Install artificial grass, remove trees on the north end, expand the existing permanent bleachers, and install a concrete pad for food truck use. These improvements would address persistent safety issues with visitor exposure to fire ants and localized destruction of surface areas due to wild hogs uprooting the landscape.
- **Project Area 2**: Install fencing along the Banana River to Astronaut Road, pave the dirt plot near the existing circular drive where dumpsters and cars are located, and possibly install solar streetlamps on the south side of the road for launch parking safety. This additional fencing would prevent wildlife from entering the work area and creating employee safety risks
- **Project Area 3**: Increase employee parking spaces on the west side of the circular drive at the north end of the site or along the south side of Astronaut Road and install solar streetlamps along Astronaut Road. These improvements would enhance the employee experience and increase safety during nighttime launch preparations. The developed area would include the upland wooded area between the building and dirt road.
- **Project Area 4**: Expand the existing retail storage area and small concrete pad.
- **Project Area 5**: Install a concrete walkway approximately 4 feet (1.2 meters) wide for emergency egress. This improvement would include clearing and grading a small upland area in Area 5 west to the dirt road adjacent to the railroad track.
- **Project Area 6:** Relocate the existing food concession area to the south end of the bleachers next to the existing restrooms to enhance the visitor experience.
- **Project Area 7**: Expand the viewing area by constructing a grandstand area consisting of box seats at the top of the existing bleachers.

Specific to timing, the improvement projects would be executed in three phases. Under the Proposed Action, the following projects would be implemented in three phases as follows:

- Phase 1 (Year 1–5 Projects),
- Phase 2 (Year 6–10 Projects), and
- Phase 3 (Year 11–15 Projects).

Table 2-1 summarizes these projects by phase. Phase 1 would begin in Winter 2026/2027.

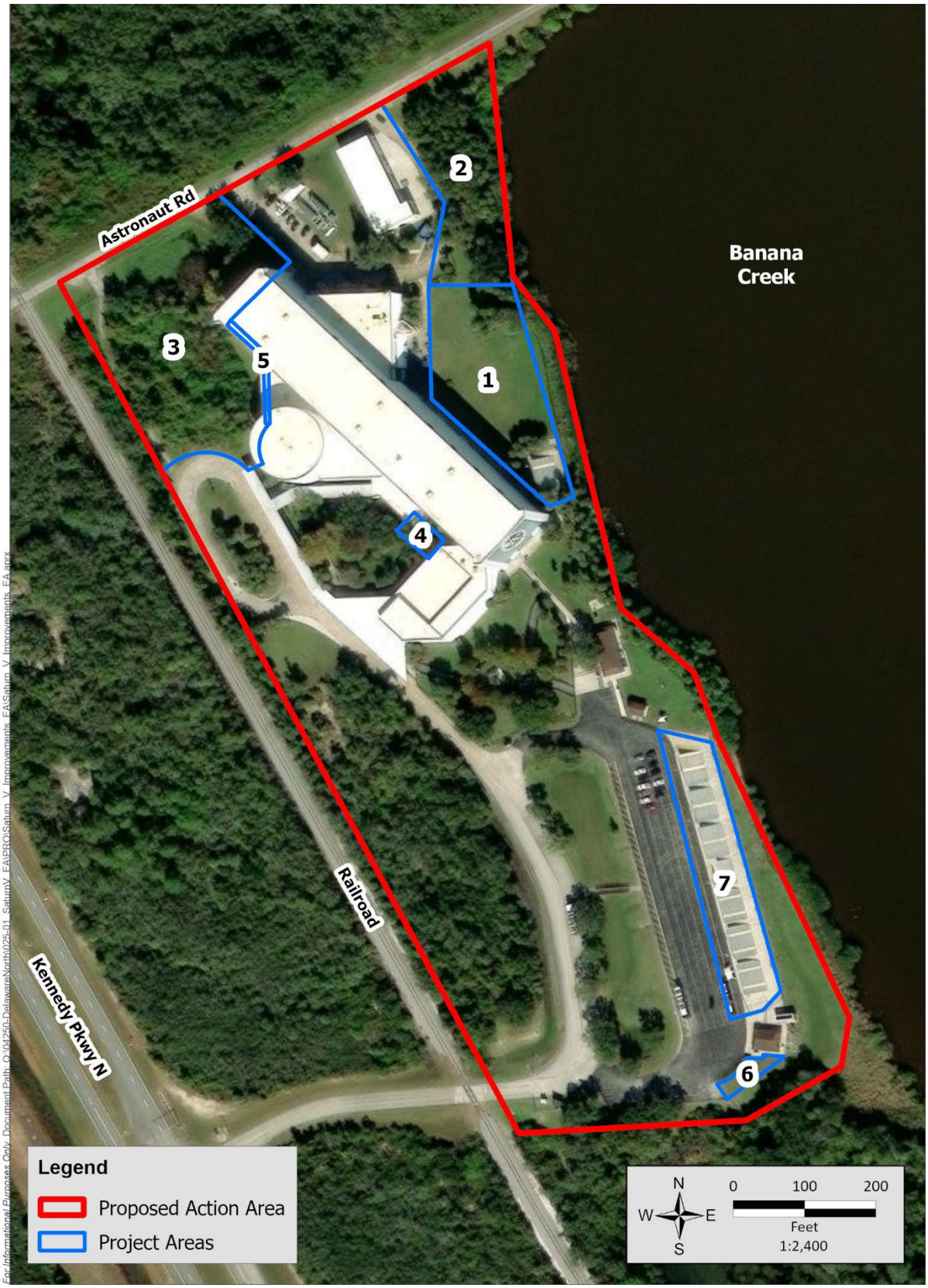

Figure 2-1 Proposed Action Project Improvements Location Map

Table 2-1 Summary of Proposed Projects by Phase

Project Phase	Area	Description of Project	Project Area (acres [hectares])
1	2	Install fencing along the Banana River to Astronaut Road, pave the dirt plot near the existing circular drive where dumpsters and cars are located, and install solar streetlamps on the south side of the road.	0.64 (0.26)
1	4	Expand the existing retail storage area and small concrete pad.	0.05 (0.02)
1	5	Install a concrete walkway approximately 4 feet (1.2 meters) wide for emergency egress.	0.03 (0.01)
1	6	Relocate the existing food concession area to the south end of the bleachers next to the existing restrooms.	0.05 (0.02)
2	1	Install artificial grass, remove trees on the north end, expand the existing permanent bleachers, and install a concrete pad for food truck use.	0.85 (0.34)
2	7	Expand the viewing area by constructing a grandstand area consisting of box seats at the top of the existing bleachers.	0.67 (0.27)
3	3	Increase employee parking spaces on the west side of the circular drive in the upland wooded area between the building and dirt road and install solar streetlamps along Astronaut Road.	1.68 (0.68)
		TOTAL=	**3.97 (1.61)**

Major elements of the Proposed Action would include the following:

- Construction staging areas (i.e. laydown areas for the temporary storage of equipment and supplies) have not been identified in the preliminary design documents; however, staging areas would occur on previously disturbed concrete, gravel, or grassy areas.
- Clean, unstained, unpainted concrete from demolition activities would be transported to the Diverted Aggregate Reclamation and Collection Yard. All other concrete would be sampled and based on the results transported to the Diverted Aggregate Reclamation and Collection Yard for reuse or the local construction and demolition debris landfill that is appropriate for receiving these materials. No burning of piles of vegetation would occur, and all refuse would be disposed of in accordance with KSC regulations.
- Any activities that would require dewatering would be coordinated with the KSC Remediation Program Manager.
- A KSC Excavation Permit would be obtained before any digging.
- Construction workers would arrive at the Apollo/Saturn V Center area via buses, work trucks, or personal vehicles. Parking for these workers would be provided at the construction laydown area.
- Construction activities would occur during regular business hours. However, certain construction activities, such as concrete placement, may extend beyond these hours to accomplish activities that must be performed without interruption until completed. Most work is expected to occur during daylight, and no artificial lighting is expected to be needed; however, the use of artificial lighting, if needed, would comply with the US Fish and Wildlife Service (USFWS) Biological Opinion for artificial lighting (FWS Log No. 04EF1000-2016-F-0083) and Lighting Operations Plan for KSC (KSC-PLN-1210 REV A).
- Typical construction equipment would include milling machines, excavators, bulldozers, graders, asphalt pavers, material transfer vehicles, compactors/rollers, water trucks, dump trucks, forklifts, scrapers, trenchers, line-up trucks, and pickup trucks.

- The Proposed Action would incorporate site-specific health and safety requirements for construction workers in accordance with Occupational Safety and Health Administration (OSHA) regulations.
- Construction activities would be conducted in accordance with federal and state permits and applicable environmental regulations.
- The Proposed Action would comply with the USFWS Biological Opinion for artificial lighting to mitigate impacts on nesting and hatchling sea turtles. Specifically, all facilities at KSC will use amber LED that meet USFWS specifications, or exterior lights off between 9:00 PM and dawn from May 1 through October 31, except where essential to support launch-related activities at active launch complexes.
- The proposed projects would comply with existing St. Johns River Water Management District (SJRWMD) permit(s), which would account for changes in grading and runoff coefficient modifications to the project areas under the Proposed Action. Further, since the areal extent of construction activities proposed would be less than 5 acres (2.0 hectares), a National Pollutant Discharge Elimination System (NPDES) permit for construction is not required.

2.2 ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

NEPA, as amended by the Fiscal Responsibility Act of 2023 (Public Law 118-5), requires, "a reasonable range of alternatives to the proposed agency action, including an analysis of any negative environmental impacts of not implementing the proposed agency action in the case of a no action alternative, that are technically and economically feasible, and meet the purpose and need of the proposal." Potential alternatives that are technically and economically feasible and meet the purpose and need of the Proposed Action were evaluated against the following screening factors:

- Location: Improvements are limited to the Apollo/Saturn V Center footprint to maintain consistency with the KSC Master Plan and existing concession agreement between Delaware North and KSC.
- Visitor Enhancement and Employee Safety: Improvements are intended to enhance the visitor experience and employee safety within the Apollo/Saturn V Center boundary. Therefore, any alternative to the Apollo/Saturn V Center improvements must occur within the boundaries due to operation and safety restrictions, as well as to maintain consistency with the KSC Master Plan and existing concession agreement between Delaware North and KSC.
- Minimize or Avoid Unnecessary Adverse Environmental and Cultural Effects: Any alternative that would meet the Proposed Action's purpose and need but result in adverse environmental or cultural effects that could otherwise be avoided or minimized was not carried forward for detailed analysis. This criterion is consistent with NASA's environmental stewardship commitments and reduces unnecessary mitigation and monitoring expenses.

In developing a reasonable range of alternatives to the Proposed Action that are technically and economically feasible that meet the purpose and need for the Proposed Action, the Proposed Action Alternative along with the No Action Alternative were identified.

2.2.1 Proposed Action

The Proposed Action is to implement the improvement projects as described in Section 2.1, Proposed Action. Figure 2-1 depicts the project locations.

2.2.2 No Action Alternative

Under the No Action Alternative, KSC would not implement the proposed Apollo/Saturn V improvements. As a result, Delaware North would not be able to achieve its goals and objectives of enhancing the visitor experience, accommodating the expected additional visitors associated with future launches or improving employee safety by reducing wildlife exposure.

The No Action Alternative would not meet the purpose and need for the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis and is used to analyze the consequences of not undertaking the Proposed Action. The No Action Alternative establishes a comparative baseline for analysis.

2.3 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ANALYSIS

No other alternatives were identified that were considered technically and economically feasible, met the purpose and need of the Proposed Action, and satisfied the screening factors presented in Section 2.2.

2.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The Executive Summary summarizes the potential effects to each resource area analyzed in this EA. Based on the analysis presented, no significant environmental effects would result from implementing the Proposed Action or the No Action Alternative.

2.5 BEST MANAGEMENT PRACTICES INCLUDED IN THE PROPOSED ACTION

This section presents an overview of the best management practices (BMPs) that are incorporated into the Proposed Action. BMPs are existing policies, practices, and measures included during the planning and construction phases to reduce the environmental effects of designated activities, functions, or processes.

Although BMPs lessen potential effects by avoiding, minimizing, or reducing/eliminating effects, BMPs are distinguished from formal mitigation measures because BMPs are (1) existing requirements for the Proposed Action; (2) ongoing, regularly occurring practices; and/or (3) not unique to this Proposed Action. That is, the BMPs identified in this EA are inherently part of the Proposed Action and are not potential mitigation measures proposed as a function of the NEPA environmental review process for the Proposed Action. Table 2-2 lists the BMPs.

Table 2-2 Best Management Practices

BMP	Description	Effects Reduced/Avoided
Stormwater Pollution Prevention Plan	Identifies how the contractor will implement procedures and practices to ensure compliance with the Installation's stormwater pollution prevention plan (SWPPP) permit during construction activities. This Plan also includes an Erosion and Sediment Control Plan to eliminate and/or minimize non-point-source pollution in surface waters, as well as a Stormwater Management Plan to reduce discharge of pollutants to storm drainage systems.	Reduces stormwater pollution.
Hazardous Materials Management Plan	Identifies how the contractor will safely transport, store, and dispose of hazardous materials. In addition, the plan will describe how spills will be controlled, personnel will be trained, and equipment maintained.	Reduces effects from hazardous materials.
Hazardous Waste Management Plan	Identifies how the contractor will minimize the generation of hazardous waste; control any spills; train personnel; and transport, store, use, handle, and dispose of hazardous waste.	Reduces generation of hazardous waste.
Coordination with KSC Remediation Program Manager Before Dewatering/ Construction Activities	Per- and polyfluoroalkyl substances (PFAS) are long-lasting chemicals found in water, air, fish, and soil. On April 19, 2024, the US Environmental Protection Agency (EPA) announced that it was designating two of the most widely used PFAS's, along with their salts and structural isomers, as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Although whether these two hazardous substances, including their salts and structural isomers, are present in surface and ground waters is not known, coordination with the KSC Remediation Program Manager will continue throughout all phases of construction to ensure compliance with all applicable regulations.	Reduces potential PFAS migration in groundwater and surface water and protects public health.
Spill Prevention Control and Countermeasures Plan	Identifies how the contractor will protect water bodies; minimize risks of spills, leaks, and releases; respond to spills, leaks, or releases; and minimize risk of human exposure to contaminated media.	Reduces effects from potentially hazardous materials.
Noise Abatement	Requires the contractor to ensure that all equipment has the manufacturer's recommended noise-abatement measures intact, inspect construction equipment, turn off idling equipment when not in use, and perform work only during normal business hours.	Reduces effects from noise exposure.
Air Quality	Requires the contractor to inspect and maintain equipment, turn off idling vehicles and equipment to reduce emissions, and use new equipment when practicable that meets the most stringent applicable federal standards.	Reduces adverse effects to air quality.

Table 2-2 Best Management Practices

BMP	Description	Effects Reduced/Avoided
Dust Control Plan	Identifies the actions that will reduce the potential for construction activities to generate dust. BMPs are project-specific but can include sprinkling the ground surface with water, using vegetative covers, mulching recently disturbed areas, using wind breaks, deep tilling, using stone to replace vegetation, and using chemical soil treatments.	Reduces effects from airborne dust.
Health and Safety Plan	29 Code of Federal Regulations (CFR) Part 1910, *Occupational Safety and Health Standards*, and 29 CFR Part 1926, *Safety and Health Regulations for Construction*, require employees and their supervisors to be trained in the specific hazards and control measures associated with their assigned tasks. The contractor will be required to prepare and implement a site-specific health and safety plan to document compliance with OSHA regulations to include but not limited to management commitment and employee involvement, site characterization and job hazard analysis, hazard prevention and control, safety and health training, personal protective equipment, medical surveillance, exposure monitoring, emergency response, and recordkeeping and program evaluation. In addition to site-specific information, the job hazard analysis will include items related to construction-related noise, asbestos-containing materials, lead-based paint, polychlorinated biphenyls, and mercury-containing light bulbs.	Reduces potential risks associated with health and safety.
Wetland-Specific	Identifies the actions that will protect wetlands and the functions they provide. The BMPs are improvement-specific and based on land use, vegetation, topography, hydrology, and habitat requirements.	Reduces adverse effects to wetlands and the functions they provide.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental resources and baseline conditions at KSC that could potentially be affected by implementing the Proposed Action and analyzes the potential direct and indirect effects.

Changes to the natural and human environment that could result from the Proposed Action are evaluated relative to the existing environmental conditions. The following five levels of potential effects were identified:

- None – No effect.
- Negligible – The effect is barely perceptible or measurable, remains confined to a single location, and would not result in a sustained recovery time for the resource affected.
- Minor – The effect is readily perceptible and measurable; however, the effect may be temporary, and the resource should recover in a relatively short period.
- Moderate – The effect is perceptible and measurable, and may not remain localized, affecting areas adjacent to the Proposed Action area; adverse effects to a resource may require several years to recover.
- Major – The effect meets the intensity/context significance criteria for the specified resource.

The potential effects to the following resource areas from implementing the Proposed Action would be negligible and are not carried forward for analysis in this EA:

- **Public Health and Safety:** Activities associated with the Proposed Action would include minor construction projects occurring within the Apollo/Saturn V Center boundaries. Negligible effects to public health and safety are expected as KSC would prohibit unauthorized access to the construction areas using appropriate signage to the affected areas. In addition, all construction activities would be performed by qualified personnel who would be required to adhere to federal and state regulations, standard operating procedures, and BMPs. As a result, implementing the Proposed Action would result in negligible effects to public health and safety.
- **Hazardous Materials and Hazardous Waste:** The Proposed Action area is within Potential Release Location #178, Launch Viewing Area, Banana Creek; however, this area has been deemed a No Further Action site. Additionally, most of the Apollo/Saturn V Center is in Solid Waste Management Unit #114, Former Shuttle Landing Facility Area, which has Land Use Controls to prevent contact with groundwater that may be potentially contaminated by PFAS; this is addressed in Section 3.9, Water Resources. Specific to hazardous materials and/or waste used or generated during construction activities, the BMPs listed in Table 2-2 would reduce the effects specific to safe transport, storage, and disposal of hazardous materials and waste; control any spills; minimize the generation of hazardous waste; and meet training requirements. In addition, contractors would be required to provide documentation indicating how hazardous materials would be safely transported, stored, and disposed of and how the contractors would minimize the generation of hazardous waste. Further, the contractors would take actions to minimize the effects from liquid products that could enter water bodies or contaminate soils. Specific to Delaware North, this organization is responsible for developing and maintaining general and site-specific procedures for their operations at the Apollo/Saturn V Center to promote consistency, minimize risk, and ensure compliance with regulatory requirements. As a result, implementing the Proposed Action would result in negligible effects to hazardous materials and hazardous waste.

Resource categories analyzed in this EA are transportation, utilities, air quality, land use, biological resources, cultural resources, geology and soils, noise, water resources, and socioeconomics. Discussion

and analysis of the affected environment (i.e., existing conditions) is commensurate with the expected level of potential environmental effect.

In addition to potential effects from the Proposed Action, this chapter also describes potential effects from reasonably foreseeable actions. In *Seven County Infrastructure Coalition v. Eagle County* (2025), the US Supreme Court majority opinion stated, "NEPA calls for the agency to focus on the environmental effects of the project itself, not on the potential environmental effects of future or geographically separate projects." Consistent with that opinion, only interrelated actions sufficiently likely to occur in close temporal and proximal location to the Apollo/Saturn V Center are considered. The timeframe centers on the timing of the Proposed Action; although the timeline is not finalized, the Proposed Action is expected to take place in phases over approximately 15 years as presented in Table 2-1, beginning in Winter 2026/2027. The study area includes respective resource areas described in each section in this chapter. Documents used to identify other possible actions that may occur over the 15-year timeframe of this Proposed Action include notices of intent for Environmental Impact Statements (EISs) and EAs, management plans, land use plans, and other planning-related studies or publications.

3.1 TRANSPORTATION

3.1.1 Definition of the Resource

Transportation refers to the means in which people and goods move to and from an area. For this EA, transportation is limited to regional transportation networks and local roads and bridges.

3.1.2 Existing Conditions

The existing road and bridge network serves all facilities and operations on KSC and CCSFS. KSC has 1.5 million square yards (1.3 square kilometers [km^2]) of parking areas, 2.8 million square yards (2.3 km^2) of roads, six major automotive bridges, and one railroad bridge that serve KSC and CCSFS. KSC is served by over 564 miles (907.7 km) of roadways that include 184 miles (296.1 km) of paved roads and 380 miles (611.6 km) of unpaved roads, trails, and access roads (NASA 2022).

Rail service to the Cocoa-Titusville area is provided by the Florida East Coast Railway, which is commonly referred to as the "FEC Railway." Approximately 40 miles (64.4 km) of track currently meet KSC and CCSFS logistical and operational requirements. Sidings are provided in the KSC Industrial Area, VAB area, LC-39A area, and LC-39B area. A rail spur at the Launch and Landing Facility (LLF) provides a rail connection for current and future operations at the LLF if needed by commercial customers.

The KSC VC is on Space Commerce Way, off NASA Parkway West, just before the KSC entrance. Of the four access roads onto KSC, NASA Parkway West serves as the primary access road for cargo, tourists, and personnel entering and leaving. This four-lane road originates in Titusville as State Road (SR) 405 and crosses the Indian River Lagoon (IRL) onto KSC. The second point of entry onto KSC is from the south via Kennedy Parkway South, which originates on north Merritt Island as SR 3 (North Courtenay Parkway). This road is the major north-south artery for KSC. The third entry point is accessible from Titusville along SR 402/A, Max Brewer Memorial Parkway, which intersects Kennedy Parkway North. The fourth entry point is south of Oak Hill at the intersection of US Highway 1 and Kennedy Parkway North in Volusia County. Additionally, the KSC VC can be accessed from CCSFS via NASA Parkway East and Samuel C. Phillips Parkway.

Specific to the Apollo/Saturn V Center, visitors are only able to access this area from buses originating at the KSC VC; visitors are prohibited from accessing the Apollo/Saturn V Center directly using private/personal vehicles.

Table 3-1 lists the average annual daily traffic (AADT) volumes, which reflect the total volume of traffic for a year divided by the total number of days per year.

Table 3-1 Average Annual Daily Traffic Counts by Road Segment

Road Segment	Average Annual Daily Traffic					
	2019	2020	2021	2022	2023	2024
Space Commerce Way between NASA Parkway West and Kennedy Parkway South	3,600	2,800	2,800	4,600	4,800	4,900
NASA Parkway W. between South Washington Avenue and Space Commerce Way	11,800	11,500	11,500	9,200	9,400	17,500
N. Courtenay Parkway between Space Commerce Way and Judson Road	14,800	14,400	14,400	14,100	14,500	14,700
N. Courtenay Parkway between Judson Road and Hall Road	14,800	14,400	14,400	14,100	14,500	14,700

Source: Florida Department of Transportation (FDOT) 2025a.

3.1.3 Environmental Consequences

3.1.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and **no adverse effects** to transportation would occur.

3.1.3.2 Proposed Action

Construction Effects

Due to the limited scope and footprint of each improvement project, the amount of construction equipment, construction personnel, and construction time needed is minimal relative to typical major construction projects at KSC. For each improvement project, construction workers would arrive at the Apollo/Saturn V Center via buses, work trucks, or personal vehicles and park at the identified construction laydown area(s). Although the construction laydown areas have not been identified in the preliminary design documents, staging areas would be on previously disturbed concrete, gravel, or grassy areas within the VC and Apollo/Saturn V Center boundaries. The increase in construction-related vehicles would be temporary and occur during normal working hours. Therefore, during the Proposed Action construction activities, **no adverse effects** on transportation would occur during the construction phase of the Proposed Action.

Operational Effects

Under the Proposed Action, the enhancement projects would provide employees and visitors with safe and continued access to the Apollo/Saturn V Center. No changes to staffing levels are proposed, and visitors would continue to access the Apollo/Saturn V Center via a bus from the KSC. Since unbadged visitors are not permitted to drive personal vehicles on the installation and no change to staffing levels is proposed, the proposed Apollo/Saturn V Center improvements are not expected to adversely affect the level of service of public roadways accessing the KSC VC. Under the Proposed Action, relatively small increase in bus traffic is expected to transport the estimated 2,000 to 3,000 additional visitors annually to the Apollo/Saturn V Center. The potential effects to internal transportation functions within KSC as a result of increased visitors and bus trips to the Apollo/Saturn V Center were previously assessed in the 2024 Programmatic EA for the Implementation of a 15-Year Development Plan at the KSC VC and LC-39 Viewing Gantry, which determined no adverse effects on transportation. Therefore, **no adverse effects** on transportation would occur during the operational phase of the Proposed Action.

3.1.3.3 Other Reasonably Foreseeable Effects

Table 3-2 summarizes reasonably foreseeable actions. The NASA Causeway Bridge and Widening of Space Commerce Way projects were recently completed, and infrastructure development at LC-39A based on the 2019 EA is underway with launches ongoing. The increase in vehicles during construction activities would be temporary and expected to occur during normal business hours; however, the widening of Space Commerce Way is completed and would accommodate the temporary increase in construction-related traffic.

Table 3-2 Reasonably Foreseeable Actions

Reasonably Foreseeable Project	Geographic and Temporal Overlap	Project Description and Reasonably Foreseeable Effects
NASA Causeway Bridge	The NASA Causeway Bridge, which is over the Indian River, is the primary access point for employees and visitors to KSC.	The eastbound bridge was opened to the public on June 9, 2023, and the westbound bridge was opened to the public in March 2025. The bridge spans 4,025 feet (1,230 meters) over the Indian River Lagoon and rises 65 feet (20 meters) above the water. The eastbound span is 51 feet wide (15.5 meters), and the westbound span is 40 feet wide (12 meters). This project improved infrastructure with clearance for waterway traffic and wide shoulders to accommodate payload size and number.
Widening of Space Commerce Way (2023–2025)	The KSC VC is on Space Commerce Way, off NASA Parkway West, just before the KSC entrance.	Approximately 2.7 miles (4.3 km) of Space Commerce Way, between NASA Parkway West to Kennedy Parkway Space Commerce Way, was widened from two lanes to four lanes. This project reduces congestion, improves safety for visitors to the KSC VC, accommodates heavy and wide loads, supports future growth, and upgrades drainage to prevent flooding during heavy rains.
SpaceX Falcon 9 and Falcon Heavy Launch Vehicles at LC-39A	The Apollo/Saturn V Center is approximately 3.9 miles (6.3 km) west of LC-39 and provides an opportunity to view LC-39 launches.	SpaceX is currently operating Falcon 9 and Falcon Heavy launch vehicles at LC-39A. An EA is being prepared to assess the effects associated with increasing the Falcon launch cadence from 20 to 36 times annually, as well as the construction and operation of landing zones at LC-39A. That EA will include a comprehensive assessment of reasonably foreseeable effects.
SpaceX Starship-Super Heavy Booster at LC-39A	The Apollo/Saturn V Center is approximately 3.9 miles (6.3 km) west of LC-39 and provides an opportunity to view LC-39 launches.	An EIS was developed for launch and landing operations of the SpaceX Starship and Super Heavy Booster at LC-39A. Up to 44 Starship/Super Heavy launches and 88 landings (44 for each stage) would occur per year. The EIS includes a comprehensive assessment of reasonably foreseeable effects. The Record of Decision was signed on January 29, 2026.

Sources: FDOT 2025b, FDOT 2025c, FDOT 2025d, FDOT 2025e, FAA 2026a, FAA 2026b, NASA 2019a, and NASA 2019b.

Any long-term increase in vehicles from operation of the Proposed Action were previously evaluated in the KSC VC 15-Year Development Plan PEA and Space Commerce District Area Development Plan EA.

Future development projects may trigger transportation improvements such as signalization, turn lanes, or signage; however, any project that modifies the roadway would require permitting through FDOT and compliance with FDOT's design and construction requirements. In addition, the widening of Space Commerce Way and completion of the NASA Causeway Bridge would improve infrastructure and reduce congestion. As a result, **negligible adverse effects** to transportation would occur when combined with other reasonably foreseeable actions.

3.2 UTILITIES

3.2.1 Definition of the Resource

Utilities include wastewater, potable water, power, and communications. Under the Proposed Action, negligible impacts to utilities would occur during construction.

3.2.2 Existing Conditions

3.2.2.1 Wastewater

Sanitary sewer service at KSC is provided by a wastewater collection and transmission system that is separated into two primary areas – one in the Industrial Area and one in the Vehicle Assembly Building area. The combined flows are pumped through a force main across the Banana River to the CCSFS Regional Wastewater Treatment Facility (RWWTF), which operates under Florida Department of Environmental Protection (FDEP) Permit No. FL0020541-015-DW1P. KSC has on-site wastewater system components including gravity sewers, manholes, lift stations, and force mains serving the KSC facilities. These wastewater system elements are part of KSC's greater Industrial Area system. The KSC wastewater system and the downstream CCSFS RWWTF are approaching capacity limits due to current flows and ongoing development at KSC but are being addressed.

3.2.2.2 Potable Water

KSC's potable water is supplied by the City of Cocoa, which obtains its water from artesian wells west of the St. Johns River in Orange County as well as the Taylor Creek Reservoir. Water enters KSC along SR 3 from a 24-inch (60-centimeter [cm]) diameter water main that extends north along Kennedy Parkway South to serve KSC. The average daily demand for water is 700,000 gallons per day (2.6 million liters per day). Various aboveground storage tanks and secondary pump systems supply water throughout KSC. The VC and LC-39 Viewing Gantry use approximately 36,000 and 114 gallons per day, respectively (136,275 and 432 liters per day, respectively) (April 17, 2024, email from G. Parrish, Delaware North Environmental Manager).

The KSC water distribution system recently underwent a major, multi-year, multi-phase upgrading that ensures sufficient domestic water and fire flow to most areas of KSC. Certain parts of the system, including the former Shuttle Landing Facility and KSC VC, have more localized capacity limitations that are being addressed by ongoing projects.

3.2.2.3 Power

The electric power distribution system at KSC is provided by Florida Power & Light Company (FPL), which transmits 115 kilovolts (kV) to KSC through two major substations – the C-5 substation that serves the LC-39 area, providing 13.8 kV, and the Orsino substation that serves the Industrial Area, providing 13.2 kV. From 2014 through 2019, electricity usage on KSC ranged between 102,832 (2019) and 187,793 (2014) megawatt-hours. Electricity consistently provides 91 percent of KSC's total energy. The high-voltage power is distributed from the substations by over 270 miles (434.5 km) of overhead and underground power lines to transformers and substations at various facilities. In late 2016, FPL installed a

new Mars substation along Space Commerce Way to serve commercial aerospace customers along Space Commerce Way, Space Florida facilities in Exploration Park I, and the VC. In addition, FPL constructed a solar farm south of Jerome Road on Kennedy Parkway South in 2010, constructed an approximately 500-acre (202.3-hectare) solar farm north of the VC in 2020, and recently completed construction of the Saturn substation on the south side of the C-5 substation in 2024.

3.2.2.4 Communications

The KSC communications system provides a variety of services at KSC including (1) conventional telephone service, (2) transmission of large volumes of test data to central collection or reduction stations, (3) transmission of timing information from operation centers to data-gathering instrumentation at widely scattered locations, (4) transmission of weather and range safety data, and (5) communication with satellites and other hardware in space. The major segments are three distribution and switching stations in the Industrial Area (First Switch) and the LC-39 area (Second and Third Switches).

3.2.3 Environmental Consequences

3.2.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and **no adverse effects** to utility demand would occur.

3.2.3.2 Proposed Action

Construction Effects

Construction is expected to occur over a 15-year period as identified in Table 2-1. During construction, negligible effects to utility demand are expected since the improvement projects are predicted to be short in duration, would be spread across a 15-year period and would not result in service interruptions. Therefore, **negligible adverse effects** would occur to utility demand from construction activities.

Operational Effects

Under the Proposed Action, the enhancement projects would provide employees and visitors with safe and continued access to the Apollo/Saturn V Center. Following construction, a relatively small increase in utility demand would occur associated with the estimated 2,000 to 3,000 additional visitors annually to the Apollo/Saturn V Center; however, the operational-related utility demand would be negligible based on findings in the 2024 Programmatic EA for the Implementation of a 15-Year Development Plan at the KSC VC and LC-39 Viewing Gantry. Specifically, the 2024 Programmatic EA assessed impacts from the potential doubling of visitor attendance and full-time staff through 2038 (i.e., 1.7 million staff and visitors in 2023 to a projected 3.3 million staff and visitors in 2038) on wastewater, potable water, power, and communications. The Proposed Action analyzed in this EA is smaller in scope supporting a **negligible adverse effects** conclusion to utility demand during the operational phase of the Proposed Action.

3.2.3.3 Other Reasonably Foreseeable Effects

The reasonably foreseeable actions summarized in Table 3-2 apply to utilities. The construction activities associated with the Proposed Action would be temporary, occurring during normal business hours, and would not result in service disruption. Any long-term increase in utility demand from population increases were previously evaluated in the KSC VC 15-Year Development Plan PEA and Space Commerce District Area Development Plan EA and subject of recent studies and upgrades. Additionally, the increased water use associated with operations at LC-39A would be minimal, and SpaceX would construct on-site bulk storage for water and commodities and would reuse or recycle as appropriate. Therefore, **negligible adverse effects** to utility demand would occur when combined with other reasonably foreseeable actions.

3.3 AIR QUALITY

3.3.1 Definition of the Resource

Air quality at KSC is regulated under federal Clean Air Act regulations (Title 40 Code of Federal Regulations [CFR] Parts 50 through 99) and Florida Administrative Code (FAC) Chapters 62-200 through 62-299. USEPA, under the authority of the Clean Air Act, as amended, has established nationwide air quality standards known as the National Ambient Air Quality Standards (NAAQS). The NAAQS represent the maximum allowable atmospheric concentrations of health-based criteria and are referred to as "criteria pollutants." These criteria pollutants include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), particulate matter 10 micrometers or less in diameter (PM_{10}), and particulate matter 2.5 micrometers or less in diameter ($PM_{2.5}$). The NAAQS are further broken into two categories, the National Primary Standards and the National Secondary Standards. The Primary NAAQS provide public health protection for the health of "sensitive" populations such as the elderly, children, and persons with asthma. The Secondary NAAQS provides general public welfare protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 3-3 lists the NAAQS.

Table 3-3 Federal National Ambient Air Quality Standards

Pollutant	Average Time	Federal Primary NAAQS	Federal Secondary NAAQS
CO	8-hour	9 ppm	N/A
	1-hour	35 ppm	N/A
Pb	Rolling 3-month Average	0.15 µg/m^3	0.15 µg/m^3
NO_2	1-hour	100 ppb	N/A
	Annual	53 ppb	53 ppb
O_3	8-hour	0.07 ppm	0.07 ppm
$PM_{2.5}$	Annual	9 µg/m^3	15 µg/m^3
	24-hour	35 µg/m^3	35 µg/m^3
PM_{10}	24-hour	150 µg/m^3	150 µg/m^3
SO_2	1-hour	75 ppb	N/A
	Annual	N/A	10 ppb

Notes: CO = carbon monoxide; N/A = not applicable; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter; PM_{10} = particulate matter 10 micrometers or less in diameter; SO_2 = sulfur dioxide; ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter of air.

Source: USEPA 2025a.

Florida has a statewide network of air-quality monitoring. This network helps manage air quality throughout the state with a focus on those areas where ambient air quality standards are at risk of being violated and areas where the ambient standards are being met but are at risk due to potential growth in the populations of those areas or industrial growth. Regional air quality in Florida is assessed at the county level; Brevard County is designated as "in attainment" with the NAAQS. The term "in attainment" refers to areas with concentrations of criteria pollutants that are below the levels established by the NAAQS. If the concentration of one or more criteria pollutant in an area exceeds the levels established by the NAAQS, the area may be classified as a "non-attainment" area. Since Brevard County is in attainment for all regulated criteria pollutants, no conformity determination is required for the Proposed Action.

3.3.2 Existing Conditions

KSC is a major source of air emissions and holds a Title V Air Operations Permit (FDEP 2025a). Table 3-4 summarizes KSC's air emissions for 2018–2022, which represents the most current publicly available data.

Table 3-4 History of Actual Annual Emissions (Tons per Year) at KSC

Pollutant	Year				
	2024	2023	2022	2021	2020
CO	1.868672	1.813717	2.200286	1.129406	0.987893
NMHC	1.064802	1.15608	1.198005	0.157797	0.097303
NO_X	6.800351	5.831212	8.283089	4.625379	3.025109
Pb	—	—	—	—	—
PM	0.365188	0.287389	0.4553	0.308417	0.202338
$PM_{2.5}$	—	—	—	—	—
PM_{10}	0.365188	0.287389	0.4553	0.308417	0.202338
SO_2	0.258969	0.179316	0.332859	0.276401	0.182264
VOC	0	0	0	0	—

Notes: — = No data available; CO = carbon monoxide; NMHC = non-methane hydrocarbon; NO_X = nitrogen oxides; Pb = lead; PM = particulate matter; $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter; PM_{10} = particulate matter 10 micrometers or less in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compounds.

Source: FDEP 2025b.

Within Brevard County, air quality data are available for two locations. The Freedom 7 Elementary School in Cocoa Beach ("Location 1"), approximately 20 miles (32 km) from the KSC VC, monitors for O_3. The 401 Florida Avenue site in Melbourne ("Location 2"), approximately 17 miles (27 km) from the KSC VC, monitors for O_3, PM_{10}, and $PM_{2.5}$ (FDEP 2025c). Table 3-5 summarizes the highest air emissions data for these two locations.

Table 3-5 Highest Readings for Select Emissions in Two Brevard County Locations

Pollutant	Year				
	2025*	2024	2023	2022	2021
Location 1 – O_3**	64 ppb	62 ppb	65 ppb	64 ppb	60 ppb
Location 2 – O_3**	62 ppb	61 ppb	63 ppb	63 ppb	62 ppb
Location 2 – $PM_{2.5}$***	16.4 µg/m^3	18.0 µg/m^3	47.1 µg/m^3	22.5 µg/m^3	27.0 µg/m^3
Location 2 – PM_{10}***	46.7 µg/m^3	57.7 µg/m^3	75.1 µg/m^3	72.9 µg/m^3	73.3 µg/m^3

Notes: * Partial data available; ** Maximum 8-hour average; *** Daily average; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter; PM_{10} = particulate matter 10 micrometers or less in diameter

Source: FDEP 2025c.

Regarding ozone-depleting substances (ODS), KSC organizations and contractors are required to comply with CFR 40 Part 82, which governs the manufacture, use, and release of ODS.

3.3.3 Environmental Consequences

Brevard County is in attainment for all criteria pollutants; therefore, the General Conformity rule does not apply. For this EA, effects to air quality would be considered negligible to minor if the Proposed Action is not likely to exceed the insignificance indicator threshold of 250 tons per year of a criteria pollutant. USEPA uses this value in its New Source Review standards as an indication for impact analysis for new source stationary sources in areas that are in attainment with the NAAQS.

Air emissions from the Proposed Action would result from construction and operation of the improvement projects.

3.3.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and **no adverse effects** would occur to air quality.

3.3.3.2 Proposed Action

Construction Effects

Under the Proposed Action, improvements would occur in seven areas of the Apollo/Saturn V Center boundaries over a 15-year period as identified in Table 2-1. As Section 2.1 describes, improvements include minor construction activities that would generate temporary emissions from heavy-duty diesel-powered construction equipment, vehicular traffic, and fugitive dust emissions. A negligible, localized increase in annual emissions would occur at KSC from the implementation of the Proposed Action; additionally, implementing the BMPs identified in Table 2-2 would further minimize air quality effects. These small increases in criteria pollutant emissions would have a negligible effect on Brevard County's air quality, which is designated as "in attainment" with the NAAQS. Therefore, **negligible adverse effects** would occur to air quality from construction activities.

Operational Effects

Following construction, there would be a relatively small increase in air emissions associated with the estimated 2,000 to 3,000 additional visitors annually to the Apollo/Saturn V Center; however, the operational-related emissions would be negligible. Therefore, **negligible adverse effects** to air quality would occur during the operational phase of the Proposed Action.

3.3.3.3 Other Reasonably Foreseeable Effects

The reasonably foreseeable actions summarized in Table 3-2 apply to air quality. The construction activities associated with the Proposed Action would be temporary, occurring during normal business hours, and would incorporate the BMPs listed in Table 2-2. Any long-term increase in annual air emissions demand from construction and operation of new buildings, as well as increases in guests and support staff were previously evaluated in the KSC VC 15-Year Development Plan PEA and Space Commerce District Area Development Plan EA. Specific to launches at LC-39A, the 2025 Starship Draft EIS determined that the total NO_X would exceed the insignificance threshold by approximately 54 percent. The FAA expects that the launch and landing activities at LC-39A would be considered potentially significant unless localized air-dispersion modeling demonstrates that the emissions would not cause or contribute substantially to a projected air quality violation of an ambient air quality standard (FAA 2026a). However, the Proposed Action would not appreciably contribute to total NO_X emissions; therefore, based on currently available information and studies, **minor adverse effects** to air quality would occur from the Proposed Action when combined with other reasonably foreseeable actions.

3.4 LAND USE

3.4.1 Definition of the Resource

Land use is a way to describe the human use of land within a given area. As a federal agency, KSC is not subject to local zoning regulations and implements its own zoning and land use planning.

3.4.2 Existing Conditions

The Apollo/Saturn V Center is in an area currently classified as Public Outreach land use, which includes facilities and associated land areas that promote an educational, research, or informational connection between the community and KSC.

3.4.3 Environmental Consequences

3.4.3.1 No Action Alternative

Under the No Action Alternative, the improvement projects would not be completed and **no adverse effects** to land use would occur.

3.4.3.2 Proposed Action

The Proposed Action would be consistent with the existing and future land use and visual character of the area; therefore, **no adverse effect** to land use would occur from implementation of the Proposed Action.

3.4.3.3 Other Reasonably Foreseeable Effects

Since no adverse effect to land use would occur from the Proposed Action, no potential for interaction with other reasonably actions would occur. Therefore, **no adverse effects** to land use would occur when combined with other reasonably foreseeable actions.

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of the Resource

Biological resources include plant and animal species and the habitats within which they occur. For this EA, these resources are analyzed and grouped into the following categories:

- *Vegetation* includes plant associations and dominant constituent species that occur in the Proposed Action area. Special status plant species are discussed in more detail below.
- *Wildlife* includes the animal species that occur in the Proposed Action area. Special consideration is given to bird species protected under the Migratory Bird Treaty Act (MBTA) and Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Special status wildlife species are further discussed in Section 3.5.2.3.
- *Special Status Species* are those species that are listed, have been proposed for listing, or are candidates for listing under the Endangered Species Act (ESA). The ESA protects federally listed threatened and endangered species and their associated designated critical habitats, as well as species proposed for listing. Special status species designation is also given to the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*), both of which are protected under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as well as species protected by the State of Florida. Under the ESA and the Florida Endangered and Threatened Species Act of 1988, agencies must follow approved measures and permitting guidelines when a Proposed Action may negatively affect a protected species.

3.5.2 Existing Conditions

3.5.2.1 Habitats and Vegetation

Uplands

KSC comprises ridge and swale topography where bands of uplands and wetlands run north to south across the complex (NASA 2020). Approximately 33,033 acres (13,368 hectares) of uplands are on KSC and comprise several unique vegetation communities. The most prominent land cover types for uplands at KSC include oak-palmetto scrub and flatwoods. Oak-palmetto scrub includes oak species, such as sand live oak (*Quercus geminate*) and Chapman oak (*Q. chapmanii*) with shrub and bush species, including saw palmetto

(*Serenoa repens*) and gallberry (*Ilex glabra*), along with species of herbs and grasses. Flatwoods are similar in species composition to oak-palmetto scrub but lack the presence of scrub oak species. Additionally, ruderal-herbaceous-mowed land cover at KSC are herbaceous areas that are mowed near facilities. Notable remaining land cover types include ruderal-woody and upland hardwood forests (NASA 2020).

The Proposed Action area comprises predominantly the Saturn V Center facilities that include buildings, viewing areas, parking areas, bus customer pick up/drop off, storage warehouse, and stormwater management system ponds. Several small areas of native upland vegetation comprise approximately 3 acres (1.21 hectares) and occur within the Proposed Action area. Approximately 0.9 acre (0.36 hectare) occurs within the proposed Project Areas 2 and 3. These areas are characterized as Temperate Hardwood (4250) using the Florida Land Use, Cover, and Forms Classification System (FLUCCS) (Figure 3-1). These areas are dominated by live oak (*Quercus virginiana*), sabal palm (*Sabal palmetto*), Brazilian pepper (*Schinus terebinthifolia*), saw palmetto, wax myrtle (*Morella cerifera*), guinea grass (*Megathyrsus maximus*), grape vine (*Vitis rotundifolia*), and greenbriar (*Smilax* spp.).

Wetlands

Wetlands are semi-aquatic ecosystems that serve as transitional zones between bodies of water or uplands. Wetlands are protected under Section 404, Waters of the US, the Clean Water Act via the US Army Corps of Engineers, as well as by the State of Florida via the state water management districts and FDEP. EO 11990 requires avoidance, to the extent possible, of the long- and short-term adverse impacts associated with the destruction or modification of wetlands and avoidance of direct or indirect support of new construction in wetlands wherever a practicable alternative exists.

Approximately 106,403 acres (43,061 hectares) of freshwater and saltwater wetlands and estuaries are found on KSC. The most prominent land cover types for wetlands at KSC include hardwood hammock/wetland forest, freshwater marsh, saltwater marsh, and mangrove swamp. Hardwood hammock/wetland forests are composed of species such as sabal palm, red maple (*Acer rubrum*), and laurel oak (*Q. laurifolia*).

Figure 3-1 Existing Land Use

Freshwater marsh species include sand cordgrass (*Spartina bakerii*), Virginia chain fern (*Woodwardia virginica*), beard grass (*Polypogon spp.*), and saw grass (*Cladium jamaicense*). Saltwater marsh contains herbaceous species such as black rush (*Juncus roemerianus*), salt grass (*Distichlis* spp.), and seashore dropseed (*Sporobolus virginicus*). Lastly, mangrove swamp land cover is dominated by white (*Laguncularia racemosa*), black (*Avicennia germinans*), and red mangrove (*Rhizophora mangle*). The northwest region of the Proposed Action area contains approximately 0.2 acre (0.08 hectare) of Mixed Wetland Hardwoods (6170). This low-to-medium quality community is dominated by sabal palm, Brazilian pepper, Carolina willow (*Salix caroliniana*), false willow (*Baccharis halimifolia*), swamp fern (*Blechnum serrulatum*), and leather fern (*Acrostichum danaeifolium*). Additionally, red mangrove is found in the water adjacent to the bank in Area 2.

3.5.2.2 Wildlife

Numerous species of reptiles and amphibians are known to occur at KSC. Four species of salamanders, 15 species of frogs and toads, 12 species of lizard, and 27 species of snakes have been documented at KSC (NASA 2020). Over 318 bird species have been documented at KSC and the Merritt Island National Wildlife Refuge (MINWR), and KSC provides nesting habitat to at least 87 species. With a large extent of wetlands, species of wading birds are commonly found throughout KSC and over 29 species of wintering waterfowl have been documented on KSC (NASA 2020). Most of the birds that utilize KSC lands for foraging and breeding habitat are protected by federal law under the MBTA and EO 13186. The MBTA makes it unlawful "by any means or manner, to pursue, hunt, take, capture [or] kill" any migratory bird except as permitted by regulation. EO 13186 directs federal agencies to avoid or minimize the negative effects of their actions on migratory birds and to take active steps to protect birds and their habitats.

Of the 29 mammal species that occur at KSC, 24 are native. Common non-native mammals found at KSC include the black rat (*Rattus rattus*), coyote (*Canis latrans*), wild boar (*Sus scrofa*), nine-banded armadillo (*Dasypus novemcintus*), and red fox (*Vulpes vulpes*) (NASA 2020).

3.5.2.3 Special Status Species

To assess the potential for federally listed, proposed, and candidate species to occur in the Project Area, an Information for Planning and Consultation search was conducted for KSC. Table 3-6 lists the federally and state-protected species that may occur, their known habitats, and their potential to occur in the Project Area.

Table 3-6 Federal- and State-Protected Species That May Occupy the Proposed Area

Common Name	Scientific Name	Status	Habitats Utilized	Potential to Occur in Proposed Action Area
Birds				
Little blue heron	*Egretta caerulea*	ST	Wetlands (marshes, lagoons, ditches)	Could forage in stormwater ponds.
Tricolored heron	*Egretta tricolor*	ST	Wetlands (marshes, lagoons, ditches)	Could forage in stormwater ponds.
Reddish egret	*Egretta refescens*	ST	Coastal Areas (estuaries, lagoons, salt marshes)	Could forage in stormwater ponds.
Roseate spoonbill	*Ajaia ajaja*	ST	Wetlands (bays, estuaries, marshes)	No suitable habitat
Southeastern American kestrel	*Falco sparverius paulus*	ST	Open woodlands, savannah pine habitats	Could forage in open lawn areas.
Florida sandhill crane	*Grus canadensis pratensis*	ST	Freshwater marshes, prairies, pastures	Could forage in stormwater ponds and mowed areas.
Bald eagle	*Haliaeetus leucoephalus*	BGEPA	Coastal areas, bays, rivers, lagoons, lakes, pine flatwoods for nesting and foraging of roadsides	No suitable habitat present.

Common Name	Scientific Name	Status	Habitats Utilized	Potential to Occur in Proposed Action Area
Rufa red knot	*Calidris canutus rufa*	FT	Bays, estuaries, tidal flats	No suitable habitat present.
Florida scrub-jay	*Aphelocoma coerulescens*	FT	Scrub, flatwoods, saw palmetto ground cover, coastal dunes, strand habitat	No suitable habitat present.
Eastern black rail	*Laterallus jamaicensis*	FT	Most all habitats on KSC	No suitable habitat present.
Crested caracara	*Caracara plancus audubonii*	FT	Wet prairies with cabbage palm, wood areas with saw palmetto, cypress, scrub oak	Could forage in stormwater ponds and nest in cabbage palms.
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	FE	Freshwater marshes and shallow vegetated edges of water bodies	No suitable habitat present.
Mammals				
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	FT	Ruderal areas, coastal strand/swale, coastal sand dunes, oak scrub	No suitable habitat present.
West Indian manatee	*Trichechus manatus*	FT	Coastal areas, rivers, saltwater bays, estuaries	No suitable habitat present.
Tricolored bat	*Perimyotis subflavus*	PE	Grasslands, urban areas, woodlands, man- made structures	Could roost in trees.
Reptiles				
Atlantic salt marsh snake	*Nerodia clarkia taeniata*	FT	Coastal salt marshes and mangrove swamps	No suitable habitat present.
Eastern indigo snake	*Drymarchon couperi*	FT	All habitat types with suitable densities, including dikes and man-made structures	No suitable habitat present.
American alligator	*Alligator mississippiensis*	FT (S/A)	Freshwater swamps, ditches, ponds, estuarine waters, marshes, rivers, lakes	Could use some areas for thermoregulation.
Florida pine snake	*Pituophis melanoleucus mugitus*	ST	Dry, upland, sandy soils	No suitable habitat present.
Gopher tortoise	*Gopherus polyphemus*	ST	Coastal dunes, man-made structures, scrub, saw palmetto, flatwoods, ruderal	No suitable habitat present.
Insects				
Monarch butterfly	*Danaus plexippus*	FC	Flowering plants, coastal areas, wetlands, urban areas	Very limited adult foraging areas. No caterpillar forage foods observed.
Plants				
Carter’s mustard	*Warea carteri*	FE	Scrubby flatwoods, inland, coastal scrub	No suitable habitat present.
Lewton’s polygala	*Polygala lewtonii*	FE	Scrubby flatwoods, scrub	No suitable habitat present.

Notes: BGEPA = Bald and Golden Eagle Protection Act; FC = Federal Candidate; FE = Federally Endangered; FT = Federally Threatened; FT (S/A) = Federally Threatened Similarity of Appearance; PE = Proposed Endangered; ST = State Threatened.

Source: NASA 2020; NASA 2016; USFWS 2024

3.5.3 Environmental Consequences

3.5.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and **no adverse effects** to biological resources would occur.

3.5.3.2 Proposed Action

Construction Effects

Habitats and Vegetation: Construction of improvements in Project Areas 1, 4, 5, 6, and 7 would occur in existing developed areas that are part of the Saturn V complex, are actively maintained by staff, and also experience visitor traffic. Construction of improvements in Project Areas 2 and 3 could result in up to 0.9 acre (0.36 hectare) of impact to Temperate Hardwood land cover community. In addition, portions of the 2.1 acres (0.85 hectare) of this community have the potential to be impacted due to unforeseen future needs at this facility. Area 2 and 3 communities are highly disturbed and have high concentrations of invasive exotic vegetation. The loss of these vegetation communities would be negligible due to their small size, low quality, and the small fraction of the vast acreages of higher quality communities that occur at KSC.

Construction of improvements in Project Area 3 has the potential to impact 0.2 acre (0.8 hectare) of jurisdictional wetlands. These wetlands are low quality due to the presence of invasive exotic and nuisance species vegetation and represent a tiny fraction of the overall wetland acreage at KSC. Any impacts to these wetlands would require mitigation by SJRWMD and would likely consist of purchasing wetland mitigation credits from a private wetland mitigation bank.

Wildlife: As previously stated, construction of most of proposed improvements would occur to existing developed areas that are part of the Saturn V Center and currently experience pedestrian traffic and human-related disturbance. Small patches of low-quality natural vegetation would be removed; however, it likely supports few wildlife species. Wildlife species would relocate and utilize the vast acreages of high-quality habitat adjacent to the Proposed Action area.

Special Status Species: Species such as little blue heron, tricolored heron, reddish egret, and Florida sandhill crane could forage in the on-site stormwater pond or east lawn. However, these are very low-quality habitats, and vast acreages of higher-quality habitat exist without human disturbance adjacent to the Proposed Action. The Proposed Action improvements do not occur in habitats that could support special status species such as rufa red knot, Eastern black rail, Everglade snail kite, southeastern beach mouse, Atlantic salt marsh snake, and eastern indigo snake. Remaining special-status species likely do not utilize the Proposed Action area due to human presence and lack of suitable habitat.

Critical habitat for the West Indian manatee includes the Banana River, which is east of the Proposed Action area (Figure 3-2). No habitat occurs on site for this species.

KSC, combined with the adjacent CCSFS, provides habitat for one of three remaining core Florida scrub-jay populations across the species range. Three types of scrub-jay habitat zones (core, support, and auxiliary) have been defined on KSC to categorize the importance and roles of different landscapes for maintaining scrub-jay populations (NASA 2014) (Figure 3-2). On KSC, core scrub-jay areas are described as primary habitat (oak scrub on well drained soils) and adjacent secondary habitat (large oak scrub ridges on poorly drained soils) that provide large contiguous clusters of territory (NASA 2014). Support areas emphasize smaller clusters of core territory outside fire management units, which may enhance population size and provide connectivity between population cores. Auxiliary areas are mostly tertiary territories but include some primary and secondary territories generally outside fire management units. Core, support and auxiliary habitat does not occur within the Proposed Action area (Figure 3-2).

Figure 3-2 Florida Scrub-Jay Habitat Zones and West Indian Manatee Critical Habitat Location Map

The only area of potential suitable habitat for this species is the small 2-acre (0.81 hectare) area in the southwest corner of the Proposed Action area west of the bus drop off/pick up parking area.

Negligible adverse impacts to biological resources are expected as a result of the construction of the Proposed Action since a majority of improvements are proposed in developed areas and native vegetation areas to be disturbed are low quality and support few special-status species.

Operational Effects

Vegetation and Habitats: **Negligible adverse impacts** on upland and wetland habitats and vegetation are expected from the operation of the Proposed Action since the operation does not require additional development and the proposed use is low intensity compared to manufacturing or launch facilities that occur at KSC. Furthermore, the proposed improvements are not expected to negatively impact the MINWR-prescribed fire program, which is critical to maintain fire-dependent vegetation communities since operation of the Proposed Action does not influence launches or other aerospace activities that can affect a proposed burn day.

Wildlife: Operational noise from vehicles and human presence (i.e., lighting, equipment, and associated personnel) is expected to increase incrementally over time as a result of Project Area 7 development since this would increase viewing observation capacity. This increased number of visitors to Project Area 7 could contribute to altered home ranges and migration patterns or increased habitat avoidance. Additionally, strikes from additional buses required to transport the increase in visitors may occur. However, these impacts are expected to be negligible due to the current developed nature of the Proposed Action area, lack of suitable habitat, and relatively small increase in bus traffic expected to transport the estimated 2,000 to 3,000 additional visitors annually to the Apollo/Saturn V Center.

Special-Status Species: Delaware North would continue to adhere to the Lighting Operations Plan to ensure appropriate lighting is available for nighttime operations at Saturn V Center while minimizing the impact on protected species, including the five federally protected marine turtle species that nest along KSC shorelines.

Operational noise from vehicles and human presence (i.e., lighting, equipment, and associated personnel) is expected to increase incrementally over time as a result of Project Area 7 development since this would increase viewing observation capacity. This increased visitation could contribute to altered home ranges and migration patterns or increased habitat avoidance. Additionally, strikes of special status species from additional buses required to transport the increase in visitors may occur. However, these impacts are expected to be negligible due to the current developed nature of the Proposed Action area, lack of suitable habitat, and relatively small increase in bus traffic anticipated to be needed in order to transport the estimated 2,000 to 3,000 additional visitors annually to the Apollo/Saturn V Center.

Prescribed fire is a critical and required land-management tool used to manage habitat for listed species such as the Florida scrub-jay. Operation of the Proposed Action improvements would not negatively affect MINWR's prescribed burning program, which could indirectly impact the quality of listed species habitat outside the Proposed Action area.

As a result, **negligible adverse impacts** to special-status species are expected as a result of the operation of the Proposed Action.

Negligible adverse impacts to biological resources are expected as a result of the operation of the Proposed Action.

3.5.3.3 Other Reasonably Foreseeable Effects

Since negligible adverse effects to biological resources would occur from the Proposed Action, negligible potential exists for interaction with other reasonably foreseeable actions. Therefore, **negligible adverse impacts** to biological resources would occur when combined with other reasonably foreseeable actions.

3.6 CULTURAL RESOURCES

3.6.1 Definition of the Resource

NEPA actions must consider the effects to cultural resources that hold community value. Cultural resources that are historic properties are one component of the human environment considered under federal law. Sites, buildings, structures, objects, or districts, including Traditional Cultural Properties containing enough significance and integrity to be listed on the National Register of Historic Places (NRHP), are defined as historic properties that are protected under the National Historic Preservation Act (NHPA) of 1966, as amended. These cultural resources generally become eligible for consideration as a historic property after reaching 50 years of age. Section 106 of the NHPA requires that every federal agency "take into account" how each undertaking could affect historic properties. NASA complies with 36 CFR Part 800 (*Protection of Historic Properties*), the implementing regulations to Section 106 of the NHPA. In addition, the *Programmatic Agreement for Management of NASA Centers* at KSC outlines how the Section 106 process will be implemented at KSC including consultation and a comment period for the State Historic Preservation Officer (SHPO), Tribes, and consulting parties. Other federal laws that NASA complies with, such as the Native American Graves and Repatriation Act (NAGPRA) and the Archaeological Resources Protection Act (ARPA), consider impacts to cultural resources that may or may not meet the NRHP criteria to be considered a historic property under the NHPA. KSC's Integrated Cultural Resources Management Plan (ICRMP) outlines the various statutes and regulatory framework governing protection and documentation of our heritage (NASA 2024d). Buildings and structures analyzed under *Special Criteria Consideration G, Properties that have Achieved Significance within the Past 50 Years,* will need to be reanalyzed on reaching 50 years of age.

3.6.2 Existing Conditions

This document seeks to identify cultural resources present and to evaluate potential effects to historic properties including those cultural resources that are significant enough for inclusion in the NRHP. The project encompasses the construction footprints.

Two historic properties were identified within the Apollo/Saturn V Center. This includes the two known precontact archaeological sites (BR00170 and BR00774) within the project area construction footprint.

A 1990 survey entitled *Archaeological Survey to Establish Zones of Archaeological Potential in the VAB and Industrial Areas of the Kennedy Space Center* (Florida Master Site File [FMSF] Report No. 2471) identified this area as having a moderate to high potential for archaeological resources. Multiple areas adjacent to and within the Apollo/Saturn V Center have undergone subsurface surveys with positive results, confirming the moderate to high potential for NRHP-eligible archaeological sites in the area.

A cultural resources survey has been conducted for all remaining undeveloped portions of this Proposed Action (Areas 1, 3, and 6). The purpose of the cultural resources survey was to identify unknown archaeological sites and evaluate how known historic properties are expressed within the Project Area. The survey did not locate any cultural resources within the remaining undeveloped portions. Consultation with the SHPO and Tribes was conducted concurrently with this EA; all correspondence letters received are provided in Appendix A.

Museum collections of significance are found within the Proposed Action project boundary. The Apollo mission artifacts and Saturn V rocket are on display and occur within the Proposed Action project boundary. These museum collections will remain in place and will not be negatively affected by the Proposed Action.

3.6.3 Environmental Consequences

3.6.3.1 No Action Alternative

Under the No-Action Alternative, the Proposed Action would not be implemented, and the area would remain undeveloped. As such, **no effects** to cultural resources would occur.

3.6.3.2 Proposed Action

Construction Effects

Currently, two historic properties are identified within the Apollo/Saturn V Center improvements Project Area. When necessary, consultations would be undertaken with the Florida SHPO or federally recognized Indian Tribes.

When the specific locations and details of the proposed facilities are developed for Area 7, KSC will consider effects on cultural resources in accordance with the Programmatic Agreement governing the management of historic properties at KSC. Due to the location of Apollo/Saturn V improvements at Area 7, this will likely result in an adverse effect on the historic property in the vicinity and steps will need to be taken to minimize or mitigate impacts in consultation with the SHPO and Tribes.

KSC will also periodically reassess cultural resources for inclusion in the NRHP, especially once they turn 50 years old, and conduct any additional surveys or studies required to determine the effect of future activities on cultural resources.

If any unexpected discovery of archaeological material or human remains were to occur during proposed activities, KSC will follow the procedures outlined in the ICRMP and the Programmatic Agreement through consultation with the appropriate parties. If previously undiscovered artifacts or features are unearthed during any of the proposed projects, work would be stopped in the immediate vicinity of the find, a determination of significance made, and a mitigation plan formulated. Immediately after stopping work and protecting the discovery from further disturbance, the Cultural Resources Manager (CRM) or another member of the Environmental Management Branch shall be notified. The following special condition for unexpected discoveries of archaeological resources at KSC applies:

> *If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery….Project activities shall not resume without verbal and/or written authorization (from NASA KSC). In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately ...*

All activities under the Proposed Action that may affect cultural resources at KSC would be managed in accordance with the Programmatic Agreement. The Programmatic Agreement provides a plan of action to identify, assess, manage, preserve, and protect these resources. The Proposed Action construction may generate **minor adverse effects** to cultural resources.

Operational Effects

No operational activities would require disturbing historic properties; as a result, operation of the Proposed Action would have **no adverse effects** on the cultural resources.

3.6.3.3 Other Reasonably Foreseeable Effects

Since adverse effects to cultural resources may occur from the Proposed Action, interaction with other reasonably foreseeable actions may occur. Therefore, **minor adverse effects** to cultural resources may occur when combined with other reasonably foreseeable actions.

3.7 GEOLOGY AND SOILS

3.7.1 Definition of the Resource

Specific to KSC, geology refers to the composition, structure, and configuration of surface and subsurface features and the processes acting upon them. Soil types and conditions determine an area's susceptibility to flooding, erosion, etc.

3.7.2 Existing Conditions

The Proposed Action area contains no unique geological features of exceptional interest or mineral resources.

3.7.3 Environmental Consequences

3.7.3.1 No Action Alternative

Under the No Action Alternative, the improvement projects would not be completed and **no adverse effects** to geologic strata or soils would occur.

3.7.3.2 Proposed Action

Construction Effects

The Proposed Action would include removing vegetation, regrading, and installing footers (specific to the bleacher expansion). These activities may require that small portions of the upper soil strata layers be removed; however, this limited excavation would result in **negligible adverse effects** on the geologic strata or soils of the local area or region. Furthermore, the BMPs listed in Table 2-2 would control runoff and prevent erosion during construction activities.

Operational Effects

No operational activities would require disturbing soils or geology; as a result, operation of the Proposed Action would have **no adverse effects** on the geologic strata or soils of the local area or region.

3.7.3.3 Other Reasonably Foreseeable Effects

Since impacts to geologic strata and soils is site specific and BMPs would be implemented to control runoff and prevent erosion during construction activities, no potential for interaction with other reasonable actions would occur. Therefore, **no adverse effects** on the geologic strata or soils would occur when combined with other reasonably foreseeable actions.

3.8 NOISE

3.8.1 Definition of the Resource

Aside from OSHA regulations to protect workers and major noise sources in commerce, primary responsibility for controlling noise is with state and local governments (USEPA 2025b). Brevard County Code of Ordinances, Chapter 46, Article IV, Section 133, requires construction activities be performed

between 7:00 am to 8:00 pm Monday through Saturday. Additionally, as a general reference, Brevard County Code of Ordinance, Chapter 46, Article IV, Section 131, identifies the maximum permissible sound levels when measured at the closest residential, commercial, or industrial property line (refer to Table 3-7).

Table 3-7 Maximum Permissible Sound Levels by Land Use and Time Period

Land Use	Time Period	Maximum Allowable Sound Pressure Level (dBA)
Residential	7:00 am to 10:00 pm	60
	10:00 pm to 7:00 am	55
Commercial	7:00 am to 10:00 pm	65
	10:00 pm to 7:00 am	55
Industrial	7:00 am to 10:00 pm	75
	10:00 pm to 7:00 am	65

Note: dBA = A-weighted decibels.

Source: Brevard County Code of Ordinance, Chapter 46, Article IV, Section 131.

In-air noise, when frequency-weighted to approximate human hearing, is measured in A-weighted scale, referred to as dBA. Since decibels are measured on a logarithmic scale, each 10-decibel (dB) increase doubles the sound (Washington State Department of Transportation 2020). Table 3-8 lists typical noise levels generated by common outdoor and indoor activities and possible human effects.

Table 3-8 Common Noise Levels and Possible Human Responses

Noise	Noise Level (dBA)	Possible Human Response
Rocket launching pad (no ear protection)	180	Irreversible hearing loss
Thunderclap	130	Painfully loud
Auto horn	120	Maximum vocal effort
Rock concert	110	Extremely loud
Garbage truck	100	Very loud
Firecrackers	100	Very loud
Heavy truck (50 feet)	90	Very annoying, with hearing damage after 8 hours of exposure
City traffic	90	Very annoying, with hearing damage after 8 hours of exposure
Hair dryer	80	Annoying
Business office	70	Telephone use is difficult
Freeway traffic	70	Telephone use is difficult
Conversational speech	60	Intrusive
Light auto traffic (100 feet)	50	Quiet
Living Room	40	Quiet
Bedroom	40	Quiet
Quiet Office	40	Quiet
Library/soft whisper	30	Very quiet
Broadcasting studio	20	Very quiet
Threshold of hearing	0	Hearing begins

Source: Washington State Department of Transportation 2020.

3.8.2 Existing Conditions

The Apollo/Saturn V Center is west of LC-39 A/B in a restricted area and is only accessible as part of the KSC Bus Tour accessed from the KSC VC. The Apollo/Saturn V Center regularly experiences noise exposure from vehicular traffic, building operations, and conversational speech. Less frequently, the Apollo/Saturn V Center would also experience noise from launches.

3.8.3 Environmental Consequences

3.8.3.1 No Action Alternative

Under the No Action Alternative, the improvement projects would not be completed and **no adverse effects** from noise could occur.

3.8.3.2 Proposed Action

Construction Effects

Ambient noise levels are expected to increase during construction activities as a result of the Proposed Action site construction; however, noise generated is expected to be below all noise thresholds and would occur for a limited period. Furthermore, the BMPs listed in Table 2-2 would be used to reduce the effects from noise exposure. Therefore, **negligible to minor adverse effects** from noise would occur during construction activities.

Operational Effects

Following construction, there would be a negligible increase in noise levels associated with a projected increase of 2,000 to 3,000 additional visitors annually. The additional increase in visitors would fall within the baseline conditions associated with vehicular traffic, building operations, and conversational speech. Therefore, **no adverse effects** from noise would occur from the operational phases of the Proposed Action.

3.8.3.3 Other Reasonably Foreseeable Effects

Following construction, the Proposed Action would not result in any long-term noise changes; therefore, this analysis assesses short-term construction-related effects only.

The reasonably foreseeable actions summarized in Table 3-2 apply to noise. Typical construction equipment that would be used for construction-related activities include milling machines, excavators, bulldozers, graders, asphalt pavers, material transfer vehicles, compactors/rollers, water trucks, dump trucks, forklifts, scrapers, trenchers, line-up trucks, and pickup trucks. In general, construction-related noise is expected to attenuate below Brevard County ordinance requirements before leaving the KSC site boundary. Additionally, all work is expected to be performed during normal business hours, and the BMPs listed in Table 2-2 would be implemented as part of the Proposed Action to ensure that all equipment is operated in accordance with manufacturer's specifications and equipped with noise-reducing equipment in proper conditions.

In addition to the projects identified in Table 2-1, regular launches at KSC and CCSFS would continue to occur including those at LC-39. Specifically, under the reasonably foreseeable action's operational scenario in the January 2026 Final EIS for the SpaceX Starship-Super Heavy Launch Vehicle at LC-39A, there would be 460 launches, 299 landings, and 671 static fire tests per year at KSC and CCSFS as a result of Starship-Super Heavy operations, Falcon Heavy operations, Falcon 9 operations, and other actions affecting spacecraft operations at KSC and CCSFS (FAA 2026a). During these operational launches, a short-term increase in noise within the regional area would occur, similar to past launch events.

Overall, **minor adverse effects** from noise would occur when combined with other reasonably foreseeable actions.

3.9 WATER RESOURCES

3.9.1 Definition of the Resource

Water resources include surface water, groundwater, and floodplains.

3.9.2 Existing Conditions

3.9.2.1 Surface Waters

The surface waters in and surrounding KSC are best described as shallow estuarine lagoons and include portions of the IRL, which includes the Indian River, Banana River, Mosquito Lagoon, and Banana Creek. The area of Mosquito Lagoon within the KSC boundary and the north-most portion of the Indian River north of the Jay Railway spur crossing are designated by the state as Class II, *Shellfish Propagation and Harvesting*. All other surface waters at KSC have been designated as Class III, *Recreation and Fish and Wildlife Propagation*. All surface waters adjacent to and within the MINWR have the distinction of being designated as an Outstanding Florida Water (OFW) as required by Florida Statutes for waters within National Wildlife Refuges. Several entities, including NASA, USFWS, SJRWMD, and Brevard County, maintain water quality-monitoring stations at surface water sites within and around KSC. The data collected are used for long-term trend analyses to support land use planning and resource management. Surface water quality at KSC is generally good, with the best areas of water quality being the Mosquito Lagoon and the north-most portions of the Indian River and Banana River.

3.9.2.2 Groundwater

Three aquifer systems underlie KSC – the surficial aquifer, intermediate aquifer, and Floridan aquifer. The surficial aquifer system (SAS) contains freshwater but is less extensive than the Floridan aquifer, the principal artesian aquifer in East-Central Florida. The surficial and Floridan aquifers are separated by nearly impermeable confining units that contain three shallow aquifers referred to as the intermediate aquifer system (IAS) (NASA 2020).

Recharge to the SAS is primarily due to infiltration of precipitation. However, the water quality in the aquifer beneath KSC is influenced by intrusion of saline and brackish surface waters from the Atlantic Ocean and surrounding lagoon systems. In addition, surficial aquifers are subject to contamination from point sources and from general land use. Point-source contamination to the KSC SAS has occurred at certain facilities. The SAS is monitored under KSC permit at the KSC landfill and LC-39B, and SpaceX holds a permit requiring monitoring at LC-39A.

The groundwater quality in the IAS varies from moderately brackish to brackish due to upward leakage from the highly mineralized and artesian Floridan aquifer system (FAS) and in some cases from lateral intrusion from the Atlantic Ocean (NASA 2020). The FAS at KSC contains highly mineralized water with high concentrations of chlorides due to connate seawater in the aquifer, lateral seawater intrusion due to inland pumping, and a lack of flushing due to distant freshwater recharge areas (NASA 2020).

3.9.2.3 Floodplains

Figure 3-3 show the area floodplains, which are lowland and relatively flat areas adjoining inland and coastal waters and other flood-prone areas such as offshore islands. These flood hazard areas are identified on Federal Emergency Management Agency Flood Insurance Rate Maps and are referred to as a Special Flood Hazard Area (SFHA). SFHAs are defined as the areas that would be inundated by a flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood and SFHAs are labeled as ‘Zones.’ A small area of Zone AE occurs on the east side of the Proposed Action area in association with Banana Creek.

3.9.3 Environmental Consequences

3.9.3.1 No Action Alternative

Under the No Action Alternative, the improvement projects would not be completed and **no adverse effects** to water resources would occur.

3.9.3.2 Proposed Action

Construction Effects

Most of the Apollo/Saturn V Center is in Solid Waste Management Unit #114, the Former Shuttle Landing Facility Area, which has Land Use Controls to prevent contact with groundwater that may be potentially contaminated by PFAS. Dewatering is not expected to be required; however, any dewatering in association with site preparation before construction of the Proposed Action has the potential to cause migration of these contaminants. Therefore, if dewatering is required, the contractor would prepare a dewatering plan and submit it to the KSC Remediation Program for review and approval.

Project Areas 1 and 2 occur in the Zone AE floodplain; however, no net fill is proposed in Project Area 1. No net fill in Project Area 2 is expected since the floodplain boundary is consistent with the riverbank area; however, under a worst-case scenario, less than 1 acre (0.40 hectare) of floodplain impact could occur for the proposed parking area in Project Area 2.

Specific to the Banana Creek, before installing fencing in Project Area 2, the BMPs listed in Table 2-2 would be used to protect the Banana Creek. Stormwater generated during construction activities in all areas would be treated by the existing stormwater management system in accordance with SJRWMD regulations. A modification to the existing SJRWMD Environmental Resource Permit (ERP) for the site will likely be required. The BMPs listed in Table 2-2 would reduce non-point source pollution as well as stormwater pollution via pollution prevention. In conclusion, **negligible to minor adverse effects** to surface waters, groundwater, and floodplains as a result of construction activities.

Operational Effects

The installation of artificial grass in Project Area 1 would have no impact on stormwater infiltration, and the long-term stormwater from the proposed paving in Areas 2, 3, 4, 5, 6, and 7 would be routed to the existing stormwater ponds. Therefore, **no adverse effect to** groundwater and **negligible adverse effects** to floodplains and surface waters would occur from the operational phases of the Proposed Action.

3.9.3.3 Other Reasonably Foreseeable Effects

The reasonably foreseeable actions summarized in Table 3-2 apply to water resources.

Specific to projects on or near groundwater contamination, if dewatering is required, the contractor would prepare a dewatering plan and submit it to the KSC Remediation Program Manager for review.

Figure 3-3 Floodplain Location Map

The KSC Remediation Program Manager would coordinate review with the FDEP Federal Programs Section, if necessary, and obtain their comments and approval before any construction begins. Stormwater generated from all construction sites would be treated by the existing stormwater management system in accordance with SJRWMD regulations. Additionally, implementing BMPs would reduce nonpoint-source pollution, as well as stormwater pollution via pollution prevention, and contractors would be required to obtain an NPDES permit for water discharges from construction activities.

Overall, **negligible to minor adverse effects** to surface water, floodplains, and groundwater would occur when combined with other reasonably foreseeable actions.

3.10 SOCIOECONOMICS

3.10.1 Definition of the Resource

Socioeconomics refers to the basic attributes and resources associated with the human environment, particularly population and economic activity.

3.10.2 Existing Conditions

In 2023, KSC operations resulted in a total of 11,144 direct jobs (civil servants, contractors, commercial launch provider employees, tenant employees, and KSC VC employees) and 15,499 additional Florida jobs, resulting in $9.36 billion in economic output in the state (NASA 2024a). During 2023, over 1.6 million visitors traveled to the KSC VC; of those, 1.3 million were out-of-state visitors and spent nearly $124 million (NASA 2024a).

3.10.3 Environmental Consequences

3.10.3.1 No Action Alternative

Under the No Action Alternative, the improvement projects would not be completed and **no adverse effects** to socioeconomics would occur.

3.10.3.2 Proposed Action

Construction Effects

The construction projects are relatively minor and short in duration; therefore, no long-term impact on the local housing market or local economy is expected. However, a temporary increase in short-term employment for the local workforce may occur, which would result in a positive effect on the local economy. Therefore, during the construction of the Proposed Action, **minor beneficial effects** to socioeconomics would occur.

Operational Effects

Under the Proposed Action, the enhancement projects would provide employees and visitors with safe and continued access to the Apollo/Saturn V Center. No changes to staffing levels are expected and any changes to the number of visitors would be relatively small; therefore, any population growth rate is expected to be nominal. Furthermore, the Proposed Action would not significantly affect the local housing market and would not negatively affect the local economy. Therefore, during the operational phase of the Proposed Action, **negligible effects** would occur.

3.10.3.3 Other Reasonably Foreseeable Effects

The reasonably foreseeable actions summarized in Table 3-2 apply to socioeconomics. In addition to the projects identified in Table 3-2, regular launches with an increase in launch cadence at KSC and CCSFS

would continue to occur. During launches, a short-term increase in the number of visitors, both in- and out-of-state are expected.

Short-term beneficial effects would occur during construction-related activities. Although the short-term demand for construction and secondary jobs is expected, the regional labor force would likely absorb the increased demand for direct construction and associated secondary jobs. In addition, temporary and minor spending and additional federal, state, and local tax revenue would occur.

Long-term beneficial cumulative effects would be associated with the increase in visitors and employees. Specifically, the 2024 Programmatic EA determined there would be long-term minor beneficial impacts from the potential doubling of visitor attendance and full-time staff from 1.7 million staff and visitors in 2023 to a projected 3.3 million staff and visitors in 2038. In 2023, over 1.6 million visitors traveled to the KSC VC. This number would steadily increase as more launches occur.

Given the current value that KSC has on the Florida economy, **the short- and long-term minor beneficial effects are not significant** when combined with other reasonably foreseeable actions**.**

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4.0 MITIGATION MEASURES

As discussed in Section 2.5, BMPs lessen potential effects by avoiding, minimizing, or reducing/eliminating effects. BMPs are distinguished from formal mitigation measures because BMPs are (1) existing requirements for the Proposed Action; (2) ongoing, regularly occurring practices; or (3) not unique to this Proposed Action. Table 2-2 lists the BMPs incorporated into the Proposed Action. In contrast, mitigation measures are a function of the NEPA environmental review process for the Proposed Action and are meant to reduce the adverse effects. Minimization and/or mitigation measures will be implemented to reduce the adverse effects to the following resource categories: biological and cultural resources.

4.1 WETLAND IMPACTS

Isolated wetland impacts will be mitigated by purchasing private wetland mitigation credits in accordance with SJRWMD regulations.

4.2 CULTURAL RESOURCES

To minimize and/or mitigate potential adverse impacts to cultural resources for this proposed improvement, the SHPO and Tribes will be consulted.

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5.0 PREPARERS AND CONTRIBUTORS

Table 5-1 lists the individuals who provided details, data, or analyses and who prepared this document. The table provides information concerning which section(s) each person was involved in writing or assembling.

Table 5-1 List of Individuals Who Prepared This Document

Preparers	Affiliation	Professional Title	Contribution
B.J. Bukata, MS, PWS, AA	Jones Edmunds	Senior Scientist/Vice-President	Project Manager, Biological Resources, Natural Resources, Transportation, Utilities, Water Resources, Geology and Soils, Document Compilation, Data, and Text
Mike Clark, PE	Jones Edmunds	Senior Engineer	Utilities
Rich Koller, PE	Jones Edmunds	Managing Director	Utilities, QA/QC Document Review
Joe Schmid	Jones Edmunds	Department Manager, Technical Communications	Document Review
Nancy Vaseen	Jones Edmunds	Technical Editor	Document Review
Stephen Berry	Oneida ESC Group	Senior NEPA Analyst	DOPAA, Senior QA/QC Document Review
Chrystal Everson	Oneida ESC Group	Senior NEPA Lead	DOPAA, Land Use, Noise, Air Quality, Socioeconomics, Reasonably Foreseeable Actions
Wendy Puckett	Oneida ESC Group	Cultural Resource Manager Team Lead	Cultural Resources, QA/QC Document Review

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6.0 AGENCIES AND PERSONS CONSULTED

Table 6-1 lists the agencies and individuals who were consulted during preparation of the EA.

Table 6-1 Agencies and Persons Consulted

Name	Agency
Federal Agencies	
James Brooks, Environmental Planning Team Lead, NEPA Compliance Don Dankert, Environmental Management Branch Chief Natasha Darre, Remediation Program Manager Patrice Hall, Environmental Protection Specialist Christopher Adkison, Remediation Program Manager David Thorpe, Master Planner Katherine Zeringue, Cultural Resources Manager	National Aeronautics and Space Administration, John F. Kennedy Space Center
State Agencies	
TBD	State Historic Preservation Office
Non-Government Organizations	
Jennifer Mayo, Sr. Manager of Facilities Projects Corey Mecagni, Senior Director of Maintenance, EHS, and Project Development Gina Parrish, Environmental Manager	Delaware North

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APPENDIX A
Cultural Resource Correspondence

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FLORIDA DEPARTMENT of STATE

RON DESANTIS
Governor

CORD BYRD
Secretary of State

National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, FL 32899

May 1, 2026

RE: DHR Project File No.: 2026-1647 Received by DHR: April 9, 2026
Phase I Cultural Resources Assessment Survey for the Approximately 2.29-Acre Project for the KSC Saturn V/Apollo Center, Brevard County, Florida

To Whom It May Concern:

Our office reviewed the referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, and its implementing regulations in *36 CFR Part 800: Protection of Historic Properties*, as well as Chapters 267.061 and 373.414, *Florida Statutes*, and implementing state regulations for possible effects on historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The project is subject to compliance with requirements for a National Aeronautics and Space Administration (NASA) undertaking.

In December 2025, Oneida ESC Group conducted the above referenced Phase I cultural resource assessment survey (CRAS) on behalf of Kennedy Space Center, Jones Edmunds Engineering and Consulting Services, and Delaware North Corporation. Oneida excavated approximately 2.29 acres with 17 shovel tests dug throughout the project area in Brevard County. As a result of the survey, two previously recorded archaeological sites were identified. The two known sites are 8BR170 (OPPOSITE FUTCH COVE; SHPO Eligible, 1988) and 8BR774 (ASTRONAUT ROAD; SHPO Eligible, 1991). Oneida could not retest site 8BR170 but did retest a portion of 8BR774. They were unable to relocate site 8BR774 and recommend a corresponding reduction of the site boundary. Based on the survey results, it is the opinion of Oneida that the proposed project will have no adverse effect on any known historic properties.

Based on the information provided, our office finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*. NASA has provided the following review of the planned project: “NASA KSC agrees with LG2 Environmental Solutions, Inc.'s conclusions that no further archaeological work in the Project Areas is necessary and with the revised boundary for 8BR774.” This office concurs with the determination provided by NASA and finds that the proposed project should have no effect on historic properties listed, or eligible for listing, in the NRHP.

If you have any questions, please contact Ethan Putman, Historic Preservationist, by email at *Ethan.Putman@dos.fl.gov*.

Sincerely,

Kelly L Chase
For

Alissa Slade Lotane
Director, Division of Historical Resources
& State Historic Preservation Officer

From:	Victoria Menchaca
To:	Zeringue, Katherine S. (KSC-SIE30)
Cc:	THPO Compliance; Danielle Simon
Subject:	[EXTERNAL] RE: Section 106 Consultation: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's Saturn V/Apollo Center and No Adverse Effect
Date:	Wednesday, April 29, 2026 2:26:34 PM
Attachments:	image001.png image002.png 4_9_2026 KSCVC SaturnV Apollo Improvements.pdf KSCVC Expansion S106 Consult Enclosure 1.pdf Phase I CRAS_KSC_Saturn V_Final_4_2026.pdf

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April 29, 2026

Katherine Zeringue
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John F. Kennedy Space Center
Spaceport Integration & Services
Environmental Management Branch, SI-E3
Kennedy Space Center, FL 32899
Phone: 321-867-8454
Email: katherine.s.zeringue@nasa.gov

Subject: Improvements to Saturn V/Apollo Center, Kennedy Space Center Visitor Complex (KSCVC), Brevard County, Florida
THPO Compliance Tracking Number: 0034826

In order to expedite the THPO review process:

1. Please correspond via email and provide documents as attachments,
2. Please send all emails to THPOCompliance@semtribe.com,
3. Please reference the THPO Compliance Tracking Number if one has been assigned.

Dear Katherine Zeringue:

Thank you for contacting the Seminole Tribe of Florida Tribal Historic Preservation Office (STOF THPO) Compliance Section regarding the Improvements to Saturn V/Apollo Center, Kennedy Space Center Visitor Complex (KSCVC), Brevard County, Florida.

The proposed undertaking does fall within the STOF Area of Interest. We have reviewed the documents that you have provided and completed our assessment pursuant to Section 106 of the National Historic Preservation Act (16 USC 470) as amended and its implementing regulations (36 CFR 800). We have no objections or other comments at this time. Please notify our office if any archaeological, historical, and/or burial resources are inadvertently discovered during project implementation and feel free to contact us with any questions or concerns.

Sincerely,
Victoria L. Menchaca, M.A.,RPA
Compliance Analyst II
STOF THPO, Compliance Section
Email: victoriamenchaca@semtribe.com

From: Zeringue, Katherine S. (KSC-SIE30) <katherine.s.zeringue@nasa.gov>
Sent: Thursday, April 9, 2026 9:16 AM
To: THPO Compliance <THPOCompliance@semtribe.com>; Danielle Simon <daniellesimon@semtribe.com>
Subject: Section 106 Consultation: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's Saturn V/Apollo Center and No Adverse Effect

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Ms. Osceola and Danielle,

Delaware North Companies Parks and Resorts operates the Kennedy Space Center Visitor Complex (KSCVC) Saturn V/Apollo Center on behalf of the National Aeronautics and Space Administration (NASA). The Saturn V/Apollo Center is a part of the KSCVC located east of Kennedy Parkway North, south of Astronaut Road, and west of Banana Creek. Delaware North is proposing to undertake a series of improvements at the Saturn V/Apollo Center to address visitor and staff safety, and to enhance the visitor experience. Because the property is owned by KSC, the approval of activities at the Saturn V/Apollo Center qualifies as a Federal Undertaking subject to review under Section 106 of the National Historic Preservation Act of 1966. This consultation is being completed in accordance with the *Programmatic Agreement Among the National Aeronautics and Space Administration, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Management of NASA Centers* (NPA).

Undertaking

The undertaking (see attached Enclosure 1) consists of the following:

- **Project Area 1**: Install artificial grass, remove trees on the north end, expand the existing permanent bleachers, and install a concrete pad for food truck use.
- **Project Area 2**: Install fencing along the Banana River to Astronaut Road, pave the dirt plot near the existing circular drive where dumpsters and cars are located, and possibly install solar streetlamps on the south side of the road for launch parking safety.
- **Project Area 3**: Increase employee parking spaces on the west side of the circular drive at the north end of the site or along the south side of Astronaut Road and install solar streetlamps along Astronaut Road.

Project Area 4: Expand the existing retail storage area and small concrete pad.

- **Project Area 5**: Install a concrete walkway for emergency egress.
- **Project Area 6:** Relocate the existing food concession area to the south end of the bleachers next to the existing restroom.

Project Area 7, depicted in Enclosure 1, is not part of the current undertaking and will be reviewed separately under Section 106 if further plans are developed.

Activities Excluded from Further Review

Activities identified in Project Areas 2, 4, and 5 meet Programmatic Exclusion C in Appendix F of the NPA and are not the subject of this consultation due to previous archaeological surveys and disturbance.

Identification of Historic Properties

In December 2025, LG2 Environmental Solutions, Inc. completed a Phase I Cultural Resources Assessment Survey (CRAS) within Project Areas 1, 3 and 6 covering approximately 2.29 acres (see Enclosure 2, Figure 1.1). The CRAS aimed to determine effects to two pre-contact archaeological sites recorded within the project areas and to identify any potential historic properties that meet the National Register of Historic Places (NRHP) criteria. The results and associated archaeological sites are:

- Project Area 1 – Site 8BR170 (Opposite Futch Cove): This is a precontact hunting and fishing camp eligible for the NRHP. Parts of it underwent phase III data recovery in 1988 prior to the construction of the Saturn V/Apollo Center. All shovel tests in Project Area 1 were negative for cultural material.
- Project Area 3 – Site 8BR774 (Astronaut Road): This is a precontact camp site and artifact scatter eligible for the NRHP. A subsurface survey in 1991 did not find cultural material south of Astronaut Road and concluded that the area had been disturbed by road construction. All shovel tests in Project Area 3 were negative for cultural materials, and the site boundary is being revised as a result.
- Project Area 6: No sites are recorded, and the shovel test was negative for cultural material.

Finding of Effect

Given the negative findings of the survey, this project will have **No Adverse Effect** on historic properties.

NASA KSC agrees with LG2 Environmental Solutions, Inc.'s conclusions that no further archaeological work in the Project Areas is necessary and with the revised boundary for 8BR774.

Should you have any questions or comments, please contact me.

Sincerely,

Katherine Zeringue
Cultural Resources Manager

Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899

April 9, 2026

Reply to Attn of: SI-E3

Ethan Putnam
Florida Division of Historical Resources
and State Historical Preservation Officer
500 S. Bronough Street
R. A. Gray Building
Tallahassee, Florida 32399-0250

Subject: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's (KSC) Saturn V/Apollo Center and No Adverse Effect

Dear Mr. Putnam:

Delaware North Companies Parks and Resorts operate the Kennedy Space Center Visitor Complex (KSCVC) Saturn V/Apollo Center on behalf of the National Aeronautics and Space Administration (NASA). The Saturn V/Apollo Center is a part of the KSCVC located east of Kennedy Parkway North, south of Astronaut Road, and west of Banana Creek. Delaware North is proposing to undertake a series of improvements at the Saturn V/Apollo Center to address visitor and staff safety, and to enhance the visitor experience. Because the property is owned by KSC, the approval of activities at the Saturn V/Apollo Center qualifies as a Federal Undertaking subject to review under Section 106 of the National Historic Preservation Act of 1966. This consultation is being completed in accordance with the *Programmatic Agreement Among the National Aeronautics and Space Administration, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Management of NASA Centers* (NPA).

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Project Area 7, depicted in Enclosure 1, is not part of the current undertaking and will be reviewed separately under Section 106 if further plans are developed.

Activities Excluded from Further Review

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Identification of Historic Properties

In December 2025, LG2 Environmental Solutions, Inc. completed a Phase I Cultural Resources Assessment Survey (CRAS) within Project Areas 1, 3 and 6 covering approximately 2.29 acres (see Enclosure 2, Figure 1.1). The CRAS aimed to determine effects to two precontact archaeological sites recorded within the project areas and to identify any potential historic properties that meet the National Register of Historic Places (NRHP) criteria. The results and associated archaeological sites are:

- Project Area 1 - Site 8BR170 (Opposite Futch Cove): This is a precontact hunting and fishing camp eligible for the NRHP. Parts of it underwent phase III data recovery in 1988 prior to the construction of the Saturn V/Apollo Center. All shovel tests in Project Area 1 were negative for cultural material.
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- Project Area 6: No sites are recorded, and the shovel test was negative for cultural material.

Finding of Effect

Given the negative findings of the survey, this project will have **No Adverse Effect** on historic properties.

Center Consulting Tribes are copied on this correspondence and will receive an unredacted version of the CRAS. Center Consulting Parties will receive a redacted version of the CRAS.

Center Consulting Tribes and Center Consulting Parties may submit comments via email within 30 days of distribution.

NASA KSC agrees with LG2 Environmental Solutions, Inc.'s conclusions that no further archaeological work in the Project Areas is necessary and with the revised boundary for 8BR774. NASA KSC requests your concurrence with its **No Adverse Effect** finding. If you have any questions or require further assistance, please contact me at 321-867-8454 or Katherine.s.zeringue@nasa.gov.

Sincerely,

Katherine Zeringue Digitally signed by Katherine Zeringue
Date: 2026.04.08 15:55:56 -04'00'

Katherine Zeringue
KSC Cultural Resources Manager
Environmental Management Branch

Enclosures:
1. Map of Project Areas
2. *Phase 1 Cultural Resources Assessment Survey for the Approximately 2.29-Acre Project for the KSC Saturn V/Apollo Center Brevard County, Florida*

cc:
HQS FPO/R. Klein
KSC/SI-E3/D. Dankert
KSC/AD/D. Thorpe
KSD/AD/J. Krouchick
KSC/CC/T. Tezel
KSC/HQ-LD/R. Griffin
KSC/HQ-LD/M. Fuchs
KSC/HQ-LD/H. Marini

Center Consulting Tribes:
Miccosukee Tribe of Indians of Florida/J. Daniel
Seminole Nation of Oklahoma/J. Fultz
Seminole Tribe of Florida/D. Simon
Thlopthlocco Tribal Town/D. Frank

Center Consulting Parties:
FWS/K. Ramos
FWS/R. Kanaski
NPS/K. Kneifl
CCSFS/T. Penders
Apollo One Memorial Foundation, Inc.
Brevard County Historical Commission
Cape Canaveral Space Force Museum
City of Titusville
Florida Public Archaeological Network – East Central Region
Historical Society of North Brevard
Indian River Anthropological Society
North Brevard Heritage Foundation
South Brevard Historical Society

Enclosure 1. Map of the Project Areas

From:	Zeringue, Katherine S. (KSC-SIE30)
To:	"mdukes677@gmail.com"; "cjsnotebook@yahoo.com"; "mboonstra@brev.org"; "james.draper.2@spaceforce.mil"; "Brad.Parrish@titusville.com"; "SEMiller@flagler.edu"; "rboggs@flagler.edu"; "titusvillehistory@gmail.com"; "Tiercel@earthlink.net"; "Roz@callhenry.com"; annita.sbhs@gmail.com
Subject:	Section 106 Consultation: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's Saturn V/Apollo Center and No Adverse Effect
Date:	Thursday, April 9, 2026 9:09:00 AM
Attachments:	image001.png image002.png 4_9_2026 KSCVC SaturnV Apollo Improvements.pdf KSCVC Expansion S106 Consult Enclosure 1.pdf Phase I CRAS_KSC_Saturn V_Final_4_2026_Redacted.pdf

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Dear Consulting Party,

Delaware North Companies Parks and Resorts operates the Kennedy Space Center Visitor Complex (KSCVC) Saturn V/Apollo Center on behalf of the National Aeronautics and Space Administration (NASA). The Saturn V/Apollo Center is a part of the KSCVC located east of Kennedy Parkway North, south of Astronaut Road, and west of Banana Creek. Delaware North is proposing to undertake a series of improvements at the Saturn V/Apollo Center to address visitor and staff safety, and to enhance the visitor experience. Because the property is owned by KSC, the approval of activities at the Saturn V/Apollo Center qualifies as a Federal Undertaking subject to review under Section 106 of the National Historic Preservation Act of 1966. This consultation is being completed in accordance with the *Programmatic Agreement Among the National Aeronautics and Space Administration, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Management of NASA Centers* (NPA).

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- **Project Area 6:** Relocate the existing food concession area to the south end of the bleachers next to the existing restroom.

Project Area 7, depicted in Enclosure 1, is not part of the current undertaking and will be reviewed separately under Section 106 if further plans are developed.

Activities Excluded from Further Review

Activities identified in Project Areas 2, 4, and 5 meet Programmatic Exclusion C in Appendix F of the NPA and are not the subject of this consultation due to previous archaeological surveys and disturbance.

Identification of Historic Properties

In December 2025, LG2 Environmental Solutions, Inc. completed a Phase I Cultural Resources Assessment Survey (CRAS) within Project Areas 1, 3 and 6 covering approximately 2.29 acres (see Enclosure 2, Figure 1.1). The CRAS aimed to determine effects to two pre-contact archaeological sites recorded within the project areas and to identify any potential historic properties that meet the National Register of Historic Places (NRHP) criteria. The results and associated archaeological sites are:

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- Project Area 6: No sites are recorded, and the shovel test was negative for cultural material.

Finding of Effect

Given the negative findings of the survey, this project will have **No Adverse Effect** on historic properties.

NASA KSC agrees with LG2 Environmental Solutions, Inc.'s conclusions that no further archaeological work in the Project Areas is necessary and with the revised boundary for 8BR774. NASA KSC is requesting SHPO's concurrence with its **No Adverse Effect** finding.

As a Center Consulting Party, you are receiving a redacted version of the CRAS. You may submit comments via email within 30 days of distribution.

Should you have any questions, please contact me.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services

Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From:	Zeringue, Katherine S. (KSC-SIE30)
To:	Jason Daniel
Subject:	Section 106 Consultation: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's Saturn V/Apollo Center and No Adverse Effect
Date:	Thursday, April 9, 2026 9:13:00 AM
Attachments:	image001.png image002.png 4_9_2026 KSCVC SaturnV Apollo Improvements.pdf KSCVC Expansion S106 Consult Enclosure 1.pdf Phase I CRAS_KSC_Saturn V_Final_4_2026.pdf

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Dear Jason,

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Finding of Effect

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NASA KSC agrees with LG2 Environmental Solutions, Inc.'s conclusions that no further archaeological work in the Project Areas is necessary and with the revised boundary for 8BR774.

Should you have any questions or comments, please contact me.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From:	Zeringue, Katherine S. (KSC-SIE30)
To:	"THPO@sno-nsn.gov"
Subject:	Section 106 Consultation: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's Saturn V/Apollo Center and No Adverse Effect
Date:	Thursday, April 9, 2026 9:14:00 AM
Attachments:	image001.png image002.png 4_9_2026 KSCVC SaturnV Apollo Improvements.pdf KSCVC Expansion S106 Consult Enclosure 1.pdf Phase I CRAS_KSC_Saturn V_Final_4_2026.pdf

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Dear Mr. Fultz,

Delaware North Companies Parks and Resorts operates the Kennedy Space Center Visitor Complex (KSCVC) Saturn V/Apollo Center on behalf of the National Aeronautics and Space Administration (NASA). The Saturn V/Apollo Center is a part of the KSCVC located east of Kennedy Parkway North, south of Astronaut Road, and west of Banana Creek. Delaware North is proposing to undertake a series of improvements at the Saturn V/Apollo Center to address visitor and staff safety, and to enhance the visitor experience. Because the property is owned by KSC, the approval of activities at the Saturn V/Apollo Center qualifies as a Federal Undertaking subject to review under Section 106 of the National Historic Preservation Act of 1966. This consultation is being completed in accordance with the *Programmatic Agreement Among the National Aeronautics and Space Administration, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Management of NASA Centers* (NPA).

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Should you have any questions or comments, please contact me.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

From:	Zeringue, Katherine S. (KSC-SIE30)
To:	"thpo@tttown.org"
Subject:	Section 106 Consultation: Phase I Cultural Resources Assessment Survey for a 2.29-Acre Area at Kennedy Space Center's Saturn V/Apollo Center and No Adverse Effect
Date:	Thursday, April 9, 2026 9:17:00 AM
Attachments:	image001.png image002.png 4_9_2026 KSCVC SaturnV Apollo Improvements.pdf KSCVC Expansion S106 Consult Enclosure 1.pdf Phase I CRAS_KSC_Saturn V_Final_4_2026.pdf

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Dear Mr. Frank,

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Given the negative findings of the survey, this project will have **No Adverse Effect** on historic properties.

NASA KSC agrees with LG2 Environmental Solutions, Inc.'s conclusions that no further archaeological work in the Project Areas is necessary and with the revised boundary for 8BR774.

Should you have any questions or comments, please contact me.

Sincerely,

Katherine Zeringue
Cultural Resources Manager
Spaceport Integration and Services
Kennedy Space Center
Mail Code: SI-E3
Kennedy Space Center, FL 32899
O: 321-867-8454
katherine.s.zeringue@nasa.gov

Final Report

Phase I Cultural Resources Assessment Survey for the Approximately 2.29-Acre Project for the KSC Saturn V/Apollo Center Brevard County, Florida

Oneida Project Number
312026008

Prepared for:
Kennedy Space Center

On Behalf of:
Jones Edmunds Engineering and Consulting Services
13545 Progress Boulevard
Suite 100
Alachua, FL 32615

And
Delaware North Corporation

Prepared by:

Oneida ESC Group
10475 Fortune Parkway, Suite 201
Jacksonville, Florida 32256
(904) 363-1686
www.lg2es.com

April 2026

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Final Report
Phase I Cultural Resources Assessment Survey for the Approximately 2.29-Acre Project for the KSC Saturn V/Apollo Center Brevard County, Florida

LG2 Project Number
312026008

Prepared for:
Kennedy Space Center

On Behalf of:
Jones Edmunds Engineering and Consulting Services
13545 Progress Boulevard
Suite 100
Alachua, FL 32615

And
Delaware North Corporation

Megan Bebee, MAS, MA, RPA
Principal Investigator

Baird Ullrey, MA
Archaeologist / Co-Author

Heather Puhl, MA
Archaeologist / Co-Author

Scott Clark, MA
Archaeologist / Contributor

April 2026

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ACKNOWLEDGEMENTS

The successful completion of this study was made possible with the hard work and input of many individuals. Oneida would especially like to thank Jones Edmunds and Delaware North Corporation. Special thanks also to Katherine Zeringue, NASA Cultural Resources Manager at Kennedy Space Center, for her review of this document. Oneida would like to thank the Oneida Nation of Wisconsin for their support, as well as in-house personnel including Baird Ullrey, Heather Puhl, Frank Keel, Scott Clark, Wendy Puckett, and Megan Bebee for their assistance with this report.

EXECUTIVE SUMMARY

This report presents the results of a Cultural Resources Assessment Survey (CRAS) conducted in support of an approximately 2.29-acre project at the Kennedy Space Center (KSC) Saturn V/Apollo Center in Brevard County, Florida. The survey was conducted by Oneida ESC Group's LG2 Environmental Solutions (Oneida) on behalf of Jones Edmunds Engineering and Consulting Services (Jones Edmunds) and Delaware North Corporation (DNC) to assist KSC in meeting its regulatory obligations under Section 106 of the National Historic Preservation Act (NHPA), as amended. All work was conducted in accordance with the NHPA and in compliance with the Archaeological Resources Protection Act and met or exceeded standards detailed in *Archaeological and Historic Preservation; Secretary of the Interior's Standards and* Guidelines 48FR, Part 44716-42, Vol. 48, No. 190, September 29, 1983 and guidelines developed by the Florida State Historic Preservation Office.

The archaeological Area of Potential Effects (APE) is located on the *Orsino, Florida* 7.5-minute USGS quadrangle (**Figure 1.1**). It is situated within the Merritt Island National Wildlife Refuge in the north portion of Brevard County.

The Florida Master Site File (FMSF) records six archaeological sites (8BR169, 8BR170, 8BR543, 8BR773, 8BR774 and 8BR1663), four NRHP eligible linear resources (8BR1986, 8BR1987, 8BR2931, and 8BR2932), two NRHP eligible historic structures (8BR1988 and 1989), and National Register listed Launch Complex 39 Historic District (8BR172) within one mile of the APE. Portions of 8BR170 and 8BR774 are within the current APE.

The CRAS was conducted in December 2025 and consisted of historic background research, pedestrian survey, and excavation of 25 shovel test probes (STPs). Seventeen shovel tests were located northwest of the Apolla/Saturn V complex (Area 3) in a poorly drained depression primarily consisting of Brazilian pepper and saw palmetto with occasional oak trees; seven of these STPs could not be excavated due to standing water. Seven shovel tests were located east of the primary structure in an improved grassy area with several palm trees (Area 1), used for viewing rocket launches and hosting social events, one of these STPs could not be excavated due to an extant structure. A single shovel test is located at the south end of the complex property immediately south of the viewing bleachers parking lot (Area 6).

All excavated STPs were negative for cultural materials. No additional structures or archaeological material on the surface were located during the survey. The previously recorded sites 8BR170 and 8BR774 were not relocated during this survey. The boundaries for 8BR774 are being revised based on the recent testing and obvious modern disturbance. The new site boundary is situated entirely north of the road. Oneida does not recommend any further archaeological surveys for this area.

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LIST OF ACRONYMS

Abbreviation	Description
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
CMBS	Centimeters Below Surface
CRAS	Cultural Resource Assessment Survey
CRM	Cultural Resource Management/Manager
EA	Environmental Assessment
FMSF	Florida Master Site File
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information System
GPS	Global Positioning System
ICRMP	Integrated Cultural Resource Management Plan
IRL	Indian River Lagoon
KSC	Kennedy Space Center
LG2	LG2 Environmental Solutions, Inc.
LC	Launch Complex
LOC	Launch Operations Center
MILA	Merritt Island Launch Area
MINWR	Merritt Island National Wildlife Refuge
NAD 27	North American Datum 1927
NAD 83	North American Datum 1983
NASA	National Aeronautics and Space Administration
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedures
SOW	Scope of Work
SF	Space Florida
STP	Shovel Test Probe
USACE	US Army Corps of Engineers
USAF	United States Air Force
UTM	Universal Transverse Mercator
VAB	Vehicle Assembly Building

1.0 INTRODUCTION

1.1 Project Description

In December 2025, LG2 Environmental Solutions, Inc., Oneida ESC Group company (Oneida), conducted a Phase I Cultural Resource Assessment survey (CRAS) in support of an approximately 2.29-acre project at the Kennedy Space Center (KSC) Saturn V/Apollo Center in Brevard County, Florida. The project area is wholly contained on the *Orsino, Florida* 7.5-minute quadrangle (USGS) (**Figure 1.1**). It was conducted on behalf of Jones Edmunds Engineering and Consulting Services (Jones Edmunds) and Delaware North Corporation (DNC) to assist KSC in meeting its regulatory obligations under Section 106 of the National Historic Preservation Act (NHPA), as amended.

All work was conducted to comply with Section 106 of NHPA, as amended, and its associated regulations, 36 CFR Part 800; Section 267.12, Florida Statues; and Chapter 1A-46 of the Florida Administrative Code. All work was conducted in accordance with the Florida Division of Historical Resources *Module Three Guidelines for Use by Historic Preservation Professional* and the Florida Division of Historical Resources' Performance Standards. All investigations were performed by professional archaeologists meeting the qualifications established in the US Secretary of Interior's Standards and Guidelines.

1.2 Area of Potential Effects

The APE for this investigation encompasses approximately 2.29 acres around the Saturn V/Apollo Center building near the intersection of Kennedy Parkway North and Astronaut Road (**Figure 1.2**). The APE is relatively level with elevations ranging from 8 to 14 meters (m) above mean sea level (amsl). Vegetation in the APE primarily consists of Brazilian pepper and saw palmetto with occasional oak trees and improved grass areas. The area contains many areas of standing water and swamp.

Figure 1.1 Area of Potential Effect

Figure 1.2 Aerial Photograph of Area of Potential Effect

2.0 ENVIRONMENTAL CONTEXT

2.1 Physiographic Setting

The KSC Saturn V/Apollo Center is on Merritt Island in Brevard County, Florida. Merritt Island is within the Southern Coastal Plain region of the Atlantic Coastal Plain physiographic province, as is all of Florida. This portion of Florida is within the Eastern Florida Flatwoods ecoregion, described as nearly level and poorly drained with numerous ponds, lakes, swamps, and sloughs (Huckle et al. 1974; Griffith et al. 1994; Scott 2001; Scott et al. 2001). The preservation of archaeological deposits is directly influenced by several variables, including soil drainage characteristics. In general, the probability of encountering archaeological resources in poorly drained soils is low. Conversely, in well drained to excessively drained soils, the probability of encountering archaeological resources is generally considered high or moderate, respectively. Although the overall physiographic setting of the project area suggests a low probability of encountering cultural resources, the occurrence of excessively drained soils specifically within the APE and the presence of a recorded archaeological site designates the APE as a high probability.

2.2 Hydrology

The KSC is within the Indian River Lagoon (IRL) watershed. The IRL watershed stretches 251 kilometers (km) from Ponce Inlet in Volusia County to Jupiter Inlet in Martin County and is comprised of the Mosquito Lagoon, the Banana River, and the Indian River (SJRWMD 2016). The IRL watershed is an estuary that receives salt water from the Atlantic Ocean through inlets and fresh water from direct precipitation, groundwater seepage, surface water runoff, and discharges from tributary streams and canals (Penders 2012a). The ridge and swale topography of the barrier island also creates a reservoir for fresh water that could have been easily obtainable by previous occupants of the island (Cantley et al. 1994). In addition to the Banana River, which borders Merritt Island to the east, other surficial water resources include impoundments, drainage canals, borrow pits, freshwater wetlands, mangrove wetlands, and salt marsh wetlands (Penders 2012b).

2.3 Generalized Topography

The following is adapted from the KSC 2020 Environmental Resource Document, Revision G (KSC 2020). Merritt Island, as well as Cape Canaveral, form a barrier island complex of Pleistocene and recent age. Topography is characterized by a series of ridges and swales created from relict dunes, which were deposited as the barrier islands were formed. The west side of Merritt Island "has been reduced to a nearly level plain" (KSC 2020). Elevations on Merritt Island range from sea level to approximately 3 meters. The island consists of saline and freshwater marshes, flatwoods, and scrubs. Within the APE, the land cover is characterized as Citrus to Brazilian Pepper (KSC 2020).

2.4 Climate

The following is adapted from the KSC 2020 Environmental Resource Document, Revision G (KSC 2020). The climate at KSC is classified as subtropical with short, mild winters and hot, humid summers and no recognizable spring or fall seasons. Summer weather begins in April and is prevalent for approximately 9 months of the year. Average temperatures in this part of the year are in the 70s Fahrenheit (F), and temperatures usually rise into the 80s and 90s F during the day. Days are mostly sunny; however, afternoon thunderstorms are common. Although cool days can occur in November, winter weather begins in January and extends through March. Winter weather is marked by windy days and temperatures in the 40s F at night and the 70s during the day. May through October weather is characterized by southeast winds, traveling clockwise around the Bermuda High. These winds bring "moisture and warm air, which help produce almost daily thundershowers creating a wet season" (KSC 2020). The dry season occurs between November and April and is characterized by cold continental air masses that cause uniformly distributed light rain, as opposed to the localized heavy thunderstorms of the wet season (KSC 2020).

2.5 Soils

Three soil types have been identified within the APE (**Table 2.1** and **Figure 2.1**). The majority of the area (2 ac.) contains Paola Fine Sand. This soil is described as excessively drained. The remaining less than 1 acre contains Pomello Sand, described as somewhat poorly drained, and St. Johns Sand, described as very poorly drained.

Table 2.1 Soils within Project Area

NRCS Code	Name	Drainage	AOI (acres)
43	Paola Fine Sand, 0-8 percent slope	Excessively drained	2
49	Pomello Sand, 0-5 percent slope	Somewhat poorly drained	<1
55	St. Johns Sand, depressional	Very poorly drained	<1

Map Unit Symbol	Name	Drainage
49	Pomello sand, 0 to 5 percent slopes	Somewhat poorly drained
55	St. Johns sand, depressional	Very poorly drained
43	Paola fine sand, 0 to 8 percent slopes	Excessively drained

Figure 2.1 Soil Types Mapped within the Project APE.

2.6 Vegetation

KSC is wholly contained within the Merritt Island National Wildlife Refuge (MINWR). The APE is situated in the north portion of the refuge. Portions of the APE were once citrus farms, and the vegetation throughout suggests prior clearing episodes. The APE is surrounded by development associated with KSC. Areas with established water control measures, such as drainage ditches, were used for citrus, truck crops, and rangeland. Natural vegetation incudes slash pine, cabbage palm, live oak, saw palmetto, laurel oak, wax myrtle, chalky bluestem, creeping bluestem, Indiangrass, little bluestem, pineland threeawn, southern bayberry, sweetbay magnolia, water oak, sweetgum, and panicum (**Figure 2.2**). Vegetation within areas of very poorly drained soils may also include cabbage palmettos, maples, gums, and Brazilian pepper with an undergrowth of vines, pineland shrubs, and ferns. Blue flags, rushes, sedges, and lilies are commonly found in depressions.

Figure 2.2 Vegetation

2.7 Faunal Resources

Numerous species of mammals, birds, and reptiles are found within the MINWR. Mammals living within the refuge include armadillos, bobcats, manatees, river otters, white tailed deer, rabbits, squirrels, raccoons, and opossum. Birds observed within the refuge include birds of prey such as the osprey, red-shouldered hawk, bald eagle, and American kestrel; shorebirds such as the killdeer, lesser yellowlegs, Wilson's snipe, and ring-billed gull; migratory birds such as the blue jay, barn swallow, tufted titmouse, Carolina wren, American robin, and pine warbler; and wading birds and waterfowl such as blue heron, white ibis, great egret, great blue heron, and many species of ducks. Reptiles include the American alligator, lizards such as anoles and skinks, over 40 species of snakes, and numerous turtle species such as Peninsula cooter, chicken turtle, snapping turtle, striped mud turtle, stinkpot, and gopher tortoise. Endangered species within the MINWR include the eastern indigo snake, the Florida scrub-jay, gopher tortoise, southeastern beach mouse, West Indian manatee, and wood stork (FWS 2020).

3.0 CULTURAL CONTEXT

The Merritt Island area has a long record of human occupation, which is reflected by the presence of numerous prehistoric and historic sites that are part of the area's rich archaeological heritage. Human occupation throughout the Merritt Island area spans from the first Native Americans of the Paleoindian Period over 12,000 years ago, the colonizing Spanish, the failed attempts of the colonizing French and their associated survivor camps, and the development of the US Space Program and US Air Force Space Wing during the Cold War through to the present day.

3.1 Pre-Contact Chronology

3.1.1 Paleoindian and Early Archaic (14,000 BP – 8,000 BP)

Florida has a rich Paleoindian history extending continuously from the late Pleistocene epoch into the early Holocene epoch (**Figure 3.1**). At early archaeological sites and isolated finds in Florida, diagnostic artifacts date from the late Pleistocene, including the Clovis fluted points and later lanceolate types. Tools of this period were constructed from a variety of natural resources. These tools were made from carefully chipped-stone into bifacial and unifacial tools (Purdy 1981), from ivory into foreshafts (Hemmings 2004), from bone into double-pointed points (Waller 1976), and from wood and other organic materials. However, the Florida Paleoindian occupation lacks good radiocarbon dates.

The projectile point sequence: Clovis to Suwannee/Simpson to Bolen notched points have a bracketed age between 11,000 BP and 10,000 BP (with Clovis being oldest). Stylistically, Clovis and Suwannee/Simpson points are lanceolates (attached to a spear), although Clovis are fluted and Suwannee/Simpsons are not. At the end of the Paleoindian period, smaller notched points, including the Bolen and Greenbrier, replaced lanceolates (Austin 2006; Powell 1990). Although Clovis remains as the earliest stylistically secure projectile point, "Pre-Clovis" occupation has been proposed for years at multiple sites in Florida, including Little Salt Spring (Clausen et al. 1979) and Page-Ladson (Dunbar and Hemmings 2004) as well as other sites in the Aucilla River in the Big Bend area (Dunbar 2006, 2007; Hemmings 2004). The closest site recorded as dating to the Paleoindian Period is the Sams Creek Fossil Site (BR1890) to the south approximately 9 miles (Digital Index of North American Archaeology 2026).

In recent years, several studies have examined genetic samples of modern Native Americans and ancient human skeletons indicating that the occupation of the Americas occurred at least 1,500 years prior to the Clovis complex, which has been confidently dated to ~13,000 calendar years before present (cal yr BP) (Halligan et al. 2016). However, until now this interpretation lacked actual archaeological evidence. The archaeological evidence of pre-Clovis occupation between 14,000 and 15,000 cal yr BP is very limited due to a number of factors but, as researchers have been saying for years, the two most important factors are the recognition and visibility of these sites. Most of these sites are theorized to be located in submerged areas, what underwater archaeologists refer to as drowned terrestrial sites. Recently, one suspected pre-Clovis site was revisited.

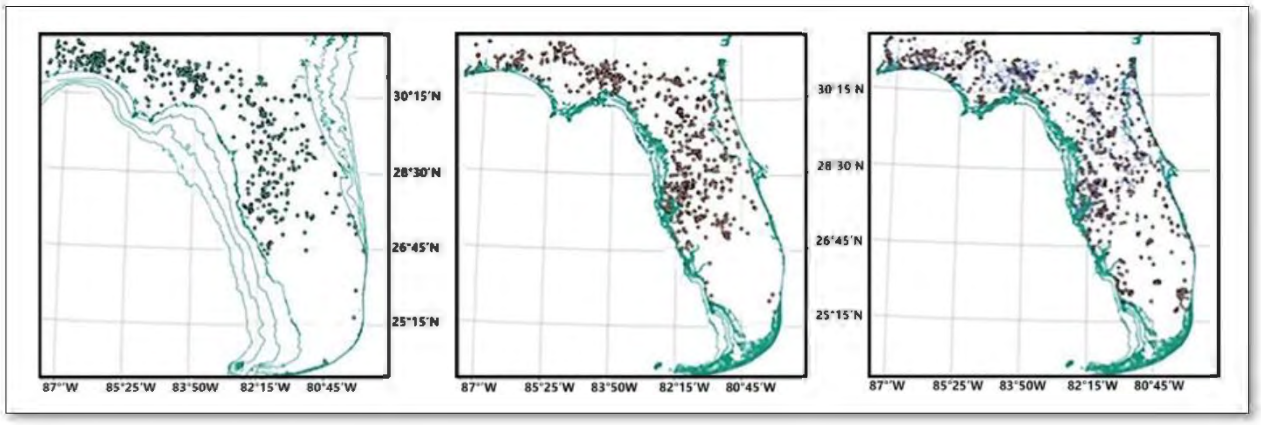

Figure 3.1 Culture Type Designations Queried from the FMSF: Paleoindian and Early Archaic Sites; Sites with Middle Archaic Designations; and Late Archaic with Middle Archaic Sites (Lydecker et al. 2011).

The Page-Ladson site in the Aucilla River in Florida's Big Bend region has yielded remarkable findings. Archaeologists from several universities, governmental, and non-governmental organizations have worked together, led by researchers from Florida State University and Texas A&M University, to conduct new excavations at this unique site. This site is under 9 m of water within a mid-channel sinkhole along a segment of the Aucilla River, about 11 km inland from the Gulf of Mexico. Although this site has been suspected to contain a pre-Clovis component since the discovery and recovery of a mastodon tusk that showed signs of butchering, no direct archaeological evidence has been found (Dunbar and Hemmings 2004). Recent publications have revealed the recovery of a biface knife in direct association with mastodon bones showing signs of blade marks from butchering (Halligan et al. 2016).

> "The findings prove that hunter-gatherers, butchered or scavenged a mastodon carcass at the sinkhole's edge next to a small pond at 14,500 cal yr BP. The record of human habitation of the Americas between ~14,000 and 15,000 cal yr BP is sparse but real. The rarity of these early sites along the Gulf Coastal Plan of North America is largely due to two factors: sediment preservation, and burial and submergence during the late Pleistocene transgression" (Halligan et al. 2016).

Little Salt Spring (8SO18) and Warm Mineral Springs (8SO19) are unique submerged terrestrial sites in Sarasota County. These two sites are spring-fed cenotes or sinkholes with anoxic subsurface environments within 4.8 km of each other. The anoxic environment results in some of the best-preserved artifacts and ecofacts known in the southeast (Wentz and Gifford 2007). Both sites also have suspected pre-Clovis occupations. One such artifact recovered from Little Salt Spring is a fire-hardened wooden stake, which was recovered in the late 1970s by Charles Clausen from the 27-m ledge. This stake was found in situ with an extinct giant ground tortoise in direct association with charcoal of a campfire, which could be radiocarbon dated. Archaeologists have also uncovered artifacts and tools never before seen due to the anoxic environment of the spring. One of the oldest artifacts from Little Salt Spring was recovered during excavations within the basin in spring 2004. A worked portion of a deer antler was recovered one meter below the sediment-water interface. Radiocarbon dating of an ecofact directly associated with the object was determined to be cal yr BP date of 10,560 to 10,253 (2 sigma; Claib Rev.6) (Gifford and Koski 2011). Investigations of these two sites have only scratched the surface. To date, only about 5 percent of Little Salt Spring has been excavated.

The transition from lanceolates to smaller notched points represents the end of the Paleoindian period (Austin 2006; Bullen 1975; Powell 1990), whereas lithic reduction strategies and contiguity from 10,000 BP to 9,000 BP represents a continuation of Paleoindian occupation of Florida (Lydecker et al. 2011:12). Early Archaic tool assemblages associated with Bolen points are well constrained stratigraphically and chronologically (10,000 BP to 9,000 BP) (Faught et al. 2003). However, unlike Clovis and Suwannee/Simpson lanceolates (Dunbar 1991; Thulman 2007), their spatial distributions have not been reconstructed for Florida. Numerous sites show at least semi-permanent occupation during this period (Faught et al. 2003), whereas other special activity sites and campsites in the Central Florida Highlands were used seasonally or to utilize a specific resource (Milanich 1994; Milanich and Fairbanks 1980).

Windover Pond is an Early Archaic mortuary pond in Brevard County. The site has produced a large variety of organic materials including 7,000-year-old human tissue, bone, antler, wood, and fabric made of saw palmetto and sable palm preserved in a peat bog. Evidence that their dead were buried underneath the peat deposits is present. The site has provided "unprecedented and dramatic" information about Early Archaic people in Florida (Milanich 1994).

3.1.2 Middle Archaic (8,000 BP – 5,000 BP)

In Florida, the Middle Archaic witnessed increased population growth and reliance on marine resources. Sites were expanded into the St. Johns River area, along the Atlantic coastal strand, and along the southwest Florida coast into south Florida (Milanich 1995:20).

During the Middle Archaic, Florida's eastern lakes were settled for the first time, and biface points were made with a stem for hafting rather than notching. Many archaic tools appear less carefully crafted and are expedient rather than consistent. New mortuary practices including the preservation of the skeleton in various positions were introduced, and populations grew much like those found at the Windover Pond site (Doran 2002). During this time, the second occupation of Little Salt Spring appears in the evidence uncovered by researchers from the University of Miami. Somewhere between 100 and 1000 submerged burials are estimated to be present at Little Salt Spring. Although evidence of this burial practice has been seen elsewhere in the world, in North America these archaic mortuary ponds are unique to Florida. Sites of a similar nature to Warm Mineral Springs, Little Salt Spring, and Windover Pond may be preserved on the submerged paleo-landscape offshore.

Maritime adaptations become increasingly apparent from 7,000 BP. Shellfish resources first appear in the archaeological record during the Middle Archaic. Extensive shell middens along the coast and canal systems connecting mangrove swamps were constructed by humans using the coastal zone. Middle Archaic sites, specifically shell middens, are plentiful and are found in a variety of locations in Florida (Milanich 1994). In at least three sites at Big Bend in Apalachee Bay, the shell middens continue offshore along relic river channels (Faught 1988, 2004).

Ground and pounded shell and limestone were increasingly used as raw materials to make tools during the Middle Archaic. In present-day Florida, evidence of lithic technology is meager during this period and pottery is absent from the record. On the other hand, excavations at the San Marco Island site found wood and plant fibers used for cordage and decorative items. The excellent preservation of these finds is due to the unusual anoxic environment in wetland muck. Wood was certainly made into many items of daily use and has been previously found in submerged settings (Lydecker et al. 2011).

Excavated artifacts made from limestone include plummets, grooved pebbles, net sinkers, and hammer stones. Large shellfish, including whelks and conchs (*Busycon*, *Strombus* and *Pleuroploca*) were modified/manufactured to make picks, adzes, celts, chisels, awls, gouges, knives, scrapers, cups, saucers, dippers, and spoons, and smaller shellfish are thought to have been used to make net weights, sinkers, and decorative beads (Kozuch 1992).

3.1.3 Late Archaic (5,000 BP – 3,000 BP)

The Late Archaic Period is characterized by greater cultural complexity after 5,000 BP (Milanich 1994). Extensive shell middens dating to the Late Archaic are found along the coast and inland waterways of Florida. In the Late Archaic Period, middle Archaic assemblages, including the expedient chipped-stone assemblage, continued (Hemmings and Kohler 1974), while new technologies were introduced to the region. The earliest ceramics tempered with plant fibers appear about 4,050 BP (2000 BC). Varying by location in Florida, these ceramics are referred to as Mount Taylor, Norwood, or Orange. The Late Archaic also sees the use of steatite cooking vessels (Milanich 1994; Powell 1990; Sassaman 2003) and shell middens made into circular features known as "shell rings" (Russo 2004).

While appearing first in Middle Archaic assemblages, socketed base points such as Culbreath and Levy are also consistent with Late Archaic settings. Hemmings and Kohler (1974) report these chipped stone assemblages as extensions of the expedient Middle Archaic tool kit. Late Archaic sites indicate that humans were hunting, fishing, processing food, manufacturing marine shell tools, building fires, and living along the developing Everglades tree island landscape more than 5,000 years ago. Several Late Archaic sites overlay pre-existing layers of organic soil, sediment, faunal remains, and cultural material, suggesting an earlier occupation during the Middle Archaic (Schwadron 2010).

Coastal occupation during the Late Archaic was more extensive than previous periods. Features including fish weirs, canals, platforms, ponds, and sluices appear in the archaeological landscape for the first time (Schwadron 2010).

The transition from the Archaic to the Woodland period in Florida is marked by increasing regionalization and the development of specific ceramic styles and variations. To understand these different traditions, Florida has been divided into nine cultural regions by Milanich (1994). Brevard County is within the East and Central region, which is further separated into the Indian River Culture Area. This region is centered on the Indian River and stretches from the north boundary of Brevard County south to St. Lucie Inlet, some 190 km. From east to west, it extends from the Atlantic seaboard to the upper St. Johns River basin, an average distance of about 50 km (45 SW 2020).

3.1.3.1 Mt. Taylor Period (6,000/5,000 – 4,000 BP)

At the end of the Late Archaic, Milanich (1994) uses the Mt. Taylor Period to differentiate and define the beginnings of identifiable regionalism in east central Florida. In the Indian River Culture Area, the end of the Late Archaic period has been associated with the Mt. Taylor regionalism (**Table 3.1**). It is heralded by the emergence of steatite vessels and ground stone implements. The presence of these artifacts in this region indicates that a long-distance trading network was established during this time. Mt. Taylor is the final preceramic culture in Central Florida and dates to the Middle and Late Archaic though the exact date is subject to debate (45 SW 2020). The subsistence strategies for people during this time are more closely related to that of the Late Archaic, indicating that it is more closely related to the latter phase, rather than the Middle Archaic (Cantley et al. 1994). Fish was the main food source, along with mammals, reptiles, birds, and amphibians (45 SW 2020).

This period is also identified with the rise of monumental architecture. Previously, shell mounds along the St. Johns River were assumed to only have been constructed during the post-Archaic periods and were associated with later cultures that used ceramics. However, recent research at shell mounds have identified purposely constructed shell mounds (some containing burials) that are older than 2,000 BP (45 SW 2020).

Sites representative of the Mt. Taylor Period include the Mt. Taylor Site (8VO19), Max Hoeck Site (8BR205), and Tick Island (8VO24). The Mt. Taylor and Tick Island Sites indicate that these people used charnel houses for preparing and storing their dead until mass burial plots could be constructed within shell middens (Cantley et al. 1994).

3.1.4 Orange Period (4,000 – 2,500 BP)

The introduction of clay pottery vessels emerges during the end of the Late Archaic Period during the Orange Period (45 SW 2020). This is the first pottery type to emerge in Central Florida and is typified by fiber-tempered pottery (Cantley et al. 1994). Little evidence of subsistence pattern differences has been found; therefore, the period is defined by the changes in pottery technology, decoration, and manufacturing methods. Although the patterns did not change, an increase in the use of shallow dwelling fish, snails, and mussels from freshwater marshes occurred (45 SW 2020).

The Orange Period is split into five separate phases based upon pottery styles (Orange Period I-V) (**Table 3.2**). Orange Period I ceramics are characterized by plain, hand-molded, thin-walled, rectangular containers with occasional lug-like appendages. Orange Period II ceramics are very similar to the previous period with the exception that in addition to plain wares, they also began to exhibit exterior decorations including incised, concentric, vertical diamonds with horizontal lines and spirals with background punctations. Orange Period III ceramics are distinguished by large, straight-sided and round-mouthed vessels with flat bottoms. The thickness varied, but the lips were always simple rounded or flattened. Exterior decorations are similar to the Orange Period II ceramics, with incised straight lines, some parallel and slanting, with occasional punctations or ticks. Orange Period IV ceramics had simple incised motifs, with sand and fiber tempers, constructed with hand molding (Cantley et al. 1994) and the first instances of coiling (45 SW 2020). Orange Period V (referred to as the Transitional Period by some researchers) ceramics exhibited hand-molded and coiled manufacturing methods with incised, pinched, and triangular punctated surface decorations. Sand and fiber were used as the tempering agents, like the ceramics of the previous Orange Periods. St. Johns chalky pottery is also associated with this phase, as well as Malabar I ware types (Cantley et al. 1994; 45 SW 2020).

Table 3.1 Prehistoric Culture Periods of the Indian River Culture Area (45 SW 2020)

Date BC/AD	Cultural Period	Cultural Traits	Diagnostic Artifacts
12,000-8,000 BC	Paleoindian	Small bands of migratory hunters and gatherers.	Fluted points: Clovis, Folsom, Dalton, Suwannee, and Simpson projectile points
8,000-2,000 BC 8,000 5,000 3,000	Archaic Early Archaic Middle Archaic Late Archaic Mount Taylor	Small groups of migratory hunters and gatherers living within smaller territories. Burials in ponds. Some evidence of aquatic resources exploitation early. Beginning of middens by Middle Archaic. Steatite vessels appear by Mt. Taylor. Regionalism begins.	Archaic stemmed points, steatite vessels
2,000-500 BC	Orange	First appearance of ceramics. Increased sedentism. Exploiting aquatic resources. Middens becoming commonplace.	Fiber-tempered pottery. Increased use of design motifs over time. Appearance of sand and mixed sand and fiber tempering late. Stemmed projectile points
500 BC-AD 900	Malabar I	Conditions similar to present. Continuation of hunter/gatherer/fisher subsistence. Villages with smaller special use camps. Burial mounds.	St. Johns Plan, Sand-Tempered Plan, Glades Plain, Sandy St. Johns, Dunns Creek Red (late)
AD 900-1565	Malabar II	First appearance of check-stamped ceramics. Large populations. Appearance of non-local objects. European artifacts 1513+. Wreck salvaging.	Stamped ceramics, Exotics (galena, copper, quartz crystals, etc.), European goods

Table 3.2 Orange Period Chronology (45 SW 2020)

Date BC	Cultural Period	Ceramic Attributes
2000–1650	Orange I	Hand-molded, flat-based rectangular shaped containers. They were undecorated with thin walls and the rim treatment was simple rounded lips.
1650–1450	Orange II	First use of decorations on ceramics. The decorations include concentric vertical diamonds with horizontal lines and some use of incised spirals and punctuations. Vessel forms were similar to Orange I.
1450–1250	Orange III	Large straight wall, rounded vessels with smooth surfaces and flat bottoms. Fewer rectangular vessels are found. Decorations on the ceramics are incised straight lines and some punctuation.
1250–1000	Orange IV	Coiling first appears as a method of manufacturing ceramics. It also signified the end of hand molding. By the end of this period, tempering begins to be a mix of sand and fibers (also known as semi-fiber tempered). Decorations on pots are simple incised motifs.
1000–500	Orange V	The end of the semi-fiber tempered ceramics and the appearance of chalky ware occurred, which is typical of the Malabar Period. Also, decorations and shapes of vessels are similar to Malabar Period wares.

3.1.5 Malabar Period (2,500 BP – 450 BP)

From the Orange Period, the Malabar Period evolved, which existed up until the arrival of the Spanish. Many researchers believe that several factors separate it from the St. Johns Culture Area to the north (45 SW 2020, Buchner et al. 2008, Cantley et al. 1994). The cultivation of corn is absent, and differences in linguistics, social activities, and religious customs are observed (Buchner et al. 2008). The period is marked by an increase of sand-tempered pottery, although spiculate-tempered pottery (St. Johns) was still dominant from Orange Period V.

The prevalence of sand-tempered Glades pottery in the southern portion of the region and St. Johns ceramics in the north portion indicate that the Indian River Culture Area was a transitional zone (45 SW 2020). Rouse (1951) was the first to describe the pre-Columbian cultures of the transitional Indian River area (**Figure 3.2**). This Malabar I period is coeval to the St. Johns I period. Malabar II, which is characterized by the appearance of St. Johns Check Stamped pottery, is temporally equivalent with St. Johns II (Penders 2012c).

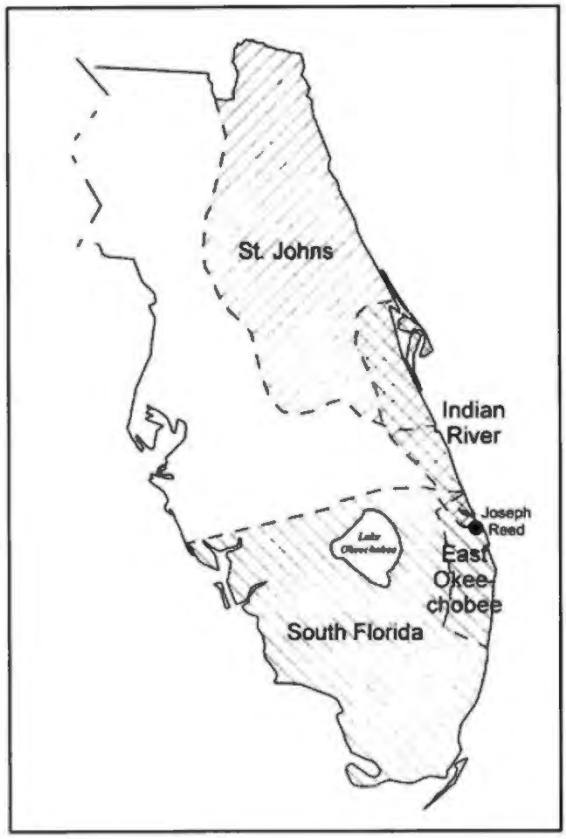

Figure 3.2 East and South Florida Culture Regions (St. Johns after Milanich 1994, Indian River after Rouse 1951, East Okeechobee after Carr and Beriault 1984, South Florida after Widmer) (Russo & Heide 2002:76).

A significant amount of undecorated pottery tempered with quartz sand also appears in the Indian River region. Indian River region ceramic samples have shown that both the St. Johns and quartz-tempered pottery are made from local clay sources, suggesting that one group made both wares (Milanich 1994).

The Malabar Period is divided into two sub-periods or phases, Malabar I and Malabar II, which are further divided into Ib and IIb respectively (**Table 3.3**). In the past, the Malabar Period has been seen as temporally equivalent with St. Johns, but recently the chronology has been further differentiated by research in the region (45 SW 2020).

3.1.5.1 Malabar I (2,500 BP-1,500 BP)

Malabar I is mainly defined by the presence of chalky, sponge spicule ceramics. Some fiber-tempered wares are present during this phase, but this is likely transitional from the prior period. The decorative motifs are linear and continue through Malabar II. Climate change from the Roman Warm Period may have caused an occupancy shift to the Indian River Lagoon area and on the coastal barrier islands (45 SW 2020).

Some influence from the Weeden Island and Yent complexes is apparent, but the degree of influence seems to be minor. Exotic goods resulting from trades with other cultures is rare and comprise of a very small percentage of the archaeological record (45 SW 2020).Malabar Ib is noted more by the brief presence of Dunns Creek Red ceramics rather than any other cultural identifier. During this short span (1,500–1,100 BP), the ceramic appeared and disappeared. What caused the short-lived pottery is unclear, but it may have to do with the climate shift to cooler and drier environments during the Vandal Minimum Period (45 SW 2020).

Table 3.3 Malabar Period Chronology (45 SW 2020)

Date BC/AD	Climatic Period**	Malabar Subperiod	Cultural Traits	Diagnostic Artifacts
500 BC–AD 900	Roman Warm Period (ca. 350 BC-AD500)	Malabar Ia	Conditions similar to present. Continuation of hunter/ gatherer/ fisher subsistence. Villages with smaller special use camps. Burial mounds.	St. Johns Plain, Sand-Tempered Plain, Glades Plain, Sandy St. Johns
AD500–900	Vandal Minimum Period (ca. AD 500-850)	Malabar Ib		Dunns Creek Red
AD900–1050	Medieval Warm Period (ca. AD850-1200)	Malabar IIa	Though check-stamped sherds appear as early as AD750, recent dates suggest a correlation between their widespread use and the start of the Mississippian Period. Large populations. Some non-local artifacts or local copies.	Check-stamped ceramics. Very few exotics (galena, copper, quartz crystals, etc.),
AD1050–1513	Little Ice Age (ca. AD 1200-1850)		European artifacts 1513+. Wreck salvaging. Populations were declining due to introduced diseases. Burial customs declined, and burials were placed in old existing mounds.	Some exotics of Native American origin early. European goods late.
AD 1513–1565		Malabar IIb		

*This revised chronology is based on Penders et al. 2009; Penders 2012a.

**The climate periods are from Marquardt and Walker 2012.

3.1.5.2 Malabar II (1,100 BP-450 BP)

Malabar II is indicated by population growth and an increase in mounds and villages during the earlier portion of the Period. The phase is also hallmarked by the presence of check-stamped ceramics, which appeared in the St. Johns region in AD 750, but did not appear in the Indian River Culture Area until 900 AD. This corresponds to the dawning of the Mississippian period and the Medieval Warm Period (45 SW 2020). In many nearby regions, this warmer weather resulted in the further cultivation of corn, but that did not seem to be the case in the Indian River Culture. Instead, the consumption of shallow-water fish within freshwater wetlands increased, which suggests a population increase.

Malabar IIb is largely distinguished archaeologically by the appearance of European goods, acquired via trade or salvage of shipwrecks. The cooler and drier climate of the Little Ice Age during this time did not seem to have much of an effect on subsidence strategies. By the end of Malabar II, populations were decreasing, possibly due to the introduction of new diseases by the Spanish. By becoming proficient wreckers, the acquisition of European goods changed the socio-political network of the region. The new trade network established by European goods could have been farther reaching than those established in the Mississippian Period (45 SW 2020).

3.2 Historic Chronology

3.2.1 Contact Period (CA. 1500–1565)

The Florida peninsula first appeared in cartography in 1502 on the Cantio map and in 1507 on the Waldseemüller map (Lydecker et al. 2011:19) (**Figure 3.3).** Although when Europeans first made contact with Florida's native tribes is unknown, Juan Ponce de León made the first "authorized discovery" of Florida in 1513 (Griffin 1983:18; Turner 2013). Before that documented voyage, Spaniards were certainly using Florida as a staging ground to capture slaves and possibly provision their ships, as had been practiced extensively in the Bahamas for some time. The exact location of Juan Ponce de León's initial landfall remains unknown, but judging from the latitude recorded in his log the prior day it would have been somewhere close to present-day Ponte Vedra, north of St. Augustine. He claimed the "island" for Spain and named it La Florida, because it was the season of Pascua Florida ("Flowery Easter") and because much of the vegetation was in bloom. He then explored south along the coast, around the Florida Keys and north up the west coast of the peninsula, before returning to Puerto Rico.

Ponce de León, like other conquistadors in the Americas, was likely looking primarily for gold, natives to enslave, and land to govern under the Spanish crown. Accounts of the Ponce de Leon voyage describe interactions with the Ais Indians, the tribe occupying the central east coast of Florida at the time (Rouse 1951). Ponce de Leon attempted to land at the St. Lucie Inlet where he encountered the Surruque Ais (Davidson 2001). After Juan Ponce de León's journey, a series of increasingly ambitious Spanish expeditions led by Pánfilo de Narváez (1528), Vazquez de Allyon (1526), Hernando de Soto (1539-1540), and finally Tristán de Luna (1559) explored Florida and parts of the southeastern United States (Meide et al. 2010:19).

Figure 3.3 The New World as it first appeared on the Waldseemüller Map in 1507 (Lydecker et al. 2011).

3.2.2 First Spanish Period (CA. 1565–1763)

By the mid-sixteenth century, Spain emerged as a leading power with its foundation in trade and plunder from the Americas. The neighboring country of France noticed this rapid rise and sought a thriving empire of its own by setting sail to this new land. On May 1, 1562, an expedition of French Protestant Huguenots under Jean Ribault's

command found and explored a large deepwater river in northeast Florida. Two years later, the French successfully established Fort Caroline on the River May, in north Florida, with three hundred settlers under the command of René Goulaine de Laudonnière, establishing a large French presence in Florida (Bennett 2001:19-20; de Bry and Meide 2014).

By this time King Philip of Spain felt an acute need to establish a coastal stronghold in the territory he claimed as *La Florida*. This time Spanish forces would attempt to settle the Atlantic rather than the Gulf coast of Florida. A military outpost on the Florida coast could suppress piracy along Spain's Gulf Stream shipping routes and serve as a base for staging rescue and salvage operations for the increasing number of ships cast away on Florida's dangerous shoals. Don Pedro Menéndez de Avilés was charged with the task of establishing a Spanish foothold on Florida's Atlantic coast and completely eradicating the French enterprise (Lyon 1976). Menéndez' fleet arrived almost simultaneously with a French re-supply ship led by Ribault, setting the stage for a rapid and bloody encounter between the two colonial powers. Ribault's fleet aimed to strike first but was ravaged by a hurricane that wrecked his ships to the south toward Canaveral. The survivors were executed by Menéndez, who had sacked Fort Caroline and ensured the survival of what would be the first Spanish settlement attempt in the United States to persist to this day, St. Augustine (Lyon 1976; Gannon 1983; de Bry and Meide 2014).

After the founding of St. Augustine, Menéndez explored the west coast of the Florida peninsula, guided by Hernando de Escalante Fontaneda. Fontaneda had, at the age of 13 in 1549, survived a shipwreck on the southwest coast of Florida. A concerted effort to document the Canaveral area and the Ais groups living there came in 1605, when Spanish soldier Alvaro Mexia traveled through the region with the goal of making allies with the native groups against the Dutch, French, and English (Dubcofsky 2011:34).

During the 1600s and 1700s, the Spanish, French, and English continued to fight over territory and religion in Florida. The English, established in South Carolina by 1670 and thereafter in Georgia, attempted to push south while the French moved east along the Gulf Coast from the Mississippi River valley. The Spanish would strengthen their hold in the Gulf with the founding of Pensacola and its fortifications beginning in 1698, but it remained tenuous, as evidenced by the inability of Spain to defend the Apalache mission system, which was abandoned when attacked by Governor Moore from South Carolina in 1704 (Hann 1988:264-317). Forts and missions were established throughout La Florida extending in all directions with St. Augustine being the epicenter. (Hann 1988:326-327). However, the Ais' territory near Canaveral is conspicuously void of both forts and missions. The Ais Indians maintained control of the Cape Canaveral area throughout the First Spanish Period, with their populations fluctuating throughout the decades.

At the close of the Seven Years War in 1763, in accordance with the Treaty of Paris, Spain ceded its Florida territory to the British and withdrew its garrisons from these remaining outposts along the Gulf of Mexico (Florida Department of State 2020a).

3.2.3 British Period (CA. 1763–1783)

Between 1754 and 1763, war ensued between the major powers of Europe, with the New World colonies of those powers serving as the predominant theaters for the war. The Seven Years' War, also called the French and Indian War in North America, concluded with Great Britain defeating the allied French and Spanish. Peace was signed with the 1763 Treaty of Paris, in which Great Britain gained control of significant land in the New World, including Florida. This transfer of power heralded a shift in the population of Florida, with many Spanish and allied native

residents departing and being replaced by British colonists. Britain divided its new territory into two colonies, West Florida with its capital at Pensacola and East Florida with its capital at St. Augustine (Schafer 2001).

Initially, the British viewed the Floridas as backwater colonies neither self-sufficient nor export-producing. Dismissive of Spanish colonial management, British authorities set out to transform their new possessions into profitable colonies. As successful as this effort was in the regions around St. Augustine and Pensacola, the British made little economic impact at the south end of the peninsula.

During this time, the Creek Indian tribes of the Carolinas, Georgia, and Alabama began to migrate to the Florida peninsula, filling the void left when the Spanish were evacuated from Florida to Cuba. The departing Spanish had taken with them most of the original tribes native to La Florida. Little information is in the historical record from those who remained after the Spanish succession. The Creek peoples in Florida would eventually become known as Seminoles and Miccosukee.

The British would make notable efforts to map the region, and one result of this was the anglicization of place names in the area. One government surveyor, Bernard Romans, conducted extensive surveys of the central and western areas of the peninsula between 1769 and 1772, producing detailed maps (Romans 1999[1775]:88, 338) (**Figure 3.4**).

Figure 3.4 **Bernard Romans' General Map of the Southern British Colonies (1776) (Note the peninsula labeled as Cape Canaveral on the eastern coast, lies west of our project area).**

British rulers promoted population growth in East Florida with large land grants. The largest British plantation to the project area was granted to Dr. Andrew Turnbull, a Scottish physician. Dr. Turnbull, with a grant of 60,000 acres and over 1,200 colonists from the Mediterranean region, attempted to establish an agricultural colony in 1768 at New Smyrna, at the north end of the Indian River above Cape Canaveral. The colony produced indigo, sugarcane,

hemp, and rum but was ultimately unsustainable. Fleeing disease, overwork, and a lack of food, the roughly 600 remaining colonists abandoned New Smyrna for St. Augustine by 1777 (Tebeau 1971).

Realizing that citizens from the British Isles might have difficulty with the heat and humidity in Florida, Turnbull resolved to use Greeks, who were accustomed to such conditions and knew how to cultivate olives, cotton, madder, and tobacco, as settlers. He had experience with the Greeks because his wife was Greek. He received large grants of land near the Ponce de Leon Inlet (near present day Daytona). His plans called for 500 Greek settlers to cultivate crops that would thrive in the Florida climate. He called his colony New Smyrna after the birthplace of his wife.

Turnbull recruited 1,403 colonists from the Mediterranean region, which included Greeks, Italians, and Minorcans, to establish an agricultural town in New Smyrna at the north end of the Indian River above Cape Canaveral. The group encountered problems almost immediately. A ship carrying supplies wrecked before it reached the colony. A total of 148 settlers died during the voyage from Minorca to New Smyrna. When the colonists finally reached their destination, they were met by mangrove swamps. The land had not been cleared, and food was inaccessible. The swamps had to be cleared and shelters built for the colonists. Despite the abundance of food in the area, the colonists were not allowed the time to gather, hunt, or fish. These conditions led to a minor revolt by about 300 colonists. They rioted, seized a ship, and sailed south. A British frigate captured the escapees and brought them to St. Augustine. Two rebels were executed, and the rest were returned to New Smyrna. Life at the colony continued to be difficult. The work was hard, food continued to be scarce, and malaria was rampant. In the first year, an additional 450 colonists died (Tebeau 1971).

The colonists who were deemed not to be working to their capacity were beaten, confined in stocks, or chained to heavy iron balls. Some were chained to logs in the fields to continue their work. Turnbull used his overseers to enforce his judgements, and often they exceeded their master in severity. Despite this, New Smyrna was the most profitable indigo plantation in North America.

All the colonists had signed letters of indenture with Turnbull. They would work for a set number of years. At the end of that time, they would be released from the indenture and Turnbull would give them a small plot of land of their own. The more skilled, such as blacksmiths and carpenters, had shorter terms of indenture. As the terms of indenture ended for the more skilled colonists, they approached Turnbull for their discharge and land. Invariably they were imprisoned and forced to sign new indentures. Eventually the colonists were afraid to ask for their discharge.

In 1777, a group of English from St. Augustine came to New Smyrna to examine the colony. A young boy overheard these gentlemen say that if the colonists knew their rights, they would not suffer the slavery in which they found themselves. The boy told his mother, who discussed the matter with other colonists. They decided to see what could be done. On March 25, 1777, three of the men got permission to go to the coast to hunt for turtles. They were granted permission and went to the coast, but they turned north and went to St. Augustine where they sought an audience with Governor Tonyn asking for justice because their terms of indenture had expired. Governor Tonyn promised to protect their rights. Several factors that came into play – the conditions at New Smyrna, the need for men to protect Florida because of the outbreak of the American Revolution, and antagonism between Tonyn and Turnbull – led Governor Tonyn to liberate the New Smyrna colonists. During May and June 1777 most of the colonists migrated to St. Augustine, and by July 17, 1777, Turnbull's attorneys had set all the colonists free. In its ten years of existence, 964 colonists died at New Smyrna (Ancestry n.d.).

A map surveyed by William de Brahm and drawn by John and Samuel Lewis depicts several smaller land grants between the project area and New Smyrna. These grants were between 10,000 and 20,000 ac and were likely given to the grantees but never occupied. The grantees include Thomas Bradshaw, with 10,000 ac on the west bank of the Indian River, and Samuel Barrington, Captain John Jervis, William Henry Ricketts, and Colonel William Faucitt, each with 20,000 acres (Lewis and Lewis 1769). Bradshaw's grant was the closest to the project area at a distance of 26.3 km.

Farther north, in the vicinity of the present Haulover Canal, two grantees developed their grants into plantations. Robert Bissett received a 300-ac grant in 1768, which he named Mount Plenty. The grant was not settled until 1777 and was only inhabited and worked for two years before it was raided by a "Spanish privateer" and abandoned shortly after. The plantation was reported to include a dwelling, a storehouse, a kitchen building, a hen house, and a stable. Bissett also claimed to have enough houses to accommodate 70 slaves. "He claimed to have built three sets of indigo vats and cleared 143 acres" (Parker 2008:30). Bissett made claims to the British government in hope of receiving compensation for losses, but this did not occur because Great Britain evacuated the Floridas when it ceded the Floridas back to Spain at the end of the American Revolution (Siebert 1929).

The second grantee of note in this area was William Elliot. Elliot's plantation was "a few miles south of the Bissett grant" (Parker 2008:30) and was developed into the first sugar plantation in British Florida. It was, at the time, the "southernmost plantation along the Atlantic coast during the British occupation of Florida" (Parker 2008:30). Elliot hired John Ross, a native of Scotland, to travel to Florida and "select and settle tracts of land in Florida." Ross selected a tract on the Halifax River approximately 85 miles south of St. Augustine. The land was called Stobs in honor of the Elliot family land in Great Britain. Elliot also ordered Ross to "purchase enslaved Africans in Georgia for his labor force" (Parker 2008:31). The slaves were to begin by constructing their lodging prior to clearing the land for "provision crops and indigo" (Parker 2008:31). These tasks were completed by the end of 1768. "Five years later, the Kings Road would be completed between St. Augustine and its southern terminus: Stobbs Farm" (Parker 2008:31). Following limited success with indigo, Ross began draining the wetlands at the plantation for the creation of sugar fields and possibly rice fields. He also created a canal network to irrigate the indigo fields. In 1771, Ross constructed "'a complete sugar works: one large mill house, one boiling and curing house and twenty-eight Negro houses'" on a previously undeveloped 1,200-ac tract that abutted the west edge of Stobbs and extended to the marshes of the Indian River (Parker 2008:31). This would become the first sugar works in East Florida and the oldest standing sugar processing facility. The plantation was moderately successful throughout the 1770s and produced both sugar and rum for export to England. As with Bissett's plantation, production ended with the raid of the "Spanish privateer in November 1779 (Parker 2008:31).

Ruins of the plantation, just beyond the boundary of the MINWR, have been recorded as site 8Vo160. Excavations conducted in 2008 also recorded the Elliot Plantation Complex (8VO9407), a multi-component archaeological site that includes nine sites consisting of the remains of the sugar mill (8VO160), Ross Hammock Midden (8VO130), Ross Hammock Indian Mounds (8Vo131), a salt evaporating plant (8VO213), sugar factory village (8VO9403), sugar factory canals (8VO9404), Ross Hammock canals (8VO9405), and Plantation Road (8VO9406). Three of the sites (8VO130, 131, and 213) are in a multiple National Register of Historic Places (NRHP) listing (8VO2569).

East Florida played a very small role in the American Revolution with the colony still so dependent on oversight and supplies from Great Britain. The last naval battle of the war took place off the coast of Cape Canaveral more than one month following the official end to the conflict.

3.2.4 Second Spanish Period (CA. 1783–1821)

The 1783 Treaty of Paris marked the end of the Revolutionary War and the beginning of the Second Spanish Period in Florida history, with the colony serving as a reward for Spanish efforts in aid of the United States. British loyalists, many of whom recently moved to Florida to escape revolution fervor in other British colonies, now had to leave again. The Spanish government attempted to populate their recovered territory the same way the English had, through land grants, but they could not keep up with the influx of American settlers moving south. During this period, Spanish leadership had some difficulty unifying and exercising control over the diverse groups then living in Florida: Spanish moving back in from other parts of the empire, Americans, Minorcans remaining from the British period, free blacks, and Seminole and Creek Indians, many of whom preferred the trading relationships they had developed with the British (Tebeau 1971).

The new Spanish governor in St. Augustine, Vicente Manuel de Zéspedes y Velasco, wrote that in 1785 Florida "was a province that has just died for England and is in the process of being reborn for Spain" (Lockey and Caughey 1949:728). After overseeing the evacuation of British subjects over an 18-month period (those who decided to leave and forfeit their property rather than stay and swear loyalty to Spain), Zéspedes' priority was to make Florida a secure, stable, and prosperous settlement. Florida was once again under Spanish control. However, Spain chose to keep the English divisions of the territory in place, leaving the state split into East and West provinces (Tanner 1989; Cusick 2000:173).

In many ways, the Florida colonies were once again a series of military outposts on the fringe of Spain's New World Empire. Numerous late 18th-century accounts note the military and backwater nature of East Florida's provincial capital, typified by this 1785 description: "All are either in service of the garrison, or live on a small liquor trade or other mercantile business of little consequence" (Lockey and Caughey 1949:481). This early characterization was no doubt to some degree the result of the massive population loss that occurred when the multitude of British subjects left the Floridas for the Bahamas or other British colonies (Poitrineau 1988).

To counter this population and economic loss, the Spanish government enacted a series of policies designed to encourage immigration and settlement of uninhabited areas. Tax exemptions, land grants, and subsidies were used to entice Catholic immigrants, and non-Catholics were for the first time allowed to own land. Many *Floridanos* (persons born in Florida under the first Spanish regime) returned from Cuba to either set up new plantation or acquire lands previously held by the British (Landers 2000a:121). Some new immigrants, including the wealthy *Floridano* Francisco Xavier Sánchez, maintained large ranches with herds of cattle (Landers 2000b; Parker 2000). Other settlers who arrived as indentured servants were upwardly integrated into the new Spanish society, most notably St. Augustine's substantial Minorcan community, who became landowners by investing in farming, fishing, business, and maritime commerce (Griffin 1991; Cusick 1993).

While the slave-based plantation economy was now firmly entrenched in Florida, Spanish authorities until 1790 continued to honor the 17th-century amnesty for runaways from adjacent territories willing to convert to Catholicism. The first to make the transition from slave to free subjects were the Africans brought by British loyalists during the Revolution, who subsequently escaped. Some 250 of these maroons were granted freedom, forming the nucleus of Florida's free black community in the Second Spanish Period. Among them were "skilled carpenters and masons, hostlers, hunters and fishermen, sailors and soldiers, ranch foremen, butchers, shoemakers and tanners, and field hands" (Landers 2000a:122). Florida's planters, laborers, merchants, hunters, and mariners formed a diverse community during the Second Spanish Period and included Anglo-Americans, Creek or Seminole

Indians, Minorcans, Greeks, Italians, Canary Islanders, African Americans, and, after 1800, French, Irish, Scottish, and Americans (Griffin 1983; Cusick 2000:179). Many U.S. citizens took advantage of the situation, pledging oaths of loyalty in order to gain fertile lands in Florida.

Both East and West Florida struggled to become the populated economic centers that the Spanish authorities intended. West Florida settlers enjoyed only limited success with staple crops and exports of tobacco, lumber, indigo, and cotton. One of the most important commodities in West Florida became deerskins. This trade, monopolized by the Panton, Leslie, and Forbes Company, provided various finished goods to the Creek Indians in exchange for the skins from the white-tailed deer, which were highly valued in the overseas market (Meide et al. 2010). Traders provided guns, knives, needles, cloth, liquor, cookware, and other manufactured goods in return for a seemingly endless supply of dressed deer pelts. Although lucrative for the company, this did not result in prosperity for the Floridas as a whole. Most of the Panton, Leslie, and Forbes employees lived as resident traders inside Indian villages and operated under the careful watch of Creek leaders.

Following the 1807 halt of slave importation to the United States, Florida became an unregulated epicenter for illegal trade. The first significant European incursions into modern-day Brevard County occurred during this time, with the Reyes Grant plantation (1804–1835) on 1,000 acres at the north end of the Indian River and the Delespine Grant of 1817 including 40,000 acres around the Titusville area (45 SW 2020). An 1834 map by Henry Schenck Tanner and an 1845 map by Joseph Meyer (1845) illustrate Mosquito County, marking the Delespine Grant inland from Cape Canaveral and Flemings Grant farther south, both on the Indian River (**Figures 3.5** and **3.6**).

The United States increased pressure to acquire Florida during this period in several ways and for several reasons. Tensions were growing between American settlers and Seminole Indians along the north border of the Florida territory. Spain became an ally with Great Britain against France in the Napoleonic Wars, and the fear was that Britain would use Florida to launch attacks against the United States. Slaveowners in the southern states disliked having free blacks who owned guns living so close by. The use of the port at Fernandina for smuggling goods and slaves into the United States was becoming a large problem for trade oversight (45 SW 2020; Tebeau 1971). Gaps in Spanish control of Florida became increasingly apparent through the Patriot War (1812–1814) and the War of 1812.

Following the War of 1812 between the United States and Britain and the related Creek War (1813–1814) between the United States and Creek Indians in Alabama, armed parties of American slaveowners began to cross the border into Spanish Florida in search of their runaway African American slaves. These maroons often joined with Creek or Seminole tribes in Spanish Florida, many of whom had fought against the United States during the Creek War and became known as Black Seminoles. Armed by British traders, the Seminoles and Black Seminoles continued to commit raids across the United States side of the border. The cross-border raids by both sides became increasingly bold, and the United States Army under the command of General Andrew Jackson invaded Spanish Florida on multiple occasions between 1817 and 1818 to fight against the Seminole and their African American allies. Collectively, these battles came to be known as the First Seminole War (1816–1819). With the widespread burning of Creek towns and the capture and occupation of the Spanish Fort San Marcos and later Fort Barrancas at Pensacola, it became increasingly obvious to Spanish authorities that they could not effectively defend their territories against incursions from the United States. To make the best out of an inevitable outcome, Spain entered negotiations with the United States and by 1819 had tentatively agreed to transfer Florida to the United States under the terms of the Adams-Onís Treaty. The treaty was ratified in 1821, and Florida was surrendered to the jurisdiction of the United States (United States Department of State 2020).

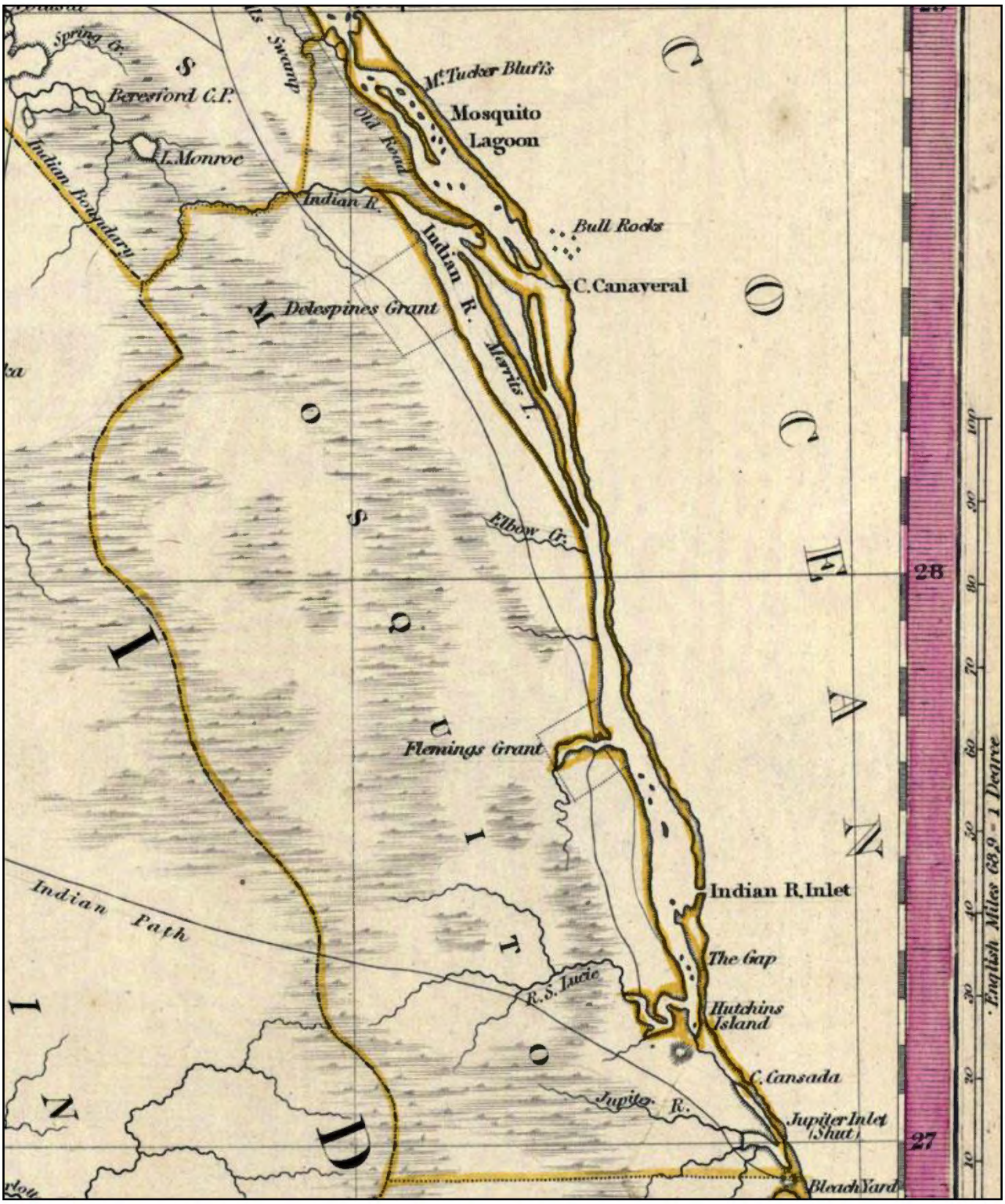

Figure 3.5 **1834 Map by Henry Schenck Tanner showing Delespine Grant and Flemings Grant (Map courtesy of the University of South Florida, Special Collections Department).**

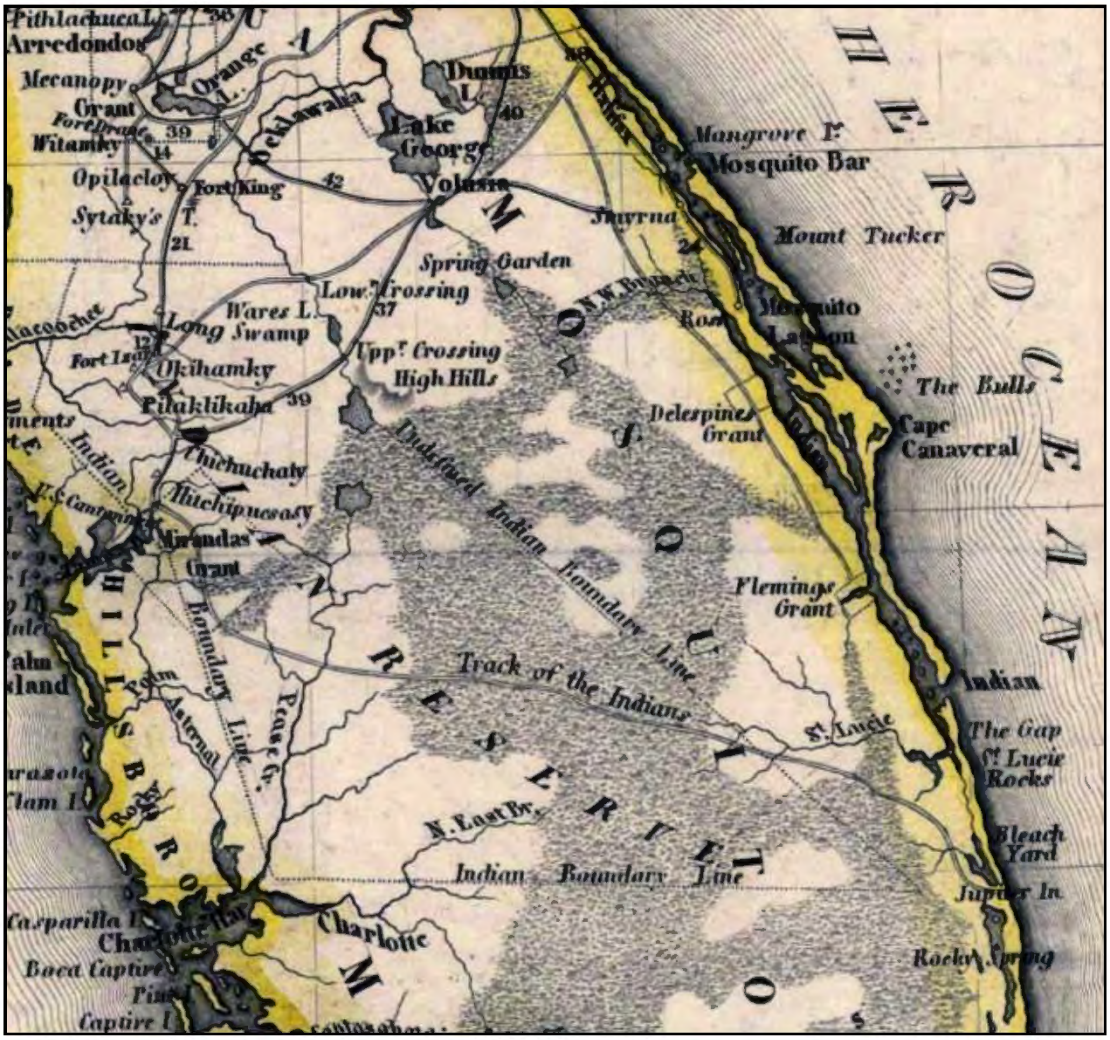

Figure 3.6 1845 Map by Joseph Meyer showing Delespine Grant and Flemings Grant (Map courtesy of the University of South Florida, Special Collections Department).

3.2.5 American Acquisition, and Settlement (CA. 1819–1845)

Responsibility for establishing Florida's new government was given to Andrew Jackson. Within weeks, he had divided Florida into two counties. The area previously called West Florida became Escambia County, and the former East Florida became St. Johns County. Jackson established county courts and mayors in the former colonial capitals of St. Augustine and Pensacola, which were joined with a new capital established at Tallahassee, halfway between St. Augustine and Pensacola. He appointed William Pope DuVal his successor as Florida's governor. Florida became an official territory of the United States on March 30, 1822 (Florida Department of State 2020b; United States Department of State 2020). New county divisions were created across the territory, and in coming decades, the Merritt Island area would go through several county designation changes (St. Johns, Mosquito, Orange, Volusia, and finally Brevard).

Florida's population grew quickly during this period from under 8,000 in 1821 to 34,530 by the 1830s. Cotton, lumber, and the naval stores industry emerged as important economic forces in the territory, joining citrus, fishing, and other colonial period agricultural products (Gannon 2003).

Florida joined the Union as the 27th state in 1845, becoming a slave state balanced by the admission of Iowa as a free state. In the years between achieving statehood and joining the Civil War, significant energy in Florida was focused on economic and social development. Large numbers of schools, churches, and newspapers were established and formalized in new and growing cities, and the population of the state doubled between 1845 and 1860, with nearly half of that population being slaves (Gannon 2003).

3.2.6 The Second and Third Seminole Wars (CA. 1835–1865)

Around 5,000 Seminoles were living in Florida when it became a U.S. territory in 1821. The explicit position of the government was that these Indians should be removed to make way for anticipated waves of white settlers into the new territory. Sharing this motivation were politically powerful slaveowners who wanted to eliminate the refuge for runaway slaves that the Seminoles provided. The first step was to confine the Seminoles to a 4,000,000-acre reservation taking up much of the central portion of Florida, south of present-day Ocala. This was accomplished through the Treaty of Moultrie Creek in 1823, though not all Seminoles complied because the reservation did not suit the tribes' needs or their accustomed means of subsistence by the sea. Once vacated by the Seminoles, Tallahassee became the new territorial capital (Florida Center for Instructional Technology 2002).

In 1829, Andrew Jackson became President of the United States and pressed to have the Indian Removal Act passed by Congress, which would open the entire eastern United States for settlement by Americans and Europeans. It became law in 1830, mandating the forced migration of the Seminoles from Florida to Indian Territory in present-day Oklahoma. Its implementation would lead to the Second Seminole War in 1835 (Mahon 1967). One of the most vocal opponents to Indian Removal policy and a warrior leader of the resistance was Osceola. He plotted the attack known as Dade Battle near Bushnell, which made clear that war was the only means to force the Seminoles from Florida (Florida State Parks 2020).

The war devastated much of Florida, gathering national attention as plantations were burned to the ground amid devastating raids and slave revolts. In February 1836, a Baltimore newspaper lamented that "the whole of the country, south of St. Augustine, has been laid waste during the past week, and not a building of any value left standing. There is not a single house now remaining between this city and Cape Florida, a distance of 250 miles... [A]ll, all, have been burnt to the ground" (Niles Weekly Register 1836). In Mosquito County, which includes present day Brevard County, the area was "sparsely populated with mostly sugar plantations along the rivers near the coast. Seminoles ransacked or burned 16 of these plantations on the northern Mosquito Lagoon by January 1836" (Eriksen 1994:36).

Several forts were constructed in east Florida in support of the war. These included Fort Ann, Fort Pierce, Fort Taylor, Fort Christmas, and Fort Bassinger. Fort Ann was constructed in December 1837 at the haulover on the Indian River side of the crossing. "The intent was to erect a fortified depot that would serve as a place to supply troops continuing down the Indian River" (KSC 2024). At the time of its completion, 900 troops were in place at the haulover. The fort was abandoned in 1838 but used again as a Union camp during the Civil War and as a station for the U.S. Schooner Beauregard to prevent trafficking on the inland waterway.

Devastation from the war, along with a postwar hurricane in 1848, caused many people to refrain from building homes or businesses outside the fort (McKay 1924). After the Civil War, the area saw significant growth again.
As regular army troops and state militias were mobilized and sent into action, the Seminoles were slowly forced to the south, seeking refuge in the swampy wilderness. Several pitched battles were fought in the Everglades region, most notably the Battle of Lake Okeechobee on Christmas Day 1837.

With most of its remaining Seminole inhabitants, perhaps 300–400, restricted to a 2,500,000-acre hunting and farming reserve in southwest Florida, the territory saw the passage by U.S. Congress of the Armed Occupation Act. Designed to stimulate white immigration and pressure the remaining Seminoles to leave the territory, the law provided men willing to settle on the Florida frontier with 160 acres of land. Most of those taking the proffered lands engaged in agriculture, such as Robert Gamble who settled on the Manatee River in 1844 to grow sugarcane and whose holdings eventually grew to 3,500 acres (Schene 1981:69-76). Thereafter economic development progressed rapidly in Florida. The population passed 54,000 by 1840, and soon after the war, on March 3, 1845, Florida's legislature applied for and was granted entry into the United States as the nation's 27th state. Over the next 15 years, St. Augustine was eclipsed by rapid economic growth in the Gulf Coast, particularly Apalachicola and St. Marks. Devastated by the Seminole War, many of the plantations around St. Augustine would never recover. Complicating the recovery were property claims from the Second Spanish Period while middle Florida (with equally rich agricultural land) benefited from a good infrastructure and readily available land.

With the increase in population, tensions inevitably grew amidst reports of "Indian Rebellions" in south central Florida. Indian territories continued to be encroached upon, and the almost inevitable Third Seminole War broke out in 1855. Also known as the Billy Bowlegs War, this conflict saw Indian troops pushed even farther south, and eventually another 200 Indians surrendered and were removed to Oklahoma. Despite the defeat, a small group persisted in the swamps of south Florida in land impassable for federal troops. The descendants of these unconquered warriors are the modern Seminoles and Miccosukee (Clement 2020).

Haulover Canal

The Haulover Canal is located at a narrow spot of Merritt Island that was used as a boat "Haul over" as early as the 1600s. Boats were moved overland from the Mosquito Lagoon to the Indian River using rollers and skids. The difficulty of this process caused residents and businessmen to discuss a canal, and although recommendations for a canal were made as early as 1824, an appropriation was not passed until 1844 and the canal was completed in 1854. The canal was excavated by slave labor provided by a local citrus grower and measured 1/3 mile in length, 10–12 ft in width and 3 ft deep, and allowed shallow draft vessels to cross from Mosquito Lagoon into the Indian River (Foster 2013b:18). "Within 15 years, the canal proved to be inadequate because of the shoals that accumulated at each end and the strong current. It was so narrow and shallow in places that only small boats could navigate it. Waters of the Indian River were usually two or 3 feet higher than the lagoon, with a strong current thus making it difficult for vessels trying to move against it, some slumping occurred, and bigger boats had to be pulled through or 'hauled over' on rollers" (Foster 2013b:18). By the 1880s the canal was in disrepair and had shrunk to a length of 1,000 ft, a width of 12 ft, and a depth of only 18 inches. The Florida Coast Line Canal & Transportation Company attempted to improve the canal through dredging, beginning in 1885. They first had to clear enough area to accommodate the dredges and brought in Italian laborers for this purpose. The dredging project was unsuccessful, and portions of the canal were impassable within two months (Parker 2008:49). In 1888, the Old Haulover Canal was replaced by a new canal at Allenhurst, today's New Haulover Canal on the Atlantic Intracoastal Waterway (Parker 2008:49).

3.2.7 The Civil War, Reconstruction, and the Late Nineteenth Century (CA. 1865–1899)

Florida joined other southern states in seceding from the Union on January 10, 1861. Union forces in Florida quickly focused on controlling the coast, taking many of the port towns, while Confederate forces sought to maintain control of the agricultural and cattle-producing interior of the state to supply food to its troops. The Cape Canaveral Lighthouse lamp was dismantled and removed by the Confederacy during the war to prevent benefit to Union naval

forces. In addition, cattle, salt (for curing meat), and citrus (for medical treatment) produced in the Cape Canaveral area were important to the war effort (45 SW 2020).

While most Floridians were loyal to the Confederacy, the Union Navy largely controlled the seas. During the war, the interior of Florida remained firmly Confederate while Union forces occupied and controlled the coast. The Union took Fernandina and St. Augustine on the east coast, Tampa, Charlotte Harbor, Cedar Key and Pensacola on the west coast, and Ft. Myers on the southwest coast and held Key West for the duration of the war.

During the Civil War, the Union Navy patrolled the Florida coastline but for the most part left the interior alone. Confederate soldiers in Florida served in the "cow cavalry," so named because their main duty was to round up cows. Tens of thousands of cattle roamed the central region of the Florida peninsula in Kissimmee Valley. Confederate army patrols gathered these cattle and drove them north into the heart of the Confederate States to provide troop provisions (Florida Center for Instructional Technology 2009). After the war, soldiers who fought not only in the Civil War but the Second and Third Seminole Wars (and had first-hand knowledge of the southern frontier) remained in the region to settle.

While Florida did not see the major battles and extensive destruction of the Civil War experienced by other southern states, it did undergo many of the same changes as roughly 15,000 troops went off to fight, many of whom did not return unscathed, if at all, and the economic system of slavery responsible for much of the state's success to that point was abolished. As in the rest of the South, Reconstruction and the final decades of the 19th century in Florida would be marred by pervasive racial prejudice. But unlike its neighbors, Florida had few physical scars from the Civil War and adopted a laissez-faire approach to governance, and as a result it experienced significant economic growth and financial investment before the turn of the century (Gannon 2003).

Railroads were a major catalyst for and manifestation of this boom time in Florida. The state had 550 miles of railroad in 1881, and in just 20 years that number grew to 3,500 miles (Gannon 2003). William D. Chipley constructed a rail line that connected the Florida Panhandle with the East Coast, Henry B. Plant linked the Atlantic and Gulf Coasts with a line between Jacksonville and Tampa, and Henry Flagler created the Florida East Coast Railroad, which ran the full length of Florida to Key West. With the railroads came easily transported building materials, development in previously impenetrable parts of the state, and scores of people seeking land, employment, and recreation.

3.2.8 Twentieth Century (CA. 1900–1999)

The boom of the late 1800s continued into the early 1900s, through hurricanes, citrus crop freezes, yellow fever, and influenza epidemics. Resort hotels anchored railroad hubs, and development promoting the tropical attractions and health benefits of Florida's climate drew tourists and seasonal residents in droves. A new economic force in Florida emerged with the advent of Prohibition in 1919. Florida's extensive and still largely undeveloped coastline, coupled with its proximity to rum distilleries in Cuba and the Bahamas, made it ripe for importing and transporting illegal liquor. A land boom took Florida by storm in the late 1910s, and by the 1920s had grown into a "land delirium" (Gannon 2003).

By 1925, ambitious construction of splendidly furnished mansions and vast neighborhoods of stucco, Mediterranean-style homes gave way to the selling and reselling of vacant, unimproved lots, tied to dreams of future development that were only drawn in brochures. A dramatic bust to end the land boom came in September 1926, when a devastating hurricane slammed into Miami. A fruit fly infestation crippled the citrus crop in early 1929,

making the stock market crash the final nail in a coffin that was already shut. The Great Depression found Florida's economy in ruins.

Floridians found hope and improvement again in President Franklin Roosevelt's New Deal programs, which acted in the state predominantly through the Civilian Conservation Corps (CCC), the Public Works Administration (PWA), the Federal Emergency Relief Administration (FERA), and the Works Progress Administration (WPA), from 1933 to 1942. New industry came to the area in the form of paper mills, phosphate mining, mechanized factories for cigar making, fruit packing and canning, and sugar refining. Tourism began to pick up again, and by the start of World War II, Florida had new life.

3.2.9 History of Merritt Island and Kennedy Space Center

3.2.9.1 Merritt Island

One of the first settlers on Merritt Island was Douglas Dummett, who moved to the area in the 1820s from Tomoka where he was the postmaster and a sugarcane farmer. He began growing oranges on a "narrow stirp of high land with abundantly rich soil near the 'Haulover'" (Foster 2014a:18). Dummett was the first to "bud" sweet orange trees onto the native sour-orange trees to create a hardier orange tree. "Because the bud union was at least 3 feet off the ground and the trees were budded and not seedlings, the Dummett trees survived the devastating freeze of 1835, thus establishing the famous Indian River Groves (Foster 2014a:19). Following the Second Seminole War, Dummett transplanted his crop to Dummett Grove and by 1859 was harvesting 60,000 oranges per year. "By 1869, his grove was referred to as the largest in Florida, with more than 1,300 bearing trees that produces over 70,000 oranges (Foster 2014a:21). Dummett contributed to the growth of citrus farming by selling budwood to other growers to start new groves. He died "at his orange grove" in 1873 (FWS 2015; see also Kanaski 2015).

Another early settler of Brevard County was Captain Miles O. Burnham, the first lighthouse keeper on Cape Canaveral. The population of the county grew slowly; the 1850 census recorded a population of 139. Settlers formed communities on the east coast near rivers, and the first settlement of any size occurred in 1856 when 30–40 families formed the community of Canaveral, where Cape Canaveral is today. Settlement did not increase until regular steamer service began on the Indian River in the 1880s (Huckle et al. 1974:2).

Merritt Island, while never heavily populated, was home to several small communities of citrus farmers and fishermen, especially along the Haulover Canal. "As recently as 1962, there were approximately 17 towns, settlements, and hamlets scattered across North Merritt Island and Canaveral, comprised of a reported 400 people, mostly farmers and citrus growers (Foster 2013a:20). The northernmost of these towns was Shiloh, on the north end of Merritt Island and the south end of Volusia County; at one time the county line ran through the center of town. The town was founded in the early 1880s by George Kuhl, who owned and operated the town store, named the town, and established the post office in 1885. The town eventually became a trade center for the Indian River area (Foster 2015a:18-30).

Clifton was located just south of Shiloh near the Haulover Canal. "The area around the canal was referred to as 'the Haulover' and was renamed Clifton in 1889" (Foster 2015b:21). It was populated primarily by citrus growers. This small town was the home of the Clifton Colored School, constructed for the children of two African American families, the Campbells and the Jacksons. The school was constructed in 1890 and 1891. The school operated for approximately 10 years, until the Campbell and Jackson children "were of the age to be out of school" (Foster 2016a:20–27). Foster reports that Clifton did not have electricity until 1928, however, Penders (2008:48) states that Clifton "no longer existed after 1928 and Eugenia Campbell supposedly returned to live in the building in 1924."

The building ruins were overlooked by the U.S. government when the area was purchased for what would become KSC. The schoolhouse was dismantled in 2004 by the North Brevard Heritage Foundation and moved to Titusville.

The Town of Allenhurst was founded in 1888 when the New Haulover Canal was opened. It "boasted" a hotel, fishing camp and marina, and several homes (Foster 2016b:17). The Allenhurst Fishing Camp and Marina "offered 500 feet of free dock, free water, homemade bread, staple and fancy groceries at city prices, and launch supplies" (Foster 2016b:17). Allenhurst's hotel, opened in 1913, "was visited by many dignitaries from all over the world" (Foster 2016b:17). The Indian River Company owned and operated the Fishing Camp and Marina and hotel and advertised throughout the east half of the United States.

Orsino was named for its first postmaster, Orsino Smith. The town had a school, post office, service station, grocery store, and several homes. "The Howes were a prominent family who had aspirations of making their community a modern city with all the latest conveniences—electricity, telephone and telegraphs. Stock was sold in the Orsino Telephone, Telegraph & Power Company in 1925, Walter H. Howe President" (Foster 2016b:27).

Courtenay, just south of Orsino, was settled in the late 19th century, primarily through land granted by the 1860 Homestead Act. Courtenay resident Edward Porcher contributed to the success of the citrus industry by founding the Indian River Orange Growers Association in 1891 and the Indian River and Lake Worth Pineapple Growers Association in 1895 (Foster 2017).

Indianola was a small rural community on central Merritt Island founded by the Field brothers of Macon, Georgia, in 1868. It was reportedly named for the Indian mounds in the area. Samuel Field opened the first post office in 1880, and the town became a shipping center for oranges, due to the narrow-gauge railway that "ran down the center of the dock which was used to transport heavy boxes of oranges from the packing houses to waiting boats" (Foster 2017:30).

Several smaller, short-lived towns were also on Merritt Island. Wilson, or Wilson's Corners, was on north Merritt Island and "was known as one of the richest fishing grounds of this part of Florida" (Foster 2016b:23). The town, named for President Woodrow Wilson, was populated by fishermen, farmers, and fruit growers. Two trailer parks were constructed near Wilson in the late 1950s: Danenburg Trailer Park (with a convenience store), built by Coleridge Danenburg on his farm, and the Wallace Trailer Park, "just down the road." The construction of the trailer parks coincided with the beginning of KSC and helped to alleviate the housing shortage caused by the large influx of families employed there.

Other short-lived communities included Wisconsin Village, approximately one mile south of Route 402, west of Wilson, which was populated by 10 families from Wisconsin. Mortonhurst, south of Wilson, was established by George W. Morton and "faded away just prior to the turn of the century" (Foster 2016b:25). Heath consisted of several homes in the vicinity of the Vehicle Assembly Building (VAB), and Happy Creek, which consisted of the Happy Creek Hunting and Fishing Lodge, run by the Benecke family. The hunting and fishing lodge was created in the 1940s by a son of the original owners.

Hunting and Fishing Camps of Merritt Island

At the beginning of the 20th century, following an increase in tourism as the railroad extended into the state, several hunting and fishing camps were established on Merritt Island and the surrounding area. These included the Indian River Haulover and Outing Club and the Canaveral Club. These were popularized by magazines such as Harper's

New Monthly Magazine and pamphlets such as A Tourist and Hunter's Guide to Indian River Country, 1889–1890 and Dr. James A. Henshall's Camping and Cruising in Florida. Other camps included the Beacon 42 Fish Camp, which opened in 1939. The camp included 20 cottages, 40 boats, a 60-seat restaurant, an airstrip, and a hotel. Activities included duck hunting and fishing. The Beacon 42 Fish Camp advertised nationally in *Fish and Stream* and was featured in an article by Charles Elliott in Outdoor Life magazine (Foster 2016b).

3.2.9.2 Kennedy Space Center

The National Aeronautics and Space Administration (NASA) was established on July 28, 1958, when President Dwight D. Eisenhower signed Public Law 85-568. Official operations began on October 1, but additional space was needed to support the Apollo Lunar Landing Program, prompting a search for a new space center. Merritt Island was chosen for the space center due to its proximity to Cape Canaveral and the 9,000-mile tracking network of the Atlantic Missile Range. Other areas under consideration included sites in the Bahamas, White Sands Missile Range in New Mexico, Christmas Island in the south Pacific, Hawaii, Texas, and Georgia (Benson and Faherty 1978:5-4). Merritt Island Launch Area (MILA) was created in 1961. In 1963, the Launch Operations Center (LOC) and MILA were renamed the John F. Kennedy Space Center to honor the late President.

The first Master Plan for KSC was completed in September 1961. This plan included locations for the early Saturn and Nova test rocket launch pads along the east shore of the island, a rail transfer system and canals to transport rocket stages, a vehicle assembly area, spacecraft checkout, and launch control areas. The Industrial Area "was placed near the town of Orsino to provide space for a wide variety of industrial and scientific support facilities such as the KSC Headquarters Building, cafeteria, hospital/dispensary, physical plant maintenance, vehicle maintenance, and spacecraft assembly and checkout buildings" (NASA 1972: n.p. in Price 2013a:22).

Once the planning was complete, acquisition of land began on September 1, 1961, when NASA requested appropriations for initial land purchases on Merritt Island. Once the site was chosen, NASA began to purchase what would eventually become approximately 140,000 acres of land on Merritt Island currently managed by KSC. The process of acquisition was handled by the US Army Corps of Engineers (USACE). In addition to coordinating the purchase of the land, the USACE was also integral in the design and construction of the space center's early buildings and infrastructure. "Whether through direct purchase or condemnation, NASA and the USACE acquired all of the Merritt Island property by 1964, including nearly 1,500 properties containing scattered homes, businesses, and citrus groves" (Benson and Faherty 1978:5-7, 5-11 in Price 2013b:22). Although many people were displaced by the acquisition, "three-fourths of the owners were absentee, three-fifths lived outside of Florida" (Benson and Faherty 1978:5-7).

When MINWR was established, approximately 2,500 acres were managed as commercial citrus groves. Beekeepers were needed to support the citrus industry on the Refuge. Active grove operations declined after the 1990s, and in 2008 all grove leases at KSC expired (KSC-PLN-1911, Revision G:245). Beekeepers are no longer active at KSC.

Four cemeteries with 22 known burials exist on KSC. While visitation is allowed at these four cemeteries, a 5th cemetery – a previously recorded African-American cemetery (8BR191) – cannot be visited since its precise location is currently unknown. A Baptist church was relocated and a second church was purchased by NASA and converted into an office and laboratory. Summer homes along the Atlantic beachfront were purchased and converted into offices and storage (Harris 1970:6).

Construction of launch facilities and support facilities began in 1962. "In the 1962-1963 fiscal year, NASA spent $162 million on roads, utilities, launch pads, towers, propellant depots, cables, and communication systems" (Price

2013b:22). Construction of the VAB, approximately two miles south of the APE, began on August 20, 1963. This building, the largest in the world at the time, was where the Saturn rockets were assembled before being transported to the launch pad. Construction of the Industrial Area began during this period as well. The major buildings in the Industrial Area were constructed between 1963 and 1966 (Grinter 2007).

On August 28, 1963, the "Bureau of Sport Fisheries and Wildlife", later the United States Fish and Wildlife Service (FWS), entered into an interagency agreement with NASA to manage all lands within the KSC that are not currently being used for NASA/KSC operations. These lands, known today as the MINWR, provide habitat for more than 1,500 species of plants and wildlife (FWS 2015).

3.2.9.3 Apollo/Saturn V Center

The Apollo/Saturn V Center, located immediately adjacent to the APE, is an educational attraction for visitors of the Kennedy Space Center Visitor Complex, housing as its centerpiece one of three remaining Saturn V rockets in existence. The facility includes two theaters and several specialized exhibit areas. The 100,000 square foot building was uniquely constructed for the massive size of the rocket, including a foundation built with auger-cast pilings to accommodate its weight of 6.4 million pounds (WJ Construction 2026). Construction began in 1995 and a grand opening hosted by NASA took place in December 1996 (NASA News Release 1997).

4.0 RESEARCH DESIGN

The purpose of this investigation was to identify and document cultural resources within the project area and to assess their potential for listing in the NRHP based on their historical, archaeological, or architectural value. Project methods generally included the following tasks: 1) background research, 2) field survey, and 3) analysis and documentation.

4.1 Background Research

Archival research began with a search of the Florida Master Site File (FMSF) database maintained by the Division of Historic Research (DHR) of the Florida Department of State and a review of the material provided by the KSC Cultural Resources Manager (CRM). The records included in the FMSF provide relevant data regarding previous surveys, recorded archaeological sites, cemeteries, bridges, structures, and resource groups in the Merritt Island area. Oneida also used historic aerial photos (1958 to 2023), topographic maps, and historic maps to analyze the environmental character of the project area and to search for potential historic sites, non-standing historic structures, and historic roads.

4.1.1 Previous Surveys and Recorded Sites

A review of the FMSF was conducted for previously completed surveys in the area and cultural resources within one mile of the project area. Sixteen surveys have been conducted within or immediately adjacent to the boundaries of the current APE (**Table 4.1**). In 1973, Smith (1973; Survey #261/14021) completed an assessment of the NASA Space Shuttle Runway Project on Merritt Island. Eight archaeological sites, one within the APE (8BR170), were identified. In 1978, Griffin and Miller (1978; Survey #260) completed an assessment of the Merritt Island National Wildlife Refuge. A Phase II assessment of 8BR170 was completed in 1988, by Water and Air Research, Inc., and determined eligible for the NRHP (Ste. Claire and Johnson 1988; Survey #1934). A portion of NRHP-eligible 8BR170 is within the current APE.

ACI's assessment of the VIP Launch Viewing Areas (ACI 1991a; Survey #2689) evaluated 8BR773 and 8BR774 as not eligible for listing the NRHP. A portion of 8BR774 is within the current APE. In 1991, ACI conducted an assessment to establish zones of archaeological potential in the Shuttle Landing and KSC South Area to the east of Kennedy Parkway (ACI 1991b; Survey #2992). Based on the results, 8BR774 was reevaluated as eligible for listing in the NRHP due to its potential to yield information about the Orange and Deptford precontact periods, though the southern section of the site within the APE is likely disturbed due to the construction of Astronaut Road. In 1992, ACI conducted an assessment to establish zones of archaeological potential in the Shuttle Landing and KSC South Area to the west of Kennedy Parkway (ACI 1992; Survey #3447).

In 1992, Florida Archaeological Services, Inc. (FAC) completed the data recovery mitigation for NR-eligible site 8BR170, the Futch Cove Site. This mitigation was in response to the proposed undertaking to construct the VIP Viewing Center. Although it was originally anticipated that the entire site would be destroyed, NASA's Environmental Management staff was able to alter the design to allow for approximately 40 to 50 percent preservation of the site (FAC 1992).

An assessment of the Orbiter GSE Storage Facility Area (ACI 1996; Survey #4491) revisited 8BR773 and identified 8BR1663. The sites were evaluated as not eligible for the NRHP. A 1998 assessment of the VAB and Shuttle Landing Facility was conducted by ACI (ACI 1998a; Survey #5474). In 1998, ACI also assessed an area to the west of the APE for proposed development (ACI 1998b). ACI completed two surveys for the railroad system (ACI 2012; Survey #19482) and the Saturn Substation and Distribution Project (ACI 2023; Survey #28963). In 2023, SWCA Environmental Consultants (SWCA) completed an archaeological survey of over 4,000 acres to the south of the APE (Handley et al. 2023; Survey #30141).

In 1991, a historic architecture survey was completed for some KSC properties (Delahaye 1991; Survey #11239). A historic architecture survey took place within the Industrial, Launch Complex 39, Vehicle Assembly Building, and Shuttle Landing Facility areas in 1998 (Delahaye 1998; Survey 5474). In 1994, two additional historic structure surveys were completed for KSC and NASA properties (Price 2013a; Survey #20744, Price 2013b; Survey #20760).

Table 4.1 Previous surveys within one mile of the APE

Survey Number	Title	Date	Author
261/14021	Archaeological Survey Report: NASA Space Shuttle Runway Project on Merritt Island, Florida	1973	Smith, Richard L.
260	Cultural Resource Reconnaissance of Merritt Island National Wildlife Refuge	1978	Griffin, John W. and Miller, James J.
1934	Phase II Archaeological Investigations at the Opposite Futch Cove Site (8BR170)	1988	Ste. Claire, Dana and Johnson, Robert E.
2689	Archaeological Survey of the VIP Launch Viewing Area.	1991a	Deming, Joan G.
2992	Archaeological Survey to Establish Zones of Archaeological Potential in the Shuttle Landing and KSC South Area (Option 1) of the Kennedy Space Center	1991b	Deming, Joan G.
3447	Archaeological Survey to Establish Zones of Archaeological Potential in the Shuttle Landing and KSC South Area (Option 2) of the Kennedy Space Center	1992	Archaeological Consultants, Inc.

Survey Number	Title	Date	Author
11239	Multiple Property Submission for Historic Cultural Resources of the John F. Kennedy Space Center, Florida	1991	Delahaye, Daniel
N/A	Phase III Archaeological Investigations of the Futch Cove Site, 8BR170, Kennedy Space Center, Florida	1992	Florida Archaeological Services, Inc.
4491	Archaeological Survey of the Orbiter GSE Storage Facility Area	1996	Deming, Joan G.
5474	Survey and Evaluation of the Historic Facilities within the Industrial, Launch Complex 39, Vehicle Assembly Building, and Shuttle Landing Facility areas of the John F. Kennedy Space Center, Brevard County, Florida	1998a	Delahaye, Daniel
N/A	Archaeological Survey of Two Area, Kennedy Space Center	1998b	Archaeological Consultants, Inc.
19482	Historical Survey and Evaluation of the Jay Jay Bridge, Railroad System, and Locomotives	2012	Archaeological Consultants, Inc.
20744	Architectural Survey and Evaluation of 45 Facilities that have reached the age of 45-50 years, John F. Kennedy Space Center, Brevard County, Florida	2013a	Price, David L.
20760	Architectural Survey and Evaluation of NASA-owned Facilities at Cape Canaveral Air Force Station	2013b	Price, David L.
28963	Cultural Resource Assessment Survey Saturn Substation and Distribution Project	2023	Archaeological Consultants, Inc.
30141	An Archaeological Survey of the Kennedy Space Center Spaceport Growth Boundaries Districts 1, 2, 3, and 4	2024	Handley et al.

Six archaeological sites (8BR169, 8BR170, 8BR543, 8BR773, 8BR774, and 8BR1663) (**Table 4.2**), four NRHP eligible linear resources (8B1986, 8BR1987, 8BR2931, and 8BR2932), two NRHP eligible historic structures (8BR1988 and 8BR1989), and National Register listed Launch Complex 39 Historic District (8BR172) have been recorded within a one-mile radius of the current APE (**Figure 4.1).** 8BR1989, a Mate-Demate Device designed to lift a Space Shuttle onto a Shuttle Carrier Aircraft, has been destroyed and is no longer extant. All archaeological sites but 8BR170 and 8BR774 are recommended not eligible for the NRHP.

Table 4.2 Archaeological Sites within a one-mile radius of the APE

Site Number	Site Name	Site Description	Direction from APE	Eligible for NRHP
BR169	South Access Road	Prehistoric	South / Southwest of APE	Not Eligible
BR170	Opposite Futch Cove	Multicomponent	Within APE	Eligible
BR543	Griffith Place	Historic	West of APE	Not Eligible
BR773	VIP West	Prehistoric	South of APE	Not Eligible
BR774	Astronaut Rd	Prehistoric	Within APE	Eligible
BR1663	Orbiter Storage Site	Prehistoric	South of APE	Not Eligible

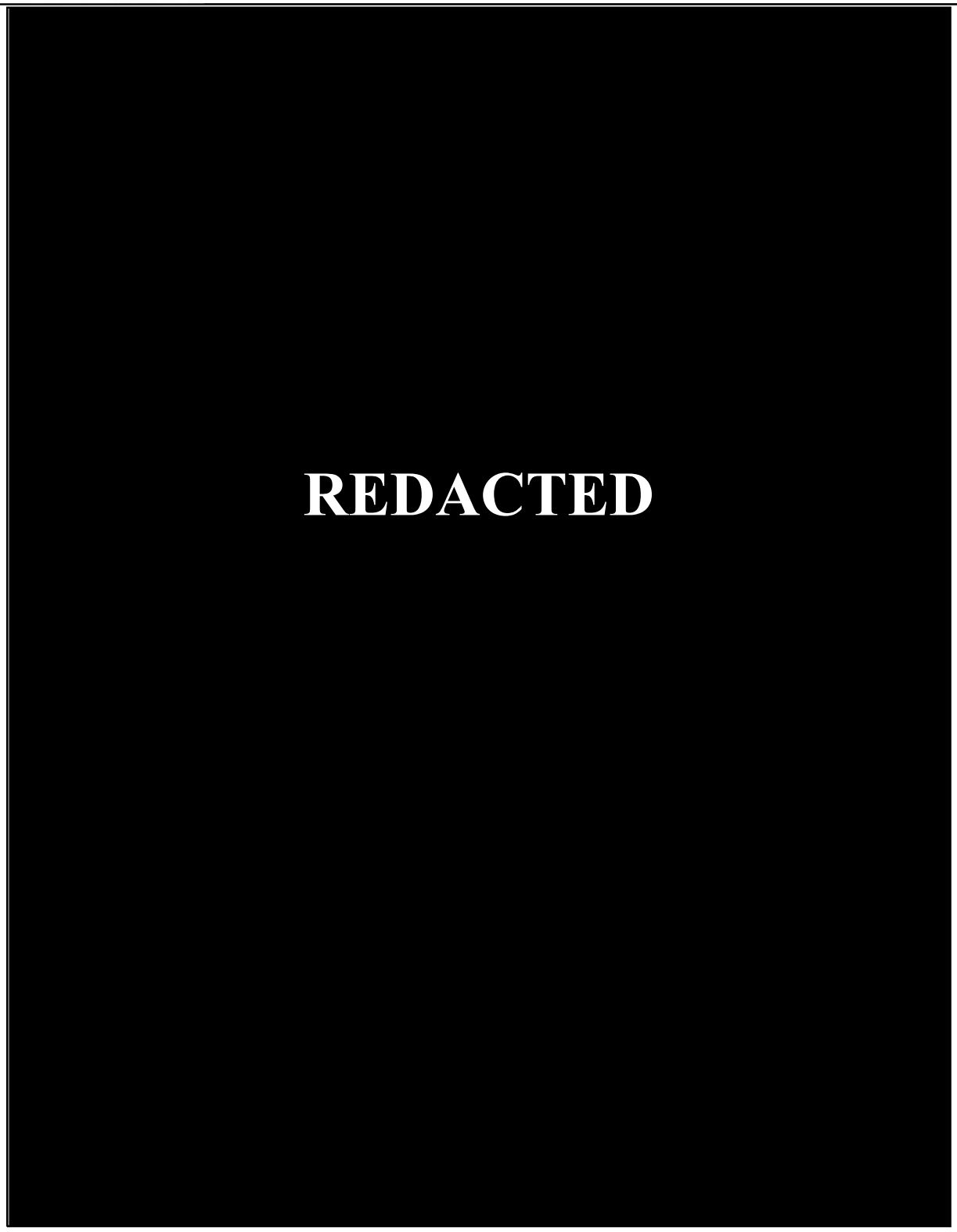

Figure 4.1 Previously Recorded Historic Resources, Kennedy Space Center.

8BR169 South Access Road

This is a prehistoric campsite site consisting of a surface scatter of Malabar period sherds and one Orange Plain sherd from the Malabar I and Malabar IIA period. The site was not considered a good example of its type for the region and not deemed able to make a significant contribution to the regional prehistory. Therefore, it was determined not eligible for the NRHP.

8BR170 Opposite Futch Cove

This site is found south of Astronaut Road between the driveway leading to the Saturn V Center and the Banana River. The southern portion of the Saturn V Center is within the site's boundary. This site is a multicomponent site consisting of a prehistoric hunting and fishing camp, and historic period "shack-like" structures that were razed into heaps of bricks, glass, pottery, and scrap metal objects. The prehistoric camp consists of Orange and St Johns ceramic types. Also recovered were lithics, shell, and faunal material. Artifacts recovered were dated to the Orange, Malabar I and Malabar IIA periods. Part of the site was mitigated through data recovery and 40-50% of the site remains preserved in place.

8BR172 Launch Complex 39 Historic District

This site was entered on the NRHP in 1973 due to its associations with the significant events of the Apollo lunar landing missions and the Skylab missions. Principal structures on the original Complex include the Vehicle Assembly Building (VAB), the Launch Control Center, three Mobile Launchers, a Mobile Service Structure, two Transporters (or Crawlers), the Crawlerway, and Launch Areas A and B. The boundary of this listing extends into the project APE. Portions of 8BR172 have been modified or mitigated. 8BR172 was the original NRHP nomination for the Launch Complex 39 and has been recently revised. 8BR172 is now obsolete.

8BR543 Griffith Place

This site is an abandoned structure with wood/plaster walls and a 12 x 15 ft concrete foundation south of 30th St. NW and approximately 0.3 miles west of Kennedy Pkwy. The interior contains glass, ceramics, wood, plastic, scrap metal, and electrical appliances, all of 20th century manufacture. Trash heaps of approximately 3 ft in height were found outside the structure. The original report classifies this as a "post-1900 shack." The artifact assemblage was reported as limited and non-diagnostic and did not appear to have the potential to yield information of importance to local or regional history. Therefore, the site was determined not eligible for the NRHP.

8BR773 VIP West

The site is located on 28th street near the entrance to the Saturn V Center VIP viewing area. This site is a low density subsurface find of sand tempered ceramics from an unknown period and lithic waste flakes found in two subsurface tests. Given the limited nature of the artifact assemblage and the lack of subsurface features, the site was determined not eligible for the NRHP.

8BR774 Astronaut Road Site (Launch Viewing Area)

The site was bisected by the construction of Astronaut Rd, north of the Saturn V Center. The original site report dates the prehistoric ceramics to the Orange III through the Florida Transitional (ca. 1450 B.C. to 500 B.C.) periods. The northern part of the site is still extant and has the potential to yield important information regarding settlement patterns and inter-regional trade due to the presence of non-local materials like steatite and Deptford pottery. The site was recommended as eligible for the NRHP.

8BR1663 Orbiter Storage Site

This site is 0.23 km south of 28th St and 30 m east of Kennedy Parkway. The site consists of one subsurface and one surface find. One sand tempered plain and one St. Johns Plain sherd were recovered. Given the limited nature of the artifact assemblage, and the lack of subsurface features and ground disturbances, the site was determined not eligible for the NRHP.

8BR1986 Shuttle Landing Facility Area Historic District

The Shuttle Landing Facility Area is a Historic District that contains 3 historic structures (2 historic structures are extant). 8BR1987 Shuttle Landing Facility Runway is a historic linear resource. 8BR1988 Landing Aid Control Building (Building J6-2313) and 8BR1989 Mate-Demate Device (destroyed) are NHRP eligible structures associated with the shuttle runway. This district is NHRP eligible due to its inclusion of multiple NHRP resources related to the U.S. Space Shuttle Program.

8BR2932 NASA KSC Railroad System Historic District

8BR2932 is a Historic District that contains railroad tracks and associated features. The NASA KSC Railroad Track (8BR2931) is a contributing resource to the district and adjacent to the APE. NASA KSC Railroad Track's west boundary meets the Florida East Coast Line. One of the rail line's two southern boundaries is located within the Kennedy Space Center Industrial Area. The other southern boundary is the point where the eastern branch reaches the boundary between KSC and Cape Canaveral Air Force Station. There is also an eastern boundary at the Vehicle Assembly Building area. The 8BR2931 rail line has been essential for transporting construction material, fuel, and Trident missiles. One 19-mile segment of 8BR2931 and the district (8BR2932) are considered eligible for their association with the Space Shuttle Program.

4.2 Historic Map and Aerial Photograph Review

Historic maps and aerial photographs of the project area were analyzed to gain a better understanding of historic land use and development in the region. Historic maps, U.S. Geological Service (USGS) topographic quadrangles, and U.S. Department of Agriculture aerial photographs were studied to determine potential historic development within the APE. Maps observed during this analysis include the original 1860 plat map for Section 1 of Township 22 South/Range 36 East, Orsino USGS topographic maps from 1949 and 1976, and US Department of Agriculture (USDA) aerial photographs from 1958 to 2023.

The earliest historic map to depict the project area is the original 1860 plat map for Section 1 of Township 22 South/Range 36 East, which shows a portion of the APE wooded but no development (**Figure 4.2)**. An aerial photograph from 1958 displays several dirt roads leading east from State Road 3/Kennedy Parkway to the west bank of Banana Creek and a citrus grove owned by the Futch family (Ste. Claire and Johnson 1988) (**Figure 4.3**). An aerial photograph taken in 1993, two years before construction of the Apollo/Saturn V Center began, shows the location being used a launch viewing area, with a parking lot and bleachers built at the previous location of the citrus grove (**Figure 4.4**). The 1993 aerial also shows the NASA Railroad (constructed 1963-1965) running parallel to Kennedy Parkway, and Astronauts Road (constructed 1964) lying immediately north of the current project APE and leading to the Banana Creek Launch Viewing Area. The Orsino USGS topographic map from 1949 is similar in nature to the 1958 aerial (**Figure 4.5**).

Figure 4.2 General Land Office Plat Map, Original Survey 1860

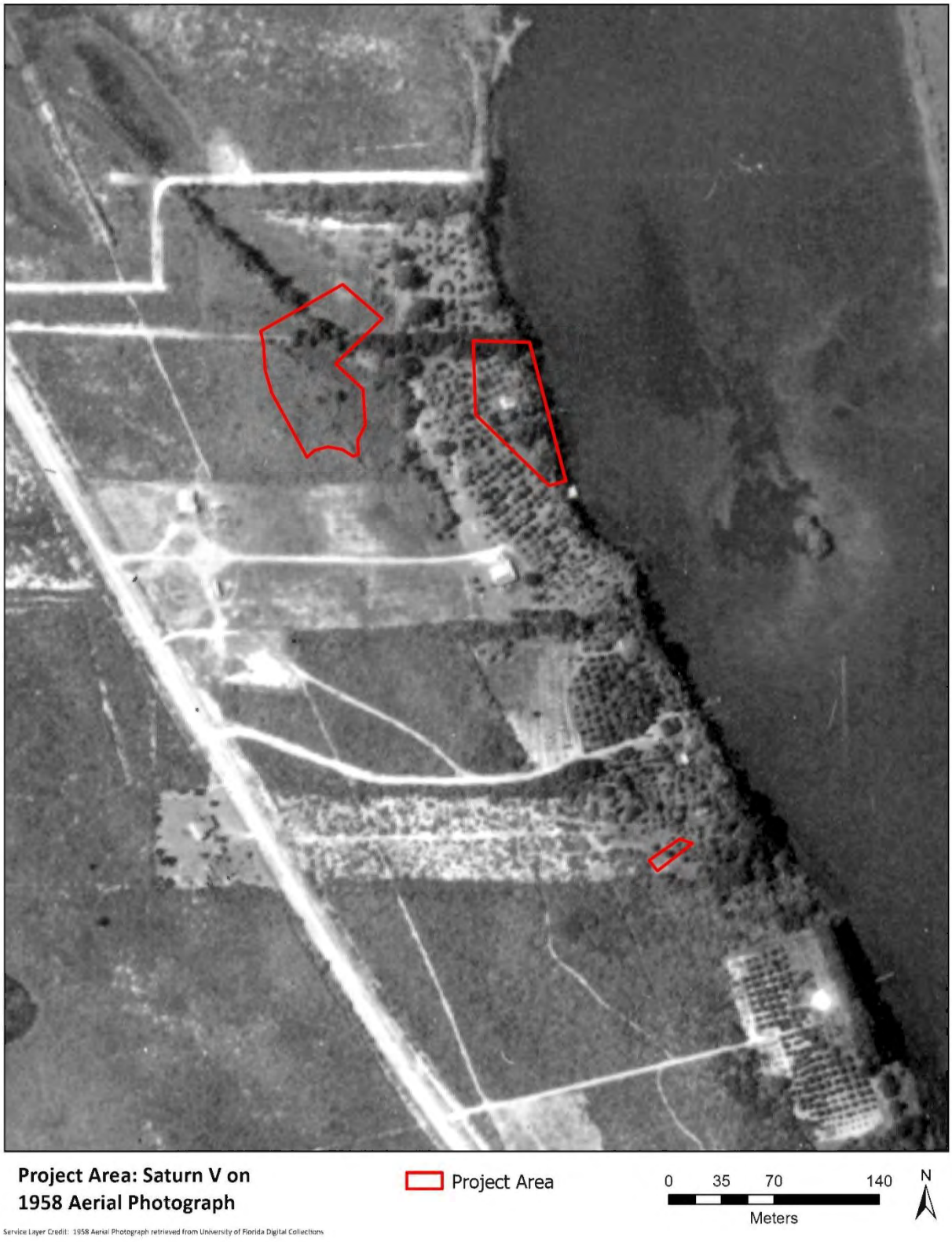

Figure 4.3 1958 Aerial (Copyright 2019, NETRonline)

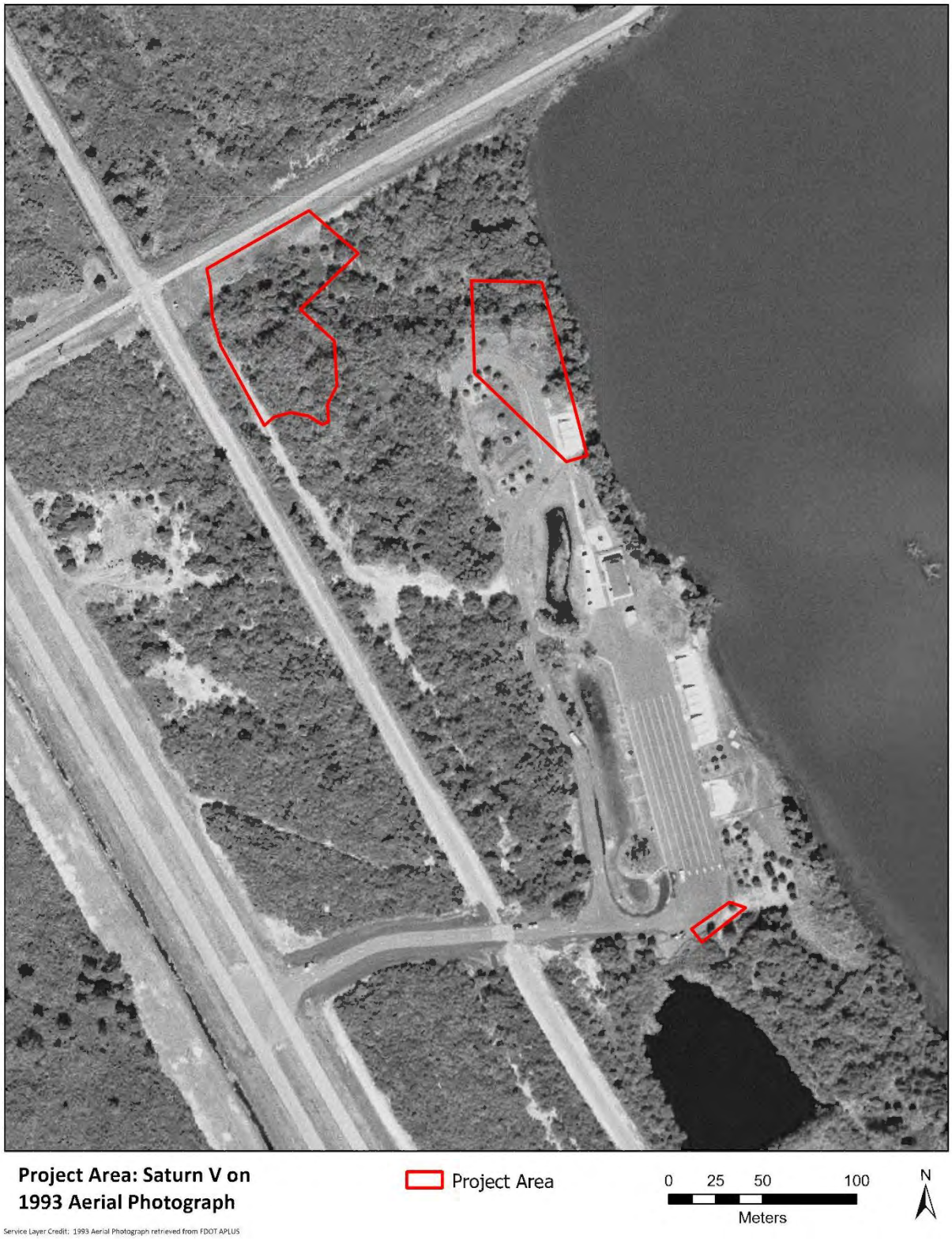

Figure 4.4 1993 Aerial (Google Earth)

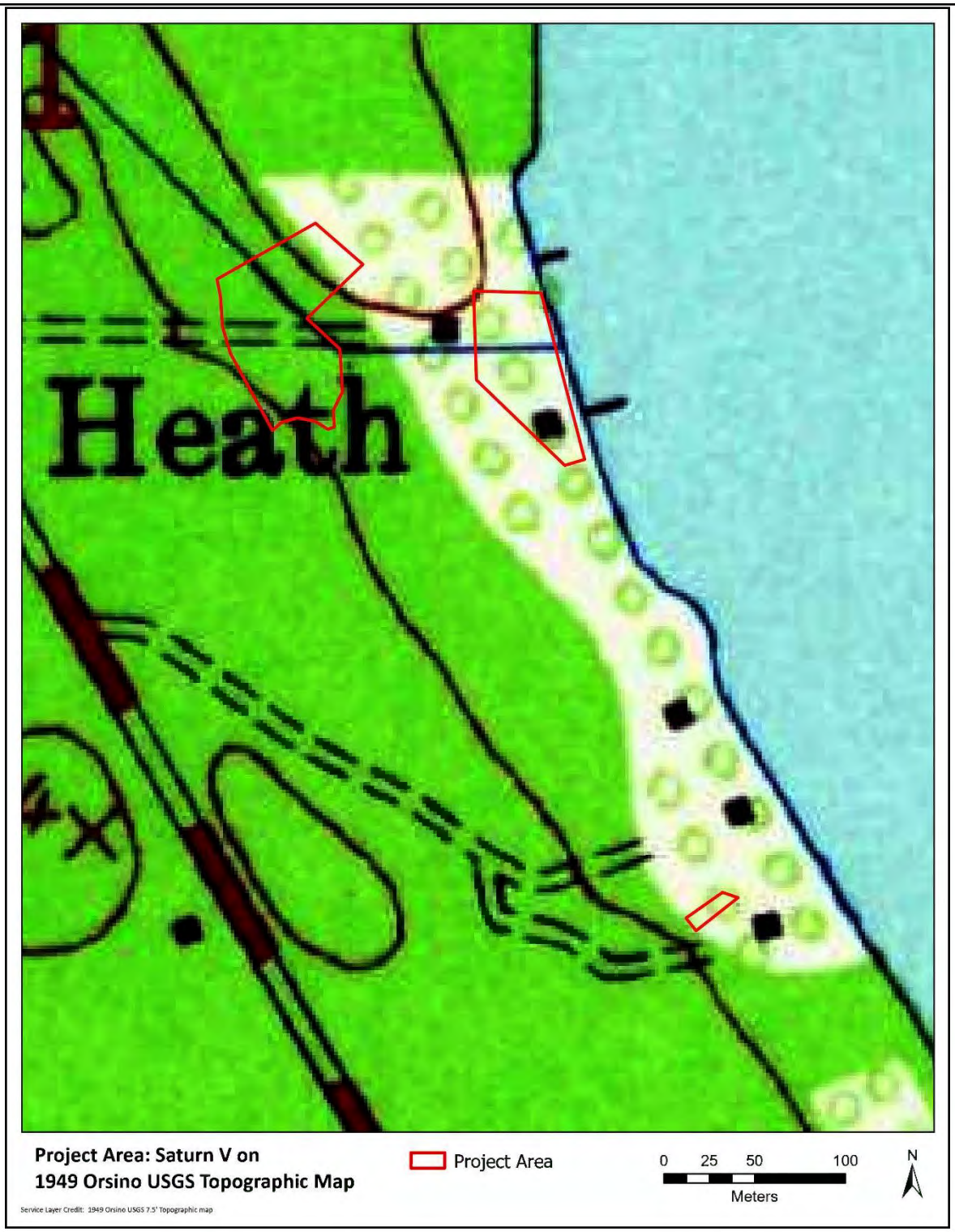

Figure 4.5 Project Area Shown on the 1949 USGS Orsino, Florida 7.5-Minute Quadrangle.

4.3 Archaeological Research Expectations

For this Phase I CRAS study, a review of the above information in conjunction with probability modelling based on proximity to natural, prehistoric, and historic resources was completed to determine if archaeological materials may be present. Nearly all the project area is situated within excessively drained soils, which indicates the project APE has a high probability. Furthermore, archaeological sites 8BR170 and 8BR774 were previously located within the APE. STPs at the northern end of the APE, within and adjacent to 8BR774, were spaced at an interval of 12.5 m to try to relocate the resource. Due to the high archaeological potential in the APE, STP intervals were placed at 25 m intervals within the remaining APE.

4.4 Field Survey

The archaeological survey included a systematic inspection of the project area in a manner consistent with The Historic Preservation Compliance Review Program of the Florida Department of State, Division of Historic Resources. All work was performed in compliance with the requirements set forth in the updated Cultural Resources Management Standards Operational Manual (2002) published by the Florida Division of Historical Resources.

Survey areas were determined and located with the use of geospatial information system (GIS) background files depicting the APE boundary overlain with a north/south transect grid. These files were uploaded onto a handheld Spectra MobileMapper 60 device for reference during fieldwork.

As stated above, the APE is located within an area of high probability which requires systematic testing at 25 m intervals. The location within and adjacent to the previously recorded site 8BR774 required tighter interval testing at 12.5 m. All shovel test unit locations were planned and documented using a hand-held GPS unit (as stated above) with an accuracy of one meter.

All shovel tests were excavated to a minimum width of 50 cm and a minimum depth of one meter (100 cm) unless water or impassible clay or limestone was reached first. All excavated soil was screened through 1/4-inch mesh for standardized collection of any artifacts present. Shovel test logs were maintained and provide information on the size, depth, soil conditions, and contents of all excavation units. The Munsell Soil Color Chart was used to describe the color of all soil layers. During the shovel test survey, no cultural features or phenomena were identified within the shovel test walls or floors. All shovel test excavations were backfilled after documentation, and all areas were restored to their previous condition to the greatest extent possible.

4.5 Laboratory Analysis

All materials will be prepared and delivered to the Kennedy Space Center for curation in accordance with the Federal standards, see 36 CFR 79. No artifacts were encountered or collected.

4.6 Procedures to Address Unexpected Discoveries

Although the project area has received a complete cultural resource assessment survey, it is impossible to ensure that all cultural resources have been discovered. This section of the report has been developed as a mechanism for clients and agencies to treat archaeological finds that were not identified and assessed for eligibility for listing in the NRHP during survey on the property.

Unexpected discoveries consist of types of archaeological remains not typically encountered during a project. Examples of such discoveries include human skeletal remains and associated funerary objects (AFOs). If an

unexpected discovery is encountered, all work within a 100 m buffer must cease and all reasonable efforts must be made to avoid and minimize the impacts (KSC 2024). If unexpected cultural resources or suspected cultural resources are discovered, the following steps should be taken:

1. All work within 50 feet of the discovery should cease and reasonable efforts should be made to avoid and minimize impacts.
2. The KSC CRM must be contacted immediately and should evaluate the nature of the discovery.
3. When the unexpected discovery involves human remains or funerary objects, the KSC CRM will the notify the SHPO, State Archaeologist located at the Florida Bureau of Archaeological Research (BAR) as stated in FS 872.05, and federally recognized tribes as required per the Native American Graves Protection and Repatriation Act (NAGPRA).
4. Work cannot commence in the area until written permission from the KSC CRM has been received.

If unexpected finds are encountered at any point in construction, the point of contact for KSC is the KSC Cultural Resources Manager.

4.7 NRHP Site Evaluation Criteria

The archaeological significance of a site is determined using criteria defined in 36 CFR 60.4, in coordination with the State Historic Preservation Office (SHPO). The significance of a site, as established by 36 CFR 60.4, may be in history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects may be eligible for listing in the NRHP if they possess "integrity of location, design, setting, materials, workmanship, feeling, or association" and meet one of the following criteria (from http://www.gpo.gov):

A. Be associated with events that have made a significant contribution to the broad patterns of our history, or
B. Be associated with the lives of persons significant in our past, or
C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction, or
D. Have yielded or may be likely to yield, information important in prehistory or history.

Under Criterion D, 'importance' is based on the likelihood that a site possesses configurations of artifacts, soil strata, structural remains, or other features that allow it to: 1) test a hypothesis about events, groups or processes in the past, 2) support or strengthen currently available information suggesting that a hypothesis is true or false, or 3) reconstruct the known archaeological sequence for an area (National Register Bulletin 1995: 21). While the evaluation of archaeological sites usually fall under Criterion D, historic buildings and structures are typically evaluated for significance under Criteria A, B, and C.

NRHP-eligible districts must possess a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development. NRHP-eligible districts and buildings must also possess historical significance, historical integrity, and historical context.

4.8 Archival Research

Archival research began with a search of the FMSF database maintained by DHR of the Florida Department of State. The site file forms at the FMSF provide relevant survey data from previous surveys at KSC and show the location of previously recorded archaeological sites, cemeteries, bridges, structures, and resource groups.

Archival research uses a range of historical and human resources. Numerous available historic period resources for the KSC area have been consulted at the Central Brevard Library and Reference Center, the Genealogy Room at the Brevard Library, the Brevard County Historical Commission, the Florida Historical Society, and the Library of Florida History. In addition, digitized historical resources were consulted through online repositories including the Bureau of Land Management's General Land Office, the Florida Memory Project, the University of Florida Maps and Imagery Library, the University of South Florida's Special Collections Department, and the University of North Florida's Florida History Online.

5.0 RESULTS

In December 2025, Oneida conducted a Phase I CRAS of a 2.29-acre parcel in support of the proposed Apollo/Saturn V Center additions at the Kennedy Space Center (KSC) in Brevard County, Florida.

5.1 Archaeological Survey

The APE was divided into three sections of STPs, one on either side of the main Saturn V building, and one stand-alone STP at the south end of the parking lot (**Figure 5.1**).

Figure 5.1 Project APE Shovel Test Results

5.1.1 Area 3

The first section is located at the northwest corner of the building. It is bordered on the north by Astronaut Road, a mixed grass/gravel parking area on the side of the road, and a chain link fence. Part of the northeast is bordered by paved parking areas and more fencing. The rest of the east side of the area abuts the Saturn V building. The south boundary is a paved area for tour bus drop-off, and the west boundary runs along a gravel access road from Astronaut Road to the bus drop-off area.

To coincide with the ongoing Environmental Assessment document, this section was named Area 3. Seventeen STPs were plotted for the area (see **Figure 5.1**). Five transects of variable lengths were plotted, named 3-1 through 3-5, including eight STPs plotted at 25 m intervals. A section of the north part of the area contains the boundaries of a previously identified site (8BR774). Because of this site location, nine STPs were plotted at approximately 12.5 m intervals in this area, however only three were viable for excavation due to extensive modern ground disturbance.

The north part of the area coinciding with the previously documented site boundaries is currently used for drainage. There are multiple cement culverts (**Figure 5.2**) which empty into a depression. As evident by the presence of wetland vegetation, the ground surface is inundated throughout the depressed area, making shovel testing with accurate recording of strata difficult (**Figure 5.3**). All three STPs in transect 3-3 (3-3-1, 3-3-2, and 3-3-3) and four STPs in transect 3-4 (3-4-1, 3-4-2, 3-4-3, and 3-4-4) were not dug because the ground surface was under standing water.

Figure 5.2 Area 3 Drain Culvert and Cypress Knees, Facing East Near STP 3-5-2.

Figure 5.3 Area 3 near STP 3-5-2, Facing Northeast

In the northwest corner of the area, STP 3-1-1 was offset to avoid the gravel access road but was truncated at 20cm because of soil disturbance and excessive road gravel. Two tests northwest of the depression (STPs 3-2-1 and 3-2-2) were in open grass near the depressed drainage area. These had to be truncated at 20-25 cm due to natural filling with ground water. Until termination, these STPs showed a uniform dark brown (10YR 3/3-4/4) layer of sand. On the east side of the depression, STP 3-5-2 also contained very dark sand (10YR 3/2) and filled quickly with groundwater; therefore, it was terminated at 15 cm (**Figure 5.4**).

Figure 5.4 STP 3-5-2 West Soil Profile

On the northeast corner, STP 3-5-1 was near the parking area and fenceline. This STP was terminated at 60 cm because of deep buried tree roots. All three strata were brown to gray (10YR 5/8-5/1) sand and showed mottling and signs of disturbance. On the east perimeter, STP 3-5-3 was truncated at 20 cm due to excessive rock, gravel, and building material as well as soil disturbance and mottling (**Figure 5.5**). This STP was located approximately one meter from a major storm drain.

Figure 5.5 STP 3-5-3 North Soil Profile

The remaining four STPs in the south and west of the section (3-5-5, 3-5-4, 3-4-5, and 3-2-3) were located within a thicket of dense vegetation and showed remarkable uniformity (**Figure 5.6**). All consisted of a single stratum of very dark grayish brown (10YR 3/2) sand. All four also had to be terminated between 40-63 cm because of filling with ground water (**Figure 5.7**).

Figure 5.6 Area 5 Near STP 3-5-3 Facing Northwest

Figure 5.7 STP 3-2-3 Water Table

Overall, STPs at the perimeter of the section showed evidence of extensive modern construction activity: disturbed soils, rocks, and gravel fill. Tests were not performed in the central drainage area because of standing water, and STPs throughout the area had to be terminated due to infill with water. No STPs were positive for cultural material.

5.1.2 Area 1

The second section is located directly east of the Saturn V building (see **Figure 5.1**). The cement patio and walkway outside the building is the west/northwest boundary of the section (**Figure 5.8**). The northeast boundary is in a grassy/wooded area between a parking area and the Banana River. The east boundary is a chain-link fence between the manicured lawn area and a wildlife area on the bank of the Banana River. The effective south boundary is a cement-paved area of shuttle launch viewing bleachers.

This section was named Area 1 to coincide with the Environmental Assessment document. Three transects were plotted, named 1-1 to 1-3, for a total of 6 plotted STPs. One additional STP was not initially mapped in the southwest corner because satellite data showed a structure in this area. Ground survey revealed this to be an event tent or other temporary structure; however, an additional STP was not performed because it was within marked utility lines.

In the northeast corner, STP 1-2-1 was located in the center of a stand of palm trees. This STP consisted of a single stratum of gray (10YR 5/1 to 6/1) sand to 100 cm (**Figure 5.9**). To the east, STP 1-3-1 was a dark yellowish brown (10YR 3/4) sand throughout to 100 cm. Multiple fragments of modern red "caution" tape (writing visible) were found throughout the STP to a depth of approximately 85 cm. The remaining four STPs followed a consistent pattern (**Figure 5.10**). The first stratum was a dark yellowish brown (10YR 4/4 to 5/4) sand to 20-30 cm, with many large chunks of rock and other modern construction materials throughout (asphalt, dyed blue cement, and landscaping cloth material). A second stratum consisting of many thin layers or streaks of various brown sands (10YR 3/4, 4/4, 4/6, 5/4, 6/3) occurred in some STPs at approximately 30-55 cm. The last stratum, extending to 100 cm, was uniform within each test but varied between STPs from a dark brown (10YR 3/3), to a dark yellowish brown (10YR 3/4, 4/4), and brownish yellow (10YR 6/6).

Figure 5.8 STP 1-1-2 Showing Proximity to Saturn V Center Patio

Figure 5.9 STP 1-2-1 North Soil Profile

Figure 5.10 STP 1-1-2 North Soil Profile

Overall, STPs throughout the section showed evidence of extensive modern construction activity due to proximity to the Saturn V Center. No STPs were positive for cultural material.

5.1.3 Area 6

The stand-alone STP (6-1-1) was in the extreme south of the Saturn V Center (see **Figure 5.1**). This section was named Area 6 to coincide with the Environmental Assessment document. It is south and east of the paved driving/parking area, north of a chain-link fence around a drainage area, and southwest of a restroom outbuilding.

This shovel test consists of four strata. The first is dark gray (10YR 4/1) sand to 10cm, followed by many thin layers or streaks of various brown sands (10YR 3/4, 4/4, and 6/3). The third stratum is very pale brown (10YR 7/4) sand to 30 cm with gray streaks and flecks throughout. Lastly, the fourth stratum is dark gray (10YR 4/1) sand to 100 cm. Test 6-1-1 was negative for cultural material (**Figure 5.11**).

Figure 5.11 Stand Alone STP Profile

5.2 Previously Recorded Archaeological Sites

Portions of NR-eligible archaeological sites 8BR170 and 8BR774 were mapped within the APE.

5.2.1. 8BR170

Although a small portion of 8BR170 boundary is mapped within the southern portion of Area 1, the shovel testing strategy focused on the open grassy area north of the boundary where the ground disturbance is being proposed. No cultural material in association with 8BR170 was encountered.

5.2.2. 8BR774

Due to a portion of 8BR774 boundary being mapped in the north area of Area 3, close interval shovel testing to target the investigation of potential cultural remains associated with this site was conducted. No cultural material in association with 8BR774 was encountered. The boundaries for 8BR774 are being revised based on the recent testing and obvious modern disturbance. The new site boundary is situated entirely north of the road (Figure 5.12).

An intensive review of the survey reports and site forms associated with this site location was conducted. Based on the previous reports that investigated site 8BR774 (Deming 1991a, 1991b), this site is situated directly to the north of Astronaut Road on a beach ridge top that terminates approximately 50 meters from Banana Creek. The site measures 100 meters east-west by 50 meters north-south (Figure 5.13). The project location map also has the site centroid midway between the rail line and the water (Figure 5.14). Future investigations at 8BR774 should focus efforts north of Astronaut Road based on the previous reports site location information which describe the site extending west and north from the current boundary (Deming 1991a, 1991b).

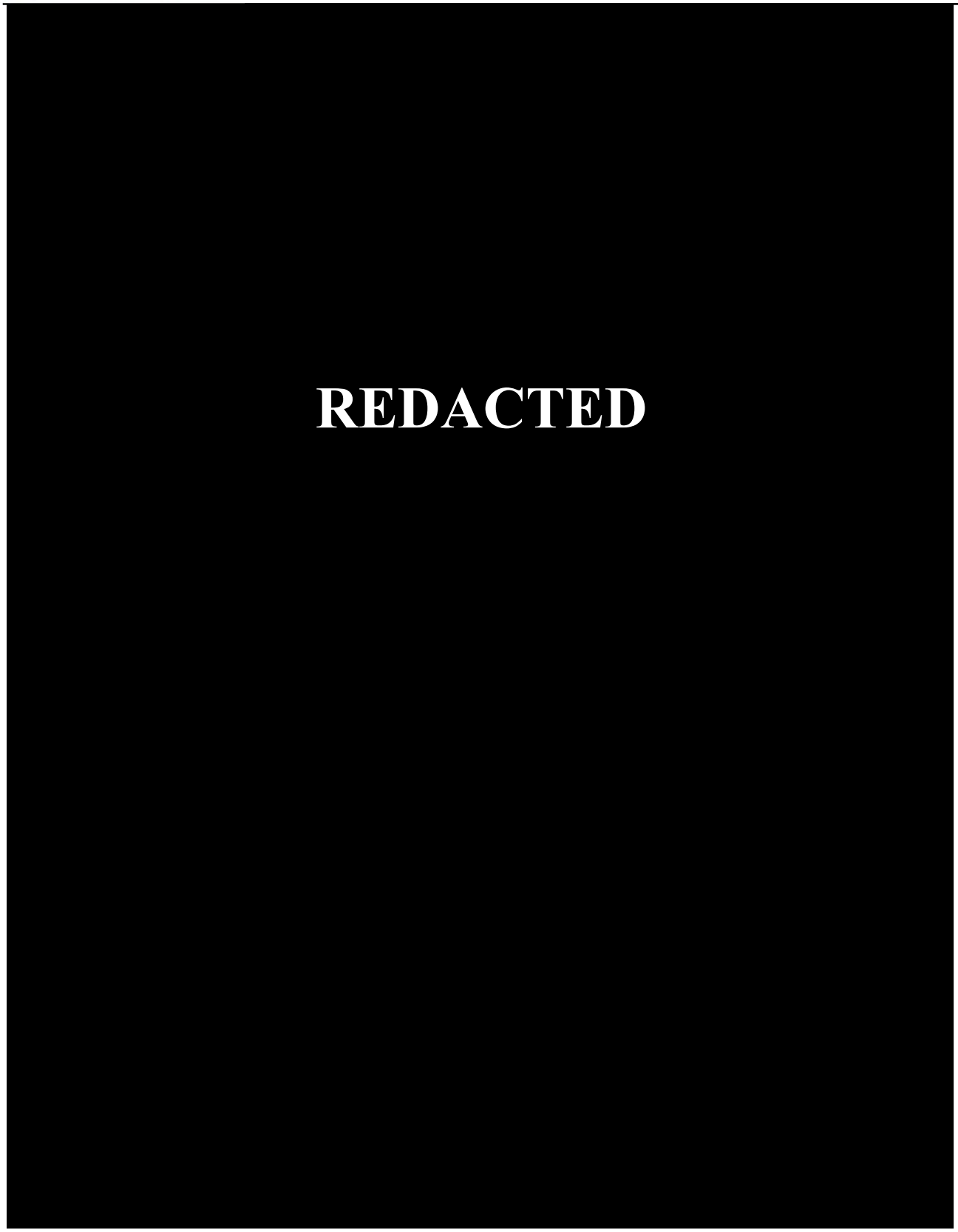

Figure 5.12 Recommended Boundary Update for 8BR774

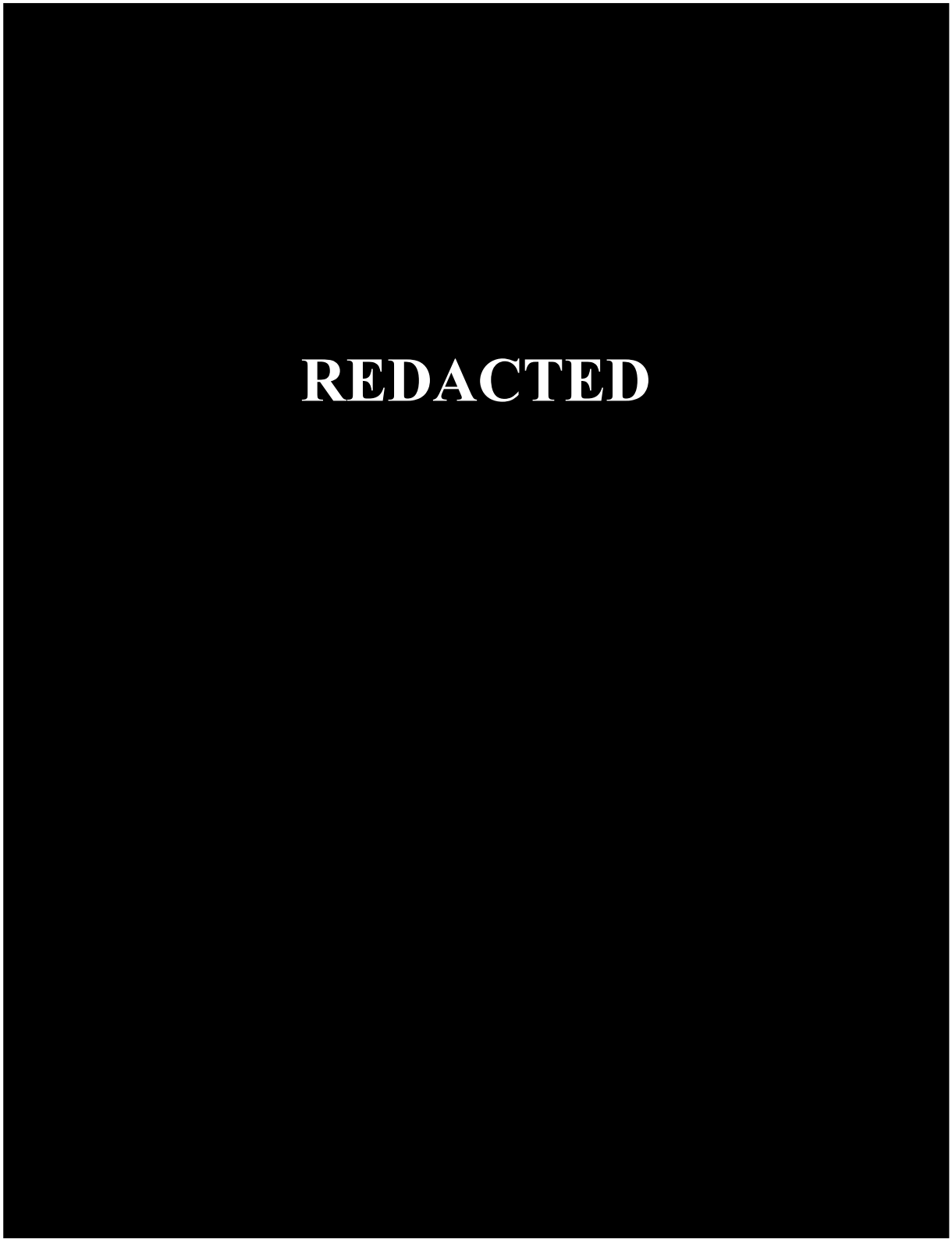

Figure 5.13 Site Map from Deming 1991b

Figure 5.14 8BR774 Site Location Map from Deming 1991b Site Form

6.0 CONCLUSIONS

The survey discovered no new recorded archaeological occurrences within the project area. The previously recorded sites 8BR170 and 8BR774 were not relocated during this survey. The boundaries for 8BR774 are being revised based on the recent testing and obvious modern disturbance. The new site boundary is situated entirely north of the road. Future investigations at 8BR774 should focus efforts north of the road and extend from the current western boundary of 8BR774 to 50 meters west of the Banana Creek and extend north 50 meters based on an intensive review of the previous reports site location information (Deming 1991a, 1991b). Further archaeological survey is warranted on the north side of Astronaut Road to verify the site boundary and location prior to any ground disturbing activities taking place in this area, as well as Phase II testing to determine the NRHP eligibility of the site.

No cultural materials or features were located during the current survey. Based on the results of this survey, Oneida recommends that the proposed development will have no adverse effect on cultural resources listed, or eligible for listing in the NRHP, or otherwise of archaeological, historical, or architectural significance within the project area. Oneida recommends no further investigation of this project area.

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APPENDIX A: Florida Master Site File Forms

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Ent D (FMSF only) _____

Survey Log Sheet

Florida Master Site File
Version 5.0 3/19

Survey # (FMSF only) _____

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Manuscript Information

Survey Project (name and project phase)

DNC KSC Saturn V/Apollo Center

Report Title (exactly as on title page)

Phase I Cultural Resources Assessment Survey for the Approximately 2.29-Acre Project for the KSC Saturn V/Apollo Center Brevard County, Florida

Report Authors (as on title page) 1. Megan Bebee 3. Heather Puhl
2. Baird Ullrey 4. Scott Clark

Publication Year 2026 **N**umber of Pages in Report (do not include site forms) 67

Publication Information (Give series, number in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)

Bebee, Megan, Baird Ullrey, Heather Puhl, and Scott Clark 2026. Phase I Cultural Resources Assessment Survey for the Approximately 2.29-Acre Project for the KSC Saturn V/Apollo Center Brevard County, Florida. Report on file Oneida.

Supervisors of Fieldwork (even if same as author) Names Megan Bebee

Affiliation of Fieldworkers: Organization LG 2 Environmental Solutions, Inc. City Jacksonville, FL

Key Words/Phrases (Don't use county name, or common words like *archaeology*, *structure*, *survey, architecture, etc.*)

1. _____ 3. _____ 5. _____ 7. _____
2. _____ 4. _____ 6. _____ 8. _____

Survey Sponsors (corporation, government unit, organization, or person funding fieldwork)

Name Delaware North Organization _____

Address/Phone/E-mail Space Commerce Way, Merritt Island, FL 32953

Recorder of Log Sheet Wendy Puckett Date Log Sheet Completed 2-18-2026

Is this survey or project a continuation of a previous project? ☒ No ☐ Yes: **P**revious survey #s (FMSF only) _____

Project Area Mapping

Counties (select every county in which field survey was done; attach additional sheet if necessary)

1. Brevard 3. _____ 5. _____
2. _____ 4. _____ 6. _____

USGS 1:24,000 Map Names/Year of Latest Revision (attach additional sheet if necessary)

1. Name ORSINO Year 2024 4. Name _____ Year _____
2. Name _____ Year _____ 5. Name _____ Year _____
3. Name _____ Year _____ 6. Name _____ Year _____

Field Dates and Project Area Description

Fieldwork Dates: Start 12-17-2025 End 12-18-2025 **T**otal Area Surveyed (fill in one) _____ hectares 2.29 acres

Number of Distinct Tracts or Areas Surveyed 3

If Corridor (fill in one for each) **W**idth: _____ meters _____ feet **L**ength: _____ kilometers _____ miles

Florida Master Site File / Div. of Historical Resources / R.A. Gray Bldg / 500 S Bronough St., Tallahassee, Florida 32399-0250
Phone 850.245.6440, Fax 850.245.6439, Email: SiteFile@dos.myflorida.com

Survey Log Sheet

Survey #_____

Research and Field Methods

Types of Survey (select all that apply): ☒archaeological ☐architectural ☒historical/archival ☐underwater
☐damage assessment ☐monitoring report ☐other(describe): _____

Scope/Intensity/Procedures

high probability intervals (25 m) and close interval intervals (12.5) within mapped boundary of 8BR774 (determined not within APE)

Preliminary Methods (select as many as apply to the project as a whole)

☐Florida Archives (Gray Building)	☐library research- *local public*	☐local property or tax records	☒other historic maps	☐**LIDAR**
☐Florida Photo Archives (Gray Building)	☐library-special collection	☐newspaper files	☒soils maps or data	☐**other remote sensing**
☒Site File property search	☐Public Lands Survey (maps at DEP)	☒literature search	☐windshield survey	
☒Site File survey search	☒local informant(s)	☐Sanborn Insurance maps	☒aerial photography	

☒other (describe): GLO

Archaeological Methods (select as many as apply to the project as a whole)

☐Check here if **NO** archaeological methods were used.

☐surface collection, controlled	☐shovel test-other screen size	☐block excavation (at least 2x2 m)	☐**metal detector**
☐surface collection, **un**controlled	☐water screen	☐soil resistivity	☐**other remote sensing**
☒shovel test-1/4"screen	☐posthole tests	☐magnetometer	☒**pedestrian survey**
☐shovel test-1/8" screen	☐auger tests	☐side scan sonar	☐**unknown**
☐shovel test 1/16"screen	☐coring	☐**ground penetrating radar (GPR)**	
☐shovel test-unscreened	☐test excavation (at least 1x2 m)	☐**LIDAR**	

☐other (describe): _____

Historical/Architectural Methods (select as many as apply to the project as a whole)

☒Check here if **NO** historical/architectural methods were used.

☐building permits	☐demolition permits	☐neighbor interview	☐subdivision maps
☐commercial permits	☐**windshield survey**	☐occupant interview	☐tax records
☐interior documentation	☐local property records	☐occupation permits	☐unknown

☐other (describe): _____

Survey Results

Resource Significance Evaluated? ☐Yes ☐No

Count of Previously Recorded Resources 0 **Count of Newly Recorded Resources** 0

List Previously Recorded Site ID#s with Site File Forms Completed (attach additional pages if necessary)

List Newly Recorded Site ID#s (attach additional pages if necessary)

Site Forms Used: ☐Site File Paper Forms ☒Site File PDF Forms

REQUIRED: Attach Map of Survey or Project Area Boundary

SHPO USE ONLY **SHPO USE ONLY** **SHPO USE ONLY**

Origin of Report: ☐872 ☐Public Lands ☐UW ☐1A32 # _____ ☐Academic ☐Contract ☐Avocational
☐Grant Project # _____ ☐Compliance Review: CRAT # _____

Type of Document: ☐Archaeological Survey ☐Historical/Architectural Survey ☐Marine Survey ☐Cell Tower CRAS ☐Monitoring Report
☐Overview ☐Excavation Report ☐Multi-Site Excavation Report ☐Structure Detailed Report ☐Library, Hist. or Archival Doc
☐**Desktop Analysis** ☐MPS ☐MRA ☐TG ☐Other: _____

Document Destination: Plottable Projects **Plotability:** _____

Florida Master Site File / Div. of Historical Resources / R.A. Gray Bldg / 500 S Bronough St., Tallahassee, Florida 32399-0250
Phone 850.245.6440, Fax 850.245.6439, Email: SiteFile@dos.myflorida.com

Project Area: Saturn V

Project Area

0 25 50 100

Meters

N

Service Layer Credit: Sources: Esri, Vantor, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community

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☐ Original
☒ Update

ARCHAEOLOGICAL SITE FORM
FLORIDA MASTER SITE FILE
Version 5.0 3/19

Consult *Guide to Archaeological Site Form* for detailed instructions

Site #8 BR00774
Field Date 12-17-2025
Form Date 3-25-2026
Recorder # _____

Site Name(s) The Astronaut Road Site
Project Name 2.29-Acre Project for KSC Saturn V/Apollo Center
Multiple Listing (DHR only) _____
Survey # (DHR only) _____

Ownership: ☐private-profit ☐private-nonprofit ☐private-individual ☐private-nonspecific ☐city ☐county ☐state ☒federal ☐Native American ☐foreign ☐unknown

LOCATION & MAPPING

USGS 7.5 Map Name ORSINO USGS Date 2024 Plat or Other Map _____
City/Town (within 3 miles) _____ In City Limits? ☐yes ☒no ☐unknown County Brevard
Township 22S Range 36E Section 1 ¼ section: ☐NW ☐SW ☐SE ☒NE Irregular-name: _____
Township _____ Range _____ Section _____ ¼ section: ☐NW ☐SW ☐SE ☐NE
Landgrant _____ Tax Parcel # _____
UTM Coordinates: Zone ☐16 ☒17 Easting 532440 Northing 3164460
Other Coordinates: X: _____ Y: _____ Coordinate System & Datum NAD 83
Address / Vicinity / Route to:

Kennedy Parkway to Astronaut Road. Turn east. Site is on the left (north) of the road, on top of ridge and north into scrub.

Name of Public Tract (e.g., park) NASA Kennedy Space Center

TYPE OF SITE (select all that apply)

SETTING
☒ Land (*terrestrial*)
☐ Lake/Pond (*lacustrine*)
☐ River/Stream/Creek (*riverine*)
☐ Tidal (*estuarine*)
☐ Saltwater (*marine*)
☐ Wetland (*palustrine*)
  ☐ usually flooded
  ☐ usually dry
☐ Cave/Sink (*subterranean*)
  ☐ terrestrial
  ☐ aquatic

STRUCTURES OR FEATURES
☐ log boat
☐ agric/farm building
☐ burial mound
☐ building remains
☐ cemetery/grave
☐ dump/refuse
☐ earthworks (historic)
☐ fort
☐ midden
☐ mill
☐ mission
☐ mound, nonspecific
☐ plantation
☐ platform mound
☐ road segment
☐ shell midden
☐ shell mound
☐ shipwreck
☐ subsurface features
☐ surface scatter
☐ well

FUNCTION
☒ campsite
☐ extractive site
☐ habitation (prehistoric)
☐ homestead (historic)
☐ farmstead
☐ village (prehistoric)
☐ town (historic)
☐ quarry (prehistoric)

Other Features or Functions (Choose from the list or type a response.)
1. _____ 2. _____

CULTURE PERIODS (select all that apply)

ABORIGINAL
☐ Alachua
☐ Archaic (nonspecific)
☐ Archaic, Early
☐ Archaic, Middle
☐ Archaic, Late
☐ Belle Glade
☐ Cades Pond
☐ Caloosahatchee
☐ Deptford
☐ Englewood
☐ Fort Walton
☐ Glades (nonspecific)
☐ Glades I
☐ Glades II
☐ Glades III
☐ Hickory Pond
☐ Leon-Jefferson
☐ Malabar I
☐ Malabar II
☐ Manasota
☐ Mississippian
☐ Mount Taylor
☐ Norwood
☒ Orange
☐ Paleoindian
☐ Pensacola
☐ Perico Island
☐ Safety Harbor
☐ St. Augustine
☐ St. Johns (nonspecific)
☐ St. Johns I
☐ St. Johns II
☐ Santa Rosa
☐ Santa Rosa-Swift Creek
☐ Seminole (nonspecific)
☐ Seminole: Colonization
☐ Seminole: 1st War To 2nd
☐ Seminole: 2nd War To 3rd
☐ Seminole: 3rd War & After
☐ Swift Creek (nonspecific)
☐ Swift Creek, Early
☐ Swift Creek, Late
☒ Transitional
☐ Weeden Island (nonspecific)
☐ Weeden Island I
☐ Weeden Island II
☐ Prehistoric (nonspecific)
☐ Prehistoric non-ceramic
☒ Prehistoric ceramic

NON-ABORIGINAL
☐ First Spanish 1513-99
☐ First Spanish 1600-99
☐ First Spanish 1700-1763
☐ First Spanish (nonspecific)
☐ British 1763-1783
☐ Second Spanish 1783-1821
☐ American Territorial 1821-45
☐ American Civil War 1861-65
☐ American 19th Century
☐ American 20th Century
☐ American (nonspecific)
☐ African-American

Other Cultures (Choose from the list or type a response. For historic sites, give specific dates.)
1. _____ 3. _____
2. _____ 4. _____

OPINION OF RESOURCE SIGNIFICANCE

Potentially eligible individually for National Register of Historic Places? ☒yes ☐no ☐insufficient information
Potentially eligible as contributor to a National Register district? ☐yes ☒no ☐insufficient information
Explanation of Evaluation (required if evaluated; use separate sheet if needed)

The northern part of this site is still extant and believe to have the potential to yield significant archaeologist information regarding such questions as settlement patterning and inter-regional trade. Contain cultural materials not typical of the area

Recommendations for Owner or SHPO Action

Preservation

DHR USE ONLY	OFFICIAL EVALUATION	DHR USE ONLY
NR List Date _____ ☐ Owner Objection	SHPO – Appears to meet criteria for NR listing: ☐yes ☐no ☐insufficient info Date _____ Init._____ KEEPER – Determined eligible: ☐yes ☐no Date _____ NR Criteria for Evaluation: ☐a ☐b ☐c ☐d (see *National Register Bulletin 15*, p. 2)	

Florida Master Site File / Div. of Historical Resources / R. A. Gray Bldg / 500 S Bronough St., Tallahassee, FL 32399-0250
Phone **850.245.6440** / Fax **850.245.6439** / E-mail **SiteFile@dos.fl.gov**

ARCHAEOLOGICAL SITE FORM

Site #8 BR00774

FIELD METHODS (select all that apply)

SITE DETECTION			SITE BOUNDARY		
☐no field check	☐exposed ground	☐screened shovel	☐bounds unknown	☐remote sensing	☐unscreened shovel
☒literature search	☐posthole tests	☒screened shovel-1/4"	☐none by recorder	☐exposed ground	☒screened shovel
☐informant report	☐auger tests	☐screened shovel-1/8"	☒literature search	☐posthole tests	☐block excavations
☐remote sensing	☐unscreened shovel	☐screened shovel-1/16"	☐informant report	☐auger tests	☐estimate or guess

Other methods; number, size, depth, pattern of units; screen size (attach site plan)

cultural material associated with the site were not located within the boundary or project area. Review of previous literature indicates site is located north of road and to the east of where currently plotted in GIS, revised site location proposed.

SITE DESCRIPTION

Extent/Size (m^2) 5,000 Depth/stratigraphy of cultural deposit (describe below)

none encountered in project area

Temporal Interpretation - Components (check one): ☐single component ☒multiple component ☐uncertain

Describe each occupation in plan (refer to attached large scale map) and stratigraphically. Discuss temporal and functional interpretations:

Orange and Transitional Periods

Integrity - Overall disturbance: ☐none seen ☐minor ☒substantial ☐major ☐redeposited ☐destroyed-**document!** ☐unknown

Disturbances / threats / protective measures

road construction/erosion; possible development

Surface collection: area collected _____ m^2 # collection units_____ | Excavation: # noncontiguous blocks _____

ARTIFACTS

Total Artifacts #_____ ○count ○estimate | Surface #_____ | Subsurface #_____

COLLECTION SELECTIVITY

☐unknown ☐unselective (all artifacts)
☐selective (some artifacts)
☐mixed selectivity

SPATIAL CONTROL

☐uncollected ☐general (not by subarea)
☐unknown ☐controlled (by subarea)
☐variable spatial control
☐other (describe in comments below)

ARTIFACT CATEGORIES and DISPOSITIONS

____ - _____
____ - _____
____ - _____
____ - _____
____ - _____
____ - _____
____ - _____
____ - _____

select a disposition from the list below for each artifact category selected at left

A - category always collected
S - some items in category collected
O - observed first hand, but not collected
R - collected and subsequently left at site
I - informant reported category present
U - unknown

Artifact Comments

no artifacts encountered during this survey

DIAGNOSTICS (type or mode, and frequency: e.g., *Suwanee ppk, heat-treated chert, Deptford Check-stamped, ironstone/whiteware*)

1. _____ N=____ 4. _____ N=____ 7._____ N=____
2. _____ N=____ 5. _____ N=____ 8._____ N=____
3. _____ N=____ 6. _____ N=____ 9._____ N=____

ENVIRONMENT

Nearest fresh water: Type River Name Banana Creek Distance from site (m) 50
Natural community XERIC UPLANDS SCRUB Topography Ridge crest Elevation: Min ____m Max ____m
Local vegetation scrub oak, saw palmetto
Present land use vacant
SCS soil series Pomello Sand Soil association Paola-Pomello-Astatula

DOCUMENTATION

Accessible Documentation Not Filed with the Site File - including field notes, analysis notes, photos, plans and other important documents

1) Document type All materials at one location Maintaining organization National Aeronautics and Space Administration
Document description report and data File or accession #'s 312026008

2) Document type _____ Maintaining organization _____
Document description _____ File or accession #'s _____

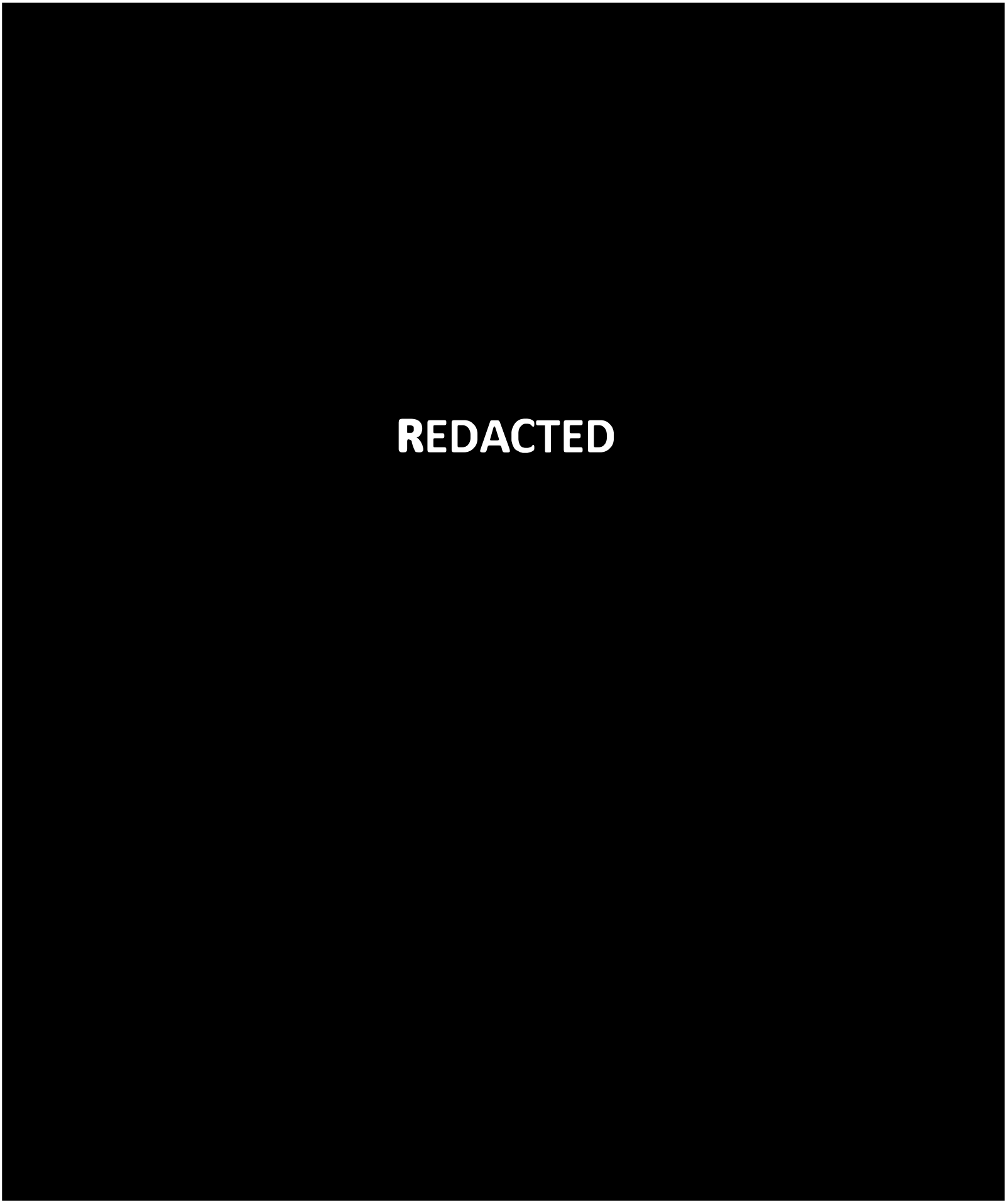
RECORDER & INFORMANT INFORMATION

Informant Information: Name _____
Address / Phone / E-mail _____

Recorder Information: Name Wendy Drennon Puckett Affiliation LG 2 Environmental Solutions, Inc.
Address / Phone / E-mail 10475 Fortune Pkwy Ste 201 Jacksonville FL 32256/9042888631/wpuckett@oescgroup.com

Required Attachments

❶ **PHOTOCOPY OF 7.5' USGS QUAD MAP WITH SITE BOUNDARIES MARKED *and* SITE PLAN**
Plan at 1:3,600 or larger. Show boundaries, scale, north arrow, test/collection units, landmarks and date.



Updated Site Boundary 8BR00774

Updated Boundary

0 50 100 150 200 250

Meters

N

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S. Department of State HIU; NOAA National Centers for Environmental Information. Data refreshed October 27, 2025.

REDACTED

REDACTED

REDACTED

REDACTED