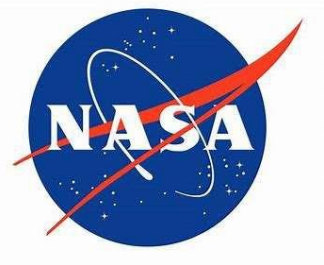
Final Environmental Assessment for the Implementation of the Space Commerce District Area Development Plan at the Kennedy Space Center

June 2025

National Aeronautics and Space Administration
John F. Kennedy Space Center
Kennedy Space Center, Florida



Prepared for:

Space Florida

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List of Abbreviations and Acronyms

AADT	Average Annual Daily Traffic
AADF	Annual Average Daily Flow
ADF	Average Daily Flow
ADP	Area Development Plan
BMP	Best Management Practice(s)
BO	Biological Opinion
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
CRAS	Cultural Resources Assessment Survey
CRM	Cultural Resources Manager
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EMB	Environmental Management Branch
EO	Executive Order
ERP	Environmental Resource Permit
ESA	Endangered Species Act
FAS	Floridan Aquifer System
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEC	Florida East Coast
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FLUCCS	Florida Land Use, Cover and Forms Classification System
FONSI	Finding of No Significant Impact
FPL	Florida Power & Light
ft^2	square foot/feet
GIS	geographic information system
GPD	gallons per day
GPM	gallons per minute
Ha	hectares
HVAC	heating, ventilation, and air-conditioning
ICRMP	Integrated Cultural Resources Management Plan
IRL	Indian River Lagoon
km	kilometer(s)
km^2	square kilometer(s)
KSC	Kennedy Space Center

kV	kilovolts
kVA	kilovolt-amp
LC	Launch Complex
LED	light-emitting diodes
LLF	Launch and Landing Facility
m	meter(s)
MGD	million gallons per day
MILA	Merritt Island Launch Annex
MINWR	Merritt Island National Wildlife Refuge
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMHC	non-methane hydrocarbons
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NPR	NASA Procedural Requirements
NRHP	National Register of Historic Places
O_3	ozone
ODS	ozone-depleting substances
OLS	Orbital Launch System
OSHA	Occupational Safety and Health Administration
OFW	Outstanding Florida Water
Pb	lead
PCB	polychlorinated biphenyls
PFAS	per- and polyfluoroalkyl substances
PM_{10}	particulate matter 10 micrometers or less in diameter
$PM_{2.5}$	particulate matter 2.5 micrometers or less in diameter
REC	Record of Environmental Consideration
RWWTF	Regional Wastewater Treatment Facility
SAS	Surficial Aquifer System
SCD	Space Commerce District
SFHA	Special Flood Hazard Area
SJRWMD	St. Johns River Water Management District
SHPO	State Historic Preservation Officer
SLD-45	Space Launch Delta 45
SLF	Space Florida Launch and Landing Facility
SLSL	Space and Life Sciences Laboratory
SO_2	sulfur dioxide
USACE	US Army Corps of Engineers
USC	US Code

USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
VAB	Vehicle Assembly Building
VC	Visitor Complex
VOC	volatile organic compound(s)
WSDOT	Washington State Department of Transportation
WWTF	Wastewater Treatment Facility
ZAP	Zone of Archaeological Potential

EXECUTIVE SUMMARY

This Environmental Assessment (EA) evaluates the potential environmental effects from implementing the Space Commerce District Area Development Plan (ADP) to accommodate future commercial space operations, capabilities, and supporting infrastructure at the Kennedy Space Center (KSC). The December 2020 National Space Policy defines the term "commercial" as, "…space goods, services, or activities provided by private sector enterprises that bear a reasonable portion of the investment risk and responsibility for the activity, operate in accordance with typical market-based incentives for controlling cost and optimizing return on investment, and have the legal capacity to offer these goods or services to existing or potential nongovernmental customers." In accordance with the National Space Policy, a commercial space sector is foundational to national strategic objectives and is vital to the security of the United States and its allies. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 US Code Sections 4321–4370), the National Aeronautics and Space Administration (NASA) Procedures for Implementing NEPA (14 CFR Part 1216), and NASA Procedural Requirements (NPR) Implementing NEPA and Executive Order 12114 (NASA NPR 8580.1). NASA is the lead federal agency in preparing this EA and has participated in the document's scoping and development to ensure that the document meets agency requirements.

The Proposed Action is to implement the Space Commerce District ADP to accommodate future commercial space operations, capabilities, and supporting infrastructure at KSC. The Proposed Action is limited to the physical planning, design, and construction improvements for commercial space development activities and does not include changes to essential NASA operational activities. The Proposed Action is designed to meet the goals and requirements of the KSC Vision Plan. As part of the KSC Vision Plan development, constraints and site analyses were used to identify areas owned by KSC appropriate for commercial-space-related development or redevelopment. The developable areas were divided into parcels and categorized into functional land categories. Potential future development options were then identified.

The Proposed Action may require permits from various state and federal agencies. Examples include, but are not limited to, and Environmental Resource Permit from the St. Johns River Water Management District (SJRWMD), a National Pollutant Discharge Elimination System (NPDES) permit from the Florida Department of Environmental Protection (FDEP), a federal Dredge and Fill Permit from the FDEP Clean Water Act Section 404 Program or US Army Corps of Engineers, and an Industrial Wastewater permit from FDEP. Additionally, coordination with and/or approvals from FDEP's Federal Programs Section may also be required for designing features that affect groundwater flow or surface-water discharge to the lagoonal systems (e.g., stormwater management features) and for planning/performing dewatering or other intrusive work that may affect contaminated media.

This EA addresses the No Action Alternative and the Proposed Action.

Environmental effects from the No Action Alternative and the Proposed Action were classified as **none, negligible, minor, moderate or major.** The potential effects to resource areas were considered in proportion to their potential for significant impacts. As a result, the following

resource areas would not have the potential to result in significant issues and further analyses were not warranted: hazardous materials and hazardous waste, health and safety, and geology and soils. Resource categories for which further study was warranted to assess their potential for significant effects are land use and visual resources, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics. Table ES-1 summarizes the potential environmental effects to these resources.

Table ES-1 Summary of Potential Environmental Effects

Resource Category	***Proposed Effects***		
	No Action	***Proposed Action***	
		Construction	***Operation***
Land Use and Visual Resources	No Adverse Effects	No Adverse Effects	No Adverse Effects
Transportation	No Adverse Effects	Negligible to Minor Adverse Effects	Minor Adverse Effects
Utilities	No Adverse Effects	Negligible to Minor Adverse Effects	Negligible to Moderate Adverse Effects
Air Quality	No Adverse Effects	Minor Adverse Effects	Minor Adverse Effects
Biological Resources	No Adverse Effects	Negligible to Minor Adverse Effects	Negligible Adverse Effects
Cultural Resources	No Adverse Effects	Negligible Adverse Effects	No Adverse Effects
Noise	No Adverse Effects	Minor Adverse Effects	Negligible Adverse Effects
Water Resources	No Adverse Effects	Minor to Moderate Adverse Effects	Negligible to Minor Adverse Effects
Socioeconomics	Minor to Moderate Adverse Effects	Minor to Moderate Beneficial Effects	Minor to Moderate Beneficial Effects

Specific to Florida scrub-jay compensation, the presence of suitable habitat will be reassessed during each site development, at which time KSC staff will evaluate and address this issue in accordance with the *Florida Scrub-Jay Compensation Plan* (NASA 2014). Additionally, a wetland mitigation plan will be required in accordance with state and federal regulations to offset the loss of wetland functions.

A cumulative effects analysis indicates that **no significant cumulative effects** would occur to any of the resource categories analyzed in this EA from implementing the Proposed Action and other past, present, and reasonably foreseeable projects occurring in the same geographic area.

1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

This Environmental Assessment (EA) evaluates the potential environmental effects from implementing the Space Commerce District Area Development Plan (ADP) to accommodate future commercial space operations, capabilities, and supporting infrastructure at the Kennedy Space Center (KSC) (NASA 2024a). The December 2020 National Space Policy defines the term "commercial" as, "…space goods, services, or activities provided by private sector enterprises that bear a reasonable portion of the investment risk and responsibility for the activity, operate in accordance with typical market-based incentives for controlling cost and optimizing return on investment, and have the legal capacity to offer these goods or services to existing or potential nongovernmental customers." In accordance with the National Space Policy, a commercial space sector is foundational to national strategic objectives and is vital to the security of the United States and its allies. KSC is one of 10 National Aeronautics and Space Administration (NASA) field centers and a premier multi-user spaceport with more than 90 private-sector partners and nearly 250 partnership agreements (NASA 2024b). The Space Commerce District is currently home to commercial activity, manufacturing and assembly of spacecraft, research, public outreach, and outdoor recreation areas at KSC. These activities provide essential functions to KSC's missions, including laboratories for engineering, testing, and prototyping; administrative centers; and the Visitor Complex (VC) constitutes commercial space activities envisioned to take place in the Space Commerce District (SCD) (NASA 2024a).

Space Florida, the state's finance, development, and spaceport authority, has prepared this EA in accordance with the National Environmental Policy Act (NEPA) (42 US Code [USC] Sections 4321–4370), as amended by the Fiscal Responsibility Act of 2023 (Public Law 118-5); NASA Procedures for Implementing NEPA (14 CFR Part 1216); and NASA Procedural Requirements (NPR) Implementing NEPA and Executive Order (EO) 12114 (NASA NPR 8580.1). NASA is the lead federal agency in preparing this EA and has participated in the document's scoping and development to ensure that the document meets agency requirements.

1.2 Background

The landing of the Space Shuttle Atlantis on July 21, 2011, marked the end to the single-user operational model at KSC and the beginning of a multi-user spaceport shared by government and commercial partners (NASA 2020). The 2012–2032 KSC Master Plan described the requirements to support NASA program objectives while providing non-NASA entities the opportunity to use excess NASA facilities and KSC's infrastructure to make access to space less costly and more routine (NASA 2017). NASA released its 95-percent Final Draft KSC Vision Plan (Vision Plan) in May 2020, which was the first stage of a Master Plan update. The Vision Plan will serve as a framework for stewarding KSC's physical assets over the next 20 years while minimizing impacts to environmentally sensitive areas (NASA 2020). Figure 1-1 shows that the Vision Plan divided

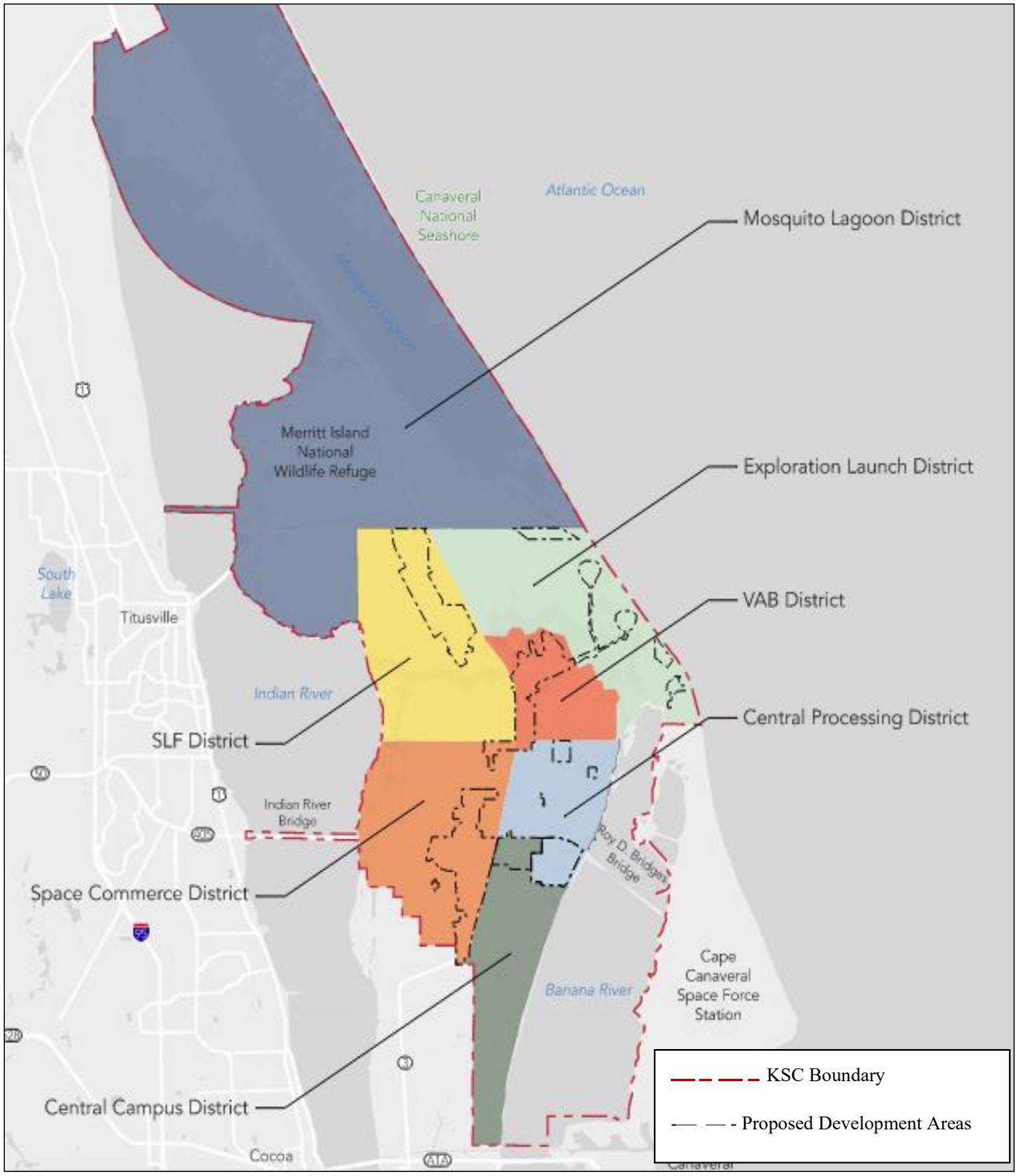


Figure 1-1 KSC Planning Districts (NASA 2020)

KSC into the following seven planning districts to guide KSC's development into a multi-user spaceport:

- Space Commerce District.
- Mosquito Lagoon District.
- Exploration Launch District.
- Vehicle Assembly Building (VAB) District.
- Space Florida Launch and Landing Facility (SLF) District.
- Central Processing District.
- Central Campus District.

In addition to the Vision Plan, a Future Development Concept was developed in 2021 that outlined strategies to achieve NASA's real property goals. KSC is updating its Center Master Plan that will build on the Vision Plan and 2021 Future Development Concept. The updated Center Master Plan includes ADPs for the four Districts where the majority of NASA operations are concentrated: the Central Campus, Central Processing District, VAB District, and Exploration Launch District. KSC's updated Master Plan will include these ADPs along with the Space Commerce District ADP and will be incorporated into the final comprehensive KSC Master Plan (NASA 2024a). The ADP for the Space Commerce District was completed by Space Florida, funded by the Florida Department of Transportation (FDOT), and released in February 2024. The ADP provides a site planning approach for 16 parcels totaling approximately 783.7 acres (317.1 hectares [ha]) (NASA 2024a).

1.3 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 roughly 6 miles (10 km) wide. The land owned by NASA at KSC consists of 141,829 acres (57,396 ha) (NASA 2024a). The Space Commerce District is bounded by Kennedy Parkway (State Road 3) to the east, the KSC boundary and Indian River to the west, Schwartz Road to the north, and the KSC boundary to the south (Figures 1-2 and 1-3). The Proposed Action area (Figure 1-4) consists of 16 parcels; however, the area excludes development projects that were analyzed for potential environmental impacts under separate NEPA reviews, as well as portions of the Space Commerce District north of NASA Parkway W. The VC, Exploration Park, Exploration Park North, International Space Research Park (Blue Origin), and Space and Life Sciences Laboratory (SLSL) areas were analyzed for potential environmental impacts under separate NEPA reviews. No new developments are proposed in these areas under the Proposed Action; however, the potential for cumulative impacts from proposed development in these areas are included in Chapter 4. Additionally, the Space Commerce District areas north of NASA Parkway W. are fully developed and comprise the Florida Power and Light (FPL) solar farm and the SpaceX manufacturing complex.



Figure 1-2 Regional Location Map
(The boundary reflects the Space Growth Boundaries based on siting constraints.)

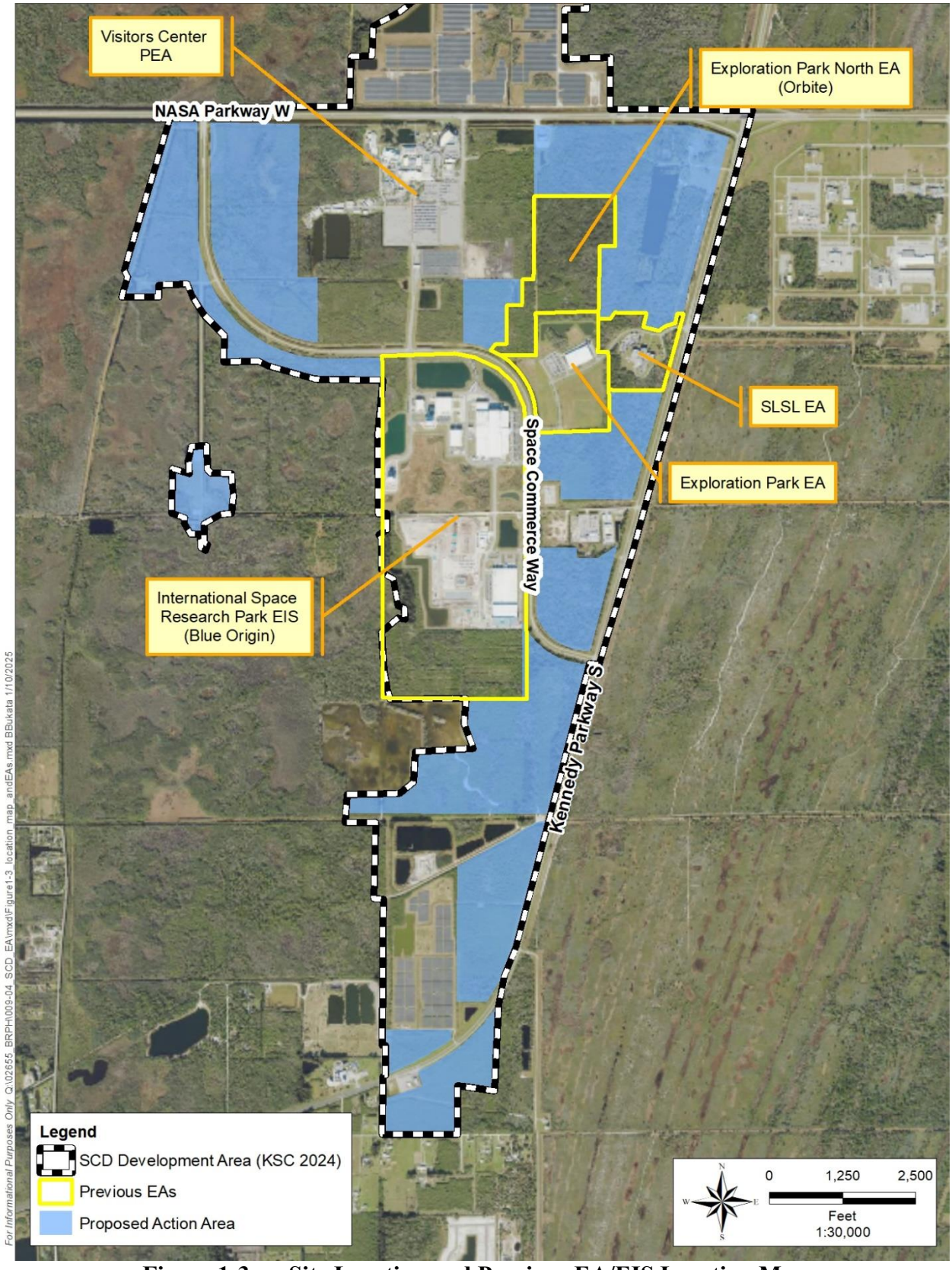


Figure 1-3 Site Location and Previous EA/EIS Location Map

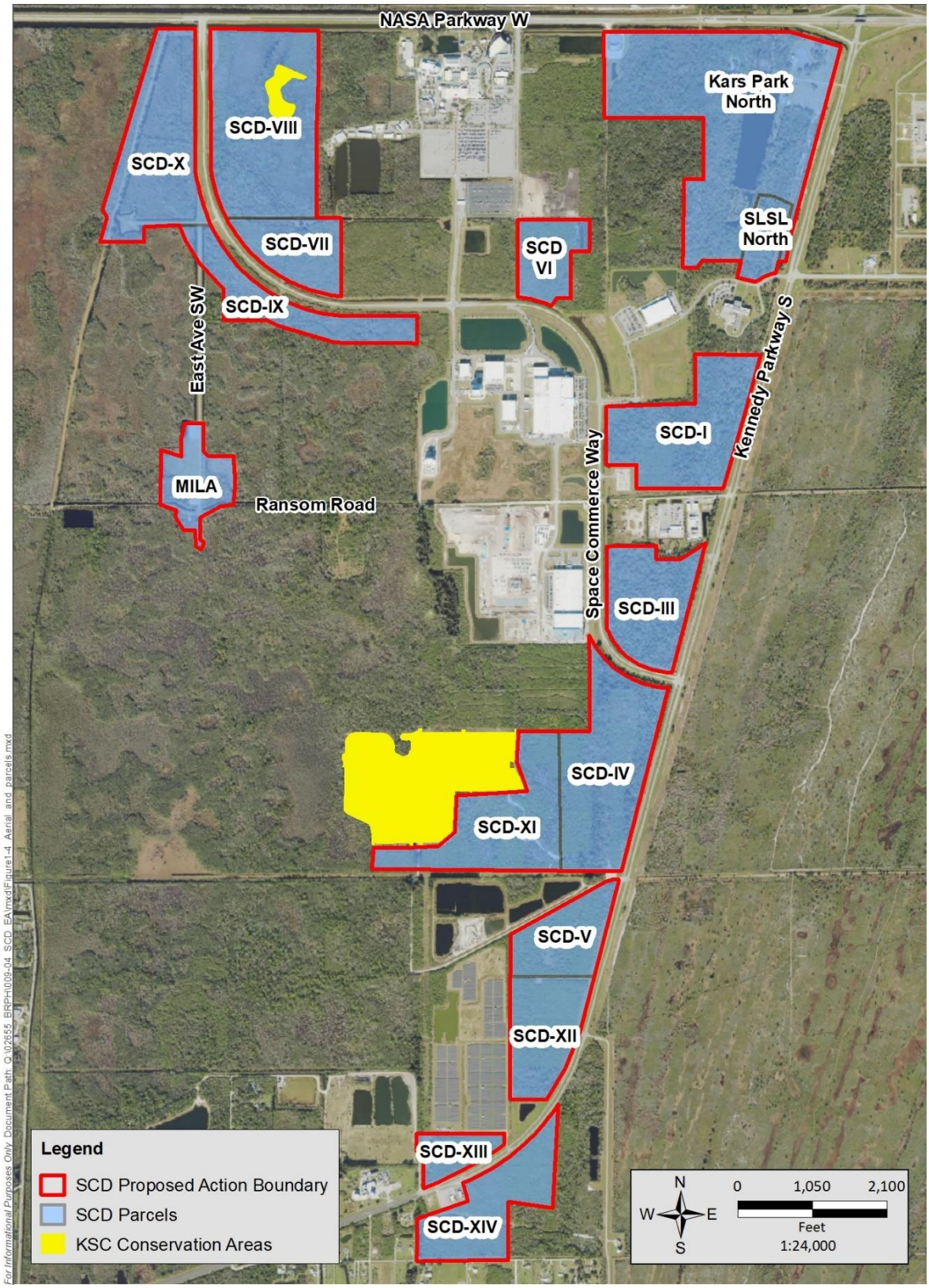


Figure 1-4 Proposed Action and Parcel Boundary Location Map

1.4 Purpose and Need

The purpose of the Proposed Action is to implement a master planning and development approach that would support the growth of the commercial space industry consistent with the Final Programmatic Environmental Impact Statement for KSC Center-Wide Operations, the 2020 Vision Plan, and the 2024 ADP (NASA 2016, 2020, 2024a).

Specifically, the Vision Plan states, "our planning vision is to enhance the multi-user spaceport with flexible processing and launch capabilities, robust infrastructure, sustainable facilities, and responsible stewardship of our built and natural environment" (NASA 2020).

The proposed development of the Space Commerce District supports the partnership between Space Florida and NASA and is consistent with the National Space Transportation Policy of the United States, which would "encourage private sector and state and local government investment and participation in the development, improvement, and sustainment of space infrastructure, including federal launch and reentry sites as well as those operated by private, state, and local entities" (NOAA Office of Space Commerce 2013).

The Proposed Action is needed to continue supporting achievement of NASA's programmatic mission objectives while maximizing the provision of making non-essential NASA lands, infrastructure, and facilities available to commercial aerospace to make access to space less costly and more routine.

1.5 Decision to be Made

The decision to be made is selecting an alternative for NASA with regard to the Proposed Action. The decision options include the following:

- Maintain status quo (the No Action Alternative),
- Prepare an Environmental Impact Statement if the Proposed Action would likely result in significant environmental effects, or
- Prepare a Finding of No Significant Impact (FONSI).

1.6 Lead and Cooperating Agencies

This EA was prepared by Space Florida, the Proposed Action proponent. Space Florida was created by the State of Florida to strengthen Florida's position as a global leader in aerospace research, investment, exploration, and commerce; as such, Space Florida serves as the single point of contact for all commercial space-related functions of Florida. NASA is the lead federal agency for the Proposed Action; furthermore, once the construction design plans are known and available, NASA will review them under the KSC Site Plan Review and Environmental Checklist process.

Due to the unique specificity of the Proposed Action and limited expected effects on potentially affected resource categories, Cooperating Agencies' participation is not warranted for this EA.

1.7 Intergovernmental Coordination/Consultations

In accordance with the requirements of EO 12372, *Intergovernmental Review of Federal Programs*, federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action were notified by NASA KSC during the development of this EA.

1.8 Public and Agency Review

Since the Proposed Action area occurs within wetlands and/or floodplains, it is subject to the requirements and objectives of EO 11990, *Protection of Wetlands* and EO 11988, *Floodplain Management* as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*. In accordance with NASA's Interim Directive 8500.100, *Floodplain and Wetlands*, a Notice of Availability of the Draft EA and Draft FONSI will be published in a locally viewed newspaper and available on NASA's internet site for a 30-day review/comment period. In addition, the Draft EA will be submitted to the Florida State Clearinghouse, which will then coordinate the review of the documents with its member agencies. Comments received on the Draft EA within the specified review period will be considered during preparation of the Final EA.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Proposed Action is to implement the Space Commerce District ADP to accommodate future commercial space operations, capabilities, and supporting infrastructure at KSC. The Proposed Action is limited to the physical planning, design, and construction improvements for commercial space development activities and does not include any specific changes to existing operational activities. The Proposed Action is designed to meet the goals and requirements of the Vision Plan. As part of the Vision Plan development, constraints and site analysis were used to identify areas owned by NASA that are appropriate for commercial space-related development or redevelopment. The Proposed Action only includes areas identified in the Vision Plan for future development. The developable areas were divided into parcels and categorized into functional land categories (Tables 2-1 and 2-2). Potential future development options were then identified (Table 2-3). One conceptual project that could occur on a parcel categorized as *light industrial* is a communal high-bay facility with a maximum height of 75 feet (23 meters [m]). This communal high-bay facility would be available for use by multiple commercial space users.

Table 2-1 Summary of Allowed Facilities/Uses by Land Category

Category	*Description*	*Allowed Facilities/Uses*
Administrative	Uses that are typically more office oriented and include space for personnel performing administrative functions. Because of greater personnel density, these uses tend to be sensitive to the negative impacts of industrial and hazardous uses.	• Office • Small Warehouse • Low-Impact Laboratory • Academic Facility • Press Facility • Fire Station
Community	Uses that are typically more targeted toward personnel support, providing amenities for the public and/or NASA employees. These uses are very sensitive to negative impacts from operational uses and safety concerns.	• Gas Station • Medical • Child-Care • Fitness/Recreation • Press Facility • Museum • Lodging/Food Amenities
Hazardous Activities	Uses that involve hazardous materials to an extent that there are safety-related stand-off distances required. These activities tend to be industrial in character and have severe incompatibilities or restrictions to other personnel-related uses.	• Explosives Storage • Hazardous Payload Processing • Hazardous Testing
Heavy Industrial	Uses that might have significant impacts on neighboring uses (e.g., noise, dust, hazards, or aesthetics). They are typically industrial in character and may have mitigatable incompatibilities with personnel-focused uses.	• Liquid Fuels • Vehicle Maintenance • Testing Ranges • Utilities/Production Plants • Fire Station
Launch	Uses associated with launch and recovery activities. They carry large and potentially dangerous impacts to personnel and other uses.	• Launch and Landing Facilities • Launch-Critical Commodity Production or Storage

Table 2-1 Summary of Allowed Facilities/Uses by Land Category

Category	*Description*	*Allowed Facilities/Uses*
Light Industrial	Uses that tend to have a more industrial character but limited incompatibilities with other personnel-focused uses.	• Warehouse Open Storage • Photovoltaic Array • Vehicle Maintenance • Laboratories • Fire Station
Open Space	Uses associated with natural environments, environmental constraints, and animal habitats.	• Floodplains • Wetlands • Waterbodies • Brownfield Sites • Animal Habitats

Table 2-2 Permitted Functional Land Use Category by Parcel ID

Parcel ID	*Administrative*	*Community*	*Heavy Industrial*	*Light Industrial*	*Open Space*
SCD-I	X	X		X	X
SCD-III	X	X		X	X
SCD-IV	X	X	X	X	X
SCD-V	X	X		X	X
SCD-VI	X	X			X
SCD-VII	X	X			X
SCD-VIII	X	X			X
SCD-IX					X
SCD-X					X
SCD-XI		X			X
SCD-XII		X			X
SCD-XIII	X	X			X
SCD-XIV	X	X		X	X
Kars Park North					X
MILA	X		X	X	X
SLSL North	X	X		X	X

Notes: MILA = Merritt Island Launch Annex; SCD = Space Commerce District.

Under the Proposed Action, the following projects would be implemented at the following parcels:

Table 2-3 Parcel ID, Location, and Development Concept Projects

Parcel ID	*Acres (Hectares)*	*Location*	*Development Concept Projects*
SCD-I	58.8 (23.8)	East of Space Commerce Way and West of Kennedy Parkway	Light industrial, administrative, and research
SCD-III	41.1 (16.6)		
SCD-IV	70.3 (28.4)	West of Kennedy Parkway	Light and heavy industrial, administrative, processing, and commercial developments
SCD-V	30.0 (12.1)		
SCD-VI	22.3 (9.0)	Between Space Commerce Way and NASA Parkway	Commercial, entertainment, and recreation
SCD-VII	28.1 11.4)		
SCD-VIII	90.0 (36.4)		
SCD-IX	34.5 14.0)	South of Space Commerce Way and West of Kennedy Parkway	Environmental mitigation and stormwater management areas
SCD-X	65.2 (26.4)		
SCD-XI	62.7 (25.4)		

Table 2-3 Parcel ID, Location, and Development Concept Projects

Parcel ID	*Acres (Hectares)*	*Location*	*Development Concept Projects*
SCD-XII	36.1 (14.6)	West of Kennedy Parkway	Light industrial, administrative, processing, and commercial developments
SCD-XIII	13.5 (5.5)		
SCD-XIV	43.4 (17.6)	South of Space Commerce Way and Kennedy Parkway	Environmental mitigation and stormwater management areas
Kars Park North	150.0 (60.7)	East of Space Commerce Way and West of Kennedy Parkway	No development has been identified.
MILA	24.0 (9.7)	West of Space Commerce Way, South of Kennedy Parkway, and at the south end S Band Road	Light and heavy industrial, administrative, and open space
SLSL North	13.7 (5.5)	East of Space Commerce Way and West of Kennedy Parkway	Light industrial, administrative, and research
Total	**783.7 (317.1)**		

Conceptual development plans for the Space Commerce District that represent likely future needs from NASA and non-NASA users are shown in Figures 2-1 and 2-2. Detailed plans of specific projects have not been designed; however, general major elements of development projects are expected to include the following:

- Building height would be conceptually limited to a maximum of 200 feet (61 m) for general planning purposes; however, individual building-height restrictions would be on a case-by-case basis. Specific to proposed new structures near the VC, the Space Florida prospective tenant must initiate and have completed to the FAA's satisfaction, an FAA Obstruction Evaluation/Airports Airspace Analysis per 14 CFR Part 77 in relation to the NASA Launch and Landing Facility and the Cape Canaveral Station Skid Strip (KXMR). The requestor must file and comply with the FAA "Notice of Proposed Construction or Alteration" form (FAA Form 7460-1) and must adhere to the requirements and stipulations defined by that process (FAA 2025).

- 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 be on previously disturbed concrete, gravel, or grassy areas within the Space Commerce District boundaries.

- 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. Site development contractors are allowed to conduct air-curtain burning only for disposing of site clearing and grubbing vegetation. Burning shall be in accordance with the conditions required in the burn permit and all requirements for conducting an air-curtain burn. All refuse would be disposed of in accordance with KSC regulations.

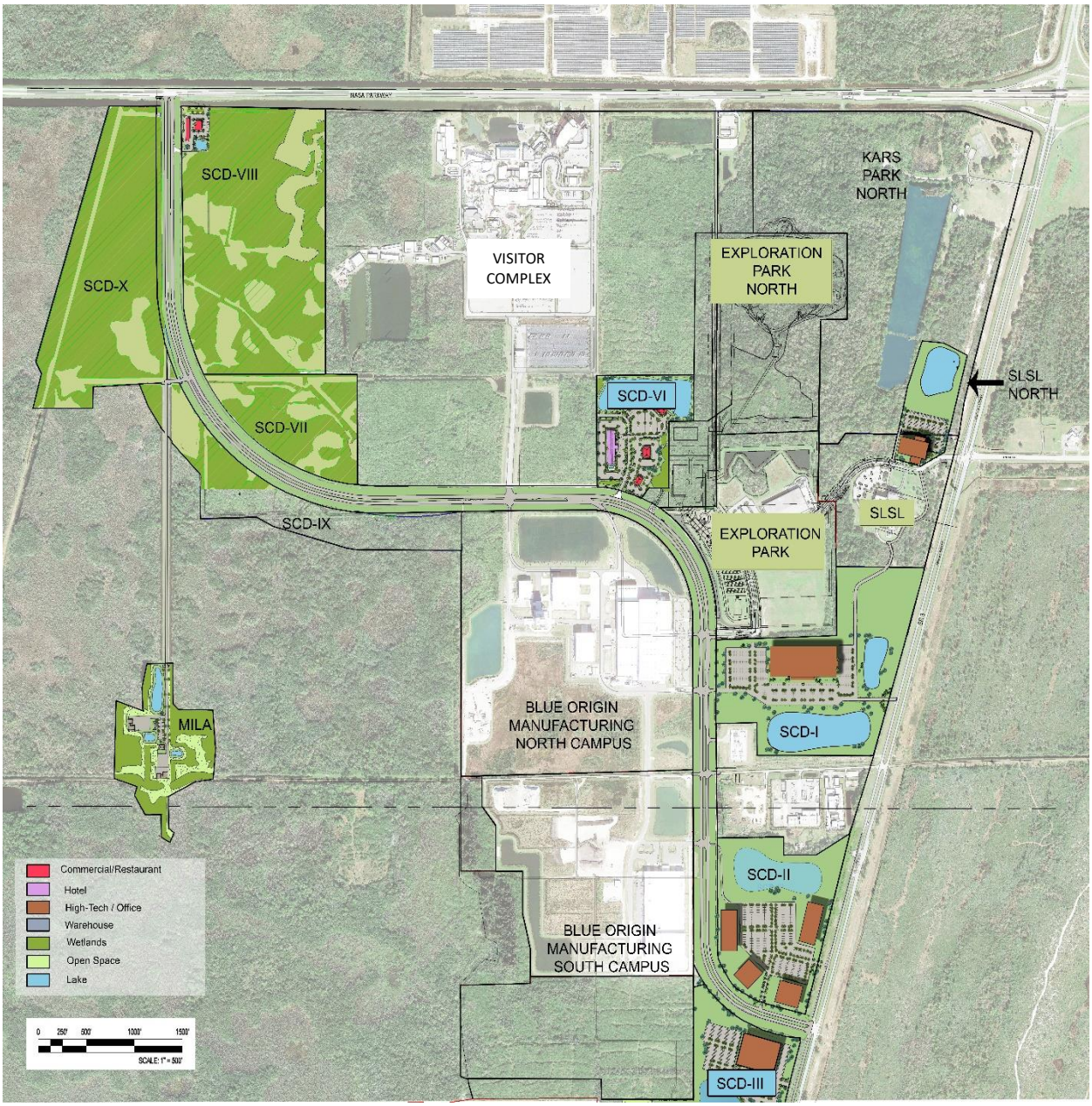


Figure 2-1 Conceptual Plan for the Central Space Commerce District

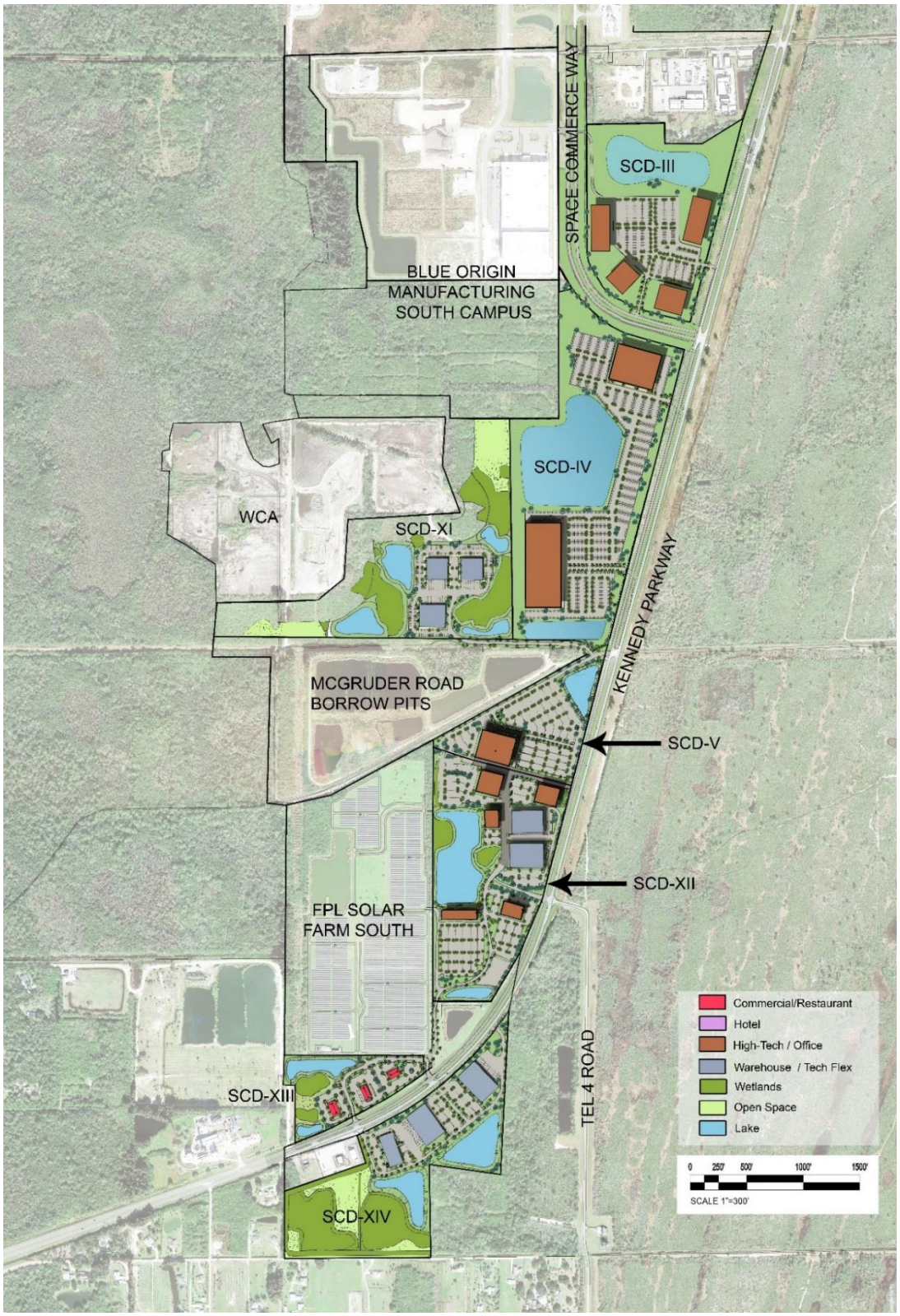


Figure 2-2 Conceptual Plan for the South Space Commerce District

- Activities requiring dewatering, including manhole dewatering, would be coordinated with the KSC Remediation Program Manager. Coordination with and approvals from the FDEP Federal Programs Section may also be required.

- Construction workers would arrive to the work site 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 would comply with the US Fish and Wildlife Service (USFWS) Biological Opinion (BO) for artificial lighting.

- 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 include installing or extending appropriate power utilities, water/sewage utilities, communication/fiber cables, or copper lines.

- The Proposed Action would incorporate site-specific health and safety requirements for construction workers per Occupational Safety and Health Administration (OSHA) regulations.

- The Proposed Action's design and planning elements that may affect groundwater flow direction in or near contaminated groundwater would be coordinated with and approved (as required) by the FDEP Federal Programs Section. Additionally, the design of stormwater management features may require evaluating the potential for increased contaminant loading into the lagoonal systems.

- Construction activities would be conducted in accordance with federal and state permits and applicable environmental regulations.

- The Proposed Action would comply with the USFWS BO for artificial lighting to mitigate impacts on nesting and hatchling sea turtles, where applicable. Specifically, all facilities at KSC will use amber light-emitting diodes (LEDs) that meet USFWS specifications or have 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 Action would require compliance with regulatory requirements/permits including but not limited to the following:

    - All on-site wetlands will be delineated in accordance with state and federal regulations before permitting each parcel. Federal wetland jurisdiction will be determined in

consultation with the US Army Corps of Engineers (USACE). If the wetlands are federally jurisdictional, wetland impacts will be avoided during the site design when possible and, if not avoidable, minimized for each parcel as required by state and federal regulations. Proposed wetland impacts will require a Clean Water Act (CWA) Section 404 Permit.

- An Environmental Resource Permit (ERP) through the St. Johns River Water Management District (SJRWMD) to construct a new stormwater management system and impact jurisdictional wetlands.

- A National Pollutant Discharge Elimination System (NPDES) Permit through FDEP for stormwater discharges associated with large construction activities greater than 5.0 acres (2.0 ha).

- An Industrial Wastewater Permit from FDEP for any wastewater discharge generated from the Proposed Action.

2.2 Screening Factors

NEPA's implementing regulations provide guidance on considering alternatives to a Proposed Action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and to meet the purpose and need require detailed analysis. Potential alternatives that meet the purpose and need of the Proposed Action were evaluated against the following screening factors:

- Mission. Support NASA program objectives while providing non-NASA entities with the opportunity to use non-essential/excess NASA facilities and KSC's infrastructure to make access to space less costly and more routine.

- Flexibility. Capability for building and site design to respond to the expansion of commercial involvement and to support NASA mission success.

- Infrastructure. Modernize and upgrade existing infrastructure to support the anticipated growth of commercial partners.

- Site Utilization. Maximize the limited developable areas remaining for building area, site population, on-site parking, centralized stormwater facilities, and innovative mitigation approaches.

- Minimize or Avoid Unnecessary Adverse Environmental and Cultural Effects. Minimize developments that impact wetlands, floodplains, protected species areas, historic properties, and water bodies. This criterion is consistent with NASA's environmental stewardship commitments and reduces unnecessary mitigation and monitoring expenses.

- Avoid any proposed impacts to areas on the *KSC Conservation Lands Layer* (Figure 1-4). The *Conservation Lands Layer* is a geographic information system (GIS) dataset that

resides in the *KSC Master Planning Institutional GIS* to provide reasonable assurance that these mitigation areas will be preserved in perpetuity.

2.3 Alternatives Carried Forward for Analysis

Using the screening factors listed in Section 2.2, reasonable alternatives were considered that met the purpose of and need for the Proposed Action. As a result of that effort, the Proposed Action and No Action Alternative were carried forward for analysis.

2.3.1 No Action Alternative

Under the No Action Alternative, KSC would continue to offer non-NASA users access and use of the Space Commerce District. However, without a comprehensive approach to development, any future development would be fragmented and would not maximize the limited developable areas remaining at the Space Commerce District. As a result, under the No Action Alternative, NASA would be unable to meet its objective of supporting the fulfillment of current and future NASA requirements and missions while making access to space less costly and more routine for non-NASA commercial space entities.

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

2.3.2 Proposed Action – Implement the Space Commerce District ADP

The Proposed Action includes conceptual development as summarized in Table 2-3 and depicted on Figures 2-1 and 2-2. For each future development area, the best available information at this time was used to create conceptual ‘development footprints’ to identify where facilities, parking, a stormwater treatment system, and other required infrastructure could be located. To the extent possible, unnecessary impacts to known natural and cultural resources were avoided. Any new development on properties listed in tables and shown figuratively in this EA to accommodate future commercial space capabilities and infrastructure would require Space Florida or a proposed user to execute a real property agreement with NASA KSC. In addition, once construction design plans are known and available, NASA will review them under the KSC Site Plan Review and Environmental Checklist processes.

2.4 Alternatives Considered But Not Carried Forward to Detailed Analysis

NEPA (40 CFR 1502.14) requires that a reasonable range of alternatives be analyzed that are technically and economically feasible and meet the purpose of and need for the Proposed Action. The following alternatives were considered but not carried forward for detailed analysis in this EA

because they were not considered feasible, did not meet the purpose of and need for the Proposed Action, and/or did not satisfy the screening factors presented in Section 2.2:

- Alternatives that would require changes to existing land use categories documented in the KSC Master Plan and 2020 Vision Plan.

- Alternatives that would consider development sites outside the Space Commerce District.

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 to reduce the environmental effects of designated activities, functions, or processes and prevent or minimize the spread of existing environmental contamination.

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; 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 functions of the NEPA environmental review process for the Proposed Action. Table 2-4 lists the BMPs pertinent to this Proposed Action.

Table 2-4 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 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 Prior to Dewatering 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 (USEPA) announced that it was designating two of the most widely used PFASs, along with their salts and structural isomers, as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Specific to the Proposed Action, the groundwater immediately south of SCD-I is contaminated by volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and PFAS at the northeast side of the Reutilization, Recycling, and Marketing Facility. Coordination with the KSC Remediation Program Manager will continue throughout all phases of construction and subsequent operation of the stormwater pond, if constructed, to ensure compliance with all applicable regulations.	Reduces potential migration of contaminants 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 and minimizes impacts from liquid products regulated under 40 CFR Part 112, Oil Pollution Act.
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 2-4 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. The 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	CFR Part 1910, *Occupational Safety and Health Standards*, and 29 CFR Part 1926, *Safety and Health Regulations for Construction*, require employees and their supervisors 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 BMPs (Project-Specific)	Identifies the actions that will protect wetlands and the functions they provide. The BMPs are project specific and based on land use, vegetation, topography, hydrology, and habitat requirements.	Reduces adverse effects to wetlands and the functions they provide.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental resources and baseline conditions that could potentially be affected from 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 – An effect is predicted that meets the intensity/context significance criteria for the specified resource.

All potentially relevant environmental resource categories were initially considered for analysis in this EA. Table 3-1 summarizes the discussion and analysis of the affected environment (i.e., existing conditions) focused only on resource areas potentially subject to effects. In addition, the level of detail describing each resource below is commensurate with the expected level of potential environmental effect.

Table 3-1 Summary of Potential Environmental Effects

Resource Category	***Proposed Impacts***		
	No Action	***Proposed Action***	
		Construction	***Operation***
Land Use and Visual Resources	No Adverse Effects	No Adverse Effects	No Adverse Effects
Transportation	No Adverse Effects	Negligible to Minor Adverse Effects	Minor Adverse Effects
Utilities	No Adverse Effects	Negligible to Minor Adverse Effects	Negligible to Moderate Adverse Effects
Air Quality	No Adverse Effects	Minor Adverse Effects	Minor Adverse Effects
Biological Resources	No Adverse Effects	Negligible to Minor Adverse Effects	Negligible Adverse Effects
Cultural Resources	No Adverse Effects	Negligible Adverse Effects	No Adverse Effects
Noise	No Adverse Effects	Minor Adverse Effects	Negligible Adverse Effects

Resource Category	*Proposed Impacts*		
	No Action	*Proposed Action*	
		Construction	*Operation*
Water Resources	No Adverse Effects	Minor to Moderate Adverse Effects	Negligible Adverse Effects
Socioeconomics	Minor to Moderate Adverse Effects	Minor to Moderate Beneficial Effects	Minor to Moderate Beneficial Effects

According to NEPA implementing regulations (40 CFR 1500.4 and 1502.2), impacts shall be discussed in proportion to their potential significance. Therefore, the following resource areas are briefly discussed since they are not expected to result in significant issues and further study is not warranted: hazardous materials and hazardous waste, health and safety, and geology and soils. The following presents, describes, and justifies why further study is not warranted for these four resource categories:

- **Hazardous Materials and Hazardous Waste:** The BMPs listed in Table 2-4 would reduce the effects associated with hazardous materials and/or waste during construction. 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 generating hazardous waste. Further, the contractors would take actions to minimize effects from liquid products that could enter water bodies or contaminate soils. Specific to KSC organizations, each organization is responsible for developing general and site-specific procedures for their operations to promote consistency, minimize risk, and ensure compliance with regulatory requirements.

- **Health and Safety:** As indicated in Table 2-4, all contractors would be required to prepare and adhere to site-specific health and safety plans during construction in compliance with OSHA regulations. Furthermore, during operation, all employees, contractors, and visitors (where specified) will be required to comply with NPR 1800.1E, NASA Occupational Health Program Procedures.

- **Geology and Soils:** The Proposed Action area contains no unique geological features of exceptional interest or mineral resources. Land clearing and excavation for facility foundations and the stormwater management system would require the upper soil strata layers be removed but soil types within the Proposed Action area are common throughout KSC. This may affect shallow subsurface flows of water from rainfall events. However, this would be minimized with site grading and construction of the state-required stormwater management systems. Following construction activities, no long-term disturbance to geology or soils is expected from operational activities. Overall, only short-term, localized, and negligible adverse impacts to geology and soils would occur.

Resource categories for which further study is warranted include land use and visual resources, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics. As previously stated in Section 2.3.2, conceptual ‘development footprints’ were developed for all future proposed development areas within the Space Commerce District.

These development footprints represent the locations where facilities, parking, the stormwater treatment system, and other required infrastructure could be located and would be in areas that avoid unnecessary impacts to wetlands, listed wildlife species habitat, and cultural resources. These development areas were used to quantify and better assess the expected effects to resource categories such as biological resources, cultural resources, and water resources in this section.

The following sections present the affected environment and the environmental consequences for these resource categories.

3.1 Land Use and Visual Resources

3.1.1 Affected Environment

Land use refers to the designated human use of the land, and visual resources refer to the natural and built features of the landscape. Visual resources refer to the features of an area's landforms, vegetation, water resources, and cultural modifications that provide the landscape with its visually distinctive properties.

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Under the No Action Alternative, the ADP would not be implemented and **no adverse effect** to land use and visual resources would occur.

3.1.2.2 Proposed Action

The Space Commerce District is in an area currently classified as research and development, which includes non-program-specific laboratories, related facilities, and associated land areas that perform research, experimentation, and testing. In addition to research and development, light industrial and manufacturing functions, and commercial uses may be accommodated within research and development land use areas (NASA 2023a). Implementation of the Proposed Action would be consistent with the current land use, existing buildings, and visual landscape; the Vision Plan; and ADP. Therefore, **no adverse effects** to land use would occur from implementing the Proposed Action during the construction or operational phases.

Visually, implementing the Proposed Action would be consistent with the visual character of nearby areas, and **no adverse effects** to visual resources would occur from implementing the Proposed Action during the construction or operational phases.

3.2 Transportation

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

3.2.1 Affected Environment

The existing road and bridge network serves all facilities and operations on KSC and Cape Canaveral Space Force Station (CCSFS). KSC has 1.5 million square yards (1.3 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 2022a).

Rail service to the Cocoa-Titusville area is provided by the Florida East Coast (FEC) Railway. The direct freight connection to KSC and CCSFS is operated and maintained by KSC. Approximately 40 miles (64 km) of track currently serve KSC and Space Force logistical and operational requirements. Sidings are provided in the KSC Industrial Area, VAB area, Launch Complex (LC)-39A area, and LC-39B area. A rail spur at the Launch and Landing Facility (LLF) now provides a rail connection for current and future operations at the LLF if needed by commercial customers.

The major arterials of the Space Commerce District are Kennedy Parkway, which forms the east border for the District; NASA Parkway West/East, which runs east and west through the District and connects KSC to CCSFS via the Roy D. Bridges Bridge; and Space Commerce Way, which runs north and south through the District to allow non-NASA badged personnel to travel through the District. 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 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 (Figure 1-2). The fourth entry point is south of Oak Hill at the intersection of US Highway 1 and Kennedy Parkway North in Volusia County.

Table 3-2 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 3-2 Average Annual Daily Traffic Counts by Road Segment

Road Segment	*Average Annual Daily Traffic*					
	2018	*2019*	*2020*	*2021*	*2022*	*2023*
Space Commerce Way between NASA Parkway West and Kennedy Parkway South	3,600	3,600	2,800	2,800	4,600	4.800
NASA Parkway W. between South Washington Avenue and Space Commerce Way	12,600	11,800	11,500	11,500	9,200	9,400
N. Courtenay Parkway between Space Commerce Way and Judson Road	—	14,800	14,400	14,400	14,100	14,500
N. Courtenay Parkway between Judson Road and Hall Road	15,000	14,800	14,400	14,400	14,100	14,500

Note: — = No data available.
Source: FDOT 2024.

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

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

3.2.2.2 Proposed Action

Construction

During implementation of the Proposed Action, various construction-related projects would occur. During this period, workers would arrive at the Space Commerce District via buses, work trucks, or personal vehicles and park at the identified construction laydown area. 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 Space Commerce District boundaries. The increase in vehicles would be temporary and occur during normal working hours. Therefore, during construction of the Proposed Action, **negligible to minor adverse effects** on transportation would occur from the temporary increase in vehicles.

Operation

A net increase in the number of employees and visitors to the Space Commerce District is expected. This would result in a long-term increase in the daily traffic counts on Space Commerce Way and NASA Parkway West. However, FDOT funded a $22.9-million project to widen 2.7 miles (4.3 km) of Space Commerce Way between NASA Parkway West to Kennedy Parkway South from two lanes to four lanes (FDOT 2023a). One purpose of the project is to provide improved access for daily visitors to the KSC VC and support the manufacturing and research workforce in the Space Commerce District; the project began in summer 2023 and was completed in 2024 (FDOT 2023b).

Although widening Space Commerce Way would reduce the overall effect from the gradual increase in vehicles, operation-specific traffic from future Space Commerce District facilities may require projects that will be permitted through FDOT. Additionally, NASA would continue to monitor traffic and determine whether a signalization study or traffic impact analysis is warranted at the time of design/permitting.

Since the widening of Space Commerce Way would reduce the overall effect from the gradual increase in vehicles, **minor adverse effects** on transportation are expected during the operational phase of the Proposed Action.

3.3 Utilities

3.3.1 Affected Environment

3.3.1.1 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 VAB 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 FDEP Permit No. FL0020541-015-DW1P.

The KSC wastewater system and the downstream CCSFS RWWTF are approaching capacity limits due to current flows and ongoing development at KSC. NASA completed the Wastewater Reliability Study and Master Plan (KSC 2022) in July 2022 to address the capacity concerns with KSC's wastewater system. This study created a systemwide hydraulic model and evaluated needed wastewater system improvements over a 20-year planning horizon based on future wastewater flow projections. The same study included assessing the conditions and capacity of master pumping stations, Lift Station (LS)-4A and LS-1AA, and their force mains, emergency power needs, upgrades to correct existing system deficiencies, and projects for increasing capacity to handle projected flows. The capacity concerns with KSC's system and the CCSFS RWWTF are being addressed via several major planned steps including the following:

- KSC (2022) identified system improvements that will be needed over time as flows at KSC increase, including upgrading LS-4A and LS-1AA, upsizing major force mains, and replacing an obstructed and underperforming force main crossing the Banana River to CCSFS. Upgrade timeframes for the CCSFS RWWTF are also outlined in the study.

- In March 2022, the Space Florida Executive Board approved $10 million to design and construct new pumping stations and a sanitary sewer force main to the Brevard County Sykes Creek Wastewater Treatment Facility (WWTF) to convey all wastewater flow from the Space Commerce District areas occupied by commercial aerospace companies including Blue Origin, SpaceX, and others. This improvement will divert a significant wastewater load away from the CCSFS RWWTF and KSC's regional LS-1AA. KSC 2022 showed that by diverting wastewater flows from the Space Commerce District to the Sykes Creek WWTF, the CCSFS RWWTF does not exceed its permitted capacity of 0.80 million gallons per day (MGD) (3.03 million liters per day) annual average daily flow (AADF) for 10 to 15 years. The Sykes Creek Regional Wastewater Treatment Facility on north Merritt Island is an extended aeration activated sludge plant with a permitted capacity of 6.0 million gallons per day (MGD) and is expected to reach capacity in approximately 10 years.

- In November 2023, the US Space Force, Space Launch Delta 45 (SLD-45), announced in a Memorandum to all Eastern Range Users that to ensure adequate capacity at the CCSFS RWWTF into the future and to improve processing efficiency, the SLD-45 is prohibiting any new non-nutritive discharges (e.g., chiller blowdown; heating, ventilation, and

air-conditioning condensate; launch deluge water) to the CCSFS RWWTF and by June 1, 2027, eliminating all existing non-nutritive wastewater discharges from existing facilities. This will create/recover capacity at the CCSFS RWWTF and in the KSC wastewater system. Commercial aerospace entities will now need to develop disposal solutions for non-nutritive water discharges from chiller blowdown, material processing, and other similar operations that generate such discharges.

3.3.1.2 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 and extends north along Kennedy Parkway South to serve KSC. The average daily flow (ADF) demand for water is 700,000 gallons per day (GPD) (2.6 million liters per day). Various aboveground storage tanks and secondary pump systems supply water throughout KSC.

The KSC VC, Space Life Sciences Laboratory building, Airbus US Space & Defense (formerly Airbus OneWeb Satellites), and Blue Origin are the current dominant water users in the vicinity of the Proposed Action area. 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.

3.3.1.3 Power

The electric power distribution system at KSC is provided by FPL, which transmits 115 kilovolts (kV) to KSC through two major substations – the C-5 substation that serves the VAB area with 13.8 kV and the Orsino substation that serves the Industrial Area with 13.2 kV. From 2015 through 2024, electricity usage on KSC ranged between 160,510 (2024) and 198,846 (2016) megawatt-hours. Electricity consistently provides 90 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 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-ha) solar farm north of the VC in 2020, and is currently constructing the Saturn substation on the south side of the C-5 substation in 2025. Additional capacity may need to be identified, which would require upgrades as part of the implementation of the Proposed Action.

3.3.1.4 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 VAB area (Second and Third Switches).

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and no changes in utility demand would occur. Therefore, **no adverse effects** to utilities would occur with implementation of the No Action Alternative.

3.3.2.2 Proposed Action

Construction and Operation

Wastewater

The Proposed Action proposes substantial commercial and industrial development in the Space Commerce District, which in turn will generate wastewater flows. For the Proposed Action, the wastewater collection system would be modified to collect domestic wastewater flows from the incremental increase in new facilities within the Space Commerce District. This collection would be accomplished with a combination of gravity sewers and wastewater lift stations on each development site, with pressurized wastewater flow from each lift station into KSC's wastewater collection system infrastructure. Significant developments are planned and are currently under construction around KSC, competing for available wastewater capacity. The wastewater flows added by each proposed Space Commerce District development would need to be coordinated with NASA on a project-by-project basis, at least until the proposed connection to the Brevard County system has been established or another solution is proposed.

A rough estimate of potential wastewater flows was developed by BRPH as part of a wastewater feasibility study for Space Florida for the Space Commerce District. The estimated flows are based on the projected land use and building square footage. Table 3-3 summarizes the potential wastewater flows as an estimated wastewater ADF in GPD, as well as an estimated peak hour flow in gallons per minute (GPM). Appendix A provides detailed calculations used to derive these estimates.

Table 3-3 SCD Projected Wastewater Demands

Facility	*Total ADF Per Facility (GPD)*	*Peak Flow Per Facility (GPM)*
SLSL Expansion	2,900	6
Blue Origin (Future Development)	33,000	69
Firefly Manufacturing Initial	6,600	14
Firefly Manufacturing Expansion	5,100	11
SCD-I	5,500	11
SCD-III	15,000	31
SCD-IV	25,100	52
SCD-V	6,700	14
SCD-VI	24,800	52
SCD-VIII	300	1
SCD-XI	7,400	15
SCD-XII	24,900	52
SCD-XIII	3,000	6
SCD-XIV	25,000	52
TOTAL=	**185,300**	**386**

Figure 3-1 presents flow projections from KSC Wastewater Reliability Study and Master Plan (2022) showing KSC and CCSFS projected flows versus the permitted capacity of the CCSFS RWWTF under the Master Plan's "Flow Scenario 2," where Space Florida diverts flows from the Space Commerce District south (Exploration Park, Blue Origin) and north areas (SpaceX at Roberts Road) to the Brevard County Sykes Creek WWTF. The Wastewater Reliability Study and Master Plan noted that by diverting wastewater flows from the Space Commerce District to the Sykes Creek WWTF, the CCSFS RWWTF does not exceed its permitted capacity of 0.80 MGD (3.03 million liters per day) AADF for 10 to 15 years. Figure 3-1 shows the point at which CCSFS will be at 75 percent of its permitted capacity and will need to begin planning for upgrades. In addition, the SLD-45 directive to eliminate non-nutritive wastewater discharges combined with implementing regional lift station and force main infrastructure projects outlined in the Wastewater Reliability Study and Master Plan will generate additional capacity in KSC's system. Furthermore, commercial aerospace entities are required to develop disposal solutions for non-nutritive wastewater discharges from chiller blowdown, material processing, and other similar operations that generate such discharges, which would further minimize capacity limitation impacts.

Under Flow Scenario 2, the Space Commerce District wastewater flows are routed to the Sykes Creek WWTF, resulting in **negligible** impacts to the KSC's wastewater system. If Flow Scenario 2 is not implemented, then **minor to moderate** impacts to the KSC wastewater system would occur as Proposed Action developments are incrementally added or developments could not occur until capacity was increased.

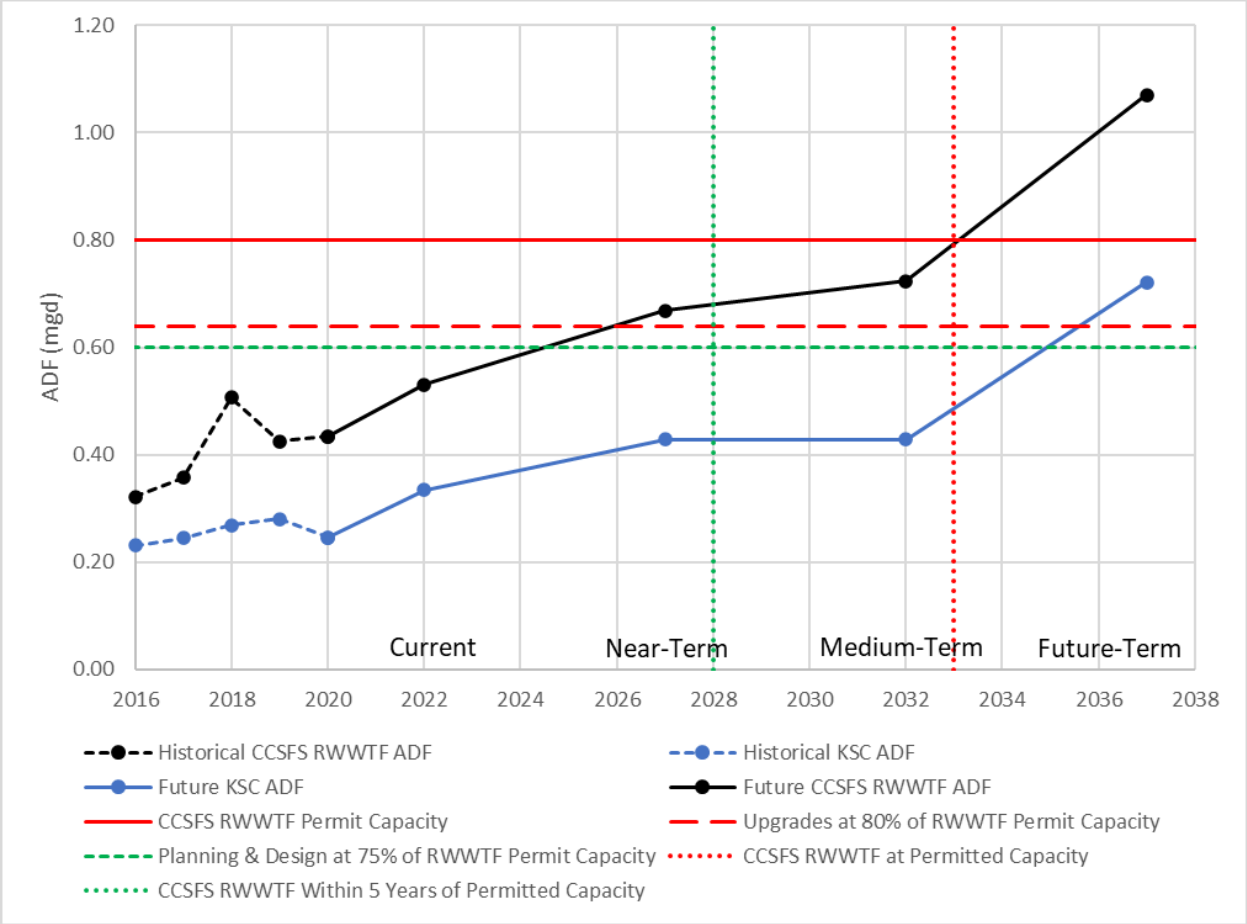


Figure 3-1 Past and Projected Wastewater Average Daily Flows (KSC 2022)

Potable Water

For the Proposed Action, new water service pipelines for fire protection and potable water are expected to be extended from the 12-inch (30-cm) water main recently constructed along Galaxy Way or directly from the main 24-inch (60-cm) feed along Kennedy Parkway. Fire flow requirements are expected to be commensurate with other similar occupancies at the VC such that no significant increase in fire demand will occur due to the Proposed Action.

To estimate water demands, a rule-of-thumb ratio of 0.8 is typically applied, meaning wastewater flow is assumed to be 80 percent of the water demand. The wastewater demands in Table 3-3 were divided by 0.8 to arrive at projected water demands for the Space Commerce District. The results indicate the following:

- Average Daily Water Demand = 185,300 / 0.8 = 231,685 GPD
- Peak Hour Demand = 386 / 0.8 = 482 GPM

KSC water system modeling for this area indicates that sufficient potable and fire flow will be available to accommodate the Proposed Action. The existing water distribution system, including the 12-inch (30-cm) water main recently completed, provides the necessary increased capacity for the new facilities. This conclusion is supported by the extensive water system improvements completed by NASA over the past decade including the new replacement W-1 regional water booster pumping station and replacement water mains. Hydraulic modeling performed for NASA as part of that design and modeling performed for Delaware North related to the new water main along Galaxy Way demonstrated adequate capacity. Based on the size of the existing water main and expected demand associated with the new facilities, new staff, and increased visitation, the construction and operation of the Proposed Action are expected to have a **negligible to minor adverse effect** on the potable water infrastructure.

Power

In 2021, FPL extended a feeder line from the Mars substation to a service connection point on Galaxy Way southeast of the new VC Parking Plaza. This service provides power to the Parking Plaza, Lots 7 and 8, and the wastewater lift station in the area. The FPL service is a 150-kilovolt-amp (kVA) transformer with three-phase, 480-volt service. This transformer was designed to be loop fed to allow the service to continue using the same circuit and provide additional power to the area. Another expansion is planned for 2025 at the VC, extending the FPL service from this transformer further into the VC location to serve new infrastructure and bus-charging stations.

Since the Proposed Action is limited to the physical planning, design, and construction improvements for commercial space development activities and does not include any specific changes to existing operational activities, the overall additional electric demand requirements cannot be predicted with any specific fidelity. However, during the design phase, energy requirements will be calculated and provided to KSC to ensure adequate system capacity will be available before new construction begins under the Proposed Action.

As a result, the construction and operation of the Proposed Action are expected to have **negligible to minor adverse** effects on power.

Communications

The Space Commerce District area is served with communication infrastructure from KSC and independent vendors. These communications currently flow through the communication infrastructure housed within the Industrial Area at KSC. For the Proposed Action, necessary communication lines would be installed and connected to the existing system using the existing NASA infrastructure. The existing communications system can provide the necessary increased capacity for these new facilities. As such, the construction and operation of the Proposed Action are expected to have **negligible adverse effects** to the communication system.

3.4 Air Quality

Air quality at KSC is regulated under federal Clean Air Act regulations (Title 40 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), NO_2, O_3, sulfur dioxide (SO_2), particulate matter 10 micrometers or less in diameter (PM_{10}), and $PM_{2.5}$. The NAAQS are further broken into two categories, the National Primary Standards and 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 provide general public welfare protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 3-4 lists the NAAQS.

Florida has a statewide network of air-quality monitoring. This network helps manage air quality throughout the state with a focus on areas where ambient air quality standards are at risk of being violated and 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 (40 CFR Part 81, Subpart C, Section 81.310). 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.

Table 3-4 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	9.0 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
	3-hour	N/A	0.5 ppm

Notes: N/A = not applicable; ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter of air. Source: USEPA 2024c.

3.4.1 Affected Environment

KSC is a major source of air emissions and holds a Title V Air Operations Permit (0090051-040-AV) that expires on November 2, 2026. The permit, issued by FDEP, governs air emissions from and establishes specific requirements for dozens of permitted emissions sources and hundreds of insignificant emissions sources such as electric power generators, boilers, paint

booths, and abrasive blasting units (KSC 2024). Table 3-5 summarizes KSC's air emissions for 2019–2023, which represents the most current publicly available data.

Table 3-5 History of Actual Annual Emissions (Tons per Year) at KSC

Pollutant	*Year*				
	2023	*2022*	*2021*	*2020*	*2019*
CO	1.81	2.200286	1.129406	0.987893	0.699011
NMHC	1.15608	1.198005	0.157797	0.097303	0.047785
NO_X	5.831212	8.283089	4.625379	3.025109	2.982084
Pb	—	—	—	—	—
PM	0.287389	0.4553	0.308417	0.202338	0.204561
$PM_{2.5}$	—	—	—	—	—
PM_{10}	0.287389	0.4553	0.308417	0.202338	0.204561
SO_2	0.179316	0.332859	0.276401	0.182264	0.188823
VOC	0	0	0	—	—

Notes: — = No data available; NMHC = non-methane hydrocarbons.

Source: FDEP 2024a.

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 Space Commerce District, monitors for O_3. The 400 West Florida Avenue site in Melbourne (Location 2), approximately 17 miles (27 km) from the Space Commerce District, monitors for O_3, PM_{10}, and $PM_{2.5}$ (FDEP 2024b). Table 3-6 summarizes the highest air emissions data for these two locations. 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.

Table 3-6 Highest Readings for Select Emissions in Two Brevard County Locations

Pollutant	*Year*				
	*2024****	*2023*	*2022*	*2021*	*2020*
Location 1 – O_3*	62 ppb	65 ppb	64 ppb	60 ppb	64 ppb
Location 2 – O_3*	61 ppb	63 ppb	63 ppb	62 ppb	63 ppb
Location 2 – $PM_{2.5}$**	18.0 µg/m^3	47.1 µg/m^3	22.5 µg/m^3	27.0 µg/m^3	27.6 µg/m^3
Location 2 – PM_{10}**	57.7 µg/m^3	75.1 µg/m^3	72.9 µg/m^3	73.3 µg/m^3	93.7 µg/m^3

* Maximum 8-hour average.

** Daily average.

*** Data reported through July 13, 2024.

Source: FDEP 2024b.

3.4.2 Environmental Consequences

Brevard County is in attainment for all criteria pollutants; therefore, the General Conformity rule does not apply. General Conformity regulations at 40 CFR Part 93 Subpart B, help states protect air quality within areas that do not meet the NAAQS (nonattainment areas) and areas of vulnerable air quality (maintenance areas) (USEPA 2024d). For this EA, effects to air quality would be considered minor if the Proposed Action did not exceed an increase of 250 tons per year of any

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.

3.4.2.1 No Action Alternative

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

3.4.2.2 Proposed Action

Construction

Expected construction dates are unknown; however, completion of the ADP is expected to occur over a long period. A negligible, localized increase in annual emissions would occur at KSC from implementing the Proposed Action, and implementation of the BMPs identified in Table 2-4 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, **minor adverse effects** to air quality would occur from construction of the Proposed Action.

Operation

Following construction, a minor net increase in long-term air emissions resulting from additional cars and new buildings is expected. Therefore, **minor adverse effects** to air quality would occur from operation of the Proposed Action.

3.5 Biological Resources

NASA KSC covers approximately 139,436 acres (56,429 ha), of which the vast majority remains undeveloped and includes uplands, wetlands, mosquito-control impoundments, and open-water areas. NASA maintains dedicated operational control over approximately 4,750 acres (9,922 ha) of KSC, and the remaining areas are managed by USFWS Merritt Island National Wildlife Refuge (MINWR) (NASA 2020). Due to its restricted access and lack of development, extensive areas of NASA KSC serve as important wildlife habitat.

Biological resources include native vegetation, wildlife, and the habitats in which they occur. Protected species are also considered in this section. The Proposed Action boundary is defined by the area that will be physically impacted as a result of the proposed new construction and additional operations. The areas considered for direct impacts are defined as the footprint of the Space Commerce District parcels and the eastern shoreline of KSC for sea turtle lighting impacts only.

3.5.1 Habitats and Vegetation

Vegetation on KSC can generally be categorized into upland and wetland communities. A "ridge and swale" topography that includes bands of uplands and wetlands oriented northeast-southwest is found on KSC primarily east of Kennedy Parkway North/South. Scrub and pine flatwoods are

the common upland communities with freshwater marshes and wet prairies between the upland bands. Large areas of mangroves and salt marsh are adjacent to the estuaries on KSC.

3.5.1.1 Uplands

Approximately 33,033 acres (13,368 ha) of uplands are on KSC; these uplands comprise several vegetation communities. Upland communities on KSC are found on well-drained, acidic, sandy soils. Scrub and pine flatwoods are the most common upland communities that rely on periodic fire for maintenance of habitat structure and vegetation composition. These upland communities support numerous upland-dependent listed wildlife species such as the Florida scrub-jay (*Aphelocoma coerulescens*) and gopher tortoise (*Gopherus polyphemus*).

Much of the Proposed Action area was active citrus groves since the 1940s up until 2006 (Figure 3-2). Currently, the Proposed Action area consists of four upland vegetation community types: (1) Governmental (1750), (2) Pine Flatwoods (4110), (3) Brazilian Pepper (4220), and (4) Temperate Hardwood (4250) (Figure 3-3 and Table 3-7). The Governmental (1750) land use type consists of various roads and other developed sites that are contained within a given parcel. The Pine Flatwoods (4110) community is dominated by slash pine (*Pinus elliottii*) and saw palmetto (*Serenoa repens*). The Brazilian Pepper (4220) community is the dominant upland community in the east and south areas of the Proposed Action boundary.

This community is dominated by a dense monoculture of invasive exotic Brazilian pepper, along with other invasive exotic species such as guinea grass (*Panicum maximum*) and caesarweed (*Urena lobata*), and it consists of areas that were formerly citrus groves (Figure 3-3). As a result, these areas are of low quality due to poor habitat conditions, which limit their ability to support diverse wildlife. The Temperate Hardwood (4250) community is a medium-quality community dominated by live oak (*Quercus virginiana*), laurel oak (*Q. laurifolia*), sugarberry (*Celtis laevigatus*), sabal palm (*Sabal palmetto*), Brazilian pepper, marlberry (*Ardisia escallonioides*), and wild coffee (*Psychotria nervosa*).

3.5.1.2 Wetlands

Wetlands are protected under Section 404 of the Clean Water Act via federal regulations implemented by USACE, as well as by the State of Florida through jurisdictional regulations of 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 to avoid direct or indirect support of new construction in wetlands whenever a practicable alternative exists.

Approximately 106,403 acres (43,061 ha) of freshwater and saltwater wetlands and estuaries are found on KSC and include diverse types such as mangrove swamps, salt marshes, shrub swamps, forested wetlands, freshwater marshes, wet prairies, and cattail marshes (NASA 2020). The wetlands and surrounding surface waters of KSC support large wintering populations of waterfowl, transient and resident wading bird populations, and several listed species, while also serving as nursery habitat for forage species that support birds and commercially and recreationally important types of fish.

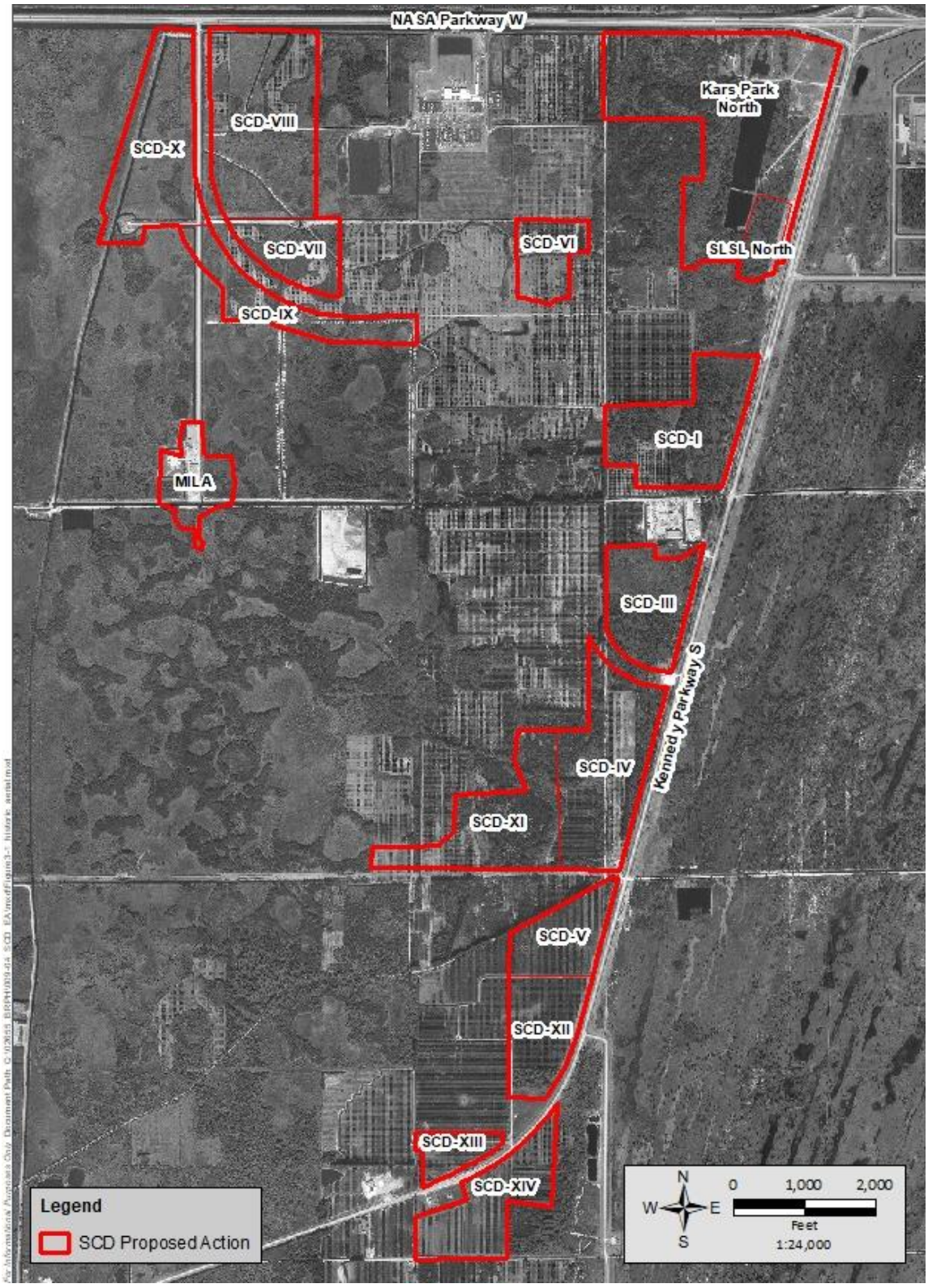


Figure 3-2 1969 Historic Aerial Map Showing Extensive Citrus Groves in the Proposed Action Area

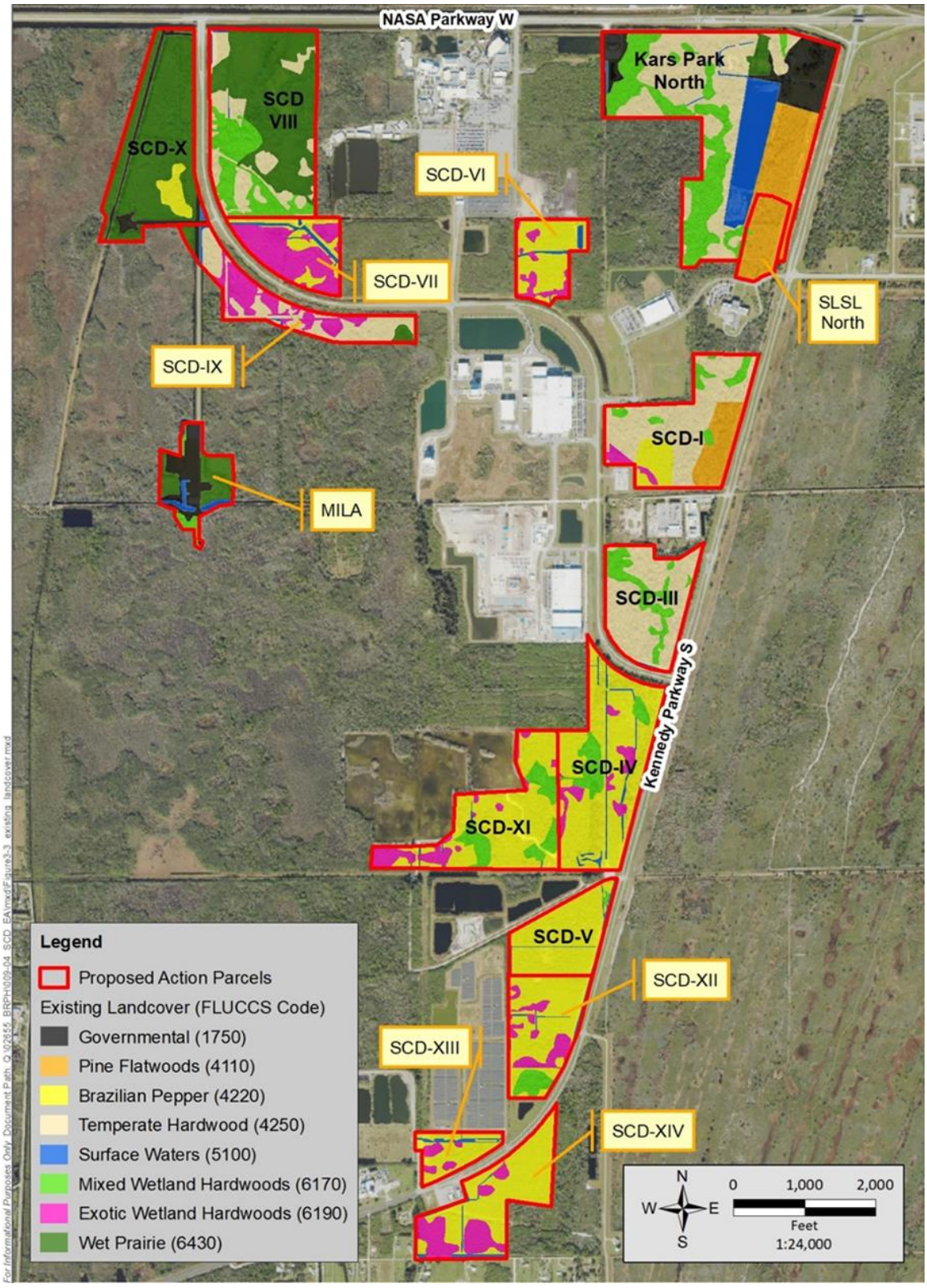


Figure 3-3 Existing Land Use Cover – Proposed Action Parcels

Table 3-7 Proposed Action Existing Land Cover Summary

Parcels	*Parcel Acreage*	*FLUCCS Code*							
		Governmental (1750)	*Pine Flatwoods (4110)*	*Brazilian Pepper (4220)*	*Temperate Hardwood (4250)*	*Surface Waters (5100)*	*Mixed Wetland Hardwoods (6170)*	*Exotic Wetland Hardwoods (6190)*	*Wet Prairie (6430)*
MILA	23.7	10.2				2.4	2.0		9.1
SCD-I	58.8		11.4	7.3	33.7		4.5	2.0	
SCD-III	41.1				31.5	0.7	8.9		0.01
SCD-IV	70.3			54.7		3.0	7.0	5.6	
SCD-V	30.0			27.6		2.1	0.3		
SCD-VI	22.3			17.1		1.6		3.7	
SCD-VII	28.1			7.2		2.8		18.1	
SCD-VIII	90.0				19.3	0.8	18.0		52.0
SCD-IX	34.5	0.9			18.4	0.9		11.6	2.8
SCD-X	65.2	8.0		4.5		0.4			52.4
SCD-XI	56.5			38.7		0.4	10.8	6.7	
SCD-XII	36.0			25.1		1.2	3.5	6.3	
SCD-XIII	13.5			10.3		1.1		2.1	
SCD-XIV	43.4			30.2		2.1		11.1	
SLSL North	13.7		13.3				0.4		
Kars Park North	149.6	20.9	21.7		50.2	19.5	34.3		3.1
TOTAL=	**776.7**	**40.0**	**46.4**	**222.5**	**153.0**	**39.0**	**89.6**	**67.1**	**119.3**

FLUCCS = Florida Land Use, Cover and Forms Classification System.

3.5.1.3 Environmental Consequences

No Action Alternative

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

Proposed Action

Development of the Proposed Action is consistent with the *2017 KSC Future Land Use Map* and the *KSC Vision Plan and Programmatic Environmental Assessment* (NASA 2020), which have identified future development regions called Spaceport Growth Boundaries within KSC. Land cover near and within the Proposed Action sites can generally be categorized into institutional development, forested uplands, forested wetlands, and open-water communities. The on-site land cover communities documented at the Proposed Action sites were categorized according to the Florida Land Use, Cover and Forms Classification System (FLUCCS) developed by FDOT and are summarized in Table 3-7.

Uplands

Construction

Construction of the Proposed Action would result in the loss of approximately 361 acres (146.1 ha) of upland vegetation communities based on conceptual designs presented in the SCD ADP (Figures 2-1 and 2-2; Table 3-8). Much of this acreage is low-quality vegetation community dominated by Brazilian pepper and other invasive exotic vegetation. Due to the vast acreage of similar and higher quality upland habitat at KSC, **negligible to minor adverse impacts** are expected.

Table 3-8 Summary of Existing Land Cover and Proposed Impacts

Parcel	*Parcel Acreage*	*Upland Acreage*	*Wetland Acreage*	*FEMA Flood Zone Acreage*	*Proposed Upland Impact Acreage*	*Proposed Wetland Impact Acreage*	*Proposed Floodplain Impact Acreage*
MILA	23.7	12.6	11.1	15.4	12.6	10.1	15.4
SCD-I	58.8	52.3	6.5	12.8	52.3	2.3	12.8
SCD-III	41.1	32.1	8.9	10.5	22.4	4.0	10.5
SCD-IV	70.3	57.9	12.6	28.7	57.9	10.8	28.7
SCD-V	30.0	29.7	0.3	0.0	29.7	0.3	0.0
SCD-VI	22.3	18.7	3.7	15.5	18.7	3.2	15.5
SCD-VII	28.1	10.0	18.1	27.1	2.0	0.8	0.0
SCD-VIII	90.0	20.2	70.0	89.4	5.0	0.2	0.0
SCD-IX	34.5	20.2	14.4	31.9	0.0	NA	0.0
SCD-X	65.2	12.9	52.4	59.0	0.0	NA	0.0
SCD-XI	62.7	45.3	17.5	36.4	31.7	6.0	36.4
SCD-XII	36.1	26.4	9.7	0.0	26.4	9.4	0.0
SCD-XIII	13.5	11.5	2.1	0.0	11.5	2.1	0.0

Parcel	*Parcel Acreage*	*Upland Acreage*	*Wetland Acreage*	*FEMA Flood Zone Acreage*	*Proposed Upland Impact Acreage*	*Proposed Wetland Impact Acreage*	*Proposed Floodplain Impact Acreage*
SCD-XIV	43.4	31.0	11.1	0.0	31.0	10.2	0.0
SLSL North	13.7	13.3	0.4	0.4	13.3	0.40	0.4
Kars Park North	149.6	92.8	37.4	71.3	0.0	0.0	0.0
TOTAL=	**783.0**	**487.5**	**276.0**	**398.3**	**360.9**	**79.8**	**119.6**

Note: FEMA = Federal Emergency Management Agency; NA = Not Applicable.
FEMA Flood Zone acreage is included in the Upland and Wetland acreage.

Operation

Operation of the Proposed Action would result in **no adverse impacts** to upland vegetation communities.

Wetlands

The Proposed Action area consists of three wetland vegetation community types – Mixed Wetland Hardwoods (FLUCCS Code 6170), Exotic Wetland Hardwoods (FLUCCS Code 6190), and Wet Prairie (FLUCCS Code 6430) (Figure 3-3 and Table 3-7). The Mixed Wetland Hardwoods (6170) community is a medium-quality community dominated by red maple (*Acer rubrum*), American elm (*Ulmus americana*), sabal palm, laurel oak, sugarberry, Brazilian pepper, leather fern (*Acrostichum danaeifolium*), and swamp fern (*Blechnum serrulatum*). The Exotic Hardwoods (6190) community is a monoculture of Brazilian pepper with little to no understory. Although the Mixed Wetland Hardwood community provides forage and nesting habitat for a diversity of wildlife species, the Exotic Wetland Hardwoods community provides minimal habitat value for wildlife species because it is a dense monoculture and lacks other understory vegetation due to dense shading and allelopathic chemicals that Brazilian pepper produces in the soil. The Wet Prairie (6430) community is dominated by herbaceous species such as sand cordgrass (*Spartina bakerii*), sedges (*Cyperus* spp.), rushes (*Juncus* spp.), and various graminoid species (*Panicum* spp.).

Construction

The Proposed Action would result in the loss of up to approximately 80 acres (32.4 ha) of wetlands based on conceptual designs presented in the SCD ADP (Figures 2-1 and 2-2; Table 3-8). Parcels such as SCD-IX and SCD-X, which are predominately wetlands, will remain undeveloped. Table 3-8 summarizes the land cover impacts for each parcel.

Wetland impacts will be minimized and avoided during each site design as required by state and federal regulations. Authorization for site construction and filling unavoidable wetland impacts will require the applicant (Space Florida and/or tenant) to obtain an ERP from SJRWMD and potentially a federal Dredge and Fill Permit from USACE. These permits will require mitigation compensation for unavoidable wetland impacts. Compensatory mitigation for wetland primary and secondary impacts will be provided in accordance with state and federal regulations.

Minor adverse impacts are expected to occur to wetlands due the acreage of impact proposed. However, the impacts are primarily to lower-quality wetlands because a large portion of the medium-quality Mixed Wetland Hardwood community occur at KARS Park North and Parcel VIII, which will not be impacted. Demonstration of avoidance and minimization of wetland impacts will be required by the regulatory agencies for each development during the permitting process, and a wetland mitigation plan will also be required in accordance with state and federal regulations to offset the loss of wetland functions.

Operation

The MINWR is the land manager for undeveloped lands outside the SCD and throughout KSC. Prescribed fire is a critical and required land management tool required to manage habitat for listed species such as the Eastern indigo snake and Florida scrub jay. MINWR has divided KSC into numerous burn units with a goal of conducting prescribed fire in each unit on a 3-to-5-year rotation (Figure 3-4).

Development of facilities within the SCD could affect MINWR's prescribed burning program, which could negatively impact the quality of listed species habitat near the SCD. However, a Memorandum of Understanding has been approved by MINWR, the USSF SLD 45, and NASA KSC that Space Florida will support and enforce in lease agreement language with its tenants in the SCD to ensure that the tenant activities will not adversely affect MINWR's and KSC's abilities and commitments to natural resource management and protection.

Further, to minimize this potential affect, Space Florida will require tenants via its lease agreement to establish a 100-foot (30.5-m) fire buffer around the perimeter of all facilities or the perimeter fence; install smoke-hardened heating, ventilation, and air-conditioning (HVAC) systems; install the necessary equipment to protect sensitive payload/manufacturing processing or hardware from smoke; and/or perform other amenable solutions. The lease agreements between Space Florida and its tenants within the SCD will also require tenants' acknowledgement of prescribed fire activities and provide educational materials for working in a fire-adapted landscape.

Negligible adverse impacts on upland and wetland vegetation are expected from the operation of the Proposed Action since the operation does not require additional development and future facilities will accommodate the MINWR-prescribed fire program.

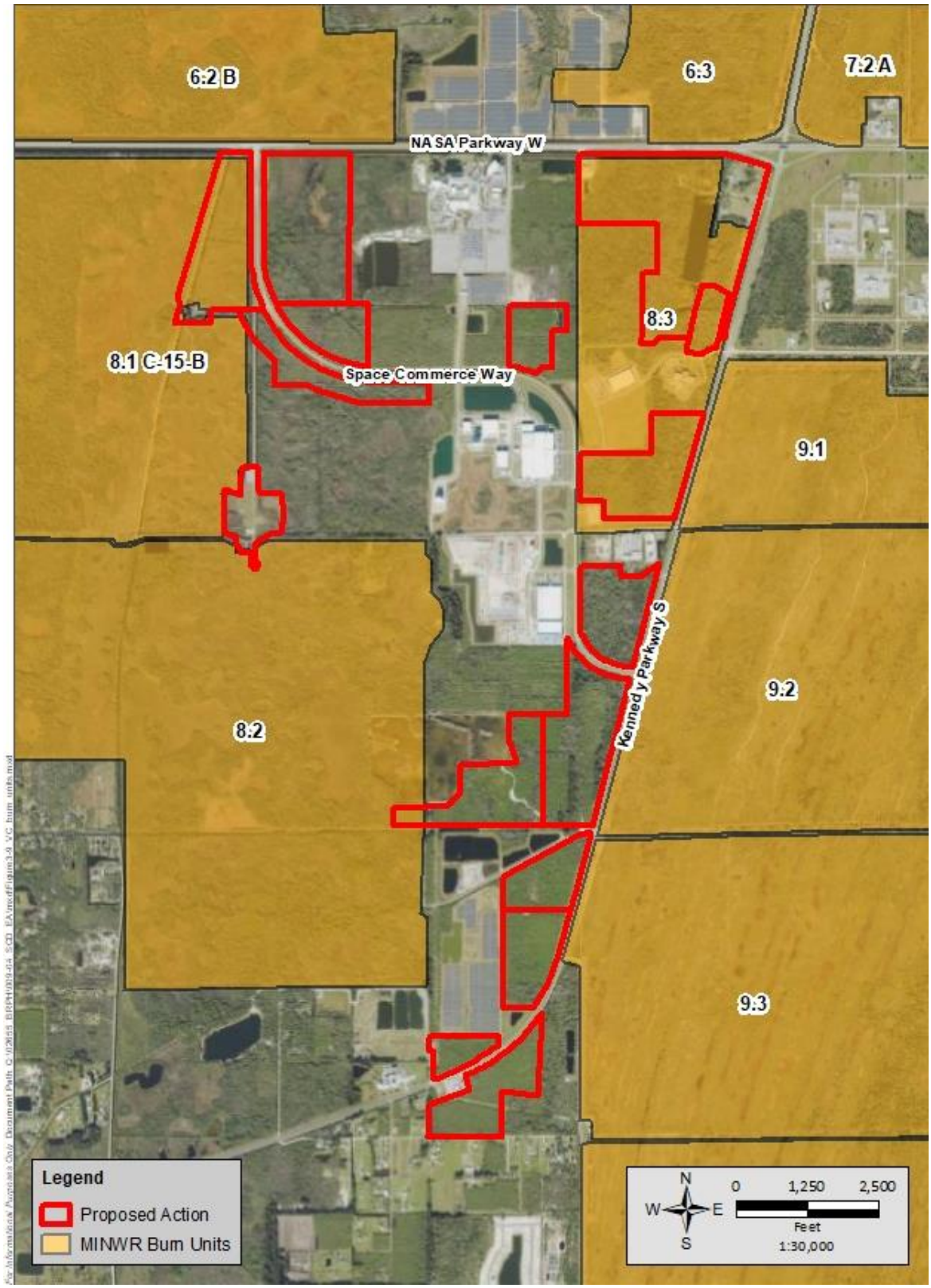


Figure 3-4 MINWR Burn Unit Location Map

3.5.2 Wildlife

3.5.2.1 Affected Environment

Birds

KSC and the surrounding coastal areas provide habitat for 318 bird species, and MINWR is considered one of the top 10 birding destinations in the United States (NASA 2020). Approximately 87 of these species are breeding residents, over 100 species have been documented to winter on KSC, and the remaining species are transients that regularly use KSC terrestrial and aquatic habitats for brief periods (NASA 2020). Non-listed bird species that could utilize the Proposed Action area include American robin (*Turdus migratorius*), Northern cardinal (*Cardinalis cardinalis*), Carolina wren (*Thryothorus ludovicianus*), grey catbird (*Dumetella carolinensis*), tufted titmouse (*Baeolophus bicolor*), blue jay (*Cyanocitta cristata*), mockingbird (*Mimus polyglottos*), brown thrasher (*Toxostoma rufum*), vireo's (*Vireo* spp.), numerous warbler species, red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), wild turkey (*Meleagris gallopavo*), red-winged blackbird (*Agelaius phoeniceus*), Eastern whip-poor-will (*Antrostomus vociferus*), red-headed woodpecker (*Melanerpes erythrocephalus*), chuck-will's-widow (*Antrostomus carolinensis*), common nighthawk (*Chordeiles minor*), Eastern towhee (*Pipilo erythrophthalmus*), loggerhead shrike (*Lanius ludovicianus*), Northern flicker (*Colaptes auratus*), common ground dove (*Columbina passerina*), mourning dove (*Zenaida macroura*), boat-tailed grackle (*Quiscalus major*), barred owl (*Strix varia*), and other common avian species. Cattle egret (*Bubulcus ibis*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), white ibis (*Eudocimus albus*), glossy ibis (*Eudocimus falcinellus*), great blue heron (*Ardea herodias*), and other common wading bird species that occasionally forage in wetlands or man-made surface water ditches, canals, and ponds within the Proposed Action area. However, the Proposed Action area provides no suitable habitat for shorebirds.

Mammals

Twenty-nine species of mammals inhabit KSC lands and waters (Ehrhart 1976). Typical terrestrial species include the opossum (*Didelphis virginiana*), hispid cotton rat (*Sigmodon hispidus*), raccoon (*Procyon lotor*), river otter (*Lutra canadensis*), and bobcat (*Lynx rufus*). Due to the regional loss of large carnivores such as the Florida panther (*Puma concolor coryi*) and red wolf (*Canis rufus*), the bobcat, coyote (*Canis latrans*), and otter now hold the position of top mammalian predators on KSC.

In addition, a proliferation of mid-level predators such as the raccoon and opossum has resulted from an imbalance of predator/prey ratios. Opportunistic species such as the hispid cotton rat and Eastern cottontail rabbit (*Sylvilagus floridanus*) account for a large portion of the small mammal biomass. At least three species of bats—Brazilian free-tailed bat (*Tadarida brasiliensis*), southeastern bat (*Myotis austroriparius*), and tricolored bat (*Perimyotis subflavus*)—have been documented that occasionally use KSC facilities as roost sites and must be relocated and excluded from re-entry when conflicts with facility operations occur. Two mammal species common in the waters of the IRL are the Atlantic bottlenose dolphin (*Tursiops truncates*) and the West Indian manatee (*Trichechus manatus*).

Additional terrestrial mammalian species that use the low- to medium-quality uplands and wetlands include the armadillo (*Dasypodidae*), wild hog (*Sus scrofa*), bobcat, and coyote. Wild hogs are common in the Proposed Action area and cause severe damage to groundcover vegetation and soils and impact native wildlife populations. USFWS continues to implement measures to control feral hog populations and associated impacts and damage at KSC and MINWR. Due to the prevalence of low-quality on-site habitats and the presence of humans, most of these mammals would use native vegetation communities found off site and likely only be passing through the Proposed Action sites on their way to higher quality habitat to the east and west.

Herpetofauna

Seventy-four species of reptiles and amphibians have been documented at KSC (NASA 2020). Non-listed herpetofauna that could potentially inhabit or occasionally forage in the Proposed Action area include green anole (*Anolis carolinensis*), brown anole (*Anolis sagrei*), green tree frog (*Hyla cinerea*), leopard frog (*Lithobates sphenocephalus*), cricket frog, Cuban tree frog (*Osteopilus septentrionalis*), garter snake (*Thamnophis sirtalis*), red rat snake (*Pantherophis guttatus*), yellow rat snake (*Pantherophis alleghaniensis*), and black racer (*Coluber constrictor*).

Potential impacts on wildlife by the Proposed Action construction and operation activities are based on habitats being removed from wildlife use by typical construction activities such as clearing, road construction, and the expected long-term use of the proposed sites. Effects from the construction phase of the project would undoubtedly occur and are expected to be temporary except for those caused by habitat removal and alteration. However, on-site natural habitats being impacted consist of low- to medium-quality uplands and wetlands that provide lower habitat value. In addition to their lesser quality as a whole, they are also less accessible to wildlife as a result of being bound to the north and south by NASA Parkway W and Space Commerce Way, respectively, with Galaxy Way in the center, as compared to the vast acreage of other natural vegetation communities found on KSC.

3.5.2.2 Environmental Consequences

No Action Alternative

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

Proposed Action

Construction

Construction activities would likely disturb wildlife from noise and human presence in habitats near the project area, which could cause them increased stress and may lead them to temporarily relocate to adjoining areas for nesting, resting, and foraging. Any species temporarily leaving the site may be subject to increased competition and predation, and species with limited mobility may be harmed during construction. Wide-ranging species, such as large mammals, should not be impacted by noise since they likely already avoid busy areas such as the Blue Origin Manufacturing Complex, Exploration Park, and KSC VC; therefore, a disruption to these wide-

ranging wildlife species movement patterns due to the proposed construction of new facilities is not expected. Wildlife species with limited mobility may be harmed during construction.

Construction of undeveloped areas and noise associated with construction of the Proposed Action sites would displace wildlife and result in the limited, but permanent, loss of habitat. Construction activities would likely disturb wildlife from construction-related noise and human presence in habitats near the project area; however, construction-related activities would be short-term and minor. Thus, **minor adverse impacts** on wildlife are expected due to habitat loss.

Operation

Long-term use of the Proposed Action sites could increase mortality of some wildlife species such as passerine birds, snakes, freshwater turtles, gopher tortoise, and small mammals due to car strikes because of increased vehicle trips on Space Commerce Way. However, the quantity of these strikes is expected to be small, and these strikes are expected to have minimal impact on wildlife species populations. Facility lighting can also negatively affect some wildlife species reproduction, foraging, and sleep habits that occur in the vicinity of new developments. However, these affects are expected to be short term since the individuals have vast acreages of adjacent suitable habitat to move to and utilize. Prescribed fire is a critical and required land management tool required to manage habitat for non-listed and listed species. Development of facilities within the SCD may affect MINWR's prescribed burning program, which could negatively impact the quality of listed species habitat near and adjacent to the SCD. However, a Memorandum of Understanding has been approved by MINWR, the USSF SLD 45, and NASA KSC that Space Florida will support and enforce in lease agreement language with its tenants in the SCD to ensure that the tenant activities will not adversely affect MINWR's and KSC's abilities and commitment to natural resource management and protection. Further, to minimize this potential affect, Space Florida will require tenants via its lease agreement to establish a 100-foot (30.5 m) fire buffer around the perimeter of all facilities or the perimeter fence, install smoke-hardened HVAC systems, and install the necessary equipment to protect sensitive payload/manufacturing processing or hardware from smoke. The lease agreements between Space Florida and its tenants within the SCD will also require tenants' acknowledgement of prescribed fire activities and provide educational materials for working in a fire-adapted landscape. Accordingly, habitat quality for non-listed wildlife species is not expected to decrease as MINWR will continue its land management activities including prescribed fire.

Following construction, an increase in ambient noise is expected due to operation of the Proposed Action. Operational noise would be primarily limited to vehicular noise and human presence from employees, contractors, and shipping at the various sites, as well as the increased traffic on Space Commerce Way. The operational noise is expected to increase incrementally over a long period (10 or more years) as sites are developed. Therefore, wildlife that do not relocate to adjoining areas for nesting, resting, and foraging would have an opportunity to acclimate. Although a long-term increase in the intensity of noise from traffic noise and human presence is expected, the operation of the Proposed Action is expected to have **negligible to minor adverse impacts** on local wildlife populations.

3.5.3 Threatened and Endangered Species

3.5.3.1 Affected Environment

Listed Wildlife

Numerous federal and state laws deal directly with conservation and preservation of flora and fauna in Florida. The primary objectives of these laws are to establish the listing and de-listing processes for endangered and threatened species, maintain data on current populations of species, identify and maintain critical habitat, and protect those species that have been identified as threatened or endangered. KSC and the adjacent CCSFS provide habitat for numerous threatened and endangered species, which are summarized in Table 3-9 (NASA 2020).

Table 3-9 Wildlife Species Known to Occur on KSC that are Federally Protected and/or by the State of Florida

Scientific Name	*Common Name*	*Level of Protection*	
		State	*Federal*
Amphibians and Reptiles			
Alligator mississippiensis	American alligator		T(S/A)
Caretta caretta	Loggerhead sea turtle		T
Chelonia mydas	Atlantic green sea turtle		T
Dermochelys coriacea	Leatherback sea turtle		E
Gopherus polyphemus	Gopher tortoise	T	
Drymarchon couperi	Eastern indigo snake		T
Pituophis melanoleucus mugitus	Florida pine snake	T	
Birds			
Caracara plancus audubonii	Crested caracara		T
Laterallus jamaicensis spp jamaicensis	Eastern black rail		T
Rostrhamus sociabilis plumbeus	Everglade snail kite		E
Egretta caerulea	Little blue heron	T	
Egretta rufescens	Reddish egret	T	
Egretta tricolor	Tricolored heron	T	
Mycteria americana	Wood stork		T
Ajaia ajaja	Roseate spoonbill	T	
Haliaeetus leucocephalus	Bald eagle		P
Falco sparverius paulus	Southeastern American kestrel	T	
Laterallus jamaicensis	Eastern black rail	T	T
Grus canadensis pratensis	Florida sandhill crane	T	
Charadrius melodus	Piping plover		T
Haematopus palliatus	American oystercatcher	T	
Calidris canutus rufa	Rufa red knot		T
Sterna antillarum	Least tern	T	
Rynchops niger	Black skimmer	T	

Scientific Name	*Common Name*	*Level of Protection*	
		State	*Federal*
Aphelocoma coerulescens	Florida scrub-jay		T
Mammals			
Peromyscus polionotus niveiventris	Southeastern beach mouse		T
Trichechus manatus	West Indian manatee		T
Perimyotis subflavus	Tricolored bat		PE
Key: SSC = Species of Special Concern; T(S/A) = threatened because of similarity of appearance to another protected species; T = threatened; E = endangered; P = Bald and Golden Eagle Protection Act; PE = Proposed for consideration as endangered.			

Listed Plants

Thirty-nine plant species on KSC are listed as threatened, endangered, or of special concern on state lists. For some of these species, KSC populations appear to be important to their regional and global survival (NASA 2020). These species are identified by agencies as being rare or restricted to sensitive habitats with many of them occurring in coastal dune areas that are not found on the Proposed Action sites. No regulatory implications exist for the occurrences of listed plant species on the Proposed Action sites. Although a formal intensive vegetation survey was not completed, listed plant species are not expected to occur within the Proposed Action sites due to the lack of coastal dune habitat and the majority of the undeveloped areas previously disturbed due to citrus production, resulting in low-quality habitat.

3.5.3.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and **no adverse effects** to threatened and endangered species would occur.

Proposed Action

Construction

The lack of xeric, aquatic, and coastal habitat in the Proposed Action boundary eliminates the potential for numerous listed species. At KSC, if an eagle nest is active, no clearing, construction, or landscaping within 660 feet (201 m) of the nest should be conducted during the nesting season (October 1 to May 15). No bald eagle nests are within 660 feet (201 m) of the Proposed Action area. KSC has one of three remaining core Florida scrub-jay populations across the species' range and has developed a habitat model that maps Auxiliary, Core, and Support Habitat. Based on the habitat model, Figure 3-5 shows a small area of support and core habitat intersecting the Proposed Action boundary (Parcels I, III, and IV); however, this is an artifact of 1,000 foot-by-1,000-foot (305 m-by-305 m) grid size of the habitat model as these areas are densely forested and do not support this species (Figure 3-5).

The south portion of SLSL North and a small area on the east side of Kars Park North contain xeric habitats mapped as Auxiliary Habitat that could potentially support Florida scrub jays. The

remaining Auxiliary Habitat that occurs within the Proposed Action area is low- to medium-quality, poorly drained mesic-forested upland and wetland habitat with areas of dense Brazilian pepper. These areas do not currently and would not support suitable and sustainable xeric habitat required for this listed species. The presence of suitable habitat will be reassessed during each site development at which time KSC staff will evaluate and address this issue in accordance with the *Florida Scrub-Jay Compensation Plan* (NASA 2014) and the USFWS Programmatic Biological Opinion for KSC Florida Scrub-Jay Compensation Plan (USFWS 2016).

Of the federally listed terrestrial wildlife species, only the eastern indigo snake, American alligator, wood stork, and tricolored bat could potentially use habitat of the Proposed Action sites.

The Proposed Action sites include FLUCCS communities (4110) and (4250), which are part of the Proposed Action sites and contain potential gopher tortoise habitat. These areas are moderately drained and could support gopher tortoise burrows, which are also used as refugia by the eastern indigo snake. Gopher tortoise burrows have been observed in the Kars Park North parcel, and this species could also utilize spoil berms found in several parcels. No eastern indigo snakes or other listed wildlife species were observed during numerous past wildlife site assessments that included the Proposed Action areas. However, an eastern indigo snake was observed in 2004 during wildlife surveys west of the Blue Origin Orbital Launch System South Campus in association with the NASA (2004) *International Space Research Park Environmental Assessment*, and thus this species could occur within the Proposed Action area. Increased construction-related traffic because of the Proposed Action development will increase the potential for vehicle strikes of this species. Additionally, increased traffic will also elevate the risk of vehicle strikes for alligators, which are known to inhabit the surrounding areas, and for gopher tortoises if they are present in the area. USFWS *Eastern Indigo Snake Protective Measures* (USFWS 2021) will be implemented before and during construction activities.

Wood stork and American alligator utilize the various surface waters and wetlands that occur within the Proposed Action area. In addition, the Proposed Action area falls within a 15-mile (42.1-km) radius from a wood stork nesting colony and therefore is considered core wood stork foraging area. Loss of habitat used by these species will be mitigated in accordance with state and federal wetland regulations.

The tricolored bat is the smallest bat found in Florida and is a candidate species to be listed as federally endangered in 2024. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees. This species of bat may also be found in Spanish moss, pine trees, and occasionally man-made structures. Forest removal within the Proposed Action area could result in impacts to tricolored bats due to the loss of suitable roosting or foraging habitat. Additionally, artificial lighting has been identified by USFWS Ecological Services as a potential impact to this species. Impacts of artificial lighting will be minimized by future tenants being required to implement the KSC Lighting Operations Plan (KSC PLN-1210, Rev. A). As a conservation measure for the tricolored bat, when feasible, construction of the various undeveloped areas within the Proposed Action will occur outside the May 1 through July 15 maternity season.

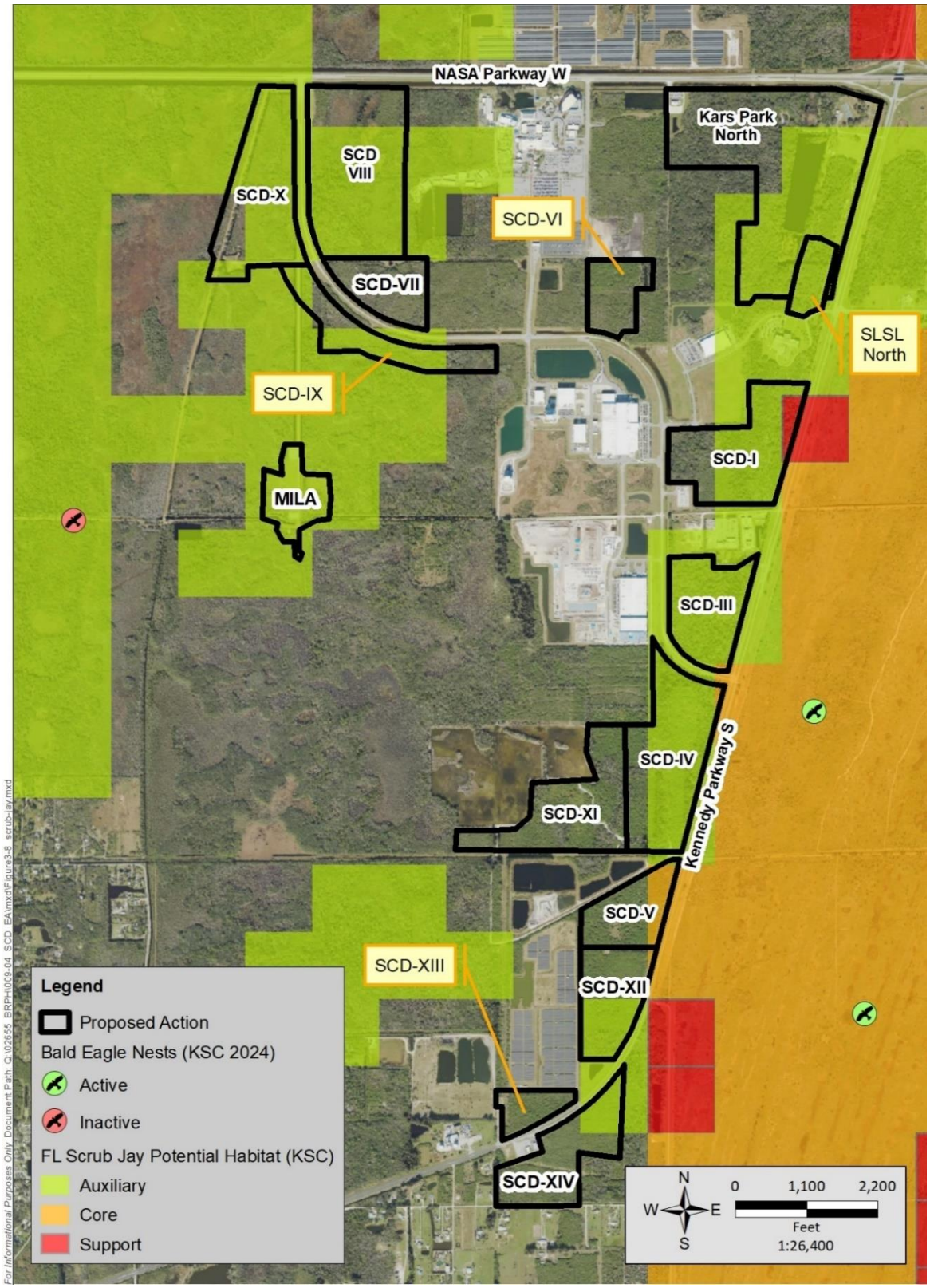


Figure 3-5 Bald Eagle Nest and Florida Scrub Jay Potential Habitat Location Map

Noise associated with construction activities could disturb listed wildlife in habitats near the project area, which could cause them increased stress and may lead them to temporarily relocate to adjoining areas for nesting, resting, and foraging. Listed species temporarily leaving the site may be subject to increased competition and predation, and species with limited mobility may be harmed during construction. Avian species and tricolored bat should not be impacted by noise since they likely already avoid busy areas such as the Blue Origin Manufacturing Complex, Exploration Park, and KSC VC; therefore, a disruption to these wide-ranging wildlife species movement patterns due to the proposed construction of new facilities is not expected.

The on-site habitats within the Proposed Action area are not necessary for the survival of federally threatened or endangered species. However, existing habitats could occasionally support listed species such as the wood stork, American alligator, tricolored bat, or eastern indigo snake due to their large home range. Construction impacts are not expected to cause changes in the overall population size or structure of any of listed species on KSC. Furthermore, the areas that could be used by these species are a small fraction of the vast acreage of available suitable habitat in the surrounding areas. Construction activities would likely disturb wildlife from construction-related noise and human presence in habitats near the project area; however, construction-related activities would be short-term and minor; As a result, impacts on threatened and endangered species from the Proposed Action are expected to be **negligible**.

Operation

KSC is required to protect marine turtle nesting habitat by NEPA and USFWS through the Endangered Species Act (ESA). In accordance with the NEPA of 1969, as amended (42 USC 4321-4370d), and the procedures of implementation of NEPA for NASA (Title 14, CFR, Part 1216 subparts 1216.1 and 1216.3), federal agencies are required to assess how programs and associated actions may affect the environment. As part of this assessment, KSC has coordinated with USFWS on the effects of exterior lighting on protected species. USFWS has issued a BO (FWS Log No. 04EF1000-2016-F-0083) based on their review of historical and expected future light management activities by KSC and the associated effects on the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles in accordance with Section 7 of the ESA of 1973, as amended (16 USC 1531 et seq). Lighting requirements that comply with the BO are provided in Chapter 24 of Kennedy NASA Procedural Requirements 8500.1 Rev. E-1 (KSC 2022). Additional guidance on lighting management practices is outlined in KSC-PLN-1210, the *Lighting Operations Plan (LOP) for Kennedy Space Center*, which provides detailed strategies and standards for reducing impacts of artificial lighting on wildlife.

Exterior lighting from Proposed Action developments could create skyglow and negatively impact sea turtle nesting and hatchling orientation. As such, exterior lighting must comply with KSC requirements and will be limited to internal lighting of signs; security and safety illuminations of adjacent streets, parking areas, loading areas, service areas, access drives, walkways, and building entrances; and exterior lighting of overall building surfaces. Such lighting will not produce any excessive glare or reflection onto any portion of any adjacent street or parcel or into the path of any oncoming or passing vehicle. All parking lots, loading areas, service areas, pedestrian walkways, and security lights, whether wall-mounted or free-standing, will be concealed-source fixtures where the lenses do not project below the opaque section of the fixture. Any exterior

lighting on KSC not meeting requirements for long-wavelength lighting (any proposed white light) must be reviewed and approved by NASA and USFWS regardless of location or application.

Critical habitat for the Florida scrub jay and other species that rely on xeric habitat occurs east of Kennedy Parkway South and does not occur west of Space Commerce Way. As previously stated, prescribed fire is a critical and required land management tool required to manage habitat for non-listed and listed species such as the eastern indigo snake and Florida scrub jay. Portions of the Proposed Action occur within MINWR burn units and development of facilities within the SCD may affect MINWR's prescribed burning program, which could negatively impact the quality of listed species habitat near the SCD (Figure 3-4). However, a Memorandum of Understanding has been approved by MINWR, the USSF SLD 45, and NASA KSC that Space Florida will support and enforce in lease agreement language with its tenants in the SCD to ensure the tenant activities will not adversely affect MINWR's and KSC's abilities and commitments to natural resource management and protection. Further, to minimize this potential affect, Space Florida will require tenants via its lease agreement to establish a 100-foot (30.1 m) fire buffer around the perimeter of all facilities or the perimeter fence, install smoke-hardened HVAC systems, and install the necessary equipment to protect sensitive payload/manufacturing processing or hardware from smoke. The lease agreements between Space Florida and its tenants within the SCD will also require tenants' acknowledgement of prescribed fire activities and provide educational materials for working in a fire-adapted landscape.

An increase in ambient noise is expected due to operation of the Proposed Action. Operational noise will be primarily limited to vehicular noise associated with employees, contractors, and shipping at the various sites as well as a result of increased traffic on Space Commerce Way. The operational noise is expected to increase incrementally over a long period (10 or more years) as sites are developed. Listed wildlife species that do not relocate to adjoining areas for nesting, resting, and foraging would have an opportunity to acclimate.

Listed species such as the American alligator and wood stork would avoid the Proposed Action site and can use similar habitats to the north, east, and south and will potentially utilize the required stormwater management ponds. No road kills of eastern indigo snake have been documented despite the significant increase in traffic that has been experienced on Space Commerce Way as a result of the expansion of the Blue Origin facility, construction of OneWeb, and rerouting of VC visitors to Galaxy Way. Fire and smoke mitigation measures implemented by future tenants in SC will minimize impacts to MINWR's prescribed fire program, which is essential for habitat management to support the Florida scrub jay and eastern indigo snake. Thus, the long-term operation of the Proposed Action is not expected to have a long-term impact on local populations of listed species. As a result, **negligible adverse impacts** on threatened or endangered species are expected due to the operation of the Proposed Action.

3.6 Cultural Resources

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 *KSC Programmatic Agreement for Management of Historic Properties* at KSC outlines how the Section 106 process will be implemented at KSC including consultation and a comment period for the Advisory Council on Historic Preservation, State Historic Preservation Officer (SHPO), and tribes. Other federal laws that NASA complies with, such as the Native American Graves and Repatriation Act and the Archaeological Resources Protection Act, 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 (KSC 2024). 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.

3.6.1 Affected Environment

For this project, 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 as well as the cultural resources visible from the proposed projects within the Space Commerce District built environment.

No historic properties were identified within the Space Commerce District. No known archaeological sites exist within the project area. A 1990 survey entitled *Archaeological Survey to Establish Zones of Archaeological Potential in the VAB and Industrial Areas of the Kennedy Space Center* (FMSF Report No. 2471) identified this area as having a low potential for archaeological resources. Multiple areas adjacent to and the ADP have undergone subsurface survey with negative results, confirming the low potential for NRHP-eligible archaeological sites in the area. However, multiple structures depicted on historic topographic maps result in moderate and high Zones of Archaeological Potential (ZAPs) in the SCD boundary. Cultural Resources Assessment Surveys (CRAS) of historic ZAPs in adjacent parcels have resulted in site recordation, confirming the moderate to high potential for historic period remains in these areas. If these historic structures mapped within the SCD boundary are potentially NRHP-eligible is unknown without completing a CRAS accompanied by archival deed research.

Due to the proposed building height, the Space Commerce District may be constructed within the viewshed of numerous buildings and structures constructed in the 1960s and 1970s. This includes a KSC Visitor Center (M6-0409, BR02998) built in 1967, a restaurant building (M6-0409C, BR04578) built in 1972, a dog kennel (M6-0409F, BR04576) built in 1976, a first-aid station (M6-0411, BR04577) built in 1963, a cafeteria (M6-0409D, BR04575) built in 1976, the Space Flight Exhibit (M6-0409E, BR04599) built in 1976, a tour bus servicing structure (M6-0455, BR04600) built in 1979 within the KSC VC, an Electromagnetic Laboratory

(BR02967), a Base Support Building/M&O Building (BR02960), a Base Operations Building/BOB (BR02959), a Support Building (BR02964), a Transportation Storage Building (BR02968), and a Propellants Shop (BR02965) within the KSC Industrial Complex. A determination of eligibility for these buildings and structures concluded that none are eligible for the NRHP. The remaining 43 buildings at the VC within the viewshed were also determined ineligible for the NRHP and have no exceptional importance that would warrant NRHP eligibility. However, additional facilities within the KSC Industrial Complex are eligible for NRHP listing including the Operations and Checkout (O&C) Building (constructed in 1964), the Flight Crew Training Building (constructed in 1966 and renamed the Engineering Development Laboratory circa 1985), and the Space Station Processing Facility (SSPF) (constructed in 1992). Depending on the extent of the viewshed, other NRHP-eligible facilities may also be visible.

One object, the historic Countdown Clock and Flagpole (M6-0409X, BR01690) built in 1969, may be within the viewshed of the new Space Commerce District. The historic Flagpole remains at the Press Site. The Countdown Clock was listed on the NRHP in 2000. Originally located at KSC's Press Site, the Countdown Clock was retired from service in 2014 and moved to its current location at the entrance of the KSC VC for exhibition purposes in 2016. The construction of the Space Commerce District would not adversely affect this historic property.

The KSC VC was also evaluated as a potential historic district. It was concluded that a historic district does not exist due to extensive changes and additions within the KSC VC leading to a lack of historic continuity or an aesthetic or historic plan that links them together.

3.6.2 Environmental Consequences

3.6.2.1 No Action

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

3.6.2.2 Proposed Action

When the specific locations and details of the proposed facilities are developed, KSC will consider effects to cultural resources in accordance with the Programmatic Agreement governing the management of historic properties at KSC. 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.

The presence of unknown archaeological sites, although unlikely, are possible; therefore, a CRAS will be conducted before individual project undertakings. When necessary, consultations would be undertaken on a project-by-project basis with the Florida SHPO or federally recognized Indian Tribes. 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 (EMB) 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 would generate **negligible adverse effects** to cultural resources. Operations under the Proposed Action would generate **no adverse effects** to cultural resources.

3.7 Noise

Aside from OSHA regulations to protect workers, primary responsibility for controlling noise is with state and local governments (USEPA 2023a). Brevard County Code of Ordinances, Chapter 46, Article IV, Section 46-133, require construction activities be performed between 7:00 am to 8:00 pm Monday through Saturday. Additionally, Brevard County Code of Ordinances, Chapter 46, Article IV, Section 46-131, identifies maximum permissible sound levels measured at the closest residential, commercial, institutional, or industrial property line (Table 3-10).

Table 3-10 Maximum Permissible Sound Levels by Land Use and Time Period

Land Use	*Period*	*Maximum Allowable Sound Pressure Level (dBA)*
Residential	7:00 am to 10:00 pm	60
	10:01 pm to 6:59 am	55
Commercial or Institutional	7:00 am to 10:00 pm	65
	10:01 pm to 6:59 am	55
Industrial	7:00 am to 10:00 pm	75
	10:01 pm to 6:59 am	65

Note: dBA = A-weighted decibels.
Source: Brevard County Code of Ordinances, Chapter 46, Article IV, Section 46-131.

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 [WSDOT] 2020). Table 3-11 lists typical noise levels generated by common outdoor and indoor activities and possible human effects.

Table 3-11 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: WSDOT 2020.

3.7.1 Affected Environment

The Space Commerce District is bounded by Kennedy Parkway (SR 3) to the east, the KSC boundary and Indian River to the west, Schwartz Road to the north, and the KSC boundary to the south. Table 3-10 shows that this area is currently exposed to noise associated with city traffic, business offices, conversational speech, light auto traffic, and industrial-related noise from the existing industrial and spacecraft manufacturing and processing facilities (Blue Origin, SpaceX Roberts Road, Airbus, etc.). Less frequently, this area also experiences noise from heavy trucks and rocket launches.

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Under the No Action Alternative, the ADP would not be implemented and the area would remain undeveloped; therefore, **no adverse effects** to noise would occur under the No Action Alternative.

3.7.2.2 Proposed Action

Construction

The two most common types of noise are point source and line source. Point source noise is typically associated with a stationary source, such as most construction activities. Examples include jackhammers, excavators, or a single traveling vehicle. The standard reduction for point source noise is 6 dB per doubling of distance from the source. Line source noise is generated from moving objects, such as highway traffic. The standard reduction for line source noise is 3 dB per doubling of distance (WSDOT 2020). Table 3-12 lists example noise reduction over distance from a 95 dBA source when the site is considered generally flat and hard such as concrete or hard-packed soil.

Additionally, dense vegetation can reduce noise levels by as much as 5 dB per 100 feet (30.5 m) of vegetation, up to a maximum reduction of 10 dB over 200 feet (61.0 m) (WSDOT 2020).

Typical construction equipment that would be used during construction 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, this equipment would range in noise levels at 50 feet (15.2 m) from its source from 72 to 93 dB (WSDOT 2020). The sound is expected to attenuate below County ordinance requirements before leaving the KSC site boundary. Additionally, all work would be performed during normal business hours, and the BMPs listed in Table 2-4 would be implemented to ensure that all equipment is operated in accordance with the manufacturer's specifications and equipped with noise-reducing equipment in proper condition. Additionally, as noted in Section 2.1, the Proposed Action incorporates site-specific health and safety requirements for construction workers in accordance with OSHA regulations, and as listed in Table 2-4, a Health and Safety Plan will be required.

Table 3-12 Example Noise Reduction Over Distance From a 95-dBA Source

Distance from Source (feet)	*Point Source (dBA)*	*Line Source (dBA)*
50	95	95
100	89	92
200	83	89
400	77	86
800	71	83
1,600	65	80
3,200	59	77
6,400	53	74

Source: WSDOT 2020.

Therefore, **minor adverse effects** from noise would occur during the construction portion of the Proposed Action.

Operation

Following construction activities, a net increase in long-term noise from cars, building operations, and people would be expected; however, this increase would likely be imperceptible. Therefore, **negligible adverse effects** are expected from noise during the operation portion of the Proposed Action.

3.8 Water Resources

3.8.1 Affected Environment

3.8.1.1 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 IRL is a shallow-water estuary stretching along 40 percent of Florida's east coast. Spanning 156 miles (251 km) from Ponce de Leon Inlet in Volusia County to the southern boundary of Martin County, the lagoon supports commercial and recreational fisheries and acts as an economic engine for the region. The IRL has been designated an Outstanding Florida Water and an Estuary of National Significance and is one of the most biologically diverse estuary in North America. 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.

The primary outfall for stormwater from the Proposed Action is to the Indian River and Sykes Creek which is a tributary of the Banana River. The IRL has experienced poor water quality and significant seagrass loss over the last several decades. In 2007, the IRL was added to the FDEP Verified List of Impaired Waters due to excessive amounts of nitrogen and phosphorus in the system and in 2009 a Total Maximum Daily Load (TMDL) was approved that established the allowable loadings of phosphorus and nitrogen to the IRL and Banana River. A Basin Management Action Plan (BMAP) was adopted in 2013 which assigned nitrogen and phosphorus load reduction for stakeholders in the IRL basin. NASA KSC is a stakeholder with a required load reduction deficit of 4,563 pounds (2,070 kg) of total nitrogen per year and 694 pounds (315 kg) of total phosphorus per year as of the 2021 BMAP revision. NASA KSC is an active participant in the total maximum daily load (TMDL) program and will continue to proactively implement water-quality improvement projects and basin management strategies to reduce nutrient loading.

SCD parcels SCD-I, SCD-VI, SCD-VII, SCD-VIII, SCD-IX, SCD-X, and MILA drain south and west to the Ransom Road canal which flows west. The Ransom Road pump station is located on the north side of Ransom Road within the MILA parcel. These pumps are powered by diesel engines and are currently listed on KSC's Title V Air Operating Permit, which limits pump run time to 100 hours of operation per year, 50 of which can be non-emergency or non-maintenance related. This allows approximately 4 days of run-time per year. Additionally, any flows leaving the Proposed Action parcels north of Ransom Road would have to continue west for over 2 miles (3.2 km) before entering the IRL. Any surface water discharges from the remaining Proposed

Action parcels drain south to a large wetland complex associated to Sykes Creek which is over 3 miles (4.8 km) to the south.

Current stormwater regulations from SJRWMD require new developments that discharge to Outstanding Florida Waters (OFWs) or impaired water bodies demonstrate net water-quality improvement, and off-site discharge flow rates must be equal to or less than predevelopment condition.

3.8.1.2 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 (NASA 2020).

Recharge to the SAS is primarily due to infiltration of precipitation. However, the quality of water 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 surficial aquifer has occurred at certain facilities. The SAS is monitored under a KSC permit at the KSC landfill and Pad 39B and by SpaceX, which holds a permit requiring aquifer monitoring at Pad 39A.

The groundwater quality in the intermediate aquifer system 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).

3.8.1.3 Floodplains

Floodplains 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 FEMA Flood Insurance Rate Maps (FIRMs) and are referred to as a Special Flood Hazard Area (SFHA). SFHAs are defined as the area that will 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. SFHAs are labeled as 'Zones,' several of which are east of, but not within, the Proposed Action area:

- Zone AE – The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1–A30 Zones.
- Zone AO – River or stream flood hazard areas, and areas with a 1 percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet (0.3 m to 0.9 m). These areas have a 26-percent chance of flooding

over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.

- Zone VE – Coastal areas with a 1-percent or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
- Zone X – Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level.

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

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

3.8.2.2 Proposed Action

Construction

Surface Waters: The Proposed Action sites do not contain natural surface waters such as rivers, estuaries, or lakes but do contain numerous man-made surface waters and man-made stormwater ditches that were constructed to manage groundwater in the citrus groves (Figure 3-3).

SCD parcels SCD-I, SCD-VI, SCD-VII, SCD-VIII, SCD-IX, SCD-X, and MILA drain south and west to the Ransom Road canal, which flows west. The Ransom Road pump station is on the north side of Ransom Road within the MILA parcel. These pumps are powered by diesel engines and are currently listed in KSC's Title V Air Operating Permit, which limits pump run time to 100 hours of operation per year, 50 of which can be non-emergency or non-maintenance related. This allows approximately 4 days of run-time per year. Additionally, any flows leaving the Proposed Action parcels north of Ransom Road would have to continue west for over 2 miles (3.2 km) before entering the IRL. Any surface-water discharges from the remaining Proposed Action parcels drain south to a large wetland complex associated with Sykes Creek, which is over 3 miles (4.8 km) to the south.

Current stormwater regulations from SJRWMD require new developments that discharge to OFWs or impaired water bodies demonstrate net water-quality improvement and off-site discharge flow rates must be equal to or less than predevelopment conditions. As a result, drainage from the Proposed Action parcels will have negligible impacts on water quality or quantity in the IRL due to the required SJRWMD stormwater management system regulations as well as the distance any potential off-site flow must travel, which would result in additional evapotranspiration and nutrient loss.

Groundwater: Several Proposed Action parcels contain land use control areas mapped by the KSC Remediation Program. These areas have documented contamination, predominantly

groundwater contaminated with PFAS, VOCs, and PCBs (Figure 3-6). When a specific development site is identified, an Environmental Checklist will be submitted to KSC. This checklist will start the issuance of a Record of Environmental Consideration (REC), which will document site-specific known contamination sources and locations that will need to be addressed by the site development contractor in coordination with the KSC Remediation Program. Coordination and approval from FDEP may also be required during design and construction phases of site development.

Any dewatering in association with site preparation near these areas has the potential to cause migration of PFAS. If dewatering is required, the contractor will prepare a dewatering plan and submit to the KSC Remediation Program for review. The KSC Remediation Program will coordinate review by the FDEP Federal Programs Section, if necessary, and obtain their comments and approval before construction. This review is independent of any required NPDES or Industrial Wastewater permits.

Stormwater generated from the Proposed Action sites would be treated by the existing stormwater management system in accordance with SJRWMD regulations. Other construction-related activities are not expected to affect groundwater within the Proposed Action area. As a result, construction of the Proposed Action is expected to have **minor to moderate adverse effects** to groundwater resources due to the potential for groundwater contaminant migration, including PFAS, resulting from construction activities.

Floodplains: The topography in and around the Proposed Action sites is relatively flat with a gradual decrease in elevation to the west. The Proposed Action sites contains extensive 100-year floodplain (Zone AE) based on the January 2021 FEMA FIRM for the area (Figure 3-7). The base flood elevation for these floodplains is 3.0 feet (0.9 meter) North American Vertical Datum of 1988 (NAVD88).

The Proposed Action area contains 398 acres (161.1 ha) of floodplain (Zone AE) (Figure 3-7, Table 3-8). The proposed site development has the potential to fill a maximum of 120 acres (48.6 ha) of floodplains based on conceptual designs presented in the SCD ADP (Figures 2-1 and 2-2; Table 3-8). This impact acreage assumes little to no development will occur in SCD-VII, SCD-VIII, SCD-IX, and SCD-X, and any development at Kars Park North will avoid floodplain impacts. Thus, no floodplains will be impacted in these parcels. In accordance with SJRWMD stormwater regulations, all new development will need to provide on-site stormwater treatment and flow attenuation so that no net increase in water is discharged from the site to downstream wetlands or receiving water bodies. In addition, these floodplains are not portions of a flow-way and result from a high-water table and flooding from the Indian River and will be mitigated in accordance with federal and state regulations.

The filling of these floodplains is expected to cause negligible downstream flooding and is not expected to negatively affect other facilities or private properties due to the vast adjacent areas of floodplain between the Proposed Action area and the closest private property west of Kennedy Parkway West. The closest private property to floodplain impacts is over 0.5 miles (0.8 km) from SCD-XI (Figure 3-7).

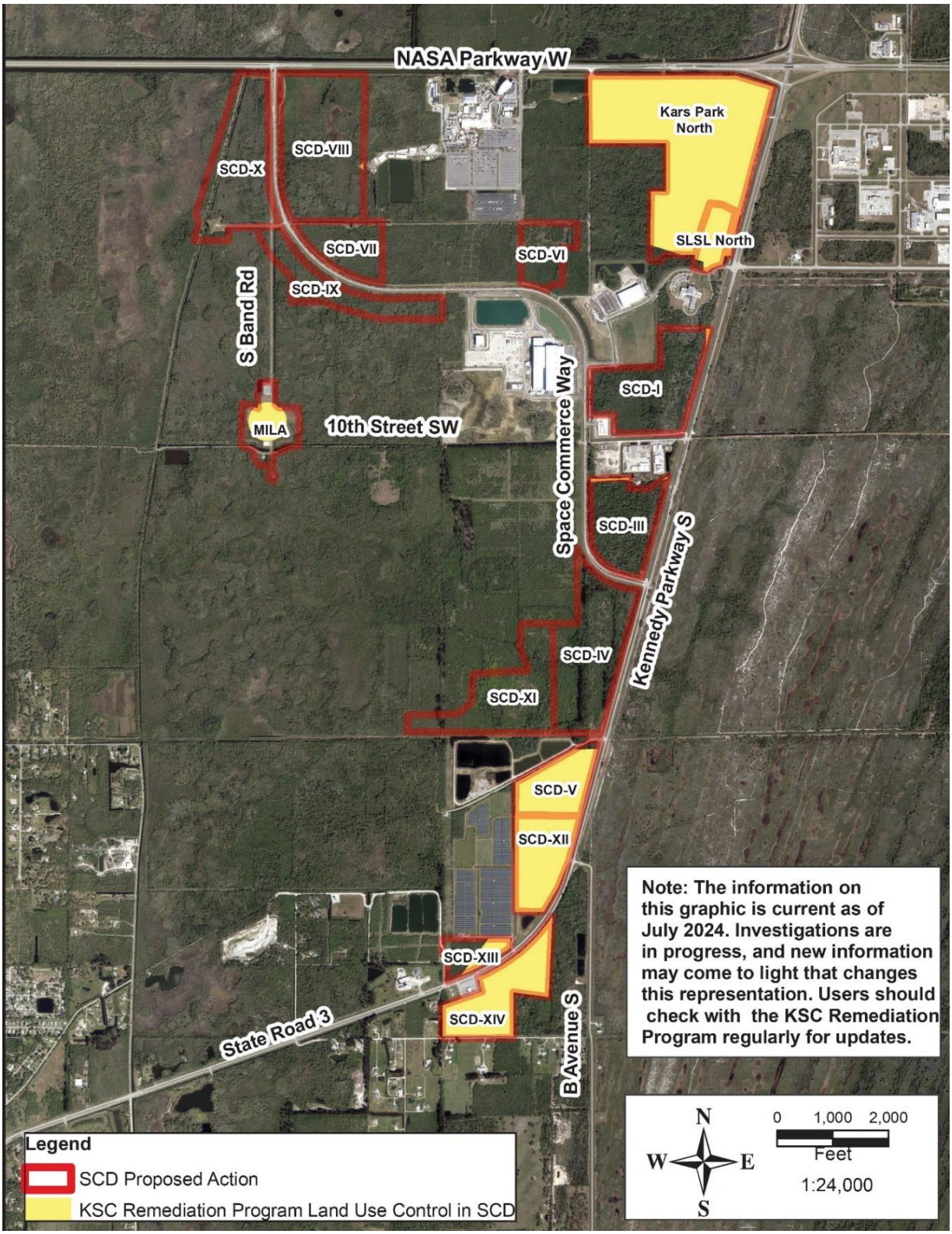


Figure 3-6 KSC Remediation Program Land Use Controls in SCD

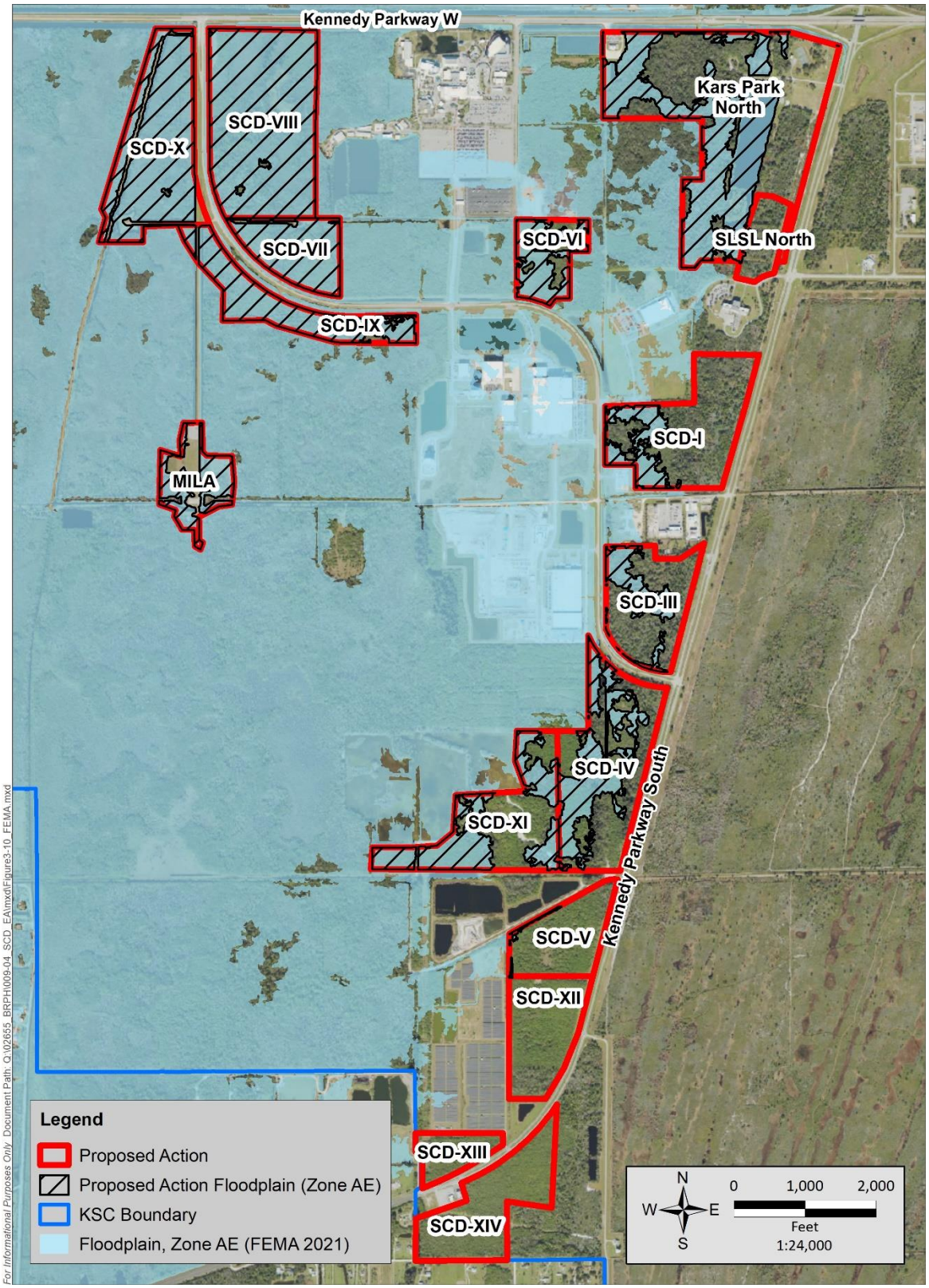


Figure 3-7 FEMA Floodplain Map

Construction

Minor to moderate adverse impacts to Water Resources are expected as a result of the construction of the Proposed Action due to the potential for PFAS or other groundwater-related contamination migration and the net loss of floodplain acreage.

Operation

Operation of the stormwater management system may alter groundwater contamination migration patterns and could mobilize contaminants downstream via surface waters and stormwater discharge. As a result, **negligible to minor adverse impacts** to Water Resources are expected as a result of the operation portion of the Proposed Action.

3.9 Socioeconomics

3.9.1 Affected Environment

KSC has nearly 100 private-sector partners and more than 240 partnership agreements. In 2023, the workforce included 26,693 jobs (11,144 total KSC jobs and 15,499 additional Florida jobs), which generated approximately $1.84 billion in labor income and $9.36 billion in economic output in the State of Florida (NASA 2023g). Every 10 jobs at KSC creates approximately 13.9 additional jobs in Florida (NASA 2023g). In addition, the 2023 benefits of spaceport operations include 1,651,470 visitors to the KSC VC include 1,301,385 out-of-state visitors who spent $123,718,720 (NASA 2023g). Specific to Brevard County, 21,444 jobs were attributable to KSC, an increase of 8.5 percent (NASA 2022b).

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, the ADP would not be implemented but KSC would continue to contribute a substantial economic output in Florida. However, not implementing KSC's well-vetted master planning approach including this ADP, which supports the overall management of KSC assets, and the growth of the commercial space industry have the potential for negative socioeconomic effects by allowing piecemeal, localized planning to occur. This approach under the No Action alternative would not be conducive to commercial space growth at KSC and could have adverse socioeconomic impacts that persist for years. Therefore, **minor to moderate adverse effects** to socioeconomics would occur under the No Action Alternative.

3.9.2.2 Proposed Action

Construction

Minor to moderate beneficial effects to socioeconomics are expected as a result of implementing the ADP. The implementation of the KSC Final Master Plan, including the ADP, would result in the comprehensive utilization of remaining property and infrastructure available for commercial space users at KSC and enhance their ability to commit their own resources at KSC for their

individual user programs. This commercial investment would have short-term and long-term beneficial effects.

Operation

Long-term **minor to moderate beneficial effects** to socioeconomics are expected during the operation portion of the Proposed Action from a likely increase in employees and support staff. However, no migration to the area is expected since the labor and materials would likely be procured locally or regionally.

4.0 CUMULATIVE EFFECTS

4.1 Definition of Cumulative Effects

The following cumulative effects analysis follows the requirements of NEPA to consider reasonably foreseeable effects from implementation of the Proposed Action. Cumulative effects are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or near the Proposed Action would be expected to have a higher potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative effects. To identify cumulative effects, the analysis needs to address the following three fundamental questions:

1. Does a relationship exist such that the effects to affected resource areas by the Proposed Action might interact with the effects to resources of past, present, or reasonably foreseeable actions?

2. If so, what would the combined effect be?

3. Do any potential unidentified significant effects exist when the Proposed Action is considered alone?

4.2 Scope of Cumulative Effects Analysis

The scope of the cumulative effects analysis involves the geographic extent of the effects and their timeframes in which the effects could be expected to occur. For this EA, the study area delimits the geographic extent of the cumulative effects analysis. In general, the study area includes the areas previously identified in Chapter 3 for the respective resource areas to include the Space Commerce District. The timeframe for cumulative effects centers on the timing of the Proposed Action. Although the construction timeline is not finalized, the cumulative effects analysis will be limited to the next 5 years.

Another factor influencing the scope of a cumulative effects analysis involves identifying other actions to consider. Beyond determining the geographic scope and timeframe for the actions interrelated to the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For this analysis, reasonably foreseeable is defined as, "sufficiently likely to occur such that a person of ordinary prudence would take it into account to reach a decision."

Documents used to identify other actions include notices of intent for Environmental Impact Statements and EAs, management plans, land use plans, and other planning-related studies or publications.

4.3 Past, Present, and Reasonably Foreseeable Actions

In determining which projects to include in the cumulative effects analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. First, it was determined whether a relationship exists such that the affected resource areas of the Proposed Action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the project was not carried forward into the cumulative effects analysis. Table 4-1 presents past, present, and reasonably foreseeable actions in the geographic area and their potential for cumulative effects.

4.4 Cumulative Effects Analysis

For resources whose impacts are localized and temporary and for a cumulative effect to occur, the direct and/or indirect effects to a resource area would need to occur in the same localized area at the same time. Resource areas where the effects are expected to be localized and temporary and the respective resources would recover within a short period include hazardous materials and hazardous waste, health and safety, land use and visual resources, and threatened and endangered species. Therefore, for these resource areas, the potential does not exist for significant cumulative effects to occur when combined with other past, present, and reasonably foreseeable projects. The resources carried forward for cumulative effects analysis include transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.

4.4.1 Transportation

As discussed in Section 3.2.2, **no adverse effects** would occur from the No Action Alternative, and **negligible to minor adverse effects** would occur from the construction phases of the Proposed Action; however, **minor adverse effects** would occur from the operational phases.

Past, present, and reasonably foreseeable projects carried forward for cumulative effects analysis include the widening of Space Commerce Way, Blue Origin Exploration Park campus updates, Airbus US facility expansion, KSC VC and LC-39 Viewing Gantry development projects, astronaut training facility, SpaceX Roberts Road North expansion, Project Comet, and 2023–2024 Blue Origin Orbital Launch System (OLS) development project.

The increase in vehicles during construction activities would be temporary and is expected to occur during normal working hours. Adverse cumulative effects are expected during the Space Commerce Way widening effort, which is expected to be completed by spring 2025. During this time, lane closures will occur intermittently. To minimize the effects from these closures, signage and other maintenance of traffic notices will be used to alert drivers of detours.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Widening of Space Commerce Way	FDOT has funded a $22.9-million project to widen 2.7 miles (4.3 km) of Space Commerce Way between NASA Parkway West to Kennedy Parkway South from two lanes to four lanes. This will support future growth and economic vitality by allowing the transportation of oversized space-industry vehicles to launch sites, as well as public and commercial traffic between the mainland near Titusville and North Merritt Island (and other barrier islands in that vicinity). The project will also provide visitors with access to the KSC VC and support the manufacturing and research workforce in the Space Commerce District. During the widening effort, intermittent lane closures on Space Commerce Way will occur; however, signage will be erected to alert drivers of detours. No closure to side streets, residences, and business will occur. The project began in July 2023 and was completed in late 2024.	Potential for Cumulative Effects: No potential for construction overlap; however, a long-term beneficial impact associated with respect to the area's transportation network will occur. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.
Exploration Park	The Proposed Action consisted of constructing eight buildings and associated parking to support education, technology and innovation development, industrial application, and space industry support services on a 60-acre (24.3-ha) site. At build-out, the footprint was estimated to total 315,000 square feet (ft^2 [0.03 km^2]) in facilities and 768,030 ft^2 (0.07 km^2) of roads, parking lots, sidewalks, and other related infrastructure. The development would accommodate up to 800 permanent employees. A Final EA was published in December 2008. Impacts to facilities and infrastructure, air quality, biological resources, threatened and endangered species, cultural resources, geology and soils, noise, surface water quality, groundwater quality, socioeconomics, and land use were assessed. No significant effects were identified. Presently, Airbus US Space & Defense, formerly known as Airbus OneWeb Satellites, occupies one building and uses it as the final assembly line for small satellites.	Potential for Cumulative Effects: No potential exists for overlap with construction activities since this building has been constructed. However, an Airbus US Facility Expansion Project is proposed, which will be analyzed in detail by KSC as a separate project and addressed below as part of this cumulative impacts review.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Airbus US Facility Expansion Project	The development consists of Site Improvements of ±5.7 acres (2.3 ha) for the building expansion within the Space Commerce District. The work includes the following four elements: 1. Site Demolition – Remove existing parking, landscape, site lighting, etc., located within and around the general footprint of the building expansion. 2. Site Preparation – Prepare ±5.7 acres (2.3 ha) of existing land for development. The work includes earthwork, grading and drainage improvements, erosion and sedimentation control, and stormwater management facilities. 3. Site Improvements – Improve ±5.7 acres (2.3 ha) of the prepared land for support of the building expansion. Improvements consist of water distribution, electrical power distribution, communications, stormwater management systems, pavements, drives, aprons, parking, sidewalks, landscaping, and site lighting. 4. Building Construction – The design of the building remains in the infancy stage, requiring further input from the owner and end user. However, site preparation and infrastructure work to support the future building construction are currently underway. Further design elements will be provided in future submittals.	Potential for Cumulative Effects: The Airbus US Facility Expansion project area is in the northeast portion of the Space Commerce District. Site preparation and infrastructure construction are currently underway. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.
15-Year Development Plan for the KSC Visitor Complex and Launch Complex 39 Viewing Gantry	The Proposed Action was to implement a 15-year Development Plan to attract additional visitors and immerse them in a uniquely themed, enhanced interactive environment of NASA's past and future. As part of the action, construction would occur over a 15-year period on 15 parcels totaling 312.1 acres (126.3 ha). The construction would support a projected growth of full-time staff and visitors from the existing 1.7 million in 2024 to a projected 3.3 million in 2038. A Draft Programmatic EA is expected to be released for public review in fall/winter 2024.	Potential for Cumulative Effects: The KSC VC is directly north of the Space Commerce District, and the potential for overlap with construction activities exists. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Exploration Park North (Astronaut Training Facility)	The Proposed Action is for NASA to execute a real property agreement with Space Florida for Exploration Park North, which would allow construction and operation of an Astronaut Training Facility on a 66-acre (27-ha) development area that would be accessed via a road connected to New Space Drive. The facility would include astronaut training facilities, astronaut accommodations, and auxiliary support facilities for future commercial astronauts and other customers. The facility would be within the Space Commerce District and could accommodate up to 50 permanent staff and 30 astronaut trainees at any one time. Additionally, a public restaurant and café could accommodate upward of 180 people. No specific construction and operational dates are available. A Final EA was released in August 2021. Impacts to transportation, utilities, air quality, biological resources, threatened and endangered species, cultural resources, geology and soils, noise, surface water quality, groundwater quality, and socioeconomics were assessed. No significant effects were identified.	Potential for Cumulative Effects: Exploration Park North is in the northeast portion of the Space Commerce District. The timeline for construction is unknown, but construction overlap will likely occur. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Project Comet at the Space Florida Launch and Landing Facility	Project Comet, also known as Project Kuiper, will consist of a new payload process facility at Space Florida's Launch and Landing Facility northeast of the Space Commerce District. The new facility would be two stories high with additional mechanical mezzanines. The gross floor area will be approximately 102,854 ft^2 (9,555.4 m^2) with a footprint of approximately 81,610 ft^2 (7,581.8 m^2). Approximately 71 parking spaces will be available for this location. The primary use of the building will be processing payloads for the commercial space program. The total on-site development area is 31.6 acres (12.8 ha). Along with the construction of the payload processing facility, additional support facilities will be constructed within the proposed development area to include an in-transit storage facility, a badging security office, and an office building. The facility will have a perimeter fence and new dry retention ponds in the area. During construction, a construction compound will be used to include a material laydown area, no more than 10 independent construction office trailers (not to exceed 1,350 ft^2 [125.4 m^2] each), and a staging/stockpile area. The construction compound will be surrounded by a 6-ft (1.8-m) tall temporary chain link fence. The new facility is expected to be completed and operational by 2025. A Draft EA was released in January 2021 for the development of this area. No significant effects to fish and wildlife, plants, floodplains, historical, architectural, archeological, and cultural resources, water quality, or wetlands were identified.	Potential for Cumulative Effects: No potential for cumulative effects exist as the Launch and Landing Facility is outside the geographic scope (the facility is approximately 7 miles [11.3 km] to the north) and construction is expected to be completed before ADP construction activities begin.
Space and Life Sciences Laboratory (SLSL)	The SLSL, built in 2003, is a 104,000-ft^2 (0.01-km^2) world-class laboratory supporting biological and life sciences research.	Potential for Cumulative Effects: No potential for overlap exists with construction activities as this facility is built and operational.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
SpaceX Roberts Road North Expansion	The approximately 100-acre (40.5-ha) parcel of land north of the existing Roberts Road Operations Area would be used for developing additional office space and industrial facilities in support of vehicle and payload processing, fabrication, storage, manufacturing, and shipping and receiving. SpaceX would construct facilities, not to exceed 1.5 million ft^2 (0.14 km^2) with a maximum facility height of 400 ft (121.9 m). Upgraded utilities would include new underground electrical feeder lines, fiber communication connectivity, water, and wastewater. Internal site roads would provide access and connectivity to facilities within the area. The September 2023 Supplemental EA evaluated potential environment effects from expanding Roberts Road Operations Area, upgrading utilities, and widening Saturn Causeway approximately 8 ft (2.4 m) from the VAB to Phillips Parkway to support vehicle transport to and from launch facilities. Resources analyzed in the SEA included land use/visual resources, coastal zone, habitats and vegetation, wildlife protected species, cultural resources, air quality, climate, surface waters, floodplains, groundwater, geology and soils, transportation, utilities, and hazardous materials and waste. No significant effects were noted. Construction development is expected to last 2 to 3 years.	Potential for Cumulative Effects: The SpaceX Roberts Road North Expansion project area is approximately 6 miles [9.7 km] north of the Space Commerce District. The timeline is unknown, but the potential exists for overlap with construction activities. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Blue Origin Orbital Launch System (OLS) Manufacturing Complex Expansion Site Development, Parking Lot Construction, and Construction of a Temporary Storage Structure	Blue Origin is proposing to develop four vacant areas totaling 100.04 acres (40.5 ha) in the OLS Manufacturing Complex (refer to the Blue Origin OLS Manufacturing Complex Expansion project), construct a parking lot, and erect a temporary storage building. The projects would provide for the infrastructure needs of existing and near future facilities for the manufacture of the Blue Origin OLS space flight hardware and launch vehicle components. The six projects include the following: 1. North Campus Early Site Development (Tier One North Campus, Area 3, 8.57 acres [3.5 ha]) – Provide clearing, stripping, earthwork, and storm drainage improvements to prepare the area for new facilities construction. 2. North Campus Early Site Development (Tier Two North Campus, Area 2, 27.64 acres [11.2 ha]) – Provide clearing, stripping, earthwork, and storm drainage improvements to prepare the area for new facilities construction. 3. Deep South Early Site Development (Tier One South Campus, 33.69 acres [13.6 ha]) – Provide clearing, stripping, earthwork, and storm drainage improvements to prepare the area for new facilities construction. 4. Deep South Early Site Development (Tier Two South Campus, 26.12 acres [10.6 ha]) – Provide clearing, stripping, earthwork, and storm drainage improvements to prepare the area for new facilities construction. 5. North Campus Parking Lot Improvement (Tier One North Campus, Area 4, 3.62 acres [1.5 ha]) – Develop a satellite automobile parking lot to serve existing facilities. Project includes site preparation, asphalt pavements, curbs, sidewalks and site lighting. South Campus Temporary Storage Structure (South Campus Improvements totaling 17,220 ft^2 (1,599.8 m^2) – Construct a fabric-covered storage structure for 18 months of operation. The tent structure would be erected in the auto parking lot of the future Chemical Processing Facility. The structure would be removed before the operation of the Chemical Processing Facility building. The structure would be an enclosed, conditioned space and equipped with fire-protection mechanisms to meet Florida Building Code and Florida Fire Code requirements.	Potential for Cumulative Effects: The Blue Origin OLS Manufacturing Complex is near the central portion of the Space Commerce District. The timeline for construction is unknown, but construction overlap will likely occur. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Naval Ordnance Test Unit/ Strategic Systems Program – P110 Cape Railhead Proposed Project	The Navy Strategic Systems Programs deters strategic attack by providing credible and affordable nuclear and non-nuclear strategic solutions to the warfighter. The Naval Ordnance Test Unit supports missile tests/launches, deployed systems, surface ships, and submarine operations; therefore, they need rail capability to receive D5LE2 rocket motors in support of its mission. Site Plan 23-0002 was approved for a site east of Kennedy Parkway, but that was determined to not be feasible from an explosive safety perspective due to Kennedy Parkway being a high-density traffic area. KSC Master Planning and Partnership Development Team stakeholders have identified a parcel of land south of Schwartz Road, west of Kennedy Parkway N., and north of NASA Parkway W., approximately 13 acres (5.3 ha). The initial short-term use permit would provide the Naval Ordnance Test Unit right of entry to KSC property for site planning, engineering, and environmental assessments.	Potential for Cumulative Effects: No potential for overlap. The proposed site location is approximately 5.5 miles (8.9 km) north-northwest of the Space Commerce District. The planning, engineering, and environmental assessment activities would be temporary and no short- or long-term environmental effects are anticipated. As a result, no potential exists for a cumulative effect.

Table 4-1 Summary of Past, Present, and Reasonably Foreseeable Actions Considered

Project	*Project Description*	*Summary of Potential for Cumulative Effects*
Blue Origin OLS Manufacturing Complex Expansion	Blue Origin is proposing to add several new facilities to the Orbital Launch Site (OLS) Manufacturing Complex in Exploration Park. The planned facilities include the following: • North Campus, Building E SCF (NASA ID# M6-1161) – 4,000 ft^2 (371.6 m^2) single-story building with a height of 25 ft (7.6 m). • North Campus, Hazardous Processing Area – five structures with a maximum height of 90 feet (27.4 m) for hydrostatic and pneumatic test procedures of vehicle components and sub-assemblies. • North Campus, Building O Parking Garage – enclosed five-story, pre-cast concrete structure with 2,300 parking spaces. The footprint would be 310 feet (94.5 m) by 435 feet (132.6 m) by 75 feet (22.9 m) high. • North Campus, Reservoir Road Widening – expand roadway to accommodate large vehicle movements. • South Campus, Building H Lunar Production Facility – 204,700 $feet^2$ (19,017.3 m^2) two-story building with a height of 140 feet (42.7 m). • South Campus, Revised Building M Maintenance Support Facility – 101,250 $feet^2$ (9,406.4 m^2) single-story building with a height of 50 feet (15.2 m). • South Campus, Office Trailer Additions – four temporary, 2,500 feet2 (232.3 m2) modular units, each with a height of 15 feet (5.6 m). A 30-feet (9.1-m) separation would be between each modular unit. The facilities would be within the Space Commerce District.	Potential for Cumulative Effects: Timeline is unknown, but the potential for overlap with construction and operational activities will likely occur. Resources Carried Forward for Cumulative Impacts Analysis: Land use and visual resources, geology and soils, transportation, utilities, air quality, biological resources, cultural resources, noise, water resources, and socioeconomics.

Sources: FDOT 2023a; FDOT 2023b; NASA 2004; NASA 2008; NASA 2021a; NASA 2021b; NASA 2021c; NASA 2022c; NASA 2023b; NASA 2023c; NASA 2023d; NASA 2023e; NASA 2023f; NASA 2024a; NASA 2024c; NASA 2024d; Space Florida 2024; and Space Florida 2023.

The cumulative projects listed in Table 4-1, when combined with the Proposed Action, would result in a cumulative increase in the total number of visitors and employees. This increase is expected to result in a long-term increase in the daily traffic counts on Space Commerce Way and NASA Parkway W.; however, FDOT funded a $22.9-million project to widen 2.7 miles (4.3 km) of Space Commerce Way between NASA Parkway W./Parkway West to Kennedy Parkway South from two lanes to four lanes (FDOT 2023a). The project began in summer 2023 and is expected to be completed by spring 2025 (FDOT 2023b). FDOT is expected to be granted an easement for the operation and maintenance of Space Commerce Way by January 2025.

Future development projects may trigger transportation improvements such as signalization, turn lanes, or signage; however, these improvements are not expected to result in major modifications to the existing roadway. Any development project that modifies the roadway will require permitting through FDOT and will require compliance with FDOT's design and construction requirements as well as permitting requirements.

Widening Space Commerce Way would reduce the overall effects from the gradual increase in vehicles, action proponents will obtain permits for projects modifying the roadway, and NASA would monitor future developments and driveway connections; therefore, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on transportation is considered minor**.

4.4.2 Utilities

As discussed in Section 3.3.2, **no adverse effects** to utilities would occur with implementation of the No Action Alternative. The construction and operational phases of the Proposed Action would result in **negligible to moderate adverse effects** on the wastewater system, **negligible to minor adverse effect** on the potable water infrastructure, **negligible to minor adverse** effects on power, and **negligible adverse effects** to the communication system.

Future development projects would result in additional demand on wastewater, potable water, power, and communication systems. To the extent possible, the Proposed Action and other construction projects would meet Leadership in Energy and Environmental Design Silver certification by incorporating sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. In addition, as discussed in Section 3.3.1, the expected demand to utilities associated with foreseeable growth at KSC was the subject of recent studies and upgrades to ensure adequate capacity. Therefore, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on utilities is considered minor**.

4.4.3 Air Quality

As discussed in Section 3.4.2, **no adverse effects** would occur for air quality from the No Action Alternative and **minor adverse effects** would occur from the construction and operational phases of the Proposed Action.

The cumulative projects listed in Table 4-1, when combined with the Proposed Action, would result in a cumulative increase in air emissions. Although these projects would occur in the same geographic vicinity and possibly at the same time, the BMPs in Table 2-4 would be implemented as part of the Proposed Action to minimize generation of air criteria pollutant emissions during the construction phases. As a result, the small increases in criteria pollutant emissions from the Proposed Action and other cumulative projects during construction activities are not expected to impact Brevard County's attainment status with the NAAQS.

Additionally, the increase in guests, support staff, and facilities would result in an increase in air emissions from cars and buildings. One of the projects at the VC is a charging station to support alternative-fuel vehicles, which would provide some reduction in air emissions from gas-powered vehicles.

In conclusion, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on air quality is considered minor**.

4.4.4 Biological Resources

As discussed in Section 3.5, **no adverse effects** to habitats and vegetation would occur from the No Action Alternative. For uplands, **negligible to minor adverse impacts** are expected from construction of the Proposed Action, and **no adverse impacts** from operation of the Proposed Action. For wetlands, construction is expected to have **minor adverse impacts** and **negligible adverse impacts** from operation of the Proposed Action. For wildlife, the expected effects of the Proposed Action are **minor adverse impacts** from construction and **negligible adverse impacts** from operation.

Future development projects would result in impacts to habitats and vegetation. Specifically, the Proposed Action would result in the loss of up to 80 acres (32.4 ha) of wetlands consisting of Mixed Wetland Hardwoods, Exotic Wetland Hardwoods, and Wet Prairie. Other nearby projects involving site construction and filling of wetlands include the KSC VC (18.2 acres [7.3 ha]), Exploration Park North (37.8 acres [15.3 ha]), and SpaceX Roberts Road North Expansion (68.2 acres [27.6 ha]). All project will require an ERP from SJRWMD and a Federal Dredge and Fill 404 Program Permit from USACE. These permits require mitigation compensation for unavoidable wetland loss. Additionally, parcels such as SCD-VIII and SCD-X are predominately wetlands and will remain undeveloped. To the extent practicable, wetland impacts would be further minimized and avoided during each site design.

Construction of the Proposed Action would result in the loss of approximately 361 acres (146.1 ha) of upland vegetation communities; however, much of this acreage is low-quality vegetation community dominated by Brazilian pepper and other invasive exotic vegetation, and similar and higher quality upland habitat is available at KSC.

In addition, the Proposed Action and other nearby projects are not expected to impact wide-ranging species such as large mammals since they are currently likely to avoid the areas. Other species that would be displaced due to a loss of habitat would relocate to nearby areas that provide similar habitat.

As a result of the availability of similar habitats for wildlife and the strategy for addressing unavoidable wetland impacts, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on biological resources is considered minor**.

4.4.5 Threatened and Endangered Species

As discussed in Section 3.5.3, **no adverse effects** to threatened and endangered species would occur under the No Action Alternative. Additionally, **negligible adverse impacts** would occur from the construction and operational phases.

Therefore, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on threatened and endangered species is considered negligible**.

4.4.6 Cultural Resources

As discussed in Section 3.6.2, **no adverse effects** would occur from the No Action Alternative. **Negligible adverse effects** would occur during the construction phases, and **no adverse effects** would occur from the operational phases of the Proposed Action.

Therefore, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on cultural resources is considered negligible**.

4.4.7 Noise

As discussed in Section 3.7.2, **no adverse effects** would occur from the No Action Alternative. **Minor adverse effects** from noise from the construction phases and **negligible adverse effects** would occur from the operational phases of the Proposed Action.

The cumulative projects in Table 4-1, when combined with the Proposed Action, would result in a cumulative increase in noise. Typical construction equipment that would be used during the construction phases under the Proposed Action and other nearby construction 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, this equipment would range in noise levels at 50 feet (15.2 m) from its source from 72 to 93 dB (WSDOT 2020). The sound is expected to attenuate below County ordinance requirements before leaving the KSC site boundary. Additionally, all work is expected to be performed during normal business hours, and the BMPs in Table 2-4 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 condition.

Operationally, the Proposed Action would contribute to noise associated with cars, building operations, and people communicating. With the exception of launch-related activities, other projects would result in similar noise levels, which is not expected to result in a significant

cumulative effect. During launches, a short-term increase in the noise level received in the community would occur, similar to other launches.

In conclusion, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on noise is considered minor**.

4.4.8 Water Resources

As discussed in Section 3.8.2, **no adverse effects** to water resources would occur under the No Action Alternative. Construction of the Proposed Action would cause **no impacts** to surface waters because surface waters are not present. The Proposed Action construction would have **minor to moderate adverse effects** to groundwaters and floodplains. Operation of the Proposed Action would have **negligible to minor adverse impacts** to Water Resources.

Future development project would result in effects to water resources. Specific to floodplains, construction at the Proposed Action location has the potential to fill 207 acres (83.3 ha) of floodplains for the construction of new facilities. These floodplains are not portions of a flow-way and result from a high-water table and flooding from the Indian River. Other nearby projects involving site construction and filling of floodplain include the KSC VC (95 acres [38.4 ha]), Exploration Park North (12.4 acres [15.3 ha]), and SpaceX Roberts Road North Expansion. All new facilities constructed would need to provide on-site stormwater treatment and flow attenuation so that they do not increase stages in downstream receiving water bodies in accordance with SJRWMD regulations.

Specific to projects on or near groundwater contamination, if dewatering is required, the contractor will prepare a dewatering plan and submit it to the KSC Remediation Program for review. The KSC Remediation Program will coordinate review by the FDEP Federal Programs Section, if necessary, and obtain their comments and approval before construction.

Stormwater generated from the Proposed Action sites would be treated by the existing stormwater management system in accordance with SJRWMD regulations. Additionally, implementing BMPs listed in Table 2-4 would reduce nonpoint-source pollution, as well as stormwater pollution via pollution prevention. In addition, contractors would be required to obtain an NPDES permit for water discharges from construction activities.

In conclusion, the **overall cumulative effect when combined with other past, present, and reasonably foreseeable future actions on water resources is considered negligible to minor to groundwaters and floodplains.**

4.4.9 Socioeconomics

As discussed in Section 3.9.2, **minor to moderate adverse effects** would occur from the No Action Alternative. Construction of the Proposed Action would have **minor to moderate beneficial effects** to socioeconomics, and operation of the Proposed action would have **minor beneficial effects**.

The cumulative projects in Table 4-1, when combined with the Proposed Action, would result in beneficial impacts. Short-term beneficial cumulative effects from the Proposed Action and other similar efforts would occur during construction activities. Although an increase in construction spending resulting from a 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. Furthermore, construction spending and additional taxes would accrue to federal, state, and local governments as a result of the increased construction activities; however, these would be minor and temporary.

Long-term beneficial cumulative effects are associated with the increase in visitors and employees. In 2023, the workforce included 26,693 jobs (11,144 total KSC jobs and 15,499 additional Florida jobs) which generated $1.84 billion in labor income and $9.36 billion in economic output in the State of Florida (NASA 2023g). Every 10 jobs at KSC results in the creation of approximately 13.9 jobs in Florida (NASA 2023g). In addition, the 1,651,470 visitors to the KSC VC includes 1,301,385 out-of-state visitors who spent $123,718,720 (NASA 2023g).

The beneficial cumulative effects associated with the Proposed Action and other past, present, and future actions would not be considered significant given the current value that KSC has on the Florida economy.

In conclusion, the **beneficial socioeconomic effect from other past, present, and reasonably foreseeable future actions when considered incrementally with the Proposed Action would not be significant.**

5.0 PREPARERS, CONTRIBUTORS, AND CONTACTS

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.

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APPENDIX A

WASTEWATER DEMAND CALCULATIONS

Space Florida Wastewater Feasibility Study Wastewater Flow Projections for Space Commerce District (Space Florida 2022)

Facility	Maximum Expected Square Footage Total	Square Footage - By Building Type	Density (occ/sf)	Occupant Count	WW Flow per Capita (GPD/Capita)	Total Domestic Flow (GPD)	Commercial Flow per Building SF (GPD/SF)	Total Commercial Flow (GPD)	Total ADF Per Facility (GPD)	Financial Analysis Time Frame	Peaking Factor[1]	Peak Flow Per Facility (GPM)
SLSL Expansion	60,000	40,000	1/500	80	15	1200	0.017	700	1,900	2027-2041	3	4
		20,000	1/300	67	15	1000	0	0	1,000	2027-2041	3	2
Blue Origin (Future Development)	1,402,560	-	-	613	15	9200	0.017	23800	33,000	2027-2041	3	69
Firefly Mfg. Initial	180,000	-	-	230	15	3500	0.017	3100	6,600	2024-2026	3	14
Firefly Manu. Expansion	180,000	-	-	100	15	2000	0.017	3100	5,100	2027-2041	3	11
SCD-I (east of MARS substation)	250,000 (From Space Commerce District ADP)	50,000	1/300	167	15	2500	0	0	2,500	2027-2041	3	5
		200,000	1/1000	200	15	3000	0	0	3,000	2027-2041	3	6
SCD-III (NW of SCW/KP intersection)	250,000 (From Space Commerce District ADP)	250,000	1/250	1000	15	15000	0	0	15,000	2027-2041	3	31
SCD-IV (SW of SCW/KP intersection)	400,000 (From Space Commerce District ADP)	250,000	1/250	1000	15	15000	0	0	15,000	2027-2041	3	31
		150,000	1/300	500	15	7500	0.017	2600	10,100	2027-2041	3	21
SCD-V	150,000 (From Space Commerce District ADP)	100,000	1/300	333	15	5000	0.017	1700	6,700	2027-2041	3	14
SCD-VI (East of KSCVC Driveway)	150,000 (From Space Commerce District ADP)	80,000	1/250	320	15	4800	0	0	4,800	N/A	3	10
		70,000	1/350	200	100	20000	0	0	20,000	N/A	3	42
SCD-VIII (East of SCW/NASA Pkwy Intersection)		5,000	1/250	20	15	300	0	0	300	N/A	3	1
SCD-XI (West of SCD-IV)	110,000 (From Space Commerce District ADP)	110,000	1/300	367	15	5500	0.017	1900	7,400	N/A	3	15
SCD-XII (South of SCD-V)	330,000 (From Space Commerce District ADP)	65,000	1/500	130	15	2000	0	0	2,000	N/A	3	4
		150,000	1/300	500	15	7500	0	0	7,500	N/A	3	16
		35,000	1/350	100	100	10000	0	0	10,000	N/A	3	21
		80,000	1/300	267	15	4000	0.017	1400	5,400	N/A	3	11
SCD-XIII (South of South Solar Area)	50,000 (From Space Commerce District ADP)	50,000	1/250	200	15	3000	0	0	3,000	N/A	3	6
SCD-XIV (South of Kennedy Pkwy)	250,000 (From Space Commerce District ADP)	250,000	1/1000	250	100	25000	0	0	25,000	N/A	3	52
								TOTALS=	**185,300**			**386**

1 - City of Cocoa Wastewater Standards.

Color	Building Type	Density By Type	GPD/Person
	High Bay	1/500	15
	Office Commercial	1/300	15
	High Tech	1/300	15
	Industrial Warehouse	1/1000	15
	Hotel Conference	1/350	100
	Commercial Retail	1/250	15