

**ENVIRONMENTAL ASSESSMENT
FOR
VISITORS CENTER ACCESS ROAD
JOHN F. KENNEDY SPACE CENTER, FLORIDA**

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN F. KENNEDY SPACE CENTER
NASA ENVIRONMENTAL
KENNEDY SPACE CENTER, FL 32899**

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ENVIRONMENTAL ASSESSMENT FOR VISITORS CENTER ACCESS ROAD JOHN F. KENNEDY SPACE CENTER, FLORIDA

Abstract

This Environmental Assessment (EA) addresses the Proposed Action to construct a new four-lane road that will access the Kennedy Space Center (KSC) Visitors Center from Space Commerce Way. Under the Proposed Action, the new four-lane road would be aligned north-south and enter the southwest corner of the existing Visitors Center parking lot. One alternative action – Alternative Action – and the No Action alternative were also evaluated to determine the extent of potential impacts on the environment at KSC. Under the Alternative Action, the four-lane road would start at Space Commerce Way and terminate at the southeast corner of the existing Visitors Center parking lot. The No Action alternative would involve not constructing the four-lane road. Environmental impacts from the Proposed Action and Alternative Action were classified as **negligible** or **minor**. **Minor environmental impacts will occur to the following categories: Transportation, Air Quality, Vegetation, Wildlife, Noise, Floodplains, and Socioeconomics.** The Alternative Action was not selected because it does not work with traffic circulation in the future parking plaza design and is significantly more expensive than a north-south road corridor. Mitigation is proposed for the Proposed Action and Alternative Action to compensate for the **minor** impacts to wetlands. Design and permitting of the Proposed Action are proposed for completion by March 2018 with construction completion by November 2018.

LEAD AGENCY: National Aeronautics and Space Administration
John F. Kennedy Space Center
Environmental Program Office
Kennedy Space Center, FL 32899

POINT OF CONTACT: Don Dankert
Environmental Planning
Mail Code S1-E3
Kennedy Space Center, FL 32899
(321) 861-1196
donald.j.dankert@nasa.gov

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List of Abbreviations and Acronyms

AST	Aboveground Storage Tank
BMPs	Best Management Practices
CCAFS	Cape Canaveral Air Force Station
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dBA	A-Weighted Decibels
DNC	Delaware North Companies Parks & Resorts at KSC, Inc.
EA	Environmental Assessment
EO	Executive Order
EPA	US Environmental Protection Agency
ERP	Environmental Resource Permit
FL	Functional Loss
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FPL	Florida Power & Light Company
ha	hectare
IRL	Indian River Lagoon
KSC	Kennedy Space Center
kV	Kilovolts
LC	Launch Complex
MINWR	Merritt Island National Wildlife Refuge
NASA	National Aeronautics and Space Administration
NAVD 88	North American Vertical Datum 1988
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OFW	Outstanding Florida Water
OSHA	Occupational Safety and Health Administration
PAMS	Permanent Air Monitoring System
REC	Record of Environmental Consideration
SJRWMD	St. Johns River Water Management District

List of Abbreviations and Acronyms

UMAM	Uniform Mitigation Assessment Methodology
USACE	US Army Corps of Engineers
USGS	US Geological Survey
USFWS	US Fish and Wildlife Service
VAB	Vehicle Assembly Building
TIS	Traffic Impact Study
ZAP	Zone of Archaeological Potential

EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC §§ 4321-4370d) and according to the Procedures of Implementation of NEPA for the National Aeronautics and Space Administration (NASA) (Title 14, Code of Federal Regulations, part 1216 subparts 1216.1 and 1216.3), the Council on Environmental Quality (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500 to 1508),; and Federal Aviation Administration Order 1050.1E, Environmental Impacts: Policies and Procedures. DNC Parks & Resorts at KSC, Inc. (DNC) operates the Kennedy Space Center (KSC) Visitors Center located just outside the controlled-access portion of KSC in Brevard County, Florida. Historically, visitors accessed the Visitors Center from the west via NASA Parkway. Space Commerce Way, which was completed in 2003, provides a link between NASA Parkway and Kennedy Parkway around and outside the controlled-access KSC security gates. Space Commerce Way provides the public (visitors) with an improved route to the Visitors Center from the south via Kennedy Parkway to Space Commerce Way to NASA Parkway. In 2004, a preliminary design was completed that proposed a new access roadway into the Visitors Center from Space Commerce Way. This new access point was to be the main and primary access point for visitor access to the Visitors Center, with the original access point off NASA Parkway being reserved for tour buses, deliveries, emergency vehicles, and official business and as an auxiliary visitor ingress/egress point when necessary. See Figure 1.0 – Existing Roadway Access. The new access road was designed but not constructed. In 2016, DNC resumed the new access road project. The reasons for resuming the project were increased traffic congestion and associated safety and security concerns on NASA Parkway and Kennedy Parkway approaching and leaving the Visitors Center, particularly on launch days, and projected increases in visitation. A Traffic Impact Study (TIS) was completed in September 2017 to evaluate and quantify the existing traffic conditions along Space Commerce Way from NASA Parkway to Kennedy Parkway, and proposed traffic conditions created by the new intersection, accounting for growth to 2035 (Lassiter Transportation Group, 2017). The TIS provided recommendations for the configuration of the intersection to optimize traffic movements. The TIS demonstrates that the new intersection on Space Commerce Way can accommodate current and future traffic conditions.

This EA addresses the Proposed Action, Alternative Action, and No Action alternative to construct a four-lane road that provides improved, direct access to the Visitors Center via Space Commerce Way and to determine the extent of impacts on the environment at KSC. The Proposed Action consists of a new access road that runs north-south from Space Commerce Way and ties into the southwest corner of the existing Visitors Center parking lot. The Alternative Action involves constructing the four-lane road from Space Commerce Way to the southeast corner of the existing Visitors Center parking lot. The No Action alternative would involve not constructing the roadway to enhance vehicular access to the Visitors Center. The Alternative Action was not selected because it does not work with traffic circulation in the future parking plaza design and is significantly more expensive than a north-south road corridor.

Executive Summary

The Proposed and Alternative Actions will require permits from the St. Johns River Water Management District (SJRWMD) and the US Army Corps of Engineers (USACE).

This document describes those portions of the KSC environment that relate to each of the proposed alternatives. Potential impact issues identified are transportation, utilities, air quality, biological resources including land use, threatened and endangered wildlife species, cultural resources, geology and soils, noise, surface water quality, groundwater quality, and socioeconomics.

Impacts resulting from implementing the alternatives were identified then classified into one of the following pre-determined categories: **Negligible**, **Minor**, or **Major**.

Impacts from construction and operation at the Proposed and Alternative Action sites vary from **negligible** to **minor** depending on the environmental issues evaluated. The results of the assessment of environmental issues from constructing the Proposed Action indicate that there will be overall **minor** impacts on vegetation due to the small acreage of wetland and jurisdictional surface water impacts proposed. A wetland mitigation plan to offset primary and secondary wetland impacts as a result of the construction of the Proposed Action or Alternative Action will be prepared in accordance with state and federal agency regulations.

Impacts from the No Action Alternative are expected to have **negligible** impacts on various categories with the exception of Transportation. **Minor** to **major** impacts to Transportation are expected if the No Action Alternative were selected. Table 4.1 of this document summarizes the results of the analyses, showing the impacts on each environmental issue for each proposed action.

Based on current information available, there will be **negligible** to **minor** impacts on transportation, utilities, air quality, wildlife, biodiversity, threatened and endangered wildlife species, cultural resources, geology, noise, surface water quality, groundwater quality, or socioeconomics for the Proposed Action. Therefore, no monitoring strategies are provided or recommended for these resource areas.

The No-Action alternative, Proposed Action, and Alternative Actions are not expected to produce any consequences related to Environmental Justice, since all activities are located away from population centers. The Proposed Action is not expected to affect the surrounding communities any differently than the current programs at KSC.

Design and permitting of the Proposed Action are proposed for completion by March 2018 with construction completion by November 2018.

1.0 Purpose and Need for Action

As a federal agency, NASA is required to consider environmental consequences resulting from its actions on any property. This is based on several regulatory mandates including the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321, et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500-1508), Procedures for Implementing NEPA (14 CFR part 1216 subpart 1216.3), and NASA policy and procedures (NASA NPR 8580.1 – Implementing the National Environmental Policy Act). Since NASA is considering a plan to construct a new four-lane road that will connect the Kennedy Space Center (KSC) Visitors Center parking lot to Space Commerce Way, this Environmental Assessment (EA) is necessary to support NASA’s compliance with NEPA and related federal and state environmental regulations.

As the landowner, NASA KSC is responsible for its real property assets and infrastructure in support of the Agency mission of human spaceflight and continued exploration of space. NASA is also responsible for managing other areas on KSC for space-related industry development and operations. KSC provides oversight for current commercial space and technology development-related uses and will be responsible for establishing and coordinating activities outlined in the Proposed Action. NASA is the lead agency for the Proposed Action and is responsible for ensuring overall compliance with applicable environmental statutes, including NEPA.

Currently, there is only a single ingress/egress point on the north side of the facility along NASA Causeway to the Visitors Center that must accommodate guests including personal vehicles, recreational vehicles, and buses, along with official business including employees, service equipment, emergency vehicles, and Visitors Center tour buses. According to Joe Hargis, Director of Protective Services at KSC Visitor Center, “traffic gets backed up west on State Road 405 and it interferes with buses returning guests from Apollo Saturn Viewing Center. More importantly, it hinders emergency response times for fire-rescue operations. There have been multiple incidents with guest injuries/illness that did not receive a proper response time due to traffic congestion. DNC does not have specific incident reports available for these occurrences but confirmed the issues are significant and frequent.” Mr. Hargis also indicated that a new road is needed to provide another ingress/egress point in case of emergency evacuation (Hargis, J., Personal communication 2017). In addition, according to Richard Hewitt, Special Agent with Kennedy Protective Services, “the new road is needed to offer a smooth flow of traffic during launch and high volume days (holidays). These high volume traffic situations also block the KSC entrance gate” (Hewitt, R., Personal communication 2017).

The Visitors Center receives over 1.6 million visitors annually, which is expected to significantly increase in addition to growth associated with the new Blue Origin Manufacturing Facility, Exploration Park Phase I, and KSC. As a result, a second ingress/egress is needed to mitigate these issues by separating official and emergency use (existing north entrance) from public/visitor access (proposed south entrance) and was supported by the Lassiter Transportation Group’s September 2017 Traffic Impact Study (TIS) (2017, Appendix 1).

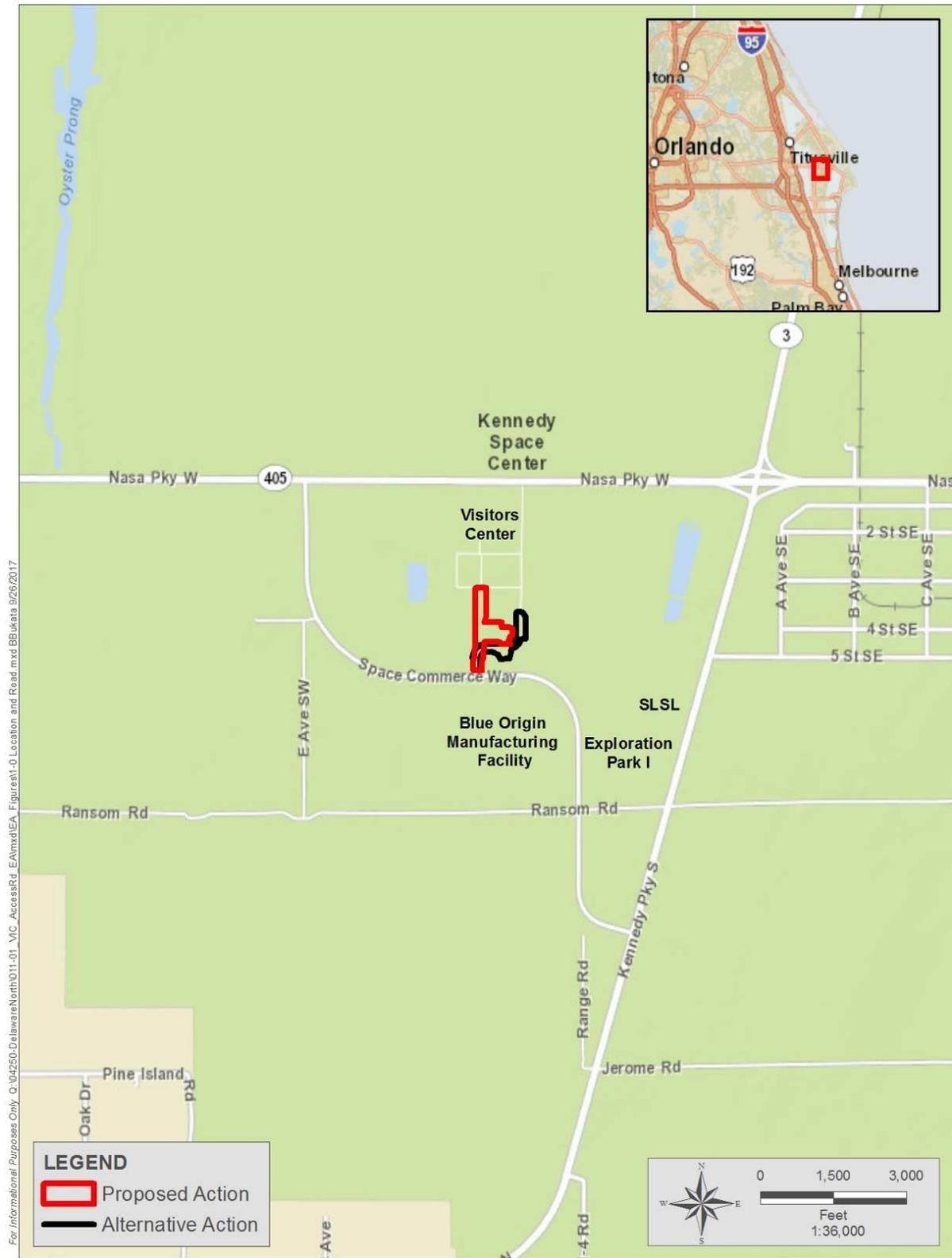
The purpose of the Proposed Action is to construct new turn lanes off Space Commerce Way that include a signalized intersection and a new four-lane access road between Space Commerce Way

Chapter 1 Purpose and Need for Action

and the Visitors Center parking area (Figure 1.0). An Environmental Assessment was completed for Space Commerce Way in 2002 (NASA, 2002). The need for the Proposed Action is to provide a new primary public (visitor) access ingress/egress, separating visitor traffic from official and emergency access to improve public safety and security, reduce interference with tour bus operation, improve guest experience, reduce traffic delays during peak seasons and rocket launches, and accommodate future growth.

The Proposed Action will have negligible impact on NASA Parkway west of Space Commerce Way, though it allows for a reduction in eastbound traffic backups during peak periods since the Visitors Center can divert a portion of the visitor traffic to the existing north entrance, in addition to the primary use of the new south entrance, if needed. The project will significantly reduce congestion at the Visitors Center entrance roadway and allow for appropriate emergency response times. The new south entrance and roadway will provide visitors with a dedicated entrance off Space Commerce Way, and NASA Parkway east of Space Commerce Way will see a substantial benefit with the reduction of visitor traffic. The new Visitor Centers intersection on Space Commerce Way, based on the recent TIS, will include dual turn eastbound left lanes, a dedicated westbound right turn lane, and dual southbound right turn lanes to allow the intersection to operate at an acceptable level of service to affected stakeholders and users. The new intersection will operate independently of the Exploration Park intersection with Space Commerce Way, thus not comingling Visitors Center traffic with Exploration Park employee traffic, and should also reduce the number of travelers that mistakenly try to enter the restricted KSC area at the security gate, thus reducing ingress delays for KSC staff.

Figure 1.0 Site Location Map



For Informational Purposes Only Q:\04250-DelawareNorth\011-01_VIC_AccessRd_EA\mxd\EA_Figures\1-0_Location_and_Road.mxd BBukata 9/26/2017

2.0 Alternative Actions

The following actions were evaluated:

Proposed Action	Construct a four-lane road that commences at Space Commerce Way and terminates at the southwest corner of the existing Visitors Center parking lot.
Alternative Action	Construct a four-lane road that commences at Space Commerce Way and terminates at the southeast corner of the existing Visitors Center parking lot.
No Action	Do not construct a new four-lane road.

In addition, 4th Street SW running from Space Commerce Way to the Visitor's Center parking lot was considered. However, this alternative would have been approximately triple the length and subsequent cost of the Proposed Action. As a result, it was not evaluated in this EA.

The road corridor will be approximately 45.5 to 54.5 meters (150 to 180 feet) wide and contain the necessary stormwater treatment system (swales and ponds) and a multi-use utility easement. A conceptual road corridor layout has been provided; however, the exact locations and dimensions will not be known until the design phase.

The Proposed Action was selected after considering the cost, schedule, and construction and operational impacts of the alternatives. Additionally the No-Action Alternative was considered in the analysis that follows.

The Proposed and Alternative Actions will require the following permits:

- An Environmental Resource Permit (ERP) through the St. Johns River Water Management District (SJRWMD) for the Proposed Action or Alternative Action for constructing a new stormwater management system and to authorize wetland impacts and the wetland mitigation plan. A US Army Corps of Engineers (USACE) dredge and fill permit will be required to authorize wetland impacts and the proposed wetland mitigation plan. In addition, a modification to the existing Space Commerce Way ERP may be required for the connection between Space Commerce Way and the new four-lane road.
- A National Pollutant Discharge Elimination System (NPDES) Permit through the Florida Department of Environmental Protection for stormwater discharges from construction activities greater than 5 acres will be required.

Design and permitting of the Proposed Action are proposed for completion by March 2018 with construction completion by November 2018.

2.1 Proposed Action

A critical action completed for any proposed new site development at KSC is for the project proponent to submit KSC Environmental Checklist (KSC Form 21-608v2). This form is reviewed by KSC Environmental Management Branch (SI-E3) staff who then generate a Record of Environmental Consideration (REC) in response to the checklist which is provided to the project proponent. This REC form is provided in Appendix 2.

As previously stated, there is a need at the KSC Visitors Center to separate public access from official and emergency access to improve public safety and security, reduce interference with tour bus operation, improve guest experience, reduce traffic delays during peak seasons and rocket launches, and accommodate future growth. The September 2017 Traffic Impact Study (TIS) analyzed existing and future conditions and supported the need for the new south access to the Visitors Center from Space Commerce Way.

Under the Proposed Action, a new four-lane road, necessary stormwater treatment facilities, and a utility corridor will be constructed. The four-lane road will run approximately north-south and connect Space Commerce Way to the southwest corner of the existing Visitors Center parking lot (Figures 2.0–2.2). The four-lane road will use existing right-of-way for Space Commerce Way. The intersection of the Proposed Action and Space Commerce Way will be signalized and will be designed to accommodate the Blue Origin rocket transporter and turn lanes based on projected traffic flows. A preliminary intersection design is provided in Figure 2.2. An approximately 1.5-acre area east of the proposed stormwater treatment pond was included as a potential wetland mitigation site.

2.2 Alternative Action

Under the Alternative Action, a new four-lane road, necessary stormwater treatment facilities, and a utility corridor will be constructed. The four-lane road will connect Space Commerce Way and run north, then east, then north again in an S-shape to the southeast corner of the existing Visitor Center parking lot (Figure 2.3). The Alternative Action intersection would be the same as the Proposed Action (Figure 2.2)

2.3 No Action Alternative

The No Action alternative would involve not constructing the four-lane road. This will result in continued high and increased traffic congestion, reduced traffic efficiency, and decreased security and public safety. Therefore, this alternative is not considered viable for meeting NASA security and safety requirements and the Visitors Center's Access Road project purpose and need.

Figure 2.0 Proposed Action – Site Location Map

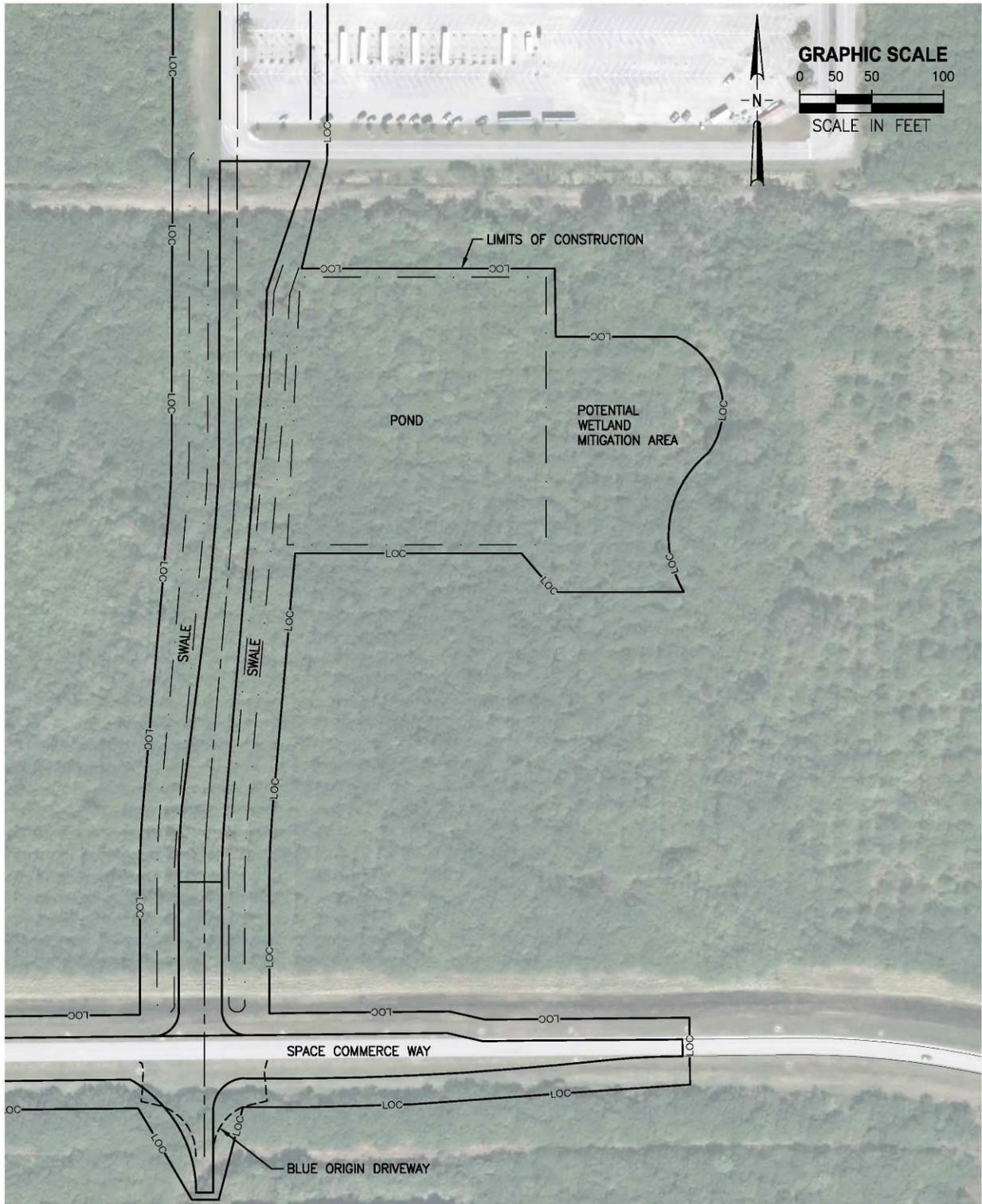


Figure 2.1 Conceptual Proposed or Alternative Action Access Road Cross Section

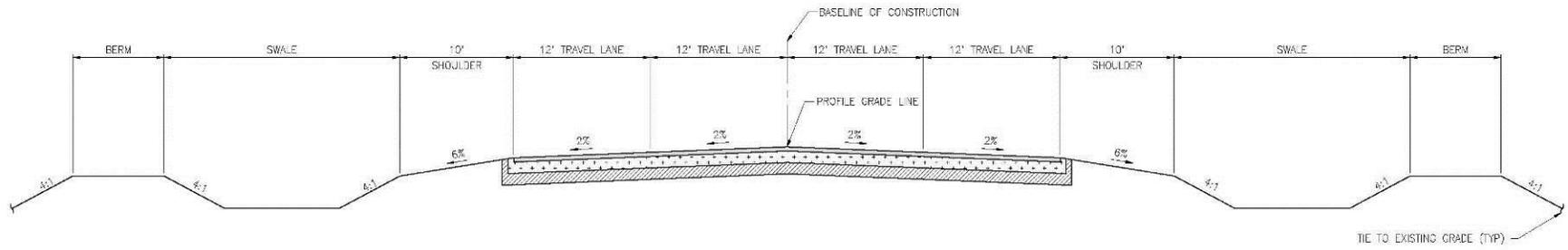


Figure 2.2 KSC Visitor Center Access Road Conceptual Intersection Layout With Space Commerce Way

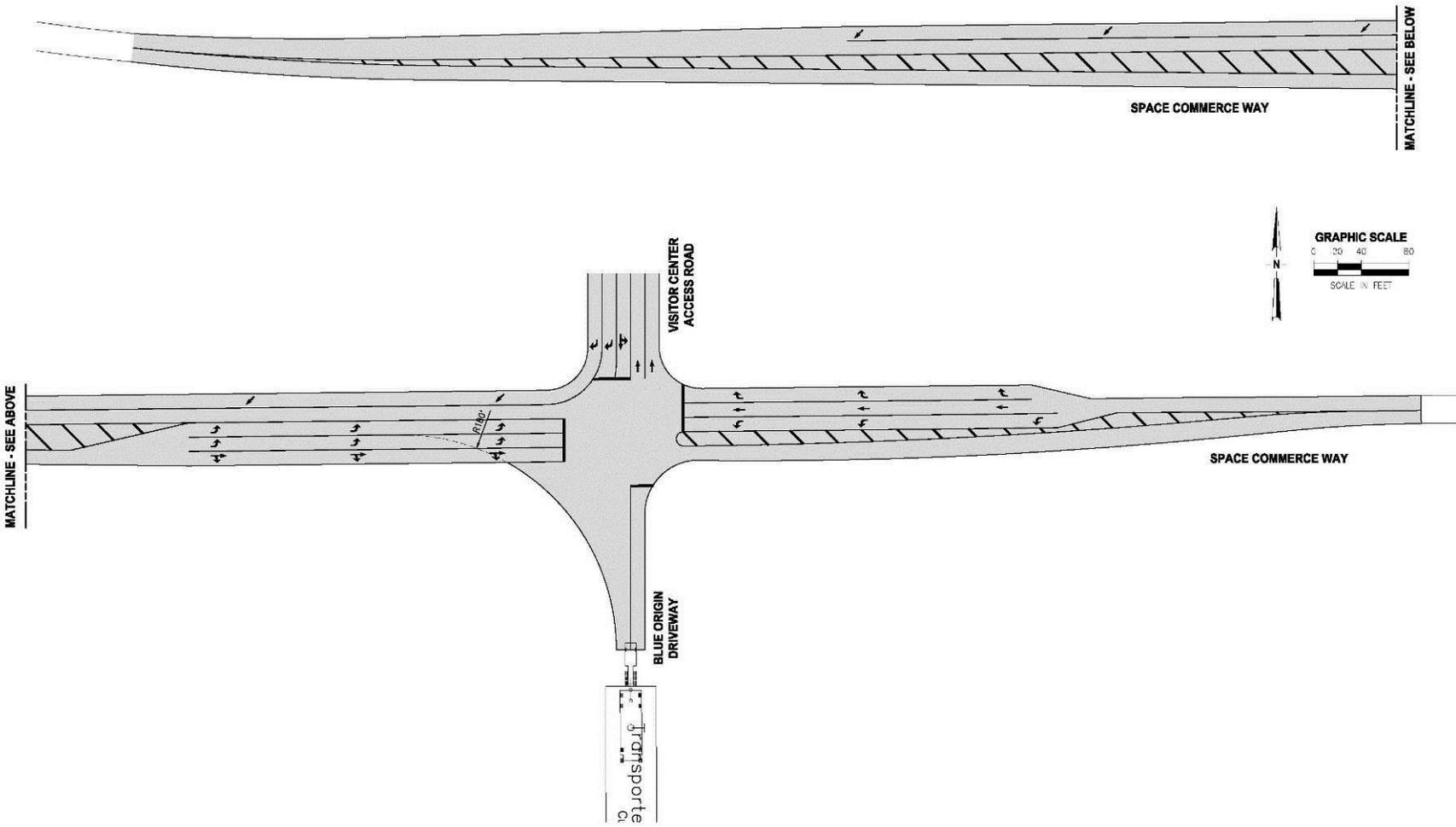
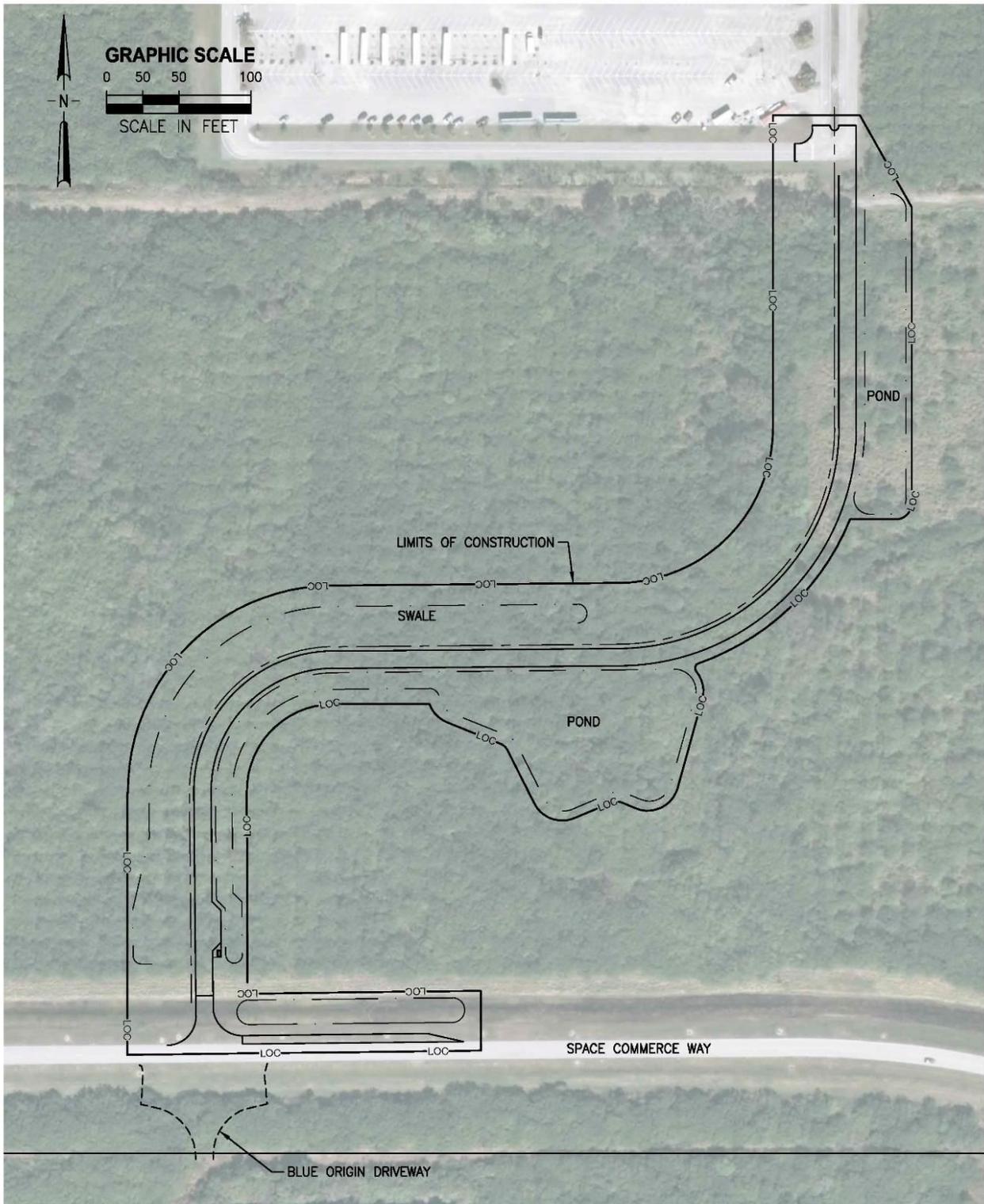


Figure 2.3 Alternative Action – Site Location Map



3.0 Affected Environments

KSC encompasses nearly 56,000 hectares (ha) (140,000 acres) on the east coast of Central Florida. It is bordered on the west by the Indian River Lagoon (IRL), on the south by the Banana River Lagoon, on the north by US 1 and several private landowners in Volusia County, and on the east by the Atlantic Ocean. KSC is the primary launch and landing site for NASA's space mission operations. In addition to supporting the nation's space mission operations, KSC contains within its boundaries the Merritt Island National Wildlife Refuge (MINWR) and the Canaveral National Seashore, which are managed by the US Fish and Wildlife Service (USFWS) and the National Park Service, respectively. This unique relationship between space flight and preservation of the environment is carefully managed to ensure that both objectives are pursued with minimal conflict to one another.

This section describes the existing conditions of the environment and resources that could be affected by the Proposed or Alternative Actions.

3.1 Facilities and Infrastructure

The Proposed Action and Alternative Action will include the design of a berm at the edge of the road right-of-way to serve as a multi-use utility corridor for planned power and potentially other future utilities should they become necessary. This utility corridor will run from the Visitors Center parking lot south to Space Commerce Way and east along the north edge of Space Commerce Way and tie into existing utilities at the entrance to Exploration Park Phase I. Electrical power supply is the only utility identified at this time to be installed in the utility corridor, serving the new roadway lighting, signalization, a new proposed parking ticket plaza, and bus charging stations. Any new utility connections along Space Commerce Way or at Exploration Park will be coordinated with appropriate stakeholders including NASA, Space Florida, Florida Power & Light (FPL), and tenants impacted by such connections.

3.1.1 Transportation

KSC is served by over 340 kilometers (211 miles) of roadways with over 263 kilometers (163 miles) of paved roads and 77 kilometers (48 miles) of unpaved roads. KSC also has approximately 64 kilometers (40 miles) of railroad. Of the four access roads onto KSC, NASA Parkway West serves as the primary access road for cargo, tourists, and personnel entering and leaving. This four-lane road originates in Titusville as State Road 405 and crosses the IRL onto KSC. After passing through the KSC Industrial Area, the road reduces to two lanes, crosses over the Banana River, and enters the Cape Canaveral Air Force Station (CCAFS). The second point of entry onto KSC is from the south via Kennedy Parkway South, which originates on north Merritt Island as State Road 3 (Kennedy Parkway). This road is the major north-south artery for KSC. The third entry point is accessible from Titusville along Beach Road, which intersects Kennedy Parkway North. The fourth entry point is south of Oak Hill at the intersection of US Highway 1 and Kennedy Parkway North in Volusia County (Figure 3.0).

Figure 3.0 Transportation Map



The only current access point for the Visitors Center is via NASA Parkway, adjacent and west of the Pass & ID building (KSC badging office). The Proposed and Alternative Actions will construct a four-lane road from Space Commerce Way north to the existing Visitors Center parking lot number 7 and will reduce impacts to existing transportation infrastructure. This is evaluated and presented in the TIS prepared by Lassiter Transportation Group, Inc. in September 2017 (Appendix 1).

3.1.2 Wastewater Treatment

Approximately 80 percent of the sanitary sewer service at KSC is provided by two collection/transmission systems – one in the Industrial Area and one in the VAB Area. These systems collect and transport raw wastewater to the Regional Plant at CCAFS. A number of septic tank systems are also present throughout KSC that support small offices or temporary buildings (NASA, 2015a).

For the Proposed Action and Alternative Action, a new wastewater line is not required or proposed to be installed in the multi-use utility corridor at this time. However, the berm that will serve as the multi-use utility corridor has been sized to accommodate a wastewater main if one is needed in the future.

3.1.3 Power

The electric power distribution system at KSC is provided by FPL, which transmits 115 kilovolts (kV) to KSC that are distributed to two major substations: the C-5 substation, which serves the LC-39 Area providing 13.8 kV; and the Orsino substation, which serves the Industrial Area providing 13.2 kV. From 2001 through 2006, electricity use on KSC ranged between 270,000 and 293,000 megawatt-hours. Electricity consistently provides 91 percent of KSC's total energy (NASA, 2015a). The high-voltage power is distributed from the substations by over 434 kilometers (270 miles) of overhead and underground power lines to transformers and substations at various facilities. In late 2016, FPL installed a new substation along Space Commerce Way for the express purpose of serving private clients along this route and outside the KSC distribution system.

For the Proposed Action and Alternative Action, the only utility currently planned for design and construction is power to serve a new parking-ticket booth plaza, tour bus charging, street lighting, and signalization. Connection points for the new power service will be determined during design, though are expected to come directly from the Mars substation or a unit substation at Exploration Park, and will be routed within the existing Space Commerce Way right-of-way corridor. The new utility corridor will be sized to accommodate a future power duct bank for potential new facilities within the existing developed areas of the Visitors Center.

3.1.4 Communications

The KSC communications system provides a variety of services at KSC including the following: (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 the three distribution and switching stations in the Industrial Area (First Switch) and LC-39 Area (Second and Third Switches). These three stations provide service for over 18,500 telephones on KSC (NASA, 2007).

For the Proposed Action and Alternative Action, no underground communications lines are proposed for the new multi-use utility easement. However, the berm that will serve as the multi-use utility corridor has been sized to accommodate communications if they are needed in the future.

3.1.5 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. Water enters KSC along State Road 3 from a 60-centimeter (24-inch) water main and extends north along Kennedy Parkway serving KSC. The average daily demand for water is 3.8 million liters per day (1 million gallons per day). Total storage capacity at KSC is approximately 15 million L (4 million gallons) in 10 aboveground storage tanks (ASTs) (NASA, 2007). LC-39 has a 4-million-L (1-million-gallon) AST and two 950,000-L (250,000-gallon) elevated storage tank/water towers. Another water tower is also located in the KSC Industrial Area. Fire-suppression system booster-pump stations and a potable water system emergency pump station are located within the utility annex in the LC39 Area and receive its supply from the LC-39 Area AST.

For the Proposed Action and Alternative Action, new water mains are not required or proposed to be installed in the multi-use utility corridor. However, the berm that will serve as the multi-use utility corridor has been sized to accommodate a potable water main if it is needed in the future.

3.2 Air Quality

The ambient air quality at KSC is predominantly influenced by daily operations such as vehicle traffic, utilities fuel combustion, and standard refurbishment and maintenance operations. Air quality is also influenced to some extent by emission sources outside of KSC, primarily two regional power plants within an 18.5-kilometer (10-mile) radius of KSC. In addition to these sources, other operations occurring infrequently throughout the year play a role in the quality of air at KSC. These include space launches and prescribed fire management practices that influence air quality as episodic events.

KSC is within an area classified as "in attainment" with respect to the National Ambient Air-Quality Standards established by the US Environmental Protection Agency (EPA) for all criteria pollutants (NASA, 2015a).

3.3 Biological Resources

NASA-KSC covers approximately 56,600 ha (140,000 acres), of which 91 percent remains undeveloped area including uplands, wetlands, mosquito-control impoundments, and open water

areas. Undeveloped areas, including abandoned citrus groves, are managed by USFWS MINWR. Due to its restricted access and lack of development, extensive areas of NASA-KSC serve as important wildlife habitat.

3.3.1 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. 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.

Vegetation near the proposed Visitors Center Access Road can generally be categorized into upland, wetland, and open water communities. The area consists of abandoned citrus groves that are now dominated by Brazilian Pepper (*Schinus terebinthifolius*) and Guinea grass (*Megathyrus maximus*).

The on-site vegetative assemblages documented at the Proposed Action and Alternative Action site locations were categorized according to the Florida Land Use, Cover and Forms Classification System (FLUCFCS) developed by the Florida Department of Transportation. Vegetation within the Proposed and Alternative Actions consists of one distinct upland vegetative community type, one distinct wetland community type, and one distinct open water community.

3.3.1.1 Uplands

Approximately 36,206 ha (89,470 acres) of uplands are on KSC; these uplands are composed of several vegetation communities. Upland communities on KSC are found on well-drained, acidic, sandy soils that experience brief periods of standing water. Scrub and pine flat woods 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*).

The Proposed Action site consists of approximately 3.8 ha (9.5 acres) of vegetated uplands that are classified as Brazilian pepper (FLUCFCS Code 4220). These uplands are dominated by Brazilian pepper and guinea grass. Other species include sabal palm (*Sabal palmetto*), wax myrtle (*Myrica cerifera*), wild coffee (*Psychotria nervosa*), wild gooseberry (*Physalis angulata*), and barnyard grass (*Echinochloa* sp.). The Proposed Action also contains 0.9 ha (2.3 acres) of Institutional (FLUCFCS Code 1750) which is the KSC Visitors Center (Figure 3.1).

The Alternative Action site consists of 2.5 ha (6.3 acres) of vegetated uplands also classified as Brazilian pepper (FLUCFCS Code 4220) and dominated by the same species as the Proposed Action alternative site. The Alternative Action also contains 0.08 ha (0.2 acre) of Institutional (FLUCFCS Code 1750), the KSC Visitors Center (Figure 3.2).

3.3.1.2 Wetlands

Approximately 14,642 ha (36,183 acres) of freshwater and saltwater wetlands are found on KSC and include a diversity of types such as mangrove swamps, salt marshes, shrub swamps, freshwater marshes, wet prairies, and cattail marshes (NASA, 2015a). Impounded salt marsh waters are found throughout KSC and are managed by USFWS on MINWR. The wetlands and surrounding waters of KSC support large wintering populations of waterfowl as well as transient and resident wading bird populations.

The Proposed Action site contains approximately 0.04 ha (0.1 ac) of jurisdictional low-quality wetlands classified as Exotic Wetland Hardwoods (FLUCFCS Code 6190) (Figure 3.1). The wetlands are dominated by a dense stand of Brazilian pepper. Native species that occur in these wetlands include cabbage palm (*Sabal palmetto*), red maple (*Acer rubrum*), saltbush (*Baccharis halimifolia*), Carolina willow (*Salix caroliniana*), sedges (*Carex* sp.), canna (*Canna flaccida*), and dayflower (*Commelina diffusa*). These wetlands are considered low quality because of the dominant exotic invasive species and the hydrological altering by the network of ditches and canals that have reduced their hydroperiod.

The Alternative Action site has approximately 0.5 ha (1.2 acres) of wetlands classified as Exotic Wetland Hardwoods (FLUCFCS Code 6190) (Figure 3.2). These wetlands are dominated by the same species found in the wetlands in the Proposed Action alternative site (Table 3.1) and are considered low quality for the same reasons as described above.

Table 3.1 Wetland Acreage in the Proposed and Alternative Action Sites

Site	Site	Wetland ID and FLUCFCS Code	Hectares	Acres	Quality
Proposed Action		Exotic Wetland Hardwoods (6190)	0.04	0.1	Low
		Streams and Waterways (5100)	0.2	0.4	Low
		Total=	0.24	0.5	
Alternative Action		Exotic Wetland Hardwoods (6190)	0.5	1.2	Low
		Streams and Waterways (5100)	0.12	0.3	Low
		Total=	0.62	1.5	

Figure 3.1 Land Use – Proposed Action Site

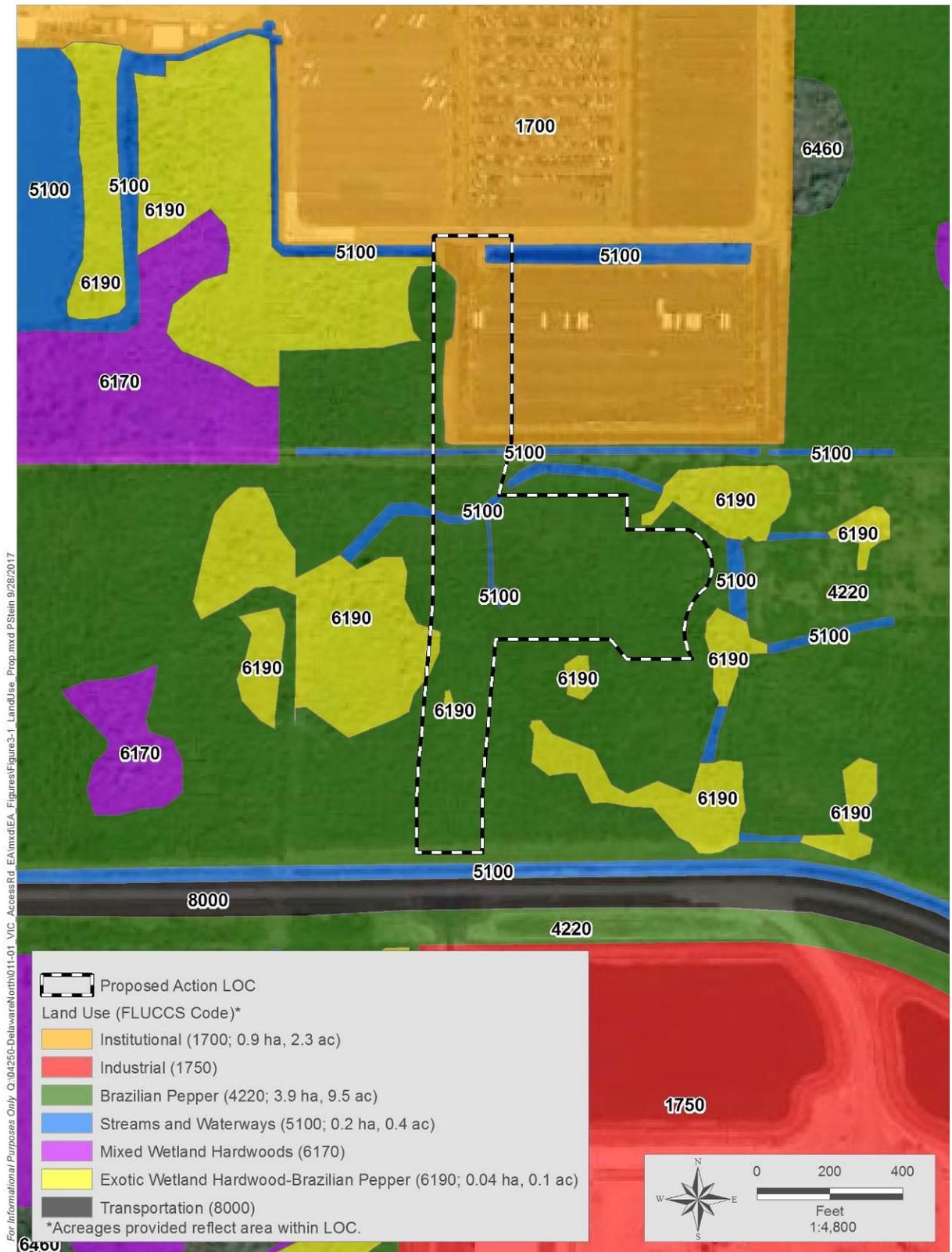
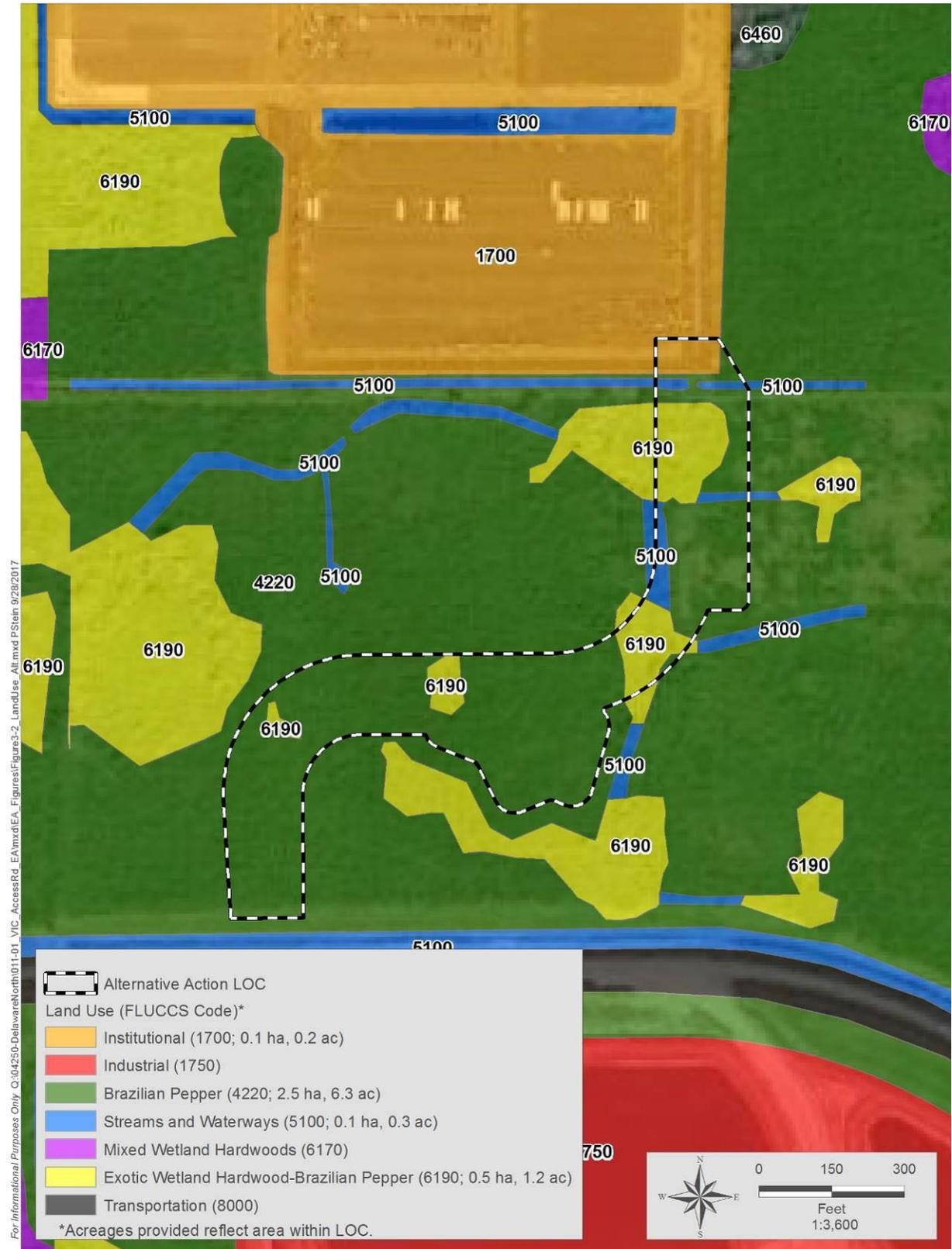


Figure 3.2 Land Use – Alternative Action Site



3.3.1.3 Surface Water

KSC is bordered on the west edge by the IRL. The IRL has been nationally recognized for its quality and species diversity. The IRL is designated as an Outstanding Florida Water (OFW) and an Estuary of National Significance and has been nominated as an Estuary for National Research.

One distinct surface water community, Streams and Waterways (FLUCFCS Code 5100), occurs in the Proposed and Alternative Action sites. Figures 3.1 and 3.2 show the locations of these communities.

Streams and Waterways comprises 0.2 ha (0.4 acres) in the Proposed Action site and 0.12 ha (0.3 acres) in the Alternative Action site and represent man-made ditches or canals that traverse the sites (Figures 3.1 and 3.2). These canals/ditches were used to drain wetlands and other depressional areas when these areas were active citrus groves. This community has herbaceous cover that varies based on the depth of the ditch and the side slope angles. Dominant herbaceous species include Carolina willow, cattail (*Typha* sp.), frog-fruit (*Lippia nodiflora*), pennywort (*Hydrocotyle umbellata*), hornwort (*Ceratophyllum demersum*), bladderwort (*Utricularia* spp.), duckweed (*Lemna* spp.), and water-spangles (*Salvinia minima*).

3.3.2 Wildlife

3.3.2.1 Birds

KSC and the surrounding coastal areas provide habitat for 318 bird species, and MINWR is considered one of the top ten birding destinations in the U.S. 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 2015a). Non-listed bird species that could utilize or be found in the vicinity of the Proposed Action project area include American robin (*Turdus migratorius*), Northern cardinal (*Cardinalis cardinalis*), Carolina wren (*Thryothorus ludovicianus*), Carolina chickadee (*Poecile carolinensis*), tufted titmouse (*Baeolophus bicolor*), grey catbird (*Dumetella carolinensis*), red-shouldered hawk (*Buteo lineatus*), and other common avian species. Cattle egret (*Bubulcus ibis*), great white heron (*Ardea herodias occidentallis*), snowy egret (*Egretta thula*), white ibis (*Eudocimus albus*), glossy ibis (*Eudocimus falcinellus*), great blue heron (*Ardea herodias*), American coot (*Fulica Americana*), and other common waterfowl occasionally forage in or adjacent to the existing roadside stormwater treatment swales that will be filled to connect the Proposed or Alternative Action to Space Commerce Way.

3.3.2.2 Mammals

Thirty 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

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(*Canis rufus*), the bobcat, coyote (*Canis latrans*), and otter now hold the position of top mammalian predators on KSC.

Additionally, 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 cotton rat and eastern cottontail rabbit (*Sylvilagus floridanus*) account for a large portion of the small mammal biomass. At least three species of bats 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 truncatus*) and the West Indian manatee (*Trichechus manatus*).

Typical terrestrial mammalian species that may use the low-quality uplands and wetlands within the Proposed and Alternative Action sites include the raccoon, armadillo, feral hog, eastern cottontail rabbit, hispid cotton rat, and opossum. Due to the low quality of on-site habitats, most mammals would utilize native vegetation communities found off site and likely only be passing through the Proposed and Alternative Action sites on their way to higher-quality habitat. The river otter could potentially utilize the on-site canals as passage to other surface waters and for foraging.

3.3.2.3 Herpetofauna

Fifty species of reptiles and 19 species of amphibians are known to occur at KSC (Seigel et al., 2002). Six of these species are federally protected as Threatened or Endangered. The gopher tortoise, Atlantic salt marsh snake (*Nerodia clarkia taeniata*), eastern indigo snake (*Drymarchon couperi*), and the pine snake (*Pituophis melanoleucus mugitis*) are terrestrial species listed by Florida. The gopher tortoise is the only one of these listed species commonly found on KSC. Additional information regarding the gopher tortoise and federally listed reptilian species is provided in NASA (2015a).

Due to the dense canopy vegetation and shallow water table, the gopher tortoise likely does not inhabit the Proposed or Alternative Action sites. In addition, gopher tortoise and the other listed herpetofauna species, with the exception of the eastern indigo snake, were not observed during pedestrian wildlife surveys or wetland delineations conducted for Exploration Park Phase I EA (NASA, 2008) or the International Space Research Park Environmental Impact Statement (NASA, 2004). These EAs were completed for extensive areas south and southeast of the Proposed Action or Alternative Action project sites. Non-listed herpetofauna that likely inhabit the Proposed and Alternative Action sites include green anole (*Anolis carolinensis*), brown anole (*Anolis sagrei*), barking tree frog (*Hyla gratiosa*), green tree frog (*Hyla cinerea*), and black racer (*Coluber constrictor*).

3.4 Threatened and Endangered Species

3.4.1 Listed Wildlife

Numerous federal and state laws deal directly with the 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 CCAFS provide habitat for more threatened and endangered species than any other federal property in the continental United States (Breininger et al., 1994). Thirty Florida or federally listed wildlife species regularly use the lands or waters of KSC (NASA, 2015). Of the 30 listed wildlife species, 13 are federally listed. Of the 30 Florida or federally listed terrestrial wildlife species, only the eastern indigo snake, gopher tortoise, and American alligator (*Alligator mississippiensis*) could potentially use the land or waters of the Proposed and Alternative Action sites (Table 3.2). The majority of the listed bird species such as the wood stork (*Mycteria americana*) would likely not use the densely vegetated communities since these species require more open foraging areas with standing water. However, several listed wading bird species and the Southeastern American kestrel (*Falco sparverius paulus*) have used or could potentially use the existing stormwater treatment ditches along Space Commerce Way and the adjacent maintained right of way for foraging (Table 3.2). These ditches will be filled to accommodate the Proposed and Alternative Actions. In addition, with regard to the wood stork, the project area does fall within a 15-mile radius from a wood stork nest and therefore is considered core wood stork foraging area (Figure 3.3). The closest bald eagle (*Haliaeetus leucocephalus*) nest is 2.3 miles to the east (Figure 3.4).

Although KSC has one of three remaining core Florida scrub-jay populations across the species range, the closest suitable habitat for this species is 0.6 mile to the southeast (Figure 3.5). Habitat in the Proposed Action and Alternative Action sites is low quality, poorly drained upland and wetland habitat dominated by dense Brazilian pepper. Thus, the Proposed Action or Alternative Action sites are unlikely to provide suitable and sustainable habitat for listed species.

Table 3.2 Wildlife Species Known to Occur on KSC that are Protected Federally and/or by the State of Florida

SCIENTIFIC NAME	COMMON NAME	LEVEL OF PROTECTION	
		STATE	FEDERAL
Amphibians and Reptiles			
<i>Lithobates capito</i>	Florida gopher frog	SSC	
<i>Alligator mississippiensis</i>	American alligator		T(S/A)
<i>Caretta</i>	Loggerhead		T
<i>Chelonia mydas</i>	Atlantic green turtle		E
<i>Dermochelys coriacea</i>	Leatherback sea turtle		E
<i>Gopherus polyphemus</i>	Gopher tortoise	T	C
<i>Drymarchon couperi</i>	Eastern indigo snake		T
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	SSC	
Birds			
<i>Pelecanus occidentalis</i>	Brown pelican	SSC	
<i>Egretta caerulea</i>	Little blue heron	SSC	
<i>Egretta rufescens</i>	Reddish egret	SSC	
<i>Egretta thula</i>	Snowy egret	SSC	

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SCIENTIFIC NAME	COMMON NAME	LEVEL OF PROTECTION	
		STATE	FEDERAL
<i>Egretta tricolor</i>	Tricolored heron	SSC	
<i>Mycteria americana</i>	Wood stork		E
<i>Eudocimus albus</i>	White ibis	SSC	
<i>Ajaia ajaja</i>	Roseate spoonbill	SSC	
<i>Haliaeetus leucocephalus</i>	Bald eagle		P
<i>Falco sparverius paulus</i>	Southeastern American	T	
<i>Aramus guarauna</i>	limpkin	SSC	
<i>Grus canadensis pratensis</i>	Florida sandhill crane	T	
<i>Charadrius melodus</i>	Piping plover		T
<i>Haematopus palliatus</i>	American oystercatcher	SSC	
<i>Calidris canutus rufa</i>	Rufa red knot		T
<i>Sterna antillarum</i>	Least tern	T	
<i>Sterna dougallii</i>	Roseate tern		T
<i>Rynchops niger</i>	Black skimmer	SSC	
<i>Aphelocoma coerulescens</i>	Florida scrub-jay		T
Mammals			
<i>Peromyscus polionotus</i>	Southeastern beach mouse		T
<i>Podomys floridanus</i>	Florida mouse	SSC	
<i>Trichechus manatus</i>	West Indian manatee		E
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; C = under consideration.			

Table 3.3 State of Florida and Federally Listed Species that Could Occur within Habitats at Proposed and Alternative Action Sites

Scientific Name	Common Name
Reptiles	
<i>Alligator mississippiensis</i>	American alligator
<i>Gopherus polyphemus</i>	Gopher tortoise
<i>Drymarchon corais couperi</i>	Eastern indigo snake
Birds	
<i>Antigone canadensis pratensis</i>	Florida sandhill crane
<i>Egretta caerulea</i>	Little blue heron
<i>Egretta rufescens</i>	Reddish egret
<i>Egretta tricolor</i>	Tri-colored heron
<i>Falco sparverius paulus</i>	Southeastern American kestrel
<i>Mycteria americana</i>	Wood stork
<i>Platalea ajaja</i>	Roseate spoonbill

Figure 3.3 Wood Stork Core Foraging Area Map

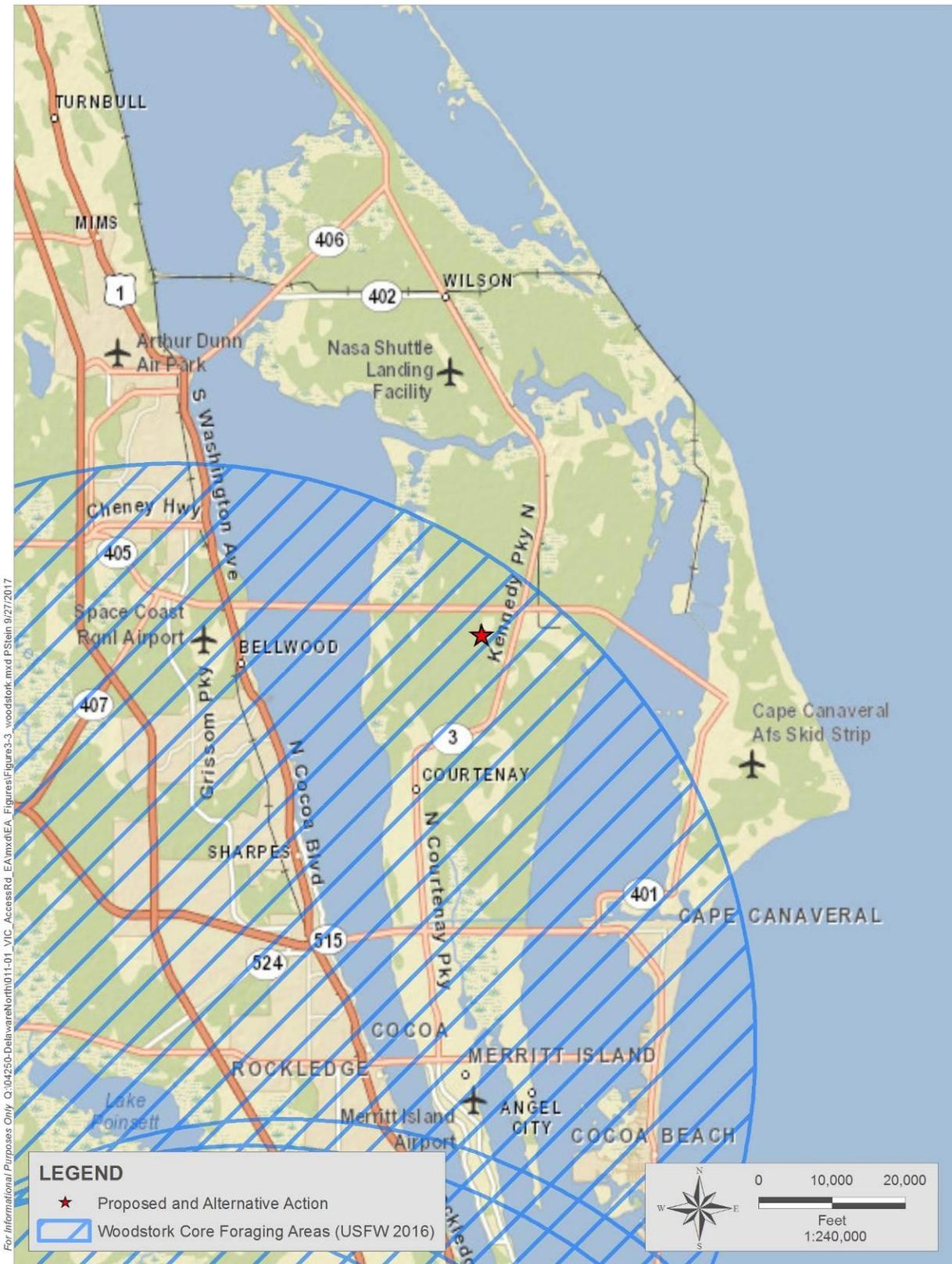


Figure 3.4 Bald Eagle Nesting Location

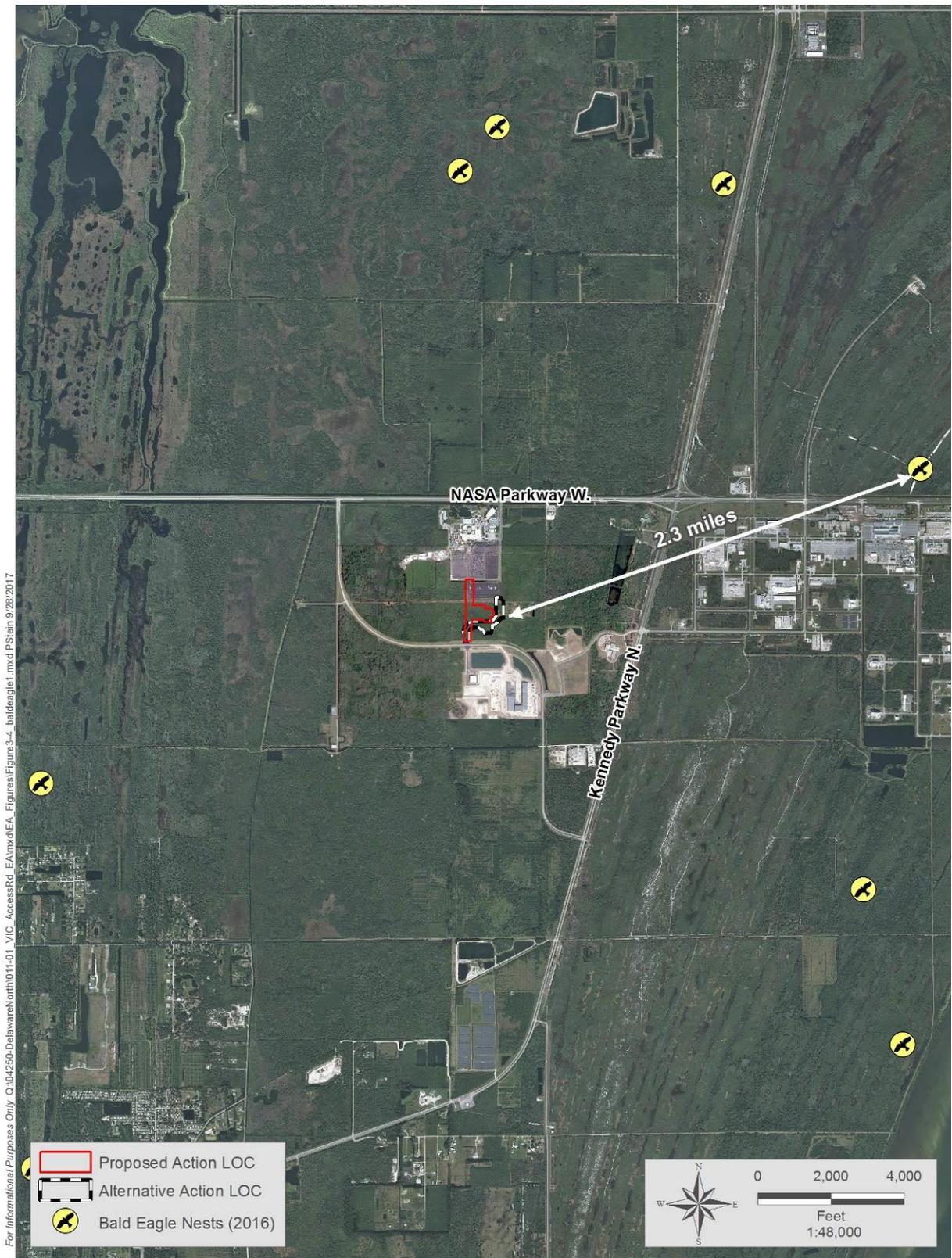
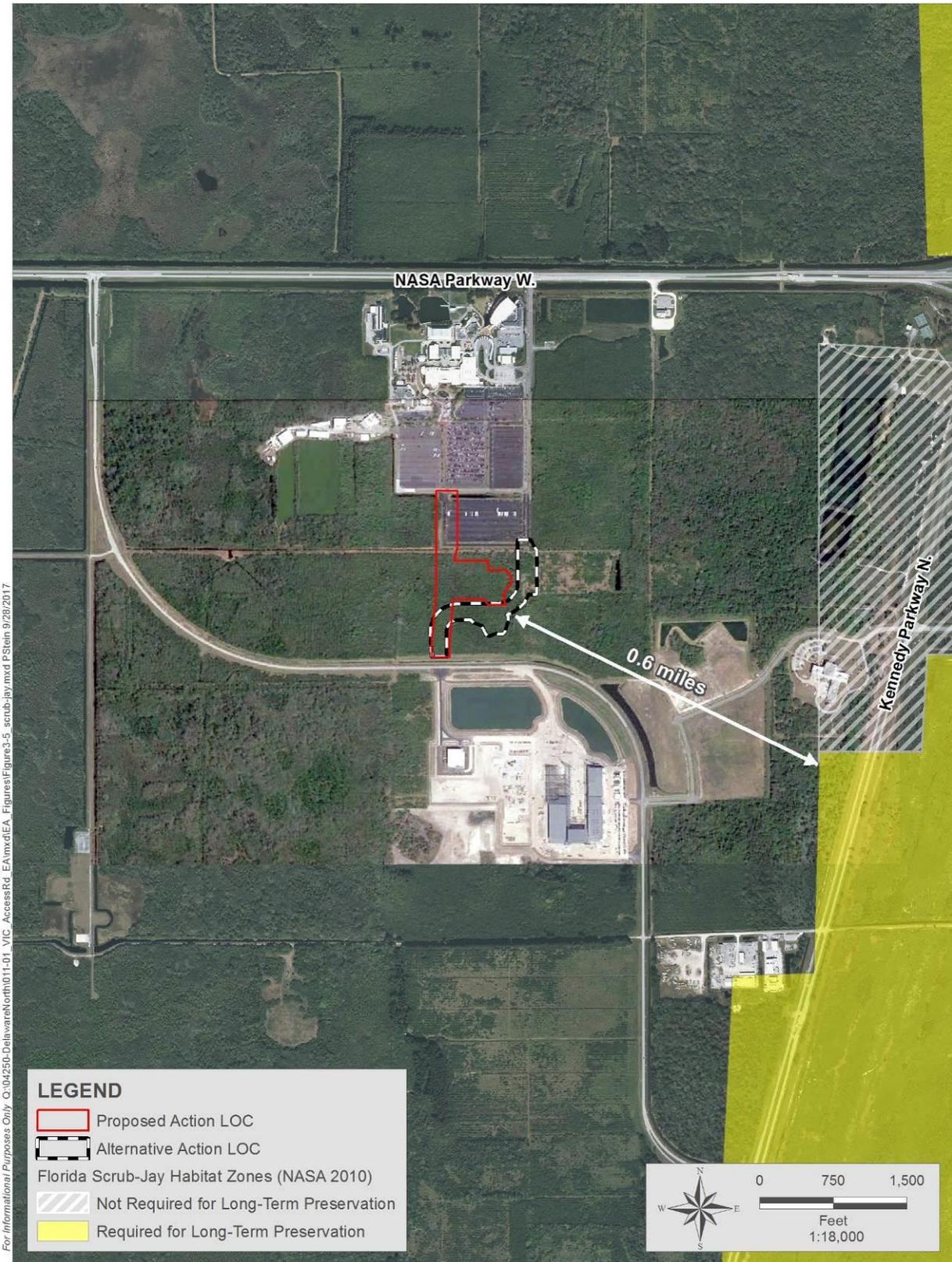


Figure 3.5 Florida Scrub-Jay Habitat



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3.4.2 Listed Plants

Forty plant species occurring 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, 2015a). 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 in the Proposed Action or Alternative Action sites. There are no regulatory implications for the occurrences of listed plant species on the project site. While a formal intensive vegetation survey was not completed, no listed plant species are expected to occur within the Proposed Action or Alternative Action sites due to the following:

- Proposed and Alternative Action sites do not contain or are within several miles of coastal dune habitat.
- Proposed and Alternative Action sites are not expected to have listed plant species because that these areas were converted to and managed as citrus groves for over 40 years.
- Current dominance of exotic invasive plant species.

3.5 Cultural Resources

Sites containing potential archaeological and/or historical resources on KSC are protected under the National Historic Preservation Act and the Archaeological Resources and Protection Act, which require that every federal agency “take into account” how each undertaking could affect historic properties. NASA has executed a Programmatic Agreement among the NASA KSC, Advisory Council on Historic Preservation, and the Florida State Center Cultural Resources Manager regarding management of historic properties at KSC. This agreement outlines roles, responsibilities, and protocols for cultural resources at KSC. NASA has mapped areas proposed for construction in previous studies and has also developed an archaeological site location predictive model to aid NASA personnel when reviewing any siting and/or dig permit activities (ACI, 1992). Areas that have low potential and/or no known archaeological sites within the Area of Potential Effect generally do not require a Phase I or II archaeological survey.

The Proposed and Alternative Action sites are located in an area that was an active citrus grove for over 40 years and within an area that has no known archaeological sites and that is identified as a “Low” Zone of Archaeological Potential, as delineated in ACI’s *Archaeological Survey to Establish Zones of Archaeological Potential (ZAPs) in the Shuttle Landing/KSC South Areas (Option 2) of the Kennedy Space Center* (ACI, 1992). However, remediation or construction activities have contract clauses that state when any archaeological material (e.g., artifacts and/or cultural features or human remains) is found, work must stop immediately and the KSC Historic Preservation Officer must be contacted. Materials and remains will need to be identified in accordance with the Native American Graves Protection and Repatriation Act.

3.6 Geology and Soils

KSC is on the eastern region of peninsular Florida, which gradually rose above a much larger feature called *the Florida Plateau*. Four distinct geologic units lie beneath KSC and are characteristic of the coastal area of East-Central Florida. In descending order, these are Pleistocene and Recent Age sands with inter-bedded shell layers, Upper Miocene and Pliocene silty or clayey sands, Central and Lower Miocene compacted clays and silts, and Eocene limestones (KSC, 2015a).

3.6.1 Proposed Action

The Natural Resources Conservation Service mapped four soil series within the project site: Chobee (0.2 ha; 0.5 acre), Copeland (6.1 ha; 15.2 acres), Floridana (0.6 ha; 1.4 acres), and Wabasso (1.8 ha; 4.4 acres) (Figure 3.6). The Chobee series is located on the east side of the site and the soils are characterized as very poorly drained soils found in wetlands. Copeland series is the most common soil series within the Proposed Action site and is described as moderately deep, very poorly drained, moderately permeable soils in depressions and flats in peninsular Florida. The Floridana series is found in one location on the west side in association with wetlands and is characterized as very poorly drained. The Wabasso series soil is described as very deep, very poorly and poorly drained soil that formed in sandy and loamy marine sediments. The Chobee, Copeland, and Floridana soil series are classified as hydric soils.

3.6.2 Alternative Action

Five soil series are found on the Alternative Action site: the Bradenton (0.2 ha; 0.4 acre), Chobee (1.9 ha; 4.7 acres), Copeland (2.1 ha; 5.2 acres), Floridana (0.1 ha; 0.2 acre), and Wabasso (2.8 ha; 6.9 acres) (Figure 3.7). The Bradenton series consists of very deep, poorly drained, moderately permeable soils on low ridges and on floodplains. The Chobee series is found in the northeast region of the site and consists of very deep, very poorly drained, slowly to very slowly permeable soils on marine terraces in depressions, flats, and in this case depressional wetlands. Copeland series is found along the west side of the site and is described as moderately deep, very poorly drained, moderately permeable soils in depressions and flats in peninsular Florida. The Floridana series is found in one small location on the west side in association with wetlands and is characterized as very poorly drained. The Wabasso series soil is described as very deep, very poorly and poorly drained soil that formed in sandy and loamy marine sediments. The Chobee, Copeland, and Floridana soil series are classified as hydric soils.

3.7 Noise

Noise generated at KSC originates from five primary sources: (1) launches, (2) aircraft movements, (3) industrial operations, (4) construction, and (5) traffic (NASA, 2015a). Tables 3.4 and 3.5 present typical values for noise levels for activities occurring at construction sites and for activities conducted routinely at KSC. The effects of noise on wildlife have been studied at KSC during the launch of spacecraft (American Institute of Biological Sciences, 1982; NASA, 2014). These studies have shown that besides an initial startle response to launches, birds and other wildlife return to their normal activities soon after and appear to show no adverse effects.

Figure 3.6 Soils Types Within the Proposed Action Site

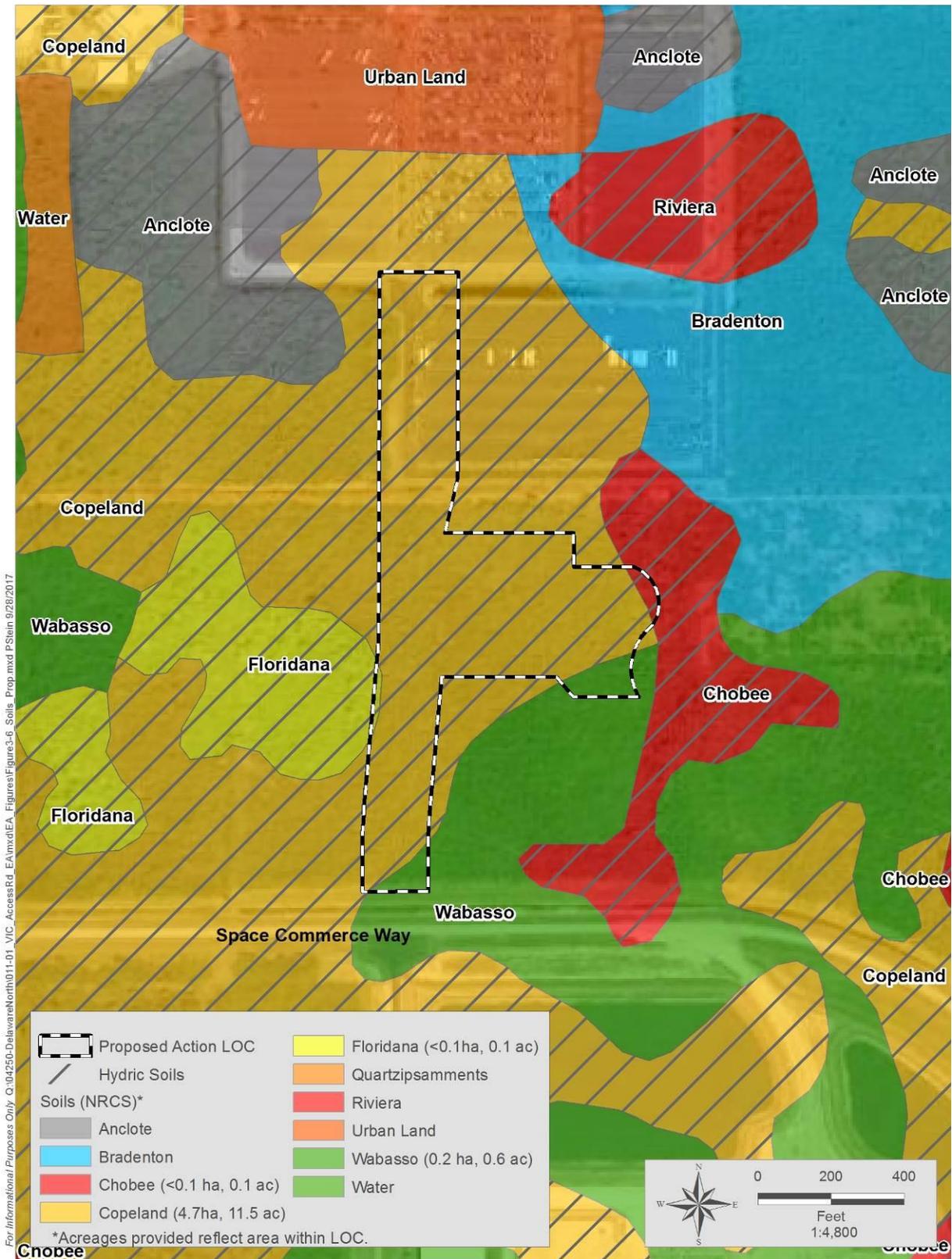
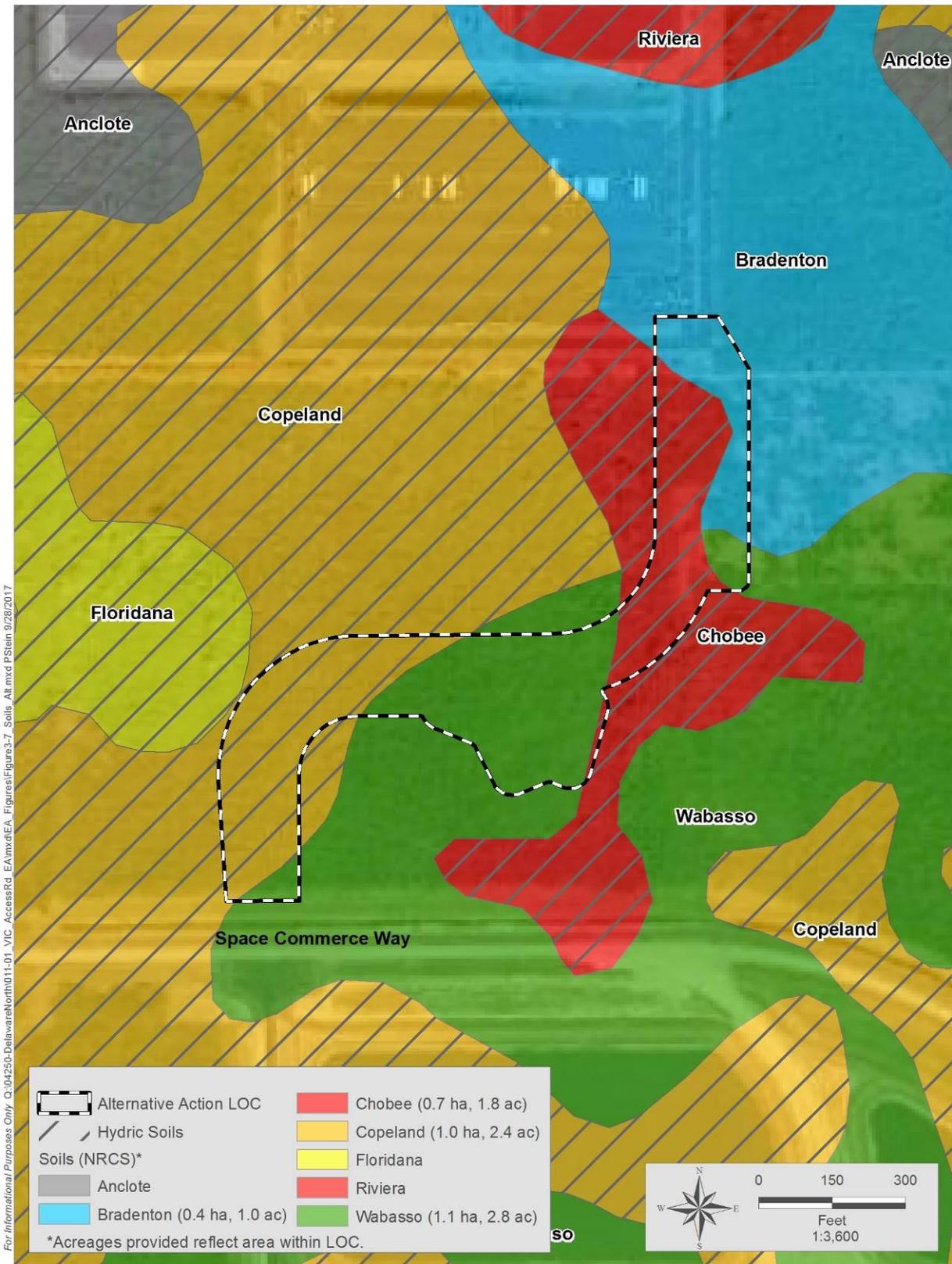


Figure 3.7 Soils Types Within the Alternative Action Site



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Table 3.4 Noise Levels (in Decibels, A-Weighted) Measured on KSC, Florida (NASA, 2015a)

SOURCE	NOISE LEVEL (Peak)	DISTANCE FROM SOURCE*			
		50 feet	100 feet	200 feet	400 feet
Construction					
Heavy Trucks	95	84–89	78–83	72–77	66–71
Pickup Trucks	92	72	66	60	54
Dump Trucks	108	88	82	76	70
Concrete Mixer	105	85	79	73	67
Jackhammer	108	88	82	76	70
Scraper	93	80–89	74–82	68–77	60–71
Dozer	107	87–102	81–96	75–90	69–84
Paver	109	80–89	74–83	68–77	60–71
Generator	96	76	70	64	58
Shovel	111	91	85	79	73
Crane	104	75–88	69–82	63–76	55–70
Loader	104	73–86	67–80	61–74	55–68
Grader	108	88–91	82–85	76–79	70–73
Caterpillar	103	88	82	76	70
Shovel	110	91–107	85–101	79–95	73–95
Ditcher	104	99	93	87	81
Fork Lift	100	95	89	83	77
Vehicles					
Mack Truck	91	84	78	72	66
Bus	97	82	76	70	54
Compact Auto	90	75–80	69–74	63–68	57–62
Passenger Auto	85	69–76	63–70	57–64	51–68
Motorcycle	110	82	76	70	64

* Assume 6-dBA decrease for every doubling of distance.

Table 3.5 Measured Noise on KSC (KSC, 1978)

SOURCE	PEAK	REMARKS
Re-Entry Sonic Boom*		
Orbiter		101 N/m ² max. (2.1 psf)
SRB casing		96 to 144 N/m ² (2 to 3 psf)
External tank		96 to 192 N/m ² (2 to 4 psf)
Launch Noise		
Titan IIIC	94	21 Oct 1965 (9,388 m)
Saturn I	89	Avg- of 3 (9,034 m)
Saturn V	91	15 Apr 1969 (9,384 m)
Atlas	96	Comstar (4,816 m)
Space Shuttle*	90	1.4 dBA Down From Saturn V (9, 384 m)
Aircraft		
F4 Jet	107	18 km From Ground Zero
F4 Jet	158	Calculated at Ground Zero
NASA Gulfstream	109	Takeoff (Marker 14)
NASA Gulfstream	100	Landing (Marker 14)
Industrial Activities		
Complex 39A	78	Transformers
LETF	92	Hydraulic Charger Unit
Machine Shop	112	Base Support Building M6-486
Computer Room	88	VAB - Room 2K11
Snack Bar	60	CIF - Room 154
Laboratories	58	CIF - Rooms 139 and 282
Elevator	62	Central Instrumentation Fac.
VAB High Bay	108	Welding, Cutting, etc.
VAB High Bay	116	Chipping
Hangar AE	77	Room 125 During Test
Headquarters office	75	Room 2637 and Printers
O&C Office	57	Room 2063
Mobile Launcher Platform	94	Main Pump Operating
Mobile Launcher Platform	100	2 Pumps Operating 5K Load
Industrial Area	66	15 m From Traffic Light
Undisturbed Areas		
Seashore	69	Medium Waves (Nice Day)
Riverbank	48	Light Gusts (No Traffic)
150 m Tower	64	Light Gusts of Wind

*Estimated.

Other studies conducted on wading bird colonies subjected to military overflights (152 meters [500 feet] of altitude) with noise levels up to 100 decibels (dBA) observed no productivity-limiting responses and only a short-term interruption of their daily routine (Dynamac, 2000). The Occupational Safety and Health Administration (OSHA) has established permissible noise exposure limits for humans and 29 CFR Section 1019.95 states personnel exposed to an 8-hour

time-weighted average of 85 dBA or greater must be issued hearing protection (NASA 2015a). Noise related to the Proposed Action and Alternative Action sites will be limited to vehicular noise, which is much less than noise associated with launches and other noise-creating activities that occur at KSC.

3.8 Surface Water Quality

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

The surface waters at the Proposed Action and Alternative Action sites consist of upland cut canals or ditches that were dug to drain wetlands and adjacent uplands for citrus production. These surface waters drain to the west to a large canal that flows south under Space Commerce Way to an east/west canal on Ransom Road. Water then flows west to the IRL.

3.9 Groundwater Quality

Three aquifer systems underlie KSC: the Surficial Aquifer, Intermediate Aquifer, and Floridan Aquifer. The Surficial aquifer system contains freshwater but is less extensive than the Floridan, 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, 2015a).

Recharge to the Surficial Aquifer System 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 surficial aquifer is monitored under permit at two KSC locations: the KSC landfill and the Seawater Immersion Facility, located at the Beach Corrosion Test Site (NASA, 2015a).

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 and in some cases from lateral intrusion from the Atlantic Ocean (NASA, 2015a).

The Floridan aquifer system 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, 2015a).

3.10 Floodplains

The topography in and around the Proposed Action (Figure 3.8) and Alternative Action (Figure 3.9) sites is relatively flat with on-site canals being the lowest elevations and the crown of Space Commerce Way being the highest. Space Commerce Way elevations range from 1.7 to 2.0 meters (5.5 to 6.5 feet) North American Vertical Datum 1988 (NAVD 88) and on-site ditch bottoms at approximately -0.3 meter (-1.0 foot) NAVD 88. The Proposed Action (Figure 3.10) and Alternative Action (Figure 3.11) sites have extensive 100-year floodplain (Zone AE) based on the March 2014 Federal Emergency Management Agency Flood Insurance Rate Map for the area.

The 100-year floodplain, which assumes a 1-percent chance of water rising in a certain area to a certain height during any given year, is outside the area.

The Proposed Action and Alternative Action sites are located within a coastal AE zone that is subject to storm surge flooding resulting from hurricane or tropical storm activity. Large tidal surges, combined with wave action and the heavy rainfall that accompanies these storms, can cause flooding at the Proposed Action and Alternative Action sites.

3.11 Socioeconomics

KSC is Brevard County's largest single employer and a major source of revenue for the local economy. KSC operations create a chain of economic effects throughout the region. Other large employers in the County are Patrick Air Force Base, the Brevard County School District, and Health First. Approximately 15,200 personnel were employed at KSC in 2003, a number that includes contractor, construction, tenant, and permanent civil service employees. Civil service employees account for approximately 12% of the total KSC workforce. The highest employment levels at KSC were recorded during the Apollo program. In 1968, KSC recorded a peak population of 25,895, with an estimated one in four workers in Brevard County employed at KSC. Employment levels dropped precipitously following the Apollo program conclusion to a historic low in 1976 when 8,441 personnel were employed. Employment levels rose sharply in 1979 when KSC was designated as the launch and operations support center for the Space Shuttle program (NASA, 2007). In 2010, an 11.6-percent decrease in the contractor work force resulted from downsizing as the Space Shuttle Program came to an end (NASA, 2010).

As of September 2015, the total KSC workforce population was 7,923, which includes NASA civil servants and interns, contractor employees, tenant staff, and construction workers (KSC, 2015b). This workforce is employed in ground and base support, unmanned launch programs, crew training, engineering, and administrative positions.

Figure 3.8 Topography Map for the Proposed Action Site

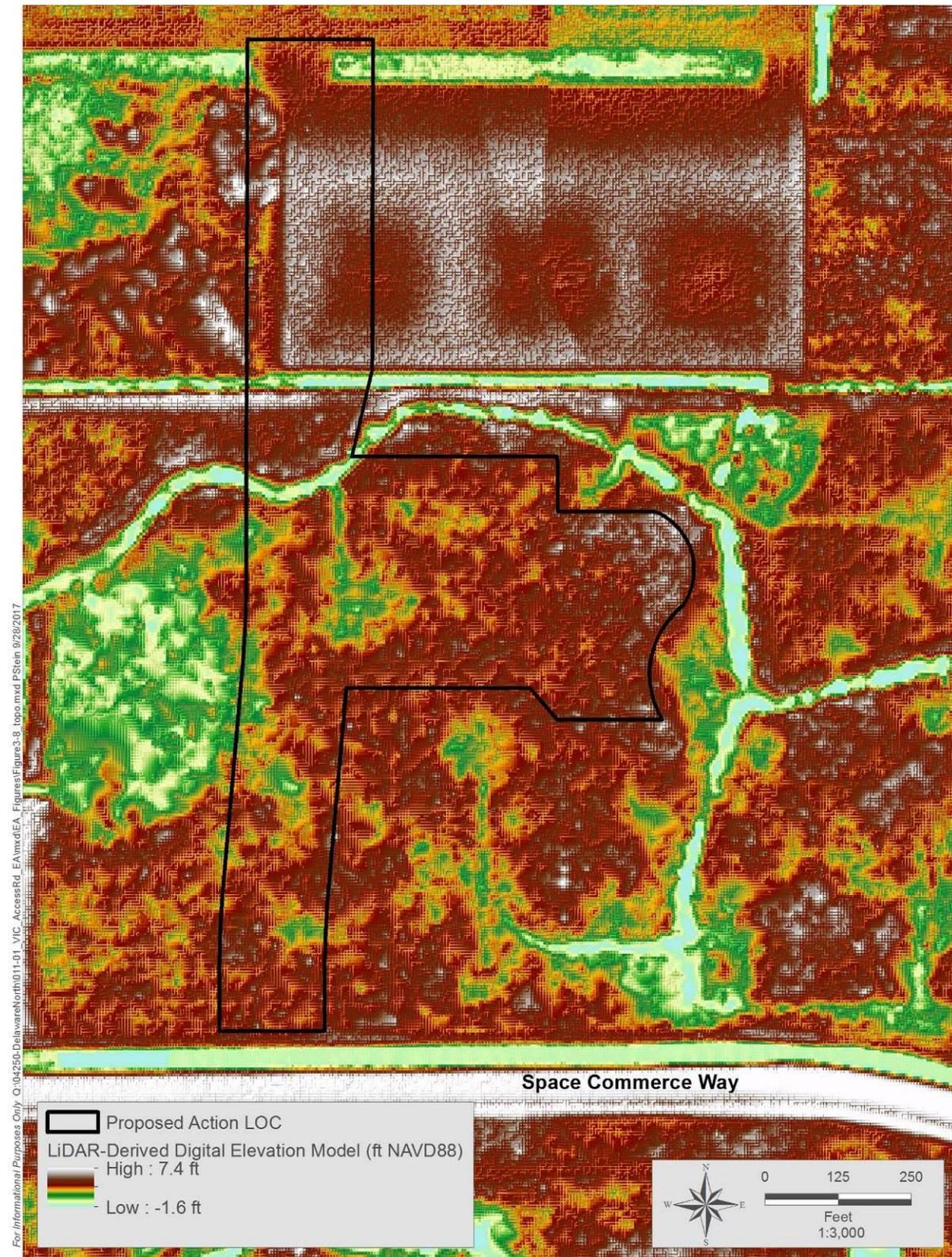


Figure 3.9 Topography Map for the Alternative Action Site

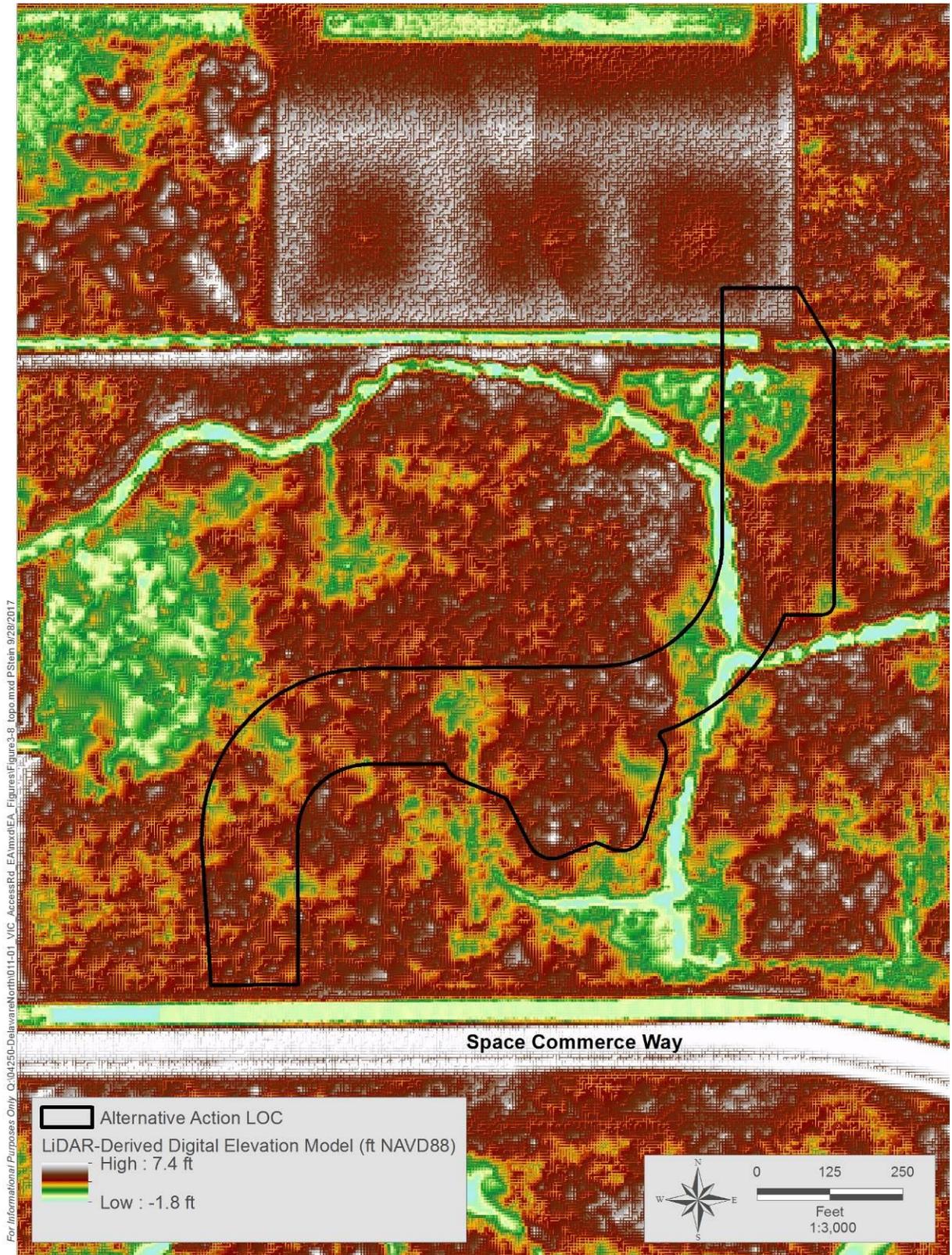
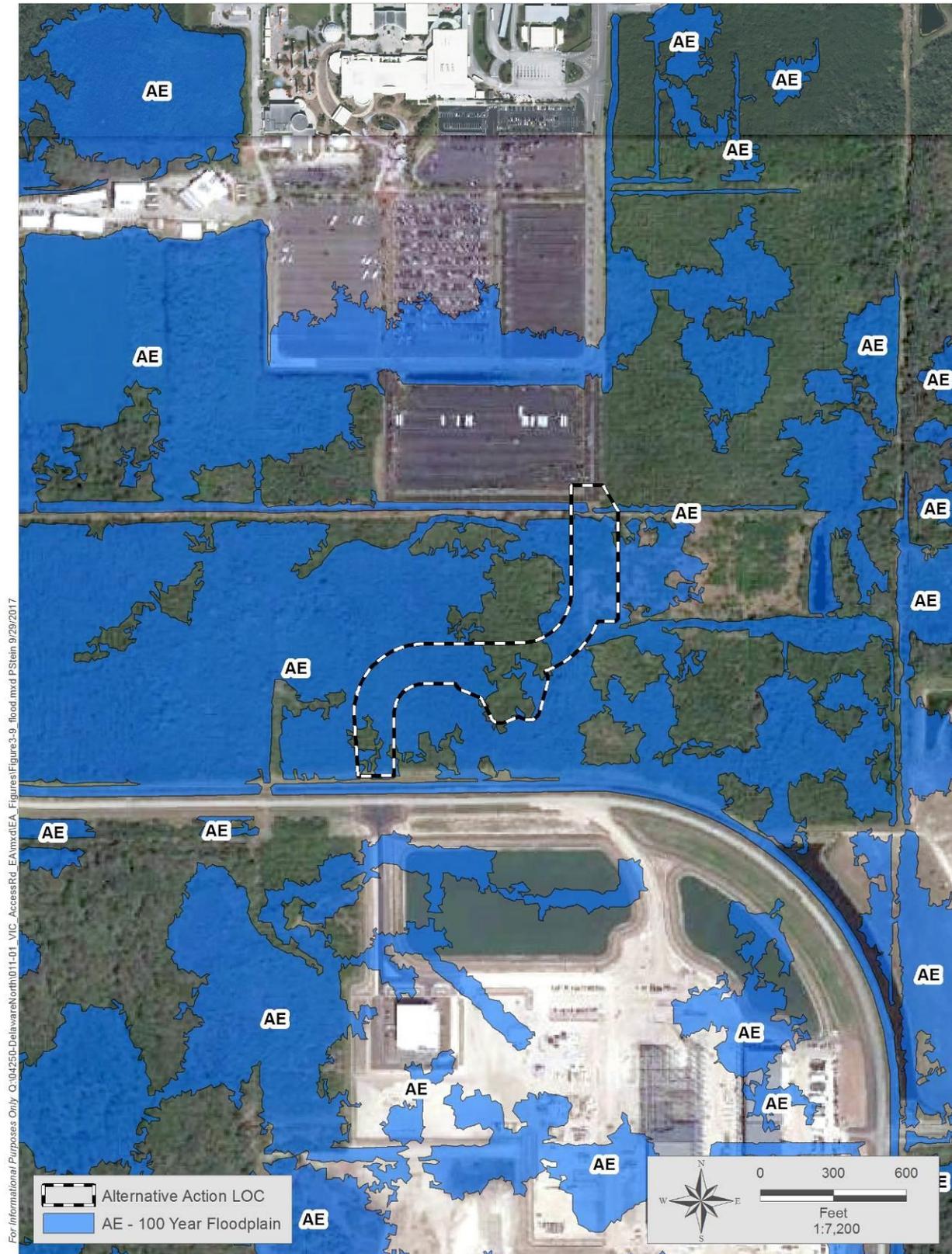


Figure 3.10 100-Year Floodplain Map for the Proposed Action Site



Figure 3.11 100-Year Floodplain Map for the Alternative Action Site



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4.0 Environmental Consequences

4.1 Summary and Status of Impacts

Impacts resulting from implementing the alternatives were identified and then classified in one of the following pre-determined categories:

- Negligible—impacts are not expected to be measurable or are too small to cause any discernable degradation to the environment.
- Minor—impacts that would be measurable but not substantial, because the impacted system is capable of absorbing the change or mitigation measures compensate for potential degradation.
- Major—those environmental impacts that individually or cumulatively could be substantial (greater than 10-percent impact on KSC).

Impacts from construction and operation at the Proposed Action and Alternative Action sites vary from negligible to minor depending on the environmental issues evaluated. Table 4.1 summarizes the results of the analyses showing the impacts on each media for each action. Additionally, wetlands and surface water impact acreage and the subsequent functional loss (FL) for primary and secondary impacts for each alternative were quantified. The FL for each alternative was calculated using the Uniform Mitigation Assessment Methodology (UMAM).

Comparing the results of the assessment of environmental issues for the two alternatives, Proposed Action has similar impacts on the environment as Alternative Action. There are no expected major environmental impacts from the Proposed Action. Therefore, Proposed Action is a viable alternative for this project.

This matrix can be used to review the overall impacts of implementation of this project for each site. The following discussion provides details of the scope and type of impacts. This section is organized by alternative so that cumulative impacts of each action can be seen as a whole.

4.2 Proposed Action

4.2.1 Facilities and Infrastructures

4.2.1.1 Transportation

4.2.1.1.1 Construction

Construction of the Proposed Action is expected to have **minor** impacts on transportation within KSC. Increased construction traffic would occur during normal working hours and may cause minimal traffic delays.

Table 4.1 Issues Matrix

Issues		Proposed Action	Alternative Action	No Action
Facilities and Infrastructure				
Transportation	C	Minor	Minor	Negligible
	O	Negligible to Minor	Negligible	Minor to Major
Utilities	C	Negligible	Negligible	Negligible
	O	Negligible	Negligible	Negligible
Air Quality	C	Minor	Minor	Negligible
	O	Negligible	Negligible	Negligible
Vegetation	C	Minor	Minor	Negligible
	O	Negligible	Negligible	Negligible
Wildlife	C	Minor	Minor	Negligible
	O	Negligible	Negligible	Negligible
Biodiversity	C	Negligible	Negligible	Negligible
	O	Negligible	Negligible	Negligible
Threatened & Endangered Species	C	Negligible	Negligible	Negligible
	O	Negligible	Negligible	Negligible
Cultural Resources	C	Negligible	Negligible	Negligible
	O	Negligible	Negligible	Negligible
Geology	C	Minor	Minor	Negligible
	O	Negligible	Negligible	Negligible
Noise	C	Minor	Minor	Negligible
	O	Negligible	Negligible	Negligible
Surface Water Quality	C	Negligible	Negligible	Negligible
	O	Negligible	Negligible	Negligible
Groundwater Quality	C	Negligible	Negligible	Negligible
	O	Negligible	Negligible	Negligible
Floodplains	C	Minor	Minor	Negligible
	O	Negligible	Negligible	Negligible
Socioeconomic	C	Minor	Minor	Minor
	O	Negligible	Negligible	Negligible

4.2.1.1.2 Operation

Operation of the Proposed Action will increase traffic on Space Commerce Way due to the public access point for the Visitors Center changing from of NASA Parkway to Space Commerce Way. However, traffic congestion the portion of NASA Parkway east of Space Commerce Way will decrease due to public eastbound traffic being routed south on Space Commerce Way to access the Visitors Center. Operation of the Proposed Action will increase traffic safety, decrease traffic congestion on NASA Parkway, and improve internal Visitors Center traffic patterns due to the ability to separate official business and tour buses from public/visitor traffic.

A TIS was performed in September 2017 (Appendix 1). Section 1 of the Study identifies future improvements to the intersection of SR405 and Space Commerce Way that will be done by Space Florida and no improvements have been identified for the intersection of SR3 and Space Commerce Way based on the results of the traffic study. Therefore, since the purpose of the project is to redirect visitors into the Visitors Center in a more efficient manner and no additional trips will be generated, operation of the Proposed Action is expected to have **negligible** impact on NASA Parkway and **minor** impact on Space Commerce Way from NASA Parkway to the Proposed Action site.

4.2.1.2 Utilities

4.2.1.2.1 Construction and Operation

Construction of the Proposed Action will include installing power utilities from Space Commerce Way to the Visitors Center parking lot within a confined multi-use utility corridor. Construction of the Proposed Action will not require modifications to the existing potable water, wastewater, electrical, or communications utilities. As a result, construction and operation of the Proposed Action are expected to have **negligible** impact on the utilities at KSC as the number of employees new to KSC is not expected to increase and the existing infrastructure will not be negatively affected.

4.2.2 Air Quality

4.2.2.1 Construction

Site preparation and construction of the Proposed Action would produce **minor** impacts on surrounding air quality. Clearing of land and other construction activities would generate airborne particulates from earth moving and vegetation burning, as well as hydrocarbon exhaust from heavy equipment. Such activities are expected to be small in scope and of short duration. Best management practices (BMPs) would also be employed to mitigate for emissions due to earth movement and burning. These BMPs include water spraying, placement of hay bales, and other forms of dust control. Once the contractor obtains a burn permit from KSC, burning (vegetation debris) would likely be conducted using a high-efficiency burn pit with forced-air injections, which allows for a high-temperature burn with little smoke and particulates.

4.2.2.2 Operation

Operation of the Proposed Action is expected to have **negligible** impact on surrounding air quality since no increase in automobile trips per weekday will result because of the implementation of the Proposed Action.

4.2.3 Biological Resources

4.2.3.1 Vegetation

4.2.3.1.1 Construction

Construction activities at the Proposed Action site would result in removing 1.3 ha (3.2 acres) of low-quality jurisdictional wetlands, 0.7 ha (1.7 acres) of surface water, and 6.2 ha (15.5 acres) of Brazilian pepper-dominated uplands. Primary impacts to vegetation would occur from construction of the four-lane road and associated stormwater infrastructure. Secondary impacts on undisturbed adjacent wetlands are expected due to the increased light, noise, and roadway traffic that bisects several wetland communities. SJRWMD typically assesses secondary impacts 200 feet into adjacent non-forested wetlands.

Construction is expected to have **minor** impact on upland and wetland vegetation on KSC due to the small impact acreage, low quality of vegetation impacted, and the vast acreage of this community at KSC. A wetland mitigation plan will need to be designed and permitted in accordance with USACE and SJRWMD regulations to offset primary and secondary wetland impacts that will occur resulting from the construction of the Proposed Action or Alternative Action.

4.2.3.1.2 Operation

Negligible impacts on vegetation are expected from the transportation use of the new access road associated with the Proposed Action operation.

4.2.3.2 Wildlife

Potential impacts on wildlife by the Proposed Action construction and operation are based on habitats removed by typical construction activities for clearing, road construction, and the expected long-term use of the proposed access road. 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 are largely composed of low-quality disturbed wetlands and uplands that provide much lower-habitat quality than the vast acreage of natural vegetation communities found on KSC.

4.2.3.2.1 Construction

Construction noise and activities of the Proposed Action would have **minor** impacts on wildlife due to the lack of critical habitat or habitat used by species within the project area. The majority of habitat within the project area is disturbed Brazilian pepper-dominated uplands and wetlands that provide little to no habitat value except for their berries on which some bird species feed. Thus, minimal impacts on wildlife are expected due to habitat loss and would not be significant to the species' continued existence. Wide-ranging species such as large mammals and the indigo snake may be impacted by habitat removal and disruption of their previous movement patterns due to the new roadway and potential for population fragmentation. The impacted species are

typically sensitive to human activity and will move away from disturbance, thus causing at least a temporary shift in the population structure.

4.2.3.2.2 Operation

Long-term use of the proposed road would have the greatest impact on wildlife species. Roads fragment populations, increase mortality, and provide avenues for opportunistic species. Roads have a long-term effect on local population success for large and small species by changing behavioral routes (e.g., dispersal, finding mates, foraging) that are necessary for survival. The inevitable changes in habitat structure along road edges would likely alter habitat enough to change the species composition in some areas. However, given that these areas are not presently highly valuable habitats and the length of the Proposed Action is relatively short, these changes are expected to have **negligible** effects on wildlife populations.

4.2.3.3 Biodiversity

4.2.3.3.1 Construction

Impacts on local biodiversity from land clearing and construction of the Proposed Action access road is expected to be **negligible**. Suitable habitat for at least locally common herpetofauna and mammalian species would be removed or altered during the construction phase. However, construction impacts are not expected to cause major changes in the overall population size or structure of any of these species on KSC.

4.2.3.3.2 Operation

Roads have a long-term effect on local population success for large and small species by changing behavioral routes (e.g., dispersal, finding mates, foraging) that are necessary for survival. Fragmented wildlife populations increase mortality and provide avenues for opportunistic species that can out-compete more habitat-specific species. The inevitable changes in habitat structure along road edges would likely alter the habitats enough to change species composition in some areas. However, the Proposed Action results in the fragmentation of very low-quality upland and wetland habitat that provides limited habitat to support biodiversity. As a result, operation of the Proposed Action is expected to have **negligible** impacts on biodiversity of the area.

4.2.4 Threatened and Endangered Species

Table 3.2 summarizes the protected species that could be impacted due to the proposed site.

4.2.4.1 Construction

On-site habitat is composed of low-quality disturbed uplands and wetlands and upland cut surface waters that provide little to no habitat compared to the natural communities found on KSC. These existing habitats are low-quality and dominated by dense Brazilian pepper that provides very limited value and are not necessary for the survival of threatened or endangered

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species. However, it is possible that existing habitats do support listed species such as the eastern indigo snake on occasion.

Space Commerce Way stormwater treatment swales provide limited forage habitat for some listed avian species. These stormwater treatment swales will be replaced by stormwater treatment swales required for the Proposed and Alternative Actions.

Construction impacts are not expected to cause major changes in the overall population size or structure of any of listed species on KSC. As a result, impacts on local threatened and endangered species from land clearing and construction of the Proposed Action are expected to be **negligible**.

4.2.4.2 Operation

Long-term operation of the Proposed Action could have a long-term impact on local populations of some listed terrestrial species such as the eastern indigo snake. Increases in road mortality and habitat fragmentation may occur. However, resident populations of eastern indigo snakes are unlikely to be found due to the low quality of habitats within and adjacent to the Proposed Action. Listed wading bird and terrestrial species likely do not use wetlands within the Proposed Action site due to the dense Brazilian pepper canopy and the vast acreages of higher-quality wetland habitats that exist locally and regionally. Mitigation for wetland impacts will provide much higher-quality listed wading bird foraging habitat than the impacted wetlands. In addition, stormwater treatment swales will be constructed as a regulatory requirement for the Proposed and Alternative Actions. These swales will provide greater quality forage habitat than that which will be impacted. As a result, **negligible** impacts on threatened or endangered species are expected due to the operation of the Proposed Action.

4.2.5 Cultural Resources

4.2.5.1 Construction and Operation

The Proposed Action and Alternative Action sites have a low probability of containing significant or potentially significant archaeological sites, and further archaeological surveys are not warranted. Near the project are two historic sites, identified in ACI's *Historic Context and Historic Period Archaeological Site Location Predictive Model for the John F. Kennedy Space Center, Volusia and Brevard Counties, Florida* (2009). Structures formerly located at these sites were presumed to be residential occupations predating NASA's acquisition of property in the early 1960s. However, these sites have low archaeological research potential and are not recommended for further archaeological surveys. Therefore, **negligible** impacts on historic or archaeological properties are expected. Nevertheless, construction activities on KSC have contract clauses that state when any archaeological material (e.g., artifacts and/or cultural features or human remains) is found, work must stop immediately and the KSC Center Cultural Resources Manager must be contacted. Materials and remains will subsequently identified in accordance with the Native American Graves Protection and Repatriation Act.

4.2.6 Geology and Soils

4.2.6.1 Construction

Proposed Action preparation activities would present the only potential impact on the geology and soils within the project area and are considered **minor**. Land clearing and excavation for roadway foundations and stormwater systems would require that the upper soil strata layers be removed. This may affect shallow subsurface flows of water from rainfall events. However, this would be mitigated with site grading and construction of the State-required stormwater management system.

4.2.6.2 Operation

Operation of the Proposed Action would be expected to produce **negligible** impacts on the geologic strata or soils of the local area or region.

4.2.7 Noise

4.2.7.1 Construction

Ambient noise levels are expected to increase during construction activities and daily operations as a result of the Proposed Action site construction. Noise generated by construction vehicles is expected to be below all noise thresholds and would occur for a brief period. To ensure the protection of employees' hearing, OSHA has outlined permissible noise exposures. 29 CFR Section 1019.95 states personnel exposed to an 8-hour time-weighted average of 85 dBA or greater must be issued hearing protection. Impacts on noise receptors due to construction of the Proposed Action are expected to be **minor**.

4.2.7.2 Operation

Traffic will increase on Space Commerce Way due operation of the Proposed Action since traffic will use the Proposed Action roadway rather than NASA Parkway. As a result, noise levels will increase marginally in the vicinity of Space Commerce Way. Operation of the Proposed Action is expected to have **negligible** impact on noise levels locally along Space Commerce Way and adjacent to the roadway and **negligible** impact on the noise levels regionally.

4.2.8 Surface Water Quality

4.2.8.1 Construction

Construction of the Proposed Action would have **negligible** effects on local surface water quality. These effects would be compensated for by constructing a dry retention and wet detention surface water management system, which would treat runoff from new impervious surfaces of the roadway. During actual construction activities, impacts on surface waters would be minimized by ensuring that BMPs are initiated and maintained to control erosion and sedimentation.

4.2.8.2 Operation

Operation of the Proposed Action is expected to have **negligible** impact on surface water quality, since the stormwater management system would offer high pollutant-removal efficiency.

4.2.9 Groundwater Quality

4.2.9.1 Construction

Construction of the Proposed Action could temporarily increase the amount of sedimentation and pollutants that could migrate into the groundwater system. However, maintaining BMPs and constructing the stormwater management system would prevent this from occurring. Therefore, construction of the Proposed Action should have **negligible** impact on groundwater quality.

4.2.9.2 Operation

Operation of the Proposed Action could generate pollutants typically created by runoff from roadways. The stormwater management system would prevent migration of contaminants downward into the surficial aquifer because it would promote their transport into the surface water management system that would be constructed along with the Proposed Action buildings and driveways. Therefore, operation of the Proposed Action is expected to have **negligible** impact on groundwater quality.

4.2.10 Floodplain

4.2.10.1 Construction

Construction of the Proposed Action site will impact Zone AE 100-year floodplain (Figure 3.9). Floodplain mitigation is not proposed nor required because flooding is caused by the site's proximity to the coast. In addition, the Proposed Action will have **minor** impact overall due to the small acreage of 100-year floodplain impact in relation to the total acreage at KSC.

4.2.10.2 Operation

Operation of the Proposed Action will result in **negligible** impacts to floodplains.

4.2.11 Socioeconomics

4.2.11.1 Construction

Several hundred construction workers are expected during construction of the Proposed Action. These workers would be drawn from the local workforce with an expected positive impact on the local economy. Construction of Proposed Action is expected to have **minor** impacts on socioeconomics and the workforce at KSC.

4.2.11.2 Operation

Operation of Proposed Action is expected to have **negligible** impact on the socioeconomics of KSC since the number of employees new to KSC is not expected to increase or decrease.

4.3 Alternative Action

4.3.1 Facilities and Infrastructure

4.3.1.1 Transportation

4.3.1.1.1 Construction

Construction of the Alternative Action is expected to have **minor** impacts on transportation within KSC. Increased construction traffic would occur during normal working hours and may cause minimal traffic delays.

4.3.1.1.2 Operation

Operation of the Alternative Action will increase traffic marginally on Space Commerce Way due to the access point for the Visitors Center changing from of NASA Parkway to Space Commerce Way. However, traffic congestion on a portion of NASA Parkway north of Space Commerce Way will decrease due to the ability for the public to access the Visitors Center from the south. Operation of the Alternative Action will increase traffic safety, decrease traffic congestion on NASA Parkway, and improve internal Visitors Center traffic patterns due to the ability to separate buses and passenger vehicles. As a result, operation of the Alternative Action is expected to have **negligible** impact on NASA Parkway and Space Commerce Way from NASA Parkway to the Alternative Action site, **negligible** impact on NASA Parkway, and **minor** impact on Space Commerce Way from NASA Parkway to the Alternative Action site since the purpose of the project is to redirect visitors into the Visitors Center in a more efficient manner and no additional trips will be generated.

4.3.1.2 Utilities

4.3.1.2.1 Construction and Operation

Construction of the Alternative Action will include installing various utilities from Space Commerce Way to the Visitors Center parking lot within a confined multi-use utility corridor. Construction of the Alternative Action will not require modifications to existing potable water, wastewater, electrical, or communications utilities. As a result, construction and operation of the Alternative Action are expected to have **negligible** impact on the utilities at KSC since the number of employees new to KSC is not expected to increase and the existing infrastructure will not be negatively affected.

4.3.2 Air Quality

4.3.2.1 Construction

Site preparation and construction of the Alternative Action would produce **minor** impacts on the surrounding air quality. Land clearing and other construction activities would generate airborne particulates from earth moving and vegetation burning as well as hydrocarbon exhaust from heavy equipment. Such activities are expected to be small in scope and of short duration. BMPs would be employed to mitigate emissions due to earth movement and burning. These BMPs include water spraying, placement of hay bales, and other forms of dust control. Once the contractor obtains a burn permit from KSC, burning (vegetation debris) would likely be conducted using a high-efficiency burn pit with forced-air injections, which allows for a high-temperature burn with little smoke and particulates.

4.3.2.2 Operation

Operation of the Alternative Action is expected to have **negligible** impact on the surrounding air quality due to no changes in automobile trips per weekday.

4.3.3 Biological Resources

4.3.3.1 Vegetation

4.3.3.1.1 Construction

Construction activities at the 7.0-ha (17.4-acre) Alternative Action site would result in removing 1.1 ha (2.7 acres) of low-quality jurisdictional wetlands and surface waters and 5.1 ha (12.8 acres) of Brazilian pepper-dominated uplands. The impact to vegetation due to the Alternative Action is greater than the Proposed Action. Primary impacts to vegetation would occur from construction of the four-lane road, associated stormwater infrastructure, and multi-use utility easement. Secondary impacts on undisturbed adjacent wetlands are expected due to the increased light, noise, and roadway traffic that bisects several wetland communities.

Construction of the Alternative Action is expected to have **minor** impact on upland and wetland vegetation on KSC due to the small impact acreage, low quality of vegetation impacted, and the vast acreage of this community at KSC. A wetland mitigation plan will need to be designed and permitted in accordance with USACE and SJRWMD regulations to offset primary and secondary wetland impacts that will occur resulting from the construction of the Proposed Action or Alternative Action.

4.3.3.1.2 Operation

Negligible impacts on vegetation are expected from the operation of the Alternative Action. This is because adjacent areas are also dominated by invasive exotic vegetation.

4.3.3.2 Wildlife

Potential impacts on wildlife by the Alternative Action construction and operation are based on habitats removed by typical construction activities for clearing, land development and building, and the expected long-term operations of the facility. Effects from the construction phase of the project are expected to be temporary except for those caused by habitat removal and alteration.

4.3.3.2.1 Construction

Construction noise and activities of the Alternative Action would have **minor** impacts on wildlife due to the lack of critical habitat or habitat used by species within the project area. The majority of the habitat within the project area is disturbed Brazilian pepper-dominated uplands and wetlands that provide little to no habitat value except for their berries on which some bird species feed. Thus, minimal impacts on wildlife are expected due to habitat loss and would not be significant to the species' continued existence. Wide-ranging species such as large mammals and the indigo snake may be impacted by habitat removal and disruption of their previous movement patterns and potential for population fragmentation due to the new roadway. The impacted species are typically sensitive to human activity and will move away from disturbance, causing at least a temporary shift in the population structure.

4.3.3.2.2 Operation

Long-term use of the proposed road would have the greatest impact on wildlife species. Roads fragment populations, increase mortality, and provide avenues for opportunistic species. Roads have a long-term effect on local population success for large and small species by changing behavioral routes (e.g., dispersal, finding mates, foraging) that are necessary for survival. The inevitable changes in habitat structure along road edges would likely alter habitat enough to change the species composition in some areas. However, since these areas are not presently highly valuable habitats and the length of the proposed access road is relatively short, these changes are expected to have minimal effects on wildlife populations. In addition, because the Alternative Action will be immediately adjacent to existing active facilities (Space Commerce Way and the Visitors Center), wildlife species currently using the Alternative Action site are accustomed to human activities. As a result, **negligible** wildlife impacts from the operation of the Alternative Action are expected.

4.3.3.3 Biodiversity

4.3.3.3.1 Construction

Suitable habitat for at least locally important species would be removed or altered during the construction phase. However, construction impacts are not expected to cause major changes in the overall population size or structure of any of these species on the Space Center due to the very small impact acreages proposed (0.7 acre of undisturbed habitat). As a result, impacts on local biodiversity from land clearing and construction of the Alternative Action are expected to be **negligible**.

4.3.3.3.2 Operation

Roads have a long-term effect on local population success for large and small species by changing behavioral routes (e.g., dispersal, finding mates, foraging) that are necessary for survival. Fragmented wildlife populations increase mortality and provide avenues for opportunistic species that can out-compete more habitat-specific species. The inevitable changes in habitat structure along road edges would likely alter the habitats enough to change species composition in some areas. However, the Alternative Action results in the fragmentation of very low-quality upland and wetland habitat that provides limited habitat to support biodiversity. As a result, operation of the Alternative Action is expected to have **negligible** impacts on biodiversity of the area.

4.3.3.4 Threatened and Endangered Species

Table 3.3 summarizes the protected species that could be impacted due to the proposed site.

4.3.3.4.1 Construction

Although the on-site acreage for wetland habitat does likely support listed wildlife species (primarily wading birds), it is very small. Additionally, extensive acreages of this habitat exist to the north and south as well as regionally on KSC. Construction impacts are not expected to cause changes in the overall population size or structure of any of listed species on KSC since a majority of these species, if present, can use adjacent similar habitats or can use stormwater treatment swales that will replace those along Space Commerce Way that will be filled. As a result, impacts on local threatened and endangered species from land clearing and construction of the Alternative Action are expected to be **negligible**.

4.3.3.4.2 Operation

Long-term operation of the Alternative Action could potentially have a long-term impact on local populations of some listed terrestrial species such as the eastern indigo snake. Increases in road mortality and habitat fragmentation may occur. However, resident populations of eastern indigo snakes are unlikely to be found due to the low quality of habitats within and adjacent to the Alternative Action. Listed wading bird species likely do not use wetlands within the Alternative Action site due to the dense Brazilian pepper canopy and the vast acreages of higher-quality wetland habitats that exist locally and regionally. Mitigation for wetland impacts will provide much higher-quality listed wading bird foraging habitat than the impacted wetlands. In addition, stormwater treatment swales will be constructed as a regulatory requirement for the Proposed and Alternative Actions. These swales will provide greater quality forage habitat than that which will be impacted. As a result, **negligible** impacts on threatened or endangered species are expected due to the operation of the Alternative Action.

4.3.4 Cultural Resources

4.3.4.1 Construction and Operation

Construction and operation of the Alternative Action is expected to have no impact on the cultural resources at KSC since construction will occur on a developed site in areas of low potential archaeological significance and does not impact the water frontage. In addition, no known historic or archaeological properties are within the site. Therefore, **negligible** impacts on historic or archaeological properties are expected. Nevertheless, construction activities on KSC have contract clauses that state when any archaeological material (e.g., artifacts and/or cultural features or human remains) is found, work must stop immediately and the KSC Historic Preservation Officer must be contacted. Materials and remains will subsequently identified in accordance with the Native American Graves Protection and Repatriation Act.

4.3.5 Geology and Soils

4.3.5.1 Construction

Land clearing and excavation for roadway foundations and stormwater systems would require that the upper soil strata layers be removed. This impact may affect shallow subsurface flows of water from rainfall events. However, site grading and construction of a suitable stormwater system would mitigate this. As a result, impacts associated with the Alternative Action are considered **minor**.

4.3.5.2 Operation

Operation of the Alternative Action would be expected to produce **negligible** impacts on the geologic strata or soils of the local area or region.

4.3.6 Noise

4.3.6.1 Construction

Ambient noise levels are expected to increase during construction activities and daily operations as a result of the Alternative Action site construction. Noise generated by construction vehicles is expected to be below all noise thresholds and would occur for a brief period. To ensure the protection of employees' hearing, OSHA has outlined permissible noise exposures. 29 CFR Section 1019.95 states personnel exposed to an 8-hour time-weighted average of 85 dBA or greater must be issued hearing protection. Impacts to noise receptors due to construction of the Alternative Action are expected to be **minor**.

4.3.6.2 Operation

Traffic will increase on Space Commerce Way due to the implementation of the Alternative Action since traffic will be routed to the Alternative Action roadway rather than continuing east on NASA Parkway. Noise levels will increase marginally in the vicinity of Space Commerce Way. As a result, the operation of the Alternative Action is expected to have a **negligible to minor** impact on noise levels locally along Space Commerce Way and adjacent to the roadway and **negligible** impact on the noise levels regionally.

4.3.7 Surface Water Quality

4.3.7.1 Construction

Construction of the Alternative Action would have **negligible** impacts on the surface water quality. These impacts would be compensated for by constructing a dry retention surface water management system, which would treat runoff from new impervious surfaces of the building expansion and driveways. During actual construction activities, impacts on surface waters would be minimized by ensuring that BMPs are initiated and maintained to control erosion and sedimentation.

4.3.7.2 Operation

Operation of the Alternative Action is expected to have **negligible** impact on surface water quality since the stormwater management system would offer high pollutant-removal efficiency.

4.3.8 Groundwater Quality

4.3.8.1 Construction

Construction of the Alternative Action could temporarily increase the amount of sedimentation and pollutants that could migrate into the groundwater system. However, maintaining BMPs and construction of the stormwater management system would prevent this from occurring. Therefore, construction of the Alternative Action should have **negligible** impact on groundwater quality.

4.3.8.2 Operation

Operation of the Alternative Action could generate pollutants typically created by runoff from the building expansion and driveway. The stormwater management system would prevent migration of contaminants downward into the Surficial Aquifer because it would promote their transport into the surface water management system that would be constructed along with the Alternative Action building expansion and driveway. There are **negligible** impacts expected on groundwater quality for the operation of this facility.

4.3.9 Floodplain

4.3.9.1 Construction

Construction of the Alternative Action site will impact Zone AE coastal floodplain (Figure 3.9). Flood mitigation is not proposed nor required because flooding is caused by the site's proximity to the coast. In addition, the Alternative Action will have **minor** impact overall due to the small acreage of the 100-year floodplain impact in relation to the total acreage at KSC.

4.3.9.2 Operation

Operation of the Alternative Action will result in **negligible** impact to floodplains.

4.3.10 Socioeconomics

4.3.10.1 Construction

Several hundred construction workers are expected during construction of the Alternative Action. These workers would be drawn from the local workforce with an expected positive impact on the local economy. The construction of the Alternative Action is expected to have **minor** impact on socioeconomics and the workforce at KSC during construction.

4.3.10.2 Operation

Operation of the Alternative Action is expected to have **negligible** impacts on the socioeconomics of KSC since the number of permanent employees at KSC is not expected to increase or decrease.

4.4 No Action Alternative

Currently, visitor traffic backs up on SR 405 and interferes with buses returning guests from the Apollo Saturn Visitor Center and hinders emergency response services such as fire. As previously stated, there have been multiple incidents with guest injuries/illness that did not receive a proper response time due to the traffic congestion. Based on the TIS from Lassiter (2017), the Visitors Center expects a 202% increase in visitors from 2018 to 2035. As a result, if the No Action Alternative is selected, impacts to Transportation are expected to be **minor** to **major** due to increased traffic congestion, NASA security issues, increased emergency response times, and safety issues from increased risk of accidents associated with only a single ingress/egress to the Visitors Center.

For the No Action Alternative, there are **negligible** impacts to utilities, air quality, vegetation, wildlife, biodiversity, threatened and endangered wildlife species, cultural resources, geology, noise, surface water quality, groundwater quality, or floodplains. **Minor** impacts are expected for the socioeconomics due to the loss of construction employment for construction of the road.

5.0 Cumulative Impacts

5.1 No Action Alternative

Based on the TIS from Lassiter (2017), the Visitors Center expects a 202% increase in visitors from 2018 to 2035. If no action is taken, cumulative impacts to Transportation are expected to be **minor** to **major** due to increased traffic congestion, NASA security issues, and safety issues from increased risk of accidents associated with only a single ingress/egress to the Visitors Center in combination with increased visitor attendance based on visitor projections and development of Exploration Park Phases 1 and 2. **Negligible** impacts to other resource categories will occur if the No Action Alternative is selected (Table 4.1).

5.2 Proposed Action Alternative

No expansion beyond the existing developed footprint of the Visitors Center is planned within the next decade. As a result, construction and operation of the Proposed Action are not expected to result in cumulative impacts to resource categories such as air quality, vegetation, and wildlife.

6.0 Environmental Justice

On February 11, 1994, the President of the United States signed Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The general purposes of the EO are to (1) focus the attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice; (2) foster non-discrimination in federal programs that substantially affect human health or the environment; and (3) give minority communities and low-income communities greater opportunities for public participation in, and access to, public information on matters relating to human health and the environment.

The EO directs federal agencies, including NASA, to develop environmental justice strategies. Further, EO 12898 requires NASA, to the greatest extent practicable and permitted by law, to make the achievement of environmental justice part of NASA's mission by identifying and addressing, as appropriate, disproportionately high adverse human health or environmental effects on minority or low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

In accordance with EO 12898, NASA established an agency-wide strategy, which in addition to the requirements set forth in the EO, seeks to (1) minimize administrative burdens, (2) focus on public outreach and involvement, (3) encourage implementation plans tailored to the specific situation at each center, (4) make each center responsible for developing its own Environmental Justice Plan, and (5) consider normal operations and accidents. In turn, KSC has developed a plan to comply with the EO and NASA's agency-wide strategy (KSC, 2017). As part of that plan, the impacts on low-income and minority populations in the KSC area were addressed as part of this EA. This project and the alternatives addressed would be implemented within the boundaries of KSC. The closest residential areas are 3 kilometers (1.8 miles) to the south on Merritt Island and 12 kilometers (7.6 miles) to the west in Titusville. No groups of low-income or minority populations have been identified in either location. In addition, the distances of these areas from the Proposed or Alternative Actions preclude any direct impacts from construction or operations. Economic impacts are not expected to adversely affect any particular group. Construction personnel would be drawn from the local workforce and provide a short-term economic benefit to the local area.

7.0 Preparers, Contributors, and Contacts

The individuals who provided details data or analyses and who prepared this document are listed in Table 8.1. The table provides information concerning which section(s) each person was involved in writing or assembling.

Table 8.1 List of Individuals Who Prepared This Document

Preparers	Affiliation	Professional Title	Contribution
Bukata, B.J., MS, PWS	Jones Edmunds	Project Manager	Biological Resources, Data and Text
Nickel, Walt, PE	Jones Edmunds	Project Engineer	Transportation
Clark, Mike, PE	Jones Edmunds	Senior Project Engineer	Utilities
Mahler, Will, MS	Jones Edmunds	Scientist	Biological Resources, Data, Figures, and Text
Berry, Stephen	Jones Edmunds	Senior Consultant	Document Review
Koller, Rich, PE, LEED AP	Jones Edmunds	Managing Director	Document Review
Stein, Phil	Jones Edmunds	Scientist	Figures
Schmid, Joe	Jones Edmunds	Editor	Document Review
Darre, Natasha	NASA/KSC	Cultural Resource Specialist	Cultural Resources, Reviewer
Phillips, Lynne	NASA/KSC	Environmental Scientist	Document Review
Dankert, Don	NASA/KSC	KSC NEPA Coordinator	Document Review
Venuto, Charlie	Delaware North		Document Review
Frungillo, Tom	Delaware North	Project Manager	Document Review

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Appendix 1 Lassiter Transportation Group, Inc. Traffic Impact Study (2017)

Space Commerce Way at KSC VIC Brevard County, Florida

Traffic Impact Study

Prepared for Jones Edmunds & Associates, Inc.
By Lassiter Transportation Group, Inc.
September 2017



PROFESSIONAL ENGINEERING CERTIFICATION

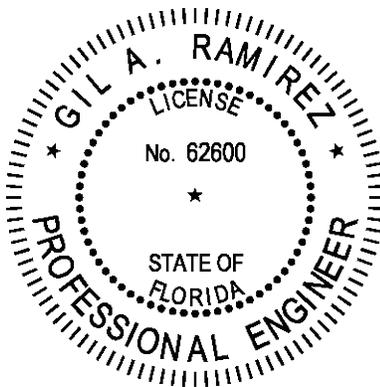
I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Lassiter Transportation Group, Inc., a corporation authorized to operate as an engineering business, EB 0009227, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I have prepared or approved the evaluations, findings, opinions, conclusions, or technical advice attached hereto for:

PROJECT: Space Commerce Way at KSC Visitor Complex Southern Access Road
LOCATION: Kennedy Space Center, FL
CLIENT: Jones Edmunds & Associates, Inc.
JOB #: 4324.03

I hereby acknowledge that the procedures and references used to develop the results contained in these computations are standard to the professional practice of Transportation Engineering as applied through professional judgment and experience.

Approved by:

NAME: Gil Ramirez, P.E.
P.E. No.: Florida P.E. No. 62600
DATE: September 25, 2017



SIGNATURE: _____

This item has been electronically signed and sealed by: Gil Ramirez, PE on date shown using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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- Appendix B- Turning Movement Counts
- Appendix C- Unsignalized Intersection HCS Worksheets – Existing Conditions
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- Appendix E- Signal Timings
- Appendix F- KSC VIC Growth Data
- Appendix G- NASA/Cape Canaveral Growth Data
- Appendix H- Signalized Intersection HCS Worksheets – 2018 Opening Year Conditions
- Appendix I- Signalized Intersection HCS Worksheets – 2035 Design Year Conditions
- Appendix J- Signalized Intersection HCS Worksheets – 2035 Design Year Conditions- Improved
- Appendix K- National Cooperative Highway Research Program (NCHRP) Report 457 Sheets

1

INTRODUCTION

Lassiter Transportation Group, Inc. (LTG) has been retained by Jones Edmunds & Associates, Inc. (JEA) to prepare a Traffic Impact Study (TIS) for the future intersection of Space Commerce Way at the proposed southern Kennedy Space Center Visitor Complex (KSC VIC) access road in unincorporated Brevard County, Florida. The proposed intersection is located approximately 1,250 ft. south of the KSC VIC and will include a new driveway intersecting Space Commerce Way opposite to the new Blue Origin facility's minor entrance. Figure 1 shows the location of the project relative to the surrounding road network. The proposed access road is anticipated to be the main access point to the KSC VIC for guests under future conditions. Anticipated future growth data for the KSC VIC, NASA/Cape Canaveral, the Blue Origin facility currently under construction, and future Space Florida/Exploration Park growth was utilized for future condition analyses. The anticipated opening year and design year are 2018 and 2035, respectively. The preliminary site/roadway plans is attached as **Appendix A**.

Study Area

The study area includes the intersections as determined in the scoping and research phase. The study area intersections and roadway segments are listed as follows:

Intersections

- NASA Parkway at Space Commerce Way
- NASA Parkway at KSC VIC Entrance
- Space Commerce Way at Kennedy Parkway
- Space Commerce Way at Proposed Southern KSC VIC Entrance

Roadway Segment:

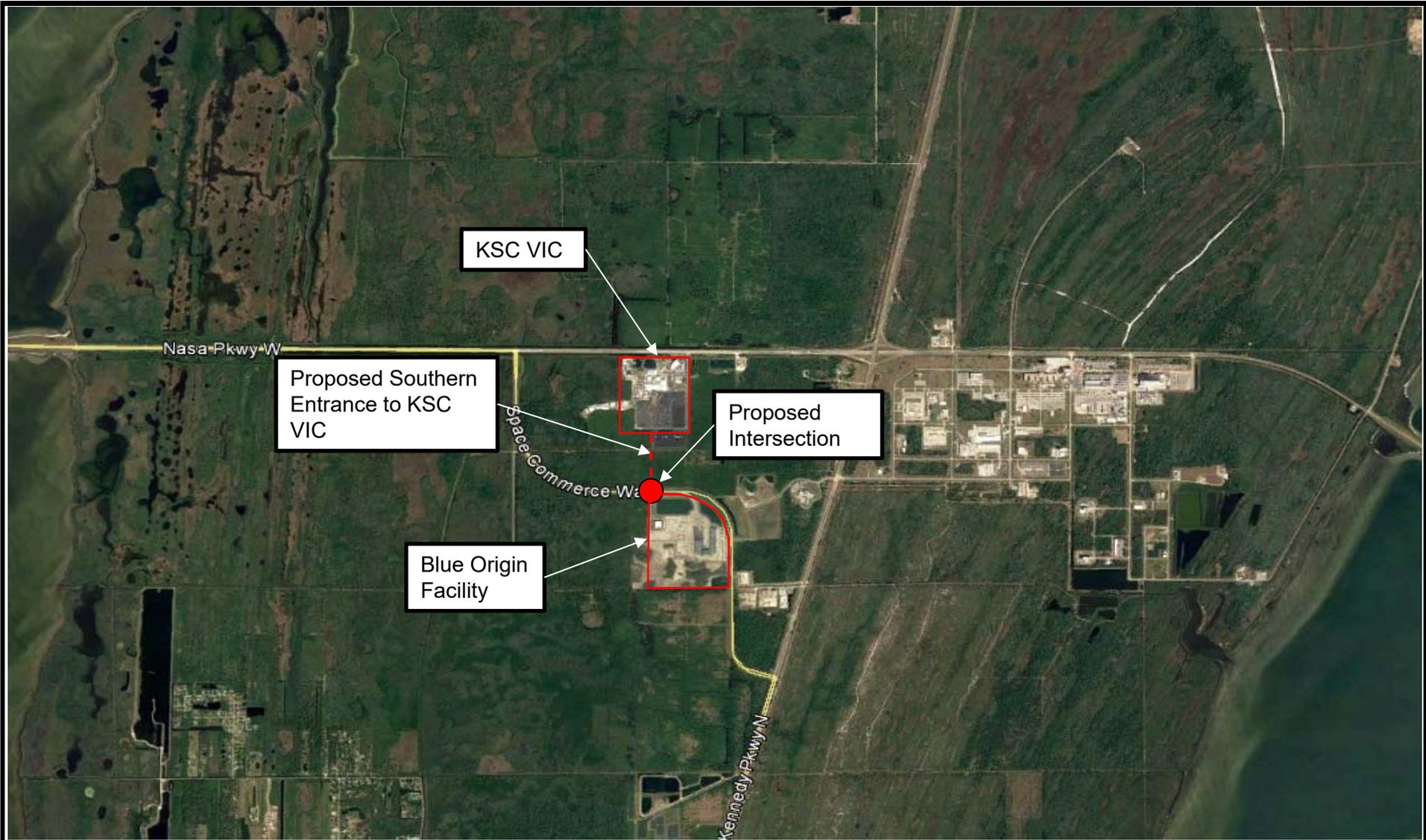
- Space Commerce Way from NASA Parkway to Kennedy Parkway

Study Procedures

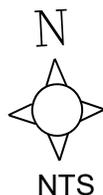
Standard engineering and planning procedures were used to determine the impacts of the proposed access road. Reference data was obtained from the Space Coast Transportation Planning Organization (SCTPO), the National Aeronautics and Space Administration (NASA), the Institute of Transportation Engineers (ITE), and the Florida Department of Transportation (FDOT).

Planned Roadway Improvements

FDOT's Five Year Work Program, NASA's planned roadway improvements, and Space Florida's draft Economic Development Transportation Project Fund (EDTPF) Infrastructure Improvements were reviewed to ascertain if there were any programmed or planned roadway improvements within the study area. Based on information available, there are recommended improvements to the intersections of NASA Parkway at Space Commerce Way and NASA Parkway at KSC VIC Entrance. Recommended improvements for NASA Parkway at Space Commerce Way include pavement widening to the existing southern leg, delineator removal between the continuous and non-continuous westbound thru lanes, and replacement of mast arms with pedestal signal structures. Recommended improvements for NASA Parkway at KSC VIC Entrance include replacement of mast arms with pedestal signal structures.



**Space Commerce
Way at Southern
Visitor Complex
Entrance**



Location Map

Project No.: 4324.03

Figure: 1



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227

2

EXISTING ROADWAY ANALYSIS

The KSC VIC is a tourism facility with unique trip generation characteristics. KSC VIC specific peak-hours were identified via the hourly distribution of 24-hour directional counts collected at the existing northern KSC VIC entrance (northbound and southbound) on Monday, August 7 and Tuesday, August 8, 2017. The hourly distribution indicated an a.m. peak-hour of 9:00 to 11:00 and a p.m. peak-hour of 4:00 to 6:00. Turning movement counts were collected for the KSC VIC specific a.m. and p.m. peak-hours at the study area intersections on Thursday, August 10, 2017. Traffic volumes were balanced when the collected traffic volumes differed between interconnected intersections. Figures 2 and 3 graphically show the existing a.m. and p.m. peak-hour turning movements at the study area intersections. The raw turning movement count summaries are provided in **Appendix B**.

Unsignalized Intersection Analysis

The level of service (LOS) at an unsignalized intersection is based on the average stop delay per vehicle for the various movements within the intersection. The operating conditions at the unsignalized intersections were evaluated using the *Highway Capacity Software 7, Version 7.2.1 (HCS)*. This software utilizes the procedures outlined in Chapter 20 and 21 of the *Highway Capacity Manual, 6th Edition*, titled “Two-Way Stop Control Intersections” and “All-Way Stop-Controlled Intersections”, respectively. Although the proposed southern KSC VIC entrance does not exist and the Blue Origin facility to the south is still under construction. The intersection was analyzed under existing conditions to determine the impact of the small amount of traffic for on-site workers. Table 1 shows the existing a.m. and p.m. peak-hour LOS at the unsignalized intersection. The HCS summary sheets are located in **Appendix C**. As indicated in the table, the unsignalized intersection currently operates within an acceptable level of service (LOS).

**Table 1
Existing A.M. and P.M. Peak-Hour LOS - Unsignalized Intersection
Space Commerce Way at Proposed Southern KSC Entrance**

Intersection	Adopted LOS	Existing Conditions			
		A.M. Peak-Hour		P.M. Peak-Hour	
		NB Approach Delay (sec.)	LOS	NB Approach Delay (sec.)	LOS
Space Commerce Way at Proposed Southern KSC VIC Entrance	E	9.6	B	10.5	B

Signalized Intersection Analysis

The LOS at a signalized intersection is based on the average control delay per vehicle for the various movements within the intersection. The operating conditions at the signalized intersections were evaluated using the agencies' signal timings and *Highway Capacity Software 7, Version 7.2.1 (HCS)*. This software utilizes the procedures outlined in Chapter 19 of the *Highway Capacity Manual, 6th Edition*, titled “Signalized Intersections”. It should be noted that all westbound through traffic on NASA Parkway originating from the east of Kennedy Parkway intersection was observed to utilize the continuous westbound through lane on NASA Parkway at the northern KSC VIC access point and at Space Commerce Way and a nominal of 10% exiting from the KSC VIC north access point is assigned to the non-continuous through lane at Space Commerce Way. Table 2 shows the existing a.m. and p.m. peak-hour LOS at the signalized intersections. The HCS summary sheets are located in

Appendix D and signal timing sheets are in **Appendix E**. As indicated in Table 2, all intersections are currently operating within an acceptable LOS with all approach V/C ratios below 1.0.

Table 2
Existing A.M. and P.M. Peak-Hour LOS – Signalized Intersections
Space Commerce Way at Southern KSC Entrance

Intersection	Existing Conditions					
	A.M. Peak-Hour			P.M. Peak-Hour		
	Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
NASA Parkway at Space Commerce Way	8.5	A	No	12.3	B	No
NASA Parkway at Visitor Center Complex	10.2	B	No	18.4	B	No
Space Commerce Way at Kennedy Parkway	12.3	B	No	17.7	B	No

Roadway Segment Analysis

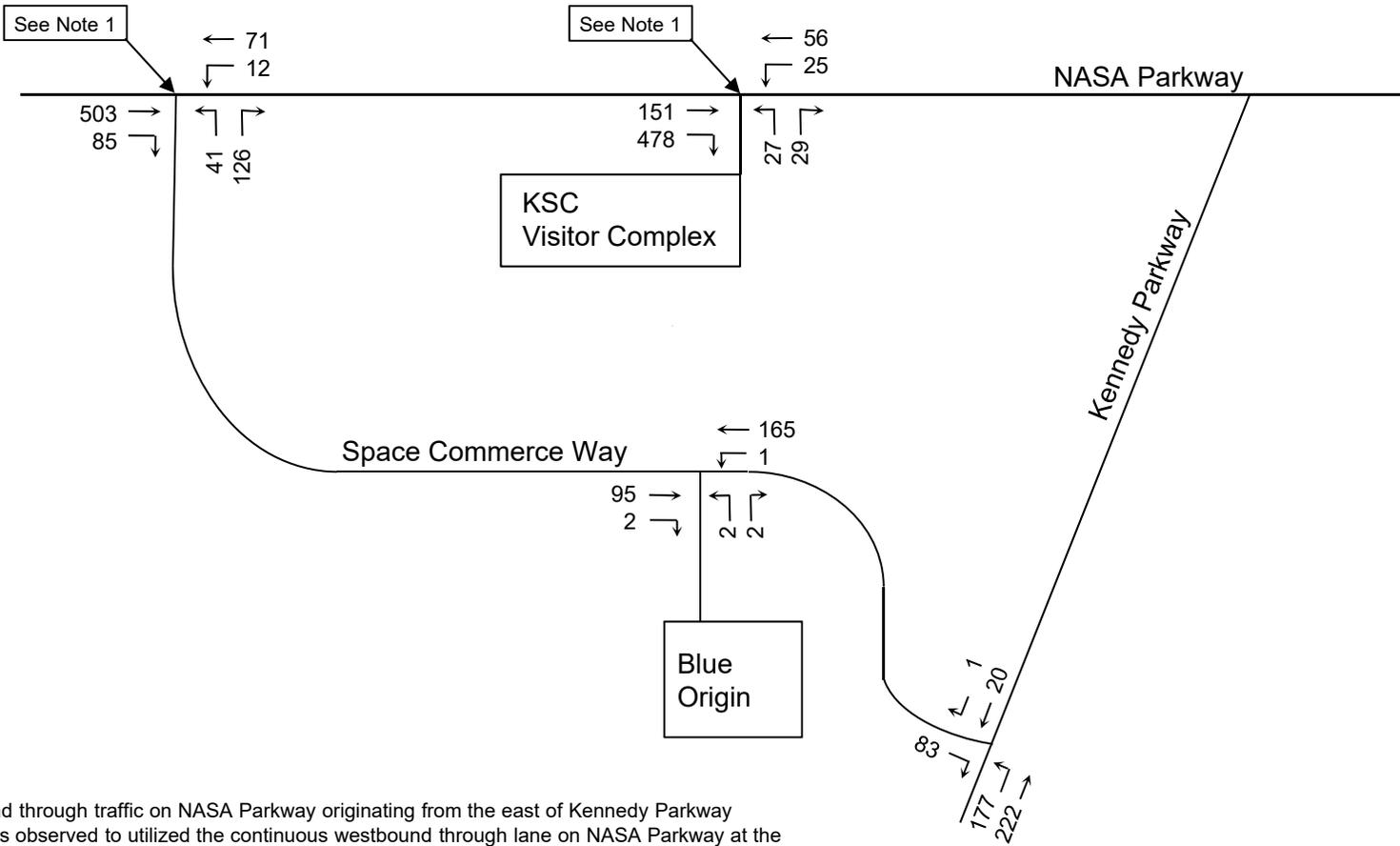
Roadway level of service describes the operating condition determined from the number of vehicles passing over a given section of roadway during a specified time period. It is a qualitative measure of several factors which include: speed, travel time, traffic interruptions, freedom to maneuver, driver comfort, convenience, safety and vehicle operating costs. Six levels of service have been established as standards by which to gauge roadway performance, designated by the letters A through F. The level of service categories are defined as follows:

- Level of Service A:* Free flow, individual users virtually unaffected by the presence of others
- Level of Service B:* Stable flow with a high degree of freedom to select operating conditions
- Level of Service C:* Flow remains stable, but with significant interactions with others
- Level of Service D:* High-density stable flow in which the freedom to maneuver is severely restricted
- Level of Service E:* This condition represents the capacity level of the road
- Level of Service F:* Forced flow in which the traffic exceeds the amount that can be served

The existing AADT for the study area roadway segment was obtained from FDOT’s Florida Transportation Information data. The existing p.m. peak-hour two-way LOS for the study area road segment is shown in Table 3. As indicated in Table 3 below, the study roadway segment currently operates within an acceptable LOS.

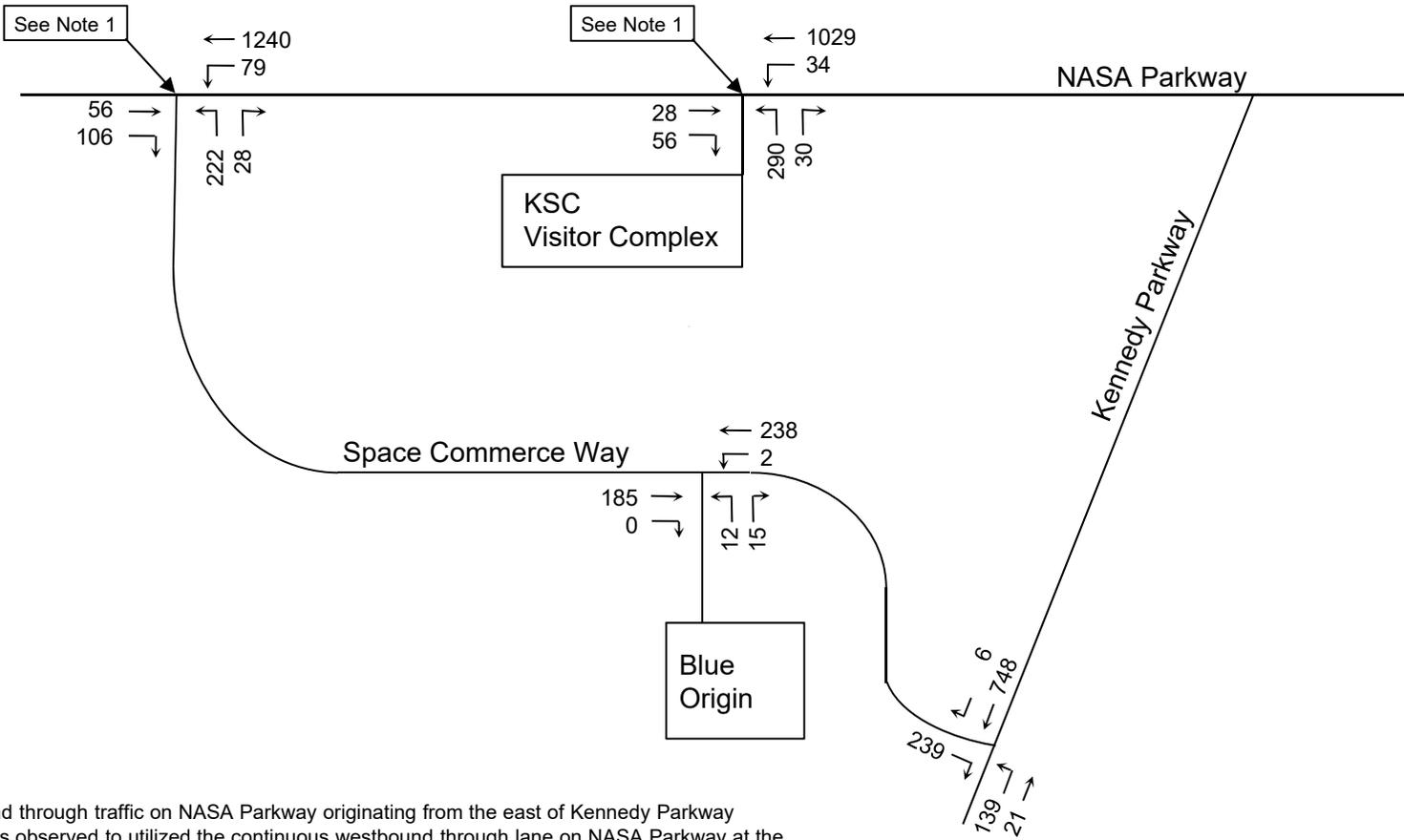
Table 3
Existing P.M. Peak-Hour Two-Way LOS - Roadway Segments
Space Commerce Way at Southern KSC Entrance

Roadway	Segment		Lanes	NASA Preferred LOS	Peak-Hour Two-Way Capacity for LOS	Existing Peak-Hour Two-Way Volume	LOS
	From	To					
Space Commerce Way	NASA Parkway	Kennedy Parkway	2	E	1,427	306	C



Notes:
 1: All westbound through traffic on NASA Parkway originating from the east of Kennedy Parkway intersection was observed to utilize the continuous westbound through lane on NASA Parkway at the northern KSC VIC access point and at Space Commerce Way; a nominal of 10% exiting from the KSC VIC north access point is assigned to the non-continuous through lane at Space Commerce Way.

KSC VIC Proposed Southern Entrance at Space Commerce Way		2017 Existing A.M. Peak Hour		
		Project No.:4324.03	Figure: 2	



Notes:
 1: All westbound through traffic on NASA Parkway originating from the east of Kennedy Parkway intersection was observed to utilize the continuous westbound through lane on NASA Parkway at the northern KSC VIC access point and at Space Commerce Way; a nominal of 10% exiting from the KSC VIC north access point is assigned to the non-continuous through lane at Space Commerce Way.

KSC VIC Proposed Southern Entrance at Space Commerce Way		2017 Existing P.M. Peak Hour		
		Project No.:4324.03	Figure: 3	

3

FUTURE TRAFFIC CONDITIONS

The critical intersections and roadway segment were analyzed to determine potential impacts based on 2018 opening year and 2035 design year conditions. The following documents the procedures used to determine the traffic for both analysis years.

The unique characteristics of the existing facilities and proposed developments within the study area required a hybrid approach in estimating the future traffic volumes. Linear average growth was used for those existing facilities where future growth trends could be estimated from historical records and client data. For other developments ITE trip generation rates were developed based on the anticipated land use and intensity:

- KSC VIC (growth rate)
- NASA/Cape Canaveral (growth rate)
- Blue Origin (ITE trip generation)
- Space Florida/Exploration Park (ITE trip generation)

Background Traffic Growth Rates

Growth rates for the KSC VIC, NASA KSC, Cape Canaveral AFB were determined via extrapolation of current growth data. KSC VIC traffic growth data was interpolated from the projected annual attendance from 2016 to 2035. Table 4 identifies the KSC VIC growth data utilized. The raw growth data is found in **Appendix F**.

**Table 4
KSC VIC Growth Rates
Space Commerce Way at Southern KSC Entrance**

Year	Sample Month (July)*	2017 %Δ
2017	177,080	NA
2018	182,392	3%
2035	357,317	202%

*Same %Δ for all months of data

NASA KSC and Cape Canaveral AFB growth data was determined via analysis of the latest Central Florida Regional Planning Model (CFRPM). Employment projections in the model's Traffic Analysis Zones (TAZ) were analyzed for years 2020 and 2040. With this data, annualized growth rates were calculated as shown in Table 5. The raw data is found in **Appendix G**.

**Table 5
NASA/Cape Canaveral AFB Growth Rates
Space Commerce Way at Southern KSC Entrance**

Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)			TAZ 2995 (NASA)		Total
	Indust.	Service	Comm.	Indust.	Service	Indust.	Service	
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (Minimum 2% Applied)								1.97%

Trip Generation Growth

The total trip generation for the Blue Origin development was determined using the trip generation rates contained in the *Institute of Transportation Engineers (ITE) 9th edition of the Trip Generation Manual*. Table 6 shows the anticipated total daily, a.m. and p.m. peak-hour trip generation for the development under 2018 and 2035 conditions.

Table 6
Blue Origin Trip Generation
Space Commerce Way at Southern KSC Entrance

	Time Period	Generator	ITE Land Use Code	Trip Rate Equation	Units (X) Employees	Total Trips (T)	Percent Enter	Percent Exit	Trips Entering	Trips Exiting
2018	Daily	Manufacturing	140	$T = 1.75(X) + 245.96$	175	552	50%	50%	276	276
	AM Peak-Hour	Manufacturing	140	$\ln(T) = 0.85 \ln(X) + 0.07$	175	87	73%	27%	64	23
	PM Peak-Hour	Manufacturing	140	$\ln(T) = 0.78 \ln(X) + 0.48$	175	91	44%	56%	40	51
2035	Daily	Manufacturing	140	$T = 1.75(X) + 245.96$	350	859	50%	50%	430	429
	AM Peak-Hour	Manufacturing	140	$\ln(T) = 0.85 \ln(X) + 0.07$	350	156	73%	27%	114	42
	PM Peak-Hour	Manufacturing	140	$\ln(T) = 0.78 \ln(X) + 0.48$	350	156	44%	56%	69	87

The total trip generation for the Space Florida/Exploration Park component development was also determined using the trip generation rates contained in the *Institute of Transportation Engineers (ITE) 9th edition of the Trip Generation Manual*. Table 7 shows the total daily, a.m. and p.m. peak-hour trip generation for component under 2035 conditions. It should be noted that there is no anticipated growth of this component for 2018 conditions.

Table 7
Space Florida/Exploration Park Trip Generation
Space Commerce Way at Southern KSC Entrance

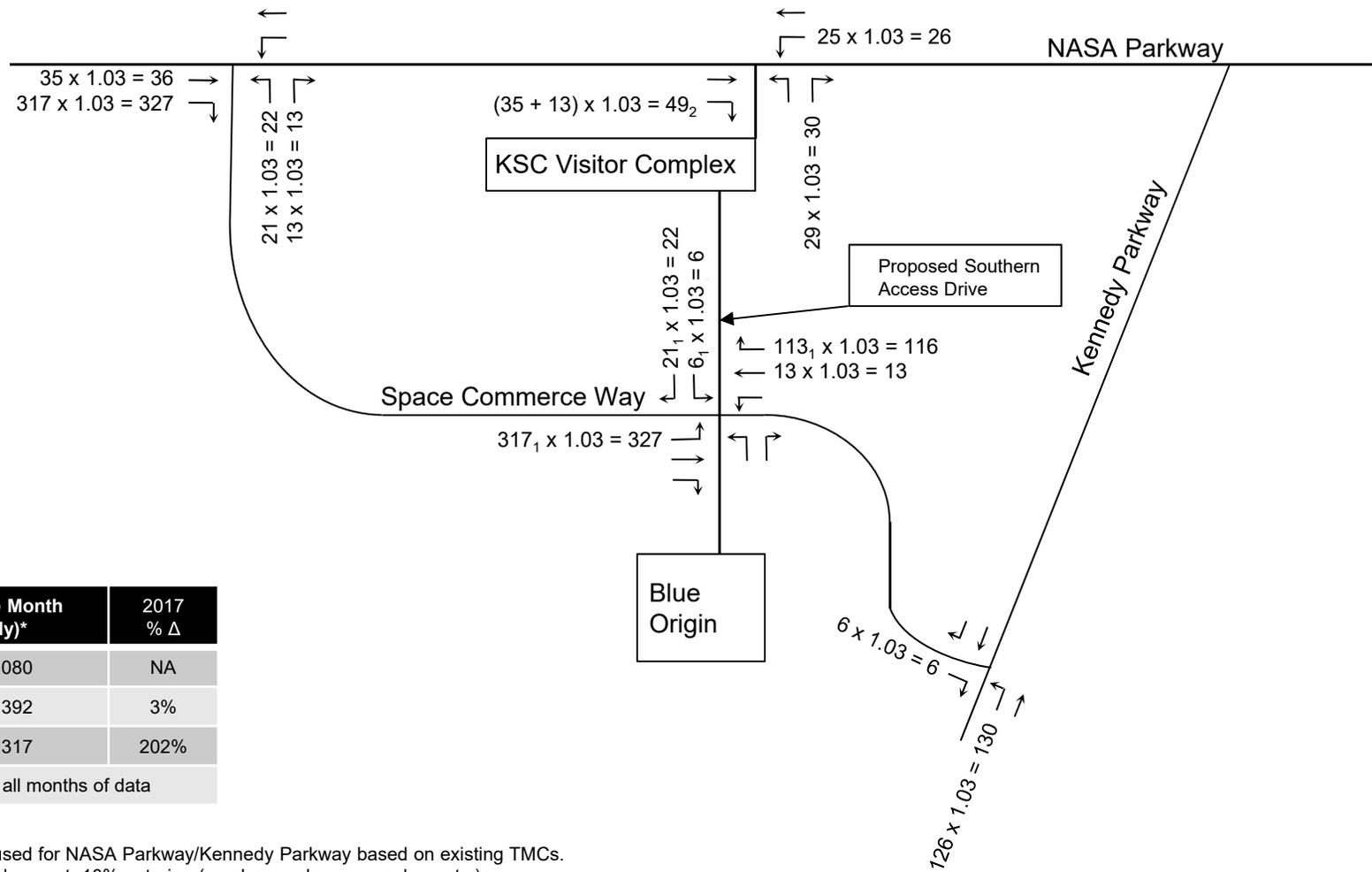
	Time Period	Generator	ITE Land Use Code	Trip Rate Equation	Units (X) Employees	Total Trips (T)	Percent Enter	Percent Exit	Trips Entering	Trips Exiting
2035	Daily	Corporate Headquarters Building	714	$\ln(T) = 0.97 \ln(X) + 2.23$	322	2,518	50%	50%	1,260	1,258
	AM Peak-Hour	Corporate Headquarters Building	714	$T = 1.52(X)$	322	489	93%	7%	455	34
	PM Peak-Hour	Corporate Headquarters Building	714	$T = 1.41(X)$	322	454	10%	90%	46	408

Trip Distribution

The process of determining the directional flow of traffic associated with a new development is called trip distribution. Each component's trip distribution was determined based on the directional distribution of existing traffic and modified to account for future developments in the study area. The anticipated distribution for each development is shown with future volumes in Figures 4-19.

Trip Assignment

The final step in the analysis was to assign the future traffic to the road network per each component. Figure 20-23 graphically depicts the a.m. and p.m. peak-hour traffic assignment for each component, as well as total combined future a.m. and p.m. traffic volumes.

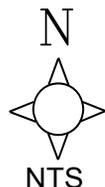


Year	Sample Month (July)*	2017 % Δ
2017	177,080	NA
2018	182,392	3%
2035	357,317	202%

*Same % Δ for all months of data

Notes:
 1: A 75/25 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
 2: Per engineering judgement, 10% entering (employees, buses, vendors, etc.) was used at the northern VIC access point.

KSC VIC Proposed Southern Entrance at Space Commerce Way



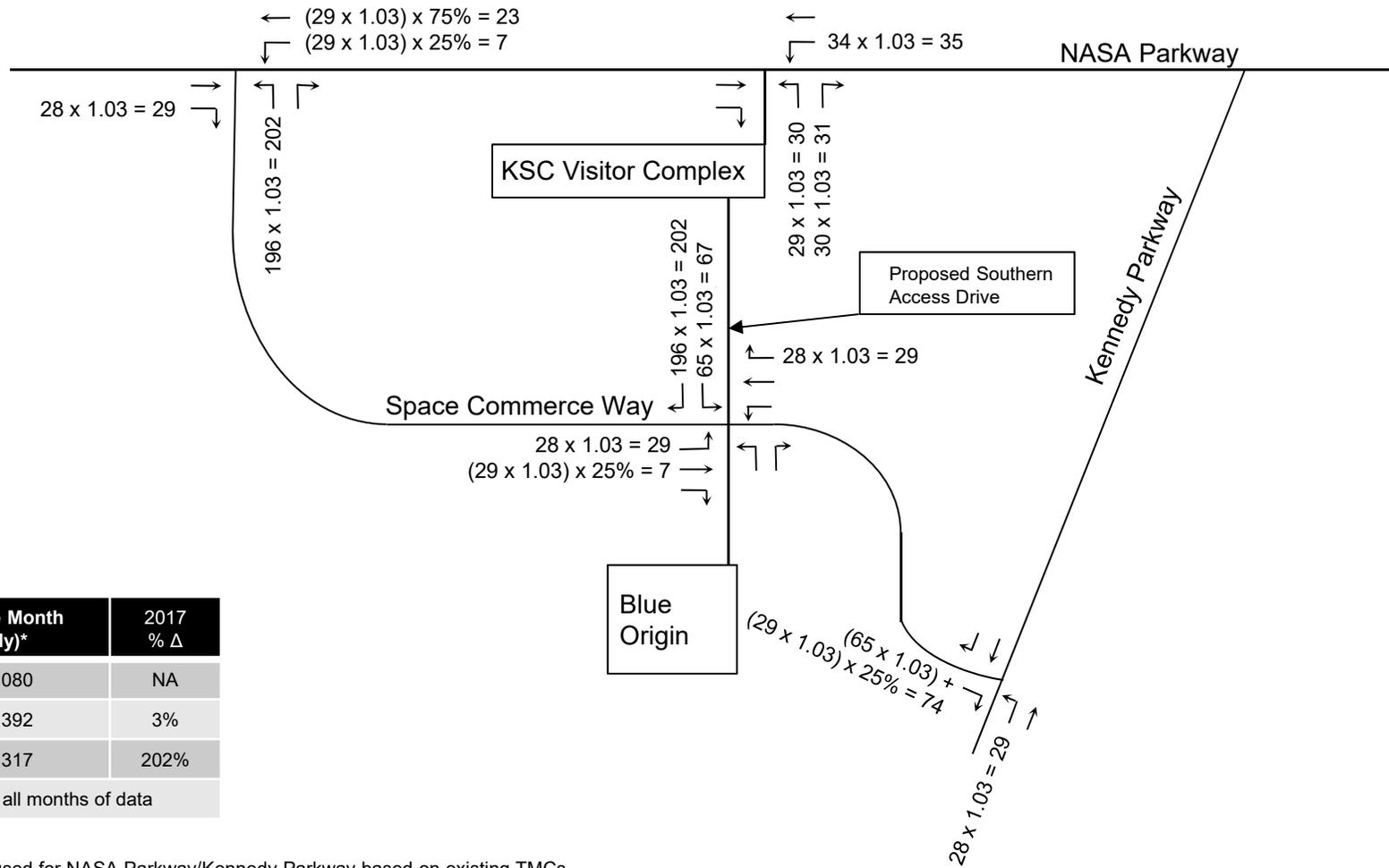
A.M. 2018 VIC Background Traffic

Project No.:4324.03

Figure: 4



1970 Dairy Road, West Melbourne, Florida 32904
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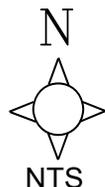
Year	Sample Month (July)*	2017 % Δ
2017	177,080	NA
2018	182,392	3%
2035	357,317	202%

*Same % Δ for all months of data

Notes:

- 1: A 75/25 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 10% entering (employees, buses, vendors, etc.) was used at the northern VIC access point.

KSC VIC Proposed Southern Entrance at Space Commerce Way



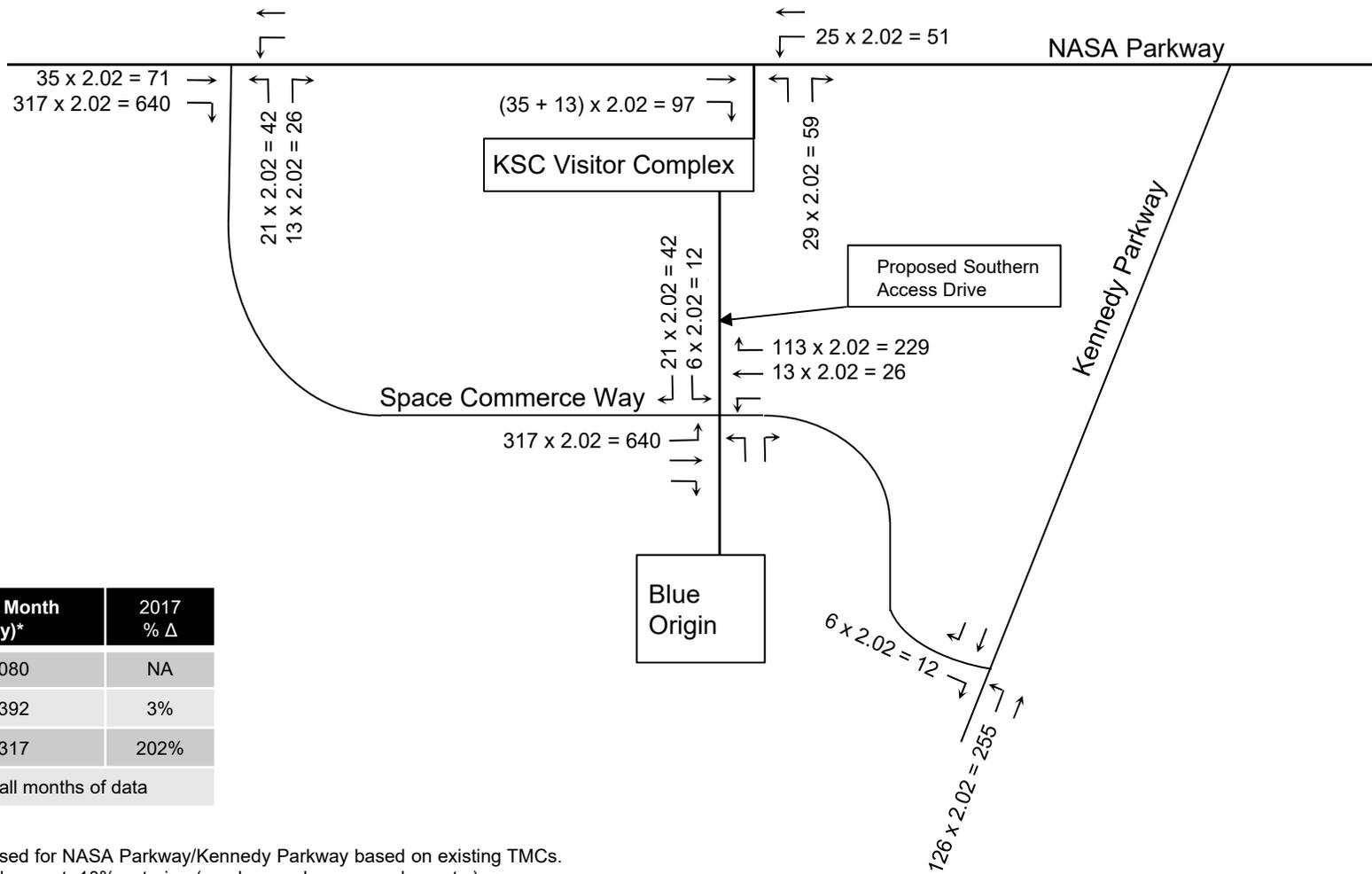
P.M. 2018 VIC Background Traffic

Project No.:4324.03

Figure: 5



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



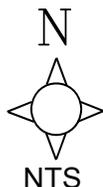
Year	Sample Month (July)*	2017 % Δ
2017	177,080	NA
2018	182,392	3%
2035	357,317	202%

*Same % Δ for all months of data

Notes:

- 1: A 75/25 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 10% entering (employees, buses, vendors, etc.) was used at the northern VIC access point.

KSC VIC Proposed Southern Entrance at Space Commerce Way



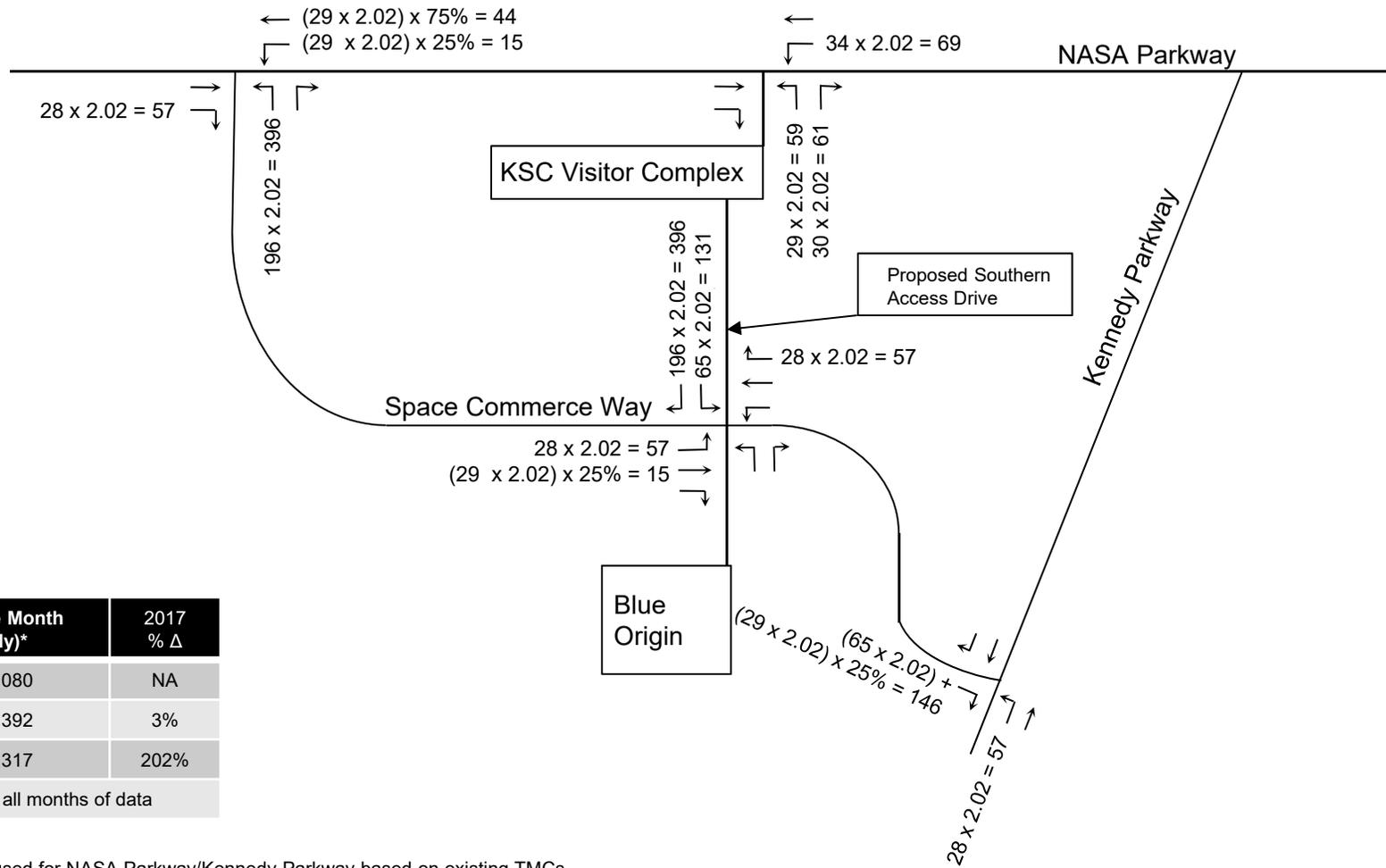
A.M. 2035 VIC Background Traffic

Project No.:4324.03

Figure: 6



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



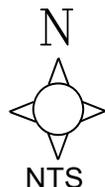
Year	Sample Month (July)*	2017 % Δ
2017	177,080	NA
2018	182,392	3%
2035	357,317	202%

*Same % Δ for all months of data

Notes:

- 1: A 75/25 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 10% entering (employees, buses, vendors, etc.) was used at the northern VIC access point.

KSC VIC Proposed Southern Entrance at Space Commerce Way



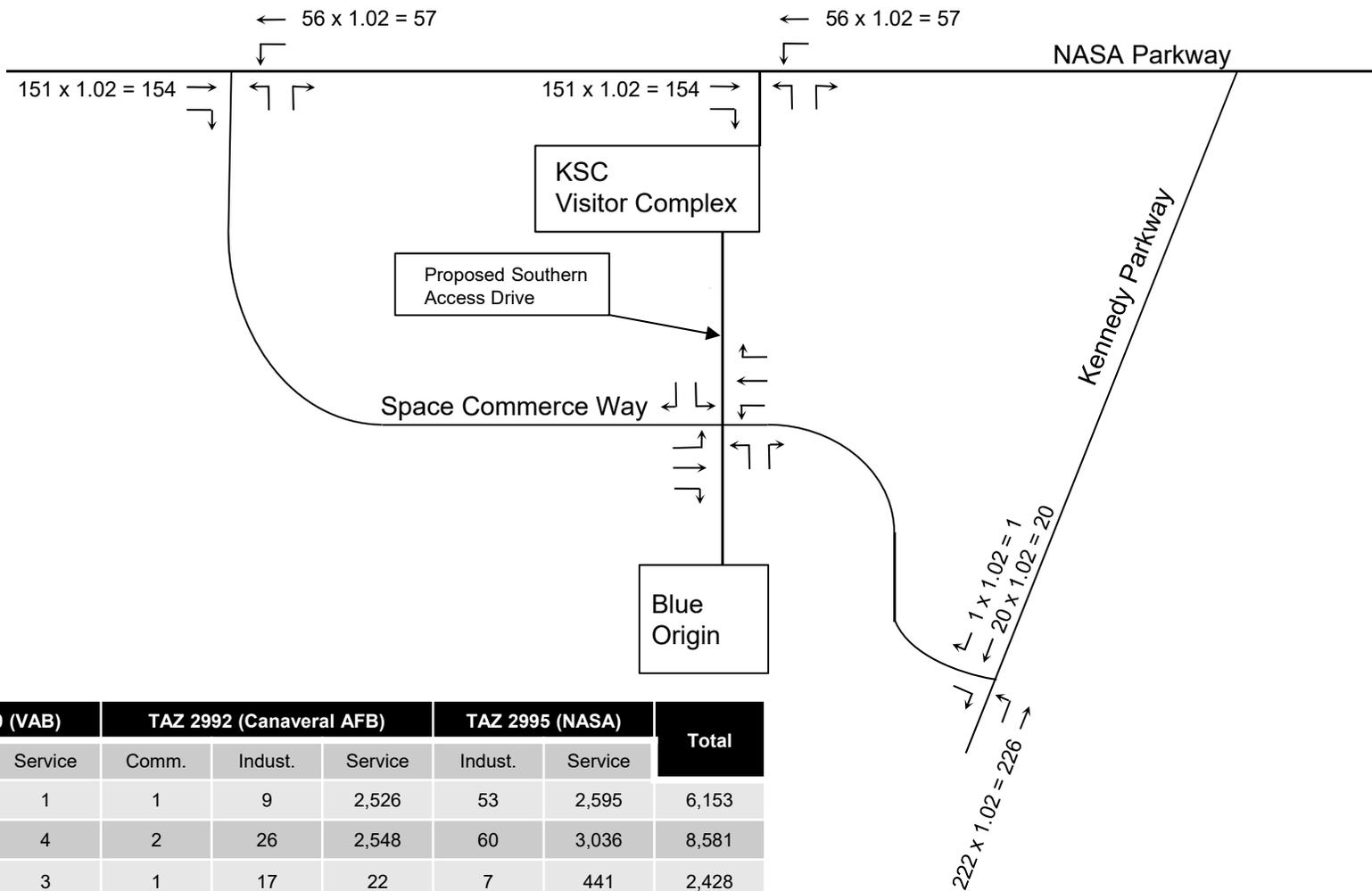
P.M. 2035 VIC Background Traffic

Project No.:4324.03

Figure: 7

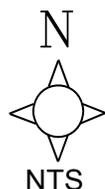


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)		TAZ 2995 (NASA)		Total	
	Indust.	Service	Comm.	Indust.	Service	Indust.		Service
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):								1.97%*

KSC VIC Proposed Southern Entrance at Space Commerce Way



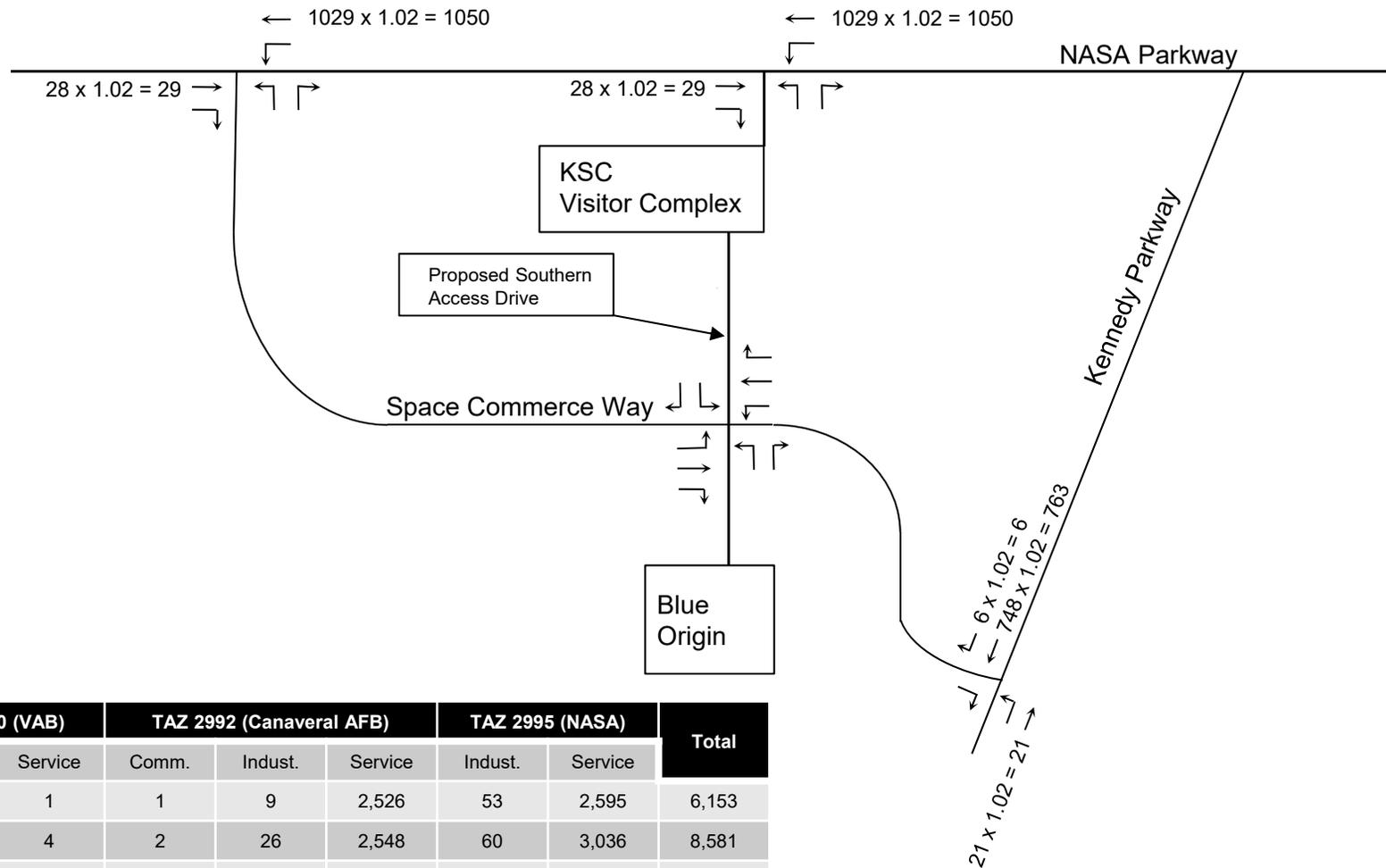
A.M. 2018 NASA Background Traffic

Project No.:4324.03

Figure: 8

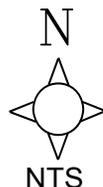


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)		TAZ 2995 (NASA)		Total	
	Indust.	Service	Comm.	Indust.	Service	Indust.		Service
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):								1.97%*

KSC VIC Proposed Southern Entrance at Space Commerce Way



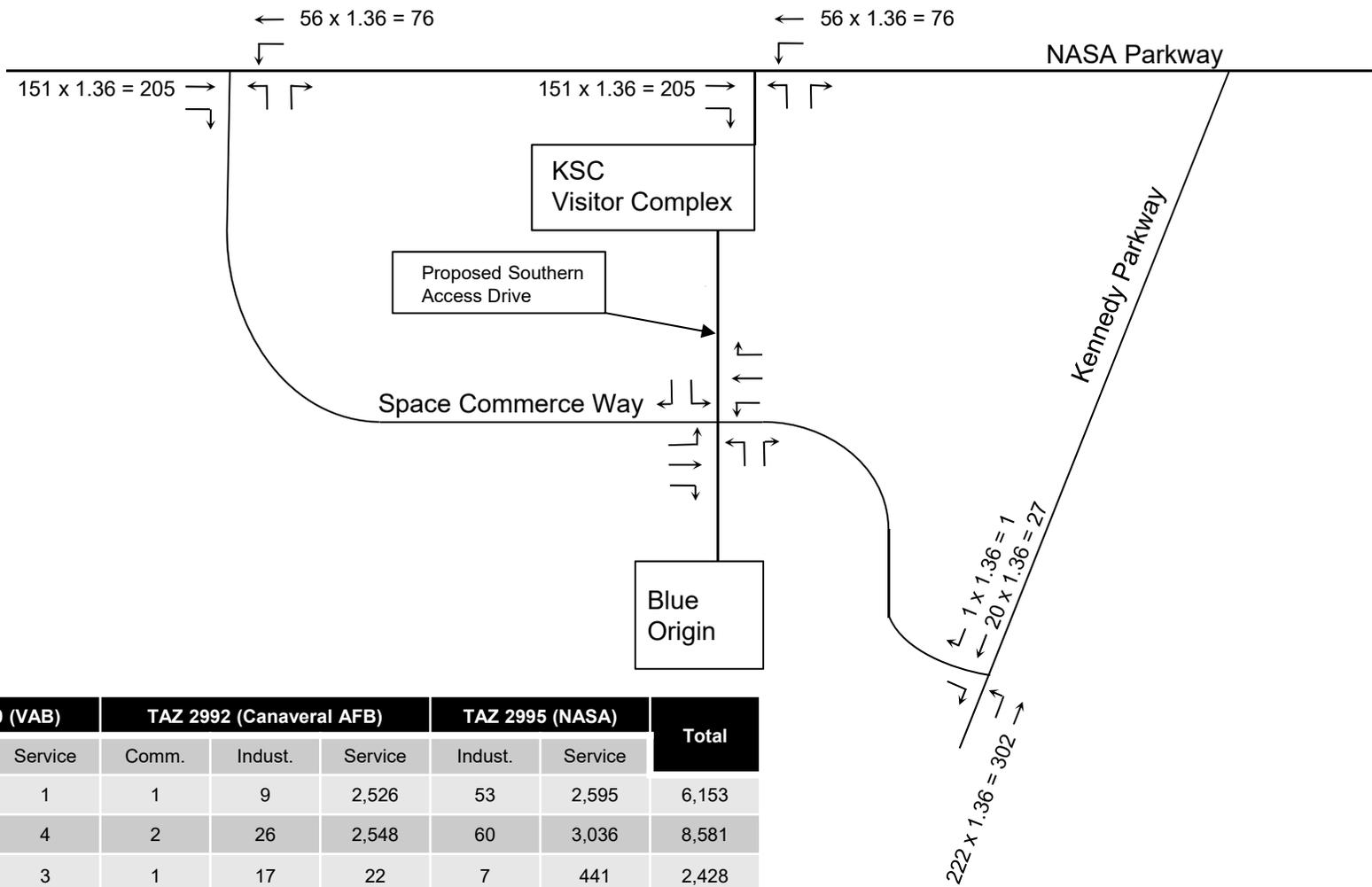
P.M. 2018 NASA Background Traffic



Project No.:4324.03

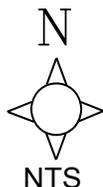
Figure: 9

1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)		TAZ 2995 (NASA)		Total	
	Indust.	Service	Comm.	Indust.	Service	Indust.		Service
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):								1.97%*

KSC VIC Proposed Southern Entrance at Space Commerce Way



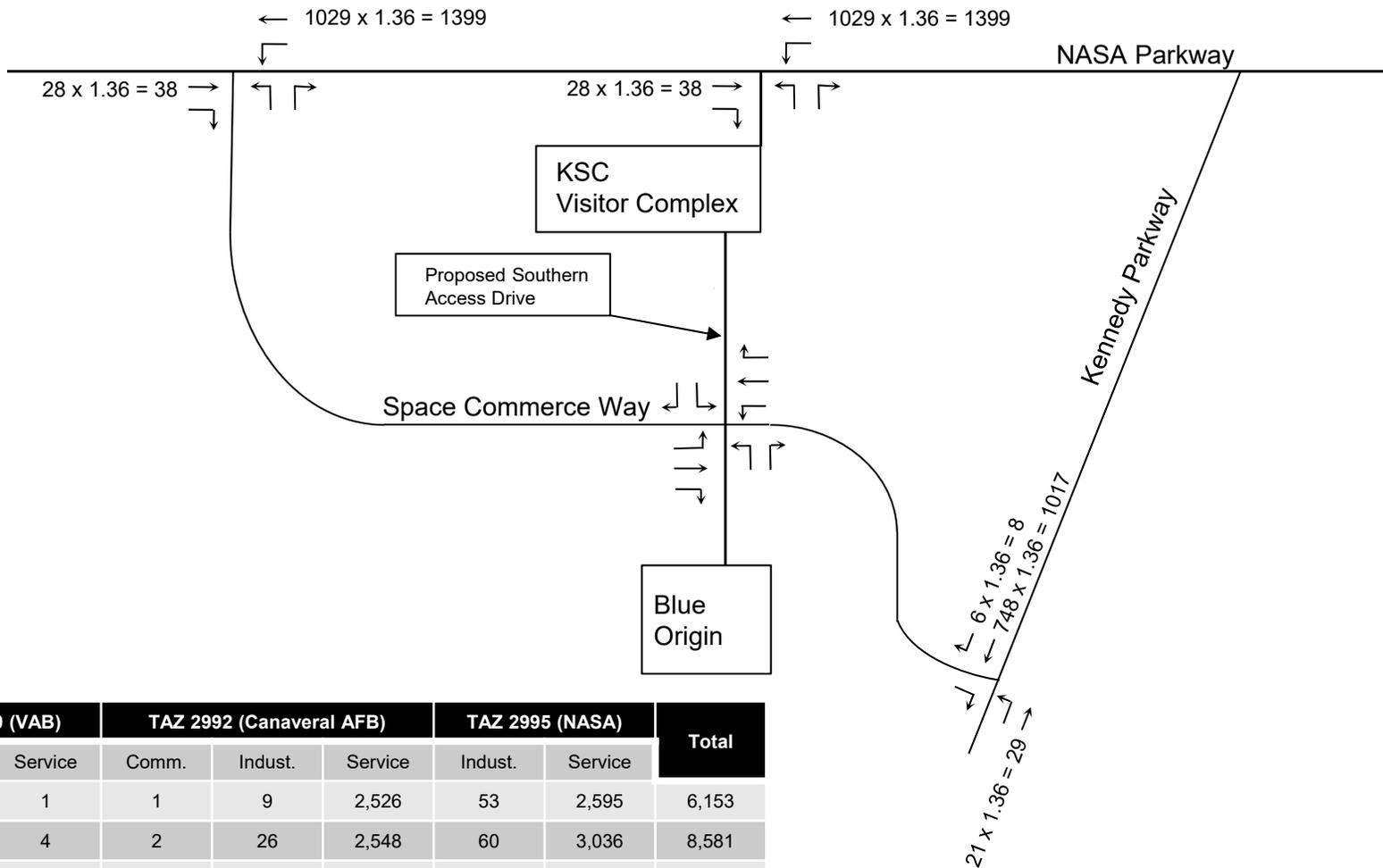
A.M. 2035 NASA Background Traffic

Project No.: 4324.03

Figure: 10

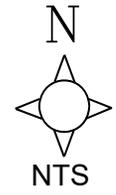


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)		TAZ 2995 (NASA)		Total	
	Indust.	Service	Comm.	Indust.	Service	Indust.		Service
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):								1.97%*

KSC VIC Proposed Southern Entrance at Space Commerce Way



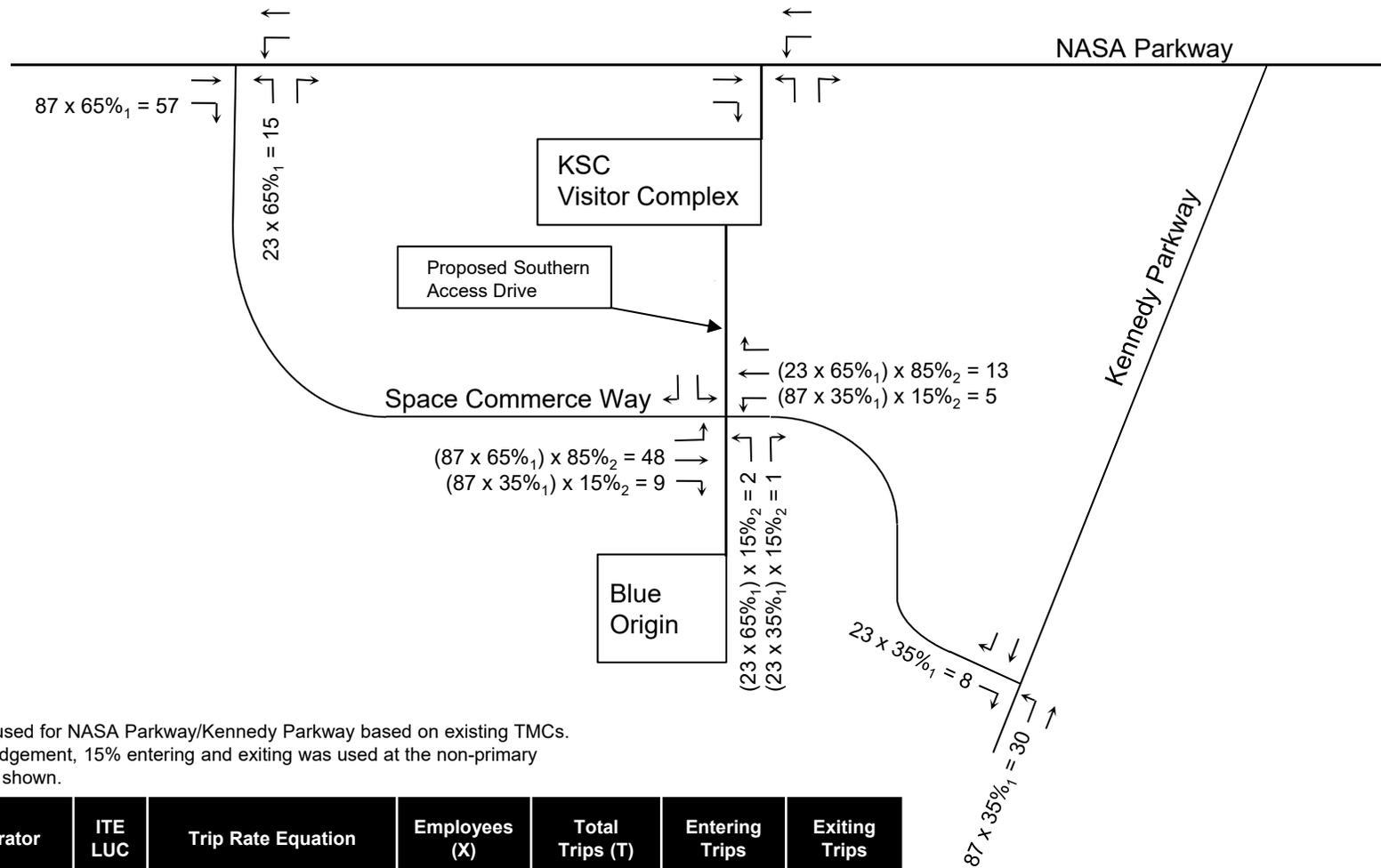
P.M. 2035 NASA Background Traffic



Project No.:4324.03

Figure: 11

1970 Dairy Road, West Melbourne, Florida 32904
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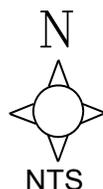


Notes:

- 1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

Time Period	Generator	ITE LUC	Trip Rate Equation	Employees (X)	Total Trips (T)	Entering Trips	Exiting Trips
AM PH	Manufacturing	140	$\ln(T) = 0.85 \ln(X) + 0.07$	175	87	64	23

KSC VIC Proposed Southern Entrance at Space Commerce Way



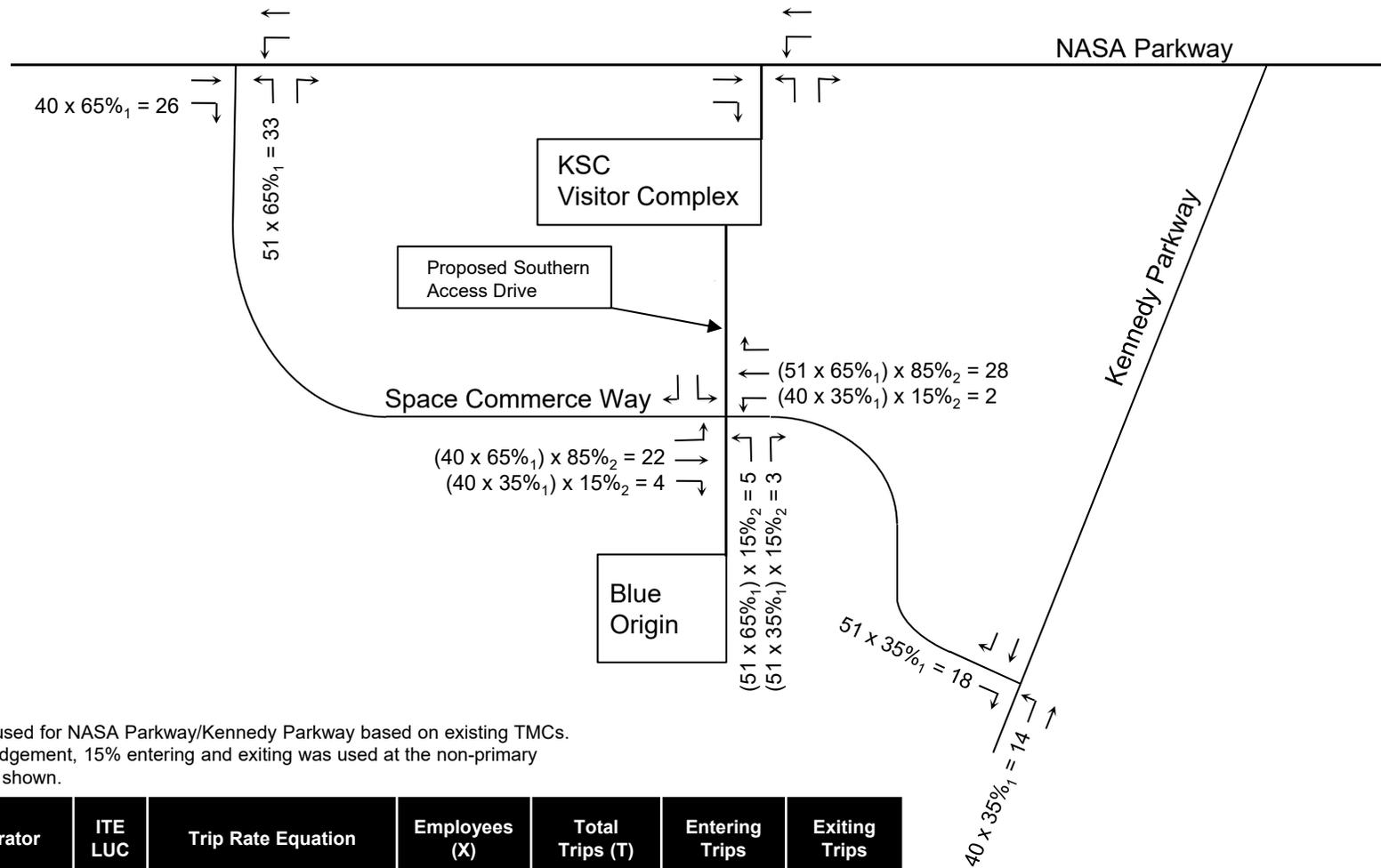
A.M. 2018 Blue Origin Traffic

Project No.:4324.03

Figure: 12



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227

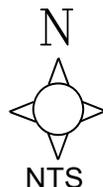


Notes:

- 1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

Time Period	Generator	ITE LUC	Trip Rate Equation	Employees (X)	Total Trips (T)	Entering Trips	Exiting Trips
PM PH	Manufacturing	140	$\ln(T) = 0.78 \ln(X) + 0.48$	175	91	40	51

KSC VIC Proposed Southern Entrance at Space Commerce Way



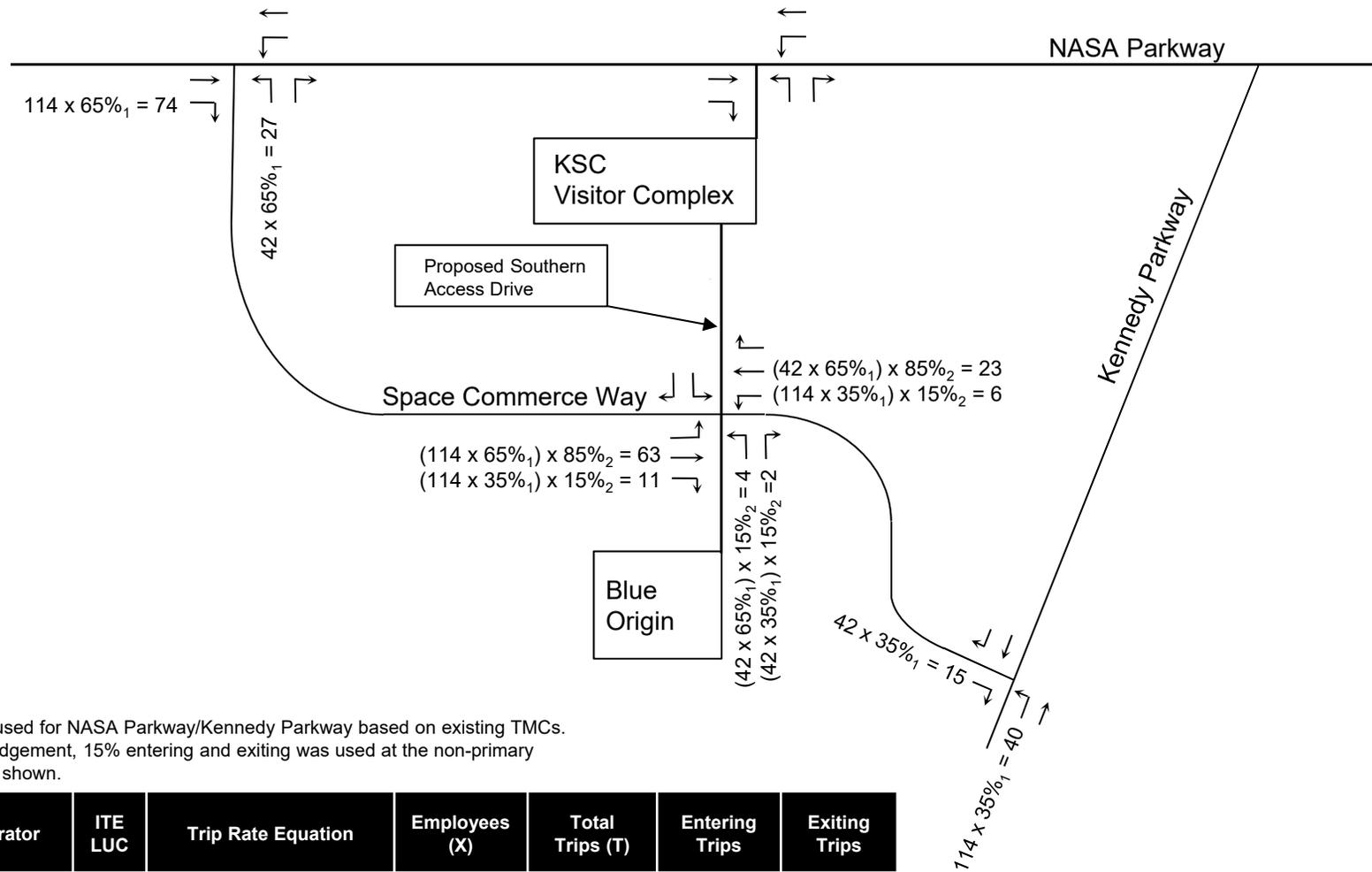
P.M. 2018 Blue Origin Traffic

Project No.:4324.03

Figure: 13



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227

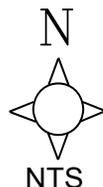


Notes:

- 1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

Time Period	Generator	ITE LUC	Trip Rate Equation	Employees (X)	Total Trips (T)	Entering Trips	Exiting Trips
AM PH	Manufacturing	140	$\ln(T) = 0.85 \ln(X) + 0.07$	350	156	114	42

KSC VIC Proposed Southern Entrance at Space Commerce Way



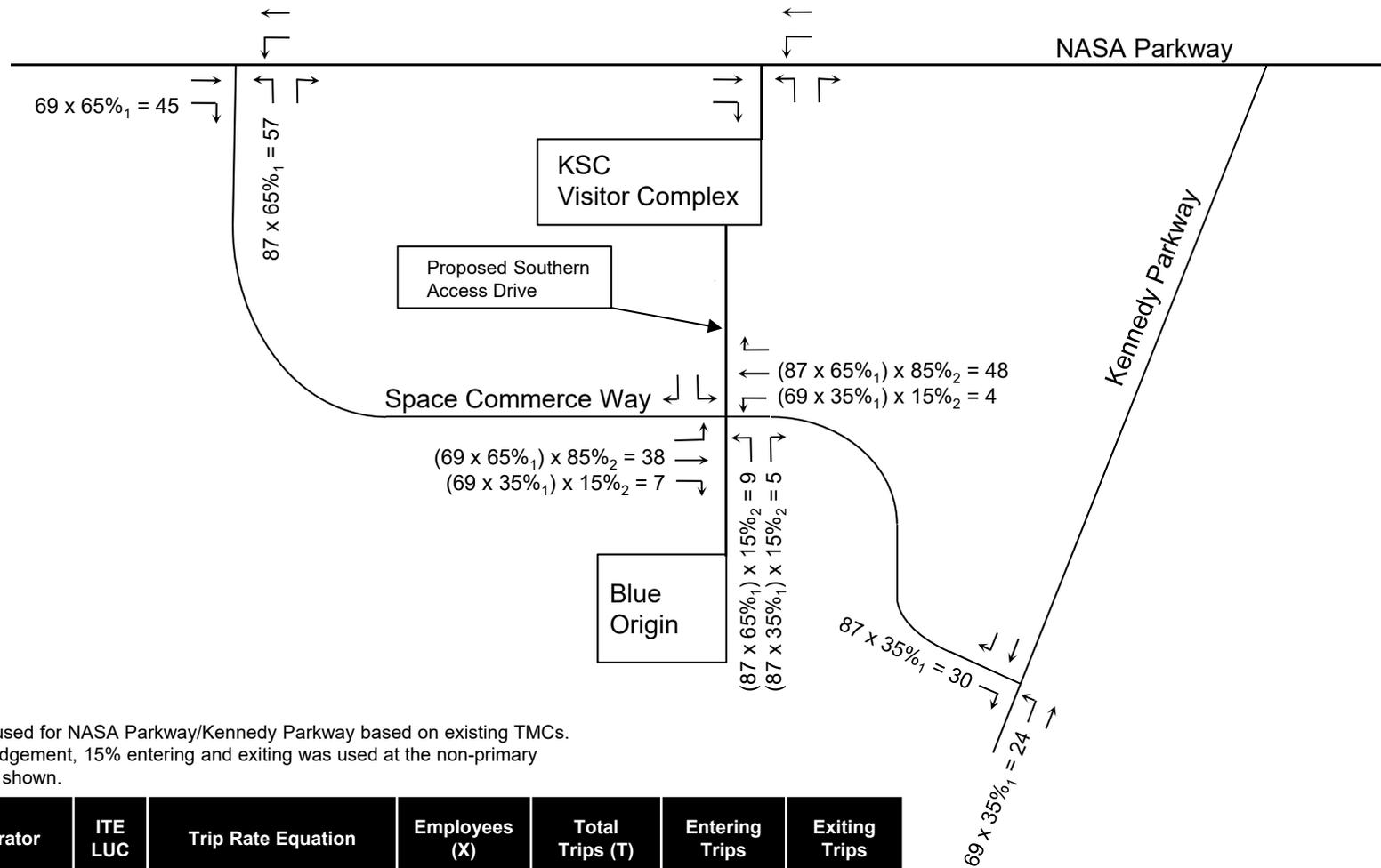
A.M. 2035 Blue Origin Traffic

Project No.:4324.03

Figure: 14



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227

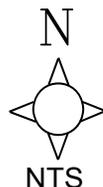


Notes:

- 1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
- 2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

Time Period	Generator	ITE LUC	Trip Rate Equation	Employees (X)	Total Trips (T)	Entering Trips	Exiting Trips
PM PH	Manufacturing	140	$\ln(T) = 0.78 \ln(X) + 0.48$	350	156	69	87

KSC VIC Proposed Southern Entrance at Space Commerce Way



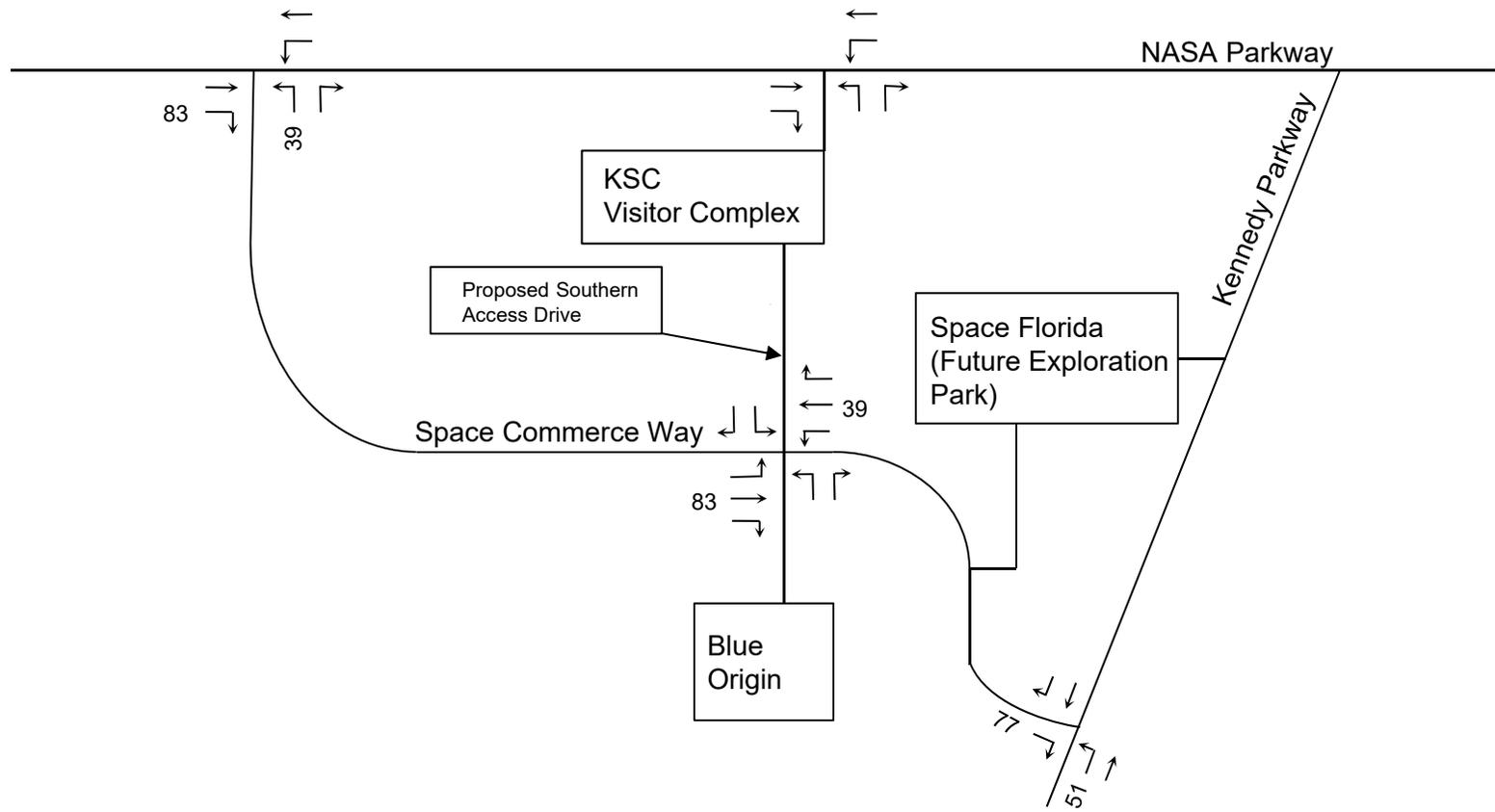
P.M. 2035 Blue Origin Traffic

Project No.:4324.03

Figure: 15

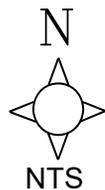


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 2018 growth rate/trip generation not applied to existing Space Commerce Way traffic due to Space Florida/Exploration Park build-out not complete until after 2018.

KSC VIC Proposed Southern Entrance at Space Commerce Way



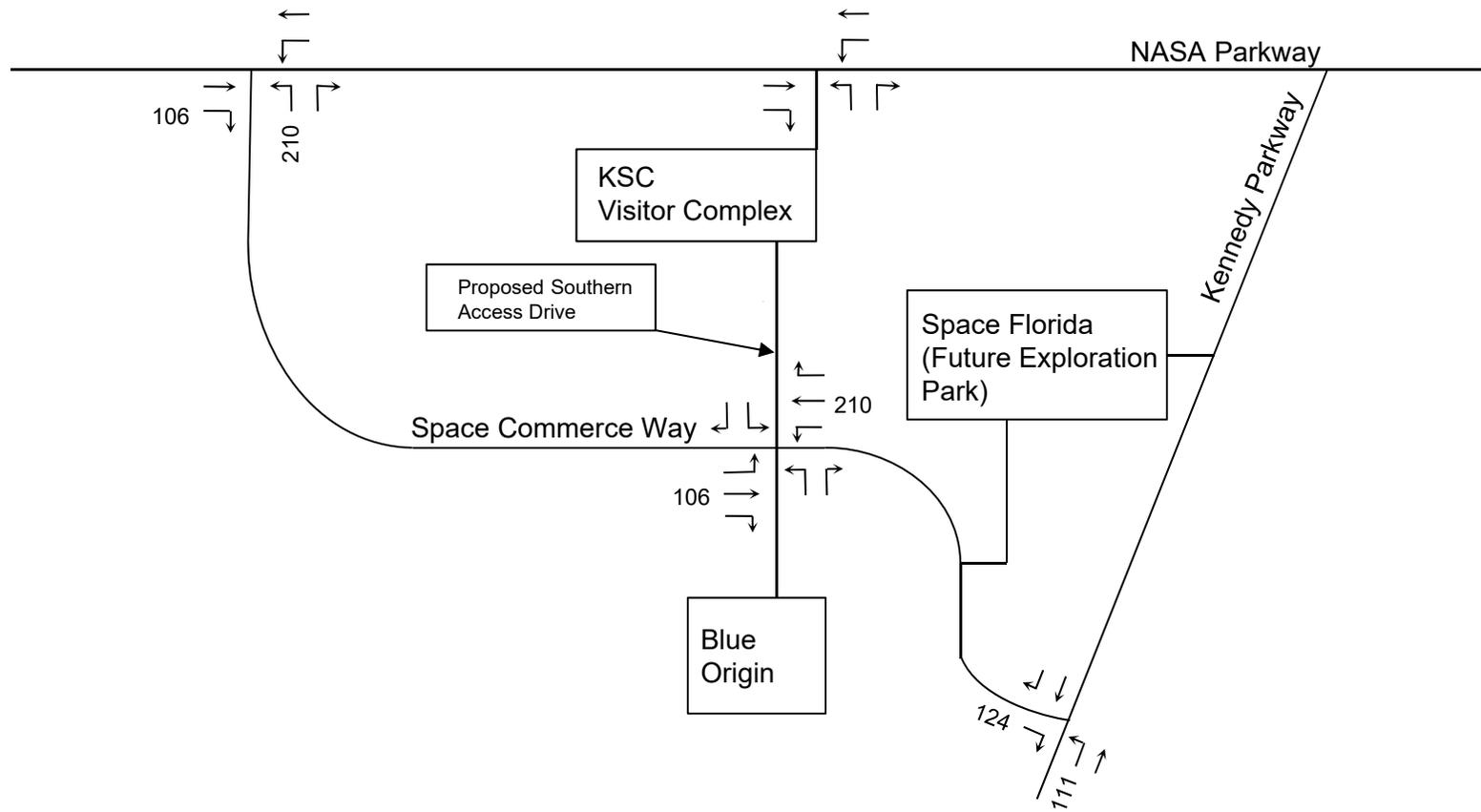
A.M. 2018 Space Florida/Exploration Park Traffic

Project No.:4324.03

Figure: 16

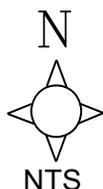


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 2018 growth rate/trip generation not applied to existing Space Commerce Way traffic due to Space Florida/Exploration Park build-out not complete until after 2018.

KSC VIC Proposed Southern Entrance at Space Commerce Way



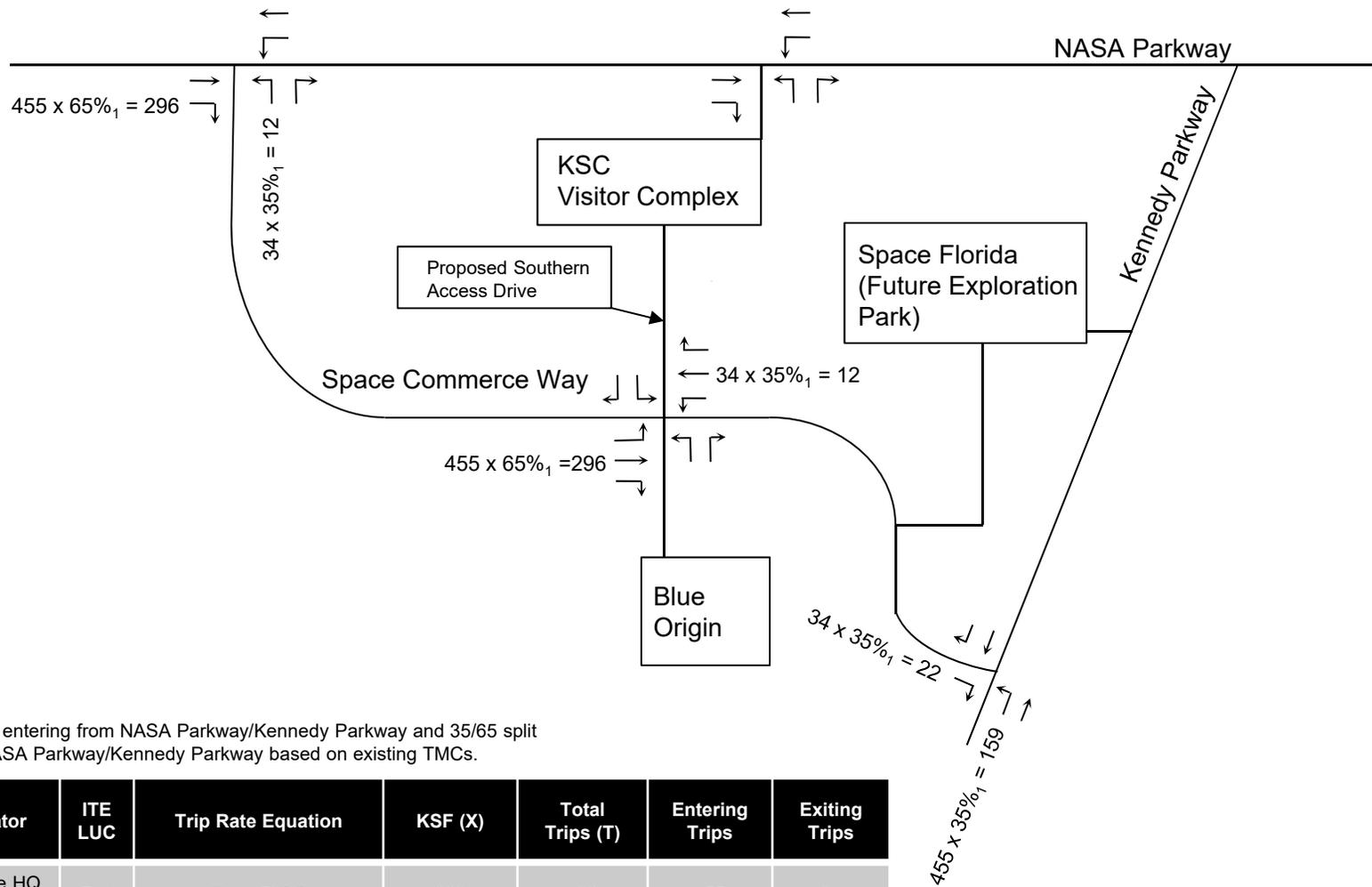
P.M. 2018 Space Florida/Exploration Park Traffic

Project No.:4324.03

Figure: 17



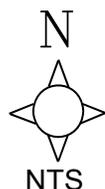
1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 1: 65/35 split used for entering from NASA Parkway/Kennedy Parkway and 35/65 split used for exiting on NASA Parkway/Kennedy Parkway based on existing TMCs.

Time Period	Generator	ITE LUC	Trip Rate Equation	KSF (X)	Total Trips (T)	Entering Trips	Exiting Trips
AM PH	Corporate HQ Building	714	$T = 1.52(X)$	322	489	455	34

KSC VIC Proposed Southern Entrance at Space Commerce Way



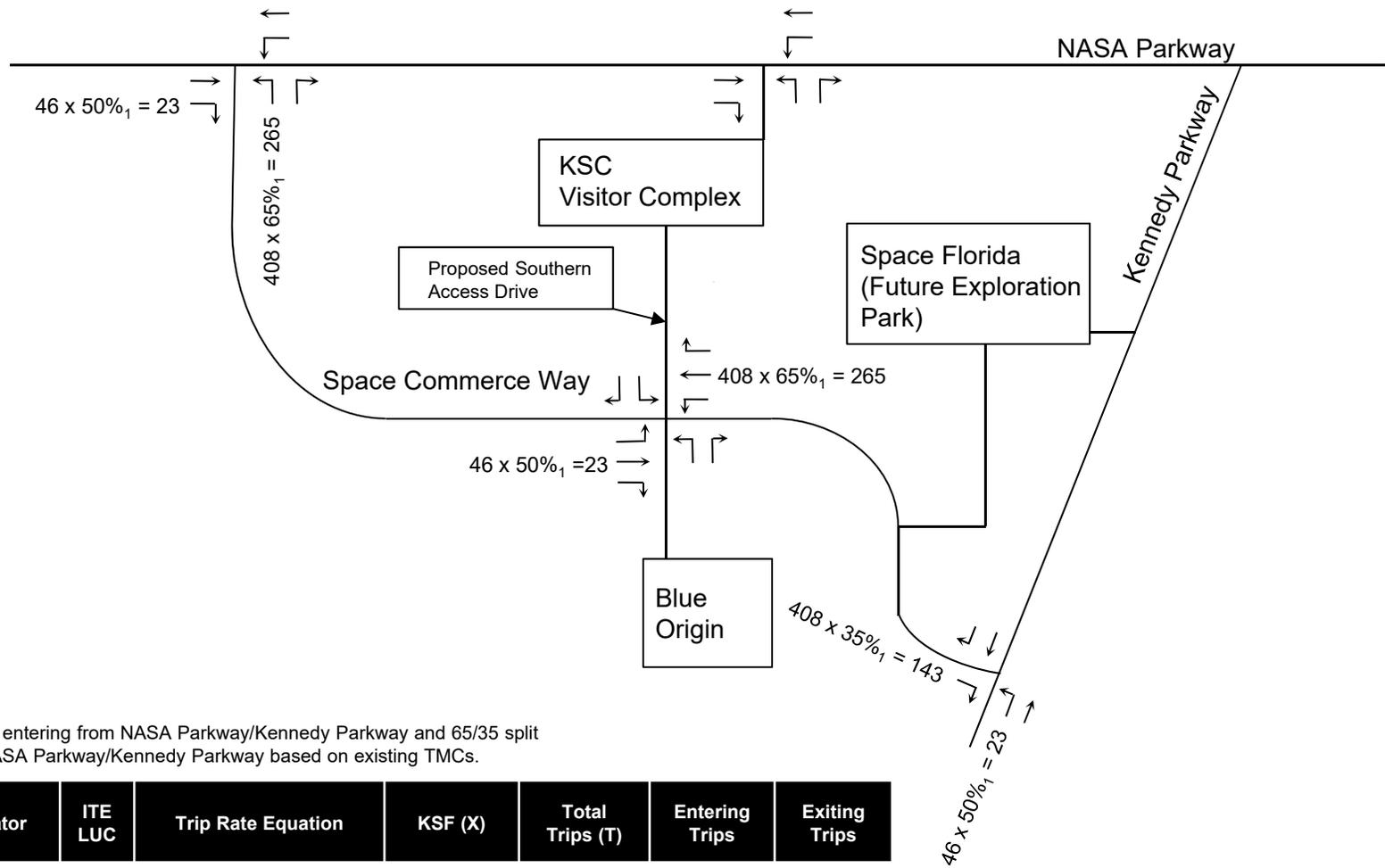
A.M. 2035 Space Florida/Exploration Park Traffic

Project No.:4324.03

Figure: 18



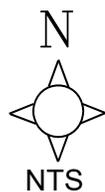
1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 1: 50/50 split used for entering from NASA Parkway/Kennedy Parkway and 65/35 split used for exiting on NASA Parkway/Kennedy Parkway based on existing TMCs.

Time Period	Generator	ITE LUC	Trip Rate Equation	KSF (X)	Total Trips (T)	Entering Trips	Exiting Trips
AM PH	Corporate HQ Building	714	$T = 1.41(X)$	322	454	46	408

KSC VIC Proposed Southern Entrance at Space Commerce Way



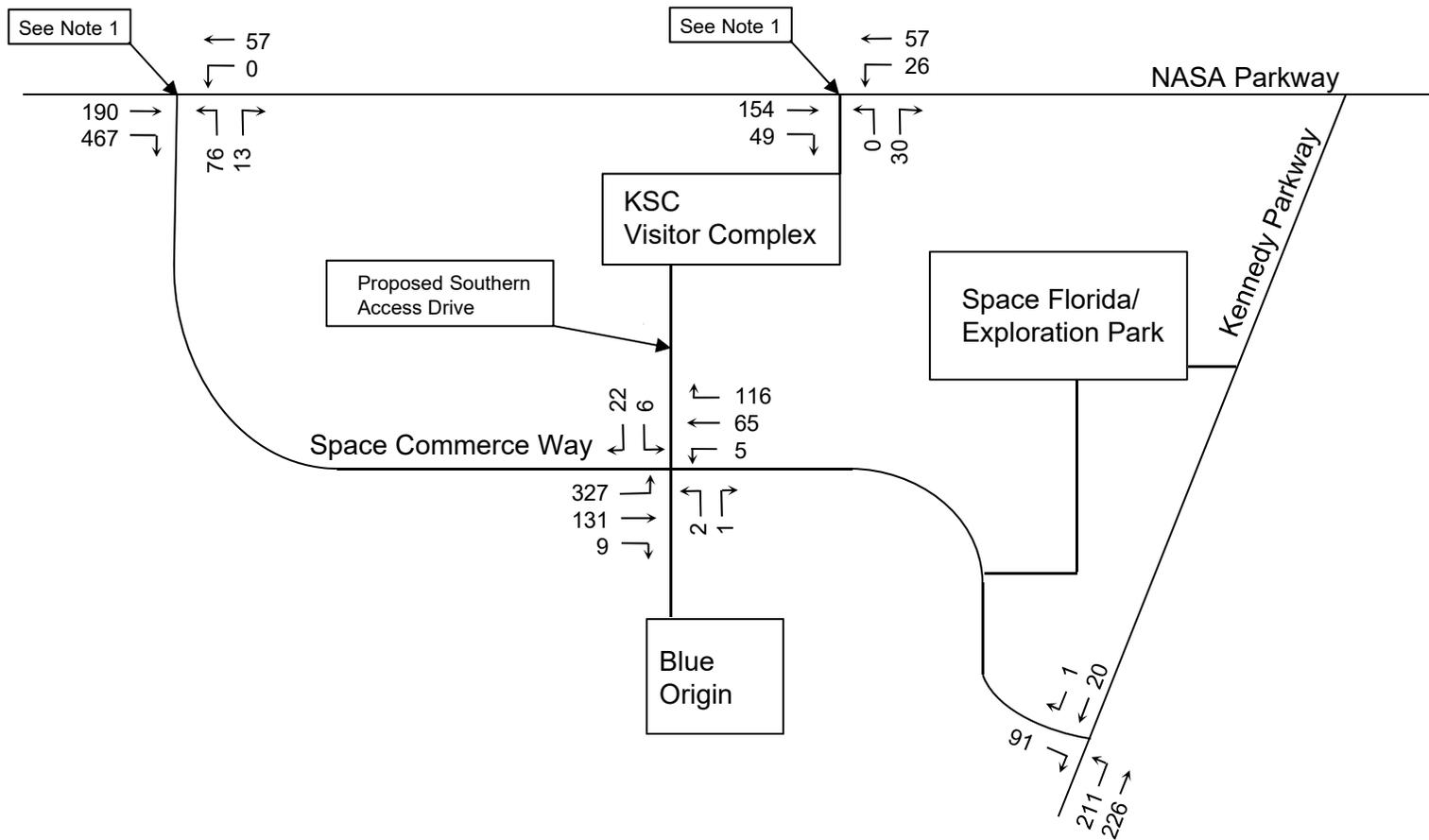
P.M. 2035 Space Florida/Exploration Park Traffic

Project No.:4324.03

Figure: 19

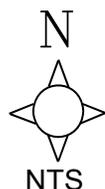


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 1: Existing traffic delineators in westbound approach anticipated to be removed for Blue Origin payload vehicle path; continuous westbound through movement removed.

**KSC VIC Proposed
 Southern Entrance at
 Space Commerce Way**



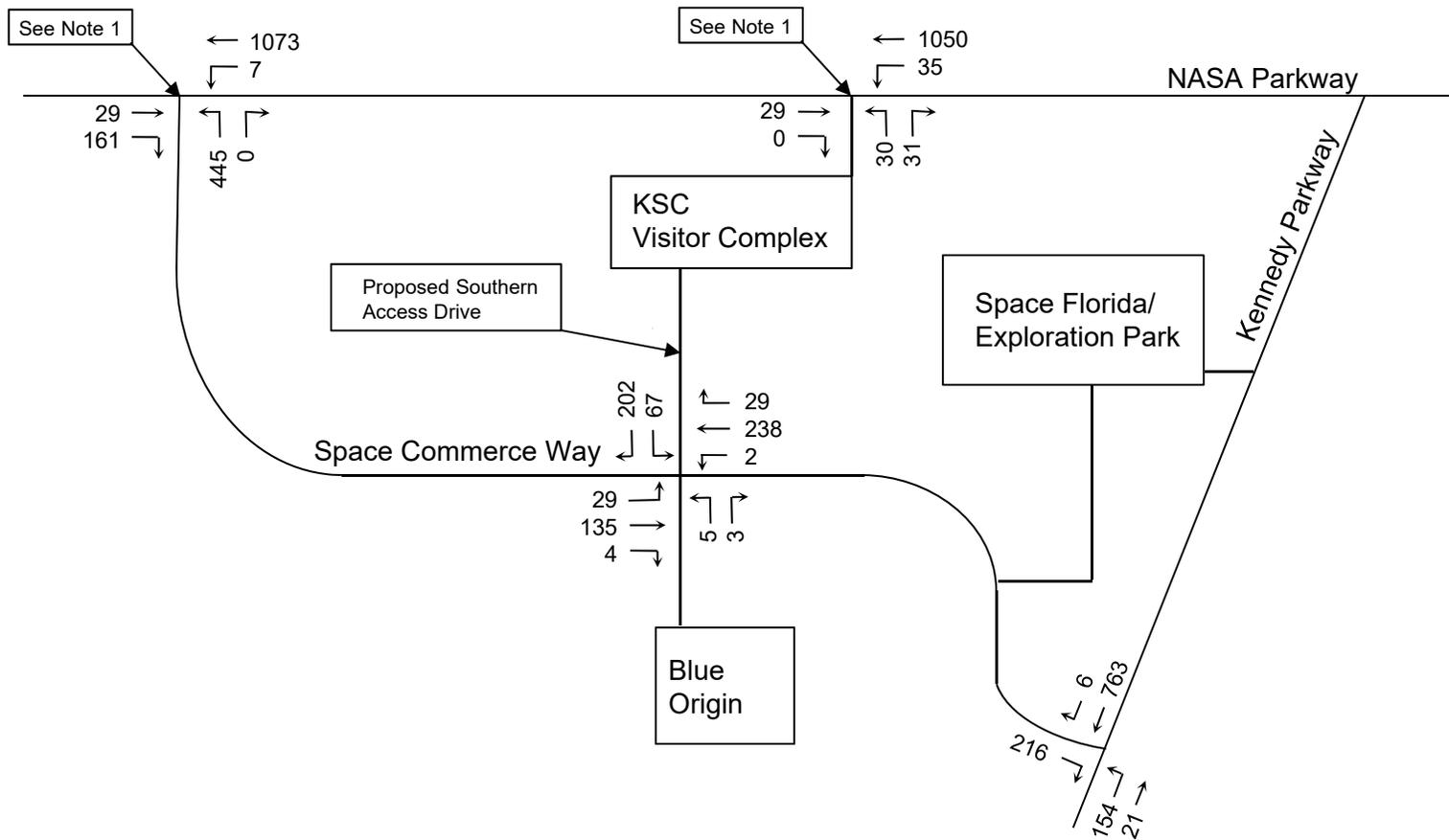
2018 A.M. Peak Hour Traffic

Project No.:4324.03

Figure: 20

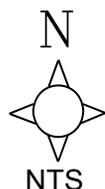


1970 Dairy Road, West Melbourne, Florida 32904
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Notes:
 1: Existing traffic delineators in westbound approach anticipated to be removed for Blue Origin payload vehicle path; continuous westbound through movement removed.

KSC VIC Proposed Southern Entrance at Space Commerce Way



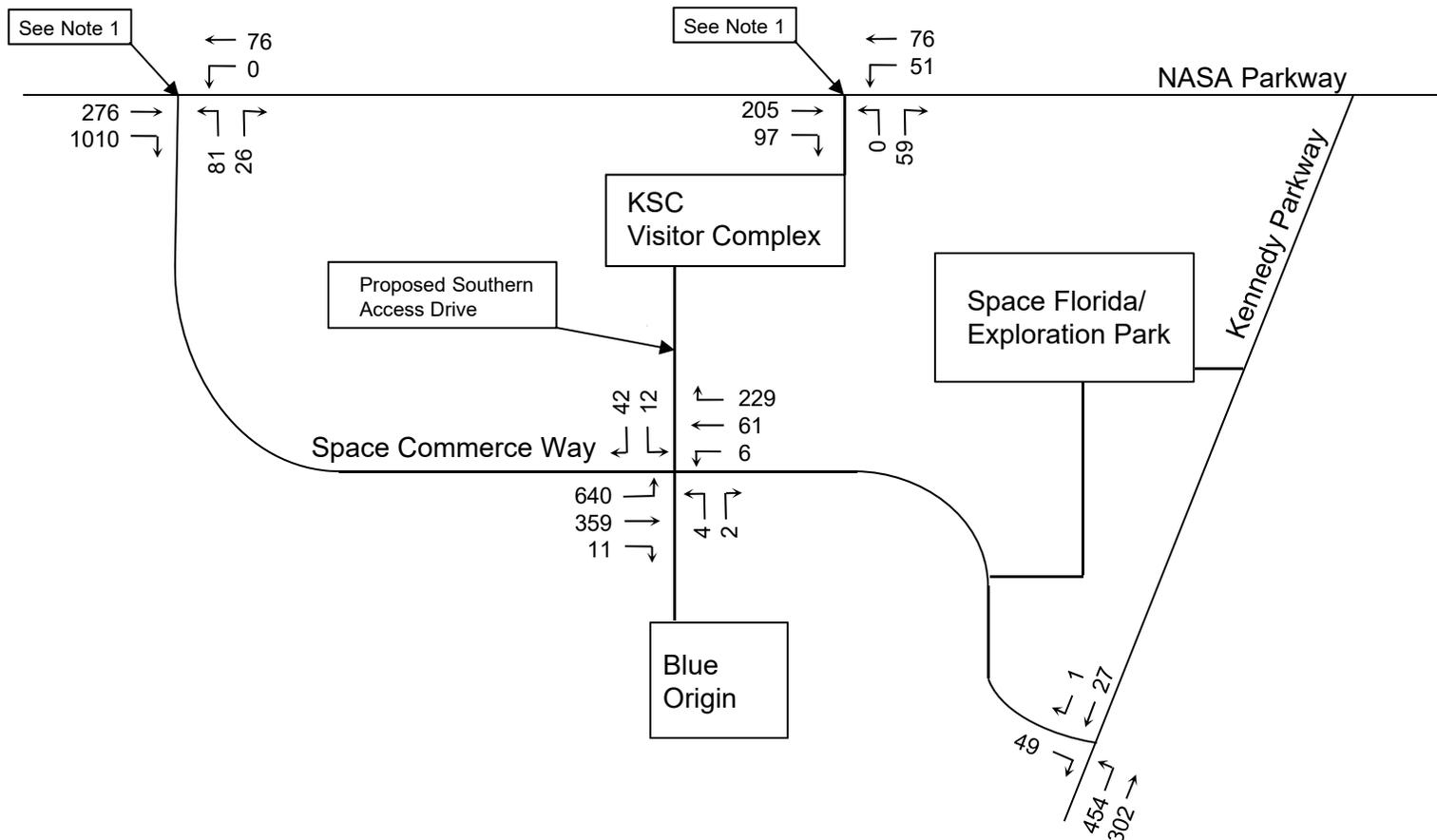
2018 P.M. Peak Hour Traffic

Project No.:4324.03

Figure: 21

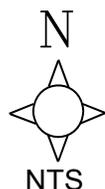


1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 1: Existing traffic delineators in westbound approach anticipated to be removed for Blue Origin payload vehicle path; continuous westbound through movement removed.

KSC VIC Proposed Southern Entrance at Space Commerce Way



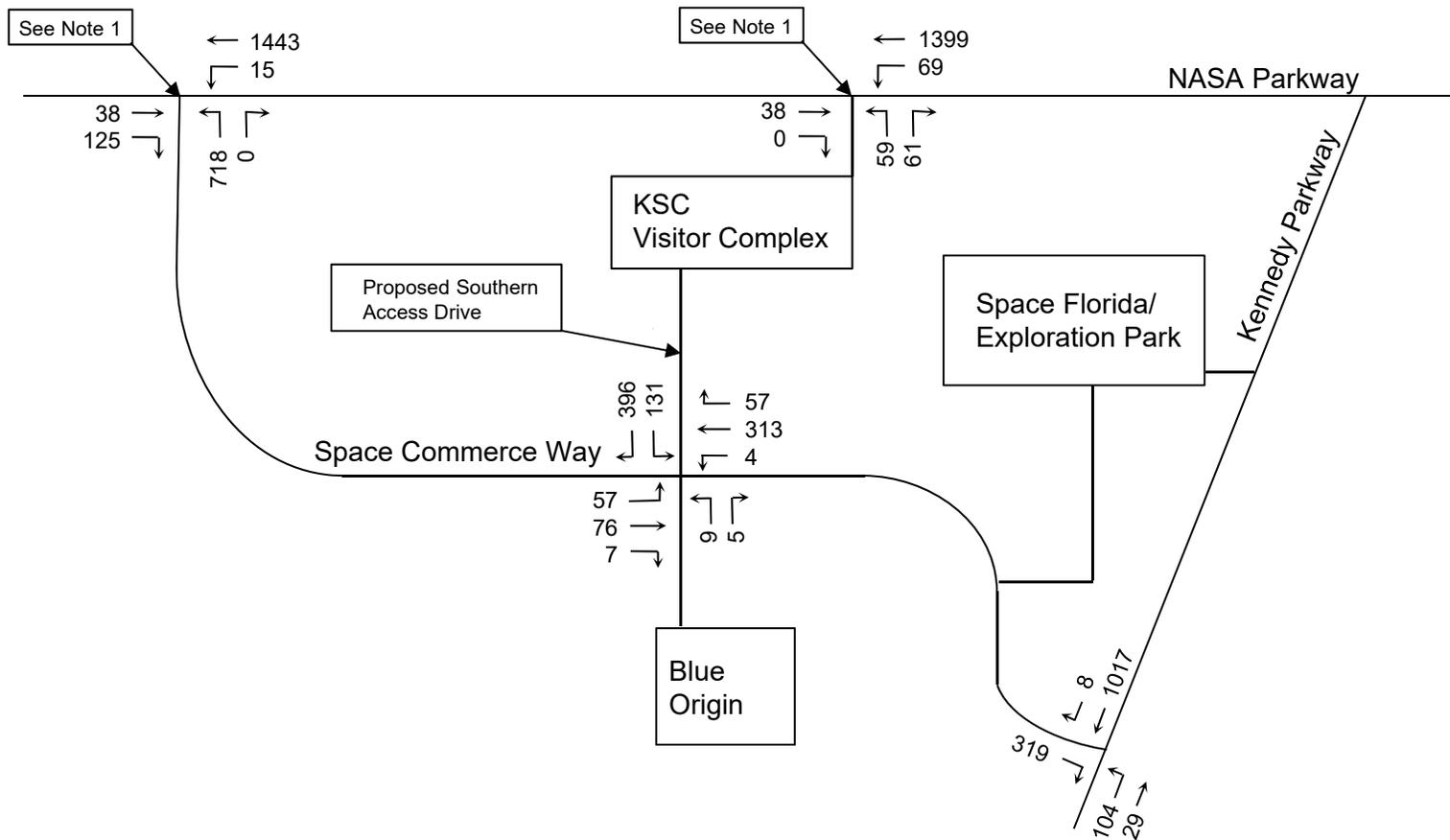
2035 A.M. Peak Hour Traffic



Project No.:4324.03

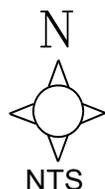
Figure: 22

1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
 1: Existing traffic delineators in westbound approach anticipated to be removed for Blue Origin payload vehicle path; continuous westbound through movement removed.

KSC VIC Proposed Southern Entrance at Space Commerce Way



2035 P.M. Peak Hour Traffic

Project No.:4324.03

Figure: 23



1970 Dairy Road, West Melbourne, Florida 32904
 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227

4

FUTURE ROADWAY ANALYSIS

The study intersections and segment were analyzed based on the future 2018 and 2035 roadway conditions to determine potential impacts and to investigate mitigation recommendations. It should be noted that the intersection of Space Commerce Way at the Proposed Southern KSC VIC Entrance will be signalized under future conditions and will be analyzed as signalized under future 2018 and 2035 conditions.

2018 Opening Year Signalized Intersection Analysis

The signalized intersections were analyzed to determine the operational LOS under 2018 conditions during the a.m. and p.m. peak-hours. As indicated in Table 8, all signalized intersections are anticipated to operate at an acceptable LOS with all approach V/C ratios below 1.0. The HCS summary sheets are located in **Appendix H**.

Table 8
2018 Opening Year Peak-Hour LOS – Signalized Intersections
Space Commerce Way at Southern KSC Entrance

	A.M. Peak-Hour			P.M. Peak-Hour		
	Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
NASA Parkway at Space Commerce Way	5.6	A	No	12.9	B	No
NASA Parkway at Visitor Center Complex	7.8	A	No	5.5	A	No
Space Commerce Way at Kennedy Parkway	13.1	B	No	17.5	B	No
Space Commerce Way at Proposed Southern KSC VIC Entrance	20.3	C	No	23.1	C	No

2035 Design Year Signalized Intersection Analysis

The signalized intersections were analyzed to determine the operational LOS under 2035 conditions during the a.m. and p.m. peak-hours. As indicated in Table 9, all signalized intersections are anticipated to operate at an acceptable LOS with all approach V/C ratios below 1.0 under 2035 conditions except NASA Parkway at Space Commerce Way. The HCS summary sheets are located in **Appendix I**.

Table 9
2035 Design Year Peak-Hour LOS – Signalized Intersections
Space Commerce Way at Southern KSC Entrance

	A.M. Peak-Hour			P.M. Peak-Hour		
	Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
NASA Parkway at Space Commerce Way	28.4	C	Yes	60.3	E	Yes
NASA Parkway at Visitor Center Complex	8.9	A	No	8.0	A	No
Space Commerce Way at Kennedy Parkway	18.2	B	No	25.8	C	No
Space Commerce Way at Proposed Southern KSC VIC Entrance	22.8	C	No	26.6	C	No

To mitigate the LOS and V/C deficiencies for NASA Parkway at Space Commerce Way the following improvements are recommended for 2035 conditions:

- Dual northbound left-turn lanes
- Optimize timing splits

Table 10 provides the revised analysis findings for NASA Parkway at Space Commerce Way with the recommended improvements incorporated. The HCS summary sheets are located in **Appendix J**.

**Table 10
2035 Design Year Peak-Hour LOS – Improved Signalized Intersections
Space Commerce Way at Southern KSC Entrance**

	A.M. Peak-Hour			P.M. Peak-Hour		
	Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
NASA Parkway at Space Commerce Way	18.9	B	No	14.9	B	No

Roadway Segment Analysis

The 2018 and 2035 peak-hour two-way LOS for the study area road segment is shown in Table 11 and 12, respectively. As indicated in the tables, the study roadway segment will operate within an acceptable LOS under 2018 and 2035 conditions. It should be noted that the p.m. peak-hour was the highest peak-hour under 2018 conditions while the a.m. peak-hour was the highest peak-hour under 2035 conditions. This is attributed to the different growth rates and trip generation components used for the future volumes. Accordingly, the highest peak-hours identified for 2018 and 2035 conditions were utilized for the analysis.

**Table 11
2018 Opening Year Peak-Hour Two-Way LOS (P.M.) - Roadway Segment
Space Commerce Way at Space Center Visitor Complex Entrance**

Roadway	Segment		Lanes	NASA Preferred LOS	Peak-Hour Two-Way Capacity for LOS	Design Traffic	LOS
	From	To					
Space Commerce Way	NASA Parkway	Kennedy Parkway	2	C	1,427	613	C

**Table 12
2035 Design Year Peak-Hour Two-Way LOS (A.M.) - Roadway Segment
Space Commerce Way at Space Center Visitor Complex Entrance**

Roadway	Segment		Lanes	NASA Preferred LOS	Peak-Hour Two-Way Capacity for LOS	Design Traffic	LOS
	From	To					
Space Commerce Way	NASA Parkway	Kennedy Parkway	2	C	1,427	1,117	C

Access Analysis

The proposed KSC VIC southern access drive will provide full-access to and from eastbound and westbound Space Commerce Way on the north leg of the intersection. The intersection will also provide full-access to and from the minor Blue Origin driveway on the south leg.

The need and geometry for turn lanes on Space Commerce Way was evaluated using National Cooperative Highway Research Program (NCHRP) Report 457, FDOT Standard Index 301 and HCS output. The summary worksheets are included as **Appendix K**. The results of the turn lane evaluation are provided below:

2018 Opening Year Conditions:

- Eastbound: Dual left-turn lanes; approximate 125 ft. 95th percentile queue + 290 ft. deceleration distance = **415 ft. total turn lane length**
One shared through/right-turn lane
- Westbound: One left-turn lane; approximate 75 ft. 95th percentile queue + 290 ft. deceleration distance = **365 ft. total turn lane length**
One through lane
One right-turn lane; approximate 25 ft. 95th percentile queue + 290 ft. deceleration distance = **315 ft. total turn lane length**
- Northbound: One shared left/right-turn lane
- Southbound: One left-turn lane; approximate 75 ft. 95th percentile queue + 145 ft. deceleration distance = **220 ft. total turn lane length**
One right-turn lane; approximate 125 ft. 95th percentile queue + 145 deceleration distance = **270 ft. total turn lane length**

2035 Design Year Conditions:

- Eastbound: Dual left-turn lanes; approximate 250 ft. 95th percentile queue + 290 ft. deceleration distance = **540 ft. total turn lane length**
One shared through lane
One right-turn lane; approximate 25 ft. 95th percentile queue + 290 ft. deceleration distance = **315 ft. total turn lane length**
- Westbound: One left-turn lane; approximate 25 ft. 95th percentile queue + 290 ft. deceleration distance = **315 ft. total turn lane length**
One through lane
One right-turn lane; approximate 200 ft. 95th percentile queue + 290 ft. deceleration distance = **490 ft. total turn lane length**
- Northbound: One shared left/right-turn lane
- Southbound: One left-turn lane; approximate 125 ft. 95th percentile queue + 145 ft. deceleration distance = **270 ft. total turn lane length**
One right-turn lane; approximate 125 ft. 95th percentile queue + 145 deceleration distance = **270 ft. total turn lane length**

It should be noted that all total turn lane lengths are estimates based on the 95th percentile queues reported in HCS and the total deceleration length (with taper included; 50 ft. single lane and 100 ft. dual lane) per FDOT Standard Index 301.

Launch Day Traffic

Traffic on an average launch day was evaluated to assess the impact on the study area roadway network and to provide potential mitigation measures. It is recognized that traffic to and from the KSC VIC will be significantly higher, directional, and concentrated for launches during the hours of operation. Coordination and data from the KSC VIC indicates that typical non-seasonal peak-day attendance is approximately 4,500 while typical seasonal peak-day attendance is approximately 6,500, with an approximate occupancy rate of 2.5 persons per vehicle. It has also been indicated on previous launches from 2017 (one in July and one in August) that attendance was approximately 12,000 to 13,000. Attendance is anticipated to grow for future manned launches.

Launch dates, times, and attendance varies significantly. Accordingly, only an analysis for the average day was conducted. The final analyses conducted on normal day conditions in both 2018 and 2035 conditions did not indicate failures, with the highest delays at NASA Parkway at Space Commerce Way and at Space Commerce Way at the Proposed Southern KSC VIC Entrance. With this, it can be anticipated that there will be times during heavily concentrated entering and exiting traffic which will cause increased delays and potential failures at the study intersections. To minimize increased delays as efficiently as possible, it is recommended to divide entering traffic when delay at NASA Parkway at Space Commerce Way and at Space Commerce Way at the Proposed Southern KSC VIC Entrance reach failure levels.

Multiple treatments can be utilized for the minimization of delay during launch times:

- Adaptive control, coordination of timings, or specific launch day timing plans to ensure optimum timings are employed.
- Installation of CCTV cameras at intersections to give KSC VIC/NASA traffic control staff views of real-time traffic conditions, allowing for manual operation of the signals due to emergent conditions.
- Installation of dynamic message or trailblazer signs on NASA Parkway and Space Commerce Way to direct visitors to the appropriate entrance and balance flows.
- On-site signage/personnel directing visitors to the exits after launches to balance outgoing traffic volumes between NASA Parkway and Kennedy Parkway.

These potential treatments can be combined in coordination with each other to best minimize delays. However, the installation of dynamic message or trailblazer signs should be considered a priority. Tourism facilities attract above average rates of visitors unfamiliar with the KSC VIC and adjacent roadway network. Unfamiliar drivers should be made aware of traffic patterns as soon and as clearly as possible. This not only applies to launch days, but also applies to the new traffic pattern for non-launch days. A dynamic message sign or trailblazer will be very effective in directing visitors to the new southern entrance.

5

CONCLUSIONS AND RECOMMENDATIONS

This study was conducted to evaluate the impact of the proposed southern KSC VIC entrance at Space Commerce Way in unincorporated Brevard County, Florida. The summary and results of the study are detailed below:

- The Proposed Southern KSC VIC Entrance will be used exclusively for visitors while the existing northern entrance will be used by employees, buses, and vendors.
- The Proposed Southern KSC VIC Entrance will be opposite of a minor driveway for the future Blue Origin facility under construction.
- Both opening year 2018 and design year 2035 conditions were analyzed.

Existing

- Under existing conditions, the unsignalized intersection of Space Commerce Way at the Southern KSC VIC Entrance operates within an acceptable LOS during the a.m. and p.m. peak-hour.
- Under existing conditions, all signalized intersections operate within an acceptable LOS with V/C ratios less than 1.0 during the a.m. and p.m. peak-hour.
- Under existing conditions, the study area roadway segment analyzed, Space Commerce Way from NASA Parkway to Kennedy Parkway currently operates within an acceptable LOS.

2018 Opening Year

- Under 2018 conditions, the existing unsignalized intersection of Space Commerce Way at the Southern KSC VIC Entrance is anticipated to be under signal control.
- Under 2018 conditions, the newly signalized intersection of Space Commerce Way at the Southern KSC VIC Entrance is recommended to have the following minimum geometry:
 - Eastbound: Dual left-turn lanes with 415 ft. length
One shared through/right-turn lane
 - Westbound: One left-turn lane with 365 ft. length
One through lane
One right-turn lane with 315 ft. length
 - Northbound: One shared left/right-turn lane
 - Southbound: One left-turn lane with 220 ft. length
One right-turn lane with 270 ft. length
- Under 2018 conditions, all signalized intersections are anticipated to operate within an acceptable LOS with V/C ratio less than 1.0.

- Under 2018 conditions, the study area roadway segment analyzed, Space Commerce Way from NASA Parkway to Kennedy Parkway is anticipated to operate within an acceptable LOS.

2035 Design Year

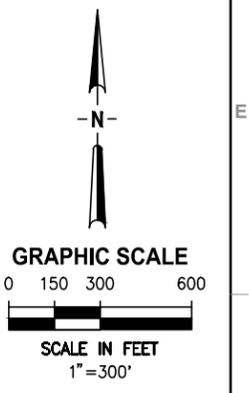
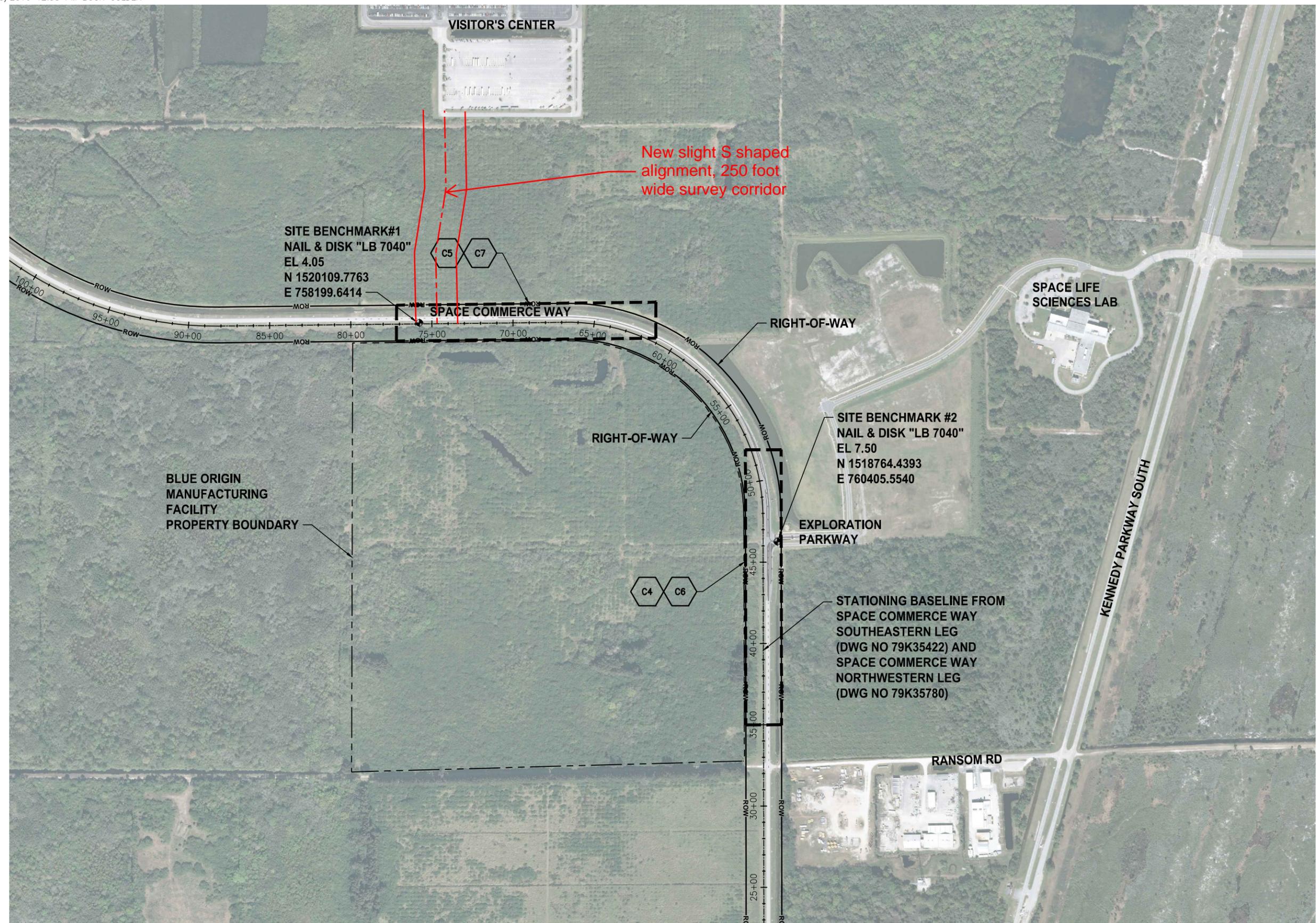
- Under 2035 conditions, the unsignalized intersections are anticipated to operate within an acceptable LOS with V/C ratios less than 1.0 except the intersection of NASA Parkway at Space Commerce Way.
- To mitigate the deficiencies at NASA Parkway at Space Commerce Way, the following improvements are recommended:
 - Dual northbound left-turn lanes
 - Optimize timing splits
- Under 2035 conditions, the signalized intersection of Space Commerce Way at the Southern KSC VIC Entrance is recommended to have the following minimum geometry:
 - Eastbound: Dual left-turn lanes with 540 ft. length
One shared through lane
One right-turn lanes with 315 ft. length
 - Westbound: One left-turn lane with 315 ft. length
One through lane
One right-turn lane with 490 ft. length
 - Northbound: One shared left/right-turn lane
 - Southbound: One left-turn lane with 270 ft. length
One right-turn lane with 270 ft. length
- Under 2035 conditions, the study area roadway segment analyzed, Space Commerce Way from NASA Parkway to Kennedy Parkway is anticipated to operate within an acceptable LOS.

APPENDICES

APPENDIX A

Preliminary Site/Roadway Concept Plan

3/1/2016 12:35 PM KPEREZ \\TITUSMD\01\DRAWING\08100 SPACE FLORIDA\004 EXPLORATION PARK PHASE 2\CONTRACT DRAWINGS\GENERAL\08100004-G03.DWG



LTR.	DATE	REVISIONS	BY	APPRD.

DESIGNED	RKOLLER
DRAWN	KPEREZ
CHECKED	RKOLLER

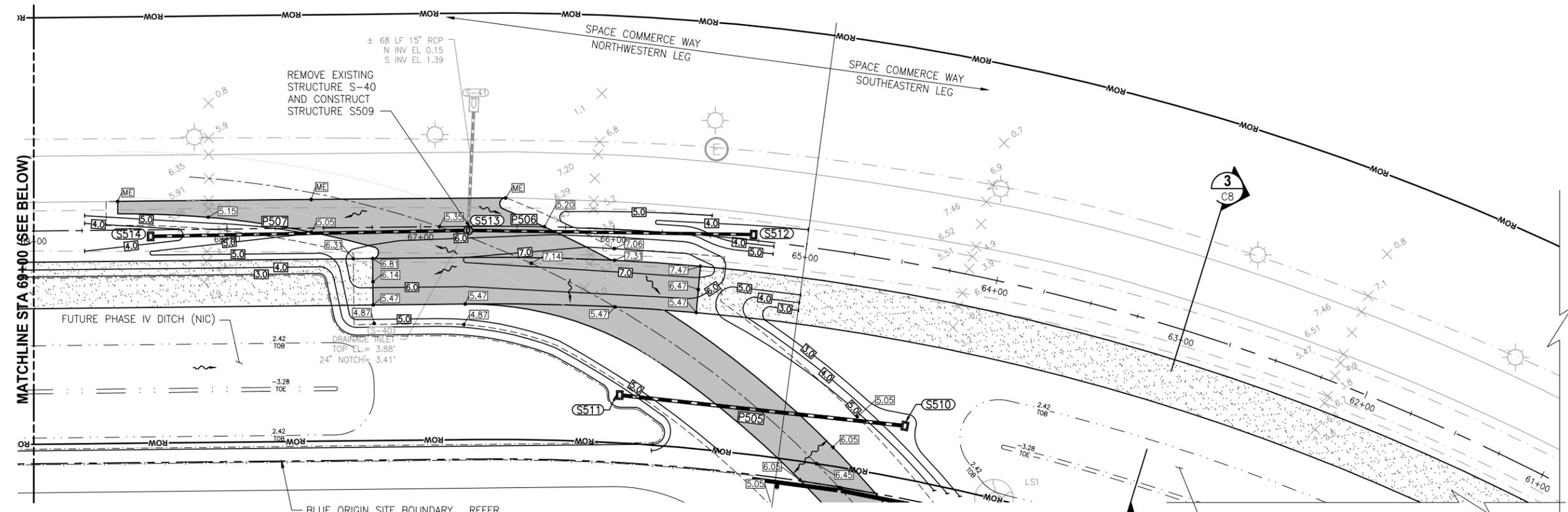
JONES EDMUNDS
730 NE WALDO ROAD, GAINESVILLE, FLORIDA 32641 / (352) 377-5821
 3910 S WASHINGTON AVE, SUITE 210, TITUSVILLE, FLORIDA 32780 / (321) 269-2950

BLUE ORIGIN FLORIDA, LLC
BLUE ORIGIN MANUFACTURING FACILITY
MODIFICATIONS TO SPACE COMMERCE WAY
FOR DRIVEWAY CONNECTIONS
BREVARD COUNTY, FLORIDA

KEY MAP

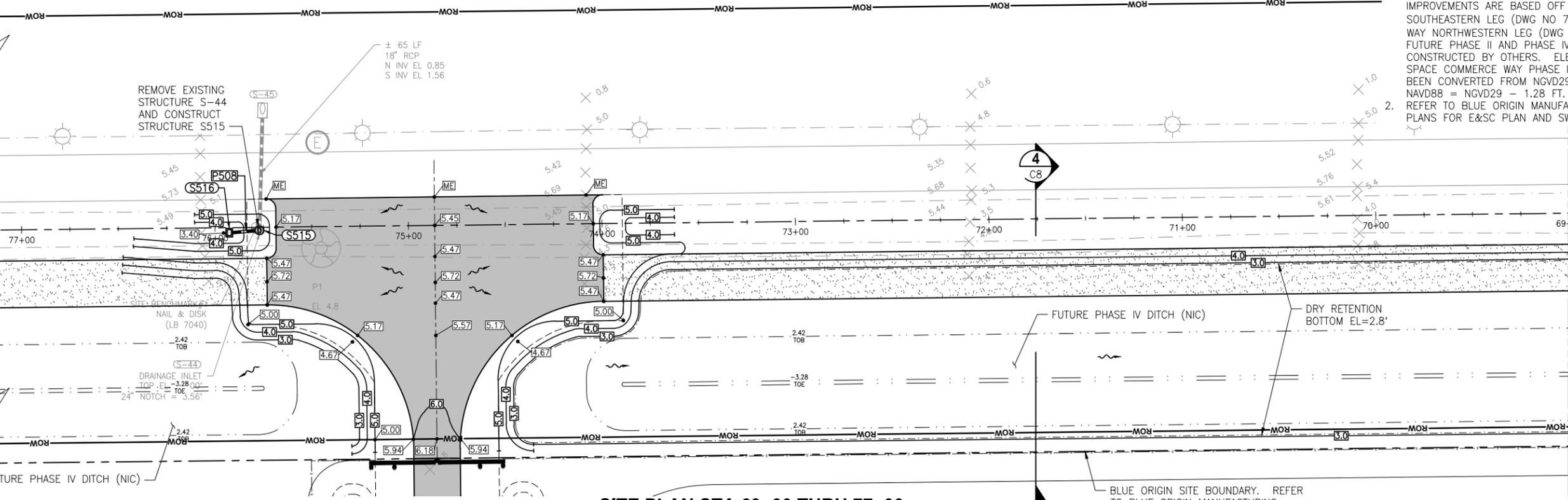
CERTIFICATE OF AUTHORIZATION #1841	DATE	PROJECT NO.
APPROVED BY	MAR 2016	08100-004-01
RICHARD N. KOLLER	SCALE	DWG. NO.
P.E. # 49947	1"=300'	G3

2/25/2016 10:44 AM KPEREZ \\TITUSMDI01\DRAWING\08100 SPACE FLORIDA\004 EXPLORATION PARK PHASE 2\CONTRACT DRAWINGS\CIVIL\08100004-C07.DWG

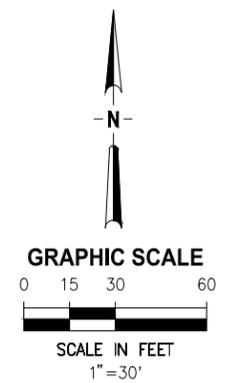


SITE PLAN STA 61+00 THRU 69+00
1"=30'

- NOTES:**
- SPACE COMMERCE WAY PHASE II & IV PAVEMENT AND DITCH IMPROVEMENTS ARE BASED OFF SPACE COMMERCE WAY SOUTHEASTERN LEG (DWG NO 79K35422) AND SPACE COMMERCE WAY NORTHWESTERN LEG (DWG NO 79K35780) RESPECTIVELY. THE FUTURE PHASE II AND PHASE IV IMPROVEMENTS WILL BE CONSTRUCTED BY OTHERS. ELEVATIONS ASSOCIATED WITH THE SPACE COMMERCE WAY PHASE II & PHASE IV IMPROVEMENTS HAVE BEEN CONVERTED FROM NGVD29 TO NAVD88. THE CONVERSION IS NAVD88 = NGVD29 - 1.28 FT. REFER TO BLUE ORIGIN MANUFACTURING FACILITY CIVIL PERMIT PLANS FOR E&S PLAN AND SWPPP NOTES.



SITE PLAN STA 69+00 THRU 77+00
1"=30'



LTR.	DATE	REVISIONS	BY	APPRD.

DESIGNED	RKOLLER
DRAWN	KPEREZ
CHECKED	RKOLLER

730 NE WALDO ROAD, GAINESVILLE, FLORIDA 32641 / (352) 377-5821
 3910 S WASHINGTON AVE, SUITE 210, TITUSVILLE, FLORIDA 32780 / (321) 269-2950

BLUE ORIGIN FLORIDA, LLC
BLUE ORIGIN MANUFACTURING FACILITY
MODIFICATIONS TO SPACE COMMERCE WAY
FOR DRIVEWAY CONNECTIONS
BREVARD COUNTY, FLORIDA

SITE GRADING & DRAINAGE PLAN STA
61+00 THRU 77+00

CERTIFICATE OF AUTHORIZATION #1841	DATE	PROJECT NO.
APPROVED BY	MAR 2016	08100-004-01
RICHARD N. KOLLER	SCALE	DWG. NO.
P.E. # 49947	1"=30'	C7

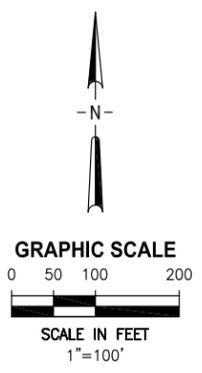


CURVE DATA
 R=1325.00
 L=1304.55
 Chd=S28°22'28"W 1252.50'

PRELIMINARY SITE DATA FOR CONCEPTUAL BUILD-OUT

BUILDING	# STORIES	GROSS SF	APPROX PARKING	SPACES/1000 SF
A	2	50000	141	2.8
B	1	25000	136	5.4
C	1	25000	74	3.0
D	2	50000	215	4.3
E	2	50000	125	2.5
F	2	50000	240	4.8
G	1	32000	100	3.1
H	1	40000	120	3.0
TOTAL		322000		

- NOTES:**
- CONCEPTUAL BUILD-OUT IS SHOWN FADED BACK WITHIN PROPERTY LINES.
 - SLSL/SERPL SITE IS SHOWN AS CONSTRUCTED.



OVERALL EXHIBIT SITE PLAN

APPENDIX B

Turning Movement Counts

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
01:00	3	3
02:00	7	7
03:00	2	2
04:00	2	2
05:00	7	7
06:00	41	41
07:00	188	188
08:00	105	105
09:00	88	88
10:00	89	89
11:00	86	86
12:00	103	103
13:00	101	101
14:00	104	104
15:00	116	116
16:00	140	140
17:00	150	150
18:00	203	203
19:00	132	132
20:00	145	145
21:00	54	54
22:00	26	26
23:00	24	24
24:00	34	34
DAY TOTAL	1950	1950
PERCENTS	100.0%	100%
AM Times	06:15	
AM Peaks	188	
PM Times	17:15	
PM Peaks	203	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
01:00	7	7
02:00	7	7
03:00	3	3
04:00	6	6
05:00	3	3
06:00	45	45
07:00	178	178
08:00	104	104
09:00	87	87
10:00	78	78
11:00	79	79
12:00	69	69
13:00	106	106
14:00	78	78
15:00	98	98
16:00	111	111
17:00	161	161
18:00	220	220
19:00	139	139
20:00	130	130
21:00	71	71
22:00	25	25
23:00	28	28
24:00	31	31
DAY TOTAL	1864	1864
PERCENTS	100.0%	100%
AM Times	06:00	
AM Peaks	178	
PM Times	17:00	
PM Peaks	234	

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
00:15	1	1
00:30	0	0
00:45	0	0
01:00	2	2
Hour Total	3	3
01:15	0	0
01:30	1	1
01:45	1	1
02:00	5	5
Hour Total	7	7
02:15	0	0
02:30	1	1
02:45	1	1
03:00	0	0
Hour Total	2	2
03:15	0	0
03:30	0	0
03:45	1	1
04:00	1	1
Hour Total	2	2
04:15	0	0
04:30	1	1
04:45	1	1
05:00	5	5
Hour Total	7	7
05:15	3	3
05:30	5	5
05:45	11	11
06:00	22	22
Hour Total	41	41
06:15	51	51
06:30	53	53
06:45	60	60
07:00	24	24
Hour Total	188	188
07:15	19	19
07:30	37	37
07:45	28	28
08:00	21	21
Hour Total	105	105
08:15	29	29
08:30	23	23
08:45	19	19

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
09:00	17	17
Hour Total	88	88
09:15	19	19
09:30	20	20
09:45	16	16
10:00	34	34
Hour Total	89	89
10:15	17	17
10:30	26	26
10:45	21	21
11:00	22	22
Hour Total	86	86
11:15	21	21
11:30	27	27
11:45	29	29
12:00	26	26
Hour Total	103	103
12:15	26	26
12:30	24	24
12:45	26	26
13:00	25	25
Hour Total	101	101
13:15	33	33
13:30	26	26
13:45	23	23
14:00	22	22
Hour Total	104	104
14:15	23	23
14:30	29	29
14:45	35	35
15:00	29	29
Hour Total	116	116
15:15	45	45
15:30	24	24
15:45	39	39
16:00	32	32
Hour Total	140	140
16:15	39	39
16:30	39	39
16:45	35	35
17:00	37	37
Hour Total	150	150

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
17:15	39	39
17:30	55	55
17:45	49	49
18:00	60	60
Hour Total	203	203
18:15	34	34
18:30	23	23
18:45	44	44
19:00	31	31
Hour Total	132	132
19:15	48	48
19:30	42	42
19:45	31	31
20:00	24	24
Hour Total	145	145
20:15	19	19
20:30	14	14
20:45	11	11
21:00	10	10
Hour Total	54	54
21:15	9	9
21:30	6	6
21:45	7	7
22:00	4	4
Hour Total	26	26
22:15	5	5
22:30	6	6
22:45	4	4
23:00	9	9
Hour Total	24	24
23:15	13	13
23:30	10	10
23:45	4	4
24:00	7	7
Hour Total	34	34
DAY TOTAL	1950	1950
PERCENTS	100.0%	100%
AM Times	06:15	
AM Peaks	188	
PM Times	17:15	
PM Peaks	203	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
00:15	2	2
00:30	0	0
00:45	2	2
01:00	3	3
Hour Total	7	7
01:15	1	1
01:30	1	1
01:45	1	1
02:00	4	4
Hour Total	7	7
02:15	0	0
02:30	1	1
02:45	1	1
03:00	1	1
Hour Total	3	3
03:15	1	1
03:30	2	2
03:45	3	3
04:00	0	0
Hour Total	6	6
04:15	0	0
04:30	1	1
04:45	1	1
05:00	1	1
Hour Total	3	3
05:15	1	1
05:30	5	5
05:45	11	11
06:00	28	28
Hour Total	45	45
06:15	54	54
06:30	50	50
06:45	46	46
07:00	28	28
Hour Total	178	178
07:15	27	27
07:30	24	24
07:45	33	33
08:00	20	20
Hour Total	104	104
08:15	33	33
08:30	10	10
08:45	21	21

DE TRAFFIC
 VOLUME SUMMARY
 Tue 8/8/2017

Machine #: Space Commer
 Site ID: 000000000151
 Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
 Street Name: Space Commerce Way E
 County: Brevard

TIME	1 EAST	Total
09:00	23	23
Hour Total	87	87
09:15	16	16
09:30	17	17
09:45	23	23
10:00	22	22
Hour Total	78	78
10:15	13	13
10:30	17	17
10:45	24	24
11:00	25	25
Hour Total	79	79
11:15	16	16
11:30	19	19
11:45	19	19
12:00	15	15
Hour Total	69	69
12:15	24	24
12:30	29	29
12:45	29	29
13:00	24	24
Hour Total	106	106
13:15	26	26
13:30	23	23
13:45	15	15
14:00	14	14
Hour Total	78	78
14:15	17	17
14:30	25	25
14:45	32	32
15:00	24	24
Hour Total	98	98
15:15	21	21
15:30	23	23
15:45	30	30
16:00	37	37
Hour Total	111	111
16:15	37	37
16:30	41	41
16:45	36	36
17:00	47	47
Hour Total	161	161

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: Space Commer
Site ID: 000000000151
Description: Space Commerce Way EB W of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce Way E
County: Brevard

TIME	1 EAST	Total
17:15	71	71
17:30	73	73
17:45	43	43
18:00	33	33
Hour Total	220	220
18:15	35	35
18:30	36	36
18:45	38	38
19:00	30	30
Hour Total	139	139
19:15	36	36
19:30	32	32
19:45	30	30
20:00	32	32
Hour Total	130	130
20:15	29	29
20:30	17	17
20:45	14	14
21:00	11	11
Hour Total	71	71
21:15	6	6
21:30	9	9
21:45	6	6
22:00	4	4
Hour Total	25	25
22:15	7	7
22:30	6	6
22:45	6	6
23:00	9	9
Hour Total	28	28
23:15	17	17
23:30	8	8
23:45	4	4
24:00	2	2
Hour Total	31	31
DAY TOTAL	1864	1864
PERCENTS	100.0%	100%
AM Times	06:00	
AM Peaks	178	
PM Times	17:00	
PM Peaks	234	

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
01:00	4	4
02:00	3	3
03:00	4	4
04:00	5	5
05:00	41	41
06:00	41	41
07:00	67	67
08:00	98	98
09:00	132	132
10:00	164	164
11:00	139	139
12:00	121	121
13:00	107	107
14:00	103	103
15:00	108	108
16:00	140	140
17:00	149	149
18:00	130	130
19:00	70	70
20:00	41	41
21:00	33	33
22:00	19	19
23:00	7	7
24:00	6	6
DAY TOTAL	1732	1732
PERCENTS	100.0%	100%
AM Times	09:30	
AM Peaks	166	
PM Times	16:45	
PM Peaks	167	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
01:00	1	1
02:00	4	4
03:00	4	4
04:00	14	14
05:00	41	41
06:00	41	41
07:00	65	65
08:00	76	76
09:00	100	100
10:00	127	127
11:00	115	115
12:00	110	110
13:00	106	106
14:00	87	87
15:00	85	85
16:00	136	136
17:00	147	147
18:00	137	137
19:00	64	64
20:00	30	30
21:00	33	33
22:00	17	17
23:00	14	14
24:00	6	6
DAY TOTAL	1560	1560
PERCENTS	100.0%	100%
AM Times	09:00	
AM Peaks	133	
PM Times	17:00	
PM Peaks	162	

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
00:15	0	0
00:30	0	0
00:45	3	3
01:00	1	1
Hour Total	4	4
01:15	0	0
01:30	0	0
01:45	1	1
02:00	2	2
Hour Total	3	3
02:15	0	0
02:30	0	0
02:45	2	2
03:00	2	2
Hour Total	4	4
03:15	1	1
03:30	2	2
03:45	0	0
04:00	2	2
Hour Total	5	5
04:15	6	6
04:30	8	8
04:45	14	14
05:00	13	13
Hour Total	41	41
05:15	22	22
05:30	15	15
05:45	2	2
06:00	2	2
Hour Total	41	41
06:15	11	11
06:30	13	13
06:45	22	22
07:00	21	21
Hour Total	67	67
07:15	28	28
07:30	23	23
07:45	22	22
08:00	25	25
Hour Total	98	98
08:15	22	22
08:30	31	31
08:45	44	44

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
09:00	35	35
Hour Total	132	132
09:15	31	31
09:30	46	46
09:45	40	40
10:00	47	47
Hour Total	164	164
10:15	33	33
10:30	38	38
10:45	44	44
11:00	24	24
Hour Total	139	139
11:15	37	37
11:30	23	23
11:45	26	26
12:00	35	35
Hour Total	121	121
12:15	24	24
12:30	34	34
12:45	25	25
13:00	24	24
Hour Total	107	107
13:15	21	21
13:30	31	31
13:45	27	27
14:00	24	24
Hour Total	103	103
14:15	28	28
14:30	22	22
14:45	21	21
15:00	37	37
Hour Total	108	108
15:15	29	29
15:30	33	33
15:45	44	44
16:00	34	34
Hour Total	140	140
16:15	33	33
16:30	20	20
16:45	38	38
17:00	58	58
Hour Total	149	149

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
17:15	30	30
17:30	41	41
17:45	33	33
18:00	26	26
Hour Total	130	130
18:15	22	22
18:30	16	16
18:45	8	8
19:00	24	24
Hour Total	70	70
19:15	20	20
19:30	6	6
19:45	9	9
20:00	6	6
Hour Total	41	41
20:15	9	9
20:30	8	8
20:45	11	11
21:00	5	5
Hour Total	33	33
21:15	6	6
21:30	6	6
21:45	4	4
22:00	3	3
Hour Total	19	19
22:15	2	2
22:30	4	4
22:45	1	1
23:00	0	0
Hour Total	7	7
23:15	2	2
23:30	3	3
23:45	1	1
24:00	0	0
Hour Total	6	6
DAY TOTAL	1732	1732
PERCENTS	100.0%	100%
AM Times	09:30	
AM Peaks	166	
PM Times	16:45	
PM Peaks	167	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
00:15	0	0
00:30	0	0
00:45	0	0
01:00	1	1
Hour Total	1	1
01:15	0	0
01:30	2	2
01:45	1	1
02:00	1	1
Hour Total	4	4
02:15	1	1
02:30	1	1
02:45	2	2
03:00	0	0
Hour Total	4	4
03:15	0	0
03:30	3	3
03:45	2	2
04:00	9	9
Hour Total	14	14
04:15	7	7
04:30	7	7
04:45	11	11
05:00	16	16
Hour Total	41	41
05:15	20	20
05:30	6	6
05:45	4	4
06:00	11	11
Hour Total	41	41
06:15	7	7
06:30	19	19
06:45	20	20
07:00	19	19
Hour Total	65	65
07:15	16	16
07:30	22	22
07:45	24	24
08:00	14	14
Hour Total	76	76
08:15	24	24
08:30	16	16
08:45	30	30

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
09:00	30	30
Hour Total	100	100
09:15	32	32
09:30	34	34
09:45	37	37
10:00	24	24
Hour Total	127	127
10:15	26	26
10:30	33	33
10:45	32	32
11:00	24	24
Hour Total	115	115
11:15	33	33
11:30	25	25
11:45	26	26
12:00	26	26
Hour Total	110	110
12:15	26	26
12:30	25	25
12:45	29	29
13:00	26	26
Hour Total	106	106
13:15	22	22
13:30	23	23
13:45	24	24
14:00	18	18
Hour Total	87	87
14:15	20	20
14:30	18	18
14:45	17	17
15:00	30	30
Hour Total	85	85
15:15	23	23
15:30	46	46
15:45	32	32
16:00	35	35
Hour Total	136	136
16:15	30	30
16:30	30	30
16:45	36	36
17:00	51	51
Hour Total	147	147

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: 080609053538
Site ID: Space Commer
Description: Space Commerce Way WB E of Prop. Drwy

File: Commer.prn
Street Name: Space Commerce WB
County: Brevard

TIME	1 WEST	Total
17:15	42	42
17:30	31	31
17:45	38	38
18:00	26	26
Hour Total	137	137
18:15	18	18
18:30	26	26
18:45	6	6
19:00	14	14
Hour Total	64	64
19:15	12	12
19:30	6	6
19:45	8	8
20:00	4	4
Hour Total	30	30
20:15	9	9
20:30	10	10
20:45	9	9
21:00	5	5
Hour Total	33	33
21:15	7	7
21:30	4	4
21:45	5	5
22:00	1	1
Hour Total	17	17
22:15	3	3
22:30	3	3
22:45	4	4
23:00	4	4
Hour Total	14	14
23:15	4	4
23:30	1	1
23:45	1	1
24:00	0	0
Hour Total	6	6
DAY TOTAL	1560	1560
PERCENTS	100.0%	100%
AM Times	09:00	
AM Peaks	133	
PM Times	17:00	
PM Peaks	162	

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
01:00	0	0
02:00	18	18
03:00	1	1
04:00	0	0
05:00	1	1
06:00	5	5
07:00	10	10
08:00	13	13
09:00	21	21
10:00	42	42
11:00	98	98
12:00	103	103
13:00	99	99
14:00	155	155
15:00	195	195
16:00	279	279
17:00	386	386
18:00	464	464
19:00	417	417
20:00	329	329
21:00	68	68
22:00	11	11
23:00	12	12
24:00	7	7
DAY TOTAL	2734	2734
PERCENTS	100.0%	100%
AM Times	11:15	
AM Peaks	103	
PM Times	17:45	
PM Peaks	477	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
01:00	6	6
02:00	15	15
03:00	2	2
04:00	0	0
05:00	0	0
06:00	1	1
07:00	11	11
08:00	23	23
09:00	24	24
10:00	51	51
11:00	51	51
12:00	80	80
13:00	101	101
14:00	128	128
15:00	170	170
16:00	271	271
17:00	359	359
18:00	450	450
19:00	396	396
20:00	273	273
21:00	60	60
22:00	10	10
23:00	16	16
24:00	6	6
DAY TOTAL	2504	2504
PERCENTS	100.0%	100%
AM Times	11:15	
AM Peaks	80	
PM Times	17:30	
PM Peaks	456	

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
00:15	0	0
00:30	0	0
00:45	0	0
01:00	0	0
Hour Total	0	0
01:15	0	0
01:30	0	0
01:45	2	2
02:00	16	16
Hour Total	18	18
02:15	1	1
02:30	0	0
02:45	0	0
03:00	0	0
Hour Total	1	1
03:15	0	0
03:30	0	0
03:45	0	0
04:00	0	0
Hour Total	0	0
04:15	1	1
04:30	0	0
04:45	0	0
05:00	0	0
Hour Total	1	1
05:15	0	0
05:30	1	1
05:45	2	2
06:00	2	2
Hour Total	5	5
06:15	0	0
06:30	7	7
06:45	1	1
07:00	2	2
Hour Total	10	10
07:15	4	4
07:30	1	1
07:45	3	3
08:00	5	5
Hour Total	13	13
08:15	5	5
08:30	4	4
08:45	5	5

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
09:00	7	7
Hour Total	21	21
09:15	10	10
09:30	5	5
09:45	12	12
10:00	15	15
Hour Total	42	42
10:15	19	19
10:30	29	29
10:45	29	29
11:00	21	21
Hour Total	98	98
11:15	23	23
11:30	27	27
11:45	18	18
12:00	35	35
Hour Total	103	103
12:15	34	34
12:30	19	19
12:45	18	18
13:00	28	28
Hour Total	99	99
13:15	25	25
13:30	27	27
13:45	37	37
14:00	66	66
Hour Total	155	155
14:15	47	47
14:30	41	41
14:45	55	55
15:00	52	52
Hour Total	195	195
15:15	60	60
15:30	69	69
15:45	77	77
16:00	73	73
Hour Total	279	279
16:15	93	93
16:30	86	86
16:45	99	99
17:00	108	108
Hour Total	386	386

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
17:15	88	88
17:30	109	109
17:45	129	129
18:00	138	138
Hour Total	464	464
18:15	95	95
18:30	115	115
18:45	111	111
19:00	96	96
Hour Total	417	417
19:15	118	118
19:30	96	96
19:45	76	76
20:00	39	39
Hour Total	329	329
20:15	30	30
20:30	22	22
20:45	7	7
21:00	9	9
Hour Total	68	68
21:15	2	2
21:30	5	5
21:45	2	2
22:00	2	2
Hour Total	11	11
22:15	2	2
22:30	1	1
22:45	1	1
23:00	8	8
Hour Total	12	12
23:15	2	2
23:30	2	2
23:45	0	0
24:00	3	3
Hour Total	7	7
DAY TOTAL	2734	2734
PERCENTS	100.0%	100%
AM Times	11:15	
AM Peaks	103	
PM Times	17:45	
PM Peaks	477	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
00:15	0	0
00:30	0	0
00:45	0	0
01:00	6	6
Hour Total	6	6
01:15	0	0
01:30	1	1
01:45	0	0
02:00	14	14
Hour Total	15	15
02:15	1	1
02:30	1	1
02:45	0	0
03:00	0	0
Hour Total	2	2
03:15	0	0
03:30	0	0
03:45	0	0
04:00	0	0
Hour Total	0	0
04:15	0	0
04:30	0	0
04:45	0	0
05:00	0	0
Hour Total	0	0
05:15	0	0
05:30	0	0
05:45	0	0
06:00	1	1
Hour Total	1	1
06:15	1	1
06:30	3	3
06:45	3	3
07:00	4	4
Hour Total	11	11
07:15	0	0
07:30	16	16
07:45	5	5
08:00	2	2
Hour Total	23	23
08:15	3	3
08:30	4	4
08:45	3	3

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
09:00	14	14
Hour Total	24	24
09:15	9	9
09:30	9	9
09:45	20	20
10:00	13	13
Hour Total	51	51
10:15	9	9
10:30	10	10
10:45	17	17
11:00	15	15
Hour Total	51	51
11:15	15	15
11:30	15	15
11:45	22	22
12:00	28	28
Hour Total	80	80
12:15	24	24
12:30	27	27
12:45	25	25
13:00	25	25
Hour Total	101	101
13:15	21	21
13:30	19	19
13:45	27	27
14:00	61	61
Hour Total	128	128
14:15	37	37
14:30	54	54
14:45	44	44
15:00	35	35
Hour Total	170	170
15:15	60	60
15:30	66	66
15:45	60	60
16:00	85	85
Hour Total	271	271
16:15	71	71
16:30	95	95
16:45	94	94
17:00	99	99
Hour Total	359	359

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: NB
Site ID: NB
Description: Visitor Center Complex NB s of NASA Pkwy

File: NB.prn
Street Name: Visitor Center Com
County: Brevard

TIME	1 NORTH	Total
17:15	100	100
17:30	121	121
17:45	116	116
18:00	113	113
Hour Total	450	450
18:15	106	106
18:30	94	94
18:45	105	105
19:00	91	91
Hour Total	396	396
19:15	85	85
19:30	67	67
19:45	69	69
20:00	52	52
Hour Total	273	273
20:15	27	27
20:30	8	8
20:45	19	19
21:00	6	6
Hour Total	60	60
21:15	1	1
21:30	5	5
21:45	2	2
22:00	2	2
Hour Total	10	10
22:15	4	4
22:30	6	6
22:45	1	1
23:00	5	5
Hour Total	16	16
23:15	2	2
23:30	0	0
23:45	3	3
24:00	1	1
Hour Total	6	6
DAY TOTAL	2504	2504
PERCENTS	100.0%	100%
AM Times	11:15	
AM Peaks	80	
PM Times	17:30	
PM Peaks	456	

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
01:00	0	0
02:00	5	5
03:00	0	0
04:00	7	7
05:00	10	10
06:00	34	34
07:00	53	53
08:00	87	87
09:00	238	238
10:00	478	478
11:00	516	516
12:00	357	357
13:00	274	274
14:00	179	179
15:00	128	128
16:00	99	99
17:00	90	90
18:00	91	91
19:00	62	62
20:00	23	23
21:00	9	9
22:00	6	6
23:00	1	1
24:00	2	2
DAY TOTAL	2749	2749
PERCENTS	100.0%	100%
AM Times	10:00	
AM Peaks	542	
PM Times	12:15	
PM Peaks	274	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
01:00	1	1
02:00	5	5
03:00	0	0
04:00	9	9
05:00	8	8
06:00	35	35
07:00	59	59
08:00	101	101
09:00	211	211
10:00	368	368
11:00	422	422
12:00	390	390
13:00	256	256
14:00	190	190
15:00	117	117
16:00	111	111
17:00	88	88
18:00	84	84
19:00	46	46
20:00	13	13
21:00	6	6
22:00	3	3
23:00	4	4
24:00	4	4
DAY TOTAL	2531	2531
PERCENTS	100.0%	100%
AM Times	10:30	
AM Peaks	429	
PM Times	12:15	
PM Peaks	256	

DE TRAFFIC
VOLUME SUMMARY
Wed 8/9/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
01:00	1	1
02:00	0	0
DAY TOTAL	1	1
PERCENTS	100.0%	100%
AM Times		
AM Peaks	1	
PM Times		
PM Peaks		

DE TRAFFIC
 VOLUME SUMMARY
 Mon 8/7/2017

Machine #: SB
 Site ID: SB
 Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
 Street Name: Visitor Center SB
 County: Brevard

TIME	1 SOUTH	Total
00:15	0	0
00:30	0	0
00:45	0	0
01:00	0	0
Hour Total	0	0
01:15	0	0
01:30	1	1
01:45	3	3
02:00	1	1
Hour Total	5	5
02:15	0	0
02:30	0	0
02:45	0	0
03:00	0	0
Hour Total	0	0
03:15	0	0
03:30	1	1
03:45	4	4
04:00	2	2
Hour Total	7	7
04:15	1	1
04:30	1	1
04:45	6	6
05:00	2	2
Hour Total	10	10
05:15	1	1
05:30	7	7
05:45	17	17
06:00	9	9
Hour Total	34	34
06:15	1	1
06:30	14	14
06:45	19	19
07:00	19	19
Hour Total	53	53
07:15	10	10
07:30	19	19
07:45	24	24
08:00	34	34
Hour Total	87	87
08:15	28	28
08:30	45	45
08:45	72	72

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
09:00	93	93
Hour Total	238	238
09:15	106	106
09:30	126	126
09:45	110	110
10:00	136	136
Hour Total	478	478
10:15	123	123
10:30	119	119
10:45	164	164
11:00	110	110
Hour Total	516	516
11:15	98	98
11:30	80	80
11:45	94	94
12:00	85	85
Hour Total	357	357
12:15	72	72
12:30	82	82
12:45	57	57
13:00	63	63
Hour Total	274	274
13:15	44	44
13:30	54	54
13:45	33	33
14:00	48	48
Hour Total	179	179
14:15	36	36
14:30	34	34
14:45	33	33
15:00	25	25
Hour Total	128	128
15:15	25	25
15:30	24	24
15:45	19	19
16:00	31	31
Hour Total	99	99
16:15	26	26
16:30	31	31
16:45	17	17
17:00	16	16
Hour Total	90	90

DE TRAFFIC
VOLUME SUMMARY
Mon 8/7/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
17:15	26	26
17:30	19	19
17:45	27	27
18:00	19	19
Hour Total	91	91
18:15	21	21
18:30	20	20
18:45	3	3
19:00	18	18
Hour Total	62	62
19:15	10	10
19:30	6	6
19:45	3	3
20:00	4	4
Hour Total	23	23
20:15	2	2
20:30	2	2
20:45	3	3
21:00	2	2
Hour Total	9	9
21:15	4	4
21:30	0	0
21:45	1	1
22:00	1	1
Hour Total	6	6
22:15	1	1
22:30	0	0
22:45	0	0
23:00	0	0
Hour Total	1	1
23:15	1	1
23:30	1	1
23:45	0	0
24:00	0	0
Hour Total	2	2
DAY TOTAL	2749	2749
PERCENTS	100.0%	100%
AM Times	10:00	
AM Peaks	542	
PM Times	12:15	
PM Peaks	274	

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
00:15	0	0
00:30	0	0
00:45	0	0
01:00	1	1
Hour Total	1	1
01:15	0	0
01:30	1	1
01:45	2	2
02:00	2	2
Hour Total	5	5
02:15	0	0
02:30	0	0
02:45	0	0
03:00	0	0
Hour Total	0	0
03:15	0	0
03:30	1	1
03:45	6	6
04:00	2	2
Hour Total	9	9
04:15	1	1
04:30	2	2
04:45	4	4
05:00	1	1
Hour Total	8	8
05:15	4	4
05:30	6	6
05:45	14	14
06:00	11	11
Hour Total	35	35
06:15	2	2
06:30	8	8
06:45	20	20
07:00	29	29
Hour Total	59	59
07:15	13	13
07:30	22	22
07:45	29	29
08:00	37	37
Hour Total	101	101
08:15	31	31
08:30	31	31
08:45	59	59

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
09:00	90	90
Hour Total	211	211
09:15	75	75
09:30	99	99
09:45	105	105
10:00	89	89
Hour Total	368	368
10:15	102	102
10:30	106	106
10:45	117	117
11:00	97	97
Hour Total	422	422
11:15	109	109
11:30	99	99
11:45	96	96
12:00	86	86
Hour Total	390	390
12:15	85	85
12:30	53	53
12:45	65	65
13:00	53	53
Hour Total	256	256
13:15	45	45
13:30	58	58
13:45	41	41
14:00	46	46
Hour Total	190	190
14:15	30	30
14:30	23	23
14:45	31	31
15:00	33	33
Hour Total	117	117
15:15	26	26
15:30	37	37
15:45	22	22
16:00	26	26
Hour Total	111	111
16:15	21	21
16:30	19	19
16:45	26	26
17:00	22	22
Hour Total	88	88

DE TRAFFIC
VOLUME SUMMARY
Tue 8/8/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
17:15	18	18
17:30	14	14
17:45	26	26
18:00	26	26
Hour Total	84	84
18:15	15	15
18:30	12	12
18:45	13	13
19:00	6	6
Hour Total	46	46
19:15	5	5
19:30	3	3
19:45	3	3
20:00	2	2
Hour Total	13	13
20:15	2	2
20:30	2	2
20:45	1	1
21:00	1	1
Hour Total	6	6
21:15	1	1
21:30	1	1
21:45	0	0
22:00	1	1
Hour Total	3	3
22:15	1	1
22:30	0	0
22:45	2	2
23:00	1	1
Hour Total	4	4
23:15	0	0
23:30	2	2
23:45	2	2
24:00	0	0
Hour Total	4	4
DAY TOTAL	2531	2531
PERCENTS	100.0%	100%
AM Times	10:30	
AM Peaks	429	
PM Times	12:15	
PM Peaks	256	

DE TRAFFIC
VOLUME SUMMARY
Wed 8/9/2017

Machine #: SB
Site ID: SB
Description: Visitor Center Complex SB s of NASA Pkwy

File: SB.prn
Street Name: Visitor Center SB
County: Brevard

TIME	1 SOUTH	Total
00:15	0	0
00:30	0	0
00:45	1	1
01:00	0	0
Hour Total	1	1
01:15	0	0
Hour Total	0	0
DAY TOTAL	1	1
PERCENTS	100.0%	100%
AM Times		
AM Peaks	1	
PM Times		
PM Peaks		

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
 Site Code : 00000002
 Start Date : 08/10/2017
 Page No : 1

Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:00 AM	0	0	0	0	1	6	0	7	6	0	2	8	0	185	63	248	263
06:15 AM	0	0	0	0	1	10	0	11	5	0	4	9	0	276	48	324	344
06:30 AM	0	0	0	0	3	13	0	16	14	0	8	22	0	341	42	383	421
06:45 AM	0	0	0	0	1	10	0	11	11	0	9	20	0	370	38	408	439
Total	0	0	0	0	6	39	0	45	36	0	23	59	0	1172	191	1363	1467
07:00 AM	0	0	0	0	3	8	0	11	15	0	7	22	0	268	17	285	318
07:15 AM	0	0	0	0	4	28	0	32	14	0	5	19	0	221	21	242	293
07:30 AM	0	0	0	0	4	7	0	11	15	0	5	20	0	239	29	268	299
07:45 AM	0	0	0	0	2	10	0	12	21	0	20	41	0	253	17	270	323
Total	0	0	0	0	13	53	0	66	65	0	37	102	0	981	84	1065	1233
09:00 AM	0	0	0	0	0	18	0	18	16	0	31	47	0	162	22	184	249
09:15 AM	0	0	0	0	2	11	0	13	8	0	22	30	0	125	21	146	189
09:30 AM	0	0	0	0	3	15	0	18	8	0	37	45	0	112	16	128	191
09:45 AM	0	0	0	0	5	18	0	23	11	0	37	48	0	125	21	146	217
Total	0	0	0	0	10	62	0	72	43	0	127	170	0	524	80	604	846
10:00 AM	0	0	0	0	6	17	0	23	9	0	24	33	0	135	27	162	218
10:15 AM	0	0	0	0	4	21	0	25	3	0	32	35	0	115	15	130	190
10:30 AM	0	0	0	0	4	21	0	25	13	0	22	35	0	126	13	139	199
10:45 AM	0	0	0	0	4	18	0	22	14	0	17	31	0	118	9	127	180
Total	0	0	0	0	18	77	0	95	39	0	95	134	0	494	64	558	787
04:00 PM	0	0	0	0	27	354	0	381	25	0	6	31	0	11	12	23	435
04:15 PM	0	0	0	0	27	325	0	352	39	0	9	48	0	9	23	32	432
04:30 PM	0	0	0	0	9	326	0	335	29	0	6	35	0	22	20	42	412
04:45 PM	0	0	0	0	14	271	0	285	58	0	7	65	0	14	34	48	398
Total	0	0	0	0	77	1276	0	1353	151	0	28	179	0	56	89	145	1677

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
 Site Code : 00000002
 Start Date : 08/10/2017
 Page No : 2

Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
05:00 PM	0	0	0	0	27	314	0	341	96	0	9	105	0	17	20	37	483
05:15 PM	0	0	0	0	18	282	0	300	34	0	5	39	0	15	20	35	374
05:30 PM	0	0	0	0	27	251	0	278	48	0	8	56	0	28	34	62	396
05:45 PM	0	0	0	0	26	215	0	241	36	0	2	38	0	21	13	34	313
Total	0	0	0	0	98	1062	0	1160	214	0	24	238	0	81	87	168	1566
Grand Total	0	0	0	0	222	2569	0	2791	548	0	334	882	0	3308	595	3903	7576
Apprch %	0.0	0.0	0.0		8.0	92.0	0.0		62.1	0.0	37.9		0.0	84.8	15.2		
Total %	0.0	0.0	0.0	0.0	2.9	33.9	0.0	36.8	7.2	0.0	4.4	11.6	0.0	43.7	7.9	51.5	

Start Time	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 06:00 AM to 08:00 AM - Peak 1 of 1																	
Intersection 06:15 AM																	
Volume	0	0	0	0	8	41	0	49	45	0	28	73	0	1255	145	1400	1522
Percent	0.0	0.0	0.0		16.3	83.7	0.0		61.6	0.0	38.4		0.0	89.6	10.4		
06:45 Volume	0	0	0	0	1	10	0	11	11	0	9	20	0	370	38	408	439
Peak Factor																	0.867
High Int.	5:45:00 AM				06:30 AM				06:30 AM				06:45 AM				
Volume	0	0	0	0	3	13	0	16	14	0	8	22	0	370	38	408	
Peak Factor								0.766				0.830				0.858	
Peak Hour From 09:00 AM to 12:00 PM - Peak 1 of 1																	
Intersection 09:00 AM																	
Volume	0	0	0	0	10	62	0	72	43	0	127	170	0	524	80	604	846
Percent	0.0	0.0	0.0		13.9	86.1	0.0		25.3	0.0	74.7		0.0	86.8	13.2		
09:00 Volume	0	0	0	0	0	18	0	18	16	0	31	47	0	162	22	184	249
Peak Factor																	0.849
High Int.					09:45 AM				09:45 AM				09:00 AM				
Volume	0	0	0	0	5	18	0	23	11	0	37	48	0	162	22	184	
Peak Factor								0.783				0.885				0.821	

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
 Site Code : 00000002
 Start Date : 08/10/2017
 Page No : 3

Start Time	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 03:45 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:15 PM																
Volume	0	0	0	0	77	1236	0	1313	222	0	31	253	0	62	97	159	1725
Percent	0.0	0.0	0.0		5.9	94.1	0.0		87.7	0.0	12.3		0.0	39.0	61.0		
05:00 Volume	0	0	0	0	27	314	0	341	96	0	9	105	0	17	20	37	483
Peak Factor																	0.893
High Int.					04:15 PM				05:00 PM				04:45 PM				
Volume	0	0	0	0	27	325	0	352	96	0	9	105	0	14	34	48	
Peak Factor								0.933				0.602				0.828	

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
 Site Code : 00000002
 Start Date : 08/10/2017
 Page No : 4

Groups Printed- Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	3
06:15 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	2	3
06:30 AM	0	0	0	0	2	1	0	3	0	0	0	0	0	1	0	1	4
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
Total	0	0	0	0	3	1	0	4	0	0	0	0	0	8	1	9	13
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
07:15 AM	0	0	0	0	2	0	0	2	0	0	0	0	0	2	1	3	5
07:30 AM	0	0	0	0	2	0	0	2	0	0	0	0	0	2	3	5	7
07:45 AM	0	0	0	0	0	2	0	2	0	0	1	1	0	1	1	2	5
Total	0	0	0	0	4	2	0	6	0	0	1	1	0	7	5	12	19
09:00 AM	0	0	0	0	0	0	0	0	2	0	1	3	0	0	1	1	4
09:15 AM	0	0	0	0	0	1	0	1	0	0	2	2	0	1	1	2	5
09:30 AM	0	0	0	0	1	1	0	2	1	0	1	2	0	2	1	3	7
09:45 AM	0	0	0	0	1	1	0	2	0	0	1	1	0	6	1	7	10
Total	0	0	0	0	2	3	0	5	3	0	5	8	0	9	4	13	26
10:00 AM	0	0	0	0	1	3	0	4	1	0	2	3	0	2	5	7	14
10:15 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	2	2	4	6
10:30 AM	0	0	0	0	1	2	0	3	1	0	0	1	0	2	4	6	10
10:45 AM	0	0	0	0	1	2	0	3	1	0	1	2	0	2	3	5	10
Total	0	0	0	0	3	8	0	11	3	0	4	7	0	8	14	22	40
04:00 PM	0	0	0	0	0	6	0	6	2	0	1	3	0	1	0	1	10
04:15 PM	0	0	0	0	1	2	0	3	0	0	1	1	0	1	0	1	5
04:30 PM	0	0	0	0	0	2	0	2	1	0	0	1	0	0	1	1	4
04:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	2	3
Total	0	0	0	0	1	11	0	12	3	0	2	5	0	2	3	5	22

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
 Site Code : 00000002
 Start Date : 08/10/2017
 Page No : 5

Groups Printed- Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
05:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	2	3
05:15 PM	0	0	0	0	0	3	0	3	1	0	0	1	0	2	1	3	7
05:30 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
05:45 PM	0	0	0	0	1	2	0	3	0	0	0	0	0	1	0	1	4
Total	0	0	0	0	1	6	0	7	3	0	0	3	0	4	2	6	16
Grand Total	0	0	0	0	14	31	0	45	12	0	12	24	0	38	29	67	136
Apprch %	0.0	0.0	0.0		31.1	68.9	0.0		50.0	0.0	50.0		0.0	56.7	43.3		
Total %	0.0	0.0	0.0	0.0	10.3	22.8	0.0	33.1	8.8	0.0	8.8	17.6	0.0	27.9	21.3	49.3	

DE TRAFFIC
<http://de-traffic.com>
 VISITOR CENTER COMPLEX AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Visitor
 Site Code : 00000005
 Start Date : 08/10/2017
 Page No : 1

Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:00 AM	0	0	0	0	2	7	0	9	0	0	1	1	0	169	0	169	179
06:15 AM	0	0	0	0	1	10	0	11	2	0	1	3	0	282	6	288	302
06:30 AM	0	0	0	0	0	14	0	14	3	0	2	5	1	318	9	328	347
06:45 AM	0	0	0	0	5	9	0	14	0	0	0	0	0	386	15	401	415
Total	0	0	0	0	8	40	0	48	5	0	4	9	1	1155	30	1186	1243
07:00 AM	0	0	0	0	1	10	0	11	0	0	1	1	0	216	16	232	244
07:15 AM	0	0	0	0	1	28	0	29	1	0	5	6	0	253	9	262	297
07:30 AM	0	0	0	0	0	9	0	9	3	0	0	3	0	206	23	229	241
07:45 AM	0	0	0	0	4	13	0	17	0	0	1	1	0	225	48	273	291
Total	0	0	0	0	6	60	0	66	4	0	7	11	0	900	96	996	1073
09:00 AM	0	0	0	0	5	13	1	19	6	0	5	11	2	101	94	197	227
09:15 AM	0	0	0	0	7	9	0	16	2	0	6	8	1	60	84	145	169
09:30 AM	0	0	0	0	4	6	0	10	11	0	9	20	2	51	89	142	172
09:45 AM	0	0	0	0	6	11	0	17	9	0	5	14	3	42	114	159	190
Total	0	0	0	0	22	39	1	62	28	0	25	53	8	254	381	643	758
10:00 AM	0	0	0	0	3	16	0	19	6	0	9	15	2	35	119	156	190
10:15 AM	0	0	0	0	4	19	0	23	8	0	10	18	2	38	104	144	185
10:30 AM	0	0	0	0	12	18	1	31	7	0	5	12	2	30	124	156	199
10:45 AM	0	0	0	0	3	10	2	15	1	0	3	4	0	24	115	139	158
Total	0	0	0	0	22	63	3	88	22	0	27	49	6	127	462	595	732
04:00 PM	0	0	0	0	7	293	0	300	93	0	8	101	0	6	13	19	420
04:15 PM	0	0	0	0	9	265	0	274	63	0	10	73	0	5	10	15	362
04:30 PM	0	0	0	0	8	269	0	277	60	0	9	69	0	7	15	22	368
04:45 PM	0	0	0	0	10	206	0	216	75	0	3	78	0	7	12	19	313
Total	0	0	0	0	34	1033	0	1067	291	0	30	321	0	25	50	75	1463

DE TRAFFIC
<http://de-traffic.com>
 VISITOR CENTER COMPLEX AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Visitor
 Site Code : 00000005
 Start Date : 08/10/2017
 Page No : 2

Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
05:00 PM	0	0	0	0	7	205	0	212	126	0	4	130	0	15	16	31	373
05:15 PM	0	0	0	0	8	177	0	185	116	0	5	121	0	11	11	22	328
05:30 PM	0	0	0	0	5	154	0	159	106	0	7	113	0	13	16	29	301
05:45 PM	0	0	0	0	3	146	0	149	103	0	5	108	0	13	6	19	276
Total	0	0	0	0	23	682	0	705	451	0	21	472	0	52	49	101	1278
Grand Total	0	0	0	0	115	1917	4	2036	801	0	114	915	15	2513	1068	3596	6547
Aprch %	0.0	0.0	0.0		5.6	94.2	0.2		87.5	0.0	12.5		0.4	69.9	29.7		
Total %	0.0	0.0	0.0	0.0	1.8	29.3	0.1	31.1	12.2	0.0	1.7	14.0	0.2	38.4	16.3	54.9	

Start Time	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 06:00 AM to 08:00 AM - Peak 1 of 1																	
Intersection 06:15 AM																	
Volume	0	0	0	0	7	43	0	50	5	0	4	9	1	1202	46	1249	1308
Percent	0.0	0.0	0.0		14.0	86.0	0.0		55.6	0.0	44.4		0.1	96.2	3.7		
06:45 Volume	0	0	0	0	5	9	0	14	0	0	0	0	0	386	15	401	415
Peak Factor																	0.788
High Int.	5:45:00 AM				06:30 AM				06:30 AM				06:45 AM				
Volume	0	0	0	0	0	14	0	14	3	0	2	5	0	386	15	401	
Peak Factor								0.893				0.450				0.779	

Peak Hour From 09:00 AM to 11:00 AM - Peak 1 of 1																	
Intersection 09:45 AM																	
Volume	0	0	0	0	25	64	1	90	30	0	29	59	9	145	461	615	764
Percent	0.0	0.0	0.0		27.8	71.1	1.1		50.8	0.0	49.2		1.5	23.6	75.0		
10:30 Volume	0	0	0	0	12	18	1	31	7	0	5	12	2	30	124	156	199
Peak Factor																	0.960
High Int.					10:30 AM				10:15 AM				09:45 AM				
Volume	0	0	0	0	12	18	1	31	8	0	10	18	3	42	114	159	
Peak Factor								0.726				0.819				0.967	

DE TRAFFIC
<http://de-traffic.com>
 VISITOR CENTER COMPLEX AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Visitor
 Site Code : 00000005
 Start Date : 08/10/2017
 Page No : 3

Start Time	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	0	0	0	0	34	1033	0	1067	291	0	30	321	0	25	50	75	1463
Percent	0.0	0.0	0.0		3.2	96.8	0.0		90.7	0.0	9.3		0.0	33.3	66.7		
04:00 Volume	0	0	0	0	7	293	0	300	93	0	8	101	0	6	13	19	420
Peak Factor	0.871																
High Int.																	
Volume	0	0	0	0	04:00 PM				04:00 PM				04:30 PM				
Peak Factor					7	293	0	300	93	0	8	101	0	7	15	22	
					0.889				0.795				0.852				

DE TRAFFIC
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 VISITOR CENTER COMPLEX AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Visitor
 Site Code : 00000005
 Start Date : 08/10/2017
 Page No : 4

Groups Printed- Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:30 AM	0	0	0	0	0	1	0	1	2	0	0	2	1	1	0	2	5
06:45 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	2	3
Total	0	0	0	0	1	1	0	2	2	0	0	2	1	3	0	4	8
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	3	0	3	4
07:15 AM	0	0	0	0	0	2	0	2	0	0	2	2	0	1	0	1	5
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	2	3
07:45 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	2	1	3	5
Total	0	0	0	0	0	4	0	4	1	0	3	4	0	8	1	9	17
09:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	2	2	0	4	5
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2
09:30 AM	0	0	0	0	0	1	0	1	0	0	1	1	2	2	2	6	8
09:45 AM	0	0	0	0	0	1	0	1	1	0	3	4	3	3	3	9	14
Total	0	0	0	0	0	3	0	3	1	0	4	5	8	8	5	21	29
10:00 AM	0	0	0	0	0	2	0	2	2	0	4	6	2	2	0	4	12
10:15 AM	0	0	0	0	0	0	0	0	0	0	3	3	2	2	0	4	7
10:30 AM	0	0	0	0	3	4	0	7	0	0	3	3	2	2	1	5	15
10:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total	0	0	0	0	3	6	0	9	2	0	11	13	6	6	1	13	35
04:00 PM	0	0	0	0	6	2	0	8	3	0	5	8	0	1	1	2	18
04:15 PM	0	0	0	0	5	0	0	5	3	0	6	9	0	0	2	2	16
04:30 PM	0	0	0	0	3	1	0	4	1	0	4	5	0	0	0	0	9
04:45 PM	0	0	0	0	8	1	0	9	0	0	2	2	0	0	0	0	11
Total	0	0	0	0	22	4	0	26	7	0	17	24	0	1	3	4	54

DE TRAFFIC
<http://de-traffic.com>
 VISITOR CENTER COMPLEX AT NASA PKWY
 BREVARD COUNTY, FLORIDA

File Name : Nasa at Visitor
 Site Code : 00000005
 Start Date : 08/10/2017
 Page No : 5

Groups Printed- Commercial

Start Time	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
05:00 PM	0	0	0	0	4	2	0	6	1	0	2	3	0	0	0	0	9
05:15 PM	0	0	0	0	4	1	0	5	0	0	0	0	0	0	0	0	5
05:30 PM	0	0	0	0	2	0	0	2	0	0	1	1	0	0	0	0	3
05:45 PM	0	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	2
Total	0	0	0	0	11	3	0	14	1	0	4	5	0	0	0	0	19
Grand Total	0	0	0	0	37	21	0	58	14	0	39	53	15	26	10	51	162
Apprch %	0.0	0.0	0.0		63.8	36.2	0.0		26.4	0.0	73.6		29.4	51.0	19.6		
Total %	0.0	0.0	0.0	0.0	22.8	13.0	0.0	35.8	8.6	0.0	24.1	32.7	9.3	16.0	6.2	31.5	

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT PROPOSED DRWY
 BREVARD COUNTY, FLORIDA

File Name : Commerce at Blue
 Site Code : 00000003
 Start Date : 08/10/2017
 Page No : 1

Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Space Commerce Way Westbound				Proposed Drwy Northbound				Space Commerce Way Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
09:00 AM	0	0	0	0	0	37	0	37	0	0	0	0	0	25	0	25	62
09:15 AM	0	0	0	0	0	28	0	28	1	0	0	1	0	23	0	23	52
09:30 AM	0	0	0	0	0	46	0	46	1	0	2	3	0	17	0	17	66
09:45 AM	0	0	0	0	1	47	0	48	0	0	0	0	0	29	0	29	77
Total	0	0	0	0	1	158	0	159	2	0	2	4	0	94	0	94	257
10:00 AM	0	0	0	0	0	28	0	28	0	0	0	0	0	31	1	32	60
10:15 AM	0	0	0	0	0	38	0	38	0	0	0	0	0	23	1	24	62
10:30 AM	0	0	0	0	0	32	0	32	0	0	0	0	0	14	1	15	47
10:45 AM	0	0	0	0	2	26	0	28	2	0	0	2	0	21	3	24	54
Total	0	0	0	0	2	124	0	126	2	0	0	2	0	89	6	95	223
04:00 PM	0	0	0	0	0	38	0	38	0	0	0	0	0	27	0	27	65
04:15 PM	0	0	0	0	0	43	0	43	0	0	0	0	0	42	0	42	85
04:30 PM	0	0	0	0	0	41	0	41	2	0	0	2	0	34	1	35	78
04:45 PM	0	0	0	0	1	56	0	57	1	0	2	3	0	38	0	38	98
Total	0	0	0	0	1	178	0	179	3	0	2	5	0	141	1	142	326
05:00 PM	0	0	0	0	0	94	0	94	1	0	2	3	0	49	0	49	146
05:15 PM	0	0	0	0	0	36	0	36	7	0	4	11	0	51	0	51	98
05:30 PM	0	0	0	0	1	43	0	44	3	0	7	10	0	56	0	56	110
05:45 PM	0	0	0	0	0	37	0	37	0	0	4	4	0	38	3	41	82
Total	0	0	0	0	1	210	0	211	11	0	17	28	0	194	3	197	436
Grand Total	0	0	0	0	5	670	0	675	18	0	21	39	0	518	10	528	1242
Apprch %	0.0	0.0	0.0		0.7	99.3	0.0		46.2	0.0	53.8		0.0	98.1	1.9		
Total %	0.0	0.0	0.0	0.0	0.4	53.9	0.0	54.3	1.4	0.0	1.7	3.1	0.0	41.7	0.8	42.5	

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT PROPOSED DRWY
 BREVARD COUNTY, FLORIDA

File Name : Commerce at Blue
 Site Code : 00000003
 Start Date : 08/10/2017
 Page No : 2

Start Time	N/A Southbound				Space Commerce Way Westbound				Proposed Drwy Northbound				Space Commerce Way Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 09:00 AM to 11:45 AM - Peak 1 of 1																	
Intersection	09:30 AM																
Volume	0	0	0	0	1	159	0	160	1	0	2	3	0	100	2	102	265
Percent	0.0	0.0	0.0		0.6	99.4	0.0		33.3	0.0	66.7		0.0	98.0	2.0		
09:45 Volume	0	0	0	0	1	47	0	48	0	0	0	0	0	29	0	29	77
Peak Factor																	0.860
High Int.	8:45:00 AM				09:45 AM				09:30 AM				10:00 AM				
Volume	0	0	0	0	1	47	0	48	1	0	2	3	0	31	1	32	
Peak Factor					0.833				0.250				0.797				
Peak Hour From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	0	0	0	0	2	229	0	231	12	0	15	27	0	194	0	194	452
Percent	0.0	0.0	0.0		0.9	99.1	0.0		44.4	0.0	55.6		0.0	100.0	0.0		
05:00 Volume	0	0	0	0	0	94	0	94	1	0	2	3	0	49	0	49	146
Peak Factor																	0.774
High Int.					05:00 PM				05:15 PM				05:30 PM				
Volume	0	0	0	0	0	94	0	94	7	0	4	11	0	56	0	56	
Peak Factor					0.614				0.614				0.866				

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT PROPOSED DRWY
 BREVARD COUNTY, FLORIDA

File Name : Commerce at Blue
 Site Code : 00000003
 Start Date : 08/10/2017
 Page No : 3

Groups Printed- Commercial

Start Time	N/A Southbound				Space Commerce Way Westbound				Proposed Drwy Northbound				Space Commerce Way Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
09:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
09:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
09:30 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	0	4	0	4	0	0	0	0	0	1	0	1	5
10:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	7	0	7	8
10:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	3	1	4	5
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2
Total	0	0	0	0	0	2	0	2	0	0	0	0	0	13	2	15	17
04:30 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Total	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
Grand Total	0	0	0	0	0	8	0	8	1	0	0	1	0	17	2	19	28
Apprch %	0.0	0.0	0.0		0.0	100.0	0.0		100.0	0.0	0.0		0.0	89.5	10.5		
Total %	0.0	0.0	0.0	0.0	0.0	28.6	0.0	28.6	3.6	0.0	0.0	3.6	0.0	60.7	7.1	67.9	

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT KENNEDY PKWY
 BREVARD COUNTY, FLORIDA

File Name : Kennedy at Commerce
 Site Code : 00000004
 Start Date : 08/10/2017
 Page No : 1

Groups Printed- Automobiles - Commercial

Start Time	Kennedy Pkwy Southbound				N/A Westbound				Kennedy Pkwy Northbound				Space Commerce Way Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
09:00 AM	0	6	0	6	0	0	0	0	42	83	0	125	0	0	20	20	151
09:15 AM	0	6	0	6	0	0	0	0	27	67	0	94	0	0	25	25	125
09:30 AM	0	5	1	6	0	0	0	0	60	44	0	104	0	0	19	19	129
09:45 AM	0	3	0	3	0	0	0	0	48	28	0	76	0	0	19	19	98
Total	0	20	1	21	0	0	0	0	177	222	0	399	0	0	83	83	503
10:00 AM	0	9	0	9	0	0	0	0	28	39	0	67	0	0	26	26	102
10:15 AM	0	13	0	13	0	0	0	0	35	18	0	53	0	0	21	21	87
10:30 AM	0	14	1	15	0	0	0	0	37	34	0	71	0	0	12	12	98
10:45 AM	0	12	1	13	0	0	0	0	27	17	0	44	0	0	25	25	82
Total	0	48	2	50	0	0	0	0	127	108	0	235	0	0	84	84	369
04:00 PM	0	240	0	240	0	0	0	0	34	6	0	40	0	0	40	40	320
04:15 PM	0	186	0	186	0	0	0	0	25	4	0	29	0	0	42	42	257
04:30 PM	0	217	4	221	0	0	0	0	31	5	0	36	0	0	41	41	298
04:45 PM	0	169	1	170	0	0	0	0	37	4	0	41	0	0	43	43	254
Total	0	812	5	817	0	0	0	0	127	19	0	146	0	0	166	166	1129
05:00 PM	0	193	0	193	0	0	0	0	37	5	0	42	0	0	77	77	312
05:15 PM	0	169	1	170	0	0	0	0	34	7	0	41	0	0	78	78	289
05:30 PM	0	149	0	149	0	0	0	0	26	3	0	29	0	0	79	79	257
05:45 PM	0	93	1	94	0	0	0	0	27	2	0	29	0	0	54	54	177
Total	0	604	2	606	0	0	0	0	124	17	0	141	0	0	288	288	1035
Grand Total	0	1484	10	1494	0	0	0	0	555	366	0	921	0	0	621	621	3036
Aprch %	0.0	99.3	0.7		0.0	0.0	0.0		60.3	39.7	0.0		0.0	0.0	100.0		
Total %	0.0	48.9	0.3	49.2	0.0	0.0	0.0	0.0	18.3	12.1	0.0	30.3	0.0	0.0	20.5	20.5	

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT KENNEDY PKWY
 BREVARD COUNTY, FLORIDA

File Name : Kennedy at Commerce
 Site Code : 00000004
 Start Date : 08/10/2017
 Page No : 2

Start Time	Kennedy Pkwy Southbound				N/A Westbound				Kennedy Pkwy Northbound				Space Commerce Way Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 09:00 AM to 11:45 AM - Peak 1 of 1																	
Intersection	09:00 AM																
Volume	0	20	1	21	0	0	0	0	177	222	0	399	0	0	83	83	503
Percent	0.0	95.2	4.8		0.0	0.0	0.0		44.4	55.6	0.0		0.0	0.0	100.0		
09:00 Volume	0	6	0	6	0	0	0	0	42	83	0	125	0	0	20	20	151
Peak Factor																	0.833
High Int.	09:00 AM				8:45:00 AM				09:00 AM				09:15 AM				
Volume	0	6	0	6	0	0	0	0	42	83	0	125	0	0	25	25	
Peak Factor	0.875												0.798				0.830
Peak Hour From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:30 PM																
Volume	0	748	6	754	0	0	0	0	139	21	0	160	0	0	239	239	1153
Percent	0.0	99.2	0.8		0.0	0.0	0.0		86.9	13.1	0.0		0.0	0.0	100.0		
05:00 Volume	0	193	0	193	0	0	0	0	37	5	0	42	0	0	77	77	312
Peak Factor																	0.924
High Int.	04:30 PM								05:00 PM				05:15 PM				
Volume	0	217	4	221	0	0	0	0	37	5	0	42	0	0	78	78	
Peak Factor	0.853												0.952				0.766

DE TRAFFIC
<http://de-traffic.com>
 SPACE COMMERCE WAY AT KENNEDY PKWY
 BREVARD COUNTY, FLORIDA

File Name : Kennedy at Commerce
 Site Code : 00000004
 Start Date : 08/10/2017
 Page No : 3

Groups Printed- Commercial

Start Time	Kennedy Pkwy Southbound				N/A Westbound				Kennedy Pkwy Northbound				Space Commerce Way Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
09:00 AM	0	0	0	0	0	0	0	0	2	1	0	3	0	0	1	1	4
09:15 AM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	1	1	3
09:30 AM	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	0	4
09:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
Total	0	2	0	2	0	0	0	0	6	2	0	8	0	0	2	2	12
10:00 AM	0	1	0	1	0	0	0	0	1	1	0	2	0	0	2	2	5
10:15 AM	0	1	0	1	0	0	0	0	1	0	0	1	0	0	4	4	6
10:30 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	1	1	4
10:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total	0	3	0	3	0	0	0	0	2	4	0	6	0	0	7	7	16
04:00 PM	0	1	0	1	0	0	0	0	2	1	0	3	0	0	0	0	4
04:15 PM	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	2
04:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	1	1	3
Total	0	5	0	5	0	0	0	0	3	1	0	4	0	0	1	1	10
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	2	3
Grand Total	0	11	0	11	0	0	0	0	11	7	0	18	0	0	12	12	41
Aprch %	0.0	100.0	0.0		0.0	0.0	0.0		61.1	38.9	0.0		0.0	0.0	100.0		
Total %	0.0	26.8	0.0	26.8	0.0	0.0	0.0	0.0	26.8	17.1	0.0	43.9	0.0	0.0	29.3	29.3	



NB Approach



EB Approach



WB Approach



Space Commerce Way
At NASA Pkwy

Brevard County

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299 McGregor Rd. DeLand FL. 32720

Project
Number: L17-041

Sheet
Number: 1



NB Approach



EB Approach



WB Approach



Space Commerce Way
At Visitor Center Complex

Brevard County

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299 McGregor Rd. DeLand FL. 32720

Project
Number: L17-041

Sheet
Number: 2



NB Approach



EB Approach



WB Approach



Space Commerce Way
At Proposed Southern Entrance

Brevard County

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299 McGregor Rd. DeLand FL. 32720

Project
Number: L17-041

Sheet
Number: 3



NB Approach



SB Approach



EB Approach



Space Commerce Way
At Kennedy Pkwy

Brevard County

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299 McGregor Rd. DeLand FL 32720

Project
Number: L17-041

Sheet
Number: 4

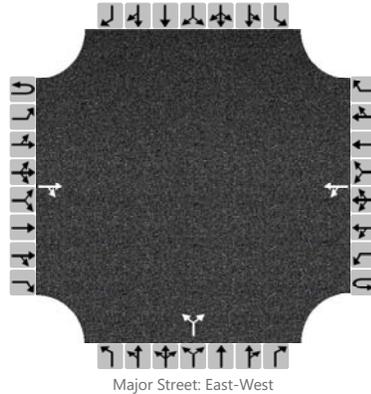
APPENDIX C

Unsignalized Intersection HCS
Worksheets – Existing Conditions

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SD	Intersection	Space Commerce at Entranc
Agency/Co.	LTG	Jurisdiction	NASA
Date Performed	8/8/2017	East/West Street	Space Commerce Way
Analysis Year	2017	North/South Street	Proposed S Entrance
Time Analyzed	Existing AM Pk-Hr	Peak Hour Factor	0.83
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	4324.03 KSC Space Commerce Way		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			95	2		1	165			2		2				
Percent Heavy Vehicles (%)						2				2		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

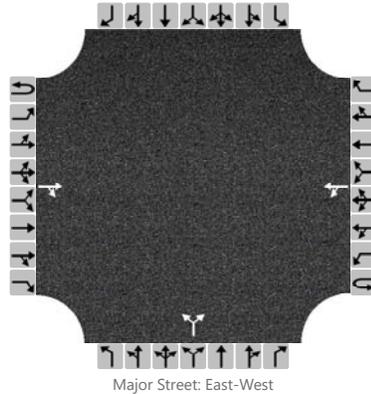
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						1					4					
Capacity, c (veh/h)						1472					785					
v/c Ratio						0.00					0.01					
95% Queue Length, Q ₉₅ (veh)						0.0					0.0					
Control Delay (s/veh)						7.4					9.6					
Level of Service, LOS						A					A					
Approach Delay (s/veh)					0.0				9.6							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	SD	Intersection	Space Commerce at Entranc
Agency/Co.	LTG	Jurisdiction	NASA
Date Performed	8/8/2017	East/West Street	Space Commerce Way
Analysis Year	2017	North/South Street	Proposed S Entrance
Time Analyzed	Existing PM Pk-Hr	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	4324.03 KSC Space Commerce Way		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume, V (veh/h)			185	0		2	238			12		15				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

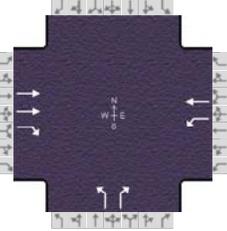
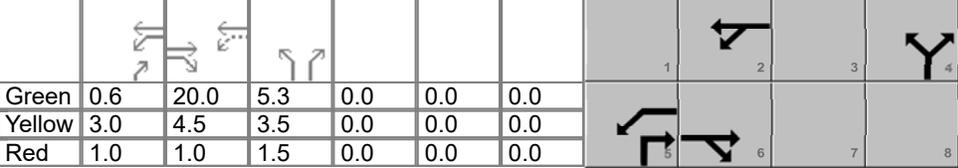
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						2					29					
Capacity, c (veh/h)						1364					681					
v/c Ratio						0.00					0.04					
95% Queue Length, Q ₉₅ (veh)						0.0					0.1					
Control Delay (s/veh)						7.6					10.5					
Level of Service, LOS						A					B					
Approach Delay (s/veh)					0.1				10.5							
Approach LOS									B							

APPENDIX D

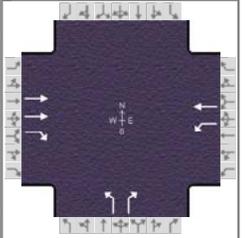
Signalized Intersection HCS
Worksheets – Existing Conditions

HCS7 Signalized Intersection Results Summary

General Information						Intersection Information									
Agency	LTG					Duration, h	0.25								
Analyst	SD		Analysis Date	8/2/2017		Area Type	Other								
Jurisdiction	NASA		Time Period	Existing AM Pk-Hr		PHF	0.85								
Urban Street	NASA Pkwy		Analysis Year	2017		Analysis Period	1 > 7:00								
Intersection	NASA Pkwy at Commer...		File Name	1. Nasa Pkwy at Space Commerce Way - Existing...											
Project Description	4324.03 KSC Space Commerce Way														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h					503	85	12	3		41		126			
Signal Information															
Cycle, s	40.4	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												
Green	0.6	20.0	5.3	0.0	0.0	0.0									
Yellow	3.0	4.5	3.5	0.0	0.0	0.0									
Red	1.0	1.0	1.5	0.0	0.0	0.0									
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					6	5	2		4						
Case Number					7.3	1.0	4.0		9.0						
Phase Duration, s					25.5	4.6	30.1		10.3						
Change Period, (Y+R _c), s					5.5	4.0	5.5		5.0						
Max Allow Headway (MAH), s					3.4	2.9	3.4		3.1						
Queue Clearance Time (g _s), s					6.1	2.2	2.0		5.6						
Green Extension Time (g _e), s					2.0	0.0	2.0		0.3						
Phase Call Probability					1.00	0.15	1.00		0.89						
Max Out Probability					0.00	0.00	0.00		0.00						
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					6	16	5	2		7		14			
Adjusted Flow Rate (v), veh/h					592	100	14	4		48		148			
Adjusted Saturation Flow Rate (s), veh/h/ln					1781	1547	1527	1643		1711		1560			
Queue Service Time (g _s), s					4.1	1.4	0.2	0.0		1.0		3.6			
Cycle Queue Clearance Time (g _c), s					4.1	1.4	0.2	0.0		1.0		3.6			
Green Ratio (g/C)					0.49	0.49	0.56	0.61		0.13		0.15			
Capacity (c), veh/h					1762	765	479	999		226		229			
Volume-to-Capacity Ratio (X)					0.336	0.131	0.029	0.004		0.213		0.648			
Back of Queue (Q), ft/ln (95 th percentile)					28	8.9	0.7	0.1		14		45.7			
Back of Queue (Q), veh/ln (95 th percentile)					1.1	0.3	0.0	0.0		0.5		1.8			
Queue Storage Ratio (RQ) (95 th percentile)					0.00	0.02	0.00	0.00		0.02		0.00			
Uniform Delay (d ₁), s/veh					6.2	5.5	4.4	3.1		15.7		16.3			
Incremental Delay (d ₂), s/veh					0.1	0.1	0.0	0.0		0.2		1.2			
Initial Queue Delay (d ₃), s/veh					0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh					6.3	5.6	4.5	3.1		15.8		17.4			
Level of Service (LOS)					A	A	A	A		B		B			
Approach Delay, s/veh / LOS				6.2	A	4.2	A	17.0	B	0.0					
Intersection Delay, s/veh / LOS				8.5						A					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.2	B	0.6	A	2.7	C	2.4	B				
Bicycle LOS Score / LOS				1.1	A	0.5	A		F						

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	Existing PM Pk-Hr		PHF	0.89	
Urban Street	NASA Pkwy	Analysis Year	2017		Analysis Period	1 > 7:00	
Intersection	NASA Pkwy at Commer...	File Name	1. Nasa Pkwy at Space Commerce Way - Existing...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		56	106	79	29		222		28			

Signal Information				Phase Diagram									
Cycle, s	45.5	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green	2.7	20.0	8.3	0.0	0.0	0.0					
		Yellow	3.0	4.5	3.5	0.0	0.0	0.0					
		Red	1.0	1.0	1.5	0.0	0.0	0.0					

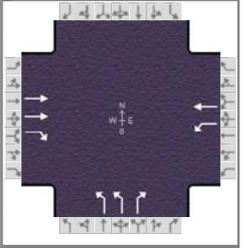
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.5	6.7	32.2		13.3		
Change Period, (Y+R _c), s		5.5	4.0	5.5		5.0		
Max Allow Headway (MAH), s		3.5	2.9	3.5		3.0		
Queue Clearance Time (g _s), s		4.1	3.1	2.3		8.1		
Green Extension Time (g _e), s		0.6	0.1	0.6		0.4		
Phase Call Probability		1.00	0.67	1.00		0.97		
Max Out Probability		0.00	0.00	0.00		0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		6	16	5	2		7		14			
Adjusted Flow Rate (v), veh/h		63	119	89	33		249		31			
Adjusted Saturation Flow Rate (s), veh/h/ln		1766	1560	1781	1870		1781		1572			
Queue Service Time (g _s), s		0.5	2.1	1.1	0.3		6.1		0.7			
Cycle Queue Clearance Time (g _c), s		0.5	2.1	1.1	0.3		6.1		0.7			
Green Ratio (g/C)		0.44	0.44	0.54	0.59		0.18		0.24			
Capacity (c), veh/h		1554	686	840	1098		324		379			
Volume-to-Capacity Ratio (X)		0.040	0.174	0.106	0.030		0.771		0.083			
Back of Queue (Q), ft/ln (95 th percentile)		4.6	19.1	7.5	1.9		90		8.4			
Back of Queue (Q), veh/ln (95 th percentile)		0.2	0.7	0.3	0.1		3.5		0.3			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.05	0.02	0.00		0.15		0.00			
Uniform Delay (d ₁), s/veh		7.3	7.7	5.1	3.9		17.7		13.4			
Incremental Delay (d ₂), s/veh		0.0	0.1	0.0	0.0		1.5		0.0			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		7.3	7.8	5.1	3.9		19.2		13.4			
Level of Service (LOS)		A	A	A	A		B		B			
Approach Delay, s/veh / LOS	7.6		A	4.8		A	18.5		B	0.0		
Intersection Delay, s/veh / LOS	12.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.7	A	2.7	C	2.4	B
Bicycle LOS Score / LOS	0.6	A	0.7	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	Existing AM Pk-Hr		PHF	0.95	
Urban Street	NASA Pkwy	Analysis Year	2017		Analysis Period	1 > 7:00	
Intersection	NASA Pkwy at Visitor C...	File Name	2. Nasa Pkwy at Visitor Center Complex - Existing...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		151	478	25	0		27		29			

Signal Information				Signal Timing (s)								Signal Phases							
Cycle, s	40.8	Reference Phase	2	Green	1.3	21.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Offset, s	0	Reference Point	End	Yellow	4.0	4.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	Yes	Simult. Gap E/W	On	Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On																

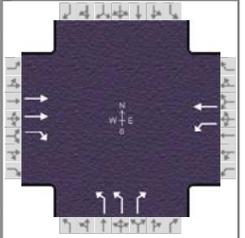
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		26.5	6.3	32.8		7.9		
Change Period, (Y+R _c), s		5.5	5.0	5.5		5.0		
Max Allow Headway (MAH), s		7.1	5.9	0.0		3.1		
Queue Clearance Time (g _s), s		11.2	2.6			3.1		
Green Extension Time (g _e), s		9.8	0.1	0.0		0.1		
Phase Call Probability		1.00	0.26			0.49		
Max Out Probability		0.03	0.00			0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		7		14			
Adjusted Flow Rate (v), veh/h		159	503	26	0		28		31			
Adjusted Saturation Flow Rate (s), veh/h/ln		1724	1585	1640	1737		1620		1045			
Queue Service Time (g _s), s		1.0	9.2	0.6	0.0		0.3		1.1			
Cycle Queue Clearance Time (g _c), s		1.0	9.2	0.6	0.0		0.3		1.1			
Green Ratio (g/C)		0.52	0.52	0.03	0.67		0.07		0.10			
Capacity (c), veh/h		1780	818	52	1165		234		109			
Volume-to-Capacity Ratio (X)		0.089	0.615	0.504	0.000		0.122		0.281			
Back of Queue (Q), ft/ln (95 th percentile)		6.6	78.1	20	0		4.7		12.7			
Back of Queue (Q), veh/ln (95 th percentile)		0.3	3.1	0.7	0.0		0.2		0.4			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.07	0.04	0.00		0.00		0.02			
Uniform Delay (d ₁), s/veh		5.0	7.0	19.4	0.0		17.7		16.9			
Incremental Delay (d ₂), s/veh		0.1	2.7	15.1	0.0		0.1		0.5			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		5.1	9.7	34.6	0.0		17.8		17.4			
Level of Service (LOS)		A	A	C			B		B			
Approach Delay, s/veh / LOS	8.6	A	34.6	C	17.6	B	0.0					
Intersection Delay, s/veh / LOS	10.2						B					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.4	B	0.6	A	2.7	C	2.8	C				
Bicycle LOS Score / LOS	1.0	A	0.5	A		F						

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	Existing PM Pk-Hr		PHF	0.87	
Urban Street	NASA Pkwy	Analysis Year	2017		Analysis Period	1 > 7:00	
Intersection	NASA Pkwy at Visitor C...	File Name	2. Nasa Pkwy at Visitor Center Complex - Existing...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		28	56	34	0		290		30			

Signal Information												
Cycle, s	32.8	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	1.5	10.5	5.8	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
				Red	1.0	1.0	1.0	0.0	0.0	0.0		

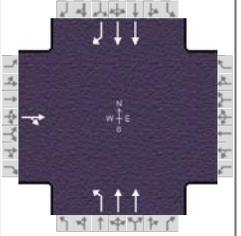
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		15.5	6.5	22.0		10.8		
Change Period, (Y+R _c), s		5.5	5.0	5.5		5.0		
Max Allow Headway (MAH), s		7.1	5.9	0.0		3.0		
Queue Clearance Time (g _s), s		3.0	3.4			4.9		
Green Extension Time (g _e), s		1.1	0.2	0.0		0.8		
Phase Call Probability		1.00	0.30			0.96		
Max Out Probability		0.00	0.00			0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		7		14			
Adjusted Flow Rate (v), veh/h		32	64	39	0		333		34			
Adjusted Saturation Flow Rate (s), veh/h/ln		1752	1535	892	1870		1730		894			
Queue Service Time (g _s), s		0.2	1.0	1.4	0.0		2.9		1.0			
Cycle Queue Clearance Time (g _c), s		0.2	1.0	1.4	0.0		2.9		1.0			
Green Ratio (g/C)		0.30	0.30	0.05	0.50		0.18		0.22			
Capacity (c), veh/h		1069	468	41	941		611		199			
Volume-to-Capacity Ratio (X)		0.030	0.138	0.955	0.000		0.545		0.173			
Back of Queue (Q), ft/ln (95 th percentile)		2	10.2	78.3	0		30.5		7.8			
Back of Queue (Q), veh/ln (95 th percentile)		0.1	0.4	2.1	0.0		1.2		0.2			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.01	0.16	0.00		0.00		0.01			
Uniform Delay (d ₁), s/veh		8.0	8.3	15.6	0.0		12.3		10.3			
Incremental Delay (d ₂), s/veh		0.0	0.5	84.0	0.0		0.3		0.2			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		8.0	8.8	99.7	0.0		12.6		10.5			
Level of Service (LOS)		A	A	F			B		B			
Approach Delay, s/veh / LOS	8.5		A	99.7		F	12.4		B	0.0		
Intersection Delay, s/veh / LOS				18.4						B		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	0.7	A	2.7	C	2.8	C
Bicycle LOS Score / LOS	0.6	A	0.6	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other		
Jurisdiction	NASA	Time Period	Existing AM Pk-Hr	PHF	0.83		
Urban Street	Kennedy Pkwy	Analysis Year	2017	Analysis Period	1 > 7:00		
Intersection	Space Commerce Way...	File Name	3. Space Commerce Way at Kennedy Pkwy - Exis...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		0	83				177	222			20	1

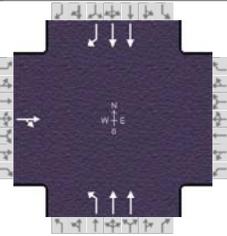
Signal Information													
Cycle, s	44.4	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	6.9	19.5	3.5	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0			
				Red	1.0	1.0	1.5	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		8.5			10.9	35.9		25.0
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (MAH), s		3.2			2.9	2.9		2.9
Queue Clearance Time (g_s), s		4.8			7.1	3.1		2.2
Green Extension Time (g_e), s		0.2			0.3	0.6		0.6
Phase Call Probability		0.71			0.93	1.00		0.97
Max Out Probability		0.00			0.00	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		4	14				1	6		2	12	
Adjusted Flow Rate (v), veh/h		100					213	267		24	1	
Adjusted Saturation Flow Rate (s), veh/h/ln		1585					1767	1781		1668	1585	
Queue Service Time (g_s), s		2.8					5.1	1.1		0.2	0.0	
Cycle Queue Clearance Time (g_c), s		2.8					5.1	1.1		0.2	0.0	
Green Ratio (g/C)		0.08					0.16	0.68		0.44	0.44	
Capacity (c), veh/h		125					276	2438		1462	695	
Volume-to-Capacity Ratio (X)		0.799					0.773	0.110		0.016	0.002	
Back of Queue (Q), ft/ln (95 th percentile)		42.8					77.4	0.1		1.7	0.2	
Back of Queue (Q), veh/ln (95 th percentile)		1.7					3.0	0.0		0.1	0.0	
Queue Storage Ratio (RQ) (95 th percentile)		0.00					0.15	0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		20.1					18.0	2.4		7.1	7.0	
Incremental Delay (d_2), s/veh		4.4					1.8	0.0		0.0	0.0	
Initial Queue Delay (d_3), s/veh		0.0					0.0	0.0		0.0	0.0	
Control Delay (d), s/veh		24.5					19.7	2.4		7.1	7.0	
Level of Service (LOS)		C					B	A		A	A	
Approach Delay, s/veh / LOS	24.5	C		0.0			10.1	B		7.1	A	
Intersection Delay, s/veh / LOS	12.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	1.8	B	2.1	B
Bicycle LOS Score / LOS	0.7	A			0.9	A	0.5	A

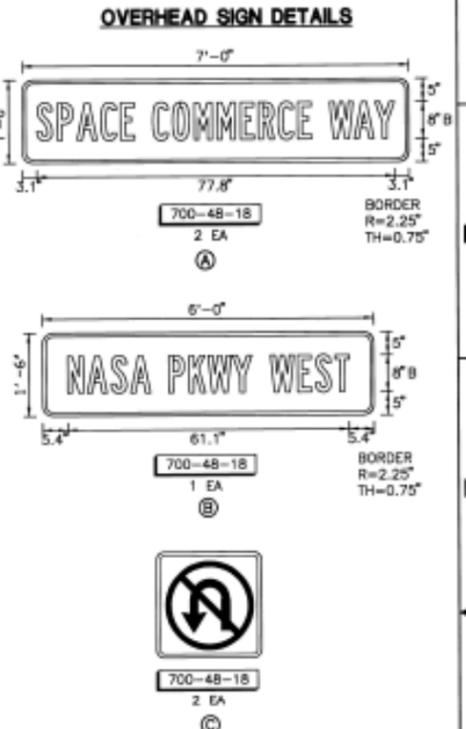
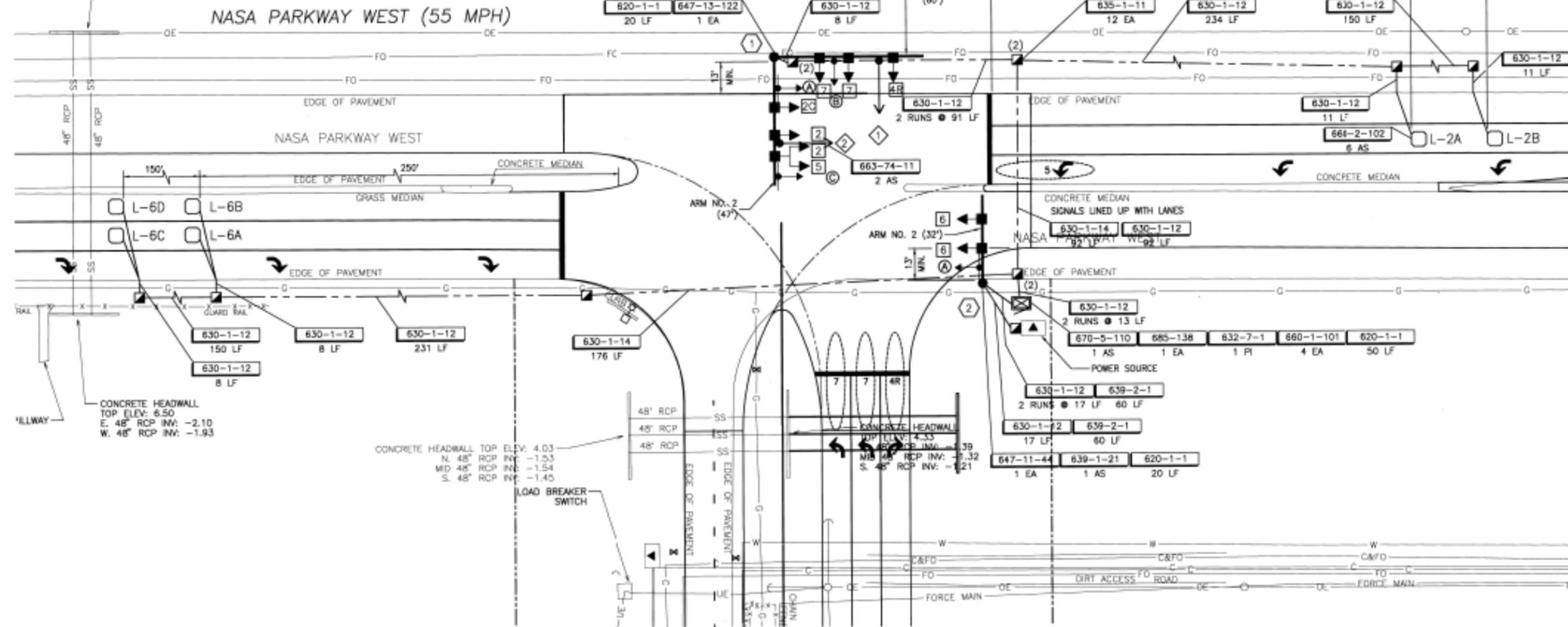
HCS7 Signalized Intersection Results Summary

General Information						Intersection Information												
Agency	LTG					Duration, h	0.25											
Analyst	SD		Analysis Date	8/2/2017		Area Type	Other											
Jurisdiction	NASA		Time Period	Existing PM Pk-Hr		PHF	0.77											
Urban Street	Kennedy Pkwy		Analysis Year	2017		Analysis Period	1> 7:00											
Intersection	Space Commerce Way...		File Name	3. Space Commerce Way at Kennedy Pkwy - Exis...														
Project Description	4324.03 KSC Space Commerce Way																	
Demand Information				EB			WB			NB			SB					
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h					0	239				139	21			748	6			
Signal Information																		
Cycle, s	54.3	Reference Phase	2															
Offset, s	0	Reference Point	End															
Uncoordinated	Yes	Simult. Gap E/W	On	Green	7.1	20.0	12.7	0.0	0.0	0.0								
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0								
				Red	1.0	1.0	1.5	0.0	0.0	0.0								
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT							
Assigned Phase					4			1	6			2						
Case Number					12.0			2.0	4.0			7.3						
Phase Duration, s					17.7			11.1	36.6			25.5						
Change Period, (Y+R _c), s					5.0			4.0	5.5			5.5						
Max Allow Headway (MAH), s					3.2			2.9	3.3			3.3						
Queue Clearance Time (g _s), s					12.1			7.3	2.2			14.9						
Green Extension Time (g _e), s					0.6			0.2	3.3			3.2						
Phase Call Probability					0.99			0.93	1.00			1.00						
Max Out Probability					0.00			0.00	0.00			0.00						
Movement Group Results				EB			WB			NB			SB					
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R			
Assigned Movement					4	14				1	6			2	12			
Adjusted Flow Rate (v), veh/h				310						181	27	971 8						
Adjusted Saturation Flow Rate (s), veh/h/ln				1585						1781	1781	1781 1585						
Queue Service Time (g _s), s				10.1						5.3	0.2	12.9 0.2						
Cycle Queue Clearance Time (g _c), s				10.1						5.3	0.2	12.9 0.2						
Green Ratio (g/C)				0.23						0.13	0.57	0.37 0.37						
Capacity (c), veh/h				370						233	2041	1312 584						
Volume-to-Capacity Ratio (X)				0.838						0.773	0.013	0.740 0.013						
Back of Queue (Q), ft/ln (95 th percentile)				142.5						89.3	1.5	174.2 2						
Back of Queue (Q), veh/ln (95 th percentile)				5.6						3.5	0.1	6.9 0.1						
Queue Storage Ratio (RQ) (95 th percentile)				0.00						0.18	0.00	0.00 0.00						
Uniform Delay (d ₁), s/veh				19.8						22.8	5.0	14.9 10.9						
Incremental Delay (d ₂), s/veh				2.0						2.1	0.0	0.6 0.0						
Initial Queue Delay (d ₃), s/veh				0.0						0.0	0.0	0.0 0.0						
Control Delay (d), s/veh				21.8						24.9	5.0	15.5 10.9						
Level of Service (LOS)				C						C	A	B B						
Approach Delay, s/veh / LOS				21.8	C	0.0		22.3	C	15.5	B							
Intersection Delay, s/veh / LOS				17.7						B								
Multimodal Results				EB			WB			NB			SB					
Pedestrian LOS Score / LOS				2.8	C	2.8	C	1.9	B	2.1	B							
Bicycle LOS Score / LOS				1.0	A			0.7	A	1.3	A							

APPENDIX E

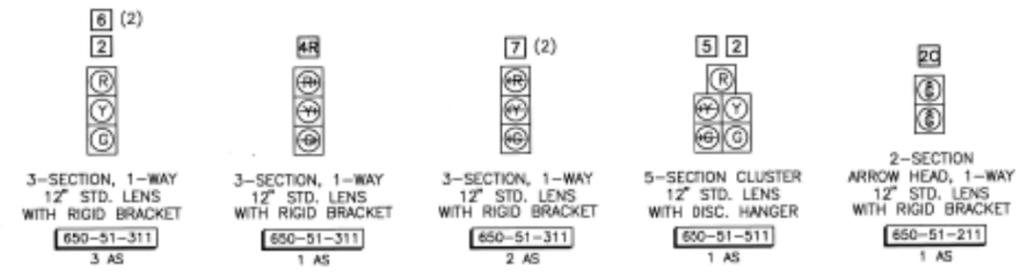
Signal Timings

RETIC HEADWALL
 TOP ELEV: 3.28
 RCP INV: 0.80
 RCP INV: 0.84
 S ELEV: -2.21



- ALL SIGNS SHALL BE ALUMINUM WITH A MINIMUM THICKNESS OF 0.125".
- SHEETING SHALL BE TYPE II RETROREFLECTIVE, LEGEND AND BORDER SHALL BE HIGH INTENSITY WITH GREEN BACKGROUND, AND WHITE MESSAGE AND BORDER.
- SIGN PANELS SHALL BE ATTACHED IN THE LOCATION SHOWN IN THE PLANS. ATTACHMENT SHALL BE PER STANDARD INDEX 17356, TYPE C OR D.

SIGNAL HEAD DETAILS



PAY ITEM NOTES

- PAY ITEM 685-138 INCLUDES ALL NECESSARY CABLING AND ATTACHMENT HARDWARE FOR A COMPLETE INSTALLATION. ALSO INCLUDED IS ALL NECESSARY VIDEO DETECTION EQUIPMENT TO BE PLACED IN THE CONTROLLER CABINET FOR A COMPLETE VIDEO DETECTION SYSTEM.

PHASING DIAGRAM



CONTROLLER TIMINGS								
PHASE	1	2	3	4	5	6	7	8
MOVEMENT NO.	-	2	-	7&4R	5&4R	6	-	-
MIN. GRN. (INT.)	-	20	-	4	4	20	-	-
EXT. (PASS)	-	2.5	-	2.0	2.0	2.5	-	-
MAX. GRN. 1	-	50	-	30	15	50	-	-
MAX. GRN. 2	-	50	-	30	15	50	-	-
YELLOW CLR.	-	4.5	-	3.5	3.0	4.5	-	-
ALL RED CLR.	-	1.0	-	1.5	1.0	1.0	-	-
PED. WALK	-	20	-	0	0	20	-	-
PED. CLR.	-	0	-	0	0	0	-	-
MEMORY	-	ON	-	OFF	OFF	ON	-	-
RECALL	-	MIN	-	OFF	OFF	MIN	-	-

DETECTOR CONFIGURATION CHART

PHASE	LOOP ID	TYPE	DETECTOR ID
2	L-2A	B	2A
2	L-2B	B	2B
4R	-	VIDEO	V-1
5	-	VIDEO	V-2
6	L-6A&B	B	6A
6	L-6C&D	B	6C
7	-	VIDEO	V-1

LEGEND

- NEW CONDUIT
- NEW CONTROLLER CABINET
- STEEL POLE
- MOVEMENT NUMBER
- POLE NUMBER
- NEW 3-SECTION SIGNAL HEAD
- NEW 5-SECTION CLUSTER SIGNAL HEAD
- NEW PULL BOX, (X)=NUMBER OF PULL BOXES
- VIDEO DETECTOR NO. X
- AREA BEING DETECTED
- LOOP ASSEMBLY (TYPE B)

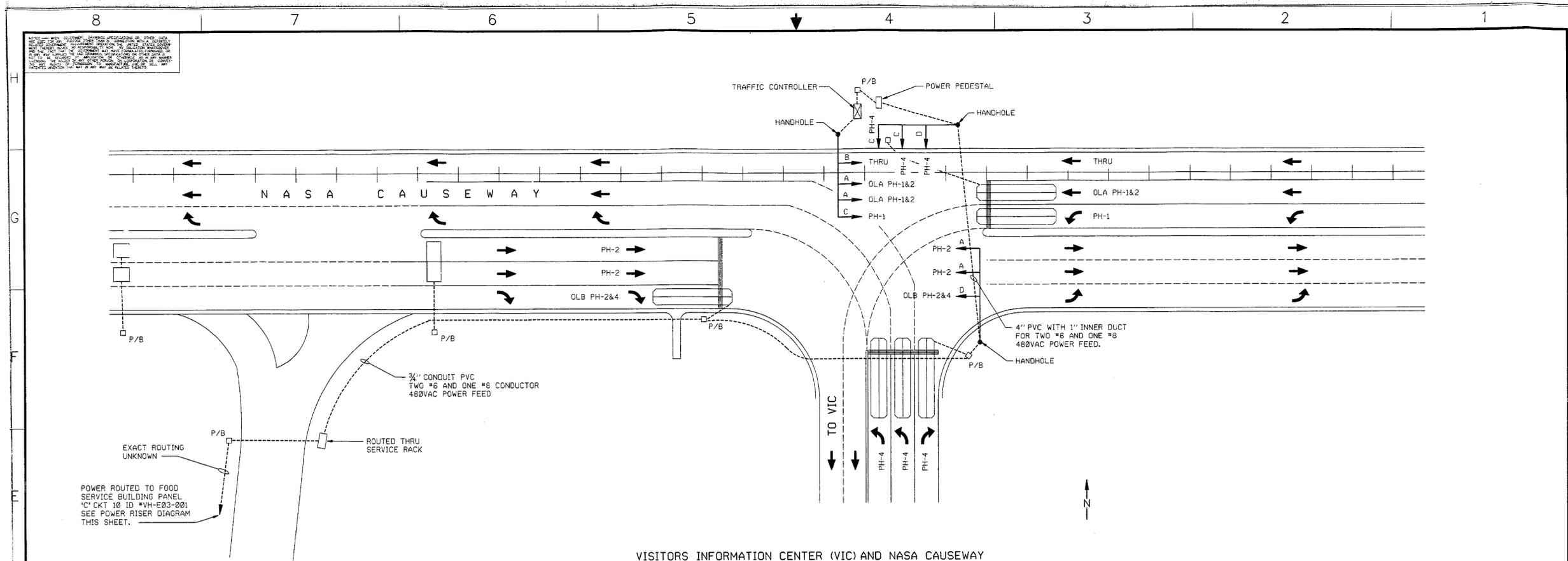
BUCKHOLZ TRAFFIC
 2385 Ruff Road
 Jacksonville, FL 32227
 TEL: (904) 986-2171

Jones Edmonds & Associates, Inc. JEA
 238-A Commercial Boulevard
 Jacksonville, FL 32202
 TEL: (904) 776-8888

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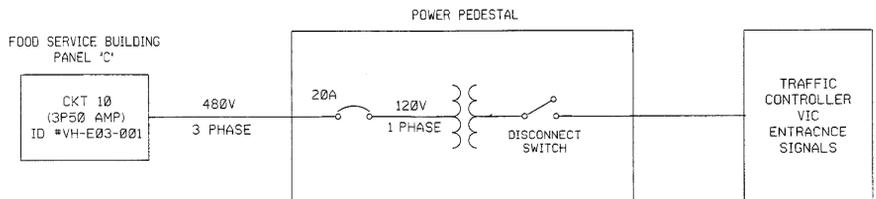
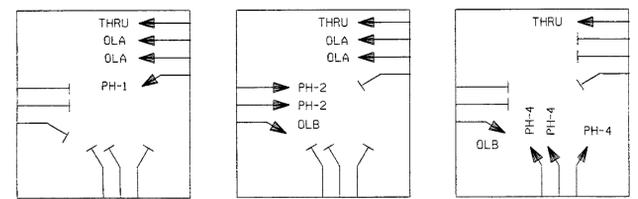
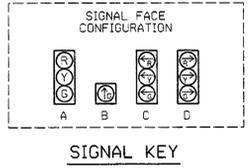
T-1

SYM	ZONE	DESCRIPTION	DATE	APPROVED
SIGNATURES				
DRWN	AVD	DELAWARE NORTH PARKS SERVICES OF SPACEPORT, INC	4/25/02	
CHECKED	JWB	KENNEDY SPACE CENTER, FLORIDA	4/25/02	
ENGINEER	JWB		4/25/02	
SPACE COMMERCE WAY NORTHWESTERN LEG				
SIGNALIZATION PLAN				
APPROVED	DATE	SHEET	DWG. NO.	REV
	4/25/02	F	79K35780	
PROJ. NO. DNP551122			SHEET 85	



VISITORS INFORMATION CENTER (VIC) AND NASA CAUSEWAY
SCALE: NONE

POWER ROUTED TO FOOD SERVICE BUILDING PANEL 'C' CKT 10 ID #VH-E03-001 SEE POWER RISER DIAGRAM THIS SHEET.



SYM	ZONE	DESCRIPTION	DATE	APPROVED
REVISIONS				
SIGNATURES	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION		
DRAWN J. SPRINKLE	23MAY91	JOHN F. KENNEDY SPACE CENTER, NASA		
CHECKED		KENNEDY SPACE CENTER		
ENGINEER Powell	5-29-91	KENNEDY SPACE CENTER TRAFFIC CONTROLS		
		VIC AND NASA CAUSEWAY		
		INTERSECTION		
		SIGNALIZATION		
		CONFIGURATION FIELD ROUTING		
SUBMITTED				
APPROVED	DATE	SIZE	81K01916	
	5-30-91	F		
TITLE	PROJ NO	WPCN 902725	SHEET	3

THIS DRAWING MADE BY AND WILL BE REVISED ONLY BY THE DRAWING LOG SYSTEM. FILE # 191683.DGN

1880EL CONTROLLER SETTINGS (ON DISK) - VIC NASA CAUSEWAY (#2) 11-08-1990 14:30:11

UNIT INITIALIZATION SETTINGS

START UP PHASE - RING 1: 2
START UP PHASE - RING 2: 0
START UP IN ALL RED?: N
ALL RED START TIME (IF USED): 0

ACTIVATE DOUBLE CLEAR OPTION?: N
DUAL ENTRY - PH. 1256?: N
DUAL ENTRY - PH. 3478?: N
SIMULTANEOUS GAP OUT (IF QUAD)? N
OVERLAPS YELLOW AT STARTUP? N

SEQUENTIAL INIT./PASSAGE TIM.? Y
2 SEC. MIN. RED REVERT? Y
RED REVERT TIME (IF USED): 0

R1 PH. TO BE GREEN BEFORE UCF: 4
R2 PH. TO BE GREEN BEFORE UCF: 0
R1 PH. TO BE GREEN AFTER UCF: 2
R2 PH. TO BE GREEN AFTER UCF: 0
OVERRIDE HOLD IF UCF ACTIVE? Y
LAST CAR PASS. ACTIVE? Y

BASIC INTERVAL SETTINGS

Table with 8 columns (PH 1 to PH 8) and rows for INITIAL, PASSAGE, YELLOW, RED CLEARANCE, MAX. GREEN #1, MAX. GREEN #2, WALK, PED. CLEARANCE.

RECALLS, OMTS, CNA, FLASHING WALKS

Table with 8 columns (PH 1 to PH 8) and rows for MIN. RECALL ON?, MAX. RECALL ON?, PED. RECALL ON?, DET. NON-LOCK ON?, CNA I ACTIVE?, CNA II ACTIVE?, FLASHING WALK?, PHASE OMIT ACTIVE?, PED. OMIT ACTIVE?, SOFT RECALL ON?.

OFFSET SETTINGS:

Table with 4 columns (CYCLE 1-4) and 4 rows (INBOUND OFFSET, AVERAGE OFFSET, OUTBOUND OFFSET, HVY INB. OFFSET).

SPLIT PLAN SETTINGS:

Table with 16 columns (PH 1 to PH 16) and rows for PHASE 1-8 SPLIT, START PERM #1-3, END PERM #1-3.

LOCAL INT. ACTIVITY CHANNELS - WHEN TO REPORT (USED IN CLOSED LOOP SYSTEMS ONLY)

Table with 2 columns (INIT FAILUR, RESUME NORMAL) and rows for CONFLICT FLASH, MANUAL/AUTO FLASH, MANUAL CONT. ENABLE, PRE-EMPTION, CHANNEL 5-8, CAB. DOOR OPEN.

SPLIT PLAN FOR EACH CYCLE/OFFSET COMBINATION:

Table with 4 columns (CY 1-4) and 4 rows (HVY INB. OFFSET, INBOUND OFFSET, AVERAGE OFFSET, OUTBOUND OFFSET).

1 = HEAVY ARTERIAL 2 = AVERAGE 3 = HEAVY SIDE ST. 4-16 = SPECIAL

COORDINATED PHASE RELATIONSHIPS:

HOLD PHASE(S) ASSOCIATED WITH HOLD 1: 0-0
PHASE(S) TO BE OMITTED DURING HOLD 1: 0-0
PHASE(S) TO BE OMITTED DURING HOLD 2: 0-0
PHASE(S) TO BE OMITTED DURING HOLD 3: 0-0
ADDIT. PHASES TO BE OMITTED DURING HOLD 3: 0-0
PED. PHASE(S) TO BE OMITTED DURING HOLD 3: 0-0
NON-EARLY RELEASE PHASE(S) DURING COORD.: 0-0
ADDITIONAL NON-EARLY RELEASE PHASES: 0-0
ADDITIONAL NON-EARLY RELEASE PHASES: 0-0
PHASE(S) TO BE OMITTED WHEN AUX. CCT. 9 ON: 0-0
ADDIT. PHASES TO BE OMITTED WHEN CCT. 9 ON: 0-0
PED. PHASES TO BE OMITTED WHEN CCT. 9 ON: 0-0
REFERENCE PHASE(S) FOR OUT OF STEP CHECK: 0-0

SPECIAL FUNCTIONS DURING COORDINATED OPERATION

ENABLE FLASH VIA TOD OUTPT 1? N USE SPLIT MATRIX? N
INVERT FREE OUTPUT? N ENABLE YEL. OFFSET TIMER? N
ENABLE AUTOMATIC PERMISSIVES? N NON-CLOSED LOOP INTERCONNECT? N
CYCLE 4 = FLASH? N ENAB. 4 SPLITS PER 4 DIALS? N
ENABLE FULL DWELL OPERATION? N UNUSED CYC. TIME TO SIDE ST? N
ENABLE MAX 2 VIA TOD OUTPT 9? N CCT. 4 TO AUX TOD? N
ENABLE COND. SERV. VIA OUT. 9? N CYCLE 4 = 2 A.M. SYNCH? N
INVERT FREE INPUT? N CITY ZERO OPERATION? N
CALL CNA I WHEN COORDINATED? N ENABLE OFFSET INTERRUPT? N
ENABLE WALK REST MODIFIER? N SPLIT 2 = 2 A.M. SYNCH? N
INHIBIT MAX TERMINATION? N FL/FREE TOD CONTROLLED? N
ENAB. ENHAN PERMS (FL LVL 3)? N CCT. 0 ON-ISOL=COORD/CL=FREE? N
ENABLE SHORT WAY OFFSET? N

PHASE REVERSAL SETTINGS

REVERSE PHASES 1 & 2 DURING THIS CYCLE/OFFSET: 0 0
REVERSE PHASES 1 & 2 DURING THIS CYCLE/OFFSET ALSO: 0 0
REVERSE PHASES 5 & 6 DURING THIS CYCLE/OFFSET: 0 0
REVERSE PHASES 5 & 6 DURING THIS CYCLE/OFFSET ALSO: 0 0
REVERSE PHASES 3 & 4 DURING THIS CYCLE/OFFSET: 0 0
REVERSE PHASES 3 & 4 DURING THIS CYCLE/OFFSET ALSO: 0 0
REVERSE PHASES 7 & 8 DURING THIS CYCLE/OFFSET: 0 0
REVERSE PHASES 7 & 8 DURING THIS CYCLE/OFFSET ALSO: 0 0

IMPLEMENTATION OF SPECIAL EVENT DAY PLANS:

NONE PROGRAMMED

WEEKPLAN STRUCTURES:

Table with 10 columns (WKPL 0 to WKPL 9) and rows for SUNDAY'S DAYPLANS, MONDAY'S DAYPLANS, TUESDAY'S DAYPLANS, WEDNESDAY'S DAYPLANS, THURSDAY'S DAYPLANS, FRIDAY'S DAYPLANS, SATURDAY'S DAYPLANS.

IMPLEMENTATION OF WEEKPLANS (OTHER THAN PLAN 0):

WEEKPLAN 0 PROGRAMMED FOR ALL WEEKS

CYCLE LENGTHS:

CYCLE 1 60 SEC.
CYCLE 2 90 SEC.
CYCLE 3 120 SEC.
CYCLE 4 150 SEC.
CYCLE 5 180 SEC.
CYCLE 6 200 SEC.
99 YEAR CLOCK SETTINGS

CURRENT MONTH (1-12):

CURRENT MONTH (1-12): 10
CURRENT DAY (1-31): 8
CURRENT YEAR (00-99): 90
MONTH TO DAYLIGHT SAVINGS (1-12): 4
SUNDAY TO DAYLIGHT SAVINGS (1-5): 1
MONTH FROM DAYLIGHT SAVINGS (1-12): 10
SUNDAY FROM DAYLIGHT SAVINGS (1-5): 4
STOP CLOCK (TO SAVE BATTERY)? N

SPECIAL SYNCH SETTINGS

CITY SYNC OFFSET FROM 12 AM - CY 1 (0-255) 0
CITY SYNC OFFSET FROM 12 AM - CY 2 (0-255) 0
CITY SYNC OFFSET FROM 12 AM - CY 3 (0-255) 0
CITY SYNC OFFSET FROM 12 AM - CY 4 (0-255) 0
CITY SYNC OFFSET FROM 12 AM - CY 5 (0-255) 0
CITY SYNC OFFSET FROM 12 AM - CY 6 (0-255) 0
SYNC REFERENCE HOUR (0-23): 0
SYNC REFERENCE MINUTE (0-59): 0
SYNC VIA EVENT TIME? N

Form with fields for SYM [ZONE], DESCRIPTION, DATE, APPROVED, SIGNATURES, DATE, REVISIONS, CHECKED, ENGINEER, SUBMITTED, DATE, SIZE, TITLE, PROJ NO, WPCN, SHEET 7 of 7.



INSTITUTIONAL SERVICES CONTRACT
P.O. BOX 21025, ISC-001
KENNEDY SPACE CENTER, FLORIDA 32815

CONTRACT NO.:

HAZARDOUS MATERIALS:
LISTED BELOW ARE THE KNOWN HAZARDOUS MATERIALS RELATED TO THIS PROJECT. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

SUSPECTED HEAVY METALS YES NO
SUSPECTED ASBESTOS
SUSPECTED PCB'S

IF THE CONTRACTOR ENCOUNTERS OR SUSPECTS ANY UNIDENTIFIED HAZARDOUS MATERIAL THAT PREVENTS THEM FROM PERFORMING THE CONTRACT WORK, CONTRACTOR IS NOT TO DISTURB THE MATERIAL IN QUESTION AND NOTIFY THE CONTRACT ADMINISTRATOR AT ONCE.

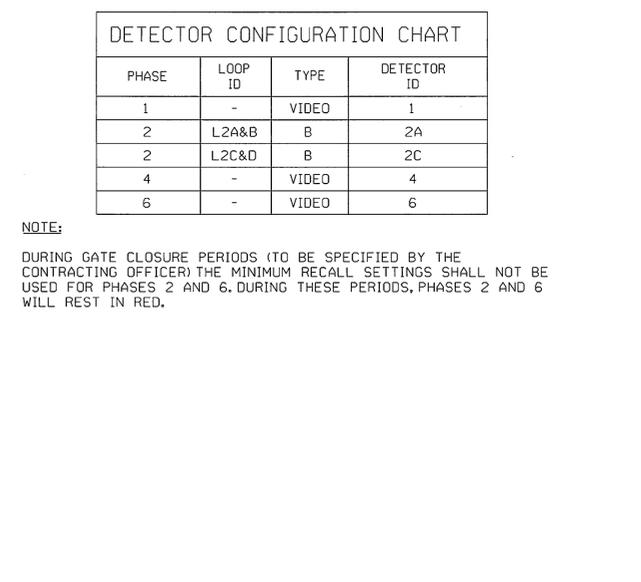
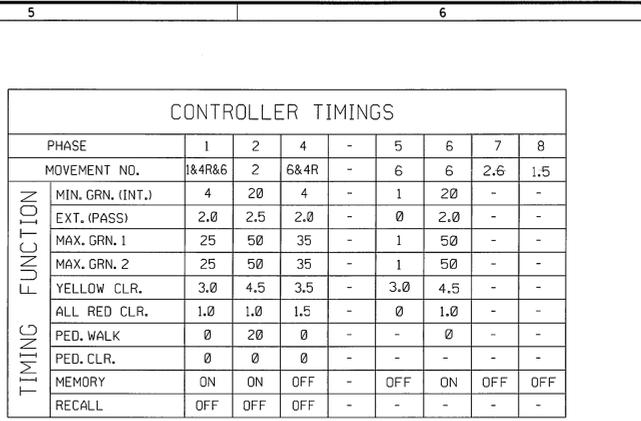
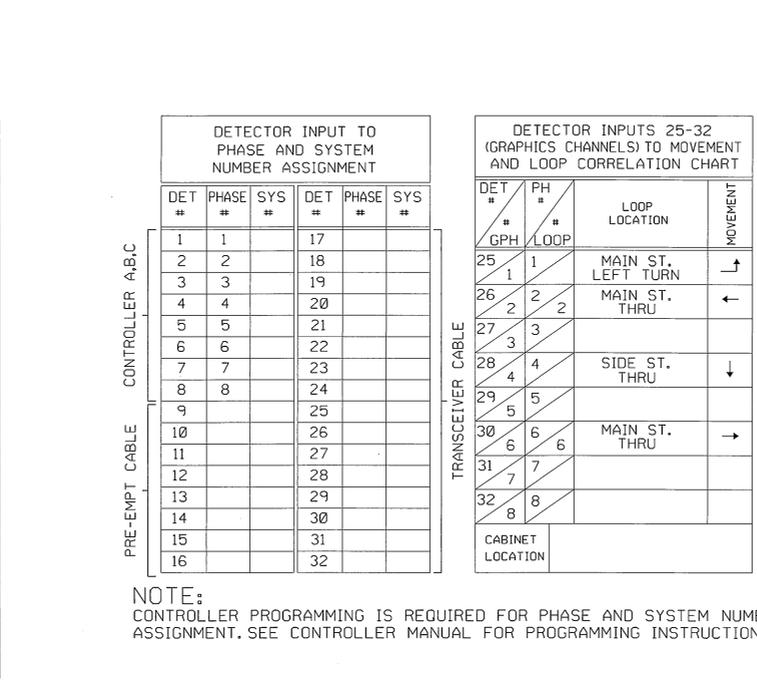
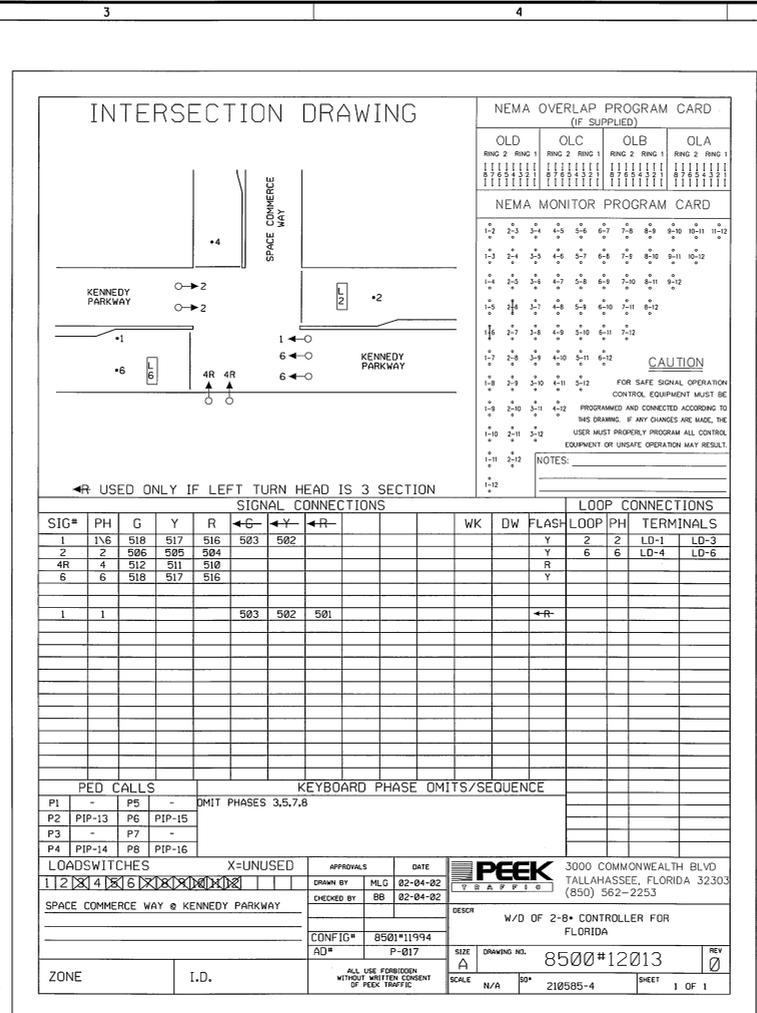
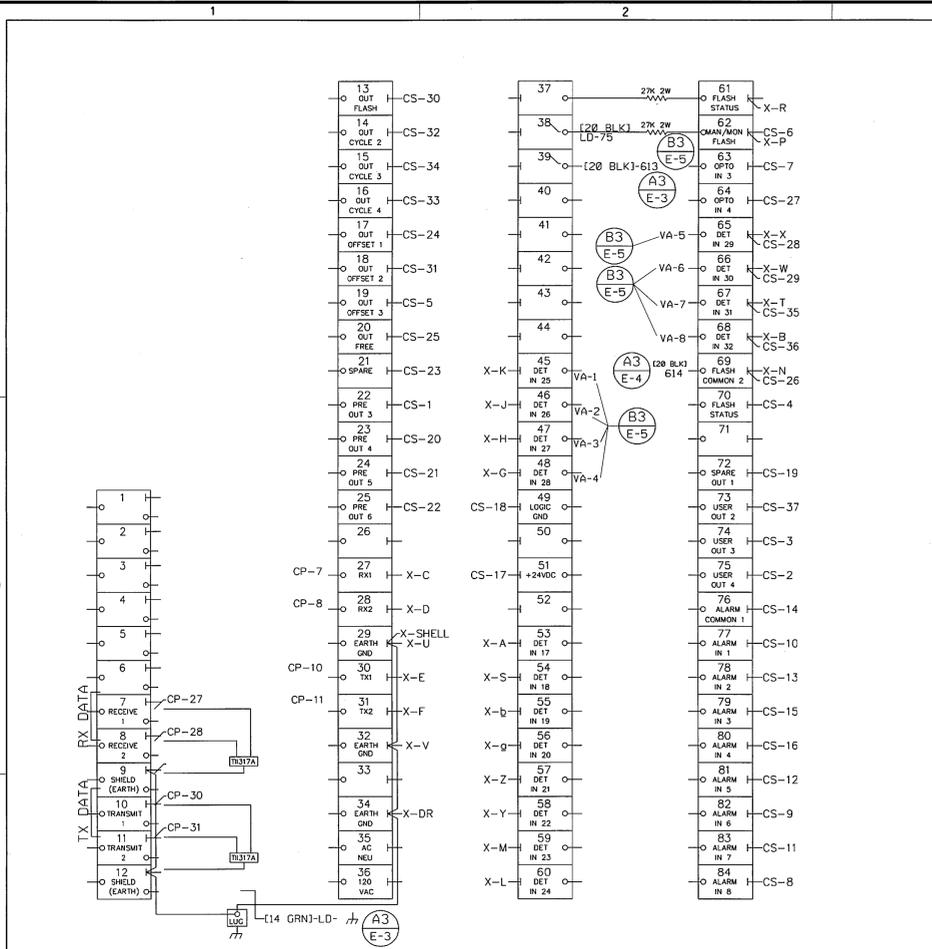
SPECIFICATION: *SPECIFICATION REQUIREMENTS HAVE BEEN INCORPORATED WITHIN THESE DRAWINGS AND A SEPARATE DOCUMENT HAS NOT BEEN ISSUED FOR THE PROJECT.*

DATE ISSUED:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN F. KENNEDY SPACE CENTER, NASA
KENNEDY SPACE CENTER, FLORIDA

KENNEDY SPACE CENTER
KENNEDY PARKWAY AND SPACE COMMERCE WAY

TRAFFIC LIGHT
CONFIGURATION DRAWING



REVISIONS:

NO.	DATE	DESCRIPTION
1	8/17/11	FINAL RELEASE PACKAGE
2	10/23/10	95% DESIGN REVIEW
3	10/26/10	100% DESIGN REVIEW

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A GOVERNMENT RELATED PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT HEREBY DISCLAIMS ANY LIABILITY FOR ANY ERRORS, OMISSIONS, OR INADEQUACIES IN SUCH DATA. THE GOVERNMENT MAKES NO WARRANTY, REPRESENTATION, OR FACT THAT THE GOVERNMENT HAS ANY LIABILITY FOR ANY ERRORS, OMISSIONS, OR INADEQUACIES IN SUCH DATA. THE GOVERNMENT SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR INADEQUACIES IN SUCH DATA. THE GOVERNMENT SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR INADEQUACIES IN SUCH DATA. THE GOVERNMENT SHALL NOT BE HELD RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR INADEQUACIES IN SUCH DATA.

WON NO: E1192853
CAD DWG NO: 81K01932
CAD FILE NO: C0193200.008

NAME	SIGNATURE	DATE
DESIGNED BY: J. VANSICVER	<i>J. Vansicver</i>	8/18/11
DRAWN BY: M. MASSON	<i>M. Masson</i>	8/18/11
CHECKED BY: C. RAMER	<i>C. Ramer</i>	8-19-11
APPROVED BY: G. HEGDE	<i>G. Hegde</i>	8-19-11
SUBMITTED BY: J. VANSICVER	<i>J. Vansicver</i>	8/18/11
RESPONSIBLE PEER REVIEWER: G. HEGDE	<i>G. Hegde</i>	8-19-11

GOPAL N. HEGDE
DATE SIGNATURE OBTAINED THE DESIGNATED DESIGNER SHEET TITLE

CABINET ASSEMBLY WIRING

SHEET NO. E-7
SHEET 8 OF 8

APPENDIX F

KSC VIC Growth Data

KSC GROWTH ASSUMPTION yrs 2016 - 2035

Year	Growth													Total	Year
	%	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2016	Base	103,654	140,826	214,642	130,976	118,684	162,240	171,922	147,585	102,400	83,744	108,644	171,600	1,656,917	2016
2017	3%	106,764	145,051	221,081	134,905	122,245	167,107	177,080	152,013	105,472	86,256	111,903	176,748	1,706,625	2017
2018	3%	109,967	149,402	227,714	138,952	125,912	172,120	182,392	156,573	108,636	88,844	115,260	182,050	1,757,823	2018
2019	3%	113,266	153,884	234,545	143,121	129,689	177,284	187,864	161,270	111,895	91,509	118,718	187,512	1,810,558	2019
2020	5%	118,929	161,579	246,272	150,277	136,174	186,148	197,257	169,334	117,490	96,085	124,654	196,888	1,901,086	2020
2021	3%	122,497	166,426	253,661	154,785	140,259	191,733	203,175	174,414	121,015	98,967	128,394	202,794	1,958,118	2021
2022	3%	126,172	171,419	261,270	159,429	144,467	197,485	209,270	179,646	124,645	101,936	132,246	208,878	2,016,862	2022
2023	3%	129,957	176,561	269,108	164,212	148,801	203,409	215,548	185,035	128,385	104,994	136,213	215,144	2,077,368	2023
2024	3%	133,855	181,858	277,182	169,138	153,265	209,511	222,014	190,586	132,236	108,144	140,299	221,599	2,139,689	2024
2025	10%	147,241	200,044	304,900	186,052	168,591	230,463	244,216	209,645	145,460	118,959	154,329	243,759	2,353,658	2025
2026	3%	151,658	206,045	314,047	191,634	173,649	237,376	251,542	215,934	149,823	122,527	158,959	251,071	2,424,267	2026
2027	3%	156,208	212,227	323,468	197,383	178,858	244,498	259,089	222,413	154,318	126,203	163,728	258,603	2,496,996	2027
2028	3%	160,894	218,593	333,172	203,304	184,224	251,833	266,861	229,085	158,948	129,989	168,640	266,362	2,571,905	2028
2029	3%	165,721	225,151	343,168	209,403	189,751	259,388	274,867	235,957	163,716	133,889	173,699	274,352	2,649,063	2029
2030	5%	174,007	236,409	360,326	219,873	199,238	272,357	288,611	247,755	171,902	140,584	182,384	288,070	2,781,516	2030
2031	3%	179,227	243,501	371,136	226,469	205,215	280,528	297,269	255,188	177,059	144,801	187,855	296,712	2,864,961	2031
2032	3%	184,604	250,806	382,270	233,264	211,372	288,944	306,187	262,844	182,371	149,145	193,491	305,613	2,950,910	2032
2033	3%	190,142	258,330	393,738	240,261	217,713	297,612	315,373	270,729	187,842	153,619	199,296	314,782	3,039,437	2033
2034	3%	195,846	266,080	405,550	247,469	224,245	306,540	324,834	278,851	193,477	158,228	205,275	324,225	3,130,620	2034
2035	10%	215,431	292,688	446,105	272,216	246,669	337,194	357,317	306,736	212,825	174,051	225,802	356,648	3,443,682	2035

APPENDIX G

NASA/Cape Canaveral Growth Data

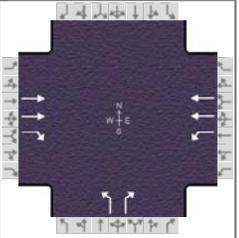
- Traffic Analysis Zone (TAZ) No. 2990 (VAB Area)
 - Commercial Employment
 - Year 2020 - 0
 - Year 2040 - 0
 - Industrial Employment
 - Year 2020 - 968
 - Year 2040 – 2,905
 - Service Employment
 - Year 2020 - 1
 - Year 2040 - 4
- TAZ 2992 (Canaveral Air Force Station)
 - Commercial Employment
 - Year 2020 - 1
 - Year 2040 - 2
 - Industrial Employment
 - Year 2020 - 9
 - Year 2040 - 26
 - Service Employment
 - Year 2020 – 2,526
 - Year 2040 – 2,548
- TAZ 2993 (Blue Origins, Space Florida)
 - Commercial Employment
 - Year 2020 - 0
 - Year 2040 - 0
 - Industrial Employment
 - Year 2020 - 0
 - Year 2040 - 0
 - Service Employment
 - Year 2020 – 0
 - Year 2040 – 0
- TAZ 2994 (Visitor Complex)
 - Commercial Employment
 - Year 2020 - 0
 - Year 2040 - 0
 - Industrial Employment
 - Year 2020 - 0
 - Year 2040 - 06
 - Service Employment
 - Year 2020 – 0
 - Year 2040 – 0
- TAZ 2995 (NASA – East of Kennedy Blvd, South of NASA Blvd)
 - Commercial Employment
 - Year 2020 - 0
 - Year 2040 - 0
 - Industrial Employment
 - Year 2020 - 53
 - Year 2040 - 60
 - Service Employment
 - Year 2020 – 2,595
 - Year 2040 – 3,036

APPENDIX H

Signalized Intersection HCS
Worksheets – 2018 Opening Year
Conditions

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	2018 AM Pk-Hr		PHF	0.85	
Urban Street	NASA Pkwy	Analysis Year	2018		Analysis Period	1 > 7:00	
Intersection	NASAPkwy at Commerc...	File Name	1. Nasa Pkwy at Space Commerce Way - 2018 A...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		190	467	0	57		76		13			

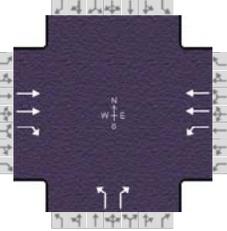
Signal Information														
Cycle, s	34.3	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	20.0	3.8	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0				
				Red	1.0	1.0	1.5	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.5	0.0	25.5		8.8		
Change Period, (Y+R _c), s		5.5	4.0	5.5		5.0		
Max Allow Headway (MAH), s		3.6	0.0	3.6		3.0		
Queue Clearance Time (g _s), s		9.9		2.3		3.7		
Green Extension Time (g _e), s		2.6	0.0	2.6		0.1		
Phase Call Probability		1.00		1.00		0.63		
Max Out Probability		0.00		0.00		0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		6	16	5	2		7		14			
Adjusted Flow Rate (v), veh/h		224	549	0	67		89		15			
Adjusted Saturation Flow Rate (s), veh/h/ln		1781	1547	1527	1651		1711		1560			
Queue Service Time (g _s), s		1.0	7.9	0.0	0.3		1.7		0.3			
Cycle Queue Clearance Time (g _c), s		1.0	7.9	0.0	0.3		1.7		0.3			
Green Ratio (g/C)		0.58	0.58	0.52	0.58		0.11		0.11			
Capacity (c), veh/h		2077	902	766	1926		189		173			
Volume-to-Capacity Ratio (X)		0.108	0.609	0.000	0.035		0.472		0.089			
Back of Queue (Q), ft/ln (95 th percentile)		0.2	5.8	0	0.1		21.6		3.4			
Back of Queue (Q), veh/ln (95 th percentile)		0.0	0.2	0.0	0.0		0.8		0.1			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.01	0.00	0.00		0.04		0.00			
Uniform Delay (d ₁), s/veh		3.2	4.6	0.0	3.0		14.3		13.7			
Incremental Delay (d ₂), s/veh		0.0	0.5	0.0	0.0		0.7		0.1			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		3.2	5.1	0.0	3.0		15.0		13.8			
Level of Service (LOS)		A	A		A		B		B			
Approach Delay, s/veh / LOS	4.6		A	3.0		A	14.8		B	0.0		
Intersection Delay, s/veh / LOS	5.6						A					

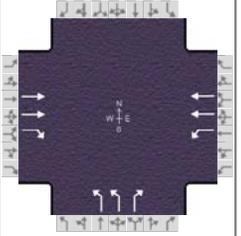
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	0.5	A		F		

HCS7 Signalized Intersection Results Summary

General Information						Intersection Information										
Agency	LTG					Duration, h	0.25									
Analyst	SD		Analysis Date	8/2/2017		Area Type	Other									
Jurisdiction	NASA		Time Period	2018 PM Pk-Hr		PHF	0.89									
Urban Street	NASA Pkwy		Analysis Year	2018		Analysis Period	1 > 7:00									
Intersection	NASA Pkwy at Commer...		File Name	1. Nasa Pkwy at Space Commerce Way - 2018 P...												
Project Description	4324.03 KSC Space Commerce Way															
Demand Information				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Demand (v), veh/h					29	161	7	1073		445		0				
Signal Information																
Cycle, s	51.4	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.4	20.0	16.4	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0						
				Red	1.0	1.0	1.5	0.0	0.0	0.0						
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT					
Assigned Phase					6	5	2		4							
Case Number					7.3	1.0	4.0		9.0							
Phase Duration, s					25.5	4.4	29.9		21.4							
Change Period, (Y+R _c), s					5.5	4.0	5.5		5.0							
Max Allow Headway (MAH), s					3.4	2.9	3.4		2.9							
Queue Clearance Time (g _s), s					6.1	2.1	15.8		15.6							
Green Extension Time (g _e), s					5.1	0.0	5.0		0.8							
Phase Call Probability					1.00	0.11	1.00		1.00							
Max Out Probability					0.00	0.00	0.00		0.00							
Movement Group Results				EB			WB			NB			SB			
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement					6	16	5	2		7		14				
Adjusted Flow Rate (v), veh/h					33	181	8	1206		500		0				
Adjusted Saturation Flow Rate (s), veh/h/ln					1766	1560	1781	1781		1781		1572				
Queue Service Time (g _s), s					0.3	4.1	0.1	13.8		13.6		0.0				
Cycle Queue Clearance Time (g _c), s					0.3	4.1	0.1	13.8		13.6		0.0				
Green Ratio (g/C)					0.39	0.39	0.44	0.48		0.32		0.33				
Capacity (c), veh/h					1375	607	684	1693		570		517				
Volume-to-Capacity Ratio (X)					0.024	0.298	0.012	0.712		0.877		0.000				
Back of Queue (Q), ft/ln (95 th percentile)					3.6	46.1	1.5	149.2		193.3		0				
Back of Queue (Q), veh/ln (95 th percentile)					0.1	1.8	0.1	5.9		7.6		0.0				
Queue Storage Ratio (RQ) (95 th percentile)					0.00	0.11	0.00	0.00		0.32		0.00				
Uniform Delay (d ₁), s/veh					9.7	10.8	8.2	10.7		16.5		0.0				
Incremental Delay (d ₂), s/veh					0.0	0.2	0.0	0.4		1.7		0.0				
Initial Queue Delay (d ₃), s/veh					0.0	0.0	0.0	0.0		0.0		0.0				
Control Delay (d), s/veh					9.7	11.0	8.2	11.1		18.3		0.0				
Level of Service (LOS)					A	B	A	B		B						
Approach Delay, s/veh / LOS				10.8		B	11.1		B	18.3		B	0.0			
Intersection Delay, s/veh / LOS				12.9						B						
Multimodal Results				EB			WB			NB			SB			
Pedestrian LOS Score / LOS				2.2		B	0.7		A	2.8		C	2.8		C	
Bicycle LOS Score / LOS				0.7		A	1.5		A			F				

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	2018 AM Pk-Hr		PHF	0.95	
Urban Street	NASA Pkwy	Analysis Year	2018		Analysis Period	1 > 7:00	
Intersection	NASA Pkwy at Visitor C...	File Name	2. Nasa Pkwy at Visitor Center Complex - 2018 A...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		154	49	26	57		0		30			

Signal Information				Phase Diagram								
Cycle, s	27.8	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	1.0	10.0	1.3	0.0	0.0	0.0				
		Yellow	4.0	4.5	4.0	0.0	0.0	0.0				
		Red	1.0	1.0	1.0	0.0	0.0	0.0				

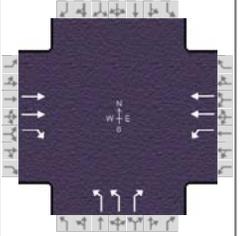
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		15.5	6.0	21.5		6.3		
Change Period, (Y+R _c), s		5.5	5.0	5.5		5.0		
Max Allow Headway (MAH), s		6.9	5.9	6.9		3.2		
Queue Clearance Time (g _s), s		2.9	2.5	2.2		2.8		
Green Extension Time (g _e), s		3.3	0.1	3.3		0.0		
Phase Call Probability		1.00	0.19	0.90		0.22		
Max Out Probability		0.00	0.00	0.00		0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		7		14			
Adjusted Flow Rate (v), veh/h		162	52	27	60		0		32			
Adjusted Saturation Flow Rate (s), veh/h/ln		1724	1585	1640	1654		1620		1045			
Queue Service Time (g _s), s		0.9	0.6	0.5	0.2		0.0		0.8			
Cycle Queue Clearance Time (g _c), s		0.9	0.6	0.5	0.2		0.0		0.8			
Green Ratio (g/C)		0.36	0.36	0.03	0.57		0.05		0.08			
Capacity (c), veh/h		1242	571	57	1901		152		85			
Volume-to-Capacity Ratio (X)		0.130	0.090	0.484	0.032		0.000		0.371			
Back of Queue (Q), ft/ln (95 th percentile)		5	4	14.9	0.3		0		7.5			
Back of Queue (Q), veh/ln (95 th percentile)		0.2	0.2	0.5	0.0		0.0		0.2			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.03	0.00		0.00		0.01			
Uniform Delay (d ₁), s/veh		6.0	5.9	13.2	2.6		0.0		12.1			
Incremental Delay (d ₂), s/veh		0.2	0.2	13.1	0.0		0.0		1.0			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		6.1	6.1	26.3	2.6		0.0		13.1			
Level of Service (LOS)		A	A	C	A				B			
Approach Delay, s/veh / LOS	6.1	A		10.0	A		13.1	B		0.0		
Intersection Delay, s/veh / LOS	7.8						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	0.6	A	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.7	A	0.6	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2018 PM Pk-Hr	PHF	0.95
Urban Street	NASA Pkwy	Analysis Year	2018	Analysis Period	1 > 7:00
Intersection	NASA Pkwy at Visitor C...	File Name	2. Nasa Pkwy at Visitor Center Complex - 2018 P...		
Project Description	4324.03 KSC Space Commerce Way				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		29	0	35	1050		30		31			

Signal Information													
Cycle, s	43.2	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		1.8	22.7	3.2	0.0	0.0	0.0				
		Yellow		4.0	4.5	4.0	0.0	0.0	0.0				
		Red		1.0	1.0	1.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		28.2	6.8	35.0		8.2		
Change Period, (Y+R _c), s		5.5	5.0	5.5		5.0		
Max Allow Headway (MAH), s		6.8	5.9	6.8		3.1		
Queue Clearance Time (g _s), s		2.2	3.0	8.9		3.2		
Green Extension Time (g _e), s		20.5	0.1	19.5		0.1		
Phase Call Probability		1.00	0.36	1.00		0.54		
Max Out Probability		0.12	0.00	0.17		0.00		

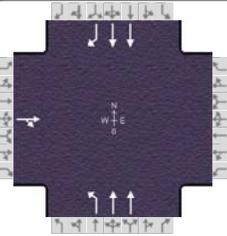
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		7		14			
Adjusted Flow Rate (v), veh/h		31	0	37	1105		32		33			
Adjusted Saturation Flow Rate (s), veh/h/ln		1724	1585	1640	1654		1620		1045			
Queue Service Time (g _s), s		0.2	0.0	1.0	6.9		0.4		1.2			
Cycle Queue Clearance Time (g _c), s		0.2	0.0	1.0	6.9		0.4		1.2			
Green Ratio (g/C)		0.53	0.53	0.04	0.68		0.07		0.12			
Capacity (c), veh/h		1811	832	68	2257		242		122			
Volume-to-Capacity Ratio (X)		0.017	0.000	0.541	0.490		0.130		0.268			
Back of Queue (Q), ft/ln (95 th percentile)		1.4	0	26.6	9.2		5.6		14.4			
Back of Queue (Q), veh/ln (95 th percentile)		0.1	0.0	1.0	0.3		0.2		0.4			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.06	0.00		0.00		0.02			
Uniform Delay (d ₁), s/veh		4.9	0.0	20.3	3.3		18.7		17.4			
Incremental Delay (d ₂), s/veh		0.0	0.0	13.5	0.6		0.1		0.4			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		4.9	0.0	33.8	3.9		18.8		17.9			
Level of Service (LOS)		A		C	A		B		B			
Approach Delay, s/veh / LOS	4.9	A		4.8	A		18.3	B		0.0		
Intersection Delay, s/veh / LOS	5.5						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	0.6	A	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.5	A	1.4	A		F		

HCS7 Signalized Intersection Results Summary

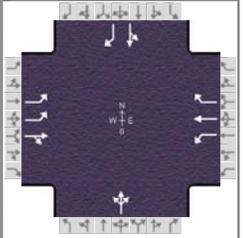
General Information					Intersection Information											
Agency	LTG				Duration, h	0.25										
Analyst	SD		Analysis Date	8/2/2017		Area Type	Other									
Jurisdiction	NASA		Time Period	2018 AM Pk-Hr		PHF	0.83									
Urban Street	Kennedy Pkwy		Analysis Year	2018		Analysis Period	1 > 7:00									
Intersection	Space Commerce Way...		File Name	3. Space Commerce Way at Kennedy Pkwy - 201...												
Project Description	4324.03 KSC Space Commerce Way															
Demand Information					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h						0	91				211	226			20	1
Signal Information																
Cycle, s	46.6	Reference Phase	2		Green	8.5	19.6	4.1	0.0	0.0	0.0					
Offset, s	0	Reference Point	End		Yellow	3.0	4.5	3.5	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On		Red	1.0	1.0	1.5	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On													
Timer Results					EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase						4			1	6		2				
Case Number						12.0			2.0	4.0		7.3				
Phase Duration, s						9.1			12.5	37.5		25.1				
Change Period, (Y+R _c), s						5.0			4.0	5.5		5.5				
Max Allow Headway (MAH), s						3.2			2.9	2.9		2.9				
Queue Clearance Time (g _s), s						5.2			8.4	3.2		2.2				
Green Extension Time (g _e), s						0.2			0.4	0.6		0.6				
Phase Call Probability						0.76			0.96	1.00		0.98				
Max Out Probability						0.00			0.00	0.00		0.00				
Movement Group Results					EB			WB			NB			SB		
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement						4	14				1	6		2	12	
Adjusted Flow Rate (v), veh/h					110						254	272	24 1			
Adjusted Saturation Flow Rate (s), veh/h/ln					1585						1767	1781	1668 1585			
Queue Service Time (g _s), s					3.2						6.4	1.2	0.2 0.0			
Cycle Queue Clearance Time (g _c), s					3.2						6.4	1.2	0.2 0.0			
Green Ratio (g/C)					0.09						0.18	0.69	0.42 0.42			
Capacity (c), veh/h					139						321	2448	1401 666			
Volume-to-Capacity Ratio (X)					0.791						0.792	0.111	0.017 0.002			
Back of Queue (Q), ft/ln (95 th percentile)					48.6						96.7	0.3	2.1 0.2			
Back of Queue (Q), veh/ln (95 th percentile)					1.9						3.8	0.0	0.1 0.0			
Queue Storage Ratio (RQ) (95 th percentile)					0.00						0.19	0.00	0.00 0.00			
Uniform Delay (d ₁), s/veh					20.9						18.2	2.5	7.9 7.9			
Incremental Delay (d ₂), s/veh					3.8						1.7	0.0	0.0 0.0			
Initial Queue Delay (d ₃), s/veh					0.0						0.0	0.0	0.0 0.0			
Control Delay (d), s/veh					24.7						19.9	2.5	7.9 7.9			
Level of Service (LOS)					C						B	A	A A			
Approach Delay, s/veh / LOS					24.7	C	0.0		10.9	B	7.9	A				
Intersection Delay, s/veh / LOS					13.1			B								
Multimodal Results					EB			WB			NB			SB		
Pedestrian LOS Score / LOS					2.8	C	2.8	C	1.8	B	2.1	B				
Bicycle LOS Score / LOS					0.7	A			0.9	A	0.5	A				

HCS7 Signalized Intersection Results Summary

General Information						Intersection Information									
Agency	LTG					Duration, h	0.25								
Analyst	SD		Analysis Date	8/2/2017		Area Type	Other								
Jurisdiction	NASA		Time Period	2018 PM Pk-Hr		PHF	0.77								
Urban Street	Kennedy Pkwy		Analysis Year	2018		Analysis Period	1> 7:00								
Intersection	Space Commerce Way...		File Name	3. Space Commerce Way at Kennedy Pkwy - 201...											
Project Description	4324.03 KSC Space Commerce Way														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h					0	216				154	21			763	6
Signal Information															
Cycle, s	53.7	Reference Phase	2	Green	7.7	20.0	11.5	0.0	0.0	0.0	1	2	3	4	
Offset, s	0	Reference Point	End	Yellow	3.0	4.5	3.5	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Red	1.0	1.0	1.5	0.0	0.0	0.0	5	6	7	8	
Force Mode	Fixed	Simult. Gap N/S	On												
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					4			1	6		2				
Case Number					12.0			2.0	4.0		7.3				
Phase Duration, s					16.5			11.7	37.2		25.5				
Change Period, (Y+R _c), s					5.0			4.0	5.5		5.5				
Max Allow Headway (MAH), s					3.2			2.9	3.3		3.3				
Queue Clearance Time (g _s), s					11.1			7.8	2.2		15.0				
Green Extension Time (g _e), s					0.5			0.3	3.3		3.3				
Phase Call Probability					0.98			0.95	1.00		1.00				
Max Out Probability					0.00			0.00	0.00		0.00				
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					4	14				1	6			2	12
Adjusted Flow Rate (v), veh/h				281						200	27	991 8			
Adjusted Saturation Flow Rate (s), veh/h/ln				1585						1781	1781	1781 1585			
Queue Service Time (g _s), s				9.1						5.8	0.2	13.0 0.2			
Cycle Queue Clearance Time (g _c), s				9.1						5.8	0.2	13.0 0.2			
Green Ratio (g/C)				0.21						0.14	0.59	0.37 0.37			
Capacity (c), veh/h				340						257	2103	1325 590			
Volume-to-Capacity Ratio (X)				0.826						0.780	0.013	0.748 0.013			
Back of Queue (Q), ft/ln (95 th percentile)				128.6						96.8	1.3	173.4 2			
Back of Queue (Q), veh/ln (95 th percentile)				5.1						3.8	0.1	6.8 0.1			
Queue Storage Ratio (RQ) (95 th percentile)				0.00						0.19	0.00	0.00 0.00			
Uniform Delay (d ₁), s/veh				20.2						22.2	4.5	14.7 10.7			
Incremental Delay (d ₂), s/veh				2.0						2.0	0.0	0.6 0.0			
Initial Queue Delay (d ₃), s/veh				0.0						0.0	0.0	0.0 0.0			
Control Delay (d), s/veh				22.1						24.1	4.5	15.3 10.7			
Level of Service (LOS)				C						C	A	B B			
Approach Delay, s/veh / LOS				22.1	C	0.0		21.8	C	15.3	B				
Intersection Delay, s/veh / LOS				17.5						B					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.8	C	2.8	C	1.9	B	2.1	B				
Bicycle LOS Score / LOS				1.0	A			0.7	A	1.3	A				

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	LTG			Duration, h	0.25	
Analyst	CAM	Analysis Date	Sep 1, 2017		Area Type	Other
Jurisdiction	NASA	Time Period	2018 AM Pk-Hr		PHF	0.86
Urban Street	Space Commerce Way	Analysis Year	2018		Analysis Period	1 > 7:00
Intersection	Space Commerce Way...	File Name	4. Space Commerce Way at Proposed S Entranc...			
Project Description	4324.03 KSC Space Commerce Way					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	327	131	9	5	65	116	2	0	1	6	0	22

Signal Information				Signal Phases									
Cycle, s	58.8	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	0.5	0.9	15.0	2.5	0.3	0.0			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	5.1	5.1	5.1	3.4	3.4	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.5	2.5	2.5	5.0	5.0	0.0			

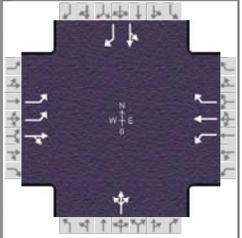
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	3.0		12.0		11.0
Phase Duration, s	16.6	31.1	8.1	22.6		8.7		10.9
Change Period, ($Y+R_c$), s	7.6	7.6	7.6	7.6		8.4		8.4
Max Allow Headway (MAH), s	3.0	3.1	3.0	3.1		3.1		3.2
Queue Clearance Time (g_s), s	8.2	5.7	2.2	6.1		2.1		2.9
Green Extension Time (g_e), s	0.8	0.6	0.0	0.6		0.0		0.0
Phase Call Probability	1.00	1.00	0.09	1.00		0.06		0.41
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	380	163		6	76	135		3			7	26
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1732		1781	1856	1585		1738			1810	1585
Queue Service Time (g_s), s	6.2	3.7		0.2	1.9	4.1		0.1			0.2	0.9
Cycle Queue Clearance Time (g_c), s	6.2	3.7		0.2	1.9	4.1		0.1			0.2	0.9
Green Ratio (g/C)	0.15	0.40		0.01	0.26	0.26		0.01			0.04	0.04
Capacity (c), veh/h	528	693		14	474	405		10			76	67
Volume-to-Capacity Ratio (X)	0.721	0.235		0.422	0.160	0.333		0.353			0.091	0.382
Back of Queue (Q), ft/ln (95 th percentile)	102.8	55.1		4.7	31.6	58.8		2.9			3.9	15.2
Back of Queue (Q), veh/ln (95 th percentile)	4.0	2.0		0.2	1.2	2.3		0.1			0.2	0.6
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.00	0.00	0.00		0.00			0.00	0.00
Uniform Delay (d_1), s/veh	23.7	11.7		29.0	17.0	17.8		29.1			27.1	27.4
Incremental Delay (d_2), s/veh	0.7	0.1		7.4	0.1	0.2		7.8			0.2	1.3
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Control Delay (d), s/veh	24.4	11.7		36.5	17.1	18.0		36.9			27.3	28.7
Level of Service (LOS)	C	B		D	B	B		D			C	C
Approach Delay, s/veh / LOS	20.6		C	18.2		B	36.9		D	28.4		C
Intersection Delay, s/veh / LOS	20.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.7	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	1.4	A	0.8	A	0.5	A	0.5	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	CAM		Analysis Date	8/2/2017		Area Type	Other
Jurisdiction	NASA		Time Period	2018 PM Pk-Hr		PHF	0.77
Urban Street	Space Commerce Way		Analysis Year	2018		Analysis Period	1 > 7:00
Intersection	Space Commerce Way...		File Name	4. Space Commerce Way at Proposed S Entranc...			
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	29	135	4	2	238	29	5	0	3	67	0	202

Signal Information													
Cycle, s	63.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.2	2.2	15.0	12.6	1.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.1	0.0	5.1	3.4	3.4	0.0			
				Red	2.5	0.0	2.5	5.0	5.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	3.0		12.0		11.0
Phase Duration, s	10.0	24.8	7.8	22.6		9.4		21.0
Change Period, ($Y+R_c$), s	7.6	7.6	7.6	7.6		8.4		8.4
Max Allow Headway (MAH), s	3.0	3.0	3.0	3.0		3.0		3.1
Queue Clearance Time (g_s), s	2.7	6.9	2.1	11.5		2.4		12.0
Green Extension Time (g_e), s	0.1	0.9	0.0	0.9		0.0		0.6
Phase Call Probability	0.48	1.00	0.04	1.00		0.17		1.00
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	38	181		3	309	38		10			87	262
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1861		1781	1870	1585		1729			1810	1585
Queue Service Time (g_s), s	0.7	4.9		0.1	9.5	1.2		0.4			2.5	10.0
Cycle Queue Clearance Time (g_c), s	0.7	4.9		0.1	9.5	1.2		0.4			2.5	10.0
Green Ratio (g/C)	0.04	0.27		0.00	0.24	0.24		0.02			0.20	0.20
Capacity (c), veh/h	133	508		6	445	377		27			362	317
Volume-to-Capacity Ratio (X)	0.283	0.356		0.410	0.694	0.100		0.378			0.240	0.828
Back of Queue (Q), ft/ln (95 th percentile)	11.9	84.7		2.9	169.4	17.4		7.3			41.7	151.8
Back of Queue (Q), veh/ln (95 th percentile)	0.5	3.3		0.1	6.7	0.7		0.3			1.7	6.0
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00		0.01	0.00	0.00		0.00			0.00	0.00
Uniform Delay (d_1), s/veh	29.5	18.5		31.3	21.9	18.7		30.7			21.2	24.2
Incremental Delay (d_2), s/veh	0.4	0.2		15.0	0.7	0.0		3.2			0.1	2.1
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Control Delay (d), s/veh	29.9	18.6		46.4	22.7	18.8		33.9			21.3	26.3
Level of Service (LOS)	C	B		D	C	B		C			C	C
Approach Delay, s/veh / LOS	20.6		C	22.4		C	33.9		C	25.1		C
Intersection Delay, s/veh / LOS	23.1						C					

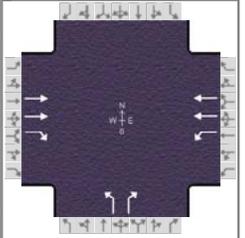
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.7	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	0.8	A	1.1	A	0.5	A	1.1	A

APPENDIX I

Signalized Intersection HCS
Worksheets – 2035 Design Year
Conditions

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	LTG			Duration, h	0.25	
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other
Jurisdiction	NASA	Time Period	2035 AM Pk-Hr		PHF	0.85
Urban Street	NASA Pkwy	Analysis Year	2035		Analysis Period	1 > 7:00
Intersection	NASAPkwy at Commerc...	File Name	1. Nasa Pkwy at Space Commerce Way - 2035 A...			
Project Description	4324.03 KSC Space Commerce Way					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		276	1010	0	76		81		26			

Signal Information													
Cycle, s	65.9	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	50.0	5.4	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0			
				Red	1.0	1.0	1.5	0.0	0.0	0.0			

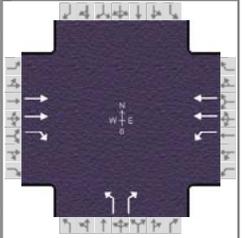
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		55.5	0.0	55.5		10.4		
Change Period, (Y+R _c), s		5.5	4.0	5.5		5.0		
Max Allow Headway (MAH), s		3.6	0.0	3.6		3.0		
Queue Clearance Time (g _s), s		52.0		2.4		5.6		
Green Extension Time (g _e), s		0.0	0.0	8.3		0.2		
Phase Call Probability		1.00		1.00		0.90		
Max Out Probability		1.00		0.01		0.00		

Movement Group Results	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement		6	16	5	2		7		14				
Adjusted Flow Rate (v), veh/h		325	1188	0	89		95		31				
Adjusted Saturation Flow Rate (s), veh/h/ln		1781	1547	1527	1651		1711		1560				
Queue Service Time (g _s), s		1.6	50.0	0.0	0.4		3.6		1.2				
Cycle Queue Clearance Time (g _c), s		1.6	50.0	0.0	0.4		3.6		1.2				
Green Ratio (g/C)		0.76	0.76	0.73	0.76		0.08		0.08				
Capacity (c), veh/h		2702	1174	776	2506		140		128				
Volume-to-Capacity Ratio (X)		0.120	1.012	0.000	0.036		0.679		0.239				
Back of Queue (Q), ft/ln (95 th percentile)		3.5	453.8	0	0.9		65.4		19.1				
Back of Queue (Q), veh/ln (95 th percentile)		0.1	17.5	0.0	0.0		2.5		0.7				
Queue Storage Ratio (RQ) (95 th percentile)		0.00	1.08	0.00	0.00		0.11		0.00				
Uniform Delay (d ₁), s/veh		2.1	8.0	0.0	2.0		29.4		28.3				
Incremental Delay (d ₂), s/veh		0.0	29.3	0.0	0.0		2.2		0.4				
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0				
Control Delay (d), s/veh		2.1	37.3	0.0	2.0		31.6		28.7				
Level of Service (LOS)		A	F		A		C		C				
Approach Delay, s/veh / LOS		29.7	C	2.0	A		30.9		C	0.0			
Intersection Delay, s/veh / LOS		28.4			C								

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.7	B	0.6	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	LTG			Duration, h	0.25	
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr		PHF	0.89
Urban Street	NASA Pkwy	Analysis Year	2035		Analysis Period	1 > 7:00
Intersection	NASA Pkwy at Commer...	File Name	1. Nasa Pkwy at Space Commerce Way - 2035 P...			
Project Description	4324.03 KSC Space Commerce Way					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		38	125	15	1443		718		0			

Signal Information				Signal Phases								
Cycle, s	82.2	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green	1.3	36.4	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Yellow	3.0	4.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Red	1.0	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

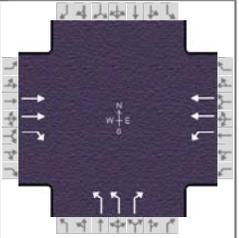
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		41.9	5.3	47.2		35.0		
Change Period, (Y+R _c), s		5.5	4.0	5.5		5.0		
Max Allow Headway (MAH), s		3.4	2.9	3.4		2.9		
Queue Clearance Time (g _s), s		6.5	2.4	35.9		32.0		
Green Extension Time (g _e), s		7.7	0.0	5.8		0.0		
Phase Call Probability		1.00	0.32	1.00		1.00		
Max Out Probability		0.00	0.00	0.24		1.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		6	16	5	2		7		14			
Adjusted Flow Rate (v), veh/h		43	140	17	1621		807		0			
Adjusted Saturation Flow Rate (s), veh/h/ln		1766	1560	1781	1781		1781		1572			
Queue Service Time (g _s), s		0.6	4.5	0.4	33.9		30.0		0.0			
Cycle Queue Clearance Time (g _c), s		0.6	4.5	0.4	33.9		30.0		0.0			
Green Ratio (g/C)		0.44	0.44	0.48	0.51		0.37		0.38			
Capacity (c), veh/h		1564	691	710	1806		650		599			
Volume-to-Capacity Ratio (X)		0.027	0.203	0.024	0.898		1.240		0.000			
Back of Queue (Q), ft/ln (95 th percentile)		8.7	63.3	6.1	447.2		1218.2		0			
Back of Queue (Q), veh/ln (95 th percentile)		0.3	2.5	0.2	17.6		48.0		0.0			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.15	0.01	0.00		2.03		0.00			
Uniform Delay (d ₁), s/veh		12.9	14.0	11.1	18.3		26.1		0.0			
Incremental Delay (d ₂), s/veh		0.0	0.1	0.0	4.6		120.9		0.0			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		12.9	14.1	11.1	22.9		147.0		0.0			
Level of Service (LOS)		B	B	B	C		F					
Approach Delay, s/veh / LOS	13.8	B		22.8	C		147.0	F		0.0		
Intersection Delay, s/veh / LOS	60.3						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	0.7	A	2.9	C	2.9	C
Bicycle LOS Score / LOS	0.6	A	1.8	B		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	2035 AM Pk-Hr		PHF	0.95	
Urban Street	NASA Pkwy	Analysis Year	2035		Analysis Period	1 > 7:00	
Intersection	NASA Pkwy at Visitor C...	File Name	2. Nasa Pkwy at Visitor Center Complex - 2035 A...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		205	97	51	76		0		59			

Signal Information				Signal Phases								
Cycle, s	29.7	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
		Green		1.8	10.0	2.4	0.0	0.0	0.0			
		Yellow		4.0	4.5	4.0	0.0	0.0	0.0			
		Red		1.0	1.0	1.0	0.0	0.0	0.0			

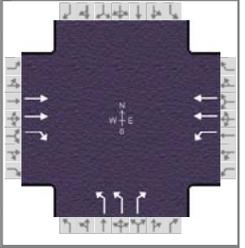
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		15.5	6.8	22.3		7.4		
Change Period, (Y+R _c), s		5.5	5.0	5.5		5.0		
Max Allow Headway (MAH), s		6.9	5.9	6.9		3.2		
Queue Clearance Time (g _s), s		3.4	2.9	2.3		3.6		
Green Extension Time (g _e), s		5.0	0.2	5.0		0.1		
Phase Call Probability		1.00	0.36	0.98		0.40		
Max Out Probability		0.00	0.00	0.00		0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		7		14			
Adjusted Flow Rate (v), veh/h		216	102	54	80		0		62			
Adjusted Saturation Flow Rate (s), veh/h/ln		1724	1585	1640	1654		1620		1045			
Queue Service Time (g _s), s		1.3	1.4	0.9	0.3		0.0		1.6			
Cycle Queue Clearance Time (g _c), s		1.3	1.4	0.9	0.3		0.0		1.6			
Green Ratio (g/C)		0.34	0.34	0.06	0.57		0.08		0.14			
Capacity (c), veh/h		1161	534	99	1870		264		148			
Volume-to-Capacity Ratio (X)		0.186	0.191	0.541	0.043		0.000		0.419			
Back of Queue (Q), ft/ln (95 th percentile)		10	11.5	23.1	0.4		0		14.1			
Back of Queue (Q), veh/ln (95 th percentile)		0.4	0.5	0.8	0.0		0.0		0.4			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.01	0.05	0.00		0.00		0.02			
Uniform Delay (d ₁), s/veh		7.0	7.0	13.6	2.9		0.0		11.6			
Incremental Delay (d ₂), s/veh		0.3	0.6	9.5	0.0		0.0		0.7			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		7.3	7.6	23.0	2.9		0.0		12.3			
Level of Service (LOS)		A	A	C	A				B			
Approach Delay, s/veh / LOS	7.4	A		11.0	B		12.3	B		0.0		
Intersection Delay, s/veh / LOS	8.9						A					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.4	B		0.6	A		2.8	C		2.8	C	
Bicycle LOS Score / LOS	0.7	A		0.6	A			F				

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr		PHF	0.95	
Urban Street	NASA Pkwy	Analysis Year	2035		Analysis Period	1> 7:00	
Intersection	NASA Pkwy at Visitor C...	File Name	2. Nasa Pkwy at Visitor Center Complex - 2035 P...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		38	0	69	1399		59		61			

Signal Information												
Cycle, s	57.5	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On	Green	3.4	33.4	5.2	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.5	4.0	0.0	0.0	0.0		
				Red	1.0	1.0	1.0	0.0	0.0	0.0		

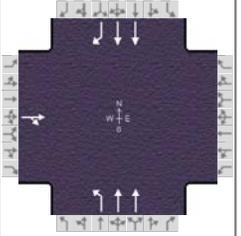
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		38.9	8.4	47.3		10.2		
Change Period, ($Y+R_c$), s		5.5	5.0	5.5		5.0		
Max Allow Headway (MAH), s		6.8	5.9	6.8		3.1		
Queue Clearance Time (g_s), s		2.3	4.5	14.6		5.2		
Green Extension Time (g_e), s		31.1	0.4	26.3		0.2		
Phase Call Probability		1.00	0.69	1.00		0.87		
Max Out Probability		0.37	0.00	0.48		0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		2	12	1	6		7		14			
Adjusted Flow Rate (v), veh/h		40	0	73	1473		62		64			
Adjusted Saturation Flow Rate (s), veh/h/ln		1724	1585	1640	1654		1620		1045			
Queue Service Time (g_s), s		0.3	0.0	2.5	12.6		1.0		3.2			
Cycle Queue Clearance Time (g_c), s		0.3	0.0	2.5	12.6		1.0		3.2			
Green Ratio (g/C)		0.58	0.58	0.06	0.73		0.09		0.15			
Capacity (c), veh/h		2001	920	98	2404		293		157			
Volume-to-Capacity Ratio (X)		0.020	0.000	0.741	0.612		0.212		0.409			
Back of Queue (Q), ft/ln (95 th percentile)		2.8	0	69	39.2		16.4		41.6			
Back of Queue (Q), veh/ln (95 th percentile)		0.1	0.0	2.5	1.4		0.6		1.2			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.00	0.14	0.00		0.00		0.06			
Uniform Delay (d_1), s/veh		5.1	0.0	26.6	3.9		24.3		22.1			
Incremental Delay (d_2), s/veh		0.0	0.0	20.6	0.9		0.1		0.6			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		5.1	0.0	47.2	4.8		24.4		22.8			
Level of Service (LOS)		A		D	A		C		C			
Approach Delay, s/veh / LOS	5.1	A		6.8	A		23.6	C		0.0		
Intersection Delay, s/veh / LOS			8.0						A			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	0.6	A	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.5	A	1.8	B		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	2035 AM Pk-Hr		PHF	0.83	
Urban Street	Kennedy Pkwy		Analysis Year	2035	Analysis Period	1 > 7:00	
Intersection	Space Commerce Way...	File Name	3. Space Commerce Way at Kennedy Pkwy - 203...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		0	49				454	302			27	1

Signal Information													
Cycle, s	56.2	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	19.2	20.0	2.5	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0			
				Red	1.0	1.0	1.5	0.0	0.0	0.0			

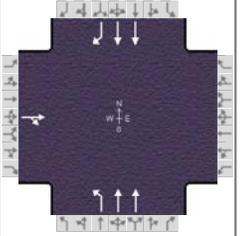
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		7.5			23.2	48.7		25.5
Change Period, (Y+R _c), s		5.0			4.0	5.5		5.5
Max Allow Headway (MAH), s		3.2			2.9	2.9		2.9
Queue Clearance Time (g _s), s		4.1			18.6	3.5		2.4
Green Extension Time (g _e), s		0.1			0.7	0.8		0.8
Phase Call Probability		0.60			1.00	1.00		1.00
Max Out Probability		0.00			0.12	0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement		4	14				1	6		2	12	
Adjusted Flow Rate (v), veh/h		59					547	364		33	1	
Adjusted Saturation Flow Rate (s), veh/h/ln		1585					1767	1781		1668	1585	
Queue Service Time (g _s), s		2.1					16.6	1.5		0.4	0.0	
Cycle Queue Clearance Time (g _c), s		2.1					16.6	1.5		0.4	0.0	
Green Ratio (g/C)		0.04					0.34	0.77		0.36	0.36	
Capacity (c), veh/h		71					605	2737		1184	563	
Volume-to-Capacity Ratio (X)		0.830					0.904	0.133		0.027	0.002	
Back of Queue (Q), ft/ln (95 th percentile)		38.6					278.1	0.1		4.9	0.3	
Back of Queue (Q), veh/ln (95 th percentile)		1.5					10.9	0.0		0.2	0.0	
Queue Storage Ratio (RQ) (95 th percentile)		0.00					0.56	0.00		0.00	0.00	
Uniform Delay (d ₁), s/veh		26.7					17.6	1.7		11.8	11.7	
Incremental Delay (d ₂), s/veh		8.9					10.0	0.0		0.0	0.0	
Initial Queue Delay (d ₃), s/veh		0.0					0.0	0.0		0.0	0.0	
Control Delay (d), s/veh		35.6					27.6	1.7		11.8	11.7	
Level of Service (LOS)		D					C	A		B	B	
Approach Delay, s/veh / LOS	35.6	D		0.0			17.3	B		11.8	B	
Intersection Delay, s/veh / LOS	18.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	1.8	B	2.1	B
Bicycle LOS Score / LOS	0.6	A			1.2	A	0.5	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	LTG			Duration, h	0.25		
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other	
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr		PHF	0.77	
Urban Street	Kennedy Pkwy		Analysis Year	2035	Analysis Period	1 > 7:00	
Intersection	Space Commerce Way...	File Name	3. Space Commerce Way at Kennedy Pkwy - 203...				
Project Description	4324.03 KSC Space Commerce Way						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		0	319				104	29			1017	8

Signal Information													
Cycle, s	78.1	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	7.6	33.4	22.6	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	4.5	3.5	0.0	0.0	0.0			
				Red	1.0	1.0	1.5	0.0	0.0	0.0			

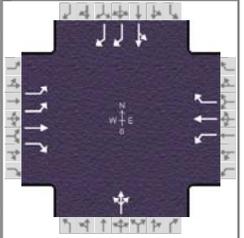
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		27.6			11.6	50.5		38.9
Change Period, (Y+R _c), s		5.0			4.0	5.5		5.5
Max Allow Headway (MAH), s		3.2			2.9	3.3		3.3
Queue Clearance Time (g _s), s		21.7			7.8	2.4		28.5
Green Extension Time (g _e), s		0.7			0.2	5.0		4.7
Phase Call Probability		1.00			0.95	1.00		1.00
Max Out Probability		0.00			0.00	0.00		0.02

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		4	14				1	6			2	12
Adjusted Flow Rate (v), veh/h		414					135	38			1321	10
Adjusted Saturation Flow Rate (s), veh/h/ln		1585					1781	1781			1781	1585
Queue Service Time (g _s), s		19.7					5.8	0.4			26.5	0.3
Cycle Queue Clearance Time (g _c), s		19.7					5.8	0.4			26.5	0.3
Green Ratio (g/C)		0.29					0.10	0.58			0.43	0.43
Capacity (c), veh/h		460					174	2052			1522	678
Volume-to-Capacity Ratio (X)		0.901					0.776	0.018			0.868	0.015
Back of Queue (Q), ft/ln (95 th percentile)		300.5					111	4.6			366	4.1
Back of Queue (Q), veh/ln (95 th percentile)		11.8					4.4	0.2			14.4	0.2
Queue Storage Ratio (RQ) (95 th percentile)		0.00					0.22	0.00			0.00	0.01
Uniform Delay (d ₁), s/veh		26.8					34.6	7.1			20.4	12.9
Incremental Delay (d ₂), s/veh		7.3					2.8	0.0			2.2	0.0
Initial Queue Delay (d ₃), s/veh		0.0					0.0	0.0			0.0	0.0
Control Delay (d), s/veh		34.1					37.4	7.1			22.7	13.0
Level of Service (LOS)		C					D	A			C	B
Approach Delay, s/veh / LOS	34.1	C		0.0			30.8	C		22.6	C	
Intersection Delay, s/veh / LOS	25.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.9	C	1.9	B	2.1	B
Bicycle LOS Score / LOS	1.2	A			0.6	A	1.6	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	LTG			Duration, h	0.25	
Analyst	CAM	Analysis Date	Sep 1, 2017		Area Type	Other
Jurisdiction	NASA	Time Period	2035 AM Pk-Hr		PHF	0.86
Urban Street	Space Commerce Way	Analysis Year	2035		Analysis Period	1 > 7:00
Intersection	Space Commerce Way...	File Name	4. Space Commerce Way at Proposed S Entranc...			
Project Description	4324.03 KSC Space Commerce Way					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	640	359	11	6	61	229	4	0	2	12	0	42

Signal Information													
Cycle, s	69.9	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
				Green	0.6	9.7	15.0	4.2	0.8	0.0			
				Yellow	5.1	5.1	5.1	3.4	3.4	0.0			
				Red	2.5	2.5	2.5	5.0	5.0	0.0			

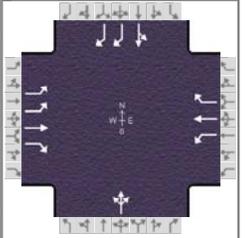
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		12.0		11.0
Phase Duration, s	25.5	39.9	8.2	22.6		9.2		12.6
Change Period, ($Y+R_c$), s	7.6	7.6	7.6	7.6		8.4		8.4
Max Allow Headway (MAH), s	3.0	3.0	3.0	3.0		3.1		3.2
Queue Clearance Time (g_s), s	16.3	13.8	2.3	13.1		2.3		3.2
Green Extension Time (g_e), s	1.6	1.4	0.0	1.4		0.0		0.1
Phase Call Probability	1.00	1.00	0.13	1.00		0.13		0.70
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	744	417	13	7	71	266		7			14	49
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1752	1610	1781	1856	1585		1738			1810	1403
Queue Service Time (g_s), s	14.3	11.8	0.3	0.3	2.2	11.1		0.3			0.5	1.2
Cycle Queue Clearance Time (g_c), s	14.3	11.8	0.3	0.3	2.2	11.1		0.3			0.5	1.2
Green Ratio (g/C)	0.26	0.46	0.46	0.01	0.21	0.21		0.01			0.06	0.06
Capacity (c), veh/h	887	809	744	16	398	340		19			110	170
Volume-to-Capacity Ratio (X)	0.839	0.516	0.017	0.430	0.178	0.783		0.367			0.127	0.287
Back of Queue (Q), ft/ln (95 th percentile)	229.3	185.2	4	6.4	40.1	177.6		5.9			9.4	16.8
Back of Queue (Q), veh/ln (95 th percentile)	9.0	6.9	0.2	0.3	1.6	7.0		0.2			0.4	0.7
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00			0.00	0.00
Uniform Delay (d_1), s/veh	24.6	13.3	10.2	34.5	22.4	25.9		34.3			31.1	31.4
Incremental Delay (d_2), s/veh	0.9	0.2	0.0	6.5	0.1	1.5		4.3			0.2	0.3
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0
Control Delay (d), s/veh	25.5	13.5	10.2	41.0	22.5	27.4		38.7			31.3	31.7
Level of Service (LOS)	C	B	B	D	C	C		D			C	C
Approach Delay, s/veh / LOS	21.1		C	26.7		C	38.7		D	31.6		C
Intersection Delay, s/veh / LOS	22.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.8	C	2.5	B	3.0	C
Bicycle LOS Score / LOS	2.4	B	1.1	A	0.5	A	0.6	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	LTG			Duration, h	0.25	
Analyst	CAM	Analysis Date	8/2/2017		Area Type	Other
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr		PHF	0.77
Urban Street	Space Commerce Way	Analysis Year	2018		Analysis Period	1 > 7:00
Intersection	Space Commerce Way...	File Name	4. Space Commerce Way at Proposed S Entranc...			
Project Description	4324.03 KSC Space Commerce Way					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	57	76	7	4	313	57	9	0	5	131	0	396

Signal Information													
Cycle, s	71.7	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.5	3.4	18.0	16.0	1.8	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	5.1	0.0	5.1	3.4	3.4	0.0			
				Red	2.5	0.0	2.5	5.0	5.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		12.0		11.0
Phase Duration, s	11.5	29.0	8.1	25.6		10.2		24.4
Change Period, ($Y+R_c$), s	7.6	7.6	7.6	7.6		8.4		8.4
Max Allow Headway (MAH), s	3.0	3.0	3.0	3.0		3.0		3.1
Queue Clearance Time (g_s), s	3.5	4.8	2.2	16.9		2.7		14.5
Green Extension Time (g_e), s	0.1	1.0	0.0	1.0		0.0		1.5
Phase Call Probability	0.77	1.00	0.10	1.00		0.30		1.00
Max Out Probability	0.00	0.00	0.00	0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Approach Movement													
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14	
Adjusted Flow Rate (v), veh/h	74	99	9	5	406	74		18			170	514	
Adjusted Saturation Flow Rate (s), veh/h/ln	1730	1870	1547	1781	1870	1585		1733			1810	1403	
Queue Service Time (g_s), s	1.5	2.8	0.3	0.2	14.9	2.6		0.7			5.8	12.5	
Cycle Queue Clearance Time (g_c), s	1.5	2.8	0.3	0.2	14.9	2.6		0.7			5.8	12.5	
Green Ratio (g/C)	0.05	0.30	0.30	0.01	0.25	0.25		0.03			0.22	0.22	
Capacity (c), veh/h	187	557	461	12	470	398		44			405	628	
Volume-to-Capacity Ratio (X)	0.397	0.177	0.020	0.422	0.866	0.186		0.410			0.420	0.819	
Back of Queue (Q), ft/ln (95 th percentile)	27.1	50.2	4.5	5.2	259.3	40.8		14			98.1	169.1	
Back of Queue (Q), veh/ln (95 th percentile)	1.1	2.0	0.2	0.2	10.2	1.6		0.6			3.9	6.7	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.01	0.01	0.00	0.00		0.00			0.00	0.00	
Uniform Delay (d_1), s/veh	32.8	18.7	17.8	35.5	25.7	21.1		34.4			23.9	26.5	
Incremental Delay (d_2), s/veh	0.5	0.1	0.0	8.3	1.9	0.1		2.2			0.3	1.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	
Control Delay (d), s/veh	33.3	18.7	17.8	43.8	27.7	21.2		36.7			24.1	27.5	
Level of Service (LOS)	C	B	B	D	C	C		D			C	C	
Approach Delay, s/veh / LOS	24.6		C	26.8		C		36.7		D	26.7		C
Intersection Delay, s/veh / LOS	26.6						C						

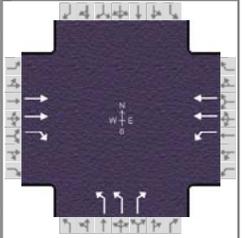
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.8	C	2.5	B	3.0	C
Bicycle LOS Score / LOS	0.8	A	1.3	A	0.5	A	1.6	B

APPENDIX J

Signalized Intersection HCS
Worksheets – 2035 Design Year
Conditions – Improved

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	LTG			Duration, h	0.25	
Analyst	SD	Analysis Date	8/2/2017		Area Type	Other
Jurisdiction	NASA	Time Period	2035 AM Pk-Hr		PHF	0.85
Urban Street	NASA Pkwy	Analysis Year	2035		Analysis Period	1 > 7:00
Intersection	NASAPkwy at Commerc...	File Name	1. Nasa Pkwy at Space Commerce Way - 2035 A...			
Project Description	4324.03 KSC Space Commerce Way					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		276	1010	0	76		81		26			

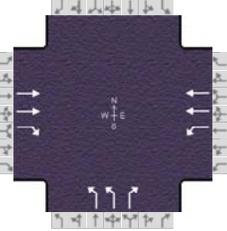
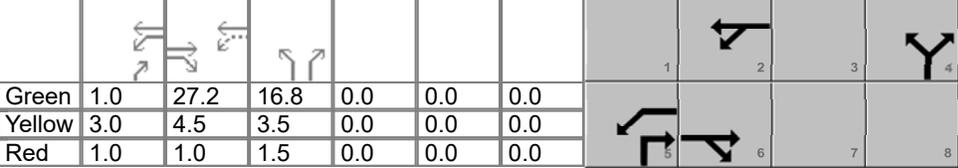
Signal Information													
Cycle, s	77.6	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green	0.0	61.5	5.6	0.0	0.0	0.0					
		Yellow	3.0	4.5	3.5	0.0	0.0	0.0					
		Red	1.0	1.0	1.5	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		67.0	0.0	67.0		10.6		
Change Period, (Y+R _c), s		5.5	4.0	5.5		5.0		
Max Allow Headway (MAH), s		3.6	0.0	3.6		3.0		
Queue Clearance Time (g _s), s		55.3		2.4		4.1		
Green Extension Time (g _e), s		6.1	0.0	8.4		0.2		
Phase Call Probability		1.00		1.00		0.93		
Max Out Probability		0.32		0.00		0.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		6	16	5	2		7		14			
Adjusted Flow Rate (v), veh/h		325	1188	0	89		95		31			
Adjusted Saturation Flow Rate (s), veh/h/ln		1781	1547	1527	1651		1661		1560			
Queue Service Time (g _s), s		1.6	53.3	0.0	0.4		2.1		1.4			
Cycle Queue Clearance Time (g _c), s		1.6	53.3	0.0	0.4		2.1		1.4			
Green Ratio (g/C)		0.79	0.79	0.77	0.79		0.07		0.07			
Capacity (c), veh/h		2822	1226	795	2617		240		113			
Volume-to-Capacity Ratio (X)		0.115	0.969	0.000	0.034		0.397		0.271			
Back of Queue (Q), ft/ln (95 th percentile)		3.9	327.5	0	1.1		37.9		23.8			
Back of Queue (Q), veh/ln (95 th percentile)		0.2	12.6	0.0	0.0		1.4		0.9			
Queue Storage Ratio (RQ) (95 th percentile)		0.00	0.78	0.00	0.00		0.06		0.00			
Uniform Delay (d ₁), s/veh		1.8	7.2	0.0	1.7		34.4		34.1			
Incremental Delay (d ₂), s/veh		0.0	16.0	0.0	0.0		0.4		0.5			
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh		1.9	23.2	0.0	1.7		34.8		34.6			
Level of Service (LOS)		A	C		A		C		C			
Approach Delay, s/veh / LOS	18.6		B	1.7		A	34.7		C	0.0		
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.3		B	0.6		A	2.9		C	2.9		C
Bicycle LOS Score / LOS	1.7		B	0.6		A			F			

HCS7 Signalized Intersection Results Summary

General Information						Intersection Information									
Agency	LTG					Duration, h	0.25								
Analyst	SD		Analysis Date	8/2/2017		Area Type	Other								
Jurisdiction	NASA		Time Period	2035 PM Pk-Hr		PHF	0.89								
Urban Street	NASA Pkwy		Analysis Year	2035		Analysis Period	1 > 7:00								
Intersection	NASA Pkwy at Commer...		File Name	1. Nasa Pkwy at Space Commerce Way - 2035 P...											
Project Description	4324.03 KSC Space Commerce Way														
Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h					38	125	15	1443		718		0			
Signal Information															
Cycle, s	59.5	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												
Green	1.0	27.2	16.8	0.0	0.0	0.0									
Yellow	3.0	4.5	3.5	0.0	0.0	0.0									
Red	1.0	1.0	1.5	0.0	0.0	0.0									
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					6	5	2		4						
Case Number					7.3	1.0	4.0		9.0						
Phase Duration, s					32.7	5.0	37.7		21.8						
Change Period, (Y+R _c), s					5.5	4.0	5.5		5.0						
Max Allow Headway (MAH), s					3.4	2.9	3.4		2.9						
Queue Clearance Time (g _s), s					5.2	2.3	24.9		15.0						
Green Extension Time (g _e), s					7.7	0.0	7.1		1.7						
Phase Call Probability					1.00	0.24	1.00		1.00						
Max Out Probability					0.00	0.00	0.05		0.00						
Movement Group Results				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement					6	16	5	2		7		14			
Adjusted Flow Rate (v), veh/h					43	140	17	1621		807		0			
Adjusted Saturation Flow Rate (s), veh/h/ln					1766	1560	1781	1781		1730		1572			
Queue Service Time (g _s), s					0.4	3.2	0.3	22.9		13.0		0.0			
Cycle Queue Clearance Time (g _c), s					0.4	3.2	0.3	22.9		13.0		0.0			
Green Ratio (g/C)					0.46	0.46	0.51	0.54		0.28		0.30			
Capacity (c), veh/h					1616	714	771	1926		980		472			
Volume-to-Capacity Ratio (X)					0.026	0.197	0.022	0.842		0.823		0.000			
Back of Queue (Q), ft/ln (95 th percentile)					5	36.6	3.3	243.9		193.4		0			
Back of Queue (Q), veh/ln (95 th percentile)					0.2	1.4	0.1	9.6		7.6		0.0			
Queue Storage Ratio (RQ) (95 th percentile)					0.00	0.09	0.01	0.00		0.32		0.00			
Uniform Delay (d ₁), s/veh					8.9	9.7	7.4	11.6		20.0		0.0			
Incremental Delay (d ₂), s/veh					0.0	0.1	0.0	1.1		0.7		0.0			
Initial Queue Delay (d ₃), s/veh					0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (d), s/veh					8.9	9.8	7.4	12.7		20.7		0.0			
Level of Service (LOS)					A	A	A	B		C					
Approach Delay, s/veh / LOS				9.6		A	12.7		B	20.7		C	0.0		
Intersection Delay, s/veh / LOS				14.9						B					
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.4		B	0.7		A	2.9		C	2.8		C
Bicycle LOS Score / LOS				0.6		A	1.8		B			F			

APPENDIX K

NCHRP-457 Turn Lane Warrant Sheets

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

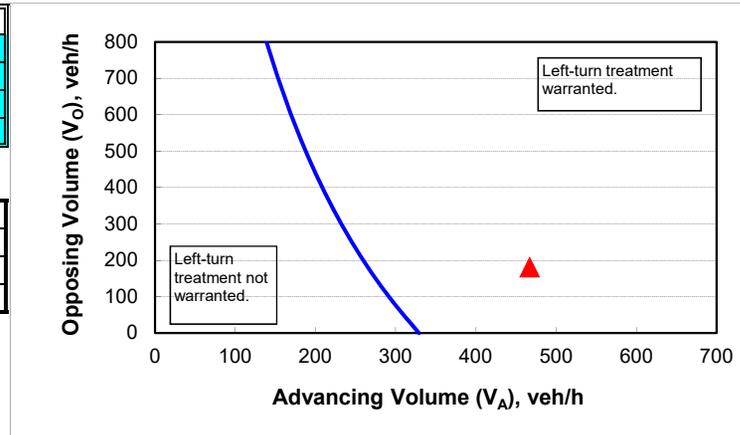
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	70%
Advancing volume (V_A), veh/h:	467
Opposing volume (V_O), veh/h:	181

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	265
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	186
Right-turn volume, veh/h:	116

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	81
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	

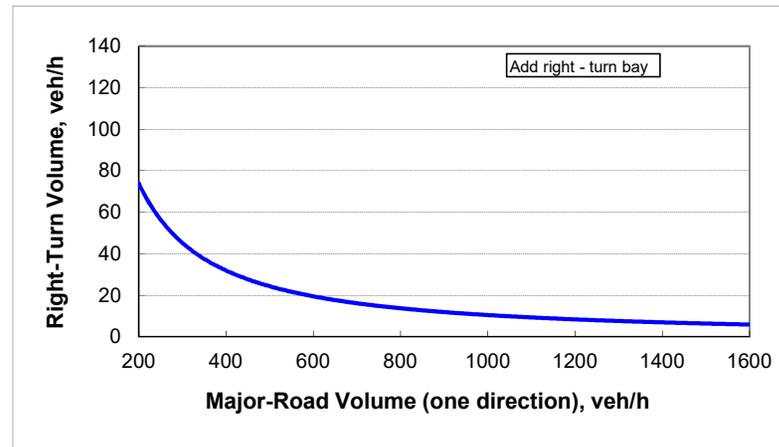


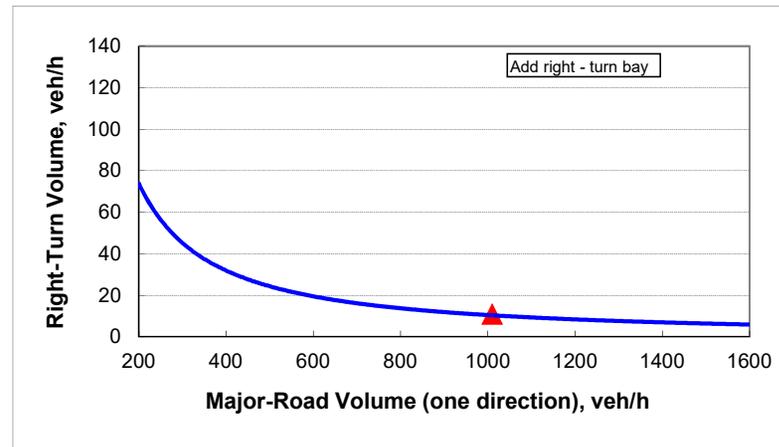
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	1010
Right-turn volume, veh/h:	11

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Appendix 2 KSC Record of Environmental Consideration (REC)

Avoid Verbal Orders

TO: DNPS/Gina Parrish

DATE: 10/23/2017

FROM: SI-E3/Environmental Management Branch

SUBJECT KSC Record of Environmental Consideration (REC)

REC #: 10187

1. PROJECT INFORMATION

Project Title: Construct New Access Road for KSCVC

Project Lead: Tom Frungillo, DNPS, 449-4361

Directorate Project No.: DNPS 1-11-2017
(REV A)

Project Description UPDATE: Option 2016, Option 1, selected. No parking expansion, Option 2 considered. Widening of Space Commerce Way to accommodate turn lanes required.

Construct new access road entry to KSC Visitor Complex from Space Commerce Way. Feasibility study was attached to checklist.

EPB Reviewer: TLP

Facility No.: KSCVC

2. NEPA DETERMINATIONS

- | | |
|---|--|
| <input type="checkbox"/> a. Categorical Exclusions per 14 CFR Part 1216.304(d) | <input type="checkbox"/> e. Centerwide EIS |
| <input checked="" type="checkbox"/> b. Environmental Assessment (EA) Required | <input type="checkbox"/> f. AF Project on KSC/813 |
| <input type="checkbox"/> c. Environmental Impact Statement (EIS) Required | <input type="checkbox"/> g. NASA Project on CCAFS/813 |
| <input type="checkbox"/> d. Existing FONSI or ROD | |

3. ENVIRONMENTAL REQUIREMENTS

- | | | |
|-----------------------------------|--|------------------------------------|
| a. Non-Permit Requirements | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |
| b. Permit Requirements | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |

UPDATE of REC 9968, originally issued 1/20/2017. Dig Permit for site borings requested 10/18, previous REC out of date

2.d.1. ENVIRONMENTAL ASSESSMENT (EA): This project cannot be categorically excluded (CATEX) as defined in 14 CFR 1216.305 from further NEPA review. An Environmental Assessment will be required for construction of a new access road to the KSC Visitor Complex (KSCVC). For additional information, please contact Don Dankert of the NASA Environmental Management Branch (SI-E3, 861-1196).

3.a.1. POTENTIAL RELEASE (PRL) SITE: The proposed project is partially within PRL #124, Visitor Complex. A PRL designation means a site has had historical operations with the potential to impact the environment. This area has been deemed a No Further Action site. There is no knowledge of any existing environmental contamination at this location.

3.a.2. HAZARDOUS/NON-HAZARDOUS WASTE: All hazardous and non-hazardous wastes generated on KSC must be managed, controlled and disposed of per the KSC Waste Management requirements outlined in KNPR 8500.1. A Process Waste Questionnaire (PWQ), KSC Form 26-551 along with any supporting documentation (MSDS, product formulation, lab analyses) must be submitted to the KEMCON/IMSS Waste Management Office for each waste stream generated. That office will then generate a Technical Response Package (TRP) which will give direction on proper handling, storage, and disposal of the waste stream. Please contact KEMCON/IMSS Waste Management Services at 867-8640 if assistance is required.

3.a.3. HAZARDOUS AND CONTROLLED WASTE (PAINT): This project will involve the application of paint coatings. All practical precautions must be taken to eliminate the possibility of a release of material or waste into the environment (primers/paints) from the paint surface preparation and painting operation. Paint chips, rust, debris, blast media, wastewater, etc. generated during preparation of surfaces will be contained and disposed of according to waste management guidelines given in Item 3.a.2. Please contact KEMCON/IMSS Waste Management Services at 867-8640 for assistance.

3.a.4. PAINT DISTURBANCE/REMOVAL: This project will involve disturbance/removal of paint coatings. Unless known to be non-hazardous, the coatings must be sampled and analyzed for the 8 RCRA hazardous metals (Ag, As, Ba, Cd, Cr, Hg, Pb, and Se) and PCBs. If the coatings contain heavy metals or PCBs, OSHA standards must be followed. It is recommended that the control zone and personal protective equipment requirements established in the lead standard be complied with to prevent exposure to workers and adjacent unprotected areas. The sampling analysis will dictate the

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level of PPE required and the handling/disposal requirements. Contact your company's Safety and Health Office or (for KEMCON contracts) IMSS Industrial Hygiene (IH) for recommendations on personal protective equipment (PPE). IMSS IH can be contacted at 867-2400 or at KSC-DL-EnvHealth/(KSC-DL-EnvHealth@mail.nasa.gov). Paint chips, rust, debris, blast media, etc. generated during preparation of metal, fiberglass, or concrete surfaces and/or deconstruction will be contained and disposed of according to waste management guidelines given above in Item 3.a.2.

3.a.5. **THREATENED AND ENDANGERED SPECIES:** This project has the potential to affect protected and/or threatened and endangered species including the Eastern indigo snake, and the gopher tortoise. Measures must be taken to minimize impacts to their habitat. A biological survey will be required to identify potential impacts prior to disturbances. Please contact Becky Bolt (IMSS-200, 867-7330), 14 days prior to beginning work to schedule a biological survey.

3.a.6. **EXTERIOR LIGHTING:** The installation/modification and use of any lighting that is visible from the exterior of a facility or structure must be in compliance with the requirements in the KSC Exterior Lighting Guidelines at: <http://environmental.ksc.nasa.gov/projects/documents/ExteriorLighting.pdf>, and requirements of the US Fish and Wildlife Service Biological Opinion for KSC regarding dark skies and artificial lighting. Safety and hazardous operations can apply for a waiver to allow for use of non-compliant lighting; however, justification must be provided to the NASA Environmental Office. Development of a lighting operations manual (LOM) that meets these criteria is required for all new structures or facilities. Lighting associated with the proposed roadway and parking lot expansion must be included in the KSCVC LOM. Please contact Lynne Phillips, NASA Environmental Management Branch (SI-E3) at 867-4817 for additional information, and for guidance on development of a LOM or for a copy of the referenced documents.

3.a.7. **REAL PROPERTY TRANSFER:** The redesigned access road and increased parking area is located outside areas controlled by NASA. The property is under the control and management of the US Fish and Wildlife Service here at the Merritt Island Wildlife Refuge. A real property transfer will need to be completed prior to any disturbance. Please contact Renee Ponik, NASA Real Property (SI-C2, 867-8498).

3.a.8. **EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs):** Precautions must be made to eliminate or reduce to the greatest extent possible any discharge of sediments outside established project boundaries. This can be accomplished by initiating proactive erosion control BMPs. Installation and maintenance of appropriate erosion/sediment control devices (such as wattles, turbidity screens, silt fences, inlet protectors, floating turbidity booms, etc.) must be completed prior to initial land disturbance where the possibility of sediment discharge could impact surrounding stormwater conveyances and other surface waters. The BMPs must be maintained so they remain functional until such time that the newly exposed soils are stabilized with sod or natural vegetation.

3.a.9. **CONCRETE WASHOUT:** Water used to rinse out concrete trucks and other equipment used for concrete work must not be allowed to discharge to surface waters. Concrete washout water shall be diverted to a settling pond where suspended material will settle out and the water can percolate into the ground. Contact Doug Durham (SI-E2, 867-8429) with any question on this requirement.

Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes. After drying/settling, the residue may be disposed of at the Diverted Aggregate Reclamation and Collection Yard (DARC); and the ground restored. Clean, unstained, unpainted concrete residue is accepted at the DARC without any sampling and analysis. Contact Rodney Brown (SI-E2, 867-9081) with any questions on this requirement.

3.a.10. **ASPHALT WASTE:** All asphalt waste should be segregated from all other wastes generated, and transported to the KSC Landfill on Schwartz road. This material can be recycled in the form of roadway stabilization within the landfill if not contaminated by other waste streams. For more information, contact Rodney Brown (SI-E2, 867-9081).

3.a.11. **GREEN PURCHASING/SUSTAINABLE ACQUISITION:** Federal agencies and their contractors are required to purchase products made from recycled or recovered materials and other environmentally preferable products whenever possible. The Green Compilation Tool found at <https://sftool.gov/greenprocurement> provides information and useful links and tools to identify applicable green/sustainable acquisition requirements for products and services (Ref. FAR subpart 23.1 and NPR 8530.1).

A Request for Waiver Form (KSC 28-825 NS) must be submitted when a product or service meets the green/sustainable requirements but is not procured. Please contact Alice Smith (SI-E3, 867-8454) with any questions on this requirement.

3.b.1. **EXCAVATION PERMIT:** A KSC Excavation Permit will be required for any digging proposed by this project. Please contact the Utility Locate/Excavation Permit Request Customer Helpline at 867-2406 or go to website at

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<http://epr.ksc.nasa.gov/Home/> for an underground utility scan and dig permit.

NOTE: If a trench or pit is to be left open all day or overnight, the trench/pit must be checked for trapped animals at the beginning and end of each work shift. If an animal is observed trapped, contact Becky Bolt (IMSS-200, 867-7330) or the Duty Office (861-5050, email KSC-ISC-DutyOffice@mail.nasa.gov) to arrange removal/release. Do not handle the animal(s).

3.b.2. ENVIRONMENTAL RESOURCE PERMIT (ERP) - STORMWATER: A new ERP stormwater permit or modification of an existing permit will be required for the proposed project. Application forms with supporting material including maps and engineering drawings must be submitted to the Environmental Assurance Branch (Doug Durham, SI-E2, 867-8429) by the 90% Design Review phase for distribution to the regulatory agencies. An electronic version in PDF format should also be provided. No work can be performed until the permit process is completed. Please contact Doug Durham for more information.

An existing ERP, 67717-3, "Space Commerce Way Phase II" is present along Space Commerce Way and a permit modification will be required.

An existing ERP, 24100-6, "Orbiter Display Facility", the combined permit for the Visitor Center, may also require modification.

3.b.3. ENVIRONMENTAL RESOURCE PERMIT (ERP) - DREDGE AND FILL: Dredge and fill permits from the St. Johns River Water Management District (SJRWMD) and Army Corp of Engineers (ACOE) may be required for this project. Provide project description and proposed site plan to Lynne Phillips (SI-E3, 867-4817) for permit determination. If a permit is deemed necessary, the application form with supporting material such as maps and engineering drawings must be submitted to the NASA Environmental Management Branch (EMB) by the 90% Design Review phase for distribution to the regulatory agencies. An electronic version in PDF format should also be provided. Please contact Lynne Phillips for assistance in preparing this application. Once all the information has been gathered, NASA EMB will submit the permit request. No work can be performed until the permit process is completed.

3.b.4. FDEP NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) CONSTRUCTION ACTIVITY PERMIT: This project may require an NPDES Phase II construction permit. If 1 acre or more of land will be disturbed, a NPDES Construction Activity Permit from the Florida Department of Environmental Protection (FDEP) is required under F.A.C. 62-621.300(4), Notice of Intent to Use Generic Permit for Stormwater Discharge from Large (If over 5 Acres) and Small (1 Acre To 5 Acres) Construction Activities. http://www.dep.state.fl.us/water/stormwater/npdes/forms/cgp_noi.pdf. This includes construction activity which will disturb less than one acre of land area that is part of a larger common plan of development that will ultimately disturb equal to or greater than one acre of land. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site. A condition of this permit is to provide a Stormwater Pollution Prevention Plan (SWPPP) detailing erosion and turbidity controls for the site. Information on completing the permit application and development of the SWPPP can be obtained by contacting Doug Durham (SI-E2, 867-8429).

3.b.5. DEWATERING: Construction dewatering is exempted from permitting under conditions of Rule 40C-2.051 (7) providing the conditions of exemption are met including: limiting withdrawal methods, limiting withdrawal to less than 300,000 gpd and limiting withdrawal to 30 days. Additional limitations are placed on discharge of produced water to prevent harm to the environment.

If conditions of the exemption cannot be met, a construction dewatering general permit is required from SJRWMD using Form 40C-2.900(12). No dewatering may begin until 10 days after submittal of the complete form.

If the dewatering activity does not qualify for a general permit by rule under Rule 40C-2.042(9), F.A.C., you must complete and submit a SJRWMD application for an individual Consumptive Use Permit pursuant to Rule 40C-2.041, F.A.C. Approval of the application must be obtained before starting the dewatering activity.

If produced water discharge will reach surface waters, an FDEP permit may be required under Rule 62-621.300-2.

Contact Doug Durham (SI-E2, 867-8429) with questions related to these requirements.

3.b.6. OPEN BURNING: Every effort must be made to deliver land clearing debris to the appropriate disposal area. Combustible vegetative material may be burned within the confines of KSC after obtaining a Burn Permit issued by the KSC Fire Inspector. Burning may be limited or prohibited during periods of dry weather, or when sensitive flight hardware is housed in the vicinity of the burn site. Notify KSC Spaceport Integration (Bill Heidtman/861-9339 or Greg

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Gaddis/861-9556) 3 days ahead of planned burn for a review of impacts.

After the site is prepared for burning, notify Pat Pearson (US Fish and Wildlife Service, 861-6695) of the proposed open burning. Also contact the Florida State Division of Forestry Cocoa Field Office (690-6465) to notify them of the planned burning of land clearing debris and schedule an inspection to ensure the setbacks, piles, and equipment are set up properly. The Cocoa Office will send inspection paperwork to the Division of Forestry Orlando District Field Unit who will issue a valid burn control number. The contractor must call the Orlando Unit (407-888-8767) every day before burning to receive a Burn Authorization Number.

Call the KSC Duty Office at 861-5050 for a Burn Permit a minimum of 48 hours prior to the burn. The KSC Fire Inspector will schedule an onsite visit for the day you get the Burn Authorization Number.

No other environmental issues were identified based upon the information provided in the KSC Environmental Checklist. This Record of Environmental Consideration (REC) does not relinquish the project lead from obtaining and complying with any other internal NASA permits or directives necessary to ensure all organizations potentially impacted by this project are notified and concur with the proposed project.

Due to potential changes in regulations, permit requirements and environmental conditions, statements in this REC are valid for 6 months, and subject to review after this period. It is the responsibility of the project lead to submit current project information for a REC update prior to project commencement if REC is older than 6 months; and also to notify the Environmental Management Branch (SI-E3) if the scope of the project changes at any time after the REC is issued.

G. Parrish/DNPS

cc:

T. Frungillo/DNPS

B. Bolt/IMSS-200

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- 4 Upon evaluation of the subject project, the above determinations have been made and identified. Contact the Environmental Management Branch (SI-E3) at 861-1196 for re-evaluation should there be any modifications to the scope of work.**



Don Dankert

10/23/2017 2:09:23 PM

Date