ENVIRONMENTAL ASSESSMENT
FOR GATEWAY TO SPACE EXHIBIT
JOHN F. KENNEDY SPACE CENTER, FLORIDA

Prepared for:

National Aeronautics and Space Administration

John F. Kennedy Space Center

Environmental Program Office

Kennedy Space Center, Florida 32899

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ENVIRONMENTAL ASSESSMENT
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Abstract

This Environmental Assessment (EA) addresses the Proposed Action to construct a new Gateway to Space Exhibit at the Kennedy Space Center (KSC) Visitor Complex (VC). Under the Proposed Action, the new exhibit will be constructed on an upland location on the northwest side of the VC and south of NASA Parkway West. Additional minor alternative configurations were reviewed during initial planning; however, only the No Action Alternative is included with this EA to evaluate the extent of potential impacts on the environment at KSC. The No Action Alternative would involve not constructing the new exhibit. Environmental impacts from the Proposed Action were classified as **negligible** or **minor. Minor environmental impacts will occur to the following categories: Transportation, Utilities, Air Quality, Vegetation, Cultural Resources, Geology, Noise, and Socioeconomics. All other categories will have negligible impacts.** Design and permitting of the Proposed Action are proposed for completion by March 2019 with construction completion by May 2020.

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Table of Contents

LIST OF ILLUSTRATIONS

LIST OF FIGURES

LIST OF TABLES

List of Appendices

List of Abbreviations and Acronyms

AMF	Astronaut Memorial Foundation
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
FAS	Floridan Aquifer System
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
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OFW	Outstanding Florida Water
OSHA	Occupational Safety and Health Administration
REC	Record of Environmental Consideration
SAS	Surficial Aquifer System
SJRWMD	St. Johns River Water Management District

USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
VAB	Vehicle Assembly Building
VC	Visitor Complex
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 [CFR] Part 1216 Subparts 1216.1 and 1216.3), the Council on Environmental Quality (CEQ) NEPA implementing regulations (40 CFR Parts 1500 to 1508), and Federal Aviation Administration Order 1050.1E, Environmental Impacts: Policies and Procedures. Delaware North Companies Parks & Resorts at KSC, Inc. (DNC) operates the Kennedy Space Center (KSC) Visitor Complex (VC), which is just outside the controlled-access portion of KSC in Brevard County, Florida.

The KSC VC is the public visitor center at National Aeronautics and Space Administration (NASA) KSC in Florida. This complex features exhibits, displays, historic spacecraft, space memorabilia, and two IMAX theaters and supports tour buses that enter the KSC secured area, providing visitors with a personal experience of NASA's facilities and capabilities for space exploration. A primarily educational and historical experience is provided, which includes entertainment activities and restaurant options. The complex includes daily presentations from former astronauts.

This EA addresses the Proposed Action and No Action Alternative to construct a new Gateway to Space Exhibit at the KSC VC. The Proposed Action consists of providing cutting-edge space and simulator design capabilities that are reflective of the NASA story and immerse visitors in the VC with a uniquely themed interactive environment of NASA's past and future. The need for the Proposed Action is to design and construct this new exhibit that provides an enlightening, educational, inspiring, and entertaining experience for visitors of all ages coming to NASA KSC. The Proposed Action is consistent with the Public Outreach land use designation in the KSC Master Plan for the entire VC.

The No Action Alternative would involve not constructing the new exhibit.

The Proposed Action will require a permit modification to an existing Environmental Resource Permit (ERP) from the St. Johns River Water Management District (SJRWMD). Since the site is entirely uplands, no permit from the US Army Corps of Engineers (USACE) will be required.

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, and 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 of the Proposed Action and No Action Alternative vary from **negligible** to **minor** depending on the environmental issues evaluated. The results of the

assessment of environmental issues from constructing the Proposed Action Alternative indicate overall **negligible** impacts on vegetation due to the lack of wetland and jurisdictional surface water impacts proposed.

Impacts from the No Action Alternative are expected to have **negligible** impacts to all categories. Table 4.1 summarizes the results of the analyses showing the impacts on each environmental issue for each proposed action.

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

The No Action Alternative and Proposed Action are not expected to produce any consequences related to Environmental Justice, since all activities are 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 2019 with construction completion by May 2020.

1.0 Purpose and Need for Action

As a federal agency, the National Aeronautics and Space Administration (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 ([NPR] 8580.1, Implementing the National Environmental Policy Act). Since NASA has considered a plan to construct the Gateway to Space Exhibit at the Kennedy Space Center Visitors Center (KSC VC), this Environmental Assessment (EA) is necessary to support NASA's compliance with NEPA and related federal and state environmental regulations.

Under the authority of the National Aeronautics and Space Act of 1958, the Government, represented by the Contracting Officer, entered into a Concessions Agreement with Delaware North Companies Parks & Resorts at KSC, Inc. (DNC). In this agreement, the Government provided DNC preferential rights to conduct revenue-producing Concession Activities associated with the KSC Public Visitor Program (PVP). The Concessioner understands that the Concession Activity is intended to serve a public interest by facilitating affordable visitation to NASA KSC and, in connection therewith, to disseminate information concerning NASA and specifically KSC's activities, which shall be accomplished with an equal or greater emphasis on the public interest as on making a profit.

The planning, approval, approaches, documentation and associated processes are applicable to all projects funded through the Trust Accounts. The Concessioner understands the requirement to collaborate with the Contracting Officer in the identification, definition, and prioritization of projects on a recurring basis by compiling and submitting proposed projects for approval. NASA's action will be the Contracting Officers' approval of DNC's request to construct the Gateway to Space Exhibit at KSC VC.

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.

The VC complex features exhibits, displays, historic spacecraft, space memorabilia, and two IMAX theaters and supports tour buses that enter the KSC secured area, providing visitors with a personal experience of NASA KSC's facilities and capabilities for space exploration. The complex is primarily an educational and historical experience that includes entertainment activities and restaurant options, including daily presentations from former astronauts. Figure 1.0 presents the VC Site Location Map.

Figure 1.0 Site Location Map

2.0 Description of Proposed Action and Alternatives

The following actions were evaluated:

Proposed Action	Construct a Gateway to Space Exhibit on the northwest side of the VC and to the south of NASA Parkway West. This will include designing a new building, pedestrian and staff access to the exhibit, reconfigured utility connections, and stormwater conveyance improvements to capture runoff from the new exhibit.
No Action	Do not construct the Gateway to Space Exhibit.

Several conceptual layouts were evaluated during the initial planning phase. However, each of these conceptual layouts use the same vacant upland site as the Proposed Action. They vary slightly to minimize conflicts with the lease line of the adjoining Astronaut Memorial Foundation (AMF) leased area and not to mitigate environmental impacts. Other potential locations for the new exhibit would require ~~the~~ developing natural or disturbed vegetation communities and likely result in wetland and wildlife impacts, all of which are avoidable with the Proposed Action location (see Figures 2.0 and 2.1). As a result, these conceptual design layouts and other DNC-leased areas were not deemed viable alternatives nor evaluated in this EA.

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

The Proposed Action will require the following permits:

- An Environmental Resource Permit (ERP) from the St. Johns River Water Management District (SJRWMD) for modifying the existing stormwater management system. A US Army Corps of Engineers (USACE) dredge and fill permit **will not** be required since no wetland impacts are proposed.
- A National Pollutant Discharge Elimination System (NPDES) Permit through the Florida Department of Environmental Protection for stormwater discharges from construction activities greater than 1 acre and less than 5 acres will be required.

Design and permitting of the Proposed Action are proposed for completion by March 2019 with construction completion by May 2020.

2.1 Proposed Action

A critical action completed for any proposed new site development at KSC is for the project proponent to submit a 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. Appendix 1 provides this REC form.

The purpose of the proposed Gateway to Space Exhibit is to provide cutting-edge space and simulator design capabilities that are reflective of the NASA story and immerse visitors in the VC with a uniquely themed interactive environment of NASA's past and future. The need for the Proposed Action is to provide a new exhibit that provides an enlightening, educational, inspiring, and entertaining experience for visitors of all ages coming to NASA KSC. The Proposed Action is consistent with the VC Vision Statement that states the purpose of the VC is *to tell the NASA story and inspire all people to support the exploration of space*. The Proposed Action will include exhibits that not only share the story of NASA's achievements, but will include never-seen-before by the public artifacts and historical pieces that illustrate the transitional nature of KSC as a *Bridge to the Future* and its successful commercial space ventures with private aerospace companies. The Proposed Action is consistent with the Public Outreach land use designation in the KSC Master Plan for the VC.

Under the Proposed Action, the vacant northwest corner of the VC will be used for this experience (Figures 2.0 through 2.2).

2.2 No Action Alternative

The No Action Alternative would involve not constructing the new exhibit. This will result in no change to the existing layout of the VC. This alternative is not consistent with the VC Mission Statement.

Figure 2.0 VC Aerial Map

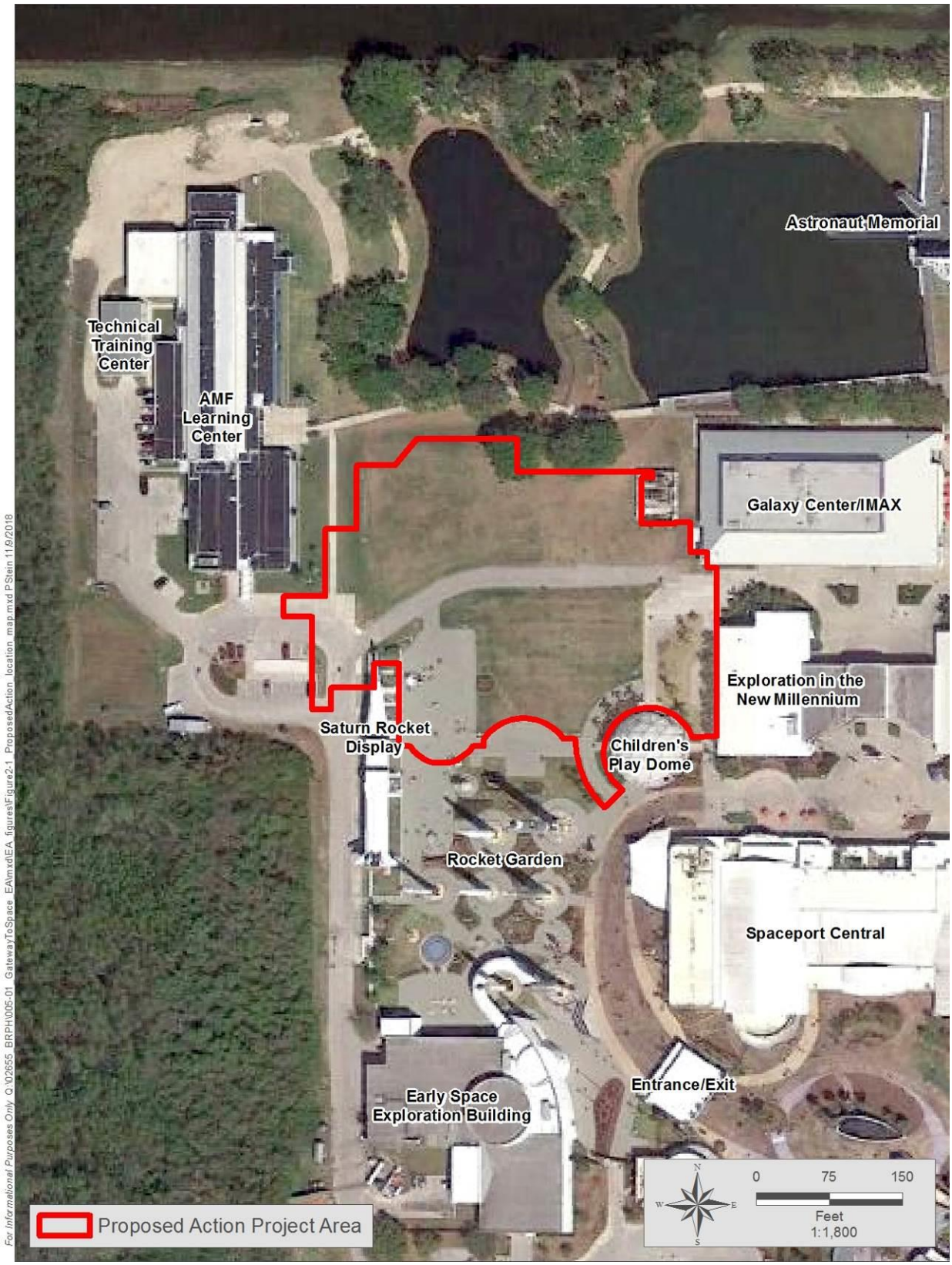
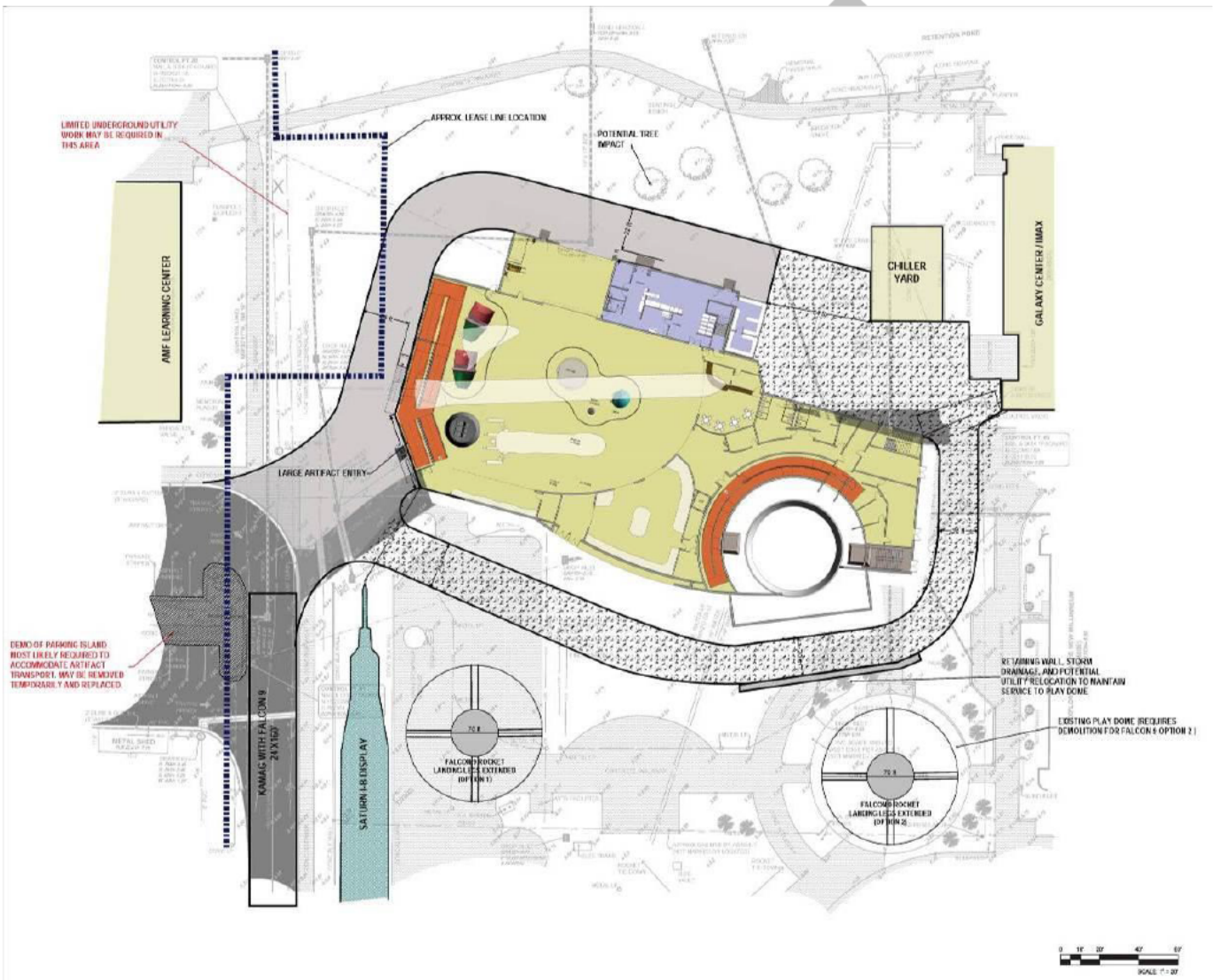


Figure 2.1 Proposed Action – Site Location Map

Figure 2.2 Conceptual Proposed Site Plan



3.0 Affected Environment

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 the other.

This Section describes the existing conditions of the environment and resources that could be affected by the Proposed Action.

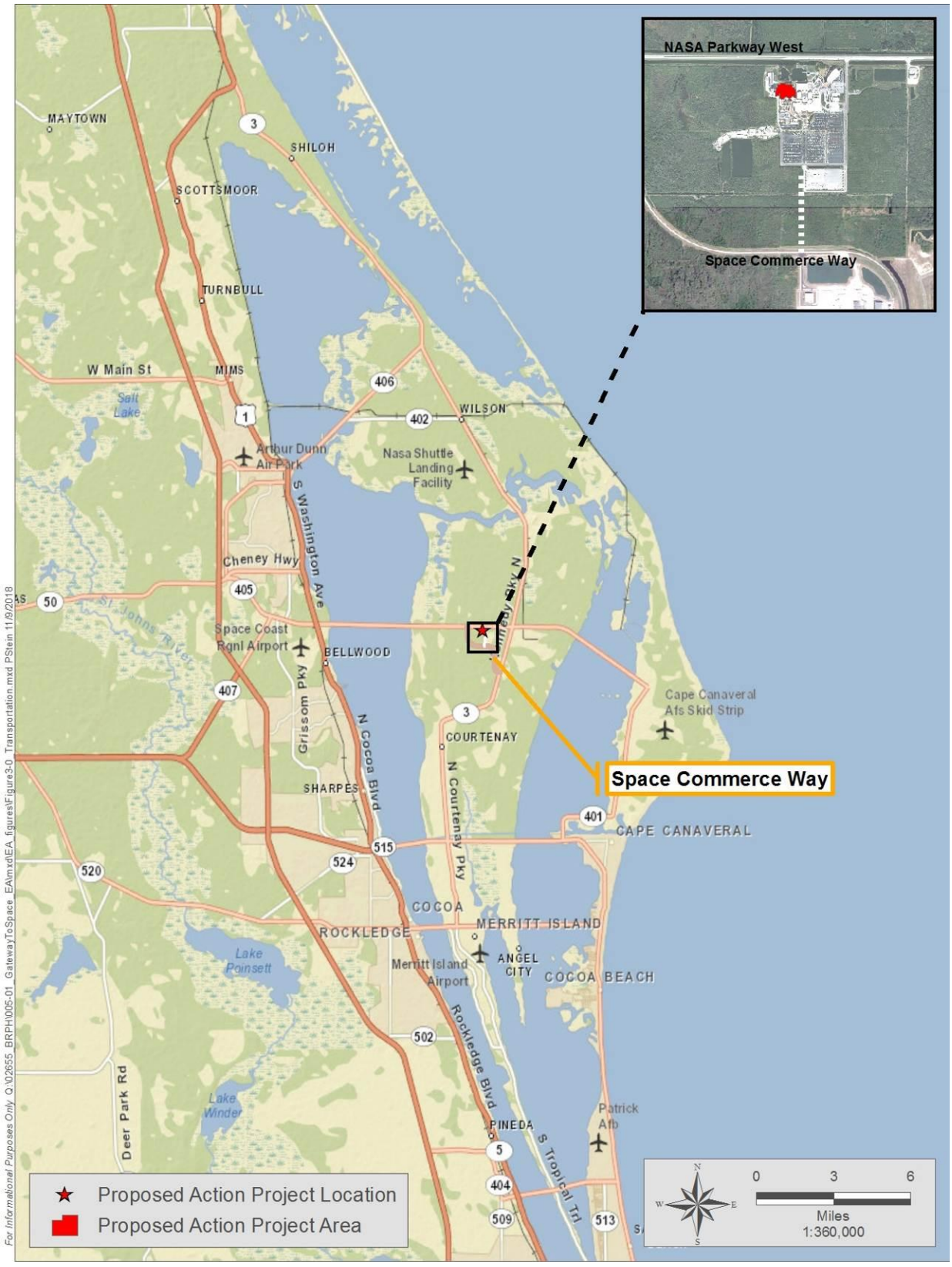
3.1 Facilities and Infrastructure

The Proposed Action will include the design of a new building, pedestrian and staff access to the exhibit, reconfigured utility connections, and stormwater conveyance improvements to capture runoff from the new exhibit. Any new utility connections will be coordinated with appropriate stakeholders including NASA, Space Florida, Florida Power & Light (FPL), AMF, and other stakeholders 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 North, which originates on north Merritt Island as State Road 3 (North Courtenay 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. The VC is accessed via NASA Parkway West and a new access road under construction that runs north off Space Commerce Way (Figure 3.0).

Figure 3.0 Transportation Map



The only current access point for the VC is via NASA Parkway, adjacent and west of the Pass & ID Facility (KSC Badging Office). A new VC roadway entrance is being constructed to the south that will provide access to the VC via Space Commerce Way. This will provide additional roadway capacity and reduce traffic flow on NASA Parkway. Some additional traffic flow is expected to result from the Proposed Action increasing attendance at the VC.

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 Vehicle Assembly Building (VAB) Area. These systems collect and transport raw wastewater to the Regional Plant at CCAFS. Several septic tank systems are also present throughout KSC that support small offices or temporary buildings (NASA, 2015).

For the Proposed Action, a new wastewater line will be installed and connected to the existing system at the VC. The existing system was designed to accommodate this additional connection. Pertinent building permits will be acquired to accommodate the addition of these lines.

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 Launch Complex (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 usage on KSC ranged between 270,000 and 293,000 megawatt-hours. Electricity consistently provides 91 percent of KSC's total energy (NASA, 2015). 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 on Space Commerce Way for the express purpose of serving private clients along this route and outside the KSC distribution system.

For the Proposed Action, a new electrical line will be installed and connected to the existing electrical system at the VC. The existing power distribution can provide the necessary power for these new facilities.

3.1.4 Communications

The KSC communications system provides a variety of services at KSC including conventional telephone service, transmission of large volumes of test data to central collection or reduction stations, transmission of timing information from operation centers to data-gathering instrumentation at widely scattered locations, transmission of weather and range safety data, and 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, necessary communications lines will be installed and connected to the existing system at the VC. The existing communications system can provide the necessary increased capacity for these new facilities.

3.1.5 Potable Water

KSC uses potable water for a variety of purposes such as lawn and landscape irrigation, human consumption, fire suppression, air conditioning, and construction. 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 4.5 million liters per day (1.2-million gallons per day). Various aboveground storage tanks and secondary pump systems supply water throughout the KSC.

The VC is served by a 20-centimeter (8-inch) water main that connects to a KSC 30-centimeter (12-inch) water main on the south side of NASA Parkway West. For the Proposed Action, a new water service line will be installed that connects to this existing 20-centimeter (8-inch) main. The existing potable water system can provide the necessary increased capacity for the new facilities. Pertinent building permits will be acquired to accommodate the addition of these lines.

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 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, 2015).

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.

Land cover near the proposed Gateway to Space Exhibit can generally be categorized into upland, wetland, and open-water communities. The area that will be developed consists of maintained bahia grass (*Paspalum notatum*) and landscaped ornamental plants. This area is not in a natural vegetative state and has been previously cleared as part of the VC.

The on-site land cover documented at the Proposed Action site was categorized according to the Florida Land Use, Cover and Forms Classification System (FLUCFCS) developed by the Florida Department of Transportation. Land cover within the Proposed Action site consists of one distinct upland vegetative community type.

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*).

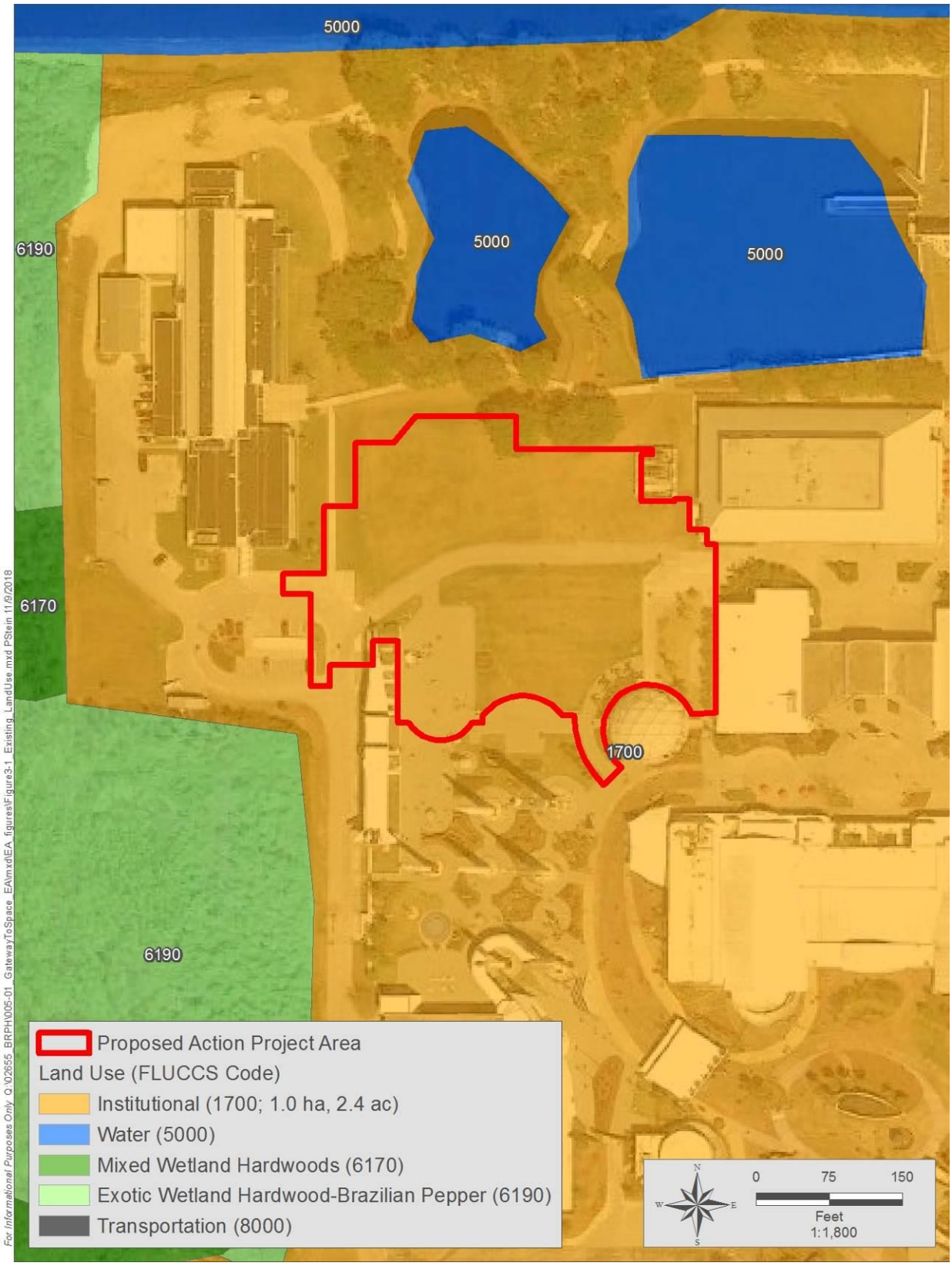
The Proposed Action site consists of approximately 1.0 ha (2.4 acres) of uplands that are classified as Institutional (FLUCFCS Code 1700). Figure 3.1 shows these uplands are dominated by bahia grass, ornamental plantings, and impervious surfaces including sidewalks and exhibit foundations.

3.3.1.2 Wetlands

Approximately 14,642 ha (36,183 acres) of freshwater and saltwater wetlands are found on KSC and include diverse types such as mangrove swamps, salt marshes, shrub swamps, freshwater marshes, wet prairies, and cattail marshes (NASA, 2015). 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 no jurisdictional wetlands (Figure 3.1). The site is near low-quality wetlands to the west; however, the proposed design will not impact these wetlands.

Figure 3.1 Existing Land Use Cover – Proposed 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.

The Proposed Action site boundaries contain no surface waters (Figure 3.1). The site is near two SJRWMD-permitted stormwater wet detention ponds to the north. The proposed drainage design uses these stormwater ponds for treatment of the runoff from additional impervious surfaces associated with the Proposed Action. Engineering calculations were performed to demonstrate that the sub-basin in which the Proposed Action would take place has sufficient remaining capacity to treat the additional stormwater runoff in terms of volume and water quality in compliance with SJRWMD regulations. These calculations are presented in Appendix 2.

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 10 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, 2015). Non-listed bird species that could utilize or be found near 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 and surface water ponds to the north. However, the Proposed Action site provides little to no cover for common passerine birds nor foraging habitat for the wading birds listed above.

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

In addition, a proliferation of mid-level predators such as the raccoon and opossum has resulted from an imbalance of predator/prey ratios. Opportunistic species such as the 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*).

Terrestrial mammalian species that may use the low-quality uplands within the Proposed Action site include the raccoon, armadillo, feral hog, Eastern cottontail rabbit, hispid cotton rat, and opossum. However, the site is centered among other VC attractions and pedestrian access areas so the utilization by such species is unlikely. Due to the low quality of on-site habitats and presence of humans, most of these mammals would use native vegetation communities found off site and likely only be passing through the Proposed Action site on their way to higher quality habitat.

3.3.2.3 Herpetofauna

Fifty species of reptiles and 19 species of amphibians are known to occur at KSC (Seigel et al., 2002). Due to the lack of natural vegetation and high pedestrian traffic through this area, the gopher tortoise likely does not inhabit the Proposed Action site. Non-listed herpetofauna that could potentially inhabit or occasionally forage the Proposed Action site include green anole (*Anolis carolinensis*), brown anole (*Anolis sagrei*), green tree frog (*Hyla cinerea*), Cuban tree frog (*Osteopilus septentrionalis*), 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., 1984 and 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 (Table 3.1). Only the Southeastern American kestrel, State of Florida listed as Threatened, could potentially use the land of the Proposed Action site. Most of the listed bird species such as the wood stork (*Mycteria americana*) would likely not use the site since no surface waters are present for foraging. In addition, regarding the wood stork, the project area falls within a 15-mile radius from a wood stork nest and is therefore considered a core wood stork foraging area (Figure 3.2). The closest bald eagle (*Haliaeetus leucocephalus*) nest is 3.9 kilometers (2.4 miles) to the east (Figure 3.3).

Table 3.1 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			
Lithobates capito	Florida gopher frog	Delisted	
Alligator mississippiensis	American alligator		T(S/A)
Caretta	Loggerhead		T
Chelonia mydas	Atlantic green turtle		E
Dermochelys coriacea	Leatherback sea turtle		E
Gopherus polyphemus	Gopher tortoise	T	C
Drymarchon couperi	Eastern indigo snake		T
Pituophis melanoleucus mugitus	Florida pine snake	T	
Birds			
Pelecanus occidentalis	Brown pelican	Delisted	
Egretta caerulea	Little blue heron	TC	
Egretta rufescens	Reddish egret	TC	
Egretta thula	Snowy egret	Delisted/C	
Egretta tricolor	Tricolored heron	TC	
Mycteria americana	Wood stork		E
Eudocimus albus	White ibis	TC	
Ajaia ajaja	Roseate spoonbill	TC	
Haliaeetus leucocephalus	Bald eagle		P
Falco sparverius paulus	Southeastern American kestrel	T	
Aramus guarauna	limpkin	Delisted/C	
Grus canadensis pratensis	Florida sandhill crane	T	
Charadrius melodus	Piping plover		T
Haematopus palliatus	American oystercatcher	TC	
Calidris canutus rufa	Rufa red knot		T
Sterna antillarum	Least tern	T	
Sterna dougallii	Roseate tern		T
Rynchops niger	Black skimmer	TC	
Aphelocoma coerulescens	Florida scrub-jay		T
Mammals			
Peromyscus polionotus	Southeastern beach mouse		T
Podomys floridanus	Florida mouse	Delisted	
Trichechus manatus	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.

Figure 3.2 Wood Stork Core Foraging Area Map

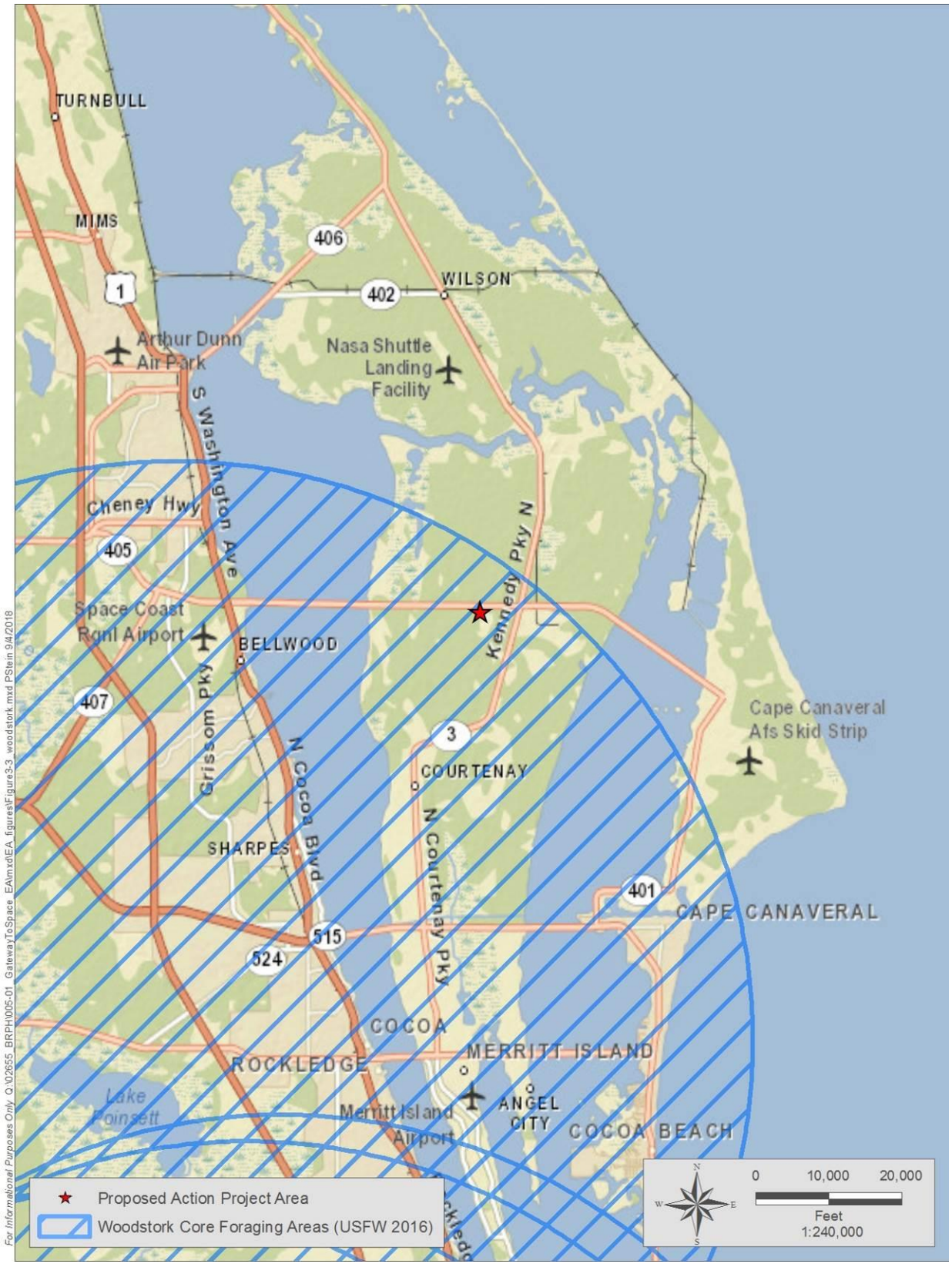
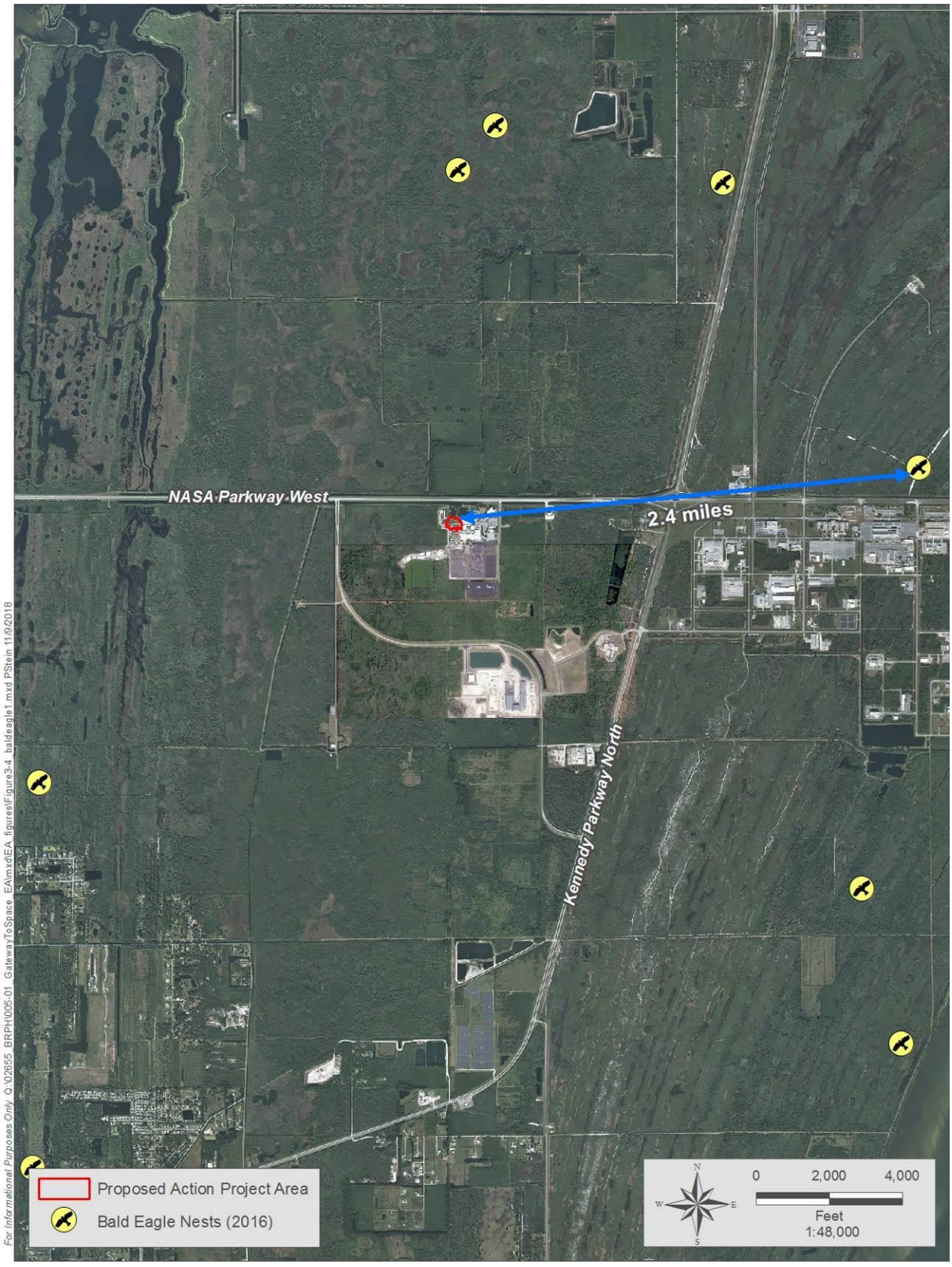


Figure 3.3 Bald Eagle Nesting Location



Although KSC has one of three remaining core Florida scrub-jay populations across the species range, the closest suitable habitat for this species is 1.3 kilometers (0.8 mile) to the east (Figure 3.4). Habitat in the Proposed Action site is mowed, low-quality, poorly drained upland dominated by bahia grass and ornamental plants. Thus, the Proposed Action site does not provide suitable habitat for this species.

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, 2015). These species are identified by agencies as being rare or restricted to sensitive habitats with many of them occurring in coastal dune areas that are not found on the Proposed Action site. There are no regulatory implications for the occurrences of listed plant species on the Proposed Action site. Although a formal intensive vegetation survey was not completed, listed plant species are not expected to occur within the Proposed Action site due to the following:

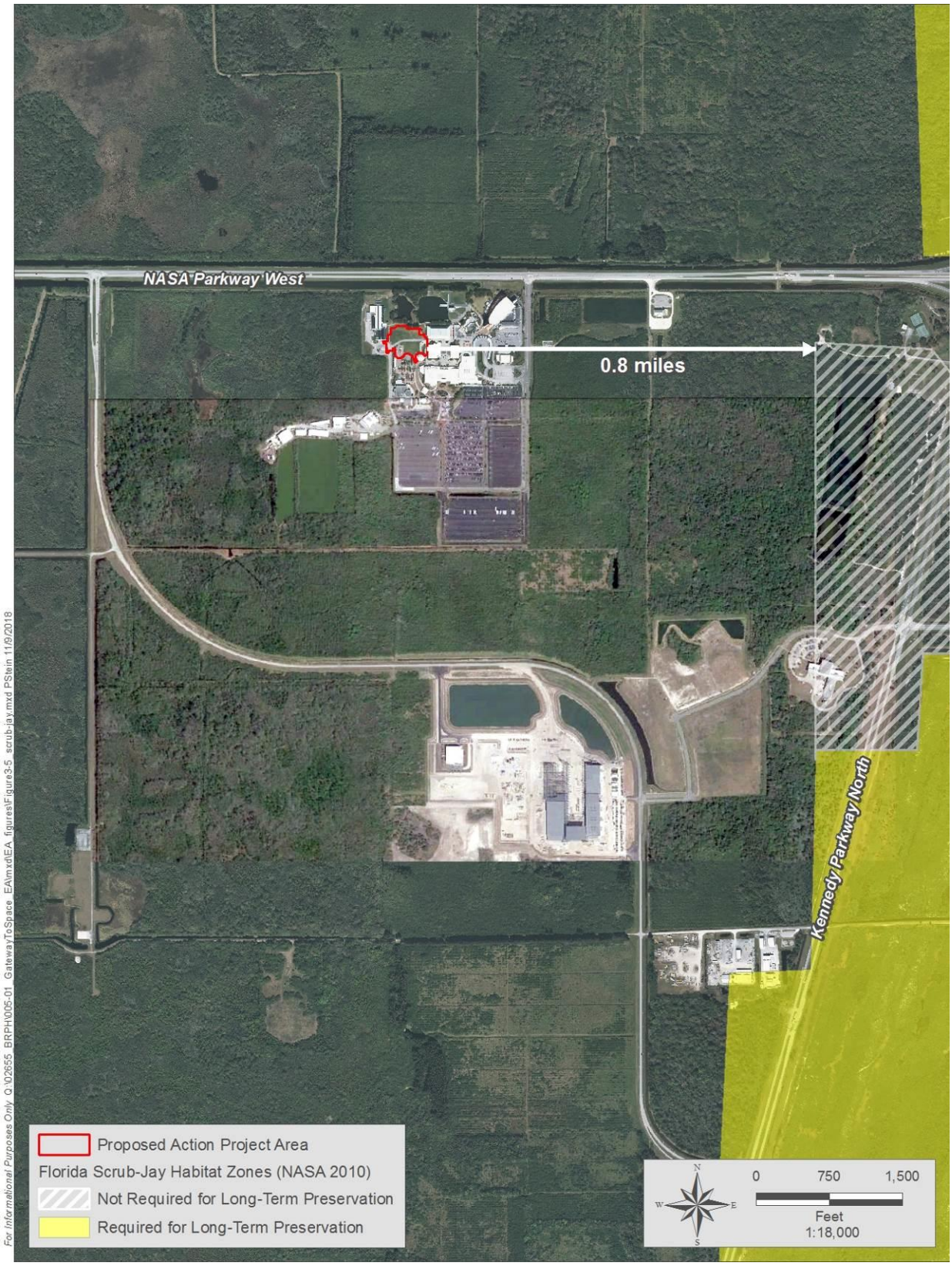
- The Proposed Action site does not contain or is within several miles of coastal dune habitat.
- The Proposed Action site is not expected to have listed plant species because this area was cleared of native vegetation when the VC was constructed.
- The Proposed Action site is dominated by maintained bahia grass and ornamental plantings.

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 consider how each undertaking could affect historical properties. NASA has executed a Programmatic Agreement among NASA KSC, the Advisory Council on Historic Preservation, and the Florida State Historic Preservation Office regarding management of historical properties at KSC. This agreement outlines roles, responsibilities, and protocols for cultural resources at KSC.

Between 1990 and 1996, Archaeological Consultants, Inc. (ACI) conducted background research and archaeological field surveys within all areas of KSC to establish differential zones of archaeological potential (ZAPs). These ZAPs were defined as having "low," "medium," or "high" probability of containing pre-contact (prehistoric) archaeological sites. In 2008 to 2009, ACI conducted additional surveying to identify historical ZAPs, as described in the *Historic Context and Historic Period Archaeological Site Location Predictive Model for KSC, Volusia County, and Brevard County* (2009). 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.

Figure 3.4 Florida Scrub-Jay Habitat



The Proposed Action site is in the developed area of the VC, within an area that has no known archaeological sites, and is identified as a "low" ZAP (ACI, 2009). However, there are historical artifacts of significance within or near the Proposed Action project boundary (Figure 2.0). A NASA Saturn V rocket and one other rocket are on display and occur within the Proposed Action project boundary. These artifacts will remain in place and will not be negatively affected because of the Proposed Action.

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 Cultural Resources Manager 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 east 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 (NASA, 2015).

The Natural Resources Conservation Service mapped two soil series within the project site – Copeland (0.1 ha; 0.2 acre) and Urban Land (0.9 ha; 2.2 acres) (Figure 3.5). The Copeland series is found on the west portion of the Proposed Action site and is described as moderately deep, very poorly drained, and moderately permeable soils in depressions and flats in peninsular Florida. The Copeland soil series is classified as hydric soils. The Urban Land series is the most common soil found at the site and is described as areas that have been impacted by development.

3.7 Noise

Noise generated at KSC originates from five primary sources: launches, aircraft movements, industrial operations, construction, and traffic (NASA, 2015). Tables 3.2 and 3.3 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 other than 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 3.5 Soils Types Within the Proposed Action Site

Table 3.2 Noise Levels (in Decibels, A-Weighted) Measured on KSC, Florida (NASA, 2015)

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

* Assumes a 6-dBA decrease for every doubling of distance.

Table 3.3 Measured Noise on KSC (KSC, 1978)

SOURCE	PEAK	REMARKS
Re-Entry Sonic Boom*		
Orbiter		101 N/m^2 max. (2.1 pounds per square foot [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 meters)
Saturn I	89	Average of 3 (9,034 meters)
Saturn V	91	15 Apr 1969 (9,384 meters)
Atlas	96	Comstar (4,816 meters)
Space Shuttle*	90	1.4 dBA Down from Saturn V (9,384 meters)
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 meters 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.

Note: N/m^2 = Newtons per square meter.

Other studies conducted on wading bird colonies subjected to military overflights (at 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 2015). Noise related to the Proposed Action site will be limited to temporary noise associated with construction activities, vehicular noise, attraction noise, and typical pedestrian noise associated with the VC, which is significantly lower 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 the IRL, Banana River, Mosquito Lagoon, and Banana Creek. The area of Mosquito Lagoon within the KSC boundary and the northern-most 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 northern-most portions of the IRL and Banana River.

The Proposed Action site contains no surface waters. The surface waters near the Proposed Action site consist of upland cut stormwater treatment ponds, canals, or ditches that were dug to treat and convey stormwater associated with the VC and NASA Parkway West. These surface waters drain west into the IRL.

3.9 Groundwater Quality

Three aquifer systems underlie KSC – the surficial aquifer, intermediate aquifer, and Floridan Aquifer. The surficial aquifer system (SAS) contains freshwater but is less extensive than the Floridan Aquifer, the principal artesian aquifer in East-Central Florida. The surficial and Floridan Aquifers are separated by nearly impermeable confining units that contain three shallow aquifers referred to as the intermediate aquifer system (NASA, 2015).

Recharge to the SAS is primarily due to infiltration of precipitation. However, the quality of water in the aquifer beneath KSC is influenced by intrusion of saline and brackish surface waters from the Atlantic Ocean and surrounding lagoon systems. In addition, surficial aquifers are subject to contamination from point sources and from general land use. Point-source contamination to the KSC surficial aquifer has occurred at certain facilities. The SAS is monitored under permit at two KSC locations – the KSC landfill and the Seawater Immersion Facility at the Beach Corrosion Test Site (NASA, 2015).

The groundwater quality in the intermediate aquifer system varies from moderately brackish to brackish due to upward leakage from the highly mineralized and artesian Floridan Aquifer System (FAS) and in some cases from lateral intrusion from the Atlantic Ocean (NASA, 2015).

The FAS at KSC contains highly mineralized water with high concentrations of chlorides due to connate seawater in the aquifer, lateral seawater intrusion due to inland pumping, and a lack of flushing due to distant freshwater recharge areas (NASA, 2015).

3.10 Floodplains

The topography in and around the Proposed Action site is relatively flat with lower elevations to the west and surface water ponds to the north (Figure 3.6). The Proposed Action site has no 100-year floodplain (Zones A or AE) on site, based on the May 2017 FEMA Flood Insurance Rate Map (FIRM) for the area (Figure 3.7). 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. However, areas to the north and west of the Proposed Action site are within a coastal AE Zone that is subject to storm surge flooding resulting from hurricane or tropical storm activity.

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, which includes contractor, construction, tenant, and permanent civil service employees. Civil service employees account for approximately 12 percent of the total KSC workforce. The highest employment levels at KSC were recorded during the Apollo Program. In 1968, KSC recorded a peak workforce 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 historical 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 workforce resulted from downsizing as the Space Shuttle Program ended (NASA, 2010).

As of September 2017, the total KSC workforce population was 8,824, which includes NASA civil servants and interns, contractor employees, tenant staff, and construction workers (KSC, 2017). This workforce is employed in ground and base support, unmanned launch programs, crew training, engineering, and administrative positions.

Figure 3.6 Topography Map for the Proposed Action Site

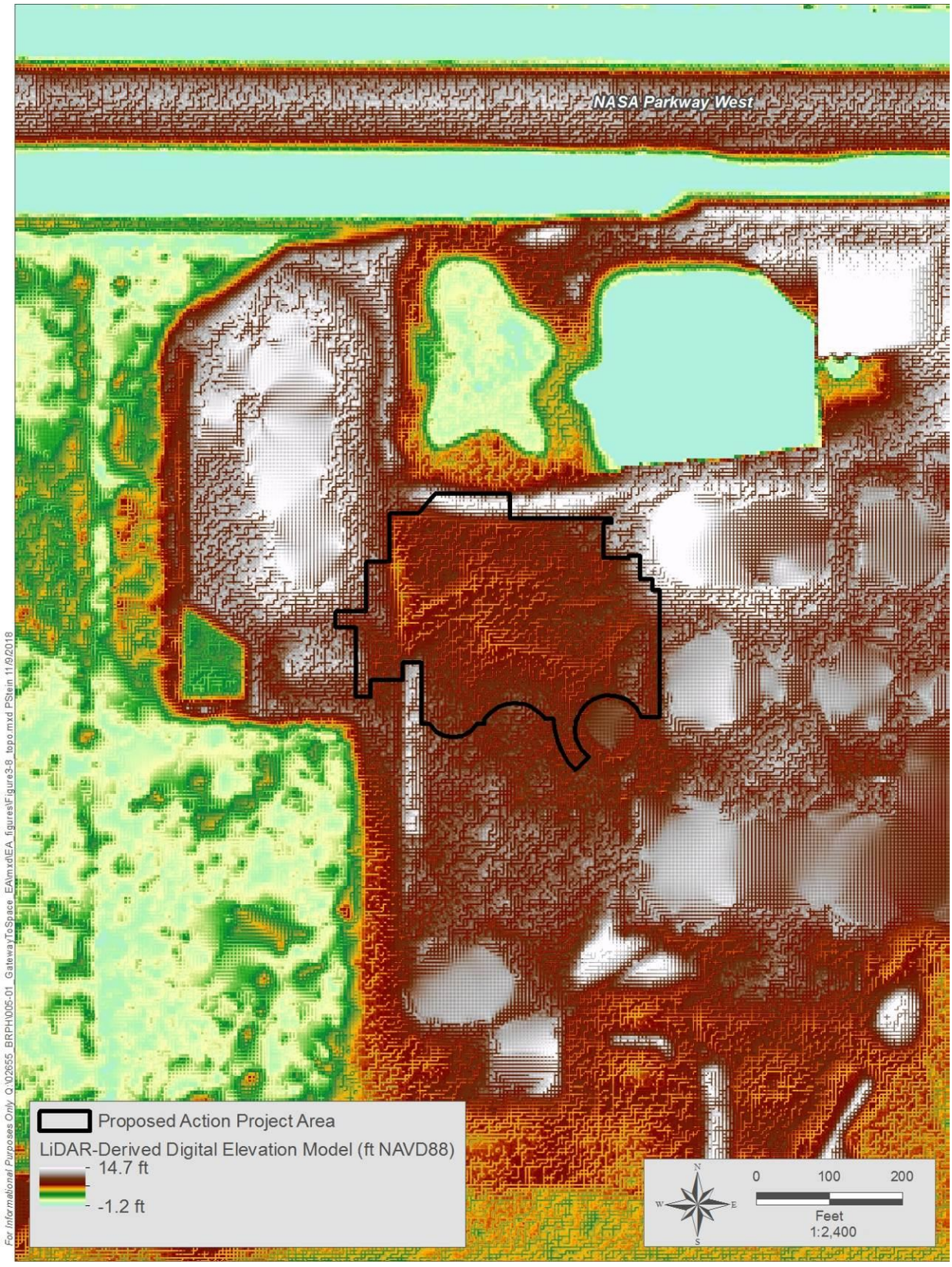


Figure 3.7 100-Year Floodplain Map for the Proposed Action Site

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 can absorb the change or mitigation measures to compensate for potential degradation.
- Major – 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 site 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.

Comparing the results of the assessment of environmental issues for the two alternatives, the Proposed Action has similar impacts on the environment as No Action. There are no expected major environmental impacts from the Proposed Action. Therefore, the 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 increased traffic delays.

Table 4.1 Issues Matrix

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

4.2.1.1.2 Operation

Operation of the Proposed Action may increase traffic on Space Commerce Way and NASA Parkway West due to higher attendance at the VC; however, this impact will have a **minor** impact on Space Commerce Way and NASA Parkway West.

4.2.1.2 Utilities

4.2.1.2.1 Construction and Operation

Construction of the Proposed Action will include installing new and connecting to existing utilities. Construction of the Proposed Action will include connecting to the existing potable water, wastewater, electrical, or communications utilities. As a result, construction and operation

of the Proposed Action are expected to have a **minor** impact on existing utilities at the VC since the capacity of the systems will be decreased.

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 the land and other construction activities would generate airborne particulates from earth moving, 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.

4.2.2.2 Operation

Operation of the Proposed Action is expected to have a **negligible** impact on surrounding air quality resulting from the potential increase in automobile trips per weekday.

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 1.0 ha (2.4 acres) of turf grass-dominated uplands. No wetland or surface water impacts are expected.

Construction is expected to have a **minor** impact on upland vegetation on KSC due to the small impact acreage, low quality of vegetation impacted, and the vast acreage of higher quality upland communities at KSC.

4.2.3.1.2 Operation

Negligible impacts on vegetation are expected from the operation of the Proposed Action.

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 site. 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 composed of low-quality disturbed uplands that provide little to no habitat value compared to 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 **negligible** impacts on wildlife due to the absence of wildlife habitat within the project area. The majority of habitat within the project area is turf grass-dominated uplands and impervious surfaces (sidewalks, rocket garden foundation, etc.) that provide little to no habitat value. Thus, **negligible** 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 should not be impacted by habitat removal since this area is within a previously developed area, and disruption of their previous movement patterns due to the new facilities should not occur. The impacted species are typically sensitive to human activity and will move away from disturbance, thereby causing at least a temporary shift in the population structure.

4.2.3.2.2 Operation

Long-term use of the proposed site would have minimal impact on wildlife species and is 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 site is expected to be **negligible**. Some habitat for locally common herpetofauna such as brown anoles 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

The Proposed Action is expected to have **negligible** impacts on the biodiversity of the area.

4.2.4 Threatened and Endangered Species

4.2.4.1 Construction

On-site habitat is composed of low-quality disturbed uplands that provide little to no habitat compared to the natural communities found on KSC. These existing habitats are low quality and dominated by bahia grass and impervious surfaces that provide very limited value and are not necessary for the survival of any threatened or endangered species.

Construction impacts are not expected to cause changes in the overall population size or structure of any of listed species on KSC. 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

Due to the distance from the ocean, it is unlikely that disorientation impacts will occur to nesting and hatching marine turtles from facility lighting. Nevertheless, lighting will have to comply with the KSC exterior lighting requirements located in the KNPR 8500.1, Rev. E (NASA, 2018). Long-term operation of the Proposed Action should not have an impact on any threatened and endangered species. **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

The Proposed Action project area contains historical artifacts such as the Saturn V rocket and others found in the Rocket Gardens. Construction fence and a gate separating construction activities from the rest of the VC will be installed to protect existing historical artifacts such as the Saturn V Rocket. As a result, these artifacts will not be disturbed because of the construction of the Proposed Action since they will remain important artifacts for visitor viewing.

The grounds to be disturbed to construct the Gateway to Space Exhibit have a low probability of containing significant or potentially significant archaeological sites, and further archaeological surveys are not warranted. Therefore, **negligible** impacts on historical or archaeological properties are expected resulting from the construction of the Proposed Action. Nevertheless, construction activities on KSC have contract clauses that state that when any archaeological material (e.g., artifacts and/or cultural features or human remains) is found, work must stop immediately and the KSC Cultural Resources Manager must be contacted. Materials and remains will subsequently be identified in accordance with the Native American Graves Protection and Repatriation Act.

4.2.5.2 Operation

The on-site artifacts will not be disturbed resulting from the operation of the Proposed Action since they will remain important artifacts for visitor viewing. However, the operation of the Proposed Action will have a **minor (positive)** impact on cultural resources since it will serve as a very valuable additional location where important NASA and commercial space artifacts will be displayed for visitor viewing. This new exhibit will allow the VC to display both NASA and commercial space achievements in cooperation with private aerospace companies such as SpaceX and Boeing.

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 building foundations, utility installation, and roadway foundations would require that the upper soil strata layers be removed and re-graded. This may temporarily affect shallow subsurface

flows of water from rainfall events. However, this would be mitigated with site grading and modifying the existing 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 resulting from 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 and NASA Parkway West due to operation of the Proposed Action since some increase in attendance is expected. Noise levels will increase marginally near Space Commerce Way and NASA Parkway West. Operation of the Proposed Action is expected to have a **negligible** impact on noise levels locally and a **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. During construction activities, impacts on surface waters would be minimized by ensuring that stormwater BMPs are implemented, inspected, and maintained to control erosion and sedimentation for the duration of construction.

4.2.8.2 Operation

Operation of the Proposed Action is expected to have a **negligible** impact on surface water quality since runoff from the Proposed Action will be routed to an existing stormwater management system for treatment before being discharged to downstream surface waters.

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 stormwater BMPs during construction will minimize this occurrence. Therefore, construction of the Proposed Action would have a **negligible** impact on groundwater quality.

4.2.9.2 Operation

Operation of the Proposed Action could generate pollutants typically created by runoff from impervious surfaces. The existing 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 is present to the north. Therefore, operation of the Proposed Action is expected to have a **negligible** impact on groundwater quality.

4.2.10 Floodplain

4.2.10.1 Construction

Construction of the Proposed Action site will not impact the 100-year floodplain and will have a **negligible** impact to floodplains at KSC (Figure 3.9).

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 the Proposed Action is expected to have **minor** impacts on socioeconomics and the workforce at KSC.

4.2.11.2 Operation

Operation of the Proposed Action is expected to have a **minor (positive)** impact on the socioeconomics of KSC as additional permanent staff will be required to support the operation of the Gateway to Space Exhibit.

4.3 No Action Alternative

Based on the Traffic Impact Study (TIS) from Lassiter (2017) (Appendix 3), the VC expects a 202-percent increase in visitors from 2018 to 2035. Additional facilities and new exhibits are

required to adequately support this projected increase and provide new user experiences as KSC transitions to a commercial spaceport. If the No Action Alternative is selected, the VC would not provide new exhibits that provide an enlightening, educational, inspiring, and entertaining experience for visitors of all ages coming to NASA KSC.

For the No Action Alternative, **negligible** impacts are expected 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 facility.

5.0 Cumulative Impacts

5.1 No Action Alternative

Based on the TIS from Lassiter (2017), the VC expects a 202-percent increase in visitors from 2018 to 2035. If no action is taken, the VC would not provide new exhibits that provide an enlightening, educational, inspiring, and entertaining experience for visitors of all ages coming to NASA KSC. **Negligible** impacts to other resource categories will occur if the No Action Alternative is selected (Table 4.1).

5.2 Proposed Action Alternative

In accordance with the Council on Environmental Quality's *Considering Cumulative Effects Under NEPA* (1997), the *levels of acceptable change used to determine the significance of effects will vary depending on the type of resource being analyzed, the condition of the resource, and the importance of the resource as an issue*. Also, *this change is evaluated in terms of both the total threshold beyond which the resource degrades to unacceptable levels and the incremental contribution of the proposed action to reaching that threshold*. In practice, *the analyst must determine the realistic potential for the resource to sustain itself in the future and whether the proposed action will affect this potential*. Accordingly, for a proposed action to have a cumulatively significant impact to an environmental resource, two conditions must be met. First, the combined effects of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the effects of the proposed action, must be significant. Second, a proposed action must make a measurable or meaningful contribution to that significant cumulative impact.

The VC has several current and future projects such as the 50th Anniversary Apollo 11, IMAX and Play Dome Renovations, and Moon Tree Garden projects. However, all of these are taking place within the footprint of the existing VC. There are potential long-term future projects such as a parking lot expansion in undeveloped areas adjacent to existing facilities that may be required as visitation grows. However, the long-term incremental expansions to the VC are not anticipated to result in significant cumulative impacts to any of the resource categories analyzed in this EA due to their construction in disturbed areas (abandoned citrus grove), small size, and operational uses that have minimal environmental impacts.

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 (NASA, 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. The distances of these areas from the Proposed Action precludes any direct impacts from construction or operation. 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

Table 7.1 lists the individuals who provided detailed data or analyses and prepared this document. The table provides information concerning which section(s) each person was involved in writing or assembling.

Table 7.1 List of Individuals Who Prepared This Document

Preparers	Affiliation	Professional Title	Contribution
Berry, Stephen	Jones Edmunds	Project Manager/ Senior Consultant	Document Preparation and Review
Bukata, B.J., MS, PWS, AA	Jones Edmunds	Senior Scientist	Biological Resources, Data and Text
Stein, Philip	Jones Edmunds	Scientist	Biological Resources, Data and Text, Figures
Nickel, Walt, PE	Jones Edmunds	Project Engineer	Transportation
Clark, Mike, PE	Jones Edmunds	Senior Project Engineer	Utilities
Koller, Rich, PE, LEED AP	Jones Edmunds	Managing Director	Document Review
Schmid, Joe	Jones Edmunds	Editor	Document Preparation and Review
Phillips, Lynne	NASA/KSC	Environmental Scientist	Document Review
Dankert, Don	NASA/KSC	KSC NEPA Coordinator	Document Review
Brooks, James	NASA/KSC	KSC NEPA Project Manager	Document Review
Berrios, Luis	NASA/KSC	Senior Design Specialist for the DNC VC	Document Review
Ferris, Tim	NASA/KSC	NASA VC Program Manager	Document Review
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Venuto, Charlie	Delaware North	Director, Environmental, Health and Safety	Document Review
Grey, Stacey	Delaware North	DNC Project Development	Document Review
Parrish, Gina	Delaware North	DNC Environmental	Document Review
Taylor, Keith	BRPH	Project Manager for Construction Services	Document Review
Gigante, Nick	BRPH	Project Manager for Design Services	Document Review
Valletta, Priyanka	BRPH	Civil Engineer	Document Review
Zenker, Tom	BRPH	Civil Engineer/Stormwater	Document Review

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Appendix 1 KSC Record of Environmental Consideration (REC)

Avoid Verbal Orders

TO: DNPS/Gina Parrish **DATE: 07/26/2018**

FROM: SI-E3/Environmental Management Branch

SUBJECT: KSC Record of Environmental Consideration (REC) **REC #: 10371**

1. PROJECT INFORMATION

Project Title: KSC Ride and Exhibit Hall

Project Lead: Stacey Grey, DNPS, 321-449-4429 **Project No.:** 99216

Project Description: KSC Ride and Exhibit Hall Project will place an approximately 40,000 SF building north of the KSC Visitor Complex Rocket Garden. The building will contain an exhibit hall for NASA to display their collection of artifacts, and it will also house a dome theater ride.

EPB Reviewer: LPH **Facility No.:** New facility, near M6-0409E, I, and M

2. NEPA DETERMINATIONS

- ☐ **a. Categorical Exclusions per 14 CFR Part 1216.304(d)**
- ☑ **b. Environmental Assessment (EA) Required**
- ☐ **c. Environmental Impact Statement (EIS) Required**
- ☐ **d. Existing FONSI or ROD**
- ☐ **e. Centerwide EIS**
- ☐ **f. AF Project on KSC/813**
- ☐ **g. NASA Project on CCAFS/813**

3. ENVIRONMENTAL REQUIREMENTS

a. Non-Permit Requirements	☑ **YES**	☐ **NO**
b. Permit Requirements	☑ **YES**	☐ **NO**

2.b.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 the KSC Ride and Exhibit Hall (Gateway to Space Project) at the KSC Visitor Complex. 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 within PRL #128, Visitor Complex. A PRL means that the site has had historical operations with the potential to impact the environment. This areas has been deemed No Further Action (NFA) status and, therefore, this project may proceed as proposed. 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 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 Waste Management Services at 867-8640 if assistance is required.

3.a.3. HAZARDOUS AND CONTROLLED WASTE (ASBESTOS CONTAINING MATERIAL): Asbestos is a regulated substance which was incorporated into many building products and most commonly found in floor tiles, roofing materials, caulking compounds, and insulation media. If asbestos will be disturbed, regulations from 62-257 F.A.C. must be followed and notification to the NASA Environmental Assurance Branch (Zach Hall, SI-E2, 867-5178) is required for any regulated asbestos removal in order that annual reporting requirements are fulfilled. If less than 260 linear feet, or less than 160 square feet of regulated asbestos containing material (RACM) is to be removed, there are no fee or reporting requirements to the FDEP, unless there is demolition of any load-supporting structural member. If the removal trips these thresholds, or is greater than 1 cubic meter, or 35 cubic feet, regulations require notification to FDEP. The "Notice of Asbestos Renovation or Demolition" (FDEP Form Number 62-257.900(1)) can be found at: http://dep.state.fl.us/air/rules/forms/asbestos.htm. The Permitting and Compliance Group within SI-E2 Environmental Assurance Branch must be copied on all reports submitted to FDEP. For asbestos disposal, KEMCON/IMSS Waste

Management can supply directions on proper handling, storage, and disposal of the waste stream through the Process Waste Questionnaire/Technical Response Package (PWQ/TRP) process. Please contact KEMCON/IMSS Waste Management Services at 867-8642 for assistance.

NOTE: Friable asbestos/RACM is not authorized for disposal at the KSC Landfill. For disposal of non-friable asbestos containing materials there, please coordinate with Zach Hall (SI-E2, 867-5178).

Ensure that a project specific asbestos survey has been performed per KNPR 1840.19 and EPA 40 CFR 61.145 requirements by a Florida Licensed Asbestos Consultant (FLAC) and that survey report is provided as part of project submittals prior to start of work.

The Asbestos Management Information System (AMIS) Database is a tool that may be used in conjunction with a survey by the FLAC and contains records on facilities that have been assessed for the presence of asbestos in a limited survey of the facility http://amis.ksc.nasa.gov/. Limited surveys typically do not include destructive sampling or exterior sampling. Check AMIS for the most recent information on the location and form(s) of asbestos at the site. Contact your company's Safety and Health Office or KEMCON Industrial Hygiene (IH) for recommendations on personal protective equipment (PPE). KEMCON/IMSS IH can be contacted at 867-2400 or at KSC-DL-EnvHealth/(KSC-DL-EnvHealth@mail.nasa.gov).

3.a.4. HAZARDOUS AND CONTROLLED WASTE (DEMOLITION OF FACILITIES): This project may include the deconstruction/demolition of load-bearing structures. All demolition activities that destroy the functionality of any load-supporting structural member of a facility, no matter of the size of the facility or the amount of material disturbed, must submit a "Notice of Asbestos Renovation or Demolition" (FDEP Form Number 62-257.900(1)) to the Florida Department of Environmental Protection. NOTE: This form must be submitted regardless of whether Asbestos-Containing Material (ACM) is identified. The FDEP must be notified at least 10 days prior to any demolition activity. The Environmental Assurance Branch Permitting and Compliance Group (Zach Hall, SI-E2, 867-5178) must be copied on all reports submitted to FDEP. Please contact Zach if clarification of this requirement is necessary.

3.a.5. HAZARDOUS AND CONTROLLED WASTE (PAINT): This project may/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 Waste Management Services at 867-8640 for assistance. There are special handling and waste management requirements for inorganic zinc (IOZ) coatings. When placed in a sealed container, IOZ paint can produce hydrogen and other gases from chemical reactions that occur during the curing process. The gas production builds pressure in the container and can cause the container to bulge and/or rupture thus creating a safety hazard. To meet environmental requirements and mitigate safety concerns, users of IOZ paint must physically separate IOZ paint related waste streams from other waste streams at the job site and manage their IOZ paint related waste streams according to the three categories below:

1) Leftover or unusable IOZ paint

Leftover or unusable IOZ paint must be stored in the original product containers supplied by the manufacturer with a loosely secured lid. Original product containers must then be placed into a larger closed drum or container that meets hazardous waste storage requirements and prevents any possible release to the environment. The larger closed drum or container must have a 5 psi pressure relief vent to avoid potential safety hazards. Cleaning solvents may NOT be placed into these containers.

2) Spent cleaning solvents

Waste cleaning solvent containers must have 5 psi pressure relief vents to avoid potential safety hazards

3) Solids from IOZ paint mixing and painting operations

Includes rags, brushes, rollers, empty cans, empty buckets, liners, stirring sticks, personal protective equipment, masking paper/tape, and any other waste materials that have contacted IOZ paint - Solid waste containers must have 5 psi pressure relief vents to avoid potential safety hazards - Empty paint cans and buckets can be disposed as

unregulated waste provided that all paint is wiped out of them. The spent rags/wipes used to wipe paint out of the cans or buckets shall be managed as waste under this category. Contractors are responsible for contacting the KSC Waste Management Office (867-8640) to arrange pickups of leftover/unusable paints, and to remove solvent or regulated paint waste when the containers are full. Contact Al Gibson (SI-E2, 861-0863) if you have any questions.

3.a.6. THREATENED AND ENDANGERED SPECIES: This project has the potential to affect the protected 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. If vegetation clearing or any disturbance of vegetated areas is necessary, a biological survey will be required to identify potential impacts to habitat and wetlands prior to disturbances. Please contact Becky Bolt (IMSS-200, 867-7330) to schedule a biological survey as soon as locations of vegetation impacts are known.

3.a.7. 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 in Chapter 24 of KNPR 8500.1 Rev. E, 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 Management Branch (EMB). Development of a lighting operations manual (LOM) that meets these criteria is required for all new construction or major modification of structures or facilities. Please contact the NASA EMB (Lynne Phillips, SI-E3, 867-4817) for additional information, and for guidance on development of a LOM or for a copy of the referenced documents.
NOTE: A LOM has been submitted for the KSC Visitor Complex and is under review by the EMB. The LOM must be updated to include construction of the proposed KSC Ride and Exhibit Hall.

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 (DARCY); and the ground restored. Clean, unstained, unpainted concrete residue is accepted at the DARCY without any sampling and analysis. Contact Zach Hall (SI-E2, 867-5178) with any questions on this requirement.

3.a.10. RECYCLING: The contractor must make every practical effort to reclaim and segregate materials that have the ability to be recycled. All reclaimed concrete (see Item X.X.X) must be segregated from other wastes and transported to the KSC Landfill (L7-0071) on Schwartz Road. All reclaimed scrap metal, not being recycled by contractor outside of KSC, must be transported to the Reutilization, Recycling and Marketing Facility (RRMF) with a KSC Form 7-49. Please turn these items and the KSC Form 7-49 in to RRMF personnel to ensure the proper disposition of the materials prior to leaving the recycling area. For any other information regarding materials that can be recycled or other general information regarding recycling policies at KSC, please contact the Environmental Management Branch (Alice Smith, SI-E3, 867-8454).

TO: DNPS/Gina Parrish **DATE: 07/26/2018**

FROM: SI-E3/Environmental Management Branch

SUBJECT: KSC Record of Environmental Consideration (REC) **REC #: 10371**

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 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. PERMITTED STORMWATER ERP: The project area is covered under an existing Environmental Resource Permit (ERP) stormwater system (INSERT PERMIT NUMBER) issued by the St. Johns River Water Management District (SJRWMD) and is subject to periodic inspection by the regulator. Ensure the final configuration of the stormwater system swales/slopes/berms, etc., and final dimensions of the structures meet the engineering requirements of the permitted stormwater facility. For more information, contact Doug Durham (SI-E2, 867-8429).PERMITTED STORMWATER ERP: There are existing Environmental Resource Permit (ERP) stormwater systems (INSERT PERMIT NUMBER) issued by the St. Johns River Water Management District (SJRWMD) in the general area of the (INSERT LOCATION/FACILITY). If this project proposes changes (increase or decrease) in ground cover, stormwater flow patterns, or impervious area, the information should be provided to Doug Durham (SI-E2, 867-8429) at the design phase for a permit modification determination.

3.b.3. 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.4. 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.

TO: DNPS/Gina Parrish **DATE: 07/26/2018**

FROM: SI-E3/Environmental Management Branch

SUBJECT: KSC Record of Environmental Consideration (REC) **REC #: 10371**

3.b.5. WATER RESOURCE PERMITTING (Domestic Wastewater): The proposed project may require a permit for the alteration or installation of utilities for transport of domestic wastewater. Please submit data and drawings required for permit determination to the NASA Permitting and Compliance Group. Additionally, any work done will be per standards and criteria set forth in the permit requirements, and not jeopardize the health and safety of personnel due to effects of the construction/modification on the KSC wastewater system. The organization responsible for the work will ensure that best engineering practices, codes, specifications and standards are followed. Contact Doug Durham (SI-E2, 867-8429) for permit requirement determination and if further assistance is required.

3.b.6. WATER RESOURCE PERMITTING (Potable Water): The proposed project may require a permit for the alteration or installation of utilities for transport of potable or FIREX water. Please submit data and drawings required for permit determination to the NASA Permitting and Compliance Group. Additionally, any work done will be per standards and criteria set forth in the permit requirements, and not jeopardize the health and safety of personnel due to effects of the construction/modification on the KSC potable water system (i.e. disinfection and verification prior to use). The organization responsible for the work will ensure that best engineering practices, codes, specifications, and standards are followed. Pressure and leak tests as well as disinfection are also required. Contact Doug Durham (SI-E2, 867-8429) for permit requirement determination and if further assistance is required.

3.b.7. INDUSTRIAL WASTEWATER: Depending on the chiller type installed, the proposed project may generate industrial wastewater. State of Florida regulations define industrial wastewater as any wastewater that is not classified as domestic wastewater. An Industrial Wastewater Permit may be required for discharge. The initiating organization or contractor shall follow FDEP's Guide to Permitting Wastewater Facilities or Activities under Chapter 62-620 when preparing the application package and submit the draft application package (five copies) to the NASA Environmental Assurance Branch (EAB) for review and comment. The designs, site plans, specifications, drawings, documents, or forms required by FAC 62-620 must be signed and sealed by a P.E. registered in the state of Florida. Permit applications must be submitted to FDEP from NASA EAB at least 180 days before a discharge occurs and at least 90 days prior to commencing construction. Contact Doug Durham (SI-E2, 867-8429) for additional assistance.

3.b.8. AIR CONDITIONER CONDENSATE (including retrofits): Condensate may not be discharged to the stormwater system. The air conditioner condensate must be discharged to sanitary sewer (see item 3.b.2), or above grade, but not below grade. If below grade, this discharge may be considered an Industrial Wastewater/Underground Injection Control (UIC) discharge and may require FDEP permit. Contact Doug Durham (SI-E2, 867-8429) for additional information on this requirement.

3.b.9. RADIATION: Use of ionizing or non-ionizing radiation sources on KSC must comply with KNPR 1860.1 and 1860.2. This project may involve the generation of a radiation source which must be evaluated by the Health Physics Group. A Radiation Use Authorization is required before operations begin. Information describing work to be performed and use of x-ray machine must be submitted to the KEMCON/IMSS Health Physics Office. Contact KEMCON/IMSS Health Physics (IMSS-023, 867-2400) with questions.

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

Avoid Verbal Orders

TO: DNPS/Gina Parrish **DATE: 07/26/2018**

FROM: SI-E3/Environmental Management Branch

SUBJECT: KSC Record of Environmental Consideration (REC) **REC #: 10371**

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:
S. Grey/DNPS
B. Bolt/IMSS-200

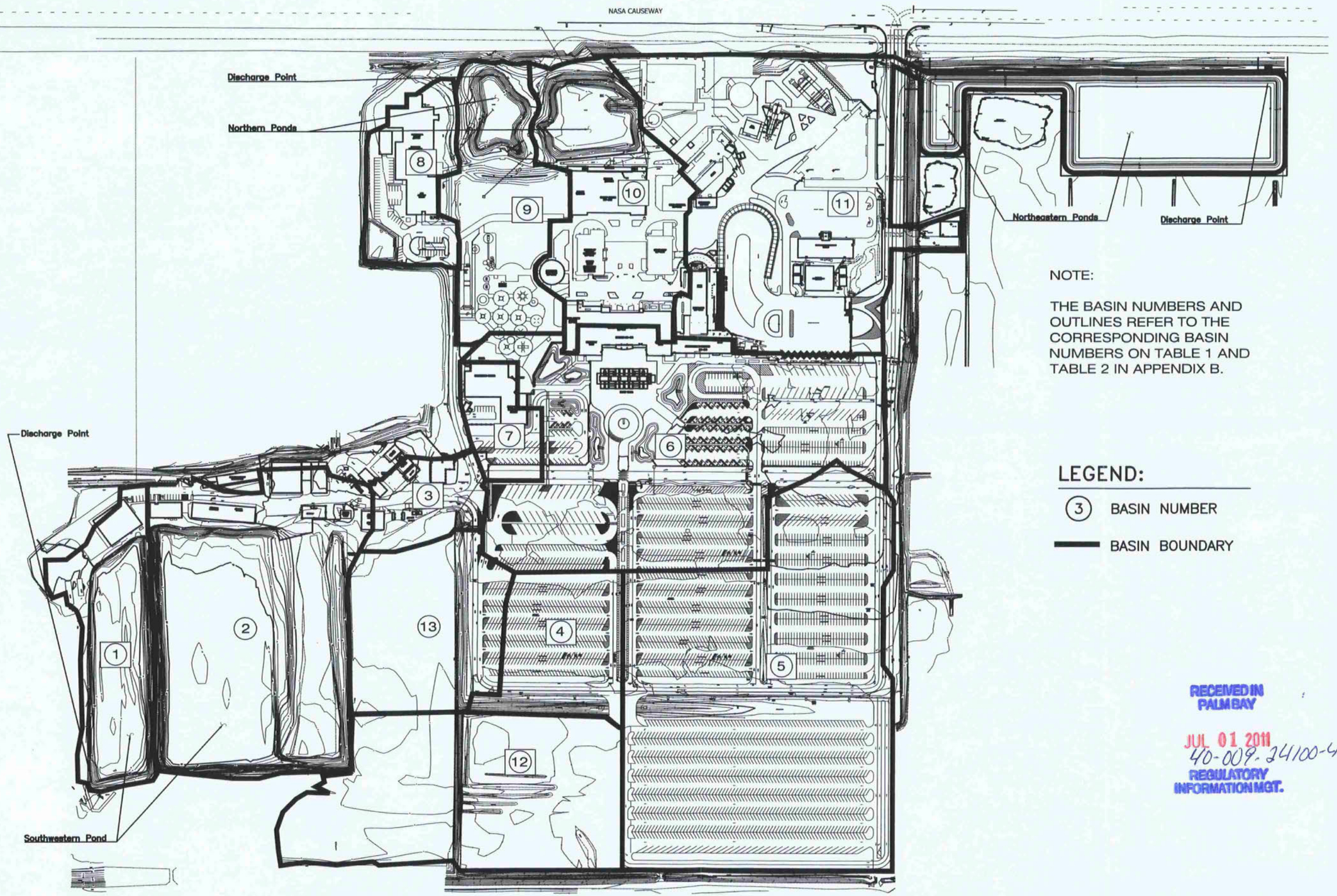
4. Upon evaluation of the subject project, the above determinations have been made and identified. Contact the Environmental Management Branch (SI-E3) at 861-1196 for re-evaluation should there be any modifications to the scope of work.

Don Dankert

07/26/2018 10:18

Date

Appendix 2 BRPH Civil Engineering Stormwater Pond Calculations



NOTE:

THE BASIN NUMBERS AND OUTLINES REFER TO THE CORRESPONDING BASIN NUMBERS ON TABLE 1 AND TABLE 2 IN APPENDIX B.

LEGEND:

(3) BASIN NUMBER

BASIN BOUNDARY

PRE-DEVELOPMENT BASINS

N

0' 150' 300' 600' 900'

D-ADDENDUM N-CONSTRUCTION CHANGE DIRECTIVE R-REQUEST FOR INFORMATION Q-PROPOSAL REQUEST I-ARCHITECTURAL SUPPLEMENTAL INFORMATION O-CHANGE ORDER V-REVISION H-OTHER

DOCUMENT REQUESTED BY: ☐ BIDDER ☐ CONTRACTOR ☐ CLIENT ☐ Other

DATE 6-10-11

PROJECT NUMBER 6394.03

ORIGINAL DRAWING REFERENCE

DRAWN BY YORIO

APPROVED BY ZENKER

RESPONSE TO

THIS SHEET FIGURE 4

KENNEDY SPACE CENTER-CONSTRUCT VISITOR COMPLEX TICKET ENTRANCE

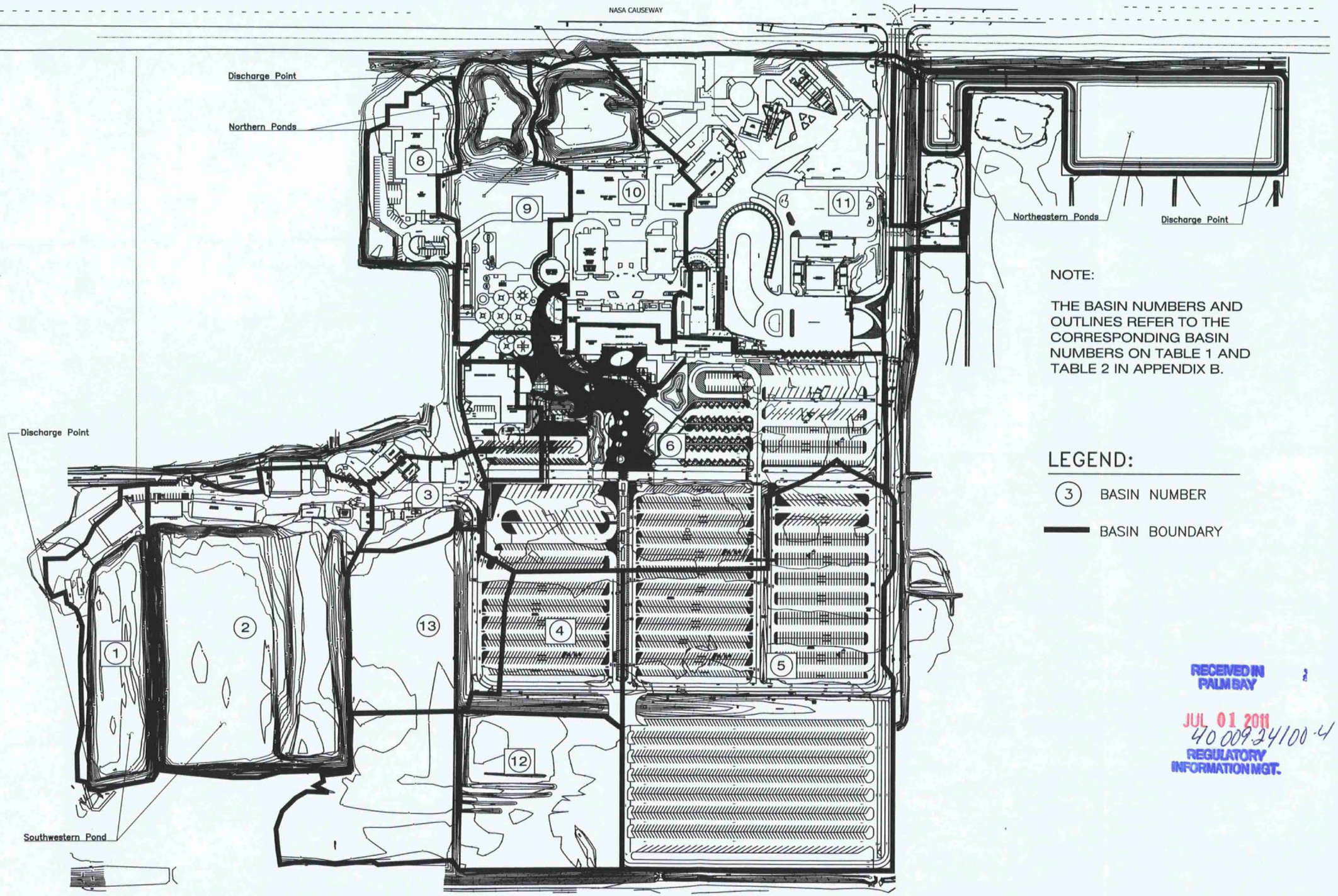
KSC VISITOR COMPLEX

DELAWARE NORTH PARKS SERVICES

VISITOR COMPLEX EXISTING MAIN CAMPUS

brph
Architects, Engineers, Constructors
Offices in Melbourne, Orlando, West Palm Beach, Atlanta, Charleston, Washington DC
Board of Architecture License No. AA C0001149
Board of Professional Engineers License No. 1439

330 North Wabash City Blvd. Suite 400 Melbourne, Florida 32940 321.254.1600 321.254.4701



NOTE:

THE BASIN NUMBERS AND OUTLINES REFER TO THE CORRESPONDING BASIN NUMBERS ON TABLE 1 AND TABLE 2 IN APPENDIX B.

LEGEND:

(3) BASIN NUMBER

BASIN BOUNDARY

POST-DEVELOPMENT BASINS

N

0' 150' 300' 600' 900'

D-ADDENDUM N-CONSTRUCTION CHANGE DIRECTIVE R-REQUEST FOR INFORMATION Q-PROPOSAL REQUEST I-ARCHITECTURAL SUPPLEMENTAL INFORMATION O-CHANGE ORDER V-REVISION H-OTHER

DOCUMENT REQUESTED BY: ☐ BIDDER ☐ CONTRACTOR ☐ CLIENT ☐ Other

PROJECT NUMBER 6394.03 | DATE 6-10-11

ORIGINAL DRAWING REFERENCE | DRAWN BY YORIO | APPROVED BY ZENKER

RESPONSE TO | THIS SHEET FIGURE 5

KENNEDY SPACE CENTER-CONSTRUCT VISITOR COMPLEX TICKET ENTRANCE

KSC VISITOR COMPLEX

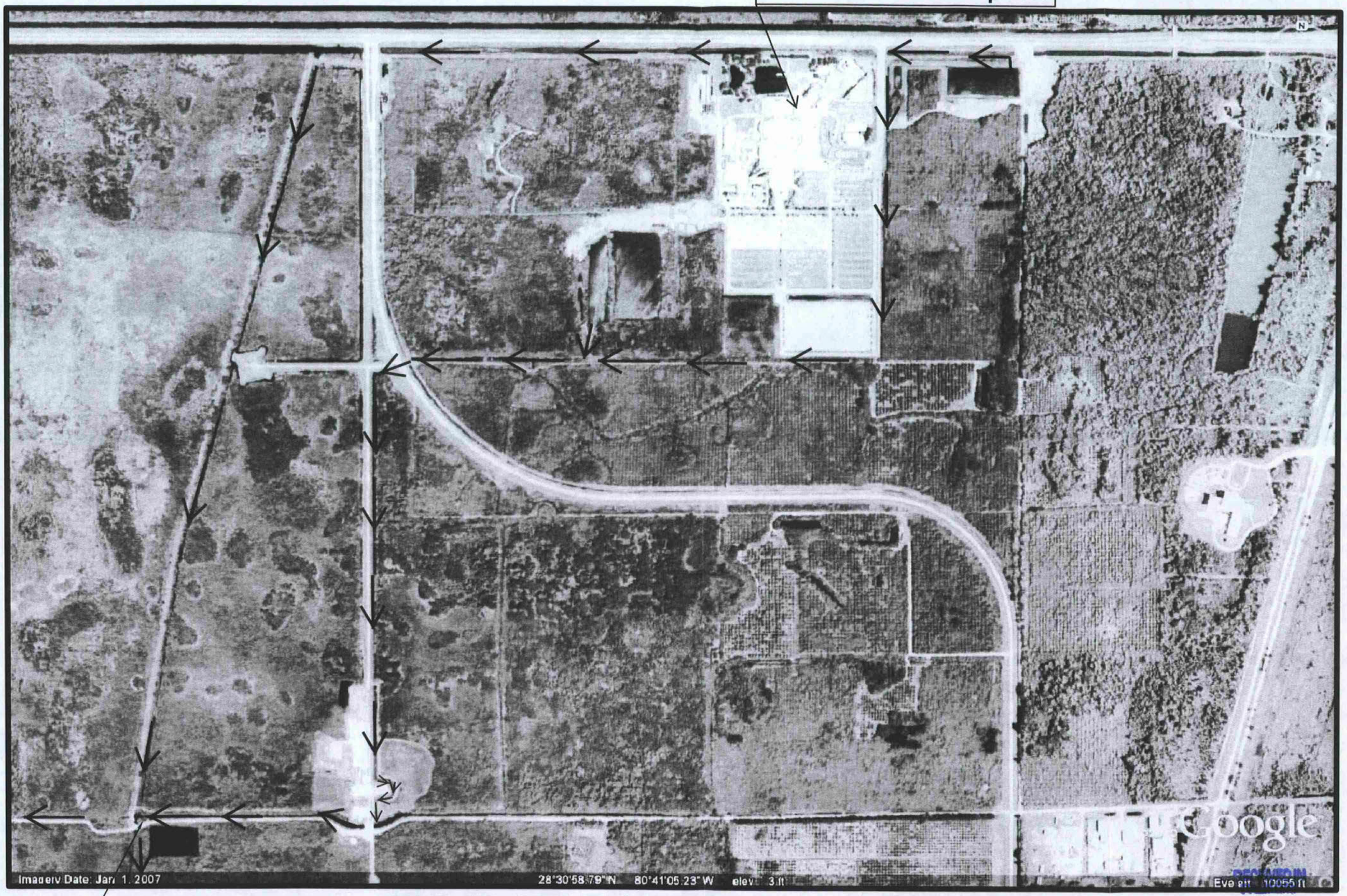
DELAWARE NORTH PARKS SERVICES

VISITOR COMPLEX PROPOSED MAIN CAMPUS

brph
Architects, Engineers, Constructors
Offices in Melbourne, Orlando, West Palm Beach, Atlanta, Charleston, Washington DC
Board of Architecture License No. AA C000149
Board of Professional Engineers License No. 1439

2301 North Harbor City Blvd., Suite 400 Melbourne, Florida 32935 321.254.7868 321.254.4707

KSC Visitor Complex



PUMP STATION LOCATION

← SHOWS FLOW DIRECTION

PUMP STATION LOCATION MAP

NTS

N

JUL 01 2011
40-009-24100-4
REGULATORY
INFORMATION MGT.

D-ADDENDUM N-CONSTRUCTION CHANGE DIRECTIVE R-REQUEST FOR INFORMATION Q-PROPOSAL REQUEST I-ARCHITECTURAL SUPPLEMENTAL INFORMATION O-CHANGE ORDER V-REVISION H-OTHER

DOCUMENT REQUESTED BY: ☐ BIDDER ☐ CONTRACTOR ☐ CLIENT ☐ Other

KENNEDY SPACE CENTER CONSTRUCT VISITOR COMPLEX TICKET ENTRANCE
KSC VISITOR COMPLEX
DELAWARE NORTH PARKS SERVICES

PROJECT NUMBER 6394.03 | DATE 06-10-11

ORIGINAL DRAWING REFERENCE | DRAWN BY YORIO | APPROVED BY ZENKER

RESPONSE TO | THIS SHEET

PUMP STATION LOCATION MAP

FIGURE 6

Architects, Engineers, Constructors
Offices in Melbourne, Orlando, West Palm Beach, Atlanta, Charleston, Washington DC
Board of Architecture License No. AA C000149
Board of Professional Engineers License No. 14591

bmph
535 North Harbor City Blvd. Suite 400 Melbourne, Florida 32935 321-254-7681 321-254-4251

APPENDIX B

Design Calculations:

Table 1: Pre-Development Basin Summary

Table 2: Post-Development Basin Summary

Time of Concentration Calculations

Table 3: Treatment Volume Determination

Stage/Storage Tables

Orifice Calculations - Northern Pond

ICPR Routing Model Input/Results

Basin Summary Tables

TABLE 1: Pre-Development Basin Summary

BASIN	TOTAL AREA (ac)	IMPERV AREA (ac)	PERV AREA (ac)	WET POND/DITCH (ac)	PERCENT IMPERV	CN	TC (min)
1	5.15	0.4	1.46	3.29	21.5%	93.75	10
2	14.03	1.63	2.94	9.46	35.7%	94.86	10
3	2.27	0.91	1.36	0	40.1%	89.01	16
4	4.22	3.66	0.1	0.46	97.3%	97.64	10
5	21.87	19.22	2.13	0.52	90.0%	96.54	10
6	18.05	15.61	2.44	0	86.5%	95.97	10
7	1.82	1.32	0.5	0	72.5%	93.88	10
8	3.37	1.99	1.38	0	59.1%	91.86	10
9	6.06	1.56	3.75	0.75	29.4%	88.72	10
10	7.7	4.71	1.33	1.66	78.0%	95.41	10
11	22.5	10.73	7.26	4.51	59.6%	93.16	10
12	11.1	0	10.91	0.19	0.0%	83.26	56
13	6.02	1.1	4.5	0.42	19.6%	86.79	45
TOTAL	124.16	62.84	40.06	21.26			

NOTE:

PERVIOUS CN 83

IMPERVIOUS CN 98

TABLE 2: (Post-Development) Master Plan Basin Summary

BASIN	TOTAL AREA (ac)	IMPERV AREA (ac)	PERV AREA (ac)	WET POND/DITCH (ac)	PERCENT IMPERV	CN	TC (min)
1	5.15	0.4	1.46	3.29	21.5%	93.75	10
2	14.03	2.41	2.16	9.46	52.7%	95.69	10
3	2.27	1.07	1.2	0	47.1%	90.07	16
4	4.22	3.66	0.1	0.46	97.3%	97.64	10
5	21.87	19.22	2.13	0.52	90.0%	96.54	10
6	18.05	18.05	0	0	100.0%	98.00	10
7	1.82	1.82	0	0	100.0%	98.00	10
8	3.37	2.15	1.22	0	63.8%	92.57	10
9	6.06	5.09	0.27	0.7	95.0%	97.33	10
10	7.7	5.7	0.3	1.7	95.0%	97.42	10
11	22.5	16.05	1.94	4.51	89.2%	96.71	10
12	11.1	0	10.91	0.19	0.0%	83.26	56
13	6.02	1.1	4.5	0.42	19.6%	86.79	45
TOTAL	124.16	76.72	26.19	21.25			

NOTE:

PERVIOUS CN 83

IMPERVIOUS CN 98

Appendix 3 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

LTG Engineering & Planning

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

Gilberto A Ramirez 2017.09.25 13:25:46 -04'00'

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.

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

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:

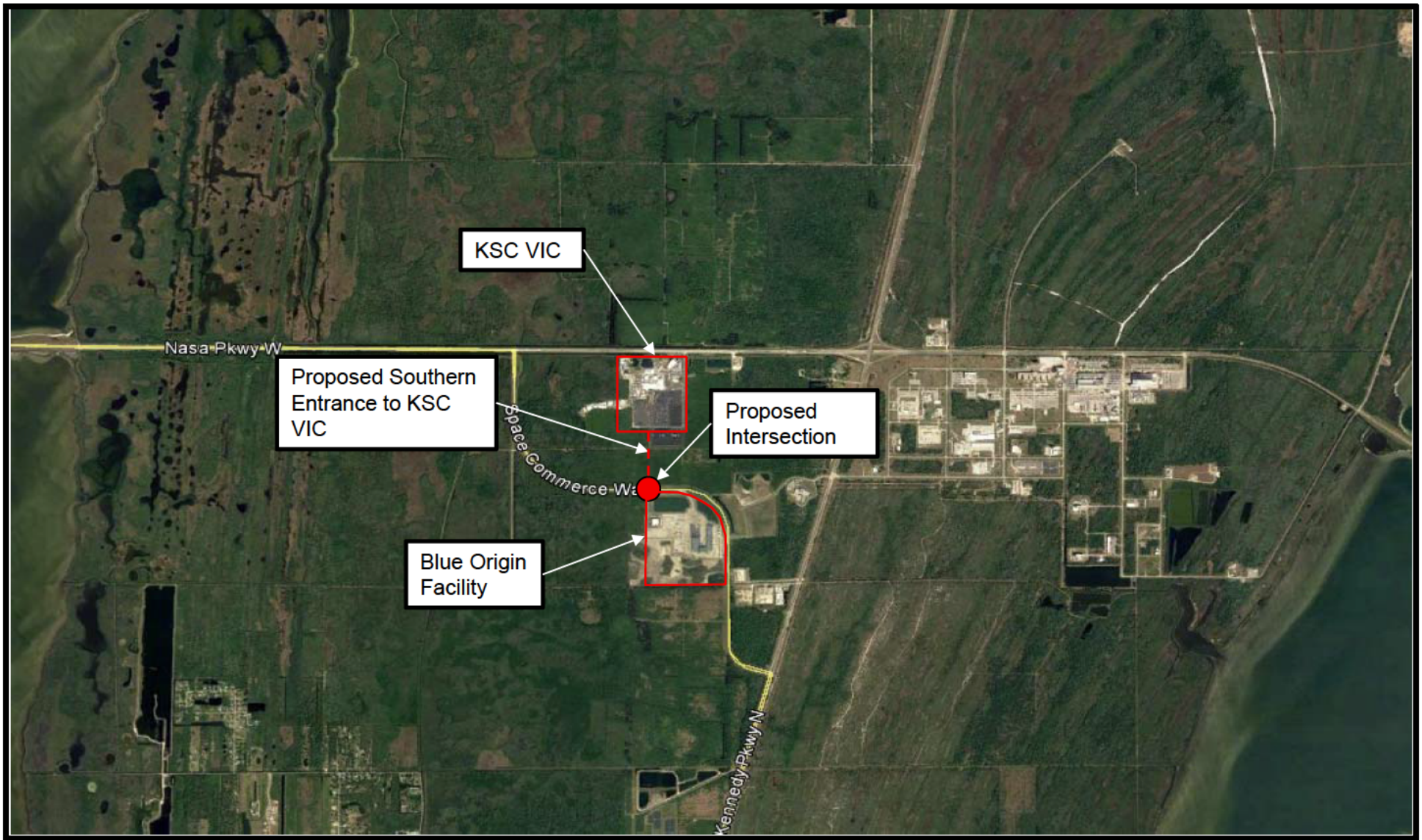
- Space Commerce Way from NASA Parkway to Kennedy Parkway

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

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Location Map

Project No.: 4324.03

Figure: 1

LTG Engineering & Planning

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 utilized 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

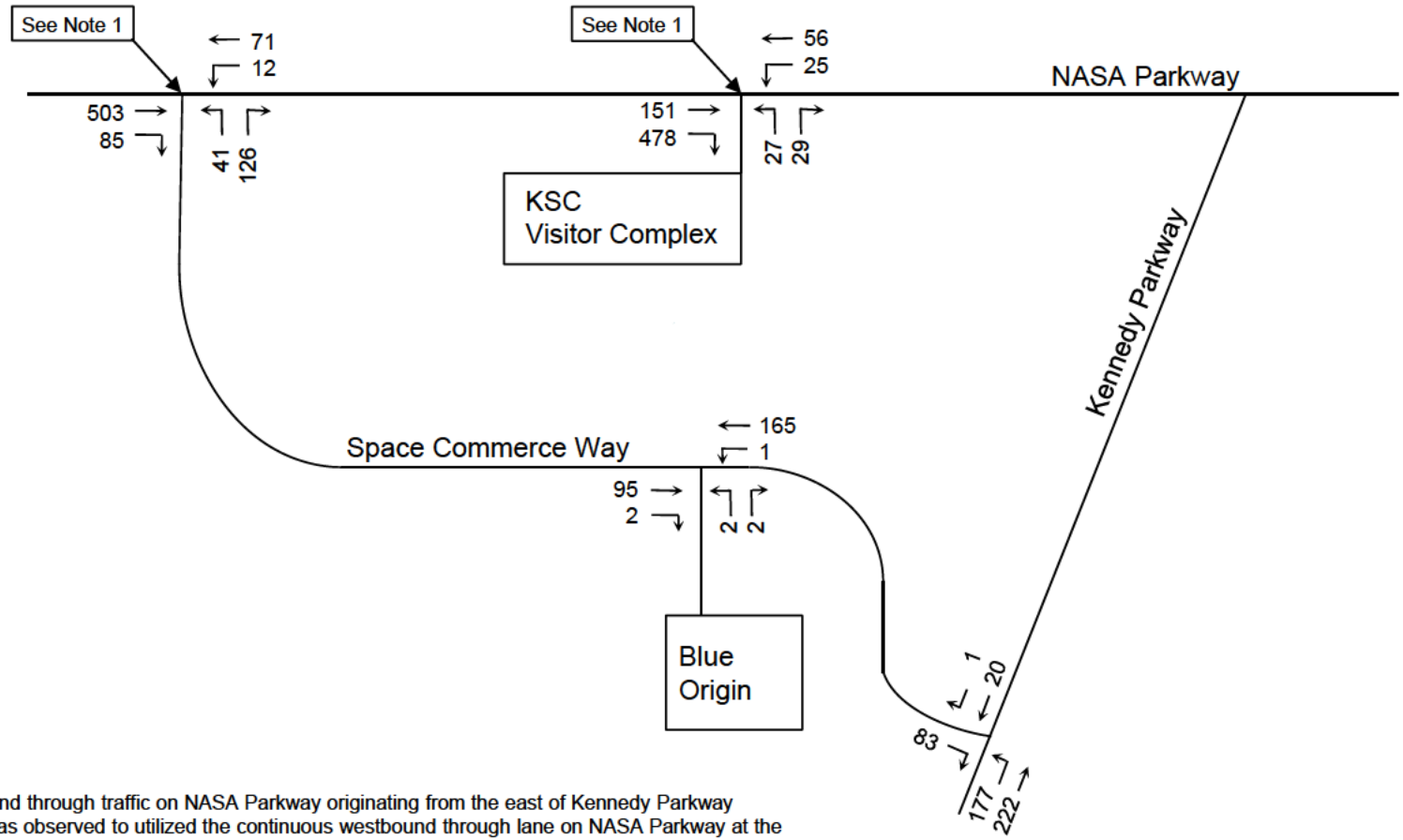
Roadway level of service describes the operating condition determined from the number of vehicles passing over a given section of roadway during a specified time period. It is a qualitative measure of several factors which include: speed, travel time, traffic interruptions, freedom to maneuver, driver 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.

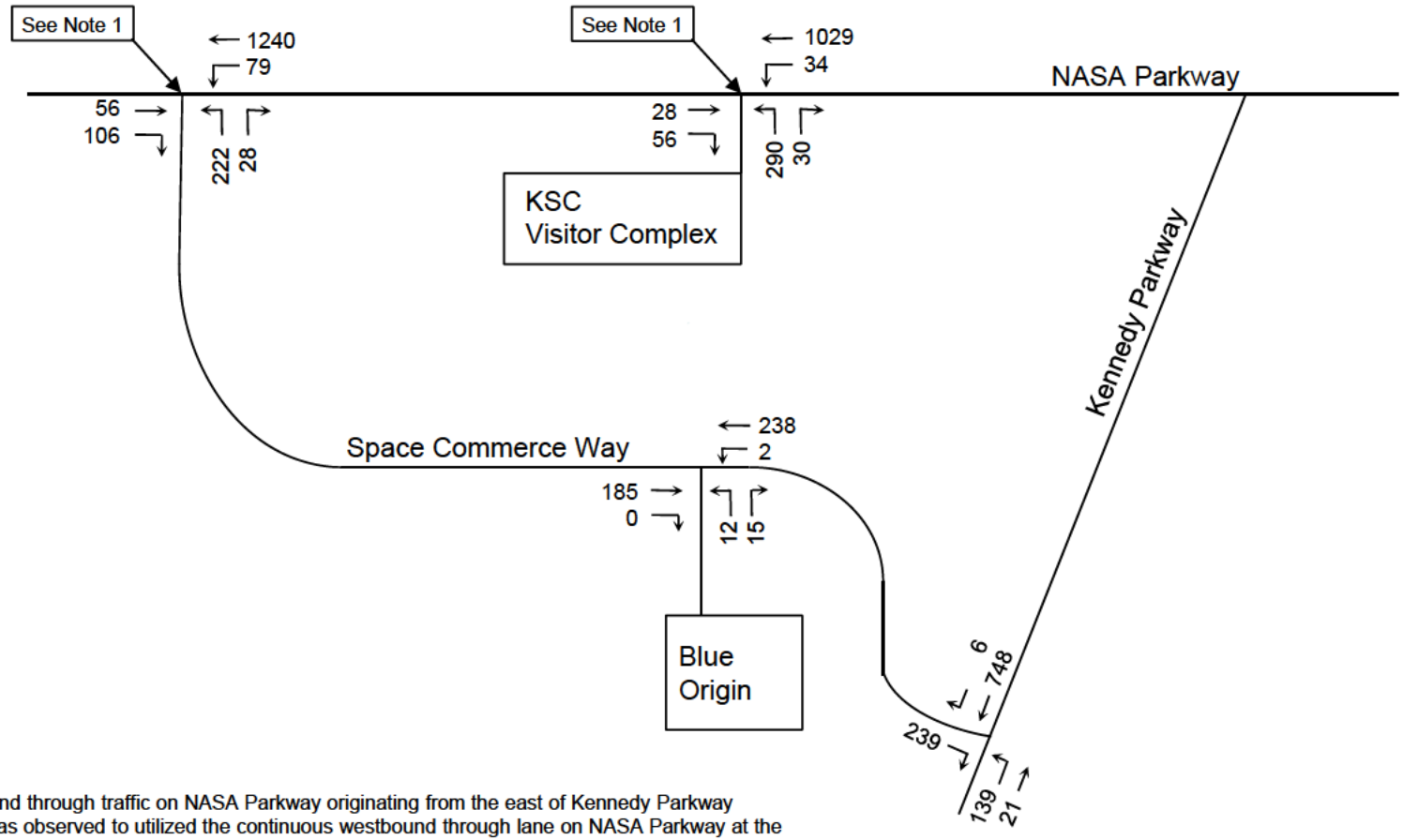
Table 3
Existing P.M. Peak-Hour Two-Way LOS - Roadway Segments
Space Commerce Way at Southern KSC Entrance

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 utilized 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	N NTS	**2017 Existing A.M. Peak Hour**	LTG Engineering & Planning
		Project No.:4324.03 / Figure: 2	1970 Dairy Road, West Melbourne, Florida 32904 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



Notes:
1: All westbound through traffic on NASA Parkway originating from the east of Kennedy Parkway intersection was observed to utilized 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	N NTS	**2017 Existing P.M. Peak Hour**	LTG Engineering & Planning
		Project No.:4324.03 / Figure: 3	1970 Dairy Road, West Melbourne, Florida 32904 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227

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

	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)			TAZ 2995 (NASA)		
Year	Indust.	Service	Comm.	Indust.	Service	Indust.	Service	Total
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

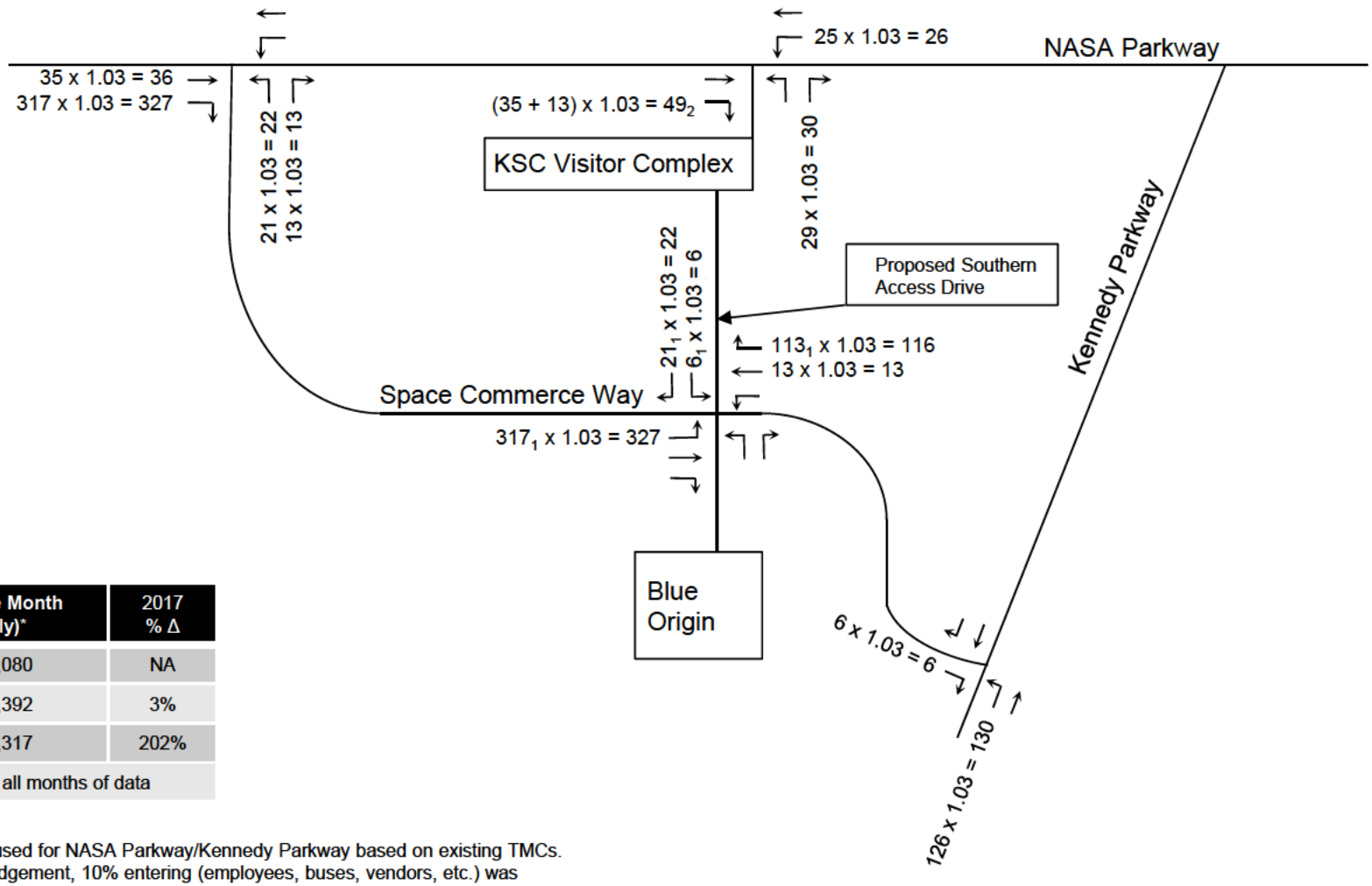
	Time Period	Generator	ITE Land Use Code	Trip Rate Equation	Units (X) Employees	Total Trips (T)	Percent Enter	Percent Exit	Trips Entering	Trips Exiting
2035	Daily	Corporate Headquarters Building	714	Ln(T) = 0.97 Ln(X) +2.23	322	2,518	50%	50%	1,260	1,258
	AM Peak-Hour	Corporate Headquarters Building	714	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

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A.M. 2018 VIC Background Traffic

Project No.:4324.03 | Figure: 4

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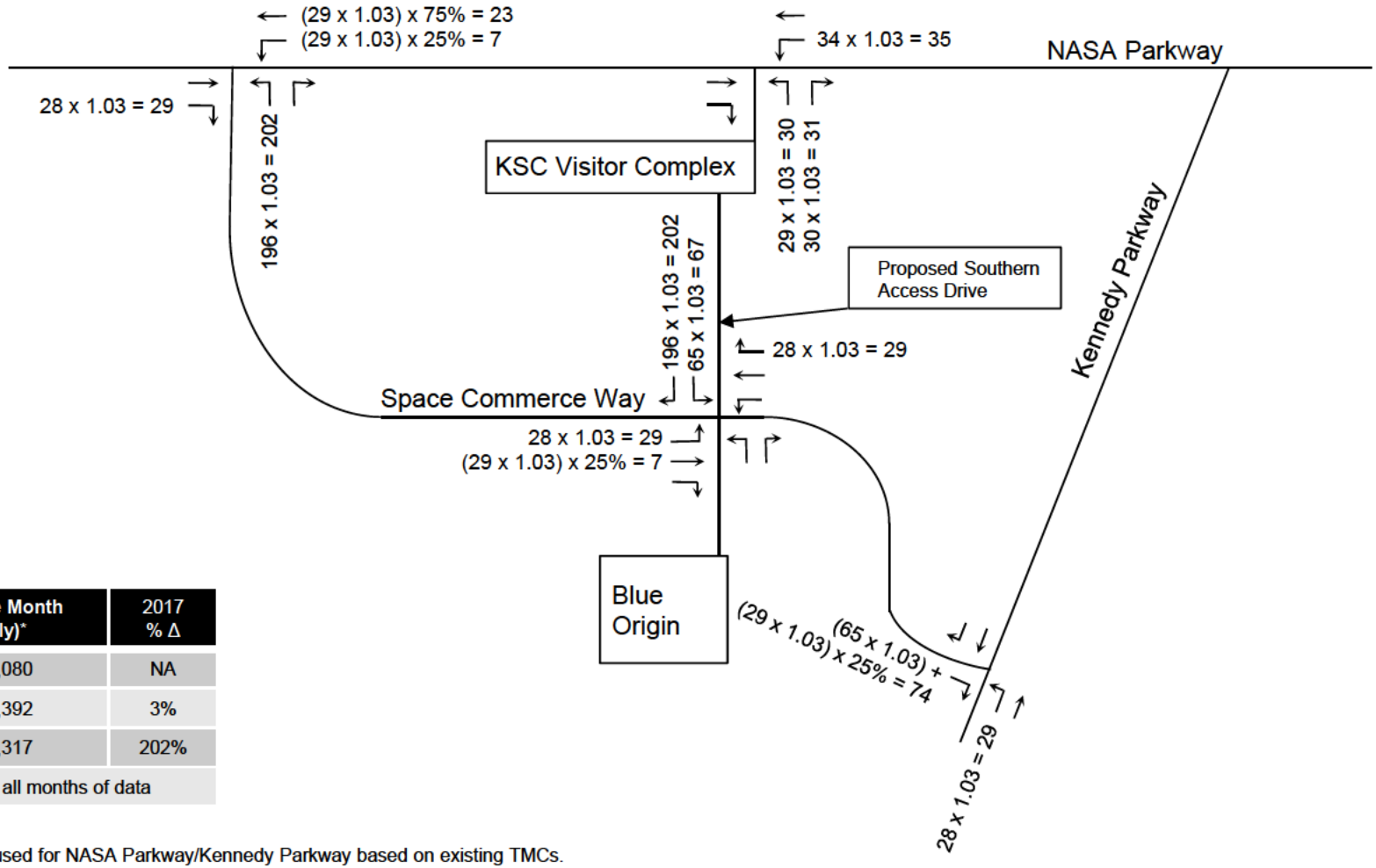

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2035	357,317	202%
*Same % Δ for all months of data		

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

N
NTS

P.M. 2018 VIC Background Traffic

Project No.:4324.03 | Figure: 5

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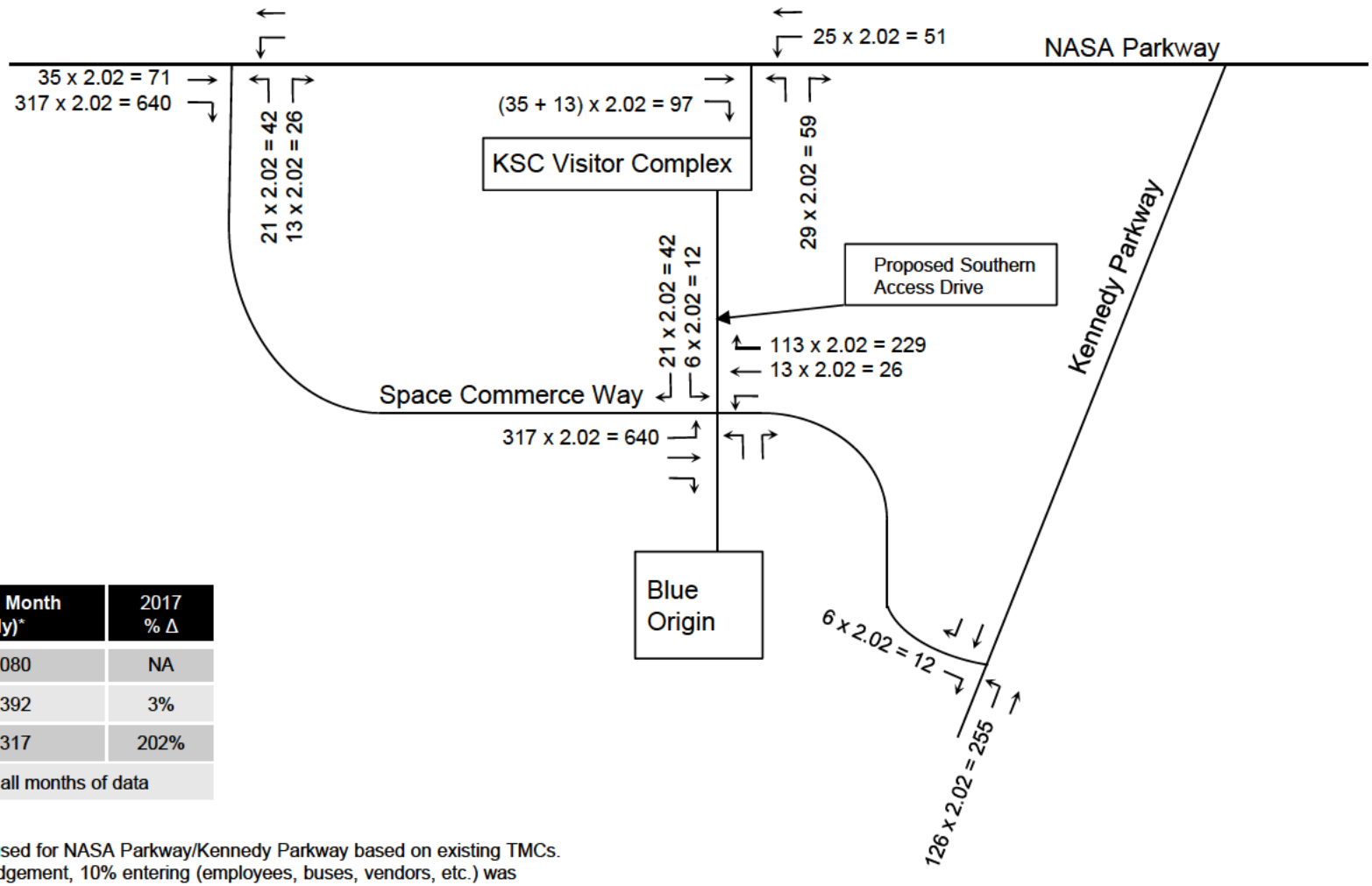

Year	Sample Month (July)*	2017 % Δ
2017	177,080	NA
2018	182,392	3%
2035	357,317	202%
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Notes:
1: A 75/25 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
2: Per engineering judgement, 10% entering (employees, buses, vendors, etc.) was used at the northern VIC access point.

KSC VIC Proposed Southern Entrance at Space Commerce Way

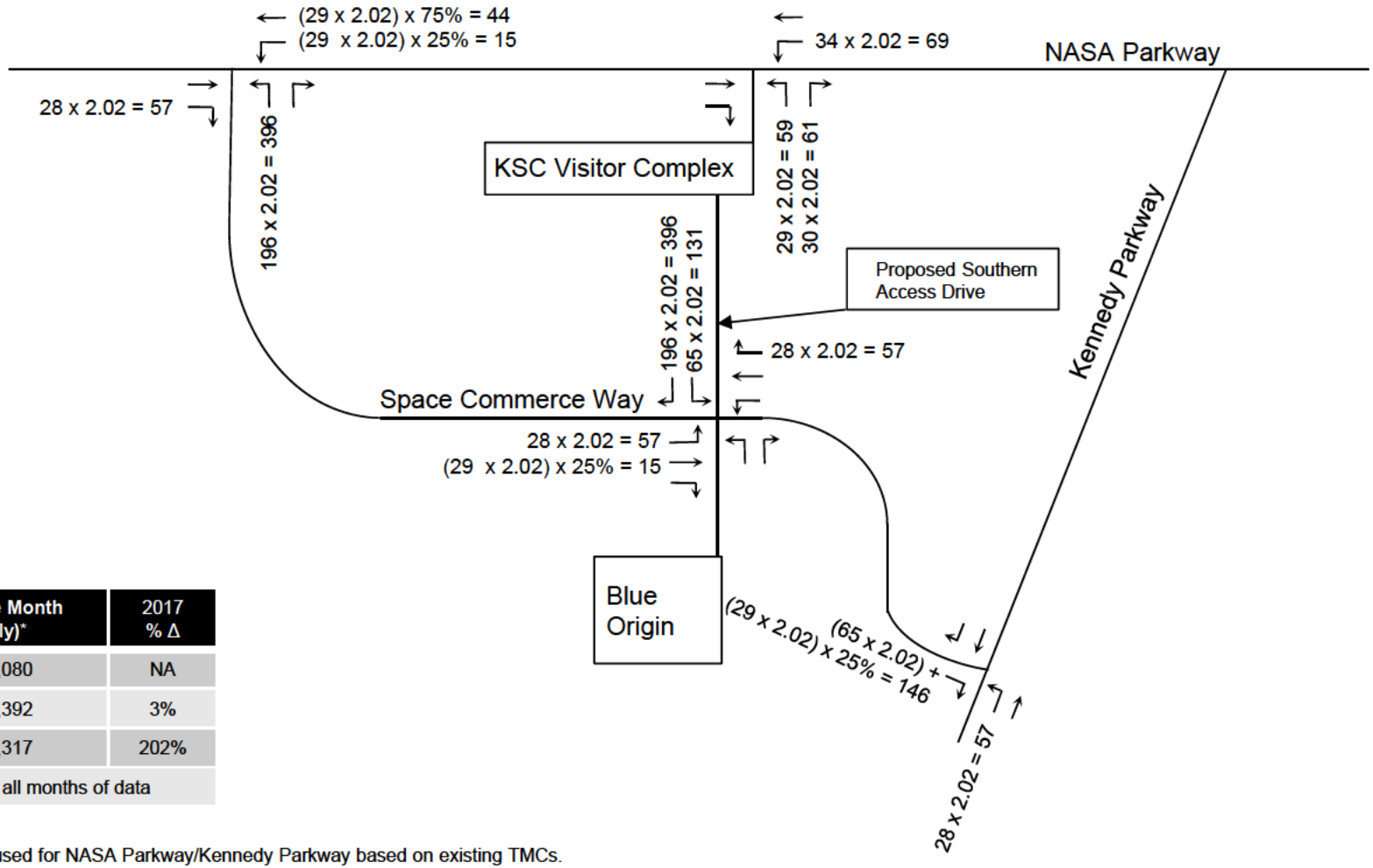
N
NTS

A.M. 2035 VIC Background Traffic

Project No.:4324.03

Figure: 6

LTG Engineering & Planning
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.

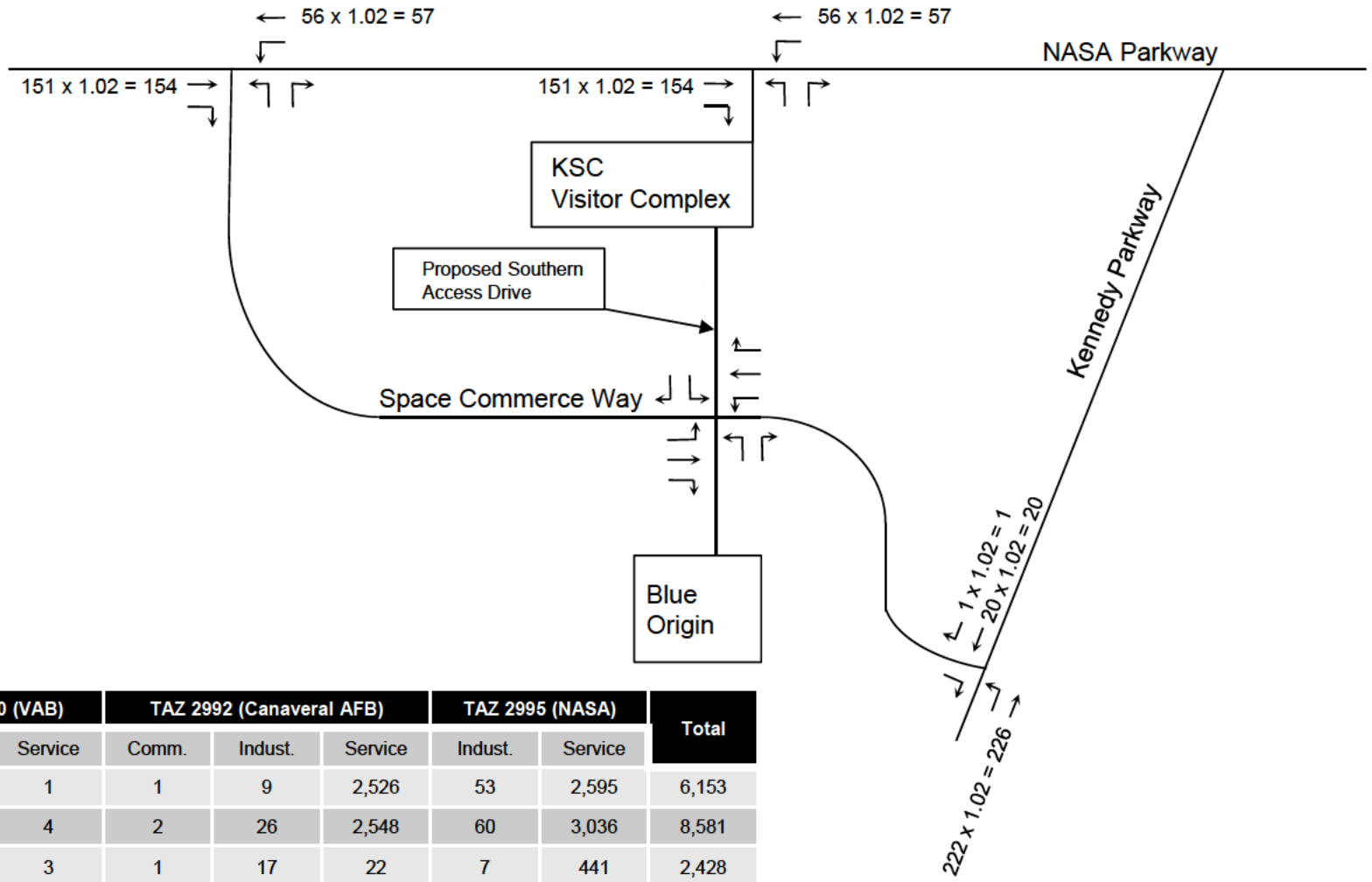
KSC VIC Proposed Southern Entrance at Space Commerce Way

N
NTS

P.M. 2035 VIC Background Traffic

Project No.:4324.03 | Figure: 7

LTG Engineering & Planning
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

N

NTS

A.M. 2018 NASA Background Traffic

Project No.:4324.03

Figure: 8

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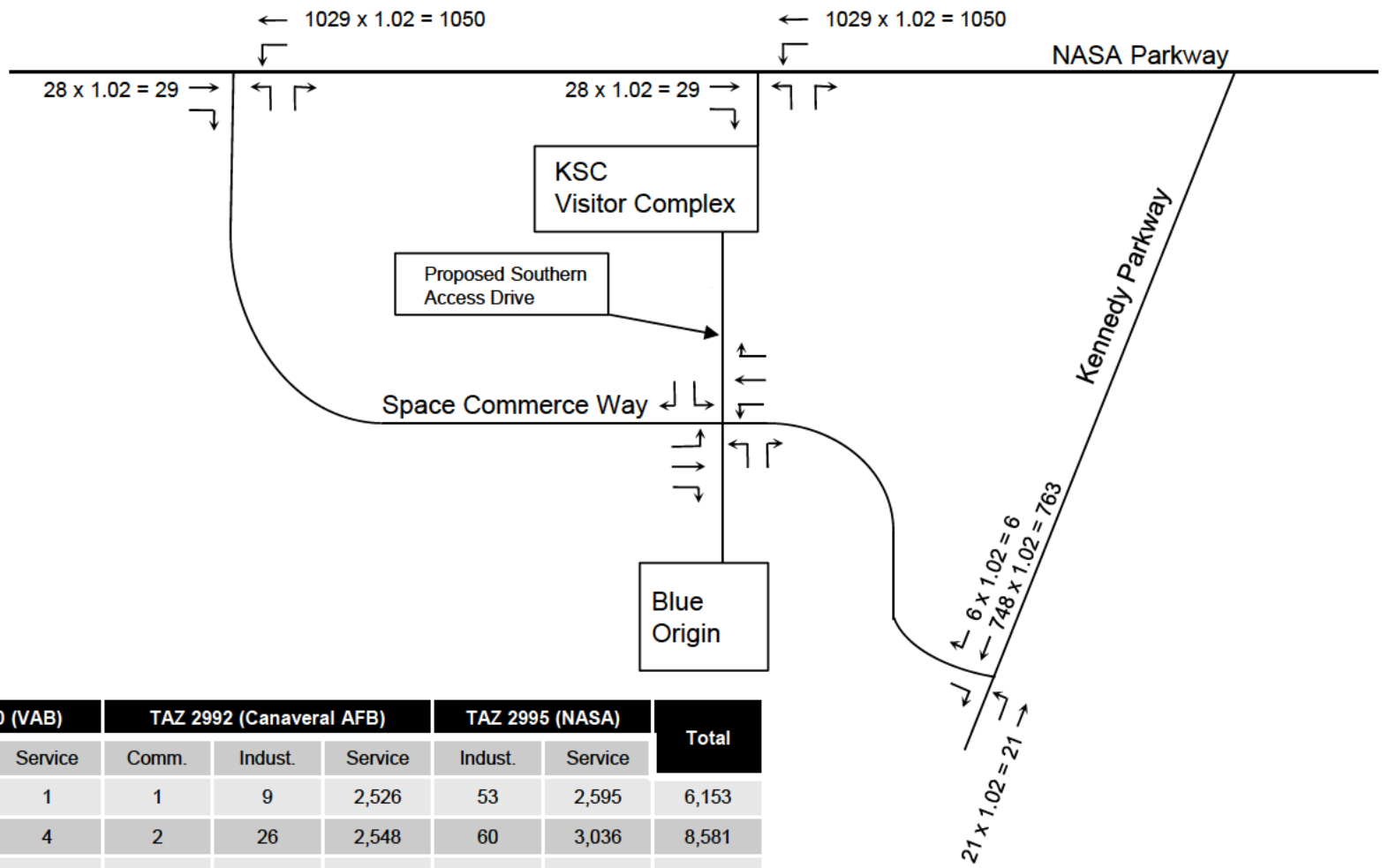

Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)			TAZ 2995 (NASA)		Total
	Indust.	Service	Comm.	Indust.	Service	Indust.	Service	
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):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

KSC VIC Proposed Southern Entrance at Space Commerce Way

N

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P.M. 2018 NASA Background Traffic

Project No.:4324.03

Figure: 9

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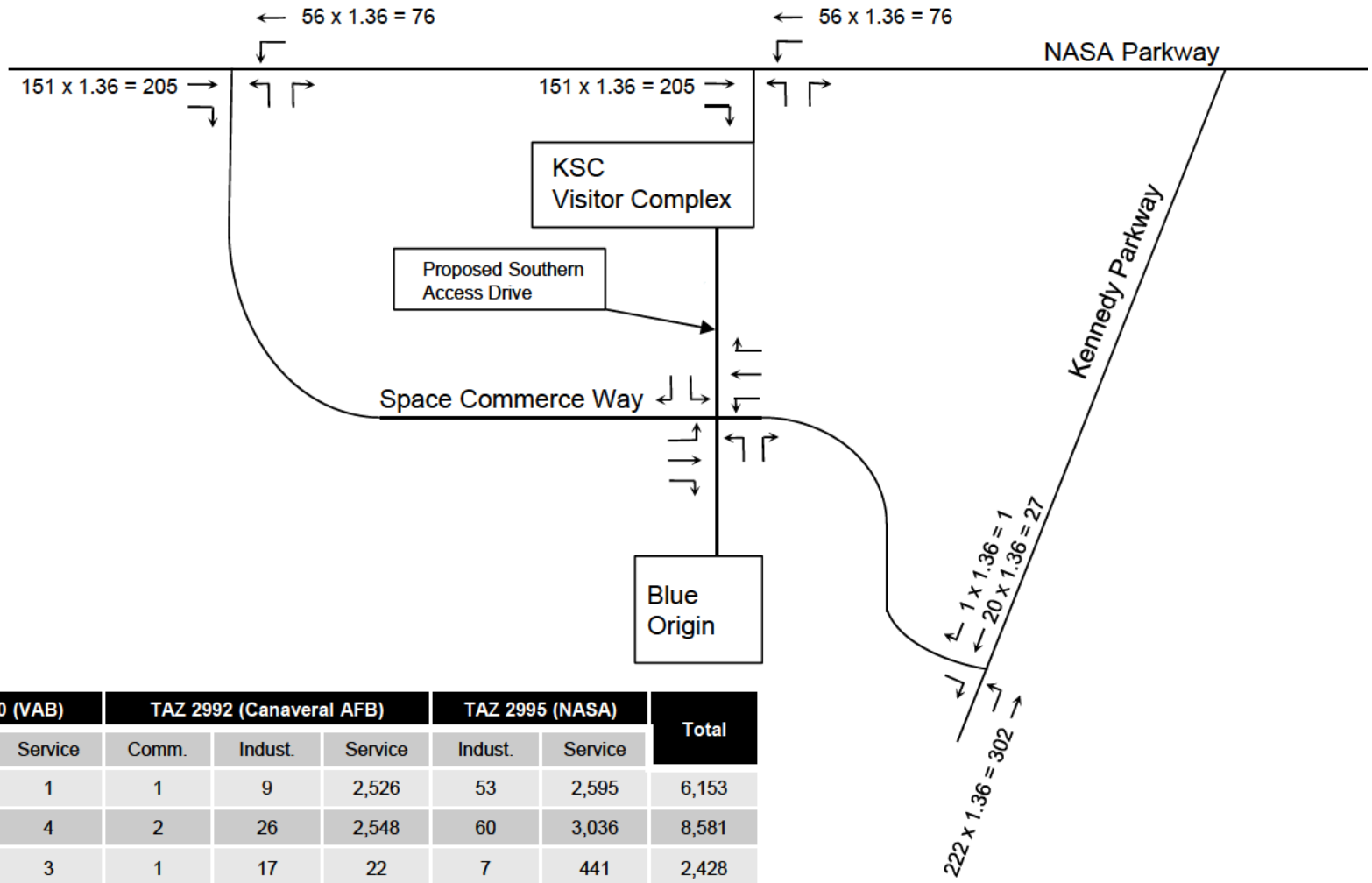

Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)			TAZ 2995 (NASA)		Total
	Indust.	Service	Comm.	Indust.	Service	Indust.	Service	
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):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

KSC VIC Proposed Southern Entrance at Space Commerce Way

N

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A.M. 2035 NASA Background Traffic

Project No.:4324.03

Figure: 10

LTG Engineering & Planning

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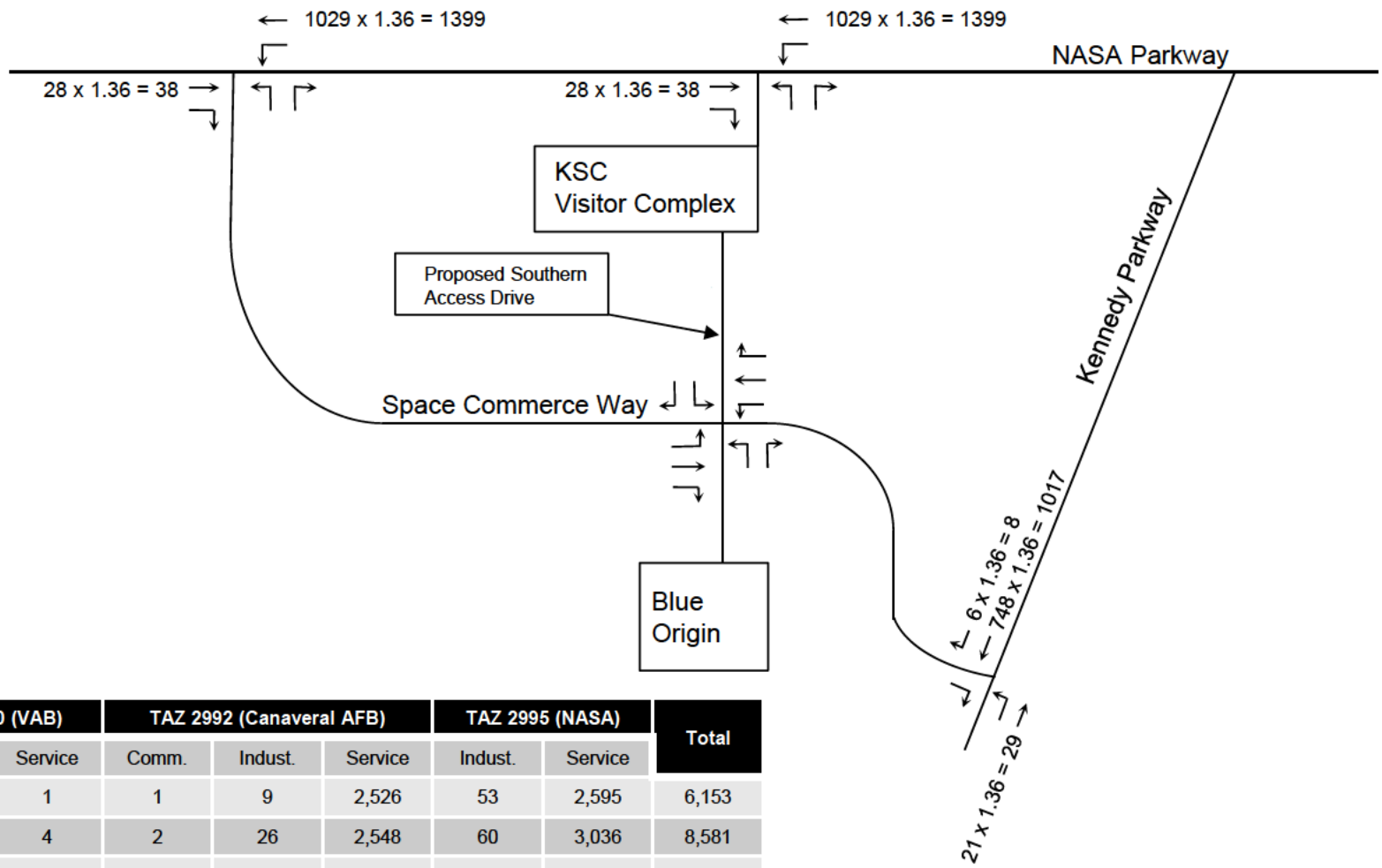

Year	TAZ 2990 (VAB)		TAZ 2992 (Canaveral AFB)			TAZ 2995 (NASA)		Total
	Indust.	Service	Comm.	Indust.	Service	Indust.	Service	
2020	968	1	1	9	2,526	53	2,595	6,153
2040	2,905	4	2	26	2,548	60	3,036	8,581
Vol. Δ	1,937	3	1	17	22	7	441	2,428
Calculated Annualized Growth Rate (*Use minimum of 2% if < 2%):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

KSC VIC Proposed Southern Entrance at Space Commerce Way

N

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P.M. 2035 NASA Background Traffic

Project No.:4324.03

Figure: 11

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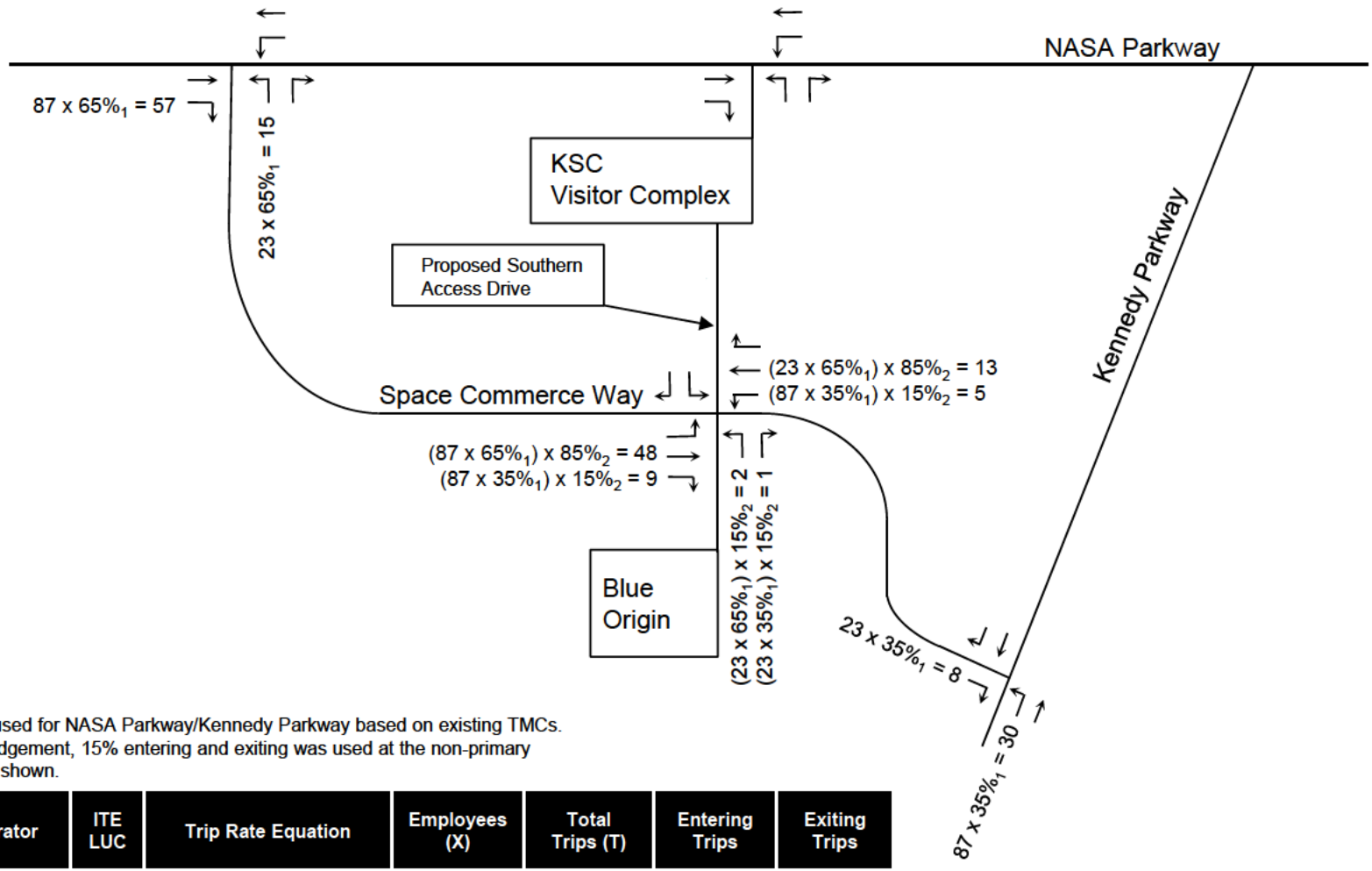

Notes:
1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

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

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A.M. 2018 Blue Origin Traffic

Project No.:4324.03

Figure: 12

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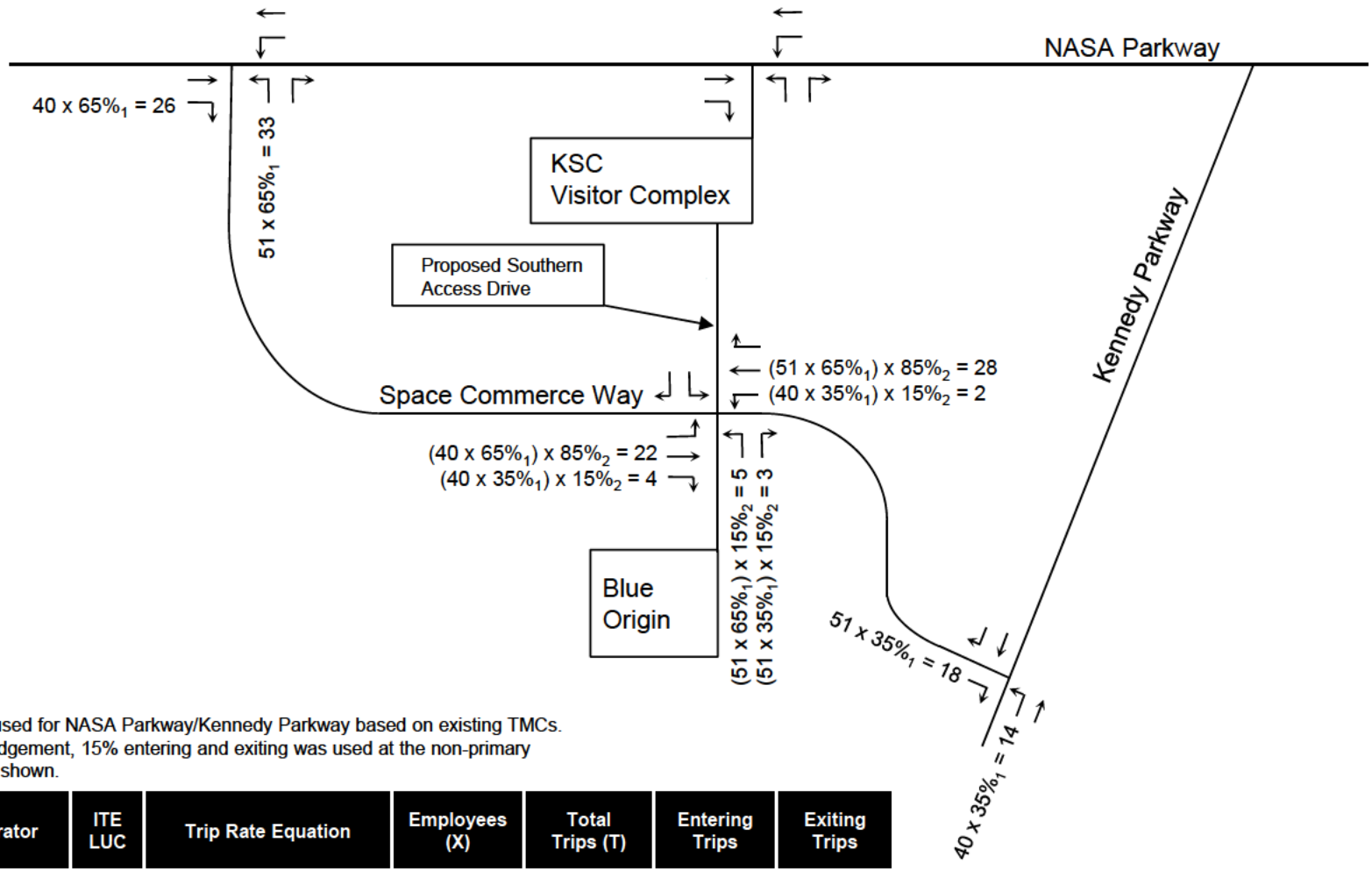

Notes:
1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

Time Period	Generator	ITE LUC	Trip Rate Equation	Employees (X)	Total Trips (T)	Entering Trips	Exiting Trips
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

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P.M. 2018 Blue Origin Traffic

Project No.:4324.03

Figure: 13

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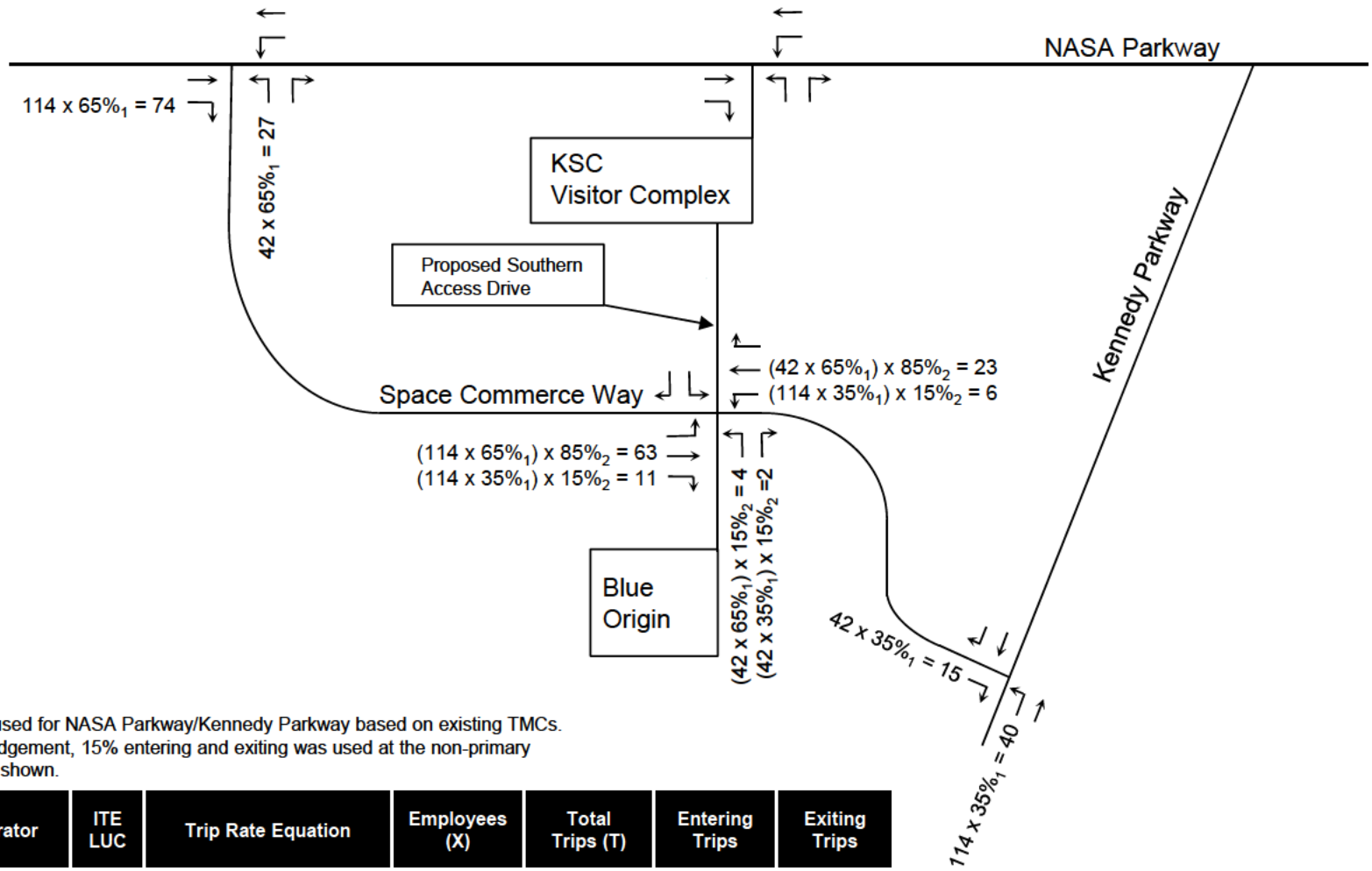

Notes:
1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

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	350	156	114	42

KSC VIC Proposed Southern Entrance at Space Commerce Way

N
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A.M. 2035 Blue Origin Traffic

Project No.:4324.03

Figure: 14

LTG Engineering & Planning
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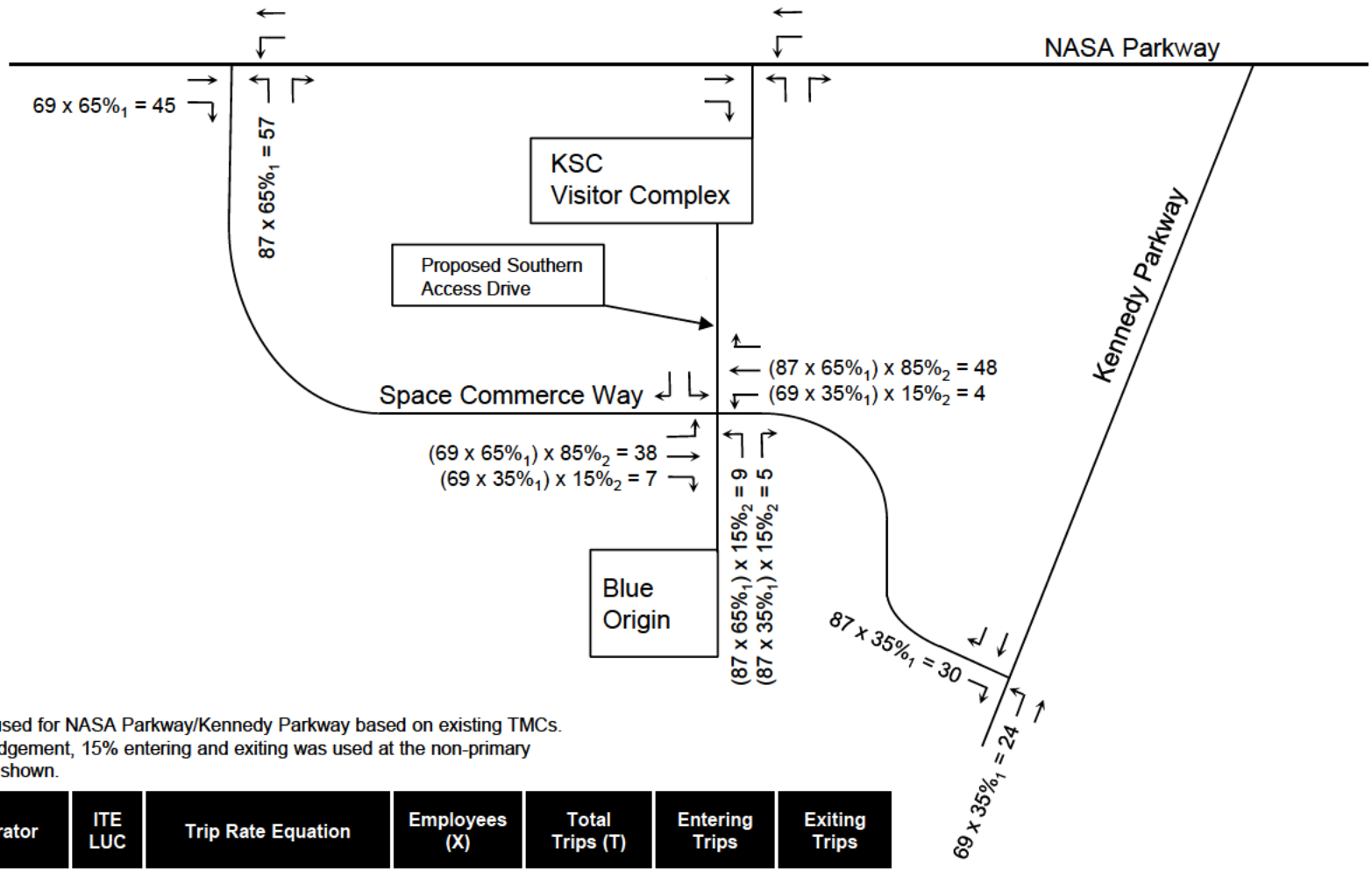

Notes:
1: A 65/35 split was used for NASA Parkway/Kennedy Parkway based on existing TMCs.
2: Per engineering judgement, 15% entering and exiting was used at the non-primary Blue Origin driveway shown.

Time Period	Generator	ITE LUC	Trip Rate Equation	Employees (X)	Total Trips (T)	Entering Trips	Exiting Trips
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

N
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P.M. 2035 Blue Origin Traffic

Project No.:4324.03

Figure: 15

LTG Engineering & Planning
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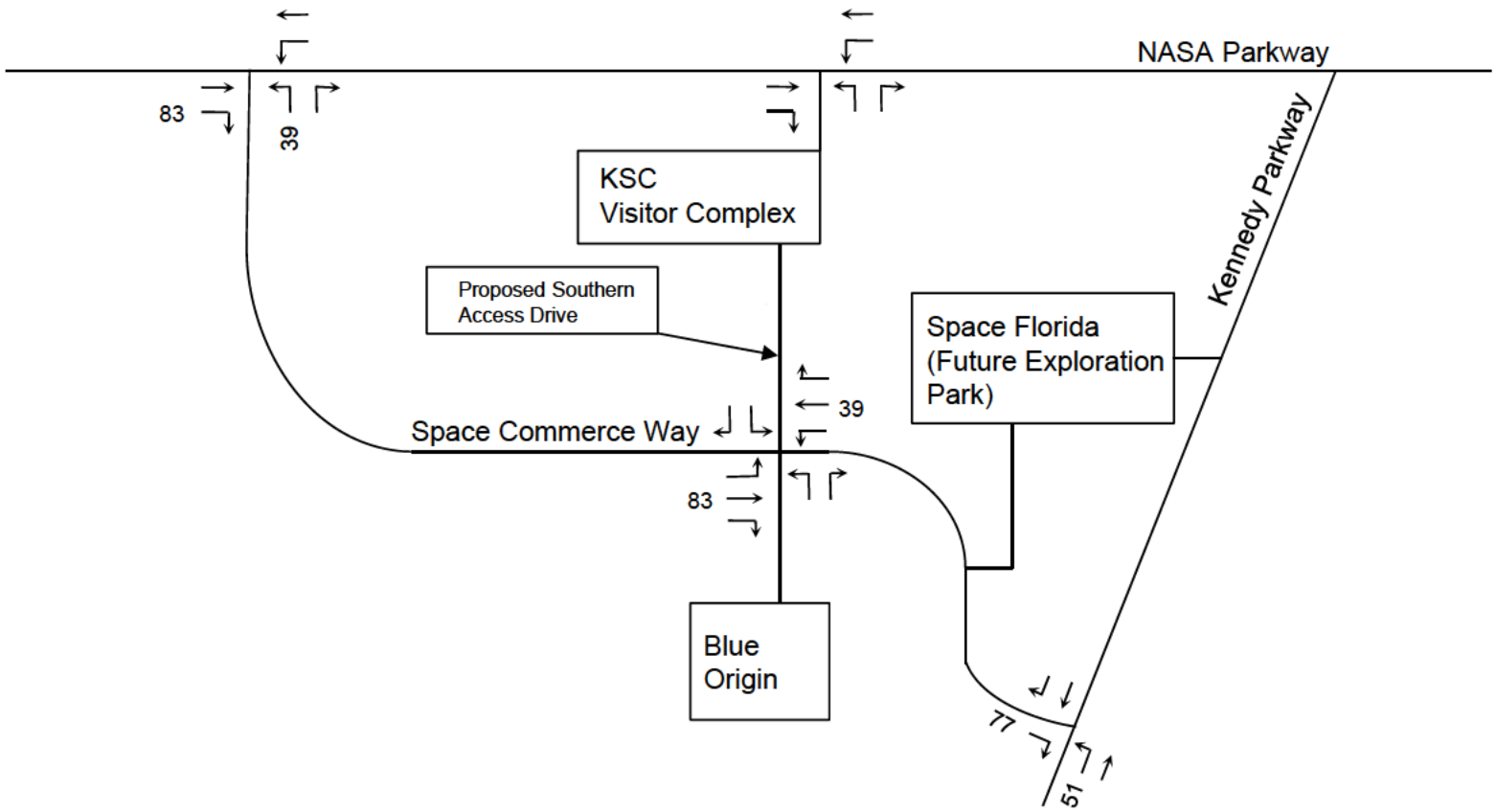
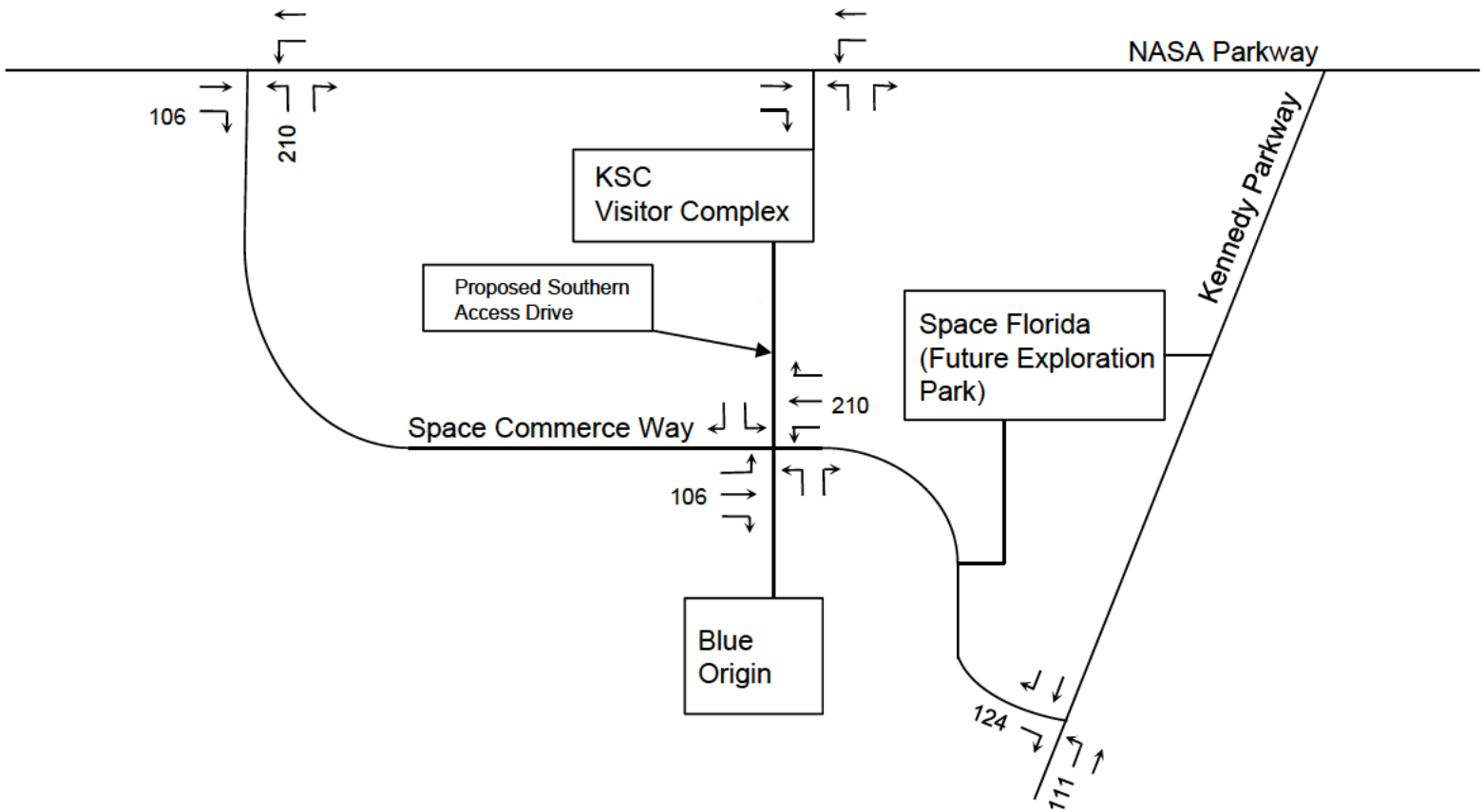


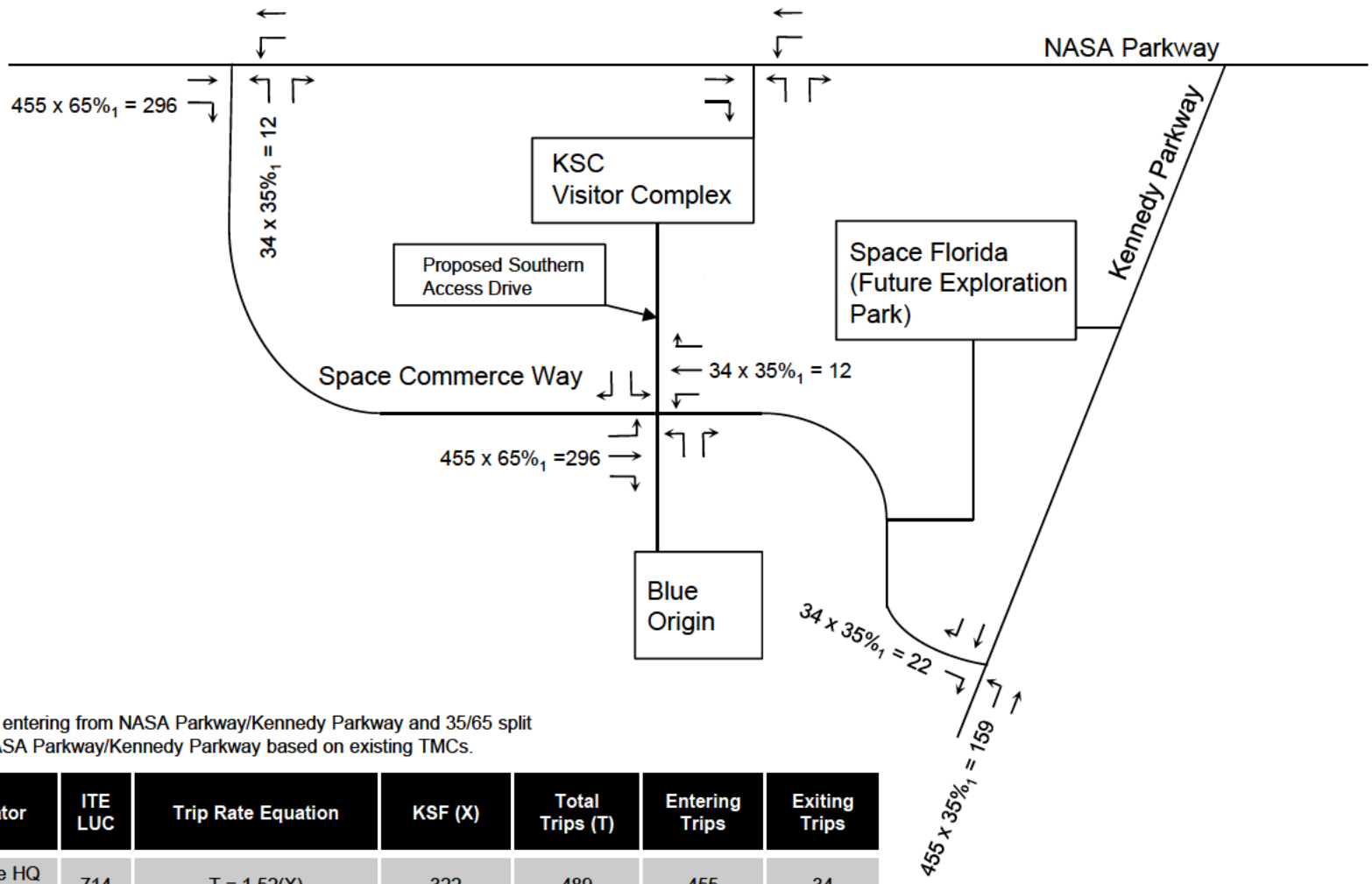
Notes:
2018 growth rate/trip generation not applied to existing Space Commerce Way traffic due to Space Florida/Exploration Park build-out not complete until after 2018.

KSC VIC Proposed Southern Entrance at Space Commerce Way	N NTS	**A.M. 2018 Space Florida/Exploration Park Traffic**	LTG Engineering & Planning
		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	N NTS	**P.M. 2018 Space Florida/Exploration Park Traffic**		LTG Engineering & Planning
		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

N
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A.M. 2035 Space Florida/Exploration Park Traffic

Project No.:4324.03

Figure: 18

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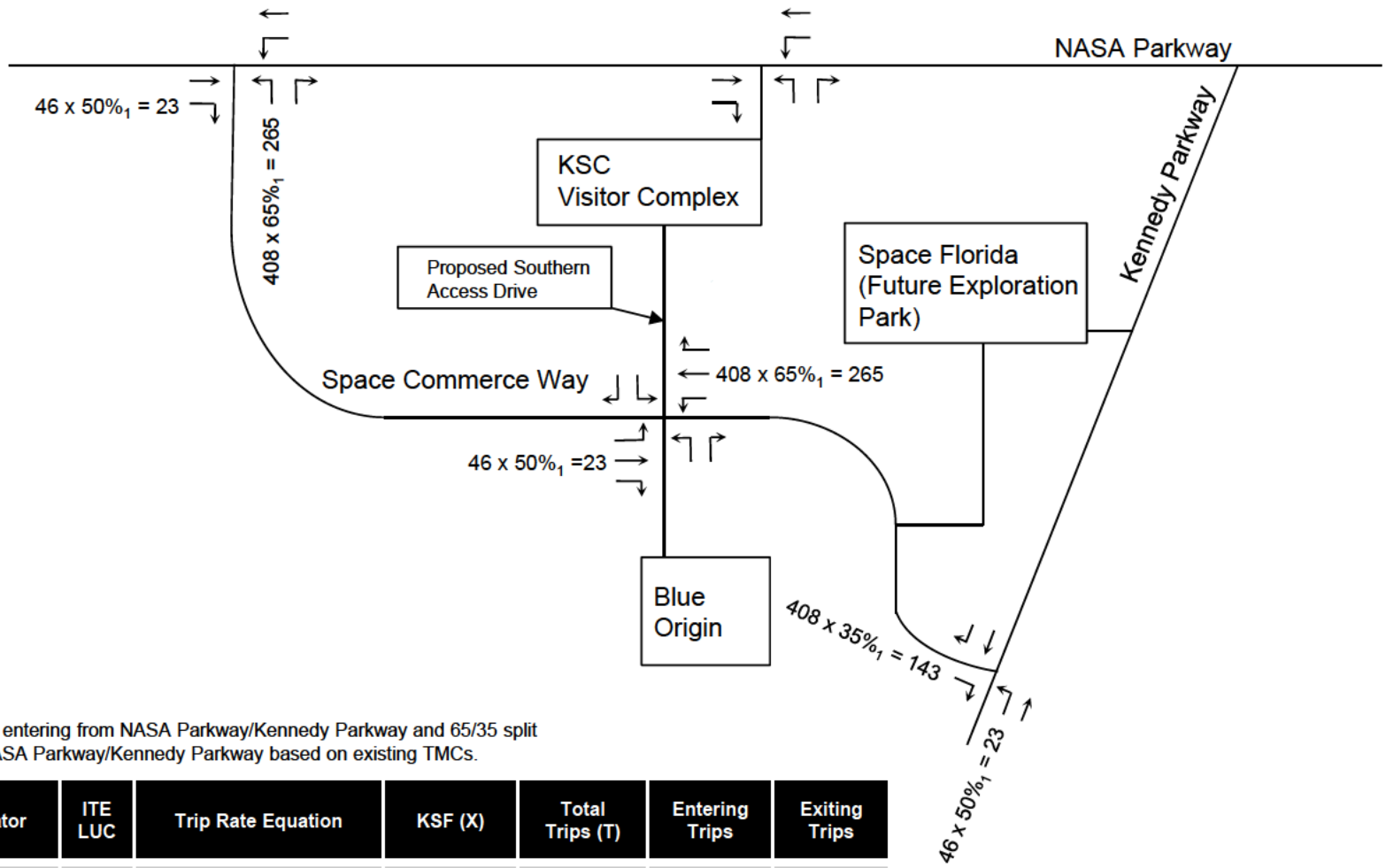

Notes:
1: 50/50 split used for entering from NASA Parkway/Kennedy Parkway and 65/35 split used for exiting on NASA Parkway/Kennedy Parkway based on existing TMCs.

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

N

NTS

P.M. 2035 Space Florida/Exploration Park Traffic

Project No.:4324.03

Figure: 19

LTG Engineering & Planning

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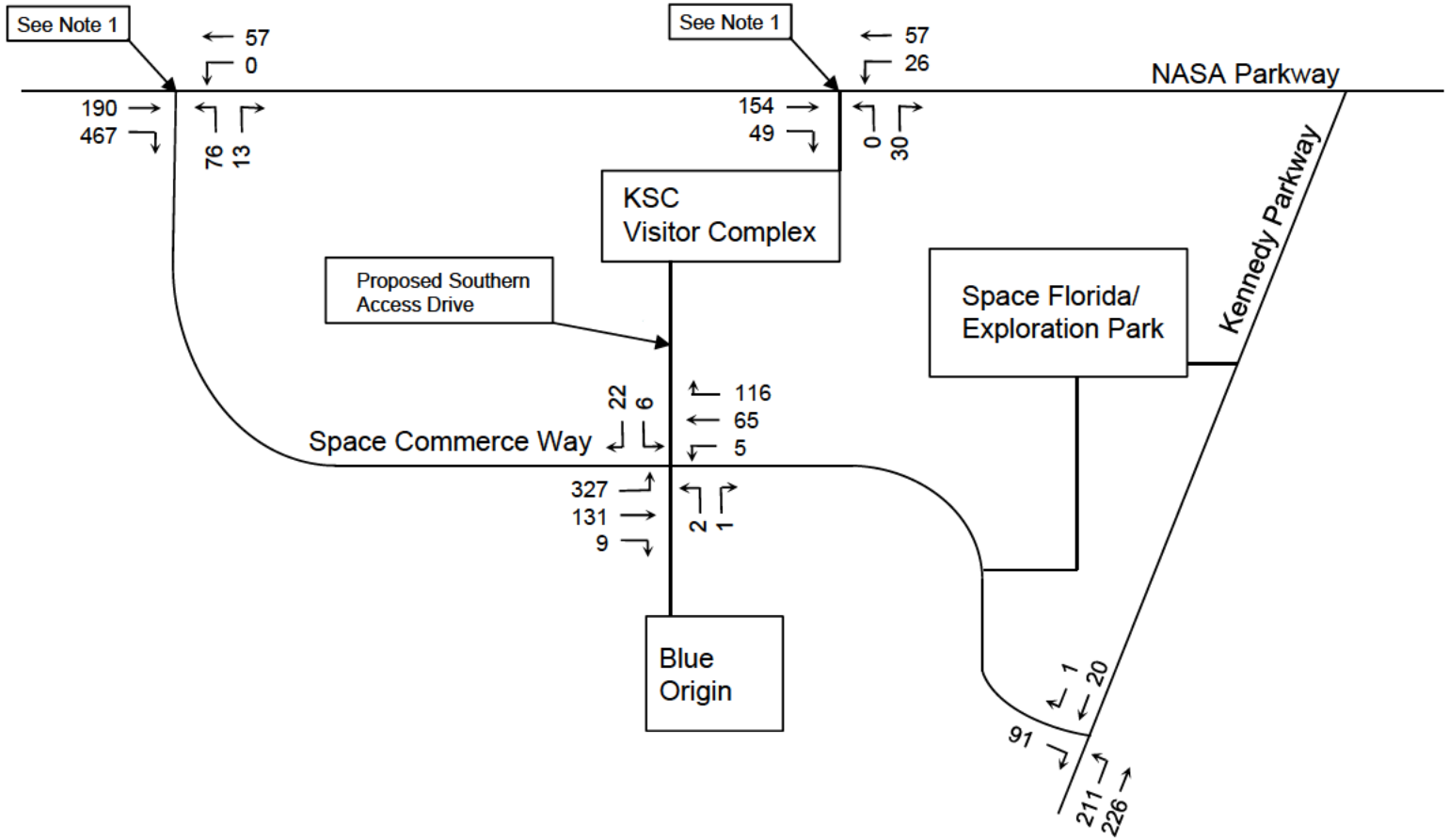
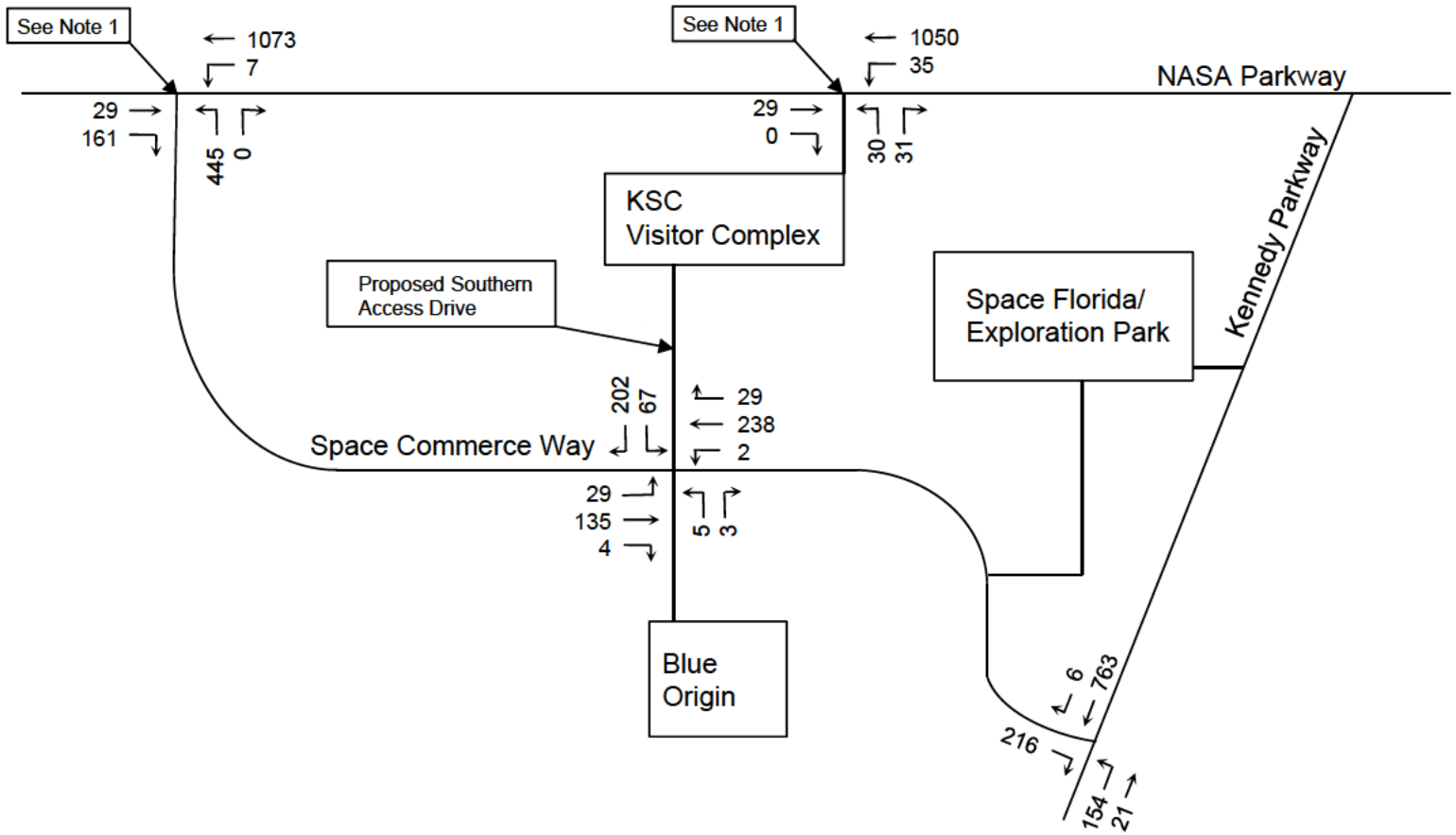


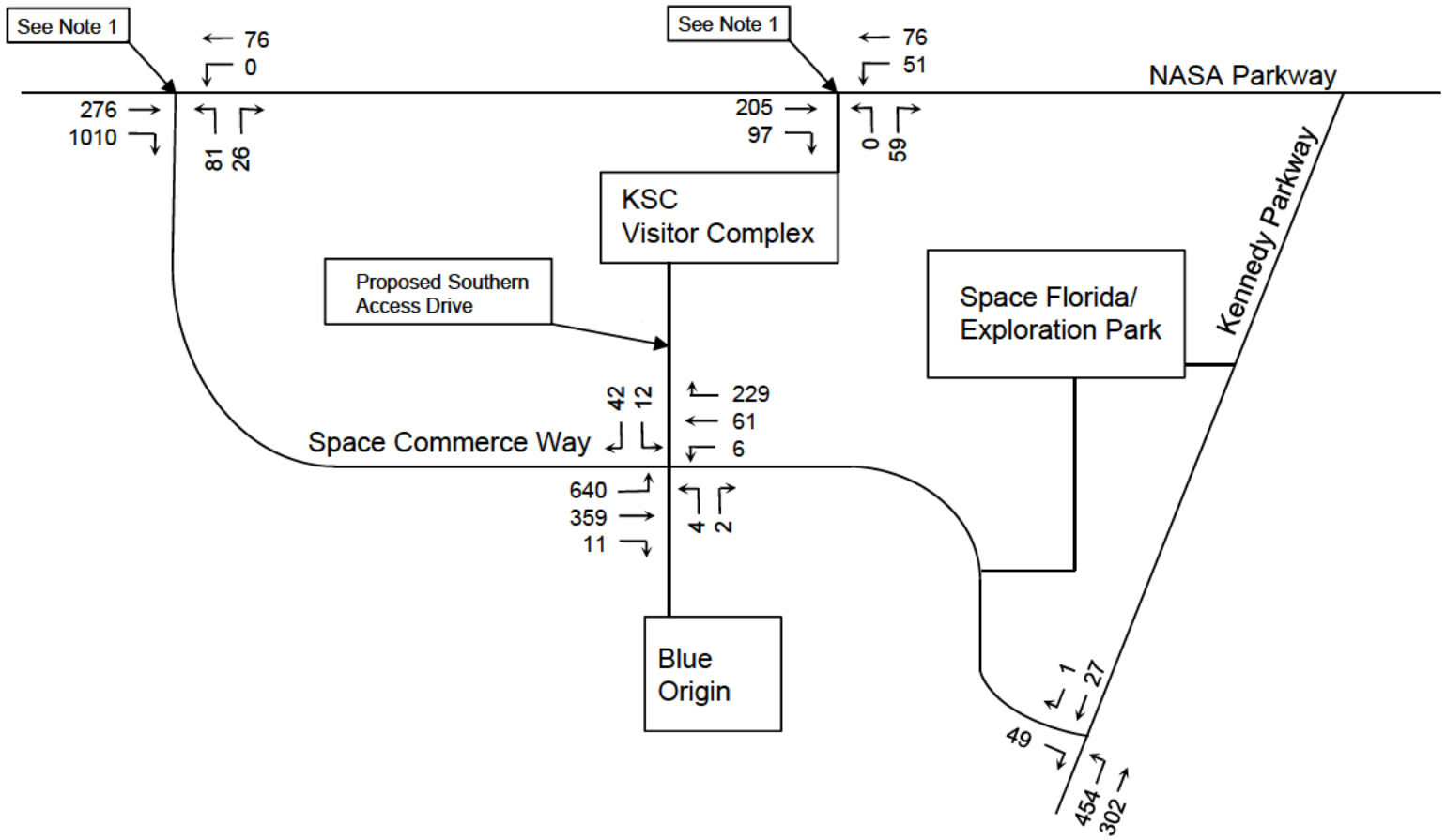
Notes:
1: Existing traffic delineators in westbound approach anticipated to be removed for Blue Origin payload vehicle path; continuous westbound through movement removed.

KSC VIC Proposed Southern Entrance at Space Commerce Way	N NTS	**2018 A.M. Peak Hour Traffic**	LTG Engineering & Planning
		Project No.:4324.03 / Figure: 20	1970 Dairy Road, West Melbourne, Florida 32904 Telephone: 321.499.4679 Fax: 321.499.4680 EB# 0009227



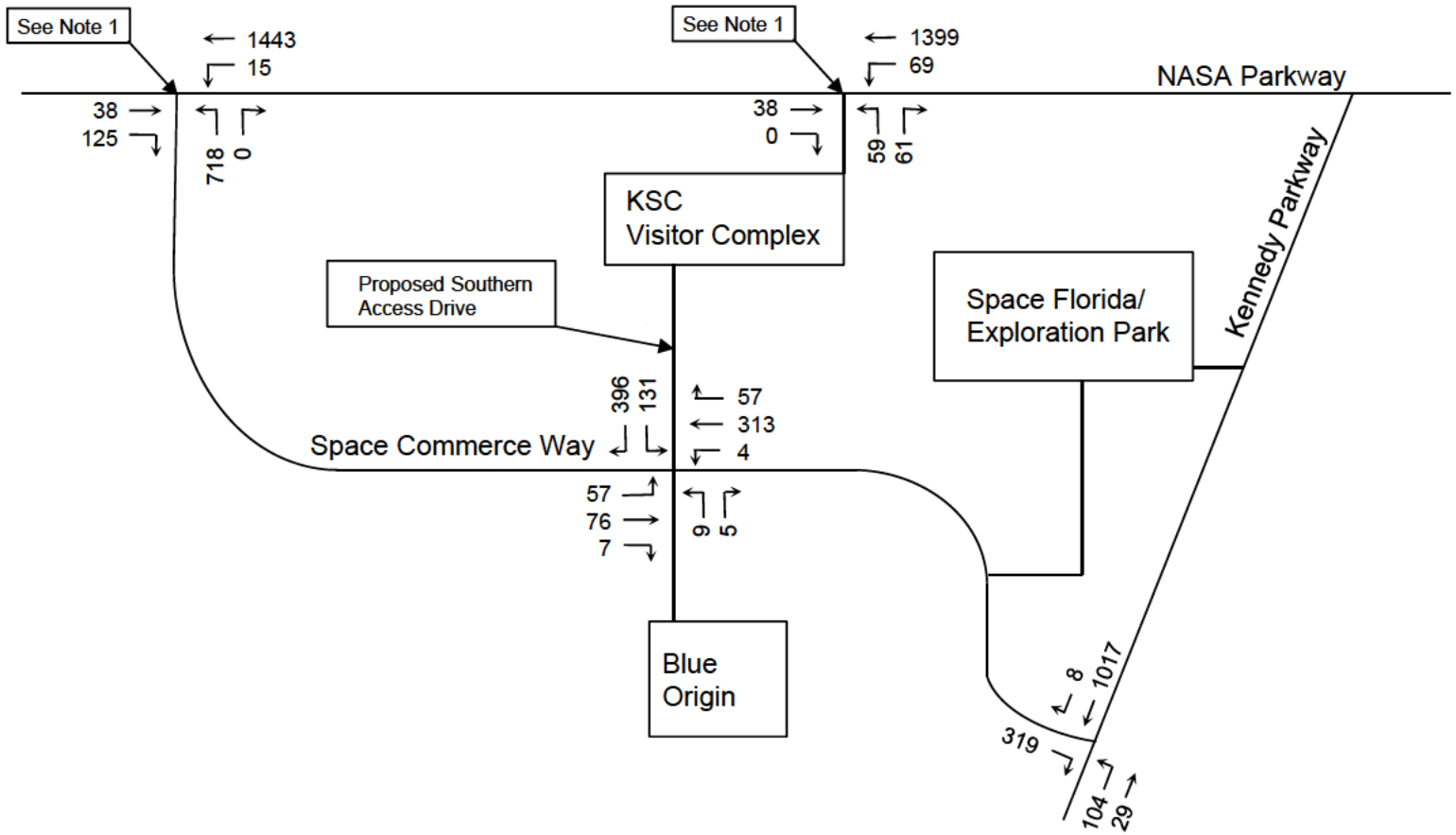
Notes:
1: Existing traffic delineators in westbound approach anticipated to be removed for Blue Origin payload vehicle path; continuous westbound through movement removed.

KSC VIC Proposed Southern Entrance at Space Commerce Way	N NTS	**2018 P.M. Peak Hour Traffic**	LTG Engineering & Planning
		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	N NTS	**2035 A.M. Peak Hour Traffic**	LTG Engineering & Planning
		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	N NTS	**2035 P.M. Peak Hour Traffic**	LTG Engineering & Planning
		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

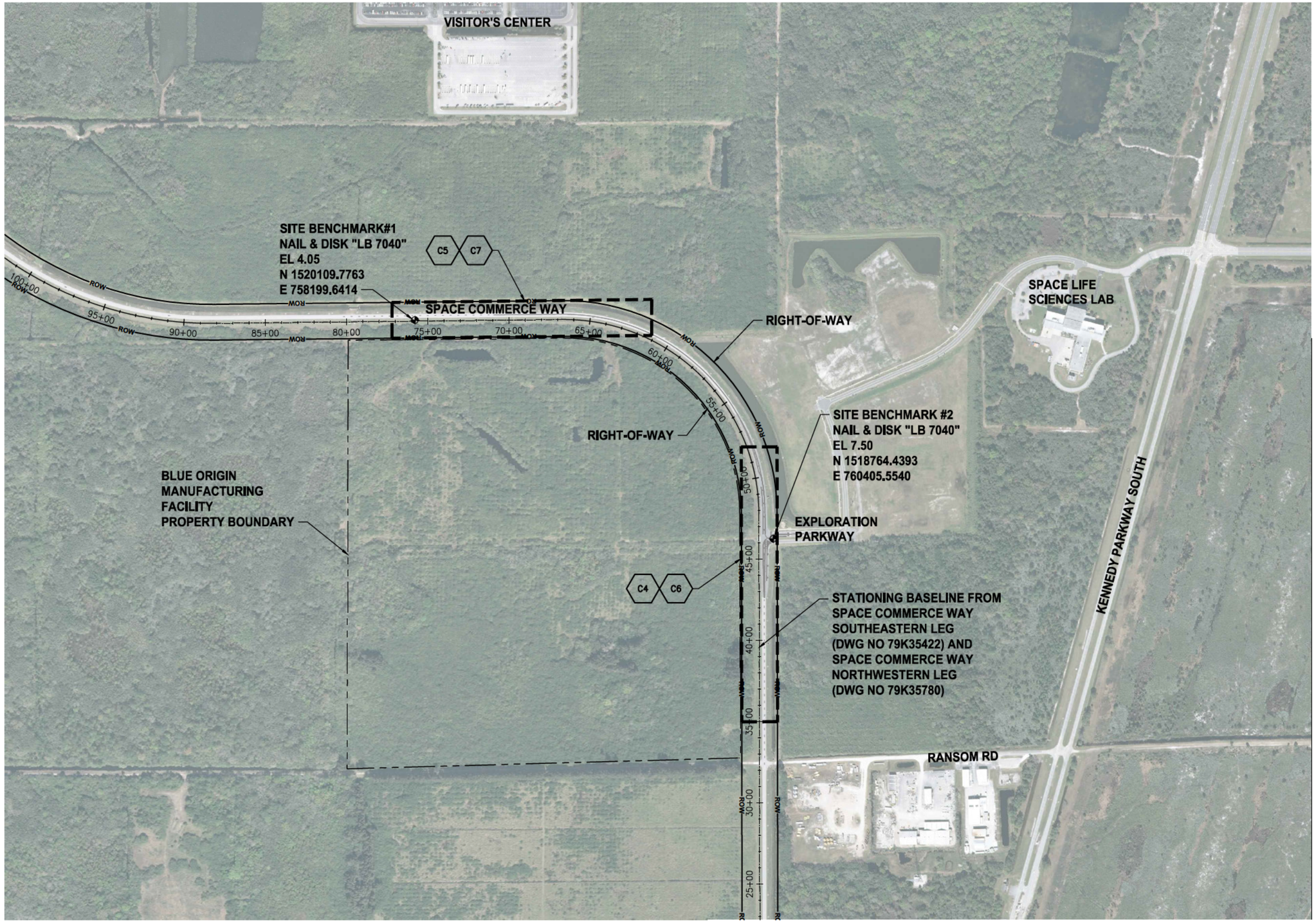
- Under 2035 conditions, the study area roadway segment analyzed, Space Commerce Way from NASA Parkway to Kennedy Parkway is anticipated to operate within an acceptable LOS.

APPENDICES

APPENDIX A

Preliminary Site/Roadway Concept Plan

PLOTTED: 6/23/2016 12:38 PM BUCK GOLDEN



N

GRAPHIC SCALE
0 150 300 600
SCALE IN FEET
1" = 300'

SAVED: 3/1/2016 12:35 PM KPEREZ \\TITUSMDI01\DRAFTING\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

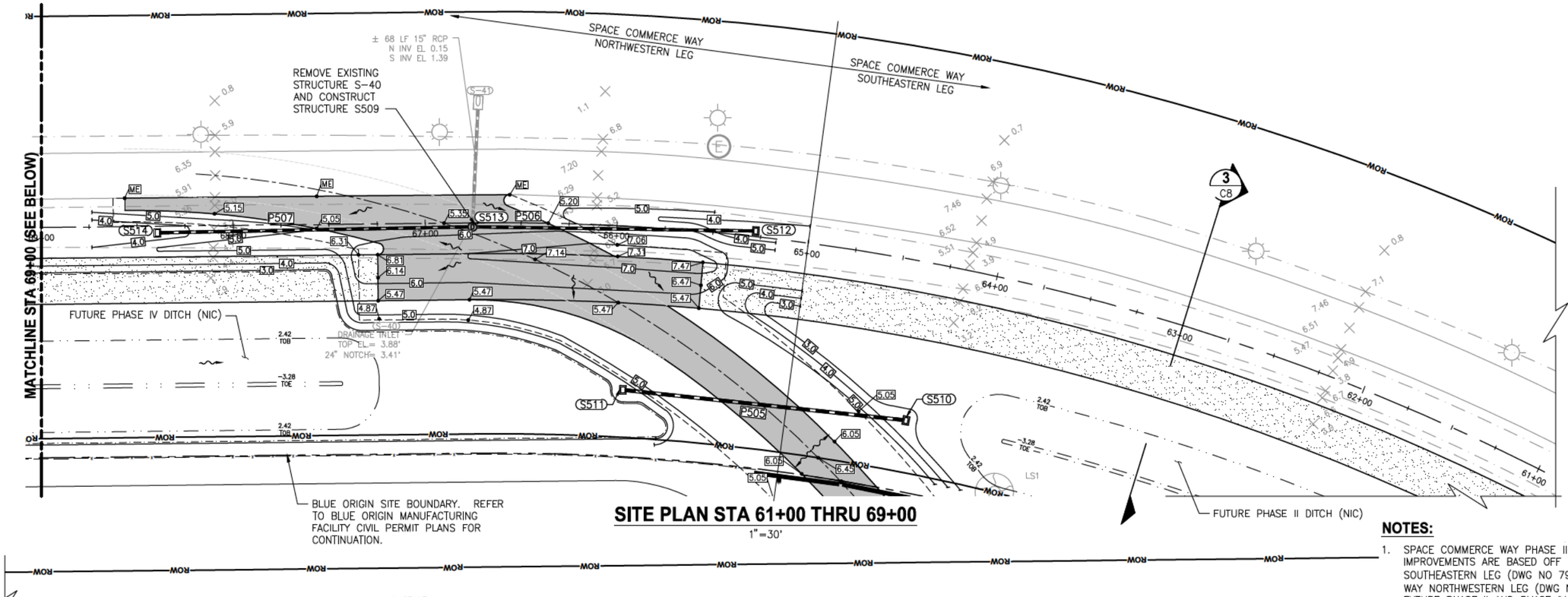
BLUE ORIGIN FLORIDA, LLC
BLUE ORIGIN MANUFACTURING FACILITY
MODIFICATIONS TO SPACE COMMERCE WAY
FOR DRIVEWAY CONNECTIONS
BREVARD COUNTY, FLORIDA

KEY MAP

CERTIFICATE OF AUTHORIZATION #1841
APPROVED BY
RICHARD N. KOLLER
P.E. # 49947

DATE: MAR 2016
SCALE: 1" = 300'
PROJECT NO.: 08100-004-01
DWG. NO.: G3

PLOTTED: 6/23/2016 12:34 PM BUCK GOLDEN

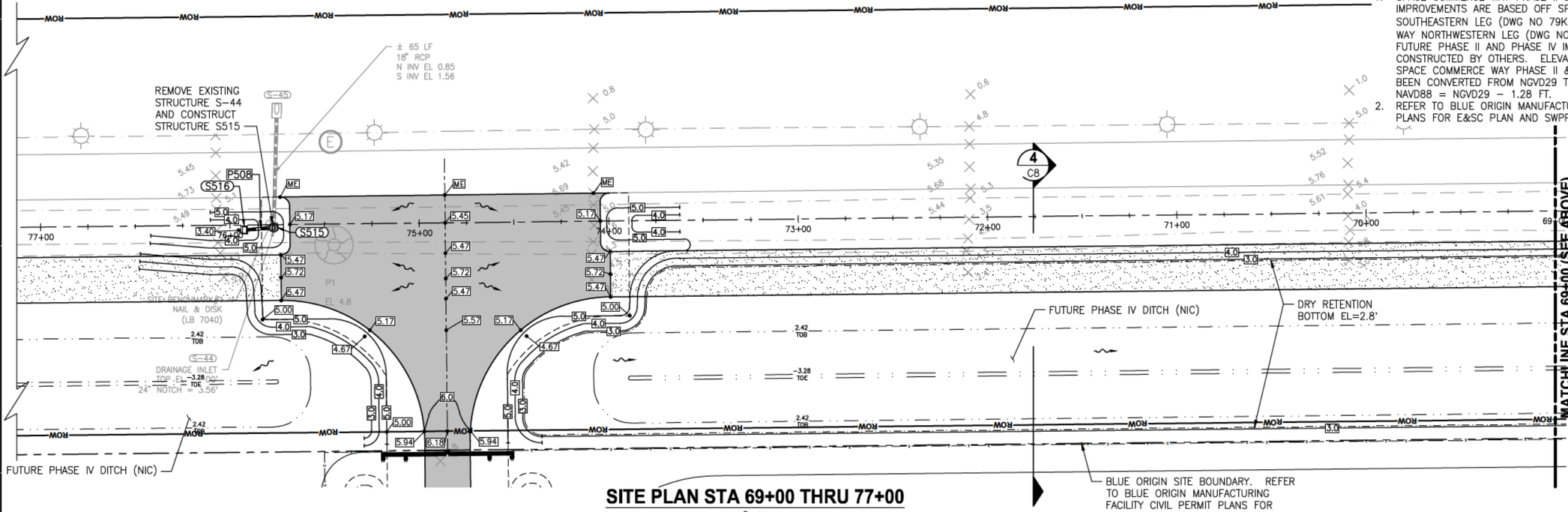


SITE PLAN STA 61+00 THRU 69+00

1"=30'

NOTES:

1. 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.
2. REFER TO BLUE ORIGIN MANUFACTURING FACILITY CIVIL PERMIT PLANS FOR E&SC PLAN AND SWPPP NOTES.



SITE PLAN STA 69+00 THRU 77+00

1"=30'

GRAPHIC SCALE
0 15 30 60
SCALE IN FEET
1"=30'

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

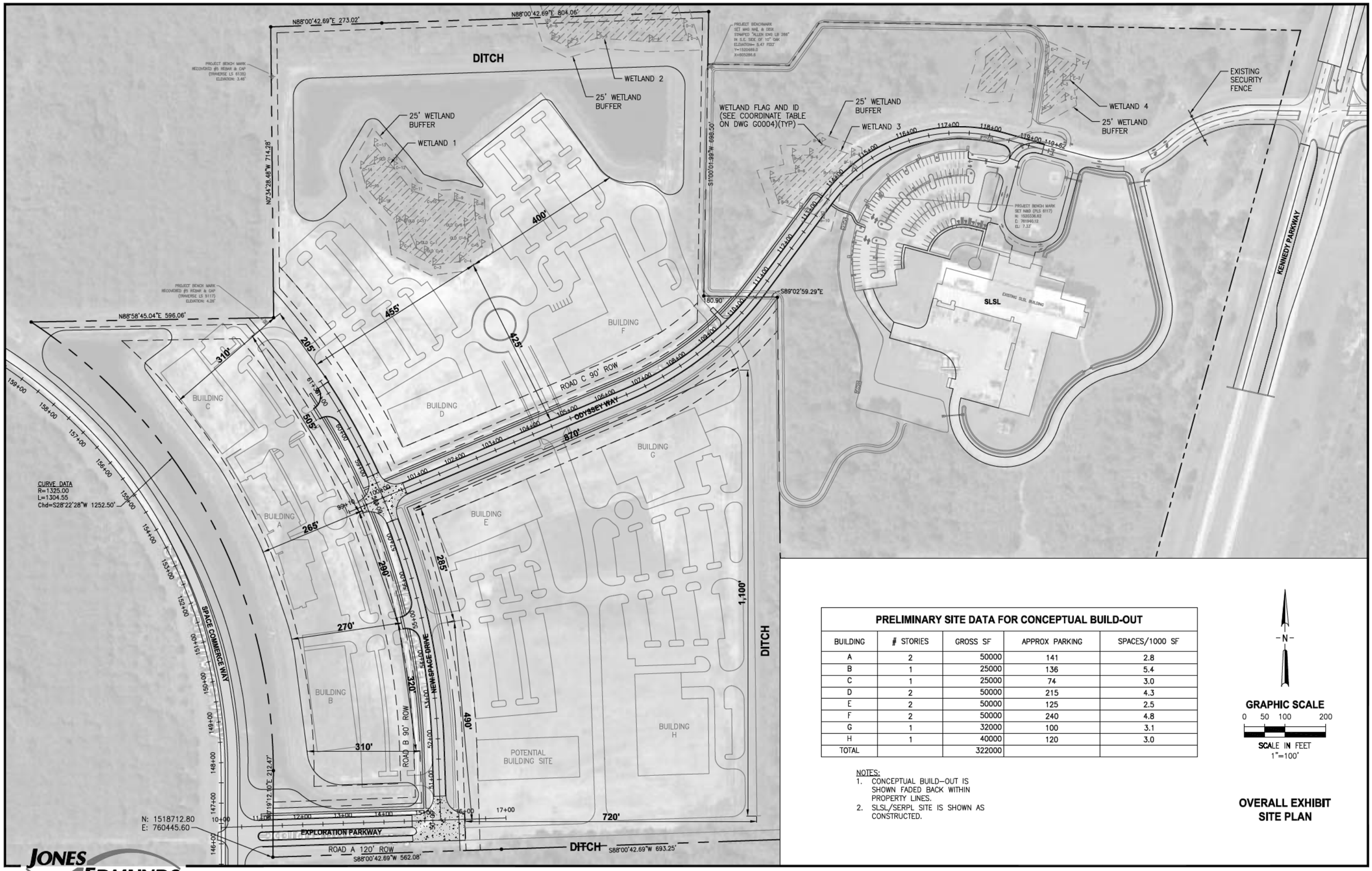
BLUE ORIGIN FLORIDA, LLC
BLUE ORIGIN MANUFACTURING FACILITY
MODIFICATIONS TO SPACE COMMERCE WAY
FOR DRIVEWAY CONNECTIONS
BREVARD COUNTY, FLORIDA

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

CERTIFICATE OF AUTHORIZATION #1841
APPROVED BY
RICHARD N. KOLLER
P.E. # 49947

DATE: MAR 2016
PROJECT NO.: 08100-004-01
SCALE: 1"=30'
DWG. NO.: C7

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



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

N

GRAPHIC SCALE
0 50 100 200
SCALE IN FEET
1"=100'

OVERALL EXHIBIT SITE PLAN

JONES EDMUNDS

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	

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	

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

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

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	

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

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

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	

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	

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

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

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	

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

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

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	

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	

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	

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

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

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	

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

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

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	

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	

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	

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		

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

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

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	

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

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

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	

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

	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

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SPACE COMMERCE WAY AT NASA PKWY
BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
Site Code : 00000002
Start Date : 08/10/2017

Groups Printed- Automobiles - Commercial

	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	

	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	

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SPACE COMMERCE WAY AT NASA PKWY
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File Name : Nasa at Commerce
Site Code : 00000002
Start Date : 08/10/2017
Page No : 3

	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	

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File Name : Nasa at Commerce
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Groups Printed- Commercial

	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

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SPACE COMMERCE WAY AT NASA PKWY
BREVARD COUNTY, FLORIDA

File Name : Nasa at Commerce
Site Code : 00000002
Start Date : 08/10/2017

Groups Printed- Commercial

	N/A Southbound				Nasa Pkwy Westbound				Space Commerce Way Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	

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BREVARD COUNTY, FLORIDA

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

Groups Printed- Automobiles - Commercial

	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

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VISITOR CENTER COMPLEX AT NASA PKWY
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File Name : Nasa at Visitor
Site Code : 00000005
Start Date : 08/10/2017

Groups Printed- Automobiles - Commercial

	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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
Apprch %	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	

	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	

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BREVARD COUNTY, FLORIDA

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

	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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.					04:00 PM				04:00 PM				04:30 PM				
Volume	0	0	0	0	7	293	0	300	93	0	8	101	0	7	15	22	
Peak Factor								0.889				0.795				0.852	

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File Name : Nasa at Visitor
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Groups Printed- Commercial

	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

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BREVARD COUNTY, FLORIDA

File Name : Nasa at Visitor
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Start Date : 08/10/2017

Groups Printed- Commercial

	N/A Southbound				Nasa Pkwy Westbound				Visitor Center Complex Northbound				Nasa Pkwy Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

	N/A Southbound				Space Commerce Way Westbound				Proposed Drwy Northbound				Space Commerce Way Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

	N/A Southbound				Space Commerce Way Westbound				Proposed Drwy Northbound				Space Commerce Way Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

Groups Printed- Commercial

	N/A Southbound				Space Commerce Way Westbound				Proposed Drwy Northbound				Space Commerce Way Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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
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SPACE COMMERCE WAY AT KENNEDY PKWY
BREVARD COUNTY, FLORIDA

File Name : Kennedy at Commerce
Site Code : 00000004
Start Date : 08/10/2017

Groups Printed- Automobiles - Commercial

	Kennedy Pkwy Southbound				N/A Westbound				Kennedy Pkwy Northbound				Space Commerce Way Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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
Apprch %	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

	Kennedy Pkwy Southbound				N/A Westbound				Kennedy Pkwy Northbound				Space Commerce Way Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

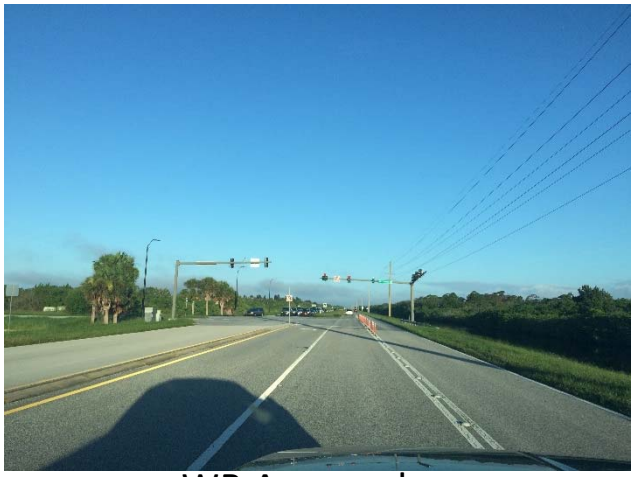
File Name : Kennedy at Commerce
Site Code : 00000004
Start Date : 08/10/2017

Groups Printed- Commercial

	Kennedy Pkwy Southbound				N/A Westbound				Kennedy Pkwy Northbound				Space Commerce Way Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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
Apprch %	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

de traffic	Space Commerce Way At NASA Pkwy	Brevard County
	www.de-traffic.com 299 McGregor Rd. DeLand Fl. 32720	Project Number: L17-041 / Sheet Number: 1

NB Approach

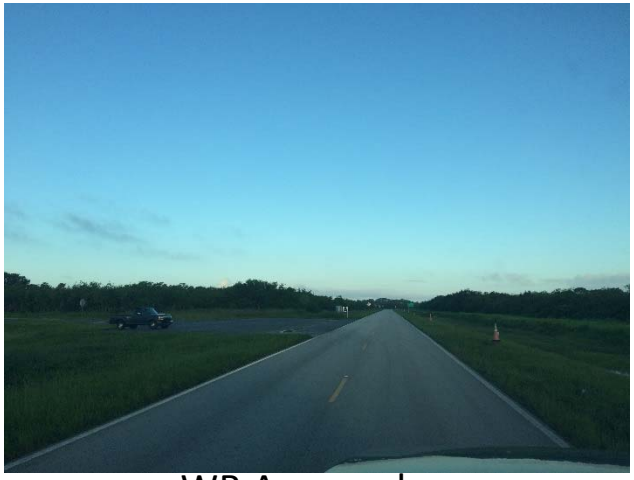
EB Approach

WB Approach

de traffic	Space Commerce Way At Visitor Center Complex	Brevard County	
	www.de-traffic.com	Project Number: L17-041	Sheet Number: 2
	299 McGregor Rd. DeLand Fl. 32720		

NB Approach

EB Approach



WB Approach

de traffic	Space Commerce Way At Proposed Southern Entrance	Brevard County	
	www.de-traffic.com	Project Number: L17-041	Sheet Number: 3
	299 McGregor Rd. DeLand Fl. 32720		

NB Approach

SB Approach

EB Approach

de traffic	Space Commerce Way At Kennedy Pkwy	Brevard County	
	www.de-traffic.com	Project Number: L17-041	Sheet Number: 4
	299 McGregor Rd. DeLand Fl. 32720		

APPENDIX C

Unsignalized Intersection HCS Worksheets – Existing Conditions

HCS7 Two-Way Stop-Control Report

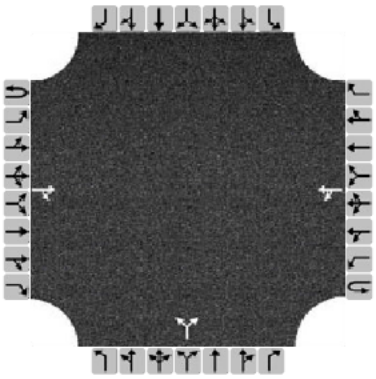
General Information

Analyst	SD
Agency/Co.	LTG
Date Performed	8/8/2017
Analysis Year	2017
Time Analyzed	Existing AM Pk-Hr
Intersection Orientation	East-West
Project Description	4324.03 KSC Space Commerce Way

Site Information

Intersection	Space Commerce at Entranc
Jurisdiction	NASA
East/West Street	Space Commerce Way
North/South Street	Proposed S Entrance
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
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

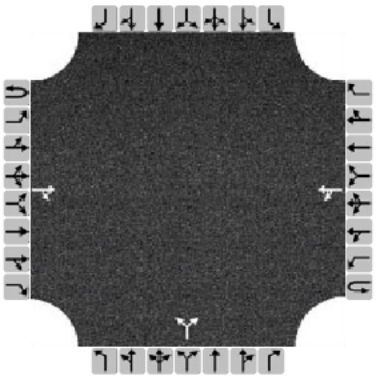
General Information

Analyst	SD
Agency/Co.	LTG
Date Performed	8/8/2017
Analysis Year	2017
Time Analyzed	Existing PM Pk-Hr
Intersection Orientation	East-West
Project Description	4324.03 KSC Space Commerce Way

Site Information

Intersection	Space Commerce at Entranc
Jurisdiction	NASA
East/West Street	Space Commerce Way
North/South Street	Proposed S Entrance
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
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

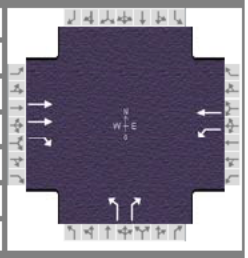
Flow Rate, v (veh/h)						2					29					
Capacity, c (veh/h)						1364					681					
v/c Ratio						0.00					0.04					
95% Queue Length, Q_{95} (veh)						0.0					0.1					
Control Delay (s/veh)						7.6					10.5					
Level of Service, LOS						A					B					
Approach Delay (s/veh)						0.1					10.5					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

APPENDIX D

Signalized Intersection HCS Worksheets – Existing Conditions

HCS7 Signalized Intersection Results Summary

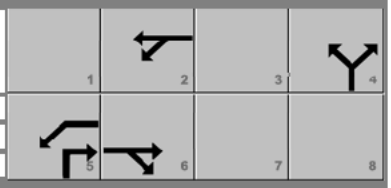
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	Existing AM Pk-Hr	PHF	0.85
Urban Street	NASA Pkwy	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Commer…	File Name	1. Nasa 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						



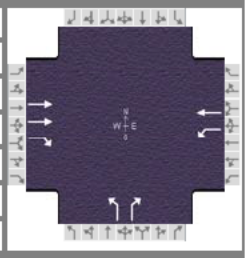
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.5	4.6	30.1		10.3		
Change Period, (*Y+R c*), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.4	2.9	3.4		3.1		
Queue Clearance Time (*g s*), s		6.1	2.2	2.0		5.6		
Green 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

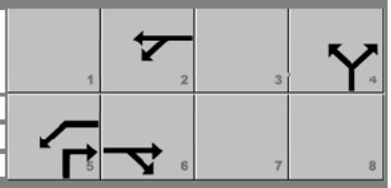
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	Existing PM Pk-Hr	PHF	0.89
Urban Street	NASA Pkwy	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Commer…	File Name	1. Nasa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



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

Signal Information			
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						



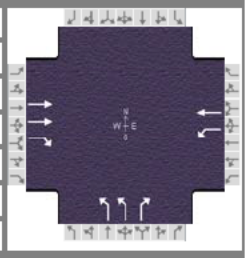
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.5	6.7	32.2		13.3		
Change Period, ($Y+R_c$), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.5	2.9	3.5		3.0		
Queue Clearance Time (g_s), s		4.1	3.1	2.3		8.1		
Green Extension 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		
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		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

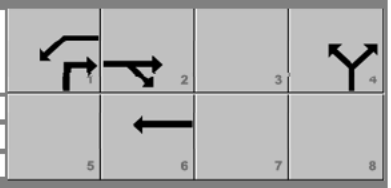
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	Existing AM Pk-Hr	PHF	0.95
Urban Street	NASA Pkwy	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Visitor C…	File Name	2.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



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

Signal Information			
Cycle, s	40.8	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	1.3	21.0	2.9	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						



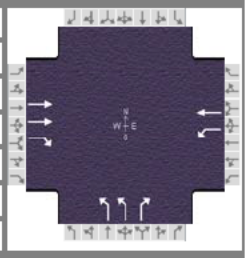
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		26.5	6.3	32.8		7.9		
Change Period, (*Y+R c*), s		5.5	5.0	5.5		5.0		
Max Allow Headway (*MAH*), s		7.1	5.9	0.0		3.1		
Queue Clearance Time (*g s*), s		11.2	2.6			3.1		
Green Extension 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		
Approach Movement	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		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

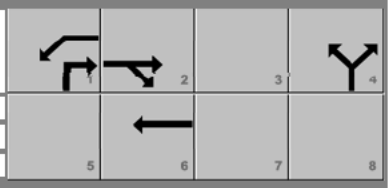
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	Existing PM Pk-Hr	PHF	0.87
Urban Street	NASA Pkwy	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Visitor C…	File Name	2.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



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.5	10.5	5.8	0.0	0.0	0.0						
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						



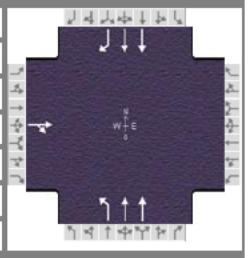
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		15.5	6.5	22.0		10.8		
Change Period, (*Y+R c*), s		5.5	5.0	5.5		5.0		
Max Allow Headway (*MAH*), s		7.1	5.9	0.0		3.0		
Queue Clearance Time (*g s*), s		3.0	3.4			4.9		
Green Extension 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		
Approach Movement	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		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

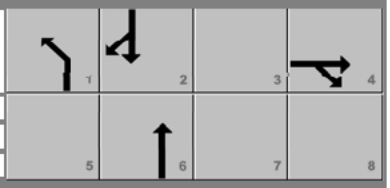
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	Existing AM Pk-Hr	PHF	0.83
Urban Street	Kennedy Pkwy	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	Space Commerce Way…	File Name	3.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



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.9	19.5	3.5	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	



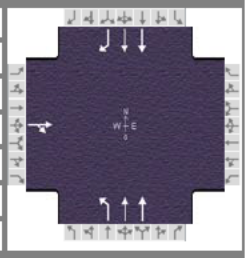
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		8.5			10.9	35.9		25.0
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (*MAH*), s		3.2			2.9	2.9		2.9
Queue Clearance Time (g_s), s		4.8			7.1	3.1		2.2
Green Extension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

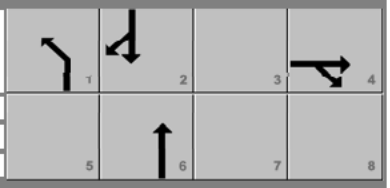
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	Existing PM Pk-Hr	PHF	0.77
Urban Street	Kennedy Pkwy	Analysis Year	2017	Analysis Period	1> 7:00
Intersection	Space Commerce Way…	File Name	3. 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
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.1	20.0	12.7	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	



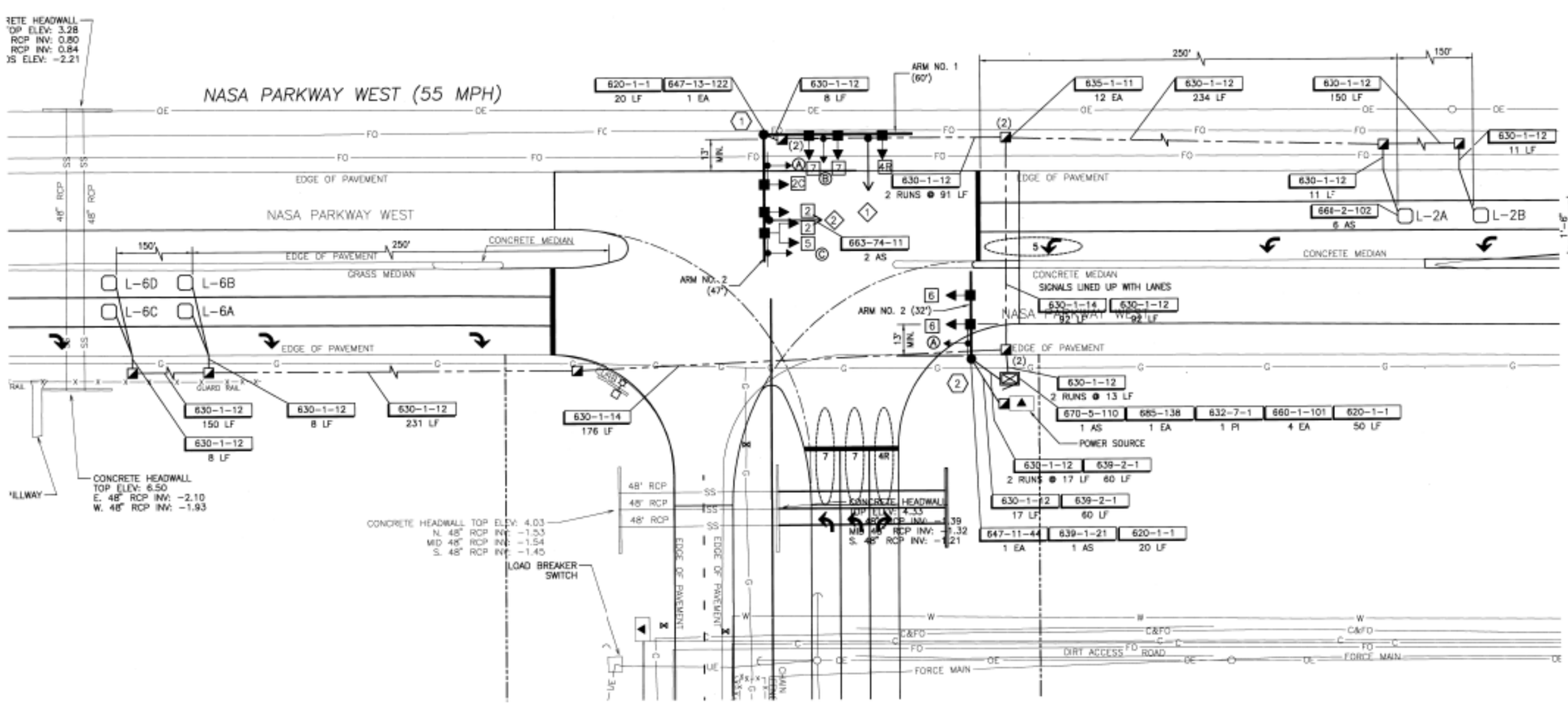
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		17.7			11.1	36.6		25.5
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (*MAH*), s		3.2			2.9	3.3		3.3
Queue Clearance Time (g_s), s		12.1			7.3	2.2		14.9
Green 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					

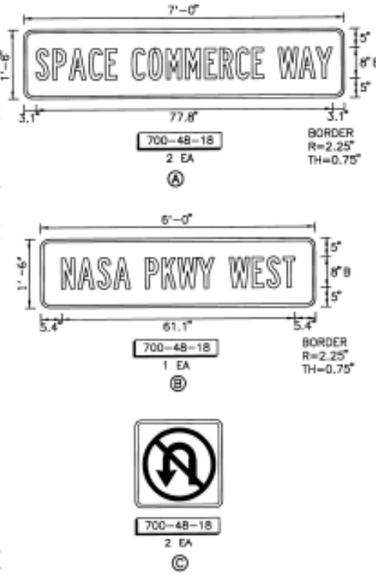
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	1.9	B	2.1	B
Bicycle LOS Score / LOS	1.0	A			0.7	A	1.3	A

APPENDIX E

Signal Timings



OVERHEAD SIGN DETAILS



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

CONTROLLER TIMINGS

	PHASE	1	2	3	4	5	6	7	8
	MOVEMENT NO.	–	2	–	7&4R	5&4R	6	–	–
TIMING FUNCTION	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	–	–

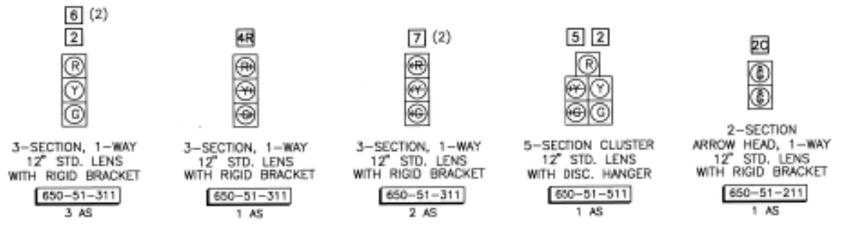
DETECTOR CONFIGURATION CHART

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
- [1] MOVEMENT NUMBER
- (2) POLE NUMBER
- NEW 3-SECTION SIGNAL HEAD
- NEW 5-SECTION CLUSTER SIGNAL HEAD
- (2) NEW PULL BOX, (X)=NUMBER OF PULL BOXES
- (X) VIDEO DETECTOR NO. X
- AREA BEING DETECTED
- LOOP ASSEMBLY (TYPE B)

SIGNAL HEAD DETAILS



PAY ITEM NOTES

1. PAY ITEM 685-1.38 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

THIS DRAWING CREATED ON AUTOCAD R.14 AND WILL BE REVISED ONLY ON AUTOCAD R.14 SYSTEM. FILE:DN001T01.DWG

T-1

BUCKHOLZ TRAFFIC
3565 Kori Road, Jacksonville, FL 32257, TEL. (904) 695-2171
238-A Commercial Boulevard, Lauderdale-By-The-Sea, FL 33308, TEL. (954) 776-6590

Jones Edmunds & Associates, Inc. JEA CONSULTING ENGINEERS AND SCIENTISTS

STM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISIONS		

SIGNATURES	DATE
DRAWN AVD	4/25/02
CHECKED JWB	4/25/02
ENGINEER JWB	4/25/02
SUBMITTED	10/16/03
APPROVED	REVISED 10-06-03

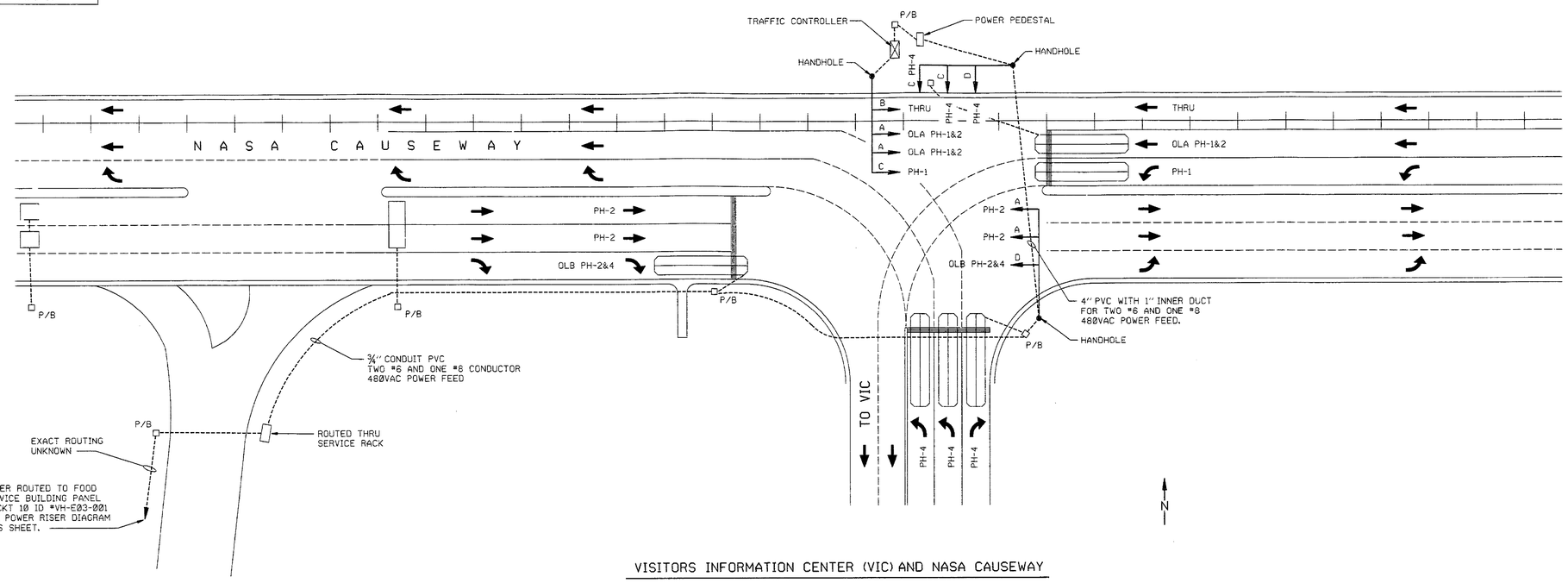
DELAWARE NORTH PARKS SERVICES OF SPACEPORT, INC
KENNEDY SPACE CENTER, FLORIDA

SPACE COMMERCE WAY
NORTHWESTERN LEG

SIGNALIZATION PLAN

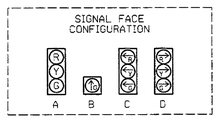
SIZE	DWG. NO.	REV
F	79K35780	
PROJ. NO. DNP551122	SHEET 65	

09/18/03 10:53 DWS dn001t01.dwg 04250-001-01

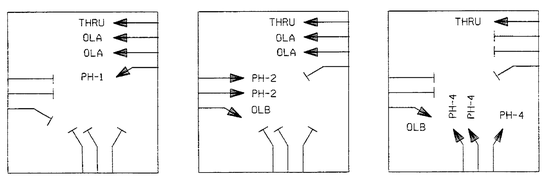


VISITORS INFORMATION CENTER (VIC) AND NASA CAUSEWAY

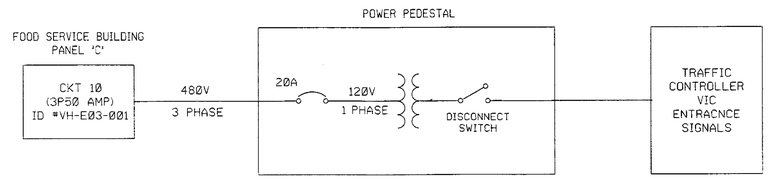
SCALE: NONE



SIGNAL KEY



MOVEMENT DIAGRAM



POWER RISER DIAGRAM

SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISIONS		

SIGNATURES	DATE
DRAWN J.SPRINKLE	29MAY91
CHECKED	
ENGINEER T. Powell	5-29-91
SUBMITTED	
APPROVED	DATE 5-29-91
TITLE	

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

KENNEDY SPACE CENTER TRAFFIC CONTROLS
VIC AND NASA CAUSEWAY
INTERSECTION SIGNALIZATION
CONFIGURATION FIELD ROUTING

SIZE F | 81K01916 | REV

PROJ NO WPCN 902725 | SHEET 3

THIS DRAWING MADE BY AND WILL BE REVISED ONLY BY INTERGRAPH CAD SYSTEM.
FILE : 191603.DGN

EG&G FLORIDA

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

	PH 1	PH 2	PH 3	PH 4	PH 5	PH 6	PH 7	PH 8
INITIAL	5	10	0	10	0	0	0	0
PASSAGE	5	6	0	6	0	0	0	0
YELLOW	4	4.5	4	4	4	4	4	4
RED CLEARANCE	1	1	1	1	1	1	1	1
MAX. GREEN *1	25	55	0	35	0	0	0	0
MAX. GREEN *2	30	30	0	30	0	0	0	0
WALK	0	0	0	0	0	0	0	0
PED. CLEARANCE	0	0	0	0	0	0	0	0

RECALLS, OMITS, CNA, FLASHING WALKS

	PH 1	PH 2	PH 3	PH 4	PH 5	PH 6	PH 7	PH 8
MIN. RECALL ON?	N	Y	N	N	N	N	N	N
MAX. RECALL ON?	N	N	N	N	N	N	N	N
PED. RECALL ON?	N	N	N	N	N	N	N	N
DET. NON-LOCK ON?	Y	N	N	Y	N	N	N	N
CNA I ACTIVE?	N	N	N	N	N	N	N	N
CNA II ACTIVE?	N	N	N	N	N	N	N	N
FLASHING WALK?	N	N	N	N	N	N	N	N
PHASE OMIT ACTIVE?	N	N	Y	N	Y	Y	Y	Y
PED. OMIT ACTIVE?	Y	Y	Y	Y	Y	Y	Y	Y
SOFT RECALL ON?	N	N	N	N	N	N	N	N

OFFSET SETTINGS:

CYCLE 1 - HVY INB. OFFSET	00%	CYCLE 4 - HVY INB. OFFSET	00%
CYCLE 1 - INBOUND OFFSET	00%	CYCLE 4 - INBOUND OFFSET	00%
CYCLE 1 - AVERAGE OFFSET	00%	CYCLE 4 - AVERAGE OFFSET	00%
CYCLE 1 - OUTBOUND OFFSET	00%	CYCLE 4 - OUTBOUND OFFSET	00%
CYCLE 1 - HVY OUT. OFFSET	00%	CYCLE 4 - HVY OUT. OFFSET	00%
CYCLE 2 - HVY INB. OFFSET	00%	CYCLE 5 - HVY INB. OFFSET	00%
CYCLE 2 - INBOUND OFFSET	00%	CYCLE 5 - INBOUND OFFSET	00&
CYCLE 2 - AVERAGE OFFSET	00%	CYCLE 5 - AVERAGE OFFSET	00%
CYCLE 2 - OUTBOUND OFFSET	00%	CYCLE 5 - OUTBOUND OFFSET	00%
CYCLE 2 - HVY OUT. OFFSET	00%	CYCLE 5 - HVY OUT. OFFSET	00%
CYCLE 3 - HVY INB. OFFSET	00%	CYCLE 6 - HVY INB. OFFSET	00%
CYCLE 3 - INBOUND OFFSET	00%	CYCLE 6 - INBOUND OFFSET	00%
CYCLE 3 - AVERAGE OFFSET	00%	CYCLE 6 - AVERAGE OFFSET	00%
CYCLE 3 - OUTBOUND OFFSET	00%	CYCLE 6 - OUTBOUND OFFSET	00%
CYCLE 3 - HVY OUT. OFFSET	00%	CYCLE 6 - HVY OUT. OFFSET	00%

SPLIT PLAN SETTINGS:

	PH 1	PH 2	PH 3	PH 4	PH 5	PH 6	PH 7	PH 8	PH 9	PH 10	PH 11	PH 12	PH 13	PH 14	PH 15	PH 16
PHASE 1 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 2 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 3 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 4 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 5 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 6 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 7 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
PHASE 8 SPLIT	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
START PERM *1	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
END PERM *1	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
START PERM *2	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
END PERM *2	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
START PERM *3	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%
END PERM *3	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%	00%

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

	INIT FAILURE REP IMMED?	RESUME NORMAL REP IMMED?
CONFLICT FLASH	N	N
MANUAL/AUTO FLASH	N	N
MANUAL CONT. ENABLE	N	N
PRE-EMPTION	N	N
CHANNEL 5	N	N
CHANNEL 6	N	N
CHANNE. 7	N	N
CHANNEL 8	N	N
CAB. DOOR OPEN	N	N

SPLIT PLAN FOR EACH CYCLE/OFFSET COMBINATION:

CY 1 - HVY INB. OFFSET	2	CY 4 - HVY INB. OFFSET	2
CY 1 - INBOUND OFFSET	2	CY 4 - INBOUND OFFSET	2
CY 1 - AVERAGE OFFSET	2	CY 4 - AVERAGE OFFSET	2
CY 1 - OUTBOUND OFFSET	2	CY 4 - OUTBOUND OFFSET	2
CY 1 - HVY OUT. OFFSET	2	CY 4 - HVY OUT. OFFSET	2
CY 2 - HVY INB. OFFSET	2	CY 5 - HVY INB. OFFSET	2
CY 2 - INBOUND OFFSET	2	CY 5 - INBOUND OFFSET	2
CY 2 - AVERAGE OFFSET	2	CY 5 - AVERAGE OFFSET	2
CY 2 - OUTBOUND OFFSET	2	CY 5 - OUTBOUND OFFSET	2
CY 2 - HVY OUT. OFFSET	2	CY 5 - HVY OUT. OFFSET	2
CY 3 - HVY INB. OFFSET	2	CY 6 - HVY INB. OFFSET	2
CY 3 - INBOUND OFFSET	2	CY 6 - INBOUND OFFSET	2
CY 3 - AVERAGE OFFSET	2	CY 6 - AVERAGE OFFSET	2
CY 3 - OUTBOUND OFFSET	2	CY 6 - OUTBOUND OFFSET	2
CY 3 - HVY OUT. OFFSET	2	CY 6 - HVY OUT. OFFSET	2

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
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 1 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:

	WKPL 0	WKPL 1	WKPL 2	WKPL 3	WKPL 4	WKPL 5	WKPL 6	WKPL 7	WKPL 8	WKPL 9
SUNDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0
MONDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0
TUESDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0
WEDNESDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0
THURSDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0
FRIDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0
SATURDAY'S DAYPLANS:	0	0	0	0	0	0	0	0	0	0

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):	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

THIS DRAWING MADE BY AND WILL BE REVISED ONLY BY INTERGRAPH CAD SYSTEM. FILE : 1916B7.DGN

EG&G FLORIDA

SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISIONS		

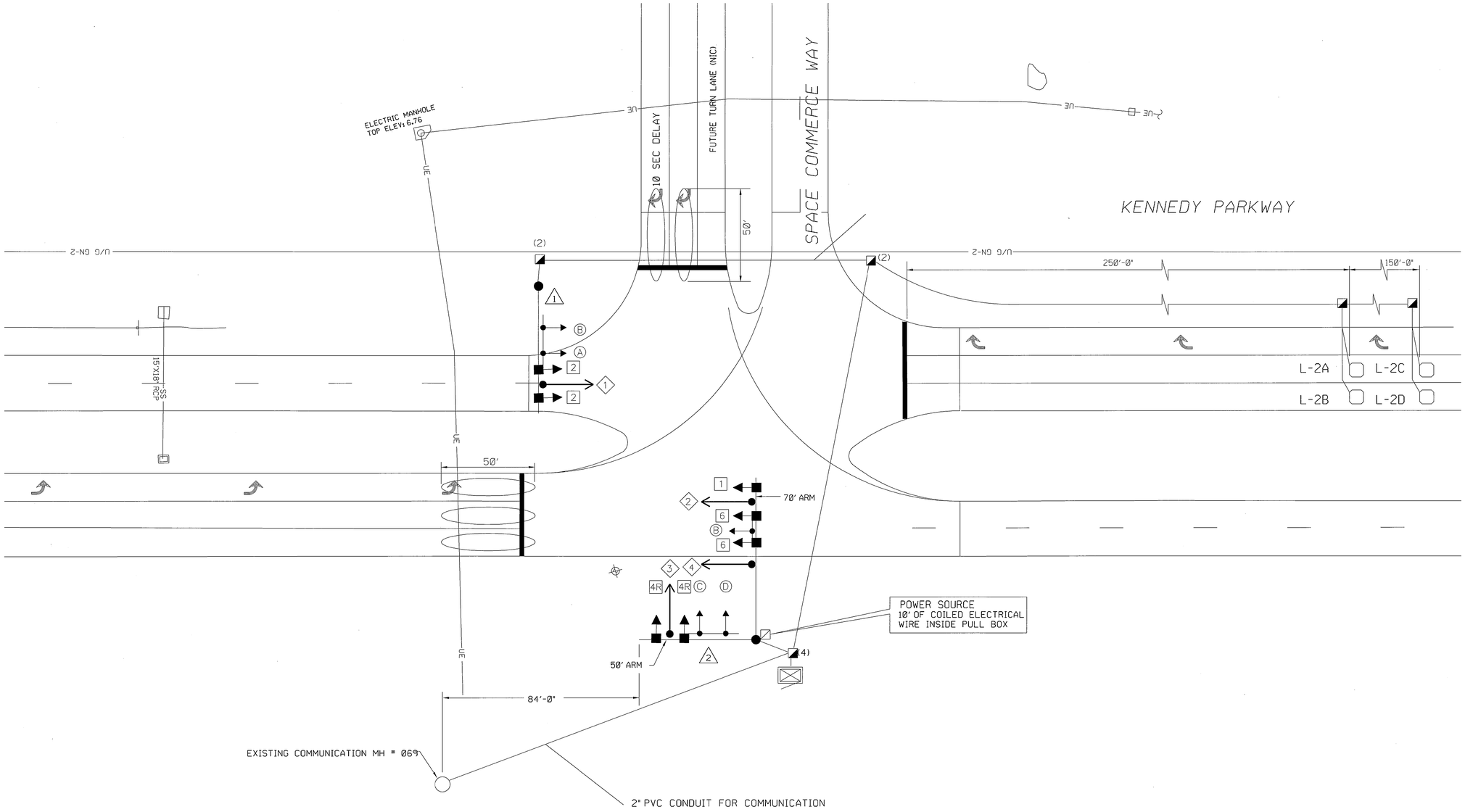
SIGNATURES	DATE
DRAWN J.SPRINKLE	29MAY91
CHECKED	
ENGINEER T. Powell	5-29-91
SUBMITTED	
APPROVED	DATE 5-30-91
TITLE	

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

KENNEDY SPACE CENTER TRAFFIC CONTROLS
VIC AND NASA CAUSEWAY
INTERSECTION SIGNALIZATION
TIMING SCHEDULE

SIZE F | 81K01916 | REV

PROJ NO WPCN 902725 | SHEET 7 of 7



B3 SIGNALIZATION PLAN
SCALE: NONE

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

CONSULTANT:

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

	YES	NO
SUSPECTED HEAVY METALS	☐	☒
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."

BAR SCALES:

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:

MARK	DESCRIPTION	DATE	APPROVAL
	90% DESIGN REVIEW	10/05/10	
	90% DESIGN REVIEW	10/13/10	
	FINAL RELEASE PACKAGE	8/17/11	

WON NO:	E1192853
CAD DWG NO:	81K01932
CAD FILE NO:	C0193200.003

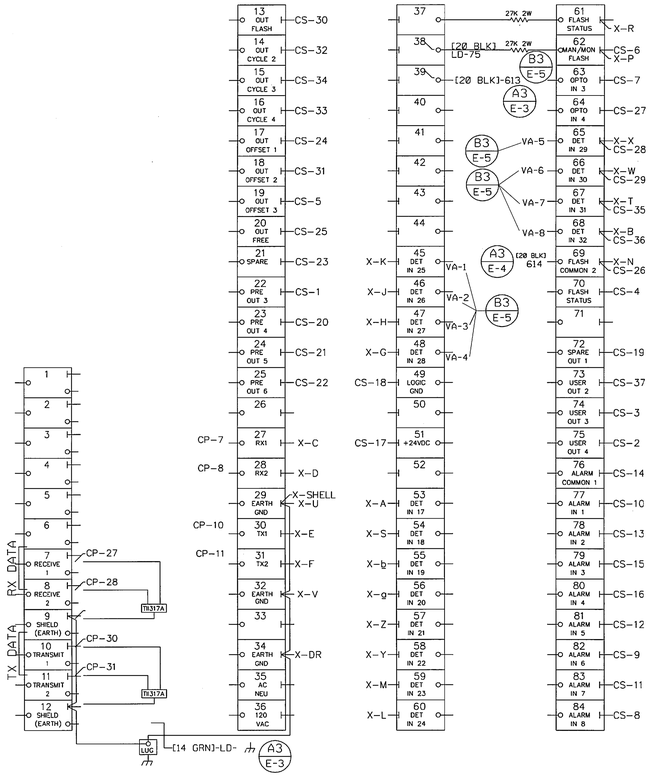
	NAME	SIGNATURE	DATE
DESIGNED BY:	J. VANSCIVER	DVD	8/18/11
DRAWN BY:	M. MASSON	Mmasson	8/18/11
CHECKED BY:	C. PAMER	CPamer	8-19-11
APPROVED BY:	G. HEGDE	Ghegde	8-19-11
SUBMITTED BY:	J. VANSCIVER	DVD	8/18/11
RESPONSIBLE PE / RA / PLS:	GOPAL N. HEGDE THIS SIGNATURE CERTIFIES THE DESIGNATED DISCIPLINE	Ghegde	8/19/11

SHEET TITLE:
SIGNALIZATION PLAN

SHEET NO.: E-2
SHEET 3

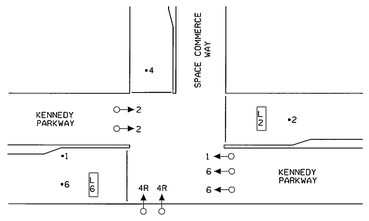
REV

ENG-F-0640 (REV. 7)



C1 CLOSED LOOP BASE PANEL -CP-
SCALE: NONE P/N 8508*5882

INTERSECTION DRAWING



◄R USED ONLY IF LEFT TURN HEAD IS 3 SECTION

NEMA OVERLAP PROGRAM CARD (IF SUPPLIED)

OLD	OLC	OLB	OLA
RING 2 / RING 1	RING 2 / RING 1	RING 2 / RING 1	RING 2 / RING 1

NEMA MONITOR PROGRAM CARD

CAUTION

FOR SAFE SIGNAL OPERATION CONTROL EQUIPMENT MUST BE PROGRAMMED AND CONNECTED ACCORDING TO THIS DRAWING. IF ANY CHANGES ARE MADE, THE USER MUST PROPERLY PROGRAM ALL CONTROL EQUIPMENT OR UNSAFE OPERATION MAY RESULT.

NOTES:

SIGNAL CONNECTIONS

SIG#	PH	G	Y	R	◄G	◄Y	◄R				WK	DW	FLASH
1	1\6	518	517	516	503	502							Y
2	2	506	505	504									Y
4R	4	512	511	510									R
6	6	518	517	516									Y
1	1				503	502	501						◄R

LOOP CONNECTIONS

LOOP	PH	TERMINALS	
2	2	LD-1	LD-3
6	6	LD-4	LD-6

PED CALLS			
P1	-	P5	-
P2	P1P-13	P6	P1P-15
P3	-	P7	-
P4	P1P-14	P8	P1P-16

KEYBOARD PHASE OMITS/SEQUENCE

OMIT PHASES 3,5,7,8

LOADSWITCHES X=UNUSED

1 2 X 4 X 6 X X X X X X

SPACE COMMERCE WAY @ KENNEDY PARKWAY

ZONE | I.D.

APPROVALS		DATE
DRAWN BY	MLG	02-04-22
CHECKED BY	BB	02-04-22
CONFIG#	8501*11994	
AD#	P-017	

PEEK TRAFFIC
3000 COMMONWEALTH BLVD
TALLAHASSEE, FLORIDA 32303
(850) 562-2253

DESCR W/D OF 2-8• CONTROLLER FOR FLORIDA

SIZE A | DRAWING NO. 8500*12013 | REV Ø

SCALE N/A | 50• 210585-4 | SHEET 1 OF 1

CONTROLLER TIMINGS

TIMING FUNCTION	PHASE	1	2	4	-	5	6	7	8
	MOVEMENT NO.	1&4R&6	2	6&4R	-	6	6	2.6	1.5
	MIN. GRN. (INT.)	4	20	4	-	1	20	-	-
	EXT. (PASS)	2.0	2.5	2.0	-	0	2.0	-	-
	MAX. GRN. 1	25	50	35	-	1	50	-	-
	MAX. GRN. 2	25	50	35	-	1	50	-	-
	YELLOW CLR.	3.0	4.5	3.5	-	3.0	4.5	-	-
	ALL RED CLR.	1.0	1.0	1.5	-	0	1.0	-	-
	PED. WALK	0	20	0	-	-	0	-	-
	PED. CLR.	0	0	0	-	-	-	-	-
	MEMORY	ON	ON	OFF	-	OFF	ON	OFF	OFF
	RECALL	OFF	OFF	OFF	-	-	-	-	-

DETECTOR CONFIGURATION CHART

PHASE	LOOP ID	TYPE	DETECTOR ID
1	-	VIDEO	1
2	L2A&B	B	2A
2	L2C&D	B	2C
4	-	VIDEO	4
6	-	VIDEO	6

NOTE:

DURING GATE CLOSURE PERIODS (TO BE SPECIFIED BY THE CONTRACTING OFFICER) THE MINIMUM RECALL SETTINGS SHALL NOT BE USED FOR PHASES 2 AND 6. DURING THESE PERIODS, PHASES 2 AND 6 WILL REST IN RED.

PIN	COLOR	FUNCTION	TERM
SH	WH/BLK/BRN	SHELL GROUND	CP-29
A	BLK	DETECTOR IN 17	CP-53
S	BRN	DETECTOR IN 18	CP-54
b	RED	DETECTOR IN 19	CP-55
a	ORA	DETECTOR IN 20	CP-56
Z	YEL	DETECTOR IN 21	CP-57
Y	GRN	DETECTOR IN 22	CP-58
M	BLU	DETECTOR IN 23	CP-59
L	VIO	DETECTOR IN 24	CP-60
K	GRA	DETECTOR IN 25	CP-45
J	WH	DETECTOR IN 26	CP-46
H	WH/BLK	DETECTOR IN 27	CP-47
G	WH/BRN	DETECTOR IN 28	CP-48
X	W/RED	DETECTOR IN 29	CP-65
W	W/ORA	DETECTOR IN 30	CP-66
T	W/YEL	DETECTOR IN 31	CP-67
B	W/GRN	DETECTOR IN 32	CP-68
R	WH/BLU	FLASH	CP-61
P	WH/VIO	MAN/MON FLASH	CP-62
N	WH/GRA	FL COMMON	CP-69
C	BLK	RCV DATA	CP-27
D	WH	RCV DATA	CP-28
E	RED	XMIT DATA	CP-30
F	BLK	XMIT DATA	CP-31
U	BLU	CHASSIS	CP-29
V	BLK	CHASSIS	CP-32
DR	SPARES	SHIELD DRAIN	CP-34

INDICATES TWISTED PAIR

A1 3000 CLOSED LOOP XCVR CABLE ASSY -X-
SCALE: NONE P/N 3462A

1880EL FUNCTIONS
SYSTEM SENSOR 1
SYSTEM SENSOR 2
SYSTEM SENSOR 3
SYSTEM SENSOR 4
SYSTEM SENSOR 5
SYSTEM SENSOR 6
SYSTEM SENSOR 7
SYSTEM SENSOR 8
LOCAL DETECTOR 1
LOCAL DETECTOR 2
LOCAL DETECTOR 3
LOCAL DETECTOR 4
LOCAL DETECTOR 5
LOCAL DETECTOR 6
LOCAL DETECTOR 7
LOCAL DETECTOR 8

PIN	COLOR	FUNCTION	TERM
1	BLACK	PRE-EMPT OUT •3	CP-22
2	BROWN	USER DEFINED OUTPUT •4	CP-75
3	WHI/BLUE	USER DEFINED OUTPUT •3	CP-74
4	ORANGE	FLASH STATUS	CP-70
5	YELLOW	OFFSET 3 OUTPUT	CP-19
6	GREEN	MONITOR STATUS	CP-62
7	WHI/VIO	OPTICAL INPUT •3	CP-63
8	VIOLET	ALARM IN •8/OFFSET 1 IN	CP-84
9	GRAY	ALARM IN •6/OFFSET 3 IN	CP-82
10	WHITE	ALARM IN •1/CYCLE 2 IN	CP-77
11	WHI/BLK	ALARM IN •7/OFFSET 2 IN	CP-83
12	WHI/BRN	ALARM IN •5/CYCLE 4/SPLIT 2 IN	CP-81
13	WHI/RED	ALARM IN •2/CYCLE 3/T.O.D	CP-78
14	WHI/ORA	OPTO COMM 1	CP-76
15	WHI/YEL	ALARM IN •3/SPLIT 2/SPLIT 3 IN	CP-79
16	WHI/GRN	ALARM IN •4/FREE INPUT	CP-80
17	RED	+24V	CP-51
18	BLUE	LOGIC GND	CP-49
19	WHI/GRAY	SPARE OUT •1	CP-72
20	BLK/BRN	PRE-EMPT OUT •4	CP-23
21	BLK/RED	PRE-EMPT OUT •5	CP-24
22	BLK/ORA	PRE-EMPT OUT •6	CP-25
23	BLK/YEL	SPARE	CP-21
24	BLK/GRN	OFFSET 1 OUTPUT	CP-17
25	BLK/BLUE	FREE OUT	CP-20
26	BLK/VIO	OPTO COMM 2	CP-69
27	BLK/GRAY	OPTICAL INPUT •4	CP-64
28	BRN/RED	DETECTOR INPUT 29	CP-65
29	BRN/ORA	DETECTOR INPUT 30	CP-66
30	BRN/YEL	FLASH OUT	CP-13
31	BRN/GRN	OFFSET 2 OUTPUT	CP-18
32	BRN/BLUE	CYCLE 2 OUT	CP-14
33	BRN/VIO	CYCLE 4/SPLIT 2 OUT	CP-16
34	BRN/GRAY	CYCLE 3 OUT	CP-15
35	RED/ORA	DETECTOR INPUT 31	CP-67
36	RED/YEL	DETECTOR INPUT 32	CP-68
37	RED/GRN	USER DEFINED OUTPUT •2	CP-73

A2 3000 D SYSTEM CABLE ASSY -CS-
SCALE: NONE P/N 3701A

DETECTOR INPUT TO PHASE AND SYSTEM NUMBER ASSIGNMENT

	DET #	PHASE #	SYS #	DET #	PHASE #	SYS #
CONTROLLER A,B,C	1	1		17		
	2	2		18		
	3	3		19		
	4	4		20		
	5	5		21		
	6	6		22		
	7	7		23		
	8	8		24		
PRE-EMPT CABLE	9			25		
	10			26		
	11			27		
	12			28		
	13			29		
	14			30		
	15			31		
	16			32		

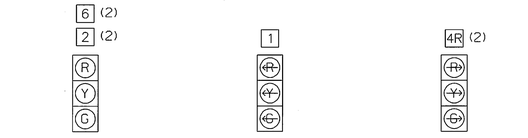
DETECTOR INPUTS 25-32 (GRAPHICS CHANNELS) TO MOVEMENT AND LOOP CORRELATION CHART

DET # / GPH	PH # / LOOP	LOOP LOCATION	MOVEMENT
25 / 1	1	MAIN ST. LEFT TURN	↰
26 / 2	2 / 2	MAIN ST. THRU	←
27 / 3	3		
28 / 4	4	SIDE ST. THRU	↓
29 / 5	5		
30 / 6	6 / 6	MAIN ST. THRU	→
31 / 7	7		
32 / 8	8		
CABINET LOCATION			

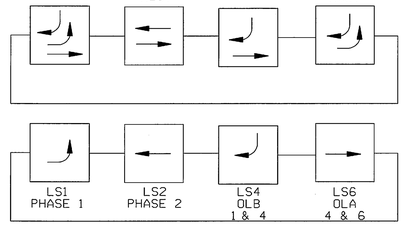
TRANSCEIVER CABLE

NOTE:
CONTROLLER PROGRAMMING IS REQUIRED FOR PHASE AND SYSTEM NUMBER ASSIGNMENT. SEE CONTROLLER MANUAL FOR PROGRAMMING INSTRUCTIONS.

A3 DETECTOR INPUT SCHEDULES
SCALE: NONE



B5 SIGNAL HEAD DETAILS
SCALE: NONE



A5 PHASING DIAGRAM
SCALE: NONE

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

CONSULTANT:

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

	YES	NO
SUSPECTED HEAVY METALS	☐	☒
SUSPECTED ASBESTOS	☐	☒
SUSPECTED PCB'S	☐	☒

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BAR SCALES

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:			
MARK	DATE	DESCRIPTION	APPROVAL
	8/17/11	FINAL RELEASE PACKAGE	
	10/13/10	95% DESIGN REVIEW	
	10/25/10	90% DESIGN REVIEW	

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

NAME	SIGNATURE	DATE
DESIGNED BY: J. VANSCIVER		8/18/11
DRAWN BY: M. MASSON		8/18/11
CHECKED BY: C. RAMER		8.18.11
APPROVED BY: G. HEGDE		8/19/11
SUBMITTED BY: J. VANSCIVER		8/18/11
RESPONSIBLE PE / RA / PLS: GOPAL N. HEGDE		8/19/11

THIS SIGNATURE CERTIFIES THE DESIGNATED DISCIPLINE

SHEET TITLE: CABINET ASSEMBLY WIRING

SHEET NO.: E-7
SHEET 8 of 8

REV

ENG-F-DEAD (REV. 7)

APPENDIX F

KSC VIC Growth Data

KSC GROWTH ASSUMPTION yrs 2016 - 2035

Year	Growth %	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Year
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

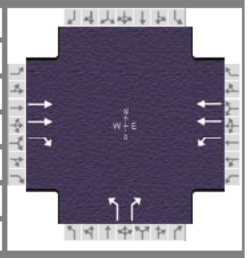
- Traffic Analysis Zone (TAZ) No. 2990 (VAB Area)
    - Commercial Employment
        - Year 2020 - 0
        - Year 2040 - 0
    - Industrial Employment
        - Year 2020 - 968
        - Year 2040 – 2,905
    - Service Employment
        - Year 2020 - 1
        - Year 2040 - 4
- TAZ 2992 (Canaveral 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

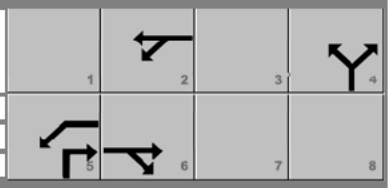
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2018 AM Pk-Hr	PHF	0.85
Urban Street	NASA Pkwy	Analysis Year	2018	Analysis Period	1> 7:00
Intersection	NASAPkwy at Commerc…	File Name	1. Nasa Pkwy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



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

Green	0.0	20.0	3.8	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						



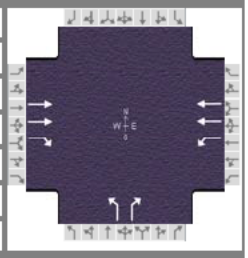
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.5	0.0	25.5		8.8		
Change Period, ($Y+R_c$), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.6	0.0	3.6		3.0		
Queue Clearance Time (g_s), s		9.9		2.3		3.7		
Green Extension 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		
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		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

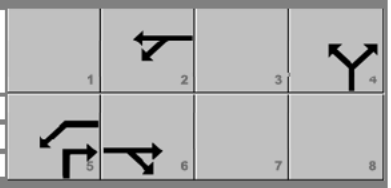
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2018 PM Pk-Hr	PHF	0.89
Urban Street	NASA Pkwy	Analysis Year	2018	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Commer…	File Name	1. Nasa Pkwy 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
Force Mode	Fixed	Simult. Gap N/S	On

Green	0.4	20.0	16.4	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						



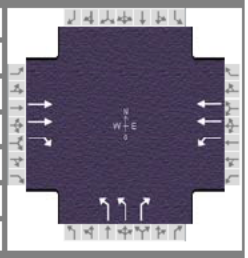
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		25.5	4.4	29.9		21.4		
Change Period, (*Y+R c*), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.4	2.9	3.4		2.9		
Queue Clearance Time (*g s*), s		6.1	2.1	15.8		15.6		
Green 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

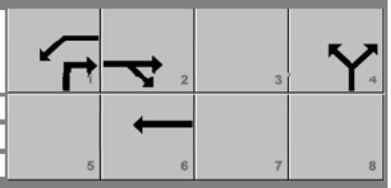
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2018 AM Pk-Hr	PHF	0.95
Urban Street	NASA Pkwy	Analysis Year	2018	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Visitor C…	File Name	2. Nasa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



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

Signal Information			
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						



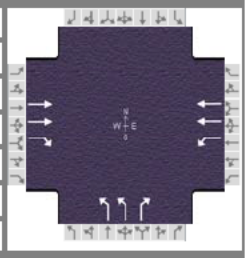
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		15.5	6.0	21.5		6.3		
Change Period, ($Y+R_c$), s		5.5	5.0	5.5		5.0		
Max Allow Headway (*MAH*), s		6.9	5.9	6.9		3.2		
Queue Clearance Time (g_s), s		2.9	2.5	2.2		2.8		
Green Extension 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		
Approach Movement	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		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

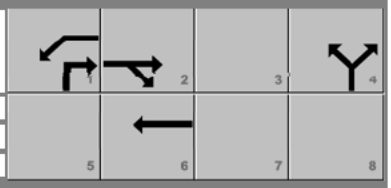
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2018 PM Pk-Hr	PHF	0.95
Urban Street	NASA Pkwy	Analysis Year	2018	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Visitor C…	File Name	2. Nasa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



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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	



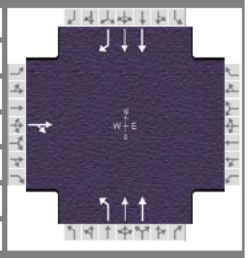
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		28.2	6.8	35.0		8.2		
Change Period, ($Y+R_c$), s		5.5	5.0	5.5		5.0		
Max Allow Headway (*MAH*), s		6.8	5.9	6.8		3.1		
Queue Clearance Time (g_s), s		2.2	3.0	8.9		3.2		
Green Extension 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		
Approach Movement	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

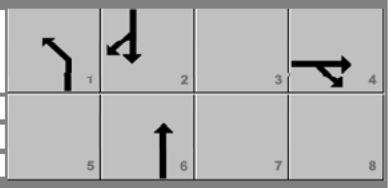
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2018 AM Pk-Hr	PHF	0.83
Urban Street	Kennedy Pkwy	Analysis Year	2018	Analysis Period	1> 7:00
Intersection	Space Commerce Way…	File Name	3. Space 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
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.5	19.6	4.1	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						



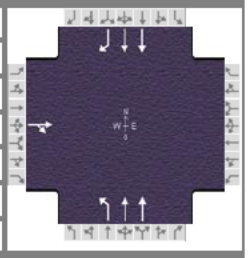
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		9.1			12.5	37.5		25.1
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (*MAH*), s		3.2			2.9	2.9		2.9
Queue Clearance Time (g_s), s		5.2			8.4	3.2		2.2
Green Extension 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

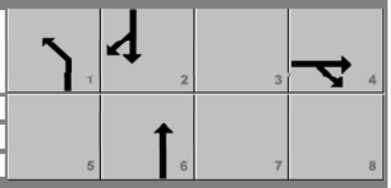
HCS7 Signalized Intersection Results Summary

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
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	7.7	20.0	11.5	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			

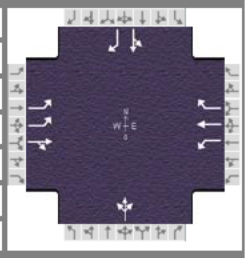
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		16.5			11.7	37.2		25.5
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (*MAH*), s		3.2			2.9	3.3		3.3
Queue Clearance Time (g_s), s		11.1			7.8	2.2		15.0
Green 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

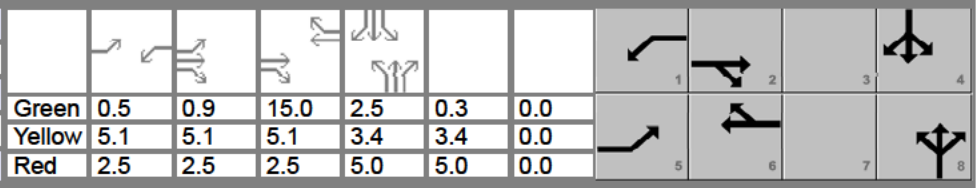
HCS7 Signalized Intersection Results Summary

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

Signal Information			
Cycle, s	58.8	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	0.5	0.9	15.0	2.5	0.3	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						

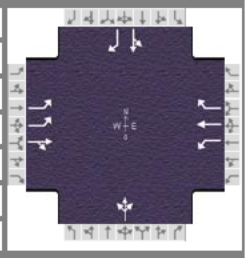
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	3.0		12.0		11.0
Phase Duration, s	16.6	31.1	8.1	22.6		8.7		10.9
Change Period, ($Y+R_c$), s	7.6	7.6	7.6	7.6		8.4		8.4
Max Allow Headway (*MAH*), s	3.0	3.1	3.0	3.1		3.1		3.2
Queue Clearance Time (g_s), s	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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

Green	0.2	2.2	15.0	12.6	1.0	0.0						
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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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					

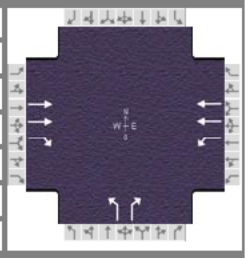
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.7	C	2.5	B	2.4	B
Bicycle LOS Score / LOS	0.8	A	1.1	A	0.5	A	1.1	A

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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

								1	2	3	4	
Green	0.0	50.0	5.4	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	5	6	7	8		

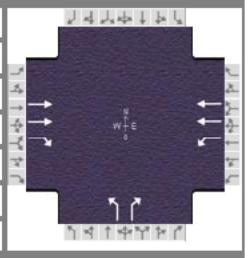
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		55.5	0.0	55.5		10.4		
Change Period, ($Y+R_c$), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.6	0.0	3.6		3.0		
Queue Clearance Time (g_s), s		52.0		2.4		5.6		
Green Extension 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		
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		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

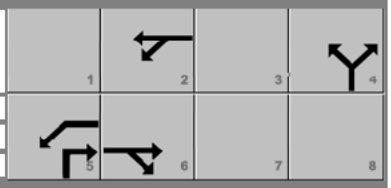
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr	PHF	0.89
Urban Street	NASA Pkwy	Analysis Year	2035	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Commer…	File Name	1. Nasa Pkwy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



Demand Information	EB			WB			NB			SB		
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	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	
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	



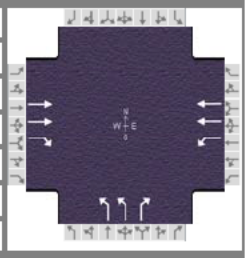
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		41.9	5.3	47.2		35.0		
Change Period, (*Y+R c*), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.4	2.9	3.4		2.9		
Queue Clearance Time (*g s*), s		6.5	2.4	35.9		32.0		
Green 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		
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		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

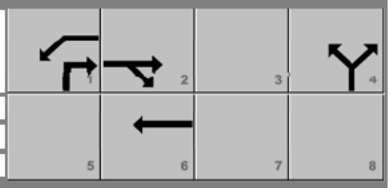
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2035 AM Pk-Hr	PHF	0.95
Urban Street	NASA Pkwy	Analysis Year	2035	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Visitor C…	File Name	2. Nasa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



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

Signal Information			
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	



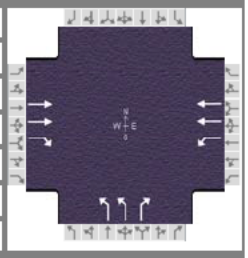
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		15.5	6.8	22.3		7.4		
Change Period, ($Y+R_c$), s		5.5	5.0	5.5		5.0		
Max Allow Headway (*MAH*), s		6.9	5.9	6.9		3.2		
Queue Clearance Time (g_s), s		3.4	2.9	2.3		3.6		
Green Extension 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		
Approach Movement	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		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

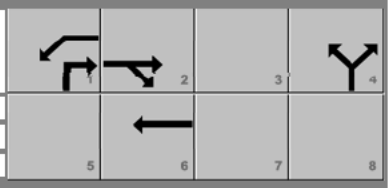
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr	PHF	0.95
Urban Street	NASA Pkwy	Analysis Year	2035	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Visitor C…	File Name	2. Nasa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



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

Green	3.4		33.4	5.2	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					



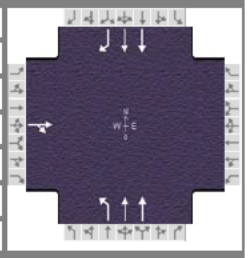
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		
Case Number		7.3	2.0	4.0		9.0		
Phase Duration, s		38.9	8.4	47.3		10.2		
Change Period, (*Y+R c*), s		5.5	5.0	5.5		5.0		
Max Allow Headway (*MAH*), s		6.8	5.9	6.8		3.1		
Queue Clearance Time (*g s*), s		2.3	4.5	14.6		5.2		
Green 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		
Approach Movement	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		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		

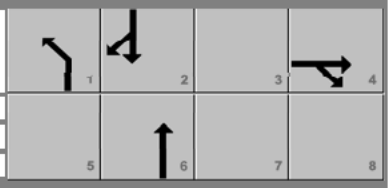
HCS7 Signalized Intersection Results Summary

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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	19.2	20.0	2.5	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						

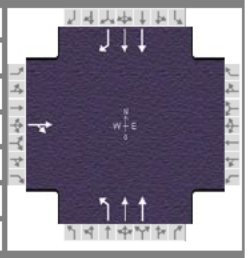
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		7.5			23.2	48.7		25.5
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (*MAH*), s		3.2			2.9	2.9		2.9
Queue Clearance Time (g_s), s		4.1			18.6	3.5		2.4
Green 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		
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		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

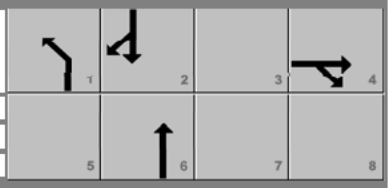
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr	PHF	0.77
Urban Street	Kennedy Pkwy	Analysis Year	2035	Analysis Period	1> 7:00
Intersection	Space Commerce Way…	File Name	3. Space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



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.6	33.4	22.6	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	



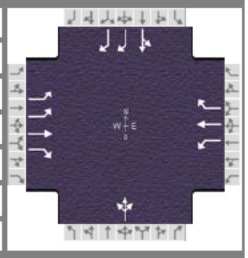
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			1	6		2
Case Number		12.0			2.0	4.0		7.3
Phase Duration, s		27.6			11.6	50.5		38.9
Change Period, ($Y+R_c$), s		5.0			4.0	5.5		5.5
Max Allow Headway (*MAH*), s		3.2			2.9	3.3		3.3
Queue Clearance Time (g_s), s		21.7			7.8	2.4		28.5
Green 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		
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		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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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						

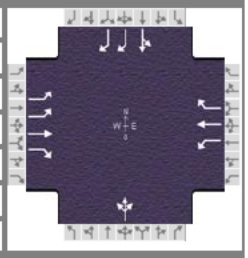
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	3.0	2.0	3.0		12.0		11.0
Phase Duration, s	25.5	39.9	8.2	22.6		9.2		12.6
Change Period, ($Y+R_c$), s	7.6	7.6	7.6	7.6		8.4		8.4
Max Allow Headway (*MAH*), s	3.0	3.0	3.0	3.0		3.1		3.2
Queue Clearance Time (g_s), s	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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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

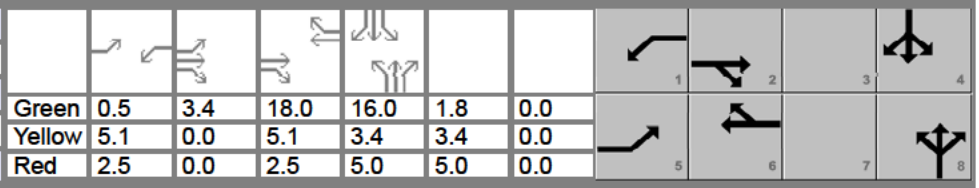
HCS7 Signalized Intersection Results Summary

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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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
Force Mode	Fixed	Simult. Gap N/S	On



Green	0.5	3.4	18.0	16.0	1.8	0.0
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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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					

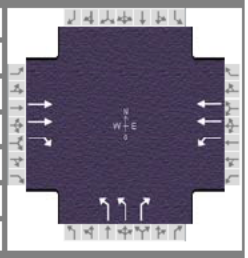
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.8	C	2.5	B	3.0	C
Bicycle LOS Score / LOS	0.8	A	1.3	A	0.5	A	1.6	B

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		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
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

								1	2	3	4	
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	5	6	7	8		

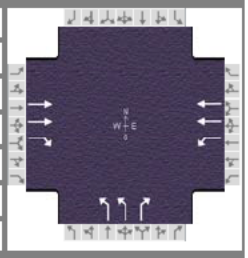
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		4		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		67.0	0.0	67.0		10.6		
Change Period, ($Y+R_c$), s		5.5	4.0	5.5		5.0		
Max Allow Headway (*MAH*), s		3.6	0.0	3.6		3.0		
Queue Clearance Time (g_s), s		55.3		2.4		4.1		
Green Extension 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		
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		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

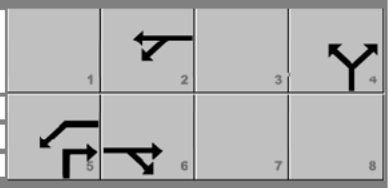
General Information				Intersection Information	
Agency	LTG			Duration, h	0.25
Analyst	SD	Analysis Date	8/2/2017	Area Type	Other
Jurisdiction	NASA	Time Period	2035 PM Pk-Hr	PHF	0.89
Urban Street	NASA Pkwy	Analysis Year	2035	Analysis Period	1> 7:00
Intersection	NASA Pkwy at Commer…	File Name	1. Nasa Pkwy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

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

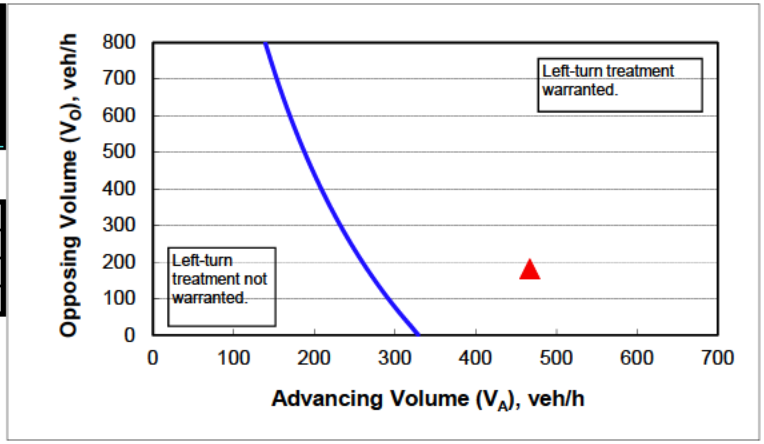
2-lane roadway (English)

INPUT

Variable	Value
85th 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.	

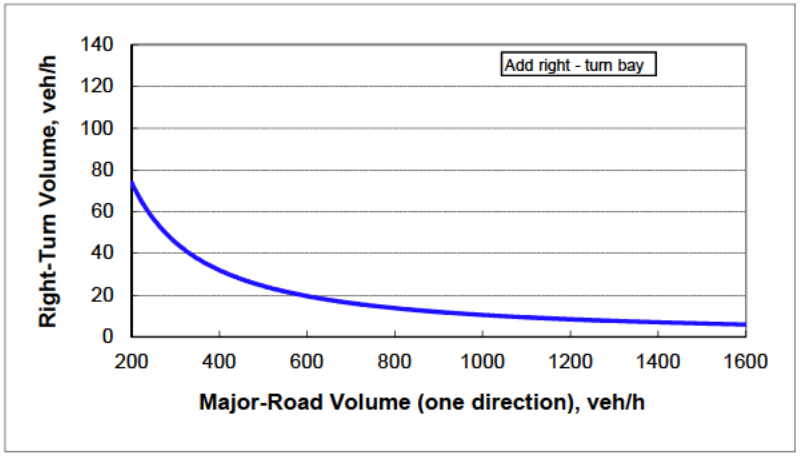


Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

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.