# NORTH MERRITT ISLAND SMALL AREA PLAN STUDY STAFF DRAFT

COMPREHENSIVE PLANNING DIVISION

JUNE 1, 1992

NOTE: This report is a staff draft which has been reviewed by the North Merritt Island Citizen Resource Group. This draft has not been reviewed by the Local Planning Agency or the Board of County Commissioners. Upon approval of this report by the Board of County Commissioners, proposed future land use changes will be processed as amendments to the Comprehensive Plan. Adopted amendments will be the basis for administrative rezonings. Each of these actions, small area plan formulation, Comprehensive Plan amendment and administrative rezoning, provides opportunity for public comment.

# I. PURPOSE OF THE SMALL AREA PLAN STUDY

The purpose of this study is to comply with Future Land Use Element (FLUE) Objective 10 of the Brevard County Comprehensive Plan, which calls for eliminating inconsistencies between the official zoning maps and the Comprehensive Plan through a Small Area Plan study (SAP) process. Policy 10.3 of the FLUE further establishes that a two step process, including SAP's and subsequent administrative rezonings, will be used to address these inconsistencies and to refine the land use designations of the Future Land Use map series. At a minimum, these SAP's are to address the issues of the public facility and service availability, environmental constraints, hurricane capabilities, land use compatibility, and the character of each study area.

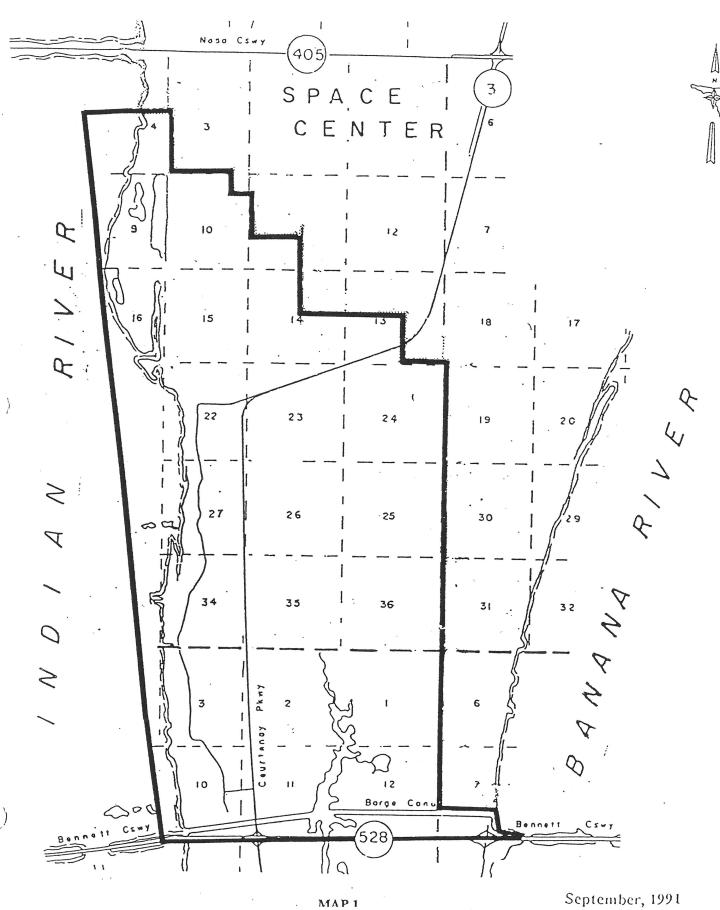
#### II. STUDY AREA DESCRIPTION

### A. Geographic Description

The North Merritt Island study area consists of approximately 10,294 acres of unincorporated Brevard County, bounded generally by the John F. Kennedy Space Center to the north and east, the Indian River to the west, and State Road 528 (Beeline) to the south. The study area is depicted in Map 1.

### B. Population

According to data in the 1990 Census, the population of the North Merritt Island study area is 3,503 (see Table 1). This represents a 4.02% annual increase in population since 1980 when the study area had a population of 2,499. In contrast, Brevard County grew by only 3.2% annually during the same period. Projections show the study area continuing to grow at a decreasing rate, reaching a population of 5,516 in the year 2005. Also, the number of households is projected to increase by 954 units by the year 2005.



September, 1991

Table 1 North Merritt Island Population and Households

Year Popi	Annual Ilation Increase	
		<u> Households</u>
1980	2,499	994
1990	3,503 4.02%	1,498
1995	4,197 3.96%	1,809
2000	4,843 3.08%	2,115
2005	5,516 2.78%	2.452

Source: Geographic Information Division, 1991.

# C. Historical Description (Pre-1900)

During Florida's early colonial period Merritt Island was populated by the Ais Indians who came to the area in pursuit of the variety of game and fish that abounded on its shores and in its rivers. Although Europeans visited the island on a number of occasions, there is no evidence to suggest that permanent settlement in the area was made during the colonial period. After Florida was acquired by the United States in 1821, the island's isolation from major population centers to the north impeded attempts to settle its lands until after the Civil War. The first concerted efforts to develop the Indian River region were made during the late 1800's when transportation improvements allowed easier access to the area.

In the late 1800's a group of South Carolina natives established a community at Courtenay (located near the intersection of North Tropical Trail and Church Road), named for a former Governor of South Carolina. Prominent early settlers included the LaRoche, Sams, Whaley and Porcher families. The six LaRoche brothers, who came to Merritt Island in the early 1870's from the Sea Islands of South Carolina, were the first to enter homesteads in the area. Together, they had extensive land holdings along the Indian River and the interior, north of what is now State Road 528. Although the LaRoches all maintained small orange groves, their main industry centered on vegetable production for northern markets. J.H. Sams raised vegetables and oranges on his 160-acre homestead and also served as superintendent of Brevard County schools. Edward Whaley, formerly a planter on the east coast of South Carolina, owned a large tract of land north of the LaRoches where he planted an extensive citrus grove and raised pineapples and bananas.

Edward P. Porcher, who came to Courtenay in 1884, ultimately became the most prominent citrus grower in Brevard County during the historic period. Porcher was descended from a South Carolina Huguenot family. He was born in Greenville, S.C. in 1861, attended military school, and later studied insurance law. Before coming to Florida, he was in the insurance business in Atlanta and Chicago. In 1885, Porcher married Byrnina Mona Peck, daughter of William Henry Peck, a prolific writer

who penned 74 historic novels and owned a large tract of land adjoining Porcher's property.

The most significant extant building associated with the early settlement of Courtenay is St. Lukes Episcopal Church located at 5555 North Tropical Trail, which is recognized as a Brevard County Historic Landmark. Although the Episcopal congregation at Courtenay was formed in the 1870's, there was no permanent place for worship services. In 1888, E.P. Porcher donated land to the church for the construction of a church building and a cemetery. Most of the area residents contributed to the church building fund and aided in its construction. The building was completed in 1889.

## III. HISTORICAL & ARCHAEOLOGICAL RESOURCES

Proposed developments within Brevard County are subject to the review and discovery procedures in the Historic Preservation Element Policies 2.3 and 2.4. These policies require review of all development projects for their impact upon designated historic resources, and for all development activities to cease where artifacts of historical or archaeological have been found, to allow for evaluation. When a discovery has been made, every effort must be made to preserve the resource.

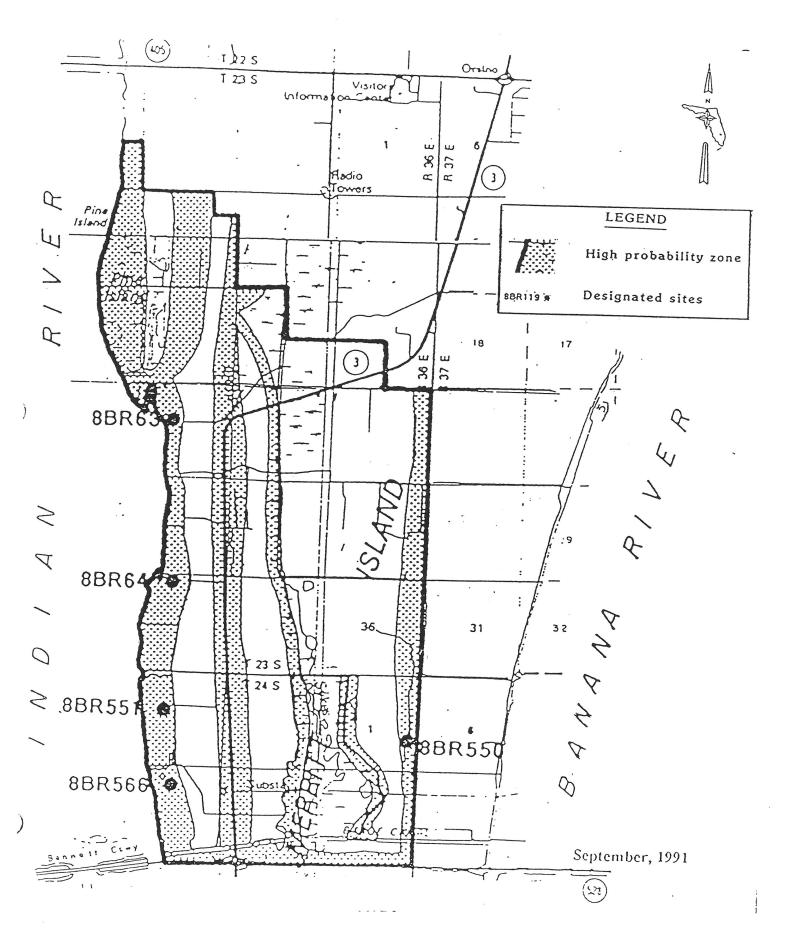
# A. Archaeological Resources

A study by the Institute of West Florida Archeology of the University of West Florida examined the North Merritt Island study area to determine locations of archaeological sites and areas which have a high probability of containing archaeologically significant sites based on soil types and topography (see Map 2). The study indicated 5 sites in the study area and was not specific as to their characteristics. The high probability zones were primarily determined by the following environmental criteria: proximity to Indian River shoreline, local elevations within the marsh areas, dune ridge tops, and dune bases adjacent to swales.

# B. Historic Structures/Sites

The <u>Historic Building Survey of Merritt Island</u>, Florida, conducted by Historic Properties Associates, Inc. of St. Augustine, lists 19 buildings that meet the criteria for the Florida Master Site File, which specifies historically significant resources. These buildings range in construction date from 1889 to 1925 and are primarily private residences located on North Tropical Trail and Crisafulli Road. The dominant architecture style is Frame Vernacular, which generally is characterized as: one to two stories in height, rectangular floor plan mounted on masonry piers, steep gable roofs, horizontal weatherboard and drop siding exteriors, and wood shingles. Other architecture styles include Bungalow, Colonial Revival, and Mediterranean Revival.

# NORTH MERRITT ISLAND SMALL AREA PLAN ARCHAEOLOGICAL SITES



#### IV. NATURAL RESOURCES

## A. Physiography and Topography

Merritt Island is generally believed to owe its origins, physiography, and present location to its former existence as a barrier island system of the Atlantic coastal waters. Sykes Creek and its associated wetlands comprise a large portion of the interior of this study area.

These features are oriented as a series of parallel, north-south, elongated ridges with intervening swales. Although not as developed as the Atlantic Coastal Ridges, (which sometimes reach up to +55 feet (NGVD-National Geodetic Vertical Datum: a national standard for establishing elevations) in elevations, these relic dunes occupy the highest elevations within the study area and are a significant factor affecting drainage features. Elevations range from below sea level adjacent to the Indian River Lagoon, to approximately +15 feet (NGVD) on the eastern beach ridges. Average elevations are approximately +5 feet (NGVD). This lower average elevation is probably the result of former land alteration activities.

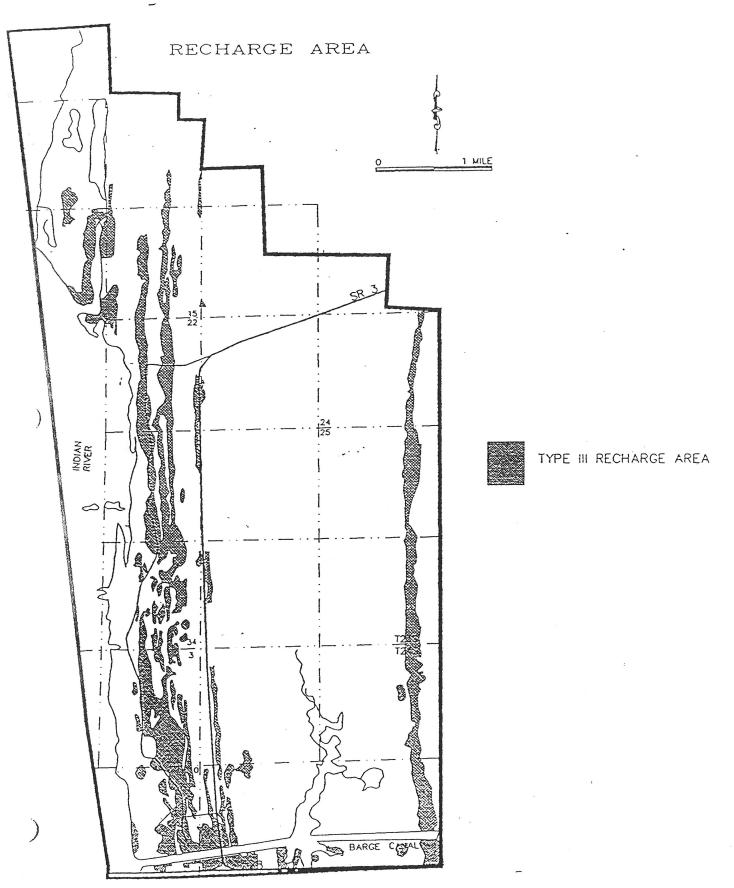
### B. Aquifer Recharge

Ground water is the primary water source in Florida, both as a potable (drinking) water source and for irrigation. Because many of the residents utilize private septic systems for wastewater treatment and due to the high ground water table found in this area, the possibility for ground water contamination by septic system failures is not remote.

The primary source of ground water in the aquifers of Florida originates from areas known as aquifer recharge areas. The recharge characteristics of an area are dependent upon several natural features, including: the elevation of land surface, surface slope, type of soils, and soil characteristics such as permeability.

There are two aquifers within the study area, the Surficial Aquifer System (SAS) and the Floridan Aquifer System (FAS). The FAS is a confined (artesian) aquifer bounded primarily by limestone and dolostone. The presence of overlying and underlying impermeable or cap rock surrounding the aquifer creates a positive pressure gradient. This often results in artesian or "flow" wells. Little is known about the characteristics of the aquifer in this area because it is seldom used as a result of its brackish (saline) quality.

The SAS is an unconfined aquifer comprised of layers, and sometimes mixtures, of sand, shell, coquina rock and other deposits. These deposits are largely "loosely defined" or unconsolidated. Occasionally, layers of silt and/or clay with varying percentages of sand, shell, and rock are encountered. The SAS is typically about 100 feet thick, occurring from land surface to the top of a geologic strata known as the Hawthorn formation.



MAP3

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The thickest sequence of fresh water in the SAS of the study area is found beneath the sandy soils which occupy the highest topographic portions of the landscape. Undisturbed profiles of these soils are very fragmented and rare in the study area due to development and other land alteration activities. Therefore, recharge to the SAS is extremely variable and localized. The majority of the water use from this formation is utilized in the irrigation of citrus and residential lawns. The SAS has not been used extensively for potable uses.

The study areas current supplier of potable water is the City of Cocoa. The water is derived from a wellfield in eastern Orange County. There are no Type I or II aquifer recharge areas, as designated by Brevard County, within the study area. However, large portions of the study area lie within a secondary aquifer recharge area, designated as Type III by Brevard County (see Map 3).

aquifer recharge areas have highly permeable Type III (permeability greater than (20) inches per hour) and are below 30 feet mean sea level. Type III aquifer recharge areas are designated on the Brevard County Resource Maps. These areas were identified from studies done by Frazee and Loughlin in Brevard County and the Brevard County 208 Plan. Although they do not provide potable water supplies, these are locally important resources. They maintain a positive downward pressure to reduce saltwater intrusion, and are locally important for individual drinking water wells. The use of fresh ground water for irrigation is preferred over using a public water supply in order to conserve the best quality of water for drinking. Type III recharge area functions can be reduced due to natural or man-made alterations which decrease the recharge of Protection of this resource is important for several reasons.

In the study area, most users are served by public water. However, the surficial aquifer system is utilized for irrigation and for heat pump operation. Saltwater intrusion in some areas of North Merritt Island has reduced the usefulness for these purposes. By protecting recharge characteristics in the study area and maintaining groundwater at historic levels, the surficial aquifer system should be able to meet most future non-potable waters needs. The Brevard County Aquifer Protection Ordinance restricts impervious surfaces to 45% and prohibits disposal of hazardous materials within the Type III recharge areas. Further protection measures could include, but not be limited to: the reduction of land alteration and impermeable surfaces in aquifer recharge areas, promotion of water conservation measures to reduce ground water consumption, continued capping of free-flowing artesian wells, and monitoring and regulation of potential contaminate sources such as septic systems.

#### C. Soils

The soils in the North Merritt Island study area are part of several different soil groups, including soils of the sand ridges (Paola-Pomello-Astatula associations), soils of the flatwoods (Myakka-Eau Gallie-Immokallee and Pineda-Wabasso associations), and wetland soils (Tidal Marsh-Tidal Swamp association).

The soils of the sand ridges are characterized as being excessively to moderately well-drained, and they are sandy throughout the soil profile. Because of the rapid permeability of these soils, they are poor filters of septic leachate and may cause contamination of ground water. As previously discussed, rapid permeability of rainfall is a desirable characteristic for ground water recharge.

The Tidal Marsh-Tidal Swamp association soils profile are nearly level, very poorly drained, saline to brackish soils of variable texture. The soils are exposed to constant flooding or inundation (dependent on whether they have been diked or impounded). The association is generally below sea level, allowing virtually no development without the need for extensive fill deposition.

Soils of the flatwoods are also nearly level and poorly drained. Within the flatwoods soils there are severe restrictions for septic tanks use due to a high water table.

The Tidal Marsh community is found principally in the Sykes Creek and the Indian River Lagoon drainage basins. Immediately landward of many of the areas are patches of floodplain forest and marshes, interspersed with development and agricultural areas. Further upslope are found the scrubby flatwoods (remnants) within the most developed areas. Ridge and swale systems characterize the upland areas of the study area.

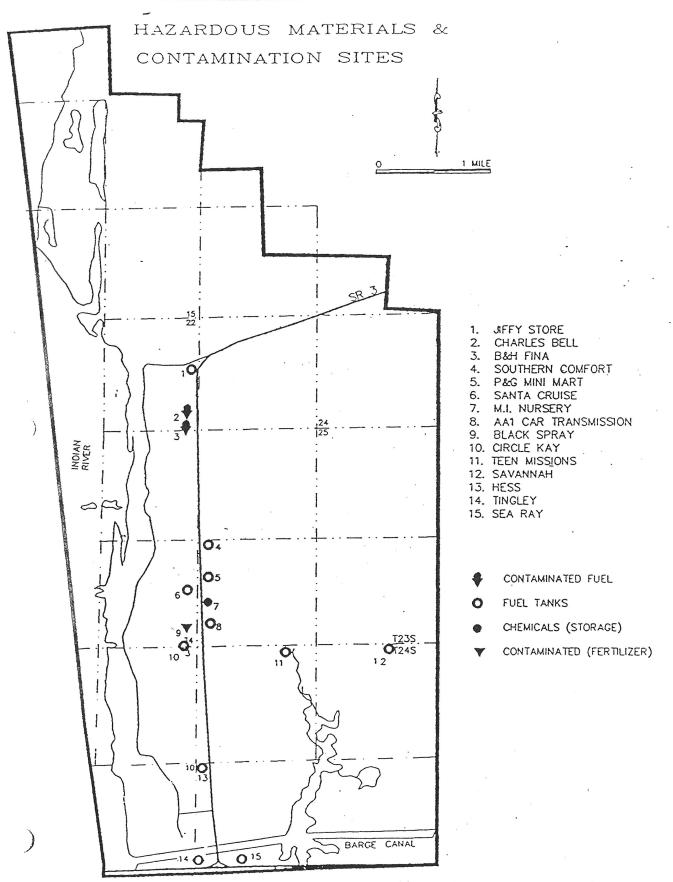
#### D. Hazardous Materials & Contamination Sites

Map 4 indicates the known hazardous and contaminated sites in the North Merritt Island planning area. This map was generated by the Office of Natural Resources Management utilizing the most recent data. Presently there are two contaminated fuel sites identified in the study area. The Charles Bell site is applying for state clean-up funds through the FDER Abandoned Tanks Restoration Program. If the site is accepted into the program, the FDER will allocate funds for the clean-up. The B&H Fina site has applied for FDER clean-up funds through the Florida Petroleum Liability Insurance and Restoration Program, whereby the state will reimburse an approved private contractor to clean-up the site. Clean-up and compliance issues are handled through the County staff.

While it is impossible to predict the contamination potential of particular areas, past experience with this program suggests an approximately 50% underground storage tank contamination rate, however this is highly variable. Larger tanks or tanks under high usage may pose a greater risk of contamination. More recent and properly installed and maintained underground tanks should pose minimal contamination risk.

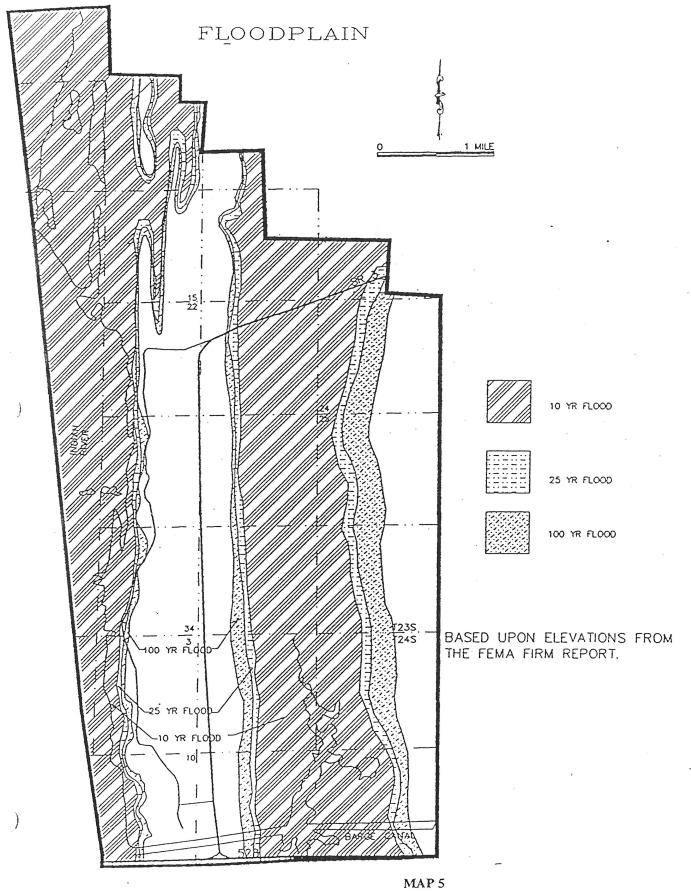
#### E. Floodplains

The floodplains of the Indian River Lagoon and Banana River extend into the western and eastern coastlines of Merritt Island,

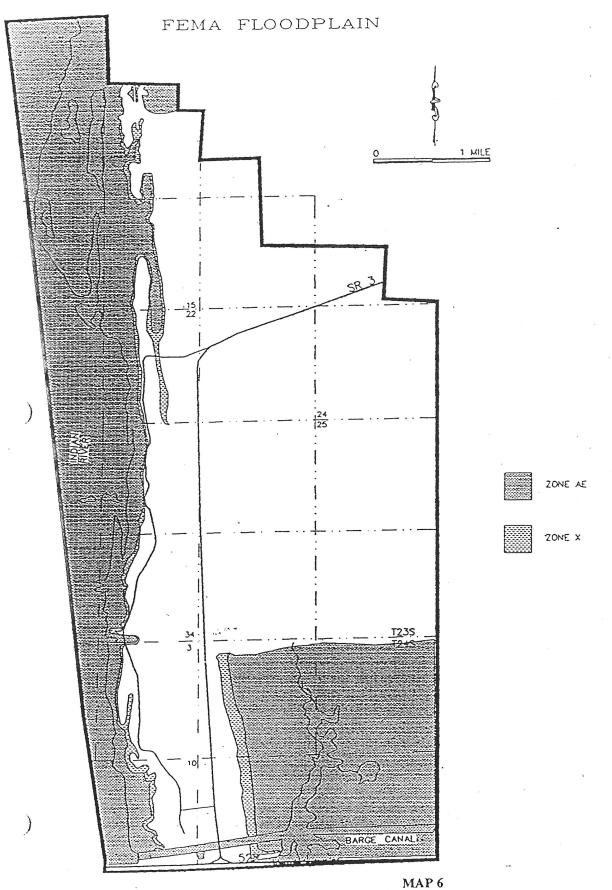


MAP 4

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respectively. The Federal Emergency Management Agency 1989 Wave Height Analysis Flood Insurance Study identified still water and base flood elevations for the Indian River Lagoon. The 10-year stillwater elevation for the study bordering both the Indian River and Banana River is +2 feet (NGVD). Base flood elevations range from +3 to +5 feet (NGVD) for the Indian River to +2 to +4 feet (NGVD) for the Banana River. Note that storm surges can increase flood elevations up to 3 feet above the quoted figures in the study area.

The Brevard County Floodplain Protection Ordinance limits the type of land use and the number of residential units allowed in the 10-year, 25-year and 100-year riverine floodplains. In the 100-year to 25-year riverine floodplain, residential land use may be considered up to a maximum density of 2 dwelling units per acre, and commercial and industrial land uses may be considered up to a maximum footprint of 15,000 square feet per acre. In the 25-year to 10-year riverine floodplain, residential land use may be considered up to a maximum density of 1 dwelling unit per 2.5 acres, commercial uses may be considered up to a maximum of 3,000 square feet per acre, and industrial land uses are prohibited. In the 10-year to 1-year (annual) riverine floodplain, residential land use may be considered up to a maximum of 1 dwelling unit per 10 acres, and commercial and industrial uses are prohibited. In the annual floodplain all land uses are prohibited.

Other areas prone to flooding during a 100-year event can be found on the Flood Insurance Rate Maps (FIRM) developed through the Federal Emergency Management Act (FEMA). Map 5 displays generalized 10, 25 and 100 year floodplains determined by NRD using contour elevations using FEMA/FIRM data. Map 6, which is used for insurance purposes, depicts those areas within the FEMA floodplain. Because of extensive alteration of the floodplain north of Hall Road, FEMA (Map 6) does not include that area as a floodplain in its flood insurance program

#### F. Surface Water Resources

The western side of the North Merritt Island study area is bordered by the Indian River Lagoon. Between the NASA Causeway and the Bennett Causeway, the water quality of the lagoon has been impacted by elevated nutrients. A large section of the western shore line of the lagoon shows excessive loss of submerged aquatic vegetation (SAV) due to heated water discharge by public utility power plants north of the study area. Furthermore, the western shoreline has been extensively modified as a result of dredge and fill activities, including the construction of sea walls, riprap and boat docks. These impacts combine to reduce aquatic habitats in the lagoon, thus, contributing to poorer water quality.

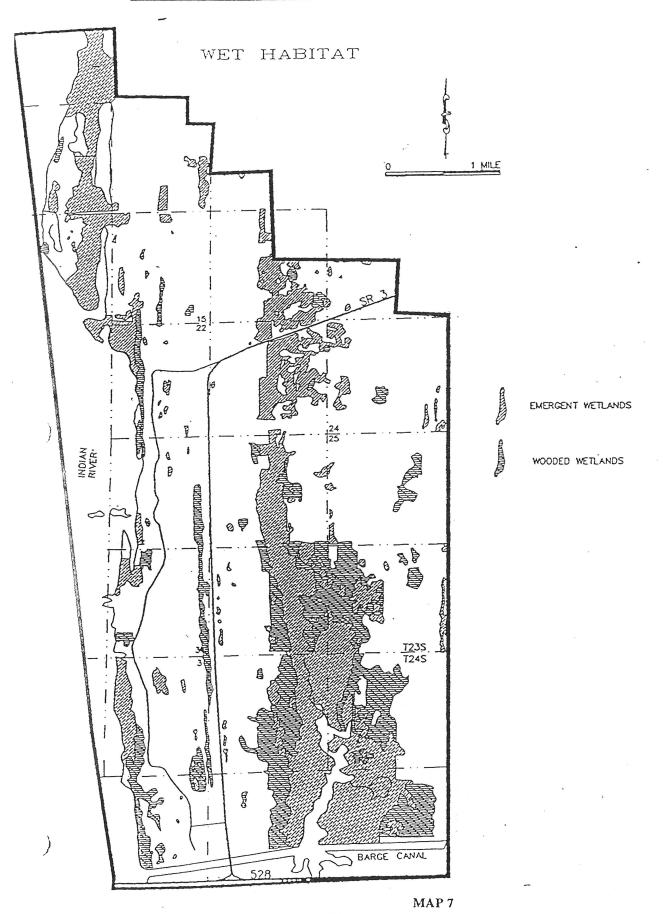
Seasonal (warm weather) increases in drift algae can sometimes affect summertime densities of SAV by smothering new growth. The drift algae is better capable of taking advantage of increased water column nutrients in comparison to sea grasses. Decaying vegetation in the shallow areas between the power plants has resulted in unpleasant odors and numerous citizen complaints.

Increased nutrients in surface waters can be indicative of stormwater from residential and commercial developments. levels -are also often associated with power discharges. As the study area continues to be developed, the contribution of pollutants from its drainage system to the Indian River Lagoon and the Banana River basins is expected to increase. more septic tanks are permitted and lawns are treated with pesticides and fertilizers, water quality degradation may be anticipated to increase. As the stormwater utility program is implemented in this area, there should be the potential for a decrease in stormwater pollution reaching the Indian River Lagoon system.

#### G. Wetlands

Map 7 shows the wetlands found in the North Merritt Island study area. The largest expanses of wetlands are associated with the low lying areas of the Sykes Creek drainage basin and the Indian River Lagoon drainage basin. The western and eastern borders of the study area are estuarine, forested, and herbaceous wetlands. Sykes Creek and its associated drainage wetland are the principal freshwater wetlands in the study area. Numerous depressional marshes and hydric (wet) hammocks occur in the study area, either as isolated wetlands or contiguous with the creek's drainage system. Several manmade wetlands resulting from borrow pit operations can be found in the study area.

Historic diking of the marshes of Sykes Creek, as well as continued development in floodplain and wetland areas, has significantly altered wetland functions and values. Recent surveys by the Natural Resources Division (NRD) indicate that the marsh system north of Hall Road is effectively diked, precluding any tidal influence from nearby lagoonal waters. The wetland complex in this area has been fragmented road construction and encroachment of residential The wetlands of the study area likely provide commercial uses. localized water quality protection for the lagoon and Sykes Creek. These wetlands have the ability to trap sediments and dissolved solids, and filter nutrients and other pollutants from stormwater passing through the marsh as it drains from upland areas. due to the intensive land use and historic reduction of marshes in the upper reaches of the creek, some functional loss of the wetlands has occurred. The loss of wetlands and wetland functions in this area has seasonal water quality degradation of the creek. protection of, and where possible, the enhancement of, existing wetlands is critical to maintaining and improving the quality of adjacent aquatic habitats. Recently, the Environmentally Endangered Lands (EELs) Committee, an organization appointed by the Board of County Commissioners to guide purchase and protection of pristine environmental habitat, has been investigating a substantial portion of Sykes Creek marsh near the Barge Canal and recommended that the County purchase it. The public purchase of this area, known as the Kaaboord Property, will help to ensure its natural and pristine condition. county also owns 300 acres of Sykes Creek to the north of the Kaabbord



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Property which was deeded to the County in the development order for the Bella Vita P.U.D.

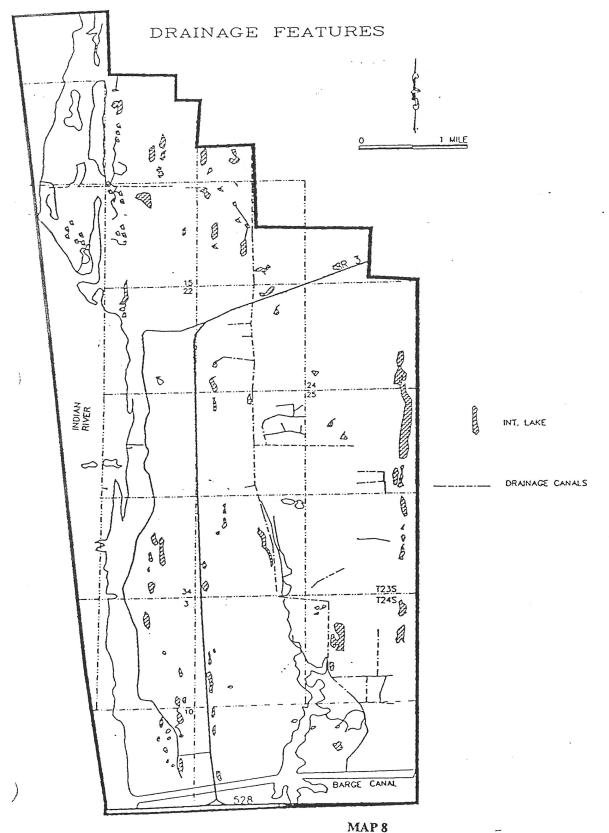
Future development of the marsh is expected to displace flood waters onto upland property, excepting regulatory provisions for compensatory on-site storage of displaced waters. However, provisions for on-site compensatory storage would result in further destruction of the marsh. This practice could increase the amount of marsh actually affected by development, thus further reducing the functional wetland habitats provide. The continued loss of wetlands is contradictory to the policy of "no net loss of wetlands" set forth in the Brevard County Ordinance 89-14, Wetlands Protection. Provisions of the ordinance require the permitted filling of wetlands to be mitigated at a minimum ratio of 2:1, with mitigation to be on site and In other words, for every acre of wetland that is filled on site, two equivalent acres of wetlands must be constructed on the site.

The wetlands associated with the Indian and Banana Rivers, as well as the Sykes Creek wetlands are subject to Brevard County Ordinance 89-14, Wetlands Protection. This ordinance restricts commercial industrial uses within wetland areas. Furthermore, the ordinance restricts the maximum residential density within all water's edge and functional isolated wetlands larger than one acre to one dwelling unit per five (5) acres. However, for a functional wetland system, this density may be costly to these systems, leading to the loss of additional wetland functions through increased habitat alteration. Efforts to further protect wetlands in this area could include a reduction in the density of wetlands areas, or the designation of these areas as conservation areas on the Future Land Use Map, providing protective measures that would assure increased habitat protection. The many important functions that wetlands provide, including flood and stormwater storage, water quality protection and wildlife habitat, may warrant consideration of the designation of conservation for these wetlands.

For identification of wetlands, County staff uses the approved methodologies of the FDER and SJRWMD, and conducts some ground truthing. However, County jurisdictions are considered non-binding by the state until verified or re-established by state officials. The County recognizes all state and federal wetland jurisdictional lines.

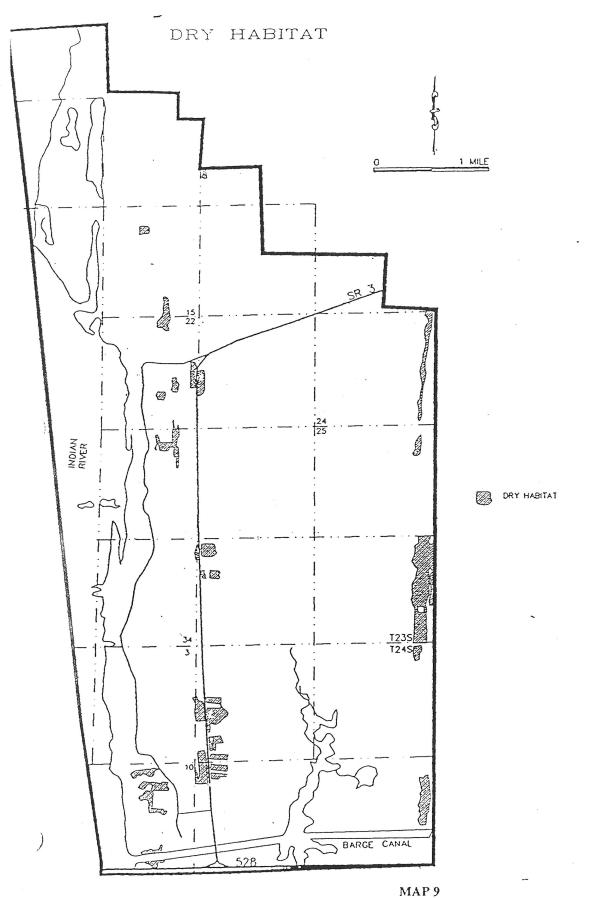
#### H. Drainage Features

The primary drainage features of this area include the basins of the Indian River Lagoon, Banana River and Sykes Creek, along with the Barge Canal (see Map 8). In addition, an extensive system of drainage and irrigation canals has significantly altered the natural drainage features of the area. (See the Stormwater section on page 11 for additional information.)



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#### I. Vegetative Communities

There are 12 major natural vegetative communities found in the North Merritt Island study area. These communities are: scrub, scrubby flatwoods, mesic flatwoods, prairie hammock, bottomland forest, floodplain marsh, basin marsh, depression marsh, hydric hammock, wet prairie, basin swale, and wet flatwoods (see "Endangered Species and Natural Communities in Brevard: Descriptions, Associations and Mapping Methods, 1990" for descriptions of these communities.)

The Tidal Marsh community is found principally in the Sykes Creek drainage area, and in association with the low-lying areas of the Indian River Lagoon basin. Immediately landward of these communities, one usually will find patches of floodplain forest and marshes, interspersed with development and agricultural areas. The scrubby flatwoods (remnants) are located further up-slope within the most developed areas. Ridge and swale systems characterize the interior of the study area.

The Atlantic Coast barrier island soils and geographic features of the study area support the dry communities (scrub and scrubby flatwoods). Patches of wet prairie, wet flatwoods, dry prairie and prairie hammocks are found scattered throughout the mesic flatwoods and developed areas. Depression areas are found throughout the mesic flatwoods and dry communities of the old dune complexes. A few areas of basin marsh and hydric hammock exist in the vicinity of the Barge Canal.

Limited distribution, accompanied with continued development pressures, have combined to make the dry communities of the barrier islands rare. These communities found in peninsular Florida are high and dry, making them ideal for development. Map 7 shows the distribution of these dry communities within the study area. The Florida Natural Areas Inventory (FNAI) lists all of these communities as endangered. These communities will be discussed further in the following section.

### J. Potential Habitat for Listed Species

All of the natural communities that occur in the North Merritt Island study area represent potential habitat for endangered plants and animals. The emergent and wooded wetland communities of the study area potentially support a large number of endangered plants and animals. The dry habitats illustrated in Map 9 are of special concern for several reasons. All of the dry habitats that occur within the study area are listed by the FNAI as endangered. These habitats are known to support several endangered species of animals.

Florida Scrub Jays are found in many of the remaining dry habitats along the barrier island. This bird is listed as endangered by the United States Fish and Wildlife Service (USFWS), and it is protected by the Endangered Species Act. This act prohibits the taking of species listed as threatened or endangered by the USFWS. Recently, the USFWS has considered the destruction of habitat as a taking of the

organisms. For this reason, large development projects taking place in these dry areas will be subject to scrutiny from the USFWs.

Gopher tortoises are also found in many of these dry habitats. This species is protected by state law. It has been listed as a Species of Special Concern by the Florida Game and Fresh Water Fish Commission (FGFWFC), and it has been listed as a Threatened Species by the Florida Committee on Rare and Endangered Plants and Animals. It has been estimated over eighty (80) species of wildlife are known to use gopher tortoise burrows. The single largest threat to the tortoise population is probably destruction and alteration of habitat by man. Large projects in dry habitats will be faced with relocating or conserving habitat for this species.

The Barge Canal is located in the southern portion of this planning area. The area has been identified as a manatee protection area by the Florida Department of Natural Resources (FDNR). The West Indian manatee is listed as endangered by the FGFWFC and the USFWS. To protect the manatee, boats are limited to idle speed while in the canal. Any development which has the potential to adversely impact the manatee, whether through habitat destruction or increased boating traffic, will need to be reviewed by these agencies and the County, to ensure adequate protection measures are utilized.

#### V. INFRASTRUCTURE

#### A. Potable Water

Potable water in North Merritt Island is provided by the City of Cocoa public water system and private wells. The City draws its water supply from well fields in eastern Orange County. The design capacity of the City's treatment plant is 41.5 million gallons per day (MGD) with 7.7 MGD capacity remaining. The City is also constructing an aquifer storage recovery system that can hold 400 to 500 million gallons, which can supply additional water when needed during periods of peak demand. This capacity is not dedicated solely to North Merritt Island, but may also be used to supply future development within the Cocoa service area. Other areas dependent on the City of Cocoa for potable water include: South Merritt Island, Cocoa Beach, Cocoa, Rockledge, Canaveral Groves, Port St. John, Suntree, the Viera Development of Regional Impact (DRI), and the Great Outdoors DRI.

#### B. Sanitary Sewer

The Brevard County Comprehensive Plan designates all of North Merritt Island as a future service area for sanitary sewer, however there are no scheduled extension of sewer lines through 1996. The southwest portion of the study area (coterminous with the 4 du/ac density area) is in the 0-5 year service area and the remainder of the area is in the 6-20 year service area. Treatment capacity is provided by the 6.0 MGD Sykes Creek Regional Wastewater Treatment Plant, which is located within the study area. The average actual flow and committed flow of the plant is 3.398 MGD, with 2.602 MGD remaining capacity which is

enough to serve 13,500 additional dwelling units. The effluent from this treatment plant receives advanced secondary treatment, high level disinfection and is then disposed of through deep well injection, except for that portion that is reclaimed. The most recent water quality data is in compliance with state standards. The majority of effluent entering the plant is from the central and south portion of Merritt Island, outside of the study area.

The study area is designated as a Mandatory Reuse Area. This requires developments that install sewer lines to install dual lines for reclaimed wastewater. The reclaimed water is used for non-potable uses such as irrigation, which assists in groundwater recharge.

Areas not serviced by public sewer use package treatment plants or onsite sewage disposal systems (OSSDs), also known as septic tanks. Septic tanks are subject to the requirements of Chapter 23, Article 5, Brevard County Code and Chapter 10D-6, Florida Administrative Code (F.A.C.). In general, these regulations restrict residential density to no more than 4 dwelling units per acre when using OSSDs and public water supply.

A recent preliminary study for septic tanks permitted in the area within the last three years, reports 21 septic tank failures, including both private and commercial/industrial systems.

#### C. Solid Waste

All residential and commercial solid waste generated in Brevard County is received at the Central Processing and Disposal Facility located on Adamson Road in West Cocoa where it is shredded and disposed in the landfill. Brevard County has acquired land for a south county landfill which will assure that the solid waste level of service will continue to be met.

#### D. Stormwater Management

Stormwater can cause significant flooding and environmental degradation in North Merritt Island, as it does throughout Brevard County and the State of Florida. The quantity and quality of urban and rural stormwater runoff has been correlated to changes in population density, land use, and construction and agricultural practices. Presently, state, regional, and local laws regulate the discharge of stormwater from a quantity and quality basis. Stormwater runoff from development which occurred prior to the promulgation of these regulations, however, continues to cause flooding and water quality problems.

Runoff from paved areas, such as streets and parking lots, contribute oils, greases, nutrients, solids and heavy metals to surface and groundwaters of the area. Rural runoff from farm fields, feedlots, and pastures add pesticides, solids, nutrients and oxygen-demanding contaminants to water resources. Residential land use practices of lawn and garden fertilization, improper disposal of grass clippings, and frequent irrigation results in increased water pollution as well.

The Brevard County Stormwater Master Plan identifies the area to the east of North Courtenay Parkway as a problem flooding area caused by the low, flat terrain of the Sykes Creek drainage basin (This plan is currently in development and will eventually plan for possible improvements to identified problem areas). Also, development in the basin has led to an increase in fill material and impervious surfaces which can exacerbate flooding problems. Fill material displaces stormwater which would normally occupy that area resulting in increases of stormwater in other areas. Impervious surfaces inhibit infiltration of stormwater into the ground and causes stormwater to be conveyed to other areas more quickly due to the smoother surface.

#### E. Recreational Facilities

Brevard County classifies parks into three types when calculating level of service (LOS): neighborhood, community, and urban-district. Neighborhood parks are "walk to" parks located within easy walking access to neighborhoods along streets where people can walk or bike without encountering heavy traffic. It serves a population of a neighborhood radius of not more than 1/2 mile. Community parks serve a larger service area of up to a five mile radius and normally range from 20 to 100 acres in size. They usually are located on collector streets and serve several neighborhoods. Urban-district parks are intended to serve the entire planning area or possibly several that are accessible given a 10 to 15 minute driving time. These are large natural and/or landscaped areas that provide for both intensive and passive recreation. They normally are greater than 70 acres and are located in the urban periphery.

North Merritt Island lies within the Merritt Island Recreational Planning Area. As a whole, the Merritt Island Recreational Planning Area contains 19 parks of which 5 are neighborhood parks, 2 are community parks, 2 are urban-district parks, 5 are special use parks, and 5 are undeveloped. The existing recreational level of service in the MIRPA, which is based on neighborhood, community and urban-district developed park acreage, is 3.85 acres per 1,000 persons. This exceeds Brevard County's adopted LOS of 1.2 acres per 1,000 persons. A concurrency review indicates that with the present parks the MIRPA will maintain an acceptable LOS through the year 2005.

There are three (3) County-owned parks in the North Merritt Island planning area: King Park, Manatee Cove Park, and The Savannahs Golf Course (see Table 2). King Park is located off of Chase Hammock Road and is limited to passive recreation and recreational water vehicles. Future facilities will include parking, picnic facilities, playground, softball and soccer fields, and an archery range. Manatee Cove Park is located off North Tropical Trail near Porcher Road and currently has a boat ramp which will be removed due to the presence of manatees in the area. Future facilities will include improved parking, picnic facilities, restrooms, boardwalk, and a fishing pier. The Savannahs 18-hole public golf course is located south of Hall Road.

Table 2
Inventory of Recreational Facilities Within the
North Merritt Island Study Area

Name	- Acres	Ownership	Park Type
King Park	240.0	County	Urban-District
Manatee Cove	Park 39.4	County	Undeveloped
The Savannahs	168.1	County	Special Use
TOTAL	447.5		

Source: Comprehensive Planning Division, 1991.

These three park facilities address North Merritt Island's needs for urban-district and community size parks, however there are no neighborhood size parks nor are any planned.

#### F. Traffic Circulation

The main roadway network on North Merritt Island consists of two parallel north-south roads, North Courtenay Parkway and North Tropical Trail. These roads are traversed at approximately one mile intersections by Grant Road, Hall Road, Chase Hammock Road, and Crisafulli Road. North Tropical Trail merges with North Courtenay Parkway south of the Pine Island Road intersection. The Christa McAuliffe Memorial Bridge and access to North Courtenay Parkway are located at the southern end of the study area and the Kennedy Space Center is located at the northern end.

#### North Courtenay Parkway

North Courtenay Parkway is the major roadway in North Merritt Island. It is a two-lane undivided road and is designated as a minor urban arterial from SR 528 north to the Kennedy Space Center (KSC) entrance. This type of facility provides an interconnection between principal arterials—which conveys trips of longer overall length—to other principal arterials and major traffic generators (i.e., KSC). Existing traffic counts indicate that 68% of the traffic on North Courtenay Parkway at Hall Road is through traffic destined to or from KSC.

Existing and historical traffic count data is provided in Table 3 for North Courtenay Parkway north of North Tropical Trail and south of Hall Road. The existing traffic volume at Hall Road is 16,000 average daily trips (ADT) and at North Tropical Trail is 10,800 ADT. The historical data indicates a 5.5% annual growth rate at Hall Road and a 6.8% annual growth at North Tropical Trail for the 8-year period from 1981 to 1989. Detailed traffic counts indicate little variation occurs in the average weekday volumes. The weekend daily volumes are 35% to 40% of the average weekday volumes at North Tropical Trail, and 60% to 70% of the average weekday volumes at Hall Road.

Table 3
Historical Traffic Counts - North Courtenay Parkway

	South of	North of
<u>Year</u>	Hall Road	Tropical Trail
1981	11,273	6,988
1982	12,102	7,263
1983	12,460	7,676
1984	12,840	8 <b>,</b> 150
1985	13,172	8 <b>,</b> 700
1986	14,322	9,988
1987	12,428	8,982
1988	14 <del>,</del> 525	10,447
1989	16,200	10,800

Source: North Courtenay Parkway Widening Project
Preliminary Engineering Report
Stottler Stagg & Associates, 1989

The level of service is a way to describe the operating condition of a roadway when it is accommodating any given volume of traffic. represents the result of a combination of factors such as speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs. The level of service may be used as a guideline to determine whether or not a particular roadway needs to be improved. There are six levels of service described in the 1985 Highway Capacity Manual developed by the Transportation Research Board, and they range from "A" to "F". of service A represents a condition of free flow where the driver experiences little interruption in driving. Level of service F represents a condition of forced flow with high congestion and The current traffic counts indicate that North frequent backups. Courtenay Parkway is operating at level of service (LOS) F, but will improve to LOS B upon completion of the county-initiated four-laning scheduled for 1992.

After completion of four-laning to both North Courtenay Parkway and the Christa McAuliffe Memorial Bridge, North Courtenay Parkway will come under the State Highway System. The Florida Department of Transportation (FDOT) will set a LOS E as the minimum acceptable level of service and impose Level III access management criteria. These criteria set standards for median cuts, traffic signals, and driveway spacing.

As North Merritt Island continues to grow, greater demand will be placed on North Courtenay Parkway. The following analysis assumes certain road conditions and then determines the maximum traffic level that can be accommodated. This maximum traffic level can be converted to dwelling units (du's), therefore establishing a maximum level of du's allowable in North Merritt Island.

The critical assumptions in this analysis are:

- 1) The Kennedy Space Center will not generate a significant number of new trips on North Courtenay Parkway. Employment at KSC is growing at less than 1% per year and it is likely that most new trips will originate from the mainland and use other routes.
- 2) Only 67% of new du's are generating one peak hour trip. This figure was taken from a traffic report conducted for North Merritt Island in 1987 which determined 67% of existing du's were generating one peak hour trip. If 100% of new du's were generating one peak hour trip, then the build out would be overestimated by 1400 du's or 32%.
- The number of commercial uses along North Courtenay Parkway will not increase significantly enough to contribute additional trips or further degrade roadway capacity from high use driveways.
- 4) The road is 4-laned and has a maximum acceptable level of service of "E" which allows 48,300 vehicles per day.
- 5) There will be no additional lanes added to North Courtenay Parkway, nor will an alternate roadway be constructed that connects S.R. 528 to KSC.

The following methodology was used:

- 1) The maximum acceptable peak hour volume of traffic for a fourlaned North Courtenay Parkway operating at LOS E is 4590 vehicles.
- 2) The current volume of traffic using this peak hour capacity is 1700 vehicles.
- 3) The difference between the maximum acceptable peak hour volume and the current volume shows that 2890 new trips would be allowed before the traffic volume exceeds the acceptable LOS.
- 4) Assuming that 67% of new du's are generating one peak hour trip, then 4313 new du's can be accommodated.
- 5) Adding the new 4313 new du's to the 1498 existing du's, allows for a total build out of 5811 du's.

This analysis can be used along with possible build-out scenarios to determine appropriate residential density guidelines; however, the analysis is subject to error resulting from the various assumptions and should not be rigorously applied.

#### North Tropical Trail

North Tropical Trail is classified as a local road serving as a collector. Residential areas use the road to gain access to North Courtenay Parkway. As the residential areas along the road continue to grow, traffic will increase and road service and safety will In a report by Vanasse Hangen Brustlin, Inc. (1991), North Tropical Trail is classified as a "constrained corridor" which means it cannot be widened by two or more lanes. The constraint is policy constraint--as considered a opposed to a physical environmental constraint -- which means improvements to the roadway are projected to be unacceptable to the Metropolitan Planning Organization, a local government, and/or the public. Alternative solutions will have to be developed in order to adequately serve the traffic as well as pedestrians/bicyclists that use the road. Possible

solutions include: engineering improvements other than widening such as increasing existing lane width, realignment or curve softening, development restrictions on adjacent land, density reductions, alternative travel modes, increase in automobile occupancy, reduction in peak period travel demand, and improvements to North Courtenay Parkway to reduce "cut-through" traffic.

## Christa McAuliffe Memorial Bridge

The Christa McAuliffe Memorial Bridge, also known as the Barge Canal Bridge and the Purple Bridge, is a drawbridge on North Courtenay Parkway that spans the Barge Canal. The bridge, when raised, stops traffic flow and has a negative affect on the North Courtenay Parkway LOS. The bridge is scheduled to be widened to four lanes beginning in late 1993, however it will remain a drawbridge. This project is being conducted by FDOT and includes the portion of North Courtenay Parkway north of the Barge Canal to Grant Road.

#### G. Other Public Facilities

#### Schools

There are no schools within the study area however the Brevard County School Board has purchased an approximately 30 acre parcel on the north side of North Courtenay Parkway near the North Tropical Trail intersection. It is anticipated that this site will be used for construction of an elementary school.

#### Fire Protection

The County maintains fire station #40 at the north end of North Tropical Trail.

# Florida Inland Navigation District Dredged Material Disposal Site

In October 1991, the Florida Inland Navigation District (FIND) purchased a portion of Parcel 33, Township 23, Range 36, Section 22 for use as a dredged material disposal site (referred to by FIND as site BV-11). The site is intended for intermittent use for 50 years by the U.S. Army Corp of Engineers as a disposal site for sediment dredged during maintenance of the Intercoastal Waterway in the Indian River Lagoon. The first use of the site for the placement of dredge material is projected to begin in 1997. As a secondary use, a lessee will continue to operate citrus groves on the property which will act as a buffer between the site and adjacent properties.

The purchase of this property by a governmental entity for spoil disposal will preclude other types of land uses. Chapter 163, Florida Statutes lists spoil disposal sites as public facilities. Policy 8.16 of the Brevard County Comprehensive Plan Future Land Use Element states lands managed by a government entity should be considered for designation as a public facility land use.

The following is a description of the site as provided in "Environmental Site Documentation for Proposed Dredge Material Disposal Areas in Brevard County, Volume VII - BV-11":

BV-11 is a 95.8 acre site located on Merritt Island. The property lies approximately 3 miles north of S.R. 528 and one-tenth mile west of North Courtenay Parkway. It is bounded on the west by North Tropical Trail and on the east by a wetland stream forest. Site elevations range from +10 feet National Geodetic Vertical Datum (NGVD) on the western boundary to +5 feet and below along the eastern wetlands.

The site is covered by maintained orange groves with the exception of the eastern edge which is covered by swamp forest. There are three soil types represented on this site which range from poorly drained swamp soils found within the forested wetland along the eastern boundary to the well-drained Tavares sand in the gently sloping higher areas of the grove. The third soil type, poorly drained Myakka sand, occurs along the western boundary, central depression and the border of the forested wetland.

A review of the Florida Master File indicates no historical or archaeological sites known on this property.

The proposed pipeline easement leaves the site from the northwest corner and goes east along an existing grove road to an undeveloped but partially cleared point of land along the Indian River.

While the site has been purchased for a spoil disposal site, further environmental assessments will be conducted as part of the federal permitting process. Concerns regarding the site's impact on the environment, particularly with relation to the groundwater supply, will continue to be monitored by Brevard County.

#### VI. HURRICANE EVACUATION

A hurricane is defined as a warm core tropical cyclone in which the maximum sustained surface storm is 74 miles per hour or greater. Using the Saffir/Simpson Hurricane Scale (see Table 4) developed by the National Hurricane Center, hurricanes are classified by their intensity from a Category 1 to Category 5 storms.

# Table 4 Saffir/Simpson Scale

	A CORPORATION OF THE PROPERTY OF A		
Category	Sustained		Storm Surge
Number	Winds (mp)	1)	Height (feet)
1	74-95		4-5
2	96-100		6-8
3	111-130		9-12
4	131-155		13-18
5	over 155		above 18
	o v cr roo		above to

Source: East Central Florida Regional Planning Council, 1984

## A. Vulnerability and Inundation Analysis

The National Oceanic and Atmospheric Administration, National Weather Service developed a model to estimate hurricane storm surge inundation. The SLOSH (Sea, Lake and Overland Surges from Hurricanes) model was recently completed for Brevard County and can be used to estimate a worst case scenario of hurricane storm surge inundation. The SLOSH model predicts that all of the North Merritt Island study area would be inundated during a Category 5 hurricane and areas at or below approximately 5 feet would be inundated during a Category 3 hurricane.

\*

The Brevard County Office of Emergency Management completed an analysis of possible roadway inundation based on the SLOSH model. The results of this comparison revealed that portions of all major roadway links and causeways will be affected in even a Category 1 storm. Additionally, it was noted that the most vulnerable segment of the evacuation network were the approaches to the causeways.

Although storm surge is not expected to occur until immediately preceding hurricane landfall, tropical storm force winds are expected to arrive approximately 11 to 12 hours prior to landfall. Blowing debris and water can impede traffic flows on causeways and high winds can make high-rise bridges impassible. Thus, safe evacuation should be completed prior to the arrival of these storm effects.

A study by the East Central Florida Regional Planning Council (which provides most of the data and framework for this analysis) using the best available data on evacuation responses and storm characteristics reveals that most people would evacuate within a 7 hour period. However, this evacuation would be distributed across a behavioral response curve, with the largest percentage of the population evacuating the fifth hour after the order was given.

When this seven (7) hour behavioral response is added to the 11.5 hours needed for evacuation prior to landfall of the tropical storm force winds in a Category 3 to 5 storm, a total of 18.5 hours is

needed to allow for a safe evacuation. Thus the above assumption that surge-induced blockage will not significantly affect evacuation holds true only if the residents can be evacuated within the 18.5 hours in the worst case scenario. However the evacuation should be completed approximately 11.5 hours prior to landfall in order to escape the developing hazards associated with tropical storm force winds.

### B. Evacuation Route Capacities

The North Merritt Island planning area is in Evacuation Zone A. The evacuation route for North Merritt Island is north on North Courtenay Parkway and then west on the NASA Causeway to SR 405. Evacuation volume will increase south to north on North Courtenay Parkway. As long as the green time ratio favors North Courtenay Parkway, signals at Hall Road, the NASA Causeway, and other future locations should not substantially reduce capacity. It is assumed that little traffic will be generated by the Kennedy Space Center, which will have completed its emergency preparations early in the warning period. If the green time ratio is .85, capacity will be 1247 passenger cars per hour per lane.

The critical element is the ramp at the NASA Causeway interchange with North Courtenay Parkway. Although North Courtenay Parkway is being widened to four lanes by both the County and NASA, the ramp from northbound North Courtenay Parkway to westbound NASA Causeway is one Thus, the additional capacity being added to North Courtenay Parkway is of little help to evacuation. If the ramp was widened to two lanes, the evacuation capacity on North Courtenay Parkway would increase to 2494 passenger cars per hour per lane. As long as there is surplus capacity available on North Courtenay Parkway, evacuation traffic from Cocoa Beach, Cape Canaveral, and central Merritt Island, could be redirected north from SR 528 to reduce demand on the overburdened Bennett Causeway. The installation of turn lanes dual ramp at the North Courtenay Parkway/NASA Causeway and interchange is an effective means to substantially enhance evacuation capacity in North Merritt Island as well as central Merritt Island.

### C. Population Capacity Analysis

The North Merritt Island 1990 population of 3503 would require 1845 (assuming 1.9 persons per car) cars to evacuate, leaving a significant amount of unused capacity. Using the seven hour behavioral response curve and the roadway capacity figures, the maximum number of cars that can be safely evacuated from North Merritt Island can These calculations show that 6235 cars can be evacuated calculated. the seven hours; this converts to 11,840 people approximately 5300 households (or dwelling units). Widening of the NASA Causeway ramp to two lanes would double these figures.

This analysis can be used along with possible build-out scenarios to determine appropriate residential density guidelines; however the analysis is subject to error resulting from the various assumptions and should not be rigorously applied.

#### VII. LAND USE

### A. Existing Land Uses and Zoning

North Merritt Island is predominantly rural in character, consisting primarily of low density single-family residences and large tracts of citrus groves and undeveloped areas. Table 5 shows the acreages currently devoted to various land uses. The existing land uses are generally consistent with existing zonings, with the majority of the citrus groves and undeveloped areas having an agricultural designation (AU). Map 10 depicts the generalized pattern of existing zoning and Table 6 lists existing zoning classifications within the study area.

- Exist	Table 5	
<u>Land Use</u>	<u>Acreage</u>	<u> </u>
Residential	1292	12,6
Commercial	163	1.6
Industrial	52	0.5
Agricultural	3259	31.7
Public Facilities	667	6.5
Vacant/Undeveloped	3828	37.2
Miscellaneous*	1033	10.0
TOTAL	10294	100.0

Includes non-parcelized areas such as open water and rights-ofway.

Source: Geographic Information Division, 1991.

#### Residential

The highest concentration of residential development, with approximate net residential density shown in parentheses, is defined by the subdivisions along North Tropical Trail north of Hall Road, such as Indian Bay Estates (3 du/ac) and Citrus River Groves (2 du/ac). Large subdivisions in other areas of North Merritt Island include: Pine Lakes (1 du/ac) on Pine Island Road, Colony Park (8.25 du/ac), Oak Hammock (1 du/ac) and Kings Park (variable) on North Courtenay, River Island Raquette Club (3 du/ac) on North Tropical Trail, Sea Gate (2 du/ac) on Smith Road, and The Savannahs (3 du/ac) and Bella Vita (6 du/ac) on Hall Road. The average residential density in the portions of the study area with existing or approved residential development is 1.5 du/ac; this includes the above referenced developments as well as other residential development in the study area.

#### Commercial

Commercial uses are limited in number and scale occurring exclusively along North Courtenay Parkway. Criteria for the location of commercial uses are in the Comprehensive Plan under Policies 4.3 through 4.13. These criteria relate to type of use, location, size and spacing.

There are three basic users of North Merritt Island commercial establishments: residents of North Merritt Island, non-residents, and KSC employees during peak traffic hours. Unfortunately, most of the existing uses primarily serve the latter two. There are very few commercial establishments that can serve basic needs of the residents, therefore they are must drive south on North Courtenay Parkway and across Christa McAuliffe Bridge--further increasing traffic congestion--for access to commercial services. North Merritt Island needs a distribution of commercial services that favors the residents in order to reduce trip lengths.

Another problem with the commercial uses along North Courtenay Parkway, is the high number of driveways. Combining the number of commercial driveways with the intense traffic they tend to generate can cause a significant impact on the roadway movement efficiency. Traffic making right turns into driveways causes braking and slows traffic in the lane, and traffic that must cross lanes to make a turn decreases the safety of the roadway. Management of commercial access along North Courtenay Parkway is critical to maintaining an acceptable level of service, and can be instituted as part of the widening project.

#### Industrial

Industrial uses are predominant along the Barge Canal, southern North Courtenay Parkway and near the NASA gate on North Courtenay Parkway. There are two significant industrial uses in North Merritt Island: Big Three Industries at the NASA gate and Sea Ray at the Barge Canal and North Courtenay Parkway. Both of these industrial areas should be buffered from residential development through appropriate land use controls. Sea Ray is not a significant concern due to the roads and waterways located around its perimeter, however Big Three Industries is in an undeveloped area that could develop as residential.

Other industrial uses are primarily warehouses and there are a few commercial uses with industrial zonings mostly located on the south end of North Courtenay Parkway. Also, there are six non-conforming industrial zonings on or near Pine Island Road, consisting of such things as an old auto shop and a junkyard.

Recently, Foreign Trade Zone officials have considered expanding the FTZ to include an area in North Merritt Island that is located near the KSC Gate. The property totals 183 acres and is has a Agriculture Residential zoning classification (AU).

Table 6

Existing Zoning Classifications within North Merritt Island

#### AGRICULTURAL

AU

AGRICULTURAL RESIDENTIAL

#### RESIDENTIAL

REU RURAL ESTATE USE RESIDENTIAL

RR-1 RURAL RESIDENTIAL

SEU SUBURBAN ESTATE RESIDENTIAL USE

SR SUBURBAN RESIDENTIAL

ESTATE USE EU EU-1 ESTATE USE EU-2 ESTATE USE

RU-1-13 SINGLE FAMILY RESIDENTIAL

RA-2-10 SINGLE FAMILY ATTACHED RESIDENTIAL RU-2-10 MEDIUM-DENSITY MULTIPLE-FAMILY RESIDENTIAL

#### MOBILE HOME RESIDENTIAL

TR-1 SINGLE FAMILY MOBILE HOME TR-2 SINGLE FAMILY MOBILE HOME

TR-3 MOBILE HOME PARK

#### COMMERCIAL

BU-1-A RESTRICTED NEIGHBORHOOD RETAIL COMMERCIAL

BU-1 GENERAL RETAIL COMMERCIAL

BU-2 RETAIL, WAREHOUSING AND WHOLESALE COMMERCIAL

#### INDUSTRIAL

PIP PLANNED INDUSTRIAL PARK

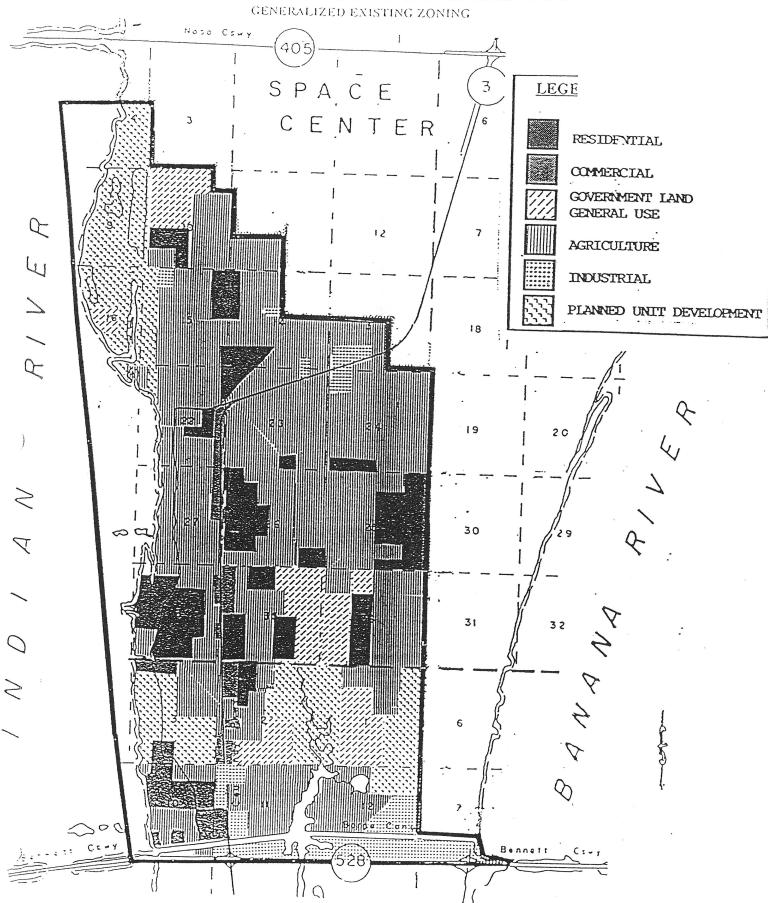
IU LIGHT INDUSTRIAL IU-1 HEAVY INDUSTRIAL

#### GENERAL USES

GU GENERAL USE

PUD PLANNED UNIT DEVELOPMENT GML GOVERNMENT MANAGED LANDS

Source: Comprehensive Planning Division, 1991.



#### B. Future Land Use

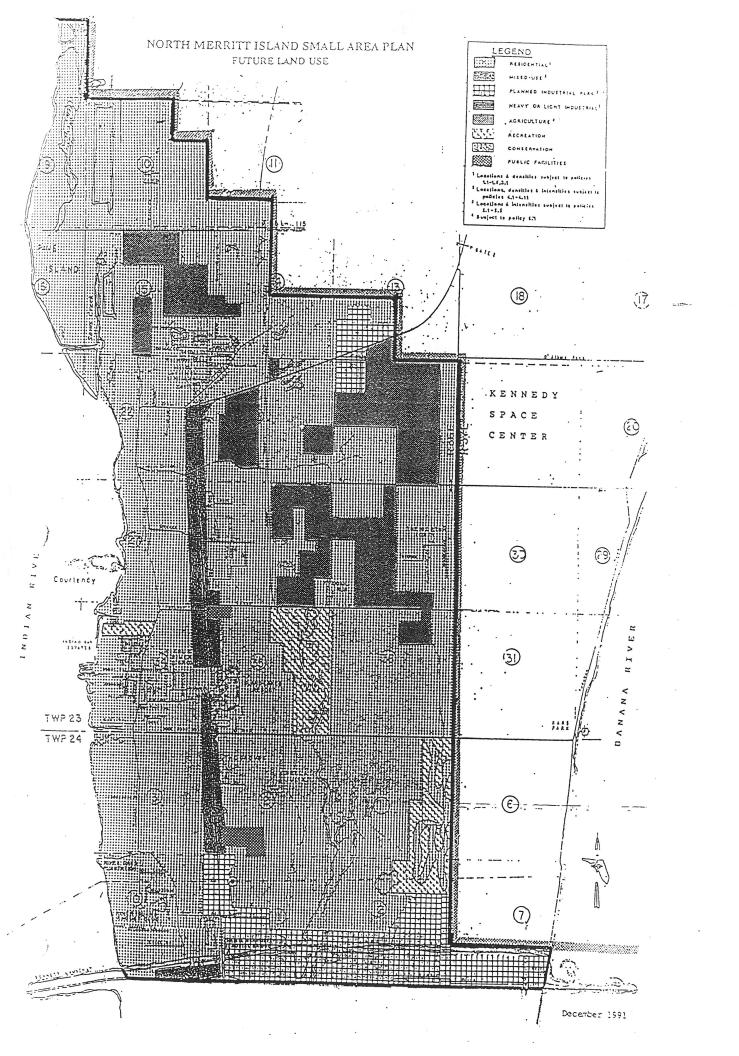
The 1988 Brevard County Comprehensive Plan establishes specific future land use designations and residential density area (maximum allowable residential density) designations which are depicted on the Future Land Use Map (FLUM) Series and adopted as part of the Future Land Use Element (FLUE). The FLUE also contains policies and criteria which guide how the various designations shall be applied. The Comprehensive Plan and Chapter 163.3202, Florida Statutes requires zonings to be consistent with land use designations.

The existing future land uses designated on the FLUM Series, as shown on Maps 11 and 12, are described below with the relevant policy from the FLUE of the Comprehensive Plan. Table 7 shows the existing future land use designations by acreage.

πablo 7	
	ons by Acreage
Acreage	Percentage
7266	71%
353	3%
950	9%
1225	12%
447	. 4%
53	1%
10,294	100%
Planning Division,	1991.
	7266 353 950 1225 447 53

#### Residential

Residential uses, directed by Objectives 1 & 3 of the FLUE, include single-family detached, single-family attached, multiple-family and mobile home developments. This is the predominant land use designation in North Merritt Island, occurring over a majority of the study area except the North Courtenay corridor, along the Barge Canal, and scattered areas in the center of the study area. residential density of four (4) dwelling units per acre (du/ac) may be considered in the area west of Sykes Creek and south of Church Road within the Urban Fringe residential density area. The remainder of the study area is designated with a maximum allowable density of Suburban 2 du/ac, except for a portion at the north end of Banana River Drive designated with a maximum allowable density of Urbanizing These are maximum densities abd are subject to more restrictive policies per FLUE Policy 1.6. A build-out scenario at these densities could result in a total of 11,905 units, a 695% increase from the current 1498 units.



### Mixed Use\_

The mixed use district, directed by policy 4.1 of the FLUE, permits consideration of commercial, professional office, and residential zoning categories. The mixed use districts in the study area occur exclusively along the North Courtenay corridor. Approximately half of the parcels in the mixed use districts are vacant, but most of the parcels do have a commercial zoning which could create the traffic problems outlined in section VII.A.

### Planned Industrial Park / Heavy & Light Industrial

Planned industrial park (PIP) uses are directed by Policy 5.2 & 5.3 of the FLUE and include office and professional uses, light industrial uses involving exclusively indoor activities such as manufacturing, assembling, fabricating, warehousing, retailing and commercial. The PIP land use designation, which only permits planned industrial park (PIP) zoning, is an effective land use for buffering between residential land uses and heavy industrial land uses.

The PIP district occurs along the Barge Canal and intersection with North Courtenay Parkway. Most of the zonings in this area however are light industrial (IU) or heavy industrial (IU-1) which is not consistent with the PIP land use designation. Also, an area of PIP occurs on North Courtenay near the NASA gate, however the only industrial use in that area is Big Three Industries.

### Agriculture

Activities within the agriculture land use designations are directed by Policy 6.1 of the FLUE and may include, but are not limited to, row, vegetable, and fruit crop production, dairy, poultry, and livestock production, aquaculture, silvaculture, horticulture, and apiariculture. Residential development is also permitted in this district consistent with residential density map. The agriculture districts in the study area are restricted to large scattered parcels throughout the central and north part of the study area and are primarily dedicated to citrus.

The United States Department of Agriculture classifies the areas on Merritt Island that are in citrus grove as "unique farmlands." Unique farmland is defined as having a special combination of soil quality, location, topography, growing season and moisture supply necessary to produce high yields of specialty crops such as fruits, vineyards, and vegetables. Since unique farmalnd cannot be relocated, agricultural use of these lands should take precedence over other land uses when possible.

### Recreation

The recreation land use designation, directed by Policy 8.14 of the FLUE, is used to identify public parks and recreation areas. There are three public parks in the study area: Manatee Cove, The Savannahs golf course, and Kings Park. (See Section V.E. for park details.)

### Conservation

The conservation land use designation, directed by Policy 2.1 of the FLUE, is for land owned by a governmental agency for the purpose of environmental protection, lands within the Environmental Area (EA) zoning classification, and areas in which it is demonstrated that the preservation of an environmentally sensitive resource will provide an overriding public benefit. There are no conservation land uses designated in the study area, however, as a condition of approval for the Bella Vita planned unit development, approximately 300 acres of the Sykes Creek basin was dedicated to the County for preservation and the County recently purchased the 438 acre Kaaboord Property. These areas would qualify for a conservation designation.

### Public Facilities

The public facilities land use designation, as directed by Policy 8.16 of the FLUE, may include governmentally-managed facilities and systems not limited to those for transportation, potable water, sanitary sewer, drainage, solid waste, education, fire and police protection, emergency medical, libraries, government administration and post offices. There are two public facility designations in the study area. The specific facilities are described in the Infrastructure section of this report.

### C. Build-Out Analysis

Using the residential density guidelines and the environmental ordinances which control density, a build-out scenario for North Merritt Island can be devised. The analysis was conducted on a section by section basis and involved determining areas of existing or approved development, availability of land for residential uses, and environmental constraints. These factors were combined to estimate a possible build-out of residential units, but does not consider growth rates or marketability of future residences. Table 8 shows the results of the analysis.

### Table 8 Residential Build-Out Scenario

Development Scenario			Num	ber of	du's
Current number of du'	s			1.	V-V-1995
Build-out at existing	density			11.	905
Build-out at 2 du/ac				10.	
Build-out at 1 du/ac				6.8	378

Source: Comprehensive Planning Department, 1991.

The analysis shows that the existing 1,498 du's could grow to 11,905 du's if conditions allowed for a build-out of all the developable property in the area. Two other scenarios show the number of du's

that could be built if the entire study area was designated with a residentail density of 2 du/ac or 1 du/ac. Although this analysis is subject to error, and the build-out has no time frame, it is useful for understanding potential impacts that may occur to various systems due to demand by future residents.

# NORTH MERRITT ISLAND TRAFFIC STUDY PART 1 EXECUTIVE SUMMARY

### PREPARED BY THE

BREVARD COUNTY TRAFFIC ENGINEERING DIVISION

JUNE, 1992

# NORTH MERRITT ISLAND TRAFFIC ANALYSIS PART 1 EXECUTIVE SUMMARY

### A. INTENT

The purpose of this analysis is to evaluate current traffic conditions and travel patterns on North Merritt Island and to estimate future traffic conditions under different residential development scenarios. The traffic study; is divided into two parts: an executive summary that outlines the general approach taken in the study and presents the major recommendations, and the detailed traffic study itself.

general, the traffic analysis focuses on four interrelated elements. Two deal with the capacity of facilities -- N. Courtenay Parkway and the intersections with N. Courtenay and SR 528, and two deal with traffic flow -- through trips to and from the Kennedy Space Center (KSC) and local trips generated by North Merritt Island As the number of dwellings increase on North Merritt dwellings. Island, more trips will be generated in the morning and afternoon This locally generated traffic will be added to the peak hours. through trips, or background traffic, generated by KSC. The capacity of N. Courtenay Parkway will be the upper constraint on the amount of traffic that can be carried. In addition, much of the traffic generated by North Merritt Island and KSC must move through the intersections with the north and south ramps of SR 528. The capacity of these two intersections will also influence the amount of traffic that can move to and from North Merritt Island. The goal of the study is to estimate the amount of additional traffic different residential development levels will create and to evaluate the ability of the area's transportation facilities to accommodate the added traffic without exceeding pre-established maximum acceptable congestion levels.

It should be recognized that this study is not definitive or all-inclusive. Many transportation issues pertinent to the future character of North Merritt Island could not be addressed due to staffing and funding limitations. Maximum use was made of current and historical traffic and turning movement counts. However, it is likely that an extensive data collection effort, while perhaps desirable in adding to the precision of current information, would not substantially alter the study's basic conclusions or provide a clearer picture of future conditions.

While the analysis procedures involve standard traffic engineering and planning techniques, underlying the study are assumptions and conditions, that, if proven incorrect over time, could significantly alter the study's findings. Perhaps most significant is the assumption that the increase in background traffic volume would be held to zero. This was done, not because there is a particularly high probability that traffic levels will not increase, but for two reasons related to the intent of the study as outlined above. The

study's purpose is to isolate the affect of changes in traffic volume resulting from variations in residential density. Holding background traffic constant permitted the analysis to focus solely on land use density. Second, the land use density scenarios tested in this report are for buildout conditions. When buildout will be reached is not known. Therefore, the number of years of continued growth in background traffic that should be considered in this study could not be specified. To set a time limit or horizon year by which buildout will occur will in itself be another assumption. Therefore, an attempt was made to keep the report focused on addressing a single issue.

### B. FINDINGS AND RECOMMENDATIONS

This section will present some recommendations concerning transportation issues in North Merritt Island, many of which are related to but not directly treated in the following traffic study.

- 1. N. Courtenay Parkway on North Merritt Island and the intersections at the SR 528 north and south ramps can accommodate at acceptable levels of service the traffic projected to be generated by the 6,878 residential dwelling units forecast under a one-dwelling unit per acre density scenario. Traffic generated by two dwelling units per acre (10,355 total residential units) and buildout at current approved densities (11,905 total residential units) are projected to produce traffic flows in excess of level of service standards. This conclusion is based on an assumed zero increase in background traffic levels and no significant additional traffic generated by commercial land uses. In that background traffic will likely increase in future years, buildout at the one dwelling unit per acre scenario may result in unacceptable congestion levels on N. Courtenay Parkway and the SR 528 ramp intersections. Therefore, the number of allowable dwellings on North Merritt Island should be less than 6,878.
- 2. The traffic study evaluated traffic on N. Courtenay Parkway based on a level of service standard of D. When the Florida Department of Transportation assumes jurisdictional control of the road upon completion of the widening project, the applicable level of service standard will be C. A waiver could be sought from the Florida Department of Community Affairs to permit the use of LOS D as the standard appropriate for N. Courtenay Parkway.
- 3. Transportation and land planning efforts can be directed toward insuring that capacity will remain available within the existing N. Courtenay Parkway corridor in order to accommodate reasonable growth while maintaining safe and efficient traffic flow. The following are some steps that can be taken to preserve capacity on N. Courtenay Parkway and the SR 528 ramp intersections for as long as possible.
  - a. Enhancing the local road network will assist in removing local traffic from N. Courtenay Parkway. This can be accomplished in several ways. The local roads on North Merritt Island consist mainly of narrow rural roads. Such conditions can discourage motorists from using these roads, thereby

increasing the traffic load on N. Courtenay Parkway. As traffic volumes increase in future years due residential growth, these \_roads could develop level of service problems of their own. suggested means to address the situation is to incrementally improve the local road network in conjunction with routine Some localized reconstruction maintenance and resurfacing. could be added to a resurfacing project to remove various as was recently done on Porcher deficiencies, suggestion is not to widen roads such as N. Tropical Trail to four lanes. The intent is to gradually bring the roads up to standards so that whatever additional traffic generated by new growth will not 'further aggravate current deficiencies or be forced to use N. Courtenay Parkway because of a lack of a safe and convenient alternative route. The cost of such upgrades could be borne by new development.

b. For similar reasons, connecting the three paved east-west roads east of N. Courtenay Parkway could be evaluated. an safe, efficient and convenient alternate north-south route, residents east of N. Courtenay Parkway will have little choice but to continue to use N. Courtenay Parkway for all north-south As residential development increases east of N. movement. Courtenay Parkway, this roadway configuration will force more travel demand onto N. Courtenay Parkway. This will place additional burden on the intersections, which could increase the need for signalization and in the long term degrade traffic conditions, reduce travel speeds and lower the level of service on N. Courtenay Parkway. While Judson Rd. may appear to be a candidate for such an alternate route, the environmental impacts of improving and extending it may prove daunting. A location analysis could be conducted in the next few years, funded perhaps through impact fees, to evaluate Judson Rd. and, if necessary, identify other suitable north-south corridors. The study should occur before substantial urbanization eliminates potential continuous routes.

c. Access management provisions should be strictly enforced on N. Courtenay Parkway. Upon completion of the widening project, N. Courtenay Parkway is to be transferred to FDOT jurisdiction. According to recently enacted FDOT access management provisions, the standards applicable to N. Courtenay Parkway stipulate that driveway spacing will be limited to 440 feet and median cuts will be at one-quarter mile intervals. FDOT recognizes that such standards cannot be met in all instances, but both the public and private sectors should attempt to insure compliance with these quidelines whenever possible. Additional access management techniques not covered in the FDOT rule, such as joint use driveways, frontage roads and greater use of side road driveways, can significantly improve the capacity of a road and should be employed wherever possible.

- d. Control of the number and placement of traffic signals is perhaps the most effective means of maintaining the capacity of a road. In general, traffic signals in which at least two-thirds of the total cycle length is devoted to green time for the major street do not adversely affect capacity. A traffic signal such as that at Hall Road has virtually no effect of the level of service of N. Courtenay Parkway. If future signals can operate in a similar manner, controlling side street access to N. Courtenay Parkway will not create a substantial loss in performance. However, this will be possible if side street volumes are not excessive. Thus, the number and operating characteristics of traffic signals are directly linked to the ability of the local street network to diffuse traffic to multiple, rather than few, entry points.
- e. Several short and long term improvements can be implemented at the SR 528 interchange intersections. Longer right turn deceleration lanes are needed at both north and southbound intersections. Additional left turn storage for the north-towestbound dual turn lanes could be added on the northbound approach of the south intersection. A right turn lane should be considered at the Sea Ray entrance. Better signage is needed, especially given the number of tourists on the road. Turning movement volume fluctuates considerably, both throughout the day and from one day to the next. The traffic signal controllers further upgraded and converted to a controlled traffic responsive system that can better adjust to these fluctuations. The county should consider installing video cameras to visually monitor the intersections. With appropriate hardware, traffic signal timings can be revised on an as-needed basis from a remote location. Eventually, the travel demand generated by the combination of both Central and North Merritt Island may rise to the point that traffic signals at the ramps are no longer effective. At that point, major design changes will be required. One method to improve the interchange without a total reconstruction would be the installation of a flyover to carry the northbound-to-westbound traffic that currently must use the dual left turns lanes. Eliminating the left turn movement would allow additional green time for reallocation to other approaches. While this is not an inexpensive option and may be infeasible for environmental or other reasons, major reconfiguration of the SR 528 interchange may be one of the few options available if traffic volumes reach such a level.
- 4. Adding new capacity to the North Merritt Island roadway system via the widening of N. Courtenay Parkway to six lanes or the installation of a parallel roadway is impractical in the near to mid-term. Further widening N. Courtenay Parkway is not seen as a realistic option for engineering, fiscal, environmental and social reasons. Further widening the road would require major reconstruction of the SR 528 interchange to accommodate additional through and turn lanes. Coupled with extensive right-of-way acquisition, relocation and environmental mitigation north of the Barge Canal, such an

improvement project would be vey costly and cause significant community disruption. As a comparison, the current widening of N. Courtenay Parkway and the installation of a parallel bridge over the Barge Canal is costing Brevard County and the Florida Department of Transportation in excess of \$18 million.

The addition of a parallel corridor from SR 528 to the Kennedy Space Center may prove feasible at some future date but cannot be considered as a cost-effective option at present. A parallel corridor would have to be built on Kennedy Space Center property about two miles east of N. Courtenay Parkway. The environmental permitting and necessary mitigation required to construct a two or three lane road traversing a National Wildlife Refuge would be formidable. Due to its location and the need to maintain security, a parallel road would not be open to the public and would primarily serve KSC employees who reside in Cape Canaveral and Cocoa Beach. The number of westbound vehicles exiting SR 528 at the north ramp and turning right, or north, toward KSC, which would reflect the volume of potential users of the parallel corridor, today number only 427 during peak hour. That number increases to a projected level of 747 under the most intense density scenario tested in this study, or less than one quarter of the northbound traffic flow. With a cost of at least \$15 million, the benefit-cost ratio for the parallel corridor does not appear to be acceptable.

## NORTH MERRITT ISLAND TRAFFIC STUDY

PART 2

METHODOLOGY AND ANALYSIS

### PREPARED BY THE

BREVARD COUNTY TRAFFIC ENGINEERING DIVISION

JUNE, 1992

# NORTH MERRITT ISLAND TRAFFIC STUDY PART 2 METHODOLOGY AND ANALYSIS

### A. APPROACH

All vehicles entering or exiting North Merritt Island must either cross the Barge Canal Bridge or pass through the south gate of the Kennedy Space Center. Traffic counts on N. Courtenay Parkway at those two locations will record all vehicular movements to and from North Merritt Island. At peak hour, the traffic stream will consist of two primary components—trips destined for or coming from KSC and trips generated by North Merritt Island itself. Turning movement counts at side streets are an indication of the volume of local trips being generated and the direction such trips are moving.

Peak hour traffic consists mainly of home-to-work trips in the morning and work-to-home trips in the afternoon. Commercial and office activity on North Merritt Island between the KSC south gate and the Barge Canal is relatively limited. The local trips measured in the turning movement counts can, therefore, be attributed to residential dwellings. Again because of the low level of indigenous commercial and office development, local trips during the morning and afternoon peak hours will likely have one trip end off of North Merritt Island. Subtracting the cumulative turning movement volume from the traffic counts taken south of KSC and north of the Barge Canal will indicate the proportion of peak hour traffic at those two points that is local versus through.

Because of the linkage between turning movement volume, local versus through trip generation and residential dwelling units, the traffic impact of future development scenarios can be tested. Ratios can be developed between the current number of dwelling units and the volume of turns onto and off of N. Courtenay Parkway. Multiplying the ratios by the number of dwelling units produced under different density schemes will indicate the level of local trips generated by each option. Adding the local trips to the background through trips will produce a projected total peak hour traffic volume.

A roadway or intersection can accommodate only a certain amount of traffic before undesirable travel conditions are reached. The ability of a facility to carry traffic is determined by its physical characteristics (e.g., number of lanes, presence of medians, turn lanes), traffic conditions (e.g., directional distribution, evenness of flow during the peak hour) and, for intersections, the nature of the traffic signals. A level of service (LOS) analysis measures these factors in order to calculate the traffic volume at which unacceptable conditions are reached. Comparing the projected peak hour traffic to the appropriate LOS maximum acceptable volume determines if the traffic generated under a given density scenario will exceed allowable conditions.

A supplemental LOS analysis was conducted on the intersections with N. Courtenay Parkway and the two SR 528 ramps. The north and south ramp intersections are critical to effective traffic flow on North Merritt Island. The LOS analysis of N. Courtenay Parkway could indicate a particular density scenario is acceptable when, in fact, the projected traffic level could overload the intersections. Current turning movement counts at the ramps were adjusted to account for the upcoming closure of the Sea Ray entrance. Projected north and southbound peak period traffic generated under each density scenario was then added and the LOS of each intersection evaluated.

### B. INPUT DATA

Traffic counts on N. Courtenay Parkway south of KSC and south of Hall Road and on Hall and Grant Roads west of N. Courtenay Parkway were obtained in February and May, 1992. The counts were taken for each direction, at fifteen-minute increments over a 48 hour period, and are summarized in Tables 1 to 4 and Figures 1 and 2. The only available counts for other side streets were taken in 1988. counts were adjusted upward to reflect 1992 conditions based primarily on the number of residential dwelling units served by each respective road. A level of service analysis was not conducted for The counts were used only to estimate turning the side streets. Traffic volume counts were not seasonally adjusted movement volumes. because reliable seasonal adjustment factors for N. Courtenay Parkway are not available and very few tourists will be travelling N. Courtenay Parkway during the AM peak hour.

Attempts were made to obtain traffic counts just north of the Crista McAuliffe Bridge over the barge canal. However, traffic count machines do not produce accurate, reliable counts when vehicles are moving less than 5 mph. The southbound queues that typically form after 3:00 PM north of the SR 528 north ramp meant vehicles were stopped on the counter hoses rendering the counts invalid. Peak hour traffic conditions for N. Courtenay Parkway south of Grant Rd. were estimated based on turning movement counts, upstream and side street traffic counts and field observation.

Turning movement counts were conducted in November, 1990 February, 1992 at the N. Courtenay Parkway intersections with the SR Turning movement counts at Hall Road were taken in 528 ramps. November, 1990 and at the Sea Ray entrance in November, 1991. were taken for each turning movement from 6:00 to 9:00 AM and 3:00 to 6:00 PM and are summarized in fifteen minute increments. turning movement volume for the 3:30 to 4:30 PM peak hour was counted at the N. Tropical Trail and Crisafulli Road intersections in June, For those intersections where turning movement counts are unavailable, estimates were made based on side street directional traffic volume, the number of residential units served by the street, turning patterns at Hall Rd. and the north to south changes in the volume on N. Courtenay Parkway. Counts were balanced to insure the approach volume equals the sum of all turning movements to or from Intersection turning movement counts are shown in that approach. Figures 3 to 12 in the Appendix.

TRAFFIC VOLUMES -- N. COURTENAY PARKWAY SOUTH OF KSC GATE

	Τ.		Π-								LMI																		
	DIRECTIONAL	SPLIT		4.9	17.4	35.9	56.3	93.7	97.8	97.6	88.3	70.7	71.5	63.8	54.3	57.0	49.3	50.8	17.5	8.0	11.1	13.4	21.7	22.2	57.1	71.4	35.5	e e de la completa d	51.8
AVERAGE		TOTAL		283.5	23	39	40	79	418.5	1557,5	1441.5	449.5	326	417.5	497	492	524	850.5	1617	1229	638.5	262	120	54	42	134.5	358		11893.5
AVE		SB		269.5	19	25	17.5	2	o o	37	168	131.5	93	151	227	211.5	265.5	418.5	1334	1130.5	567.5	227	94	42	18	38.5	231	-	5730.5
		NB		4	4	41	22.5	74	409.5	1520.5	1273.5	318	233	266.5	270	280.5	258.5	432	283-	98.5	71	35	26	12	24	96	127		6163
	DIRECTIONAL	SPLIT		9.0 0.0	20.0	34.5	67.7	91.0	98.3	97.8	88.0	68.6	7.07	61.5	56.6	54.4	47.3	49.5	17.4	8.4	11.4	14.5	25.8	20.8	47.4	68.5	33.1		51.3
FEB 13		TOTAL	- !	282	20	29	31	29	411	1580	1373	472	345	434	489	522	541	880	1634	1205	634	255	132	53	38	127	329		11913
FEI		SB		271	16	19	10	9	7	34	165	148	101	167	212	238	285	444	1349	1104	295	218	98	42	20	40	240		5796
		NB	;	-	4	10	21	61	404	1546	1208	324	244	267	277	284	256	436	285	101	72	37	34	=	18	87	119		6117
	DIRECTIONAL	SPLIT	(	0.9	15.4	36.7	49.0	92.6	97.4	97.4	88.7	73.1	72.3	66.3	52.1	0.09	51.5	52.1	17.6	7.7	10.9	12.3	16.7	23.6	65.2	73.9	37.8		52.3
3 12		TOTAL	i C	582	56	49	49	91	426	1535	1510	427	307	401	202	462	202	821	1600	1253	643	269	108	22	46	142	357		11874
FEB		SB	Č	202	55	31	25	4	=	40	171	115	82	135	242	185	246	393	1319	1157	573	236	06	42	16	37	222		5995
		NB	ŗ	<b>\</b>	4	18	24	87	415	1495	1339	312	222	266	263	277	261	428	281	. 96	20	33	18	13	30	105	135		6209
		HOUR	C	>	-		က	4	· 01	9	^	ω	o o	10	11	12	13	4	15	16	17	18	19	20	21	22	23		TOTAL

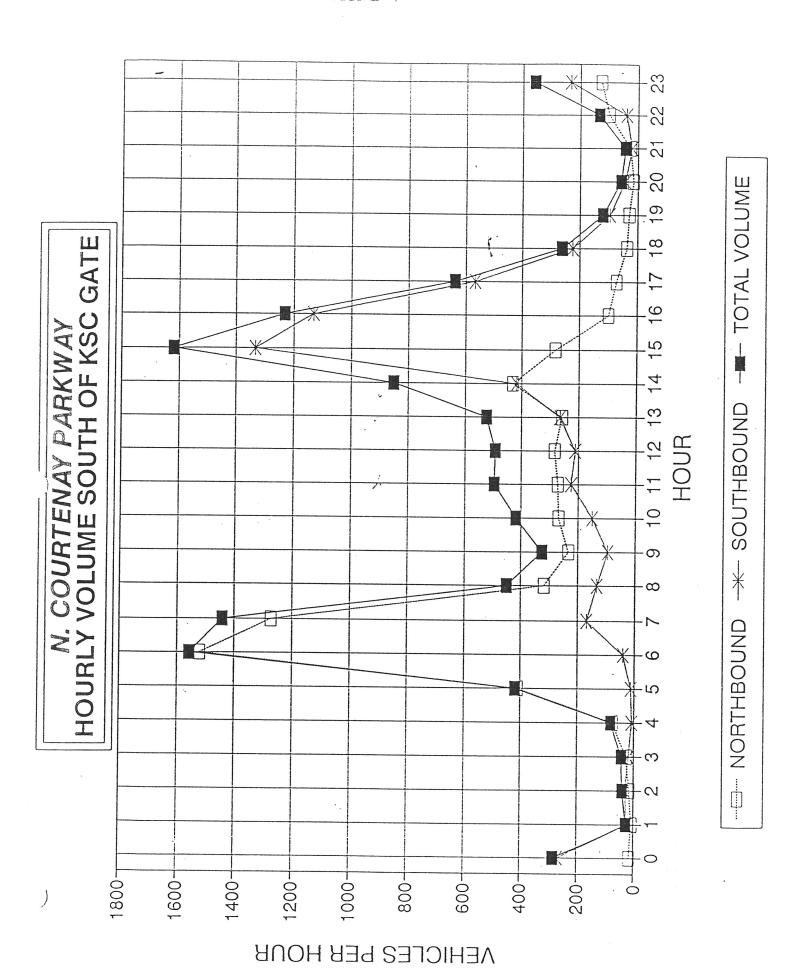
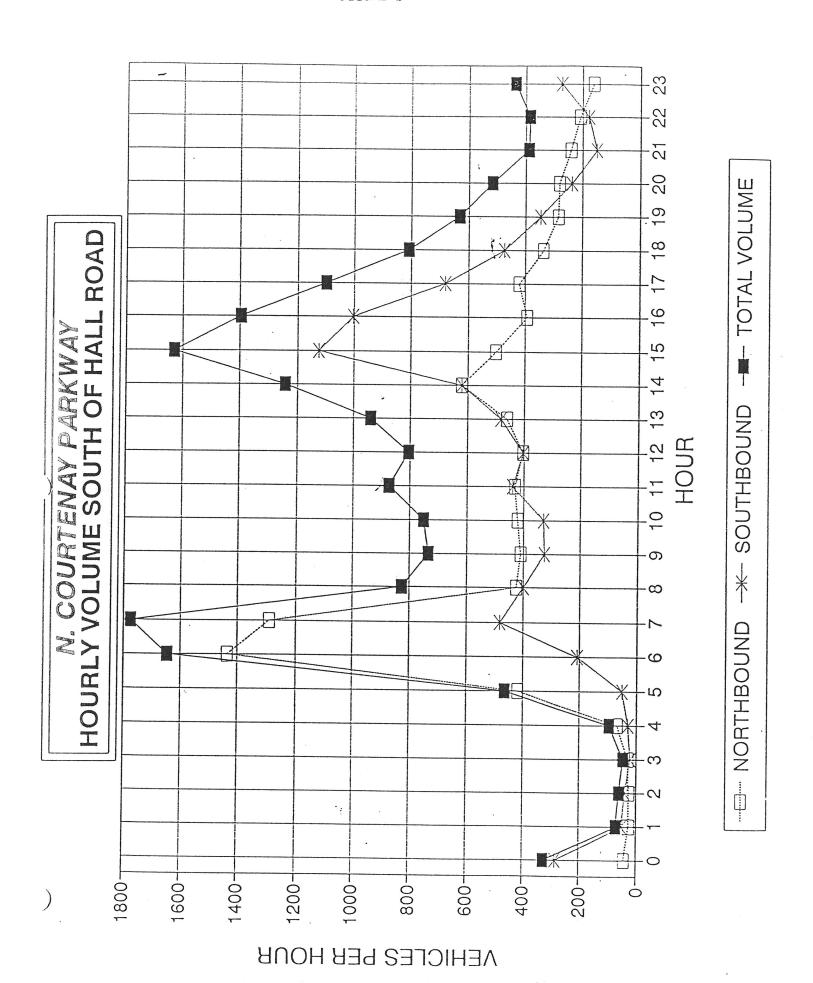


TABLE 2

TRAFFIC VOLUMES -- N. COURTENAY PARKWAY SOUTH OF HALL ROAD

_	_		n																										
	DIRECTIONAL	SPLIT		12.5	33.8	36.7	58.6	70.4	0.06	87.3	72.8	5 1 5	55.8	56.3	9.64	50.1	48.9	49.9	30.9	28.2	38.3	41.3	44.9	54.2	61.5	53.7	37.6		52.0
AVERAGE		TOTAL		323,5	71	09	43.5	94.5	464	1645	1773	825.5	733	749.5	872	805	938	1239.5	1629	1397	1100.5	808	628.5	515.5	389.5	384.5	434		17924.5
AVE		SB	(	283	47	38	18	28	46.5	208.5	481.5	400	324	327.5	439.5	401.5	479.5	621	1125	1003	629	475	346.5	236	150	178	271		8607
		NB	L C	40.5	24	22	25.5	66.5	417.5	1436.5	1291.5	425.5	409	422	432.5	403.5	458.5	618.5	504	394	421.5	334	282	279.5	239.5	206.5	163		9317.5
	DIRECTIONAL	SPLIT		4.4	37.3	35.7	59.2	72.0	90.0	87.6	73.1	51.2	. 56.6	54.8	47.8	48.6	47.8	49.6	31.2	27.7	40.6	41.4	45.1	56.2	6.09	52.3	35.7		51.9
MAY 15		TOTAL	77	20	75	26	49	100	459	1656	1726	828	761	733	933	835	946	1229	1633	1381	1066	801	665	546	432	428	499		18154
M		SB	020	212	47	36	20	28	46	206	464	404	330	331	487	429	494	620	1124	666	633	469	365	239	169	204	321	,	8737
		NB	72	2	28	20	29	72	413	1450	1262	424	431	402	446	406	452	609	209	382	433	332	300	307	263	224	178	And the second s	9417
	DIRECTIONAL	SPLIT	40.0	2 6	29.9	37.5	57.9	68.5	90.0	87.1	72.6	51.9	54.9	57.7	51.7	51.7	50.0	50.2	30.7	28.7	36.1	41.1	44.6	52.0	62.2	55.4	40.1		52.1
IY 14		TOTAL	330	0 0	/9	64	38	88	469	1634	1820	823	705	992	811	775	930	1250	1625	1413	1135	817	265	485	347	341	369		17695
MAY		SB	294	7	7 4	04	16	78	47	211	499	396	318	324	392	374	465	622	1126	1001	725	481	328	233	131	152	221		8477
-		NB	36	C	0 2	74	22	61	422	1423	1321	427	387	442	419	401	465	628	499	406	410	336	264	252	216	189	148		9218
	(	HOOH	0		- c	V (	က ·	4 (	w i	ω	7	ω	o ,	9	-	72	<u> </u>	4	13	9	17	Φ :	0	50	21	22	23		TOTAL



TRAFFIC VOLUMES -- GRANT RD WEST OF N. COURTENAY

		W	MAY 12			MA	MAY 13			AVE	AVERAGE	-
	1			DIRECTIONAL				DIRECTIONAL				DIRECTIONAL
HOUR	EB	WB	TOTAL	SPLIT	EB	WB	TOTAL	SPLIT	EB	WB	TOTAL	SPLIT
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·	C	ď	. 0	0 0	0 0	2 7	4		c.0		2	35.1
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4	ω	2	13	61.5	9	က	6	66.7	7	4	-	63.6
2	20	80	28	71.4	23	9	29	79.3	21.5	7	28.5	75.4
9	73	31	104	70.2	70	37	107	65.4	71.5	34	105.5	67.8
7	112	09	172	65.1	110	55	162	62.9	111	26	167	66.5
ω	65	27	92	70.7	. 98	45	131	65.6	75.5	36	111.5	67.7
<del></del>	20	33	103	68.0	29	28	95	. 70.5	68.5	30.5	66	69.2
10	61	51	112	54.5	87	72	159	54.7	74	61.5	135.5	54.6
	29	71	138	48.6	09	23	113	53.1	63.5	62	125.5	50.6
12	72	72	144	50.0	54	75	129	41.9	63	73.5	136.5	46.2
5	09	59	119	50.4	65	22	122	53.3	62.5	58	120.5	51.9
14	74	81	155	47.7	29	26	. 123	54.5	70.5	68.5	139	50.7
15	190	98	276	68.8	199	95	294	67.7	194.5-	90.5	285	68.2
16	332	06	422	78.7	308	106	414	74.4	320	98	418	76.6
17	104	114	218	47.7	131	111	242	54.1	117.5	112.5	230	51.1
18	80	71	151	53.0	82	83	165	49.7	81	77	158	51.3
19	20	97	167	41.9	26	70	126	44.4	63	83.5	146.5	43.0
50	35	47	82	42.7	51	52	103	49.5	43	49.5	92.5	46.5
21	. 27	46	73	37.0	30	54	84	35.7	28.5	20	78.5	36.3
22	13	30	43	30.2	15	34	49	30.6	4	32	46	30.4
23	13	18	31	41.9	9	F	17	35.3	9.5	14.5	24	39.6
TOTAL	1554	1114	2668	58.2	1584	1118	2702	58.6	1569	1116	2685	58.4

TRAFFIC VOLUMES -- HALL RD WEST OF N. COURTENAY PARKWAY

Г	_	1	T																											
	DIRECTIONAL	SPLIT		16.7	40.0		00 t	75.0	87.5	92.0	91.2	78.4	51.7	56.0	53.1	40°.	5 Y	00	0.17 0.17	) E	11.7	216	41.2	3.00	39.1	15.7	28.6	38.2		
AVERAGE		TOTAL		6	77	) U	<u>-</u> ن ر	7	4	12.5	79.5	125	105.5	117	105.5	121.5	124.5	113	119.5	147.5	266	178.5	139.5	85.5	78	60.5	31.5	17		
AVE		WB		7.5	n	1	- u		U.5	_	7	27	51	51.5	49.5	61	61	65.5	57.5	100.5	235	140	82	52	47.5	51	22.5	10.5	-	
		EB		1.5	2	0.5	) +	- c	ກຸ່	ς: -	72.5	86	54.5	65.5	56	60.5	63.5	47.5	62	47.4	31.	38.5	57.5	33.5	30.5	9.5	6	6.5		0
	DIRECTIONAL	SPLIT		10.0	33.3	50.0	1000	7.00	000.7	0	94.4	78.0	52.2	53.9	50.9	47.0	53.7	41.9	51.8	34.0	11.2	14.2	47.5	44.1	31.0	13.5	25.0	47.1		0
FEB 13		TOTAL		10	9	2	-	· (r	ָרָ כ	1 0	7.7	127	113	12 <sub>8</sub>	108	132	123	124	112	141	294	226	139	93	71	52	28	17		7070
FE		WB		ത	4	-	0	-		- <	7	28	54	29	53	70	57	72	54	93	261	194	73	52	49	45	21	6		1061
		EB	•	-	7	-	~	~	1 +	- u	000	66	59	69	22	62	99	52	58	48	33	32	99	41	22	7	7	8		870
	DIRECTIONAL	SPLIT	i i	72.0	50.0	0.0	66.7	100.0	92.3	2 2 2	9 0	6.8	51.0	58.5	55.3	53.2	48.4	42.2	52.0	29.9	12.2	34.4	35.0	33.3	45.9	17.4	31.4	29.4		43.6
7/ 0	1	IOTAL	C	0	4	-	ო	2	13	87	000	52	86	106	103	111	126	102	127	154	238	131	140	78	82	69	35	17		1964
FEB		MW.	ú	0 (	7	-	~	0	_	10	90.	0 7	48	44	46	52	65	29	61	108	508	98	91	25	46	22	24	12		1107
	<u>.</u>	מם	c		N ·	0	7	5	12	77	97		20	29 !	2/5	29	61	43	99	46	29	45	49	26	39		<del>-</del>	5		857
	2	כססנ	C	) •	- (	N	ო	4	S .	9	7	- a	0 0	n (	<u> </u>	<del>-</del> :	12	<u>ლ</u> :	4	15	9 !	17	9	9	50	21	22	53		TOTAL

A license plate survey was conducted at N. Tropical Trail, E. Crisafulli Rd., Hall Rd. and Grant Rd. between 3:30 and 4:30 PM on June 13, 1992. The license plate number of all southbound vehicles on N. Courtenay Parkway turning westbound onto Tropical Trail, E. Crisafulli Rd. and Hall Rd. and westbound vehicles on Grant Rd. turning southbound onto N. Courtenay Parkway were recorded. plate numbers recorded at Grant Rd. were matched with those recorded at Tropical Trail, E. Crisafulli Rd. and Hall Rd. Matched plate numbers belong to through southbound vehicles generated at KSC that are seeking to avoid the queue that usually develops at the SR 528 intersections in the afternoon. If we assume all unmatched plate numbers recorded at Tropical Trail, E. Crisafulli Rd. and Hall Rd. belong to vehicles generated at KSC but destined for North Merritt residences, then unmatched plates at Grant Rd. southbound trips generated on North Merritt Island. The license plate survey revealed 152 total inbound, 205 through and 182 outbound trips using N. Tropical Trail/Grant Rd. in preference to N. Courtenay The license plate data is used to supplement the turning movements counts to provide a more accurate picture of the origins and destinations of vehicles during the afternoon peak hour.

### C. PEAK PERIOD CONDITIONS

The key peak period traffic characteristics for N. Courtenay Parkway south of KSC and south of Grant Road are shown in Table 5, and for Hall and Grant Roads west of N. Courtenay Parkway in Table 6. For N. Courtenay Parkway, the highest peak hour volume occurs between 3:30 and 4:30 PM, with a significant volume also recorded for the hour beginning at 6:15 AM. These times reflect the period at which the bulk of KSC employes arrive or leave work. It is interesting to note the morning peak period for the southbound direction is 7:30 to 8:30 AM when non-KSC employees head for their place of work off of North Merritt Island. The afternoon peak for the northbound direction begins at 2:15 PM when KSC employees on the 3:00 to 11:00 shift begin their commute to work.

As mentioned above, the data for N. Courtenay Parkway south of Grant Rd. was developed by adding the peak hour turning movement counts derived from the Grant Rd. peak hour data in Table 6 to the traffic count information recorded for N. Courtenay Parkway south of Hall Rd.

The extreme directionality of the traffic flow in both the morning and afternoon is evident. The proportion of peak hour traffic travelling in the peak direction is called the "directional factor (D)". The evenness of flow during the peak hour is indicated by the "peak hour factor (PHF)" The peak hour factor is found by dividing the total peak hour volume by the peak fifteen minute volume times four. The PHF is used to convert a peak hour volume to a peak fifteen minute volume. Note in Tables 5 and 6, the PHF is calculated for both the northbound and southbound directional volumes as well as for the total peak hour volume.

TABLE 5

# N. COURTEANY PARKWAY PEAK HOUR TRAFFIC DATA South of KSC Gate

				T					-
	DAY 1:		, 1992	DAY 2:	Feb 13	, 1992	TWO	DAY AVERA	(GE
TIME	NB VOL	SB VOL	TOTAL	NB VOL	SB VOL	TOTAL	NB VOL	SBVOL	TOTAL
				_					
0615	406	7	413	417	5	422	411.5	6	417.5
0630	408	15	423	439	8	447	423.5	11.5	435
0645	367	12	379	396	17	413	381.5	14.5	396
0700	405	55	460	364	51	415	384.5	53	437.5
PK HR								•	
TOTAL VOL	1586	89	1675	1616	81	¢ 1697	1601	85	1686
PERCENT NB			94.7			95.2			95.0
PERCENT SB			5.3			4.8			5.0
PK HR FACTOR			0.91			0.95	0.95	0.40	0.96
1530	52	433	485	51	465	516	51.5	449	500.5
1545	23	330	353	33	353	386	28	341.5	369.5
1600	38	406	444	27	374	401	32.5	390	422.5
1615	18	236	254	23	219	242	20.5	227.5	248
				v					
PK HR									
TOTAL VOL	131	1405	1536	134	1411	1545	132.5	1408	1540.5
PERCENT NB			8.5			8.7			8.6
PERCENT SB			91.5			91.3			91.4
PK HR FACTOR			0.79			0.75	0.64	0.78	0.77

### South of Grant Road

	DAY 1:	Feb 12	2, 1992	DAY 2:	Feb 13,	1992	TWO	DAY AVERA	.CE
TIME	NB VOL	SB VOL	TOTAL	NB VOL	SB VOL	TOTAL	NB VOL	SB VOL	TOTAL
						10172	NB VOL	OBVOL	TOTAL
0615	386	56	442	376	55	431	381	55.5	436.5
0630	355	66	421	398	77	475	376.5	71.5	448
0645	388	96	484	400	82	482	394	89	483
0700	389	126	515	409 ·	122	531	399	124	523
25		9							020
PK HR									
TOTAL VOL	1518	344	1862	1583	336	1919	1550.5	340	1890.5
PERCENT NB			81.5			82.5			82.0
PERCENT SB			18.5			17.5			18.0
PK HR FACTOR			0.90			0.90	0.97	0.69	0.90
1530	129	343	472	117	358	475	123	350.5	473.5
1545	111	376	487	106	362	468	108.5	369	477.5
1600	95	369	464	86	330	416	90.5	349.5	440
1615	115	310	425	106	349	455	110.5	329.5	440
PK HR									
TOTAL VOL	450	1398	1848	415	1399	1814	432.5	1398.5	1831
PERCENT NB		1	24.4			22.9			23.6
PERCENT SB			75.6			77.1			76.4
PK HR FACTOR			0.98			0.95	0.88	0.95	0.96

TABLE 6

### GRANT ROAD PEAK HOUR TRAFFIC DATA West of N. Courtenay Parkway

	T 5			Υ					
	DAY 1:		4, 1992	DAY 2:	May 15	, 1992	TWO	DAY AVER	AGE
TIME	EB VOL	WB VOL	TOTAL	EB VOL	WB VOL	TOTAL	EB VOL	WB VOL	TOTAL
0615	15	3	18	15	7	22	15	. 5	20
0630	. 11	6	17	16	11	27	13.5	8.5	22
0645	20	25	. 45	20	19 🖟	39	20	22	42
0700	29	18	47	30	29	59	29.5	23.5	53
PK HR									
TOTAL VOL	75	52	127	81	66	. 147	78	59	137
PERCENT EB			59.1		3	55.1			56.9
PERCENT WB			40.9			44.9			43.1
PK HR FACTOR			0.68	į.		0.62	0.66	0.63	0.65
1530	29	29	58	26	24	50	27.5	26.5	54
1545	100	24	124	89	20	109	94.5	22	116.5
1600	132	32	164	118	26	144	125	29	154
1615	91	29	120	94	23	117	92.5	26	118.5
									, , , , ,
PK HR				i,					
TOTAL VOL	352	114	466	327	93	420	339.5	103.5	443
PERCENT EB			75.5			77.9		1.13.0	76.6
PERCENT WB			24.5		.	22.1			23.4
PK HR FACTOR			0.71			0.73	0.68	0.89	0.72

### HALL ROAD PEAK HOUR TRAFFIC DATA West of N. Courtenay Parkway

	DAY 1:	Feb. 1	2, 1992	DAY 2:	Feb. 13	3, 1992	TWO	DAY AVERA	AGE
ПМЕ	EB VOL	WB VOL	TOTAL	EB VOL	WBVOL	TOTAL	EB VOL	WB VOL	TOTAL
								<u> </u>	
0615	13	0	13	17	1	18	. 15	0.5	15.5
0630	15	1	16	18	5	23	16.5	3	19.5
0645	28	3	31	29	2	31	28.5	2.5	31
0700	21	5	26	27	5	32	24	5	29
PK HR									
TOTAL VOL	` 77	9	86	91	13	104	84	11	95
PERCENT EB			89.5			87.5			88.4
PERCENT WB			10.5			12.5			11.6
PK HR FACTOR			0.69			0.81	0.74	0.55	0.77
4500				,					
1530	14	19	33	11	14	25	12.5	16.5	29
1545	8	46	54	7	55	62	7.5	50.5	58
1600	6	45	51	5	52	57	5.5	48.5	54
1615	9	81	90	5	79	84	7	80	87
							· ·		
PK HR	07								
TOTAL VOL	37	191	228	. 28	200	228	32.5	195.5	228
PERCENT EB		.	16.2			12.3			14.3
PERCENT WB	***************************************		83.8			87.7		9 1	85.7
PK HR FACTOR			0.63			0.68	0.65	0.61	0.66

### D. LEVEL OF SERVICE ANALYSIS

### 1. N. Courtenay Parkway

Level of service is a measure of the degree of congestion on a roadway or at an intersection. For roadways, LOS is based on average travel speed. For roads such as N. Courtenay Parkway where traffic signals do not substantially affect travel conditions, saturated traffic conditions appear when the average travel speed is less than 30 mph. When traffic volumes reach the magnitude that travel speed is below 30 mph, designated LOS F, traffic flow is very unstable and a breakdown in flow can easily occur. Conversely, at LOS A, traffic density is low, lane changes are made easily and travel speeds approach (or exceed) the posted speed.

The procedures to measure level of service are contained in the 1985 Highway Capacity Manual (HCM) developed by the U.S. Transportation The Florida Department of Transportation (FDOT) will Research Board. only recognize the validity of LOS analyses developed with HCM procedures. A number of computer programs are available to simplify the application of the Highway Capacity Manual. For N. Courtenay Parkway, this analysis used the "Urban Undeveloped Multilane Uninterrupted Highway LOS Tables" software developed by FDOT. signalized intersections, the "HCS Signalized Intersection Software, Version 2.1" developed by the University of Florida Transportation Research Center was used. Both are standard analysis programs used in Florida.

A total of twelve LOS tables for N. Courtenay Parkway were developed covering the AM and PM peak periods at the monitoring locations south of KSC and south of Grant Rd. (Appendix, Tables 15 to 26). For a detailed LOS analysis of N. Courtenay Parkway, multiple tables are necessary because, as shown in Table 5, peak hour traffic conditions vary considerably between the morning and afternoon, between the north and southbound lanes and between the north and south extremities of the corridor. To produce only one LOS table would require examining only the 3:30 PM peak hour, since it has the highest volume, and averaging the peak hour data for the north and south locations. The resulting LOS analysis would be less precise and could lead to inaccurate conclusions.

Roadway and traffic characteristics are entered on the left side of the LOS table and the results displayed on the right. The adjusted saturation flow rate is the maximum number of vehicles per lane the roadway can accommodate during the peak hour. A value of 1900 vehicles per hour per lane is used, which is based on 2% trucks, a Florida driver population familiar with the road and the design characteristics of N. Courtenay Parkway when widened. (Four lanes on N. Courtenay Parkway is assumed throughout this study). The adjusted saturation flow rate is combined with the roadway characteristics data and PHF value to generate the peak hour peak direction LOS volumes at the top of the right-hand column of the table. Eight peak hour peak direction tables are developed, one for each direction at each monitoring location for the morning and afternoon peak periods

(Appendix, Tables 15 to 22). The adjusted saturation flow rate and roadway characteristics are identical in each LOS table. Only the PHF value is changed to correspond to the directional values indicated in Table 5.

The peak direction peak hour output is then divided by the directional factor D to produce the total peak hour volume figures in the middle of the right side. Since the peak hour is defined as including both northbound and southbound directional volumes, the PHF value calculated under the "total" column in Table 5 is used. The four peak hour tables are included as Tables 23 to 26. (The terms "peak period" and "peak hour" are often interchangeable. However, "peak hour" should be used when referring to the highest volume hour of the day, while "peak period" can refer to any time interval in which heavy traffic flows are recorded.)

Finally, the peak hour LOS volume is divided by the K factor to produce the average annual daily traffic volume in the lower right side. The K factor is the "design hour ratio", the ratio of peak hour traffic volume to total daily volume during the peak season of the year. A default value of .096 is used as recommended by FDOT. Because the highest hourly volume occurs at 3:30 PM south of Grant Rd., the LOS table corresponding to that peak hour (Table 26, Appendix) is used to derive to annual daily LOS service volumes

The LOS D service volumes are summarized on Table 7. Comparing the four level of service tables reveals considerable difference between the LOS D service volumes even though all input data is identical except for the D factor and PHF. The peak period LOS D service volumes range from 2,560 to 3,860 vehicles per day. Most of the variability is caused by the directional factor. The value of D can range from .50, where traffic flow is evenly split between both directions, and 1.0, where all traffic is moving in one direction. At D=1.0, in effect only one half of the road is being used, and the capacity will be determined by the character of the lanes carrying all the traffic. Directional flow on N. Courtenay Parkway is particularly pronounced near KSC, and indeed the lower capacities are found at the north end of N. Courtenay Parkway.

### 2. Intersections

Intersections level of service is based on the length of delay encountered. LOS F conditions are reached when delay is greater than sixty seconds. The level of service of an entire intersection depends on the weighted average of the delay on all approaches. The LOS of an intersection is controlled by the geometrics of the intersection, the type of traffic signal (actuated or non-actuated), the amount of green time given to each approach as a percentage of the total cycle length (g/C ratio) and the degree of progression between adjacent signals.

SUMMARY OF CURRENT N. COURTENAY PARKWAY LOS D SERVICE VOLUMES

	PE,	AK PERIOD D	EAK PERIOD DIRECTIONAL LOS D	7 SO D	PEAK PERI	PEAK PERIOD LOS D	AVERAGE
LOCATION	NORTH	HBOUND	SOUTHBOUND	BOUND	BOTH DIR	BOTH DIRECTIONS	DAILY
	6:15 AM	3:30 PM	6:15 AM>	3:30 PM	6:15 AM	3:30 PM	0 S O 7
	\$ 000 Managarity and						
SOUTH OF KSC	2,890	2,130	2,130	2,370	3,070	2,560	
SOUTH OF GRANT RD.	2,950	2,680	2,130	2,890	3,340	3,820	008,86

Peak period service volumes in vehicles per hour (vph)

A LOS analysis for the AM and PM peak periods for each of the three signalized intersections in the corridor, Hall Rd. and the SR 528 north and south ramps, is included as Tables 39 to 44 in the Note the location and time of day of the analysis in the The top section of the table indicates the turning table header. movement volumes, lane configuration and number of vehicles turning right on red (RTOR). The middle section displays the phasing and timing of the traffic signal. Calculating intersection LOS is a complicated process, and only the most important factors displayed at the bottom of the table. Note that the delay and LOS is calculated for each intersection movement, for each approach and for the entire intersection. Intersection LOS is very sensitive to the amount of green time allotted to each movement. The HCS signalized intersection software permits the evaluation of the affect on LOS caused by changes to the amount of green time allotted to each phase and the total cycle length. Likewise, the LOS impact of additional volume on one or more approaches can be evaluated and alternate signal timing plans necessary to accommodate that added turning movement volume tested.

The three intersections on N. Courtenay Parkway function between LOS A and C. The signal timings recently implemented by FDOT at the SR 528 ramps were evaluated. It was necessary to add ten seconds to the southbound movement of the north ramp signal in the afternoon in order to avoid LOS F conditions on the approach.

### 3. Level of Service Standards /

The value listed under the LOS E column in the tables represents the "capacity" of the road, or that volume above which traffic flow becomes unstable. Such traffic levels are generally unacceptable to the public and represent potentially unsafe conditions. Governmental agencies frequently exercise a policy decision to establish a higher For N. Courtenay Parkway, the minimum acceptable LOS than LOS E. level of service standard established by FDOT, who will assume control of the road when the widening project is completed, will be This standard is based on the fact that North Merritt Island is defined as a "Transitioning Urbanized Area" for which the LOS standard for multilane roads is LOS C. The new LOS standards were adopted by a rule that took effect in April, 1992. Local governments must implement the LOS standards as part of the next update of their Comprehensive Plan, which in Brevard County's case, is 1994.

Nevertheless, the Florida Department of Community Affairs (DCA) retains the right to grant waivers from the FDOT standards for roads not on the Florida Intrastate Highway System for comprehensive planning purposes where to do so will further other important community goals and/or where unusual or atypical situations exist. DCA will not entertain a waiver solely for the purpose of circumventing growth management regulations. Therefore, a waiver request should be accompanied by a demonstration that appropriate land use planning and density considerations are in place in the area served by the roadway. Because N. Courtenay Parkway and North Merritt Island basically fit the DCA requirements for a waiver, this

analysis will assume that LOS D is the applicable LOS roadway standard.

Unlike roadways, generally accepted LOS criteria for intersections have yet to evolve. For this study, the performance of an intersection is considered acceptable if the overall intersection level of service does not exceed LOS E, if the LOS on any single approach does not exceed LOS E and if the total cycle length is no greater than 180 seconds. Motorists are usually unwilling to accept a cycle length of three minutes or more. LOS E or greater at the intersection or on one or more individual approaches is generally indicative of the inability of the intersection to discharge vehicles at an acceptable rate which leads to the formation of substantial queues.

### E. TRIP GENERATION ANALYSIS

A general indication of the number of trips generated by North Merritt Island residences during the morning and afternoon peak periods can be found by calculating the difference in volume on N. Courtenay Parkway between the KSC south gate and south of Grant Rd. (Table 5). The plus or minus symbols indicates the difference in volume at KSC relative to the Grant Rd. volume.

	Northbound Volume (vph)	Southbound Volume (vph)
TIME: 6:15 AM South of Grant Rd.	1550	340
South of KSC Gate	1601	85
Difference	+ 51	- 255
TIME: 3:30 PM South of Grant Rd.	432	1398
South of KSC Gate	133	1408
Difference	- 299	+ 10

Thus, for the 6:15 AM period for example, the northbound volume south of KSC is 51 vehicles greater than south of Grant Rd. Because access to or from North Merritt Island is restricted to only two points, the additional vehicles must come from North Merritt Island. In the southbound direction in the morning, 255 vehicles are added to the N. Courtenay Parkway traffic stream by North Merritt Island between KSC and the Barge Canal Bridge. Similar results can be deduced for the 3:30 PM peak period.

However, these differences represent **net** change in volume. Vehicles can both exit the main road to a side street as well as enter. If the same number of vehicles are counted entering an intersection as the number leaving, that does not mean zero turns occurred. It does

mean the number of vehicles turning off equalled the number turning onto the main road from the side street. The values above represent the net difference between the number of vehicles entering N. Courtenay Parkway and the number exiting. A positive number indicates more vehicles are entering N. Courtenay Parkway than exiting, and a negative means the opposite. With a turning movement count, the specific number of turns and the direction the turns headed or originated can be determined. Thus, to calculate specific AM and PM travel patterns of North Merritt Island residents, it is necessary to evaluate the turning movement counts.

The detailed turning movement counts in Appendix Figures 3 to 12 are summarized in Tables 8 and 9 for the 6:15 and 3:30 peak periods respectively. The direction the turns occur is indicated along the top of the tables and the intersection on the left side. For example, for the hour beginning at 6:15 AM, six vehicles turned from southbound N. Courtenay Parkway to westbound on Pine Island Rd. In the same hour, 24 vehicles turned from Pine Island Rd. southbound onto N. Courtenay Parkway.

The column entitled "Net Resulting SB/NB Thru Directional Volume" is interpreted in the following manner. The traffic count data in Table 5 indicates 85 vehicles leave KSC southbound on N. Courtenay in the The turns at Pine Island Rd. produce a net increase of 18 southbound vehicles on N. Courtenay Parkway. These 18 vehicles are added to the volume upstream of the Pine Island Rd. intersection (85) produce the number of southbound vehicles approaching the intersection at N. Tropical Trail (103). After the turns at N. Tropical Trail are factored, the southbound volume north of the Crisifulli Rd. intersection is 187 vehicles per hour. Adding and subtracting turning movements continue until south of Grant Rd., where the southbound volume should approximate the directional volume recorded by the traffic counts in Table 5. This procedure serves as a check to ensure the turning movements are balanced with the overall net change in directional traffic volume.

Ideally, the aggregated turning movement totals summarized at the bottom of Tables 8 and 9 should match the overall net change in peak period directional volume tallied in Table 5 and summarized above. The values do not match precisely because turns occur at locations other than side streets, the mixture of current and historical turning movement counts used in this study causes some variability in the data, and traffic flows on N. Courtenay Parkway fluctuate from day to day. Nevertheless, the aggregate turning movements in Tables 8 and 9 are sufficiently close to the values recorded in Table 5 to warrant acceptance of the data.

One modification was made to Table 9. Southbound to westbound turning volumes at Tropical Trail, E. Crisafulli Rd. and Hall Rd. were reduced by the number of through trips recorded in the license plate survey discussed above. Through trips were likewise removed from the southbound turning movement volume at Grant Rd. Thus, the 3:30 PM southbound data in Table 9 reflect only local trips.

SUMMARY OF N. COURTENAY TURNING MOVEMENTS: 6:15 AM PEAK HOUR

TURN FROM:	SOUTHBOUND N. COURTENAY	OUND	STREET(S)	NET RESULTING	NORTHBOUND NORTHBOUND	SOUND	SIDE	NETRESULTING
TURN DIRECTION:	EB	WB	SB .	DIR. VOLUME	EB	WB	SINEE (S)	NE ICY RIC
LOCATION:								
SOUTH OF KSC		-		85				1674
PINE ISLAND RD.	Υ V	9	24	103	N A	24	33	1674
N TROPICAL TRAIL	N Y	16	84	171	ΥN	14	99	1665
CRISAFULLI RD.	9	8	24	187	18	က	36	1640
KINGS WAY	က	Ϋ́	19.	206	12	Ϋ́	22	1625
CHASE/PORCHER RD.	5	-	25	230	1	8	42	1603
HALL RD.	2	16	44	256	6	7	81	1574
GRANT RD.	Z Y	9	99	316	N A	54	13	1509
SOUTH OF GRANT			-	316				1550
	FOR SOUTHBOUND DIRECTION: TOTAL EB & WB TURNS FROM N. COURTENAY TOTAL SB TURNS FROM SIDE STREETS	IND DIRECTI TURNS FROM S FROM SIDE	ON: 1 N. COURTENAY STREETS	63	FOR NORTHBOUND DIRECTION: TOTAL EB & WB TURNS FROM N. COURTENAY TOTAL NB TURNS FROM SIDE STREETS	ND DIRECTION URNS FROM N FROM SIDE ST	: COURTENAY REETS	181

All traffic volumes in vehicles per hour (vph)

TABLE 9

SUMMARY OF N. COURTENAY TURNING MOVEMENTS: 3:30 PM PEAK HOUR

TURN FROM:	SOUTHBOUND N. COURTENAY	JUND ENAY	SIDE STREET(S)	NET RESULTING	NORTHBOUND	BOUND	SIDE	NET RESULTING
TURN DIRECTION:	EB	WB	SB	DIR. VOLUME	EB COOR	WB	SIREEI(S)	NB THRU
LOCATION:								) ) ) )
SOUTH OF KSC	į			1408				158
PINE ISLAND RD.	Υ Z	28	18	1398	Ϋ́	28	ო	158
N. TROPICAL TRAIL	<b>V</b> .,	66	32	1337	NA	64	4	183
CRISAFULLI RD.	53	17	20	1317	38	8	5	243
KINGS WAY	28	NA	17	1334	42	Z V	ß	284
CHASE/PORCHER RD.	13	12	19	1341	36	6		279
HALL RD.	21	42	45	1323	45	73	27	313
GRANT RD.	Ϋ́	34	182	1471	ΥN	69	41	404
SOUTH OF GRANT				1471				432
	FOR SOUTHBOUND DIRECTION: TOTAL EB & WB TURNS FROM N. COURTENAY TOTAL SB TURNS FROM SIDE STREETS NOTE: SB and WB turns adjusted to remove thru trips	ND DIRECTION URNS FROM N FROM SIDE ST turns adjusted	<ul> <li>V:</li> <li>COURTENAY</li> <li>TREETS</li> <li>to remove thru trip</li> </ul>	333	FOR NORTHBOUND DIRECTION: TOTAL EB & WB TURNS FROM N. COURTENAY 1 TOTAL NB TURNS FROM SIDE STREETS	IND DIRECTION TURNS FROM N. FROM SIDE ST	f: . COURTENAY '	96
			SANGESTANDENS OF THE PROPERTY	warming our commencement of the commencement o				-

All traffic volumes in vehicles per hour (vph)

The directional turning movements in Tables 8 and 9 are expressed as trip directions in the left side of Table 10. The four trip direction and termini can also be expressed in the following manner:

- SB Trips Destined for NMI -- Trips beginning on KSC and ending on North Merritt Island.
  Trips recorded as southbound volume south of KSC gate.
- SB Trips Originating on NMI -- Trips beginning on North
  Merritt Island and ending south
  of North Merritt Island. Trips
  recorded as southbound volume
  south of Grant Rd.
- NB Trips Destined for NMI -- Trips beginning south of North Merritt Island and ending on North Merritt Island. Trips recorded as northbound volume south of Grant Rd.
- NB Trips Originating on NMI -- Trips beginning on North

  Merritt Island and ending to
  the north, probably KSC. Trips
  recorded as northbound volume
  at KSC south gate.

As stated above, commercial and office development is limited on North Merritt Island and peak period trips will be largely composed of home-to-work and/or work-to-home trips. At present, there are 1498 residential dwelling units (DU) on North Merritt Island. Dividing the number of peak hour directional trips in each of the four trip direction and terminus categories by the number of dwelling units on North Merritt Island that are producing or attracting the trips (1498) will yield a set of eight peak period trip generation ratios. The trip generation rates are recorded in the middle of Table 10. (In transportation planning, a "trip" is one-way and is usually synonymous with "vehicles" in the sense that 50 trips per hour is equivalent to 50 vehicles per hour.)

This study did not evaluate trips generated by commercial land uses for the following four reasons. First, relatively little general commercial acreage is developed on North Merritt Island. Second, because of the low level of commercial development, most North Merritt Island residents rely on the commercial establishments south of the Barge Canal for shopping and other commercial services. Commercial development on North Merritt Island will, at least initially, generate relatively few new trips but rather redirect the commercial trips already made by North Merritt Island residents. Whatever commercial trips are being made by North Merritt Island residents. Whatever commercial trips are being made by North Merritt Island residents are already reflected in the traffic counts used in this study, and to add additional commercial trips could lead to double counting. Third, relatively few commercial trips are made during the peak periods considered in this study. Peak activity at retail

PEAK HOUR TRIP GENERATION AND DIRECTION AT VARIOUS DENSITIES

F	T-			_		TABLE 10		
	CURRENT BUILD-OUT	SITY	DII = 11 905	500.00	2,161	2,313	2,862	299
NSITY OF:	CURRENT	YLISNED		6.15 AM	438	1,987	1,257	2,036
RATED AT DEI	2 DWELLING UNITS	PER ACRE	DU = 10.355	3-30 PM	1,839	1,969	2,436	568
NEW TRIPS GENERATED AT DENSITY OF:	2 DWELLI	PER,	≡ DQ	6:15 AM	372	1,691	1,070	1,732
NEW	I DWELLING UNIT	PER ACRE	DU = 6,878	3:30 PM	1,117	1,196	1,480	345
	1 DWELL	PER,	= na	6:15 AM	226	1,027	920	1,052
RATIO OF TRIPS	TO CURRENT	VG UNITS	DU = 1,498	3:30 PM	0.2076	0.2223	0.2750	0.0641
RATIO	10 OT	DWELLING	= na	6:15 AM	0.0421	0.1909	0.1208	0.1956
		PEAK HOUR	AL TRIPS	3:30 PM	311	333	412	96 .
		NUMBER OF PEAK HOUR	DIRECTIONAL TRIPS	6:15 AM	83	286	181	293
9		TRIP	DIRECTION	AND TERMINUS	SB TRIPS DESTINED FOR NMI	SB TRIPS ORIGINATING ON NMI	NB TRIPS DESTINED FOR NMI	NB TRIPS ORIGINATING ON NMI

Il traffic counts in vehicles per hour (vph)

establishments occurs after 7:00 PM and on weekends. Fourth, generalized commercial trip generation rates are difficult to develop because much of the traffic produced by a business depends on marketing and location factors specific to that establishment or type of business that are not realistically transferable to other commercial land uses.

### F. CALCULATION OF PROJECTED TRAFFIC

The primary goal of this traffic study is to evaluate in impact on N. Courtenay Parkway of various potential residential density scenarios. Based on analysis in other sections of the North Merritt Island Small Area Plan, the number of residential units estimated to be produced at buildout under three different density schemes is as follows:

One Dwelling Unit per Acre = 6,878 Total Dwelling Units

Two Dwelling Units per Acre = 10,355 Total Dwelling Units

Buildout at Current Approved Density = 11, 905 Total Dwelling Units

The important element is not the density but the total dwelling units produced under a given density scenario. The trip generation rates are expressed on a "per unit" basis, and, assuming trip behavior remains constant over time, the trip rates can be used to evaluate the impacts on N. Courtenay Parkway of the dwellings produced under any number of different density schemes. The volume of new peak period trips for each trip direction generated by the dwellings produced under each of the three density scenarios is tabulated in Table 10. These are "new" trips in that the peak hour directional trips generated by the existing 1498 residences have been removed.

In Table 11, the trip generation and directional data in Table 10 has been recombined and expressed in relation to the monitoring stations south of KSC and Grant Rd. according to the tabulation listed in Section 5 above. The volumes in Table 11 include both existing trips, summarized in Table 11 in the row labeled "Current Dwelling Units", plus the new trips calculated in Table 10. As an example, consider the 6:15 AM northbound direction south of KSC under the one unit per acre density scenario. Table 11 indicates 2,653 trips will Of that total, 1,601 are already present on N. Courtenay occur. As indicated in the summary in Section 5 and in Table 10, "Northbound trips originating on North Merritt Island" will be recorded south of KSC as part of the morning northbound traffic. Table 10 indicates 1,052 such trips will occur with one unit per acre, 293 of which are due to dwellings currently in place on North With buildout at one dwelling unit per acre, the Merritt Island. total number of northbound trips south of KSC during the hour beginning at 6:15 AM will be 1,601 existing trips plus 1,052 new trips, or 2,653 vehicles per hour. The data in Table 11 assumes no additional growth in the volume of through traffic on N. Courtenay The projected change in volume is totally due to the increase in residential units on North Merritt Island under each density scenario.

ESTIMATED PEAK PERIOD VOLUME AT VARIOUS DENSITIES

DENSITY		PEAK	PERIOD DIF	PEAK PERIOD DIRECTIONAL VOLUME	VOLUME	PEAK PERIC	PEAK PERIOD VOLUME
SCENARIO	LOCATION	NORTHBOUND	BOUND	SOUTHBOUND	ONNO	BOTH DIF	BOTH DIRECTIONS
		6:15 AM	3:30 PM	6:15 AM	3:30 PM	6:15 AM	3:30 PM
CURRENT		(		l (			
UNITS	000 TO 000	١٥٩,١	732	82	1,408	1,686	1,540
(1,498 DU)	SOUTH OF GRANT RD.	1,550	432	340	1,398	1,890	1,830
1 D.U. PER ACRE	SOUTH OF KSC	2,653	> 477	311	2,525	2,965	3,002
(6,878 DU)	SOUTH OF GRANT RD.	2,200	1,912	1,367	2,594	3,567	4,506
2 D.U. PER ACRE	SOUTH OF KSC	3,333	200	457	3,247	3,791	3,946
(10,355 DU)	SOUTH OF GRANT RD.	2,620	2,868	2,031	3,367	4,651	6,235
CURRENT BUILD-OUT	SOUTH OF KSC	3,637	799	523	3,569	4,159	4,368
(11,905 DU)	SOUTH OF GRANT RD.	2,807	3,294	2,327	3,711	5,134	900'2

All traffic volumes in vehicles per hour (vph)

### G. LEVEL OF SERVICE ANALYSIS OF DENSITY SCENARIOS

### 1. N. Courtenay Parkway

The remaining task is to evaluate the affect projected traffic may have on the level of service of N. Courtenay Parkway. Table 12 is the analysis of peak period directional volumes. The current and projected directional volumes developed in Table 11 are matched with the appropriate LOS D peak direction service volumes presented in Tables 15 to 22. Current peak direction service volumes were used to evaluate projected future traffic levels. To quickly potential deficiencies, the directional volume is divided by the LOS D service volume to produce a ratio. Directional volumes that exceed the LOS D standard will have a ratio of 1.00 or greater are printed in Table 11 in bold italic. Examination of Table 11 reveals that the traffic estimated to be produced under one dwelling unit per acre can be accommodated except for the southbound direction south of KSC in With two dwellings per acre, LOS D is exceeded in the afternoon. four of eight instances. The number rises to five with buildout at current densities.

evaluate peak period traffic generated under each density scenario, a new set of LOS tables are needed. As more dwelling units are added on North Merritt Island, a larger proportion of the traffic on N. Courtenay Parkway will be local trips generated or attracted to the area as approximated by the directional trip generation ratios in The addition of northbound and southbound local traffic over time, cause a gradual shift in the directional distribution of peak period traffic on N. Courtenay Parkway. moderation in the directionality of peak period traffic flow as an area urbanizes is a well documented occurrence. Because both travel directions of the road are used more efficiently, the LOS service volumes will actually increase as the directional split begins to approach .50.

Using the directional traffic estimates for each density scenario in Table 12, a new directional ratio (D) was calculated for the AM and PM peak periods at both monitoring locations and LOS tables developed (Appendix, Tables 27 to 38). Current PHF values were used. Total peak period and daily volumes are analyzed in Table 13. The peak period traffic volume produced under each density scenario listed in Table 11 is compared to the appropriate LOS D peak period service volume, ratios calculated and potential deficiencies noted in bold italics. As in the peak direction analysis discussed above, the one dwelling unit per acre scenario creates a potential deficiency in the afternoon period south of KSC. Under the other density schemes, all peak periods at both locations are deficient.

The average daily volume is found by dividing the peak hour volume by the K factor, or the ratio of peak hour volume to total daily volume during the peak season. The peak period data in Table 13 indicates the highest peak period volume occurs during the 3:30 PM hour south of Grant Rd. under all three density scenarios. Dividing the peak

PEAK PERIOD PEAK DIRECTION LEVEL OF SERVICE ANALYSIS
Ratios in Italics indicate volume exceeds LOS D standard

		RATIO		0.59	0.48	1.07	06.0	1.37	1.17	1.51	1.28
	Md 0										
ERIOD	TIME: 3:30 PM	LOS D VOL		2,370	2,890	2,370	2,890	2,370	2,890	2,370	2,890
SOUTHBOUND PEAK PERIOD	F	DIR. VOL.		1,408	1,398	2,525	2,594	3,247	3,367	3,569	3,711
THBOUN	Σ	RATIO		0.04	0.16	0.15	0.64	0.21	0.95	0.25	1.09
sou	TIME: 6:15 AM	LOS D VOL		2,130	2,130	2,130	2,130	2,130	2,130	2,130	2,130
	YI.	DIR. VOL.		82	340	311	1,367	457	2,031	523	2,327
	<b>&gt;</b>	RATIO		90.0	0.16	0.22	0.71	0.33	1.07	0.38	1.23
RIOD	TIME: 3:30 PM	TOS D NOF		2,130	2,680	2,130	2,680	2,130	2,680	2,130	2,680
) PEAK PERIOD	VIT.	DIR. VOL.		132	432	477	1,912	200	2,868	799	3,294
NORTHBOUND	≥	RATIO		0.57	0.53	0.94	0.75	1.19	0.89	1.29	0.95
NOR	TIME: 6:15 AM	LOS D VOL		2,810	2,950	2,810	2,950	2,810	2,950	2,810	2,950
	F	DIR. VOL.		1,601	1,550	2,653	2,200	3,333	2,620	3,637	2,807
	LOCATION			SOUTH OF KSC	SOUTH OF GRANT RD.	SOUTH OF KSC	SOUTH OF GRANT RD.	SOUTH OF KSC	SOUTH OF GRANT RD.	SOUTH OF KSC	SOUTH OF GRANT RD.
DENSITY	SCENARIO		CURRENT	UNITS	(1,498 DU)	1 D.U.	(UO 878.6)	2 D.U. PER ACRE	(10,355 DU)	CURRENT BUILD-OUT	(UD 306,11)

All truffic volumes in vehicles per hour (vph)

# PEAK PERIOD AND DAILY LEVEL OF SERVICE ANALYSIS

Ratios in Italics exceed maximum LOS D service volume

DENSITY		ו ממוסט וו	TOTA!	PEAK PE	TOTAL PEAK PERIOD VOLLIME	TOTAL PEAK PERIOD VOLIME	ıme	AVEDA	77 7 77 7 3 4	
SCENARIO	LOCATION		TIME: 6:15 AM	N		TIME: 3:30 PM		AVENA	AVERAGE DALT VOLUME	OLO 1918
		VOLUME	LOS D VOL	RATIO	VOLUME	TOS D VOL	RATIO	VOLUME	LOS D VOL	RATIO
CURRENT DWELLING	SOUTH OF KSC	1,686	3,070	0.55	1,540	2,560	09.0			
(1,498 DU)	SOUTH OF GRANT RD.	1,890	3,340	0.57	1,830	3,820	0.48	19,688	38,800	0.49
1 D.U. PER ACRE	SOUTH OF KSC	2,965	3,320	0.89	3,002	2,780	1.08	7		
(UQ 878.6)	SOUTH OF GRANT RD.	3,567	4,180	0.85	4,506	5,080	0.89	37,158	008,25	0.70
2 D.U.	SOUTH OF KSC	3,791	3,420	1.11	3,946	2,840	1.39	i i	;	
(10,355 DU)	SOUTH OF GRANT RD.	4,651	4,430	1.05	6,235	5,400	1.15	64,946	26,300	1.15
CURRENT BUILD-OUT	SOUTH OF KSC	4,159	3,450	1.21	4,368	2,870	1.52	) ) 1	1	1
(11,905 DU)	SOUTH OF GRANT RD.	5,134	4,510	1.14	900'2	5,510	1.27	0/6/2/	57,400	1,2,1

Peak hour traffic volumes In vehicles per hour (vph)

hour volume by the K factor (.096) yields the average daily volume generated under the three density schemes during the peak season. The LOS table corresponding to the afternoon peak hour south of Grant Rd. for each density scenario (Tables 36, 37 and 38) is consulted to establish the appropriate LOS D service volume. Ratios are calculated and deficiencies noted. The 2 dwelling unit per acre and current buildout density scenarios are projected to generate traffic in excess of the LOS standard.

## b. Intersections

The intersection analysis focused on the SR 528 north and south ramps. As in other sections of this study, the intersection analysis evaluates N. Courtenay Parkway as the road will operate after widening. As part of the construction of a new bascule bridge over the Barge Canal, the present entrance to Sea Ray Boats and the Tingley Marina will be modified to eliminate left turns and allow only right-in, right-out movements. The turning movement counts for the Sea Ray entrance were adjusted to remove the left turns (Appendix, Figure 13). Left turns from the western, Tingley Marina side were added to the right turn volume, and left turns from the eastern Sea Ray side were removed completely because of the availability of Lambert Drive as an alternate exit.

Next, to analyze the impacts of additional traffic generated under each development scenario, the southbound peak period directional traffic volume under each density scenario projected to occur south of Grant Rd. was added to the southbound adjusted volume at the Sea Ray entrance intersection. The resulting southbound volume exiting the Sea Ray intersection then became the southbound volume entering the SR 528 north ramp intersection from the north. The proportion of through and right turn movements recorded in recent turning movement counts was applied to the projected volumes. The southbound through volume exiting the north ramp intersection became the southbound volume entering the south ramp intersection from the north. current proportion of left turns was calculated and a like percentage of the projected traffic assigned to the south-to-west turn movement at the south ramp intersection. The remaining southbound through volume plus the east-to-south traffic exiting SR 528 will approximate the southbound peak period volume heading south on N. Courtenay Parkway into central Merritt Island.

For the northbound direction, a similar procedure was followed. The northbound peak period volume projected for N. Courtenay Parkway south of Grant Rd. will be equivalent to the volume exiting the Sea Ray intersection to the north. Reversing the calculation process outlined above, the peak period volume on each approach can be estimated. The overall computation procedure was executed for the 6:15 and 3:30 peak periods for each density scenario at each intersection. The resulting turning movement volumes are presented in Figures 13 to 24 in the Appendix.

To evaluate the affect on intersection level of service, the projected turning movement volumes at the SR 528 north and south

2 2

ramps were analyzed with the Highway Capacity Manual Signalized Intersection Software. Progression (arrival type 5) was assumed to favor the movement with the highest traffic volume. The number of right turn on red vehicles was assumed to be similar proportion observed in recent traffic counts. The Signalized Intersection Software does not perform traffic signal optimization, so a manual process of substituting many different signal timing combinations was used. If any of the intersection level of service standards discussed in Section 4.c above were violated, a different timing pattern was tried. If after multiple iterations the LOS standards could not be met, the intersection as presently designed was deemed incapable of accommodating the traffic projected under that density scenario. Once the LOS standards of an intersection were exceeded for a particular peak period, that period was not tested under higher density scenarios.

The LOS analysis of the SR 528 north and south ramp intersections under various density scenarios is summarized in Table 14. Under the one dwelling unit per acre scenario, both intersections operate in an acceptable manner. This analysis indicates the intersections as currently designed may not be able to accommodate the traffic volume generated by the two unit per acre and current buildout density scenarios at the LOS standards specified herein.

As discussed previously, an important assumption in this study is a zero increase in background traffic. The SR 528 interchange links North Merritt Island to the rest of the transportation system in central Brevard County. An increase in traffic volume generated by the beaches, Central Merritt Island and/or the mainland could significantly affect the long-term ability of the SR 528 interchange to accommodate traffic flow to and from North Merritt Island. The interchange must continue to be closely monitored in order to avoid negative traffic impacts on N. Courtenay Parkway in both North and Central Merritt Island.

## SUMMARY OF N. COURTENAY -- SR 528 INTERSECTION LEVEL OF SERVICE AT VARIOUS DENSITIES

	<u> </u>		
DÉNSITY SCENARIO	LOCATION	INTERS	SECTION SERVICE
		6:15 AM	3:30 PM
CURRENT		<u> </u>	
DWELLING UNITS	NORTH RAMP	С	С
(1,498 DU)	SOUTH RAMP	C	В
1 D.U. PER ACRE	NORTH RAMP	С	· D
(6,878 DU)	SOUTH RAMP	D	D .
2 D.U. PER ACRE	NORTH RAMP	<sub>.</sub> C	F
(10,355 DU)	SOUTH RAMP	F	F
CURRENT BUILD-OUT	NORTH RAMP	С	
(11,905 DU)	SOUTH RAMP		<b></b>

## APPENDIX

	TABLES	
Number	Subject	Page
15 to 22	Peak Hour Peak Direction Level of Service Tables	2-31
23 to 26	Peak Hour Level of Service Tables	2-39
27 to 38	Projected Peak Hour Level of Service Tables	2-43
39 to 44	Current Signalized Intersection Analysis	2-55
45 to 57	Projected Signalized Intersection Analysis	2-61
	FIGURES	
Number	Subject	Page
3 to 12	Current Intersection Turning Movement Counts	2-74
13 to 24	Projected Intersection Turning Movement Counts	2-84

PEAK HOUR PEAK DIRECTION VOLUME	Level of Service (	2 1,190 1,810 2,350 2,890 3,610 3 1,790 2,710 3,520 4,330 5,420 4 2,380 3,610 4,690 5,780 7,220		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	4 1,230 1,860 2,420 2,980 3,720 6 1,840 2,790 3,630 4,470 5,580 8 2,460 3,720 4,840 5,950 7,440	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service A B C D E	ES 12,800 19.400 25.200 31.000 38	29,100 37,800 46,500 38,800 50,400 62,000	
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	sion 1.0 -91 od, W.McShane, and G.Brown	Verdeting N	6:15 AM Eeh 12-13 1002	- 0	Northbound	Range 0.096 (0.06 - 0.20) 0.970 (0.50 - 1.00) 0.950 (0.70 - 1.00)	1,900 (1600-2400)		60 (60 or 50)	Use design speed (mph):	Oc ≻ ≻
Florida Department of Transportation eveloped Multilane Uninterrupted Highway Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane,	DESCRIPTION ROAD NAME:	Study Time Period: Analysis Date:	NAME: User Notes:	TRAFFIC CHARACTERISTICS	K FACTOR: D FACTOR: PHF:	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): 55 or 50	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	880 1,330 1,730 2,130 2,660	2,590 3,190 3,460 4,260			PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	900 1370 1780	2,060 2,670 2,740 3,560		AVERAGE ANNITATION TRAFFIC (AADT)	Level of Service	∢	9,400 14,300 18,600 22,900 28,600 14,100 21,400 27,900 34,300 42,800 18,900 28,600 37,100 45,700 57,100	
	У V U U	2 2	<u>ω</u> 4				-	. LANES	ω ω				LANES	4 0 8	
of Transportation terrupted Highway LOS Tables ray Capacity Manual	rsion 1.0 0-91 od, W.McShane, and G.Brown			N. Courtenay Pkwy 6:15 AM	Feb. 12-13, 1992	South of KSC Gate	Southbound			0.970 (0.50 - 1.00)	1,900 (1600-2400)	Accessed the second sec	60 (60 or 50)	Use design speed (mph): 60 50	>->
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown		DESCRIPTION	ROAD NAME: Study Time Period:	Analysis Date:	User Notes:	TRAFFIC CHARACTERISTICS		K FACTOR:	PHF:	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): 55 or 50	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

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JME	Ш	2,660	5,320		IONS)		Ш	2,910	5,820		VADT)	ı	Ш	30,300 45,500 60,600	• ,	
TION VOLI	Ω	2,130	3,190 4,260		rH DIRECT		Ω	2,330 3,490	4,660	,	RAFFIC (A	(	<b>a</b>	24,300 36,400 48,500		
AK DIREC	Level of Service 3 C	1,730	3,460		UME (BO)	Level of Service	O	1,890 2,840	3,780		ALTDAILY 1	Level of Service	S	19,700 29,600 39,400		
PEAK HOUR PEAK DIRECTION VOLUME	Level	1,330	2,660		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level	В	1,460 2,180	2,910		AVERAGE ANNUALTDAILY TRAFFIC (AADT)	Level	ກ	15,200 22,700 30,300		
PEA	⋖	880	1,760		PEAK		∢ .	960	1,920		AVER	<	₹	10,000 15,000 20,000		
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Florida Department of Transportation Urban Undeveloped Multllane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown		· N	3:30 PM	Feb. 12-13, 1992 RSK South of KSC Gate	Northbound		•		1,900 (1600 - 2400)	ANT MARKET - SACTOM SERVICE STATES OF THE SE		60 (60 or 50)	Use design speed (mph):	90	>->

PEAK HOUR DEAK DIRECTION VOLLIME	TEAN HOUR PEAN DIRECTION VOLUME	A B B ESS		096,2	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service	A B C D E	1,070     1,620     2,110     2,590     3,240       1,610     2,430     3,160     3,890     4,860       2,140     3,240     4,220     5,190     6,490		AVERAGE ANNUAL DALLY TRAFFIC (AADT)	Level of Service	O B	11,100 16,900 22,000 27,000 33,800 16,700 25,300 32,900 40,500 50,700 22,300 33,800 43,900 54,000 67,600		
		Ž		•				4 0 0				LANES	4 0 8		Material
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables	vay Capacity Manual	0-91 od, W.McShane, and G.Brown		N. Courtenay 3:30 PM	Feb. 12-13, 1992 RSK South of KSC Gate	Southbound		Range 0.096 (0.06 - 0.20) 0.914 (0.50 - 1.00)				60 (60 or 50)	Use design speed (mph): 60	50	<b>&gt;</b> >-
Florida Department of Transportation n Undeveloped Multilane Uninterrupted Highw	Based on the 1985 Highway Capacity Manual UMUL TAB Version 1.0	Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	DESCRIPTION	Study	Analysis Date: NAME: User Notes:		TRAFFIC CHARACTERISTICS	K FACTOR: D FACTOR:	PHF: ADJ. SATURATION FLOW RATE:		ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): 55 or 50	45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

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Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	ROAD NAME: N. Courtenay Pkwy Study Time Period: 6:15 AM	Analysis Date: May 14-15, 1992  NAME: RSK User Notes: South of Grant Rd. Northbound		0.096 (0.06 - 0.20) 0.764 (0.50 - 1.00) 0.970 (0.70 - 1.00)	ATION FLOW RATE: 1,900 (1600 - 2400)  AVERAGE ANNUAL DAILY TRAFFIC (44017)		60 (60 or 50) A LANES	For a posted speed to the following speed by the following speed (mph):  Use design speed (mph):  Sor 50  6  24,900  37,700  49,000  60,300  75,400  8  33,200  50,300  65,300  80,400  100,500  45,40 or 35  50	MEDIANS (Y/N);
Florida Depa Urban Undeveloped Multllan Based on the 1985	UMUL_7 Da Developed by: E.Shenk, E	DESCRIPTION ROAD NA Study Time Per	Analysis D NA User No	TRAFFIC CHARACTERISTICS	K FACTO	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted spe limit of (mp 55 or 45, 40 or	MEDIANS (Y/N):

3,480 5,220 6,960

2,660 3,990 5,320

36,300 54,400 72,500

PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	1,100     1,670     2,170     2,680     3,340       1,660     2,510     3,260     4,010     5,020       2,210     3,340     4,350     5,350     6,690		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	1,440 2,190 2,850 3,500 4.380	3,280 4,270 5,250 4,380 5,690 7,000		AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service	A B C D E	15,000     22,800     29,600     36,500     45,600       22,600     34,200     44,500     54,700     68,400       30,100     45,600     59,300     72,900     91,200		
	Д Д				1	CANES 4	ω ω ω ω		`		LANES	4 15, 6 22, 8 30,		
of Transportation errupted Highway LOS Tables	sion 1.0 1-91 od, W.McShane, and G.Brown		N. Courtenay Pkwy 3:30 PM	RSK South of Grant Rd.	Northbound		•	0.880 (0.70 - 1.00)	1,900 (1600-2400)		60 (60 or 50)	Use design speed (mph):	50	<b>&gt;</b> >
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Magnial	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	DESCRIPTION BOAD NAME.	Study Time Period: Analysis Date:	NAME: User Notes:	TRAFFIC CHARACTERISTICS		K FACTOR: D FACTOR:		ADS. SATORATION FLOW BATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph):	55 or 50 45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

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JME	3,610 5,420 7,220	IONS)	ш	4,730 7,090 9,450	ADT)	. 1	ח	49,200 73,800 98,400	
דוסא עסבנ	2,890 4,330 5,780	'H DIRECT	Ω	3,780 5,670 7,560	TRAFFIC (A		ے	39,400 59,100 78,800	
JR PEAK DIREC Level of Service 3 C	2,350 3,520 4,690	R VOLUME (BOT Level of Service	O	3,070 4,610 6,140	AC DAILY 1	Level of Service	o .	32,000 48,000 64,000	
PEAK HOUR PEAK DIRECTION VOLUME Level of Service B C D	1,810 2,710 3,610	PEAK HOUR VOLUME (BOTH DIRECTIONS) Level of Service	В	2,360 3,540 4,730	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level	מ	24,600 36,900 49,200	
PEA.	1,190 1,790 2,380	PEAK	∢ .	1,560 2,340 3,120	AVER	<	₹ ,	16,200 24,400 32,500	100000000000000000000000000000000000000
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of Transportation  cerrupted Highway LOS Tables  ay Capacity Manual  sion 1.0  1-91  od, W.McShane, and G.Brown	N. Courtenay Pkwy 3:30 PM	May 14-15, 1992 RSK South of Grant Rd. Southbound		•	1,900 (1600 - 2400)		60 (60 or 50)	Use design speed (mph): 60 50	<b>&gt;</b> >
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	DESCRIPTION ROAD NAME: Study Time Period:	Analysis Date: NAME: User Notes:	TRAFFIC CHARACTERISTICS	K FACTOR: D FACTOR: PHF:	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): 55 or 50 45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

PEAK HOUR PEAK DIRECTION VOLUME	LANES A B C D E LANES	2 1,200 1,820 2,370 2,920 3,650 3 1,810 2,740 3,560 4,380 5,470 4 2,410 3,650 4,740 5,840 7,300	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	4 1,270 1,920 2,500 3,070 3,840 6 1,900 2,880 3,740 4,610 5,760 8 2,530 3,840 4,990 6,140 7,680	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service	ES A B C C	4 13,200 20,000 26,000 32,000 40,000 60,000 30,000 39,000 48,000 60,000 80,000 82,000 64,000 80,000	
of Transportation errupted Highway LOS Tables ay Capacity Manual	sion 1.0 1-91 od, W.McShane, and G.Brown	N. Courtenay Pkwy 6:15 AM	Feb. 12-13, 1992 RSK South of KSC Gate		0.096 (0.06 - 0.20) 0.950 (0.50 - 1.00) 0.960 (0.70 - 1.00)	1,900 (1600 - 2400)		60 (60 or 50)	Use design speed (mph): 60 50	>->-
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane,	DESCRIPTION ROAD NAME: Study Time Period:	Analysis Date: NAME: User Notes:	TRAFFIC CHARACTERISTICS	K FACTOR: D FACTOR: PHF:	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): 55 or 50 45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	2 970 1,460 1,900 2,340 2,930 3 1,450 2,190 2,850 3,510 4,390 4 1,930 2,930 3,800 4,680 5,850	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E LANES	4 1,060 1,600 2,080 2,560 3,200 6 1,580 2,400 3,120 3,840 4,800 8 2,110 3,200 4,160 5,120 6,400	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service	ES A	4 11,000 16,700 21,700 26,700 33,300 6,700 25,000 32,500 40,000 50,000 80,000 83,300 43,400 53,400 66,700	
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	d G.Brown		Analysis Date: Feb. 12-13, 1992 NAME: RSK User Notes: South of KSC Gate	TRAFFIC CHARACTERISTICS	Range 0.096 (0.06 - 0.20) 0.914 (0.50 - 1.00) 0.770 (0.70 - 1.00)	ADJ. SATURATION FLOW RATE: 1,900 (1600 - 2400)	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph): 60 (60 or 50)	For a posted speed limit of (mph): 55 or 50 60 45, 40 or 35 50	MEDIANS (Y/N): Y LEFT TURN BAYS (Y/N): Y

	PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	1,130 1,710 2,220 2,740 3,420	2,570 3,330 4,100 3,420 4,450 5,470		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service	A B C D E	1,380       2,090       2,710       3,340       4,170         2,060       3,130       4,070       5,000       6,260         2,750       4,170       5,420       6,670       8,340	AVEHAGE ANNUAE DAILY TRAFFIC (AADT)	A B C D E	14,300     21,700     28,200     34,800     43,400       21,500     32,600     42,400     52,100     65,200       28,700     43,400     56,500     69,500     86,900	
		У. Ц Д		ю <b>4</b>				LANES	408		LANES	4 0 B	
	Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown			6:15 AM	May 14-15, 1992 RSK South of Grant			0.096 (0.06 - 0.20) 0.820 (0.50 - 1.00)		60 (60 or 50)	Use design speed (mph):	0° ->->-
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	PEAK HOUR PEAK DIRECTION VOLUME	Level of Service 3 C D E	2,370 2,920	3,560 4,380 5,470 4,740 5,840 7,300	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service	С	3,100 3,820 4,660 5,730	6,210 7,640	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service	0	32,300 39,800 49,700 48,500 59,700 74,600 64,700 79,600 99,500	
	PEAK HOUR	Α.	1,200	1,810 2,740 2,410 3,650	PEAK HOUR V	Le	A B	1,580 2,360	3,150	AVERAGE ANI	Le	∢	16,400 24,900 24,600 37,300 32,800 49,700	CONTRACTOR OF THE THE PROPERTY OF THE PROPERTY
	oles	-	T	ω 4			LANES	4 0				LANES	 4 ω ω	
San Andrews of Control of the Contro	Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91	מוס, מוס כים	N. Courtenay Pkwy	1992	ומוו		Range	(0.06 - 0.20) (0.50 - 1.00) (0.70 - 1.00)	(1600 - 2400)		(60 or 50)	(ydw) pec	
	Florida Department of Transportation eveloped Multilane Uninterrupted Highway Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91	555	N. Courte	May 14-15, 1992 RSK			•		1,900 (16		09) 09	Use design speed (mph): 60 50	<b>&gt;</b> >

partment of Transportation ane Uninterrupted Highway LOS Tables 185 Highway Capacity Manual	Level of Service , Level of Service , D. McShane, and G.Brown , D.McLeod, W.McShane, and G.Brown	iy Pkwy	CURRENT BUILDOUT RSK South of KSC Gate	CS A B C D E	0.096 (0.06 - 0.20) 0.845 (0.50 - 1.00) 0.960 (0.70 - 1.00)	RATE:         1,900 (1600 - 2400)    AVERAGE ANNUAL DAILY TRAFFIC (AADT)		60 (60 or 50) LANES	peed 4 14,800 22,500 29,200 36,000 45,000 peed ph): Use design speed (mph): 8 29,700 45,000 58,500 72,000 89,900 or 35 50	Y/N);
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane,	DESCRIPTION ROAD NAME: N. ( Study Time Period: 6:1	Analysis Date: CU NAME: RSI User Notes: Sou	TRAFFIC CHARACTERISTICS		ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): Use 55 or 50 45, 40 or 35	MEDIANS (Y/N):

43,200 64,800 86,500

3,650 5,470 7,300

PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	2 1,200 1,820 2,370 2,920 3,650 3 1,810 2,740 3,560 4,380 5,470 4 2,410 3,650 4,740 5,840 7,300	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	4 1,370 2,080 2,700 3,320 4,150 6,230 8,300 8,300 8,300	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service		4 14,300 21,600 28,100 34,600 43,200 64,800 85,500 43,200 56,200 69,200 86,500	
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	DESCRIPTION ROAD NAME: N. Courtenay Pkwy Study Time Period: 6:15 AM	Analysis Date: 1 DU PER ACRE NAME: RSK User Notes: South of KSC Gate	TRAFFIC CHARACTERISTICS	0.096 (0.06 - 0.20) 0.879 (0.50 - 1.00) 0.960 (0.70 - 1.00)	ADJ. SATURATION FLOW RATE: 1,900 (1600 - 2400)	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph): 60 (60 or 50)	For a posted speed limit of (mph): 55 or 50 60 45, 40 or 35 50	MEDIANS (Y/N): Y LEFT TURN BAYS (Y/N): Y

4,270 6,410 8,540

44,500 66,700 89,000

3,650 5,470 7,300

Urban Undeveloped by: Estend Manual Capacity								
B Version 1.0  E-10-91  A B C D  C D  LANES  B. 1,200 1,820 2,370 2,920 3 1,810 2,740 3,660 4,740 5,840  E. South of KSC Gate  C D  LANES  B. 2,410 3,650 4,740 5,840  A B C D  LANES  C D  LANES  A B C D  LA	Florida Department Urban Undeveloped Multilane Unin Based on the 1985 Highw	of Transportation Iterrupted Highway LOS Tables way Capacity Manual		PEA	к ноия Рі	EAK DIREC	TION VOL	JME
2 1,200 1,820 2,370 2,920 3 1,810 2,740 3,560 4,380 4,380 4 2,410 3,650 4,740 5,840 4,380 4 2,410 3,650 4,740 5,840 5,840 8,15 AM  2 DU PER ACRE  E. South of KSC Gate  1.410 2,140 2,780 3,420 6,830 1,000 0,006 (0.06 - 0.20) 0,006 (0.06 - 0.20) 0,006 (0.00 - 2400) 0,	UMUL_TAB Ve Date: 6-11 Developed by: E.Shenk, D.McLe	rsion 1.0 0-91 od, W.McShane, and G.Brown	NA NA NA NA NA NA NA NA NA NA NA NA NA N	A	Level	of Service C	۵	ш
South of KSC Gate			2	1,200	1,820	2,370	2.920	3 650
## PEAK HOUR VOLUME (BOTH DIRECTIC    PEAK HOUR VOLUME (BOTH DIRECTIC   South of KSC Gate	DESCRIPTION ROAD NAME: Study Time Period:	N. Courtenay Pkwy 6:15 AM	<b>ω</b> 4	1,810 2,410	2,740 3,650	3,560	5,840 5,840	5,470
Canalist	Analysis Date: NAME: User Notes:	2 DU PER ACRE RSK South of KSC Gate		PEAK	HOUR VOI	UME (BOT	'H DIRECT	(SNO)
Control   Cont		Control of the contro			Level	of Service		
Hermogenerates and the control of th	TRAFFIC CHARACTERISTICS			∢	ω	O	۵	ш
E: 1,900 (1600 - 2400)  AVERAGE ANNUAL TRAFFIC (AA  Level of Service  A B C D  LANES  4 14,700 22,200 28,900 35,600 6 22,000 33,400 43,400 53,400 5 50  Y  Y  Y  Y  Y  Y  Y  Y  Y  Y  Y  Y  Y	K FACTOR: D FACTOR: PHF:	•		1,410 2,110 2,820	2,140 3,200 4,270	2,780 4,160 5,550	3,420 5,130 6,830	4,270 6,410 8,540
Lavel of Service  A B C D  LANES  4 14,700 22,200 28,900 35,600 6 22,000 33,400 43,400 53,400 8 29,400 44,500 57,800 71,200 5 50  Y  Y	ADJ. SATURATION FLOW RATE:			AVER	IGE ANNU.	AL DAILY T	RAFFIC (A	ADT)
Danes A B C D LANES 4 14,700 22,200 28,900 35,600 6 22,000 33,400 43,400 53,400 60 50 50 Y Y	ROADWAY CHARACTERISTICS				Level	of Service		
Use design speed (mph): 6	DESIGN SPEED (mph):		LANES	∢	ш	O	۵	Ш
	For a posted speed limit of (mph): 55 or 50 45, 40 or 35	Use design speed (mph): 60 50	4 O O	14,700 22,000 29,400	22,200 33,400 44,500	28,900 43,400 57,800	35,600 53,400 71,200	44,500 66,700 89,000
	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):	<b>&gt;</b> >				NC-11-20 CHRYKY NO CHECHE MOMENT		

2,930 4,390 5,850

	PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D	3 1,450 2,190 2,850 3,510 4,390 4,680 5,850	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E LANES	4       1,150       1,740       2,260       2,780       3,480         6       1,720       2,610       3,390       4,180       5,220         8       2,300       3,480       4,520       5,570       6,960	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service	ES A B C D	4 12,000 18,100 23,600 29,000 36,200 6 17,900 27,200 35,300 43,500 54,400 8 23,900 36,200 47,100 58,000 72,500	
					, 				<u> </u>		
Florida Department of Transportation	eveloped Multillane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	N. Courtenay Pkwy 3:30 PM	1 DU PER ACRE RSK South of KSC Gate		0.096 (0.06 - 0.20) 0.841 (0.50 - 1.00) 0.770 (0.70 - 1.00)	1,900 (1600 - 2400)		60 (60 or 50)	Use design speed (mph): 60 50	<b>&gt;- &gt;-</b>
of Trans	Urban Undeveloped Multilane Uninterrupt Based on the 1985 Highway Cap	UMUL_TAB Version 1.0 Date: 6-10-91 Shenk, D.McLeod, W.M	20	_ g. o.		000	<u>_</u>			Use	

3,480 5,220 6,960

36,200 54,400 72,500

2,930 4,390 5,850

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Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	of Transportation Iterrupted Highway LOS Tables way Capacity Manual		PEA	K HOUR P.	PEAK HOUR PEAK DIRECTION VOLUME	TION VOL	JME
UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	rsion 1.0 0-91 od, W.McShane, and G.Brown	LANES		Leve B	Level of Service 3 C	ο .	Ш
DESCRIPTION ROAD NAME: Study Time Period:	N. Courtenay Pkwy 3:30 PM	N W 4	970 1,450 1,930	1,460 2,190 2,930	1,900 2,850 3,800	2,340 3,510 4,680	2,93 4,39 5,85
Analysis Date: NAME: User Notes:	2 DU PER ACRE RSK South of KSC Gate		PEAK	HOUR VO	PEAK HOUR VOLUME (BOTH DIRECTIONS)	'H DIRECT	(SNO)
TRAFFIC CHARACTERISTICS		LANES	4	B	Level of Service	۵	Ш
K FACTOR: D FACTOR: PHF:	•		, 1,170 1,760 2,350	1,780 2,670 3,560	2,310 3,470 4,620	2,840 4,270 5,690	3,560 5,330 7,110
ADJ. SATURATION FLOW RATE:	1,900 (1600 - 2400)	The second secon	AVER	AGE ANNU	AVERAGE ANNUAL DALY TRAFFIC (AADT)	RAFFIC (A	ADT)
ROADWAY CHARACTERISTICS				Level	Level of Service		
DESIGN SPEED (mph):	60 (60 or 50)	LANES	∢	മ	O	Ω	Ш
For a posted speed limit of (mph): 55 or 50 45, 40 or 35	Use design speed (mph): 60 50	408	12,200 18,300 24,400	18,500 27,800 37,000	24,100 36,100 48,100	29,600 44,400 59,300	37,000 55,600 74,100
MEDIANS (Y/N): LEFT TURN BAYS (Y/N):	<b>&gt;- &gt;-</b>	Transcriptory Actor Creeks g. c.				Market Control of the	

3,560 5,330 7,110

37,000 55,600 74,100

	PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E $^{\rm l}$	970 1.460 1.900 2.340 2.930	2,190 2,850 3,510 2,930 3,800 4,680		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service	A B C D E		3,580		AVERAGE ANNUAL'DAILY TRAFFIC (AADT)	Level of Service	O O	18,700 24,200 29,800 28,000 36,400 44,800	24,600 37,300 48,500 59,700 74,600		
A Land Comment			S	ω 4				LANES	4 (	-			<del> </del>	S	4 4 12 6 18 8 6 1			Horasacan 2000 E 2 2 2000 Maria Santa Andrea
	terrupted Highway LOS Tables vay Capacity Manual	rsion 1.0 0-91	od, W.McShane, and G.Brown		N. Courtenay Pkwy 3:30 PM	CURRENT BUILDOUT RSK			Bange		0.770 (0.70 - 1.00)	1,900 (1600 - 2400)		60 (60 or 50)		ose design speed (mpn): 60	20	<b>&gt;</b> >
Florida Department of Transportation	Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91	Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	DESCRIPTION	ROAD NAME: Study Time Period:	Analysis Date: NAME: User Notes:		TRAFFIC CHARACTERISTICS		K FACTOR: D FACTOR:	PHF	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed	55 or 50	45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

	PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	2,740	0,420	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service	A B C	1,720     2,610     3,390     4,180     5,220       2,580     3,920     5,090     6,270     7,830       3,450     5,220     6,790     8,350     10,440		AVERAGE ANNUAL DALLY TRAFFIC (AADT)	Level of Se	A B C	17,90027,20035,40043,50054,40026,90040,80053,00065,30081,60035,90054,40070,70087,000108,800	-	
		LANES	ω w 4	-			LANES	408				LANES	408		
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TO THE	Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	sion 1.0 -91 od, W.McShane, and G.Brown		N. Courtenay Pkwy 6:15 AM	1 DU PER ACRE RSK South of Grant			.096	0.900 (0.70 - 1.00) 1,900 (1600 - 2400)			60 (60 or 50)	Use design speed (mph): 60	50	>>
TOTAL DESCRIPTION OF THE PROPERTY OF THE PROPE	partment or and	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.M		ROAD NAME: Study Time Period:	Analysis Date: NAME: User Notes:		TRAFFIC CHARACTERISTICS	K FACTOR: D FACTOR:	PHF: ADJ. SATURATION FLOW RATE:		ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph):	45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

3,420 5,130 6,840

57,600 86,500 115,300

PEAK HOUR PEAK DIRECTION VOLLIME	Level of Service	C C	7,159 2,570 3,330 4,100 5,130 2,260 3,420 6,840	PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	1,830       2,770       3,600       4,430       5,530         2,740       4,150       5,400       6,640       8,300         3,650       5,530       7,190       8,850       11,070	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	Level of Service		19,000 28,800 37,500 46,100 57,600 28,500 43,200 56,200 69,200 86,500 38,000 57,600 74,900 92,200 115,300	
		LANES	1 m 4		Д Д	4 0 8			ES		
of Transportation errupted Highway LOS Tables	ay Capacity Manual sion 1.0	od, W.McShane, and G.Brown	N. Courtenay Pkwy 6:15 AM	2 DU PER ACRE RSK South of Grant		0.096 (0.06 - 0.20) 0.618 (0.50 - 1.00) 0.900 (0.70 - 1.00)	1,900 (1600 - 2400)		60 (60 or 50)	Use design speed (mph): 60 50	>>
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables	Based on the 1985 Highway Capacity Manual UMUL_TAB Version 1.0 Date: 6-10-91	Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	DESCRIPTION ROAD NAME: Study Time Period:	Analysis Date: NAME: User Notes:	TRAFFIC CHARACTERISTICS	K FACTOR: D FACTOR: PHF:	ADJ. SATURATION FLOW RATE:	ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed limit of (mph): 55 or 50 45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

	PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E	1,710 2,220	1,690 2,570 3,330 4,100 5,130 2,260 3,420 4,450 5,470 6,840		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service A B C D E	1,860       2,820       3,670       4,510       5,640         2,790       4,230       5,500       6,770       8,470         3,720       5,640       7,340       9,030       11,290	AVERAGE ANNITATION TO A ELLO VANDETA	Level of Service	A B C D E	19,400 29,400 38,200 47,000 58,800 29,100 44,100 57,300 70,500 88,200 38,800 58,800 76,400 94,100 117,600	
		LANES	2	ლ <b>4</b>			0 2 2	γ γ γ γ γ γ γ γ γ γ γ γ γ γ γ γ γ γ γ			LANES	4 0 8	
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Florida Department of Transportation	Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown		N. Courtenay Pkwy 6:15 AM	<b>CURRENT BUILDOUT</b>	RSK South of Grant		0.096 (0.50 - 1.00)			60 (60 or 50)	Use design speed (mph): 60 50	<b>&gt;- &gt;-</b>
	2 2 3	~ 0 0					l						ì

PEAK HOUR PEAK DIRECTION VOLUME	Level of Service A B C D E 1	1,200	2,740 3,560 4,380 3,650 4,740 5,840		PEAK HOUR VOLUME (BOTH DIRECTIONS)	Level of Service	A	2,090 3,170 4,120	4,760 6,190 7,610	4,190 6,340 8,250 10,150 12,690		AVED A OF A SIALIS CHARLES ALL VITTA CONTRACTOR	AVERAGE AVNOAL DAILT THAFFIC (AADT)	Level of Service	S. A B. C.	33,000 43,000 52,900 49,600 64,400 79,300	43,600 66,100 85,900 105,700 132,200	-	
	М М	~	ω 4				LANES	-	9						LANES	4 0 0	Φ		
of Transportation errupted Highway LOS Tables by Capacity Manual	sion 1.0 -91 d. W.McShane. and G.Brown			N. Courtenay Pkwy 3:30 PM	1 DU PER ACRE RSK	South of Grant			•	0.096 (0.06 - 0.20) 0.575 (0.50 - 1.00)		1,900 (1600 - 2400)		6	60 (60 or 50)		Ose design speed (mpn): 60	20	<b>&gt;</b> >
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown		DESCRIPTION	Study Time Period:	Analysis Date: NAME:	Osel NOtes.	TRAFFIC CHARACTERISTICS		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	D FACTOR:	HHA CONTROL HAND TO A	ADJ. SATORATION FLOW KATE:		ROADWAY CHARACTERISTICS	DESIGN SPEED (mph):	For a posted speed		45, 40 or 35	MEDIANS (Y/N): LEFT TURN BAYS (Y/N):

3,650 5,470 7,300

6,760 10,130 13,510

70,400 105,600 140,700

Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	of Transportation terrupted Highway LOS Tables ay Capacity Manual		PEA	K HOUR PI	PEAK HOUR PEAK DIRECTION VOLUME	TION VOLI	IME
UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	sion 1.0 J-91 od, W.McShane, and G.Brown	LANES	∢	Level	Level of Service 3 C	۵	Ш
		0.0	1,200	1,820	2,370	2,920	3,650
DESCRIPTION ROAD NAME: Study Time Period:	N. Courtenay Pkwy 3:30 PM	w 4	1,810	2,740 3,650	3,560	4,380 5,840	5,470
Analysis Date: NAME: User Notes:	2 DU PER ACRE RSK South of Grant		PEAK	HOUR VOI	PEAK HOUR VOLUME (BOTH DIRECTIONS)	'H DIRECT	(SNO)
			. ∢	Level B	Level of Service		Ш
TRAFFIC CHARACTERISTICS		LANES	:	ı	)	1	1
K FACTOR: D FACTOR: PHF:	Range 0.096 (0.06 - 0.20) 0.540 (0.50 - 1.00) 0.960 (0.70 - 1.00)	4 0 8	2,230 3,340 4,460	3,380 5,070 6,760	4,390 6,590 8,780	5,400 8,110 10,810	6,760 10,130 13,510
ADJ. SATURATION FLOW RATE:	1,900 (1600 - 2400)		AVER.	4GE ANNU	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	RAFFIC (A	ADT)
ROADWAY CHARACTERISTICS				Level	Level of Service		•
DESIGN SPEED (mph):	. 60 (60 or 50)	LANES	∢	മ	O	۵	ш
For a posted speed limit of (mph): 55 or 50	Use design speed (mph): 60 50	<b>4</b> Φ Φ	23,200 34,800 46,400	35,200 52,800 70,400	45,700 68,600 91,500	56,300 84,400 112,600	70,400 105,600 140,700
MEDIANS (Y/N): LEFT TURN BAYS (Y/N):	<b>&gt;</b> >		Commence of the Commence of th			CTT ET SELECTION STORY OF THE SELECTION STORY	
8 8 8							

3,650 5,470 7,300

6,880 10,320 13,770

71,700 107,500 143,400

		1						
Florida Department of Transportation Urban Undeveloped Multilane Uninterrupted Highway LOS Tables Based on the 1985 Highway Capacity Manual	of Transportation terrupted Highway LOS Tables ay Capacity Manual			PEA	K HOUR PE	PEAK HOUR PEAK DIRECTION VOLUME	נוסא אסדר	IME
UMUL_TAB Version 1.0 Date: 6-10-91 Developed by: E.Shenk, D.McLeod, W.McShane, and G.Brown	sion 1.0 0-91 W.McShane, and G.Brown		A II ()	∢ .	Level B	Level of Service 3 C	Ω	ш
			2 2	1,200	1,820	2,370	2.920	3.650
DESCRIPTION ROAD NAME: Study Time Period:	N. Courtenay Pkwy 3:30 PM		ю <b>4</b>	1,810	2,740	3,560	5,840	5,470
Analysis Date: NAME: User Notes:	CURRENT BUILDOUT RSK South of Grant	<u></u>		PEAK	HOUR VOL	PEAK HOUR VOLUME (BOTH DIRECTIONS)	H DIRECT	ONS)
					Level	Level of Service		
TRAFFIC CHARACTERISTICS	¥	,	LANES	⋖	В	O	۵	Ш
	Range		4 C	2,270	3,440	4,470	5,510	6,880
K FACTOR: D FACTOR:			8	4,540	6,880	8,950	11,010	13,770
ADJ. SATURATION FLOW RATE:	1,900 (1600 - 2400)						,	
				AVER	IGE ANNU,	AVERAGE ANNUAL DAILY TRAFFIC (AADT)	RAFFIC (A	ADT)
ROADWAY CHARACTERISTICS				•	Level	Level of Service	(	ı
DESIGN SPEED (mph):	60 (60 or 50)		LANES	∢	æ	ပ	Ω	Ш
For a posted speed limit of (mph): 55 or 50 45, 40 or 35	Use design speed (mph): 60 50		4 Φ Β	23,700 35,500 47,300	35,800 53,800 71,700	46,600 69,900 93,200	57,400 86,000 114,700	71,700 107,500 143,400
MEDIANS (Y/N): LEFT TURN BAYS (Y/N):	>- >-							

HCM: SIGNALIZED INTERSECTION SUMMARY

Streets: (E-W) HALL RD Analyst: RSK

(N-S) N COURTENAY File Name: HALL3.HC9

3-26-92 3:30 PM

Area Type: Other

	====		=====									
	L	Eastbo T	und R	We:	stbou T	nd R	No:	rthbou T	ind R	Son	uthbou T	nd R
No. Lanes Volumes Lane Width RTOR Vols		> 1 9 2 12.0	1   27 12.0 19	> 18	1 1 12.0	1   18 12.0 7	   73   12.0	2 < 409 12.0	45		1070 12.0	71 1
Phase combin	natio	on 1	2	Signa 3	l Ope	ration	ns		5	6	- <b></b> -	8

		S	ignal	Opera	tion	S				
Phase combinat	ion 1	2	3	4			5	6	7	8
EB Left	*				NB	Left	*	*		
Thru	*					Thru		*		
Right	*					Right		*		
Peds						Peds				
WB Left	*				SB	Left	*	*		
Thru	*					Thru		*		
Right	*					Right		*		
Peds						Peds				
NB Right					EB	Right				
SB Right			1.		WB	Right				
Green	10A				Gre	_	2A	99A		
Yellow/A-R	4				Yel	low/A-R	3	5		
Lost Time	2.0					t Time 2		2.0		
Cycle Length:	123 secs	Pha:	se com	binat:	ion	order: #	1 #5	#6		

			Intersec	ction Perfo	ormance	Summary			
		Group:	Adj Sat	v/c	g/c			Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	LT	1783	174	0.07	0.10	32.6	D	32.6	D
	R	1530	149	0.06	0.10	32.5	,D		
WB	LT	1850	180	0.12	0.10	32.7	D	32.7	D
	R	1530	149	0.08	0.10	32.6	D		
ИВ	L	1740	42	0.00	0.87	0.0	A	1.2	A
	$\mathtt{TR}$	3608	2992	0.17	0.83	1.3	A		
SB	L	1740	42	0.00	0.87	0.0	A	1.8	A
	TR	3624	3005	0.44	0.83	1.9	A		
Inte	rsectio	n Delay =	= 2.5	(sec/veh)		Inter	section	n LOS = A	A

HCM: SIGNALIZED INTERSECTION SUMMARY

Streets: (E-W) HALL RD

(N-S) N COURTENAY

Analyst: RSK

File Name: HALLAMIM.HC9

Area Type: Other

3-26-92 6:15 AM

Comment: CURRENT CONDITIONS

========	====											
	1	astbo			stbou	ınd	Nor	 thbou	ind	Sou	===== ıthboı	==== ind
	L	${f T}$	R	L	${f T}$	R	L	${f T}$	R	L	${f T}$	R
No. Lanes		> 1	1	>	1	1	1 2	<		 1	2 <	
Volumes Lane Width	57	_	31 12.0	13	12.0	- (-	7 12.0	1465	9	2 12.0	227 12.0	16
RTOR Vols	<u> </u>		19			7			2	12.0	12.0	1
			5	Signa	l Ope	ratio	ns					
Phase combin	natio	n 1	2	3	_	4		5	5	6	7	8
EB Left		*				NB	Left	*	<del>,</del>	*		
Thru		*					Thru			*		
Right		*					Right	F		*		

Pha:	se combinati	on 1	2	3	4			5	6	7
EB	Left	*				NB	Left	*	*	
	Thru	*					Thru		*	
	Right	*					Right		*	
	Peds			٥			Peds			
WB	Left	*		-		SB	Left	*	*	
	Thru	*					Thru		*	
	Right	*					Right		*	
	Peds						Peds			
NB	Right					EB	Right			
SB	Right			<i>/</i> *		WB	Right			
Gree		10A				Gre	en	2A	99A	
Yel.	low/A-R	4				Yel	low/A-R	3	5	
	: Time	2.0				Los	t Time 2	. 0	2.0	
CTTO	la Tamatha 1	22	D1	,					" -	

Cycle Length: 123 secs Phase combination order: #1 #5 #6

	Lane Mvmts	Group: Cap	Intersect Adj Sat Flow	ion Perfo v/c Ratio	ormance g/c Ratio	Summary Delay	LOS	Approac Delay	ch: LOS
EB	LT	1699	166	0.39	0.10	34.3	D	34.0	D
	R	1530	149	0.09	0.10	32.6	D		
₩B	$\mathtt{LT}$	1341	131	0.15	0.10	32.9	D	32.8	D
	R	1530	149	0.13	0.10	32.8	D		
NB	L	1740	42	0.00	0.87	0.0	A	2.2	А
	TR	3660	3035	0.54	0.83	2.2	A		
SB	L	1740	42	0.00	0.87	0.0	A	1.2	А
	TR	3624	3005	0.09	0.83	1.3	A		
Inte	ersection	on Delay	= 3.9 (	sec/veh)		Inters	section	n LOS = A	7

HCM: SIGNALIZED INTERSECTION SUMMARY

Streets: (E-W) SR 528 NORTH RAMP

(N-S) N. COURTENAY

Analyst: RSK

File Name: 528NR6.HC9

Area Type: Other

6-5-92 6:15 AM

			====		====:	=====	=====	====	====	====	====	
	1	stbou		1	tbour	nd	No	rthbo	und	So	uthbo	und
	L	T	R 	L	T	R 	L	T	R	L	T	R
No. Lanes Volumes Lane Width RTOR Vols				2 113 12.0		1 427 12.0 85	2 346 12.0	2 1320 12.0			2 249 12.0	1 103 12.0 0
				Signal	Oper	ation	าร					
Phase combin	nation	1	2	3	4				5	6	7	8
EB Left						NB	Left			*	,	0
Thru							Thru		*	*		
Right							Righ					
Peds							Peds					
WB Left		*		٠		SB	Left					
Thru							Thru	l	*			
Right		*				1	Righ	it	*	*		
Peds							Peds	;				
NB Right						EB	Righ	it				
SB Right		*		7.		WB	Righ	t	*	*		
Green		25A				Gre	en	2.	5A :	30A		
Yellow/A-R	_	5					low/A			4		
Lost Time		. 0				Los	t Tim	e 2.	0 2.	. 0		
Cycle Length	: 94	secs	Pha	ase con	nbina	tion	order	: #1	#5 #6	5		

	Lane	Group:	Intersect Adj Sat	ion Perfo		Summary			
		~	_	v/c	g/c			Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	Los
v ***	_								
WB	L	2747	818	0.21	0.30	18.8	С	5.9	В
	R	1557	1491	0.25	0.96	0.1	A		D
ИВ	L	3370	1147	0.41	0.34	18.2	C	7.1	В
	T	3663	2416	0.61	0.66	3.6	A	, . 1	Ъ
SB	${f T}$	3663	1091	0.34	0.30	16.7	C	12.4	В
	R	1557	1491	0.09	0.96	0.1	A	12.4	Д
Inte	rsectio	n Delay	= 7.8 (	sec/veh)	0.50			LOS = I	3

TABLE 42

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP (N-S) N COURTENAY

File Name: 528NR3.HC9

Analyst: RSK

6-12-92 3:30 PM

Area Type: Other

										====	====	=====
	Ea	astbo	and	Wes	stbou	nd	No	thbou	ınd	Son	uthbo	und
	L	${f T}$	R	L	$\mathbf{T}$	R	L	${f T}$	R	L	${f T}$	R
No. Lanes	ł			2		1 (	2	2			2	1
Volumes				401		82	568	372			1218	458
Lane Width				12.0		12.0	12.0	12.0				12.0
RTOR Vols						40			0			0
												O

	w.		Sig	nal	Opera	tion	S				
	se combina	tion 1	2	3	4	1		5	6	7	8
EB	Left					NB	Left		*		J
	Thru						Thru	*	*		
	Right						Right				
T.TD	Peds						Peds				
WB	Left	*				SB	Left				
•	Thru	:					Thru	*			
	Right	*					Right	*	*		
ND	Peds						Peds				
NB	Right		/			EB	Right				
SB	Right	*				WB	Right	*	*		
Gree		25A				Gre		35A	30A		
	Low/A-R	5					low/A-F		4		
	Time	2.0	_,			Los	t Time	2.0	2.0		
CyCl	le Length:	104 Secs	Phase	COM	binati	ion	order:	#1 #5	#6		

			Intersec	ction Perf	ormance	Summary			
	Lane	Group:	Adj Sat	v/c	g/c	_		Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	L	2747	740	0.66	0.27	27.2	D	24.8	С
	R	1557	1497	0.03	0.96	0.1	A	5	•
NВ	L	3370	1037	0.61	0.31	24.1	C	16.0	С
	${f T}$	3663	2536	0.16	0.69	3.6	A	10.0	•
SB	${f T}$	3663	1338	1.02	0.37	29.5	D	21.7	С
	R	1557	1497	0.33	0.96	0.1	A	22.7	C
Inte	rsectio	n Delay	= 20.4	(sec/veh)		_	section	LOS =	С

HCM: SIGNALIZED INTERSECTION SUMMARY

Streets: (E-W) SR 528 South Ramp Analyst: RSK

(N-S) N Courtenay

File Name: 528SR6.HC9

6-12-92 6:15 AM

Area Type: Other

	L L	stbo T	und R	Wes	tboui T	nd R	No:	rthbor T	und R	Sou L	uthbou T	==== ind R
No. Lanes Volumes Lane Width RTOR Vols	2 665 12.0		1 227 12.0 95			•		2 1001 12.0	1 186 12.0 0	1 61 12.0	2 301 12.0	0
Phase combin	Signal Operations Phase combination 1 2 3 4   5 6 7 9											

			Si	ignal	Opera	tion	S				
Pha	se combina	tion 1	2	3	4			5	6	7	8
EB	Left	*				NB	Left				
	Thru						Thru		*		
	Right	*					Right	*	*		
	Peds						Peds				
WB	Left					SB	Left	*			
	Thru						Thru	*	*		
	Right						Right				
) ID	Peds	-				İ	Peds				
NB	Right	*		1.		EB	Right	*	*		
SB	Right					WB	Right				
Gre		35A				Gre	en	20P	35A		
	low/A-R	4				Yel	low/A-R	4	4		
	t Time	3.0				Los	t Time	3.0	3.0		
Cyc.	le Length:	102 secs.	Phas	e con	binat	ion	order:	#1 #5	#6		

			Intersec	ction Perf	ormance	Summary			
		Group:	Adj Sat	v/c	g/c	-		Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	2747	970	0.79	0.35	25.7	D	21.0	C
	R	1557	1465	0.12	0.94	0.2	A		
NB	$\mathbf{T}$	3663	1293	0.91	0.35	20.3	С	17.1	C
	R	1557	1465	0.15	0.94	0.2	A		
SB	L	1740	358	0.20	0.21	25.6	D	10.1	В
	${f T}$	3663	2155	0.20	0.59	7.5	В		_
Inte	rsectio	n Delay	= 17.1	(sec/veh)		Inter	section	LOS = 0	

TABLE 44

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 South Ramp (N-S) N Courtenay Analyst: RSK File Name: 528SR3.HC9

Area Type: Other

6-11-92 3:30 PM

					====:	=====	=====		=====	=====	=====	====
	Ea	astbou	ind	Wes	stbou	nd	No	rthbou	und	Sou	ıthboi	ind
	L	${f T}$	R	L	${f T}$	R	L	${f T}$	R	L	${f T}$	R
No. Lanes	2		1			Ĭ.		2	1	1	2	
Volumes	134		323			7		925	155	163	1456	
Lane Width	12.0		12.0					12.0	12.0	12.0	12.0	
RTOR Vols	1		0						0			0

				Signal	Opera	tion	S				
Pha	se combina	tion 1	2	3	4			5	6	7	8
EB	Left	*				NB	Left				
	Thru						Thru		*		
	Right	*		5			Right	*	*		
	Peds					1	Peds				
WB	Left			•		SB	Left	*			
	Thru						Thru	*	*		
	Right						Right				
	Peds						Peds				
NB	Right	*		<i>/</i> *		EB	Right	*	*		
SB	Right					WB	Right				
Gre		35A				Gre	en	20A	35A		
	low/A-R	4				Yel	low/A-R	4	4		
	t Time	2.0				Los	t Time	2.0	3.0		
Сус	le Length:	102 secs	Pha	ase co	mbinat	ion	order:	#1 #5	#6		

			Intersec	tion Perf	ormance	Summary			
		roup:	Adj Sat	v/c	g/c	4		Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	2747	996	0.17	0.36	16.8	С	5.5	В
	R	1557	1496	0.23	0.96	0.1	A		_
NB	T	3663	1293	0.89	0.35	25.3	D	22.1	С
	R	1557	1496	0.11	0.96	0.1	A		
SB	L	1740	375	0.48	0.22	27.3	D	10.1	В
	${f T}$	3663	2191	0.80	0.60	8.3	В		_
Inte:	rsection	Delay	= 13.7	(sec/veh)		Inter	section	LOS = E	3

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP (N-S) N. COURTENAY

8

Analyst: RSK

File Name: NR6.HC9

6-5-92 6:15 AM

Area Type: Other Comment: CURRENT CONDITIONS, SEA RAY LEFTS REMOVED

			=====		=====		=====		=====	=====	=====	====
	E	Eastbound			stbour	nd	Northbound			Southbound		
	L	${f T}$	R	L	${f T}$	R	L	${f T}$	R	L	${f T}$	R
No. Lanes				2		1 (	2	2			2	1
Volumes				113		427	346	1320			242	101

Lane Width RTOR Vols

			Sign	nal	Operat	tion	S			
Phas	se combinat:	ion 1	2	3	4			5	6	7
EB	Left					NB	Left		*	
	Thru						Thru	*	*	
	Right		,				Right			
	Peds						Peds			
WB	Left	*				SB	Left			
	Thru			•			Thru	*		
	Right	*					Right	*	*	
	Peds						Peds			
NB	Right		1.			EB	Right			
SB	Right	*				WB	Right	*	*	
Gree	en	25A				Gre	en	25A	30A	
	Low/A-R	5				Yel	low/A-R	5	4	
-	Time	2.0				•	t Time		2.0	
CVC	le Tenath.	94 SACS	Dhaco	COM	hinati	ion	ordor.	#1 #5	#6	

Cycle Length: 94 secs Phase combination order: #1 #5 #6

	T	<b>C</b>	Intersect			Summary			
	Lane	Group:	Adj Sat	v/c	g/c			Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	L	2747	818	0.21	0.30	18.8	С	5.9	В
	R	1557	1491	0.25	0.96	0.1	A		
NB	L	3370	1147	0.41	0.34	18.2	С	7.1	В
	${f T}$	3663	2416	0.61	0.66	3.6	A		
SB	${f T}$	3663	1091	0.33	0.30	16.7	С	12.3	В
	R	1557	1491	0.09	0.96	0.1	A		
Inte	ersectio	on Delay	= 7.8 (	sec/veh)		Inters	section	n LOS = F	3

TABLE 46

HCM: SIGNALIZED INTERSECTION SUMMARY Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP (N-S) N. COURTENAY File Name: NR6-1.HC9

Area Type: Other

6-5-92 6:15 AM

Comment: DENSITY -- 1 D.U PER ACRE

		stbou		1	tboun	d	Noi	thb	ound		So	uthboi	ind
	L	T 	R 	L	T 	R 	L	T	_ R		L	${f T}$	R
No. Lanes Volumes Lane Width RTOR Vols				2 113 12.0		1 ( 586 12.0 117	2 346 12.0			0		2 950 12.0	1 397 12.0 0
				Signal	Opera	ation	าร						
Phase combine EB Left	nation	1	2	3	4				5		6	7	8
EB Left Thru						NB	Left				*		
Right							Thru		*		*		
Peds				5			Righ						
WB Left		*				CD	Peds						
Thru		••				SB	Left Thru		*				
Right		*					Righ		*		*		
Peds							Peds		^		^		
NB Right				1.		EB	Righ						
SB Right		*				WB	Righ		*		*		
Green	2	25A				ł	en		35A	3 (	OΑ		
Yellow/A-R		5				Yel	low/A				4		
Lost Time	2.					Los	st Tim	e 2	. 0	2.0	0		
Cycle Length	1: 104	secs	Pha	ase com	mbinat	ion	order	: #	1 #5	#6			

				ormance	Summary			
	~	Adj Sat	v/c	g/c			Approa	ch:
Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
L	2747	740	0.23	0.27	22.5	С.	5.7	В
R	1557	1497	0.34	0.96	0.1	A		
L	3370	1037	0.45	0.31	22.2	С	8.1	В
${f T}$	3663	2536	0.80	0.69	4.9	A		
${f T}$	3663	1338	1.06	0.37	54.6	E	40.4	E
R .	1557	1497	0.34	0.96	0.1	A		_
rsectio	n Delay	= 20.0	(sec/veh)		Inter	section	n LOS = (	C
	Mvmts L R L T T	Lane Group: Mvmts Cap L 2747 R 1557 L 3370 T 3663 T 3663 R 1557	Lane       Group:       Adj Sat         Mvmts       Cap       Flow           740         R       1557       1497         L       3370       1037         T       3663       2536         T       3663       1338         R       1557       1497	Lane       Group:       Adj Sat       v/c         Mvmts       Cap       Flow       Ratio              L       2747       740       0.23         R       1557       1497       0.34         L       3370       1037       0.45         T       3663       2536       0.80         T       3663       1338       1.06         R       1557       1497       0.34	Lane Group: Adj Sat v/c g/c  Mvmts Cap Flow Ratio Ratio   L 2747 740 0.23 0.27  R 1557 1497 0.34 0.96  L 3370 1037 0.45 0.31  T 3663 2536 0.80 0.69  T 3663 1338 1.06 0.37  R 1557 1497 0.34 0.96	Mvmts         Cap         Flow         Ratio         Ratio         Delay           L         2747         740         0.23         0.27         22.5           R         1557         1497         0.34         0.96         0.1           L         3370         1037         0.45         0.31         22.2           T         3663         2536         0.80         0.69         4.9           T         3663         1338         1.06         0.37         54.6           R         1557         1497         0.34         0.96         0.1	Lane Group: Adj Sat v/c g/c  Mvmts Cap Flow Ratio Ratio Delay LOS  L 2747 740 0.23 0.27 22.5 C R 1557 1497 0.34 0.96 0.1 A L 3370 1037 0.45 0.31 22.2 C T 3663 2536 0.80 0.69 4.9 A T 3663 1338 1.06 0.37 54.6 E R 1557 1497 0.34 0.96 0.1 A	Lane Group:         Adj Sat         v/c         g/c         Approact           Mvmts         Cap         Flow         Ratio         Delay         Los         Delay           L         2747         740         0.23         0.27         22.5         C         5.7           R         1557         1497         0.34         0.96         0.1         A           L         3370         1037         0.45         0.31         22.2         C         8.1           T         3663         2536         0.80         0.69         4.9         A           T         3663         1338         1.06         0.37         54.6         E         40.4           R         1557         1497         0.34         0.96         0.1         A

Streets: (E-W) SR 528 NORTH RAMP

(N-S) N. COURTENAY File Name: NR6-2.HC9

Analyst: RSK

6-5-92 6:15 AM

Area Type: Other

Comment: DENSITY -- 2 D.U PER ACRE

		=====	====	=====			=====	====	====:	=====	=====	====
	E	astbo	und	Wes	tbour	nd	Non	cthbo	und	So	outhbo	und
	L	T 	R	L	T	R	L	${f T}$	R	L	${f T}$	R
No. Lanes Volumes Lane Width RTOR Vols				2 113 12.0		1 ( 689 12.0 138	2 346 12.0	2 2130 12.0			2 1407 12.0	1 588 12.0 0
				Signal	Oper	ation	ns					
Phase combi	natior	1 1	2	3	- 4				5	6	7	8
EB Left						NB	Left	:		*		
Thru							Thru	1	*	*		
Right				5			Righ	ıt				
Peds							Peds	5				
WB Left		*		,		SB	Left	:				
Thru							Thru	1	*			
Right		*					Righ	it :	*	*		
Peds							Peds	;				
NB Right				7.		EB	Righ	ıt				
SB Right		*				WB	Righ	it :	<del>*</del>	*		
Green		25A				Gre	een	75	5A	30A		
Yellow/A-R	_	5					llow/A			4		
Lost Time		. 0				Los	st Tim	e 2.0	) 2	2.0		
Cycle Length	n: 144	sec	s Pha	ase co	mbina	tion	order	: #1	#5 #	<sup>‡</sup> 6		

		Froup:	Intersect Adj Sat	ction Perf	ormance g/c	Summary		Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	L	2747	534	0.32	0.19	38.0	D	8.5	В
	R	1557	1514	0.40	0.97	0.1	A		
NB	L	3370	749	0.62	0.22	39.6	D	11.3	В
	${f T}$	3663	2849	0.84	0.78	5.7	В		
SB	$\mathbf{T}$	3663	1984	1.06	0.54	52.3	E	38.7	D
	R	1557	1514	0.49	0.97	0.2	A		
Inte	rsection	Delay	= 23.0	(sec/veh)		Inter		n LOS = (	C

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP

(N-S) N. COURTENAY

Analyst: RSK

File Name: NR6-C.HC9

Area Type: Other

6-12-92 6:15 AM

Comment: DENSITY -- CURRENT BUILD-OUT

	L E	astbo T	und R	Wes	tboun T	 d R	Nor L	thbo		1		uthboi	
								T 	R 		L 	T	R
No. Lanes Volumes Lane Width RTOR Vols				2 113 12.0		1 5 747 12.0 149	12.0	2 2310 12.0		0		2 1611 12.0	1 673 12.0 0
				Signal	Oper.	ation	 1s						
Phase combin	natio	n 1	2	3	4				5	$\epsilon$	5	7	8
EB Left						NB	Left			. >	k		
Thru							Thru		*	7	ŧ		
Right Peds				5		1	Righ						
WB Left		*				l cp	Peds						
Thru						SB	Left Thru		*				
Right		*					Righ		*	نر	Ļ.		
Peds							Peds		•	•	•		
NB Right				7.		EB	Righ						
SB Right		*				WB	Righ		*	4	•		
Green		22A				Gre	een		9A	30	λ		
Yellow/A-R		5				Yel	low/A	-R	5	4			
Lost Time		2.0				Los	t Tim	e 2.	0	2.0	)		
Cycle Length	1: 16	5 sec	s Pha	ase co	mbinat	tion	order	: #1	#5	#6			

			Intersed	ction Perf	ormance	Summary			
		Group:	Adj Sat		g/c	-		Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	$\mathbf L$	2747	416	0.41	0.15	48.5	E	10.1	В
	R	1557	1519	0.43	0.98	0.2	A		
NB	L `	3370	654	0.71	0.19	49.8	E	12.0	В
	${f T}$	3663	3019	0.85	0.82	5.1	В		
SB	${f T}$	3663	2264	1.07	0.62	52.4	E	38.8	D
	R	1557	1519	0.56	0.98	0.4	А		
Inte	rsectio	n Delay	= 24.1	(sec/veh)		Inter	section	LOS =	С

) (1

TABLE 49

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP (N-S) N COURTENAY

File Name: NR3.HC9

Analyst: RSK
Area Type: Other

6-12-92 3:30 PM

Comment: CURRENT CONDITIONS, SEA RAY LEFTS REMOVED

	Eastbou L T	nd R	Wes	tboun T	d R	Nort	hbound T	==== d   R	Soı L	===== uthbou T	===== ind R
No. Lanes Volumes Lane Width RTOR Vols			2 401 12.0		1 f 82 12.0 40	1	2 372 2.0	0		2 1019 12.0	1 383 12.0 0
		5	Signal	Oper	ation	 1s					
Phase combin	nation 1	2	3	4			5		6	7	8
EB Left					NB	Left			*		
Thru						Thru	*		*		
Right Peds						Right	:				
WB Left	*					Peds					
Thru	^				SB	Left					
Right	*					Thru	*		*		
Peds						Right Peds	. *		*		
NB Right			/		EB	Right					
SB Right	*				WB	Right			*		
Green	25A				Gre	_	25A		0A		
Yellow/A-R	5				Ye]	low/A-			4		181
Lost Time	2.0					st Time		2.	_		
Cycle Length	: 94 secs	Pha	se co	mbina		order:		#6			

			Intersec	tion Perfo	rmance	Summary			
		roup:	Adj Sat	v/c	g/c	_		Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	L	2747	818	0.60	0.30	22.3	С	20.3	С
	R	1557	1491	0.03	0.96	0.1	A		
NB	L	3370	1147	0.55	0.34	19.6	С	13.4	В
	$\mathbf{T}$	3663	2416	0.17	0.66	4.0	А		_
SB	${f T}$	3663	1091	1.04	0.30	35.5	D	26.2	D
	R	1557	1491	0.27	0.96	0.1	А		_
Inte	rsection	Delay	= 20.9	(sec/veh)		Inter	section	n LOS = 0	2

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP Analyst: RSK

(N-S) N COURTENAY File Name: NR3-1.HC9

6-12-92 3:30 PM

Area Type: Other

Comment: DENSITY -- 1 D.U. PER ACRE

	1	stbou	nd	Wes	tbound	 1	Noi	thbou	ind	So	===== uthboi	===== ind
	L	T	R 	L	T	R	L	T	R	L	T	R
No. Lanes Volumes Lane Width RTOR Vols				2 401 12.0	]	1 ( 346 12.0 169	2 568 12.0	2 1572 12.0	0		2 1885 12.0	1 709 12.0 0
				Signal	Opera	ation	ns					
Phase combin	nation	1	2	3	4	1		5	5	6	7	8
EB Left						NB	Left			*		
Thru Right							Thru		•	*		
Peds				ż			Righ Peds					
WB Left		*				SB	Left					
Thru							Thru		:			
Right		*					Righ	ıt 🔞	:	*		
Peds							Peds	5				
NB Right				7.		EB	Righ					
SB Right		*				WB	Righ			*		
Green		25A				1	een	70		30A		
Yellow/A-R	~	5			**		llow/A			4		
Lost Time		.0	nh-		. 1. 2 4		st Tin					
Cycle Length	1. 139	Secs	Pna	ase con	noinat	.lon	order	* <i>#</i> 1	かり かり	Ó		

			Intersect	ion Perf	ormance	Summary			
	Lane	Group:	Adj Sat	v/c	g/c			Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	$\mathbf{L}_{}$	2747	553	0.88	0.20	52.0	E	36.6	D
	R	1557	1512	0.14	0.97	0.0	A		
NB	L	3370	776	0.82	0.23	43.3	E	15.0	С
	${f T}$	3663	2820	0.62	0.77	4.8	A		
SB	${f T}$	3663	1924	1.09	0.53	45.9	E	33.9	D
	R	1557	1512	0.50	0.97	0.3	A		
Inte	rsectio	on Delay	= 26.6 (	sec/veh)		Inter	section	n LOS = I	)

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 NORTH RAMP Analyst: RSK

(N-S) N COURTENAY
File Name: NR3-2.HC9

Area Type: Other

6-12-92 3:30 PM

Comment: DENSITY -- 2 D.U. PER ACRE

						====:			====	====		
	L Ea	stbou T	nd R	Wes	tbour T	nd R	Nor	thbou T	nd R	So	uthboi T	
											1	R
No. Lanes Volumes Lane Width RTOR Vols				2 401 12.0		1 ( 519 12.0 241	1	2 2355 12.0	0		2 2445 12.0	1 919 12.0 0
				Signal	Oper	ation	ns					
Phase combin	nation	1	2	3	- 4			5		6	7	8
EB Left						NB	Left	:		*	•	Ū
Thru							Thru	*		*		
Right				-			Righ	it				
Peds							Peds					
WB Left		*				SB	Left					
Thru							Thru					
Right Peds		*					Righ			*		
NB Right						777	Peds					
SB Right		*		7.		EB	Righ					
Green		25A				WB	Righ			*		
Yellow/A-R		5 5				1	een	991 -P 5		30A		
Lost Time	2	.0						-R 5 e 2.0		4 . 0		
Cycle Length			Pha	ase co	mbina	tion	order	: #1;	#5 #6			

	Lane	Group:	Intersecti Adj Sat	V/C	rmance g/c	Summary		Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
WB	${f L}$	2747	458	1.07	0.17	107.8	F	64.9	F
	R .	1557	1520	0.21	0.98	0.0	A		
NB	L	3370	642	0.99	0.19	76.0	F	22.2	С
	${f T}$	3663	2965	0.89	0.81	9.2	В		
SB	$\mathbf{T}$	3663	2224	1.23	0.61	: *	*	*	*
	R	1557	1520	0.64	0.98	0.7	A		
	Intersec	ction De	lay = * (se	c/veh)		Int	ersec	tion Los	= *
	* Delay	and LOS	not meanin	gful whe	n any v	/c is gre	eater	than 1.2	

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 South Ramp

(N-S) N Courtenay File Name: SR6.HC9

Analyst: RSK

C 12 02 C 15 NM

Area Type: Other

6-12-92 6:15 AM

Comment: CURRENT CONDITIONS -- SEA RAY LEFTS REMOVED

	Easth	ound	Wes	tbound	ł	Nort	hboun	d	Southb	ound
	L T	R	L	${f T}$	R	L '	r	RI		R
No. Lanes Volumes Lane Width RTOR Vols	2 665 12.0	1 227 12.0 95			ţ.	1	001	1 186 2.0 12	2 60 29 2.0 12.	
		5	Signal	0pera	tion	ns				
Phase combin	nation 1	2	3	4	1		5	6	7	8
EB Left	*				NB	Left				
Thru						Thru		*		
Right	*					Right	*	*		
Peds WB Left						Peds				
Thru					SB	Left	*			
Right					1	Thru	*	*		
Peds						Right				
NB Right	*		<i>j.</i>		EB	Peds Right	*	*		
SB Right		9			WB	Right	^	^		
Green	35A				Gre	_	20P	35A		
Yellow/A-R	4				Yel	low/A-I	_	4		
Lost Time	3.0					t Time		3.0		
Cycle Length	102 se	cs Pha	se co	mbinat		order:		5 #6		

	<b>T</b>		Intersecti			Summary			
		Froup:	Adj Sat	v/c	g/c			Approad	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	2747	970	0.79	0.35	25.7	D	21.0	С
	R	1557	1465	0.12	0.94	0.2	A		
NB	T	3663	1293	0.91	0.35	20.3	С	17.1	С
	R	1557	1465	0.15	0.94	0.2	A		
SB	L	1740	358	0.20	0.21	25.5	D	10.0	В
	T	3663	2155	0.20	0.59	7.5	В		
Inte	rsection	n Delay	= 17.2 (s	sec/veh)		Inter	section	n LOS = 0	2

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 South Ramp Analyst: RSK

(N-S) N Courtenay File Name: SR6-1.HC9

Area Type: Other

Thru

Right

Peds

NB Right

SB Right

6-12-92 6:15 AM

Thru

Right

Peds

EB Right

Comment: DENSITY -- 1 D.U. PER ACRE

==========													
	Ea	Eastbound			Westbound   N			No	 rthbo	und	Son	Southbour L T 1 2 179 884 12.0 12.0	
	L	${f T}$	R	L	${f T}$	R		L	${f T}$	R	L	${f T}$	R
No. Lanes Volumes Lane Width	2 861 12.0		1 227 12.0						2 1297 12.0		1	884	
RTOR Vols			95	-						0			0
the time over such some land time time time time time time		· · · · · · · · · · · · · · · · · · ·		 Signa	 l Ope	 erat	ion	is					
Phase combin	nation	1	2	3		4				5	6	7	8
EB Left Thru		*					NB	Left Thru			*		
Right Peds		*		5		-		Righ Peds		*	*		
WB Left							SB	Left		*			

WB Right Green 53A Green 20A 55A Yellow/A-R Yellow/A-R 4 4 Lost Time 2.0 Lost Time 2.0

Cycle Length: 140 secs Phase combination order: #1 #5 #6

•	Lane	Group:	Intersect Adj Sat	ction Perf	ormance g/c	Summary		Approac	h:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	2673	1050	0.95	0.39	43.2	E	36.8	D
	R	1515	1472	0.12	0.97	0.0	A		
NB	T	3663	1491	1.03	0.41	34.5	D	30.1	D
	R	1515	1472	0.15	0.97	0.0	A		
SB	${f L}$	1740	273	0.78	0.16	52.1	E	18.3	С
	${f T}$	3663	2119	0.61	0.58	12.7	В		
Inte	rsection	on Delay	= 27.8	(sec/veh)		Inter	section	LOS = D	

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division 

Streets: (E-W) SR 528 South Ramp (N-S) N Courtenay File Name: SR6-2.HC9

Area Type: Other

6-12-92 6:15 AM

Comment: DENSITY -- 2 D.U. PER ACRE

	l Ea	stbou	ınd l	Wes	tboun	====:	====	===== rthbo	====:	====:	=====	====
	L	T	R	L	T.	R	L	r chbo T	una R	L	uthbou	
											T	R
No. Lanes	2		1			5		2	1	1	2	
Volumes	988		227			•		1488	186	256	1264	
Lane Width	12.0		12.0					12.0	12.0	12.0		
RTOR Vols			95						0			0
			S	ignal	Oper	atior						
Phase comb	ination	1	2	3	4	1			5	6	7	8
EB Left		*				NB	Lef			O	,	8
Thru							Thru			*		
Right		*					Rigl	nt *	t ,	*		
Peds WB Left							Peds	5				
WB Left Thru						SB	Left	. 4	*			
Right							Thru		•	*		
Peds						1	Righ					
NB Right		*		<i>j</i> .		775	Peds					
SB Right						EB	Righ		•	*		
Green		50A				WB Gre	Righ					
Yellow/A-R		4						25 25		5A		
Lost Time	2	. 0						A-R 4 to $A-R$		4		
Cycle Lengt			Pha	se cor	nbinat	ion	Order	· #1	2. #5 #6	U		
								• #1	# J # O			

Intersection Performance Summary Lane Group: Adj Sat v/c g/c Approach: Mvmts Cap Flow Ratio Ratio Delay LOS Delay LOS 2673 979 1.16 0.37 126.8 F 110.2 1515 1472 0.12 0.97 0.0 A 3663 1470 1.19 0.40 85.8 F 76.1 1515 1472 0.15 0.97 0.0 A 1740 331 0.92 0.19 64.5 F 23.0 3663 2218 0.83 0.61 16.1 C on Delay = 63.3 (sec/veh) Intersection Los = --------\_\_\_ EB L F R NB  $\mathbf{T}$ 76.1 F R SB L 23.0 C  ${f T}$ Intersection Delay = 63.3 (sec/veh) Intersection LOS = F

TABLE 55

HCM: SIGNALIZED INTERSECTION SUMMARY

Brevard County Traffic Management Division

Streets: (E-W) SR 528 South Ramp Analyst: RSK

(N-S) N Courtenay File Name: SR3.HC9

Area Type: Other

Thru

Peds

NB Right

Right

6-11-92 3:30 PM

Thru

Right

Peds

Comment: CURRENT CONDITIONS -- SEA RAY LEFTS REMOVED

========													
	1	Eastbound			Westbound   Northbound			und	Southbound				
	L	T	R	L	T	R		L	${f T}$	R	L	$\mathbf{T}$	R
No. Lanes Volumes	2 134		1 323				5		2 806	1 155	1	2	
Lane Width	12.0		12.0								12.0	1277 12.0	
RTOR Vols	 		0							0			0
			5	Signal	l Ope	rati	ion	.s					
Phase combi	nation	1	2	3	-	4				5	6	7	8
EB Left		*				N	1B	Left					
Thru						1		Thru			*		
Right		*						Righ		<b>k</b>	*		
Peds								Peds					
WB Left						IS	sB	Left	:	k			

EB Right SB Right WB Right Green 35A Green 20A 35A Yellow/A-R 4 Yellow/A-R 4 Lost Time 2.0 Lost Time 2.0

Cycle Length: 102 secs Phase combination order: #1 #5 #6

	Lane Mvmts	Group: Cap	Intersec Adj Sat Flow	tion Perfo v/c Ratio	g/c Ratio	Summary Delay	LOS	Approac	ch: LOS
EB	L	2747	996	0.17	0.36	16.8	С	5.5	В
	R	1557	1496	0.23	0.96	0.1	A		
NB	T	3663	1293	0.78	0.35	20.9	С	17.9	С
	R	1557	1496	0.11	0.96	0.1	A		
SB	L	1740	375	0.42	0.22	26.7	D	7.7	В
	${f T}$	3663	2191	0.70	0.60	5.8	В		
Inte	ersectio	n Delay :	= 10.9	(sec/veh)		Inters	section	n LOS = F	3

HCM: SIGNALIZED INTERSECTION SUMMARY Brevard County Traffic Management Division 

Streets: (E-W) SR 528 South Ramp

(N-S) N Courtenay File Name: SR3-1.HC9

Analyst: RSK

Thru

Peds

NB Right

SB Right

Yellow/A-R

Green

Right

Area Type: Other

6-11-92 3:30 PM

Thru

Peds

EB Right

WB Right

Green

Right

Yellow/A-R 4

25A 80A

4

Comment: DENSITY -- 1 D. U. PER ACRE

22A

4

	=====	====	=====	====		====	====	====		====		
	Ea	Eastbound		We:	Westbound			rthbo	und	Soi	uthbou	ind
	L	$\mathbf{T}_{\cdot}$	R	L	T	R	L	${f T}$	R	L	${f T}$	R
No. Lanes Volumes Lane Width	2 305 12.0		1 323 12.0			ţ		2 1835 12.0		1 230 12.0	2 2056 12.0	
RTOR Vols			0						0			0
							· 					
			5	Signal	l Ope	ratio	ns					
Phase combi	natior	1 1	2	3		4			5	6	7	8
EB Left		*				NB	Lef	t				
							Thr	u		*		
_		*		5			Rig		*	*		
						CD			L			
Lane Width RTOR Vols Phase combi	12.0	*	12.0	_	_	4	Lef Thr	12.0  t u ht	12.0 0 	6	12.0	0

Lost Time 3:0 Lost Time 3.0 Cycle Length: 139 secs Phase combination order: #1 #5 #6

		Group:	Adj Sat	,	ormance g/c	Summary		Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	2747	. 455	0.85	0.17	52.4	E	27.6	D
	R	1557	1490	0.23	0.96	0.1	A		
NB	${f T}$	3663	2135	1.07	0.58	53.4	E	49.8	E
	R	1557	1490	0.11	0.96	0.1	A		
SB	L	1740	325	0.78	0.19	48.5	E	9.5	В
	$\mathbf{T}$	3663	2899	0.86	0.79	5.5	В		
Inte	rsection	n Delay	= 28.5	(sec/veh)		Inter	section	n LOS = 1	D

HCM: SIGNALIZED INTERSECTION SUMMARY Brevard County Traffic Management Division 

Streets: (E-W) SR 528 South Ramp Analyst: RSK

(N-S) N Courtenay File Name: SR3-2.HC9

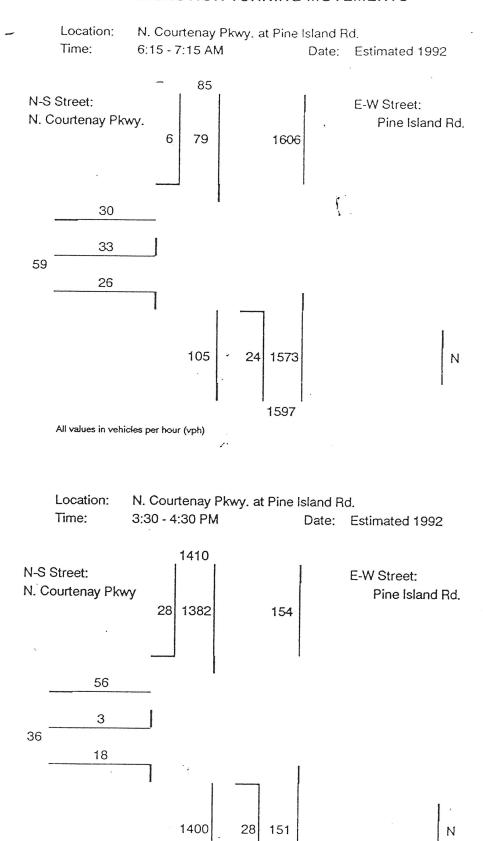
6-11-92 3:30 PM

Area Type: Other

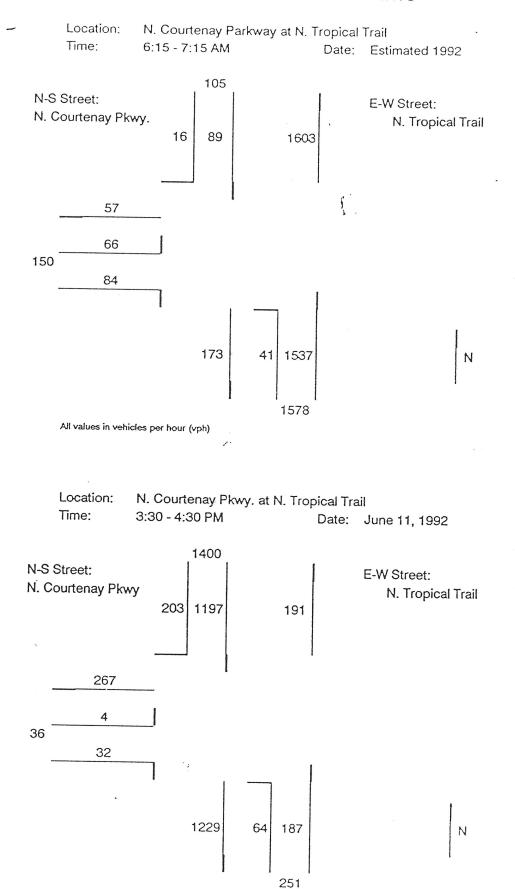
Comment: DENSITY -- 2 D. U. PER ACRE : 

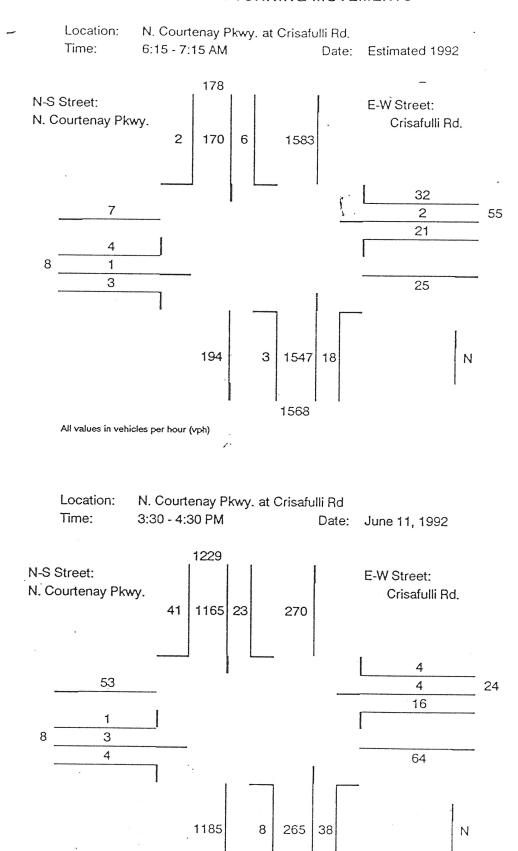
		stbou	ind	Wes	tbound	i	Nort	hbou	nd	Soi	ıthbou	nd
		T 	R 	L	T 	R		T	R	L	Т	R
No. Lanes Volumes Lane Width RTOR Vols	2 417 12.0		1 323 12.0 0			(	2	2 506 2.0	1 155 12.0 0	1 287 12.0	2 2559 12.0	0
			S	ignal	Opera	ation	าร					
Phase combine EB Left Thru Right Peds WB Left Thru Right Right Peds	nation	*	2	3	4	NB	Left Thru Right Peds Left Thru Right Peds	5 * * *		6 * *	7	8
NB Right SB Right Green		*		21	•	EB WB	Right Right	*		*		
Yellow/A-R	•	22A 4				Gre		22A	5	8A		
Lost Time	3	. 0					low/A-1			4		
Cycle Length		secs	Pha	se con	nbinat	ion	t Time order:	3.0 #1 #	3. 5 #6			÷

	Lane	Group:	Intersecti			Summary			
	CONTRACTOR CONTRACTOR	_	Adj Sat	v/c	g/c			Approa	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	Los	Delay	LOS
EB	L	2747	554	0.95	0.20	53.5	E	32.3	D
	R	1557	1475	0.24	0.95	0.1	А		_
NB	T	3663	1896	1.65	0.52	*	*	*	*
-	R	1557	1475	0.11	0.95	0.1	A		
SB	L	1740	351	0.90	0.20	51.0	E	49.4	E
	${f T}$	3663	2731	1.13	0.75	49.3	E	47.4	E
Intersection Delay = * (sec/veh) Intersection LOS = *									
	* Delay	and LOS	not meaning	igful whe	n any v	//c is gre	ersec	than 1.2	= *
					-	,	and the second second		

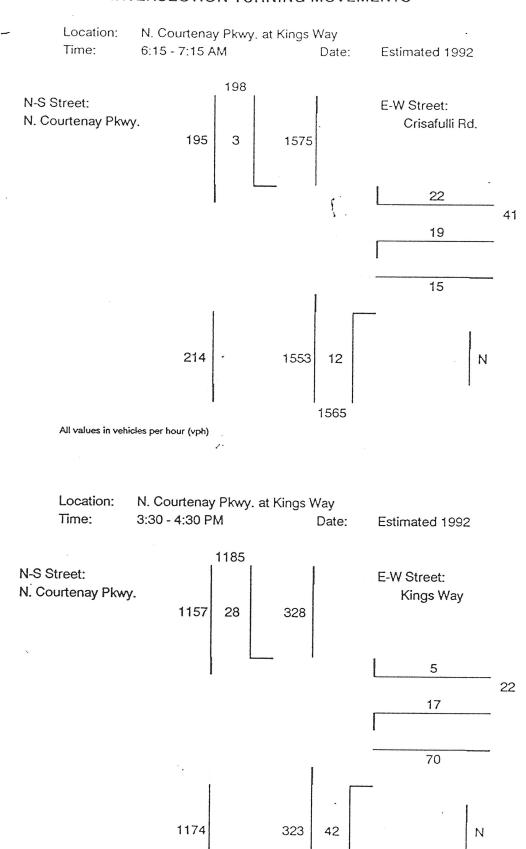


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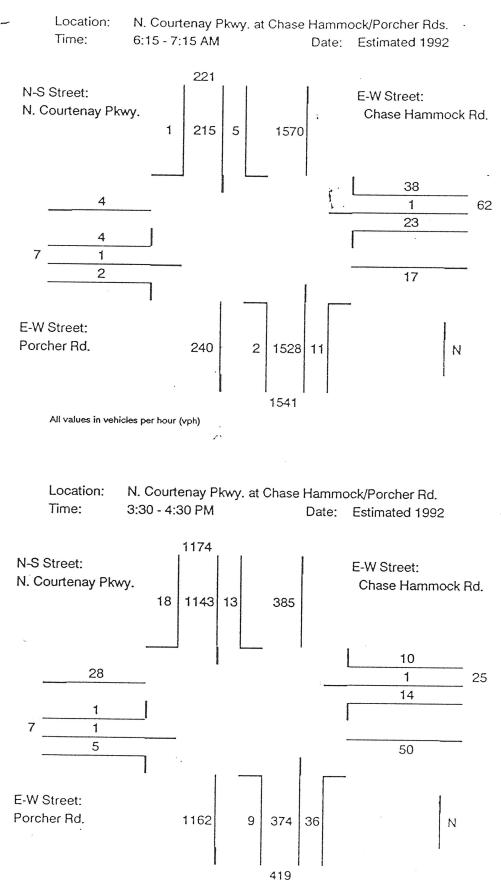


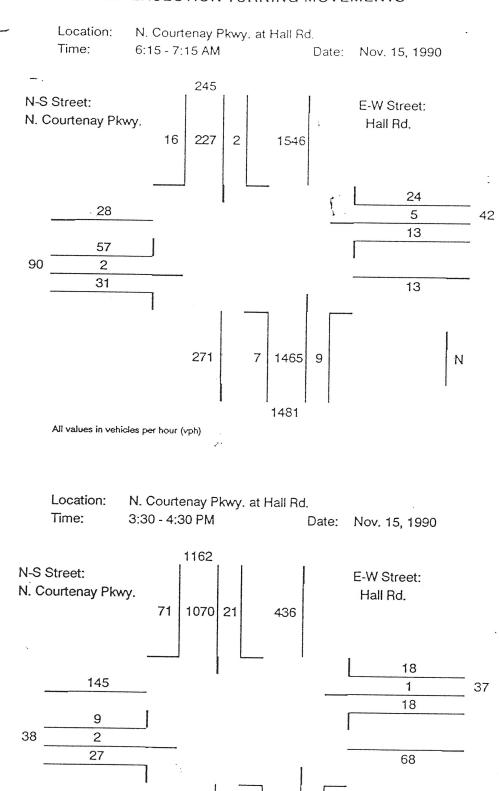


311



365





All values in vehicles per hour (vph)

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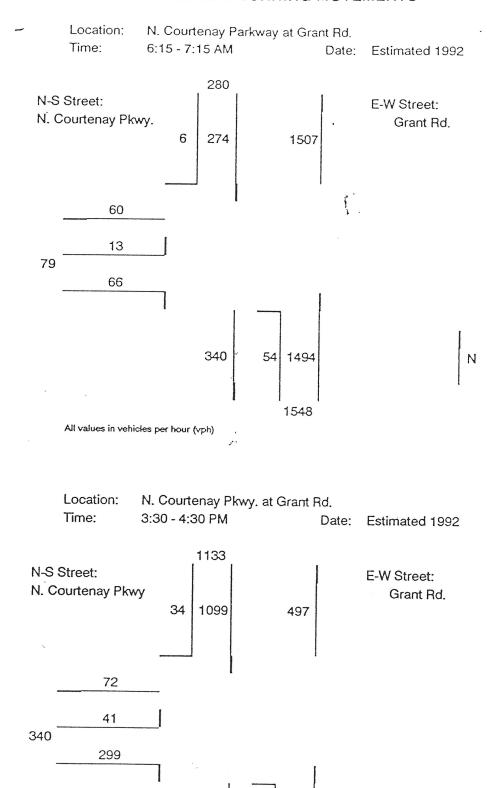
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N



All values in vehicles per hour (vph)

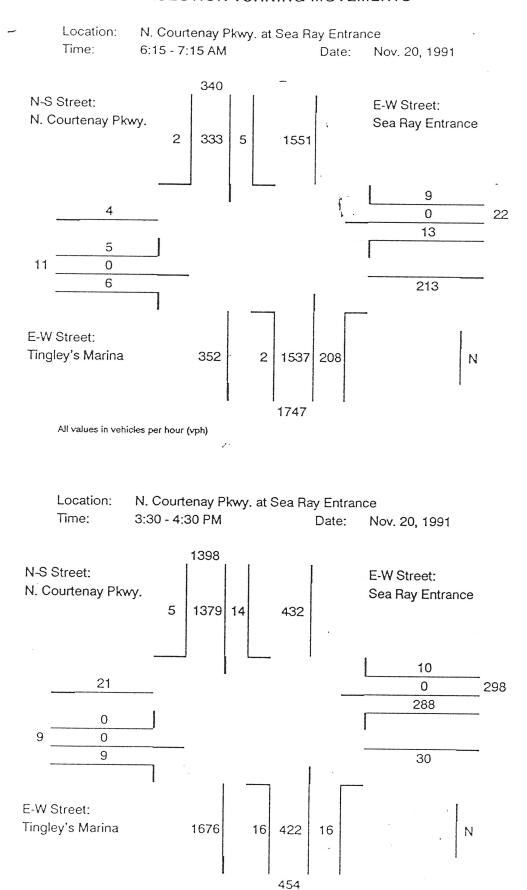
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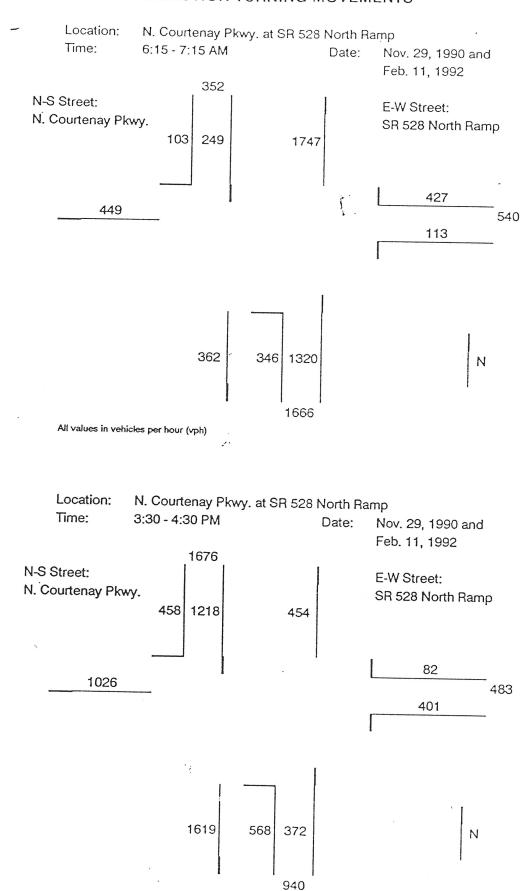
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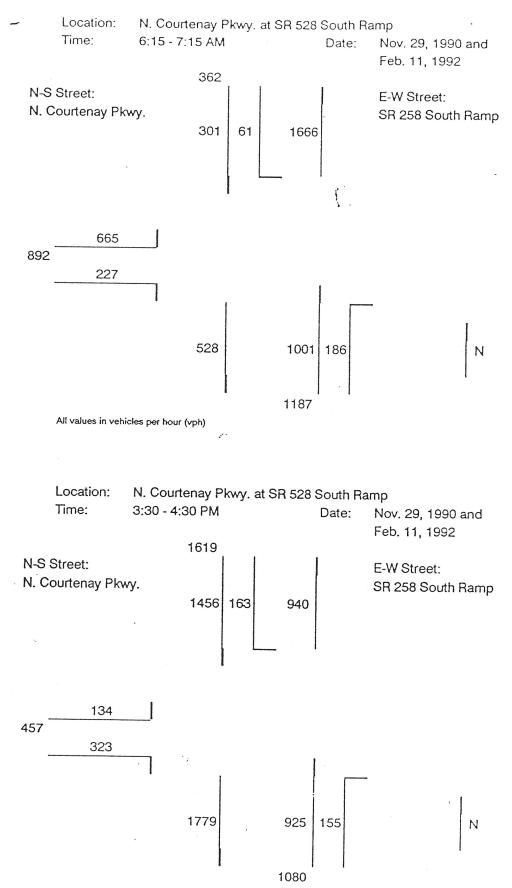
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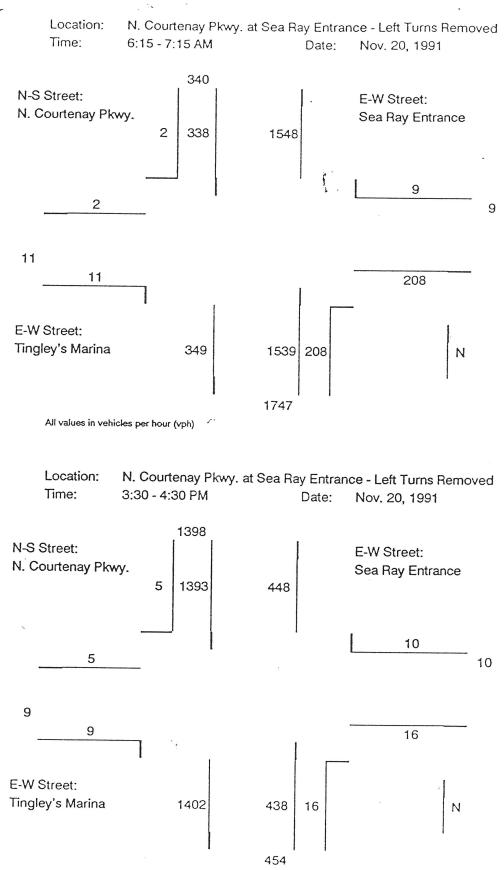
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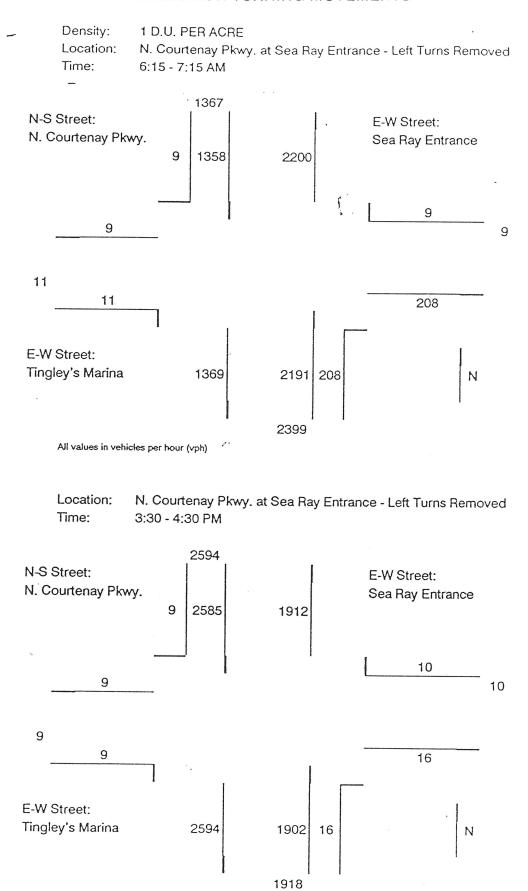
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All values in vehicles per hour (vph)

20

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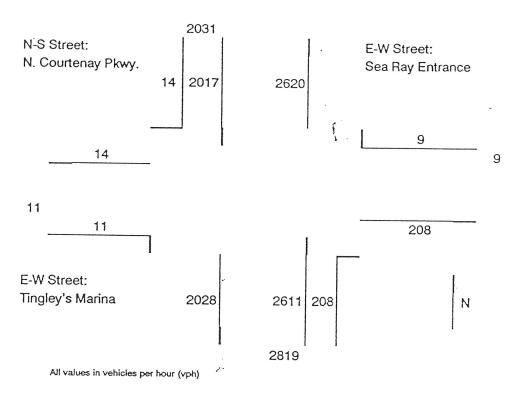
2 D.U. PER ACRE

Location:

N. Courtenay Pkwy. at Sea Ray Entrance - Left Turns Removed

Time:

6:15 - 7:15 AM

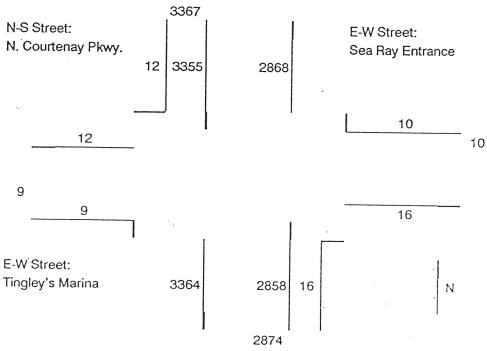


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N. Courtenay Pkwy. at Sea Ray Entrance - Left Turns Removed

Time:

3:30 - 4:30 PM



Density:

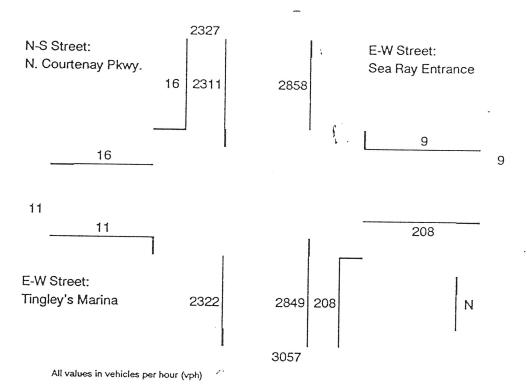
**BUILD-OUT AT CURRENT DENSITY** 

Location:

N. Courtenay Pkwy. at Sea Ray Entrance - Left Turns Removed

Time:

6:15 - 7:15 AM

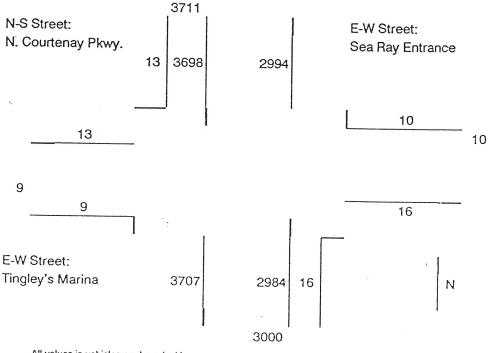


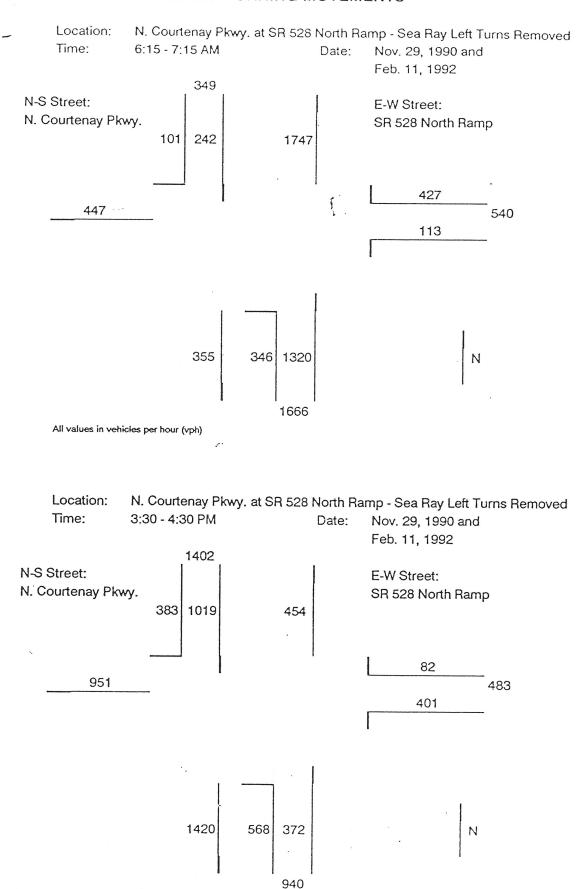
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Time:

3:30 - 4:30 PM





Density:

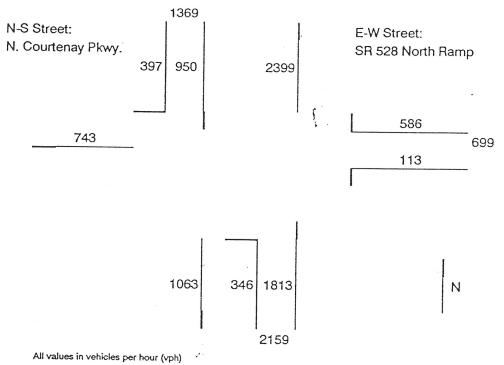
1 D.U. PER ACRE

Location:

N. Courtenay Pkwy. at SR 528 North Ramp - Sea Ray Left Turns Removed

Time:

6:15 - 7:15 AM



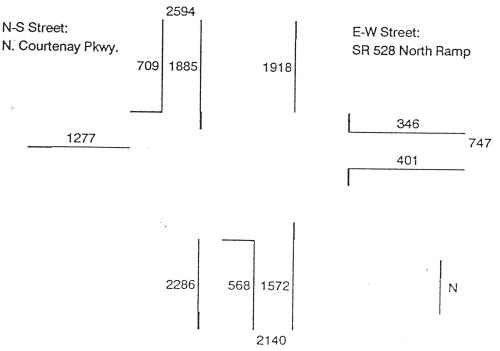
per meer (rp.,

Location:

N. Courtenay Pkwy. at SR 528 North Ramp - Sea Ray Left Turns Removed

Time:

3:30 - 4:30 PM



Density:

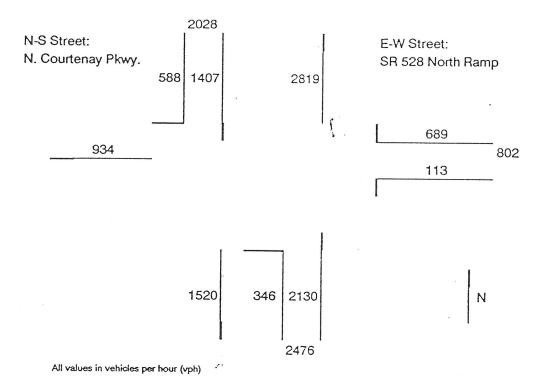
2 D.U. PER ACRE

Location:

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Time:

6:15 - 7:15 AM

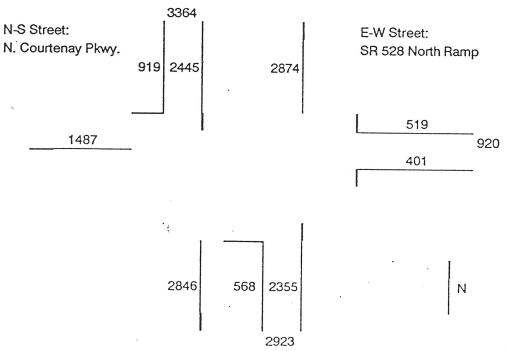


Location:

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Time:

3:30 - 4:30 PM



Density:

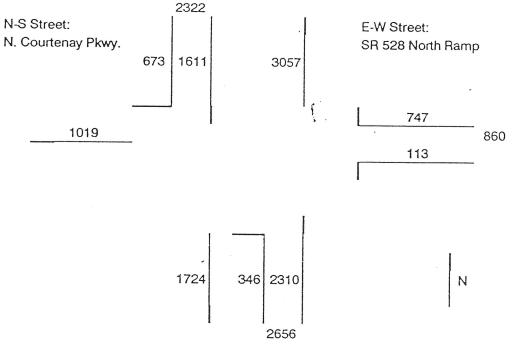
**BUILD-OUT AT CURRENT DENSITY** 

Location:

N. Courtenay Pkwy. at SR 528 North Ramp - Sea Ray Left Turns Removed

Time:

6:15 - 7:15 AM



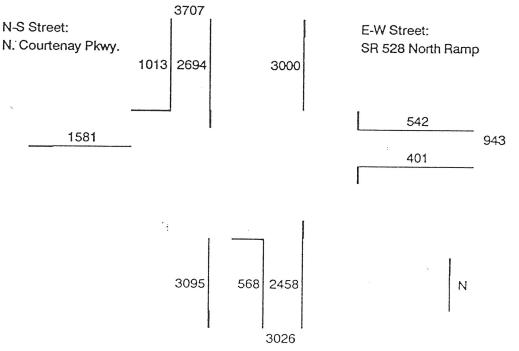
All values in vehicles per hour (vph)

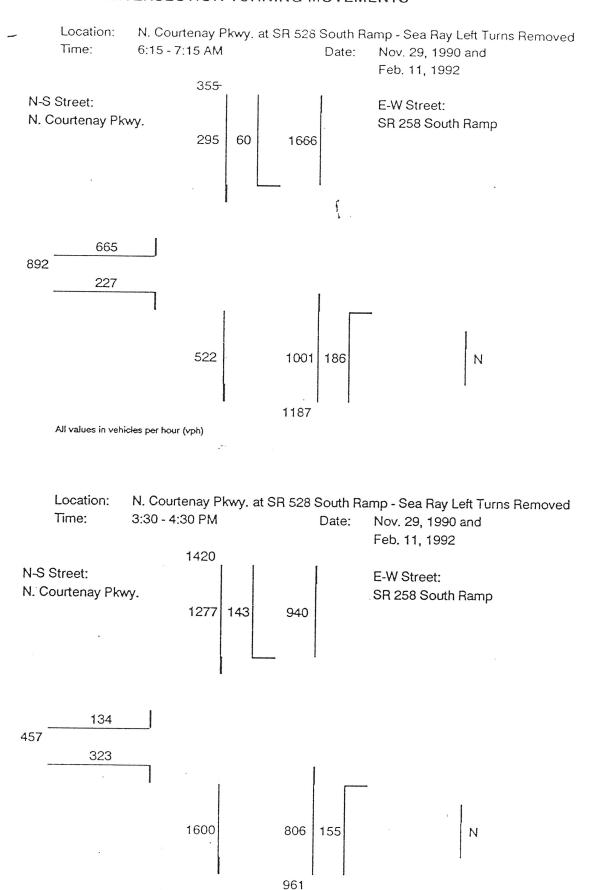
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Time:

3:30 - 4:30 PM





Density:

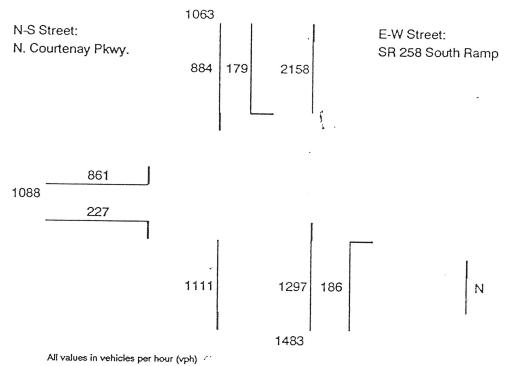
1 D.U PER ACRE

Location:

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Time:

6:15 - 7:15 AM



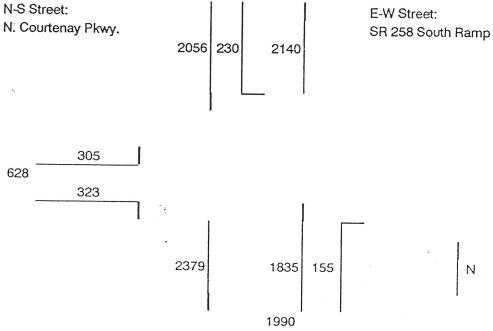
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Time:

3:30 - 4:30 PM

2286



Density:

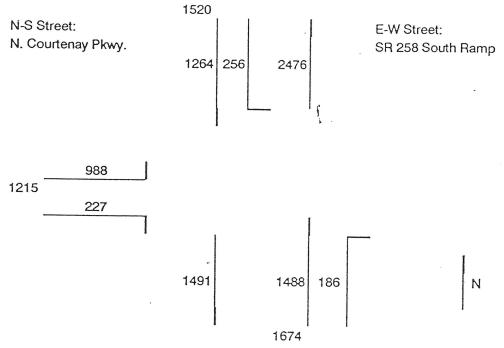
2 D.U PER ACRE

Location:

N. Courtenay Pkwy. at SR 528 South Ramp - Sea Ray Left Turns Removed

Time:

6:15 - 7:15 AM



All values in vehicles per hour (vph)

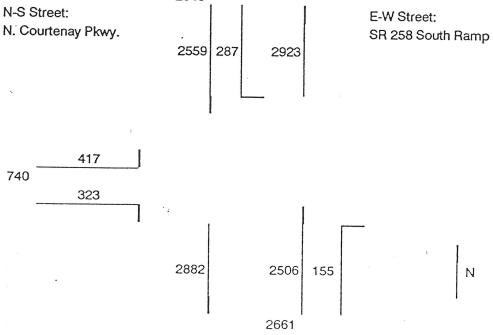
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Time:

3:30 - 4:30 PM

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Density:

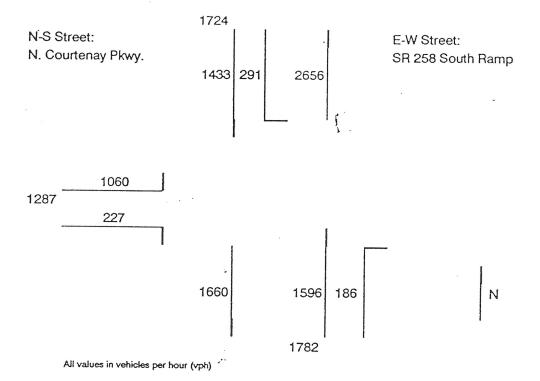
**BUILD-OUT AT CURRENT DENSITY** 

Location:

N. Courtenay Pkwy. at SR 528 South Ramp - Sea Ray Left Turns Removed

Time:

6:15 - 7:15 AM



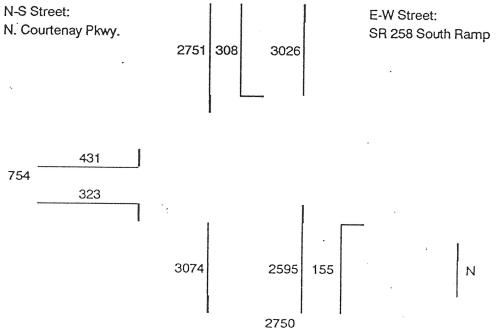
Location:

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Time:

3:30 - 4:30 PM

3059



## Effect of Change in Land Use on North Merritt Island

#### Purpose

The purpose of the study is to compare the effect of two residential density scenarios on the generation of revenue from ad valorem assessments and impact fees. This can then be compared to expected capital outlays for infrastructure improvements required by an increasing population. The two scenarios represent the existing residential density and the proposed residential density in the North Merritt Island Small Area Plan study.

### Methodology

The general outline of the methodology is as follows:

1) determine average developed lot values in the study area for various densities.

2) apply those values to build-out conditions under each residential density scenario to determine effect on ad valorem revenue,

3) apply impact fee rate to build-out conditions under each scenario to determine effect on impact fee revenue.

4) compare difference under each scenario and consider necessary infrastructure improvements.

5) determine the effect of proposed land use changes of vacant commercial land on ad valorem revenue.

Data from the Property Appraisers data base was used to determine average values for various lot sizes on North Merritt Island. The data was sorted by zoning and an acreage range. The compilation includes: number of acres that fit the zoning and acreage criterion, number of acres in criterion group, average value of dwelling unit in group, and average land value per acre. This data was used to determine the average value of a dwelling unit on a quarter, half and full acre lot (see Table 1).

The average developed lot values were used in conjunction with the build-out estimates from the Comprehensive Planning Division to determine the effect on ad valorem revenue to the county general fund at build-out. This was accomplished by determining a total taxable value that would be generated by the existing residential density and the proposed residential density. By applying the current millage rate to these figures and comparing the difference an estimated revenue difference can be calculated. Also, the effect on revenue from impact fees can be calculated by applying the impact fee rate to the expected number of dwelling units in the study area at build-out under each scenario and comparing the difference.

It is important to note that the difference in revenue on a yearly basis represents the condition at build-out in current dollars. Assuming an equal growth rate under each scenario, a difference in revenue would not occur until the number of units at build-out under the proposed residential density was exceeded.

### Results of Analysis

Analysis of the data showed the average value of a lot and dwelling unit in different densities:

(Table 1)	
Du/Ac	Average Total Value
1	\$92,327
2	\$114,591
4	\$113,270

The near similarity in value despite the difference in actual lot size is most likely explained by the greater amount of infrastructure improvements and amenities associated with the higher density development.

Table 2 shows the average total value applied to new units expected under the build-out scenarios. Build-out under the existing residential density would result in a total tax value of \$804,124,757 that results in \$3,556,644 of revenue assuming a millage of 4.423. Build-out under the proposed residential density would result in a total tax value of \$405,876,415 which results in \$1,795,191 of revenue. The difference in revenue generated per year at build-out would be \$1,761,452, or a 50% reduction.

Another revenue source from residential construction is impact fees (Table 3). The total fees for a single-family residence is \$1,106.53 which can be used to compare total impact fees that would be collected up to build-out with the existing residential density is \$10,020,736; the total with the proposed residential density would be \$5,967,516. This results in a difference of \$4,053,219, or a 40% reduction.

Build-out under the current density will necessitate roadway improvements because the acceptable level of service on North Courtenay Parkway will be exceeded. The cost can be estimated by considering the current improvement from two to four lanes and considering cost estimates for an alternate roadway on KSC property. The current cost estimate for the North Courtenay Parkway widening project, including a new bridge over the barge canal, is \$18 million. A similar cost could be expected for a six laning project. Cost estimates from a 1988 report by Stottler Stagg & Assoc. for an alternate roadway on KSC property total \$18 million.

In addition 53.07 acres are proposed for change in land use from commercial to residential (Table 4). The average land value for commercial property in the area is \$40,735 per/acre and residential in the same area averages \$12,623 per/acre. This results in a \$6,599 annual reduction in tax revenue.

A potential shortcoming in using this analysis to determine economic impact to the county would be to view this study in microcosm. Although a scenario allowing fewer units will result in less revenue generated from the study area, it is likely that the demand for those dwelling units will be manifest in another part of the county thereby having no overall effect on the tax base. A more fundamental economic question may simply be, "Is this the area in Brevard County into which we want to direct future infrastructure improvements?"

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Request No. 92B.5.1

North Merritt Island Small Area Plan Recommendation A-1

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 2,11, Township 24, Range 36

Acreage: 850 +/- acres

Existing Residential Density Designation:

Urban Fringe 4 units per acre

Proposed Residential Density Designation:
Suburban 2 units per acre

Description: Amendment 92B.5.1 is based on recommendation A-1 of the North Merritt Island Small Area Plan study. The future land use designation is primarily residential, however a majority of the frontage on North Courtenay Parkway is mixed use--which allows consideration of commercial and residential uses--and planned industrial park. This area, which is east of North Courtenay Parkway and west of the Sykes Creek basin, is mostly undeveloped with much of the area in citrus groves except for the roadway frontage which has commercial and industrial uses.

The amendment would reduce the potential build-out in the area by an estimated 224 dwelling units based on existing conditions and anticipated environmental regulations.

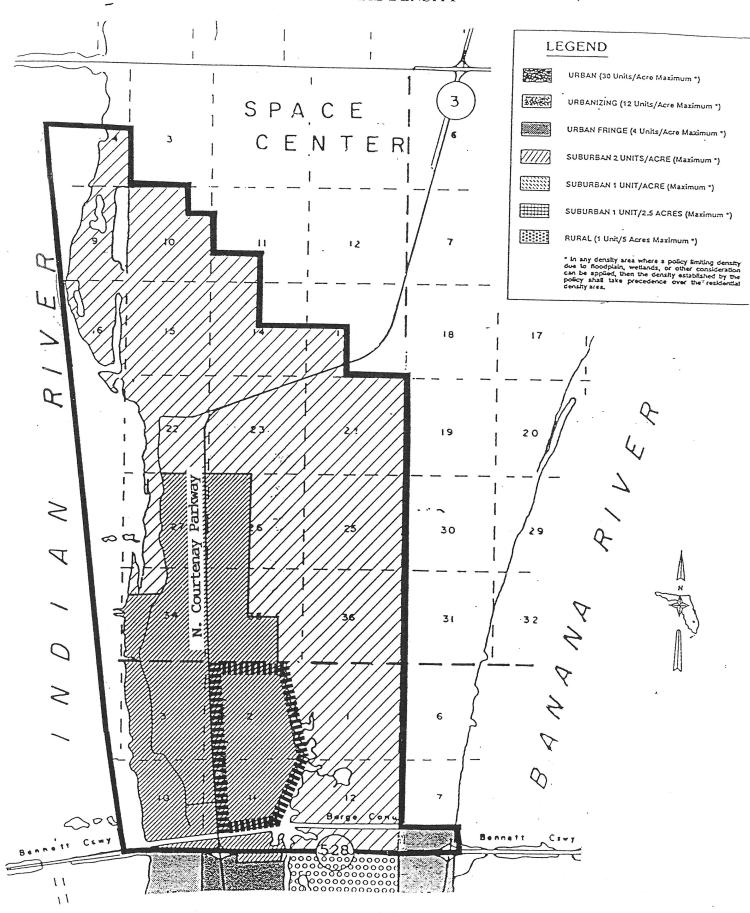
Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from a potential 19,041 trips to 20,111 trips, however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is supplied by the City of Cocoa and wastewater treatment is provided by the County's Sykes Creek Regional Wastewater Treatment Plant.

Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there may be type III aquifer recharge, floodplains, and wetlands in this area. Any future development will be evaluated against Brevard County's Aquifer Protection Ordinance which limits impervious surfaces in type III areas to 45%; the Floodplain Protection Ordinance which may limit residential density in the various floodplains as much as 1 unit per 10 acres; and the Wetlands Protection Ordinance which limits residential density to 1 unit per 5 acres and provides for mitigation at a ratio of 2:1. All other land development regulations which may pertain to this area will be strictly enforced.

Historic Resources: This area includes High Probability Zones for containing archaeologically significant sites based on a study prepared by the University of West Florida. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would reduce the potential build out in the area from an estimated 1074 units to 850 units based on existing conditions and anticipated environmental regulations. Assuming an average of 2.41 persons per household, the population reduction would be 540 persons.

RESIDENTIAL DENSITY



Request No. 92B.5.2 North Merritt Island Small Area Plan Recommendation A-3

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 27,34, Township 23, Range 36

Acreage: 310 +/- acres

Existing Residential Density Designation:

Urban Fringe 4 units per acre

Proposed Residential Density Designation: Suburban 2 units per acre

Description: Amendment 92B.5.2 is based on recommendation A-3 of the North Merritt Island Small Area Plan study. The future land use designation is primarily residential, however a majority of the frontage on North Courtenay Parkway is mixed use which allows consideration of commercial and residential uses. This area, which is west of North Courtenay Parkway, is mostly undeveloped with much of the area in citrus groves except for the roadway frontage which has commercial uses. To the south, in Section 34, is the most highly developed area of North Merritt Island; a majority of the section is at three and four units per acre. Also, the Florida Inland Navigation District dredged material disposal site and the County's Manatee Cove Park is in the amendment area.

The amendment would reduce the potential build-out in the area by an estimated 180 dwelling units based on existing conditions and anticipated environmental regulations.

Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from a potential 16,176 trips to 16,916 trips however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is supplied by the City of Cocoa and wastewater treatment is provided by the County's Sykes Creek Regional Wastewater Treatment Plant.

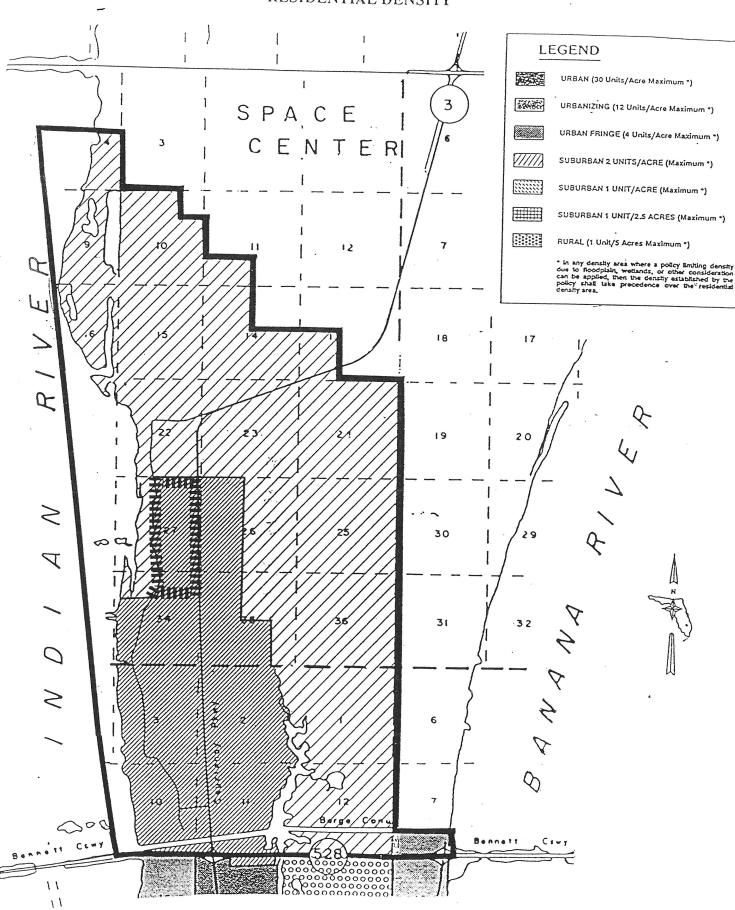
Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there may be type III aquifer recharge and wetlands in this area. Any future development will be evaluated against Brevard County's Aquifer Protection Ordinance which limits impervious surfaces in type III areas to 45% and the Wetlands Protection Ordinance which limits residential density to 1 unit per 5 acres and provides for mitigation at a ratio of 2:1. All other

land development regulations which may pertain to this area will be strictly enforced.

Historic Resources: This area includes High Probability Zones for containing archaeologically significant sites based on a study prepared by the University of West Florida. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would reduce the potential build out in the area from an estimated 385 units to 205 units based on existing conditions and anticipated environmental regulations. Assuming an average of 2.41 persons per household, the population reduction would be 434 persons.

RESIDENTIAL DENSITY



Request No. 92B.5.3

North Merritt Island Small Area Plan Recommendation A-4

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 26,27,34,35, Township 23, Range 36

Acreage: 650 +/- acres

Existing Residential Density Designation:

Urban Fringe 4 units per acre

Proposed Residential Density Designation:
Suburban 2 units per acre

Description: Amendment 92B.5.3 is based on recommendation A-4 of the North Merritt Island Small Area Plan study. The future land use designation is primarily residential, however a majority of the frontage on North Courtenay Parkway is mixed use which allows consideration of commercial. This area, which is in the vicinity of Judson Canal and King Park, has been developing in one acre and larger lots. Existing development along the roadway is at a higher density or more intense use such as commercial.

The amendment would reduce the potential build-out in the area by an estimated 270 dwelling units based on existing conditions and anticipated environmental regulations.

#### Availability of Public Facilities and Services:

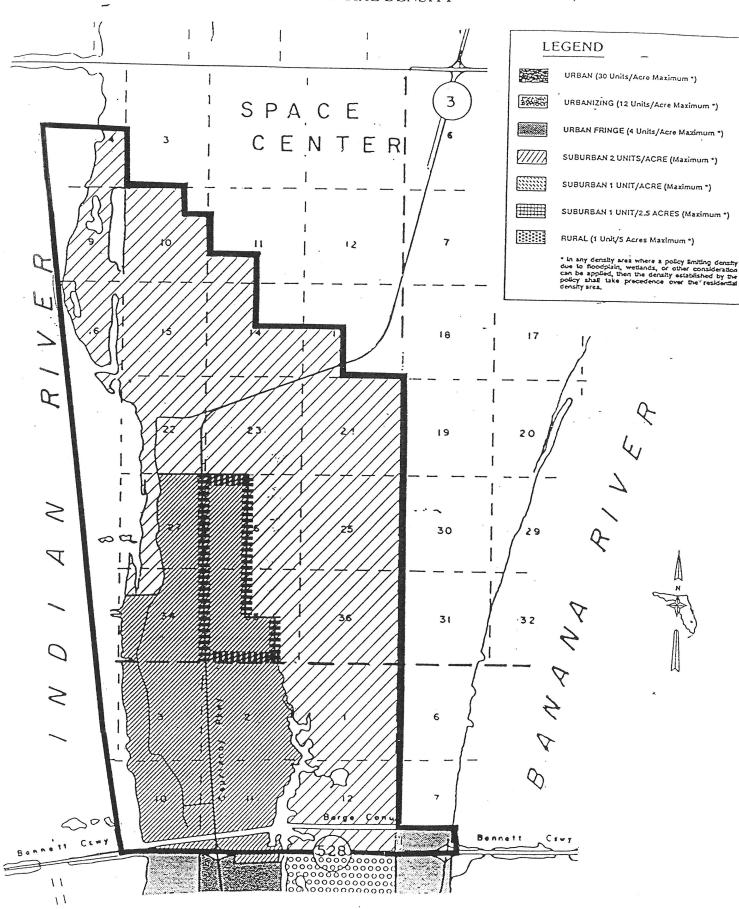
A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from a potential 17,317 trips to 18,606 trips however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is supplied by the City of Cocoa and wastewater treatment is provided by the County's Sykes Creek Regional Wastewater Treatment Plant.

Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there may be type III aquifer recharge, floodplains, and wetlands in this area. Any future development will be evaluated against Brevard County's Aquifer Protection Ordinance which limits impervious surfaces in type III areas to 45%; the Floodplain Protection Ordinance which limits residential density in the various floodplains; and the Wetlands Protection Ordinance which limits residential density to 1 unit per 5 acres and provides for mitigation at a ratio of 2:1. All other land development regulations which may pertain to this area will be strictly enforced.

Historic Resources: This area includes High Probability Zones for containing archaeologically significant sites based on a study prepared by the University of West Florida. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would reduce the potential build out in the area from an estimated 889 units to 619 units based on existing conditions and anticipated environmental regulations. Assuming an average of 2.41 persons per household, the population reduction would be 651 persons.

RESIDENTIAL DENSITY



Request No. 92B.5.4

North Merritt Island Small Area Plan Recommendation B-1

**Applicant:** Brevard County

Quad Map: Courtenay

Location: Section 35, Township 23, Range 36

Parcels 269, 255, 256, 257, 272

Acreage: 7.6 + /- acres

Existing Land Use Designation: Public Facilities

Existing Density Area Designation:

Urban Fringe 4 dwelling units per acre

Proposed Land Use Designation:

a) Mixed Use District (2.8 ac)

b) Residential (4.8 ac)

Description: Amendment 92B.5.4 is based on recommendation B-1 of the North Merritt Island Small Area Plan study. This area is the southeast corner of the North Courtenay Parkway and Chase Hammock Road. This amendment is a correction to recognize that no public facility exists in this area. The area consists of five parcels of which three are vacant, one has a residence, and one has a commercial establishment. The amendment to Mixed Use District and Residential is consistent with the existing development pattern and the surrounding Future Land Use designations.

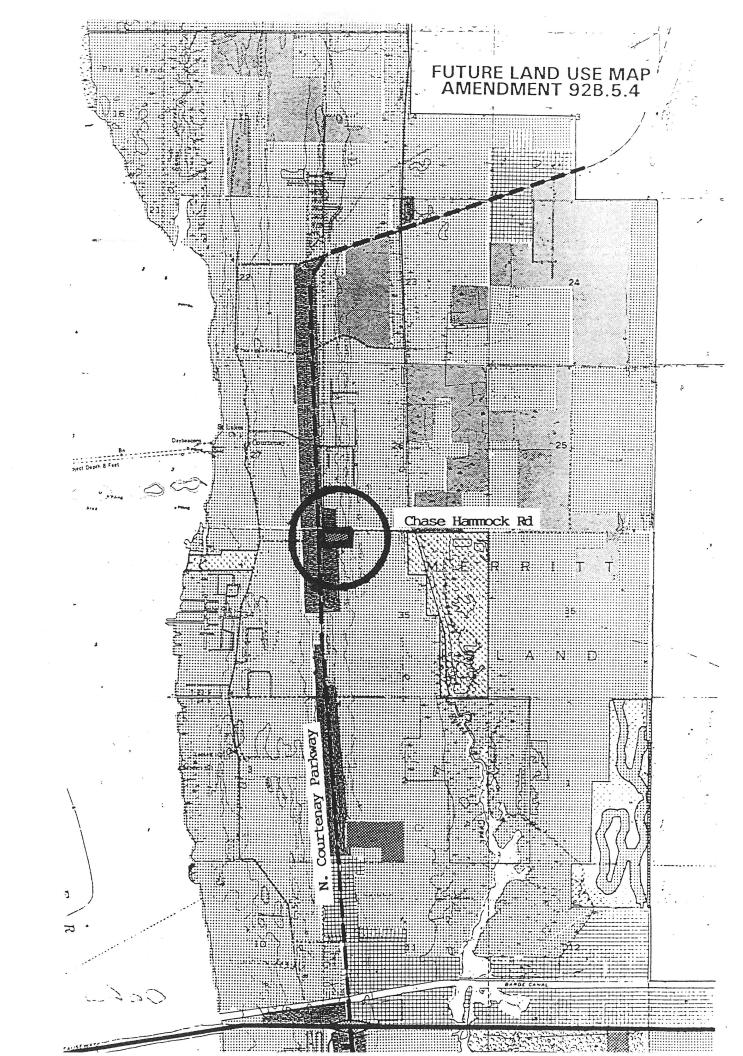
Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from 15,178 trips to 16,522, however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is provided by the City of Cocoa and wastewater treatment is provided by the County's Sykes Creek Regional Wastewater Treatment Plant.

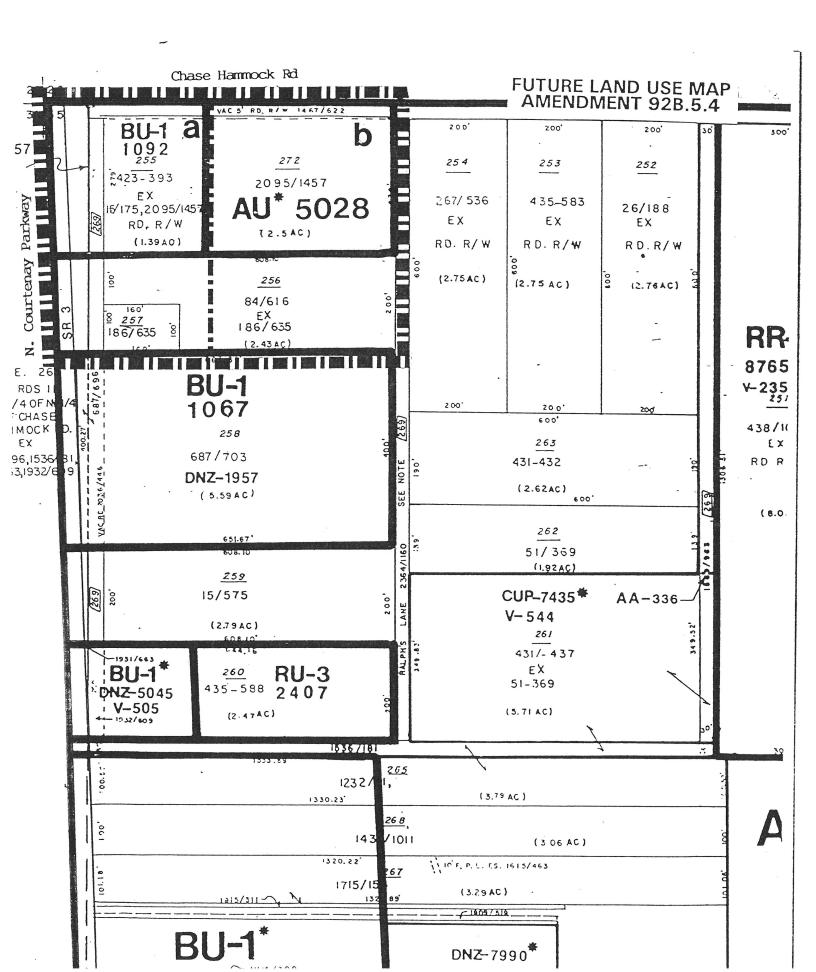
Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there may be type III aquifer recharge in this area. Any future development will be evaluated against Brevard County's Aquifer Protection Ordinance which limits impervious surfaces in type III areas to 45%. All other environmental protection ordinances which may pertain to this area will be strictly enforced.

Historic Resources: This area is a High Probability Zone for containing archaeologically significant sites based on a study prepared by the University of West Florida. Future development in this area will be subject to review and

discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would add approximately 2.5 acres of vacant developable land to the residential designation. The existing residential density for the area is 4 units per acre which would allow for an additional 10 dwelling units or 24 persons assuming an average of 2.41 persons per household.





Request No. 92B.5.5 North Merritt Island Small Area Plan Recommendation B-4

Applicant: Brevard County

Quad Map: Courtenay

Location:

Section 14, Township 23, Range 36, Parcel 511

Section 23, Township 23, Range 36, Parcels 252, 253

Section 22, Township 23, Range 36, Parcel 12

Acreage: 30.4 +/- acres

Existing Land Use Designation: Residential

Existing Density Area Designation: Suburban 2 units per acre

Proposed Land Use Designation: Public Facilities

Description: Amendment 92B.5.5 is based on recommendation B-4 of the North Merritt Island Small Area Plan study. This area is currently an active citrus grove on the north side of the North Courtenay Parkway and North Tropical Trail intersection. The Brevard County School Board has purchased this site for the purpose of establishing an elementary or junior high school. The request is consistent with Future Land Use Element Policy 8.16 which states that lands managed by a governmental entity should be considered for designation as a public facility.

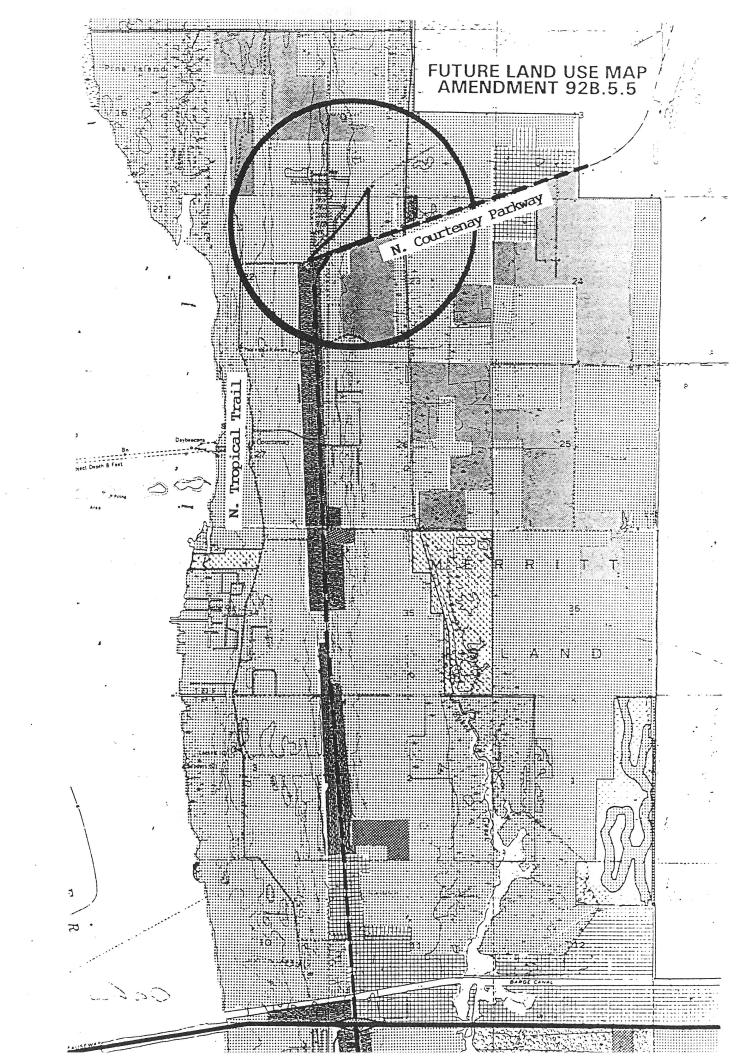
Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from a potential 15,459 trips to 15,580, however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is provided by the City of Cocoa and wastewater treatment would require an on-site sewage disposal system.

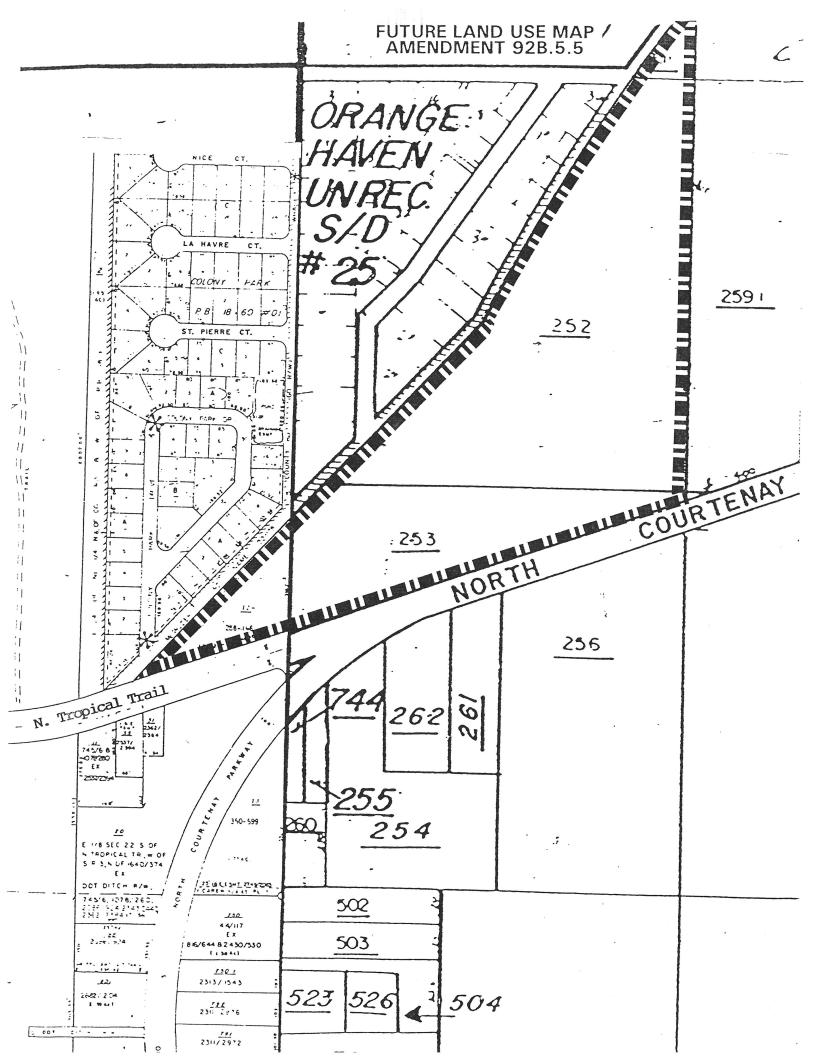
Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there are no significant environmental constraints for the area primarily because of the disturbed nature of the area which has resulted from the active citrus grove, however a site specific analysis may show otherwise. All environmental protection ordinances which may pertain to this area will be strictly enforced.

Historic Resources: This area is a High Probability Zone for containing archaeologically significant sites based on a study prepared by the University of West Florida. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element

of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would remove approximately 30.4 acres of vacant developable land from the residential designation. The existing residential density for the area is 2 units per acre which would result in a lost potential for 61 dwelling units or 147 persons assuming an average of 2.41 persons per household.





Request No. 92B.5.6

North Merritt Island Small Area Plan Recommendation B-5

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 1,2,11,12, Township 24, Range 36

Acreage: 815 +/- acres

Existing Land Use Designation:

Residential (545 ac)

Planned Industrial Park (270 ac)

Existing Density Area Designation:

Urban Fringe 4 units per acre (Sec. 2 & 11) Suburban 2 units per acre (Sec. 1 & 12)

Proposed Land Use Designation:

a) Residential (15 ac)

b) Conservation (800 ac)

Description: Amendment 92B.5.6 is based on recommendation B-5 of the North Merritt Island Small Area Plan study. This area is nearly 100% wetlands and includes property deeded to the County in the Bella Vita planned unit development, and the Kaaboord property purchased under the Environmentally Endangered Lands program. Area (a) is publicly owned land in the Sykes Creek basin; area (b) is a portion of a privately-owned, residential homestead.

Support for the amendment can be found in Policy 2.1, Criterion A of the Future Land Use Element which states: The conservation land use designation should include lands under the ownership of Brevard County, the St. Johns River Water Management District, or other such agencies, for the purpose of environmental protection, and lands with the Environmental Area (EA) zoning classification, and areas in which it is demonstrated that the preservation of environmentally sensitive resources will provide an overriding public benefit.

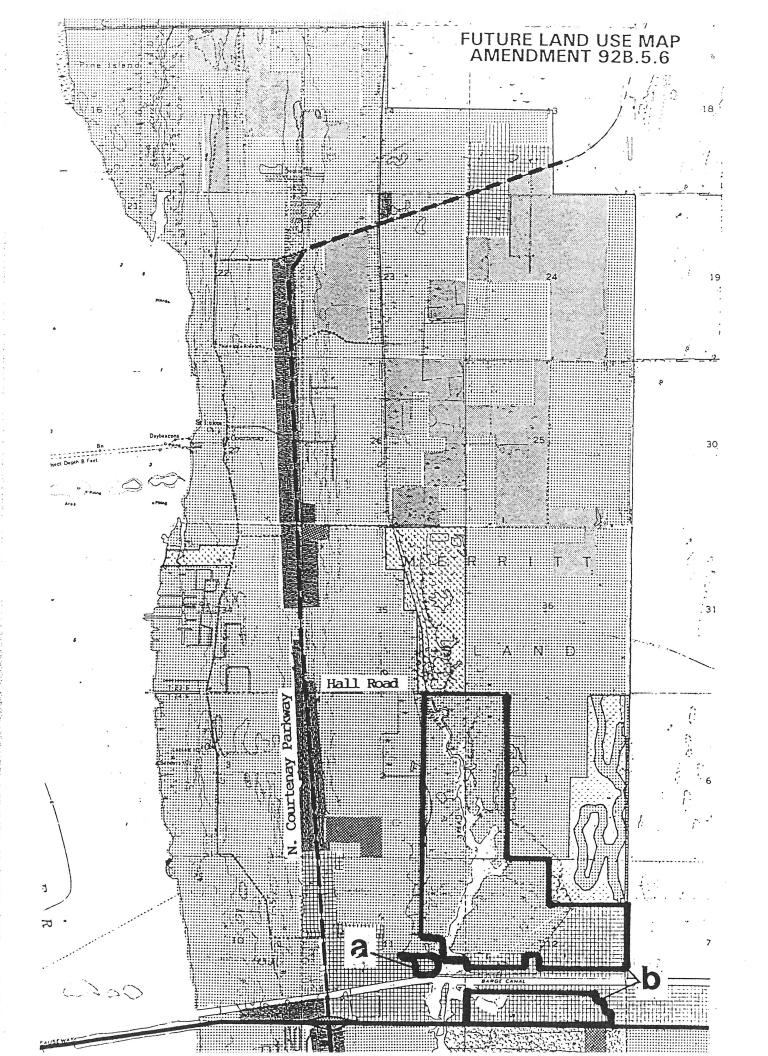
Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, the extreme environmental restrictions on the property would allow little development, therefore no significant change to levels of service can be expected through this amendment.

Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there may be type III aquifer recharge, floodplains, and wetlands in this area. Any future development will be evaluated against Brevard County's Aquifer Protection Ordinance which limits impervious surfaces in type III areas to 45%; the Floodplain Protection Ordinance which may

limit residential density in the various floodplains as much as 1 unit per 10 acres; and the Wetlands Protection Ordinance which limits residential density to 1 unit per 5 acres and provides for mitigation at a ratio of 2:1. All other land development regulations which may pertain to this area will be strictly enforced.

Historic Resources: This area is a High Probability Zone for containing archaeologically significant sites based on a study prepared by the University of West Florida. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: The extreme environmental restrictions on the property would allow for little development, therefore no significant impact to population projections are expected.



Request No. 92B.5.7

North Merritt Island Small Area Plan Recommendation B-6

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 10,11,12, Township 24, Range 36

Section 7, Township 24, Range 37

Acreage: 100 +/- acres

Existing Land Use Designation:

Planned Industrial Park (80 ac)

Residential (20 ac)

Existing Density Area Designation:

Urbanizing 12 units per acre (Sec. 7) Urban Fringe 4 units per acre (Sec. 10,11)

Suburban 2 units per acre (Sec. 12)

Proposed Land Use Designation:

No designation - Extrajurisdictional

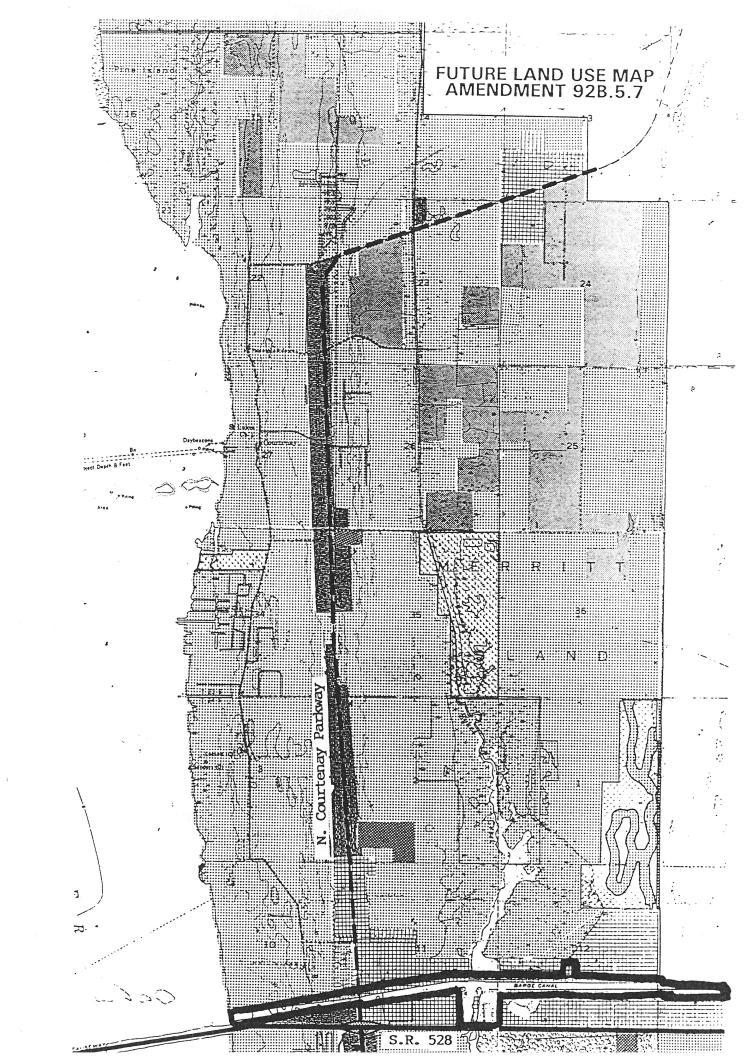
Description: Amendment 92B.5.7 is based on recommendation B-6 of the North Merritt Island Small Area Plan study. The area is under the jurisdiction of the Canaveral Port Authority. Designation of these areas was an oversight during preparation of the original Future Land Use Map. Brevard County has no land use jurisdiction in these areas.

Availability of Public Facilities and Services: The amendment only changes the Future Land Use Map and does not change the development potential for the property due to its' extrajurisdictional nature, therefore there is no impact to this section.

Environmental Resources: The amendment only changes the Future Land Use Map and does not change the development potential for the property due to its' extrajurisdictional nature, therefore there is no impact to this section.

Historic Resources: The amendment only changes the Future Land Use Map and does not change the development potential for the property due to its' extrajurisdictional nature, therefore there is no impact to this section.

Impact on Population Projections: The amendment only changes the Future Land Use Map and does not change the development potential for the property due to its' extrajurisdictional nature, therefore there is no impact to this section.



Request No. 92B.5.8

North Merritt Island Small Area Plan Recommendation B-13

Applicant: Brevard County

Quad Map: Courtenay

Location: Section 13, Township 23, Range 36

Parcels 500, 508, 509 and the northeast quarter of Southern Pines

Subdiv P.B. 29-5

Acreage: 51.3 +/- acres

Existing Land Use Designation: Residential

Existing Density Area Designation: Suburban 2 units per acre

Proposed Land Use Designation: Planned Industrial Park

Description: Amendment 92B.5.8 is based on recommendation B-13 of the North Merritt Island Small Area Plan study. This area is currently vacant and partially in active citrus groves. It is bordered on the south by Big Three Industries which supplies liquid coolant for the NASA space shuttle launches, to the east and north by the Kennedy Space Center, and to the west by vacant industrial property and a residential subdivision. The intent of the amendment is to provide an area near the Kennedy Space Center gate for space-related industrial activities to take place.

Support for the amendment can be found in Policy 5.6 of the Future Land Use Element which states: To ensure long-term economic opportunity for the residents of Brevard County, the County shall take advantage of its unique space-related resources, transportation systems, and location to capitalize on the new National Space Policy and State of Florida efforts regarding Spaceport Florida by encouraging space-related development proposals in the Gateway Center/Spaceport Florida area and other areas in proximity to the Kennedy Space Center.

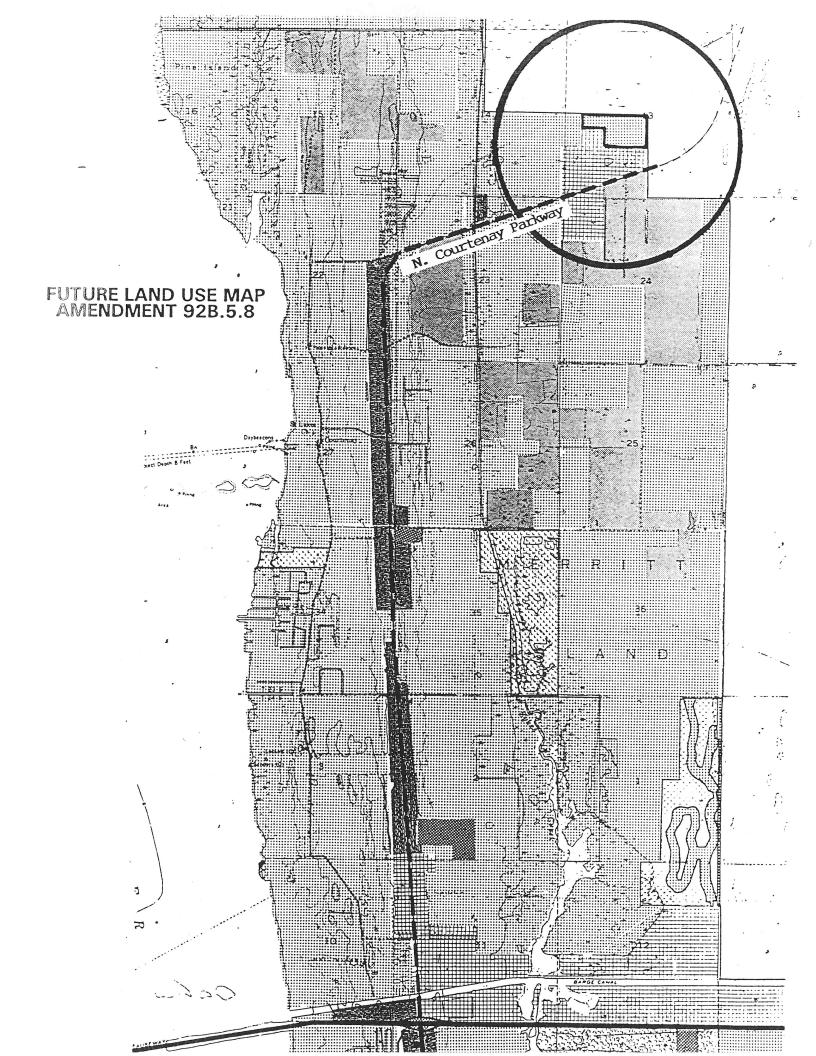
Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from the existing 15,197 trips to 18,253 trips however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is not available to the area except for the possible use of private wells and wastewater treatment would require an on-site sewage disposal system.

Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan the amendment area may be in the 10 year floodplain although the citrus grove operation has likely altered the historic

hydrologic conditions. Any future development will be evaluated against Brevard County's <u>Floodplain Protection Ordinance</u> which limits industrial development within the various floodplain designations. All environmental protection ordinances which may pertain to this area will be strictly enforced.

Historic Resources: There is no impact on known historic resources associated with this amendment, as listed on the Florida Master Site File. No archaeological finds have been discovered in this area. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would remove approximately 51.3 acres of vacant land from the residential designation. The existing residential density for the area is 2 units per acre, however the Floodplain Protection Ordinance may restrict development to as low as 1 unit per 10 acres in the 10 year floodplain, which would allow for only 5 dwelling units or 12 persons assuming an average of 2.41 persons per household.





Request No. 92B.5.9 North Merritt Island Small Area Plan

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 13,24, Township 23, Range 36

Parcels 503, 506, 507 and portions of 250, 253

Acreage: 59.3 +/- acres

Existing Land Use Designation: Agricultural

Existing Density Area Designation: Suburban 2 units per acre

Proposed Land Use Designation: Planned Industrial Park

Description: This area is currently vacant and in active citrus groves. It is bordered on the south by citrus groves, on the north by North Courtenay Parkway and Big Three Industries which supplies liquid coolant for the NASA space shuttle launches, to the west by vacant Planned Industrial Park, and to the east by citrus groves and the Kennedy Space Center. The intent of the amendment is to provide an area near the Kennedy Space Center gate for space-related industrial activities to take place.

Support for the amendment can be found in Policy 5.6 of the Future Land Use Element which states: To ensure long-term economic opportunity for the residents of Brevard County, the County shall take advantage of its unique space-related resources, transportation systems, and location to capitalize on the new National Space Policy and State of Florida efforts regarding Spaceport Florida by encouraging space-related development proposals in the Gateway Center/Spaceport Florida area and other areas in proximity to the Kennedy Space Center.

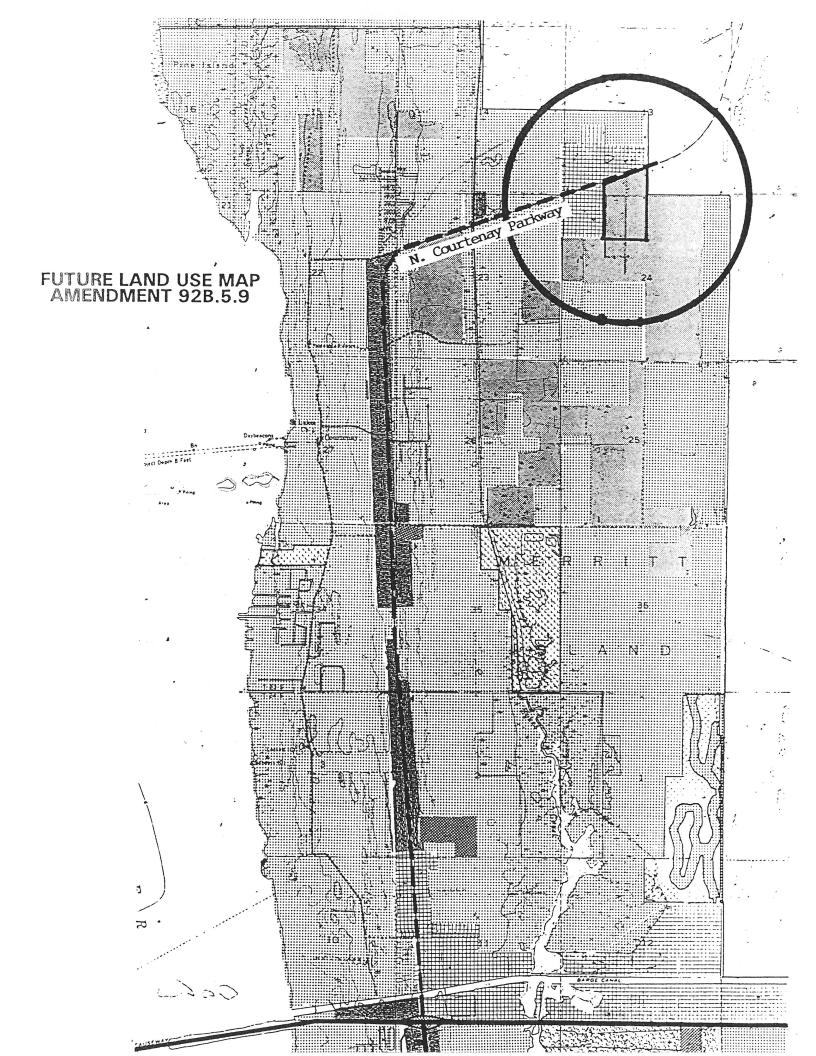
Availability of Public Facilities and Services: A concurrency review has been completed for this amendment. Based on the analysis, average daily traffic on North Courtenay Parkway would increase from the existing 15,197 trips to 18,637 trips however the level of service remains at "A". Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is not available to the area except for the possible use of private wells and wastewater treatment would require an on-site sewage disposal system.

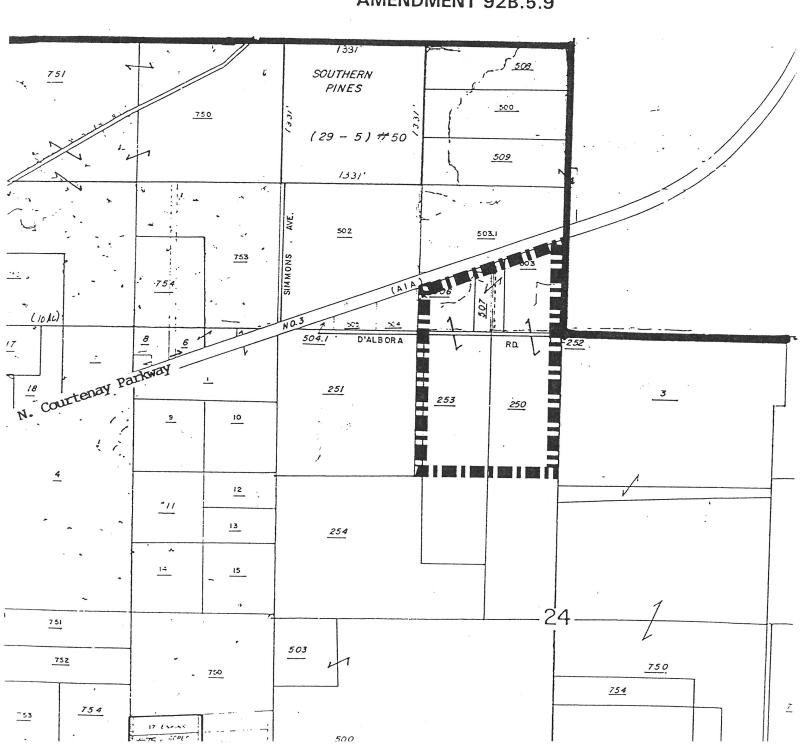
Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan the amendment area may be in the 25 and 100 year floodplains although the citrus grove operation has likely altered the historic hydrologic conditions. Any future development will be evaluated against

Brevard County's <u>Floodplain Protection Ordinance</u> which limits industrial development within the various floodplain designations. All environmental protection ordinances which may pertain to this area will be strictly enforced.

Historic Resources: There is no impact on known historic resources associated with this amendment, as listed on the Florida Master Site File. No archaeological finds have been discovered in this area. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: This amendment would remove approximately 59.3 acres of vacant land from the residential designation. The existing residential density for the area is 2 units per acre, however the <u>Floodplain Protection Ordinance</u> would likely restrict development to as low as 1 unit per 2.5 acres in the 25 year floodplain, which would allow for only 24 dwelling units or 58 persons assuming an average of 2.41 persons per household. At 2 units per acre the figures would rise to 118 dwelling units and 284 persons.





Request No. 92B.5.10 Withdrawn

Request No. 92B.5.11 Withdrawn

Request No. 92B.5.12 Withdrawn

Request No. 92B.5.13 North Merritt Island Small Area Plan

Applicant: Brevard County

Quad Map: Courtenay

Location: Sections 4,9,10,11,13,14,15,16,22,23,24,25,36 and portions of

Sections 26,27,34,35, Township 23, Range 36

Sections 1,12 and portions of Sections 2,11 Township 24, Range 36

Acreage: 6500 + /- acres

Existing Residential Density Designation:
Suburban 2 units per acre

Proposed Residential Density Designation:
Suburban 1 unit per acre

Description: This amendment will reduce the potential build-out of North Merritt Island. The amendment represents approximately 65% of the study area and includes primarily low density residential development and citrus groves. A significant portion of the area contains such environmental features as the Sykes Creek drainage basin, the Pine Island wetlands, and other isolated wetland and scrub areas. The North Merritt Island Small Area Plan study contains additional information concerning this area.

Availability of Public Facilities and Services: As stated in the North Merritt Island Small Area Plan study, a reduction in the potential build-out of the study area will reduce the demand on public facilities and services. A traffic analysis completed for the study shows the potential for reduction in peak hour trips on North Courtenay Parkway to a level that would assist in preservation of the roadway level of service. Levels of service for parks and recreation, solid waste, potable water, and wastewater remain at acceptable levels of service. Potable water is available from the City of Cocoa along most improved roadway corridors. A small portion of the area along Hall Road has wastewater treatment available from the Sykes Creek Regional Wastewater Treatment Plan; wastewater treatment in the remainder of the area would require an on-site sewage disposal system.

Environmental Resources: According to the environmental analysis prepared for the North Merritt Island Small Area Plan there are be type III aquifer recharge, floodplains, and wetlands in this area. Any future development will be evaluated against Brevard County's Aquifer Protection Ordinance which limits impervious surfaces in type III areas to 45%; the Floodplain Protection Ordinance which may limit residential density in the various floodplains as much as 1 unit per 10 acres; and the Wetlands Protection Ordinance which limits residential density to 1 unit per 5 acres and provides for mitigation. All other land development regulations which may pertain to this area will be strictly enforced.

Historic Resources: This area includes High Probability Zones for containing archaeologically significant sites based on a study prepared University of West Florida as listed on the Florida Master Site File. Future development in this area will be subject to review and discovery procedures in Policies 2.3 and 2.4 of the Historic Preservation Element of the Comprehensive Plan. This will ensure that any potential resources on this site are not further disturbed by construction or similar activities and to allow for documentation of the site resources.

Impact on Population Projections: As stated in the North Merritt Island Small Area Plan study, a reduction in the potential build-out of the study area by approximately 2500 units will result in a population reduction of approximately 5600 persons.

