

terrace extends into and beyond the northwest corner of the county and reaches elevations of approximately 40 feet above sea level.

The topography of the county is depicted in Figure 2.17. Overall, the relatively flat terrain of the county poses few constraints to development as compared to a rough or rugged terrain. The topography is also a key feature in the natural drainage system and must be examined along with other natural features to identify development opportunities and constraints. These potential opportunities and constraints are addressed in the analysis section of this element and examined in the Conservation, Coastal Management, and Infrastructure Elements.

Soils

Soils can greatly influence the value or development potential of land. On farmland, those soils which are rich in nutrients provide the potential for high crop yields, while other soils require extensive fertilization and treatment. Generally, structures cannot be built on soils with poor load bearing capacity unless costly methods are employed to overcome the problem. Soils can also severely limit the use of sanitary facilities such as ~~septic tank~~septic systems and landfills. While wet soils often cannot accommodate ~~septic tank~~septic systems, ground water can be polluted in highly permeable soils. Those soils with high water tables may also indicate the existence of a wetland vegetative community.

In Indian River County, the United States Soil Conservation Service has identified 58 different soil types. These soils are further classified into thirteen generalized soil types and distributed among five physiographic areas of the county as follows: sand ridges; coastal islands and tidal marshes; flatwoods, low knolls and ridges; sloughs, poorly defined drainage ways and hammocks; and freshwater swamps and marshes. The generalized soil types are depicted in Figure 2.18.

The suitability of soils for development is discussed in the analysis section of this element and in greater detail in the Conservation and Coastal Management Elements.

Water transportation is provided on the Intracoastal Waterway in the Indian River Lagoon. This federally maintained water route traverses the length of the county. The nearest deepwater ports are located at Ft. Pierce to the south and Port Canaveral to the north.

In Indian River County, rail service is provided by the Florida East Coast Railroad (FEC). The FEC maintains single and double tracks just west of and parallel to US 1. The nearest FEC freight yard is in Ft. Pierce.

Aviation, Ports, and Rail issues are also discussed in the Transportation Element.

Sanitary Sewer

Generally, wastewater is a service that has traditionally been supplied by local government. In addition to the more technologically sophisticated and efficient central systems, traditional methods of wastewater treatment, including ~~septic-tank~~septic systems, are still employed in Indian River County.

The primary purpose of wastewater treatment is to remove solids and toxic chemicals from wastewater and render organic wastes inert. After treatment, the resulting water product is then reintroduced into the natural water cycle.

Presently, there are five publicly operated regional wastewater treatment plants operating in the county. Four of those plants are operated by the Indian River County Utilities Department, while the other plant is operated by the City of Vero Beach. There are also three privately-operated package treatment plants in the county.

While the county operated plants provide a level of service of 250 gallons/residential unit/day, the city operated plant provides a level of service of 197 gallons/residential unit/day. The combined design capacity of the regional plants is ~~13,370,000~~ 17,350,000 gallons/day, an amount sufficient to accommodate their combined average daily demand of ~~8,274,000~~ 8,780,000 gallons/day.

Currently, the service area of the regional system includes substantial portions of the urban area of the county. As such, wastewater lines extend to much of the county's urban area, including portions of all three of the commercial/industrial nodes along I-95. In 2006, the county utilities department had ~~24,250~~ 28,167 sanitary sewer customers.

With respect to ~~septic-tank~~septic systems, the Department of Health in Indian River County (DOH-Indian River)~~Public Health Unit, Division of Environmental Health~~, currently estimates that there are approximately more than 36,039 ~~septic-tank~~septic systems in use in Indian River County. While approximately ~~1,272~~ 121 new ~~septic-tank~~septic systems were installed in 2001~~6~~ in the county, that number has decreased significantly in more recent years as the level of residential construction has declined.

Within the county, many of the older residential areas were developed with well and septic ~~tank~~ systems on lots which, by today's standards, are small in size. The small lot size in those areas often results in inadequate separation distances between wells and ~~septic tank~~septic systems. For that reason, some of those areas have experienced contamination of wells.

To address that health problem, county policy has been to connect those areas to the regional potable water system. Because connection to the regional potable water system is usually sufficient to eliminate health risks, connection of those areas to the regional sanitary sewer system has been on a much more limited basis.

Wastewater and sanitary sewer systems are addressed more fully in the Sanitary Sewer Sub-Element of the Infrastructure Element and in the Capital Improvements Element. The impact of those systems is also addressed in the Conservation Element.

Potable Water

Water is essential to human life and is a key ingredient in agriculture, commerce and industry. Traditionally, water in urban areas has been provided by local governments, while in rural areas individual wells or water systems have sufficed. This pattern is also present in Indian River County; however, it is not uniform in all areas of the county.

In Indian River County, the water delivery system is composed of private wells and public water systems. The potable water system is discussed in greater detail in the Potable Water Sub-Element and the Capital Improvements Element. Groundwater sources are discussed in the Natural Groundwater Aquifer Recharge Sub-Element and the Conservation Element.

As with the county's population distribution, water systems other than private wells are primarily limited to the developed eastern third of the county land area. Currently, there are four publicly owned regional water treatment plants operating in the county. Two of those plants are operated by the Indian River County Utilities Department, while the other plants are operated by the City of Vero Beach and the City of Fellsmere. While the county-operated plants provide a level of service of 250 gallons/residential unit/day, the Vero Beach and Fellsmere plants provide a level of service of 351 and 200 gallons/residential unit/day, respectively. The combined design capacity of those plants is 24,720,000 gallons/day, an amount sufficient to accommodate their combined average daily demand of 15,990,000 gallons/day.

The plants operated by the county Utilities Department use the Floridan Aquifer as their primary water source. While the City of Vero Beach uses both the Surficial and Floridan Aquifers, the City of Fellsmere uses only the Surficial Aquifer. Because water drawn from the Floridan Aquifer contains impurities, that water must be treated to become potable. For water drawn from the Floridan Aquifer, the type of treatment used by both the city and county plants is reverse osmosis. For water drawn from the Surficial Aquifer, a lime softening treatment process is used.

A by-product of the reverse osmosis process is brine; brine is water with a high concentration of impurities. That brine is then treated prior to being discharged.

Future Land Use Map, the 106,661 units projected at build-out represent fewer units than the maximum allowed by the Future Land Use Map. If single-family development continues to occur at densities substantially less than the maximum allowed by the by Future Land Use Map, then it can be expected that the unincorporated county's build-out potential will be reduced in the future.

Currently, comprehensive plan policies direct the vast majority of residential development to land inside the urban service area. Of the projected 106,661 residential units at build-out, 96,029 units (or 90%) will be located inside the urban service area. The remaining 10,632 units will be located outside of the urban service area.

Because of the recent municipal annexations and the future land use plan densities expected to be assigned to those annexed areas, the build-out potential for the total county has increased significantly. Upon build-out, it is projected that the unincorporated county and the county's municipalities will contain 188,848 residential units. At that time, the county's five municipalities will contain 82,187 residential units. Of these residential units, 49,474 residential units will be in the City of Fellsmere, while the remaining 32,713 residential units will be located in the county's other municipalities.

Use Suitability of Soil

Within the county, soils can limit development activity in two major ways: load bearing capacity and suitability for sanitary facilities. Those characteristics are addressed in the United States Department of Agriculture Soil Conservation Service's soil survey for Indian River County. In addition to mapping the different soils, the survey also provides an analysis of the soils. The analysis, which includes the physical, chemical, and hydric composition of each soil type, provides a basis to evaluate the soil potential for different uses. Table 2.12 is a summary of soil ratings and limitations from the Soil Survey. (Soils are also discussed in the Conservation Element). That table indicates that most soils in the county present severe limitations for site development and sanitary facilities.

Usually, building limitations are due to the wetness of the soil. The wetness of the soil can result in the ponding of water, flooding and caving of excavation. The wetness also presents severe limitations to sanitary facilities and, in particular, to ~~septic tank~~septic systems. Since wetness and ponding lead to poor filtering and slow percolation, wet soils are unable to adequately drain.

Within the county, those limitations can be reduced through the use of certain building techniques and standards. Those techniques and standards include raising the elevations of sites through the use of fill dirt and enhancing the natural drainage area of development projects.

Throughout the county, ~~septic tank~~septic systems are permitted by the ~~Environmental Health Department~~DOH-Indian River. To ensure that adequate sanitary facilities are provided for sites not connected to the county's centralized sanitary sewer system, county building regulations require the issuance of a septic permit prior to issuance of a building permit. Several standards

used by the ~~Environmental Health Department~~DOH-Indian River to guarantee the viability of septic systems include: a minimum ~~septic tank~~septic system elevation requirement of 48" above the wet season water table; a minimum separation distance requirement between ~~septic tank~~septic systems and potable water wells of 75 feet; and a limitation on total building square footage based on lot size and drainfield requirements.

Because of the limitations associated with on-site septic systems, the county's policy should be to expand the public sanitary system throughout the urban service area. The Sanitary Sewer Sub-Element provides additional analysis of ~~septic tank~~septic system suitability in the county and the regulatory framework under which ~~septic tank~~septic systems are permitted.

Table 2.12, Soil Characteristics and Suitability

Soil Drainage	Corrosivity		Irrigation	Septic Fields	Dwellings	Pond
	Steel	Concrete				
Poorly Drained	Moderate to High	Low to High	Wetness, Droughty, Fast intake	Severe limitations – Wetness, Percolates slowly	Severe limitations – Wetness	Severe Limitations – Seepage
Moderately Drained	Low to Moderate	Low to Moderate	Wetness, Droughty, Fast intake	Severe Limitations – Percolates slowly, Poor filtering	Slight to Severe Limitations – Wetness	Severe Limitations – Seepage
Excessively Drained	Low	Moderate to High	Droughty, Fast intake, Soil blowing	Slight – Very poor filtration. Potential for groundwater contamination	Slight	Severe Limitations – Seepage

Data Source: U.S.D.A. - Soil Conservation Service

Figure 2.26 shows soil characteristics which present severe limitations to development.

Use Suitability of Topography

The topography of Indian River County is generally flat with the exception of several ridges. Due to the lack of rough or rugged terrain, topography does not present any major limitations to development. Only a few areas along the coastal ridge have slopes steep enough to constrain development.

Overall, topography is one of the principal influences on the drainage system. Because much of the county consists of relatively low flatlands, many of those areas, including the highly developed eastern mainland, would be underwater for portions of the year without man-made drainage ditches and canals. There are, however, certain county areas, such as the barrier island, the sand ridges, the St. Sebastian River area, and the higher elevations in the western county, which have a topography that results in the natural runoff of stormwater.

Going forward, the county's policy should be to require that stormwater runoff from new development does not negatively impact adjacent properties or receiving water bodies. Because of the county's flat terrain, stormwater management systems are necessary to direct and retain

➤ Groundwater Recharge Areas

Underlying Indian River County are two aquifers that provide county residents with all water for domestic consumption. Those aquifers are recharged or filled by the percolation of rain and surface water through soil layers into the underground reservoirs. Those areas which provide the greatest potential for recharge are classified as "Prime Recharge Areas" and are shown on Figure 2.29. While excessive development of those areas can result in changes to natural drainage patterns and reduce recharge potential, excessive use of ~~septic tank~~ septic systems and hazardous materials in those areas can increase the possibility of contamination of the aquifer.

For the county public water system, the public water supply source is the deep aquifer which, because of its depth, is less likely to be subject to contamination from ground sources. Recharge areas for that aquifer are located northwest of the county.

Within the county, those areas which contain community wells that draw large quantities of water are especially subject to contamination or pollution. Generally, groundwater contamination can result from excessive or improper use of septic systems and other wastewater treatment facilities, the leakage of chemicals and fuels stored underground, seepage from landfills and other waste storage areas, or surface spills of hazardous materials. For each of the community wells or wellfields in the county, zones of influence have been calculated. Those zones vary in size due to the amount or volume of flow, depth of the well and the porosity of the aquifer. Within those zones, the county's policy should restrict uses that could contaminate community wells.

➤ Summary of Use Suitability of Natural Resources

Overall, the natural features of the county provide various constraints to development, many of which can be overcome through modern building and engineering techniques. In fact, one natural resource constraint that has been mitigated through engineering is drainage. With respect to drainage, large areas of the county would be underwater, if it were not for the county's extensive system of drainage canals and ditches.

In some cases, modifications are relatively simple and provide minimal adverse impacts to the environment. Where only slight modification is required, areas are generally suited for most types of development. Other areas require extensive man made improvements to achieve even the lowest intensity of development. Often those improvements include the wholesale destruction of important and sensitive habitats. In those areas, development should be kept to a minimum and highly regulated to ensure the protection of natural features and resources.

Figure 2.30 is a composite of the natural constraints in the county. In those areas which contain severe constraints, the county's policy should be to restrict development.

A review of existing development and natural land uses reveals the following important facts:

- destruction of natural areas is most evident in the eastern portion of the county, especially waterfront areas along the Indian River and on the barrier island;
- continued reliance on ~~septic tank~~septic systems increases the potential for pollution of the shallow aquifer;
- the use of ~~septic tank~~septic systems in soils which are not suited for ~~septic tank~~septic systems and development in areas with low elevations require large amounts of fill dirt obtained by mining;
- the large amounts of runoff that result from development can lead to the need for expensive drainage improvements, pollution of natural water bodies, and localized flooding; and
- development of wetlands, woodlands and other natural areas results in the destruction of natural habitat, upsetting the natural balance of the ecosystem.

Wherever development occurs, the natural state of the land is altered, most of it without serious consequences. Certain areas, however, are of such a sensitive nature that their alteration can lead to serious problems for nature and humans alike. In the past, much of the land area of the county was drained and cleared for agriculture. While it is impossible to preserve all natural areas, development policies and land use regulations can and should protect sensitive areas and limit the destruction of the environment.

permit the transfer of development rights, and promote the use of conservation easements, dedications, and public acquisition.

Policy 7.4: Any development activity in areas designated as environmentally sensitive or important, as defined in policies 5.4 and 6.11 of the Conservation Element, shall require an environmental survey as part of the approval of a development order. Based upon the results of the environmental survey, development projects shall be required to provide a site design which minimizes impacts upon endangered and threatened plants and animals.

Policy 7.5: The county shall review and evaluate proposed development projects to ensure that stormwater runoff from the new development will not negatively impact adjacent properties or receiving surface waterbody quality.

Policy 7.6: Indian River County shall maintain and enforce regulations to protect wetlands from the negative impacts of development. These regulations address building setbacks, protection from solid and liquid wastes including pesticides and herbicides, dredging or filling of wetlands, incorporation of wetlands into a site's development scheme, and mitigation of lost or destroyed wetlands.

Policy 7.7: Indian River County acknowledges the environmental importance of the prime aquifer recharge areas shown on Figure 2.29. The county shall regulate the development of these areas. Regulations include an overlay district which restricts land uses, implements special siting requirements for ~~septic tank~~ septic system to mitigate soil drainage characteristics, and regulates other factors which impact the recharge capability of the land.

Policy 7.8: The county shall protect public water supply wells by prohibiting the placement of septic systems; stormwater retention/detention areas; wastewater treatment plant effluent discharges, including but not limited to percolation ponds, surface water discharge, spray irrigation, and drainfields; sanitary landfills, feed lots and other concentrated animal facilities; mining and excavation activities; and the handling, production, and storage of regulated substances within wellfield cones of influence.

Policy 7.9: Consistent with the Potable Water Sub-Element, the county shall continue to extend the county water system, enabling the acquisition of small public water systems, thereby reducing the number of residents using the shallow aquifer, which is subject to groundwater pollution threats.

Policy 7.10: Through the use of fee simple purchase, transfer of development rights, and conservation easements, Indian River County shall coordinate with other state, federal and local agencies to identify and protect vegetative communities identified in Conservation Element policies 6.1 through 6.7.

Policy 7.11: The county, in cooperation with the local ~~Environmental Health Department~~DOH-Indian River, shall continue to regulate the siting of ~~septic tank~~septic systems including siting requirements to mitigate soil characteristics.

OBJECTIVE 8: PROTECTION OF HISTORIC RESOURCES

Through 2015, at least 95% of unincorporated Indian River County’s historic properties (as identified in “Historic Properties Survey of Indian River County, Florida”, prepared by Historic Property Associates, Inc., April 1989) will continue to be preserved in fair, good, or excellent condition.

Policy 8.1: The county historian and, as needed, outside consultants and experts shall provide guidance and advice to the Board of County Commissioners on matters concerning historic and archaeological preservation. The county historian shall be consulted for recommendations concerning:

- proposed changes to county regulations protecting historic and archaeological resources; and
- projects which may impact historical and archaeological sites identified on the Florida Master Site File or designated as significant by the Board of County Commissioners.

Policy 8.2: Indian River County shall use incentives such as transfer of development rights, tax relief, mitigation, and public acquisitions; and penalties such as fines and imprisonment, to protect and preserve historically and archaeologically important resources. The following criteria are used to determine the historical significance of a resource:

- whether or not the resource is at least 50 years old;
- whether or not the resource contains significant character, interest or value as part of the historical, cultural, aesthetic and architectural heritage of the county;
- whether or not the resource displays historical, political, cultural, economic, or social trends of community history;
- whether or not the resource displays unique and/or distinguishing characteristics of an architectural style, design period, construction method, detail, craftsmanship, or material; and
- whether or not the resource is a work by a prominent architect, designer, engineer, builder or landscape architect.

Policy 8.3: All public and private development or redevelopment proposals shall be reviewed for their impact upon designated historic resources.

Policy 8.4: Public and private development and redevelopment activities shall cease, at least temporarily, if historic or archaeological artifacts are discovered, in order to allow for evaluation of historic significance.