

**RESOLUTION NO. 2022- 14**

**A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF NASSAU COUNTY, FLORIDA, ADOPTING THE NASSAU COUNTY FIRE-RESCUE WATER SUPPLY NEEDS SURVEY AND ASSESSMENT; PROVIDING CERTAIN FINDINGS; DIRECTING THE FIRE CHIEF TO DEVELOP AND PROVIDE IMPLEMENTATION STRATEGIES FOR A NASSAU COUNTY, FLORIDA ALTERNATIVE RURAL WATER SUPPLY PLAN FOR FIRE SUPPRESSION; AND PROVIDING FOR AN EFFECTIVE DATE.**

**WHEREAS**, the majority of western Nassau County is located beyond existing water supply service areas, and although expansion of existing systems provide the most reliable pressurized water source, it is often not practical in rural areas; and

**WHEREAS**, water for firefighting purposes is typically transported to the scene via water tanker shuttling operations with scarce refill points and distance between communities is an issue; and

**WHEREAS**, requirements for water supply are established by the Florida Fire Prevention Code and National Fire Protection Association, and the Insurance Services Office (ISO); and

**WHEREAS**, current growth trends indicate pressure from development will manifest in rural areas of the County, which includes land west of I-95, where water resources for firefighting purposes is limited; and

**WHEREAS**, in order to define water supply alternatives, Nassau County engaged Neptune Fire Protection Engineering LLC to assist in development of the Nassau County Fire-Rescue Water Supply Needs Survey and Assessment; and

**WHEREAS**, the Board now finds it in the best interest of the County and its citizens to adopt the Nassau County Fire-Rescue Water Supply Needs Survey and Assessment.

**NOW, THEREFORE, BE IT RESOLVED** by the Board of County Commissioners of Nassau County, Florida, as follows:

**SECTION 1. FINDINGS.** The adoption of this Fire-Rescue Water Supply Needs Survey and Assessment is in the best interests of the citizens of Nassau County.

**SECTION 2. ADOPTION OF SURVEY AND ASSESSMENT.** The Nassau County Fire-Rescue Water Supply Needs Survey and Assessment, dated July 12, 2021, is attached hereto as Appendix A and incorporated herein by reference, including the analysis, assessment of County needs and water supply alternatives, is hereby approved.

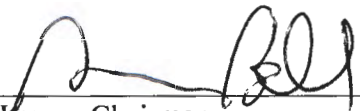
**SECTION 3. IMPLEMENTATION AND APPLICABILITY.**

- (A) The Nassau County Fire-Rescue Water Supply Needs Survey and Assessment shall guide the creation and implementation of the Nassau County, Florida Rural Water Supply Plan for Fire Suppression.
- (B) The Nassau County Fire Chief is hereby directed to prepare the development and implementation strategies of the Nassau County, Florida Rural Water Supply Plan for Fire Suppression. The plan shall be presented to the Board of County Commissioners for consideration and adoption within 365 days of adoption of this Resolution.

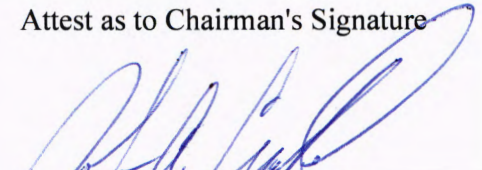
**SECTION 4. EFFECTIVE DATE.** This Resolution shall take effect immediately upon its passage.

**DULY ADOPTED** this 14<sup>th</sup> day of February, 2022.

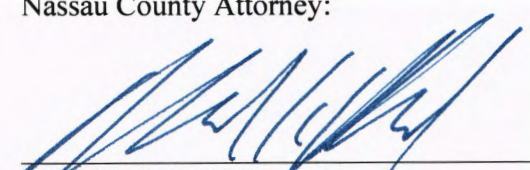
**BOARD OF COUNTY COMMISSIONERS  
OF NASSAU COUNTY, FLORIDA**

  
Its: Chairman

Attest as to Chairman's Signature

  
JOHN A. CRAWFORD  
Its: Ex-Officio Clerk

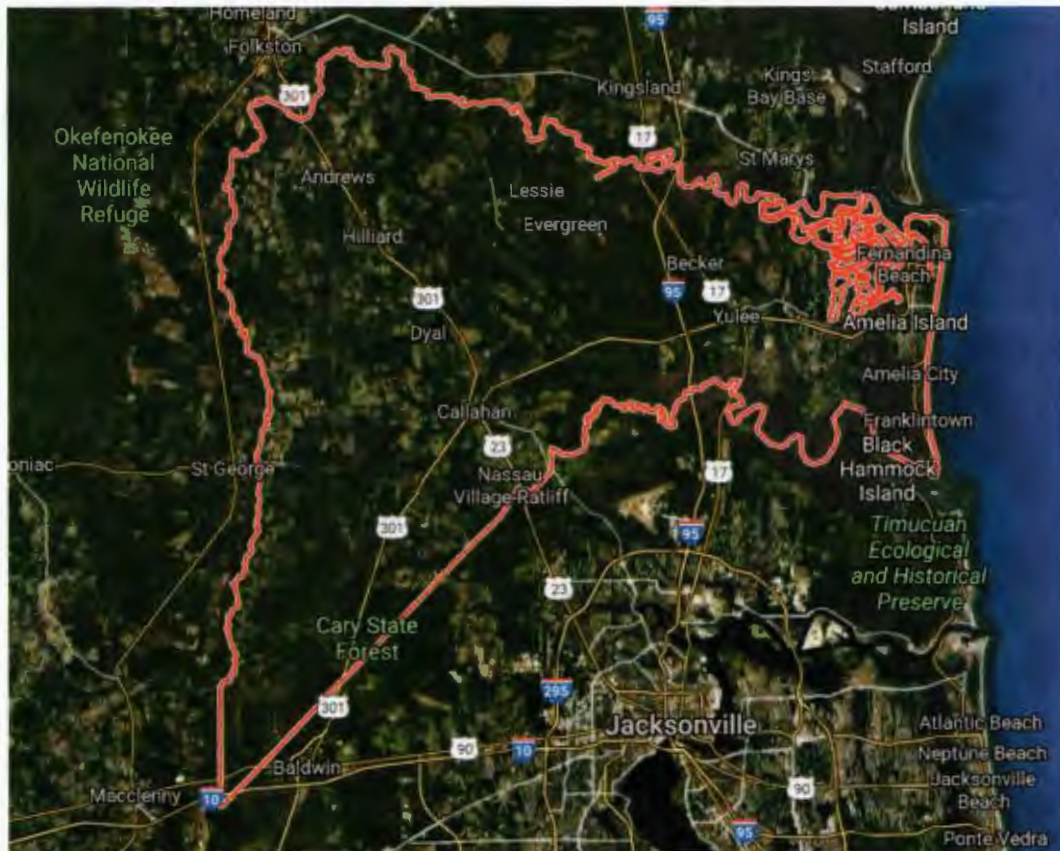
Approved as to form by the  
Nassau County Attorney:

  
MICHAEL S. MULLIN

**APPENDIX A**

**NASSAU COUNTY FIRE-RESCUE WATER SUPPLY NEEDS SURVEY AND  
ASSESSMENT**

# Nassau County Fire-Rescue Water Supply Needs Survey and Assessment



Prepared for  
Nassau County  
by  
Olivia Bray, E.I.T. & Stephen Kowkabany, P.E.  
July 12, 2021

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## 1.0 Executive Summary

Neptune Fire Protection Engineering was contracted by Nassau County, Florida to define at least three (3) viable water supply alternatives that meet the requirements of the code and provide sustainable, affordable, and practical solutions to managing growth and supplying adequate water for firefighting purposes. The majority of western Nassau County is located beyond existing municipal water supply services areas, and although expansion of the existing distribution systems provides the most reliable pressurized water source, it is often not practical in rural areas. Currently, in the event of a fire, water for firefighting purposes is typically transported to the scene via water tanker shuttling operations; however, refill points are scarce and the distance between communities and residents is an issue.

Where no adequate and reliable water supply exists and additional fire protection is needed, the following water supply alternatives for providing water for firefighting purposes are acceptable in accordance with current codes:

- Dry Hydrants
- High-Flow Wells
- Residential Sprinkler Systems
- Tanker Shuttling
- Water storage tanks

## 2.0 Overview and Methodology

### 2.1 Overview

Neptune Fire Protection Engineering was contracted by Nassau County, Florida to define at least three (3) viable water supply alternatives, which will meet the requirements of the Florida Fire Prevention Code, 7<sup>th</sup> Edition, and can be applied in a practical and fiscally responsible manner to mitigate risk. Current growth trends indicate that pressure from inevitable development will manifest in rural areas of the County, which includes most of the land area west of I-95, where resources for water for firefighting purposes are very limited. As growth and development continue in western Nassau County, it is important that adequate water supplies for firefighting are established in a practical, efficient, and effective manner.

### 2.2 Background

Nassau County, Florida is situated on the Florida/Georgia border, just north of Jacksonville, with an area of approximately 726 square miles. According to the 2019 United States Census, Nassau County's population was approximately 88,625. Nassau County's population has grown by 110 percent in the past 25 years and is projected to continue increasing to over 100,000 by 2030. Nassau County ranked as the 40<sup>th</sup> fastest-growing county by percent growth for counties in the U.S. with a population over 10,000, placing Nassau in the top 1.5% of all counties in the country. Development from the Jacksonville metropolitan area north into Nassau County, specifically into

the eastern portion of the County, has brought unprecedented growth; however, rural areas of western Nassau County are beginning to feel the pressure of encroaching development.

Along with population expansion comes the need for additional infrastructure, including transportation systems, communication networks, sewage, water, and electrical systems. The historically rural areas of Nassau County are not currently served by public water and wastewater infrastructure and the limited water supply in rural areas pose a great risk to firefighting efforts. Currently, most water for firefighting is transported to the scene via water tankers; however, water refill points for the tankers are limited and distance is often an issue. These cumbersome methods are slow and can lead to critical delays in responding to modern residential fires.

The National Fire Protection Association (NFPA) defines rural as those areas that are not unsettled wilderness or uninhabitable territory but are sparsely populated with densities below 500 persons per square mile. The primary characteristic of rural America is distance. The distance between communities and between residents within those communities results in challenges related to fire. Rural communities have the highest fire incident and fire death in most years. To combat this historic problem, rural water supply operations should provide rapid, efficient, expandable, and uninterrupted supply for firefighting operations. The purpose of this evaluation is to define at least three (3) viable water supply alternatives that meet the requirements of the code, provide sustainable, affordable, and practical solutions to managing growth and supplying adequate water for firefighting purposes.

Nassau County received a Public Protection Classification (PPC) of 3/3x from the Insurance Services Office (ISO) in 2021 for property insurance rating. The Fire Suppression Rating Schedule measures major elements of a fire protection area's fire prevention and fire suppression systems on a scale from 1 to 10, with 10 representing less than the minimum recognized protection. The fire protection area considered in this rating may include cities, towns, villages, districts, counties, or other civil jurisdictions responsible for providing fire prevention and fire suppression services. Nassau County ranks in the top 14% in the nation; however, it is to be noted that this rating only applies to areas that are within five (5) miles of a fire station and within 1,000 feet of a credible water source. The criteria for evaluating fire protection and suppression capabilities of fire protection areas are set forth in the Fire Suppression Rating Schedule and the requirements for water supply have been considered in the development of the alternatives recommended in this report.

## **2.3 Methodology**

The main purpose of this evaluation is to define at least three (3) viable water supply alternatives that can be utilized in rural areas that meet the requirements of the code, as well as provide sustainable, affordable, and practical solutions to managing growth and supplying adequate water for firefighting purposes. To determine these viable alternative supplies, many factors and code requirements must be evaluated. Specific code requirements applicable to rural water supplies and firewater demand requirements include the Florida Fire Prevention Code, NFPA 1, NFPA 1142, and ISO requirements, as well as local codes. It is important to note that ISO requirements are not mandated by local or federal agencies but provide a rating for a designated fire area that indicate

how well-protected the community is by the fire department. This rating affects insurance rates for properties within the fire area.

Additionally, consideration has been given to current community growth, development, and the available utilities and/or resources required to provide the necessary water supply alternatives. These considerations include items such as current and projected population centers, environmental characteristics, existing resources, and land use availability for the installation of refill points, water storage tanks, and/or artesian wells for water supply.

Furthermore, a list of comparison counties in the State of Florida was provided by Nassau County to be used for benchmarking. The six (6) comparison counties included in this evaluation consist of Flagler County, Walton County, Sumter County, Martin County, Santa Rosa County, and Monroe County. Current policies and procedures, implementation of water supply alternatives (if any), and associated cost responsibilities for each of the comparison counties were considered in the development of potential alternative water supplies in rural areas of Nassau County. This data can be found in Appendix A of this report.

Each water supply alternative considered in this report has been defined and detailed in Section 5 of this report. This information includes details on the components, potential configurations, and operation of the alternative water supply, code requirements, and an estimated cost and timeframe of implementation.

## **2.4 Nassau County Areas of Interest**

According to the Western Nassau Heritage Preservation 2019 Vision Book, approximately 80% of the County's land area is west of I-95. Currently, the towns of Callahan and Hilliard are the most densely populated areas of western Nassau County. The Jacksonville Metropolitan Statistical Area (MSA) consists of Nassau County, Duval County, Baker County, Clay County, and St. John's County. According to the 2020 Growth Trends Report for Nassau County, of the five (5) counties in the Jacksonville MSA, Nassau County ranked second in percent growth since 2010.

Job centers are shifting north, driving development into southern and western Nassau County. These job centers include the ICI Villages, Cecil Commerce Center, Westlake Industrial Park, Westside Industrial Park, JAX International Airport, Downtown Jax, ENCPA Employment Center, and Crawford Diamond. Residential stressors have also been projected to extend towards western Nassau County. With more jobs comes the need for more homes, and as such, residential development in western Nassau County is inevitable. According to the Western Nassau Technical Assistance Panel (2017), to prepare for this growth, capital improvements and spending strategies for preferred growth areas must be addressed to ensure adequate infrastructure is implemented, including municipal water and sewer, either through new facilities or through relationships with existing providers.

## **2.5 Existing Firefighting Resources**

The availability of water at a fire scene is of great importance in saving lives and protecting property. In rural areas of western Nassau County, neither municipal water supplies, nor fire hydrants, currently exist, and response time for first responders is typically long due to the distance



between fire stations and the structures requiring protection. According to a news article published by News4Jax, the average response time countywide for a 911 call in 2020 was nine (9) minutes and 35 seconds; however, for rural areas it often takes much longer when distance is taken into consideration.

### **2.5.1. Fire Rescue Resources**

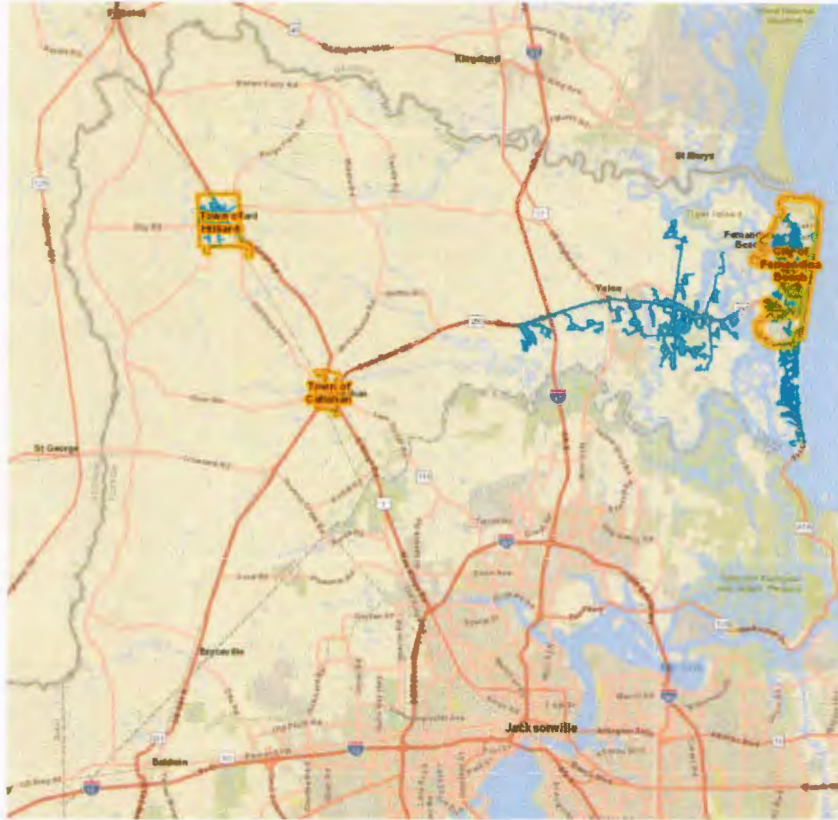
Nassau County Fire Rescue currently has seven (7) stations with the following resources:

- Station 20 (5518 First Coast Highway, Fernandina Beach, FL): Engine 20, Rescue 20, Ladder 20, Brush 20, Utility 20, Marine 20
- Station 30 (86028 Pages Dairy Road, Yulee, FL): Engine 30, Rescue 30
- Station 40 (37230 Pea Farm Road, Hilliard, FL): Engine 40, Rescue 40, Brush 40, Tanker 40
- Station 50 (542310 US Highway 1, Callahan, FL) \*Lease agreement with the Town of Callahan: Engine 50, Rescue 50
- Station 60 (8290 US Highway 301, Bryceville, FL): Engine 60, Rescue 60, Brush 60, Tanker 60, Battalion 2
- Station 70 (96031 Pine Grove Road, Fernandina Beach, FL): Engine 70, Rescue 70
- Station 71 (96262 Chester Road, Yulee, FL): Engine 71, Rescue 71, Tanker 71, Battalion 1, Squad 71
- Station 90 (3195 SR-2, Hilliard, FL): Engine 90, Rescue 90, Tanker 90, Brush 90

Additionally, there are buffalo tanks located at Stations 60 and 90, which are water storage tanks holding approximately 20,000-25,000 gallons. These locations may serve as refill points for water tanker operations.

### **2.5.2. Municipal Resources**

Nassau County has multiple utility providers supplying water to the community. The towns of Callahan and Hilliard each have their own water purveyor; Amelia Island is served by Nassau-Amelia Utilities, Fernandina Beach is served by the City of Fernandina Beach, and Yulee is served by JEA. However, the majority of western Nassau County is beyond the service limits of these providers. A map of existing water distribution lines can be seen in blue in Figure 1. With distance an issue in rural areas, it is often not feasible for existing municipal water systems to be extended. The existing water purveyors evaluate expansion of existing service on a case-by-case basis through developer review. If deemed mutually beneficial to the water purveyor and the developer, arrangements can be made to extend service, but this often occurs in close proximity to existing service areas. An example of this being the Town of Callahan has agreed to provide water and wastewater service to the Crawford Diamond Industrial Park. This includes the extension of a minimum 12-inch water main, the addition of fire hydrants, valves, and appurtenances needed along the water main, and a proposed Water Treatment Plant (WTP). Note that with extension of water mains and an increase in the number of connections within a system reduces the available pressure and flow. Furthermore, as water mains are extended large distances, the need for WTPs and the associated equipment increases as well.



**Figure 1: Existing Water Distribution Lines - Nassau County, FL**

Environmental characteristics of the area also play a large role in the practicality of existing municipal water service extension. Western Nassau County naturally sits at a higher elevation. Extension of municipal water service from the current JEA service area would require water mains to be run uphill, creating potential issues in available pressure and flow. This does not eliminate the possibility completely, however, it must be considered in determining practicality of the project. It is also important to note that the expansion of existing municipal service is an extensive effort and can take anywhere from months to years to complete.

Nassau County has many retention ponds that could be used as refill points for tanker shuttling operations should there be the need for water at a fire scene. However, these ponds often exist on private property. The Florida Department of Transportation (FDOT) has communicated to Nassau County Fire Rescue that the retention ponds along SR-200 could be used as potential refill points. It is essential to establish safe access to the refill sites and obtain a written land use agreement. Additionally, a drafting pad, or hard surface built to support the weight of a fire apparatus, would be necessary for safe and efficient drafting operations. The same concept of utilizing existing ponds as potential refill points would apply on private residential properties. According to local data, drafting pads cost approximately \$5,000 per pad and installation time is minimal.



### 3.0 Applicable Codes and Standards

The evaluation and recommendations presented in this report are based on the following codes, standards, and guidelines:

- Florida Fire Prevention Code (FFPC), 7<sup>th</sup> Edition
- Insurance Services Office, Inc. (ISO)
  - Fire Suppression Rating Schedule (FSRS), 2012 Edition
- National Fire Protection Association (NFPA)
  - NFPA 1 – Fire Code, as modified by the FFPC
  - NFPA 13D – Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, 2016 Edition
  - NFPA 13R – Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies, 2016 Edition
  - NFPA 22 – Standard for Water Tanks for Private Fire Protection, 2013 Edition
  - NFPA 24 – Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 2016 Edition
  - NFPA 25 – Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2017 Edition
  - NFPA 101 – Life Safety Code, as modified by the FFPC
  - NFPA 1142 – Standard on Water Supplies for Suburban and Rural Firefighting, 2017 Edition
  - NFPA 1901 – Standard for Automotive Fire Apparatus, 2016 Edition
  - NFPA 1963 – Standard for Fire Hose Connections, 2014 Edition
- Code of Nassau County
  - Code of Laws and Ordinances of Nassau County, Florida

### 4.0 Water Supply Requirements

#### 4.1 NFPA 1, as modified by FFPC

As a basic premise of the fire code, a ready supply of water must be made available for manual firefighting operations in new and existing buildings. According to NFPA 1, Section 13.5, private fire service mains shall be installed in accordance with NFPA 13 and NFPA 24. Where no adequate and reliable water supply exists for fire-fighting purposes, the requirements of NFPA 1142 shall apply. NFPA 1, Chapter 18 details the requirements for fire department access and water supplies. According to Section 18.3.1, an approved water supply capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities, buildings, or portions of building are hereafter constructed or moved into the jurisdiction. However, where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

NFPA 1 defines fire flow as the flow rate of a water supply, measured at 20 psi (137.9 kPa) residual pressure, that is available for firefighting, with the fire flow area being the floor area, square feet (sqft), used to determine the required fire flow. Per NFPA 1, Section 18.4.5.1, for one- and two-family dwellings not exceeding 5,000 sqft, the minimum fire requirements shall be 1,000 gpm for one (1) hour. Where an approved automatic sprinkler system is provided, a reduction in required fire flow of 75 percent shall be permitted. Additionally, a reduction in the fire flow shall be permitted for building separation distance in accordance with NFPA 1, Table 18.4.5.1.4. It is important to note that the reductions shall not reduce the required fire flow to less than 500 gpm. Alternatively, per NFPA 1, Section 18.4.5.2, for one- and two-family dwellings exceeding 5,000 sqft, the fire flow and flow duration shall not be less than that specified in NFPA 1, Table 18.4.5.2.1. Where an approved automatic sprinkler system is installed, the required fire flow shall be reduced by 75 percent and the duration reduced to one (1) hour. A reduction in fire flow shall also be permitted for building separation distance in accordance with NFPA 1, Table 18.4.5.1.4. Required fire flow for one- and two-family dwellings protected by an approved automatic sprinkler system shall not exceed 2,000 gpm for one (1) hour. Once again, it is important to note that the reductions shall not reduce the required fire flow to less than 500 gpm for one (1) hour.

Per NFPA 1, Section 18.4.5.3, for buildings other than one- and two-family dwellings, the minimum required fire flow shall be specified in NFPA 1, Table 18.4.5.2.1. The required fire flow shall be reduced by 75 percent when the building is protected throughout by an approved automatic sprinkler system. The resulting fire flow shall not be less than 1000 gpm; however, where the building is protected throughout by an approved sprinkler system, which utilizes quick response sprinklers throughout, the resulting fire flow shall not be less than 600 gpm. Note that the required fire flow for buildings protected by an approved automatic sprinkler system shall not exceed 2,000 gpm for two (2) hours. Additionally, a reduction in the required fire flow for open parking structures shall be permitted in accordance with NFPA 1, Section 18.4.5.3.5.

For a building with an approved fire sprinkler system, the fire flow demand and the fire sprinkler system demand shall not be required to be added together. The water supply shall be capable of delivering the larger of the individual demands.

Fire hydrants shall be provided in accordance with NFPA 1, Section 18.5 for all new buildings, or buildings relocated into the jurisdiction unless otherwise permitted by 18.5.1.1 or 18.5.1.2, which state that where the water distribution system is not capable of providing a fire flow of greater than 500 gpm at a residual pressure of 20 psi, or where modification or extension of the water distribution system is deemed to be impractical by the AHJ, fire hydrants shall not be required.

## **4.2 NFPA 1142**

NFPA 1142 identifies a method of determining the minimum requirements for alternative water supplies for structural fire-fighting purposes in areas where the AHJ determines that adequate and reliable water supply systems for fire-fighting purposes do not otherwise exist. In accordance with NFPA 1142, Chapter 4, prior to calculating the minimum water supply for a structure, the structure shall be surveyed to obtain the following information: occupancy hazard, type of construction, structure dimensions, and exposures, if any. Note that NFPA defines an exposure hazard as a



structure within 50 feet of another building and 100 sqft or larger in area, or a structure with a Class 3 or Class 4 occupancy hazard within 50 feet of another building, regardless of size.

For structures without exposure hazards, the minimum water supply, in gallons, shall be calculated in accordance with NFPA 1142, Section 4.2; however, the minimum water supply required for any structure without exposure hazards shall not be less than 2,000 gallons. Alternatively, for structures with unattached structural exposure hazards, the minimum water supply, in gallons, shall be calculated in accordance with NFPA 1142, Section 4.3; however, the minimum water supply required for a structure with exposure hazards shall not be less than 3,000 gallons. Where the structure is protected by an automatic sprinkler system that fully meets the requirements of NFPA 13, NFPA 13D, or NFPA 13R, the AHJ shall be permitted to reduce the water supply required for manual fire-fighting purposes. The minimum water supply calculated shall be delivered in accordance with NFPA 1142, Table 4.6.1; however, it should be noted that the minimum water delivery rate shall not be less than 250 gpm.

NFPA 1142, Chapter 7 details water supply requirements for suburban and rural firefighting. According to Section 7.1, any water supply source used to meet the requirements of the standard are to be of a quality approved by the AHJ. In locations where adequate municipal-type water systems are not provided and additional fire protection is needed, minimum water supplies shall be established in, or transportable to, the designated area. Unless otherwise permitted by the AHJ, all approved non-pressurized water supply sources shall be accessible using dry hydrants that meet the requirements of the standard; note that dry hydrants must be installed in accordance with NFPA 1142, Chapter 8. To be acceptable, water supply sources shall maintain the minimum capacity and delivery requirements on a year-round basis, based on 50-year drought conditions for the water source. When a private water supply source is used to meet the requirements of the standard, the AHJ shall enter into a water-use agreement. Additionally, a water source indicator approved by the AHJ shall be erected at each water point identifying the site for fire department emergency use and any fitting provided at a water source to permit a fire apparatus to connect to the water source shall be approved by the AHJ and shall conform to NFPA 1963. Roads providing means of access to any required water supply shall be constructed and maintained in accordance with Section 7.5. If water storage tanks are used, they shall be inspected, tested, and maintained in accordance with NFPA 25.

### **4.3 ISO Fire Suppression Rating Schedule**

ISO requirements are not mandated by local or federal agencies but provide a rating for a designated fire area that indicates how well-protected the community is by the fire department. This rating affects insurance rates for properties within the fire area. According to the Fire Suppression Rating Schedule, a recognized water system is a water system capable of delivering 250 gpm or more for two (2) hours plus consumption at the maximum daily rate at a fire location, or fire department supply capable of delivering 250 gpm or more for a period of two (2) hours at a fire location beginning within five (5) minutes of arrival of the first-due engine. The maximum daily consumption rate is the rate of consumption on the maximum day. The maximum day is the 24-hour period during which the highest consumption total is recorded in the latest three-year

period. High consumption that will not occur again because of changes in the system or that was caused by unusual operations will not be considered.

The calculation of a Needed Fire Flow (NFF) in gallons per minute (gpm) considers factors such as the type of building construction (C), occupancy (O), exposure (X), and communication (P) of each subject building or fire division. The following equation is to be used in calculating the NFF:  $NFF_i = (C_i)(O_i)[1.0 + (X + P)_i]$ ; where the minimum Needed Fire Flow is 500 gpm, and the maximum is 12,000 gpm. For residential occupancies protected with an automatic fire sprinkler system installed in accordance with the general criteria of NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and including Four Stories in Height*, the Needed Fire Flow is either the demand at the base of the automatic sprinkler riser or 1,000 gpm at 20 psi for a duration of two (2) hours, whichever is greater.

For 1- and 2-family dwellings not exceeding two (2) stories in height, the following Needed Fire Flows at a duration of one (1) hour shall be used:

- More than 30 feet between buildings: 500 gpm
- 21-30 feet between buildings: 750 gpm
- 11-20 feet between buildings: 1,000 gpm
- 0-10 feet between buildings: 1,500 gpm

However, for 1- or 2-family dwellings protected with an automatic fire sprinkler system installed in accordance with the general criteria of NFPA 13D, *Installation of Sprinkler Systems for One- and Two-Family Dwellings and Manufactured Homes*, the Needed Fire Flow is either the demand at the base of the automatic sprinkler riser or 500 gpm at 20 psi for a duration of one (1) hour, whichever is greater. Alternatively, for a 1- or 2-family dwelling with an Effective Area of greater than 4,800 square feet, the Needed Fire Flow is to be calculated using the equation defined above with a fire-flow duration of two (2) hours for NFFs up to 2,500 gpm and three (3) hours for NFFs of 3,000 and 3,500 gpm. Additionally, for commercial properties with NFFs up to 2,500 gpm, the NFF Duration is two (2) hours, and for commercial properties with NFFs of 3,000 and 3,500 gpm, the NFF Duration is three (3) hours.

According to the Fire Suppression Rating Schedule, fire apparatus either carrying and/or relaying water to a fire must be able to deliver water at a rate of 250 gpm or more within five (5) minutes of the initial arrival of the pumper apparatus at the fire site and must continue for the fire-flow duration. The fire department supply (FDS) is the capacity of the supply for the fire duration, the capacity of the source pumping equipment, the capacity of the delivery equipment (mobile water supply apparatus and/or hose lines), or the capacity of the final delivery pumping equipment, whichever is least, at the test location, expressed in gpm. The travel time of fire apparatus is calculated using the following equation:

$$T = 0.65 + 1.7D$$

where T is the time in minutes and D is the distance in miles. The formula assumes an average speed of 35 miles per hour (mph).

#### **4.4 Code of Nassau County**

The Code of Nassau County, Chapter 29 defines a development as the division of land, regardless of how said lots or parcels are described or recorded into more than two (2) parcels. The term 'subdivision' is defined as the division of real property in the unincorporated areas of Nassau County, Florida into more than two (2) contiguous lots, parcels, tracts, or units regardless of how said lots, parcels, tracts, sites or units are described, for the purpose of transfer of ownership for development or sale. Additionally, a rural subdivision is defined as developments allowable in open rural (OR) zoned areas that provide for the creation of lots or parcels, utilizing a sixty-foot easement or road and that provide for the creation of nine (9), five-acre minimum lots or parcels up to twenty-five (25), five-acre minimum lots or parcels.

Section 29-44 dictates the water line requirements for subdivisions and developments. Where there is an approved public water supply that is reasonably accessible, as determined by the county department of health and pursuant to Florida State Statutes and Florida Administration Code, each lot within the subdivision is to be provided with a connection to such water supply. This includes the installation of fire hydrants in all subdivisions where an existing public water supply can be extended within dedicated or proposed right-of-way that is within one-quarter mile of said proposed development; the developer is to extend the water supply and provide fire hydrants at five-hundred-foot intervals. Where there is no existing public water supply available, the installation of a public water supply system will be required at the time of application for a building permit; the private water supply system is to be constructed such that an adequate supply of potable water will be available to each lot. Alternatively, where there is no existing public water supply, and it is not anticipated that a public water supply will be made available, alternative fire protection measures may be required; alternative fire protection measures could include, but are not limited to the installation of wells, pumps, drafting hydrants and other measures to allow adequate fire protection for the area being subdivided.

#### **5.0 Water Supply Alternatives**

According to NFPA 1, Section 13.5.2, where no adequate or reliable water supply exists for fire-fighting purposes, the requirements of NFPA 1142 shall apply. Additionally, NFPA 1, Section 18.3.1.1 states that where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved system capable of providing the required fire flow shall be permitted. Per NFPA 1142, Section 7.1.5, in locations where adequate municipal-type water systems are not provided and additional fire protection is needed, minimum water supplies shall be established in, or transportable to, the designated area. Furthermore, NFPA 1142, Section 7.1.6 states that unless otherwise permitted by the AHJ, all approved non-pressurized water supply sources shall be accessible using dry hydrants that meet the requirements of this standard.

The following subsections provide various methods of providing the required fire flow to areas where extension of the existing municipal water supply is not possible or practical.



## 5.1 Dry Hydrants

A dry hydrant is an arrangement of pipe permanently connected to a water source other than a piped, pressurized water supply system that provides a ready means of water supply for fire-fighting purposes that utilizes the drafting (suction) capability of a fire department pump, as defined by NFPA. There are several factors that affect the flow rate from a dry hydrant including the pipe size, type of pipe, total horizontal length of pipe, total vertical length of pipe, the number and types of elbows, strainers, and reducers. Dry hydrants are typically installed in natural static water sources, such as lakes, streams, and ponds. The composition of the bottom of the water source can also greatly affect the effectiveness of the dry hydrant. Vegetative matter, rocks, and muck may clog the strainer, limiting the flow out of the hydrant. Additionally, the depth of the water source is crucial to the operation of the dry hydrant. NFPA 1142 requires not less than two (2) feet of water above the strainer and not less than one (1) foot below the strainer. The depth of the water is to be based on the 50-year drought level for the water source.

Dry hydrants require routine testing and maintenance to ensure proper operation. Per NFPA 1142, the hydrants shall be flow tested at least annually with an approved pump to ensure that the minimum design flow is maintained. Based on historical practices, regular testing and maintenance are not often conducted for dry hydrants, which can make it difficult for the fire department to rely on the dry hydrant to function as designed and provide adequate flow. Also note that the dry hydrant must be accessible to fire apparatus during all weather conditions and a hard surface or pad should be provided to support the apparatus during drafting operations.

## 5.2 High-Flow Wells

According to the U.S. Fire Administration, wells are the primary source of water for municipalities with populations up to approximately 5,000. Artesian wells, or flow wells, utilize the pressure of groundwater in confined aquifers to flow water towards the surface, illustrated in Figure 2. Turbine pumps within the well casings provide the required pressure and flow necessary to pump water through a distribution network, which should include hydrants. To determine the necessary pumping capacity, testing should be completed.

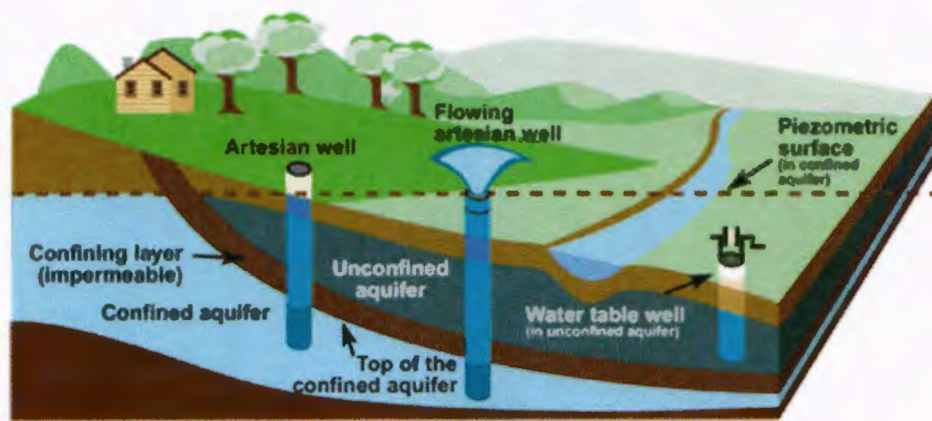


Figure 2: Aquifers and Wells



The Floridian aquifer system (FAS) is one of the most productive aquifers in the world. The aquifer depth ranges approximately 100 feet to 3,300 feet. According to HomeGuide, for an artesian well, the average cost in 2021 for drilling and casing is approximately \$35-\$85 per foot to an average depth of 150 to 450 feet. Installation of an artesian well is typically completed in two (2) days.

### 5.3 Residential Sprinkler Systems

For over 100 years, fire sprinkler technology has been saving lives and protecting property. According to the National Fire Sprinkler Association, the civilian death rate per 1,000 reported home fires was 81% lower in homes with sprinklers. Residential fire sprinklers vastly improve life safety and dramatically decrease the smoke, heat, and flames generated in a home fire. Although residential sprinkler systems are not as common as commercial and industrial systems, the technology is similar. The sprinklers are connected by a network of piping, often hidden within the walls or ceiling, automatically reacting to the heat from a fire and providing water to the flame, while the system draws from a household water source. In most home fires in sprinklered buildings, only one (1) sprinkler was needed to control the fire.

According to the U.S. Fire Administration, flashover is a thermally-driven event during which every combustible surface exposed to thermal radiation in a compartment or enclosed space rapidly and simultaneously ignites. Today, homes are filled with synthetic products and furnishings and feature an increasing number of open spaces, which according to the National Institute of Standards and Technology (NIST), results in houses burning faster and hotter. Additionally, modern construction materials typically have increased fire dangers, such as lightweight wood construction products, such as I-joists and wood-truss roofing, which burn faster and fail sooner, reaching flashover in a matter of minutes. Residential sprinkler systems are an extremely effective tool in ensuring residents have time to escape, while controlling the fire until first responders arrive.

As discussed in previous sections, where an approved automatic sprinkler system is installed, a reduction is allowed in the water supply required for firefighting purposes. According to research conducted by FM Global, fire sprinklers reduce water usage to fight a fire by upwards of 90%. Typically, for homes with residential sprinkler systems, the fire department response is merely a clean-up operation; however, even when additional fire suppression is necessary, the required water is minimal.

The installation of residential sprinkler systems shall be in accordance with NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*. NFPA 13D allows for two (2) types of residential fire sprinkler systems: stand-alone sprinkler systems and multipurpose piping sprinkler systems. A stand-alone sprinkler system is defined by NFPA as a sprinkler system where the aboveground piping serves only fire sprinklers. Alternatively, a multipurpose piping sprinkler system is a piping system intended to serve both domestic needs in excess of a single fixture and fire protection needs from one (1) common piping system throughout the dwelling unit(s). Most home residential sprinkler systems are connected to

the domestic water supply; however, where domestic water supply is unavailable or inadequate, a well or a tank and pump system can be used to supply water to the sprinkler system. The water supply must meet the requirements of NFPA 13D, Chapter 6. The data sheet of a reputable stand-alone 13D pump and tank system is attached in Appendix D.

Based on current local market values from a reputable leader in the industry, the cost of residential sprinkler systems for single family homes is \$1.91 per square foot. This is for a residential sprinkler system in accordance with NFPA 13D with no upgrades or additional areas protected, beyond what is required by code.

Homeowners with residential sprinkler systems have also seen reductions in insurance premiums. The National Association of Home Builders (NAHB) conducted a survey in 2007 to determine how beneficial fire sprinkler systems were in relation to homeowner's insurance. Per the report, insurance companies categorize sprinkler systems into two (2) separate classes: Class A and Class B. Class A systems consist of the installation of sprinklers in all areas including bathrooms, closets, attics, and attached structures. Class B systems include those in which sprinklers are totally or partially omitted in bathrooms, closets, attics, and attached structures. The average discount for a Class A system was 10%, and for a Class B system was 5%. Nationwide Insurance of Florida provided a maximum discount of up to 16% for Class A systems. Although some insurance companies do not offer discounts for residential sprinkler systems, in the NAHB study, of the 172 companies surveyed, only 15 companies did not offer a discount for Class A systems.

## 5.4 Tanker Shuttling

A mobile water supply apparatus, otherwise known as a tanker or tender, is a vehicle designed primarily for transporting (pickup, transporting, and delivering) water to fire emergency scenes to be applied by other vehicles or pumping equipment. In rural areas, where there is typically not a reliable water supply, first responders are limited to the amount of water their engines can hold (typically about 1,000 gallons). When attacking large fires, tankers are often used to shuttle additional water to the scene to maintain uninterrupted flow. NFPA 1142, Annex C offers information on mobile water supply apparatus operations, providing considerations and calculations for establishing adequate water for firefighting purposes and response tactics. Two primary factors to consider when developing water tanker supplies are the amount of water carried on initial responding units and the amount of water that can be continuously delivered after the initial response. The maximum continuous flow capability at the fire scene is calculated as follows:

$$Q = \frac{V}{A + T_1 + T_2 + B} \times k$$

where:

$Q$  = maximum continuous flow capability (gpm)

$V$  = tank volume of the mobile water supply apparatus in gal

**A** = time (min) for the mobile water supply apparatus to drive 200 ft, dump water into a drop tank, and return 200 ft to starting point

**T<sub>1</sub>** = time (min) for the mobile water supply apparatus to travel from fire to water source

**T<sub>2</sub>** = time (min) for the same mobile water supply apparatus to drive from water source back to fire

**B** = time (min) for the water supply apparatus to drive 200 ft, fill mobile water supply at water source, and return 200 ft to starting point

**k** = 1.0 for vacuum/pressure mobile water supply apparatus; 0.9 for all other mobile water supply apparatus due to spillage, underfilling, and incomplete loading

The dumping time (A) and filling time (B) for the formula should be determined by drill and by close study of water sources. Equipment does not have to be operated under emergency conditions to obtain travel time (T), which is calculated using the following equation:

$$T = 0.65 + XD$$

where:

**T** = time (min) of average one-way trip travel

**X** = average speed factor = 60/average speed; an average safe constant speed of 35 mph is typically used

**D** = one-way distance (miles)

The development of the portable drop tank, or portable folding tank, and the jet-assisted dump, or large gravity dump, to quickly discharge the water from the mobile water supply apparatus into the tank has enabled many rural fire departments to utilize isolated water supplies and provide sufficient water for effective firefighting.

Establishing potential refill points is essential to coordinating water shuttling operations. The distance between the fire scene and refill points is crucial in determining the number of responding tankers to maintain adequate water delivery at the fire scene. In rural areas, refill points often consist of natural static water sources, such as lakes, ponds, and streams; however, where there are wells or water storage tanks installed, those may also serve as refill points. It is important to note that land use agreements with property owners are required to permit drafting operations on private properties.

Based on conservative assumptions and calculations, included in Appendix C, if tanker shuttling operations are to be used as a means to provide sufficient water to a fire scene, it is recommended that a refill point is established within two (2) miles of each new and existing development. This would include the installation of a drafting pad to allow for safe and efficient drafting operations,



which would cost approximately \$5,000 per pad and require minimal installation time according to local market pricing.

## 5.5 Water Storage Tanks

Water storage tanks are containers for holding water to be used later for drinking, sanitation, irrigation, or fire protection. Water storage tanks can range in size, anywhere from about 20 gallons to over 1,000,000 gallons, and are typically manufactured of polyethylene or steel. All water tanks for private fire protection must be designed, installed, and maintained in accordance with NFPA 22 and NFPA 25. The adequacy and dependability of the water source for filling the tank are of primary importance and shall be fully determined, with due allowance for its reliability in the future. The source of water to fill the tanks must be of adequate quality, quantity, and pressure. Per NFPA 22, the water supply shall be capable of filling the minimum required fire protection volume within the tank in a maximum of eight (8) hours. High-flow wells may be used to automatically refill the water storage tank.

Dual-service tanks, which are used both for fire protection and other purposes, utilize separate plumbing systems for fire protection and for residential use. Per NFPA 22, pipe used for other than fire protection purposes shall be entirely separate from fire-service pipes and shall extend to an elevation inside the tank above that required for fire protection. This ensures adequate water supply for firefighting is always available, regardless of residential use. Water storage tanks used to supply a water distribution network, including hydrants, require the help of a pump(s). The size of these pumps is directly related to the size of the distribution system and the required pressure and flow.

A conservative cost estimate for an aboveground water storage tank is approximately \$1 per gallon, according to local market pricing within Northeast Florida, and online data from the estimating tool RSMeans. This does not include the cost of pumps, piping, or other appurtenances due to the variations in sizing based on required pressure and flow. The installation of these systems would typically take about a month.

## 6.0 Findings

The main purpose of this evaluation is to define at least three (3) viable water supply alternatives that can be utilized in rural areas that meet the requirements of the Florida Fire Prevention Code, as well as provide sustainable, affordable, and practical solutions to managing growth and supplying adequate water for firefighting purposes. The majority of western Nassau County is located beyond existing municipal water supply service areas, and although expansion of the existing distribution systems provides the most reliable pressurized water source, it is often not practical in rural areas.

The following water supply alternatives are acceptable means to provide the required fire flow for new and existing development in Nassau County, based on currently applicable codes. These water supply alternatives are to be designed, installed, and maintained in accordance with applicable codes and standards:



- High-Flow Wells
  - High-flow wells, or artesian wells, capable of providing the required fire flow are permitted to be used as an alternative water supply in areas without municipal-type water systems. The Floridian aquifer system (FAS) depth ranges approximately 100 feet to 3,300 feet.
  - Drilling and casing of the well would cost approximately \$35-\$85 per foot to an average depth of 150 to 450 feet, with an installation time of approximately two (2) days.
- Residential Sprinkler Systems
  - In rural areas where response time is often long, the installation of automatic residential sprinkler systems can provide enough time for residents to escape, reduce the property damage, and require less water for firefighting once the first responders arrive. The installation of an approved automatic sprinkler system in accordance with NFPA 13D provides a reduction in the required fire flow. These systems provide fire protection in the homes, while reducing the amount of water required to be stored on-site or transported to the scene in the event of a fire.
  - Residential sprinkler systems cost approximately \$1.91 per square foot in new construction and offer potential cost-savings for residents on their homeowner's insurance.
- Tanker Shuttling
  - Where property exists without adequate water supply for firefighting purposes, water shuttling operations using water tankers must be used to transport water to the scene. Nassau County currently has four (4) water tankers that can deliver water to a fire scene; however, refill points are scarce, or have not yet been identified. Existing retention ponds, as well as retention ponds that are added through the development process that meet the requirements of NFPA 1142, should be designated as refill points. Water use agreements are required to be established where the refill point exists on private property, and agreements with the FDOT and other agencies will be required to utilize retention ponds along state roads for drafting operations.
  - Drafting pads can be installed at all refill points, with an approximate cost of \$5,000 per pad and an installation time of approximately two (2) days.
  - At least one (1) refill point within two road (2) miles of all new and existing homes is required in order to provide the required fire flow, per conservative assumptions and calculations included in Appendix C.
- Water Storage Tanks
  - Water storage tanks capable of providing the required fire flow are permitted to be used as an alternative water supply in areas without municipal-type water systems. The

water storage tanks should be designed, installed, and maintained in accordance with NFPA 22 and NFPA 25. Additionally, dual-service water tanks can be used to provide water for fire protection and other purposes.

- Water storage tanks typically cost approximately \$1 per gallon, excluding pumps, piping, and other appurtenances, with an installation time of about one (1) month.

Furthermore, as development moves into Nassau County, the addition of fire stations is inevitable. Fire stations should be designed in projected areas of dense population pockets. Along with new fire stations, new equipment and additional tankers should be considered. More importantly, the addition of water tankers to the existing fleet should be considered in the near future to accommodate for the absence of a pressurized municipal water supply in Nassau County. With large distances between existing fire stations and some rural properties, it is important that multiple tankers are able to respond to a fire scene in a timely fashion and continue making trips in a relay-type operation to refill and dump water at the scene, providing adequate water to fight a fire.

## Appendix A. Comparison Counties

As part of the effort to define at least three (3) viable water supply alternative for Nassau County, Florida that meet the legal requirements, as well as provide sustainable, affordable, and practical solutions to managing growth and supplying adequate water for firefighting purposes in rural areas, several comparison counties were contacted to discuss firewater requirements. The process involved a review of each county's comprehensive plan and current codes, as well as discussions with the individuals listed in Table 1. The following pages summarize these reviews and discussions.

**Table 1: Comparison County Contacts**

County	Contact	Reference Documents
Flagler	Irma Velez, Utility Development Review Specialist	Flagler County Land Development Code Flagler County Comprehensive Plan
Martin	Phil Keathley, Utilities Project Director	Martin County Comprehensive Plan
Monroe	Fire Chief R.L. Colina Zully K. Hemeyer, Fire Safety Inspector	Monroe County Comprehensive Plan Florida Keys Aqueduct Authority Rules and Regulations Monroe County Land Development Code
Santa Rosa	Jason McLarty, Planner	Santa Rosa County Comprehensive Plan Santa Rosa County Land Development Code Santa Rosa Code of Ordinances Chapter 11 - Fire Prevention and Protection
Sumter	Susan Farnsworth, Planning Department	Sumter County Unified Comprehensive Plan Sumter County Land Development Code
Walton	Mac Carpenter, Director of Planning	Walton County Comprehensive Plan Policy Document Walton County Land Development Code

### Flagler County

Flagler County is located along the northeastern coast of Florida and includes Beverly Beach, Bunnell, Flagler Beach, Marineland, and Palm Coast. According to the 2019 United States Census Bureau, the total population of Flagler County is approximately 115,000 people, with almost 86,000 people located in Palm Coast. Projections of Florida Population by County, completed by the Bureau of Economics and Business Research, indicate that the population will increase to approximately 138,300 people by 2030.

Flagler County does not provide guidelines or recommendations regarding alternative water supplies for firefighting purpose. All alternatives are subject to Fire Marshal approval; however, in areas within existing water supply service areas, connection to municipal service is required. According to the Utility Development Review Specialist for Palm Coast, connection to existing water distribution systems is required within existing service areas, regardless of distance. The developer is responsible for designing, installing, and permitting the extension themselves, and area also responsible for the cost. Palm Coast allows developers of single-family homes and



subdivisions to pay 20% of the cost upfront, with the remaining 80% paid per building permit by lot. Commercial and multifamily developments are required to pay 100% of the cost upfront.

According to the County's Land Development Code, water and sewerage systems shall conform to county specification and shall be designed by a professional engineer. The cost of installing water and sewer lines connecting into an existing system shall be borne by the applicant and all water and sewerage systems and connections shall be approved by the utility owner or, if no utility owner exists, by the county engineer. Fire hydrants shall be installed in all subdivisions utilizing a complete water distribution system in accordance with requirements of the National Fire Insurance Service Office's "Rating Schedule for Municipal Fire Protection". All costs of installing the hydrants shall be borne by the applicant. Water mains serving fire hydrants shall be adequate to provide design fire flows. Hydrants may be held in abeyance for installation provided a bond satisfactory to the county engineer and county attorney is posted and such action is approved by the county commission. Additionally, if it is determined that certain sizes are necessary as part of coordinated water and/or sewer plan, they may be required at the pro rata share to the developer.

According to Flagler County Comprehensive Plan Policy D.1.2.3:

***Policy D.1.2.3:*** *Flagler County shall coordinate with adjoining cities/counties, private utility providers, and quasi-governmental organizations (e.g. CDDs) when a request to extend centralized water service into the area west of US Highway 1 with the goal of allowing the extensions only under one of the following conditions:*

- (1) To eliminate an existing health hazard;*
- (2) To provide for the consolidation of existing central water systems into more efficient, cost-effective systems which are consistent with the Capital Improvements Program;*
- (3) To serve a new development that is consistent with the Flagler Agricultural Resource Mitigation System (FAMS) program;*
- (4) To provide adequate fire flow to residential subdivisions with lots less than two (2) acres and planned unit developments which are located within one-half (1/2) mile of an existing water transmission main; or*
- (5) Where deemed by the Flagler County Board of County Commissioners to be essential to economic development, consistent with the County's Economic Element and Capital Improvement Program.*

## **Martin County**

Martin County is located in the Treasure Coast region of Florida and includes Stuart, Jupiter Island, Ocean Breeze, and Sewall's Point. According to the 2019 United States Census Bureau, the total population of Santa Rosa County is approximately 161,000 people. Projections of Florida Population by County, completed by the Bureau of Economics and Business Research, indicate that the population will increase to approximately 176,900 people by 2030.



Martin County has set up Primary Urban Service Districts (PUSDs) through its Comprehensive Growth Management Plan (Chapter 4, §4.3). Specifically, Policy 4.7A.3 states “All future development of a use or intensity that requires public urban facilities, including water and sewer, will be permitted only in the Primary Urban Service District. Within the PUSDs, developers pay to extend the system or add capacity if necessary.

The Plan included a future needs estimate by the South Florida Water Management District (SFWMD) in §11.3 which assumed that all populations outside of public water supply service areas had self-supplied potable water. Policy 11.1C.1, which has the explicit objective of discouraging urban sprawl mandates that: “Extension of public potable water facilities shall be limited to areas identified in the Future Land Use Element as an established urban service district including the exceptions identified in Chapter 4, Policy 4.7A.3 of the CGMP.”

Outside the PUSDs no public services are available. Agricultural and single resident projects in areas outside PUSDs must develop alternative fire protection arrangements. Any fire protection alternative approved by the Fire Marshal is acceptable.

### **Monroe County**

Monroe County is the most southern point of Florida and includes the islands of the Florida Keys. Although most of the county’s land area is on the mainland, it is part of the Everglades and nearly uninhabited. Over 99% of the county’s population is located in the Florida Keys. According to the 2019 United States Census Bureau, the total population of Monroe County is approximately 74,000 people, with almost 25,000 people located in Key West. Projections of Florida Population by County, completed by the Bureau of Economics and Business Research, indicate that the population will increase to approximately 76,800 people by 2030.

Monroe County is unique among the counties quired due to its geographic location and resulting state regulatory framework. Monroe County includes the mainland area and over 1,700 islands which lie along the Florida Straits, dividing the Atlantic Ocean to the east from the Gulf of Mexico to the west, and defining one edge of the Florida Bay. The mainland part of the County is made up of the Everglades National Park and the southern portion of Big Cypress National Preserve. The Florida Keys extend 233 miles southwestward in a gradual arc from Biscayne Bay to the Dry Tortugas in the Gulf of Mexico. The regional and statewide resources of the Florida Keys prompted its designation by the Administration Commission as an Area of Critical State Concern in December 1975 and the Florida Legislature in 1979 (Section 380.0552, F.S.). In addition to those regulatory requirements established within Chapter 163, F.S., all planning and development within the Florida Keys must be consistent with Sections 380.05 and 380.0552(7), F.S., Principles for Guiding Development.

Because of this legal framework and the limitations on water availability in the Keys, the Monroe County Comprehensive plan institutes strict growth policies. Policy 101.3.1 establishes a permit allocation system for new residential development known as the Residential Rate of Growth Ordinance (ROGO) System. And Policy 101.4.1 establishes a similar permit system for nonresidential floor are known as the Nonresidential Rate of Growth Ordinance (NROGO)

System. Policy 101.3.2 mandates that “the number of permits issued for residential dwelling units under the Rate of Growth Ordinance shall not exceed a total of 1,970 new allocations for the time period of July 13, 2013 through July 12, 2026, plus any available unused ROGO allocations from a previous ROGO year”. Likewise, Policy 101.41.1 limits “the floor area of new nonresidential development available within the County to maintain a maximum of 47,083 square feet of floor area per NROGO year.” The NROGO allocation system shall apply within the unincorporated area of the county, excluding areas within the county mainland and within the Ocean Reef planned development.

Beyond these strict development criteria, Florida law requires coordination with the Florida Keys Aqueduct Authority (FKAA) to ensure adequate capacity is available to provide for fire flows for protection of the public health, welfare, and safety. [F.S. § 163.3177(3)(a)3.]. In the Comprehensive Plan, Policies 701.4.1 and 701.4.2 state:

***Policy 701.4.1:** Monroe County shall coordinate with the FKAA, in accordance with its Capital Improvements Program, to continue upgrading the distribution system toward the goal of providing fire flow capabilities throughout Florida Keys as funds and land are available. Fire flows shall meet the provisions of the Florida Fire Prevention Code. All commercial facilities not along U.S. 1 shall provide "on site" fire abatement, unless identified in the Agreement Between Monroe County and the Florida Keys Aqueduct Authority for Installation and Maintenance of Fire Hydrants in Unincorporated Monroe County.*

***Policy 701.4.2:** Monroe County shall require that at the time a construction permit is issued, adequate fire flow is supplied to the site in accordance with the Florida Fire Prevention Code.*

For residential water service, FKAA Rules and Regulations §48-107.007(2) requires:

*Water Service for fire protection purposes is intended to stand ready to provide a supply of water exclusively for fire protection purposes and no water shall be used from the fire protection system facilities for any other purpose unless said system is an existing Authority approved fire/domestic dual Service, and all applicable fees paid.*

The county has some budget to extend fire service mains and add a limited number of hydrants each year, but if a development is proposed in an area that is not currently serviced, the property owner/developer is responsible to pay the cost of providing service per §48-104.002(2)(a):

*If the property to be served is one where no previous Service existed, or where modifications are made to the Premises where Service is provided, the Owner will be required to pay all applicable fees and charges, and insure availability of an adequately sized water main in accordance with subsection (4), which states:*

*Prior to entering into an Agreement for Service, the applicant shall determine by inquiry to the Authority's Engineering Department whether the property to be served is adjacent to an adequately sized water main of the Authority's Distribution System. In the event that it is not, the applicant shall cause to be constructed an adequate (sic) sized Water Main*

*Extension at the applicant's expense from the nearest adequately sized water main, as determined by the Authority, across the full Frontage of the Premises to be served, in accordance with Minimum Design and Construction Standards and Specifications for Potable Water Systems.*

If it is not feasible to extend existing service mains to the property, alternative fire water arrangements can be made with the approval of the Monroe County Fire Marshal. Given the Monroe County Comprehensive Plan's strong concurrency system as established in Policy 101.1.2, and the Capital Improvements Policy 1401.4.5, the Fire Marshal must approve the adequacy of any construction with regard to fire requirements before any permits can be issued. The specific requirements of the Monroe County Fire Marshal with respect to construction are attached hereto as Appendix B.

### **Santa Rosa County**

Santa Rosa County is located in northwest Florida and includes Milton, Navarre, Pace, and Gulf Breeze. According to the 2019 United States Census Bureau, the total population of Santa Rosa County is approximately 184,000 people, with about 45,000 people located in Navarre. Projections of Florida Population by County, completed by the Bureau of Economics and Business Research, indicate that the population will increase to approximately 213,400 people by 2030.

Santa Rosa County is not a major infrastructure provider, with water and sewer services being provided by private utilities or incorporated cities. The highest percentage of land use in unincorporated Santa Rosa County is agriculture/silviculture (over 39%). The second-largest percentage of land use (23%) is conservation, recreation, and open space land (primarily the Blackwater River State Forest). The next highest percent of land use is residential (7%), ranging from very low-density agricultural homestead to high-density multi-family units, with the majority in the form of low-density, single-family detached residential units.

The current Santa Rosa Comprehensive Plan sets forth areas zoned by density and established a Future Land Use Map (FLUM) to control urban sprawl. Policy 1.1.E.2 states:

*No future land use category may be changed and no rezoning may be approved unless a finding is made that the change in land use or land use classification or zoning category will promote compact development and discourage urban sprawl. The Santa Rosa County Board of County Commissioners shall be responsible for making such finding upon receipt of a report from the Zoning Board.*

In general, requirements for fire protection and the need for concurrency review is limited by Article 5, §5.02.00(a) to:

- 1. The planned activity involves combined land and water area (to include submerged land leased area) exceeding three (3) acres unless the application is for the construction of a single-family house or residential duplex;*
- 2. The development is a residential project including ten (10) or more dwelling units;*



3. *Development involves more than one thousand five hundred (1,500) square feet of nonresidential floor space;*
4. *When development in aggregate with other requests for a development order (permit) exceeds any of the above limits*

For areas outside zones where public services are available, Chapter 11 of the Santa Rosa Code of Ordinances, §11-33(a) provides “. . . [w]here public water supply is inadequate or not available, an approved alternate water source meeting the approval of the Fire Protection Board of Appeals, and in conjunction with the appropriate fire department, shall be provided.”

### **Sumter County**

Sumter County is located in central Florida, and includes Bushnell, Center Hill, Coleman, Webster, Wildwood, and The Villages. According to the 2019 United States Census Bureau, the total population of Santa Rosa County is approximately 132,000 people, with over 79,000 people located in The Villages. Projections of Florida Population by County, completed by the Bureau of Economics and Business Research, indicate that the population will increase to approximately 170,800 people by 2030.

Sumter County has joint planning with cities of Center Hill, Coleman, and Webster in the County. Since 2012, all intensive development has been focused into water service areas. Per the Unified Comprehensive Plan, Policy 1.3.4:

*An Urban Development Area (UDA) is established and depicted on the Future Land Use Map. The UDA encompasses those lands that are or expected to become urban through 2035. The UDA shall encompass the city boundaries, MSAs adopted by the Interlocal Service Boundary Agreements, pursuant to Chapter 171, Part II, Florida Statutes, and those lands appropriate for urbanization and are able to be served or planned to be served by appropriate public infrastructure.*

- a. *Economic development activities and the provision of urban infrastructure within the UDA shall be strongly encouraged;*
- b. *The Urban Residential future land use category shall only be located within the UDA;*
- c. *Agriculture land use category may only be located outside the UDA or within the UDA where it:*
  - i. *serves as a holding area in anticipation of future annexation consistent with the MSAs approved between the County and the cities of Bushnell, Center Hill, Coleman, Webster, and Wildwood,*
  - ii. *if it is within the jurisdiction of the Cities; or*

- iii. *is held under a perpetual conservation easement, or similar legal instrument, dedicated to a public agency for resource conservation purposes while allowing for continued agricultural uses.*
- d. *Other than Agriculture, as described in Policy 1.2.4, all other Future Land Use categories may be located inside or outside the UDA; and*
- e. *Developments within the UDA shall connect to central water and sewer if available by a municipality, a private not-for-profit utility, or other off-site utility provider. Where central water or sewer is not available within the UDA, on-site facilities shall be provided in accordance with the provisions of Chapter 64E-6, Florida Administrative Code. Use of wells, septic tanks or package treatment plants in these areas shall be considered a temporary measure and future connection to central water and sewer shall be required when available.*

The Sumter County Code, Chapter 13 (Land Development Code), Division 5, §13-531(9)(a) requires:

*“ . . . the following developments shall provide a system of fire hydrants and fire flow within the development in accordance with the National Fire Protection Association requirements for the buildings located or intended to be located within such development: ”*

- 1. *Every residential development having more than twenty (20) lots of less than one-half (½) acre each.*
- 2. *Every commercial, industrial and institutional development of more than fifteen thousand (15,000) square feet.*
- 3. *All residential planned unit developments (PUDs).*
- 4. *All developments, regardless of size, where the commission feels that it is necessary for public safety.*

The County Board of Commissioners has consistently denied plans for intensive development outside water service areas. Per Plan Policy 1.4.5:

*All PUDs shall provide for central potable water and sewer facilities at the developer's expense and provide for fire hydrants and fire flow within the development in accordance with the National Fire Protection Association standards.*

For low intensity (agricultural or single residential) in non-serviced areas, there are no fire service requirements. A current concern for the County is larger “Mulching” Facilities in agricultural areas. These are being required to have firewater tanks on-site at the cost of the developer.

**Walton County**

Walton County is located on the Emerald Coast in northwest Florida, and includes DeFuniak Springs, Freeport, and Paxton. According to the 2019 United States Census Bureau, the total population of Walton County is approximately 74,000 people. Projections of Florida Population by County, completed by the Bureau of Economics and Business Research, indicate that the population will increase to approximately 89,600 people by 2030.

Walton County does not have utilities. The county is divided into “franchise” units, and private utilities are assigned specific franchises. Most of these utilities use capacity fees as opposed to connection fees. Per the Walton County Land Development Code §3.01.01, every development must obtain a certificate of concurrency. Each individual franchise determines concurrency with respect to services. If the proposed development is within the areas where central facilities are available depicted on the Utility Service Area Map, then the following policies apply:

***Policy I-1.3.6:** Walton County shall coordinate with providers for the extension and increase in capacity of central water facilities to meet future needs within the Utility Service Areas. The term “facilities” shall include wells, intakes, water storage tanks, treatment facilities, pumping facilities and distribution mains.*

***Policy I-1.5.1:** The County shall eliminate the use of individual potable water wells and package plants within existing and planned service areas by requiring mandatory hookup, pursuant to §381.00655, where central facilities are available depicted on the Utility Service Area Map.*

***Policy I-1.5.2:** The County shall prohibit the installation of individual potable water wells and package plants for new developments where central facilities are available.*

***Policy I-1.5.3:** Proposed increases to density and intensity through a proposed Future Land Use Map amendment shall take into consideration the availability of central water and fire flow protection.*

***Policy I-1.5.4:** The County shall actively participate and aid in expansion of water services to Walton County, and development of alternative water sources throughout Walton County.*

***Policy I-1.5.5:** Water main over-sizing may be required consistent with the County’s and the utility’s overall plans for an area. The developer shall negotiate payment with the local utility for line extensions sufficient for the development’s need. The utility may require that the line be oversized where extra capacity is needed. The utility provider shall bear the incremental cost for the required oversizing, as negotiated with the developer. All proposed development shall coordinate with the utility providers to ensure that water facilities are extended in accordance with the County’s objectives.*

In general, the utilities are responsible to determine the costs of extension of services within their franchise area.



If the development is proposed in an area *not Accessible to Operating Water Systems*, then per Land Development Code, Chapter 5 §5.05.01(G):

*For developments with any number of lots where a private well must be used such installation shall be in accordance with Florida law. Approval from the health department for installation of water wells on a lot-by-lot basis shall be provided to the planning department at the time of application.*

Various alternatives are allowed within the areas not accessible to operating water systems, including tanks, wells dry fire hydrants, or other methods of supplying required fire water flow. Any such alternative must be reviewed and approved by the County Fire Marshal.

## **Appendix B. Monroe County Example Requirements**

# County of Monroe

## The Florida Keys



Office of the Fire Marshal  
490 63<sup>rd</sup> Street Ocean  
Marathon, FL 33050  
Phone (305) 289-6020

### Construction Related Fire Department Requirements

The following are the requirements that the Fire Marshal's Office (FMO) will review during plans examination and inspections. All documents, such as permits, reports and revisions referenced herein must be submitted **through** the Building Department. This document is intended to facilitate the permitting process however is not meant to include every requirement necessary. Additional conditions may be required.

#### General / Site Plan.

1. Site Plan shall clearly identify the location of the project within the parcel and adjacent roadways.
2. Site Plan shall identify ingress/egress locations, measurements, and protective measures during construction.
3. Site plan must contain and clearly show the locations for all hydrant(s), arterial mains, feeder mains and stub out main sizes, including point of service from FCAA source.
4. Provide address numbers placed in a position to be plainly legible and visible from the street or road fronting the property. Additionally, address numbers shall contrast with their background, in accordance with NFPA 1, 10.11.
5. Provide reference to current edition of NFPA 241 and Chapter 16 NFPA 1, Standard for Safeguarding Construction, Alteration and Demolition Operations, which shall be maintained for duration of work.
6. No vertical construction or storage of combustible material on site shall be permitted until fire hydrants (fire wells) are installed, inspected, flow tested, and approved for service by the Fire Marshal's office.  
Note: Slabs can be poured, non-combustible walls can be erected, no combustible framing or roof assemblies may be on site.
7. Fire hydrants shall have proper clearances provided and maintained in accordance with Chapter 18, NFPA 1, and guidelines provided by the Fire Marshal's office. No poles, signs or other obstructions shall be in this clear space.
8. An in-service hydrant is defined as cleared through letter by the Florida Keys Aqueduct Authority (FCAA) and the Florida Department of Environmental Protection (FDEP). After obtaining the DEP clearance all hydrants shall be flow tested. This will be done by a licensed sprinkler or underground contractor, with certified test results being provided to the Monroe County Fire Marshal's office. Hydrants shall be flowed and plotted on a graph certifying the flow meets ISO (Insurance Services Office) flow calculations @ 20psi. Hydrants shall be painted in accordance with NFPA 291, providing proper bonnet and cap colors for the hydrant flow @ 20psi. A blue reflector shall also be provided in the center of the traffic lane closest to the hydrant. A Deputy Fire Marshal will provide a site inspection to verify the flows and accept the system before combustible material is brought on site. This inspection must be scheduled through the Building Department.
9. Any structure greater than 3 floors, will have an easily accessible and identifiable fire department connection "FDC" leading to a dry standpipe in a stairwell at 1 floor level below the highest working floor.
10. Prior to final approval of construction, it is the responsibility of the property owner or their designee to ensure 99% radio/cellular communication capabilities for all fire and police personnel in accordance with NFPA 72 paragraph 24.5.2\* Two-Way Radio Communications Enhancement Systems. If a failure occurs, a radio/cellular enhancement system will need to be installed.
11. Access shall be provided to fire crews for site and building construction familiarization (new buildings).
12. Separate Permits are required for Fire Sprinkler, Fire Alarm, and Fire Extinguishing Systems.  
Engineered plans (if required), shall be included in the "SEPARATE" permit application documents.
13. Upon completion of all underground, the site should have 360-degree accessibility for emergency apparatus.



**Building Design Criteria for New Construction.**

1. Identify all applicable Fire and Life Safety Codes, and Standards used for design. As a minimum, the Design criteria shall comply with the Florida Fire Prevention Code (FFPC) 7<sup>th</sup> edition effective December 31, 2020, consisting of NFPA 1, NFPA 101, F.S. 633, & F.A.C. Chapter 69A.
2. For New Construction provide a Life Safety Plan to include the following:
  - a. Identify the Type of Construction.
  - b. Occupancy classification and Occupant load calculations for each Occupancy Type
  - c. Total square footage information.
  - d. Common paths of travel and distances in LF to exits.
  - e. Corridor widths.
  - f. Identify door widths.
  - g. Locations and type of Fire extinguisher(s) with attachment details, in compliance with NFPA 10, including but not necessarily limited to each residential cooking area.
  - h. Locations for Emergency lighting and illuminated exit signage. \* (\*May be on the lighting/reflective ceiling plan or the LSP, but if on both, plans must be identical.)
3. Provide Wall Types (including its joint assemblies) any shafts and chases shown referenced to detailed drawings on plans, UL or equivalent design details.
4. Identify and include the minimum fire resistance of walls, partitions, and opening protectives. Clearly identify fire resistance separations of Structure members and/or Compartmentation of living spaces.
5. Provide fire stopping details and identify required fire resistance rating for each penetration type (To be inspected on "Rough Fire Inspection – 800"). *Note: If Rough inspection is not called in by Contractor, and this inspection is not performed by the Fire Marshal's Office, Contractor shall be responsible for removing any work covering fire stopping, etc. for the inspection to be completed.*
6. Provide fire stopping details and identify required fire resistance rating between occupancies.
7. Provide a complete Interior finish schedule including wall coverings, floor finishes, furnishings and draperies. Identify and include the minimum interior finish classification(s).
8. Provide Exit access, exit, and exit discharge information that complies with Chapter 7 of NFPA 101.
9. Provide Exit illumination that complies with Chapter 7 of NFPA 101.
10. Provide Emergency lighting and exit signs that comply with Chapter 7 of NFPA 101.
11. Each required exit has to be equipped with exit sign/emergency light combo fixture.
12. Provide Exit corridors that comply with Chapters 7 and 8 of NFPA 101.
13. Provide Stairs with sufficient details including all dimensions such as width, headroom, rise, run, etc. to ensure compliance with Chapter 7 of NFPA 101.
14. Provide Handrail and guard detail including all dimensions-extension, rejections, height, etc.
15. Provide Ramp Detail including all dimensions, show slope in ratio, etc.
16. Provide Doors, locks, latches, and alarm devices with sufficient details such as rating, hardware, width, assembly, etc. on schedule to ensure compliance with Chapter 7 of NFPA 101.
17. Provide a complete Window Schedule including all dimensions, identify egress windows, clear widths, sill height above finished floors, etc.
18. Occupant load and classification shall comply with Chapter 7 of NFPA 101.
19. Accessible means of egress shall comply with Chapter 7 of NFPA 101.
20. If Mechanical Plans, the proper location of Duct Detectors in the supply & return for systems greater than 2000 CFM or 60,000 BTUs and their respective test switches.
21. If Mechanical Plans in a non-sprinklered/non-fire alarm building, the proper location of their respective test switches AND the location of each "Smoke" indicator.
22. If Electrical Plans, the panel schedule needs to indicate which breaker is for the Emergency Lighting and which breaker is for the Fire Alarm Control Panel "FACP" in an alarmed structure. The Fire Alarm breaker must be locked. Note: Only Fire Alarm Contractor shall install the Fire Alarm Detection System.
23. If Lighting Plans, the location of all illuminated exit signs and emergency lighting must be identical to the LSP.

24. Identify whether or not the building will contain a fire sprinkler or fire alarm system.
25. Any Fire System related work shall require a "SEPARATE" permit from the specific trade performing the work.

**Fire Department Access.**

1. Design shall meet the specifications provided in Chapter 18 Fire Department Access and Water Supplies, NFPA 1.
2. Note on plans that "Emergency Access to Fire Apparatus, Emergency Medical Vehicles and Water Supplies shall be maintained unobstructed at all times."
3. Ingress/Egress shall provide inside turning radius of 25 ft. clear and an outside turning radius of 50 ft. clear.
4. The plan for Ingress/Egress during construction for Fire Department Access roads shall have an unobstructed width of not less than 20 ft., an unobstructed vertical clearance of not less than 13 ft., 6 in., and be designed and maintained to support imposed loads of fire apparatus (44 tons which includes Fire Apparatus and EMS Rescue Vehicles), all clearly shown on the plan, and shall be provided with an all-weather driving surface. (NFPA 1 Chapter 18 & NFPA 241 Chapter 7).
5. There shall be no parking on both sides of the street.
6. An approved turnaround for fire apparatus shall be provided where an access road is a dead end and is in excess of 150 feet. The turnaround shall have a minimum centerline radius of 50 ft. The grade, surface and location of the fire lane shall be approved by the Fire Marshal's Office.
7. A Tee or Y turnaround may be accepted, upon review by the Fire Marshal's Office.
8. Secondary paved access or an emergency vehicle access to this site may be required or necessary, Per NFPA 1 Chapter 18, upon review by the Fire Marshal's Office.
9. Provide Automatic access at points of ingress and egress to be activated by "Electronic Siren Welp and Wail Modes" (for gated businesses/developments/communities).
10. Provide for "Red Model 1403 Knox Box," with notation to coordinate installation with Monroe County Fire Marshal's Office. The Knox Box for new buildings shall be mounted and have the following placed inside of the box:
  - a. Keys to the following:
    - 1) Main entrance.
    - 2) All mechanical and electrical rooms.
    - 3) Emergency elevator operations (2 keys).
    - 4) Fire alarm panel.
    - 5) Pull stations.
  - b. Business card of 24/7 emergency point of contact.

**Water Supply for Fire Suppression.** The following water supply design requirements, references and notations shall be provided on the Plans:

1. Provide the ISO "Determination of Needed Fire Flow" Report which will identify the water supply required for fire suppression for each building, including the fire sprinkler system, with the building Plans Permit submittal, include reference on Plans to this Report, and submit report through the Building Department. Guidance to prepare this "Report" may be found at the following website: <https://www.isomitigation.com/siteassets/downloads/guide-determinerequiredfireflow.pdf>
2. Provide plan for sufficient fire hydrant(s) and/or fire well(s).
3. Plans shall provide for the installation of Fire hydrant(s) and/or Fire well(s) such that the coverage for each building can be provided by fire suppression apparatus.
4. Provide locations for the point of service from the FKA water main, and locations of the Backflow preventer, Post indicator valve and fire hydrant(s) and/or fire well(s) on the Site Plan.
5. Provide hydraulic nodal information on plans.



6. Where no reliable water service is within ¼ mile of the site then Chapter 29, NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting, will apply.
  - a. A water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material accumulates. There shall be no delay in the installation of fire protection equipment.
7. **Underground Fireline:** Required inspections include underground visual of pipe and connections, hydrostatic pressure test, per NFPA 24 and 25, and the flushing of the line until water runs clear. If the underground piping is to be installed by a contractor other than the fire sprinkler contractor (Contractor I or II), the contractor shall possess a current Contractor V Florida License.
8. Provide copy of FKA permit(s).

**Fire Sprinkler System.** The following design requirements, references and notations shall be provided on the Plans:

1. Provide Separate "Fire Sprinkler System Plans" submittal by state licensed fire sprinkler contractor, pursuant to Chapters 489 and 633, F.S.
2. Design criteria shall meet the requirements of NFPA 13, 14, 24, and 25, as well as, any applicable requirements identified by the Fire Marshal's Office.
3. If this plan is not submitted with the original permit set, provide notation that a follow up permit will be submitted.
4. Provide details for sprinkler heads, hangars, control valve, main drain, auxiliary drain, fire department connection, water flow alarm and system air vent.
5. Clearly identify the location, pipe dimensions and diameter for the fire main point of service from the FKA water supply.
6. Required inspections include aboveground visual of piping and connections, hangers, heads, and other components under an 800 Rough Fire Inspection, called in through the Building Department. Hydrostatic pressure test, as per NFPA 13, and flow and tamper switch operation required under 891 Final Fire with Acceptance Inspection, called in through the Building Department.
7. Copies of the Contractor's Material and Test Certificates for both the underground and aboveground piping shall be provided to Deputy Fire Marshal/Fire Marshal's Office upon completion of the hydrostatic tests by submission through the Building Department, which is required for the 892 Final Fire Inspection, called in through the Building Department.
8. Fire Sprinkler contractor shall also provide the following upon final inspection by submission through the Building Department:
  - a. Fire Pump testing certificate (new buildings).
  - b. Hydraulic plates.
  - c. Spare Heads and associated wrenches.
  - d. Escutcheons/cover plates.
  - e. Copy of plans – 4" PVC by FACP.
  - f. Maintenance Contract.
  - g. All signage per Code requirements.

**Fire Alarm System.** The following design requirements, references and notations shall be provided on the Plans:

1. Provide Separate "Fire Alarm System Plan" submittal by licensed fire alarm contractor.
2. If submitted in full plan set, provide "Fire Alarm System Plans" on separate designated sheets, in compliance with the current adopted NFPA 72: *National Fire Alarm and Signaling Code*.
3. If this plan is not submitted with the original permit set, provide notation that a separate follow up permit application will be submitted.
4. Systems must meet the applicable criteria per NFPA 72, and the occupancy type, as well as any applicable requirements identified by the Fire Marshal's Office.
5. Provide all manufacturer's product (cut) sheets.



6. Requires remote annunciator(s) for each building.
7. Clearly identify and locate FACP on plans with smoke detector above it.
8. The Fire Marshal's Office requires an inspection for a "Fire Alarm System" which includes testing of any and all components of the system, per NFPA 72.
9. Commercial Cooking Fixed Suppression System Plans must be submitted by a Florida licensed contractor for review, permitting, and all associated inspections per NFPA 1, NFPA 17, 17A, and 96.
10. Hood duct inspections require a "liquid" or "light test" of all seams and welds on sections of ductwork being installed. Once ductwork has been installed, a liquid or light test inspection will be required on welds and seams necessary to install ductwork.
11. Final inspections for alarm systems shall include a function test to verify the proper operation of all system components, including fuel shut off, etc.
12. Fire Alarm contractor shall also provide the following upon final inspection:
  - a. Location of electrical panel and breaker associated with the panel.
  - b. Contact number inside of the panel door.
  - c. Account number inside of the panel door.
  - d. All strobes within visual of another shall be in synchronization.
  - e. Record of Completion.
  - f. Monitoring Contract.
  - g. Maintenance Contract.
  - h. Copy of plans – 4" PVC by FACP.

**Commercial Cooking Fire Suppression System.**

1. Provide separate "Fire Suppression System Plans" submittal by state licensed fire suppression system contractor, pursuant to Chapters 489 and 633, F.S.
2. Design criteria shall meet the requirements of NFPA 10, 13, 17A and 96, as well as, meeting any applicable requirements identified by the Fire Marshal's Office.
3. If this plan is not submitted with the original permit set, provide notation that a follow up permit will be submitted.
4. Fire Alarm contractor shall also provide the following upon final inspection:

UL-300:

  - a. Notification Device.
  - b. Gas company representative.
  - c. Electrical Inspector.
  - d. Representative of the business (owner/manager).
  - e. Chain.
  - f. Shunt Trip test.
  - g. Chocks.
  - h. Pre-Engineered Restaurant Fire Suppression Systems Report.
  - i. Signage.
5. FM-200:
  - j. Notification Device.
  - k. Fan test – Enclosure Integrity Report.
  - l. Signage.

**Above Ground and Underground Fuel Tanks.**

1. Plans must be submitted by a Florida licensed contractor for review, permitting, and any associated inspections.
2. All tanks and installation(s) shall meet the requirements per NFPA 30, NFPA 30A, or NFPA 30B, as deemed applicable by the Fire Marshal's Office.

3. All underground tanks require inspections of slab, anchors, piping, and any associated components.
4. All aboveground tanks require inspections of supports, mounting, strapping, other protective requirements, and any associated components.

**Propane Tanks.**

1. Plans must be submitted by a Florida licensed contractor for review, permitting, and any associated inspections.
2. All tanks and installation(s) shall meet the requirements per NFPA 10, 54, 55, and 58, and any other standard or Code as deemed applicable by the Fire Marshal's Office.

**General Inspection Requirements.**

1. All fire related inspections are required to be scheduled at least 1 day prior to the inspection and must be called in through the Building Department's Inspection Line (IVR System).
2. All inspection time requests are for either morning or afternoon, no specific times will be given.
3. Inspections are conducted Monday through Friday 8:00 AM to 4:00 PM.
4. "Courtesy or miscellaneous inspections" cannot be performed by the Fire Marshal's Office.
5. If a Deputy Fire Marshal is on site and observes work that has not been called in for an inspection, an inspection result will not be filed. Inspections shall be requested through the Building Department inspection line in order for results to be posted to the building permit.
6. All ROUGH Inspections are to be called in by the sub-contractor, as applicable.
7. All FINAL Inspections are to be scheduled by permit number.
8. All FINAL Inspections are to be called in by the General Contractor.
9. A representative of each trade shall be on site at the time of their respective inspection.
10. The Permit card and a copy of all approved/stamped plans shall be on site for each of the inspections being conducted.
11. Additional inspection requirement details will be provided on the Fire Marshal's Office inspection checklist.

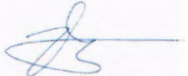
**Specialty Inspections.**

1. Fire Sprinkler Scheduling Requirements:
  - a. Coordinate with Fire Alarm/Fire Suppression System inspections.
  - b. All rough inspections are to be scheduled by the sub-contractor performing the work.
  - c. Rough inspections to include:
    1. All underground.
    2. All flushing prior to connection to the fire sprinkler riser.
    3. Fire pump acceptance testing.
    4. Existing construction - 1 hard-lid inspection per job.
    5. New construction, commercial – 1 hard-lid inspection per floor.
    6. New construction to including hotels, apartments, residential board and care – 1 hard-lid inspection per wing, each floor.
    7. New construction, residential – 1 hard-lid inspection.
  - d. Final Inspection called in by the General Contractor.
2. Fire Alarm Scheduling Requirements:
  - a. Coordinate with Fire Sprinkler/Fire Suppression System inspections.
  - b. The sub-contractor performing the work is not to call for inspection.
  - c. Final Inspection called in by the General Contractor.
3. Fire Suppression Scheduling Requirements:
  - a. Coordinate with Fire Alarm/Fire Sprinkler system inspections.

- 1) UL-300, Kitchen Suppression Systems:
    - a) The sub-contractor performing the work is not to call for inspection.
  - 2) FM-200, Clean Agent Systems:
    - a) The requirements listed in section 1 above.
    - b) Fan-Pressure Test to be called in by the sub-contractor performing the work.
  - b. Final Inspection must be called in by the General Contractor.
4. Petroleum Fuel Tank Scheduling Requirements:
- a. The sub-contractor shall call in Underground visualization of mounting.
  - b. The sub-contractor shall call in the pressure test of gas lines.
  - c. Final Inspection called in by the General Contractor.

Note that new development(s) may be required to provide a Fire Department Service Delivery Concurrency Evaluation at the expense of the developer, including the cost of a third-party evaluator, in accordance with Chapter 15, NFPA 1 at the discretion of the Fire Marshal.

Please use this document as a resource. The Fire Marshal's Office can be contacted at (305) 289-6020.



Monroe County Fire Marshal R. L. Colina



## Appendix C. Water Shuttling Operation Calculations

Assumptions:

- Tanker holds 3,000 gallons
- Drop tank holds 3,000 gallons
- Tanker fills at 1,000 gallons per minute
- Tanker dumps at 1,000 gallons per minute
- Set-up time to fill or dump tanker is 1 minute
- Supplying water to the fire at 250 gallons per minute
- Tanker travel speed is 35 miles per hour
- Two (2) responding tankers; one (1) tanker is filling at the refill point, while the other tanker is dumping at the fire scene

This calculation is a conservative calculation because it assumes that only two (2) tankers are shuttling water to the fire scene and only one (1) dump tank is utilized. In an ideal situation, more than two (2) tankers will be active in shuttling operations, with more than one (1) drop tank at the scene.

$$\text{Time to deplete drop tank capacity: } 3,000 \text{ gal} \times \frac{1 \text{ min}}{250 \text{ gal}} = 12 \text{ min}$$

$$\text{Time to fill or dump tanker: } 3,000 \text{ gal} \times \frac{1 \text{ min}}{1,000 \text{ gal}} = 3 \text{ min}$$

Time to fill tanker and dump tanker (including set-up time for each): 8 min

Time remaining to travel to or from the fire scene/refill point:  $12 \text{ min} - 8 \text{ min} = 4 \text{ min}$

$$\text{Distance tanker could travel in 4 minutes: } D = \frac{T-0.65}{1.7} = \frac{4 \text{ min} - 0.65}{1.7} = 1.97 \text{ miles}$$

## **Appendix D. H<sub>2</sub>home™ Data Sheet**

# H<sub>2</sub>home<sup>TM</sup>

NFPA 13D PUMP & TANK SYSTEM

Designed & built specifically to meet NFPA 13D requirements, the H2hOme® is everything you need to provide required pressure & flow to a residential fire sprinkler system in a sleek, all-in-one package. As with all of our 13D pump & tank systems, the H2hOme® comes standard with a stainless steel pump and all non-ferrous components to protect against corrosion and ensure longevity. Additionally, this is the only stand-alone system on the market with an easily removable slide-out pump. Created with contractors in mind, our 29" slim tank can be carried through any typical doorway - with reduced weight when the pump is removed. The H2hOme® also includes a riser manifold kit making installation even easier. A control panel can be added with indicator lights, alarm functionality and a simple "push-to-test" button. The H2hOme® is quite simply the most efficient, reliable and easiest to install pump & tank system available - backed by the best customer service & technical support in the fire sprinkler industry.



- All-In-One Unit With Small Footprint
- 29" Wide/425 Gallon Narrow Water Tank
- Removable Stainless Steel Pump
- All Non Ferrous Components
- Designed & Built For Fast Installation
- Riser Manifold Kit Included
- Advanced Control Panel (Optional)
- Lifetime Customer Service & Tech Support

Model	Pump Motor					Tank Size (gal)	Dimensions (in)		
	HP	PH	HZ	Volts	Amp Draw		L	W	H
H2H425-E01	¾	Single	60	240	5.2	425	68	29	76
H2H425-E03	1½	Single	60	240	9.1	425	68	29	76
H2H425-A04	2	Single	60	240	11.2	425	68	29	76
H2H425-A06	3	Single	60	240	12.8	425	68	29	76

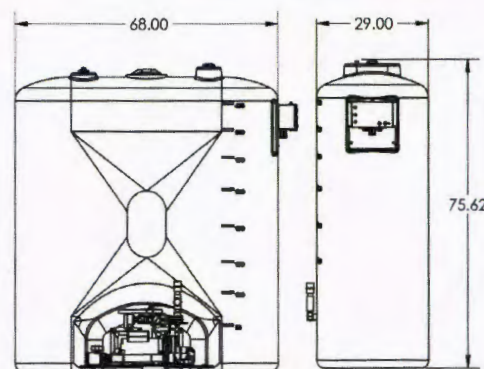
## Optional Accessories:



**Control Panel:** The optional control panel puts the functionality of the H2hOme® at your fingertips. Visual displays for the unit's status are present as well as a simple push-button to test the functionality of the pump.



**Alarm:** The horn/strobe will alert in the event of system activation. Includes a 30' power cord and can be wall mounted anywhere in the home. System must include the control panel for alarm function.

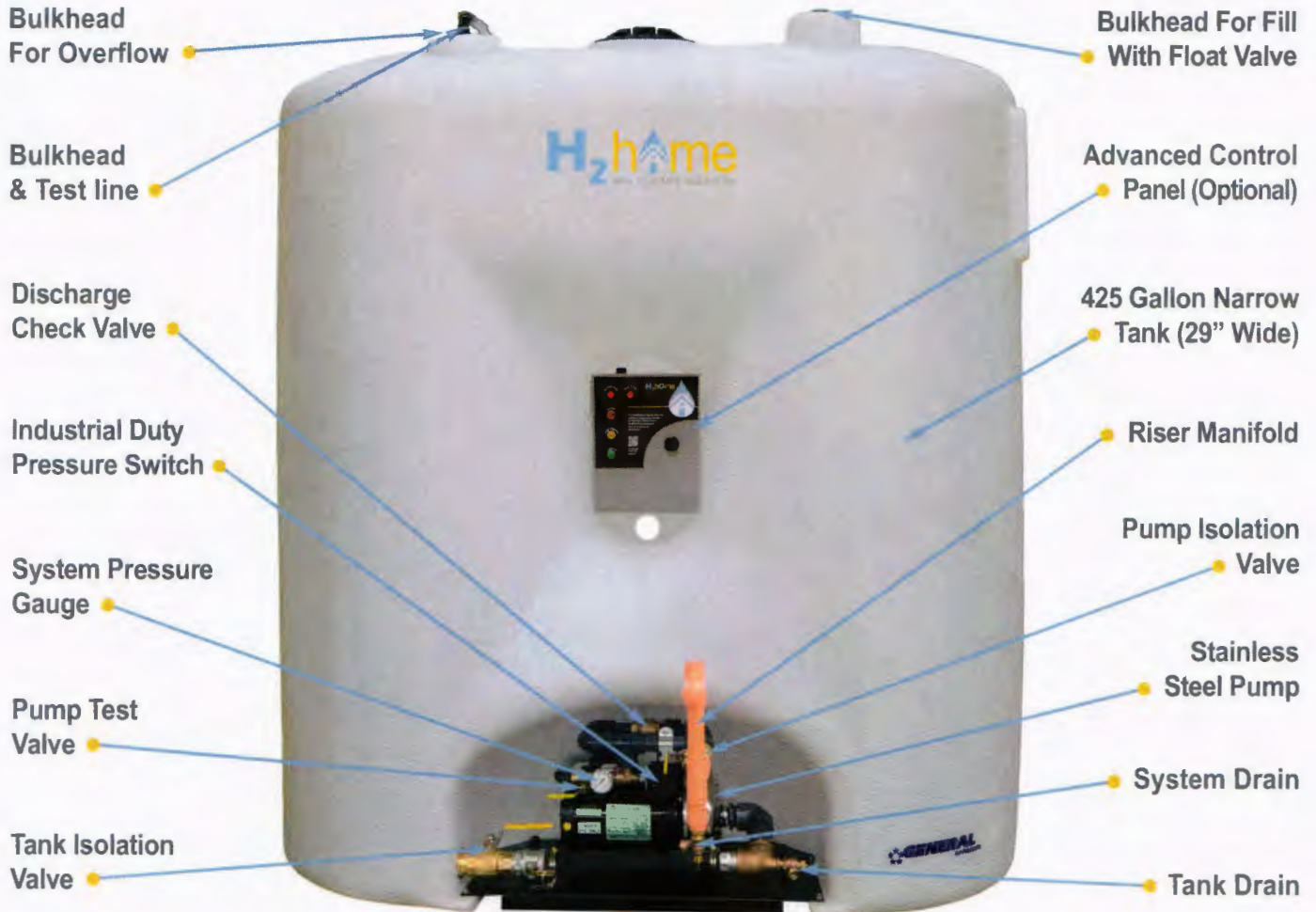




# H<sub>2</sub>home

NFPA 13D PUMP & TANK SYSTEM

Resolution 2022-014



H2H425-E01 Performance				
<b>GPM</b>	20	25	30	35
<b>PSI</b>	26	24	20	18

H2H425-E03 Performance				
<b>GPM</b>	20	25	30	35
<b>PSI</b>	48	46	39	34

H2H425-A04 Performance									
<b>GPM</b>	0	20	25	30	35	40	45	50	55
<b>PSI</b>	61	57	54	52	50	46	43	39	37

H2H425-A06 Performance										
<b>GPM</b>	0	20	25	30	35	40	45	50	55	60
<b>PSI</b>	72	67	65	63	60	58	55	51	48	45

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