Central East Florida National Cemetery
Phase 1 Development
Scottsmoor, Florida

VA Project Number 934PC2002
Contract Number VA101F-12-C-0026
Obligation Number 934X20000

MP3/SD1 Submittal
November 2, 2012

Prepared For:
Department of Veterans Affairs
National Cemetery Administration
Washington, DC 20420

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Table of Contents
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Basis of Design

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Table of Contents

Section 1.00

1.01 Project Description

The goal of the Central East Florida National Cemetery Phase 1 Development project is to provide additional burial space and support facilities, and create a place of honor and dignity for eligible veterans and their dependents. The Cemetery is a national shrine, which commemorates the service of these citizens to the protection of our nation's safety and security. The following objectives have been established in order to meet this goal:

(1) To develop the Cemetery in such a way that respects the constraints and opportunities of the land's natural features, recognizes the dynamic qualities of the environment, and is in harmony with the surrounding community.

(2) To respect contemporary principles in the field of landscape architecture and architecture, specifically, environmentally sensitive planning and design.

(3) To adhere to the program requirements as defined by the National Cemetery Administration for the master planning, as well as design development and construction documentation phases of the project.

1.02 Project Goals and Objectives

The Goals and Objectives of this project are to establish a national cemetery to provide burial facilities for eligible veterans in the Central East Florida area. A master plan will be prepared which addresses development of the approximately 318 acre site, and design development will be accomplished focusing upon the first phase of construction. A construction early turn-over burial area will be identified which will allow for the early provision of burials prior to completion of the permanent Phase I facilities. The VA Program Guide (PG-18-15, Volume D), A/E Submission Instructions for National Cemetery Projects will be followed, as well as the NCA Facilities Design Guide. The design will culminate in the preparation of contract documents and construction specifications to be used for competitive bidding purposes.

This project will consist of the construction of Phase I of the cemetery. The remainder of the site will be developed in future phased projects in accordance with the cemetery master plan. Those facilities necessary to maintain, operate, and provide burials for approximately ten years will comprise the Phase I construction. Approximately 45 acres of land will be consumed and 17,000 gravesites, including full-casket and cremain sites will be developed including the following elements and features:

(a) Access Roads
(b) Entrance Area
(c) Interment Areas (Burial Sections, including early turnover area):
    (1) Casketed Remains:
        - Approximately 7,500 pre-placed crypt full casket gravesites
    (2) Cremated Remains:
        - Approximately 3,000 in-ground, garden niche, or terrace sites
        - Approximately 6,500 columbarium niches

- Garden for scattering of cremated remains and Ossuary

(d) Memorial Walls (6)
(e) Committal Service Shelters (2)
(f) Memorial Walkway/Donations Area
(g) Administration/Public Information Center Building (approximately 3,800 GSF) with Electronic Gravesite Locator and Public Restrooms and associated parking
(h) Maintenance Complex (approximately 8,000 GSF) with Buildings, Honor Guard space, Service Yard and associated parking
(i) Flag/Assembly Area
(j) Roadway System and Parking
(k) Site Furnishings
(l) Grading, Drainage
(m) Fencing and Landscaping, as required for this particular site
(n) Irrigation System, as required for this site
(o) Utility Distribution Systems, including off-site infrastructure, if necessary, to bring utilities to the site
(p) Energy Conservation Savings Features
(q) Protected Habitat Preservation, Wetlands, and Mitigation
(r) Global Positioning System (GPS) Site Integration

Section 2.00

2.01 Construction Access

Although the specific main access location for construction is not yet definable, typically this would be in close proximity to the DOVA Resident Engineer's field office for security purposes. Adjacent roadways may be utilized for deliveries and should be properly scheduled so as not to cause a traffic blockage for the surrounding neighborhoods. Based on Brevard County comments, the preferred construction access would be US 1-Huntington Avenue to Dixie Way with site access along Dixie Way.

2.02 Pollution Control

Florida State and Local regulations are very specific and detailed as to control of environmental pollution and damage to environmental resources including but not limited to air, water and land resources. The design of the Cemetery needs to pay special attention to specific control measures and the associated costs for the contractor to implement during construction. An environmental protection plan should be prepared and coordinated with the contractor prior to the construction phase to help minimize adverse effects to human health, undesirable alterations to the ecological balances, or significant degradation of the environment in any way. For this project the measures will be focused primarily on: erosion control of sediment caused by runoff; surface water discharge control of runoff from impervious surfaces; and disposal of combustible and non-combustible debris. The design will include the use of best management practices as established by the Florida Department of Environmental Protection and will include items such as silt fences, turbidity barriers, and designated earthen stockpile areas. Also, due to the proximity of the Cemetery to the surrounding local community, careful attention to noise pollution should be accomplished by performing noise producing construction activities during less sensitive hours of the day or week.

2.03 Clearing and Grubbing

Because of the importance of the setting of a Cemetery and the atmosphere created by the natural surroundings, it is important to minimize the required clearing to only what is necessary for the efficient development of the Cemetery development. Design elements should include preserving existing trees where possible and minimizing required grading adjacent to the tree save areas. The design should also attempt to use as much of the organic and/or unsuitable soils for non-structural areas and limit grubbing to the burial and roadway/infrastructure areas only.

2.04 Site Grading and Drainage

This report summarizes the stormwater management analyses for the Central East Florida National Cemetery site. The site has been screened for both stormwater quality and quantity as they relate to St. Johns River Water Management District (SJRWMD) and Brevard County regulations. For compliance with SJRWMD and Brevard County water quantity criteria, the post-development discharge must be less than or equal to the pre-development discharge from each drainage area for the 25-year, 24-hour storm event. For compliance with

SJRWMD water quality criteria, the stormwater management facility (SMF) must provide both dynamic and quiescent treatment.

The site is located within the drainage basin for the Indian River Lagoon, which is an aquatic preserve, and which has also been deemed as impaired for nutrients by the Florida Department of Environmental Protection (FDEP). The fact that the site is within an aquatic preserve drainage basin means that by SJRWMD regulations, the stormwater runoff must receive 150 percent of the treatment normally required. The fact that the site lies within a drainage basin for a waterbody that has been deemed impaired by the FDEP means that the post-development nutrients load discharged from the site must be equal to or less than the pre-development nutrients load. Since the site is located within a drainage basin that is both for an aquatic preserve and for an impaired waterbody, the 150 percent increase in treatment is applied to whichever analysis indicates a higher level of treatment.

The proposed grading within the burial fields will typically be 3%. Subsurface underdrains shall be incorporated to facilitate groundwater control.

2.05 Lawn Irrigation System

Existing Conditions

The Environmental Site Survey identified three existing irrigation water wells on the site. Two of these wells are operational. The production of one well is estimated at 200 GPM based on anecdotal knowledge from the previous landowner based on how the well was pumped. The location of the existing wells conflicts with the cemetery layout so it is anticipated that the existing wells will be capped and replaced. It is assumed that the new well(s) will have similar production as this existing well.

Similar to the irrigation water source at Jacksonville National Cemetery, the primary water source is the surficial aquifer. Water from the surficial aquifer naturally seeps into the unlined irrigation pond. Well water is intended to be a back-up source. A test well with actual pumping data is required to document the available flow from the irrigation well. Tentatively, the irrigation well is to be located adjacent the maintenance area and the irrigation pumping station.

The surficial aquifer is known to contain Ethylene Dibromide (EDB) which was used as a fumigant for crops, citrus and tropical fruits and vegetables. A report on EDB published on the Extension Toxicology Network states that “because of the inability of plants to take up EDB from the soil, it is not likely to accumulate in plants”. No report documenting the effects of EDB on turf or landscape plants or trees has been found.

A water quality assessment of the well water was completed. The reader is referred to Appendix A for the complete report. The assessment concludes that the well water has “pH values outside of normal ranges, elevated chloride and/or sodium concentrations and elevated iron concentrations”. Potentially, an acid injection system may be needed to address the alkaline pH. Further study of the assessment findings is required to determine what management practices and/or water treatment is required. Additionally, a soil chemistry

analysis may be required to determine what agronomic practices are required to address these issues.

Irrigation Water Use

Updated site master plan describes a seven phase development. With the proposed landscape approach described later, it is estimated that approximately 110 acres are to be permanently irrigated at build-out. Phase 1 is estimated to have 25 irrigated acres and Phases 2 and 3 to have approximately 15 acres each (30 acres total) and Phases 4-7 an additional 55 acres.

World Water for Agriculture from the International Irrigation Center at Utah State University publishes potential evapotranspiration (ET) and mean precipitation data for sites throughout the world. Based on 10 years of historic ET data for Titusville, FL, the peak season daily water use is estimated to be 0.27-inches per day. Assumptions for this calculation include:

- Irrigation operational efficiency of 75%
- Effective precipitation of 50%

Data for historical precipitation is taken from National Oceanic and Atmospheric Administration (NOAA) reports.

Phase 1 is estimated to use 185,700 gallons per day (GPD) at peak season and 27.4 million gallons (MG) annually. At the completion of Phases 1-3, the daily water use is approximately 410,000 GPD with an annual water use of approximately 60 MG. At build-out, the site potentially will use 760,000 GPD with an annual water use of 112 MG.

Permitting for irrigation water will be with the St. Johns River Water Management District. A preliminary review of the permitting requirements shows that well withdrawals over 100,000 GPD require a permit. The design of the irrigation system will be compliant with rule 40C-2.04 and other applicable water management district rules.

On-Site Water Storage

Irrigation ponds are typically designed to store three or four days of usable water. Due to the elevation of the pumping system intake structure, there is some water in the pond that is not usable. To meet the needs of the site at build-out, the irrigation pond needs to store 4.5 to 5.0 MG of usable water.

A single pond is provided for irrigation and is the pond that the irrigation pumping system will pump out of. This pond has a depth of approximately 12-feet and an estimated storage capability is 5 to 6 MG of usable water.

Irrigation well will pump directly into the pump system wet well when there is a shortage of water in the irrigation pond. Water level probes located in the pumping system wet well will determine which water source to use. When the water level in the pond reaches a predetermined low level, the probes will activate an electrical relay to automatically turn on the well pump. When the pond reaches a predetermined high level, the probes will automatically shut the well pump off.

Irrigation Pumping System

An irrigation pumping system is considered to have an economic life of 30 years. The intent of the pumping system design is to provide a mechanical system that is sized for Phases 1-3, i.e., 30 years, and a permanent infrastructure (ponds, intake, intake pipe and wet well) that can be used to build-out.

For Phases 1-3 and assuming an 8-hour irrigation water window, the instantaneous required flow rate at peak season is 1,000 gallons per minute (GPM). For a 6-hour water window the required flow rate is 1,350 GPM. A 1,350 GPM pump station is recommended.

An irrigation pumping system for the well/pond water source includes a prefabricated multiple vertical turbine pump system with filtration. The system requires a 480 VAC, 3 phase power supply. For a 1,350 GPM pump station, two equally sized 675 GPM pumps are used. Each pump would be 60 horsepower (HP). Under normal operation, one pump starts up based on pressure as the irrigation system ramps up. The second pump starts when the flow required by the irrigation system exceeds the capacity of the first pump. Both pumps operate together until the required flow falls below the threshold of the second pump. The equally sized two pump system allows back-up in case one of the pumps fails. However, until the failed pump is repaired, the water window doubles.

A 5 HP submersible pressure maintenance pump (PMP) is used to maintain mainline pipe pressure when the main pumps are off and is sized to handle manual watering needs.

The pumping system is controlled by a variable frequency drive (VFD). This type of system provides a constant pressure while allowing the flow rate to vary based on the needs of the irrigation system. This control approach also conserves energy and contributes to LEED certification.

The filtration system includes a 50 mesh (300 micron) screened filter. The filtration system includes a suction scanner so captured debris is physically “sucked” from the screen and discharged back into the irrigation pond at a location away from the intake structure. This type of system is particularly advantageous if there are algae or other debris in the water that can stick to the screen.

A feature of the pumping system is operational monitoring software that can be read on the pump system interface panel. An optional feature that can be specified is monitoring this information remotely from a computer located in the maintenance building.

Pumping system is contained in a building. The construction materials for the building are determined by the Project Architect and are based on the building’s visibility to the public. Other pump buildings at National Cemeteries in Florida have used CMU block construction. It is anticipated that a pump building sized 16-feet by 20-feet is required to provide adequate clearance for maintenance and to meet codes. The building includes 6-feet wide double doors, a roof hatch over the pump station to allow removal of pumps, and ventilation fan and louvers. Ideally a phone line should be installed to the building for maintenance and troubleshooting purposes. When a phone line is connected to the programmable logic

controller in the pump control panel, the connection can be used by the pumping system manufacturer to remotely troubleshoot operational problems.

The layout of equipment in the pump building gives consideration to the installation of the pond aeration system and a fertigation and/or acid injection system. This injection system allows the application of fertilizer or wetting agents via the irrigation system. Acid injection may be required to lower the pH of the water.

Ponds require an aeration system to minimize algae bloom and to maintain water quality. A lake bottom aeration system is recommended. This system utilizes either aeration plates or tubing set on the pond bottom and compressed air is forced through the plates or tubing. The stored water is aerated by both the exposure to the bubbles and by the circulation of the water that is created as the bubbles rise to the surface of the pond. The mixing of the water created by the rising bubbles also eliminates stratification in the pond. The system is designed so the water in the pond is turned over four to six times per day.

Irrigation Approach

The approach to the irrigation system is similar to that used for the renovation of the irrigation system at Bay Pines National Cemetery. This approach and the products used are intended to minimize long term maintenance. The proposed approach is:

- HDPE mainline and submainline pipe
- Valve-in-head golf style rotary sprinkler for burial sections and large open areas
- Block style laterals using remote control valves, closed case rotary sprinklers or spray sprinklers and PVC piping for medium or small areas
- Bubblers for trees in non-irrigated areas
- Mainline components including isolation valves, quick coupling valves, flush valve and air-vacuum relief valves
- Flower water stations supplied from the irrigation system
- Climate based 2-wire control system using decoder technology
- Flow sensing to monitor burial sections

The overall goal is to provide an irrigation system that efficiently applies water; uses latest technology to design and manage; is cost effective to construct, operate and maintain; and meets the water conservation goals of LEED and other federally mandated directives.

Areas to be permanently irrigated include burial sections, columbarium, landscaped area around the PIC, administrative and maintenance buildings, cemetery entrance and the assembly area. To meet the 50% water use reduction mandate, areas to be temporarily irrigated for establishment of the landscape are edges of roadways, any areas disturbed by grading including the area between burial sections and tree plantings used for screening.

Mainline and Submainline Pipe

Mainline pipe is routed from the pumping system to irrigated areas by paralleling the back of the burial areas where possible. Where the mainline is installed adjacent to roads, it is placed on one side of the road and crosses under the road as needed to accommodate the irrigation system on the opposite side of the road. HDPE mainline pipe crossing under a road is direct bury and typically not installed in a pipe sleeve. Mainline installed along roads is typically located 4-feet back of curb to avoid conflicts with street trees or 10-feet back of uncurbed road edge to avoid conflicts with street trees and automobile traffic on valve boxes. Pipe stub-outs are installed for future connection to future phases. Mainline pipe will be installed at a depth of 24- to 30-inches depending on pipe size. Use of 4170 HDPE fusible pipe is anticipated.

The mainline pipe will be designed in a looped configuration to minimize pipe sizing. The mainline pipe will be sized using a computerized hydraulic model that allows the pipe to be optimized based on an assumed long term operating scenario that reflects the proposed water window.

Photograph 2.05-1 HDPE Pipe Installation at Bay Pines National Cemetery

Mainline Components

Mainline components include Isolation Gate Valve Assembly, Air Vacuum Relief Assembly, Flush Valve Assembly, Quick Coupling Valve Assembly and Flower Watering Stations.

The Isolation Gate Valve Assembly (IGV) allows sections of the mainline to be separated for maintenance purposes. The IGV is also used to terminate mainline pipe for phased construction. IGV are sized to match the mainline pipe size. They will be located at pipe junctions and at the halfway point of mainline loops in order to provide isolation of the irrigation mainline for maintenance with minimal disturbance to the rest of the site.

Photograph 2.05-2 Isolation Gate Valves on HDPE Pipe at Bay Pines National Cemetery

Air-Vacuum Relief Valve Assembly (AVR) allows air to exit and enter the system. AVRs are typically located at high points and at strategic locations along the mainline pipe. AVRs are typically sized 2-inch and are continuous acting so that any air that gets trapped in the mainline during day to day operation is released. They also allow air into the mainline in the event of a catastrophic break so that the mainline does not collapse on itself due to vacuum.

A Flush Valve Assembly allows the mainline to be properly flushed for either construction or maintenance purposes. These assemblies are strategically located so that the large quantities of water that are required for flushing of large diameter pipe do not damage or erode the site. These assemblies can also be used for draining the mainline in the case of a mainline break.

Quick Coupling Valve Assembly (QCV) provides the connection for the manual watering or other maintenance operations. QCVs have keys that are compatible with irrigation hoses and are typically sized 1-inch. Assuming 75 to 100-foot hoses are used for manual watering; QCVs are placed on 150-foot centers in the burial sections, columbarium, assembly area, administrative building and other selected areas where manual watering is required. QCV are rated for 200 PSI.

All the above assemblies are installed in a plastic valve boxes with the lids branded to identify the assembly. As much as possible, valve boxes are located between burial sections and not between the road and a burial section to avoid conflicts with visitors.

Flower watering stations are connected to the irrigation system. These stations allow visitors to fill flower vases with water. These stations will be per the DOVA standard and installed at locations as designated by the Landscape Architect.

Sprinklers

Valve-in-head (VIH) golf style sprinklers are used in the pre-placed crypt sections, traditional burial sections and the assembly areas. Each VIH sprinkler will be connected to a single station on the controller to allow for the greatest operational flexibility. VIH sprinklers are currently being used at Florida and Bay Pines National Cemeteries.

Photograph 2.05-3 VIH Sprinkler at Florida National Cemetery

A block style system, i.e., Remote Control Valve Assembly (RCV) with lateral piping and either closed case rotary or spray sprinklers are used in smaller irrigated areas such as landscaped area in the columbarium or around the PIC or Administrative Buildings. The RCV supplies water to multiple sprinklers via non-constant pressure PVC lateral piping. The RCV is connected to a single station on the irrigation controller.

Alignment of water alleys and the location of sprinklers in the burial sections are coordinated with the Cemetery Planner in an effort to minimize interference between the irrigation spray and upright monuments. Sprinklers are centered between two rows or four adjacent upright monuments thus allowing the greatest distance from the sprinkler to the monuments. Although the majority of the spray shoots over the upright monuments due to the trajectory of the spray out of the sprinkler, some spray hits the front or back of the closest monument.

Sprinkler spacing for the burial sections is selected to provide the most efficient water application. Computer software is used to select the most efficient pressure, sprinkler, nozzle combination. The efficiency metrics used for selection are the Distribution Uniformity (DU) and Scheduling Coefficient (SC). The higher the DU percentage, the greater the application efficiency. The closer the SC is to 1.0, the higher the application efficiency. An example analysis of selected VIH sprinklers is shown in Table 2.05-1. The analysis shows that DUs from 84% to 91% and SCs of 1.1 or 1.2 can be achieved. Spacing for VIH and rotary sprinklers will be selected to achieve a minimum DU of 80% and a SC of less than 1.2.

Spacing of sprinkler alleys in the burial sections will be coordinated with the Cemetery Planner.

Table 2.05-1: DU and SC Results for Selected VIH Sprinklers at 70 PSI

Manufacturer	Model	Nozzle	Spacing	DU	SC
Hunter	G-80	#25	63' x 61'	91%	1.1
Rain Bird	EAGLE 900	#18	66' x 61'	87%	1.1
Toro	834	#33	66' x 61'	84%	1.2

All VIH, rotary and spray sprinklers will have plastic bodies. Rotary sprinklers will be gear driven with stainless steel risers. Sprinklers will be mounted on prefabricated swing joints. To further improve efficiency, rotary and spray sprinklers will be zoned by part circle, full circle, hydrozones and exposure as much as possible.

RCV will be plastic valves rated at 200 PSI having flow control and pressure regulation capabilities. The RCV valves will be installed in a plastic valve box with the lid branded to identify the station and station number of the valve.

Lateral pipe between the remote control valve and sprinklers will be Class 200 PVC. Lateral pipe will not typically crossing beneath the roads except at the committal shelters. Burial depth will be 18-inches.

Bubblers are used to irrigate trees in areas that are temporarily irrigated areas.

Control System

A climate based, decoder style irrigation control system conforming to the Irrigation Association Smart Water Application Technologies testing is recommended for the Phase 1 construction. This type of system allows efficient management of the irrigation system and minimizes the amount of water applied. A decoder based system also allows for flexibility in future expansion phases as additional controllers may not be required. The controller(s) are mounted in plastic pedestals due to the proximity of salt water. Hand held radios are provided to operate the controllers remotely for troubleshooting and maintenance.

Controllers have the capability to connect to a central control system should one be implemented in a future expansion phase.

Each controller requires a 120 VAC power source. Low voltage wiring is routed from controller to the decoders at the VIH sprinklers and remote control valves and is sized either 14 or 12 AWG.

Photograph 2.05-4 Plastic Pedestal Controllers at Bay Pines National Cemetery

A rain sensor is connected to the controller(s) to automatically shut-down the system in case of a rain event.

Power and control wiring will be routed in the mainline pipe trench. If this wiring is not routed in the mainline pipe trench, it will be protected with warning tape 6-inches above the wiring. Power wiring is sized to meet NEC Codes.

Flow Sensing

Flow monitoring is required to meet the Executive Order 13514 and other federal mandates pertaining to conservation of water for irrigation. This flow sensor is located at and is an integral part of the irrigation pump station. It monitors total irrigation volume used for reporting purposed and high flow which could indicate a catastrophic mainline break. The pumping system report total accumulated use so that monthly or annual reporting is done manually, i.e., read by the maintenance staff and recorded in a separate document/location. If there is an energy management system incorporated into the buildings, potentially the flow reading could be recorded directly into that system.

Flow sensors on submainline pipe to burial sections are sized to monitor flow at the controller station level. It is anticipated that two VIH sprinklers are wired together on a single controller station. This produces a velocity that can accurately monitor operating conditions. Each phase will have flow zones requiring two or more sensors. The proposed scheme has the capability to detect leaks caused by a broken rotor or sprinkler heads. With the proposed approach, the 4 -inch flow sensor can detect flows down to 4.5 GPM.

Additionally, the flow sensors can monitor a flow as high as 300 GPM. The control system has the capability to “learn” the normal operating flow. When the flow exceeds the learned flow stored in the control system data base, the controller can shut down the station(s) currently operating and send an alarm indicating a high flow condition has occurred. An alarm can be sent to the cell phone of a designated maintenance person with the addition of a modem subscription.

Irrigation System Sustainable Practices

The design of the irrigation system is intended to comply with federally mandated sustainable design and water conservation practices. A description of practices implemented in this project is as follows:

Efficient Irrigation Design, Installation and Testing

The irrigation system is a combination of various types of sprinklers. Individual planting hydrozones were considered in the design of the irrigation system and the primary plant material types are irrigated on separate laterals. Computer modeling is used during the design process to determine and select a sprinkler pressure, nozzle and spacing combination to provide the most efficient application and uniformity. At the selected spacing, sprinklers will provide a theoretical scheduling coefficient of 1.2 or less and a theoretical distribution uniformity application efficiency of 80% or greater. All sprinklers are installed based on these criteria. Following installation of the irrigation system, a water audit is performed to determine if the installation meets the design criteria. If necessary, field adjustments are made to achieve the desired application efficiency. Actual application rate information from the water audit is also used in programming the control system so that the irrigation schedule is based on actual not theoretical application rate data.

Control System for Irrigation

A climate based irrigation control system is used to manage the overall operation of the irrigation system. Historic climatic data is programmed into the controller which in turn will automatically adjust the operation time based on data. A rain sensor automatically shuts down operation of the irrigation system in case of a rain event.

VFD Controls for Irrigation Pump Station

A centrifugal booster pump station is used to provide water to the irrigation system. The electrical controls for the pump system include variable frequency drive (VFD). The VFD regulates the speed of the electric motors for the pumps so that the pump system maintains constant pressure as the flow varies. VFD control provide for the most efficient operation of the pump system while conserving electrical energy.

Flow Sensors

A flow sensor is incorporated in the pump station. In addition to monitoring the operation of the pump station it can be used to monitor for high flow conditions which are an indication of a mainline pipe break. A high flow condition will initiate a shut-down of the pumping system. The flow sensor is also used to report irrigation water use.

In some recent projects for the VA, flow monitoring by burial section has been required. This is primarily on projects where a potable water source is used. If this level of flow monitoring is required for this project, it means that the central control system will need to be implemented starting in Phase 1. The flow sensors will monitor up to three burial sections

depending on the number of sprinklers per section. When the flow exceeds the learned flow stored in the central computer, a master valve for that section will shut down flow for those sprinklers and alarm will be indicated on the central control computer. An alarm can also be sent to the cell phone or pager of a designated maintenance person, with the addition of a modem subscription.

2.06 Landscaping

Flora

The proposed Cemetery site contains five upland communities, two "other surface water communities", and three wetland communities. These communities are all typical of the region. No protected or rare flora was observed during any of the site investigations. Please note that the Project Team has not currently received the formal wetland determination for this site. Therefore, the exact extent of on-site wetlands cannot be qualified at this time. Additional wetland communities may be present and wetland concerns will be addressed at a later date.

The vegetative communities within the project boundaries were defined by the *Florida Land Use, Cover and Forms Classification System* (FLUCFCS) handbook and are described as follows:

Upland Communities

1. Improved Pasture (FLUCFCS 211). The dominant community on-site, approximately 222.56 acres, can be classified as improved or semi-improved pastures. The area on-site is dominated by planted non-native or domesticated native forage species with scattered patches of native plant regeneration. This area displays evidence of recent pasture activity, specifically mowing. The dominant species is bahia grass (*Paspalum notatum*). Weedy native species common in the pastures include dog fennel (*Eupatorium capillifolium*), flatsedge (*Cyperus* spp.), carpetgrass (*Axonopus* spp.), blazing star (*Liatris* spp.), purpose love-grass (*Eragrostis spectabilis*), lantana (*Lantana* spp.), crabgrass (*Digitaria* spp.), rustweed (*Polypremum procumbens*), frog-fruit (*Lippia nodiflora*) and foxtail grass (*Setaria* spp.).

2. Woodland Pasture (FLUCFCS 213). The woodland pasture is located within the eastern portion of the property and encompasses approximately 36.91 acres. This area is used as pasture but its tree canopy remains. The predominate canopy species is live oak (*Quercus virginiana*) with scattered laurel oak (*Quercus laurifolia),* cabbage palm (*Sabal palmetto),* red cedar (*Juniperus virginiana*) and slash pine (*Pinus elliottii*). Understory vegetation includes American beautyberry (*Callicarpa americana*), Caesar-weed (*Urena lobata*), paw-paw (*Asimina reticulata*), tropical soda apple (*Solanum viarum*) and southern fox grape (*Vitis munsoniana*).

3. Pine Flatwoods (FLUCFCS 411). Along the eastern project boundary, a small strip of uplands, approximately 3.58 acres, can be characterized as pine flatwoods. This mesic flatwoods community is vegetated with a canopy of tall pines and a dense, low ground layer of shrubs, grasses and forbs. Slash pine is the principal canopy tree in this area. Characteristic shrubs include saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*) and fetterbush (*Lyonia*

lucida). Rhizomatous dwarf shrubs, usually less than two feet tall are common and include dwarf live oak (*Quercus minima*), runner oak (*Q. margaretta*), shiny blueberry (*Vaccinium myrsinites*), and dwarf huckleberry (*Gaylussacia dumosa*). The herbaceous layer is predominantly grasses, including wiregrass (*Aristida stricta* var. *beyrichiana*), dropseed (*Sporobolus curtissii, S. floridanus*), panicgrass (*Dichanthelium* spp.) and broomsedge (*Andropogon* spp.).

4. Live Oak (FLUCFCS 427). Located also in the eastern forested community, a live oak community exists that is approximately 9.63 acres. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. The canopy is dominated by live and laurel oak with varying amounts of cabbage palm, American elm (*Ulmus americana*), sweetbay (*Magnolia virginiana*), red cedar, red maple (*Acer rubrum*), sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), and water oak (*Q. nigra*). In addition to saplings of canopy species, the understory contained a number of small trees and shrubs. American hornbeam (*Carpinus caroliniana*) was observed as well as additional woody species including common persimmon (*Diospyros virginiana*), wax myrtle (*Myrica cerifera*) and American beautyberry. Common vines occurring in this community are poison ivy (*Toxicodendron radicans*), peppervine (*Ampelopsis arborea*), trumpet creeper (*Campsis radicans*), yellow jessamine (*Gelsemium sempervirens*), greenbriers (*Smilax* spp.) and grape vine (*Vitis* spp.). Herb cover includes mostly graminoids and ferns with the following species commonly encountered: sedges (*Carex* spp.) and woodoats (*Chasmanthium* spp.).

5. Hardwood Conifer Mixed (434). Along the northwestern project boundary and flanking the improved pasture in the western portion of the project boundary, an upland community exists that is characterized as hardwoods and conifers, where neither species dominates. Both areas together total approximately 14.46 acres. While species composition between the two varies, the community generally has a closed canopy of oaks, pines and palms with a thick understory of scattered saw palmetto, grape vine, greenbriar and blackberry (*Rubus* spp.). There is little groundcover. Minor canopy components include southern magnolia, water oak, and sand pine (*P. clausa*).

The proposed landscape improvements will strive to complement and enhance the existing natural beauty of the area, provide a sense of place, and utilize low maintenance plant materials and plant arrangements. Native trees will be used to provide visual relief, vegetative buffering, and an enhanced sense of scale. Trees will be arranged in naturalistic groupings rather than formal allees. Shrub beds will be minimized to areas of high use such as the Public Information Center, Committal Service Shelters, Columbaria and the Cortege lane area. Shrub beds, where utilized, will be integrated with the natural existing vegetation.

Lawn areas in cremains burial plots will be planted with "Celebration Bermuda" *Cynodon Dactylon* sod, which is the preferred sod as indicated by the MSN 2 agronomist. Back of house or maintenance areas and areas not visible to visitors and guests may be sodded with Argentine Bahia.

A partial list of proposed trees include: Live Oak (*Quercus Virginiana),* Red Maple *(Acer Rubrum),* Southern Magnolia *(Magnolia Grandiflora),* Holly *(Yaupon Holly),* Crape Myrtle

(Lagerstroemia Spp.), Cabbage Palm *(Sabal Palmetto),* and Southern Red Cedar *(Juniperus Silicicola).*

A partial list of proposed shrubs include: African Iris (Dietes Vegeta), Gulf Muhly Grass (*Muhlenbergia Capillaris*), Walters' Viburnum (*Viburnum Obovatum*), Sweet Viburnum (*Viburnum Odoratissima*), Wax Myrtle (*Myrica Cerifera*), Saw Palmetto (*Serenoa Repens*), and Parson's Juniper (*Juniperus Chinensis 'Parsonii').*

All plant material will be specified as "Florida No. 1" Grade or better. Mulch will be specified as Pine Bark mini nugget bark 2"-3" thick or Pine Bark needle mulch 4"-6" thick.

2.07 Asphalt Pavement

In concert with the geotechnical engineer's recommendation, a flexible pavement system consisting of an asphalt layer overlaying a limerock base and compacted subgrade will be used for the roadway and parking sections. A rigid concrete section will be utilized behind the maintenance facility.

2.08 Special Pavement

Pre-cast concrete pavers and/or heavy exposed colored concrete aggregate pavement may be proposed as vehicular pavement at the main cemetery visitor entrance. Precast concrete pavers to have a minimum 10,000 psi design compressive strength.

2.09 Storm Sewer System

Storm drainage inlets integral with the roadway curb and gutter shall collect the surface drainage where it will then be piped via reinforced concrete pipe to the stormwater management lakes where the water levels shall be maintained by control structures. The ultimate outfall is at the southeast corner of the site. The stormwater management system shall be permitted through St. Johns River Water Management District.

2.10 Potable Water

Potable water for the PIC/Admin and Public Restroom Building & Maintenance Building facility will be obtained from a proposed on-site well at treatment plant.

Existing Water Service
The public utility that serves Brevard County is the Brevard County Utility Services. The project is located in the Scottsmoor area of Brevard County and Scottsmoor is located outside of the Brevard County Utility Services, service area, i.e. no public water system.

Proposed Improvements
One option is available for potable water service:

Well and package water treatment plant. This option does have an operation and maintenance cost (approx. $30,000/year) but is the only option available for water service. In Brevard County, all wells less than 6" in diameter must obtain a permit through Brevard

County and comply with Chapter 46, Article II, Brevard County Code of Ordinances, Chapter 40C-3, Florida Administrative Code (FAC) and Chapter 62-532, FAC. All wells 6" diameter or larger are permitted through the St. Johns River Water Management District.

2.11 Sanitary Sewer System

The on-site sanitary sewer disposal and treatment system will be on-site septic tank(s). The final design of the septic tanks will be designed and permitted with the assistance of the Geotechnical Engineer. Careful attention will be paid to the sizing and location of the system to improve on the reliability and the frequency of maintenance required of the septic systems. The drain fields and septic tanks will be designed to not only meet the State of Florida unobstructed area calculations, but will be conservatively oversized to meet the peak demand periods of cemetery visitors.

Section 3.00

3.01 Concrete Sidewalks

The proposed concrete walks will be specified with a minimum depth of 4" thick. They shall be non-colored natural grey Portland cement. This finish consists of a simple broom finish with a 4" smooth trowelled picture frame edge.

The minimum compressive strength shall be specified at 3000 PSI. The walks shall be poured over a compacted subgrade to a 95% modified proctor.

3.02 Concrete Control Markers

Concrete control markers will be used in all burial areas. The control markers will be poured in place concrete into a PVC pipe and a metal marker with incised crosshairs. The control markers will be placed in a 66' by 64' grid pattern within in-ground cremain burial sections, 66' by 68'-3" grid pattern within Pre-Placed Crypt burial sections, and 64' by 70' grid pattern within traditional standard casket burial sections. Concrete control markers will be placed along a bearing particular to that burial section.

3.03 Precast Concrete Crypts

All double depth crypts shall be manufactured by a company with a minimum of three years of like experience and who has a Florida licensed Professional Engineer on staff. These crypts will be precast concrete; one-piece box with separate outer lid with a removable one-piece inside shelf to the dimensions specified by DOVA. Crypts shall be capable of structurally withstanding passage of a wheel axle load of 12,000 lbs after burial, and a center point load of 6,000 lbs.

Section 4.00

4.01 Marble Niche Covers

In an effort to coordinate with the typical marble upright grave markers, marble niche covers will be used at the Columbaria. The covers will be 11-1/4" wide X 15-3/4" high X 3/4" thick, per DOVA Specifications. Similarly, the Memorial Wall covers will also be marble, although they will be cut to half the size of the niche cover plates (11-1/4" wide X 7-7/8" high X 3/4" thick).

The marble niche covers will be specified by the design team based on the standard specifications provided by DOVA, and are intended to be mined and supplied by sources located in the United States. All necessary information regarding size, configuration and quantity will be specified for bidding by the contractor.

Both the columbarium niche covers and the memorial wall covers are to be attached to their respective walls with the use of the standard DOVA rosette screw assembly.

Section 5.00

5.01 Site Furnishings

Site furnishings will include flower watering stations, benches, and trash receptacles. Flower watering stations consist of a trash receptacle, a flower vase container receptacle, and a water spigot. The *Victor Stanley, Inc.* receptacles and *Murdock* water spigot are consistent with the DOVA standard design. The trash receptacle and flower vase container will be a slatted steel style. The water spigot plumbing equipment will be encased in metal housing with an attached faucet. The spigot features an automatic shut off valve and an ADA compliant and self-closing handle. Signage will be integral with the flower vase container outlining the floral regulations. Signage will also be attached to the water spigot safe guarding against people drinking the non-potable water. The placement of the flower watering stations shall accommodate a minimum of two burial sections per flower watering station and one flower watering station per columbarium complex. The design intent for the placement of the flower watering station is a median between the need for minimal walking distance for the visitor and limiting the number of flower watering stations for the Cemetery. The location of flower watering stations shall not distract from the visual appearance of each burial section.

Benches shall be floor mounted backless metal benches with metal arms and support and metal strap seating. Benches shall be as manufactured by Sitescapes Cityview model no. CV1-2100 or as approved by DOVA.

Trash Receptacles and flower vase receptacles shall be as manufactured by Victor Stanley, Inc. model no. S-42A and S-424.

Color of all site furnishings shall be bronze. Color to be approved and coordinated with DOVA and or Resident Engineer.

5.02 Site Signage

Exterior site signage shall conform to Sections 1 and 2 of the “Exterior Sign” guidelines published by the Department of Veterans Affairs. The main site project signage will be located along US1 and be constructed of Architectural Finished CMU with cast stone caps and painted aluminum lettering. Site signage shall consist of way finding signs, place name signs, informational, and regulatory signage. Signage will be provided within the project areas identifying all of the design elements as well as providing direction and traffic control. Site signs shall be non-illuminated post and panel constructed of extruded aluminum painted in an accent color to be determined by the VA. All sign information will be boldly displayed and concisely worded, as to offer visitors clear and simple information and orientation. Signage shall conform to standard VA specification section 101400.

5.03 Columbarium

The Columbarium Plazas will be designed to incorporate repetitive forms, will use materials similar in nature to the architecture and other site elements, and will include landscape features to mitigate climatic conditions. The key issues to consider for both the plaza layout and the vertical wall design are pedestrian circulation, wayfinding, and visitor safety.

The Plaza will be a stand alone site feature formed in concrete. The initial goal will be for the entire plaza to fall on one level. In the event that site grading dictates multiple levels, the connection to each level will incorporate ramps, and steps if necessary. To manage water flow across the plaza, each columbarium wall will incorporate an underdrain system in the flower strip located at the base of each wall.

The columbarium walls will consist of the typical DOVA precast concrete niche bank with the standard 10-1/2" wide X 15" high X 20" deep size. Each niche bank will be formed using a consistent/repetitive pattern that may be anywhere from three to five niche units high. The length of the walls may vary, but will be based on a consistent multiple (i.e. banks of niches five, ten or fifteen long). The ends of the walls will be flanked with an architectural type pilaster, in a material that complements the architecture and site elements. Each niche bank will then be capped with a hard surface material (precast concrete or stone) that will provide an overhang with a drip edge to minimize the intrusion of water into the niches.

An addressing system for the plaza area (niche banks and individual niche units) will be presented for review by the VA. This addressing system will be outlined on a graphic sign that will be located at each plaza area.

Section 6.00 Architecture

6.01 Architectural Design Criteria

Applicable codes:
Florida Building Code; 2010 Edition

PIC/Administration Building

The architectural intent for the Central East Florida National Cemetery (CEFNC) combined Public Information Center & Administration Building is to create a place that gives an impression of permanence, is integrated with the site, and utilizes the regional vernacular. To achieve these ideas, the combined PIC/Administration building is situated near U.S. 1 so that it is highly visible to visitors to the site. The architectural vernacular is an interpretation of the American front porch which is a notion that is a uniquely American idea intertwined with the architecture of the region and climate.

We have interpreted the front porch into a place that not only provides place for gathering and orientation within the landscape, but it is intertwined with the solemn significance of a place which honors Americans and their sacrifices for our country. We create an architecture that reflects permanence and stature woven within a place for memory and reverence.

Programmatically, the "front porch" is oriented to be viewed as a destination by visitors. The porch area will contain a design/art feature and house the gravesite locator, access to public restrooms as well as the lobby and administrative components. The porch also gives the visitor a place for viewing the landscape to help orientation within the site. The public lobby is adjacent to the public restrooms and contains a designated reception desk as well as counter access to the cemetery reps in the event the reception desk is not occupied. The private administration areas are organized efficiently along a corridor. The multi-purpose room is adjacent to the lobby. The general office, director's office and operations are co-located near the center of the building, with private staff facilities and service rooms near the back of the building with access to the staff parking and private staff entry.

The building is to be constructed of CMU walls with a limestone veneer (or similar), open web steel joists and standing seam single slope metal roof. Interior walls will be painted gypsum with appropriate acoustic control as needed. The exterior columns will also be CMU and limestone veneer with metal panel details that will complement the metal store front system along portions of the exterior. Glass use will be focused in the general office and director's office for views of the cortege lanes, as well as in public lobby spaces, and staff break rooms. Other spaces will have clerestory windows to maintain privacy while bringing in natural light. The exterior soffits and public lobby ceiling will use an engineered wood composite to provide a warm natural environment and bridge the exterior to the interior.

All material use will focus on durability, ease of maintenance and local materials when applicable.

The PIC/Administration building will have fire suppression in the data and I.T. rooms. The remainder of the building will have fire/smoke detection and smoke alarm systems.

CEFNC PIC-ADMINISTRATION AREAS 934PC2002

MP-3

Space	Program	Actual Net
PIC		
Lobby/Display	300	300
Receptionist	73.5	64
Information		
Covered/Open	75	75
Gravesite Locator	25	41
Public Restrooms		
Men	*152*	177
Women	*130*	168
Unisex (assisted)	*64*	64
H.A.C.	*0*	0
PIC Net Totals	819.5	889
Administration		
Lobby	*200*	200
Reception	*73.5*	64
Multipurpose Room	330	320
Director	200	260
General Office		
Assistant Director	0	0
Program Assistant	192	188
Contracting	96	96
Cemetery Rep	148	148
Admin Staff	74	74
Operational Center	420	427
Storage	2	4
Lunch Room	250	202
Mechanical Room	50	94
General Storage	50	101
Toilet (Staff &Visitors)		
Male	54	43
Female	54	62
H.A.C.	40	34
Lockers	12	18
IT Data-Elec	100	114
	Program	***Actual***
Administration Total Net SF	2345.5	2449
PIC Total (from above)	819.5	
Total Gross SF (PIC/Admin Net x 1.5)	**4747.5**	
Actual Building Gross SQ. FT.		**5097**

Maintenance Facility

The maintenance facility located to the western edge of the Phase I site will be a free-standing 8" or 12" CMU structure with stucco. The roof is to be a low slope roof over open web steel joints. The facility will be the primary operations center for grounds and vehicle maintenance, containing a 39,000sf maintenance yard, and three service bays with work areas and equipment storage within the building. The building will also house a staff lunch room, adjacent restroom and locker room areas, as well as office and work spaces for a foreman and caretakers.

The maintenance facility will also contain space for the use of honor guard members to gather and prepare for burials. The honor guard suite contains an open gathering area, two restroom/changing rooms, kitchenette, and access to an outdoor porch area.

The Maintenance building will have fire suppression in the data and I.T. rooms. The remainder of the building will have fire/smoke detection and smoke alarm systems.

CEFNC MAINTENANCE FACILITY AREAS

MP3/SD1

Space	Program	Actual Net
Maintenance Office		
Foreman	190	193
HR & Link	74	75
Lunch Room/ Lounge	790	543
Mens Locker Room	*378*	388
Womens Locker Room	*109*	187
Honor Guard Room	*418*	432
Boot Holding	*32*	48
Boot Wash	*30*	30
COTR Office	*0*	142
Parts & Tool Storage		
Parts and Tools Storage	200	217
Vehicle and Equipment Storage	450	450
Wash Bay	420	420
Vehicle & Equipment Storage (enclosed)	2328	2464
Work Area	100	100
Total Net SF	5519	5684
Total Gross SF (Net x 1.5)	**8279**	
Actual Building Gross SQ. FT.		**7406**

CEFNC MAINTENANCE YARD AREAS

MP3/SD1

Space	Program	Actual Net
Fuel Island	1000	1000
Storage - Headstones	360	360
Storage - bins	1296	1296
Vehicles & Equipment	1440	1440
Total Net SF	**4096**	
Actual Building Gross SQ. FT.		**38,945** *Entire maint. yard with circulation.*

	Program	Actual
Employee Parking - Outside Service Yard	10	12
Vendor/Volunteer/Visitor	5	7
Cemetery Sedans	5	5
	20	24

Committal Service Shelters

The two Phase I Committal Service Shelters are designed to complement the PIC/Administration building design with the engineered composite wood ceiling and limestone clad CMU columns. The roof is a steel structure with standing seam metal roofing. The shelter is simple in its design to leave exterior space for overflow attendance. The shelter will also contain a storage component whose exterior wall creates the backdrop to the bier and for the officiate of the ceremony. The Committal Service Shelters will have ceiling fans and convenience outlets. No fire protection will be provided at the committal service shelters.

Irrigation Pump House

The irrigation pump house is a structure near the maintenance facility. The building will contain two rooms divided by a CMU wall. One room will contain the pump equipment for the site irrigation and the second space will house the water treatment equipment. The building will be a stucco over CMU structure, and a single slope roof with standing seam metal. A small clerestory window will be included in the front wall to bring in natural light. No fire protection will be provided at the pump house.

6.02 Structural Design Criteria

Applicable Codes

Florida Building Code	2010 Edition
ASCE 7-10	Minimum Design Loads for Buildings and Other Structures

VA Physical Security Design Manual – Life Safety Protected Facilities, January 31, 2012

Design Load Requirements

Live Loads:	Roof: 20 psf
Design Wind Speed:	141 mph in accordance with ASCE 7-10 Risk Category II Exposure C
Foundations:	Conventional wall and spread footings are anticipated based on the preliminary geotechnical report. Verification is pending receipt of the final geotechnical report.

PIC-Administration Building

The Administration building will be a CMU building with a low-sloped roof of mixed structural steel and pre-engineered joists. The structural steel will facilitate large overhangs at one side and over the entry plaza. Rectangular concrete columns will support the roof framing over the plaza. In addition to the exterior, certain interior walls will be CMU to provide shear resistance to wind loading and to help isolate sound. The building will be approximately 88’x 42’, with a covered plaza approximately 34’ x 30’.

Committal Service Shelters

The Committal Service Shelter(s) will be free-standing open building(s) with a monoslope steel framed roof. The steel framing will be supported by cast-in-place concrete columns, which will also provide lateral stability. The shelter will cover an area of approximately 32’ x 48’. Small storage areas of CMU will be provided.

Maintenance Facility

The Satellite Maintenance Facility will be a CMU building with a low-slope roof of formed metal deck over pre-engineered steel joists. The building will be approximately 42’ x 88’, with about half being vehicle and equipment storage and maintenance. Large bay doors will provide access to the storage and maintenance areas. The CMU walls will likely be 12” wide at the exterior, or 8” wide with integral concrete tie columns, to resist anticipated wind loading. Interior partition walls will be 8” CMU.

Pump House Building

The pump house buildings will be utilitarian CMU buildings with monoslope roof likely constructed of pre-engineered steel joists with metal roof deck. The dimensions are approximately 20’ x 16’.

Section 7.00 MEP / FP Design Criteria

7.01 Plumbing Design Criteria

The plumbing system shall include all sanitary waste and vent piping and potable hot and cold water piping within five feet of the exterior wall of the proposed Maintenance Building and Public Information Center (PIC) Administration Building. The plumbing systems shall also include all water heating equipment, plumbing fixtures, valves and all other accessories required for a fully operable Plumbing system.

Applicable Codes
2010 Florida Building Code
2010 Florida Plumbing Code
2010 Florida Energy Efficiency Code (Chapter 13)
2010 Florida Accessibility Code
Americans with Disability Act (Latest Edition)

Plumbing Systems General

Piping

A. All above ground domestic cold water, hot water, tempered water and hot water return piping shall be type L copper. All below ground domestic cold water, hot water, and hot water return piping shall be type K copper.
B. All soil, waste and vent piping above and below ground shall be Schedule 40 PVC with solvent welded Drainage Waster & Vent (DWV) fittings.
C. All water and sanitary waste and vent piping shall be sized in accordance with the 2010 Florida Plumbing Code.
D. Water supply piping shall be sized at a maximum velocity of 8 feet per second.
E. All piping shall be concealed and properly supported with allowances for expansion and contraction. Interior water distribution piping shall not be installed under concrete floors except at the service entrance. All piping systems shall be drainable.
F. Interior hot water and tempered water piping systems shall be insulated with closed cell foam insulation.
G. Water piping systems shall not be routed or located where subjected to freezing, and shall be located within the insulated building envelope.
H. Isolation shut-off valves shall be provided on branches serving common areas with two or more fixtures.
I. Individual shutoff or stop valves shall be provided on the water supply lines to all plumbing fixtures.
J. The incoming water service to each building shall have a shut off valve located in a valve box in the ground outside of the building.
K. Water hammer/shock arresters shall be provided throughout the system in accordance with the best engineering practices to limit water hammer in the water distribution system.

Water Heaters

Water heating for the Maintenance Building and Public Information Center Building shall be provided by electric resistance storage type water heater(s). A roof or ground mounted solar water heating panel shall be installed to provide hot water to each of these buildings. Tempered water shall be provided to all lavatories, utility sinks, service sinks, breakroom sinks and showers. Water shall be stored at 140°F and delivered to service/mop sinks at 140 degrees F. Hot water shall be delivered through a tempering/mixing valve to all other plumbing fixtures at 110°F. Water heaters shall be sized in accordance with ASHRAE 90A-1980.

Plumbing Fixtures

All plumbing fixtures shall be of commercial grade and white in color for all non-stainless steel fixtures. All handicap accessible fixtures shall comply with the Americans with Disabilities Act (ADA) and with CABO A117.1 and the 2010 Florida Accessibility Code. Fixtures shall be water conservation type, in accordance with the International Plumbing Code. All faucets shall have solid brass bodies, ceramic valving, and chrome plated trim. All lavatory faucets shall have a .5gpm flow restrictor. Plumbing fixtures shall include:

A. Water closets shall be floor mounted, floor outlet white vitreous china with infrared, hard wired flush valve flushing mechanisms and elongated bowls. Water closets will include heavy duty seat. Water closets shall be low water consumption (1.28 GPF).
B. Urinals shall be white vitreous china floor mounted units with infrared, hard wired flush valve flushing mechanisms. Urinals shall be low water consumption (1/8 GPF).
C. Flush valves and lavatory faucets shall be automatic infrared sensor operated (battery or hardwired).
D. Lavatories shall be countertop mounted or wall mounted type and shall be made of white vitreous china. Lavatories will include infrared, hard wired faucets, wheel handle supplies, grid drains, and cast brass p-traps. Handicap accessible lavatories shall have insulation kit on drain, trap and supplies. Lavatories shall be low flow water consumption - .5 GPM.
E. Service sinks/mop sinks shall be molded stone type with wall mounted brass faucet and hose, vacuum breaker, and stainless steel rim guards.
F. Utility sinks shall be enameled cast iron, wall hung units with wall mounted faucet and hose, vacuum breaker and a trap standard.
G. Break room sinks shall be ADA accessible, stainless steel, single or double bowl, countertop type with single lever faucet. Break room sink shall include wheel handle supplies, removable crumb cup strainer, and cast brass p-traps.
H. Electric water coolers shall be provided at public restrooms and shall be stainless steel with integral compressor. All electric water coolers will be surface mounted hi low, wall hung, handicap accessible with front and side push bars and a stainless steel finish.
I. Hose Bibs shall be provided on the building exterior. All hose bibs and wall hydrants shall be ¾" and shall be loose key operated and shall have a vacuum breaker.
J. Floor drains shall be provided in all toilet rooms and locker rooms. Floor drains shall also be provided in all mechanical rooms for receiving condensate discharge from air handling equipment. All floor drains shall be a minimum of 3 inches in diameter. Floor drains in toilet rooms shall have heelproof nickel bronze strainers. Floor drains in

mechanical rooms shall have a cast iron strainer. All floor drains shall be provided with a trap primer.

K. A double check backflow preventer shall be provided at the service entrance of the domestic water system to each building. The domestic water backflow preventer shall be located outside of the building. Water source shall be well water.

Plumbing Systems Public Information Center/Administration Building

The Public Information Center/Administration Building shall be served by numerous water closets and lavatories along with some urinals in the men's room. The building will have a mop sink located in a Janitor's Closet. Hot water shall be furnished by a 50 gallon electric water heater located in the Janitor's Closet. Hot water shall be supplied to the mop sink and tempered water shall be supplied to all lavatories and counter sinks in the building. A dual height ADA accessible Electric Water Cooler shall be located near the Public Restrooms. The Lunch Room will have a stainless steel counter mounted sink with tempered water. The building will have (3) exterior hose bibs.

Gas will be provided to the Emergency Generator serving this building by an underground 500 gallon to 1000 gallon LP Gas storage tank located adjacent to the building. The LP gas will be provided by a local gas provider (Suburban Propane or other) which will be contracted by the owner.

Plumbing Systems Maintenance Building

The Maintenance Building shall be served by numerous water closets and lavatories along with some showers in the Locker Rooms. The building will have a mop sink located in a Janitor's Closet. Hot water shall be furnished by an 80 gallon electric water heater located in the Janitor's Closet. This water heater shall be supplemented by a roof mounted solar water heating panel. Hot water shall be supplied to the mop sink and tempered water shall be supplied to all showers, lavatories and counter sinks in the building. A dual height ADA accessible Electric Water Cooler shall be located in the Vehicle & Equipment Storage Room. The Lunch Room will have a stainless steel counter mounted sink with tempered water. The building will have (5) exterior hose bibs and two additional hose bibs located in the Vehicle & Equipment Storage Room. The Honor Guard area will have two individual restrooms/ changing rooms –each with a water closet and a lavatory.

Gas will be provided to the Emergency Generator serving this building by an underground 500 gallon to 1000 gallon LP Gas storage tank located adjacent to the building. The LP gas will be provided by a local gas provider (Suburban Propane or other) which will be contracted by the owner.

Plumbing Systems Irrigation Pump House

The Irrigation Pump House shall be served by a wall mounted hose bib for general purpose wash down.

Plumbing Systems Committal Shelters

The Committal Shelters shall be served by a wall mounted hose bib for general purpose wash down.

7.02 Fire Protection/Fire Suppression Design Criteria

Applicable Codes
2010 Florida Fire Prevention Code
NFPA 13, Standard for the Installation of Fire Sprinklers
National Fire Code (NFC)

Fire Protection Systems
Public Information Center/Administration Building & Maintenance Building

There is no state or local code requirement for fire sprinklers in the PIC/Administration Building or the Maintenance Building, FBC 2010. The design intent is to provide an appropriate fire suppression system consisting of a dry chemical extinguishing system FM 200 or equivalent) for the Data/I.T. rooms. The remainder of the spaces will not have fire sprinklers; however all spaces will have fire detection, including smoke detectors and fire alarm devices.

7.03 HVAC Design Criteria

Applicable Codes
2010 Florida Mechanical Code
2010 Florida Energy Efficiency Code (Chapter 13)
2010 Florida Fire Prevention Code
American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Manuals
NFPA 90A, Installation of Air Conditioning and Ventilating Systems
National Fire Code (NFC)
ASHRAE Standard 62-2001, Ventilation for Acceptable Indoor Air Quality
SMACNA Standards

HVAC Design Conditions

A. Outdoor Conditions:
    1. Heating Season: 38 deg. F Dry Bulb
    2. Cooling Season: 94 deg. F Dry Bulb. 78 deg. F Wet Bulb
    3. Air Cooled Chiller Condition: 94 deg. F Dry Bulb
B. Indoor Conditions:
    1. Occupied Air Conditioned Spaces: 75 degrees F, 50-60 percent RH. Winter: 70 degrees F.

Ventilation Requirements

ASHRAE 62, 2001 for actual occupancy.

Thermal Characteristics

A. Masonry Wall = 0.18 BTUH/sq. ft. – degree F
B. Masonry Wall w/ Gypboard = 0.13 BTUH/sq. ft. – degree F
C. Roof/Ceiling = 0.05 BTUH/sq. ft. – degree F/minimum R-19 Insulation

HVAC Systems- General

All diffusers, registers, and grilles shall be white and shall be constructed of aluminum. Diffusers, registers and grilles shall not have balancing dampers. Balancing shall be accomplished at the main duct take offs.

Inline and ceiling mounted exhaust fans shall be direct drive with variable speed controllers and centrifugal blowers. Exhaust fans shall be furnished with wall cap. Roof penetrations shall not be utilized.

Split system DX air handlers shall have electric heat, removable filters, variable speed blower motors, programmable thermostat with humidity sensor and shall utilize R-410A refrigerant.

Split system Air Handling Units shall utilize variable speed centrifugal blowers which shall vary the speed of the air handling units to match the cooling load of the space. Minimum efficiency of these systems shall be 15.0 SEER.

Split system DX condensing units shall be air cooled, pad mounted and shall utilize R-410A refrigerant. All pad mounted condensing units shall be fastened to the concrete pad to meet FBC wind load ratings.

Condensing units shall utilize digital variable speed scroll compressors which shall vary the speed of the compressor to match the cooling load of the space. These systems shall utilize R-410A refrigerant, minimum 18 gauge construction with a 16 gauge sound attenuating base, stainless steel hardware, vinyl coated fan guards, accumulator, filter drier, high pressure safety control, anti short cycle timer, scroll compressor, and aluminum tube coils. Minimum efficiency of these systems shall be 15.0 SEER.

All outside air wall louvers shall be constructed of aluminum, shall be drainable and shall have insect screens. All wall louvers shall be rated for wind loads as per FBC zones.

All supply air, outside, and return air duct systems will be constructed of galvanized sheet steel ductwork sealed with mastic and wrapped with 2” thick, R-6 fiberglass insulation. R-6 insulation shall be secured with fiberglass fabric, stainless steel staples and shall be sealed with mastic.

All exhaust air ductwork systems will be constructed of galvanized steel or aluminum ductwork welded watertight. Galvanized steel ductwork shall be sealed with mastic.

All ductwork shall be suspended from the building structure utilizing 2" wide galvanized steel straps in accordance with the latest edition of SMACNA.

In general, exhaust air discharges and outside air intakes shall not penetrate the roofs of the buildings but rather shall penetrate the walls of these buildings.

HVAC Systems Public Information Center/Administration Building

The Public Information Center/Admin Building shall be served by a total of (4) four DX high efficiency, R-410A split system air conditioners. Three of the air handling units shall be vertical discharge and shall be located in the mechanical room at the rear of the building. The fourth air handling unit shall be a cartridge type unit and shall be wall mounted in the Secure I.T. room. The condensing units shall be air cooled, pad mounted and shall be located adjacent to the building. Condensing units shall be located as close as possible to the air handling units to minimize the length of run of the refrigerant lines. The minimum efficiency of the air conditioning systems shall be 15.0 SEER with an efficiency goal of 16.0 SEER.

HVAC Systems Maintenance Building

The majority of the Maintenance Building consisting of the lunch room, waiting area, locker rooms, restrooms, and offices shall be served by (3) three dedicated 3.0 ton – 5.0 ton split system air conditioners with the air handlers located in the mechanical room and the condensing units located next to the mechanical room. The three air handling units shall be vertical discharge and shall be located in the mechanical room at the rear of the building.

The Honor Guard Office and restrooms shall be served by a dedicated 1.5 -2.0 ton split system air conditioner with an air handler located in the mechanical room and a condensing unit located next to the mechanical room. The Honor Guard restroom shall be exhausted by an inline, ceiling mounted centrifugal exhaust fan. This fan shall discharge to a wall cap or wall block vent. This exhaust fan shall be interlocked to run with the air handling unit serving the Honor Guard Offices.

The Vehicle and Equipment Storage Room shall not be air conditioned and shall be ventilated by (4) four wall mounted exhaust fans and shall be ventilated at a rate of 10-15 air changes per hour. Ventilation air shall be introduced into the Vehicle and Equipment Storage Room by (4) four wall mounted aluminum wall louvers located on the front of the building adjacent to the overhead doors. The Parts & Tools Storage Room shall be ventilated by an inline centrifugal exhaust fan discharging to a wall cap. Air shall be brought into the Parts & Tools Storage Room through the Vehicle & Equipment room. The unisex restroom shall be air conditioned with supply air from the air conditioner serving the office area. The restrooms and locker rooms shall be ventilated by an inline, centrifugal exhaust fan that is served by numerous exhaust registers located within the restrooms and locker rooms. This fan shall discharge to a wall cap or block vent.

HVAC Systems Irrigation Pump House

The irrigation Pump House shall be ventilated by a wall mounted propeller exhaust fan which shall discharge to a wall louver. The pump house shall be ventilated at a rate of 10 – 20 air

changes per hour. This fan shall be controlled by a manual wall mounted switch and shall run 24 hours a day, 7 days a week. Ventilation air shall be introduced into the pump house by two fully louvered doors located on the opposite side of the pump room from the exhaust fan in order to wash the pumps with ventilation air and remove heat generated by the pump motors.

HVAC Systems Committal Shelters
The Committal Shelters will not have any HVAC systems.

7.04 Site Electrical Distribution Design Criteria

7.04.01 Electrical Design Criteria

A complete electrical design will be provided in accordance with the standards in the following editions of the listed codes, ordinances, laws and regulations applicable to the place of work.

Applicable Codes

IEEE-C2	National Electrical Safety Code
ANSI/EIA/TIA-568	Commercial Building Telecommunications Cabling Standard
ANSI/EIA/TIA-569	Commercial Building Standard for Telecommunications Pathways and Spaces
ANSI/EIA/TIA-606	Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
NFPA 70	National Electrical Code 2008
NFPA 72	National Fire Alarm Code 2002
NFPA 101	Life Safety Code 2003
NFPA 110	Standard for Emergency and Standby Power Systems, 2002 Edition.
NFPA 780	Standard for the Installation of Lightning Protection Systems
LPI-175	Lightning Protection Institute Standard of Practice

2010 Florida Building Code
Electric Utility Company Service Standards
IES Lighting Handbook
NECA Standard of Installation
Underwriters' Laboratories Standards
Department of Veterans Affairs Standards

7.04.02 Internal Electrical System Design Criteria

Power and Lighting

A. The interior electrical system for the PIC/Administration Building, the Maintenance Building and the Committal Shelters will be 120/240 volts, 1ph, 3 wire connected to the existing power grid.
B. The interior electrical system for the Pump House will be 480 volts, 3ph for power to the irrigation pumps with a step-down transformer to provide 120 volts for lighting and receptacles.

C. The lighting fixtures used in the PIC/Administration Building and the Maintenance Building will be predominantly fluorescent fixtures with type T8 lamps and electronic ballasts. Compact fluorescent down lights will be used in certain areas. The lighting levels for normal condition will be as recommended by the IES Lighting Handbook and the emergency egress lighting will be as required by the Life Safety Code NFPA 101. Interior and exterior lighting control systems will be provided. Occupancy sensors will be provided where practical to shut off interior lights automatically when not needed.

D. The distribution panels will be located in the electrical rooms. Panels and disconnects will be rated NEMA 1 for indoor and NEMA 3R for outdoor use. All panels will be sized for 20 percent spare capacity. Each electrical room will be coordinated to ensure proper working space and clearance for all panelboards and equipment.

E. Voltage drop calculations will be performed as part of the design to ensure that no more than 2 percent voltage drop occurs in the main feeders and 3 percent voltage drop in the branch circuits.

E. The raceway systems used in the buildings differ with respect to where they are installed:

1. Service entrance conductors and underground communications pathways – Schedule 40 PVC buried 36" below grade.
2. Panelboard feeders – Electrical Metallic Tubing where run concealed and above grade. Rigid Galvanized Steel where run exposed and above grade.
3. Low voltage cabling systems - Electrical Metallic Tubing where run concealed and above grade. Rigid Galvanized Steel where run exposed and above grade.

Emergency Power System

Emergency generators will be provided for the PIC/Administration Building and the Maintenance Building with the capability to provide emergency power for the full load of each building for a minimum duration of 72 hours.

Grounding and Lightning Protection

A lightning protection system will be provided for all proposed buildings in accordance with NFPA 780 and LPI-175 Lightning Protection Institute Standard of Practice.

The grounding system for all proposed buildings will consist of the following:

- Ground ring for connection to lightning protection system down conductors.
- Ground rods for connection to service entrance equipment.
- Bond to building steel, water service and other piping systems as required by code.
- Lightning protection ground interconnection to electric, telephone and other building ground systems as required by codes.
- Equipment grounding conductor in each branch and feeder circuit.
- Ground bus for telecommunications equipment connected to electric service entrance ground.

7.04.03 Systems Design Criteria

Fire Alarm Detection and Monitoring System

The system shall meet the requirements of the National Fire Alarm Code, NFPA 72, as adopted in the Florida Fire Prevention Code and the Florida Building Code, 2010 Edition. All necessary tests and inspections shall be included in the contract documents.
The system will also be designed to the current Florida Accessibility Code for Building Construction and the Life Safety Code requirements.

Intrusion Detection / Access Control System

The facility will be provided with a logical and coordinated physical security system comprised of Intrusion Detection and CCTV components as necessary to meet the project requirements.

Voice / Data Cable Infrastructure

The facility will be provided with a complete Voice and Data T1 distribution system comprised of telephone terminal boards, Owner approved outlets, interconnecting cables and all other components as necessary to meet the project requirements.