



ENVISIONING TYNDALL

TYNDALL AIR FORCE BASE

JANUARY 2019

A destructive event can impact mission assurance and make life stressful for a long period of time.

Resilience is about getting back to normal - moving people back into their homes, and resuming operations as quickly as possible.

OPPORTUNITY

On October 10, 2018, Hurricane Michael hit Tyndall Air Force Base, significantly impacting the physical infrastructure and operations of the Base. Following the Hurricane, assessments of the damage and planning for recovery have been ongoing.

Although no personnel were injured, every structure sustained damage.

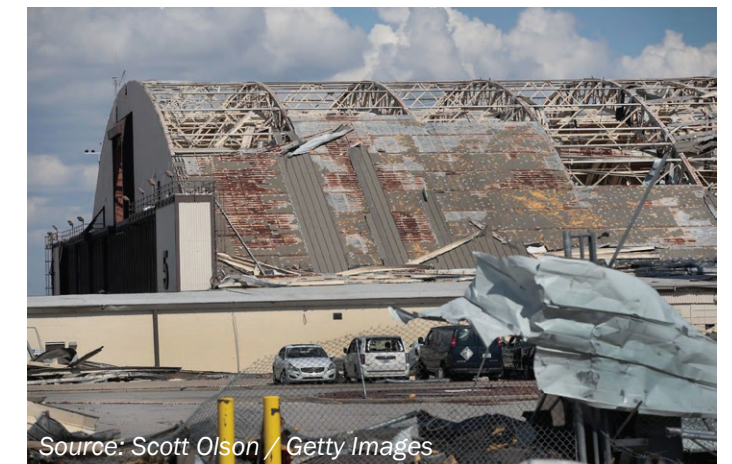
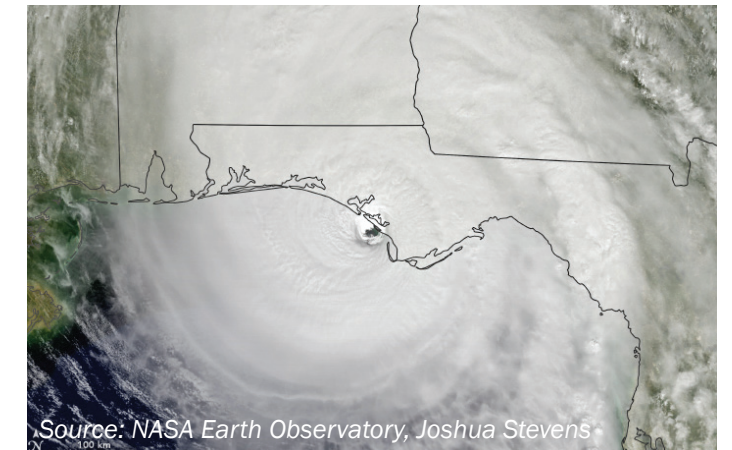
Rebuilding of Tyndall AFB is underway, with initial planning to fund major investments moving forward. In November it was determined, that several existing missions will endure at Tyndall AFB and others will move to other locations.

Predictions indicated these events will only be exacerbated by climate change. Therefore, it is imperative that the redevelopment incorporate robust resiliency strategies.

With the establishment of the Program Management Office for redevelopment of Tyndall AFB and considering the extensive amount of damage caused by the Hurricane, **now is the time to establish a strategy for the program, that incorporates cost effective, creative financing and smart long-term strategies for rebuilding.**

These strategies should include consideration of unique Federal Authorities including Energy Savings Performance Contracts, Utility Energy Savings Contracts, Enhance Use Leasing and other Public Private Partnerships.

Considering the complexity of rebuilding Tyndall AFB and opportunity to integrate a wide-range of funding strategies, **incorporating Program Management Services will help facilitate successful program implementation.**



Debris litters Tyndall Air Force Base after Hurricane Michael's eye moved over the Base in the Florida Panhandle. No one was hurt on the Base, but every building sustained damage.

TYNDALL AFB PROFILE

Tyndall AFB has served a critical mission function of training F-22 Raptor pilots and maintenance personnel to support combat Air Forces. Along with this mission, the Base has supported the Headquarters of 1 AFNORTH, Air Control Squadron, RPA Training, 53 Weapons Evaluation Group, AFCEC and others. Moving forward, the plan is to have up to three F35 squadrons, Reaper Wing, associated group and squadrons along with MQ9 Beddown at Tyndall AFB.

The original Base, built over an extended period of time, has a dispersed development pattern. The flight line was developed based on the linear layout, created by the boundaries of the runways and Route 98. The areas around Route 98 were built in a suburban pattern with plenty of space between facilities. The housing area, located several miles to the west, was separate from other parts of the Base. Additional mission elements, including the drone runway and training area, are in isolated locations both east and west of the airfield. As a result, vehicles are required to move between housing and work, as well as to move between the facilities.

\$596 MILLION
to local economy each year

\$276 MILLION MILITARY PAYROLL/YEAR
\$94 MILLION CIVILIANS AND LOCAL BUSINESS

18,502 TOTAL
POPULATION

3395 MILITARY
1665 CIVILIAN
4132 DEPENDENTS
9310 RETIREES



71%
of Base land is constrained by
wetlands, floodplains, or storm surge



8344
acres are developable

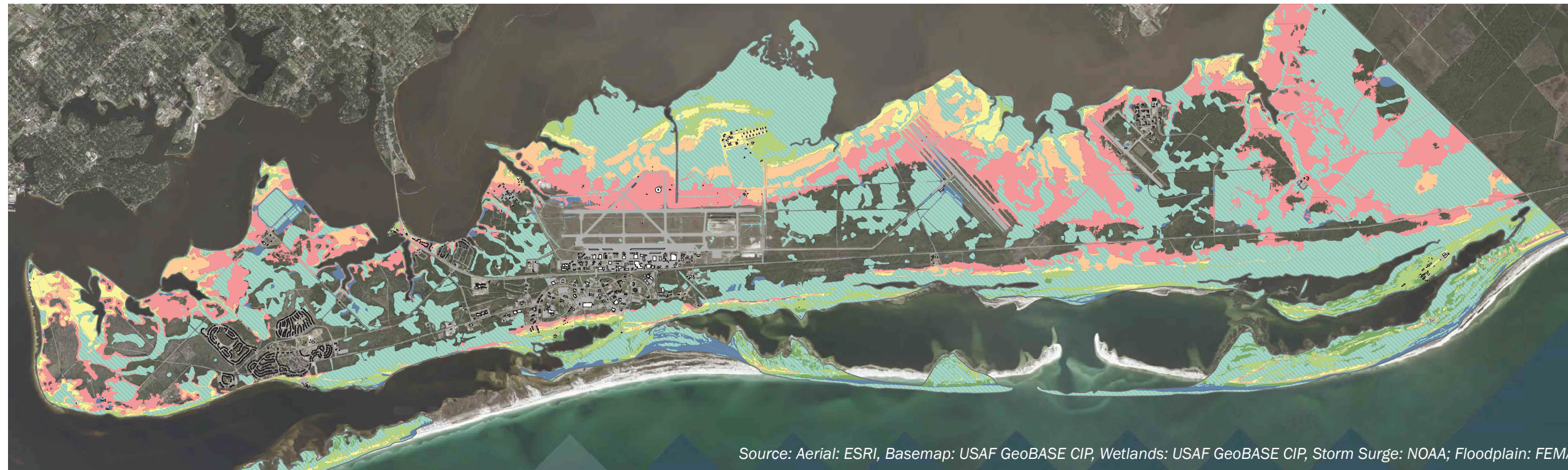


\$3.4 BILLION
replacement cost of
facilities only



1253 TOTAL BUILDINGS
(5.8MSF)

555 BUILDINGS NON-HOUSING (4.1MSF)
698 HOUSING (1.7MSF)
1,200,000 FEET WATER, SEWER, STORM
609,000 FEET ELECTRIC LINES
62 MILES PAVED ROADS



Much of the Base land is constrained to development by storm surge, wetlands, and floodplains.

STORM SURGE (16,403 acres)

- CAT 1 STORM SURGE
- CAT 2 STORM SURGE
- CAT 3 STORM SURGE
- CAT 4 STORM SURGE
- CAT 5 STORM SURGE

WETLANDS (11,208 acres)



100-YEAR FLOODPLAIN (15,520 acres)



Source: Aerial: ESRI, Basemap: USAF GeoBASE CIP, Wetlands: USAF GeoBASE CIP, Storm Surge: NOAA; Floodplain: FEMA

CREATING THE INSTALLATION OF THE FUTURE

Rebuilding Tyndall Air Force Base offers a tremendous opportunity to design and construct the Base of the Future - a re-imagining of Tyndall AFB.

The rebuilding should incorporate planning and design strategies that support operational readiness and efficiency; create a secure, resilient environment; address flood and storm surge risks; and consolidate development to efficiently use land.

A consolidated development will support the creation of a walkable community that has a sense of place and will be more cost effective with regard to infrastructure and life cycle costs.

Some of the development strategies that should be used in the re-imagining of Tyndall AFB are listed to the right. The plan below shows one version of a development framework that incorporates these strategies.

MISSION ASSURANCE

Provide assets that support the long-term goals of the Air Force and mission readiness.



REGIONAL VALUE

Use land assets strategically and incorporate market considerations to create value for the community and overall Florida Panhandle.



TECHNOLOGY

Incorporate the latest proven technologies to create a Smart and Connected Base, that supports proactive asset management.



QUALITY OF LIFE

Provide a compact development that creates a sense of place, encourages walking, and limits the amount of infrastructure required.



ENERGY

Implement energy solutions that support mission assurance while being cost effective, efficient, and resilient.



RESOURCE PROTECTION

Protect the natural assets to support a resilient, enduring Base.



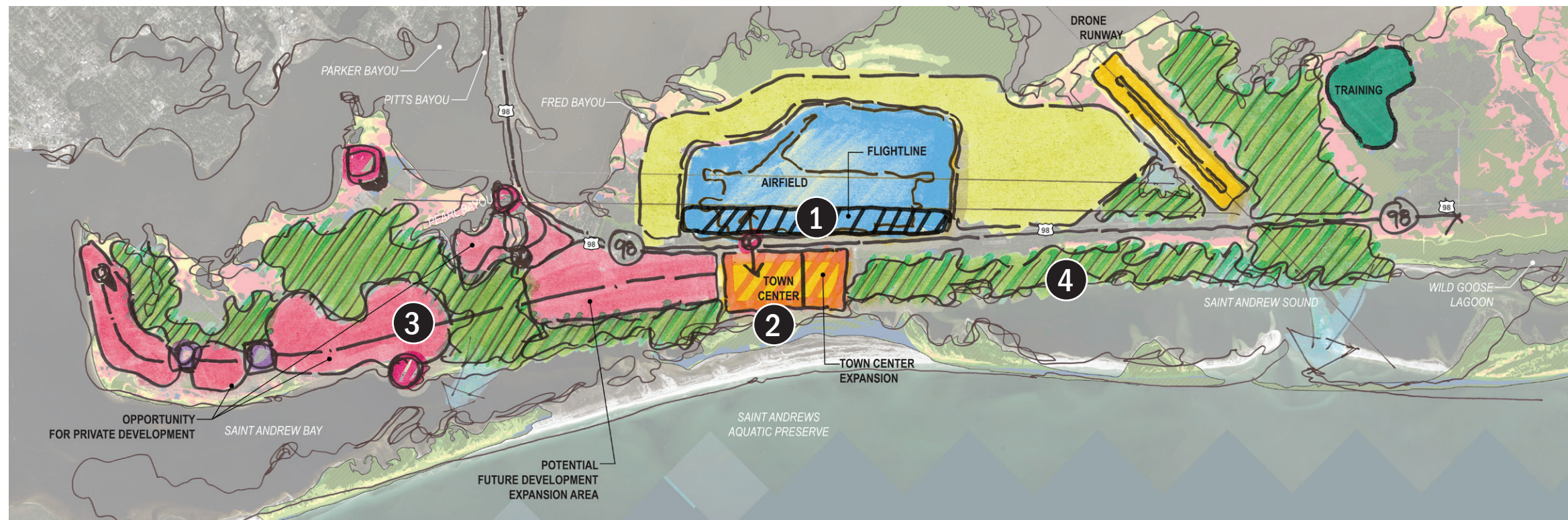
FACILITY DESIGN

Design new flexible facilities that can support multi-use functions and mission changes, while adhering to the latest standards that reduce the facilities vulnerabilities to severe weather events and achieve needed force protection.



FINANCING

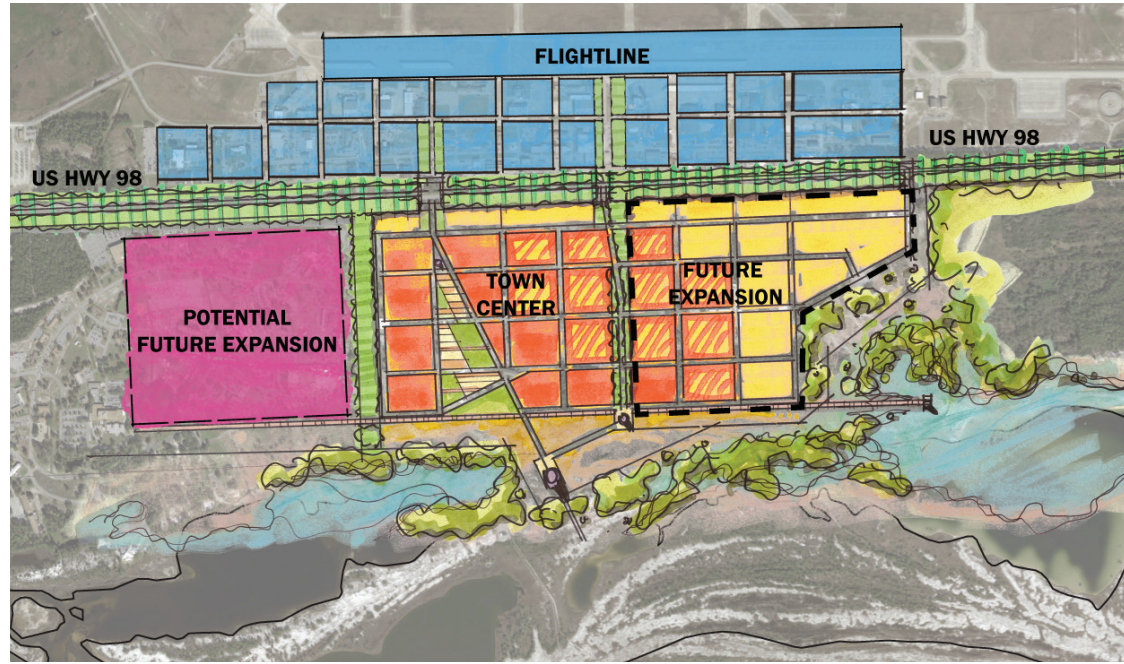
Leverage private sector/ alternative funding sources and authorities to reduce upfront and long-term capital investment funding from the Federal Government.



BASE DEVELOPMENT FRAMEWORK

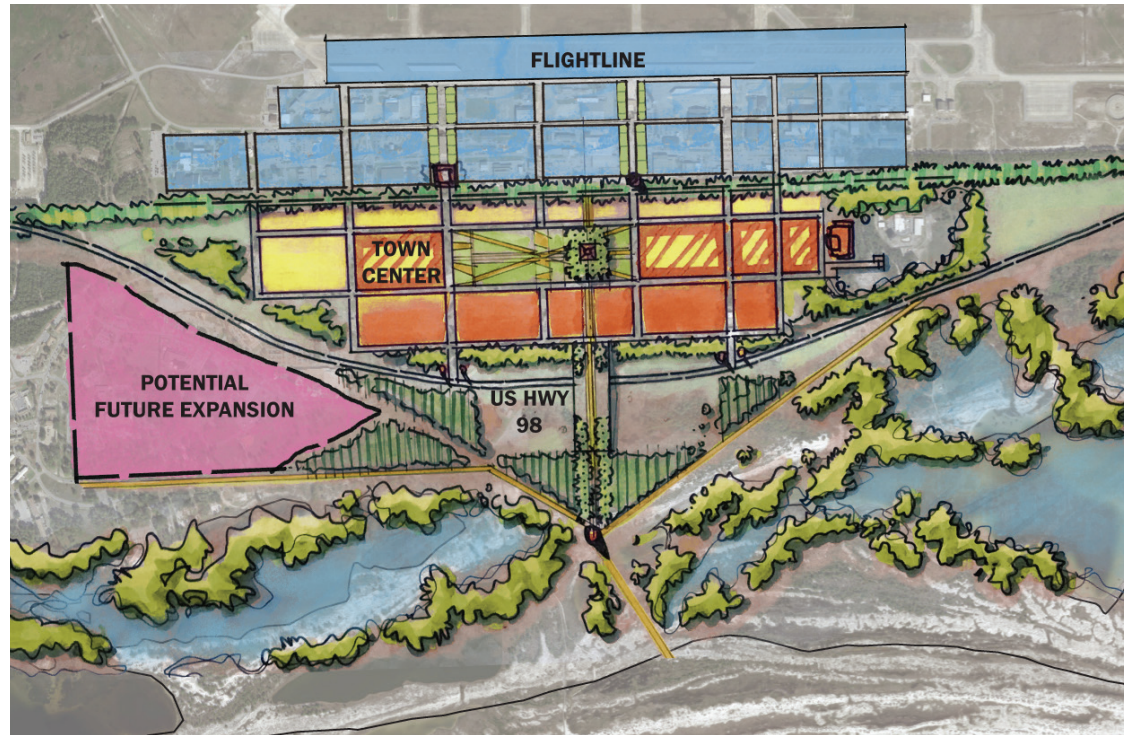
- 1** The development framework for a future Tyndall AFB focuses on consolidating operational development along the flightline in support of mission assurance.
- 2** Development of a Town Center to consolidate most of the base support and community uses (non-airfield uses) into a walkable, cohesive development. (More details about the town center are provided on the following page.)
- 3** Land parcels in the western portion of the base are identified for potential leveraging with private development, the proceeds of which could contribute to offsetting rebuilding and redevelopment costs via creative financing and public / private partnerships.
- 4** Consolidating development facilitates the protection of natural resources and improves resiliency.

TOWN CENTER



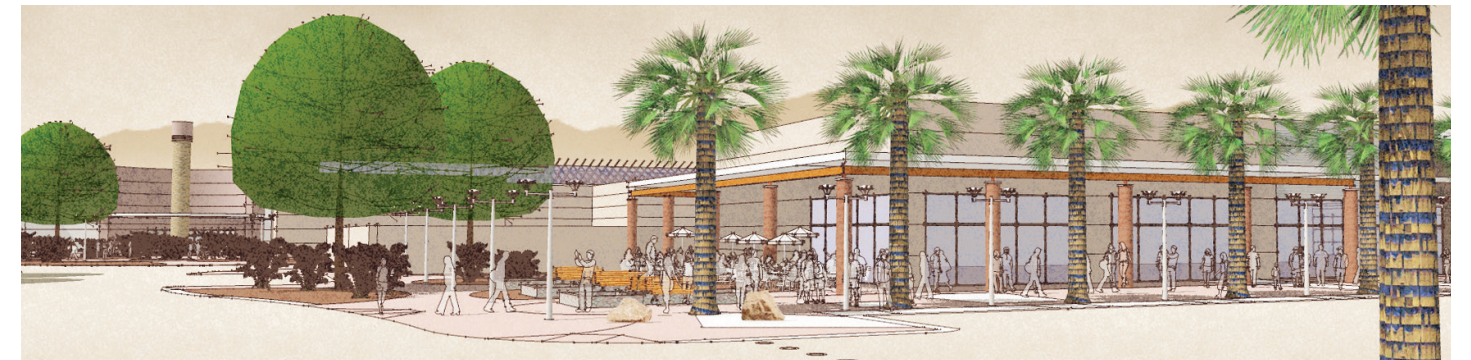
TOWN CENTER DEVELOPMENT OPTION A

A Town Center development form consolidates most of the non-airfield uses into a walkable, cohesive development, which could accommodate much of the community and base support functions, potentially financed, built, operated and maintained by private development interests.



TOWN CENTER DEVELOPMENT OPTION B: RELOCATING ROUTE 98

Realigning Route 98 around the town center increases the walkability and connectedness of the airfield and Town Center areas.



Examples of the Town Center development.

ENSURE LONG-TERM RESILIENCE

Protecting Tyndall AFB, providing mission assurance, and contributing to the long-term resilience of the region are important goals for rebuilding of the Base. Tyndall AFB is over 25,000 acres with large wooded sections and a string of barrier islands. In addition, large swaths of land are wetlands that provide natural barriers to storm surge for Tyndall AFB and the surrounding region. Rebuilding of Tyndall AFB

should incorporate protection of these features, limiting construction to the higher areas along Route 98 and to other strategic locations that offer important mission value or opportunities to leverage land assets to support long-term goals.

Facilities should be redesigned to incorporate flood barriers, the latest building technologies and meet the most stringent building codes to ensure buildings and infrastructure can withstand future storm events. Building roofs, windows and walls should be strong enough to limit damage and ensure mission continuity following storms. Infrastructure should be designed to allow for water inundation or placed/ located above anticipated storm surges.



Source: NOAA

SMART BASE STRATEGIES

Installations of the future will be digitally connected and incorporate systems to manage, monitor and control many functions of the Base from street lights, to traffic signals to building systems to infrastructure and utilities. These smart systems should be included in the redesigned facilities and infrastructure to support the cost-effective operation, manage on-going maintenance, and provide a robust and resilient network that can withstand and react to future storm events.

Smart strategies will help to reduce utility and O&M costs, provide useful data for planning investments and increase the level of security.

CONNECTED BUILDINGS, NASA LANGLEY RESEARCH CENTER (LaRC), VIRGINIA

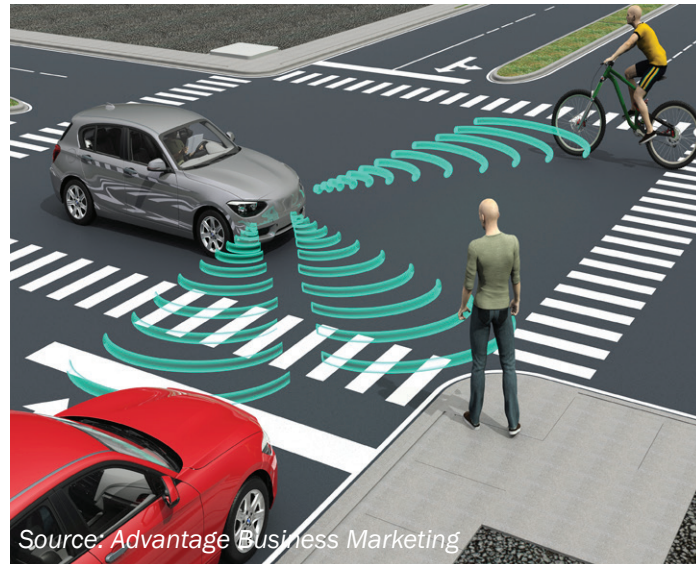
- NASA LaRC operates 42K assets, average age >30 years
- Shrinking budgets, unplanned failures, increased maintenance costs, lack of qualified resources
- Jacobs designed/operates 24/7 Integrated Ops Center providing command and control of 110K data points (temperature sensors, cameras, CO2 sensors, accelerometers, etc.)
- Strategic plan includes asset prioritization, energy management (SCADA), IT systems, sensors, tools, wireless network, solar and micro-energy harvesting, data storage
- Conditional Based Maintenance (CBM) enabled early identification/prevention of catastrophic failures, increased useful operating life, optimized maintenance intervals, increased safety, lowered disruptions

\$12M client savings over 4 years with only one minor failure/unplanned outage on instrumented assets.



FLEXIBLE TRANSPORT STRATEGIES

The layout of new building, roads and parking should take into account the latest technologies and trends in transportation. Considering the quickly advancing autonomous vehicle technologies and potential for personal transit vehicles, including e-bikes, scooters, and others. Transportation infrastructure should be designed to accommodate these options and incorporate flexibility to support these evolving systems. In addition, there may be opportunities to design corridors to support Personal Rapid Transit (PRT) systems, that efficiently moves people from major nodes of activities.



URBAN MOBILITY, PROJECT EDMOND, TRANSPORT FOR LONDON (TfL), UNITED KINGDOM

- Harness the power of big data to help prepare for these future challenges
- 900M multi-modal journeys over 3 months from freight, private vehicles, and taxis using mobile phones, cycling apps, smart cards, social media, and GPS
- Previously unattainable insight into real crowd behavior
- Intelligent data-driven investment decisions
- Revolutionize the way TfL makes decisions to improve London's transport network
- Capacity to have a major impact for transport solutions in cities across the globe

The most comprehensive dataset of its kind ever used, we quantify and analyze journeys by foot, bus, car, taxi, bike, train and underground.



ENERGY SOLUTIONS

Tyndall AFB has the unique opportunity to redevelop the energy and other critical infrastructure systems, that are designed efficiently to support the overall Air Force Installation Energy Program to create Mission Assurance through Energy Assurance.

IMPROVE RESILIENCY

- Plan for and design critical infrastructure systems to effectively manage utilities to achieve Mission Assurance (looped systems, design for redundancy, microgrids near mission critical loads)

OPTIMIZE DEMAND

- Establish and implement design standards that utilize the most efficient and cost effective utility and building technologies (envelope, HVAC, controls, lighting, other facility related controls systems (FRCS))
- Implement a cyber-secure Industrial Controls System and a single front end that provides real time analytics and monitoring of critical infrastructure loads

ASSURE SUPPLY

- Work closely with local utility partners to re-structure utility contracts and evaluate potential for multiple utility feeds for redundancy to meet mission critical requirements
- Evaluate entire supply chain for each outside utility to assure processes and procedures are in place (and possibly include in new contracts) that include backup/redundancy strategies

Leverage Private Sector (to include Utilities) financing for mission critical infrastructure to reduce overall appropriated funding requirements.

Ultimately implementing the right energy solutions will contribute to mission and energy assurance, minimized costs and a reduced payback period to achieve a positive return on investment.

ENERGY OPTIMIZATION, CONFIDENTIAL PRIVATE SECTOR U.S. CLIENT

- Challenge: poor performance with industrial water distribution system that lead to process interruptions, downtime and product production
- Jacobs has developed the Replica™ simulation platform to allow rapid development of digital twin models for water and industrial water related processes
- Accurately portrays intricate process dynamics and allow what-if scenarios to be carried out in the digital domain
- Optimized solutions can be validated within the physical process control system (SCADA) hardware to bridge the divide between the simulation to the physical hardware

We demonstrated operational improvements within the control logic that reduced energy consumption by 33%.

DISTRIBUTED UTILITY GENERATION STUDY, NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC), WASHINGTON DC, MCB HAWAII, AND NAWS CHINA LAKE

- Distributed Utility Generation Study (DUGS) to evaluate the value proposition of distributed energy resources (DERs) to avoid or defer distribution system capital expenditures, reduce operating costs, and support resiliency efforts.
- MCB Hawaii can save more than \$3 million annually, and nearly \$40 million in net present value, across multiple DER opportunities while cost-effectively reducing peak load by over 18% and annual energy consumption by 17%.
- NAWS China Lake can save nearly \$1.4 million annually, and over \$12 million in net-present value, across these opportunities while reducing peak load by up to 23% and annual energy consumption by 5%.

INNOVATIVE FINANCE TOOLS

Any installation of the future requires an integrated understanding of both its natural and built environments. The coastal features of Tyndall AFB offer both asset amenities attractive to the outdoor recreational enthusiast, recreational fishing and pristine beach and liabilities. The natural assets have development value - an understanding, what that is in a "post-Michael" market, requires thoughtful analysis.

Alternative financing tools and commercial approaches should be considered in future planning, as a means to leverage these assets to higher values, creating financial capital for built environment and mission requirements.

Historically, the non-mission requirements for military installations have been difficult to fund and many times required non-appropriated funding. Expanding the concept of non-US Treasury appropriated funding is an appropriate approach to financing future non-mission requirements and there are several well-known and proven tools in use today.

Enhanced use leases, energy investments for return on higher efficiency performance, and land exchanges are examples of ways to leverage private sector financing.

Some innovative public, private projects, like the USACE Flood Protection Program for Fargo-Morehead required special supporting legislation and the political environment is right to seek such authorities.

One of the underused natural assets at Tyndall AFB is Pearl Bayou and its surrounding shoreline. A natural and protected harbor the Bayou is an asset that could be leveraged to the recreational fishing market in return for other built environment non-mission support solution.

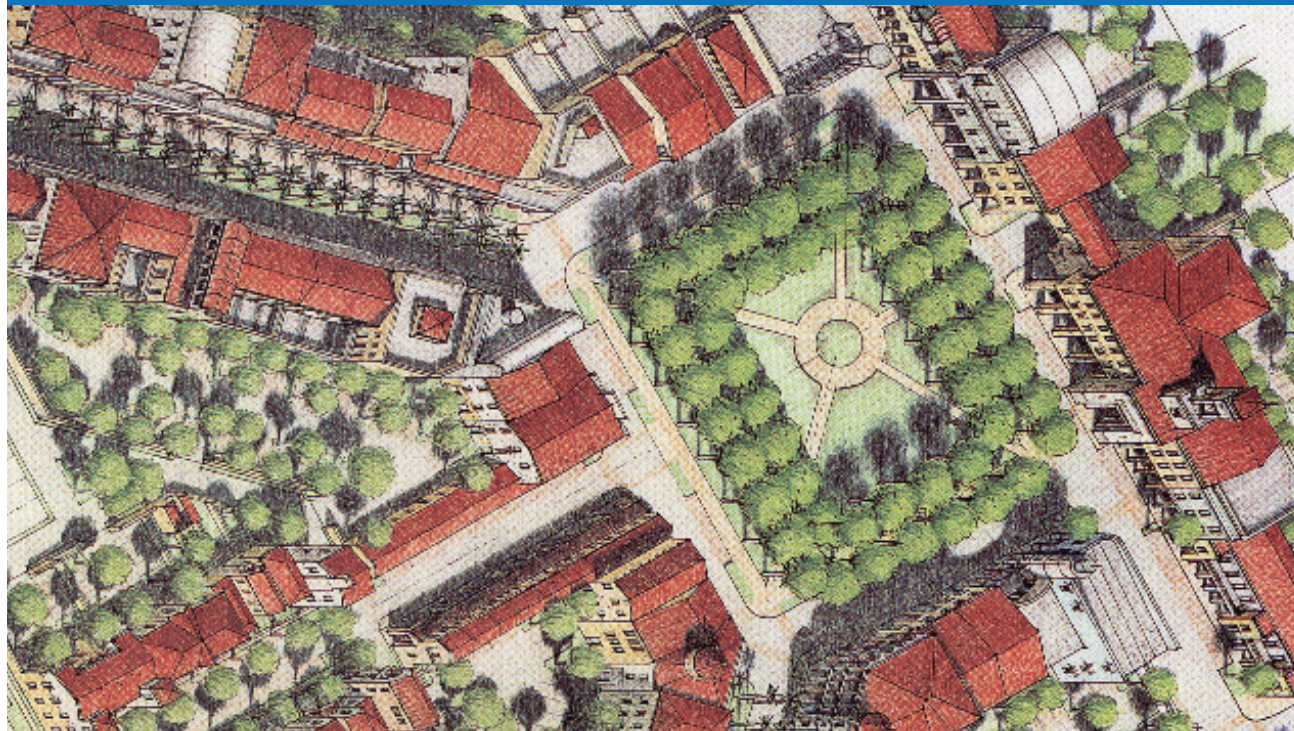
There are other natural assets that have commercial and market value across the footprint of the base. A focused planning and programming team can potentially generate a significant set of alternative financing options that should be part of any re-envisioned military base.

New tools and new financing partners exist today that didn't exist just five years. As socially conscious investors increase their desire to see their assets invested in sustainable outcomes a whole new set of asset managers has emerged with a new investment class of assets approaching 6 trillion dollars. These investors are organizations, funds, and people who have long term investment needs and desire to see their resources placed against opportunities that delivery high ESG (Environmental Social and Governance) performance. Appropriately planned, the non-mission support requirements for Tyndall AFB could be defined as high performing ESG assets and be of significant interest to these fund managers.

Jacobs has extensive experience working with Federal Clients to help identify and implement innovative financing approaches.

Defining a high performance environmental, resilient, socially responsible and well managed program, specific for the rebuilding of Tyndall AFB, is within reach of the Air Force.

Pursue innovative financing options to allow private investment to support construction of community support facilities, including recreation centers, child development centers, fitness centers, marinas, golf course, shopping, food services and hotel facilities.



INTEGRATED PROGRAM MANAGEMENT SERVICES

In a complex program, such as Rebuilding Tyndall AFB, a technical delivery partner can help create certainty in what seems to be an uncertain situation. Incorporating the right tools, systems and processes with the right delivery partner is key to the success of all fast-moving, forward-thinking programs.

Working in partnership with the Air Force and the PMO, a delivery partner can bring the latest, proven and forward-thinking tools and processes to support the program. This will enable the Air Force organization to focus on the internal requirements and external authorizations, required to implement the base of tomorrow.

JacobsValue+

Value Plus is a practice for aggregating and reporting the value added ideas generated by our employees. In 2017, our government PMO clients approved \$16.9M in savings and cost avoidance ideas generated by our project teams. Our goal is to provide more in cost savings than you spend engaging our team early in your programs.

Over the last five years, we have implemented more than \$145.3M in Value+ ideas for federal PMO clients.

LONDON OLYMPICS 2012

In the London 2012 Olympics, a \$10B program, the need to meet cost requirements and tight delivery schedule was coupled with the goal of implementing world's first sustainable Olympic games.

A multi-objective framework was established to guide the process and set the stage for the program's ultimate success. The framework was used by both the delivery authority and the delivery partner to guide their decisions and implement smart, sustainable outcomes.

U.S. ARMY GARRISON HUMPHREYS RELOCATION PROGRAM

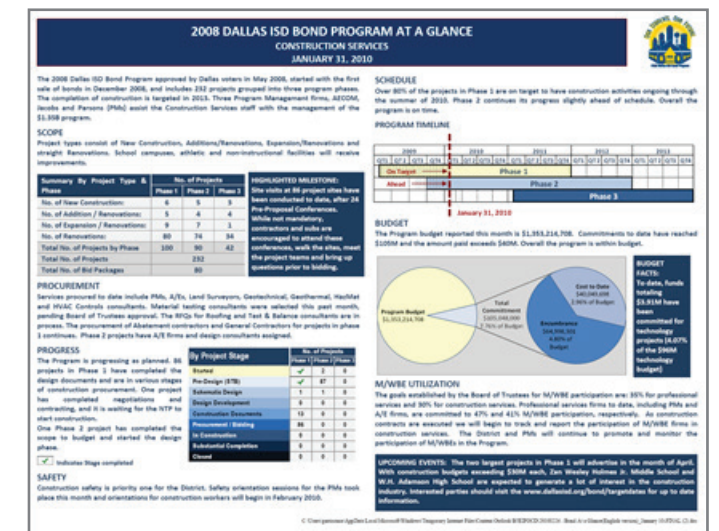
The U.S. Army Garrison Humphreys Relocation was a \$10.7B program. It expanded the installation from 1200 acres to 3500 acres; expanded the population from 10,000 to 40,000; constructed over 600 facilities; placed 18,000,000m³ of engineered landfill; and had a peak construction placement of \$6.5M/day; on-site workers at 11,000/day, and on-site construction vehicles of 2,200/day.

Jacobs revised the existing development plans on an expedited schedule. Our revised plans, which incorporated the latest AT/FP standards, resulted in more than \$300 million in savings to the governments of the United States and the Republic of Korea. Jacobs also prepared design guidelines that incorporated sustainable planning principles.

Jacobs will bring our extensive PMO expertise to Tyndall AFB and ensure successful implementation of the rebuilding effort - the creation of a smart, resilient, cyber secure, walkable and mission adaptable base of tomorrow.

PROGRAM PERFORMANCE PORTAL

- Single Program Entry Point
- Deploy Internally, Externally or in the Cloud
- Secure and Password Protected
- Easily Integrates with SharePoint
- Program Key Performance Indicators
- Configured for the Program
- Integrated Schedule and Cost Systems
- Easy to Customize
- Interactive Graphics
- Custom Reports and Trackers



BENEFITS OF DELIVERY MANAGEMENT PARTNER

- Cost savings
- Cost avoidance
- Discipline in management control and reporting
- Facilitation of efficiencies in management and schedule



Success is where preparation and opportunity meet.

Bobby Unser

JACOBS®