WELCOME

Integrated 1Water Engineering / Business Approach to Solving FL Resource Water Challenges

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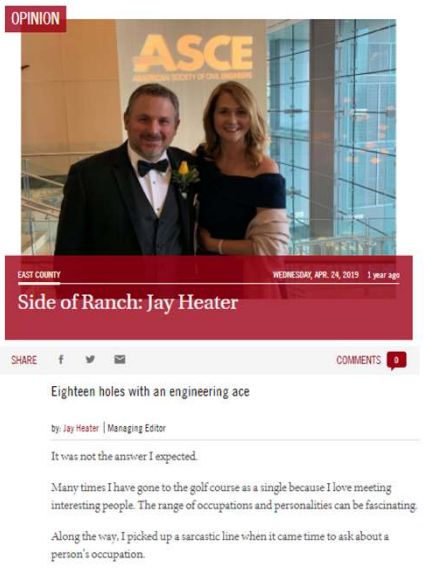
AGENDA

AGENDA

1. Introduction
2. Florida's Water Resource Challenges
3. What is and Why One Water?
4. Integrated Approach and Solutions
   a) Framework
   b) Technical, Business, & Stakeholder
5. Keys to Success
6. Case Studies



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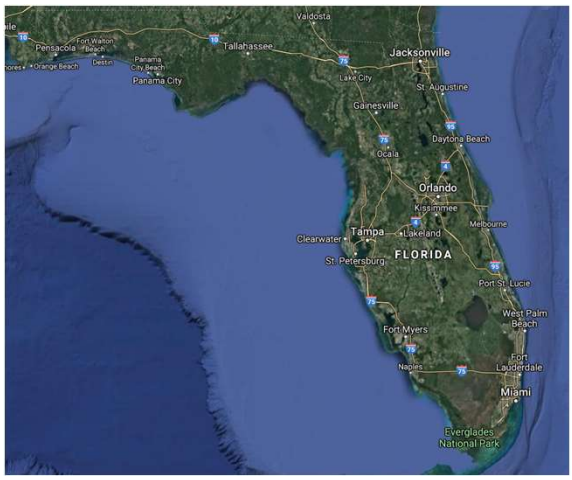
INTRODUCTION

"Water, water everywhere in state of Florida!
50+ inches of rain annually, home to the second-largest freshwater lake wholly in the U.S. (Lake Okeechobee), and the state surrounded by water on three sides – are there really water resources problems to solve?"



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FLORIDA's WATER RESOURCE CHALLENGES

Complex Water Resource & Environmental Challenges

- Population Growth
- Diminishing Water Supplies
- Saltwater Intrusion
- Evapotranspiration
- Highly Variable Seasonal and Yearly Weather Patterns
- Flooding / Drought
- Tropical Systems
- Water Quality
- Climate Change

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WHAT IS ONE WATER?

WHAT IS ONE WATER?

One Water Defined

"One Water is an integrated planning and implementation approach to managing finite water resources for long-term resilience, sustainability and reliability, meeting both community and ecosystem needs"

The Water Research

sustainable resources and overall resulting in multiple local and regional benefits"

City of Winter Haven, 2019

Avoidance of the depletion of natural resources in order to maintain an ecological balance. "the pursuit of global environmental sustainability"

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WHY ONE WATER?

Water is Essential!

Water is VITAL, PRECIOUS, and WE need to FOCUS our TIME and INVESTMENT on it

"The One Water Approach is applied using science and engineering-based assessment approach and tools along with cost-risk-benefit business analytics resulting in sustainable and innovative solutions that promote responsible stewardship of social, economic, and environmental resources. "
Bryan Veith, 2019

"Water is essential to everything we do, from the water we need to brush our teeth and make coffee, to the water farmers need to grow crops, water recreation, and firefighters need to keep us safe.
But the systems that deliver this essential resource are at risk."
US Water Alliance

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WHY ONE WATER?

Recognized Benefits

- Achieve Efficiencies with "Finite" Resources (i.e., accomplish more as one, by sharing resources)
- Minimizes Competing Interests
- Enhanced Collaboration and Communications
- Opens More Doors for Outside Funding
- Solve Complex Problems with One Integrated Solution

One Water Framework Helps Align Water Agency Departments for Success and to Maximize their Return on Investment (ROI)

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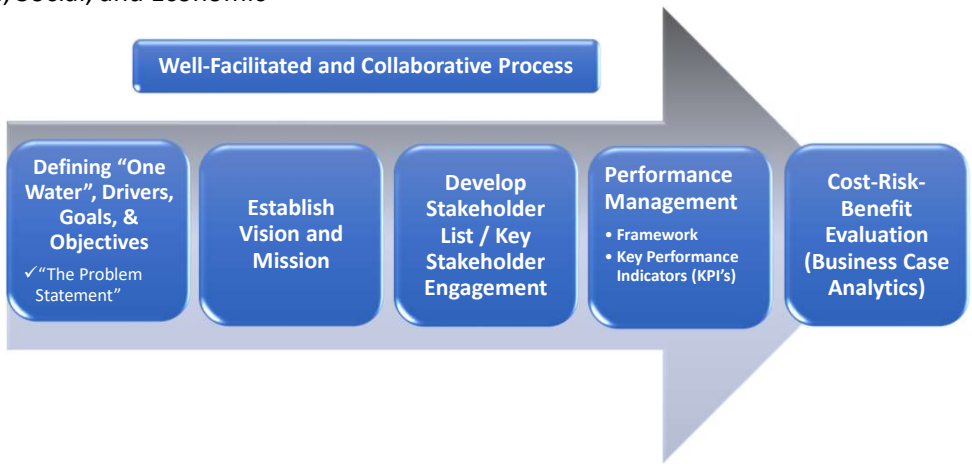
FRAMEWORK

ONE WATER FRAMEWORK

Technical, Social, and Economic



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FRAMEWORK

ONE WATER FRAMEWORK – DEFINING "ONE WATER", DRIVERS, AND GOALS

What, Why, Who, How, Where – Defining the Attributes

- **What** is the Approach and **Who** is executing it?
- **How** are the Benefits realized?

What is the Problem?

Assumptions?
Givens?
Define the Problem!
Is there one Answer?
Is there one Solution?

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ONE WATER FRAMEWORK – WELL-FACILITATED AND COLLABORATIVE PROCESS

One Water Framework is Key to Establishing Your "Plan's" Foundation

- External Workshops For Early and Timely Stakeholder and Public Engagement
- Collaborative and Fully Integrated Planning Process
- A Series of Interactive Internal Workshops to Establish the Strong Foundation and Guiding Principles

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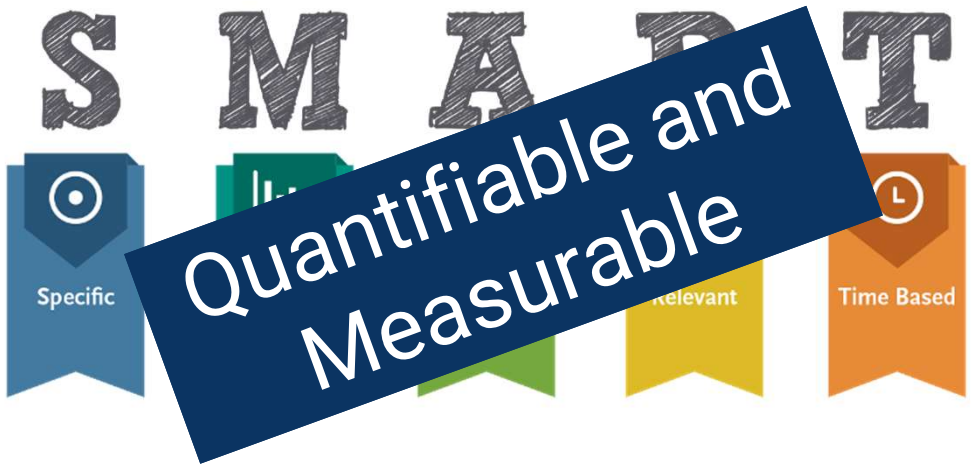
FRAMEWORK



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FRAMEWORK

ONE WATER FRAMEWORK – STAKEHOLDER ENGAGEMENT

Steps to Project(s) Success

- **Stakeholder Identification and Categorization**
- **Initial Communication(s)**
- **Develop Clear/Concise**
  - **Project Overview**
  - **Message**
  - **Engagement Rules and Timing**
- **Stakeholder Questionnaire and Evaluation**
- **Stakeholder Plan Development and Engagement**

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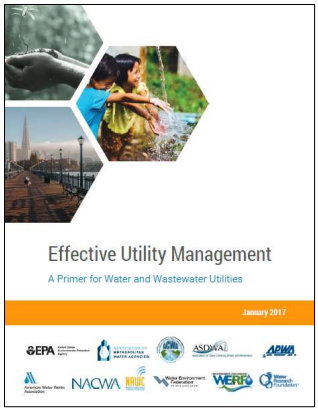
Performance Management

EFFECTIVE UTILITY MANAGEMENT (EUM) FRAMEWORK



Effective Utility Management is a Proven Utilities Based Framework

- **Product Quality**
- **Customer Satisfaction**
- **Employee & Leadership Development**
- **Operational Optimization**
- **Financial Viability**
- **Infrastructure Strategy and Performance**
- **Enterprise Resiliency**
- **Community Sustainability**
- **Water Resource Sustainability**
- **Stakeholder Understanding and Support**

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Performance Management

PERFORMANCE MANAGEMENT FRAMEWORK

A Balanced Perspective of Public Organization's Performance Measures

Customer	• Customer Satisfaction • Community Sustainability • Stakeholder Understanding and Support
Employee Learning & Growth	• Employee and Leadership Development • Enterprise Resiliency
Financial	• Financial Viability • Infrastructure Strategy and Performance
Internal Processes	• Water Resource Sustainability • Operational Optimization • Product Quality

Effective Utility Management
A Primer for Water and Wastewater Utilities

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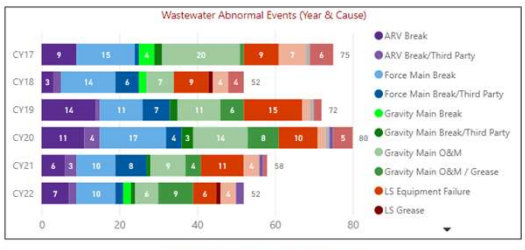
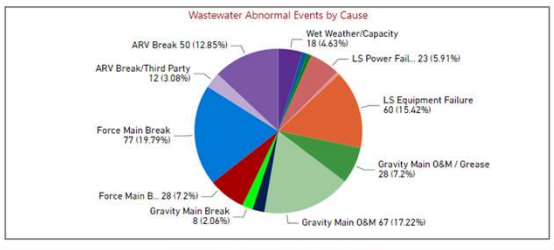
Performance Management

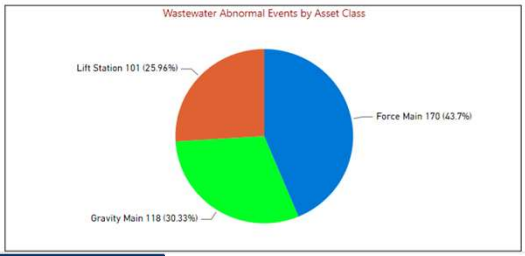
Wastewater Malfunction / Abnormal Events

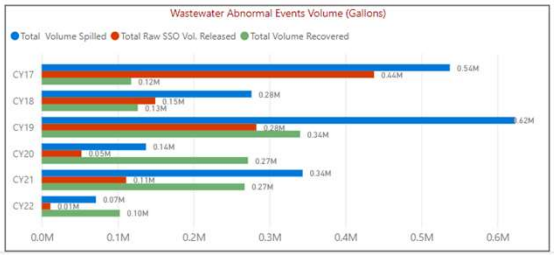
Sarasota County

Year | Month | Sewer Basin | Asset Class | Type of Water | Cause | Volume Range | Discharge to Stormwater









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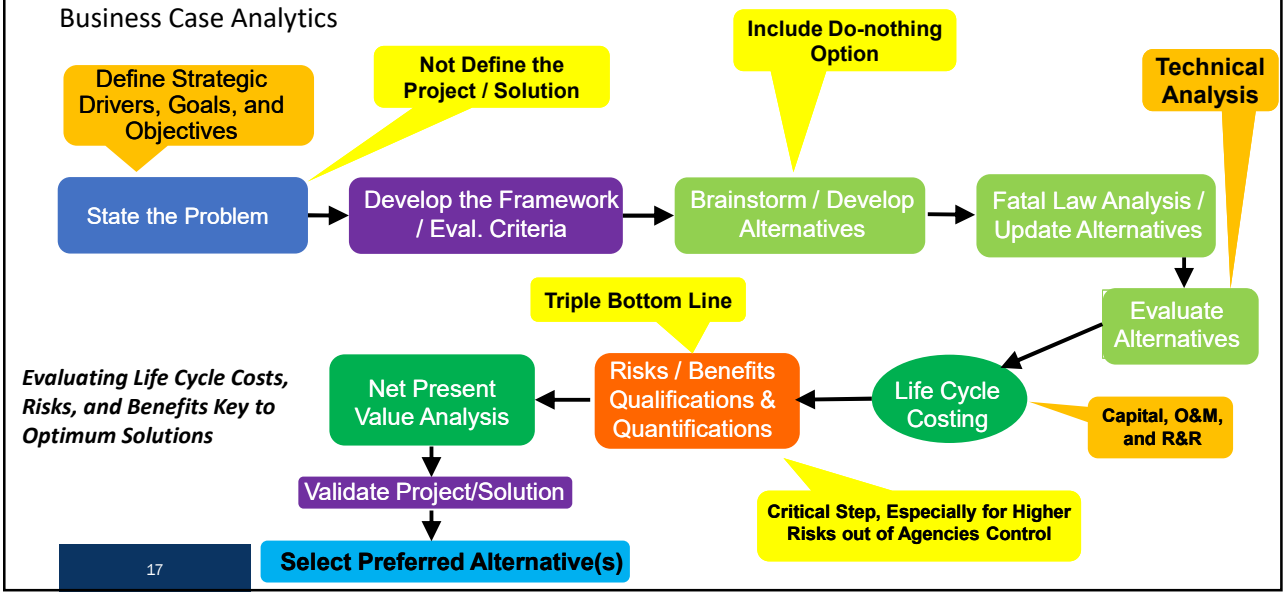
Business Case

COST-RISK-BENEFIT EVALUATION

Business Case Analytics



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FRAMEWORK

ONE WATER FRAMEWORK – KEYS TO SUCCESS

Key Elements of the Approach to Follow

Apply One Water Framework Approach Focusing on Sound Fundamentals

- Technical
- Business
- Stakeholder Engagement

To Achieve Local and Regional Benefits

- Social
- Economic
- Environmental

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CASE STUDY 1

HERITAGE HARBOUR GOLF LODGING AND VILLA DEVELOPMENT

Manatee County, Florida

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CASE STUDY 1

PROJECT BACKGROUND

18-hole Championship Golf Course Built in 2001

Master Planned Mixed-Use Community

- Single Family
- Commercial
- Recreation

Existing Development of Regional Impact (DRI)

Tourism and Meeting Space

HERITAGE HARBOUR
GOLF & EATERY

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CASE STUDY 1

APPROACH

Integrated and Sustainable Solutions Benefiting:

- ✓ Golf Course (Private & Public)
- ✓ Local Community (Public)
- ✓ Manatee County (Government)
- ✓ Environment (Regional)
- ✓ Local Economy (Private and Public)

"Our success will be the community's success, and vice versa," he said. "This is a resurrection story of a golf course. Nationally, golf courses were once thought of as the easiest business in the world, … and that's just not so. The cost of maintenance would make your chin drop. We have to figure out a formula here as to how to make this business sustainable for the long term.

"This will be a new beginning of sorts for the Heritage Harbour and Stoneybrook communities, creating several benefits for everyone living or wanting to live in this great community."

Rule, Joy, Trammell and Rubio architects of Atlanta did renderings of how the lodge and villas could be situated.

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CASE STUDY 1

INTEGRATED APPROACH - Challenges

Golf Course

- ✓ Address Conditions and Infrastructure of an Aging Golf Course
  - Turf / Sand Traps
  - Irrigation
  - Rising O&M Costs

Community's Needs

- ✓ Quality of Life
- ✓ Economic

Environmental

- ✓ Ecosystem Preservation
- ✓ Water Conservation
- ✓ Water Quality
- ✓ Flood Protection

Stoneybrook HOA

Manatee County FLORIDA

HERITAGE HARBOUR GOLF & EATERY

Heritage Harbour South COMMUNITY DEVELOPMENT DISTRICT

Southwest Florida Water Management District

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CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

Benefits – Golf Course, Community, County, Local Economy

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CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

Benefits – Golf Course, Community, County, Local Economy, Businesses

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CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

Solution –> Low-Impact Design (LID)

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CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

ONE WATER

BENEFITS

- *Water* Quality
- Water Conservation
- Flood Protection

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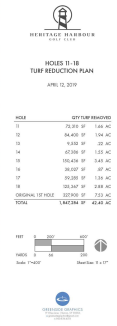
CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

Benefits – Environment, Ecosystem, Community Recreation



- ✓ **Water quality** improvements through nutrient (N&P) and pesticide reduction
- ✓ **Water conservation** through less irrigable turf & native xeriscape plants
- ✓ **Flood protection & ecosystem restoration**

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CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

Benefits – Environmental Protection, Ecosystem Preservation, Community Recreation and Economic Vitality

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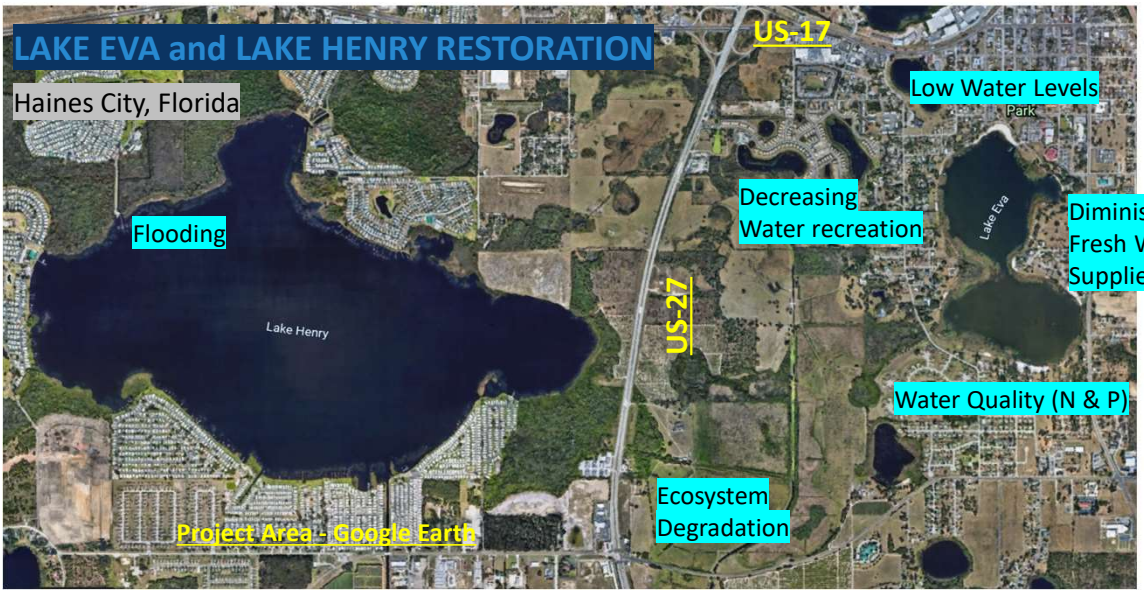
CASE STUDY 2



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CASE STUDY 2

PROJECT OBJECTIVES

- Address Lake Eva **Minimum Flow and Level** (MFL) and SWFWMD guidance levels
- Improve **water quality (N&P)** in Lake Eva
- Improve **flood protection** in the vicinity of Lake Henry, while protecting water recreation opportunities
- Improve **groundwater recharge** and potentially obtain water supply credits from SWFWMD
- **Natural systems** enhancement/improvement

Lake Eva 2011

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Water Availability for Hydrologic Restoration

1. *Is there enough "Excess" water to meaningfully restore Lake Eva water levels?*
2. *Is the "Excess" water available when Lake Eva needs it?*
3. *Where is the "Excess" water coming from?*
4. *Can the "Excess" water be re-routed the Lake Eva?*
5. *Will intercepting/re-directing "excess" water negatively impact downstream waterbodies?*

Answering these questions requires a detailed hydrologic analysis!

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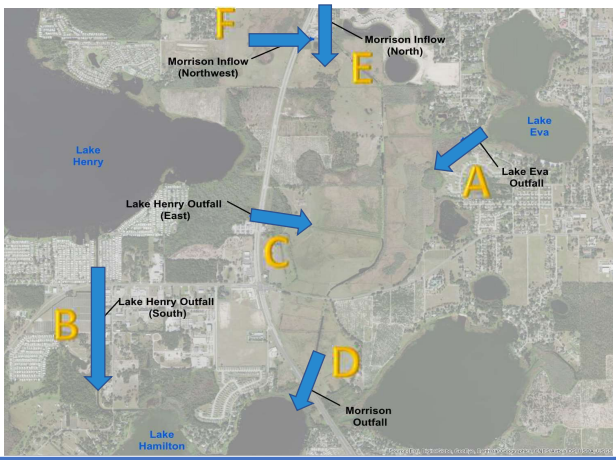
CASE STUDY 2

EXISTING CONDITION ICPR MODEL RESULTS



Project Area Water Availability – Average Annual

Water Availability in the Lake Eva - Lake Henry Study Area Based on ICPR Modeling Results (average annual water volume from 6/1/2002 to 5/31/2016)					
Lake Eva Outfall (West to Morrison) Ac-ft/yr	Lake Henry Outfall (South to Hamilton) Ac-ft/yr	Lake Henry Outfall (East to Morrison) Ac-ft/yr	Morrison Outfall (South to Hamilton) Ac-ft/yr	Morrison Inflow (from North) Ac-ft/yr	Morrison Inflow (from Northwest) Ac-ft/yr
0	213	413	2,752	1,661	91

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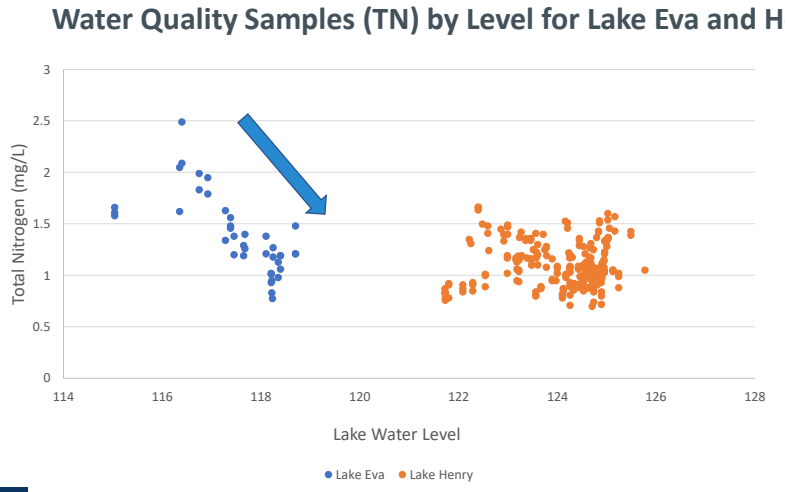
CASE STUDY 2

LAKES' EXISTING WATER QUALITY NITROGEN ASSESSMENT



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CASE STUDY 2

COLLABORATIVE PROCESS FOR CRITERIA PRIORITIZATION

Evaluation Criteria and Priority

City / District / BC Team Final Prioritization Meeting - January 14, 2019

Selection Criteria	Priority	Description
Improve Lake Eva Water Quality	1	Achieve Lake Water Quality Improvement for Key Parameters including Total Phosphorus and Chlorophyll-a
Address Lake Eva Low Water Level Concerns	2	Address Regulatory Requirements for Maintaining Minimum Level and Flow (MFL) in Lake Eva
Meet Regional Integrated Water Resources Needs including Groundwater Recharge and Water Supply Credits	3	Follow Central Florida Water Initiative (CFWI) guidelines, use regional approach to solving multi-jurisdictional "One Water" needs. Infiltrate "Excess" Water into project area groundwater system with the goal of generating water supply credits
Minimize Need for Land Acquisition and Easements / Utilize Existing Infrastructure & Natural Conveyances	4	Maximize the use of existing public lands and easements for project improvements and minimize the need to acquire additional private land or easements. Maximize natural conveyance and maintain existing drainage system infrastructure is such a way that it's compatible with maximizing natural conveyance.
Public / Stakeholder Acceptance	5	Consensus of acceptance by Stakeholders, Residences, and Businesses
Life-Cycle Cost	6	Lowest combined Capital and O&M Costs for 20-year life
Provide Natural Systems Enhancement, Recreational Benefits, Social Benefits	7	Improve ecosystem form and function within the project area. Maintain or improve Lake Recreational Benefits (Swimming, boating, fishing, etc.). Provide public benefits such as increased property value, economic development, educational opportunities, aesthetics, etc.
Reduce Lake Henry Flooding During Wet Weather Periods	8	Reduce extent/depth of flooding for residents adjacent to Lake Henry for the 100-year, 24-hour event based on existing flood maps
Minimize Impacts (temporary/permanent) to residences and businesses	9	Construction and Operation of Proposed Improvements has minimal impact on residences and businesses
Likelihood or Ease of Permitting	10	Regulatory Acceptability and Less Time/Lower Cost for Project Permitting
Proven Treatment/Recharge Approach	11	Use project elements which are effective and meet regulatory requirements

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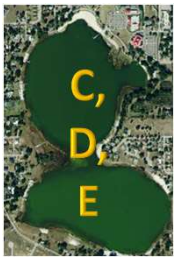
CASE STUDY 2

LAKE EVA and LAKE HENRY RESTORATION CONCLUSIONS

- + Model results show there is sufficient water (avg. basis) reaching Morrison Ranch property (project area) to evaluate alternatives to meet project objectives
- A No need to alter Lake Henry water inflow, elevation or water quality
- B Flooding in the vicinity Lake Henry appears to be limited
- C Statistical Analysis indicates Lake Eva WQ improves at higher lake levels
- D Options to improve Lake Eva water quality include wetland treatment (west), LIDs (north and east), and Pretreatment (Alum for P removal)
- + Areas exist for wetland rehydration and enhancement
- E Options to improve Lake Eva water level include improving conveyance systems and storing/rerouting inflows from North



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CASE STUDY 3

THE LEGACY PROJECT

Manatee County, Florida

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CASE STUDY 3

THE LEGACY PROJECT

Existing Site Conditions

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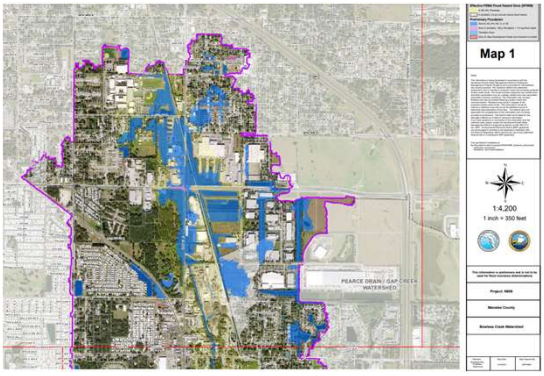
CASE STUDY 3

PROJECT CHALLENGES

- Urban site developed well before SWFMWD / County integrated water resources and stormwater standards/regulations
- Site located in Bowless Creek Watershed Overlay **Protection** District
- Tight site
- Increased parking requirements
- Reclaimed water not available for irrigation water



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CASE STUDY 3

INNOVATIVE ENGINEERING CONCEPTS & BENEFITS

LIDs

- Pervious Pavers for Parking Ingress / Egress
- Grassed Parking Spots
- Bioswale / Bioretention
- Xeriscape Landscaping

Onsite Shallow Well as Irrigation Source

Community & Regional Benefits

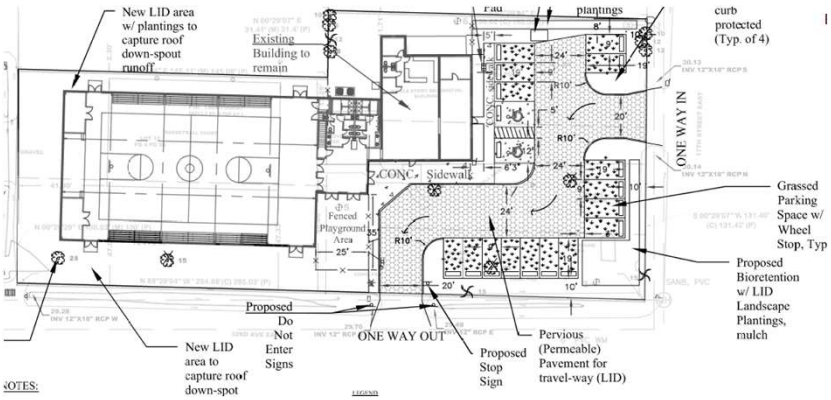
- Water quality improvement
- Water conservation
- Flood protection

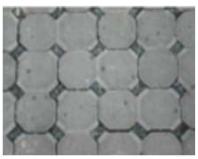
The project's innovative design will have a net positive impact through off-site stormwater flow reduction and water quality improvement.

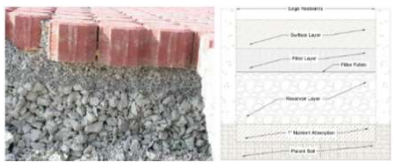
CASE STUDY 3

INNOVATIVE ENGINEERING CONCEPTS & BENEFITS

***Water Conservation**: With LID design drainage/runoff will infiltrate into the ground onsite thereby allowing for replenishing the groundwater which will then be used as a source for irrigating the existing and proposed landscaping.*







- Pervious Pavers for Parking Ingress / Egress

CASE STUDY 4

CITY OF ST PETERSBURG BIOSOLIDS TO ENERGY

Technical and Economic Innovation

- Consolidated City's WRF Biosolids at their three (3) WRF's to single location, SWWRF
- Conveyed WRF waste activated sludge (WAS) through City's WWCS to new SWWRF Biosolids to Energy Facility (instead of trucking)
- Biosolids quality enhanced from Class B to Class AA
- Accept Fats, Oils, and Grease to increase biogas production
- Biogas from biosolids processing treated and cleaned to produce natural gas quality for fueling WRF generators and sanitation fleet.

Benefits

- High-grade Class AA biosolids for beneficial use as fertilizer
- Fuel City's sanitation fleet and provide supplemental power to SWWRF during peak usage
- Annual operational savings about $4M

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Industry Best Practices

EPA United States Environmental Protection Agency

https://www.epa.gov/greeningepa

https://www.epa.gov/nps/urban-runoff-low-impact-development

https://www.epa.gov/green-infrastructure/green-infrastructure-modeling-tools

https://www.epa.gov/water-research/national-stormwater-calculator

https://www.epa.gov/green-infrastructure/green-infrastructure-design-and-implementation

https://www.epa.gov/greeningepa/stormwater-management-practices-epa-facilities

https://www.epa.gov/sustainable-water-infrastructure

https://www.scgov.net/home/showdocument?id=33258

https://VeithSolutions.com/contact-us

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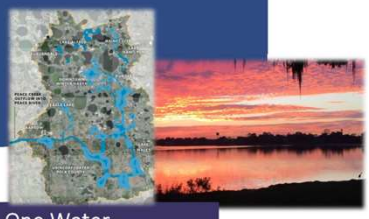
CONCLUSIONS

Integrated 1Water Engineering / Business Approach to Solving FL Resource Water Challenges

1. Think Holistically to Address Water Resource Challenges (1Water)
2. Define the Problem Before Developing Solutions
3. Develop the Framework and Engage Stakeholders
4. Integrate Business Case Analysis & Risk Management w/Technical

THANK YOU

WINTER HAVEN
The Chain of Lakes City



One Water Framework Technical Memorandum

One Water Master Plan
City of Winter Haven, Florida
March 26, 2020

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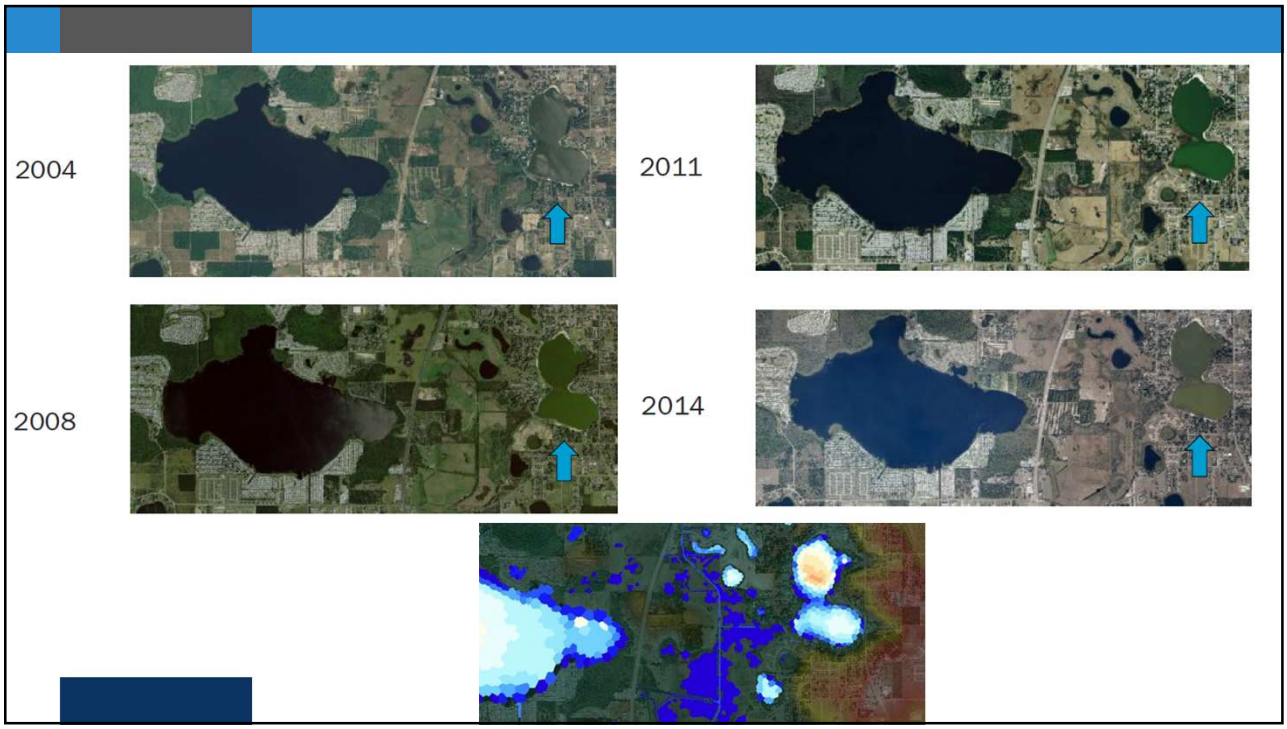
BLACK & VEATCH

QUESTIONS



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Lake Existing Conditions Assessment

Water Quality Analysis - Statistical Methods and Results

- Lake Eva time series of TN, TP, and chlorophyll-a
- Lake Henry time series of TN, TP, and chlorophyll-a
- Annual geometric mean TN and TP and avg. annual TN-TP ratio in Lake Eva and Lake Henry
- Annual geometric mean chlorophyll-a, DO, and PH in Lake Eva and Lake Henry
- Annual geometric mean Secchi disk depth, TSS, and turbidity in Lake Eva and Lake Henry
- Annual geometric mean alkalinity, color, and temperature in Lake Eva and Lake Henry
- Water quality and WQ/depth correlations

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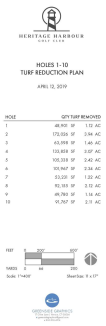
CASE STUDY 1

INTEGRATED APPROACH & SOLUTIONS

Benefits – Environment



- ✓ **Water Quality** Improvements through Nutrient Reduction (N & P)
- ✓ **Water Conservation** through less Irrigable Turf & Native Xeriscape Plants & Trees
- ✓ **Flood Protection & Ecosystem Restoration**

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