

Stormwater Design Guide

SUMMER 2022**PROJECT
HYDROLOGY**

Holding Water Pre Installation



Post Installation NOV 2020

**FLOOD·CON**
REAL SOLUTIONS FOR RESPONSIBLE URBAN DEVELOPMENT**Flood Mitigation Infrastructure
To Increase Public Safety****EGRP Energy Passive Groundwater Recharge Product***Together, we will improve the World's Practice of Water Management*

Surfacewater Management Infrastructure

Innovative Technologies for Increased Public Safety and Flood Mitigation

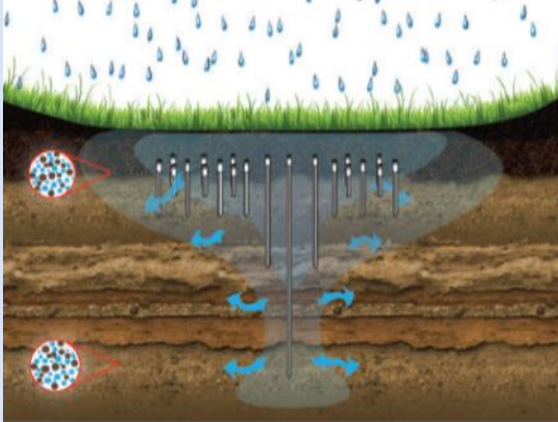
A guide for Public Safety Officials, Municipal Leaders, Risk
Management, Floodplain, Stormwater Professionals, and Citizens
Impacted by Flooding and Urban Sprawl

We Can Improve Our Stormwater Design

TABLE OF CONTENTS

1. **EGRP** Augmented Permeability

Revolutionary Technology for Drainage and Increased Infiltration of Soils, 2X+ Rate Increase, Guaranteed



2. **FLOOD-CON** AOS Automated Weir

Automated Outlet Structure controls Surface Water flows with passive and active management to Mitigate Flooding. Reduce retention/detention pond size with AOS passive release matching predevelopment hydrology



3. **FocalPoint** Compact Bio-Retention System

Store runoff in small confined spaces. Designs for municipal applications challenged by flooding, impervious surface, and water quality. The future of retention design.



Practical Solutions for Urban Design & Sustainable Development



SURFACEWATER INFRASTRUCTURE

A Stormwater Professionals Source Specializing in Passive & Automated Watershed Management Products

Project Hydrology (PHI) markets innovative BMP products to advance and improve surface water management while promoting environmental stewardship. Included propriety system and performance claims, are made by manufacture. Manufacture images provided for marketing content. Catalog of BMP products provided by PHI INC. We represent BMP manufacture products for sales, distribution, and marketing in specific geographical regions including Alabama, Florida, Mississippi, Georgia, Louisiana. For advertising information, to place an order, to schedule a demonstration, presentation, or distance learning, contact: PHI Corporate Office: ATTN: PHI Marketing: 7199 Kimbrell Lane Milton, Florida 32570 1-800-442-6709 1-850-292-6705
www.projecthydrology.com email: theprojecthydrology@gmail.com

SITE PRODUCTS FOR IMPROVED STORMWATER DESIGN

800-442-6709

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EGRP

INCREASE PERMEABILITY

IMPROVE INFILTRATION

A REVOLUTIONARY

SUBTERRANEAN

DRAINAGE PRODUCT

DOUBLE DRAINAGE RATES!

Energy Passive Groundwater

Recharge Product

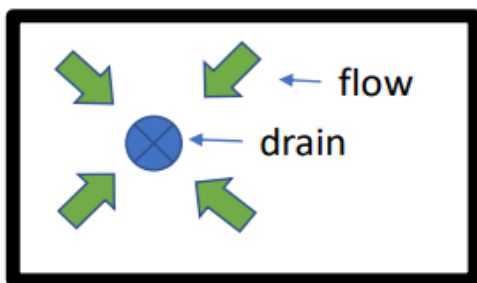
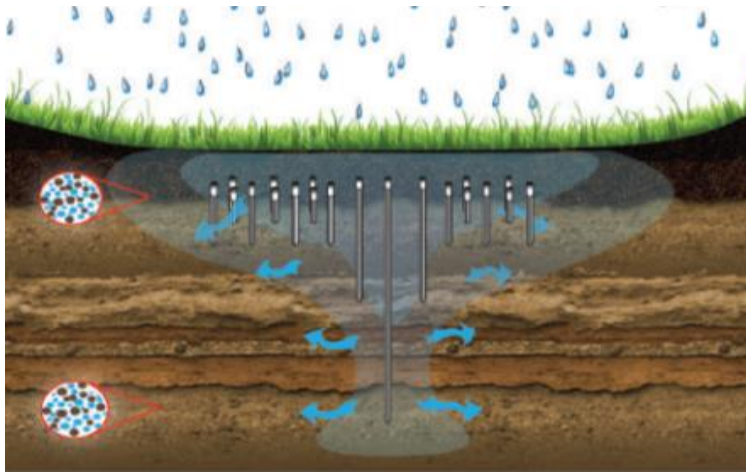
Before Parjana® EGRP® installation



After Parjana® EGRP® installation



EGRP *CONNECTS UNSATURATED ZONES FOR STORAGE!*



Axisymmetric 3D Flows
to each drain

EGRP CREATES PATH OF LEAST RESISTANCE

HOW DOES IT WORK?

Drilling function penetrates "Impervious" layers "Swiss Cheese Effect"

Creates continuity and connection within Soil Layers

Unsaturated zone storage- Fillable Porosity

Vertical Transmission

Horizontal Permeability

Capillary action greater than gravity

Wet Boundary Surface Area increases sorption into soils-Soil suction

Pressure differential

Gravity

EGRP Assists Water to Reach Unsaturated Zones for storage

Case Studies

Mettetal Airport Retention Pond



Facing northeast viewing high water level in Forebay. Outlet to Detention Pond is underwater and the staff gauge is in the middle (May 29, 2014).



Facing west viewing relatively low water level in Forebay. Outlet from the Forebay is visible in the lower left (May 29, 2014).

Professor Edwin Hendrix 2014

The passive design of the EGRP® is unique, and much different than traditional drainage technologies. My examination of the system suggests that element operation is based on a complex set of physical processes operating on water in liquid and molecular forms, which results in the distribution of water in the vadose zone. Each element facilitates the movement of liquid water from locations of higher concentration/density to areas of lower concentration/density. The actual physical processes involve diffusion of water molecules in the soil matrix that is governed by gravity, capillary action, osmotic forces, surface tension of the EGRP® and soil particles, and other mechanisms. These mechanisms take advantage of the EGRP® system to establish a connection between the near surface soils and the soil matrix along the full length of an element. When placed vertically in an area the unit facilitates the movement of water from the surface to the adjacent soil matrix. The mechanisms of this movement are passive depending on concentration/density differences and small scale forces acting on soil particles and water molecules. The overall infiltration of water is enhanced after EGRP® installation because the EGRP® elements provide a mechanism to change the way water is distributed in the soil matrix. The EGRP® element with open crescents uses the continuous surface of the element and close association with soil particles to facilitate water movement. It is the interaction between liquid water, and water molecules, with soil particles that is the foundation of EGRP® system operation. The result is that water can move more freely into the soil matrix, influencing soil surface conditions. The effect of the installation of the EGRP® system is a long-term change to surface soil saturation. The end result is that wet areas are “dried” and the capacity to address nuisance conditions is enhanced.

Pilot Study Report
Mettetal Airport
8550 N Lilley Road, Canton, Michigan
Photographs taken by Brent Ritchie, Adam Near, and Walter Bolt



Facing southwest viewing (through fence) dry Forebay, staff gauge and outlet to the Detention Pond can be seen to the right (October 22, 2014).



Facing southwest viewing (through fence) close-up of staff gauge and outlet to the Detention Pond (October 22, 2014).

FAA, MDEQ, MDOT

**EGRP Distributes Water Within Soil Matrix: Creates Communication of Soil Layers
Moving Water to areas of Unsaturated Zones for Storage & Increased Permeability**



Drilling function creates “SWISS CHEESE EFFECT”



20' EGRP DEVICE prior to installation

Retention Ponds, ERP Maintenance, Roadside Flooding, Public Works, Stormwater Management, Recharge, Agriculture, more

REDUCE RUNOFF BY 80%, REDUCE TN, TP, STABILIZE SOILS, I&I, A PARADIGM SHIFT FOR WATER MANAGEMENT

20 million gallons infiltrated annually since installation- 3 year study by City of Fresno, California



PARJANA®

The Future of Sustainable
Water Management

AN INNOVATIVE APPROACH TO GROUNDWATER RECHARGE



Results that Parjana® EGRP® system, installed by The Water Group LLC, has delivered to a recharge facility in Fresno.

High
performance
after 3 seasons
of available
water!

**Fresno
California**

9X

**Infiltration
Increase!**

EGRP
Infiltration
BMP

New Design
Solution

Stabilize Soil

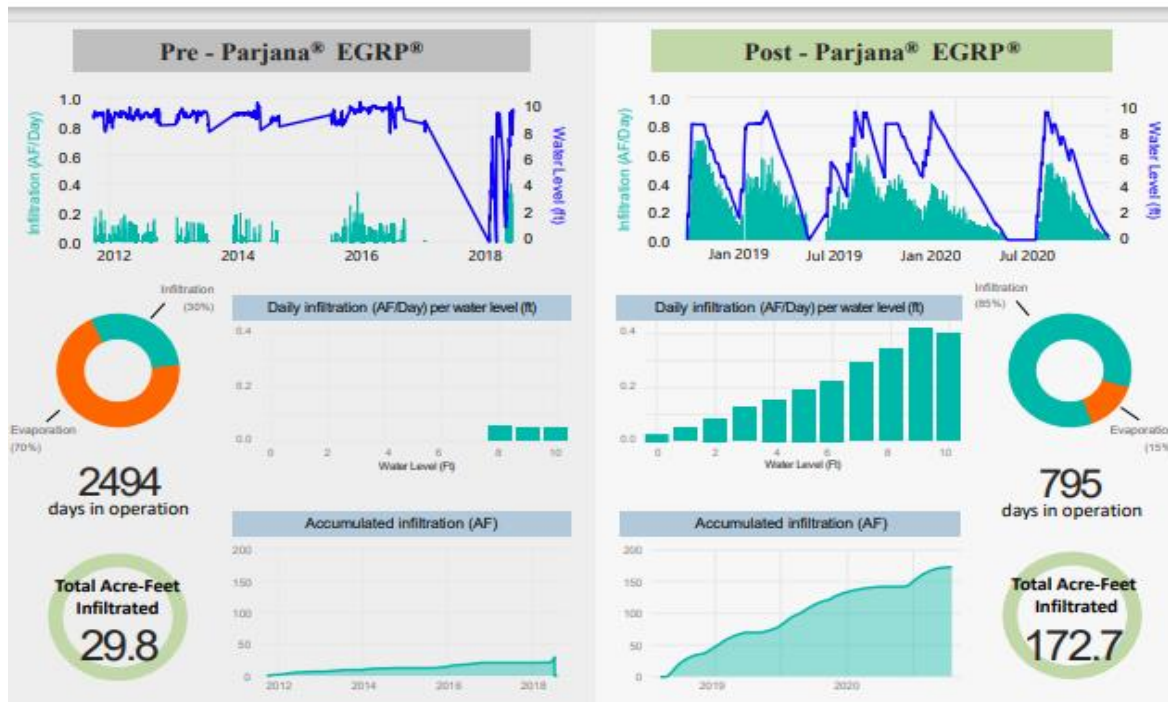
Turf
Management

Reduce
Runoff

Maintenance
Free

300+ Projects

Guaranteed



EGRP= Engineering Soil Permeability Double Existing Rates

Post installation: EGRP Infiltration Rate Increase in 6 months = 6 years prior performance and decreased evaporation loss by 90%+

GROUNDWATER RECHARGE NO MAINTENANCE A PROVEN STORMWATER INFRASTRUCTURE

Belle Isle, Detroit MI / Shelter 5



Background

Belle Isle, a 985-acre island in the Detroit River near the mouth of Lake St. Clair, is considered one of the jewels of the city of Detroit. Having recently been leased to The State of Michigan for thirty years, the Department of Natural Resources (DNR) has primary authority over its management within the Michigan State Park system (Greene 2013). This demonstration project was made possible through a grant from the Michigan Economic Development Corporation (MEDC) and was intended to vastly mitigate the expense of managing stormwater by DWSD, that would result annually in \$1.5 million dollars.

Purpose

Determine if the EGRP® system could eliminate standing water on an approximately 23 acres parcel and decrease the volume of stormwater delivered to DWSD through the municipal combined sewer drain system thereby alleviating the cost associated with treatment.

A secondary goal was to explore the effect the EGRP® system has on groundwater.

Project Description

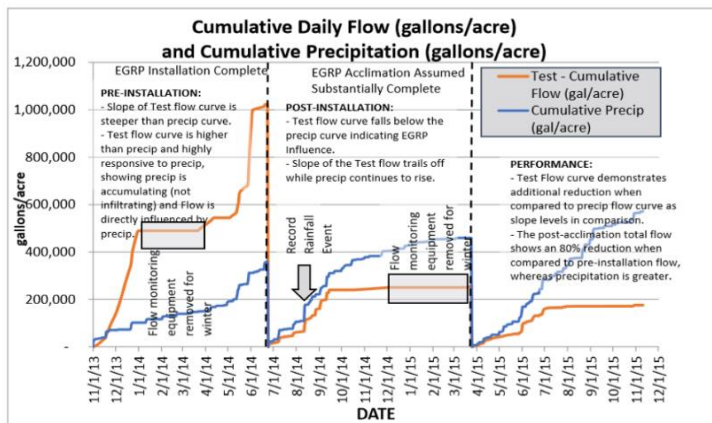
In summary, Environmental Consulting & Technology, Inc (ECT) monitored groundwater quality and elevation, precipitation, and stormwater flow in both the test site and the control site, located over 300-feet away from the test site. Tests were performed in three phases: before installation (Nov 2013 -June 2014), after installation but before acclimation (Jul-Mar 2015), and after EGRP® acclimation (Apr-Dec 2015).

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Surfacewater design has a new method to infiltrate, recharge, reduce runoff

Study Results

- EGRP Completely Eliminated Standing Water
- Surficial Water Table Elevation not Effected; Water Quality Unchanged
- Smaller Storms No Longer Contributed to Runoff Entering Sewer
- Discharge to Sanitary Sewer Reduced by 80%+ Annually; Representing a 7:1 Increase in Groundwater Infiltration



Flow Rate Pre - 3.1 MG Per hour Post - 580,000 Per hour
 2,520,000 Gallons Infiltrated in Place
 (A football field about 8 feet high)



Control



Post EGRP

Infiltration Rate
 104,166 GALLONS
 PER ACRE PER HOUR

Public Funded, Third party study, since 2015-saves \$400K annually in CSS processing fees

Infiltrate Locally Where Water Lands, Don't Convey, Infiltrate Stormwater in Place to Reduce Runoff Volume by 80%

EGRP CASE STUDY: FL-100 EGRP Increased Infiltration in Pond to Mitigate Standing Water



Retention Pond Case Study

Project FL-100
Pensacola, FL

www.projecthydrology.com

POST EGRP Performance = **NO PONDING**

FEB 2017

FEB 2015

NOV 2013

JAN 2012

APRIL 2010

JAN 2018

Design Criteria:

1. Mitigate Ponding
2. Infiltrate 1" in 72 hours
3. ERP Maintenance

JAN 2019 (EGRP Installed)

Street View

SEPT 2019

NOV 2019

NOV 2020

Note:
10 Year
Google view history
of ponding water

Image copyright Project Hydrology Inc

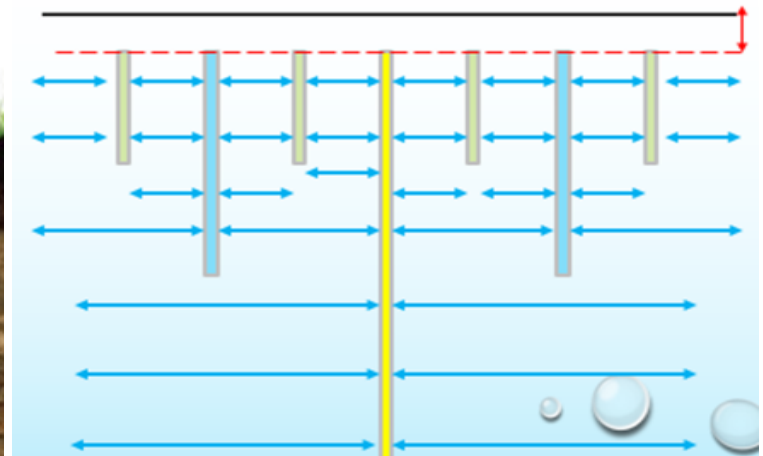
CALL:
850-292-6705
800-442-6709

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Drilling Function Creates:



Allows Water to Drain Deeper into Soils:



Flux/Movement Post EGRP
"CAPILARY TUBE"

Drilling function penetrates restrictive layers allowing water to drain/move down into the Earth



BEFORE



AFTER

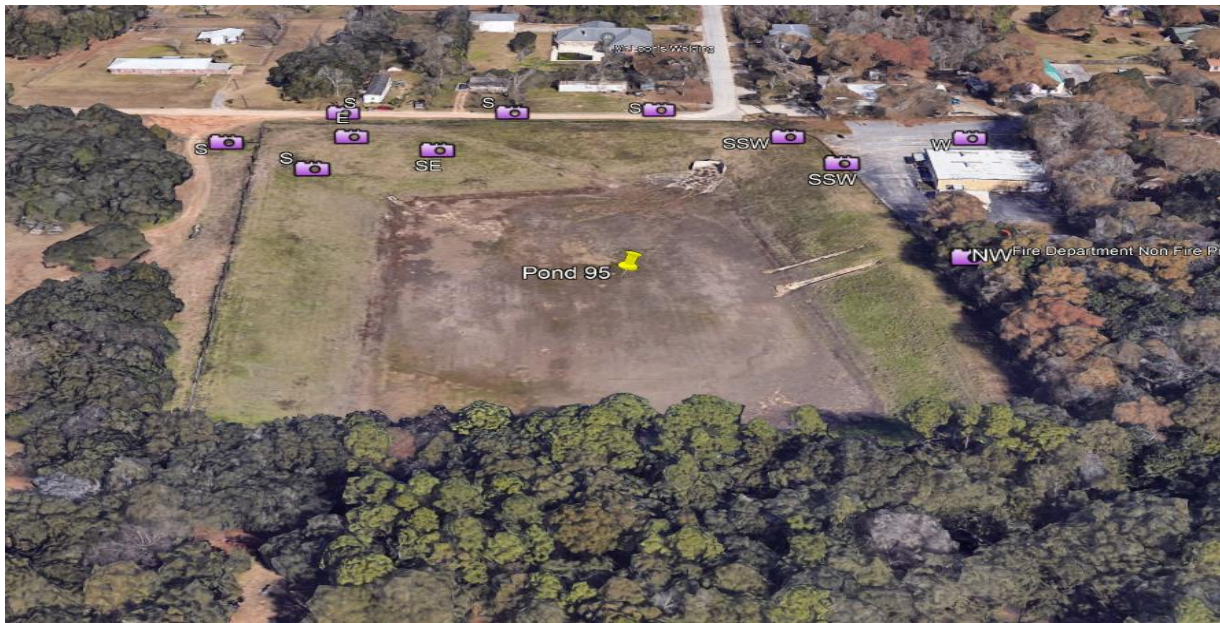


Performance Guaranteed

This 120 Acre Foot Basin has no outfall trapping stormwater once entering the pond. EGRP was funded in 2021 by the Escambia County Sheriff Office of Risk Management in collaboration with the Escambia County BOCC Engineering Staff as a Public Safety, Flood Mitigation project to mitigate historical flooding of nearby homes. Prefiltration rates were measured at 1.71" per hour, post installation data supports 3.65" inches per hour+. This project also outperformed its scope and infiltrated 88" of rainfall during 2021, that's 22" more than the historical 66" annually, as designed, and never once over flowed.

EGRP has a cost benefit of 1:5 when compared to traditional infrastructure designs saving capital improvement funds for citizens, reduced impacts to footprint, and environment.

Infiltrate don't convey! Put water in the ground where it lands with EGRP



Next Generation LID/GI Tecnologies- The Natural Approach & Stormwater Solution



EGRP LINE FIELD POST INSTALLATION AT POND 95



HURRICANE SALLY SEPT. 16, 2020, FLOODING AT POND 95

[Stormwater Systems, Erosion Control, Drainage Solution for Residential, Commercial, Agriculture, Industrial Effluent Disposal, Reduced Runoff, Groundwater Recharge, 300+ Projects, Guaranteed!](#)

INTRODUCING FLOOD-CON'S INNOVATIVE STORMWATER MANAGEMENT TECHNOLOGY



**REDUCES STORMWATER
STORAGE VOLUME BY 25-50%**

100 % SOLAR POWERED

Alerts for device health and exceeded
environmental parameters



**NO-OBLIGATION
DESIGN EVALUATION**

HOW DOES IT WORK?



Our AOS is a patented intelligent device that monitors rainfall and depth of pond then calculates how much water to allow to flow from the pond. It can mimic the natural runoff rate and volume and provides proper management of water quantity and quality. It sends storm event and vital information to our cloud via cellular connectivity. Flood-Con is the only company in the industry to provide a real solution to stormwater management and flood control.

HOW WILL THIS HELP ME?

MAXIMIZE LAND USE



Our system has the ability to reduce stormwater ponds up to 50%. For above ground ponds this gives the customer more flexibility developing the property. For sites with underground ponds it can save the customer substantial cost in underground detention.

TOTAL COMPLIANCE



Our product meets or exceeds stormwater runoff and quality requirements. Our system records event data in the cloud and provides customers the ability to prove regulatory compliance.

LOWER EXPENSES



Our product helps minimize system volume, uses less land area for ponds or underground detention. This saves money on land, construction costs, and time.



FLOOD-CON

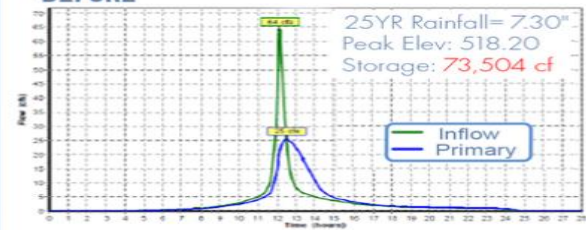
**EMERGENCY MANAGEMENT MODE- AUTO FUNCTION TO DEWATER PRIOR
& DURING PEAK RAIN EVENTS TO CONTROL FLOWS, MANAGE STORMWATER IMPACTS!**

It mimics the natural runoff of the actual storm by utilizing real time data and control flows to prevent potential downstream flooding.

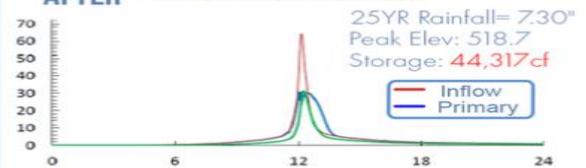


AOS VS CONVENTIONAL OS

BEFORE



AFTER 40% Pond Reduction



FLOOD-CON
REAL SOLUTIONS FOR RESPONSIBLE URBAN DEVELOPMENT



FLOOD-CON LLC

209 OXMOOR CIRCLE, #710 BIRMINGHAM, AL 35209

PHONE: 1-205-807-1799 EMAIL: CONTACT@FLOOD-CON.COM

Founded in 2016, our team has over 50 years combined experience leading and developing in the Civil and Systems Engineering Industry.

Our products have years of testing and refinement in the real-world environment.



FLOOD-CON - REAL WORLD EXAMPLES



Before



After Opt. 1

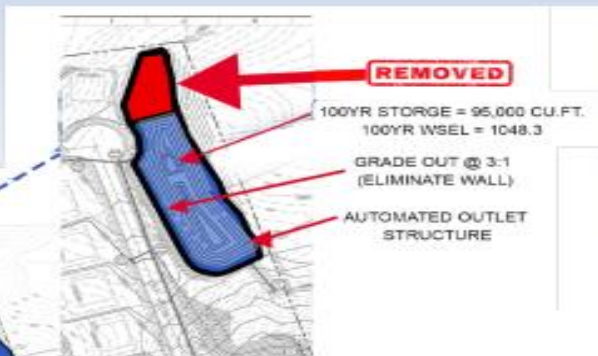


After Opt. 2

What We Did:

One Mile Parkway Madison, TN

Removed 100 LF of 8FT high retaining wall. Decreased pond volume by 22,100 CU. FT. (-31%). Reduced pond footprint by 40%. Save sitework construction costs.



RESULTS ARE BASED ON THE FOLLOWING:

RRv / WQV EL = 1044.00
AOS INVERT EL = 1039.00
(WITH INTERNAL WEIRS)

What We Did:

43 Lot Residential Subdivision
Gwinette CO., GA

Removed 500 LF of 10FT retaining wall.
Decreased pond volume 30,000 CU FT (-40%)



REDUCE STORMWATER POND SIZES UP TO 40% ALLOWING FOR INCREASED ROI & DEVELOPMENT



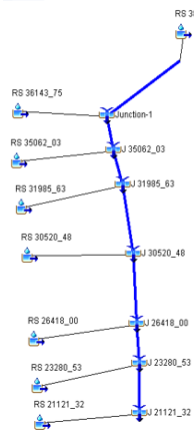
WE ALSO PROVIDE: ACTIVE TREATMENT

ENVIRONMENTAL MONITORING

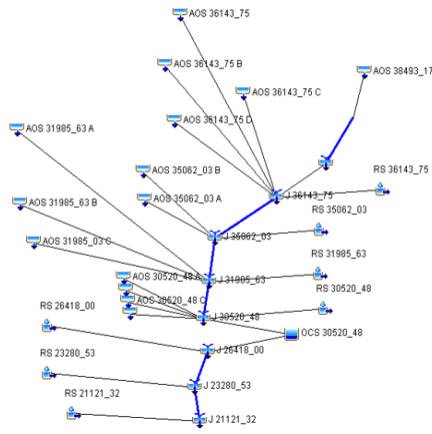
SITE MONITORING

AOS REMOVES DEVELOPMENT FROM FEMA FLOOD MAPPING & LOWERS BFE BY CONTROLLING SURFACE FLOWS

Existing model



Proposed model

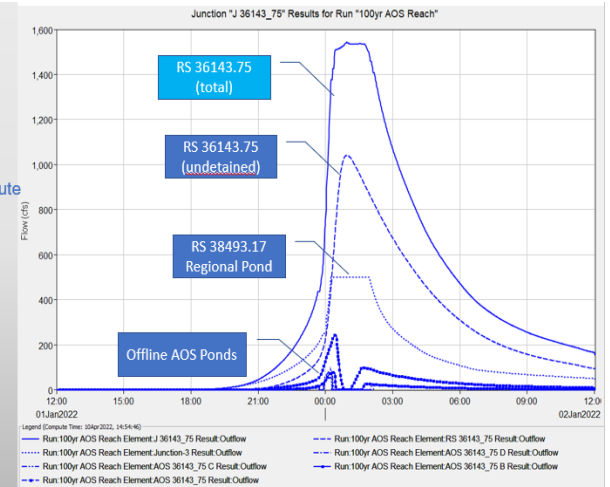


RS 36143.75

Total= Upstream + Undetained

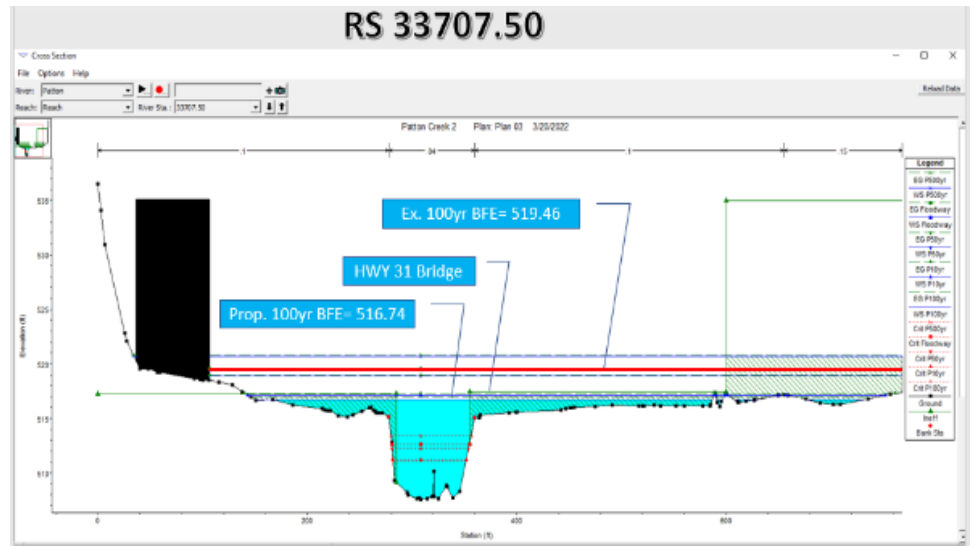
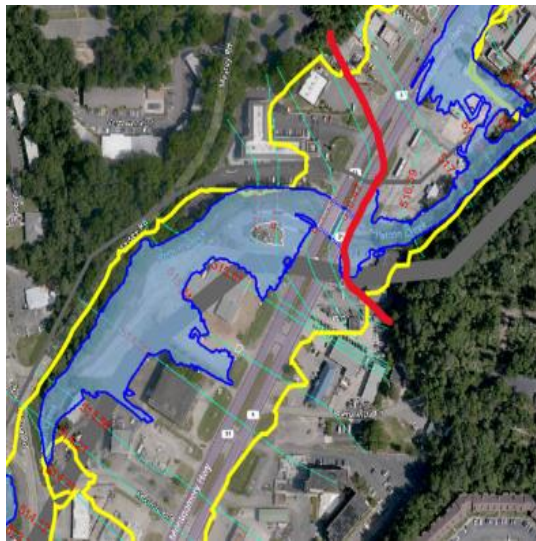
AOS Ponds do not contribute to the total peak

FLOOD MITIGATION
Patton Creek Study,
Jefferson County, AL



CASE STUDY: PATTEN CREEK BIRMINGHAM, ALABAMA

HYDROGRAPH OF PEAK FLOWS

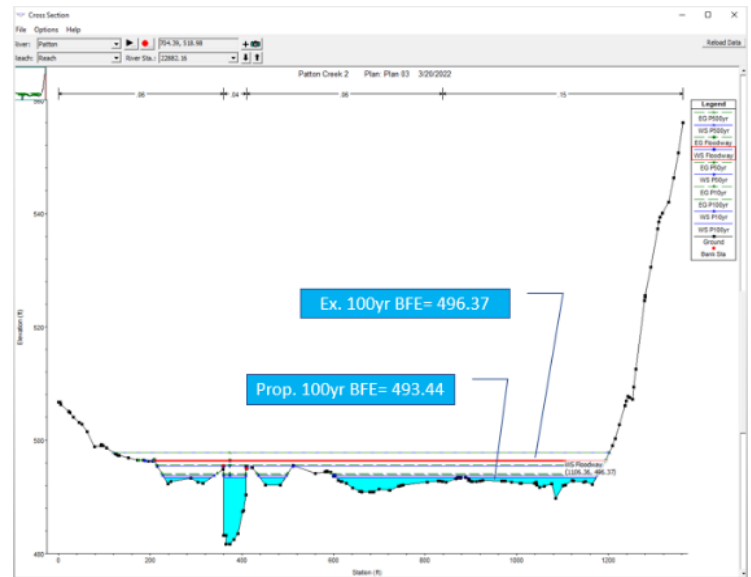
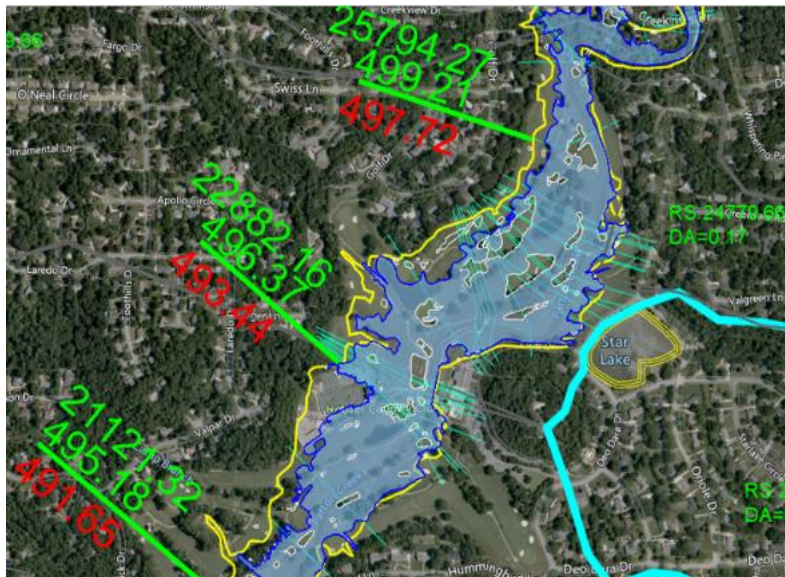


YELLOW LINE IS EXISTING FEMA MAPPING

FLOOD STAGE LOWERED 3 FEET POST AOS

BLUE LINE POST AOS INSTALLATION

ROADS, BRIDGES, COMMERCIAL & RESIDENTIAL DEVELOPMENT MITIGATED

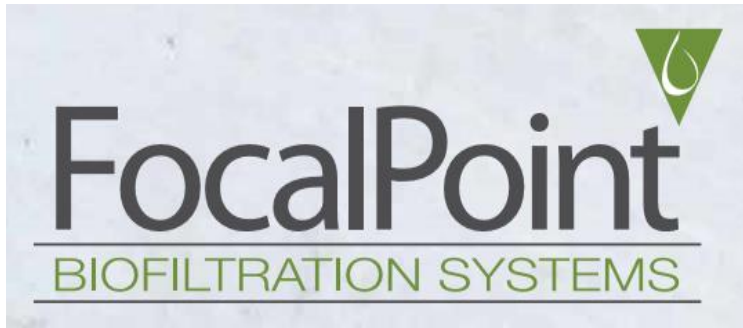


AOS MODEL OF PATTEN CREEK FLOOD MITIGATION

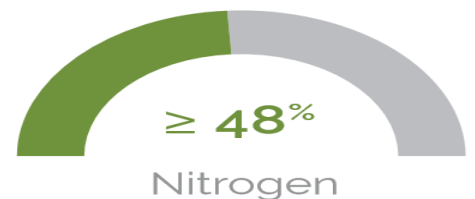
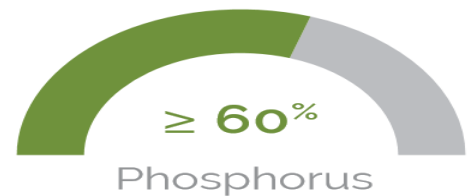
100YR BFE LOWERED BY 3' REDUCING IMPACTS OF FLOODING

NEW DESIGN TOOL TO CONTROL SURFACE FLOWS IN URBAN SPACE TO REDUCE FLOODING IMPACTS

3. FocalPoint - A Retention System Challenging Historical Designs



Pollutant Removal Efficiency



----Performance media makes system 30 times smaller, per acre, resulting in a 50% cost saving per acre treated----



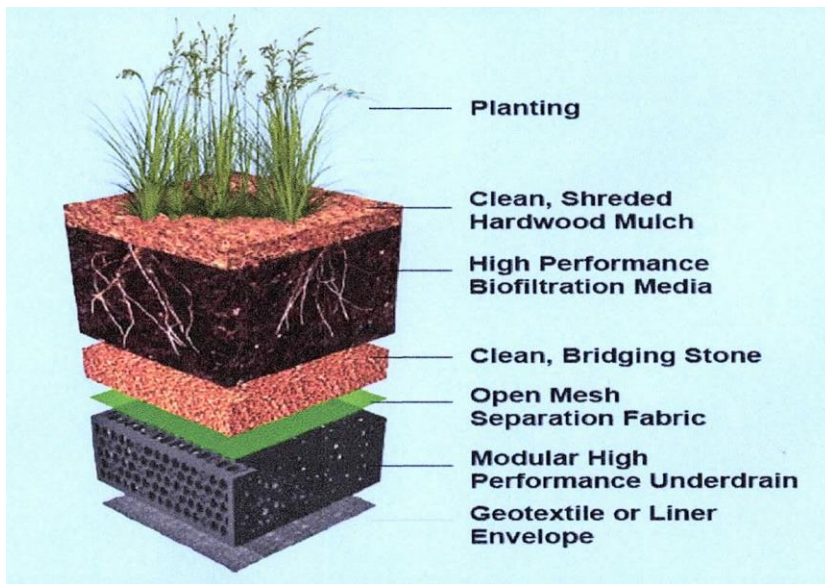
Performance Media Comparison

-Example: 112 Gallons per minute

-FocalPoint 108 SF x \$175 = \$18,900

-Low Flow Media 2170 SF x \$20 = \$43,400

RETHINKING REUSE, HARVESTING
RETENTION, DETENTION, WATER
QUALITY IN CONFINED SPACE



SMALLER FOOTPRINT
FLOW RATE 100" PER HOUR



FOCALPOINT

Traditional landscaping adds aesthetic value to projects, but has more potential. Many developers turn to bioretention, but are forced to surrender massive land areas and dedicate significant future funds to maintenance. FocalPoint reduces the space requirements and maintenance costs of bioretention by up to 90% while providing similar pollutant removal.

Why High-Flow Bio-Filtration?:

Same Volume and Treatment Capacity



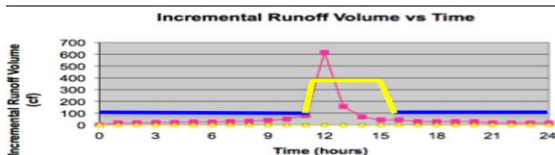
Same Volume and Treatment Capacity

Traditional Bioretention Design:
1,000 Square Foot of Standard
2"- 5" Per Hour / 4' to 10' Per Day
Bioretention Mix



= Media Treatment Footprint

1,000 Square Footprint: 980 Square Foot of
Grassed or Landscaped Depression
for Storage +
20 Square Foot of High Flow
100" Per Hour / 200' Per Day Biofiltration Mix



All of the island are connected and drain to the FocalPoint at the far end of the conveyance swale.



-----Confined Space Storage in Urban Areas = **FocalPoint**-----

RETHINKING RETENTION/DETENTION/REUSE/RECHARGE IN CONFINED URBAN SPACE

Project Hydrology Offers a System Approach Infrastructure Design for Flood Mitigation, Improved Stormwater Management

1. **EGRP** = Reduce volume using infiltration, control erosion, mitigate flooding, reduced footprint, recharge, cost less
2. **AOS** = Control stormwater flows to mitigate flooding, reduce pond size, water quality, emergency management mode
3. **Focal Point** = Confined space stormwater storage in tight urban areas, bioretention, reuse, water quality, economy

**IT'S A VALUE PROPOSITION
MULTIFUNCTIONAL DESIGN FOR
SAFER COMMUNITIES**

**FLOOD MITIGATION, RUNOFF REDUCTION,
AUTOMATED STORMWATER CONTROL,
PERFORMANCE VERIFIED, COST EFFECTIVE,
LID/GREEN, RECHARGE GROUNDWATER**

**Remove communities, real estate and other development in your municipality from designated FEMA flood mapping areas with our products by reducing volume, controlling flows, and storage.
Improved drainage in your yard, stabilize soils, recharge rain water to prevent flooding.**

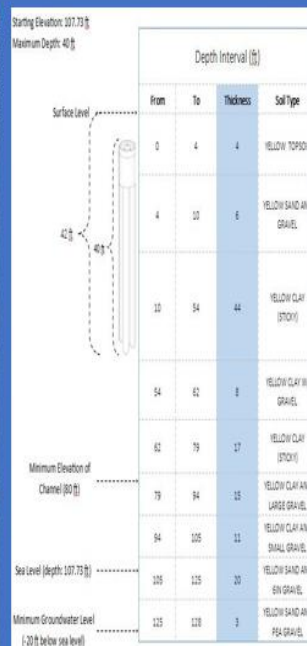
AMERICAN DRILLING INC GEOTECHNICAL ENVIRONMENTAL WATER WELL

**TEST BORINGS * LIMITED ACCESS DRILLING
* WELL REHABILITATION**

**ANGLE DRILLING * MINIMAL DISTURBANCE
DRILLING * GRAVEL DEPOSIT EXPLORATION**

**HAND PORTABLE TRIPOD DRILLING *
MONITOR WELL INSTALLATION *
UNDISTURBED SAMPLES**

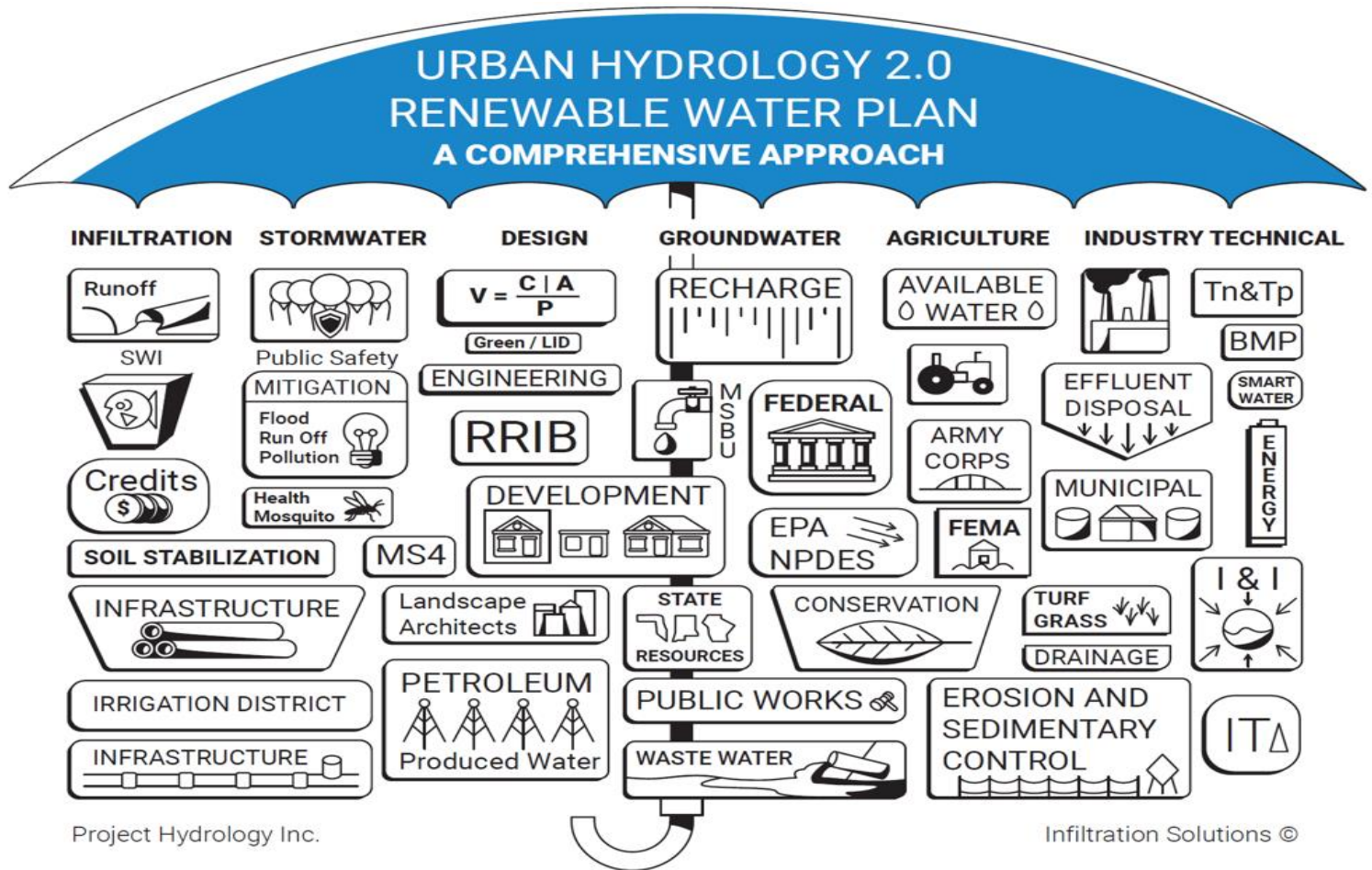
**CONCRETE DIAMOND CORING * WELL
ABANDONMENT * INDOOR DRILLING * LOW
CLEARANCE DRILLING**



2373 Herman Ave Pensacola, FL 32505 850 450 6011

WATER MANAGEMENT INFRASTRUCTURE DESIGN SOLUTIONS

Our Plan To Change The World



How will we, how will you apply and embrace a new design, new infrastructure, new tools for surfacewater management?

INFRASTRUCTURE THAT AFFECTS EVERY INDUSTRY, EVERY DESIGN, COST LESS, AND ARE A SUSTAINABLE SHIFT TO MANAGING SURFACEWATER. WATER GIVES US LIFE AND IS OUR MOST PRECIOUS RESOURCE. NOW, ADD A PASSIVE, AUTOMATED WAY TO RECHARGE, REUSE, AND MITIGATE TO A WORLD CHALLENGED BY AQUIFER DEPLETION, DROUGHT, NATURAL DISASTER, POLLUTION, RISK MANAGEMENT, AND GLOBAL WARMING TO SOLVE MULTIPLE CHALLENGES.



**PROVEN SOLUTIONS FOR
RESPONSIBLE URBAN
DEVELOPMENT**

WATER MANAGEMENT SOLUTIONS FOR HISTORICAL CHALLENGES



**ONE OF NATURE'S BMP SEEN NEAR
BRISTOL, FL. ROADSIDE ALONG
HWY 65, THE APALACHICOLA
NATIONAL FORREST PITCHER
STAND IS A MUST SEE. A HIDDEN
TREASURE WITH FIELDS OF
PITCHER BOGS THAT DOT
WETLANDS IN THE PERESERVE
ALONG A SERINE SCENIC BYWAY.
SARRACENIA FLAVA SEEN HERE
ARE INDIGENOUS TO THE
EASTERN SEABOARD,
CARNIVOROUS, AND ATTRACT
PREY WITH EXTRAFLORAL
NECTARIES.**

Mission/Vision of the Company 2018

We took a Chance!

Together, we took a chance to explore an opportunity to develop a market of what we thought was the next disruptive technology. A revolutionary product that could change the concept of water management. Simply put, augmented permeability; made possible by the product EGRP, energy passive groundwater recharge product, by Parjana.

Too test market the concepts and benefits of infiltration and explore the science of this application within the water regime.

Too pursue adaption, gain regulatory review, and solicit acceptance within the public, state, federal, and private sector of the Southeast to promote a general awareness of EGRP, new 'BMP' (best management practice), a new science for surface water management.

We challenge historical designs and support policy with cutting edge solutions benefiting public safety and health, while promoting environmental stewardship.

"The iPhone of Water Management"



Detroit, MI 2018

BOD 2018



Guyton, Ga. 2020



Orange Beach, Al 2020



Warnerville, CA
2019

BOD July 2021



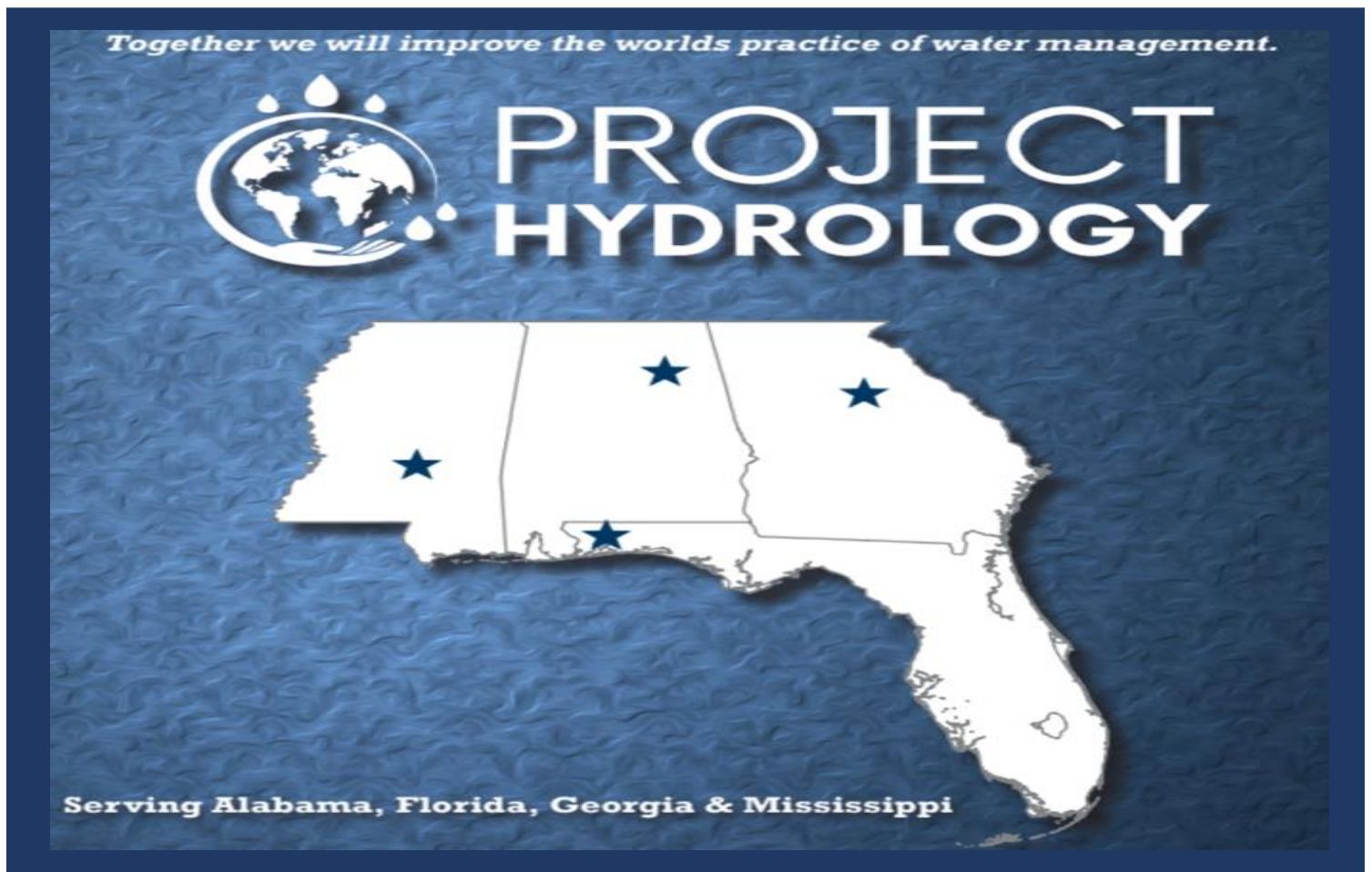
POND 95 2021



AAFPM 2021

Project Hydrology, Inc. promotes innovative stormwater management and flood mitigation solutions through low impact green technologies, employing multidisciplinary products and strategies in achieving water management goals

IMPROVED DESIGN-INCREASED SAFETY-REDUCED IMPACTS



PROJECT HYDROLOGY INC

CORPORATE OFFICE

7199 Kimbrell Lane

Milton, FL. 32570

POSTAGE

TO:

FLOOD MITIGATION SPECIALISTS

TO ORDER: PHONE, ONLINE, EMAIL, OR TO SCHEDULE A PRESENTATION

www.projecthydrology.com 800-442-6709 850-292-6705 theprojecthydrology@gmail.com

LID -Low Impact Development / GI -Green Infrastructure

ALABAMA FLORIDA
MISSISSIPPI GEORGIA

We're growing...

Together, we will improve the Worlds Practice of Water Management

STORMWATER MANAGEMENT INFRASTRUCTURE SOURCE FOR FLOOD MITIGATION

SUMMER 2022

SERVING THE SOUTHEAST

CALL TODAY

STORMWATER TECHNOLOGIES

"Reversing the Effects of Urbanization on Runoff"