ELIJAH BEHNKE
STATE REPRESENTATIVE • 89th ASSEMBLY DISTRICT

10/06/2021

Testimony on Assembly Bill 500, Assembly Committee on Environment

Chairman Kitchens and Members of the Assembly Committee on Environment,

Thank you for holding a public hearing today and allowing me to testify in favor of Assembly Bill 500, which allows for installation of certain groundwater recharge systems.

The Energy-Passive Groundwater Recharge Product (EGRP) was designed to increase infiltration of surface water into and through soils, providing benefits to groundwater recharge, runoff mitigation, water quality, and vector control. These systems have not only been successful throughout the country, but also throughout the world.

The EGRP system can be used with other established drainage systems or by itself. The device is installed in the sub-surface of soil allowing flow paths between soil layers and restoring moisture content to the soils. It has been shown that storm water infiltration capacities can be improved by a factor of 5 to 10 times the existing rates.

Despite the wide success of the EGRP technology, the Wisconsin Department of Natural Resources has strict rules prohibiting the use of injection wells compared to other states. Assembly Bill 500 is asking the DNR to provide an exception to this prohibition due to the advanced EGRP technology.

Assembly Bill 500 allows EGRP installation to be done in Wisconsin without impacting any water quality standards. The design of EGRP allows the installation of this technology to be eco-friendly while still reducing flooding and standing surface water. This technology also has been proven to require no maintenance once installed.

Assembly Bill 500 allows the innovative, eco-friendly EGRP technology to be utilized in Wisconsin like many other states in the country. I believe that it is important to make Wisconsin continues to evolve and implement new systems that betters our environment.

Thank you again for holding this hearing on Assembly Bill 500 and allowing me to testify in favor of it. I am happy to answer any questions you may have.

P.O. Box 8953 • Madison, WI 53708-8953
Office: (608) 266-2343 • Toll Free: (888) 529-0089 • Rep.Behnke@Legis.WI.Gov

ANDRÉ JACQUE
STATE SENATOR • 1ST SENATE DISTRICT

Phone: (608) 266-3512
Fax: (608) 282-3541
Sen.Jacque@legis.wi.gov

State Capitol - P.O. Box 7882
Madison, WI 53707-7882

Testimony before the Assembly Committee on Environment
State Senator André Jacque
October 6, 2021

Chairman Kitchens and Committee Members,

Thank you for holding this hearing on Assembly Bill 500, allowing installation of certain groundwater recharge systems.

The Energy-Passive Groundwater Recharge Product (EGRP) is a technology that accelerates infiltration into and through all soil conditions and types, so that instead of water pooling, or excess stormwater running off, the water can now infiltrate those same soils significantly faster than before. These systems have been successfully implemented throughout the United States and internationally, and are used in both public and private sector applications. There has been a considerable amount of interest in the EGRP technology in Wisconsin, however, unfortunately the installation process used for the EGRP is not allowed under NR 812.05 of the Wisconsin Administrative Code, as the Wisconsin DNR has a more stringent prohibition on the use of injection wells than most other states, none of which had anticipated the development of the EGRP Technology.

Assembly Bill 500 allows this best practice to be implemented in Wisconsin, specifically dealing with the technical issue of EGRP installation, without impacting any water quality standards. The passive design of the EGRP increases the infiltration rate in a low-impact, eco-friendly manner requiring no energy and no maintenance, successfully reducing standing surface water and flooding, while improving water quality.

During installation, a series of EGRP devices are inserted vertically into the ground underneath natural topsoil, which allows water entering the EGRP network to be naturally filtered by the soil. The EGRP arrays initially capture surface water and subsequently dewater upper soils, thereby preparing the upper soil layer for the next wet-weather event. The water that enters, and contacts the EGRP, is then pushed outward into the various soil layers via capillary action, using naturally occurring movements of soil and earth. By accelerating infiltration into and through the near surface soils, the EGRP technology increases the volume of stormwater that can be stored, infiltrated, and ultimately recharged. Surface water that would have pooled or run off is captured below grade and filtered locally. The total volume of water to be infiltrated by the EGRP can be enhanced by pairing it with other common stormwater processing practices, that capture peak stormwater volumes. The EGRP can work in concert with stormwater ponds, bioretention systems, and other subsurface storage systems. This "systems approach" captures stormwater runoff, stores the peak volume, adsorbs certain pollutants of concern, and allows large volumes of water to infiltrate over time, using fundamental physical principles to restore and optimize rates of water infiltration through the soil. Soil moisture can be managed both vertically and horizontally without the need of a water pump, heavy excavation, or continuous maintenance.

The EGRP System can function independently or in conjunction with established drainage systems to improve overall drainage performance, eliminate standing water, protect underground structures, and/or manage soil moisture. As described in the LRB Analysis, the EGRP consists of five-chambers. It is a hydrophobic

ANDRÉ JACQUE
STATE SENATOR • 1ST SENATE DISTRICT

Phone: (608) 266-3512
Fax: (608) 282-3541
Sen.Jacque@legis.wi.gov

State Capitol - P.O. Box 7882
Madison, WI 53707-7882

polyethylene plastic device with base lengths of 5 to 40 feet, having a device diameter of 1.25 and 2 inches, a drill hole diameter 2.5 inches or smaller, and is installed vertically between 2 to 3 feet below the surface, and capped to restrict water flow.

Thank you for your consideration of Assembly Bill 500.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor
Preston D. Cole, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

Assembly Committee on Environment

2021 Assembly Bill 500

Allowing installation of certain groundwater recharge systems

October 6, 2021

Good morning Chair Kitchens and members of the Committee. My name is Bruce Rheineck, and I am the Groundwater Section Chief for the Wisconsin Department of Natural Resources. Thank you for the opportunity to testify in opposition to Assembly Bill 500 (AB 500), related to allowing installation of certain groundwater recharge systems.

The department opposes AB 500 due to the risks the bill poses to public health and to the drinking and groundwater resources of the state.

AB 500 would represent a major policy change, by permitting, for the first time in the state, the disposal of stormwater by deep injection into the subsurface. The bill contradicts existing statutes specifically crafted to prohibit deep injection practices and to provide safeguards against endangering Wisconsin's underground sources of drinking water. If passed, it would threaten groundwater quality and perhaps lead to Wisconsin losing primacy for the Underground Injection Control (UIC) program.

Unlike other states, there are no aquifers in Wisconsin that have been designated for waste disposal, and all are used for drinking water. To allow the installation of devices that allow deep injection of contaminated water and that bypass the natural protection of soil is contrary to existing Wisconsin Administrative Code and federal regulations. This would be a dramatic shift from Wisconsin's record of protection of the groundwater resource, which serves as the sole source of drinking water for 70% of the state's population.

AB 500 requires the DNR to provide an exception to the use of wells and drillholes for the placement of any substance underground for the installation of certain groundwater recharge systems. These systems deliver stormwater quickly as much as 43 feet below the ground surface. By the nature of its design, the product would do so in a manner where surface water containing bacteria, viruses and other contaminants would be channeled directly (untreated) into groundwater. The product functions by creating vertical openings or macropores in the subsurface, which allow for standing water under hydrostatic pressure to bypass the normal filtering capacity of soil layers and to fall freely under gravity, not by capillary action as claimed. Without the full unaltered soil column to help absorb, retard, and degrade contaminants, there is a significant risk to water quality and public health. In addition to directly carrying surface pollutants deeper into the subsurface or directly to the water table itself, the recharged water could have lower pH and high dissolved oxygen. These factors can cause geochemical reactions contributing to water quality problems, including the release of arsenic and heavy metals.

Existing stormwater management best practices in Wisconsin are designed to capture stormwater runoff and infiltrate it into the ground over a period of days. These practices include infiltration trenches, infiltration basins, bioswales, rain gardens, pervious pavement, and other practices. Runoff gradually

percolates through the bottom or sides of these installations, removing pollutants through sorption, trapping, straining, and bacterial degradation or transformation. None of these broadly accepted and implemented existing stormwater practices are designed to rapidly shunt standing water into the subsurface.

The bill would require multiple changes to NR 812 and 815 and would create an almost certain risk of violating 40 Code of Federal Regulations (CFR) part 142 and part 144. In particular, 40 CFR 144.12: "(a)No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons." To comply with 40 CFR part 142 and part 144, the department would need to develop a new permitting program that reviews proposals for deep injection of fluids, which are currently prohibited. A new review process and new staff would be required for permitting approval, inspection, and long-term tracking. Additional staff will also be needed to address the increase in contaminated potable well incidents and to inspect facilities where these practices are deployed.

For the reasons outlined above, AB 500 poses serious risks to public health and to the drinking and groundwater resources of the state.

On behalf of the Department of Natural Resources, we would like to thank you for your time today. I would be happy to answer any questions you may have.

WISCONSIN WATER WELL ASSOCIATION, INC.

Providing & Protecting Wisconsin's Groundwater

To: Assembly Committee on Environment

From: Jeffrey J Beiriger
Government Relations Advisor
Wisconsin Water Well Association

Re: Opposition to Assembly Bill 500 (Groundwater Recharge Systems)

On behalf of the Wisconsin Water Well Association and its members – well drillers and pump installers operating in every part of the State – I am testifying in opposition to Assembly Bill 500 related to groundwater recharge systems.

The mission of the Wisconsin Water Well Association is to provide and protect Wisconsin's groundwater. People don't hire us to drill wells. They hire us to provide water. A quality well is only as good as the quality of the groundwater below.

Last session, the Speaker convened a Clean Water Task Force. We applauded that effort, participated in public hearings, and worked to see several of the Task Force recommendations enacted into law. Headlines about Flint, Michigan brought a renewed urgency to the issue of clean water. So too has the issue of nitrates and, more recently, PFAS.

We went through an extensive process and balanced the needs of many stakeholders to make progress on this issue. Nobody walked away satisfied, but we all walked away knowing there was more work to do, and that we were heading in the right direction.

This bill, we think, is a move in the *wrong* direction.

To begin with, this bill circumvents an existing product review process within the Department of Natural Resources. We support the agency's review process. The agency has consistently placed the safety of our groundwater and public health before all other considerations. Their reviews have been consistent, objective, and fact-based and have been for many years.

In addition, the industry has opposed the use of injection wells of any kind, and that's what we are talking about here – a product that is designed to take water from the surface and inject it into the ground below. Or the groundwater directly, as the bill allows the injection well to extend as much as forty-three feet below the surface. As one driller told us:

> *"My fear is that by accelerating the speed by which the surface water percolates through the soil and rock layers it will not be sufficiently cleaned upon entering the saturated zone where all wells are terminated."*

The problem is, the groundwater, in many areas of the state, can be reached at and above that level. One immediate example is the area on the northeast part of the state – the Karst Area – where the depth to groundwater can be less than 50 feet. This is the same area that is already experiencing water quality difficulties because of nitrates and arsenic. We know that PFAS is an emerging issue that we will have to deal with in many areas of the state. To introduce another potential source of contamination to that area – or any area – is simply not good policy.

Neither do we think that the issue is simply one of installation. Even if approved, there are some products whose continued operations require commitments to ongoing maintenance. If an owner of a care defers maintenance, the majority of the impacts fall on the car owner. That's not the case here. We cannot simply install these systems and walk away because the impacts fall upon everyone in that aquifer. Thus, restricting the use of injection systems to certain types of properties doesn't work. For instance, restricting use to commercial properties or providing setbacks from public water supplies is inadequate, we believe, because the groundwater does not care about the use of the property above and everyone in Wisconsin – users of publican and private water systems – should have an expectation that we are doing everything we can to protect their water supply.

Let me expand on that idea – that the groundwater does not care about the property lines above. That's the basis for POWTS remediation programs and well compensation grant programs. What happens on one property affects others and thus there is a public interest in what happens on that property. We support surface water remediation, it's just that we believe that the solution should remain above ground and on within the property owner's lot lines. Surface water does not travel straight down. Water below the surface is subject to lateral forces and will follow a path of least resistance. Even a well on an adjacent property can affect the travel of the groundwater as it is drawn to that well by the actions of the well pump below ground. It can't be stressed enough that what goes into the ground on one property will almost certainly have effects on other, neighboring properties.

That's why we think the best way for a property owner to address surface waters is at the surface, using other available means to capture surface water and allow for it to slowly make its way back to the aquifer below. AB 500 offers a "solution" to one problem – accumulating surface waters – by creating another – a direct conduit for contamination to the groundwater. Better to solve the problem above the ground, we think, where we can better see what the effects are.

Finally, I'll turn to the comments of another driller regarding the capacity of injection systems. He said:

> *"I am concerned that during these heavy rainfall events the increase in infiltration suggested in the EGRP design would not allow the soil to properly clean the runoff water prior to entering an aquifer."*

Heavy rainfall events do happen. In Green Bay, more than 3.4 inches of rain fell in a single day just this past August and the number of significant rainfall events is on the rise across the state. To be clear, a 100-year rain is just another way of saying that there is a one percent chance that there will be a major rainfall event at a particular location. If there were only one hundred cities, villages, or townships in our state, we would experience one major rainfall event somewhere in the state each year. There are more, and so the risk is, simply put, too high and affects too many people.

As noted earlier, our mission is to provide and protect Wisconsin's groundwater. In opposing this bill, we strongly believe that we are choosing to protect the groundwater today so that we can provide safe, clean water for many years to come.

About the WWWA

The Wisconsin Water Well Association represents over three hundred licensed well drillers and pump installers. Its purpose is to increase the industry's knowledge and understanding of proper drilling, pump installation, and well abandonment techniques; work with the appropriate state and local agencies in the protection of Wisconsin's groundwater, and increase the public's awareness of the importance of and involvement in groundwater efforts.

Wisconsin Wetlands ASSOCIATION

Wisconsin Wetlands Association Testimony on Assembly Bill 500

Jennifer Western Hauser, Policy Liaison

On behalf of the Wisconsin Wetlands Association, I appreciate the opportunity to comment on Assembly Bill (AB) 500 related to permitting installation of groundwater recharge systems. The Wisconsin Wetlands Association is dedicated to the protection, restoration, and enjoyment of wetlands and associated ecosystems through science-based programs, education, and advocacy. As you may know, wetlands are masterful at storing and slowing water, reducing flooding and damages, improving water quality, and replenishing groundwater. Wetlands also can have direct connections to groundwater and surface water.

As an organization with extensive work focused on helping Wisconsin communities reduce flood risks and damages, we are sensitive to the need for both natural and technology-based solutions and appreciate the authors' intent to share and discuss new technology for managing the storage and movement of water across Wisconsin's landscapes.

It is our position that there is no bad technology, but that technology inappropriately applied can cause more harm than good. We do not support this bill as written because it enables use of a specific water management system anywhere, for essentially any purpose, and provides no safeguards to protect waters of the state or adjacent property owners.

While we *can* imagine situations where this particular technology may benefit a landowner and could also be beneficial to the resource, there are also many circumstances where its use may not be appropriate or simply may not work.

While the bill subject is regulation of groundwater recharge systems, this technology also promotes surface water drainage and appears to function as a vertical drainage tile. With that in mind, we are particularly concerned about unintended consequences for wetlands.

We believe this proposal would benefit from additional consultation with experts in hydrology and hydrogeology who can offer objective feedback to help policy makers determine the contexts in which this technology might be appropriate, beneficial, and effective, and when it may be detrimental. Specifically, we encourage you to seek input from the Wisconsin Geologic and Natural History Survey, or even individually to members of the Examining Board of Professional Geologists, Hydrologists and Soil Scientists Board.

Further consultation with Wisconsin DNR, DATCP, Wisconsin Emergency Management, and statewide organizations representing municipalities and counties would also be beneficial as the proposal appears to have wide-reaching implications for policies and practices related to stormwater management, agricultural drainage, groundwater protection, floodplain management and flood risk reduction, among others.

As a final comment, we also recommend that the legislature request either a Wisconsin-based pilot project to demonstrate this technology, or at least a synthesis of available literature to better understand how and where the use of the proposed groundwater recharge technology can help address Wisconsin-specific water management concerns.

We appreciate the opportunity to offer this feedback on AB 500 and respectfully request that this proposal be held to allow time for further input and consideration. Please feel free to contact me at 608-695-7511 or Jennifer.westernhauser@wisconsinwetlands.org if we can be of further assistance.

MEG
Water Division
Municipal Environmental Group

P.O. Box 927
Madison, WI 53701-0927
Telephone (608) 283-1788
Facsimile (608) 283-1709

TO: Assembly Committee on the Environment

FROM: Municipal Environmental Group - Water Division (MEG - Water)

DATE: October 6, 2021

RE: Opposition to AB 500 - Allowing Installation of Certain Groundwater Recharge Systems

MEG - Water is an association of 69 municipal water systems who provide drinking water to Wisconsin residents. MEG - Water and its members oppose AB 500.

It is critical that drinking water sources be protected from contamination. MEG - Water opposes AB 500 because it would allow for the installation of groundwater recharge systems which would provide a direct conduit for contamination to reach the source of drinking water for many Wisconsin residents.

Municipal water systems are required by the federal Safe Drinking Water Act (SDWA) to take action to protect the groundwater used for drinking water. For example, they must ensure that unused wells in their communities are eliminated so those wells do not provide a conduit for contaminating the groundwater, and they must adopt wellhead protection plans in order to manage potential sources of contamination and minimize their threat to drinking water sources. AB 500 runs directly contrary to those source water protection efforts.

If municipal drinking water is contaminated, it will cost all residents who receive that water more because treatment of that water will have to provided and paid for. The minimal advantages that AB 500 may provide to a few do not justify the risk that these systems may contaminate our drinking water.

MEG - Water asks you to oppose AB 500.

For further information, please contact MEG - Water's Legal Counsel, Lawrie Kobza at lkobza@boardmanclark.com or 608-283-1788.

cleanwisconsin

YOUR ENVIRONMENTAL VOICE SINCE 1970

DATE:	October 6, 2021
TO:	Members of the Assembly Committee on Environment
FROM:	Clean Wisconsin
RE:	Assembly Bill 500 – Installation of Groundwater Recharge Systems

Chairman Kitchens, Vice-Chairman Tusler, Ranking Member Hebl, and Committee Members,

Thank you for the opportunity to testify on Assembly Bill 500. My name is Erik Kanter. I am the Government Relations Director at Clean Wisconsin.

Clean Wisconsin works to preserve and protect our state's clean air, clean water and natural heritage. For over 50 years, legislators on both sides of the aisle, policy makers and the general public have turned to Clean Wisconsin for reliable, evidenced-based analysis of legislative and administrative proposals.

We oppose Assembly Bill 500, which would undermine existing groundwater protections in Wisconsin and allow surface water, and the pollutants it carries, to bypass natural filtration mechanisms and pollute groundwater resources.

Groundwater is the source of drinking water for two thirds of Wisconsin's residents. Hundreds of municipal water systems and hundreds of thousands of private wells draw drinking water from Wisconsin's groundwater resources. Despite the importance of groundwater as a source of drinking water for Wisconsin families, tens of thousands of wells across the state are already polluted with contaminants from the surface that make their way down through soils and bedrock to the groundwater. AB 500 could exacerbate this already acute drinking water pollution problem.

AB 500 would allow contaminated surface water to bypass much of the natural filtration mechanisms that protect our groundwater from surface contaminants and rapidly inject untreated stormwater into the groundwater. We already know that inadequate filtration or treatment of surface water can contaminate groundwater resources when that surface water moves underground. Throughout Northeast and Southwest Wisconsin, shallow soils and fractured bedrock allow surface contaminants to rapidly reach groundwater, and Wisconsin faces significant drinking water contamination challenges in these parts of the state.

634 W. Main Street • Suite 300
Madison, WI 53703
www.cleanwisconsin.org

Phone: 608-251-7020
Email: info@cleanwisconsin.org

We do not want to introduce a technology that would create circumstances similar to those in Northeast and Southwest Wisconsin in other parts of the state, or make an existing problem worse in those areas, in an attempt to address stormwater concerns. AB 500 would, in fact, employ a technology contrary to other widely used practices that slow stormwater movement so that it can be treated before polluting other water resources.

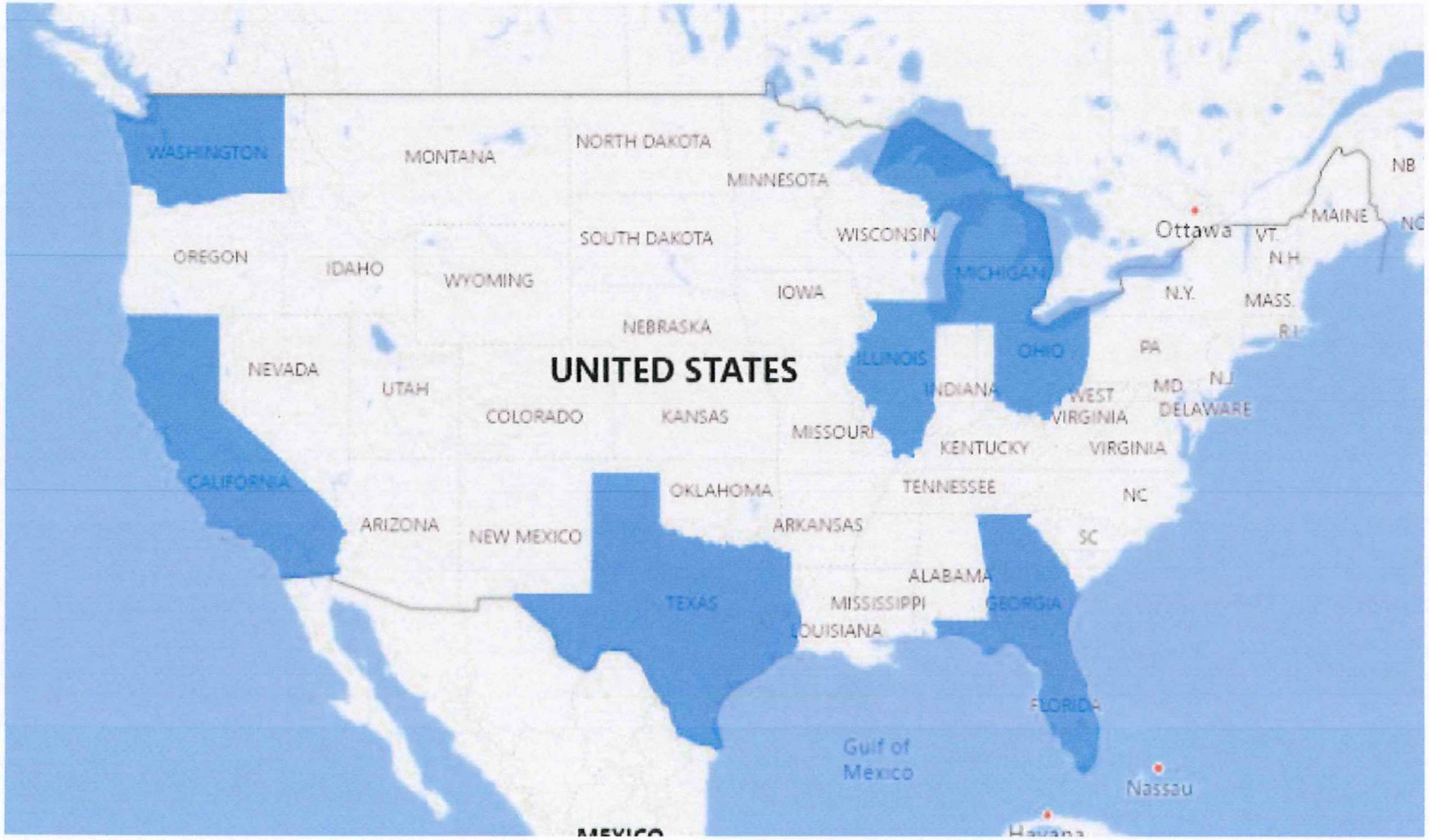
We urge you to protect Wisconsin's groundwater quality and oppose Assembly Bill 500.

634 W. Main Street • Suite 300
Madison, WI 53703
www.cleanwisconsin.org

Phone: 608-251-7020
Email: info@cleanwisconsin.org

States where the EGRP® is installed

The first device was installed in 1997 and still works to design! No site has required maintenance since installed! There's also been positive response to nearby vegetation and no negative feedback on groundwater quality.



PARJANA®

PARANA

States where the EGRP® is installed

The first device was installed in 1997 and still works to design! No site has required maintenance since installed! There's also been positive response to nearby vegetation and no negative feedback on groundwater quality.

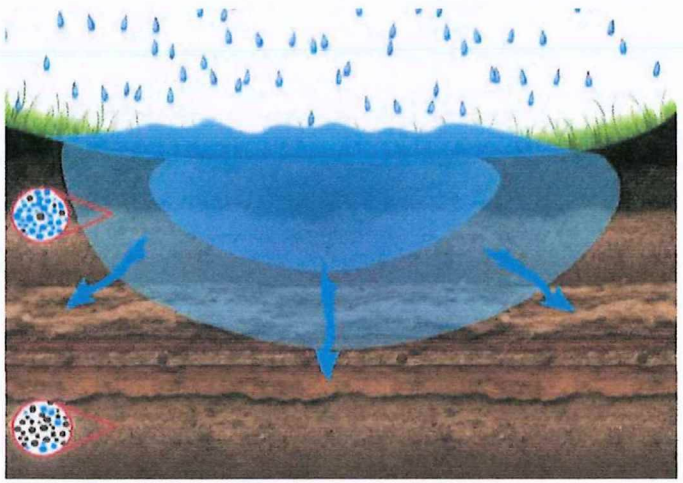
How does the EGRP® work?

EGRP stands for Energy-Passive Groundwater Recharge Product®.

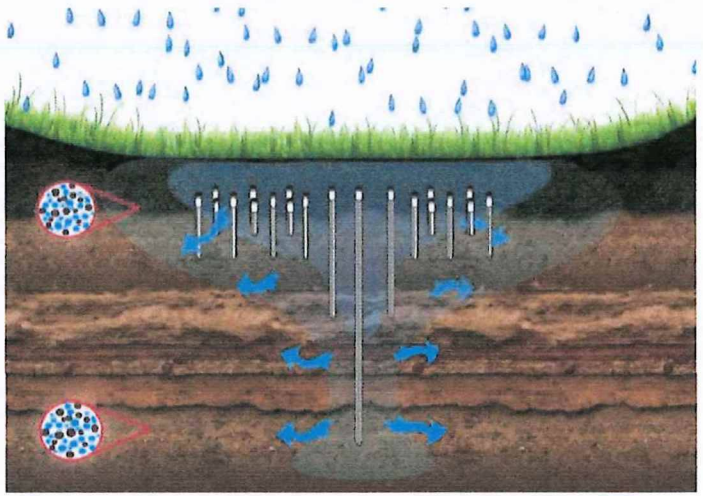
The EGRP is a product made of polyethylene that works by connecting different soil layers in the ground. This product is usually installed 2 feet below ground surface, in a system that combine devices of different lengths, like in the image 2 below.

It is a know fact that water does not travel vertically with ease between soil layers. Surface tension retain the water in the upper layers and retard the infiltration process.

The presence of the EGRP offers a path of least resistance. In contact with the device water moves from areas of high potential (saturated) to areas of low potential (less saturated).



1-Before EGRP®



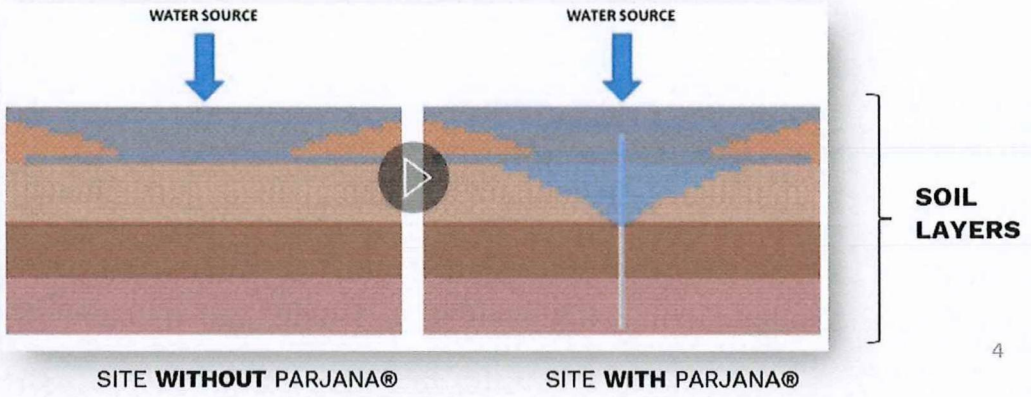
2-With EGRP®

PARJANA®

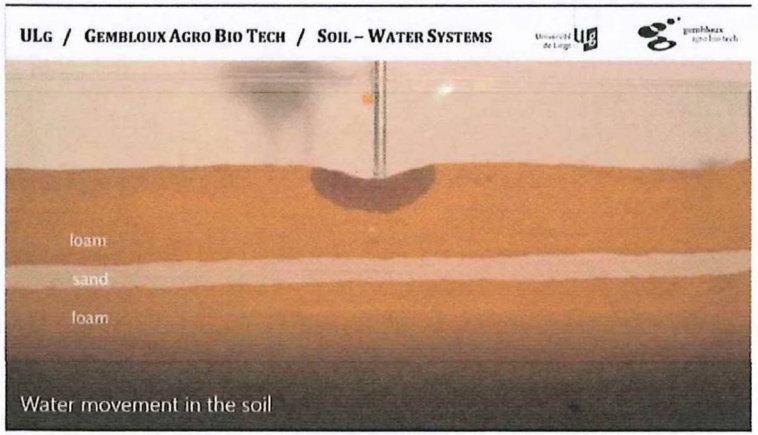
Reducing surface tension between layers:

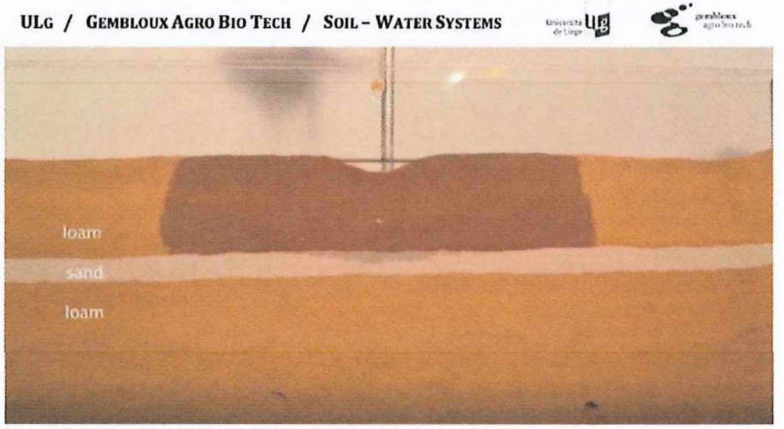
It is difficult for water to cross soil layers vertically.

Tension builds up between layers and a large amount of energy is necessary to allow the water to breach into an underlaying layer.



The EGRP offers an easier access to underlaying layers of soil. And the system as whole, with devices side by side, augment both lateral and vertical infiltration of water, without directly channeling water down.





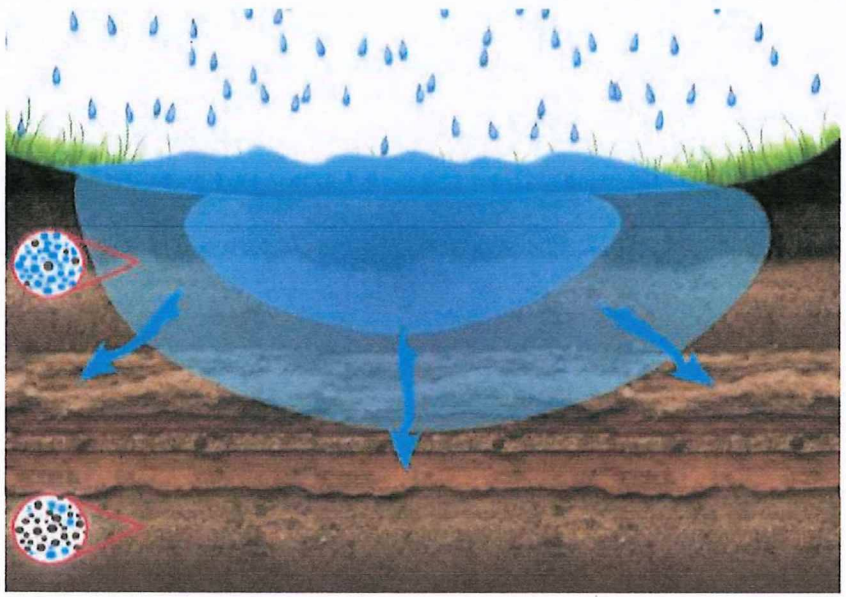
Images from: Water movement in the soil by Gembloux Agro-Bio Tech (https://www.youtube.com/watch?v=ego2FkuQwxc)

PARJANA®

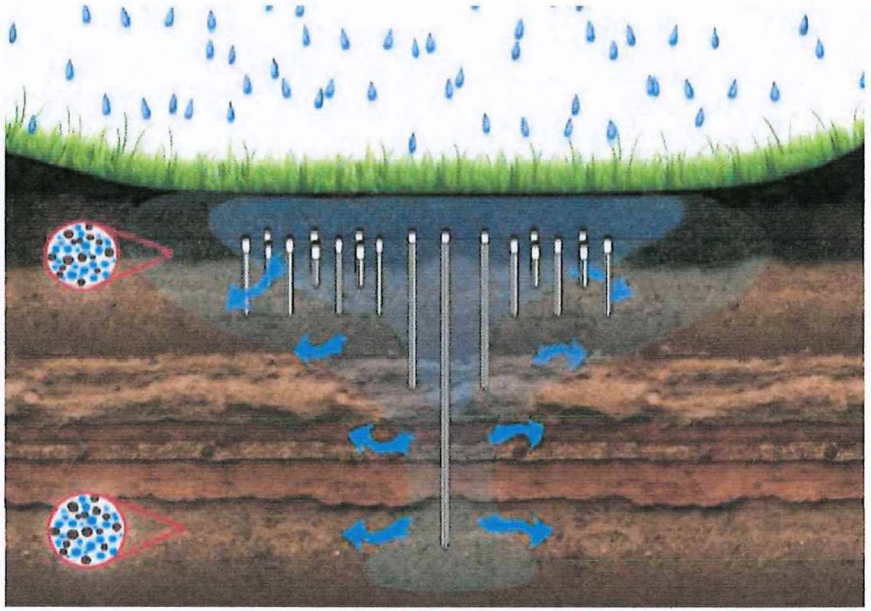
In other words:

Gravity moves water downwards. Differential Pressure draws the water close to the EGRP. **Adhesion** and **cohesion** forces between water and soil molecules distributes the water away from the devices. **Differential pressure** continues to "move" water from areas of high potential (energy) to areas of low potential, until the system reaches its balanced (natural/low energy) state again.

EGRP® **improve infiltration** rates without disturbing ecological balance, as the devices do not encourage water to flow straight down to the bottom of the device like a pipe. They enhance **horizontal** distribution of water through the soil matrix, as well as **vertical** distribution.



Before EGRP®

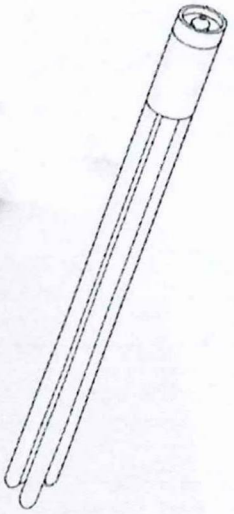


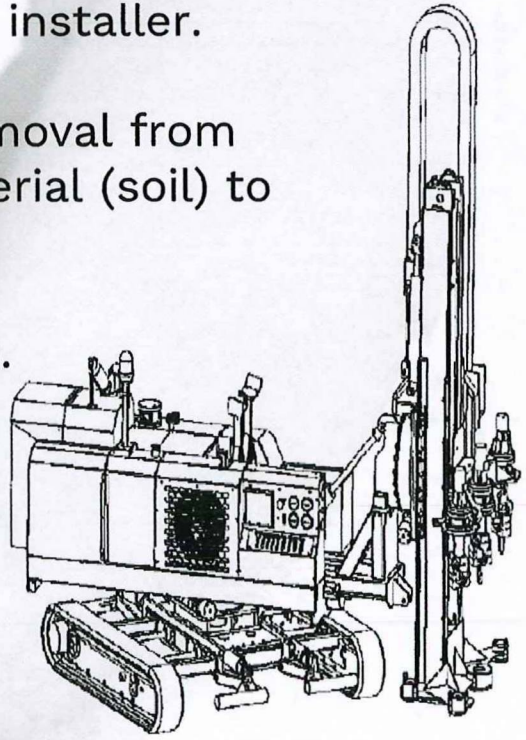
With EGRP®

PARJANA®

EGRP® Specifications and Installation

- Five-chamber, hydrophobic polyethylene plastic device
- Base lengths 5’ to 40’
- Device diameter 1.25”. Drill hole diameter 1.75”.
- Capped to restrict free water flow
- Installed vertically 2-3’ below surface
- System installation is performed by a certified installer.
- There is no excavation resulting in material removal from the ground. Nor the necessity to add new material (soil) to the site.
- The machine is 4’-wide and 16’-tall (clearance).





Installation video: https://www.youtube.com/watch?v=Xp8jPOIidbI

PARJANA®

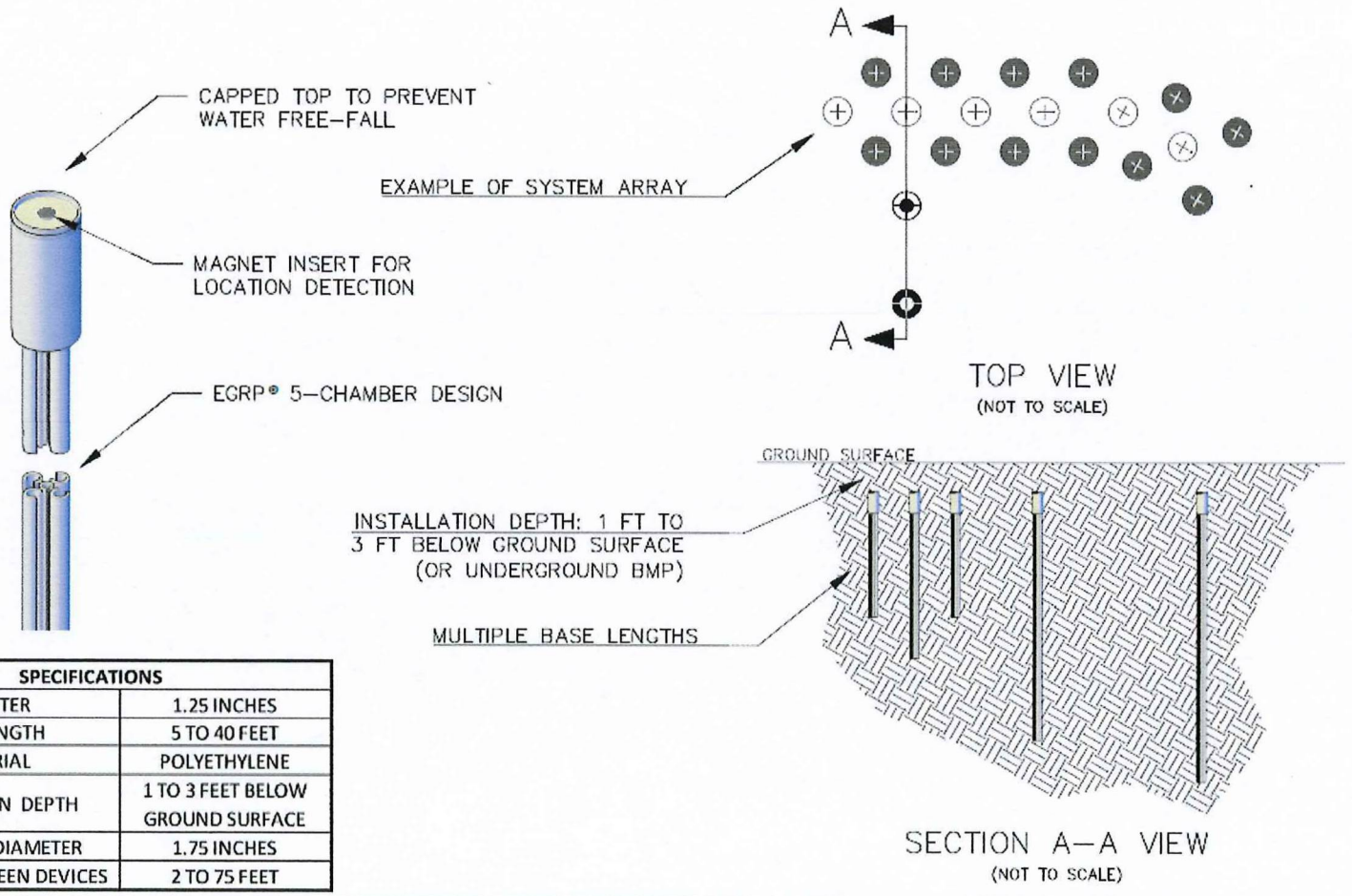
PARLAN

EGRP® Specifications and Installation

- Five-chamber, hydrophobic polyethylene plastic device
- Base lengths 5' to 40'
- Device diameter 1.25". Drill hole diameter 1.75".
- Capped to restrict free water flow
- Installed vertically 2-3' below surface
- System installation is performed by a certified installer.
- There is no excavation resulting in material removal from the ground. Nor the necessity to add new material (soil) to the site.
- The machine is 4'-wide and 16'-tall (clearance).

Installation video: https://www.youtube.com/watch?v=xoBlPOIIdbI

Product Detail: Detail Sheet 1



SPECIFICATIONS	
DIAMETER	1.25 INCHES
BASE LENGTH	5 TO 40 FEET
MATERIAL	POLYETHYLENE
INSTALATION DEPTH	1 TO 3 FEET BELOW GROUND SURFACE
DRILL HOLE DIAMETER	1.75 INCHES
SPACING BETWEEN DEVICES	2 TO 75 FEET

PARJANA & PARJANA Distribution

PARJANA® EGRP®
TYPICAL DETAIL AND SPECIFICATIONS
(ENERGY-PASSIVE GROUNDWATER RECHARGE PRODUCT)

6/25/2020

PARJANA®

Product Detail: Detail Sheet 2

EGRP®
SPECIFICATIONS
(ENERGY-PASSIVE GROUNDWATER RECHARGE PRODUCT)

PART 1 - GENERAL

Each EGRP® has a central core with four crescents around the central core. EGRP® are made of polyethylene and are chemically inert so as not to degrade the soil. The plastic is rigid but flexible enough to meet the contraction and expansion required. The EGRP® has a smooth surface restricting siltation and/or clogging. Each EGRP® is capped to restrict the conduit for water free flow. The EGRP® devices are placed underground, generally one to three feet below the finished ground surface at lengths according to the design plan and submittal drawings. The diameter of the drill hole is 1-3/4" (31.75 mm) to facilitate installation of the device.

The EGRP® system is designed utilizing an empirical model that requires knowledge of soil type, native infiltration rates, area of influence, volume of water to manage from the contributing drainage area and drawdown time. The model is be based on real-world field data to optimize the spacing of the units in arrays customized to specific project needs given the expected soil transmissivity. The mechanisms of water movement through the EGRP® and into soils allows for horizontal movement of water and vertical connectivity of soil layers.

The EGRP® have been independently tested to validate the functionality of the system that include but are not limited to stormwater runoff reduction, increased infiltration rates, optimized water movement between soil layers, and no negative impact on water table levels or groundwater quality.

Performance warranty of ten (10-years) and EGRP® system component warranty for twenty-five (25) years.

PART 2 - PRODUCT

PRODUCT NAME: EGRP® (Energy-Passive Groundwater Recharge Product)
TYPICAL BASE LENGTHS: 5 ft (1.524 m), 10 ft (3.048 m), 20 ft (6.096 m), 40 ft (12.192 m)
DIAMETER: 1-1/4" (31.75 mm)
COLOR: Natural Transparent Clear (Colorless)
MATERIAL: 100% Polyethylene

PART 3 - INSTALLATION

System installation will be performed by an installer that has been certified by the manufacturer.

System installation will be a minimally invasive process that does not involve excavating trenches or changing the elevations of the site unless there is an underground storage component associated with the design.

Submittal drawings approved by the Engineer of Record will be used for installation purposes that detail the location of the system on the plans in addition to horizontal spacing, quantity, depth and lengths of EGRP® to be installed.

MANUFACTURER - Parjana® Distribution, 21455 Melrose Ave Bldg R #22, Southfield, MI 48075 855-727-5262

PART 4 - INSPECTION AND MAINTENANCE

Thirty days after installation, the EGRP® system will be visually inspected for any small divots on ground surface above the devices, resulted from siltation/drilling activities. The divots shall be backfilled and compacted with native soil.

The system will be visually monitored to ensure water has dissipated in the appropriate amount of time.

The EGRP® will not require any additional maintenance or interference after installation.

PARIANA

Product Detail: Detail Sheet 2

PARIANA* EGRP*

TYPICAL DETAIL AND SPECIFICATIONS

(ENERGY-PASSIVE GROUNDWATER RECHARGE PRODUCT)

EGRP® Material (PFAS Free) & Classification

A study performed by Michigan Technological University has shown that the devices are made of **100% pure polyethylene** (classification PE10220A), which is not known to leach any hazardous substance.

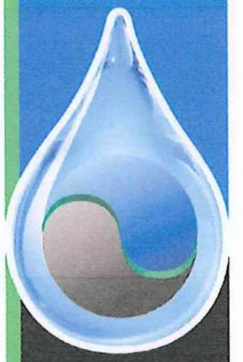
This classification uses the Cell Classification System from ASTM D 3350-06, which demonstrates the material's properties values, including its natural color. The EGRP® materials are certified under the FDA CFR 21 and is qualified as a pure medium-density polyethylene (MDPE) with **no additives**.

The product life was determined to be over 100 years.

EGRP® are classified as **UIC Class-V** wells under National EPA, Regional and State.

Injection through a well can be defined as the subsurface emplacement of fluids through a subsurface distribution system.

PARJANA®



PARAMA

Features of Parjana® EGRP®

- Non-invasive
- Low cost
- Small footprint
- Big results
- No maintenance cost
- Scalable
- Compatible to other technologies
- Environmentally safe
- Works every time!

PARJANA®

PARJANA

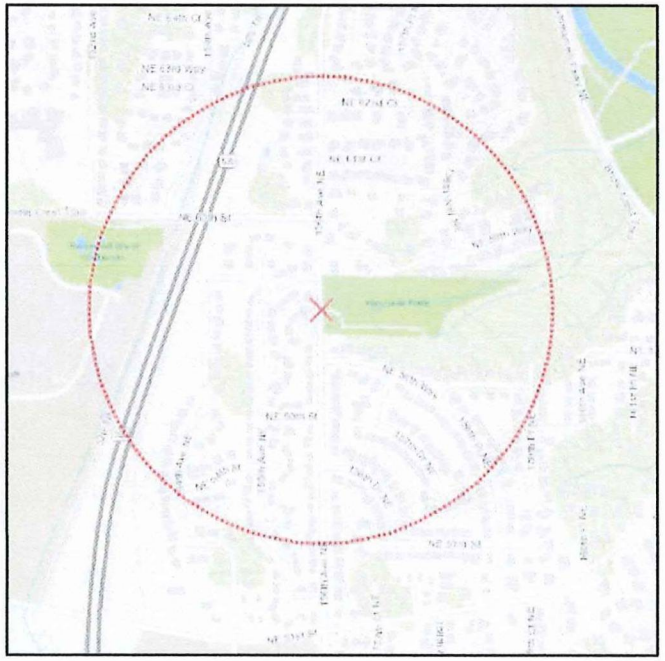
Features of Parjana® EGRP®

- Non-invasive
- Low cost
- Small footprint
- Big results
- No maintenance cost
- Scalable
- Compatible to other technologies
- Environmentally safe
- Works every time!

Environmental Evaluation

Prior to any design, each site undergoes a qualifying **environmental assessment** to ensure that the system will not directly interfere with sites of environmental contamination.

After carefully considering geohydrology, Parjana® can offer **solutions** that make the best use of the land's geography, designing systems that require **low intervention** and **minimal ecological disturbance**.



PARJANA®

Environmental Evaluation

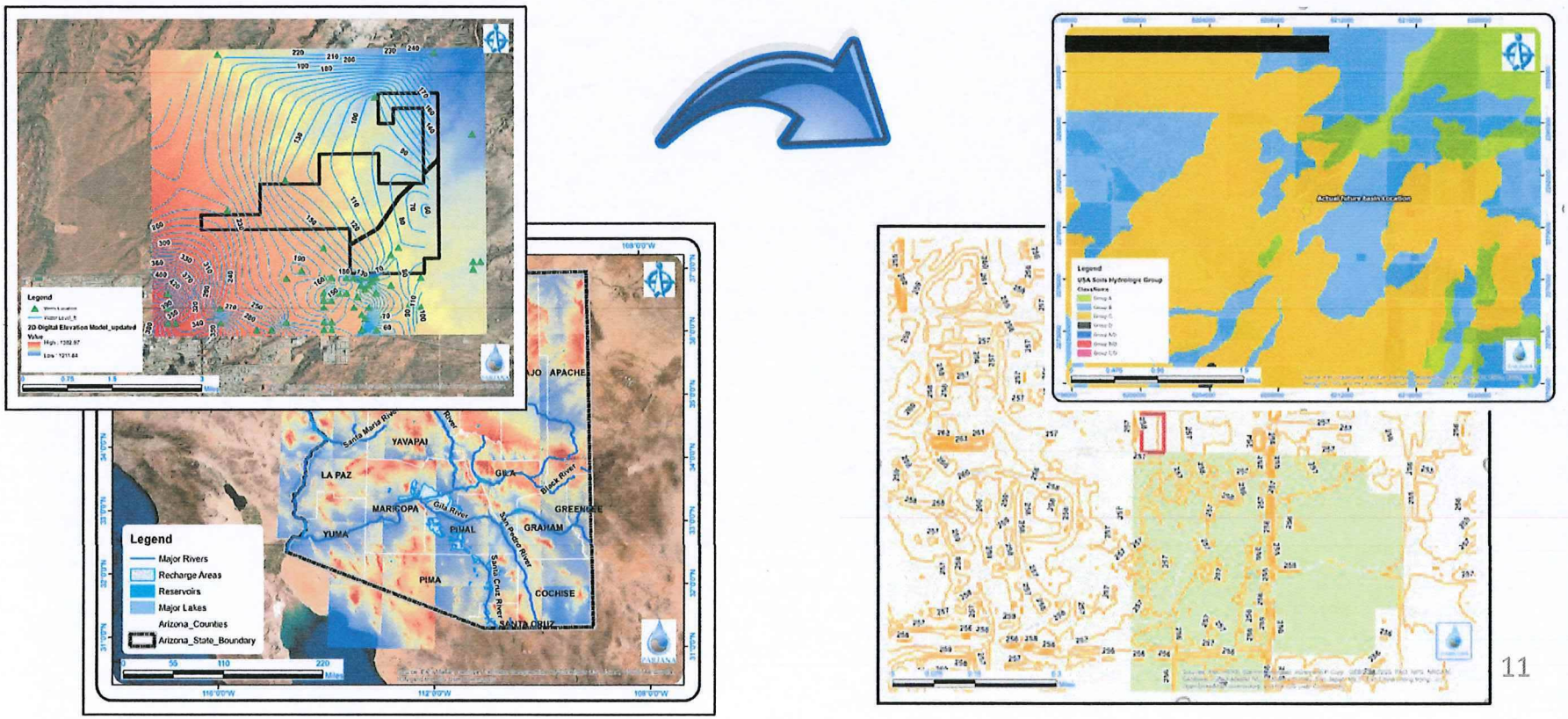
Prior to any design, each site undergoes a qualifying environmental assessment to ensure that the system will not directly interfere with sites of environmental contamination.

After carefully considering geohydrology, Parjana® can offer solutions that make the best use of the land's geography, designing systems that require low intervention and minimal ecological disturbance.

Comprehensive approach

Parjana® resources help to diagnose areas most needed in order to mitigate droughts or floods consequences, depending on the region. Targeted groups can be based on geohydrology or socio-economical aspects.

System design is informed by **costumer expectations** and the best available **technology**. Systems can be design to meet very specific infiltration demands.



PARIANA

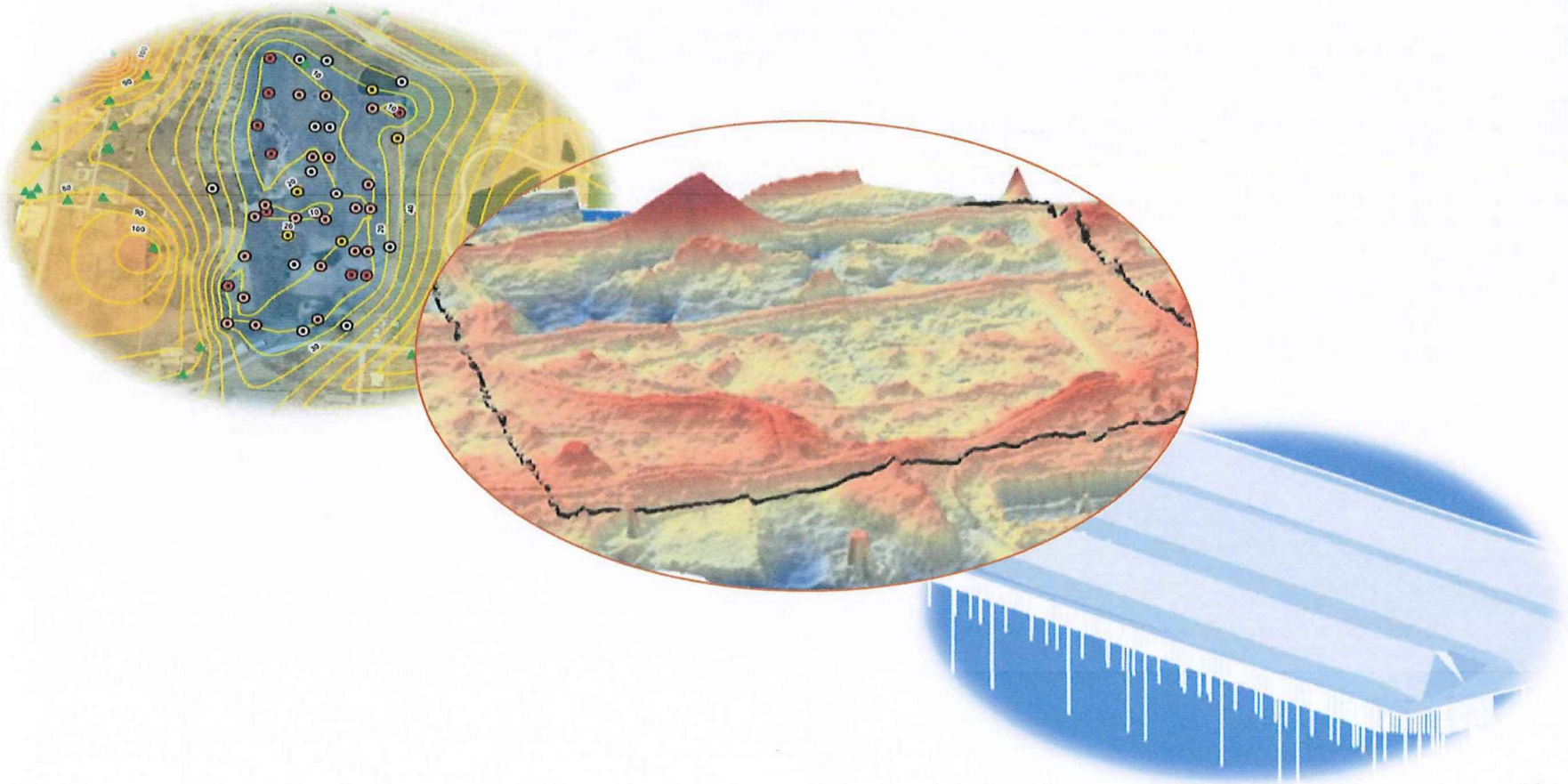
Comprehensive approach

Pariana® resources help to diagnose areas most needed in order to mitigate droughts or floods consequences, depending on the region. Targeted groups can be based on geohydrology or socio-economical aspects.

System design is informed by consumer expectations and the best available technology. Systems can be design to meet very specific infiltration demands.

Costumer Centered Approach

When provided **geotechnical investigations**, Parjana® uses the material to inform the design process. Parjana® uses **3D modeling** and other resources to determine best system design.



PARJANA®

PARJANA

Important to know about design and cost:

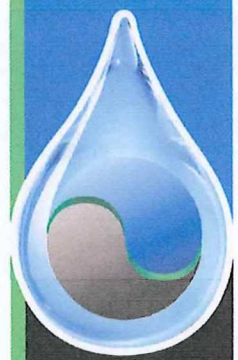
Each project is **custom made**. Even neighbor properties will have **different aspects** that will **influence design**.

EGRP® never stop working, but there is a matter of time. Adding devices to a project can make the project more expensive, but it will also make the system work faster. **TIME** is a very important element of the design.

Area is another important element of design. The devices need to be installed underground. So, available area for installation is critical to determine "system capacity".

Parjana® will happily provide a **free cost estimate** specific to the site you have in mind. All you need to do is contact your **Parjana® Representative** and we'll send you guidelines as what to submit in order to receive a cost estimate.

PARJANA®



Important to know about design and cost:

Each project is custom made. Even neighbor properties will have different aspects that will influence design.

EGRP® never stop working, but there is a matter of time. Adding devices to a project can make the system more expensive, but it will also make the system work faster. TIME is a very important element of the design.

Area is another important element of design. The devices need to be installed underground. So, available area for installation is critical to determine "system capacity".

Parjana® will happily provide a free cost estimate specific to the site you have in mind. All you need to do is contact your **Parjana® Representative** and we'll send you guidelines as what to submit in order to receive a cost estimate.

FAQ's + Results

1) Does the system work like a conduit or a dry well?
2) Does the system negatively change groundwater levels or quality?
3) What kind of maintenance do EGRP systems require?
4) Has the system addressed road safety issues?
5) Does the system affect plant health?
6) Does the system work in C or D type soil?
7) Does the system work for large volumes of water?

PARJANA®

Information can be found in www.parjana.com under Executive Summary and Webinars.

PARJANA

FAQ's + Results

1) Does the system work like a conduit or a dry well?
2) Does the system negatively change groundwater levels or quality?
3) What kind of maintenance do EGRP systems require?
4) Has the system addressed road safety issues?
5) Does the system affect plant health?
6) Does the system work in C or D type soil?
7) Does the system work for large volumes of water?

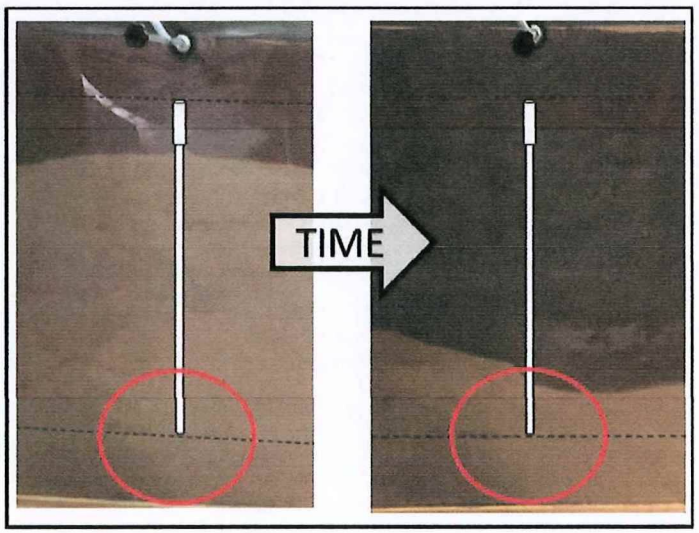
Information can be found in www.parjana.com under Executive Summary and Webinars.

The system is not like a conduit or a dry well!

A study led by Dr. David Lusch of MSU demonstrated that EGRP do not function like a pipe. Their caps prevent water from "free falling" to the bottom of the devices.

This specific study used a tracer to identify water movement within the EGRP and its surroundings.

Additional studies have confirmed the same information using different methodologies like observation of water levels in shallow and deep monitoring wells, as well as groundwater quality. In all studies where a control site was stablished to monitor groundwater quality, no significant difference was detected between control and test site.



Experiment showing the EGRP does not act like a drain.

Water was introduced to the device, keeping a water head. The saturated zone increases alongside the device, but no water is detected at the bottom at any given point. This shows taht the device does not operate as a conduit.

PARJANA®

PARANA

The system is not like a conduit or a dry well!

A study led by Dr. David Lusch of MSU demonstrated that EGRP do not function like a pipe. Their caps prevent water from "free falling" to the bottom of the devices.

This specific study used a tracer to identify water movement within the EGRP and its surroundings.

Additional studies have confirmed the same information using different methodologies like observation of water levels in shallow and deep monitoring wells, as well as groundwater quality. In all studies where a control site was stablished to monitor groundwater quality, no significant difference was detected between control and test site.

Water was introduced to the device, keeping a water head. The saturated zone increases alongside the device, but no water is detected at the bottom at any given point. This shows taht the device does not operate as a conduit.

Experiment showing the EGRP does not act like a drain.

No negative effect on groundwater levels or quality!

Multiple sites were monitored using piezometers.

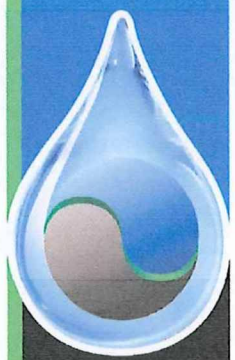
No visible mounding was detected, and it has been observed that the system helps groundwater levels to recover faster to their baseline elevations following large rain events. There is **no negative effects on groundwater levels**.

Studies also revealed **no differences** between groundwater quality at test and control sites, with no horizontal nor vertical dissemination of pollutants.

When water is introduced to the EGRP devices, it has already **filtered through** at least two feet of **natural soil**. After that, the transport happens through soil particles, as the devices are not a conduit/tube/drywell.

Detailed information about these projects can be found in www.parjana.com under **Executive Summary** and **Webinars**.

PARJANA®



EGRP® systems require NO maintenance!

Following installation, the system **does not clog** and is **maintenance free**. Parjana® has **monitored sites for years** after installation in order to evaluate performance.

No system has ever stopped working nor required interference.

If a site would not perform as expected, additional devices would be installed.

Control site after rain

EGRP® (test) site after rain

PARJANA®

PARJANA

EGRP® systems require NO maintenance!

Following installation, the system does not clog and is maintenance free. Parjana® has monitored sites for years after installation in order to evaluate performance.

No system has ever stopped working nor required interference.

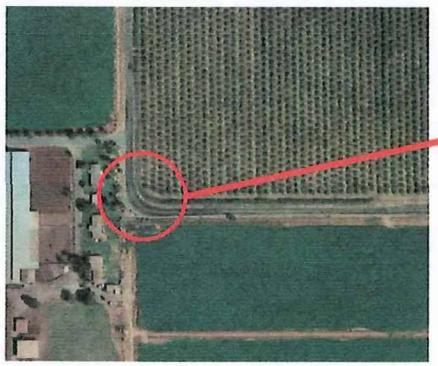
If a site would not perform as expected, additional devices would be installed.

Control site after rain

EGRP® (test) site after rain

The system can be used to address road safety

A site in Stanislaus County (CA) was experiencing flooding near the edge of the road, posing a huge safety hazard to drivers. Standing water could accumulate there following most rain events above 0.3" **and remain standing for 8-10 weeks**, even leading to the accumulation of algae.



The road pre-EGRP®

PARJANA®

The system can be used to address road safety

With EGRP®, infiltration has increased considerably and the road is no longer unsafe due to standing water.

Pictured below: on 10/03/18, a 1.25" rain event was recorded at a nearby weather station. Water infiltrated **under 48 hrs**.

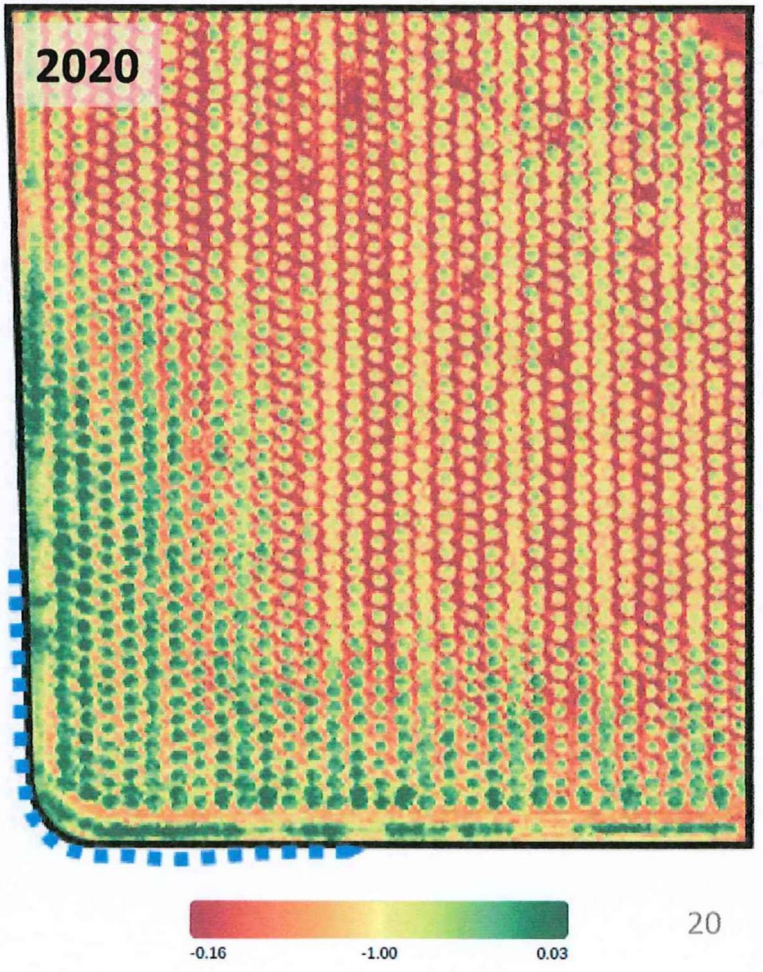
PARJANA®

The system improves plant health!

The almond orchard near the system in the previous slide has shown improvement in plant health after the system was installed.

In 2020 the site was monitored by a drone capturing the normalized difference vegetation index (NVID) and the image has confirmed the observations made onsite: trees near the EGRP® appeared healthier than the others.

System Location



PARJANA®

EGRP® systems work in low-permeability soil

In Georgia, Parjana® installed EGRP® to increase infiltration efficiency at a new condo development on land with significant **clay**, **clay loam**, and **sandy clay** layers.

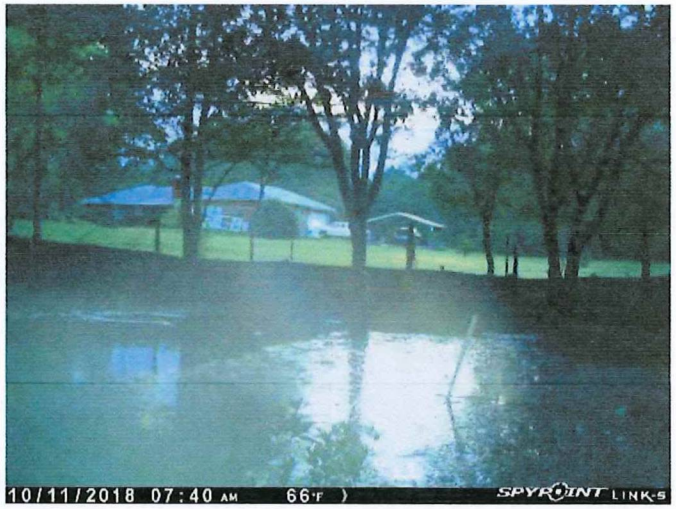
Standing water could accumulate there **and remain standing for 2-3 weeks**.

A camera was installed onsite to monitor infiltration post-installation.

PARJANA®

EGRP® systems work in low-permeability soil

A local weather station measured 2.75” of rain. The ground shows no standing water 32 hours later.



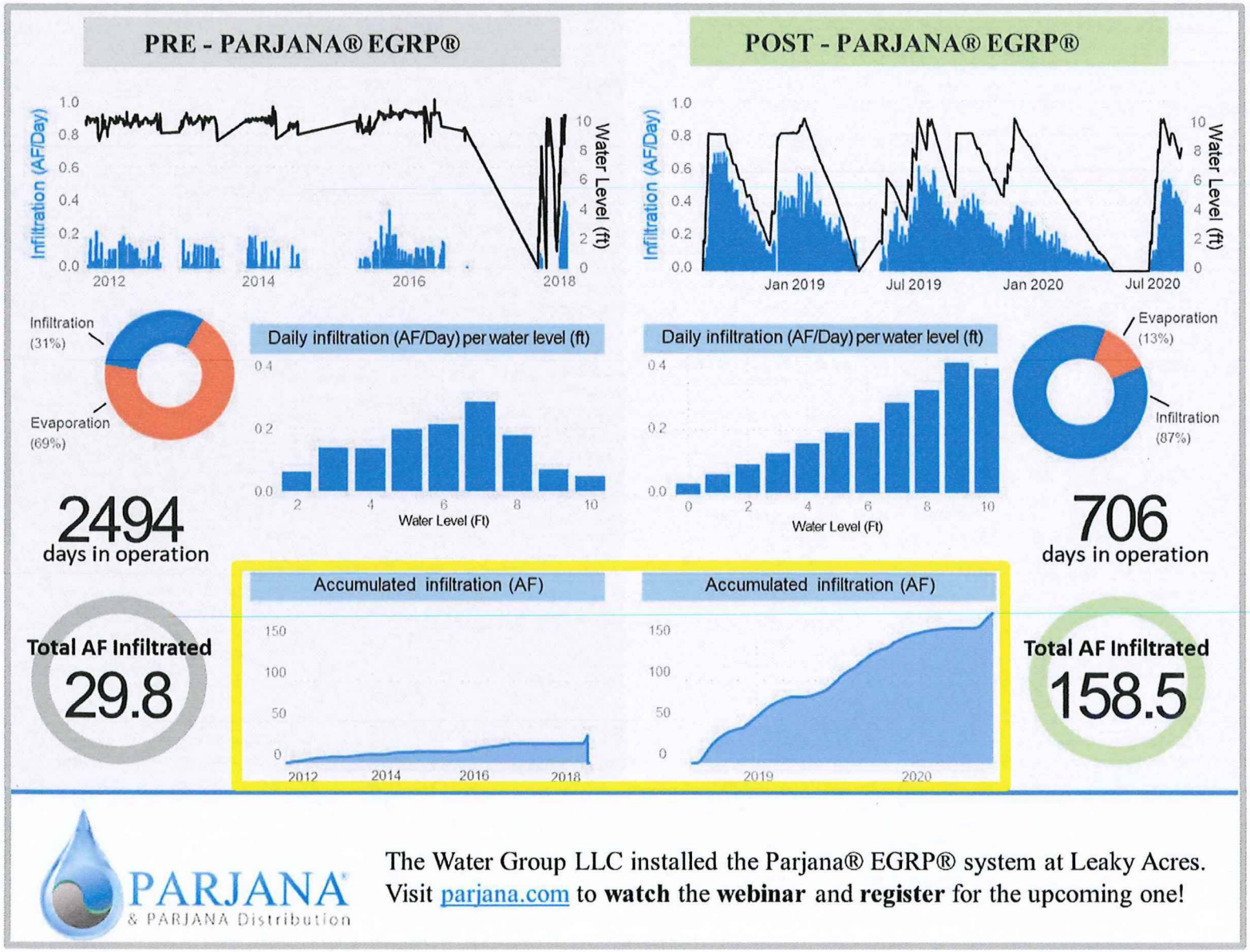
Infiltration after 1.8” rain

Infiltration after consecutive rain:

PARJANA®

The systems work for large volumes of water

This system was designed to meet a high infiltration demand. It is possible to inform desired infiltration rate during system design. EGRP system is versatile and scalable.



PARJANA & PARJANA Distribution

The Water Group LLC installed the Parjana® EGRP® system at Leaky Acres. Visit parjana.com to **watch** the **webinar** and **register** for the upcoming one!

PARJANA®

PARJANA

Possibilities with Parjana® EGRP® System

PARJANA®

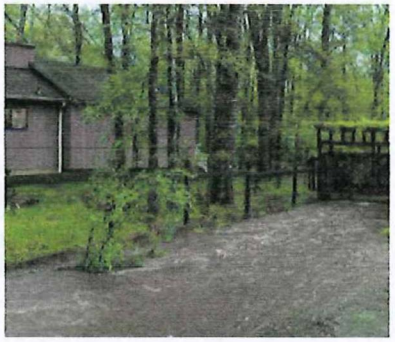
Different Possibilities with Parjana® EGRP®

Agriculture

Groundwater recharge

Balance moisture

Water Credits



Residential

Standing water

Adaptable to other LID products

Energy-passive solution

Municipality

Peak Runoff

Flood mitigation

Stormwater management

Commercial

Footprint reduction

Volume reduction

Reduce treatment water volume

PARJANA®

PARJANA

Different Possibilities with Parjana® EGRP®

Agriculture

Residential

Municipality

Commercial

Groundwater recharge

Balance moisture

Water Credits

Standing water

Adaptable to other LID products

Energy-passive solution

Peak Runoff

Flood mitigation

Stormwater management

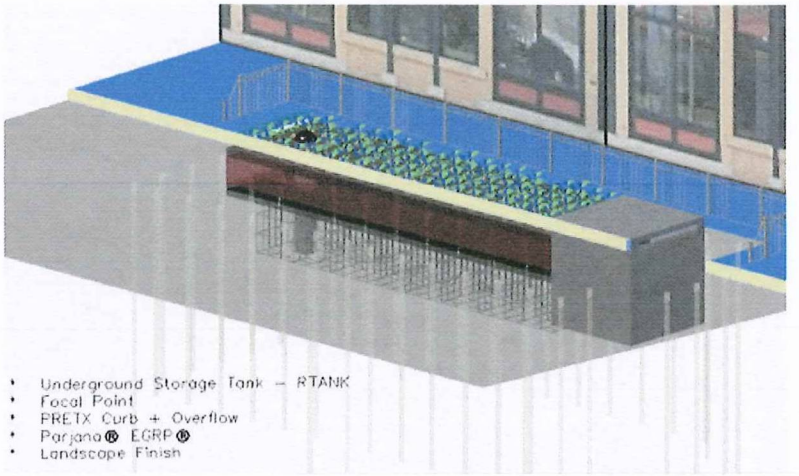
Footprint reduction

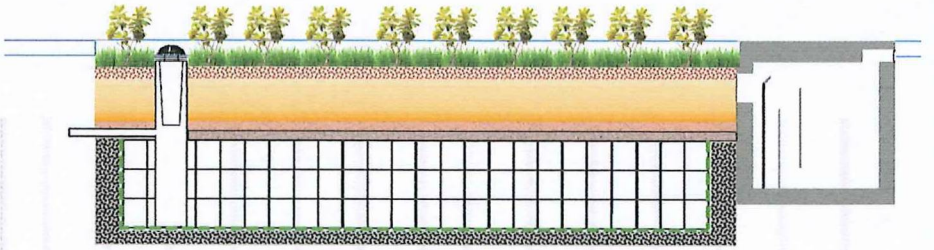
Volume reduction

Reduce treatment water volume

Parjana® Urban Infiltration System

- Suited for paved or unpaved areas, for small or large applications:
- Combined with other technologies.



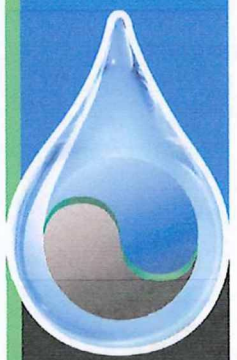


PARJANA®

Features of Parjana® EGRP®

- Non-invasive
- Low cost
- Small footprint
- Big results
- No maintenance cost
- Scalable
- Compatible to other technologies
- Environmentally safe
- Works every time!

PARJANA®



PARJANA

Features of Parjana® EGRP®

- Non-invasive
- Low cost
- Small footprint
- Big results
- No maintenance cost
- Scalable
- Compatible to other technologies
- Environmentally safe
- Works every time!

PARJANA®

Thank you!

855-727-5262

www.parjana.com

Thank you!