Commercial Services

WELL WATER CONNECTION, INC.

Water Well Design & Project Management

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Company Profile

Thank you for your interest in ***Well Water Connection, Inc.*** and for allowing me to introduce myself and my company to you. After receiving a civil engineering degree from the University of Massachusetts in 1990, I worked on the Central Artery Project for Stone & Webster's Geotechnical Engineering Division in Boston. There I supervised geotechnical site investigations and drilling operations, monitored well installations and performed bedrock and soil testing, both in the field and in the laboratory. As the geotechnical work on the "Big Dig" was completed, I was laid off, so in 1995, I started working for a small local artesian water well drilling company. Over the next six years as the sales manager and then general manager of that company, I became directly responsible for sales, design, coordination and supervision of the installation of over 600 residential and commercial artesian well and pump systems.

During that time, I listened to many questions, concerns and complaints from home owners, property owners, property managers, landscapers and irrigation contractors about the limited information and services provided by most well drilling companies.

After six successful years with that company , I began to search for a company that could provide all types of water wells (not just artesian), but also the pumps, filtration systems and the planning, permitting, design and maintenance services that I knew by now were necessary for quality well installations and the key to long-term satisfied customers. I quickly learned that that type of company did not yet exist.

In 2002, I started ***Well Water Connection, Inc.***, a truly full-service, water well design and project management company that provides well-managed, custom-designed irrigation wells, pumping systems, filtration and related services that dovetail seamlessly with our customers' irrigation systems and landscape plans. We are a company whose capabilities and menu of services is not limited by our drillers' experience or by the type of equipment we own. With a civil engineering degree and geotechnical engineering background , and professional affiliations with competent, highly knowledgeable, fully licensed and insured water well drillers and related professionals, we are able to handle large projects while still providing personal one on one attention to the smallest details. We realize the importance of good communication with our customers, whether they are big or small, and meeting the technical concerns and practical expectations of the other engineers, designers and contractors working on the project.

In 2011, we moved our office to a new facility, opened our Water Filtration Division and hired additional service and administrative staff. In addition, we made an arrangement with a local retail store, **Quality Pump & Supply**, to offer professional grade water pump and filtration products at a discounted price for our customers. As we continue to grow and develop, we strive to provide our customers with the best service, but know the decision to hire a contractor can be challenging. At ***Well Water Connection, Inc.,*** one of our goals is to provide our customers with enough information to make well-informed decisions. Please do not hesitate to contact our office if you have any questions, need more information, references, or would like a free, no-obligation written estimate for your water well related project.

We are proud to offer you our expertise and eager for you to experience our level of service. Thank you again for allowing me to introduce my company to you. We look forward to working with you.

John Larsen
Owner

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WELL WATER CONNECTION, INC.
Water Well Design & Project Management

Project Management & Technical Services

Our *Project Management Division* will assist you in the implementation of your ground water well project. . .

- Cost Estimating
- Estimate Procurement
- Site Study and Selection
- Permitting
- Water Well Design
- Estimate Analysis & Comparisons
- Specifications Design
- Water Analysis
- Pump System Design
- Feasibility Analysis
- Site Assessment
- Investigation Services
- Filtration Design
- Fracture Trace Analysis
- System Evaluation
- Pump Test Analysis
- VLF Geophysical Surveys

…while our *Technical Services Division* utilizes our own pump installation and service equipment, experienced crew and network of fully qualified and licensed water well and related professionals to get the job done right, on time and within budget.

- Artesian Wells
- Point Wells
- Gravel Wells
- Geothermal Systems
- Booster Pump Systems
- Pump System Diagnostics
- Pump Removal & Installations
- Water Sampling & Testing
- Zone-Fracturing
- Constant Pressure Systems
- Filtration Systems
- Hydro-fracturing
- Site Prep and Preservation
- Trenching
- Test Work
- Down Hole Video Inspections
- Pump Repair & Maintenance
- Locating Existing Wells
- Stain Removal Services
- Stain Prevention Systems
- Pump Testing
- Debris Removal and Containment
- Whole House Water Systems

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WELL WATER CONNECTION, INC.
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Commercial Testimonials

PROPERTY MANAGERS

"My experience with Well Water Connection has been great. They have always been reliable, dependable and their work is top-notch. John has always been extremely honest in his recommendations and advice. It is clear that Well Water Connection strives to earn client respect by delivering on what they promise."

Paul Schmitt, Barkan Management, Job: Knollsbrook Condominium, Stoughton, MA

"When we built our building in 2000, we hired a pump company to install a well to supply the water for our irrigation needs. It was a considerable investment. But, unfortunately, the system never performed as advertised. Finally, someone suggested I contact John Larsen of Well Water Connection, Inc. John immediately diagnosed the problem and suggested a cost effective repair. I'm happy to say the system has been running great for the past two years. Thank you Well Water Connection!"

Peter Crocker, PGA Realty, Wilmington, MA

"I was very happy with the results of Well Water Connection. They showed up when they were supposed to and got the job done. I had a serious iron stain problem and John took care of it like he said he would. I also had a water treatment system installed that works well too."

Roger Calarese, Calarese Properties, Job: Digital Federal Credit Union, Franklin, MA

DEVELOPERS

"A.W Perry, Inc. is a real developer based in Boston and the South Shore. We recently built a new building on a 36 acre site in Hingham. Well Water Connection was recommended to us and we brought them in to oversee the drilling of our irrigation wells. This area isn't noted for productive wells and we wanted to limit our exposure. John Larsen did a nice job developing a detailed set of specifications and a scope of work for the well drillers to follow. John coordinated the entire process from permitting through to the start-up and testing of the wells. I can highly recommend John and Well Water Connection."

Steve Leggett, Operations Manager, A. W. Perry, Inc., Jobs: Blue Cross Blue Shield & EMD Serono, Inc, Hingham, MA

PARKS AND RECREATION

"The Belmont Soccer Association offered to donate three water wells to the town of Belmont for three different athletic fields. The athletic fields would require significant quantities of water and we were concerned about where the wells should be drilled. After significant due diligence, we chose Well Water Connection. Well Water Connection suggested doing initial testing rather than just drilling holes and hoping for the best. This included using Very Low Frequency testing (VLF) to help identify the optimum drilling locations. John and Nancy worked seamlessly & collaboratively with the various town departments that contributed to the project to provide a complete solution. I would highly recommend Well Water Connection!"

Jim Fitzgerald, Board Member, Belmont Soccer Association, Jobs: PQ Field, Town Field, Grove St. Field, Belmont, MA

"Thanks for a job well done!!"

Denis Fraine, Town Administrator, Job: Blackstone Field, Bellingham, MA

LANDSCAPE AND IRRIGATION CONTRACTORS

"I have been using Well Water Connections to take care of any well issues that my custromers have had for several years now. The knowledge and professionalism that John provides has been an invaluable asset to both me and my customers."

Paul Catanzano, Molloy Landscaping, Milton, MA, Jobs: South Shore and Eastern MA

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FROM LANDSCAPE AND IRRIGATION CONTRACTORS…

"I have been using Well Water Connection to take care of any well issues that my custromers have had for several years now. The knowledge and professionalism that John provides has been an invaluable asset to both me and my customers.“

Paul Catanzano, Molloy Landscaping, Milton, MA

“Working with John on various projects and having his consultation with our clients is a very valuable resource for us. We always enjoy working with him whenever the opportunity is there! ”

Don Labriole , D&D Irrigation Co. Inc

“We have been referring Well Water Connection to all of our clients for new & existing wells for over five years. The feedback that we get on John’s service is overwhelmingly, always great comments from his attention to detail, responsiveness, knowledge & professionalism. For any & all well related issues John has been & will continue to be our go to man for us & our clients.”

Stephen DiCicco, DiCicco Landscape & Irrigation, LLC

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Residential Testimonials

"John is always courteous and professional and cares about customer satisfaction. A pleasure to do business with." **Jim Barry, Tewksbury, MA**

"We recently installed an irrigation well at our home in Randolph. After considering several companies, I selected Well Water Connection primarily because I was confident, after talking with John Larsen, that he and his company were competent, responsible and honest. John, Nancy and Mike thoroughly justified my confidence. The work was performed when and as promised and they were always responsive and pleasant to deal with. While actual well production is, of course, not predictable, we got a well with about three times the production that our contract called for, on time, at a fair price and within budget. I couldn't have asked for more."

Laurence Johnson, Randolph, MA

"John has been nothing but the best for us." **Chet and Joy MacAskill, Saugus, MA**

"WWC provided a complete turnkey solution -- coordinated the drilling, plumbing, electrical, and landscaping; also the town permit in advance and the water dept certification upon completion. John also kept my neighbors informed about the project, and kept their disruption to a minimum. The Foxboro Water Dept was pleased, my neighbors were pleased, and I was pleased (because he even came in under budget!)."

Arthur Barrett, Foxboro, MA

"John, great job and support. Give Henry some treats!" **Ralph Poirier, Reading, MA**

"John and Nancy were thorough, responsive and professional during all stages of our well project. John worked with us to customize our project over a period of time in a way that allowed us to move through the planning and installation stages comfortably and with confidence. We ended up with a terrific product for a fair price."

Lou DiFronzo, N. Reading, MA

"John has taken care of us since day one and doing a great job and going out of his way to take care of us. Thanx John!" **Chris Dowd, Weymouth, MA**

"We were building a house and were looking to install a well and John was recommended to us by one of our neighbors. I had already contacted a couple of other companies, but after meeting with John it was obvious he was the person we could trust. He took the time to provide us with all the answers to our questions so we could make an intelligent decision. He coordinated the entire installation from permits to the drilling, electrical, and plumbing. It has been two years and the system has worked great!!! I cannot say enough about our experience with Well Water Connection and we recommend them very highly." **Bob Bernard, Braintree, MA**

"Great job - we have been very happy!" **Bob and Betty Joyce, Franklin, MA**

"Three years ago I had a well drilled in my yard. The workings of the well were above ground, visible and ugly. Last Fall I saw a sign for Well Water Connection on the front lawn of a house. I called and got in-touch with John from Well Water Connection to see if there was anything that could be done with my well. John took a look at my well and came up with a plan that eliminated the unsightly well top. He redesigned the well head and now it is out of sight. John also set me up with a system that eliminates the staining of iron heavy water. Great service is what Well Water Connection is all about. I highly recommend them." **Joe Salvucci, Tewksbury, MA**

"I am satisfied with all your services, sales representative, installation team and office and service staff."

Mario Delvecchio, Braintree, MA

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Service Plans and Lifetime Warranties

A properly designed and installed *Water Well System* consists of several separate *systems* each made up of many different *components*, or *parts*. Each part is crucial and must work properly and in unison so that the entire system provides a clean, reliable and consistent source of water.

Shallow Well Jet Pump System & Tank System

Artesian Well Submersible Pump System & Mechanical Constant Pressure System

Artesian Well Submersible Pump System, Tank System & Water Treatment System

Artesian Well Submersible Pump System, VFD Drive System, Tank System & Water Filtration System

THE PROBLEM:

Every Water Well System is made up of parts from different manufacturers. Even if installed by a professional, most manufacturers will only warranty their parts for up to one year from the date of installation.

The manufacturer <u>will not</u> cover the labor costs that it will take to fix or replace that part. This could cost hundreds or even thousands of dollars in repairs and replacement parts if you have a problem, even within the first few years!

THE SOLUTION:

Well Water Connection, Inc. offers *Annual Service Plans* and *Lifetime Warranties* that include *Parts* AND *Labor*!

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What Does Your Water Cost?

2010 Water & Sewer Retail Rate Survey **MWRA Advisory Board**

Combined Annual Water and Sewer Charges for Communities Receiving Services from the MWRA 2010

(Charges include MWRA, community, and alternatively supplied services
Rates based on average annual household use of 120 hundred cubic feet (HCF), or approximately 90,000 gallons)

	Water	Sewer	Combined	Change
Arlington (W/S)*	$517.10	$505.20	$1,022.30	15.4%
Ashland (S)	$408.40	$1,226.40	$1,634.80	6.3%
Bedford (S/partial W)	$503.00	$953.00	$1,456.00	6.4%
Belmont (W/S)	$688.56	$1,203.80	$1,892.36	6.7%
Boston (W/S)	$479.30	$616.53	$1,095.83	4.0%
Braintree (S)	$259.00	$734.40	$993.40	0.0%
Brookline (W/S)	$594.00	$822.00	$1,416.00	6.3%
Burlington (S)	$181.50	$371.50	$553.00	17.1%
Cambridge (S/partial W)	$380.00	$980.00	$1,360.00	6.1%
Canton (S/partial W)	$621.40	$736.40	$1,357.80	7.4%
Chelsea (W/S)	$469.20	$884.40	$1,353.60	10.5%
Chicopee (W)	$324.00	$592.00	$916.00	6.9%
Clinton (W/S)	$343.60	$257.70	$601.30	0.0%
Dedham (S/partial W)	$527.44	$969.60	$1,497.04	0.0%
Everett (W/S)	$181.20	$493.20	$674.40	0.0%
Framingham (W/S)	$529.08	$567.24	$1,096.32	8.8%
Hingham (S)	$918.98	$1,020.00	$1,938.98	0.0%
Holbrook (S)	$459.60	$774.00	$1,233.60	0.0%
Leominster (partial W)	$378.60	$385.40	$764.00	12.8%
Lexington (W/S)	$422.80	$838.40	$1,261.20	1.7%
Lynn (partial W)	$400.80	$736.92	$1,137.72	3.8%
Malden (W/S)	$452.16	$549.36	$1,001.52	1.6%
Marblehead (W)	$521.00	$752.00	$1,273.00	5.2%
Marlborough (partial W)	$609.60	$409.20	$1,018.80	0.0%
Medford (W/S)	$637.20	$912.00	$1,549.20	1.3%
Melrose (W/S)	$600.00	$987.12	$1,587.12	1.9%
Milton (W/S)	$603.60	$1,113.36	$1,716.96	5.1%
Nahant (W)*	$684.00	$949.20	$1,633.20	-1.4%
Natick (S)	$316.00	$951.20	$1,267.20	7.9%
Needham (S/partial W)	$483.00	$997.80	$1,480.80	0.0%
Newton (W/S)	$658.00	$932.00	$1,590.00	11.3%
Northborough (partial W)	$547.08	$632.60	$1,179.68	15.5%
Norwood (W/S)	$504.72	$741.10	$1,245.82	4.7%
Peabody (partial W)	$306.00	$409.80	$715.80	0.0%
Quincy (W/S)	$565.20	$928.20	$1,493.40	3.7%
Randolph (S)	$423.00	$740.20	$1,163.20	5.7%
Reading (W/S)	$963.60	$1,012.80	$1,976.40	4.6%
Revere (W/S)	$386.40	$1,206.00	$1,592.40	14.5%
Saugus (W)	$472.40	$344.00	$816.40	5.3%
Somerville (W/S)	$564.00	$815.58	$1,379.58	4.3%
Stoneham (W/S)	$516.00	$1,032.00	$1,548.00	2.4%
Stoughton (S/partial W)	$467.88	$1,064.40	$1,532.28	14.5%
Swampscott (W)	$812.00	$633.80	$1,445.80	4.8%
Wakefield (S/partial W)	$527.04	$1,019.52	$1,546.56	2.4%
Walpole (S)	$562.20	$759.26	$1,321.46	5.3%
Waltham (W/S)	$356.64	$664.32	$1,020.96	2.2%
Watertown (W/S)	$455.36	$871.20	$1,326.56	4.5%
Wellesley (S/partial W)	$434.28	$872.40	$1,306.68	5.1%
Westwood (S/partial W)	$527.44	$748.00	$1,275.44	0.0%
Weymouth (S)	$608.88	$877.40	$1,486.28	4.8%
Wilbraham (W)	$378.00	$492.00	$870.00	3.6%
Wilmington (S/partial W)	$449.60	$598.80	$1,048.40	2.2%
Winchester (S/partial W)*	$275.60	$313.20	$588.80	0.0%
Winthrop (W/S)	$598.80	$998.40	$1,597.20	0.0%
Woburn (S/partial W)	$205.00	$328.00	$533.00	-5.3%
Worcester (partial W)	$378.00	$485.76	$863.76	7.8%
AVERAGE	$489.95	$764.47	$1,254.42	4.6%

AVERAGE COST PER GALLON
$1,254 / 90,000 = 1.4¢

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How Fast Your Well Pays for Itself

Let's say you now pay a **combined water and sewer charge of only 1.4 cents for each gallon of water you use on your lawn** (Average Combined Annual Water and Sewer Charges for MWRA Communities in 2010). You also have a typical **automatic sprinkler system** that runs twice a day - one hour each time. If the sprinkler system sprays 10 gallons of water every minute its on, (or 10 gallons per minute = $.14 per minute) in one hour it will spray 600 gallons (or 10 gallons per minute x 60 minutes = 600 gallons = $8.40 per hour). If you run your sprinkler system 2 hours a day that's 1200 gallons or $17 per day. During an average summer, if you use your sprinkler for 90 days you will spray 108,000 gallons of water onto your lawn. **At 1.4 cents per gallon you will spend $1,500.00 to water your lawn**.

Now, let's say you installed a water well and had it hooked up to your sprinkler system. **Instead of paying $1,500.00 per year to water your lawn, you don't pay anything.** That's right. **The ground water is free**, and because it will be used on your lawn there will be no sewer charge either!

The well is paying for itself! Instead of paying the water and sewer department for watering your lawn, you're making payments on a well that increases the value of your home and supplies water for years to come.

CALCULATE YOUR ANNUAL SAVINGS - EXAMPLE

Step 1: Calculate your COST PER GALLON. Find current "Combined Annual Water and Sewer Charge" on your latest water bill.

Step 2: Calculate your TOTAL WATER USE. See last years water bill(s) or add up all outside water uses including irrigation system, pool, washing cars, etc.

Step 3: Calculate your ANNUAL SAVINGS by multiplying your Total Water Use by your Cost Per Gallon. The following simple formula can be used if you have an automatic sprinkler system. The constant 54 is based on just 90 days of summer watering (60 mins per hour x 90 days divided by 100 pennies = 54).

54	X	Cost Per Gallon (in pennies)	X	Flow in gallons per minute	X	Usage in hours per day
54	X	1.4	X	10	X	2

ANNUAL SAVINGS = $1,500.00

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How Much Water Does My Sprinkler System Use?

ZONE #		# HEADS Per ZONE (A)		GALLONS Per HEAD Per MINUTE (B)		MINUTES Per CYCLE (C)		CYCLE Per DAY (D)		GALLONS Per DAY (AxB)x(CxD)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
									Total # Gallons Used Per Day (E)	

WATER & SEWER COST IN PENNIES PER GALLON? $_____________ (F)

ESTIMATED DAYS PER MONTH RUN SPRINKLER SYSTEM? _____________ (G)

ESTIMATED MONTHS PER YEAR RUN SPRINKLER SYSTEM _____________ (H)

COST SAVINGS PER YEAR = ExFxGxH_______________________ = $_________________

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Project Scope of Work Items & Time Line

Items / Tasks To Do	Time	Who
Site Survey / Feasibility Analysis / System Design	1-14 days	Well Water Connection, Inc. (WWC)
Generate & Submit Proposal	1-7 days	WWC
Proposal Acceptance	1-3 days	Client (C)
Plot Plan / Certified Engineering Plan	1-21 days	WWC / C / Surveyor or Engineer
Permit Procurement	1-45 days	WWC/ C / Board of Health (BOH)
Pre-Mark Site / Dig Safe Notification & Approval	3-5 days	WWC
Geophysical Investigation & Data Report	5-45 days	WWC
Test Hole - Soil Sampling & Preliminary Water Test	1-14 days	WWC
Site Preparation	1-3 days	WWC / Landscape Contractor (LC)
Well Drilling / Installation	1-3 days	WWC
Well Development & Testing	1-3 days	WWC
Hydro-fracturing / Zone-fracturing / Pump Testing / Water Test	2-7 days	WWC
Preliminary Pump / Filtration System Design	1- 14 days	WWC
Debris Removal / Trenching for Electrical / Water/ Offset Line	1-3 days	WWC / LC
Installation of Pad / Pump House for Pump System	1-5 days	WWC
Pump / Filtration System Installation	1-3 days	WWC
Electrical Conduit installed in trench	1-2 days	WWC / LC
Permitting / Wiring of Pump System / Electrical Inspection	1-5 days	WWC / Electrician (EC)
Backfilling of Electrical / Water Trench	1 -2 days	WWC / LC
Run / Test Pumping System & Controls / Water Tests	1-14 days	WWC
Connect Pump System To Irrigation System	1-2 days	WWC / Irrigation Contractor (IC)
Debris Removal / Clean-up / Final Landscaping	1-2 days	WWC / LC
Final Water Testing / Inspections / Approval of System for Use	1-21 days	WWC / EC / BOH

Notes: Variables affecting the design, scope of work and timeline of the project include: offset distances to power source(s), voltage and phase available, operating pressure of the irrigation system, depth to water, type and number of well(s) (point, gravel or bedrock/artesian) and pump system(s) (shallow well, convertible or vertical jet, submersible or self priming centrifugal), operating controls (pump-start relay, tank/pressure switch, constant pressure controls (mechanical, VFD). With larger commercial well projects, a preliminary geophysical site survey and/or test well(s) is highly recommended to determine soil type, water levels, depth to bedrock, etc prior to the design and installation of any well(s).

Please contact our office to discuss your particular project needs.

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Well & Pump System Ball Park Prices

Depth & GPM	10 GPM	15 GPM	20 GPM	25 GPM	30 GPM	35 GPM	40 GPM	50 GPM
20'-40'	$2,000 - $4,000	$3,000 - $6,000	$4,000 - $8,000	$4,000 - $8,000	$5,000 – $10,000	$6,000 - $12,000	$7,000 - $14,000	$8,000-$16,000
40'-60'	$3,000 – $6,000	$4,000 - $8,000	$4,000 - $8,000	$5,000 - $10,000	$5,000 - $10,000	$6,000 - $12,000	$7,000 - $14,000	$8,000 - $16,000
60'-80'	$4,000 – $8,000	$5,000 - $10,000	$5,000 - $10,000	$6,000 - $12,000	$6,000 - $12,000	$7,000 - $14,000	$8,000 - $16,000	$9,000 - $18,000
80'-100'	$4,000 - $8,000	$5,000 - $10,000	$5,000 - $10,000	$6,000 - $12,000	$7,000 - $14,000	$8,000 - $16,000	$9,000 - $18,000	$10,000 - $20,000
100'-150'	$5,000-$10,000	$5,000 - $10,000	$5,000 - $10,000	$6,000 - $12,000	$7,000 - $14,000	$8,000 - $16,000	$9,000 - $18,000	$10,000 - $20,000
150'-200'	$5,000-$10,000	$6,000 - $12,000	$6,000 - $12,000	$7,000 - $14,000	$8,000 - $16,000	$9,000 - $18,000	$10,000 - $20,000	$11,000 - $22,000
200'-300'	$6,000-$12,000	$6,000 - $12,000	$7,000 - $14,000	$8,000 - $16,000	$9,000 - $18,000	$10,000 - $20,000	$11,000 - $22,000	$12,000 - $24,000
300'-400'	$6,000-$12,000	$7,000 - $14,000	$8,000 - $16,000	$9,000 - $18,000	$10,000 - $20,000	$11,000 - $22,000	$12,000 - $24,000	$13,000 - $26,000
400'-500'	$7,000-$14,000	$8,000 - $16,000	$9,000 - $18,000	$10,000 - $20,000	$11,000 - $22,000	$12,000 - $24,000	$13,000 - $26,000	$14,000 - $28,000
500'-600'	$8,000-$16,000	$9,000 - $18,000	$10,000 - $20,000	$11,000 - $22,000	$12,000 - $24,000	$13,000 - $26,000	$14,000 - $28,000	$15,000 - $30,000

Notes: Variables affecting the design (and cost) of the project will include: offset distances to power source(s), voltage and phase available, operating pressure of the irrigation system, depth to water, type of pump system (shallow well, convertible or vertical jet, submersible or self priming centrifugal), operating controls (pump-start relay, tank/pressure switch, constant pressure controls (mechanical, VFD). With larger commercial well projects, a preliminary geophysical site survey and/or test well(s) is highly recommended to determine soil type, water levels, depth to bedrock, etc prior to the design and installation of any well(s).

The figures above represent the price range for one (1) successful well (point, gravel or bedrock/artesian) & pump system and are for budgeting purposes only. These prices may not include additional costs that may be necessary such as: permitting, design/engineering fees, site preparation, trenching and/or backfilling, electrical work, pump pads and/or pump housings, water treatment and/or filtration, water sampling and testing, drilling debris removal/re-landscaping/site restoration, plumbing and/or tying into an existing irrigation system.

Please contact our office to discuss your particular project needs.

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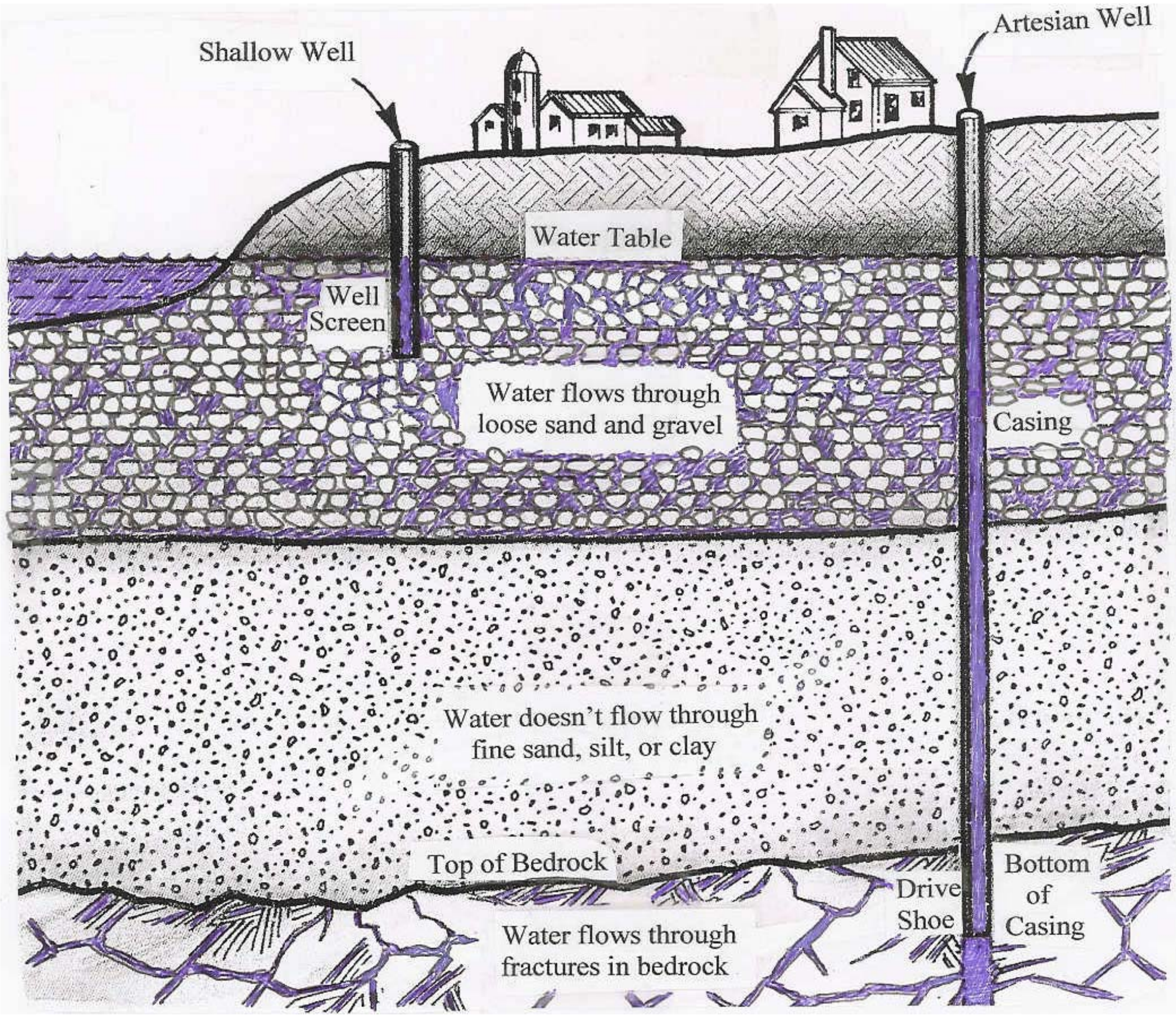
Water Well Design & Project Management

Bedrock "Artesian" vs. Shallow Wells



Shallow Wells rely on water that travels through spaces in loose sands and gravels. Because they are not very deep, they may be fitted with either surface mounted or submersible pumps and motors. Installation methods include driving a well point, wash and drive methods, or by auger. With this type of well, the depth to the water table and the type of soil encountered will determine how much water, if any, can be pumped from the ground.

Artesian Wells are generally deeper and fitted with submersible pumps and motors. With this type of well, a drilling rig is used to bore a hole through the soil and rocks and into solid bedrock that exists beneath your property. Steel casing and drive-shoe are then installed into the surface of the bedrock to provide a watertight seal and prevent soil, rocks and dirty water from entering the borehole. Drilling into the bedrock resumes without casing until the borehole intersects with fractures that exist naturally in the bedrock. This factor determines how much water, if any, can be pumped from the ground.

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How Artesian Wells Work

To understand how bedrock wells work, imagine you have 2 - 5 gallon buckets and 2 large rocks. In each bucket, you place one of the rocks. One rock is solid, with no cracks or fractures in it. The other rock has several fractures running through it. Each bucket is then filled to the top with water. Imagine if we drilled a small hole a couple inches into the top of each rock. Imagine we then insert a straw through the water, into each boulder to the bottom of each hole we drilled, and created a watertight seal between the inside of the rock and the outside of the straw.

Would we be able to draw up any water through the straw from the rocks? Obviously, the rock with no cracks in it would have no water in it, right? In the other bucket, the rock with the fractures running through it would contain water, but only in its cracks. But because the straw seals off cracks as it passes through each one, no water would be able to flow into the straw from a crack. Any water that moves through these cracks will flow around the straw, not into it. If we were able forced the straw down deeper through the middle to near the bottom of this same rock, no water could be drawn from the rock. That is unless the tip of the inserted end of the straw somehow ended up on a crack and the chances of that are remote. So how do we get water from the rocks? The solid rock, because it has no cracks will never allow water to flow freely through it. The other rock, however has plenty of cracks and therefore allows water to flow through it. We just need to get at it.

Now imagine if we left the straw in place just a couple inches in the fractured rock. Then we took a slightly narrower, but much longer drill bit and inserted it inside the straw down to the rock below. Then we started drilling. Because the rock is hard, the hole drilled through it will stay open as the drill bit travels through. As the drill bit eventually passes small cracks in the fractured rock, water would begin to flow into the drilled hole. If we pulled out the drill bit and watched, what would happen? We would see water flowing from the cracks that were intersected by the drill bit. The flowing water would begin to fill up the drilled hole.

The water level in the drilled hole would continue to rise, past the bottom tip of the straw and up to the same level as the water in the bucket. This occurs because the water in the submerged rock is under *hydrostatic pressure.* Hydrostatic pressure (psi) is created by the weight of the water above the fracture and is the force that pushes the water through the fracture into the drilled hole and up to the same level as the water surrounding the rock. Anyone who has been more than a few feet below the surface of water has felt it.

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How Point Wells and Gravel Wells Work

This simple demonstration helps explain how groundwater flows through different soil types and can be used to help understand the cause of localized flooding, wet basements, and even how shallow wells work.

To understand how groundwater flows from the ground and into point wells and gravel well (shallow wells), imagine you have a 5 gallon bucket. Now, imagine you fill it a third of the way with clay. Next, fill it another third of the way with silty, fine (like the beach) sand. Lastly, fill the bucket to the top with gravel and coarse sand. Now we have a bucket with three distinct layers of different soil types. Now attempt to fill the bucket with water by repeatedly dumping cupfuls of water into it. As you can imagine, the water will easily flow through the first layer of soil (the coarse sand and gravel). The water, when it reaches the second layer (the fine sand) will slow down, maybe even create a temporary puddle on the top of its layer that will disappear gradually as the water continues to seep downward.

When the water reaches the top of the last layer (the clay) it will stop flowing down and just sit there and on top of the clay. Eventually, some of the water will be absorbed by the clay while the rest sits on top. As we continue to dump water into the bucket, its level rises above the clay layer, slowly filling the layer of fine sand with water and pushing the air out at the same time. This process speeds up through the top layer of coarse sand and gravel until the bucket is full of only water and soil, as the air spaces between the grains of soil has been pushed out and replaced with water. Each layer of soil is now *saturated.*

Attempting to install a point well or gravel well is like putting a long straw into each layer of soil and trying to suck the water out. Intuitively, you can imagine how it can be done easily in a saturated layer of coarse sand and gravel.

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Recovery Rate in Artesian Wells

Recovery rate is a measurement in gallons per minute (gpm) of how quickly the well re-fills itself after being pumped down from its “normal” (static) level. A way to see it is to place one end of a clear straw into a glass of water while holding a fingertip firmly onto the other end so that no air can escape. Now push the straw deeper into the glass. As you do this you may feel a slight increase in pressure on your fingertip. As you continue to push the straw deeper to the bottom of the glass, as long as you keep your fingertip firmly on the other end, the pressure against your fingertip will increase as water tries to rush up the straw, but is held down by the air being compressed inside the straw. As soon as you take your fingertip off the end and the air pressure is released, you will see the water flow up the straw.

Intuitively, we know that it will stop when it reaches the same level (static level) as the water on the outside of the straw. However, if you watched carefully, you will notice that the level of the water in the straw does not rise at the same rate.

You can see the water rush up the straw quickly as you first remove your finger, then slow down as the water rises inside the straw and approaches the level of the water inside the glass. *The flow rate visibly decreases as the straw fills up with water.* This is due to the increasing weight of the water *inside* the straw as it rises. As more water flows in, the weight of the water inside the straw increases and is pushing down on the water that’s flowing *into* the straw. This is why the rate of flow slows down as the straw fills up with water. When the water level in the straw reaches the same level as the water outside the straw (state of equilibrium) the water stops flowing. This type of water flow, to a lever higher than its original source is called *artesian*. Since the flow of water from most bedrock wells behaves in precisely this same manner, the term *artesian well* has become synonymous with bedrock wells.

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The Process & Time Line
Artesian Wells

Artesian wells draw water from deep fractures down in the bedrock.

Unlike *point wells* which can be installed using light, portable equipment, *artesian (or "bedrock") wells* are installed using large drilling rigs. Once set up, these rigs bore a hole down to the solid bedrock that exists beneath your property. 20' lengths of steel casing and a drive-shoe are installed in the open hole to keep loose soil and rocks from caving in the well. Drilling continues into solid bedrock until enough water is found. If an insufficient flow-rate of water is measured, the well may need to be *hydrofractured.*

Before drilling begins, we'll first want to determine the best location for the well and placement of any other related components…

After the drilling, the pumping system is installed inside the well, and any additional components such as a tank system or sediment filter are also installed. An 18" deep trench may be needed in order to run electricity.

After it's powered up, the completed system can be disguised and any excess drilling debris discarded or used on-site in landscaping.

The *Artesian Well* process (permitting, drilling, pump installation, etc) can take several weeks depending on seasonal weather conditions and other factors.

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Submersible Pump Systems

Submersible Pump Systems may be operated ***"tankless"*** or ***"pressurized"***. A tankless system utilizes a pump start relay, float switch or other control device wired to your irrigation system, to turn on and off your pump. A pressurized system utilizes a pressurized tank and switch that turns the pump on and off based on the pressure in the system.

- **3"-6" Professional Grade submersible pumps and motors**
- **Pressure regulating valves**
- **Single or double jacketed electric cable**
- **Poly, PVC or galvanized drop pipe**
- **Torque arrestors, cable guides, pitless adapter**
- **Watertight and vented 4"-8" well caps and seals**
- **Bleed-back/winterizing valves and hose bibs**
- **Flow inducer and pump intake sediment screens**
- **Optional five (5) year or *Lifetime Warranties***
- **Annual Service Contracts & Preventative Maintenance Plans**

Submersible pump & motor size needed to run average residential sprinkler system at 10-12 gallons per minute (gpm) & 40-60 psi at various well recovery depths

Well Depth	10 gpm Recovery Depth	HP Pump System
50'	5' – 45'	1/3 hp – 1/2 hp
100'	50' – 80'	1/2 hp – 3/4 hp
200'	100' – 180'	3/4 hp – 1 hp
300'	200' – 280'	1 hp – 1 1/2 hp
400'	300' – 380'	1 1/2 hp
500'	400' – 480'	1 1/2 hp – 2 hp

The final pump design (make, model, motor size & rating) recommended will be based on many variables, including but not limited to the depth and yield of the well, distance to the power source, the existing or proposed irrigation design and personal preferences you may have.

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WELL WATER CONNECTION, INC.

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Submersible Pump Curve

Model 10GS

GOULDS PUMPS

SELECTION CHART

Horsepower Range ½ – 3, Recommended Range 3 – 16 GPM, 60 Hz, 3450 RPM

Pump Model	HP	PSI	Depth to Water in Feet/Ratings in GPM (Gallons per Minute)																											
			20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	340	380	420	460	500	540	580	620	660	700	740	780	820
10GS05R	½	0			15.6	14.0	12.4	10.4	6.5																					
		20	15.4	13.5	11.5	9.2	6.0																							
		30	13.0	11.1	8.0	4.0																								
		40	11.0	7.9	3.0																									
		50	7.0																											
		60																												
Shut-off PSI			61	53	44	34	26	18	10																					
10GS05	½	0				16.0	15.3	14.3	12.8	11.3	9.0	6.4																		
		20		15.9	14.9	13.8	12.5	10.8	8.3	4.8																				
		30	15.7	14.6	13.5	12.3	10.5	7.8	4.0																					
		40	14.5	13.4	12.0	10.3	7.5	3.0																						
		50	13.0	11.5	9.8	7.2																								
		60	11.3	9.0	6.4																									
Shut-off PSI			89	81	72	63	55	46	37	29	20	11																		
10GS07	¾	0						16.0	15.2	14.3	13.4	12.5	11.5	10.3	9.0	7.0	4.0													
		20				15.8	15.0	14.0	13.0	12.3	11.2	10.2	8.5	6.0																
		30			15.7	14.8	13.9	12.8	12.0	11.0	9.8	8.2	5.5																	
		40		15.6	14.7	13.8	12.7	11.9	10.8	9.7	8.1	5.2																		
		50	15.3	14.4	13.5	12.6	11.6	10.5	9.4	7.5	4.8																			
		60	14.3	13.4	12.5	11.5	10.3	9.0	7.0	4.0																				
Shut-off PSI			130	121	113	104	95	87	78	69	61	52	43	35	26	17	9													
10GS10	1	0								15.8	15.2	14.5	13.7	12.8	12.0	11.0	10.0	6.7												
		20						15.7	14.9	14.3	13.5	12.7	11.7	10.6	9.6	8.1	6.5													
		30				16.0	15.6	14.8	14.2	13.3	12.5	11.6	10.4	9.4	7.8	5.5	3.0													
		40			16.0	15.5	14.7	14.1	13.2	12.4	11.5	10.3	9.1	7.4	5.0	3.0														
		50			15.3	14.6	13.9	13.0	12.3	11.3	10.1	8.9	7.0	4.3																
		60	15.8	15.2	14.5	13.7	12.8	12.0	11.0	10.0	8.6	6.7	4.0																	
Shut-off PSI			158	150	141	132	124	115	106	98	89	81	72	63	55	46	37	20												
10GS15	1½	0												15.7	15.3	14.8	14.4	13.3	12.2	10.9	9.3	7.1	3.0							
		20									16.0	15.6	15.2	14.7	14.3	13.7	13.2	11.9	10.6	9.0	6.5									
		30								15.9	15.5	15.2	14.6	14.2	13.5	13.1	12.6	11.3	9.7	7.6	4.0									
		40							15.8	15.5	15.1	14.6	14.2	13.5	13.0	12.5	11.8	10.3	8.8	6.0										
		50						15.7	15.4	14.9	14.5	14.0	13.4	12.8	12.3	11.7	11.0	9.4	7.4	3.4										
		60					15.7	15.3	14.8	14.4	13.9	13.3	12.8	12.2	11.6	10.9	10.1	8.1	5.6											
Shut-off PSI							197	188	180	171	162	154	144	136	128	119	110	93	76	58	41	24	6							
10GS20	2	0														16.0	15.7	14.9	14.2	13.4	12.4	11.4	10.0	8.2	5.8					
		20												15.9	15.5	15.3	14.8	14.1	13.2	12.2	11.0	9.9	8.0	5.2						
		30											15.8	15.4	15.1	14.7	14.4	13.5	12.7	11.7	10.3	8.8	6.5							
		40										15.8	15.4	15.1	14.7	14.4	14.0	12.9	12.2	10.9	9.5	7.8	3.9							
		50								16.1	15.7	15.3	15.0	14.6	14.2	14.0	13.4	12.5	11.5	10.1	8.5	6.0								
		60							16.0	15.7	15.3	14.9	14.5	14.2	13.8	13.4	12.8	11.8	10.7	9.1	7.2	3.4								
Shut-off PSI									225	216	208	199	190	182	173	164	156	139	121	104	87	69	52	35	17					
10GS30	3	0																	15.8	15.2	14.6	14.0	13.3	12.6	11.9	11.0	10.0	9.0	7.5	5.8
		20																15.7	15.1	14.5	13.9	13.2	12.5	11.8	10.9	9.9	8.8	7.2	5.4	
		30															15.9	15.4	14.8	14.2	13.4	12.8	12.0	11.3	10.3	9.3	8.1	6.2	3.8	
		40														15.9	15.6	15.0	14.4	13.8	13.1	12.4	11.5	10.8	9.7	8.6	7.1	4.7		
		50												16.0	15.8	15.6	15.3	14.7	14.1	13.3	12.7	11.9	11.0	10.2	9.1	7.8	6.0	3.0		
		60											16.0	15.8	15.5	15.2	14.8	14.3	13.7	12.9	12.3	11.4	10.6	9.6	8.3	6.8	4.5			
Shut-off PSI													284	275	267	258	249	232	215	197	180	163	145	128	111	94	76	59	42	24

Horsepower Range 5, Recommended Range 3 – 16 GPM, 60 Hz, 3450 RPM

Pump Model	HP	PSI	Depth to Water in Feet/Ratings in GPM (Gallons per Minute)																						
			440	480	520	560	600	640	680	720	760	800	840	880	920	960	1000	1040	1080	1120	1160	1200	1240	1280	1320
10GS50	5	0						16	15.5	15.2	14.9	14.5	14	13.5	13	12.5	12	11.5	10.8	10.2	9.5	8.5	7	5.2	
		20					15.9	15.4	15.1	14.8	14.5	13.9	13.4	12.9	12.4	11.9	11.3	10.7	10.1	9.4	8.2	6.8	4.3		
		30					15.6	15.2	14.9	14.6	14.2	13.7	13.1	12.6	12.1	11.6	11.0	10.4	9.8	8.8	7.5	6.0	3.0		
		40				15.8	15.3	15.1	14.7	14.4	13.8	13.3	12.8	12.3	11.8	11.2	10.6	10.0	9.2	7.9	6.6	4.1			
		50				15.5	15.2	14.9	14.6	14.1	13.6	13.0	12.5	12.1	11.5	10.9	10.3	9.7	8.6	7.3	5.6				
		60			15.7	15.3	15.0	14.7	14.3	13.7	13.2	12.7	12.2	11.7	11.1	10.5	9.9	9.0	7.7	6.5	3.2				
Shut-off PSI					346	329	312	294	277	260	242	225	208	191	173	156	139	121	104	87	69	52	35	17	

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Constant Pressure Systems

Constant Pressure Systems (CPS) are custom designed, built and installed by us to meet your particular needs.

With the use of pressure-regulating valves or 3-phase variable speed motors and drives, Constant Pressure Systems provide consistent pressure while changing flow rates. Pumping Systems and Controls are protected by eliminating the on/off cycling and other conditions common with traditional large-tank water systems. Constant Pressure Systems have the added benefit of smaller tanks, allowing them to be installed virtually anywhere and easily hidden.

Constant Pressure Systems are available in all sizes and configurations.

Constant Pressure System for sprinkler system mounted inside garage. (Wayland, MA)

Constant Pressure System mounted to well, for hoses to garden, sprinklers and pool. (Franklin, MA)

Constant Pressure System including filter and electrical components mounted in shed. (Wilmington, MA)

Constant Pressure System on side of house with electrical components and sediment filter. (Milton, MA)

Constant Pressure Systems provide "better than town water-like" pressure for home sprinkler systems, gardens, washing cars, filling pools and any other water needs.

Constant Pressure System mounted in basement of home with additional port for future expansion. (North Reading, MA)

Variable Drive Constant Pressure System with stainless steel tank components and NEMA 4 controller. Mounted on board. (Tewksbury, MA)

Tank-less Constant Pressure System for "irrigation only" (with no spigots) (Sharon, MA)

Constant Pressure System and controls mounted outside on pressure treated lumber. (Dedham, MA)

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Site Preparation

Because artesian and gravel well installations require the use of large heavy drilling equipment, some of the site preparation services shown below are important to consider when planning your water well installation. Utilizing these services (when applicable) can save you time and money on your completed well project.

Delivery, use and removal of plywood for use on sensitive areas

Trim branches from trees for access to drill site

Delivery and use of hay bales to help divert or contain drilling mud

Removal of fence for access with equipment and/or allow for removal of drilling debris

Use of tarps to prevent mud splatter on new blue stone patio

Use of equipment to level off ground to allow access and safe set-up of drilling rig

Removal of trees or shrubs for access to drill site

Delivery, use and removal of mud tracks for use on sensitive areas

Provide blocking to support weight of heavy drilling equipment

WELL WATER CONNECTION, INC.
Water Well Design & Project Management

Hydrofracturing & Zonefracturing

Hydrofracturing and *Zonefracturing* are specialized and highly effective procedures used to increase water production from low-yield bedrock wells. A trained crew installs one or two inflatable “packer(s)” down the well through the steel casing and into the bedrock below. The well is then pressurized and flushed with tremendous water pressure. This process cleans out plugged fractures in the bedrock and usually results in a substantial increase in the amount of water that flows into the well. Upon completion of the process, a *pump test* is necessary to flush out the well and determine the new flow rate.

During hydrofracturing, a single inflatable packer is lowered into an Artesian well
(Wilmington, MA)

During zonefracturing two inflatable packers are used
(Dover, MA)

Tank loads of water needed for the *hydrofracturing* and *zonefracturing* processes
(Dover, MA)

A pump test is performed afterwards to determine the new flow rate
(North Reading, MA)

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WELL WATER CONNECTION, INC.
Water Well Design & Project Management

Common Water Problems

Probable Cause	General Effect	Probable Remedy
Hardness (Calcium & Magnesium)	Scale in pipes and water heaters; causes "soap curd" on fixtures, tile, dishes and laundry; low sudsing characteristics	Removal by ion exchange softener.
Iron /Manganese	Causes discolored water; red, brown, orange or black stains on fixtures, appliances and laundry; dark scale in pipes and water heaters.	Low level (2 ppm) removal by ion exchange softener when hardness is also present; best removed by oxidizing iron filter; aeration and/or chlorination followed by filtration in some cases.
Iron/Manganese/ Sulfur (Bacteria)	Same general effects as above plus slimy deposits that form in pumps, pipes, softeners and toilet tanks.	Low level removal possible by oxidizing iron filter; best removed by chlorination followed by filtration.
Hydrogen Sulfide Gas	Foul rotten-egg odor; corrosion to plumbing; tarnishes silver and stains fixtures and laundry; ruins the taste of foods and beverages.	Best removed by aeration, scrubbing and filtration; also removed by oxidizing filters or chlorination followed by filtration.
Turbidity	Suspend matter in water; examples include mud, clay, silt and sand; can ruin seats, seals and moving parts in appliances.	Removal by backwashing sediment filters; extra fine treatment utilizing sediment cartridge elements.
Acid Water (low pH)	Corrosive water attacks piping and other metals, red and/or green staining of fixtures and laundry.	Best corrected by neutralizing filters or soda ash feeding.
Taste/Odor/Color (organic matter)	Makes water unpalatable; can cause staining.	Depending on the nature of contaminant, aeration followed by filtration; carbon filtration; chlorination followed by filtration.
Tannins/Humic Acid	Can impart an "iced-tea" color to water; causes light staining; can affect the taste of foods and beverages.	Removal by special ion exchange or oxidizing agents and filtration.
Coliform Bacteria	Can cause serious disease and intestinal disorders.	Chlorination and filtration is most widely practiced; iodination, ozonation and ultraviolet treatment are used to a lesser degree.
Organic Halides (e.g. Herbicides & Pesticides)	Can cause serious disease and/or poisoning.	Most are readily removed by absorption with carbon filters; some can also be removed by hydrolysis and oxidation.
Nitrates/Chlorides & Sulphates	Can cause health-related problems if quantities are high.	Removal by special ion exchange, deionization process or reverse osmosis.
Sodium Salts	Imparts an alkaline or soda taste to water.	Removal by deionization process or reverse osmosis; distillation can be used.

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Sediment Filters

Sediment Filters are an important part of any well. For *irrigation only* wells, they help protect the pump and irrigation system. For *whole house* water systems, filters help protect the pump, the heating system and the household appliances.

Clear View sediment filter with "Manual" flush valve for irrigation well
(Wayland, MA)

Clear View sediment filter including "Automatic" flush valve for irrigation well
(Canton, MA)

Pump Screen installed over submersible pump to limit intake of sediment from irrigation well
(Wilmington, MA)

Submersible pump sand separator for sediment isolation and removal from pump intake
(Hingham, MA)

1 micron bag filter for removal of fine sand and silt from irrigation well
(Hopkinton, MA)

Cartridge Filter to remove sediment from well in whole house water system
(Stoughton, MA)

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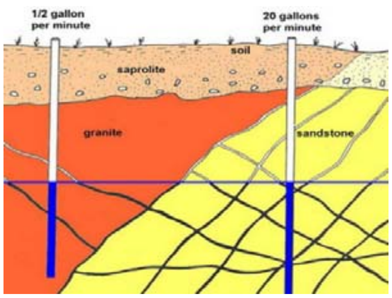
Water Well Design & Project Management

Fracture Trace Analysis

Fracture trace analysis is a photo-geologic exploration tool used to locate rock fractures buried below the surface of the earth. The chief effect of this new tool is that it minimizes the total number of test holes needed to identify and pinpoint groundwater resources. Successful wells often produce greater than average well yields, reduce energy operation cost, and lengthen scheduled preventative maintenance periods.

Fracture traces are natural occurring vertical cracks or crevices formed in bedrock that extend downward to a great depth below land surface. Their location can be detected by a trained hydrogeologist's evaluation of satellite and low altitude photographs. In order to verify the existence of fracture traces plotted on the photographs, an on-site inspection is conducted to better define the ground position of the fracture trace. Higher yielding wells are possible where two or more fracture traces intersect one another. The zone of fracturing increases at the intersection point. The main reason for the presence of high yield wells is their direct association with fracture traces and the fracture traces ability to transport ground water into the influence of a pumping well.



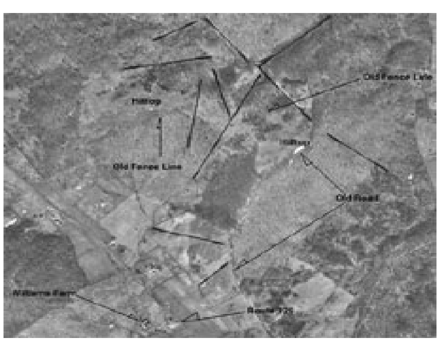
Hundreds of successful high yield wells have been drilled using fracture trace analysis. There is nothing occult or mysterious about the occurrence of ground water. In reality, the presence of ground water beneath the surface of the earth follows well-established natural laws and hydrogeologic principles. Using modern scientific techniques to identify natural geologic conditions that promote the occurrence of groundwater, water bearing fracture can be located prior to drilling the well.

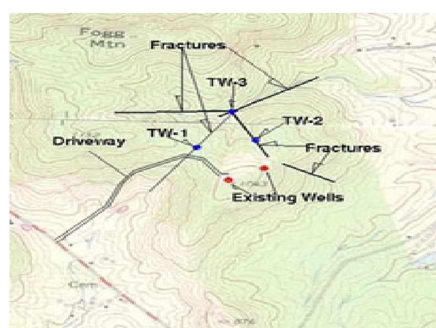
Depending on water requirement and hydrogeologic conditions, the odds of drilling a high volume well using random site selection can be very low. In order to maximize our ability in finding the future location of a high capacity well, a hydrogeological investigation by a trained geologist must be conducted along with a fracture trace analysis of the target property.

Benefits of using fracture trace analysis include:

1. The technique reduces the chances that multiple wells will be needed to obtain the desired total yield.
2. A well located on an identifiable fracture trace, fracture trace intersection, lineament, mega-lineament, or any combination of the group of fractures will result in productivity well yields ranging from 10 to 1,000 times higher than one not drilled into a fracture sequence.
3. Utilizing the fracture trace method of well location can save tens of thousands of dollars in drilling, pump systems and associated costs.
4. Wells centered on fracture traces display a more consistent yield rather than variable yields associated with non-fracture trace location wells.
5. Fracture trace well sites can result in improved ground water yields can reduce operational energy cost.

Fracture trace can be an economical and successful way to more accurately find underground water resources.





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WELL WATER CONNECTION, INC.
Water Well Design & Project Management

Expert Advice Key to Successfully Drilling a Water Well

Property managers and community associations know how important it is to have good communication and coordination between contractors on any project. With water wells it is even more critical. A well drilling project involves a well driller, a pump installer, an irrigation contractor, a landscaper, an electrician and a plumber. There are also many inherent unknowns with wells which lead to a greater financial risk and therefore a dire need for precise project management. Without an experienced project manager, someone who knows the process of well drilling and the important steps that need to be taken, having a well installed can be a challenging and frustrating experience for many.

Many community associations that drilled wells years ago are still dealing with issues that were not properly addressed when the wells were installed. Before the drilling can begin there are many issues that need to be discussed and questions that need to be asked. For example, the projected (and actual) costs for a completed well system to provide water for a condominium's irrigation needs (including plumbing, electrical tie-ins and re-landscaping) could vary from as little as $5,000 to more than $50,000 for the same project.

The total cost depends on the type of well(s), the system design, and of course the results of the drilling. Many budgets have been blown on well drilling projects because careful attention was not paid to these and other issues.

There are many inherent unknowns with wells that lead to a greater financial risk and therefore a dire need for precise project management

Which type of well do you need? The real question is not which type is needed, but rather which type is feasible based on the geological conditions of the site on which the well is to be installed. There are two types of wells. Shallow wells, (dug well, gravel well, point well), extract groundwater from coarse sands and gravel layers just below the ground surface. Artesian wells, (bedrock wells, drilled wells), extract groundwater from naturally occurring fractures in the bedrock that exist hundreds of feet below the ground surface.

Under the right conditions a shallow well may produce better results with much less initial cost and downside risk than an artesian well Unfortunately, the majority of well drilling contractors do not install this type of well and they are often overlooked. A visual site inspection by a trained eye or some soil testing may be all it takes to determine if a shallow well is feasible. If a shallow well is ruled out, an artesian well may then be considered. Artesian wells are generally feasible providing the drill rig can safely access the property.

It is during the design phase that many important questions need to be asked. It is also where communication with the irrigation contractor/designer is absolutely essential. Answers to the following questions and more will be the basis of the preliminary design of the well and pump system, and the basis for the estimates from the various contractors. Later, after the drilling begins, other issues will make it necessary to review and possibly alter the design. Also note that a change required by one contractor may have a ripple effect and cause unexpected changes elsewhere in the project’s design and ultimate cost. This needs to be considered before making any final decisions.

Questions include, but are not limited to, what is the pressure and gallons per minute on the current system? If there is no irrigation system, is one planned? How much water is needed per day? How much per week? How many hours per day are available for watering? Will a tank be part of the design? Will a tank serve its intended purpose without compromising the life of the pump. Will it require winterizing? What is the warranty on the pump system? Will there be any other uses for the well? Is there a pool? Will there be spigots for association members for washing cars, etc? Is there any possibility of future expansion of irrigation system? Who will handle the permitting, water testing, and any filtration that may be required? Should the added cost of a filtration system need to be considered? What measures can be taken during the design and installation of the well to minimize the need for one? What are the electrical requirements? What plumbing is needed? How much mess can be expected from the drilling process and how can it be managed?

Good project planning, communication and management can save community associations, property managers and contractors valuable time, frustration and usually a lot of money over the entire project. It will uncover potential problems that are much easier to address before the work begins. An effective project manager should work directly with the property managers and contractors to streamline the process, assure that each contractor is getting the information that he/she needs and assure they are doing the best for the association. This person can address important issues, bring clarity to the whole mystery surrounding wells and best use the water that is available. This will help the whole process run much smoother with fewer unexpected problems and will enable community associations to take full advantage of the benefits of water wells.

A full-service, project management firm providing custom-designed irrigation wells, pumps, filtration systems and related services

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