

BROOKTRAILS TOWNSHIP

COMMUNITY SERVICES DISTRICT

24860 Birch Street
Brooktrails, California 95490
Phone: 707-459-2494
Fax: 707-459-0358
drose@btcsd.org

October 10, 2014

To: Joy Wildflower
From : Denise Rose

Re: Brooktrails Township Community Services District – Supplemental water supply for long-term drought.

Background

Brooktrails Township Community Services District is a small water service provider serving the Brooktrails subdivision which was developed in the late 1960s, in Mendocino County. The District currently service 1553 connections and is authorized to serve up to 1576 connections.

Brooktrails currently receives 100 percent of its water supply from surface sources including the Willits Creek. Water is stored in two small reservoirs. Lake Ada Rose holds approximately 118 acre feet and Lake Emily hold approximately 250 acre feet of water. Water is transferred from Lake Emily to Lake Ada Rose, which transmits raw water to the adjacent water treatment plant. Subsequent to treatment, water is pumped to more than twenty tanks and thusly to residents through 63 miles of water lines. Storage tanks range in size from 10,000 gallons up to 220,000 gallons

Current and Future conditions

Brooktrails began its life as a vacation resort with an expectation that it would serve a part-time population of second homes. Through the vagaries of the economy over the years the community has for the most part become a year-round residential community whose infrastructure is aging and in the area of water storage and sourcing undersized when faced with prolonged drought conditions. During a normal year of rainfall the District receives an average of 90 inches of rain. During 2013 it received five inches of rain and thus far it has received 39 inches of rain for 2014. The District's reliance on rain to maintain water supply has meant that the lack of rain in the autumn of 2013 reduced the water supply to less than 100 days by January 2014. The rain received in March 2014 has allowed the district to continue to provide water to its connections. However, with just 110 days' worth of water, the supply is at a new low for this time of year. The district implemented a mandatory rationing program in January 2014. This program has been renewed each month. The District is producing an average 31 acre feet per month for its connections and releasing approximately 7 to 10 acre feet per day for the fish population in accordance with its Fish and Wildlife permit.

At its September 9th meeting the Board of Directors renewed the emergency and reduced the maximum usage per connection (assuming a family of four) from 200 gallons per day to 170 gallons per day (or 42.50 gallons per person). Should the drought conditions persist it is anticipated that the Board will have to further reduce the maximum usage per connection.

Unfortunately, there are no water systems in close proximity that it is practical to connect to as an emergency source. The closest entity is also experiencing severe drought conditions and is not in a position to sell water to Brooktrails.

In order to meet the need of its customers and the California Department of Health minimum of 50 gpcpd the district must seek out and develop new sources of water. At this point the district and its engineers find that the only practical source of water would be development ground water.

The District has conducted a geological survey to identify areas which based on the rock formation and soils identified a number of sites that might yield sufficient ground water to develop wells that could produce enough water to supplement its surface water supply to a level that would meet the 50 gpcpd requirement.

The District is seeking funding to conduct a geophysical survey for groundwater investigations, and Drilling of ground water wells. The objective of the survey is to locate groundwater, predict its depth and, to the degree possible, estimate the expected yield.

Review of recent water wells.

The geology of the area appears to be primarily mainly sandstone, shale and minor conglomerate in coastal belt of northwestern California. Research conducted prior to the field survey revealed more than 3 reported well logs for the immediate surrounding area. The yields of the wells were reported to range from 0 to 50 gallons per minute and the depths were reported to be between 300 and 540 feet. Based on the information available we think that a groundwater survey is important to ensure the best chance of drilling successful wells.

Scope of work

The Geophysical Method to be used

There are several geophysical methods that can be used to detect groundwater; however, all of them except the Seismoelectric method have significant limitations and cannot determine approximate yield or sufficiently accurate depth.

Briefly, the Seismoelectric (SE) method, sometimes called Electro kinetic Surveys (EKS) makes use of a phenomenon, known since the 1950's, whereby an electrical signal is produced when a seismic wave encounters water within rock pores, such as is the case for an aquifer. Although the basic physics of the method has been understood for many years, and numerous field demonstrations have been completed showing the feasibility of the method during the past 20 years, it was not until 1996, that this method was fully developed and shown to be useful and accurate in locating and predicting the presence of groundwater. The techniques of measuring the SE signal which is recorded essentially devoid of naturally occurring electrical noise. Without the use of this technology the data contains significantly more noise, as was the case for earlier soundings, which did not use this technology. Instrumentation developed to both record this signal and to process the data, allowing the existence of groundwater to be inferred along with estimates of its depth and the yield of the aquifer. Many surveys have now demonstrated the success of this method.

The Expected Survey Parameters.

The district proposes that a sufficient number of soundings to cover the reasonably accessible 2500 acres in its 'green belt' available for exploration of potential new water well site(s). A final report will provide estimates for approximate depth, yield and thickness of any detected source of groundwater.

The District will identify, based on the geological survey the following:

- The sites where SE soundings are to be recorded that can be accessed using a four-wheel drive truck.
- Conduct the survey work at approximately 25 potential sites over the course of eight days.
- Identify at least five sites to bore test wells

Cost Estimate

Seismoelectric Sounding per Day	\$6,000 per day X 8 =	\$48,000
Well drilling including all seals and materials	\$100 per foot x 600Ft x 5 wells =	\$300,000
Pipe line to Distribution	\$90 per foot X 1875 feet =	<u>\$168,750</u>
	Total	\$516,750

While it is feasible to install filtration systems at each of the viable wells in order to provide safe drinking water and feed the water directly into the distribution system, doing so would require filter enclosures and backwash holding tanks at each site. The district proposes to transport well water to its reservoirs and then to its treatment plant. Filtering all source water in one place will mitigate any quality issues of water entering the system. Transporting all water to one filtration system will reduce the initial cost of the project as well as long-term maintenance and costs.

As an alternative to the project noted above the district has explored both the cost and likely hood of reaching an agreement at this time with the City of Willits for an intertie. Preliminary engineering estimates that such a project will cost in excess of \$1.75 million dollars requiring the installation of at least two pumping stations. Additionally, the City of Willits is in the midst of its own drought emergency and does not appear to be willing to entertain such a project in the near-term.

As previously stated, without supplemental water source Brooktrails Township Community Services District is not able to meet the 50 gpcpd requirement from CDPH at this time. If this continues and no other sources are available the district will have to truck in water to serve its residents. To provide the same supplemental capacity the district anticipates that it would need approximately 25 truckloads of water per day at a cost of approximately \$500 gallons per truck. This number is expected to increase dramatically if the drought continues and the rains do not fill the District's reservoirs this fall or winter.

Summary: As detailed herein, in order to continue to supply water and meet the 50 gpcpd to customers during this extended drought, the district must find alternative sources of water to provide supplemental water. The district plans to explore and utilize ground water to meet the continuing needs of its customers.

The costs for this project including estimated costs for engineering of the improvements are summarized below:

Improvement and Engineering costs

Seismoelectric Sounding per Day	\$6,000 per day X 8 =	\$48,000
Well drilling including all seals and materials	\$100 per foot x 600Ft x 5 wells =	\$300,000
Pipe line to Distribution	\$90 per foot X 1875 feet =	<u>\$168,750</u>
	Sub-total	\$516,750
Engineering, inspection and administration		<u>\$103,350</u>
	Total	\$620,100

An anticipated project schedule is shown below:

	Week									
Work Item	1	2	3	4	5	6	7	8	9	10
Seismoelectric sounding	■	■								
Well drilling & testing			■	■	■	■				
Pipe line construction					■	■	■	■	■	■
Engineering and inspection	■	■	■	■	■	■	■	■	■	■

Mark D. Vogel, P.E.

VOGEL ENGINEERING
Civil Engineering & Land Surveying

761 So. State Street
Ukiah, CA 95482
707-462-2303
Fax 707-462-8550
April 1, 2014

Robert Melliush
Brooktrails Township C.S.D.
24860 Birch Street
Willits, CA 95490

Re: Brooktrails/Willits Water Connection


Dear Robert,

This letter report is in response to your request for a cost estimate to construct a permanent water connection between the City of Willits and Brooktrails to allow for emergency transfer of treated water between the systems. A cost estimate with various supporting figures is attached for your consideration.

The connection would require a tie-in to the 6 inch main in the sharp curve where Mill Creek Drive becomes Mill Creek Court in the City of Willits. Existing water mains are reportedly either 6 inch looped or 8 inch serving the area. A pump station would be required to overcome the elevation difference between the two systems and any minor head losses. This would likely require a duplex or triplex pump station capable of flows in the 200 to 500 GPM range at 50 TDH depending on the type of emergency requirement. A plumbing by-pass would allow gravity feed from Brooktrails to Willits if required. The Clearwell at the Brooktrails WTP is approximately 10 feet higher than the Treated Water Storage that serves the Mill Creek Court area in Willits.

Approximately 10,000 feet of 8 inch main would be constructed parallel to the existing sewer trunk main along the Willits Creek alignment. The water main would cross Willits Creek as an elevated crossing parallel to the catwalk on the dam that creates the Summer Lake. The main would then be connected to the inlet piping to the Clearwell or the Contact Basin at the Brooktrails WTP. Additional easement width and lot acquisition will be required along the alignment. Grading will be required to provide sufficient construction width. It is anticipated that the roadbed will need to be resurfaced to provide all weather access.

Sincerely
Vogel Engineering


Mark D. Vogel, P.E.

Att:

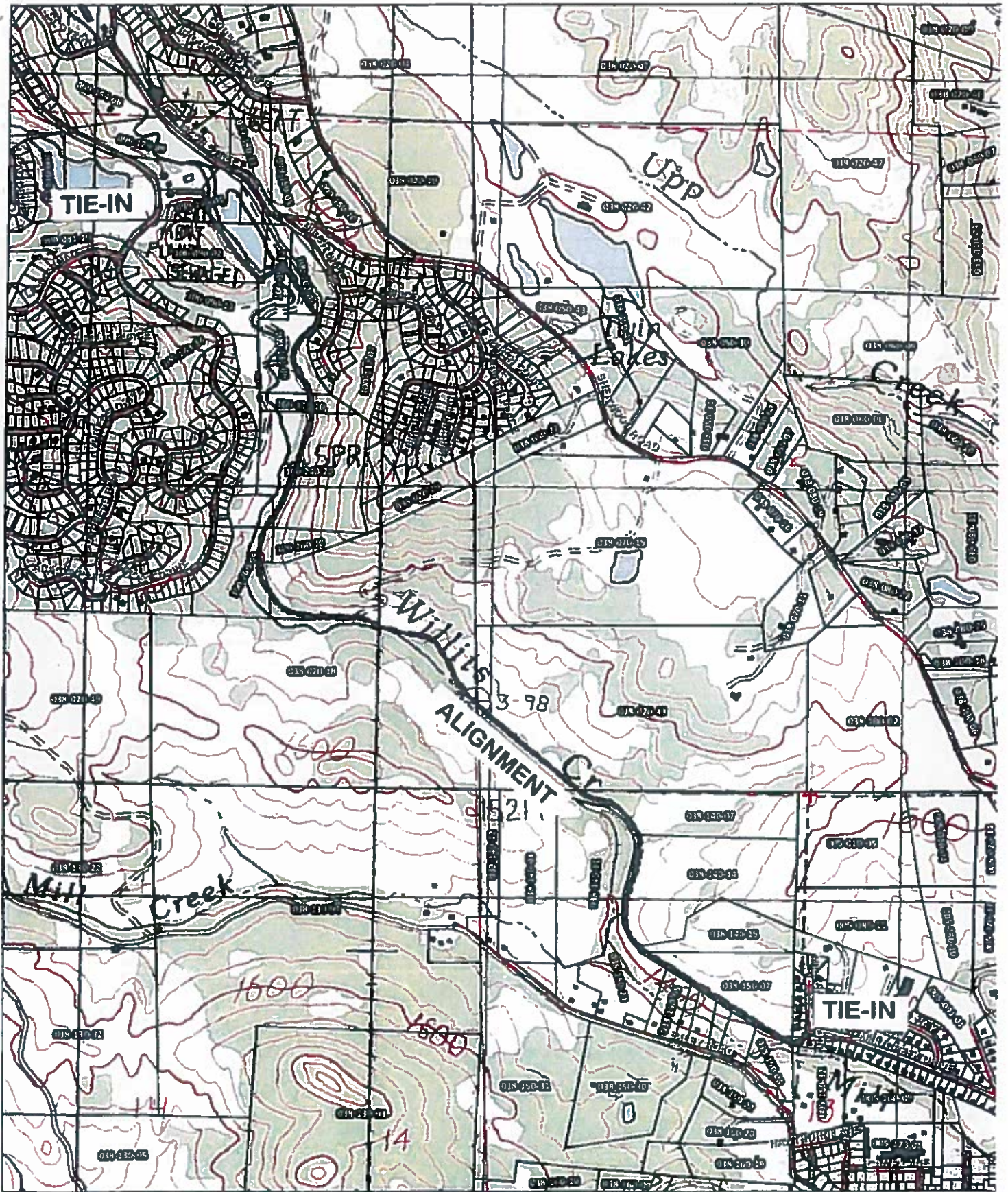
1411 Trans

PRELIMINARY ONLY

**COST ESTIMATE
BROOKTRAILS/WILLITS WATER CONNECTION**

Item	Description	Quantity	Units	Unit Cost	\$ Cost
1	Tie-in Mill Creek Dr.		LS	5,000	5,000
2	Triplex Pump Station		LS	100,000	100,000
	3 X 200 GPM @ 50' TDH				
3	SCADA Telemetry		LS	30,000	30,000
4	Lot Acquisition		LS	60,000	60,000
5	Easement Acquisition	120,000	SF	1	120,000
6	Grading	15,000	CY	20	300,000
7	8" Class 150 Water Main	10,000	LF	40	400,000
8	8" Gate Valves	12	EA	2,500	30,000
9	Fire Hydrant Assemblies	10	EA	5,000	50,000
10	Creek Crossing		LS	10,000	10,000
11	Tie-in to Clearwell		LS	10,000	10,000
12	Cross Culverts	400	LF	60	24,000
13	Road Surfacing	128,000	SF	1	<u>120,000</u>
			Sub-total		1,259,000
			25% engineering and cont.		<u>315,000</u>
			Total		1,574,000

_____, April 1, 2014
 Mark D. Vogel, RCE 25758
 Lic. Ex. 12-31-15

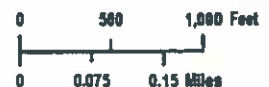


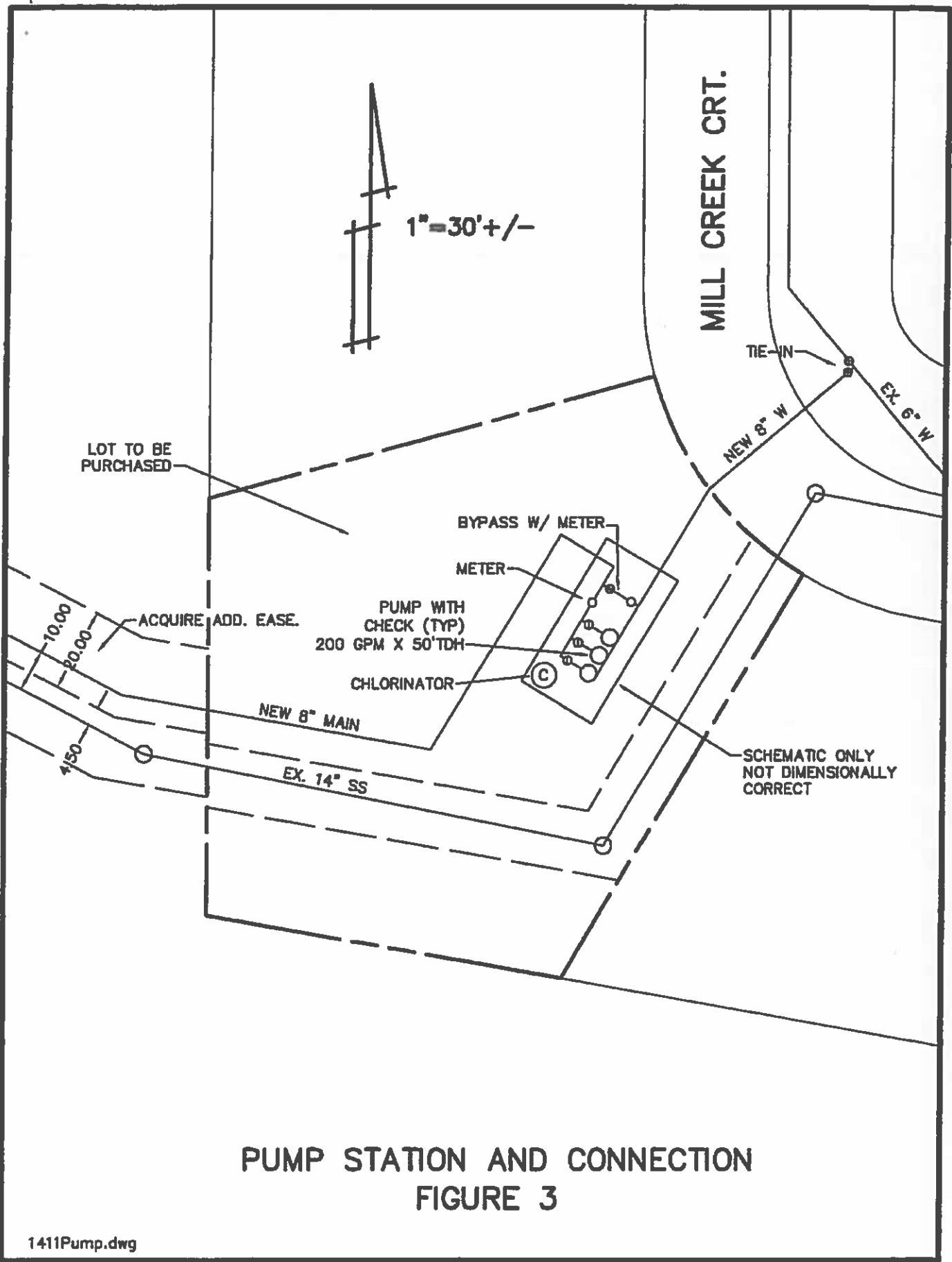
Map produced by the Mendocino County Planning & Building Services, January, 2014
 Aerial photography from USDA NAIP program, 2012. Parcel data from October, 2012 Contax.
 All spatial data is approximate; this map is not a substitute for a proper land survey.
 Reasonable effort has been made to ensure the accuracy of the data provided, however errors
 Map and data subject to change, correction or revision without notice.
 Do not make a business decision based on this map without first consulting the appropriate

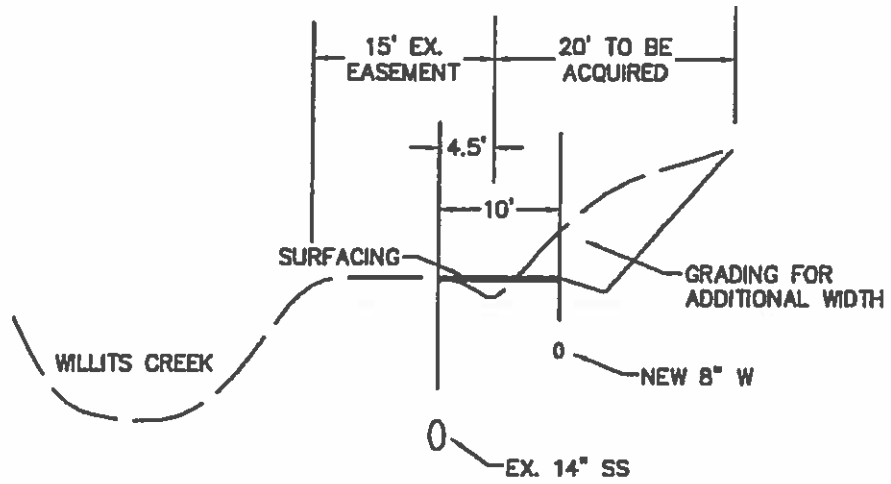
THIS MAP AND DATA ARE PROVIDED WITHOUT WARRANTY...

ALIGNMENT FIGURE 1

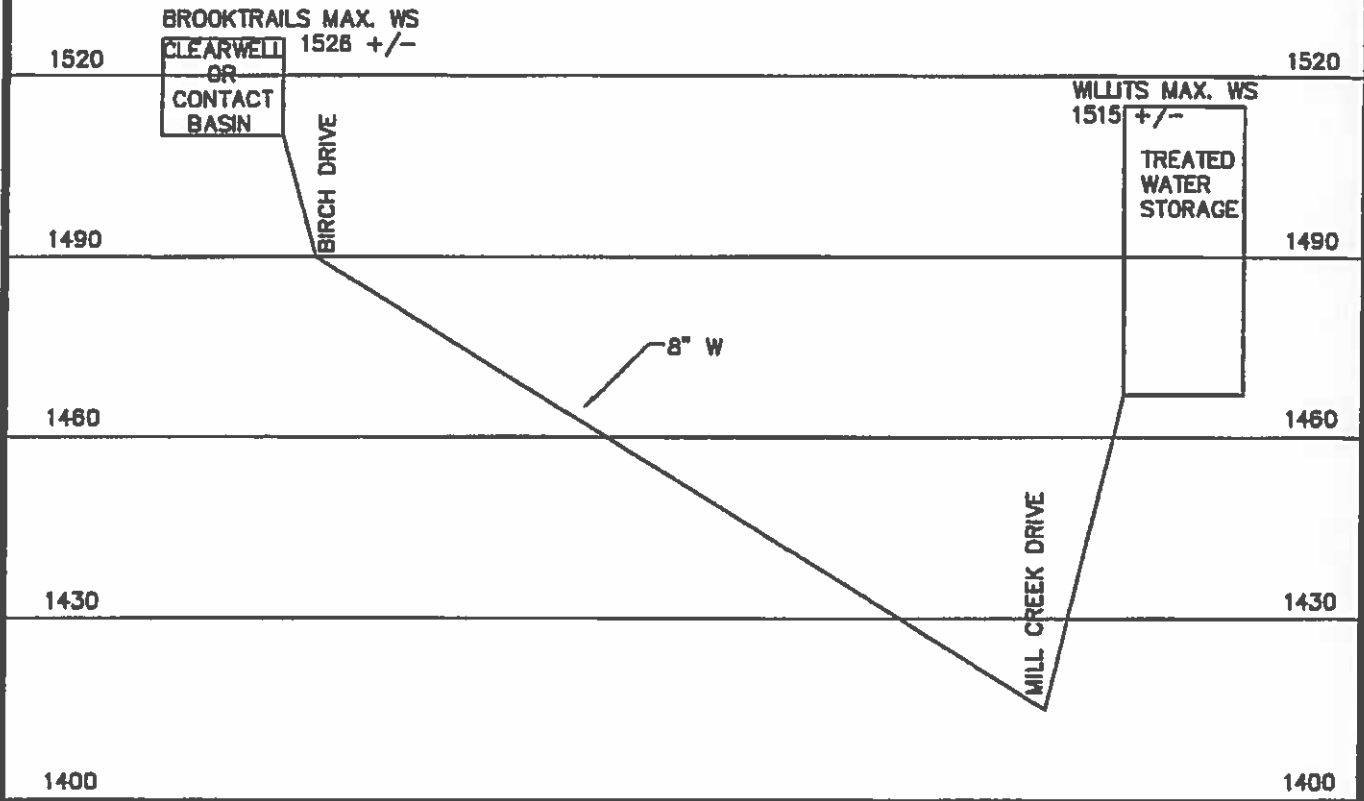
TOPOGRAPHIC MAP
 CONTOUR INTERVAL IS 40 FEET







TYPICAL SECTION



PROFILE
FIGURE 4

