

# Technical Report



**BROWARD COUNTY  
BOARD OF COUNTY COMMISSIONERS**

**TECHNICAL REPORT  
DPEP 02-06**

**Hillsboro Pines  
Groundwater Quality  
Study**

# **Hillsboro Pines Groundwater Quality Study Technical Report 02-06**

**October 2002**

Conducted by  
The Environmental Monitoring Division  
Department of Planning and Environmental Protection  
218 SW 1<sup>st</sup> Avenue  
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**Broward County  
Board of County Commissioners**





## Hillsboro Pines Groundwater Quality Study October 2002

### EXECUTIVE SUMMARY

Hillsboro Pines is an unincorporated neighborhood located north of Hillsboro Boulevard between Lyons Road and State Road 7. While this area is physically located within the potable water and sewer service area of the City of Coconut Creek, the City does not currently provide these services. Property owners in this area rely on private wells and septic systems. Summer rain events have created concern over the potential contamination of the groundwater wells. At the direction of the Broward County Board of County Commissioners, the Environmental Monitoring Division of the Broward County Department of Planning and Environmental Protection implemented a survey of the groundwater quality in the Hillsboro Pines area. The attached results demonstrate that the groundwater in this area is of good quality based on the parameters for which we tested. The Broward County Health Department, the local branch of the Florida Department of Health, reviewed the report and concurred with its findings and recommendations.

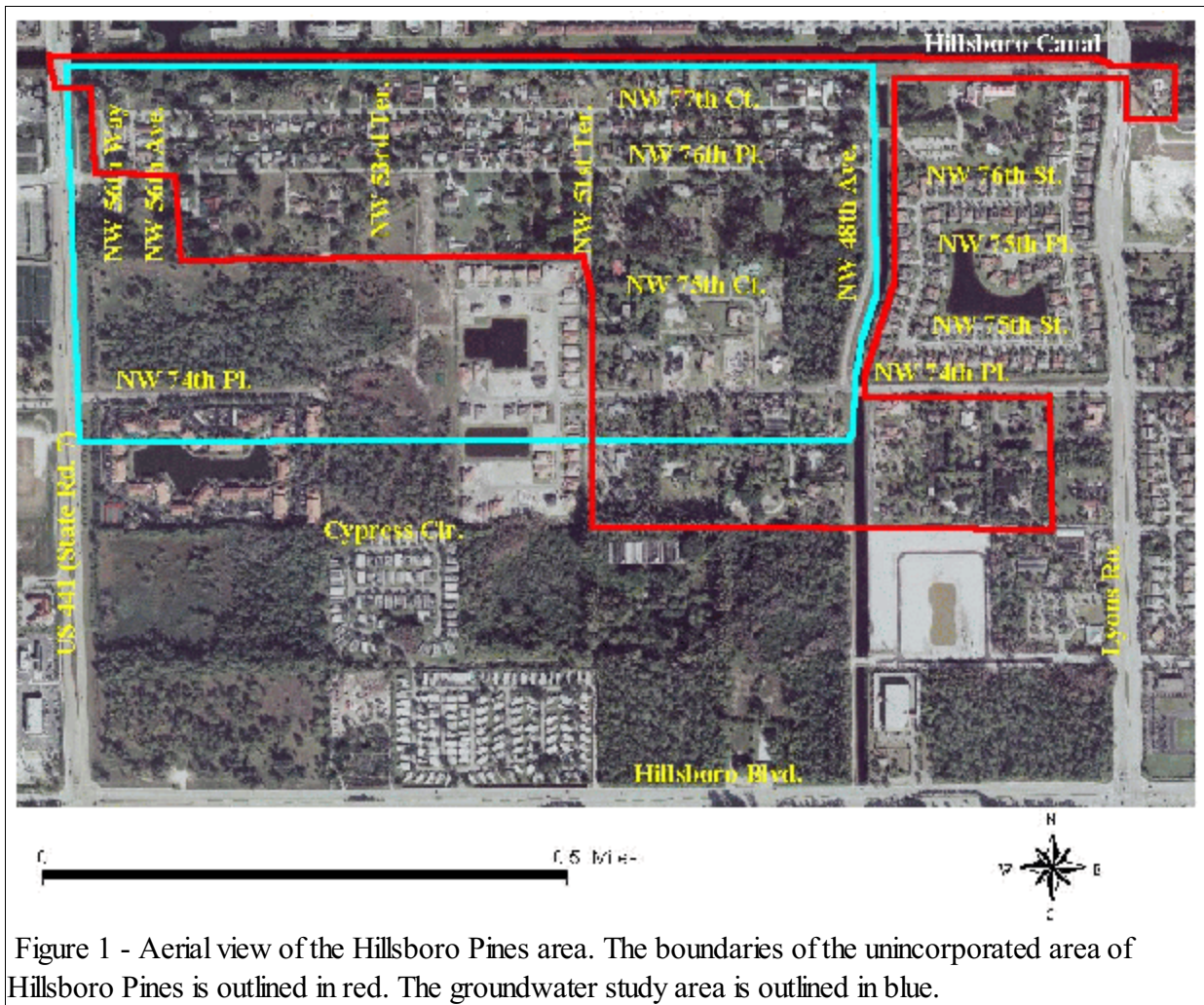
Seventeen sites were sampled for eleven basic drinking water quality parameters (fecal coliform bacteria, total coliform bacteria, nitrate, nitrite, nitrate+nitrite, sulfide, calcium, magnesium, iron, hardness and alkalinity). To protect the identity of the property owners, each site is identified as a letter of the alphabet. Individual homeowners were made aware of the alphabetical designation of their property. An explanation is provided for each parameter.

No bacterial indicators of sewage or septic contamination were found in any of the wells. However, one home had a high level of non-specific bacteria. Well decontamination using Broward County Health Department guidelines is recommended for that property. We analyzed for nitrate and nitrite as possible indicators of fertilizer contamination. These compounds were not detected or were found at trace levels below the standard for drinking water (1 milligram per liter [mg/l]). Sulfide, a compound which makes water smell like rotten eggs, was either not detected or was found at trace levels (~1.00 mg/l) in the wells. The ability of humans to smell and taste sulfide is greater than the sensitivity of our analytical equipment. There is no drinking water standard for this compound. Hardness, alkalinity, calcium and magnesium are related measures of water quality. These parameters were found in the expected range for Broward County groundwater. While high iron levels were found in many wells, these levels are generally characteristic of our groundwater in Broward County. Residents whose wells tested high for iron may want to have their treated water tested and adjust their treatment systems as appropriate.

In addition, the well water from four geographically representative sites was also tested for pesticides, organic contaminants and heavy metals. None of the fourteen pesticides analyzed were detected in the four groundwater wells tested. Of the 63 organic compounds analyzed, only one was detected. Two of the four groundwater wells sampled had methyltertbutylether, a gasoline additive which is often found as a contaminant in ground water throughout the country. The levels found were nearly 200 times lower than the guidance concentrations for this compound, indicating little threat to public health. In this study, arsenic, cadmium, chromium, and copper were not detected in any of the four wells tested. Trace levels of lead and nickel were found in all the wells. Zinc was found in two of the wells. The levels were below the guidance concentrations for these metals.

## INTRODUCTION

Hillsboro Pines is an unincorporated neighborhood located north of Hillsboro Boulevard between Lyons Road and State Road 7 (Figure 1). While this area is physically located within the potable water and sewer service area of the City of Coconut Creek, the City does not currently provide these services. Property owners in this area rely on private wells and septic systems. Summer rain events have created concern over the potential contamination of the groundwater wells. At the direction of the Broward County Board of County Commissioners (Item #29 August 27, 2002), the Environmental Monitoring Division (EMD) of the Broward County Department of Planning and Environmental Protection implemented a survey of the groundwater quality in the Hillsboro Pines area.

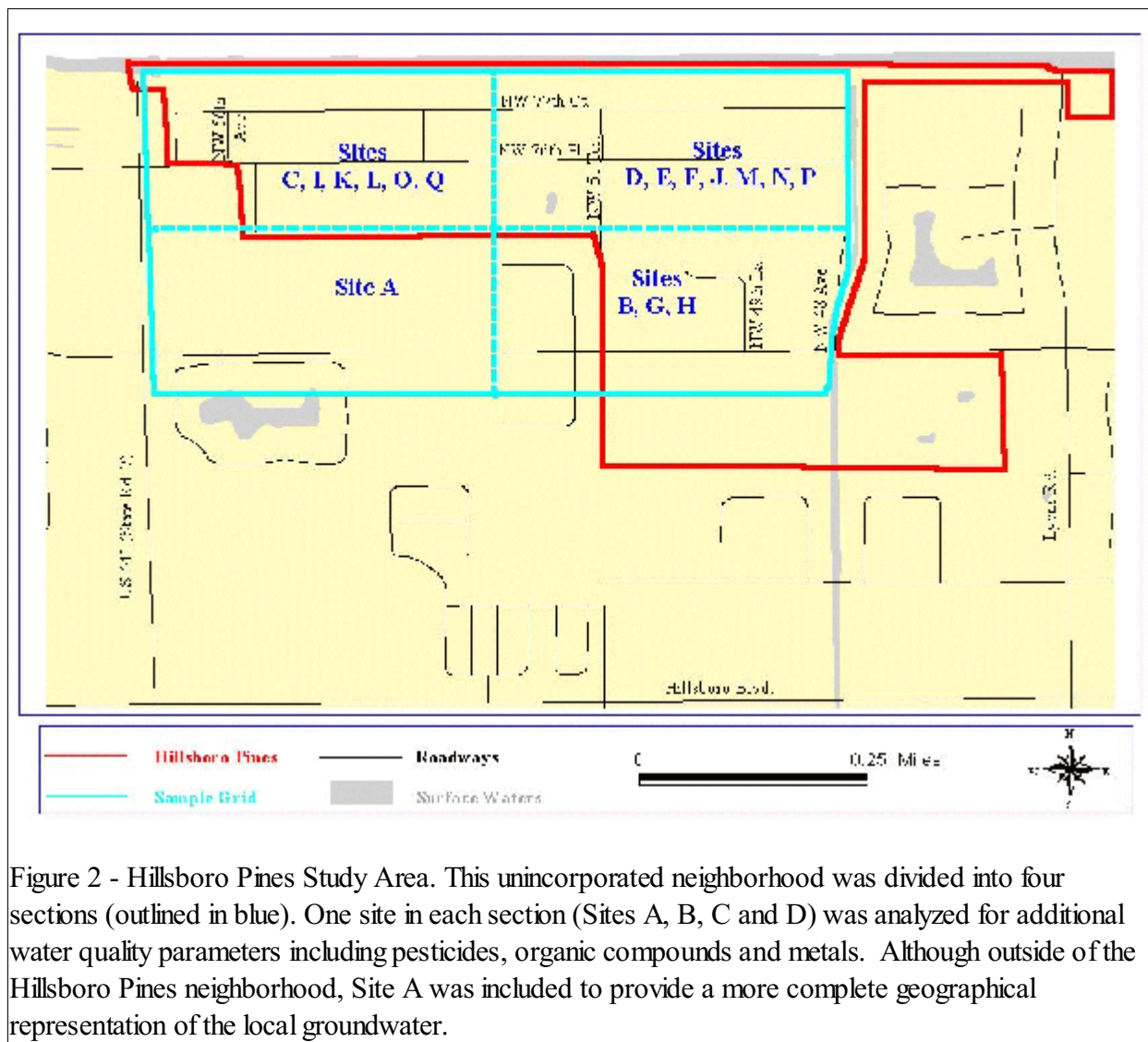


## STUDY DESIGN

A geographically representative group of the interested residents' properties (a total of seventeen - approximately 10% of the total properties in the area) was selected for sampling. The local homeowner's association officers helped facilitate coordination of volunteers for the study. Residents

were notified of their selection to participate in the study and of the sampling date for their well.

The seventeen sites were sampled over three separate sampling dates (September 12, 18, and 19, 2002) (Figure 2). An exterior tap which delivers untreated groundwater was run for a few minutes. Samples were then taken to test for fecal coliform bacteria, total coliform bacteria, nitrate, nitrite, nitrate+nitrite, sulfide, calcium, magnesium, iron, hardness and alkalinity. In addition to these parameters, four of the seventeen sites were also tested for other contaminants (pesticides, metals and organic compounds). To determine which properties would be tested for the additional parameters, the Hillsboro Pines area was broken up into four sections. One site from each section was randomly selected.



All samples were analyzed by EMD staff in the laboratory using approved United States Environmental Protection Agency methods. This county lab is certified under the National Environmental Laboratory Accreditation Program (NELAP) for all parameters except bacteria and sulfide. Certification for bacteria has not been sought by this lab because NELAP certifies for bacterial assays of this type for drinking water samples and does not currently certify for these assays for environmental samples such as groundwater.



## RESULTS AND DISCUSSION

Surface water inundation of private drinking water wells can lead to contamination by co-located septic systems, pet waste, fertilizers, common pesticides used in the yard, pollutants from nearby contaminated sites and common heavy metals in stormwater runoff. The parameter list was chosen to provide a broad overview of the potential contamination concerns of the private wells in Broward County. All the results were compared to available drinking water standards or guidance concentrations (Appendix 1). The reader should take note that this study analyzed groundwater *prior* to treatment and that the drinking water standards are usually applied to water *after* treatment.

Each of the 17 wells was tested for fecal and total coliform bacteria. These bacteria are commonly used as indicators of sewage contamination from municipal wastewater systems, septic systems, or pet waste. In this study, no fecal or total coliform bacteria were detected (Appendix 2). Six of the 17 homes had some low level non-specific bacterial contamination in the well (<10 bacteria colonies per 100 milliliters of ground water tested [col/100 mls]). One home had 15 non-specific bacteria col/100 mls. However, one home had a high level of non-specific bacteria (>200 bacteria col/100 mls). Well decontamination using Broward County Health Department guidelines is recommended for that property (Appendix 3).

Nitrate and nitrite were tested as possible indicators of fertilizer contamination. High levels of these compounds can cause health effects in pregnant women and new borns. These compounds were not detected or were found at trace levels below the standard for drinking water. Sulfide, a compound which makes water smell like rotten eggs, was either not detected or was found at trace levels (~1.00 milligram/liter of sample [mg/l]) in the wells. However, the ability of humans to detect sulfide (0.5 mg/l) is greater than our analytical equipment (minimum detection limit for the laboratory samples is 1 mg/l).

Hardness, alkalinity, calcium and magnesium are related measures of water quality. These parameters were found in the expected range for Broward County groundwater (Appendix 2). The value for hardness (approximately 300 mg/l = 300 parts per million [ppm]), while characteristic of our groundwater, is high compared to other parts of the country. Water softeners are used to treat hardness to reduce the amount of soap needed for cleaning and disinfection. While high iron levels were found in many wells (0.07 -3.35 mg/l=ppm), these levels are generally characteristic of our groundwater in Broward County. Variability in the iron content between homes may be related to the construction material of the well (e.g. iron casing) or to the depth of the well. Residents may want to have their treated water tested for this parameter and adjust their treatment systems as appropriate.

In addition to the basic parameters previously discussed, groundwater from four of the seventeen homes was also analyzed for additional parameters. These properties were randomly selected to represent the northeast, northwest, southeast and southwest regions of the Hillsboro Pines neighborhood.

Organophosphorus Pesticides - This class of pesticides includes those commonly used for weed control (atrazine), mosquito control (malathion), and insect control (diazinon). The ground water was analyzed for fourteen different pesticides. None of the pesticides were detected in the four groundwater wells tested.

Volatile Organic Compounds (VOCs) - This class of compounds include a wide variety of common solvents (benzene and chloroform), cleaning solutions and plasticizers. Of the 63 VOCs tested, only one was detected. Two groundwater wells had low levels of methyltertbutylether (MTBE). MTBE is a gasoline additive which is often found as a contaminant in groundwater throughout the country. The levels found (0.260 and 0.270 ug/l = parts per billion [ppb]) were nearly 200 times lower than the

guidance concentrations for this compound, indicating little threat to public health.

Metals (As, Cd, Cr, Cu, Ni, Pb, and Zn) - Metals are components of stormwater runoff and selected pesticides. Road runoff contains metals from brake pads. Metal contamination in water supplies can also come from the piping, well casings and solders used in the plumbing construction. In this study, arsenic, cadmium, chromium, and copper were not detected in any of the four wells tested. Trace levels of lead and nickel were found in all the wells. The levels found were below the guidance concentrations for these metals. In two wells, zinc was found at low levels (49 and 70 ug/l = ppb). Once again, this level was well below the standard (5000 ug/l) for this metal.

### **STUDY COSTS**

The approximate laboratory costs of this project include field collection (\$1,200), analytical costs for the basic water quality parameters (\$2,278) and analytical costs for the pesticides, metals and organic compounds (\$1,600).

### **CONCLUSION**

The ground water quality in the private wells tested in the Hillsboro Pines area was generally good.

## Appendix 1

Parameter *	DPEP1 Groundwater Standards	DPEP2 Range of expected values in Broward groundwater	FDEP/USEPA Treated drinking water standards
Total coliform	1,000 colonies/100ml		zero
Fecal coliform	800 colonies/100ml		zero
Nitrite and Nitrate (NO <sub>2</sub> + NO <sub>3</sub> )	10	0.01 to 4.0	10
Nitrite (NO <sub>2</sub> )	1		1
Hardness		100 to 400	
Alkalinity	n.s.		
Sulfide	n.s.		n.s.
Arsenic	0.05	0.0001 to 0.1	0.05
Cadmium	0.005	0.0001 to 0.10	0.005
Chromium	0.1	0 to 0.026	0.1
Copper	1	0.0001 to 0.1	1
Iron	0.3	0 to 6.9	0.3
Lead	0.015	0.001 to 5.5	0.015
Magnesium	n.s.		n.s.
Nickel	0.1	0.0001 to 0.1	0.1
Zinc	5.0	<0.01 to 0.26	5.0

\* All values except coliform reported as mg/l ( milligrams per liter = parts per million)

n.s.= no standard

### Applicable Standards:

DPEP1: Chapter 27 of the Broward County Natural Resource Protection Code, Sec. 27-195 Water Quality Standards (for groundwater) Table 1.

DPEP2: Broward County Department of Planning and Environmental Protection Technical Report Series TR-01-07, Broward County Groundwater Quality An Overview, August 2001. The listed concentrations are ranges for the parameters naturally occurring in groundwater and/or previously measured throughout Broward County.

FDEP: Florida Department of Environmental Protection Chapter 62-550 Drinking Water Standards.

USEPA: United States Environmental Protection Agency National Drinking Water Standards.



## Appendix 2 - Hillsboro Pines Groundwater Study Results

		Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H	Site I	Site J
Hillsboro Pines Groundwater Study Oct 2002	Sample ID	02N80121	02N80123	02N80125	02N80127	02N80130	02N80131	02N80195	02N80196	02N80197	02N80198
	Units	02N80120	02N80122	02N80124	02N80126						02N80199
<b>Metals</b>											
Iron	mg/l*	1.79	0.093	2.44	3.35	0.115	0.069	0.370	0.541	0.610	1.94
Calcium	mg/l	132	118	107	120	110	120	117	126	103	138
Magnesium	mg/l	2.34	2.29	4.30	2.50	2.44	2.17	1.48	1.95	5.1	1.93
<b>Nutrients</b>											
Nitrate	mg/l	nd**	trace	nd	nd	trace	trace	nd	nd	nd	nd
Nitrite + Nitrate	mg/l	~0.0051	~0.0086	~0.0064	~0.0087	~0.0059	~0.0065	trace	trace	trace	trace
Nitrite	mg/l	~0.0086	~0.0040	~0.0124	~0.0152	~0.0030	~0.0029	~0.0044	~0.0054	~0.0050	~0.0073
<b>Bacteria</b>											
Total coliform	col/100ml	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fecal coliform	col/100ml	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Non-specific bacteria	col/100ml	4	>200	7	nd	2	4	1	15	nd	nd
<b>Basic WQ parameters</b>											
Alkalinity	mg/l	301	301	285	315	317	306	310	302	276	308
Sulfide	mg/l	trace	trace	trace	~1.01	trace	~1.08	trace	trace	trace	trace
Hardness (as CaCO3)	mg/l	338	304	284	310	284	309	298	322	279	352

\*mg/l = milligrams per liter (parts per million)

\*\*nd = not detected

trace = values just above detection limits

~ = estimated values

Appendix 2 (continued)

Hillsboro Pines Groundwater Study Oct 2002	Sample ID Units	Site K	Site L	Site M	Site N	Site O	Site P	Site Q	Summary Statistics				
		02N80200	02N80201	02N80203	02N80204	02N80206	02N80207	02N80208	02N80209	Min	Max	Mean	std dev
<b>Metals</b>													
Iron	mg/l	0.394	0.100	0.281	2.77	0.150	0.165	1.45	0.069	3.35	0.978	1.08	
Calcium	mg/l	105	129	132	117	113	121	117	103	138	119	10	
Magnesium	mg/l	1.81	2.13	2.7	2.73	3.67	2.22	1.80	1.48	5.10	2.56	0.95	
<b>Nutrients</b>													
Nitrate	mg/l	nd	trace	trace	nd	trace	trace	nd					
Nitrite + Nitrate	mg/l	trace	trace	~0.0057	trace	trace	trace	trace					
Nitrite	mg/l	~0.0041	~0.0033	~0.0051	~0.0084	~0.0032	~0.0034	~0.0074					
<b>Bacteria</b>													
Total coliform	col/100ml	nd	nd	nd	nd	nd	nd	nd					
Fecal coliform	col/100ml	nd	nd	nd	nd	nd	nd	nd					
Non-specific bacteria	col/100ml	nd	nd	1	nd	nd	nd	nd					
<b>Basic WQ parameters</b>													
Alkalinity	mg/l	259	283	314	324	280	302	283	259	324	298	17	
Sulfide	mg/l	~1.00	trace	trace	trace	trace	trace	trace	0.00	0.00	0.00	0.00	
Hardness	mg/l	269	331	340	304	298	312	299	269	352	308	24	

\*mg/l = milligrams per liter

\*\*nd = not detected

trace = values just above detection limits

~ = estimated values

Appendix 2 (continued)		Site A	Site B	Site C	Site D
Hillsboro Pines Groundwater	Sample				
Study Oct 2002	ID	02N80121	02N80123	02N80125	02N80127
	Units	02N80120	02N80122	02N80124	02N80126
<b>Metals</b>					
Arsenic	ug/l	nd	nd	nd	nd
Cadmium	ug/l	nd	nd	nd	nd
Chromium	ug/l	nd	nd	nd	nd
Copper	ug/l	nd	nd	nd	nd
Lead	ug/l	trace	trace	trace	trace
Nickel	ug/l	trace	trace	trace	trace
Zinc	ug/l	nd	49.1	70	nd
<b>Pesticides</b>					
Atrazine	ug/l	nd	nd	nd	nd
Azinphos Methyl	ug/l	nd	nd	nd	nd
Chloropyrifos	ug/l	nd	nd	nd	nd
Demeton	ug/l	nd	nd	nd	nd
Diazinon	ug/l	nd	nd	nd	nd
Dichlorvos	ug/l	nd	nd	nd	nd
Disulfoton	ug/l	nd	nd	nd	nd
Ethion	ug/l	nd	nd	nd	nd
Fenamiphos	ug/l	nd	nd	nd	nd
Fenthion	ug/l	nd	nd	nd	nd
Malathion	ug/l	nd	nd	nd	nd
Parathion, Ethyl	ug/l	nd	nd	nd	nd
Parathion, Methyl	ug/l	nd	nd	nd	nd
Simazine	ug/l	nd	nd	nd	nd
ug/l = microgram per liter (parts per billion)					

Appendix 2 (continued) Hillsboro Pines Groundwater Study Oct 2002		Site A	Site B	Site C	Site D
	Units	02N80121 02N80120	02N80123 02N80122	02N80125 02N80124	02N80127 02N80126
<b>Volatile Organic Compounds</b>					
1,1 Dichloroethane	ug/l	nd	nd	nd	nd
1,1 dichloroethylene	ug/l	nd	nd	nd	nd
1,1 dichloropropene	ug/l	nd	nd	nd	nd
1,1,1 trichloroethane	ug/l	nd	nd	nd	nd
1,1,1,2 tetrachlorethane	ug/l	nd	nd	nd	nd
1,1,2 trichloroethane	ug/l	nd	nd	nd	nd
1,1,2,2 tetrachlorethane	ug/l	nd	nd	nd	nd
1,2 dichlorobenzene	ug/l	nd	nd	nd	nd
1,2 dichloroethane	ug/l	nd	nd	nd	nd
1,2 dichloropropane	ug/l	nd	nd	nd	nd
1,2,3 trichlorobenzene	ug/l	nd	nd	nd	nd
1,2,3 trichloropropane	ug/l	nd	nd	nd	nd
1,2,4 trichlorobenzene	ug/l	nd	nd	nd	nd
1,2,4 trimethylbenzene	ug/l	nd	nd	nd	nd
1,2 dibromoethane	ug/l	nd	nd	nd	nd
1,3 dichlorobenzene	ug/l	nd	nd	nd	nd
1,3 dichloropropane	ug/l	nd	nd	nd	nd
1,3,5 trimethylbenzene	ug/l	nd	nd	nd	nd
1,4 dichlorobenzene	ug/l	nd	nd	nd	nd
2,2 dichloropropane	ug/l	nd	nd	nd	nd
2 chloroethyl vinyl ether	ug/l	nd	nd	nd	nd
2 chlorotoluene	ug/l	nd	nd	nd	nd
4 chlorotoluene	ug/l	nd	nd	nd	nd
benzene	ug/l	nd	nd	nd	nd
bromobenzene	ug/l	nd	nd	nd	nd
bromochloromethane	ug/l	nd	nd	nd	nd
bromodichloromethane	ug/l	nd	nd	nd	nd
bromoform	ug/l	nd	nd	nd	nd
bromomethane	ug/l	V code	V code	nd	nd
carbon tetrachloride	ug/l	nd	nd	nd	nd
chlorobenzene	ug/l	nd	nd	nd	nd
chloroethane	ug/l	nd	nd	nd	nd
chloroform	ug/l	nd	nd	nd	nd
chloromethane	ug/l	nd	nd	nd	nd
cis 1,2 dichloroethylene	ug/l	nd	nd	nd	nd
cis 1,3 dichloropropene	ug/l	nd	nd	nd	nd
Appendix 2 (continued) Hillsboro Pines Groundwater		Site A	Site B	Site C	Site D

Study Oct 2002		02N80121	02N80123	02N80125	02N80127
	Units	02N80120	02N80122	02N80124	02N80126
dibromochloromethane	ug/l	nd	nd	nd	nd
dibromochloropropane	ug/l	nd	nd	nd	nd
dibromomethane	ug/l	nd	nd	nd	nd
dichlorodifluoromethane	ug/l	nd	nd	nd	nd
ethyl benzene	ug/l	nd	nd	nd	nd
hexachlorobutadiene	ug/l	nd	nd	nd	nd
isopropyl benzene	ug/l	nd	nd	nd	nd
meta/para xylene	ug/l	nd	nd	nd	nd
methylene chloride	ug/l	V code	V code	V code	V code
methylterbutylether	ug/l	~0.270	nd	nd	~0.260
n-butyl benzene	ug/l	nd	nd	nd	nd
n-propyl benzene	ug/l	nd	nd	nd	nd
naphthalene	ug/l	nd	nd	nd	nd
ortho xylene	ug/l	nd	nd	nd	nd
para isopropyl toluene	ug/l	nd	nd	nd	nd
sec-butylbenzene	ug/l	nd	nd	nd	nd
styrene	ug/l	nd	nd	nd	nd
tert-butylbenzene	ug/l	nd	nd	nd	nd
tetrachloroethene	ug/l	nd	nd	nd	nd
toluene	ug/l	nd	nd	nd	nd
trans 1,2 dichloroethylene	ug/l	nd	nd	nd	nd
trans 1,3 dichloropropene	ug/l	nd	nd	nd	nd
trichloroethylene	ug/l	nd	nd	nd	nd
trichlorofluoromethane	ug/l	nd	nd	nd	nd
vinyl chloride	ug/l	nd	nd	nd	nd
V code notes that this compound was found in one of the quality control blank and may not be present in the sample.					
~ = estimated value for the compound					

## Appendix 3 - How to Disinfect Your Well

Available at [http://browardchd.org/Hot\\_Topics/Flooding.htm](http://browardchd.org/Hot_Topics/Flooding.htm)

### BROWARD COUNTY HEALTH DEPARTMENT

#### 1. HOT TOPICS

##### The Facts on Flooding

What is flooding? Flooding usually occurs from storm water events that result in an accumulation of standing surface water which does not drain readily due to soil saturation and high ground water levels.

How does flooding affect you? Flood waters should be considered contaminated due to sewage runoff and overflow from lakes and canals that carry bacteria and possible waterborne diseases such as hepatitis and cholera. The risk of contaminated water is increased in areas served by septic tank systems.

If surface water enters your well, it may contaminate the water you rely on for drinking, cooking, washing and bathing.

What should I do to protect my family? Children should be advised to avoid contact with standing water (i.e., walking around or playing in it). Residents relying on private water wells are advised to use bottled water or boiled water if flooded conditions exist. Water should be brought to a rolling boil for at least one minute to kill infectious agents. After the flooding subsides, wells must be disinfected and sampled for bacteriological testing.

How do I disinfect my well? Follow the procedure outlined below:

Remove the plug or cap from the top of the well casing.

Pour two quarts of unscented household bleach into the well and wait one hour.

Replace plug or cap on well casing.

Open all outlets on the system and allow water to run until the chlorine odor is noticeable.

Allow the chlorine to remain in the system at least six hours, but preferably overnight, and then run the water from all outlets until the system is free of chlorine odor.

How do I test my well? The only way to verify that the water is safe to drink is to have it tested. Although chlorine bleach is effective against microorganisms, it will not remove chemical contamination that may have gotten into your well. Contact the Broward County Health Department for sampling instructions to get your water tested. The health department is available to sample your well for bacteriological testing for a fee of \$50.00 (includes State fee for laboratory cost).

For further information, contact the Broward County Health Department at 954/467-4829.

2421A SW 6th Ave., Ft. Lauderdale, FL 33315 July 1999

1. TITLE AND SUBTITLE <i>HILLSBORO PINES GROUNDWATER QUALITY STUDY</i>		2. REPORT DATE <i>October 2002</i>	
3. CONTRIBUTORS <i>DR. NANCY J. GASSMAN, BRET C. MAXWELL, RUSSELL V. RAND, NANCY HOLSING, WILLIAM A. BARTO, BEVON JOHNSON, ELIZABETH HUMPLE, MARIA FERNANDEZ, ANIEL PIERRE-LOUIS, KEVIN CARTER, REGINALD PAGE, SEAN LESCHER AND KENNETH VATHAUER.</i>		4. PERFORMING ORGANIZATION REPORT NO. <i>PROJECT REPORT</i>	
5. RESPONSIBLE DEPARTMENT AND DIVISION <i>BROWARD COUNTY DEPARTMENT OF PLANNING AND ENVIRONMENTAL PROTECTION</i>  <i>ENVIRONMENTAL MONITORING DIVISION</i>  <i>218 SW 1ST AVENUE</i>  <i>FORT LAUDERDALE, FL 33301</i>  <i>954/519-1240</i>		6. STRATEGIC ASSESSMENT PROGRAM ELEMENT NO.	
8. SPONSORING AGENCY NAME AND ADDRESS <i>BROWARD COUNTY BOARD OF COUNTY COMMISSIONERS</i>  <i>115 S. ANDREWS AVENUE</i>  <i>FORT LAUDERDALE, FL 33301</i>		7. CONTRACT/GRANT NO.	
10. SUPPLEMENTARY NOTES		9. TYPE OF REPORT AND PERIOD COVERED  <i>TECHNICAL</i>	
11. ABSTRACT  At the direction of the Broward County Board of County Commissioners, a groundwater quality survey was conducted in the Hillsboro Pines neighborhood located north of Hillsboro Boulevard between Lyons Road and State Road 7. Summer rain events have created concern over the potential contamination of the private drinking water wells. The attached results demonstrate that the groundwater in this area is of good quality based on the parameters for which we tested.  Seventeen sites were sampled for eleven basic drinking water quality parameters (fecal coliform bacteria, total coliform bacteria, nitrate, nitrite, nitrate+nitrite, sulfide, calcium, magnesium, iron, hardness and alkalinity). While iron levels were high at a few locations, the other parameters met drinking standards and were generally within expected values for Broward County groundwater. One well had a high level of non-specific bacteria and the home owner's are encouraged to follow Broward County Health Department guidelines for well disinfection.  In addition to these basic parameters, the well water from four geographically representative sites was also tested for pesticides, organic contaminants and heavy metals. None of the fourteen pesticides analyzed were detected in the four groundwater wells tested. Of the 63 organic compounds analyzed, only one was detected. Two of the four groundwater wells sampled had methyltertbutylether, a gasoline additive which is often found as a contaminant in ground water throughout the country. The levels found were nearly 200 times lower than the guidance concentrations for this compound, indicating little threat to public health. In this study, arsenic, cadmium, chromium, and copper were not detected in any of the four wells tested. Trace levels of lead and nickel were found in all the wells. Zinc was found in two of the wells. The levels were below the guidance concentrations for these metals.  The Broward County Health Department has reviewed this report and agrees with the conclusions of the study.			
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