

APPENDIX A

**WISCONSIN ADMINISTRATIVE CODE,
WELLHEAD PROTECTION PLAN**

The Wisconsin Administrative Code, Chapter NR 811, Section 16(5) states:

- (5) Well Head Protection Plan. A well head protection plan shall be provided for all new wells for municipal water systems. The plan shall be developed by the owner of the municipal water system or its agent. No new municipal well may be placed into service until the department has approved the well head protection plan. The plan shall include but is not limited to:
- (a) Identification of the recharge area for the proposed well.
 - (b) Identification of the zone of influence for the proposed well.
 - (c) Identification of the groundwater flow direction.
 - (d) An inventory of existing potential contamination sources within a ½ mile radius of the proposed well and an assessment of existing potential contamination sources within the recharge area of the well.
 - (e) Establishment of a well head protection area for the proposed well. The well head protection area shall encompass, at a minimum, that portion of the recharge area equivalent to a 5-year time of travel to the well. The well head protection area may be determined by a hydrogeologic investigation.
 - (f) A public education program for well head protection.
 - (g) A water conservation program.
 - (h) A contingency plan for providing safe water and protecting the well from contamination based on the inventory and assessment of potential contamination sources.
 - (i) A management plan, based upon an assessment of alternatives for addressing potential contamination sources, describing the local ordinances, zoning requirements, monitoring program, and other local initiatives proposed within the well head protection area established in subpar.(e). The management plan shall address maintaining the separation distances established by well siting in sub.(4)(d).

APPENDIX B
SURVEY PLAT - UNIT WELL 24



City of Madison - Assessor's Office Property Information

General Information

Parcel Number: 070913211028
 Address: 101 N Livingston St
 Owner: CITY OF MADISON WATER UT
 WELL # 24
 Mailing Address: 119 E OLIN AVE
 City, State, Zip: MADISON, WI 53713-1431
 Property Class: Commercial
 Property Use: Commercial exempt
 Assessment Area: 9937

[Sales for this Area](#)
[Assessment Area Map \(PDF\)](#)

Refuse District: 07B
[Refuse collection schedule](#)

Residential Bldg Info

Home Style:
 No. of Dwelling Units: 0
 Number of Stories: 0
 Year Built: 0
 Number of bedrooms: 0
 Number of full baths: 0
 Number of half baths: 0
 Total Living Area: 0
 First Floor Area: 0
 Second Floor Area: 0
 Third Floor Area: 0
 Above Third Floor: 0
 Finished Attic Area: 0
 Basement: 0
 Fin. Basement Area: 0
 Exterior Wall:

Fireplace: 0
 Central Air:
 Garage 1:
 Number of Stalls: 0.0
 Screen Produced: 05/22/07 09:02

Assessment Info

	2007	2006
Land	\$0	\$0
Improvements:	\$0	\$0
Total:	\$0	\$0

2006 Tax Info

Net Taxes: \$0.00
 Special Assmnt: \$0.00
 Other: \$0.00
 Total: \$0.00

2006 Tax - Pay Online**Parcel Information**

Lot Size: 63,360
 Zoning: R5
 Frontage: 264 - N
 Livingston St
 Water Frontage: NO
 TIF District: 36
 School District: Madison
 Elementary: Lap-Marq
 Middle: O'Keeffe
 High School: East
 Alderperson: Brenda Konkel

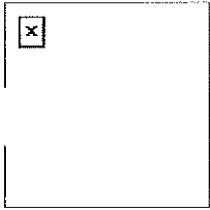
Sales Information**Legal Description****2006 Tax Info****Special Assessment**

[Please click here](#) for help about
viewing a map of this parcel.

Click the button below to view a map of this
parcel.

View Map

Check to show Aerial Photo on map
(optional)



City of Madison - Assessor's Office

Legal Description

(Notice: This description may be abbreviated and is for assessment purposes only. It should not be used to transfer property)

Parcel Number: 070913211028 **Address:** 101 N Livingston St

Lot Number: 0

Block Number: 0

ORIGINAL PLAT, BLK 142, LOTS 1, 2, 3, 16, 17, 18 AND THE SWLY 42 FT OF LOTS 4 AND 15.

APPENDIX C

UNIT WELL 24 CONSTRUCTION REPORT AND FORMATION LOG

Well name Madison City Well #24

County: Dane

Log No. DN-1124

Completed... 10/4/79

Owner.... City of Madison

Field check. WG&NHS - RMP

Address.. 523 E. Main St.
Madison, WI 53703

Altitude.... 851' ETM

Use..... Municipal

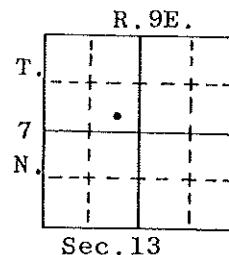
Driller.. Miller Well & Pump Co.

Static w.l.. 63'

Engineer. James R. Blotz

Spec. cap... 15.7 GPM/ft

Madison, Wisconsin



Location: about C, SW 1/4, NW 1/4, SE 1/4, SE 1/4, NW 1/4, sec. 13, T7N, R9E

Quad. Madison West 7 1/2'

Drill Hole						Casing & Liner Pipe or Curbing							
Dia.	from	to	Dia.	from	to	Dia.	Wgt. & Kind	from	to	Dia.	Wgt. & Kind	from	to
42"	0	144'				36"	New Steel			30"	New Steel		
35"	144'	235'					.375' W.				.500 W.		
29"	235'	729'					ASTM API-56 Welded	0	144'		ASTM API-5L	+2'	235'

Drilling method: air rotary & reverse rotary

Grout

Samples from 0 to 729' Rec'd: 11/1/79 &

Neat Cement

9/12/79 (last samp)

Studied by: Kathleen Massie

Issued: 8/25/88

Formations: Horicon Fm, Wonewoc Fm, Eau Claire Formation, Mt Simon Fm, Weathered Precambrian

Remarks: Well tested for 24 hours at up to 2195 GPM with 140 feet of drawdown.
DNR Permanent Well #77143.

The dolomite and sandstone in the drift appears to be locally derived.
Complete retention of the dolomite cement in a sample means the cement is so strong that drilling has destroyed little of the cementing and no loose sand grains occur.

LOG OF WELL:

	Depths	Graphic Section	Rock Type	Color	Grain Size		Miscellaneous Characteristics
					Mode	Range	
	0-10		NO SAMPLE. Driller reports drift.				
H O R I C O N	10-15		Clay	Brown	---	---	Calcareous. Much silt.
	15-20		"	"	---	---	Same.
	20-25		"	"	---	---	"
	25-30		Gvl & clay	Mxd brown	M pnb	Gran/L pnb	Calcareous (clay). Dol, trap, qtz, cht. Much sand, silt.
	30-35		Gravel	Mxd yl	"	Gran/VL pnb	Dolomite, fos dol, dol cem ss, chert, qtz, trap, dior. Tr snd.
	35-40		"	"	S pnb	Gran/L pnb	Same plus dolomite crystals floating in chert.
	40-45		"	"	VL pnb	Gran/VL pnb	Dolomite, chert, trap, gab, zircon, rich gab. Trace sand.
	45-50		"	"	L pnb	"	Dolomite, chert, trap, dol cem ss(w/glauc), quartz, gabbro.
	50-55		Gvl & clay	"	"	Gran/L pnb	Dol, cht, trap, dol cem ss, grnt, qtz. Calcaus(cl). Mch snd, st.
	55-60		"	"	"	Gran/VL pnb	Same.
	60-65		"	"	"	"	"
	65-70		"	"	"	"	"
	70-75		Gravel	"	"	"	Dol, fos dol, trap, dol cem ss, grnt, Fe form, qtz. Tr sand.
	75-80		"	"	"	"	Same plus trace fossiliferous chert.
	80-85		"	"	"	S pnb	"
85-90	"	"	"	M pnb	Gran/VL pnb	Dol, dol cem ss, fos dol, trap, qtz. Trace sand.	
90-95	"	"	"	"	Same plus trace clay.		
95-100	"	"	"	MP&VLP	"	Dol & sndy dol(w/glauc), glaucic dol cem ss, qtz, trap. Tr snd.	
100-105	"	"	"	"	Same plus trace oolitic white chert.		
105-110	"	"	"	"	trap, qtz. Tr snd.		
110-115	"	"	"	M pnb	Gran/L pnb	Dol & sndy dol w/glauc, glaucic dol cem ss, wh cht, ool wh cht.	
115-120	"	"	"	"	Gran/VL pnb	Same plus granite. Much sand.	
W O N	115-120	Sandstone	Wh & yl	Fn/M	Vfn/Vc	Srnd. Mch V G sil cem. Ltl yl & pl gn sh. Tr cvd dol, cvd clay.	
	120-125	"	White	M	"	Srnd. Mch V G sil cem, cvd gvl. Trace caved sand & clay.	
	125-130	"	"	"	"	Srnd. Mch V G sil cem. Tr layers of pl gn sh, pl gn & yl sh, cvd	
	130-135	"	"	M/C	"	Rnd. Tr good sil cem, pl gn shale, wh clay. VL pnb.	
W O C	135-140	"	"	"	"	Rnd. Trace good silica cement, pale gn shale, sft wh chert.	
	140-145	"	"	"	"	Rnd. Tr G sil cem, pl gn sh, sft wh cht, Ltl V sndy yl dolomite.	
	145-150	Dolomite	Bn yellow	"	Fn/M	Mch fltg snd, pnk stng. Tr ool (just forming), pl gn sh, yl sh, cvd	
	150-155	Sandstone	Yl brown	C	Vfn/Vc	Rnd. Mch V G dol cem. Tr pl gn sh, cvd dol (as in 145'- wh ss.	
	155-160	"	Bn yellow	"	"	Rnd. Mch V G limy cem (complete retention of cem). 150'. Trace pale green shale.	

Well name: Madison City Well #24

Log No. DN-1124

	Depths	Graphic Section	Rock Type	Color	Grain Size		Miscellaneous Characteristics
					Mode	Range	
W O N E	160-165		Sandstone	Bn yellow	M	Vfn/VC	Rounded, Ltl good dolomite cement, pale green shale.
	165-170		"	Pl yellow	M/C	"	Rounded, Tr fair dolomite cem. Much pale green shale, silt.
	170-175		"	"	"	"	Rounded, Trace hematite cement, brown clay, silt.
	175-180		"	"	"	"	Same.
	180-185		"	Yellow	M	"	Rnd, Mch G dol cem(almost a sndy dol). Tr pl gn shale, silt.
W O C,	185-190		"	"	Fn/M	"	Srnd. Mch G dol cem(almost a sndy dol),st. Tr pl gn sh,sft wh c
	190-195		"	Pl yellow	"	"	Same but little silt, pale green shale.
	195-200		"	"	M	"	Rounded, Trace fair dolomite cement, silt. (cvd?)
C L A I R E	200-205		"	"	Vfn/Fn	"	Srnd. Mch G dol cem,pl gn sh(occd as thin layers). Tr st,glauc
	205-210		Siltstone	Lt pink&blgy	--	--	Dolic. Hd. Mny thin pl gn sh layers, Mch Vfn snd. Tr Fn/C snd.
	210-215		Sandstone	Lt pink&plgn	Vfn	Vfn/C	Srnd. Mch V G dol cem(complete retention),st,pl gn sh(in thin
	215-220		Ss & shale	Lt gry&gry	Fn	"	See end of log. layers).
	220-225		Shale	Grey	--	--	Dolic. Mch st size pyr. Ltl ss(as above),pl gn & hemic sh. Tr
30'	225-230		Siltstone	Rd bn&gry	--	--	See end of log. Vfn glauc.
M T. S I M O N F O R M A T I O N	230-235		Sandstone	Pink	C	Vfn/VC	Rnd. Mch V G dol cem(complete retention of cem)almost a sndy do
	235-240		"	"	"	"	Same but slgtly less cem. Ltl cvd sts(as 225-230'). Tr Vfn-gla
	240-245		"	"	M	"	See end of log.
	245-250		"	"	C	"	Rnd. Mch V G dol cem(compl retn, almost a sndy dol). Tr pyrite.
	250-255		"	White	M/C	"	Rounded, Trace pyrite, pale green shale, soft white chert.
	255-260		"	"	"	"	Rnd. Mch G dol cem (pink). Trace pyrite, silt. / form of ool(?)
	260-265		"	Pink	"	"	Rnd. Mch V G dol cem(almost a sndy dol),st. Tr pl gn sh,pyr.
	265-270		"	"	"	"	Rnd. Mch V G dol cem(compl retn). Few ool in 1st stages of
	270-275		"	White	"	"	Rounded. Trace dolomite cement. form. Tr dol xls.
	275-280		"	"	"	"	Same. 260-270'. Tr pyrite.
	280-285		"	Pink	"	"	Rnd. Mch V G dol cem(compl retn) but slgtly less dol than in
	285-290		"	"	"	"	Rnd. Mch V G dol cem(compl retn, almost a sndy dol),pl gn sh.
	290-295		"	"	"	"	See end of log. Few ool in 1st stages of form(?). Tr pyr.
	295-300		"	"	"	"	Rnd. Mch V G dol cem,st. Tr pl gn sh, pyr.
	300-305		"	White	"	"	Rnd. Trace pyr cem, pyr, pyr incl, pale green shale.
	305-310		"	Pink	"	"	Rnd. Mch very good dol cem(complete retention). Trace pyrite.
	310-315		"	"	"	"	Rnd. Mch V G dol cem(compl retn, almost a sndy dol). Tr pyr,pl
	315-320		"	"	"	"	See end of log. gn sh,thin layers of a sndy dolomite.
	320-325		Dolomite	"	Fn	Fn/M	See end of log. / layers of st sz pyr,thin layers of pl gn sndy s
	325-330		Sandstone	"	M	Vfn/VC	Rnd. Mch V G dol cem(compl retn, almost a sndy dol). Tr thin
	330-335		"	"	"	"	Same but few thin paral layers of st sz pyr & sndy pl gn shale.
	335-340		"	"	"	"	See end of log.
	340-345		"	White	"	"	Rnd. Trace pyr & dol cement, mafic & pyrite inclusions, pl gn sh
	345-350		"	Lt pink	"	"	Rnd. Ltl G dol cem. Tr pyr cem, pl gn sh, sft wh cht (?).
	350-355		"	White	"	"	Rnd. Trace dolomite & pyrite cement, soft white chert (?).
	355-360		"	Pink	"	"	Rnd. Mch V G dol cem(compl retn). Few V dolic layers. Tr pl gn
	360-365		"	White	"	"	Rnd. Tr pyr & dol cement, pl gn shale, sft wh cht(?). sh, pyr.
	365-370		"	"	"	"	Same.
	370-375		"	"	"	"	Same plus trace caved brown clay.
	375-380		"	"	"	"	Same but no clay.
	380-385		"	Pink	"	"	Rnd. Mch V G dol cem. Tr pale green shale, pyrite.
	385-390		"	"	"	"	Rnd. Mch V G dol cem(compl retn), pl gn sh(sndy). Tr thin layers
	390-395		"	"	"	"	See end of log. of st sz pyr & dol
395-400		"	"	"	"	Same plus tr thin layers of a bn siliceous substance.	
400-405		"	Pnk white	"	"	Rnd. Ltl V G dol cem. Tr pyr cem, pale gn shale.	
405-410		"	"	"	"	Rnd. Mch G dol cem. Tr pyr cem, pl gn sh, sft wh cht.	
410-415		"	"	"	"	Same but little good dolomite cement.	
415-420		"	"	"	"	Same.	
420-425		"	"	"	"	Same but trace good dolomite cement.	
425-430		"	White	"	"	Rounded, Trace F to G dolomite cement, pale green shale, pyr.	
430-435		"	"	"	"	Same plus trace soft white chert.	
435-440		"	"	"	"	Rnd. Ltl G dol cem(most cvd?). Tr pyr cem,pl gn sh,sft wh cht.	
440-445		"	"	M/C	"	Rounded. Trace fair dolomite cement,pl green shale,sft wh cht.	
445-450		"	"	"	"	Same.	
450-455		"	"	"	"	"	
455-460		"	Pnk white	Fn/M	"	"	
460-465		"	White	Fn&C	"	Srnd & rnd. Tr fair dol cem, pl gn shale, sft white chert.	
465-470		"	"	Fn/M	"	Sang to rnd. Trace fair dol cem, pale green shale, sft wh chert.	
470-475		"	"	Fn&C	"	Same.	
475-480		"	"	"	"	Same plus trace pyrite cement.	
480-485		"	"	"	"	Same.	

Well name: Madison City Well #24

Log No. DN-1124

Depths	Graphic Section	Rock Type	Color	Grain Size		Miscellaneous Characteristics
				Mode	Range	
485-490		Sandstone	White	M/C	Vfn/VC	Srnd & rnd. Trace pyrite cement, pale green shale.
490-495		"	"	"	"	Srnd & rnd. Ltl G to F dol cem. Trace pale green shale.
495-500		"	"	"	"	Srnd & rnd. Tr fair dolomite cement, pale green shale.
500-505		"	"	"	"	Same.
505-510		"	"	Fn&C	"	Sang to rnd. Tr good dol cem, sft wh chert, pl green shale.
510-515		"	"	C	"	Rnd. Trace good dol cem, soft white chert, pale green shale.
515-520		"	"	M/C	"	Same.
520-525		"	"	"	"	Srnd & rnd. Trace good dolomite cement. Ltl pale green shale.
525-530		"	Rd brown	Fn&M	"	Rnd. Mch V G dol cem (compl retn, almost a sndy dol), pl gn sndy
530-535		"	White	M	"	Rnd. Trace sil & pyr cem, pl gn shale. sh. Tr well cem (dol) wh
535-540		"	Pink	Fn&M	"	Rnd. Mch V G dol cem (compl retn, almost a sndy dol), rd bn stng.
540-545		"	White	C	"	Rnd. Tr sil cem, pl gn shale. Ltl pl gn sh. Tr pyrite cem.
545-550		"	"	M&C	"	Rnd. Mch G dol cem stnd lt rd bn to rd bn. Trace pl gn shale.
550-555		"	"	C	"	Rnd. Trace pink dolomite cement, pale green shale.
555-560		"	"	Fn/M&C	"	Rnd. Ltl G dol cem stnd pnk to rd bn. Tr pale green shale.
560-565		"	"	Fn&C	"	Same.
565-570		"	"	"	"	Rnd. Trace silica cement, pale green shale, quartz granules.
570-575		"	"	"	"	Rnd. Little good silica cement, pl gn shale. Trace quartz grans
575-580		"	"	M	"	Rounded, Trace silica cement, pale green shale.
580-585		"	"	Fn/M	"	Same plus trace soft white chert.
585-590		"	"	"	"	Srnd. Trace silica cement, soft white chert, quartz granules.
590-595		"	Lt pink	"	"	Srnd. Trace poor silica cement stained pink, soft white chert.
595-600		"	"	Fn	"	Srnd. Ltl F to G sil cem stnd pnk to rd bn, sft wh cht. Tr pyr cem
600-605		"	White	Fn/M	"	Srnd. Tr sil cem, pyr, sft wh cht. Mch pl gn shale, mica.
605-610		"	Lt grey	"	"	Srnd. Little silica cement. Mch pale green shale, mica (biot?).
610-615		"	White	M	"	Srnd. Tr silica & pyrite cem, pale green shale, quartz grans.
615-620		"	"	"	"	Same plus trace mica.
620-625		"	"	"	"	Srnd. Few quartz granules. Trace pyrite, small pebbles.
625-630		"	Pl yellow	"	"	Srnd. Ltl G sil cem mxd w/tr amts of pl gn sh & mica. Tr pyr, sft
630-635		"	White	"	"	Srnd. Tr silica cem, sft wh cht. Few qtz grans. wh cht, qtz grans
635-640		"	"	"	"	Same but little soft white chert.
640-645		"	"	"	"	Subrounded, Trace silica cement, soft white chert.
645-650		"	"	Fn	"	Same.
650-655		"	"	Fn/M	"	"
655-660		"	"	"	"	Little fair silica cement. Trace soft white chert.
660-665		"	"	"	"	Subrounded, Trace fair silica cement, soft white chert.
665-670		"	"	"	"	Srnd, Little silica cement. Trace soft white chert.
670-675		"	"	"	"	Srnd. Trace silica cement, soft white chert, quartz granules.
675-680		"	"	"	"	Same plus trace white micaceous shale.
680-685		"	"	"	"	Srnd. Ltl G sil cem (some stnd lt ppl to pnk). Tr qtz grans, wh
685-690		"	"	Fn	"	Srnd. Tr sil cem, qtz grans, sft wh cht, wh sh. micus sh, sft wh c
690-695		"	"	Fn&C	"	Srnd & rnd. Tr G sil cem. Trace qtz grans, sft white chert.
695-700		"	"	M	"	Srnd. Tr G sil cem, sft wh cht, qtz grans. Ltl wh micus shale.
700-705		"	"	"	"	Srnd. Tr G sil cem, sft wh cht, qtz grans, wh micaceous shale.
705-710		"	"	"	"	Same.
710-715		"	Lt pink	"	"	Rnd. Tr G dol, sil & hem cem, qtz grans, soft white chert.
715-720		"	Pl yellow	Fn/M	"	Srnd to rnd. Tr P dol & sil cem, qtz grans, sft wh chert.
720-725		Ss & shale	Rd brown	M	"	Hemic (sh). Tr G sil & calc cem, sft wh cht. Few V ang qtz grns
725-729		Granite	Rd bn&bl gn	--	--	(VC/Grns) some incorporated in cemented ss.
			END OF LOG			Very weathered, 40% hematite, 40% epidote, 15% plagioclase, 5% mafic minerals. Trace quartz.
			"See end of log" samples.			
215-220		Ss & shale	Lt gry&qry	Fn	Vfn/C	Dolomitic (shale). Subrounded. Much very good silica cement. Trace pale green shale, fossil fragments (in pale green shale), hematitic shale, Vfn-glaucanite. Little silt size pyrite (in grey shale).
225-230		Siltstone	Rd bn & qry	--	--	Hematitic. Dolomitic. Hard. Sample ranges from siltstone to dolomitic sandstone to sandy dolomite. Much grey shale (with much silt size pyrite), Fn/C-glaucanite, floating sand. Little dolomite, sandstone, Few fossil fragments.

WISCONSIN UNIQUE WELL NUMBER
Source: SWAP PROJECT KEYED **BF523**

State of Wi-Private Water Systems-DG/2 Form 3300-77A
 Department Of Natural Resources, Box 7921 (Rev 02/02)bw
 Madison, WI 53707

Property Owner **MADISON, CITY OF** Telephone Number **608-266-4656**
 Address **523 E MAIN ST**

I. Well Location **Depth 729 FT**
 T=Town C=City V=Village Fire#
 C of **MADISON**

City **MADISON** State **WI** Zip Code **53703**

Street Address or Road Name and Number
101 N LIVINGSTON ST #24

County of Well Location **13 DANE** Co Well Permit No **W** Well Completion Date **October 4, 1979**

Subdivision Name Lot# Block #

Well Constructor **MILLER WELL AND PUMP** License # **208** Facility ID (Public) **113022470**

Gov't Lot **OR NE 1/4 of SW 1/4 of Section 13 T 7 N;R 9 E**

Address Public Well Plan Approval# **79-0256**

Latitude Deg. **43** Min. **4.9688**
 Longitude Deg. **89** Min. **22.5695**

City State Zip Code Date Of Approval **04/05/1979**

2. Well Type 1 (See item 12 below) Lat/Long Method

Hi-cap Permanent Well # **77143** Common Well # **024** Specific Capacity **15.7 gpm/ft**

1=New 2=Replacement 3=Reconstruction
 of previous unique well # _____ constructed in **0**

3. Well Serves # of homes and or
M (eg: barn, restaurant, church, school, industry, etc.) High Capacity: Well? Property?

Reason for replaced or reconstructed Well?
1 1=Drilled 2=Driven Point 3=Jetted 4=Other

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?

- Well located in floodplain? Distance in feet from well to nearest: (including proposed)
- | | | |
|---------------------------------|---|--|
| 1. Landfill | 9. Downspout/ Yard Hydrant | 17. Wastewater Sump |
| 2. Building Overhang | 10. Privy | 18. Paved Animal Barn Pen |
| 3. 1=Septic 2= Holding Tank | 11. Foundation Drain to Clearwater | 19. Animal Yard or Shelter |
| 4. Sewage Absorption Unit | 12. Foundation Drain to Sewer | 20. Silo |
| 5. Nonconforming Pit | 13. Building Drain
1=Cast Iron or Plastic 2=Other | 21. Barn Gutter |
| 6. Buried Home Heating Oil Tank | 14. Building Sewer 1=Gravity 2=Pressure
1=Cast Iron or Plastic 2=Other | 22. Manure Pipe 1=Gravity 2=Pressure
1=Cast iron or Plastic 2=Other |
| 7. Buried Petroleum Tank | 15. Collector Sewer: ___ units ___ in. diam. | 23. Other manure Storage |
| 8. 1=Shoreline 2= Swimming Pool | 16. Clearwater Sump | 24. Ditch |
| | | 25. Other NR 812 Waste Source |

5. Drillhole Dimensions and Construction Method

From (ft)	To (ft)	Upper Enlarged Drillhole	Lower Open Bedrock
42.0	surface	144	
35.0	144	235	
29.0	235	729	

1. Rotary - Mud Circulation
 2. Rotary - Air
 3. Rotary - Air and Foam
 4. Drill-Through Casing Hammer
 5. Reverse Rotary
 6. Cable-tool Bit ___ n. dia
 7. Temp. Outer Casing ___ in. dia. ___ depth ft. Removed?
 Other

8. Geology

Geology Codes	Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
__Z_	GRAVEL @ CLAY	0	115
I_N_	SANDSTONE-WONEWOC	115	145
Y_L_	DOLOMITE-WONEWOC	145	150
Y_N_	SANDSTONE-WONEWOC	150	200
__NM	SS @ SANDSTONE-EAU CLAIRE	200	215
__HN	SHALE @ SANDSTONE-EAU CLAIRE	215	225
__HM	SILTSTONE-EAU CLAIRE	225	230
__N_	SANDSTONE-MT SIMON	230	320
P_L_	DOLOMITE-MT SIMON	320	325
__N_	SANDSTONE-MT SIMON	325	720
R_HN	SANDSTONE & SHALE-MT SIMON	720	725
DQ_	GRANITE-PRECAMBRIAN	725	729

6. Casing Liner Screen

Dia. (in.)	Material, Weight, Specification	From (ft.)	To (ft.)
36.0	NEW STEEL 0 375 W WELDED ASTM API 56	surface	144
30.0	NEW STEEL 0 500 W ASTM API 5L-2' ABOVE SURFACE	0	235

Manufacturer & Method of Assembly

9. Static Water Level
63.0 feet **B** ground surface
 A=Above B=Below

10. Pump Test
 Pumping level **203.0** ft. below surface
 Pumping at **2195.0** GP M **24.0** Hrs

11. Well Is: **0** in. Grade
 Developed? A=Above B=Below
 Disinfected?
 Capped?

7. Grout or Other Sealing Material

Method	Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
	NEAT CEMENT	surface	235.0	

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
 If no, explain

13. Initials of Well Constructor or Supervisory Driller Date Signed
 Initials of Drill Rig Operator (Mandatory unless same as above) Date Signed

APPENDIX D
CITY OF MADISON ZONING MAP

LAKE MENDOTA

UNIT WELL 24

5 YEAR TIME OF TRAVEL CAPTURE ZONE.

50 YEAR TIME OF TRAVEL CAPTURE ZONE

100 YEAR TIME OF TRAVEL CAPTURE ZONE

LAKE MONONA

LEGEND

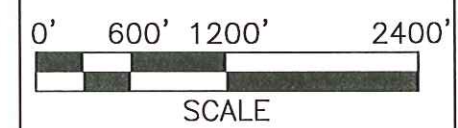
City of Madison Boundary

Zoning_Districts

- R1 - Single-Family Residence District
- R1-R - Rustic Residence District
- R2 - Single-Family Residence District
- R2S - Single-Family Residence District
- R2T - Single-Family Residence District
- R2Y - Single-Family Residence District
- R2Z - Single-Family Residence District
- R3 - Single- and Two-Family Residence District
- R4 - General Residence District
- R4A - Limited General Residence District
- R4L - Limited General Residence District
- R5 - General Residence District
- R6 - General Residence District
- R6H - General Residence District
- OR - Office Residence District
- CDP - General Development Plan in Planned Community Development/Planned Unit Development/Planned Community Model Home Park Districts**
- SIP - Specific Implementation Plan in Planned Community Development/Planned Unit Development/Planned Community Model Home Park Districts**
- O-1 - Limited Office-Residence District
- O-2 - Business & Professional Office District
- O-3 - Administrative Office District
- O-4 - Administrative Office & Research & Development District
- C1 - Limited Commercial District
- C2 - General Commercial District
- C3 - Highway Commercial District
- C3I - Commercial Service and Distribution District
- C4 - Central Commercial District
- RFSM Research Park - Specialized Manufacturing District
- M1 - Limited Manufacturing District
- SM - Specific Manufacturing District
- M2 - General Manufacturing District
- Agriculture District
- Conservancy District
- W - Wetland District

**For Zoning Districts with a GDP or SIP classification please see City of Madison Zoning for individual zoning information

SOURCE: CITY OF MADISON ZONING DISTRICTS



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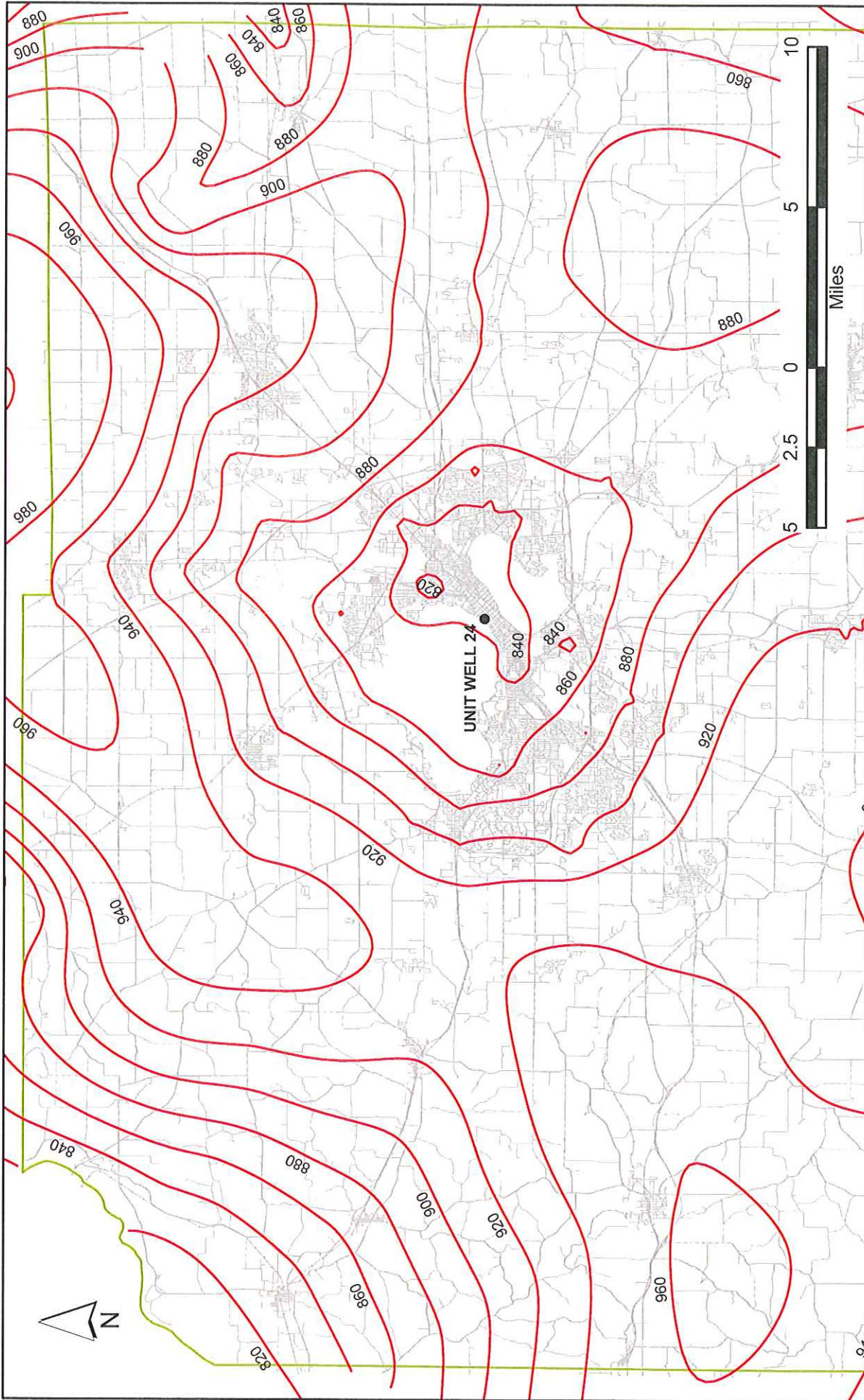
EarthTech
A Tyco International Ltd. Company

UNIT WELL 24
5, 50, 100 YEAR T.O.T. Z.O.Cs ASSUMING
FULL CAPACITY PUMPING RATE
ZONING AND WELL CAPTURE ZONES
MADISON, WISCONSIN

82359

APPENDIX E

**POTENTIOMETRIC SURFACE - LOWER BEDROCK (MOUNT SIMON)
AQUIFER AND AREAS OF RECHARGE AND DISCHARGE**



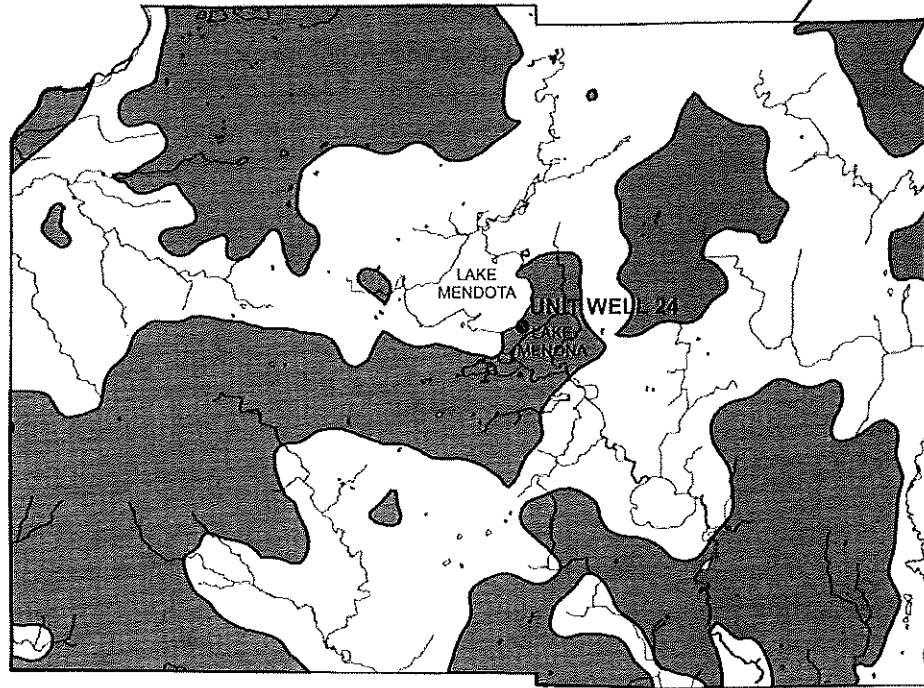

EarthTech
A Tyco International Ltd. Company

FIGURE 4
UNIT WELL 24
SIMULATED 2000 HEADS IN MT. SIMON AQUIFER
MADISON WATER UTILITY
MADISON, WISCONSIN 82359

REFERENCE SOURCE:
DCRPC, 2004
CONTOURS SHOWN = FT
ABOVE MEAN SEA LEVEL

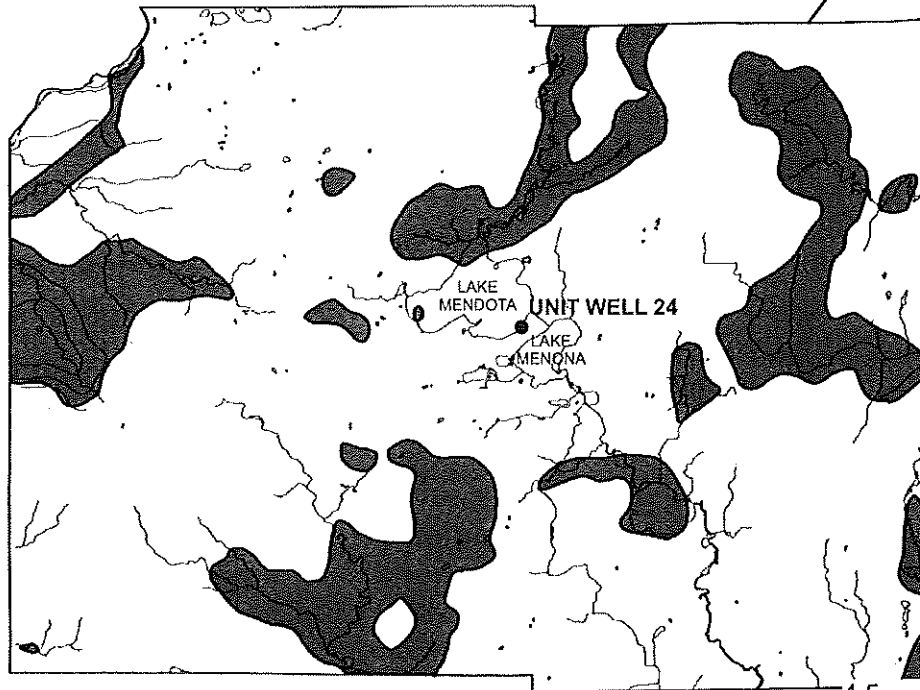
AREAS OF RECHARGE

DANE COUNTY

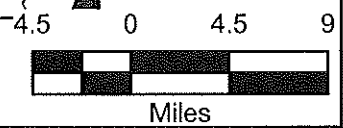


AREAS OF DISCHARGE

DANE COUNTY

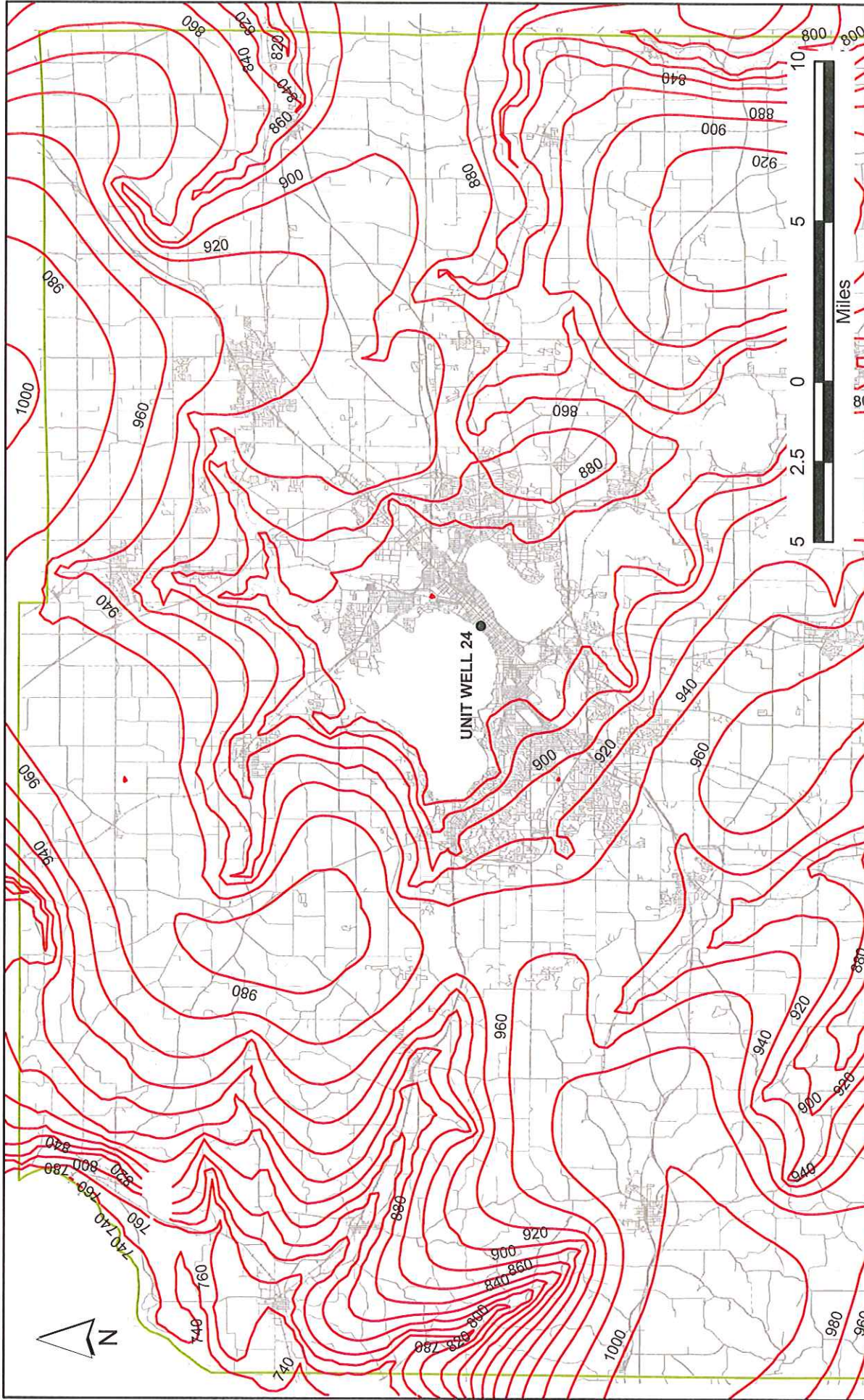


REFERENCE SOURCE:
HYDROGEOLOGY OF DANE COUNTY,
BRADBURY, ET. AL., 1999



APPENDIX F

POTENTIOMETRIC SURFACE - WATER TABLE ELEVATION



EarthTech
A Tyco International Ltd. Company

FIGURE 3
UNIT WELL 24
SIMULATED 2000 WATER TABLE
MADISON WATER UTILITY
MADISON, WISCONSIN

REFERENCE SOURCE:
DCRPC, 2004
CONTOURS SHOWN = FT
ABOVE MEAN SEA LEVEL

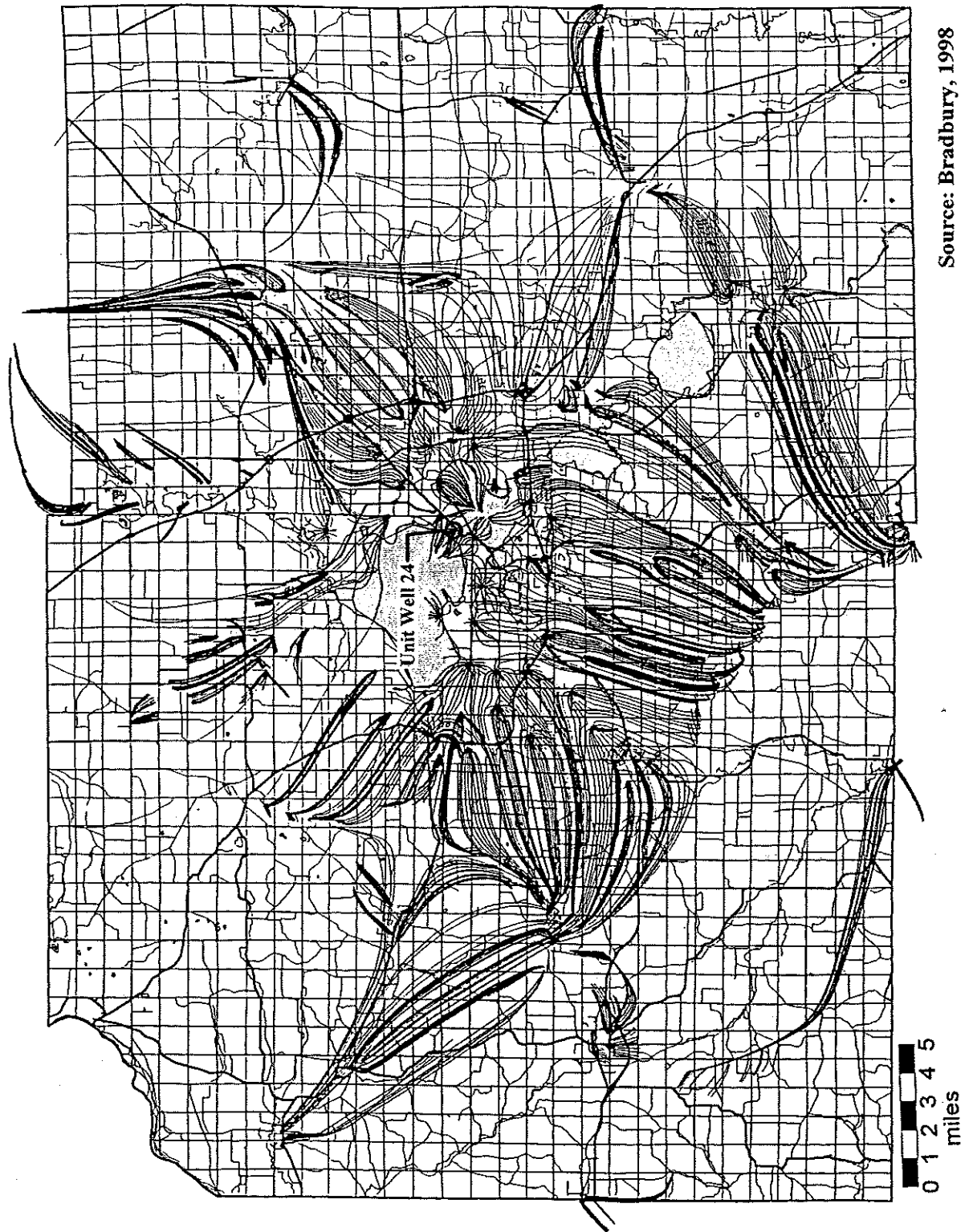
APPENDIX G

**DISTANCE-DRAWDOWN CALCULATION
(ZONE OF INFLUENCE)**

APPENDIX H

ULTIMATE ZOCS FOR MUNICIPAL WELLS IN DANE COUNTY

Fig. 2
Ultimate Zones of Contribution for
Municipalities in Dane County, WI.



Source: Bradbury, 1998

APPENDIX I

**PROHIBITED LAND USES IN WHPAs,
POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION AND LAND USES,
AND THEIR RELATIVE RISK TO GROUNDWATER**

TABLE I-1
RECOMMENDED PROHIBITED LAND USES
UNIT WELL 24 WELLHEAD PROTECTION ZONES
MADISON, WISCONSIN

ZONE A - PROHIBITED USES

Commercial animal confinement facilities
Animal waste facilities
Asphalt products manufacturing
Auto body repair businesses
Auto sales & service
Auto salvage yards (junk yards)
Bus or truck terminals
Commercial bulk fertilizer and/or pesticide facilities (storage, mixing and/or loading)
Cemeteries
Dry cleaning businesses/facilities
Electroplating businesses/facilities
Exterminating businesses/facilities
Fuel storage tanks (heating oil)
Furniture manufacturing and refinishing
Garage and vehicular towing
Hazardous and/or toxic materials storage
Hazardous and/or toxic waste facilities
Industrial businesses that use hazardous chemicals as defined by the EPA
Industrial pipelines
Landfills or waste disposal facilities
Machine shops
Paint and coating manufacturing
Photo processing
Plastics manufacturing
Printing and duplicating businesses that use hazardous chemicals as defined by the EPA
Public and municipal maintenance garages
Radioactive waste facilities
Recycling facilities
Research laboratories
Retail liquid motor fuel dispensing facilities
Salt storage
Septage and/or sewage sludge spreading
Spray wastewater facilities
Stormwater impoundments/retention areas
Underground and aboveground petroleum and chemical product storage tanks
Unsewered residential, commercial, or industrial development
Vehicle Repair shops
Wastewater treatment or disposal facilities

TABLE I-1 (cont.)

ZONE B - PROHIBITED USES

Commercial animal confinement facilities
Animal waste facilities
Asphalt products manufacturing
Auto body repair businesses
Auto salvage yards (junk yards)
Bus or truck terminals
Commercial bulk fertilizer and/or pesticide facilities (storage, mixing and/or loading)
Dry cleaning businesses/facilities
Electroplating businesses/facilities
Exterminating businesses/facilities
Garage and vehicular towing
Hazardous and/or toxic materials storage
Hazardous and/or toxic waste facilities
Industrial businesses that use hazardous chemicals as defined by the EPA
Landfills or waste disposal facilities
Manufacturing businesses that use hazardous chemicals as defined by the EPA
Paint and coating manufacturing
Printing and duplicating businesses that use hazardous chemicals as defined by the EPA
Public and municipal maintenance garages
Radioactive waste facilities
Recycling facilities
Retail liquid motor fuel dispensing facilities
Salt storage
Septage and/or sewage sludge spreading
Spray wastewater facilities
Underground and aboveground petroleum and chemical product storage tanks (less than 600 feet from well)
Unsewered residential, commercial, or industrial development (if sewage system receives 8,000 gallons per day or more)
Vehicle Repair shops
Wastewater treatment or disposal facilities

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Table 4-4. Potential Sources of Ground Water Contamination

Source	Health, Environmental, or Aesthetic Contaminant ^{1,2,3}
NATURALLY OCCURRING SOURCES	
Rocks and soils	<i>Aesthetic Contaminants:</i> Iron and iron bacteria; manganese; calcium and magnesium (hardness) <i>Health and Environmental Contaminants:</i> Arsenic; asbestos; metals; chlorides; fluorides; sulfates; sulfate-reducing bacteria and other microorganisms
Contaminated water	Excessive sodium; bacteria; viruses; low pH (acid) water
Decaying organic matter	Bacteria
Geological radioactive gas	Radionuclides (radon, etc.)
Natural hydrogeological events and formations	Salt-water/brackish water intrusion (or intrusion of other poor quality water); contamination by a variety of substances through sink-hole infiltration in limestone terrains
AGRICULTURAL SOURCES	
Animal feedlots and burial areas	Livestock sewage wastes; nitrates; phosphates; chloride; chemical sprays and dips for controlling insect, bacterial, viral, and fungal pests on livestock; coliform ⁴ and noncoliform bacteria; viruses
Manure spreading areas and storage pits	Livestock sewage wastes; nitrates
Livestock waste disposal areas	Livestock sewage wastes; nitrates
Crop areas and irrigation sites	Pesticides; ⁵ fertilizers; ⁶ gasoline and motor oils from chemical applicators
Chemical storage areas and containers	Pesticide ⁵ and fertilizer ⁶ residues
Farm machinery areas	Automotive wastes; ⁷ welding wastes
Agricultural drainage wells and canals	Pesticides; ⁵ fertilizers; ⁶ bacteria; salt water (in areas where the fresh-saltwater interface lies at shallow depths and where the water table is lowered by channelization, pumping, or other causes)
RESIDENTIAL SOURCES	
Common household maintenance and hobbies	<i>Common Household Products:</i> ⁸ Household cleaners; oven cleaners; drain cleaners; toilet cleaners; disinfectants; metal polishes; jewelry cleaners; shoe polishes; synthetic detergents; bleach; laundry soil and stain removers; spot removers and dry cleaning fluid; solvents; lye or caustic soda; household pesticides; ⁹ photochemicals; printing ink; other common products <i>Wall and Furniture Treatments:</i> Paints; varnishes; stains; dyes; wood preservatives (creosote); paint and lacquer thinners; paint and varnish removers and deglossers; paint brush cleaners; floor and furniture strippers <i>Mechanical Repair and Other Maintenance Products:</i> Automotive wastes; ⁷ waste oils; diesel fuel; kerosene; #2 heating oil; grease; degreasers for driveways and garages; metal degreasers; asphalt and roofing tar; tar removers; lubricants; rustproofers; car wash detergents; car waxes and polishes; rock salt; refrigerants
Lawns and gardens	Fertilizers; ⁵ herbicides and other pesticides used for lawn and garden maintenance ¹⁰
Swimming pools	Swimming pool maintenance chemicals ¹¹
Septic systems, cesspools, and sewer lines	Septage; coliform and noncoliform bacteria; ⁴ viruses; nitrates; heavy metals; synthetic detergents; cooking and motor oils; bleach; pesticides; ^{9,10} paints; paint thinner; photographic chemicals; swimming pool chemicals; ¹¹ septic tank/cesspool cleaner chemicals; ¹² elevated levels of chloride, sulfate, calcium, magnesium, potassium, and phosphate
Underground storage tanks	Home heating oil
Apartments and condominiums	Swimming pool maintenance chemicals; ¹¹ pesticides for lawn and garden maintenance and cockroach, termite, ant, rodent, and other pest control; ^{9,10} wastes from onsite sewage treatment plants; household hazardous wastes ⁸

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant ^{1,2,3}
MUNICIPAL SOURCES	
Schools and government offices and grounds	Solvents; pesticides; ^{9,10} acids; alkalis; waste oils; machinery/vehicle servicing wastes; gasoline and heating oil from storage tanks; general building wastes ¹³
Park lands	Fertilizers; ⁶ herbicides; ¹⁰ insecticides ⁹
Public and residential areas infested with mosquitoes, gypsy moths, ticks, ants, or other pests	Pesticides ^{5,9}
Highways, road maintenance depots, and deicing operations	Herbicides in highway rights-of-way; ^{5,10} road salt (sodium and calcium chloride); road salt anticaking additives (ferric ferrocyanide, sodium ferrocyanide); road salt anticorrosives (phosphate and chromate); automotive wastes ⁷
Municipal sewage treatment plants and sewer lines	Municipal wastewater; sludge; ¹⁴ treatment chemicals ¹⁵
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments	Sewage wastewater; nitrates; other liquid wastes; microbiological contaminants
Land areas applied with wastewater or wastewater byproducts	Organic matter; nitrate; inorganic salts; heavy metals; coliform and noncoliform bacteria; ⁴ viruses; nitrates; sludge; ¹⁴ nonhazardous wastes ¹⁶
Storm water drains and basins	Urban runoff; gasoline; oil; other petroleum products; road salt; microbiological contaminants
Combined sewer overflows (municipal sewers and storm water drains)	Municipal wastewater; sludge; ¹⁴ treatment chemicals; ¹⁵ urban runoff; gasoline; oil; other petroleum products; road salt; microbial contaminants
Recycling/reduction facilities	Residential and commercial solid waste residues
Municipal waste landfills	Leachate; organic and inorganic chemical contaminants; wastes from households ⁸ and businesses; ¹³ nitrates; oils; metals
Open dumping and burning sites, closed dumps	Organic and inorganic chemicals; metals; oils; wastes from households ⁸ and businesses ¹³
Municipal incinerators	Heavy metals; hydrocarbons; formaldehyde; methane; ethane; ethylene; acetylene; sulfur and nitrogen compounds
Water supply wells, monitoring wells, older wells, domestic and livestock wells, unsealed and abandoned wells, and test hole wells	Surface runoff; effluents from barnyards, feedlots, septic tanks, or cesspools; gasoline; used motor oil; road salt
Sumps and dry wells	Storm water runoff; spilled liquids; used oil; antifreeze; gasoline; other petroleum products; road salt; pesticides; ⁵ and a wide variety of other substances
Drainage wells	Pesticides; ^{9,10} bacteria
Well pumping that causes inter-aquifer leakage, induced filtration, landward migration of sea water in coastal areas; etc.	Saltwater; excessively mineralized water
Artificial ground water recharge	Storm water runoff; excess irrigation water; stream flow; cooling water; treated sewage effluent; other substances that may contain contaminants, such as nitrates, metals, detergents, synthetic organic compounds, bacteria, and viruses
COMMERCIAL SOURCES	
Airports, abandoned airfields	Jet fuels; deicers; diesel fuel; chlorinated solvents; automotive wastes; ⁷ heating oil; building wastes ¹³
Auto repair shops	Waste oils; solvents; acids; paints; automotive wastes; ⁷ miscellaneous cutting oils
Barber and beauty shops	Perm solutions; dyes; miscellaneous chemicals contained in hair rinses
Boat yards and marinas	Diesel fuels; oil; septage from boat waste disposal areas; wood preservative and treatment chemicals; paints; waxes; varnishes; automotive wastes ⁷

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant ^{1,2,3}
Bowling alleys	Epoxy; urethane-based floor finish
Car dealerships (especially those with service departments)	Automotive wastes; ⁷ waste oils; solvents; miscellaneous wastes
Car washes	Soaps; detergents; waxes; miscellaneous chemicals
Camp grounds	Septage; gasoline; diesel fuel from boats; pesticides for controlling mosquitoes, ants, ticks, gypsy moths, and other pests; ^{5,9} household hazardous wastes from recreational vehicles (RVs) ⁸
Carpet stores	Glues and other adhesives; fuel from storage tanks if forklifts are used
Cemeteries	Leachate; lawn and garden maintenance chemicals ¹⁰
Construction trade areas and materials (plumbing, heating and air conditioning, painting, paper hanging, decorating, drywall and plastering, acoustical insulation, carpentry, flooring, roofing and sheet metal, wrecking and demolition, etc.)	Solvents; asbestos; paints; glues and other adhesives; waste insulation; lacquers; tars; sealants; epoxy waste; miscellaneous chemical wastes
Country clubs	Fertilizers; ⁶ herbicides; ^{5,10} pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests; ⁹ swimming pool chemicals; ¹¹ automotive wastes
Dry cleaners	Solvents (perchloroethylene, petroleum solvents, Freon); spotting chemicals (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
Funeral services and crematories	Formaldehyde; wetting agents; fumigants; solvents
Furniture repair and finishing shops	Paints; solvents; degreasing and solvent recovery sludges
Gasoline services stations	Oils; solvents; miscellaneous wastes
Golf courses	Fertilizers; ⁶ herbicides; ^{5,10} pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests ⁹
Hardware/lumber/parts stores	Hazardous chemical products in inventories; heating oil and fork lift fuel from storage tanks; wood-staining and treating products such as creosote
Heating oil companies, underground storage tanks	Heating oil; wastes from truck maintenance areas ⁷
Horticultural practices, garden nurseries, florists	Herbicides, insecticides, fungicides, and other pesticides ¹⁰
Jewelry/metal plating shops	Sodium and hydrogen cyanide; metallic salts; hydrochloric acid; sulfuric acid; chromic acid
Laundromats	Detergents; bleaches; fabric dyes
Medical institutions	X-ray developers and fixers; ¹⁷ infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; dental acids; miscellaneous chemicals
Office buildings and office complexes	Building wastes; ¹³ lawn and garden maintenance chemicals; ¹⁰ gasoline; motor oil
Paint stores	Paints; paint thinners; lacquers; varnishes; other wood treatments
Pharmacies	Spilled and returned products
Photography shops, photo processing laboratories	Biosludges; silver sludges; cyanides; miscellaneous sludges
Print shops	Solvents; inks; dyes; oils; photographic chemicals
Railroad tracks and yards	Diesel fuel; herbicides for rights-of-way; creosote for preserving wood ties
Research laboratories	X-ray developers and fixers; ¹⁷ infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; solvents; infectious materials; drugs; disinfectants (quaternary ammonia, hexachlorophene, peroxides, chlornexade, bleach); miscellaneous chemicals

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant ^{1,2,3}
COMMERCIAL SOURCES (continued)	
Scrap and junk yards	Any wastes from businesses ¹³ and households; ⁸ oils
Sports and hobby shops	Gunpowder and ammunition; rocket engine fuel; model airplane glue
Above-ground and underground storage tanks	Heating oil; diesel fuel; gasoline; other petroleum products; other commercially used chemicals
Transportation services for passenger transit (local and interurban)	Waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes ⁷
Veterinary services	Solvents; infectious materials; vaccines; drugs; disinfectants (quaternary ammonia, hexachlorophene, peroxides, chlornexade, bleach); x-ray developers and fixers ¹⁷
INDUSTRIAL SOURCES	
Material stockpiles (coal, metallic ores, phosphates, gypsum)	Acid drainage; other hazardous and nonhazardous wastes ¹⁶
Waste tailing ponds (commonly for the disposal of mining wastes)	Acids; metals; dissolved solids; radioactive ores; other hazardous and nonhazardous wastes ¹⁵
Transport and transfer stations (trucking terminals and rail yards)	Fuel tanks; repair shop wastes; ⁷ other hazardous and nonhazardous wastes ¹⁵
Above-ground and underground storage tanks and containers	Heating oil; diesel and gasoline fuel; other petroleum products; hazardous and nonhazardous materials and wastes ¹⁶
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments	Hazardous and nonhazardous liquid wastes; ¹⁶ septage; sludge ¹⁴
Chemical landfills	Leachate; hazardous and nonhazardous wastes; ¹⁶ nitrates
Radioactive waste disposal sites	Radioactive wastes from medical facilities, power plants, and defense operations; radionuclides (uranium, plutonium)
Unattended wet and dry excavation sites (unregulated dumps)	A wide range of substances; solid and liquid wastes; oil-field brines; spent acids from steel mill operations; snow removal piles containing large amounts of salt
Operating and abandoned production and exploratory wells (for gas, oil, coal, geothermal, and heat recovery); test hole wells; monitoring and excavation wells	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals ¹⁶
Dry wells	Saline water from wells pumped to keep them dry
Injection wells	Highly toxic wastes; hazardous and nonhazardous industrial wastes; ¹⁶ oil-field brines
Well drilling operations	Brines associated with oil and gas operations
INDUSTRIAL PROCESSES (PRESENTLY OPERATED OR TORN-DOWN FACILITIES)¹⁸	
Asphalt plants	Petroleum derivatives
Communications equipment manufacturers	Nitric, hydrochloric, and sulfuric acid wastes; heavy metal sludges; copper-contaminated etchant (e.g., ammonium persulfate); cutting oil and degreasing solvent (trichloroethane, Freon, or trichloroethylene); waste oils; corrosive soldering flux; paint sludge; waste plating solution
Electric and electronic equipment manufacturers and storage facilities	Cyanides; metal sludges; caustics (chromic acid); solvents; oils; alkalis; acids; paints and paint sludges; calcium fluoride sludges; methylene chloride; perchloroethylene; trichloroethane; acetone; methanol; toluene; PCBs
Electroplaters	Boric, hydrochloric, hydrofluoric, and sulfuric acids; sodium and potassium hydroxide; chromic acid; sodium and hydrogen cyanide; metallic salts
Foundries and metal fabricators	Paint wastes; acids; heavy metals; metal sludges; plating wastes; oils; solvents; explosive wastes

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant ^{1,2,3}
Furniture and fixtures manufacturers	Paints; solvents; degreasing sludges; solvent recovery sludges
Machine and metalworking shops	Solvents; metals; miscellaneous organics; sludges; oily metal shavings; lubricant and cutting oils; degreasers (tetrachlorethylene); metal marking fluids; mold-release agents
Mining operations (surface and underground), underground storage mines	Mine spoils or tailings that often contain metals; acids; highly corrosive mineralized waters; metal sulfides
Unsealed abandoned mines used as waste pits	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals ¹⁶
Paper mills	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals ¹⁶ ; organic sludges; sodium hydroxide; chlorine; hypochlorite; chlorine dioxide; hydrogen peroxide
Petroleum production and storage companies, secondary recovery of petroleum	Hydrocarbons; oil-field brines (highly mineralized salt solutions)
Industrial pipelines	Corrosive fluids; hydrocarbons; other hazardous and nonhazardous materials and wastes ¹⁶
Photo processing laboratories	Cyanides; biosludges; silver sludges; miscellaneous sludges
Plastics materials and synthetics producers	Solvents; oils; miscellaneous organics and inorganics (phenols, resins); paint wastes; cyanides; acids; alkalis; wastewater treatment sludges; cellulose esters; surfactant; glycols; phenols; formaldehyde; peroxides; etc.
Primary metal industries (blast furnaces, steel works, and rolling mills)	Heavy metal wastewater treatment sludge; pickling liquor; waste oil; ammonia scrubber liquor; acid tar sludge; alkaline cleaners; degreasing solvents; slag; metal dust
Publishers, printers, and allied industries	Solvents; inks; dyes; oils; miscellaneous organics; photographic chemicals
Public utilities (phone, electric power, gas)	PCBs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions (chromium, nickel, cadmium); herbicides from utility rights-of-way
Sawmills and planers	Treated wood residue (copper quinolate, mercury, sodium bazide); tanner gas; paint sludges; solvents; creosote; coating and gluing wastes
Stone, clay, and glass manufacturers	Solvents; oils and grease; alkalis; acetic wastes; asbestos; heavy metal sludges; phenolic solids or sludges; metal-finishing sludge
Welders	Oxygen, acetylene
Wood preserving facilities	Wood preservatives; creosote

¹In general, ground water contamination stems from the *misuse and improper disposal* of liquid and solid wastes; the *illegal dumping or abandonment* of household, commercial, or industrial chemicals; the *accidental spilling* of chemicals from trucks, railways, aircraft, handling facilities, and storage tanks; or the *improper siting, design, construction, operation, or maintenance* of agricultural, residential, municipal, commercial, and industrial drinking water wells and liquid and solid waste disposal facilities. Contaminants also can stem from *atmospheric pollutants*, such as airborne sulfur and nitrogen compounds, which are created by smoke, flue dust, aerosols, and automobile emissions, fall as acid rain, and percolate through the soil. When the sources listed in this table are used and managed properly, ground water contamination is not likely to occur.

²Contaminants can reach ground water from activities occurring on the land surface, such as industrial waste storage; from sources below the land surface but above the water table, such as septic systems; from structures beneath the water table, such as wells; or from contaminated recharge water.

³This table lists the most common wastes, but not all potential wastes. For example, it is not possible to list all potential contaminants contained in storm water runoff or research laboratory wastes.

⁴Coliform bacteria can indicate the presence of pathogenic (disease-causing) microorganisms that may be transmitted in human feces. Diseases such as typhoid fever, hepatitis, diarrhea, and dysentery can result from sewage contamination of water supplies.

⁵Pesticides include herbicides, insecticides, rodenticides, fungicides, and avicides. EPA has registered approximately 50,000 different pesticide products for use in the United States. Many are highly toxic and quite mobile in the subsurface. An EPA survey found that the most common pesticides found in drinking water wells were DCPA (dacthal) and atrazine, which EPA classifies as *moderately toxic* (class 3) and *slightly toxic* (class 4) materials, respectively.

⁶The EPA National Pesticides Survey found that the use of fertilizers correlates to nitrate contamination of ground water supplies.

⁷Automotive wastes can include gasoline; antifreeze; automatic transmission fluid; battery acid; engine and radiator flushes; engine and metal degreasers; hydraulic (brake) fluid; and motor oils.

⁸Toxic or hazardous components of common household products are noted in Table 3-2.

⁹Common household pesticides for controlling pests such as ants, termites, bees, wasps, flies, cockroaches, silverfish, mites, ticks, fleas, worms, rats, and mice can contain active ingredients including naphthalene, phosphorus, xylene, chloroform, heavy metals, chlorinated hydrocarbons, arsenic, strychnine, kerosene, nitrosamines, and dioxin.

¹⁰Common pesticides used for lawn and garden maintenance (i.e., weed killers, and mite, grub, and aphid controls) include such chemicals as 2,4-D; chlorpyrifos; diazinon; benomyl; captan; dicofol; and methoxychlor.

¹¹Swimming pool chemicals can contain free and combined chlorine; bromine; iodine; mercury-based, copper-based, and quaternary algicides; cyanuric acid; calcium or sodium hypochlorite; muriatic acid; sodium carbonate.

¹²Septic tank/cesspool cleaners include synthetic organic chemicals such as 1,1,1 trichloroethane, tetrachloroethylene, carbon tetrachloride, and methylene chloride.

¹³Common wastes from public and commercial buildings include automotive wastes; rock salt; and residues from cleaning products that may contain chemicals such as xylenols, glycol esters, isopropanol, 1,1,1-trichloroethane, sulfonates, chlorinated phenols, and cresols.

¹⁴Municipal wastewater treatment sludge can contain organic matter; nitrates; inorganic salts; heavy metals; coliform and noncoliform bacteria; and viruses.

¹⁵Municipal wastewater treatment chemicals include calcium oxide; alum; activated alum, carbon, and silica; polymers; ion exchange resins; sodium hydroxide; chlorine; ozone; and corrosion inhibitors.

¹⁶The Resource Conservation and Recovery Act (RCRA) defines a hazardous waste as a solid waste that may cause an increase in mortality or serious illness or pose a substantial threat to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. A waste is hazardous if it exhibits characteristics of ignitability, corrosivity, reactivity, and/or toxicity. Not covered by RCRA regulations are domestic sewage; irrigation waters or industrial discharges allowed by the Clean Water Act; certain nuclear and mining wastes; household wastes; agricultural wastes (excluding some pesticides); and small quantity hazardous wastes (i.e., less than 220 pounds per month) generated by businesses.

¹⁷X-ray developers and fixers may contain reclaimable silver, glutaldehyde, hydroquinone, phenedone, potassium bromide, sodium sulfite, sodium carbonate, thiosulfates, and potassium alum.

¹⁸This table lists potential ground water contaminants from many common industries, but it does not address all industries.

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Table 4-5. Land Uses and Their Relative Risk to Ground Water

LEAST RISK	<ul style="list-style-type: none">A. <ul style="list-style-type: none">1. Land surrounding a well or reservoir, owned by a water company.2. Permanent open space dedicated to passive recreation.3. Federal, state, municipal, and private parks.4. Woodlands managed for forest products.5. Permanent open space dedicated to active recreation.B. <ul style="list-style-type: none">1. Field crops: pasture, hay, grains, vegetables.2. Low density residential: lots larger than 2 acres.3. Churches, municipal offices.C. <ul style="list-style-type: none">1. Agricultural production: dairy, livestock, poultry, nurseries, orchards, berries.2. Golf course, quarries.3. Medium density residential: lots from 1/2 to 1 acre.D. <ul style="list-style-type: none">1. Institutional uses: schools, hospitals, nursing homes, prisons, garages, salt storage, sewage treatment facilities.2. High density housing: lots smaller than 1/2 acre.3. Commercial uses: limited hazardous material storage and only sewage disposal.E. <ul style="list-style-type: none">1. Retail commercial: gasoline, farm equipment, automotive, sales and services; dry cleaners; photo processor; medical arts; furniture strippers; machine shops; radiator repair; printers; fuel oil distributors.2. Industrial: all forms of manufacturing and processing, research facilities.3. Underground storage of chemicals, petroleum.
GREATEST RISK	<ul style="list-style-type: none">4. Waste disposal: pits, ponds, lagoons, injection wells used for waste disposal; bulky waste and domestic garbage landfills; hazardous waste treatment, storage and disposal sites.

Source: Adapted from U.S. EPA, 1989a.

APPENDIX J
CLEAN SWEEP COLLECTION PROGRAM



AGRICULTURE



HOUSEHOLD



BUSINESS



EXCHANGE

What's new

Come visit us at the Clean Sweep and Madison Metropolitan Sewerage District Table during the Earth Day Celebration.

CleanSweep will be open from May 1st - October 31 for the 2007 season. Hours are 7:30 AM - 2:00 PM Tuesdays, Wednesdays, Fridays, and Saturdays. See the Press Release.

Directions

Stop by and visit us in Madison at 2302 Fish Hatchery Road (on the north end of the Dane County Highway Garage property).

[\[View map to CleanSweep site\]](#)

Contact

For more information, call our recorded information line at 608-294-5366 or contact Dave Radisewitz at 608-294-5358 or email him at

dradisewitz@cityofmadison.com

Check out an entertaining and educational game on the hazards present in your home. The National Institute of Health proves that learning can be fun. Play Tox Mystery today!

The Agricultural Waste Program helps farmers and agricultural businesses to dispose of unwanted, unused, damaged or banned hazardous chemicals, including pesticides.

More on the ag program

The Household Hazardous Waste Program provides an opportunity for residents of Dane County to safely dispose of hazardous waste, free of charge.

More on household hazardous waste

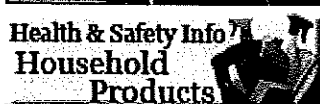
The Business Waste Program allows businesses to dispose of hazardous materials and wastes conveniently and cost-effectively.

More on the business waste program

The Product Exchange is a program for residents to take, free of charge, the high quality and usable products brought into Clean Sweep.

More on the product exchange

More information on recycling programs can be found at Dane County Department of Public Works Recycling Page and also at the City of Madison Streets & Recycling Page.



[\[Dane County Home Page\]](#)
[\[Dane County Public Works\]](#)

Last Revised: May 18, 2007

[\[City of Madison Home Page\]](#)
[\[Madison Department of Public Health\]](#)



AGRICULTURE



HOUSEHOLD



BUSINESS



EXCHANGE

The Household Hazardous Waste Program provides an opportunity for homeowners of Dane County to safely dispose of hazardous waste, free of charge.

The 2007 Collection Season is currently open and runs through Wednesday, October 31, 2007. We'll be open every Tuesday, Wednesday, Friday, and Saturday from 7:30 A.M. to 2:00 P.M. Our facility is located in Madison at 2302 Fish Hatchery Road (on the north end of the Dane County Highway Garage property).

[\[View map to CleanSweep site\]](#)

When you bring in a load, products and materials should be packaged to keep them from spilling or breaking on the way. Leave materials in their original containers. DO NOT MIX like or unlike materials together. Leaking containers may be placed, as is, in another container. Label the outside container.

Disposal options for common items

Although we do our best to accept as much household hazardous waste as possible, there are some things we cannot take off your hands. Click on the items below to display information regarding their disposal

Note: If an item is in this list, it does not mean that Clean Sweep will accept it. Please click on the item you are interested in to see how to dispose of your item.



- Aerosol cans
- Asbestos
- Ammunition, explosives, and fireworks
- Antifreeze and oil filters
- Batteries
- Ballasts
- Brake, transmission, power steering fluid
- Computers
- Cooking oil
- Driveway sealer / roofing tar
- Fertilizer
- Fire extinguishers
- Fluorescent light bulbs
- Gasoline additives (not oil), engine degreaser
- Gasoline and gasoline/oil mixes
- Household products containing organic solvents
- Flammable solvents, fuels and aerosols

Disposal Instructions

Select an item on the left

Clean Sweep does not take tires, paper or cardboard products, yard waste, construction, debris, rubbish, glass, solid metals, solid waste, appliances, etc. Contact your local government or trash hauler for details.

[\[Dane County Home Page\]](#)
[\[Dane County Public Works\]](#)

Last Revised: May 18, 2007

[\[City of Madison Home Page\]](#)
[\[Madison Department of Public Health\]](#)



AGRICULTURE



HOUSEHOLD



BUSINESS



EXCHANGE

The Agricultural Hazardous Waste Disposal Program

Allows producers of agricultural crops and commodities to dispose of unwanted, unused, damaged, or banned hazardous chemicals at no charge. Other agri-businesses, such as golf courses and farm co-operatives will be charged one-half of the small business disposal charge.

Collection Dates

Agricultural Clean Sweeps will be held every Wednesday between May 18 and October 12. Please note that pre-registration is required. The exact time and date for your drop-off will be assigned upon registration.

Frequently Asked Questions

- Can I bring in unknown chemicals?
- Can I participate if I am not a farm?
- How much will I be charged?
- Can I get directions to the CleanSweep site?



Items acceptable under the Agricultural Clean Sweep

- Unused, damaged, cancelled, banned, or otherwise unwanted agricultural chemicals, including herbicides, insecticides, fungicides, rodenticides, and wood preservatives.
- Common pesticides such as 2,4-D, captan, malathion, DDT, parathion, toxaphene, chlordane, heptachlor, lindane, 2,4,5-T, and pentachlorophenol
- Other agricultural chemicals including veterinary supplies, lead paint, acid washes, wood finishes, solvents, and engine cleaners.

Unacceptable chemicals

- Explosives, including detonators and blasting caps
- Radioactives, including smoke alarms
- Infectious and biological wastes
- Propane cylinders. Certain compressed gas cylinder will be accepted; however, you must pre-register to determine whether or not your particular cylinder is acceptable. There are no exceptions to this rule.

How to Transport Materials to Clean Sweep

Products and materials should be packaged to keep them from spilling or breaking on the way to Clean Sweep. Leave materials in their original containers. **DO NOT MIX** like or unlike materials together. Leaking containers may be placed, as is, in another container. Label the outside container.

Make an Appointment

If you'd like to set up an appointment to bring in your agricultural hazardous waste please fill out our online preregistration form or, if you'd rather, our printed form. If you have questions about the program or if you are unsure whether you qualify, you can find answers in the preregistration form or by contacting Dave Radisewitz at 608-294-5358 (phone), 608-267-3105 (fax), or email him at dradisewitz@cityofmadison.com.



AGRICULTURE



HOUSEHOLD



BUSINESS



EXCHANGE

The Small Business Hazardous Waste Disposal Program allows businesses to dispose of hazardous materials and waste in a convenient and cost-effective manner. Wastes are accepted on Wednesdays by appointment only.

Reduced costs

State law requires that all Wisconsin businesses producing hazardous waste manage and dispose of their materials and wastes properly. For generators of large quantities of waste this means hiring a chemical contractor to sort, package, and transport the waste to a licensed facility. This option proves very costly for generators of small quantities of waste, especially if they have different waste streams (e.g. solvents and paints). Because the program is an add-on to the Household Hazardous Waste Program, economies of scale provide significant cost savings.

Reduced Regulations

The Dane County Clean Sweep, through approval of the Wisconsin DNR, has designed a program to assist generators of small quantities of waste to simply, safely, and cost effectively dispose of their materials. Ordinarily the procedures required and the paperwork involved is confusing and complicated. Through special rulemaking by the Wisconsin DNR, manifest requirements are waived and Clean Sweep programs have been authorized to accept business waste.

Proper Treatment

As a VSQG, you may consider your waste to be properly managed by using a Clean Sweep program. Facilities to which this waste is sent are audited regularly. And to minimize liability, these materials are disposed through a hierarchy of disposal: Reuse, Recycle, Treatment, or Incineration. By utilizing a hierarchy of disposal, wastes are disposed of in the most cost-efficient and environmentally-conscious manner.

How to Transport Materials to Clean Sweep

Products and materials should be packaged to keep them from spilling or breaking on the way to Clean Sweep. Leave materials in their original containers. DO NOT MIX like or unlike materials together. Leaking containers may be placed, as is, in another container. Label the outside container.

Make an Appointment

If you'd like to set up an appointment to bring in your small business hazardous waste, please fill out our [online small business application](#). If you have questions about the program or if you are unsure whether you qualify, you can find answers in our more-detailed [small business program brochure and application](#) or by contacting Dave Radisewitz at 608-294-5358 (phone), 608-267-3105 (fax), or email him at dradisewitz@cityofmadison.com.

Frequently Asked Questions

- [What's a very small quantity generator \(VSQG\)?](#)
- [When can I bring in my hazardous waste?](#)
- [How much will I be charged?](#)
- [Can I get directions to the CleanSweep site?](#)



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Last Revised: May 7, 2007

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[\[Madison Department of Public Health\]](#)

What is a Very Small Quantity Generator (VSQG)?

Your business must generate 220 pounds or less of hazardous waste in a month and store no more than 2,200 pounds of hazardous waste on site at any time to meet the definition of a very-small quantity generator. Additionally, you may have no more than two pounds of acutely hazardous waste on site.

Please note that you are responsible for proper packing and transportation of your waste. You are responsible for your waste from "cradle to grave" under CERCLA.

When can I bring in my hazardous waste?

Hazardous waste from small businesses is accepted by appointment on every Wednesday that Clean Sweep is open. Small business wastes are also accepted other days as time permits. A non-scheduled drop off fee of \$50 may apply. To set up an appointment, complete our Small Business Disposal Application.

If you have any questions, contact Dave Radisewitz at 608-294-5358 or email him at dradisewitz@cityofmadison.com.

How much will I be charged?

Participants are required to pay for their share of the handling and disposal costs which include contractor costs, testing (if required), handling/packaging and transportation from the collection site. The program expects costs to be significantly lower than they would be individually because of the larger quantity of materials / wastes and resulting from economies of scale. The final invoice will include the cost per pound determined at drop off and any additional charges that may be incurred.

Pricing chart (all prices included the weight of the container)

- Paints = \$0.68/lb
- Flammable Liquids, Solvents, and Aerosols = \$1.65/lb
- Lab Packs, Acids, Bases, and Ballasts = \$1.40/lb
- Pesticides, Herbicides, and Toxics = \$2.04/lb
- Mercury (no lamps) = \$11.00/lb
- Non-Scheduled Drop-Off Charge = \$25.00

[\[Dane County Home Page\]](#) [\[Dane County Public Works\]](#) [\[Madison Department of Public Health\]](#) [\[City of Madison Home Page\]](#)

Can I bring in unknown chemicals?

You can often find chemicals of unknown origin around farms or agricultural businesses. Clean Sweep can accept most unknown chemicals, but you must pre-register unknown chemicals over 50 pounds or 5 gallons in size. Clean Sweep will also accept 30 and 55-gallon drums but you must also pre-register them.

Can I participate if I am not a farm?

Businesses that meet pesticide licensing categories regulated by the DATCP can now receive disposal services. These categories include co-ops, golf courses, rights-of-way applicators, aerial applicators, feed mills, landscape companies and any local governments, including schools.

DATCP offers a 50% disposal subsidy for waste pesticides. Businesses must pay the remaining balance. Agricultural businesses must pre-register with the Dave Radisewitz. You can call him at 608-294-5358 or email him at dradisewitz@cityofmadison.com.

How much will I be charged?

The first 200 pounds of chemicals are free for farmers. Waste amounts over 200 pounds may require a per-pound charge. This fee will be waived if pre-registered waste quantities can be paid for with available grant dollars.

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APPENDIX K

**CITY OF MADISON WELL ABANDONMENT ORDINANCE -
DANE COUNTY ORDINANCE RELATING TO PRIVATE WATER SYSTEMS**

13.21 WELL ABANDONMENT.

- (1) Purpose . To prevent contamination of groundwater and to protect public health, safety and welfare by assuring that unused, unsafe or noncomplying wells, wells which may serve as conduits for contamination or wells which may be illegally cross-connected to the Madison Water Utility are properly abandoned.
- (2) Applicability . This ordinance applies to all wells located in the City of Madison or on premises served by the Madison Water Utility.
- (3) Definitions .

Noncomplying means a well or pump installation which does not comply with the provisions of Ch. NR 812, Wisconsin Administrative Code, in effect at the time the well was constructed, a contamination source was installed, the pump was installed or work was done on either the well or pump installation.

Pump installation means the pump and related equipment used for withdrawing water from a well including the discharge piping, the underground connections, pitless adapters, pressure tanks, pits, sampling faucets and well seals or caps.

Unsafe means a well or pump installation which produces water which is bacteriologically contaminated or contaminated with substances in excess of the standards of Chapters NR 809 or 140, Wisconsin Administrative Code, or for which a Health Advisory has been issued by the Department of Natural Resources.

Unused means a well or pump installation which is not in use or does not have a functional pumping system.

Well means an excavation or opening into the ground made by digging, boring, drilling, driving, or other methods for the purpose of obtaining groundwater for consumption or other use. Wells for the express purpose of monitoring the quality of ground water and/or gases and/or soil characteristics are exempt from this Ordinance.

Well abandonment means the filling and sealing of a well according to the provisions of Chap. NR 812, Wisconsin Administrative Code.

- (4) Abandonment Required . All wells located in the City of Madison or on premises served by the Madison Water Utility shall be abandoned if no valid well operation permit has been obtained from the Madison Water Utility or if so required under NR Sec. 812.26(2), Wisconsin Administrative Code. An application for a well operation permit shall be made within ninety (90) days of the date of any abandonment notice from the Madison Water Utility. (Am. by Ord. 12,567, 5-3-00)
- (5) Well Operation Permit . No person may operate a well without having obtained a well operation permit. The Madison Water Utility may grant a permit to a private well owner to operate a well for a period not to exceed five (5) years providing the conditions of this section are met. An owner may request renewal of a well operation permit by submitting information verifying that the conditions of this section are met. The Madison Water Utility, or its agent, may conduct inspections or have water quality tests conducted at the applicant's expense to obtain or verify information necessary for consideration of a permit application or renewal. Permit applications and renewals shall be made on forms provided by the Madison Water Utility. A permit fee of one hundred dollars (\$100) shall accompany the application. This fee shall include the cost of conducting bacterial examinations of water samples obtained from the well. The Madison Water Utility may require abandonment of a well for failure to renew a permit or to pay renewal fee within ninety (90) days of the date of any abandonment notice from the Madison Water Utility; otherwise, abandonment shall be required. The following conditions must be met for issuance or renewal of a well operation permit:

- (a) The well and pump installation meet or are upgraded to meet the requirements of Chap. NR 812, Wisconsin Administrative Code.
- (b) The well construction and pump installation have a history of producing bacteriologically safe water as evidenced by at least two (2) samplings taken a minimum of two (2) weeks apart. No exception to this condition may be made for unsafe wells, unless the Department of Natural Resources approves, in writing, the continued use of the well.
- (c) There are no cross-connections between the well and pump installation and the Madison Water Utility.

(Am. by Ord. 12,567, 5-3-00)

- (6) Required Inspection . Whenever real property with a well on the premises is conveyed pursuant to Chapter 706, Wisconsin Statutes, the seller shall contact the Madison Water Utility at least fourteen (14) days prior to the transfer of property. Upon proper notice, the Madison Water Utility may conduct an inspection to determine whether the well should be permitted or abandoned under this section.
- (7) A representative of the Madison Water Utility shall have the power and authority at all reasonable times, for any proper purpose, to enter upon any property in the City of Madison and make inspection thereof. If entry is refused, such representative may obtain a special inspection warrant under Section 66.0119, Wisconsin Statutes. Upon request by a representative of the Madison Water Utility, the owner, lessee or occupant of any property so served shall furnish to the inspection agency any pertinent information regarding the well on such property if such information is known to such owner, lessee or occupant. (Am. by Ord. 12,567, 5-3-00)
- (8) Abandonment Procedures .
 - (a) All wells abandoned under the jurisdiction of this ordinance or rule shall be abandoned according to the procedures and methods of Chap. NR 812, Wisconsin Administrative Code. All debris, pump, piping, unsealed liners and any other obstructions which may interfere with sealing operations shall be removed prior to abandonment.
 - (b) The owner of the well, or the owner's agent, shall notify the Madison Water Utility at least forty-eight (48) hours prior to commencement of any well abandonment activities. The abandonment of the well may be observed by the Madison Water Utility.
 - (c) An abandonment report form, supplied by the Department of Natural Resources, shall be submitted by the well owner to the Madison Water Utility and the Department of Natural Resources within ten (10) days of the completion of the well abandonment.
 - (d) The Madison Water Utility may require any person who has abandoned a well not in compliance with Subdivision (a) to return and take corrective action so that the well is abandoned by him or her in a complying manner. (Cr. by Ord. 12,567, 5-3-00)
- (9) This law does not supersede the State Plumbing Code, Section NR 811, Wisconsin Administrative Code, or Chapter 18 of the Madison General Ordinances entitled "Plumbing Code" but is supplementary to them.
- (10) Penalties . The penalty for violation of this section may be not less than twenty-five dollars (\$25) nor more than one thousand dollars (\$1,000) and the cost of prosecution. Each day of violation is a separate offense. If any person fails to comply with this ordinance for more than ten (10) days after receiving written notice of the violation, the City may impose a penalty and cause the well abandonment to be performed and the expense to be assessed as a special tax against the property.

(Sec. 13.21 Cr. by Ord. 10,136, 11-14-90; Am. by Ord. 12,345, 3-12-99; Am. by Ord. 12,567, 5-3-00; Ord. 13,500, 1-23-04)

**TITLE 9
HEALTH AND SANITATION**

- Chapter 45 Relating to Private Water Systems
- Chapter 46 Private Sewage System Ordinance and Health Ordinance
- Chapter 47 Animal Control

**CHAPTER 45
RELATING TO PRIVATE WATER SYSTEMS**

- 45.01 Authority and Adoption.
- 45.02 Jurisdiction.
- 45.03 Purpose.
- 45.04 Intent.
- 45.05 Effective Date.
- 45.06 Severability and Non-liability.
- 45.07 Repeal.
- 45.08 Definitions.
[45.09 - 45.10 reserved.]
- 45.11 County Responsibilities; Private Well Location Permits.
- 45.12 County Responsibilities; Existing Private Water Systems.
- 45.13 Cooperation With Other Units.
- 45.14 Administrator.
- 45.15 Qualifications of Administrator.
- 45.16 Powers of Administrator.
- 45.17 Duties of Administrator.
[45.18 - 45.20 reserved.]
- 45.21 Requirements and Permits.
- 45.22 Appeals.
- 45.23 Violations.
- 45.24 Administrative Directives and Orders.
- 45.25 Enforcement Actions.
[45.26 - 45.50 reserved.]
- 45.51 Fee Schedules.
[45.52 - 45.99 reserved.]

45.01 AUTHORITY AND ADOPTION. (1) This ordinance is adopted under the authority of ss. 59.067 and 162.07, Wis. Stats., and Ch. NR 845, Wis. Admin. Code.

(2) This ordinance is subject to the provisions of ss. 59.067 and 162.07, Wis. Stats., and all rules promulgated thereunder regulating private water systems.

(3) This ordinance may not be more lenient nor more stringent than the rules promulgated pursuant to ch. 162, Stats.

(4) Failure to comply with any of the provisions of such regulations shall constitute a violation of this ordinance, actionable according to the penalties provided herein.

(5) This ordinance applies to the entire county and includes cities, towns, villages and sanitary districts in the county.

45.02 JURISDICTION. The provisions of this ordinance shall apply to all private water systems within Dane County.

45.03 PURPOSE. The purpose of this ordinance is to protect the drinking water and groundwater resources of the county by governing access to groundwater through regulating (1) private well location and (2) existing private water systems.

45.04 INTENT. The intent of this ordinance is to regulate (1) the locations of wells and (2) existing water systems and to provide for the administration and enforcement of this ordinance.

45.05 EFFECTIVE DATE. (1) This ordinance shall be effective July 1, 1987 for well location. [HISTORY: (2) rep., OA 29, 1995-96, pub. 12/06/95.]

45.06 SEVERABILITY AND NON-LIABILITY. If any section, provision or portion of this ordinance is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance shall not be affected. The county asserts that there is no liability on the part of the board of supervisors, its agencies or employees for any health hazards or damages that may occur as a result of reliance upon, and compliance with, this ordinance.

45.07 REPEAL. All other county ordinances or parts of ordinances inconsistent or conflicting with this ordinance, to the extent of the inconsistency only, are repealed.

45.08 DEFINITIONS. As used in this ordinance, the following words and phrases have the meanings indicated:

(1) Administrator means the county employee designated by the county executive to issue permits for private well location and to administer ch. NR 812, Wis. Admin. Code, in the county as authorized by the department. The administrator is hereby empowered to delegate his or her authority under this ordinance to any or all of the certified well inspectors employed by the community support and health services department of the County of Dane.

(2) *Central office* means the department's bureau of water supply, located in Madison, which functions as the coordinating authority for the statewide water supply program.

(3) *Community water system* has the meaning designated in s. NR 811.02(7), Wis. Admin. Code.

(4) *County* means the County of Dane.

(5) *County office staff* means county office personnel trained to answer general well location questions and to accept permit applications.

(6) *Delegation level* means the program level, as set forth in s. NR 845.05, Wis. Admin. Code, at which a county is authorized to administer and enforce ch. NR 812, Wis. Admin. Code.

(7) *Department* means the Department of Natural Resources of the State of Wisconsin.

(8) *District office* means the department's office located in Madison, Wisconsin.

(10) *Existing installations* has the meaning designated in ch. NR 812, Wis. Admin. Code.

(11) *Health hazard* means a condition which constitutes:

(a) A violation of ch. NR 812, Wis. Admin. Code, regarding the installation, construction, operation or maintenance of a private well; or

(b) Confirmed bacteriologically unsafe well water quality.

(11m) *Large parcel* means, for the purpose of this ordinance, a parcel having dimensions such that all boundary lines cannot be shown on a sheet of paper not to exceed 8½ inches by 11 inches for a plan diagram that has a scale of 1 inch equals 100 feet or smaller.

(12) *Noncommunity water system* means a public water supply system that serves at least 25 people at least 60 days each year. A noncommunity water system commonly serves a transient population rather than permanent year-round residents. This is typically an individual well serving a restaurant, industry, service station, tavern, motel, campground or church.

(13) *Noncomplying well* means a private water system not in compliance with all provisions of ch. NR 812, Wis. Admin. Code, in effect at the time the well was constructed.

(14) *Person* means an individual, corporation, company, association, cooperative, trust, institution, partnership, state, public utility, sanitary district, municipality or federal agency.

(15) *Personal interest* means having a financial interest in a property or being related by marriage or birth to a person having a financial interest in a property.

(16) *Primary drinking water standards* means those maximum contaminant levels which

represent minimum public health standards set forth in ch. NR 809, Wis. Admin. Code.

(17) *Private water system* means the water collection, storage and treatment facilities and all structures, piping and appurtenances by which water is provided for human consumption by other than community water systems. For the purpose of this ordinance, it includes non-community water systems.

(18) *Private water systems ordinance* means a county ordinance, approved by the department, regulating private water systems at the county's authorized delegation level.

(19) *Private well* means, for the purpose of this ordinance, any drilled, driven point, dug, bored or jetted well constructed for the purpose of obtaining groundwater for potable use, including wells constructed in special well casing depth areas, wells constructed to potable well standards regardless of the intended use of the well and noncommunity wells. It does not include springs, or private or public wells that require written plan approval from the department.

(20) *Public water system* has the meaning designated in ch. NR 812, Wis. Admin. Code.

(21) *Reconstruction* means modifying the original construction of a private well. It includes, but is not limited to, deepening, lining, installing or replacing a screen, underreaming, hydrofracturing and blasting.

(22) *Variance* means an approval issued by the department under ch. NR 812, Wis. Admin. Code, allowing a private water system to vary from ch. NR 812, Wis. Admin. Code, requirements if department approved conditions are met.

(23) *Water system* means the water collection, storage, treatment facilities and all structures, piping and appurtenances by which water is provided.

(24) *Well* has the meaning designated in ch. 162, Wis. Stats.

(25) *Well construction* means the procedures, methods, materials and equipment used during the construction or reconstruction of a private well.

(25m) *Well constructor* means any person who constructs a well.

(26) *Well location permit* means a permit, or comparable registration system, issued by the county which allows the construction or reconstruction of a private well.

[HISTORY: (1) am., Sub. 1 to OA 43, 1987-88, pub. 06/18/88; (9) rep., (12) am. and (25m) cr., OA 29, 1995-96, pub. 12/06/95; (11m) cr. and (19) am., OA 21, 2002-03, pub. 03/04/03.]

[45.09 - 45.10 reserved.]

45.11 COUNTY RESPONSIBILITIES; PRIVATE WELL LOCATION PERMITS.

In accepting Level 1 and Level 5 responsibility from the department, the county hereby agrees to:

(1) Issue permits authorizing the location of new and replacement private wells, including drilled, driven point, dug, bored or jetted wells, or the reconstruction or rehabilitation of existing private wells.

(2) Conduct inspections of wells for which well location permits are required as soon as possible after the well is constructed.

(3) Determine whether the casing height of a permitted well complies with ch. NR 812, Wis. Admin. Code, and that there is a cap or seal on the upper terminus of the well.

(4) Require the abandonment of wells not in service, or that will be taken out of service, if the well is unused, noncomplying or bacteriologically unsafe. The county may require abandonment of a well or drillhole as per s. NR 812.26, Wis. Admin. Code, or which has other chemical compounds, including inorganic and organic compounds, for which state health advisory limits have been issued, after consultation with and approval by the department.

(5) Require upgrading of all inspected private wells that are not in compliance with the minimum private well locational distances in ch. NR 812, Wis. Admin. Code.

[HISTORY: (intro.) am., OA 29, 1995-96, pub. 12/06/95; (4) am., OA 21, 2002-03, pub. 03/04/03; (4) am., OA 10, 2003-04, pub. 09/12/03.]

45.12 COUNTY RESPONSIBILITIES; EXISTING PRIVATE WATER SYSTEMS.

(1) On the request of a property owner or a lending institution, the administrator will conduct an evaluation of the well and collect a water sample for coliform bacteria analysis and, if also requested, collect a nitrate-nitrogen sample from the private water supply.

(2) The administrator will conduct a private water system evaluation whenever any water sample is collected as part of a complaint or problem follow-up, unless directed not to do so by the department.

(3) The administrator shall require upgrading of all inspected private water systems that are not in compliance with the minimum private well location standards of ch. NR 812, Wis. Admin. Code.

[HISTORY: 45.12 am., OA 29, 1995-96, pub. 12/06/95.]

45.13 COOPERATION WITH OTHER UNITS.

The administrator shall cooperate with all other governmental units and agencies in the enforcement of all state and local laws and regulations pertaining to matters in this ordinance.

45.14 ADMINISTRATOR. (1) The county director of environmental health shall act as the Dane County administrator and is assigned the duties of administering the private water system program in accordance with department rules.

(2) The administrator shall have the power and duty to enforce the provisions of this ordinance and all other ordinances, laws and orders of the county and of the State of Wisconsin which relate to the construction, alteration or installation of all private water systems within the county, at the county's authorized delegation level.

45.15 QUALIFICATIONS OF ADMINISTRATOR.

(1) The administrator shall be informed on the principles and practices of private well construction. If the administrator has a personal interest in the construction or modification of any well subject to the provisions of ch. 162, Wis. Stats., ch. NR 812, Wis. Admin. Code, or county ordinance, the county executive shall, after consultation with the department, designate another knowledgeable person to examine the application to issue the required permit(s) and to make the necessary inspections.

45.16 POWERS OF ADMINISTRATOR.

The administrator shall have all the powers necessary to enforce the provisions of this ordinance commensurate with the level or levels of the county's delegated authority, including the following:

(1) In the discharge of his or her duties, the administrator or an authorized assistant may enter any building or property upon presentation of the proper credential, during reasonable hours for the purpose of inspecting the private water system and may request the owner or operator to produce the private well location required under this ordinance. No person may interfere with the administrator or an authorized assistant in the performance of his or her duties. Any person interfering shall be in violation of this ordinance and subject to penalty as provided by this ordinance. If consent to enter property for inspection purposes is denied, the administrator may obtain a special inspection warrant under ss. 66.122 and 66.123, Wis. Stats.

- (2) Order any person owning, operating or installing a private water system to abandon, repair or place it in a complying safe or sanitary condition if the system is found to be unused, bacteriologically unsafe or not in compliance with ch. NR 812, Wis. Admin. Code, or this ordinance.
- (3) Prohibit the use of any new well which is found to be installed, located, constructed, operated or maintained so as to be a health hazard to the users, neighbors or community.
- (4) Appoint assistants to aid in processing applications for well location permits.
- (5) Enforce any or all ordinances applicable to private water systems in accordance with department rules.
- (6) If the administrator of the private water systems ordinance or an authorized assistant determines that the location or construction of a private well does not comply with this ordinance, the administrator or assistant shall post, in a conspicuous place upon the site, a suspension of work order demanding cessation of work. The administrator shall notify the well constructor and property owner in writing of the noncompliance and the nature of the work to be discontinued and corrected, identifying the location and the name of the person issuing the order. It shall be a violation of this ordinance to engage in work at conflict with the terms of an order or to make an unauthorized removal of a posted order. Work may resume on the site only under the direction of the administrator.

[HISTORY: (3) am., OA 29, 1995-96, pub. 12/06/95.]

45.17 DUTIES OF ADMINISTRATOR. It shall be the duty of the administrator to enforce the provisions of this ordinance and perform the following duties commensurate with the level or levels of the county's delegated authority:

- (1) Record all permits, fees, inspections and other official actions and make an annual report thereon to the county board of supervisors.
- (2) Provide the department with copies of all permits and correspondence as required by ch. NR 845, Wis. Admin. Code.
- (3) Inspect the location of new private water systems upon completion.
- (5) Investigate and record all private water system complaints.
- (6) Investigate cases of noncompliance with this ordinance, ch. NR 812, Wis. Admin. Code, and ch. 162, Wis. Stats., issue orders to abate the noncompliance and submit complaints to the corporation counsel for enforcement.
- (7) Refer complaints and cases of noncompliance believed to be or known to be

beyond the scope of the county's delegation level to the department.

- (8) Cooperate with all other governmental units and agencies in the enforcement of all state and local laws and regulations of matters related to this ordinance.
- (9) Assist the department as specified in ch. NR 845, Wis. Admin. Code.
- (10) Refer variance requests and actions which require department approval to the department.
- (11) Advise owners not to drink or use water from private water systems under conditions specified in ch. NR 845, Wis. Admin. Code.
- (12) The administrator, a trained county inspector or county office staff shall be available at the administrator's office for answering questions regarding permit applications and for accepting applications for well location for a minimum of four regularly scheduled hours each working day.

[HISTORY: (4) rep., OA 29, 1995-96, pub. 12/06/95.]

[45.18 - 45.20 reserved.]

45.21 REQUIREMENTS AND PERMITS. (1)

No person may install a private well or water system unless the owner of the property on which the private water system is to be installed holds a valid well location permit issued by the county or has made arrangements to acquire a permit by notifying the administrator prior to construction. Notification shall include providing the administrator with the property owner's name and address, property legal description, proposed starting date and identification of the person who will be obtaining the permit. Unless other arrangements are made in advance, the permit shall be applied for on the first workday following initial construction.

(2) No private water system may be located, installed or operated within the jurisdictional limits of the county without the appropriate permit being obtained in compliance with sub. (1) above and without being in full compliance with the provisions of this ordinance and all other applicable state and local laws and regulations. Permit applications for the location of a well shall be made by the property owner or the property owner's designated agent. Permits shall be issued from the office of the administrator.

(3) The permit application shall be on forms provided by the administrator, and shall include the following:

- (a) A site plan diagram. The plan diagram shall be submitted on paper not less than 8½ by 11 inches and shall include the location of all

structures, septic tanks, septic absorption fields, underground fuel storage tanks, animal yards and other sources of contamination; at least one property line, the property access road and nearest public road. Distances shall be provided by dimension or to scale. For large parcels the plan must include a small scale diagram showing all property lines and adjacent roads in addition to the large scale diagram showing site details.

(b) A copy of any variance granted by the department including proof that the variance has been properly recorded.

(4) Well location permit applications shall be signed by the property owner or the property owner's designated agent. Well location permit applications shall be submitted to the administrator at least 2 working days prior to construction if the property owner or well constructor is interested in receiving information about potential contamination sources such as landfills, underground storage tanks, primary and replacement on-site sewage disposal system areas on the development site and on adjacent properties, and special casing areas. When a well permit application is submitted less than 2 working days prior to construction, the well constructor shall be responsible for maintaining full compliance with all provisions of ch. NR 812, Wis. Admin. Code. The permit application may be submitted by the property owner or the property owner's designated agent and shall be issued to the property owner.

(5)(a) The administrator shall assist applicants by answering questions and providing forms, reviewing applications and approve, disapprove or notify an applicant of the need to seek a variance or special approval from the department or return the permit application due to incompleteness for all private water systems to be constructed or modified in the county, within 2 working days following submission of the permit application. The administrator may reserve final approval or disapproval of a permit which requires department action until the variance or special approval request has been acted on by the department.

(b) If a permit is disapproved because an applicant submits an incomplete or inaccurate application, one-half of the application fee shall be retained by the county. Any reapplication shall require the same fee as a new application.

(7) The administrator shall issue written notice to each applicant whose permit application is disapproved. An application shall be disapproved if the well construction would result in noncompliance with ch. NR 812, Wis. Admin.

Code, or if a well construction variance or special approval request was denied by the department. Each notice shall:

(a) State the specific reason for denial.

(b) Inform the applicant of the right to request a special approval or a variance from the department and the procedures for making such a request.

(8) When construction occurs on a weekend or holiday, notification shall be provided to the administrator on the first workday following the weekend or holiday in the same manner as described in sub. 4 above. Unless other arrangements are made with the administrator, the permit application shall be obtained on the first workday following the weekend or holiday. The well constructor shall be responsible for maintaining full compliance with all provisions of ch. NR 812, Wis. Admin. Code.

(10) A permit transfer application shall be submitted to the county when there is a change of property owner after the application is submitted but before well construction is completed. Failure to submit a transfer application to the county shall invalidate a previously issued permit. The application shall be on a form made available by the administrator.

(11) As soon as the well location permit is received it shall be displayed conspicuously at the well site during construction, for a minimum of seven (7) days following completion of construction or until the well has been inspected by county staff, whichever occurs first.

(12) A well location permit shall be valid for a period of one year or until construction is completed, whichever comes first. If the permit expires, a new application shall be submitted to the administrator. Reapplications shall be evaluated so that construction will comply with the provisions of ch. NR 812, Wis. Admin. Code, in effect at the time of the reapplication. The administrator may require additional inspection and fees for reapplications.

(13) A well location permit is not required nor shall be issued by the county for private water systems requiring written plan approval from the department.

(14) Any permit issued under this section shall be void if any false or inaccurate statement is made or if any inaccuracy is shown on any application for a permit.

(15) No permit may be issued to any property owner or designated agent of the property owner who is in violation of this ordinance, until the

violation has been corrected, unless the permit is to allow correction of the violation.

[HISTORY: (5)(a) and (b) am., Sub. 1 to OA 43, 1987-88, pub. 06/18/88; (1), (2), (4), (5), (7), (8), (10), (11) and (15) am. and (6) and (9) rep., OA 29, 1995-96, pub. 12/06/95; (3) am., OA 21, 2002-03, pub. 03/04/03; (3)(a) am., OA 10, 2003-04, pub. 09/12/03.]

45.22 APPEALS. Persons seeking to appeal a decision of the administrator under this ordinance shall file written letters of appeal with the administrator. The administrator shall place the appeal on the agenda of the county board of health and the appeal shall be given a due process proceeding in accord with s. 46.17. The board shall decide whether to uphold, uphold with modifications or reverse the administrator's decision based upon the terms and intent of this ordinance and of relevant state laws and administrative rules. No appellate decision of the committee shall have the effect of approving an existing or proposed condition that would violate this ordinance or state law or administrative rule. Appeals that may only be approved by the granting of a variance to ch. NR 812, Wis. Admin. Code, shall be referred to the department pursuant to ch. NR 845, Wis. Admin. Code. Board appellate decisions shall be made in writing and shall be filed in the administrator's office. Appeals of decisions made by authorized agents on behalf of the administrator shall be made first to the administrator and then be appealable as provided herein.

45.23 VIOLATIONS. The administrator shall investigate violations of this ordinance and ch. NR 812, Wis. Admin. Code, at the county's authorized delegation level(s), issue orders to abate the violations and submit orders to the corporation counsel for enforcement.

45.24 ADMINISTRATIVE DIRECTIVES AND ORDERS. (1) The administrator, after investigation and a determination that a violation exists, may issue a written field directive. This field directive may consist of a hand written note on an inspection report, or similar paper, identifying the violation that has occurred and assigning a date by which the violation must be corrected, and shall include the inspector's telephone number and office address.

(2) A formal letter may be issued which states the violation, the ordinance, administrative rule or statutory section violated, the date the violation was noted, the name of the inspector who noted

the violation and the date by which the correction must be made.

(3) Upon discovery and after documentation of a violation, the administrator may issue a correction order. The administrator may use a stepped enforcement procedure by issuing a directive before an order or may proceed directly to issuing a correction order. An order shall include the following:

(a) The location of the violation (site).

(b) The name of the parties: owner, permittee, well constructor.

(c) The section of the ordinance and Wisconsin Administrative Code violated.

(d) The date of inspection of the site where the violation occurred.

(e) The name of the person who conducted the inspection which revealed the violation.

(f) The date by which the correction must be completed.

(g) The name of the person who must be contacted regarding subsequent inspection of the site.

(h) A statement that if the order is not complied with, the administrator will refer the violation to the corporation counsel with a recommendation to seek injunctive relief or forfeitures, or both, from the circuit court of Dane County. Orders must be signed by the administrator.

(i) Orders shall be served on the owner or well constructor by certified mail. Where appropriate, the administrator may request the sheriff to serve any particular order. The administrator shall report all orders that have not been complied with to the corporation counsel for enforcement.

[HISTORY: (3)(i) am., Sub. 1 to OA 43, 1987-88, pub. 06/18/88.]

45.25 ENFORCEMENT ACTIONS. (1) An enforcement action may be brought by the corporation counsel against a person or persons for any of the following violations:

(a) Failure to comply with any provision of this ordinance;

(b) Failure to comply with any permit specification or requirement;

(c) Failure to comply with any directive or order issued by the county administrator;

(d) Resisting, obstructing or interfering with the county administrator's or an authorized assistant's actions undertaken pursuant to this ordinance.

(2) The county corporation counsel may, for any violation, seek injunctive relief or forfeitures of not less than \$50.00 nor more than \$200.00, or both, for each violation.

(3) Each day a violation exists is a separate offense.

(4) Any person who has the ability to pay any forfeiture entered against him or her under this ordinance but refuses to do so may be confined in the county jail until such forfeiture is paid, but in no event to exceed thirty (30) days. In determining whether an individual has the ability to pay a forfeiture imposed under this section, all items of income and all assets may be considered regardless of whether or not the income or assets are subject to garnishment, lien or attachment by judgment creditors under the laws of this state.

[HISTORY: (2) am., OA 16, 2000-01, pub. 02/05/01.]

[45.26 - 45.50 reserved.]

45.51 FEE SCHEDULES. (1) The fee for a well siting permit shall be \$79.00.

(2) The fee for a transfer of a well siting permit shall be \$40.00.

(3) The fee for a re-inspection of a well site shall be \$30.00.

[HISTORY: (1) and (2) am., and (4) rep., OA 21, 2002-03, pub. 03/04/03; (1) - (3) am., OA 37, 2003-04, pub. 04/28/04; am., OA 25, 2006-07, pub. 12/29/06, eff. 01/01/07.]

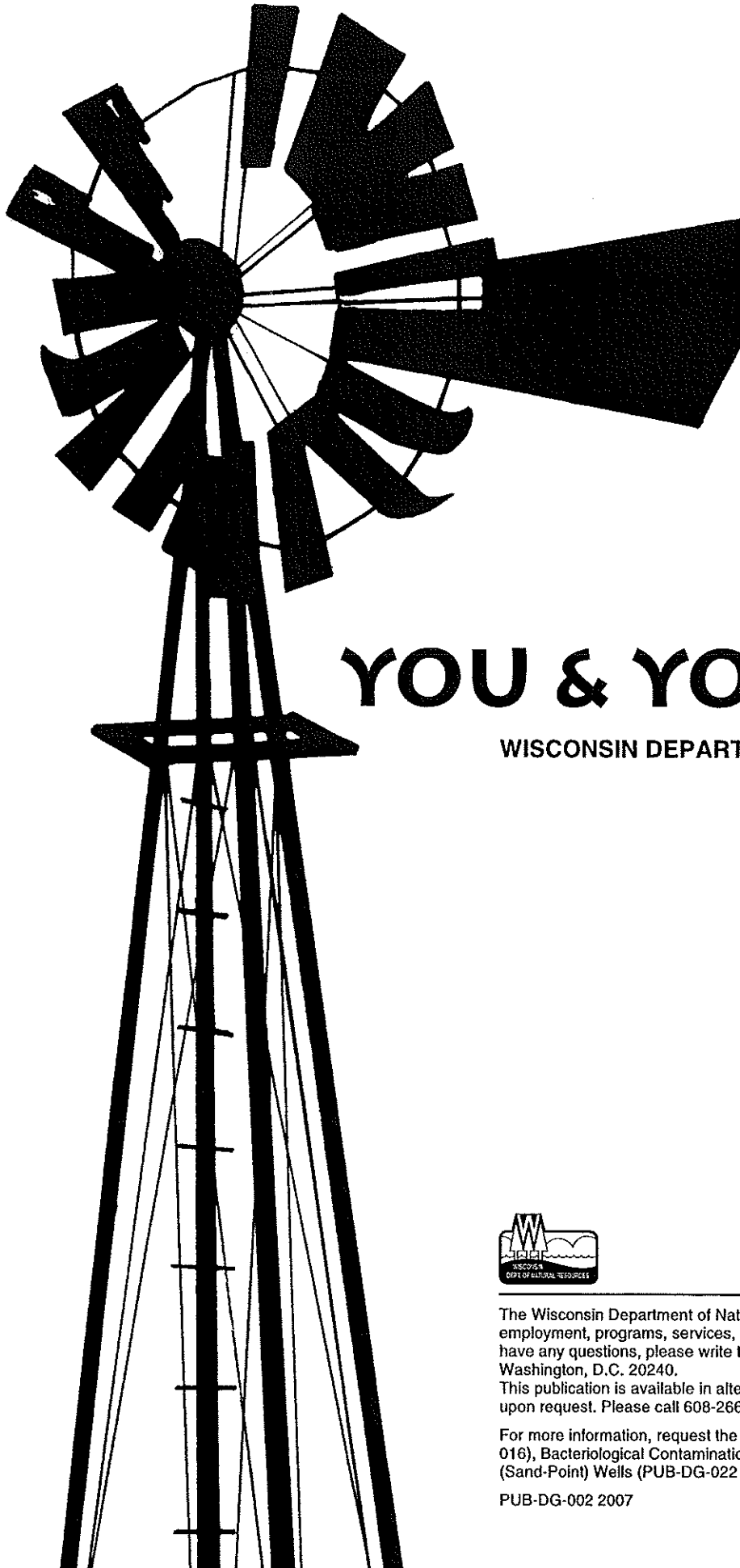
[45.52 - 45.99 reserved.]

END OF CHAPTER

[HISTORY: Ch. 45 cr., OA 4, 1987-88, pub. 09/14/87; references throughout chap. 45 to NR 11.03(2), NR 109, NR 112, NR 145 and NR 145.05 were changed to, respectively, NR 811.02(7), NR 809, NR 812, NR 845 and NR 845.05, OA 29, 1995-96, pub. 12/06/95.]

APPENDIX L

PRIVATE WELLS AND WELL ABANDONMENT INFORMATION



YOU & YOUR WELL

WISCONSIN DEPARTMENT OF NATURAL RESOURCES



The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240.

This publication is available in alternative format (large print, Braille, audio tape, etc) upon request. Please call 608-266-0821 for more information.

For more information, request the following brochures: Well Abandonment (PUB-DG-016), Bacteriological Contamination of Drinking Water (PUB-DG 003), Driven-Point (Sand-Point) Wells (PUB-DG-022 92)

PUB-DG-002 2007



Is there a new well in your future? Perhaps you are building a new home, or are simply considering replacing or upgrading an existing water supply. Whatever the case, here is some information that can help you.

Who regulates water wells?

Wisconsin has had well regulations since 1936, and today is recognized as a national leader in well protection. NR 812, (formerly NR 112), Wis. Adm. Code, is administered by the Department of Natural Resources (DNR). The Well Code is based on the sound premise that if a well and water system is properly located, constructed, installed and maintained the well should provide safe water continuously without the need for treatment. Most county zoning and public health offices have a copy of the Well Code. For information about the code, contact a DNR regional water supply staff person or a licensed well driller or pump installer. Consult with licensed individuals or neighbors for background information on water quality.

When is an approval required prior to construction?

A DNR Notification Number is required prior to construction. You may obtain a DNR Notification Number online at: dnr.wi.gov. Under "Online Services" click on Well Construction Notification and answer the questions. Be sure to print a copy for your records. A second option is that you may also visit one of the 1500 locations throughout Wisconsin where hunting & fishing licenses are sold. You will receive a receipt for your records which displays a DNR Notification Number. Also, some DNR approved county ordinances require that a "well permit" be obtained prior to construction. Check with your county health department or zoning office.

State statutes require that any owner who constructs and/or operates a well or combination of wells on one property that are capable of producing 70 or more gallons per minute, in aggregate, must obtain an approval from the DNR prior to construction.

Approvals are also required for constructing school water systems, wastewater treatment plant water systems and community water systems governed under chapter NR 811 and for the installation of some types of water treatment.

Who can construct wells? Who can install pumps?

Well Driller—Only those persons holding a current well drilling license from the Department of Natural Resources may construct or reconstruct (deepen or install a liner or screen) potable wells.

Pump Installer—Only those persons holding a current pump installer license from the

Department of Natural Resources may install and replace pumps, pitless adapters and accessory piping and pressure tanks on both drilled and driven point potable wells.

Exceptions—A well drilling license is not required for constructing driven point wells.

A license is not required for a person constructing a well or installing a pump on property owned and occupied by him or her. State law requires, however, that no matter who does the work, it must comply with the State Private Well Code (ch. NR 812), and a Well Construction Report must be submitted to DNR.

A license is not required for an individual constructing a nonpotable well or installing a pump in a nonpotable well, however the installation must comply with the well code.

What are the responsibilities of a well constructor to the owner?

The well must be constructed or reconstructed in compliance with ch. NR 812, and upon completion of a well construction or reconstruction, a well driller or point driver is required to:

1. Test pump and flush the well.
2. Disinfect the well.
3. Collect a water sample for a bacteriological test; submit the sample to a laboratory certified for bacteriological testing; and provide a report of the results to the owner within 10 days of receiving the water test results. (The DNR recommends that the water also be tested for nitrates.)
4. Provide the owner or his agent with a copy of a Well Construction Report, that describes how the well was constructed, within 30 days of completion of the well. The report assigns a unique number to the well.

The water sample test results and well construction report must also be sent to the Department.

What are the responsibilities of a pump installer to the owner?

A pump installer must install the pump, the pitless adapter, pressure tank and sample faucet in compliance with the Well Code, disinfect the

pump and distribution system after installation, flush it, take a water sample for bacteriological analysis (as described in #3 above) and report the results to the owner.

The pump installer may delegate the sample collection to the owner or another agent, by leaving the sample bottle, instructions and form, but the pump installer is still responsible for the sample collection.

Some private well location requirements (from NR 812)

Always ensure that your well is located upslope and as far as possible from potential sources of contamination, but at least:

- ◆ 8 feet from an approved gravity building sewer pipe or 25 feet from building sewers made of other non-approved materials or a pressurized building sewer.
- ◆ 8 feet from a swimming pool.
- ◆ 100 feet from any buried petroleum tank, except that only 25 feet of separation is required for a buried fuel oil tank if the tank is used only for private residential heating.
- ◆ 25 feet from a septic or holding tank, or from a laundry or wastewater sump.
- ◆ 25 feet from the high water mark of a lake, pond or stream.
- ◆ 50 feet from a privy, dry well, soil absorption system ("drainfield") or mound system.
- ◆ 50 feet from a municipal collector sewer.
- ◆ 50 feet from an animal yard or animal shelter
- ◆ 250 feet from a sludge disposal area, a salvage yard or a salt storage area.
- ◆ 250 feet from an absorption, storage, retention or treatment pond; ridge and furrow system; or spray irrigation waste disposal site.
- ◆ 1,200 feet from any existing, proposed or abandoned landfill site.

NOTE: This list is not complete. Consult NR 812 or the DNR for specific requirements. Figures A and B show well location requirements.

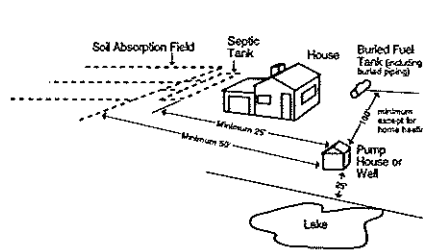


Figure A Common separation distances on residential lots

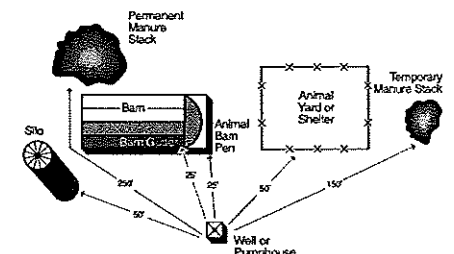


Figure B Common separation distances on farms

Some general DOs and DON'Ts

- DO** Make certain the well constructor extends the well casing pipe at least 12 inches above the finished ground surface and two feet above a floodplain. (Future landscaping must be taken into account.)
- DO** Properly install a vermin-proof well cap and electrical conduit to prevent entrance of insects into the well.
- DO** Make certain any underground connection to the well is made with an approved pitless adapter or unit. Properly installed, this will provide a water tight connection to the well and allow easy pump repair or well cleaning.
- DO** Completely fill and seal any unused wells (a DNR brochure on well abandonment is available).
- DO** Collect a water sample for bacteriological analysis at least once each year and anytime you notice a change in taste, odor, color or appearance. Also sample for nitrate if the water is to be used for an infant or a pregnant woman.
- DO** Construct your driven point well to a depth of at least 25 feet (not including the screen), or, 10 feet below the static water level, whichever is the greater depth.
- DO** Install an accessible downward-facing, non-threaded sampling faucet between the pump and the pressure tank at least 12 inches above the floor to allow for sampling water directly from the well.
- DO** Use only code-complying well casing pipe. (see NR 812.17).

DON'T Install a well in the basement or in a crawl space of your home. (The well would not be accessible for repair.) If the basement is of the walk-out type, installation is permissible. (Offset pumps may be installed in dry basements.)

DON'T Construct a well, pump, or pressure tank pit. A well may not terminate in a pit or an alcove. The DNR *does not* allow pits because of the potential for flooding and subsequent contamination of the water supply. (Pitless adapters have made pits obsolete.)

DON'T Install unprotected buried suction line between a well and a pump or pressure tank in a basement. If the pipe were to develop a hole or crack, it could allow surface water to get into the water supply. Instead use a pitless adapter or unit with a pressurized piping arrangement. Do not install a non-pressure conduit to enclose the suction piping between a well and a basement.

DON'T Use a well for disposal or drainage of solid wastes, sewage, surface water or wastewater. This can contaminate an aquifer.

DON'T Develop a spring as a drinking water source without obtaining advance approval from DNR. The DNR *does not* recommend the use of a spring as a source of water for drinking.

Types of acceptable pump installations

Offset Pump Installations (pump usually installed offset from the well in basement of house) with a seal-cross fitting or a flange adapter and pressurized, concentric discharge. Connections should be made below frost depth to eliminate the potential for freezing.

1. Offset shallow-well pump for driven point well (Figure C)
2. Packer jet assembly for offset for driven point well pump (Figure D)

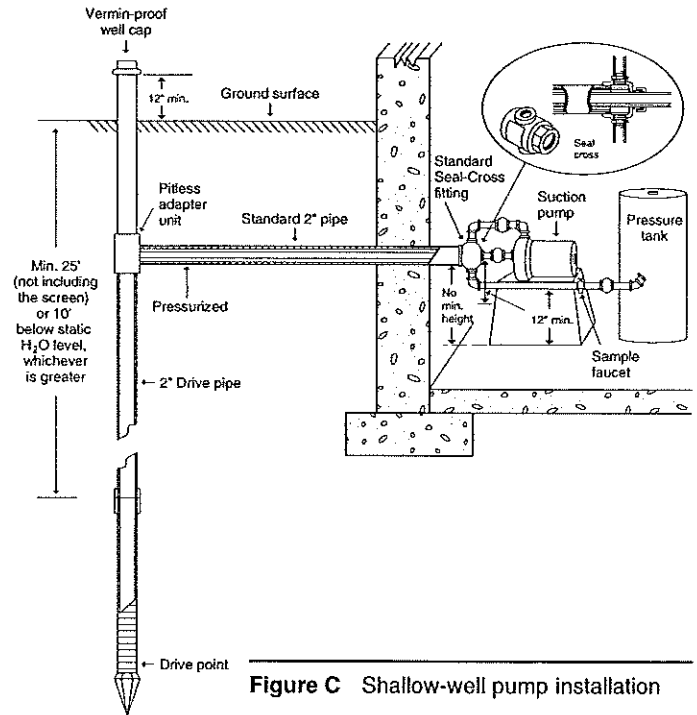


Figure C Shallow-well pump installation

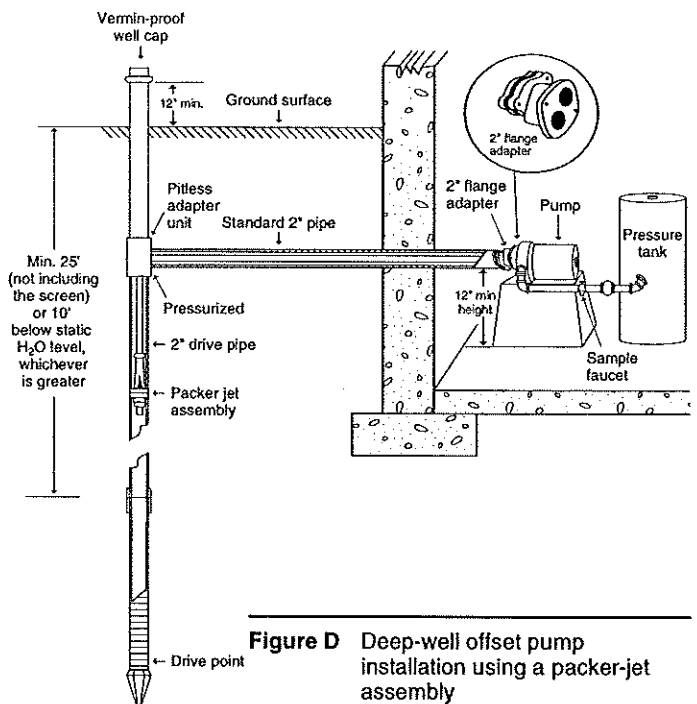


Figure D Deep-well offset pump installation using a packer-jet assembly

Submersible Pumps installed within well, below water level with:

1. An above-ground discharge pipe enclosed in a heated shelter (Figure E); or
2. Approved above-ground discharge unit, directed to an inside pressure tank (Figure F); or
3. A below-ground discharge with approved pitless adapter or pitless unit (Figure G); or
4. A buried pitless receiver tank (Figure H).

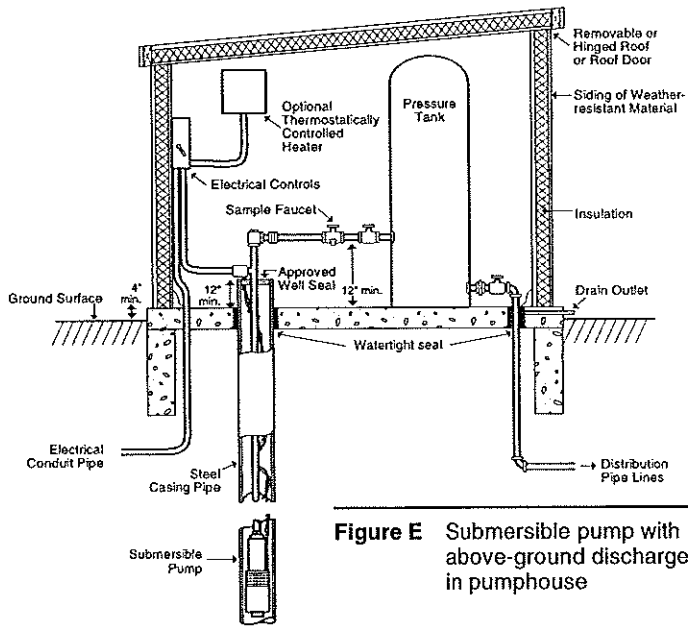


Figure E Submersible pump with above-ground discharge in pumphouse

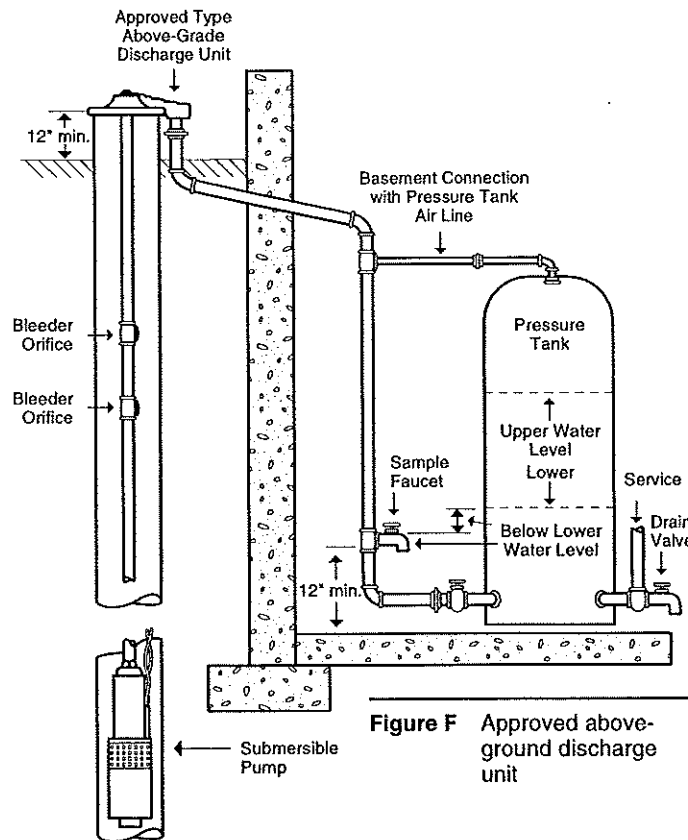


Figure F Approved above-ground discharge unit

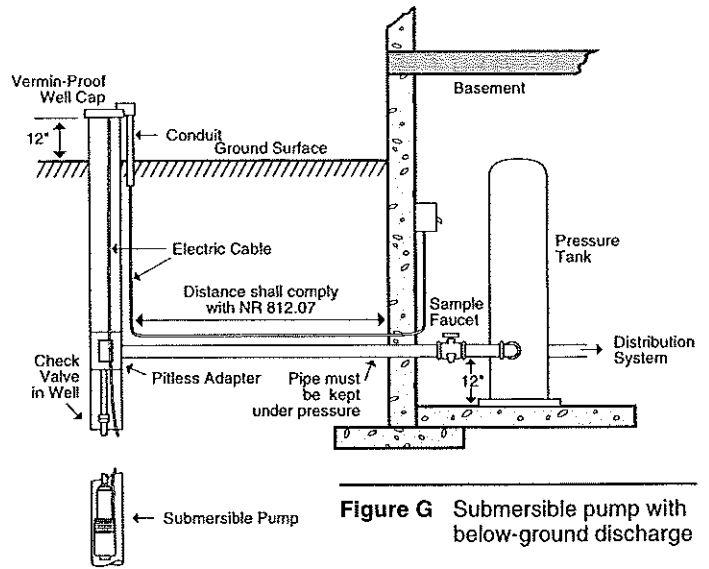


Figure G Submersible pump with below-ground discharge

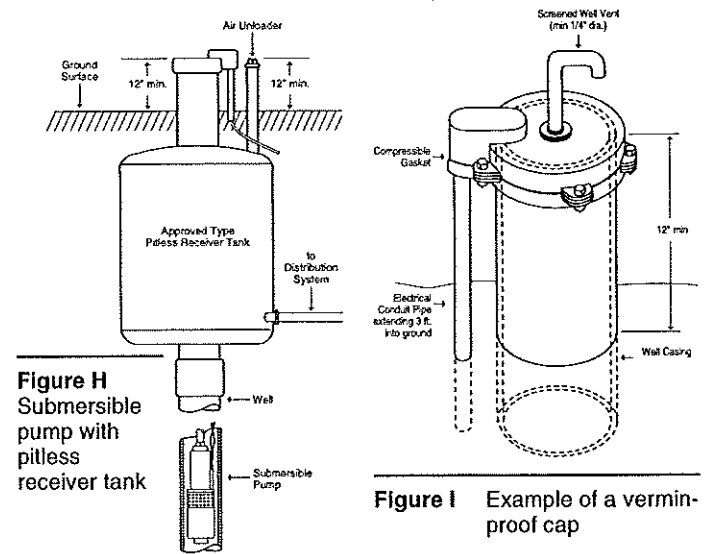


Figure H Submersible pump with pitless receiver tank

Figure I Example of a vermin-proof cap

Well Code requirements have been simplified for this pamphlet.

For specific details on the Wisconsin Well Code (NR 812), look on our website at: dnr.wi.gov/org/water/dwg/code.htm. If you have questions on the specifics of NR 812, please contact staff at one of the following offices.

Northern Region
810 W. Maple Street
Spooner, WI 54801
(715) 635-2101

Northeast Region
2984 Shawano Avenue
P.O. Box 10448
Green Bay, WI 54307-0448
(920)662-5100

Central Office
101 S. Webster
P.O. Box 7921
Madison, WI 53707-7921
(608) 268-0821

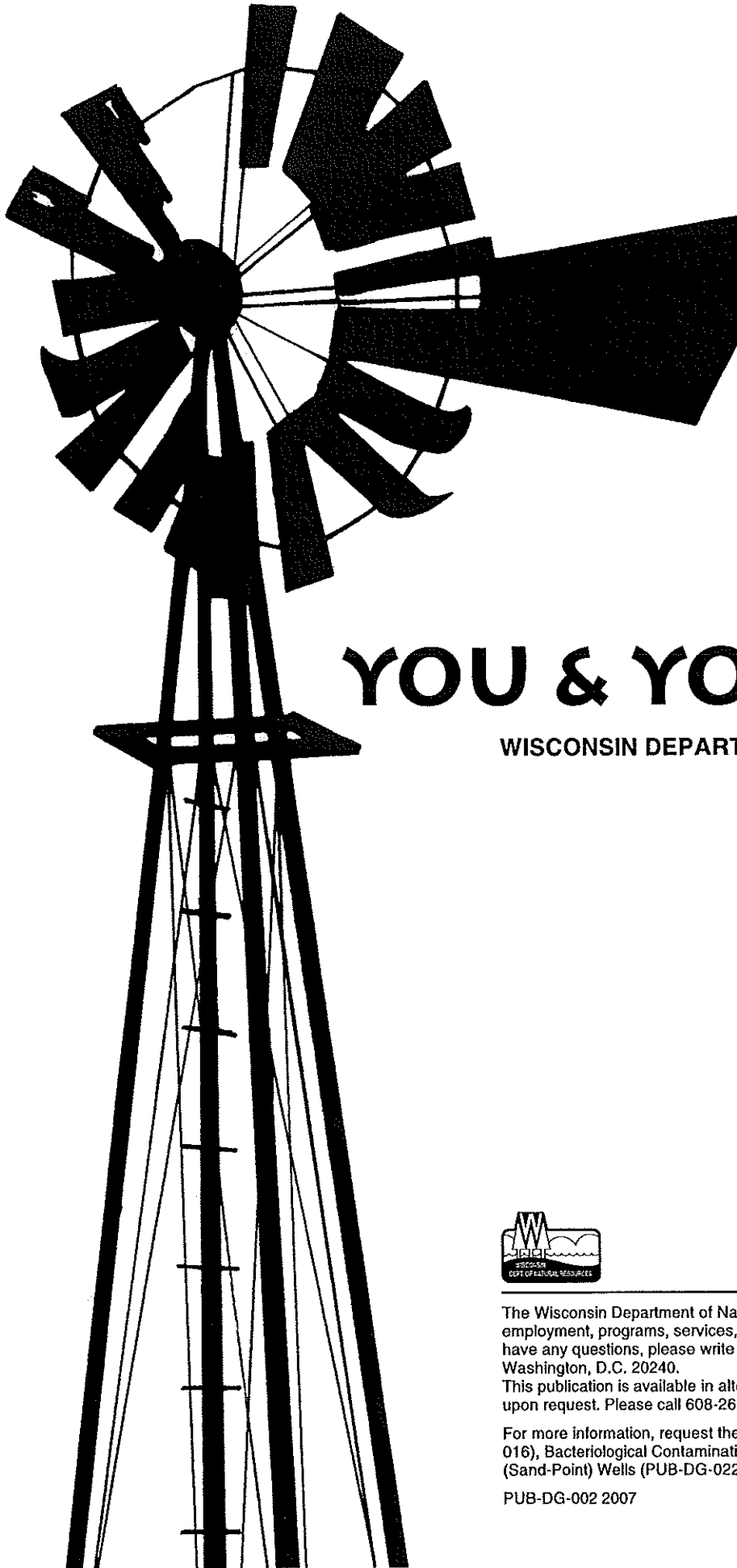
or
107 Sulliff Avenue
Rhineland, WI 54501
(715) 365-8900

South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711
(608) 275-3266

West Central Region
1300 W. Clairemont
PO Box 4001
Eau Claire, WI 54702-4001
(715) 839-3700

Southeast Region
2300 N. Dr. Martin Luther
King, Jr. Drive
Milwaukee, WI 53212
(414) 263-8500





YOU & YOUR WELL

WISCONSIN DEPARTMENT OF NATURAL RESOURCES



The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240.

This publication is available in alternative format (large print, Braille, audio tape, etc) upon request. Please call 608-266-0821 for more information.

For more information, request the following brochures: Well Abandonment (PUB-DG-016), Bacteriological Contamination of Drinking Water (PUB-DG 003), Driven-Point (Sand-Point) Wells (PUB-DG-022 92)

PUB-DG-002 2007



Is there a new well in your future? Perhaps you are building a new home, or are simply considering replacing or upgrading an existing water supply. Whatever the case, here is some information that can help you.

Who regulates water wells?

Wisconsin has had well regulations since 1936, and today is recognized as a national leader in well protection. NR 812, (formerly NR 112), Wis. Adm. Code, is administered by the Department of Natural Resources (DNR). The Well Code is based on the sound premise that if a well and water system is properly located, constructed, installed and maintained the well should provide safe water continuously without the need for treatment. Most county zoning and public health offices have a copy of the Well Code. For information about the code, contact a DNR regional water supply staff person or a licensed well driller or pump installer. Consult with licensed individuals or neighbors for background information on water quality.

When is an approval required prior to construction?

A DNR Notification Number is required prior to construction. You may obtain a DNR Notification Number online at: dnr.wi.gov. Under "Online Services" click on Well Construction Notification and answer the questions. Be sure to print a copy for your records. A second option is that you may also visit one of the 1500 locations throughout Wisconsin where hunting & fishing licenses are sold. You will receive a receipt for your records which displays a DNR Notification Number. Also, some DNR approved county ordinances require that a "well permit" be obtained prior to construction. Check with your county health department or zoning office.

State statutes require that any owner who constructs and/or operates a well or combination of wells on one property that are capable of producing 70 or more gallons per minute, in aggregate, must obtain an approval from the DNR prior to construction.

Approvals are also required for constructing school water systems, wastewater treatment plant water systems and community water systems governed under chapter NR 811 and for the installation of some types of water treatment.

Who can construct wells? Who can install pumps?

Well Driller—Only those persons holding a current well drilling license from the Department of Natural Resources may construct or reconstruct (deepen or install a liner or screen) potable wells.

Pump Installer—Only those persons holding a current pump installer license from the

Department of Natural Resources may install and replace pumps, pitless adapters and accessory piping and pressure tanks on both drilled and driven point potable wells.

Exceptions—A well drilling license is not required for constructing driven point wells.

A license is not required for a person constructing a well or installing a pump on property owned and occupied by him or her. State law requires, however, that no matter who does the work, it must comply with the State Private Well Code (ch. NR 812), and a Well Construction Report must be submitted to DNR.

A license is not required for an individual constructing a nonpotable well or installing a pump in a nonpotable well, however the installation must comply with the well code.

What are the responsibilities of a well constructor to the owner?

The well must be constructed or reconstructed in compliance with ch. NR 812, and upon completion of a well construction or reconstruction, a well driller or point driver is required to:

1. Test pump and flush the well.
2. Disinfect the well.
3. Collect a water sample for a bacteriological test; submit the sample to a laboratory certified for bacteriological testing; and provide a report of the results to the owner within 10 days of receiving the water test results. (The DNR recommends that the water also be tested for nitrates.)
4. Provide the owner or his agent with a copy of a Well Construction Report, that describes how the well was constructed, within 30 days of completion of the well. The report assigns a unique number to the well.

The water sample test results and well construction report must also be sent to the Department.

What are the responsibilities of a pump installer to the owner?

A pump installer must install the pump, the pitless adapter, pressure tank and sample faucet in compliance with the Well Code, disinfect the

pump and distribution system after installation, flush it, take a water sample for bacteriological analysis (as described in #3 above) and report the results to the owner.

The pump installer may delegate the sample collection to the owner or another agent, by leaving the sample bottle, instructions and form, but the pump installer is still responsible for the sample collection.

Some private well location requirements (from NR 812)

Always ensure that your well is located upslope and as far as possible from potential sources of contamination, but at least:

- ◆ 8 feet from an approved gravity building sewer pipe or 25 feet from building sewers made of other non-approved materials or a pressurized building sewer.
- ◆ 8 feet from a swimming pool.
- ◆ 100 feet from any buried petroleum tank, except that only 25 feet of separation is required for a buried fuel oil tank if the tank is used only for private residential heating.
- ◆ 25 feet from a septic or holding tank, or from a laundry or wastewater sump.
- ◆ 25 feet from the high water mark of a lake, pond or stream.
- ◆ 50 feet from a privy, dry well, soil absorption system ("drainfield") or mound system.
- ◆ 50 feet from a municipal collector sewer.
- ◆ 50 feet from an animal yard or animal shelter
- ◆ 250 feet from a sludge disposal area, a salvage yard or a salt storage area.
- ◆ 250 feet from an absorption, storage, retention or treatment pond; ridge and furrow system; or spray irrigation waste disposal site.
- ◆ 1,200 feet from any existing, proposed or abandoned landfill site.

NOTE: This list is not complete. Consult NR 812 or the DNR for specific requirements. Figures A and B show well location requirements.

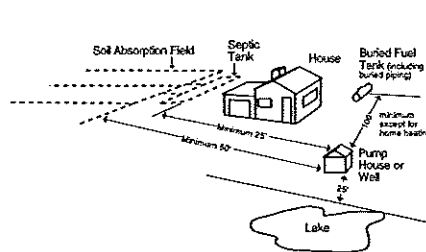


Figure A Common separation distances on residential lots

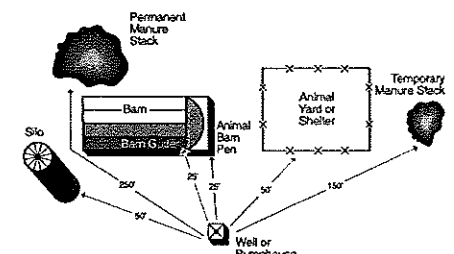


Figure B Common separation distances on farms

Some general DOs and DON'Ts

JO Make certain the well constructor extends the well casing pipe at least 12 inches above the finished ground surface and two feet above a floodplain. (Future landscaping must be taken into account.)

DO Properly install a vermin-proof well cap and electrical conduit to prevent entrance of insects into the well.

DO Make certain any underground connection to the well is made with an approved pitless adapter or unit. Properly installed, this will provide a water tight connection to the well and allow easy pump repair or well cleaning.

DO Completely fill and seal any unused wells (a DNR brochure on well abandonment is available).

DO Collect a water sample for bacteriological analysis at least once each year and anytime you notice a change in taste, odor, color or appearance. Also sample for nitrate if the water is to be used for an infant or a pregnant woman.

DO Construct your driven point well to a depth of at least 25 feet (not including the screen), or, 10 feet below the static water level, whichever is the greater depth.

DO Install an accessible downward-facing, non-threaded sampling faucet between the pump and the pressure tank at least 12 inches above the floor to allow for sampling water directly from the well.

DO Use only code-complying well casing pipe. (see NR 812.17).

DON'T Install a well in the basement or in a crawl space of your home. (The well would not be accessible for repair.) If the basement is of the walk-out type, installation is permissible. (Offset pumps may be installed in dry basements.)

DON'T Construct a well, pump, or pressure tank pit. A well may not terminate in a pit or an alcove. The DNR *does not* allow pits because of the potential for flooding and subsequent contamination of the water supply. (Pitless adapters have made pits obsolete.)

DON'T Install unprotected buried suction line between a well and a pump or pressure tank in a basement. If the pipe were to develop a hole or crack, it could allow surface water to get into the water supply. Instead use a pitless adapter or unit with a pressurized piping arrangement. Do not install a non-pressure conduit to enclose the suction piping between a well and a basement.

DON'T Use a well for disposal or drainage of solid wastes, sewage, surface water or wastewater. This can contaminate an aquifer.

DON'T Develop a spring as a drinking water source without obtaining advance approval from DNR. The DNR *does not* recommend the use of a spring as a source of water for drinking.

Types of acceptable pump installations

Offset Pump Installations (pump usually installed offset from the well in basement of house) with a seal-cross fitting or a flange adapter and pressurized, concentric discharge. Connections should be made below frost depth to eliminate the potential for freezing.

1. Offset shallow-well pump for driven point well (Figure C)
2. Packer jet assembly for offset for driven point well pump (Figure D)

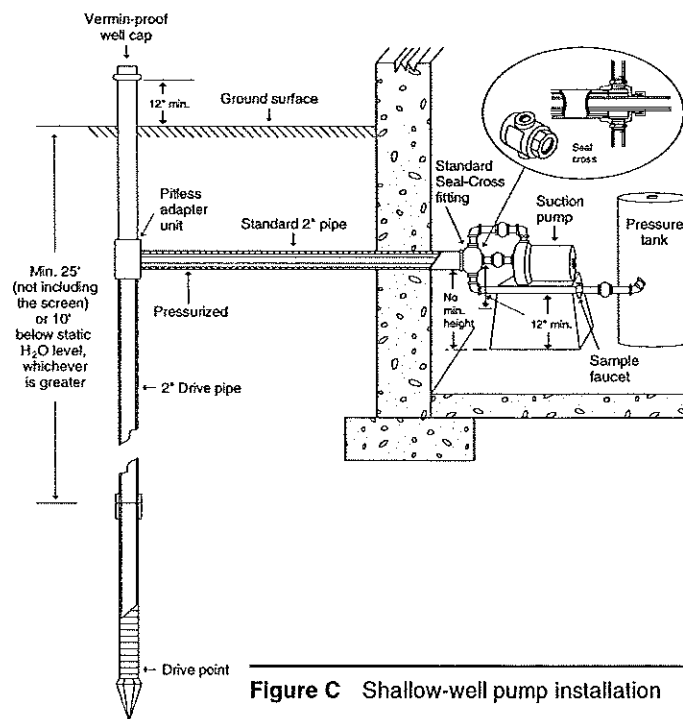


Figure C Shallow-well pump installation

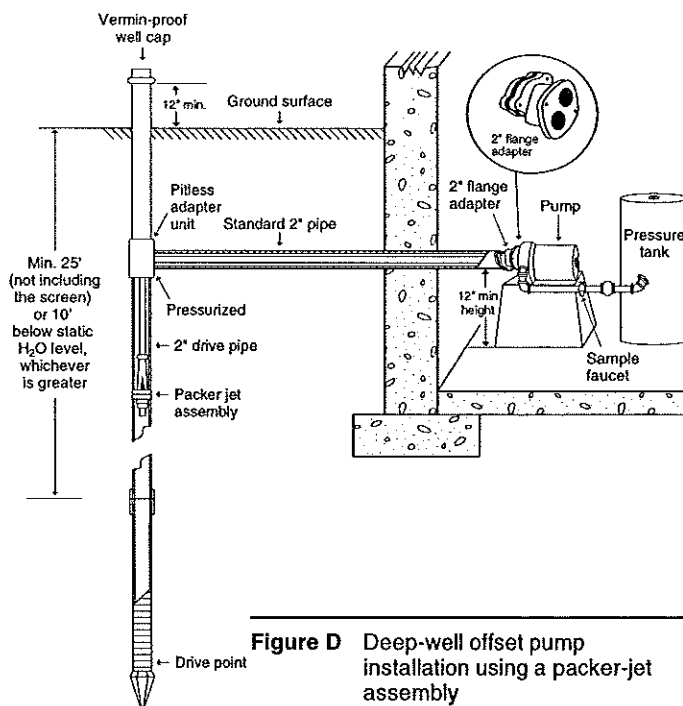


Figure D Deep-well offset pump installation using a packer-jet assembly

Submersible Pumps installed within well, below water level with:

1. An above-ground discharge pipe enclosed in a heated shelter (Figure E); or
2. Approved above-ground discharge unit, directed to an inside pressure tank (Figure F); or
3. A below-ground discharge with approved pitless adapter or pitless unit (Figure G); or
4. A buried pitless receiver tank (Figure H).

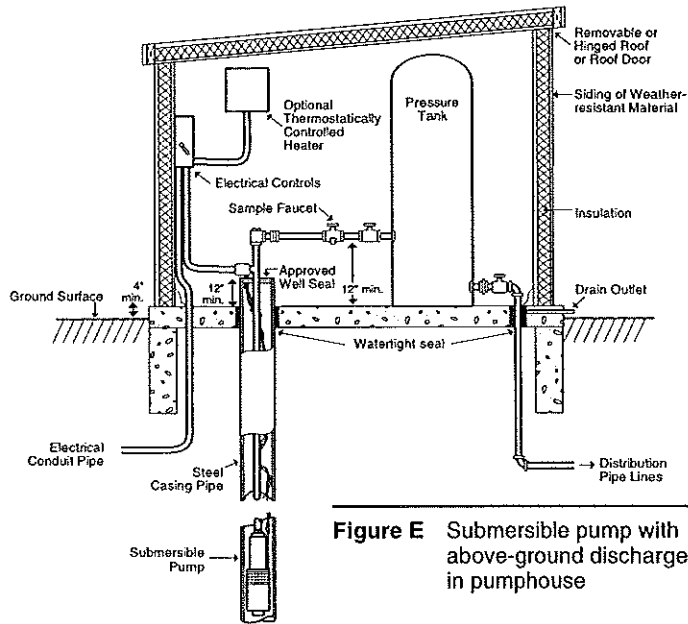


Figure E Submersible pump with above-ground discharge in pumphouse

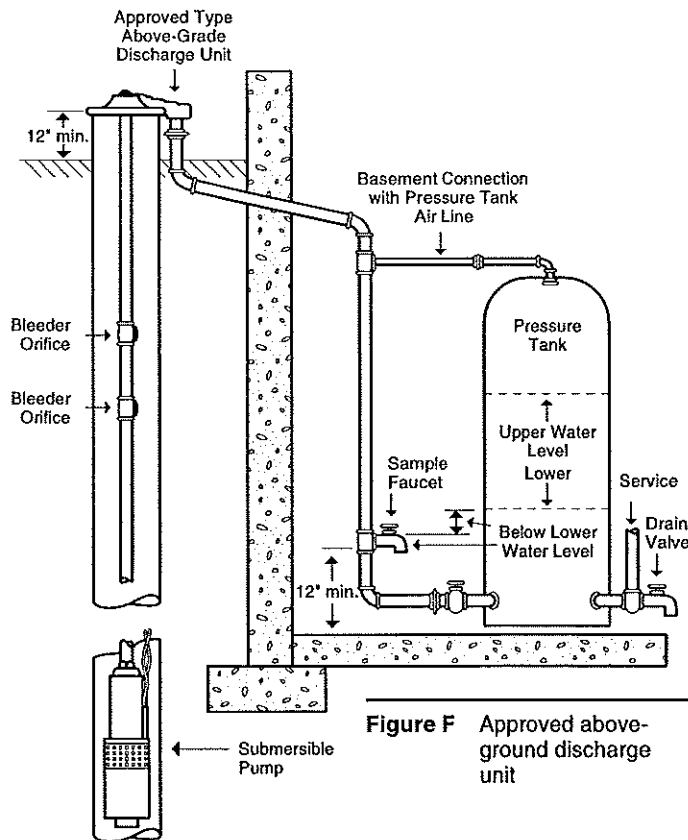


Figure F Approved above-ground discharge unit

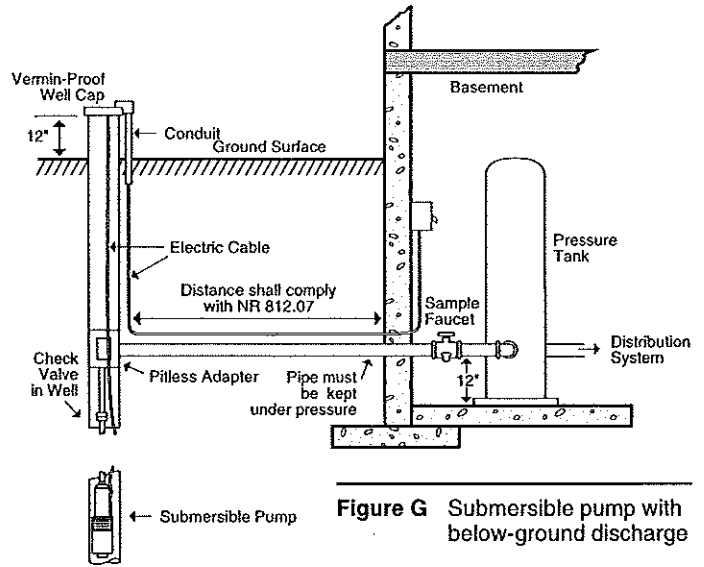


Figure G Submersible pump with below-ground discharge

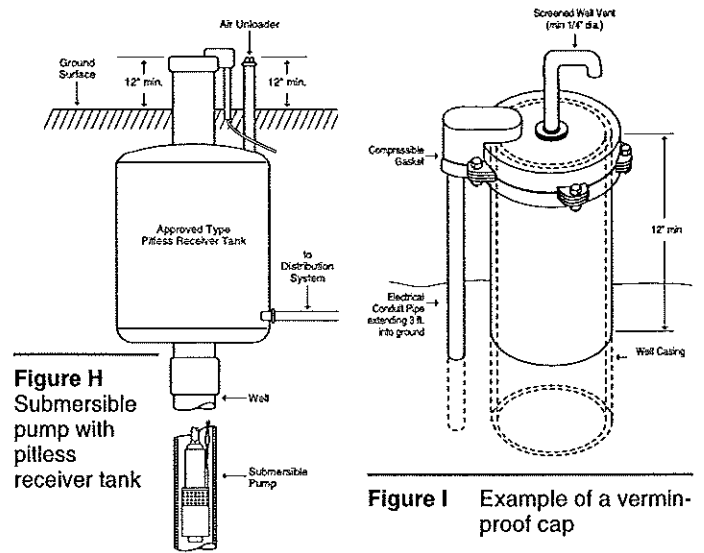


Figure H Submersible pump with pitless receiver tank

Figure I Example of a vermin-proof cap

Well Code requirements have been simplified for this pamphlet.

For specific details on the Wisconsin Well Code (NR 812), look on our website at: dnr.wi.gov/org/water/dwg/code.htm. If you have questions on the specifics of NR 812, please contact staff at one of the following offices.

Northern Region
810 W. Maple Street
Spooner, WI 54801
(715) 635-2101

Northeast Region
2984 Shawano Avenue
P.O. Box 10448
Green Bay, WI 54307-0448
(920)662-5100

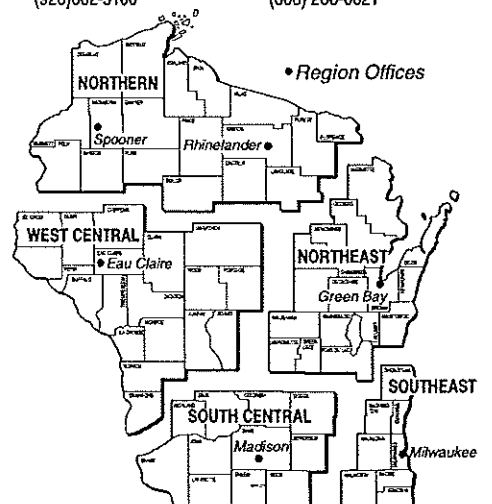
Central Office
101 S. Webster
P.O. Box 7921
Madison, WI 53707-7921
(608) 266-0821

or
107 Suttiff Avenue
Rhineland, WI 54501
(715) 365-8900

South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711
(608) 275-3266

West Central Region
1300 W. Clairemont
PO Box 4001
Eau Claire, WI 54702-4001
(715) 839-3700

Southeast Region
2300 N. Dr. Martin Luther
King, Jr. Drive
Milwaukee, WI 53212
(414) 263-8500



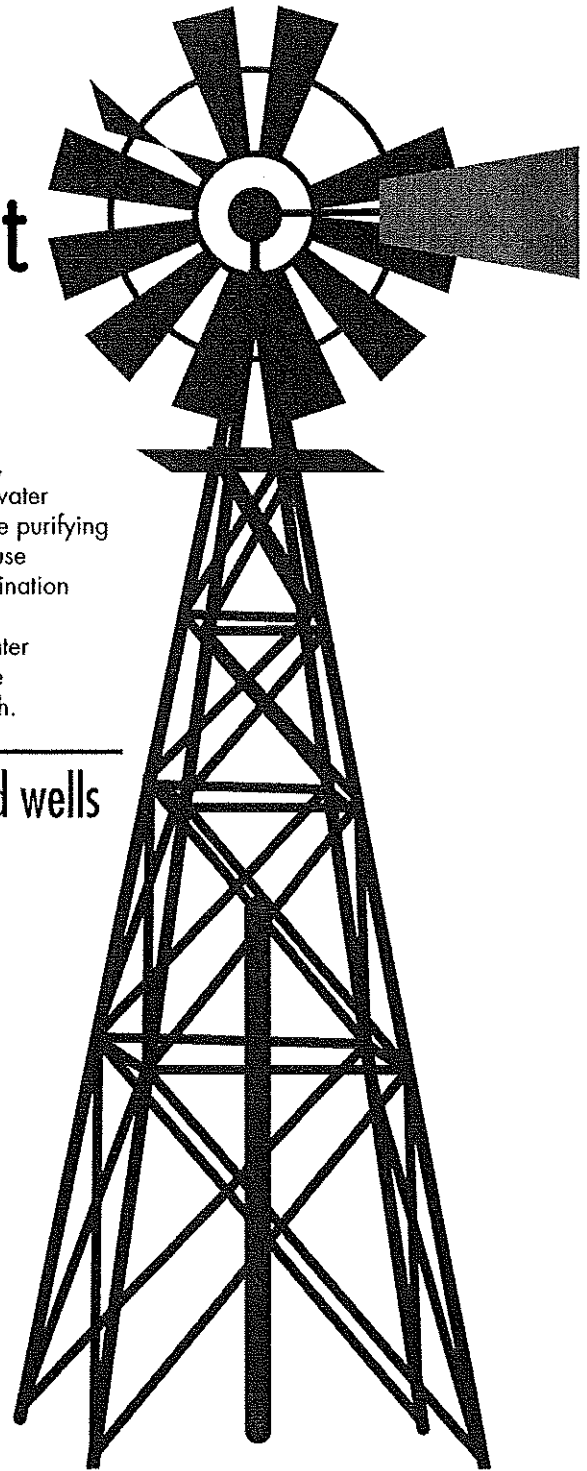
Answers to Your Questions on Well Abandonment

Why are unused and improperly abandoned wells threats to groundwater?

Unused and improperly abandoned wells are a significant threat to groundwater quality. If not properly filled with impermeable material, abandoned wells can directly channel contaminated surface or soil water into groundwater. Water that gets into abandoned wells bypasses the purifying action that normally takes place in the upper layers of the soil. Because groundwater flows in soil and bedrock formations (aquifers), contamination that enters old wells can move to nearby drinking water wells. Many thousands of improperly abandoned wells are threatening groundwater in Wisconsin. Whenever you see an old deteriorating windmill in the countryside, there is likely an improperly abandoned well underneath.

How can unused and improperly abandoned wells threaten groundwater and personal safety?

- Contaminated surface water can enter a well if the casing pipe does not extend high enough above the ground surface and the well cap has been broken or removed; or if there are cracks or holes in the casing due to damage or deterioration with age.
- Contaminated surface water can seep down along the casing pipe of an improperly constructed well.
- Wells in low areas are sometimes illegally left open to drain surface water from heavy rainfall or snowmelt.
- Open wells offer tempting disposal receptacles for liquid and solid wastes. The disposal of any pollutant or wastewater in a well is prohibited by State codes.
- Large-diameter open wells pose safety hazards for small children and animals. Several years ago a small boy fell into an unfinished well in Italy and died after a valiant rescue attempt. In 1987, a small girl fell into a well in Midland, Texas and was rescued but only after three days of hard work. In 1987, an 11-year old boy fell through a wooden cover into an old dug well on a farm in Missouri and drowned. Although such occurrences are infrequent, they should never be allowed to happen.
- Improperly abandoned flowing wells can be a nuisance and may lower artesian pressure in neighboring wells.



When should wells be properly abandoned?

Wells must be properly filled when they are removed from service. Wells are removed from service for a number of reasons, including construction of a replacement well, destruction of the building being served, failure of the well to produce safe water, failure of the well to meet the State Well Code (NR 812) standards, or when a community water system is extended into an area formerly served by individual private wells.

After wells are removed from service they are seldom used. They often get forgotten after a property transfer and, in time, may get covered by a parking lot or a building. Sometimes in this way all traces of old wells disappear. Such wells can cause groundwater contamination. In one recent case in Wisconsin, a house burned down over an improperly abandoned well located in the basement. The well provided a point of entrance into the aquifer and allowed ash-laden water to contaminate the neighbor's well.

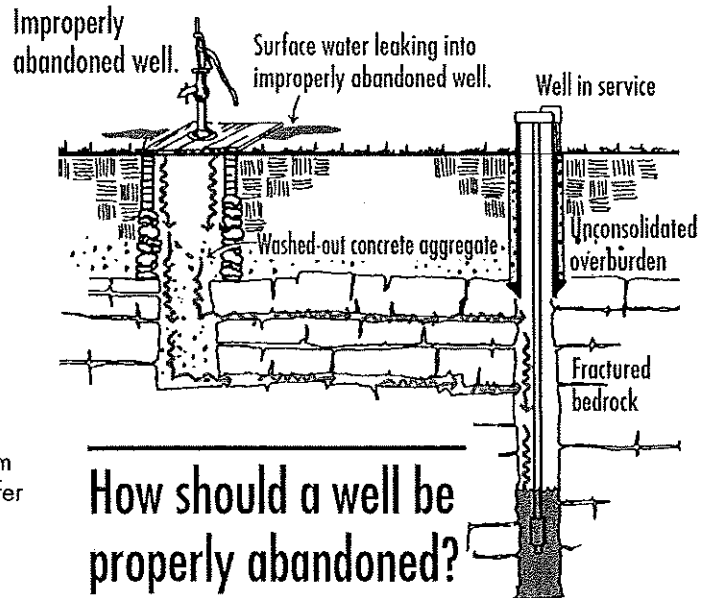
In another case, a buried well having only a stone set on the top of the open casing caused severe contamination of the drinking water pumped from another well on the same property. The unused well was near both an animal yard and a sewage absorption field and thus provided direct access for the entrance of contamination into the groundwater.

After a well gets covered, it is very difficult, if not impossible, to find it and determine if it's causing contamination. When new wells are constructed in an area with improperly abandoned wells, they may have to be cased much deeper or to alternate aquifers to provide safe water. These problems can be avoided by the proper filling of unused wells.

Chapters NR 811 and NR 812, Wis. Adm. Codes, require proper abandonment, by permanent filling, of unused wells.

Who can perform proper well abandonment work?

Although current law allows any person to do well abandonment work, the DNR recommends that licensed Well Drillers and Pump Installers be hired to fill wells. These contractors are familiar with correct abandonment materials and procedures, are knowledgeable about wells, and have access to the necessary equipment. It's usually more economical to fill an old unused well at the same time the Well Driller is at the site constructing a new well.



How should a well be properly abandoned?

First determine the construction and condition of the well

The first step in proper abandonment is to obtain information on the construction and condition of the well. Construction information is best obtained from the Well Construction Report on file with the Wisconsin Geological and Natural History Survey (WGNHS) or with DNR. The records date back to 1936.

IMPORTANT INFORMATION TO KNOW WHEN REQUESTING A WELL CONSTRUCTION REPORT:

To request a report, you must furnish a legal description in terms of 1/4 - 1/4 Section, 1/4 - Section, Section, Township and Range designations of the property where the well is located. It's also helpful if you can obtain the name of the well driller, the property owner or agent at the time of drilling, the approximate date of construction and the street address or lot #. The chances of finding the report are greater with more information. Order forms and other information about well construction reports are available on the WGNHS (Wisconsin Geological & Natural History Survey) uwex.edu/wgnhs/well.htm.

Specific forms include:

- ◆ To request a Well Construction Report for a specific well uwex.edu/wgnhs/pdfs/wcrpdf/private_wells.pdf.
- ◆ To request a Well Construction Report for an area uwex.edu/wgnhs/pdfs/wcrpdf/wellord2.pdf.

A site inspection will help you locate the well and see what condition it is in. You should determine if the well is easily accessible in the yard; or if it

is in a pit or a basement. It's possible the top of the well is buried in the yard, in which case you may be able to find it using a metal detector.

During your inspection you can also check to see if the pump has been removed.

Clearing and filling the well

Before the well is filled, the pump and its associated piping, any ungrouted liner pipe, or other obstacles must be removed from the well. If debris has been thrown in the well, a Well Driller may have to first drill it out. After the well is cleared, it must be filled from the bottom up with neat cement grout, sand-cement grout, concrete or bentonite chips. Well Drillers and Pump Installers are familiar with these materials and know how to calculate and place the proper volume of material. If you choose to fill the well yourself, contact the DNR for the proper mixture of materials and methods for determining material volume.

The filling material must be placed through a conductor (tremie) pipe extending to the bottom of the well except when approved bentonite chips are used according to DNR instructions (see pages 4 and 5). Use of a conductor pipe will assure that the filling material won't be diluted by the water in the well and will not plug in the well part-way down. The bottom of the conductor pipe must be kept submerged in the material during filling, but may be pulled as the well is being filled.

Except when using bentonite chips, do not just pour or dump the filling material into the well without the use of a conductor pipe because this could cause the filling material to become diluted or bridge in the well part-way down. If dilution occurs, the fill material will not be impermeable. If bridging occurs, the well will only get partially filled. An improperly filled well can be as much a threat to groundwater quality as an open well.

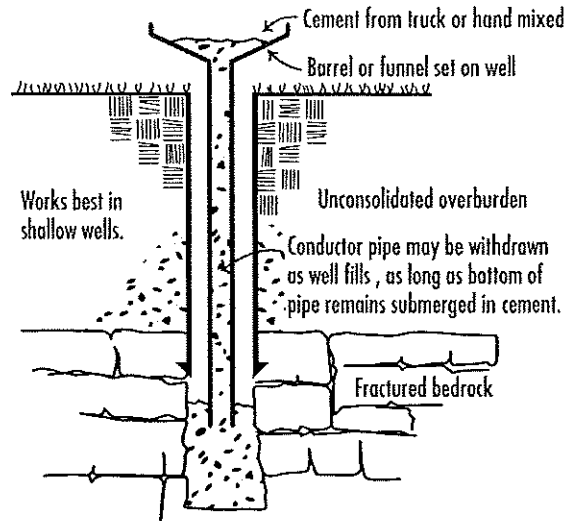
After properly filling the well from the bottom up, the filling material may terminate a few feet below the ground surface to allow the top of the casing to be cut off, if preferred. The casing may also be left in place. If the well discharged through a non-pressure conduit, the end of this conduit (in the basement) must be sealed watertight with a steel plate.

Flowing wells

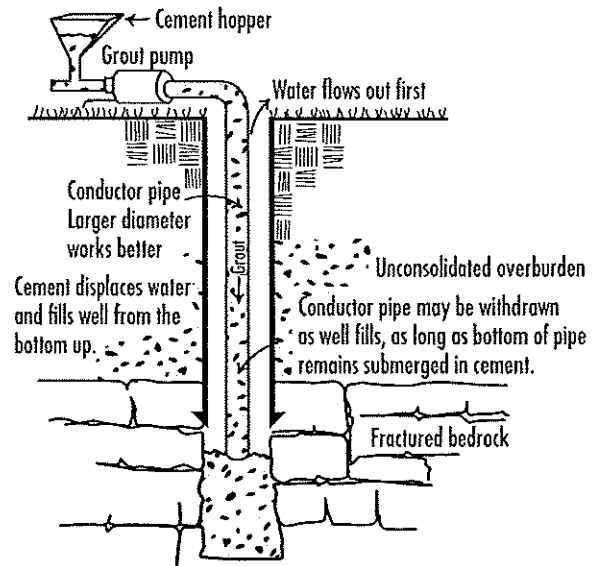
Flowing artesian wells that flow at high rates may require special techniques to reduce the flow before the well is filled. Contact the DNR for more information.

For very deep, large-diameter drilled wells, contact the DNR Bureau of Drinking Water and Groundwater staff for acceptable alternate procedures and materials. In some cases chlorinated, sand-free pea gravel may be used to fill the lower portions of bedrock wells to reduce the cost of material.

Gravity method for well abandonment



Pumped method for well abandonment



Driven-point (sand-point) wells

Driven-point or jetted wells 2 inches or less in diameter must be filled with neat cement grout. You may simply pour the grout down the casing, or, if you wish, pump it down through a conductor pipe. You may pull the drive pipe and screen before pouring the grout if the well is 25-feet deep or less. Bentonite chips may not be used for these wells because the chips can too easily bridge in the casing pipe.

Many driven-point wells terminate in pits or in the basements of buildings. Since April 10, 1953 such well locations have been prohibited by the State Well Code. If your well was constructed

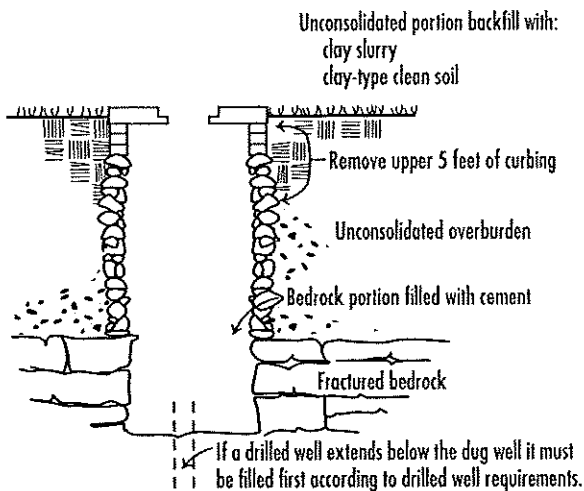
after this date, the well does not comply and must be properly abandoned and filled except when the department approves its continued use.

Dug wells

To properly abandon a dug well, first remove the well cover and remove any piping or debris before filling the well. (If a drilled well extends below the dug well it must be filled first.) You must fill the dug well with clean clay, silt, clean native clay or silt-type soil (if compacted), concrete, sand-cement grout or bentonite chips. If the dug well penetrates partially or completely into bedrock, the well must be filled with concrete or sand-cement grout to a point at least two feet above the top of the bedrock. The top 5 feet of curbing of the dug well must be removed to allow for a good contact between the filling material and the soil. You may cave the curbing into the dug well while the well is being filled if you do it in a manner to prevent plugging of the filling material part-way down; or you may also do this step near the end of the filling procedure.

If the dug well is less than 18 inches in diameter, you must use a conductor (tremie) pipe to place the filling material, except when bentonite chips are used. For very deep or large diameter dug wells, alternate materials may be allowed. Contact the DNR for more information.

Dug well abandonment



Well pits

When a pit well is abandoned, the pit structure must also be filled. To properly abandon a well pit, perforate or knock in at least one wall, break up or perforate the floor, and then fill the pit with clean native clay, silt, or clean native soil. If the pit is a subsurface pump room (alcove) connected to the building foundation, the pit does not have to be filled.

Well Abandonment Using Chipped Bentonite

In Wisconsin chipped bentonite products may be used to fill wells and drillholes. The chips may be used for both sand and gravel formation wells and bedrock wells. They may be used for wells & drillholes meeting the following specifications.

- 4 inches or larger in diameter.
- Not more than 500 feet deep.
- Not more than 350 feet of water standing in the well or drillhole.

(Note: Chipped bentonite may **not** be used to fill wells or drillholes filled with drilling mud or clay slurry and may **not** be used for small diameter driven point wells.)

Chipped bentonite may also be used for the following:

- To fill dug wells.
- As an alternative to concrete in the top 5 feet when clay slurry is used to fill a well or drillhole from the bottom up to the 5-foot depth.

(Note: Bentonite chips come in two basic size ranges (1/4" - 3/8" and 1/2" - 3/4" chips). The 1/4" - 3/8" chips should be used for 4-inch diameter wells. Bentonite chips are irregularly shaped pieces of sodium bentonite clay that look very much like crushed limestone. They should not be confused with pellets or tablets which are not allowed.)

Use the following procedures when using chipped bentonite:

1. Determine the construction details of the well or drillhole including at least the:
 - a. Well or drillhole diameter, by simply measuring the inside diameter of the well casing pipe or drillhole; and
 - b. Well or drillhole depth, by lowering a weighted line down to the bottom. (Make sure the weight is securely attached).
2. Remove the pump, pump piping and any other material obstructions or debris in the well or drillhole that could prevent complete filling.
3. Calculate the volume of the well or drillhole to determine the number of bags of chips that will be required by using:
 - a. The attached Table 1 page 5; OR
 - b. The formula:

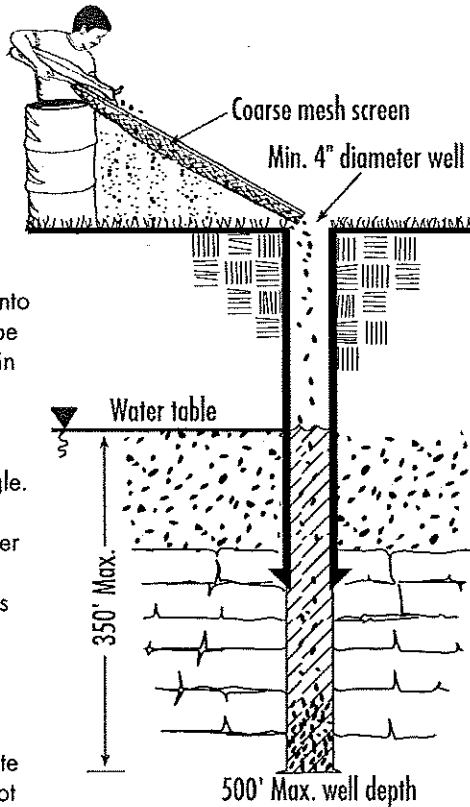
$$\frac{\pi r^2 h}{0.69 \text{ ft}^3/\text{bag}}$$

$$0.69 = \text{number of ft}^3 \text{ filled by one 50 lb. bag}$$

$\pi = \text{pi} = 3.14$
 $r = \text{well radius (in feet)}$
 $h = \text{well depth (in feet)}$

(Remember: Divide the well radius (in inches) by 12 to get the radius in feet.)

4. Fine particles and dust contained in the bags of bentonite chips must not be allowed to enter the well. This is prevented by pouring the bentonite chips out of the bag such that they tumble under their own weight down across a coarse-mesh screen 2 to 3 feet in length. This allows the dust to fall through the screen onto the ground. The screen should be formed into a U-shape like a rain gutter. One end of the screen should be placed on the top of the well casing while the other end is supported at a steep angle. Removal of the dust prevents bridging of the chips at the water table. Do not push or pull the chips down across the screen as this will only create more dust.
5. Pour the bentonite chips across the screen into the top of the well at a rate not faster than 3 minutes per bag. Pour at this rate so bridging of the chips does not



6. Make sure the well "accepts" the entire number of bags calculated to fill it. If it doesn't, bridging may have occurred. The point of bridging must be broken so the bentonite chips will fall to the bottom. If the bridge cannot be broken, the well may have to be drilled out and re-filled with neat cement grout.
7. If the standing water in the well does not rise to the surface during the filling procedure, clean, uncontaminated water must be poured down into the well (through the chips) until water rises up to the top of the well and stays there. The chips will then swell and create an impermeable plug in the well.

Table 1 - Method for Determining the Number of 50 lb. Bags of Chipped Bentonite to Fill a Well

Hole Size and Volume Table

Hole Diameter Inches	Hole Volume (ft ³ /foot)	Pounds Chipped Bentonite To Fill 1 Ft	Feet Filled By One Bag Chipped Bentonite	Bags Chipped Bentonite to fill 100 Ft
4	0.087	6.3	7.9	12.6
4-1/2	0.110	7.9	6.3	15.8
5	0.136	9.8	5.1	19.6
5-1/2	0.165	11.9	4.2	23.8
6	0.196	14.1	3.5	28.2
6-1/2	0.230	16.6	3.0	33.2
7	0.267	19.2	2.6	38.4
7-1/2	0.307	22.1	2.3	44.2
8	0.349	25.1	2.0	50.2
8-1/2	0.394	28.4	1.8	56.8
9	0.442	31.8	1.6	63.6
9-1/2	0.492	35.4	1.4	70.8
10	0.545	39.2	1.3	78.4
11	0.660	47.5	1.1	95.0
12	0.785	56.5	0.89	113.0
15	1.227	88.3	0.57	176.6
18	1.767	127.2	0.39	254.4
20	2.182	157.1	0.32	314.2
25	3.409	245.4	0.20	490.8
30	4.909	353.4	0.14	706.8

Table C - Acceptable Materials And Methods For Well Abandonment

Well Type	Materials							Methods	
	Clean Clay or Silt or Clean Native Soil	Approved Bentonite Chips ◆	Neat Cement Grout ■	Concrete ▲	Sand-cement Grout	Bentonite-sand slurry w/min. mod svi. 11 lbs/gal	Chlorinated, sand-free pea gravel		
Unconsolidated Formation Wells	Driven-Point (sand-point) Wells ↓ & Drillholes ≤ 2 1/2" diameter	No	No	Yes	No	No	No	No	Material may be poured without using a conductor ● pipe
	Wells & Drillholes > 2 1/2" diameter	No	Yes, provided well is 4" minimum diameter & 500' maximum depth	Yes	Yes	Yes	Yes, provided top 5' filled with neat cement grout, sand-cement grout or concrete	● Yes, but in depths below 250'	Conductor ● pipe required except when bentonite chips or pea gravel is used
	Dug Wells ○	Yes (top 5' of curbing must be removed following filling)	Yes	Yes	Yes	Yes	No	No	Conductor ● pipe not required unless well is ≤+18" diameter
Bedrock Wells	Bedrock wells not extending through Maquoketa Shale	No	Yes, provided 4" minimum diameter & 500' maximum depth	Yes	Yes	Yes	No	● Yes, but in depths below 250'	Conductor ● pipe required except when bentonite chips or pea gravel is used
	Bedrock wells extending through Maquoketa Shale	No	Yes in top 500' & for 40' plugs at top & bottom of Maquoketa Shale contact surfaces	Yes	Yes	Yes	No	● Yes, in depths below 250', but not at Maquoketa Shale contact surfaces	Conductor ● pipe required except when bentonite chips or pea gravel is used
	Dug Wells ○	Yes, but only in unconsolidated portion of well	Yes	Yes	Yes	Yes	No	No	Conductor pipe required only for placement of grout or concrete; or if well is ≤+18" diameter
Well Pits	Yes	Yes	Yes	Yes	Yes	No	No	Must perforate floor & 1 wall of pit	

- ◆ Bentonite chips may only be used for wells not deeper than 500 feet and having not more than 350 feet of standing water in them. The chips must be poured across a coarse mesh screen such that excess dust does not enter the well. Pour rate should not be faster than 3 min. per 50 lb. bag to prevent bridging.
- Neat cement grout and sand-cement grout must have a density of at least 15.2 lbs per gallon
- ▲ When concrete is used, the gravel size may not exceed 1/8 the inside diameter of the conductor pipe used.
- ↓ Driven-Point (Sand-Point) Wells may be pulled prior to filling the hole if the well is 25' deep or less.
- The terms, conductor pipe and tremie pipe, are synonymous. The bottom of the pipe must remain submerged in the grout throughout the filling procedure. Conductor pipe must be metal pipe, thermoplastic pipe rated for at least 100 psi or rubber-covered hose reinforced with braided fiber or steel and rated for at least 300 psi.

- 40' Impermeable plugs shall be provided at each bedrock formation change. [See s. NR 812.26(7)(a)]
- The top 5 feet of dug well curbing must be knocked out to provide a soil contact with the filling material.



"Clean clay or silt or clean native soil"

means low permeability soil material, free of organic humus or any other contamination.

"Clay or Bentonite-sand slurry" means a mixture having the minimum ratio of 50 pounds of native clay or approved bentonite mixed with 100 gallons of water (from a known safe and uncontaminated source) and 10-25% sand by volume of the slurry such that a mud weight of at least 11 lbs./gal. is achieved.

"Neat Cement Grout" means a mixture of cement and water in the proportion of one bag of Portland cement (94 lbs.) meeting ASTM C 150, Type I or API-10A, Class A standard; and 5 to 5.5 gallons of water from a known safe and uncontaminated source. Powdered bentonite may be added up to ratio of 5 pounds per 94-pound

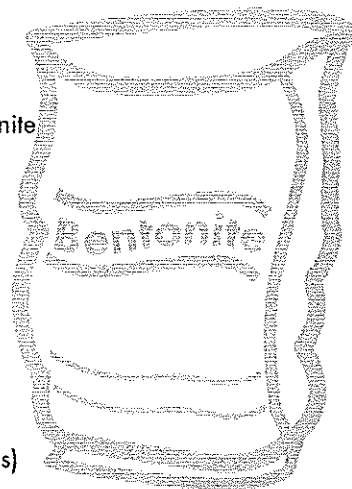
bag of cement provided 1.3 gallons of water are added for each 2 pounds of bentonite added.

"Concrete (sand-cement) grout" means a mixture of cement, sand and water in the proportion of one bag of Portland cement (as described above), a cubic foot of dry sand and 5 to 5.5 gallons of clean water from a known safe and uncontaminated source.

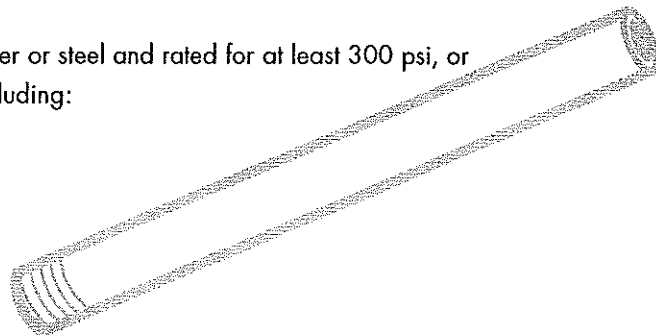
"Concrete" means a mixture of cement, water, sand and gravel in the proportion of one bag of Portland cement (as described above), an equal measure of gravel (by weight or by volume) and not more than 5.5 gallons of water from a known safe and uncontaminated source. A commercially-prepared mix may be used provided the mix has at least 6 bags of cement per cubic yard.

"Approved chipped bentonite products" are as follows:

ABI Plug	ABI, Inc.
Cowboy Brand ..	Cowboy Mining Co. (Fine, Medium & Coarse)
Econoplug	Economy Mud Products Co. (both medium chips: 1/4" to 3/8" and coarse chips: 1/2" to 3/4") (mfg. by Wyo-Ben, Inc.)
Enviroplug	Wyo-Ben, Inc. (both medium chips: 1/4" to 3/8" and coarse chips: 1/2" to 3/4")
Federal Plug	M-1 Drilling Fluids (Federal) – 100% of chipped sodium bentonite (both medium chips: 1/4" to 3/8" and coarse chips: 1/2" to 3/4")
Holeplug	N.L. Baroid, Inc. (3/8" and 3/4" chips)
Kwik Plug	Federal Summit (3/8" and 3/4" chips)
Naturapel	Wyo-Ben, Inc. (chips)
Opti Seal	Bentonite Corp. (3/8" and 3/4" chips)
PdsCo Plug	PdsCo. (Polymer Drilling Systems) (medium and coarse chips)
Permaplug	Catholic Engineering Equipment Co. (both coarse chips: 3/4" and medium chips: 3/8")
Pure Gold Chips ..	CETCO (both medium 1/4" to 3/8" and coarse 3/8" to 3/4" chips)
Tower Plug	Black Hills Bentonite Co. (3/8" and 3/4" chips)
Volclay Chips	American Colloid Co. (both medium chips: 1/4" to 3/8" and coarse chips: 1/2" to 3/4")
Well-Plug	Fluidril Mud Systems (from Black Hills Bentonite) 100% chipped bentonite (3/8" and 3/4" chips)

**Conductor (tremie) pipe used for well abandonment shall be any of the following:**

1. Metal pipe,
2. Rubber-covered hose reinforced with braided fiber or steel and rated for at least 300 psi, or
3. Thermoplastic pipe rated for at least 100 psi including:
 - a. polyvinyl chloride (PVC),
 - b. chlorinated polyvinyl chloride (CPVC),
 - c. polyethylene (PE),
 - d. polybutylene (PB), and
 - e. acrylonitrile butadiene styrene (ABS)



Must I report the well abandonment to the DNR?

Yes. When groundwater contamination investigations are undertaken, it's important to know the location of active, unused and former wells. Further, this information is important documentation for property transfers. Well abandonment report forms (Form #3300-5B or 3300-5W) are available from the DNR's central or regional offices or from counties delegated to enforce the State Well Code. You must use these forms to report how the well was filled and document that the well no longer exists. The form must be completed and signed by the person performing the abandonment work. The second copy is the owner's copy. Send the original to the appropriate DNR regional office indicated at the end of this brochure or to the appropriate county office.

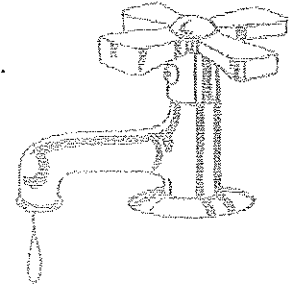
What administrative rules cover well filling and sealing?

NR 812.26 governs proper abandonment of private water supply wells. The filling requirements are also printed on the back of the well abandonment form. NR141, Wis. Adm. Code, governs the proper abandonment of monitoring wells. NR 811.17, has rules for abandonment of community wells.

Where can I obtain additional information or report improperly abandoned wells?

The DNR has five regional offices statewide to serve you. Call the nearest one to talk to a drinking water and groundwater specialist assigned to your county.

The DNR Drinking Water staff directory is also found on the Internet at: dnr.wi.gov/org/water/dwg. Click on "Staff Contacts" at the bottom left side of the page.



For further information on drinking water supplies and groundwater quality check the DNR website at dnr.wi.gov/org/water/dwg/index.htm. Also check the UW Extension website at: ecommerce.uwex.edu/. Click on "Water Quality" under the "Natural Resources" drop-down menu.

This brochure was revised by the Wisconsin Department of Natural Resources with assistance from the Education Subcommittee of the Groundwater Coordinating Council.

The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services and functions under an Affirmative Action Plan. If you have any questions, please write to: Equal Opportunity Office, Department of the Interior, Washington, D.C. 20240.

This publication is available in alternative format (large print, Braille, audiotape, etc) upon request. Please call (608) 266-0821 for more information.

Region Offices

Northern Region
810 W. Maple Street
Spooner, WI 54801
(715) 635-2101

107 Suttiff Ave.
Rhinelander, WI 54501
(715) 365-8900

West Central Region
1300 West Clairemont
P.O. Box 4001
Eau Claire, WI 54702-4001
(715) 839-3700

Northeast Region
2984 Shawano Avenue
P.O. Box 10448
Green Bay, WI 54307-0448
(920) 662-5100

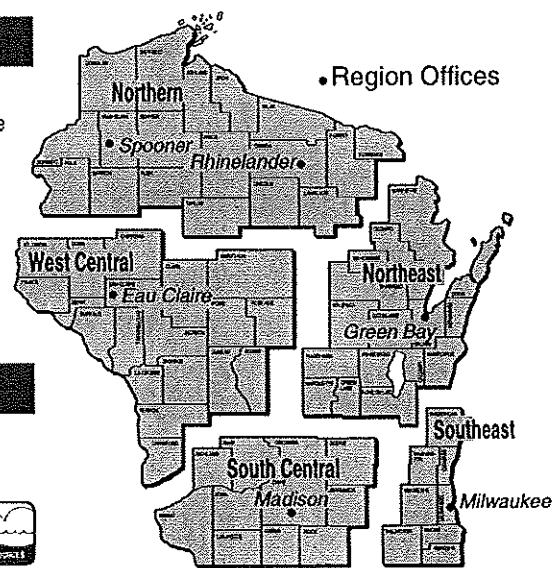
Southeast Region
2300 N. Dr. Martin Luther King, Jr. Drive
Milwaukee, WI 53212
(414) 263-8500

South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711
(608) 275-3266

Central Office:

Street Address
101 S. Webster Street
Madison, WI
(608) 266-0821

Mailing Address
PO Box 7921
Madison, WI 53707-7921



APPENDIX M

CITY OF MADISON WELLHEAD PROTECTION ORDINANCE

13.22 WELLHEAD PROTECTION.

- (1) To prevent contamination of wells supplying municipal water systems, the Water Utility General Manager or his/her designee shall review all proposed uses on zoning lots in Zones A and B in Wellhead Protection Districts.
- (2) Review will be based on the presence, use, or storage on the lot of hazardous chemicals, as defined by the Environmental Protection Agency. Consideration will be given to factors including but not limited to the following: whether the zoning lot is in Zone A or Zone B, effective storage or containment of particular hazardous chemicals, and the magnitude and/or frequency of use of the hazardous chemicals. Approval of the use may be contingent on specific conditions being met. A current list of hazardous chemicals, as defined by the Environmental Protection Agency, shall be maintained. (Cr. by Ord. 13,106, 7-23-02)

28.107 WELLHEAD PROTECTION DISTRICTS.

- (1) Statement of Purpose. The Common Council of the City of Madison finds that certain uses can seriously threaten or degrade groundwater quality. To promote the public health, safety, and general welfare of the City of Madison, the Wellhead Protection Districts are created to protect municipal water supplies.
- (2) Applicability. The requirements of the Wellhead Protection Districts shall apply to all zoning lots located in such districts in addition to all requirements in the Madison General Ordinances that apply to the principal zoning district classification of said zoning lots.
- (3) Protection Zones. Each wellhead shall have two (2) zones of protection around it.
 - (a) Zone A shall be the area around the well in which it has been determined that groundwater and potential contaminants will take five (5) years or less to reach the pumping well.
 - (b) Zone B shall be the smaller of the area around the well in which it has been determined that groundwater and potential contaminants will take one hundred (100) years or less to reach the pumping well, or the area within a twelve hundred (1,200) foot radius around the well, except for the area in Zone A.
- (4) Uses. All uses in Zones A and B of any Wellhead Protection District shall be approved by the Water Utility General Manger or his/her designee. A use may be approved with conditions. Approval by the Water Utility General Manager or his/her designee shall be in addition to all other approvals required for the proposed use.
 - (a) Permitted Uses In Zones A and B. Any use allowed as permitted in the principal zoning district, except those uses not approved pursuant to Sec. 13.22.
 - (b) Conditional Uses In Zones A and B. Any use allowed as a conditional use in the principal zoning district except those uses not approved pursuant to Sec. 13.22. All conditional uses are subject to the provisions of Sec. 28.12(11).
- (5) Existing Uses. Any lawful use existing at the time of the creation of a Wellhead Protection District may be continued, however, no expansion or enlargement of such use is allowed without approval pursuant to Sec. 13.22 by the Water Utility General Manager or his/her designee.

APPENDIX N

WATER CONSERVATION INFORMATION



- WATER
UTILITY HOME
PLANS,
PROGRAMS &
PROJECTS**
- ABOUT
US
JUST FOR
KIDS!**
- WATER
QUALITY**
- WATER
TREATMENT**
- ENVIRONMENTAL
INITIATIVES**

Environmental Initiatives: Water Conservation

Other Resources:

- [City of Madison Water Quality Initiatives](#)
- [Sustain Dane](#)
- [My Fair Lakes.com](#)
- [Dane County Office of Lakes and Watersheds Rain Garden Information](#)
- [UW Extension Home & Garden](#)
- [Water Conservation Initiative, Public Service Commission of WI](#)
- [EnAct Program](#)



At Your Service

- [Ask Us, Tell Us](#)
- [Pay Your Bill](#)
- [Request to Start or End Service](#)
- [Bill & Rates](#)

Water Conservation Tips

- **Good Watering Practices**
 - Don't water the pavement. Position sprinklers so that water lands on the lawn or garden, not in areas where it is not needed.
 - Check weather reporting or buy a rain gauge to monitor whether watering in addition to rain is needed; most established lawn and garden plantings do well on an inch of water per week.
 - During drought, turf grass plants need only 1/4 inch of water a month to survive. If lawn and garden do need water, limit loss to evaporation.
 - Water before 8:00 a.m. when it isn't windy, position a sprinkler to avoid losing water on driveway or sidewalks, and water slowly so the soil can absorb the water.
 - Water the lawn only when needed. Step on the grass; if it springs back up when you move your foot, it does not need water.
 - Water less frequently and thoroughly. A good soaking is better than watering frequently and will allow the roots to grow to greater depths and help make turf more drought tolerant. Lawns need about 1 inch per week. Hint: Place 3-5 empty tuna or cat food cans at varied distances from the sprinkler. The time it takes to fill the cans is about how long you should water your lawn.
- **Collect rainwater in a rain barrel or cistern**
 - Water that runs off of hard surfaces such as your roof can be collected and reused to water plants. Rain water is "soft," without groundwater minerals or municipal treatment, so it's more plant-friendly than tap water. Capturing water from gutters and downspouts in a well-designed rain barrel conserves the municipal supply while providing the best water for lawn and garden. To learn more, go to: [Sustain Dane, http://www.sustaindane.org/](http://www.sustaindane.org/)
- **Only Rain In The Storm Drain!**
 - Everything from our streets drains to surface waters and someone's ground water, so we need to try to keep plant material, toxins and debris

out of the storm sewers.

- **Rain gardens**

- Manage rainfall on your property as much as possible, using the contour of the area and plantings to slow down the flow of water, use it and offer it back to the atmosphere. To learn more, go to the City of Madison Engineering, Water Quality Initiatives, <http://www.cityofmadison.com/engineering/stormwater/>



- WATER
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- PLANS,
PROGRAMS &
PROJECTS
- JUST FOR
KIDS!

Environmental Initiatives: Home Conservation

At Your Service

- [Ask Us, Tell Us](#)
- [Pay Your Bill](#)
- [Request to Start or End Service](#)
- [Bill & Rates](#)

- Go to:
- [Is there a leak?](#)
 - [Repair Leaky Faucets](#)
 - [Toilet Leaks](#)
 - [Backflow Prevention Devices](#)
 - [Good Practices](#)
 - [Outside Resources](#)

Is there a leak?

Any water-using device or pipe connection can leak. There is usually some evidence of such problems, but the evidence isn't always obvious: A toilet leak can be noisy but it can also be rather quiet; a dripping faucet can be overlooked. Checking the water meter can be a good way of finding out if there is a water leak:

- The meter in the basement may have a small (1/4-inch) "leak detector" dial, a blue gear-like fitting visible on the face of the meter with no numbers or markings. If there is any movement of that dial when water isn't in use, there is likely to be a leak. (Be sure the water softener isn't cycling and no other water-using appliances are operating when you check this.)
- The meter in the basement shows movement of water through the meter, registering on a digital display, including tenths and hundredths, and often on a one-cubic-foot dial showing the precise amount of water being used. Checking the meter for any change in the display or movement on the dial after a period of time when no water has been used will reveal whether any water is being lost.
- The register on the outside of the house shows a digital display to tenths of cubic foot (7.48 gallons) and can also be checked for any registration when no water has been in active use.

Repair Leaky Faucets:

At one drop a second, a leaky faucet can waste more than 3000 gallons of water in a year. Most leaks are easily repaired with basic know-how and simple tools. Good reference books and articles are available, hardware store and home center staff can be very helpful--and the cost of a plumber may be minor compared to the costs of damage.

Toilet Leaks:

Listen and watch for toilet leaks. To test for "flapper" leaks, put a coloring agent--food coloring, egg dye or other water-soluble color--in the toilet tank, and check to see whether any of the color leaks into the toilet bowl within ten minutes. Flapper replacement is the most common remedy for such leaks. Check float ball assemblies for corrosion of metal components that may prevent the shutoff of water refilling the tank so that it runs over into the overflow pipe; such leaks won't show in a dye test but can cause great water loss.

Backflow Prevention Devices:

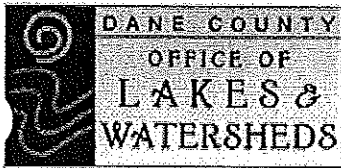
Install Backflow prevention devices on outdoor faucets, sprinkler system, and laundry tubs, or any other threaded faucet. The devices, available in most hardware stores, prevent possible contamination by reverse flow of products used in the home or garden into the water distribution system.

Good Practices:

- Install water-saving devices: Aerators for kitchen and bath taps, flow regulators for shower heads and toilet tanks, and displacement devices to reduce the amount of water used in older toilets can make significant reductions in water used.
- Use automatic shutoff attachments on hoses, and don't let the water run unnecessarily while washing the car or for other outdoor uses.
- Use the most efficient settings for dishwashers and clothes washing machines. Full loads are often the most efficient. When it's time to replace appliances, consider water efficiency in your choice.
- Turn off the tap when not actively rinsing toothbrush or razor.
- Think of practices and habits that might be changed to make a difference. Can showers be shorter? Sidewalk and driveway swept rather than hosed?
- Electrical energy is needed to pump water from the well and send it to our homes and work places. Conserving energy and water is critical during electrical power shortages, and makes very good sense all of the time.
- Activities that use significant amounts of water--both indoors and outdoors--can be timed to help manage periods of high demand for electricity.
- **When it's time to replace appliances, purchase more energy-efficient and water-efficient ones.** Initial costs may take some time to be offset by water savings, but savings for electricity use are often very quick, rebates are sometimes offered, and there are often other features on the newer appliances that help compensate for the aggravation and expense of having had to replace the earlier model.

Other Resources:

- **[EPA: How to Conserve Water and Use It Effectively](#)**
- **[EPA: Water Use Efficiency Program](#)**
- **[EPA: "Do"s and Don'ts Around the Home](#)**
- **[H2O House](#)**



Dane County Waters: Resource Information | Management Issues & Activities | Site Map | Contact Us | Dane Lakes Home

Office of Lakes & Watersheds and the Dane County Lakes & Watershed Commission

Dane County > Land & Water Resources > Office of Lakes & Watersheds > Rain Garden Information

Lakes & Watershed Commission & the Office of Lakes & Watersheds ▶

For Citizens & Schools ▶

For Businesses, Developers & Contractors (Incl. Permits) ▶

Press & Publications ▶

Other Information ▶

[Get a free copy of Adobe Acrobat to open PDF files.](#)

Office of Lakes & Watersheds
Dane County Land and Water Resources Department
 Located in the
 Lyman F. Anderson
 Agriculture and
 Conservation Center
 One Fen Oak Court
 Room 234
 Madison, WI 53718-8812
[Map to Fen Oak](#)
 608-224-3758
lakes@co.dane.wi.us

What is a rain garden?

Rain gardens are shallow depressions (3-4 inches to two feet) planted with native wildflowers and other plants that soak up rainwater or melted snow from your rooftop, driveway and lawn. The gardens allow water to infiltrate into the soil rather than becoming runoff.

A rain garden can soak up to 30% more water than a traditional lawn. This helps to protect the quality of water downstream by preventing runoff from getting to the storm drains and helps reduce the chances for local flooding.

Why is that important? Because the water from rain or snow fall that runs off our roofs and off our yards, into our streets and eventually through the storm drain system to our lakes is untreated, and carries with it all sorts of pollutants like fertilizers, oil from the street and pet waste. Holding back the runoff by allowing it soak into the ground in rain gardens, helps improve the water quality in our lakes, can reduce the chances for local flooding and also helps reduce bank and shoreline damage.

Such a complex and important mix of environmental benefits is accomplished by devoting a small amount of space, time and money to the creation of a rain garden. There are only a couple of key decisions you'll need to make: the size of the garden, its location, the mix of native plants and vegetation you'll put in and whether you build it yourself or hire a professional landscaping company to help you.

Rain gardens should be positioned to receive water from downspouts or at a low-point in the lawn where drainage naturally occurs. While the plants grow, you'll need to weed a bit, but a mature rain garden is delightfully easy to maintain. The simpler you keep your design the more involved you can be in both planning and building the garden. But increasingly, driven by consumer demand and interest, there are many professional landscapers and horticulturists who are in the business of designing and building rain gardens.

Visiting well-designed gardens can give you ideas and talking to folks who have them can provide helpful tips on how to do it right.

Rain gardens are aesthetically pleasing to look at and provide habitat for birds, butterflies and beneficial insects-including dragonflies that eat mosquitoes. Once the plants mature, maintenance is relatively low, and beats mowing! Just think-no noise, no gas, and all that free time!

Rain Garden Listserv

The Office of Lakes and Watersheds currently maintains a discussion group for those interested in rain gardens in Dane County. To

subscribe, send a blank email to [daneraingardens-
subscribe@yahoogroups.com](mailto:daneraingardens-
subscribe@yahoogroups.com). To email the listserv, send email to daneraingardens@yahoogroups.com.

Links and Resources

- [How to Build a Rain Garden \(1.05Mb, pdf\)](#)
- [Friends of the Arboretum Native Plant Sale](#)
- [Plant Dane! Workshop \(7/30/05\) Rain Garden Presentation](#)
 - [27 MB PowerPoint](#)
 - [11 MB PDF](#)
 - [9 MB PDF \(Handouts\)](#)
- [10 Steps to Building a Rain Garden](#)
- [Edgewood College Rain Garden Project](#)
- [Rain Garden Info \(Friends of Lake Wingra\)](#)
- [2002 Parade of Condos features Rain Gardens, August 3-11](#)
- [DNR UWEX Rain Garden Brochure](#)
- [DNR Links to Rain Garden information](#)
- [DNR Rain Garden Manual for Homeowners \(pdf\)](#)
- [2002 Rain Garden Tour Homes](#)
- [2002 Parade of Homes features Rain Gardens](#)
- [Plotting to Infiltrate, Try! Extension](#)
- [Maryland developer gro control residential runoff](#)
- [On-Lot Infiltration System Metropolitan Council \(pdf\)](#)
- [Bioretention Systems for Management, Ten Town](#)
- [Rainwater garden: More space , Pioneer Press](#)
- [Save the rainwater - rain Green Guide](#)
- [Stormwater Treatment S National Resources Def](#)
- [Rain Garden / Bio-Retention CDC, Maryland](#)
- [Planting a Rain Garden,](#)
- [Landscape Ecology & L: Barr Engineering \(pdf\)](#)