

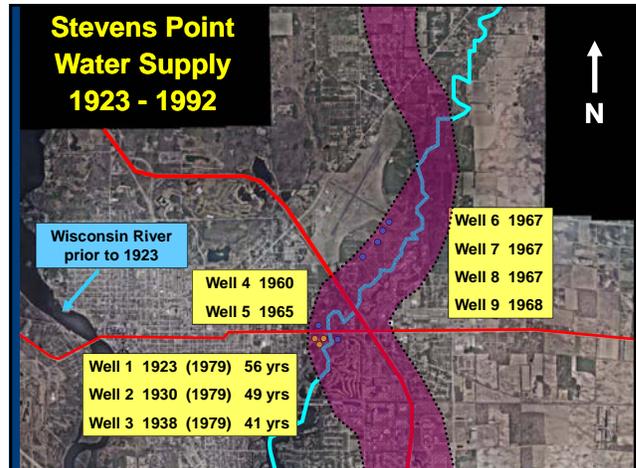
# Water Study Group Meeting Well 11 Project

Town of Hull  
Town Hall

July 14, 2011

## Presentation Outline

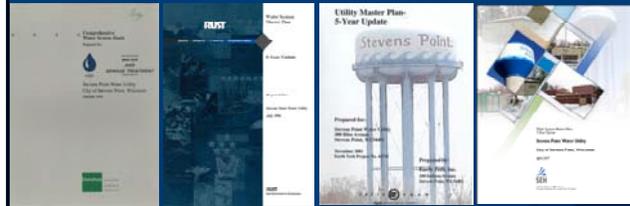
- ◆ Introductions
- ◆ *Brief History of Wisconsin Water Law*
- ◆ Well 11 Project History & Background
- ◆ Area Water Level Data
- ◆ Local Groundwater Quality
- ◆ Well 11 Test Pumping Results
- ◆ Current Project Status
- ◆ Project Schedule
- ◆ Questions



## Well 11 Project History & Background

- ◆ North Well Field identified in the City's 1991 Water System Master Plan
- ◆ Majority of City water supply comes from Airport Well Field
- ◆ Well 10 recommended in 1991 and constructed in 1993
  - ◆ Horizontal Collector well similar to Well 11
  - ◆ Well yield = 5 mgd
  - ◆ Close to the Plover River
  - ◆ Very efficient, low drawdowns (1,250 gpm/ft)
  - ◆ Very good water quality

## Recent City Water Utility Master Planning Efforts

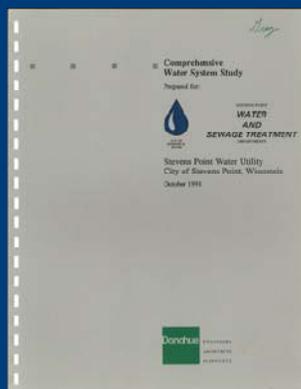


1991

1996

2001

2007



## 1991 Master Plan

- ◆ Well 10
- ◆ New control system
- ◆ Water main improvements



FIGURE 7-7  
PROPOSED FUTURE  
WELL FIELD LOCATIONS  
STEVENS POINT WATER UTILITY  
1991





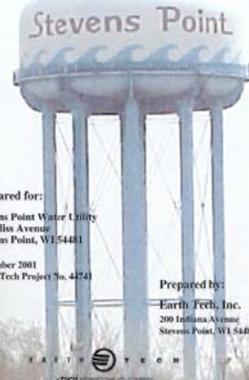
## 1996 Master Plan recommended improvements

**Table 8-1**  
**Recommended Capital Improvements Plan**  
Stevens Point Water Utility  
City of Stevens Point, Wisconsin

Short-Term Improvements (1996-1999)		Budget Estimate
<b>1996-97</b>		
Well 4 Water Treatment Plant		\$2,200,000
12-inch Ben Franklin Connection		\$55,000
French Riverview Drive Loop		\$70,000
<b>Subtotal</b>		<b>\$2,325,000</b>
<b>1999</b>		
0.9 MG Water Tower		\$800,000
New Tower Connecting Water Main		\$C50,000
<b>Subtotal</b>		<b>\$1,050,000</b>
	<b>Short-Term Total</b>	<b>\$3,375,000</b>
Intermediate-Term Improvements (1999-2002)		
Clark Street 24-inch Transmission Main (Minnesota Ave. to Water St.)		\$1,100,000
Standby Generator for Well 6		\$90,000
Install Three Additional Laterals in Well 10		\$400,000
Airport Wellfield 30-inch Parallel Transmission Main (minimum size and recommended length between Maria Dr. and Well 7)		\$200,000
North Second Street Water Main Replacement (Blaine Ave. to John's Dr.)		\$600,000
<b>Total</b>		<b>\$2,090,000</b>
Long-Term Improvements (2002-2010)		
Ultimate Service Area Distribution System Expansion		
Develop Proposed North Well Field and Well 11		
Airport Central Water Treatment Plant (if required)		
<b>Total</b>		<b>\$0</b>

*Note: Budget Estimates include engineering, contingency, and administrative costs.*

## Utility Master Plan-5-Year Update



## 2001 Master Plan

- ◆ New water tower
- ◆ Airport Well field Treatment Station
- ◆ New Well 11
- ◆ Well 5 Nitrate Blending

## 2001 Master Plan recommended improvements

**TABLE 10-1**  
**RECOMMENDED CAPITAL IMPROVEMENTS PLAN**  
STEVENS POINT WATER UTILITY  
CITY OF STEVENS POINT, WISCONSIN

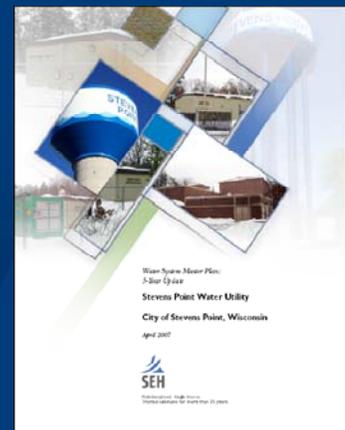
Short-Term Improvements (2002-2004)		Budget Estimate
Airport Wellfield Well Siting Investigation - Well 11 and Future Wells		\$40,000
Well 9 Chemical and Sanitary Waste System Improvements		\$150,000
New Tower A Connecting 18-inch Water Transmission Main		\$1,400,000
Well 11, Pump Station and Connecting Main		\$800,000
<b>Total</b>		<b>\$2,390,000</b>
Intermediate-Term Improvements (2005-2009)		
Well 5 Nitrate Blending Project		\$1,000,000
Airport Transmission Main		\$900,000
Well 12, Pump Station and Connecting Main *		\$800,000
Well 13, Pump Station and Connecting Main *		\$800,000
<b>Total</b>		<b>\$3,100,000</b>
Long-Term Improvements (2010-2020)		
Business 51 Transmission Main		
Airport Wellfield Treatment Plant *		
Ultimate Service Area Distribution System Expansion		
<b>Total</b>		<b>\$0</b>

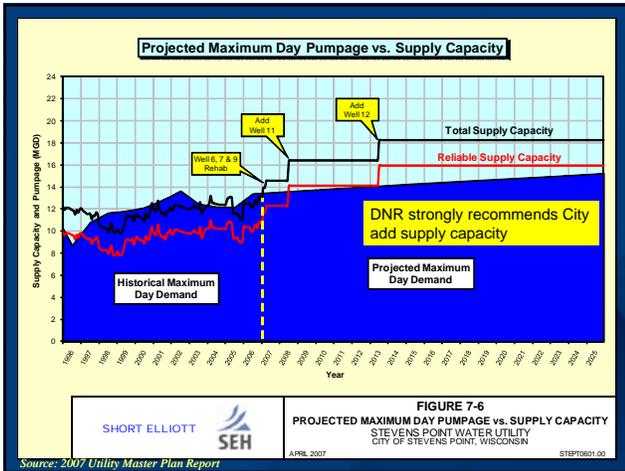
\* As needed depending on results of short-term well pumping strategies

*Note: Budget Estimates include engineering, contingency, and administrative costs.*

## 2007 Water System Master Plan

Stevens Point Water Utility  
April 2007





## Wisconsin DNR Concerns with City Supply Capacity

### Annual Inspection Report May 2008

**“The City must realize that not increasing the source capacity of the water system is not an option.”**

State of Wisconsin DEPARTMENT OF NATURAL RESOURCES  
 Wisconsin  
 1000 Wisconsin Center  
 Madison, WI 53706  
 Wisconsin DNR  
 608-261-8200  
 TTY Access to Relay: 711

Fergus County  
 PWSID: 73005410

May 19, 2008

ANDREW HALVORSON, MAYOR  
 CITY OF STEVENS POINT  
 1212 STRONG AVENUE  
 STEVENS POINT, WI 54481

SUBJECT: 2008 Annual Wastewater Inspection

Dear Mayor Halvorson:

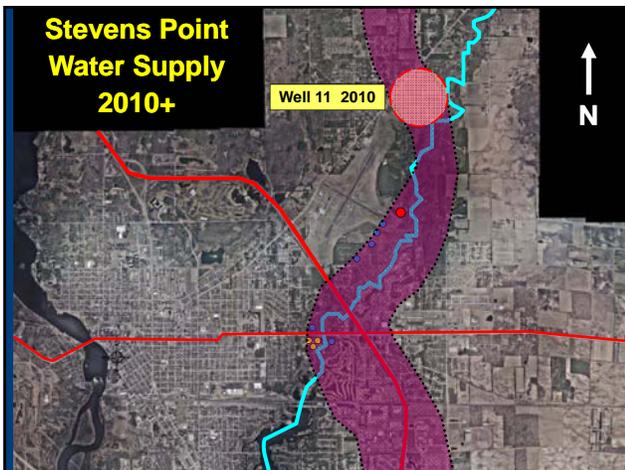
An annual inspection of the Stevens Point Wastewater was conducted on April 29, 2008. The sampling and reporting program for the preceding 12 months was also reviewed at this time.

It is obvious that the Utility recognizes the need for additional source capacity. This was clearly highlighted in the recent Utility Master Plan prepared by the consulting firm of Short Elliott and Handrickson. Three alternatives to increase production capacity have been outlined. A test well was constructed to determine quality and quantity available for a new Well 11. Feasibility of treatment options for Well 5 were investigated and the ability of the Patch Street Well for municipal supply was also investigated.

Each of these investigations have revealed problems which may delay the process of increasing source capacity for the City. Water quality at the Well 11 site has revealed the need for treatment to remove elevated concentrations of manganese. The blending of Well 2 has also been noted and due to technical difficulties in water main routing. In addition, the Patch Street Well will also require treatment for iron and manganese and may also need additional treatment for a groundwater under the dike.

**Underground or surface water - All of these problems can be solved, but the costs associated with such alternatives have increased. The City must realize that not increasing the source capacity of the water system is not an option.**

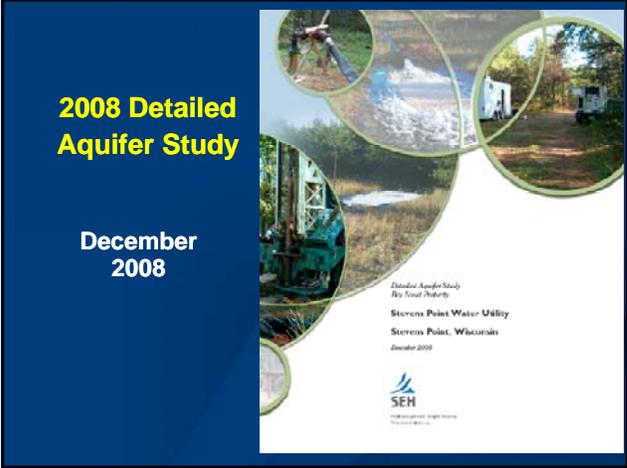
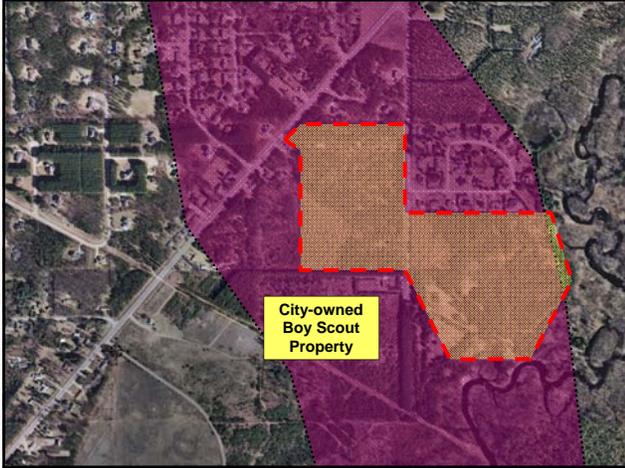
As with  
 sewage,  
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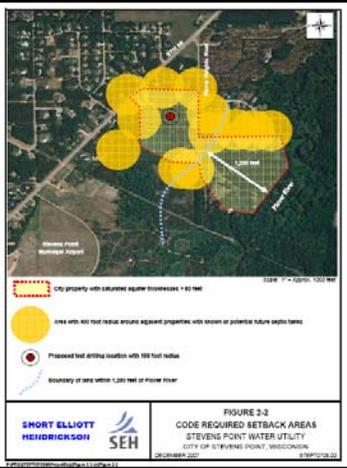
## Water Supply and Treatment Studies

### December 2007

Water Supply and Treatment Studies  
 Stevens Point Water Utility  
 Stevens Point, Wisconsin  
 December 2007



**Over one half of the western property is not available for construction of Well 11**

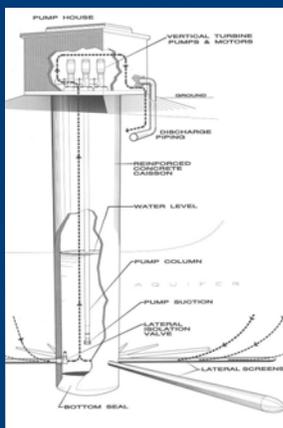


## Well 11 Project

- ◆ Project in planning stages for 20 years
- ◆ Addresses current and future City water supply needs
- ◆ Addresses DNR recommendations to increase water supply capacity
- ◆ Provides supply reliability and improved water quality (e.g., Well 5 nitrate)
- ◆ City-owned property
- ◆ Very large aquifer saturated thickness
- ◆ Large separation distances from neighbors
- ◆ Large separation from Plover River

## Well 11 Project Timeline

- ◆ DNR well site approval – February 2009
- ◆ DNR well engr report approval – March 09
- ◆ PSC construction authorization – April 09
- ◆ Public Hearing – June 1, 2009
- ◆ DNR well design approval – July 2009
- ◆ State DNR funding approval – August 2009
  - ◆ \$1.4 million grant; \$1.4 million loan
- ◆ State CDBG funding – Sept 09 (\$750,000)



## Horizontal Collector Well

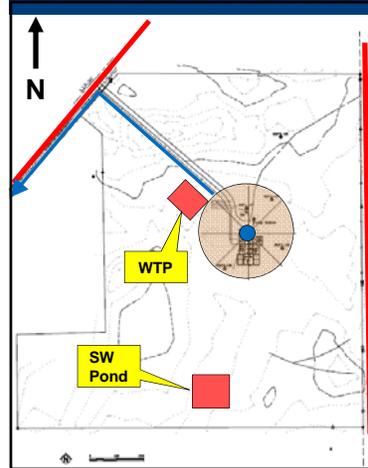
- Stevens Point Well 10
- Wisconsin Rapids Wells 1-4
- Calpine Power (Beloit)

## Well 11 Project Timeline

- ◆ Construction contract – October 2009
- ◆ Construction start – December 2009
- ◆ Caisson complete – April 2010
- ◆ Laterals started – May 2010
- ◆ Private wells inspected/sampled – June 2010
- ◆ Laterals complete – July 2010
- ◆ Meeting with Town WSG – July 28, 2010
- ◆ Test pumping – August 2010
- ◆ Well completed – December 2010

### Well 11 Site Plan and Well Design

- ◆ Well 11 is a horizontal collector well very similar to City Well 10
- ◆ Collector wells:
  - ◆ Are more expensive to build
  - ◆ Have greater well yields
  - ◆ Have smaller local area water level drawdowns
  - ◆ Are more cost-effective when water treatment plants are required (economies of scale)



### Well 11 Site Plan

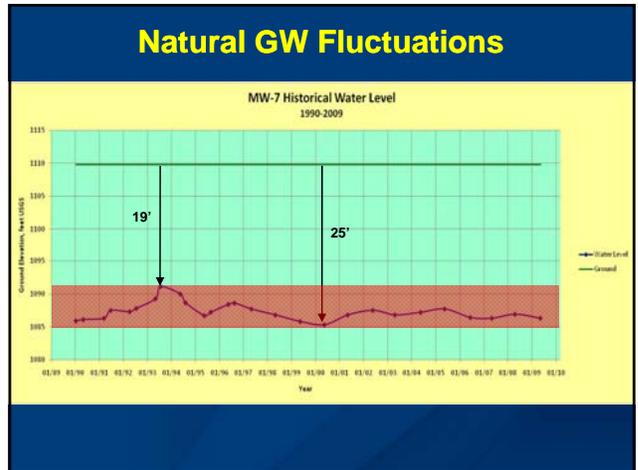
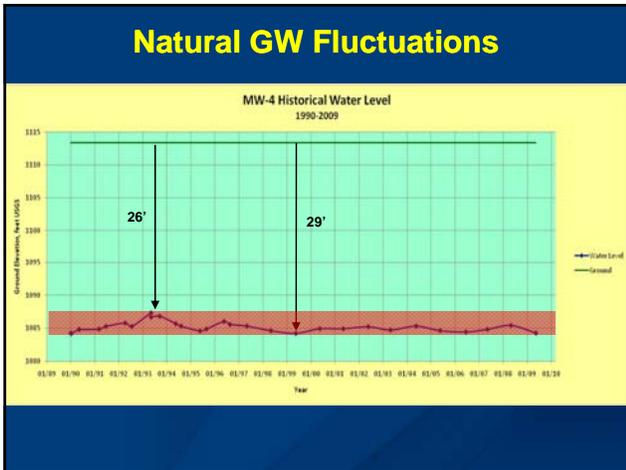
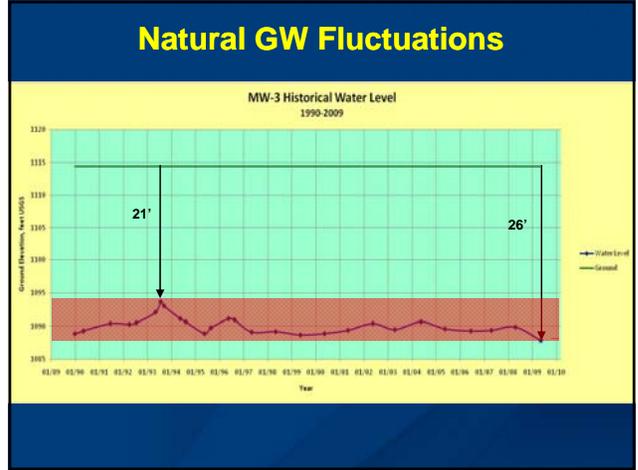
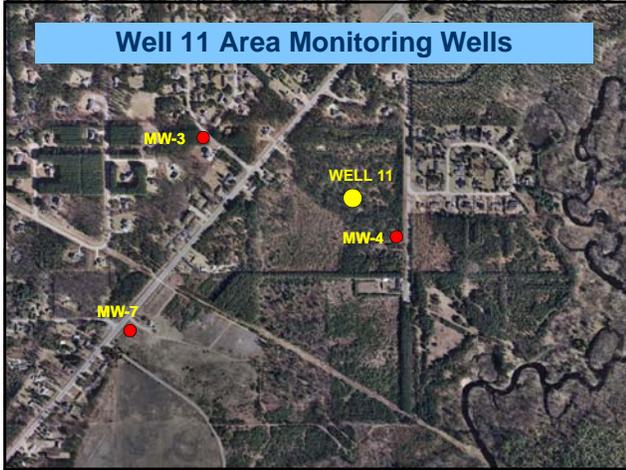
- ◆ WTP is being built next to well
- ◆ Temporary access road will be abandoned
- ◆ Permanent access road to STH 66
- ◆ New 24" water main along east ROW to Torun Road

### Water Main Plan



### Area Historical Water Levels

- ◆ City has numerous monitoring wells the STH 66 and Airport area
- ◆ Monitoring wells sampled annually for water quality and for water depth
- ◆ Some wells indicate higher nitrate in shallow areas, and iron and manganese in deeper areas
- ◆ Groundwater levels do fluctuate seasonally and with extremely wet or dry conditions
- ◆ Private and high capacity well designs take these normal fluctuations into account when wells are constructed



## Anticipated Water Levels Affects July 2010

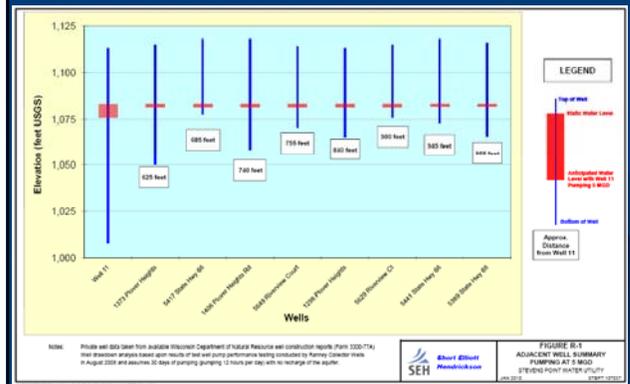
- ◆ Site aquifer data collected in August 2007 and August 2008
- ◆ Projections of water level impacts estimated based on 5 mgd pumping capacity
  - ◆ 12 hour per day pumping
  - ◆ No recharge for 30 continuous days
- ◆ Maximum drawdown within:
  - ◆ 200 feet is 3 feet
  - ◆ 450 feet is 2 feet
  - ◆ 1,400 feet is 1 foot
- ◆ Drawdowns were measured during test pumping in August 2010

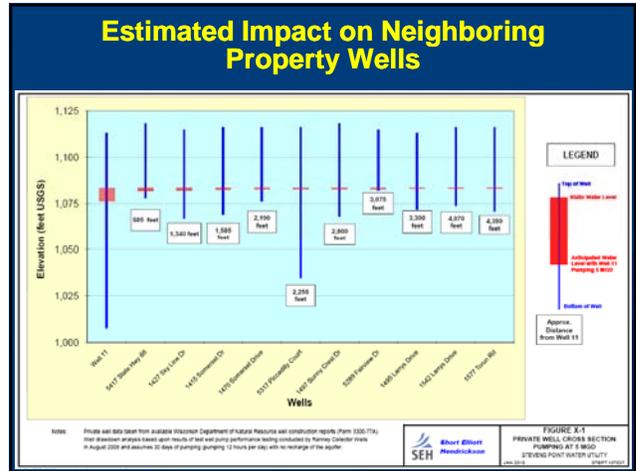
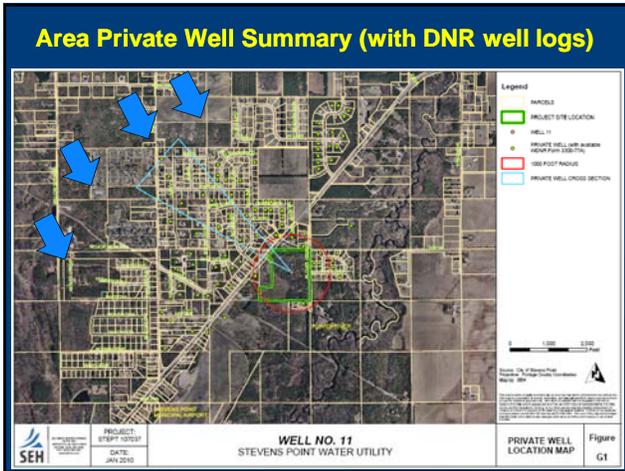
Drawdown estimates are conservative

## Drawdown Estimates at 5 mgd

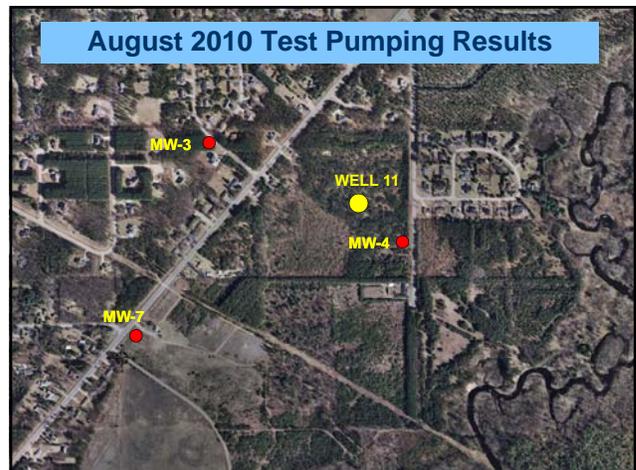


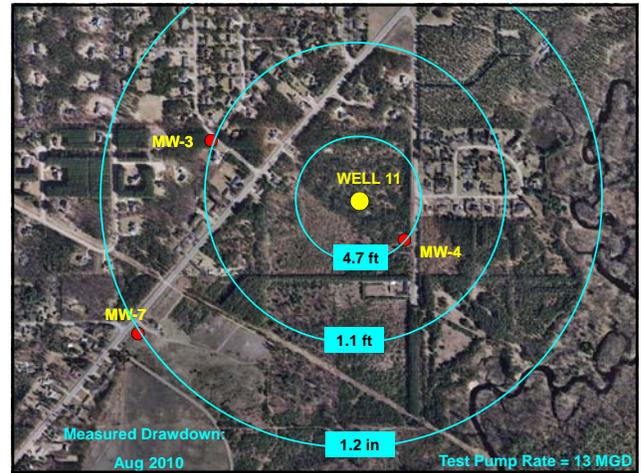
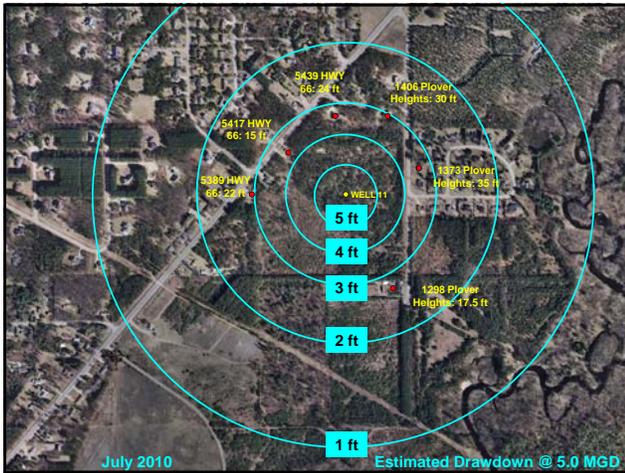
## Estimated Impact on Neighboring Property Wells





- ### August 2010 Test Pumping Results
- Well 11 was test pumped for 72 hours starting on August 16, 2010
  - Well test pumped at 10,000 gpm, or 13 mgd
    - WTP design for 3,500 gpm (5 mgd) – 38%
  - Water levels monitored:
    - Well 11
    - Five on-site observation wells
    - Three City monitoring wells





### Existing Groundwater Quality

- ◆ Water quality on project site was sampled in August 2007, 2008 and 2010
- ◆ Groundwater meets all federal/state primary drinking water standards
- ◆ Groundwater meets all secondary (aesthetic) drinking water standards except:
  - ◆ Dissolved Iron: 0.42 mg/l 0.30 mg/l SMCL
  - ◆ Dissolved Manganese: 0.33 mg/l 0.05 mg/l

### Groundwater Quality Impacts?

- ◆ No significant changes are anticipated to the groundwater quality in the area
- ◆ Groundwater from Well 11 and from nearby private wells have already been tested
- ◆ County recommends all private well owners sample drinking water annually for bacteria and nitrate (\$44 at WEAL)

### How Will Any Future Changes in Groundwater Quality be Quantified?

- ◆ City has specific and frequent sampling requirements mandated by DNR
- ◆ June/July 2010 – City paid to have Chet's Plumbing inspect and sample private wells within 1,400 feet of Well 11
- ◆ Confidential data collected:
  - ◆ Well type, depth, water level depth, well yield
  - ◆ Water quality - WEAL Homeowners & Metals Package plus Total Dissolved Solids (~\$100 per well)

### Water Quality Sampling Established a Baseline of Data

- ◆ Water quality parameters tested by Water & Environmental Analysis Lab at UW-SP:
  - ◆ Alkalinity
  - ◆ Arsenic
  - ◆ Calcium
  - ◆ Chloride
  - ◆ Conductivity
  - ◆ Copper
  - ◆ Corrosivity Index
  - ◆ Hardness
  - ◆ Iron
  - ◆ Lead
  - ◆ Magnesium
  - ◆ Manganese
  - ◆ Nitrate
  - ◆ Nitrate + Nitrite
  - ◆ pH (Lab)
  - ◆ Potassium
  - ◆ Sodium
  - ◆ Sulfate
  - ◆ Total Coliform Bacteria
  - ◆ Total Solids
  - ◆ Zinc

### General Water Quality Results Private Wells

- ◆ 44 private wells within 1,400 feet of Well 11 were sampled and tested at UWSP WEAL
- ◆ No unsafe samples for coliform bacteria
- ◆ 1 well tested >10 mg/l for nitrate (19.1 mg/l)
- ◆ pH ranged from 7.89 to 8.47
- ◆ 1 well water tested slightly corrosive
- ◆ No lead, arsenic, or copper concerns
- ◆ 4 wells with Fe >0.3 mg/l
- ◆ 1 well with Mn >0.05 mg/l (0.06 mg/l)

### Well 11 Project Status & Schedule

- ◆ Well pump station and treatment plant are currently being constructed on City-owned property
- ◆ Pump station is built; WTP complete up to grade level
- ◆ Contractor plans to complete construction of buildings this Fall
- ◆ WTP to be completed early 2012 for testing and start up
- ◆ Facilities will be operational in 2012

## Questions

