



Rochester Public Utilities Wellhead Protection & Water Quality

Todd Osweiler, Environmental & Regulatory Affairs Coordinator

**Olmsted County Environmental Commission
December 18, 2019**

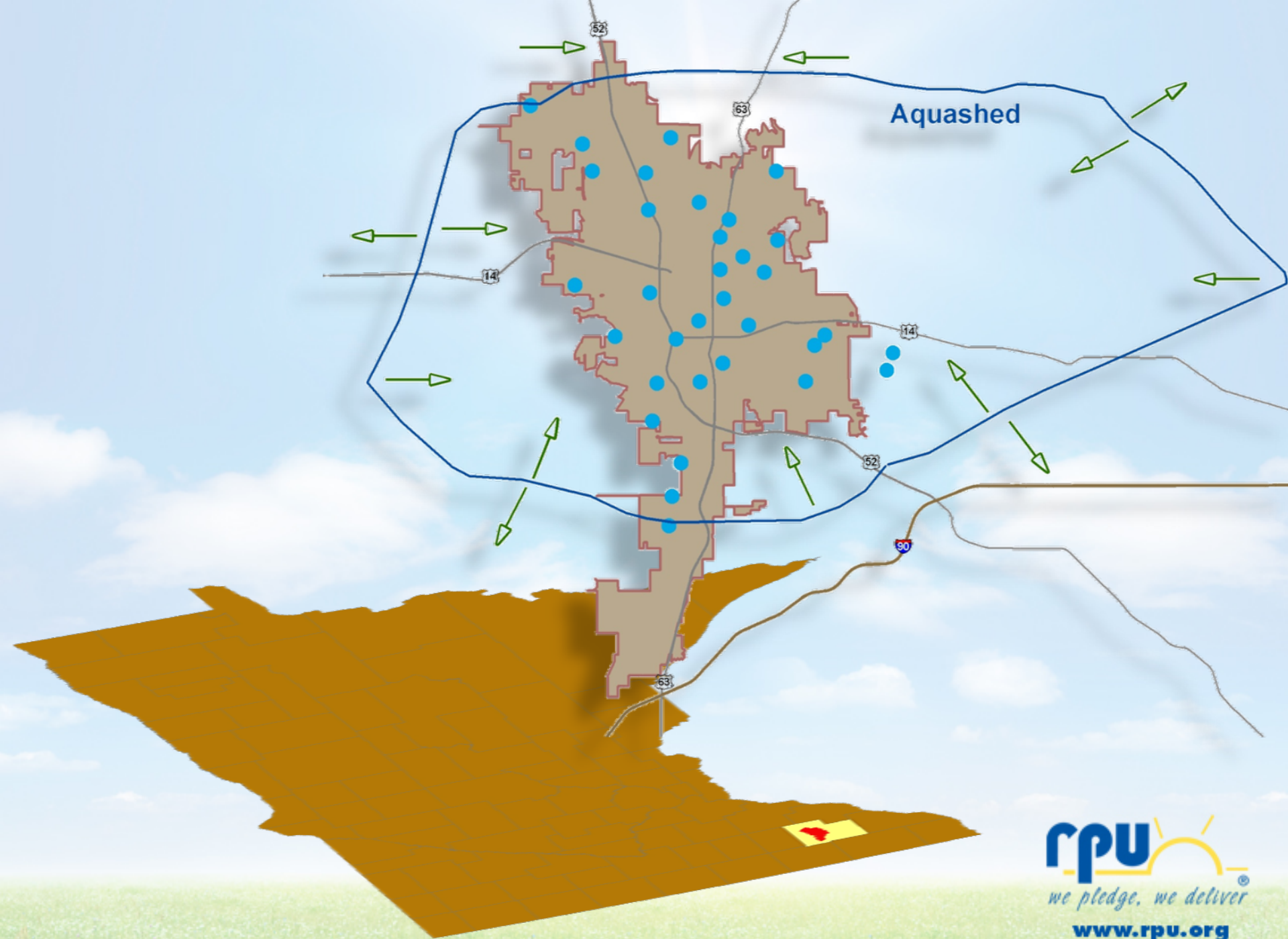
Overview

- 1. Water System Summary**
- 2. WHP Amendment Process**
- 3. Potential Contaminant Source Inventory**
- 4. WHP Implementation**
- 5. Water Quality**

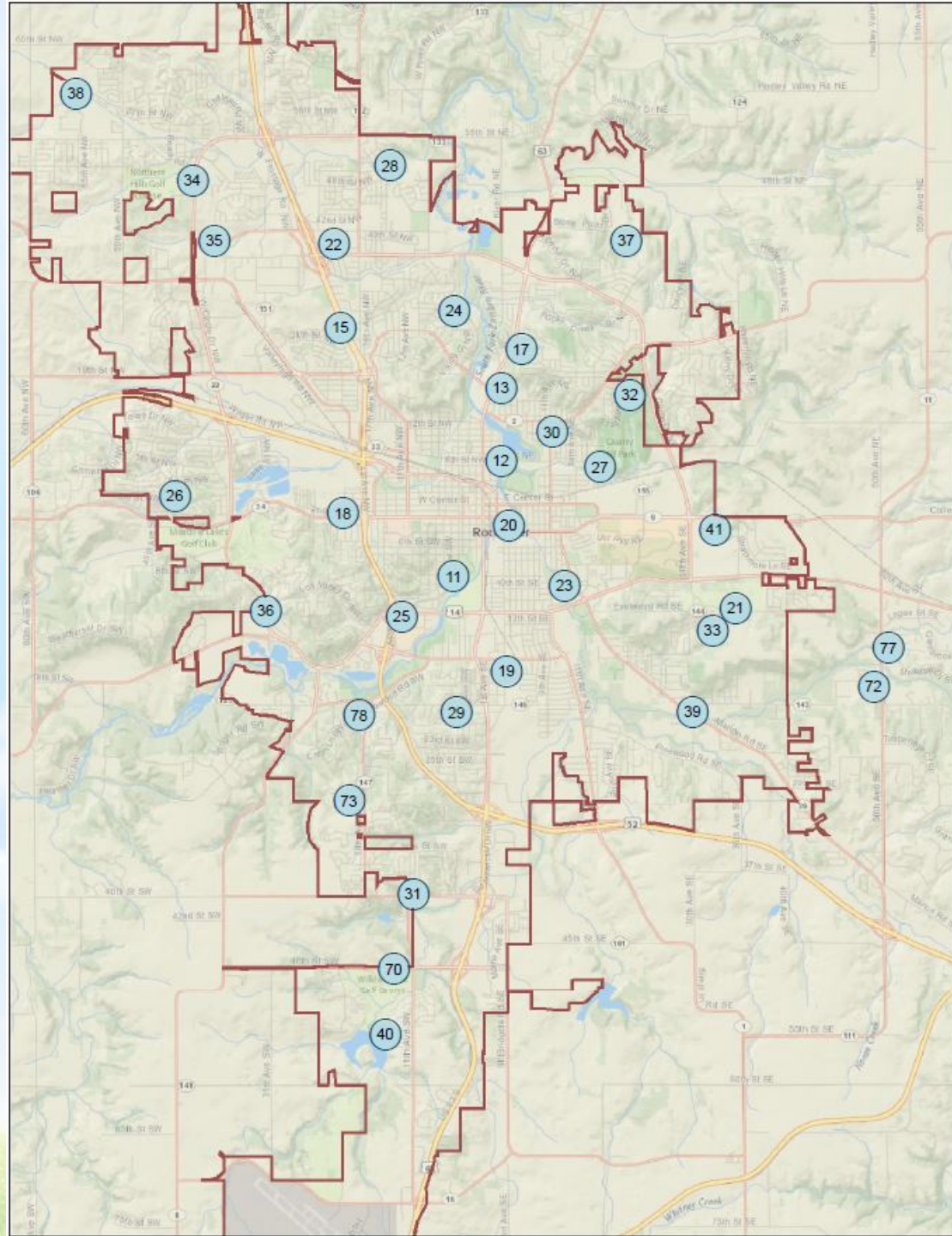
2018 Water System

- 31 wells
 - Wells pump from a total of 5 aquifers
 - 400 to 1,000 feet deep
- Total Annual Pumpage 4.5 billion gallons
 - DNR Appropriations is currently 5.7 BG/YR
 - Peak day demand 22.6 mgd (August 15th)
 - Avg. day demand ~11.9 mgd
 - Historic Peak Day 30.2 mgd (2007)
- 20 Water Storage Facilities
 - 16.95 million gallons
- Serves a population of ~115,000
- Water customers ~40,400





Hydrostratigraphy (Thickness, ft)
Galena aquifer (190)
Decorah confining (42-55)
Platteville (18-24)
Glenwood (5-10)
St. Peter aquifer (92 to 112)
Shakopee aquifer (175-255)
Oneota confining unit (125)
Jordan aquifer (75)
Jordan confining (20)
St. Lawrence confining unit (60-75)
Tunnel City Aquifer (82)
Tunnel City confining unit (82)
Wanewoc aquifer (65)
Eau Claire confining unit (~110)
Mt. Simon aquifer (~200)
Precambrian confining unit



Wells

Well Facts

RPU has
over 30
wells

RPU's wells
range from
400'-1,000' deep

The majority of
groundwater
comes from the
Jordan Aquifer

Most wells
have 24
inch steel
casing

Well 16

Well 41

Well 26

Hydrostatigraphy
(Thickness, ft)

Galena Aquifer
(190)

Decorah Conf. (42-55)
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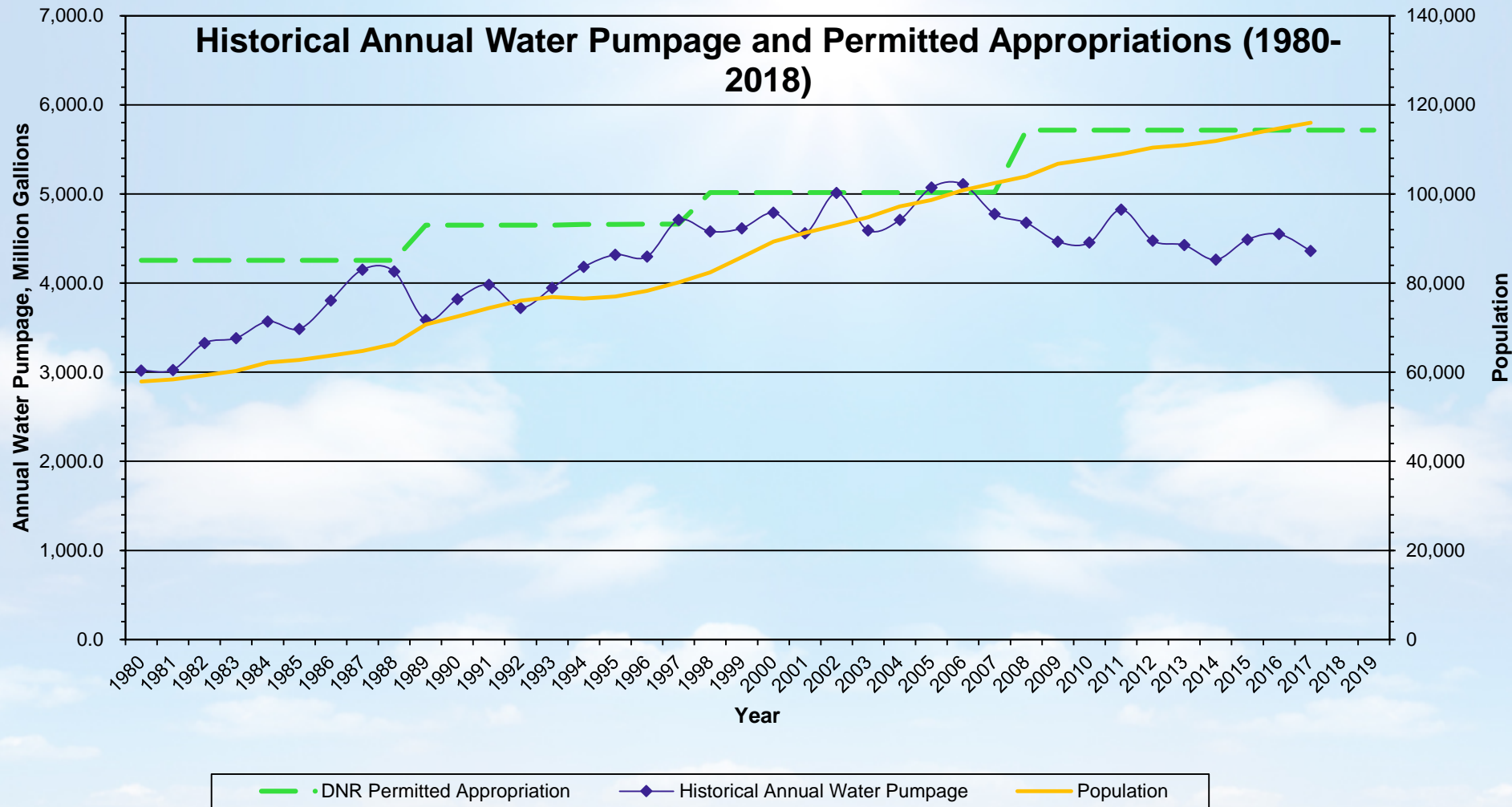
Eau Claire Conf. Unit
(~110)

Mt. Simon Aquifer
(~200)

Precambrian Conf. Unit



Historical Pumpage 1980-2018



Destination Medical Center (DMC)

- Largest Economic Development Initiative in Minnesota's History
- \$5 billion in private development, \$585 million in public infrastructure investment (State, City, County)
- Expected growth from 115,000 to 165,000 while adding 50,000 new jobs by 2040



Rochester Projected Growth (2019-2040)

Year	Population	Per Capita Demand (gpcd)	Ave Daily Demand (MGD)	Max Daily Demand (MGD)
2019	119,100	110	13.10	28.17
2020	121,000	110	13.31	28.62
2021	123,200	110	13.55	29.14
2022	125,400	110	13.79	29.66
2023	127,600	110	14.04	30.18
2024	129,800	110	14.29	30.70
2025	132,000	110	14.52	31.22
2030	143,000	110	15.73	33.82
2040	165,000	110	18.15	39.02

Wellhead Protection Summary

Goal - Preventing the risk of contamination of public water supply wells by managing potential contaminant sources in the area which contributes water to the well

WHP plans (every 10-yrs)

Part 1

- Delineated Wellhead Protection Areas (Groundwater model – 10 yr TOT)
- Aquifer & Well Vulnerability Assessment

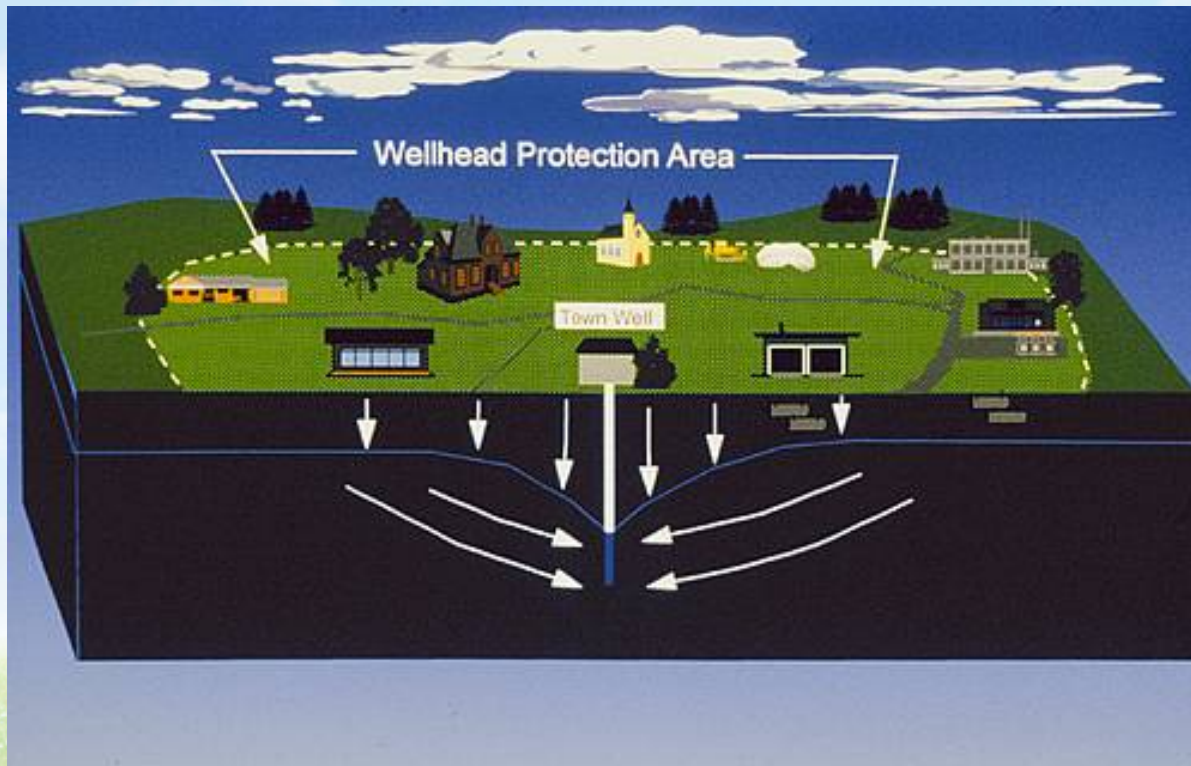
Part 2

- Inventory of the Potential Contaminant Sources
- Implementation of the Plan
- Goals & Evaluation

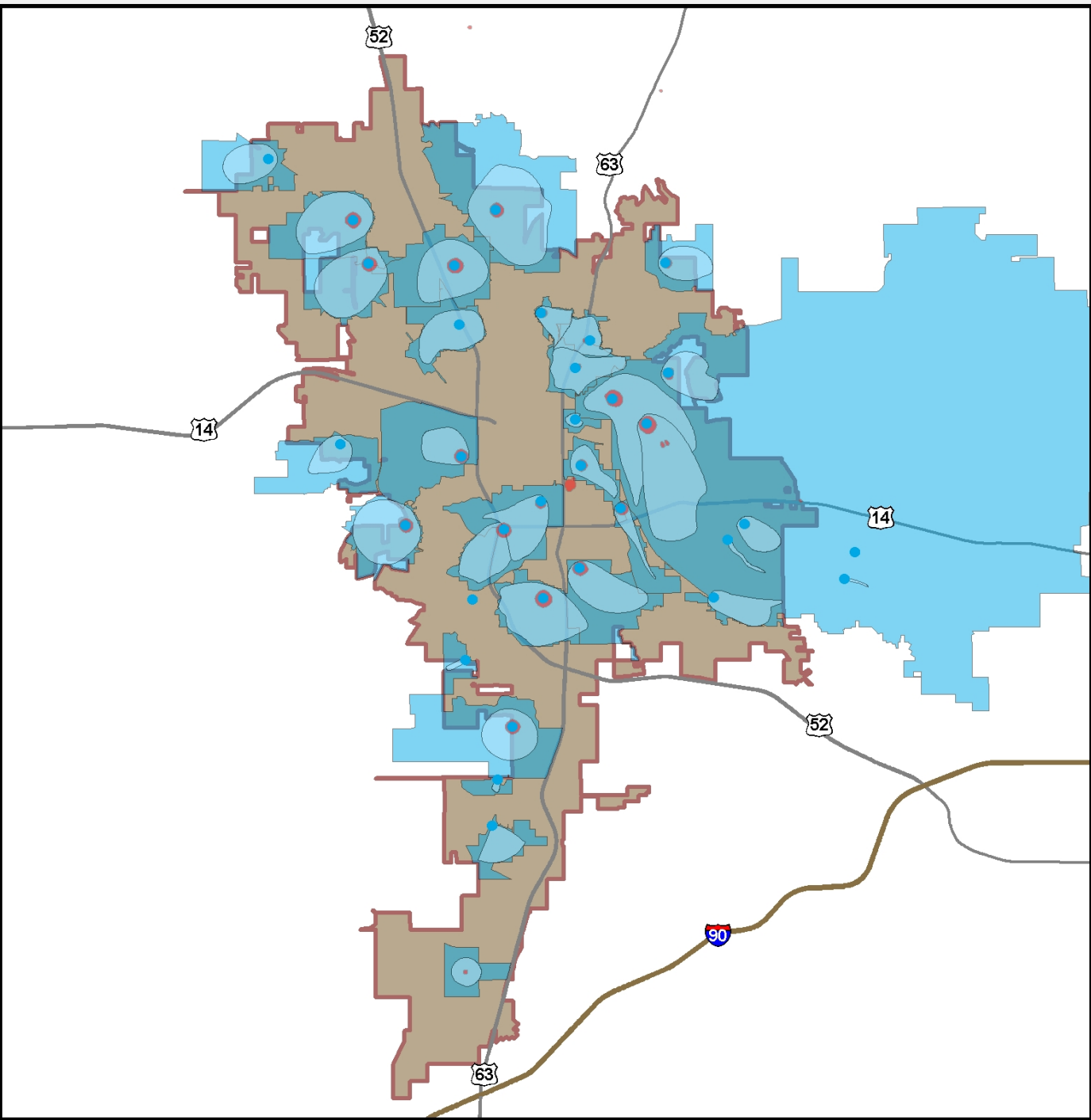
WHP Planning – Part 1

WHP Plan **Part 1** – September 2017

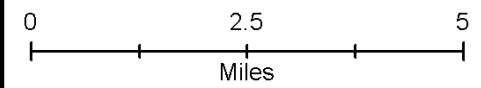
- Delineation of WHPA & DWSMA's
- Vulnerability Assessment of the Aquifer and Wells



Wellhead Protection Program
Rochester Public Utilities

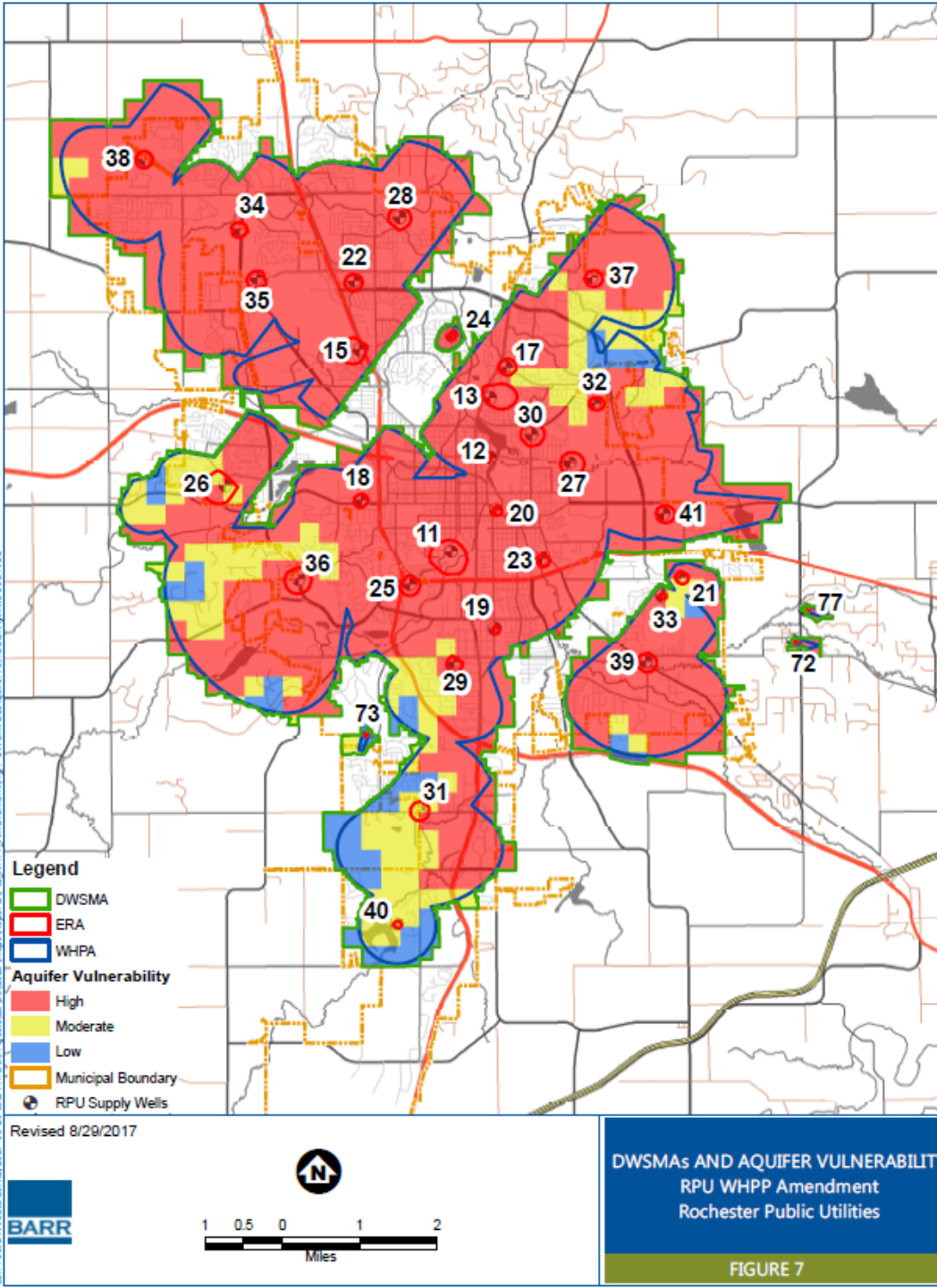


- RPU Well
- ERZ
- WHPA
- DWSMA



RPU's Current Wellhead Protection Areas (WHPA's)

- Emergency Response Zone (ERA)
 - 1 year TOT Zones
- Drinking Water Supply Mngt. Areas (DWSMA)
 - Aquifer Vulnerability



WHP Planning – Part 2

WHP Plan **Part II** – Summer 2019

- Potential Contaminant Source Inventory
- Develop Goals, Objectives, Plans of Action, Evaluation Program & Contingency Plan



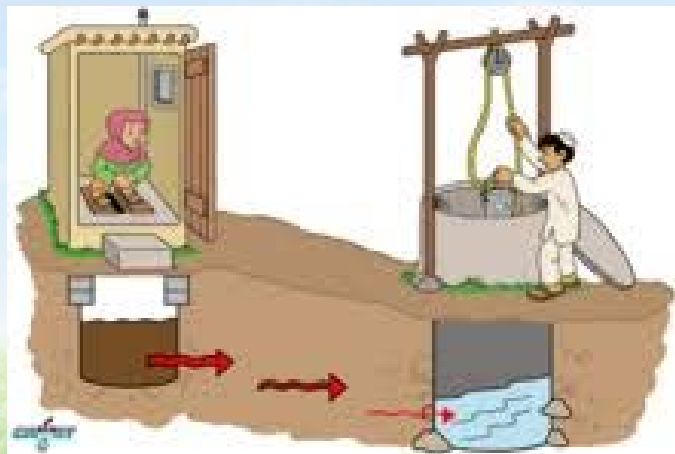
Examples of Potential Contaminant Sources Inventory (PCSI)

- Above-Ground Storage Tanks
- Animal Feed Lots
- Hazardous Waste Generators
- Land Applications: Ag Chemicals, Fertilizers, Biosolids
- Wells & Class V Wells
- Spills
- Septic Systems
- Stormwater Basins
- Rail Crossings & Bridges



MDH PCSI Pilot Program

- RPU Received a \$10K Source Water Implementation Grant from MDH
- Grant focused on new approach to collect PCSI
- GIS property parcel based approach using SIC & NAICS codes
 - Assigned PCS codes to each parcel
- Prioritized contaminants of concern
 - “Wells” provide a direct pathway for contaminants
- Prioritized based on proximity to the well
 - Emergency Response Area (ERAs)
 - 1-yr TOT



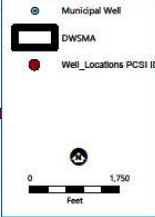
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Figure C7-c

Figure C7-c

Class V Wells

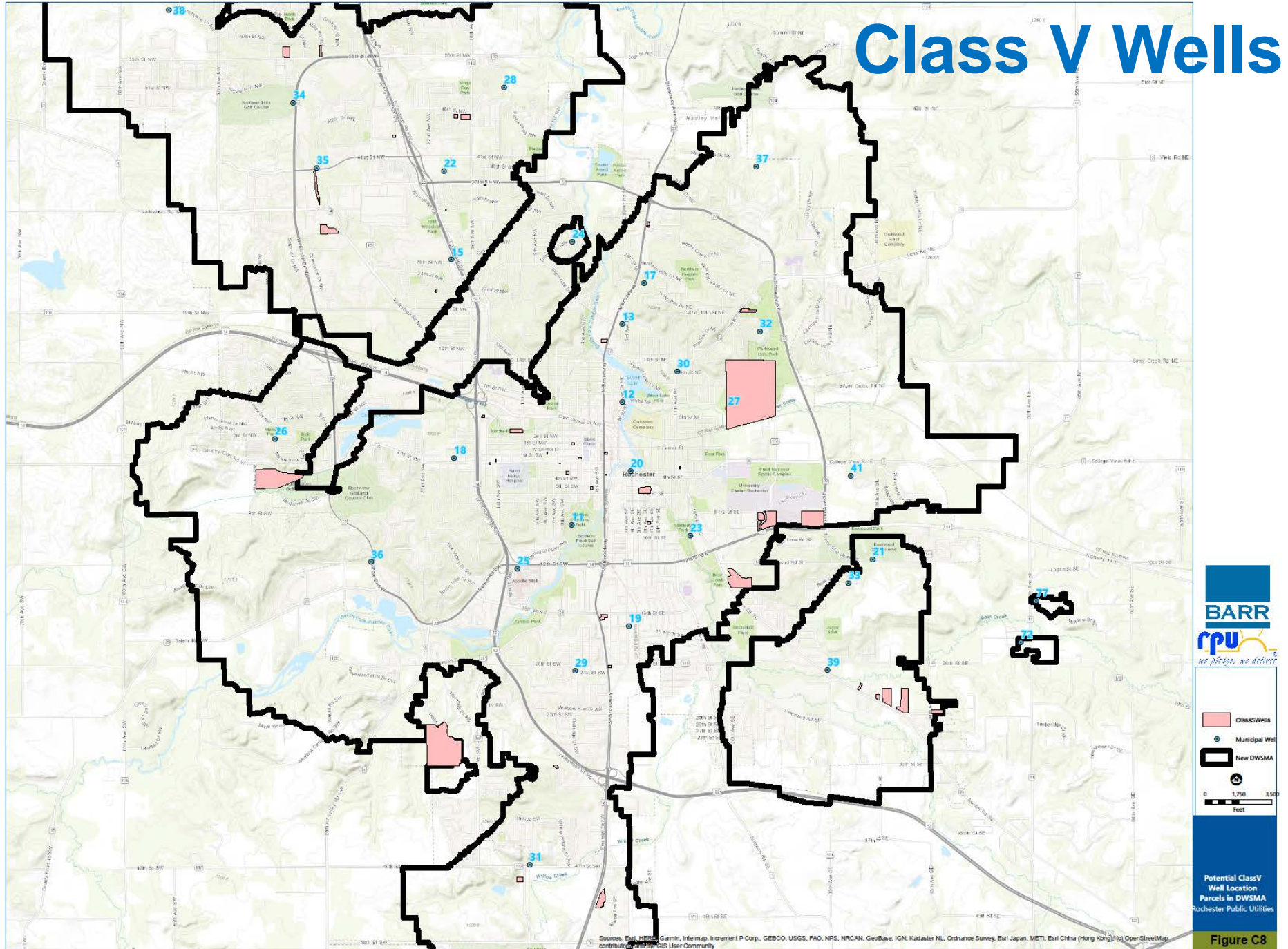
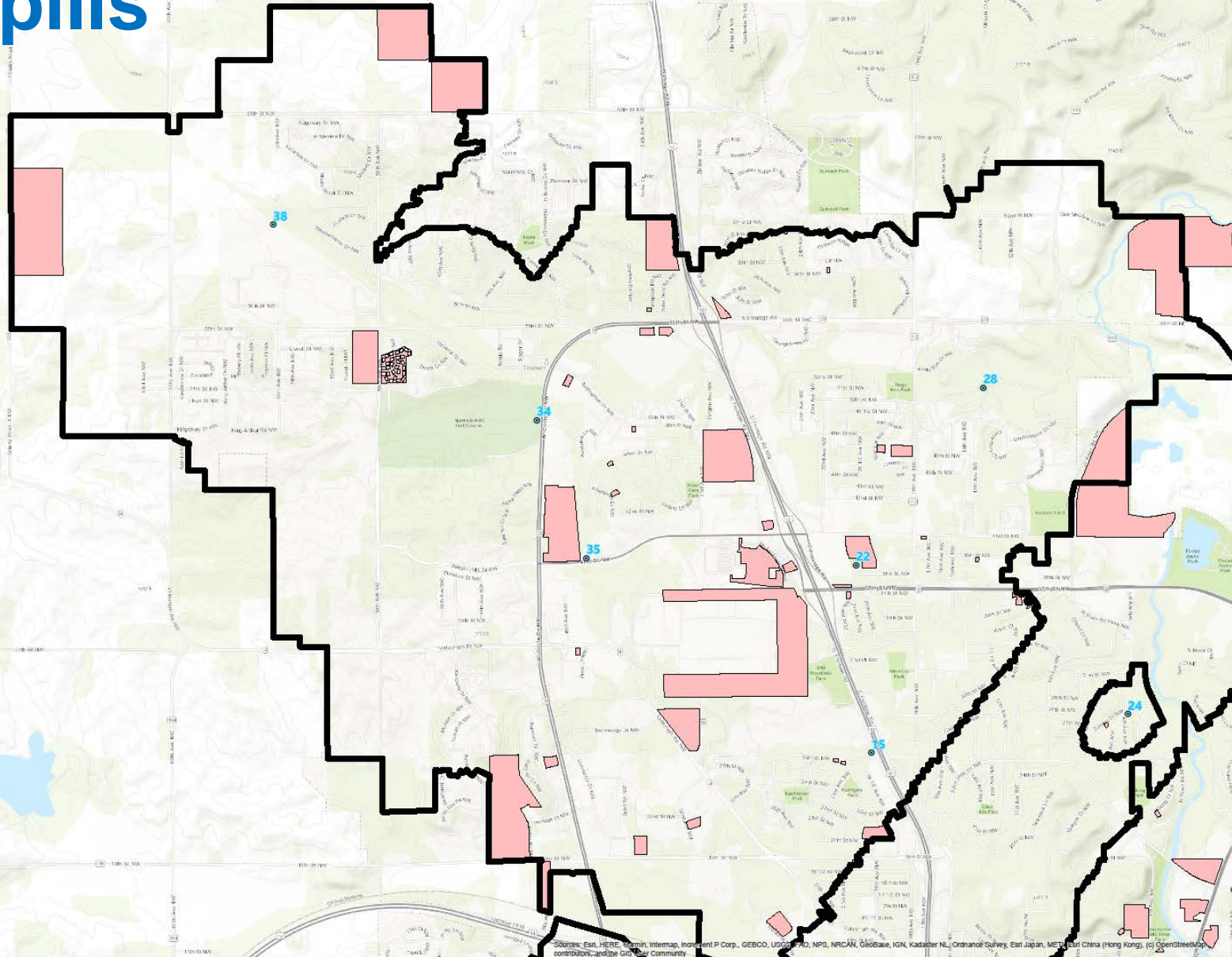


Figure C8

Spills



BARR
rpw
we bridge, we deliver

Spills
 Municipal Well
 New DWSMA

0 1,750
 Feet

Spill
 Location
 Parcels in DWSMA
 Rochester Public Utilities

Figure C12- a

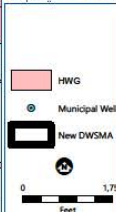
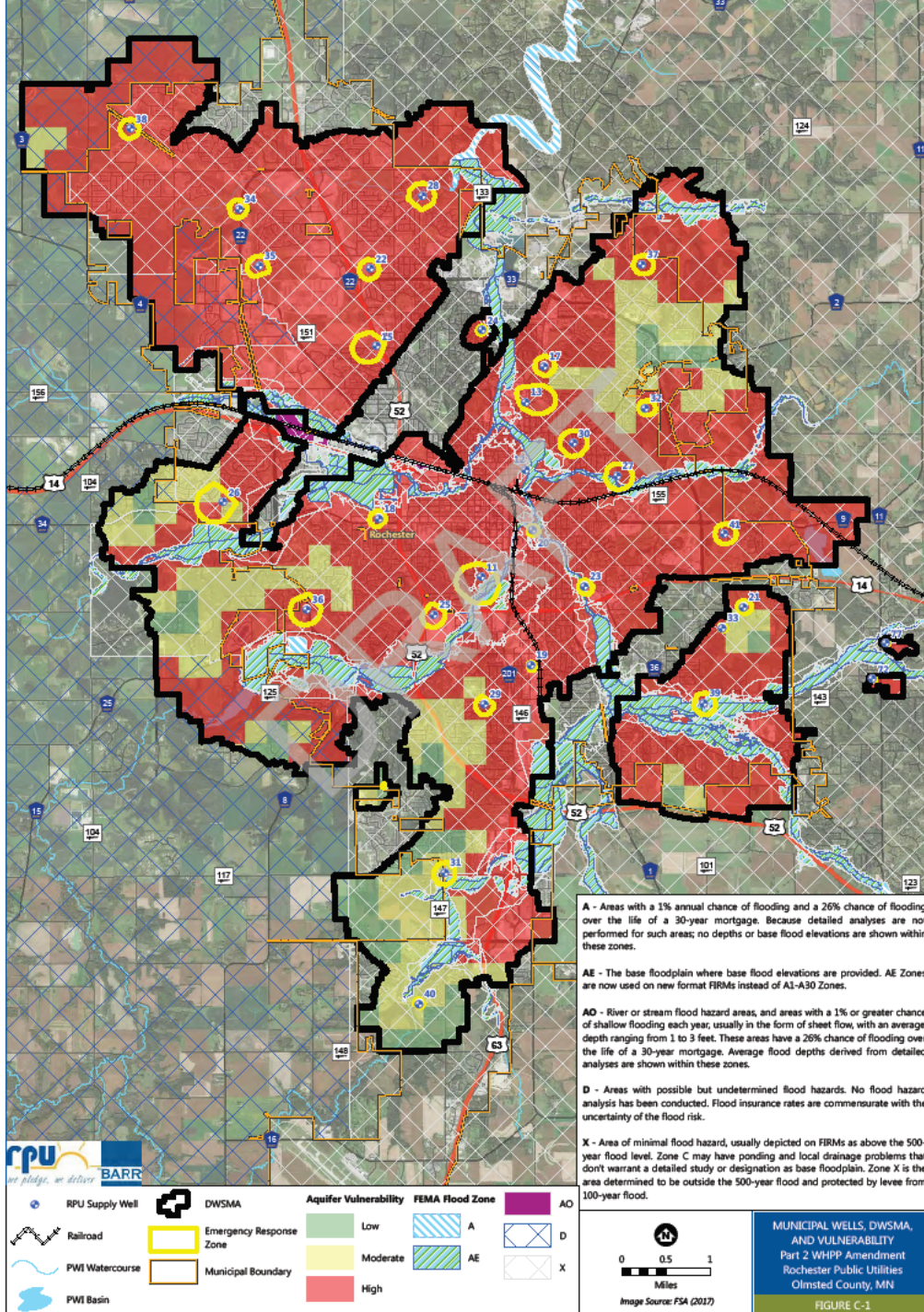
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Figure C15-

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, MGS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, OpenStreetMap contributors, and the GIS User Community

Emergency Response Areas (ERAs)

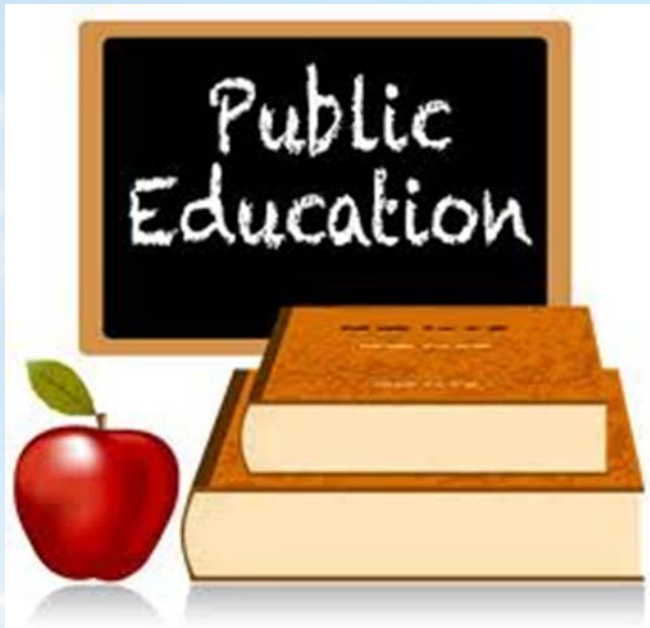


RPU's WHP Goals

1. **Maintain or Improve Water Quality**
2. **Work with Olmsted County & Appropriate State Agencies to Protect Source Water Aquifers**
3. **Increase Public Education & Community Awareness**
4. **Continue to Collect Data to Support Future Wellhead & Source Water Protection Efforts**



Public Education & Community Awareness



Public Education & Community Awareness - Objective

- Increase Public & Internal City Staff Awareness
 - General knowledge about the importance of WHP
 - Identify steps that individuals & businesses can take to help maintain the quality & quantity of the community's drinking water

Public Education & Community Awareness – RPU's Efforts

- Bill Inserts / News Letter / Brochures
- Presentations / Tours
 - Schools, Social Groups, Other City Dept.
- City Web Page
- Community Events / Science Centers
 - Science Fairs, Drinking Water Week, Arbor Day, Town Festivals etc...

2006

OLMSTED COUNTY HAZARDOUS WASTE FACILITY

305 Silver Creek Road NE • Rochester, Minnesota
MON-FRI 8am - 5pm • SAT 8am - 1pm
Questions? Call (507) 285-8231.

• BRING •

Acids/Bases
(corrosives)
Aerosols
Auto, Rechargeable &
Button Batteries
Automotive Fluids
Cleaners & Solvents
Mercury Products
(such as thermometers)
Paints, Stains & Varnishes
Pesticides/Herbicides
(poisons)

• DON'T BRING •

Alkaline Batteries
Empty Containers
Explosives
Medical Wastes
Radioactive Materials
Unidentifiable Products
Used Motor Oil



ANSWERING YOUR QUESTIONS

Rochester's Public Works Department and
Rochester Public Utilities work hard to ensure the
safety of our water supply. Contact us with any questions
you may have about the quality of our water!



CITY OF ROCHESTER Stormwater Management

201 4th Street NE • Rochester, MN 55904
(507) 287-1900 • www.rochestermn.gov/stormwater



ROCHESTER PUBLIC UTILITIES Groundwater Protection

4000 East River Road NE • Rochester, MN 55906-2813
(507) 280-1500 • www.rpu.org/environment/water_quality

Keeping
it Clean



Storm Water
MANAGEMENT

Keeping
it Clean



Ground Water
PROTECTION

If you think your
actions on land
don't matter...



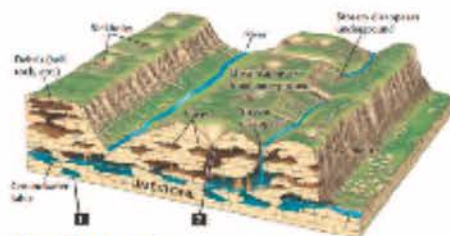
Drink
this!

Help keep our
water clean by
properly managing
your hazardous waste!

THE WAY WATER WORKS

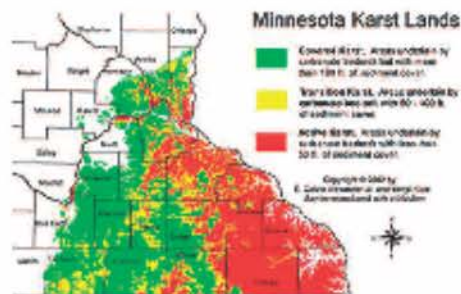
Rain and snowmelt, or **stormwater**, can easily drain through the porous and cracked bedrock that lies beneath Rochester, sinking until it becomes **groundwater**. Wherever stormwater goes, so do the pollutants it carries. Even hazardous liquids dumped on the ground can eventually reach the groundwater we drink.

This transfer of pollutants can happen because we live in a *harst* landscape – an area with shallow soils and porous bedrock that can quickly transport water.



Karst Topography

Groundwater in karst areas is usually sensitive to contamination from the way we live. When surface water rapidly flows to become groundwater, there is little time for filtration of pollutants before it reaches a drinking water well. *Therefore, what we do on the land today can have lasting effects on the groundwater we drink tomorrow.*



Source: H. Cabiri Alexander, University of Minnesota

WHAT YOU CAN DO TO PROTECT OUR WATER

Learn to recognize hazardous products when you buy them and dispose of them properly. If a container lists one or more of the following descriptions, it probably contains hazardous chemicals.

- Danger
- Corrosive
- Caution
- Combustible
- Poison
- Contains Acid
- Flammable
- Contains Lye
- Warning
- Toxic
- Causes Burns to the Skin
- Contains Petroleum Distillates

If used or disposed of improperly, hazardous chemicals can be harmful to human health and the environment. Consider buying a less hazardous alternative! When purchasing an alternative product is not an option, always follow these tips:

- TIP #1** Use and store hazardous products according to the directions on the label. Keep them in their original containers and never remove the labels.
- TIP #2** Use them in their entirety and only for their intended purpose.

- TIP #3** Never mix leftovers with other products.
- TIP #4** Residents may take household hazardous waste (see list of approved items on other side) to the Olmsted County Hazardous Waste Facility. There may be a charge for some materials. Small businesses and non-profit organizations pay a small fee for service.*
- TIP #5** NEVER dump hazardous waste into storm drains or sanitary sewers!

* Very Small Quantity Generator Program

Businesses and organizations in Rochester that generate 220 pounds or less of hazardous waste per month may participate in the Very Small Quantity Generator Program. This fee-for-service program provides a cost-effective means of proper disposal, thereby avoiding potential environmental, financial, health, and safety risks. Call (507) 285-8231 to learn more.



All About Aquifers

The Water Underground

Water that settles in an underground reservoir of porous rock, sand or gravel is called an aquifer. Much of our drinking water comes from aquifers, not to mention the water used for agriculture and industry. Because of natural filtration, the water in aquifers is usually cleaner than surface water above.



Water in Motion

When there's rain, it soaks into the ground through porous rocks and sand. It soaks into the ground so fast that it can't be seen. It's called groundwater. It's always moving, but it's moving so slowly that it's almost invisible.

The water table is the level of water in the ground. It's the level of water that is closest to the surface. It's the level of water that is closest to the surface. It's the level of water that is closest to the surface.

Did you know?

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Which rock holds more water?

Granite is a hard rock. It's made of many different minerals. It's very strong and it's very hard. It's very strong and it's very hard. It's very strong and it's very hard.

Sandstone is a soft rock. It's made of sand and it's very porous. It's very soft and it's very porous. It's very soft and it's very porous. It's very soft and it's very porous.

Shale is a soft rock. It's made of clay and it's very porous. It's very soft and it's very porous. It's very soft and it's very porous. It's very soft and it's very porous.



The Ground Below Us

Take a closer look
at the aquifer system
below Rochester.

Karst Uplands

Much of southern Minnesota
rests on Karst terrain—an area
with limestone and dolomite
bedrock easily dissolved by
rainwater. Karst regions are
vulnerable to groundwater
pollution as contaminants can
move easily through crevices,
caves and springs.

Jordan Aquifer

Much of the city's drinking water
comes from the layer of sandstone
approximately 100 to 1,000 feet
below the ground.

Glacial Drift

Waukegan Formation

Galena Group

Decorah Shale

Platteville Formation

Greenwood Formation

St. Peter Sandstone

Prairie du Chien Group

Jordan Sandstone

St. Lawrence Formation

Tunnel City Group

Waukegan Sandstone

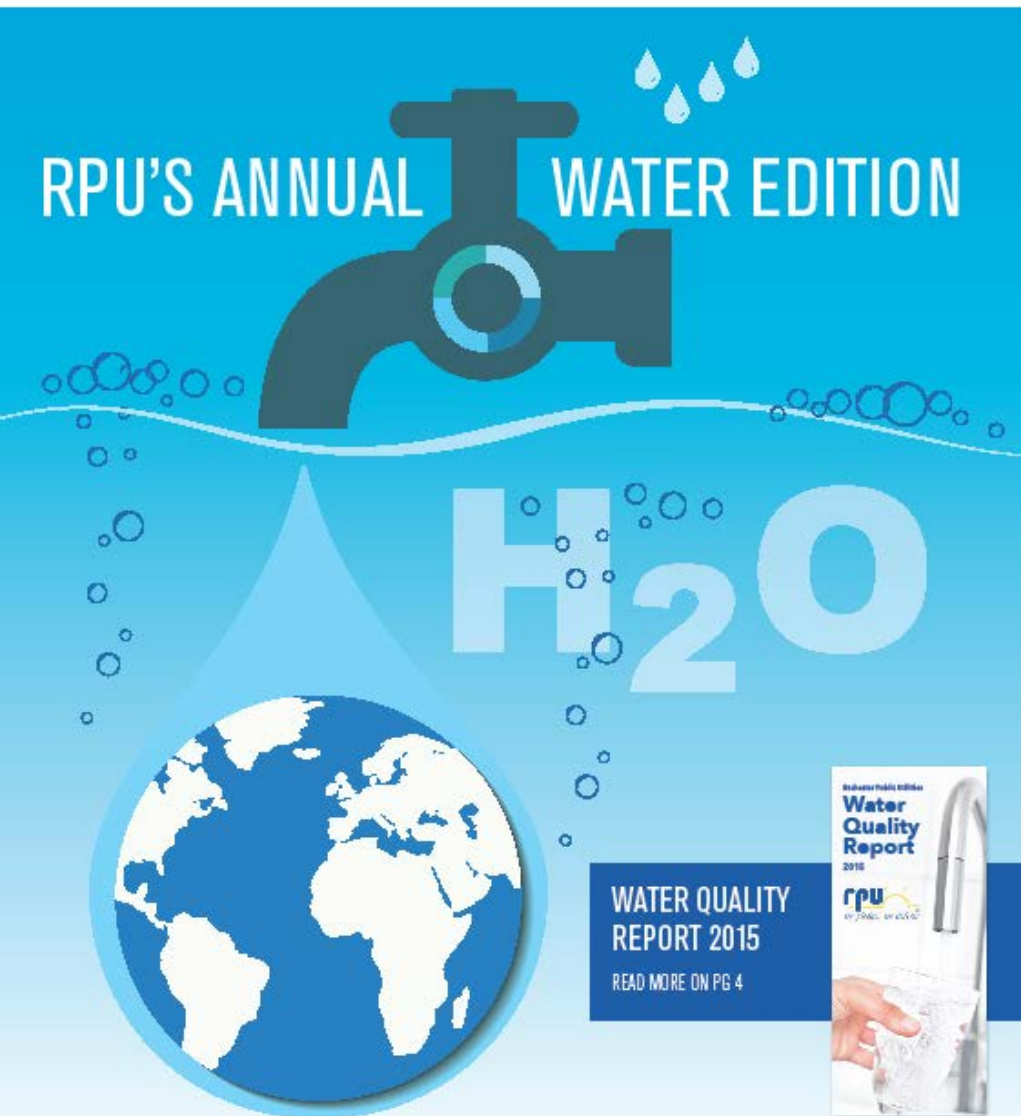
East Claire Formation

St. Simon Sandstone





RPU Plugged In



FEATURING: 4 Water Quality Report 2015 | 5 Leaving Town or Moving? | 6 St. Bridget Water Tower Progress Photos

RPU Plugged In

- New RPU Newsletter
- 2012 to Present
- ~50,000 Customers
- May is focused on Water
- Monthly Water Conservation Tips



School Tours

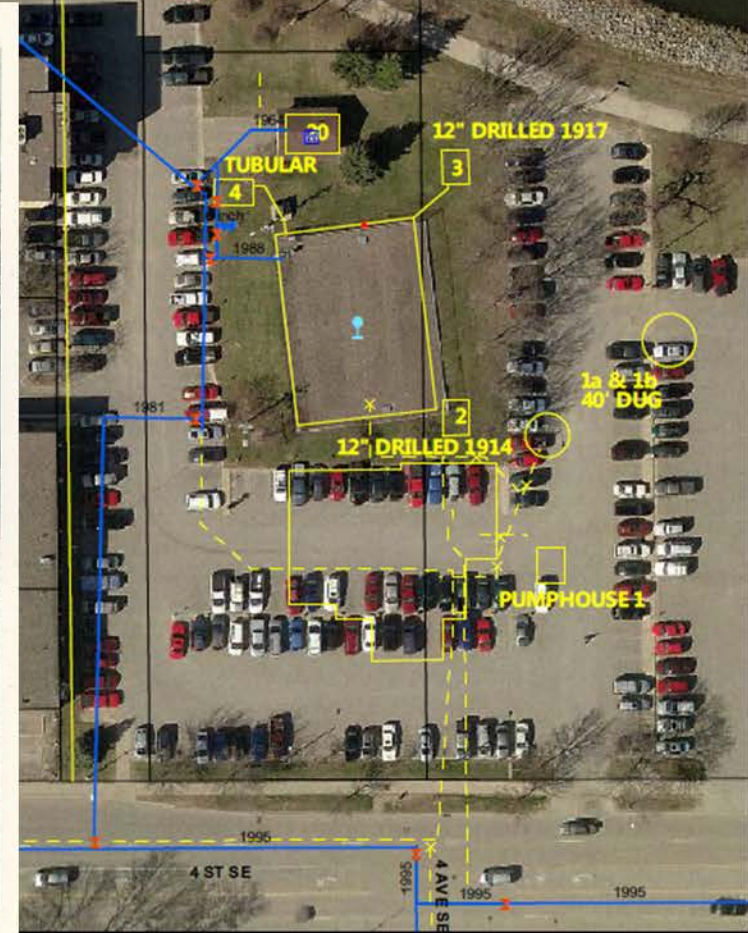
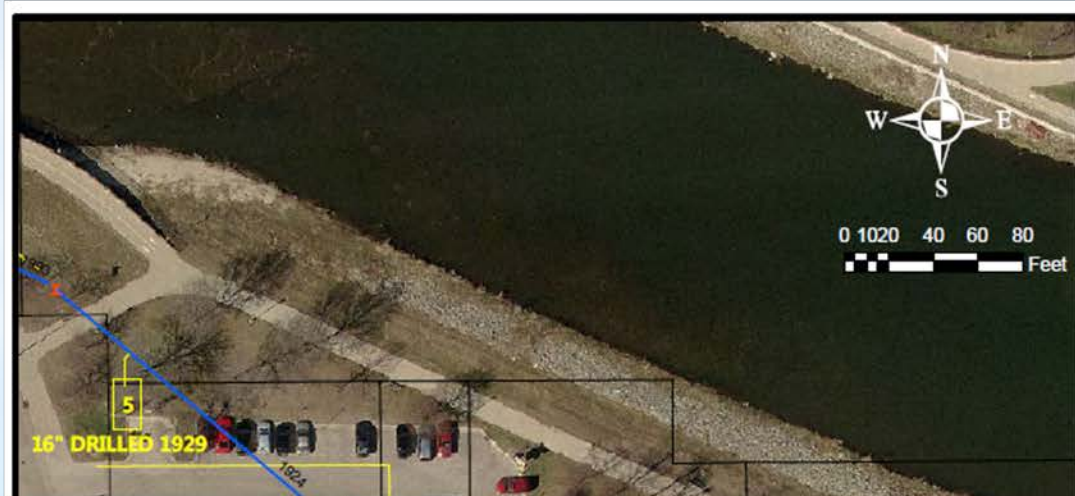


Drinking Water Week

- Public Tours of Water Tower & Well
- Promotional Giveaways
 - Rain Barrels & Water Bottles
- Water Bottle Display in Lobby



Old Municipal Well Sealing Project



		Target Implementation/Completion Year									
Management Action		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
7.2 Well Management											
7.2.1	Distribution of Well Operation and Maintenance Information	X									
7.2.2	Promote the Proper Sealing of Unused, Unmaintained, Damaged, or Abandoned Wells within the DWSMAs	X	X								
7.2.3	Seal Old Municipal Wells		X								
7.2.4	Identify New High Capacity Wells Within or Near the DWSMAs	X	X	X	X	X	X	X	X	X	X
7.3 Potential Contaminant Source Properties											
7.3.1	Information for Registered Storage Tank Owners	X	X					X			
7.3.2	Tracking of Registered Storage Tanks					X					
7.3.3	Information for Chemical Storage and Hazardous Waste Generator Properties	X									
7.3.4	Inner Wellhead Management Zone Management			X			X			X	
7.3.5	Transportation Corridors, Pipelines, and Emergency Response	X	X								
7.4 General Public Education											
7.4.1	Wellhead Protection Information	X	X	X	X	X	X	X	X	X	X
7.4.2	Drinking Water Quality Report	X	X	X	X	X	X	X	X	X	X
7.4.3	Inclusion of Wellhead and Source Water Protection in the Planning Process within the DWSMAs	X	X	X	X	X	X	X	X	X	X
7.4.4	Inclusion of Wellhead and Source Water Protection Information in Public Presentations	X	X	X	X	X	X	X	X	X	X
7.4.5	Source Water Protection Coordinating Committee	X									
7.5 Data Collection											
7.5.1	Monitoring Static and Pumping Levels in RPU Wells	X	X	X	X	X	X	X	X	X	X
7.5.2	Water Quality Database Upgrade	X	X								
7.5.3	Groundwater and Surface Water Quality Data Collection				X						
7.5.4	Sampling of RPU Water Supply Wells	X	X	X	X	X	X	X	X	X	X
7.5.5	Other Geologic and Hydrogeologic Data Collection	X	X	X	X	X	X	X	X	X	X
7.5.6	Updating RPU's Groundwater Model					X	X	X			
7.5.7	Potential Contaminant Source Database				X	X	X				
7.5.8	Tritium Sampling				X						
8.0	Evaluation Program		X		X		X		X		X

Water Quality Testing

1. Distribution System (RPU Lab)

- 3,107 Fluoride
- 1,220 Bacteria & Total Chlorine
- THM's & HAA5
- Lead & Copper

2. Municipal Wells (MDH Lab)

- Nitrate
- Radionuclides
- Radon
- Arsenic (<1.0 ppb)
- Inorganic Compounds (IOC's)
- Volatile Organic Compounds (VOC's)
 - TCE & PCE
- Synthetic Organic Compounds (SOC's)
- Unregulated Contaminant Monitoring Rule (UCMR's)
 - PFOS, Pharmaceuticals



Nitrate in RPU Wells

- RPU's 31 Municipal Wells Tested Annually
 - 25 wells tested below detection level limit (0.05 ppm)
 - 6 wells tested at or above detection level
 1. Well #13 (Kellogg School) – **0.49 ppm**
 2. Well #15 (South of IBM) – **0.23 ppm**
 3. Well #39 (Marion Rd) – **0.13 ppm**
 4. Well #41 (RCTC) – **0.12 ppm**
 5. Well #26 (CCM) – **0.07 ppm**
 6. Well #33 (Eastwood Golf) – **0.05 ppm**

QUESTIONS?



CONTACT INFORMATION

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