
 Madison Water Utility	PROJECT SCOPING DOCUMENT	Project Manager:	Dennis M. Cawley P.E.
		Project Information:	Pressure Zone 4 Water Supply Augmentation
		Draft:	
Department:	Section:	Revised:	
Madison Water Utility	Engineering	Approved:	

Project Scoping Document

Pressure Zone 4 Water Supply Augmentation

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1. Project Description

A description of the project, including a map showing existing facilities, approximate location of proposed facilities, documented contaminated sites, the extent of the Eau Claire shale (if applicable) and the location of floodplain areas.

The 2006 Water Utility Master Plan identified fire flow deficiencies throughout significant portions of Pressure Zone 4 (PZ4). PZ4 is supplied by a single source, which makes it vulnerable and the water supply less reliable. PZ4 is also expanding rapidly to the southeast making Unit Well 9 hydraulically remote from the far reaches of the zone and therefore difficult to move water efficiently and effectively to where it is needed.

The Madison Water Utility proposes to construct a new Unit Well in the southeast corner of the City in Pressure Zone 4. At this time the only identified potential location for the well is 5802 Femrite Drive. A location map of this site and system facilities map are attached as Exhibit A.

A standard Madison unit well consists of a deep well capable of producing 3 MGD, an approximately 400,000 gallon reservoir, and a booster station. This booster station is expected to have multiple sets of booster pumps, as it will be designed to serve both pressure district 6(PZ6) and pressure district 4 (PZ4).

This well will serve PZ4 by connecting to the existing water main immediately in front of the site. In order to provide service to PZ6 an additional 7000 feet of 12 or 16 inch water main will be need to be installed.

2. Purpose


The purpose and necessity of the project, with supporting data including recent and anticipated water consumption data and hydraulic model summarizations.

The two primary reasons for needing another unit well in this area are fire protection and supply redundancy.

During the preparation of the 2006 Water Master Plan, PZ4 was analyzed for fire flow capability and the fire flow analysis of our current system shows significant areas of deficiency in this zone. The criteria established to determine fire flow requirements and maps showing areas of fire flow deficiency are included in Exhibit B.

The system facilities map shows that PZ4 is presently served only by Unit Well 9. When Well 9 is out of service valves must be opened so that service can be maintained from PZ6. All points of connection between the pressure districts are at the northern end of PZ4. When Well 9 is down the system has difficulty maintaining adequate flow and pressure in the rapidly expanding southeast portion of this pressure zone.

Once constructed PZ4 will have excess supply capacity when both wells are in service. The proposed dual pump station and transmission main will allow water to be pumped from PZ4 to PZ6 to supplement supply in PZ6. This function will serve to delay future well projects within PZ6 and will improve supply reliability.

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3. Projected Effect

The projected affect of the project on quality and reliability of service, and hydrologic impacts.

This project will increase system reliability and improve fire protection to the customers in Pressure Zone 4.

4. Alternatives

A description of alternative projects or programs considered (This does not include specific site comparisons during early phases of the project).

1. Transfer water from Pressure Zone 6

a. Description

Instead of creating redundancy from a new well, one alternative would be to transfer water from other existing wells in other pressure districts.

b. Discussion

The only adjoining pressure district is PZ6. This is how the Water Utility currently provides water to PZ4 when Unit Well 9 is taken out of service.

There are two problems with this current scenario. The first is that because PZ6 operates at a higher hydraulic gradient than PZ4 the 3 million gallon reservoir at Unit Well 9 is taken out of service and thus while the static pressures are actually raised the fire protection in this zone is reduced during these periods. To overcome this a series of pressure reducing stations along with larger transmission mains would have to be installed along the border between the two districts. The second problem is that this alternative puts more pressure on the wells in the eastern portion of PZ6. PZ6 east does not have excess supply capacity, especially with the use of Unit Well 29 at 1100 gpm, and the loss of Unit Well 3. This lack of surplus makes routine transfer of water to PZ4 unfeasible.

2. Transfer water from adjacent municipalities

a. Description


Another alternative would be to purchase water from other municipalities.

b. Discussion

The only adjoining municipalities are the City of Monona and the Village of McFarland. Neither municipality however has enough excess capacity to meet our supply needs. A new well would have to be constructed in one of the adjoining municipalities.

3. Construct a reservoir only, without a deep well

a. Description

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Instead of drilling a well we build a large reservoir only on the site.

b. Discussion

A large reservoir would provide needed supplemental supply for fire flow but it would not be a redundant water supply source. Since PZ4 has a domestic water demand of about 1 MGD even a 6 million gallon reservoir would have less than a weeks capacity and thus would not solve the redundant supply problem. This alternative does not meet all project objectives.

5. Photographic Examples

Photographic examples of similar facilities with discussion of possible variations.

The most recent similar projects are Unit Wells 28, 29, & 30. Photos of these wells are attached as Exhibit C for your viewing in order to give all parties an idea of the size and scope of the project, as well as seeing different architectural styles.

6. Cost Estimate

The cost of the project by major plant accounts.

The total budget for this project is \$3,259,000. This breaks down to \$601,000 for well construction, \$269,000 for design, and \$2,990,000 for construction. Previously the Water Utility spent \$56,976.44 on a test well at this site. Also previously the Water Utility paid a \$13,196 sewer assessment on this property. This creates the following estimate of final project cost by major plant account.

Land \$13,196
 Well \$658,000
 Reservoir \$854,000
 Pumphouse \$1,297,000
 Pumping Equipment \$997,000
 Chlorinating Equipment \$23,000
 Fluoridating Equipment \$ 20,000
 Telemetry Equipment \$68,000


7. Financing

The proposed method of financing the project.

We propose to continue our practice of financing new construction through revenue bonds.

8. Operational Costs

The estimated annual operating costs of the project, by major expense accounts, to include possible fiscal effects of water treatment if anticipated.

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The following are average yearly operating costs for a typical well:

Power \$ 80,000 to \$ 110,000
 Building and Pumping equipment maintenance \$ 18,000
 Chemicals \$ 7500
 Chemical equipment maintenance \$5000
 Sampling and testing \$ 13,000

9. Replacement Costs

A description of and the original cost of any property being replaced, by major plant accounts.

No Utility property is being replaced with this project.

10. Designation of Affected Parties, Notification List

The designation of public utilities, alders, and other persons materially affected by the project and a list of those, which have been notified.

Attached as Exhibit D is a list of all property owners within ¼ mile of Femrite site. At the request of Commissioner Melton six “at-large” stakeholders were added to the list. The alderperson for this district is Judy Compton. There is no neighborhood association in the vicinity of this site.

11. RFP for Property Valuation Analysis

A draft request for proposals (RFP) for the acquisition of services to determine the impact on values of adjoining properties.


It is anticipated that this project will have no negative impact on the real estate values of the surrounding area. If requested the Madison Water Utility will prepare an RFP for the acquisition of services to determine the impact on values of adjoining properties.

12. Site Selection Criteria

A description of the draft site selection criteria to be used in locating, evaluating, and ranking potential sites for the proposed facility. Site selection criteria categories will include regulatory requirements, groundwater quality and quantity, aesthetic impact, compatibility with existing neighborhood context, historic land use, existence of natural buffers, and environmental equity/justice considerations.

When determining the permanent location for this well the following criteria will be considered: Quantity and quality of available water, land availability and cost, proximity to sources of contamination, proximity to large transmission mains, and neighborhood impact. Other criteria may be added by the Citizens Advisory Panel.

The site at 5802 Femrite Drive was dedicated to the Water Utility at no cost as part of the creation of the Second Addition to World Dairy Center Plat in 1996. This site was selected due to its availability, its proximity to a natural drainage way, and its proximity to existing distribution mains.

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In 2001 the Water Utility did consider an alternative site in the Madison Commerce Park Plat on Marsh Road approximately 1000 ft. south of Voges Road. However due to the presence of a quarry just east of this site the Wisconsin Department of Natural Resources indicated that they would not approve this site for a municipal well.

When siting wells in this pressure zone it is important to note that due to the existence of certain geological conditions, mainly a fault line that does not allow the lateral movement of water, there are lands in this pressure zone where adequate capacity does not exist for a municipal well. A municipal well, originally drilled by the Town of Blooming Grove on Savannah Road, and Parks Department irrigation wells at Yahara Hills all have specific capacities ten to twenty times less than our standard City of Madison wells.

In 2004 the Water Utility had a test well drilled on the Femrite site in order to determine if water quality and quantity was adequate for a permanent well. A packer assembly was installed at the top of the Mount Simon formation in order to test the water in the lower aquifer. Results of the test pumping indicate that this is an appropriate location for a permanent well. Test well results, the well log, and the drillers report are included as Exhibit E.

13. Project Timeline

The estimated project timeline, with identifies major project phases and decision points requiring an approved resolution from the Water Utility Board. Project phases requiring a resolution shall, at a minimum, include the establishment of the proposed project, the facility site selection, and the site plan selection.

The key dates in the project approval process are as follows:

November 25, 2008 – Present Public Participation Plan Scoping Document to Water Board for referral to January meeting.


Week of December 15th – Hold first public meeting, hold first public comment period open until January 20th.


January 27, 2009 – Water Board holds public hearing and acts on the Scoping Document.

If the Water Board approves proceeding with the project, staff will submit to the DNR detailed construction plans for the well drilling operation in addition to a separate well site investigation report as required under NR 811.13(1)(b). At the same time Water Utility staff will seek approval of the Board of Public Works and Common Council to approve plans and advertise for bids to drill the well. All approvals can be obtained within 90 days of authorization to proceed by the Water Board.

At the end of the drilling operation a report on water quality and quantity will be presented to the Water Board to allow the Board to determine whether to proceed to the design phase.

If the project is approved we propose to drill the well in 2009, start the design of the facility in late 2009, and start construction of the facility in 2010.

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14. Exhibits

Documents referenced in the Scoping Document.

List of Exhibits

<u>Location Map and Existing Facilities Map</u>	<u>Exhibit A</u>
<u>Black & Veatch Fire Flow Analysis</u>	<u>Exhibit B</u>
<u>Photos of Similar Projects</u>	<u>Exhibit C</u>
<u>Stakeholders List</u>	<u>Exhibit D</u>
<u>Test Well Data</u>	<u>Exhibit E</u>