



City of Madison Master

Item 15-1
City of Madison
Madison, WI 53703
www.cityofmadison.com

File Number: 07287

File Number: 07287

File Type: Resolution

Status: Draft

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Reference:

Controlling Body: Water Utility

Requester: BOARD OF WATER
COMMISSIONERS

Cost:

Introduced: 08/14/2007

File Name: Authorizing the Mayor & City Clerk to execute Amendment #1 to Professional Services Agreement with Montgomery Assoc Resource Solutions LLC for completion of Ph 2 of site selection, public participation & DNR approved well siting study to replace Well 3.

Final Action:

Title: Authorizing the Mayor and the City Clerk to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC for the completion of Phase 2 of the site selection, public participation program, and a DNR approved well siting study for a replacement well for the Utility's existing Well 3 (2nd, 6th and 15th AD).

Notes:

Code Sections:

Agenda Date: 08/21/2007

Indexes:

Agenda Number:

Sponsors: Lauren Cnare

Enactment Date:

Attachments:

Enactment Number:

History of Legislative File

Ver- sion:	Acting Body:	Date:	Action:	Sent To:	Due Date:	Return Date:	Result:
1	Water Utility	08/15/2007	Fiscal Note Required / Approval	Comptroller's Office/Approval Group			
1	Comptroller's Office/Approval Group Notes: <i>Knepp</i>	08/16/2007	Fiscal Note Pending	Water Utility		08/16/2007	

Text of Legislative File 07287

..Fiscal Note
FISCAL NOTE PENDING.

..Title

Authorizing the Mayor and the City Clerk to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC for the completion of Phase 2 of the site selection, public participation program, and a DNR approved well siting study for a replacement well for the Utility's existing Well 3 (2nd, 6th and 15th AD).

..Body

WHEREAS, Madison Water Utility advertised for consultant services, received and evaluated proposals, and negotiated a Professional Services Agreement with Montgomery Associates Resource Solutions LLC; and

WHEREAS, Montgomery Associates Resource Solutions LLC is nearing completion of Phase 1 of the project where the citizen's working group was established, site selection criteria were developed, a preliminary area evaluation was conducted, and area mapping was prepared; and

WHEREAS, the purpose and intent of Phase 1 was to fully define and establish project objectives, protocol, and study boundaries, and Phase 2 will be to utilize the basis developed in Phase 1 to develop and evaluate candidate sites in conjunction with input and feedback from the citizens work group; and

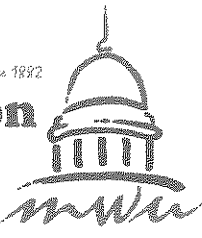
WHEREAS, it is in the best interests of the Water Utility for efficiency and continuity of knowledge to continue this project with Montgomery Associates Resource Solutions, LLC; therefore it is prudent to seek Council approval of this amendment and extension of work as a "sole source" per MGO 4.26(4)(a)2 and 4.26(4)(b);

WHEREAS, Madison Water Utility wishes to move into Phase 2 of this project and continue the process of evaluating the East Isthmus area of the City for an acceptable and WDNR approved replacement well site; and

WHEREAS, Madison Water Utility wishes to continue the public participation program in conjunction with the site selection for a new well on the East Isthmus; and

WHEREAS, Madison Water Utility has budgeted funds in the 2007 Operating Budget;

NOW THEREFORE BE IT RESOLVED that the Mayor and the City Clerk are authorized to execute Amendment No. 1 to the Professional Services Agreement with Montgomery Associates Resource Solutions LLC and for the continuation of a site selection, public participation program, and a DNR approved well siting study for a replacement well for the Utility's existing Well 3.



Madison Water Utility

David Denig-Chakroff, General Manager
Alan L. Larson – Principal Engineer

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MEMORANDUM

Date: Tuesday, August 14, 2007

To: Board of Water Commissioners

(Resolution # 07287)

From: Al Larson
Principal Engineer

Subject: East Isthmus Well Siting Study
Continuation of the Technical Analysis and Public Participation

Description: Continue the work of evaluating potential well sites on the near east side of Madison with a goal toward selecting, procuring, and testing a site. This work will also continue the public participation program and the citizens working group initiated during Phase 1. A great deal of preliminary mapping and analysis has been completed that has laid the foundation for selecting prospective well sites for further technical analysis. This work will provide valuable information and data on the aquifer in the area. The public participation effort formulated and initiated during Phase 1 has laid the foundation of public understanding and public trust in the well siting process. Significant effort and progress has been made by the citizen's working group as they wrestle with the challenge of finding an acceptable location for the proposed well. It is important to continue the work of the citizen's working group so the general public will have the information they need to have confidence that the new well will provide high quality water for generations to come. See attached proposal for a detailed description of the proposed scope of services.

Estimated Cost: \$118,000 – All of the necessary funds are currently not available in the 2007 budget. It is estimated that \$40,000 could be authorized without a budget amendment. A budget amendment could be authorized to complete the work during 2007.

Benefit: Madison Water Utility has lost public trust on the near east side due to long-term water quality issues with Well 3. Completing a comprehensive technical analysis and open process for siting a new well will help to rebuild trust in the Utility. Demonstrating that a high quality new well can be located on the near east side through a cooperation between the public, the hydrogeologists, and the Utility will help the public understand the process and the challenges of siting a well. Working with the citizen's group to educate the public on the complexities of the water system will help to preserve, protect, and renew the water infrastructure system. The knowledge gained through this study would be used to site future high quality municipal wells and potentially help the Utility manage our groundwater resource throughout the City. This project would be a long-term benefit to the Utility.

Recommendation: Approval of the study.

Memorandum

To: Al Larson
From: Steve Gaffield and Rob Montgomery
Date: August 8, 2007
cc:
Re: Initial scope and fee estimate for continuing work on the East Isthmus Well Siting Study

This memorandum describes our proposed scope of work for continuation of the East Isthmus Well Replacement Project. The details below reflect recent discussions with you; Alders Cnare, Konkel, Rummel and Rhodes-Conway; the East Isthmus Well Replacement Project Working Group; and the mayor's office.

We understand that work in 2007 must be conducted within a budget of approximately \$40,000, with the remaining work in 2008. We are concerned about balancing progress on the technical work with maintaining an effective public participation and information program, and we welcome discussion of the details presented below.

Task 1) Analysis of the water quality of the deep aquifer near the east isthmus (Estimated fee for technical analysis \$15,000)

Note: This is an addition to our original proposal dated March 16, 2007, based on insights gained in addressing water quality issues for Unit Well 29.

Outcome: Better understand how deep aquifer water quality is affected by surface contaminants (e.g. from industrial land use) and naturally occurring compounds such as iron and manganese. This information will be useful for evaluating potential well locations on or near the east isthmus, as well as for sites farther to the east.

- Interpret vertical profiling data anticipated to be collected during fall 2007 for the ongoing Mn study to assess water quality of the deep aquifer in the project area.
- Collect water quality samples from selected unit wells and/or existing monitoring wells in or near the study area.
- Working group review and meeting.

Task 2) Additional well site analysis (Estimated fee for technical analysis \$24,000)

Note: This item is the same as for our March 16, 2007 proposal, with the addition of the detailed review of selected sites with documented groundwater contamination (as noted below).

Outcome: Select areas identified in Phase 1 for the detailed hydrogeologic analysis described below. A screening-level analysis of cost and feasibility will be conducted to supplement the information provided in Phase 1.

- Map property value ranges
- Screen potential areas for availability property
- Review hydraulic performance modeling anticipated to be completed by Black and Veatch
- Assess infrastructure and operational costs for wells in different general areas
- Refine mapping of potential contamination sources
- Review details of selected sites with groundwater contamination (listed in DNR database) to determine risk level) – **New scope item (Estimated fee \$13,000)**
- Selection of potential well site areas identified in Phase 1 for further consideration.
- WG review and meeting

Task 3) Detailed groundwater analysis of potential well locations (Estimated fee for technical analysis \$17,000)

Note: This scope and fee is the same as in our March 16, 2007 proposal.

Outcome: Understand likely source areas for potential well locations and associated level of risk.

- Review available hydrogeologic data
- Use existing regional groundwater model, then refined models where necessary, to assess flow paths and travel times, focusing on the impact of the Eau Claire Shale and groundwater-lake interactions

Task 4) Alternatives evaluation (Estimated fee for technical analysis \$12,000)

Note: This scope and fee is the same as in our March 16, 2007 proposal.

Outcome: Selection of site for test well by Water Utility board and others as appropriate. We anticipate this decision will involve the Utility staff and board, the working group, the general public, and DNR.

- Identify sites for consideration by the Utility staff and board, the working group and general public
- Provide recommendation to Utility staff and working group
- Discuss recommendation with DNR
- Complete DNR well site application as directed by Water Utility

Task 5) Public Participation (Estimated fee \$40,000 - \$50,000)

Note: This scope and fee is based on our experience with public participation in Phase 1.

August 8, 2007

Outcome: Public participation will be integrated into all of the above aspects of the project to create a transparent process that includes the community's concerns, knowledge and preferences.

- 5 Working Group meetings to review technical work and help present it to the public
- 2 community workshops for outreach and input: first to discuss "short list" of potential sites (approximately December 2007), second to present recommended site (approximately February 2008)
- Development of website materials and 2 additional newsletters
- Note that expanding the search area will also require expansion of the public participation process to include residents of affected areas, and this could increase the estimated fee of \$5,000 - \$10,000. This is reflected in the range of costs shown above.

Total Estimated Fee: \$108,000 - \$118,000

Draft 8/10/2007

East Side Well Replacement Technical Factors for Mapping Potential Sites

Many factors must be considered in locating a new drinking water well, including requirements of Department of Natural Resources regulations, hydrogeologic conditions affecting source areas of potential wells and the quality of water that can be expected at these sites, impacts of pumping the new well on surface water features, how operation of a new well would affect other wells and the existing water distribution network, cost, and issues of concern to the community.

Requirements of Wisconsin Administrative Code (NR811.16)

The Department of Natural Resources has developed standard separation distances to protect water supply wells from potential contamination sources. DNR may allow smaller separation distances on a site-by-site basis if a hydrogeologic investigation indicates that the well site will be adequately protected.

A first step for the East Isthmus Well Replacement Project will be to map the standard set-back distances listed below to identify areas for more detailed consideration.

Minimum setback distances

1. 50ft to a storm sewer main
2. 200 ft to:
 - a. a sanitary sewer main, manhole, lift station
 - b. a single family residential fuel oil tank
3. 400 ft to:
 - a. septic tank or soil absorption unit receiving <8,000 gal/day
 - b. cemetery
 - c. storm water drainage pond
4. 600 ft to an approved gasoline or fuel oil storage tank
5. 1,000 ft to:
 - a. waste land application site
 - b. boundaries of an active petroleum contaminated soil land spreading site
 - c. industrial, commercial or municipal waste water lagoons or storage structures
 - d. manure stacks or storage structures
 - e. septic tanks or soil adsorption receiving >8,000 gal/day
6. 1,200 ft to:
 - a. any solid waste facility
 - b. any property with residual groundwater contamination (e.g. concentration above NR140 Enforcement Standard, as listed on the WDNR GIS registry)
 - c. coal storage area
 - d. salt or deicing material storage area
 - e. gasoline or fuel oil storage tanks that have not received approval

Draft 8/10/2007

Hydrogeologic Factors

Site-specific hydrogeologic conditions determine the source area that would supply a new well, how long groundwater will take to flow from the land surface to the well, and the level of protection from contamination offered by the well site and well design (e.g. casing depth). This information will help guide decisions about whether the above distances from potential contamination sources can be reduced, or if they should be increased to provide additional protection. This analysis may also identify other issues to consider, such as potential impacts of pumping on local streams, lakes, wetlands and springs.

1. Eau Claire Shale presence / absence
2. Eau Claire Shale thickness
3. Vertical gradient across Eau Claire Shale (if available anywhere)
4. Proximity to surface water bodies and wetlands
5. Predicted impacts on groundwater flow to surface waters and wetlands

Location Relative to Other Wells

The location of other wells will be considered to avoid adversely affecting the performance of existing wells, and to reduce the risk of contamination related to other wells. Pumping at one well may interfere with pumping at another well, affecting how far the water table is drawn down near the wells and how much water can be pumped from each well. Older wells that have shallow casings with an open borehole that penetrates the Eau Claire shale confining unit have the potential to act as pathways for contaminated groundwater to flow from the upper aquifer into the lower aquifer.

1. Distance from active production wells
 - a. Distance from the nearest active Water Utility unit well
 - b. Distance from other high capacity supply wells
2. Distance from former or existing wells with shallow casing potentially penetrating the Eau Claire Shale

Economic Factors

Several factors affect how much a new well will cost to construct and operate in the future. After several potential well sites have been identified, these economic factors will be analyzed for consideration in the well siting decision.

1. Capital cost for connection to existing distribution system, with necessary hydraulic improvements
2. Operation and maintenance cost of supplying water to distribution system
3. Cost for access to prospective well sites

15-9

Memorandum

To: Al Larson
From: Steve Gaffield
Date: August 2, 2007
Re: Summary of ongoing and proposed projects with the Madison Water Utility

We have prepared this memorandum to brief all involved in the East Isthmus Well Replacement Project on the full range of projects related to aquifer water quality that the Montgomery Associates team is currently involved with. As you know, the Montgomery Associates team consists of staff from Montgomery Associates: Resource Solutions, LLC, in collaboration with RMT, Inc., Partners in Place, LLC and Michael Best & Freidrich, LP. We suggest discussing this document in the conference call this afternoon between members of the water utility and the mayor's office and for briefing alders involved in this project, including Alders Cnare, Konkel, Rummel, and Rhodes-Conway. We understand that this memorandum, together with the revised, multi-phased approach to continuing work on the well replacement project, could allow for introduction of a resolution at next Tuesday's Common Council meeting proposing continuing work on this project.

1) Analysis of the Larkin Street Test Well

Status: Authorized budget \$31,200, contract issued, kickoff meeting held July 20, 2007

The pilot well protocol developed for the Water Utility during the UW 29 study is being adapted for this existing Larkin Street test well (i.e., drilled before the protocol was developed) and is being used to assess probable water quality and production rate to determine whether or not the Water Utility should proceed with the installation of a production well at this site. An informational meeting is scheduled for August 9, 2007 at 6:00 p.m. to discuss the project with the neighborhood.

2) Pumping Test at Unit Well 29

Status: Proposed budget: \$23,400, detailed proposal dated May 16, 2007 under review by the Water Utility

A pumping test is proposed for UW 29 which will include monitoring water levels at selected wells at the Sycamore Landfill to assess the potential for long term impacts on UW 29 by influencing groundwater flow conditions beneath the landfill. Completion of this work was one of the recommendations from our UW 29 manganese assessment study.

3) Continued Assessment of Manganese in City of Madison Wells

Status: Proposed budget: \$110,400, detailed proposal dated July 24, 2007 under review at the Water Utility

This study will broaden our understanding of the sources and causes of dissolved manganese in the City's aquifers in order to better manage the quality of our water supply. A sampling program is proposed to assess aquifer water quality at wells that draw their supply from different combinations of upper and lower aquifers at different locations, and which have produced different Mn concentrations. Completion of this work was one of the recommendations of our UW 29 manganese assessment study.

4) East Isthmus Well Replacement Study

Status: Original proposal dated March 16, 2007 budgeted \$87,000. Only Phase 1 authorized for \$50,000 due to budget constraints. Project is currently at authorized budget limit. Outline proposal for Phase 2 submitted to the water utility on July 31; this proposal is now being revised to divide the work into a Phase 2 effort of approximately \$40,000 to be completed in year 2007, with remaining work to be completed under a Phase 3 in year 2008.

This project includes the technical analysis of hydrogeologic conditions, groundwater quality and potential contamination sources, as well as an extensive public participation and information process, with the objective of finding a site for a new well to replace Unit Well 3.

5) Unit Well 3 Sampling prior to abandonment

Status: Anticipated proposed budget budget approximately \$15,000 - \$20,000; detailed proposal being developed for submittal to the Water Utility.

Prior to abandoning Unit Well 3, we recommend it be sampled to assess the sources, causes, and migration pathways for the presence of carbon tetrachloride and manganese to provide insight to the management of the other numerous older wells that are constructed similarly to UW 3 (i.e., drawing from both the upper and lower aquifers) and located in areas of potential surficial contamination (e.g., old industry, gas stations, sanitary sewers, etc.). Specifically, this sampling and analysis would evaluate whether the source of carbon tetrachloride came from the upper aquifer only, or whether the source of carbon tetrachloride penetrated the Eau Claire shale and migrated through the lower aquifer as well. This "post mortem" sampling is also designed to assess whether the cause of the manganese is naturally occurring or associated with surficial contaminants.

Memorandum

To: Al Larson
From: Steve Gaffield and Rob Montgomery
Date: August 10, 2007
Re: East Isthmus Well Replacement – Phase 1 Summary

This memorandum summarizes the results of phase 1 of the East Isthmus Well Replacement Project and presents recommended next steps. At your request, work described in our original proposal dated March 16, 2007 was divided into phases to meet budgetary constraints. Phase 1 included establishing a public participation process and mapping the locational factors to be considered in siting a new well. We anticipate that the remaining work in our original proposal will be conducted under phase 2, including detailed hydrogeologic and feasibility analyses of selected areas and continued public participation.

Activities Completed in Phase 1

Public Participation

The contamination of Unit Well 3 and the process by which it will be replaced were the focus of intense public concern in the winter and spring of 2007, and this included a lack of adequate communication and trust between the community and the Water Utility. Public participation in this project has substantially increased dialogue between the Utility and community representatives through the formation of a citizen working group to assist in the search for a replacement well. This has been particularly important for understanding community concerns and preferences, describing the well siting process, discussing the complex scientific issues related to assessing risk, and preparing the project team to present this information to the general public. Specific activities completed include:

- Project kickoff presentation at the April 19 East Isthmus Drinking Water Series public meeting
- Working group formation and three meetings
- Website development for this project (beta version created but not yet online)
- Project update newsletter production and distribution at the July 19 East Isthmus Drinking Water Series public meeting (also posted on Utility website)
- Development of topics and content for informational posters to be used at public open-house style meetings

Well Siting Criteria Mapping

We have used geographic information system mapping tools to display and analyze many of the factors that must be considered in locating a new well. The goal of the preliminary mapping in phase 1 was to identify several parts of the study area for more detailed analysis in phase 2, with the goal of selecting 3 to 5 options for consideration by the Water Utility, the public, and other stakeholders. Specific activities completed include:

- Development of a list of criteria for siting the well (attached). This is a working list and may be modified throughout the process to reflect our increasing technical understanding and input from the public
- Researched siting criteria data sources and converted 7 different database formats into a series of criteria and composite overlay maps
- Production of a set of maps analyzing Wisconsin Department of Natural Resources (DNR) locational criteria for well sites listed in NR 811.
- Discussion of these requirements and the well siting process with DNR reviewers
- Coordinating a compilation of available information on the Eau Claire Shale aquitard in the Madison area by Ken Bradbury of the Wisconsin Geological and Natural History Survey (WGNHS)
- Mapping the probable distribution of the Eau Claire Shale based on the data from WGNHS
- Preparing a map overlaying the NR 811 and Eau Claire Shale information for use in identifying potential well site areas for future study.

Copies of these maps have been provided to the Water Utility previously; additional copies are available upon request.

Alternative Approaches for Locating the New Well

1. *Perform detailed investigations of potential well sites on or near east isthmus that meet all NR811 criteria.*

The maps of NR 811 criteria indicate that a few areas on the east isthmus meet the minimum set back distances (e.g. near the shorelines of Lakes Monona and Mendota and near Starkweather Creek).

Key questions:

- What would be the source area for the well, and what is the level of risk due to potential contaminant sources?
- What is the influence of hydraulic connection between the deep aquifer and the lakes on water quality?
- What are the expected impacts of a new well on baseflow to Starkweather Creek?

August 10, 2007

2. *Perform detailed investigations to determine the feasibility of sites on or near the east isthmus that would require a variance from the minimum set backs in NR 811 based on site-specific hydrogeologic conditions.*

The presence of the Eau Claire Shale aquitard above the deep sandstone aquifer would be a key factor for this option. Areas of the east isthmus where the shale appears to be present include most of the Atwood Avenue, East Washington Avenue and East Johnson Street corridors.

Key questions:

- Which potential contamination sources identified on the maps pose the highest risk?
- What are the properties of the Eau Claire Shale, and what level of protection does it provide?
- What is the expected deep aquifer water quality, including the influence of the lakes?
- What level of analysis will the Department of Natural Resources require to consider approval of this option?

3. *Expand search area farther east.*

The mapping work already completed includes areas to the east and north of the isthmus. Review of the criteria maps suggests potential well sites located west of Interstate 90, in the vicinity of existing unit wells 11, 23, 25 and 29.

Key questions:

- What is the expected water quality of the deep aquifer?
- How would a new well in these areas perform with the existing water distribution system, and what would the necessary hydraulic system improvements cost?
- How would the public participation process need to be expanded to include additional neighborhoods affected?

Recommended Next Steps

As described in our original proposal (March 2007), work on this project should continue with more detailed consideration of several areas, including groundwater modeling and feasibility analyses. To help identify which of the areas described above should be the focus of this additional work, you suggested an analysis of the performance of a new well in different areas using the Utility's existing hydraulic model of the distribution system. This would better define the needed infrastructure improvements and costs associated with well sites on the east isthmus versus sites farther to the east. We understand that the Utility would undertake this analysis separately from this project.

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To provide this comparison, we suggest analysis of well performance in the following general areas:

1. Near the Lake Monona shoreline south of Atwood Avenue and west of Unit Well 8
2. Near the intersection of Fair Oaks Avenue and Hwy. 30
3. Near Milwaukee Street between Hwy. 51 and Interstate 90.

We anticipate that selection of areas for detailed study in phase 2 will be based on this performance analysis as well as the information generated in phase 1 of our siting study. We will be happy to discuss options with you in more detail.

Attachments: Well siting criteria list