NORTH DAVIS MEADOWS COUNTY SERVICE AREA PUBLIC WATER SYSTEM

SEPTEMBER 27 , 2011

Agenda

- Brief review of current system and issues
- Compliance Order
- Water system requirements
- Options and funding
- Water meters/Solar system overview

WATER WELLS OVERVIEW

North Davis Meadows water supply comes from two ground water wells, NDM Well #1 and NDM Well #2.

Well # 1

- 24 years old (The average lifespan for a well in Davis is 31 years)
- 490 feet deep
- Draws water from two aquifers, one between 150-340 feet and the other from 370-490 feet.
- Calculated peak flow is between 350-400 gallons per minute (gpm). Well 1 does not have a flow meter.

Well #2

- 15 years old
- 500 feet deep
- Draws water from four aquifers, the upper aquifer being from 182-202 feet.
- Wells have sanitary seals to 65/50 feet.
- Peak flow pre-packer installment was 520 gpm.
- Peak flow post packer installation is 460 gpm.

Annual Cost and Usage

- Annual cost per household for water is approximately $1,200

- The CSA uses about 95 million gallons annually
  - In house usage is approximately 10-15 millions gals per year
  - Balance of usage is for irrigation!!!!

Nitrate issue

❖ During routine testing in August 2008 North Davis Meadows Well #2 exceeded the maximum nitrate contaminant level of 45 mg/L, set by California Department of Public Health (CDPH).

❖After communication with CDPH, the North Davis Meadows CSA Advisory Board voted to support:

- 1) installation of a temporary inflatable packer to Well #2,
- 2) determining if permanently sealing off the upper aquifer would eliminate drawing water from the contaminated, upper aquifer thereby creating a reliably clean water source.

❖In June 2009, the inflatable packer was installed, worked briefly, failed, and was reinstalled in August 2009.

- Since then, the nitrate levels have fluctuated but have not tested low enough to satisfy the state's requirements once the ascendance had occurred.

System has to be upgraded to meet current standards and requirements

COMPLIANCE ORDER

Issued by CA Dept of Public Health (CDPH) 12/1/09

- Requires
  1. Regular testing until a long term solution is found.
  2. 100 % redundancy of the water source
  3. Bacteriological testing for both wells
  4. A permanent solution acceptable per State Drinking Water Standards within the timeline specified.

The CDPH compliance order requires that NDM comply and complete all improvements to the water quality and redundancy issues by **December 1, 2010.**

- Failure to comply can result in penalties up to $200/day.

Actions Taken to Date

- Frequent water quality sampling for both wells
- Installation of temporary packer on well # 2
- Flushing of well # 1 to rid a possible plume of contaminated water
- Issuing Emergency Water Notices since 2009
- Hiring of Engineering/Hydrogeology Consultant
- Feasibility Study of City of Davis Water Connection
- Compilation of Water Supply Alternatives-(presented at community meeting 9/30/10

Actions Taken- cont.

- Preliminary Prop. 218 Bonding scenarios (presented at 9/30/10 community meeting)
- County Submissions of Universal pre-application information for CDPH grant/loan drinking water systems and statement of intent for submission of formal application authorized by the Yolo County Board of Supervisors
- County submission of complete North Davis Meadows Area Safe Drinking Water State Revolving Fund Application for construction funding authorized by the Yolo County Board of Supervisors (submitted January 2011 to CDPH)

Water system requirements

1. Water to meet State Quality Standards
2. Be at least two water sources capable of supporting peak usage *plus* fire demand
3. Peak usage per well has been determined: 411 gpm
   - (note that actual in house usage is <30 gpm)
4. Fire requirement is 875 gpm for 2 hours
   - Requirement must assume one well is inoperative, and usage is at peak!
   - Can be met by flow rate, storage, or combination of both

Options

1. Connect to City of Davis
2. Water treatment system
3. Each house drill own well
4. Upgrade current system

Connect to City of Davis

- Capital cost estimated $4,500,000
- Per house annual cost: $2,500-$3,000 for water usage, and could double over the next 5 years
- Out of city surcharge for water use (20%)
- City may use river water in the future as part of their supply
- Option not supported by NDM (2010 straw poll)

Water Treatment Systems

- Treat at the well issues
  - Current output does not meet fire protection requirement; can be addressed by installing storage tank; cost approximately $200,000
  - Current system probably does not meet peak demand requirement; if verified; treatment with current wells not a viable option
  - Capital investment >$1.5 million
  - Disposal of brine annual cost estimated at: $200,000, or additional $2,000 per household, and could be problematic
- Point of entry/Point of usage
  - Not allowed by regulation except for economically distressed communities (and only as temporary measure)

Each home drill own well

- Cost would range from $25,000 to $28,000 (Eaton Drilling Company estimate). Possible sharing of wells???
- **Some parcels may not have adequate set backs from leach fields (>100 ft).**
- Option would transfer responsibility for quality and reliability from CSA to individual homeowners
- A generator would be necessary for power outages.
- Need to maintain CSA well(s) for fire fighting/ communal landscaping ???
- **Project would not be able to be bonded.**

Options to Upgrade Current System

1. Exclusively rehabilitate current wells
2. Rehabilitate current well(s) and drill new one
3. Install 2 new wells to provide entire water supply
4. Install two smaller new wells to provide in home usage; use existing wells for fire and irrigation (Replumbing of water distribution system required)

1. Rehabilitate Current Wells

- Just rehabilitating both wells is not a feasible option since:
  - Well #1 can not currently meet peak demand
  - Well # 1 nearing end of useful life time, so probably not worth investing in to meet current water quality standards.

Note: Industry average life for wells is 50 years. Davis average is 31 years

2. **Rehabilitate Well # 2 and Drill One New Well**

- Approach: Line well #2 to seal off upper aquifer. Injection of cement grouting.

- Capital cost (approximate)

  $1,000,000 to $1,100,000

Rehabilitate One Well/Drill One New Well-cont.

Issues:

- Line casing can potentially reduce output to below peak demand requirement
- Size of tank to meet peak demand may be so large that it would not be cost effective. (Million gallon tank???)
- Depth of well may not produce acceptable water quality (and well can not be drilled to greater depth)
- Life time of rehabilitated well is 10-15 years
- **Hexavalent chromium level (21ppb) unlikely to meet new state MCL (Recent PHG is .02 ppb)**

Hexavalent Chromium

- A Public Health Goal (PHG) of .02 ppb was set on July 27, 2011. PHG is a level of drinking water contaminant at which adverse health effects are not expected to occur from a life time of exposure.
- CDHP is required by law to implement Maximum Contaminant Levels (MCL) that are as close to PHG's as "economically and technically feasible."
- Anticipated to take several years for an MCL to be set
- Most Davis wells 250-500 feet deep have hexavalent chromium levels above 20ppb.
- Most Davis deep wells have hexavalent chromium levels below 10 ppb.

Rehabilitate Both Wells and Drill New One

Cost estimate: $1,200,000 to $1,300,000

- Lower cost than two new wells
- Lower probability of long term water quality
- Concern about hexavalent chromium level.
- Age of Well #1

3. Install Two New Wells

- **Capital cost estimate: $1,800,000- $2,000,000**
- Install two wells (700-900 feet), each capable of supporting peak demand (411 gpm). Wells sealed to 600 feet.
- Estimate includes destroying existing wells and the cost for a new storage tank
- New wells would be constructed of better quality materials than existing wells.

Two New Wells- cont.

Assumptions:

- Yearly operating costs similar to current
- Adequate water quantity and quality available
  - City of Davis and UCD wells of similar depth and in close proximity to NDM are meeting *current* standards
  - **Test well recommended to verify both quality and quantity prior to drilling wells. Arsenic, hexavalent chromium, and manganese could be of concern.** See "Summary of Well Data" Report June 2011
  - Deep aquifer water can be of better quality (lower TDS)

4. Small New Household Water Wells/Replumb Neighborhood

- New wells would be only for in home usage
- Assumes old wells can continue to supply irrigation and fire protection needs
- Requires replumbing of water system to divide irrigation/fire water supply to in home usage
- **Offers a more cost effective way to treat in home use water if required in the future**

“Household Water Only” Wells-cont’d

Total Cost Estimate: $2,300,000 -$2,500,000+

Replumbing of neighborhood: $606,000

Engineering cost: $ 20,000

Water line street to home: $240,000

Total **:** **$866,000**

(Estimate provided by Yashavant Kulkarni,MSEE,MBA, P.E.)

Landscaping repair: $95,000

Two 8 inch diameter wells: $880,000

New Tank: $100,000

Major electrical upgrade ($250,000 to $500,000)

Household Water Only Wells-cont.

- Major electrical upgrade might be necessary- possibly $250,000-$500,000 in addition. Estimate to have engineer determine cost= $7,000.
- Would require trenching and patching of county streets
- Trenching from street to individual homes would be required

“Household water only” new wells- cont.

- For some homes, plumbing configuration for irrigation/household water may make separating lines more costly
- Potentially higher maintenance costs (four total wells, two being older)
- Long term viability of Well #1

Summary of Options

- **Low risk to high risk**

1. City of Davis Connection- $ 4,500,000
2. Small Wells/Replumbing- $2,300,000 to $2,500,000+
3. Two New Wells- $ 1,800,000 to $2,000,000
4. One New Well/Rehab $1,200,000 to $1,300,000

Individual Wells- paid for individually. State would not be involved in quality.

How do we pay for the project?

- Any long term solution would require a Proposition 218 Election
- A Proposition 218 election is a legal process by which a funding mechanism or levee of additional fees can be collected.
  1. The election is based on an Engineers Report showing need for the additional fee and a financial assessment.
  2. The election requires all property owners be notified 45 days prior to any passage of fees per the Governing Body (Board of Supervisors)
  3. A 50 % + 1 protest of property owners in the CSA prior to the public hearing would prohibit a fee from passing.
- Once a fee has passed, the bonding for the Infrastructure may proceed.

Prop 218 Election/ Bonding

- The process is similar to the previous sewer bond and paid for on the annual tax bill.

Illustration of annual costs:

Project cost $1,000,000

30 year bond

Annual cost per house $1,000

(County assumes 7% interest for illustration)

Bonding- continued

The larger the borrowing amount, the lower the annual assessment per $1 million.

For a project cost of $1.7 million, the estimated average annual assessment over 30 years is approximately $1,700, or about $1,000 per $1 million.

For a project cost of $2.5 million, the estimated average annual assessment over 30 years is approximately $2,400, or about $950 per $1 million.

Next Steps

- Follow up electronic forum for questions and answers. (October)
- NDM to select option via a poll: (November)
  - Rehabilitate both wells and Drill new well (not recommended by water sub committee due to potential inadequate water quality and meeting peak flow requirement)
  - Drill two large wells
  - Drill two small household usewells/replumb water distribution system
  - Drill individual wells (not recommended)

  Other: Interest in metering at this time/ Use of solar

Next Steps- continued

- Engineering design and cost estimate performed on option selected (December)
- Conduct 218 election to obtain funding (January)

Question and Answer Forum

- Follow-up questions regarding the water issue should be sent to Chris.Starkey@yolocounty.org
- Please submit your questions by:

  October 14, 2011

- All questions and answers will be posted at our website for you to review. http://www.yolocounty.org/Index.aspx?page=701

Water meters

- Water meters will be required by 2025 per current legislation
- Cost estimate to install water meters for NDM is $255,000
- Potentially could result in lower water usage, reducing electrical use and the wear and tear on wells. Savings may be in part off set by management costs

Solar

- Solar system to generate electricity is estimated around $250,000
- ROI for solar systems is typically 7 years
- System would require 6,000-8,000 ft2 of land

QUESTIONS ABOUT REPORT

- Please visit the website at www.yolocounty.org and go to the Planning and Public Works NDM CSA link.

- Please contact Regina Espinoza at 530-666-8725 or Regina.Espinoza@yolocounty.org

- Chris Starkey is talking calls for Regina, until the end of October. His email is Chris.Starkey@yolocounty.org