CITY COUNCIL MEETING AGENDA
Council Chambers, 1000 Laurel Street

March 3, 2014
Monday

Special Meeting / Study Session
7:00 p.m.

1. **Call to Order**
2. **Roll Call of Council Members**
3. **Action Items**
   - **a.** Alder St Stormwater Improvements
   - **b.** Appointment of Mark Langford as Interim City Administrator
4. **Study Items**
   - **a.** Meet with Water Staff (no packet information)
   - **b.** Well Drilling Report
   - **c.** Water Capital Improvement Plan
5. **Adjournment**

Note: Public comment is generally not taken at Study Sessions. However, on some occasions, public comments may be allowed at the discretion of the Chair and Council. The public may also submit written communications, via letters or emails to dperry@cityofmilton.net. Any item received by noon on the day of the meeting will be distributed to Council.

If you need ADA accommodations, please contact City Hall at (253) 517-2705 prior to the meeting. Thank you.

PENDING COUNCIL AGENDA CALENDAR (Dates are Subject to Change) FOR PLANNING PURPOSES ONLY

March 2014			
Mon 3/03	7:00 pm	Study Session **Special Meeting**	A. Meet with Water Staff B. Alder St Stormwater Improvements C. Appointment of Mark Langford as Interim City Administrator D. Well Drilling Report E. Discussion of Water Capital Improvement Plan
Mon 3/10	7:00 pm	Regular Meeting	A. Public Hearing of Marijuana Moratorium B. Granting of Easement to DOE C. Amendments to Building & Fire Codes
Mon 3/17	7:00 pm	Regular Meeting	A. Award of Activity Center Roof Replacement Contract B. 2013 Financial Results C. Flood Control District Agreement with Pierce County D. 5th Avenue Stormwater Project – Design Contract
April 2014			
Mon 4/07	7:00 pm	Study Session	A. Curtailment Agreement with Tacoma Power B. Biennial Budget discussion C. Amending Frontage Improvement Code
Mon 4/14	7:00 pm	Regular Meeting	A. 1st Qtr Financial Report
Mon 4/21	7:00 pm	Regular Meeting	A. Ordinance Amending Frontage Improvement Code
May 2014			
Mon 5/05	7:00 pm	Study Session	A. Meet w/ Electrical Staff B. Amending Access Tract Code
Mon 5/12	7:00 pm	Regular Meeting	
Mon 5/19	7:00 pm	Regular Meeting	A. Ordinance Amending Access Tract Code
June 2014			
Mon 6/02	7:00 pm	Study Session	A. 6 Year Transportation Improvement Program B. Transportation Benefit District
Mon 6/09	7:00 pm	Regular Meeting	
Mon 6/16	7:00 pm	Regular Meeting	
July 2014			
Mon 7/07	7:00 pm	Study Session	
Mon 7/14	7:00 pm	Regular Meeting	A. 2nd Qtr Financial Report
Mon 7/21	7:00 pm	Regular Meeting	
August 2014			
Mon 8/4	7:00 pm	Study Session	A. Meet w/ staff: Stormwater Discussion
Mon 8/11	7:00 pm	Regular Meeting	
Tue 8/18	7:00 pm	Regular Meeting	
September 2014			
Tue 9/2	7:00 pm	Study Session	
Mon 9/8	7:00 pm	Regular Meeting	
Mon 9/15	7:00 pm	Regular Meeting	
October 2014			
Mon 10/06	7:00 pm	Study Session	
Tue 10/14	7:00 pm	Regular Meeting	A. 3rd Qtr Financial Report
Mon 10/20	7:00 pm	Regular Meeting	

To: Mayor Perry and City Councilmembers

From: Public Works Director Neal

Date: March 3, 2014 Special Meeting

Re: **Alder Street Stormwater Revisions - EMERGENCY**

ATTACHMENTS:
A. Vicinity map showing approximate location of washout
B. Photos of landslide after major storm event
C. Engineer's Estimate for Construction

TYPE OF ACTION:

☐ Information Only ☐ Discussion ☒ Action ☒ Expenditure Required

Recommendation/Action: "In recognition of the threat and potential for additional destruction of private and public property, I move to authorize the Public Works Director to expedite the Alder Street Stormwater Improvement project and pre-authorize an amount not to exceed $150,000 for construction of the same."

Fiscal Impact/Source of Funds: This project was not anticipated, and so is not included in the 2014 adopted budget. Funds for this work will come out of the Stormwater Utility Capital Fund ending fund balance.

Previous Council Review: None

Background: On June 6, 2013, Public Works staff was notified of a possible stormwater issue by property owners at the far western end of Alder Street. A small landslide had occurred where a section of the hill above the Interurban Trail had washed out, and the cause was determined to be a break in a stormwater line. (Refer to Attachment A showing approximate location of washout.)

Upon further investigation, it was determined by staff that further damage to private properties immediately above the trail, and the steep slope leading down to the trail, was a distinct possibility with the current way stormwater was handled in that area. In September, staff directed the City's on-call engineering firm, Gray & Osborne, to proceed with a design to re-route the stormwater discharge to a piped system nearby.

While design was underway, additional minor slides in the same area of the Interurban Trail occurred on October 30 and November 12.

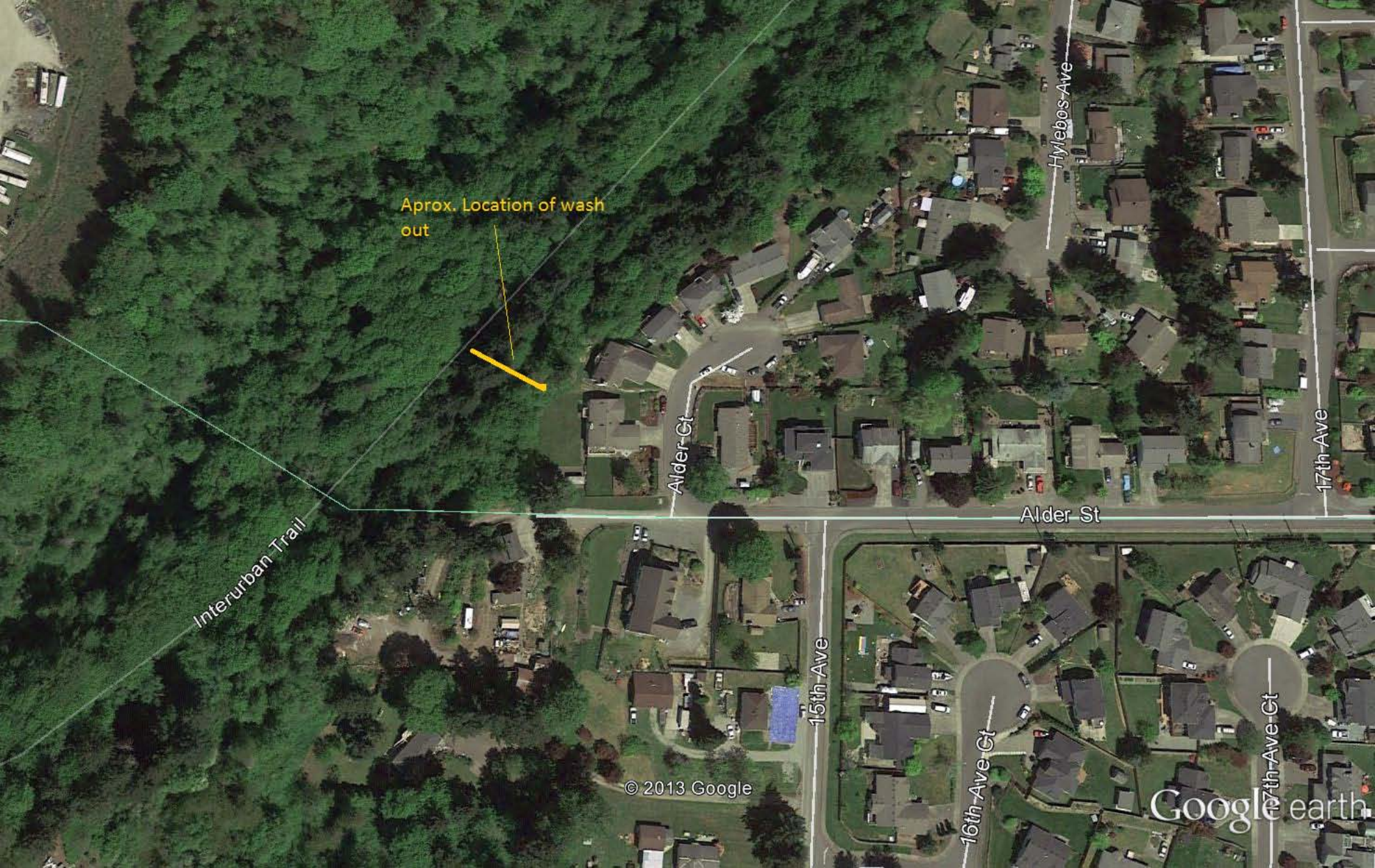
On February 17, 2014, the Puget Sound area experienced a major storm event. A significant amount of the hillside at the end of Alder Street washed down onto the Interurban Trail, completely

blocking it. Further material came down on February 18 and February 19. Staff closed both ends of the trail, and were able to clear approximately ½ the width of the trail by February 21st. Concrete retaining blocks had been set to keep more mud from flowing across the trail section, and downed trees have been removed. (Refer to photos in Attachment B.)

Discussion: What began as an ordinary design project in response to a localized problem has evolved into a critical stormwater retrofit to avoid property damage and future liability. The designed retrofit of the Alder Street stormwater situation needs to be implemented immediately, in the hopes of completion before another major storm event.

As designed, stormwater currently flows to the western end of Alder Street, across private property, and outlets at the top of the slope above the trail. This water will be re-routed to a nearby system, which is piped down the slope, underneath the trail, and outlets at the bottom of the ravine near the east fork of the Hylebos.

Attachment C is an engineering estimate of the construction cost to do the designed improvements.


Aprox. Location of wash out
Hylebos Ave
Alder Ct
17th Ave
Alder St
Interurban Trail
15th Ave
16th Ave Ct
17th Ave Ct
© 2013 Google
Google earth

February 17, 2014 mudslide onto Interurban Trail, looking north

February 17, 2014 mudslide onto Interurban Trail, looking south

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Both photos, the washout on the slope above the Interurban Trail

CITY OF MILTON
ALDER STREET STORM IMPROVEMENTS
ENGINEER'S PRELIMINARY COST ESTIMATE
February 5, 2014

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY		UNIT PRICE	AMOUNT
1.	Minor Changes (S.P. 1-04.4(1))	1	MC	$10,000.00	$10,000.00
2.	Survey (S.P 1-05.4(2))	1	LS	$2,000.00	$2,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS	$1,000.00	$1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-09.7)	1	LS	$15,000.00	$15,000.00
5.	Project Temporary Traffic Control (S.P. 1-10.4(1))	1	LS	$3,000.00	$3,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	1	LS	$1,000.00	$1,000.00
7.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS	$5,000.00	$5,000.00
8.	Control Density Fill (S.P. 2-09.5)	5	CY	$200.00	$1,000.00
9.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	$2,000.00	$2,000.00
10.	Crushed Surfacing Top Course (S.P. 4-04.5)	120	TN	$23.00	$2,760.00
11.	HMA Cl. 1/2" PG 58-22, Trench Repair (S.P. 5-04.5)	50	TN	$150.00	$7,500.00
12.	Temporary HMA (S.P. 5-04.5)	10	TN	$200.00	$2,000.00
13.	CPEP Storm Sewer Pipe, 12 In. Diam.(Incl. Bedding) (S.P. 7-04.5)	325	LF	$70.00	$22,750.00
14.	Catch Basin Type 1 (S.P. 7-05.5)	3	EA	$1,800.00	$5,400.00
15.	Catch Basin Type 2, 54 In. Diam. w/Oil/Water Separator (S.P. 7-05.5	1	EA	$6,000.00	$6,000.00
16.	Connect to Existing Storm Systems (S.P. 7-05.5)	2	EA	$3,000.00	$6,000.00
17.	Unsuitable Excavation (S.P. 7-08.5)	5	TN	$50.00	$250.00
18.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	800	TN	$25.00	$25.00
19.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	$5,000.00	$25,000.00
20.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	$1,000.00	$1,000.00
21.	Project Documentation	1	LS	$1,000.00	$1,000.00
	Subtotal				$119,685.00
	Sales Tax at 9.4% per Washington State Dept of Revenue				$11,250.39
	Total Construction Cost:				**$130,935.39**

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Agenda Item #: 3B

Return to Agenda

To: City Council Members

From: Mayor Debra Perry

Date: March 3, 2014

Re: **Appointment of Mark Langford as Interim City Administrator**

ATTACHMENTS: A. Appointment Offer Letter

TYPE OF ACTION: Amended Fee Resolution

☐ Information Only ☐ Discussion ☒ Action ☒ Expenditure Required:

Recommendation/Action: "I move to approve the attached appointment letter to Mark Langford as Interim City Administrator."

Fiscal Impact/Source of Funds: The base salary for this position is being proposed at $8,662.50/mo. With an effective start date of March 4, 2014, the total cost of this position (salary and benefits) for 2014 is estimated at $112,276. Similar to other administrative positions, the cost will be allocated as follows: General Fund: 70%, Electric Fund: 14%, and Water Fund: 16%. Anticipated 2014 savings will be approximately $157,277, depending on the length of interim status.

Issue: The appointment of Mark Langford to Interim City Administrator will fill the vacancy due to the previous Administrator's resignation. During this interim period, and until the positions of ***City Administrator*** and ***Police Chief*** have been recruited for and permanently filled, the Interim City Administrator will perform the basic and essential duties of both of these positions.

February 13, 2014

Mark Langford
2602 S. 38th Street, #384
Tacoma, WA 98409-7303

Dear Mark:

We are pleased to offer you temporary employment with the City of Milton, as its Interim City Administrator on the following terms and conditions:

1. Job Duties: You will be employed as Interim City Administrator to the City of Milton in order to perform certain duties and functions as described in Chapter 2.06 of the Milton Municipal Code. All power and authority exercised by the Administrator is delegated from the powers and authority granted to the Mayor by state statute. The City of Milton is an optional code municipal city created under the provisions of Title 35A RCW. The performance of duties by the Administrator and the interpretation of this contract shall in all instances be interpreted and take into account the City Administrator's role as the designee of Mayoral duties. The City Administrator shall work closely with and under the direction of the Mayor.

2. Additional Duties: Your employment as Interim City Administrator may include the following additional duties for an indefinite period of time as determined by the Mayor: Responsibility for the overall management of the Police Department; Assignment of work, supervision of regular and reserve officers, evaluation and implementation of projects, policies and programs benefitting the public interest and the community; And compliance with all rules, policies and procedures of the department and the City. Before accepting this employment, you will provide proof of being a "Certified Police Officer."

3. Term of Employment: Your employment will commence on March 4, 2014. It is anticipated that the Interim City Administrator will serve until the appointment of a full-time permanent City Administrator. However, this is an "at will" position and the City may end your employment at any time, with or without cause. As the Interim City Administrator, you will serve at the pleasure of the Mayor.

4. Compensation: The City will pay you a monthly salary of $8,662.50.

5. Benefits: Medical, dental and vision insurance coverage will be provided similar to that offered to other exempt positions, with the employee paying 10% of the health premium costs. You may decide to opt out of the City of Milton's insurance coverage for both employee and dependent coverages. This should be done in writing by March 18, 2014.

6. Leave Accrual: Sick leave, vacation accrual, holidays, floating holidays and other similar leaves will be received in accordance with the Personnel Policy of the City. In recognition of your experience, you shall begin employment on date of hire with 5 additional days of vacation to your current accrued balance. The employee will accrue vacation leave at a rate of 18 days per year.

7. Equipment/Vehicle: Standard equipment, vehicle and mobile phone will be provided, or allowance there for paid, by the City per its applicable policy.

8. Eligibility for PERS: The position for which you are being hired is eligible for PERS. Eligibility notwithstanding, you have indicated to the City a desire to refrain from membership/participation in PERS in order to preserve LEOFF benefits that you are currently receiving. It is the City's recommendation that you seek advice from your legal counsel on impacts, if any, that your employment with the City may have on LEOFF benefits that you are receiving. The City takes no position in your voluntary decision to participate or not to participate in PERS, and by accepting employment with the City as its Interim City Administrator you acknowledge that the City has not influenced you or attempted to do so in your decision to participate or not to participate in PERS, and you have either sought or waived your right to seek advice from your legal counsel on this matter.

9. Hold Harmless: The City of Milton shall not be responsible for any impact to any retirement benefits that you are currently receiving and/or are or were eligible to receive, including but not limited to LEOFF and Social Security benefits as a result of your temporary employment with the City of Milton. Should you experience any change in any retirement benefits that you are currently receiving and/or are or were eligible to receive, regardless of cause or reason for said change, you agree to hold the City of Milton harmless and waive all rights to file any claim against the City of Milton for any loss of, damage to, reduction of, or impact to said benefits.

10. Prior Terms and Conditions: Terms and conditions applicable to any other prior or current employment with the City shall be replaced with those set forth herein.

Sincerely,

_____ Return to Agenda Bill

Mayor Debra Perry

Acceptance of Offer

I have read this Offer of Temporary Employment and I agree to the terms and conditions of the Offer.

Accepted: _____ Date: _____

Mark Langford

To: Mayor Perry and City Councilmembers

From: Public Works Director Neal

Date: March, 3, 2014 Special Session

Re: Additional Water Source – Test Drilling Project, Results

ATTACHMENTS: A. Test Well Drilling Report (partial)

TYPE OF ACTION:

[X] Information Only [X] Discussion [ ] Action [ ] Expenditure Required:

Recommendation/Action: N/A

Fiscal Impact/Source of Funds: This project utilized the last of the Revenue Bond Funds.

Previous Council Review: N/A

Issue: Results of the Test Well Drilling project.

Background: At its February 4, 2013 meeting, the City Council looked at the status of the water revenue bond projects and directed staff to bring back a scope and fee for an additional project: Additional Water Source – Test Drilling. On March 11, 2013, Council approved the scope and fee for Robinson & Noble to proceed with the project. On May 6, 2013, Council reviewed the technical memorandum regarding siting of the new well and drilling method, and gave staff direction to proceed with the project. On September 16, 2013, Council awarded the construction bid to Tacoma Pump and Drilling Co., and the drilling commenced.

Discussion: As stated in the technical memorandum, the preferred location for test drilling of the new well was the 2MG Reservoir site. The test well drilling is complete, to the extent of the approved funding and scope of work. Attached is a partial copy of the report by Robinson & Noble summarizing the results of the Test Well Drilling project. The full report is available for review in the Public Works office.

ROBINSON NOBLE

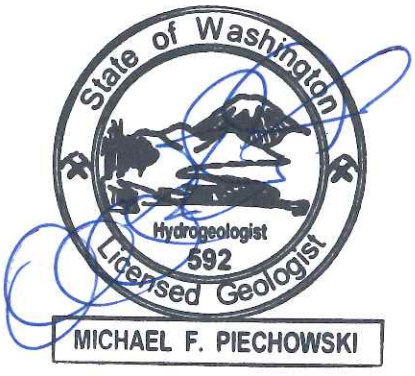
CITY OF MILTON
DEEP TEST WELL
MILTON, WASHINGTON

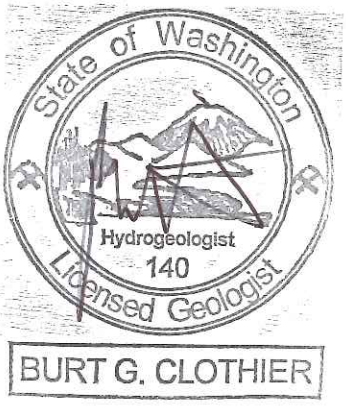
FEBRUARY 2014

by

Michael F. Piechowski, LHG
Senior Hydrogeologist

Burt G. Clothier, LHG, RG, CPG
Principal Hydrogeologist





3011 South Huson Street, Suite A
Tacoma, Washington 98409
P: 253.475.7711 | F: 253.472.5846

www.robinson-noble.com

17625 130th Avenue NE, Suite 102
Woodinville, Washington 98072
P: 425.488.0599 | F: 425.488.2330

CITY OF MILTON
DEEP TEST WELL
MILTON, WASHINGTON
FEBRUARY 2014

APPENDICES

CITY OF MILTON
DEEP TEST WELL
MILTON, WASHINGTON
FEBRUARY 2014

Introduction

Based on our recommendations in the City of Milton Water Source and Hydrogeologic Analysis Technical Memorandum (Robinson Noble & Saltbush, 2008), the City of Milton (City) asked Robinson Noble to organize and oversee the drilling, construction, and testing of a deep-aquifer exploration well at the City's water tank located at 9732 18th Street Court East in Edgewood, Washington. The project was funded from a grant program and had a construction completion deadline of December 31, 2013. The well's location relative to the tank is shown on Figure 1.

To begin the project, we prepared technical specifications for the drilling, installation, and testing of the well. The specifications called for reverse-circulation mud-rotary drilling to a depth of 900 feet below surface. This target depth was based on the 2008 investigation. If the drilling identified the deep aquifer at the site, the specifications called for the construction of a resource protection well to test the aquifer's quality and quantity. Bids were received from Schneider Water Services of St. Paul, Oregon, and Tacoma Pump & Drilling of Graham, Washington. Tacoma Pump & Drilling was the apparent low bidder and was awarded the contract by the City. After the completion of the project's SEPA checklist, site permitting, and site preparation, drilling commenced on October 16, 2013.

Well Drilling

Initial drilling progress was as expected. However, the rate slowed considerably below 122 feet where a more permeable sand and gravel deposit was encountered. The drilling contractor struggled to maintain fluid circulation within the sand and gravel. A number of different procedures were attempted to stem the loss of drilling fluid, including using a thicker drilling fluid and the mixing a spun-mineral-fiber additive that helps remedy lost circulation into the fluid, but loss of drilling mud continued to be an issue. Due to fluid loss and the inability to effectively clear cuttings from the hole, the drilling rate slowed to 20 feet per day or slower.

After a week of struggling with fluid loss, we determined that advancing the 12-inch fluid conductor casing through the high-permeability material would be a prudent step to maintain fluid circulation and ensure the stability of the hole for the remainder of the project. Additional 12-inch casing was brought to the site on October 28. By the 29th, the 12-inch casing had been advanced another 95 feet to 191 feet below ground, effectively sealing off the higher-permeability sediments responsible for the lost circulation.

Drilling continued below the 12-inch casing without significant issues until a depth of 815 feet was reached. At this depth, return flows were again insufficient to clear the cuttings from the hole and mud pressures became excessive, resulting in increased fluid loss. The mud system was inspected for blockages and obstructions. Finding none, the drill rod and bit were removed from the hole and inspected. No obvious problems or obstructions were noticed. The drill-bit stabilizer was removed to reduce pressure drop and enhance fluid flow. The drill bit and rod were then tripped back in for the final 100 feet of drilling.

Drilling proceeded to contract depth. The rate of progress was slower than anticipated as mud loss continued to be a problem and mud pressures remained higher than desired. Additionally, several days of drilling were missed as a result of limited availability of drilling mud. On November 14, the total depth of 918 feet was reached. Geophysical logging of the hole was completed the same day.

The geologic and geophysical logs of the materials penetrated are presented on Figure 2. The deep test well penetrated at least three, possibly four, aquifer systems. The uppermost high-permeability sand and gravel found between 122 and 176 feet is likely correlative with the Redondo Milton Channel, which is a significant aquifer in the Federal Way area. Due to a higher elevation, it may be partially unsaturated at this location. The first intermediate aquifer was a sand and gravel deposit encountered from 300 to 349. A second intermediate aquifer sequence of sand and gravel was present between depths of 495 and 532 feet below ground.

Well Completion and Development

The well completion was designed to investigate the zones where geophysical logs, drilling response, and material descriptions suggested the presence of higher permeability material in the deep aquifer system. Following the completion of the geophysical logging, the drilling contractor installed a continuous liner of 10-inch casing within the 12-inch borehole. The installation of the liner was completed on November 21. The hole was backfilled and made ready for screen installation on November 26. After a slight delay due to shipment of the screen, the screen assembly was assembled and installed on December 6. From top to bottom, the 209-foot long assembly is constructed as listed on Table 1.

Table 1. Assembly construction

Item	Depth to top	Depth to bottom
8" neoprene packer with a "J" slot hook on top	663.5	664.5
8" riser casing	664.5	685.0
8" pipe-size screen, 0.025" slot size (25-slot)	685.0	705.0
8" blank casing	705.0	786.5
8" pipe-size screen, 0.025" slot size (25-slot)	786.5	807.5
8" pipe-size screen, 0.020" slot size (20-slot)	807.5	817.5
8" tailpipe with steel plate bottom	817.5	827.5

As detailed above, two screens were installed: a lower section set between 786.5 and 817.5 feet and the upper screen set from 685 to 705 feet below ground. Construction details of the well are presented on Figure 2. The Water Well Report prepared by Tacoma Pump & Drilling is included as Appendix A.

The lower screen was exposed to the formation by withdrawing the 10-inch casing to 787 feet after the assembly was placed. Development of the lower screen was accomplished by bailing and air-lift pumping with the drill stem. Approximately two days of development was sufficient to remove the fines from the formation and prepare the lower section of the screen for testing.

Testing of Lower Screen

Testing of the lower screen was accomplished on December 11. Testing was conducted with a submersible pump capable of approximately 150 gallons per minute (gpm). The well was instrumented with a data-logging pressure transducer to automatically record water levels at one

minute intervals. The lower screen was tested by pumping 53 gpm for two hours. Drawdown is presented in Figure 3; recovery is presented on Figure 4. The data logger was allowed to sit in the well until the morning following testing to record water levels during recovery.

After two hours of pumping at 53 gpm, the water level drew down 91.06 feet below the static level indicating a two-hour specific capacity of 0.58 gpm/foot of drawdown (gpm/ft). A hydrogen sulfide odor was noted during testing. The initial testing response indicated that, though some water-bearing material was present, yields were not high enough to warrant long-term constant-rate testing. Prior to the conclusion of testing, water samples were collected and submitted to Water Management Laboratories in Tacoma for inorganic analysis.

Exposure and Development of Upper Screen

As yields from the lower screen were not sufficient, the contractor withdrew the 10-inch pipe to 680 feet below ground to expose the upper screen to the formation. Similar to the lower screen, development of the upper screen was accomplished via bailing and air-lift pumping of the well with the drill stem. After approximately three days of development, the upper screen was producing clear and sand-free water and was considered ready for a pumping test. Water levels remained similar both prior to and after the upper screen was exposed to the aquifer, indicating that both zones screened lie within the same aquifer system.

Testing of Both Screens

Testing of both screens (lower plus upper) was completed on December 17. Testing was accomplished with the same equipment used in the initial testing. Yields were better so the pumping rates were varied and the testing was conducted for a slightly longer duration. Testing was accomplished with pumping rates of 55, 101, and 137 gpm for one-hour periods. Similar to the testing of the lower screen, a hydrogen sulfide odor was noted. Drawdown is presented in Figure 5; recovery is presented on Figure 6. The data logger was allowed to sit in the well for several days following testing to generate a hydrograph during non-use. This record is presented in Figure 7. Pumping rates and drawdown after 15, 30, and 60 minutes are presented in the following table.

Table 2. Pumping rates and drawdown

Rate (gpm)	Drawdown, ft (15 minutes)	Drawdown, ft (30 minutes)	Drawdown, ft (60 minutes)	15-minute Q/s, gpm/ft	30-minute Q/s, gpm/ft	60-minute Q/s, gpm/ft
55	35.30	37.27	38.26	1.56	1.48	1.44
101	75.20	77.25	78.57	1.34	1.31	1.29
137	109.55	110.66	111.90	1.25	1.24	1.22

Although the specific capacity of both screens was more than double that of the lower assembly alone, yields were still not high enough to warrant long-term, constant-rate testing. Prior to the conclusion of testing, a second set of water samples was collected and submitted to Water Management Laboratories in Tacoma for inorganic analysis.

Water Quality

Water quality samples were collected during both tests and submitted to Water Management Laboratories of Tacoma for analysis. With the exception of slightly elevated manganese levels (0.07 and 0.08 mg/L, respectively), the water meets all inorganic drinking water requirements. Water chemistry was similar for both samples collected. Complete results are included in Appendix B.

Hydrogeology

Though only limited-duration testing was completed on the deep test well, we were able to calculate the aquifer transmissivity from the data collected. The initial testing yielded transmissivity values that ranged from 2,000 to 7,500 gallons per day per foot of aquifer width (gpd/ft), averaging approximately 5,000 gpd/ft. The testing of both screens yielded transmissivity values that ranged between 2,300 and 17,000 gpd/ft averaging approximately 7,000 gpd/ft. These transmissivity values are generally low suggesting that the deep-aquifer material encountered during drilling does not appear to be capable of supporting typical municipal production rates. However, as discussed below, there may be additional permeable sediments within the deep aquifer system beneath the depths drilled by the test well.

The drawdown and recovery data from testing indicate that the test well is very inefficient with an efficiency of approximately 20%. Increasing the well efficiency may be possible via additional well development but is not expected to be cost effective due to the large amount of effort expected to be necessary. Further, much of the inefficiency is likely due to the screens being only exposed to a portion of the aquifer material. Regardless, as a resource protection well cannot be used for production, optimizing well efficiency was not a primary concern during the drilling and construction of the deep test well.

Analysis

The deep test well drilling reached an elevation of 546 feet below sea level. Sediments correlative with the deep aquifer system were encountered; however, the material screened by the well is not transmissive enough to efficiently yield a significant amount of water. Deeper exploration was not practical at the time of drilling. The well drilling exceeded contract depth; additionally, the practical limit of the drilling equipment as configured was reached. Further, the time remaining in the permitted contract period was not sufficient to extend the drilling any further. However, since little was known about the nature of the deep aquifer system below the City of Milton and the eastern upland, the drilling of the deep test well provided considerable information regarding the deeper stratigraphy in this area.

Building on the work we completed for the City in 2008, as well as the work we have completed for a number of other regional purveyors, we completed a review of nearby deep well logs and compared this information to the findings at the City's deep test well. We prepared a new geologic cross section crossing the southwestern portion of our 2008 study area that correlates and presents this information. The trace of the section is presented as E-E' on Figure 8, which also shows the traces of the sections prepared in our 2008 effort. The new cross section is presented in Figure 9; the logs included in this section are included in Appendix C.

The deep aquifer system, as defined here, consists of a series of aquifers encountered at elevations as shallow as 400 feet below sea level system to as deep as 1,000 feet below sea level. The top of the deep aquifer system is somewhat variable. It was identified at approximately 550 feet below sea level in Lakehaven Utility District's Well 28M. Fife's Well 5 also encountered a deep aquifer at approximately 550 feet below sea level and is completed in water-bearing sands from 630 to 673 feet below sea level. The irrigation well at the Gethsemane cemetery produces from water-bearing sand and gravel found at an elevation of approximately 950 feet below sea level and identified several other water-bearing zones below 600 feet below sea level. These are all consistent with the City's deep test well, which encountered a deep aquifer at approximately 450 feet below sea level, but did not fully penetrate the deep water-bearing zones.

The most similar log to the City's deep test well appears to be Well 28M, which was drilled to 1,104 feet. Well 28M is located approximately three miles to the northwest of the deep test well site. This well was included in our 2008 work (Figure 2 of that report) but was not included in any of the cross sections as it is located considerably west of the study area. The correlation between characteristic sedimentary traits (lavender-colored sediments, ash layers, and mention of pumice) observed while drilling the two wells is notable, as are the geophysical logs for the two wells. Well 28M was completed between 543 and 603 feet below sea level in a sand aquifer but did not reach the deeper sands found below 700 feet below sea level in the Gethsemane irrigation well. Testing of Well 28M indicated a transmissivity of 6,000 to 9,000 gpd/ft, which is approximately the same as at the deep test well. Water quality results from the testing of Well 28M are similar to those measured at the deep test well; pH was slightly above neutral, a slight amount of manganese was present, and a hydrogen sulfide odor was noted.

The Gethsemane irrigation well is completed in water-bearing sands that are also correlative to the deep aquifer system. It was also included in the 2008 effort, referenced as 32M1, but was not included in any of the sections. Unlike the wells drilled in the upland, this well penetrated a thick sequence of glacial-lake clay that has filled an ancestral valley. This material extends to a depth of 586 feet below surface. Below this depth, materials are more correlative to those encountered in Well 28M and the deep test well. The Gethsemane well was drilled to a depth of 1,124 feet with 8-inch casing. The well was completed with a 166-foot long assembly containing a total of 25 feet of 5-inch diameter, 60-slot (0.060-inch) screen set in four intervals between 944 and 1,042 feet below ground with screen locations based in part on geophysical logging results. Testing results indicate a specific capacity of approximately 1 gpm/ft and a transmissivity of approximately 3,000 gpd/ft. The report documents considerable difficulty with construction, development, and testing of the Gethsemane well, as well as excessive sand production once the well was put into service. Therefore, we do not consider the performance of the Gethsemane irrigation well to accurately represent the characteristics of the deep aquifer sediments. The water-quality characteristics of the Gethsemane well water appear similar to other deep aquifer water samples with a pH slightly above neutral, a slight amount of manganese, and a noticeable hydrogen sulfide odor.

A 1,005-foot deep well was drilled by Randy Holt on his property located of Freeman Road, approximately 1.6 miles to the south of the City's deep test well location. This well was completed in 2009 and is referenced as 17J1 on Figure 8. This well encountered a thick sequence of water-bearing sand and gravel below 690 feet below sea level. No testing results are available. The City of Fife's Well 5 was drilled to 695 feet below ground; approximately 680 feet below sea level. This well was tested at 784 gpm and has a transmissivity ranging from 11,500 gpd/ft to 18,900 gpd/ft and a specific capacity of 7 gpm/ft.

Conclusions

Two intermediate aquifers were encountered at the deep test well location. The deep aquifer system was also encountered. The deeper permeable deposits that Fife's Well 5 and the Gethsemane irrigation well are completed in were not reached within the depth drilled. Testing of the deep test well indicates that, though the test well is inefficient, the transmissivity of the formation is consistent with that observed at Lakehaven's 28M and the Gethsemane irrigation well. Fife's Well 5 has a slightly higher transmissivity but is screened through a thicker permeable sequence.

Although the permeable material correlative to the deep aquifer system that was penetrated during drilling does not appear to be capable of supporting municipal production rates, the well

screens that were set are only exposed to a portion of the aquifer material penetrated. The drawdown and recovery data from testing suggest that the test well is very inefficient with an efficiency of approximately 20%. Other logs in the area have penetrated a significantly thicker water-bearing sequence, and some of the wells in the area produce significant amounts of water from the deep aquifer system. A well at the current test site that effectively screened the presumed deeper, more permeable sediments would be expected to yield several times the yield of the test well with similar drawdown. Such a well could approach the economic limit of viability for a deep production well at this location.

With the exception of manganese, the water samples collected during testing meet all inorganic water quality standards, and the water quality appears to be consistent with other recorded data from the deep aquifer in the area. As with other local wells in the deep aquifer, the water has a hydrogen sulfide odor. Odors such as this can typically be remedied through aeration.

Recommendations

To complete the full exploration of the deep aquifer system, we recommend using the existing deep test well as a starting point. The existing screen assembly should be removed and a grout plug set at the bottom of the drill casing. This will help maintain the integrity of the casing and existing borehole as additional drilling progresses past. We recommend advancing an 8-inch nominal, fluid-rotary exploration boring an additional 500 feet beyond the original depth of the deep test well to an approximate elevation of 1,050 feet below sea level to fully penetrate the deep aquifer system. This final elevation is approximately consistent with the deepest known local expressions of the deep system. Geophysical logging should be conducted once the exploration boring is complete. Should conditions warrant, the exploration boring can be completed with 6-inch steel casing, either perforated or screened through water-bearing sequences. Once the well is constructed and developed, we recommend a pumping test to evaluate water quality and aquifer characteristics.

Should the recommended deeper drilling at this site not identify a sufficiently thick or transmissive water-bearing sequence, the intermediate aquifers that have been identified also warrant further exploration. Drilling deeper will not eliminate the chance to investigate either of the intermediate aquifers with the existing well, as the lower portions of the resource protection well can be decommissioned prior to the investigation of the intermediate aquifer zones.

ROBINSON NOBLE	Note: Image from ESRI ArcGIS	PM: BGC February 2014 1610-010A	Pierce County T 20 N/R 04 E - 09 Scale 1" = 100'	Figure 1 Aerial Map of Site City of Milton: Deep Test Well Drilling

Agenda Item #: 4C

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To: Mayor Perry and City Councilmembers

From: Public Works Director Neal

Date: March 3, 2014 Special Session

Re: Water Utility – proposed 6-year Capital Improvement Plan

ATTACHMENTS:

A. Current Water Utility 6-yr CIP (adopted 7/6/2010)

B. Revenue Bond Project Summary

C. Proposed Water Utility 6-yr CIP

TYPE OF ACTION:

☐ Information Only ☒ Discussion ☐ Action ☐ Expenditure Required:

Recommendation/Action: Staff will incorporate Council comments and bring back a final version for formal adoption at a later date.

Fiscal Impact/Source of Funds: The costs of the projects identified in the proposed Water Utility CIP is estimated at $2.86M. These funds will be included in the budget each year, and will have a long-term impact on the ending fund balance of the Water Utility Fund.

Previous Council Review: N/A

Issue: Council needs to formally adopt a new 6-year Capital Improvement Plan for the Water Utility, thereby providing direction for infrastructure improvements and annual budgeting.

Background: The Water System Plan Update, approved in July of 2010, identified more than thirty (30) capital improvement needs for the utility – significantly more than can be realistically accomplished in any single six year time period. Staff took a careful look at the project list and selected those projects that were critical to the continued operation of the water utility for the Six-Year Capital Improvement Plan (adopted 7/6/2010 – see Attachment A).

As part of the financing strategy, Council authorized revenue bonds late in 2010 in order to complete the adopted CIP. Not only were all of the identified CIP projects completed, but two additional projects as well. Refer to Attachment B for a summary of the revenue bond projects completed.

Discussion: The Water Utility is in need of a new Six-Year Capital Improvement Plan (CIP) to guide infrastructure priorities and budgeting decisions.

Attachment C is a proposed new Water Utility CIP that has been prepared from the capital improvements identified in Chapter 8 of the adopted Water System Plan. The following are brief descriptions of the eleven (11) selected capital improvements:

1. WS-2: Additional Source – Exploratory Drilling Phase 1.5
   During the course of 2013, Council directed staff to proceed with an additional revenue bond project to construct an exploratory test well. As discussed at the time, future growth in the City will demand additional water resources, and this project was intended to identify the site, depth, and pumping capacity of a future source of water. The results of the project were positive, indicating several potential aquifer layers that could be developed in the future. However, at just over 500 feet below sea level, this test well did not go deep enough to tap into the deep aquifer that is suspected in the area. Based on the test drilling results (also presented at tonight's meeting), it is strongly recommended that we drill another 500 feet, to 1000 feet below sea level, in an attempt to hit a high producing aquifer level that will not interfere with any of the City's other water sources.

2. 24th Street East Watermain Replacement
   This project was not included in the Water System Plan, and only came to light during the fall of 2013. The existing 2-inch line, originally installed in the mid-1940's, is now considered sub-standard. The water crew repaired two breaks in close proximity with each other, and debris pulled out of the trench indicated a likelihood of future breaks. At the November 18, 2013 meeting Council approved proceeding with design of this watermain replacement. This project will replace approximately 600 feet of existing AC line with standard 8-inch ductile iron pipe.

3. SR161 Waterline Replacement
   This project was included in the previously adopted Water Utility CIP. The work was included in WSDOT's contract for the roadway improvements on SR161 south of Milton Way. The waterline replacement is complete, but the City has yet to be billed for this work by WSDOT. So, essentially, this project is a place-holder for the monetary expenditure only.

4. 15th Avenue Reservoir Painting (Exterior)
   Repainting the interior of the 15th Avenue Reservoir was completed in the fall of 2011. The exterior is still in need of repainting; it was last repainted in 1999 for $42,157.84.

5. D-13: 19th Avenue Watermain Replacement
   This project will replace 1,300 lineal feet of 4-inch pipe with 8-inch pipe along 19th Avenue from Milton Way to Emerald Street. This project replaces aging and

undersized pipe, and increases fire flow availability by eliminating pressure constraints. Also included in this project is a new pressure vault at Emerald to replace the existing one that is old and failing. The City is currently in the design phase for pedestrian improvements along the north side of Milton Way at 19th Avenue, and continues to apply for grant funding to extend pedestrian improvements north down 19th Avenue to Emerald Street. Any watermain improvements necessary should be completed before pedestrian improvements are constructed in this area.

6. D-21: Milton Way and 13th Avenue Watermain Replacement
   This project replaces 1,150 lineal feet of 6-inch pipe with 8-inch pipe along Milton Way from 15th Avenue to 13th Avenue and along 13th Avenue north of Milton Way. Completion of the project will increase fire flow availability by eliminating pressure and velocity constraints. This segment of Milton Way is prime for an overlay, and any necessary improvements to the watermain should be completed before an overlay is constructed.

7. D-10: Reconnection of Services along 15th Avenue
   The City needs to abandon much of the aging and undersized pipe in the area by transferring services and connections over to parallel pipes where possible. Only a short segment of 8-inch pipe to connection the intersection of 15th Avenue / Oak Street will need to be installed. The City's water crew may be able to accomplish this project in-house.

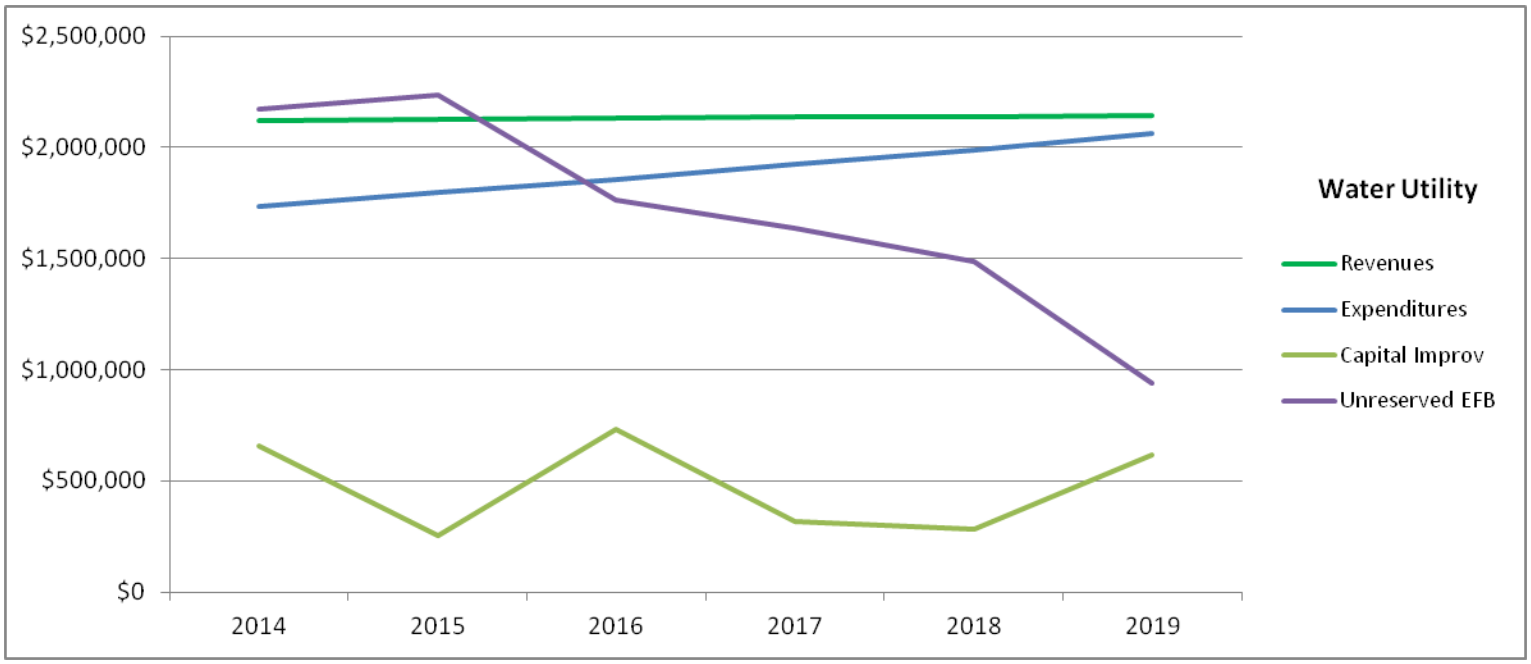
8. M-3: Well #10 Building Upgrades/Retrofitting
   The ground beneath the Well #10 building has settled significantly over the years. Council saw this firsthand during the Public Works shop tour at the 2013 Council Retreat. As a result of the settling, the building needs to be retrofitted or replaced.

9. D-14: 15th Avenue Watermain Replacement
   Replacement of 1,340 lineal feet of 4-inch pipe with 8-inch pipe along 15th Avenue from Emerald Street to Juniper Street. This project replaces aging and undersized pipe and increases fire flow availability by eliminating pressure constraints.

10. D-11: 12th Avenue Watermain Replacement
    Replacement of 1,300 lineal feet of 4-inch pipe with 8-inch pipe along 12th Avenue from Taylor Street to Oak Street and connection of the new pipe to the existing 8-inch pipe along the south side of Taylor Street. A small segment of this project has already occurred in preparation for the Taylor Street Overlay Project. This project replaces aging and undersized pipe and increases fire flow availability by eliminating pressure constraints.

D-12: 13th Avenue Watermain Replacement
Replacement of 1,300 lineal feet of 4-inch pipe with 8-inch pipe along 13th Avenue from Taylor Street to Oak Street and connection of the new pipe to the existing 8-inch pipe along the south side of Taylor Street. A small segment of this project has already occurred in preparation for the Taylor Street Overlay Project. This project replaces aging and undersized pipe and increases fire flow availability by eliminating pressure constraints.

The figure below is a 6-year trend analysis for the Water Utility Fund, if the expenditures planned for in the proposed Water Utility CIP were to occur:



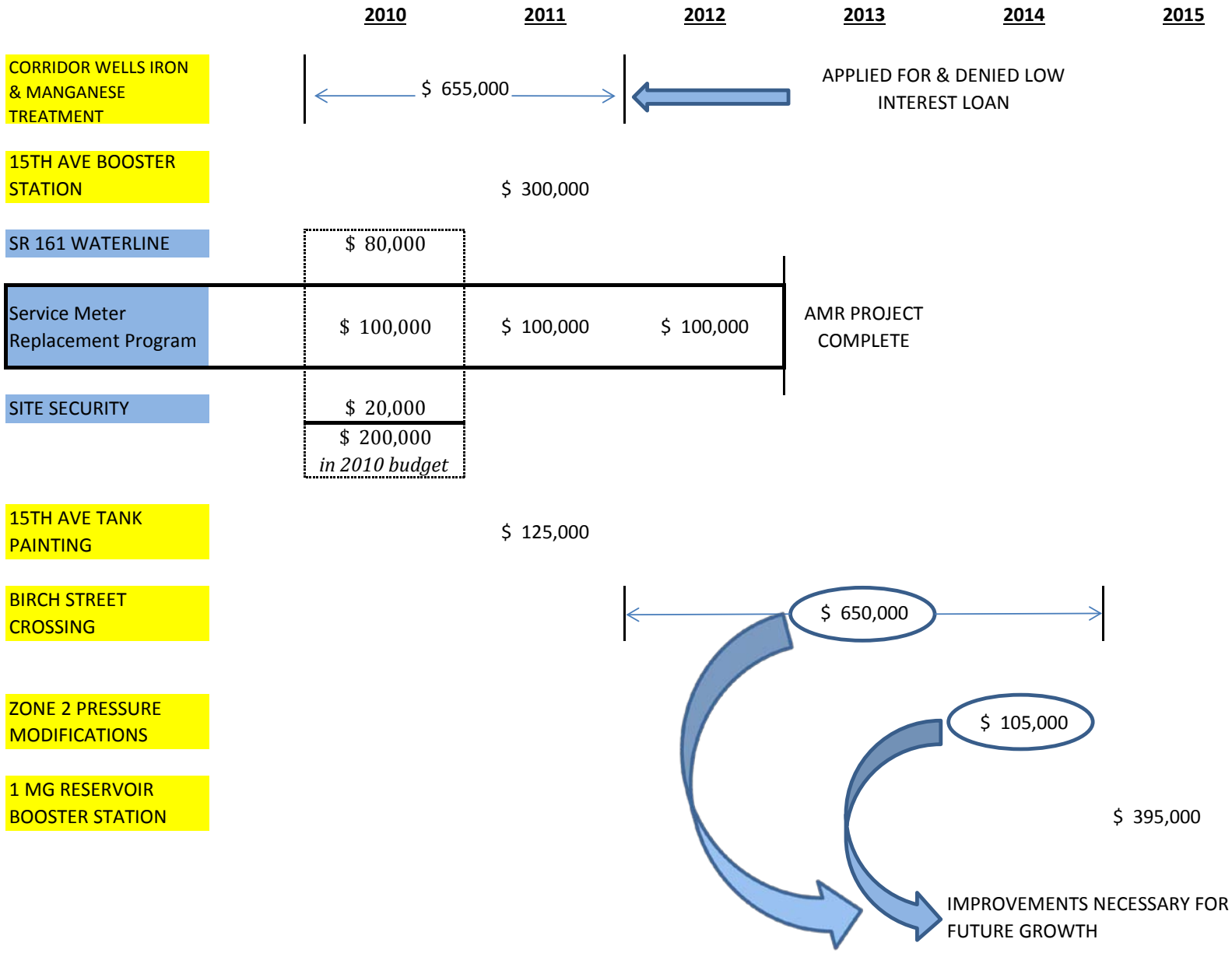
WATER UTILITY

	Budget 2014	Projected 2015	Projected 2016	Projected 2017	Projected 2018	Projected 2019
Beginnning Fund Bal	2,872,874	2,605,930	2,684,528	2,225,151	2,118,909	1,982,335
Revenues	2,122,434	2,126,679	2,130,932	2,135,194	2,139,464	2,143,743
Expenditures	1,734,378	1,795,081	1,857,909	1,922,936	1,990,239	2,059,897
Capital Improv	655,000	253,000	732,400	318,500	285,800	614,400
Ending Fund Balance	2,605,930	2,684,528	2,225,151	2,118,909	1,982,335	1,451,781
Reserved	433,595	448,770	464,477	480,734	497,560	514,974
Unreserved EFB	2,172,336	2,235,757	1,760,674	1,638,175	1,484,775	936,807

For Projected years
Using an annual increase of **2%** for Revenue
Using an annual increase of **3.5%** for Expenditures

At the end of the six year forecasting period as shown above the ending fund balance for the Water Utility will have fallen to approximately $1.5M, with the unreserved ending fund balance less than $1M.

WATER UTILITY
6-YR CAPITAL IMPROVEMENT PLAN
(REVISED 6/28/2010)



*** ALL COSTS SHOWN ARE IN 2010 DOLLARS, ESTIMATED.**

2011 Budget
Bond monies

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REVENUE BOND PROJECT SUMMARY - FINAL

2/24/2014

Project	Revenue Bond Planning Cost Estimates			Actual or Updated Estimated Cost						
	Construction	Eng & Admin	Total (Rounded)	Construction Estimate	Bid/Actual Const. Cost	Materials Acquired by City	Design Contract	CM	Total	Surplus/ (Deficit) to Bond Cost Estimates
Corridor Wells Fe & Mn Treatment	$579,000	$76,000	$655,000	NA	$435,176	$150,000	$71,545	$25,850	$682,571	(27,571)
15th Ave. Booster Station	$241,900	$58,100	$300,000	NA	$315,073	$44,879	$50,000	$7,619	$463,371	111,629
1 MG Reservoir Booster Station	$206,250	$68,750	$275,000	NA			$45,800			
15th Ave. Tank Painting	$93,750	$31,250	$125,000	NA	$114,675	NA	$8,100	$24,000	$146,775	(21,775)
Birch St. Crossing	$519,000	$130,000	$650,000	NA	$510,649	NA	$60,400	$10,000	$581,049	NA
434 Zone Modifications	NA	$20,600	$105,000	NA	NA	$44,826	$11,603	$0	$56,429	48,571
SUBTOTAL	**$1,639,900**	**$384,700**	**$2,110,000**	**$0**	**$1,375,572**	**$239,705**	**$247,448**	**$67,469**	**$1,930,195**	**179,805**
Porter Way Watermain Project	$349,041	$69,800	$418,841	NA	$358,226	N/A	$29,800	$5,856	$393,882	$24,959
ADDED on May 7, 2012 by Council Action										
Addt'l Water Source - Test Drilling	-	-	$250,000	-	$205,102	N/A	$63,670		$268,772	($18,772)
ADDED on March 11, 2013 by Council Action										
TOTAL	**$1,988,941**	**$454,500**	**$2,778,841**	-	**$1,938,900**	**$239,705**	**$414,243**		**$2,592,849**	**$185,992**

Actual Revenue Bond Funds Received	$2,582,557
Costs incurred	$2,592,849
TOTAL COST OVERRUN	-$10,292

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WATER UTILITY
6-YR CAPITAL IMPROVEMENT PLAN
PROPOSED

	2014	2015	2016	2017	2018	2019
ADDTL WATER SOURCE - TEST DRILLING PHASE 1.5	$350,000					
24TH ST E WATERMAIN	$230,000		UNDERWAY			
SR 161 WATERLINE	$75,000					
15TH AVE RESERVOIR PAINTING (EXTERIOR)		$55,000				
19TH AVE WATERMAIN		$68,000	$270,000			
MILTON WAY & 13TH AVE WATERMAINS			$60,000	$240,000		
RECONNECTION OF SERVICES - 15TH AVE		$30,000				
WELL#10 BUILDING UPGRADES/RETROFIT		$100,000	$402,400			
15TH AVE WATERMAIN				$78,500	$131,000	
12TH AVE WATERMAIN					$77,400	$307,200
13TH AVE WATERMAIN					$77,400	$307,200
ANNUAL TOTALS	**$655,000**	**$253,000**	**$732,400**	**$318,500**	**$285,800**	**$614,400**

These items are currently included in the 2014 adopted budget.

IMPROVEMENTS NECESSARY PRIOR TO ANY PAVEMENT REPAIRS IN THIS NEIGHBORHOOD

*** ALL COSTS SHOWN ARE IN 2014 DOLLARS, ESTIMATED.**

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