



Date: October 3, 2017

To: CITY COUNCIL

From: Ross Bintner PE, Engineering Services Manager, Chad Millner PE, Director of Engineering, Brian Olson PE, Public Works Director

Subject: Water Treatment Plant 5 Preliminary Design Report

Information / Background:

On March 7, 2017 Council approved professional services and amendment to include pilot study of chemical treatment options for preliminary design of Water Treatment Plant 5 (WTP 5) and, on September 6 Council approved change order #1 for evaluation of an additional site and to extend the pilot study.

The attached 2017 WTP 5 Preliminary Design Report by AE2S includes review of topics that support decisions on; the timing of plant construction, the location of the plant, treatment objectives, and treatment technologies. The report explores tradeoffs in service, risk and cost for each of these decisions and recommends a prudent path forward to design and build WTP 5.

Timing of plant construction: Why now?

Siting and planning for Water Treatment Plant 5 (WTP 5) began over a decade ago. Since that time Edina built Water Treatment Plant 6 (Grandview) and has taken Water Treatment Plant 1 (Utley Park) offline. The City has secured easements for WTP 5 adjacent to the Southdale water tower and partially extended raw water pipes to ultimately connect the planned facility with its source wells. The easements for WTP 5 development require coordination and architectural review from project partners. WTP 5 will range from 2000-3000gpm, and will filter water from Edina wells 5 and 18, and a potential third future well.

Treatment plants serve to remove contaminants from groundwater by a variety of physical and chemical processes. Currently wells 5 and 18 are seasonally operated to meet peak demands. Their operations introduce intermittent unfiltered water into a growing area of the City resulting in water clarity complaints. A primary treatment goal of this plant is the reduction of iron and manganese to improve water taste, clarity, and reduce staining and sediment. WTP 5 will allow the water utility to operate wells 5 and 18 to supply daily water demand with a product that meets customer expectations.

The Edina water system has served an average of between 6-7.5 MGD (million gallons per day) over the past decade, with peak day demands between 13-23MGD. WTP5 is planned to be expandable to include a future well 21 to meet peak days with a growing user base. Planning evaluation is presented in chapter 3, and the

attached 2013 Water System Demand and Capacity Analysis, SEH. When complete WTP 5 will; Increase filtered capacity of the City of Edina water system to be able to provide filtered water during nearly all typical summer demands, add flexibility and resilience to the filtered supply, and end the seasonal unfiltered water pulse that affects water clarity in southeast Edina.

Location of plant construction: Tradeoffs and where?

The preliminary design report reviewed four potential locations, including the preferred site near the Southdale tower. The remaining sites under review were; Yorktown park near well 18 and fire station 2, the median of 69th street near well 5, and Fred Richards park co-located with existing water treatment plant 3. Criteria used to evaluate the site included; Treatment performance, safety and security, architecture, constructability, and utility piping needs. The project team took an iterative approach to refine options in greater detail, to the extent that they presented value. Raw water and distribution system limitations added hurdles to many sites, described in detail in chapter 8. The sites alternatives are detailed in chapter 8, and evaluation of sites are presented in chapter 10. While every site could meet the treatment objective, the costs to make some sites ready narrowed the field.

Two configurations of the plant were reviewed, a standalone building and building integrated with a mixed use development in partnership with the property owner, Simon. Staff presented WTP 5 options to Simon for consideration and comment. An integrated Southdale site, provides the highest and best use of land while meeting all treatment objectives at the least cost while managing risks. The Southdale site alternative of a standalone site is also acceptable and will as it provides similar service, with less risk, yet less efficient use of land.

Staff recommends the preferred site at Southdale. Simon has given staff preliminary indication that they are not interested in pursuing a mixed use development and staff has indicated that we remain open to change structural and foundation components of the design to make the plant development ready for a future mixed use at the property owner's option and expense, but that opportunity ends during the preliminary design phase. More context is provided in the 'community fit' section below and the 2012 easement agreement is attached for reference.

Treatment Objectives and Choices: Balancing Service, Risk and Cost

The preliminary design report goes into detail on treatment objectives and choices. Chapter 4 treatment process objectives, Chapter 5 technology alternatives, and Chapter 7 technology evaluations cover the topic. The study included a pilot study where a scaled down version of actual treatment options was run over the course of more than a week, with frequent chemical tests of influent and effluent water to dial in effect and efficiencies. The pilot study is described in Chapter 6.

In addition to the primary goals of iron and manganese removal mentioned above in the timing section, WTP 5 will be designed to treat radionuclides and meet and exceed industry standards to provide corrosion control, disinfection and management of disinfection byproducts, and fluoridation. The treatment goals above drive many of the treatment recommendations and plant design, but so to do controls for security, risk and safety.

Technology selections around the treatment process were compared to balance initial capital and long term operating cost. The selections also affect future resources demands guided by City sustainability goals. Some of the tradeoffs in that realm are discussed in further detail in the section below. Future staff burden

was also considered as part of the operating cost evaluation, and current water system operators were engaged during the study to provide input into the choices. There was a strong preference to favor gravity filtration and make the treatment process as simple to operate as possible.

The media used in the filtration process, and its resulting filtration and the timing of chemical reactions were studied in the pilot. Along with the coagulation and settling of filter backwash these physical and chemical timing factors drives many of the space needs in the recommended plant. The sizing of the plant is also driven by the addition of future well 21, and the plant design capacity of 3000 gallons per minute.

Decisions with significant risk management context include the strategy for radionuclides treatment and the choice of disinfection and its relation to the procurement and use of ammonia and chlorine. These tradeoffs and the management of risks are discussed in the study. With consideration for service, risk and cost, staff recommends treatment option 1C, (floorplan shown in appendix I) a 3000 gpm gravity filtration plant meeting industry standards for security, safety and treatment, with the primary treatment objectives of iron, manganese and radionuclides reduction.

Plant design will kick off with discussions with the DNR on future well 21 appropriations, and with the property owner to review possible low cost modification to the structure that would make it development ready for nearby or zero setback mixed use redevelopment opportunities in the future. Staff will propose modification of the easement document to spell out the revised configuration of the plant, and address construction sequencing for constructability.

Community Fit, Architecture and Sustainability

The preliminary design report includes architectural renderings and floor plan for the proposed WTP 5. The plan was created to be consistent with ongoing Southdale area planning with sensitivity to the concerns of the property owner. A city owned utility building is a permitted use in all zoning districts, so no land use decisions are needed.

The plan provides a low profile building that does not disrupt holiday parking, confuse mall customers or unduly block sight lines. Delivery space for the plant is tucked between the plant and existing water tower, and the security fence for the tower and plant are integrated to make a single secured space. Architectural renderings are shown in appendix AB, and a prior iteration provides options for consideration. Materials vary on distinct sections of the building, and will be high quality.

While the shape of the building is largely driven by the treatment practices within, staff welcomes input on the exterior aesthetic to inform the preliminary and final design and will include the property owners input, consistent with the easement. Staff recommends demolition of the existing well 5 building in the median of 69th street and construction of a below-grade vault as a premium addition (described as option 1 in the estimate) as part of the required well integration work.

The plan also engages France Avenue, with options for educational component that describes the building and water treatment process, plaza, or landscaped sidewalk that provides a pleasing landscaped aesthetic that includes ornamental trees. Green site improvements include a living wall and a green roof. Sustainability considerations will be developed in the design consistent with tract 2 detailed in appendix P. The preliminary design includes a high efficiency backwash reclaim system with plate settler, and close attention to ongoing resource needs that also drive operating costs.

Costs and Recommendations

The report recommends the timing, site and treatment choices that will meet customer demands while managing risk and fitting in to the community. Staff recommends approving a contract for professional services for design. If Council elects to move forward with design, the following schedule will be pursued.

October - November 2017	Preliminary Design
December 2017 – March 2018	Final Design
April 2018	Bid Opening / Award
May 2018	Construction Start
July 2019	Construction Complete

If approved for design, the next Council decision point would be following bidding for the consideration of award of construction contracts.

Funding sources, Actual and Estimated Costs

Cost considerations include initial capital costs and ongoing maintenance costs. Ongoing costs to maintain are presented for a comparative basis in the preliminary design report and include major items such as labor, chemical, electric, and maintenance. Actual operating costs consider cost tradeoffs among water treatment plants and will be estimated during the 2019-20 budget development process or during a future utility rate study if it were to occur before the 2019 budget.

Planned CIP line items are compared to initial capital costs estimates described in the table below. Four CIP items cover WTP 5 and associated options for construction. The construction estimate (appendix U and AA) includes 15% contingency to account for uncertainty, including site size and constructability constraints at this level of design. Staff recommends redirecting funds from the storage CIP item to WTP 5, and delaying a decision on the creation of Well 21 and raw water line until construction cost for the treatment plant is better known. If costs come in below estimate, some of the contingency could be repurposed to Well 21 and raw water, if not the plant would be planned to come online with two wells, with the third well programmed in the 2019-2023 CIP work.

CIP ITEMS

Item & Total Amount	Amount by Year	Funding Source - Notes
CIP 15-162 <i>New Water Treatment Plant 5</i> TOTAL \$8,675,000	2017; \$2,000,000 2018; \$6,750,000	Early estimates built off 2000gpm pressure plant. 3000gpm gravity plant recommended.
CIP 15-163 <i>New Storage at WTP 5</i> TOTAL \$1,000,000	2018; \$1,000,000	Not adding storage at WTP 5, but redirecting funds to CIP 15-162
CIP 15-164 <i>Well 21 and Raw Water Line</i> TOTAL \$675,000	2017; \$75,000 2019; \$600,000	Delay Well 21 decision until WTP 5 bid costs are known, hold these funds in reserve
CIP 15-102 <i>Well 5 Rehab</i> TOTAL \$120,000	2018; \$120,000	Estimate for removal of well house and below grade vault \$80K higher

CIP GRAND TOTAL \$10,545,000	2017; \$2,075,000 2018; \$7,870,000 2019; \$600,000	Estimated schedule puts more expenses into 2018 and 2019
------------------------------	---	--

PROJECT EXPENSE AND ESTIMATE

Item & Total Amount	Amount by Year	Actual and Estimate Costs - Notes
CIP 15-162 <i>New Water Treatment Plant 5</i> SERVICES \$1,527,000 WTP \$7,591,000 CONTINGENCY \$1,199,000 INTEGRATION \$400,000 ESTIMATE \$10,717,000	2017 To date; \$116,000 2017 Additional; \$368,000 2018; Estimate \$6,556,000 2019; Estimate \$3,677,000	\$85.5K report + change order I \$17K Tower stability analysis \$13.6K Borings, Geotechnical Report \$268K Preliminary design \$100K Final design (partial) \$505K Final design (remaining) \$38K Bidding services \$460K Construction services \$40K Soils and Material Testing \$5.513MM Construction (60% partial) \$3.677MM Construction (remaining) (includes integration costs and 15%, construction contingency)
CIP 15-163 <i>New Storage at WTP 5</i> ESTIMATE \$0		Not adding storage at WTP, but redirecting funds to CIP 15-162
CIP 15-164 <i>Well 21 and Raw Water Line</i> ESTIMATE \$0 - \$1,700,000		Delay Well 21 decision until WTP 5 bid costs are known, sharpen estimate and hold these funds in reserve
CIP 15-102 <i>Well #5 Rehab</i> TOTAL \$100,000 - \$200,000	Base cost built into integration costs above OPT I - 2018; \$100,000 premium	Option I recommending removal of median well house and conversion to below grade structure and pump
TOTAL ESTIMATE; \$10,717,000 w/ OPT I; \$10,817,000	2017; \$484,000 2018; \$6,656,000 2019; \$3,677,000	

Estimates are to nearest \$1,000's

Attachments:

Letter Agreement, Fee Detail

Water Treatment Plant 5 Preliminary Design Report and Appendices

2013 Water System Demand and Capacity Analysis, SEH

Easement Agreement