

APPENDIX E:



MEMORANDUM

DATE: May 15, 2015

PROJECT #: 1450.05
Tumwater Brewery Planned Action EIS

SUBJECT: Infrastructure Analysis

ATTACHMENTS: Area Map
DOE Appendix E – Flow Control Exemption
Stormwater Sizing Calculations
Estimate of Water and Sewer Demand Calculations
Pipe Flow Calculations – Existing Water Pipe to Main Brewery Site
Water System Plan Maps
Capital Improvement Program (Water)
Pipe Flow Calculations – Existing Sewer Pipe in Custer Way
Sewer System Plan Maps
Existing Utility Maps

Purpose

The purpose of this memorandum is to discuss the availability of utility infrastructure at the Tumwater Brewery project, the resulting impacts of the proposed development alternatives, and, if necessary, mitigations that will be necessary. This analysis includes stormwater, water, sewer and power only.

The project area is made of up 3 sites. For purposes of the following discussion, they will be referred to as the main brewery site, RST site and upper parking site (see attached map).

Stormwater

Affected Environment and Methodology

The construction on all 3 sites predates requirements for management of stormwater such as flow and water quality control. Stormwater management at the existing sites consist of stormwater conveyance only. Conveyance includes pipes, roadside ditches, foundations drains to divert water around the foundations and sheet flow. All flow is directed either to the Deschutes River or adjacent wetlands. This runoff is uncontrolled and untreated.



Stormwater management in the City of Tumwater is currently governed by the 2010 Drainage Design and Erosion Control Manual for Thurston County and the 2012 Department of Ecology Stormwater Management Manual for Western Washington. Because the site has not recently been redeveloped, the existing stormwater systems do not meet current standards. Future stormwater improvements will be designed based on the standards in effect at the time of site development. A code change is proposed for 2015/2016 which will emphasize implementing low impact design (LID) strategies where feasible. Code changes typically occur approximately every 5-10 years. Future code requirements could impose stricter standards but the nature and extent of future code changes are unknown. For purposes of the impact analysis, the current code requirements have been applied.

Impacts

There are many requirements for stormwater management per the current codes. The two requirements that have the biggest impact to site development and construction costs are flow control and water quality control. The project area is located in an area that is exempt from flow control (see attached Appendix 1-E of the DOE Manual). The following analysis of the alternatives therefore, focuses on water quality requirements only.

Water quality treatment is only required for pollution generating impervious surfaces (PGIS). For this type of development, PGIS is typically comprised of parking areas and access roads. Roof areas (including parking garages with roofs that don't allow parking), landscape areas, and sidewalks do not require water quality treatment for runoff.

The upcoming manual updates will have a focus on implementing LID strategies where feasible. Therefore, all future projects will need to analyze whether LID are feasible on the site. The specific requirements are not yet known, including if new requirements will modify LID or stormwater facility size.

Alternative #1

Under this alternative, the existing buildings will be redeveloped and repurposed. No expansion of building footprint or site improvements are proposed. The following impacts are anticipated for the 3 site areas:

For the main brewery site (lower), the only PGIS proposed is the existing 20 foot emergency access road and turn around. No treatment is provided with current facilities therefore, water quality treatment systems are required. Based on the attached calculations, it was determined that a total treatment volume of about 7,000 cubic feet and a water quality treatment flow of 0.2 cubic feet per second would be required for the roadway PGIS.

The RST site (upper) has a small area of parking directly adjacent to the building and another small parking area across Desoto Street. Treatment of stormwater runoff is not currently provided. Therefore, treatment systems need to be added. Per the attached calculations, it was found that a total treatment volume of about 3,000 cubic feet and a water quality treatment flow of 0.08 cubic feet per second would be required for the parking area PGIS.



The upper parking site is comprised completely of PGIS. Treatment of stormwater is not currently provided and will be required. Based on the attached calculations, it was determined that a total treatment volume of about 6,000 cubic feet and a water quality treatment flow of about 0.17 cubic feet per second would be required for this area.

Future treatment retrofits should focus on implementation of LID where feasible. LID facilities that could be added include rain gardens, biofiltration swales, use of pervious paving, and other strategies. Given space limitations on the RST and upper parking sites, implementation of LID might not be possible without decreasing parking. Therefore, other space saving alternatives should be considered, such as mechanical treatment filters. Once treated, all stormwater will require conveyance to the river or wetlands where the flow currently is conveyed (the location of current runoff flow outlet shall be maintained per flow control exemption requirements). If flow is diverted from its current flow path, the diverted flow would require flow control. For the purposes of this analysis, it was assumed flow diversion would not be proposed.

Roof runoff and runoff from other non-PGIS areas will need to be collected and conveyed to the current discharge location.

Alternative #2

For this alternative, the only proposed modification that would affect stormwater management is the widening of the existing access road (24 foot roadway and 6 foot sidewalk) and addition of a 20 stall parking lot. Based on the attached calculations, it was determined that a total treatment volume of 9,600 cubic feet and a water quality treatment flow of 0.27 cubic feet per second would be required for the roadway and parking PGIS. There will be challenges with construction of either a volume based facility (pond) or a flow based system (mechanical filters). Space is limited both physically and because of critical areas and associated buffers. Therefore, finding space to accommodate a 9,600 cubic foot facility will be challenging. Vertical elevation will be the challenge for a mechanical filter system. These systems require about 2 ½ feet of vertical elevation change. According to available data (Thurston County GeoData), the change between the river and the site is only about 4 feet. Therefore, the available vertical fall for the filter and connecting pipe might be insufficient.

Alternative #3

For this alternative, no additional PGIS is proposed over Alternative #2 so no additional impacts would be anticipated.

Although the parking garage is a large area of vehicular impact and PGIS, it is not subject to rainfall as it will be a roofed structure. Therefore it is not subject to water quality requirements. As water will be tracked into the garage and garage floor cleaning will occur, a sewer connection for the garage will be needed.

Mitigation

Provided the project provides for water quality treatment as stated above, No additional mitigation is necessary as a result of stormwater impacts.



Water

Affected Environment and Methodology

Water is provided by the City of Tumwater. According to the City's current Water System Plan (2010), the City of Tumwater water system includes 12 groundwater wells, 5 reservoirs in 3 pressure zones, 3 booster stations, and a pipeline distribution network. The brewery project area is located in pressure zone 350. This zone has a minimum and maximum static service pressure of 38 and 143 respectively. The minimum and maximum elevation served by zone 350 are 20 and 262 feet respectively. Zone 350 is served entirely by groundwater wells.

Zone 350 is the zone with the most usage and has the most of the projected growth in Tumwater therefore, the most increase for demand. Based on the City Water System Plan, the current system does not have the capacity to address the future demand and is projected to have a source deficiency in 2029. There are planned projects that will boost capacity and should address any future shortfalls, if these planned projects are constructed. These projects include the Palermo Well Field and the Bush Well Field treatment facility as well as planned future sources (e.g. the Brewery, Southwest, and Northeast Well Fields). There were several of these projects proposed as part of the Capital Improvement Program (attached), but the only project built to date was a water line that can facilitate future tie-ins to the Palermo Well Field.

Per the City Water System Plan, the brewery area has been planned for historic commercial therefore, commensurate commercial demand has been incorporated into system planning. Depending on the timing of future site development, system shortfalls could be present in the main distribution network.

An existing 6-inch cast iron water lines serves the main brewery site. This line follows the existing access road and terminates at a fire hydrant at the northwest corner of the brew house. At a recent site visit, it appeared a portion of this pipe may have been removed. An existing 8-inch water main within Custer Way provides water service to the RST site. Water service to the upper parking site is not required and was not verified.

Impacts

Water services will only be required by the main brewery and RST sites. Therefore only these sites are considered in this analysis.

Alternative #1

Based on assumed sizes and land uses for the main brewery site (residential, retail, hotel, and restaurant), a potable water system demand of about 26,000 gallons per day (19.69 gallons per minute) has been estimated. Fire flow needs would likely be in excess of 2,000 gallons per minute. The existing 6-inch water line serving the site would be insufficient to provide these anticipated flows. It is anticipated that an 8- to 10- inch water line would be needed to provide adequate service for both potable and fire system demands.



Based on assumed sizes and land uses for the RST site (office, distillery, residential, and restaurant), a potable water system demand of about 28,000 gallons per day (17.75 gallons per minute) has been estimated. Fire flow needs would likely be in excess of 2,000 gallons per minute. The existing 8-inch water main in Custer Way would be sufficient to provide adequate service for the both the potable and fire system demands.

Alternative #2

Based on assumed sizes and land uses for the main brewery site (retail, hotel and restaurant), a potable water system demand of about 17,000 gallons per day (11.95 gallons per minute) has been estimated. Fire flow needs would be in excess of 2,000 gallons per minute. The existing 6-inch water line serving the site would still be insufficient to provide these anticipated flows. It is anticipated that an 8- to 10-inch water line would be needed to provide adequate service for both potable and fire system demands.

Based on assumed sizes and land uses for the RST site (office, distillery, and restaurant), a potable water system demand of about 18,000 gallons per day (12.74 gallons per minute) has been estimated. Again this is a reduction in demand from Alternative #1 due to the elimination of the residential uses. Fire flow needs would likely be in excess of 2,000 gallons per minute. The existing 8-inch water main in Custer Way would be sufficient to provide adequate service for the both the potable and fire system demands.

Alternative #3

Based on assumed sizes and land uses for the main brewery site (same as Alternative 2 plus up to 150 residential units), a potable water system demand of about 41,000 gallons per day (32.77 gallons per minute) has been estimated. Fire flow needs would be in excess of 2,000 gallons per minute. The existing 6-inch water line serving the site would be insufficient to provide these anticipated flows. It is anticipated that an 8- to 10-inch water line would be needed to provide adequate service for both potable and fire system demands.

Based on assumed sizes and land uses for the RST site (same as Alternative 3 plus up to 5,000 square feet of retail), a potable water system demand of about 18,000 gallons per day (12.52 gallons per minute) has been estimated. Fire flow needs would likely be in excess of 2,000 gallons per minute. The existing 8-inch water main in Custer Way would be sufficient to provide adequate service for the both the potable and fire system demands.

Mitigation

Provided the 8- to 10-inch water main in Custer Way is provided for the lower site and the appropriate mitigation is completed for the impacts of adding any new water pipes along or in the roadways, no additional mitigation is necessary as a result of water impacts for all the alternatives.



Sewer

Affected Environment and Methodology

Sewer is provided by the City of Tumwater. According to the City's current Sewer System Plan (1996), the City of Tumwater sewer system serves a 7 square mile area with largely residential users. Existing facilities consist largely of gravity collection lines (ranging in size from 6- to 27-inches), pump stations, and force mains. There are 4 major interceptors which receive wastewater from the collection lines and route the flow towards LOTT Alliance (LOTT). Treatment is provided at the LOTT treatment facility. The system also includes 17 pump/lift stations. These vary in size from 60 to 500 gallons per minute (GPM). There were no deficiencies identified in the existing system. Therefore, it is anticipated that the City's main sewer system will have sufficient capacity to serve a future brewery redevelopment.

The exact location and size of existing on-site sewer service lines could not be determined. There is a City owned pump station located on the brewery property. According to the City, this pump station was designed largely for flows from about 20 homes located on Capital Blvd. They could not verify if the brewery site has a connection to the pump station.

According to drawings from the 1950's, the existing RST building connects to a city sewer main within Schmidt Place. This, in turn, connects to a 16-inch sewer main line that runs adjacent to the railroad tracks east of the site and conveys flows north along Capital Way. In 2007, a 12-inch gravity sewer main was installed along Custer Way. The capacity of this pipe is approximately 1.78 cubic feet per second (801 GPM) using the flattest slope for purposes of calculation (see attached calculations).

Impacts

Sewer services will only be required by the main brewery and RST sites. Therefore only these sites have been considered for analysis.

Alternative #1

Based on assumed land uses and sizes for the main brewery site (residential, distillery, office, and restaurants), a sewer system demand of about 26,000 gallons per day (19.69 GPM) has been estimated. Connection to and possible upgrade of the existing pump station would be needed to accommodate these flows. It is also assumed that all new conveyance pipes would be required.

Based on assumed land uses and sizes for the RST site (office, distillery, residential, and restaurant), a potable sewer system demand of about 28,000 gallons per day (17.75 GPM) has been estimated. It is anticipated that a future redevelopment of the RST building would connect sewer to the existing 12-inch line in Custer Way. The main on Custer Way has sufficient capacity for the expected flows.

Alternative #2

Based on assumed land uses and size for the main brewery site (retail, hotel and restaurant, a sewer system demand of about 17,000 gallons per day (11.95 GPM) has been estimated. Connection to and



possible upgrade of the existing pump station would be needed to accommodate these flows. It is also assumed that all new conveyance pipes would be required.

Based on assumed land uses and sizes for the RST site (office, distillery, and restaurant), a sewer system demand of about 18,000 gallons per day (12.74 GPM) has been estimated. It is anticipated that a future redevelopment of the RST building would connect sewer to the existing 12-inch line in Custer Way. The main on Custer Way has sufficient capacity for the expected flows

Alternative #3

Based on assumed land uses and sizes for the main brewery site (same as Alternative 2 plus up to 150 residential units), a sewer system demand of about 41,000 gallons per day (32.77 GPM) has been estimated. Connection to and possible upgrade of the existing pump station would be needed to accommodate these flows. It is also assumed that all new conveyance pipes would be required.

Based on assumed land uses and sizes for the RST site (same as Alternative 3 plus up to 5,000 square feet of retail), a sewer system demand of about 18,000 gallons per day (12.52 GPM) has been estimated. It is anticipated that a future redevelopment of the RST building would connect sewer to the new 12-inch line in Custer Way. The main on Custer Way has sufficient capacity for the expected flows.

Mitigation

Temporary impacts may occur from the installation of conveyance lines. The impacts are temporary and any disturbed areas will be restored once the installation is complete. Because there is capacity within the overall existing LOTT system, no additional mitigation is necessary as a result of sewer impacts.

Power

Affected Environment and Methodology

According to the City's current Utilities Plan (2004), power to the City of Tumwater is provided the Bonneville Power Administration (BPA) and Puget Sound Energy (PSE). BPA owns and operates the principle high voltage bulk transmission lines serving the Puget Sound region. BPA is a power marketing agency of the United States Federal Government. PSE provides electrical services and is an investor-owned public utility. The primary service BPA provides is wheeled to the PSE service area from several BPA transmission lines.

Tumwater is part of the PSE service area that also includes Bucoda, Lacey, Olympia, Rainier, Rochester, Tenino, Yelm and unincorporated areas of Thurston County. There is one power generation station in Centralia and three transmission stations in Thurston County. In Thurston County, most transmission lines are 115kV. In Thurston County, there is a need for additional transmission lines to support the system. It is not anticipated that power system needs for the City would affect the ability to serve power to the brewery site area.



The existing power at the project site includes a 3-phase feeder line along Custer Way with a 3-phase distribution line extending from Custer Way along the Boston Street access and through the site³.

Impacts

It is anticipated that serving the site with power for any of the alternatives will not have any significant impacts to the existing power infrastructure. Relocations of power lines and poles (and possible undergrounding) might be necessary for Alternatives #2 and #3.

Mitigation

It is anticipated sufficient power is available, provided appropriate mitigation is provided for the undergrounding of utilities, no additional mitigation is necessary as a result of power impacts.

References:

- Tumwater Historic District Infrastructure Analysis Summary of Findings by Parametrix dated January 2005
- 2010 Drainage Design and Erosion Control Manual for Thurston County
- 2012 Department of Ecology Stormwater Management Manual for Western Washington
- 2010 City of Tumwater Water System Plan
- 1996 City of Tumwater Sewer System Plan
- 2004 City of Tumwater Utilities Plan