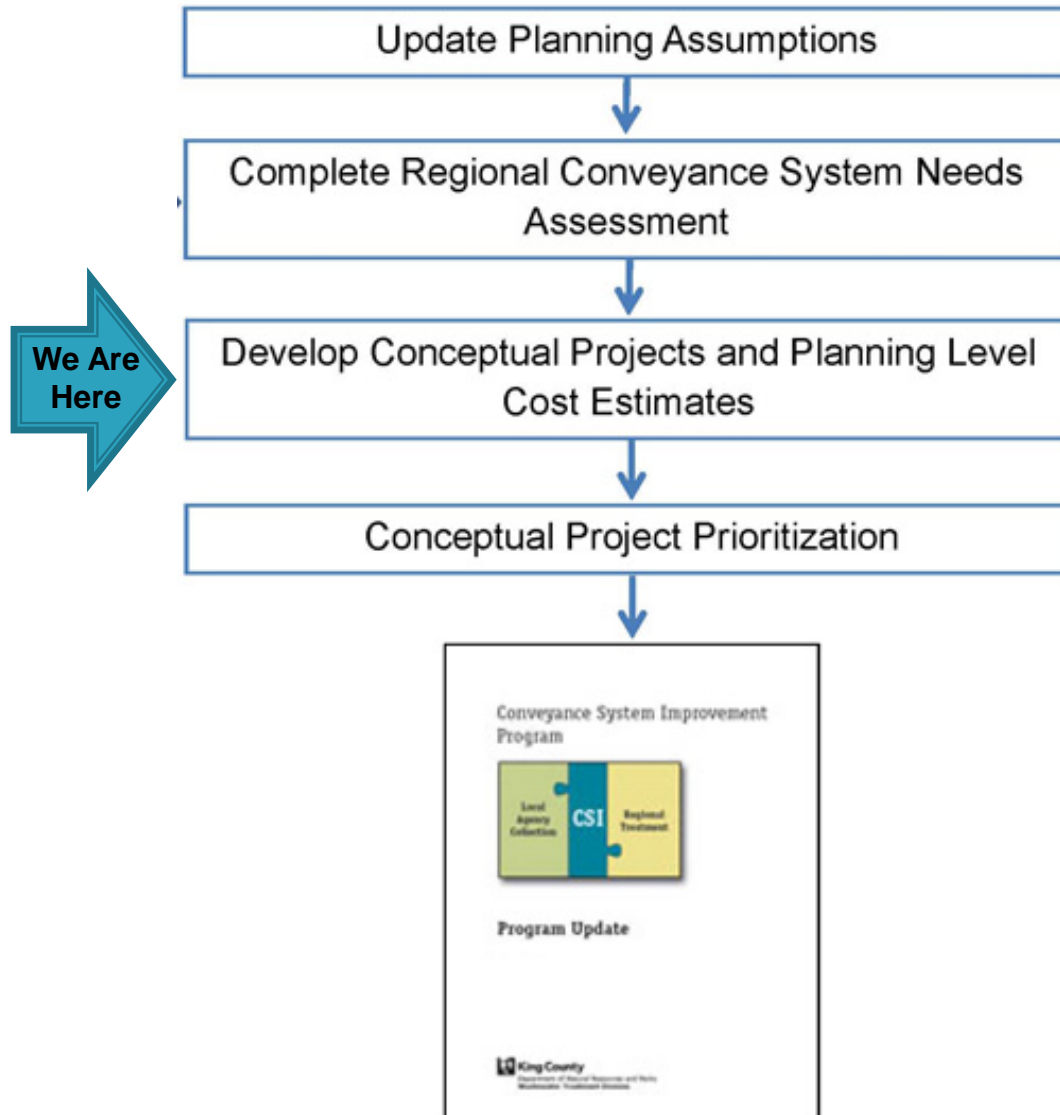
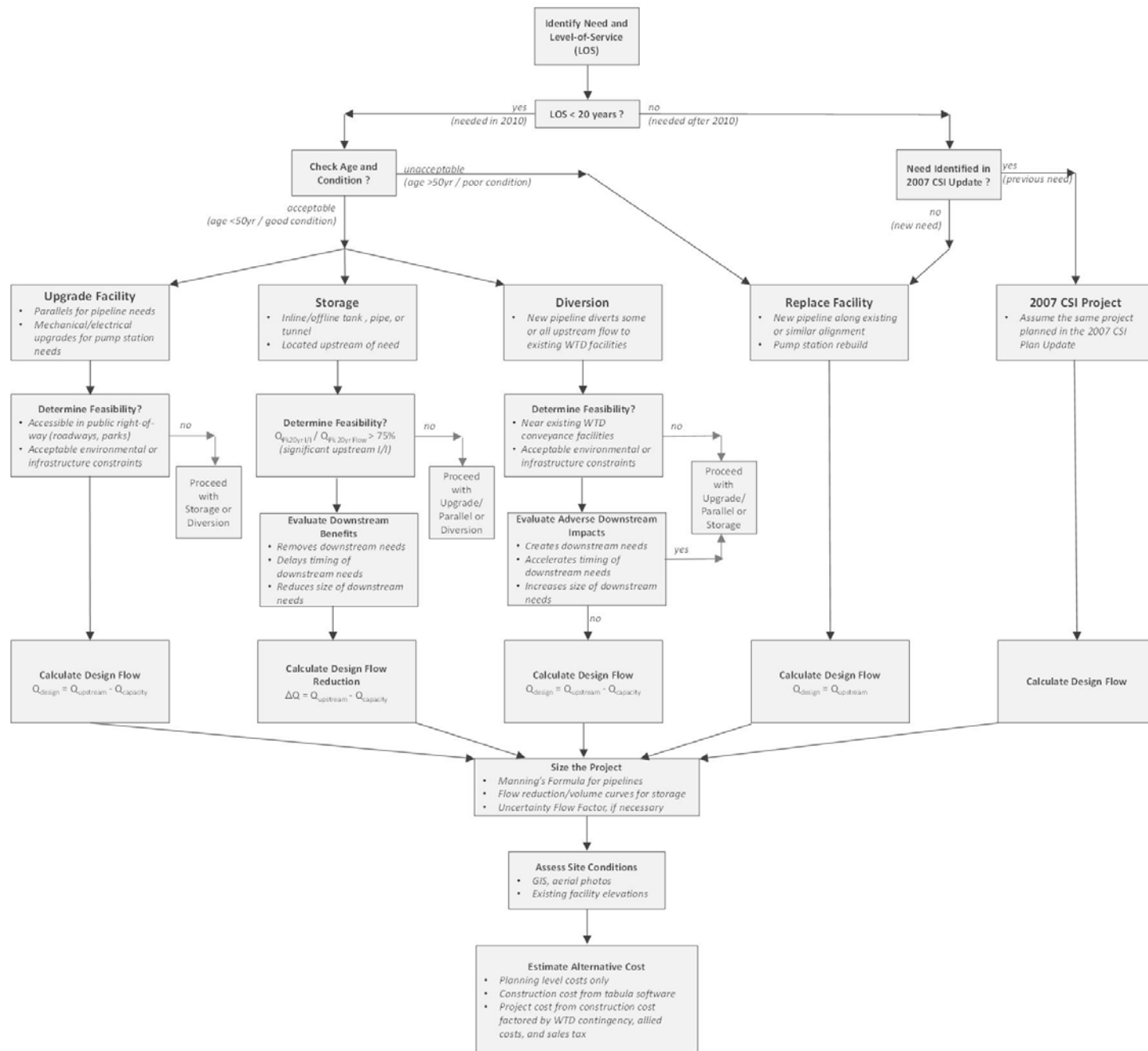


# Steps to Complete CSI Program Update



# Process to Evaluate Alternatives for CSI Needs



# Example Conceptual Project Description

DRAFT Conceptual Projects to Meet Identified Capacity Needs  
Northeast Lake Washington Planning Area

DRAFT Conceptual Projects to Meet Identified Capacity Needs  
Northeast Lake Washington Planning Area

## Conceptual Project: Medina Trunk Replacement

### Capacity Needs Addressed

Medina Trunk

### Location

Sewer Agency: Bellevue Utility Services  
Jurisdiction: City of Medina  
Planning Area: Northeast Lake Washington

### Existing Facilities and Capacity Needs

Conveyance Facility	Upstream Manhole	Downstream Manhole	Length (ft)	Diameter (in)	Year Built	Capacity (mgd)	2040 20-yr Peak Flow (mgd)	2060 20-yr Peak Flow Exceeded (mgd)	Year Exceeded	2010 Level of Service (yr)
RE*MEDINA T-18(8)	T-18	T-11	3,427	21	1963	3.52	5.60	2.08	2010	8.5
RE*MEDINA T-11(11)	T-11	T-02C	2,073	24	1963	5.21	8.69	3.49	2010	6.7
RE*MEDINA T-02C(1)	T-02C	T-02B	34	12 (x 2)	1963	8.28	8.69	0.41	2051	> 20
RE*MEDINA T-02B(3)	T-02B	Medina	169	24	1963	5.85	12.48	6.64	2010	> 20

### Project Description

#### Components and Construction Methods

The Medina Trunk Replacement Project replaces all 5,703 feet of the Medina Trunk with 24-inch to 36-inch-diameter pipeline. Construction is assumed to be trench-cut. The conceptual alignment follows the existing WTD conveyance route from manhole T-18 to the Medina Pump Station.

#### Upstream and Downstream Considerations

Upstream Projects: None

Downstream Projects: Medina Pump Station Upgrade; Medina Siphon Replacement; Eastside Interceptor Section 8 Storage; Eastside Interceptor Section 1 Replacement

#### Concepts Evaluated

- Storage.** Storage was evaluated by the volume required to address downstream pipe reach needs in the Medina Trunk, Medina Pump Station, and Medina Siphon. Peak flow reduction-to-volume relationships were developed at upstream manholes T-18 and T-09 and the Medina Pump Station in series. It was determined that these volumes of storage would be 0.4 MG, 0.71 MG, and 0.36 MG, respectively. However, the estimated total construction cost of \$11.9M (\$2016) exceeds the cost for the replacement alternative. Storage was not considered further for a conceptual project.
- Paralleling.** Paralleling was evaluated by the age and condition of the pipe reach needs. The Medina Trunk was constructed in 1963. In a 2011 assessment, WTD Facility Inspections found moderate signs of corrosion, sedimentation, root intrusion, or infiltration. Paralleling was not considered further for a conceptual project because of age (more than 50 years old in 2016) and condition.

- Diversion.** Diversion was evaluated by upstream flow and route. Sufficient flow could be diverted from upstream manhole T-18 to address downstream pipe reach needs in the Medina Trunk, Medina Pump Station, and Medina Siphon. However, no feasible diversion route to the Eastside Interceptor Section 13 could be proposed. Diversion was not considered further for a conceptual project.

### Estimated Project Costs

#### Construction Costs

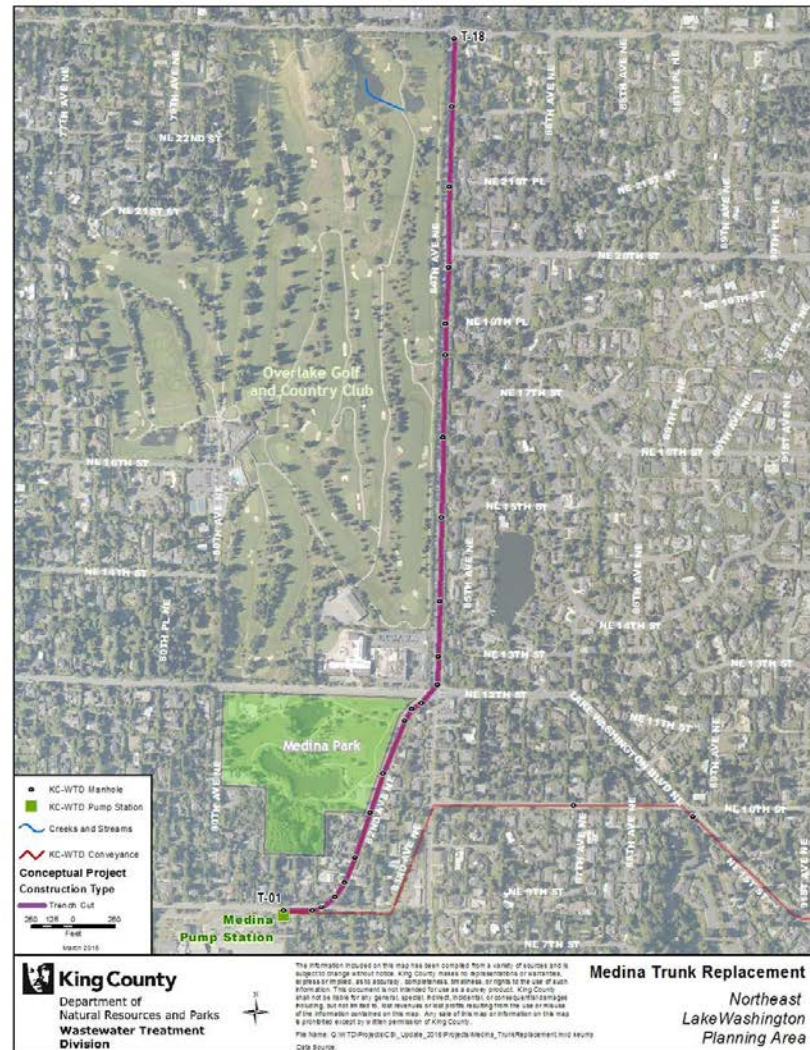
Conveyance Facility	Segment (manholes)	Project Element	Construction Methodology	Diameter (in)	Length (ft)	Design Capacity	Construction Estimate (\$2016 ± 1M)
RE*MEDINA T-18(8)	T-18 to T-11	Pipe replacement	Trench-cut	30	3,427	7.00 mgd	\$2.1
RE*MEDINA T-11(11)	T-11 to T-02C	Pipe replacement	Trench-cut	36	2,073	10.9 mgd	\$1.7
RE*MEDINA T-02C(1)	T-02C to T02B	Pipe replacement	Trench-cut	27	34	9.31 mgd	\$0.03
RE*MEDINA T-02B(3)	T-02B to MEDINA	Pipe replacement	Trench-cut	36	169	15.6 mgd	\$0.1

#### Total Project Cost

The construction cost estimate is \$3.95M (\$2016) for the Medina Trunk Replacement Project. The project cost estimate is \$12.2M (\$2016) after applying allied costs, project contingency, and construction cost and change order allowances. Cost estimating methodologies are as follows:

- The construction cost was estimated with Tabula conveyance system cost estimating software. Tabula is a parametric construction cost estimation tool used for conceptual or feasibility studies for projects at the 0 to 2 percent design level. Additional information on Tabula can be found at <http://www.kingcounty.gov/services/environment/wastewater/csi/tabula.aspx>.
- Allied costs (including design allowance, change order allowance, engineering, permitting, WTD staffing) were estimated based on a percentage of project construction costs in WTD's project management database, PRISM. These allied cost percentages are based on a statistical analysis of different types and sizes of WTD's historical project costs over time.
- Overall project contingency (30 percent), construction cost allowances for indeterminate items (25 percent), and construction change order allowances (10 percent) are added in accordance with WTD estimating guidelines appropriate to this class of estimate.
- The estimate is an early AACE International Class 5 cost estimate based on 0–2 percent project design. Class 5 estimates are considered to have an accuracy range of -50% to +100 percent. (AACE RP No. 18R-97, Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries: [http://www.aacei.org/toc/toc\\_18R-97.pdf](http://www.aacei.org/toc/toc_18R-97.pdf)).

# Example Conceptual Project Description





# 2007 CSI Project Prioritization Results

Table 5-3. Results of Application of Prioritization Criteria to Planned Conveyance Projects

I/I Project <sup>(1)</sup>	Project Name	Exceedance Year/Level of Service (LOS)/Sewered Growth				Prioritization Criteria						Coincident Benefit Comments	Table Key and Notes
		Year Exceeded	Estimated LOS in 2000	Sewered Area Growth <sup>(2)</sup> (2000 to 2010)	Population Growth <sup>(2)</sup> (2000 to 2010)	Risk of Overflow vs. Surcharge	Public Health and Water Quality Impacts	Risk of Non-Compliance Relative to Overflow Risk	O&M Issues	Community and Local Agency Concerns	Coincident Benefits		
Hidden Lake Planning Basin													<b>Key Planning Basin</b> <b>High Priority Projects (7 total)</b> <b>Medium Priority Projects (6 total)</b> <b>Lower Priority Projects (20 total)</b>
	Boeing Creek Storage Expansion	Before 2000	2–5 years <sup>(3)</sup>	2%	4%	Medium	Medium	Medium	No	None identified	No	None identified	
	Richmond Beach Storage	Before 2000	5–10 years <sup>(3)</sup>	3%	5%	Medium	Medium	Medium	No	None identified	No	None identified	
Northeast Lake Washington Planning Basin													<b>Notes</b> (1) Implementation of the Regional I/I Control Program includes development of two or three initial I/I reduction projects from four possible project sites identified by the county and component agencies. Implementation will occur between 2007 and 2011. The I/I reduction projects are intended to eliminate the need for planned conveyance system improvements. Therefore, the conveyance system improvement projects associated with the identified I/I reduction projects have been given lower priority to allow adequate time to develop the initial I/I reduction projects and determine if I/I reduction successfully eliminated the need for the identified conveyance projects. (2) Population and sewer area growth calculated for high and medium priority projects only. (3) After the Hidden Lake Pump Station Replacement and Sewer Improvement Project is complete, the level of service (LOS) is estimated to be 10 to 20 years. (4) The current capacity restricted point is the east channel siphon and just downstream in the Enatai Trunk. In addition, it was discovered that the Mercer Trunk is restricted after the trunk sustained damage from utility work in late December 2006. (5) The Bellevue Inflow Trunk should be upgraded so that peak capacity in the Bellevue Pump Station upgrade can be used. (6) The York Pump Station Modification Project involves valving work to enable peak flows to be diverted from the Eastside Interceptor north to the Brightwater System.
	North Mercer and Enatai Interceptor Parallels	Before 2000	2–5 years <sup>(4)</sup>	1%	8%	High	High	High	No	Increased zoning density in Mercer Island Central Business District	No	None identified	
	Bellevue Inflow Trunk Parallel	Before 2000	2–5 years <sup>(5)</sup>	2%	27%	High	High	High	No	Increased zoning density in Bellevue Central Business District	Yes	Needed to convey peak flows to upgraded pump station	
	Factoria Pump Station and Trunk Diversion	Before 2000	5–10 years	10%	7%	Medium	Medium	Medium	No	None identified	No	None identified	
	Medina Storage	2009	>20 years			Low	Low	Low	No	None identified	No	None identified	
	Juanita Bay Pump Station Force Main Upgrade	2020	>20 years			Low	Low	Low	Yes	None identified	No	None identified	
North Green River Planning Basin													
Yes	South Renton Interceptor Parallel	2011	>20 years			Medium	Medium	Medium	No	None identified	No	None identified	
North Lake Sammamish Planning Basin													
	Lake Hills Trunk Replacement	Before 2000	2–5 years	2%	13%	High	High	High	No	None identified	No	None identified	
	Northwest Lake Sammamish Interceptor Parallel	Before 2000	2–5 years	2%	17%	High	High	High	No	Increased zoning density in Redmond Central Business District	Yes	Multiple transportation projects along alignment	
North Lake Washington Planning Basin													
	York Pump Station Modifications	2016 <sup>(6)</sup>	N/A <sup>(6)</sup>			Low	Low	Low	No	None identified	Yes	Coincident benefit of Brightwater conveyance	
	[CS] Swamp Creek – Section 1B Parallel	2017	>20 years			Low	Low	Low	No	Increased zoning density throughout service Area	No	None identified	
	Lower North Creek Interceptor Parallel	2024	>20 years			Low	Low	Low	No	Increased zoning density throughout service Area	No	None identified	
	Upper North Creek Parallel	2029	>20 years			Low	Low	Low	No	Increased zoning density throughout service Area	No	None identified	
Northwest Lake Washington Planning Basin													
	[CS] Thornton Creek Interceptor Parallels	Before 2000	5–10 years	1%	7%	High	High	High	No	None identified	No	None identified	
Southeast Lake Washington Planning Area													
	Coal Creek Siphon and Trunk Parallel	Before 2000	2–5 years	22%	21%	High	High	High	No	None identified	No	None identified	
South Green River Planning Basin, Kent Planning Zone													
	Garrison Creek Trunk Parallel	2018	>20 years			Low	Low	Low	No	None identified	No	None identified	
	ULID #1 Contract #4 Parallel	2021	>20 years			Low	Low	Low	No	None identified	No	None identified	
	Auburn Interceptor – Section 3 Parallel Pipe Storage	2028	>20 years			Low	Low	Low	No	None identified	No	None identified	

# 2007 CSI Project Prioritization Results (cont.)

## Chapter 5. Schedule, Costs, and Future Planning for Recommended Projects

I/ Project <sup>(1)</sup>	Project Name	Exceedance Year/Level of Service (LOS)/Sewered Growth				Prioritization Criteria						Coincident Benefit Comments	Table Key and Notes
		Year Exceeded	Estimated LOS in 2000	Sewered Area Growth <sup>(2)</sup> (2000 to 2010)	Population Growth <sup>(2)</sup> (2000 to 2010)	Risk of Overflow vs. Surcharge	Public Health and Water Quality Impacts	Risk of Non-Compliance Relative to Overflow Risk	O&M Issues	Community and Local Agency Concerns	Coincident Benefits		
South Green River Basin, Auburn Planning Zone													Key Planning Basin High Priority Projects (7 total) Medium Priority Projects (6 total) Lower Priority Projects (20 total)
	Algona Pacific Trunk Stage 1 <sup>(7)</sup>	Before 2000	10–20 years	19%	40%	Medium	Medium	Medium	No	None identified	No	None identified	
	Algona Pacific Trunk Stage 2	2027	>20 years			Low	Low	Low	No	None identified	No	None identified	
	Lakeland Hills Pump Station Replacement	2040	>20 years			Low	Low	Low	No	None identified	No	None identified	
South Green River Basin, Soos Planning Zone													(7) At this point in predesign of the Kent Auburn Conveyance Project, it appears that the Algona Pacific Trunk projects will be incorporated into that project. If so, the Algona Pacific projects will be removed from the planned projects list. (8) Soos Pump Station B is planned to serve an area that currently does not have county conveyance service. (9) Initially, Soos Pump Stations D and H were planned to serve existing customers and planned growth for the Black Diamond and Soos Creek Service areas. The Black Diamond Storage Project will delay the need for the pump stations and conveyance lines for 10 to 20 years. (10)The South Lake Sammamish Planning Basin has seven projects that are all capable of contributing to increased level of service to downstream capacity constraints. The proposed prioritization accounts for the phasing of projects to address capacity constraints over time by including O&M issues along with coincident benefits in the decisions on the preferred course of action.
	[CSI] Soos Alternative 3A(3) – Pump Station B with Conveyance	N/A <sup>(8)</sup>	N/A			Low	Low	Low	No	None identified	No	None identified	
	[CSI] Soos Alternative 3A(3) – Pump Station D with Conveyance <sup>(9)</sup>	Before 2000	10-20 years			Low	Low	Low	No	None identified	No	None identified	
	[CSI] Soos Alternative 3A(3) – Pump Station H with Conveyance <sup>(9)</sup>	Before 2000	2–5 years			Low	Low	Low	No	None identified	No	None identified	
South Lake Sammamish Planning Basin <sup>(10)</sup>													
	Heathfield/Sunset Pump Station Replacement and Force Main Upgrade	Before 2000	5–10 years	64%	58%	High	High	High	Yes	None identified	No	None identified	
	[CSI] Sammamish Plateau Diversion	Before 2000	5–10 years	80%	76%	High	High	High	N/A	None identified	Yes	City of Sammamish has phased East Lake Sammamish Pkwy plans for potential road alignment; King County Parks has plans for potential Trail Alignment	
	[CSI] Sammamish Plateau Storage	Before 2000	5–10 years	80%	76%	Medium	Medium	Medium	N/A	None identified	No	None identified	
Yes	[CSI] Issaquah Storage	Before 2000	5–10 years			High	High	High	N/A	None identified	Yes	Sammamish State Park plan under way; opportunity to coordinate with both the city and the state; may be able to phase storage	
Yes	Eastgate Parallel Pipe Storage	Before 2000	5–10 years			High	High	High	N/A	None identified	No	None identified	
	Issaquah Creek Highlands Storage	2009	>20 years			High	High	High	No	None identified	Yes	City of Issaquah	
Yes	Issaquah Interceptor Section 2 Parallel	2011	>20 years			Medium	Medium	Medium	No	None identified	No	None identified	
South Lake Washington Planning Basin													
Yes	Bryn Mawr Storage	2005	>20 years			Medium	Medium	Medium	No	None identified	No	None identified	

# 2007 CSI Program Update:

## How Prioritization Criteria Were Applied to Planned Conveyance Projects

Comments and Application	Rating Scale/ Application Guidelines
<b>Criterion: Design facilities to meet the 20-year peak flow expected by 2050</b>	
This criterion implements the RWSP design standard.	<p>This criterion was applied equally to all projects.</p> <p>Project design and construction may be phased over time if technically feasible and/or financially beneficial. Candidate projects will likely be in high growth areas where there are significant differences in projected 20-year peak flow volumes from decade to decade. Phasing of projects typically increases their total cost, but reduces their impact to rates and capacity charge.</p>
<b>Criterion: Determine risk of overflow vs. peak capacity</b>	
Higher priority will be given to projects that address capacity limitations in areas that are prone to overflow than to those that address capacity limitations in facilities that can continue to safely convey flows in a surcharged condition. <sup>a</sup>	<p>High, Medium, or Low:</p> <ul style="list-style-type: none"> <li>High = Less than 5-year LOS in 2000 or less than 10-year LOS and significant growth by 2010</li> <li>Medium = Greater than 5-year LOS in 2000 with minimal growth. Greater than 10-year LOS in 2000 with moderate to high growth causing the LOS to decrease to 5-year LOS</li> <li>Low = Greater than 10-year LOS in 2010</li> </ul>
<b>Criterion: Estimated risk of public health and water quality impacts</b>	
This criterion relates to the immediate threats to water quality and human health from overflows.	<p>High, Medium, or Low:</p> <ul style="list-style-type: none"> <li>High = Risk of overflow directly to a water body or identified backups into structures</li> <li>Medium = Where there is the potential to isolate and prevent the overflows to an urban drainage system from getting to a water body</li> <li>Low = Risk to public health occurs only if there is a Low risk of overflow (criterion above)</li> </ul>
<b>Criterion: Determine risks of regulatory non-compliance</b>	
Any overflows are a violation of WTD's NPDES permits.	<p>High, Medium, or Low (same as for overflow criterion):</p> <ul style="list-style-type: none"> <li>High = Less than 5-year LOS in 2000 or less than 10-year LOS and significant growth by 2010</li> <li>Medium = Greater than 5-year LOS in 2000 with minimal growth. Greater than 10-year LOS in 2000 with moderate to high growth causing a decrease to a 5-year LOS</li> <li>Low = Greater than 10-year LOS in 2010</li> </ul>

# 2007 CSI Program Update:

## How Prioritization Criteria Were Applied to Planned Conveyance Projects

Criterion: Identify O&M issues	
<p>Two Categories:</p> <ul style="list-style-type: none"> <li>• Coordinate with existing Asset Management capital program</li> <li>• Identify and coordinate with planned Asset Management capital replacement and/or repair projects<sup>b</sup></li> </ul>	<p>Yes or No.</p> <p>Identified O&amp;M issues can influence priority of either Major Capital or Asset Management capital projects. O&amp;M assessments are an ongoing WTD function. The inspection of force mains, pressure sewers, and siphons will provide additional information for prioritization over time.</p>
Criterion: Identify community and local agency concerns	
<p>Coordinate with local agencies to identify any concerns and incorporate them into prioritization process.<sup>c</sup></p>	<p>Yes or No.</p> <p>WTD staff met with local agencies and reviewed identified needs and planned projects with agency representatives. Information about local conditions, such as development activity that affects capacity demand, was incorporated.</p>
Criterion: Evaluate coincident benefits	
<p>Coincident benefits can be applied in three distinct areas:</p> <ul style="list-style-type: none"> <li>• Partnering with transportation or other capital projects in the vicinity of WTD projects</li> <li>• Ensuring that capital work by other jurisdictions does not prevent WTD from doing work in recently improved corridors/sites</li> <li>• Integrating the project into other wastewater facilities that depend on the project to fully function</li> </ul>	<p>Yes or No.</p> <p>WTD staff reviewed local agency and host city capital improvement plans and schedules to identify when and where local projects are scheduled to occur near capital conveyance project areas. WTD staff met with local jurisdiction representatives to review WTD's proposed project schedule. Potential coincident benefits were noted where project areas matched and project timing for local projects and regional conveyance projects were within 3 years or less.</p>
Criterion: Identify financing benefits	
<p>Financing benefits will be explored during predesign after project scopes and final budgets are established. At that point, all portions of the project that qualify for grant and/or low-interest loans can be identified.</p>	<p>Equal across all projects.</p> <p>Financing concerns will be considered during the predesign or design phases and may influence project scheduling at that time.</p>
<p><sup>a</sup> The overflow risk criteria are applied to needs or capacity constraints. In some cases, more than one project address the needs.</p> <p><sup>b</sup> O&amp;M issues can be applied to either capacity needs or projects.</p> <p><sup>c</sup> Community and agency concerns and input can be applied to either capacity needs or projects.</p>	