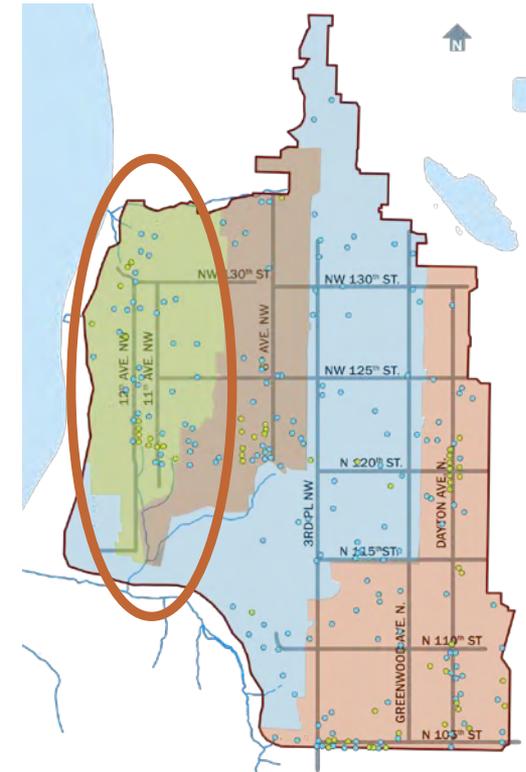


Broadview Sewer and Drainage Improvement Project

12th Avenue NW Basin Paired Alternatives



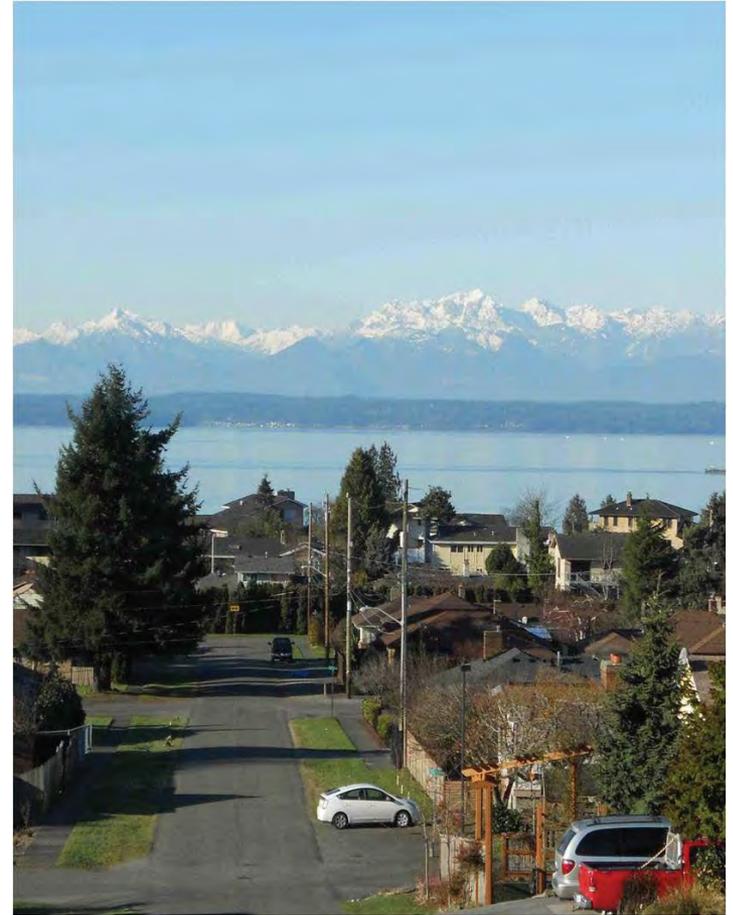
Luther Memorial Lutheran Church
September 23, 2014

Agenda

- Presentation (6:30 – 7:15 pm)
 - 12th Avenue NW paired sewer/storm drainage alternatives
 - Existing funding
 - Phasing of improvements
- Questions and answers (7:15 – 7:45 pm)
- Next steps (7:45 – 8:00 pm)
- Open house (8:00 – 8:30pm)

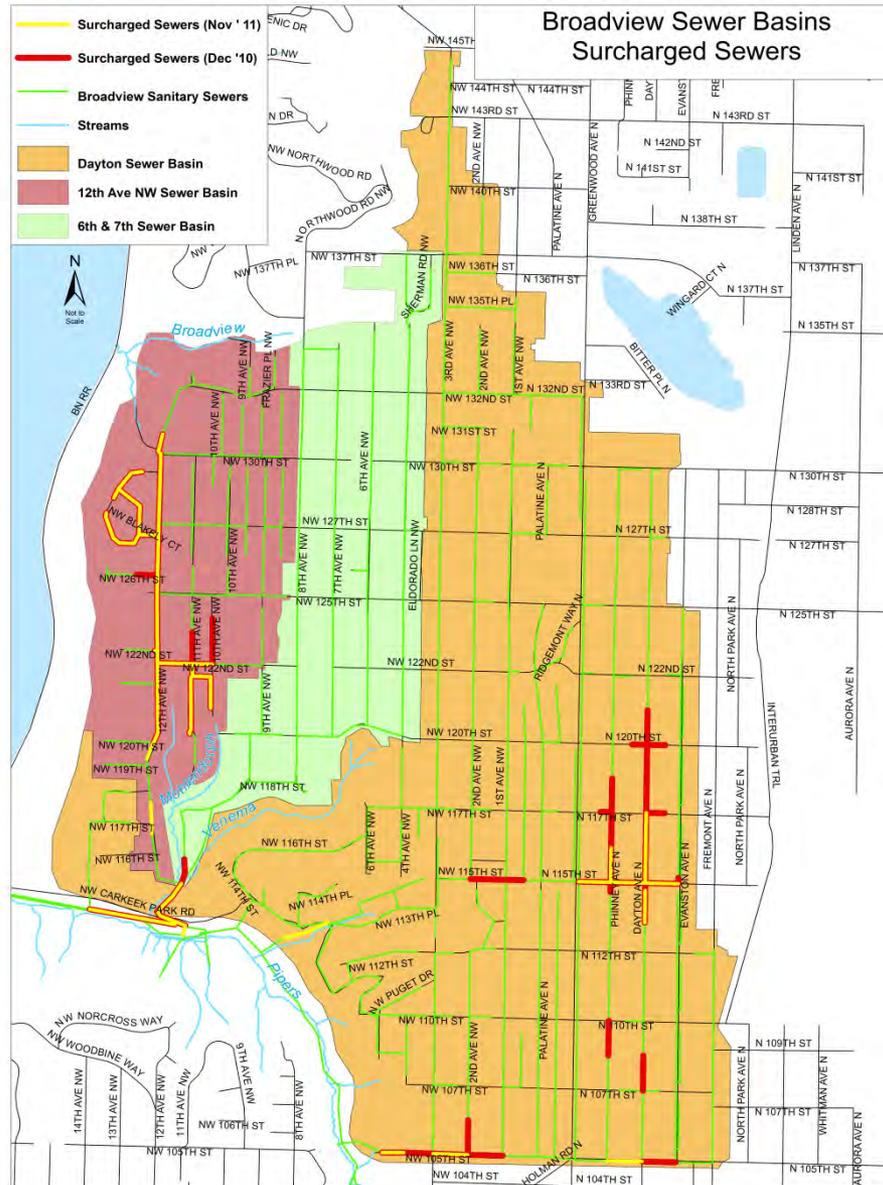
Project goals in Broadview

- Reduce frequency and quantity of sewer backups into properties, streets and creeks
- Reduce frequency and quantity of surface flooding to areas most impacted, especially to building structures



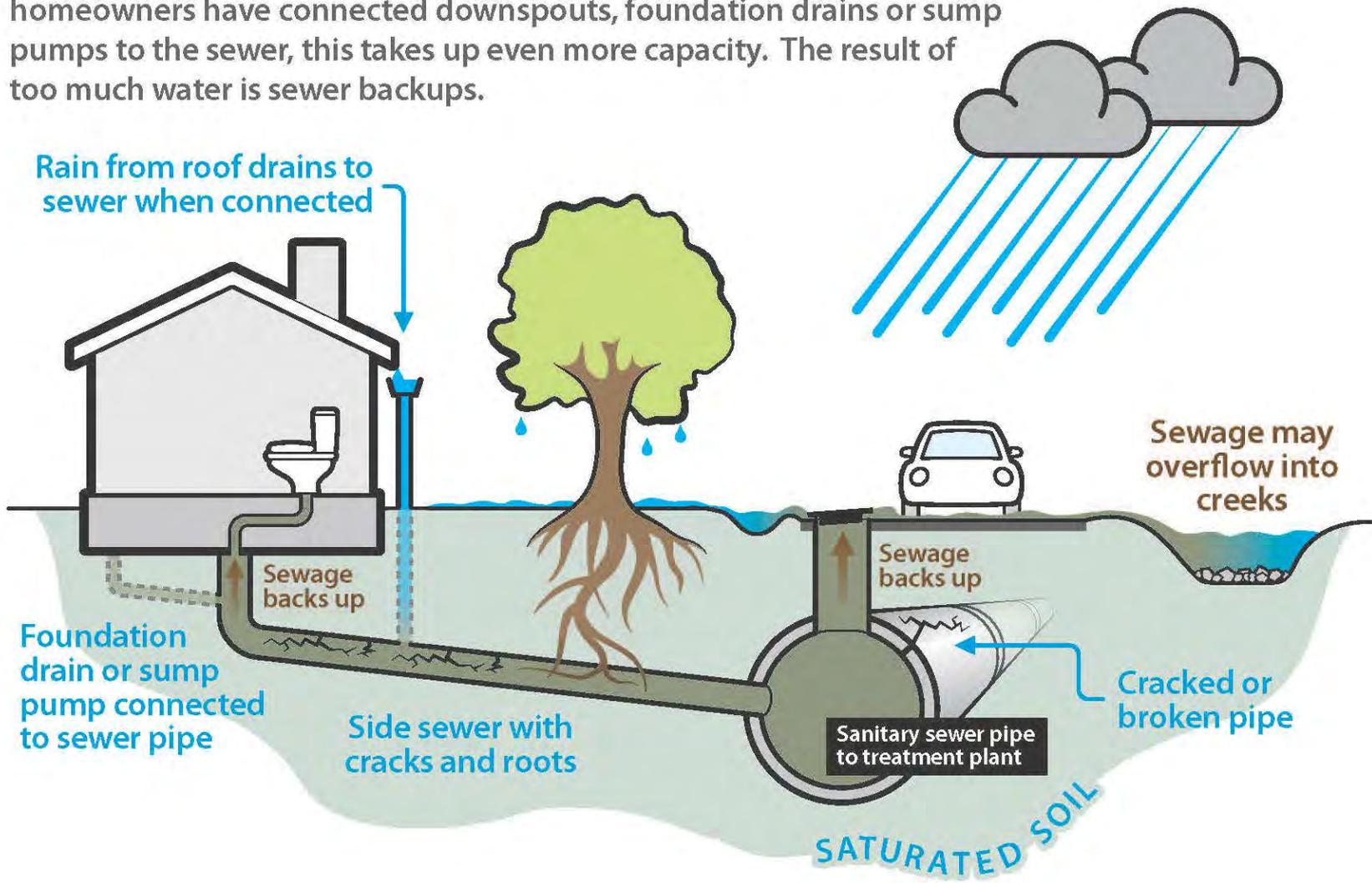
Broadview neighborhood

Why are sewer improvements needed in Broadview?



CAUSES OF SEWER BACK UPS

During heavy rains, more than sewage flows into sewer pipes. Groundwater leaks through cracked sewer pipes. Tree roots take up additional space. And in some cases where homeowners have connected downspouts, foundation drains or sump pumps to the sewer, this takes up even more capacity. The result of too much water is sewer backups.



Why are drainage improvements needed?

- Address drainage impacts of sewer improvements
 - Convey rainfall diverted from sewer (e.g., roof drains, sump pumps)
 - Meet City Stormwater Code requirements triggered by construction
- Reduce high priority stormwater flooding to homes



What's already been done?

To better understand the problem, SPU has:

- Measured direction and amount of sewer, surface water and groundwater flows
- Created sewer and surface water models for water flow
- Hosted public meetings to hear comments from the Broadview community

Early actions completed:

- Conducted a flood grouting pilot project to seal pipes
- Installed 24 backflow preventers to reduce likelihood of backups into homes
- Spot drainage work in many locations in 12th Ave NW basin
- Pipe cleaning and maintenance

Project funding and phasing

- Current project funding for 12th & Dayton basins
 - ~\$23 million through 2020
- Phasing of improvements will be necessary
 - Budget is much less than the identified costs of potential sewer and drainage improvements
- Prioritization of Broadview improvements will occur in early 2015
 - Community meeting to discuss our proposal for first phase of improvements
 - Priority will be given to sewer improvements needed
- Dayton Ave NW Basin update
 - Identify preferred alternative in Spring of 2015
- We will continue to look at potential early actions

Sewer level of service in the 12th Avenue NW and Dayton Avenue N basins

12th Avenue NW basin

- 14 homes have 0-5 year level of service
- 2 homes have 5-10 year level of service
- 0 homes have 10-25 year level of service

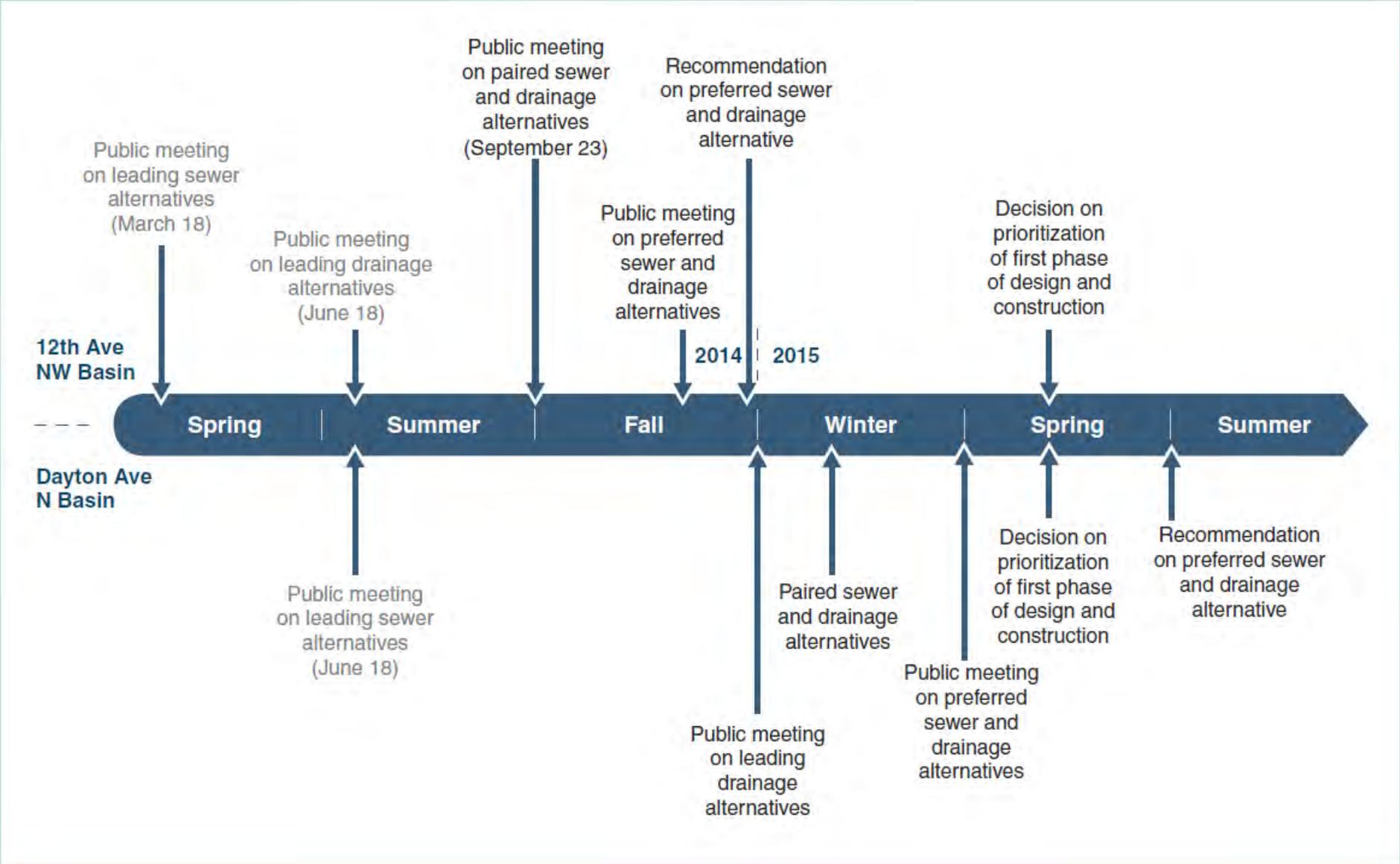
Total = 16 homes with a level of service less than 25 years in 12th Ave NW basin.

Dayton Avenue N basin

- 2 homes have 0-5 year level of service
- 23 homes have 5-10 year level of service
- 25 homes have 10-15 year level of service
- 15 homes 15-20 year level of service
- 1 home 20-25 year level of service

Total = 66 homes with a level of service less than 25 years in Dayton Ave N basin.

Public involvement opportunities



12th Avenue NW basin sewer and drainage alternative pairing

Sewer Alternatives

Reduce sewer flows

Sewer tank storage

Sewer pipe storage

Sewer tank storage in Carkeek Park

Pair sewer alternatives with drainage alternatives

Drainage Alternatives

Stormwater pipe storage

Stormwater pond

Stormwater tank storage

Previously considered new outfall to Puget Sound, rain gardens and deep infiltration

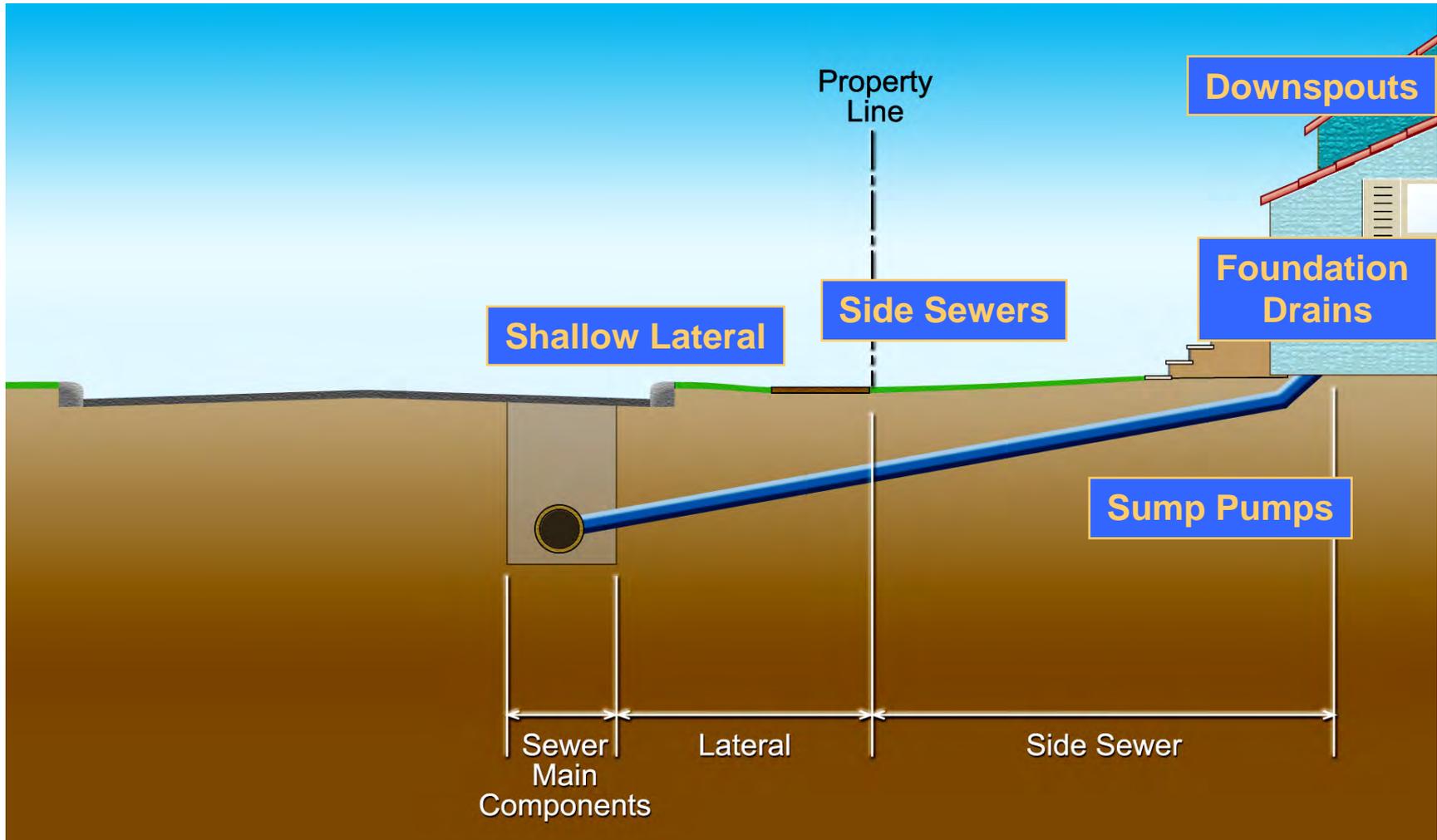
Evaluation criteria

- ✓ **Performance** — complexity and certainty of improvements, as well as future adaptability and impact during extreme events
- ✓ **Stakeholders** — support from City, agency and community stakeholders
- ✓ **Construction Impacts** — impacts to streets and private property
- ✓ **Environmental** — impacts and benefits to creeks and other resources
- ✓ **Operations and Maintenance** — need for specialized or frequent operations and maintenance; accessibility
- ✓ **Schedule** — length of time and permitting complexity
- ✓ **Cost** — project cost for alternatives
- ✓ **Build to Budget** — ability to phase construction

12th Avenue NW Basin - Paired Alternatives

Alternative	Sewer Components	Drainage Components
A	<p>Reduce flows into sewer pipes French drain Sewer tank storage (if needed)</p>	<p>Stormwater pipe storage Stormwater cascades Increase storm drain flow capacity</p>
B	<p>Reduce flows into sewer pipes French drain Sewer tank storage (if needed)</p>	<p>Stormwater pond Stormwater cascades Increase storm drain flow capacity</p>
C	<p>Sewer tank storage Increase sewer size French drain</p>	<p>Stormwater pond Increase storm drain flow capacity</p>
D	<p>Sewer pipe storage Increase sewer size French drain</p>	<p>Stormwater pond Increase storm drain flow capacity</p>

Sewer Component – Reduce Flows into Sewer Pipes (Alternatives A & B)



Sewer Component – Reduce Flows into Sewer Pipes (Alternatives A & B) Cont.

- Redirect rainwater currently entering sewers toward improved drainage system
- Reduce pipe leaks in SPU system and on private side sewers
 - Pipe bursting
 - Flood grouting
 - Maintenance hole liner



Pipe bursting



Flood grouting

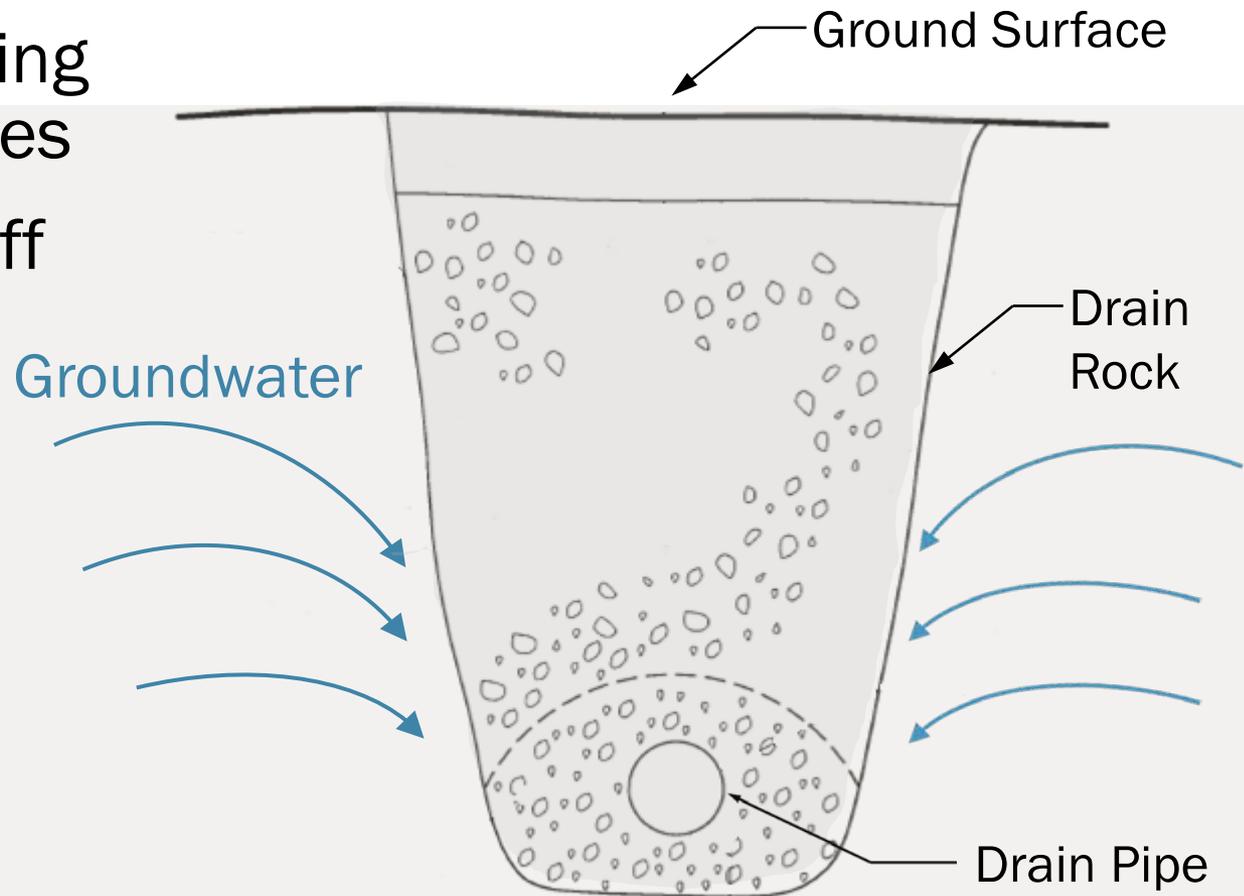


Maintenance hole liner

Sewer Component - French Drain (All Alternatives)

Redirect cool clean groundwater

- Currently leaking into sewer pipes
- Away from bluff
- To creek



Sewer Component – Sewer Tank Storage (Alternative C)

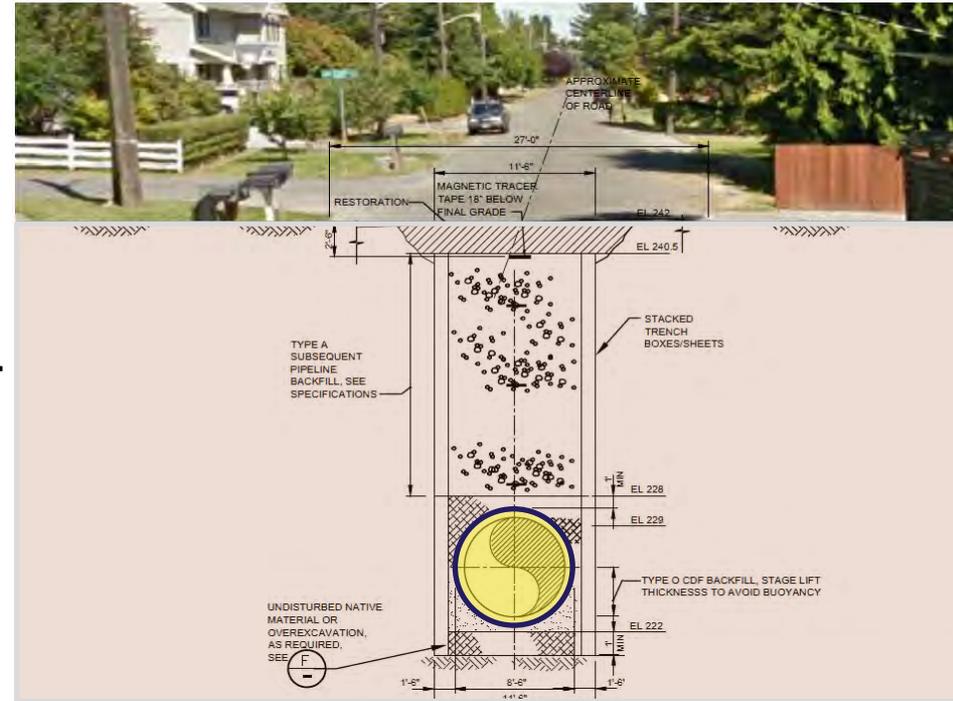
- Approximately 500,000 gallons of storage
- Requires approximately two properties
- Includes underground tank, odor control and above grade control room



Rendering of potential underground tank location with pocket park at S. Alaska Street and 54th Avenue S.

Sewer Component – Sewer Pipe Storage (Alternative D)

- Approximately 500,000 gallons of storage
- Requires approximately zero to one property
- Includes underground odor control and above grade control room
- Deep pipe below basements
- Potential construction impact along 12th Ave NW
- Installed through open cut or tunnel



Underground pipe storage example

Drainage Component -- Stormwater Cascades (Alternatives A & B)

- Manage flows from disconnections
- Preliminary locations identified

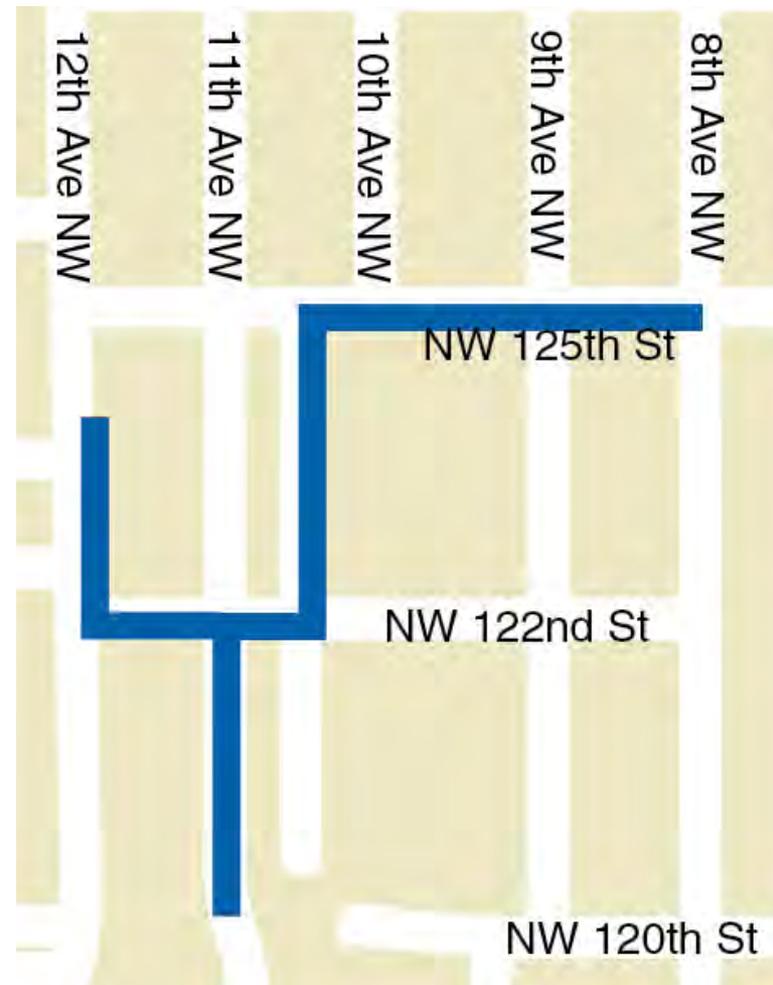


Broadview cascade on NW 107th St.



Drainage Component - Increase Storm Drain Flow Capacity (All Alternatives)

- Upsize existing ditches/pipes/culverts in right-of-way
- Reduces flooding risk to homes
- Preliminary locations identified



Drainage Component - Underground Pipe Storage (Alternative A)

- Capacity for 560,000 gallons
- No private property acquisition needed
- Potential construction impacts along 12th Ave NW and 8th Ave NW
- Costs approximately \$14 million more than stormwater pond component

Drainage Component - Stormwater Pond (Alternatives B, C, D)

- Intermittent storage for up to 500,000 – 560,000 gallons
- Approximately four properties needed
- Gentle side slopes
- Design avoids mosquitos
- Most cost effective stormwater storage option



Madison Valley Stormwater Pond



Midvale Stormwater Pond (10735 Stone Ave N)

12th Avenue NW Basin - Paired Alternatives

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A	<p>Reduce flows into sewer pipes French drain Sewer tank storage (if needed)</p>	<p>Stormwater pipe storage Stormwater cascades Increase storm drain flow capacity</p>
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Paired Alternative A – Reduce Flows into Sewer Pipes and Provide Stormwater Pipe Storage and Cascades



Paired Alternative A – Benefits and Challenges

Sewer Components		Drainage Components	
Benefits	Challenges	Benefits	Challenges
Addresses leaks at source and extends sewer lifespan	Construction on 350-400 private properties	Pipe storage does not require property acquisition	\$14 million more expensive to construct than stormwater pond
Smaller or no storage required (less or no property acquisition)	Policy and tax issues for work on private properties need further study	Cascades add green landscape to neighborhood	Construction impacts across a broader area
French drains improve creek base flows	Potential for localized drainage issues	–	–

Paired Alternative B – Reduce Flows into Sewer Pipes and Provide Stormwater Pond and Cascades



Paired Alternative B – Benefits and Challenges

Sewer Components		Drainage Components	
Benefits	Challenges	Benefits	Challenges
Addresses leaks at source and extends sewer lifespan	Construction on 350-400 private properties	Stormwater pond is \$14 million less expensive to construct	Stormwater pond requires acquisition of four properties
Smaller or no storage required (less or no property acquisition)	Policy and tax issues for work on private properties need further study	Cascades add green landscape to neighborhood	–
French drains improve creek base flows	Potential for localized drainage issues	–	–

Paired Alternative C – Sewer Tank Storage and Provide Stormwater Pond



Paired Alternative C – Benefits and Challenges

Sewer Components		Drainage Components	
Benefits	Challenges	Benefits	Challenges
Smaller extent of construction impact	Requires property acquisition of two properties	Stormwater pond is \$14 million less expensive to construct	Stormwater pond requires acquisition of four properties
Minimal work on private properties	Does not address problem at source	–	–
–	–	–	–

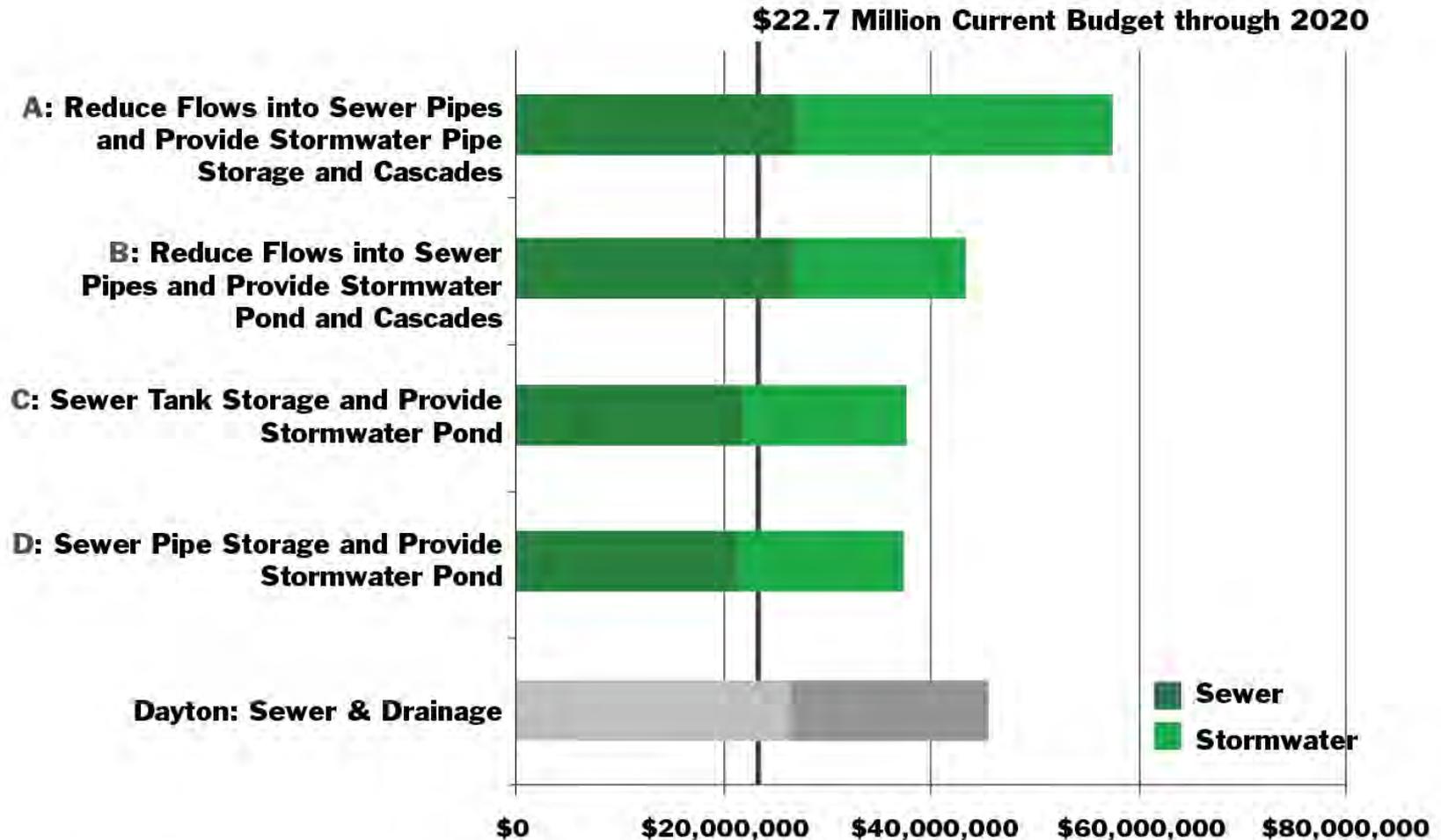
Paired Alternative D – Sewer Pipe Storage and Provide Stormwater Pond



Paired Alternative D – Benefits and Challenges

Sewer Components		Drainage Components	
Benefits	Challenges	Benefits	Challenges
Minimal work on private properties	Does not address problem at source	Stormwater pond is \$14 million less expensive to construct	Stormwater pond requires acquisition of four properties
Less property acquisition required	Significant construction impact along 12 th Ave NW	–	–
Smaller extent of construction impact	–	–	–

Potential costs of 12th Avenue NW and Dayton Avenue N Paired Alternatives

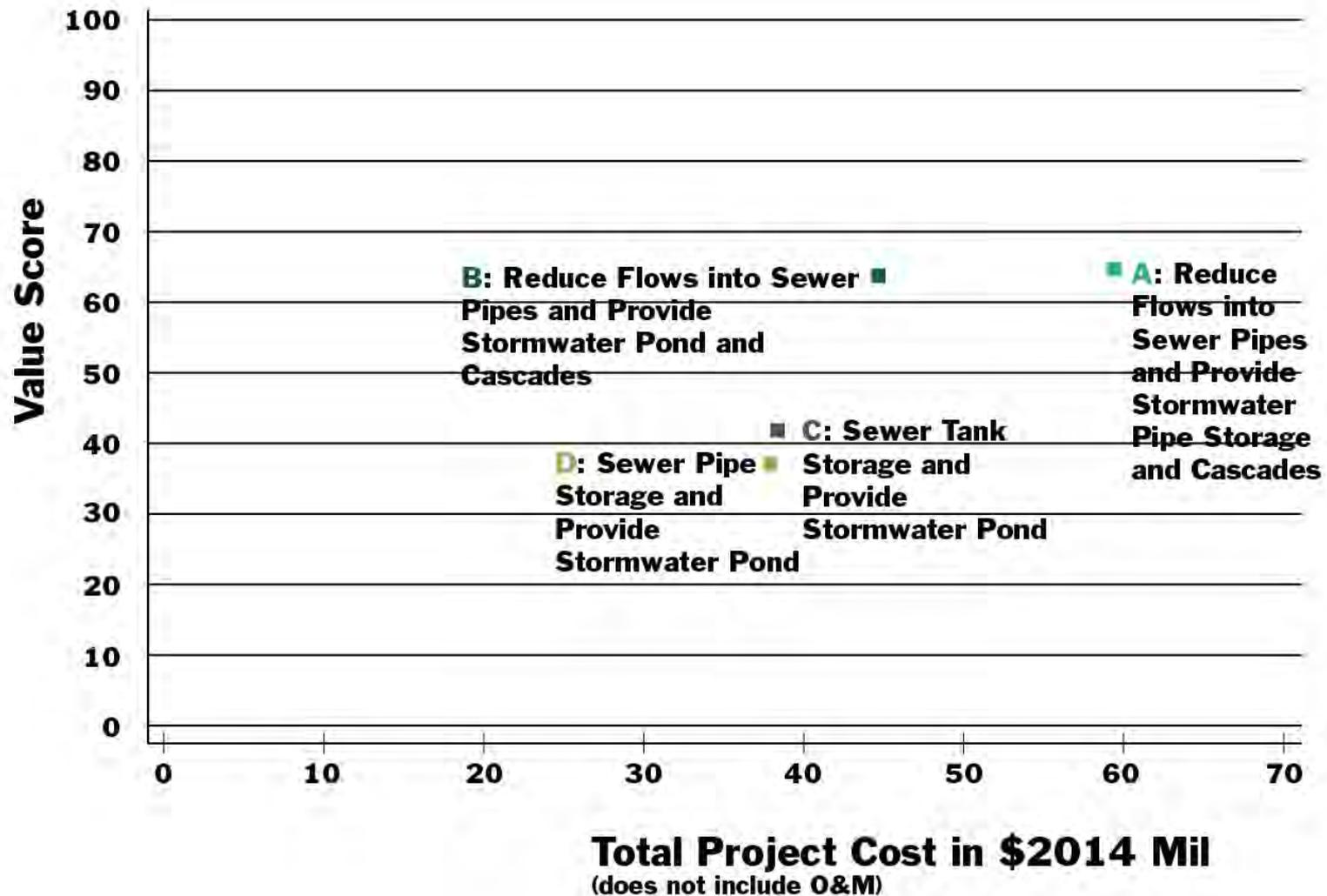


* Actual cost could range from negative 30% to positive 50% of costs shown above

Evaluation criteria

- ✓ **Performance** — complexity and certainty of improvements, as well as future adaptability and impact during extreme events
- ✓ **Stakeholders** — support from City, agency and community stakeholders
- ✓ **Construction Impacts** — impacts to streets and private property
- ✓ **Environmental** — impacts and benefits to creeks and other resources
- ✓ **Operations and Maintenance** — need for specialized or frequent operations and maintenance; accessibility
- ✓ **Schedule** — length of time and permitting complexity
- ✓ **Cost** — project cost for alternatives
- ✓ **Build to Budget** — ability to phase construction

Total Potential Costs for 12th Avenue NW Basin Leading Alternatives



Comments and questions

- What comments do you have on the sewer and drainage components?
- What comments do you have on the paired alternatives?
- What comments do you have on SPU's approach to making these improvements?

Storm season preparation – how can you help?

Help prevent stormwater flooding into homes or onto properties

- Please help keep stormwater system (e.g., ditches and stormwater grates) near your home clear of debris and leaves

If you experience sewer backups or stormwater flooding

- Call (206) 386-1800 to reach someone 24 hours a day, 7 days a week

For more information

Website: www.seattle.gov/util/broadviewprojects

Project information line: (206) 409-3651

Email: SPU_broadviewprojects@seattle.gov