Seattle Public Utilities
Martha Washington Park Vicinity (Basin 45) CSO Reduction Project - Comparison of Project Alternatives
June 9, 2011 – Community Meeting

	Alternative 1a: Martha Washington Park Underground Storage Dual 72-Inch-Diameter Pipe Storage (Open Cut)	**Alternative 1b: Martha Washington Park Underground Storage 108-inch-Diameter Tunnel (Trenchless)**	**Alternative 2 - 57th Avenue S. Underground Storage**
Major Project Elements (information is provided to help the reader understand the size of major project components. Dimension and depths may change during design)	• 200,000 gallons of storage via twin 72-inch-diameter underground CSO Storage Pipes located in Martha Washington Park. (Each approx. 475 ft long). • Underground facilities vault, approximately 45 ft. long x 25 ft. wide. • 18-inch-diameter gravity sewer (approx. 230 feet long). • Motor-operated gate to control flow.	• 200,000 gallons of storage via twin 72-inch-diameter Microtunnels or a single 108-inch-diameter Tunnel (underground) located in Martha Washington Park (approx. 475 ft long). • Underground facilities vault, approximately 45 ft. long x 25 ft. wide housing electrical, mechanical and odor control equipment. • 18-inch-diameter gravity sewer (approx. 150 ft). • Motor-operated gate to control flow.	• 200,000 gallon underground CSO Storage Pipe located in 57th Ave S. (530 ft of 8-foot-diameter concrete pipe, distributed in 3 cascading storage pipes). • Underground facilities vault, approximately 45 ft. long x 25 ft. wide, located in South Holly Street housing electrical, mechanical and odor control equipment. • Relocate gravity sewer in 57th Avenue South (approx. 500 ft, 8-inch-diameter) and reconnect at least 8 side sewers. • Relocate water main in 57th Ave. S. (approx. 500 ft, 8-inch-diameter), and connect at least 8 water services & 2 fire hydrants. • 18-inch-diameter force main (approx. 230 ft) • Motor-operated gate to control flow.
Total Project Cost	$7,500,000	$25,400,000	$11,700,000
Anticipated Construction Duration (Some items listed here may occur concurrently with one another and time frames are approximate)	Approximately 12 months • Site Mobilization and Preparation: 2 months • Install Storage Pipes: 2 months • Construct Facilities Vault: 7 months • Construct Control Structure: 2 months • Final Site Restoration: 2 months	Approximately 18 months • Site Mobilization, Preparation, delivery of tunnel boring machine: 2 months • Excavate Shafts and Install tunnel boring machine equipment: 3 months • Install Storage Pipe: 3 months • Construct Facilities Vault: 7 months • Construct Control Structure: 2 months • Final Site Restoration: 2 months	Approximately 19 months • Site Mobilization and Preparation: 2 months • Install Storage Pipe and Relocate Utilities: 5 months • Construct Facilities Vault: 7 months • Construct Control Structure: 2 months • Final Site Restoration: 2 months
Park Closure	• Approximately 2 months for pipe installation and park restoration, with a smaller area closed for approximately 7 months for construction of the facilities vault.	• Approximately 8 months for construction staging, shafts excavation, and pipe installation, and an additional 7 months for construction of the facilities vault.	• Portions of Martha Washington Park may be closed for staging.
Pros	• Construction duration is shortest of all alternatives. • Residents would have access to their homes for the entire duration of construction. • Traffic disruptions would be minor on 57th Ave. S. for construction vehicles entering and leaving the park. • No conflicts with existing utilities • Lower cost than other alternatives.	• Trees adjacent to 57th Ave S. in Martha Washington Park would remain in place. • Residents would have access to their homes for the entire duration of construction. • No conflicts with existing utilities.	• Less disruption to Martha Washington Park than Alternative 1, similar level of disruption to Alternative 3 (temporary partial closure for contractor staging rather than full park closure). • Trees adjacent to 57th Ave S. in Martha Washington Park would remain in place.
Cons	• Noise and dust would be disruptive to residences adjacent to Martha Washington Park. • Full closure of Martha Washington Park for 2 months during pipe installation and site restoration. • Partial closure of Martha Washington Park for an additional 7 months for construction of the facilities vault, after installation of the storage pipes is completed.	• Residents would have limited access to S. Warsaw Street for construction staging area for tunnel boring machine. • Noise and dust would be disruptive to residences adjacent to Martha Washington Park. • Martha Washington Park would be closed for 8 months during construction. • After construction of the storage pipe, the area around the facilities vault (which could be located in S. Warsaw St. or the south end of 57th Ave S near existing Pump Station 10) would be closed for approximately 7 months.	• Noise and dust would be disruptive to adjacent residences (at least 8 residences) for approximately 5 months for installation of storage pipes. • Portions of Martha Washington Park may be closed during construction for contractor staging. • Conflicts with existing utilities would increase construction duration. • No vehicle access to homes on 57th Avenue S. from Holly Street to S Morgan Place for approximately 5 months. Residents would need to walk around construction area on sidewalks to reach homes.
Constructability Issues	• Equipment needed to install precast concrete pipe would create disruptive construction presence in Martha Washington Park. •	• Risks associated with tunneling include: damage to existing trees within park due to ground settlement, rescue pit for tunnel boring machine or obstructions, tunnel boring machine mechanical failure, tunnel boring machine proceeds out of alignment, uncontrolled groundwater, and unknown geotechnical risks.	• Large equipment needed to install precast concrete pipe would create disruptive construction presence. • Pipe installation rate would be slow due to limited access for construction vehicles and relocation of existing utilities. • The facilities vault could be located either in S. Holly St. or S. Warsaw St.

	Alternative 1a: Martha Washington Park Underground Storage Dual 72-Inch-Diameter Pipe Storage (Open Cut)	Alternative 1b: Martha Washington Park Underground Storage 108-inch-Diameter Tunnel (Trenchless)	Alternative 2 - 57th Avenue S. Underground Storage
Possible Construction Mitigation	Traffic • The Contractor could provide flaggers to maintain traffic on 57th Ave S. and S. Holly St. Access/Contractor Services to the Public: • Residents on S. Warsaw St. would have limited vehicle access to their homes during construction, but would still have access to S. Morgan Place and S. Oaklawn Place. At times during construction when there is no vehicular access to S. Warsaw St., the Contractor could provide assistance to property owners including: carrying things to/from their homes or providing a vehicle such as a golf cart to shuttle residents to/from their homes. • Additional services the contractor could provide during construction include: providing an escort for kids to get to/from their bus, moving construction materials away from the site after construction hours, picking up garbage and delivering it to a drop-off point for pickup, establishing a temporary mailbox when mail service is interrupted, relocating bus stops, and offering a daily or weekly public meeting for any interested parties to be updated on project status, construction impacts, etc. • Fencing would be constructed around construction zone for safety. Noise • Allowable work hours are 7 am to 7 pm Monday through Friday and 9 am to 7 pm on weekends; however, the Contractor could be required to work limited hours to reduce noise, for example, from 9 a.m. to 4 p.m. • Sound level limits would be limited to 55 (dBA) for daytime construction per Seattle Municipal Code, but the Contractor is allowed an additional 25 dBA for equipment on construction sites and up to 90 dBA continuously for impulsive impact equipment (i.e. jackhammers, pile drivers, etc.). • The Contractor could obtain a variance to replace back-up beepers on equipment. • The Contractor could construct a sound-wall for residences on S. Warsaw St. Emergency Vehicle Access: • Emergency vehicle access to all homes would be maintained throughout construction (fire trucks, police vehicles, ambulances, etc.). Settlement/Property Damage: • Settlement monitoring would be performed before, during, and after construction. The contractor would be liable for any property damage during construction and would be legally required to restore any such damage. Stormwater/Erosion Control • The Contractor would be required to treat and control stormwater during construction and follow best management practices to prevent erosion and sediment transport from the construction site onto private property.	Traffic: • The Contractor could provide flaggers to maintain traffic on 57th Ave S. & S. Holly St. Access/Contractor Services to the Public: • Residents on S. Warsaw St. would have limited vehicle access to their homes during construction, but would still have access to S. Morgan Place and S. Oaklawn Place. At times during construction when there is no vehicular access to S. Warsaw St., the Contractor could provide assistance to property owners including: carrying things to/from their homes or providing a vehicle such as a golf cart to shuttle residents to/from their homes. • Additional services the contractor could provide during construction include: providing an escort for kids to get to/from their bus, moving construction materials away from the site after construction hours, picking up garbage and delivering it to a drop-off point for pickup, establishing a temporary mailbox when mail service is interrupted, relocating bus stops, and offering a daily or weekly public meeting for any interested parties to be updated on project status, construction impacts, etc. • Fencing would be constructed around construction zone for safety. Noise: • Allowable work hours are 7 am to 7 pm Monday through Friday and 9 am to 7 pm on weekends; however, the Contractor could be required to work limited hours to reduce noise, for example, from 9 a.m. to 4 p.m. • Sound level limits would be limited to 55 (dBA) for daytime construction per Seattle Municipal Code, but the Contractor is allowed an additional 25 dBA for equipment on construction sites and up to 90 dBA continuously for impulsive impact equipment (i.e. jackhammers, pile drivers, etc.). • The Contractor could obtain a variance to replace back-up beepers on equipment. • The Contractor could construct a sound-wall for residences on S. Warsaw St. Emergency Vehicle Access: • Emergency vehicle access to all homes would be maintained throughout construction (fire trucks, police vehicles, ambulances, etc.). Settlement/Property Damage: • Settlement monitoring would be performed before, during, and after construction. The contractor would be liable for any property damage during construction and would be legally required to restore any such damage. Stormwater/Erosion Control: • The Contractor would be required to treat and control stormwater during construction and follow best management practices to prevent erosion and sediment transport from the construction site onto private property.	Traffic/Access/Contractor Services for the Public: • Construction on 57th Ave S. could be staged into phases, so that as construction begins near S. Holly St., homeowners north of S. Warsaw St. can still access their homes, and as construction proceeds north the contractor could restore the trench and allow homeowners near S. Holly St. to have vehicular access to their homes. At times during construction when there is no vehicular access to S. Warsaw St., the Contractor could provide assistance to property owners including: carrying things to/from their homes or providing a vehicle such as a golf cart to shuttle residents to/from their homes. • Additional services the contractor could provide during construction include: providing an escort for kids to get to/from their bus, moving construction materials away from the site after construction hours, picking up garbage and delivering it to a drop-off point for pickup, establishing a temporary mailbox when mail service is interrupted, relocating bus stops, and offering a daily or weekly public meeting for any interested parties to be updated on project status, construction impacts, etc. • Fencing would be constructed around construction zone for safety. Noise: • Allowable work hours are 7 am to 7 pm Monday through Friday and 9 am to 7 pm on weekends; however, the Contractor could be required to work limited hours to reduce noise, for example, from 9 a.m. to 4 p.m. • Sound level limits would be limited to 55 (dBA) for daytime construction per Seattle Municipal Code, but the Contractor is allowed an additional 25 dBA for equipment on construction sites and up to 90 dBA continuously for impulsive impact equipment (i.e. jackhammers, pile drivers, etc.). • The Contractor could obtain a variance to replace back-up beepers on equipment. • The Contractor could install triple-paned windows on impacted homes. • Homeowners could be moved out to hotels during particularly noisy construction periods. • Covered walkways over sidewalks could be constructed for additional noise reduction and added safety. Emergency Vehicle Access: • The Contractor would be required to coordinate with life safety agencies and emergency vehicles to maintain emergency vehicle access to residences at all times (fire trucks, police vehicles, ambulances, etc.), particularly on 57th Ave. S. when construction equipment and excavation could potentially interrupt emergency vehicle services. Settlement/Property Damage: • Settlement monitoring would be performed before, during, and after construction. The contractor would be liable for any property damage during construction and would be legally required to restore any such damage. Stormwater/Erosion Control: • The Contractor would be required to treat and control stormwater during construction and follow best management practices to prevent erosion and sediment transport from the construction site onto private property.

	Alternative 3 – Underground Storage on Private Property	Alternative 4 – Infiltration Reduction + Alternative 1, 2, or 3
Major Project Elements (Information is provided to help the reader understand the size of major project components. Dimension and depths may change during design)	• 200,000 gallon underground CSO Storage Tank located in Private Property on the south corner of 57th Avenue South and S. Holly St. (approx. 60 ft long x 45 ft wide x 15 ft deep) • Facilities vault, approximately 45 ft long x 25 ft wide, either underground adjacent to storage tank or above ground on top of storage tank. Facilities vault would house electrical, mechanical and odor control equipment. • 18-inch-diameter gravity sewer (approx. 50 ft). • 12-inch-diameter force main (approx. 30 ft). • Motor-operated gate to control flow.	• Replace existing sewer mains and side sewers in Basin 45 to reduce amount of groundwater infiltrating into the combined sewer system. • All sewer mains would require sewer rehabilitation and side sewers to individual properties would be rehabilitated with pipe bursting. • Concrete panels would be replaced where side sewers connect to sewer main and where maintenance holes on sewer main are pipe-burst. • Infiltration reduction would not be sufficient to completely address control volume, so the effectiveness of infiltration reduction would be monitored and a smaller storage facility would need to be built later to store remaining control volume (Alternative 1, 2, or 3), with preliminary estimates ranging from approximately 50,000 gallons to 130,000 gallons.
Total Project Cost	$8,000,000	$13,800,000
Anticipated Construction Duration (Some items listed here may occur concurrently with one another and time frames are approximate)	Approximately 17 months • Site Mobilization and Preparation: 2 months • Install Influent Gravity Sewer: 2 months • Demolish existing house, Construct Storage Tank and Facilities Vault: 13 months • Final Site Restoration: 2 months	Approximately 7 months + Duration of Constructing Additional Storage Facility • Replace existing sewer mains, side sewers, and repave streets: 7 months • Construction Storage Facility: 12-19 months
Park Closure	• Martha Washington Park may be used for staging.	• Martha Washington Park may be used for staging of storage facility. See Alternatives 1, 2 and 3 for additional information.
Pros	• Site could be restored with landscaping and/or above ground facilities building to match character of neighborhood. • Vehicle access to homes on 57th Ave. S. & S. Holly St. could be maintained for majority of construction and traffic disruptions would be minimal compared to Alternative 2.	• It is anticipated that Green Stormwater Infrastructure (GSI) such as cisterns or rain gardens could be implemented on approximately 10% of private properties where downspouts would be disconnected from existing sewer system. • Infiltration reduction & GSI eliminate the source of stormwater from the collection system.
Cons	• Noise and dust would be disruptive to adjacent residences on 57th Ave S. and S. Holly St. for approximately 13 months for construction of storage tank and facilities vault. • Some traffic disruptions on 57th Avenue South & S. Holly St. for majority of construction. • Portions of Martha Washington Park may be closed during construction for contractor staging.	• Major traffic disruptions on every street in Basin 45 for construction of new sewer mains and side sewers. • It is anticipated that every home in Basin 45 will be constructed on to replace side sewers. • Higher cost than Alternatives 1a, 2, and 3. • Additional storage facility would still need to be constructed (Alternative 1, 2, or 3), so total construction duration would be longer than other alternatives. • Bypass pumping would be required at homes while side sewers are pipe-burst and replaced.
Constructability Issues	• The site has limited area for construction access and staging. Off-site project staging would be needed (Martha Washington Park could be used). • Large equipment needed to construct storage tank would create disruptive construction presence.	• Because storage would still be required after infiltration reduction was implemented, the same issues from Alternative 1, 2, or 3 would still exist.
Possible Construction Mitigation	Traffic: • Contractor could provide flaggers to maintain traffic on 57th Ave S. and S. Holly St. Access/Contractor Services to the Public: • All homeowners on 57th Ave. S., S. Holly St., and S. Warsaw St. would have full vehicular access to their homes throughout construction. • Fencing would be constructed around construction zone for safety. Noise: • Allowable work hours are 7 am to 7 pm Monday through Friday and 9 am to 7 pm on weekends; however, the Contractor could be required to work limited hours to reduce noise, for example, from 9 a.m. to 4 p.m. • Sound level limits would be limited to 55 (dBA) for daytime construction per Seattle Municipal Code, but the Contractor is allowed an additional 25 dBA for equipment on construction sites and up to 90 dBA continuously for impulsive impact equipment (i.e. jackhammers, pile drivers, etc.). • The Contractor could obtain a variance to replace back-up beepers on equipment. • The Contractor could construct a sound-wall around the site for adjacent residences. Emergency Vehicle Access: • Emergency vehicle access to homes would be maintained throughout construction (fire trucks, police vehicles, ambulances, etc.). Settlement/Property Damage: • Settlement monitoring would be performed before, during, and after construction. The contractor would be liable for any property damage during construction and would be legally required to restore any such damage. Stormwater/Erosion Control: • The Contractor would be required to treat and control stormwater during construction and follow best management practices to prevent erosion and sediment transport from the construction site onto private property.	Traffic: • The Contractor could be required to work in one location at a time to minimize the area disturbed by construction for local traffic. Access/Contractor Services to the Public: • Homeowners may not have access to their driveways/garages at various phases during construction (pipe-bursting sewer mains or side sewers). The contractor could provide assistance to property owners including: carrying things to/from their homes, providing a vehicle such as a golf cart to shuttle residents to/from their homes, and moving construction materials away from the site after construction hours. • Additional services the contractor could provide during construction include: providing an escort for kids to get to/from their bus, moving construction materials away from the site after construction hours, picking up garbage and delivering it to a drop-off point for pickup, establishing a temporary mailbox when mail service is interrupted, relocating bus stops, and offering a daily or weekly public meeting for any interested parties to be updated on project status, construction impacts, etc. • Fencing would be constructed around construction zone for safety. Noise: • Allowable work hours are 7 am to 7 pm Monday through Friday and 9 am to 7 pm on weekends; however, the Contractor could be required to work limited hours to reduce noise, for example, from 9 a.m. to 4 p.m. • Sound level limits would be limited to 55 (dBA) for daytime construction per Seattle Municipal Code, but the Contractor is allowed an additional 25 dBA for equipment on construction sites and up to 90 dBA continuously for impulsive impact equipment (i.e. jackhammers, pile drivers, etc.). • The Contractor could obtain a variance to replace back-up beepers on equipment. Emergency Vehicle Access: • Emergency vehicle access to all homes would be maintained throughout construction (fire trucks, police vehicles, ambulances, etc.). Settlement/Property Damage: • Settlement monitoring would be performed before, during, and after construction. The contractor would be liable for any property damage during construction and would be legally required to restore any such damage, including damage to property owners' yards for side sewer replacement. Stormwater/Erosion Control: • The Contractor would be required to treat and control stormwater during construction and follow best management practices to prevent erosion and sediment transport from the construction site onto private property.