NORTH BEACH BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1A: RECTANGULAR BOTTOM OF BASIN STORAGE WITH CONVEYANCE TO CARKEEK PUMP STATION		ALTERNATIVE 1B: PIPELINE BOTTOM OF BASIN STORAGE WITH CONVEYANCE TO CARKEEK PUMP STATION		ALTERNATIVE 1C: CENTRALIZED STORAGE UP IN BASIN WITH CONVEYANCE TO 8TH AVENUE INTERCEPTOR	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
LAND USE AND PERMITTING						
1. City of Seattle Comprehensive Plan	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright.	3	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Because of the small size of the facilities, the alterantive may be consistent with the comprehensive plan.	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright.
2. Seattle Municipal Code (SMC/Zoning Code)	2	Located on or adjacent to existing pump station. Zoning is Single Family Residential. Utility Service Use is permitted as a City Council conditional use.	2	Located on or adjacent to existing pump station. Zoning is Single Family Residential. Utility Service Use is permitted as a City Council conditional use.	3	**Bottom of Basin Site:** Zoning is Single Family Residential. **Holman Road Site:** Zoning is Commercial. Utility Service Uses are permitted in C1-40 zones.
3. Shoreline Master Program Compatibility	2	Storage is most likely considered a "Utility Service Use". A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District. It may be possible to locate the storage facility outside the Shoreline District (i.e., more than 200 feet from the Puget Sound shoreline).	3	Storage is most likely outside of the shoreline zone.	2	The pump station may be within the shorelne district. Utilities would be buried underground which would only temporarily disrupt public access. Storage tank would not be within the shoreline.
4. Permitting Complexity	2	This alternative may require a Shoreline Permit. Affected roadways in residential area with regional transportation (railway) adjacent to site. Will require careful traffic planning to maintain access. Work hours likely to be restricted.	3	This alternative likely does not require a Shoreline Permit. Affected roadways in residential area with regional transportation (railway) adjacent to site. Will require careful traffic planning to maintain access. Work hours likely to be restricted.	2	This alternative may require a Shoreline Permit. Affected roadways in residential area with regional transportation (railway) adjacent to site. Will require careful traffic planning to maintain access. Work hours likely to be restricted.
5. Property Acquisition Complexity	2	Single family residential acquisition required. Concerns regarding acquisition from homeowners association. Approximately 1/2 Ac.	3	Assumes street use of 250 lineal feet for pipeline storage.	2	**Bottom of Basin Site:** Single family residential. Possible concerns regarding acquisition from homeowners association. Approximately 1/4 Ac. **Holman Road Site:** Assume purchase from City of Seattle Parks **not** required. If purchase from City of Seattle Parks Dept. required would change to 1. Approximately 1/2 Ac. **Pipeline:** Extensive street right of way required.

NORTH BEACH BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1A: RECTANGULAR BOTTOM OF BASIN STORAGE WITH CONVEYANCE TO CARKEEK PUMP STATION		ALTERNATIVE 1B: PIPELINE BOTTOM OF BASIN STORAGE WITH CONVEYANCE TO CARKEEK PUMP STATION		ALTERNATIVE 1C: CENTRALIZED STORAGE UP IN BASIN WITH CONVEYANCE TO 8TH AVENUE INTERCEPTOR	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
ENVIRONMENT						
1. Cultural Resources	3	No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources.	3	No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources.	3	No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources.
2. Fish and Wildlife	3	Construction and operation of this alternative would not adversely affect fish and wildlife, or their habitat.	3	Construction and operation of this alternative would not adversely affect fish and wildlife, or their habitat.	3	Construction and operation of this alternative would not affect fish and wildlife, or their habitat.
3. Wetlands, Streams and Shoreline	3	GIS maps show a piped stream crossing through the project area. This rating assumes that construction would not impact the stream or any wetlands or shoreline area.	3	GIS maps show a piped stream crossing through the project area. This rating assumes that construction would not impact the stream or any wetlands or shoreline area.	3	**Bottom of Basin Site:** GIS maps show a piped stream crossing through this project area. This rating assumes that construction would not impact the stream or any wetlands or shoreline area. **Holman Road Site:** No wetlands, streams or shoreline in this project area.
4. Soils and Sediments	3	No known contaminated sites. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas. Potential landslide areas are located within project area, but it is assumed that construction of this alternative would not increase the likelihood of landslides.	3	No known contaminated sites. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas. Potential landslide areas are located within project area, but it is assumed that construction of this alternative would not increase the likelihood of landslides.	2	No known contaminated sites in the vicinity of the Blue Ridge Park Site. There are known contaminated sites and potential to encounter contaminated soils in the vicinity of the storage basin site and pipeline alignment near Holman Road. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas. Potential landslide areas are located within project area, but it is assumed that construction of this alternative would not increase the likelihood of landslides.
5. Water Quality	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.
TECHNICAL						
1. Technical Complexity	3	Single site. Simple approach. Gravity overflow at new control structure to gravity fill tank. Automatic cleaning and emptying after event will require telemetry and local controls. Flows exceeding tank capacity overflow at diversion structure to existing outfall.	3	Single site. Simple approach. Gravity overflow at new control structure to gravity fill tank. Automatic cleaning and emptying after event will require telemetry and local controls. Flows exceeding tank capacity overflow at diversion structure to existing outfall.	2	Two sites. More complex approach including pump station sized for baseline and peaking. Gravity overflow at new control structure pumped to fill tank. Automatic cleaning and emptying after event will require telemetry and local controls. Flows exceeding tank capacity overflow at diversion structure to existing outfall.
2. Compatibility with Existing WW system	3	Stand alone alternative. Diversion structure to tank built in collection system upstream of existing CSO control. Does not affect downstream capacity in county system.	3	Stand alone alternative. Diversion structure to tank built in collection system upstream of existing CSO control. Does not affect downstream capacity in county system.	3	Stand alone alternative. Diversion structure to pump station built in collection system upstream of existing CSO control. Re-directs flow now going to Carkeek Pump Station. Potential impact at 3rd Street NW CSO and other downstream facilities needs to be evaluated.
3. Flexibility/Adaptive Management	2	Storage tank not easily modified for enlargement.	2	Storage tank not easily modified for enlargement.	1	Storage tank and pump station not easily modified for enlargement.
4. Constructability/ Implementation Schedule	2	Risks associated with shoring, groundwater and limited space. Very limited staging and access area due to residential area. Alternative can likely meet the construction schedule.	2	Risks associated with shoring, groundwater and limited space. Very limited staging and access area due to residential area. Alternative can likely meet the construction schedule.	2	Risks associated with shoring, groundwater and limited space for pump station. Limited staging and access area due to residential area. Storage site provides more flexibility but still provides challenges. Alternative can likely meet the construction schedule.

NORTH BEACH BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1A: RECTANGULAR BOTTOM OF BASIN STORAGE WITH CONVEYANCE TO CARKEEK PUMP STATION		ALTERNATIVE 1B: PIPELINE BOTTOM OF BASIN STORAGE WITH CONVEYANCE TO CARKEEK PUMP STATION		ALTERNATIVE 1C: CENTRALIZED STORAGE UP IN BASIN WITH CONVEYANCE TO 8TH AVENUE INTERCEPTOR	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
O&M						
1. Staffing	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.	2	Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.
2. Training	3	Staff familiar with storage facilities. Similar control approaches to other facilities within the system can be specified for consistency.	3	Staff familiar with storage facilities. Similar control approaches to other facilities within the system can be specified for consistency.	3	Staff familiar with pump stations and storage facilities. Similar control approaches to other facilities within the system can be specified for consistency.
3. Reliability	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.	2	A pump station is required to actively divert flows to a storage tank during a peak event. Power is critical for operation of telemetry & monitoring equipment. Storage is a proven technology for controlling peak flow events.
4. Maintenance	3	Alternative requires little maintenances. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry to storage.	3	Alternative requires little maintenances. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry to storage.	2	Alternative requires more maintenance due to need for a two-stage pump station. More complex telemetry/controls than bottom of the basin alternatives. Assumes no entry to storage.
5. Safety	3	No street access required. No traffic control procedures required. No street use/closure permit required.	2	No street access required typical operations. Infrequent maintenance issues will require traffic control procedures and street use/closure permit.	3	No street access required. No traffic control procedures required. No street use/closure permit required.
COST EFFECTIVENESS						
1. Project Capital Costs	3	Relative Cost = 1.0	3	Relative Cost = 1.0	1	Relative Cost = 4.4 Potential benefit of avoided future costs since this eliminates the need for the existing North Beach Pump Station and Force Main.
2. Life Cycle Costs						
3. Cost Variability/Risk	3	Variability Ratio = 1.13	3	Variability Ratio = 1.01	3	Variability Ratio = 1.37
Note: Project Capital Costs for North Beach Alternatives range from a low $7.3M to a high of $63.3M						
COMMUNITY IMPACT						
1. Location	1	Alternative requires acquisition of private property. Facility can be designed to be consistent with community's vision of itself; however permanent above ground facilities will be visible to numerous homes. Some permanent loss of park use area may occur.	3	Pipeline in street is not visible. Ancillary facilites located within existing North Beach Pump Station site. Design will need to address concerns about light, noise, or odor control. Acquisition of private property is not required for this alternative. Does not address PS/FM upgrade project.	1	**Bottom of Basin Site:** Siting will require acquisition of private property. Facility will be visible from numerous properties uphill of the site. Design will need to address concerns about light, noise, or odor control. **Holman Road Site:** Site is currently privately owned. Site is visible but can be designed to be compatible with the surrounding commercial area.
2. Potential Community Impacts	2	Use will require frequent visits by O&M and potential heavy equipment access, primarily following a peak flow event. Assuming portion of Blue Ridge Park can be restored to park activities, some O&M activites may conflict with site uses and adjacent facilities requiring close coordination between O&M and the community.	2	Use will require frequent visits by O&M and potential heavy equipment access, primarily following a peak flow event. Pipeline storage in the right of way may require street closures.	3	Use will require frequent visits by O&M and potential heavy equipment access, primarily following a peak flow event. However, this will be at the Holman Road Site which is a commercial area. Operations at the bottom of the basin would be comparable to existing. Project eliminates need for a second project to upgrade existing infrastructure.
3. Construction Impacts	1	Siting will affect adjacent properties during construction Construction staging may require acquisition of additional single family residential property. Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Work hour and noise restrictions may impact the construction duration. It may be difficult to mitigate impacts through standard construction methods. Blue Ridge Park will be inaccessible during construction.	1	Siting will affect adjacent properties during construction. Construction staging may require acquisition of additional single family residential property. Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Work hour and noise restrictions may impact the construction duration. It may be difficult to mitigate impacts through standard construction methods. Blue Ridge Park will have limited access during construction.	1	Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Work hour and noise restrictions may impact the construction duration. It may be difficult to mitigate impacts through standard construction methods. Limited private property required at the bottom of the basin. Siting will affect adjacent properties during construction. Construction impacts various areas of the basin due to pipeline construction and facilities at two sites.

NORTH BEACH BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1D: CENTRALIZED STORAGE AT BOTTOM OF BASIN WITH CONVEYANCE TO 8TH AVENUE INTERCEPTOR		ALTERNATIVE 2A: CONVEYANCE TO CARKEEK CSO TREATMENT PLANT WITH BEACH ALIGNMENT		ALTERNATIVE 2B: CONVEYANCE TO CARKEEK CSO TREATMENT PLANT WITH NEIGHBORHOOD ALIGNMENT	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
LAND USE AND PERMITTING						
1. City of Seattle Comprehensive Plan	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright.	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location will require review for consistency with City parks policies.	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location will require review for consistency with City parks policies.
2. Seattle Municipal Code (SMC/Zoning Code)	2	**Bottom of Basin Site:** Located on or adjacent to existing pump station. Zoning is Single Family Residential. Utility Service Use is permitted as a City Council conditional use. **Holman Road Site:** Zoning is Commercial. Utility Service Uses are permitted in C1-40 zones.	1	**Bottom of Basin Site:** Zoning is Single Family Residential. **Carkeek Park Site:** Zoning is Single Family. Expansion of an existing sewage treatment plant is permitted under strict provisions in the Land Use Code, requiring a City Council finding of no feasible alternative locations. **Pipeline:** On a Puget Sound Beach. Rating of 1 (red) is for permitting a pipeline on the beach, plus expanding STP in Carkeek Park.	2	**Bottom of Basin Site:** Zoning is Single Family Residential. **Carkeek Park Site:** Zoning is Single Family Residential. Expansion of an existing sewage treatment plant is permitted under strict provisions in the Land Use Code, requiring a City Council finding of no feasible alternative locations. **Pipeline:** In the public right-of-way.
3. Shoreline Master Program Compatibility	2	The pump station and storage tank may be within the shoreline district. Storage is most likely considered a "Utility Service Use". A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District. It may be possible to locate the storage facility outside the Shoreline District (i.e., more than 200 feet from the Puget Sound shoreline).	1	The pump station may require a shoreline permit. Treatment Facility would be within existing Carkeek Facility footprint. The Pipeline would be within the public beach. Utilities would be primarily buried underground which would only temporarily disrupt public access. Rating of 1 (red) is for permitting a pipeline on the beach.	2	The pump station may require a shoreline permit. Treatment Facility would be within existing Carkeek Facility footprint. The Pipeline would be within public right-of-way. Utilities would be primarily buried underground which would only temporarily disrupt public access.
4. Permitting Complexity	2	This alternative may require a Shoreline Permit. Affected roadways in residential area with regional transportation (railway) adjacent to site. Will require careful traffic planning to maintain access. Work hours likely to be restricted.	1	**Bottom of Basin Site:** Pump station may require shoreline substantial development permit. If so, Utility Service Uses are permitted in shoreline district only if they require a shorteline location. Shoreline permit is appealable to State Shorelines Hearings Board. Seattle ECA review, land use review, possible Shorelines permit. Special inspections may be required due to shoring and water control. Stormwater control will be complex due to likelihood of groundwater. **Carkeek Park Site: Treatment plant expansion would be required.** Permits to construct/upgrade facilities on existing County site require City Council approval and finding of no feasible alternative location. **Pipeline:** Marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule.	1	**Bottom of Basin Site:** may require shoreline permit. If so, Utility Service Uses are permitted in shoreline district only if they require a shorteline location. Shoreline permit is appealable to State Shorelines Hearings Board. **Carkeek Park Site:** Treatment plant expansion would be required. Permits to construct/upgrade facilities on existing County site require City Council approval and finding of no feasible alternative location. Seattle ECA review (environmentally critical areas) will be required. **Pipeline:** Pipeline within road right-of-way. Rating of 1 (red) for STP expansion in Carkeek Park - less complex than Alternative 2A because no beach pipeline.
5. Property Acquisition Complexity	2	**Bottom of Basin Site:** Single family residential. Possible concerns regarding acquisition from homeowners association. Approximately 1/2 Ac. **Holman Road Site:** Assume purchase from City of Seattle Parks **not** required. If purchase from City of Seattle Parks Dept. required would change to 1. Approximately 1/4 Ac. **Pipeline:** Extensive street right of way required.	2	**Bottom of Basin Site:** Single family residential. Possible concerns regarding acquisition from homeowners association. Approximately 1/2 Ac. **Carkeek Park Site:** Site owned by King County. **Pipeline:** Assumed within existing County easement.	2	**Blue Ridge Park Site:** Single family residential. Possible concerns regarding acquisition from homeowners association. Approximately 1/2 Ac. **Carkeek Park Site:** Site owned by King County. **Pipeline:** Extensive street right of way required.

NORTH BEACH BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1D: CENTRALIZED STORAGE AT BOTTOM OF BASIN WITH CONVEYANCE TO 8TH AVENUE INTERCEPTOR		ALTERNATIVE 2A: CONVEYANCE TO CARKEEK CSO TREATMENT PLANT WITH BEACH ALIGNMENT		ALTERNATIVE 2B: CONVEYANCE TO CARKEEK CSO TREATMENT PLANT WITH NEIGHBORHOOD ALIGNMENT	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
ENVIRONMENT						
1. Cultural Resources	3	No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources.	2	**NBPS Site:** No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources. **FM Alignment & CSTP Sites:** Piper's Creek is identified as an ethnologic site. Based on site characteristics, the mouth of Piper's Creek and the CSTP area have a medium probability of containing archaeological resources. The Piper homestead orchard and garden are maintained in Carkeek Park, but it is assumed that they would not be affected by construction or operation of this alternative.	2	**NBPS Site:** No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources. **FM Alignment & CSTP Site:** Piper's Creek is identified as an ethnologic site. Based on site characteristics, the CSTP area has a medium probability of containing archaeological resources. The Piper homestead orchard and garden are maintained in Carkeek Park, but it is assumed that they would not be affected by construction or operation of this alternative.
2. Fish and Wildlife	3	Construction and operation of this alternative would not affect fish and wildlife, or their habitat.	1	Construction of the forcemain along the Puget Sound beach and Piper's Creek alignments would likely adversely affect fish and wildlife and/or their habitat. Piper's Creek is a salmon-bearing stream and the lower portion of the creek is identified as a Priority Habitat and Species (PHS) area. Operation of this alternative would not adversely affect fish and wildlife, or their habitat.	2	Construction of the new treatment facility next to Piper's Creek in Carkeek Park may adversely affect fish and wildlife and/or their habitat. Piper's Creek is a salmon-bearing stream. Operation of this alternative would not adversely affect fish and wildlife, or their habitat.
3. Wetlands, Streams and Shoreline	3	**Bottom of Basin Site:** GIS maps show a piped stream crossing through this project area. This rating assumes that construction would not impact the stream or any wetlands or shoreline area. **Holman Road Site:** No wetlands, streams or shoreline in this project area.	1	**Bottom of Basin Site:** GIS maps show a piped stream crossing through this project area. It is assumed that construction would not impact the stream or any wetlands or shoreline area. **FM Alignment:** It is likely that construction of the forcemain along the Puget Sound beach and Piper's Creek alignments would directly impact shoreline, wetlands and Piper's Creek. **CSTP Site:** Construction of the treatment facility at Carkeek Park could affect the Piper's Creek stream buffer.	2	**Bottom of Basin Site:** GIS maps show a piped stream crossing through this project area. It is assumed that construction would not impact the stream or any wetlands or shoreline area. **FM Alignment & CSTP Site:** It is likely that construction of the forcemain and/or new treatment facility would directly impact the Piper's Creek stream buffer.
4. Soils and Sediments	2	No known contaminated sites in the vicinity of the Blue Ridge Park Site. There are known contaminated sites and potential to encounter contaminated soils in the vicinity of the drop structure and odor control facility site and pipeline alignment near Holman Road. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas. Potential landslide areas are located within project area, but it is assumed that construction of this alternative would not increase the likelihood of landslides.	2	No known contaminated sites and pipeline alignment is in beach and Piper's Creek corridor where contaminated soils are not expected. No steep slopes and/or known landslide areas at Blue Ridge Park Site or along beach alignment. The pipeline alignment between the beach and the CSTP Site contains steep slopes and potential landslide areas.	3	No known contaminated sites and pipeline allgnment is in a mostly residential area where contaminated soils are not expected. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas at Blue Ridge Park Site and pipeline construction in not expected to increase the likelihood of landslides.
5. Water Quality	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.
TECHNICAL						
1. Technical Complexity	3	Primary facilites on single site. Simplified control approach with pump station sized for baseline flows only with gravity overflow to storage. Automatic cleaning and emptying after event will require telemetry and local controls. Flows exceeding tank capacity overflow at diversion structure to existing outfall.	1	Two sites. Complex approach with treatment facility required at Carkeek. Gravity overflow at new control structure pumped to treatment facility. Treatment facility can run automatically but coagulation/flocculation/sedimentation/disinfection processes are critical to meeting effluent limits. Flows exceeding tank capacity overflow at diversion structure to existing outfall.	1	Two sites. Complex approach with treatment facility required at Carkeek. Gravity overflow at new control structure pumped to treatment facility. Treatment facility can run automatically but coagulation/flocculation/sedimentation/disinfection processes are critical to meeting effluent limits. Flows exceeding tank capacity overflow at diversion structure to existing outfall.
2. Compatibility with Existing WW system	3	Stand alone alternative. Diversion structure to pump station built in collection system upstream of existing CSO control. Re-directs flow now going to Carkeek Pump Station. Potential impact at 3rd Street NW CSO and other downstream facilities needs to be evaluated.	2	Diversion structure to pump station built in collection system upstream of existing CSO control. Carkeek wet weather facility capacity would need to be increased to handle flows.	2	Diversion structure to pump station built in collection system upstream of existing CSO control. Carkeek wet weather facility capacity would need to be increased to handle flows.
3. Flexibility/Adaptive Management	1	Storage tank and pump station not easily modified for enlargement.	2	Treatment facility provides flexibility in peak flow treatment with limited space required to add significant additional capacity. The pump station would also require modification.	2	Treatment facility provides flexibility in peak flow treatment and limited space required to add significant additional capacity. The pump station would also require modification.
4. Constructability/ Implementation Schedule	2	Risks associated with shoring, groundwater and limited space for pump station and storage facility. Limited staging and access area due to residential area. Alternative can likely meet the construction schedule.	1	Risks associated with shoring, groundwater and limited space for pump station. Limited staging and access area due to residential area. Treatment facility site at Carkeek provides challenges due to remote location and uses surrounding site. Beach alignment of pipeline will provide additional construction challenges. Alternative can likely meet the construction schedule.	1	Risks associated with shoring, groundwater and limited space for pump station. Limited staging and access area due to residential area. Treatment facility site at Carkeek provides challenges due to remote location and uses surrounding site. Neighborhood alignment of pipeline will provide additional construction challenges. Alternative can likely meet the construction schedule.

NORTH BEACH BASIN ALTERNATIVES

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
O&M						
1. Staffing	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.	1	Facility can be automatically started and run autonomously under design conditions. However, the treatment facility at Carkeek will likely require operator response to ensure proper startup and operation of the facility. Staffing/supervision will be needed for cleaning. Facility should not impact downstream facilities.	1	Facility can be automatically started and run autonomously under design conditions. However, the treatment facility at Carkeek will likely require operator response to ensure proper startup and operation of the facility. Staffing/supervision will be needed for cleaning. Facility should not impact downstream facilities.
2. Training	3	Staff familiar with pump stations and storage facilities. Similar control approaches to other facilities within the system can be specified for consistency.	1	Staff familiar with pump stations. Similar control approaches to other facilities within the system can be specified for consistency. However, County does not currently operate a high rate clarification facility. New control approaches and training procedures will need to be developed.	1	Staff familiar with pump stations. Similar control approaches to other facilities within the system can be specified for consistency. However, County does not currently operate a high rate clarification facility. New control approaches and training procedures will need to be developed.
3. Reliability	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.	2	A pump station is required to actively divert flows during a peak event. Power is critical for operation of telemetry & monitoring equipment. High rate clarification is a proven technology for treating peak flow events, however it is mechanically intensive which may impact the reliability.	2	A pump station is required to actively divert flows during a peak event. Power is critical for operation of telemetry & monitoring equipment. High rate clarification is a proven technology for treating peak flow events, however it is mechanically intensive which may impact the reliability.
4. Maintenance	2	Alternative requires more maintenance due to need for a two-stage pump station. Assumes no entry to storage.	1	Alternative requires significant maintenance for pump station and high rate clarification facility. More complex telemetry/controls including pump station monitors, flow meters, chemical metering systems, flocculation/sedimentation and disinfection facilities.	1	Alternative requires significant maintenance for pump station and high rate clarification facility. More complex telemetry/controls including pump station monitors, flow meters, chemical metering systems, flocculation/sedimentation and disinfection facilities.
5. Safety	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	No street access required. No traffic control procedures required. No street use/closure permit required.
COST EFFECTIVENESS						
1. Project Capital Costs	2	Relative Cost = 3.4 Potential benefit of avoided future costs since this eliminates the need for the existing North Beach Pump Station and Force Main.	1	Relative Cost = 6.0 Potential benefit of avoided future costs since this eliminates the need for the existing North Beach Pump Station and Force Main.	1	Relative Cost = 6.8 Potential benefit of avoided future costs since this eliminates the need for the existing North Beach Pump Station and Force Main.
2. Life Cycle Costs						
3. Cost Variability/Risk	3	Variability Ratio = 1.47	3	Variability Ratio = 1.04	3	Variability Ratio = 1.41
Note: Project Capital Cost						
COMMUNITY IMPACT						
1. Location	1	**Bottom of Basin Site:** Siting will require acquisition of private property. Facility will be visible from numerous properties uphill of the site. Design will need to address concerns about light, noise, or odor control. **Holman Road Site:** Site is currently privately owned. Site is visible but can be designed to be compatible with the surrounding commercial area.	1	**Bottom of Basin Site:** Siting will require acquisition of private property. Facility will be visible from numerous properties uphill of the site. Design will need to address concerns about light, noise, or odor control. **Carkeek Park Site:** Siting at Carkeek is not compatible with community's understanding of what Carkeek TP is scoped to do, and who it is supposed to serve. Additional effluent, even treated, from the Carkeek site may cause environmental concerns. Facility will be visible from numerous properties uphill of the site. Design will need to address concerns about light, noise, or odor control.	1	Alternative may be inconsistent with community's vision of itself with limited opportunity to address issues during design. Siting requires use of private property. Pump station facility will be visible from numerous properties uphill of the site . There will be significant concern about light, noise, or odor control that may exceed county design standards. Community and Parks may be concerned about potential expansion of facilities at Carkeek, and additional outfalls or effluent.
2. Potential Community Impacts	2	Use will require frequent visits by O&M and potential heavy equipment access, primarily following a peak flow event. Assuming portion of Blue Ridge Park can be restored to park activities, some O&M activites may conflict with site uses and adjacent facilities requiring close coordination between O&M and the community. Project eliminates need for a second project to upgrade existing infrastructure.	3	O&M work efforts will generally be infrequent, similar to existing pump station O&M efforts at North Beach and Carkeek. Project planning may need to address limited impacts to park use.	3	O&M work efforts will generally be infrequent, similar to existing pump station O&M efforts at both North Beach and Carkeek.
3. Construction Impacts	1	Construction staging may require acquisition of additional single family residential property. Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Work hour and noise restrictions may impact the construction duration. It may be difficult to mitigate impacts through standard construction methods. Limited private property required at the bottom of the basin. Siting will affect adjacent properties during construction. Construction impacts various areas of the basin due to pipeline construction and facilities at two sites. Blue Ridge Park will be inaccessible during construction.	1	Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Impacts may be difficult to mitigate using standard methods. Work hour and noise restrictions may impact the construction duration. Access and use of Blue Ridge Park will be limited.Beach alignment of pipeline will impact recreational users during construction.	1	Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Impacts may be difficult to mitigate using standard methods. Work hour and noise restrictions may impact the construction duration. Access and use of Blue Ridge Park will be limited during construction. This alternative would also affect additional residents living outside of the basin.

NORTH BEACH BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 3A: BOTTOM OF BASIN TREATMENT FACILITY		ALTERNATIVE 3B: CENTRALIZED TREATMENT FACILITY UP IN BASIN		ALTERNATIVE 5A: I/I CONTROL	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
LAND USE AND PERMITTING						
1. City of Seattle Comprehensive Plan	1	Seattle's Land Use Element of the Comprehensive Plan promotes public health and environmental quality (LU G3, for example). Many Land Use policies stress compatibility with neighboring uses, and discourage non-residential uses in residential zones except for those uses necessary to the functioning of residential areas (LU 12). This type of balancing will support some necessary wastewater facilities in residential zones. However, there is a strong emphasis on compatibility of function, character, and scale for non-residential uses. Establishing a new sewage treatment plant along the Puget Sound shoreline may run counter to many of these policies.	1	Seattle's Land Use Element of the Comprehensive Plan promotes public health and environmental quality (LU G3, for example). Many Land Use policies stress compatibility with neighboring uses, and discourage non-residential uses in residential zones except for those uses necessary to the functioning of residential areas (LU 12). This type of balancing will support some necessary wastewater facilities in residential zones. However, there is a strong emphasis on compatibility of function, character, and scale for non-residential uses. Establishing a new sewage treatment plant in a residential zone may run counter to many of these policies.	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility. The Comp Plan places much emphasis on sustainable solutions and restoration of natural drainages.
2. Seattle Municipal Code (SMC/Zoning Code)	1	Zoning is Single Family Residential. The establishment of new sewage treatment plants is prohibited in SFR zones (SMC 23.44.036.E.4).	1	**Blue Ridge Park Site:** Zoning is Single Family Residential. **North Beach Elementary Site:** Zoning is Single Family Residential. Establishing a new sewage treatment plant in a SF zone is prohibited by the land use code.	2	May be consistent with the Seattle Municipal Code.
3. Shoreline Master Program Compatibility	1	New treatment plants are not allowed in Shoreline District	2	The pump station may require a shoreline permit. Treatment Facility would not be within Shoreline District. The Pipeline would be within road right-of-way.	3	N/A - Not within Shoreline District.
4. Permitting Complexity	1	This alternative will require a Shoreline Permit for a prohibited use. Affected roadways in residential area with regional transportation (railway) adjacent to site. Will require careful traffic planning to maintain access. Work hours likely to be restricted. The large size of facility and associated construction impacts (temporary) may be considered a "high impact' use by the City.	1	This alternative may require a Shoreline Permit. Affected roadways in residential area with regional transportation (railway) adjacent to site. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Approval will require a permit for a currently prohibited use in a single family zone (in the upper basin, possibly at the site of an elementary school).	2	ROW permits required. Water quality treatment issues may increase permitting complexity. Affected roadways have moderate traffic volume in residential and neighborhood commercial land uses. Will require careful traffic planning to maintain access. Work hours may be restricted. Permit review likely to be complex.
5. Property Acquisition Complexity	2	**Bottom of Basin Site:** Single family residential. Possible concerns regarding acquisition from homeowners association. Approximately 1/2 Ac.	1	**Bottom of Basin Site:** Single family residential. Possible concerns regarding acquisition from homeowners association. Approximately 1/2 Ac. **North Beach Elementary Site: Zoned commercial.** Purchase from Seattle School District. Approximately 1/2 Ac.	2	Street use permits, may require rights of entry for property disconnection. May require property acquisition for stormwater treatment facilities.

NORTH BEACH BASIN ALTERNATIVES

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
ENVIRONMENT						
1. Cultural Resources	3	No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources.	3	No known archaeological sites or historic resources. Based on site characteristics, the project area has a low probability of containing archaeological resources.	3	No known cultural resources.
2. Fish and Wildlife	3	Construction and operation of this alternative would not adversely affect fish and wildlife, or their habitat.	3	Construction and operation of this alternative would not affect fish and wildlife, or their habitat.	2	Construction of this alternative would not adversely affect fish and wildlife, or their habitat. Operation could have adverse effects on fish and wildlife if treatment was not required for stormwater discharges.
3. Wetlands, Streams and Shoreline	2	GIS maps show a piped stream crossing through the project area. This piped stream would likely have to be moved to construct this alternative. This alternative would not impact wetlands or shoreline areas.	3	**Bottom of Basin Site:** GIS maps show a piped stream crossing through this project area. It is assumed that construction would not impact the stream or any wetlands or shoreline area. **North Beach Elementary Site:** No wetlands, streams or shoreline in this project area.		need more information
4. Soils and Sediments	3	No known contaminated sites. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas. Potential landslide areas are located within project area, but it is assumed that construction of this alternative would not increase the likelihood of landslides.	3	No known contaminated sites and pipeline alignment is in a mostly residential area where contaminated soils are not expected. Project area is not within liquifaction zone. No steep slopes and/or known landslide areas. Potential landslide areas are located within project area, but it is assumed that construction of this alternative would not increase the likelihood of landslides.		need more information
5. Water Quality	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.	1	This assumes stormwater treatment is not required. If stormwater treatment is required, rating would change from 1 to 3.
TECHNICAL						
1. Technical Complexity	1	One site. Complex approach with treatment facility required. Gravity overflow at new control structure to treatment facility. Treatment facility can run automatically but coagulation/flocculation/sedimentation/disinfection processes are critical to meeting effluent limits. Flows exceeding tank capacity overflow at diversion structure to existing outfall.	1	Two sites. Complex approach with treatment facility required up in basin. Gravity overflow at new control structure pumped to treatment facility. Treatment facility can run automatically but coagulation/flocculation/sedimentation/disinfection processes are critical to meeting effluent limits. Flows exceeding tank capacity overflow at diversion structure to existing outfall.	2	Simple approach, however effectiveness to meet CSO control objectives is largely unknown until implemented.
2. Compatibility with Existing WW system	3	Stand alone alternative. Diversion structure to treatment facility built in collection system upstream of existing CSO control. Does not affect downstream capacity in county system.	3	Stand alone alternative. Diversion structure to treatment facility built in collection system upstream of existing CSO control. Does not affect downstream capacity in county system.	3	Upgrades existing infrastructure by removing excess infiltration in side sewers as the initial target.
3. Flexibility/Adaptive Management	3	Treatment facility provides flexibility in peak flow treatment with limited space required to add significant additional capacity.	2	Treatment facility provides flexibility in peak flow treatment and limited space required to add significant additional capacity. The pump station would also require modification.	3	Ability to adapt by increasing number of disconnections and side sewer repairs subject to capacity of stormwater system.
4. Constructability/ Implementation Schedule	1	Significant risks associated with shoring, groundwater and limited space for treatment facility. Limited staging and access area due to residential area. Alternative can likely meet the construction schedule.	2	Risks associated with shoring, groundwater and limited space for the pump station and treatment facility. Limited staging and access area due to residential area. Alternative can likely meet the construction schedule.	2	Unknown if approach can meet schedule. Low probability of groundwater effects if disconnected flow goes directly to stormwater system. Side sewer repair requires cooperation of homeowners. Number of disconnects can only be estimated. Both factors increases risk for compliance, but work could be implemented relatively soon.

NORTH BEACH BASIN ALTERNATIVES

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
O&M						
1. Staffing	1	Facility can be automatically started and run autonomously under design conditions. However, the treatment facility will likely require operator response to ensure proper startup and operation of the facility. Staffing/supervision will be needed for cleaning. Facility should not impact downstream facilities.	1	Facility can be automatically started and run autonomously under design conditions. However, the treatment facility will likely require operator response to ensure proper startup and operation of the facility. Staffing/supervision will be needed for cleaning. Facility should not impact downstream facilities.	3	No operator attention required
2. Training	1	County does not currently operate a high rate clarification facility. New control approaches and training procedures will need to be developed.	1	Staff familiar with pump stations. Similar control approaches to other facilities within the system can be specified for consistency. However, County does not currently operate a high rate clarification facility. New control approaches and training procedures will need to be developed.	3	There are numerous stormwater conveyance and treatment facilities throughout the area.
3. Reliability	2	High rate clarification is a proven technology for treating peak flow events, however it is mechanically intensive which may impact the reliability. Power is critical for operation of telemetry & monitoring equipment.	2	A pump station is required to actively divert flows during a peak event. Power is critical for operation of telemetry & monitoring equipment. High rate clarification is a proven technology for treating peak flow events, however it is mechanically intensive which may impact the reliability.	3	System is not complex assuming no stormwater treatment. Gravity stormwater and treatment system. Peak flow reduction, when effectively implemented, is a proven technology for controlling peak flow events.
4. Maintenance	1	Alternative requires significant maintenance for high rate clarification facility. More complex telemetry/controls including flow meters, chemical metering systems, flocculation/sedimentation and disinfection facilities.	1	Alternative requires significant maintenance for pump station and high rate clarification facility. More complex telemetry/controls including pump station monitors, flow meters, chemical metering systems, flocculation/sedimentation and disinfection facilities.	3	Minimal maintenance compared to other alternatives assuming no stormwater treatment. Typical stormwater piping and treatment system maintenace.
5. Safety	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	Maintenance of storm sewers will require manhole access in streets.
COST EFFECTIVENESS						
1. Project Capital Costs	2	Relative Cost = 3.5		Relative Cost = 5.3	2/3	Relative Cost = 1.1 to 2.6
2. Life Cycle Costs						
3. Cost Variability/Risk	3	Variability Ratio = 1.04	3	Variability Ratio = 1.11	2	Variability Ratio = 2.98
Note: Project Capital Costs						
COMMUNITY IMPACT						
1. Location	1	Facility type is inconsistent with community's vision of itself. Siting will affect adjacent properties during construction and require acquisition of private property. Construction staging may require acquisition of additional single family residential property. Facility will be visible from numerous properties uphill of the site . Design will have to address noise, light, and odor concerns.	1	**Bottom of the basin:** Siting will require acquisition of private property. Facility will be visible from numerous properties uphill of the site . Design will need to address concerns about light, noise, or odor control that may exceed county design standards. **North Beach Elementary Site:** Proposed location is adjacent to a school playground and proximal to residences and may be viewed as inconsistent with community's vision of itself.	3	Will affect numerous homes throughout the basin to have a significant reduction in CSO flows but impact will be minimal and not visible, noisy or have lighting issues after construction. If stormwater treatment facilities are required, the rating of this alternative may change to a "1" to account for siting new above ground facilities that are inconsistent with the community's vision of itself.
2. Potential Community Impacts	1	O&M work efforts will be more involved than storage or pumping otions, including staff during a peak flow event and additional routine maintenance. Treatment option will also require chemical delivery and storage. Treatment facilities will require security fencing and significant screening efforts. Some O&M activites may require close coordination between O&M and the community.	1	O&M work efforts will be more involved than storage or pumping otions, including staff during a peak flow event and additional routine maintenance. Treatment option will also require chemical delivery and storage in a location adjacent to residences and a school. Treatment facilities will require security fencing and significant screening efforts. Some O&M activites may require close coordination between O&M and the community.	2	Design will need to address concerns about increased surface water in the area. If stormwater conveyance systems and treatment are required, the additional infrastructure required would change this rating to a "1".
3. Construction Impacts	1	Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Work hour and noise restrictions may impact the construction duration. During construction, there will be no park access. Additional property will be required for staging.	1	Construction will create noise, dust and construction traffic impacts on local traffic and neighboring residences. Work hour and noise restrictions may impact the construction duration. Access and use of Blue Ridge Park may be limited during construction. Special safety procedures may be required due to construction adjacent to school.	2	Construction may be carried out on private property and in streets; however, duration in any area is expected to be limited. If stormwater conveyance systems and treatment are required, construction impacts may change in rating to a "1".