

Barton, Murray, Magnolia and North Beach CSO Projects
 Alternatives Analysis
 FINAL CRITERIA
 May 2010

Category	Sample Criteria	Sample Questions	Scale		
			Low Impact (rating of 3)	Moderate Impact (rating of 2)	High Impact (rating of 1)
LAND USE AND PERMITTING					
[REV 11/23/09]	1. City of Seattle Comprehensive Plan	1. Will location of new facilities be consistent with Seattle's short and long-term planning policies?	Yes	Partly consistent	Potentially inconsistent with policies
[REV 11/23/09]	2. Seattle Municipal Code	1. Is the location and type of construction consistent with Seattle's Municipal Code (SMC) and the Growth Management Act (GMA) requirements?	Yes	Partly consistent	Inconsistent; requires change to code or major exception to existing regulations
[REV 11/23/09]	3. Shoreline Master Program	1. Will location of facilities be consistent with the City of Seattle Shoreline Master Program?	Not located in shoreline zone	Located in shoreline zone, generally consistent with SMP	Located in shoreline zone, potentially inconsistent with SMP
[REV03/08/10]	4. Permitting Complexity	1. Will discretionary permits be required?	SEPA and local permits (no conditional use or variances required)	SEPA and local permits (conditional use and/or variance required)	COE Individual Section 10 or 404 permit required with Public Notice or NWP 404 and Section 10 Review required; HPA Permit; Shoreline permit and ECA reviews required
[REV03/08/10]		2. Will multiple departmental reviews from City of Seattle be required?	1 departmental review only	2 departmental reviews required	3 or more departmental reviews required
[REV04/05/10] NEW QUESTION		3. Are above-ground structures at the site (e.g. odor control/electrical) consistent with City of Seattle height restrictions?	Yes	Consistent with Conditions (CCU required)	No - prohibited
[REV 11/23/09]		4. Will the site location require marine access or in-water work? If so, will multiple work closures be imposed due to the presence of important fish/wildlife habitat?	No marine access required. No known fish or wildlife impact likely.	Marine access may be required. Fish and wildlife impacts low to moderate may occur.	Marine access believed required for project. Fish and wildlife impacts higher and more certain.
[REV 11/16/09]	5. Property Acquisition Complexity	5. Will traffic and noise impacts be potentially significant due project location?	Roadways not affected, or affected roadways are low volume and provide access to few residents for a short duration project.	Affected roadways will require careful attention to traffic control and maintaining access to properties during a moderate duration project	Major traffic and access issues raised by the alternative during a long duration project.
		1. Ability to acquire property rights within project timeline. <i>(Can we get it?)</i>	King County has ownership, or Existing use of ROW	Voluntary seller has been/will be identified, or Acquisition	Ability to acquire property rights unknown Property ownership requires work with other agencies Acquisition difficulty evaluated case-by-case basis by KC
		2. Potential acquisition variables that impact cost <i>(How will it costs impact probability of success?)</i>	Owner accepts appraised value, or King County offers listed price	Owner requests additional compensation that is supported	Significant costs of acquisition probable
		3. Impacts on stakeholders & current use <i>(Who is impacted? = level of impact)</i>	No conflict w/ current use	Owner(s) /tenant(s) require relocation	Agency, neighbors or other stakeholders may have strong opposition
ENVIRONMENT					
[REV 11/23/09]	1. Cultural Resources	1. Will construction of the alternative impact archaeological resources?	The project site area does not contain any known archaeological sites. And, based on site characteristics, there is low potential for archaeological resources to be present in the project site area.	The project site area does not contain any known archaeological sites. However, based on site characteristics, there is potential for archaeological resources to be present in the project site area.	The project site area contains or is adjacent to a known archaeological site(s).
[REV 11/23/09]		2. Will construction of the alternative impact historic resources?	Historic properties not located in or near the project site area.	Historic properties are located in or near the project site area, but construction of the alternative is not likely to impact those properties.	Historic properties are located in or near the project site area and construction of the alternative will likely impact those properties.
[REV 11/23/09]	2. Fish and Wildlife	1. Will construction or operation of the alternative adversely affect fish and wildlife or their habitat?	Construction and operation of the alternative will not adversely affect, or will beneficially affect, fish and wildlife and/or their habitat.	Construction and/or operation of the alternative may adversely affect fish and wildlife or their habitat.	Construction and/or operation of the alternative is likely to adversely affect fish and wildlife and/or their habitat.
[REV 11/23/09] [REV 12/3/09]	3. Wetlands, Streams, and Shoreline	1. Will construction of the alternative impact wetlands, streams, or shoreline areas?	It is unlikely that the alternative will impact wetlands, streams, their buffers, or shoreline areas.	It is likely that the alternative will directly impact wetland and/or stream buffer, and/or piped streams, but not wetlands, non-pipe streams, or shoreline areas.	It is likely that the alternative will directly impact wetlands, non-piped streams, and/or shoreline areas.
[REV 11/23/09] [REV 12/3/09]	4. Soils and Sediments	1. Will construction of the alternative disturb contaminated soils or sediments?	The project site area is not known to contain contaminated soils. And, based on site characteristics, there is low potential for contaminated soils to be present in the project site area.	The project site area is not known to contain contaminated soils. However, based on site characteristics, there is potential for contaminated soils to be present in the project site area.	The project site area is known to contain contaminated soils. New discharges of untreated stormwater could impact sediment quality.
		2. Will construction of the alternative require disruption of steep slopes or increase the likelihood of landslides?	It is unlikely that the alternative will disrupt steep slopes or increase the potential for landslides.	It is likely that the alternative will temporarily impact steep slopes and/or temporarily increase the potential for landslides.	It is likely that the alternative will result in long-term disruptions to steep slopes and/or result in long-term increase in the potential for landslides.
[REV 11/23/09]	5. Water Quality	1. Will operation of the alternative result in the discharge of a new source of untreated stormwater to a surface waterbody?	Operation of the alternative will not result in the discharge of a new source of untreated stormwater to a surface waterbody.	N/A	Operation of the alternative will result in the discharge of a new source of untreated stormwater to a surface waterbody.

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TECHNICAL	1. Technical Complexity				
		1. Does Implementation require complex flow measurement, algorithms, or PLC programming and infrastructure to direct flow to the alternative storage or treatment facility? Will the technology reliably meet CSO control objectives using the required controls? (Note: Re-worded to clarify.)	Routing of flows is simple, with overflow weirs, automatic gates, or similar controls. Alternative is located adjacent to or part of the infrastructure. Flow measurement is simple and controls require only simple 'on/off' controls.	Implementation requires remote measurement of flows, measurement of flows in downstream infrastructure to coordinate and control routing of flows to the alternative storage or treatment facility. Location of the alternative is remote from the measurement point. Modifications to infrastructure include simple structures and limited pipelines.	There are more than two locations included in flow control. The alternative includes modifications to existing infrastructure and complex controls to route flow including complex measurement of upstream and downstream flows. Pump stations may be required to route flows to the alternative storage or treatment facility. New pipelines of significant length may be needed to implement.
		2. How many individual sites are included in the alternative and what is the consistency of technical and construction approach across the sites?	There is one site included in the alternative. All controls and infrastructure are located within the site or on adjacent existing rights of way or county-owned property.	There are two non adjacent sites included in the alternative. There may be differing construction methodologies, e.g. a pump station combined with a storage tank. Flow routing and diversion structures may be located adjacent to the sites on rights of way or county-owned property.	There are multiple non-adjacent sites included in the alternative. There may be two or more differing construction technologies involved, e.g. pump stations, storage tanks, and pipelines that are not contiguous.
	2. Compatibility with Existing WW system				
[REV 3/01/10]		1. Do the standards of other agencies affect the design and operation of the facility?	King county design standards are the only applicable standards. Construction and operation is entirely within county infrastructure.	Structures required for flow routing may be located in City of Seattle right of way, and be subject to City sewer operational standards. No City access permissions are needed for access. (WTD would not accept City operational standards for operations. Some engineering elements for design may need to meet City design standards.)	Major structures may be located within City of Seattle right of way, e.g. pipeline storage adjacent to collector sewers, where City standards control design and operation. Access permissions and coordination are needed for normal O&M activities. (Can't see where any City issues would affect operational designs. Structures would need to meet City
[REV 3/01/10]		2. Is the alternative stand alone or does its implementation affect other parts of the WW system including the West Point Treatment Plant?	The alternative is stand alone, and does not affect downstream or upstream county facilities. Peak flows at the WPTP are not affected.	The alternative may require modifications to the county's infrastructure upstream and downstream for implementation, e.g. modification of pump stations, pipelines, or operational methods for existing infrastructure. Peak flows at the WPTP may be affected. (Should delete affecting peak flows at WPTP as a criteria. This is a no go criteria.)	The alternative requires modification of both City of Seattle and county infrastructure and operational methods for both, e.g. flow patterns may be changed in City sewers, changes in capacity of wet weather treatment plants may occur. (Should delete affecting peak flows at WP as a criteria. This is a no go criteria.)
	3. Flexibility/Adaptive Management				
		1. Can the alternative meet changing control criteria?	Yes, with minimal modification of controls.	Yes, with moderate modification of controls.	Yes, but significant modification of complex controls likely.
[REV 3/01/10]		2. Can the alternative be easily modified to meet future flow conditions?	Infrastructure can readily be modified in the future.	Infrastructure can be modified in the future with significant effort.	Infrastructure can not be modified in the future.
[REV 3/01/10]	4. Constructability/Implementation Schedule				
		1. Are construction risks associated with groundwater, steep slopes, or soil materials significant?	Alternatives are on stable, low-slope sites, with groundwater elevations not affected during construction or operation.	Sites may have low to moderate slopes, require some dewatering, and robust foundations including piles or tiebacks.	Sites have steep slopes with groundwater and soils conditions that increase instability if disturbed. Erosion potential may be high. Special construction and permanent measures are needed to stabilize the site such as caissons, slurry walls, tiebacks, permanent dewatering.
[REV 3/01/10]		2. Are construction risks associated with access, staging, availability of specialty contractors, availability of power, etc. significant? (All construction requires some type of staging. Here we are rating alternatives based on the ease of close staging? This is a usual contractor secured item AND is a short duration item. Staging areas should not impact permanent decisions.	Site is not constrained. Adequate area for access and staging and operation of special equipment can be accommodated. There is adequate room on site for contractor staging and operations.	Site may be constrained, but access and staging are not required for adequate construction sequencing. Contractor may have to provide offsite staging and operations.	Site is constrained, requiring careful construction sequencing, with several move-in, move-out stages to accommodate specialty contractors as well as conventional construction. Contractor must provide offsite staging and operations.
		3. Can the alternative meet the project schedule?			
O&M	1. Staffing				
[REV 03/01/10]		1. Can the facility be easily (automatically) started up? Can the facility operate autonomously under the design conditions?	The facility can be automatically started. The facility can operate autonomously under the design conditions.	The facility can be automatically started. The facility may require operator attention during design conditions (e.g. monitoring, sampling, chemical control, etc.).	The facility will likely require operator attention during startup or operations. The facility will likely require operator attention during design conditions (e.g. monitoring, sampling, chemical control, etc.).
[REV 03/01/10]		2. What level of staffing is required for operation and shutdown (how often is the facility used, how long is the facility in use, how many operators are required, what level of operator experience is required, what are travel times)? What are peak staff requirements?	The facility can be remotely operated. Peak staff times require no operator be present during operation or startup. The facility can be shut down via automated processes. Cleanup work is automated.	The facility can generally be remotely operated. An operator may need to be present periodically for sampling, chemical make-up, chemical delivery acceptance or other discrete tasks. Peak staff times require 1-2 operators. The facility can be shut down with minimal staff time. Cleanup work is generally just monitored however, 1-2 personnel may very infrequently be required. Some procedures of shutdown may need to be conducted immediately, however, most work can be automated or scheduled to be integrated with other staff duties.	The facility requires operator attention during the event. Peak staff times require 2 or more operators. The facility requires significant effort for shut down (e.g. vac/boom truck, several days for cleanup). Cleanup work is generally manual with 2 or more personnel required for more than one day. Most procedures of shutdown need to be conducted immediately.
[REV 03/01/10]		3. Does the alternative impact downstream treatment facility processes?	No impact on downstream secondary processes. No impact on secondary treatment bypass frequency.	Impact on downstream secondary processes minimal but no effect on permit compliance. Increase on secondary treatment bypass frequency but within permit limits.	Impact on downstream secondary processes that may affect permit compliance or require construction of additional facilities. Increase on secondary treatment bypass frequency.
[REV 03/01/10]		4. Does the alternative require hi labor annual type cleaning requirements or does the design allow for passive post event cleanup systems?	The facility by design does not require post event cleanup activities.	the facility by design requires post event cleanup activities. Previous designs of this type have successfully designed automated cleanup systems that reduce staffing requirements to a single individual.	The facility by design will require annual or schedule large effort confined space entries by multiple staff. These type of activities will require large number of mobile resources and require large amounts of area to stage in.

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	2. Training				
[REV 03/01/10]		1. What level and frequency of training is required? Is the existing staff familiar with the technology? Is similar equipment in use in the West Section?	Minimal routine annual training is required. Staff is familiar with the technology and similar processes are used at other WTD facilities.	Minimal routine annual training is required. Staff does not routinely operate similar processes or the processes are distinctly different than those used at other CSO projects.	Significant routine annual training is required. Staff does not routinely operate similar processes and the processes are distinctly different than those used at other CSO projects.
		2. Are similar control approaches specified with identical components? Can the facilities be used to simulate an event for testing and training?	Similar control approaches are specified with identical components at each facility. Control procedures are similar to existing West Section facilities. The facilities can be used to simulate an event during testing and training.	Somewhat similar control approaches are specified at each facility, however there may be differences due to different equipment requirements. Control procedures are not similar to existing West Section facilities. The facilities can be used to simulate an event during testing and training.	Different control approaches are specified at each facility. Control procedures are not similar to existing West Section facilities. The facilities can not be used to simulate an event during testing and training.
	3. Reliability				
[REV 03/01/10]		1. How complex is the system (number and type of components)? How complex are the startup procedures and controls? Are redundant control systems provided? Is dedicated backup power available?	The alternative has a single control facility with one or two inlet/outlet structures.. Startup procedures are passive or automated remotely with redundant control systems and backup power.	The alternative has several components in that control is not achieved at a single structure with one or two inlet/outlet structures.. Startup procedures are automated locally with redundant control systems and backup power.	The alternative has numerous components (>4 pump stations, storage facilities, treatment processes, etc.). Startup procedures are generally automated locally but may require operator testing/monitoring with redundant control systems and backup power.
		2. Proven technology? Are the control systems routinely used for similar facilities and similar applications?	The alternative employs standard processes commonly used in the West Section and within the industry. Control requirements are minimal and routinely used for similar facilities.	The alternative employs standard processes commonly used within the industry. Control requirements may be significant but are routinely used for similar facilities.	The alternative employs processes not commonly used within the industry. Control requirements may be significant and unique.
	4. Maintenance				
[REV 03/01/10]		1. What is the level of normal maintenance? How many mechanical/instrumentation components are required?	The facilities only requires annual preventive maintenance. The processes have minimal mechanical/instrumentation components	The facilities require monthly maintenance such as bumping pumps. The processes have an increasing level of mechanical/instrumentation components.	The facilities require monthly maintenance such as bumping pumps. The processes have an increasing level of mechanical/instrumentation components.
[REV 03/01/10]		2. Are facility components accessible? Is there access and staging for chemical, vactor and boom trucks? Are traffic control procedures required for routine maintenance?	The facilities are accessible.	The facilities are accessible for routine O&M. Special procedures or traffic control may be required for irregular maintenance.	The facilities have restricted access for routine O&M. Special procedures or traffic control may be required for irregular maintenance.
[REV 03/01/10]		3. Do the facilities require interaction with other agencies?	Coordination with other agencies (Seattle Parks, etc.) is not required for operation and maintenance.	Coordination with other agencies (Seattle Parks, etc.) is not required for operation. Coordination is required for routine maintenance.	Coordination with other agencies is required for operation and maintenance. Coordination not required for operations however maintenance coordination is extensive requiring multiple days notice before significant entry.
	5. Safety				
		1. Does the facility have access requirements in the right of way or require confined space entry? Are traffic control procedures required? Does access require street use permit or lane closure?	The facility does not have right of way access requirements or require confined space entry. No traffic control procedures are required during operations and maintenance.	The facility has right of way access requirements or confined space entry during for non-routine operation and/or maintenance procedures. Traffic control procedures are required during non-routine operations and maintenance procedures.	The facility has right of way access requirements or confined space entry during for routine operation and/or maintenance procedures. Traffic control procedures are required during routine operations and maintenance procedures.
COST EFFECTIVENESS					
[REV 12/08/09]	1. Relative Project Costs				
		1. Are the Project Costs relatively close to one another (i.e. project cost is not a differentiating factor in selecting an alternative), or is there a high degree of variability in Project Cost between the alternatives?	Alternative has the lowest Project Cost, or the Project Cost is tightly grouped near the lowest cost alternative relative to the expected accuracy of the estimate.	Alternative has a Project Cost that is significantly higher than the low cost alternative, and significantly lower than the high cost alternative, relative to the expected accuracy of the estimate.	Alternative has the highest Project Cost and/or is significantly higher than the next lowest cost alternative, relative to the expected accuracy of the estimate.
[REV 12/08/09]	2. Relative Life-Cycle Costs				
		1. Are the Life-Cycle Costs relatively close to one another (i.e. life-cycle cost is not a differentiating factor in selecting an alternative), or is there a high degree of variability in Life-Cycle Cost between the alternatives?	Alternative has the lowest Life-Cycle Cost, or the Life-Cycle Cost is tightly grouped near the lowest cost alternative relative to the expected accuracy of the estimate.	Alternative has a Life-Cycle Cost that is significantly higher than the low cost alternative, and significantly lower than the high cost alternative, relative to the expected accuracy of the estimate.	Alternative has the highest Life-Cycle Cost and/or is significantly higher than the next lowest cost alternative, relative to the expected accuracy of the estimate.

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[REV 12/08/09]	3. Relative Variability/Risk	1. At this level Project Costs are represented as having a range (low to high). Is there a high degree of variability in the estimated range of Project Cost for a particular alternative? (i.e. are their risk factors that could cause the cost of an alternative to increase significantly?)	There is a minimal spread in the Project Cost range (i.e. the difference between the high end and the low end of the Project Cost range is small relative to the expected accuracy of the estimate). There is low risk of the Project Cost growing significantly as the project develops.	There is a minimal spread in the Project Cost range (i.e. the difference between the high end and the low end of the Project Cost range is moderate relative to the expected accuracy of the estimate). There is moderate risk of the Project Cost growing significantly as the project develops.	There is a large spread in the Project Cost range (i.e. the difference between the high end and the low end of the Project Cost range is high relative to the expected accuracy of the estimate). There is a high risk of the Project Cost growing significantly as the project develops.
COMMUNITY IMPACT					
[REV 11/20/09]	1. Location	1. Does facility change or impede surrounding land and marine uses?	Facility does not change or impede surrounding land and marine use.	Facility design must be considered to limit changes or impediments to surrounding land and marine use.	Facility changes or impedes surrounding land and marine use, and changes can't be addressed during design.
[REV 11/20/09]	2.Potential Community Impacts	1. Can design make the facility compatible with community vision of itself at this stage, before specific conversations with potentially affected parties can occur?	Facility is consistent with or does not affect community's vision of itself.	Facility and grounds can be designed to remain consistent with community's vision of itself.	Facility type/size is distinct from character, use, community's vision of area and distinction can't be addressed through design.
		2. What are the impacts of O&M activities on the surrounding community?	Minimal staff will be present infrequently (intermittent or only during/after storms) and maintenance is carried out within facilities.	Routine maintenance will be needed by staff, and staff may be onsite round the clock to check facilities during large storms. Some special equipment may be necessary to maintain the facility, but noise/light/work hours, and/or traffic disruptions are minor.	Routine maintenance will be needed by staff, and multiple staff will be present around the clock during large storms, for special parking, traffic disruptions and/or access limitations to homes and businesses during maintenance operations.
[REV 11/20/09]	3. Construction Impacts	1. What is the construction schedule/duration?	Short term project in residential area, long term project in business/industrial area, or longer term project on alignment.	Project extends over 1 year on a site near residences of any kind, or over two years on an alignment.	Project extends several years, or follows another substantial construction project in one area.
		2. Will construction be carried out in public access areas, including parks, beaches and roadways?	Project located on site with no public access, or public access can be maintained during construction, and project is short duration or constructed outside main user season.	Project located in public access area; access may be reduced, but some access can be maintained during construction. Duration may be longer.	Project lasts year or more, located in heavy use roadway, park or beach area, with serious and unavoidable area closures, resulting in significant use impact.
		3. What are anticipated construction impacts to near neighbors? What are	Neighbors and businesses will experience limited impacts from	Construction will be located near residences and businesses, but impacts	Construction will be located adjacent to residences and businesses, and it
		4. How will truck traffic affect area?	Limited amount of hauling required for materials/equipment; roadways sufficient to support traffic (arterials).	Project requires moderate level of hauling that may occur on residential streets but can be scheduled and routed to avoid conflicts with neighborhood traffic, transportation, and services.	Project requires high volume, long term truck traffic on constricted roadways that cannot be carried out on a restricted schedule or route.
		5. What is construction area requirement?	Construction can be carried out on facility site, with limited offsite area required.	Construction can be carried out on facility site, but additional offsite areas will be required for equipment/materials storage or other activities.	Additional property or extensive easements must be obtained for the alternative to be constructed. Multiple offsite areas will be required for equipment/materials storage with ongoing transport of materials to primary construction site.
		2. Will construction be carried out in public access areas, including parks, beaches and roadways?	Project located in area with no public access, few neighbors, little commuter traffic.	Project located in public access area; however, area is closed only during winter (note high flow months).	Project located in heavy use roadway, park or beach area, resulting in area closure or significant use impact, with duration an entire dry weather season or longer.
		3. What are anticipated construction impacts to near neighbors? What are the traffic disruptions?	Construction will be located distant to residences and businesses. Haul routes.	Construction will be located near residences and businesses, but impacts will be minimal, or can be mitigated.	Construction will be located near residences and businesses, and it will be difficult or impossible to mitigate impacts such as noise, after hours work, light, vibration, and access.