Barton, Murray, Magnolia and North Beach CSO Projects
Alternatives Analysis
DRAFT CRITERIA

| 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** | | | | | |
| | Land Use Compatibility at Site and adjacent And in the vicinity Of site | Is proposed site compatible with Zoning? | Use is permitted outright | Conditional Use | Prohibited |
| | Consistency with City of Seattle Planning Policies (Comp Plan) | Will location of new storage facility be consistent with Seattle's short and long-term planning policies? | Yes | | No |
| | Consistent with Municipal Code and Shoreline Management Program | Is the location and type of construction consistent with Seattle's Environmental Critical Areas (ECA) and Shoreline Management Program (SMP) requirements? | Yes | Minor alterations to Code requiring little or no mitigation | Major alterations to Code requiring extensive review and major compensatory mitigation |
| | Permitting Complexity | How many permits will be Required? Will COE permit be required – if so, will Section 106 and Section 7 be triggered? | 1-3 0 | 4-6 COE NWP, with no Section 106 or Section 7 review required | 7-10 COE permit required with Section 106 and 7 review required. |
| | Number of Discretionary (this can be incorporated into Permitting Complexity) Permits or Reviews Required | How many and what types of permits will be required that will be "appealable" | 1 (SEPA only) | 2 (Shoreline Permit required & SEPA review) | 3 -4 (COE Individual 404 and Section 10 Permit Review) required with Public Notice, HPA Permit,. Shoreline and ECA reviews required |
| | Prohibited or Restricted Work Windows by Regulatory Agencies (this can be incorporated into Permitting Complexity) | Will WDFW, COE permit be triggered requiring in-water work or access to worksite adjacent to Puget Sound? If so, could have multiple work closure periods due to fish and wildlife protection. Will work hours be restricted on permit due to noise and traffic disruption? | No work closure period No restriction outside of normal allowed work hours | 1 work closure period Work hour restriction imposed due to noise imposed on adjacent homeowners | 2-4 work closure periods Restrictions imposed for noise and traffic severely limiting daily allowable work hours. |
| | Space Constraints | 1) What is the SF of land needed for each type of treatment? 2) Do we choose the treatment type on the SF of land we have/ can acquire or vice versa? 3) Do we want the land to slope, be flat, etc? | KC has the land it needs | KC can buy useable land in the open market | We have to deal with Parks; We have to deal with adjacent private property owners |
| | Traffic Disruption During Construction | 1) Major issue is the vehicle back-up along Fauntleroy when ferry is running for Barton & Murray ; 2) Plus traffic from park users and boaters | SDOT & WSDOT & drivers are elated that we are doing this project | SDOT, WSDOT, and public are annoyed but they can compromise | SDOT user fees are notoriously high; WSDOT complains; public complains – protest to gov't officials |
| | Access to Property | Do we share an ingress/egress with another property? | Property owner is agreeable with ingress/egress | Property owner wants lots of money for ingress/egress | Property owner give us no rights to access property |
| | Number of Easements Required | Do we need any permanent easements or just temporary construction easements | Property owner gives easement for "at market" rates | Property owners puts up a fight, so KC WTD pays more money | Property refuses to give easement. KC WTD must condemn |
| | Recreational Impacts | Are we affecting public use of the property for dog walks, bicycling, hiking, etc? | Public thinks WTD project is great and will sacrifice years of construction for "greater good." | Public asks for accommodation for recreational use at alternative site | Public protests and wants to keep all recreational facilities open at all times. |
| **ENVIRONMENT** | | | | | |
| | **1. Cultural Resources** | | | | |
| | | Will construction of the alternative impact significant archaeological resources? | The project site does not contain any known archaeological sites. And, based on project site characteristics, there is low potential for archaeological resources to be present at the project site. | The project site does not contain any known archaeological sites. However, based on project site characteristics, there is potential for archaeological resources to be present at the project site. | The project site contains a known archaeological site(s). |
| | | Will construction of the alternative impact significant historic resources? | No historic properties are located on or near the project site. | Historic properties are located on or near the project site, but construction of the alternative is not likely to impact those properties. | Historic properties are located on or near the project site and construction of the alternative will likely impact those properties. |
| | **2. Threatened and Endangered Species** | | | | |
| | | Will construction of the alternative adversely affect threatened and endangered species? | Construction will not adversely affect, or will beneficially affect T&E species. | Construction may adversely affect T&E species. | Construction is likely to adversely affect T&E species. |
| | | Will operation of the alternative adversely affect threatened and endangered species? | Operation will not adversely affect, or will beneficially affect T&E species. | Operation may adversely affect T&E species. | Operation is likely to adversely affect T&E species. |
| | | Will operation of the alternative have indirect effects on T&E species? | ? | ? | ? |
| | **3. Environmentally Critical Areas** | | | | |
| | | Will the alternative impact wetlands and/or wetland buffers? | It is unlikely that the alternative will impact wetlands or wetland buffers. | It is likely that the alternative will directly impact wetland buffer, but not wetlands. | It is likely that the alternative will directly impact wetlands. |
| | | Will 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. |
| | **4. Contaminated Soils** | | | | |
| | | Will construction of the alternative disturb contaminated soils? | The project site is not known to contain contaminated soils. And, based on project site characteristics, there is low potential for contaminated soils to be present at the project | The project site is not known to contain contaminated soils. However, based on project site characteristics, there is potential for contaminated soils to be present at | The project site is known to contain contaminated soils. |
| | **5. Water Quality** | | | | |
| | | Relative to other alternatives, will loadings to Puget Sounds be low or high? | ? | ? | ? |
| **TECHNICAL** | | | | | |
| | **1. Technical Complexity** | | | | |
| | | 1. Does Implementation require complex controls and infrastructure to route flows properly? | The alternative requires a minimum level of modification to existing infrastructure to route flow. | | The alternative includes modifications to existing infrastructure and complex controls to route flow. |
| | | 2. How complex is the technology to operate? | The technology is simple to operate with little additional training and no complex controls. | | |
| | | 3. Will the technology reliably meet CSO control objectives from a technical and performance perspective? | The technology is likely to meet the control objective, based on one variable, volume of storage. | | The technology has many variables which will affect peformance. |

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| | **2. Compatibility with Existing WW system** | | | | |
| | | 1. Do the standards of other agencies affect the design and operation of the facility? | King county design standards are the only applicable standards. | | |
| | | 2. Is the alternative stand alone or does its implementation affect other parts of the WW system? | The alternative is stand alone, and does not affect downstream or upstream facilities. | | |
| | **3. Flexibility/Adaptive Management** | | | | |
| | | 1. Can the alternative be expanded or upgraded to meet changing control criteria, or if the alternative does not meet CSO control performance measures? | | | |
| | **4. Contructability** | | | | |
| | | 1. Are construction risks associated with groundwater, steep slopes, or soils materials significant? | | | |
| | | 2. Are construction risks associated with access, staging, availability of specialty contractors significant? | | | |
| | | 3. Are construction risks associated with construction sequencing, utilities interference, or other affects on existing infrastructure significant? | | | |
| | **5. Site Suitability** | | | | |
| | | 1. How many individual sites are included in the alternative and what is the consistency of technical and construction approach across the sites? | | | |
| | | 2. Will site use constraints during construction and/or long term use affect implementation of the alternative? | | | |
| **O&M** | | | | | |
| | **1. Staffing** | | | | |
| | | 1. Can the facility be remotely monitored and easily (automatically) started up? Can the facility operate autonomously under the design conditions? | The facility can be remotely monitored and automatically started. The facility can operate autonomously under the design conditions. | The facility can be remotely monitored and automatically started. The facility requires operator attention during design conditions (e.g. monitoring, sampling, chemical control, etc.). | The facility can be remotely monitored. The facility requires operator attention during startup. The facility requires operator attention during design conditions (e.g. monitoring, sampling, chemical control, etc.). |
| | | 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 < 1 operator. The facility can be shut down with minimal staff time. Cleanup work is automated or can be scheduled to be integrated with other staff duties. | 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 automated, however, 1-2 personnel may be required. Some procedures of shutdown may need to be conducted immediately, however, most work can be 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. |
| | | 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 but no affect 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 likely not within permit limits. |
| | **2. Training** | | | | |
| | | 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 CSO projects. | 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 exsting 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 exsting West Section facilities. The facilities can be used to simulate an event during testing and training. | Differnt control approaches are specified at each facility. Control procedures are not similar to exsting West Section facilities. The facilities can not be used to simulate an event during testing and training. |
| | **3. Reliability** | | | | |
| | | 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 minimal number of components (1-2 pump stations, storage facilities, treatment processes, etc.). Startup procedures are passive or automated remotely with redundant control systems and backup power. | The alternative has several components (3-4 pump stations, storage facilities, treatment processes, etc.). 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. Backup power is not available. |
| | | 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** | | | | |

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|---|---|---|---|---|---|
| | | | Low Impact (rating of 3) | Moderate Impact (rating of 2) | High Impact (rating of 1) |
| | | 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 (I.e. storage tank). | The facilities require monthly maintenance such as bumping pumps. The processes have an increasing level of mechanical/instrumentation components (I.e. pump station). | The facilities require monthly maintenance such as bumping pumps. The processes have an increasing level of mechanical/instrumentation components (I.e. treatment facility). |
| | | 2. Are facility components accessible? Is there access and staging for 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 mainteance. | The facilities have restricted access for routine O&M. Special procedures or traffic control may be required for irregular mainteance. |
| | | 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 (Seattle Parks, etc.) is required for operation and maintenance. |
| | **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 EFFECTIVNESS** | | | | | |
| | **1. Project Costs** | | | | |
| | | 1. Are the Project Costs predictable and quantifiable in terms of permitting and mitigation costs? | | | |
| | | 2. Does the alternative have higher risk than other alternatives in terms of potential change orders, failure to meet permits that could result in cost increases? | | | |
| | | 3. What is the relateive premium to provide flexibility and durability to meet future uncertainty? | | | |
| | **2. Operation Costs** | | | | |
| | | 1. Compared to other alternatives, are operational costs predictable and quantifiable, e.g. does operational complexity for uncertain weather conditions pose uncertainties in costs? | | | |
| | | 2. Compared to other alternatives, are operational costs for training, energy, staffing, and external agency costs greater, the same or lower? | | | |
| | | 3. Are additional, new staff positions required for operation? | | | |
| | **3. Maintenance Costs** | | | | |
| | | 1. Does the alternative require more or less maintenance resources than other alternatives? | | | |
| | | 2. Does the alternative require maintenance skills beyond the County's typical expertise compared to other alternatives? | | | |
| | | 3. Does maintenance cost increase with capacit? | | | |
| | **4. External Costs** | | | | |
| | | 1. How does the cost of land and land development compare with other alternatives? | | | |
| | | 2. Are there extra costs imposed by external agencies and/or stakeholders resulting from their design standards or durability requirements? | | | |
| | | 3. Are there extra costs for durability elements to insure successful operation and maintenance, e.g. what are extra costs to insure successful operation of elements under external control? | | | |
| | **5. Grant Opportunities** | | | | |
| | | 1. Does the alternative have attributes that make it more or less amenable to external grant funding? | | | |
| **COMPATIBILITY W/ OTHER PROGRAMS** | | | | | |
| | **KC CSO** | | | | |
| | | Reduces CSO volume to be managed | yes | no | |
| | | Alternative meets 1 overflow per year | yes | | no |
| | Overlaps with O&M | Alternative is reliable to operate | Copy from O&M | | |
| Only if treatment approach | Overlap w/Environmental | Alternative reduces TSS, BOD and Fecal Coli form in CSO discharge | Reduces | | Does not reduce |
| | | Maximizes flow to West Point | All flows are treated at West Point | Some flows treated at West Point | No CSO flows are treated at West Point |
| | | Maximizes use of collection system for storage | More storage in conveyance system | Less storage | No storage |
| | | Eliminates (or does not increase potential) of CSOs during dry weather | no dry weather overflows | | Dry weather overflows would occur |
| | | Controls solids and floatable materials in CSOs | No solids or floatables | | Solids or floatables would be present in discharge |
| | Overlap w/Environmental | Reduces contaminants in CSOs | yes | | no |
| | **KC SMP** | | | | |
| | Overlap w/Environmental | Does project improve sediments | yes | no | makes worse |

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| | **KC NPDES** | | | | |
| | | Alternative requires a commissioning period | no | | yes |
| | | Alternative changes NPDES permit requirements | Meets baseline reporting requirements | | Requires additional monitoring and/or reporting |
| | | Alternative meets NPDES Schedule | Able to meet schedule | Scheduled delay by <6 mos | Schedule delay >6 mos |
| | | Alternative benefits sensitive species/habitat | no species present/no impact | species present/no impact | impacts sensitive species & habitat |
| | | Alternative's reporting requirement | No additional reporting requirements | Additional reporting requirements | More reporting requirements and non-standard reporting procedures |
| | **KC Sustainability** | | | | |
| | | Triple bottom Line Score 3BL (based on all criteria combined) | Sustainable | Viable/Equitable/Bearable | Only meets one criterion (Environmental, Social, Economic) |
| | | Alternatives vulnerability to sea-level rise | Alternative would not be impacted by sea level rise | Moderate probability of impact to facility form sea level rise | High probability of facility being impacted by sea level rise |
| | | Alternatives Green House Gas Emissions | Decrease or mitigates GHG emissions | No increase in GHG emissions | Increases GHG emissions |
| | | Percentage of CSO control from green alternatives | >25% | 25%-15% | <15% |
| | | Alternative has impact on Shoreline Zone | no impact | some impact (within 200') | impact (within tidal zone) |
| Only if Treatment approach | **KC Reclaimed Water (optional)** | | | | |
| | | Is there an opportunity to provide reclaimed water from treatment facility (Skimming Plant)? | Yes | No | |
| Only if I&I approach | **KC I&I (optional)** | | | | |
| | | Reducing I&I is cost effective | Yes | No | |
| | **SPU CSO** | | | | |
| | | Alternative increases CSO volume to manage | no increase | increase | |
| | **SPU Drainage** | | | | |
| | | Alternative increases stormwater volume to manage | no increase | increase | |
| **COMMUNITY IMPACT** | **Location** | | | | |
| | | Is the site visible to surrounding neighbors/users? | Site is buffered or facility is underground. | Site has some above ground features, but is visible only to certain types of property owners (i.e. industry). | Site is visible, facility blocks views or is obvious in a residential area. |
| | | Will facility change traffic patterns, public access? | No. | Some facilities in public access - don't impede activies. | Facilities impede public access or limit public activities. |
| | | Is the facility located in an environmentally sensitive area? | No. | Yes, but neither construction nor operations pose an environmental risk and there are no anticipated environmental changes. | Yes, and both construction and operations will have to be managed to prevent environmental damage or impacts to wildlife. |
| | | Will siting the facility in this location change local zoning. | No. | Yes, but the changes in zoning will not affect property values or use in the area. | Yes, and the changes in zoning may affect neighboring properties or the broader community. |
| | | Is there adequate existing nearby infrastructure to support use? | Yes. | Utility services may need to be altered or upgraded to serve facility. Road/parking access may need to be constructed. | New utilities will have to be installed, or major upgrade to existing utilities needs to occur, with impacts to private property. Road/parking will be acquired/constructed. |
| | **Long Term Risk, New Facilities** | | | | |
| | | Will the project change surface or subterranean hydrology? | No, stormwater and groundwater levels/flows will not change. | Some changes in surface/groundwater can be expected, but they will not impact structures under any condition. | Some changes in surface/groundwater can be expected, and they may affect structures under exceptional circumstances. |
| | | How much maintenance/inspection/operations will facility require? | Minimal staff will be present infrequently (intermittent or only during/after storms). | Routine maintenance will be needed by staff, and staff will be onsite to check facilities during large storms. | Routine maintenance will be needed by staff, and multiple staff will be present around the clock during large storms, for special parking and access during maintenance operations. |
| | | Will the new facility impact flows outside of basin? | New facility contains basin flows within basin (for neighboring areas). For basin residents, low impact may be conveying problem out of basin. | | New facility transfers problem outside of basin to other facilities (for community in newly affected basins). Basin community may not care that the problem is transferred. Also high impact if failure may occur in one basin and extend downstream to cause problems elsewhere. |
| | | Will the new facility have risks associated with operations? | New facility is always reliable, easy to operate and failures do not put public health, access, or private or public property at risk. | New facility may have some technical complexities, but are not difficult to operate and don't require hazardous chemicals or large amounts of fuel on site. Severe conditions may exceed design capacity but consequences are minimal. | New facility requires hazardous chemicals or flammable materials to be delivered and stored on site. Facility may fail under some conditions, and failure may result in surface flooding, backups, or overflows. |
| | **Construction Impacts** | | | | |
| | | What is the construction schedule/duration? | Short term project that can be conducted during off season. | Short term project conducted during dry weather (low flow) season, or longer term project that moves along an alignment. | Project extends 1 year or more in a single location, or 2 years or more on an alignment, and extends over summer season. Or project follows on the heels of another public works project. Delays in construction schedule. |
| | | 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. |
| | | What are anticipated construction impacts to near neighbors? | 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. |