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Meeting Notes
Barton, Murray, Magnolia, North Beach CSO Facilities Project
E00022E06
King County Department of Natural Resources and Parks
Wastewater Treatment Division

Date of Meeting:	October 21, 2009	**Date of Notes:**	November 3, 2009	**Work Order No:**	7562A.10
Time:	1:00 pm				
Location:	King Street Center 7045 North Wind				

Purpose:
1. Overview of organization of October meetings.
2. Review/status update of Non-Technical information needs development.
3. Review/status update of action items from last round of meetings.
4. Presentation and discussion of Storage Alternatives CSO control approach.
5. Review of Storage Alternatives application in each of four basins.
6. Overview of Technical Information needs for Storage Alternatives.

Meeting # 100-55 - Technical Review Meeting #1 - Storage Schematics

Attendees:

County		Consultants
Shahrzad Namini	Sekhar Palepu	Brian Matson
Chris Okuda	Kevin Schock	Jeff Lykken
Ron Kohler	Bob Swarner	Kevin Dour
John Phillips	Monica Van Der Vieren	Karl Hadler
Sue Meyer	Kathy Mathena	
Jim Weber	Karl Zimmer	SPU
		Sahba Mohandessi

Distribution: Attendees, Betsy Cooper, John Cameron, Karen Huber, Mary Wohleb, Lee Miller, Hien Dung, Meredith Redmon, Kevin Sandquist, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Pam Erstad, Allen de Steiguer, Jennifer Corrigan, Lloyd Skinner, Bob Wheeler, Ellen Blair

PRELIMINARY DRAFT

ACTION ITEMS

Item #	Action	Action By	Due By
1	Schedule a separate meeting for briefing and to receive input from O&M staff. Provide handout materials electronically.	Ron Kohler	11/3/09
2	Check Orange Book requirements for odor control, backup power, redundancy requirements to make sure the schematic designs comply with the Ecology standards.	Jim Weber	11/10/09

3	Check space requirements of vertical versus horizontal activated carbon vessel. Use worst case footprint for planning.	Kevin Dour	11/10/09
4	Check air change requirements and use conservative value to develop the site footprint.	Jim Weber	11/10/09
5	Provide SDOT right of way use fee structure to team.	Hien Dung	11/10/09
6	Provide information on SPU use of odor control for CSO tanks.	Sabha Mohandessi	11/10/09
7	Determine need for H2S sampling.	John Phillips	11/10/09

PRELIMINARY DRAFT

DISCUSSION

1. There is a meeting scheduled to discuss storage volumes required. Different models are producing different storage requirements. We are proceeding with the alternatives analysis based on the volumes developed by the County several months ago.
2. Schedule a separate meeting for briefing and to receive input from O&M staff. Provide handout materials electronically.
3. Check Orange Book requirements for odor control, backup power, redundancy requirements to make sure the schematic designs comply with the Ecology standards.
4. Check space requirements of vertical versus horizontal activated carbon vessel. Use worst case footprint for planning.
5. Right of way access for routine maintenance not acceptable.
6. Weirs are preferable to gates to keep solids in the sewer system.
7. Inline storage tanks are preferable with a flow-through design.
8. Check air change requirements and use conservative value to develop the site footprint. Changes during design can have a significant impact on the site footprint. Spaces are Class 1/Div 1.
9. Standby power is more important if it is a point of failure during the peak flow event such as a diversion gate. Pumps to drain the storage facility are not as critical because failure would simply delay return to the sewer system after the peak event.
10. A 12 hour draining period should be assumed for planning purposes.
11. Assume corrosion resistant materials for hatches and other pieces of equipment due to a humid, corrosive environment.
12. No special coatings are required for concrete.
13. Sand buildup is a concern in the storage tanks. Consider if a grit box is required.
14. Include washdown amenities in schematic design for cells likely to get most of flow.
15. Need to add SDOT right of way use fees to alternatives costs for evaluation.
16. The MAT wants to look at a range of storage volumes for alternatives.
17. County safety team to review operational aspects of alternatives.
18. Slope tunnel storage back towards sewer to facilitate solids removal.

END OF NOTES
Technical Review Meeting #1 - Storage Schematics
10/21/09

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Meeting Agenda
Barton, Murray, Magnolia, North Beach CSO Facilities Project
E00022E06
King County Department of Natural Resources and Parks
Wastewater Treatment Division

Date of Meeting: October 22, 2009 **Work Order No.:** 7562A.10

Time: 1 - 4 pm

Location: KSC 7045 North Wind

Purpose: Technical Review Meeting #2 - Pump Station Schematic

Meeting # 100-56

Anticipated Attendees

County		Consultants
John Cameron	Shaun O'Neil	Ellen Blair
Betsy Cooper	Sekhar Palepu	Kevin Dour
Hien Dung	John Phillips	Karl Hadler
Pam Erstad	Meredith Redmon	Jeff Lykken
Sue Hildreth	Kevin Sandquist	Brian Matson
Karen Huber	Mike Sand	Allen de Steiguer
Ron Kohler	Kevin Schock	Lloyd Skinner
Kathy Mathena	Bob Swarner	Jennifer Corrigan
Sue Meyer	Martha Tuttle	
Lee Miller	Jim Weber	**SPU**
Shahrzad Namini	Mary Wohleb	Martha Burke
Chris Okuda	Monica Van Der Vieren	Sahba Mohandessi
Ukwenga Oleru	Karl Zimmer	

Meeting Purpose:
1. Overview of organization of October meetings.
2. Presentation and discussion of Pump Station approach for CSO control.
3. Review of Pump Station Alternatives application in each of four basins.
4. Review/status update of Non-Technical information needs development
5. Overview of Technical Information needs

Topic	Time	By
Introduction	TBD	S. Namini
Overview of October meetings for new attendees	10 min	B. Matson
Pump Station Alternatives CSO control details and application in each basin	60 min	A. de Steiguer K. Dour K. Hadler
Technical information needs introduction (time permitting)	30 min	K. Dour
Status update, questions, discussion, Non-Technical information	10 min	B. Matson

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Meeting Notes

Barton, Murray, Magnolia, North Beach CSO Facilities Project

E00022E06

King County Department of Natural Resources and Parks
Wastewater Treatment Division

Date of Meeting:	October 22, 2009	**Date of Notes:**	November 3, 2009	**Work Order No:**	7562A.10

Time: 1:00 pm

Location: King Street Center 7045 North Wind

Purpose:
1. Overview of organization of October meetings.
2. Presentation and discussion of Pump Station approach for CSO control.
3. Review of Pump Station Alternatives application in each of four basins.
4. Review/status update of Non-Technical information needs development
5. Overview of Technical Information needs.

Meeting # 100-56 - Technical Review Meeting #2 - Pump Station Schematic

Attendees:

County		Consultants
Shahrzad Namini	Sekhar Palepu	Allen de Steiguer
Chris Okuda	Kevin Schock	Kevin Dour
Ron Kohler	Bob Swarner	Karl Hadler
Lee Miller	Mary Wohleb	
Pam Erstad	Monica Van Der Vieren	
Sue Meyer		SPU
Jim Weber		Sahba Mohandessi

Distribution: Attendees, Betsy Cooper, John Cameron, Karen Huber, John Phillips, Hien Dung, Meredith Redmon, Kathy Mathena, Kevin Sandquist, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Karl Zimmer, Brian Matson, Jeff Lykken, Jennifer Corrigan, Lloyd Skinner, Bob Wheeler, Ellen Blair

PRELIMINARY DRAFT

ACTION ITEMS

Item #	Action	Action By	Due By
1	Provide a summary of pump station capacity and head requirements for each alternative.	Allen de Steiguer	11/3/09
2	Provide County Design Standards.	Shahrzad Namini	11/3/09
3	Review the pump station design guidelines. Hold a separate meeting to review any deviations that may be appropriate for a CSO pump station.	Allen de Steiguer/ Kevin Dour/ Karl Hadler	11/13/09

4	Consider retrofit of SPU pump station for the South Magnolia alternatives that impact PS 77.	Allen de Steiguer	11/17/09
5	Look at gravity flow all the way to Interbay Pump Station to eliminate storage needs.	Allen de Steiguer	11/17/09
6	Provide Seattle Design Review Board requirements.	Hien Dung	11/17/09

DISCUSSION

PRELIMINARY DRAFT

1. Pump Station Schematic:
   a. The cost of operation of a high head pump station will be significant. Provide a summary of capacity and head requirements for each alternative.
   b. The schematic does not cover pump stations downstream of storage to drain the storage basin.
   c. Submersible and VTSH pump stations are not typically employed in King County pump stations. Need to assess cost benefits of going with non-standard dry-pit pump station design.
   d. No access to the wet wells is assumed. Try to verify that 2 air changes per hour is acceptable.
   e. Prefer that generator fuel storage tanks are above ground for generators smaller than 500kW.
   f. Use one generator sized for peak flow in a separate room in lieu of multiple generators.
   g. Review the pump station design guidelines. Include standard requirements in schematic design and cost analysis. Hold a separate meeting to review any deviations that may be appropriate for a CSO pump station.
   h. Check City of Seattle requirements for height restrictions and view shed issues.
   i. Consider ancillary facilities in the site footprint such as access roads, restroom, HVAC, etc.
   j. Fencing and security to be provided for pump stations.
   k. Consider retrofit of SPU pump station for the South Magnolia alternatives that impact PS 77.
   l. Look at gravity flow all the way to Interbay Pump Station to eliminate storage needs.

2. Force Mains:
   a. The design maximum velocity in force mains is 10 feet per second.
   b. The most practical route is assumed for planning purposes. Non-technical issues may affect routing and final evaluation.

END OF NOTES
Technical Review Meeting #2 - Pump Station Schematic
10/22/09

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Meeting Agenda

Barton, Murray, Magnolia, North Beach CSO Facilities Project

E00022E06

King County Department of Natural Resources and Parks
Wastewater Treatment Division

Date of Meeting: October 28, 2009 **Work Order No.:** 7562A.10

Time: 1:00 - 3:00 pm

Location: 8th floor Conference Room

Purpose: Technical Review Meeting #3 - End of Pipe Treatment Schematic

Meeting # 100-57

Anticipated Attendees

County		Consultants
John Cameron	Shaun O'Neil	Ellen Blair
Betsy Cooper	Sekhar Palepu	Kevin Dour
Hien Dung	John Phillips	Karl Hadler
Pam Erstad	Meredith Redmon	Jeff Lykken
Sue Hildreth	Kevin Sandquist	Brian Matson
Karen Huber	Mike Sand	Allen de Steiguer
Ron Kohler	Kevin Schock	Lloyd Skinner
Kathy Mathena	Bob Swarner	Jennifer Corrigan
Sue Meyer	Martha Tuttle	
Lee Miller	Jim Weber	**SPU**
Shahrzad Namini	Mary Wohleb	Martha Burke
Chris Okuda	Monica Van Der Vieren	Sahba Mohandessi
Ukwenga Oleru	Karl Zimmer	

Meeting Purpose:

1. Presentation and discussion of End of Pipe Treatment approach for CSO control.
2. Review of End of Pipe Treatment Alternatives in each of four basins.
3. Overview of technical information needs

Topic	Time	By
Introduction	5 min	S. Namini
Non-Technical Information Needs Status and Questions	30 min	All
End of Pipe Treatment Details and Alternatives In Each Basin	60 min	A. de Steiguer K. Dour K. Hadler
Technical Information Needs Introduction (time permitting)	30 min	K. Dour

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Meeting Notes

Barton, Murray, Magnolia, North Beach CSO Facilities Project

E00022E06

King County Department of Natural Resources and Parks
Wastewater Treatment Division

Date of Meeting:	October ~~22~~28, 2009	**Date of Notes:**	November 9, 2009	**Work Order No:**	7562A.10

Time: 1:00 pm

Location: King Street Center 8th Floor Conference Room

Purpose:
1. Presentation and discussion of End of Pipe Treatment approach for CSO control.
2. Review of End of Pipe Treatment Alternatives application in each of four basins.
3. Review/status update of Non-Technical information needs development.
4. Overview of Technical Information needs.

Meeting # 100-57 - Technical Review Meeting #3 - End of Pipe Treatment Schematic

Attendees:

County		Consultants
Chris Okuda	Sekhar Palepu	Brian Matson
Ron Kohler	John Phillips	Jeff Lykken
Karl Zimmer	Bob Swarner	Karl Hadler
Pam Erstad	Jim Weber	Lloyd Skinner
	Mary Wohleb	

SPU
None

Distribution: Attendees, Shahrzad Namini, Betsy Cooper, John Cameron, Karen Huber, Hien Dung, Lee Miller, Meredith Redmon, Kathy Mathena, Kevin Sandquist, Sue Meyer, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Kevin Schock, Monica Van Der Vieren, Allen de Steiguer, Kevin Dour, Jennifer Corrigan, Bob Wheeler, Ellen Blair, Sahba Mohandessi

PRELIMINARY DRAFT

ACTION ITEMS

Item #	Action	Action By	Due By
1	Look at space requirements for sodium hypochlorite and dechlorination.	Karl Hadler	12/1/09
2	Include access for chemical truck and boom trucks in facility layout and costs.	Allen de Steiguer/ Kevin Dour/ Karl Hadler	12/1/09
3	Include an HVAC room.	Karl Hadler	11/3/09

DISCUSSION

1. Overview of Non-Technical Issues:
   a. The Broadview Community may weigh in on the North Beach alternatives because they are interested in the impacts on Carkeek facilities.
   b. Need to start planning coordination effort with the City of Seattle Department of Planning and Development.
   c. The team is working on a definition and requirements for above grade and below grade facilities based on City of Seattle code.
   d. South Magnolia alternatives should look at discharge downstream of the Interbay Pump Station.
   e. The November 3 meeting with O&M staff will look at approaches and criteria information needs for storage, pump stations and end of pipe treatment.

2. End of Pipe Treatment Schematic:
   a. Fecal coliform limits mandate disinfection.
   b. The type of disinfection process has not been confirmed yet. UV has been assumed for comparison purposes and is a common technology for CSO facilities. A detailed comparison of UV versus sodium hypochlorite will likely need to be conducted if end of pipe treatment makes it to the next round of alternatives.
   c. Look at space requirements for sodium hypochlorite and dechlorination. The space requirements are expected to be large and may preclude certain sites.
   d. Sludge and screening are assumed to be recycled to the sewer. Consider the impact on sewers and conveyance facilities.
   e. Bremerton CSO Treatment Facility has met discharge requirements for a number of years. Salem has on been in operation for about a year. These facilities may be visited if end of pipe treatment makes it to the next round of alternatives.
   f. Need to determine if a pump station is required or flow through treatment facility is by gravity. This is basin specific and the costs of a pump station, if applicable, need to be included in the alternative.
   g. Include access for chemical truck and boom trucks in facility layout and costs.
   h. Include an HVAC room.
   i. The screenings area will require a cover.
   j. Consider how the facility will drain and the standard operating procedures for startup and shutdown. Alki is required to drain automatically. Alki requires approximately 15 to 20 minutes to start up.
   k. The sand used in high rate clarification stays in the tanks during standby periods. Makeup sand will be required for losses during operation. Routine maintenance may require disinfection of the sand.
   l. The convey and treat options in North Beach assume high rate clarification and disinfection at Carkeek combined with the existing facility. It is not feasible to retrofit the existing basins but a new facility would likely fit on the site.

PRELIMINARY DRAFT

END OF NOTES
Technical Review Meeting #3 - End of Pipe Treatment Schematic
10/28/09

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Meeting Agenda

Barton, Murray, Magnolia, North Beach CSO Facilities Project

E00022E06

King County Department of Natural Resources and Parks
Wastewater Treatment Division

Date of Meeting: October 29, 2009 **Work Order No.:** 7562A.10

Time: 1:00 - 3:00 pm

Location: Chinook Building Room 121

Purpose: Technical Review Meeting #4 - Criteria Information Needs

Meeting # 100-58

Anticipated Attendees

County		Consultants
John Cameron	Shaun O'Neil	Ellen Blair
Betsy Cooper	Sekhar Palepu	Kevin Dour
Hien Dung	John Phillips	Karl Hadler
Pam Erstad	Meredith Redmon	Jeff Lykken
Sue Hildreth	Kevin Sandquist	Brian Matson
Karen Huber	Mike Sand	Allen de Steiguer
Ron Kohler	Kevin Schock	Lloyd Skinner
Kathy Mathena	Bob Swarner	Jennifer Corrigan
Sue Meyer	Martha Tuttle	
Lee Miller	Jim Weber	**SPU**
Shahrzad Namini	Mary Wohleb	Martha Burke
Chris Okuda	Monica Van Der Vieren	Sahba Mohandessi
Ukwenga Oleru	Karl Zimmer	

Meeting Purpose:

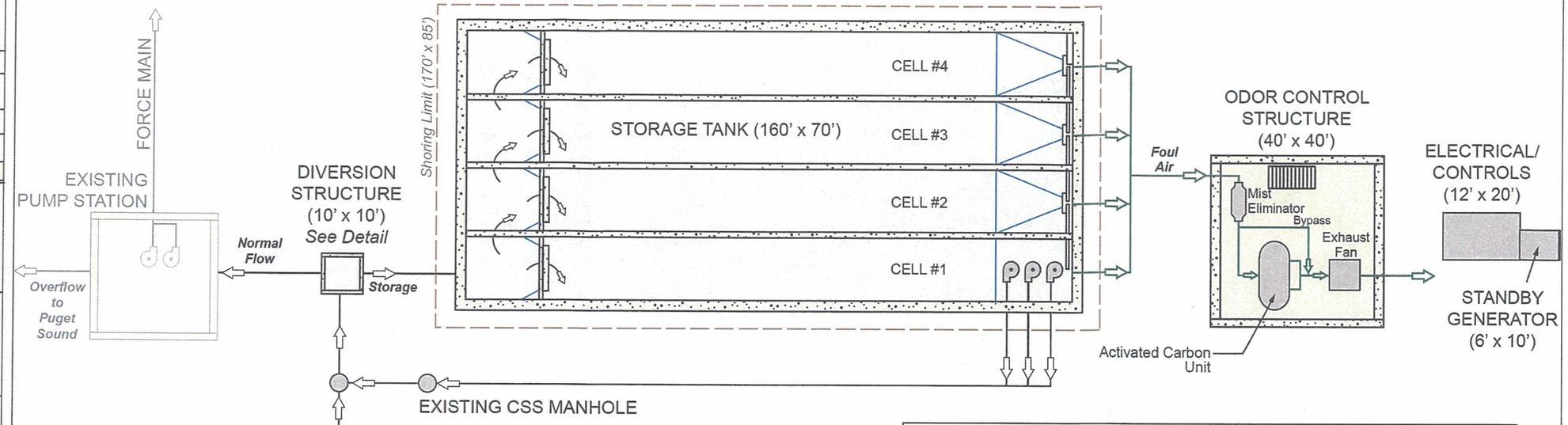
1. Review of Alternatives Analysis upcoming work.
2. Overview of technical information needs.
3. Discuss O&M coordination meeting format and agenda.

Topic	Time	By
Introduction	5 min	S. Namini
Alternatives Analysis Next Steps	10 min	B. Matson
Technical & O&M Information Needs	60 min	A. de Steiguer K. Dour K. Hadler
O&M Meeting Preparation	20 min	B. Matson

DRAFT

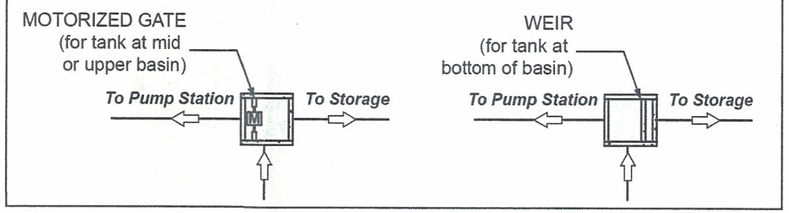
1.0-MG Rectangular Storage Tank Design Criteria & Assumptions

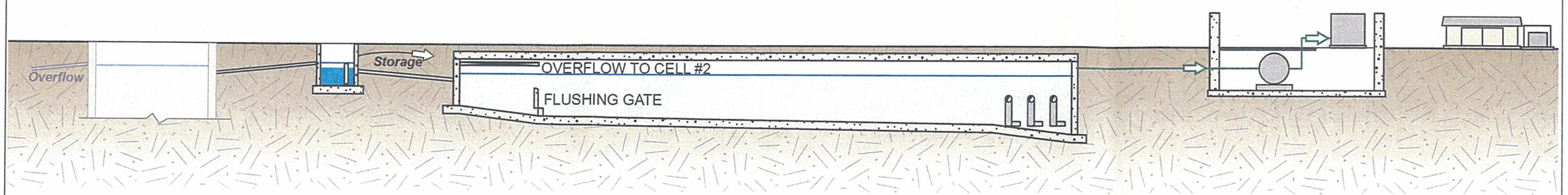
Structural	
Maximum Excavation Depth	30 feet
Outer Walls	2-foot thickness
Internal/baffle Walls	1.5-foot thickness
Floor Slope	1.0%
Shoring	5 feet beyond exterior walls
Mechanical	
Odor Control	Activated carbon unit and fan are sized for peak air displacement rate from the storage tank or 2 ACH/hr, whichever is greater. Air displacement rate is assumed to be equal to the peak flow discharge rate into the tank (12 mgd for Barton and 28.5 mgd for Murray)
Carbon Unit	Operate carbon unit during storage event (2) 3' thick Vertical Bed Units, 1 Pass Air Flow, 50 FPM air velocity Size: 8' Diameter x 12' Long Capacity: 4,500 cfm Dual H_2S Sensors
Fan / Blower	Constant speed Fan Size = 8' x 8' Estimated footprint: 40' x 40'
Location	Fan unit would be located above ground and carbon scrubber unit below ground.
Electrical	
Electrical Space	Total Estimated Load = 50 hp (fan, flushing gates, sluice gates, drain and water booster pumps) Estimated footprint: 20-foot x 12-foot x 12 feet high
Location	Inside a building
Standby Generator	Type of Fuel: Diesel Estimated footprint: 6-foot x 10-foot x 8 feet high Capacity: 60 kw
Location	Above grade, inside an acoustical enclosure
Flow Control Strategy - Bottom of the Basin	
Diversion Structure	Divert peak flows using overflow weir
Control Strategy	Peak flows are diverted over a weir when the water elevation within the pump station wet well rises. The diversion weir elevation is set below the elevation of the overflow weir in the existing CSO diversion structure. If the tank fills to capacity and the peak event has not subsided, the water elevation will continue to rise and a CSO will occur.
Flow Control Strategy - Mid & Upper Basin	
Diversion Structure	Divert peak flows using motorized gates and telemetry signals
Control Strategy	Peak flows are diverted by closing a motor-operated gate within the diversion structure when a signal is received. A signal will be sent when it is determined that a CSO event is likely or imminent. Indication that a CSO event may be imminent will be based on a combination of real-time control elements, including: water elevation in the pump station wet well; flow rate/water elevation in certain sewer pipelines; and pump/flow meter data within the pump station wet well.



PLAN

DETAIL - DIVERSION STRUCTURE OPTIONS, PLAN VIEW





PROFILE

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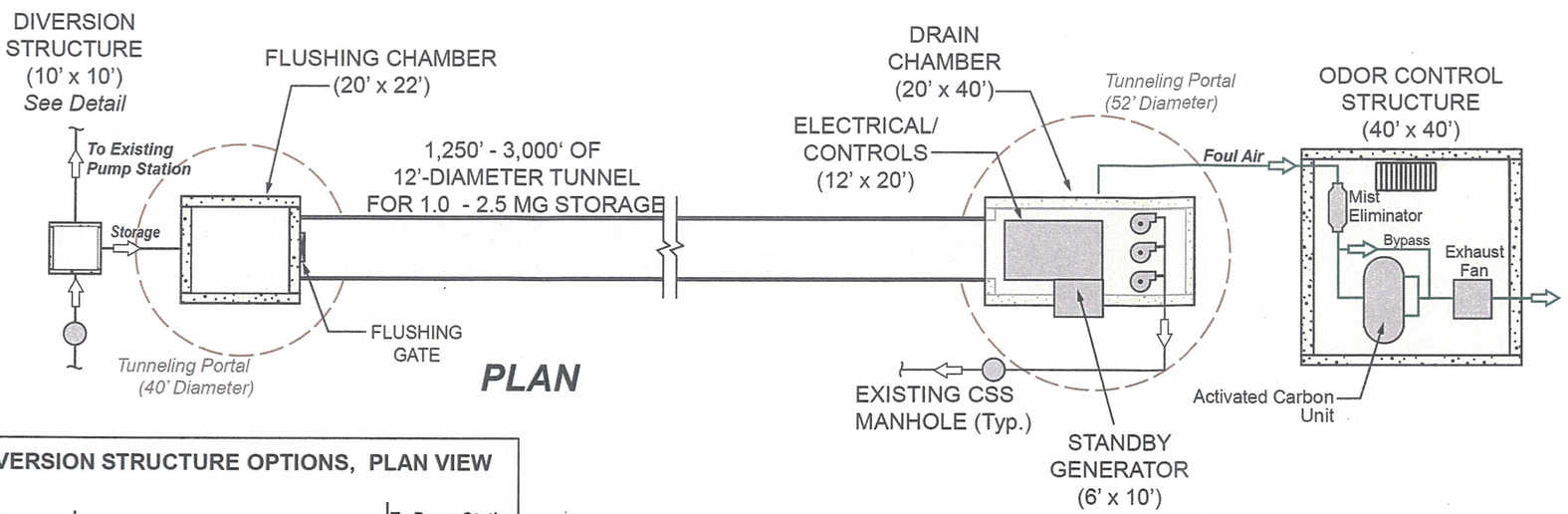
Wastewater Treatment Division

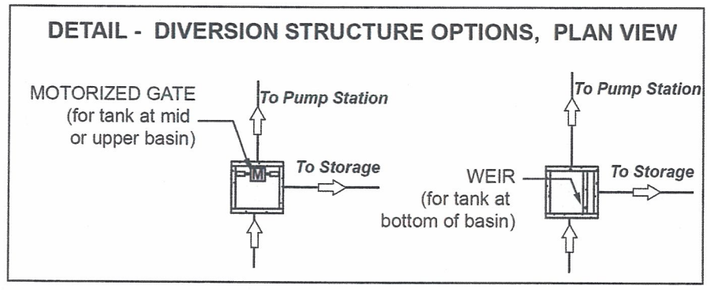
PRELIMINARY DRAFT

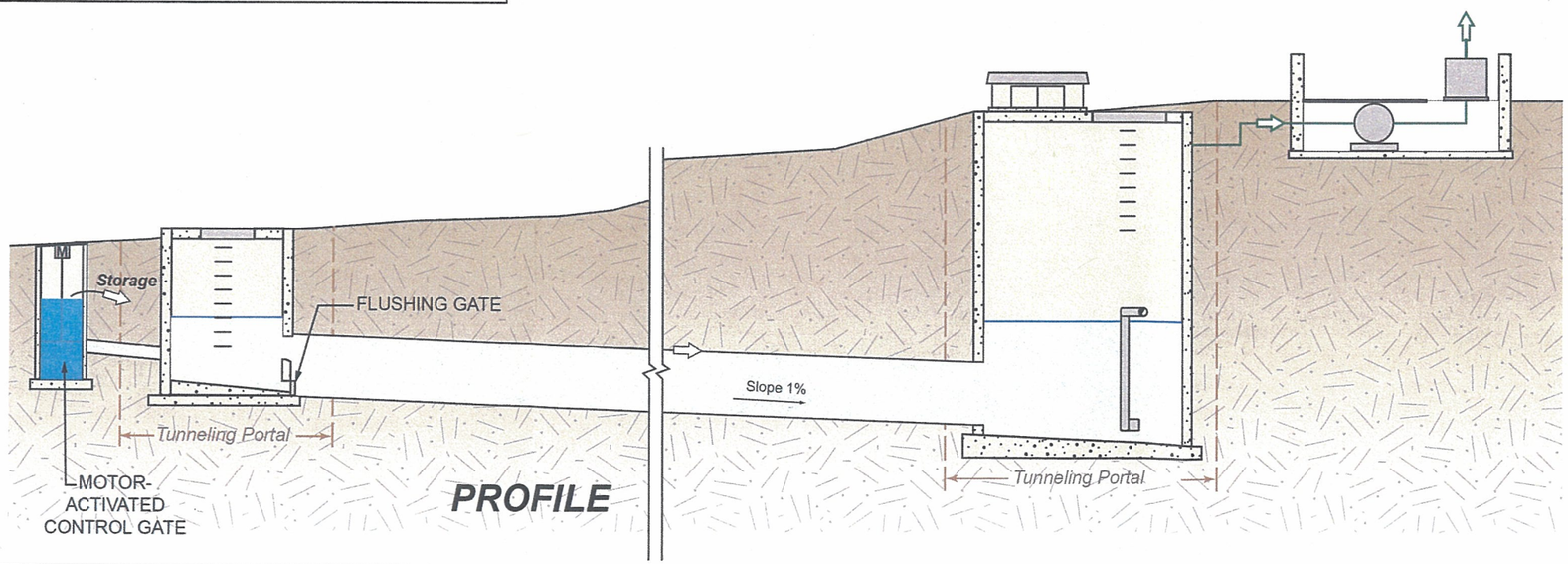
1.0-MG Tank Storage Facility Schematic Design

1.0-MG Tunnel Storage Design Criteria & Assumptions

General	
Type of Excavation	Tunneling
Tunnel Diam	144 inches
Slope	1.0%
Flushing	One flushing gate for entire length of the tunnel, 1,250 feet. The flushing and drain chambers shown are for 1.0 MG storage tunnel. For longer tunnels, the size of the structures and the number of flushing gates required to be verified.
Mechanical	
Odor Control	Activated carbon unit and fan are sized for peak air displacement rate from the storage tank or 2 ACH/hr, whichever is greater. Air displacement rate is assumed to be equal to the peak flow discharge rate into the tank (12 mgd for Barton, 28.5 mgd for Murray, 11 mgd for North Beach, 8 mgd for South Magnolia)
Carbon Unit	Operate carbon unit during storage event (2) 3' thick Vertical Bed Units, 1 Pass Air Flow, 50 FPM air velocity Size: 8' Diameter x 12' Long Capacity: 4,500 cfm (for 1.0 MG) Dual H_2S Sensors
Fan / Blower	Constant speed Fan Size = 8' x 8' (for 1.0 MG) Estimated footprint: 40' x 40' (for 1.0 MG)
Location	Fan unit would be located above ground and carbon scrubber unit below ground.
Electrical	
Electrical Space	Total Estimated Load = 50 hp (fan, flushing gates, sluice gates, drain and water booster pumps) Estimated footprint: 20-foot x 12-foot x 12 feet high
Location	Inside a building
Standby Generator	Type of Fuel: Diesel Estimated footprint: 6-foot x 10-foot x 8 feet high Capacity: 60 kw
Location	Above grade, inside an acoustical enclosure
Flow Control Strategy - Bottom of the Basin	
Diversion Structure	Divert peak flows using overflow weir
Control Strategy	Peak flows are diverted over a weir when the water elevation within the pump station wet well rises. The diversion weir elevation is set below the elevation of the overflow weir in the existing CSO diversion structure. If the tunnel fills to capacity and the peak event has not subsided, the water elevation will continue to rise and a CSO will occur.
Flow Control Strategy - Mid & Upper Basin	
Diversion Structure	Divert peak flows using motorized gates and telemetry signals
Control Strategy	Peak flows are diverted by closing a motor-operated gate within the diversion structure when a signal is received. A signal will be sent when it is determined that a CSO event is likely or imminent. Indication that a CSO event may be imminent will be based on a combination of real-time control elements, including: water elevation in the pump station wet well; flow rate/water elevation in certain sewer pipelines; and pump/flow meter data within the pump station wet well.







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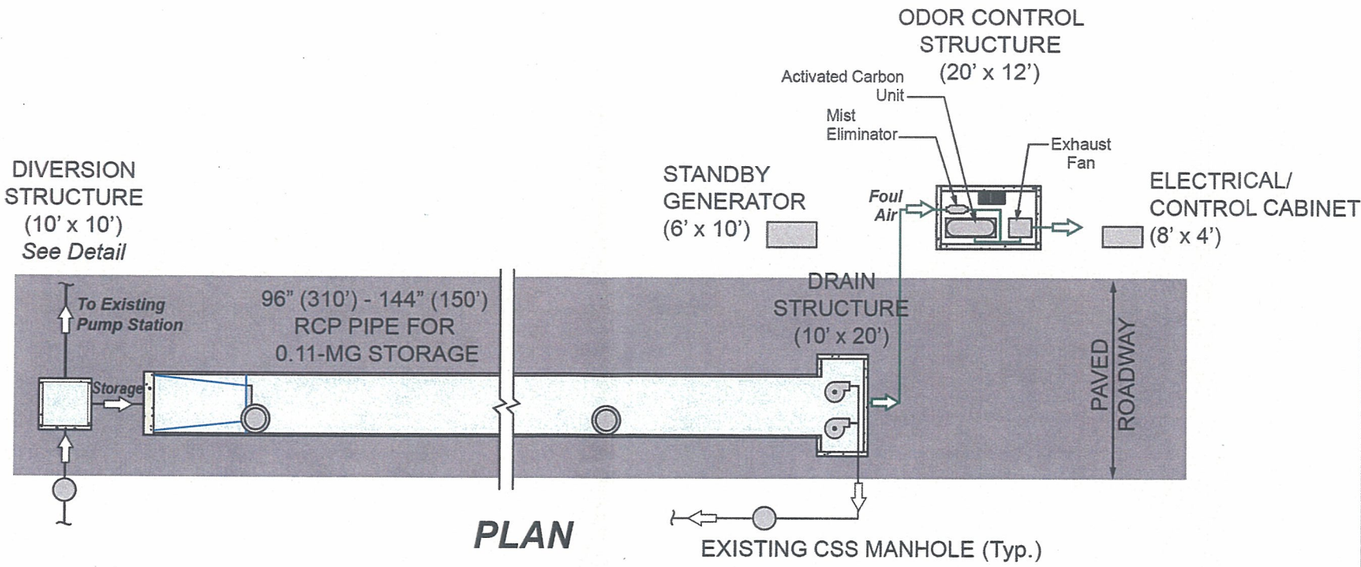
PRELIMINARY DRAFT

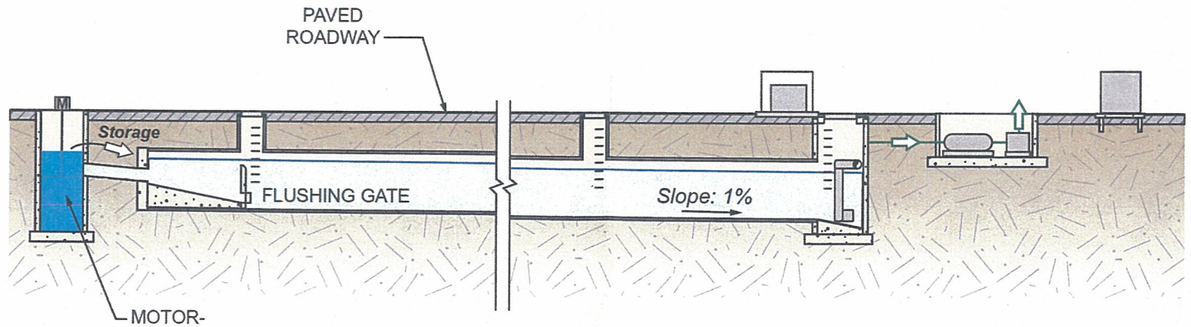
1.0-MG Tunnel Storage Facility Schematic Design

0.11-MG Pipe Storage Design Criteria & Assumptions

General	
Type of Excavation	Cut and cover up to depths of 30 feet and possible trenchless methods for depths > 30 feet
Pipe Diameter	96 inches to 144 inches
Slope	1.0%
Flushing	One flushing gate for 0.11 MG of storage
Location	Road right-of-way. Width of pavement varies from 15' to 40' (15' on Upper Fauntleroy Ave. SW and 40' on Fauntleroy Ave. SW and Beach Drive SW)
Mechanical	
Odor Control	Activated carbon unit and fan are sized for peak air displacement rate from the storage tank or 2 ACH/hr, whichever is greater. Air displacement rate is assumed to be equal to the peak flow discharge rate into the tank (12 mgd for Barton)
Carbon Unit	Operate carbon unit during storage event (2) 3' thick Vertical Bed Units, 1 Pass Air Flow, 50 FPM air velocity Size: 4' Diameter x 10' Long Capacity: 1,250 cfm
Fan / Blower	Constant speed Fan Size = 3' x 3' Estimated footprint: 12' x 20'
Location	Below grade structure located in or adjacent to the right-of-way
Electrical	
Electrical Space	Total Estimated Load = 20 hp (fan, flushing gates, drain and water booster pumps) Electrical cabinet mounted on a concrete pad at grade with weather-proof enclosure. Estimated footprint: 8-foot x 4-foot x 8 feet high
Standby Generator	Type of Fuel: Diesel Estimated footprint: 6-foot x 10-foot x 8 feet high Capacity: 35 kw
Location	Above grade, inside an acoustical enclosure
Flow Control Strategy - Bottom of the Basin	
Diversion Structure	Divert peak flows using overflow weir
Control Strategy	Peak flows are diverted over a weir when the water elevation within the pump station wet well rises. The diversion weir elevation is set below the elevation of the overflow weir in the existing CSO diversion structure. If the storage pipe fills to capacity and the peak event has not subsided, the water elevation will continue to rise and a CSO will occur.
Flow Control Strategy - Mid & Upper Basin	
Diversion Structure	Divert peak flows using motorized gates and telemetry signals
Control Strategy	Peak flows are diverted by closing a motor-operated gate within the diversion structure when a signal is received. A signal will be sent when it is determined that a CSO event is likely or imminent. Indication that a CSO event may be imminent will be based on a combination of real-time control elements, including: water elevation in the pump station wet well; flow rate/water elevation in certain sewer pipelines; and pump/flow meter data within the pump station wet well.



PLAN



PROFILE

DETAIL - DIVERSION STRUCTURE OPTIONS, PLAN VIEW

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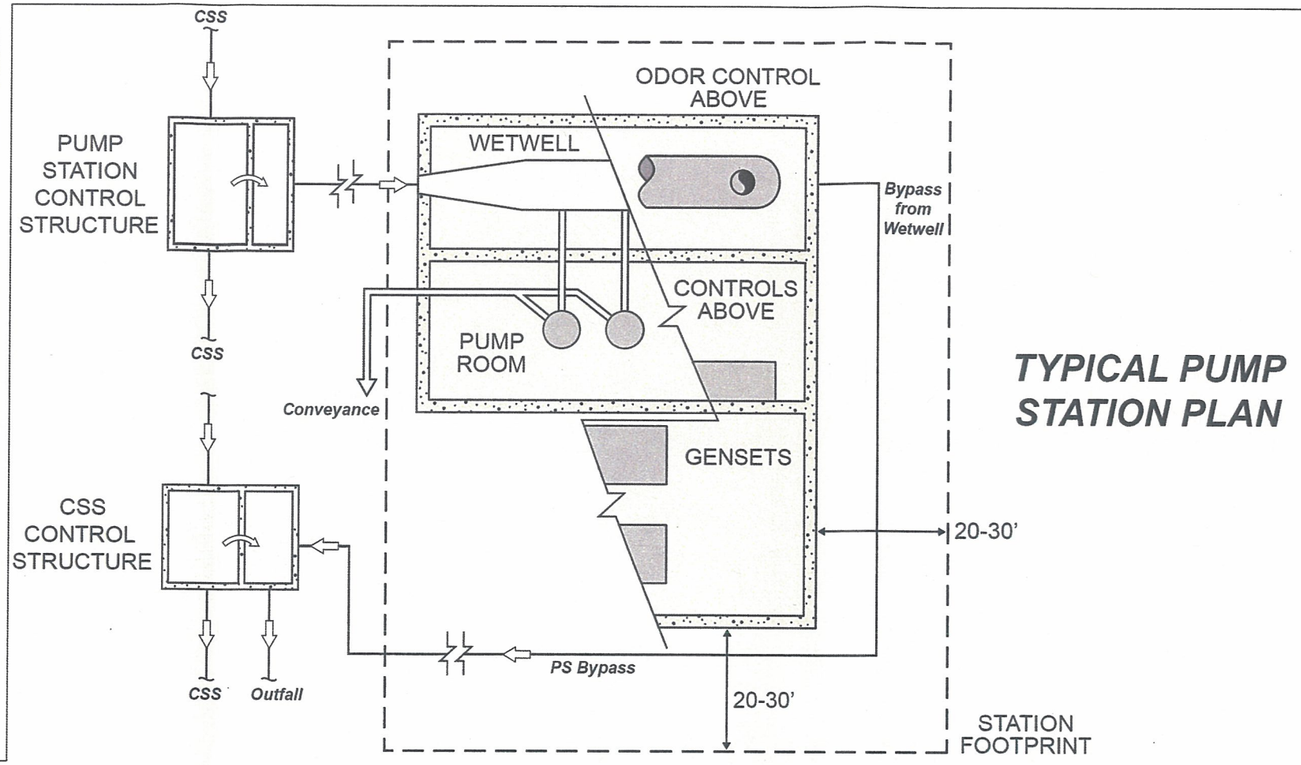
Wastewater Treatment Division

PRELIMINARY DRAFT

0.11-MG Pipe Storage Facility Schematic Design

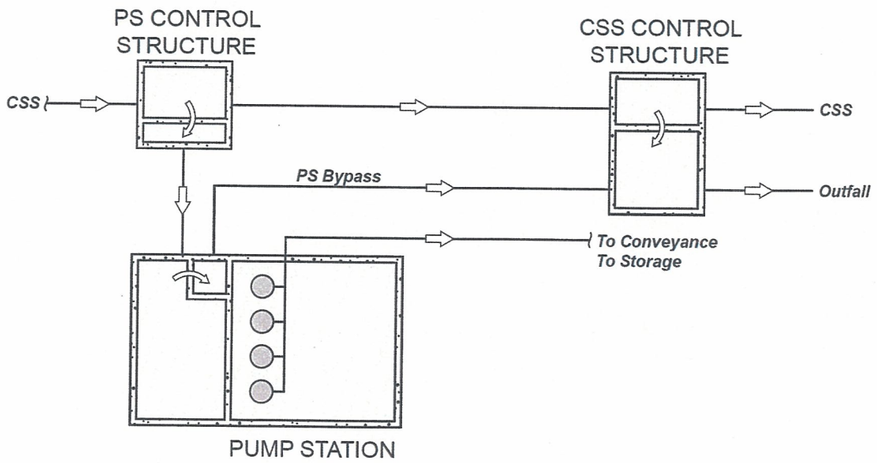
7 to 30 Mgd Pump Station Criteria and Assumptions

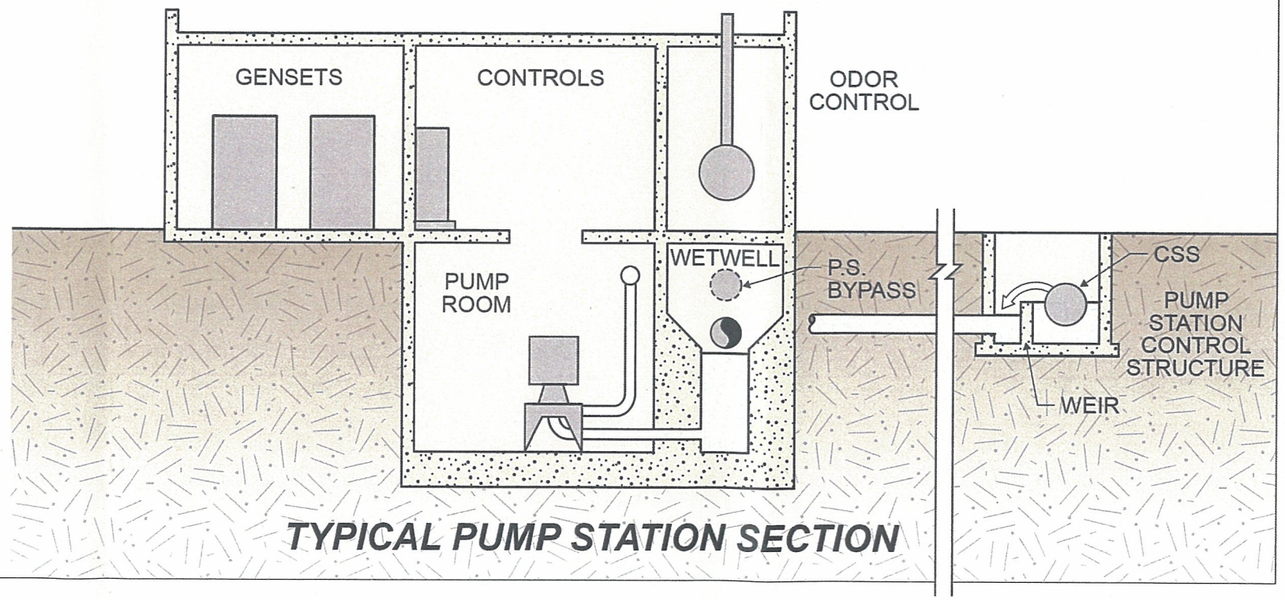
General				
Firm Capacity mgd		7	20	30
Hydraullic Conditions		70 - 200 ft head	70 - 200 ft head	Over 200 ft Head
		single stage	single stage	series, two stage
Number pumps installed		4	4	8
Motor Size, Hp		50 - 125 at 7mgd	125 - 325 at 20mgd	200 - 700 at 30mgd
Standby power, kW		1@200 - 400	2@250 - 650	2@600-1250
		Station Footprint, with setbacks		
Wetwell		Circular, rectangular	Rectangular	Rectangular
Pump types, installation	Submersible wet pit	90 x 90	110 x 105	NA
	Centrifugal dry pit	110 x 90	110 x 90	115 x 100
	VTSH dry pit	90 x 90	NA	NA
Average depth, ft		25	25	25
Outer Walls, ft		2	2	2
Shoring		5ft beyond walls		
Mechanical				
Ventilation Odor Control	12 air changes per hour in occupied space when operational. Carbon scrubber and fan, 2AC/hr for wetwell. Operates when pump station on line.			
Ancillary Eqpmt.	Typical service air, water, gates, valves for ww pump station			
Electrical				
Pump drives	Close coupled motors, VFD			
Emergency Power	Permanent generator(s), diesel, sound attenuated. 36-hour fuel capacity in buried tank			
Flow Control Strategy				
Diversion Structure	Divert peak flows using a weir and/or gate structure on the sewer upstream of the CSO control structure.			
Control Strategy	Peak flows are diverted over a weir when water elevation exceeds capacity of sewer or existing dry wet weather pump station. Flows exceeding pump station capacity overflow to outfall.			



TYPICAL PUMP STATION PLAN

GENERAL ARRANGEMENT PLAN





TYPICAL PUMP STATION SECTION

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King County
Department of Natural Resources and Parks
Wastewater Treatment Division

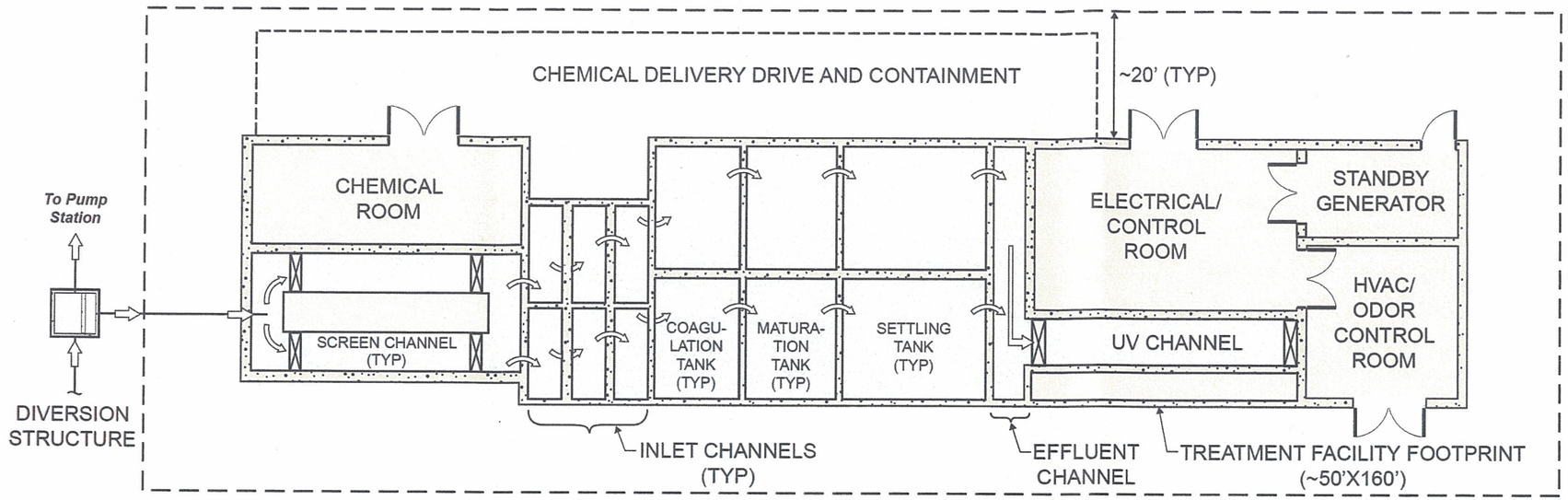
PRELIMINARY DRAFT

Pump Station

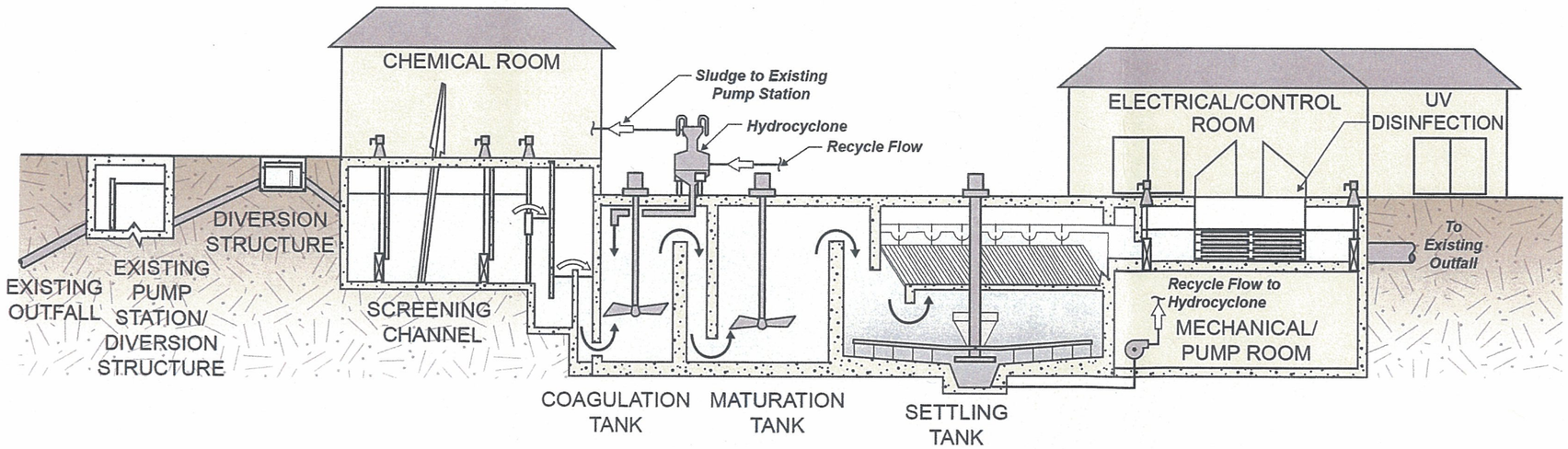
10 mgd High Rate Clarification Treatment Facility Design Criteria and Assumptions

Description	Units	
Plant Flow		
Minimum Flow Rate	mgd	1
Design Flow Rate	mgd	10
Influent Screening		
Screen Type	type	Perforated Plate
Number of Screens	ea	2
Maximum Capacity per Screen	mgd	5
Maximum Head Loss	in	12
Screen Spacing	mm	6
High Rate Clarification System		
Design Flow		
Number of Trains	ea	2
Maximum Hydraulic Capacity per Train	mgd	6
Performance Requirements		
Total Suspended Solids (TSS)	-	85% or 10 MG/L
BOD	-	50% or 10 MG/L
Injection/Coagulation/Maturation Tank		
Hydraulic Retention Time	min	5
Tank Depth	ft	20
Number of Mixers per Train	ea	3
Settling Tank		
Tank Depth	ft	20
Overflow Rate at Design Capacity	gpm/sqft	60
Microsand/Sludge Recirculation Circuit		
Number of Pumps per Train	ea	1 Lead, 1 Lag
Number of Hydrocyclones per Pump	ea	1
Sludge Discharge per Train at Design Flow	gpm	200
Estimated Sludge Concentration	% solids	0.1 to 0.8
Chemical Feed Systems		
Coagulant		
Number of Coagulant Pumps	ea	1 Lead, 1 Lag
Coagulant Dosage Range	mg/L	0-100
Coagulant Storage Tank		
Number of Tanks	ea	1
Tank Type	type	FRP, Vertical
Coagulant Tank Capacity	gal	8,000
Diameter	ft	10
Polymer		
Number of Polymer Preparation Systems	ea	1 Lead, 1 Lag
Number of Polymer Pumps	ea	2
Polymer Dosage Range	mg/L	0-2
Number of Polymer Totes	ea	2
Capacity of Each Polymer Tote	gal	150
Ultraviolet Disinfection System		
Performance Requirements		
Number of Channels	ea	1
Influent BOD/TSS	mg/L	10
Maximum Average Particle Size	microns	30
Maximum Influent (mpn/100 ml E. Coli)	MPN/100	400,000
UV Transmittance at 254 nm/1cm	%	70
Minimum Dose	mJ/sqcm	40
Electrical		
Estimated Load	Hp	300
Standby Power	kW	250

Flow Control Strategy - Bottom of the Basin	
Diversion Structure:	Divert Peak Flows Using Overflow Weir.
Control Strategy:	Peak flows are diverted over a weir when the water elevation within the pump station wet well rises. The diversion weir elevation is set below the elevation of the overflow weir in the existing CSO diversion structure. If the existing CSO diversion structure continues to fill and the peak event has not subsided, the water elevation will continue to rise and an uncontrolled CSO event will occur.



TYPICAL TREATMENT FACILITY PLAN



TYPICAL TREATMENT FACILITY SECTION

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PRELIMINARY DRAFT

10 mgd High Rate Clarification Facility
Schematic Design