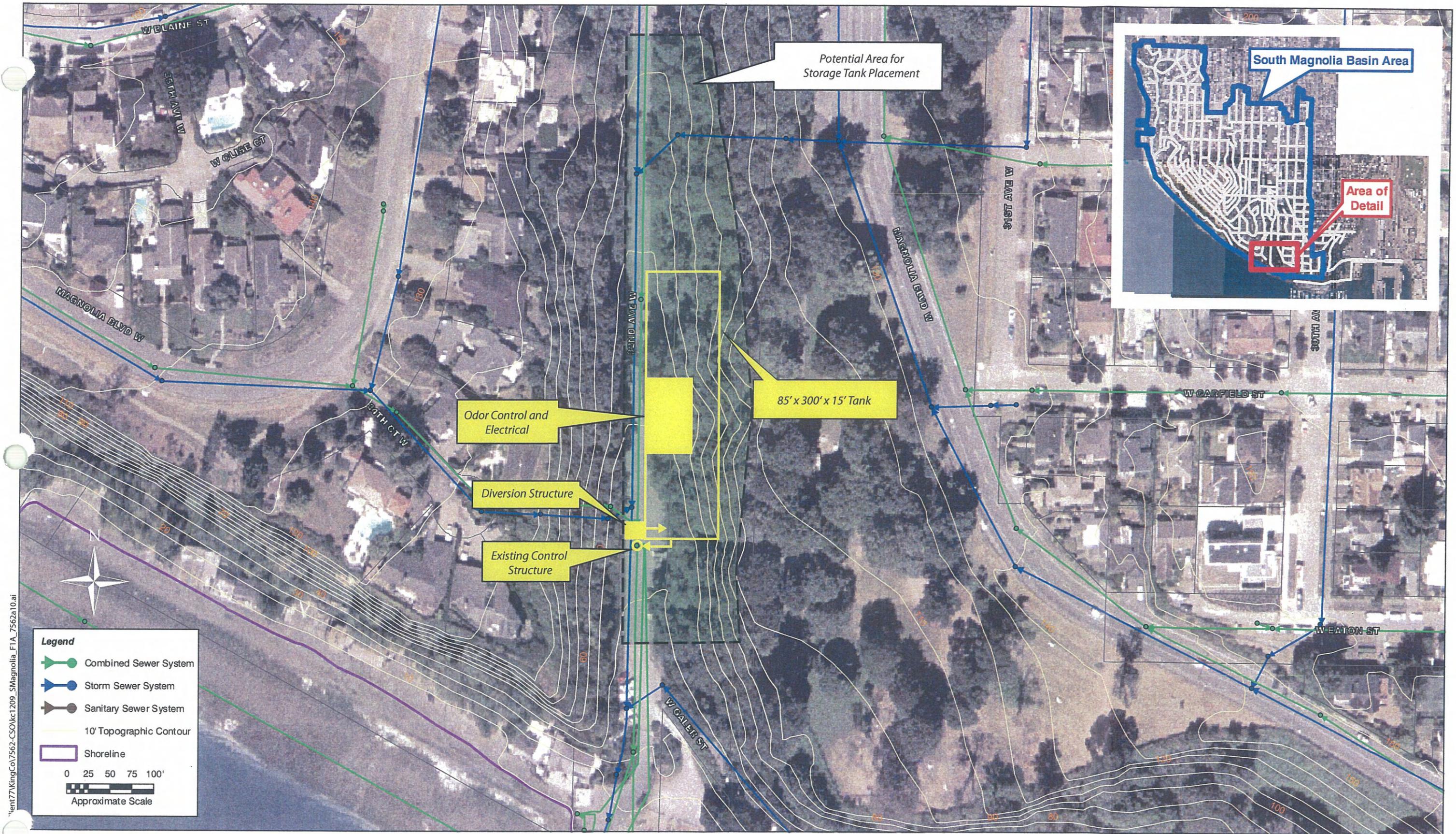


MAGNOLIA BASIN INITIAL ALTERNATIVES

**S. MAGNOLIA BASIN
INITIAL ALTERNATIVES MATRIX SUMMARY**

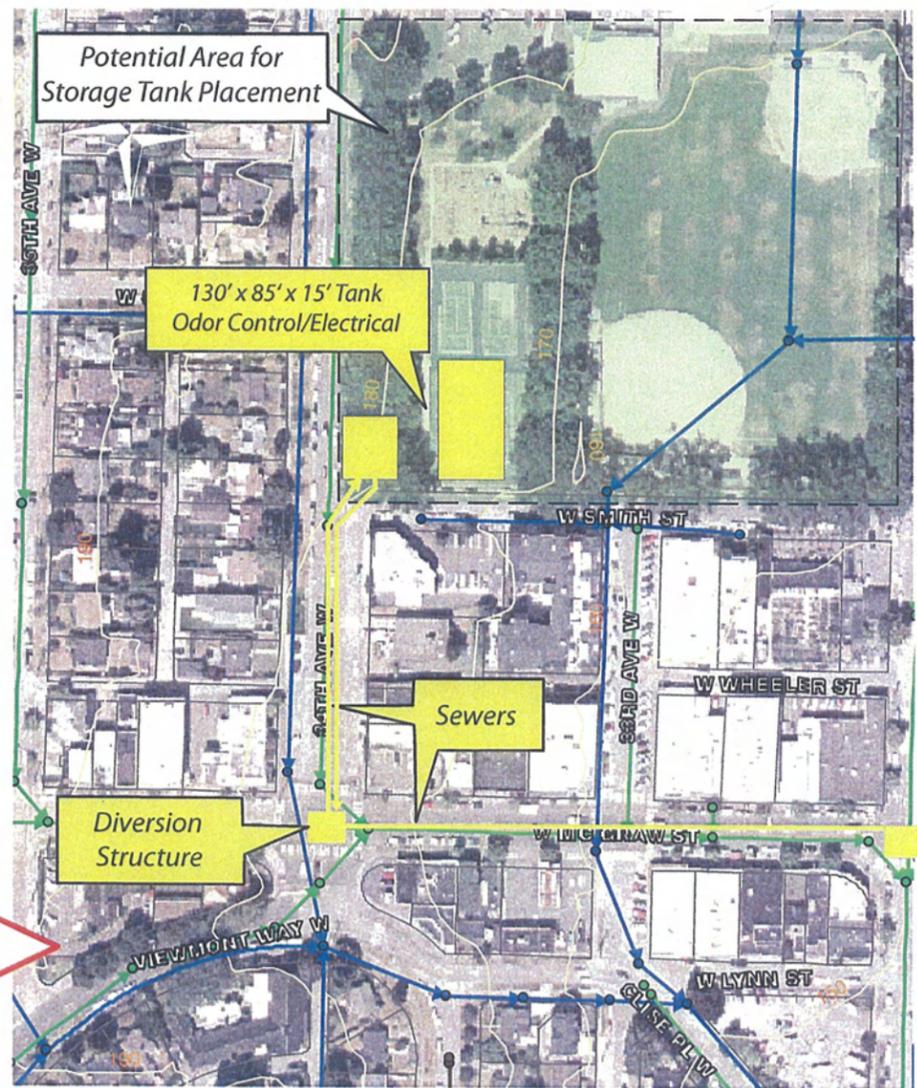
Control Approach	Alternatives										
	1A	1B	1C	1D	1E	1F1	1F2	1F3	2A	3A	5A
	Single Rectangular Storage Tank	Dispersed Rectangular Storage Tanks	Dispersed Rectangular Storage Tanks	Pipe Storage in Rights of Way Rectangular Storage at bottom of Basin	Tunnel Storage under Galer St.	Rectangular Storage Tank out of Basin	Rectangular Storage Tank out of Basin	Rectangular Storage Tank out of Basin	Conveyance out of Basin to downstream treatment	End of Pipe Treatment	Peak Flow Reduction w/Storage
	Bottom of Basin	Bottom of Basin Upper Basin	Bottom of Basin Upper Basin	Bottom of Basin Lower Basin Upper Basin	Bottom of Basin	Bottom of Basin Out of Basin	Bottom of Basin Out of Basin	Bottom of Basin Out of Basin	Bottom of Basin Out of Basin	Bottom of Basin	Dispersed throughout basin
1. Peak Flow Storage											
Rectangular Storage	X	X	X			X	X	X			X
Pipe Storage				X							
Tunnel Storage					X						
2. Convey and Treat									X		
3. End of Pipe Treatment										X	
5. Combined Stormwater Reduction and Storage											X



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MAGNOLIA BASIN INITIAL ALTERNATIVES

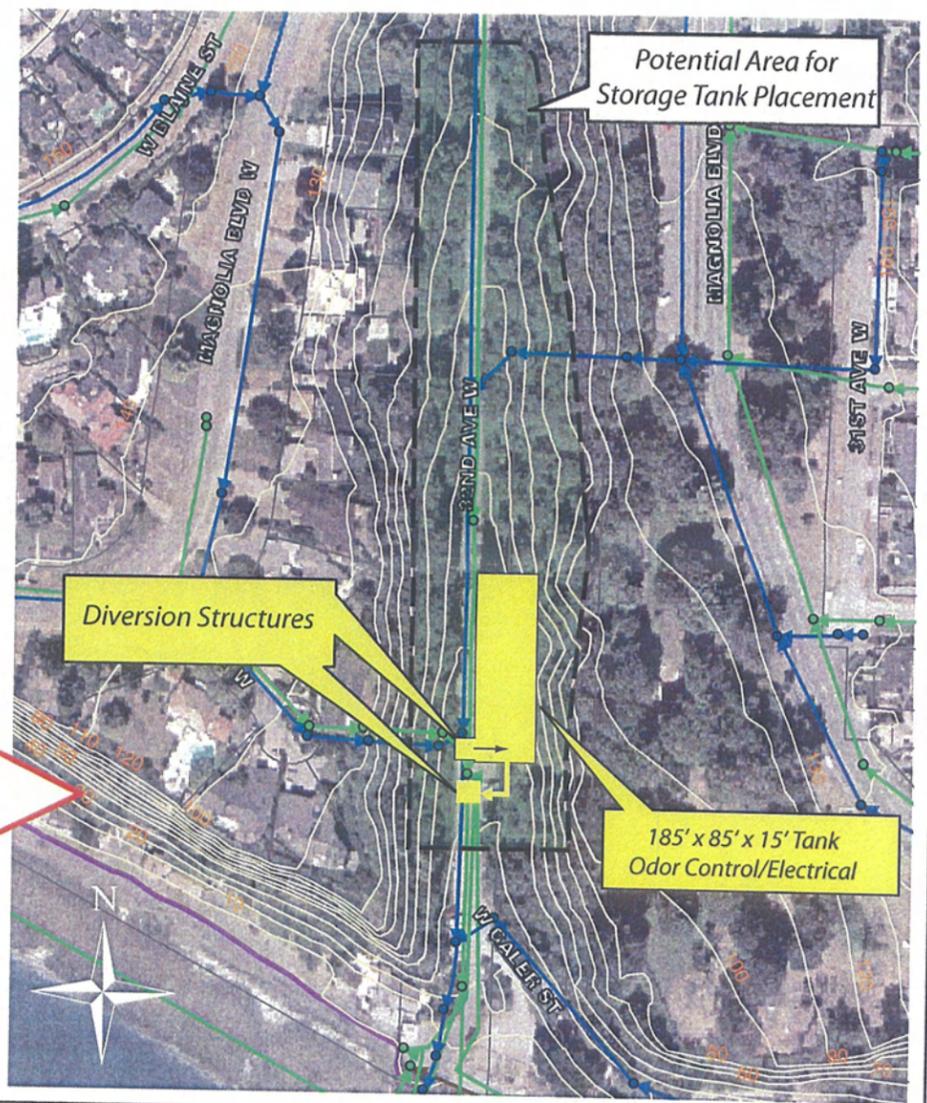
ALTERNATIVE TITLE		1A- BOTTOM OF BASIN RECTANGULAR STORAGE
TECHNICAL SUMMARY		
LOCATION	1520 32 nd Ave. W. (approx address) Bottom of the basin near the CSO control manhole on 32 nd Ave. W.	
DESCRIPTION	1.8 MG storage tank 300 x 85 x 15-ft deep, 4 channels. Construct one diversion structure in SPU system to divert flow at bottom of basin. Storage tank characteristics: buried, rectangular, multi-channel, self-cleaning, cast-in-place concrete tank. Weir diversion. Automated tipping buckets. Submersible pumps. Above grade access with stairway. Access area footprint approximately 10 ft by 20 ft. by 10 ft. Odor Control: All sites, carbon scrubber.	
ANCILLARY FACILITIES	Odor control in underground concrete structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank, pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of Basin Acquire 1 Ac from City of Seattle for site and access.
	Critical Areas	Steep slopes, groundwater, landslide area.
ENVIRONMENT	Shorelines Zone	No.
	Fish and Wildlife	TBD, depends on whether marine access is required for bottom of basin tank.
TECHNICAL	Complexity and Startup	Similar to other county storage tanks.
	Compatibility w/WW system	No additional conveyance capacity in Magnolia Trunk required. Added flow volume of up to 1.8 MG following storm routed to Interbay and WPTP. Add one diversion structures to existing SPU collection system upstream of CSO control structure, and modify existing county CSO control structure. Possible extension of existing SPU PS77 force main uphill. Tank drainage pumps in tank, 1.8 mgd.
	Flexibility	Modular, 50% expansion capacity. Most likely have to add length due to steep slopes.
	Constructability	Geotechnical and construction constraints due to steep, unstable slopes and dewatering. Special measures required. Possible tie back wall construction required to control slopes and water.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Off-street possible, but site constrained. Parking/Access on top.
	Process Effects	TBD
COST	Project Cost Factors	Potential for local traffic disruption during construction. Access for 11 existing residences affected. Possible need for off site parking and transportation service.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	Possible upgrade of TDH of SPU PS 77 required to get flows to tank.
COMMUNITY	External Costs	Land acquisition.
	Location	Assume buried tank with minimal above grade structures. ROW informal parking may be reduced. Possible need to provide more off street parking for existing residences. No effect on long-term traffic patterns.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Project effects on community at least one year. Include traffic, effects on access to waterfront park. Effects are common to utilities and street improvement projects and can be planned using common techniques. Disruption of recreational uses of waterfront park possible. Informal parking for residences near tank may be reduced. Possible need to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns.



Legend

- Combined Sewer System
- Storm Sewer System
- Sanitary Sewer System
- 10' Topographic Contour
- Shoreline

0 50 100 150 200'
Approximate Scale



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King County
Department of Natural Resources and Parks
Wastewater Treatment Division

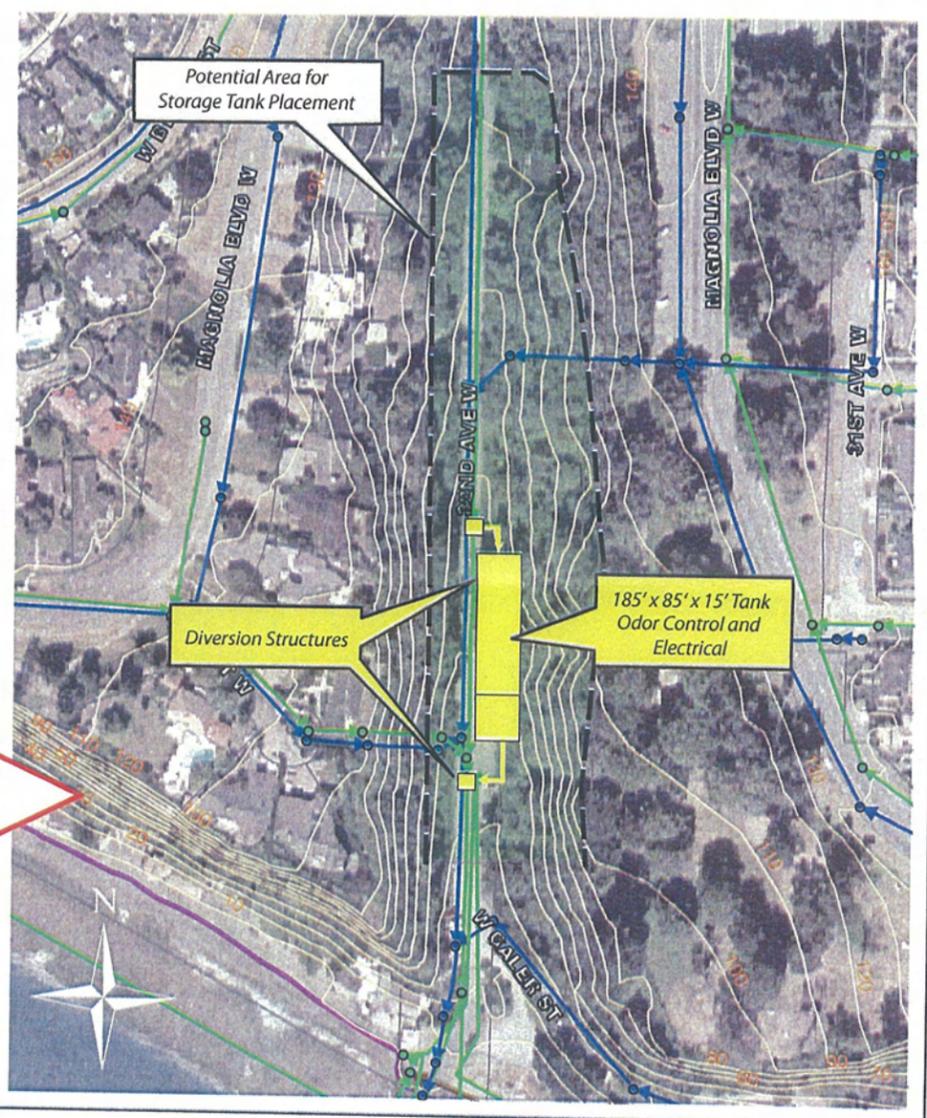
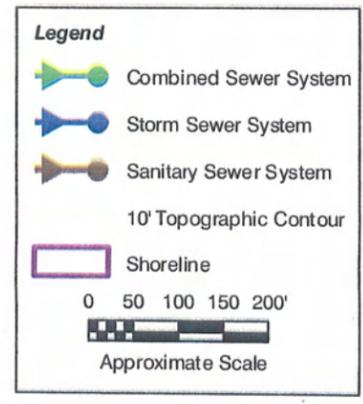
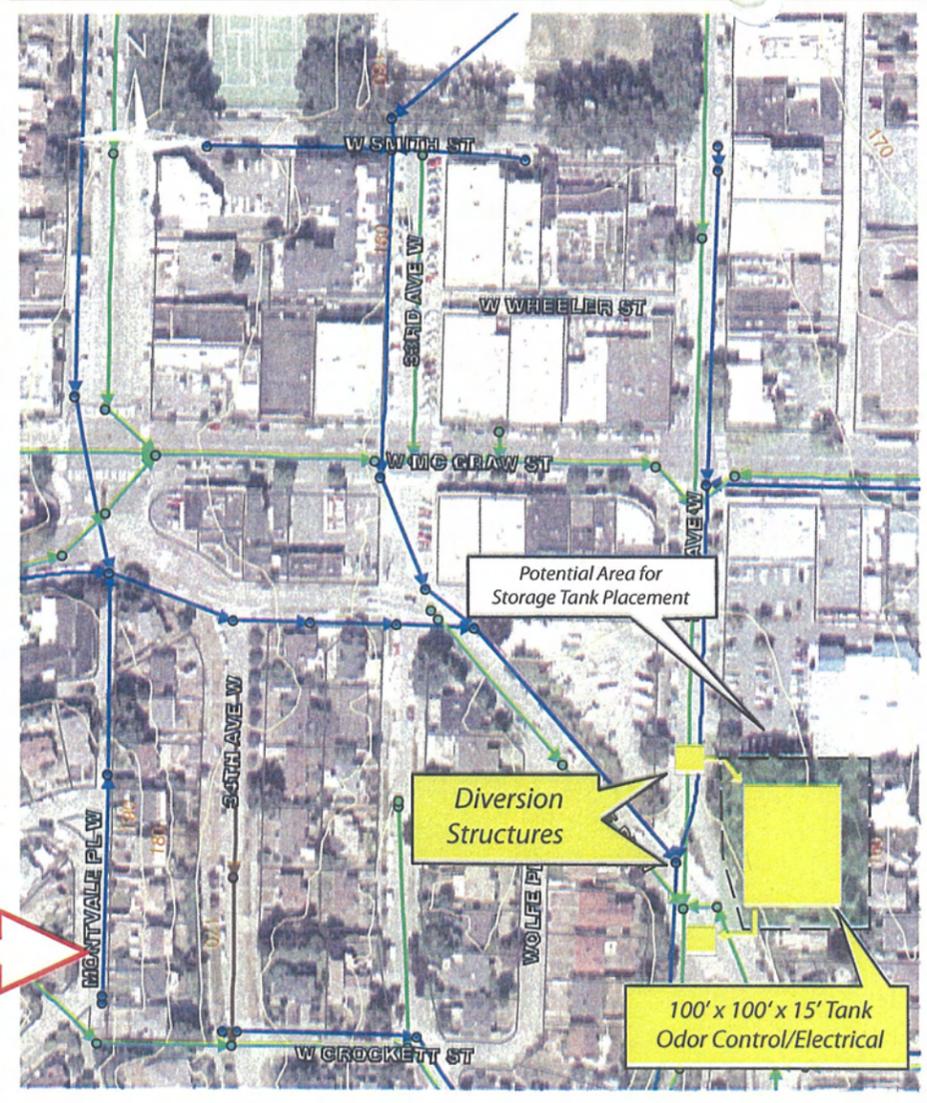
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Draft

South Magnolia Basin Alternative 1B
Dispersed Storage Tanks

MAGNOLIA BASIN INITIAL ALTERNATIVES

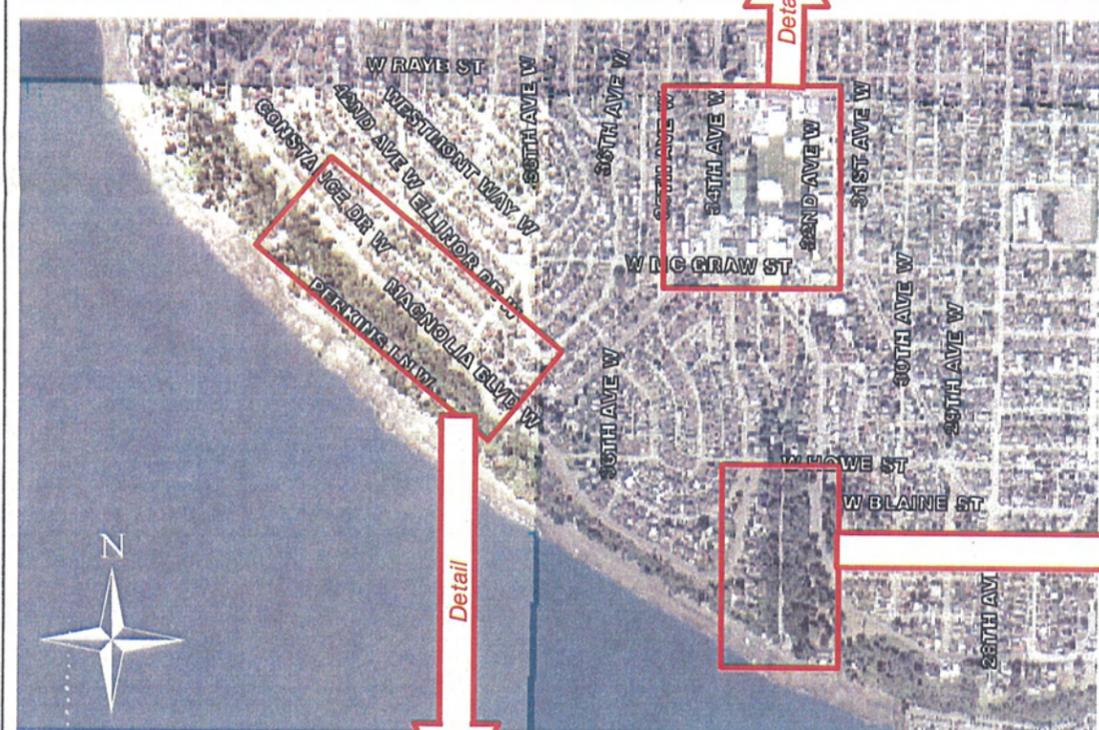
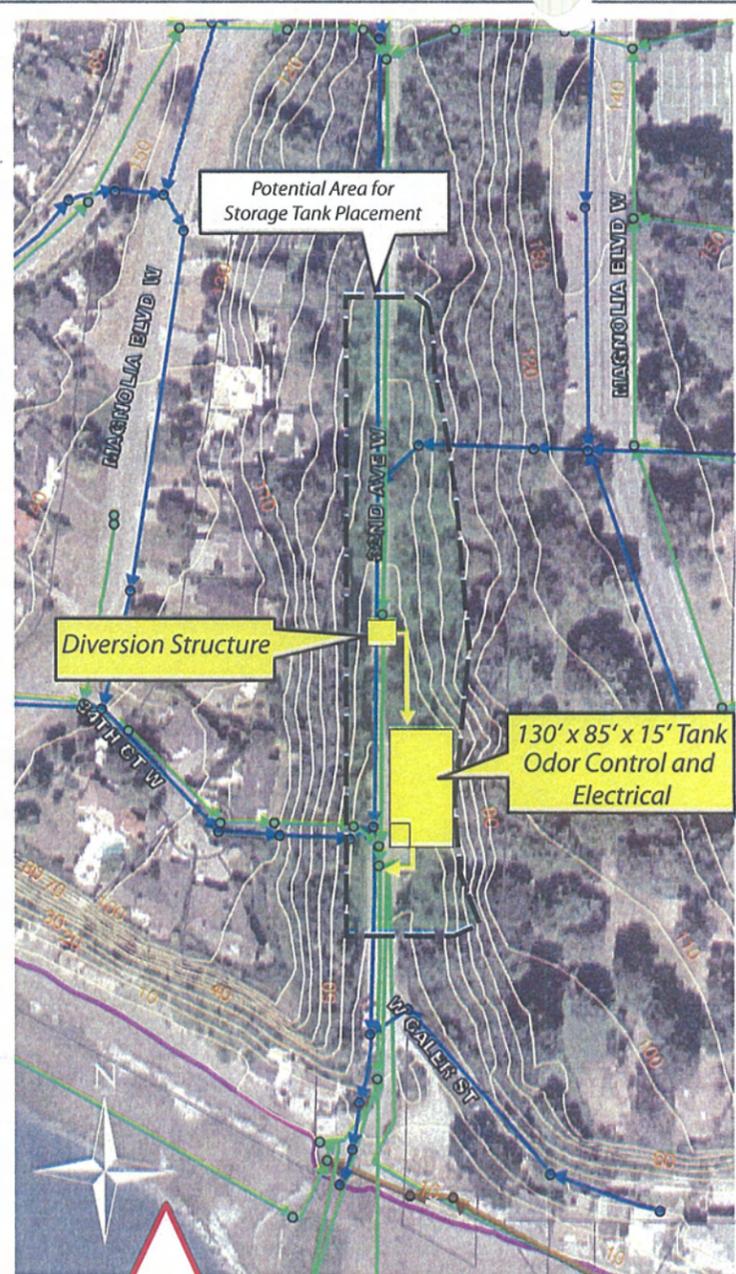
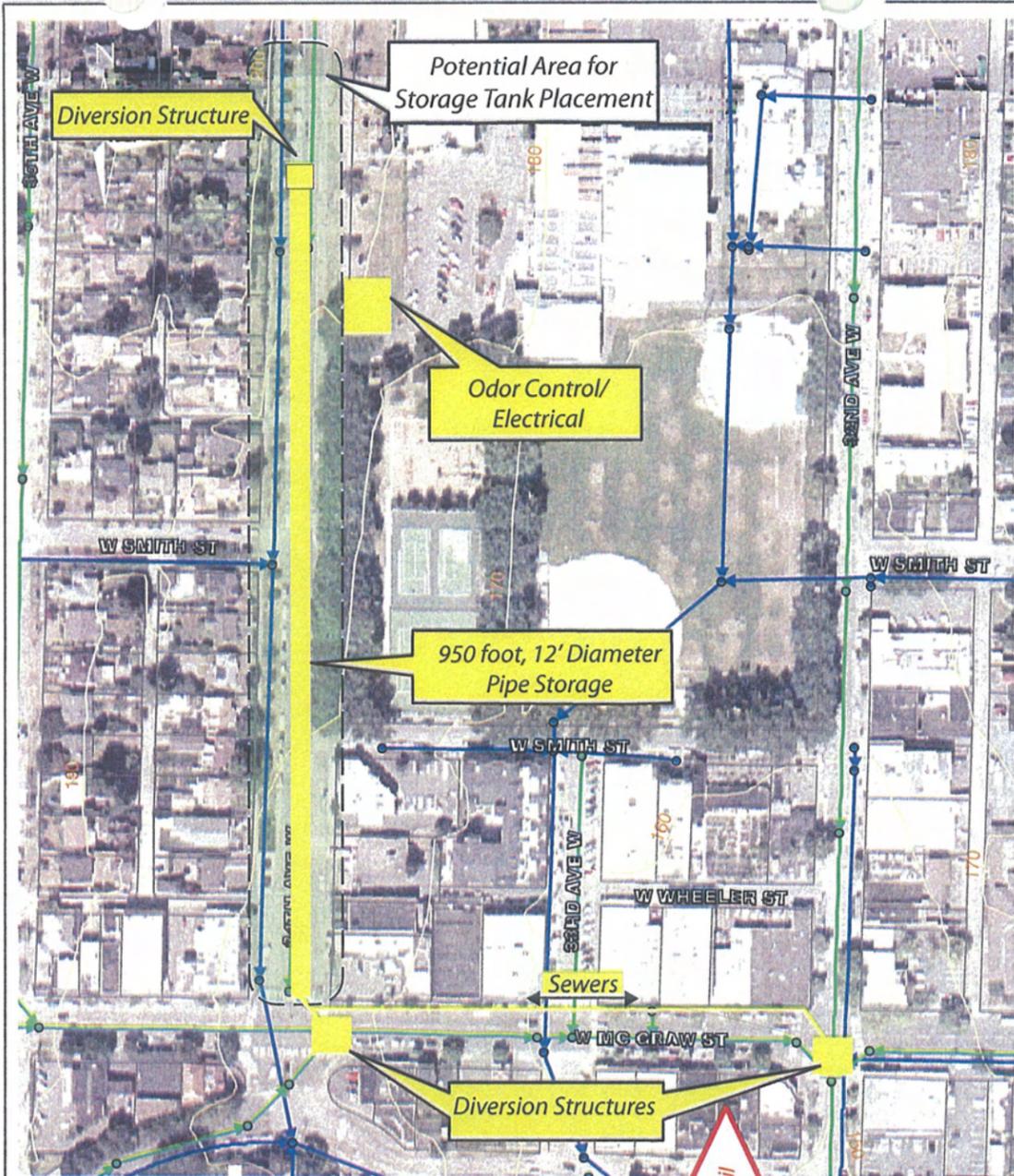
ALTERNATIVE TITLE		1B - DISTRIBUTED STORAGE BOTTOM AND UPPER BASIN, RECTANGULAR TANKS.
TECHNICAL SUMMARY		
LOCATION	Two areas in basin: 1. Bottom of basin 2. Upper third of basin near the confluence of sub basins 5,7, and 8.	
DESCRIPTION	1.08 MG storage tank 185 x 85 x 15-ft deep, 4 channels, and 0.72 MG (716,000 gal) storage tank, 130 x 85 x 15-ft deep, 4 channels, serves sub basins 5, 7, and 8 which comprise 40% of total peak flow. Tank could be square, 110 x 110 x 15 ft deep. Construct one diversion structure in SPU system to divert flow at bottom of basin. Construct three diversion structures in SPU system to divert flow in upper basin to tank site(s). Storage tank characteristics: buried, rectangular, multi-channel, self-cleaning, cast-in-place concrete tank. Weir diversion. Automated tipping buckets. Submersible pumps. Above grade access with stairway. Access area footprint approximately 10 ft by 20 ft. by 10 ft. Odor Control: All sites, carbon scrubber.	
ANCILLARY FACILITIES	Odor control in above grade structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank, pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: 0.75 Ac more or less; need to acquire. Upper basin: 1 Ac, more or less. Acquire or lease from City of Seattle.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area. Upper basin: none known.
ENVIRONMENT	Shorelines Zone	No
	Fish and Wildlife	TBD, depends on whether marine access is required for bottom of basin tank.
TECHNICAL	Complexity and Startup	Similar to other county storage tanks. Multiple storage tanks, telemetry and control interconnected. Requires predictive control strategy.
	Compatibility w/WW system	Requires three diversion structures in City of Seattle sewer system. No additional conveyance capacity in Magnolia Trunk required. Added flow volume of up to 1.8 MG following storm routed to Interbay and WPTP. Add one diversion structures to existing SPU collection system upstream of CSO control structure, and modify existing county CSO control structure. Possible extension of existing SPU PS77 force main uphill. Tank drainage pumps in tanks to drain in 24 hrs.
	Flexibility	Modular.; opportunities to expand possible at bottom of basin; less likely in upper basin.
	Constructability	Bottom of Basin; steep slopes, deep cuts and tie back walls required, groundwater, restricted access, limited space for staging. Upper Basin: Disruption of recreational uses and traffic impacts to businesses.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Parking needed off street in upper basin, as part of acquisition for access to odor control and electrical.
COST	Process Effects	TBD
	Project Cost Factors	Impacts to business access in four-block area of commercial district during construction due to narrow streets. Impacts on access and parking for up to 11 residences on 32nd Av. W during construction.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	TBD
COMMUNITY	External Costs	Land acquisition.
	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Project effects on community at least one year. Include traffic, effects on access to waterfront park. Effects are common to utilities and street improvement projects and can be planned using common techniques. Disruption of recreational uses of waterfront park possible. Informal parking for residences near tank may be reduced. Possible need to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns. Impacts on business and commercial traffic near upper basin site.

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MAGNOLIA BASIN INITIAL ALTERNATIVES

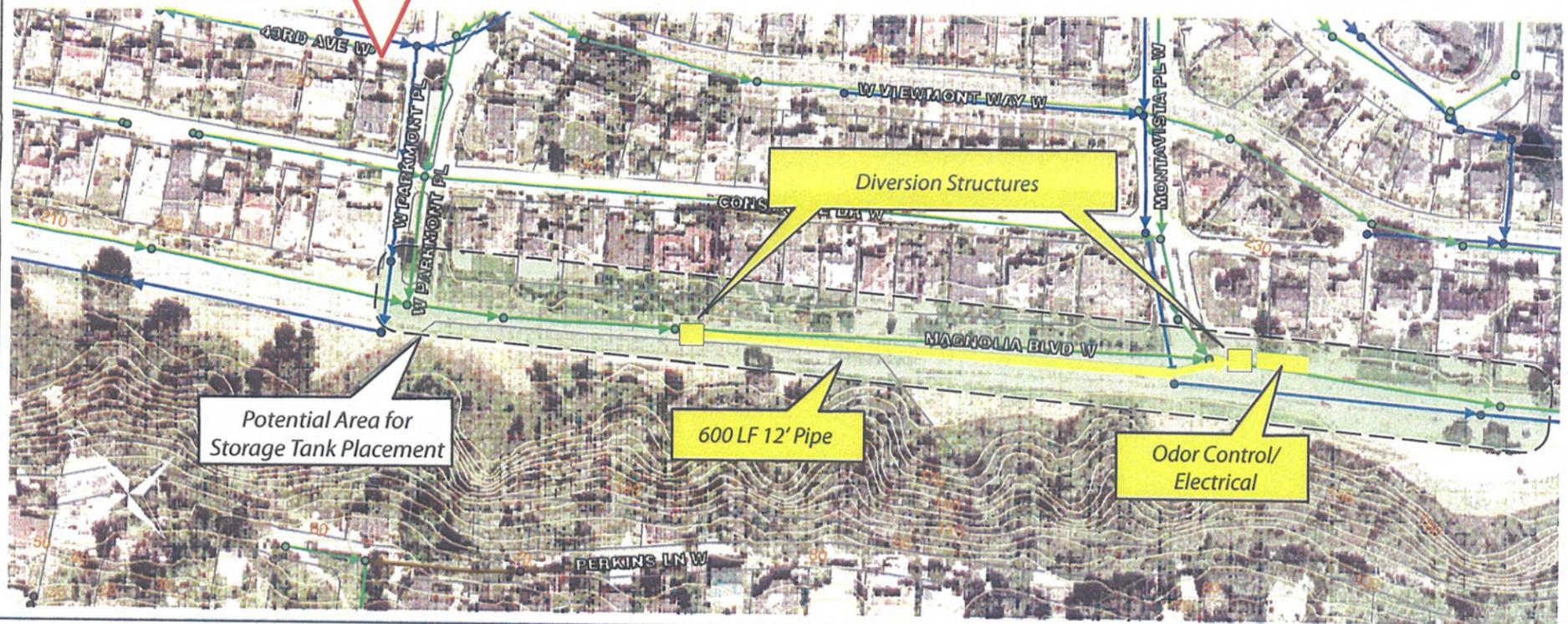
ALTERNATIVE TITLE		1C - DISTRIBUTED STORAGE BOTTOM AND UPPER BASIN, RECTANGULAR TANKS
TECHNICAL SUMMARY		
LOCATION	Two areas in basin: 1. Bottom of basin 2. Upper third of basin near the confluence of sub basins 5,7, and 8.	
DESCRIPTION	1.1 MG storage tank, 185 x 85 x 15-ft deep, 4 channels. 0.67 MG storage tank, 100 x 100 x 15 ft deep, 5 channels, can serve 90% of flows from sub basins 5, 7, and 8 which comprise 40% of total peak flow. Construct diversion structures on City of Seattle sewer system to divert flows to tank in upper basin. Storage tank characteristics: buried, rectangular or cylindrical, multi-channel, self-cleaning, cast-in-place concrete tank. Automated diversion gates. Automated tipping buckets. Submersible pumps. Above grade access with stairway. Access area footprint approximately 10 ft by 20 ft. by 10 ft. Odor Control: All sites, carbon scrubber.	
ANCILLARY FACILITIES	Odor control in above grade structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank, pumped discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: 0.75 Ac more or less; need to acquire. Upper basin: 0.25 Ac, more or less. Acquire from private or public owners.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area. Upper basin: none known.
ENVIRONMENT	Shorelines Zone	No
	Fish and Wildlife	TBD, depends on whether marine access is required for bottom of basin tank.
TECHNICAL	Complexity and Startup	Similar to other county storage tanks. Multiple storage tanks, telemetry and control interconnected. Requires predictive control strategy.
	Compatibility w/WW system	Requires two diversion structures in City of Seattle sewer system. No additional conveyance capacity in Magnolia Trunk required. Added flow volume of up to 1.8 MG following storm routed to Interbay and WPTP. Add one diversion structures to existing SPU collection system upstream of CSO control structure, and modify existing county CSO control structure. Possible extension of existing SPU PS77 force main uphill. Tank drainage pumps in tanks to drain in 24 hrs.
	Flexibility	Modular.; opportunities to expand possible at bottom of basin; less likely in upper basin.
	Constructability	Bottom of Basin; steep slopes, deep cuts and tie back walls required, groundwater, restricted access, limited space for staging. Upper basin in residential area; restricted access, staging for construction.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Access restricted by site size. Routine access parking on street most likely.
	Process Effects	TBD
COST	Project Cost Factors	Impacts on local traffic during construction.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	TBD
	External Costs	Land acquisition.
COMMUNITY	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Project effects on community at least one year. Include traffic, effects on access to waterfront park. Effects are common to utilities and street improvement projects and can be planned using common techniques. Disruption of recreational uses of waterfront park possible. Informal parking for residences near tank may be reduced. Possible need to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns. Impacts on business and commercial traffic near upper basin site.



Legend

- Combined Sewer System
- Storm Sewer System
- Sanitary Sewer System
- 10' Topographic Contour
- Shoreline

0 50 100 150 200'
Approximate Scale



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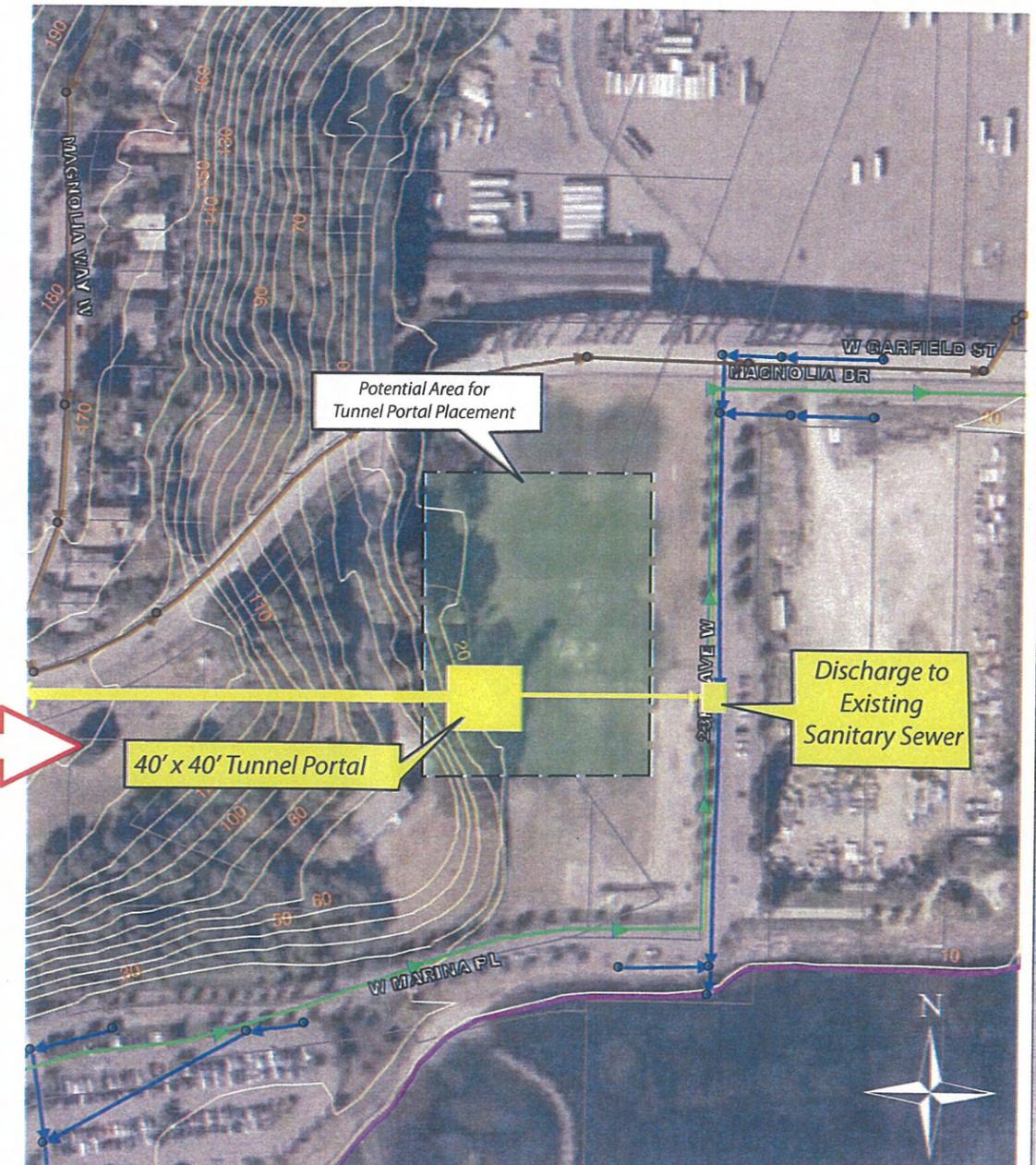
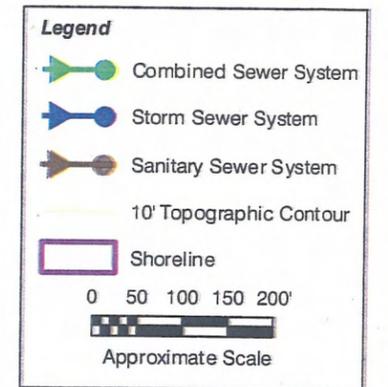
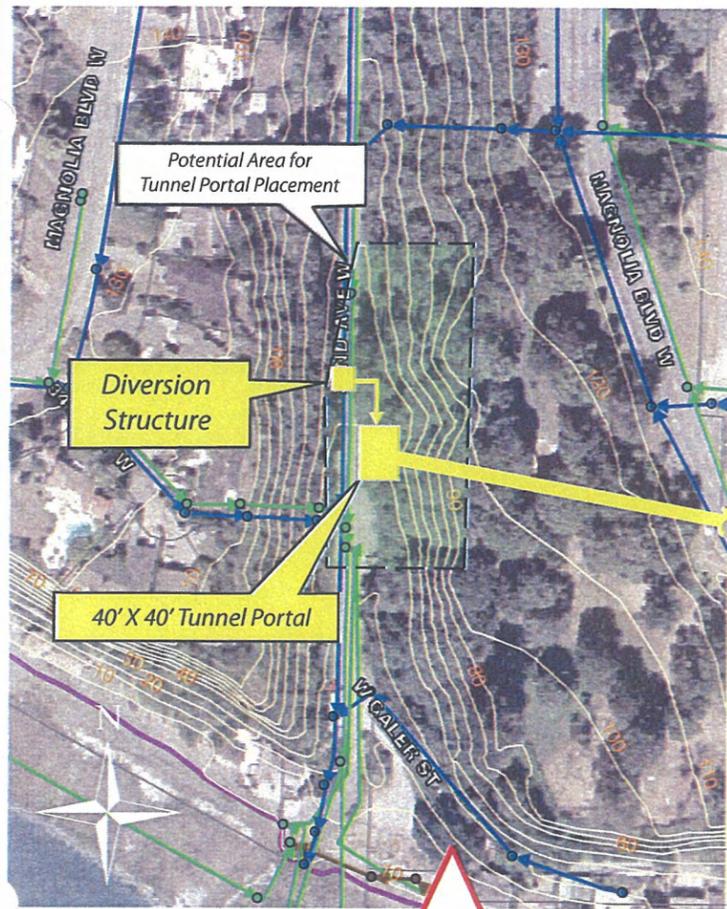
King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Preliminary
Draft

South Magnolia Basin Alternative 1D
Dispersed Pipe Storage in Three Locations

MAGNOLIA BASIN INITIAL ALTERNATIVES

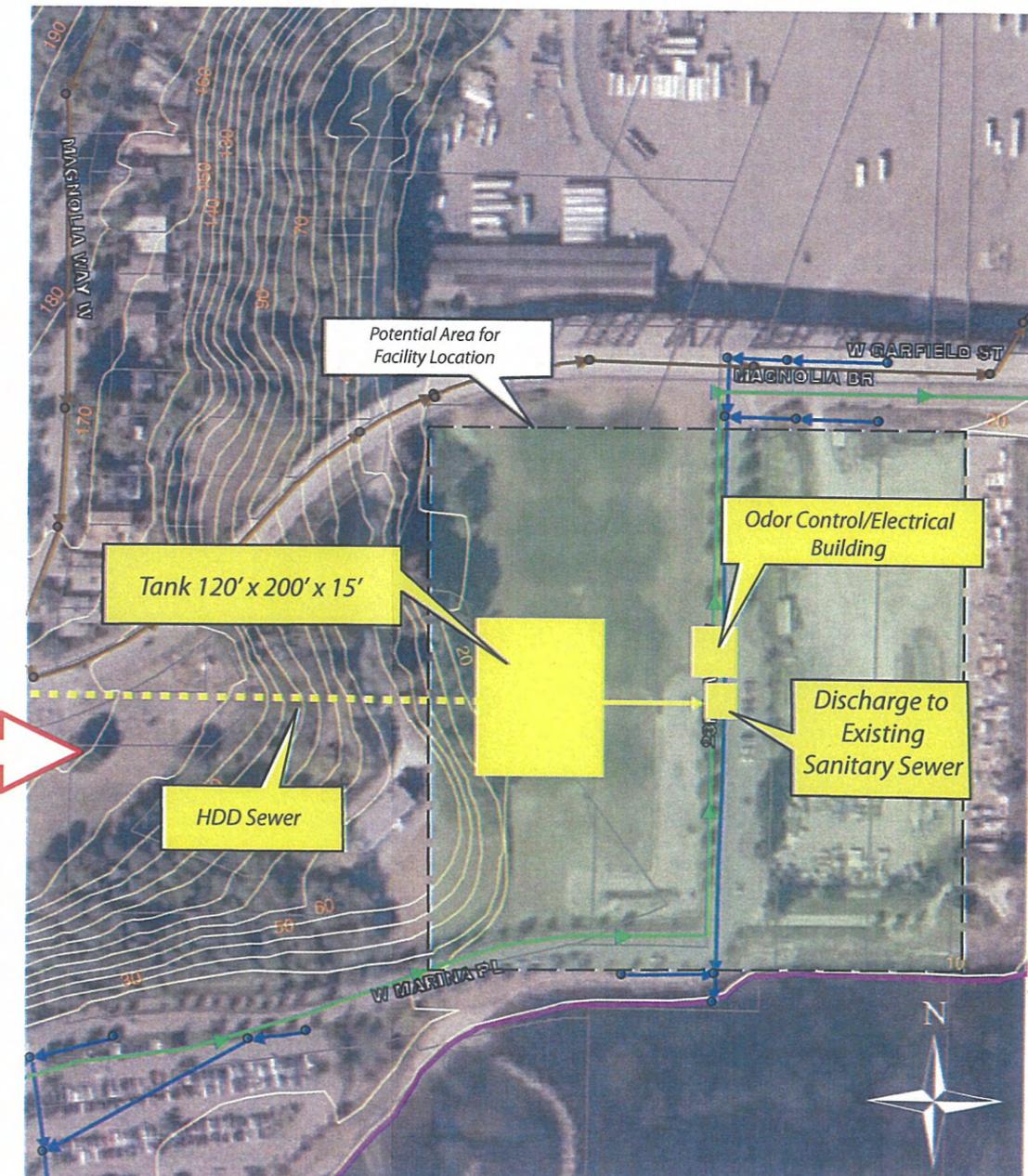
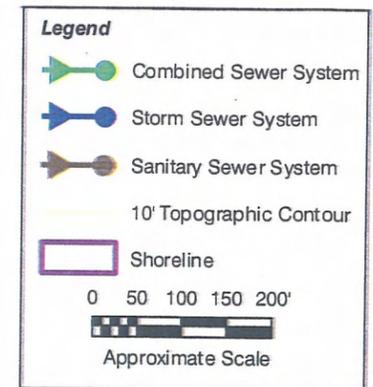
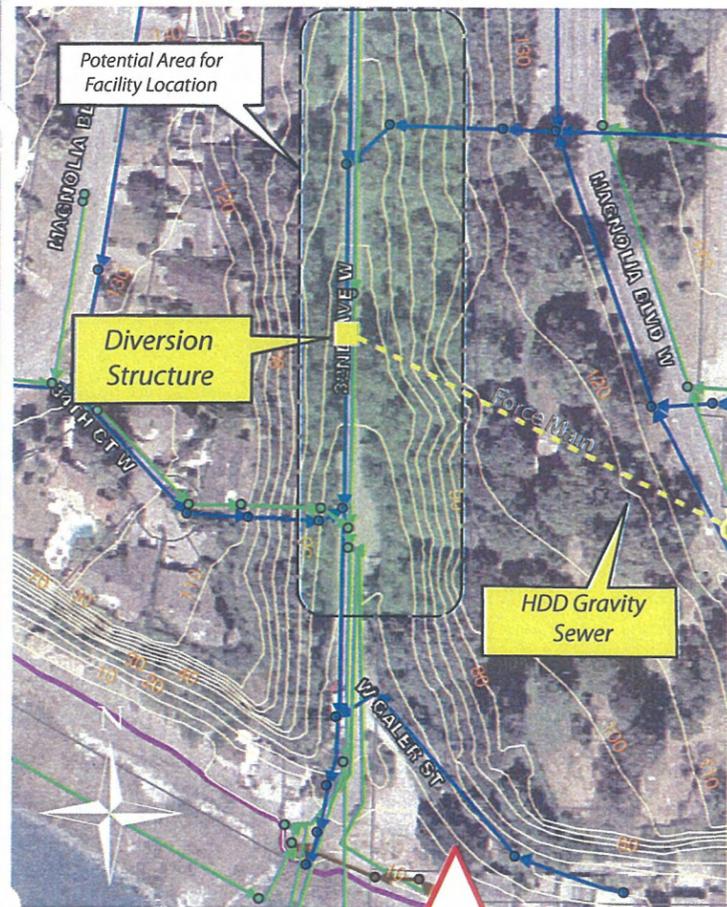
ALTERNATIVE TITLE		1D- DISTRIBUTED STORAGE - BOTTOM OF BASIN RECTANGULAR TANK, AND PIPE IN RIGHT OF WAY IN UPPER BASIN
TECHNICAL SUMMARY		
LOCATION	Three areas in basin: 1. Bottom of basin 2. Upper third of basin near the end of sub basin 6. 3. Upper third of basin near the confluence of sub basins 5, 7, and 8.	
DESCRIPTION	Bottom of Basin: 0.6 MG storage tank, 130 x 85 x 15 ft deep, 3 channels. Sub basin 6: 0.45 MG pipeline storage, 600 LF, 12-ft diameter, 60% of sub basin SM06. Sub basins 5, 7,8: 0.72 MG pipeline storage, 950 LF, 12-ft diameter. Construct up to five diversion structures at locations necessary to serve tanks. Pipe storage in street. Above grade access with stairway. Access area footprint approximately 10 ft by 20 ft. by 10 ft. Odor Control: All sites, carbon scrubber.	
ANCILLARY FACILITIES	Odor control in above grade structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank, pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: 0.75 Ac more or less; need to acquire. ROW franchise. Potential acquisition from private owners on adjacent land for access and odor control.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area, open space. Upper basin: Steep slopes adjacent in some areas, but not in ROW.
ENVIRONMENT	Shorelines Zone	No
	Fish and Wildlife	TBD, depends on whether marine access is required for bottom of basin tank.
TECHNICAL	Complexity and Startup	Similar to other county in line storage facilities. Multiple storage tanks, telemetry and control interconnected.
	Compatibility w/WW system	Add five diversion structures to existing SPU collection system and modify existing county CSO control structure.
	Flexibility	Modular, potential with linear expansion.
	Constructability	Bottom of basin: steep slopes, groundwater, restricted access, limited space for staging. Traffic and residential access restrictions during construction.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Access restricted in bottom of basin.
	Process Effects	TBD
COST	Project Cost Factors	Local traffic impacts during construction. Access disruption to up to 60 residences and multiple businesses. Disruption of traffic on arterial street, 8-10 blocks.
	Operation Cost Factors	Carbon replacement for odor control. Potential access in ROW.
	O&M	TBD
	External Agency	TBD
COMMUNITY	External Costs	Land acquisition.
	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Project effects on community at least one year. Include traffic, effects on access to waterfront park. Effects are common to utilities and street improvement projects and can be planned using common techniques. Disruption of recreational uses of waterfront park possible. Informal parking for residences near tank may be reduced. Possible need to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns. Impacts on business and commercial traffic near upper basin site.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

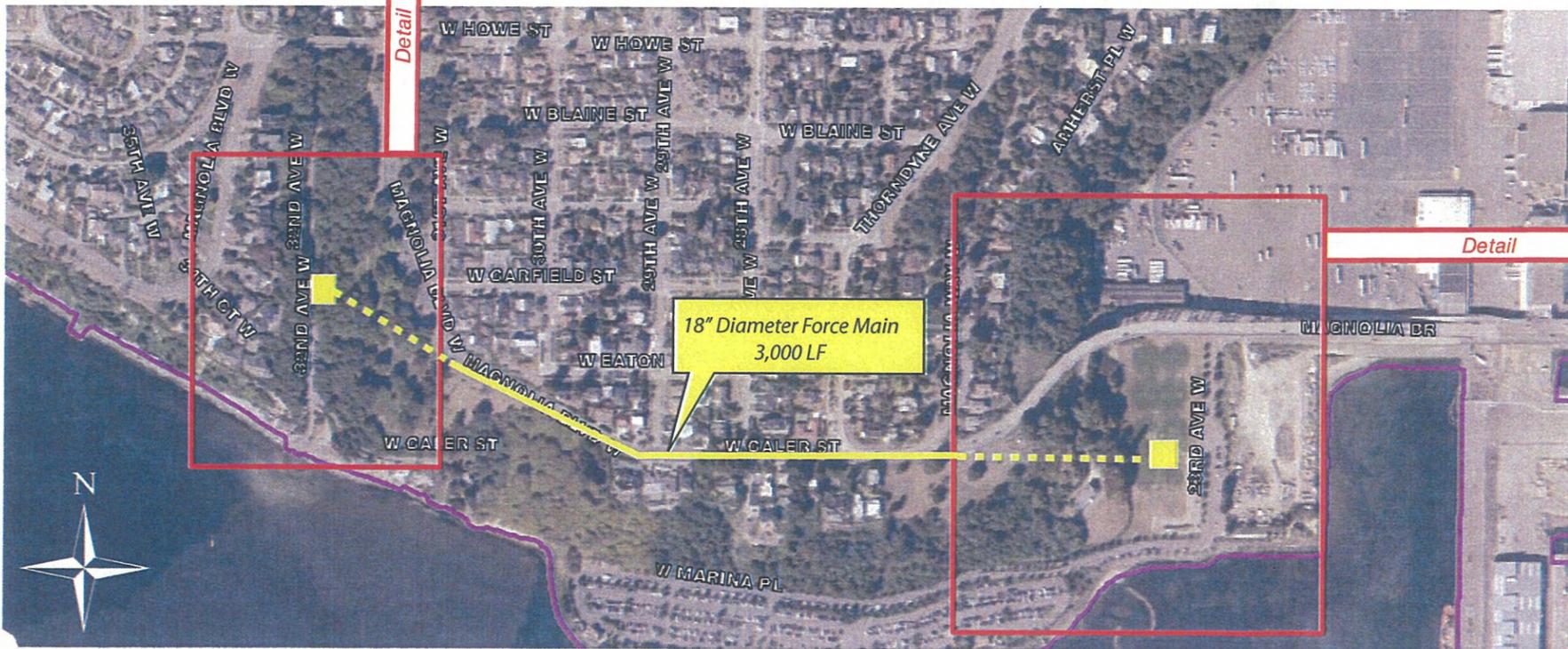
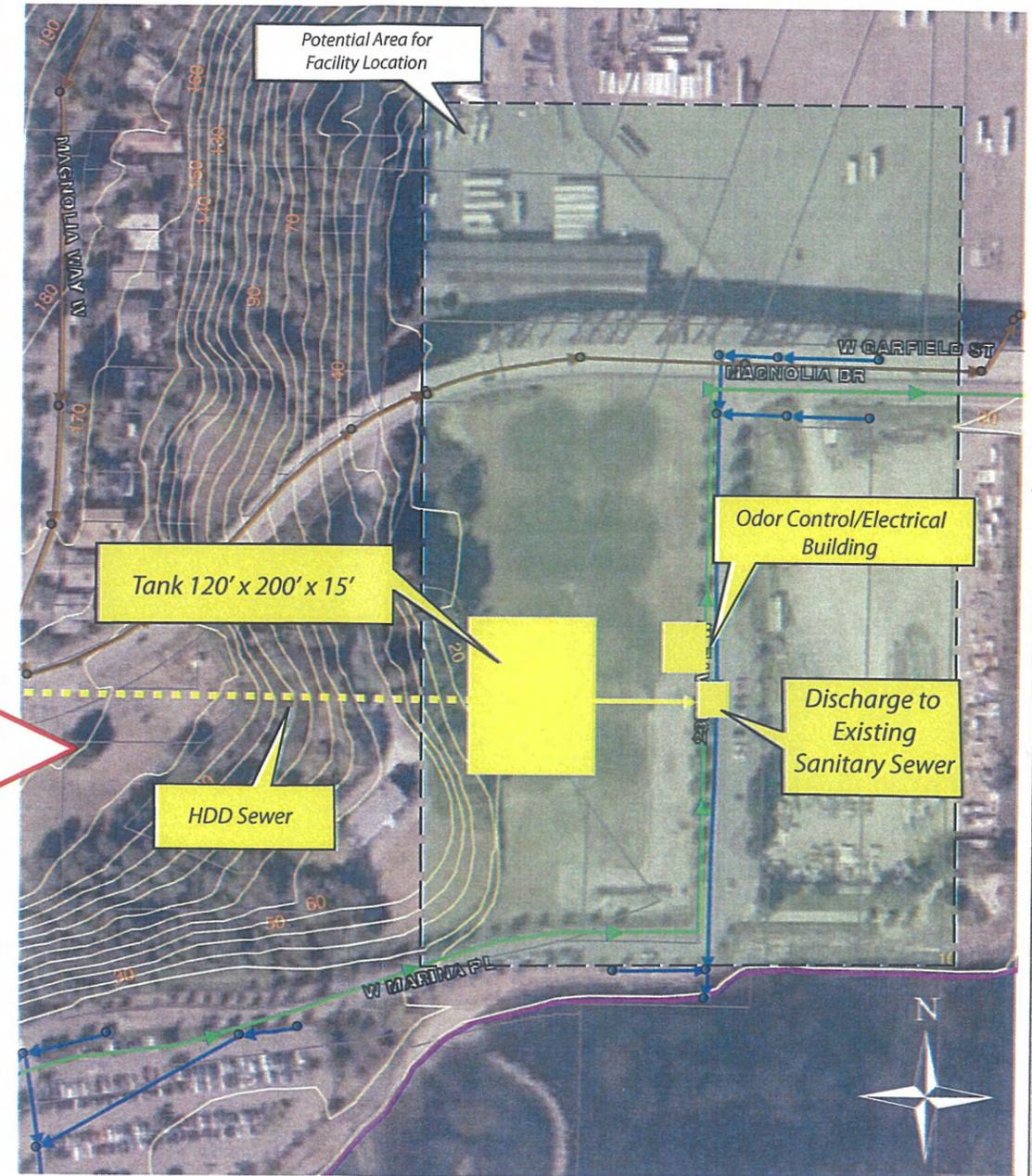
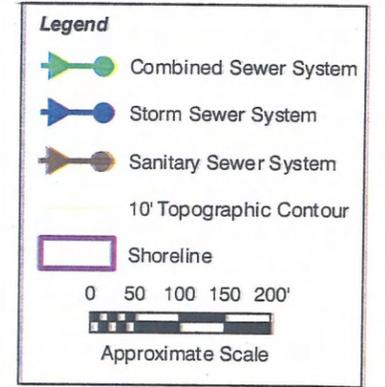
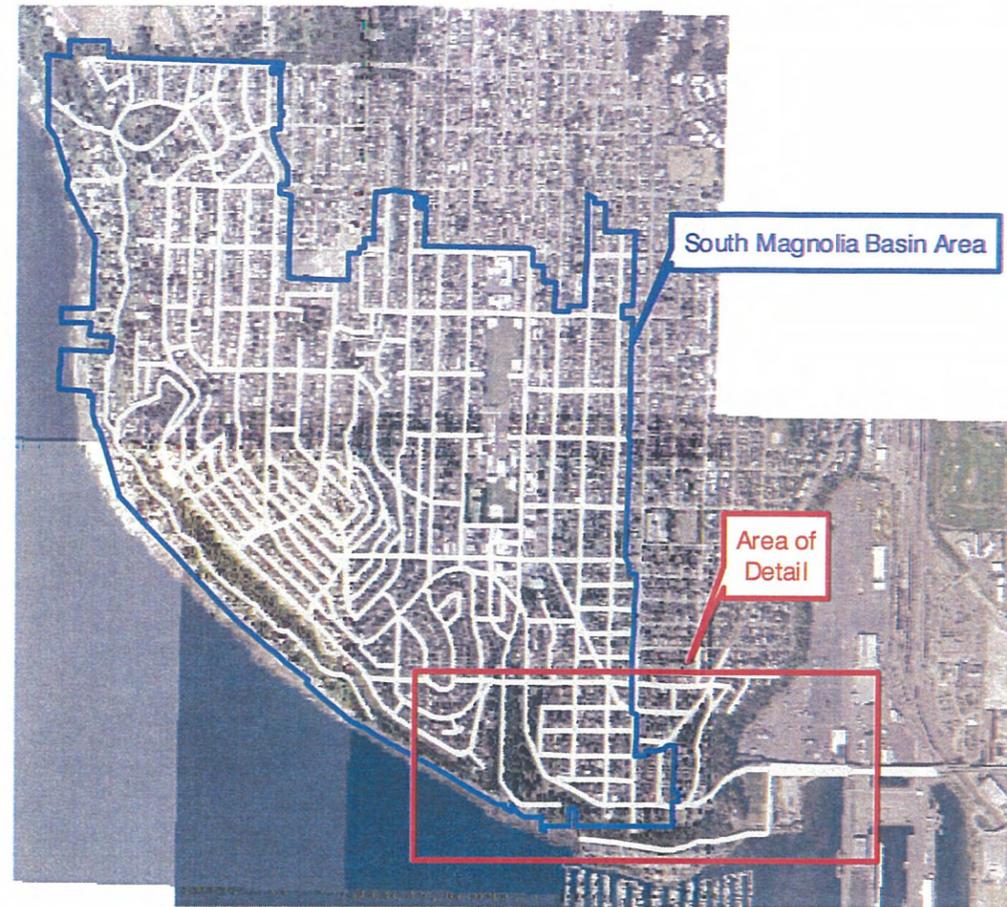
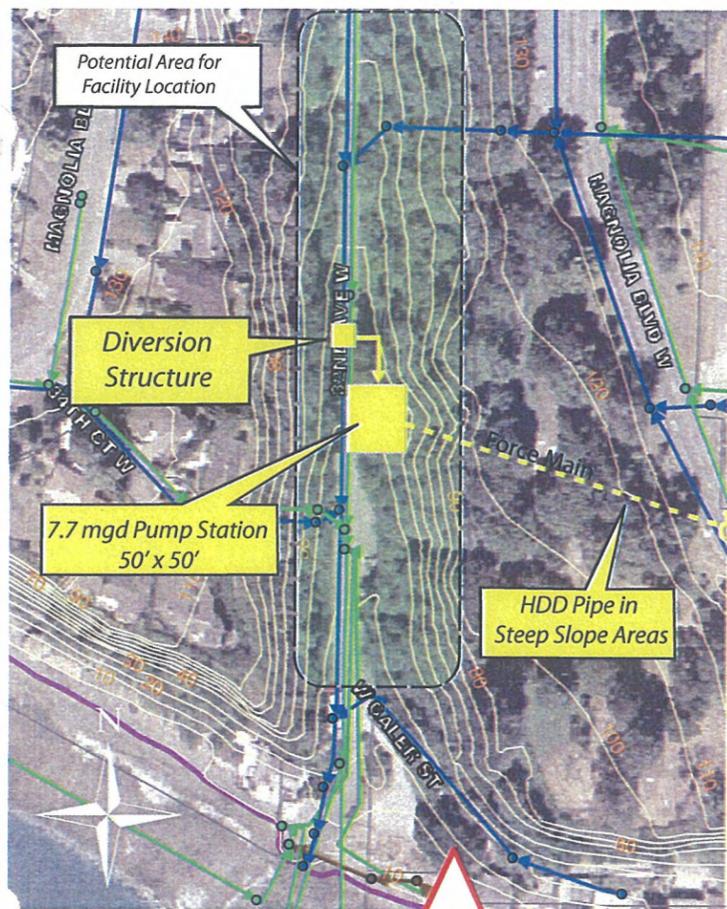
ALTERNATIVE TITLE		1E – OUT OF BASIN STORAGE, TUNNEL
TECHNICAL SUMMARY		
LOCATION	Three areas: 1. Bottom of basin on 32nd Ave. W. 2. Tunnel under hillside near W. Galer St. 3. Out of basin sewer connection near 23rd Ave. W and W. Marina Pl.	
DESCRIPTION	Bottom of basin: Modification of existing diversion structure and tunnel portal. Tunnel under hillside: 3,000 LF 12-ft diameter tunnel. Out of basin: Tunnel portal and diversion structures on S. Magnolia Trunk. Odor Control: carbon scrubber at east tunnel portal.	
ANCILLARY FACILITIES	Odor control in above grade structure at east end of tunnel. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into storage tunnel, pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: Acquire 0.25 Ac from City of Seattle. Tunnel under hillside: Acquire easements from City of Seattle. Out of Basin: Acquire easement from City of Seattle. Acquire 0.5 Ac from City of Seattle for odor control and access.
	Critical Areas	Bottom of Basin: Steep slopes, groundwater, landslide area, open space. Tunnel under hillside: In critical area, but tunnel alignment should be below any areas of concern. Out of basin: Potential for active portion of site to be in Shorelines zone.
ENVIRONMENT	Shorelines Zone	East Tunnel portal likely in shoreline zone.
	Fish and Wildlife	Not likely.
TECHNICAL	Complexity and Startup	Similar to other county tunnels.
	Compatibility w/WW system	Add diversion structure to existing county CSO control structure.
	Flexibility	Tunnel: 25% more capacity than needed will be required due to length.
	Constructability	Bottom of basin: limited space for staging, special shoring required to stabilize slopes above portal. Out of basin site: foundation issues due to poor soils may be problematic. Adequate staging available. Likely tunnel construction runs east to west.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	All access off street.
	Process Effects	TBD
COST	Project Cost Factors	Local traffic disruption during construction.
	Operation Cost Factors	Carbon replacment for odor control.
	O&M	TBD
	External Agency	TBD
	External Costs	Land acquisition.
COMMUNITY	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Informal parking along 32nd Av.W may be reduced. Possible mitigation needed to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses at out of basin site.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

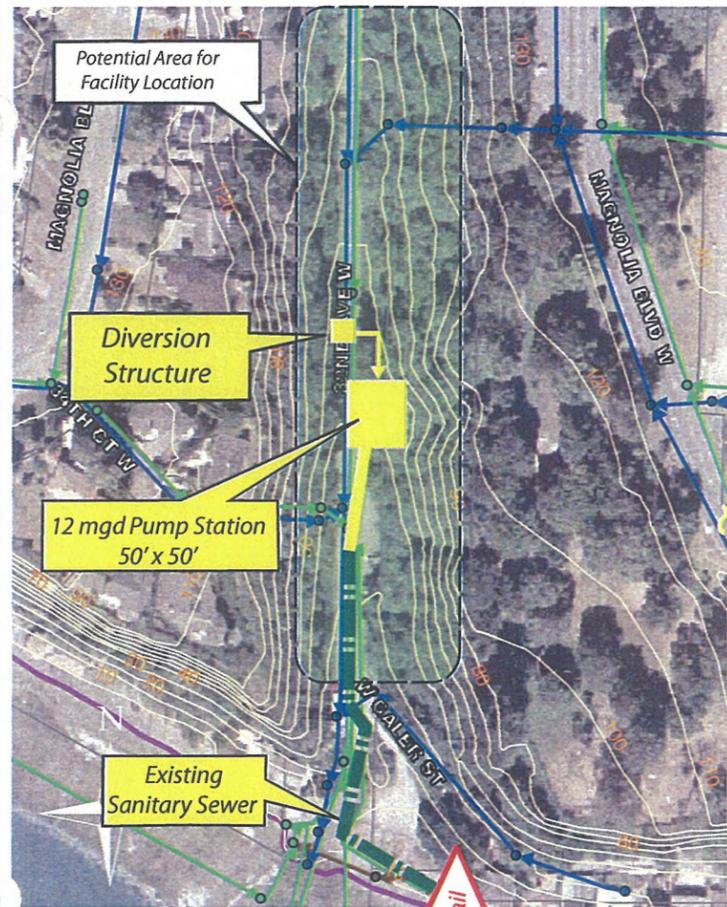
ALTERNATIVE TITLE		IF1- CENTRALIZED STORAGE OUT OF BASIN – GRAVITY SEWER TO OUT OF BASIN TANK
TECHNICAL SUMMARY		
LOCATION	Three areas: 1. Bottom of basin on 32nd Ave. W. 2. Under hillside near W. Galer St. 3. Out of basin sewer connection near 23rd Ave. W and W. Marina Pl.	
DESCRIPTION	Modification of existing diversion structure with gravity sewer. 2,400 lf directional drilled (HDD) 18-inch diameter gravity sewer. Out of basin: 1.8 MG storage tank, 200 x 120 x 15 ft deep. Drill portal and diversion structures on S. Magnolia Trunk on W. Marina Place.	
ANCILLARY FACILITIES	Odor control in above grade structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: Acquire 0.25 Ac from City of Seattle for access. Under hillside: Acquire easements from City of Seattle. Out of basin: Acquire ground lease from City of Seattle or Port of Seattle. Acquire 1 Ac for odor control and access.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area, open space. Under hillside: In critical area, but HDD alignment should be below any areas of concern. Out of basin: Potential for active portion of site to be in Shorelines zone.
ENVIRONMENT	Shorelines Zone	Tank likely in Shoreline zone
	Fish and Wildlife	None likely
TECHNICAL	Complexity and Startup	Similar to other county sewers.
	Compatibility w/WW system	Add diversion structure to existing county CSO control structure.
	Flexibility	Out of basin: 50% expansion capacity. Gravity sewer 25 - 50% additional capacity based on size and material.
	Constructability	Bottom of basin: limited space for staging. Simple diversion structure to gravity sewer. Out of basin: foundation issues due to poor soils may be problematic for tank. May require pile support. Likely HDD construction runs east to west from out of basin to bottom of basin.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	All access off street. No routine access to tunnel.
COST	Process Effects	TBD
	Project Cost Factors	Local traffic disruption during construction. Limited staging area.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	TBD
COMMUNITY	External Costs	Land acquisition.
	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Informal parking may be reduced. Possible mitigation needed to provide more off street parking for 11 existing residences.. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

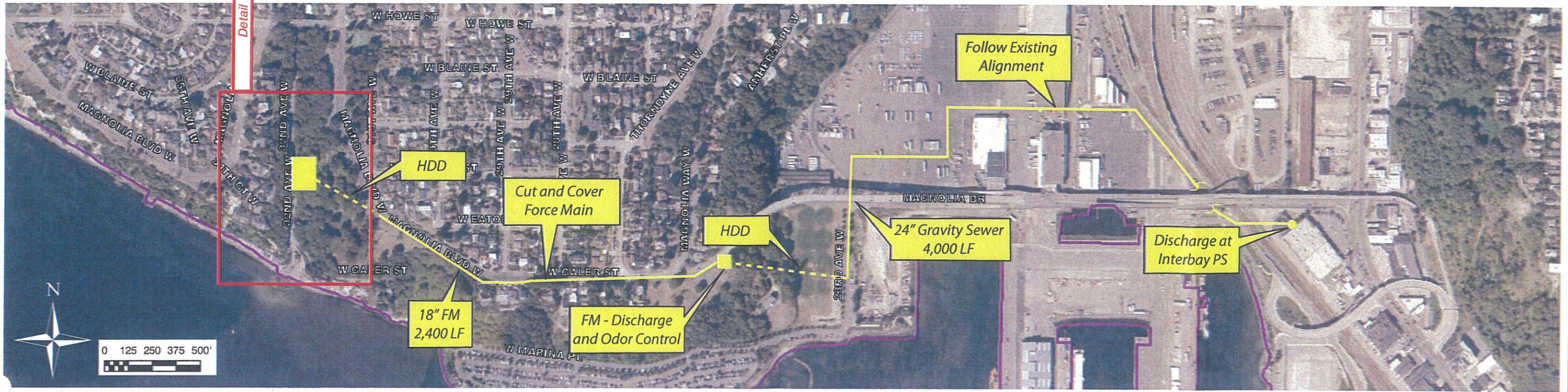
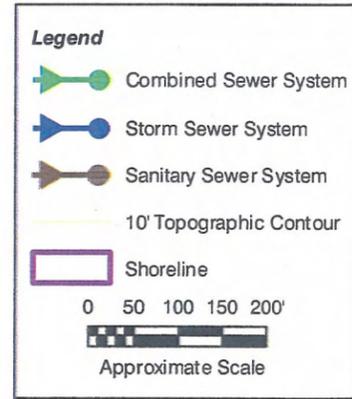
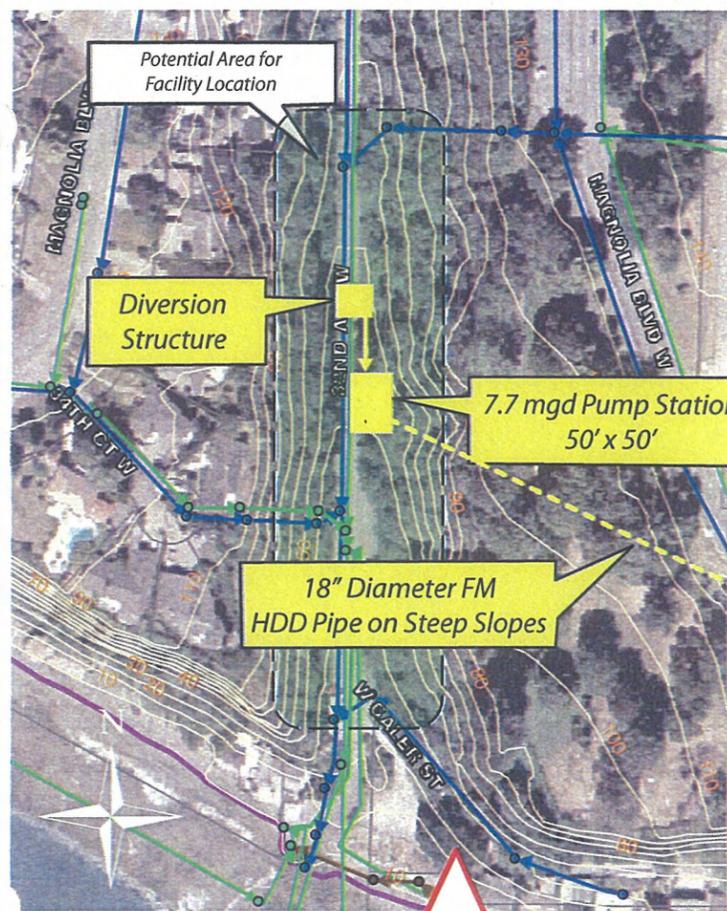
ALTERNATIVE TITLE		1F2- CENTRALIZED STORAGE OUT OF BASIN – PUMP STATION AND FORCE MAIN TO TANK
TECHNICAL SUMMARY		
LOCATION	Three areas: 1. Bottom of basin on 32nd Ave. W. 2. Under hillside near W. Galer St. 3. Out of basin sewer connection near 23rd Ave. W and W. Marina Pl.	
DESCRIPTION	1. Modification of existing diversion structure. 2. 7.7 mgd pump station and force main. 3. 2,400 LF 18-inch diameter force main, TDH 190 - 200 feet . 4. Out of basin: 1.8 MG storage tank, 200 x 120 x 15 ft deep. Drill portal and diversion structures on S. Magnolia Trunk on W. Marina Place.	
ANCILLARY FACILITIES	Odor control in above grade structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank, pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: Acquire 0.25 Ac from City of Seattle for access. Under hillside: Acquire easements from City of Seattle. Out of basin: Acquire ground lease from City of Seattle or Port of Seattle. Acquire 1 Ac for odor control and access.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area, open space. Under hillside: In critical area, but HDD alignment should be below any areas of concern. Out of basin: Potential for active portion of site to be in Shorelines zone.
ENVIRONMENT	Shorelines Zone	Tank likely in Shoreline zone
	Fish and Wildlife	None likely
TECHNICAL	Complexity and Startup	Similar to other county pump stations.
	Compatibility w/WW system	Add diversion structure to existing county CSO control structure.
	Flexibility	Out of basin: 50% expansion capacity. Pump station and force main capacity limited unless built in at initial construction.
	Constructability	Bottom of basin: limited space for staging, special shoring required to stabilize slopes above pump station. Out of basin: foundation issues due to poor soils may be problematic for tank. May require pile support. Likely HDD construction runs east to west from out of basin to bottom of basin.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	No know impacts
COST	Process Effects	TBD
	Project Cost Factors	Local traffic disruption during construction. Limited staging area.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	TBD
COMMUNITY	External Costs	Land acquisition.
	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Informal parking may be reduced. Possible mitigation needed to provide more off street parking for 11 existing residences.. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

ALTERNATIVE TITLE		IF3- CENTRALIZED STORAGE OUT OF BASIN – PUMP STATION AND FORCE MAIN TO TANK
TECHNICAL SUMMARY		
LOCATION	Three areas: 1. Bottom of basin on 32nd Ave. W. 2. Convert existing trunk sewer to force main 3. Out of basin sewer connection near 23rd Ave. W and W. Marina Pl.	
DESCRIPTION	1. 12 mgd pump station. 2. Convert existing pressure sewer to force main for all peak flow Out of basin: 1.8 MG storage tank, 200 x 120 x 15 ft deep. Drill portal and diversion structures on S. Magnolia Trunk on W. Marina Place.	
ANCILLARY FACILITIES	Odor control in underground concrete structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Gravity flow into tank, pump discharge.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of basin: Acquire 0.25 Ac from City of Seattle for access. Out of basin: Acquire ground lease from City of Seattle or Port of Seattle. Acquire 1 Ac for odor control and access.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area, open space. Out of basin: Potential for active portion of site to be in Shorelines zone.
ENVIRONMENT	Shorelines Zone	Tank likely in Shoreline zone
	Fish and Wildlife	None likely
TECHNICAL	Complexity and Startup	Similar to other county pump stations.
	Compatibility w/WW system	Add diversion structure to existing county CSO control structure. A new pump station and force main will be required to replace the existing gravity connection at the Elliott West Marina.
	Flexibility	Out of basin: 50% expansion capacity. Gravity sewer 25 - 50% additional capacity based on size and material.
	Constructability	Bottom of basin: limited space for staging, special shoring required to stabilize slopes above portal. Out of basin: foundation issues due to poor soils may be problematic for tank. May require pile support.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	No known impacts
	Process Effects	TBD
COST	Project Cost Factors	Mitigation for local traffic disruption during construction. New pump station and force main for marina.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	TBD
	External Costs	Land acquisition. New submersible pump station and force main for restaurant at marina to replace existing gravity connection to trunk sewer.
COMMUNITY	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Informal parking may be reduced. Possible mitigation needed to provide more off street parking for 11 existing residences.. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

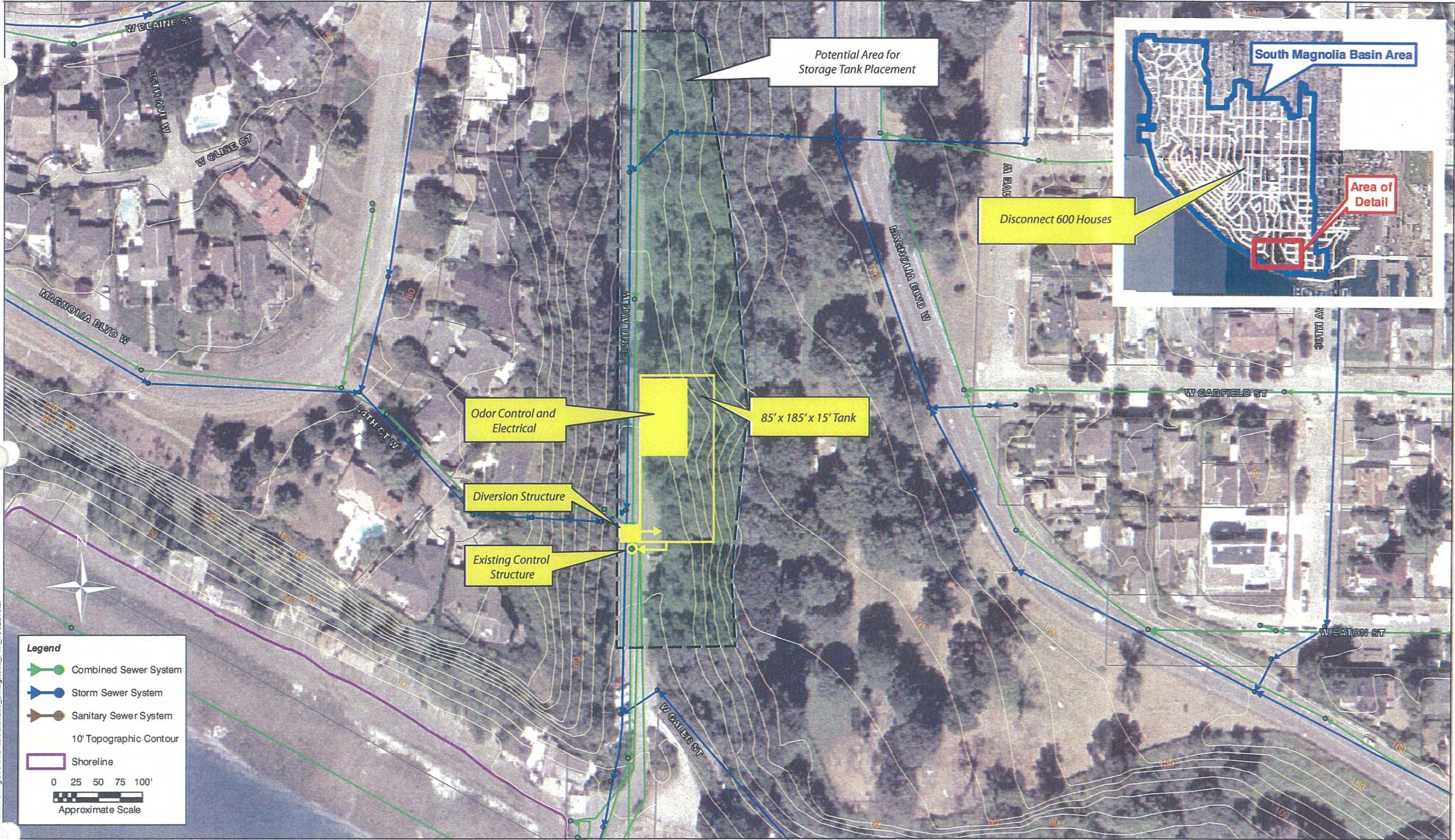
ALTERNATIVE TITLE		2A - CONVEY AND TREAT
TECHNICAL SUMMARY		
LOCATION	Three Areas: 1. Bottom of basin 2. Under hillside near W. Galer St. 3. In W. Garfield St. area	
DESCRIPTION	Modification of existing diversion structure. New 7.7 mgd pump station. 2,400 LF 18-inch diameter force main, TDH exceeds 200 ft. New parallel pressure sewer, 18-inch diameter (est.) to Interbay PS, 4,000 LF.	
ANCILLARY FACILITIES	Odor control at pump station. Generator, 500kW and integrated fuel tank in underground structure. Odor control in underground concrete structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls at both sites. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Overflow from diversion structure to pump station wetwell.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required.
	Ownership/acquisition	Bottom of Basin Acquire 1 Ac from City of Seattle for site and access. Under hillside: Acquire easements from City of Seattle. ROW franchises for new sewers in streets. Potential need for expanded sewer easement from Port of Seattle, 4,000 LF.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area, open space. Under hillside: In critical area, but HDD alignment should be below any areas of concern. Sewers. Potential for sewers to be in shoreline zone.
ENVIRONMENT	Shorelines Zone	Sewer in shoreline zone
	Fish and Wildlife	None likely
TECHNICAL	Complexity and Startup	Similar to other county pump stations.
	Compatibility w/WW system	Addition to influent controls at Interbay PS likely.
	Flexibility	Expansion capacity only if pump station, force main, and sewer are overbuilt.
	Constructability	Bottom of basin: limited space for staging, special shoring required to stabilize slopes above pump station. Possible HDD for force main on steep slopes. Some areas of known and suspected hazardous material in soils in Port of Seattle area.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Access off street.
	Process Effects	TBD
COST	Project Cost Factors	Local traffic disruption during construction on 32 nd Ave. W. Potential for contaminated soils on Port of Seattle property. Unknown if sewer will fit into existing county easement across Port property.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
	External Agency	TBD
	External Costs	Land acquisition.
COMMUNITY	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Informal parking may be reduced. Possible mitigation needed to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

ALTERNATIVE TITLE		3A- BOTTOM OF BASIN TREATMENT
TECHNICAL SUMMARY		
LOCATION	Bottom of basin.	
DESCRIPTION	Bottom of basin. Modification of existing diversion structure. New 7.7 mgd High Rate Clarification (HRC) treatment plant. Footprint approximately 120 x 65 ft. May require upgrade of SPU PS77.	
ANCILLARY FACILITIES	Odor control at treatment plant. Generator, 1000kW and integrated fuel tank in underground structure. Odor control in underground concrete structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls at both sites. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Remotely started and monitored. Chemical usage.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential zoning may prohibit use without zoning variance or other change.
	Ownership/acquisition	Bottom of basin. Acquire 1 Ac from City of Seattle for site and access.
	Critical Areas	Bottom of basin. Steep slopes, groundwater, landslide area, open space.
ENVIRONMENT	Shorelines Zone	Not in shoreline zone.
	Fish and Wildlife	TBD. Impacts if marine access.
TECHNICAL	Complexity and Startup	Similar to three other county wet weather treatment facilities.
	Compatibility w/WW system	No issues.
	Flexibility	Expansion capacity with modular expansion.
	Constructability	Bottom of basin: limited space for staging, special shoring required to stabilize slopes above treatment plant.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Access off street.
	Process Effects	TBD
COST	Project Cost Factors	Local traffic disruption during construction.
	Operation Cost Factors	Chemicals for treatment and odor control.
	O&M	TBD
	External Agency	TBD
COMMUNITY	External Costs	Land acquisition.
	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Informal parking may be reduced. Possible mitigation needed to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses.



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MAGNOLIA BASIN INITIAL ALTERNATIVES

ALTERNATIVE TITLE		5A – COMBINATION STORMWATER DISCONNECTION AND BOTTOM OF BASIN STORAGE
TECHNICAL SUMMARY		
LOCATION	Throughout basin , plus tank at 1520 32 nd Ave. W. (approx address) Bottom of the basin near the CSO control manhole on 32 nd Ave. W.	
DESCRIPTION	1.08 MG storage tank 185 x 85 x 15-ft deep, 4 channels storage tank. Construct one diversion structure in SPU system to divert flow at bottom of basin. Stormwater disconnection of approximately 600 rooftops throughout the basin	
ANCILLARY FACILITIES	Odor control at pump station. Generator, 375kW and integrated fuel tank in underground structure. Odor control in underground concrete structure. Generator and integrated fuel tank in underground concrete structure. Surface access structure with electrical equipment and controls at both sites. Access roads, fencing around surface structures.	
OPERATIONAL FEATURES	Overflow from diversion structure to pump station wetwell.	
SELECTION CRITERIA FACTORS		
LAND USE	Zoning	Residential. Conditional use permit required for pump station.
	Ownership/acquisition	Bottom of Basin Acquire 1 Ac from City of Seattle for site and access.
	Critical Areas	Bottom of basin: Steep slopes, groundwater, landslide area, open space.
ENVIRONMENT	Shorelines Zone	No.
	Fish and Wildlife	TBD, depends on whether marine access is required for bottom of basin tank
TECHNICAL	Complexity and Startup	Similar to other county storage tanks..
	Compatibility w/WW system	No additional conveyance capacity in Magnolia Trunk required. Added flow volume of up to 1.1 MG following storm routed to Interbay and WPTP. Add one diversion structures to existing SPU collection system upstream of CSO control structure, and modify existing county CSO control structure. Possible extension of existing SPU PS77 force main uphill. Tank drainage pumps in tank, 1.1 mgd.
	Flexibility	Modular, 50% expansion capacity. Most likely have to add length due to steep slopes. Possible to disconnect more houses, but depends on cooperation and feasibility
	Constructability	Geotechnical and construction constraints due to steep, unstable slopes and dewatering. Special measures required. Possible tie back wall construction required to control slopes and water.
O&M	Staffing	Remotely monitored, started, and shut down using county telemetry and control system. Periodic access for equipment exercising and cleaning check.
	Training	TBD
	Access	Off-street possible, but site constrained. Parking/Access on top.
COST	Process Effects	TBD
	Project Cost Factors	Potential for local traffic disruption during construction. Access for 11 existing residences affected. Possible need for off site parking and transportation service.
	Operation Cost Factors	Carbon replacement for odor control.
	O&M	TBD
COMMUNITY	External Agency	TBD
	External Costs	Land acquisition.
	Location	All sites are visible to surrounding residences. No effect on long-term traffic patterns. Short-term effect on recreation and business access uses. Assume buried tank with minimal above grade structures. ROW informal parking may be reduced. Possible need to provide more off street parking for existing residences. No effect on long-term traffic patterns.
	Potential Community Impacts	Periodic O&M activities will be visible from surrounding community.
	Construction	Project effects on community at least one year. Include traffic, effects on access to waterfront park. Effects are common to utilities and street improvement projects and can be planned using common techniques. Disruption of recreational uses of waterfront park possible. Informal parking for residences near tank may be reduced. Possible need to provide more off street parking for 11 existing residences. No effect on long-term traffic patterns.