Attachment 1 - Functional Design Criteria

Project Memorandum

To: Robert Ovadia

From: Blake Rothfuss

Job Number: 3957.1

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Subject: Vista Grande Drainage Basin Alternatives Analysis Project
Functional Design Criteria, Revision 0

This memorandum summarizes the Functional Design Criteria developed for the analysis of the three alternatives selected by the City of Daly City (City). This work builds upon the previous analysis of 17 alternative conceptual designs completed in December 2007.

A functional design criteria summarizes the initial design basis for the supplemental analysis and is included as Attachment A. It includes a recent draft watershed hydrograph predicting the peak stormwater flow near Westlake Park and the estimated flow-duration curve of the design storm. The criteria also documents the design assumptions used in the conceptual design and layout of the proposed project features.

1 Applicable Alternatives

Alternative 5B
Alternative 5B, located within the city limits of San Francisco, would include a drop structure, a gross solid screening device, an 800-foot-long box culvert within the existing canal corridor, a new drainage tunnel that would be approximately 5,300 feet long, and a 4 MG underground stormwater storage tank beneath Westlake Park in Daly City. The existing tunnel outfall structure would be rehabilitated and modified to accommodate the new tunnel.

A new drop structure, located at the canal inlet (John Muir and Lake Merced Blvd.), would collect the flows from the major culvert lines and direct the flows to the gross solid screening device. Assuming the screens were no more than 25% full, the screening device would have a capacity of 1,500 cfs. The transition between the screening device and the new box culvert would incorporate an overflow weir to split the flows. In the box culvert, flows up to 170 cfs would flow through a box culvert to the existing canal north of the new tunnel inlet and through the existing tunnel. Flows in excess of 170 cfs would flow over a weir into a separate double box culvert leading to the new tunnel inlet.

The new tunnel would run northwest from the wide section of the canal corridor, located approximately 800 feet downstream of the canal inlet, to the rehabilitated Vista Grande Outfall Structure. The tunnel would run under the Olympic Club, Highway 35, and the GGNRA lands.

Alternative 6
Alternative 6, located within the city limits of San Francisco, would include a drop structure, a gross solid screening device, a 2,100-foot-long box culvert, a new drainage tunnel that would be approximately 4,200 feet long, and a 4 MG underground stormwater storage tank beneath Westlake Park in Daly City.

A new drop structure, located at the canal inlet, would collect the flows from the major culvert lines and direct the flows to the gross solid screening device. Assuming the screens were no more than 25% full, the screening device would have a capacity of 1,500 cfs. The transition between the screening device and the new box culvert would incorporate an overflow weir to split the flows. In the box culvert, flows up to 170 cfs would flow through a box culvert to the existing canal north of the new tunnel inlet and through the existing tunnel. Flows in excess of 170 cfs would flow over a weir into a separate double culvert leading to the new tunnel inlet.

The new tunnel would run northwest from a wide section of the canal, located approximately 2,100 feet downstream of the canal inlet, to the rehabilitated Vista Grande Outfall Structure. The tunnel would run under the Olympic Club, Highway 35, and the GGNRA lands.

Alternative 7

Alternative 7, located within the city limits of San Francisco, would include a drop structure, a gross solid screening device, a 3,500-foot-long box culvert, a new drainage tunnel that would be approximately 3,200 feet long, and a 4 MG underground stormwater storage tank beneath Westlake Park in Daly City.

A new drop structure, located at the canal inlet, would collect the flows from the major culvert lines and direct the flows to a gross solid screening device. Assuming the screens were no more than 25% full, the screening device would have a capacity of 1,500 cfs. The transition between the screening device and the new box culvert would incorporate an overflow weir to split the flows. In the box culvert, flows up to 170 cfs would flow through a box culvert to the existing canal north of the new tunnel inlet and through the existing tunnel. Flows in excess of 170 cfs would flow over a weir into a separate double box culvert leading to the new tunnel inlet. The flows up to 170 cfs would flow through a separate box culvert to the existing canal north of the new tunnel inlet.

The new tunnel would run west from a point in the canal approximately 200 feet south of the existing tunnel, to the rehabilitated Vista Grande Outfall Structure. The tunnel would run beneath the Olympic Club, Highway 35, and the GGNRA lands.

Stormwater Storage

- Provide stormwater storage for peak stormwater flow shaving at Westlake Park or inline canal storage equal to at least 4 MG.
- Do not include groundwater recharge options.

2 Level of Service

- Design storm event: 25-Year-4-Hour blue sky event
- Consider the design event to be the first flush
- Assume back-to-back storms are separated by 24-hours
- Assume that back-to-back storms are equal to or less than the design storm event.

3 Existing property use (temporary, emergency, permanent)

Do not incorporate the following facilities into the design:

- The drainage culvert (24–inch diameter) to Lake Merced Impound Lake
- Lake Merced Outfall Tunnel.
- Lake Merced Outfall Structure.

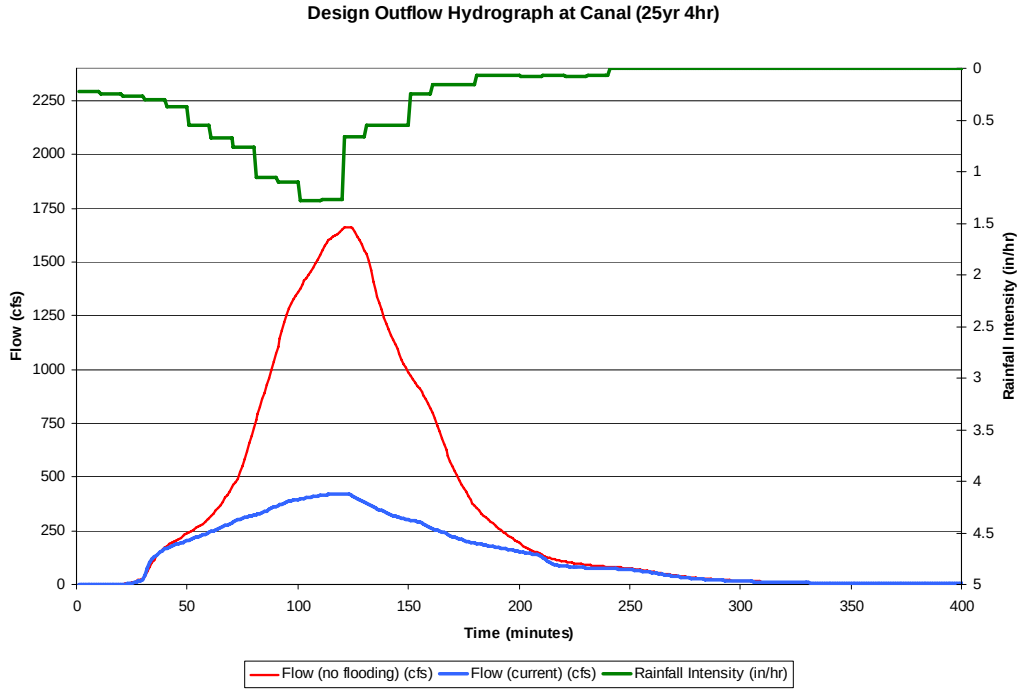
Incorporate the following facilities into the design as applicable:

- North San Mateo County Sanitation District 27–inch diameter forced main outfall. Maintain existing flow capacity
- North San Mateo County Sanitation District 33-inch WWTP bypass to Vista Grande Tunnel (VGT). Maintain existing flow capacity.
- The existing Daly City Outfall Structure.

Limit the need for new or additional right-of-way (ROW).

4 Hydraulics & Hydrology

- Design hydrograph will be 25Yx4Hr event modeled by RMC with peak flow of 1,663 cfs assuming future no upstream drainage system constraints. [Reference: Draft Vista Grande Storm Drain Model Calibration, RMC Water, 3/24/08. Affirmed by CDC, 4/29/08 to use draft model for functional design criteria.]



- Flow 170 cfs through existing Vista Grande tunnel.
- Flow 893 cfs through the proposed new tunnel.
- Divert 4 million gallons to temporary storage at a peak rate of 600 cfs. Total duration of diversion would be about 80 minutes.
- Preference should go to passive hydraulic controls (weirs, orifices, chutes) over dynamic controls (inflatable weirs). Hydraulic control device (inflatable weir) controls for Westlake storage option only.
- Intersect Cliffside Drive (to Lake Merced Blvd) & connect with storage.
- Post Construction: Maintain effluent gravity flow from WWTP to (E) VGT Inlet during dry weather, est. 8 MGD. When "raining" switch to 33-inch diameter forced main operations to move effluent to VG beach structure.
- Provide VGC water level monitoring. Provide water level indicators at canal to WWTP operations.

- Pump out criteria for Westlake Park Storage
    - Provide a minimum of 2 pumps. Normal operation would be one duty pump and one standby pump.
    - Setup float control to enable switching pump lead/follow. For operating flexibility provide dewatering set controls to run both pumps together.
    - Include SCADA and float wells to divert water to detention and PLC to initiate pumping.
    - Pump out entire volume within 24 hours using on pump (Q equal to 4 mgd/2,800 gpm).

5 Water Quality

- Provide debris screening for material > 6-inch at existing VGT portal.
- Provide debris screening for material > 5mm for all improvements. Develop costs w/r to flow rates.
- Exclude design provisions for stormwater treatment beyond screening.
- Beach outfall ties into (E) forced main shore pipeline. Flows in excess of FM will run through protected gate structures across the beach to the ocean.

6 Constructability

- Provide temporary storage or stormwater bypass when construction disrupts normal stormwater routing to the beach outfall.
- Explore potential for using sandstone tunnel muck for beach replenishment. Contact USACE for supplying them with material.
- Explore temporary construction shaft at Fort Funston to drive tunnel and construct new 24–inch diameter force main drop shaft. Need approximately 2 acres.
- Explore tunnel heading construction from both canal & shaft.
- Temporary diversion of WWTP & baseline flows around construction sites. Do not use CCSF assets.
- Beach cofferdam should facilitate public access around the construction site but could block access at high tide. It could be equipped with stairways and ramps to allow passage during a rising tide.
- During Construction/ Tie-in of (N) with (E): Use the (E) WWTP effluent forced main during demo of (E) beach structure. WWTP may need to store some effluent during tie-ins.
- At beach, combine tunnels to reduce footprint of (N) beach outfall.

7 Public Amenities

- Remove existing NSMCSD beach structure, exposed force main, and tunnel.
- Depress effluent force main across the beach grouted into trench in the rock, so that beach is unobstructed at base of bluff.

8 O&M expectations

Debris Handling

- Debris separator cleanout(s) should be located with easy access from Lake Merced Blvd/John Muir Drive and from West Lake Park.
- Replace-in-kind the trashrack at the (E) VGT inlet. Do not require an automated trashrake and debris handling system.
- Debris accumulation not provided.

Pumpout

- Detention basin pump-out criteria—empty within 24 hours
- Detention basin clean out, aeration, ventilation, provide means to cleanout and washdown with recycled water.
- Detention basin non-storm defaults is empty.
- Dispose of accumulated debris appropriately.

Outfall

- Consider grated surface discharge instead of flap valves.
- Include splash apron to reduce scouring.
- Include sacrificial concrete wall at bottom face of structure.
- Provide strategy for continued coastal retreat.

9 CCSF/CDC Issues

- When (N) VG Beach structure is rebuilt, the (E) Lake Merced Beach Structure will be completely exposed and vulnerable to surf (north bound wave pattern). Potential outcomes will be under cut and erosion.