APPENDIX M

Operational Strategies

Appendix M provides two documents — the most recent bayside and westside operating strategies. This summarizes the overall Operations Plan for the bayside transport/storage, pump stations, and combined sewer discharge facilities.

Bayside System Operations Plan

Dry-Weather Operations

Dry-weather operation of the Southeast Water Pollution Control Plant (SEP), which most concerns the Bayside System, involves flow control of the plant influent. Operations staff have specific limits of flow to consider, with the most important limit being the capacity of the Effluent Booster Pump Station. Any dry–weather diurnal peak flows over 100 mgd (based on tide conditions) could bypass to Islais Creek. Peak flows through the SEP are limited to a maximum of 100 mgd or less, dependent on tide level.

Control of influent hydraulic peaks is accomplished by regulating the Northshore Pump Station and Channel Pump Station discharges, the SEP lift pump discharge, and the Bayside System Transport/Storage (T/S) structure levels. The Northshore Pump Station pumps to the Channel Pump Station T/S structure and that flow is then pumped to the SEP along with gravity flows from the Channel drainage area.

Southeast basin flows from the Griffith Pump Station enter the SEP through the Fairfax, Newhall, Evans, and Davidson Avenue sewers, along with area gravity flows, and are regulated by the SEP lift pumps and operation of the Bruce Flynn Pump Station. The lift pumps and the Bruce Flynn Pump Station can be operated remotely from the SEP Operations Service Center or locally. The normal mode of operation is by remote control.

With these controls, the SEP staff can maintain daily peaks below booster station maximum capacity. Normal and critical transport/storage levels are given in the Dry-Weather Operations and Wet-Weather Operations sections of this plan. Critical flow limits for SEP staff to monitor, in addition to the 100–mgd booster station capacity, are the 150–mgd secondary system hydraulic capacity, the 100–mgd primary disinfection system (Buildings 040 and 041) capacity, and the 250–mgd maximum plant flow.

Mariposa, Griffith, Sunnydale Pump Stations

Dry–weather flows from the Mariposa and Griffith pump stations are relatively small and these bayside facilities are automatically controlled by their T/S structure levels. Although there are no remote controls for these stations at the SEP, the status of each station is monitored and recorded at the Operations Service Center. The Sunnydale T/S structure and pump station facilities are used only for wet–weather.

Dry–Weather System Control

The SEP is the "control center" for all wastewater treatment, pump station, and T/S system control for the eastern portion of the City and is staffed 24 hours per day, every day. Major wet–and dry–weather control activities originate from the SEP Operations Service Center. In addition to monitoring of T/S structure levels, facilities status, and system discharges, flows to the SEP are controlled to provide the best combination of consistent flow to the treatment process and for odor reduction and reserve capacity. Operations staff at the SEP perform the following dry–weather plan procedures:

With the North Point Wet-Weather Facility (NPF) out of service in dry weather, all northside sewage is pumped by the Northshore Pump Station to the Channel Pump Station T/S structure. Daily flows from the Northshore Pump Station range from 15 to 34 mgd. The Northshore Pump Station is secured each morning due to low sewage flows during that period. Before station shut-down, the Northshore T/S structure is pumped down to flush the box floor. When the station is in service, pumping rates are regulated to keep the T/S structure level at a minimum. Increases and decreases in pumping rates are made slowly, anticipating

sewage flow peaks and valleys through past recorded daily flow history, to provide an even flow to the Channel Pump Station and minimize T/S structure.

The Channel Pump Station normally pumps flow to the SEP 24 hours per day via a 66–inch forcemain and contributes 50% to 80% of the total influent flow. The upper and lower Channel Basins' gravity sewage flow provides enough volume to keep from having to secure the Channel Pump Station. Daily flows from the Channel Station to the SEP range from 20 to 60 mgd. The Channel box level is maintained between 30 to 260 inches from the box floor throughout each 24–hour period, except on mornings when the box is pumped down for flushing between 3:00 and 5:00 a.m.

Remote control of the Channel Pump Station, coordinated with lift pump discharge rates at the SEP headworks, provides a more even diurnal flow to the SEP. Influent pump control and T/S structure levels monitoring are the methods Operations uses to manage Bayside System flows and stay within the effluent Booster Pump Station capacity. Sewage flows from the Mariposa Pump Station (0 to 3 mgd), Southeast transport/storage systems (0 to 11 mgd) and the Islais Creek basin area (6 to 30 mgd) make up the influent sewage pumped by the SEP headworks. The daily hydraulic range through the SEP is maintained at 40 to 75 mgd. The SEP upstream transport/storage level is held between 4 to 7 feet above the box floor. Flushing of the SEP influent box is coordinated with the Channel T/S structure flushing, between 3:00 and 5:00 a.m. in the morning, using the lift pumps in manual mode.

The Griffith Pump Station receives all Sunnydale and Yosemite/Fitch transport/storage systems' gravity flow, which is then pumped to the Hunters Point sewer. These South Basin and Hunters Point flows converge with Davidson Street transport/storage flows and enter the SEP at Rankin Street.

Dry–weather flows from the south basin and the Mariposa areas are relatively small and the Griffith and Mariposa stations operate automatically, controlled by transport/storage level changes. The daily range of flow from the Griffith Pump Station is 0 – 10 mgd. The Yosemite/Fitch and Mariposa transport/storage boxes are pumped down for flushing as required to control odors.

System control adjustments are made by Operations staff to accommodate facility repair, system flow changes, and transport/storage box entry for cleaning and inspection.

Wet–Weather Operations

Normally, the wet–weather period extends from October into May. The system is designed to allow four discharges per year in the North Basin, 10 discharges per year for the Central Bayside Basin, and one discharge per year for the South Basin. These discharge requirements are long–term averages; however, the fact that an average is not exceeded is not justification to allow a discharge that can be prevented.

Storm Flow Operations Control

In dry or wet weather, the operational range and control of the SEP Operations Service Center exceeds the boundaries of the SEP. The Operations staff have some control over the Bayside System's flow to the plant and have the authority to control systems as necessary to maximize treatment process and meet discharge requirements. To make correct decisions on Operations activities, Operations staff must be aware of changes occurring within the bayside transport/storage system as well as the treatment plant. The SEP distributed control system provides the necessary level and flow information.

All bayside T/S structure levels are monitored closely when a storm has been forecast to provide maximum storage and time to activate the Northshore Pump Station wet-weather pumps and the NPF.

Critical Control Points

Storm Increasing

Maximum level of the Northshore T/S box before activating the NPF:

- Inches from the box floor, that is, little or no sewage in the box
- Any chance of rain
- Gravity overflow into the NPF may occur at the 350–inch level (Northshore T/S structure)
- A discharge at Pierce Street will occur at the 410–inch level (Northshore T/S structure)

Southeast Plant Typical Flow Scenario for 250 mgd

- From the Channel Station, 80 – 100 mgd
- From the Southeast area 55 – 70 mgd
- From the Bruce Flynn Station, 85 – 110 mgd
- Increase in increments of 20 mgd or less
- Through the secondary treatment system, 150 mgd
- Through the Primary Disinfection System, 100 mgd

Storm Subsiding

Level in the Channel Station T/S structure before restarting the dry–weather pumps at the Northshore Station:

- If rain is still forecast, approximately 100 – 150 inches
- If storm has passed, approximately 150 – 200 inches

Level of the Northshore transport/storage box before securing the NPF and the Northshore Station wet–weather pumps;

- If rain is still forecast, approximately 100 – 150 inches
- If storm has passed, approximately 150 – 200 inches

Having these limits as guidelines helps control the Bayside System facilities. In order to maximize treatment of combined storm flows, minimize discharges, to stay within permit limits and anticipate of storm flows, Operations staff must control the following:

- T/S structure levels
- Pumping changes
- Process changes
- Staff changes
- Operational mode

Rain intensity and storm duration cannot accurately be predicted. Therefore, rising T/S structure levels, in a given time period, are usually the best indicators for implementing wet–weather operational changes.

Current weather reports, contact with Oceanside and Northshore Station operators, and pump station status are also information used to make control decisions. Another consideration to determine proper operational activity is "past experience" in wet–weather control functions.

This experience is a critical factor in determining correct reaction time for implementation of various wet–weather operational controls. Using the given system limits, and the information available, the Bayside System wet–weather general operating procedures will be as follows.

Since most storms originate from a southwest direction, Operations supervisors at the SEP will communicate with the Oceanside Water Pollution Control Plant (OSP) to verify rainfall to anticipate operational changes.

The SEP flow through the secondary system will be maximized at 150 mgd to keep the Northshore, Channel, and Southeast transport/storage as low as possible.

Once there is indication the Griffith Station wet–weather pumps have started, the higher southeast area flows will reach the SEP in about 15 minutes. This allows Operations

staff time to check the SEP influent flow and T/S structure level, the Channel Station level and pump rate, and the Northshore T/S structure level and pump rate. The objective at this point is to stay ahead of the increasing flows and provide maximum treatment.

Flows from the southeast areas are allowed to reach 55 – 70 mgd. The Channel Station pump rate is allowed to reach 75 – 85 mgd and 20 – 30 mgd at the Bruce Flynn Pump Station in 150 mode at the SEP.

As the combined flow to the SEP approaches 150–mgd, and in order to stay within limits and ahead of storm flows, the 250 – mgd mode of operation is implemented. In 250 Mode the Bruce Flynn Pump Station flow is 85 – 110 mgd, Channel Pump Station flow is 80 – 100 mgd, and SEP flow is 55 – 75 mgd.

As the Northshore transport/storage level rises, a decision to start the NPF will be made by the time the 150 to 250 – inch T/S structure level is reached. The North Point staff will be called and instructed to start the facility and the Northshore wet–weather pumps and to secure pumping to the Channel T/S system.

At this point, the NPF is online, the Channel Station has reached about 80 – 100 mgd, the Griffith Station is at about 80 – 120 mgd, and the SEP is at 250 – mgd. All treatment systems and pumping facilities are in service. If transport/storage and pump station capacity is exceeded, the first discharge may occur at the Channel and Central Basin T/S discharges. The Selby/Marin bayside systems may discharge shortly after the Channel and Central Basin systems. If the storm flow exceeds the NPF capacity and the volume of the transport/storage box, the Northshore T/S system will discharge. The southeast drainage areas have the highest discharge priority and flow adjustments to the SEP and the Bruce Flynn Pump Station will be made to allow the Griffith Station to reach maximum flow to the SEP. However, if the Southeast transport/storage system volume is exceeded, at this pumping rate, a Southeast T/S discharge will occur.

Since rainfall rates can differ greatly from the northshore to southeast areas of the city, Operations staff must make adjustments to meet discharge priorities. The fastest–rising T/S system becomes the controlling factor.

As examples, if the Southeast System level is the fastest rising, a Channel Station pumping rate increase would be delayed to take all possible flow from the southeast transport/storage. If the Channel Pump Station flow and transport/storage level are increasing quicker than other drainage areas, the Northshore Station pumping rate may be lowered or the NPF may be started to take flows from the Channel System. If the Northshore transport/storage level is rising fastest, the NPF could be started so that the higher capacity wet–weather pumps can be used. Any of these operational controls can be used in combination to maximize treatment at the SEP before discharges occur.

After the rain has stopped, discharge alarms cleared, and box levels start to lower, the Operations staff will follow limits given previously under "storms subsiding." Discharge points will be visibly checked to confirm recorded discharges. Samples collected of discharges will be delivered by Operations staff to division laboratories for analysis.

Experience of the Operations staff must be relied upon to make system changes to comply with treatment, discharge, and design requirements. How fast transport/storage box levels increase, the duration of a storm, and how long changes take to implement are all decisive factors for the Operations supervisors to consider.

Westside System Operations Plan

Dry-Weather Operations

During dry weather, all flow entering the Westside T/S structure is pumped via the lift pumps at the Westside Pump Station to the OSP for treatment to secondary effluent level.

Wet-Weather Operations

When it begins to rain, the Operations crew ramps OSP up to its maximum treatment capacity of 65 mgd while the transport/storage is available to provide primary treatment to another 110 mgd of storm runoff if necessary. With the exception of four small pump stations needed to lift flows from points lower in elevation than the surrounding gravity sewers, other system equipment is for level and flow monitoring, effluent quality sampling, and odor control. A supervisor at the Distributed Control System console in the OSP's Central Control Station monitors the transport/storage system.

The following parameters are used to evaluate system performance and permit compliance:

- All flow up to 43 mgd receives full secondary treatment. "Wet weather" is, by definition, when flow to the OSP is in excess of 43 mgd or if the influent contains less than 100 mg/L Total Suspended Solids or the Westside transport/storage flow elevation exceeds 0 feet in the west box or 18 feet in the east box as a result of rainfall.
- Wet–weather flow greater than 43 mgd, up to 65 mgd, receives primary treatment. The primary effluent blends with secondary effluent and is discharged out of the Southwest Ocean Outfall (SWO).
- Wet–weather flow to the OSP will be maximized prior to the onset of pumping to the SWO from the Westside Pump Station.
- Wet-weather flow greater than 65 mgd up to 175 mgd (110 mgd) receives the equivalent of primary treatment in the Westside T/S structure and is pumped through the SWO via the Westside Pump Station.
- Treated flow in excess of 175 mgd is released via combined sewer discharge structures (numbers 1, 2, 3, and 4) on Ocean and Baker beaches only when all storage elements are full.
- Wet–weather flow to the SWO is to be maximized (i.e., 175 mgd) prior to the onset of any shoreline discharges.

Once a rainstorm begins, the Operations supervisor activates necessary systems to treat the OSP's maximum capacity. The three lift pumps in the east wet well of the Westside Pump Station automatically ramp up in response to the rising level in the Westside T/S. When maximum plant capacity is reached and the storm continues, the level will rise in the Westside T/S to 18 feet and decant under the baffle and over the weir from the east bore to the west bore of the Westside T/S. This decanted flow continues through bar screens and into the westerly wet well of the Westside Pump Station. It is then pumped through the SWO to the Pacific Ocean. If the combined stormwater and sewer flow continue at a rate of greater than 175 mgd, filling the available transport/storage, excess combined sewage and storm water runoff will be discharged nearshore from Vicente, Lincoln, and Lake Merced outfalls. Similarly, discharges from the Mile Rock outfall take place only when the Richmond Tunnel is full and its 42-inch connection to the Westside T/S is discharging at maximum capacity.

Westside System's Operations Division priority is to pump and treat the maximum flow to the highest level allowed by the system. To the Operations supervisor and crew, this means monitoring weather reports for impending storms, preparing to place additional equipment online if it does begin to rain; at the onset of the storm, bringing

plant flow up quickly while continuing to meet effluent permit standards. Expediting increased plant flow delays the time when the Westside T/S level rises to 18 feet deep and decants to the west bore for direct pumping out of the SWO.

Once the plant is at maximum capacity, and excess flow is decanting to the west bore at Sloat Avenue, the goal is to maximize the decant flow to avoid, or at least delay as long as possible, near-shore discharges at combined sewer discharge points. In severe storms the supervisor has the authority to begin to pump decant flow to the SWO before 65–mgd plant flow is attained. The reason for this flexibility is to ensure that we meet our objective of maximizing the volume of wastewater treated at the OSP and discharged via the deep water ocean outfall, the SWO. If the supervisor delays pumping the decant flow out to the SWO for the additional critical minutes it takes to maximize plant flow, there may be an eventual near-shore is charge that could otherwise have been avoided.

Upon reaching the maximum transport/storage level in the storage system, combined sewage and storm water flow over a weir onto an electronic sensor that records the discharge event in the Distributed Control System at the OSP. The sensor records the event as continuing until the level in the transport/storage system drops below discharge level, and stops going over the weir. Once a nearshore discharge does take place, the Operations supervisor contacts the Laboratory supervisor to initiate shoreline sampling and public notification via posting of beach access points in the area of the discharge. Composite sampling of the decant flow is initiated when flow begins to decant over the east bore–to–west bore weir for analysis of TSS and biochemical oxygen demand (BOD). Shoreline samples are analyzed for total and fecal coliform. After three consecutive days of sample results below 1,000 CFU/100 mL, the beach postings are removed.

Return to Dry-Weather Operation

As a storm subsides, transition to dry–weather operation begins. When storm-water-runoff into the Richmond Tunnel drops below the gravity outflow rate to the Westside T/S, Mile Rock Outfall discharge is suspended and the Richmond Tunnel gradually empties into the Westside T/S through the 42–inch diameter gravity line. Settled material is carried into the OSP for treatment.

When the sum of storm runoff plus gravity flow from the Richmond Tunnel and Lake Merced T/S into the Westside T/S drops below the Westside Pump Station pumping rate, discharge from the Westside T/S and Lake Merced T/S stops and the level in the Westside T/S starts declining. When the Westside T/S level drops to 18 feet, pumping of decanted flow to the SWO stops and the remaining combined sewage stored in the east and west bores of the Westside T/S is pumped to the OSP for treatment and disposal to the SWO. As the level in the Westside T/S continues to drop, flow velocities in the cunette increase and sediment starts migrating to the pump station and is pumped to the OSP.

Discharges in the Seacliff District that may occur at combined sewer outfall number 5, 6, and 7 stop when pumping capacities at the Seacliff pump stations match or exceed local storm runoff rates.

The hypochlorite feed in the chemical building, secured during rainstorms, is resumed when needed to control sulfide production.

With the exception of Mile Rock combined sewer discharge, discharge starts, stops, and duration information is documented by Operations staff for required RWQCB monthly wet–weather reports. If a storm discharge is interrupted for six or more hours, the next discharge is considered a new event.