

San Francisco's Sewer System: Effectiveness and Affordability

How It Works

While other coastal cities in California have separate sewer and stormwater systems, most of San Francisco is served by a [combined sewer system](#). Stormwater from streets and wastewater from buildings flow into the same set of pipes. We are the only coastal city in California with a combined system, although [they are common in other parts of the country, particularly the Midwest and Northeast](#). New York and Boston, for example, both have combined sewer systems serving large parts of their cities. This combined system provides greater environmental benefits because it captures and treats most stormwater to the same high standards that apply to wastewater from homes and businesses before releasing it to the bay or ocean.

Other cities and counties in the Bay Area don't treat their stormwater, instead allowing pollutants – including bacteria, metals, and other contaminants – to flow into the bay or ocean. San Francisco removes pollutants that other cities don't. San Francisco's system protects public health, and it protects the environment.

Storms

San Francisco's wet-weather control facilities are operated consistent with permits issued by the U.S. Environmental Protection Agency and the San Francisco Bay Area Regional Water Quality Control Board. The system handles most rainstorms by sending the combined sewage and stormwater to the treatment plants for treatment and disinfection prior to releasing it into the bay or ocean through deep-water outfalls.

Some extreme storms can exceed the capacity of the system, requiring partially treated discharges through permitted nearshore outfalls along the bay or ocean. These discharges are known as combined sewer discharges. These discharges are authorized by our EPA and Regional Water Board permits. The SFPUC's extensive system of underground storage, transport, and treatment boxes minimizes the frequency and volume of these discharges. When discharges do occur, they consist overwhelmingly of stormwater.

The Improvements

Since 1976, San Francisco has spent more than \$2 billion to improve its collection and treatment system. These investments have been tremendously effective, reducing the volume of the city-wide combined sewer discharges by over 80%.

The investments have greatly reduced the frequency of the combined sewer discharges as well. Prior to 1976, the combined sewage discharges occurred during every rainstorm. As a result of San Francisco's efforts, on average, discharges occur only 10 times per year, even though we have an average of 30 storms per year.

At Issue on the Bayside

San Francisco, and indeed every other combined sewer system in the country, cannot capture, treat, and disinfect all of the stormwater from every storm that rolls into town. Achieving that level of control through projects like separating the combined system into different pipe systems for wastewater flows and stormwater flows, or storage of all stormwater until it can be fully treated, is simply not practical due to the technical complexity, lack of feasibility, extremely high costs, and negligible environmental benefits. Even assuming that such a system could be constructed, it would cost San Francisco ratepayers well over \$10 billion in 2024 dollars to undertake on the bayside alone. Paying for that would require major increases to wastewater bills, which are already substantial.

Such costs would compound the City's cost of living crisis. Thousands of San Franciscans would no longer be able to cover their basic needs and would be plunged into poverty, according to an economic and social impact analysis conducted by consulting firm Raftelis. Depending on which of the cost-of-living metrics one uses, between 8,100 and 10,600 more people – or 3,400 to 4,500 households – would no longer earn enough to cover their basic needs and would descend into poverty.

Non-white San Franciscans make up a majority of households in San Francisco that earn near or below a living wage. The higher cost of living and increase in poverty would exacerbate racial income inequality in the City by disproportionately impacting people of color. These economic impacts would be substantial and widespread. For the 47% of San Francisco residents who already earn less than a living wage, the required rate increases would cause these households to forego more of their essential needs.

The benefit to wildlife or swimmers, kayakers and other others who recreate on the bay from such huge expenditures would be negligible, especially as water recreation rarely occurs during storms that are large enough to result in combined sewer discharges. The social and economic harms to San Franciscans, however, would be severe and would be felt year-round.

The Solution for the Bayside

Decades ago, Congress and the EPA recognized the need to address circumstances like this. They developed regulatory tools that authorize permit conditions that do not create unreasonable, community-wide hardships, while continuing to provide appropriate water quality protection. They memorialized the availability of these tools for combined sewer communities in an amendment to the Clean Water Act.

One such tool is called a variance. For municipal sewer systems like San Francisco's, a variance enables regulatory agencies to modify the applicable requirements for a specific timeframe while the city implements projects that represent the highest attainable water quality condition that can be cost-effectively achieved.

The EPA and regional regulatory agencies regularly authorize variances for a variety of standards, including water quality standards for municipal sewer systems. The City of Boston, for example, has approved variances to water quality standards for its combined sewer system discharges. Just last month, in a draft guidance document, the [EPA reaffirmed the appropriateness of variances and similar tools for combined sewer communities](#).

On January 31, 2023, San Francisco formally requested that the Regional Water Board modify its discharge permit with a variance for its bayside discharges. On April 2, 2024, San Francisco updated its request based on feedback from Regional Water Board staff. **San Francisco is proposing a fifteen-year timeframe in which to implement the following eight projects – costing approximately \$2.36 billion – that will continue to protect water quality in San Francisco Bay:**

- Implementation of \$1.5 billion in nutrient reduction projects at the Southeast Plant to achieve substantial reductions in the concentration of nutrients, specifically total inorganic nitrogen, in the effluent discharged from the Southeast Plant into the bay;
- Implementation of green infrastructure projects projected to reduce the frequency and volume of combined sewer discharges from the City’s Central Bayside collection system by diverting stormwater into the ground;
- Implementation of both the Folsom Area Stormwater Improvement and Lower Alemany Area Stormwater Improvement Projects, which will improve stormwater conveyance in two neighborhoods and are anticipated to improve water quality by redistributing combined sewer discharge volume from the shallow, upstream end of Mission Channel to locations close to and outside of the mouth of the channel, and by reducing the activation frequency and volume of combined sewer discharges to Islais Channel, respectively;
- Identification and initiation of potential regulatory actions, provision of incentives, or modification of policies to facilitate property owners’ effectuation of measures to reduce stormwater and stormwater pollutants originating from large-scale sources;
- Characterization of sediment pollution in Mission and Islais Channels to assess whether these channels are impaired and the scope of any impairment as a step toward resolving the channel impairments resulting from sediment contamination, consistent with the requirements of the June 27, 2023 California Water Code section 13383 Directive;
- Expansion of the capacity of the 20th Street Pump Station, if needed, to avoid combined sewer discharges at the 20th Street outfall (CSD 030) and 22nd Street outfall (CSD 030A); and
- Completion of a pilot project to demonstrate the potential of an operational decision support system to optimize combined sewer system gray infrastructure performance during wet weather.

These projects will have substantial benefits for bay water quality. The \$1.5 billion San Francisco will be investing to reduce wastewater nutrients in the bay, which contribute to algal blooms, is the largest and most consequential investment in nutrient reduction in the region. This leadership by San Francisco in nutrient reduction is anticipated to improve conditions to limit or prevent future algal blooms.

Our green infrastructure projects, like rain gardens or living roofs, will divert millions of gallons of stormwater per year while bringing nature into the urban environment. Besides reducing combined sewer discharges, green stormwater infrastructure provides valuable benefits like increased heat resilience, urban greening, traffic calming, urban habitat for wildlife, and improving the livability of the

public realm. These projects also contribute to a more resilient City and are a key component of the SFPUC's commitment to environmental justice.

Central Bayside Portion of our System

The Central Bayside portion of the collection system is one the largest and most highly developed watersheds in the City. It is mostly industrial and contains the Islais and Mission Channels – former waterways that once conveyed stormwater out of the City. This area has the highest volume of stormwater runoff across the city. It is also the location of our Southeast Treatment Plant.

Affordability

The \$2.36 billion cost for these projects is substantial and will require planned rate increases. But these are the right kinds of investments. They provide the most meaningful environmental benefits, are cost-effective, and limit the impact on ratepayers. San Francisco's proposal is sensible and appropriate. It strikes the right balance.

By the Numbers

7.6 billion gallons – average annual volume of San Francisco's citywide combined sewer discharges when calculated in 1976

80% – amount that volume has been reduced by after San Francisco ratepayers invested more than \$2 billion to improve the system

100% – percentage of rainstorms that triggered combined sewer discharges in SF prior to 1976

30 – average number of storms per year in San Francisco

10 – average number of storms per year that now trigger discharges

\$10.68 billion – estimated cost to build the wastewater treatment infrastructure on the bayside if no variance is provided in the Southeast Plant permit

\$395 – amount of monthly combined water/sewer bill for the average residential household in SF in order to pay for \$10.68 billion in infrastructure, up from the current \$134 a month

8,100 to 10,600 – number of San Franciscans who would be driven into poverty by rate increases that would be needed if no variance is provided

13 miles – length that a 24-foot-diameter tunnel would need to be to be big enough to capture the combined sewer discharge volume in a statistically average year for the Central Bayside portion of San Francisco's sewer system. Even at that size, it still wouldn't capture all of the combined flows in the biggest storms.

7 miles – width of San Francisco

Sources: San Francisco Public Utilities Commission; [Raftelis "Economic and Social Impact Assessment"](#)