WATER UTILITY CLIMATE ALLIANCE
ENGINEERING CASE STUDIES

CITY AND COUNTY OF SAN FRANCISCO

SEA LEVEL RISE CAPITAL PLANNING GUIDANCE

San Francisco, California

PREPARING FOR RISING SEAS

This case study describes the process involved in developing actionable, climate science-based planning guidance for sea level rise. Under a directive from the Mayor of San Francisco in 2013, the City and County of San Francisco formed a Sea Level Rise Committee, led by the San Francisco Public Utilities Commission and including members from the Port, Airport, Municipal Rail system, Planning, and others to develop guidance for incorporating sea-level rise into the City's 10-year Capital Plan. The overall goal was to increase the resilience of assets to climate change-driven sea level rise. Today, this guidance is being implemented in capital planning across the City and County of San Francisco.

CLIMATE CHANGE CHALLENGES

With sea level rise threatening coastal San Francisco, local public agencies led by SFPUC started the process of creating sea level rise guidance for use in capital planning with the aim to increase resilience across a range of assets and infrastructure.

CLIMATE-READY DESIGN

A Sea Level Rise Committee was convened to start the guidance planning development process in 2013. The guidance includes a set of sea level rise projections, estimates of storm surge for the 1% storm, and a checklist for project managers to use to determine if or when a project site will be temporarily or permanently flooded. To incorporate the uncertainty associated with sea level rise projections and to build in adaptive capacity, the guidance stipulates that capital projects need to consider the functional life cycle of an asset and the ability of the asset, or resilience feature protecting an asset, to be modular. If an asset or resilience feature can be iteratively adapted, the Guidance suggested achieving resilience with this approach. The City's Capital Planning Committee adopted the guidance in 2014 and implementation of the guidance began in 2015-2016. After one cycle of implementation, lessons learned led to some revisions to assist in implementation.

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SPOTLIGHT ON THE SCIENCE

To determine the sea level rise projections that would be incorporated into the guidance, the Sea Level Rise Committee reviewed a range of international and national climate reports and assessments. They ultimately chose projections from a National Research Council (2012) report after extensive interviews with report authors and experts to determine which range of projections they could be confident using in a planning context. The committee included "most likely" and "upper end" sea level rise projections for three time periods (see table below). Initially included "low-end" sea level rise projections were removed in the 2015 Guidance revision as they were determined to be insufficiently precautionary for meeting the City's resilience goals.

Year	Most likely sea level rise	Upper-end sea level rise
2030	6 inches	12 inches
2050	11 inches	24 inches
2100	36 inches	66 inches

Project managers were trained to use the sea level rise planning guidance, which includes a checklist for capital planning projects that incorporates four scenarios to asses the conditions under which a project site will flood temporarily or permanently. Scenarios include: 1) the most likely sea level rise, 2) the most likely sea level rise plus storm surge, 3) the upper-end ("unlikely but possible") sea level projection, and 4) the upper-end sea level rise plus storm surge. Once the project manager has completed the checklist, the City Engineer reviews and approves the checklist, followed by review and approval by the capital planning committee.

THE ROLE OF STAKEHOLDERS

The Sea Level Rise Committee included 13 members from City and County departments including the San Francisco Airport, the Port of San Francisco, the Municipal Transportation Agency, SFPUC, the City's capital planning office, and two consultants. Several scientists also provided expertise to help the Committee produce this science-based guidance. This breadth of perspective and expertise was needed to develop useful and actionable guidance as there is often significant effort required to translate and integrate climate science information into planning and decision-making contexts.

KEY TAKE-AWAYS

The San Francisco sea level rise guidance development process highlights how sea level rise projections are not always easy to integrate into planning without significant effort by a range of stakeholders to translate, distill and understand how the climate science information fits into a particular context. It is important to note that this pilot effort only addressed a portion of City assets, which means the vulnerability of other assets vulnerability to flooding still needs to be assessed. This guidance was also only for sea level rise and does not integrate climate resilience at a systematic level across the City and County.

LEARN MORE

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