

MEMORANDUM

DATE: September 16, 2024

TO: City Ventures
444 Spear Street Suite 200
San Francisco, CA 94105

FROM: Robin Lee, PE, CFM
Jocelyn Barber, EIT

SUBJECT: Auburn Grove Housing Floodplain Displacement Study

Introduction

City Ventures contracted Schaaf & Wheeler to provide continued floodplain support for the proposed Auburn Grove Housing development in the City of San Rafael. The housing project is located in FEMA flood zone AE with a Base Flood Elevation (BFE) of 10 feet NAVD88 according to the effective FIRM 06041C0459F dated 03/16/2016, Figure 1.

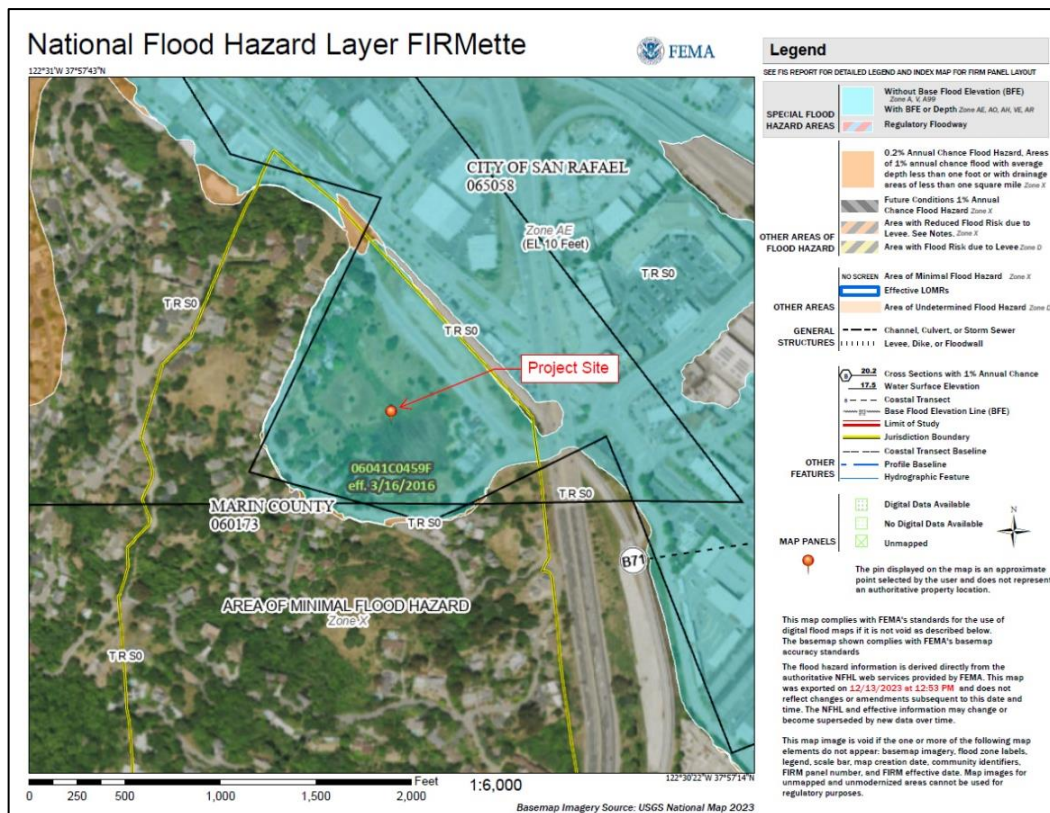


Figure 1. FEMA Effective FIRMette at Project Site

This study determines whether the proposed development adversely affects the carrying capacity of areas where the base flood elevations have been determined but a floodway has not been designated.

Analysis

Review of the Flood Insurance Study (FIS) shows that flooding in this area of the City of San Rafael is tidally influenced from San Francisco Bay because of an incomplete system of levees built along the Bay. In a flood event, the tidally influenced floodplain flow path travels under the Highway 101 overpass and into the project site. In the event of the failure of the non-certified Bayfront levees during a 100-year event, the site would be inundated by Bay waters to elevation 9.7-ft NAVD88 based on transect 71. This elevation is rounded on the FIRM to 10.0-ft.

Since this is a tidal area, the base flood elevation (BFE) is not affected by the reduction in the available floodplain. The removal of these floodwaters is distributed across the bay and does not impact adjacent properties. Furthermore, the placement of fill on the site will still allow the floodplain to spread through the site as the top of fill elevations will still be below the BFE. The buildings are to be wet floodproofed which will not block the flood flows.

To determine the effects of the project, a calculation was performed to solve the volume of floodwater that will be removed from the flooded area shown in Figure 2 due to the placement of fill on the project site. Approximately 10,000 cubic yards of fill will be placed over 3.7 acres based on the Grading Impact Analysis provided by CBG Civil Engineers. This will cause a net reduction to the floodplain volume at the project site of 6.2 acre-feet. Table 1 below shows the resulting impact to the average AE (9.7) FEMA floodplain depth.

Table 1. Impact to Floodplain

Condition	Value
Net Flood Volume Reduction (ac-ft)	6.2
Floodplain Volume (ac-ft)	4,588
Percent Volume Impact	0.135%

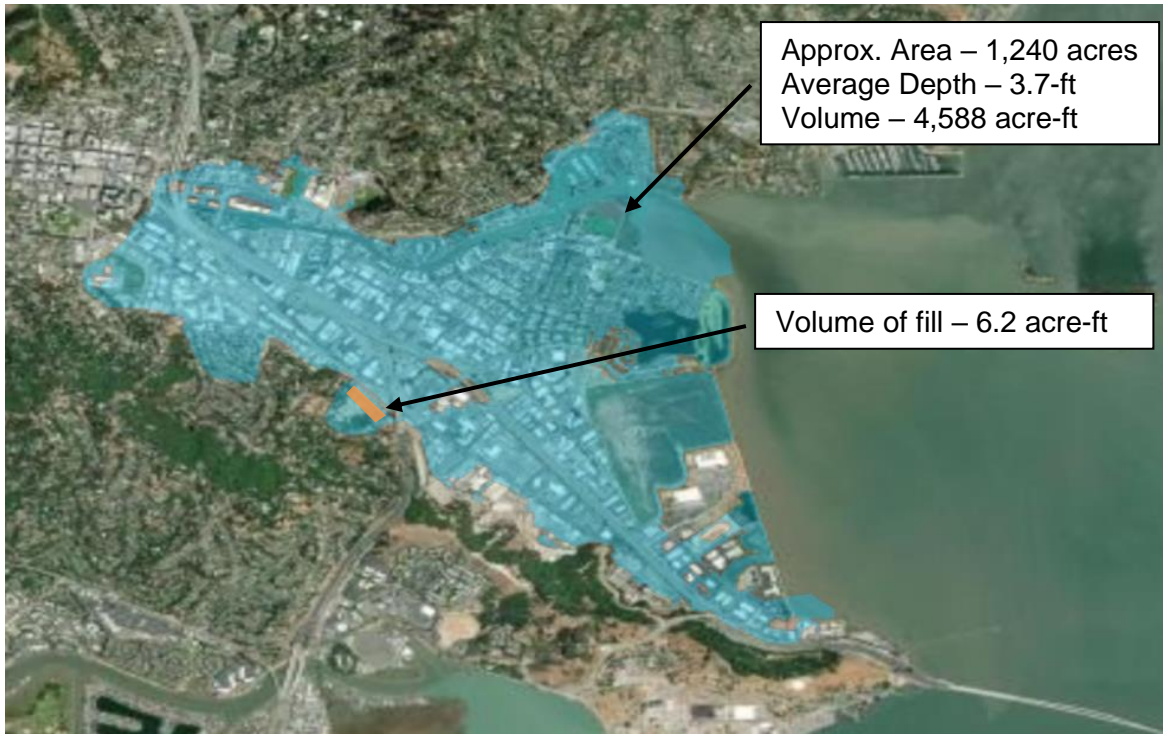


Figure 2. Surface Area of Floodplain over Land



Figure 3. Wet Floodproofing Diagram

Conclusion

The impact to the average flood depth of the floodplain area due to placed fill on site to meet the City's elevation requirement is negligible. It is important to note that the impact of 0.135% reported here is conservative as it assumes the floodplain is confined to the overland flooded area in San Rafael (Figure 2); however, the floodwaters in the event of a 100-year tide would be distributed across the San Francisco Bay resulting in a smaller impact. The volume of the Bay at mean higher high water is estimated at 390 billion gallons (over 1 million acre-ft).

The buildings at this development will be wet floodproofed which will allow the floodplain to go through the buildings without impacting the BFE as shown in Figure 3.

Schaaf & Wheeler has determined that any displacement of existing flood water in this area has no impact on the floodplain. The floodwaters are retained in the Bay and are not distributed to adjacent properties. The Auburn Grove Housing Development project will not adversely affect the depth or extent of the 100-year tidally influenced floodplain because the project footprint is insignificant compared to the San Francisco Bay. Additionally, floodproofing will not cause blockage of the base flood on this site and the placement of fill will be below the base flood elevation and still allow floodwaters to disperse through the site.

Sincerely,
Schaaf & Wheeler



Robin J. Lee, PE, CFM
Senior Project Manager