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Date: May 10, 2021

Project Number: 19-009

Subject: 301 Mission Retrofit Monitoring Report 001: Results as of May 7, 2021

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## **CONTEXT**

This memorandum summarizes results from the monitoring plan implemented at the 301 Mission property. Instrumentation to monitor the structure prior to, during and after the retrofit was installed in January 2021, including piezometers and extensometers. Settlement markers installed in April 2009 and January 2017, survey prisms mounted on the exterior of the structure in December 2016, and crack gauges installed in April 2009 have also been monitored.

## **INTERPRETATION**

Figure 01 presents the instrument locations as referenced in later figures.

Figure 02 presents the historical settlement data interpreted from settlement markers installed on the B-1 Level of 301 Mission Tower. In addition, data from surveys performed during the retrofit are included.

Figure 05 presents historical lateral roof deflections in the project north-south and project east-west directions interpreted from survey prisms mounted on the exterior of the Tower, from InSAR data, and from a planar fit of the settlement marker data. In addition, data from survey performed during the retrofit are included.

Figure 07 presents the historical groundwater elevation interpreted from piezometer readings at locations near 301 Mission. In addition, data from piezometers installed to monitor groundwater elevation during the retrofit are included.

Note that several figures are omitted for various reasons. Figures 03, 04 and 06 are omitted because the baseline readings of the settlement markers and exterior prisms have yet to be obtained since production pile installation has not commenced. Figures 08 and 09 are omitted because the piezometers have yet to be connected to the automatic data loggers. Figures 10, 11 and 12 are omitted because the baseline readings of the extensometers have yet to be obtained since production pile installation has not commenced.

## **CLOSING**

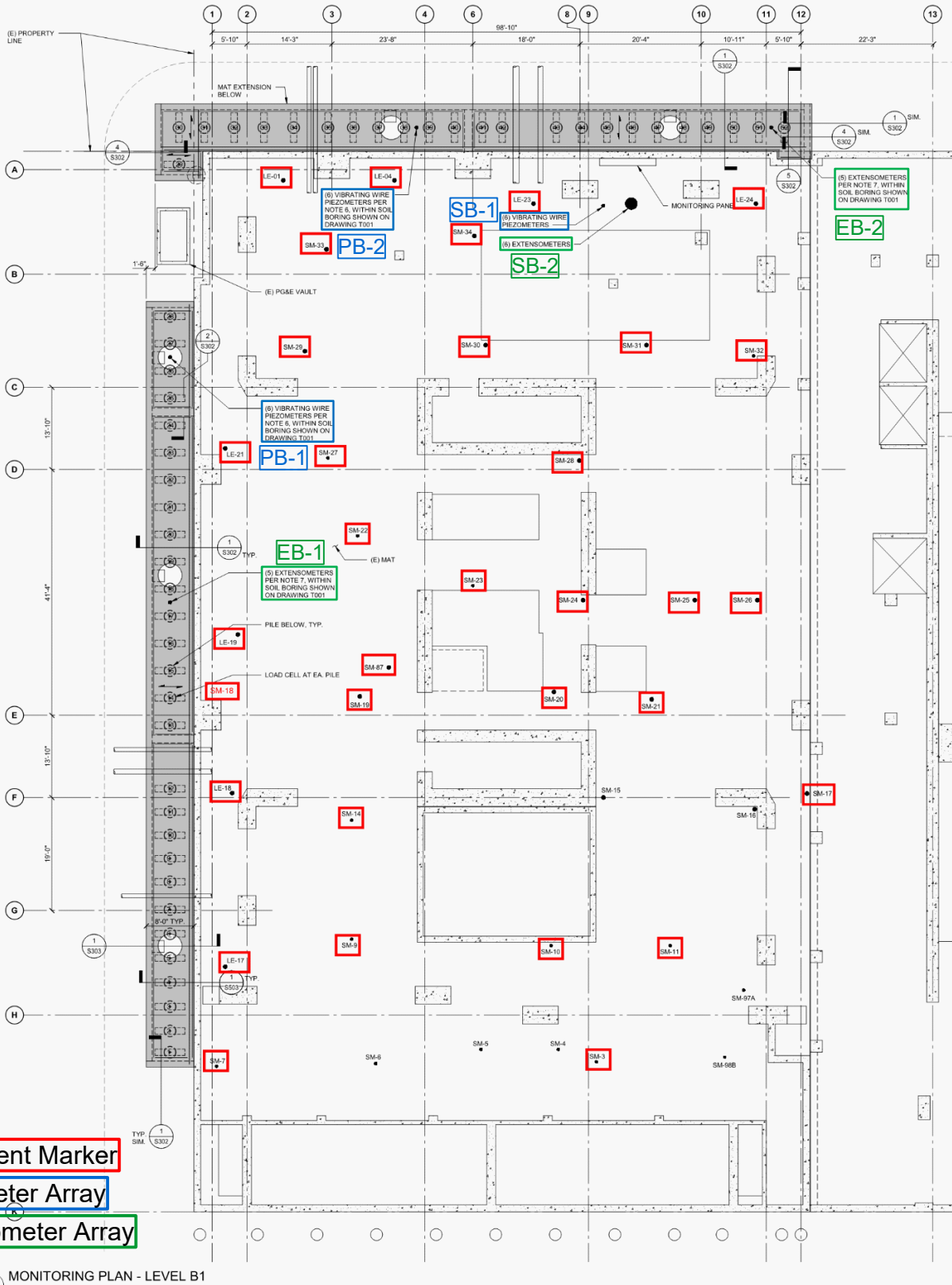
Please contact us if you have any comments or questions, or if you would like to discuss the results presented in this memorandum.

## **FIGURES**

Figure 01A – Instrument Location Map: Settlement Markers, Piezometers, Extensometers  
Figure 01B – Tower Survey Prism Location Schematic



Figure 02 – Historical Settlement Marker Data  
Figure 05 – Historical Lateral Roof Deflection Data  
Figure 07 – Historical Groundwater Elevation Measurements at Locations Near 301 Mission



Settlement Marker

Piezometer Array

Extensometer Array

1 MONITORING PLAN - LEVEL B1  
1/8" = 1'-0"

From 301 Mission Perimeter Pile Upgrade IFC 2020-02-25

Project No: 19-009.00

Date: 5/10/2021

Created By: NBW

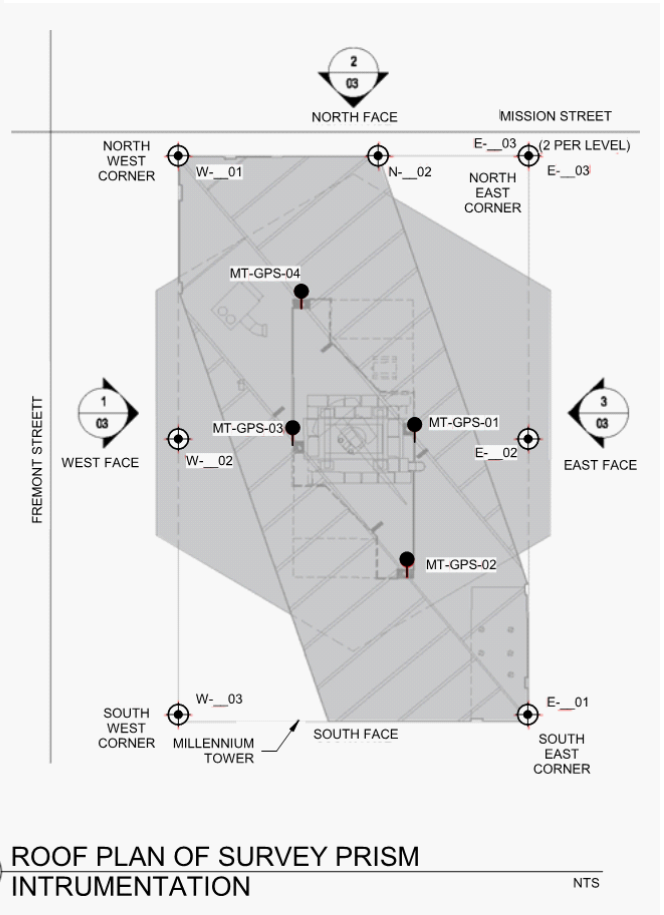
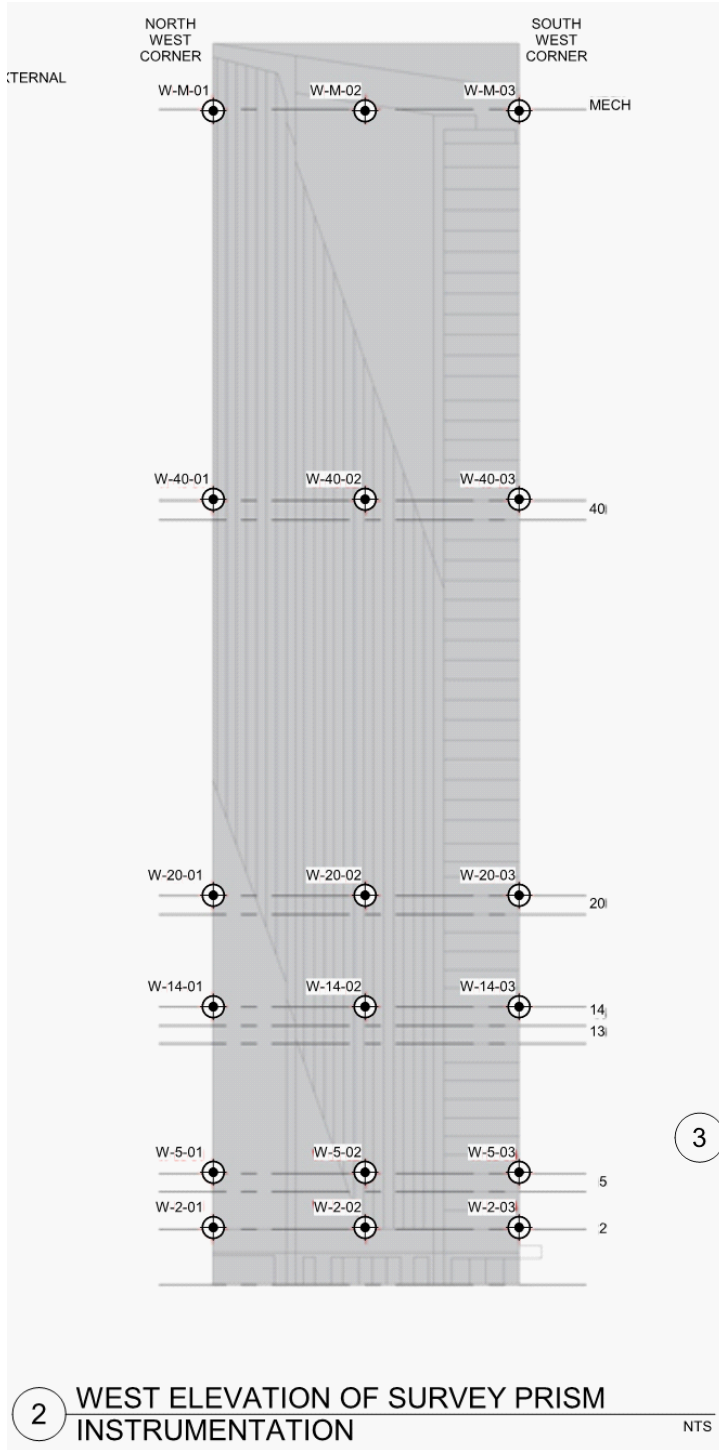
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Figure No: 001-01A



INSTRUMENT LOCATION MAP  
SETTLEMENT MARKERS, PIEZOMETERS, EXTENSOMETERS

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California



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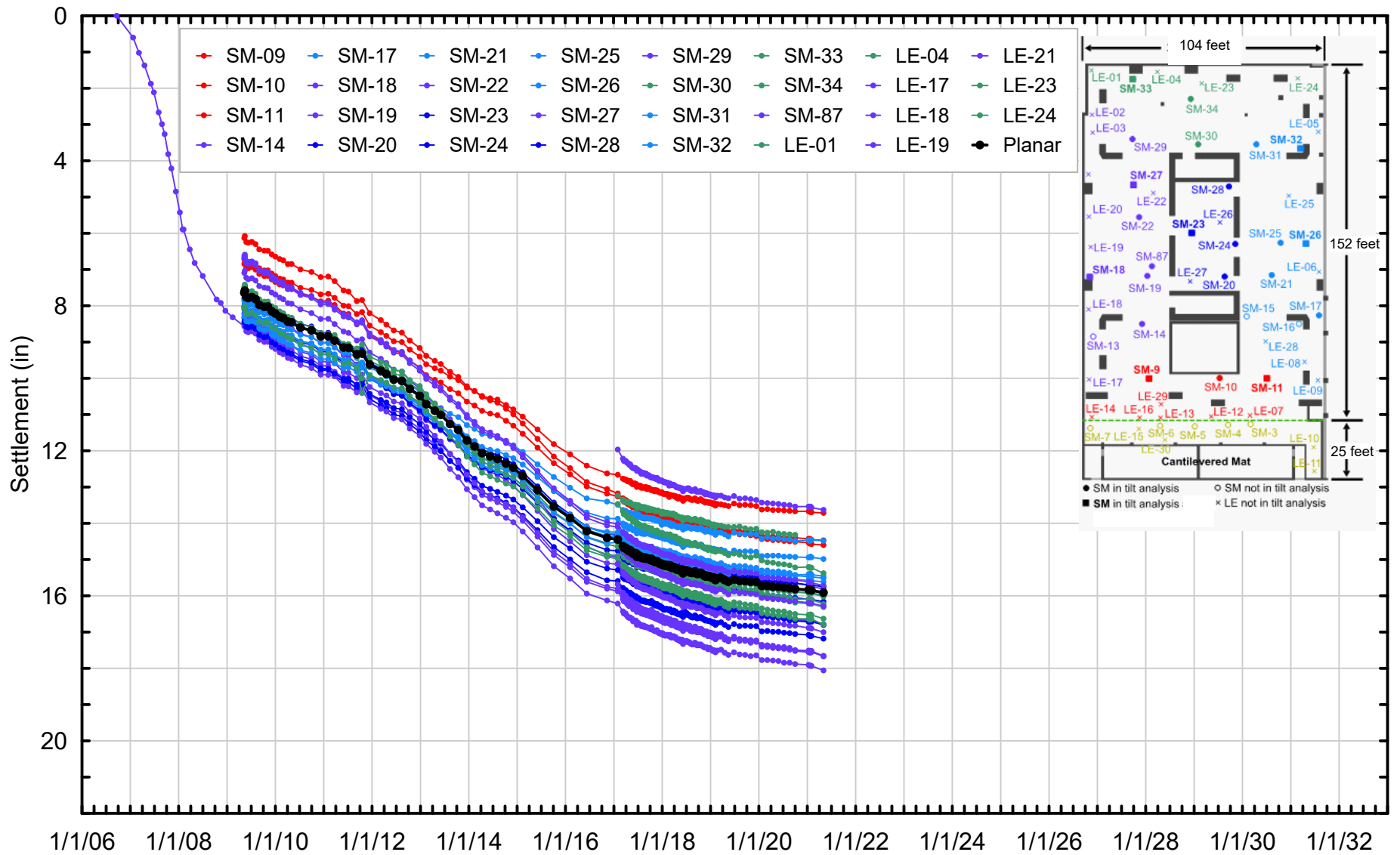
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TOWER SURVEY PRISM LOCATION SCHEMATIC

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California



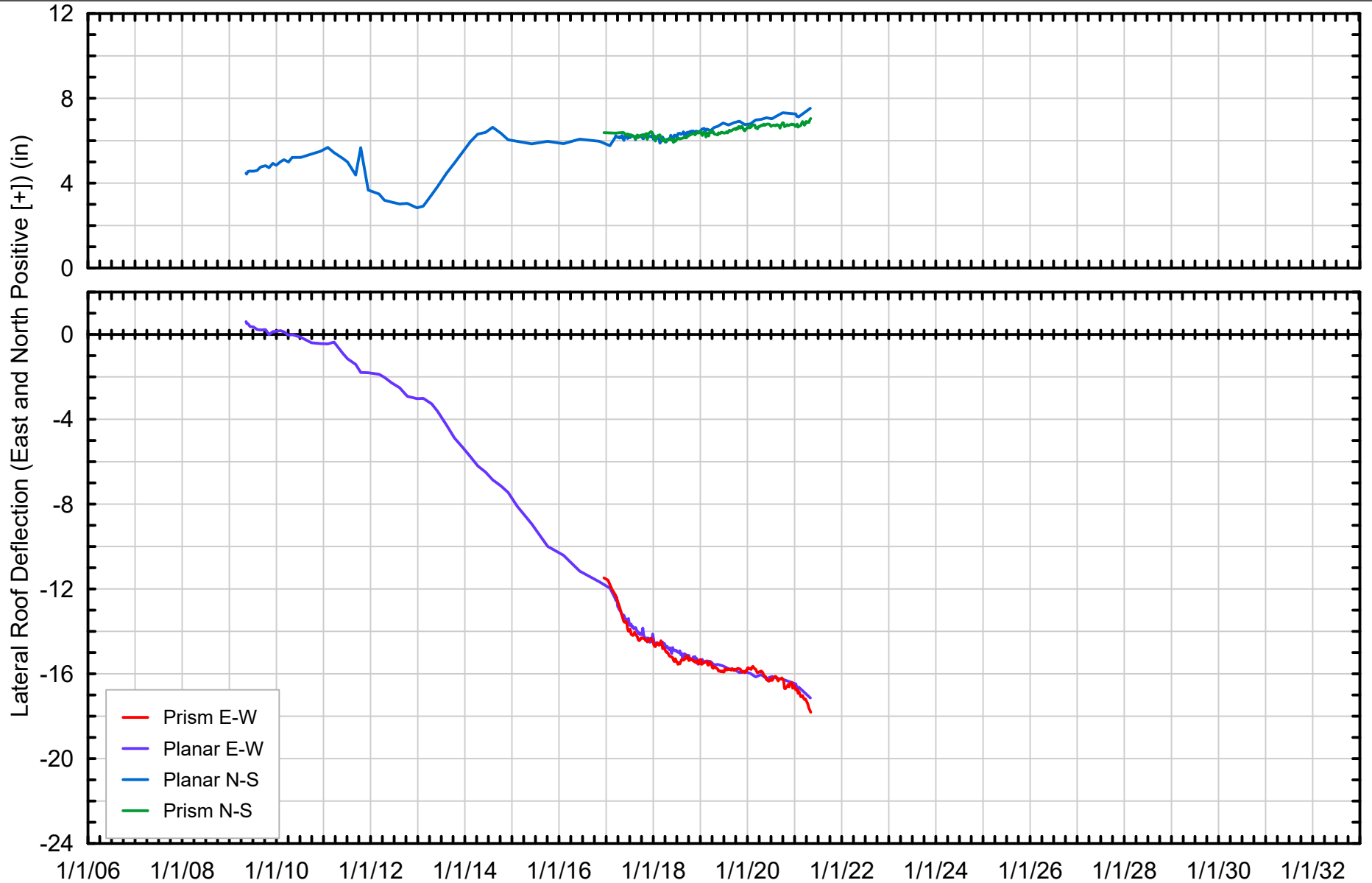


Project No: 19-009.00	Date: 5/10/2021	Created By: NBW	Checked By: DGM	Figure No: <b>001-02</b>
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HISTORICAL SETTLEMENT MARKER DATA

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California

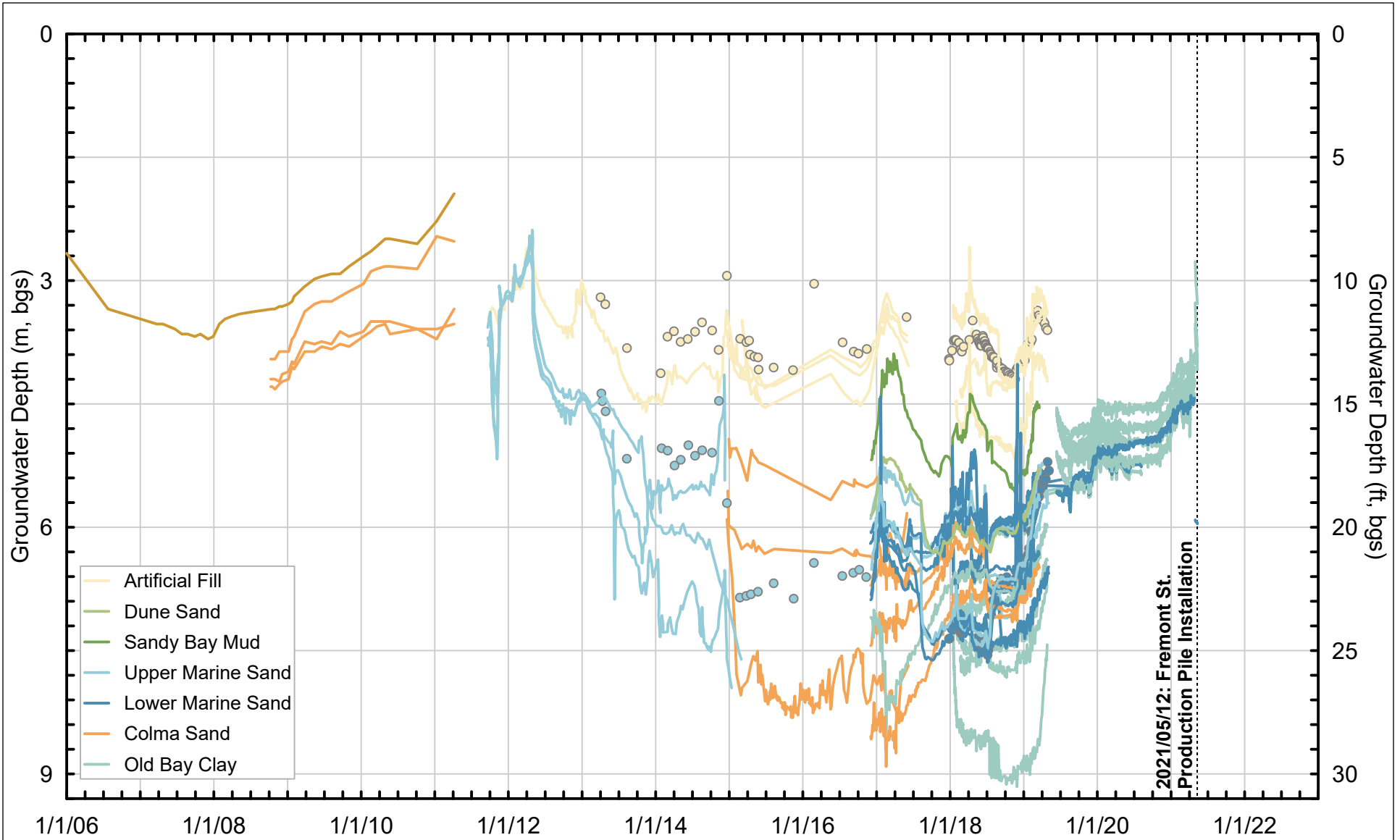


Project No: 19-009.00	Date: 5/10/2021	Created By: NBW	Checked By: DGM	Figure No: <b>001-05</b>
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HISTORICAL LATERAL ROOF DEFLECTION DATA

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California



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HISTORICAL GROUNDWATER ELEVATION MEASUREMENTS  
AT LOCATIONS NEAR 301 MISSION

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California