City and County of San Francisco
Department of Building Inspection

London N. Breed, Mayor
Patrick O'Riordan, Interim Director

September 10, 2021

To Mr. James Zaratin, General Manager & members of the Millennium Tower Association:

Ron Hamburger, the engineer of record for the foundation retrofit for 301 Mission, has informed the San Francisco Department of Building Inspection (DBI) that survey measurements have documented the cessation of the accelerated rate of building settlement associated with the installation of the piles for the retrofit. Attached is the monitoring report provided by Mr. Hamburger, in which the cessation of the accelerated rate of settlement is shown in Figure 019-06B (page 11 of the PDF). In the interest of all involved, please refrain from resuming construction until DBI and the City's Engineering Design Review Team (EDRT) have reviewed the updated construction approach for the pile and casings installation for the 301 Mission retrofit.

Mr. Hamburger has repeatedly assured DBI officials and advisors that, based on analyses conducted by his firm, the building settlement and tilt do not present a concern for the building's structural safety.

DBI and the EDRT agree with Mr. Hamburger's assessment that the building settlement does not present a structural concern and believe that Mr. Hamburger's hypothesis that construction activity was producing the accelerated rate of settlement was likely accurate. Upon first being informed of the accelerated rate of settlement, the EDRT and DBI engineers promptly reviewed the survey data and analyses provided by Mr. Hamburger and his design team. In their weekly meetings and regular email exchanges, the EDRT posed questions to Mr. Hamburger and the design team about the potential structural impact and possible causes of the accelerated rate of settlement. DBI and the EDRT supported the pauses on the retrofit work, which has apparently stopped the accelerated rate of settlement, and the continued monitoring is providing data to help establish the mechanisms that caused the accelerated settlement.

With the cessation of the accelerated rate of settlement, Mr. Hamburger and his team are now developing options for how the Millennium Tower Association can continue the retrofit work with the end goal of limiting building settlement and assuring its long-term stability. DBI and the EDRT will continue to review and provide feedback on Mr. Hamburger's analysis and planning for an updated construction approach to ensure that the building remains safe for the occupants and compliant with the San Francisco Building Code.

Thank you,

Patrick O'Riordan
Interim Director
San Francisco Department of Building Inspection

SLATE
GEOTECHNICAL CONSULTANTS

To: John Egan, PE, GE
Ron Hamburger, PE, SE
Phil Lovett
Kristin Gonsar
Kelly McCormick
Andrew Weichert

From: Debra Murphy, PE
Nathaniel Wagner, PE, PhD

Date: September 8, 2021
Project Number: 19-009
Subject: 301 Mission Retrofit Monitoring Report 019: Results as of September 7, 2021

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.

PRESENTATION OF DATA

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 03A presents settlement data since the start of production pile installation (May 12, 2021; baseline readings on May 10, 2021) through September 7, 2021. The presentation of data on Figure 03A has been updated to clarify the intent. Figure 03B presents settlement data since January 11, 2021, through September 7, 2021. Figure 04 presents current settlement contours (in inches) on August 30, 2021.

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 06A presents lateral roof deflection data from a planar fit of the settlement marker data and from survey prisms mounted on the exterior of the Tower since the start of production pile installation (May 12, 2021; baseline readings on May 10 and 13, 2021, respectively) through September 7, 2021. Figure 06B presents lateral roof deflection data from a planar fit of the settlement marker data and from survey prisms mounted on the exterior of the Tower since January 11, 2021, through September 7, 2021. Note that data from the survey prisms was not available for September 4 through September 7, 2021.

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. Figures 08 and 09 present groundwater elevation interpreted from piezometer readings in the Marine/Colma Sand and the Old Bay Clay, respectively, for the time period prior to the start of production pile installation (January 1, 2021) through September 7, 2021.

Figure 10 presents extensometer data from within the Tower basement since the start of production pile installation (May 12, 2021) through September 7, 2021. Figure 11 presents extensometer data from

Fremont Street since the start of production pile installation (May 12, 2021) through September 7, 2021. Figure 12 presents extensometer data from Mission Street since the start of production pile installation (May 12, 2021) through September 7, 2021.

CLOSING

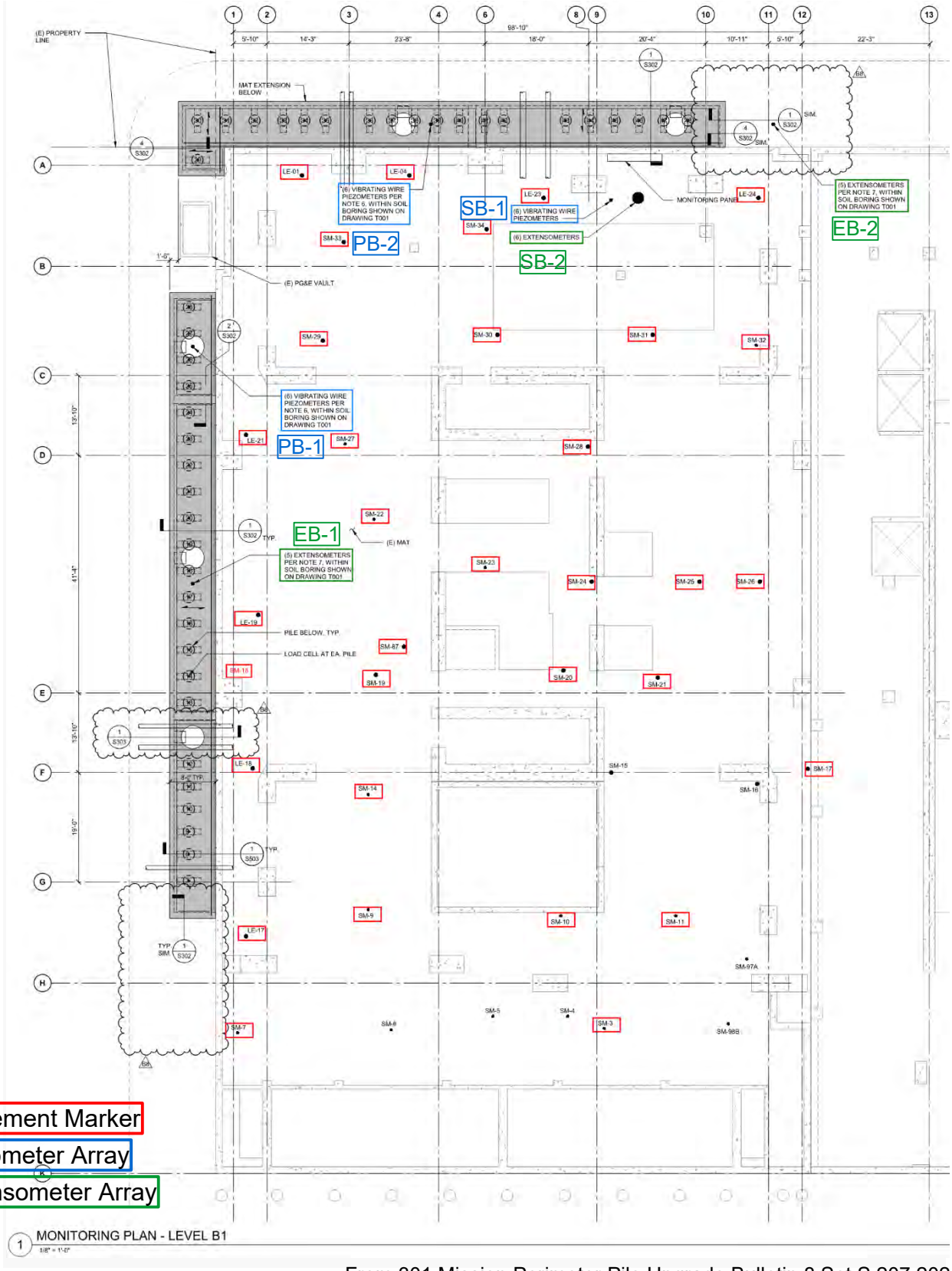
Please contact us if you have any comments or questions, or if you would like to discuss the results presented in this memorandum.

FIGURES

Figure 01A – Instrument Location Map: Settlement Markers, Piezometers, Extensometers
Figure 01B – Tower Survey Prism Location Schematic
Figure 02 – Historical Settlement Marker Data
Figure 03A –Settlement Marker Data since 05/10/2021 through 09/07/2021
Figure 03B – Settlement Marker Data since 01/11/2021 through 09/07/2021
Figure 04 – Settlement Contours since 05/10/2021 through 09/07/2021
Figure 05 – Historical Lateral Roof Deflection Data
Figure 06A – Lateral Roof Deflection Data since 05/10/2021 through 09/07/2021
Figure 06B – Lateral Roof Deflection Data since 01/11/2021 through 09/07/2021
Figure 07 – Historical Groundwater Elevation Measurements at Locations Near 301 Mission
Figure 08A – Groundwater Elevation Measurements in Marine and Colma Sand since 01/01/2021 through 09/07/2021
Figure 08B – Groundwater Elevation Measurements in Marine and Colma Sand since 05/10/2021 through 09/07/2021
Figure 09A – Groundwater Elevation Measurements in Old Bay Clay since 01/01/2021 through 09/07/2021
Figure 09B – Groundwater Elevation Measurements in Old Bay Clay since 01/01/2021 through 09/07/2021
Figure 10A – Extensometer Data from within Tower Basement since 01/01/2021 through 09/07/2021
Figure 10B – Extensometer Data from within Tower Basement since 05/10/2021 through 09/07/2021
Figure 11A – Extensometer Data from Fremont Street since 01/01/2021 through 09/07/2021
Figure 11B – Extensometer Data from Fremont Street since 05/10/2021 through 09/07/2021
Figure 12A – Extensometer Data from Mission Street since 01/01/2021 through 09/07/2021
Figure 12B – Extensometer Data from Mission Street since 05/10/2021 through 09/07/2021

ATTACHMENTS

Attachment 01 – Crack Gauge Report since 01/06/2021 through 09/07/2021



From 301 Mission Perimeter Pile Upgrade Bulletin 8 Set S 207 2021-06-15

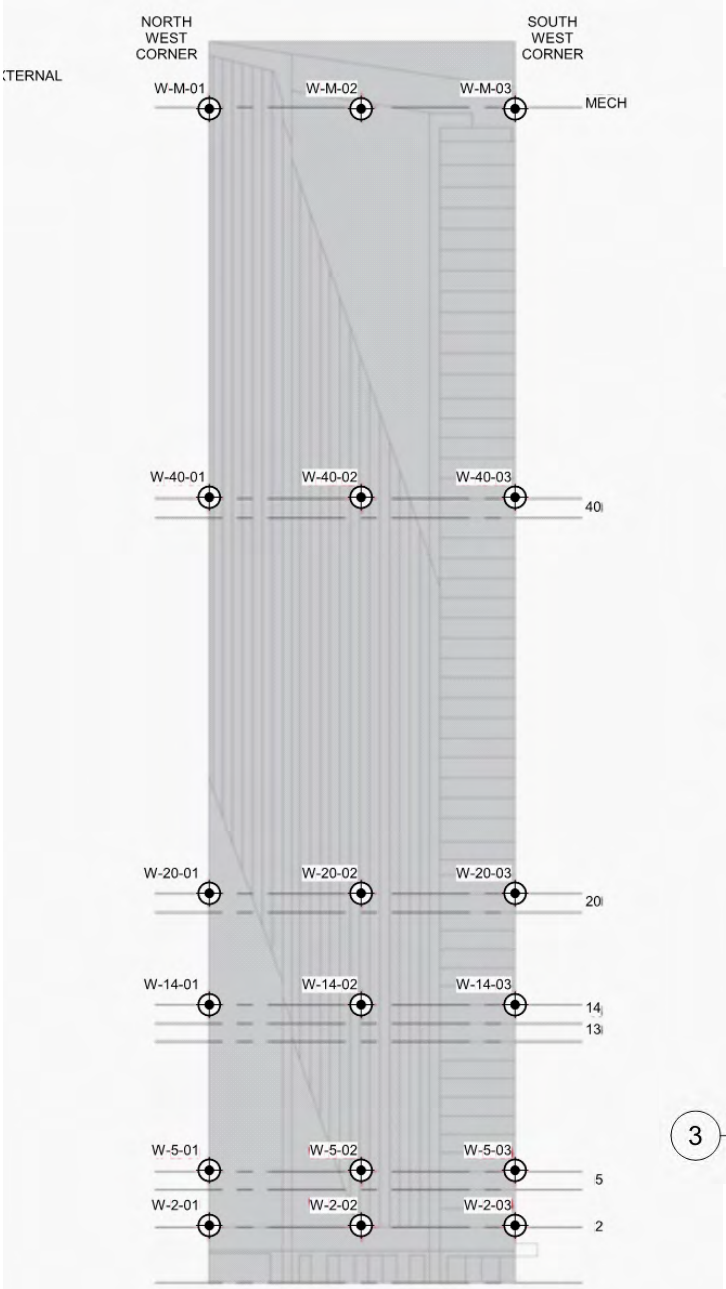
Project No: 19-009.00	Date: 7/26/2021	Created By: NBW	Checked By: DGM	Figure No: **019-01A**

SLATE GEOTECHNICAL CONSULTANTS

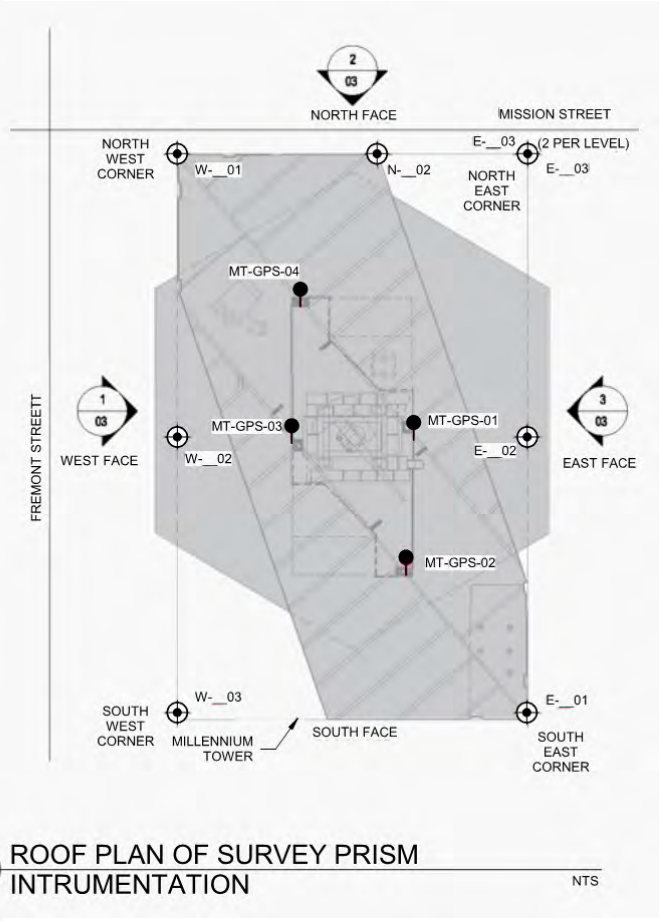
INSTRUMENT LOCATION MAP
SETTLEMENT MARKERS, PIEZOMETERS, EXTENSOMETERS

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-01A_Instrument_Map.grf



2 WEST ELEVATION OF SURVEY PRISM INSTRUMENTATION NTS



3 ROOF PLAN OF SURVEY PRISM INTRUMENTATION NTS

From 301 Mission Perimeter Pile Upgrade Bulletin 8 Set S 207 2021-06-15

Project No: 19-009.00	Date: 7/26/2021	Created By: NBW	Checked By: DGM	Figure No: **019-01B**

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TOWER SURVEY PRISM LOCATION SCHEMATIC

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

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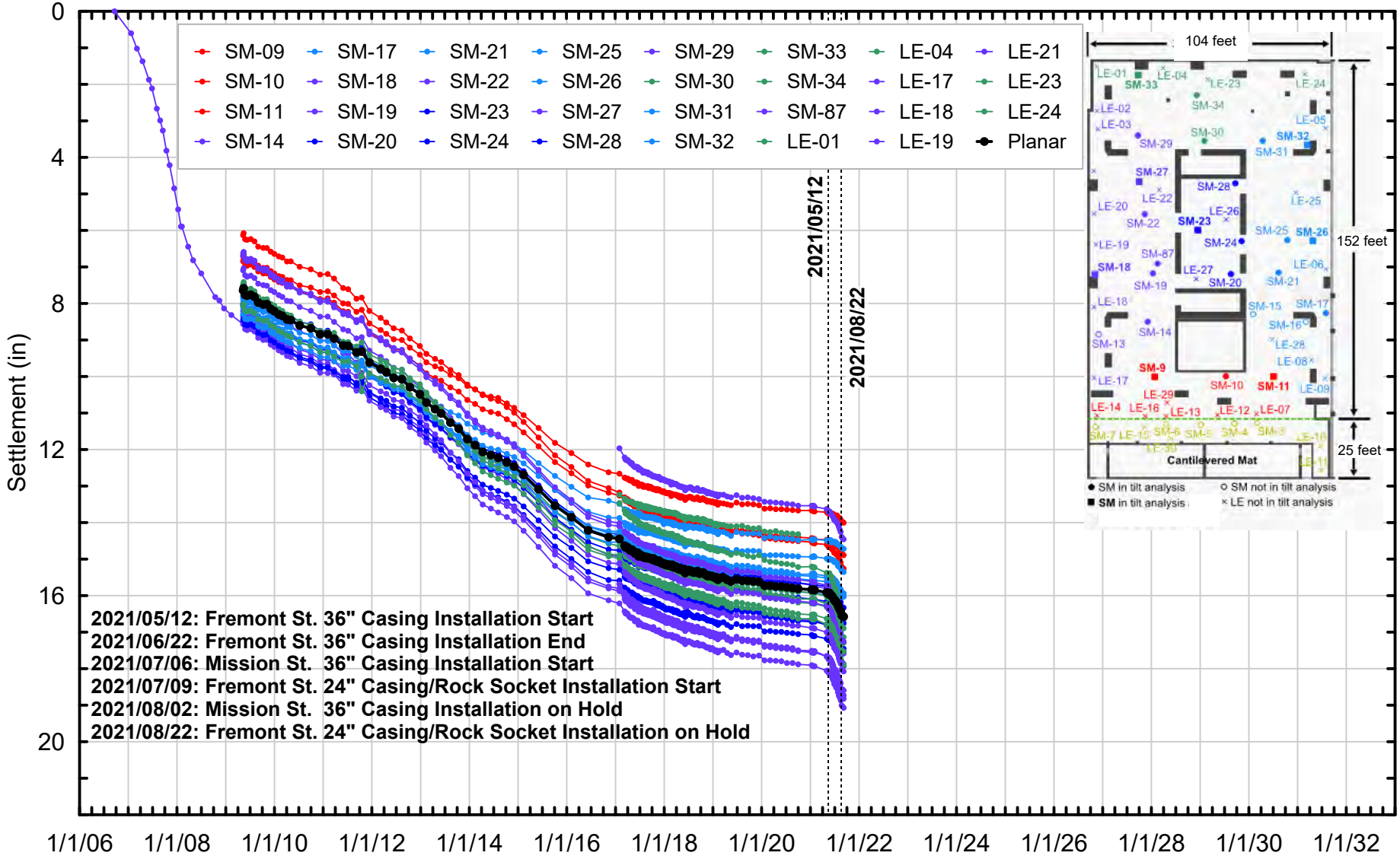

Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-02**

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HISTORICAL SETTLEMENT MARKER DATA

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

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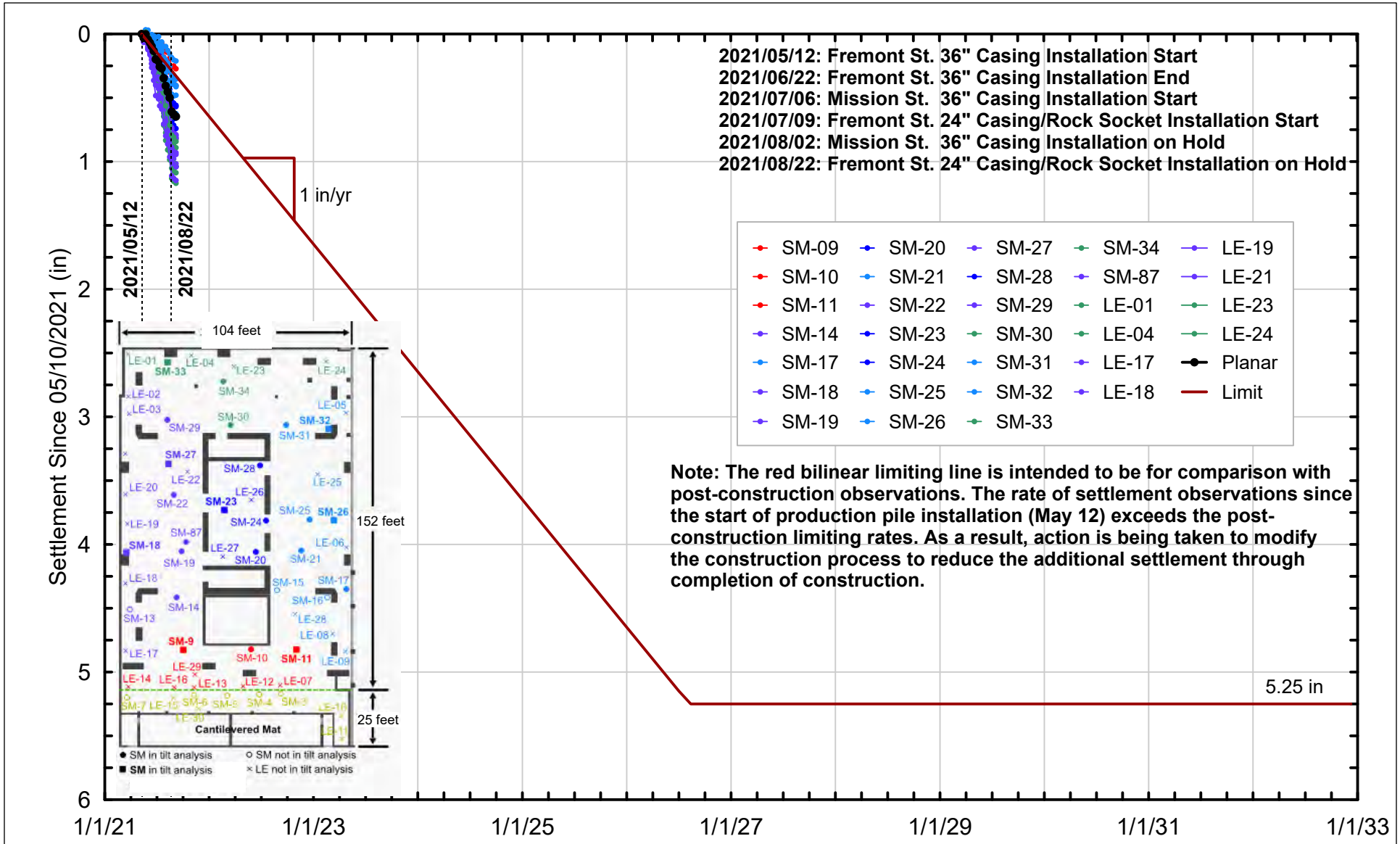

Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-03A**

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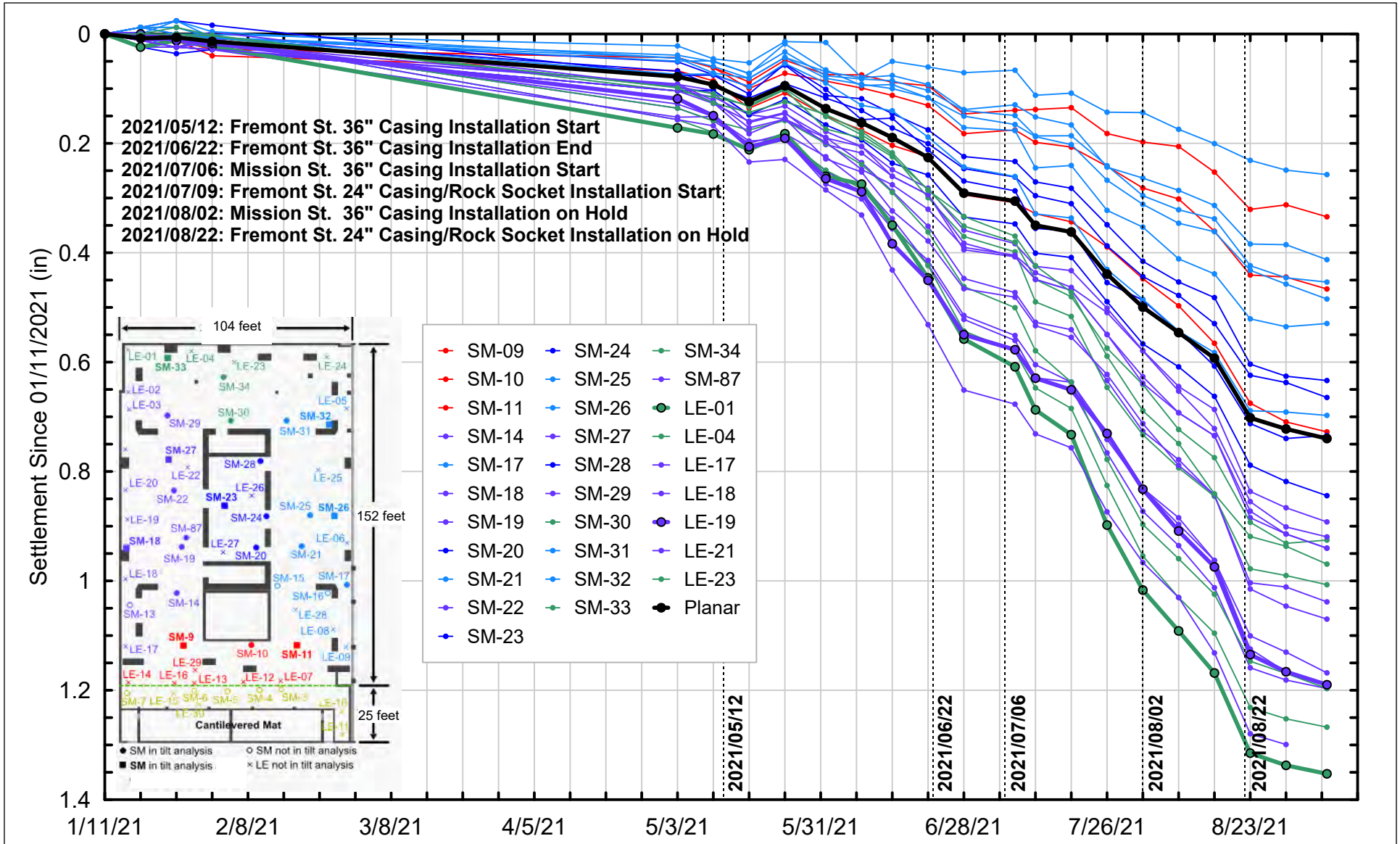
SETTLEMENT MARKER DATA
SINCE 05/10/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-03B_SM_Data_Diff.grf



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-03B**

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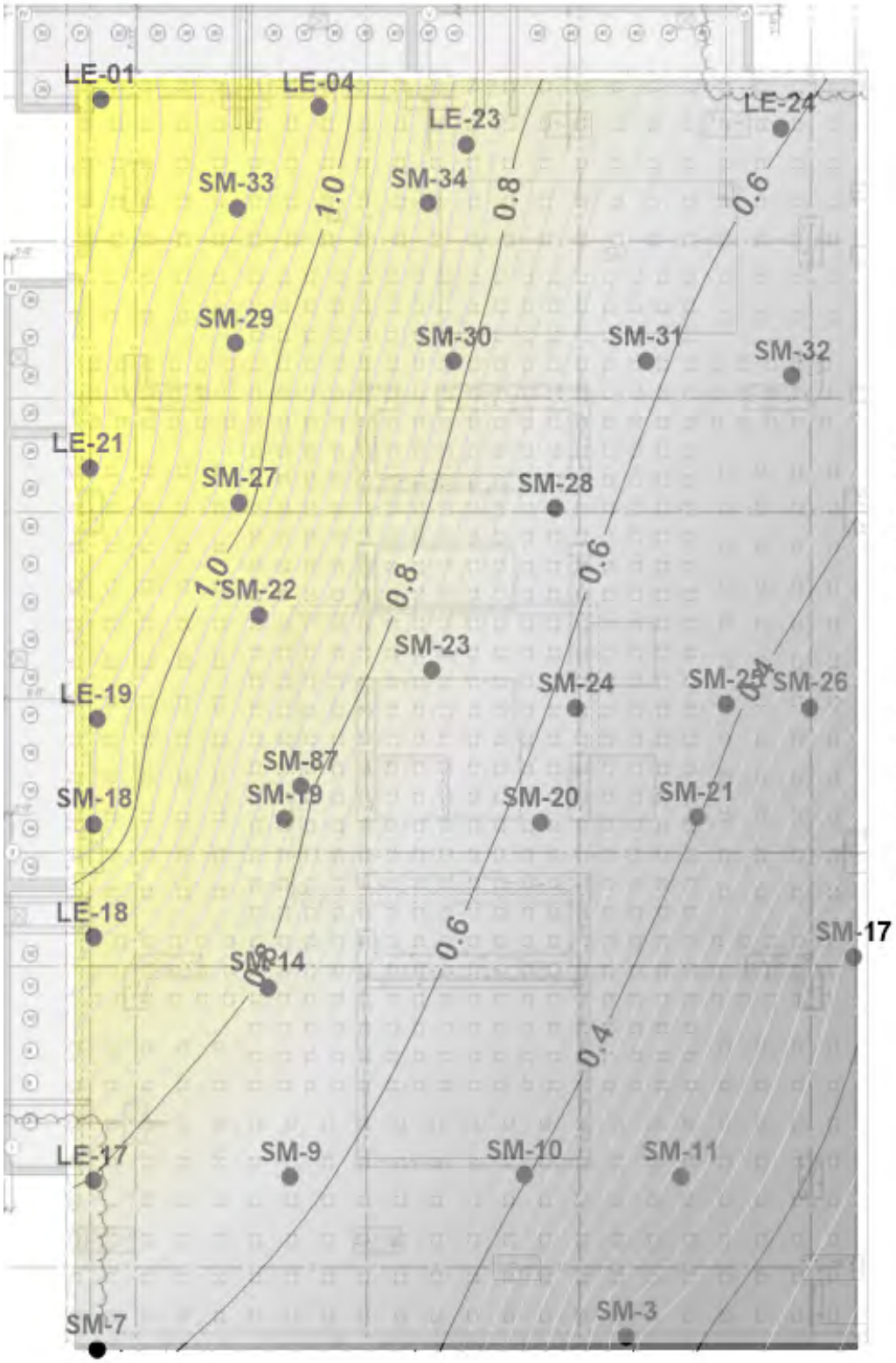
SETTLEMENT MARKER DATA
SINCE 01/11/2021 THROUGH 09/07/2021

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



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-04**

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SETTLEMENT CONTOURS
SINCE 05/10/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-04_SM_Data_Diff_Contours.grf

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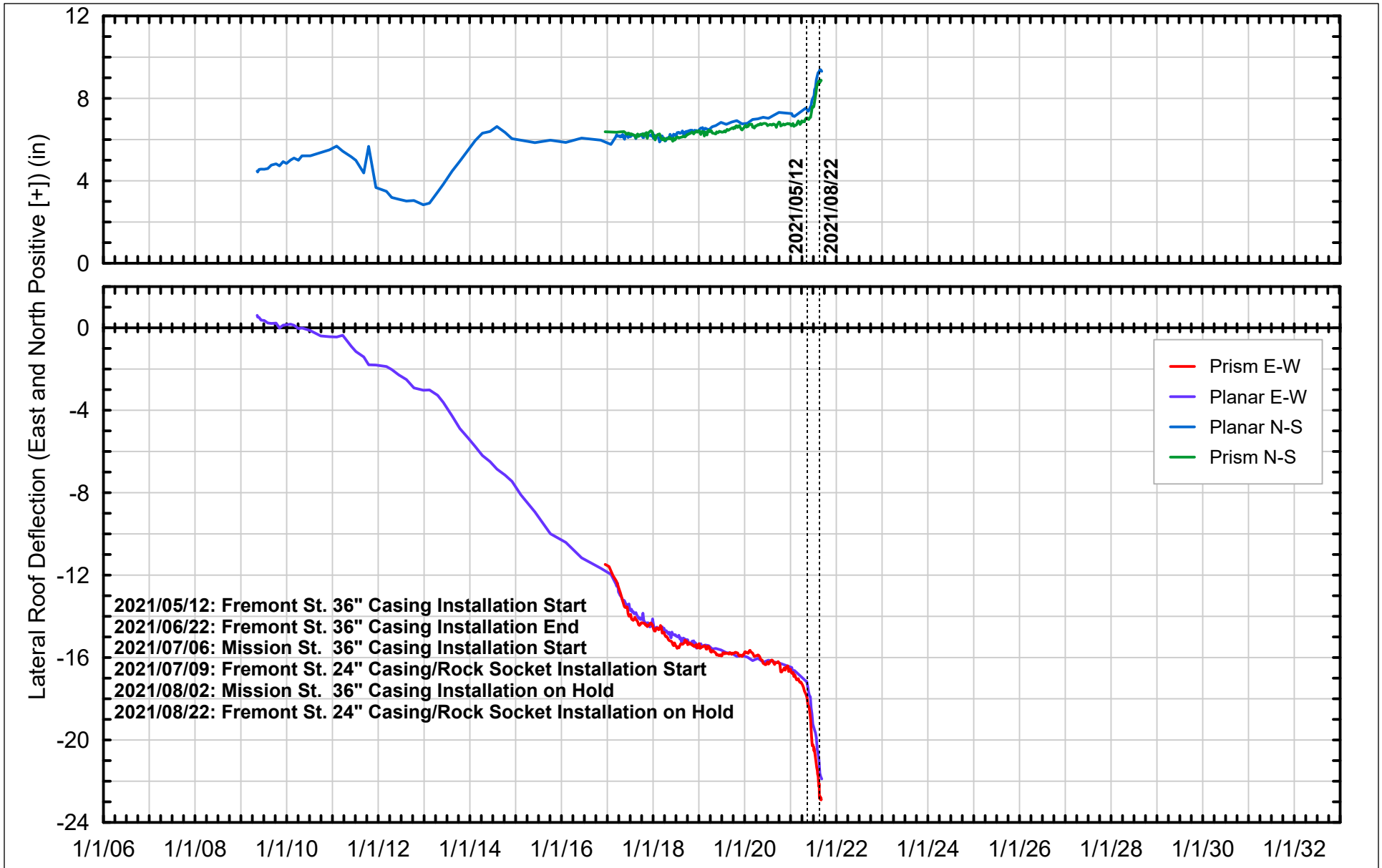

Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-05**

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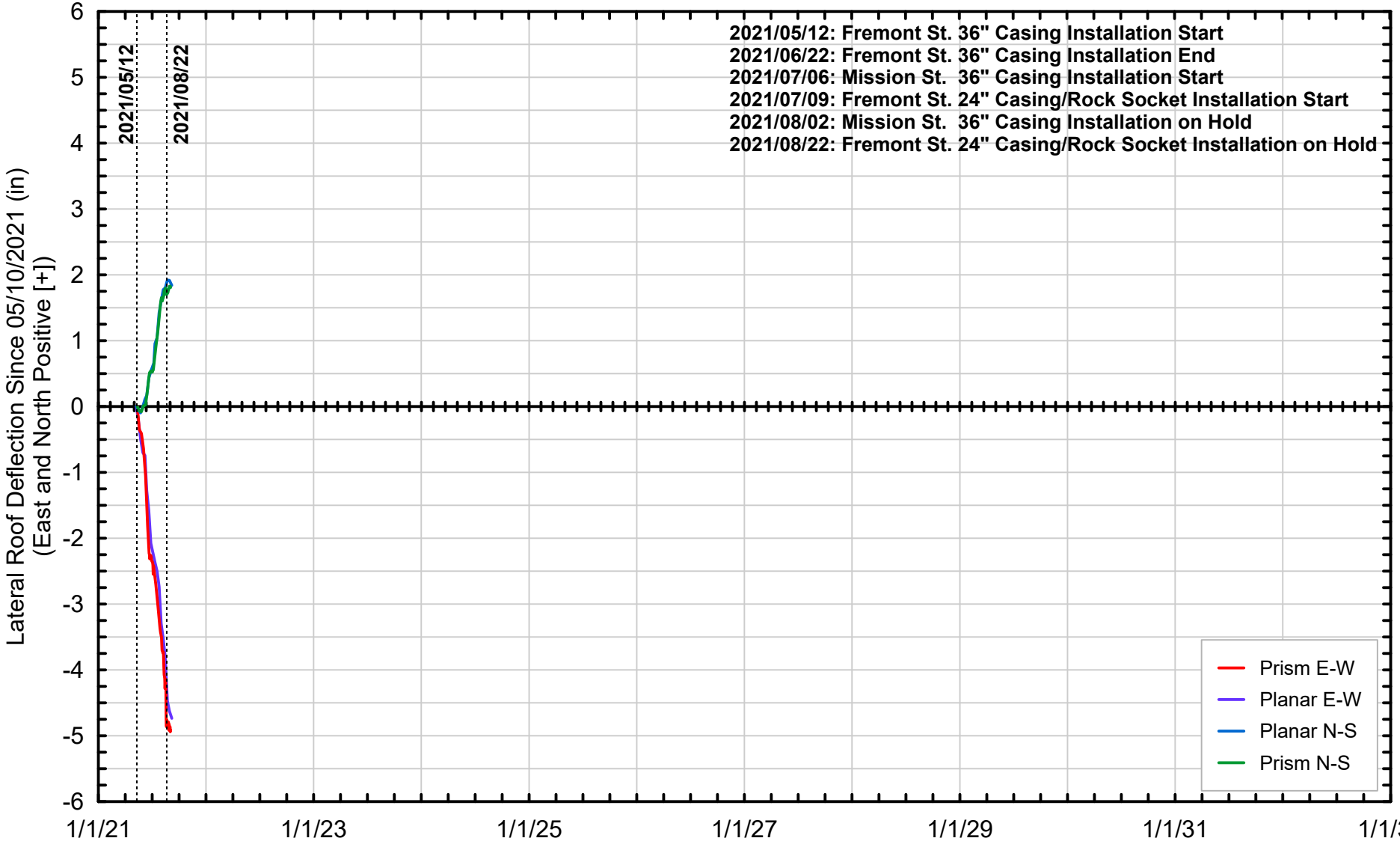
HISTORICAL LATERAL ROOF DEFLECTION DATA

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-06A_LatDef_Data_Diff.grf



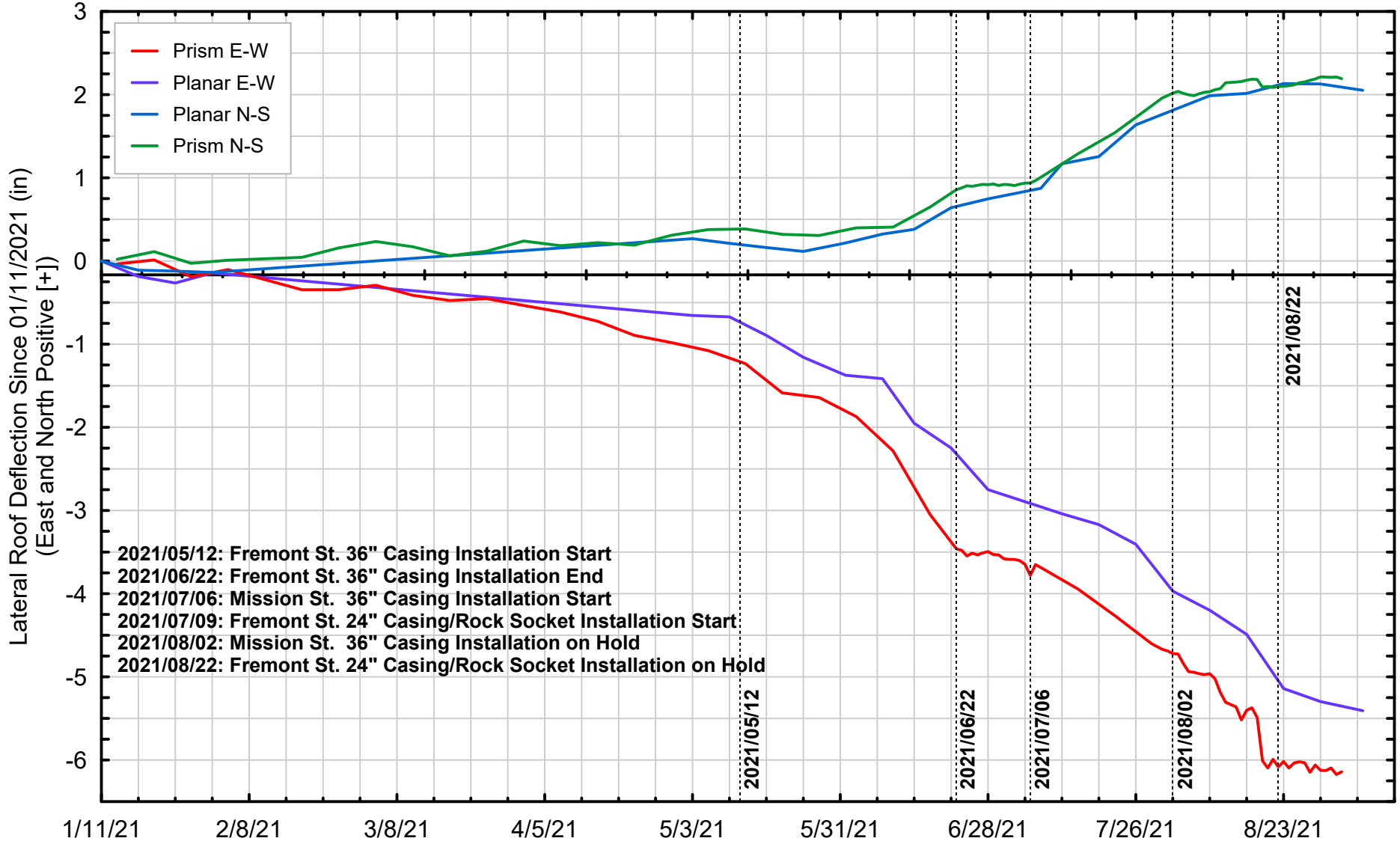
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-06A**

SLATE GEOTECHNICAL CONSULTANTS

LATERAL ROOF DEFLECTION DATA
SINCE 05/10/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-06B_LatDef_Data_Diff.grf



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-06B**

SLATE GEOTECHNICAL CONSULTANTS

LATERAL ROOF DEFLECTION DATA
SINCE 01/11/2021 THROUGH 09/07/2021

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

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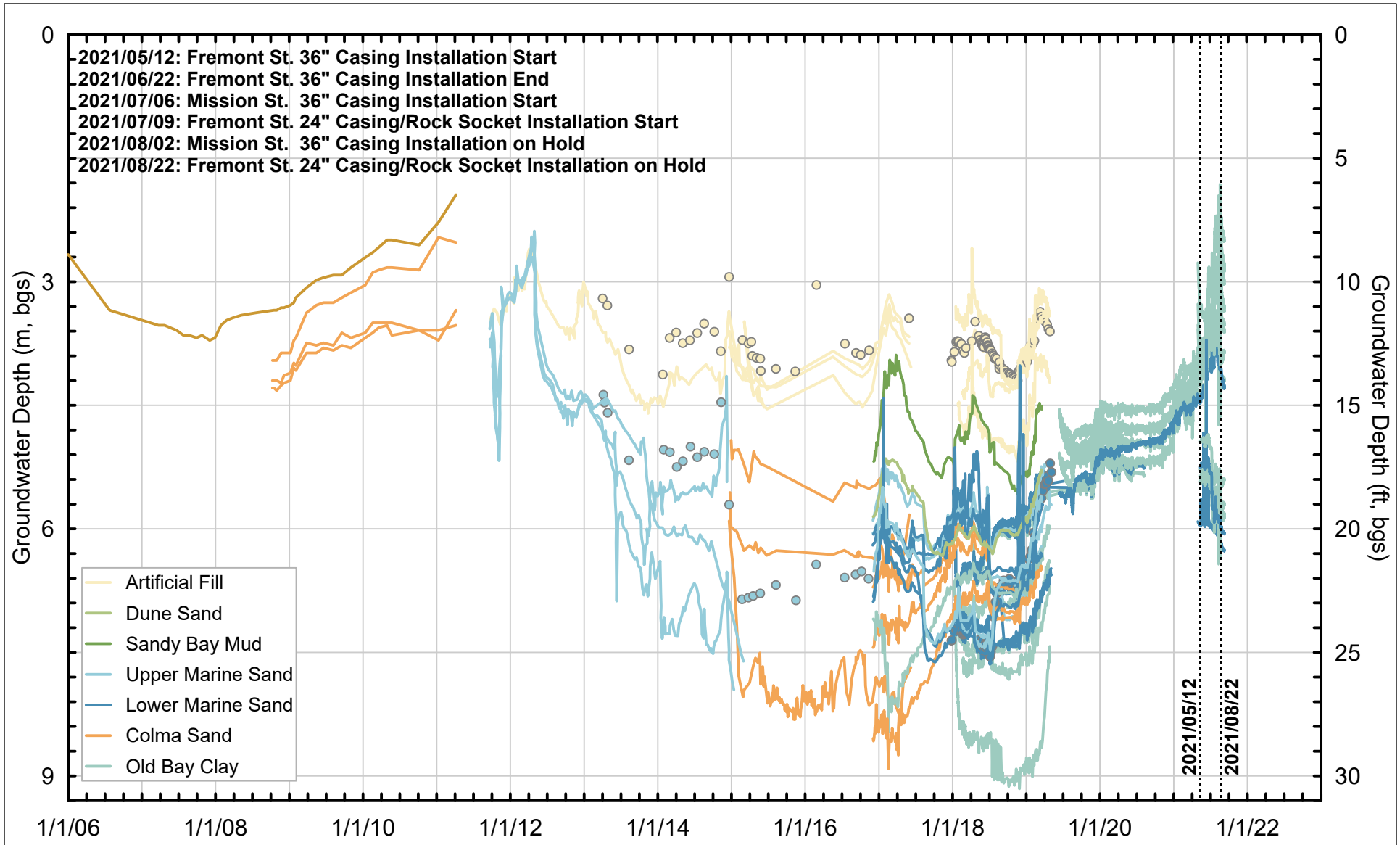

Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-07**

SLATE GEOTECHNICAL CONSULTANTS

HISTORICAL GROUNDWATER ELEVATION MEASUREMENTS
AT LOCATIONS NEAR 301 MISSION

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

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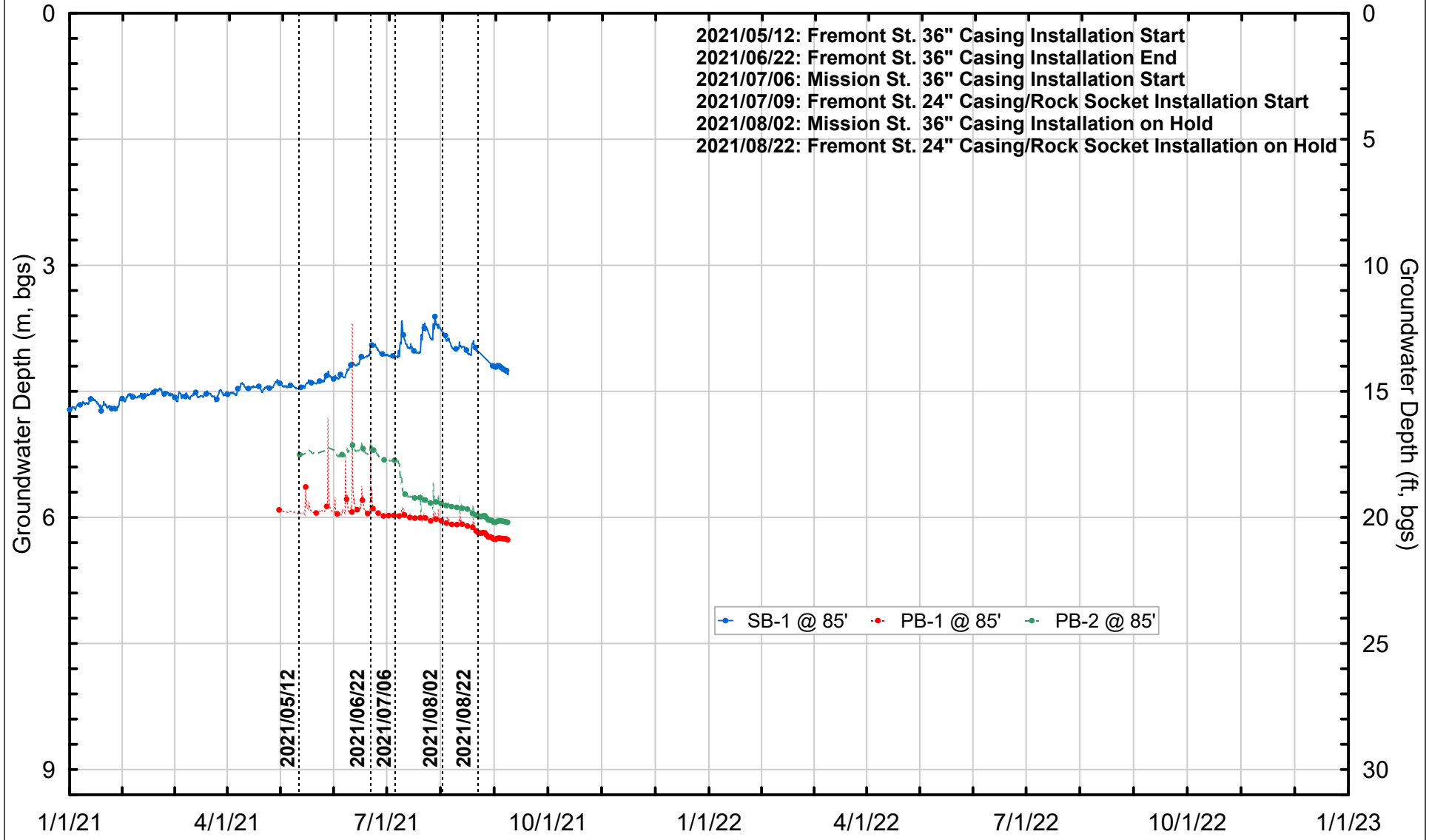


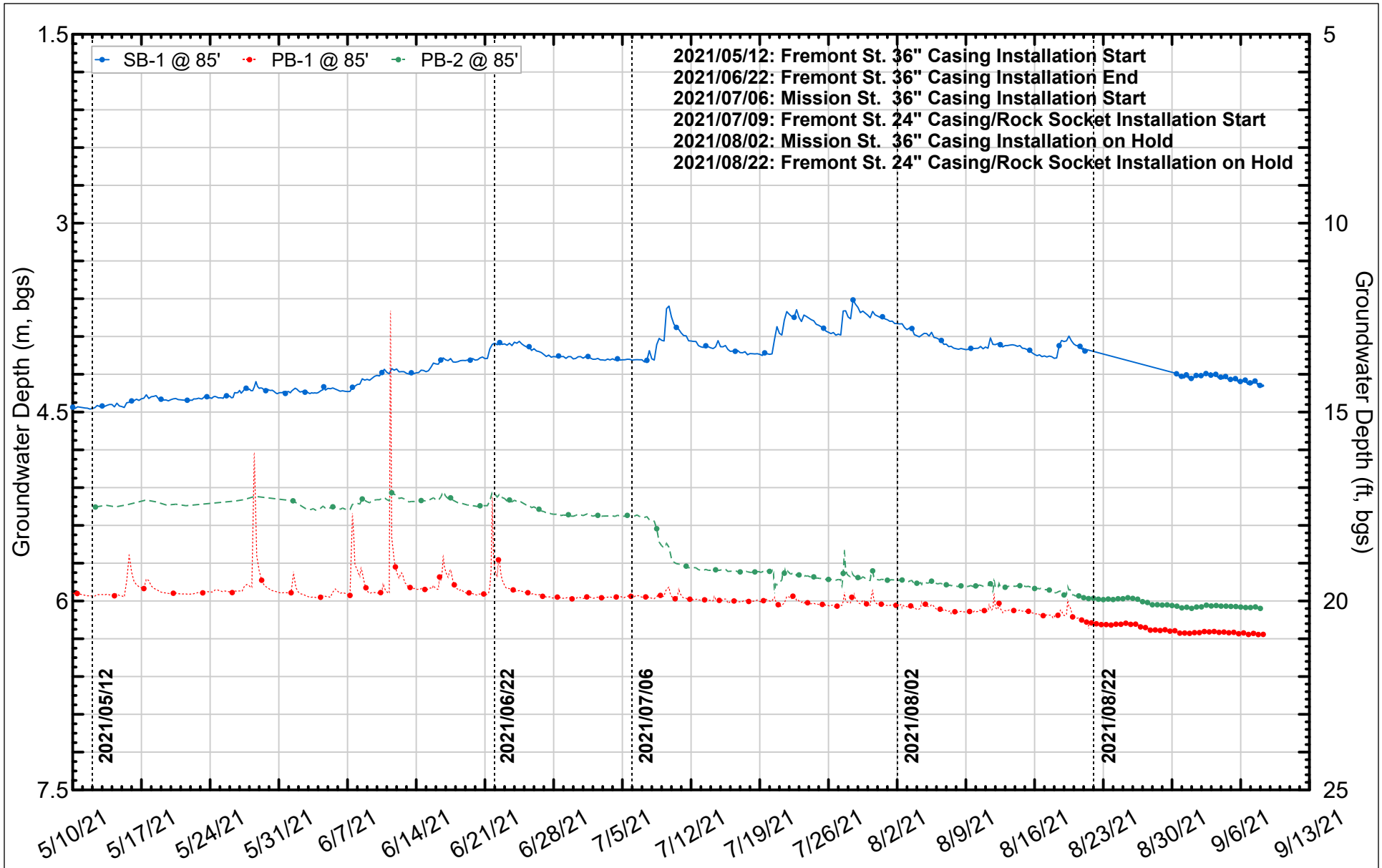
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-08A**

SLATE GEOTECHNICAL CONSULTANTS

GROUNDWATER ELEVATION MEASUREMENTS IN MARINE AND COLMA SAND
SINCE 01/01/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-08B_GWT_Data_Sand.grf



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-08B**

SLATE GEOTECHNICAL CONSULTANTS

GROUNDWATER ELEVATION MEASUREMENTS IN MARINE AND COLMA SAND
SINCE 05/10/2021 THROUGH 09/07/2021

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

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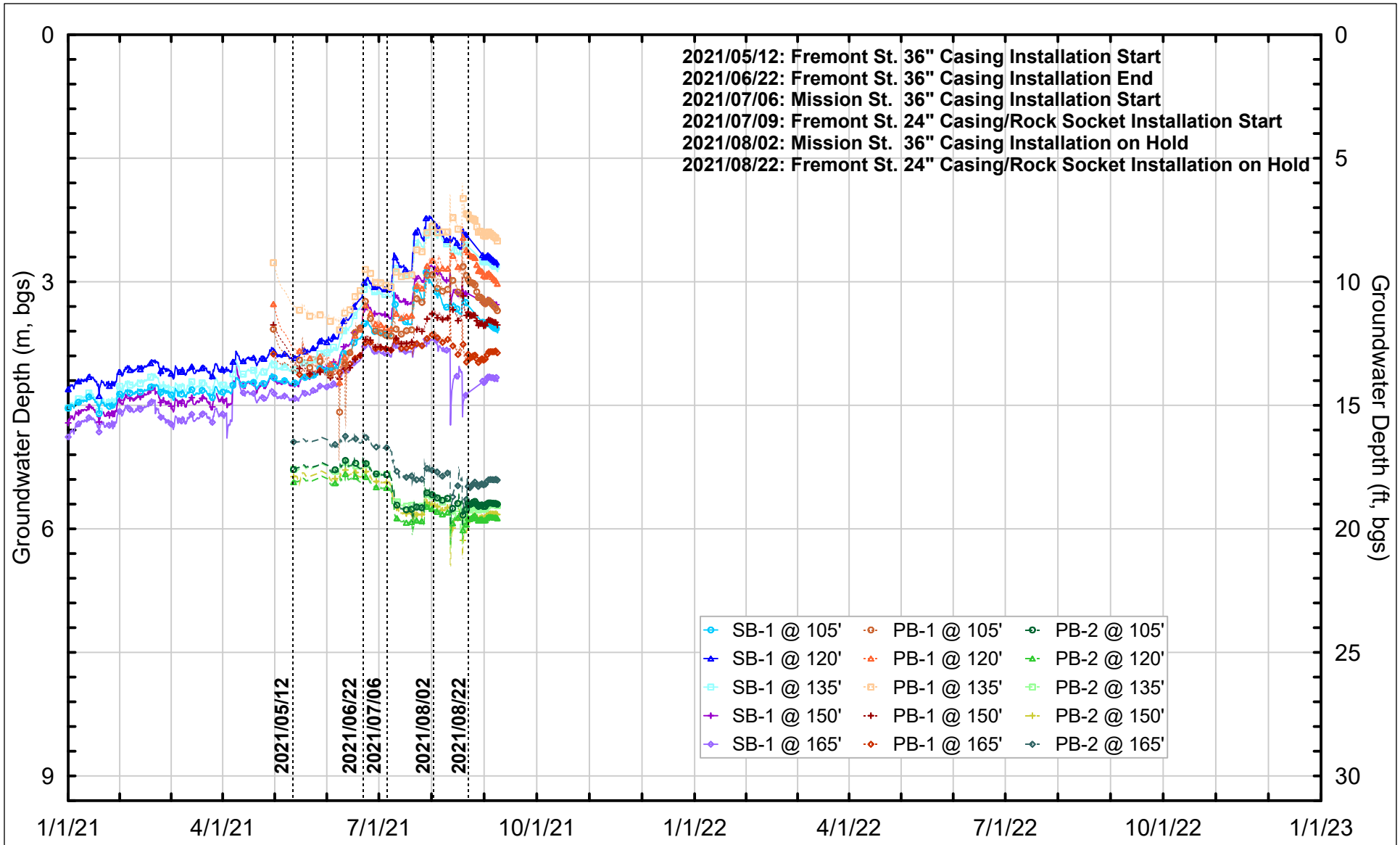


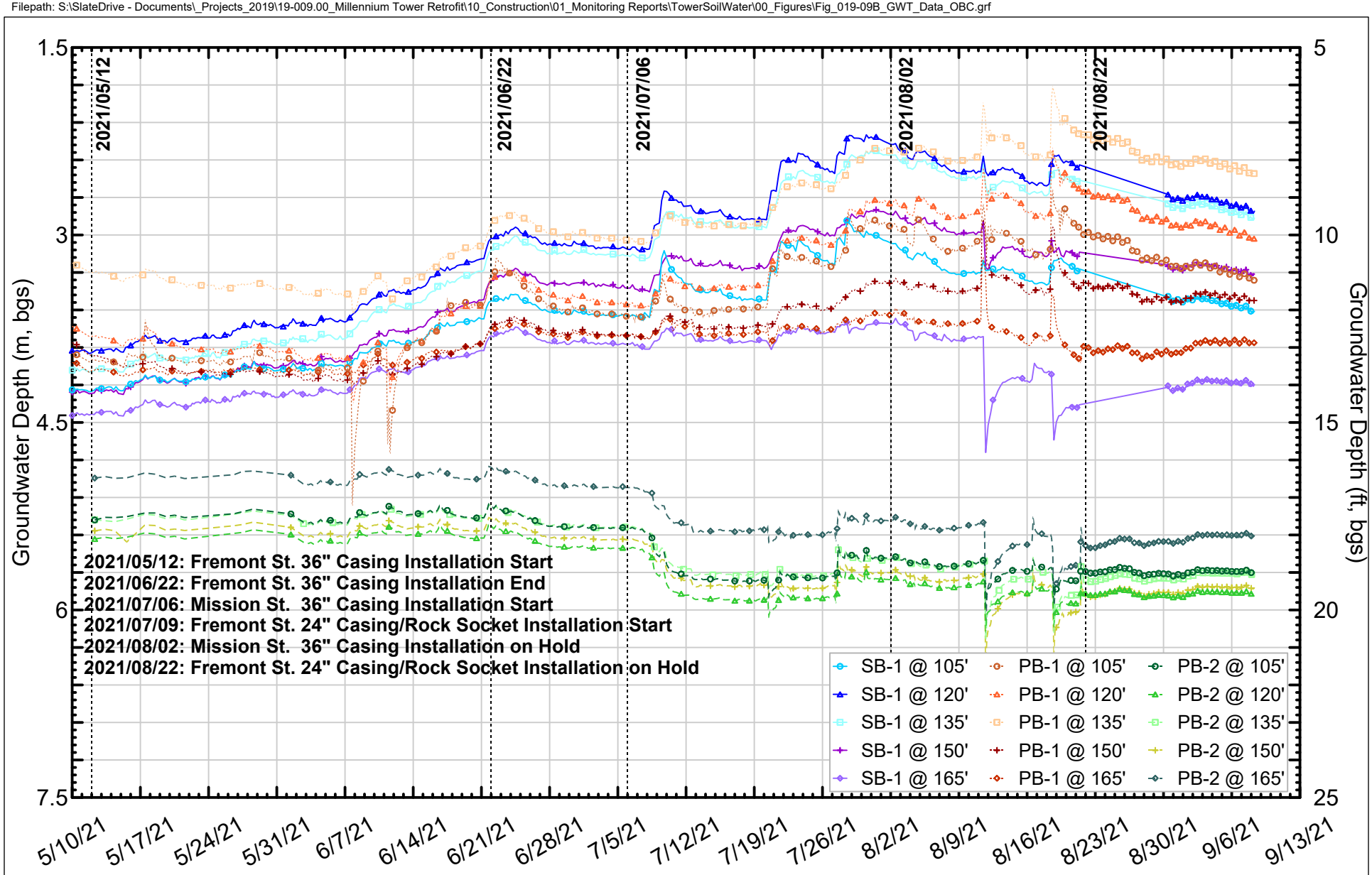
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-09A**

SLATE GEOTECHNICAL CONSULTANTS

GROUNDWATER ELEVATION MEASUREMENTS IN OLD BAY CLAY
SINCE 01/01/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-09B_GWT_Data_OBC.grf



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-09B**

SLATE GEOTECHNICAL CONSULTANTS

GROUNDWATER ELEVATION MEASUREMENTS IN OLD BAY CLAY
SINCE 05/10/2021 THROUGH 09/07/2021

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

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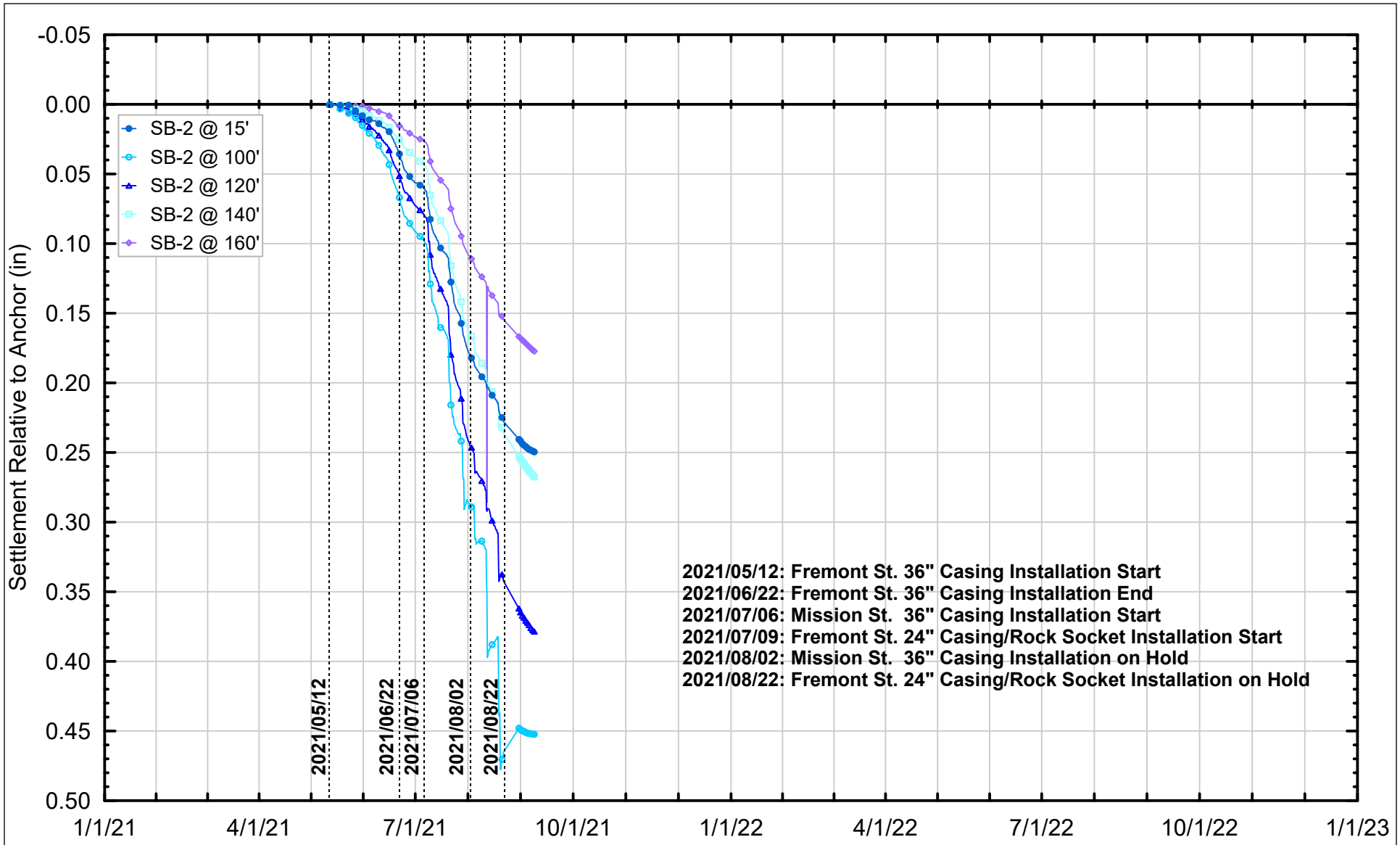


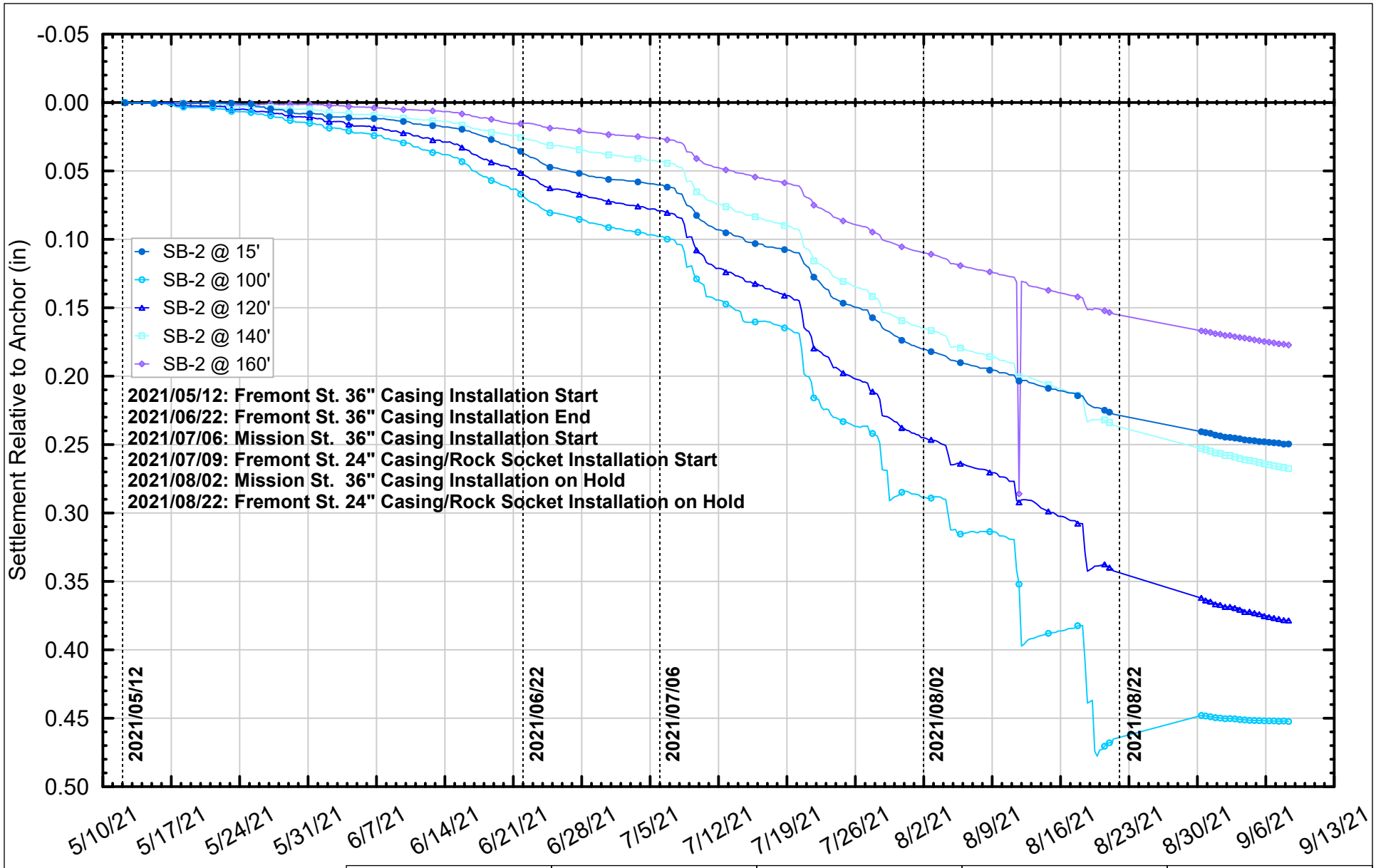
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-10A**

SLATE GEOTECHNICAL CONSULTANTS

EXTENSOMETER DATA FROM WITHIN TOWER BASEMENT
SINCE 01/01/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-10B_Ext_Data_Basement.grf



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-10B**

SLATE GEOTECHNICAL CONSULTANTS

EXTENSOMETER DATA FROM WITHIN TOWER BASEMENT
SINCE 05/10/2021 THROUGH 09/07/2021

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

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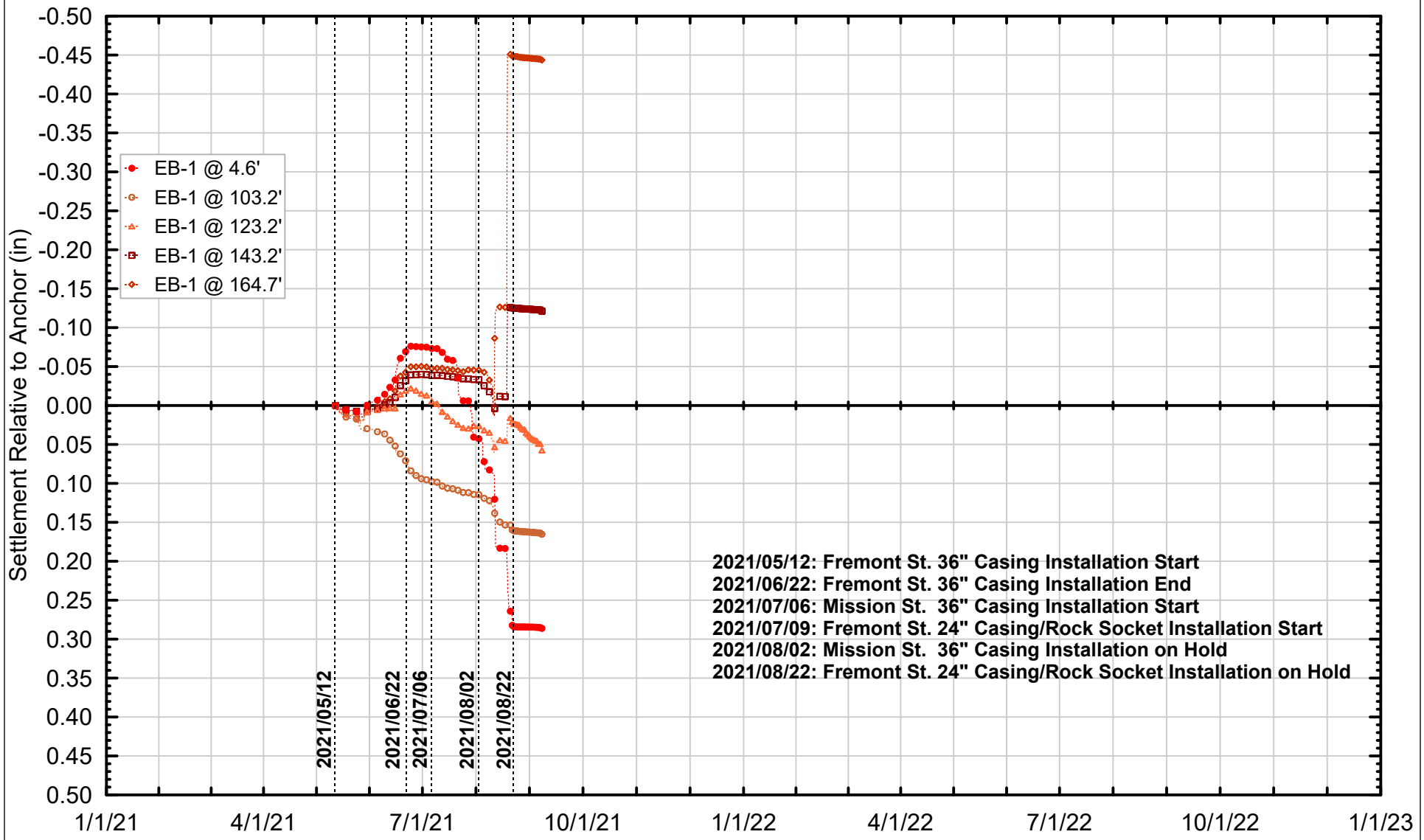


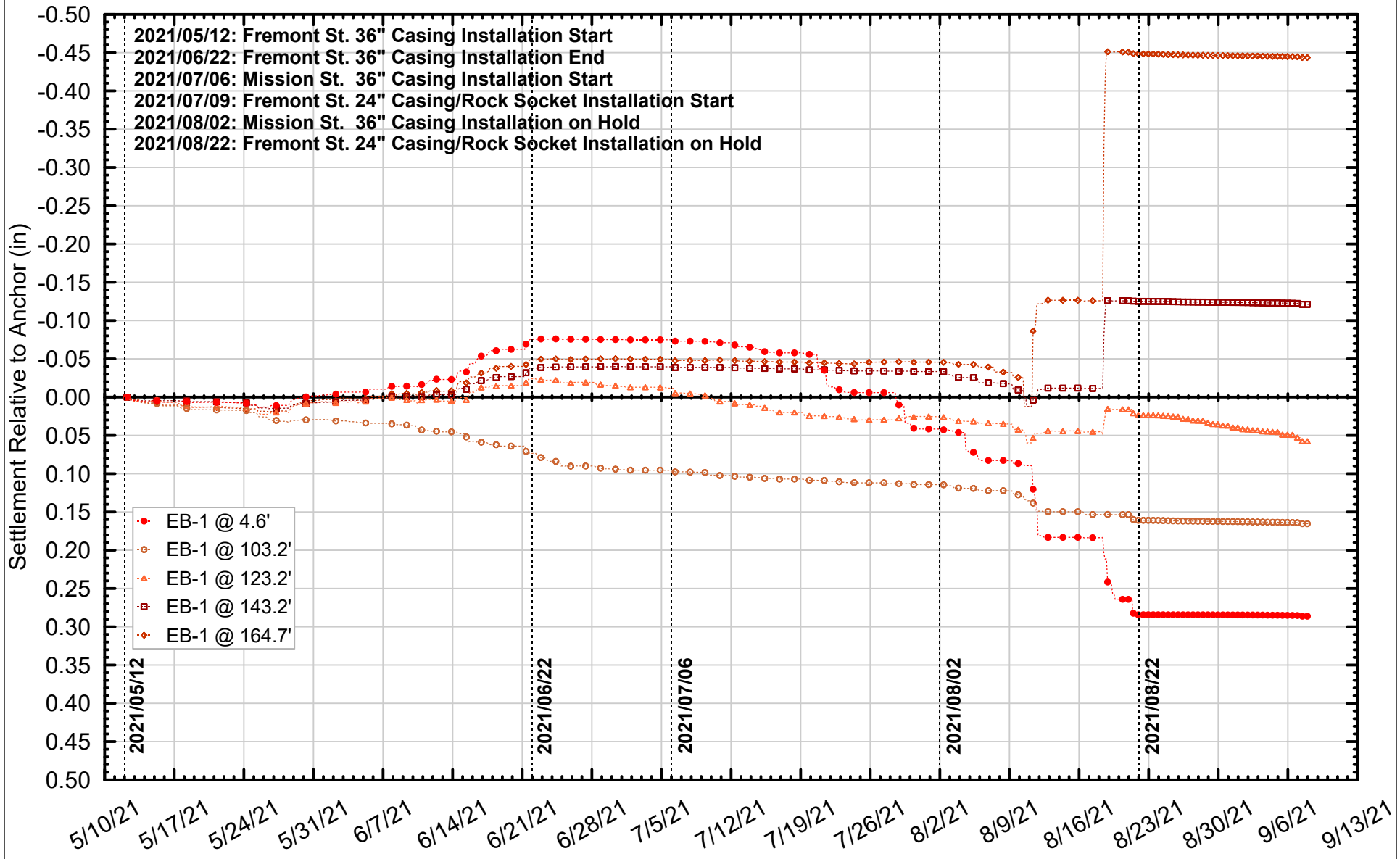
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-11A**

SLATE GEOTECHNICAL CONSULTANTS

EXTENSOMETER DATA FROM FREMONT STREET
SINCE 01/01/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-11B_Ext_Data_Fremont.grf



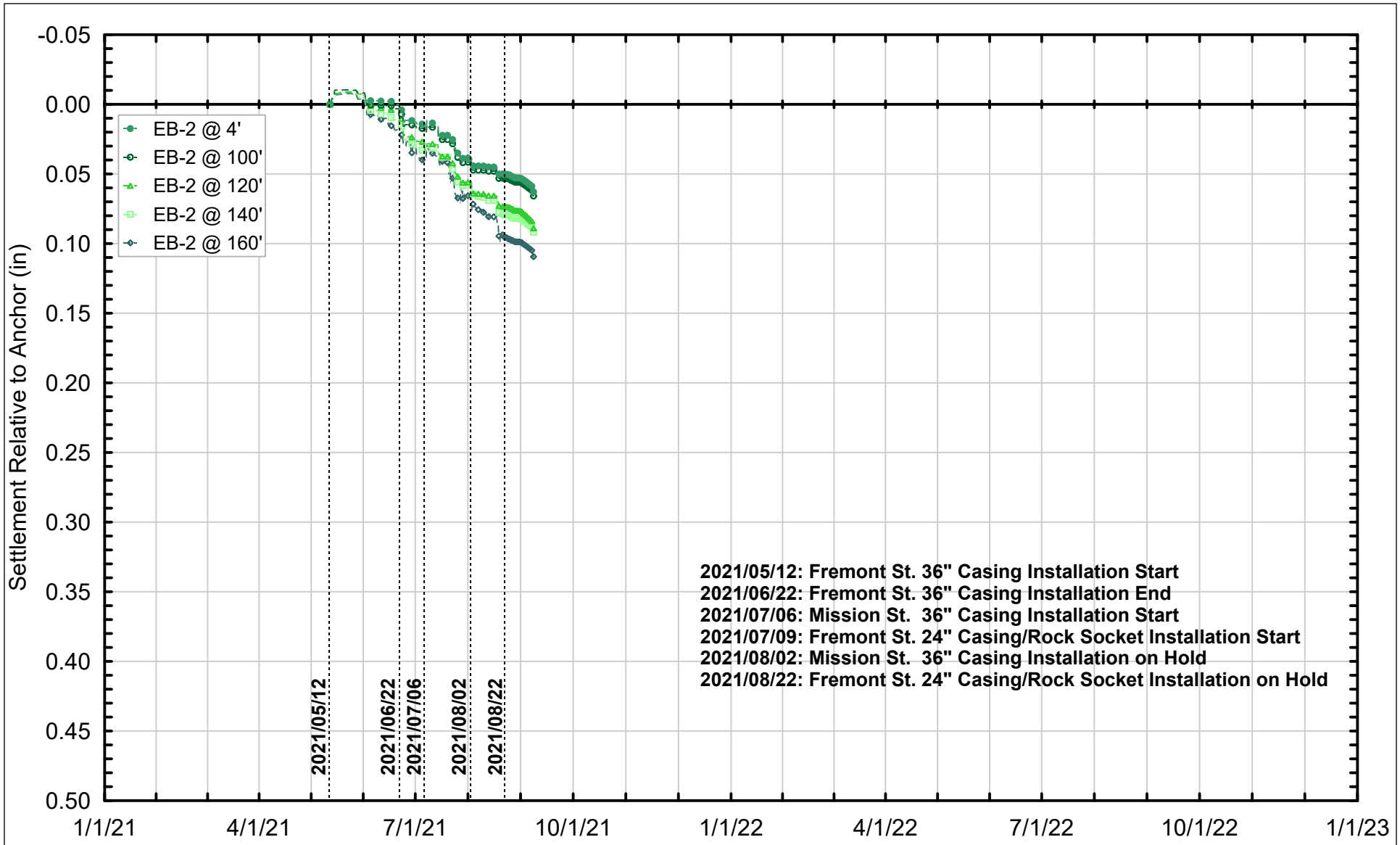
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-11B**

SLATE GEOTECHNICAL CONSULTANTS

EXTENSOMETER DATA FROM FREMONT STREET
SINCE 05/10/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-12A_Ext_Data_Mission.grf



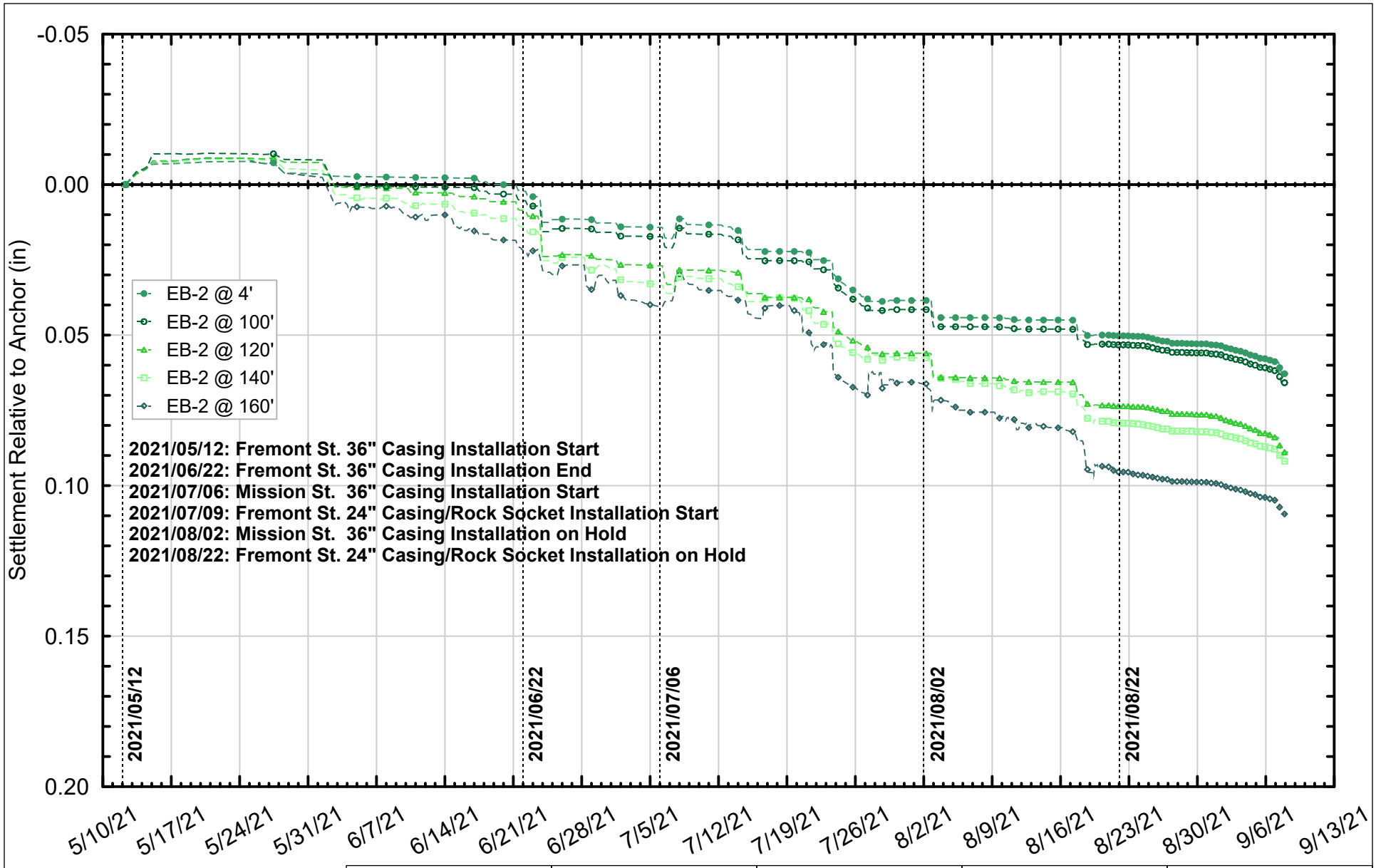
Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-12A**

SLATE GEOTECHNICAL CONSULTANTS

EXTENSOMETER DATA FROM MISSION STREET
SINCE 01/01/2021 THROUGH 09/07/2021

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

Filepath: S:\SlateDrive - Documents_Projects_2019\19-009.00_Millennium Tower Retrofit\10_Construction\01_Monitoring Reports\TowerSoilWater\00_Figures\Fig_019-12B_Ext_Data_Mission.grf



Project No: 19-009.00	Date: 9/8/2021	Created By: NBW	Checked By: DGM	Figure No: **019-12B**

SLATE GEOTECHNICAL CONSULTANTS

EXTENSOMETER DATA FROM MISSION STREET
SINCE 05/10/2021 THROUGH 09/07/2021

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

STAFF FIELD REPORT

DATE: August 27, 2021

ADDRESS: 301 Mission Street.

BLOCK/LOT: 3719/020

SITE INSPECTORS: DBI Acting Senior Building Inspector Kevin Birmingham
DBI Senior Electrical Inspector Michael Doherty
Senior Plumbing Inspector Robert Chrisman
SF Fire Department Assistant Fire Marshal Rich Brown

Overview

On Friday, August 27, 2021, a site inspection was performed at 301 Mission Street by DBI Acting Senior Building Inspector Kevin Birmingham, Senior Electrical Inspector Michael Doherty, Senior Plumbing Inspector Robert Chrisman, and SF Fire Department Assistant Fire Marshall Rich Brown. The purpose of the visit was to perform a visual site evaluation of the non-residential areas of the building. It was determined that the building was in conformance with the life safety standards set forth by the Building Code.

Inspection Focus

The inspectors examined the building lobby and basement sub-levels for any cracks or surface distortions, bent pipes or insufficient clearance around pipes, and to confirm fire-proofing materials had not been displaced. The inspectors also checked the functionality of building operations for residents accessing public areas including elevators, the lobby and building entrances. No private residences were assessed.

Observations

The DBI inspectors did not find any observable variations from the last inspection in March 2021 and observed no habitability concerns; found no water, electrical or safety deficiencies; and determined that the building is in compliance with the applicable building, electrical, plumbing and fire codes.

As noted in past inspections, the team saw continued evidence of water intrusion through the basement walls of the subterranean levels and signs of past settlement. All piping on basement levels appeared to be intact with no non-conformance issues. The team identified several areas in which seals on building drains exiting the building appeared to be leaking ground water from outside of the building to the inside. The building's stationary engineer committed to tightening the seal links. The team observed water seepage from the basement wall into the sewage ejector room. The additional building settlement of less than 1" that has occurred since May 2021 cannot be visibly discerned, but the inspectors documented modest building renovations to maintain building functionality during settlement, including installation of ramps in areas where the differential settlement is most pronounced and strain gauges installed years ago to measure settlement.