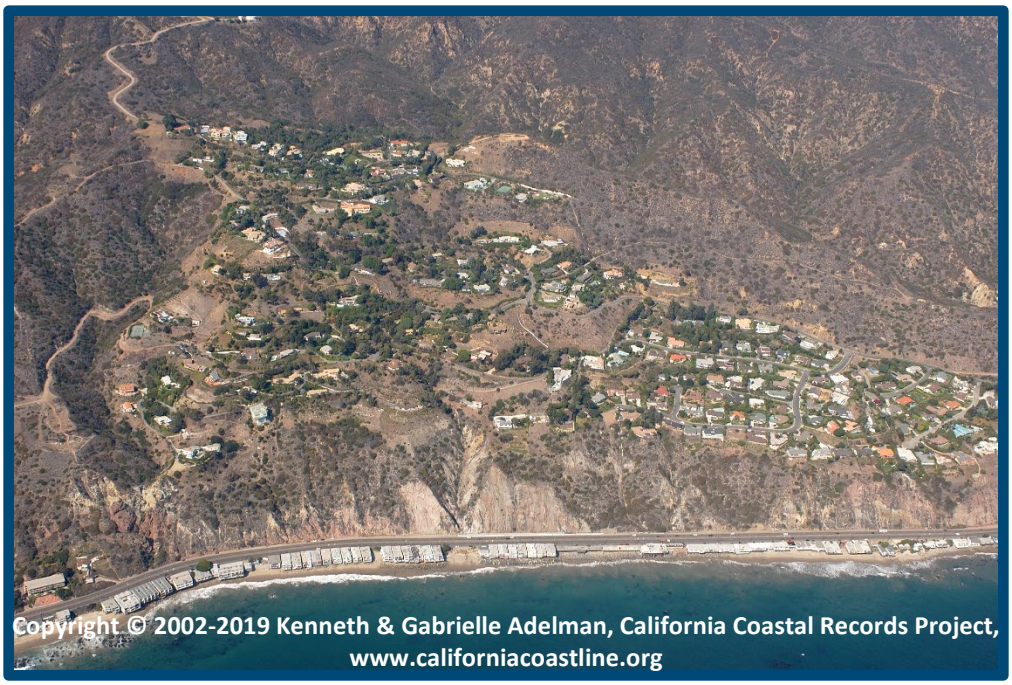
FY24/25 Maintenance and Monitoring

AD98-1, Big Rock Mesa

City of Malibu, California

Yeh Project No.: 220-276

March 6, 2026



Prepared for:

City of Malibu
23825 Stuart Ranch Rd.
Malibu, California 90265
Attn: Mr. Travis Hart

Prepared by:

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March 6, 2026

Project No. 220-276

City of Malibu
23825 Stuart Ranch Rd.
Malibu, California 90265

Attn: Mr. Travis Hart, Interim Assistant Public Works Director

Subject: **Annual Monitoring and Maintenance Report FY24/25, City of Malibu Assessment District 98-1, Big Rock Mesa, Malibu, CA**

Dear Mr. Hart:

Yeh and Associates, Inc. is pleased to submit this monitoring and maintenance report FY24/25 City of Malibu Assessment District AD-1, Big Rock Mesa in Malibu, California. This report was prepared in accordance with our Agreement for Professional Services, dated June 22, 2020, between the City of Malibu and Yeh and Associates, Inc. and Amendment Nos. 1 and 2, dated June 10, 2024, and June 9, 2025, respectively. This report provides geotechnical an annual summary of monitoring and maintenance for the project over fiscal year July 1, 2024, to June 30, 2025.

The geotechnical services consisted of monitoring and maintenance, data management, public outreach, reporting, NPDES compliance and capital improvement planning. A map showing the location of the maintenance and monitoring facilities is provided on Plate 1.

We appreciate the opportunity to be of service. Please contact Loree Berry (Lberry@yeh-eng.com) at 805-440-0966 if you have any questions or require additional information.

Sincerely,
YEH AND ASSOCIATES, INC.

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1. INTRODUCTION

Yeh and Associates (Yeh) was retained by the City of Malibu (City) to perform maintenance and monitoring of the existing geotechnical instrumentation and dewatering facilities within the City of Malibu's Big Rock Mesa Landslide Assessment District, 98-1. The project location is shown by the red polygon in Figure 1. This report presents monitoring results, a maintenance summary, and facilities status for the monitoring year July 1, 2024, through June 30, 2025 (monitoring year). Yeh monitors groundwater levels, slope inclinometers, crack gauges and tracks discharge flow from dewatering wells and horizontal drains. Yeh also repairs and maintains the monitoring instrumentation and dewatering well and hydrauger facilities. Plate 1 is attached and shows the approximate locations of the specific assessment district monitoring facilities. Table 1 summarizes the equipment inventory and the approximate frequency of monitoring and maintenance over the monitoring year. Section 5.0 of this report provides a detailed summary of the maintenance activities performed during this monitoring year.

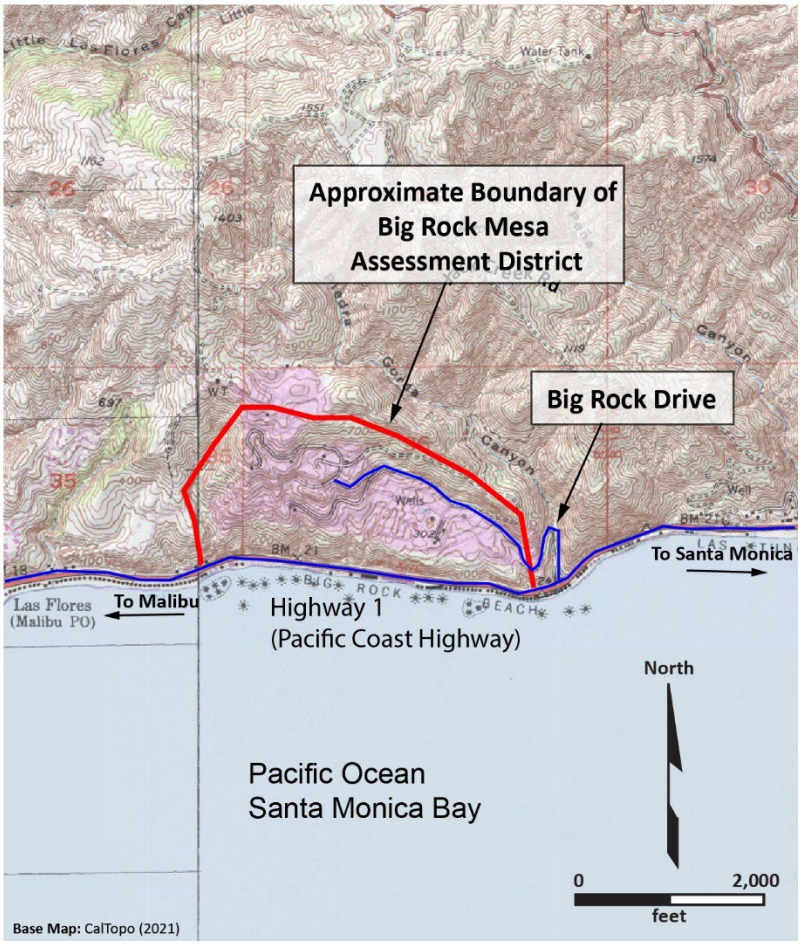


Figure 1: Project Location Map

Table 1. Summary of Annual Monitoring and Maintenance

Type of Monitoring Instrument or Dewatering Device	Number of Active Locations	Brief Description	Monitoring Frequency	Maintenance Effort[2]
Standpipe Monitoring wells	29[1]	1.5-inch to 3.25-inch diameter perforated PVC, aluminum, or casing, used to measure depth to groundwater using electric sounder or by a transducer/datalogger	Monthly direct read; hourly data from pressure transducer	low
Vibrating Wire Piezometers	4	Sensors attached to cable and embedded in boreholes with inclinometer casing at various depths to measure pore water pressure within multiple perched or groundwater zones. Installed with datalogger and programmed to read as needed, data is then manually downloaded	Programmed to record daily, can be downloaded daily to monthly	low
Inclinometer Survey Casings	23[1]	1.5-inch to 3.25-inch diameter grooved casings made of PVC, or aluminum used to survey for shear displacement by a traversing inclinometer probe	quarterly to annually	low
Time Domain Reflectometry (TDR) Cables	1	Coaxial cable embedded in borehole with inclinometer casing and spanning across previous shear zone. Used to monitor for deformation. Installed with datalogger and programmed to read as needed, data is then manually downloaded	Programmed to record daily, can be downloaded daily to monthly	low
Dewatering Wells	24	6-inch diameter steel or PVC casings equipped with 0.5 to 3HP submersible pump and connected to electrical controls, pumped water flows through meter and into conveyance piping to discharge	monthly	high
Horizontal Drains (hydraugers)	36	1-inch to 1.5-inch perforated PVC casings drilled slightly higher than horizontal into the face of the bluff and into the slope for hundreds to thousands of feet and used to drain groundwater that intercepts the casing. Flow can be measured along PCH before it flows to discharge	monthly	high
Big Rock Master Water Meter #0138193	1	Meters imported water to Big Rock Mesa, data obtained from Los Angeles County Public Works	monthly	N/A
Big Rock Mesa Rain Gauge #1239	1	Documented Rainfall, Data obtained from Los Angeles County Public Works	monthly	N/A
PK Nail Crack Gauges	5	PK survey nails set in the pavement to straddle existing cracks within areas of previously documented landslide related distress cracking	Quarterly to annually	low
Discharge Point	10	Water quality sampling and testing in accordance with active LARWQB NPDES Compliance File CI-6893	Monthly/weekly	Low to medium

Notes:
[1] - standpipe and inclinometer casings are same device. Some casings are no longer usable* to survey with a modern inclinometer probe but are used to collect groundwater level measurements.
[2] - maintenance effort (generalized): "high" – services monthly, "medium" – services quarterly, "low" – services annually
*'No longer usable' refers to inclinometer casings that are sheared, twisted, compressed, or otherwise deformed or damaged to an extent that an inclinometer probe cannot traverse the casing or survey data is un-reliable with current standard inclinometer survey equipment.

1.1 PHYSIOGRAPHIC SUB-REGIONS

Monitoring results are discussed with respect to the six physiographic sub-regions within the overall 1983 landslide boundary and are described by BYA (1992, 1999) and similarly by D.A. Evans (1986) as: Headscarp, Eastern, PCH, Central, Bluff and Western Extension. Figure 2 presents the approximate areas associated with the six physiographic sub-regions and they are described below. The South-Facing Slope Region is included as part of the Western Extension Region. Each is composed of landslide blocks or complexes of landslide blocks defined by common structural, tectonic and hydrologic characteristics (BYA, 1992).

- **Headscarp Region:** delineated to the north by cracking and scarps from the 1983 landslide boundary on the steep slopes along the Northeast Ridge and North Peak down to the Central Region boundary on the south. It includes modern and paleo satellite slides including the Hansch Sub-Slide located below North Peak which activated during the main 1983 event. Small, intermittent or creep movements may still be detectable on the shallow secondary-shear plane in this area and are a priority to monitor and characterize.
- **Eastern Region:** delineated on the north and east by the 1983 landslide boundaries and separated from the Central Region to the west by the Inland Lane fault which trends approximately south-southwest just west of the Piedra Chica and Inland Lane cul-de-sacs. It is delineated on the south by the fracture zone along top of the PCH bluffs which is continuous with the fracture zone mapped across the Central-Bluff Regions boundary. The Eastern Region experienced extensive cracking prior to and during the 1983 landslide. Small intermittent or creep movements may still be detectable in this Region and are a priority to monitor and characterize.
- **Central Region:** comprised of distinct blocks that form upper and lower "Mesas," it extends west from the Inland Lane Fault to the western boundary of the 1983 landslide. It spans from north to south, from the base of the Head Scarp Region to the fracture zone at the northern boundary of the Bluff Region. This area is mostly residentially developed.
- **Bluff Region:** delineated on its northern boundary from the Central and Eastern Regions by the fracture zone formed along the top of the PCH bluffs that extends along Roca Chica Drive east to the eastern landslide perimeter. It includes numerous, complex sub-slides mapped within the PCH bluff face down to and beneath PCH. Failures of sub-slides and global displacement along a fracture zone at the top of the bluffs caused damage to numerous homes during the late 1970's and the main 1983 slide. Rockfalls, debris flows, and erosion off the steep, fractured slopes of the Bluff Region are routine especially during heavy rains, differentiating localized or surficial events from precursors to incipient movement is a priority.
- **Pacific Coast Highway (PCH) Region:** delineated east to west along the southern edge of the mapped landslide boundary from the base of the PCH bluffs south across PCH to the mapped toe of the 1983 landslide, where uplift/thrusting damaged numerous homes during the main 1983 landslide and where isolated bulging of the ground surface occurred during the 1990s.
- **Western Extension Region**: Located west of the 1983 landslide boundary and extends from above the upper terminus of Big Rock Drive in the north to PCH in the south. The Western Extension Region was not part of the active 1983 slide but was initially postulated to be a

potential westward development of the 1983 slide; however, there is "no convincing evidence that the Western Extension has undergone mass movement" (BYA 1992).

- **South Facing Slope Sub-Region**: The South Facing Slope Subregion is a complex of sub-slides located within the Western Extension Region. Shallow failures occurred here in the 1970s including the 1975 and 1978 Love and Kubek Slides which necessitated the abandonment of the residence at 20674 Rockpoint Way. A stability analysis was performed for the South Facing Slope Sub-Region in 1996 (BYA, 1996).

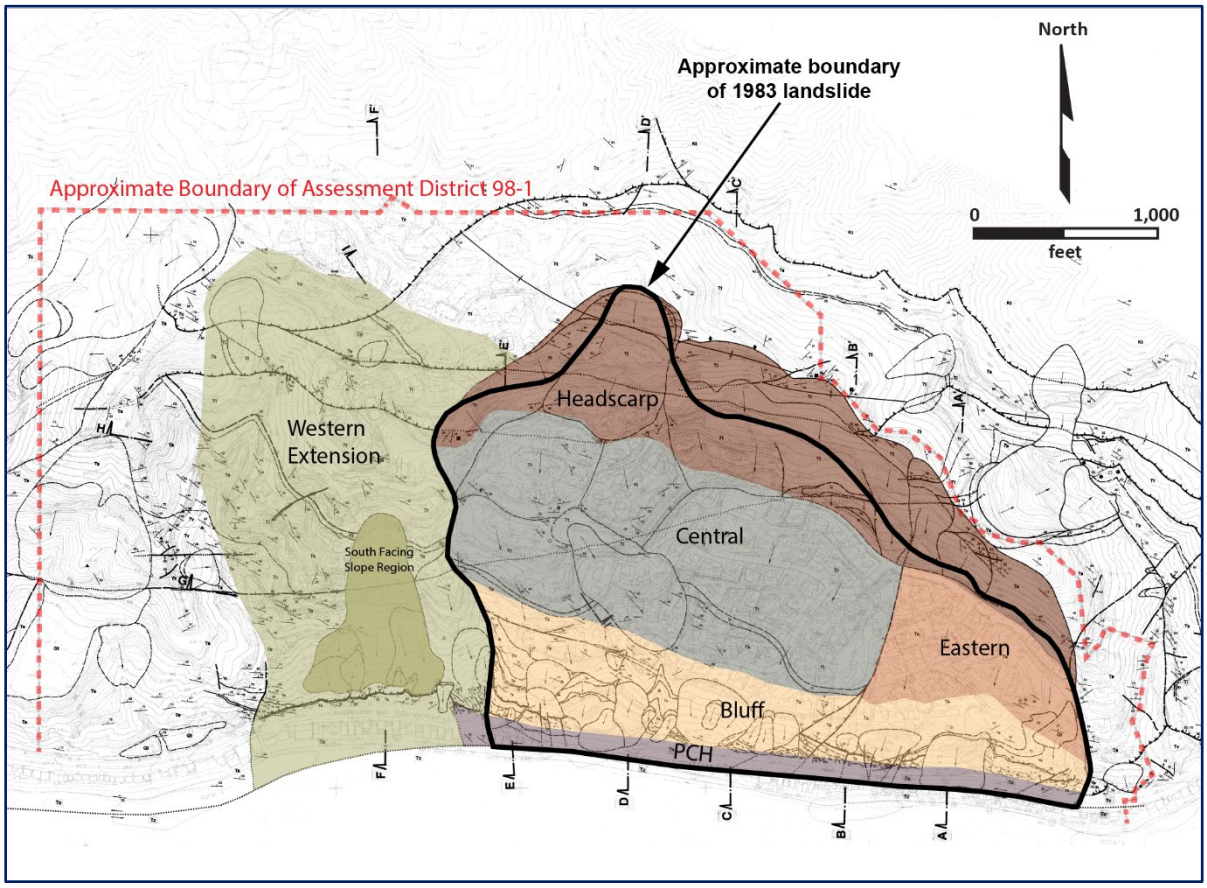


Figure 2: Approximate Boundaries of Physiographic Regions

2. New CIP Monitoring Facility, SI-39

A new slope inclinometer identified as SI-39 was installed as part of this monitoring years' capital improvement program (CIP). The installation is intended to replace inclinometer SP-3A and provide improved slope deformation data and water level measurements for the Eastern Region. Drilling and installation of the inclinometer casing, sensors and surface vault were completed on May 21, 2025. Additional work to program software and calibrate instrumentation and data loggers occurred through June. The facility consists of 350-feet of 2.77-inch Geokon inclinometer casing. The casing was installed in a 6-inch diameter borehole drilled to 360 feet below the ground surface and tremie grouted to the surface in two stages. The casing was installed with an external Time-Domain-

Reflectometry (TDR) cable to measure deformation and four vibrating wire (VW) piezometers to measure water levels. The surface installation is a 2-foot by 2-foot vault that encloses instrumentation data loggers and the TDR and VW readers. The TDR cable and VW piezometers are currently programmed to read once per day, the data is stored in the onsite data logger to be downloaded, as necessary. Specifics and dimensions for the inclinometer casing and instrumentation are provided in the completion detail attached as Appendix F. The location of the facility on Rockport Way is included on Plate 1.

3. PALISADES FIRE

The Big Rock Mesa Neighborhood was heavily impacted by the Palisades Fire from January 7, 2025, with the majority of homes and significant public infrastructure within the Assessment District 98-1 boundary damaged or destroyed. Above-ground dewatering well pump enclosures, controls and electronics, Southern California Edison (SCE) electrical meters, power hookups, and electrical wiring/conduit/risers to most dewatering wells suffered a range of damage to destruction. Damage to the SCE electrical grid caused widespread, ongoing power loss and as a result all dewatering wells were de-energized. Groundwater discharge from the gravity drained hydraugers continued to flow, however most of the above ground plumbing was melted and they were not connected to the conveyance system through to the PCH storm drains.

On January 15, 2025, Yeh personnel began district facilities damage assessments and repairs which are ongoing as of this report. A detailed summary of damages and repair efforts were provided in document “Interim Report of Dewatering System Status and Summary of Collected Data following Palisades Fire, City of Malibu Assessment District 98-1 - Big Rock Mesa, Malibu, CA” dated May 12, 2025 and in the “Post-Fire Power Point Presentation” dated May 28, 2025 that was presented by Yeh to the City Public Works Commission on May 28, 2025.

In addition to District facility repairs, Yeh implemented the following items to address immediate concerns post-fire:

- Accelerate groundwater monitoring to weekly to assess water level response to reduced dewatering capacity,
- Expand groundwater monitoring to include measurements from de-energized dewatering wells,
- Install additional datalogging water level transducers in Central Region,
- Provide intermittent power to functional wells using gas and propane portable generators,
- Coordinate with Edison to repair melted electric meters and to temporarily energize wells using Edison large load, diesel, tow-behind generators.

Monitoring groundwater levels, dewatering wells, hydraugers and inclinometers as well as repair efforts were frequently complicated by restricted work access due to fire-debris, debris removal activities and ongoing construction.

4. MONITORING

The following sections provide monitoring results for groundwater levels, slope inclinometers, crack gauges, and TDR cable.

4.1 GROUNDWATER LEVELS

Groundwater levels are typically measured approximately monthly in 29 standpipe monitoring wells and piezometers and are also measured intermittently in select abandoned dewatering wells. Beginning January 14, 2025, standpipe groundwater level monitoring was accelerated to weekly and expanded to include de-energized dewatering wells fitted with sounding tubes to promptly assess water level response to the post-fire dewatering wells shut-off. Groundwater levels were measured by lowering an electric probe attached to a measuring tape into the standpipes until contact with the groundwater surface. The depths to water from the top of the casing are manually recorded. When interpreting the manual groundwater data, it should be considered that many of the standpipes installed prior to 1990 were constructed as fully screened monitoring wells and generally screened by drilling ¼-inch holes at 5-foot intervals along the aluminum well casing and then backfilling the annular space between the casing and borehole with clean sand (DAE, 1986 V4). This construction allows perched and shallow water to enter the casing through the filter pack from anywhere along the casing and the ground surface. Therefore, water levels measured in this type of standpipe may have artificially high readings following rainfall events depending on the as-built construction of the specific standpipe and the geology at the location.

Data-logging pressure transducers were installed in standpipes PC-1, SP-3A, SP-20, abandoned dewatering well W-10 and various pumping dewatering wells for most of the FY24/25 monitoring year. Additional pressure transducers were installed in de-energized dewatering well W-17 and standpipe SP-35 to assist in monitoring the Central Region groundwater response to de-energized dewatering wells. Transducers were programmed to record data at 24-hour, 12-hour, one-hour or one-minute intervals depending on the conditions.

Pneumatic piezometers are mechanical sensors that were installed with select inclinometer casings until 1998. They had previously been measured intermittently to evaluate perched water conditions. Existing pneumatic piezometers either no longer function or are not considered to provide reliable groundwater data. Selected pneumatic piezometers were re-tested this year but data does not appear reliable. No data from the pneumatic piezometers for this monitor year is included in this report.

The results of the groundwater monitoring are discussed by region in the following sections. Transducer data for the FY24/25 monitoring year are presented as figures within the discussion of each groundwater region. Appendix A includes groundwater hydrographs for each standpipe from the earliest available historic data through the end of the FY24/25 monitoring year. An inventory and status of the groundwater monitoring facilities are also included Appendix A.

4.1.1 HEADSCARP REGION

Water levels in the Headscarp Region are monitored using SP-26 only. Water levels in SP-26 generally continued to decline from peak elevations following the winter of 23/24 and did not appear to rise in response to post-fire dewatering well shut-off but remain elevated above the historical mean. There are no dewatering facilities in the vicinity of SP-26.

Table 2: Headscarp Region Water Level Monitoring

Standpipe ID	Change in Groundwater Elevation between last and first measurements of monitoring year (ft)	2024-2025 Average Groundwater Elevation (ft)	Change in Average Groundwater Elevation from Prior Monitoring Year Average (ft)	Historical (1991-2025) Mean Groundwater Elevation (ft)	2024-2025 Average Groundwater Elevation from Historical Mean Groundwater Elevation (ft)
SP-26	-3.9	557.3	-1.0	550.2	+7.1

4.1.2 EASTERN REGION

Water levels in the Eastern Region are monitored with standpipe monitoring wells SP-3, SP-3A and SP-33 and piezometer PC-1. SP-3 was not monitored this year due to lack of property access and because it has been dry to its maximum open (post-sheared off and filled in) depth since at least 2014. Groundwater levels in Standpipes PC-1 and SP-3A fluctuated over the monitoring year in response to the January to March 2025 rainfall and levels in standpipe SP-33 continued to generally decline following an anomalous peak in January 2017. Water levels in PC-1, SP-3A and SP-33 did not rise significantly in response to post-fire dewatering well shut offs.

Figures 3 and 4 present plots of groundwater level data from datalogging transducers for SP-3A and PC-1 relative to daily rainfall totals over the monitoring year. Yeh's observations of groundwater levels in the Eastern Region include:

- Water levels in SP-3A appeared to rise up to 150-feet, over a period of several minutes, in response to rainfall and then declined over several days to a level close to the pre-rainfall level. SP-3A water levels appear to be trending higher since December 2022. This may be a result of surface runoff directly entering the casing and the timing coincides with drainage pattern changes after Inland Lane and Rockport Way were re-paved. Water levels recorded in SP-3A may not represent the true water levels following rain events and until surface water that entered the casing has dissipated.

- PC-1 water levels increased in response to individual rain events and then dissipated over the following few days to weeks.

Table 3: Eastern Region Water Level Monitoring

Standpipe ID	Change in Groundwater Elevation between last and first measurements of monitoring year (ft)	2024-2025 Average Groundwater Elevation (ft)	Change in Average Groundwater Elevation from Prior Monitoring Year (ft)	1991-2025 Historical Mean Groundwater Elevation (ft)	2024-2025 Average Groundwater Elevation from Historical Mean Groundwater Elevation (ft)
PC-1	+0.2	132.7	+2.0	137.4	-4.7
SP-3A[1]	-2.0	88.7	+30.8	66.8	+21.9
SP-33	+2.1	-44.3	+0.5	-30.3	-14.0
SP-3	Not Measured				

Notes:
[1] Recorded values may represent surface runoff entering casing during rainfall.

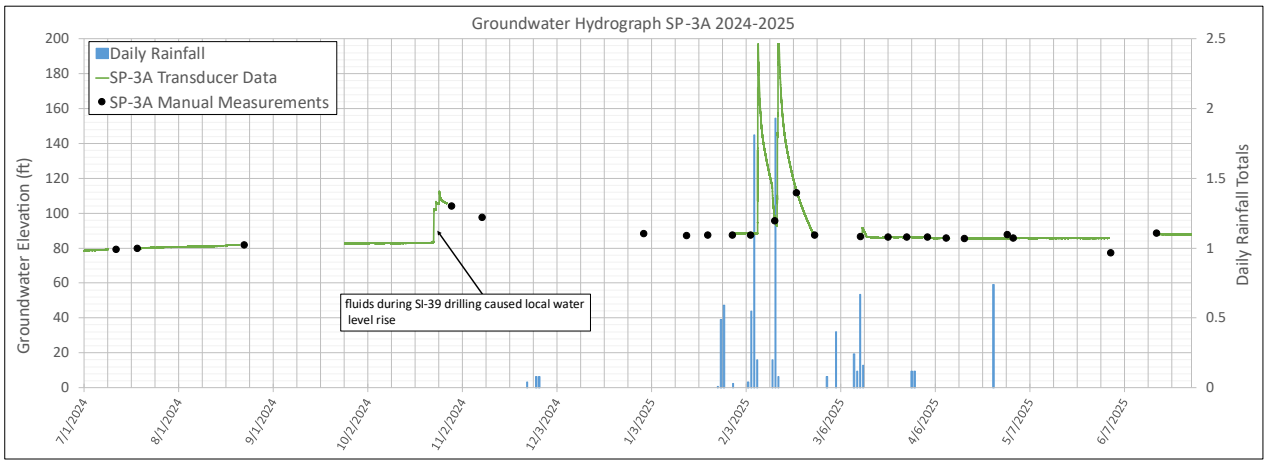


Figure 3: SP-3A transducer hydrograph vs daily rainfall, programmed to 1-minute

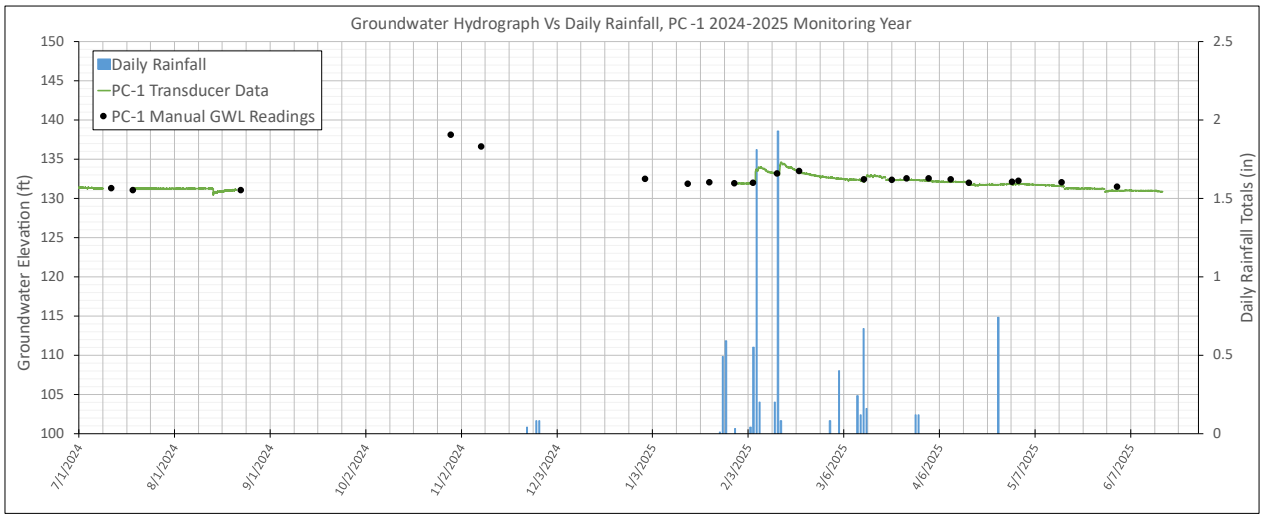


Figure 4: PC-1 transducer hydrograph vs daily rainfall, programmed to 1-hour and 1-minute

4.1.3 CENTRAL REGION

Water levels in the Central Region are monitored with standpipe monitoring wells SP-9A, -16, -16A, -17, and -24 and piezometers SP-35 and -36. Water levels in SP-16 and SP-16A are highly reactive to pumping rates in Dewatering Well BYA-1 and are more reflective of pumping cycles in the well at the time of measurement than actual groundwater levels. Groundwater levels are no longer collected in SP-17A and SI-17B because records indicate they were installed without a screened section and the casings were fully grouted (Fugro, 2012a and BYA, 1992).

Central Region water levels appeared to generally rise in response to the dewatering well shut off and had begun to stabilize by February to March 2025 and decline by April 2025 when several of the Central Region dewatering wells were energized by Edison emergency generators.

Table 4: Central Region Water Level Monitoring

Standpipe ID	Change in Groundwater Elevation between last and first measurements of monitoring year (ft)	2024-2025 Average Groundwater Elevation (ft)	Change in Average Groundwater Elevation from Prior Monitoring Year (ft)	1991-2025 Historical Mean Groundwater Elevation (ft)	2024-2025 Average Groundwater Elevation from Historical Mean Groundwater Elevation (ft)
SP-9A	+15.62	226.9	+2.4	226.3	+0.6
SP-16	-38.37	110.1	-5.0	77.4	+32.7
SP-16A	-10.52	129.5	-0.6	137.7	-8.3
SP-17	-1.5	397.1	3.7	387.0	+10.2
SP-24	+0.28	52.9	+2.7	45.5	+7.4
SP-35	+43.00	122.9	+38.8	93.9	+29.1
SP-36	+0.76	191.3	+1.1	191.5	-0.3

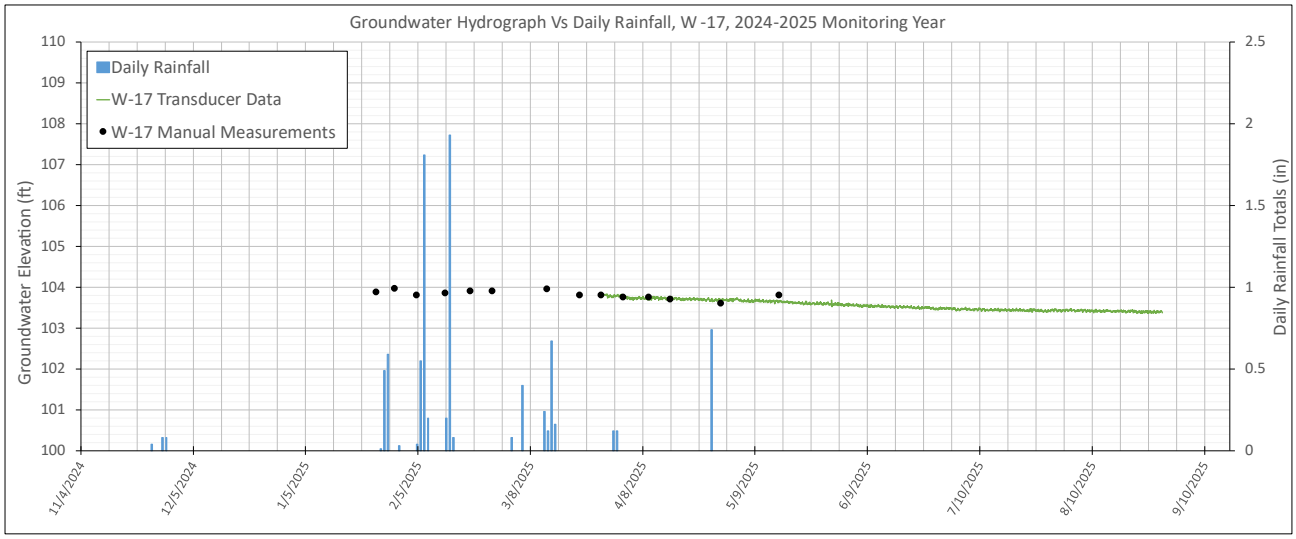


Figure 5: W-17 transducer hydrograph vs daily rainfall, programmed to 1-hour

Figures 5 and 6 present water level data from weekly manual water level readings and hourly transducer data for Standpipe SP-35 and depowered dewatering well W-17.

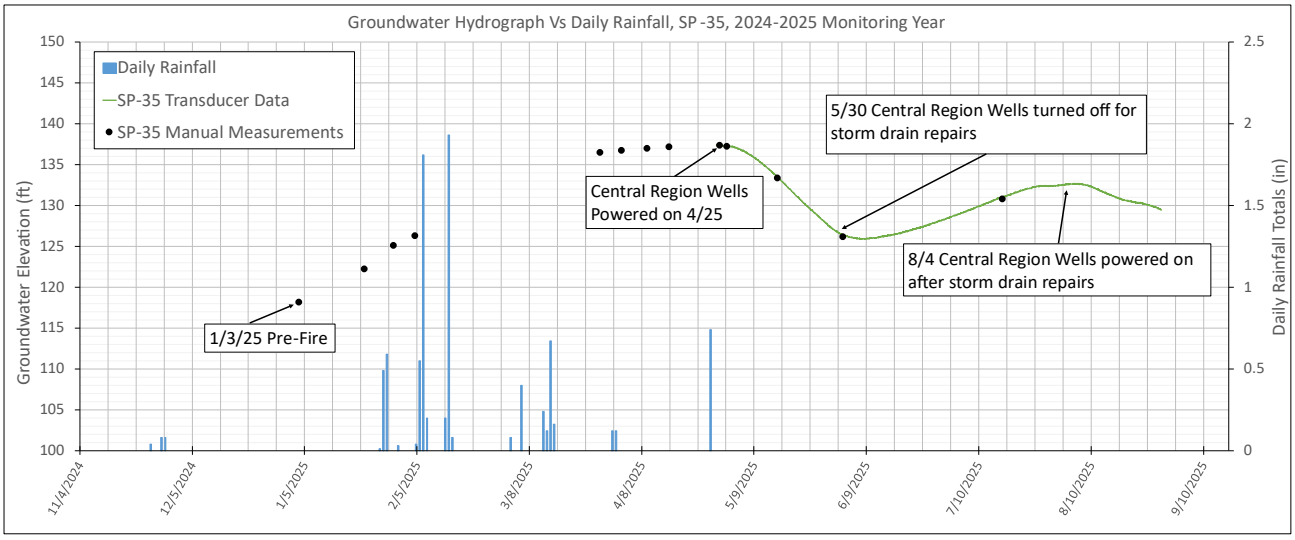


Figure 6: SP-35 transducer hydrograph vs daily rainfall, programmed to 1-hour

4.1.4 BLUFF REGION

Water levels in the Bluff Region are monitored with standpipe monitoring wells SP-10, -28, -32 and Piezometer SP-34. Water levels in these standpipes had been declining or stabilizing following the winters of 2022/23 and 2023/24 rainfall. During this monitoring year, water levels in the Bluff Region generally rose between January through March, likely due to rainfall and following the dewatering well shut off. Those elevated water levels have since declined. Standpipe SP-28 rose through May likely because of dewatering well discharge leaking from a broken storm drain at the end of Seamoor Drive and infiltrating near the standpipe.

Table 5: Bluff Region Water Level Monitoring

Standpipe ID	Change in Groundwater Elevation between last and first measurements of monitoring year (ft)	2024-2025 Average Groundwater Elevation (ft)	Change in Average Groundwater Elevation from Prior Monitoring Year (ft)	1991-2025 Historical Mean Groundwater Elevation (ft)	2024-2025 Average Groundwater Elevation from Historical Mean Groundwater Elevation (ft)
SP-10	-0.1	49.2	+1.9	44.5	+4.7
SP-28	+9.8	37.0	+3.4	33.4	+3.6
SP-32	-3.0	50.1	+0.4	74.7	-24.6
SP-34	+2.7	31.1	+5.2	51.7	-20.6

4.1.5 PCH Region

Water levels in the PCH Region are monitored with standpipe monitoring wells SP-11, -12, -14, -15, -19, -27A, -29 and -30. Groundwater level change within individual standpipes located in the PCH Region fluctuated during the year in response to rainfall and tidal influence and remain between 2.2-feet below and 0.7-feet above levels at the start of the monitoring year. Direct surface runoff likely enters Standpipe SP-30 and SP-29 during rainfall events. SP-30 is in a topographic low along the shoulder of PCH and following rain can be submerged beneath an area of persistent ponding.

Table 6: PCH Region Water Level Monitoring

Standpipe ID	Change in Groundwater Elevation between last and first measurements of monitoring year (ft)	2024-2025 Average Groundwater Elevation (ft)	Change in Average Groundwater Elevation from Prior Monitoring Year (ft)	1991-2025 Historical Mean Groundwater Elevation (ft)	2024-2025 Average Groundwater Elevation from Historical Mean Groundwater Elevation (ft)
SP-11	+0.7	5.5	-0.3	5.5	+0.0
SP-12	-1.8	5.0	+0.0	5.0	+0.0
SP-14	-0.8	4.8	+0.0	4.3	+0.0
SP-15	+0.7	10.9	-0.3	10.7	+0.2
SP-19	-1.1	4.3	+0.6	3.7	+0.6
SP-27A	+0.1	9.9	+0.1	9.9	+0.0
SP-29	-2.2	18.4	+0.6	16.7	+1.3
SP-30	-0.7	23.4	+1.1	14.0	+9.4

4.1.6 Western Extension Region

Water levels in the Western Region are monitored with standpipe monitoring wells SP-20, -21, -22, -23 and abandoned dewatering well W-10. Water level measurements in standpipe casings SP-21 and -22 declined following the winter of 2023-2024 and then rose in response to 2024/25 rainfall. They remain elevated relative to levels measured before the winter of 2022-2023. Water measurements in standpipe SP-23 rose following Hurricane Hiliary in August 2023 and the winter of 2023-2024; the level peaked in October 2024, and has gradually declined since, over the 24/25 monitoring year, but remains elevated from before 23/24. Water level measurements in standpipe SP-20 had risen following the winter of 2022-2023 and appear to have stabilized since approximately February 2025. Water level measurements in some of the Western Region standpipes may have risen following the post-fire dewatering well shut off; however, the amount is too small to differentiate from normal seasonal variations.

Table 7: Western Extension Water Level Monitoring

Standpipe ID	Change in Groundwater Elevation between last and first measurements of monitoring year (ft)	2024-2025 Average Groundwater Elevation (ft)	Change in Average Groundwater Elevation from Prior Monitoring Year (ft)	1991-2025 Historical Mean Groundwater Elevation (ft)	2024-2025 Average Groundwater Elevation from Historical Mean Groundwater Elevation (ft)
SP-20	+7.8	217.6	+11.9	186.1	+31.5
SP-21	+3.6	402.5	+3.4	382.3	+19.7
SP-22	+1.1	465.8	-2.1	467.7	-1.3
SP-23	+67.9	562.6	+30.9	499.0	+63.6

Figure 7 presents a plot of groundwater level data from hourly recording transducers with daily rainfall totals for SP-20 and W-10 over the monitoring year.

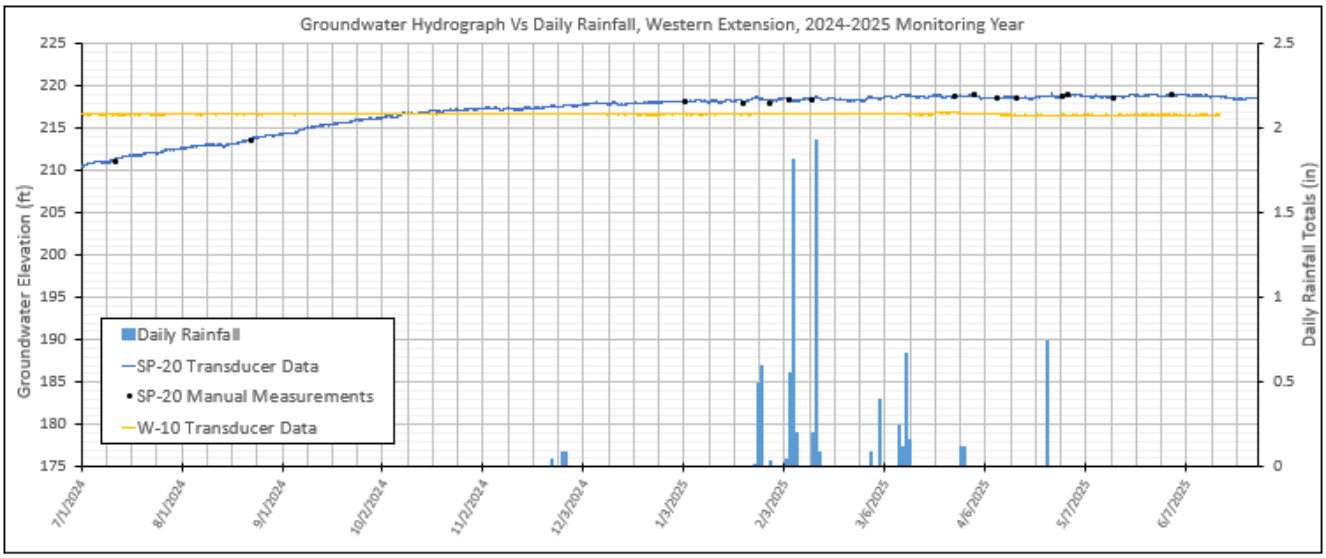


Figure 7: SP-20 and W-10 Transducer hydrograph vs daily rainfall, programmed to 1-hour

4.2 Slope Inclinometers and TDR Cables

Yeh surveyed a total of 23 inclinometers during the 2024-2025 monitoring year. Appendix B-1 is a map that presents the locations and status of known active inclinometers and abandoned and historical inclinometers, annotated with interpreted movement for the monitoring year. Inclinometers are surveyed quarterly, semi-annually, annually or on an accelerated schedule depending on the inclinometer location and the past and recent movement history. Inclinometers were surveyed using a vertical traversing probe that measures the tilt of the casing at 2-foot intervals in two perpendicular directions. Inclinometer data were collected via Bluetooth onto a field tablet and processed by comparing each tilt measurement to previous surveys.

Inclinometer data processing and presentation utilized DigiPro2 software (Slope Indicator, 2014) and used a post Q1 2021 survey as a baseline (unless otherwise noted). Updated baselines are generally used following a change or repair to the cable and/or servicing of the inclinometer probe sensors and carriage. Appendix B includes plots of cumulative change and incremental change in the A and B directions for each inclinometer surveyed during the monitoring year. The plots in Appendix B also provide construction details and notes of interpreted past and current movement, as applicable. Resultant plots in the polar and profile view are attached for inclinometers that display quantifiable movement or interpreted possible movement. Of the inclinometers surveyed, SP-26 in the Headscarp Region measured possible displacement on the order of 0.1 inch over the monitoring year.

During this monitoring year, surveys were not performed during Q4 of 2024 in anticipation of the need for increased monitoring frequency in Q1 2025 should a third winter of above average rainfall occur. During Q1 2025, surveys were interrupted due to the Palisades Fire. Most surveys were able to be performed beginning in February 2025 and again in April 2025. Between February and April, a sensor shift occurred in the probe accelerometers which created enough error between readings that the April 2025 survey could not be compared to previous baselines for some inclinometers depending on the shape of the casing. In these instances, a second inclinometer plot with an April 2025 baseline is presented. All accessible inclinometers were re-surveyed in July 2025 after servicing and calibrating the probe and cable.

A summary of the inclinometer results by region is presented below.

4.2.1 HEADSCARP REGION

SP-26 is the only usable inclinometer in the Headscarp Region. Data for SP-26 through August 5, 2025, is included in this report. The potential resolution of the surveys in this casing have been reduced by the current casing properties.

D.A. Evans Inc. reported that the SP-26 casing had closed off at approximately 41-foot depth by July 1984 and was later repaired by replacing the upper approximately 40 feet of casing (DAE, 1986 V4), that was reportedly backfilled with a foam product (BYA, 95-96). SP-26 continues to display sensor stabilization lag in the upper 40 feet which may indicate an issue with the backfill. The casing is also significantly tilted and/or curved at depths of 30, 40 and 80 feet.

Prior movement recorded on SP-26 occurred at approximately 40-foot depth and has been interpreted to have occurred on a shallow sub-slide and not the basal landslide shear zone.

The top 100 feet of casing has been surveyed during this monitoring year and the margin of error associated with measuring this location is unclear. Possible displacement on the order of 0.1-inch is documented between 30 to 40 feet deep from the August 2025 survey.

4.2.2 EASTERN REGION

Two inclinometers were monitored approximately quarterly within the Eastern Region: PC-1 and SP-3A. Neither SP-3A nor PC-1 displayed discernable shear-type movement during the monitoring year. Data is included for SP-3A through February 15, 2025, and for PC-1 through May 29, 2025.

Inclinometer SP-11, located in the PCH Region directly south of the Eastern Region and near the toe of the 1983 landslide and is typically monitored quarterly. SP-11 is considered relevant to the Eastern Region and is included in this section. Data is included for SP-11 through September 24, 2024. SP-11 was buried beneath fire debris and the riser melted. It has been recovered but is currently unable to be surveyed. Inclinometer SP-11 had previously recorded episodic, shear-type displacement following winters of high rainfall and most recently between the December 2023 and April 2024 surveys. No interpreted movement was recorded between the April 2024 reading and the last reading taken on September 24, 2025.

4.2.3 CENTRAL REGION

Four inclinometers are typically monitored approximately semi-annually in the Central Region: SP-9A, SP-16A, SP-35 and SP-36 and one inclinometer; SP-17B is typically measured approximately quarterly. SP-9A was not measured during this monitoring year. Data is included for SP-16A through April 22, 2025, and for SI-17B through July 23, 2025. Data for SP-35 and SP-36 are presented through September 2024 and August 2024, respectively, because later data could not be compared due to errors introduced by inclinometer probe sensor errors.

No shear-type displacement was interpreted on the Central Region inclinometers during his monitoring year.

4.2.4 BLUFF REGION

Two inclinometers are typically surveyed semi-annually within the Bluff Region: SP-32 and SP-34. Data is included for SP-32 through July 16, 2025. Inclinometer SP-32 did not display discernable shear-type displacement during the monitoring year. No data is included for inclinometer SP-34 this monitoring year.

4.2.5 PCH REGION

Four inclinometers located in the PCH Region are typically surveyed approximately annually: SP-12, SP-14, SP-15 and SP-19. Four more key inclinometers: SP-11, 27A, -29, and -30 are typically surveyed approximately quarterly or more frequently in response to rainfall events and seismic activity. SP-19

was not surveyed as of this report due to lack of access following the fire and subsequent construction activities. SP-19 has no history of deformation and is located outside of the mapped 1983 landslide perimeter. Inclinometer SP-11 is discussed in Section 4.2.2 Eastern Region. The remaining seven inclinometers surveyed in this region did not display discernable shear-type movement during the monitoring year.

4.2.6 Western Extension Region

Four inclinometers located in the Western Extension Region are typically surveyed approximately annually: SP-20, SP-21, SP-22 and SP-23. No data is included for inclinometer SP-23 this monitoring year. Data for SP-20 and -21 through July 2025 is included. The inclinometers did not display discernable shear-type movement during the monitoring year.

4.3 Crack Monitoring

Yeh measured five of the six PK-nail crack gauges that were installed in January 2021 at the following locations: two on Pinnacle way cul-de-sac, one at the intersection of Pinnacle Way and Big Rock Drive, one at the intersection of Big Rock Drive and Cool Oak Way, one at the hairpin turn on Big Rock Drive south of Rockport Way, and one in the Seamoor Drive cul-de-sac. The crack gauge located on Lower Big Rock Drive near Rockport Way was previously damaged and was not measured. Five of the crack gauges were installed in areas where cracks in the road had been identified and are in areas where cracking had been mapped during the 1983 landslide. One crack gauge was installed on Seamoor Drive across a crack with similar morphology as other visible cracks in an area, but where no previous landslide-related cracking had been mapped.

Results for the five measured crack gauges are attached in Appendix C. No measurable displacement was observed on the crack gauges since the last monitoring year. No measurable displacement has been recorded on the crack gauges since installation.

5. Water Budget Tracking

5.1 Rainfall Data

Yeh obtained rainfall data for the monitoring year from the Big Rock Mesa Rain Gauge #1239 operated by the Los Angeles County Department of Public Works (LADPW). Prior to 1984, rainfall data was obtained from the Carbon Canyon Rain Gauge #447C and after 1984 from the onsite Big Rock Mesa Rain Gauge #1239. For this report, a 41-year rainfall average of 16.14 inches from the Big Rock Mesa Rain Gauge is used as an annual average.

Plate 2 - Rainfall Graph displays historical monthly and water year annual rainfall for the Big Rock Mesa area from October 1968 through September 2025. Recorded rainfall for the Big Rock Mesa area over the monitoring year from July 1, 2024, to June 30, 2025, totaled 8.50 inches, which is 7.64

inches below the 41-year Big Rock Mesa Rain Gauge running average of 16.13 inches. The recorded rainfall total for the water year from October 1, 2024, to September 30, 2025, totaled 8.62 inches. This year was the first year of below average rainfall after two consecutive years of above average rainfall.

Plate 4 – Annual and Cumulative Deviation from Mean Rainfall vs Total Dewatering Production, shows rainfall deviation from the 40-year mean and compares rainfall amounts to changes in the sum of annual average dewatering output.

5.2 Imported Water Usage

Yeh collected monthly water usage readings for Big Rock Mesa from the Los Angeles County Department of Public Works master water meter #138193 located at the corner of Rockport Way and Big Rock Drive and acquired monthly meter data directly from the LA Country Waterworks District 29. The average water imported to the site for the monitoring year was 97.8 thousand gallons per day (gpd). This is 16.8-percent less than the 2023-2024 monitoring year of 117.6 thousand gpd. The decline in imported water volume resulted from residential depopulation following the Palisades Fire with volumes declining to 20.3-thousand-gpd for February 2025 and remaining below normal.

A plot of monthly usage and water usage trendline is included on Plate 3 – Total Dewatering Production and Total Water Consumption.

5.3 Dewatering

Yeh tracks dewatering production for pumping dewatering wells installed throughout the regions and horizontal gravity drains (hydraugers) installed at the base of the Bluff Region slopes. Dewatering production rates for the 2024-2025 monitoring year were affected by de-energizing and damage to dewatering wells following the Palisades fire. The 2024-2025 monitoring year total dewatering production averaged 70,936 gpd, which is a decrease of 16.7-percent from the previous monitoring years' average production of 85,181 gpd. The decrease in production was due to below average rainfall and depowering of dewatering wells. Production rates peaked in April 2025 at a monthly average production of 113,317 gpd. The high production rate for April is a response to February and March rainfall and initially high production rates from dewatering wells that were turned on after being depowered for an extended period. Approximately 61-percent of the total dewatering production was pumped from dewatering wells and 39-percent was measured from hydraugers. Figure 8 is a plot of total dewatering production from the start of dewatering efforts through this monitoring year annotated for significant high rainfall years and dewatering system construction benchmarks.

5.3.1 Dewatering Well Production

Yeh performed monthly monitoring of production for 24 dewatering wells. Well production is measured approximately monthly for each well by reading flow totalizers that are installed along the discharge line. A summary of well production and well status is presented on Appendix D-1. A plot for historical production and a plot for monitoring year production vs daily rainfall for individual wells are included in Appendix D. A graph showing total dewatering well production since 1993 is included on Plate 3.

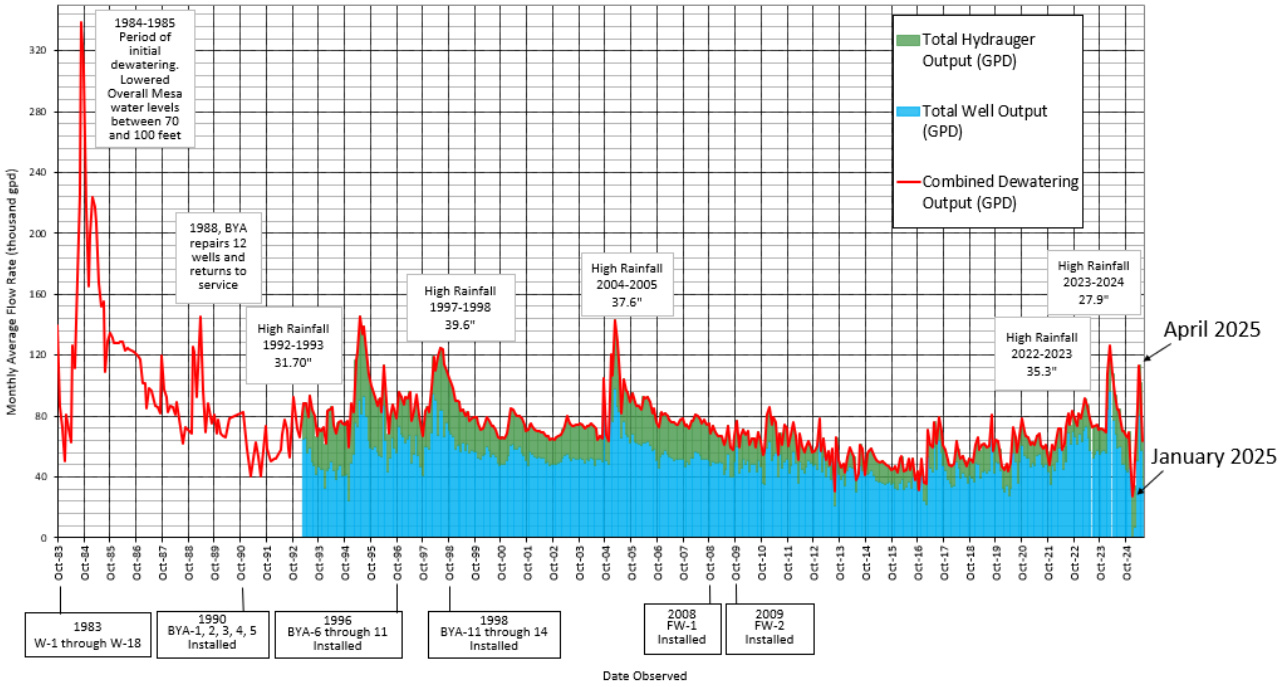


Figure 8: Historical dewatering production and high rainfall winters

Average total well production for the monitoring year was 43,318 gpd which is 32.8-percent lower than last year's average production of 64,439 gpd, 16.8-percent less than the historical production average of 52,071 gpd calculated from 1993 to present, and 38-percent less than the maximum recorded production of 69,741 gpd during the 2004-2005 monitoring year.

Dewatering well production rates were impacted by depowering of the wells following the Palisades Fire, a decrease in imported water and below average rainfall.

5.3.2 Hydrauger Production

Yeh performed monthly monitoring for 36 hydraugers. Hydrauger production is measured directly from a sampling port installed on each hydrauger. A graph showing total hydrauger production since

1993 is presented on Plate 3. Production plots and status for individual hydrauger locations are included in Appendix D.

Annual average hydrauger production during the monitoring year was calculated to be 25,837 gpd which is approximately 25-percent higher than last year's average monthly production of 20,743 gpd. Hydrauger production fluctuated over the monitoring year in response to rainfall. As is typical for the hydraugers, production rate increases appear to have a delayed response to rainfall with this year's peak production occurring in May. The May 2025 monthly average production was the highest monthly average recorded since April 2005. Hydrauger production rates may have also been influenced by depowering of dewatering wells.

6. Seismic Events Summary

24 earthquakes with a magnitude of M3.0 or higher occurred with epicentral distances within 25-miles of the project area and five earthquakes with a magnitude of M4.0 or greater were recorded between 25 to 100-miles of the project area (See Figure 9). The largest event was a M5.2 located 79 miles northwest, near Lamont, CA which was followed by a cluster of three aftershocks exceeding M4.0. For the M5.2 event, the USGS shake map reported a Modified Mercalli Intensity (MMI) of 2 with weak shaking felt at the Big Rock area. On September 12, 2024, an M4.7 event occurred approximately 11 miles west of the Big Rock area. The USGS shake map reported an MMI of 3.5 to 4 with light shaking felt at the Big Rock area, and six aftershocks with magnitudes ranging from M3.1 to 3.7 were associated with the main quake. The closest event to the project site was a M3.0 with an epicenter offshore approximately 5.5 miles southwest of the project site with the USGS shake map reporting MMI of 1 to 1.5 and weak shaking.

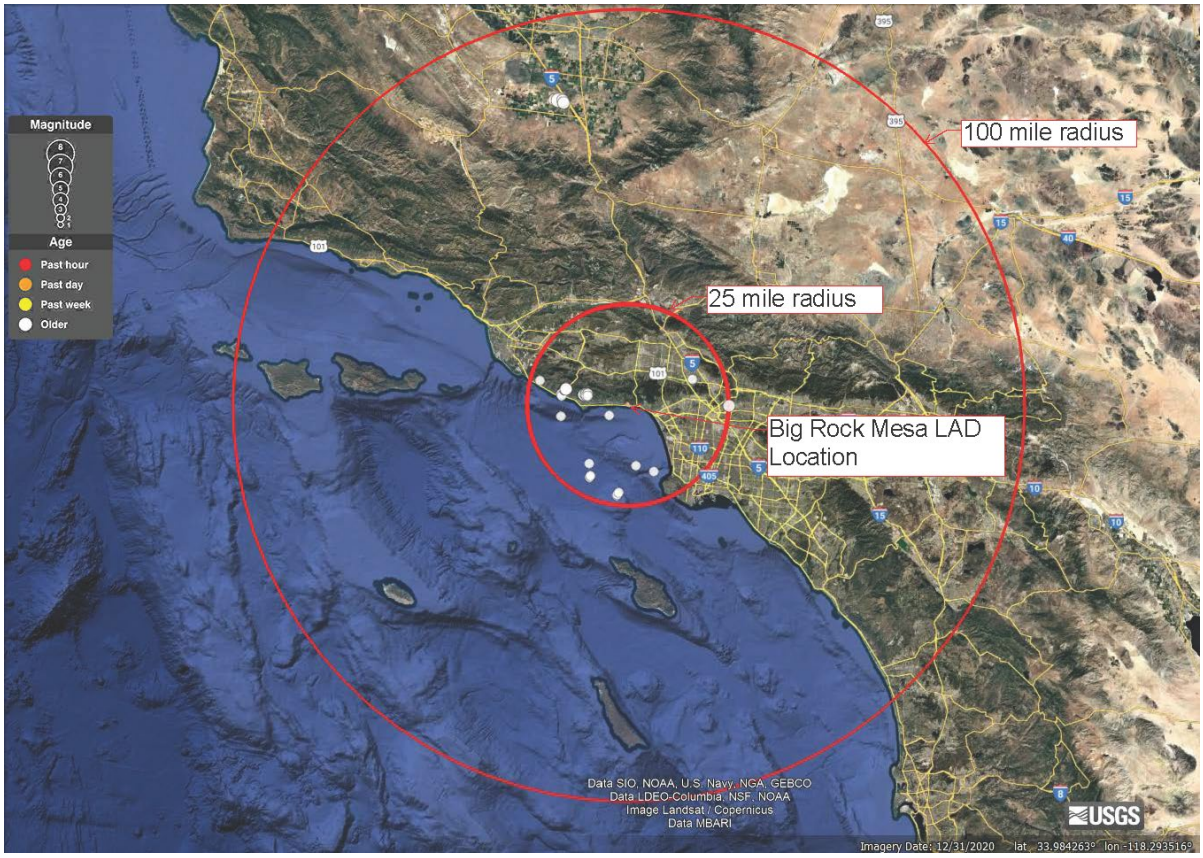


Figure 9: M4.0+ earthquakes within 100-miles of Big Rock Mesa LAD between 7/1/2024 and 6/30/2025

Yeh personnel performed post-earthquake observations and measurements that included surveying of key inclinometers and/or field observations of the ground surface made during scheduled monitoring and maintenance before and after the earthquake events. Yeh staff did not observe surface displacements or inclinometer deformations in response to the recorded earthquakes and is unaware of any reports of damage local to the Big Rock Mesa Landslide AD resulting from the earthquakes.

7. Groundwater Quality Monitoring

The City of Malibu has permitted the dewatering discharge with the Los Angeles Regional Water Quality Control Board (Water Board) under the National Pollutant Discharge Elimination System (NPDES) under permit CAG994004 order number R4-2018-0125 implemented July 1, 2022. A Notice of Intent to comply with upcoming order R4-2023-0429 was delivered to the Water Board on March 19, 2024. The new order has not yet been received from the Water Board. Yeh and the City continue to coordinate with the Water Board regarding our test results, sampling procedures, and future effluent limits.

Yeh and Associates, Inc., as a consultant for the City, performed the NPDES monitoring and reporting for this monitoring year in general accordance with the active permit. Analyses were conducted at

certified laboratories, in accordance with current U.S. Environmental Protection Agency procedures. Analytic results for the water quality sampling performed this monitoring year are attached in Appendix E - Quarterly Results. Quarterly Discharge Monitoring Reports were submitted to the Water Board for Q3 and Q4 of 2024 for 2024-2025 monitoring year.

Groundwater quality sampling was suspended following the Palisades fire due to sampling infrastructure damage, de-energized dewatering wells, and lack of safe access to sampling locations. A status letter was submitted to the Water Board to describe the infrastructure and sampling conditions during Q1 and Q2 of 2025.

8. Maintenance and Capital Improvements

A summary table of the maintenance and capital improvement activities performed over this monitoring year is provided in Table 8. Typical maintenance activities to dewatering wells include evaluating, troubleshooting, and replacing or repairing dewatering well pumps, well electronics and well controls, repairs to well equipment vaults, and repairs to well discharge lines. Typical maintenance to hydraugers included PVC repairs within the PCH Region along Highway 1 or within the conveyance piping for discharge. Capital improvements include replacement and rehabilitation of existing facilities and special projects to improve the monitoring and maintenance capabilities. Yeh performed numerous maintenance and repairs to dewatering facilities and improvements to the project assets throughout the monitoring year.

It should be noted that several hydraugers along the base of the PCH bluffs were damaged or buried by rockfall between December and March following rainfall events. Most of the damaged locations have either been repaired or have undergone temporary repairs. Some of the locations remain buried while Yeh and the City coordinate with Caltrans to excavate the facilities during their shoulder clearance maintenance work.

Table 8: Facilities Maintenance Log

Date Entered	Type	Facility ID	Description/Observation	Maintenance Performed and Status
January 7 to current	All	As noted	Palisades Fire Repairs	• Fire repairs are summarized in: "Interim Report of Dewatering System Status and Summary of Collected Data following Palisades Fire, City of Malibu Assessment District 98-1 - Big Rock Mesa, Malibu, CA" dated May 12, 2025, and in the "Post-Fire Power Point Presentation" dated May 28, 2025
10/3/2024	DW	FW-1	Vault consistently full of soil probably from burrowing animals getting into vault	• Excavate soil from vault • Pour concrete on bottom of vault

Date Entered	Type	Facility ID	Description/Observation	Maintenance Performed and Status
4/4/2025	H	Western hydrauger cluster to Port-9	Discharge line leaking below ground causing ponding behind K-rail	• Excavate and locate leak • Attach above ground hose to bypass broken buried section
5/20/2025	H	BYA-H8	Discharge line leaking below ground	• Excavate and locate leak • Buried conveyance scheduled to be bypassed with above ground line
5/30/2025	DW	W-1	Discharge line leaking near meter	• Excavate discharge line • Locate leaking connection. • Replace connections to repair leak
6/13/2025	H	Unknown hydrauger	Re-activated hydrauger between HD-32 and H-4 ponding on PCH shoulder	• Install above ground conveyance to Port-5 • Removed above ground conveyance after hydrauger stopped flowing

9. Additional Observations

The following additional field observations were made by Yeh staff over the monitoring year that will continue to be considered and tracked for future improvement projects.

- Yeh continued to observe changes in the condition of two intermittent water seeps behind the existing soldier pile wall between hydraugers HD-12 and HD-10. No significant changes were observed over the monitoring year.
- Mass wasting along the PCH bluffs has buried or damaged several District hydrauger facilities. Yeh performed repairs to limit flooding on the PCH shoulder; however, some of the facilities remain buried or inaccessible. Yeh and the City are coordinating with Caltrans to excavate District facilities while they perform their normal shoulder maintenance with heavy equipment.

10. Capital Improvement and Special Projects

10.1 Work In Progress

The following capital improvement and special projects have been estimated and are in planning and implementation phases.

- Install and implement upgraded continuous datalogging flow meters with walk-by transceiver upload capability,
- Perform maintenance and implement chemical treatment schedule for iron oxide bacteria conditions in selected wells: BYA-1, W-1, BYA-9 and W-18.

10.2 Future Implementation

The following improvement projects have been identified and are being tracked and planned for future consideration.

- Install a grouted time-domain reflectometer cable and vibrating wire piezometer in abandoned inclinometers SP-33, SP-17A, SP-16, SP-24 and SP-28,
- Install one, 100-foot-deep inclinometer along PCH below Rockport Way,
- Install one, 100-foot-deep inclinometer in the Headscarp Region to Replace the upper portion of SP-26,
- Install non-traversing sensors in inclinometer SP-11,
- Over-drill and replace inclinometer PC-1,
- Continue efforts to install and implement remote transmitting or continuous datalogging pressure transducers for dewatering production and water levels,
- Continue efforts to design and implement well controls that better protect pumps from wear than the current pump-savers alone,
- Rehabilitate dewatering wells W-1 and BYA-9 and attempt to recover well depth by removing existing sediment at well bottom,
- Perform maintenance and implement chemical treatment schedule for dewatering well FW-1 to improve water quality results for NPDES compliance,
- Replace dewatering wells BYA-1 and W-3 to original depths to restore/improve dewatering system capabilities,

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Maintenance and Monitoring Facilities
Assessment District 98-1, Big Rock Mesa
City of Malibu, California

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- Dewatering Well
- Hydrauger Outfall
- Hydrauger Installation Length
- Conveyance Point
- Ocean Discharge Point
- Approximate Limits of Primary Land Movement
- Western Extension Boundary
- Big Rock Mesa Landslide Assessment Boundary
- Slope Inclinometer/Standpipe Piezometer (standpipe only, not usable for inclinometer
- Slope Inclinometer/Standpipe Piezometer
- Time Domain Reflectometry Test Location
- Vibrating Wire Test Location
- Catch Basin
- Master Water Meter
- Storm Drain

N

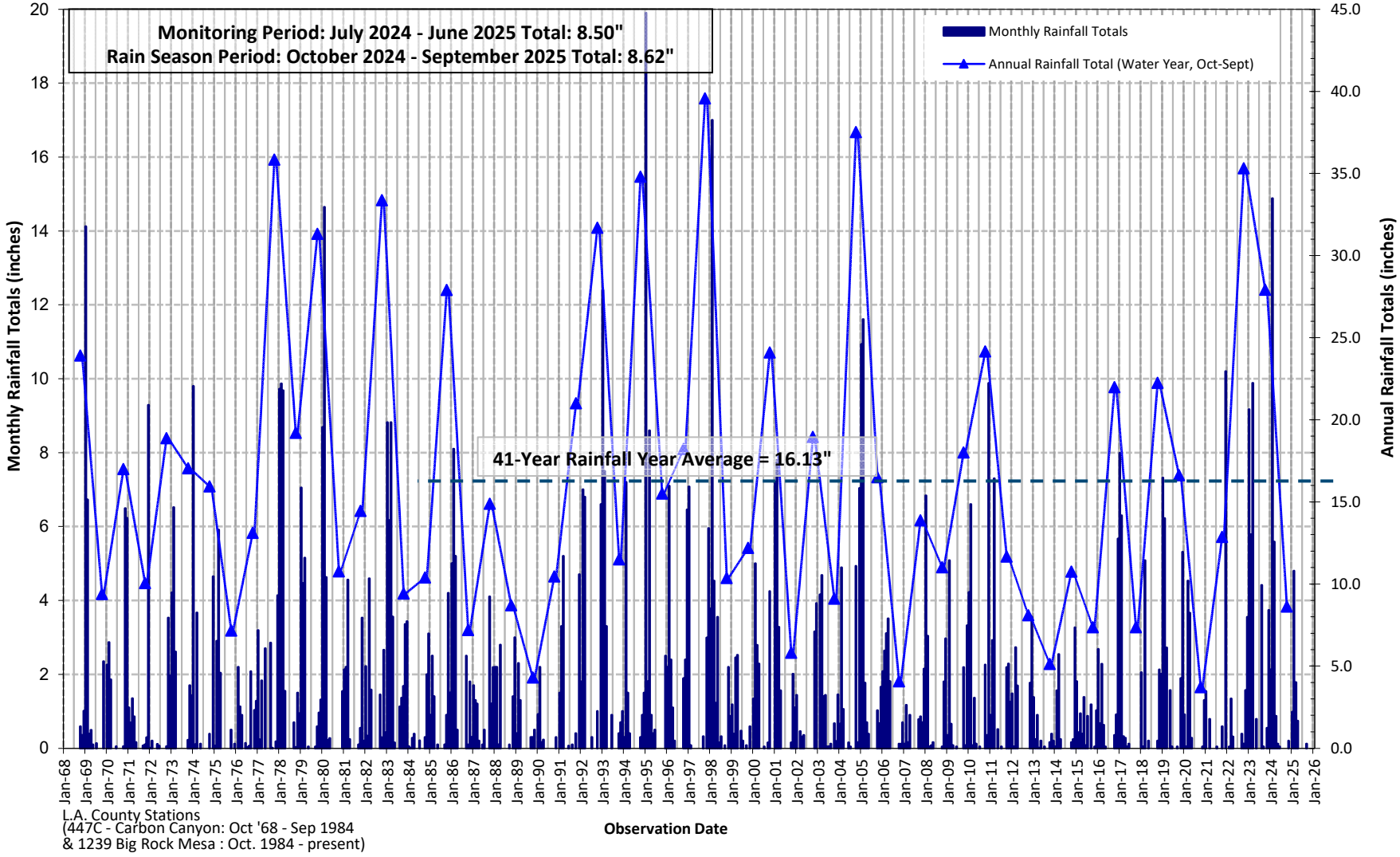
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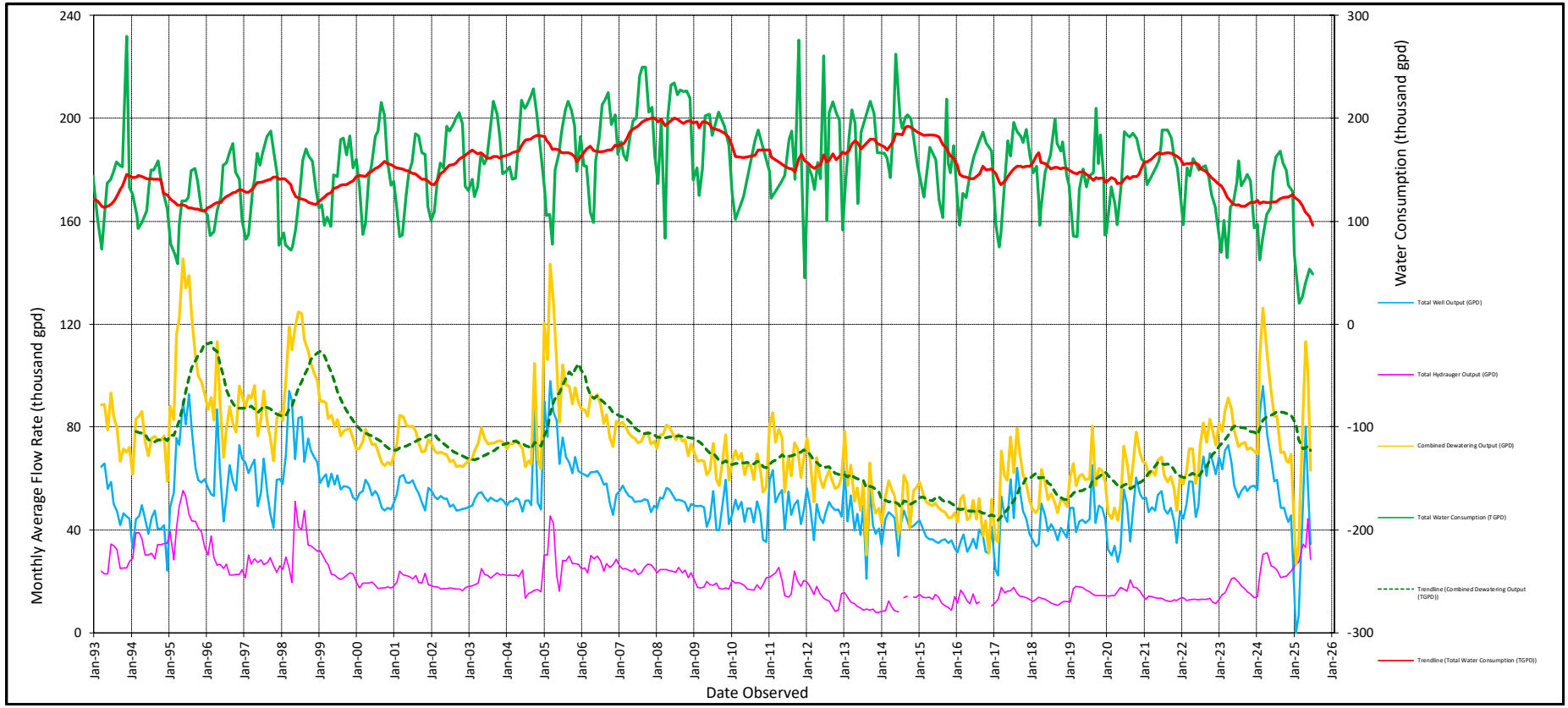
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DRAWN BY: M. Boyd	APPROVED BY: L. Berry	

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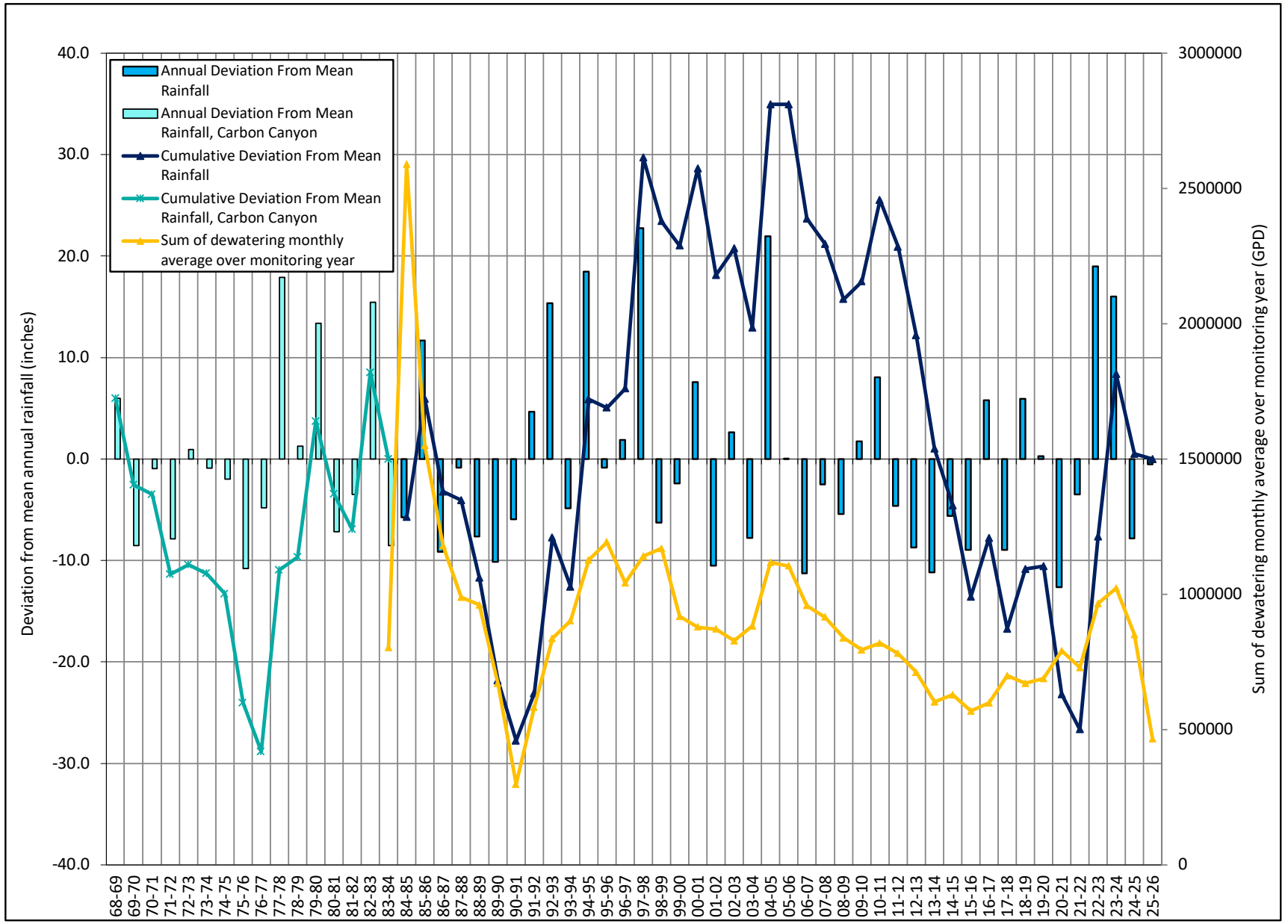
RAINFALL GRAPH
Landslide Assessment Districts
Malibu, California



TOTAL DEWATERING PRODUCTION AND TOTAL WATER CONSUMPTION
Wells and Hydraugers(Combined)/Total Water Consumption
Big Rock Mesa Landslide Assessment District
Malibu, California

PLATE 3

Yeh and Associates, Inc.
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ANNUAL AND CUMULATIVE DEVIATION FROM MEAN REAINFALL VS TOTAL DEWATERING PRODUCTION
Big Rock Mesa Landslide Assessment District
Malibu, California

PLATE 4

APPENDIX A - GROUNDWATER LEVELS

Big Rock Mesa: Standpipe Monitoring Wells and Piezometer Information				
Piezometer ID	**Surface Elev. (ft)**	**Depth (ft)**	**Perforation Interval Elevation (ft)**	**Installer**
PCH Standpipe Monitoring Wells				
SP-11	27	58	Unknown	Evans
SP-12	26	40	Every 5 feet[1]	Evans
SP-14	25	30	Every 5 feet[1]	Evans
SP-15	20	82	Every 5 feet[1]	Evans
SP-19	25	82	Every 5 feet[1]	Evans
SP-27A	29	94	Every 5 feet[1]	Evans
SP-29	27	138	-111 to -106	Evans
SP-30	29	128	unknown	Evans
Bluff Standpipe Monitoring Wells				
SP-10	295	332	Every 5 feet[1]	Evans
SP-28	270	358	Every 5 feet[1]	Evans
SP-32	233	354	Every 5 feet[1]	Evans
SP-34	270	382	-112 to -107	BYA
Headscarp Standpipe Monitoring Wells				
SP-26	745	346	Every 5 feet[1]	Conv
Central Standpipe Monitoring wells and Piezometers				
SP-9A	365	300	Every 5 feet[1]	Evans
SP-16	285	240	Every 5 feet[1]	Evans
SP-16A	285	392	Every 5 feet[1]	Evans
SP-17	540	192	Every 5 feet[1]	Evans
SP-17A	540	238	Every 5 feet[1]	BYA
SP-24	370	382	Every 5 feet[1]	Conv
SP-35	345	396	-51 to -46	BYA
SP-36	380	254	120 to 125	BYA
Western Standpipe Monitoring Wells				
SP-20	430	326	Every 5 feet[1]	Conv
SP-21	660	280	Every 5 feet[1]	Evans
SP-22	780	332	Every 5 feet[1]	Conv
SP-23	860	398	Every 5 feet[1]	Conv
Eastern Standpipe Monitoring Wells and Piezometers				
PC-1	250	160	87.5 to 90	BYA
SP-3	212	132	Every 5 feet[1]	Evans
SP-3A	203	246	Every 5 feet[1]	Evans
SP-33	208	374	Every 5 feet[1]	Evans

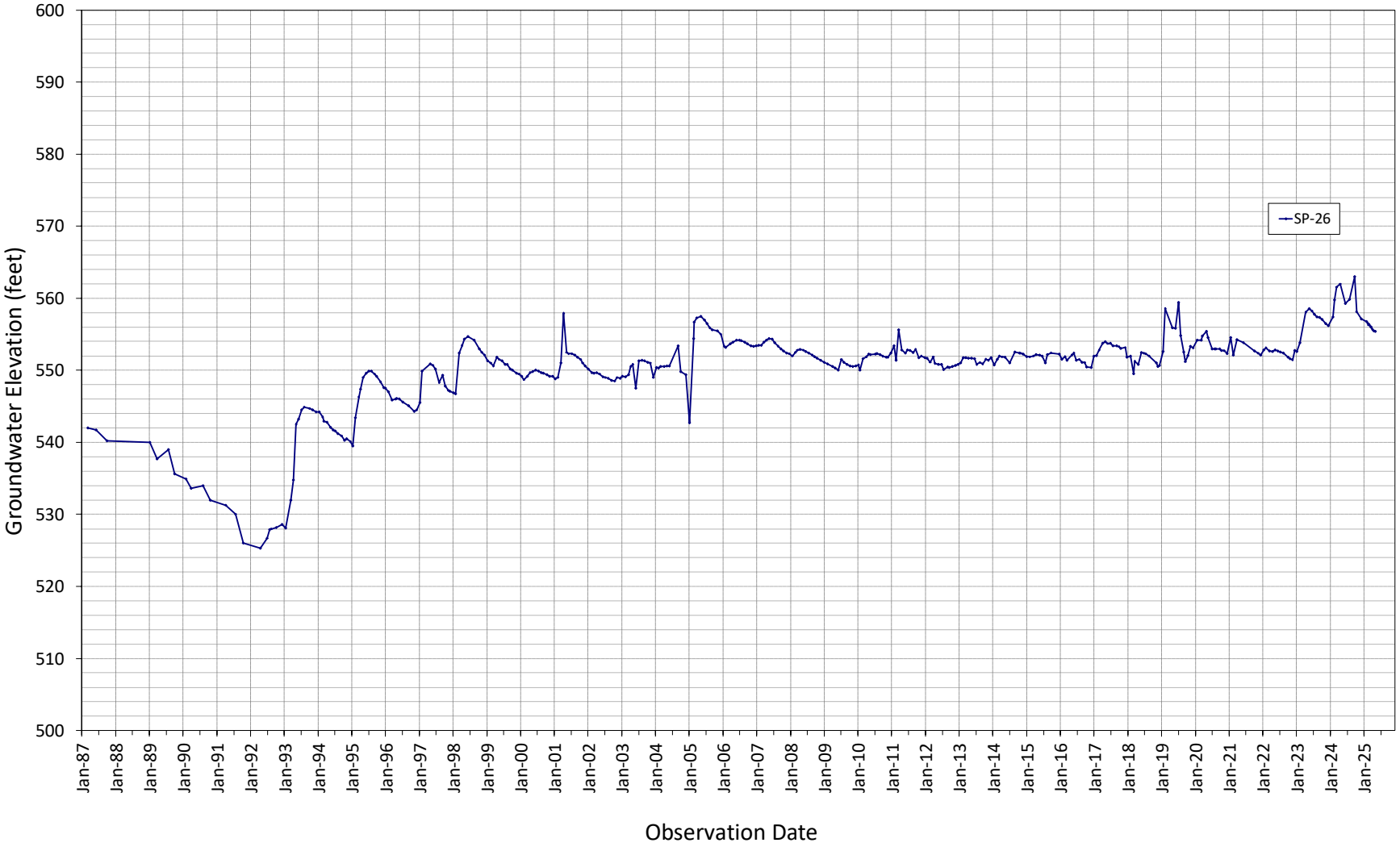
Evans - D.A. Evans
Converse - Converse Consultants
BYA - Bing Yen and Associates

[1] 1/4" holes drilled in casing every 5' (D.A. Evans 1986)

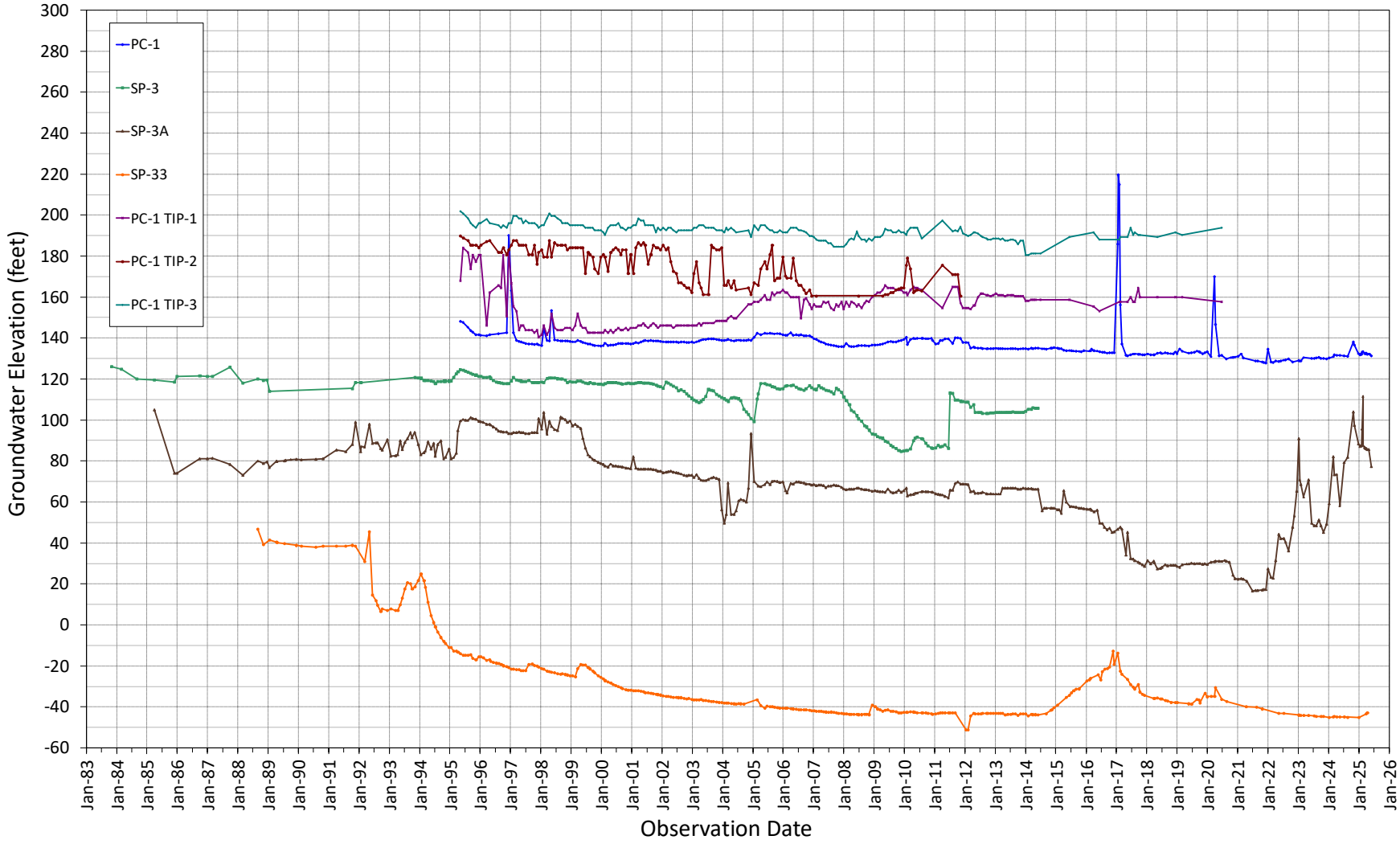
PNEUMATIC PIEZOMETER INFORMATION					
Piezometer ID	**Surface Elev. (ft)**	**Tip No.**	**TIP DEPTH (ft.)**	**INSTALL BY**	**STATUS**
W-10**	432	230	230	BYA	Water level reported, data-logging transducer installed
W-11**	507	214	214	BYA	Air-line present, no sounder access, no data reported
W-15**	295	164	164	BYA	Air-line present, no sounder access, no data reported
PC-1	250	TIP-1	120	BYA	Functioning as of 2020, not measured during monitoring year
		TIP-2	90		0 PSI since November 2011
		TIP-3	70		Functioning as of 2020, not measured during monitoring year
		TIP-4	40		Non-Functioning, no return air flow
		TIP-5	20		Non-Functioning, no return air flow
SP-5A*	NA	TIP-1		BYA	Non-functioning - Covered by asphalt pavement
		TIP-2	NA		
		TIP-3			
SP-8A*	NA	TIP-1		BYA	Non-functioning - Covered by landslide
		TIP-2	NA		
		TIP-3			
SP-17A*	540	TIP-1	Unknown	BYA	Non-functioning, no return air flow
		TIP-2	Unknown		
		TIP-3	Unknown		
		TIP-4	Unknown		
		TIP-5	Unknown		
SP-34	270	TIP-1	381	BYA	Functioning as of 2020, not measured during monitoring year
		TIP-2	282		Functioning as of 2020, not measured during monitoring year
		TIP-3	182		Low PSI since installation, not reported
		TIP-4	82		Non-Functioning, no return air flow
SP-35	345	TIP-1	393	BYA	Functioning as of 2020, not measured during monitoring year
		TIP-2	293		Functioning as of 2020, not measured during monitoring year
		TIP-3	193		Functioning as of 2020, not measured during monitoring year
		TIP-4	98		Non-Functioning, no return air flow, not reported
SP-36	380	TIP-1	255	BYA	Functioning as of 2020, not measured during monitoring year
		TIP-2	195		Functioning as of 2020, not measured during monitoring year
		TIP-3	95		0 PSI since installation, not reported
BYA-2*	665	TIP-1	Unknown	BYA	Non-functioning, no return air flow
		TIP-2	Unknown		
		TIP-3	Unknown		
BYA-3A*	NA	TIP-1		BYA	Non-Functioning
		TIP-2			
		TIP-3	NA		
		TIP-4			
BYA-4A*	NA	TIP-1		BYA	Non-functioning, no return air flow
		TIP-2			
		TIP-3	NA		
		TIP-4			
		TIP-5			
		TIP-6			
BYA-5A*	NA	TIP-1		BYA	Non-Functioning, Paved over
		TIP-2	NA		
		TIP-3			
		TIP-4			
GEO-2 (OB-2)*	305	TIP-1		GS	Non-Functioning
		TIP-2	NA		
		TIP-3			
GEO-1*	NA	TIP-1		GS	Restricted Access (possibly malfunctioning)
		TIP-2	NA		
		TIP-3			

NOTE: * Not functioning or no longer monitored pneumatic peizometer
** Inactive dewatering well air-line

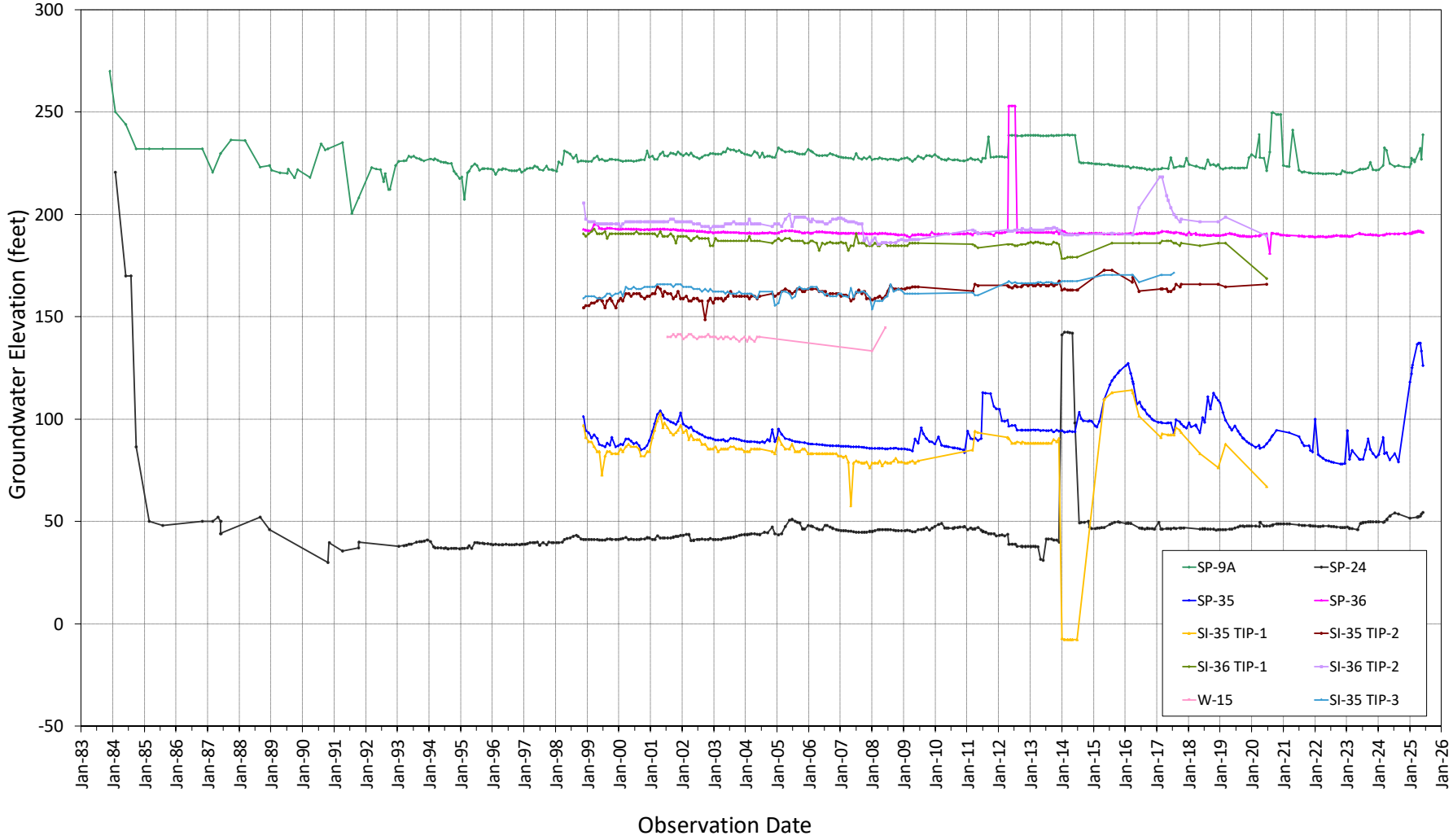
PNEUMATIC PIEZOMETER INFORMATION
Big Rock Mesa Landslide Assessment District
Malibu, California



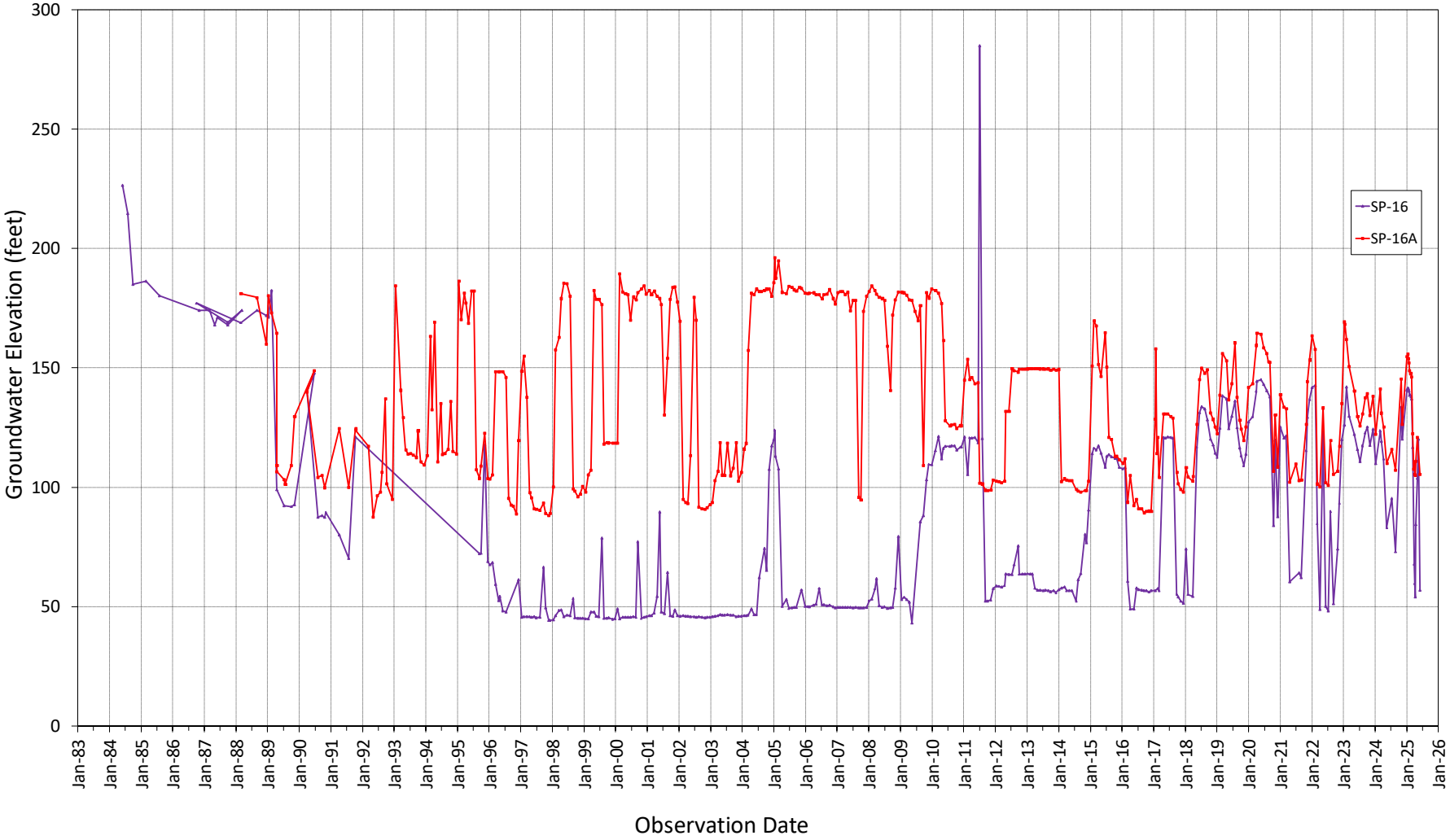
GROUNDWATER HYDROGRAPH
Headscarp Area
Big Rock Mesa Landslide Assessment District
Malibu, California



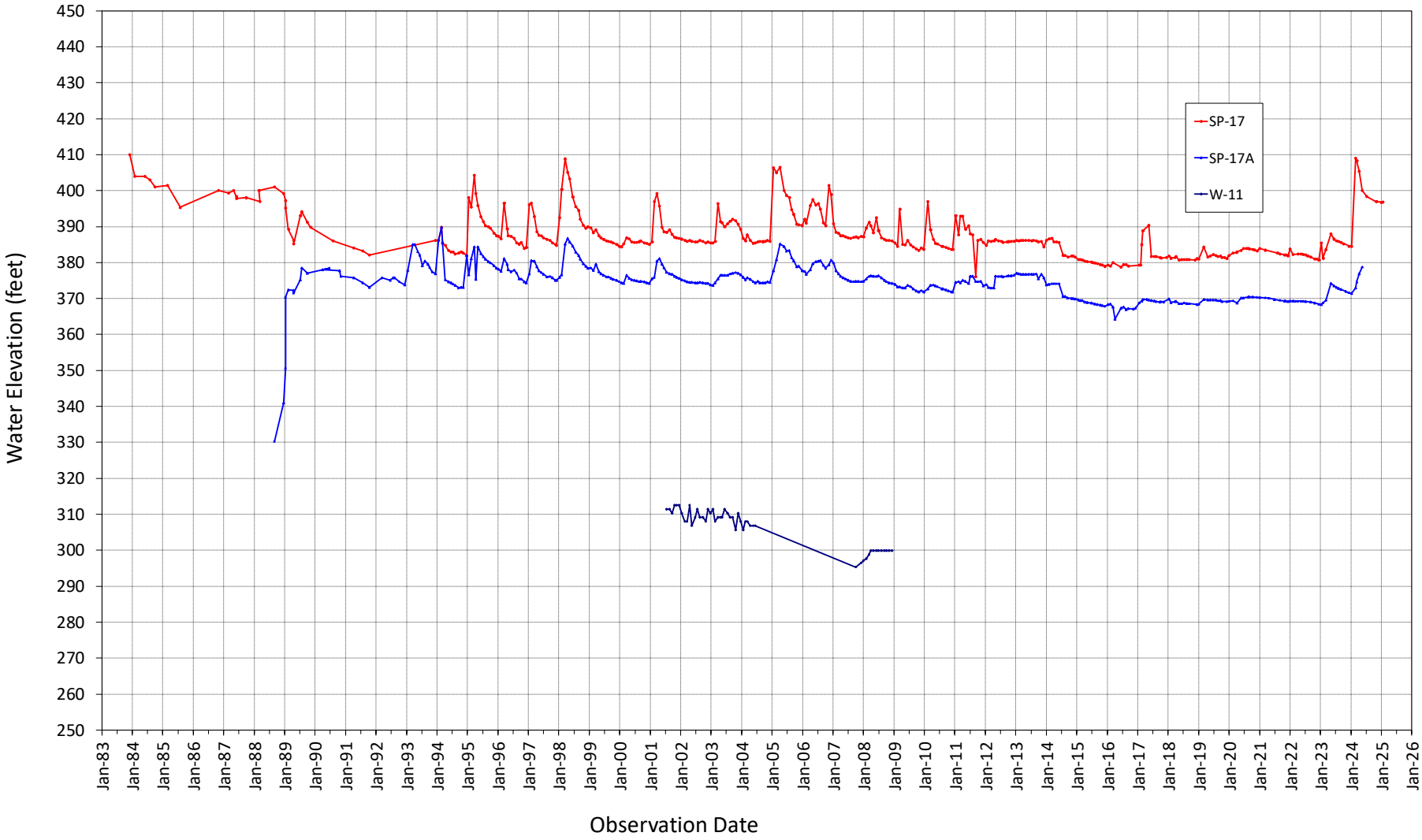
GROUNDWATER HYDROGRAPH
Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



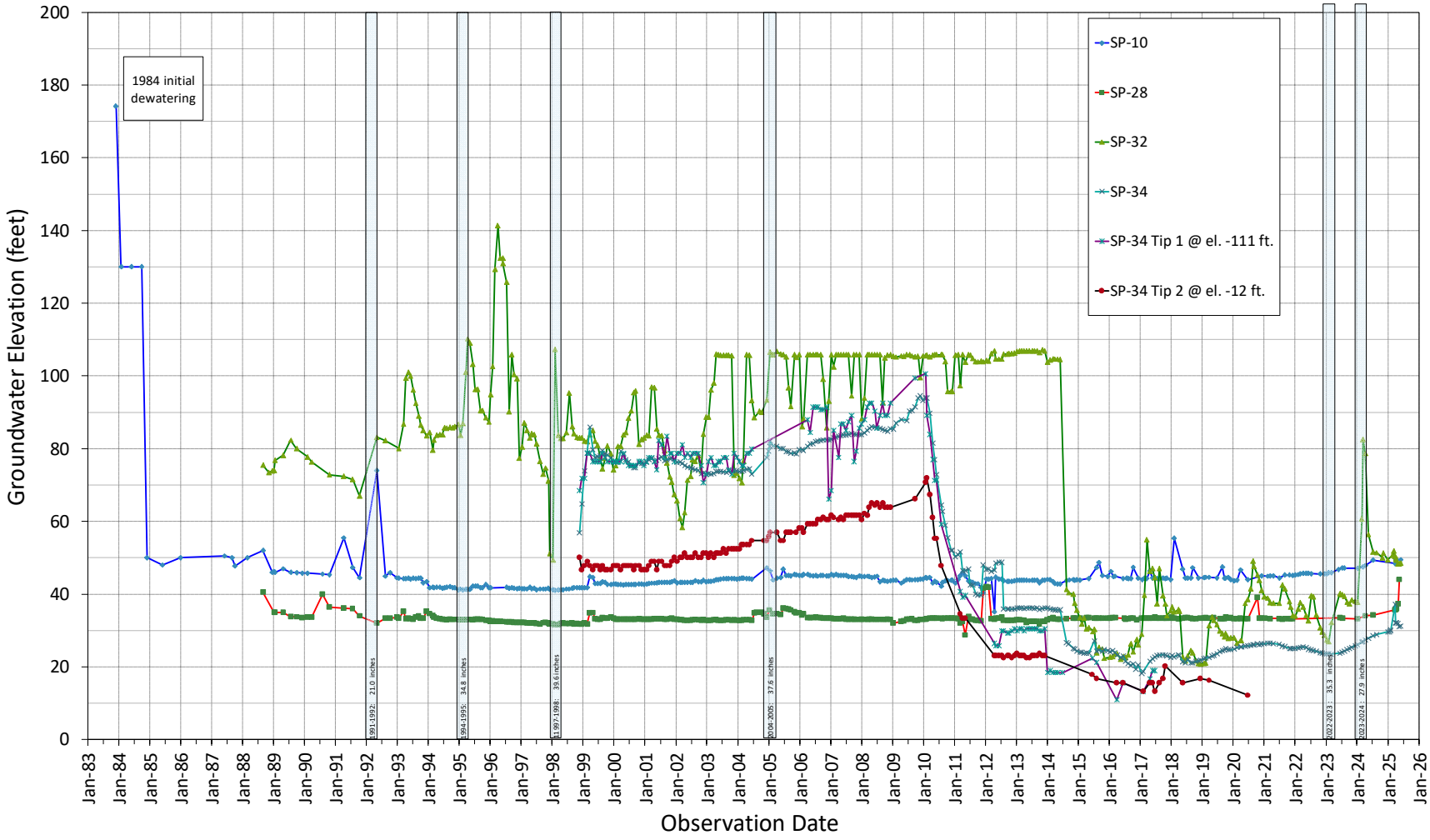
GROUNDWATER HYDROGRAPH
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



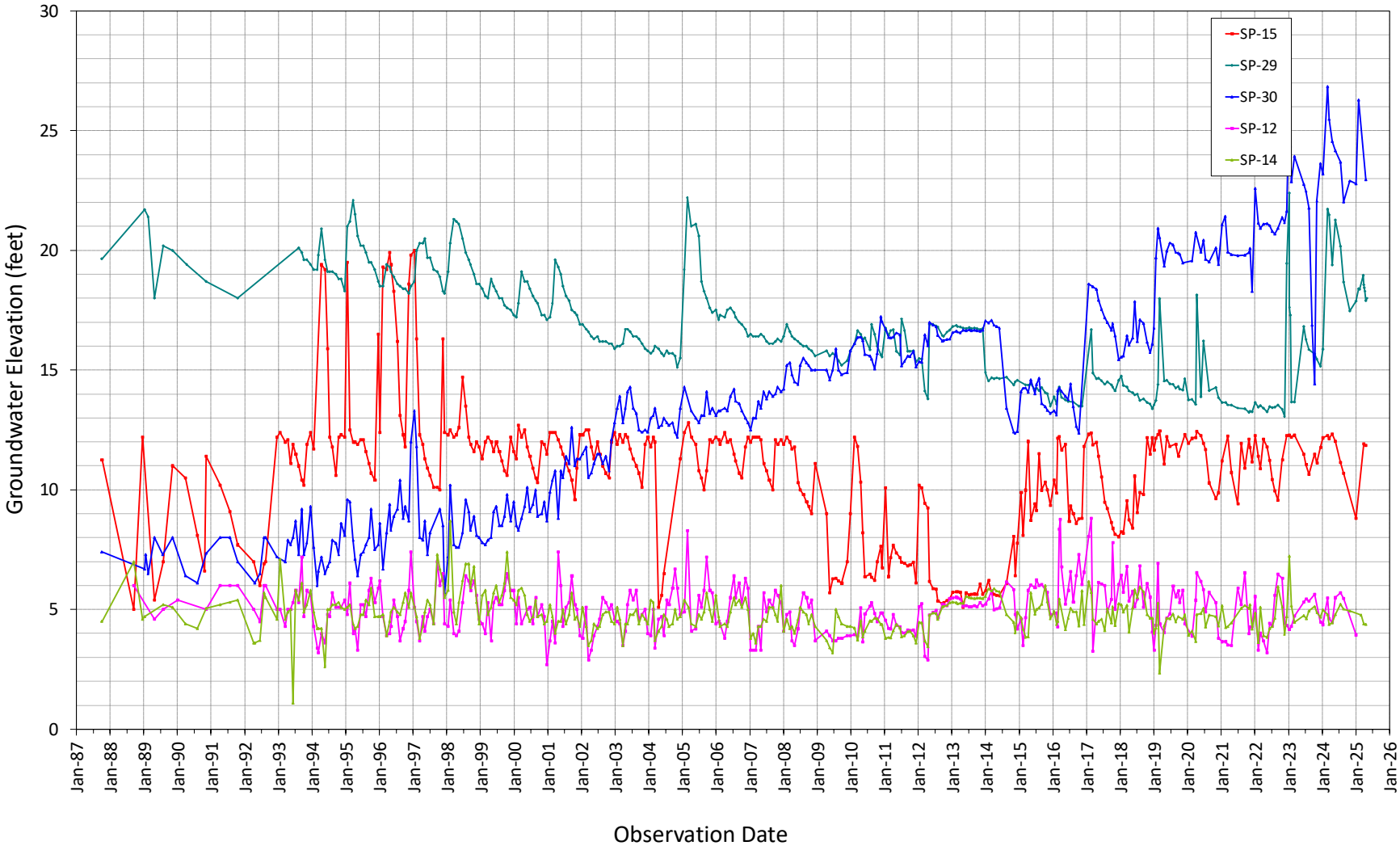
GROUNDWATER HYDROGRAPH
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



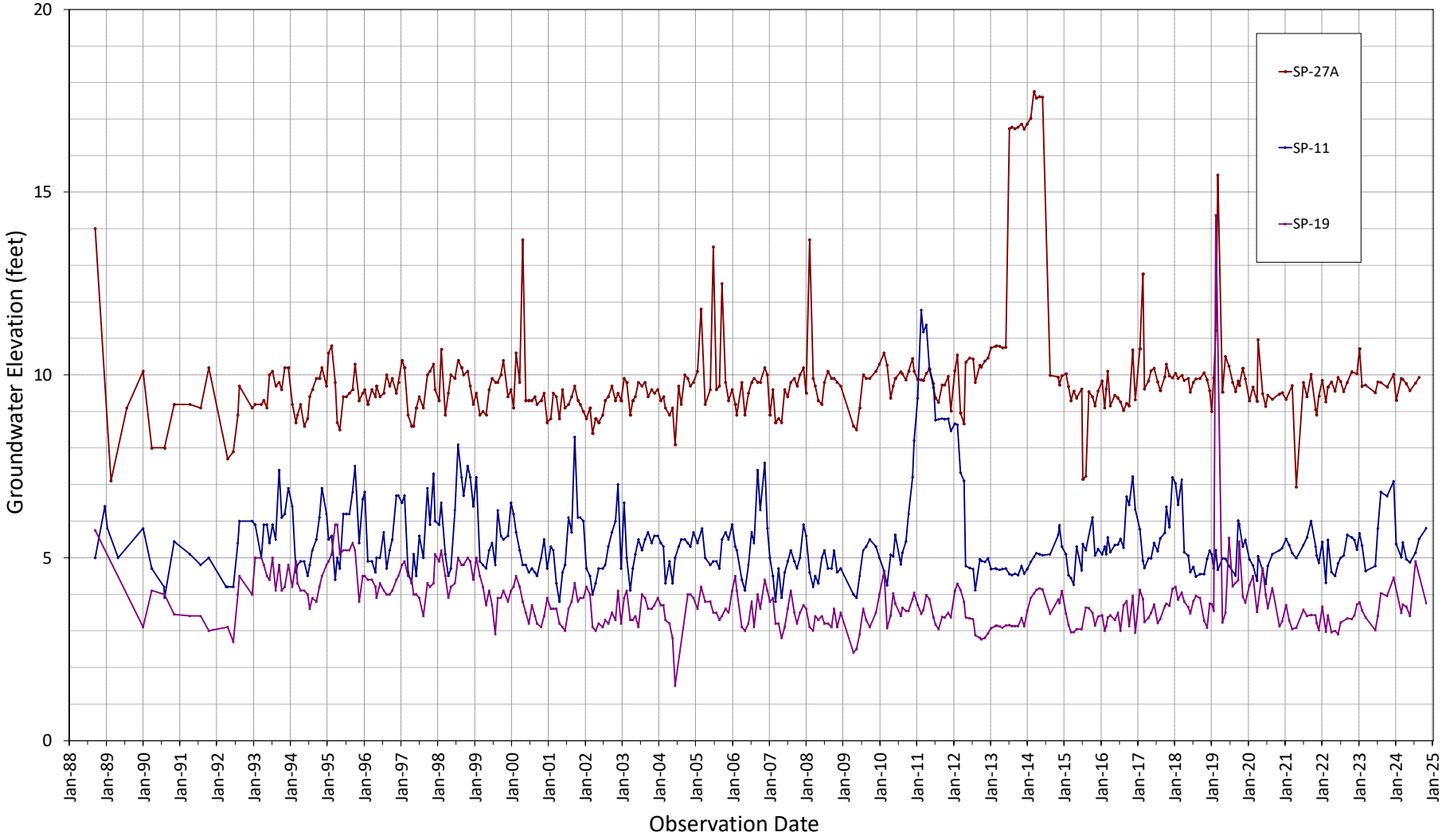
GROUNDWATER HYDROGRAPH
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



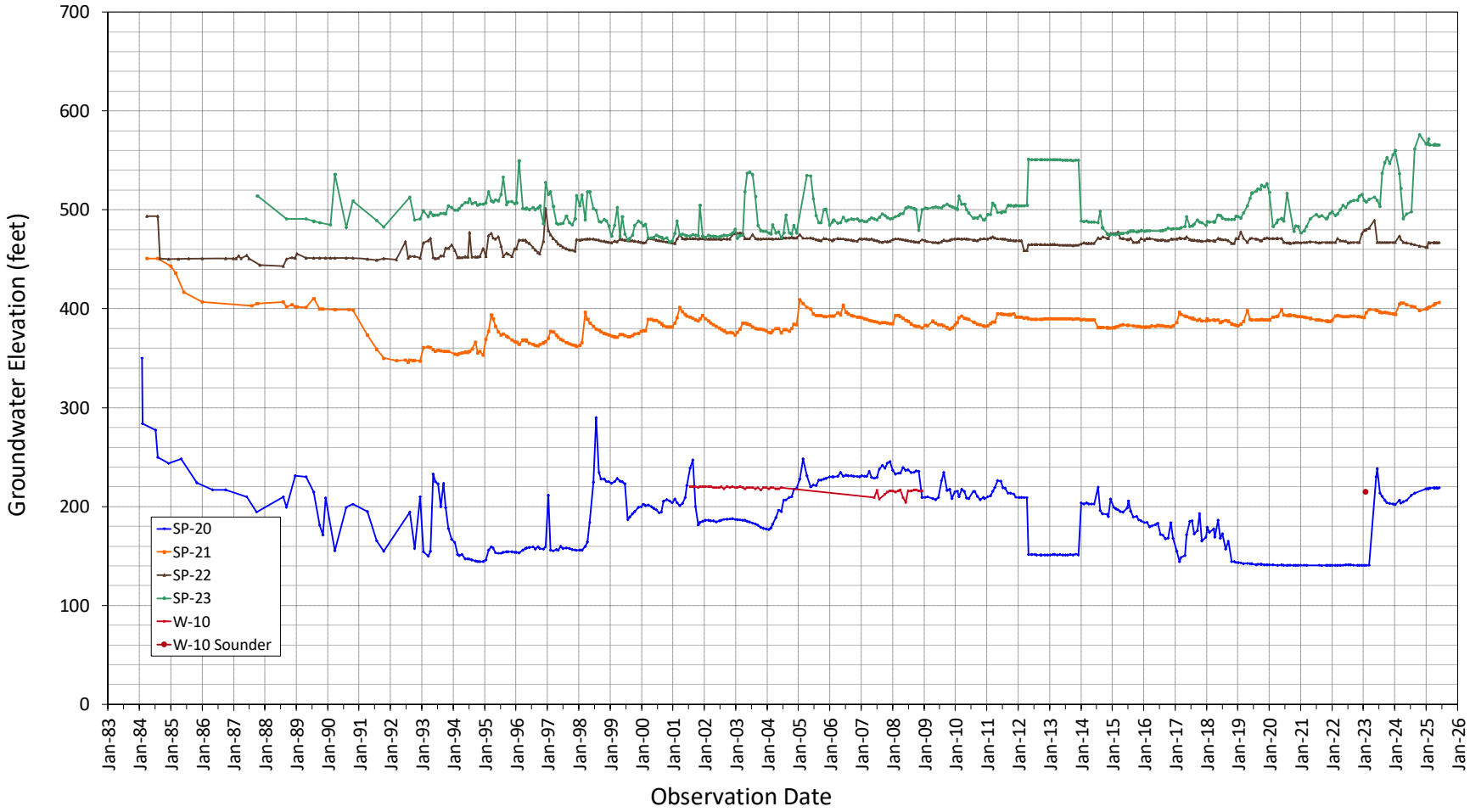
GROUNDWATER HYDROGRAPH
Bluff Region
Big Rock Mesa Landslide Assessment District
Malibu, California



GROUNDWATER HYDROGRAPH
Pacific Coast Highway (Western Half)
Big Rock Mesa Landslide Assessment District
Malibu, California



GROUNDWATER HYDROGRAPH
Pacific Coast Highway (Eastern Half)
Big Rock Mesa Landslide Assessment District
Malibu, California



GROUNDWATER HYDROGRAPH
Western Extension
Big Rock Mesa Landslide Assessment District
Malibu, California

APPENDIX B - SLOPE INCLINOMETERS



Inclinometers
Assessment District 98-1, Big Rock Mesa
City of Malibu, California

Yeh and Associates, Inc.
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- Approximate Limits of Primary Land Movement
- Western Extension Boundary
- Big Rock Mesa Landslide Assessment Boundary

Inclinometer Status

- Abandoned or Destroyed, Other
- SI Closure, Date and Depth of Closure (if known)
- Functioning, Penetrates Slide Plane
- Functioning, Installed Above or Outside Slide Plane
- Monitoring Above Previous Closure, Date and Depth of Closure
- Movement Bearing and Magnitude (inches)
- Potential Movement Bearing and Magnitude (inches)

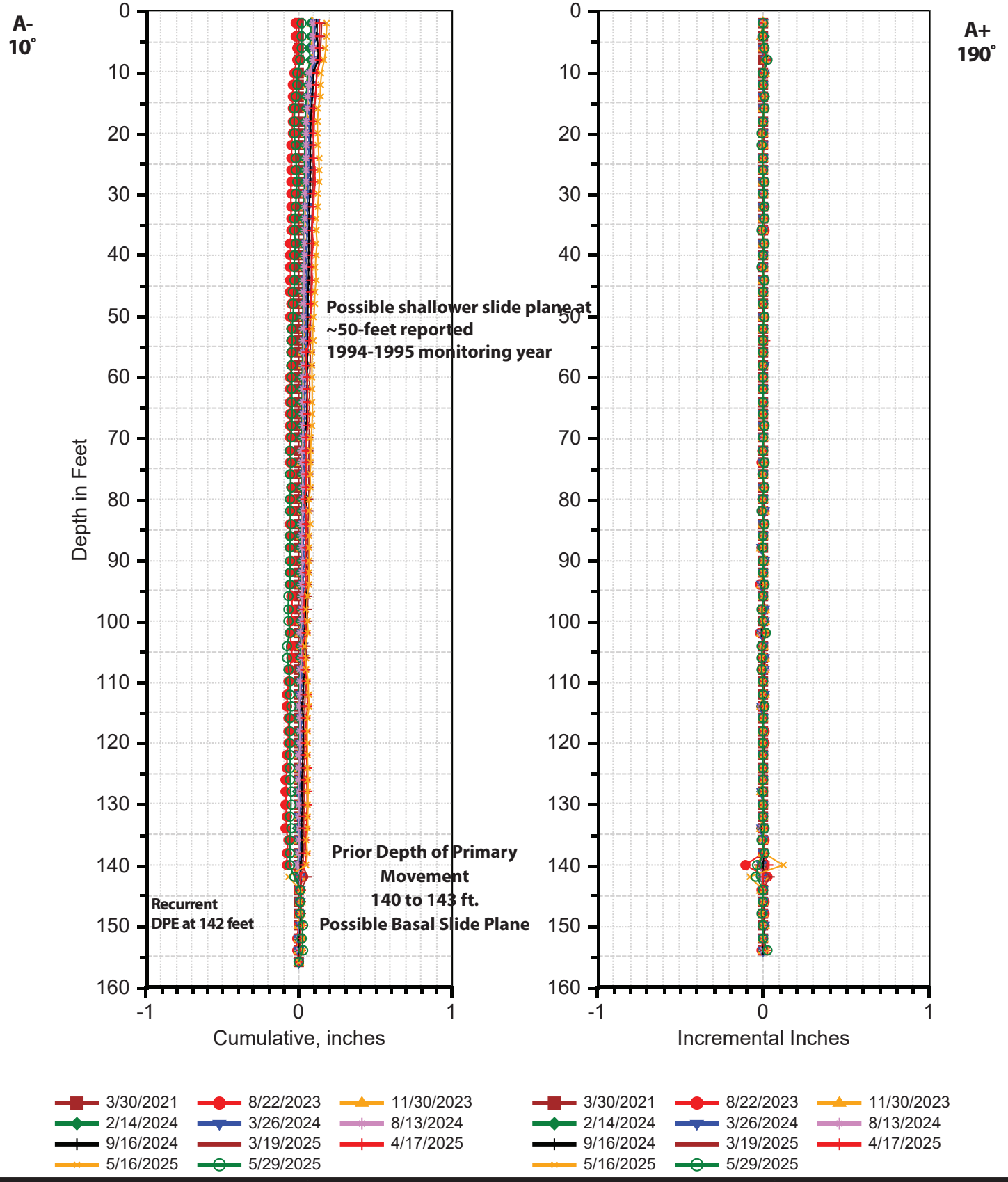
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DRAWN BY: M. Boyd	APPROVED BY: L. Berry	

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Plot of Slope Inclinometer

PC-1

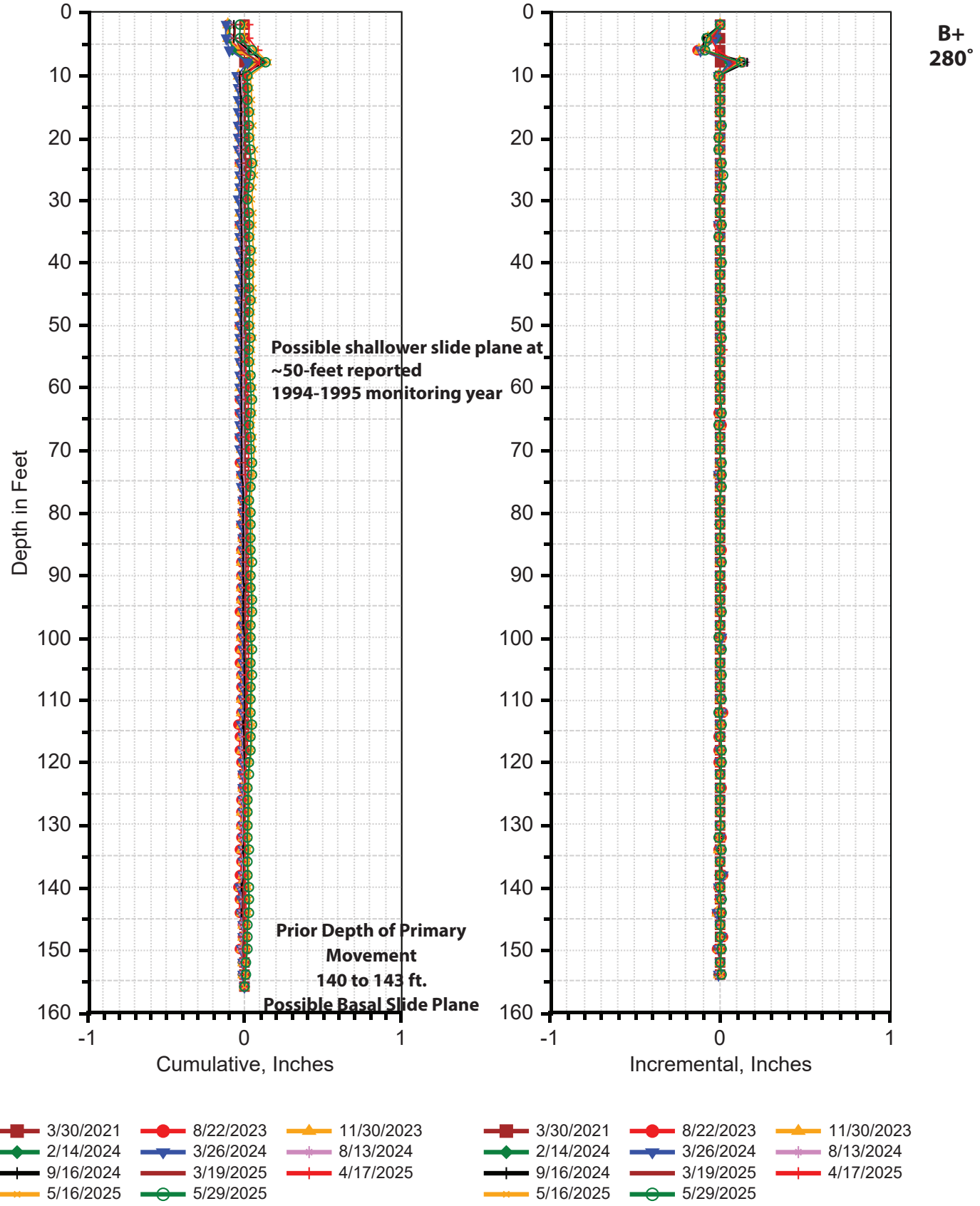
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 154		Baseline Date: 3/30/2021	Corrections: None
Install Date: 6/1995	Installed Depth (ft): 160	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

PC-1

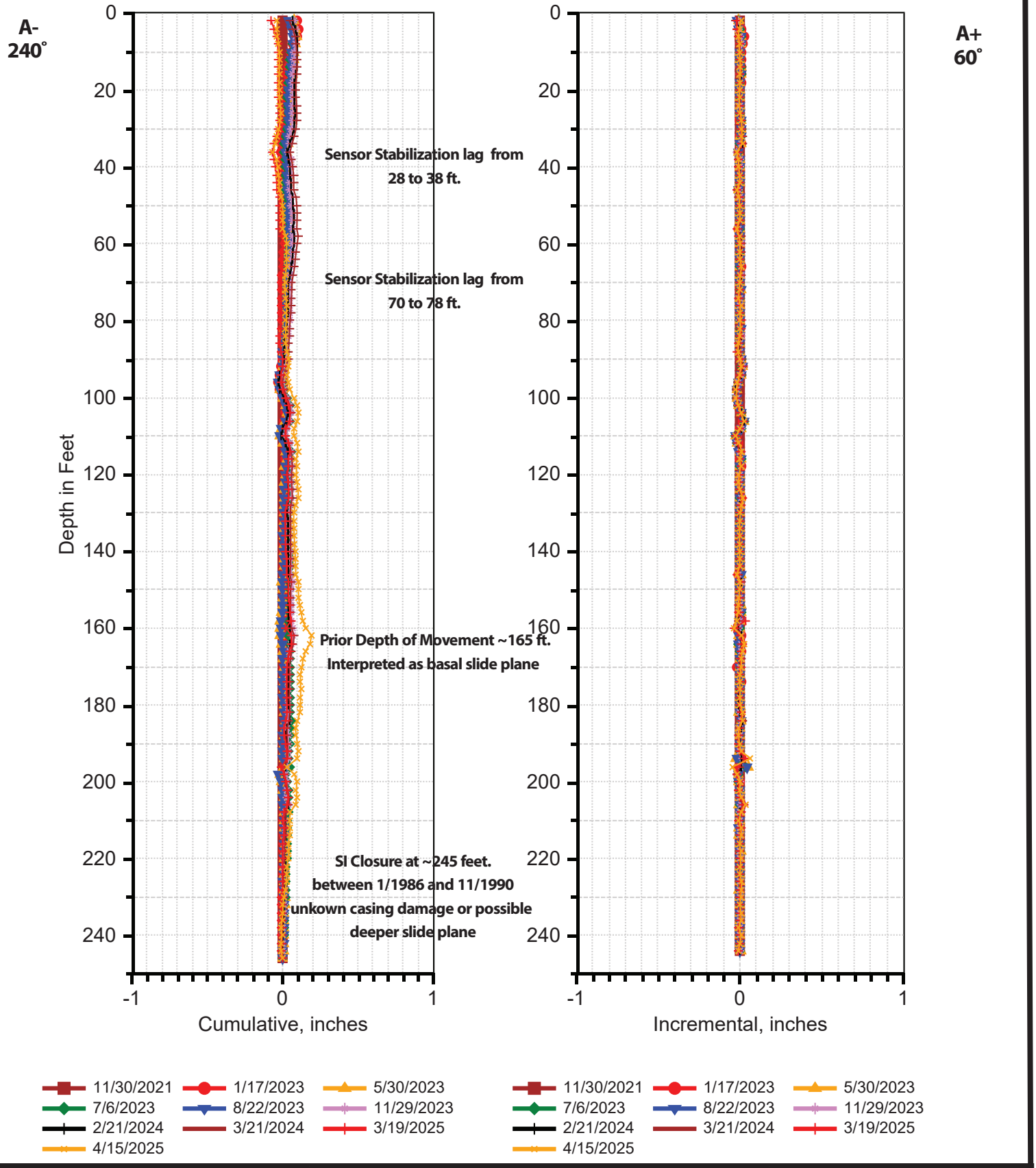
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Install Date: 6/1995	Installed Depth (ft): 160	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-3A

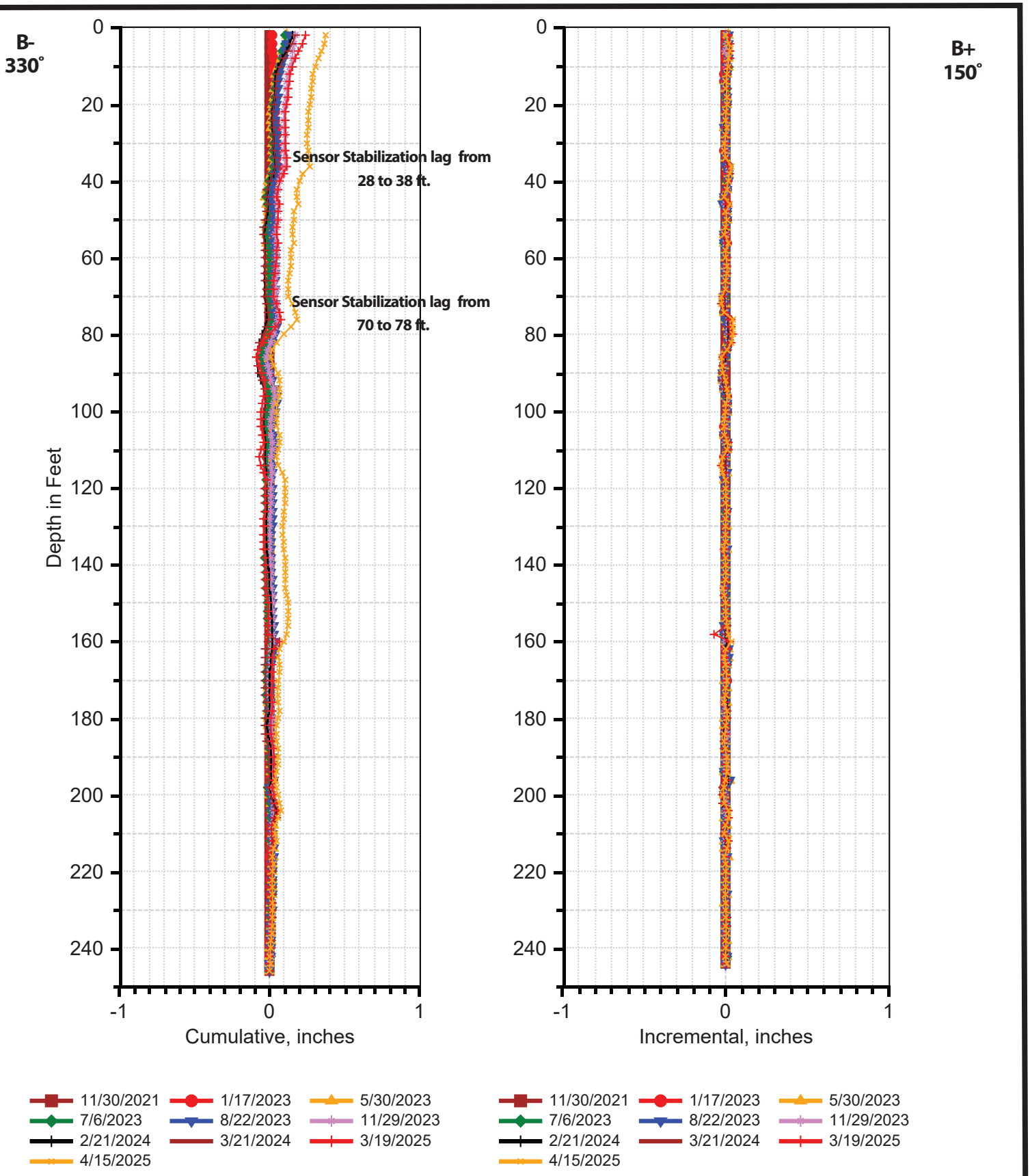
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 244		Baseline Date: 11/30 /21	Corrections: None
Install Date: 4/1985	Installed Depth (ft): 295	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-3A

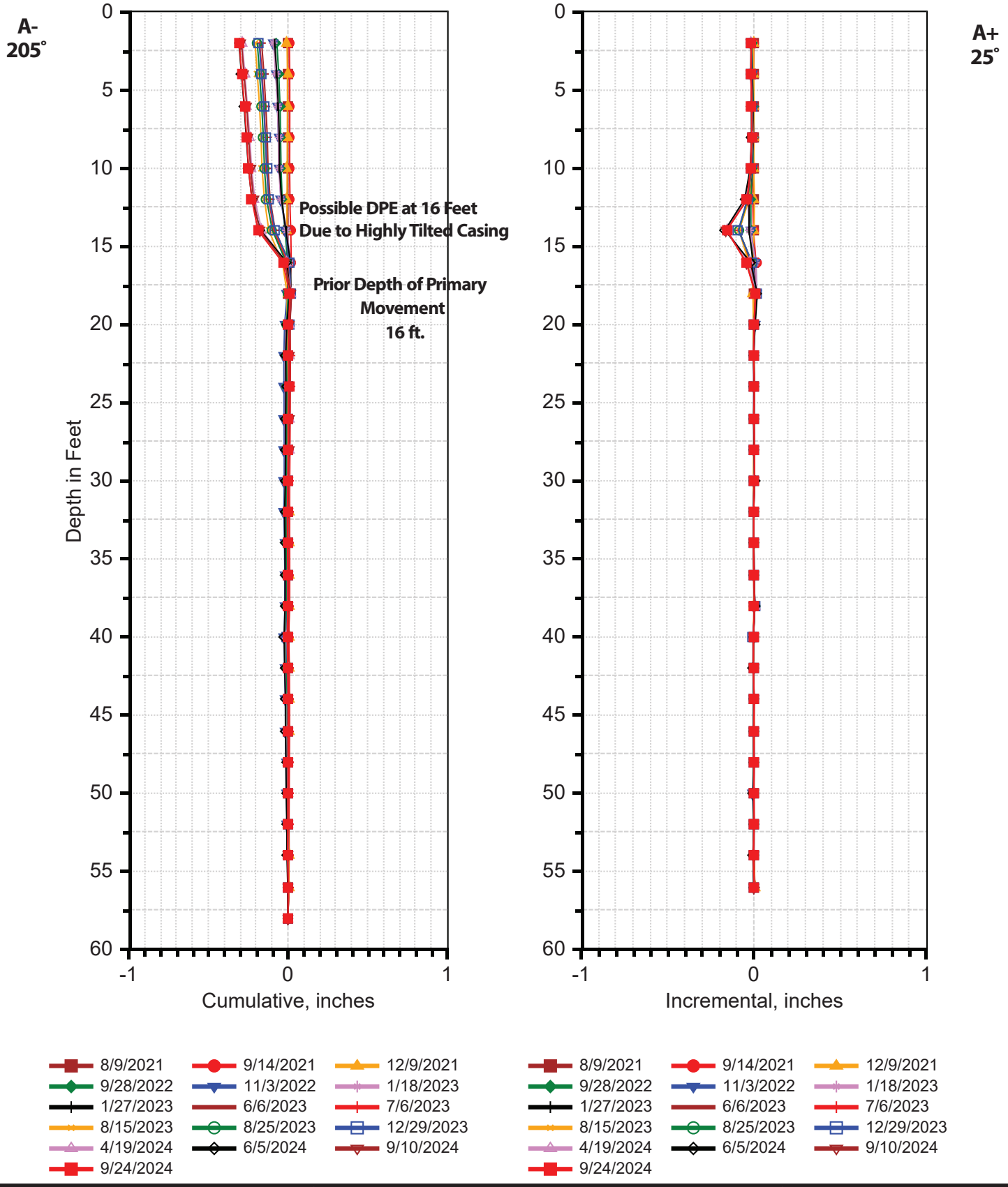
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 244		Baseline Date: 11/30/2021	Corrections: Rotation
Install Date: 4/1985	Installed Depth (ft): 295	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

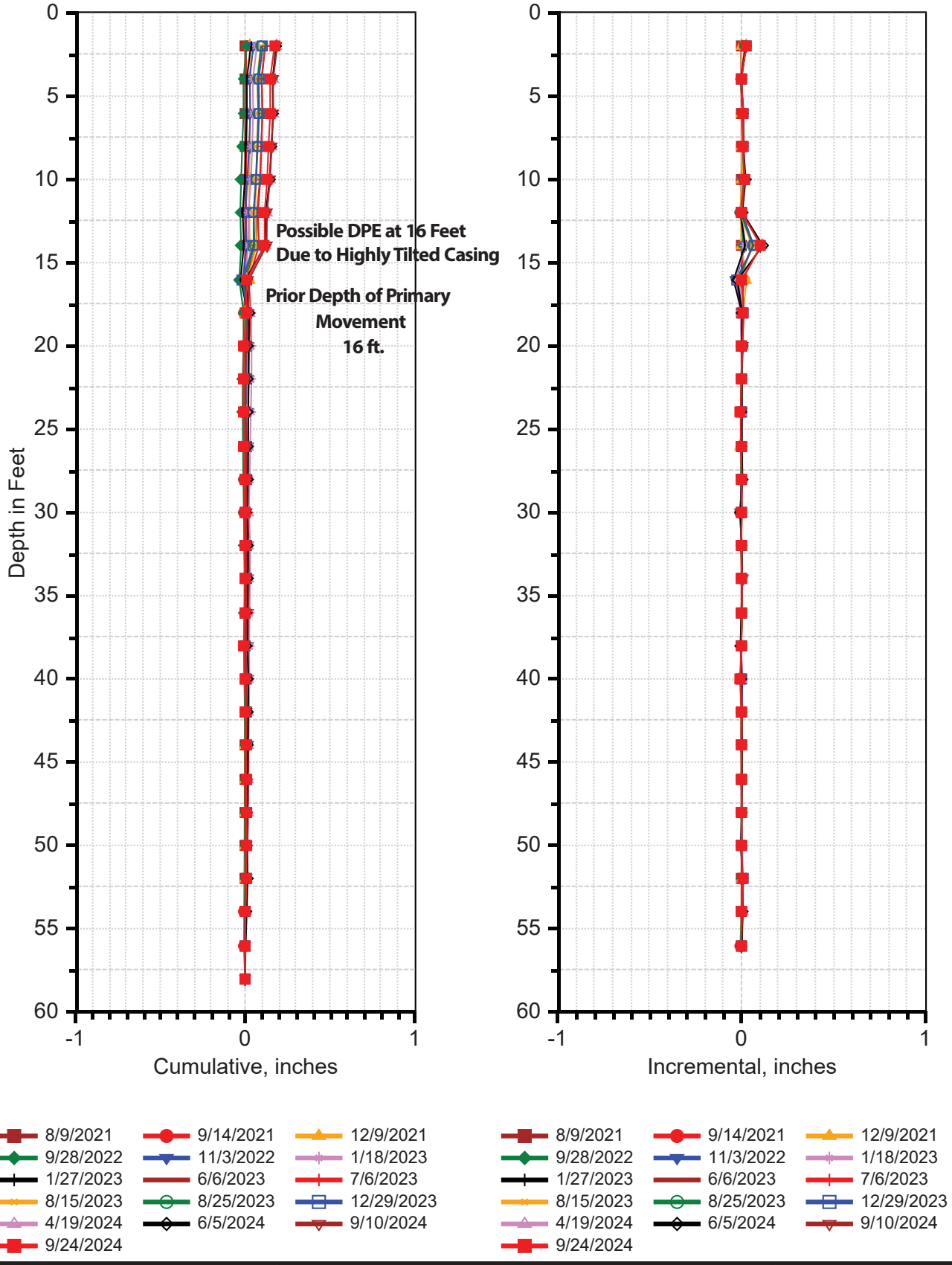
REVISION DATE: 9/26/2025



Plot of Slope Inclinometer SP-11	Plot Type: Cumulative and Incremental		Plot Direction: A-Direction
	Depth of Survey (ft): 59	Baseline Date: 8/9/2021	Corrections: None
	Install Date: 12/1983 / Installed Depth (ft): 60	Interpreted Movement Since Baseline (in): 0.25	Interpreted Movement Monitoring Year (in): 0.10

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PROJECT: Big Rock Mesa LAD, Malibu, CA
PROJECT NUMBER: 220-276
REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-11

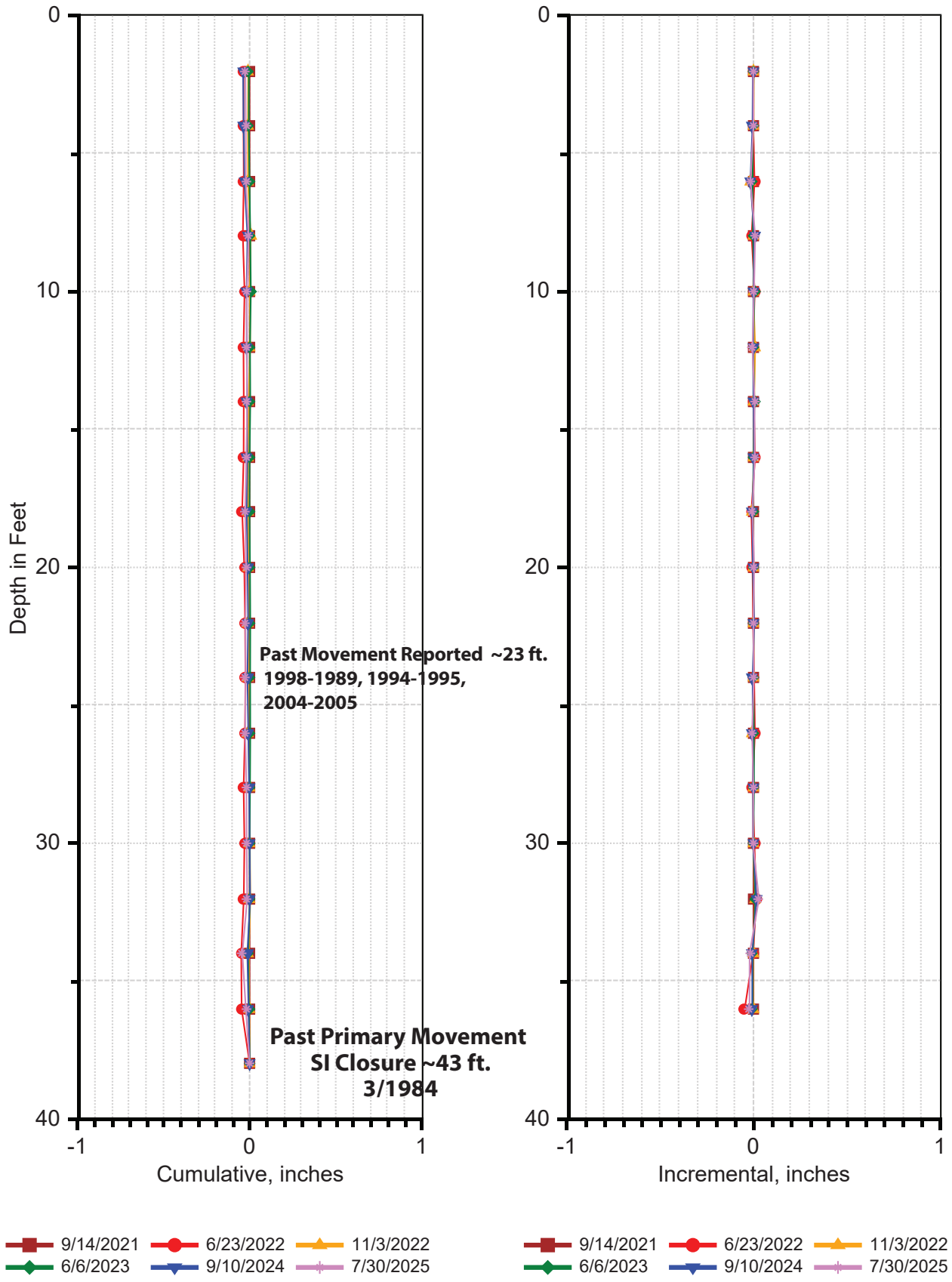
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 59		Baseline Date: 8/9/2021	Corrections: None
Install Date: 12/1983	Installed Depth (ft): 60	Interpreted Movement Since Baseline (in): 0.25 @16 ft. b175°	Interpreted Movement Monitoring Year (in): 0.10 @16ft. b175°

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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-12

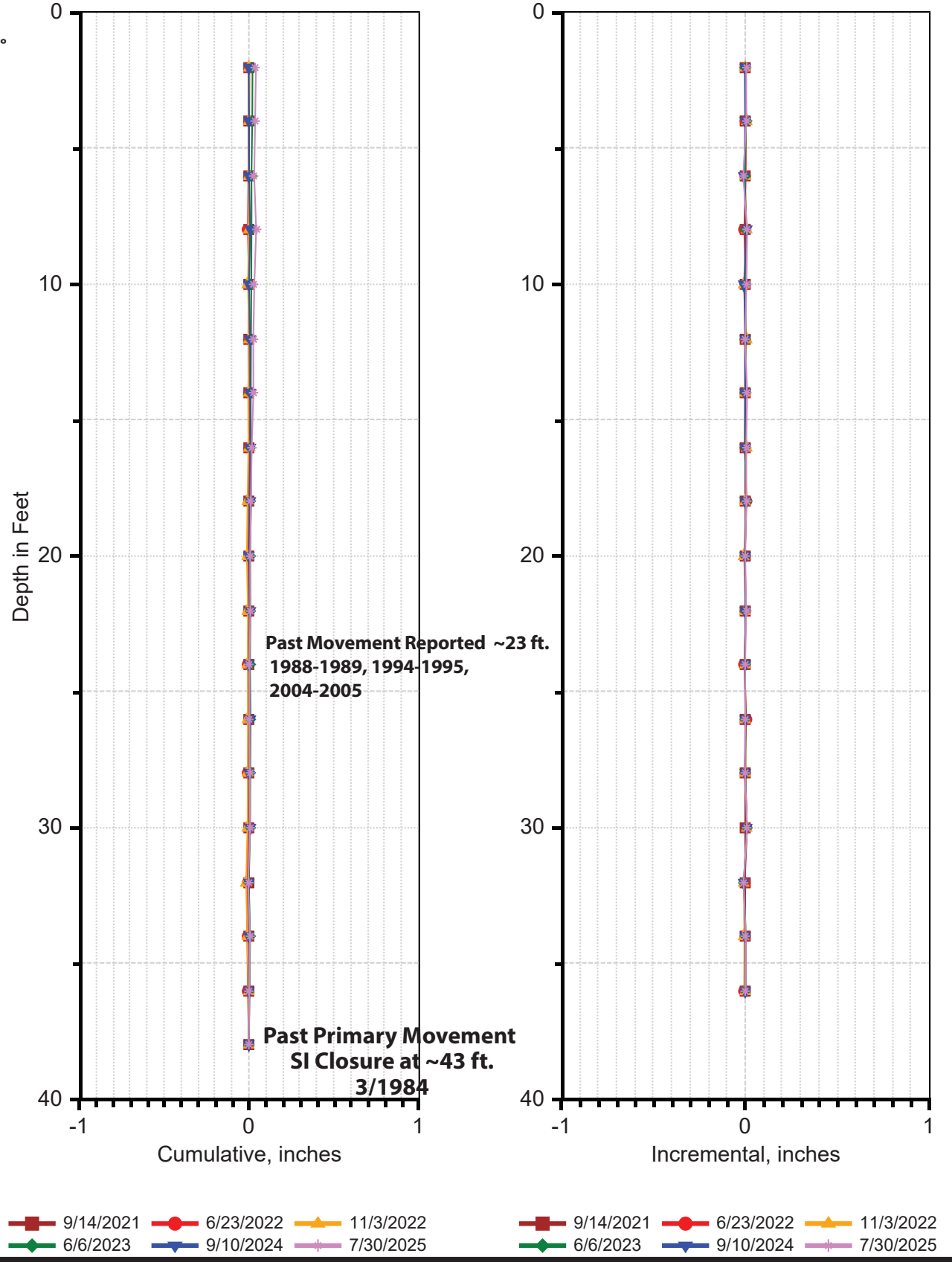
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 38		Baseline Date: 9/14/2021	Corrections: None
Install Date: 1/1984	Installed Depth (ft): 95	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Geotechnical • Geological • Construction Services

PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-12

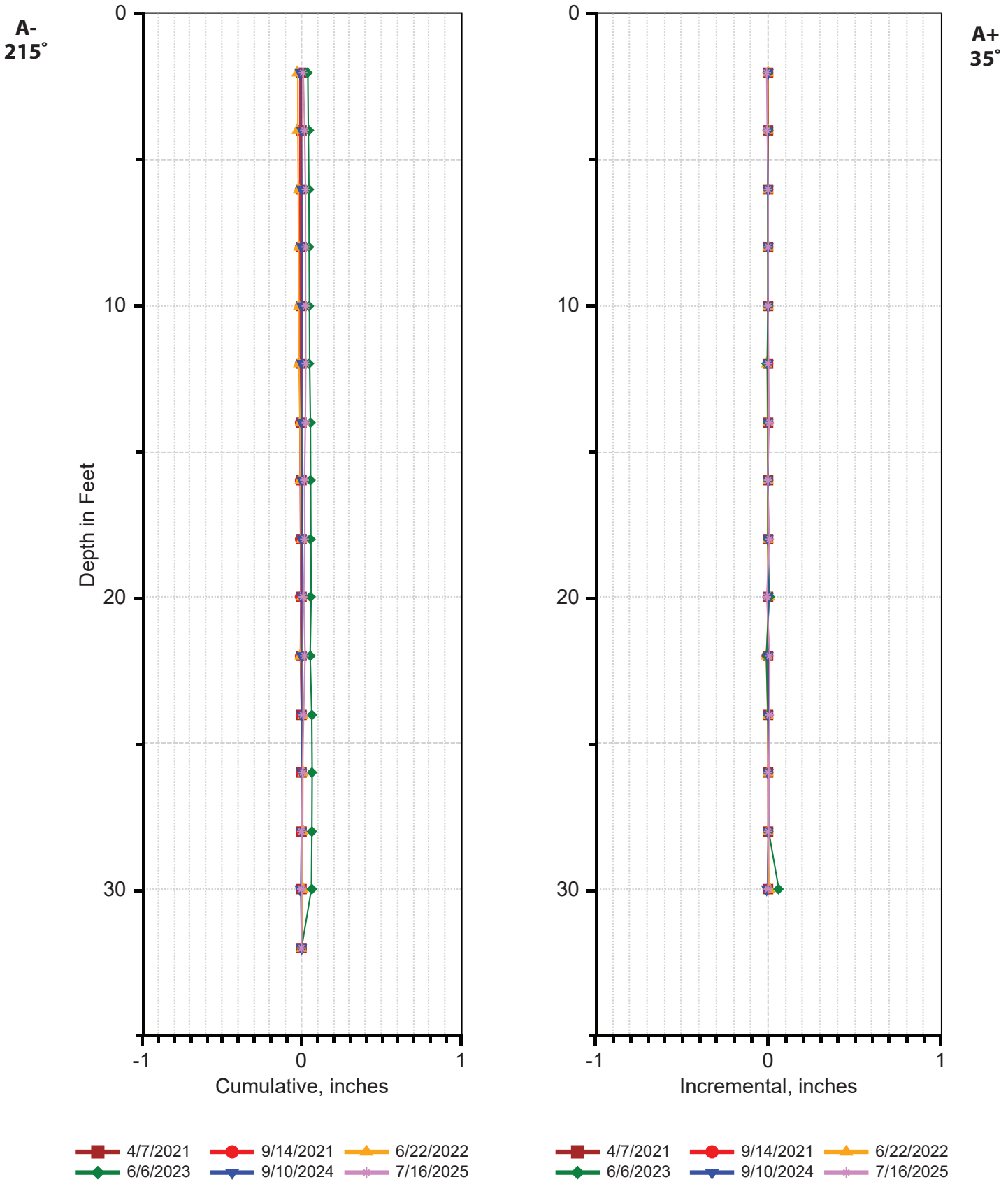
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Depth of Survey (ft): 38		Baseline Date: 9/14/2021	Corrections: None
Install Date: 1/1984	Installed Depth (ft): 95	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

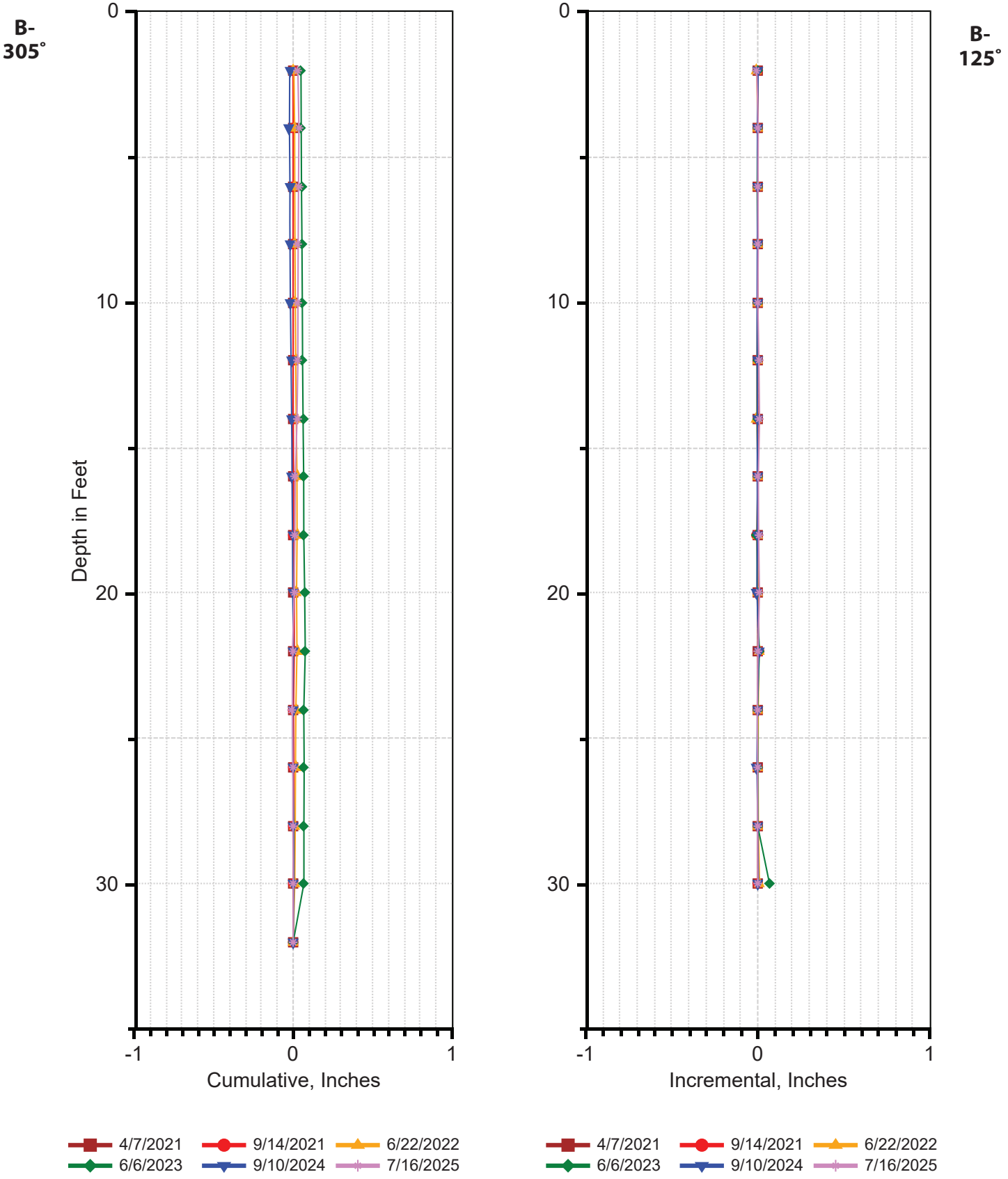
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Plot of Slope Inclinometer SP-14	Plot Type: Cumulative and Incremental		Plot Direction: A-Direction
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	Install Date: 4/1984 / Installed Depth (ft): 32	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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PROJECT: Big Rock Mesa LAD, Malibu, CA
PROJECT NUMBER: 220-276
REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-14

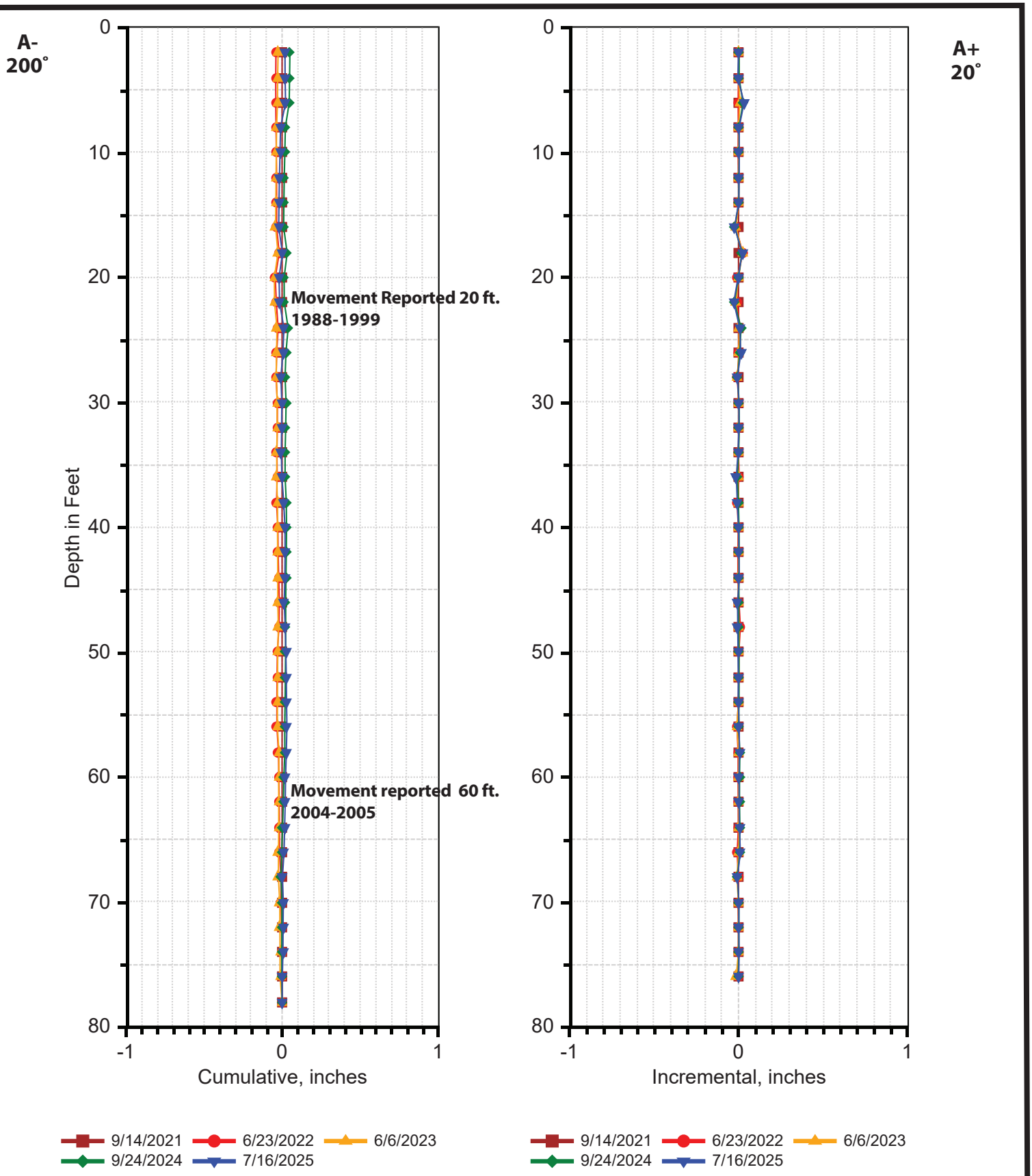
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 32		Baseline Date: 4/7/2021	Corrections: None
Install Date: 4/1984	Installed Depth (ft): 32	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
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PROJECT: Big Rock Mesa LAD
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Plot of Slope Inclinometer

SP-15

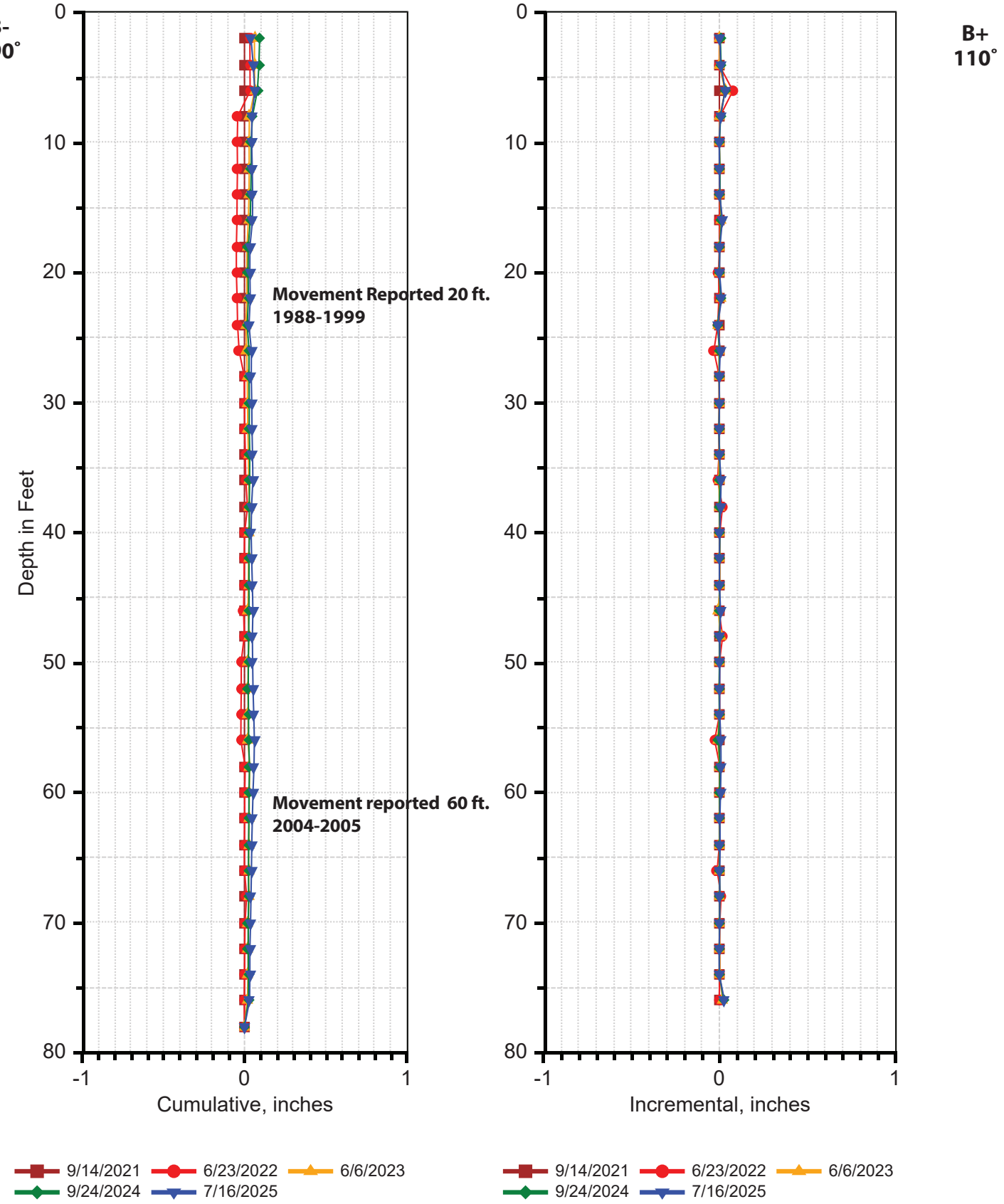
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 78		Baseline Date: 9/14/2021	Corrections: None
Install Date: 3/1984	Installed Depth (ft): 88	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-15

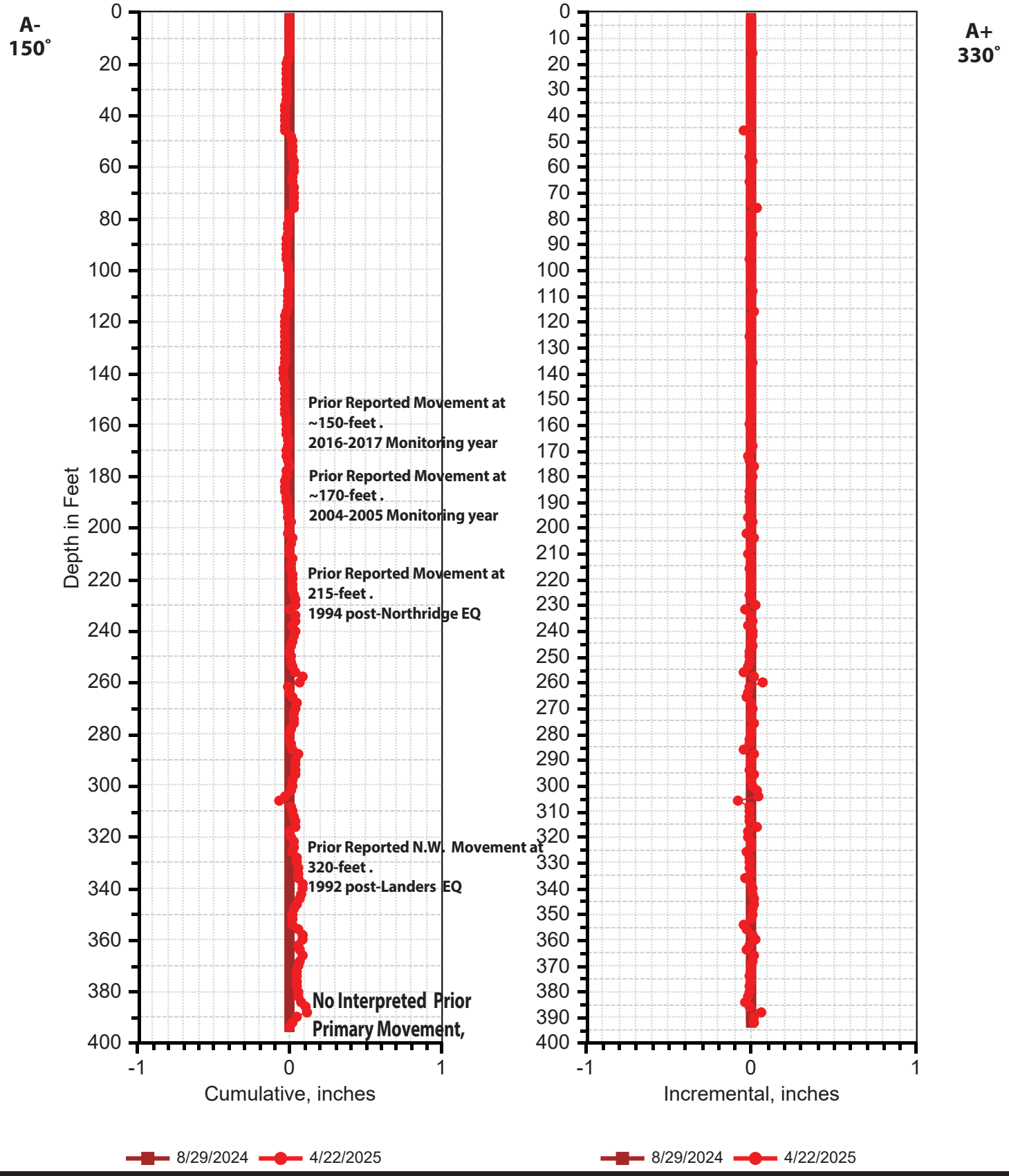
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 78		Baseline Date: 9/14/2021	Corrections: None
Install Date: 3/1984	Installed Depth (ft): 88	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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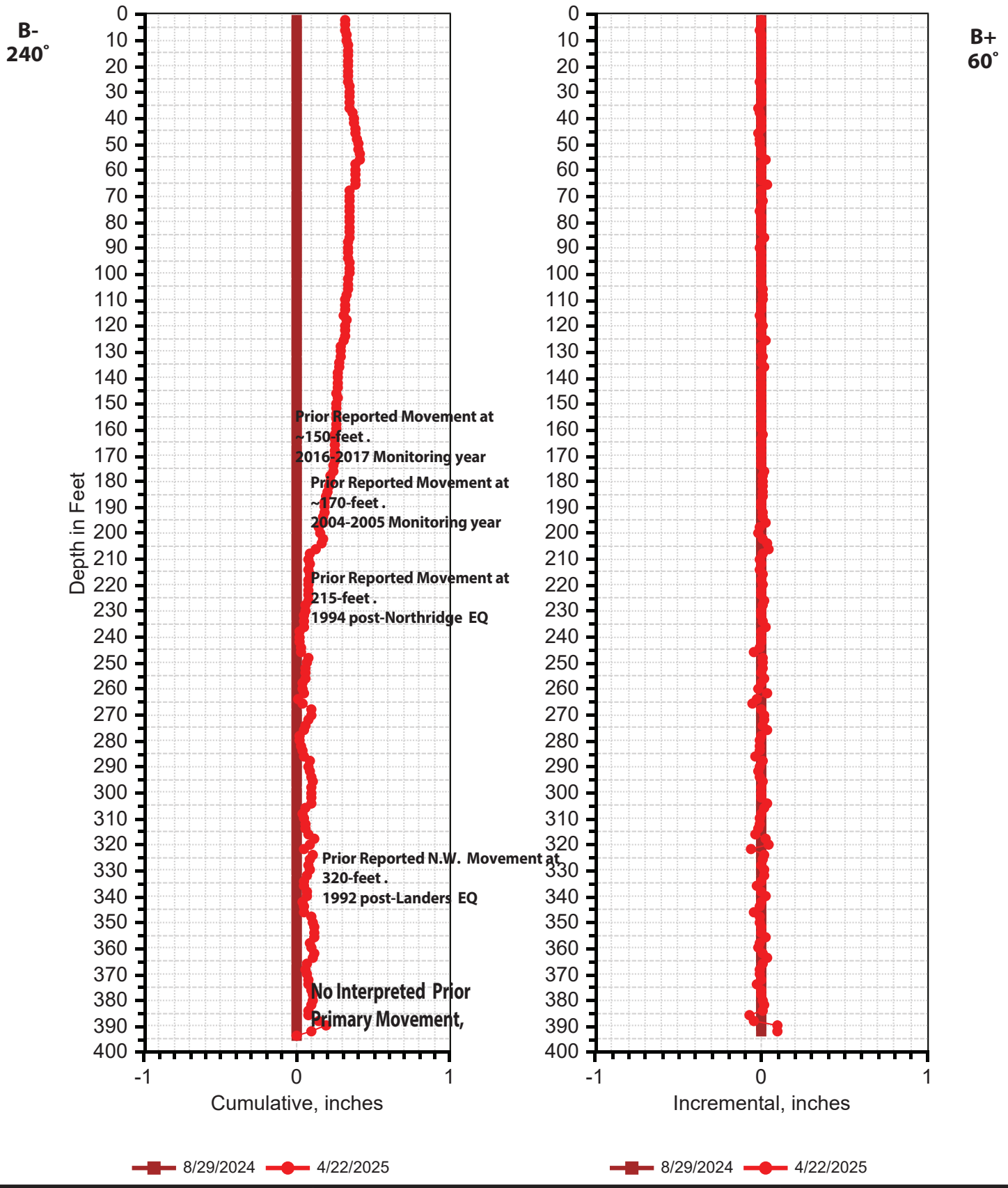
Plot of Slope Inclinometer SP-16A	Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
	Depth of Survey (ft): 390		Baseline Date: 8/29/2024	Corrections: Rotation
	Install Date: 5/1985	Installed Depth (ft): 392	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-16A

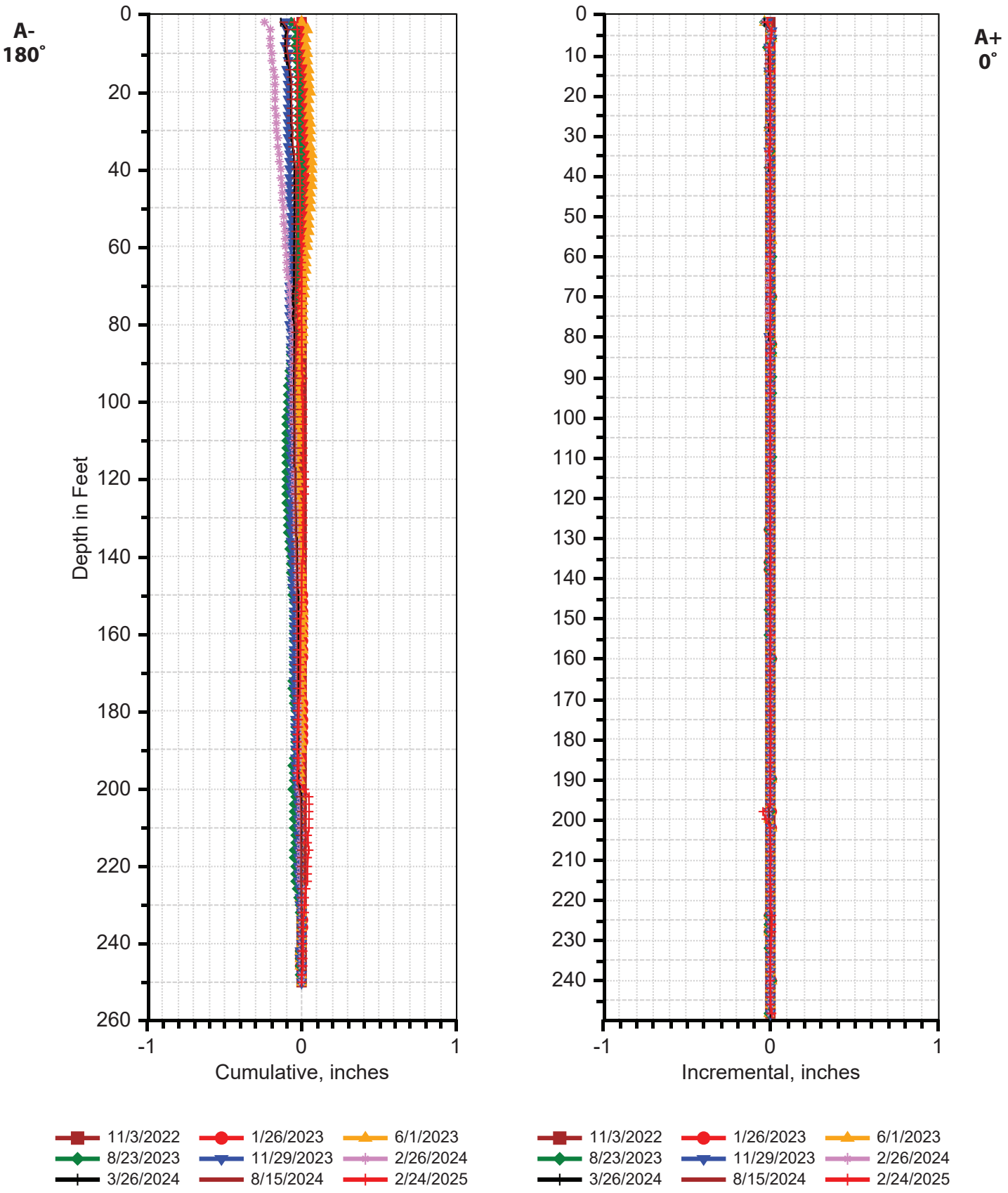
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 390		Baseline Date: 8/29/2024	Corrections: None
Install Date: 5/1985	Installed Depth (ft): 392	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-17B

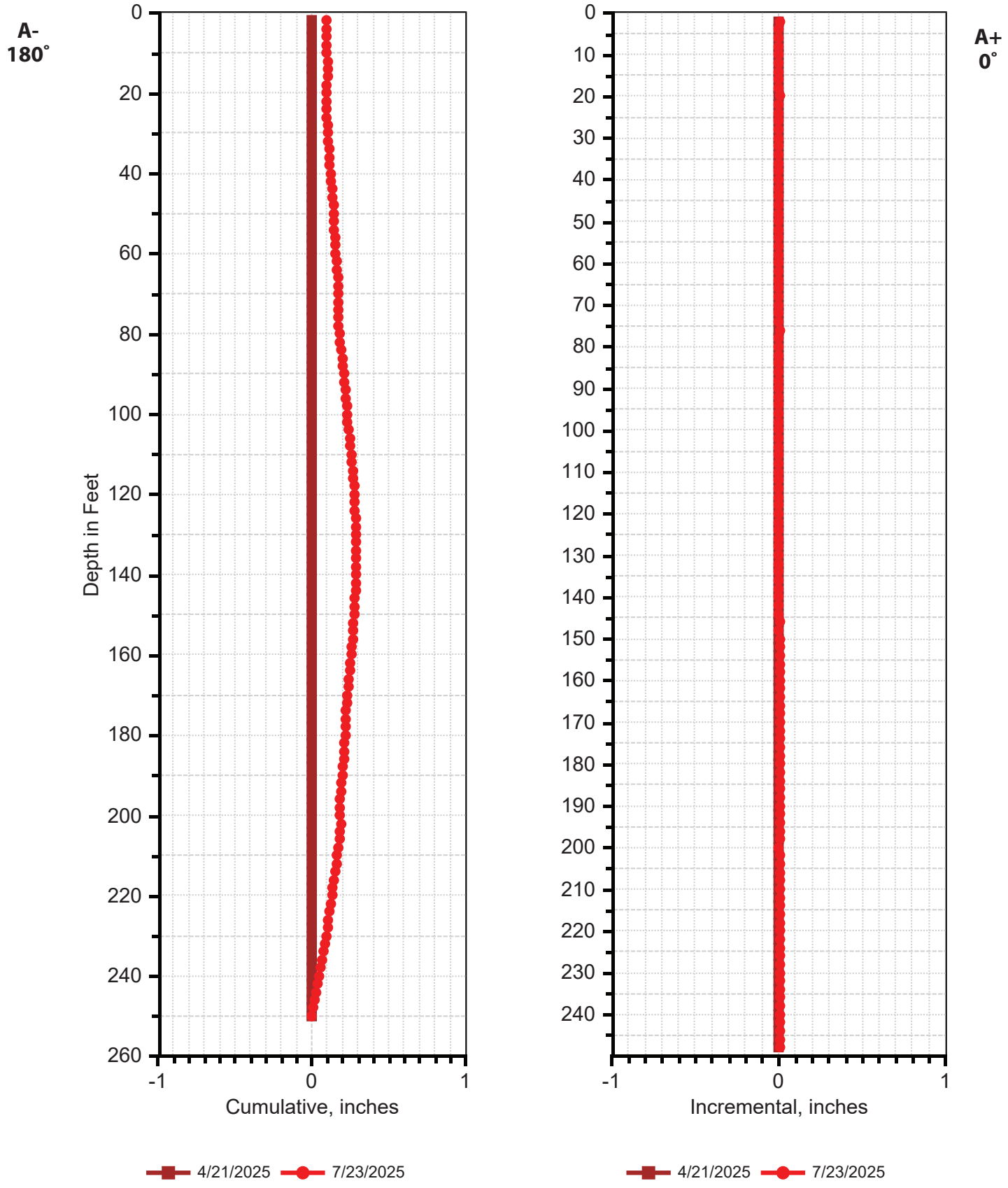
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 248		Baseline Date: 11/3/2022	Corrections: None
Install Date: 11/2012	Installed Depth (ft): 250	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-17B

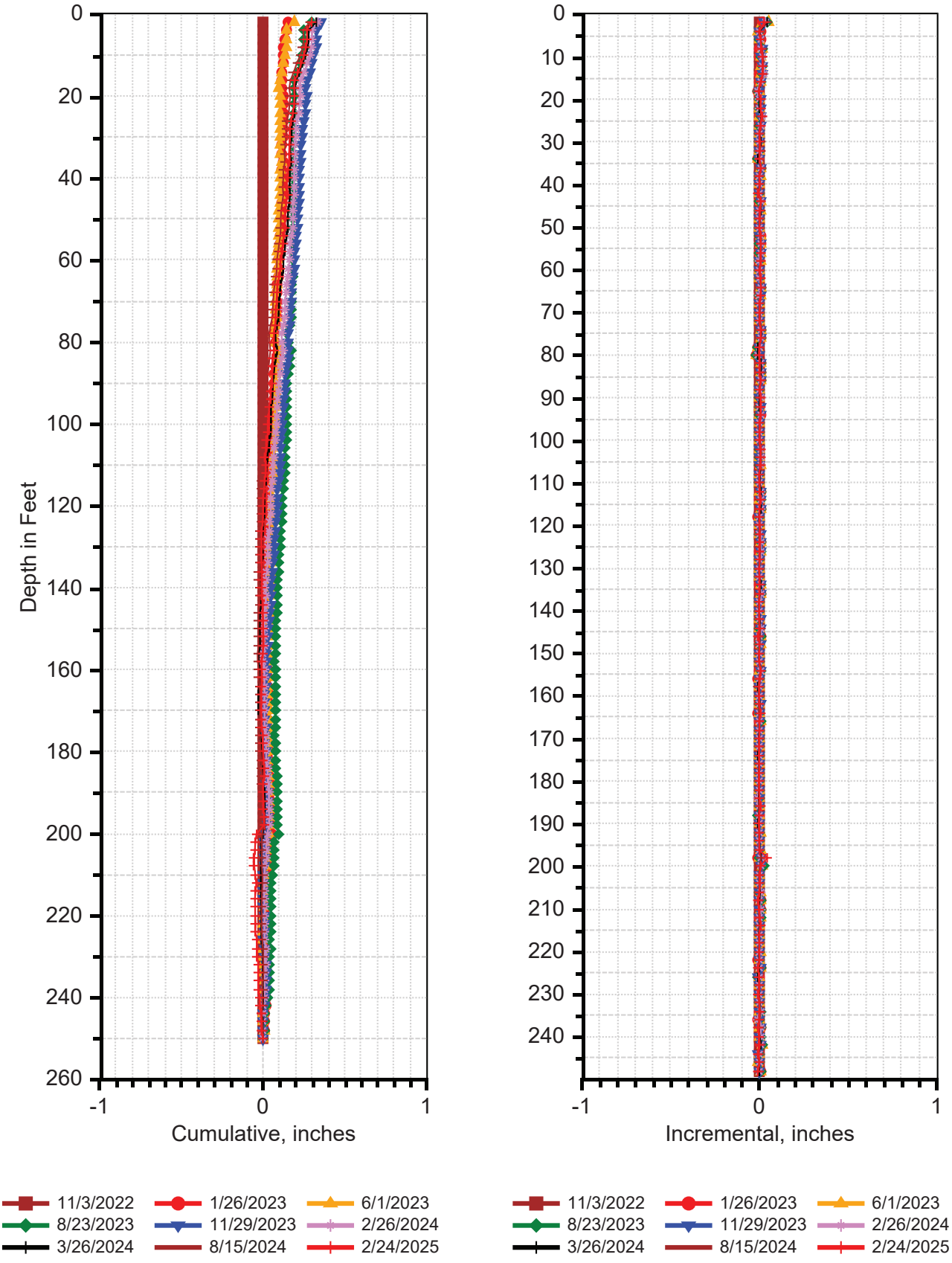
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 248		Baseline Date: 4/21/2025	Corrections: None
Install Date: 11/2012	Installed Depth (ft): 250	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-17B

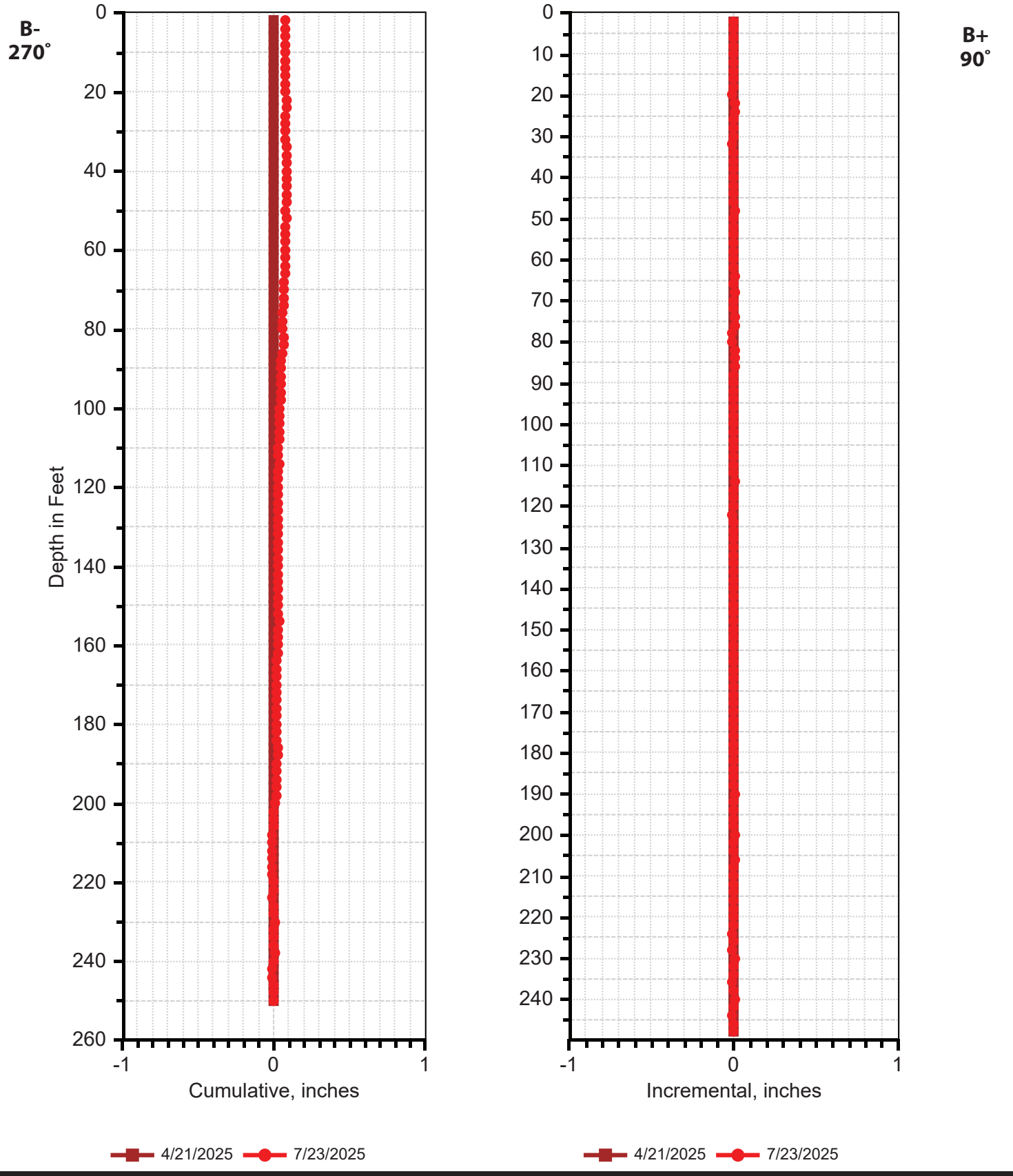
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 248		Baseline Date: 11/3/2022	Corrections: None
Install Date: 11/2012	Installed Depth (ft): 250	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-17B

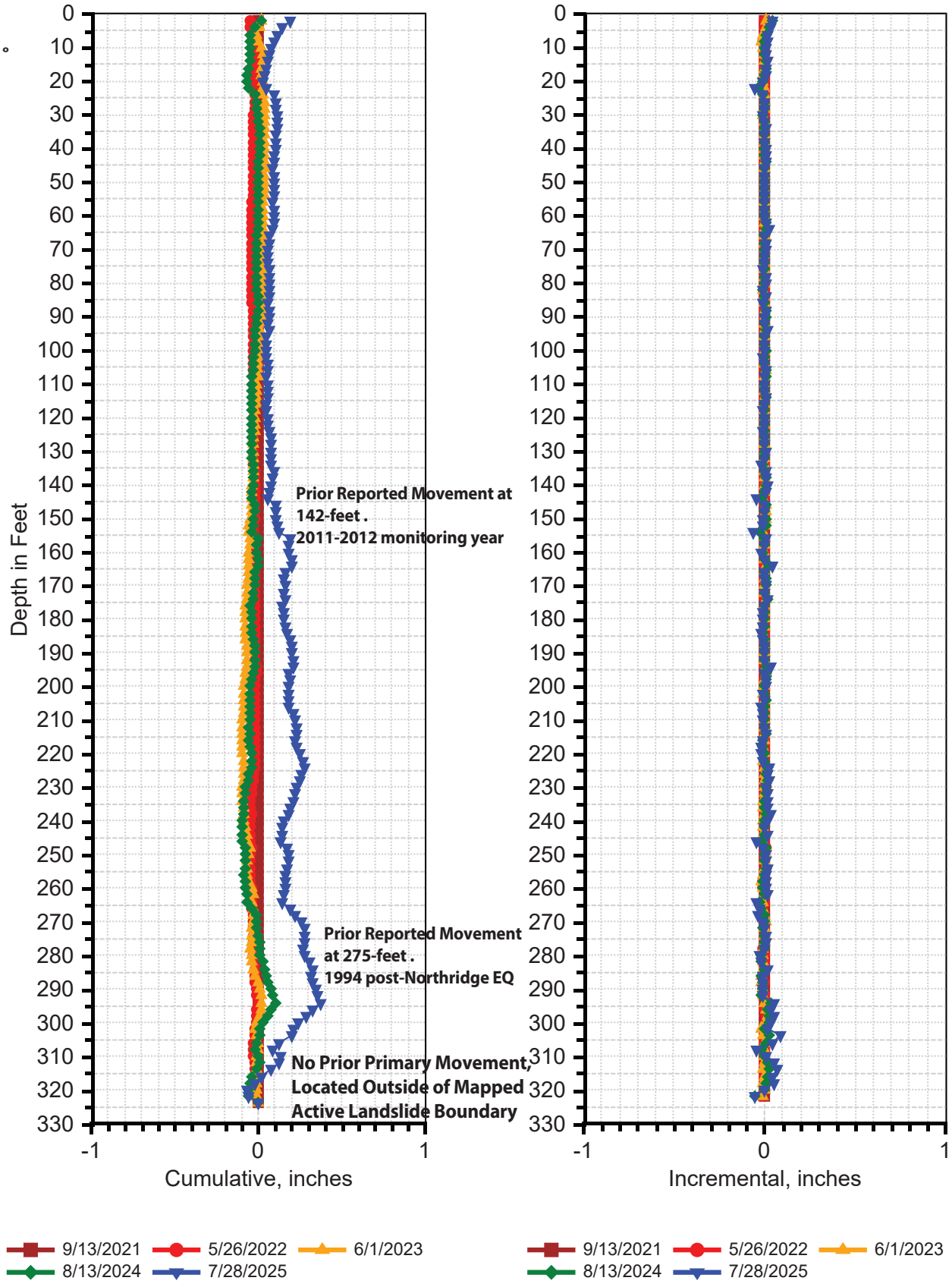
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 248		Baseline Date: 4/21/2025	Corrections: None
Install Date: 11/2012	Installed Depth (ft): 250	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-20

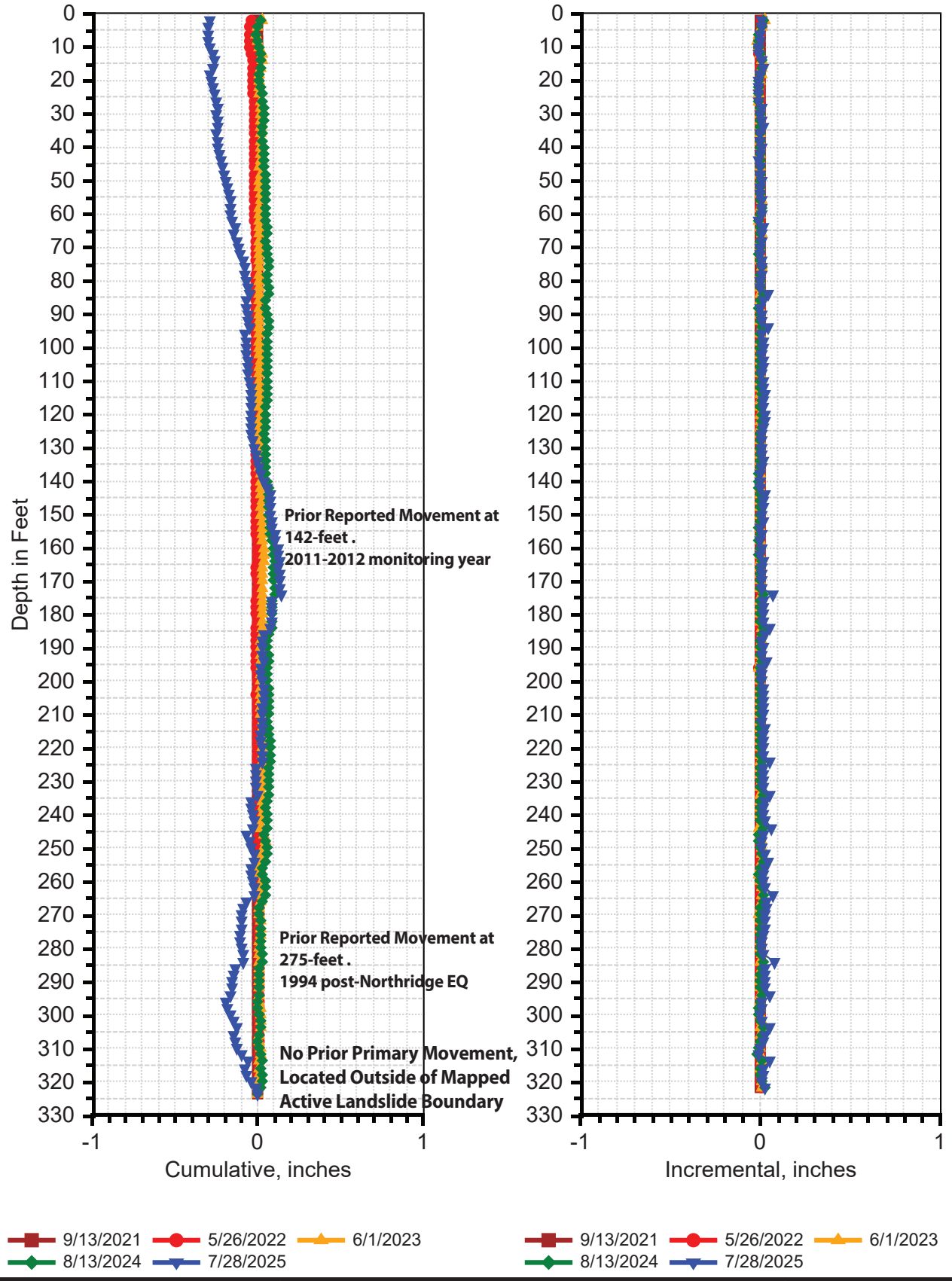
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 322		Baseline Date: 9/13/2021	Corrections: Rotation
Install Date: 3/1984	Installed Depth (ft): 330	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-20

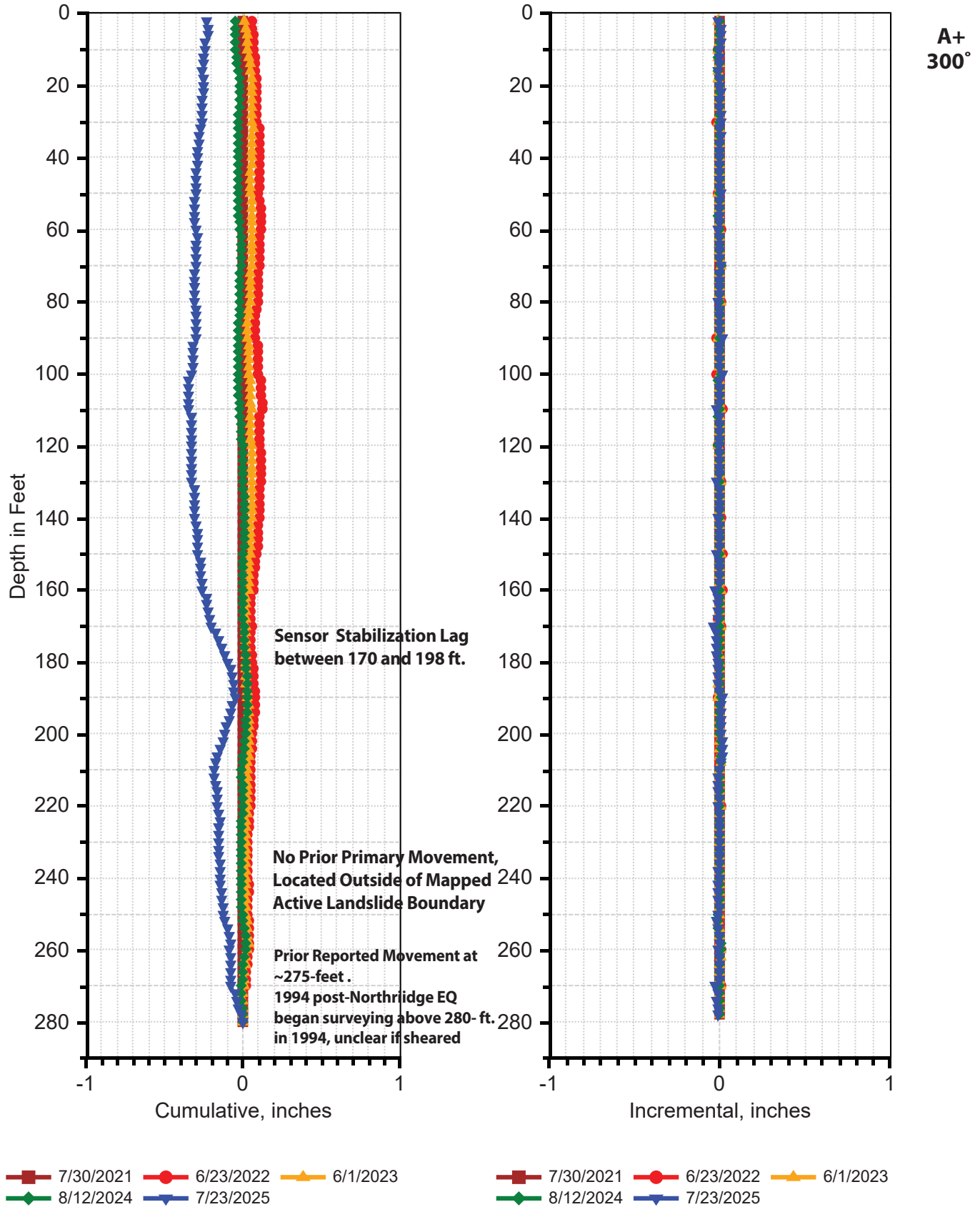
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 322		Baseline Date: 9/13/2021	Corrections: Rotation
Install Date: 3/1984	Installed Depth (ft): 330	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-21

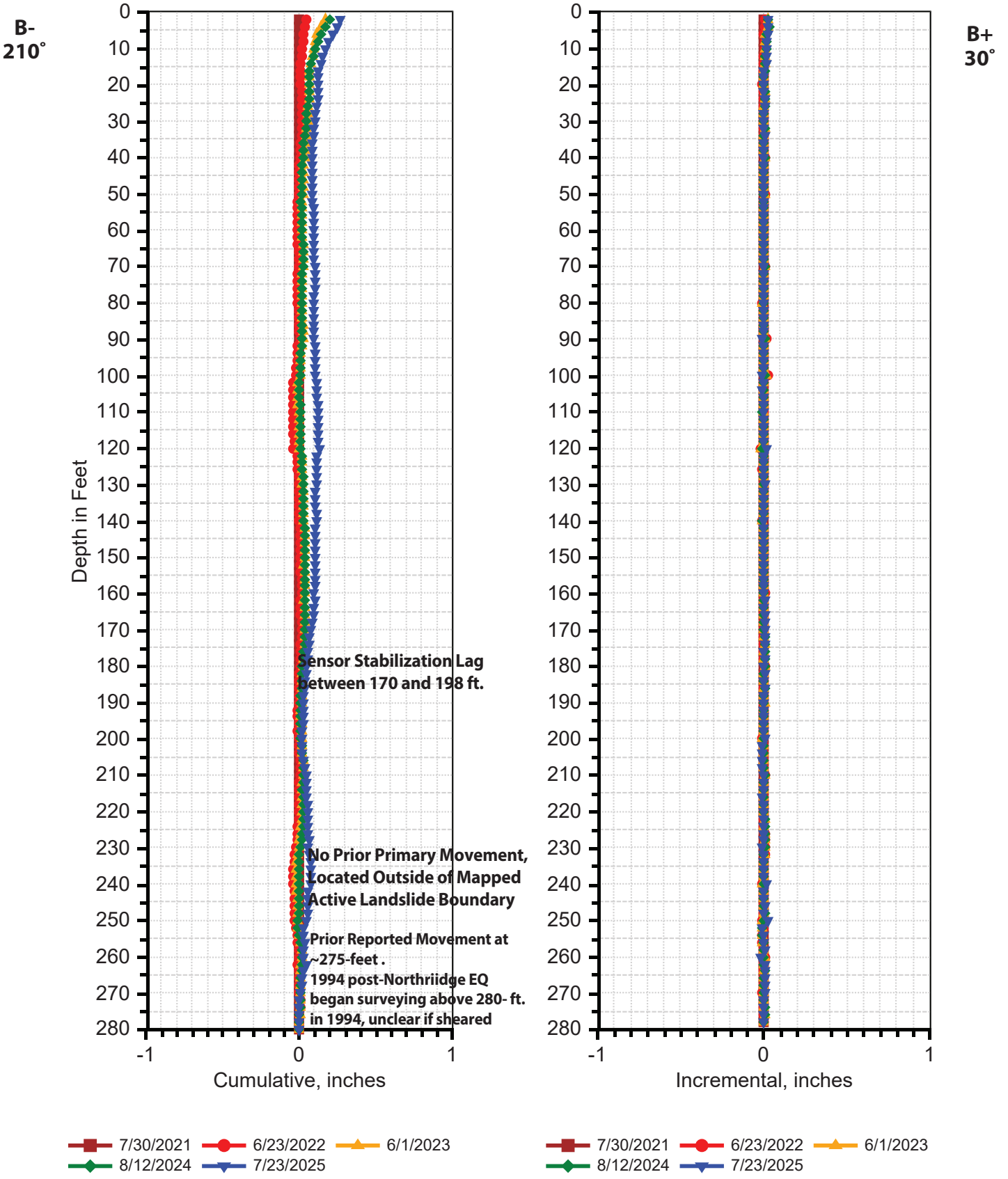
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 280		Baseline Date: 7/30/2021	Corrections: None
Install Date: 4/1984	Installed Depth (ft): 380	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-21

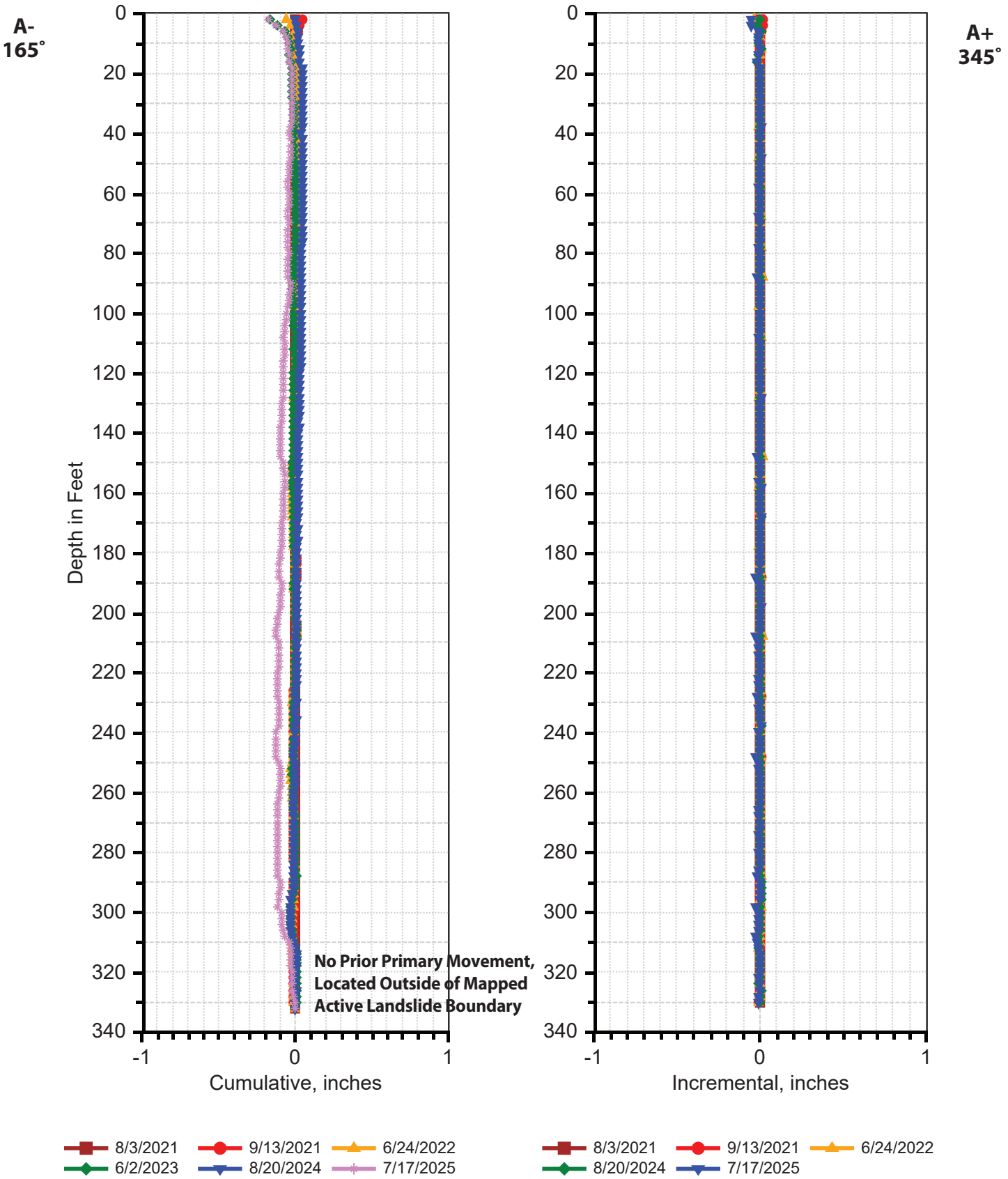
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 280		Baseline Date: 7/30/2021	Corrections: None
Install Date: 4/1984	Installed Depth (ft): 380	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-22

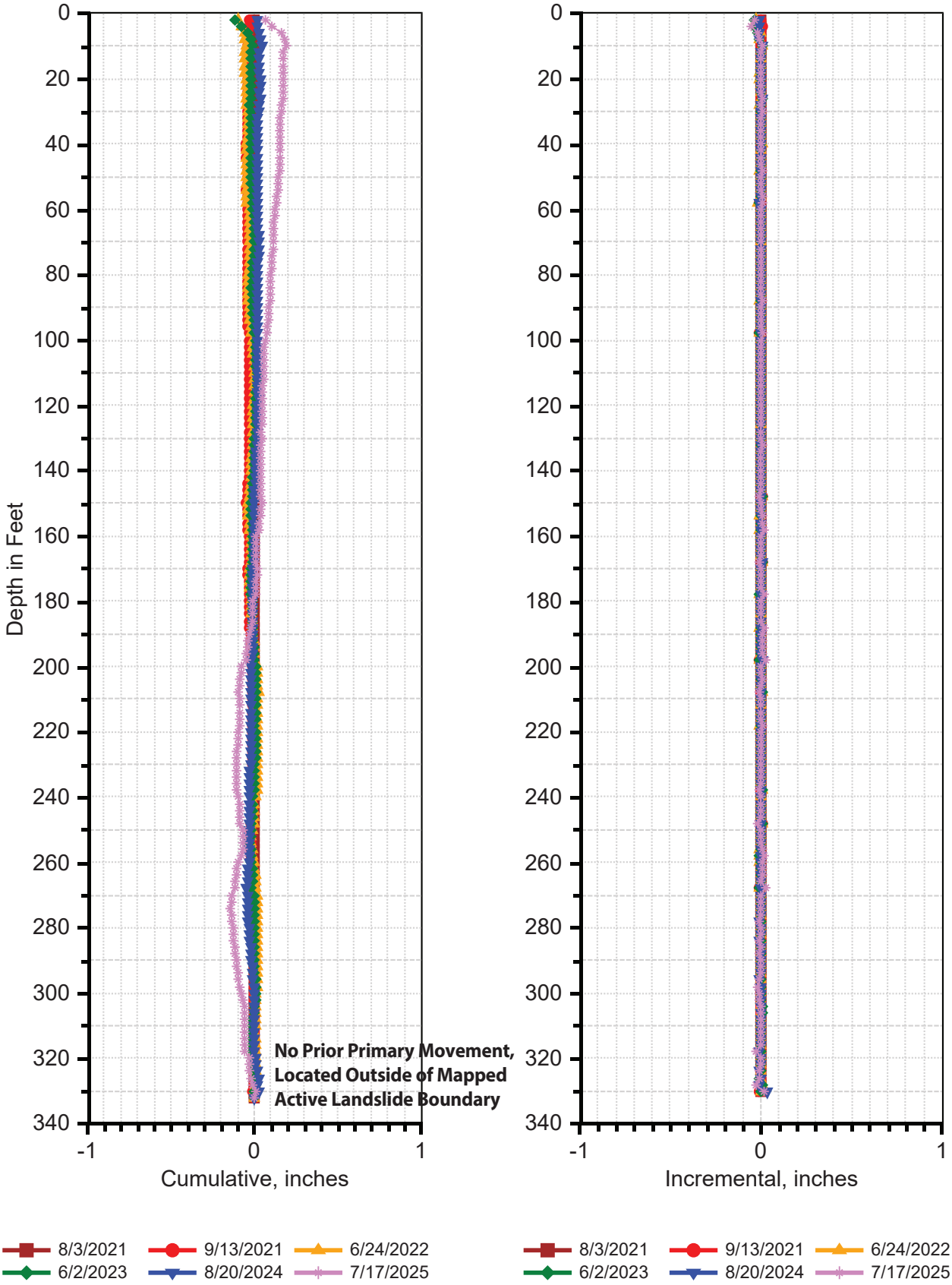
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 330		Baseline Date: 8/3/2021	Corrections: Rotation
Install Date: 4/1984	Installed Depth (ft): 345	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-22

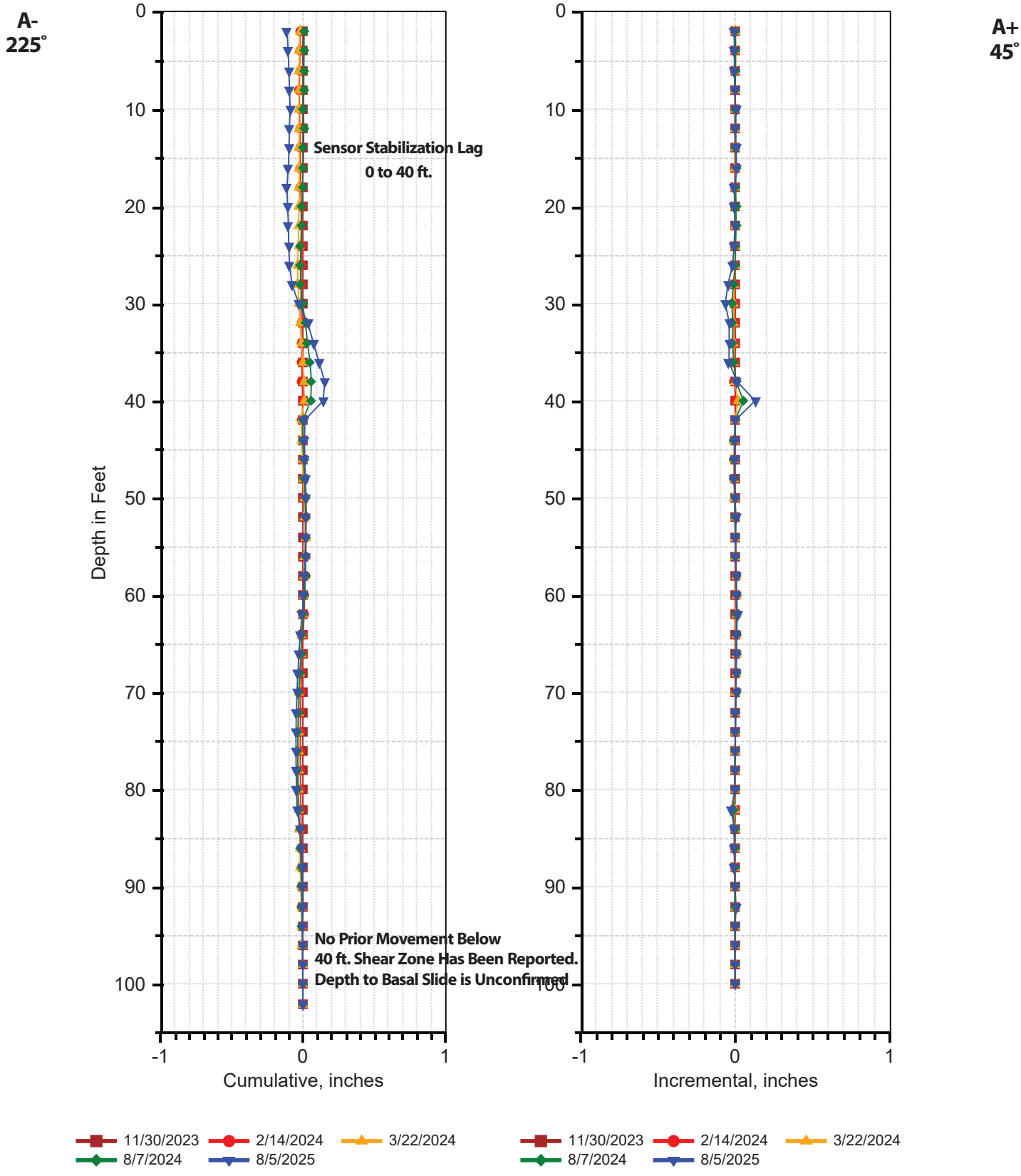
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 330		Baseline Date: 8/3/2021	Corrections: Rotation
Install Date: 4/1984	Installed Depth (ft): 345	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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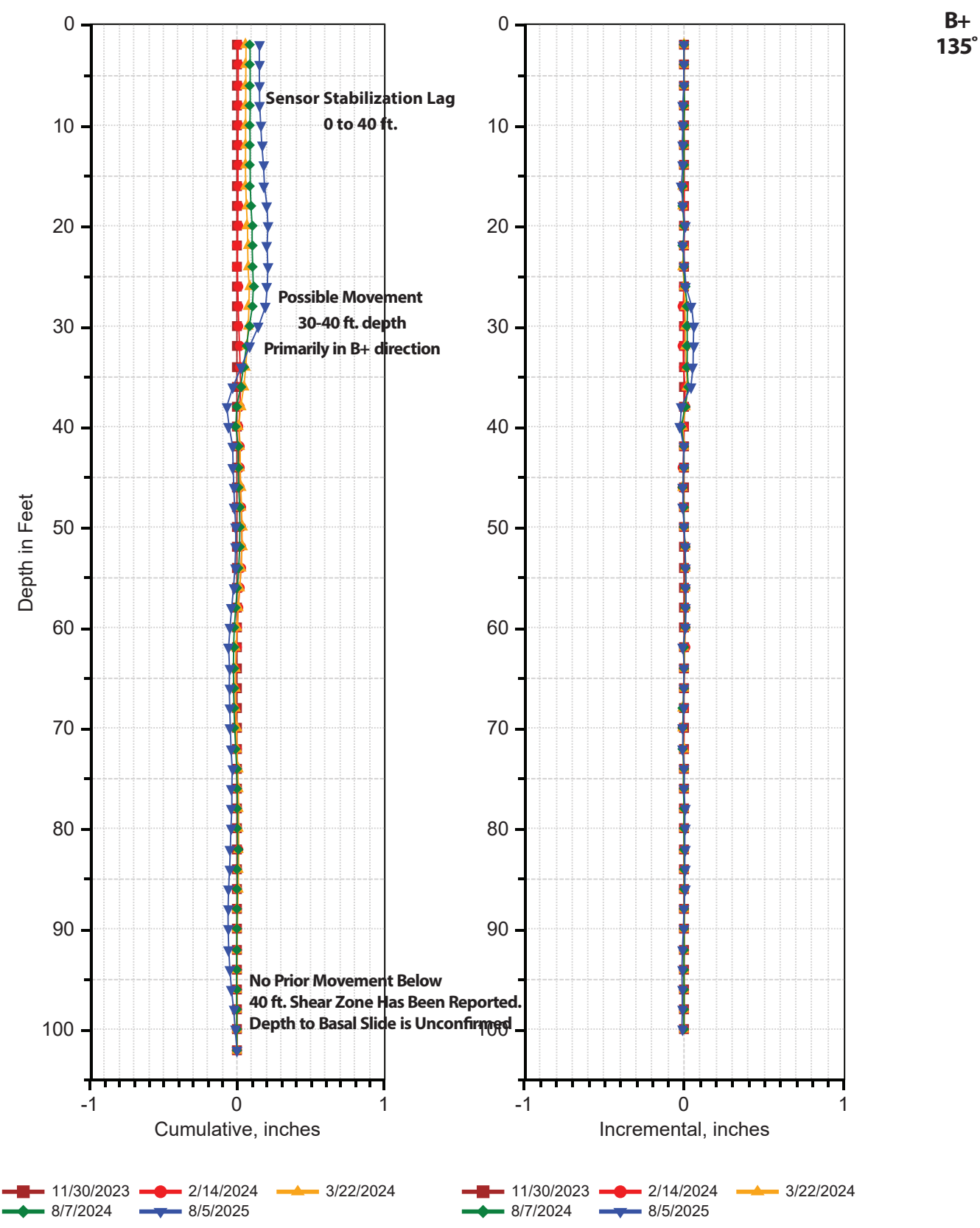
REVISION DATE: 9/26/2025



Plot of Slope Inclinometer	Plot Type: Cumulative and Incremental		Plot Direction: A-Direction
SP-26	Depth of Survey (ft): 100	Baseline Date: 11/30/2023	Corrections: None
	Install Date: 4/1984 / Installed Depth (ft): 405	Interpreted Movement Since Baseline (in): 0.1 possible	Interpreted Movement Monitoring Year (in): < 0.1, possible

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Plot of Slope Inclinometer

SP-26

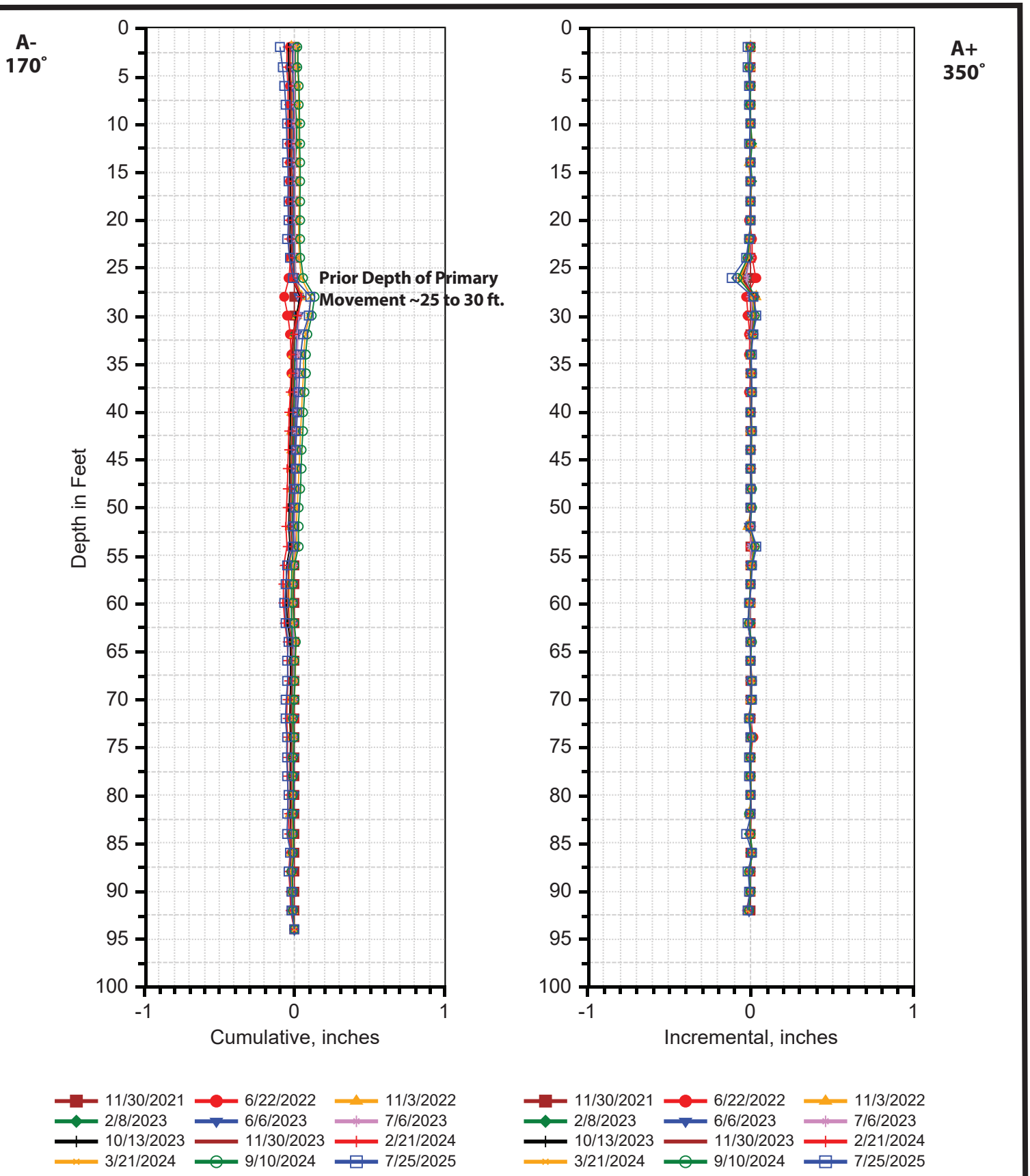
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 100		Baseline Date: 11/30/2023	Corrections: None
Install Date: 4/1984	Installed Depth (ft): 405	Interpreted Movement Since Baseline (in): 0.1 possible	Interpreted Movement Monitoring Year (in): <0.1, possible

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Plot of Slope Inclinometer

SP-27A

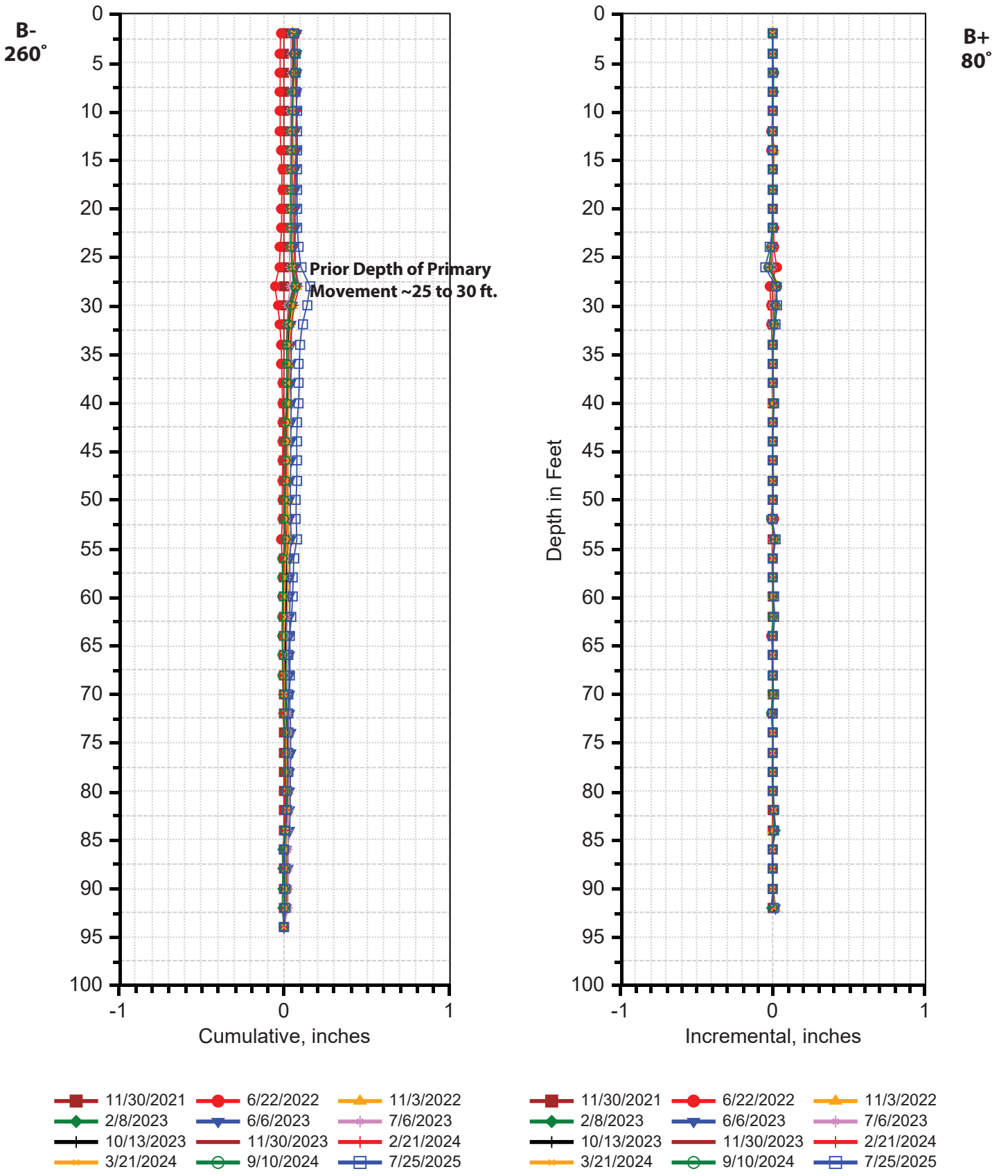
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 92		Baseline Date: 11/30/2021	Corrections: None
Install Date: 5/1984	Installed Depth (ft): 95	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-27A

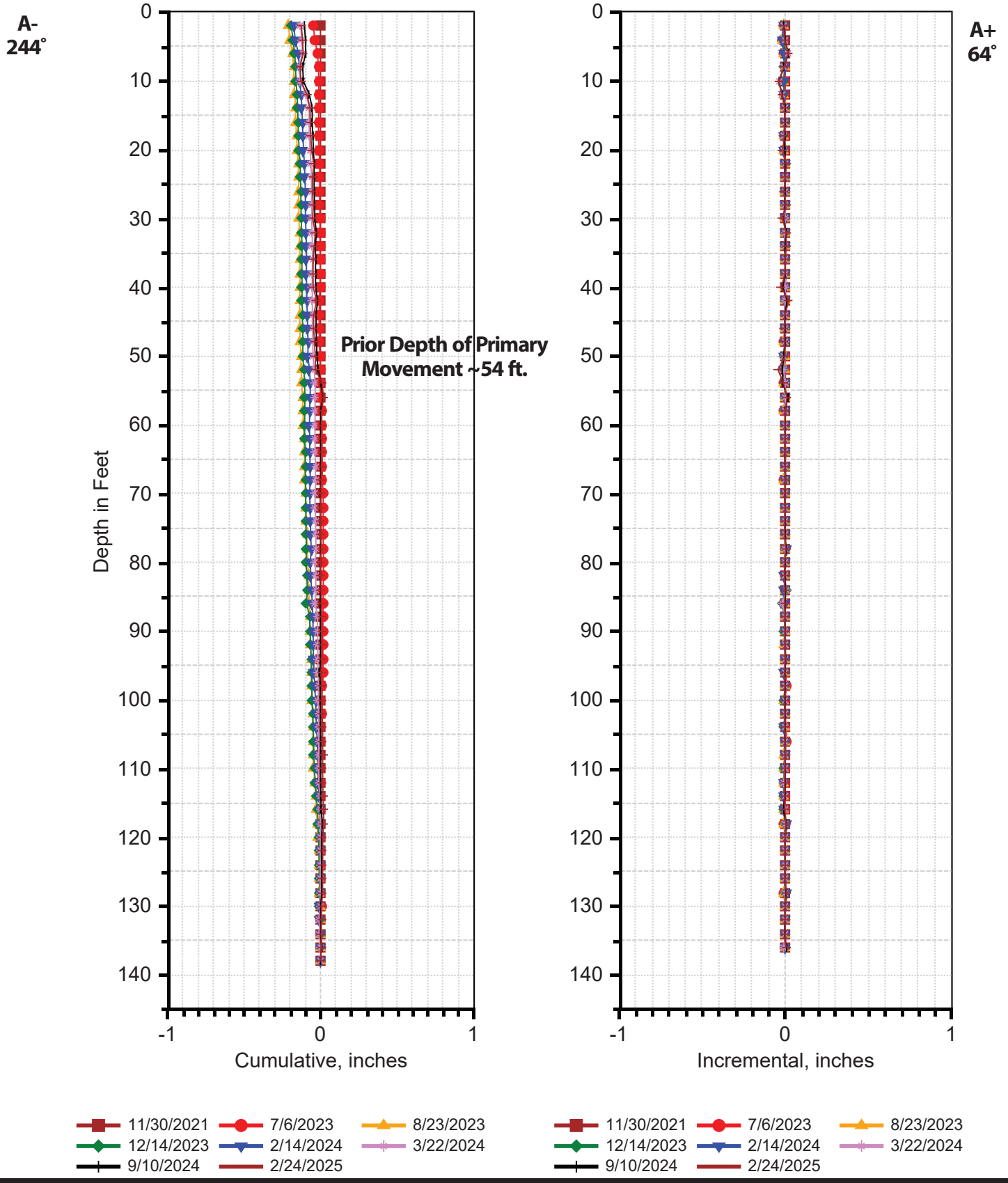
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 92		Baseline Date: 11/30/2021	Corrections: None
Install Date: 5/1984	Installed Depth (ft): 95	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-29

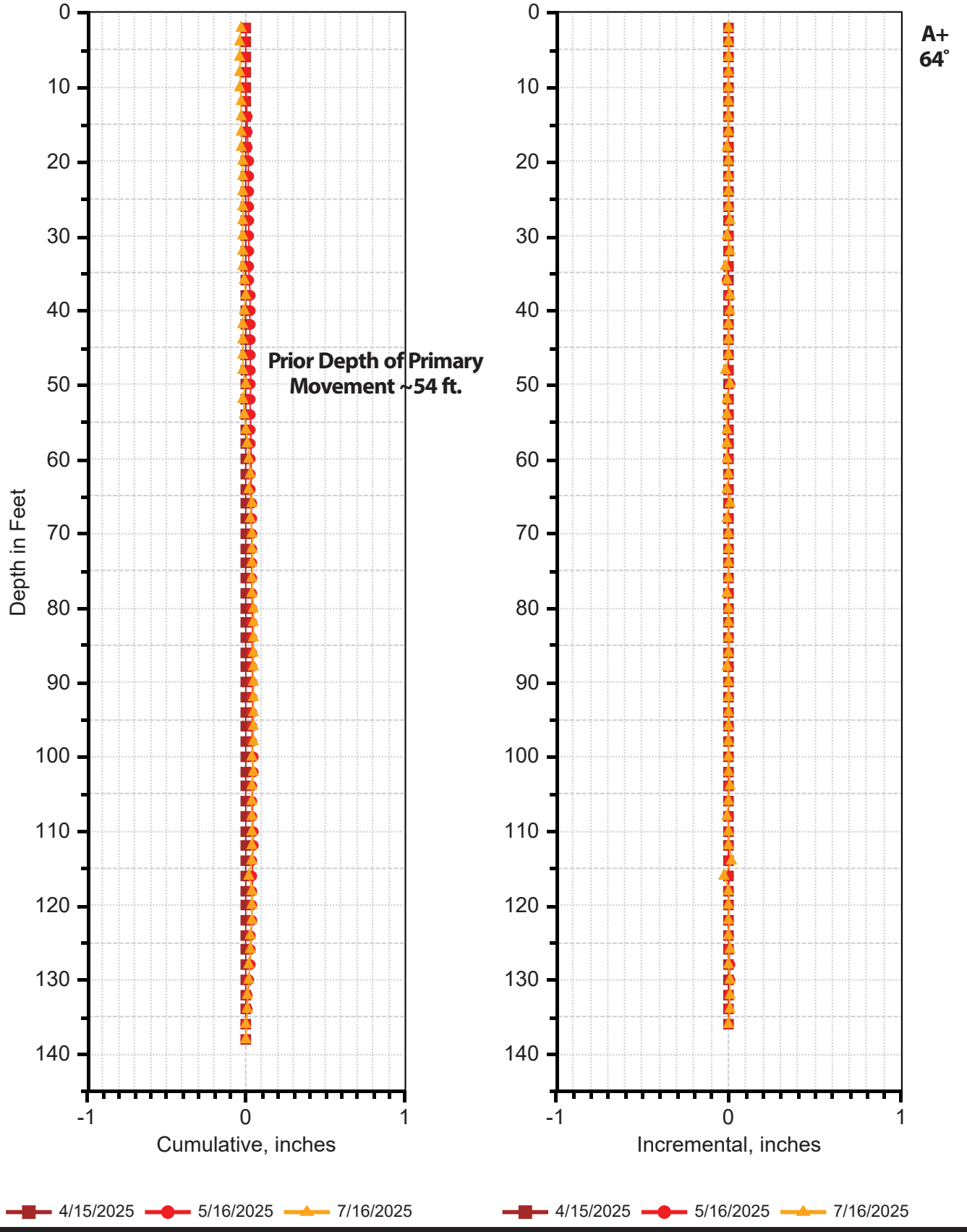
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 138		Baseline Date: 9/14/2021	Corrections: None
Install Date: 8/1984	Installed Depth (ft): 150	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-29

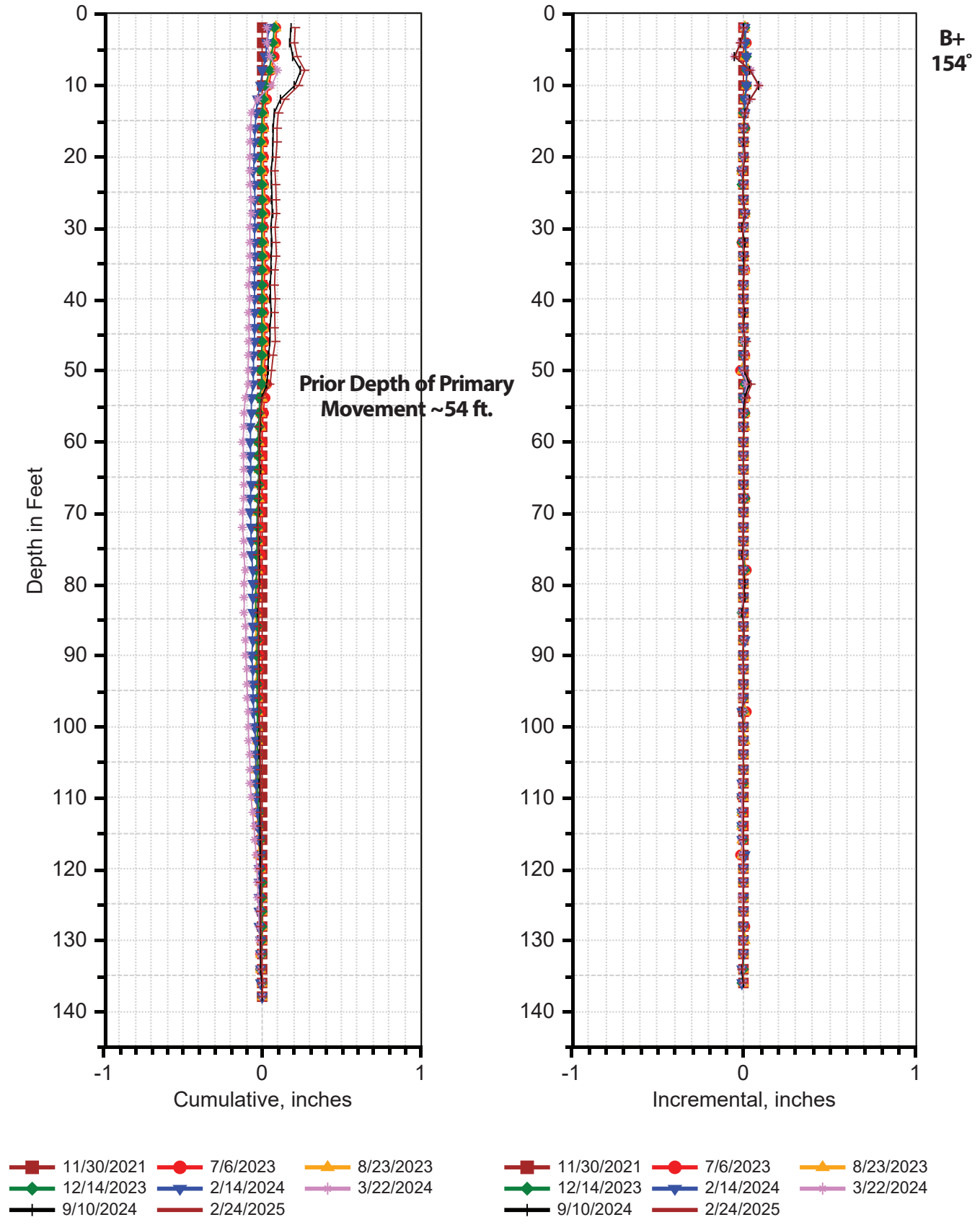
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 138		Baseline Date: 4/15/2025	Corrections: None
Install Date: 8/1984	Installed Depth (ft): 150	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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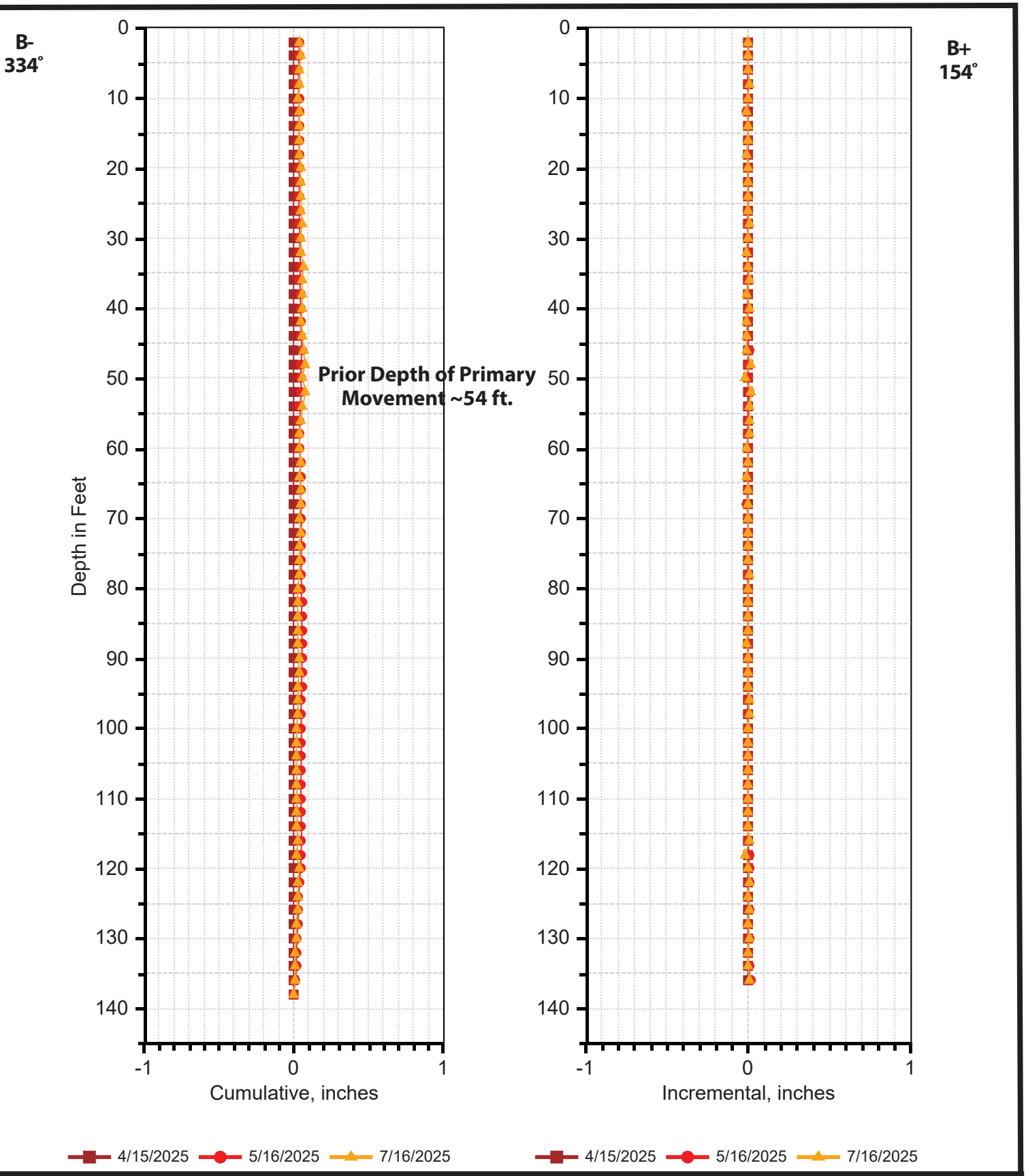
Plot of Slope Inclinometer SP-29	Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
	Depth of Survey (ft): 138		Baseline Date: 9/14/2021	Corrections: None
	Install Date: 8/1984	Installed Depth (ft): 150	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-29

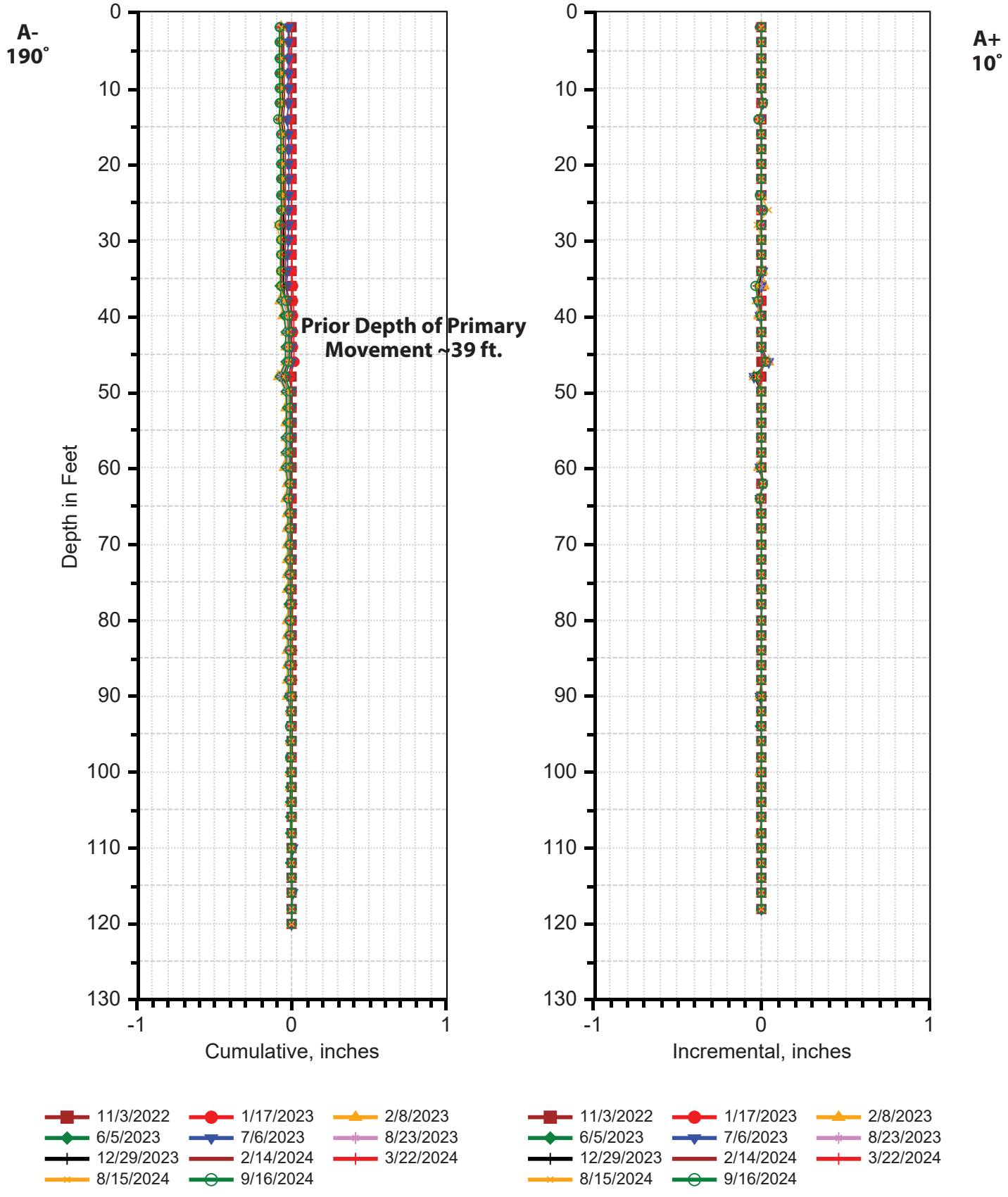
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 138		Baseline Date: 4/15/2025	Corrections: None
Install Date: 8/1984	Installed Depth (ft): 150	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-30

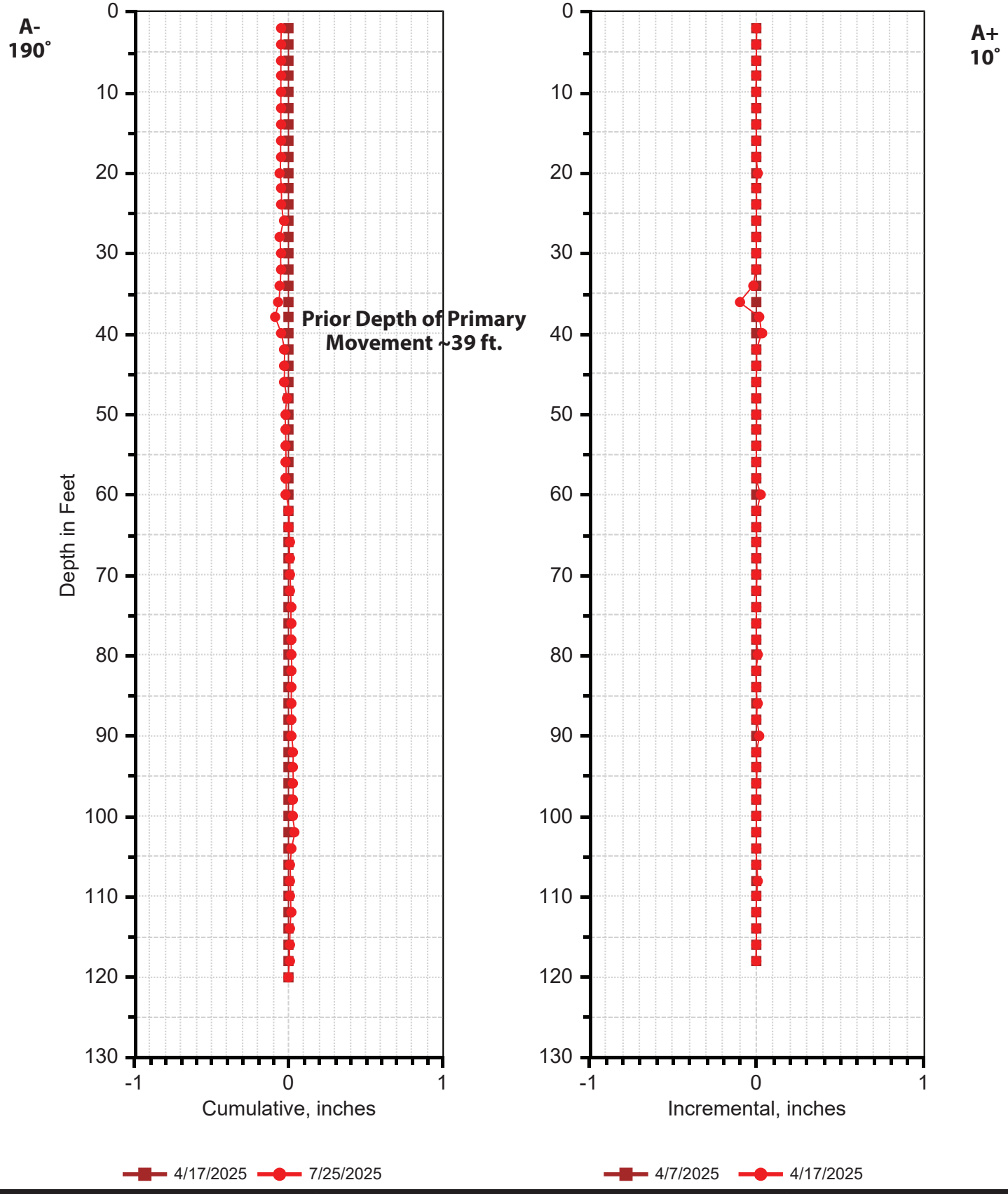
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 120		Baseline Date: 11/3/2022	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 155	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-30

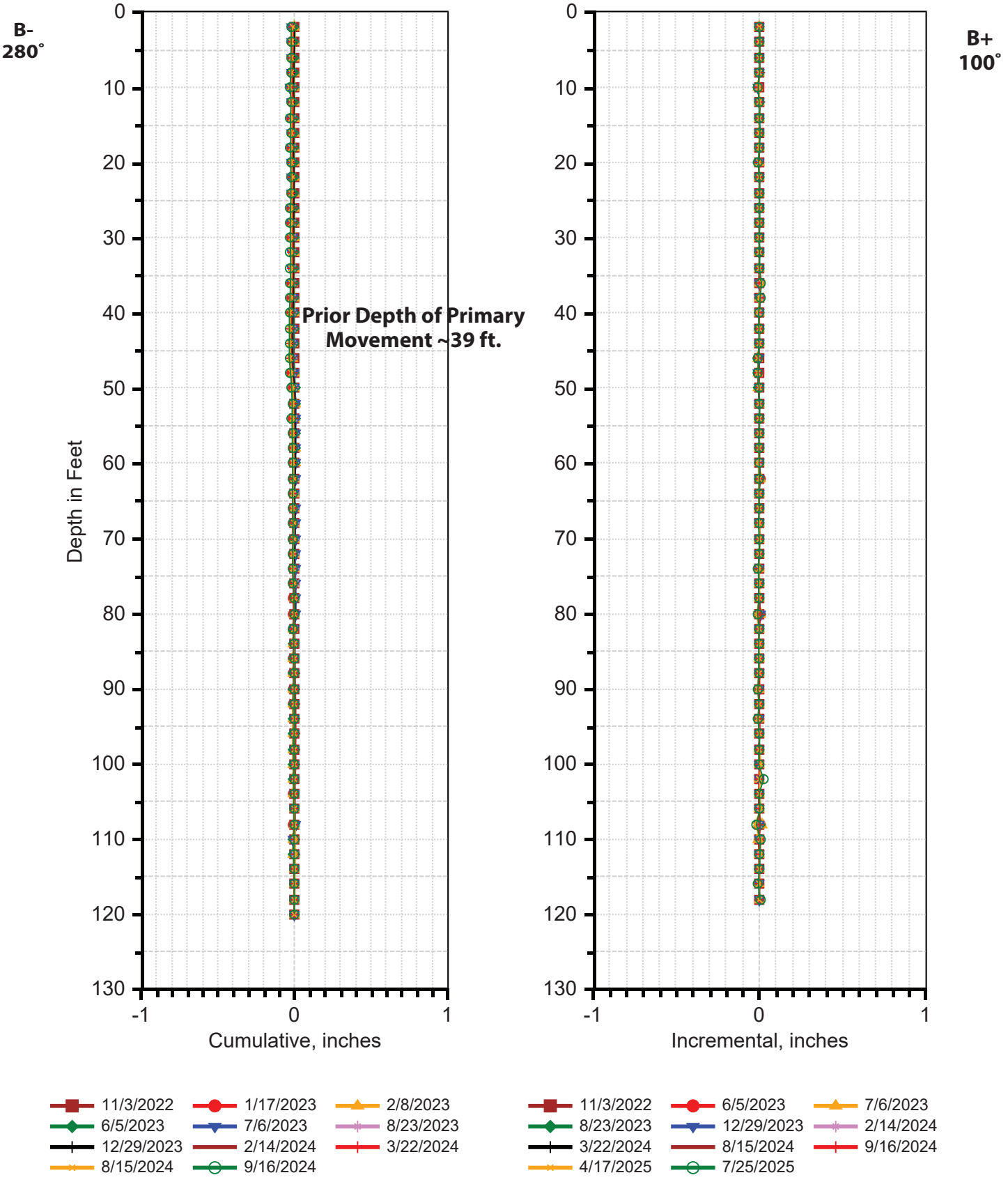
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 120		Baseline Date: 4/5/2021	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 155	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-30

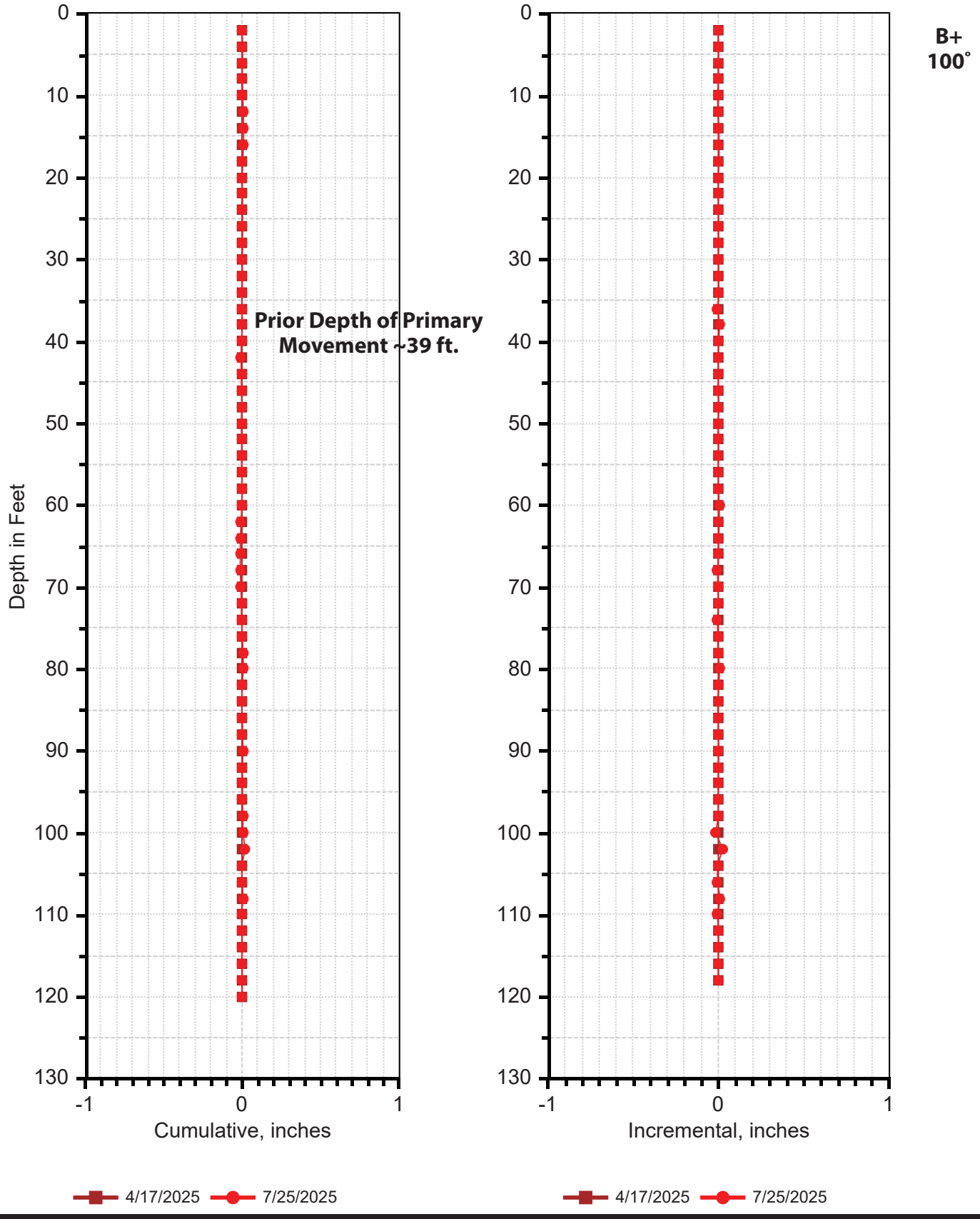
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 120		Baseline Date: 11/3/2022	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 155	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-30

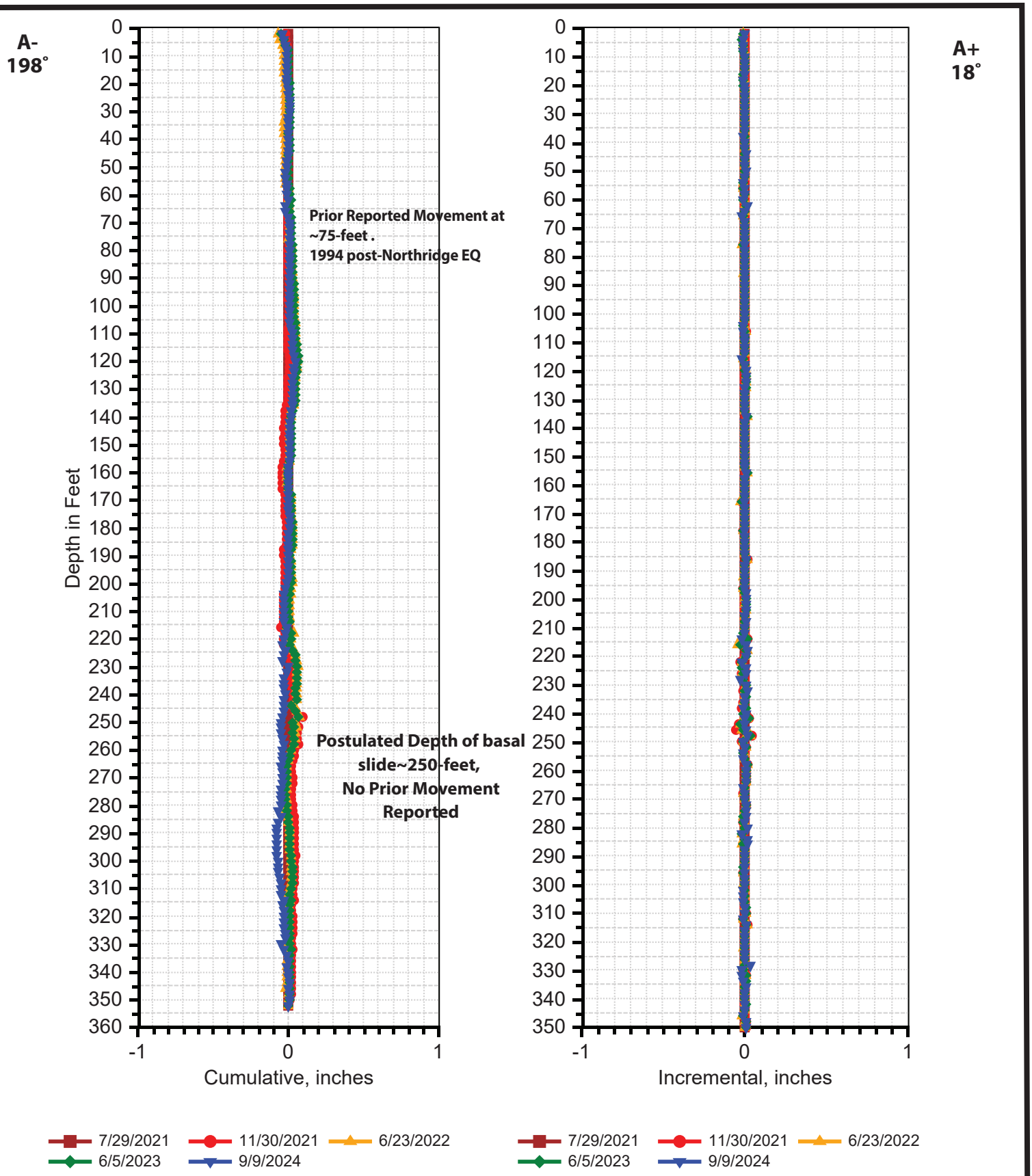
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 120		Baseline Date: 4/17/2025	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 155	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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Plot of Slope Inclinometer

SP-32

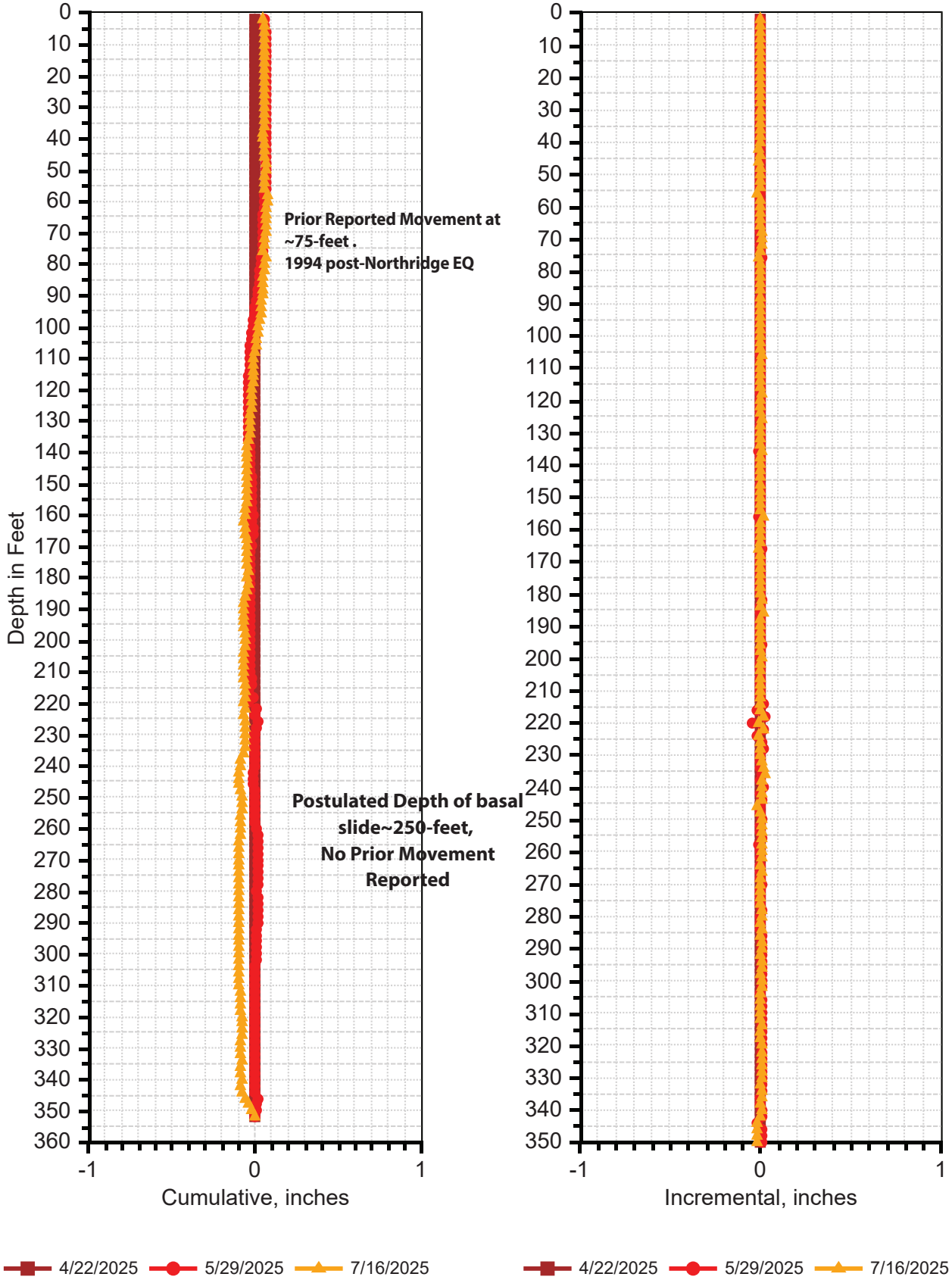
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 350		Baseline Date: 7/29/2021	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 400	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



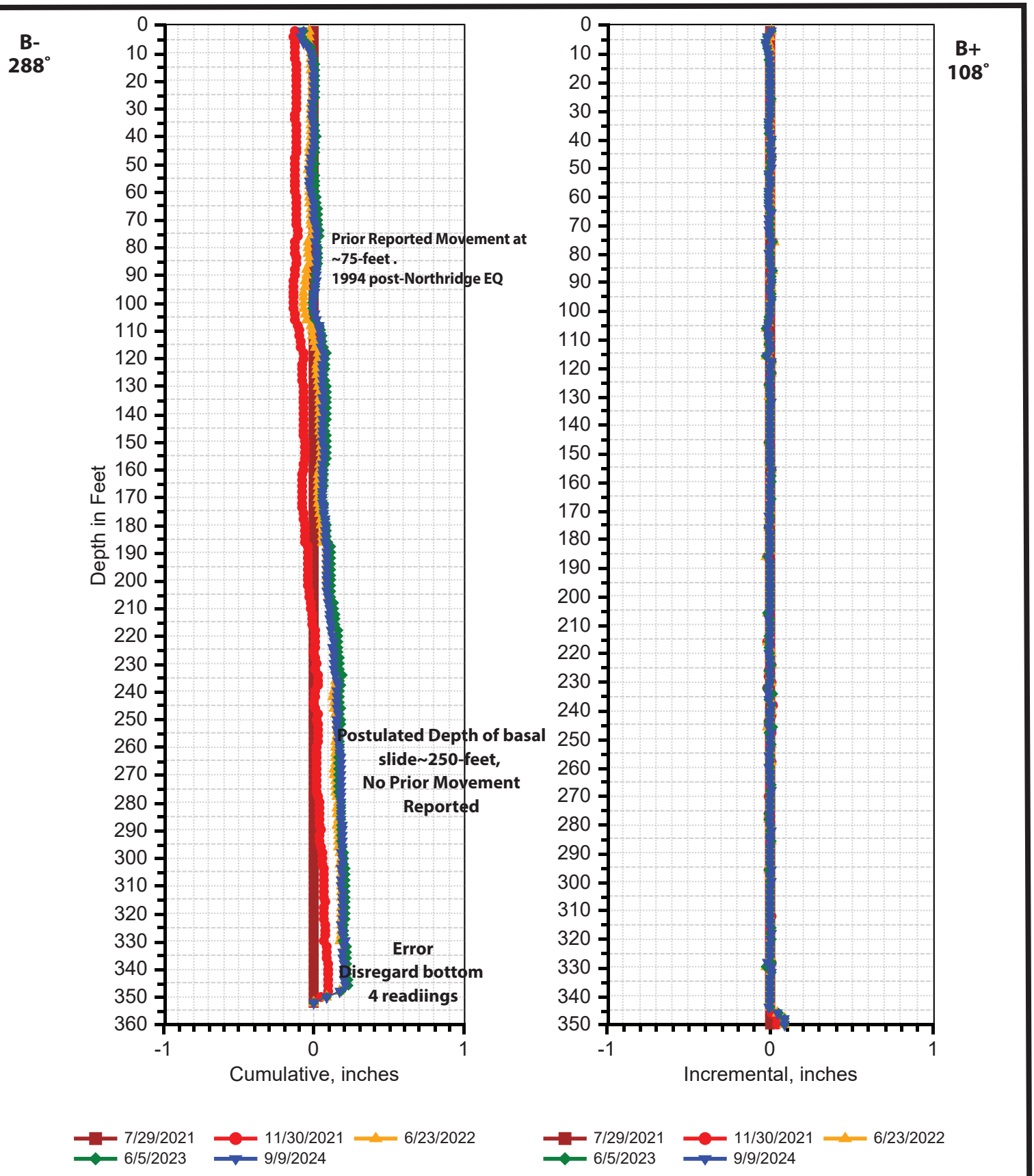
Plot of Slope Inclinometer SP-32	Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
	Depth of Survey (ft): 350		Baseline Date: 4/22/2025	Corrections: None
	Install Date: 3/1985	Installed Depth (ft): 400	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-32

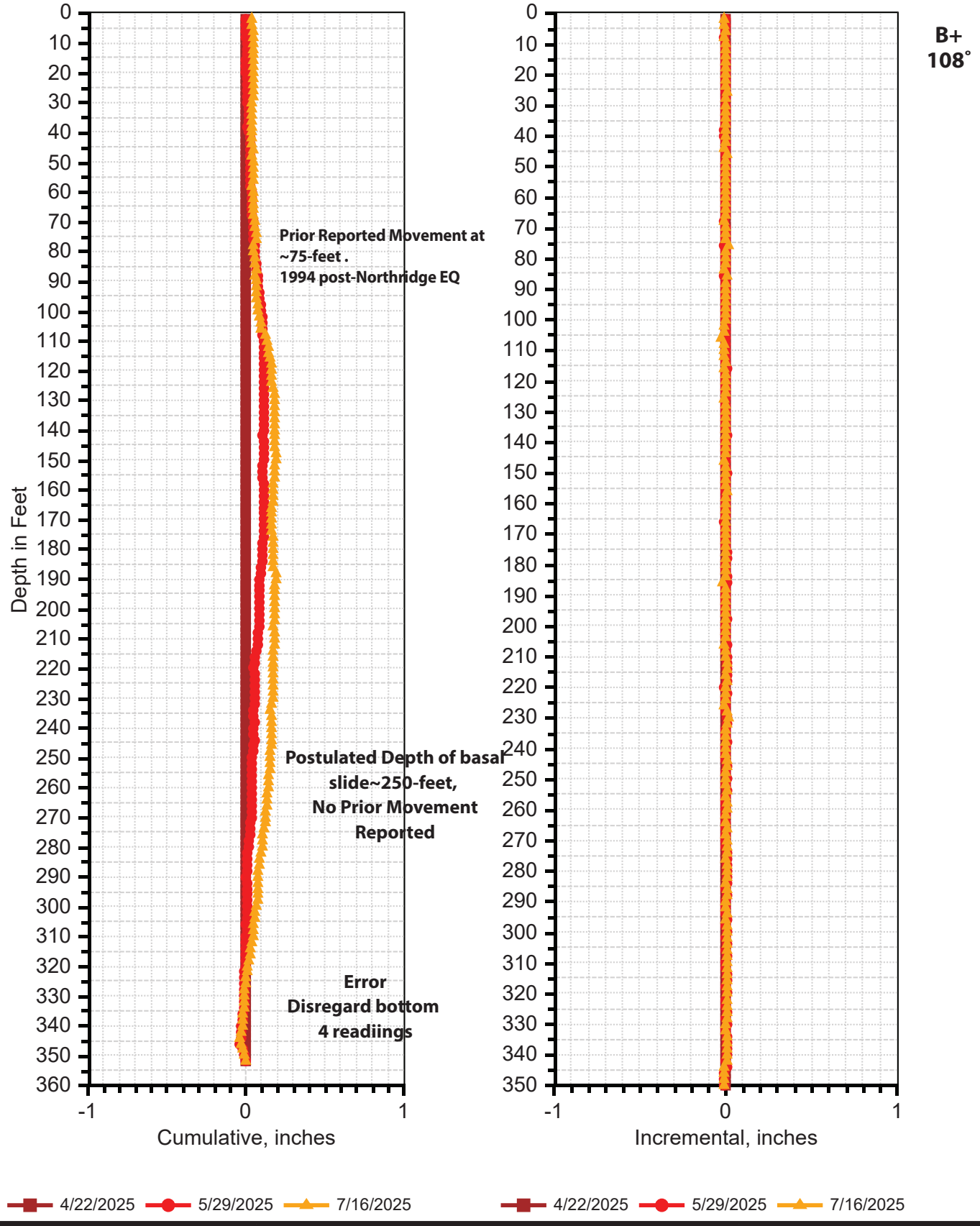
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Depth of Survey (ft): 350		Baseline Date: 7/29/2021	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 400	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-32

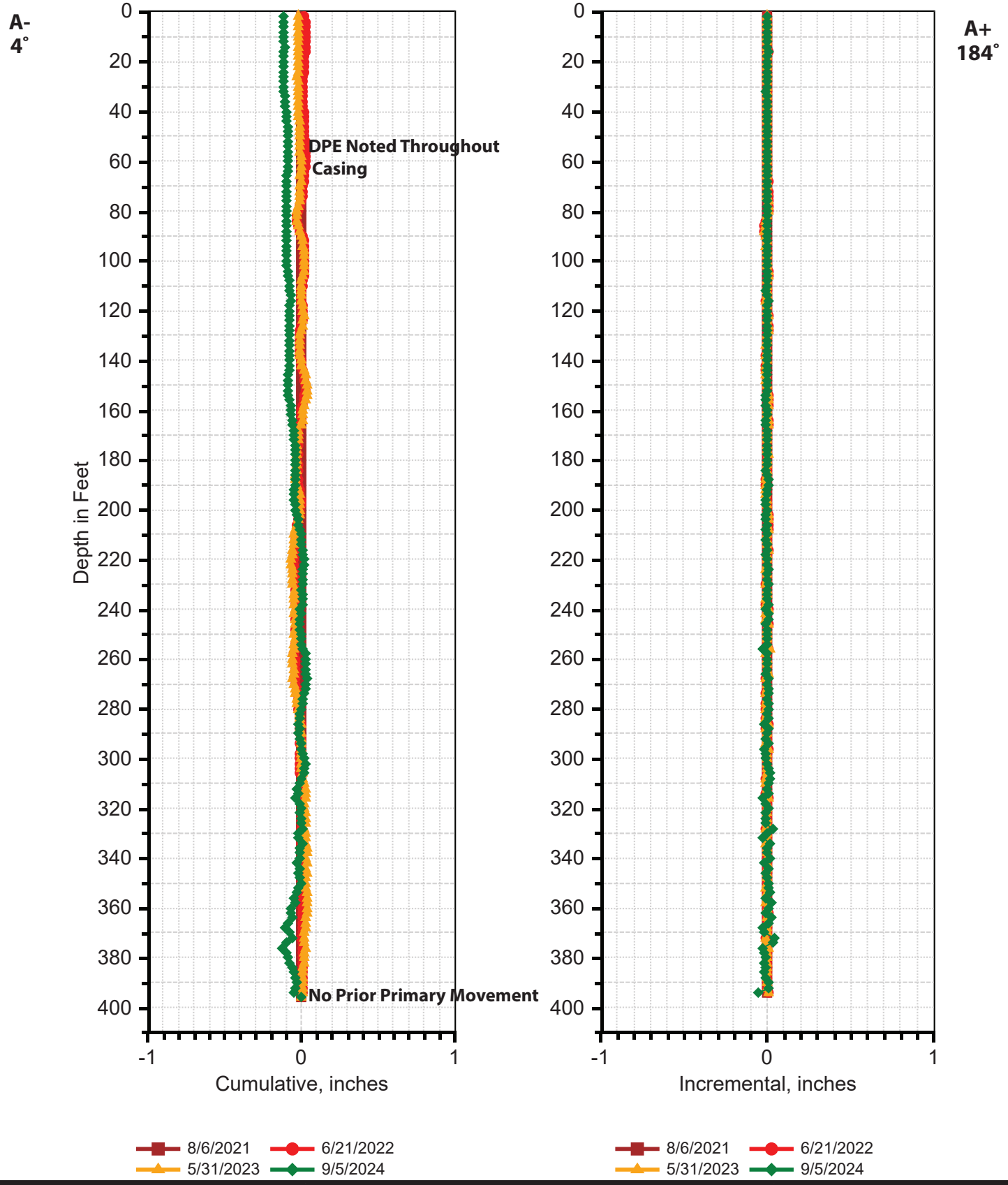
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 350		Baseline Date: 4/22/2025	Corrections: None
Install Date: 3/1985	Installed Depth (ft): 400	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-35

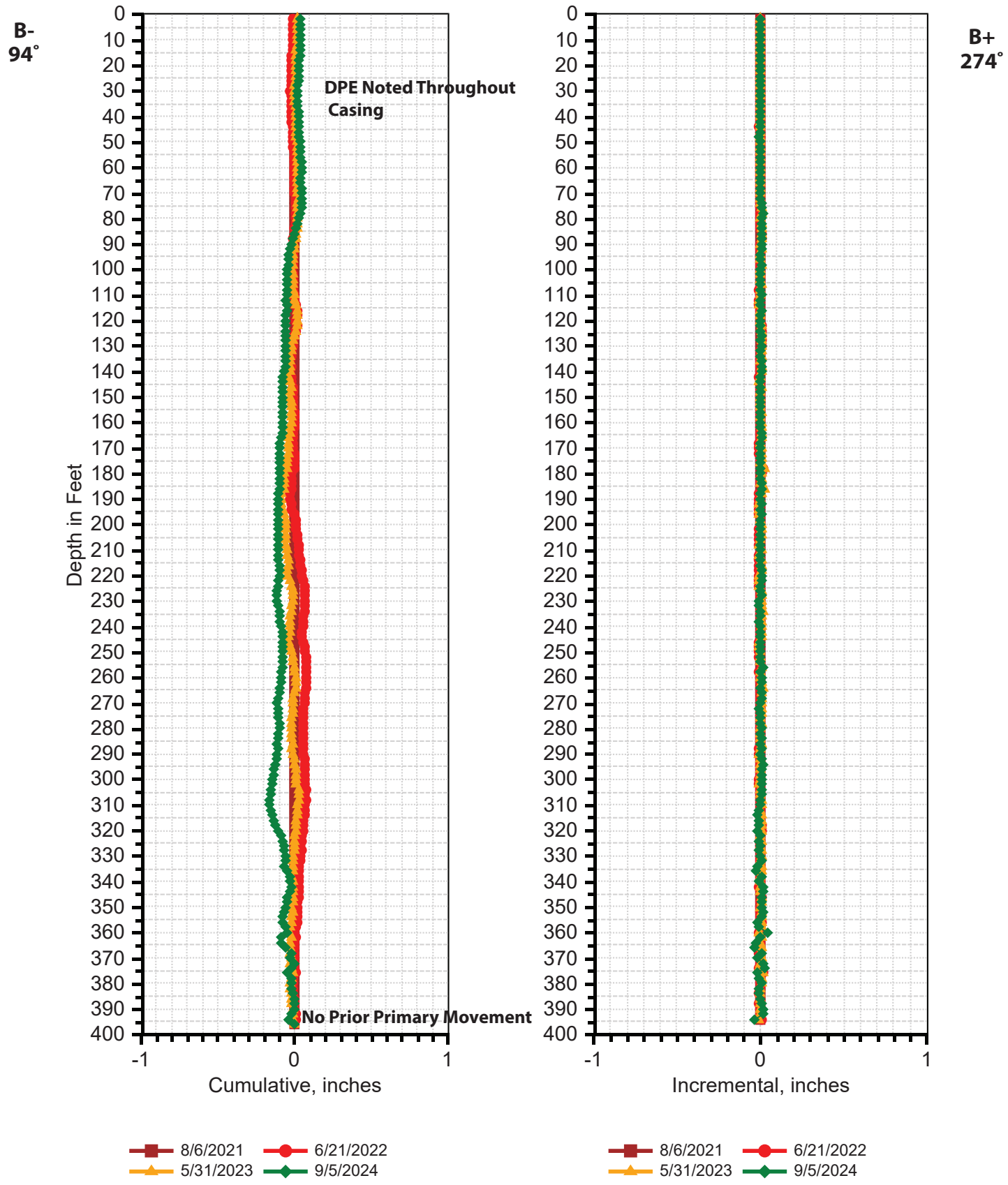
Plot Type: Cumulative and Incremental			Plot Direction: A-Direction
Depth of Survey (ft): 394		Baseline Date: 8/06/2021	Corrections: None
Install Date: 11/1998	Installed Depth (ft): 396	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
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PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

REVISION DATE: 9/26/2025



Plot of Slope Inclinometer

SP-35

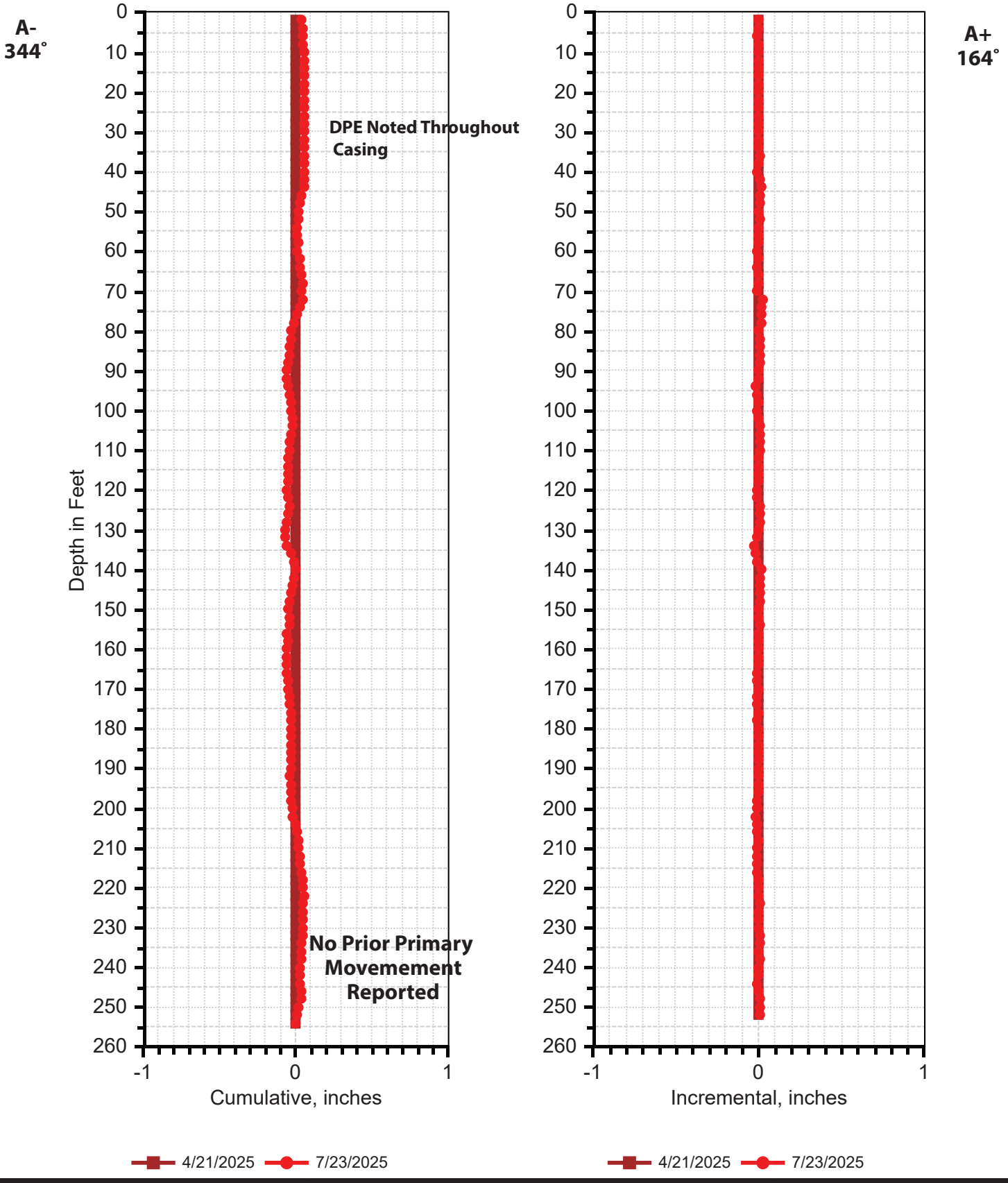
Plot Type: Cumulative and Incremental			Plot Direction: B-Direction
Depth of Survey (ft): 394		Baseline Date: 8/06/2021	Corrections: None
Install Date: 11/1998	Installed Depth (ft): 396	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

PROJECT: Big Rock Mesa LAD
Malibu, CA

PROJECT NUMBER: 220-276

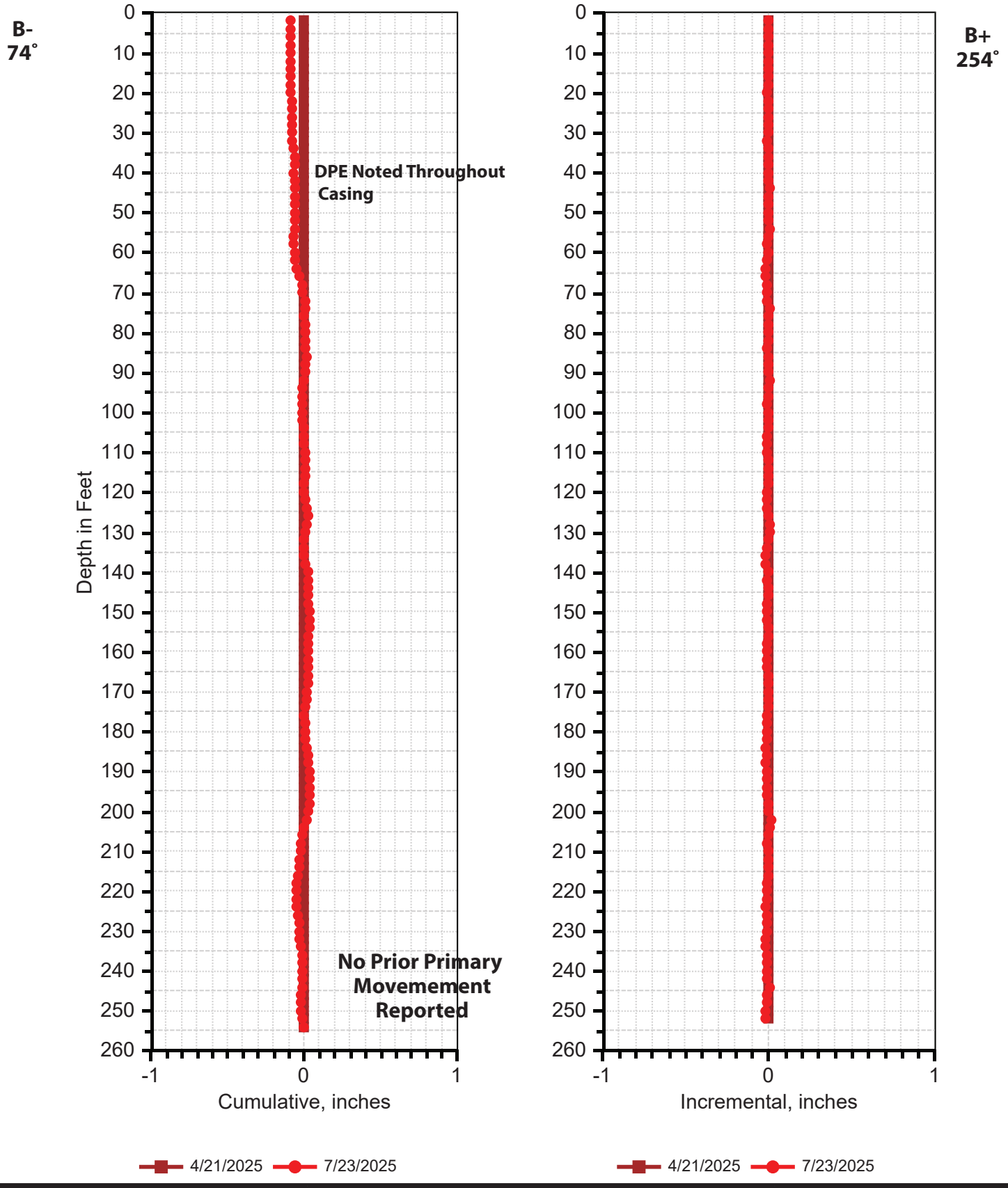
REVISION DATE: 9/26/2025



Plot of Slope Inclinometer SP-36	Plot Type: Cumulative and Incremental		Plot Direction: A-Direction
	Depth of Survey (ft): 254	Baseline Date: 4/21/2025	Corrections: None
	Install Date: 11/1998 / Installed Depth (ft): 255	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

PROJECT: Big Rock Mesa LAD, Malibu, CA
PROJECT NUMBER: 220-276
REVISION DATE: 9/26/2025



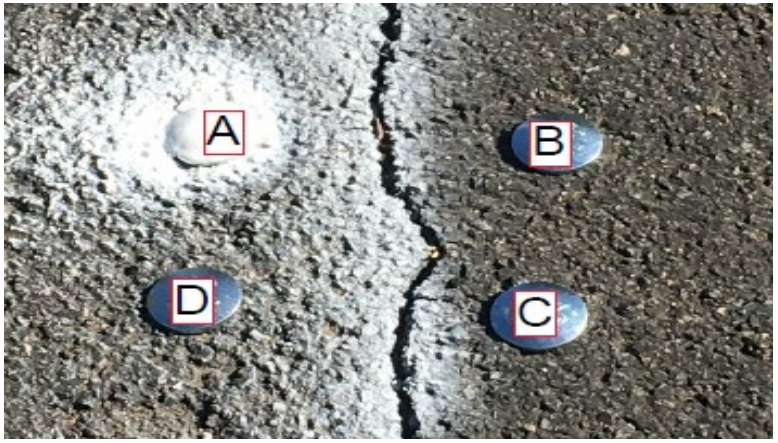
Plot of Slope Inclinometer	Plot Type: Cumulative and Incremental		Plot Direction: B-Direction
SP-36	Depth of Survey (ft): 254	Baseline Date: 4/21/2025	Corrections: None
	Install Date: 11/1998 / Installed Depth (ft): 255	Interpreted Movement Since Baseline (in): 0	Interpreted Movement Monitoring Year (in): 0

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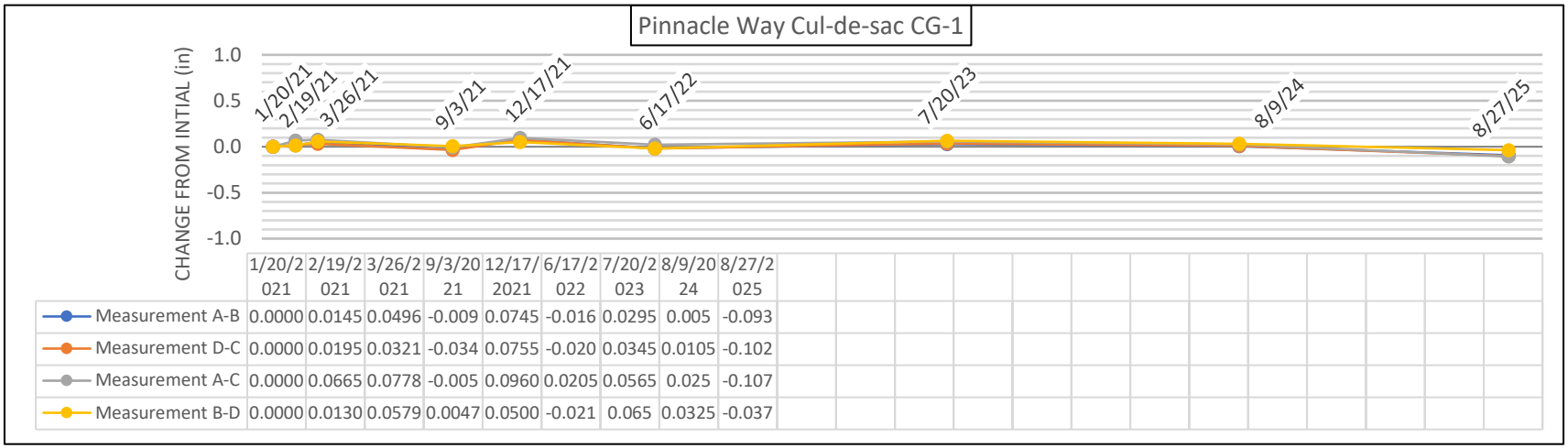
PROJECT: Big Rock Mesa LAD, Malibu, CA
PROJECT NUMBER: 220-276
REVISION DATE: 9/26/2025

APPENDIX C – CRACK GAUGE PLOTS

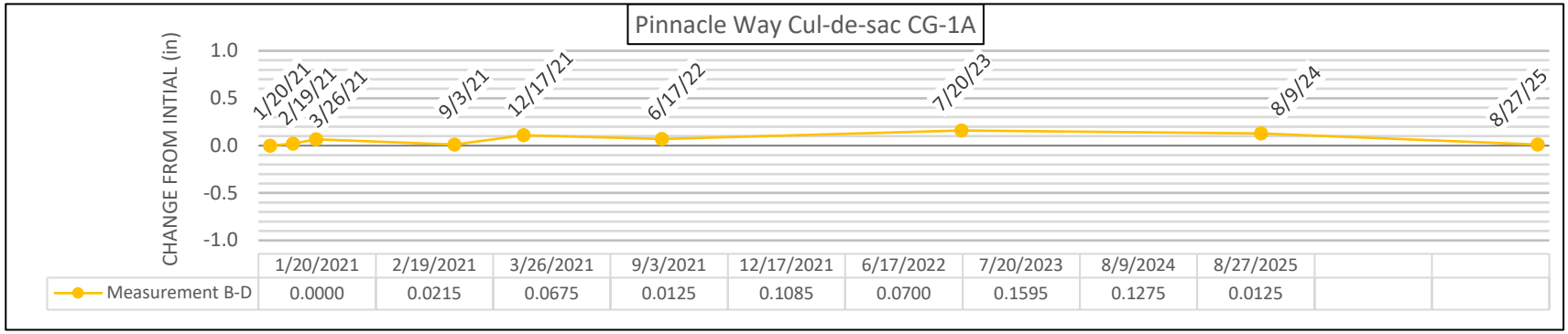
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Northwestern-most Corner is "A"
Gauge
B, C, and D proceed after in a clockwise rotation



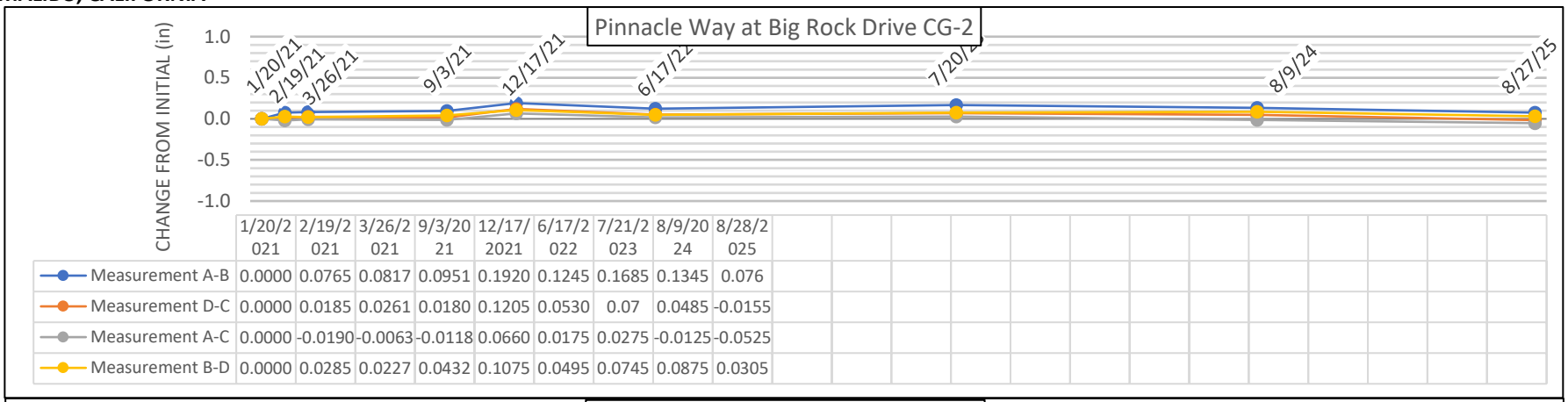
	1/20/2021	2/19/2021	3/26/2021	9/3/2021	12/17/2021	6/17/2022	7/20/2023	8/9/2024	8/27/2025
Measurement A-B	0.0000	0.0145	0.0496	-0.009	0.0745	-0.016	0.0295	0.005	-0.093
Measurement D-C	0.0000	0.0195	0.0321	-0.034	0.0755	-0.020	0.0345	0.0105	-0.102
Measurement A-C	0.0000	0.0665	0.0778	-0.005	0.0960	0.0205	0.0565	0.025	-0.107
Measurement B-D	0.0000	0.0130	0.0579	0.0047	0.0500	-0.021	0.065	0.0325	-0.037



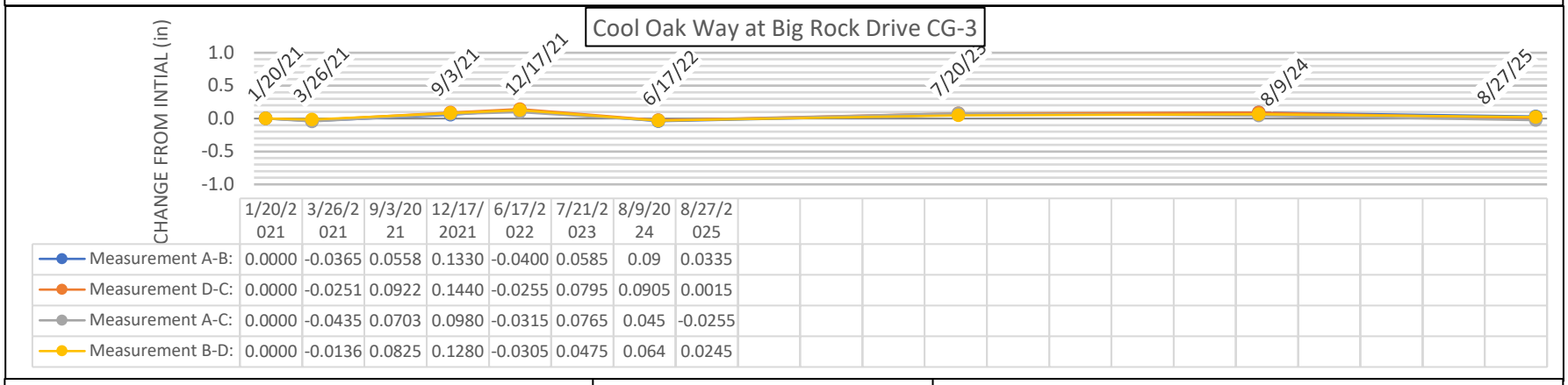
	1/20/2021	2/19/2021	3/26/2021	9/3/2021	12/17/2021	6/17/2022	7/20/2023	8/9/2024	8/27/2025
Measurement B-D	0.0000	0.0215	0.0675	0.0125	0.1085	0.0700	0.1595	0.1275	0.0125

PK NAIL CRACK GAUGE MEASUREMENTS
Big Rock Mesa Landslide Assessment District
Malibu, California

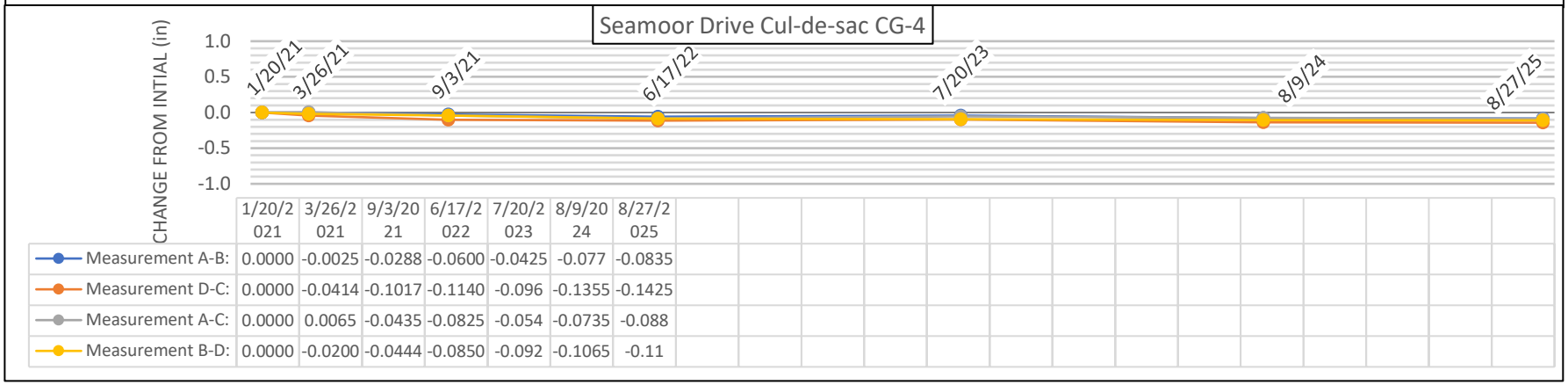
Yeh and Associates, Inc.
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	1/20/2021	2/19/2021	3/26/2021	9/3/2021	12/17/2021	6/17/2022	7/21/2023	8/9/2024	8/28/2025
Measurement A-B	0.0000	0.0765	0.0817	0.0951	0.1920	0.1245	0.1685	0.1345	0.076
Measurement D-C	0.0000	0.0185	0.0261	0.0180	0.1205	0.0530	0.07	0.0485	-0.0155
Measurement A-C	0.0000	-0.0190	-0.0063	-0.0118	0.0660	0.0175	0.0275	-0.0125	-0.0525
Measurement B-D	0.0000	0.0285	0.0227	0.0432	0.1075	0.0495	0.0745	0.0875	0.0305



	1/20/2021	3/26/2021	9/3/2021	12/17/2021	6/17/2022	7/21/2023	8/9/2024	8/27/2025
Measurement A-B:	0.0000	-0.0365	0.0558	0.1330	-0.0400	0.0585	0.09	0.0335
Measurement D-C:	0.0000	-0.0251	0.0922	0.1440	-0.0255	0.0795	0.0905	0.0015
Measurement A-C:	0.0000	-0.0435	0.0703	0.0980	-0.0315	0.0765	0.045	-0.0255
Measurement B-D:	0.0000	-0.0136	0.0825	0.1280	-0.0305	0.0475	0.064	0.0245



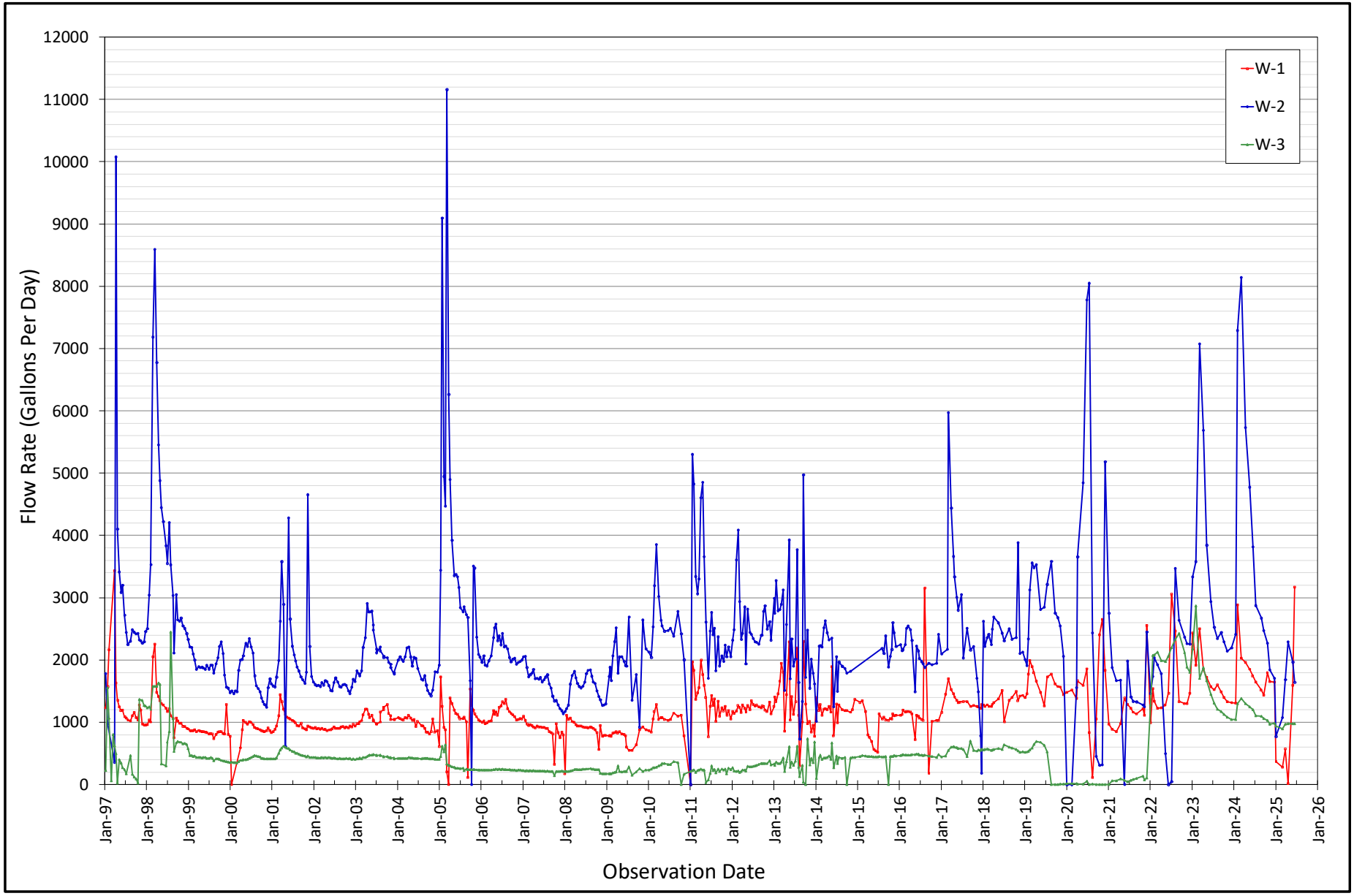
	1/20/2021	3/26/2021	9/3/2021	6/17/2022	7/20/2023	8/9/2024	8/27/2025
Measurement A-B:	0.0000	-0.0025	-0.0288	-0.0600	-0.0425	-0.077	-0.0835
Measurement D-C:	0.0000	-0.0414	-0.1017	-0.1140	-0.096	-0.1355	-0.1425
Measurement A-C:	0.0000	0.0065	-0.0435	-0.0825	-0.054	-0.0735	-0.088
Measurement B-D:	0.0000	-0.0200	-0.0444	-0.0850	-0.092	-0.1065	-0.11

PK NAIL CRACK GAUGE MEASUREMENTS
Big Rock Mesa Landslide Assessment District
Malibu, California

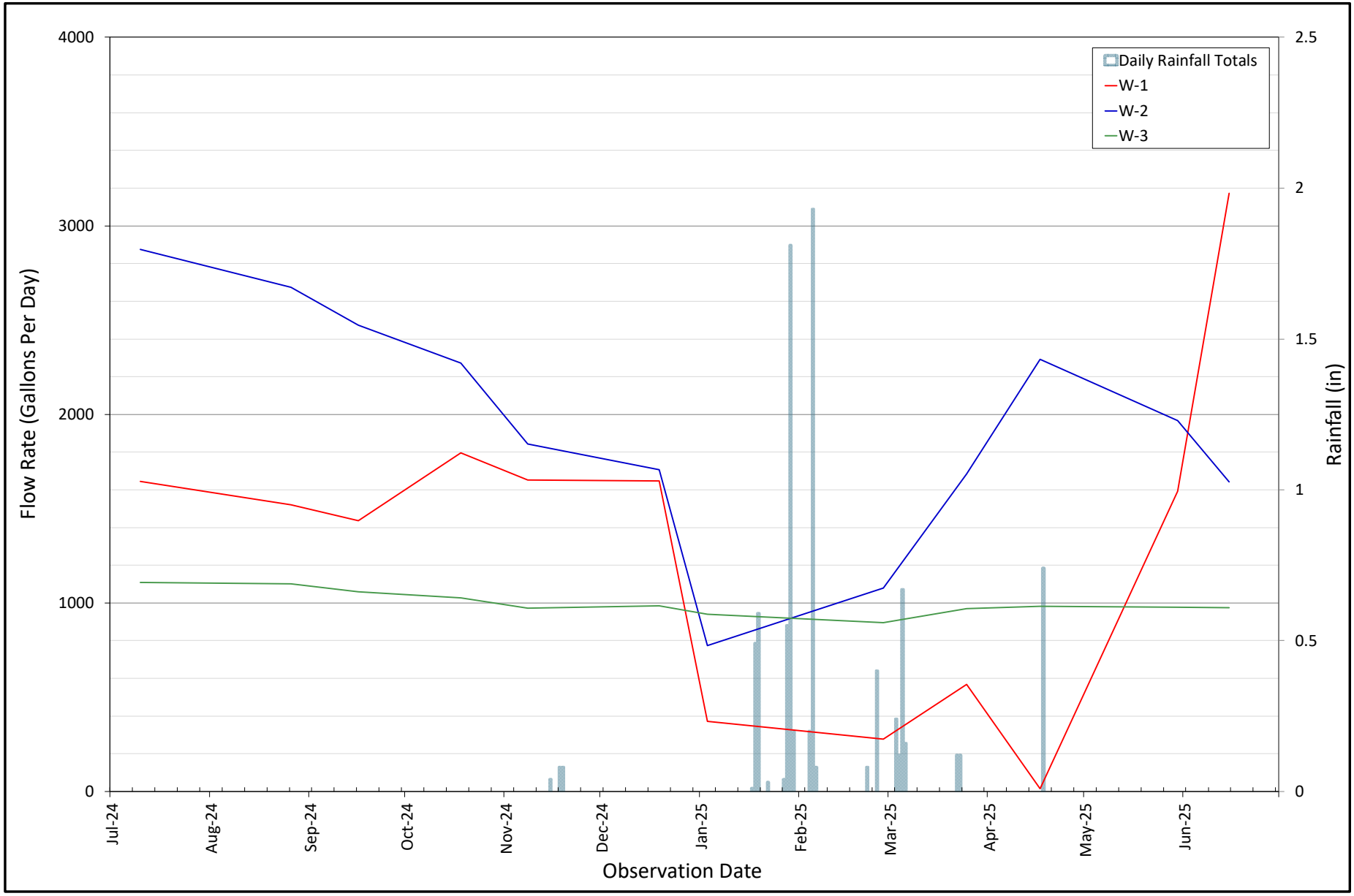
APPENDIX D - DEWATERING

SUMMARY OF DEWATERING WELL INFORMATION												
Well I.D.	**INSTAL L DATE**	**TOP ELEV. (ft.)**	**BOTTOM ELEV. (ft.)**	**PUMP ELEV. (ft.)**	**PUMP SIZE (HP)**	**2024-2025 PUMPING RATE (GPD)**	**% of TOTAL PRODUCTION**	**Rank**	**Drainage Port**	**Sounding Tube Present**	**Most Recent Video Log Date**	**COMMENT**
W-1	1977	210.5	-30	14.5	1.5	1,308	3%	10	3	Yes	--	Producing
W-2	1955	219	50	45	0.5	1,940	4%	7	3	Yes	6/21/2022	Producing
W-3	1973	243.5	-9.5	65.5	0.75	1,000	2%	13	3	Yes	8/31/2020	Producing, casing damage at 65.5 feet
W-4	1973	248	-10	N/A	N/A	0	0%	24	N/A	No	--	Non-producing, casing perforations closed due to siltation (BYA 1991)
W-5	1984	280	252	N/A	N/A	0	0%	24	N/A	No	--	Capped 4/4/84 (DA Evans 1986)
W-6	1983	174	80	N/A	N/A	0	0%	24	N/A	No	--	Non-producing, static water level at bottom of casing (BYA 1991)
W-7	1983	257	171	N/A	N/A	0	0%	24	N/A	No	--	Non-producing, static water level at bottom of casing (BYA 1991)
W-8	1983	287	93	98	1	6,060	12%	3	4	No	--	Producing
W-9	1983	282	87	N/A	N/A	0	0%	24	N/A	No	--	Non-producing, static water level at bottom of casing (BYA 1991), replaced with BYA-11
W-10	1983	432	192	194	N/A	0	0%	24	N/A	No	--	Inactive, no pump
W-11	1983	507	285	292	N/A	0	0%	24	N/A	No	--	Inactive, diconnected from electrical, replaced with BYA-10
W-12	1983	375	195	N/A	N/A	0	0%	24	N/A	No	--	Non-producing, casing sheared at 185 ft.elevation (BYA 1991)
W-13	1983	361	184	193	1	2,951	6%	6	5	No	--	Producing
W-14	1984	283	131	N/A	N/A	0	0%	24	N/A		--	Non-producing, static water level at bottom of casing (BYA 1991)
W-15	1984	295	121	130	N/A	0	0%	24	N/A		--	Inactive, replaced with BYA-9
W-16	1984	325	107	113	0.75	11,004	21%	1	5	Yes	--	Producing
W-17	1984	270	41	50	0.75	1,408	3%	8	4	Yes	8/31/2020	Producing
W-18	1984	750	179	225	3	0	0%	24	6	No	--	Producing
BYA-1	1990	281	-164	30	1	9,825	19%	2	4	Yes	2/15/2022	Producing, casing damage at 245 feet
BYA-2	1990	665	215	242	1.5	282	1%	19	6	No	--	Producing
BYA-3	1990	510	-40	29	3	764	1%	16	6	No	--	Producing
BYA-4	1990	372	-68	-28	1.5	3,486	7%	5	5	No	--	Producing
BYA-5	1990	189	-231	-211	1.5	270	1%	20	1	No	--	Producing
BYA-6	1996	220	-280	-275	0.75	367	1%	18	1	No	--	Producing
BYA-7	1996	240	-120	-115	0.75	1,197	2%	12	2	No	--	Producing
BYA-9	1996	295	-105	-70	5	4,665	9%	4	5	Yes	5/20/2021	Producing, in-filled -105 to -75 feet
BYA-10	1996	510	210	215	1	849	2%	15	5A	No	--	Producing
BYA-11	1996	275	-125	-120	0.75	965	2%	14	5	No	--	Producing
BYA-12	1998	207	-140	-137	0.5	210	0%	21	1	No	--	Producing
BYA-13	1998	329	-14	-18	0.5	1,213	2%	11	3	No	--	Producing
BYA-14	1998	265	38	40	0.5	467	1%	17	1A	No	--	Producing
BYA-15	2002	429	340	300	1	3	0%	23	6	No	8/21/2014	Producing <10 GPD, water level at pump intake, airline functioning
FW-1	2008	170			1	61	0%	22	1A	No	--	Producing
FW-2	2009	270	-130	-115	1.5	1,362	3%	9	4	No	--	Producing

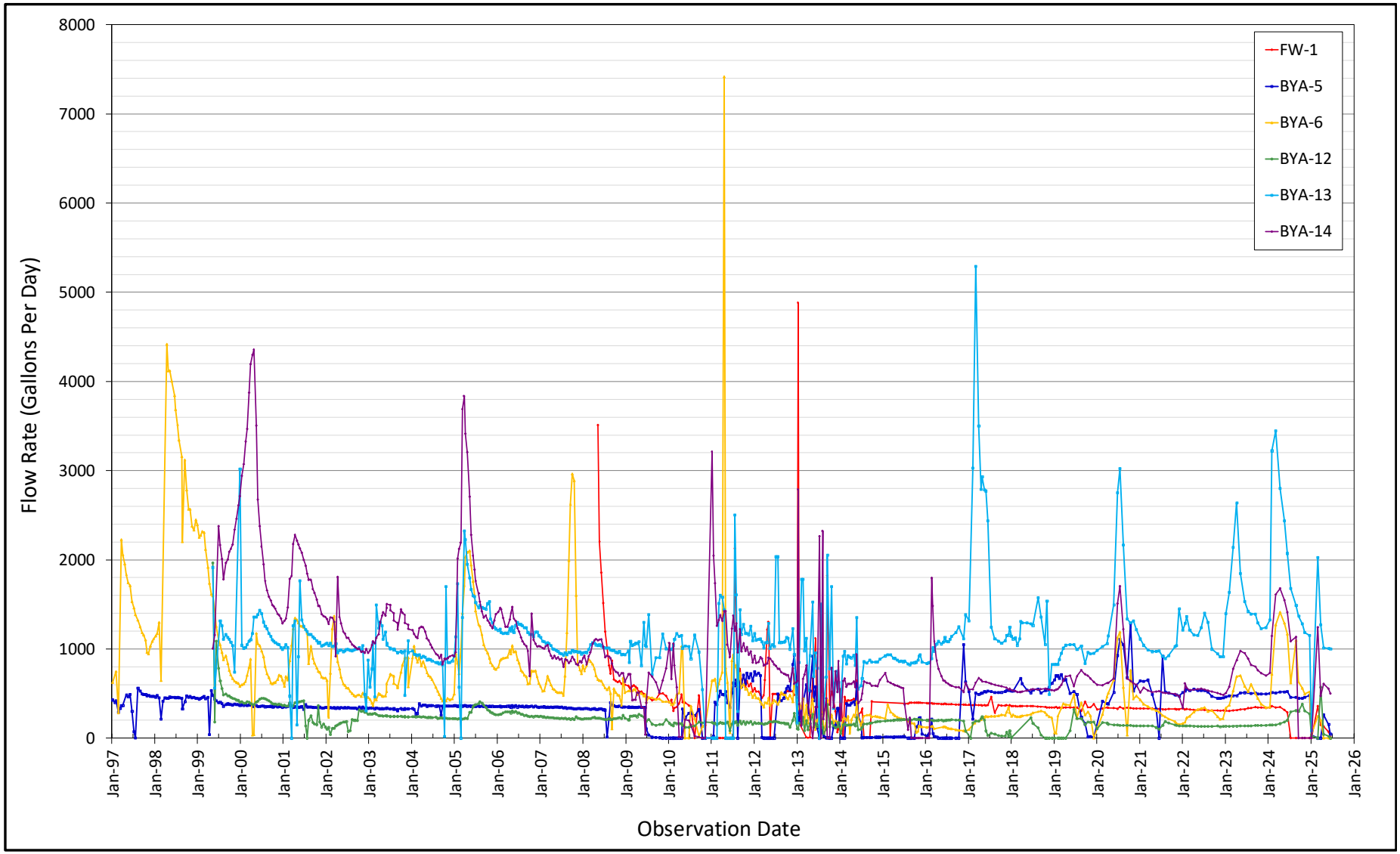
Note:
- Not functioning or no longer monitored dewatering well



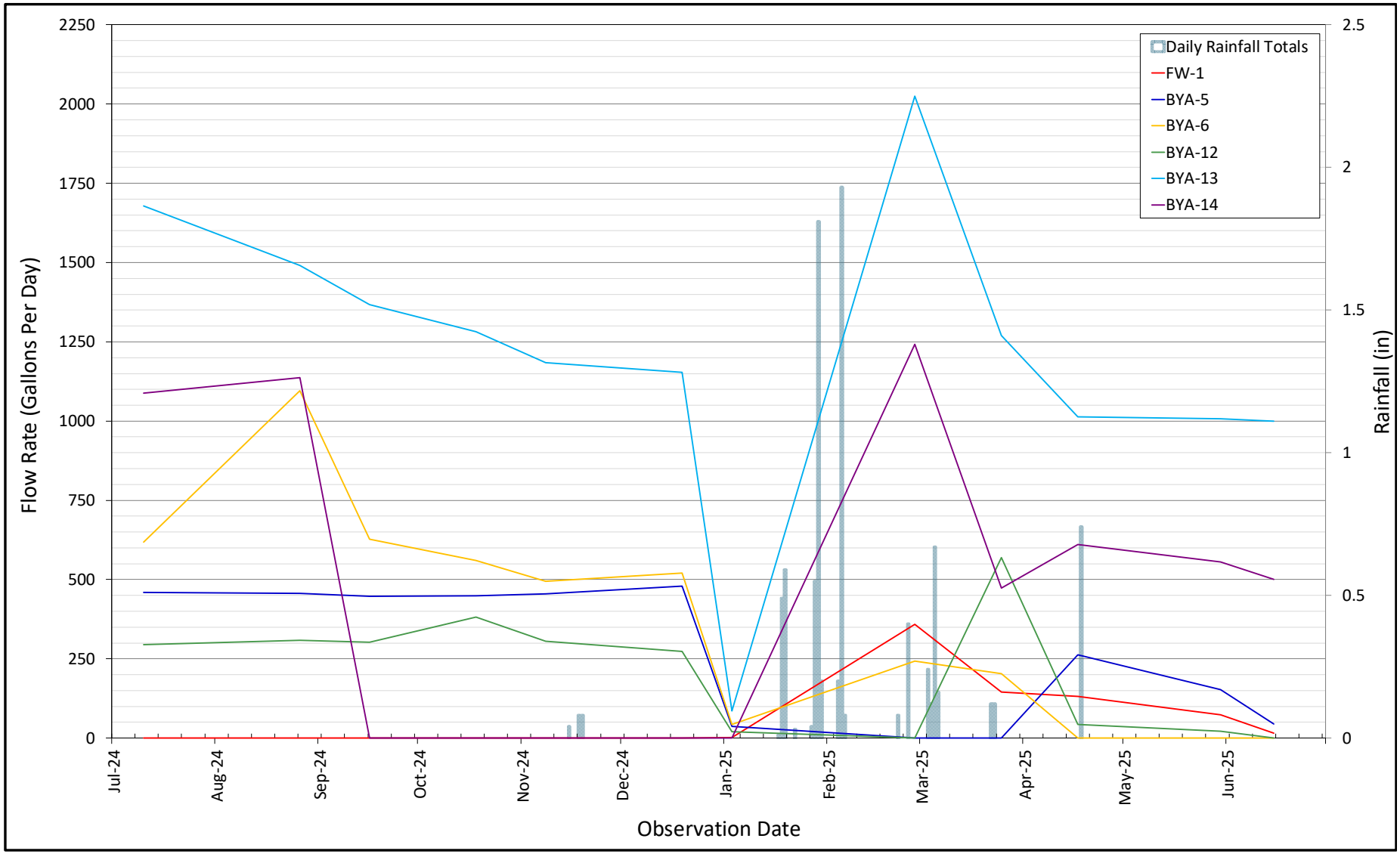
DISCHARGE RATE FOR DEWATERING WELLS (HISTORIC)
Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



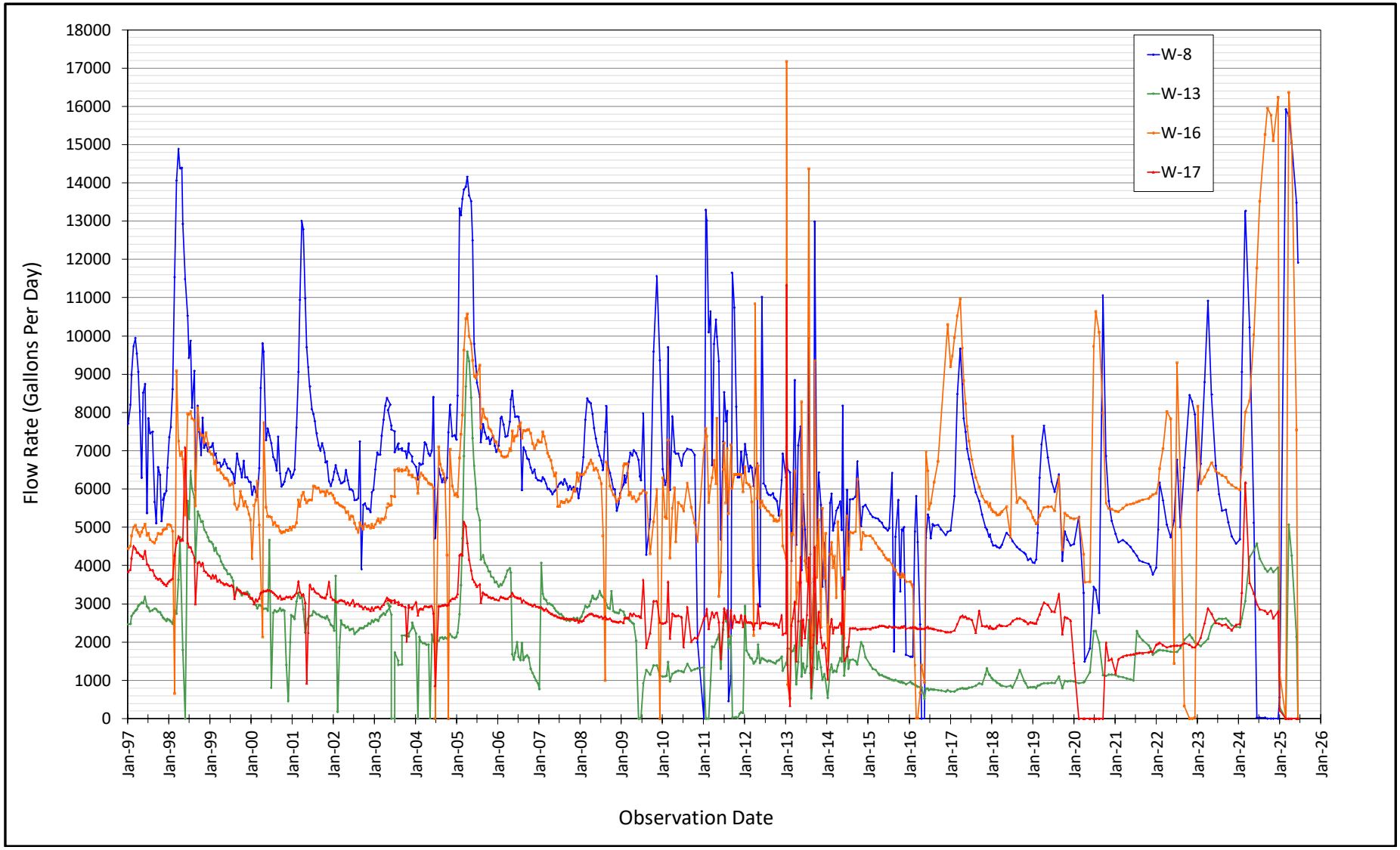
DISCHARGE RATE FOR DEWATERING WELLS (MONITORING YEAR)
Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



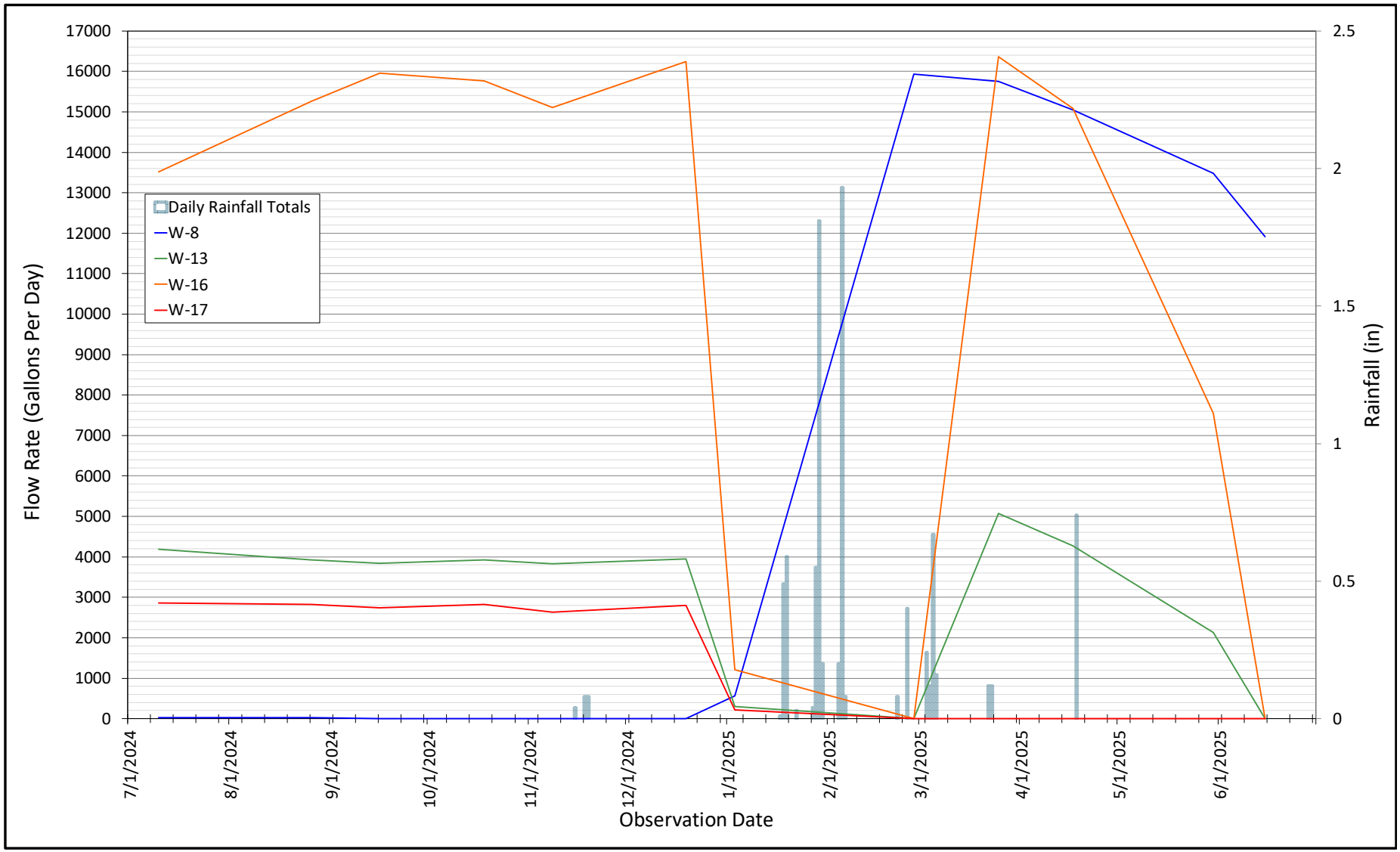
DISCHARGE RATE FOR DEWATERING WELLS (HISTORIC)
Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



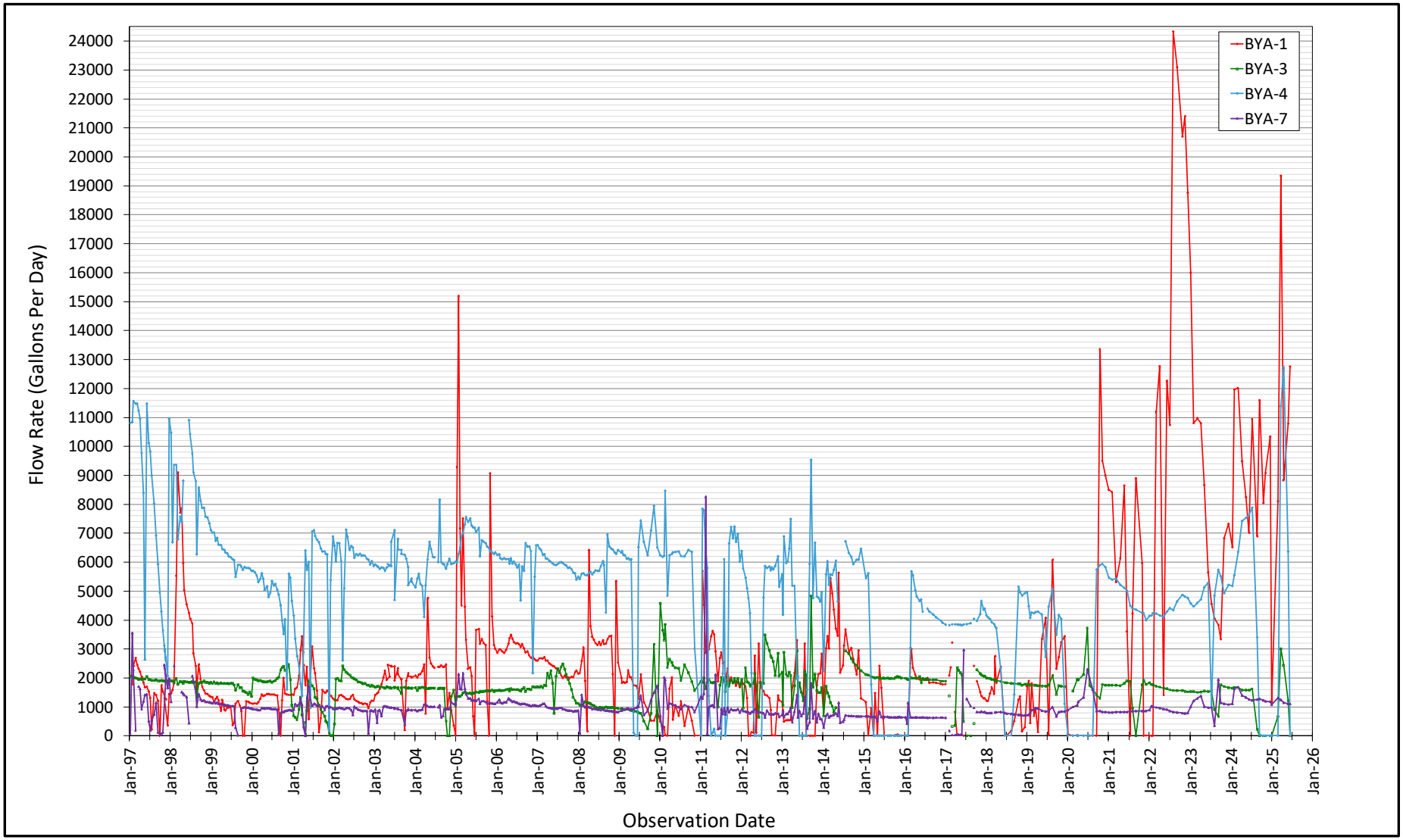
DISCHARGE RATE FOR DEWATERING WELLS (MONITORING YEAR)
Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



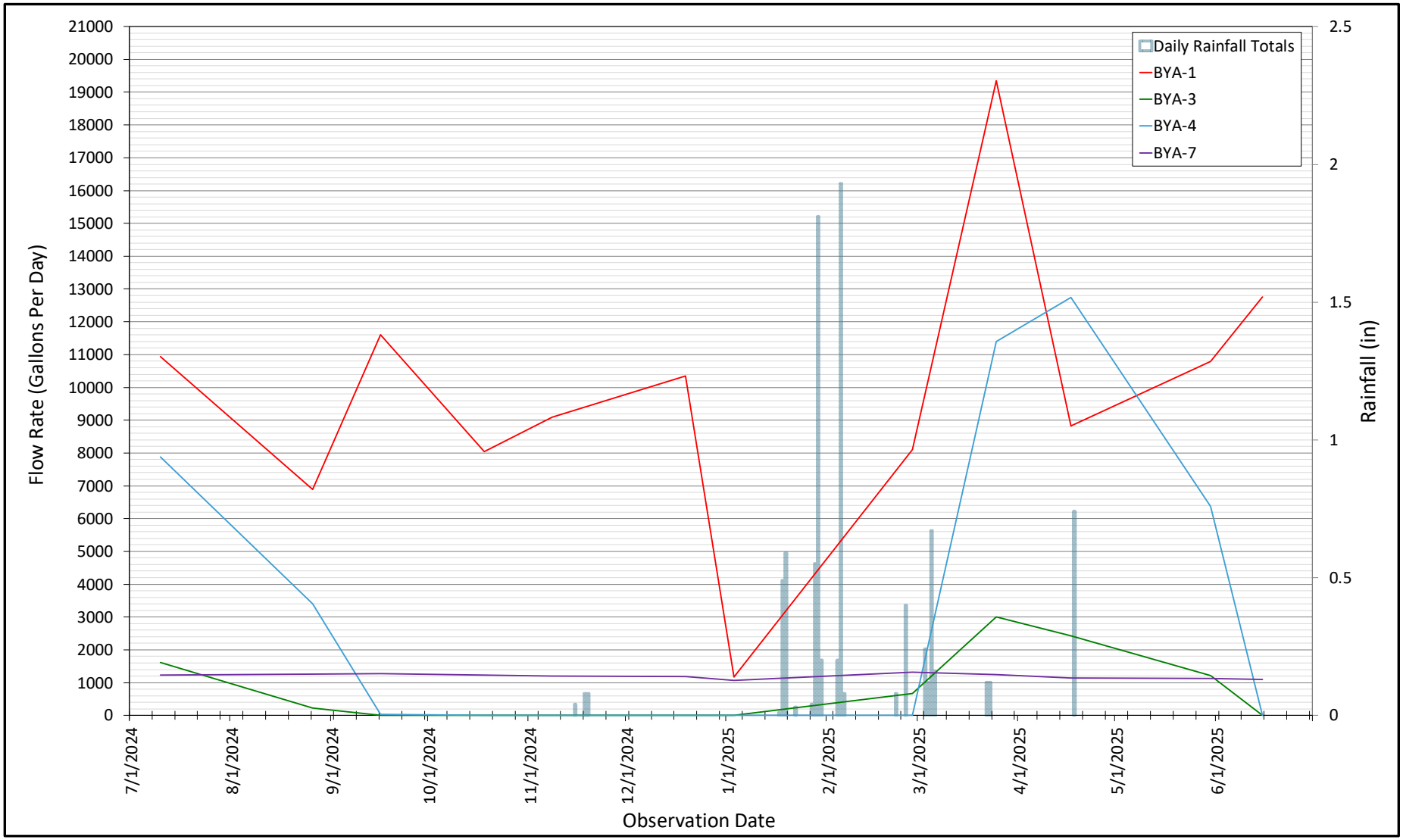
DISCHARGE RATE FOR DEWATERING WELLS (HISTORIC)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



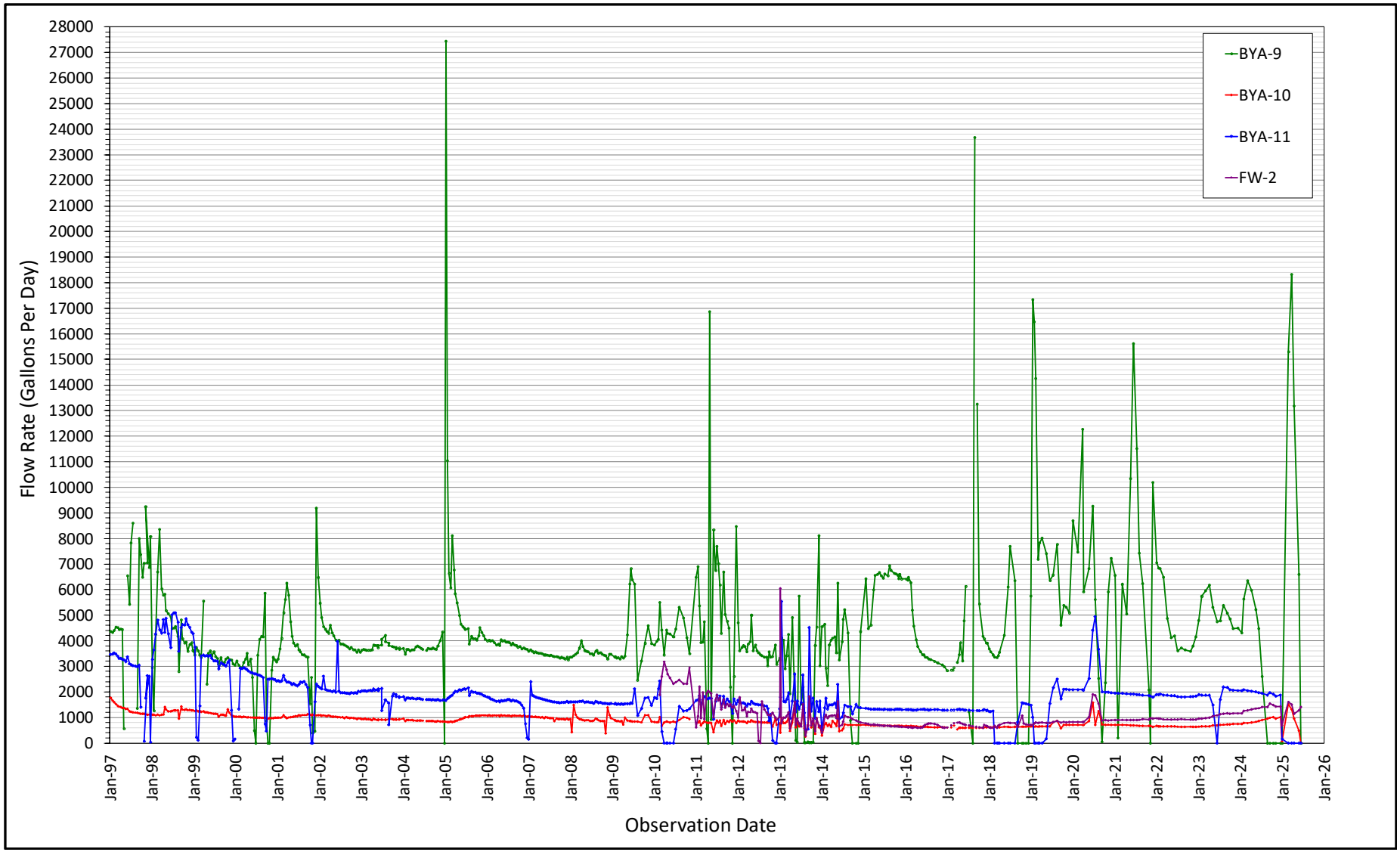
DISCHARGE RATE FOR DEWATERING WELLS (MONITORING YEAR)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



DEWATERING WELL HYDROGRAPHS (HISTORIC)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California

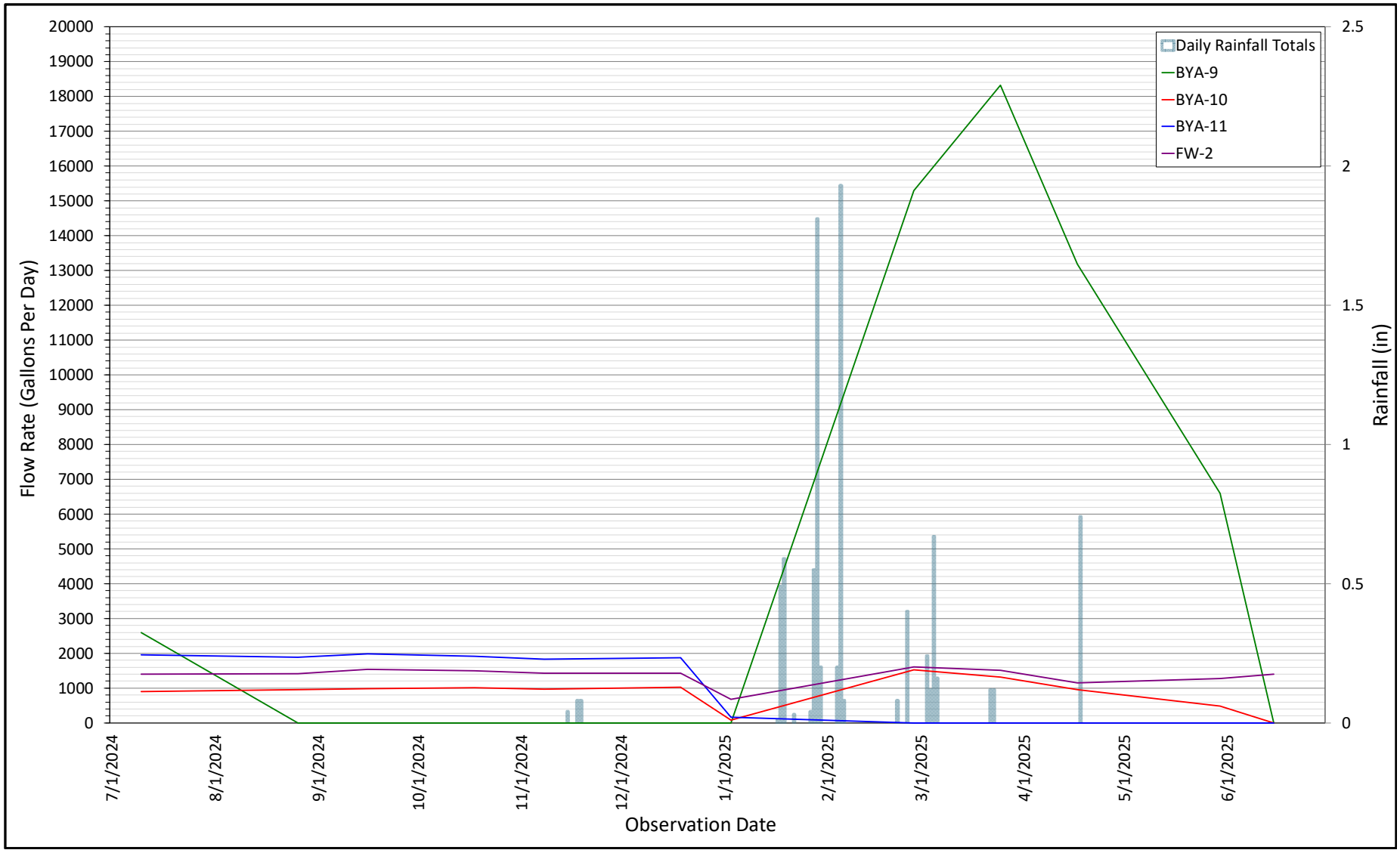


DEWATERING WELL HYDROGRAPHS (HISTORIC)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California

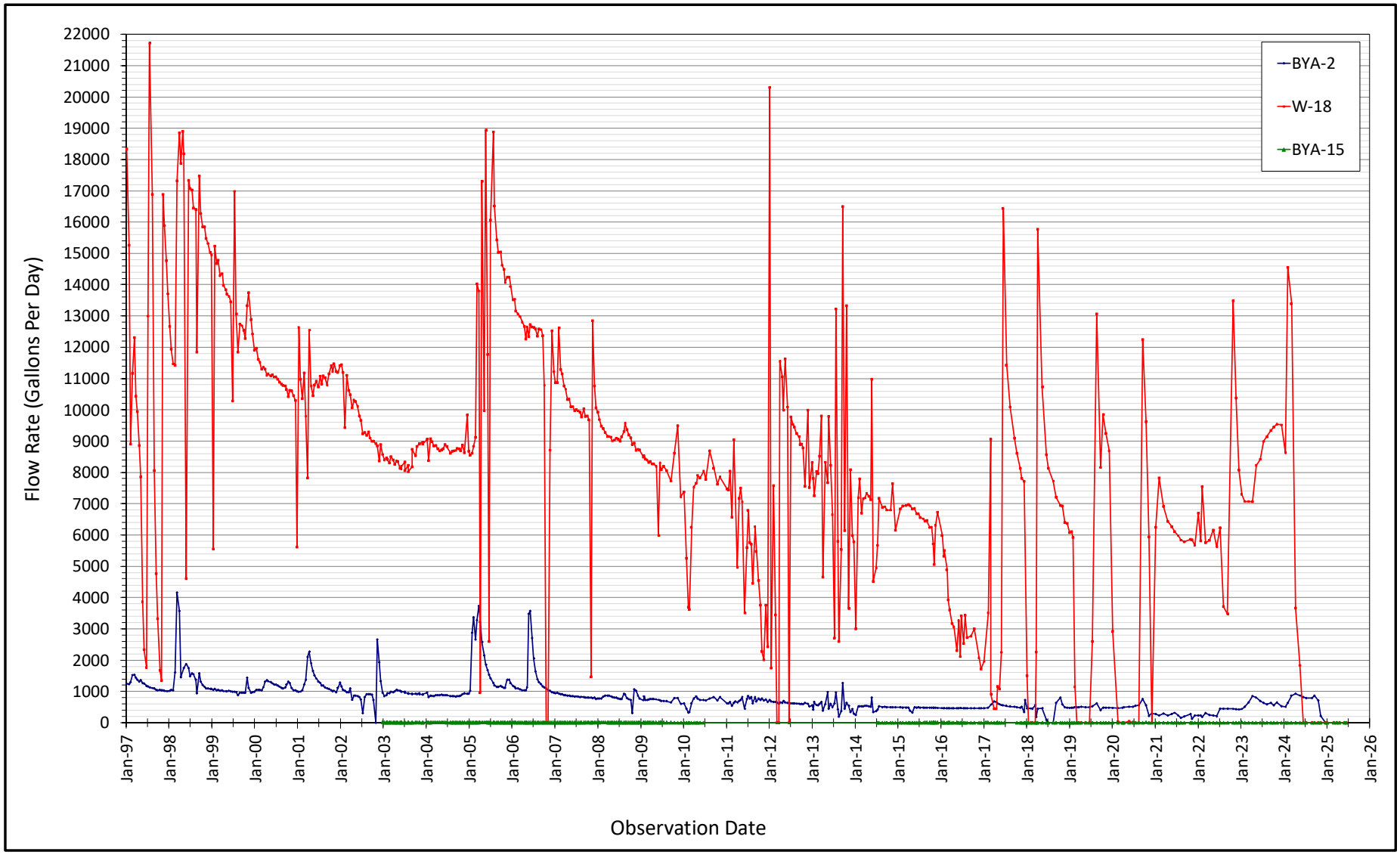


DISCHARGE RATE FOR DEWATERING WELLS (HISTORIC)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California

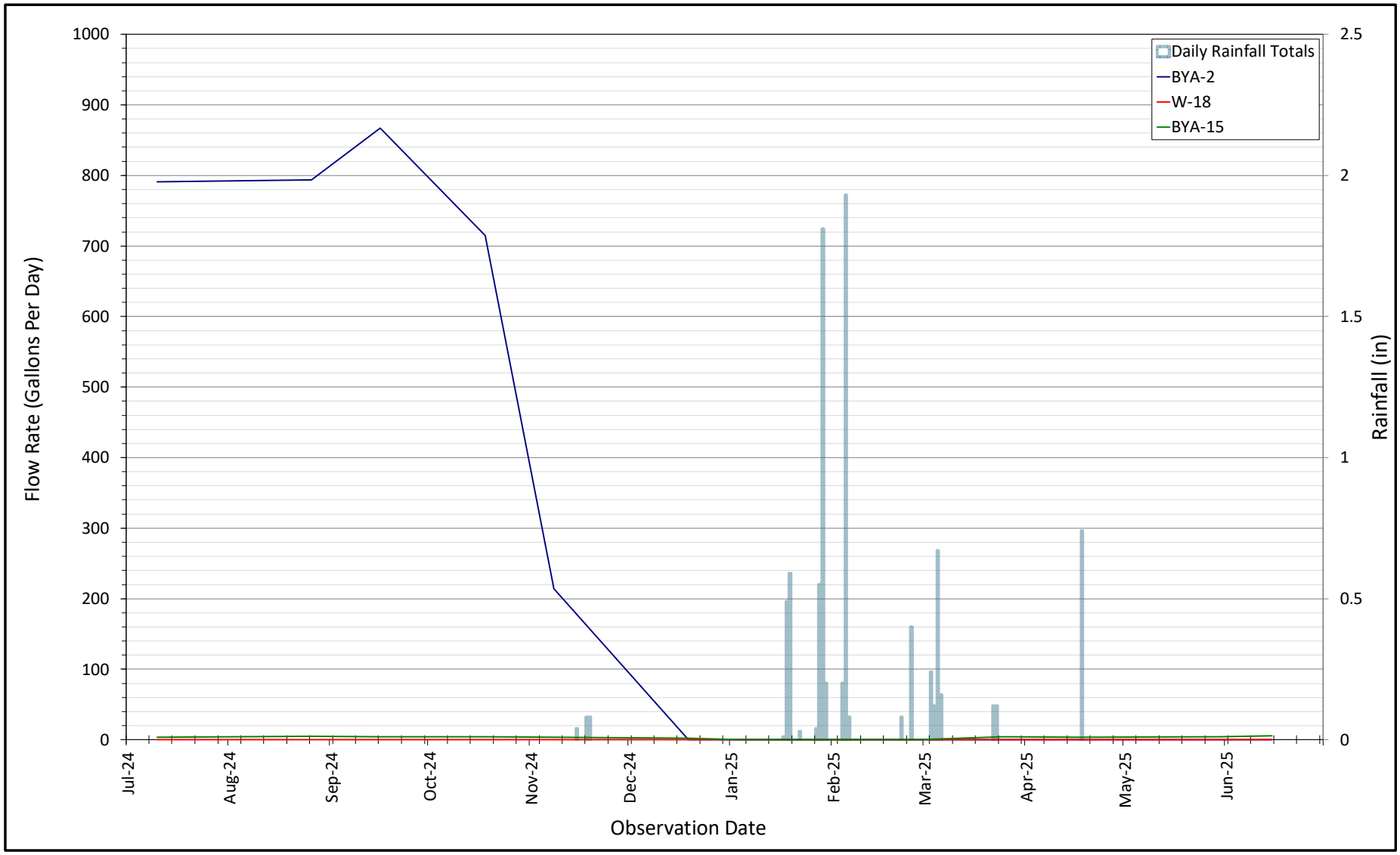
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DISCHARGE RATE FOR DEWATERING WELLS (MONITORING YEAR)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



DISCHARGE RATES FOR DEWATERING WELLS (HISTORIC)
Western Extension
Big Rock Mesa Landslide Assessment District
Malibu, California



DISCHARGE RATES FOR DEWATERING WELLS (MONITORING YEAR)
Western Extension
Big Rock Mesa Landslide Assessment District
Malibu, California

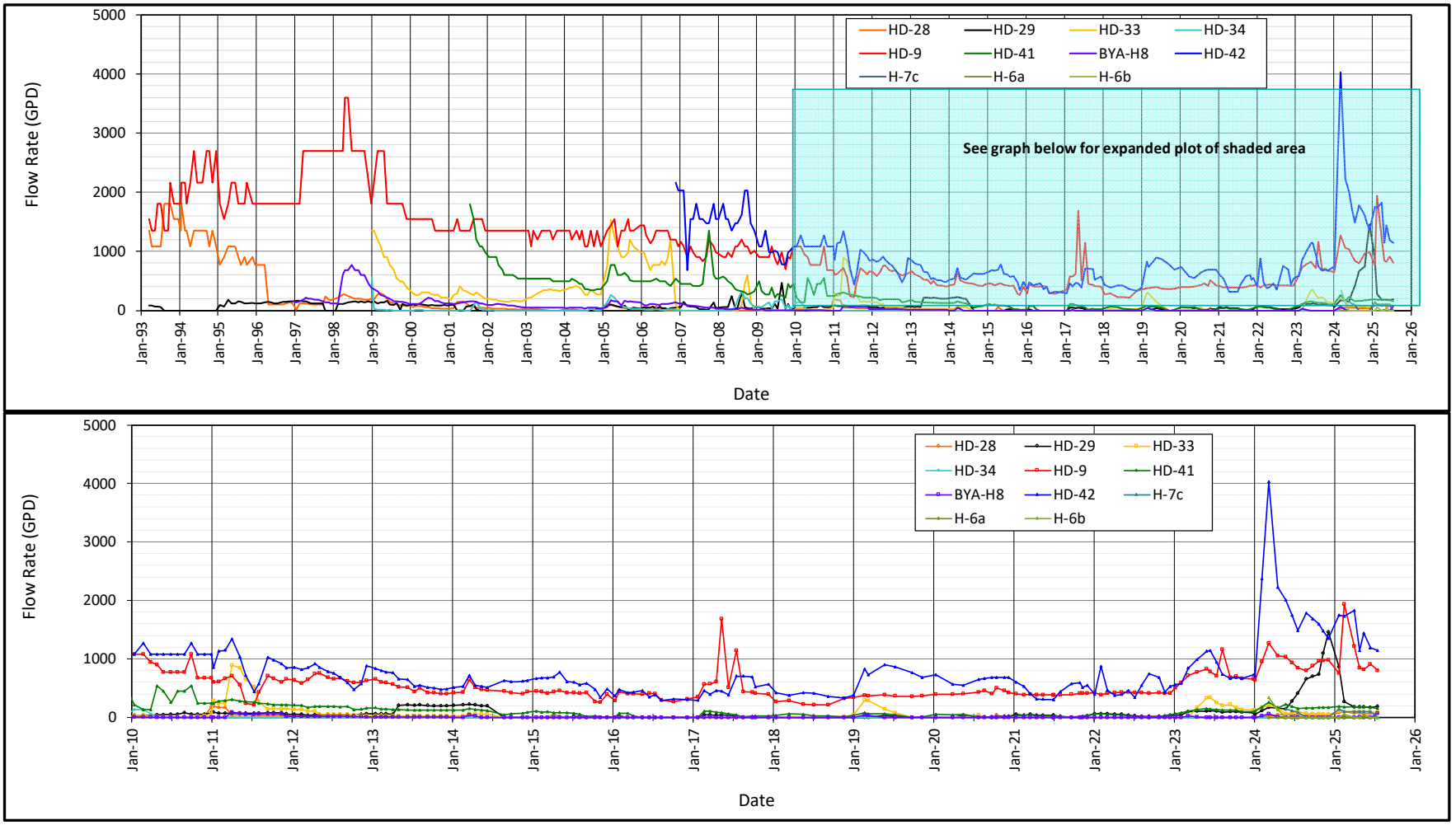
SUMMARY OF HYDRAUGER INFORMATION							
HYDRAUGER ID	**INSTALLED LENGTH (ft.)**	**OPEN LENGTH (ft.)****	**Orientation/ Slope**	**2024-2025 Average Flow (GPD)**	**% OF TOTAL PRODUCTION**	**Rank**	**INSTALLED BY**
H-1	700	210**	S115W / 3	0	--	--	MT
HD-4	760	10	-	122	0.5%	18	D.E.
HD-5	890	530**	-	520	2.0%	12	D.E.
HD-6	980	490**	-	0	--	--	D.E.
HD-7	1160	420**	-	128	0.5%	17	D.E.
HD-9	205	205**	-	995	3.9%	8	D.E.
HD-10	990	170**	-	1489	5.8%	6	D.E.
HD-11	540	540**	-	543	2.1%	11	D.E.
HD-12	690	385**	-	1399	5.5%	7	D.E.
HD-15	200	200**	-	456	1.8%	13	D.E.
HD-22	568	540**	-	4777	18.6%	1	D.E.
HD-23	1280	260**	-	3296	12.9%	4	D.E.
HD-24	1030	580**	-	694	2.7%	9	D.E.
HD-25	1005	360**	-	2	0.0%	27	D.E.
HD-26	1200	410**	S37W / 1	4647	18.1%	2	D.E.
HD-28	1420	595**	-	58	0.2%	21	D.E.
HD-29	1150	450**	-	578	2.3%	10	D.E.
HD-30	1040	10**	S13W / 7	3381	13.2%	3	D.E.
HD-33	340	340	S23W / 5	85	0.3%	19	BYA
HD-41	500	500	S18E / 3	173	0.7%	16	BYA
BYA-H8	500	345**	-	1	0.0%	29	BYA
BYA-H10	500	10**	-	3	0.0%	26	BYA
HD-42	700	700	-	1538	6.0%	5	Fugro
HD-43	700	700	-	354	1.4%	14	Fugro
H-2*	Unknown	0	-	0	--	--	MT
H-3a*	Unknown	0	-	0	--	--	MT
H-3b*	Unknown	0	-	0	--	--	MT
H-3c*	Unknown	0	-	2	0.0%	28	MT
H-4	680	115**	-	0	--	--	MT
H-5a*	Unknown	0	-	0	--	--	MT
H-5b*	Unknown	0	-	0	--	--	MT
H-6a*	100	96	-	0	--	--	CT
H-6b*	100	96	-	8	0.0%	24	CT
H-7a*	100	100	-	0	--	--	CT
H-7b*	100	96	-	0	--	--	CT
H-7c*	50	0	-	61	0.2%	20	CT
H-8*	Unknown	0	-	0	--	--	CT
HD-1*	350	340**	-	0	--	--	D.E.
HD-2a*	70	33	-	0	--	--	D.E.
HD-2b*	Unknown	0	-	0	--	--	D.E.
HD-2c*	460	0	-	0	--	--	D.E.
HD-3	560	90**	-	0	--	--	D.E.
HD-8*	530	170**	-	0	--	--	D.E.
HD-13*	650	14	-	0	--	--	D.E.
HD-14*	130	130**	-	0	--	--	D.E.
HD-16	575	575**	-	0	--	--	D.E.
HD-17*	750	176	-	0	--	--	D.E.
HD-18*	870	285	-	0	--	--	D.E.
HD-19*	1000	182	-	0	--	--	D.E.
HD-20*	1000	446	-	0	--	--	D.E.
HD-21*	1560	147	-	0	--	--	D.E.
HD-27*	700	327	-	0	--	--	D.E.
HD-31*	140	113	-	0	--	--	D.E.
HD-32*	835	700**	-	0	--	--	D.E.
HD-34	150	150	S40W / 10	0	--	--	BYA
HD-35*	40	40	-	0	--	--	BYA
HD-36*	150	150	-	0	--	--	BYA
HD-37*	430	50	-	0	--	--	BYA
HD-38A*	140	140	S23W / 5	0	--	--	BYA
HD-38B*	140	140	S18W / 6	0	--	--	BYA
HD-39	400	400	S15E / 5	228	0.9%	15	BYA
HD-40*	595	595	S25W / 6	0	--	--	BYA
BYA-6a	350	20**	-	5	0.0%	25	BYA
BYA-6b	60	60	-	29	0.1%	23	BYA
BYA-7	400	375**	-	58	0.2%	22	BYA
BYA-H9*	550	550**	-	0	--	--	BYA
BYA-H11*	450	400**	S7E / 3	0	--	--	BYA

** Not functioning or no longer monitored hydrauger*

*** Open Length is Measured on 10-1997 by BYA*

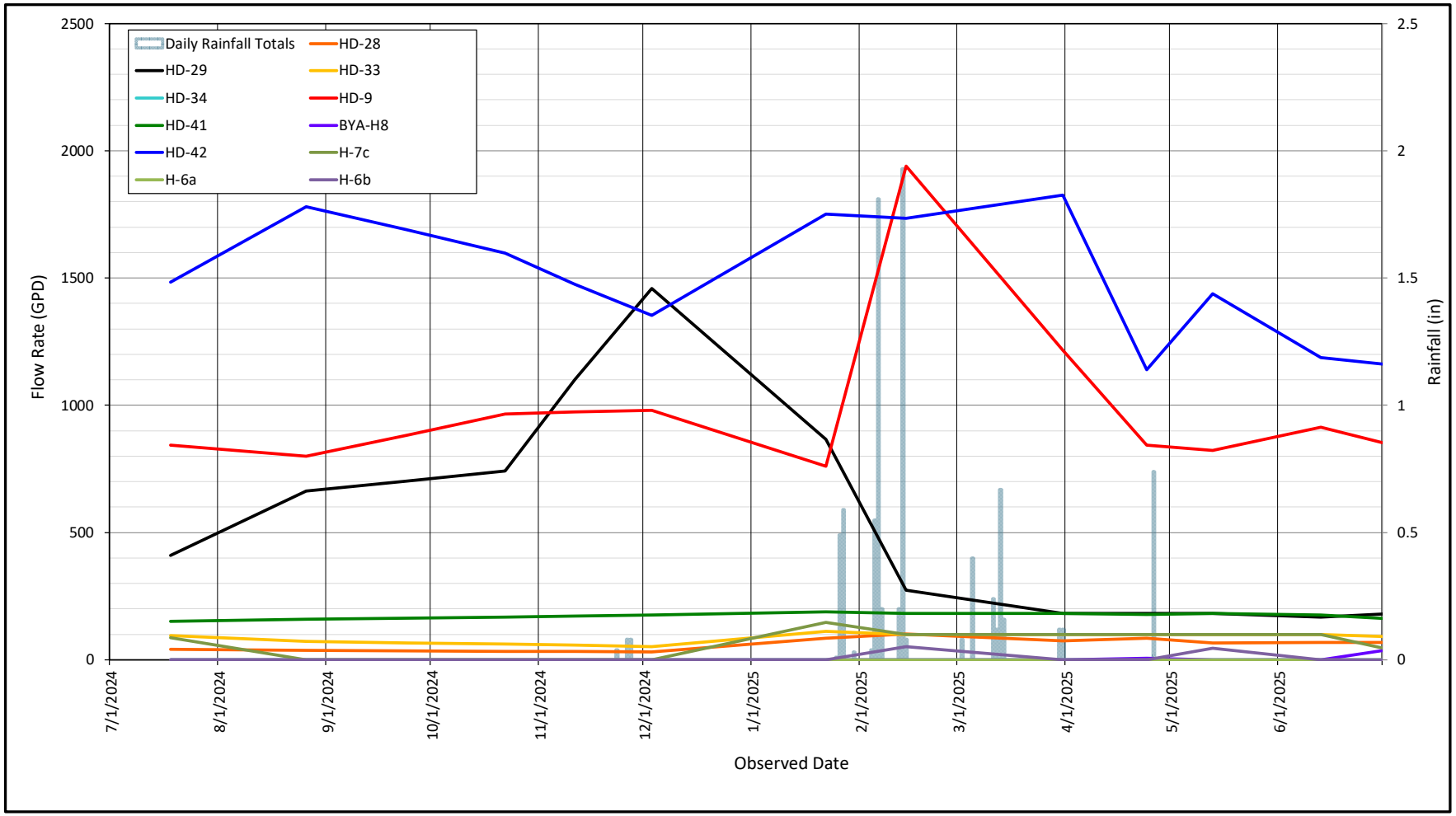
Installed by: MT = Moore & Taber; CT = Caltrans; D.E. = D.A. Evans; BYA = Bing Yen & Associates

SUMMARY OF HYDRAUGER INFORMATION
Big Rock Mesa Landlside Assessment District
Malibu, California



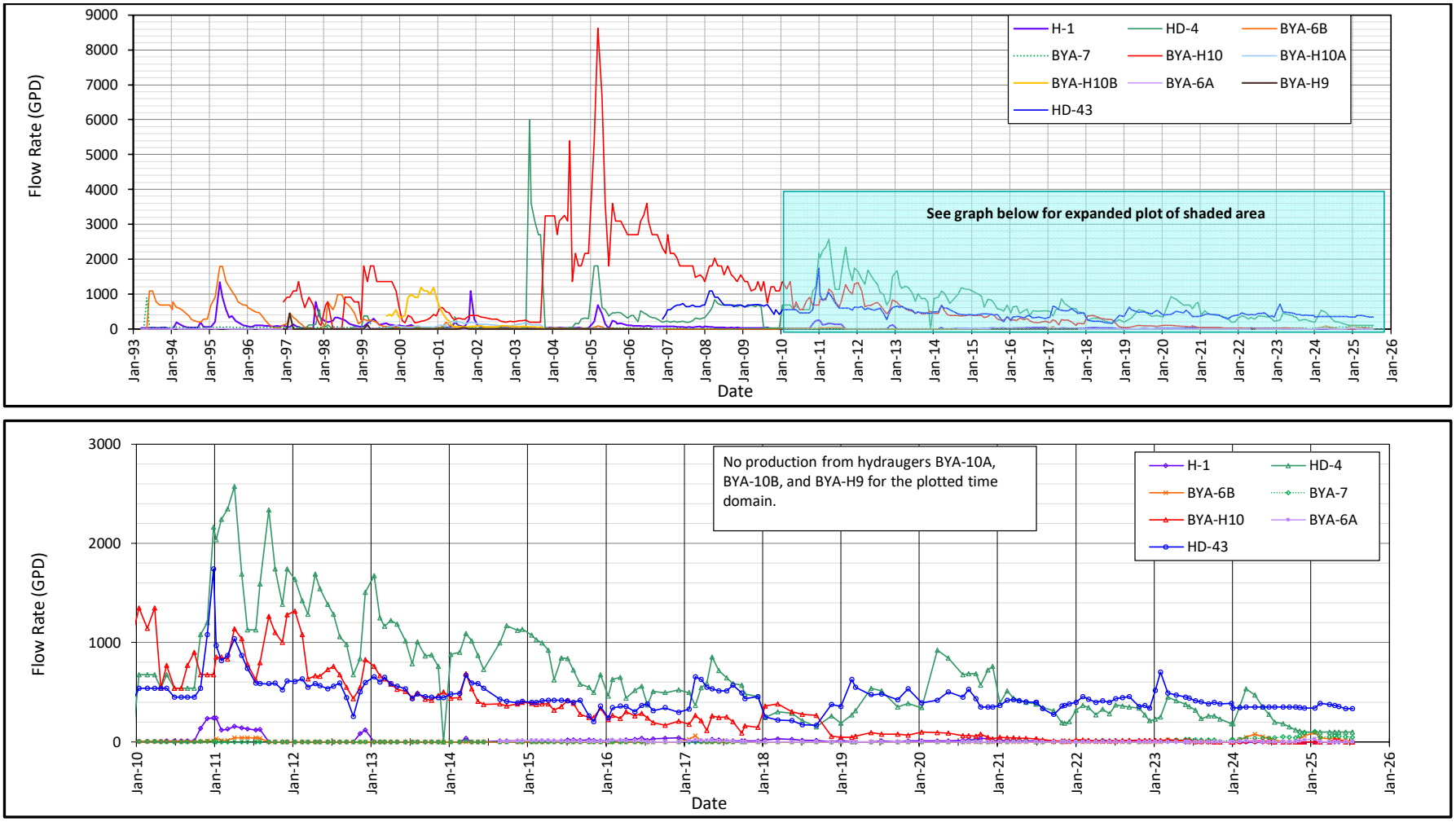
DISCHARGE RATE FOR HYDRAUGERS (HISTORIC)
Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California

Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services



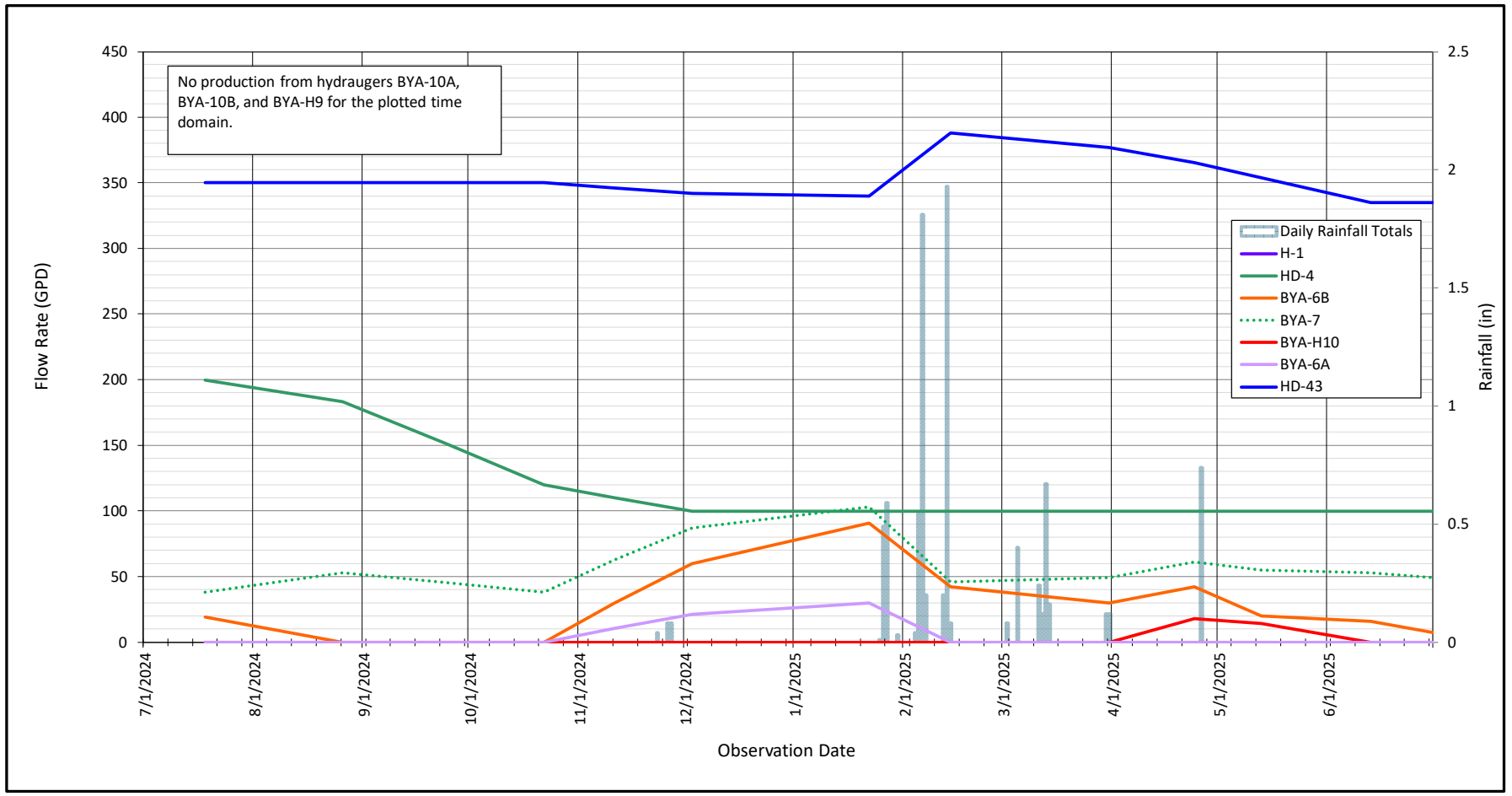
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Eastern Mesa Region
Big Rock Mesa Landslide Assessment District
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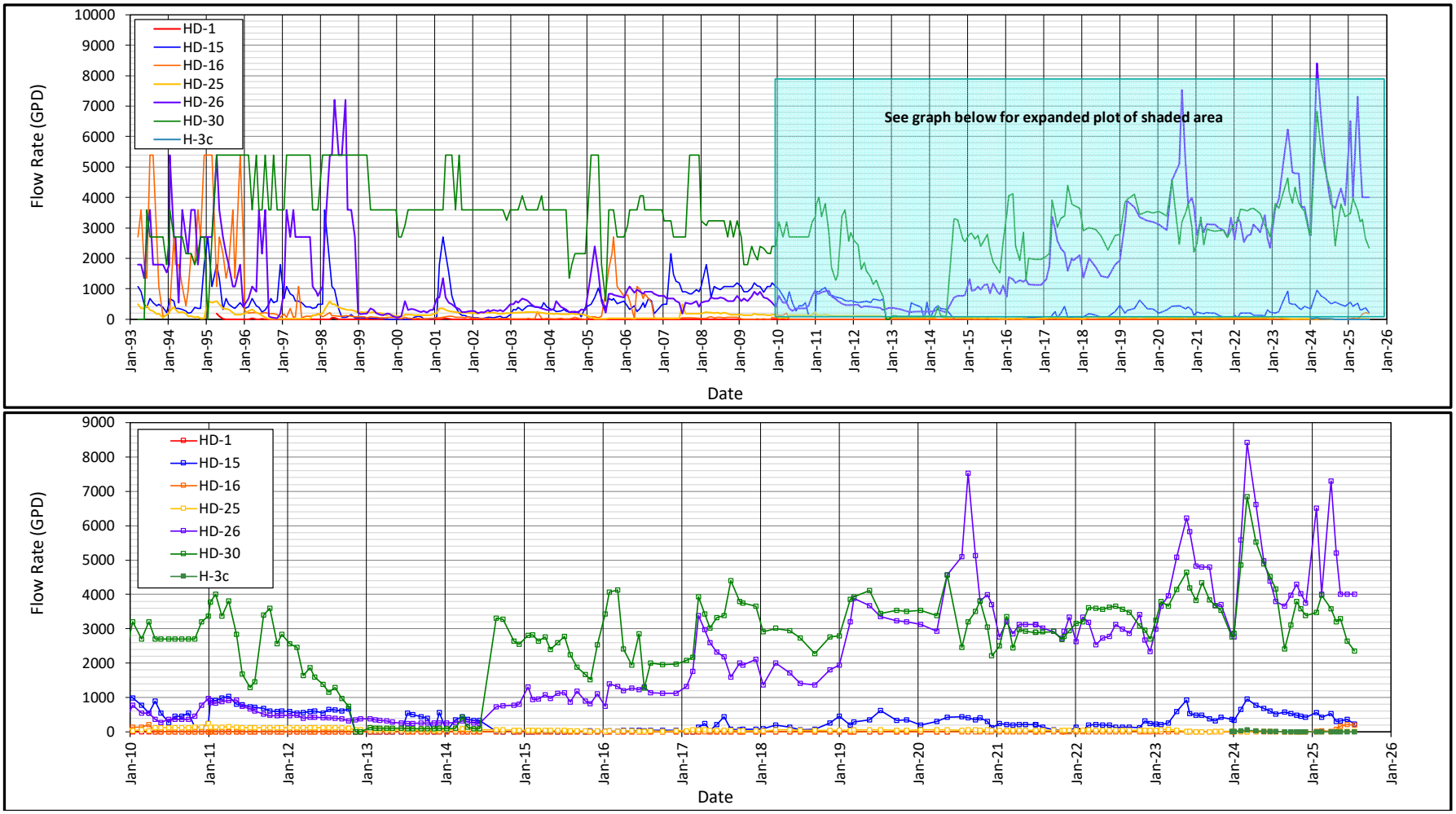
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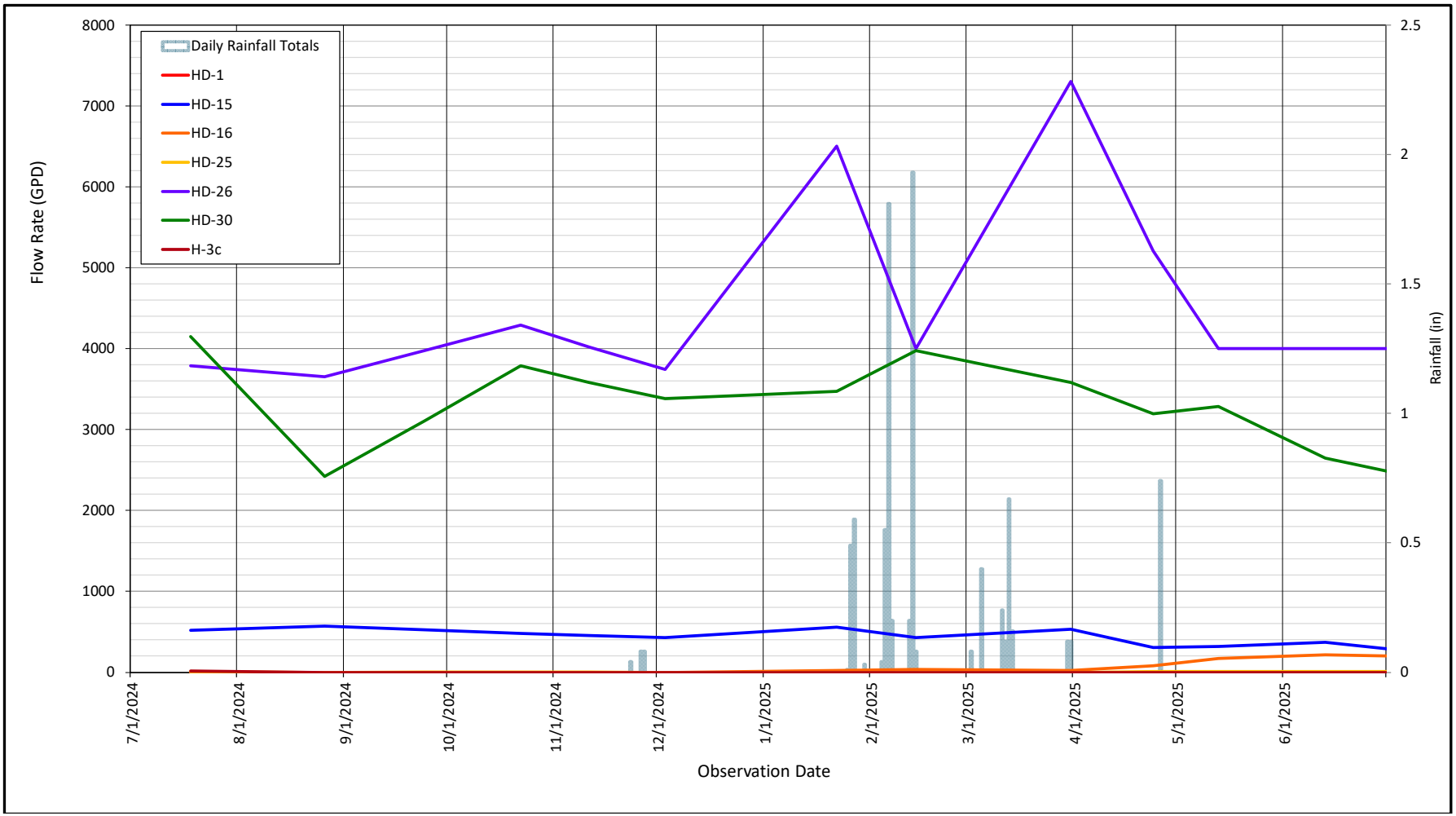
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Big Rock Mesa Landslide Assessment District
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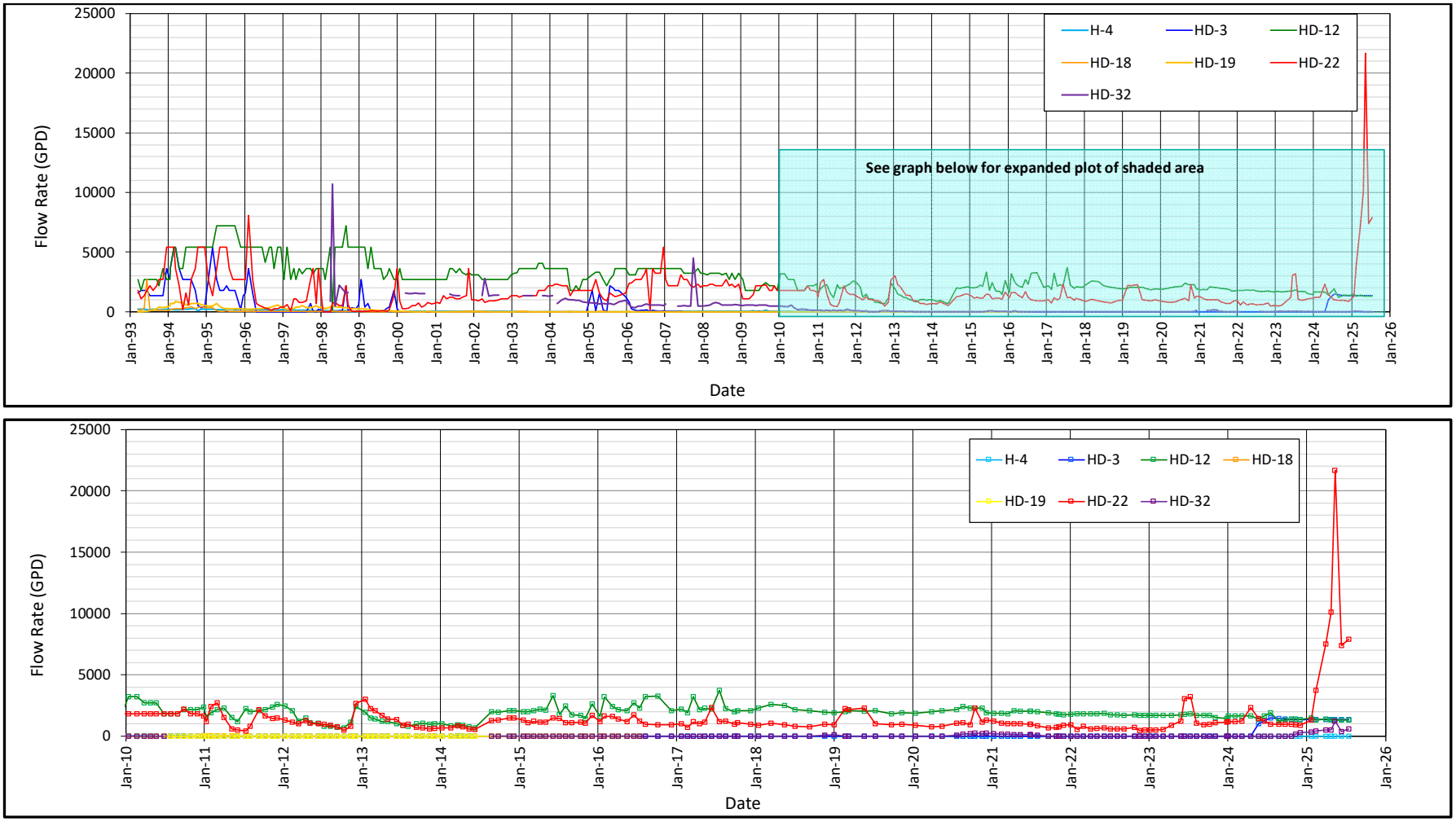
DISCHARGE RATE FOR HYDRAUGERS (HISTORIC)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California

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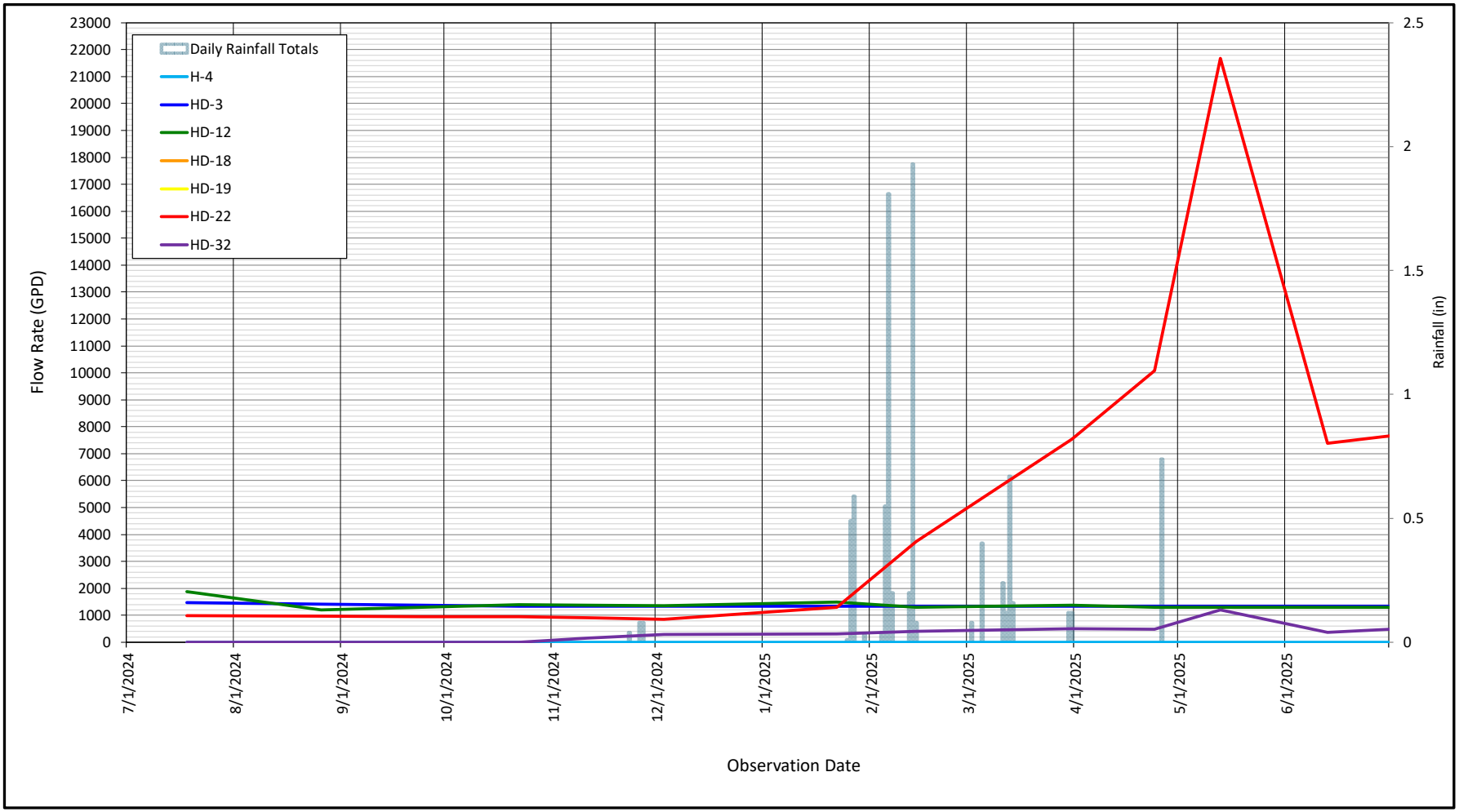


DISCHARGE RATE FOR HYDRAUGERS (MONITORING YEAR)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
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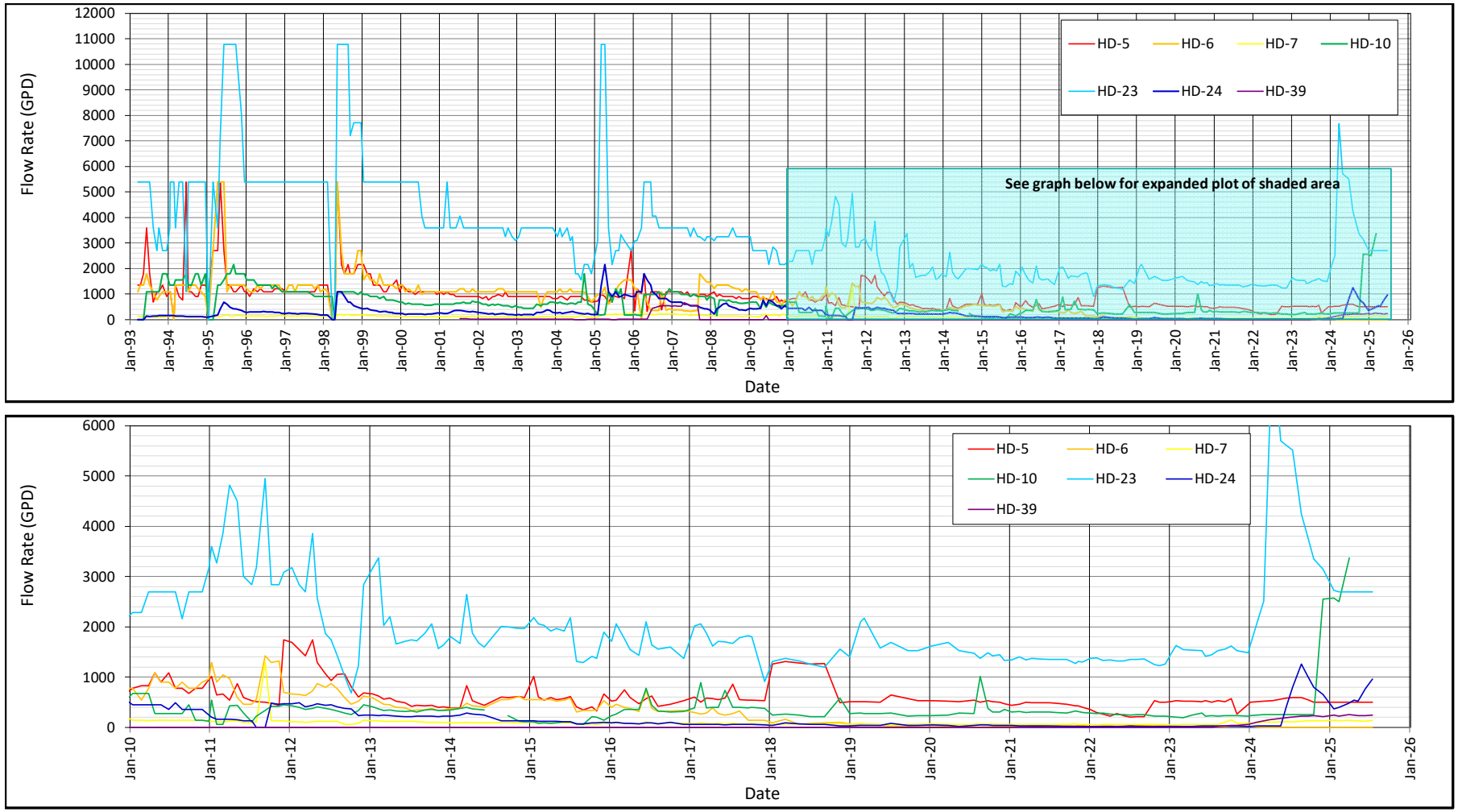


DISCHARGE RATE FOR HYDRAUGERS (HISTORIC)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California



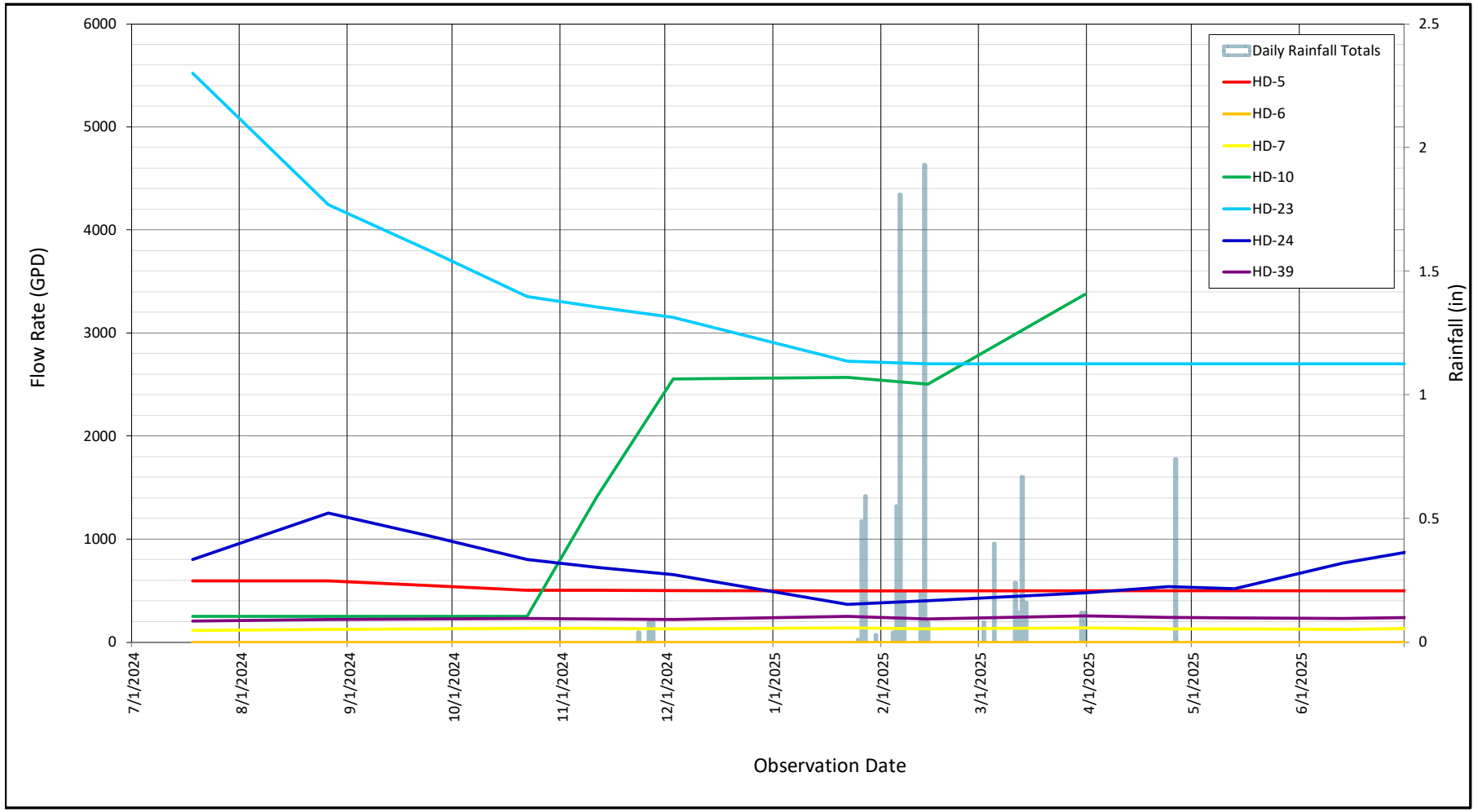
DISCHARGE RATE FOR HYDRAUGERS (MONITORING YEAR)
Central Mesa Region
Big Rock Mesa Landslide Assessment District
Malibu, California

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DISCHARGE RATE FOR HYDRAUGERS (HISTORIC)
Western Extension
Big Rock Mesa Landslide Assessment District
Malibu, California

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DISCHARGE RATE FOR HYDRAUGERS (MONITORING YEAR)
Western Extension
Big Rock Mesa Landslide Assessment District
Malibu, California

APPENDIX E - GROUNDWATER QUALITY

2024 Q3 EFFLUENT TESTING SUMMARY (Geochemistry Constituents)

Date Sampled	Sample Point	Percentage of Composite Sample	pH (Field Measured)	Temperature	Biochemical Oxygen Demand	Surfactants (MBAS)	Oil & Grease	Settleable Solids	Sulfides	Phenols	Residual Chlorine (Field Measured)	Total Suspended Solids	Turbidity	Copper	Cyanide	Mercury	Nickel	Zinc	Acute Toxicity***
				o F	*mg/L*	*mg/L*	*mg/L*	*mL/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*NTU*	*µ g/L*	µg/L	µg/L	µg/L	µg/L	% Survival
Discharges to M-001 (Outfall/Port #1a)																			
7/25/2024	BYA-14	100%	7.9	73.8	ND	ND	ND	ND	ND	ND	0.00	ND	0.10	ND	ND	ND	4.60 J	7.30 J	--
8/8/2024	BYA-14	100%	7.2	74.7	ND	ND	ND	ND	ND	ND	0.00	ND	0.10	ND	ND	ND	4.60 J	4.60 J B	--
9/16/2024	BYA-14	100%	8.4	75.0	ND	0.0736 J F1	ND	ND	ND	ND	0.01	1.30	0.20	ND	ND	ND	4.80 J	6.20 J	--
Discharges to M-002 (Outfall/Port #1)																			
7/25/2024	M-002	N/A	8	70.3	ND	ND	ND	ND	ND	ND	0.01	ND	0	ND	ND	ND	ND	ND	--
8/8/2024	M-002	N/A	8.69	69.8	ND	ND	ND	ND	ND	ND	0	ND	0.25	ND	ND	ND	3.00 J	ND	--
9/16/2024	DUP	N/A	ND	69.3	ND	ND	ND	ND	ND	ND	ND	ND	0.10	ND	ND	ND	ND	ND	
	M-002	N/A	7.45	69.3	ND	ND	ND	ND	ND	ND	0.08	ND	0.15	ND	ND	ND	ND	ND	--
Discharges to M-003 (Outfall/Port #2)																			
7/25/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Discharges to M-004 (Outfall/Port #3)																			
7/25/2024	M-004	N/A	8.55	70.9	1.24	ND	2.47	ND	ND	ND	0.02	ND	0.25	ND	ND	ND	2.90 J	ND	--
8/8/2024	M-004	N/A	8.86	70.3	ND	ND	ND	ND	ND	ND	0.03	ND	0.10	ND	ND	ND	ND	ND	--
9/16/2024	M-004	N/A	8.06	72.5	ND	0.0531 J	ND	ND	ND	ND	0.09	1.30	0.25	ND	ND	ND	2.00 J	ND	--
Discharges to M-005 (Outfall/Port #4)																			
7/25/2024	M-005	N/A	8.77	72.0	2.14	0.107 J	1.41	ND	ND	ND	0.16	ND	1.4	ND	ND	ND	1.80 J	4.90 J	--
8/8/2024	M-005	N/A	7.88	71.4	ND	ND	ND	ND	ND	ND	0.06	ND	0.45	ND	ND	ND	1.50 J	ND	--
9/16/2024	M-005	N/A	8.59	71.8	ND	0.0511 J	ND	ND	ND	ND	0.04	1.20	0.25	2.20 J	ND	ND	2.10 J	ND	--
Discharges to M-006 (Outfall/Port #5)																			
7/25/2024	M-006	N/A	7.25	77.2	ND	ND	ND	0.100	ND	ND	0	ND	0.15	ND	ND	ND	ND	ND	--
8/8/2024	M-006	N/A	7.99	71.2	ND	ND	ND	ND	ND	ND	0.05	ND	0	ND	ND	ND	ND	ND	--
9/20/2024	M-006	N/A	--	--	ND	ND	ND	ND	ND	ND	0.08	2.40	0.25	ND	ND	ND	ND	ND	--
Discharges to M-007 (Outfall/Port #5a)																			
7/25/2024	BYA-10	68%	7.25	77.2	ND	ND	ND	ND	ND	ND	0	ND	0.15	ND	ND	ND	ND	5.10 J	--
	HD-12	32%	7.12	87.8															
	DUP	--	--	--	ND	ND	ND	ND	ND	ND	--	ND	0.15	ND	ND	ND	4.80 J	8.20 J	--
8/8/2024	BYA-10	68%	7.82	73.9	ND	ND	ND	ND	ND	ND	0.06	ND	0.10	ND	ND	ND	ND	ND	--
	HD-12	32%	7.54	75.4							0.07								
	DUP	--	--	--	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--
9/16/2024	BYA-10	68%	8.57	73.9	ND	ND	ND	ND	ND	ND	0.09	ND	0.40	ND	ND	ND	3.90 J	ND	--
	HD-12	32%	8.28	73.9							0.04								
Discharges to M-008 (Outfall/Port #6)																			
7/25/2024	M-008	N/A	8.31	69.1	ND	ND	2.74	ND	ND	ND	0.1	1.20	0.3	ND	ND	ND	2.40 J	8.30 J	--
8/8/2024	M-008	N/A	7.82	69.3	ND	ND	ND	ND	ND	ND	0.1	3.80	0.30	ND	ND	ND	1.60 J	9.40 J B	--
9/16/2024	M-008	N/A	8.49	73.0	ND	ND	ND	ND	ND	ND	0.2	4.60	6.7	ND	ND	ND	1.60 J	7.00 J	--
Discharges to M-009 (Outfall/Port #7)																			
7/25/2024	HD-7	100%	8.75	75.2	ND	ND	0.618 J	ND	ND	ND	0.08	2.20	0.30	ND	ND	ND	2.70 J	ND	--
8/8/2024	HD-7	100%	8.75	78.3	ND	ND	ND	ND	ND	ND	0.05	ND	0	ND	ND	ND	ND	ND	--
9/16/2024	HD-7	100%	7.25	75.2	ND	ND	ND	ND	ND	ND	0.08	1.00	0.40	ND	ND	ND	1.60 J	ND	--
Discharges to M-010 (Outfall/Port #9)																			
7/25/2024	Port 9	100%	7.64	77.5	ND	ND	0.903 J	ND	ND	ND	0.05	1.10	0.15	ND	ND	ND	2.20 J	ND	--
8/8/2024	Port 9	100%	8.2	76.1	ND	ND	ND	ND	ND	ND	0.03	ND	0	ND	ND	ND	ND	ND	--
9/16/2024	Port 9	100%	8.33	79.9	1.51 J	0.0729 J	ND	ND	ND	ND	0.11	ND	0.15	ND	ND	ND	ND	ND	--
Effluent Limit (Daily Max.)				--	30	0.5	15	0.3	1.0	1.0	0.1	75	150	5.8	1.0	0.1	14	95	90
Effluent Limit (Daily Max. if Fecal/Total Coliform > 0.1))					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Effluent Limit (Monthly Avg.)					20	--	10	0.1	--	--	--	50	50	2.9	0.50	0.05	6.7	47	--
Water Board Minumum Limit (Table 2c)					--	--	--	--	--	--	--	--	--	10	5	0.2	20	20	--
State MCL 9/21/2021														1300	150	2	100	5000	

-- = Not tested for

--- = No established limit.
ND = Analyte Not Detected.
NR = No reading taken or not reported
DNQ = Value is greater than or equal to laboratory MDL but less than the Water Board Minimum Limit.
J= Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
A = Laboratory PQLs were raised due to sample dilution caused by high analyte concentration or matrix interference.
B = Compound was found in the blank and sample.
A01= Detection and quantitation limits were raised due to sample dilution
A07 = Detection and quantitation limits were raised due to sample dilution caused by high analyte concentration or matrix interference.
A11 = Detection and quantitation limits were raised due to inadequate sample size received.
A10 = Detection and quantitation limits were raised due to matrix interference.
A26 = Sample recieved past holding time.
D = Chromatogram not typical of motor oil.
1 = Chlorine test repeated after flow appeared to increase.
2 = Area of coalesence that discharges through M-007.
S05 = Sample holding time was exceeded.
S16 = Sample analysis performed outside the method holding time and reported per client request.
F1 = MS and/or MSD recovery exceeds control limits.
*- = LCS and/or LCSD is outside acceptance limits, low biased

0.12 Exceedance of effluent limit (Daily Max.) or exceedance of Water Board Minimum Limit (Table 2c)
22 Exceedance of effluent limit (Monthly Avg.) but not an exceedance of effluent limit (Daily Max.)
\+ Waiting for data
Exceedance Sampling Needed

2024 Q3 EFFLUENT TESTING SUMMARY (Saltwater Bacteria)

Date Sampled	Sample Point	Percentage of Composite Sample	pH (Field Measured)	Temperature	Total Coliform	Fecal Coliform	Fecal/Total Coliform >0.1?	Enterococcus
				°F	MPN/100ml	MPN/100ml		MPN/100ml
Discharges to M-001 (Outfall/Port #1a)								
8/22/2024	BYA-14	N/A	--	--	>1600	49	Yes	<1
	FW-1	No Flow	--	--	--	--	--	--
Discharges to M-002 (Outfall/Port #1)								
8/8/2024	BYA-5	11%	--	--	2	<1.8	No	--
	HD-9	21%						
	HD-42	41%						
	BYA-6	27%						
8/12/2024	BYA-5	N/A	--	--	<1.8	<1.8	No	--
	HD-9	N/A	--	--	70	<1.8	No	--
	HD-42	N/A	--	--	<1.8	<1.8	No	--
8/13/2024	BYA-6	N/A	--	--	<1.8	<1.8	No	--
	BYA-12	No Flow	--	--	--	--	--	--
	HD-29	No Flow	--	--	--	--	--	--
	HD-33	No Flow	--	--	--	--	--	--
9/5/2024	HD-29	N/A	--	--	<1.8	<1.8	No	<1
9/9/2024	BYA-6	N/A	--	--	--	--	--	<1
	BYA-5	N/A	--	--	--	--	--	6.3
	HD-9	N/A	--	--	--	--	--	1
	HD-42	N/A	--	--	--	--	--	1
Discharges to M-003 (Outfall/Port #2)								
8/22/2024	HD-41	N/A	--	--	<1.8	<1.8	No	<1
	BYA-7	No Flow	--	--	--	--	--	--
	BYA-6A	No Flow	--	--	--	--	--	--
	BYA-6B	No Flow	--	--	--	--	--	NR
--								
9/9/2024	W-2	N/A	--	--	350	110	Yes	61.3
	W-1	N/A	--	--	920	70	Yes	<1
	BYA-13	N/A	--	--	<1.8	<1.8	No	<1
	W-3	N/A	--	--	1.8	<1.8	No	<1
	HD-30	N/A	--	--	<1.8	<1.8	No	<1
	HD-4	No Flow	--	--	--	--	--	--
	HD-43	Buried	--	--	--	--	--	--
Discharges to M-005 (Outfall/Port #4)								
9/5/2024	W-17	N/A	--	--	7.8	<1.8	No	<1
	BYA-1	N/A	--	--	<1.8	<1.8	No	<1
	BYA-7	N/A	--	--	<1.8	<1.8	No	<1
	FW-2	N/A	--	--	<1.8	<1.8	No	<1
	HD-15	N/A	--	--	<1.8	<1.8	No	<1
	HD-26	N/A	--	--	23	<1.8	No	<1
	W-8	No Flow	--	--	--	--	--	--
Discharges to M-006 (Outfall/Port #5)								
9/9/2024	W-16	N/A	--	--	<1.8	<1.8	No	<1
	BYA-4	No Flow	--	--	--	--	--	--
	BYA-9	No Flow	--	--	--	--	--	--
	W-13	N/A	--	--	<1.8	<1.8	No	<1
	BYA-11	No Flow	--	--	--	--	--	--
	HD-22	N/A	--	--	1.8	<1.8	No	<1
	HD-3	N/A	--	--	11	<1.8	No	<1
Discharges to M-007 (Outfall/Port #5a)								
9/5/2024	BYA-10	N/A	--	--	4.5	<1.8	No	<1
	HD-12	N/A	--	--	<1.8	<1.8	No	<1
Discharges to M-008 (Outfall/Port #6)								
9/5/2024	BYA-2	N/A	--	--	4	<1.8	No	<1
9/9/2024	BYA-3	No Flow	--	--	--	--	--	--
	W-18	No Flow	--	--	--	--	--	--
	HD-10	Buried	--	--	--	--	--	--
	HD-11	Buried	--	--	--	--	--	--
Discharges to M-009 (Outfall/Port #7)								
8/26/2024	HD-7	N/A	--	--	2	<1.8	No	<1
Discharges to M-010 (Outfall/Port #9)								
8/26/2024	HD-5	N/A	--	--	<1.8	<1.8	No	5.1
	HD-39	N/A	--	--	<1.8	<1.8	No	<1
	HD-23	N/A	--	--	<1.8	<1.8	No	<1
	HD-24	N/A	--	--	1.8	<1.8	No	<1
Effluent Limit (Daily Max.)			--	--	10000	400		104
Effluent Limit (Daily Max. if Fecal/Total Coliform > 0.1))					--	1000	--	--
Effluent Limit (Monthly Avg.)				--	1000	200		35
Water Board Minumum Limit (Table 2c)					--	--	--	--
State MCL 9/21/2021								

0.12	Exceedance of effluent limit (Daily Max.) or exceedance of Water Board Minimum Limit (Table 2c)
22	Exceedance of effluent limit (Monthly Avg.) but not an exceedance of effluent limit (Daily Max.)
+	Waiting for data
	Exceedance Sampling Needed
-- =	Not tested for

--- =	No established limit.
ND =	Analyte Not Detected.
NR =	No reading taken
DNQ =	Value is greater than or equal to laboratory MDL but less than the Water Board Minimum Limit.
J=	Laboratory estimated value, below laboratory PQL and above the laboratory MDL.
A =	Laboratory PQLs were raised due to sample dilution caused by high analyte concentration or matrix interference.
B =	Indicates laboratory measurement.
A01=	Detection and quantitation limits were raised due to sample dilution
A07 =	Detection and quantitation limits were raised due to sample dilution caused by high analyte concentration or matrix interference.
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A26 =	Sample recieved past holding time.
D =	Chromatogram not typical of motor oil.
1 =	Chlorine test repeated after flow appeared to increase.
2 =	Area of coalesence that discharges through M-007.
S05 =	Sample holding time was exceeded.
S16 =	Sample analysis performed outside the method holding time and reported per client request.
F1 =	MS and/or MSD recovery exceeds control limits.
*- =	LCS and/or LCSD is outside acceptance limits, low biased

2024 Q4 EFFLUENT TESTING SUMMARY (Geochemistry Constituents)

Date Sampled	Sample Point	Percentage of Composite Sample	pH (Field Measured)	Temperature	Biochemical Oxygen Demand	Surfactants (MBAS)	Oil & Grease	Settleable Solids	Sulfides	Phenols	Residual Chlorine (Field Measured)	Total Suspended Solids	Turbidity	Copper	Cyanide	Mercury	Nickel	Zinc	Acute Toxicity***
				° F	*mg/L*	*mg/L*	*mg/L*	*mL/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*NTU*	*µg/L*	*µg/L*	µg/L	*µg/L*	*µg/L*	*% Survival*
Discharges to M-001 (Outfall/Port #1a)																			
10/14/2024	NR	0%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2024	NR	0%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/26/2024	NR	0%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Discharges to M-002 (Outfall/Port #1)																			
10/14/2024	M-002	N/A	8.4	70.5	1.03 J *-	ND	ND	ND	ND	ND	--	4.70	ND	1.90 J B	ND	ND	ND	7.30 J	--
	Duplicate	N/A	8.4	70.5	ND	ND	ND	ND	ND	ND	--	4.40	ND	1.90 J B	ND	ND	ND	ND	--
11/12/2024	M-002	N/A	--	--	ND	0.0540 J	ND	ND	ND	ND	--	1.20	ND	ND	ND	ND	ND	ND	--
12/26/2024	M-002	N/A	7.5	66.9	ND	ND	2.29	ND	ND	ND	0.03	ND	ND	ND	ND	ND	ND	ND	100
	Duplicate	N/A	7.5	66.9	ND	ND	0.803 J	ND	ND	ND	0.03	ND	ND	ND	ND	0.203	ND	ND	100
Discharges to M-003 (Outfall/Port #2)																			
10/14/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/26/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Discharges to M-004 (Outfall/Port #3)																			
10/14/2024	M-004	N/A	8.6	73.6	2.01 *-	0.0789 J	ND	ND	ND	ND	--	18.3	ND	2.80 J B	ND	0.129 J	ND	6.60 J	--
11/12/2024	M-004	N/A	--	--	1.05 J	0.357	ND	ND	ND	ND	--	3.50	1.0	3.00 J	ND	0.144 J F1	ND	4.70 J	--
12/26/2024	M-004	N/A	7.5	67.6	ND	ND	ND	ND	ND	ND	0.08	ND	ND	1.60 J	ND	ND	ND	ND	100
Discharges to M-005 (Outfall/Port #4)																			
10/14/2024	M-005	N/A	8.7	71.1	ND	ND	ND	ND	ND	ND	--	3.90	ND	2.60 J B	ND	0.126 J	ND	7.40 J	--
11/12/2024	M-005	N/A	--	--	2.42	ND	1.27	ND	ND	ND	--	0.900 J	ND	ND	ND	ND	ND	ND	--
12/26/2024	M-005	N/A	7.5	69.4	5.14	1.71	1.69	ND	ND	ND	0.01	1.70	ND	ND	ND	ND	ND	ND	100
Discharges to M-006 (Outfall/Port #5)																			
10/14/2024	M-006	N/A	8.6	72.0	ND	ND	ND	ND	ND	ND	--	4.20	ND	ND	ND	0.125 J	ND	ND	--
11/12/2024	M-006	N/A	--	--	ND	ND	ND	ND	ND	ND	--	4.80	ND	ND	ND	ND	ND	ND	--
12/26/2024	M-006	N/A	7.7	70.0	ND	ND	0.608 J	ND	ND	ND	0.01	ND	ND	ND	ND	ND	ND	ND	100
Discharges to M-007 (Outfall/Port #5a)																			
10/14/2024	BYA-10	100%	9.0	72.3	ND	ND	ND	ND	ND	ND	0.09	4.30	ND	ND	ND	ND	ND	ND	--
11/12/2024	BYA-10	100%	--	--	ND	ND	0.613 J	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--
12/26/2024	BYA-10	100%	6.6	70.3	ND	ND	ND	ND	ND	ND	0.04	ND	ND	ND	ND	ND	ND		100
Discharges to M-008 (Outfall/Port #6)																			
10/14/2024	NR	N/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2024	M-008	N/A	7.5	69.3	ND	ND	ND	0.600	ND	ND	0.00	130	1.60	ND	ND	ND	ND	0.500 J	--
12/26/2024	M-008	N/A	7.4	65.8	ND	ND	ND	0.100	ND	ND	0.05	16.5	1.6	ND	ND	ND	ND	5.00 J	100
Discharges to M-009 (Outfall/Port #7)																			
10/14/2024	HD-7	100%	8.3	76.5	ND	ND	ND	ND	ND	ND	--	6.40	ND	ND	ND	ND	ND	ND	--
11/12/2024	HD-7	100%	--	--	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--
	Duplicate	N/A	--	--	ND	ND	ND	ND	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	--
12/26/2024	HD-7	100%	7.3	70.2	ND	ND	ND	ND	ND	ND	0.03	ND	ND	ND	ND	0.228	ND	ND	100
Discharges to M-010 (Outfall/Port #9)																			
10/14/2024	NR	100%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2024	NR	100%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/26/2024	NR	100%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Effluent Limit (Daily Max.)			--	--	30	0.5	15	0.3	1.0	1.0	0.1	75	150	5.8	1.0	0.1	14	95	90
Effluent Limit (Daily Max. if Fecal/Total Coliform > 0.1)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Effluent Limit (Monthly Avg.)				--	20	--	10	0.1	--	--	--	50	50	2.9	0.50	0.05	6.7	47	--
Water Board Minumum Limit (Table 2c)					--	--	--	--	--	--	--	--	--	10	5	0.2	20	20	--
State MCL 9/21/2021														1300	150	2	100	5000	

-- = Not tested for

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J= Laboratory estimated value, below laboratory PQL and above the laboratory MDL.

A = Laboratory PQLs were raised due to sample dilution caused by high analyte concentration or matrix interference.

B = Compound was found in the blank and sample

A01= Detection and quantitation limits were raised due to sample dilution

A07 = Detection and quantitation limits were raised due to sample dilution caused by high analyte concentration or matrix interference.

A11 = Detection and quantitation limits were raised due to inadequate sample size received.

A10 = Detection and quantitation limits were raised due to matrix interference.

A26 = Sample recieved past holding time.

D = Chromatogram not typical of motor oil.

1 = Chlorine test repeated after flow appeared to increase.

2 = Area of coalesence that discharges through M-007.

S05 = Sample holding time was exceeded.

S16 = Sample analysis performed outside the method holding time and reported per client request.

F1 = MS and/or MSD recovery exceeds control limits.

*- = LCS and/or LCSD is outside acceptance limits, low biased

0.12	Exceedance of effluent limit (Daily Max.) or exceedance of Water Board Minimum Limit (Table 2c)
22	Exceedance of effluent limit (Monthly Avg.) but not an exceedance of effluent limit (Daily Max.)
+	Waiting for data
	Exceedance Sampling Needed

2024 Q4 EFFLUENT TESTING SUMMARY (Saltwater Bacteria)

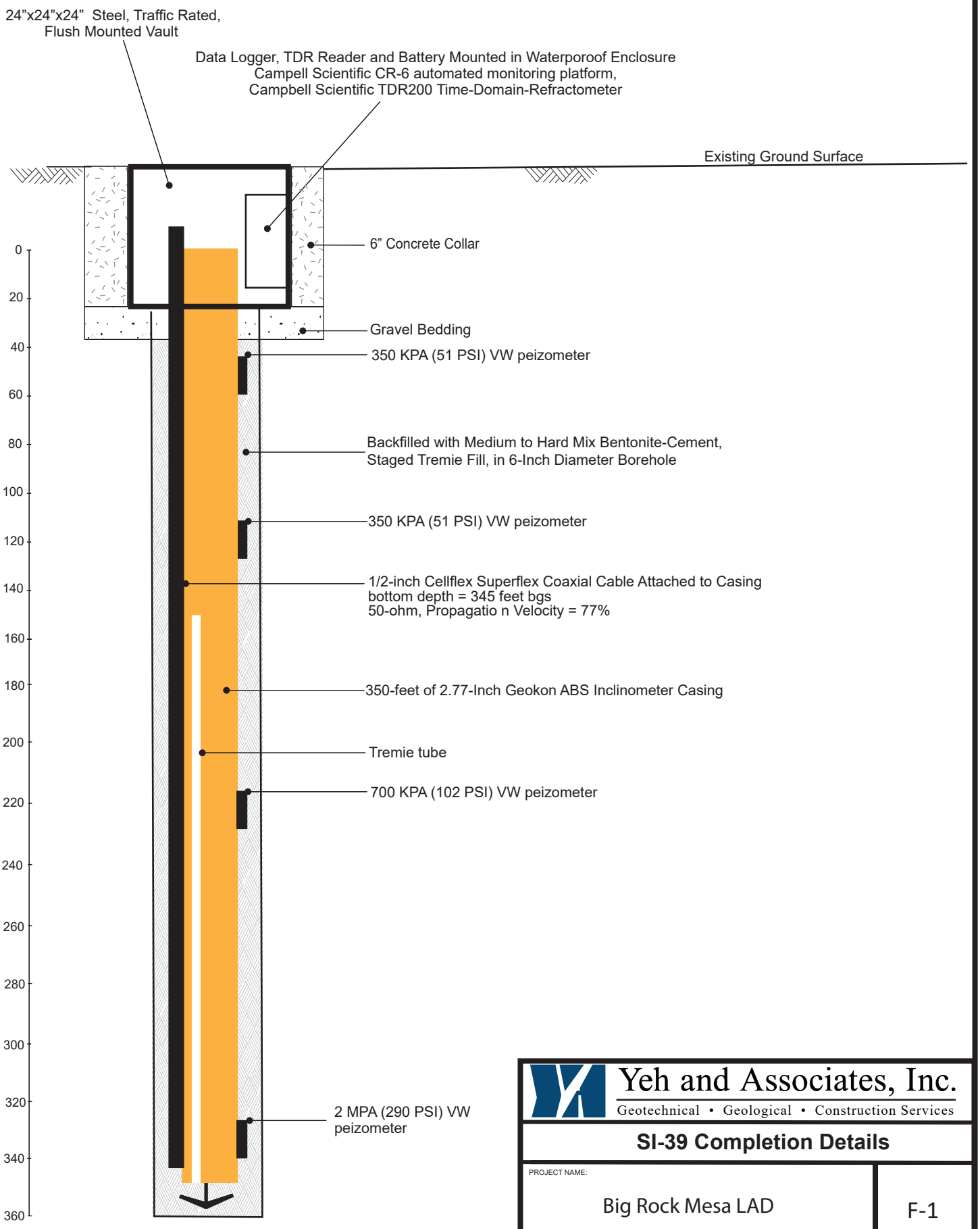
Date Sampled	Sample Point	Percentage of Composite Sample	pH (Field Measured)	Temperature	Total Coliform	Fecal Coliform	Fecal/Total Coliform >0.1?	Enterococcus
				°F	MPN/100ml	MPN/100ml		MPN/100ml
Discharges to M-001 (Outfall/Port #1a)								
12/27/2024	BYA-14	No Flow	--	--	--	--	--	--
	FW-1	No Flow						
Discharges to M-002 (Outfall/Port #1)								
12/27/2024	BYA-5	9%	--	--	<1.8	<1.8	No	<1
	HD-9	20%						
	HD-42	30%						
	BYA-6	11%						
	HD-29	22%						
Discharges to M-003 (Outfall/Port #2)								
12/27/2024	HD-41	N/A	--	--	--	--	--	--
	BYA-7	No Flow						
	BYA-6A	No Flow						
	BYA-6B	No Flow						
Discharges to M-004 (Outfall/Port #3)								
12/27/2024	W-2	20%	--	--	79	<1.8	No	2
	W-1	17%						
	BYA-13	12%						
	W-3	10%						
	HD-30	36%						
	HD-4	1%						
	HD-43	3%						
Discharges to M-005 (Outfall/Port #4)								
12/27/2024	W-17	14%	--	--	1.8	<1.8	No	<1
	BYA-1	48%						
	BYA-7	6%						
	FW-2	8%						
	HD-15	2%						
	HD-26	21%						
	W-8	No Flow						
Discharges to M-006 (Outfall/Port #5)								
12/27/2024	W-16	66%	--	--	<1.8	<1.8	No	<1
	BYA-4	0%						
	BYA-9	0%						
	W-13	16%						
	BYA-11	8%						
	HD-22	4%						
	HD-3	6%						
	HD-32	1%						
Discharges to M-007 (Outfall/Port #5a)								
12/27/2024	BYA-10	N/A	--	--	13	<1.8	No	<1
	Dupe	N/A			<1.8	<1.8	No	<1
Discharges to M-008 (Outfall/Port #6)								
12/27/2024	BYA-3	No Flow	--	--	33.00	<1.8	No	<1
	BYA-2	No Flow						
	W-18	No Flow						
	HD-10	38%						
	HD-11	15%						
	HD-12	38%						
Discharges to M-009 (Outfall/Port #7)								
12/27/2024	HD-7	N/A	--	--	<1.8	<1.8	No	<1
Discharges to M-010 (Outfall/Port #9)								
12/27/2024	HD-5	N/A	--	--	--	--	--	--
	HD-39	N/A						
	HD-23	N/A						
	HD-24	N/A						
Effluent Limit (Daily Max.)			--	--	10000	400		104
Effluent Limit (Daily Max. if Fecal/Total Coliform > 0.1))					--	1000	--	--
Effluent Limit (Monthly Avg.)				--	1000	200		35
Water Board Minumum Limit (Table 2c)					--	--	--	--
State MCL 9/21/2021								

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APPENDIX F - NEW FACILITY DIAGRAM

Not To Scale



Yeh and Associates, Inc.
Geotechnical • Geological • Construction Services

SI-39 Completion Details

PROJECT NAME: Big Rock Mesa LAD

F-1

PROJECT NUMBER: 220-276

DATE: rev. 9/26/25