
Report on Structural Integrity of Light Poles

Date: 12/8/2019

Purpose of Study

The property contains 18 light poles in the parking facility. One of these poles failed and collapsed (Figure 1). An examination of the failed pole found extensive rusting around the base of the pole, indicating that water had likely been pooling inside the pole and causing it to rust from the inside out (Figures 2 and 3).

The purpose of this study is to examine the remaining 17 light poles and determine if they have experienced internal rusting and need to be replaced.



Figure 1: Downed light pole on NE corner of the property.



Figure 2: Rusting visible at base of downed pole.



Figure 3: Internal view of rusting at base of downed pole.

Methods

Roxana Safipour of ES Denver performed an inspection of all 17 remaining light poles. An ultrasonic metal thickness gauge was used to measure the thickness of the steel around the base of each light pole. Measurements were taken 1 – 1.5 inches apart, with a minimum of 20 measurements taken around the circumference of each pole base.

The uncorroded section of the downed pole showed thicknesses of 1/8th inch (0.125”) or greater, while the corroded section at the base of the downed pole showed thicknesses of less than 0.125” in many locations, with some spots measuring as thin as 0.01”. Based on the profile obtained from the downed pole, for the purpose of this study, a measured steel thickness of 0.12” or greater around the entire base of a pole is required to pass the structural integrity test. If sections of the base are found to be thinner than 0.12”, the pole has likely experienced some internal deterioration from rusting and is recommended to be replaced.

Poles were also visually inspected for any signs of rusting showing on the outside of the pole.

Results

All 17 remaining poles were measured with the ultrasonic steel thickness gauge. 12 poles passed with thicknesses of 0.12” or greater around the entire base. 3 poles failed, with significant sections of the base measured at less than 0.12” and visible rusting showing on the outside of the pole. 2 poles are considered marginal, with measurements indicating mild deterioration on a small section of the base, although no rusting was visible from the outside on these poles.

Pole Locations

The map (Figure 4) shows the locations of the numbered poles and indicates which poles received a rating of pass (green), marginal (yellow), or fail (red). Note that pole number 1 indicates the pole which already fell down.

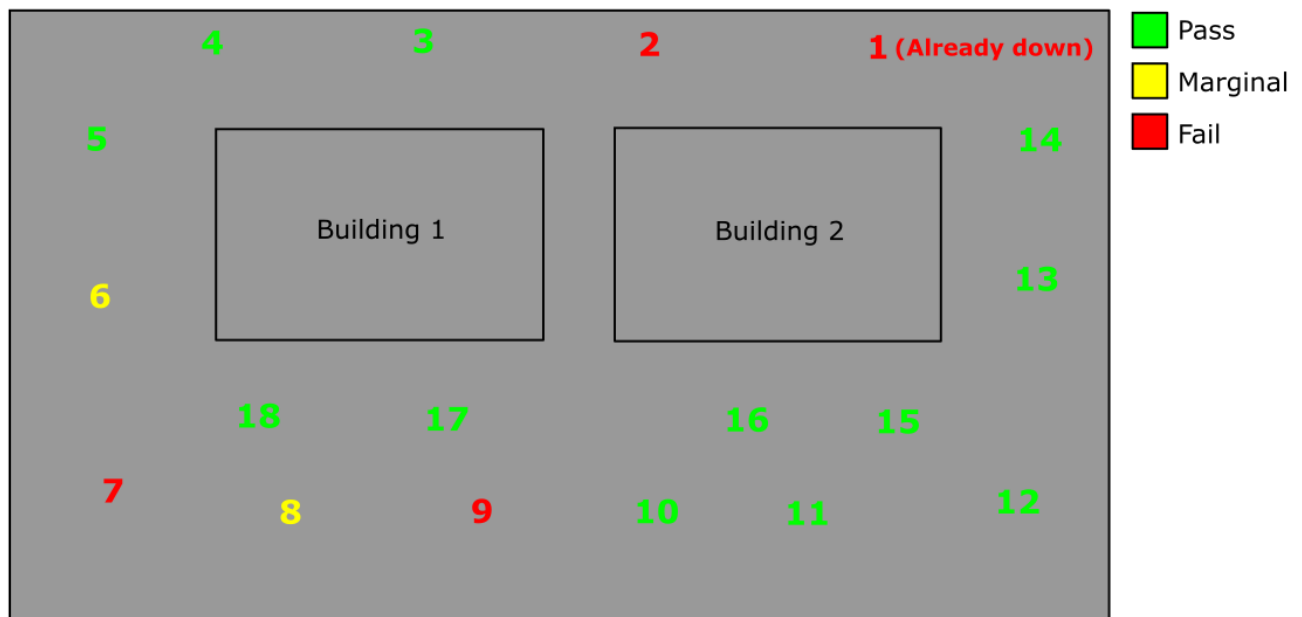


Figure 4: Map of light pole locations.

Recommendations

ES Denver recommends repair or replacement of all failed and marginal poles. It is the opinion of ES Denver that these poles have experienced deterioration from internal rusting and may no longer be structurally sound.

- Poles 2, 6, 7, 8, and 9 should be replaced or repaired.
- If the owner wishes to repair the poles rather than replacing them, ES Denver may be contracted to design a repair plan.
- The property owner should perform regular visual inspections of all light pole bases to look for any visible signs of rusting. If visible rusting develops in the future on any pole, ES Denver should be notified to perform a follow-up inspection.

Additionally, it was observed that several light poles were surrounded by large snow piles from plowing of the parking lot (Figures 5 & 6). Given that the last snowstorm occurred more than a week prior to this observation, it seems likely that these poles were at one time buried in snow above the height of the concrete pedestal. Burial of the pole in snow above the concrete pedestal may be a contributing factor to water penetrating the light pole base. It is recommended that the snow plowing procedures of the parking lot be modified to prevent burial of the concrete pedestals.



Figure 5: Pole number 7 with large pile of snow plowed around the base.

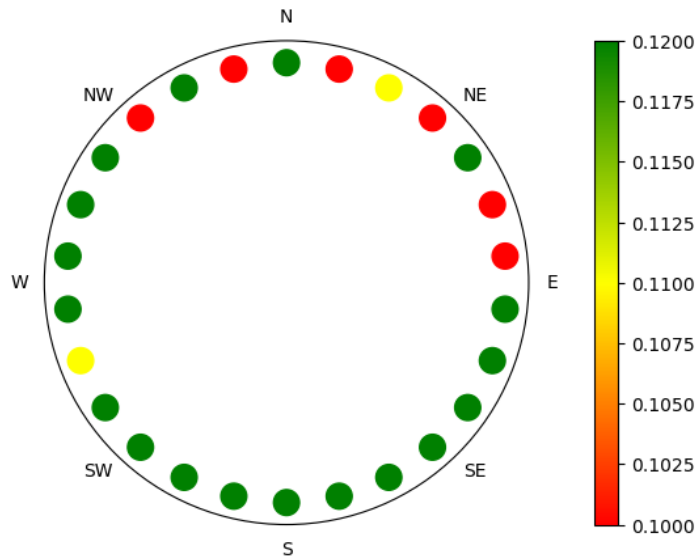


Figure 6: Pole number 12 with large pile of snow plowed around the base.

Individual Light Pole Data

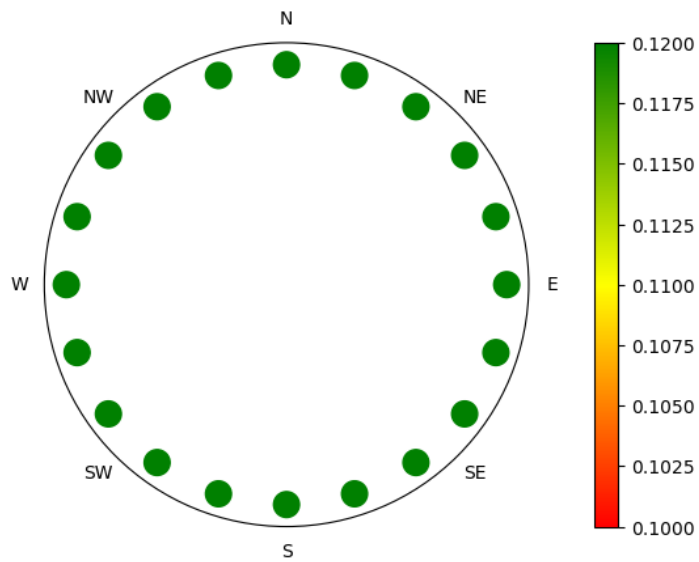
Note: All measurements are in inches.

POLE #2



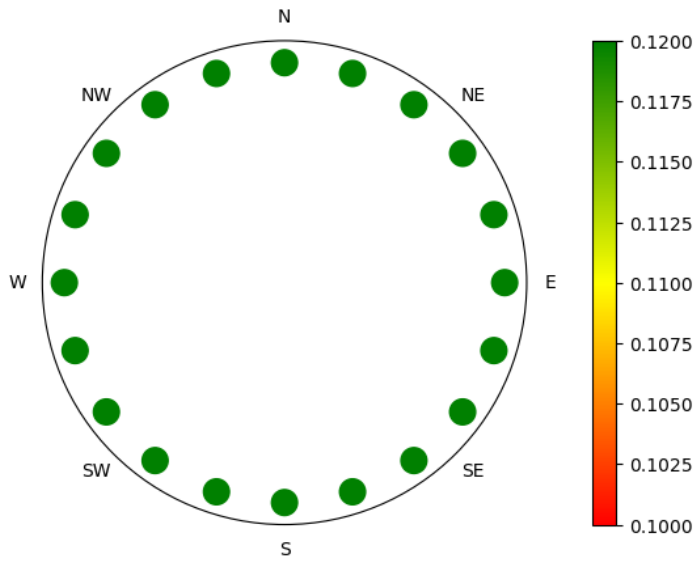
Observations: Minor rusting visible on north side.

POLE #3



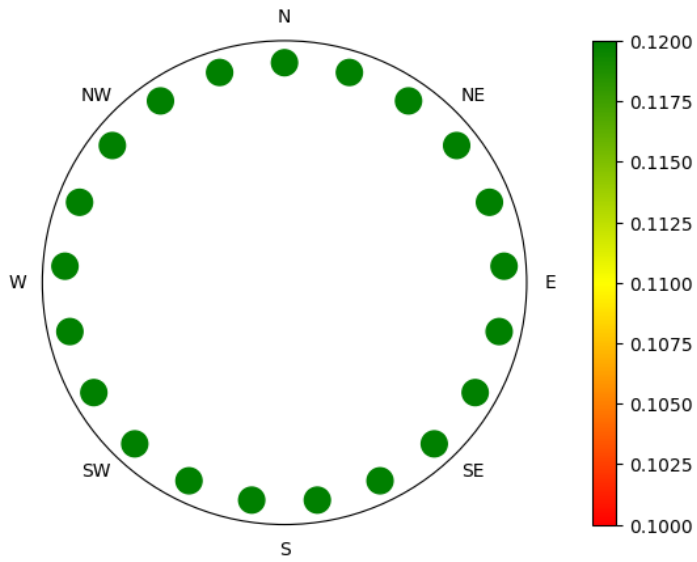
Observations: No visible rusting.

POLE #4



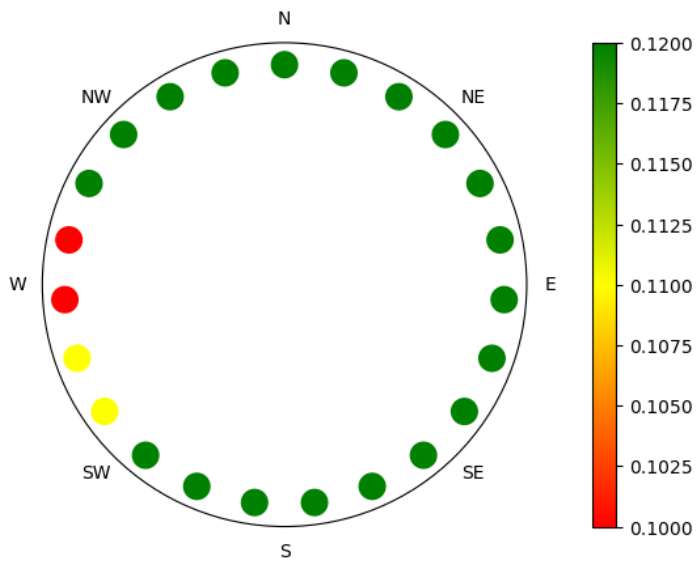
Observations: No visible rusting.

POLE #5



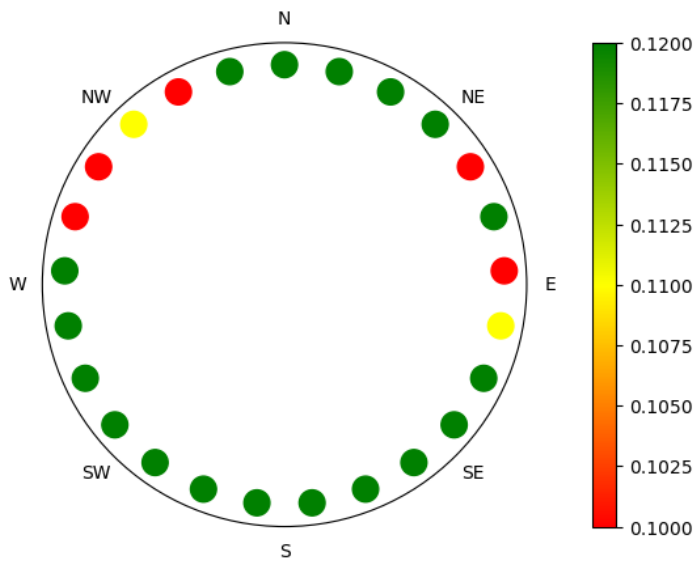
Observations: No visible rusting.

POLE #6



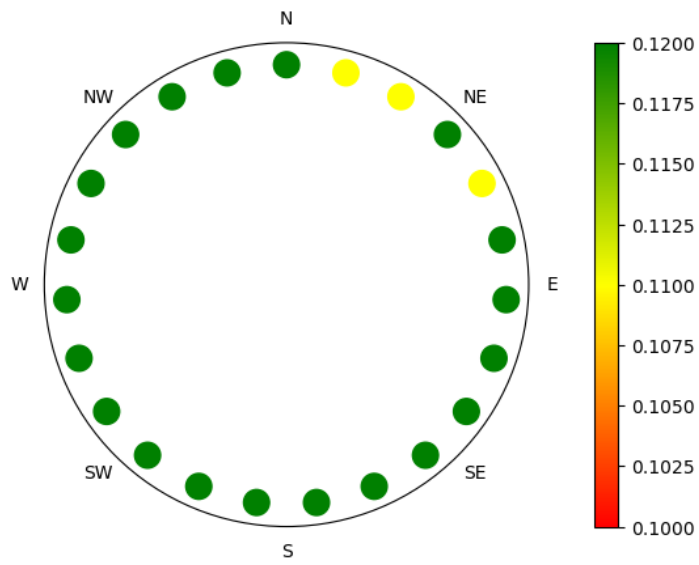
Observations: No visible rusting.

POLE #7



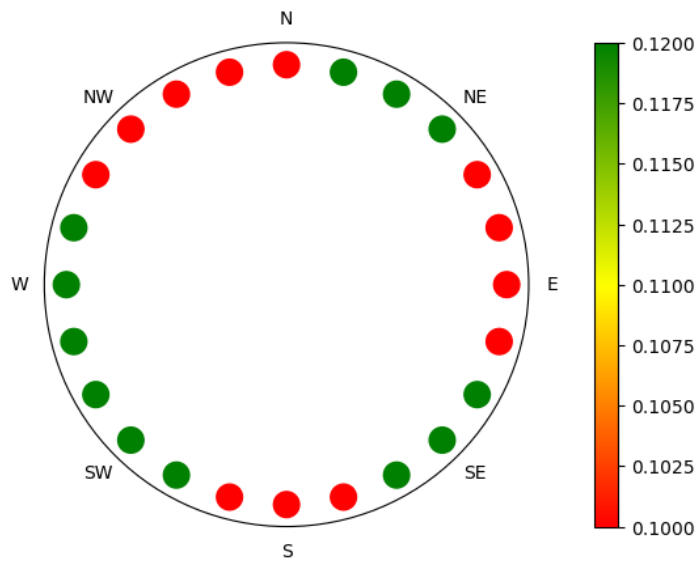
Observations: Extensive rusting visible on west side and minor rusting visible on north side.

POLE #8



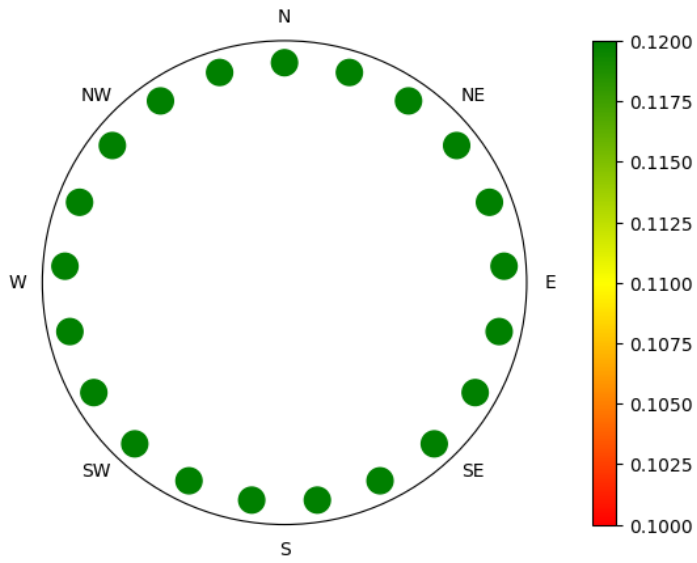
Observations: No visible rusting.

POLE #9



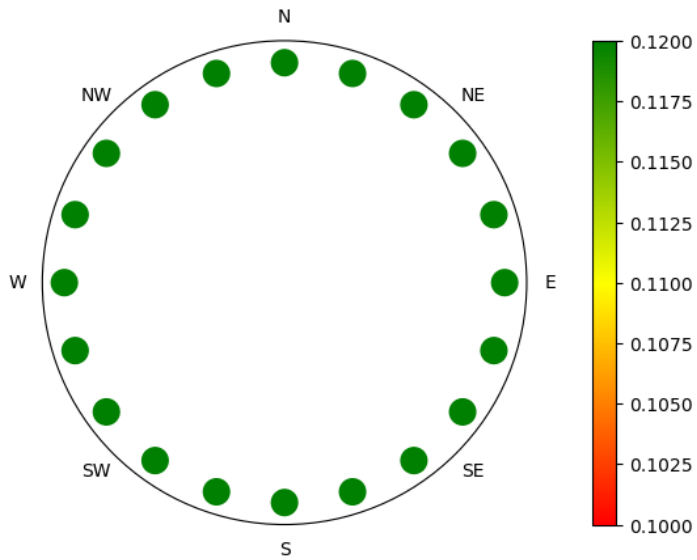
Observations: Extensive rusting visible on south side.

POLE #10



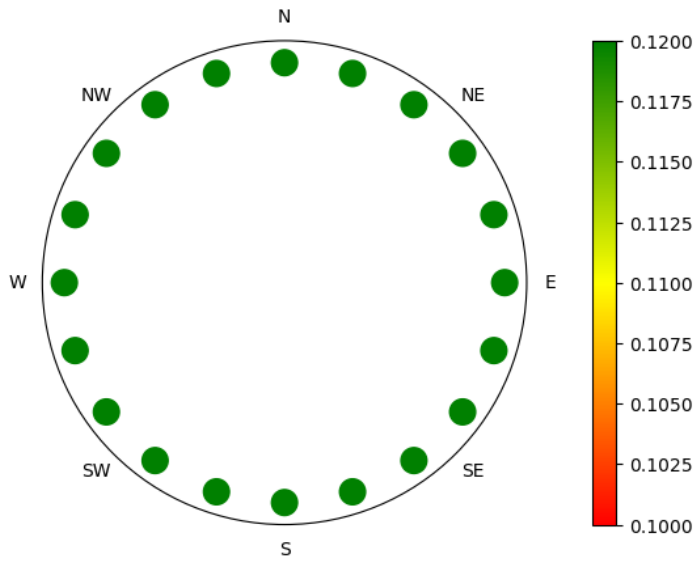
Observations: No visible rusting.

POLE #11



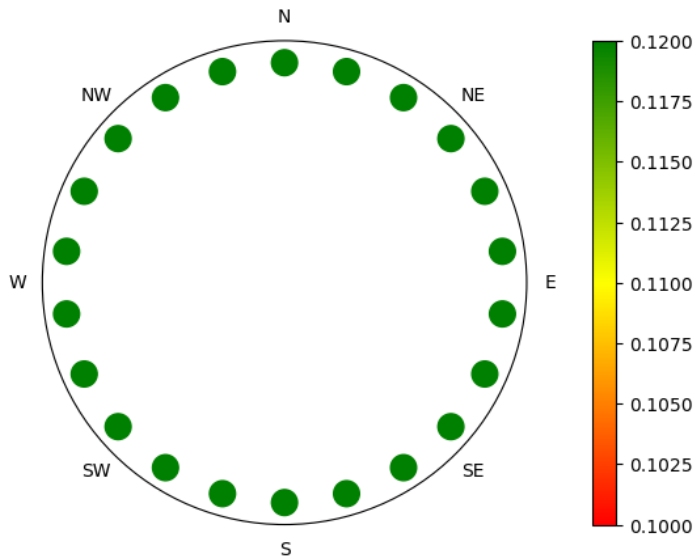
Observations: No visible rusting.

POLE #12



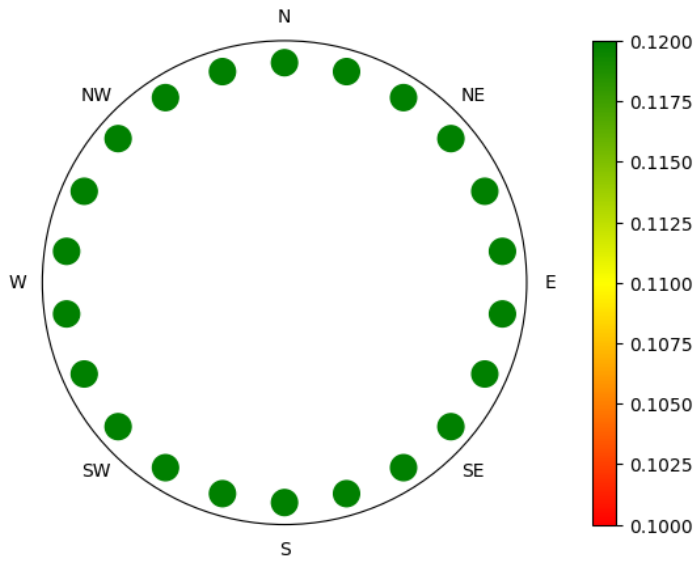
Observations: No visible rusting.

POLE #13



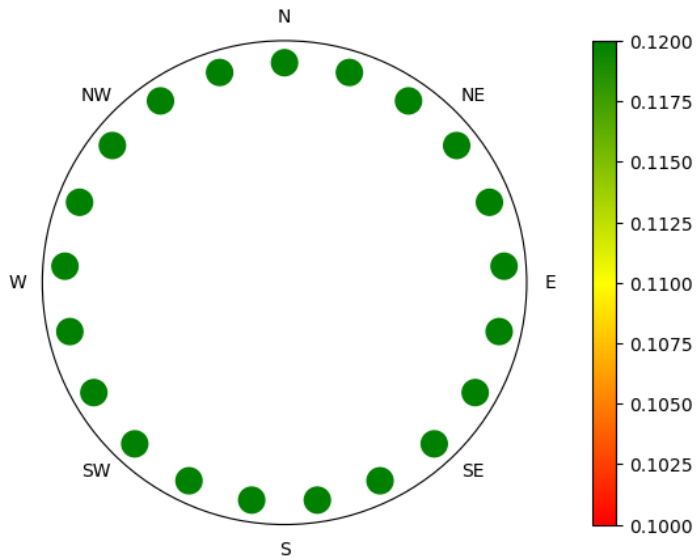
Observations: No visible rusting.

POLE #14



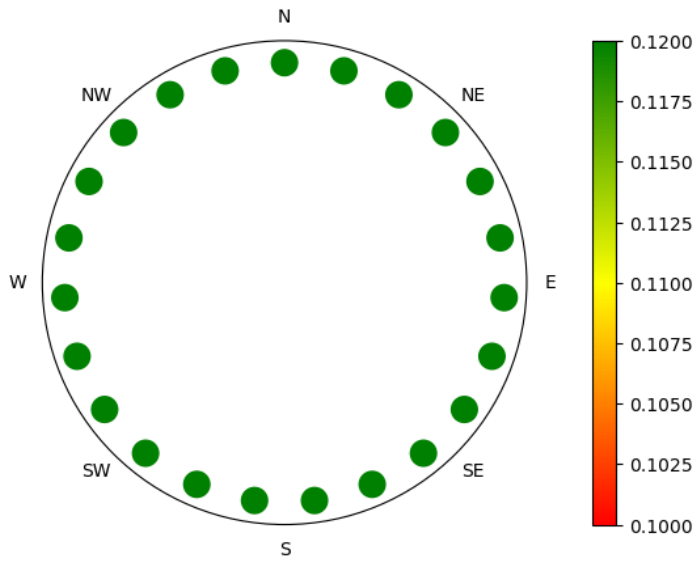
Observations: No visible rusting.

POLE #15



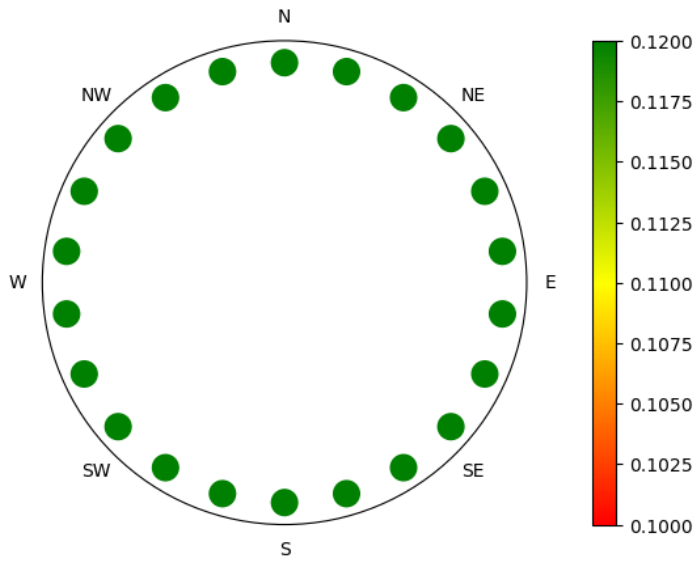
Observations: No visible rusting.

POLE #16



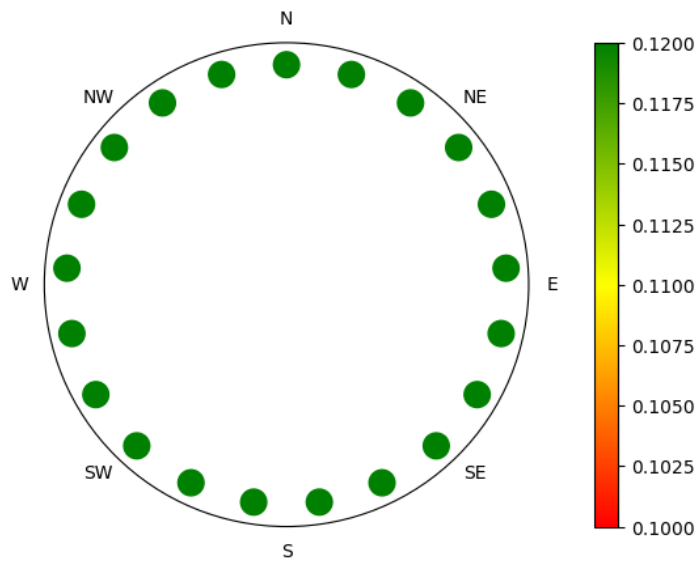
Observations: No visible rusting.

POLE #17



Observations: No visible rusting.

POLE #18



Observations: No visible rusting.

Limitations of Services

1. This report is based on the available data and the limited accessibility of the elements and compounds of the structure. No invasive testing was conducted.
2. The opinions and assessment of this structure are based on accepted general practice and are limited to the data available to our office. ES Denver makes no warranty on the continued structural integrity of the property including the repaired area.
3. Based on this information, the value of the observation given is mutually agreed to be limited to the cost of the observation.

Thank you for having ES Denver perform this observation. Please contact us at 720.612.7553 for any questions regarding this report.

Regards,

Dustin Randle, PE
President/CEO