

2 February 2023

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**Subject: Ward Village Block E
Environmental Noise Study
Salter Project 23-0015**

Dear Daniel:

We have conducted an environmental noise study for the project. The purpose of the study is to quantify the noise environment at the site, compare the measured data with applicable standards, and propose mitigation measures as necessary. This report summarizes the results.

PROJECT CRITERIA

The Hawai'i Building Code (i.e., 2012 International Building Code) does not include standards for environmental noise intrusion. However, the Department of Housing and Urban Development (HUD) has a criterion of DNL¹ 45 dB for multi-family residential projects, which matches the criterion in the California Building Code and is used by Howard Hughes (HHC) for other Ward Village projects. We have used that as the criterion for this project.

NOISE ENVIRONMENT

The project is a new 33-story "branded" condominium tower bounded by Ala Moana Boulevard and Auahi Street, on the block between Kamakee Street and Queen Street in Honolulu. The noise environment at the site is predominantly controlled by vehicular traffic along Ala Moana Boulevard and Auahi Street.

1 DNL (Day-Night Average Sound Level) – A descriptor for a 24-hour A-weighted average noise level. DNL accounts for the increased acoustical sensitivity of people to noise during the nighttime hours. DNL penalizes sound levels by 10 dB during the hours from 10 PM to 7 AM. For practical purposes, the DNL and CNEL are usually interchangeable. DNL is sometimes written as L_{dn} .



To quantify the existing noise environment, we conducted two long-term noise measurements from 9 to 12 January 2023 along Ala Moana Boulevard and Auahi Street. The monitors were at a height of 12 feet above grade. This data was used in conjunction with our collected data from other Ward Village and nearby projects. See **Figure 1** for the measurement locations and measured noise levels.

Based on our measured data, we created a 3-D noise model to calculate noise levels at the building facade. Our model includes noise from the planned HART (Honolulu Authority for Rapid Transit) elevated tracks that will run near the project site. In the absence of a project traffic study, we added 1 dB to the data in our calculations to account for future traffic increases.

RECOMMENDATIONS

We used the SD area plans sent 18 January 2023, which show room sizes and locations, and window areas. We calculated the window STC² ratings needed to meet the project criterion (see **Figures 2 to 5**). Our calculations are based on the following:

- All rooms will have hard-surfaced flooring
- Ceilings are 9 feet high
- Windows will be punched
- The exterior assembly will achieve at least STC 45 (e.g., a three-coat stucco system)

The recommended STC ratings are for full window assemblies (glass and frame) rather than just the glass itself. Tested sound-rated assemblies should be used.

For reference, typical one-inch glazing assemblies (two 1/4-inch thick panes with a 1/2-inch airspace) achieve approximately STC 32. Where STC ratings above 33 are required, at least one pane will need to be laminated.

Where windows need to be closed to meet the project criterion, an alternative method of supplying fresh air (e.g., mechanical ventilation) should be considered. This applies to all residences. This issue should be discussed with the project mechanical engineer.

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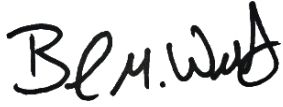
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2 STC (Sound Transmission Class) – A single-number rating defined in ASTM E90 that quantifies the airborne sound insulating performance of a partition under laboratory conditions. Increasing STC ratings correspond to improved airborne sound insulation.

This concludes our environmental noise study for Ward Village Block E. Should you have any questions, please give us a call.

Best,

SALTER



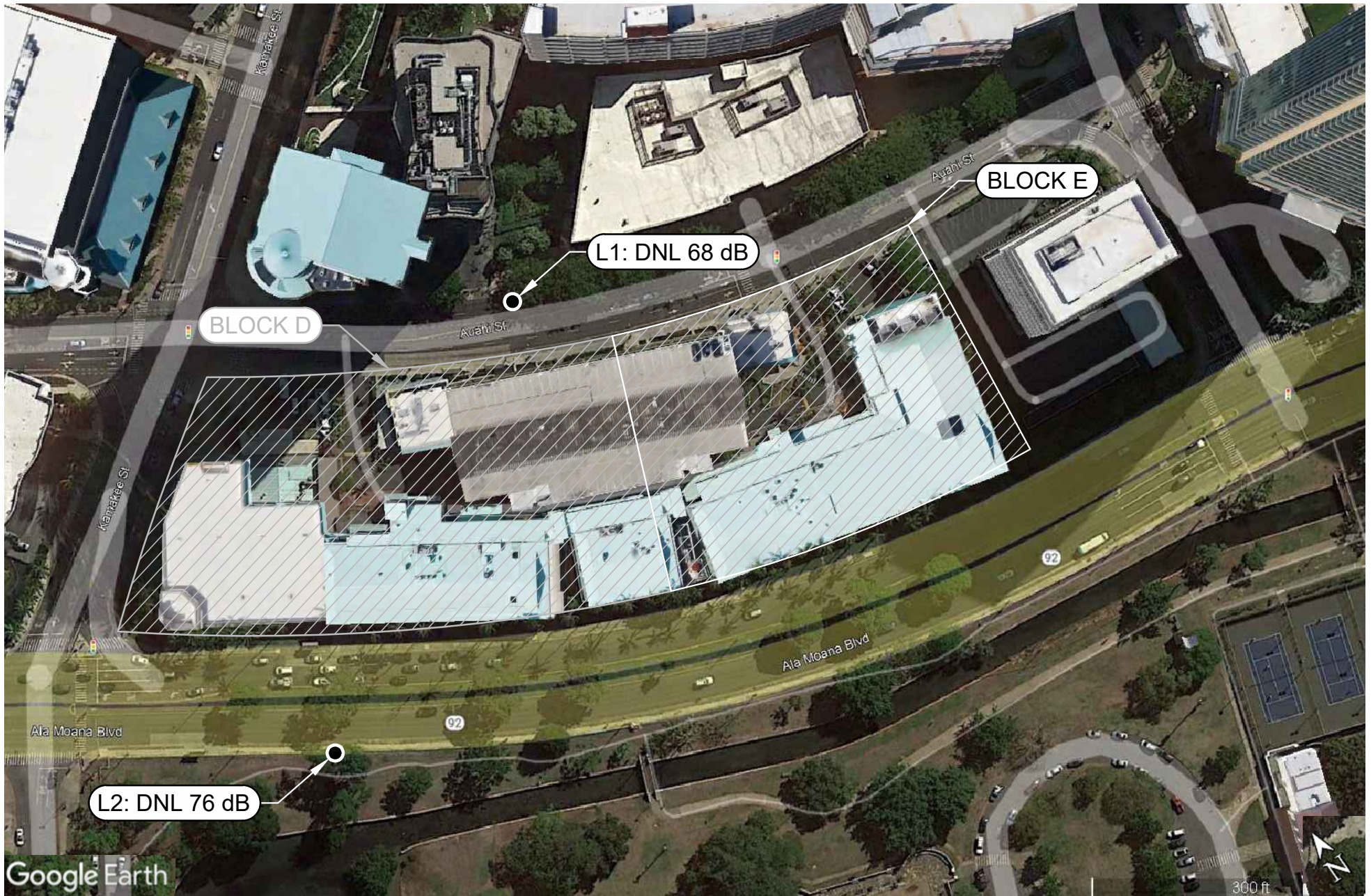
Blake Wells, LEED GA
Associate



Eric Mori, PE
Senior Vice President

Enclosures as noted





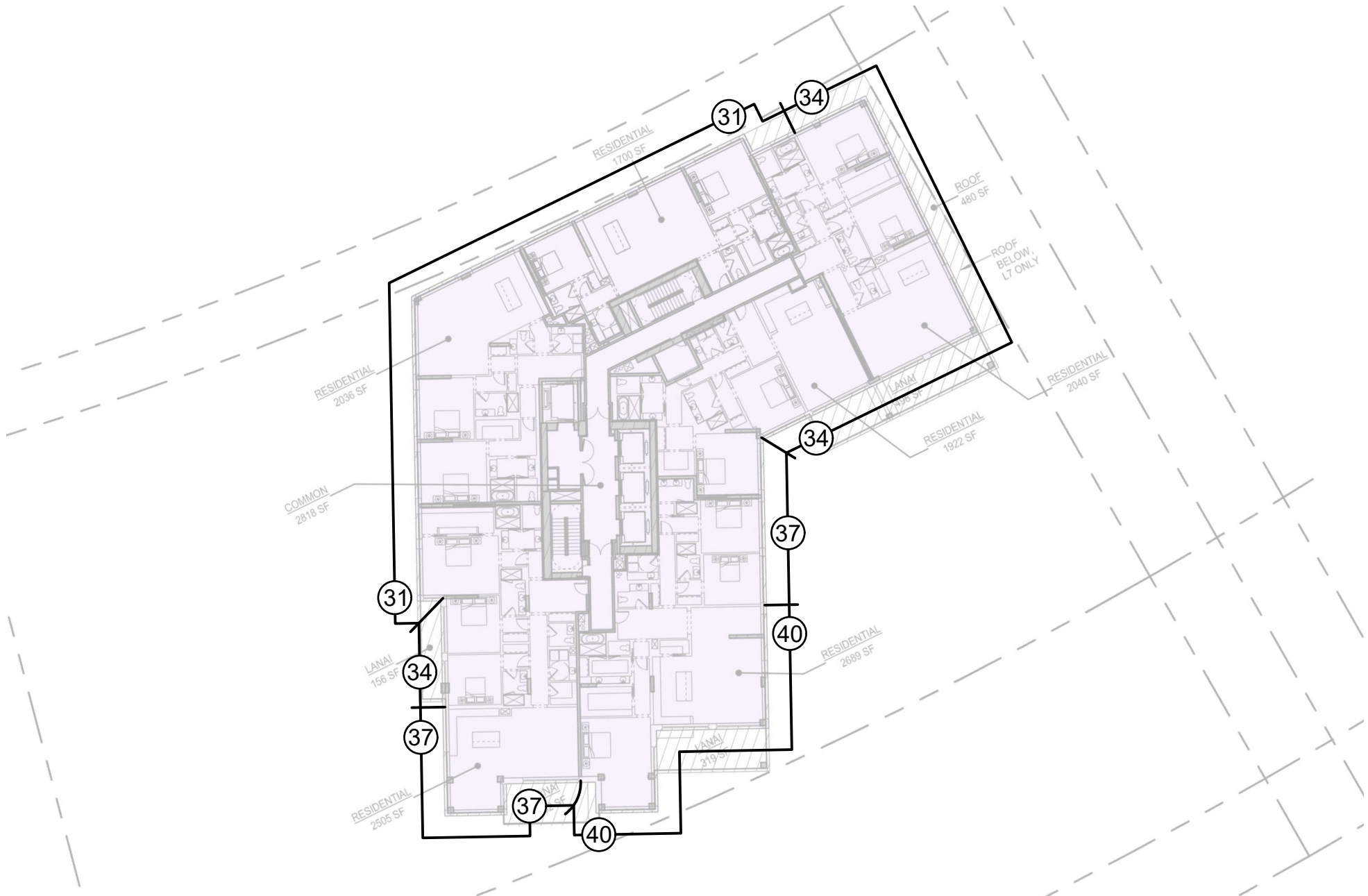
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WARD VILLAGE – BLOCK E MEASUREMENT LOCATIONS AND MEASURED NOISE LEVELS

FIGURE 1

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NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

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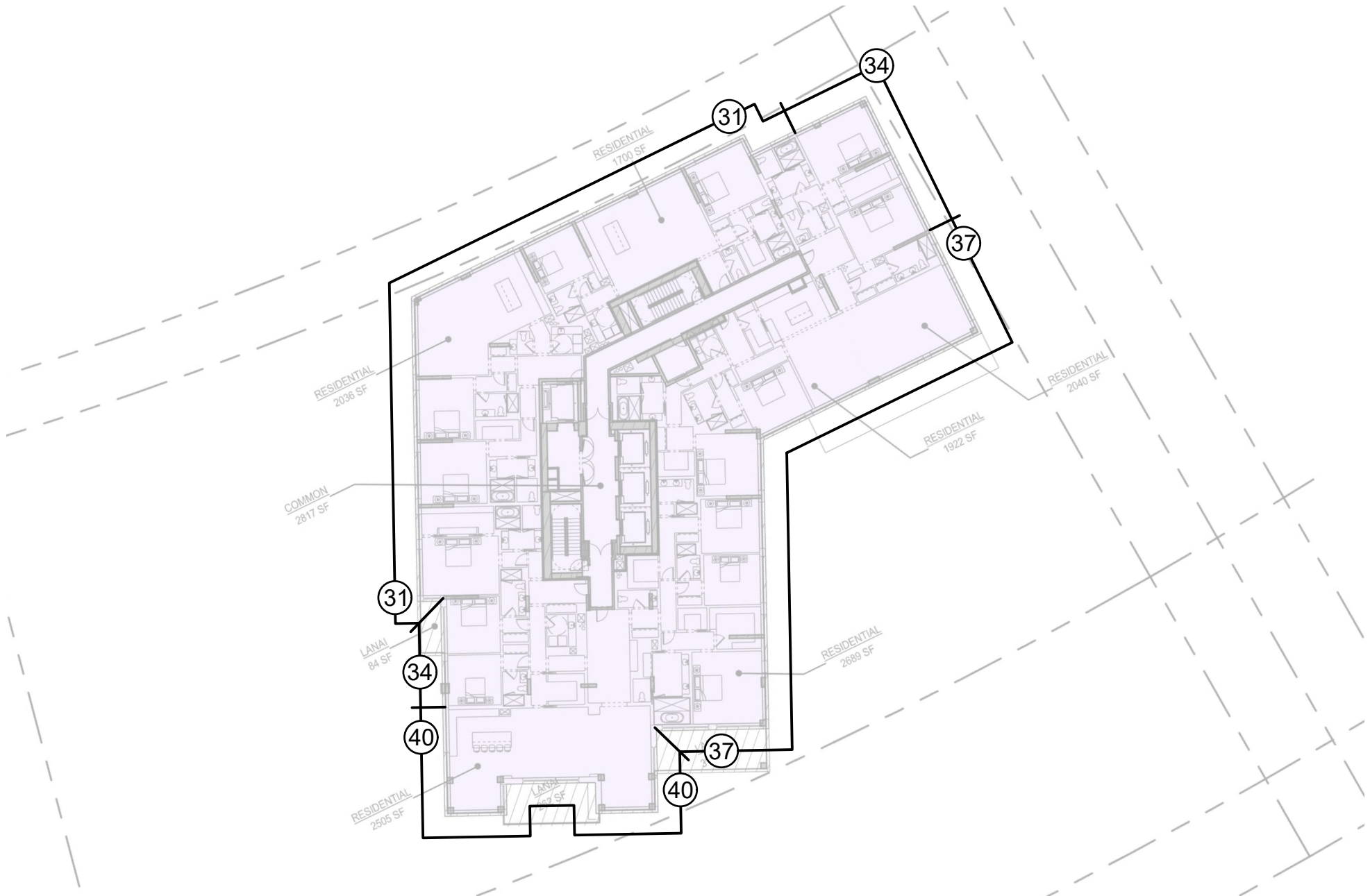
WARD VILLAGE – BLOCK E

MINIMUM CODE-REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 7 TO 11)

FIGURE 2

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NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

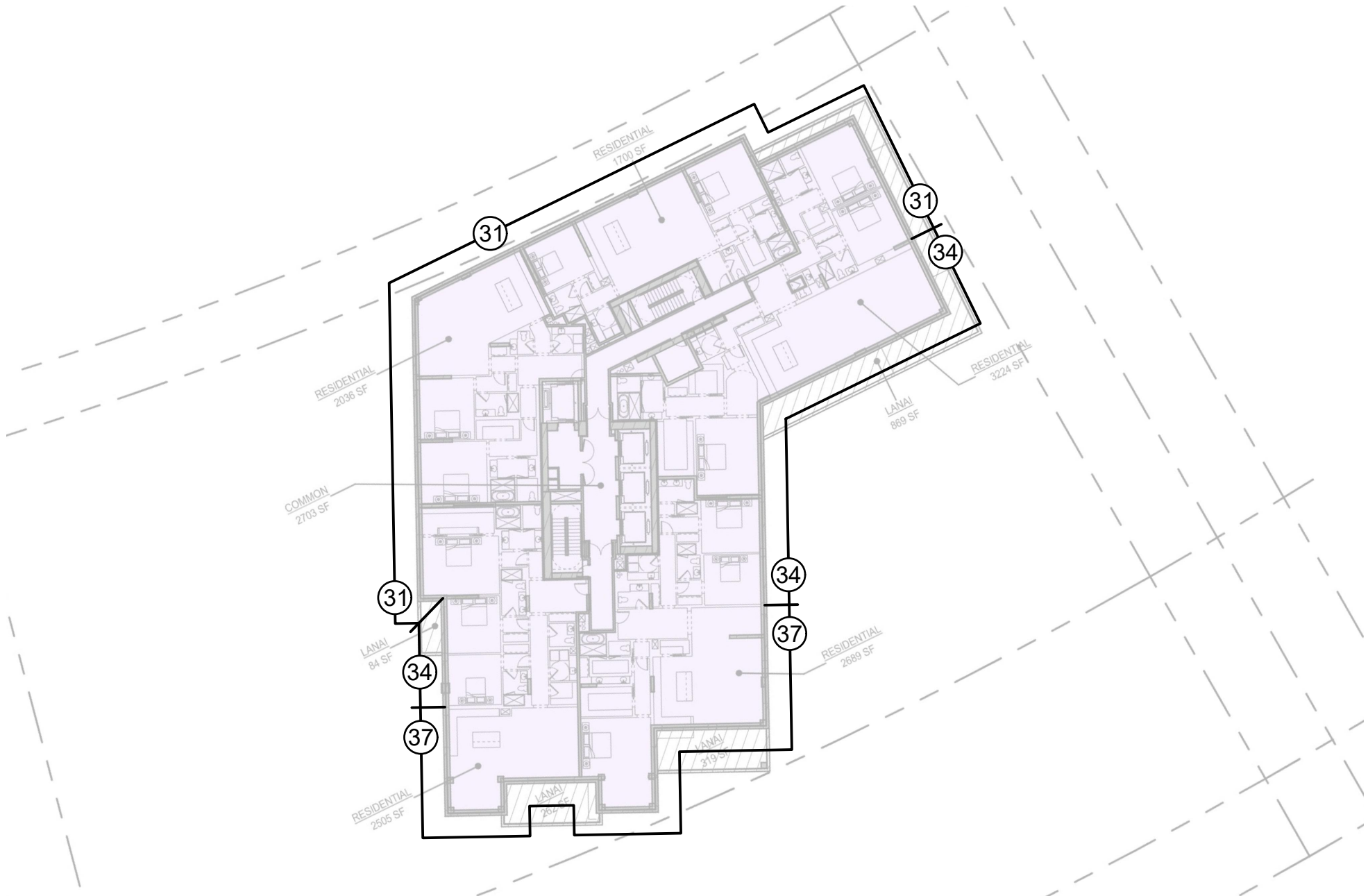
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WARD VILLAGE – BLOCK E MINIMUM CODE-REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 12 TO 28)

FIGURE 3

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NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

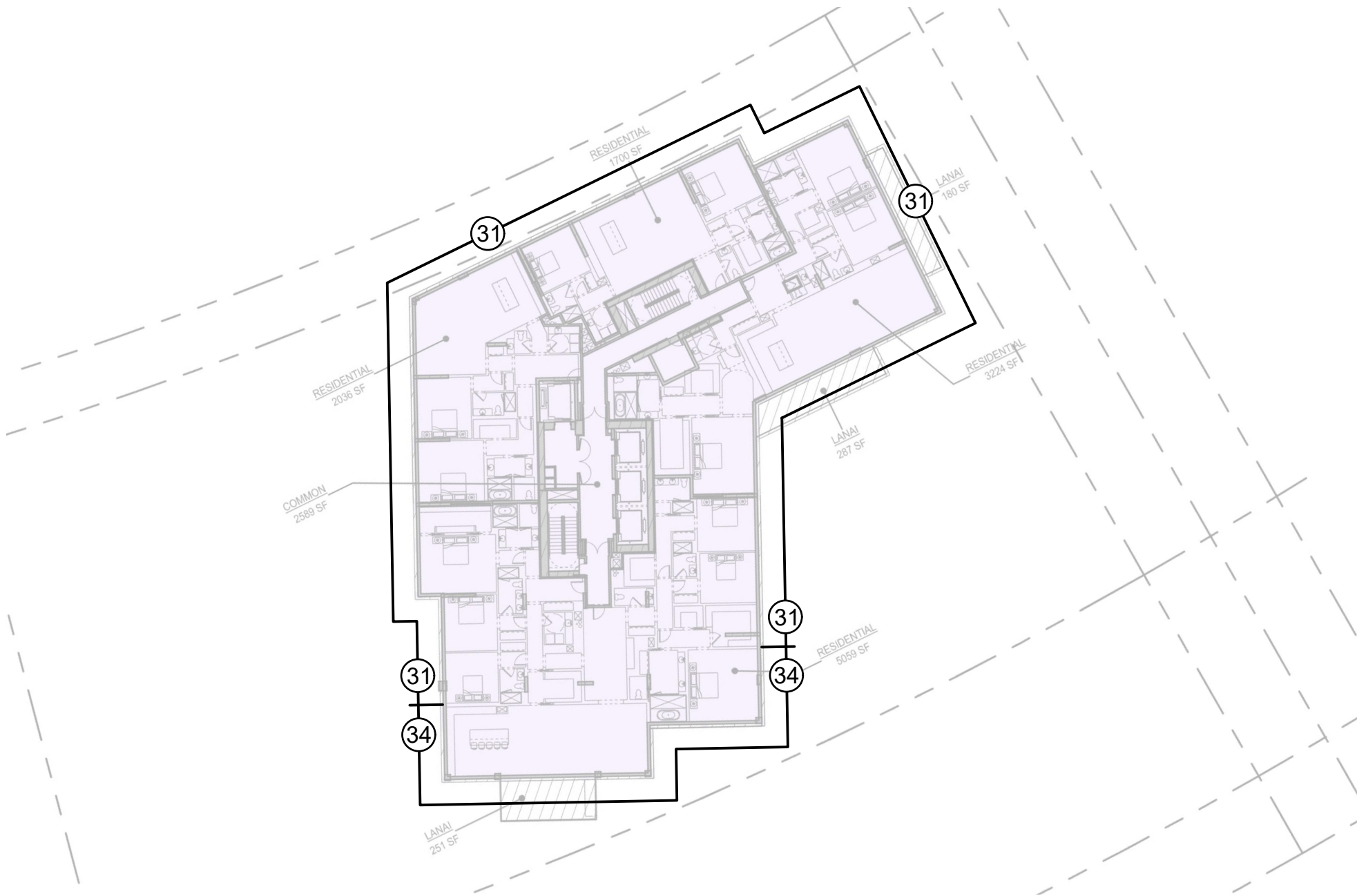
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WARD VILLAGE – BLOCK E MINIMUM CODE-REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 29 AND 30)

FIGURE 4

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WARD VILLAGE – BLOCK E

MINIMUM CODE-REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 31 TO 33)

FIGURE 5

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