RESULTS

COMPARING VARIOUS SLR-DFE METHODS

University of Hawai'i, Meguro, W., Briones, J. I., Teeples, E., & Fletcher, C. H. 2025. "Establishing a Sea Level Rise-Adjusted Design Flood Elevation for Buildings: A Comparative Study of Methods". Water 17, no. 16: 2376. https://doi.org/10.3390/w17162376.

NEW YORK CITY FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– ***SLR Adjustment***

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)

5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

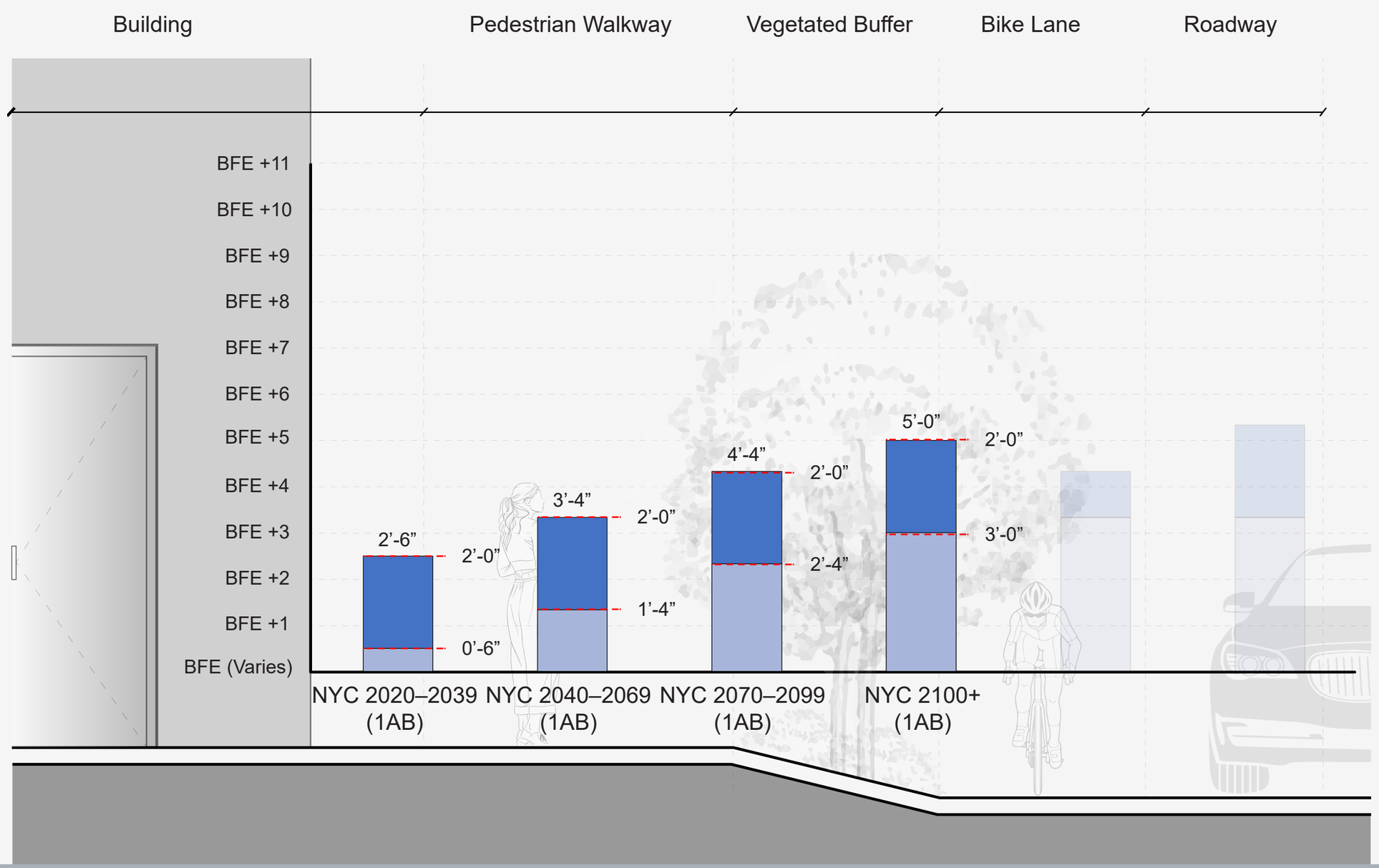
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



University of Hawai'i, Meguro, W., Briones, J. I., Teeples, E., & Fletcher, C. H. 2025. "Establishing a Sea Level Rise-Adjusted Design Flood Elevation for Buildings: A Comparative Study of Methods". Water 17, no. 16: 2376. https://doi.org/10.3390/w17162376.

BOSTON FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– ***SLR Adjustment***

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)

5 BFE + 1’-1” to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

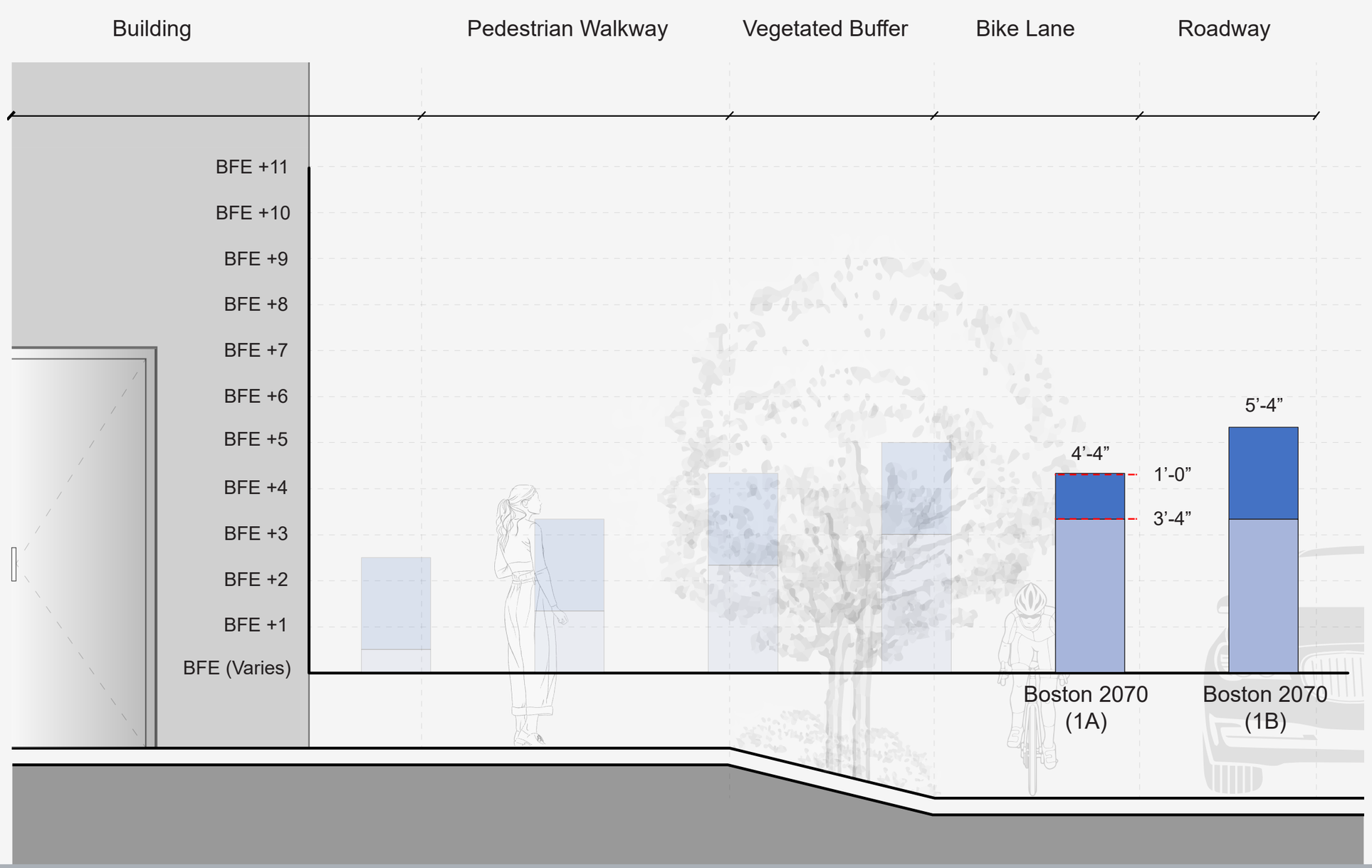
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



University of Hawai‘i, Meguro, W., Briones, J. I., Teeples, E., & Fletcher, C. H. 2025. “Establishing a Sea Level Rise-Adjusted Design Flood Elevation for Buildings: A Comparative Study of Methods”. Water 17, no. 16: 2376. https://doi.org/10.3390/w17162376.

MIAMI BEACH FREEBOARD + SLR ADJUSTMENT

LEGEND

– ***Additional Freeboard***

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)

5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

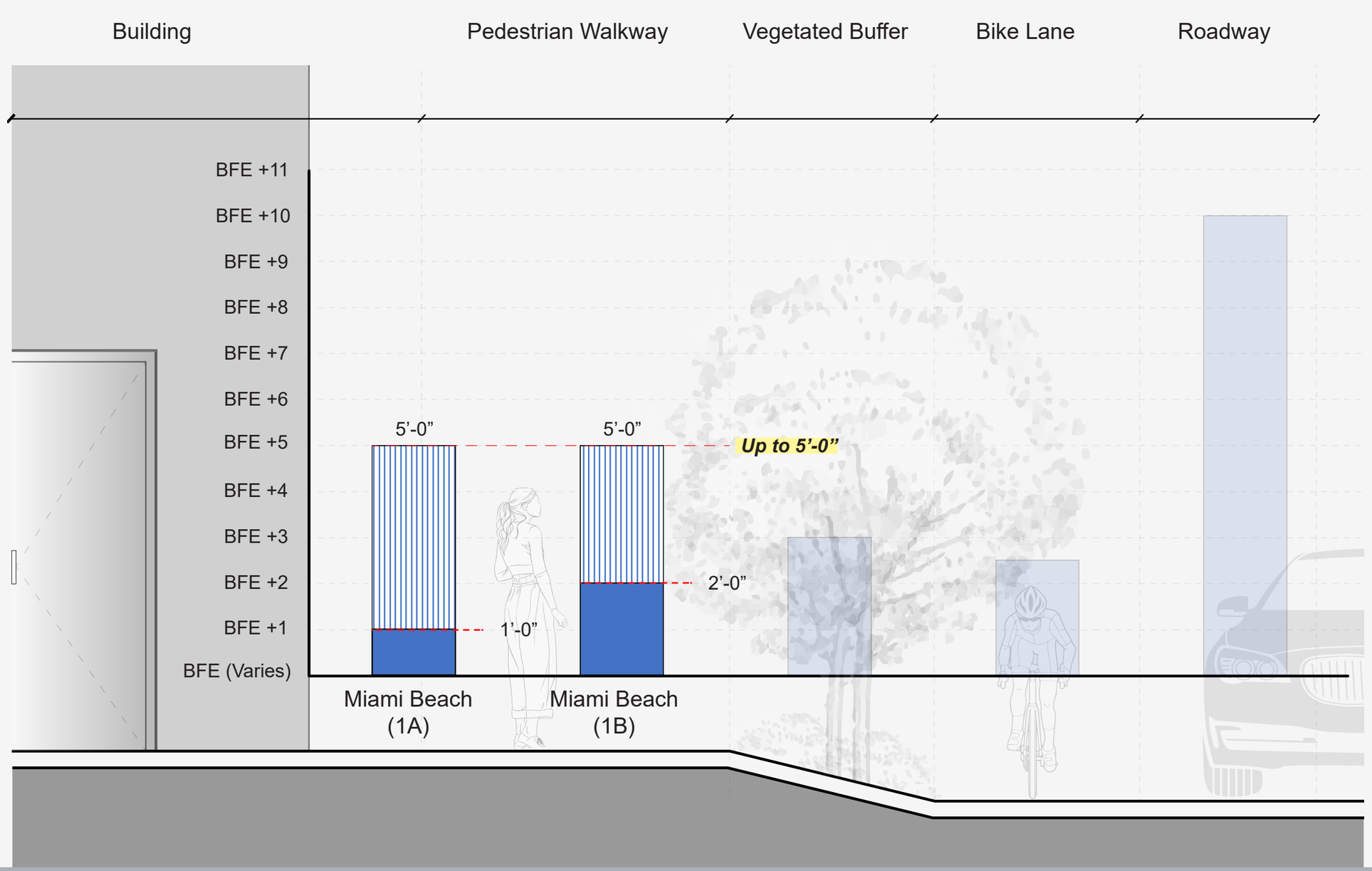
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



University of Hawai'i, Meguro, W., Briones, J. I., Teeples, E., & Fletcher, C. H. 2025. "Establishing a Sea Level Rise-Adjusted Design Flood Elevation for Buildings: A Comparative Study of Methods". Water 17, no. 16: 2376. https://doi.org/10.3390/w17162376.

SATELLITE BEACH FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/Recommendation)

5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

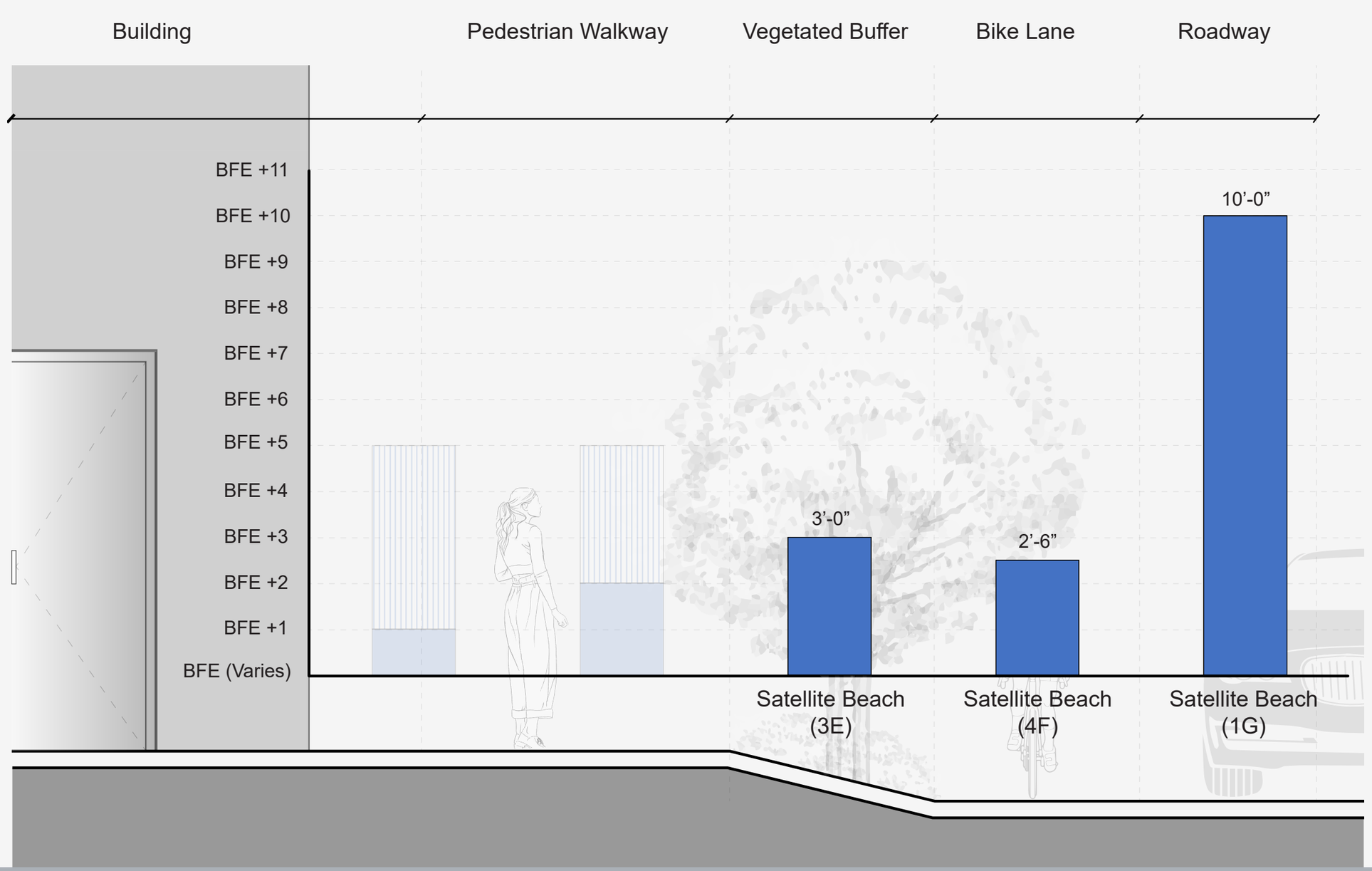
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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SATELLITE BEACH FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

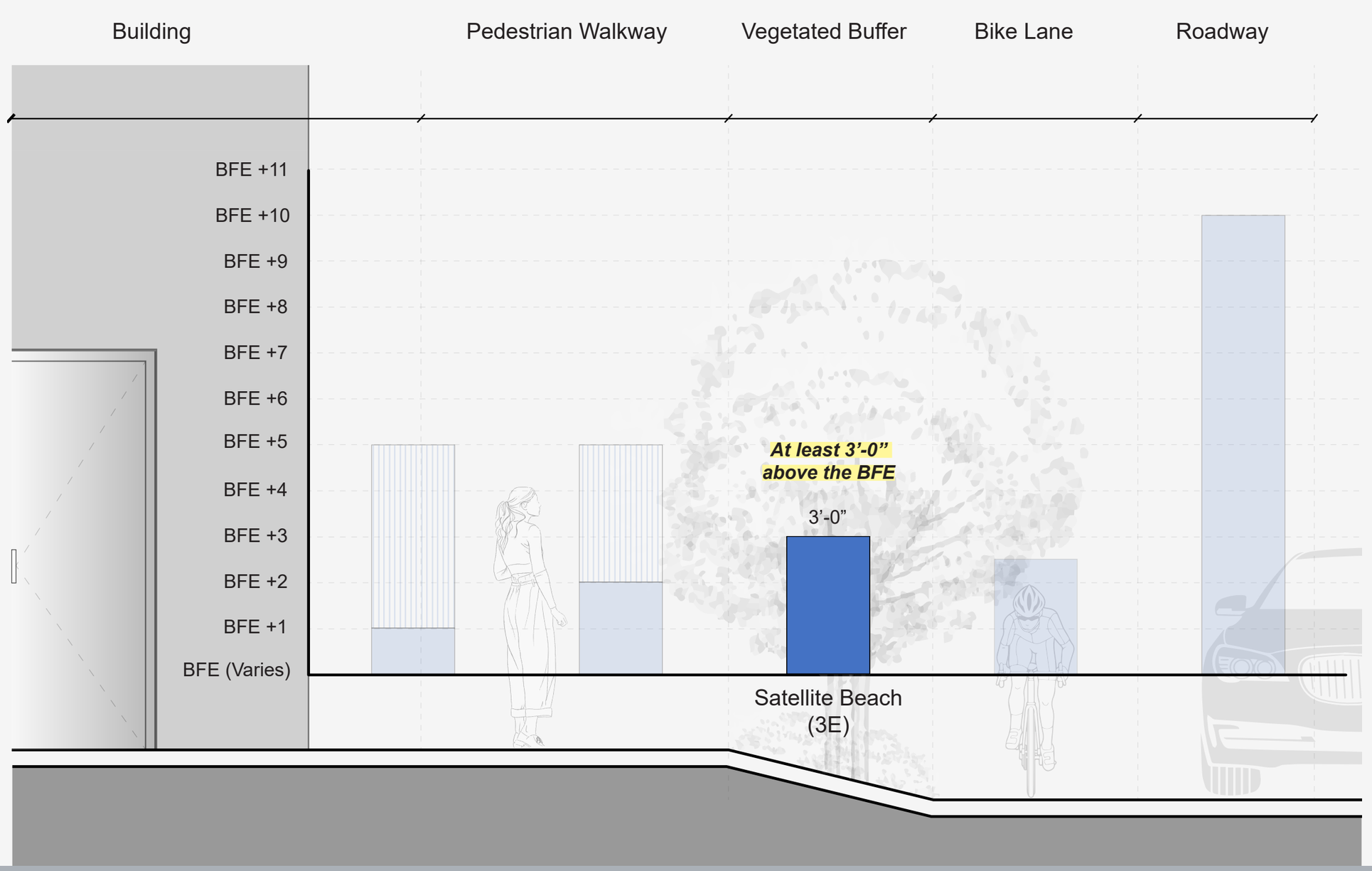
– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)
2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher
3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)
4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)
5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects
B Critical and essential projects
C FEMA A Zone (Non Coastal)
D FEMA High Hazard Zone
E Residential only
F Residential, commercial, institutional, and industrial buildings and structures
G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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SATELLITE BEACH FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/Recommendation)

5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

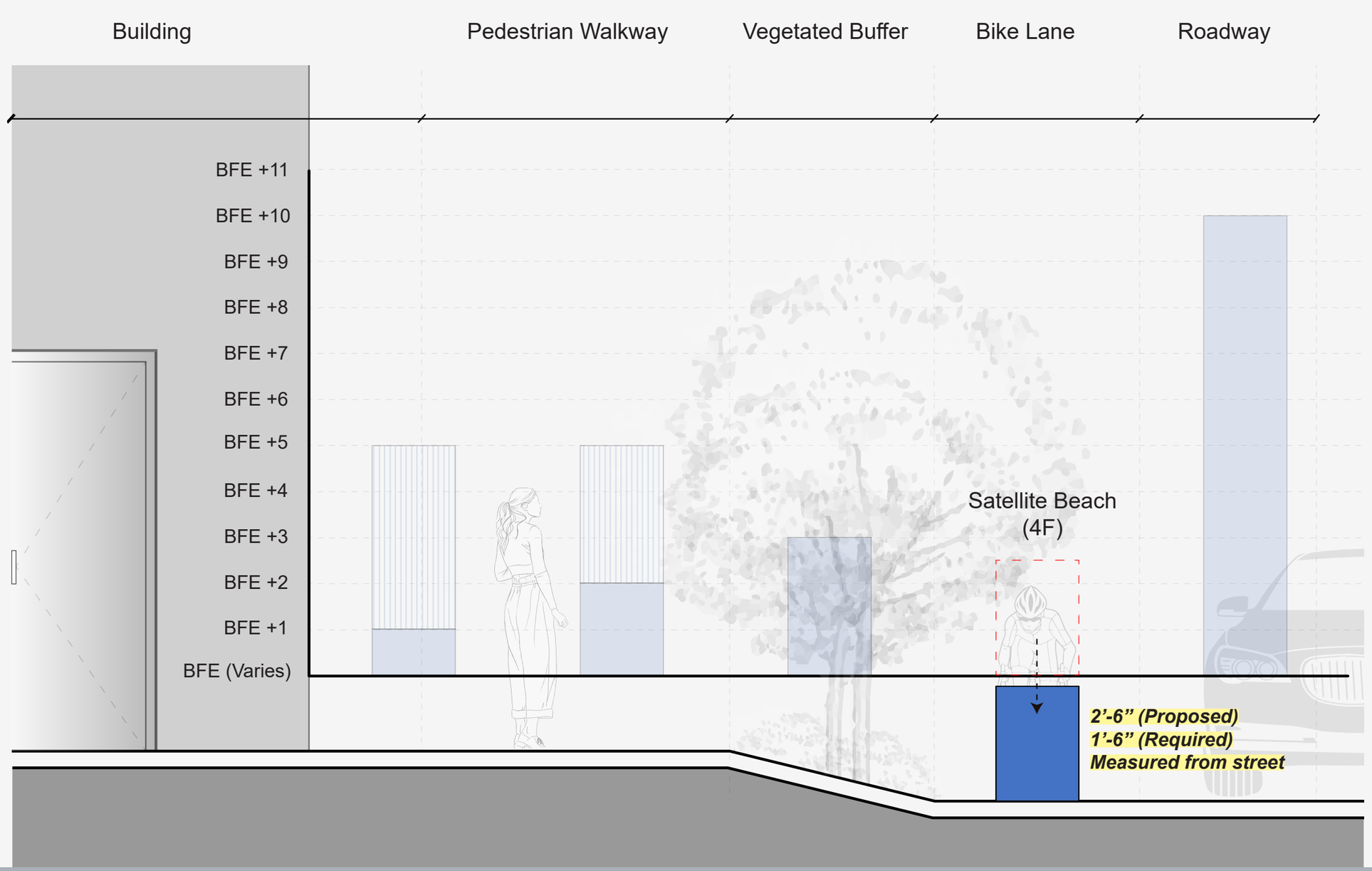
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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SATELLITE BEACH FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

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5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

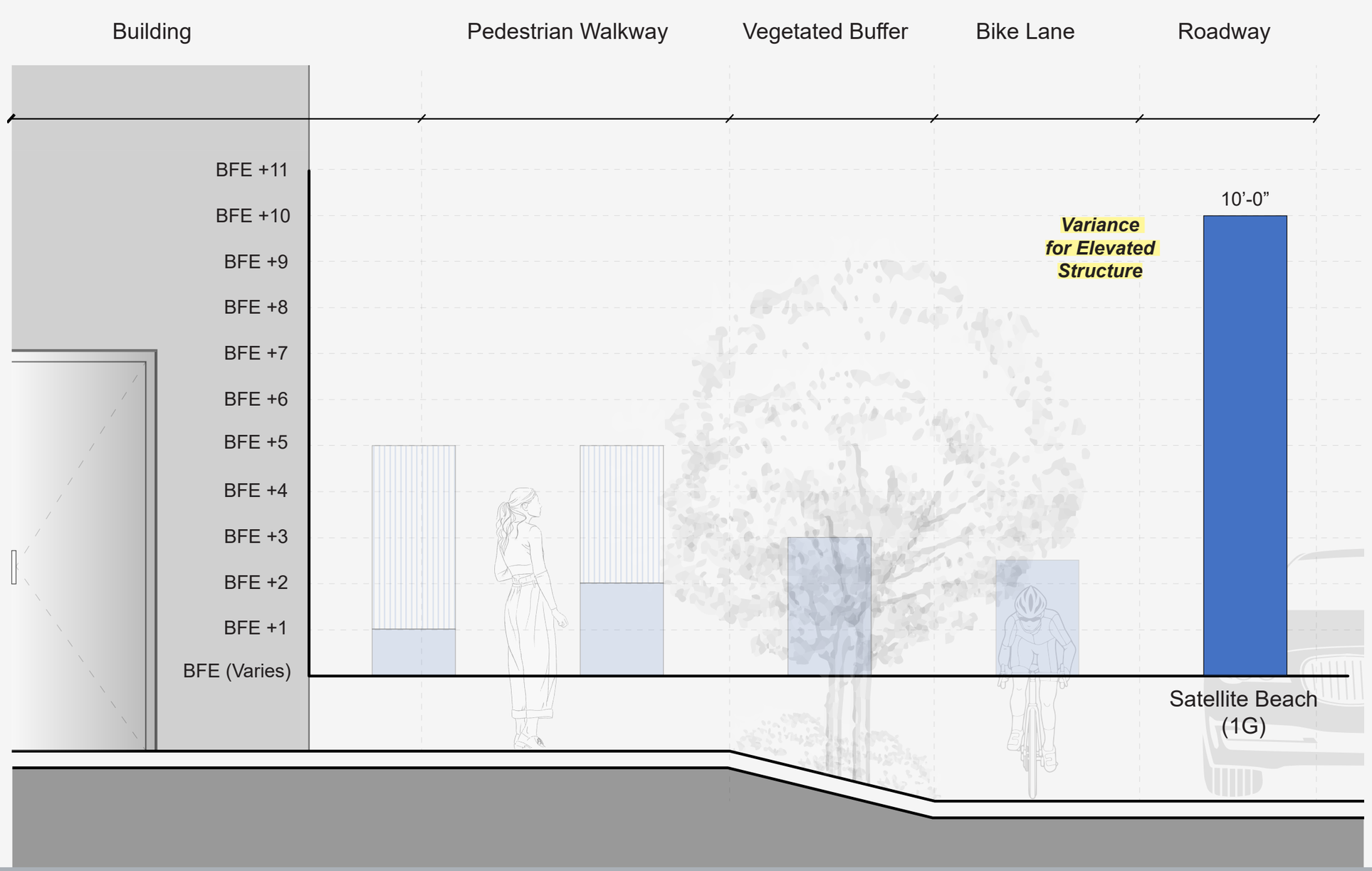
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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ASCE FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)

5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

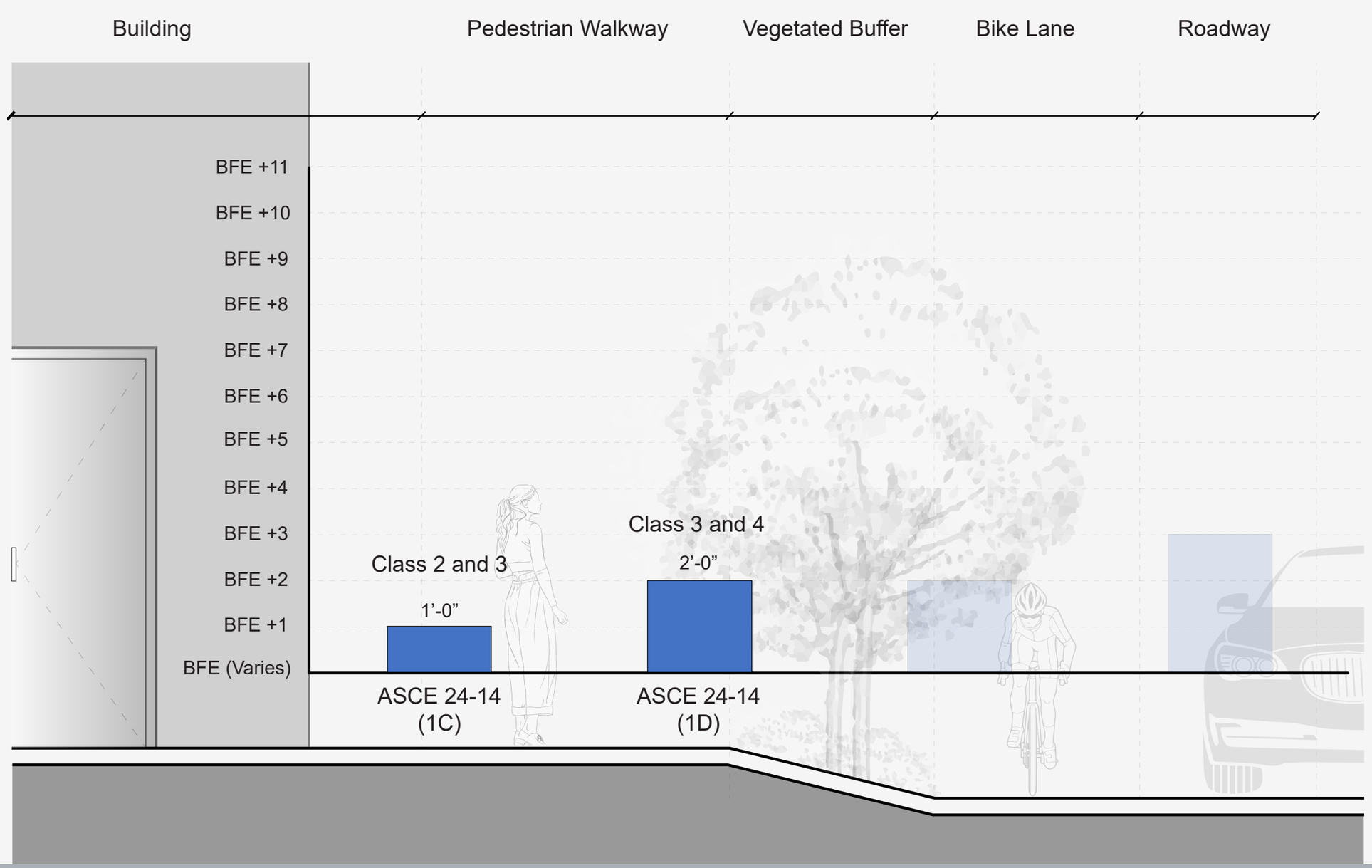
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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FFRMS FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)

5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

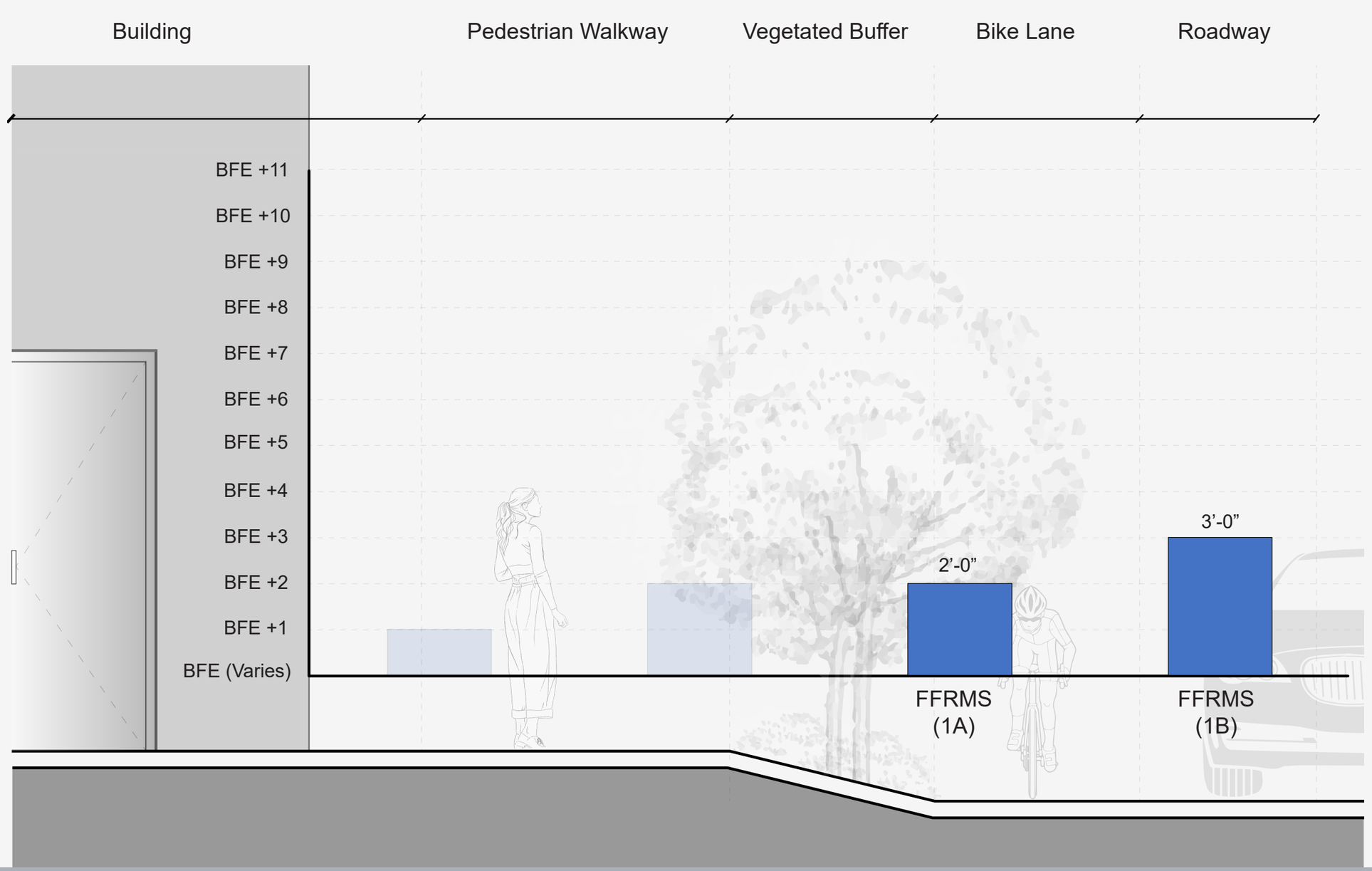
C FEMA A Zone (Non Coastal)

D FEMA High Hazard Zone

E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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COUNTY OF KAUA‘I FREEBOARD + SLR ADJUSTMENT

LEGEND

– Additional Freeboard

– ***Freeboard***

– SLR Adjustment

Measurement Starts From

1 Base Flood Elevation (BFE)

2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher

3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)

4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)

5 BFE + 1’-1” to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects

B Critical and essential projects

C FEMA A Zone (Non Coastal)

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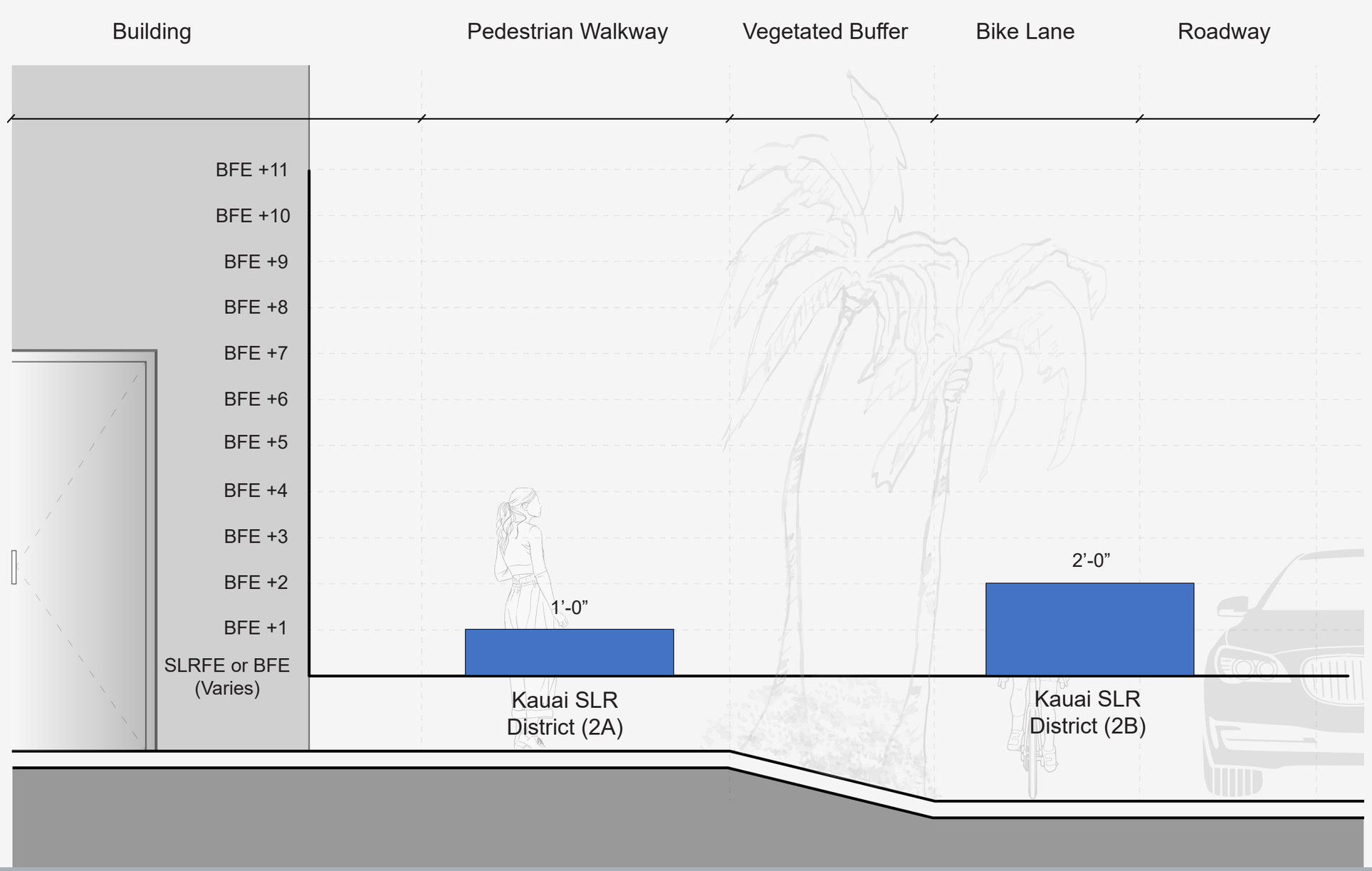
E Residential only

F Residential, commercial, institutional, and industrial buildings and structures

G Variance granted (<15 feet (4.57m) landward) pile-constructed structure



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CITY AND COUNTY OF HONOLULU SLR GUIDANCE

LEGEND

– Additional Freeboard

– ***Freeboard***

– ***SLR Adjustment***

Measurement Starts From

1 Base Flood Elevation (BFE)
2 Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher
3 Above dune vegetation and at least 3 ft (0.91 m) above the BFE (Current Requirement)
4 Street + 30 in (0.76 m) or 7 ft (2.13m) NVGD (if higher) (Proposed/ Recommendation)
5 BFE + 1'-1" to account for Mean Higher High Water (MHHW)

Application

A Non-critical and non-essential projects
B Critical and essential projects
C FEMA A Zone (Non Coastal)
D FEMA High Hazard Zone
E Residential only
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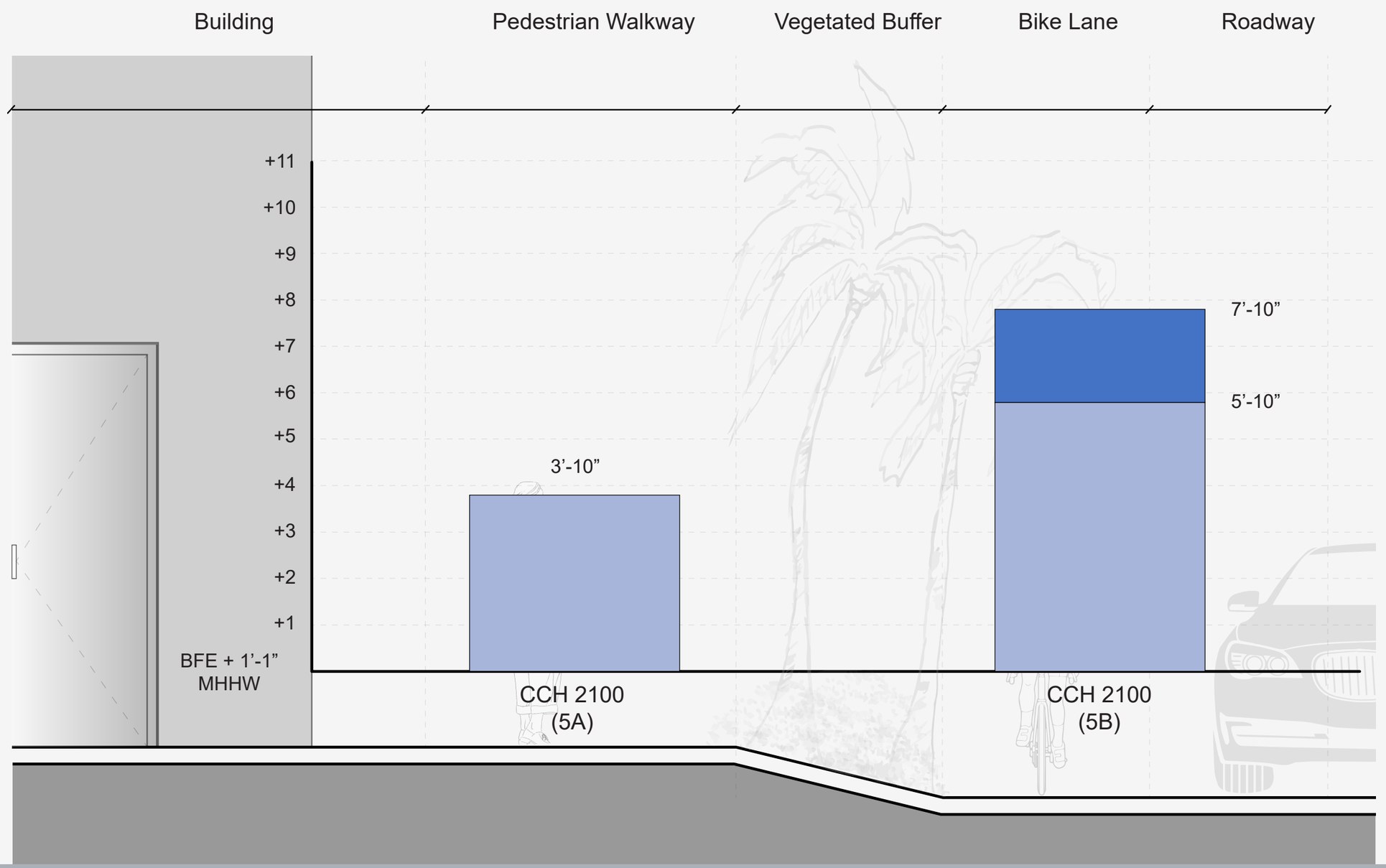

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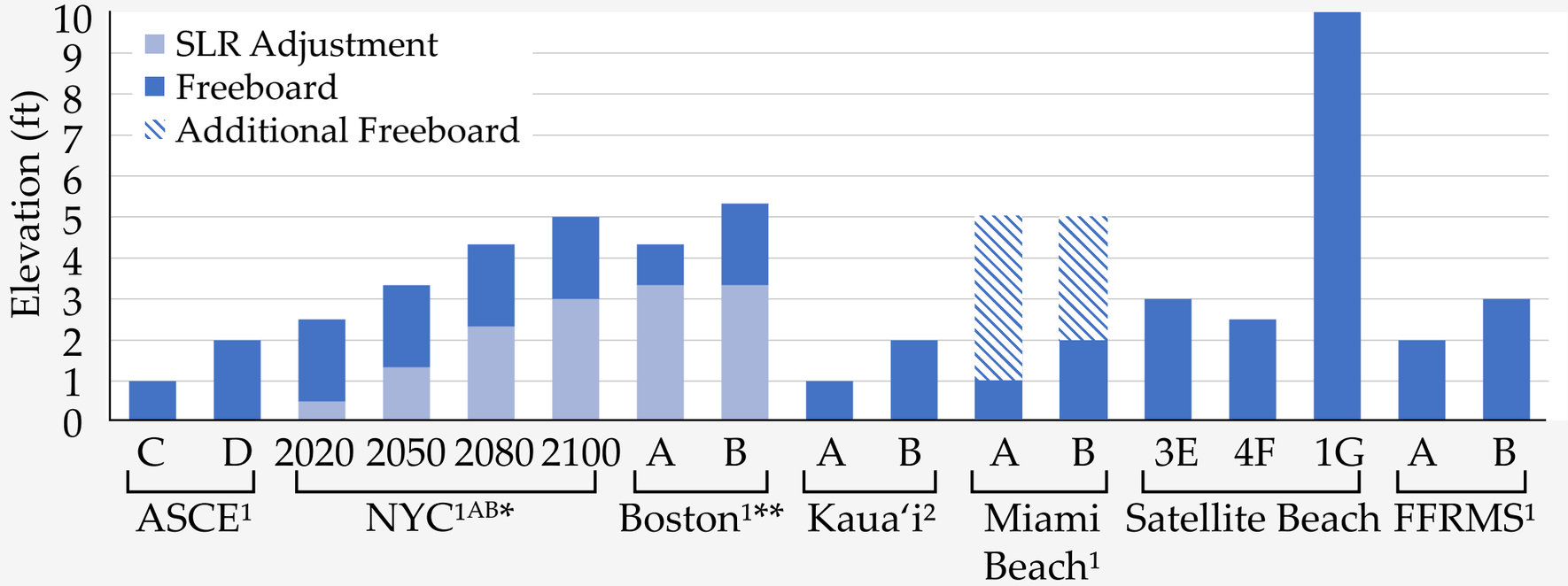
COMPARISON OF SLR-ADJUSTED DFE FREEBOARD + SLR ADJUSTMENT APPROACH



Legend

Measurement Starts From

[1] Base Flood Elevation (BFE)
[2] Sea Level Rise Flood Elevation (SLRFE) or BFE, whichever is higher.
[3] Above dune vegetation and at least 3 ft (0.91 m) above BFE (Current Requirement)
[4] Street + 30 in (0.76 m) or 7 ft (2.13 m) NGVD (if higher) (Proposed/Recommendation)

Application

A Non-critical and non-essential projects
B Critical and essential projects
C FEMA A Zone (Non Coastal)
D FEMA High Hazard Zone
E Residential only
F Residential, commercial, institutional, and industrial buildings and structures
G Variance granted (<15 feet (4.57 m) landward) pile-constructed structure

*End of Useful Life for New York Resilience Design Guidelines is separated into four time slices for the 2020s, 2050s, 2080s, and 2100, which are: 2020–2039 (6" (0.15 m) sea level rise adjustment); 2040–2069 (1'–4" (0.41 m) sea level rise adjustment); 2070–2099 (2'–4" (0.71 m) sea level rise adjustment); 2100+ (3' (0.91 m) sea level rise adjustment).

**"The 2070 time horizon was selected to account for the long-lived nature of the city's building stock and the hazards these building assets experience during their useful life. The 40 inches (1.02 m) of sea level rise, which incorporates 2 inches (0.05 m) of land subsidence …" (BPDA 2019).

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