Avoiding Application Pitfalls

Observations from the FY 2018 National Technical Review Cycle

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Agenda

- Presentation – 1 hour
- Questions – 1 hour

Agenda

- Common Pitfalls
- Best Practices
- Questions and Answers

- Acquisition/Elevation
- Flood Risk Reduction
- Slope Stabilization
- Wind Retrofit
- Generator
- Safe Room
- Seismic
- Wildfire

Common Pitfalls – All Project Types

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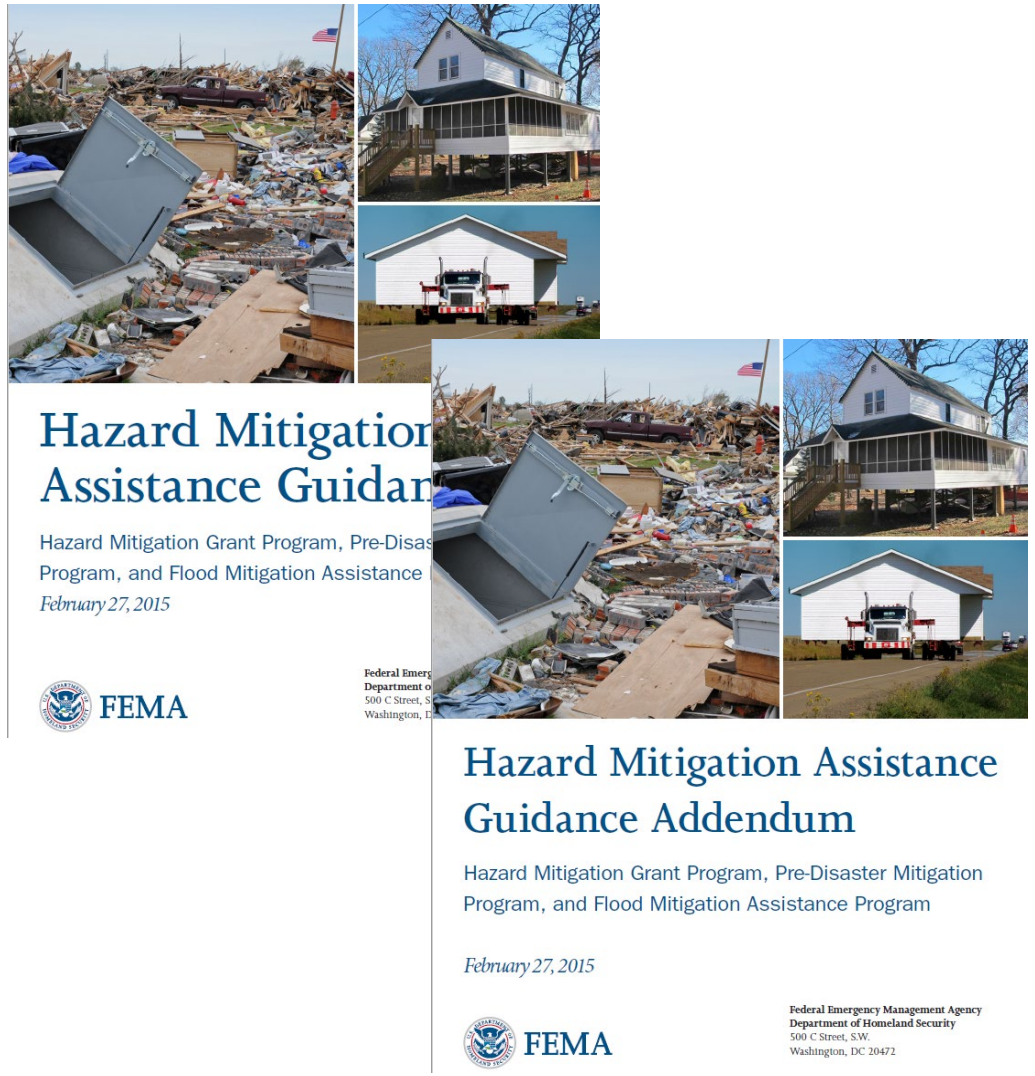
Common Pitfalls

- Unclear Scope of Work
- Inconsistencies within application sections
- Inconsistencies between application and Benefit-Cost Analysis (BCA)



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Common Pitfalls: Cost-Effectiveness

- Incomplete or Unsupported Documentation
- Recurrence Intervals (RIs)
  - RIs are not equal to the time between two events
- Historical/Professional Expected Damages
  - Unsupported estimated damages
  - User analysis duration
  - Does not consider residual risk (after mitigation)

Acquisition/Elevation Projects

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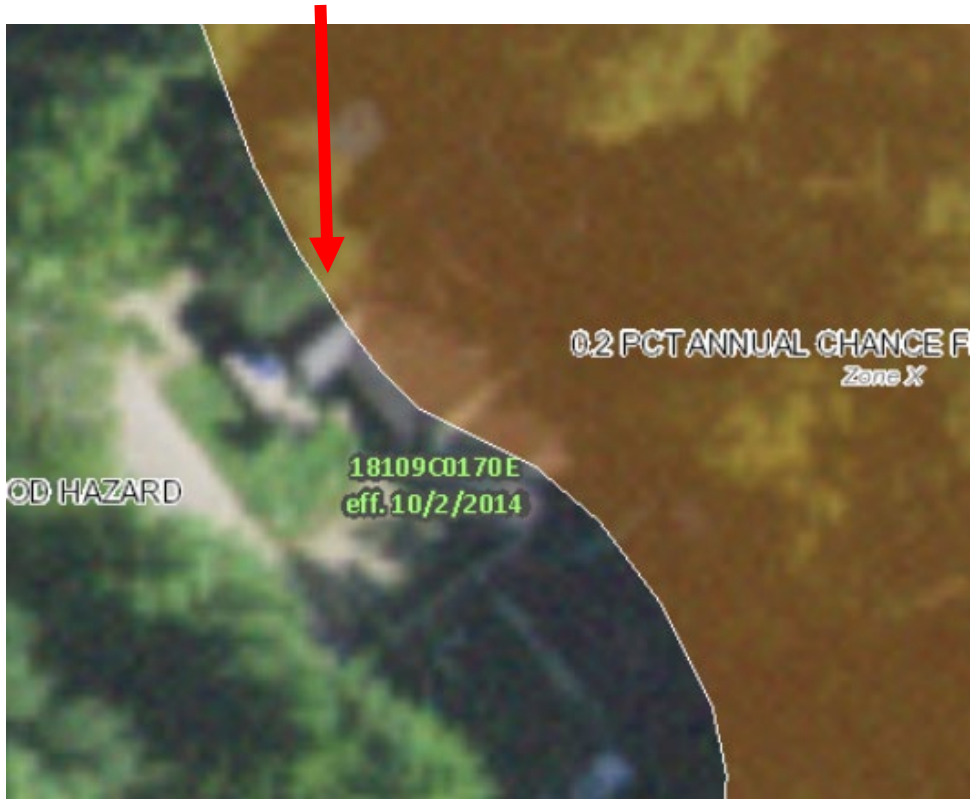
Acquisition/Elevation: Pre-Calculated Benefits Common Pitfalls

Not in Special Flood Hazard Area (SFHA)

But structure is not in SFHA



Property parcel boundaries identified as overlapping with SFHA

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Acquisition: Common Pitfalls

Unsupported Fair Market Value (FMV)

Data Quality	Form of Supporting Documentation for FMV
Best	• Recent appraisal
Good	• Older appraisal + % market adjustment • Property tax card + % market adjustment
Ok	• Average based on homes acquired in area previously
Low	• Building replacement value

Acquisition/Elevation: Flood Module Common Pitfalls

Incorrect first floor elevation (FFE) based on building diagram type

FFE Guidance Table[1,2]

Building Diagram[1]	Lowest Finished Floor Description[1]	A-Zone FFE location[1]	V-Zone FFE location[1]	Residential Building Type[2]
1A	Bottom Floor	C2.a		One or two (or more) story without a basement
1B	Bottom Floor	C2.a		One or two (or more) story without a basement
2	Next Higher Floor	C2.b		One or two (or more) story with a basement

a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	188.00	☐ feet	☐ meters
b) Top of the next higher floor	196.30	☒ feet	☐ meters
c) Bottom of the lowest horizontal structural member (V Zones only)		☐ feet	☐ meters
d) Attached garage (top of slab)	185.30	☒ feet	☐ meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	188.70	☒ feet	☐ meters
f) Lowest adjacent (finished) grade next to building (LAG)	185.00	☒ feet	☐ meters
g) Highest adjacent (finished) grade next to building (HAG)	196.40	☒ feet	☐ meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	189.10	☒ feet	☐ meters

DIAGRAM 1A

All slab-on-grade single- and multiple-floor buildings (other than split-level) and high-rise buildings, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor is at or above ground level (grade) on at least one side.*

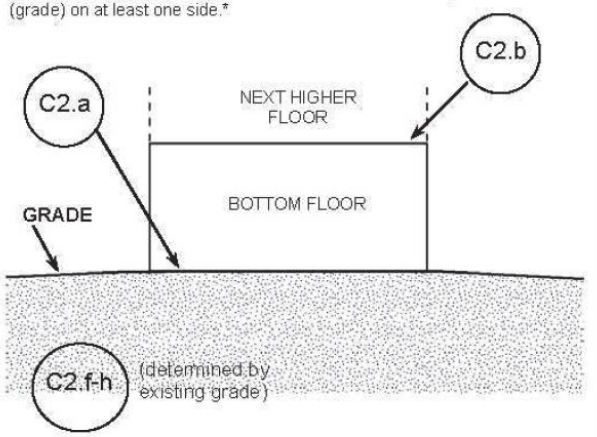
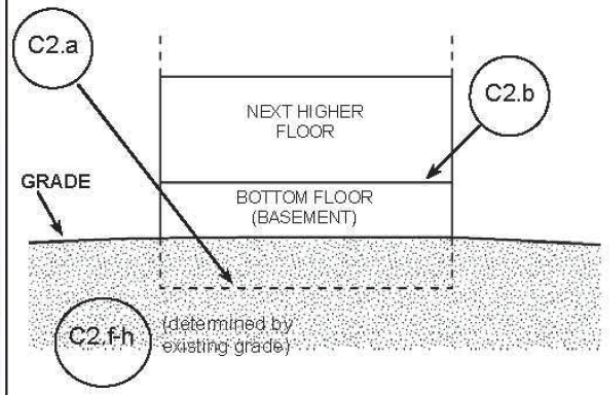


DIAGRAM 2

All single- and multiple-floor buildings with basement (other than split-level) and high-rise buildings with basement, either detached or row type (e.g., townhouses); with or without attached garage.

Distinguishing Feature – The bottom floor (basement or underground garage) is below ground level (grade) on all sides.*



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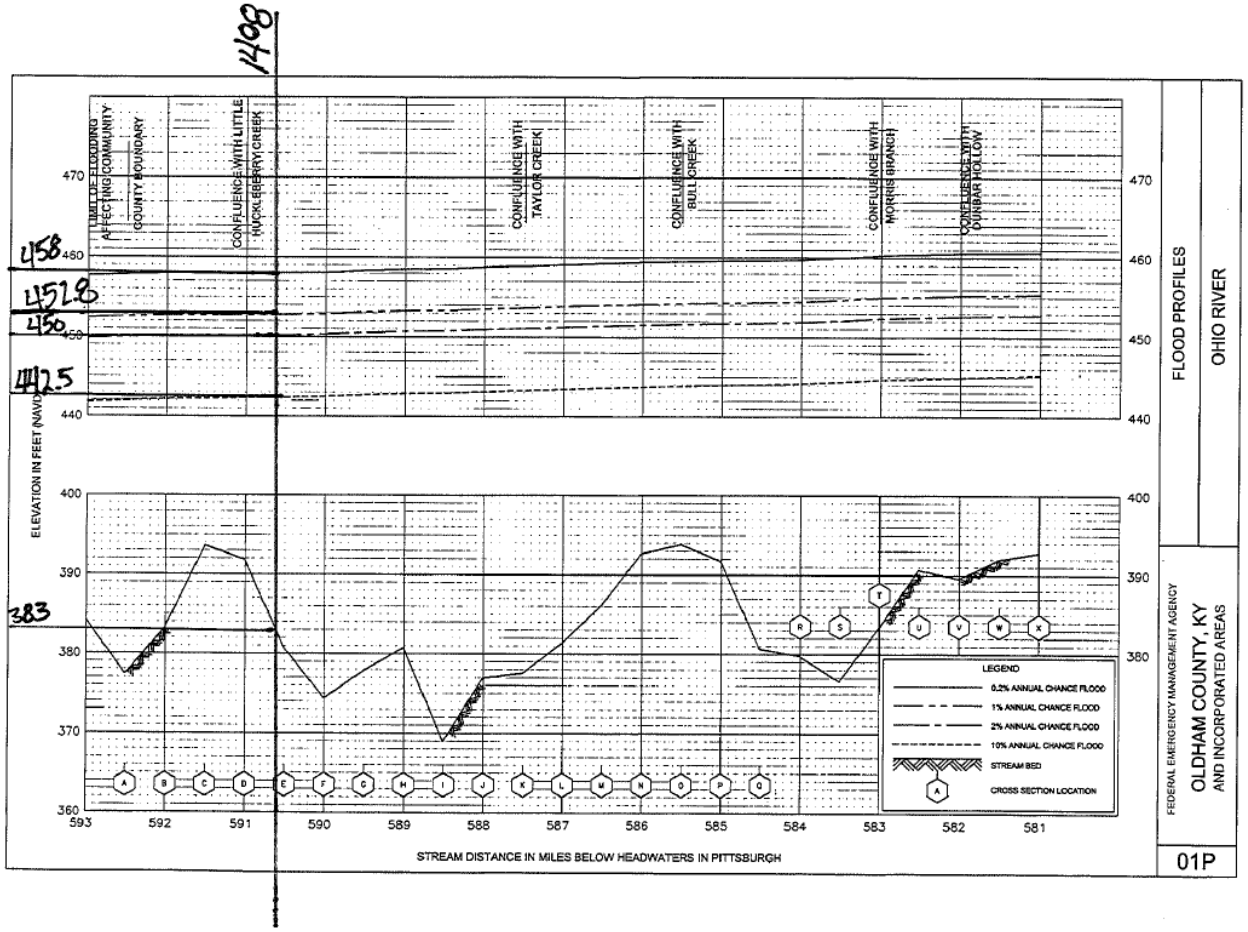
Acquisition/Elevation: Best Practices

- Flood Module – Includes Flood Insurance Study (FIS) profile with structure location clearly marked
- Historical Damages – Provides claims data for historic damages



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Flood Risk Reduction Projects

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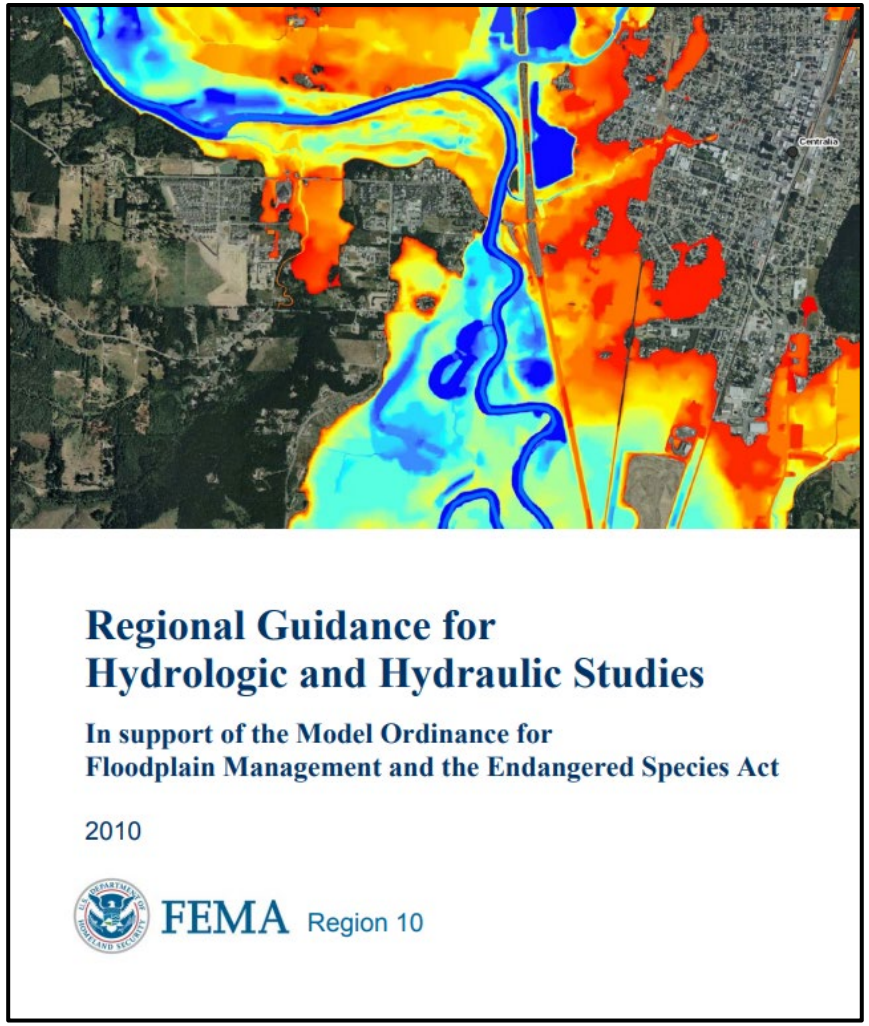
Flood Risk Reduction: Riverine Common Pitfalls

- Project does not address upstream and downstream impacts
- Hydrologic and Hydraulic study (H&H) results are based on a study that includes improvements other than the proposed project
- Not including flood elevation for each RI in project area
- Not providing elevation data for each structure



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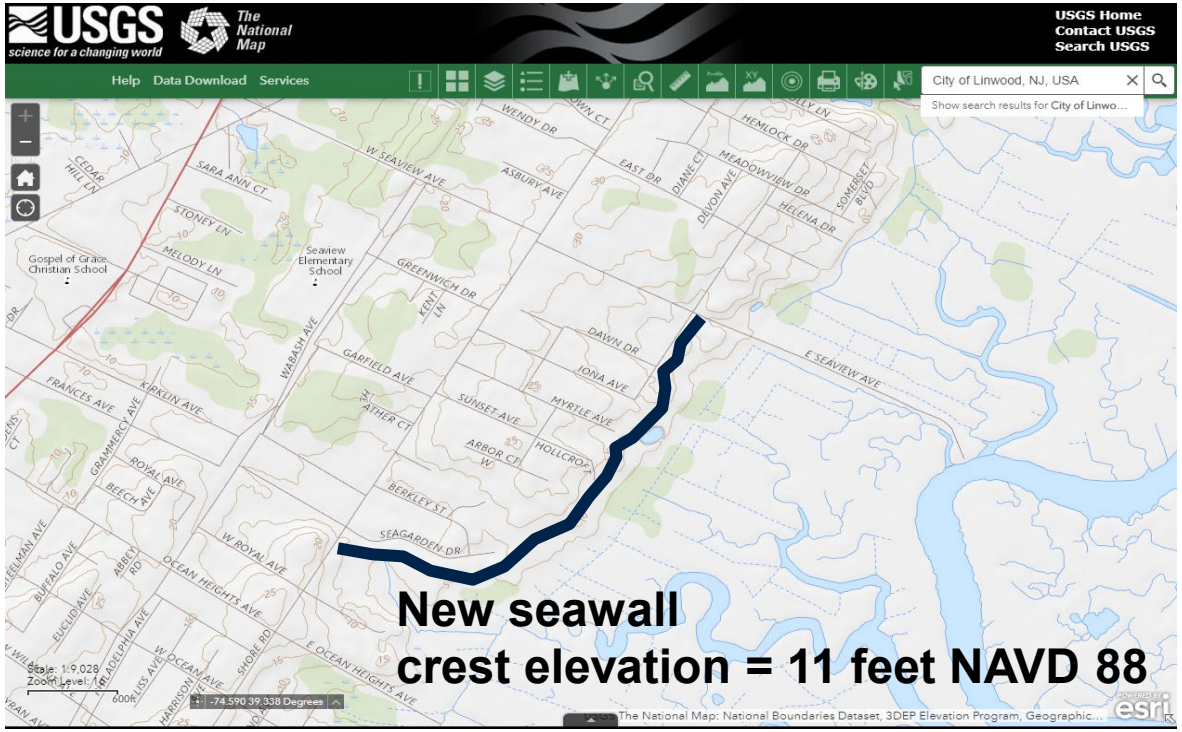
Flood Risk Reduction: Coastal Common Pitfalls

Does not clearly demonstrate how project will prevent flooding or damage to structures

- Tie-in to local topography will not prevent flooding
- Unclear whether structures will be protected by project. Structures are affected by flooding from a different source, or floodwaters can enter from a different direction
- Backwater or ponding issues are not addressed



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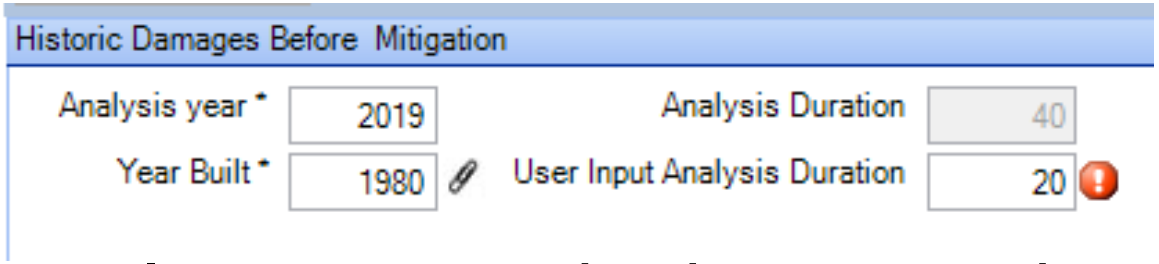
Flood Risk Reduction: Cost-Effectiveness Common Pitfalls

- Incorrect Analysis Duration



- Incorrect methods are used to determine recurrence intervals
- Regional estimates are used rather than best available, site-specific data
- Missing residual risk (after mitigation)

Central Pa.'s 100-year flood - Tropical Storm Lee in 2011

Posted Sep 7, 2019

Shipoke and the surrounding area is surrounded by water as flooding from the remains of Tropical Storm Lee hit the midstate. 09/09/2011 SEAN SIMMERS,THE PATRIOT-NEWS

Flood Risk Reduction: Best Practices

- RI from reputable source: FIS reports, FEMA models, USGS historic streamflow calculations, NOAA Atlas 14
  - Identify nearest coastal transect to project site
- Best available data used
- Provide stage-frequency documentation at project site from H&H modeling or other statistical calculations

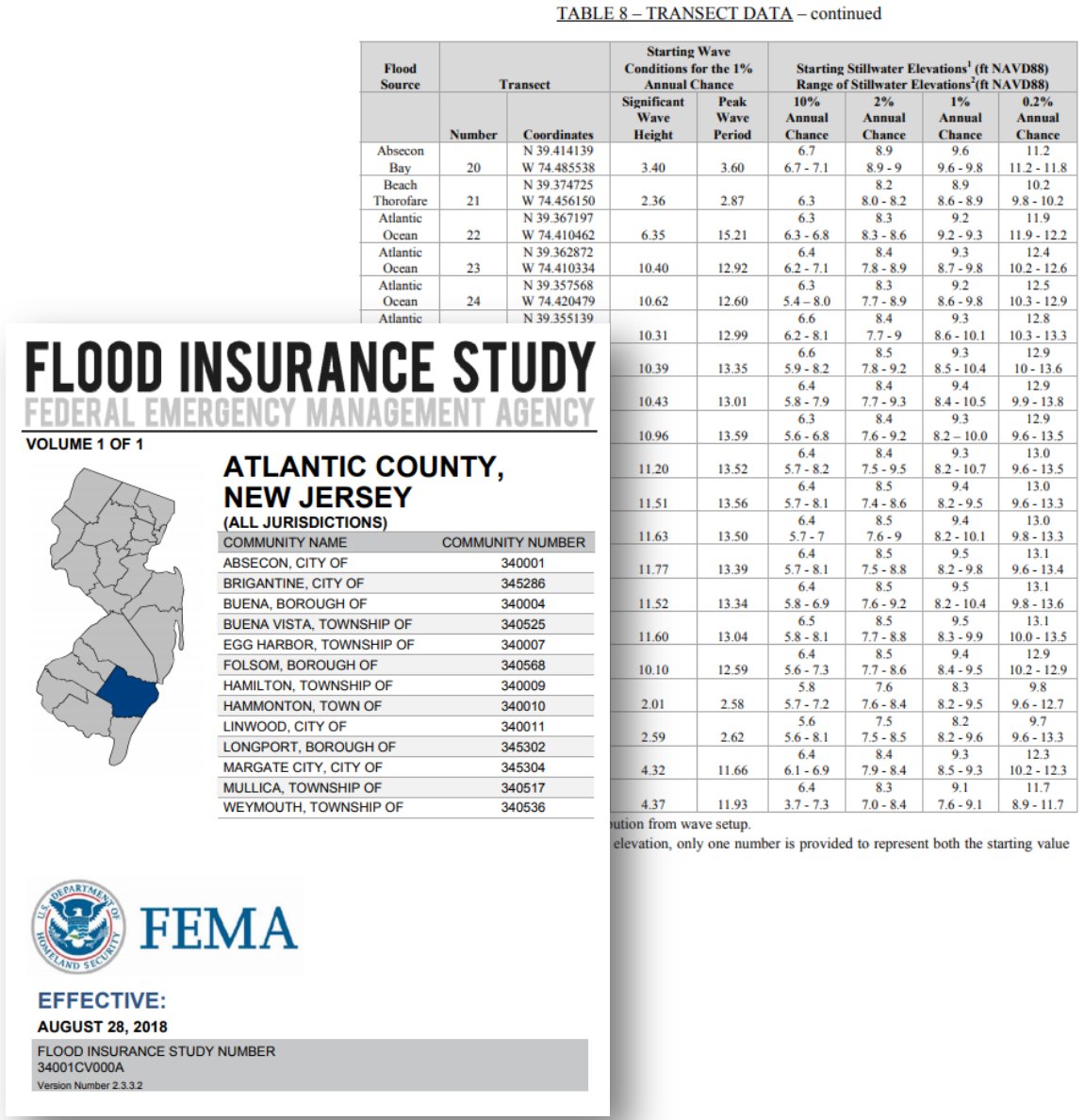


TABLE 8 – TRANSECT DATA – continued

Flood Source	Transect		Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations[1] (ft NAVD88) Range of Stillwater Elevations[2](ft NAVD88)			
	Number	Coordinates	Significant Wave Height	Peak Wave Period	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Absecon Bay	20	N 39.414139 W 74.485538	3.40	3.60	6.7 6.7 - 7.1	8.9 8.9 - 9	9.6 9.6 - 9.8	11.2 11.2 - 11.8
Beach Thorofare	21	N 39.374725 W 74.456150	2.36	2.87	6.3	8.2 8.0 - 8.2	8.9 8.6 - 8.9	10.2 9.8 - 10.2
Atlantic Ocean	22	N 39.367197 W 74.410462	6.35	15.21	6.3 6.3 - 6.8	8.3 8.3 - 8.6	9.2 9.2 - 9.3	11.9 11.9 - 12.2
Atlantic Ocean	23	N 39.362872 W 74.410334	10.40	12.92	6.4 6.2 - 7.1	8.4 7.8 - 8.9	9.3 8.7 - 9.8	12.4 10.2 - 12.6
Atlantic Ocean	24	N 39.357568 W 74.420479	10.62	12.60	6.3 5.4 – 8.0	8.3 7.7 - 8.9	9.2 8.6 - 9.8	12.5 10.3 - 12.9
Atlantic		N 39.355139	10.31	12.99	6.6 6.2 - 8.1	8.4 7.7 - 9	9.3 8.6 - 10.1	12.8 10.3 - 13.3
			10.39	13.35	6.6 5.9 - 8.2	8.5 7.8 - 9.2	9.3 8.5 - 10.4	12.9 10 - 13.6
			10.43	13.01	6.4 5.8 - 7.9	8.4 7.7 - 9.3	9.4 8.4 - 10.5	12.9 9.9 - 13.8
			10.96	13.59	6.3 5.6 - 6.8	8.4 7.6 - 9.2	9.3 8.2 – 10.0	12.9 9.6 - 13.5
			11.20	13.52	6.4 5.7 - 8.2	8.4 7.5 - 9.5	9.3 8.2 - 10.7	13.0 9.6 - 13.5
			11.51	13.56	6.4 5.7 - 8.1	8.5 7.4 - 8.6	9.4 8.2 - 9.5	13.0 9.6 - 13.3
			11.63	13.50	6.4 5.7 - 7	8.5 7.6 - 9	9.4 8.2 - 10.1	13.0 9.8 - 13.3
			11.77	13.39	6.4 5.7 - 8.1	8.5 7.5 - 8.8	9.5 8.2 - 9.8	13.1 9.6 - 13.4
			11.52	13.34	6.4 5.8 - 6.9	8.5 7.6 - 9.2	9.5 8.2 - 10.4	13.1 9.8 - 13.6
			11.60	13.04	6.5 5.8 - 8.1	8.5 7.7 - 8.8	9.5 8.3 - 9.9	13.1 10.0 - 13.5
			10.10	12.59	6.4 5.6 - 7.3	8.5 7.7 - 8.6	9.4 8.4 - 9.5	12.9 10.2 - 12.9
			2.01	2.58	5.8 5.7 - 7.2	7.6 7.6 - 8.4	8.3 8.2 - 9.5	9.8 9.6 - 12.7
			2.59	2.62	5.6 5.6 - 8.1	7.5 7.5 - 8.5	8.2 8.2 - 9.6	9.7 9.6 - 13.3
			4.32	11.66	6.4 6.1 - 6.9	8.4 7.9 - 8.4	9.3 8.5 - 9.3	12.3 10.2 - 12.3
			4.37	11.93	6.4 3.7 - 7.3	8.3 7.0 - 8.4	9.1 7.6 - 9.1	11.7 8.9 - 11.7

ution from wave setup.
elevation, only one number is provided to represent both the starting value

FLOOD INSURANCE STUDY
FEDERAL EMERGENCY MANAGEMENT AGENCY
VOLUME 1 OF 1

ATLANTIC COUNTY, NEW JERSEY
(ALL JURISDICTIONS)

COMMUNITY NAME	COMMUNITY NUMBER
ABSECON, CITY OF	340001
BRIGANTINE, CITY OF	345286
BUENA, BOROUGH OF	340004
BUENA VISTA, TOWNSHIP OF	340525
EGG HARBOR, TOWNSHIP OF	340007
FOLSOM, BOROUGH OF	340568
HAMILTON, TOWNSHIP OF	340009
HAMMONTON, TOWN OF	340010
LINWOOD, CITY OF	340011
LONGPORT, BOROUGH OF	345302
MARGATE CITY, CITY OF	345304
MULLICA, TOWNSHIP OF	340517
WEYMOUTH, TOWNSHIP OF	340536

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EFFECTIVE:
AUGUST 28, 2018

FLOOD INSURANCE STUDY NUMBER
34001CV000A
Version Number 2.3.3.2

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Slope Stabilization Projects

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Slope Stabilization: Common Pitfalls

- Application does not specify what will be protected
- If structures are not acquired, scope of work must address how they will be protected

Cost-Effectiveness

- Imminent failure
  - Lack of documentation showing that slope will fail in ≤5 years
- Incorrect methods to determine RIs
  - Analysis duration
  - RI < project useful life
- Residual risk
  - No basis for after-mitigation damages

Slope Stabilization: Best Practices

Application

- Scope of work proposes to acquire structures at risk of imminent failure

Cost-Effectiveness

- Documentation for estimated days loss of function
- After-mitigation damages demonstrate residual risk

Wind Retrofit Projects

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Wind Retrofit: Common Pitfalls

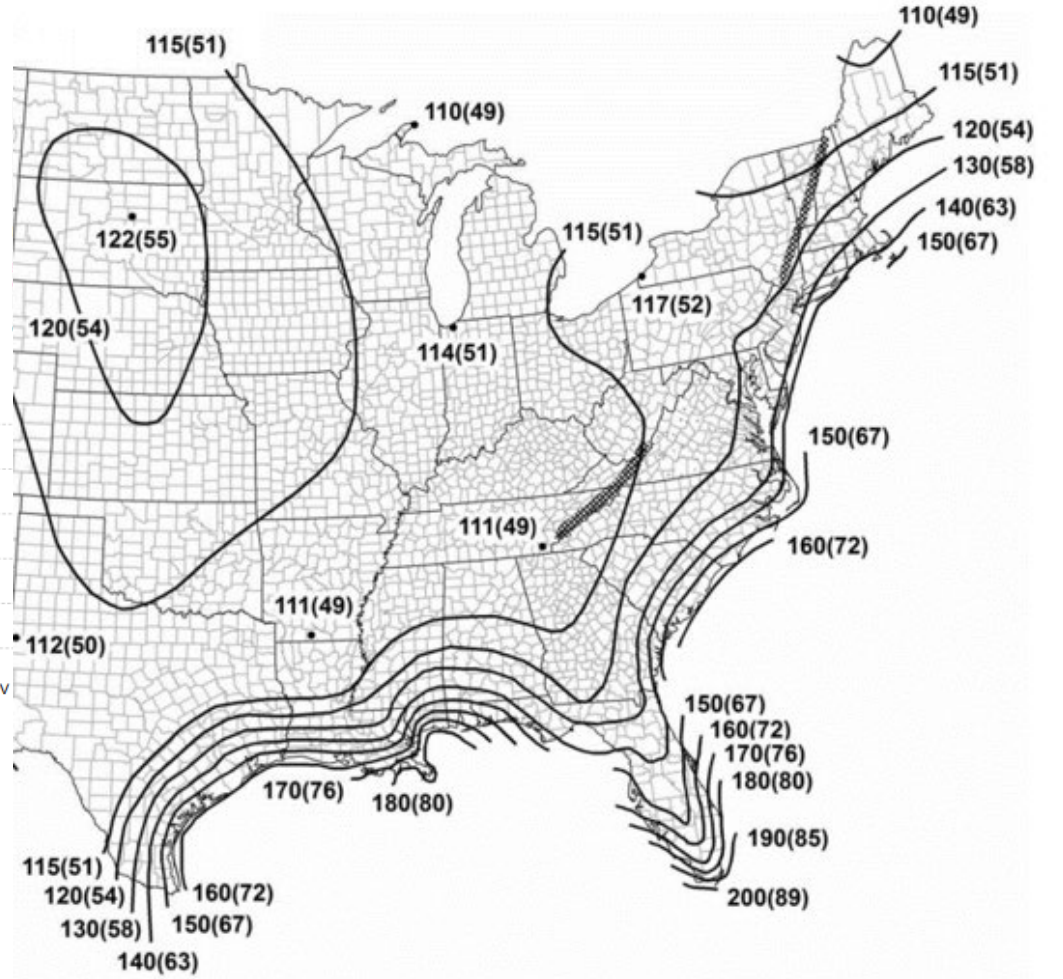
- Does not state whether building can resist current code level design wind speeds
- Does not address all known building vulnerabilities

ATC Hazards by Location

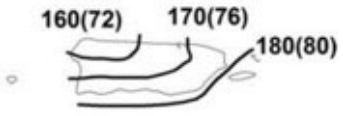
Search Information

Address:	1348 Florida Ave NW, Washington, DC 20009, USA
Coordinates:	38.920043, -77.031249
Elevation:	ft
Timestamp:	2019-08-30T15:31:09.995Z
Hazard Type:	Wind

ASCE 7-16		ASCE 7-10
MRI 10-Year	76 mph	MRI 10-Year
MRI 25-Year	81 mph	MRI 25-Year
MRI 50-Year	87 mph	MRI 50-Year
MRI 100-Year	94 mph	MRI 100-Year
Risk Category I	103 mph	Risk Category I
Risk Category II	111 mph	Risk Category II
Risk Category III	120 mph	Risk Category III-IV
Risk Category IV	125 mph	



Location	V (mph)	V (m/s)
Guam	210	(94)
Virgin Islands	175	(78)
American Samoa	170	(76)
Hawaii	See Figure 26.5-2C	



Puerto Rico

FIGURE 26.5-1C (*Continued*). Basic Wind Speeds for Risk Category III Buildings and Other Structures

Wind Retrofit: Common Pitfalls – Cost-Effectiveness

Does not include documentation for building properties before or after mitigation

Building Properties

Select Type of Construction	Steel
Select Building Type	SECBL: Steel, Engineered Commercial Building, Low-Rise (1-2 Stories)

	Properties Before Mitigation	Properties After Mitigation
Window Area *	Medium	Medium
Roof Cover Type *	SPM	BUR
Wind Debris *	Residential/Commercial Mix	Residential/Commercial Mix
Shutters *	No	Yes
Roof Deck Attachment III (Metal) *	Standard	Standard

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Wind Retrofit: Best Practices

- Includes evaluation that addresses all vulnerabilities and demonstrates structure's ability to endure design wind speed
- Properly select wind exposure category
  - FEMA only uses Wind Exposure Categories B and C
  - If building is in Wind Exposure Category D, use Wind Exposure Category C

Exposure B:

Exposure C:

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Generator Projects

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Generator: Common Pitfalls

- Proposed load is non-critical load
- Residential-type generator
- Upgrade to the electrical system that is not necessary for the generator to function
- Project is not accepted by local code
- Purpose is to meet current building code

Generator:
Common Pitfalls – Cost-Effectiveness

- Incorrect service type for loss of function
- Includes previous damages/ outages that will not be mitigated by proposed scope of work
- Does not account for residual risk after mitigation measure is implemented

Generator: Best Practices

- Identified fuel tank capacity
- Documented project useful life
- Documented occurrences of loss of function, such as:
  - Letter from utility detailing power outages
  - Narrative indicating historical power losses (e.g., news articles)
  - Historical documentation of damage events

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Safe Room Projects

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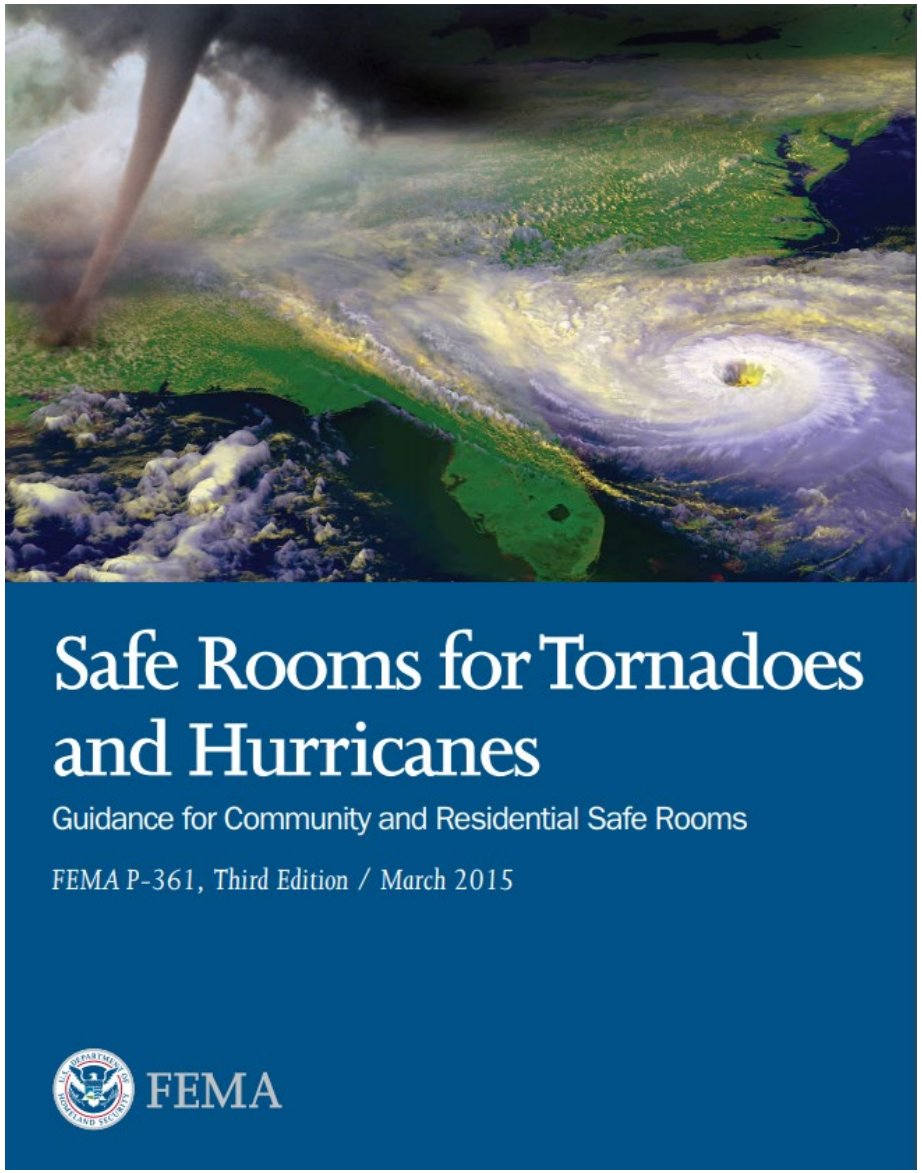
Safe Room: Common Pitfalls

- Safe room occupancy vs. number of possible protected occupants
- Lacks documentation for meeting requirements of ICC-500 and FEMA P-361



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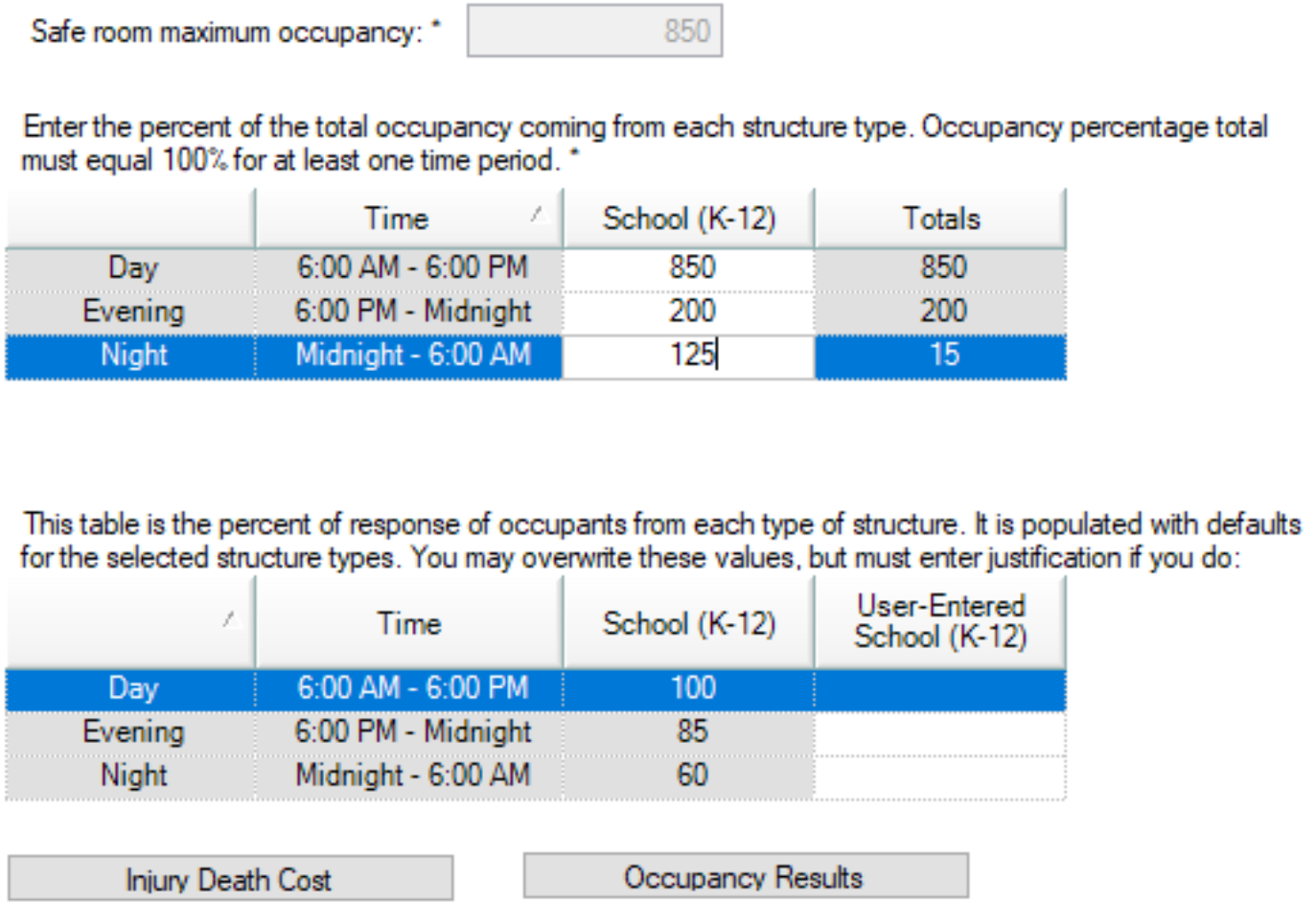
Safe Room: Common Pitfalls – Cost-Effectiveness

- Entered the number of occupants instead of the occupant percentage
- Cannot have more than 100% of the occupants in a safe room



Safe room maximum occupancy: * 850

Enter the percent of the total occupancy coming from each structure type. Occupancy percentage total must equal 100% for at least one time period. *

	Time	School (K-12)	Totals
Day	6:00 AM - 6:00 PM	850	850
Evening	6:00 PM - Midnight	200	200
Night	Midnight - 6:00 AM	125	15

This table is the percent of response of occupants from each type of structure. It is populated with defaults for the selected structure types. You may overwrite these values, but must enter justification if you do:

	Time	School (K-12)	User-Entered School (K-12)
Day	6:00 AM - 6:00 PM	100	
Evening	6:00 PM - Midnight	85	
Night	Midnight - 6:00 AM	60	

Injury Death Cost | Occupancy Results

Safe Room: Best Practices

- Provide documentation that safe room will be designed to ICC-500 and FEMA P-361
- Provide a map indicating:
  - Population protected
  - Maximum travel distance
  - Type of surrounding structures
- Peer review statement

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Seismic Projects

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Seismic: Common Pitfalls

- Unsupported soil type
- Benefits from both monthly cost of living and loss of rental income
- Inappropriate design level (pre-code, low code, medium code, high code)

	Morning (8AM-12PM)	Afternoon (12PM-5PM)	Evening (5PM-9PM)	Night (9PM-8AM)
Monday	10	10	25	30
Tuesday	10	10	25	30
Wednesday	10	10	25	30
Thursday	10	10	25	30
Friday	10	10	25	30
Saturday	15	15	25	30
Sunday	20	20	25	30

- Incorrect average number of occupants

Seismic: Best Practices

Data Quality	Form of Supporting Documentation for Retrofit Sketches
Best	• Engineered retrofit drawings. Final “for construction" drawings not required
Acceptable	• Sample drawings of retrofits from similar projects • Sketches of retrofit options under consideration • Industry accepted standard details

- Approved projects almost always include involvement from a registered Professional Engineer
- Explicitly references codes/standards being applied
- As-built/record drawings provided whenever possible to describe structure

Wildfire Projects

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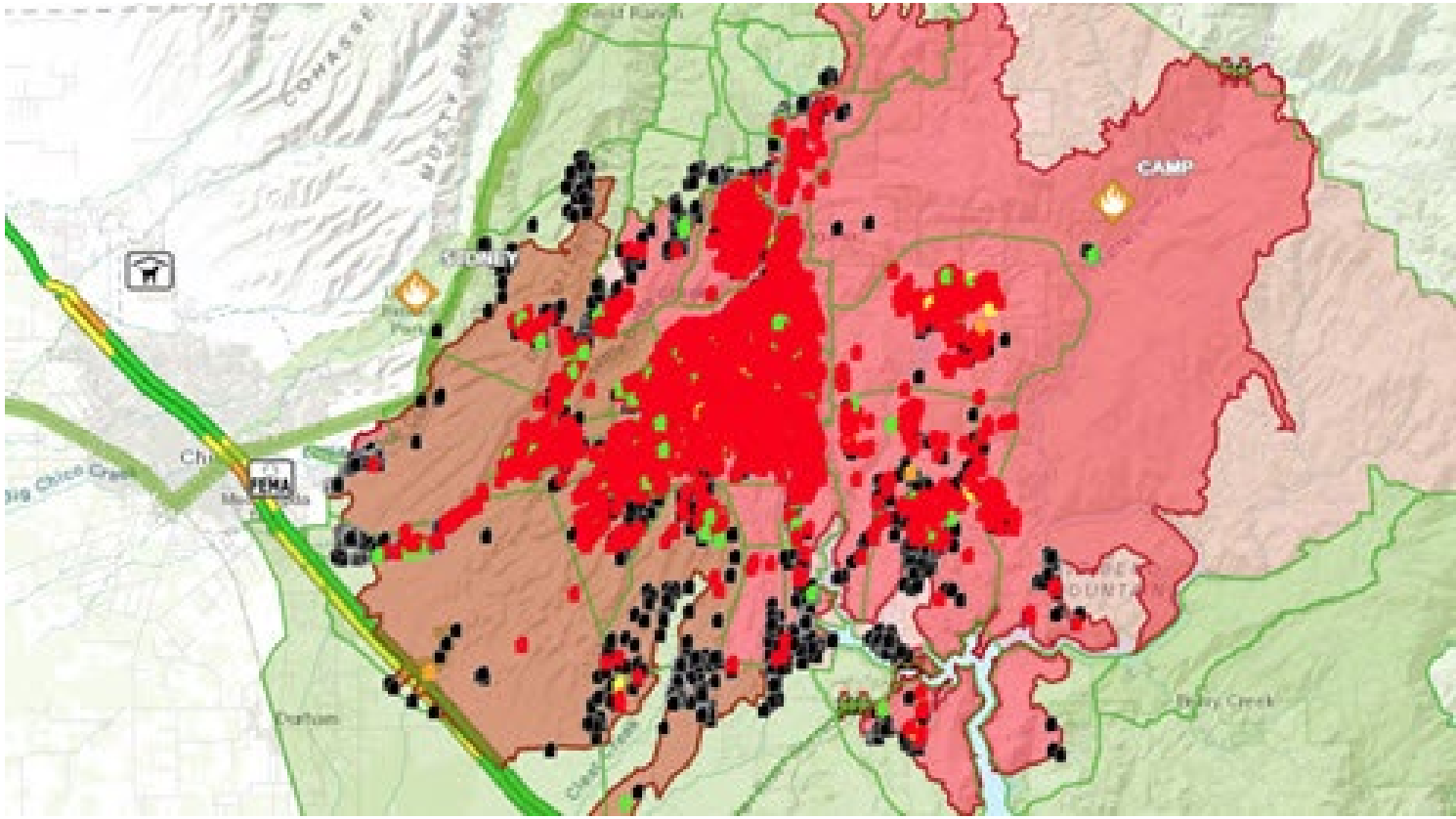
Wildfire: Common Pitfalls

- Incorrect use of mitigation measures
  - Ignition-resistant construction must be paired with defensible space measures
- Unclear vulnerability and location of properties within project area



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Wildfire:
Common Pitfalls – Cost-Effectiveness

- Incorrect selection of mitigation measures
- Unsupported fire suppression costs and/or timber value
- Environmental benefits

Wildfire:
Best Practices

The scope of work should clearly explain the mitigation measures and wildfire risk reduction.

Data Quality	Type of Maps
Best	• Aerial maps with clearly defined boundaries of mitigation activities and the associated benefited properties • Clearly shows the wildfire risk rating of the area, the wildland-urban interface, and the location of recent nearby wildfires
Ok	• Map highlighting general project area without indicating boundaries of mitigation activities or wildfire risk rating

Best Practices – All Project Types

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Best Practices

- All inputs into Benefit-Cost Analysis Tool are supported
  - Pre-mitigation damages
  - After-mitigation damages
  - User analysis duration
  - Any non-default Inputs
- For BCA 6.0, use comment box to identify where documentation is in application
- Narratives and checklists are helpful to check work and ensure data are accurately conveyed

Best Practices: Documentation

Data Quality	Building Replacement Value	First Floor Elevation	Loss of Function
Best	• Cost estimate from a contractor • Standard cost reference guide	• Elevation Certificate	• Official statement/accounting table showing annual operating budgets or venue • Official statement outlining service area/populations
Good	• Statement of BRV from an insurance company	• Lidar elevation	• Maps showing service area with estimate of population based on the number of houses
Ok	• Tax records	• Ground surface elevation and offset	• Statement in the scope of work indicating operating budgets, service areas/population, or description of services

Questions?

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