

# MERIZO CAP 205 FLOOD RISK MANAGEMENT STUDY

**NON-FEDERAL  
SPONSOR UPDATE**

**HONOLULU DISTRICT  
XX AUG 2025**



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# BOTTOM LINE UP FRONT (BLUF)

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- Based on current modeling, the PDT is likely to recommend elevation of 28 homes in Merizo to reduce flood risk.
  - Will requires policy exceptions (NED waiver and cost exceedance).
  - Sponsor to pay all costs in excess of \$15M
- Structural alternatives are not effective or efficient in reducing flood risk in Merizo due to:
  - Limited channel capacity relative to flows
  - Small number of structures at risk
  - High construction and mitigation costs
- The immediate next steps in the study are to review the H&H and economics to make sure that alternative performance is accurate.



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# EXISTING AND FWOP FLOODING

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## Existing Flooding Characteristics:

- Flashy, short duration flood events – Eyewitness accounts report ~45 mins from seeing waterfalls at ridge to flooding at property
- Existing channel capacity upstream does not contain high Annual Exceedance Probability (AEP) (2 to 10-year) events
- Resultant sheet flow across study area.
- Approximately 1-3 feet flood depths at structures near Manell River at 5-year event

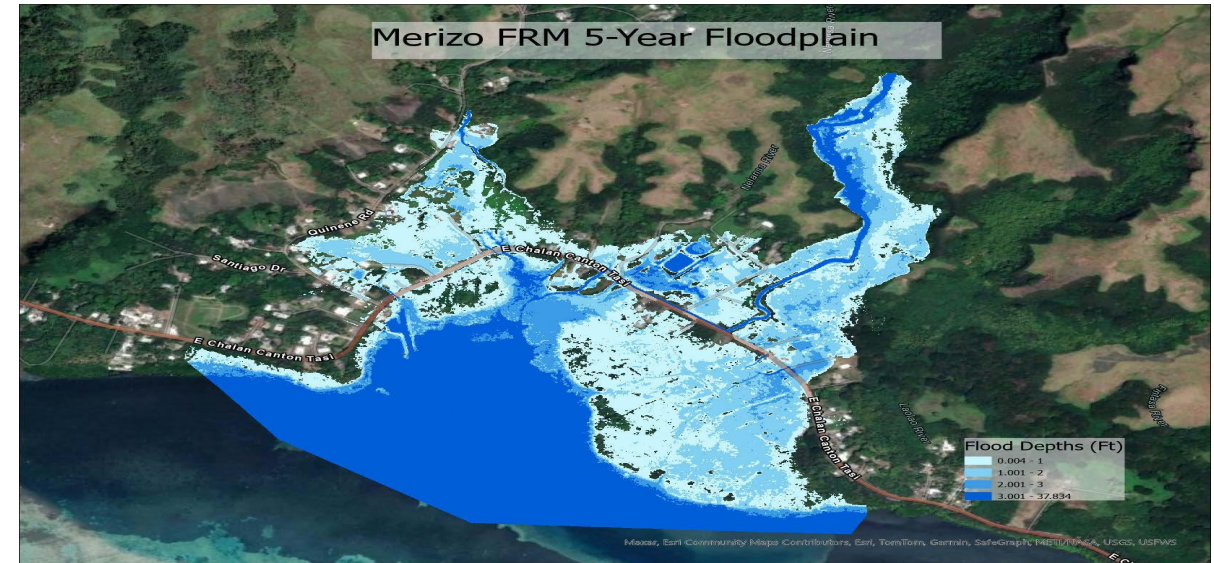




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# FWOP FLOODING (50% - 10% AEP EVENTS)

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# HEC-RAS MODEL LIMITATIONS

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- Manell River and the unnamed stream on the western side of the study area do not have stream gauge data
- HEC-RAS model for the study was calibrated using stream gauge data from an adjacent stream
- No gridded rainfall data with precipitation distribution to further calibrate model



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# ALTERNATIVES- MANELL RIVER (EASTERN REACH)



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| Reach    | Alternative                                                  | Components                                                                                                     | Estimated Cost |
|----------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------|
| East     | 2B: Downstream Ditch – Reduced                               | Box culvert, 400-ft outlet channel tying into nearby stream, 200ft floodwall along right bank south of Route 4 | \$4,453,000    |
| West     | 9B: Western Chanell and Floodwall                            | 800-ft channel to convey stream to cuverts at Route 4, floodwall on right bank of proposed channel             | \$6,589,000    |
| East     | 16: Manell River Floodwalls                                  | 2B components, 1400-ft floodwall on right bank and 810-ft floodwall on left bank North of Route 4              | \$29,649,000   |
| Combined | 13 Elevation (10-year floodplain)                            | Elevate all structures in the 10-year floodplain (18 structures) by 2-4 ft                                     | \$15,534,000   |
|          | 14 Elevation (25-year floodplain)                            | Elevate all structures in the 10-year floodplain (28 structures) by 2-4 ft                                     | \$23,459,000   |
|          | 17 Eastern Ditch (Reduced) and Western Channel and Floodwall | 2B+9B                                                                                                          | \$9,585,000    |
|          | 18 Manell River Floodwalls + Western Channel and Floodwall   | 16+9B                                                                                                          | \$36,435,000   |



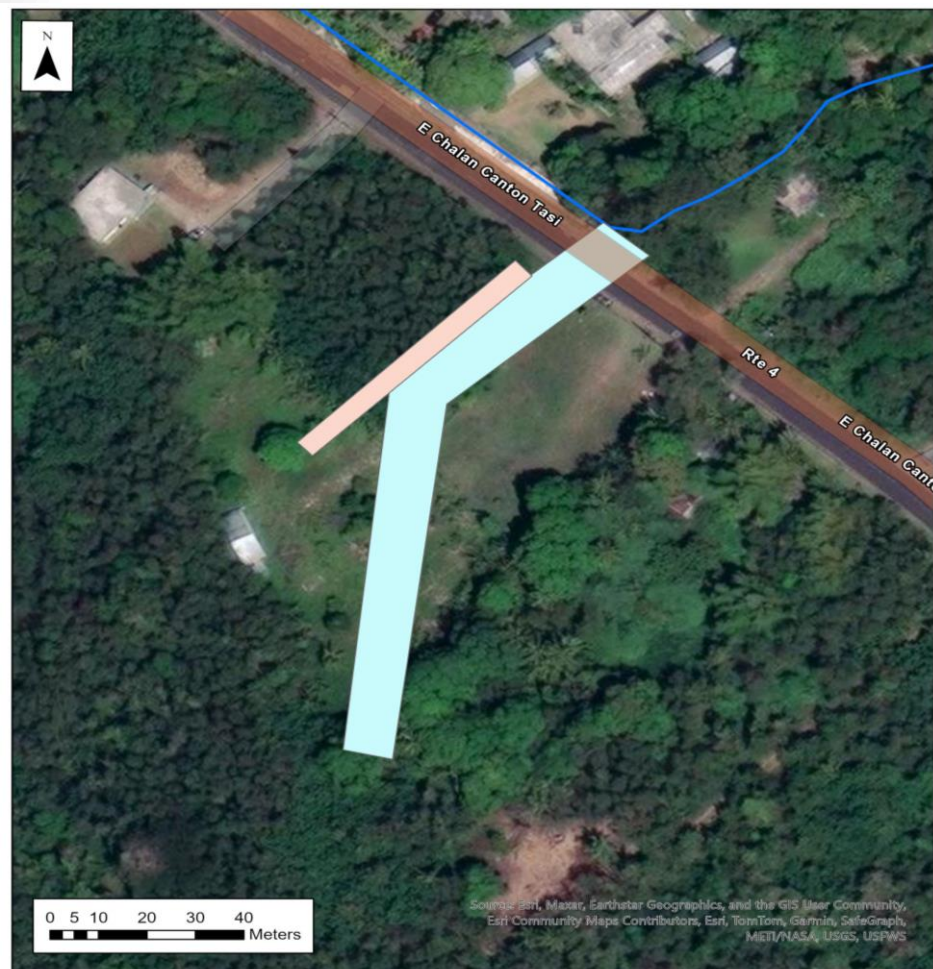
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# ALTERNATIVES- MANELL RIVER (EASTERN REACH)



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Alternative 2B – Downstream Ditch (Reduced)



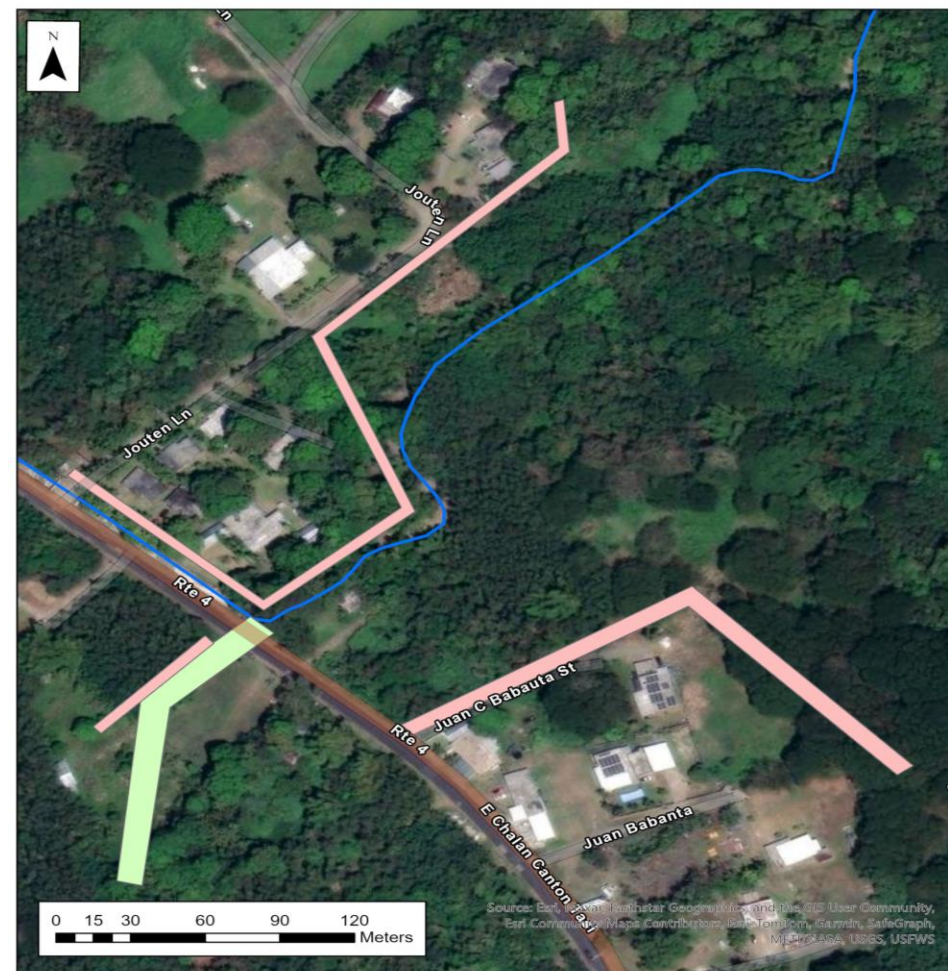
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## Merizo FRM Project - Alternative 2B

Merizo Village, Guam



Alternative 16 – Manell River Floodwalls



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## Merizo FRM Project - Alternative 16

Merizo Village, Guam

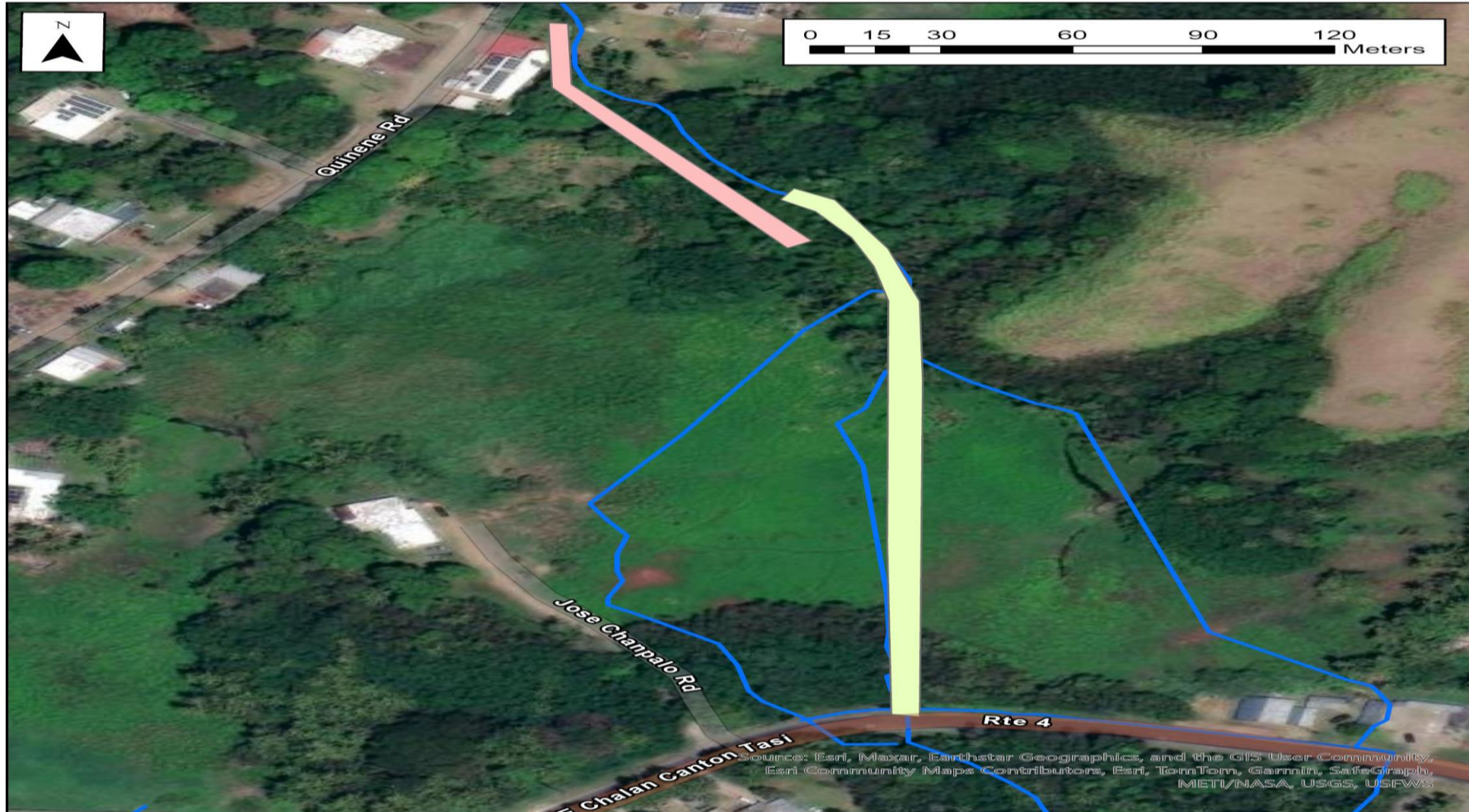




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# STRUCTURAL ALTERNATIVES- WESTERN REACH

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## Merizo FRM Project - Alternative 9B

Merizo Village, Guam

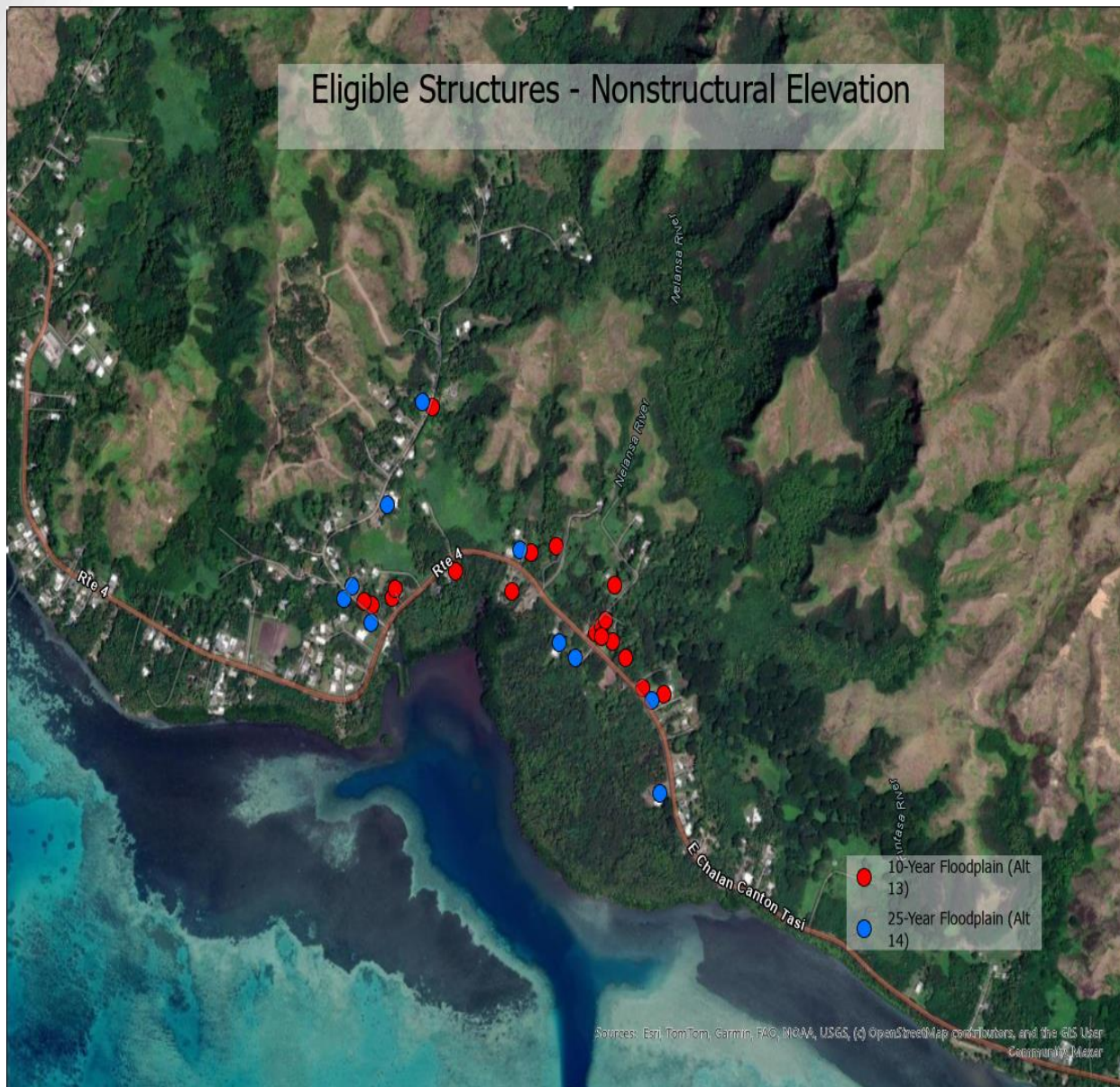




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# ALTERNATIVES 13 & 14 (NONSTRUCTURAL)

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| Metric                                            | Alternative 13 | Alternative 14 |
|---------------------------------------------------|----------------|----------------|
| # Structures                                      | 18             | 28             |
| Avg Square Footage                                | 1,755          | 1,782          |
| Median Structure Value (\$1000)                   | 328            | 335            |
| Total Value (Structure, Contents, Autos) (\$1000) | 13,746         | 22,619         |



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# NONSTRUCTURAL ELEVATION

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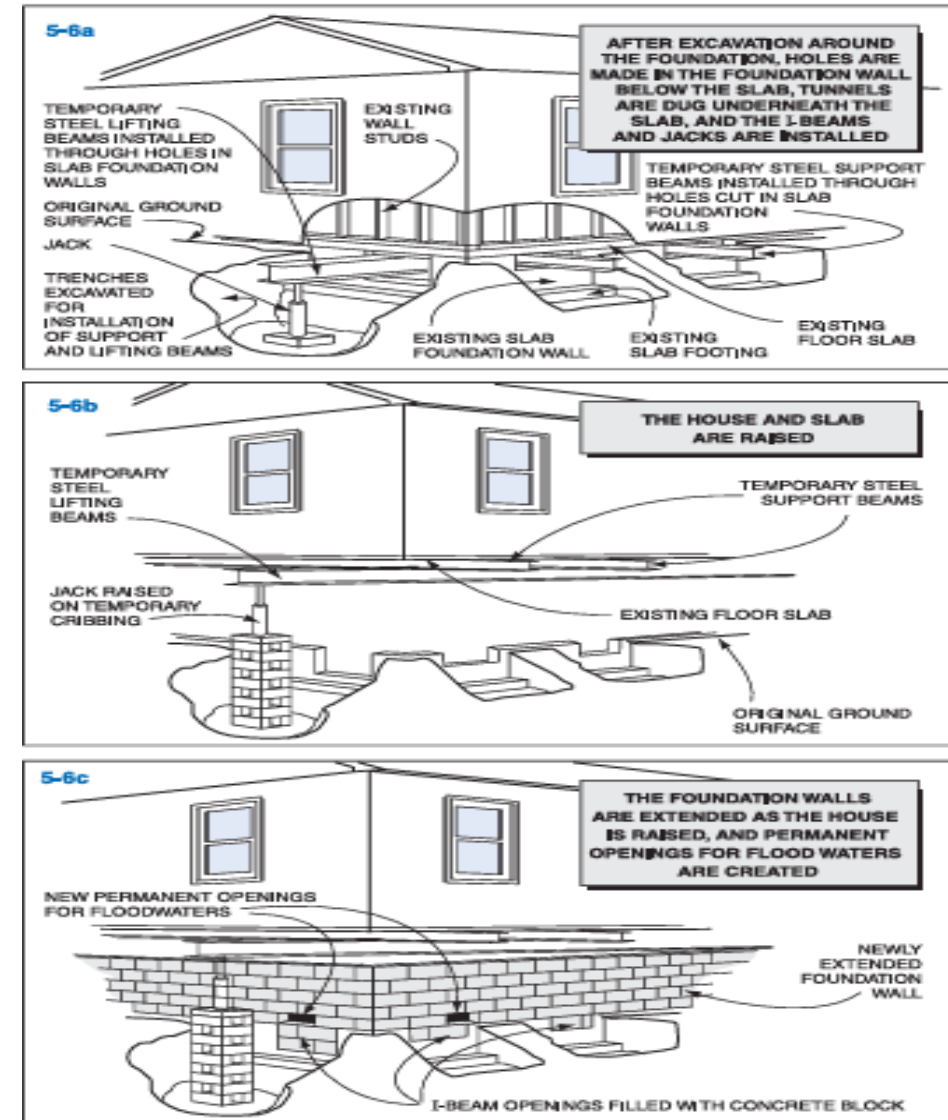


## Tentatively Selected Plan (As of July 2025)

- Elevate all homes in the 25-year floodplain (28 structures) to 1 ft above base flood elevation for 25-year event (3 ft elevation)
- Reduces flood damage by 72% (\$855K annual)
  - Residual damage: \$325K annual (27% of FWOP annual damages)
- Fully voluntary
- Requires temporary relocation during construction

## Construction Method:

- Dig trenches under foundation for placement of I-beams and hydraulic lifts
- Lift slab and home up using I-beam supports
- Build elevated foundation (masonry piers, extended foundation wall, or compacted fill)
- Place slab and home on elevated foundation
- Restore utility connections and regrade/ add access



Source: FEMA P-312 *Homeowner's Guide to Retrofitting* (2014)



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# ALTERNATIVE PERFORMANCE

| Alternative                                                  | Annual Damages Reduced (\$1000) | Annual Cost (\$1000) | Net Benefits (\$1000) | Keeps Road Clear? (Social/ Environmental Benefits) |
|--------------------------------------------------------------|---------------------------------|----------------------|-----------------------|----------------------------------------------------|
| 2B: Downstream Ditch – Reduced                               | 6                               | 174                  | -168                  | No                                                 |
| 16: Manell River Floodwalls                                  | 317                             | 1,187                | -870                  | No                                                 |
| 9B: Western Chanell and Floodwall                            | 133                             | 258                  | -125                  | No                                                 |
| 13 Elevation (10-year floodplain)                            | 422                             | 606                  | -183                  | No                                                 |
| 14 Elevation (25-year floodplain)                            | 855                             | 915                  | -60                   | No                                                 |
| 17 Eastern Ditch (Reduced) and Western Channel and Floodwall | 136                             | 376                  | -240                  | No                                                 |
| 18 Manell River Floodwalls + Western Channel and Floodwall   | 681                             | 1,462                | -781                  | No                                                 |

- Rerouting Manell River without floodwalls does little to reduce inundation depths at structures
- Structural alternatives are inefficient - high environmental and mitigation costs and limited inundation reduction
- Raising houses by 3-4 ft to achieve 1 ft freeboard above the 25-year event is more efficient than structural measures that reduce depths by ~6 inches
- No alternatives reduces flooding of Route 4 that is required to realize nonmonetary benefits (EQ, Life Safety)
- Upland work (retention or expanding channel) limited by high cost for mitigating impacts to ESA species (tree snails)



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# COURSES OF ACTION (POST-REVIEW)

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1. Finish CAP study with recommendation for nonstructural plan
  - Highest potential for immediate flood relief solution
  - Leaves potential for future study under combined FRM/ecosystem restoration authority to restore wetlands and store water upstream
  - Requires NED and cost exceedance waiver
2. Terminate CAP study
  - 2A. Convert to GI under FRM/ecosystem restoration authority
  - 2B. Complete technical report w/ findings and pursue other avenue