DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
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WASHINGTON, DC 20314-1000

CECW-ZA 03-Sep-2025

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Nonstructural Guidance Supplement

1. References:

a. ER 1105-2-101, Risk Assessment for Flood Risk Management Studies, 15 July 2019

b. ER 1105-2-103, Policy for Conducting Civil Works Planning Studies, 7 December 2023

c. ER 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs, 15 June 2019

d. ER 1110-2-1302, Civil Works Cost Engineering, 30 June 2016

e. Engineer Construction Bulletin (ECB) 2018-14, Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects, 19 August 2022

f. Memorandum for See Distribution, Subject: Guidance for Nonstructural Project Planning and Implementation, 22 July 2024

g. MEMORANDUM FOR District Commanders, Deputy District Engineers, Engineering Chiefs, and Cost Engineering Community of Practice (CoP), Subject: Guidance on Cost Engineering Products for Civil Works Projects in accordance with Engineer Regulation 1110-2-1302 – Civil Works Cost Engineering.

h. American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI) 24-24, Flood Resistant Design and Construction, 2024

i. ASCE/SEI 7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures, 2022

2. Purpose. This guidance memorandum supplements, and does not supersede, Reference 1.f. The guidance is applicable to all U.S. Army Corps of Engineers Headquarters (HQUSACE) elements, major subordinate commands, districts, laboratories, and field operating agencies having Civil Works responsibilities. The guidance includes but is not limited to all feasibility studies, including General Reevaluation Reports, Limited Reevaluation Reports, Validation Reports, Dam Safety Modification Studies, and Continuing Authority Program studies. The guidance also applies to all USACE Civil Works projects that include nonstructural measures. This memorandum specifically addresses target design flood elevation, wind risk, the inclusion of structures in a project that were not identified for elevation in a decision document, and building code violations or deficiencies. In addition, this memorandum provides cost engineering guidance for studies that evaluate or recommend floodproofing measures. This guidance will be incorporated in a future Nonstructural ER.

3. Background. Reference 1.f was issued on 22 July 2024. It is multi-disciplinary and included direction for numerous aspects of nonstructural planning and implementation. Since issuance, several critical issues have been identified that require immediate resolution. This guidance provides a path forward for those issues and is needed to ensure that nonstructural plan evaluation, design, and implementation is consistent across the enterprise.

4. Discussion.

a. USACE project delivery teams (PDTs) should be familiar with References 1.a–g and should develop nonstructural project plans and designs in accordance with such references and other applicable USACE guidance, consistent with applicable law and policy. Target design flood elevation will be established using ER 1105-2-101, dated 15 July 2019. This guidance also affirms the requirements to utilize ECB 2018-14 and ER 1100-2-8162 to ensure proper consideration of variability in future without project conditions in studies and projects. USACE PDTs may consider guidance issued by other agencies, to the extent such guidance might inform USACE planning, design, or decision-making, but should not substitute guidance of other agencies for USACE guidance unless required by law or policy.

b. Certain areas of the Nation, particularly those along the coast, have higher standards for wind risk management, either in local building codes, or through the application of ASCE 7-22 or the International Code Council International Codes. These codes can vary by location and may call for wind risk management improvements such as pressure-rated windows and doors, roof tie downs, and other measures. This memorandum clarifies that, unless specifically authorized by Congress, improvements to address wind risk management will not be considered projects costs. Additionally,

USACE will not constrain the target design flood elevation, thereby reducing the level of flood risk management provided by a project, in order to remain below the model code that may limit the overall height of an elevated structure.

c. This guidance recognizes that structure inventories for nonstructural projects may involve some uncertainty at the feasibility stage, with further refinement later in pre-construction engineering and design. Accordingly, this guidance provides direction for districts in the case that a structure (or structures) was not included in a project feasibility study. Additionally, this guidance provides direction for nonstructural project implementation when there may be building code violations or deficiencies. Lastly, this memorandum includes a discussion of cost engineering for floodproofing and provides guidance in an appendix.

5. Target design flood elevation.

a. The target design flood elevation is the height to which a structure will be elevated or floodproofed to manage risk for a certain AEP. USACE uses a comprehensive, analytical approach based on projected future meteorological and atmospheric conditions to determine the target design flood elevation for nonstructural projects.

b. ASCE/SEI 24-24 is a standard that provides minimum requirements for flood resistant design and construction of structures that are subject to building code requirements or floodplain management regulations in flood hazard areas and is intended to meet or exceed the requirements of the National Flood Insurance Program (NFIP) as set forth by the Federal Emergency Management Agency (FEMA). This standard applies to new construction, including subsequent work to such structures, and work classified as substantial improvement of existing structures that are not historic structures. Historic structures would likely need more specific treatment.

c. Although USACE generally relies on ASCE/SEI 24-24 for the design of nonstructural projects, the USACE approach to establish a target design elevation is different from the approach in ASCE/SEI 24-24. Specifically, ASCE/SEI 24-24 differs from USACE development of flood events on the principle of intent. The minimum requirements for ASCE/SEI 24-24 are somewhat constrained for an intended purpose; whereas USACE derivation of flood risk considers explicitly the performance consequences of subjecting people and property to the entire range of likely flood events, given risk management provided by any structural or nonstructural measures. Formulation of events in the construct of USACE Flood Risk Management (FRM) policy, which includes Coastal Storm Risk Management (CSRM), denotes the risk analysis

framework is to be used, to include the evaluation of a full range of floods (including those that would be in excess of FEMA derived base flood elevations) that will be used in the formulation and evaluation of alternatives.

d. ER 1105-2-101 provides guidance for the risk framework, which is a decision-making process that comprises three tasks: risk assessment, risk management, and risk communication. All Flood Risk Management FRM and CSRM studies must utilize ER 1105-2-101 to apply the risk framework and perform a risk assessment, which in turn will be used to inform the risk management decision that establishes the target design flood elevation for structures in the recommended plan. The risk management decision must be coordinated with the non-federal interest (NFI) and documented in the feasibility report. For instance, per ER 1105-2-101, all FRM and CSRM studies will report project performance as described by the AEP with uncertainty, along with associated assurance for the 0.2, 0.1, 0.02, 0.01, 0.004, and 0.002 events. The assurance, along with other relevant criteria such as cost effectiveness, is then used to make a risk management decision that establishes the target design flood elevation for nonstructural projects. For nonstructural elevations, Feasibility Report and Chief of Engineers Report documentation will both state that "Given irreducible uncertainties inherent in flood frequency analysis, the Recommended Plan includes elevating residential structures to a target elevation height of X feet that will pass the X% AEP flood event with 90% assurance." A similar statement will be included for nonstructural floodproofing projects.

e. For inland flooding, ECB 2018-14 describes the process that must be followed to incorporate future without project conditions and variability information into a hydrologic analysis. Regarding target design flood elevation of structures, although the addition of explicit freeboard is not allowed, feasibility reports may recommend additional vertical clearance to account for inherent natural variability in flooding due to weather variables and drivers and develop a more resilient plan that includes risks to the natural environment as well as the social and cultural well-being of people. The qualitative analysis required by ECB 2018-14 must provide an evaluation of the uncertainty of environmental factors, such as extreme seasonal conditions of rainfall and runoff or altered snow volume and melt, over the planning horizon that clearly articulates a need for additional vertical clearance. Increases in resilience capacity via additional vertical clearance must be fully articulated and include information specific to the study area regarding the ability of communities to prepare for, resist, absorb, recover, and adapt to potential floods.

f. For coastal studies, districts must follow the guidance in ER 1100-2-8162 for incorporating sea level change (SLC). This ER requires that "planning studies and engineering designs over the project life cycle, for both existing and proposed projects, will consider alternatives that are formulated and evaluated for possible future rates of

SLC, represented by three scenarios of "low," "intermediate," and "high" SLC. The ER requires districts to carefully consider the "adaptability" of project features, as "Civil Works projects typically have an actual physical life far beyond the period of economic analysis." Residential elevations are likely to have project lives beyond the 50-year period of economic analysis and many are likely to exceed the 100-year hydrometeorological horizon. Residential elevations are also considered relatively less adaptable features, as each structure would need to be raised again if flood risk were to increase. For compound flooding situations where USACE must evaluate the effects of riverine and coastal flooding that may occur simultaneously in the same area, PDTs are encouraged to contact the FRM- and CSRM-Planning Centers of Expertise to determine a path forward.

g. USACE does not consider changes in NFIP rates for structure owners in its design of nonstructural projects. For nonstructural elevations, the NFI must request a Locally Preferred Plan to elevate structures higher than the target design flood elevation determined in a feasibility study using a comprehensive, analytical approach that applies to every structure in the project area. It would be infeasible to modify federal contracts to allow for individual structure owners to elect to elevate their structure higher than the authorized target design flood elevation even as a betterment due to the potential for a high number of contract modifications. It is critical that districts discuss and explain the specific aspects of this guidance with NFIs. The target design flood elevation may influence non-federal participation in the project, particularly if the NFI wants to elevate structures above the target design flood elevation since this would be at full non-federal cost.

6. Wind risk.

a. Residential structures that are eligible for elevation may already have high risk for damage from wind. Many existing homes in areas that may be affected by coastal storms were designed and constructed to either no code or less stringent code for wind risk management than is currently required. Newer homes may be compliant with current building codes for wind risk management, but it can vary by state depending on when upgraded standards were adopted.

b. Improvements for wind risk management of nonstructural projects are not considered project costs. Additionally, USACE will not conduct detailed inspection of structures to determine if they are compliant with national standards or local/state building codes for wind risk. As noted earlier in this document, USACE will not limit the target design flood elevation of a structure, thereby lowering the level of flood risk management provided by a project, in order to remain compliant with standards or building codes. All USACE participation agreements for nonstructural elevation projects will include indemnification language that holds the United States harmless from any

wind damage that may occur after elevation of the structure, and this participation agreement is required for project eligibility. The project participant will be responsible for any wind risk management improvements that are required as a result of the project.

7. Additional structures.

a. During project implementation, if it becomes apparent through discussion with the NFI and their community members, field observations, or other means that additional structures in the study area should have been included in the authorized plan due to incorrect or missing data in the structure inventory or modeling uncertainty during the study phase, then the PDT may conduct an assessment to determine which additional structures will be included in the project. These structures must meet the criteria for plan selection that were approved in the Chief of Engineers Report.

b. If a decision is made to include these additional structures, it must be documented in district files and updated for all total project costs. The addition of structures and potential cost increases cannot exceed the Chief of Engineer's discretionary authority pursuant to Appendix G of ER 1105-2-100, or any subsequent replacement. Specifically, MSC Commanders will ensure the inclusion of additional structures does not exceed 20 percent of the authorized scope of the project or the authorized project costs greater than increases in price level changes and modifications required by law pursuant to 33 USC § 2280 (also known as "Section 902") and follow USACE Civil Works Program Development Guidance and Program Execution Guidance where the cost estimates exceeding the authorized cost plus inflation (or an already approved USACE cost) must be approved by the DCG-CEO.

8. Building Code Violations or Deficiencies. If building code violations or deficiencies, such as illegal electrical connections, that would affect the federal project are discovered prior to construction, the NFI or the owner must resolve the issue for the structure to be eligible for elevation. In the instance that pre-existing violations or deficiencies that affect the federal project are discovered during construction, the work will be treated as a modification and will be cost shared accordingly with the NFI.

9. Cost engineering for floodproofing.

a. Cost Engineering guidance for floodproofing projects has been included as an appendix. Dry and wet floodproofing requires measures to be designed and constructed for a specific, existing structure, which may include different numbers and types of openings, multiple types of building materials and construction techniques, and other differences. As each structure is typically unique and costs to floodproof the structures can significantly vary, cost estimates for individual structures cannot normally be extrapolated to others as is done for typical structures in elevation projects. Therefore,

development of cost estimates for floodproofing can require significantly more field verification. Districts must take these facts into consideration when developing the scope, schedule, and budget for FRM and CSRM studies.

b. In addition, districts must thoroughly investigate whether floodproofing would be allowable according to the use of the building. For example, although critical infrastructure can greatly benefit from floodproofing, structures such as hospitals or fire stations may require ingress and egress during storm events, eliminating dry floodproofing from consideration as it requires a structure to be watertight. If there are elevated areas where vehicles could be parked outside of the structure, along with an elevated entrance that does not interfere with the floodproofing system, then dry floodproofing may be feasible.

10. Planning and policy questions regarding this memorandum should be directed to Ray Wimbrough, Senior Policy Advisor, HQUSACE Planning and Policy Division, at 202-699-2961 or raymond.l.wimbrough@usace.army.mil. For Real Estate, questions should be directed to John Wilburn at 662-301-4562 or john.t.wilburn. For Engineering and Construction concerns, please contact John Winkelman at 978-318-8615 or john.h.winkelman@usace.army.mil.

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Appendix 1: Cost engineering guidance for Civil Works floodproofing projects in the feasibility phase

1. General

a. Cost Engineering products are required to follow all applicable USACE regulations and be transparent, comprehensive, well documented, accurate and credible.

b. Estimates must be based on sufficient design to support estimate classifications per ER 1110-2-1302.

2. Best Practices

a. Design maturity must support cost products. Ensure that the technical lead has completed design review and the Project Delivery Team (PDT) has concurrence with design.

b. Designs must be in sufficient detail. Different building classifications and end use will dictate measures. It is likely that a number of different measures will be needed for wet and dry floodproofing.

c. Utility relocation will need to be defined for individual structures and elevation of mechanical/electrical equipment.

d. Structure inventories must be current and validated by the PDT.

e. Contract Execution Strategy

1) The PDT must identify the project execution strategy.

2) Consideration must be given for district execution capacity, NFI capabilities, and market conditions.

3. Schedule Constraints. Schedule constraints include weather constraints, environmental windows, and other considerations. Overtime, shift work and other project constraints will affect the project cost. The Cost Engineer is responsible for the construction schedule, but the Project Schedule is provided by the PDT. The Project Schedule is needed to capture escalation costs.

4. Cost Schedule Risk Analysis

a. A Cost Schedule Risk Analysis (CSRA) template for floodproofing projects is being produced to streamline and assist teams. The template will be made available for use as soon as it is completed and will be included in the future ER.

b. The following risks will be discussed, at minimum:

1) Scope Maturity. Scope maturity will include a discussion on preliminary design assumptions that may change as scope definition progresses. Unknown factors may exist such as environmental hazard mitigation or historic preservation concerns.

2) Contract Acquisition Strategy. The acquisition strategy will define how the work will be done. The strategy can change as the scope matures, which will impact both costs and schedule.

3) Market Conditions. Availability and interest from contractors to conduct this work in the timeline set forth may change. Attention should be paid for competition with other projects both in the area and within the region regarding both labor and equipment. Material and fuel costs can also fluctuate over time. Consider age of structures and variations in study area. Many of the structures will be of different ages and variations. As the design progresses, the number and types of structures will likely change.

4) Design and Construction Management Costs. Preconstruction, engineering and design costs as well as construction supervision and administration expenses may not be fully vetted, as project definition is not initially completely understood.

5) Modifications During Construction. Differing site conditions and other unknowns may arise during construction requiring changes to design and/or construction.

6) Survey Data and Investigations. Existing survey data will likely be incomplete or insufficient. Additional investigations may result in changes to the design.

7) Funding. Review the funding stream and any shortages that may occur due to changing priorities both at the federal and non-federal level.

8) Internal Resource Capacity. This includes identification of any internal resource issues such as floodproofing experience in critical disciplines, competing study/project efforts due to Supplementals or other increases in workload.

9) State, Local, or Tribal Nation concerns/issues. Identify concerns regarding the timing of building permit issuance, inspection of properties/construction sites, etc.

10) Inventory Uncertainty. There is a potential for changes from when the study was completed to the current inventory as there may be ownership changes, other Government programs, or incorrect information within existing databases that may have been used during feasibility.

11) Phasing. Discussion on the outside effects such as homeowner participation changes that may inhibit ideal phasing initially proposed during feasibility stage.