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ENGINEERING AND CONSTRUCTION BULLETIN

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SUBJECT: Lessons Learned from SDD Policy Validation Visits

CATEGORY: Guidance and Information.

1. **References:**

a. Memorandum, ASA (IE&E), Subject: Sustainable Design and Development Policy Update, 16 December 2013.

b. Unified Facilities Criteria 1-200-02, Subject: High Performance and Sustainable Building Requirements, 1 March 2013.

c. Engineering Regulation ER-1110-345-100, Design Policy for Military Construction, 15 February 1994.

d. Army Regulation (AR) 420-1 (Army Facilities Management), 12 February 2008, Including Rapid Action Revision No. 2 Issued 24 August 2012.

e. Engineering Construction Bulletin 2015-07, Subject: Life-Cycle Cost Analysis Requirements for the Design Phase of USACE Buildings, Central Energy Systems and Associated Supporting Facilities, 4 Mar 2015.

f. Engineering Regulation ER-1110-345-700, Design Analysis, Drawings and Specifications, 30 May 1997.

g. Engineering Construction Bulletin 2016-11, Subject: Reissue of 2014-1, Authorized Scope of Work for Military Construction (MILCON) Projects, 13 April 2016.

2. **Purpose.** The purpose of this Engineering and Construction Bulletin (ECB) is to share lessons learned from Sustainability Design & Development (SDD) Policy validation visits conducted for various MILCON and Sustainment, Restoration and Modernization (SRM) projects in different stages of construction and take corrective action on sustainable design processes that will achieve compliance with Army SDD Policy.

3. **Background.** The Assistant Secretary of the Army (Installation, Energy & Environment) (ASA(IE&E)) issued Army Sustainable Design and Development (SDD) Policy Update (ref. a) establishing the minimum requirements for new construction (MILCON) and major renovation (SRM) projects to support the Army's mission and resilience goals. The policy also meets the Federal and Department of Defense (DoD) high performance sustainable building (HPSB) requirements, which include the requirements of Unified Facility Criteria (UFC) 1-200-02 (ref. b) and requires certification of projects at the U.S. Green Building Council's LEED rating system Silver level or higher. The USACE Chief of Engineering & Construction issued a memo (Attachment A) that outlines the USACE role in response to a memo (Attachment B) issued by

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ASA(IE&E) regarding Validation of SDD Policy Update. This memo was sent to all the Division Commanders directing them to assist in and participate with the SDD validation process. At the direction of ASA(IE&E), ODASA(E&S) along with OACSIM and USACE, will “institute a SDD validation process that evaluates a representative sample of projects each year for compliance with Army SDD policy.” The intent of the validation visits is to gain valuable insights that can improve our processes and “identify where implementation guidance should be strengthened or clarified and where additional training is needed.” As part of this process, the ASA(IE&E) requested that best practices and lessons learned be shared throughout USACE.

The lessons learned were based on observations from five FY2015 MILCON and five FY2013 or later SRM projects visited in FY2017 including discussions with PDT, DPW, MSC representatives and the review of submittal documents, design analysis and drawings, energy models, life-cycle cost analysis, contract documents, 1391s, LEED documentation and various other project files. To continue to improve the way USACE executes design and construction, it is important to share lessons learned and identify corrective actions to effect behavioral changes in our organization.

4. Lessons Learned & Corrective Action.

a. Unified Facility Guide Specifications (UFGS).

(1) Lesson Learned. Inconsistent use of UFGSs available on Whole Building Design Guide (WBDG) (www.wbdg.org) was found in the review of projects. It was observed in review of contract documents that the current UFGSs available on WBDG at the start of design are not consistently used on projects. In some cases District offices are maintaining specifications reused from previous projects without incorporating appropriate updates for references and other technical content provided in the UFGS on WBDG. Specifically, out of date references and missed opportunities were found for environmentally preferable products, Energy Star/FEMP designated equipment, and WaterSense labeled products in some specifications reviewed.

(2) Corrective Action. Strict compliance with ER 1110-345-100 Design Policy for Military Construction (ref. c) to incorporate current criteria in place at Code 3 (Parametric design stage, which is 5 to 15% of design) is required to be implemented (ref. d). Criteria includes UFCs and UFGSs published and active on Whole Building Design Guide (WBDG) (www.wbdg.org) is required on all projects. The Technical Lead will ensure current UFCs and UFGSs available at Code 3 will be used.

b. Standard Designs.

(1) Lesson Learned. As the Army SDD Policy and UFC 1-200-02 continue to evolve, changes required for standard design compliance are lagging and need to be updated to the most current Army SDD Policy and UFC requirements.

(2) Corrective Action. Updates to bring standard designs into compliance with current Army SDD Policy and UFC 1-200-02 will occur starting at the beginning of FY18. Center of Standardization and the geographic district PDT will work together to ensure the standard design is brought into compliance with current policy and criteria.

c. Whole Building Life-Cycle Cost Analysis (LCCA).

(1) Lesson Learned. Life-cycle cost analysis prepared in support of design decisions were limited in scope to renewable energy and/or energized systems and were not comprehensive of a whole building LCCA. Additionally, when there is a standard design that has used a previous LCCA, we should be reviewing the LCCA to ensure that the utility rates used in the original analysis match the actual project location. If not, then the LCCA should be updated to match the utility rates of the project location. This could potentially change the outcome of the system that is selected for that project site. This also applies to any other component of the LCCA including maintenance costs used and other factors.

When there are projects that have multiple facilities as part of a complex, we should be looking to leverage sustainable features that take advantage of a cluster of buildings in close proximity (e.g. Co-generation may be more viable with multiple buildings clustered together rather than just looking at options at a single building level). There should be a discussion or narrative discussing this approach to make sure we have documented that this was considered.

(2) Corrective Action. Strict compliance with ECB 2015-07 (ref. e) which includes minimum requirements for performing Life-Cycle Cost Analysis (LCCA) for energy conservation alternatives during the design phase for buildings, renewable energy systems, central energy plants and heating or cooling distribution networks. An Engineering Regulation regarding LCCA and energy modeling is currently being developed to further clarify the requirements to perform a LCCA for each project and will replace the ECB mentioned above. The Technical Lead on the PDT will be responsible for ensuring that the requirements in the ECB or ER will be followed to ensure an LCCA for facility as a whole, including renewable energy and/or energized systems, is completed and included in the project documents.

d. Implementation of LCCA Results in Design.

(1) Lesson Learned. Results of LCCAs used in the final design decision to implement one alternative over another were not well documented. It was observed that if there are multiple options for HVAC systems that are LCC effective that sometimes only the options with the lowest first cost are being selected and the greatest energy conservation option is not selected. The decision to make this selection should be documented. As an example, there may be an instance where two alternatives are close enough but there may be a decision made where the maintenance of the system would be too burdensome to an installation or perhaps a sensitivity analysis demonstrates that a change in one of the analysis parameters would significantly change the outcome of analysis. These considerations are also important and related to life-cycle cost analysis and need to be documented clearly in the project documents. If the LCCA results are not implemented then an analysis needs to be included in the design analysis on what the cost and resource implications are over the life of the facility for the alternative selected.

(2) Corrective Action. Previous Corrective Action for item c. includes requirements for completing a LCCA with full documentation as to the decision process using the energy model and LCCA to demonstrate the decision making process for selecting one alternative over others. The Technical Lead on the PDT will be responsible for ensuring that this documentation is clearly identified in the project documents.

e. Documentation of Design Decisions related to DD Form 1391.

(1) Lesson Learned. Availability of documented design decisions related to implementation of the DD Form 1391 scope of work was inconsistent. It was observed that elements of scope such as greywater harvesting, rainwater harvesting, or provisions to connect to future central energy plant were described or included in sub line items to the primary facilities in DD Form 1391 scope, however were not included in the final design or appropriately documented in the design analysis as to why the scope was eliminated. Per Appendix B, Part ER 1110-345-700 (ref. f), design analysis is required to provide a project description, summary of factors influencing the choice and design of systems in the project including how initial and life-cycle costs were considered and justification provided to validate design decisions. Design analysis requirements to document designed scope is reinforced in Part 5 of Engineering & Construction Bulletin (ECB) 2016-11 (ref. g).

(2) Corrective Action. Strict compliance with Engineering Regulation 1110-345-700 and ECB 2016-11, which require documentation of design decisions related to DD Form 1391 scope of work is required on all projects. The Project Manager and Technical Lead will ensure design decisions related to the scope and all sub-line items to the primary facilities authorized under the DD Form 1391 are included and documented in the design analysis.

f. Design Decisions Requiring Exemption or Waivers.

(1) Lesson Learned. Related to item e. above, there may be an instance where an exemption or waiver is warranted in which there is a conflict with mission or life-safety requirements or an inability to meet a design requirement based on cost limitations or other considerations.

(2) Corrective Action. The Project Manager and Technical Lead will ensure that any decisions that require an exemption to the SDD policy are submitted through the proper channels to the DASA(IH&P) for consideration and approval as outlined in paragraph 3.d. of the Army SDD Policy (ref. a).

g. Unit Costs for Facilities and Systems in DD Form 1391.

(1) Lesson Learned. Related to line item e. above, it was observed that elements of scope related to Sustainability/Energy Measures (e.g. greywater harvesting, rainwater harvesting, solar or wind renewable energy systems or provisions to connect to future central energy plant) were described or included as sub line items to the primary facilities in DD Form 1391 scope, however were not included in the final design due to scope reductions needed in order to stay within the Program Amount.

ECB 2015-07 also includes guidance on how this process should be implemented including the schedule requirements: “During Code 3 (ref. d), the project scope and cost must be shown to support a cost effective project as described in the 1391. The final LCCA is to be completed no later than the completion of the initial design code release activity - Code 3 Parametric Design (15%) or Code 2 Conceptual design (35%). The LCCA must validate a cost effective project as part of the 3086 project review and be made part of the Design Analysis and available for review

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upon request. Any subsequent changes in project scope beyond the initial design that impact energy savings or energy features require an update to the LCCA.”

(2) **Corrective Action.** Corrective Action. Energy and sustainable design is a mission objective of the Army which competes equally with other mission objectives when balancing scope and cost of any project. Strict compliance with Engineering Regulation 1110-345-700 and ECB 2016-11, which require documentation of design decisions related to DD Form 1391 scope of work is required on all projects. The Project Manager and Technical Lead will ensure design decisions related to the scope and all sub-line items to the primary facilities authorized under the DD Form 1391 are included and documented in the design analysis.

(3) **Points of Contact.** HQUSACE point of contact for this ECB is Daniel Carpio, CECW-CE, (213) 452-36667, or Daniel.Carpio@usace.army.mil.

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Encl.

Attachment A – Validation of Sustainable Design and Development Policy Compliance