National BIM Standard - United States®
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National BIM Standard - United States® Version 3

5 Practice Documents

5.8 Practical BIM Contract Requirements US Army Corps of Engineers BIM Contract Requirements for Design Build Projects

CONTENTS

5.8.1 Scope – General Criteria

5.8.1.1 Business case description

The successful execution of BIM requires a well-defined set of contract requirements, specifications, and comprehensive execution planning, paired with efficient and consistent review and quality control procedures. Additionally, the ability to adapt these tools and procedures to address the needs of various project types and contract delivery methods is critically important for organizations managing portfolios of projects.

The Return on Investment (ROI) of implementing a well-coordinated process and legal structure is the ROI of BIM. If BIM contract requirements are not clear, the Owner's expected ROI for BIM is often not realized. If Owners want to attain their estimated ROI using BIM content, then they need specific contract language that provides a solid procedural and substantive legal structure for BIM deliverables with well-defined minimum modeling requirements and quality controls that ensure BIM content is developed and delivered as expected. Expected results cannot be achieved without a comprehensive modeling process that ensures the BIM technical requirements, planning, and quality assurance measures are fully implemented. The ROI of implementing specific BIM Contract Requirements thus becomes directly linked to the Owner's estimated value of BIM ROI.

The United States Army Corps of Engineers (USACE) has developed BIM Contract Requirements to ensure consistent and usable BIM project deliverables and BIM process. These BIM Contract Requirements consist of Contract Language, a Project Execution Plan (PxP) Template, and a Minimum Modeling Matrix (M3). The three documents utilized together establish a clear and thorough approach to BIM project delivery. See Annex A – Practice Documents (Native UBR files).

5.8.1.2 Unique Features of the USACE BIM Contract Requirements (UBR):

1. Requirements were collaboratively developed by an Owner along with BIM-aggressive volunteer representatives of industry, academia, legal, and public-sector entities, seeking to maximize ROI from BIM.

2. Performance-based specifications are used whenever possible, while allowing for flexible means and methods within predefined constraints to adapt to project-specific conditions.

3. Demonstrates an Owner's successful implementation of NBIMS-US™ (Penn State BIM Project Execution Planning Templates and BIM Use definitions.)

4. Emphasizes the expectation that project participants are legally bound by clear, objective contract requirements to achieve a successful Owner BIM implementation. "If it's not in the contract, it won't happen."

5. Demonstrates proven success on over 500+ single and multi-facility projects either proposed, constructed, or in various stages of construction — comprising over $9 Billion and over 46 Million SF in scope — since January 2008. Over 600 facilities, consisting of over 25 Million SF, have been constructed to date.

6. Has been implemented by other governmental agencies, institutions, and private-sector stakeholders to further define/refine company standards.

7. Rewards innovation within a BIM application-neutral context, yet ensures that deliverable requirements are fair, practical, and achievable given the evolving state of BIM technology and standards.

8. The PxP provides a framework for communicating the Contractor's means and methods to achieve the Owner's requirements, fostering mutual agreement of the process for achieving contract goals.

9. Phase-specific Levels of Development (LOD) are explicitly predefined, utilizing multiple, cross-referenced industry classification systems to clearly articulate the LOD needed for BIM deliverables at each stage of the evolving design and in subsequent submittal stages and uses of BIM.

10. Outlines a scalable process for validating the quality of BIM deliverables with Quality Control performed by Contractor and Quality Assurance performed by Owner. "If you don't check it, you won't get it."

11. Separately provides for project design quality controls and data integrity quality checking.

12. Utilizes industry-recognized vendor-neutral terminology wherever possible.

13. Is intentionally created to be easily adopted and adaptable.

14. All process decisions used to develop these documents were made with the following goals:

    a. The final deliverables are articulated consistent with Owner's lifecycle objectives.

    b. A framework is provided to help ensure Contractors can get it right the first time, reducing the need for resubmittals.

    c. All standards developed must be fair, practical, and achievable within the current state of technology.

5.8.2 Normative references

The following referenced documents are indispensable in applying this best practice. For dated references, only the edition cited applies. For undated references, the latest edition (including any amendments) applies.

1. Industry Foundation Class (IFC) – ISO16739 http://www.buildingsmart-tech.org/

    a. IFC Express format – ISO10303-11

2. A/E/C CAD Standard, Release 5.0 - The CAD/BIM Technology Centre, ERDC/ITL TR-12-X, September 2012, The A/E/C CAD Standard is compliant with Version 5.0 of the United State. National CAD Standard® (NCS) and contains supplemental materials and DoD specific requirements not addressed in the NCS. See AECStandardR5.pdf in Annex A.

    a. United States National CAD Standard® (NCS), V5 – National Institute of Building Science buildingSMART alliance®, May 2011.

3. NBIMS-US™ Project Execution Planning Guide – Version 2.1

4. NBIMS-US™ Project Execution Plan Content – Version 2.1

5. NBIMS-US™ OmniClass™ Table 21 Elements

6. UniFormat 2010 - produced jointly by the Construction Specifications Institute (CSI) and Construction Specifications Canada (CSC). U.S. copyright is held by CSI and Canadian copyright by CSC. All Rights Reserved. www.csinet.org/uniformat

7. MasterFormat 2010 - produced jointly by the Construction Specifications Institute (CSI) and Construction Specifications Canada (CSC). U.S. copyright is held by CSI and Canadian copyright by CSC. All Rights Reserved. www.MasterFormat.com

8. The US Army Corps of Engineers Roadmap for Life-Cycle BIM - ERDC SR-12-2, November 2012. See ERDC-SR-12-2.pdf in Annex A.

    a. Section 1.5 - Updated contract language and project preparation tools

    b. Appendix A: BIM Implementation Progress, 2006 – 2012

9. USACE Engineering Construction Bulletin ECB 2012-22 “Standardization of Computer Aided Design (CAD), Building Information Modeling (BIM) and Geographic Information Systems (GIS) Deliverables for Military Design and Construction Projects.” http://wbdg.org/ccb/ARMYCOE/COEECB/ecb_2012_22.pdf

10. USACE Engineering Construction Bulletin ECB 2013-18 “BIM Requirements on USACE Projects.” http://wbdg.org/ccb/ARMYCOE/COEECB/ecb_2013_18.pdf

5.8.3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

5.8.3.1
native BIM/CAD format
the default file format created by the authoring BIM/CAD software package when saving a Model or other CAD work that has not been converted, exported, or published in a way that would cause the work to be un-editable by the original authoring software.

5.8.3.2
Building Information Model
BIM
a digital representation of physical and functional characteristics of an entity, in AECOO industry referring to a facility, a site, or a part thereof, comprised of “Model Elements” and “Facility/Site Data.”

5.8.3.3
model element
a self-contained element or object with a unique identification, whose behavior and properties are defined by Facility/Site Data and depiction using software processes. A Model Element can represent a single physical object or a system of components, such as a pump or a wall system, and can range from the simple to the complex.

5.8.3.4
Centers of Standardization
CoS
in support of the US Army Military Construction Transformation Program, the US Army Corps of Engineers developed the Centers of Standardization (CoS) Program: design centers for standardizing and improving assigned military facility prototypes. The Centers implement BIM tools for planning, design, construction, and lifecycle building management. Visit the CoS website at mrsi.usace.army.mil/cos/SitePages/Home.aspx for information related to the Military Construction

Business (MCB) process, standard design development, points of contact and headquarters information, and procedural documents.

5.8.3.5
contractor
as applied in USACE contract language, refers to contracted design, construction, or other types of consulting firms providing BIM services.

5.8.3.6
element grade
grade
within each Level of Development, there is the potential to represent information in various formats. Certain elements may be best depicted in 2-dimensional or 3-dimensional representation, while for others, manual drafting or narratives are sufficient for a particular deliverable. Each grade listed below represents a deliverable or deliverables that would typically be used for a project:

Grade	Description
A	3D + Facility Data
B	2D + Facility Data
C	2D Only (Drafting, linework, text, and or part of an assembly)
+	Original Grade (A, B, or C) adjusted for contract changes and field conditions.
-	Not included in or tied to the model (however is still required in the deliverable)
●	Refer to the specific child element for appropriate Grade. (Used for categories that have multiple sub-elements for which varying Grades apply.)

Figure 5.8-1 – Element Grade

5.8.3.7
element level of development
LOD
the following USACE LOD descriptions identify the specific element definition and content requirements for Model Elements.

LOD	Definition
100	Model Elements indicative of area, height, volume, location, and orientation are modeled geometrically or represented by other data (e.g., a pump could be represented by a cube.)
200	Model Elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location, and orientation. Non-geometric information may also be attached to Model Elements (e.g., a pump would be represented by a generic pump of approximate size.)

300	Model Elements are modeled as specific assemblies accurate in terms of quantity, size, shape, location, and orientation. Non-geometric information may also be attached to Model Elements. Accurate to the degree dimensioned or indicated on contract documents (e.g., a pump would be a represented by a generic pump of accurate size complete with connections and clearances for a complete system.)

Figure 5.8-2 – USACE LOD Descriptions

5.8.3.8
facility owner
typically refers to the legal owner, but may also refer to the end user, or operator of the constructed building and/or site.

5.8.3.9
facility type
the standard programmatic use and configuration of a particular building or site, for example as defined by the applicable USACE Center of Standardization (CoS). A complete list of facility types including general design information can be found at: mrsi.usace.army.mil/cos/SitePages/Home.aspx

5.8.3.10
facility/site data
the non-graphical information attached to objects in the Model that defines various characteristics of the objects. Facility/Site Data can include properties such as parametric values that drive physical sizes, material definitions and characteristics (e.g., wood, metal), manufacturer data, industry standards (e.g., AISC steel physical properties and composition), and project or object identification numbers. Facility/Site Data can also define supplementary physical properties, requirements, characteristics, or other data that are not depicted graphically in the Model (e.g., insulation around a duct, hardware on a door, content of conduit, transformer properties, or warranty information for a piece of equipment).

5.8.3.11
minimum modeling matrix
M3
a spreadsheet matrix developed by USACE that establishes the minimum Level of Development (LOD) and Grade of model elements at each required Design and Construction project phase. The Element LOD and Element Grade definitions are further clarified within this matrix as needed to meet USACE/Owner requirements.

5.8.3.12
over-the-shoulder progress reviews
periodic quality control meetings or construction progress review meetings, which may include quality control analysis of the Model.

5.8.3.13
United States Army Corps of Engineers
USACE
United States Army Corps of Engineers, a United States federal agency and major Army command under the Department of Defense.

5.8.3.14
USACE BIM contract requirements
UBR
the documents that comprise the BIM Contract Requirements for USACE projects, to include the USACE BIM Contract Language, Minimum Modeling Matrix (M3), and USACE BIM PxP Template.

5.8.3.15
workspace
a collection of content libraries and supporting files that assist in defining and articulating BIM. A workspace may include BIM libraries such as wall types, standard steel shapes, furniture, HVAC fittings, and sprinkler heads. It may contain sheet libraries, such as print/plot configurations, font and text style libraries, and sheet borders and title blocks. USACE has developed Workspaces specific to USACE BIM standards that are dependent on specific software versions of the BIM applications they serve. USACE BIM Workspaces can be downloaded from the CAD/BIM Technology Center (https://cadbim.usace.army.mil).

5.8.4 Best Practice Use

5.8.4.1 Description of use

The USACE BIM Contract Requirements (UBR) includes the USACE BIM Contract Language, the USACE BIM PxP Template, and the USACE Minimum Modeling Matrix (M3). The cross-referenced table below illustrates the relationship of these items to one another and to the original NBIMS-US™ BIM PxP Template as customized for Owner-specific needs.

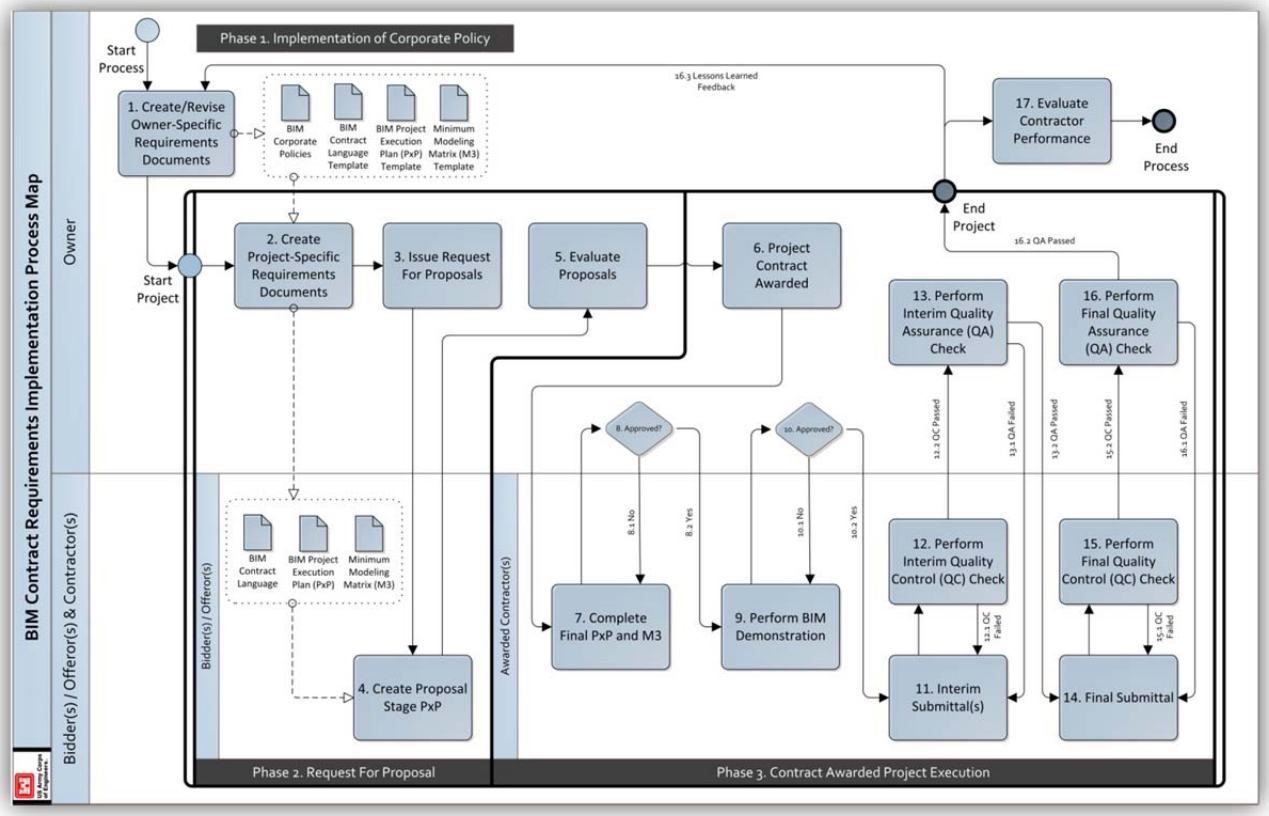
NBIMS-US™ BIM PxP Template	USACE BIM Contract Requirements				
	USACE BIM PxP Template			USACE BIM Contract Language v20130913	USACE Minimum Modeling Matrix v1.1
		RFP Proposal Stage PxP	Final PxP		
Section A: BIM PxP Overview					
Section B: Project Information	Section A: Project Information	X	X		
Section C: Key Project/ Contacts	Section B: Key Project Contacts	X	X		
Section D: Project Goals/ BIM Uses	Section C: Project Goals/ BIM Objectives	X	X		
Section E: Organizational Roles/ Staffing	Section D: Organizational Roles/ Staffing	X	X		
Section F: BIM Process Design	Section E: BIM Process Design	X	X		
Section G: BIM Information Exchanges	Section F: BIM Information Exchange Worksheet		X		
Section H: BIM & Facility Data Requirements	Section G: Minimum Modeling & Data Requirements		X	Section 4.0	M3 Documentation
Section I: Collaboration	Section H: Collaboration	X	X	Section 2.5	

NBIMS-US™ BIM PxP Template	USACE BIM Contract Requirements				
	USACE BIM PxP Template			USACE BIM Contract Language v20130913	USACE Minimum Modeling Matrix v1.1
		RFP Proposal Stage PxP	Final PxP		
Procedures	Procedures				
Section J: Quality Control	Section I: Quality Control	X	X	Section 2.4	
Section K: Technological Infrastructure Needs	Section J: Technological Infrastructure Needs	X	X	Section 1.0	
Section L: Model Structure	Section K: Model Organization	X	X		
Section M: Project Deliverables	Section L: Project Deliverables		X	Section 3.0	
Section N: Delivery Strategy/ Contract					
Section O: Attachments	Section M: Attachments	X	X		
	Section Q: Qualifications	X			

Figure 5.8-3 – USACE BIM Contract Requirements Relationship to BM PxP Template

5.8.4.2 Process map

The process depicted below is a sample procedure for implementing contract-based execution of BIM. (See Annex A for enlarged Process Map.)



5.8-4 – Process Map of Contract-Based Execution of BIM

5.8.4.2.1 BPMN description

5.8.4.2.1.1 Phase 1. Implementation of Corporate Policy

Create/Revise Owner-Specific Requirements Documents: The Owner will obtain the original templates from NBIMS-US™ and revise them to reflect Owner-Specific Requirements. Variations of Templates may be desired based on contract delivery methods, building types, geographic regions, and/or other categories as appropriate. Mandatory BIM Uses should be identified in each Owner-Specific BIM Project Execution Plan Template to clearly delineate the corporate standard between required BIM Uses and Elective BIM Uses. The Owner-Specific Minimum Modeling Matrix should be modified as necessary to reflect appropriate phases and desired Level of Development (LOD) and Grade requirements, and restricted to read-only if variations are not desired or required. It is highly recommended that this restriction be applied to LOD and Grade which, as currently specified, reflect minimum requirements which have been determined to be fair, practical, and achievable with the current state of technology. The LOD and Grade should only be unrestricted if project-specific variation is desired or required.

5.8.4.2.1.2 Phase 2. Request for Proposal

Create Project-Specific Requirements Documents: The Owner will modify the Owner-Specific Requirements templates to reflect project-specific requirements.

Issue Request For Proposals: The Owner will issue a Request for Proposals (RFP) and provide Project-Specific Requirements documents to potential Offerors as part of the RFP. As a Technical Evaluation Factor, the RFP will identify the BIM PxP sections that the Offeror must complete in the Proposal Stage PxP. The RFP will specify which BIM PxP template to use (see steps 1 and 2 in the process map). Refer to Annex A, Practice Documents, for an example of RFP Technical Evaluation Factor criteria (USACE_RFP_Technical_Evaluation_Factor-Offeror_BIM_Qualifications_20130903).

Create Proposal Stage PxP: The Offerors will state how they plan to meet RFP requirements by completing and including the specified portions of the BIM PxP Template identified in the RFP. The Proposal Stage PxP will document the Elective BIM Uses the Offeror will perform and the associated BIM means and methods, and will document the Offeror's BIM qualifications.

Evaluate Proposals: The Owner will evaluate the Proposal Stage PxPs and utilize evaluation criteria established in the RFP to determine a winning Contractor.

5.8.4.2.1.3 Phase 3. Contract Awarded Project Execution

Project Contract Awarded: The Owner will award the Contract based on the overall evaluation criteria to include the Contractor's Proposal Stage PxP.

Complete Final PxP and M3: The Contractor will complete the remaining sections from the Proposal Stage PxP to create the Final PxP. The Contractor will also fill out the M3 and submit the Final PxP and M3 to the Owner for approval. No changes of Proposal Stage PxP are permitted, only addition of content to complete the Final PxP consistent with the Proposal submittal.

Approved/Disapproved: The Owner will review and approve or require resubmittal. The Elective BIM Uses the Contractor committed to in the proposal stage should be verified as they become a contractual obligation after contract award. This ensures the Contractor does not commit to Elective BIM Uses to win the project, only to take them out after contract award. Owner will confirm consistency of Final PxP with Proposal PxP content.

Perform BIM Demonstration: Upon Owner approval of the Final PxP and M3, the Contractor will perform a BIM Demonstration to establish the Contractor's ability to perform the means and methods described in the PxP. The BIM Demonstration does not have to be performed on project-specific BIM content. Sample content is sufficient as the focus is on demonstrating capability to perform project-specific commitments described in the PxP and communication between Owner and Contractor to align expectations.

Approved/Disapproved: The Owner will approve or require another BIM Demonstration to be performed. Payment is typically withheld until the BIM Demonstration is approved.

Interim Submittal(s): Upon approval of the BIM Demonstration, the Contractor will initiate and complete one or more Interim Submittal(s) as described in the awarded contract and approved PxP. This is where the majority of the project work is completed. Interim Submittals can include a revised PxP if conditions have changed and the Contractor would like to propose a revised plan. At the end of the project, the PxP should reflect the actual plan executed and the actual products and results produced. Communication between the Owner and Contractor prior to the submittal of a revised plan is highly recommended.

Explicit documentation of revisions and explicit Owner approval of the revised PxP is required and contractually binding.

Perform Interim Quality Control (QC) Check: The Contractor will perform an Interim Quality Control (QC) Check as described in the approved PxP. Once it passes internal QC, it is submitted to the Owner along with the QC Reports and all other required Interim Submittal items described in the contract and approved PxP.

Perform Interim Quality Assurance (QA) Check: The Owner will perform an Interim Quality Assurance (QA) Check to spot check and verify the QC was performed as stated. Because the review and rejection cycle is time consuming, it is mutually advantageous that submittals are approved the first time through. Communication between Owner and Contractor prior to submittal to align expectations can increase the probability of success the first time through.

Final Submittal: Upon Owner approval by the last Interim Submittal, the Contractor will incorporate necessary revisions to complete the Final Submittal.

Perform Final Quality Control (QC) Check: The Contractor will perform a Final Quality Control (QC) Check as described in the approved PxP. Once it passes internal QC, it is submitted to the Owner along with the QC Reports and all other required Final Submittal items described in the contract and approved PxP.

Perform Final Quality Assurance (QA) Check: The Owner will perform a Final Quality Assurance (QA) Check to spot check and verify the QC was performed as stated. The Final QA Checking process may be more rigorous than the Interim Checking process to ensure the highest possible quality product is provided for use. After the completion of the Project, Lessons Learned Feedback (Step 16.3) should be documented and any desired modifications incorporated into the Owner-Specific Requirements for future projects.

Evaluate Contractor Performance: Upon Owner approval of the Final Submittal QC and QA Checks, the Owner should evaluate the performance of the Contractor to be factored into consideration for future projects.

5.8.4.3 Guide for use

5.8.4.3.1 Implement corporate policy and required document templates

Successful implementation of BIM Contract Requirements requires organizational leadership commitment. In order to demonstrate this commitment, it is recommended that the strategic vision, BIM Contract Requirements, and associated templates be made standard operating procedure within the organization. Owners are encouraged to use the UBR documents as templates for the products identified in 5.3.3, 5.3.4 and 5.3.5.

The USACE strategic vision for BIM is published in the ERDC SR-12-2 (Normative Reference 2.9). USACE BIM policies are defined in Engineering Construction Bulletins (ECB). If BIM is specified on MILCON projects, the BIM Contract Requirements and software platform options are formalized in USACE ECB 2012-22 (Normative Reference 2.10), and the requirement for BIM on all MILCON projects is formalized in USACE ECB 2013-18 (Normative Reference 2.11).

BIM Contract Requirements templates should follow the guidelines in Step 1 of the Process Map.

5.8.4.3.2 Owner's RFP technical evaluation factor for contractor BIM qualifications

In order to obtain qualified Contractors who provide the best value to the project, it is suggested that a BIM evaluation factor be applied to the bids during the bid-evaluation process. The offeror will be evaluated on their qualifications to meet the implementation and execution requirements through a Proposal Stage PxP submitted with their proposal. This will encourage a competitive, yet fair, bidding environment by providing a standard measure of evaluation. This process will encourage BIM innovation and project enhancements by allowing the offeror to select Contractor Elective BIM Uses. It also gives the Owner the ability to evaluate offerors before contract award and to determine if they have necessary BIM qualifications. Evaluation of BIM performance at project completion provides incentives for high-quality execution which will be factored into future RFP qualifications. USACE uses the "USACE RFP Technical Evaluation Factor - Offeror BIM Qualifications" document to define the requirements in the RFP Process – see Annex A.

5.8.4.3.3 BIM contract language

Each Owner will need to develop contract language to reflect the particular requirements of the project and objectives of their organization. This should be undertaken in conjunction with BIM Champions within the organization to ensure the requirements reflect organizational BIM goals, and with legal specialists to ensure legal requirements are well articulated.

Typical customizations would include determining necessary specific BIM application(s) and acceptable software and hardware requirements for modeling, together with determining submittal types and frequencies to align with submittal requirements as further described in the contract.

Customization of the contract provisions should be administered collaboratively to ensure internal and external project objectives, resources, and schedules are properly aligned. Of particular importance are scheduling, funding requirements, and identification of technical review resources to ensure submittals are in compliance with the contract requirements, and that parties will follow the required process for development of BIM at each deliverable phase.

5.8.4.3.4 Project Execution Plan

Each Owner will need to develop a template Project Execution Plan (PxP) to reflect the particular requirements and objectives of their organization as described in "NBIMS-US™, Project Execution Plan Content."

5.8.4.3.5 Minimum modeling requirements

Each Owner will need to develop a template describing their minimum modeling requirements organized according to "NBIMS-US™ Section 2.5 OmniClass Table 21 Elements" adapting the Minimum Modeling Matrix (M3) to their needs. It should reflect the particular requirements and objectives of their organization, specifically with Tab 2 instructions and Tab 3 phasing and Model Element LOD/Grade goals. Once the template is complete, it is recommended that the tables be restricted to read-only for that project unless project-specific variation is specifically desired and permitted in the Contract Language.

5.8.5 Demonstrated Use and Acceptance

This Best Practice was developed as part of a consensus group. The USACE BIM Contract Requirements were developed as a public/private industry partnership through the voluntary participation of industry experts on the USACE/Industry BIM Committee. Development was initiated in 2006 and is still actively

evolving. In addition to the consensus development, the USACE BIM Contract Requirements have been tested and refined on 500+ US Army MILCON CoS and non-CoS single and multi-facility projects, since January of 2008. Multiple projects have been executed by other programs or Agencies such as Military Health Systems, US Air Force, Naval Facilities Engineering Command (NAVFAC), and Federal Aviation Administration (FAA). Separate versions of the Contract Language and PxP were developed for the US Air Force. Additionally, there is evidence of public and private-sector firms using the USACE BIM Contract Requirements, with adaptations if needed, and incorporating them into their corporate BIM Standards.

5.8.5.1 Evidence of repeatability

The following are the members of the Consensus Group involved with UBR development and maintenance, most of whom have experience using these requirements on projects for USACE.

USACE/Industry BIM Committee:	
USACE	
USACE HQ	Jason Fairchild
CAD/BIM Technology Center	Edward Huell, Stephen Spangler
Southwestern Division	Bryan Haney
Fort Worth District	Greg Hall
St. Louis District	Brandon Meinert
Seattle District	Steve Hutsell (Lead), Van Woods (Technical Lead), Lisa Hansen (Technical Editor), Justin Jameson, Rob Nevitt
AEs	
Black & Veatch	Shawn Foster
Bullock Tice Associates	Johnny Fortune
CH2M Hill	Maryann Germaine
CRB Engineering Consultants	John Grady
HDR, Inc.	John Bowen, Ron Croke, Rachel Riopel Wiley
Hoefer Wysocki Architects	Jason Gardner
Independent	Jason Kornaker
Jacobs Global Buildings	Dawn Bridges, Charles Wood
Mason & Hanger	Eric Baker, Mark Mates
Michael Baker	Robert Duffy, Bruce Preston
SSOE	Lauren Collier, John Eddy, Mark LaBell Jr.
ZGF	Nathan Renfro
GCs	
Balfour Beatty	Kurt Maldovan
Kiewit Corporation	Connor Christian
M.A. Mortensen Co.	Chris Allen, Mitch Cornelius
McCarthy Building	Shannon Lightfoot
Senovva	Adam Lega
Sundt Construction	Dan Russell
The Walsh Group	Michael Baird, Weston Tanner
AGC and Associates	
AGC	Dimitri Alferieff

USACE/Industry BIM Committee:	
Hurtado, S.C., Counselors at Law (AGC Liaison)	Kim Hurtado
Academia	
The Pennsylvania State University Director, CIC Research Program	John Messner
PSU Graduate Student	Ralph Krieder
PSU Instructor/Graduate Student	Steve Ayer

5.8.5.2 Documentation of Success

Not applicable due to utilization of consensus group option guidelines.

Annex A
USACE BIM Requirements
(Native UBR files)

A.1 BIM Contract Language: USACENon-CoSBIM-Application-SpecificRequirements20120913.pdf

A.2 BIM Project Execution Plan (PxP) Template: USACE_BIM_PXP_TEMPLATE_V2.1-20131016.docx

A.3 BIM Minimum Modeling Matrix (M3): USACE_M3_v1.2_20131016.xlsx

A.4 M3_Resources_Files

A.4.1 USACE_M3_AECOSim_Building_Designer_v1.1_20130801

A.4.1.1 Classification Queries

A.4.1.1.1 All_Classification_Location.ecquery.xml

A.4.1.1.2 MasterFormat.ecquery.xml

A.4.1.1.3 OmniClass.ecquery.xml

A.4.1.1.4 UniFormat.ecquery.xml

A.4.2 USACE_M3_Revit_v1.1_20130801

A.4.2.1 M3-ComplianceContainerFile.rvt

A.4.2.2 UniformatClassifications.txt

A.5 USACE RFP Technical Evaluation Factor - Offeror BIM Qualifications : USACE_RFP_Technical_Evaluation_Factor-Offeror_BIM_Qualifications_20130903.docx

A.6 Process Map:

A.6.1 ProcessMap.pdf (full size)

A.6.2 ProcessMap.jpg (JPEG)

A.7 A/E/C CAD Standard, Release 5.0: AECStandardR5.pdf

A.8 The US Army Corps of Engineers Roadmap for Life-Cycle BIM - ERDC SR-12-2, November 2012: ERDC-SR-12-2.pdf

Files in Annex A submitted in PDF and Excel format are locked to maintain integrity of original documents. USACE-specific projects MUST use files located on the CAD/BIM Technology Center Website. For editable versions of these files contact Steve Hutsell, Chief Geospatial Section, Seattle District, US Army Corps of Engineers (USACE), Steve.Hutsell@usace.army.mil .

Bibliography

None