



Guidelines for Construction PDF Documents

The purpose of the Guidelines for Construction PDF Documents is to provide Architects, Engineers, Constructors and Owners (AECO) with a common framework in which to create and maintain Construction PDF Documents.

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Scope

The scope of this Guideline covers Construction PDF Documents created by the design professionals and contractors in support of constructing the project. This includes, but is not limited to, design drawings, design specifications, design changes, submittals, and facility operation and maintenance documentation. These guidelines are intended to supplement the documentation set forth in the team's Project Execution Plan (PxP).

Use of the Guideline

The intent is for the Project Team (ideally the AECO, including the Owner's Operation and Maintenance Personnel) to use this Guideline as points for discussion during the formation and execution of the project in order to agree upon how Construction PDF Documents are created, used and maintained on the project. By using this Guideline as a template, the Project Team can quickly gain alignment and agreement on the best solution for the project. As the Guideline was written in an informational and best practices format, each project will result in different implementation based on Project Team composition and experience with Construction PDF Documents – the important activity is that the Project Team convenes a meeting, using this Guideline as the template for discussion.

Specifications for PDF Construction Document Creation

1. Consistency Across Disciplines

1.1. In order to allow all Project Team Members to operate in the most efficient manner possible, taking advantage of operations such as document overlay, hyperlinking, sheet comparison, navigation and plan review, the following items shall be consistent across all PDFs generated for the project by all disciplines, as agreed upon at the beginning of the project and maintained throughout. As a matter of best practice, all projects should utilize a Project Execution Plan (PxP) and project specific requirements (including implementations of PDF Creation guidelines) should be documented therein. An example is available in the NBIM-US v2 & v3 section 5.3:

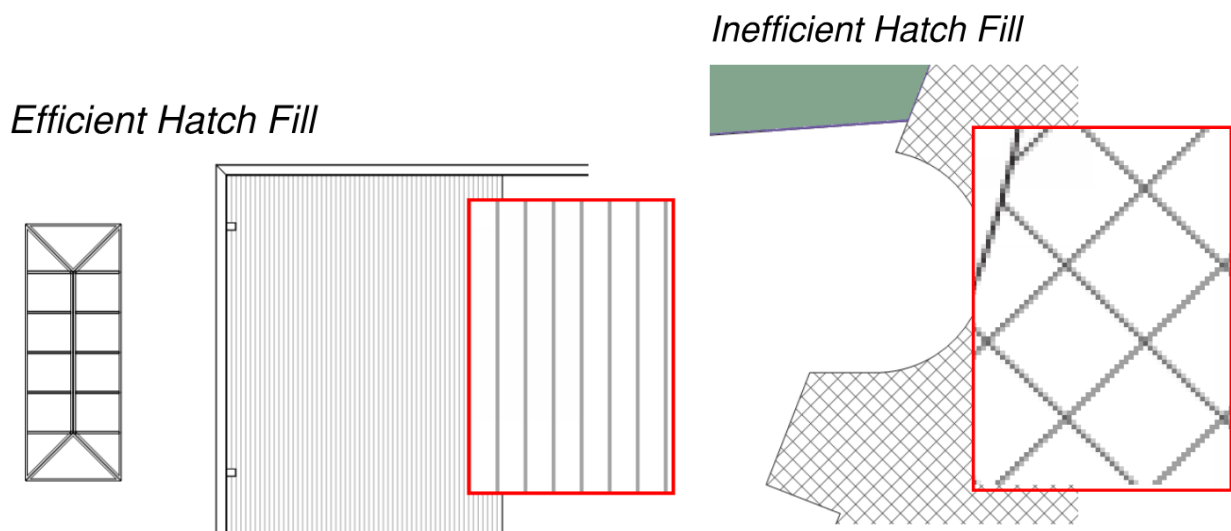
<http://www.nationalbimstandard.org/>

- 1.1.1. Sheet size and orientation of sheets should be consistent so that if overlaid, they align – coordinate project specific requirements with NCS v5 UDS 2.2 Sheet sizes
- 1.1.2. Consistent plot location in paper space through location of gridline intersections or other project baseline on similar sheet types amongst the set, across disciplines. For example floor plan or enlarged plan views.
- 1.1.3. Scale of each sheet type/view to be consistent amongst the set (underground coordination), across disciplines, as agreed upon by the Project Team. Scale should be determined for each sheet type (i.e. overall plans at 1/16", partial plans at 1/8", enlarged plans at 1/4", sections at 3/4" etc.) Reference UDS Module 4 and template project worksheet.
- 1.1.4. Consistent gridline visibility (i.e. should be consistent for navigating across all sheets, across disciplines for alignment purposes)
- 1.1.5. Naming convention and structure should be consistent with like pages across disciplines as agreed upon by the Project Team, within the PxP (i.e., plumbing, mechanical, electrical, floor plan level 1, etc.) Please refer to the NCS Module 1 Drawing Set Organization Module 1.7 Appendix B.

2. Creation

- 2.1. The goal for Creation is to streamline the flow of data for use in construction and operations while minimizing overall file size. Best practices include the following:
 - 2.1.1. PDFs should be created directly from authoring application with output quality consistent with native file format
 - 2.1.2. Use vector based lines when creating PDFs

- 2.1.2.1. Use efficient hatch fills so as not to inhibit PDF performance or increase file size. Complex line styles slow down rendering speed. Rather, simple lines styles provided within the native software program perform the best.



- 2.1.3. Use True Type fonts to allow search ability within the PDF (SHX are not searchable)
- 2.1.4. Limit information generated in PDF to what is agreed upon by the Project Team including the following
 - 2.1.4.1. Unused layers
 - 2.1.4.2. Extraneous viewports
 - 2.1.4.3. Unneeded Meta data
- 2.1.5. Maintain output scale when printing to PDF – Print to Scale, avoid Fit to Page
3. Distribution
 - 3.1. The goal of Distribution is to enable more efficient methods for navigating PDF drawings/documents for construction and operations consisting of the following:
 - 3.1.1. The Project Team should convene a kick-off meeting to determine the method for distribution of documents throughout the project (from design through owner operations): either a single file, or multiple files (single sheet each) as is outlined and recommended in the PxP.
 - 3.1.2. The Project Team should identify the lead document manager who will be responsible for Project Team Members maintaining consistency of project documents as agreed to in accordance with this guideline.
 - 3.1.3. Each sheet should have a bookmark with the sheet name and number (e.g., A-101 First Level Floor Plan)
 - 3.1.4. If and when possible Hyperlinks created within the native application should be maintained within and between PDF sheet output
 - 3.1.4.1. Each sheet set to have a fully hyperlinked index of drawings
4. Maintaining Document Integrity
 - 4.1. To provide Real-time document changes to all Project Team Members, full sheet revisions should be provided when possible. Separate “sketch” documents can be incorporated into digital sets but may increase chance of misinterpretation or missed information (e.g., if a bathroom wall dimension changes, the entire sheet should be re-issued to reflect bathroom change)
 - 4.2. Major changes to the documents should be made in the original authoring application
 - 4.3. New output from the authoring application shall follow the original format (Section 1 and 2)
 - 4.4. Record drawings should keep all dimensions true to scale throughout (i.e., avoid overriding dimensions with text values)
5. Metadata

5.1. If available from source software, document and element metadata can be used to produce a data-rich PDF, which allow for better navigation and searching of the document, as well as reduces the need for manual data input.

5.1.1. Each sheet should contain the following metadata:

- 5.1.1.1. Page # or Spec #
- 5.1.1.2. Project Title Name
- 5.1.1.3. Sheet Title
- 5.1.1.4. Revision
- 5.1.1.5. Date Issued
- 5.1.1.6. Author
- 5.1.1.7. Discipline
- 5.1.1.8. Document type (i.e., elevation, detail, floor plan, spec)

5.1.2. Location and Object Information should be included on the sheet when possible for the following:

- 5.1.2.1. Building zone
- 5.1.2.2. Level (if applicable to one level)
- 5.1.2.3. Systems
- 5.1.2.4. Area
- 5.1.2.5. Room
- 5.1.2.6. Object information breakdown

5.2. Maintain hyperlinks (see 3.1.2, 3.1.2)