

<p><b>WABO/SEAW</b>  <b>Liaison Committee</b>          Washington Association of          Building Officials &amp;          Structural Engineers Association          of Washington</p>	<p><b>WHITE PAPER 4-2020</b></p>
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<p><b>Title:</b> Guideline – Structural Permit Submittal</p>	<p><b>Dated:</b> March 2009  <b>Issue Date:</b> January 31, 2020</p>
<p><b>Abstract:</b>          This white paper is intended to establish guidelines for the design professional to use in submitting structural design documents for building permit approval.</p>	<p><b>Committee Members:</b>  <i>Matt Snook (SEAW Co-chair), Lee Kranz (WABO Co-Chair), Shalini Prochazka (SEAW), Nancy Devine (WABO), Larry Lindell (SEAW), Rick Fine (SEAW), Mary Kate McGee (WABO), Cheryl Burwell (WABO), Chris Ricketts (WABO), Steve Belzak (WABO), Charlie Griffes (SEAW).</i></p>
<p><b>Committee Mission Statement:</b></p> <ul style="list-style-type: none"> <li>• <i>Improve communications between the public jurisdictions that administer building codes and the engineering design community that prepares construction documents.</i></li> <li>• <i>Improve consistency and quality of engineering submittals and project reviews.</i></li> <li>• <i>Build consensus between the engineering design community and building officials with regard to code interpretation and submittal requirements.</i></li> </ul>	

**INTRODUCTION:**

The intent of this paper is to provide guidelines for permit applicants, their consultants and building officials for the submittal of documents necessary to demonstrate compliance with the structural provisions of the building codes.

Confusion arises on what documents are required specifically by code, which documents are not specifically required but may assist in determining code compliance and what documents are of no relevance to determining code compliance. Setting forth common expectations can assist in minimizing the required submittal documents. Organization and clarity of the submitted material will minimize review times.

**GUIDELINE:**

The following should be used by the engineer as a guide in preparing a submittal package for permit application:

- **Construction Documents:** Drawings should be as complete as necessary to verify code compliance and inspection in the field.
- **Drawing list:** A list of the drawings should be noted on the plans to ensure the reviewer has a complete package when reviewing the application.
- **Design Criteria and Construction Materials:** Specific items should be noted on the plans as specified in various code sections including Chapters 1, 16, 17, and 18. At a minimum, this should include material specifications, loading criteria, and special inspection requirements.
- **Accessory Documents:** Additional documents such as a design narrative, calculations, studies, and reports should be provided to the extent necessary to clarify code compliance.
- **Deferred Submittals:** Items not included, but intended for later submittal to the building department, should be clearly noted on the Drawings.

## COMMENTARY:

**Scope of Submittal:** The extent of submittal documents, the level of required organization, and level of details is dependent on any specific project. A small residential remodel may require a minimal set of documents while a new high rise or assembly building should be well documented and organized to ensure a comprehensive review and facilitate field inspections. Such documentation allows for follow up reviews during the inspection phase or subsequent remodels.

**Design Narrative:** Including an explanation of the design approach and assumptions can direct the plan reviewer to focus on the key elements of the design. Accordingly, this can reduce confusion regarding the application and misinterpretation of code provisions. There are multiple methods of achieving code compliance. Communicating to the reviewers which approach was used on a particular design allows the reviewer to focus their review on the appropriate code provisions. For example, the design narrative could include:

- A description of the vertical and lateral force resisting system
- The design approach (e.g. prescriptive wind vs. analytical method)
- Any special or unique structural elements or conditions

**Construction Documents Organization:** Indexing or listing of construction documents is important to make sure that the entire package is maintained complete. This provides two benefits: it directs the reviewer or inspector to specific information provided and ensures that the reviewer knows they are working with a complete package. During the permit process as documents are submitted or resubmitted items can be misplaced or omitted. The reviewer may spend unnecessary time searching for and then requesting information that was already prepared as a part of the package.

To help ensure the submittal documents are effectively used, it is important to provide linkage between the various documents such as between the drawings and the calculations. The construction design documents and supporting review aids (such as calculations) should be coordinated and cross-referenced to reduce uncertainty and time spent in the review of such documents. See the attached appendix.

Construction drawings should be submitted that are completed to the level required to confirm code compliance and inspection of the construction. Submitting documents that indicate they are not for construction or less than 100% submittal is problematic for the reviewer as it indicates that the documents will change in the future. If the design is to change then a resubmittal of the documents may be required.

**Information on the Plans:** There are standards available on what type of information to include on the plans:

- Items specifically identified in the building codes; see Appendix A.
- The Department of Licensing “Guidelines for Washington State Building Officials and Design Professionals” is a resource that provides guidelines for permit application requirements.
- The “National Practice Guidelines for the Structural Engineer of Record” published by the Coalition of American Structural Engineers (CASE). This provides extensive details beyond what is required for code compliance verification but does serve as an excellent reference.

Basic information should be on the plans including the project name and address, the engineer of record and specialty engineers, and associated phone numbers and addresses. Revisions should be clearly noted and dated so that the reviewer understands and is able to limit their review to the changed items only.

### **Accessory Documents**

Calculations shall be done by the design engineer to the degree required to select structural members and systems that meet the code requirements. This generally requires determination of the potentially controlling design requirements and checking for adequacy for those parameters. Calculations required to verify code compliance should be submitted with the permit submittal documents.

Computer programs used in the design shall be identified in the calculations. The entire input and output from the computer design need not be submitted with the calculations unless so requested by the Building Official. The computer analysis should identify critical design assumptions incorporated in the model such as loading, material properties, stiffness properties, and overall model characteristics. The use of representative design results from the computer program is acceptable. Summarized results are encouraged to be included in the supporting documents to demonstrate code compliance.

Manufacturer’s specifications and test reports may be required but need not be submitted unless specifically requested by the jurisdiction.

Project Specifications – These documents are often aimed at bid requirements and design needs and are often included in a separate book. These documents do not need to be submitted to the building department. If there are items in the specifications that are required to be in the approved documents, they must also be included on the construction plan sets.

Alternative Design or materials – When proposing to use designs or materials not recognized by national standards, the design professional shall submit supporting evidence to demonstrate equivalent code compliance. The requirements and authority for submitting the documents can be found in IBC Section 104.11, “Alternative Materials, Design and Methods of Construction and Equipment”. Submittal information may include test findings, reports or links to reports.

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## **Appendix A - Recommended Best Practices for Submittal of Construction Documents:**

1. Items as identified in the various code provisions such as contained in Appendix B of this White Paper
2. Drawings should be labeled (i.e. S-1) and a drawing list should be included
3. A title block should be provided on all sheets identifying:
  - a. Professional's name and contact information
  - b. Drawings should be signed and sealed
  - c. Identify specific job; i.e. location and project name
  - d. Date documents were prepared and
  - e. Revision dates should be clearly noted
4. Drawings should be coordinated with other project documents.
5. All details required to determine construction conformance with code shall be in the construction documents not in the calculations.
6. Drawings should meet recognized drafting standards and jurisdictional requirements, such as for sheet size, scale, north arrow and line weight.
7. Drawings should contain information as noted in IBC Section 1603, including but not limited to:
  - a. Size, section and relative locations of structural members.
  - b. Material specifications: Specify requirements for structural materials used for the project including both generic materials and proprietary elements.
  - c. Soil design parameters: Bearing pressure, lateral pressure, and reference to geotechnical report as applicable.
  - d. Floor live load: Uniform, concentrated and impact loads shall be indicated.
  - e. Roof live and snow loads.
  - f. Wind design data: Note the wind parameters used for the design. Include basic wind speed (V), exposure category, topographic factor ( $K_{zt}$ ).
  - g. Seismic design data: Note seismic parameters used for the design. Include mapped acceleration parameters ( $S_s$  and  $S_1$ ), risk category and seismic importance factor ( $I_e$ ), seismic design category, seismic-force-resisting system(s), seismic response coefficient(s) ( $C_s$ ), and response modification coefficient(s) (R).
  - h. Flood load: See IBC section 1603.1.7 if applicable.
  - i. Special loads that are applicable to the design of the building or structure.
  - j. Deferred submittals.
8. Statement of Special Inspections: follow IBC Section 1705.
9. Structural Observations: Where required by IBC Section 1704.6, the requirement should be identified on the Drawings.

## **Appendix B - Recommended Best Practices for Submittal of Structural Calculations:**

The level of required organization and details is dependent on the size and scope of the project. A small residential remodel may not require most of these items while a new high rise or assembly building will need a very careful layout of the supporting documents. The following list is a suggested guide for the format and content of the structural calculations.

1. Provide table of contents or index for structural calculations
2. Include narrative description of design methodology and assumptions used in the design of both gravity and lateral systems. The narrative should address any peculiarities and irregularities in the design.
3. Include design criteria summary (applicable codes and standards; DL, LL, seismic, wind and soil design assumptions)
4. Provide linkage between Drawings and calculations for all primary structural members. This can be with location descriptions in the calculations or the use of key plans and member identifications.
5. Calculations should:
  - a. Identify special applications of code sections as necessary
  - b. Reference special design resources as necessary (design aids, design books, product literature)
  - c. Calculations should be coordinated with the most recent design (calculations not used in the final design should be removed from the submitted calculations)
6. Commercially produced computer software submittal:
  - a. Specify program and version
  - b. Include design assumptions incorporated into the program and input
  - c. Input and output design summary, representative calculations are acceptable
  - d. Final design summary from final output

## **Appendix C - Applicable Code Provisions**

**IBC Section 107.1 General.** Submittal documents consisting of *construction documents*, statement of *special inspections*, geotechnical report and other data shall be submitted in two or more sets with each *permit* application. The *construction documents* shall be prepared by a *registered design professional* where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the *building official* is authorized to require additional *construction documents* to be prepared by a *registered design professional*.

**IBC Section 107.2.1 Information on Documents:** Construction documents shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.

**IBC Section 1603.1 General;** *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets fully dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

**IBC Section 1704.2.3 Statement of special inspections.** The applicant shall submit a statement of *special inspections* in accordance with Section 107.1 as a condition for permit issuance. This statement shall be in accordance with 1704.3.