Session 5
CONSTRUCTION DOCUMENTS
Part 2

Project Delivery
Education Program
Construction Document Technology (CDT)
Preparatory Course

2011

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Learning Objectives

• To understand how construction documents define the rights of, responsibilities of, and relationships between the parties.
• To gain an insight of the benefits of using standard documents created by professional associations.
• To introduce the definitions, purposes, and content of each of the Procurement and Contract Documents.
• To understand the distinctions between procurement and contracting requirements and documents.
• To become familiar with the procedures for soliciting pricing for the Work.

Session Outline

STUDY GUIDE: Subject Matter Area No. 3 – DESIGN

B. Construction Documents

7. Specifications
   a. Division 01 General Requirements Subgroup
   b. Division 02-19 Facility Construction Subgroup
   c. Division 20-29 Facility Services Subgroup
   d. Division 30-39 Site and Infrastructure Subgroup
   e. Division 40-49 Process Equipment Subgroup

8. Contract Drawings
   a. Role and Function
   b. Categories
   c. Features
   d. Formats
   e. Trends

9. Resource Drawings

10. Modifications
CONSTRUCTION DOCUMENTS
SPECIFICATIONS
STUDY GUIDE: Subject Matter Area No. 3 - B. 7.

Specifications

- Administrative and performance requirements
- Precise description and characteristics of materials and products that complements the graphic representations on drawings
- Standards for manufacturing and installing materials and products
Nature of Specifying

• To specify
  – Describe or define an object, idea, or concept in such detail that it is easily understood by most people

• Construction Documents
  – Drawings indicate products quantitatively
  – Specifications specify products qualitatively

CONSTRUCTION DOCUMENTS
SPECIFICATIONS
STUDY GUIDE: Subject Matter Area No. 3 - B. 7.

a. Division 01 General Requirements Subgroup
b. Division 02-19 Facility Construction Subgroup
c. Division 20-29 Facility Services Subgroup
d. Division 30-39 Site and Infrastructure Subgroup
e. Division 40-49 Process Equipment Subgroup
Division 01 General Requirements

General Categories

• Administrative and procedural requirements
• Temporary facilities and controls requirements
• Performance requirements
• Life cycle activities

Relationship with Other Documents

• Expands administrative and procedural provisions in Conditions of the Contract
• Applies broadly to execution of the Work of other specification sections
• Avoids mixing conditions of the Contract with administrative and procedural provisions in specifications
Division 01 General Requirements
Relationship with Other Documents

- Specifications are subject to administrative and procedural requirements of the Conditions of the Contract and Division 01.
Division 01 General Requirements
Relationship with Other Documents

- There is a parallel between Division 01 and SectionFormat™ Project Delivery Practice Guide: Figure 11.16

Division 01 General Requirements
Relationship with Other Documents

<table>
<thead>
<tr>
<th>CONDITIONS OF THE CONTRACT</th>
<th>DIVISION 01—GENERAL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are inherent part of the contract</td>
<td>Administrative part of the Specifications</td>
</tr>
<tr>
<td>With the Agreement governs the content of the entire contract</td>
<td>Administrative part governs the Specification sections</td>
</tr>
<tr>
<td>Contain contractual principles applicable to most projects with supplements for a particular project</td>
<td>Contains specifications directly applicable to a particular project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERAL CONDITIONS</th>
<th>SUPPLEMENTARY CONDITIONS</th>
<th>DIVISION 01—GENERAL REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are broad contract conditions</td>
<td>Modify the contractual conditions</td>
<td>Contains specific administrative and procedural requirements</td>
</tr>
<tr>
<td>Contain the contract</td>
<td>Modify the contract for a specific project</td>
<td>Contains variables directly applicable for specific project</td>
</tr>
<tr>
<td>Relatively static terms, thus allowing the use of published standard documents</td>
<td>Take precedence over general conditions</td>
<td>Must be written separately for each project</td>
</tr>
<tr>
<td>Are not specifications</td>
<td>Are specifications</td>
<td></td>
</tr>
</tbody>
</table>

Project Delivery Practice Guide: Figure 11.15
Divisions 02 - 19
Facility Construction Subgroup

• DIVISION 02 - EXISTING CONDITIONS
• DIVISION 03 - CONCRETE
• DIVISION 04 - MASONRY
• DIVISION 05 - METALS
• DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES
• DIVISION 07 - THERMAL AND MOISTURE PROTECTION
• DIVISION 08 - OPENINGS
• DIVISION 09 - FINISHES
• DIVISION 10 - SPECIALTIES

Divisions 02 - 19
Facility Construction Subgroup

• DIVISION 11 - EQUIPMENT
• DIVISION 12 - FURNISHINGS
• DIVISION 13 - SPECIAL CONSTRUCTION
• DIVISION 14 - CONVEYING EQUIPMENT
• DIVISION 15 THRU 19 - RESERVED FOR FUTURE EXPANSION
Divisions 20 - 29

Facility Services Subgroup

- DIVISION 20 - RESERVED FOR FUTURE EXPANSION
- DIVISION 21 - FIRE SUPPRESSION
- DIVISION 22 - PLUMBING
- DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING
- DIVISION 24 - RESERVED FOR FUTURE EXPANSION
- DIVISION 25 - INTEGRATED AUTOMATION
- DIVISION 26 - ELECTRICAL
- DIVISION 27 - COMMUNICATIONS
- DIVISION 28 - ELECTRONIC SAFETY AND SECURITY
- DIVISION 29 - RESERVED FOR FUTURE EXPANSION

Divisions 30 - 39

Site and Infrastructure Subgroup

- DIVISION 30 - RESERVED FOR FUTURE EXPANSION
- DIVISION 31 – EARTHWORK
- DIVISION 32 - EXTERIOR IMPROVEMENTS
- DIVISION 33 – UTILITIES
- DIVISION 34 – TRANSPORTATION
- DIVISION 35 - WATERWAY AND MARINE CONSTRUCTION
- DIVISION 36 THRU 39 - RESERVED FOR FUTURE EXPANSION
Divisions 40 - 49
Process Equipment Subgroup

- DIVISION 40 - PROCESS INTEGRATION
- DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT
- DIVISION 42 - PROCESS HEATING, COOLING, AND DRYING EQUIPMENT
- DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT
- DIVISION 44 - POLLUTION AND WASTE CONTROL EQUIPMENT

Divisions 40 - 49
Process Equipment Subgroup

- DIVISION 45 - INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT
- DIVISION 46 - WATER AND WASTEWATER EQUIPMENT
- DIVISION 47 - RESERVED FOR FUTURE EXPANSION
- DIVISION 48 - ELECTRICAL POWER GENERATION
- DIVISION 49 - RESERVED FOR FUTURE EXPANSION
CONSTRUCTION DOCUMENTS

CONTRACT DRAWINGS

STUDY GUIDE: Subject Matter Area No. 3 - B. 8.

a. Role and Function
b. Categories
c. Features
d. Formats
e. Trends

Nature of Drawings

- Graphic and textual information in two dimensional format
- Conveys information about a specific portion of the Project
- Conveys design intent
- Indicates relationships between elements
- Shows the following for each material, assembly, component, piece of equipment, and accessory
  - Location
  - Identification
  - Dimension and size
  - Details and diagrams of connections
  - Shape and form
Role and Function
Drawings in Project Stages

• **Conceptual Design Drawings**
  – To establish extent and design of Project
  – Conveys aesthetics
  – Qualities of space

• **Schematic Design Drawings**
  – General in nature with few dimensions
  – Sketches, renderings, or conceptual diagrams
  – Complemented with preliminary project descriptions

Role and Function
Drawings in Project Stages

• **Design development drawings**
  – More detailed information
  – Multiple views to describe materials and basic systems and interrelationships
  – Complemented with outline specifications

• **Construction drawings**
  – Detailed description of the Work
  – Become Contract Documents
  – Complemented with specifications

• **Drawings during construction**
  – Shop drawings
  – Supplementary drawings for changes and clarifications
Role and Function
Drawings in Project Stages

- **Record drawings**
  - Contractor required to maintain
  - Marked-up or corrected contract drawings
  - Identifies changes incorporated into Work
  - Shows actual locations of important items shown diagrammatically
  - Includes field orders, modifications, and supplemental drawings
  - Purpose is to provide Owner with drawings describing actual construction to facilitate
    - Operations
    - Maintenance
    - Future modifications

Categories of Drawings
Plans
Categories of Drawings

Plans

Categories of Drawings

Elevations
Categories of Drawings

Sections

Categories of Drawings

Details
Categories of Drawings

Schedules

Project Delivery Practice Guide:
11.2.4 and Figure 11.7

Categories of Drawings

Perspective
Categories of Drawings
Isometric

Features of Drawings
- Drawing standards
- Drawing identification
- Cover sheet
- Graphics
- Symbols
- Dimensions
- Notations
- Abbreviations
Drawing Set Organization

- Number of disciplines
- Number of Project parts
- Number of Contracts
- Project phases
- Construction sequences
- Number and extent of systems
- Project Delivery Method

Formats

U. S. National CAD Standard (NCS)

- Administered by buildingSMARTalliance, a Council of NIBS
- Consensus standard comprised of following
  - Interrelated standards
  - Guidelines
  - Tools for uniformly organizing and presenting drawing information
    - Facility planning
    - Design
    - Construction
    - Operation
  - Composed of following
    - NIBS Forward and Administration
    - AIA CAD Layer Guidelines
    - CSI Uniform Drawing System
    - Plotting Guidelines
Trends

- Integrated Project Delivery (IPD)
- Building Information Modeling (BIM)

Project Delivery Practice Guide: 7.7 and 11.2.8

CONSTRUCTION DOCUMENTS
RESOURCE DRAWINGS

STUDY GUIDE: Subject Matter Area No. 3 - B. 9.

DISCUSSED IN GREATER DETAIL IN A FUTURE SESSION
CONSTRUCTION DOCUMENTS
MODIFICATIONS
STUDY GUIDE: Subject Matter Area No. 3 - B. 10.

DISCUSSED IN GREATER DETAIL IN A FUTURE SESSION

Review Outline

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