Blueprints are the basic element of communication in the construction industry. They are name “blueprints” due to past history when the original tracings were hung in the windows in order to transfer the image to a photo light-sensitive sheet. The use of blue inks was an easy colour to receive the transfer, thus the name stuck.

Prints are initially viewed as nothing more than a bunch of confusing lines and symbols. The initial view of any set or drawings is that of a mess – not creating a comprehensive building outline for construction. This view is likely due to a lack of understanding of construction drawings.

The key to properly interpreting construction drawings lays in understanding the basic framework of a full set of drawings. Once a person can get past the initial apprehension of looking at the drawings, the meaning should become clear. It is not a big secret form of communication – it just looks that way.

It is hoped that this introductory course will serve to eliminate the confusion and frustration a person finds themselves in while reviewing construction documents.

It should be noted that the views and methods presented in this course are entirely those of the author/presenter. These views and methods should not be misconstrued as industry standards. (They should be but aren’t yet).

A proper set of construction documents is made up of two equally important and linked elements:

Specifications
And
Drawings

Neither element can be reviewed independently of the other. By the end of these two nights, I am hoping that you will agree with this statement.
INTRODUCTION AND BACKGROUND

The basic process of construction is a team effort from the consultants (Architects, Engineers), the Owners, working alongside the Contractors. It should not be an adversarial relationship. The process of teamwork is required in order to produce a superior product that everyone can use for future reference. Our reputations, as well as yours, are based on our last mistakes.

The task of interpreting the construction documents is fairly immense. It isn’t easy when you haven’t been involved in the process to look at something which resembles this:

![Image](image1)

and realize that the Architect actually intends the final built product to look like this:

![Image](image2)
The design process leading up to construction documents can take years to complete, requiring different schemes and sketches. Some of these preliminaries can get quite intensive and detailed, going through 10 – 20 different variations.

I won't attempt to explain the actual design process since an explanation of that type is not required in order to understand the physical reality of construction documents.

The construction documents that are produced for the building process represent hundreds of hours of work, involving dozens of people and different offices, and represent hundreds of decisions along the way.
1. **The purpose of blueprints**
   - Instrument of communication
   - Ideas on paper
   - details the elements of construction
   - communicate the idea to the builder
   - show resolved details of construction
      - we are supposed to know how to build
   - detail all areas of construction wither in visual or verbal form
      - (no wiring to be surface applied, what type is used and where allowed)
      - we don’t always say why it must be done that way but there will be a reason
      - { drying chamber uses plastic paint but will look just like a storage room}
   - construction documents should be complete to the best of our abilities in order to get
     an accurate, fair and reasonable price, and facilitate a smooth construction process.
   - If I've done a good job, you can too.
   - If the information cannot be found on either the drawings or specifications, then you
     cannot make an assumption as to the desired result.
   - **ASSUME** is a dirty word in our industry. If you assume, you have a 50 percent
     chance of being wrong. If you are wrong, you may have to change it. It all comes
     down to responsibility, if you make the decision without being granted the right to do
     so, you are automatically accepting the responsibility for it and all the ramifications
     resulting from that decision are now yours. In the end, it may cost you time and
     money. Don't assume.
   - Always ask the question – do it in writing, leave the decisions to those responsible
     for them, limit your liability
Drawings may include:
- Site Plan
- Floor Plans
- Reflected Ceiling Plans
- Elevations
- Building Sections
- Wall Sections
- Door, Window, Building Details
- Finish Schedules, Door Schedules, Window Schedules
- Interior Elevations
- Millwork / Miscellaneous Details

Specifications include:
- General Contractual Conditions
- Supplementary General Conditions (Specific to the Actual Project)
- Individual Specification Sections for all Materials and Installations
- Finish Schedules, Door Schedules, Window Schedules.
There are several drawing type formats as well as specification formats. Each consultant has the opportunity to select a type that they feel will work best for the particular project. Typically, offices have developed standards that they like to use making them cost-effective and efficient.

Basic drawing types are known as

**Key Notes**: The first example is a key note drawing. This method sets the material descriptions aside and numerically references them into the wall section. It allows for typical assemblies to be listed as well as for additional materials to be added without much complication. This method requires constant referencing back to the note legend until one learns all the numeric references.

**Descriptive Method**: The second example is a descriptive drawing. This method illustrates and calls up the materials within each detail. Typically, there is a standard detail on the sheet for the basic component systems and additional details are referred back to it. This method is detail specific however it doesn’t take to changes within the systems well.

The basic difference between these two is only in how you will find the information. All of the information is the same and included on the drawings, it's just located or referenced in a different manner.
Specifications also have variations on their formats.
- descriptive
- generic / global

Descriptive specs will tell you what to use by name, how to install it and where.

Generic specifications will not list any product by name, nor give a clear direction to its use. This type is common to the National Master Spec where they are attempting to not "favor" any one product – rather they spec what is intended towards the product type, quality, standards and reference methods.

Drawings are the visual method by which we show the construction. Drawings are interpretive and subject to each person's own bias.

Specifications are the verbal method by which we describe the construction. Specifications are not nearly as interpretive as drawings, since they are specific and direct.

Everything shown on the drawings will be noted in the specifications.
- earth moving
- ceiling tile
- paint
- accessories.

Specs may contain items not shown on the drawings that can impact your schedule, costs, and work
- time frames
- sequencing
- cash sums
- additional materials
- switches
- totes, etc.

The written language has precedence over drawings because lawyers and judges can't read drawings. They deal in the written text. A drawing can be subject to interpretation whereas the typed word must be clear and specific.
2. **Integration of Specs & Prints**
   - How are the two items linked.
   - Order of precedence
   - Liability of errors and omissions
   - Drawings and Specs make up the contract. You cannot have one without the other in some form.
   - Smaller projects will have the spec right on the drawings, some other types may have the drawings contained within the specs.
   - Don't ever assume that what you have is all inclusive without checking.

3. **Interpreting the Written Language**
   - Construction terms
   - Abbreviations and Acronyms

4. **Drawings Scales**
   - Purpose of different scales
   - Large vs Small Scale drawings

5. **Element Identification**
   - Lineweight
   - Linetype
   - Hatching
   - Key Notes
   - Order of Precedence

6. **Schedules and Symbols**
   - Purpose of Schedules
   - Symbol interpretation
   - Cross-referencing
7. Site / Location Plans
   - Surveys
   - Landscaping
   - Plot Plans

8. Foundation Plans
   - Foundation members
   - Foundation Types
   - Reading Plans

9. Floor Plans
   - Building Layout
   - Interior Organizations
   - Dimensions / Symbols
   - Schedules

10. Reflected Ceiling Plans
    - Purpose
    - Elevations
    - Details

11. Exterior Elevations
    - Material Designations
    - Finishes
    - Projections Orientation

12. Building Sections
    - Purpose
    - Building Relationship
    - Material Assembly

13. Wall Sections
    - Large Scale Details
    - Overall Sections
    - Dimensions
    - Orientation/Cross Referencing
    - Materials

14. Detail Drawings
    - Purpose
    - Cross-References
    - Interpretation
15. Interior Elevations
   - Orientation
   - Finishes
   - Fitments

16. Millwork
   - Orientation
   - Cross-references

17. Structural
   - Foundation
   - Wall Sections
   - Roof Framing

18. Mechanical Drawings
   - Site Services
   - Plumbing
   - Ventilation
   - Fire Suppression

19. Electrical Drawings
   - Site Services
   - Lighting
   - Building services
   - Schedules and Schematics

20. Specifications
   - General Conditions
   - Supplementary General Conditions
   - Specific Sections

21. Total Contract Documents
   - Overall Comprehension
   - Specifications/ Addenda
   - Drawings
   - Order of precedence
   - Co-ordination

22. Legal Issues
   - Building Codes
   - Authorities Having Jurisdiction
   - Bidding Procedures
   - Contracts
Building codes and published regulations are sets of safety regulations with respect to structure requirements, fire issues, and public health & safety. These governing rules were developed in response to frequently demonstrated hazards of structural collapse, catastrophic fires, and spread of disease. They were not, as is assumed in many cases, created to limit the abilities of the designer, make life complicated on site, and give the authorities something to fall back on.

The actual process of building design and construction creates the greatest set of compromises with which man is faces. The best idea may need modification in order to meet the prescribed regulations of codes and local bylaws. These regulations ensure a level of conformity in all buildings for the protection of the general public and owner.

**Fire and Design of Buildings**

Fire presents a major hazard to life and property in buildings. The requirements of building codes refer to creation of fire compartments which are used to confine property loss to the compartment where it originated. The same philosophy is used when it applies to life safety.

Fire resistance is defined in terms of the length of time it will meet certain requirements when exposed in a test furnace. Codes regulate the allowable size of a compartment or building without having any special forms of construction such as firewalls or fire suppression systems such as automatic sprinklers. Sprinklers allow for larger compartments due to the ability to quickly contain a hazardous situation.

Stairwells, ventilating shafts, refuge areas in tall buildings and areas where identified hazards are present (boiler rooms, janitor rooms, electrical rooms) should constitute totally enclosed fire resisting compartments due to the nature of the zone. This regulation is designed to provide adequate time for evacuation and possibility of containment.
SPECIFICATIONS

SECTION BREAKDOWN

Addendums and Clarifications

**Contract Stuff -**

- SECTION 00000 - 01000 : CONTRACTUAL ARRANGEMENTS

**Outside Stuff -**

- SECTION 02000 : EXTERIOR WORKS

**Heavy Weights -**

- SECTION 03000 : CONCRETE
- SECTION 04000 : MASONRY
- SECTION 05000 : STEEL

**Middle Weights -**

- SECTION 06000 : CARPENTRY / WOODS
- SECTION 07000 : INSULATION / CLADDING
- SECTION 08000 : DOORS, WINDOWS, HARDWARE

**Light Weights -**

- SECTION 09000 : FINISHES (PAINT, FLOORING, CEILINGS)
- SECTION 10000 : SPECIALITIES

**Systems Engineers -**

- SECTION 15000 : MECHANICAL
- SECTION 16000 : ELECTRICAL
TYPICAL SPECIFICATION SECTION

PART I    :    GENERAL CONTRACTUAL ARRANGEMENTS

May include requirements for SAMPLES, SHOP DRAWING SUBMISSIONS, DELIVERY DATES, REFERENCE SECTIONS

PART II    :    MATERIALS

Listing of all the materials to be used by the Section including type, grade, conformance to ULC listings, composition, fasteners, colours, and finish surface.

PART III    :    EXECUTION

Descriptive method to illustrate how the MATERIALS are to be applied on the project including spacing of fasteners, jointing, exposure, and sequence of installation.
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- Form C - Certificate for Substantial Completion of Subcontract
- Form C-1 - Certificate for Substantial Completion of Contract

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- Section 02050 Demolition
- (Section 02200 Excavation and Backfill)
- (Section 02210 Site Grading)
- Section 02220 Building Excavation & Backfill
- (Section 02230 Granular Base Course)
- (Section 02250 Subgrade Preparation/Compaction)
- Section 02300 Pile Foundation
- Section 02610 Asphalt Paving
- Section 02620 Gravel Paving
- Section 02800 Landscaping
- Section 02810 Planting Soil
- Section 02820 Trees, Shrubs and Ground Covers
- Section 02830 Landscape Maintenance

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- Section 03200 Concrete Reinforcing
- Section 03250 Concrete Accessories
- Section 03300 Cast-In-Place Concrete
- Section 03346 Concrete Testing
- Section 03347 Concrete Floor Finishing
- Section 03400 Architectural Precast Concrete
- Section 03420 Prestressed Concrete
- Section 03510 Gypsum Concrete Deck

**Division 4 - Masonry**
- Section 04200 Masonry
- Section 04501 Masonry Restoration

**Division 5 - Metals**
- Section 05100 Structural Steel
- Section 05300 Metal Decking
- Section 05500 Miscellaneous Metals
INTERPRETING CONSTRUCTION DOCUMENTS
Introductory Level
{Instructor Copy}

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FINAL QUIZ

1. You only really need either Drawings or Specifications; not both.
   - [ ] True
   - [ ] False

2. The General Conditions Section of the Specifications relates only to the General Contractor’s responsibilities.
   - [ ] True
   - [ ] False

3. All information is always shown on the drawings.
   - [ ] True
   - [ ] False

4. All drawings are done to the same scale.
   - [ ] True
   - [ ] False

5. The first thing to check when picking up contract sets is the Title Block/Title Page.
   - [ ] True
   - [ ] False

6. Schedules are contained either on the drawings or in the specifications.
   - [ ] True
   - [ ] False

7. Section arrows indicate the direction of view.
   - [ ] True
   - [ ] False

8. If something is not shown on the drawings, it does not get included in the contract.
   - [ ] True
   - [ ] False

9. Changes to the documents by addendum overrule what is shown on drawings or original specs.
   - [ ] True
   - [ ] False

10. Each specification trade section has 3 sub-sections.
    - [ ] True
    - [ ] False

11. Changes can be made to the drawings/specs without consultant approval.
    - [ ] True
    - [ ] False
12. All specifications are written in the National Master Specifications format.
   □ True
   □ False

13. Bid depository trade definitions overrule the consultant/client’s expectations.
   □ True
   □ False

14. Materials are shown on the drawings, and identified in writing within the specifications.
   □ True
   □ False

15. Specific details can be placed anywhere within a contract set (either drawings or specifications)
   □ True
   □ False

16. Grid lines are what consulting fees are based on. They have no other purpose on the documents.
   □ True
   □ False

17. Large scale details are more important/precise than small scale details.
   □ True
   □ False

18. Building codes were written to ensure protection of property and life.
   □ True
   □ False

19. Sub-trades need only review the one spec section and single drawings relative to their trade.
   □ True
   □ False

20. Construction documents may be comprised of separate specifications and drawings, specs on the drawings, or drawings in the specs.
   □ True
   □ False