# Intro to CAD & Working Drawings:

Technical drawings describing the project in pictorial form for the builder to execute, fully explaining what has to be done.

CMCE 1110 Construction Drawings

Professor Anderson

# How a building gets built:

Standard Delivery Methods:

3 main parties involved:
1. Owner
2. Design Professional
3. Builder

| | Design-Bid-Build | CMAR | Lump Sum D-B |
|---|---|---|---|
| Innovation | ●●○○○○ | ●●●○○ | ●●●○○ |
| Budget Control | ●●●○○ | ●●●●○ | ●●●●○ |
| Transparency | ●●○○○○ | ●●●●● | ●○○○○ |
| Schedule | ●●○○○ | ●●○○ | ●●●●● |
| Design Approval | ●●●●● | ●●●●○ | ●○○○○ |
| Minimal Disputes | ●○○○○○ | ●●●○○ | ●●●●○ |

- Key Roles:
  - Architect / Engineer: codes, MEP, structural
  - General Contractor: responsibility for constructing the project
  - Sub-Contractors: independent construction firms that specialize in a specific trade (carpenter, electrician,concrete, etc)

# Project Phases:

1. **Preliminary / Schematic Design**: explore ideas for the building, code research
2. **Design Development**: develop one design exculsively
3. **Contract Documents**: develop to fully describe the project
   - working drawings
   - Specifications
4. **Bid Documents**: bidding and negotiation
5. **Construction Administration**: administer the contract documents, shop drawings and construction sketches.  Architect continues to coordinate with the GC to make sure the project is built to the standards defined in the CD's
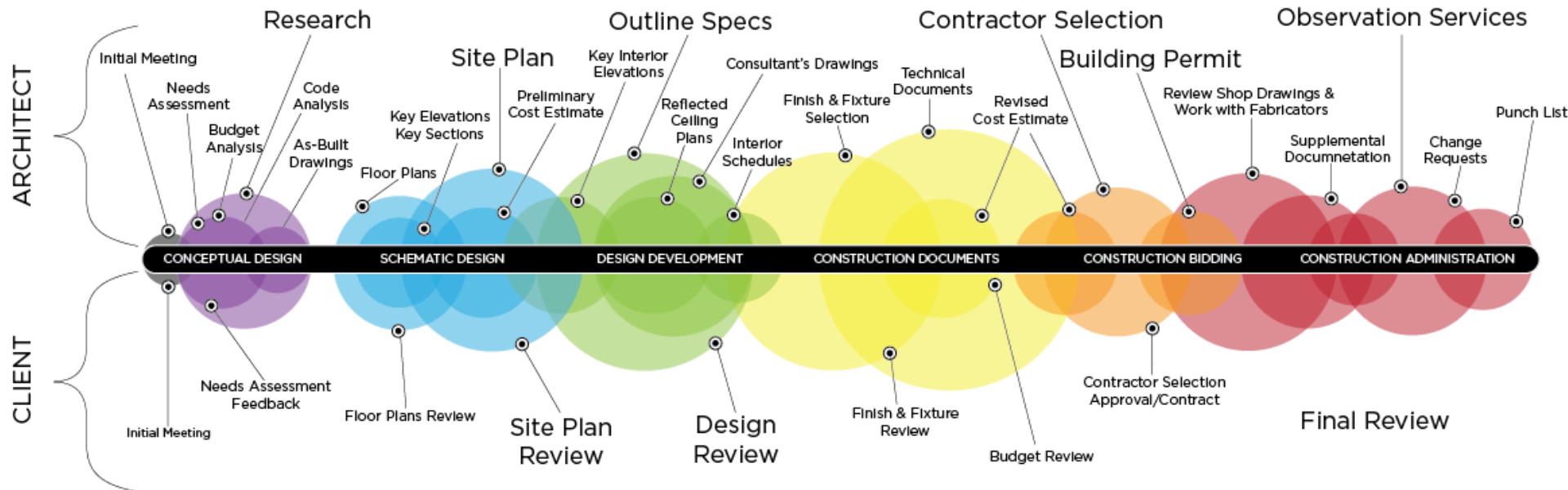
# Codes & Regulations
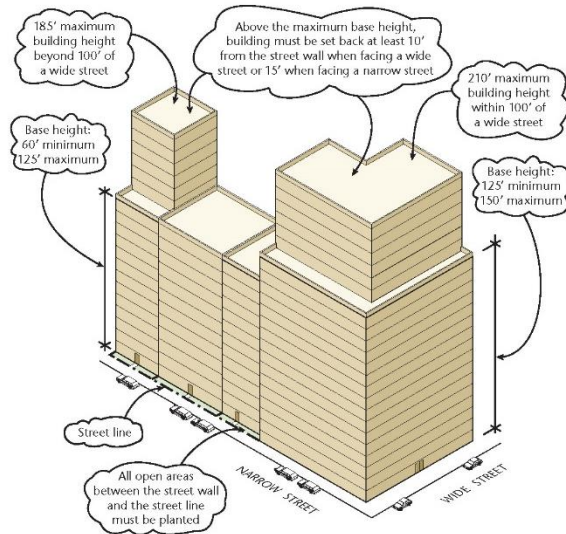




| R10 General Residence District: Quality Housing Regulations | | | | | | |
|---|---|---|---|---|---|---|
| **R10'** | | **FAR** (max) | **Lot coverage** (max) | | **Base Height** (min/max) | **Building Height** (max) | **Required Parking¹** (min) |
| | | | Corner Lot | Interior/Through Lot | | | |
| | Wide Street | 10.0² | 100% | 70% | 125 ft–150 ft | 210 ft | 40% of dwelling units⁴ |
| | Narrow Street | | | | 60 ft–125 ft | 185 ft | |
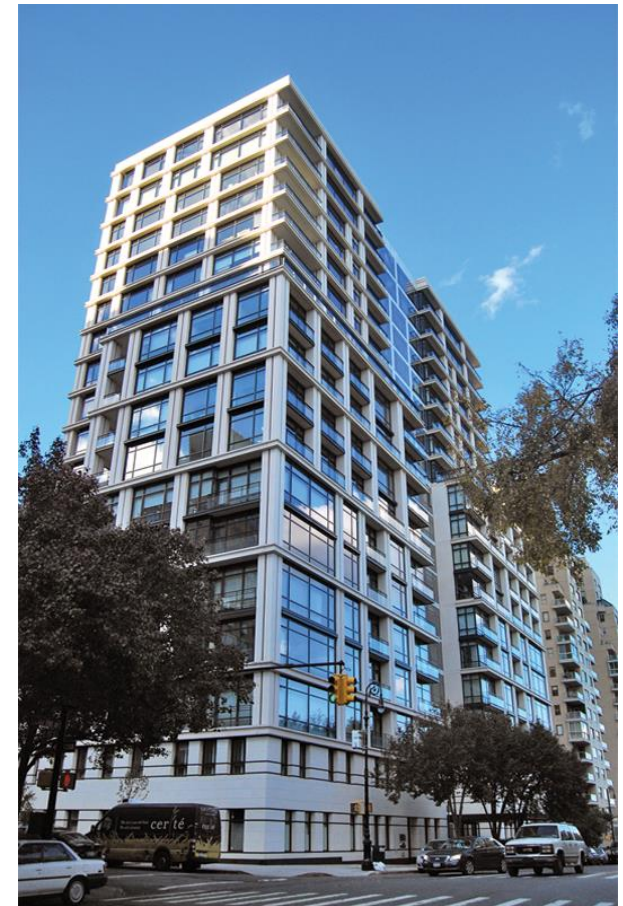
**Building Codes & Zoning Regulations:**
*Working Architectural Drawings must conform with the applicable building codes.
Building Code: laws that provide for the health, safety, and general welfare of the public.

**Building Permits:**
Plans and specs are submitted and reviewed by building department officials to determine whether the project meets local building codes. A GC must have a building permit to begin construction on the project. Work is inspected by building officials and construction progresses.
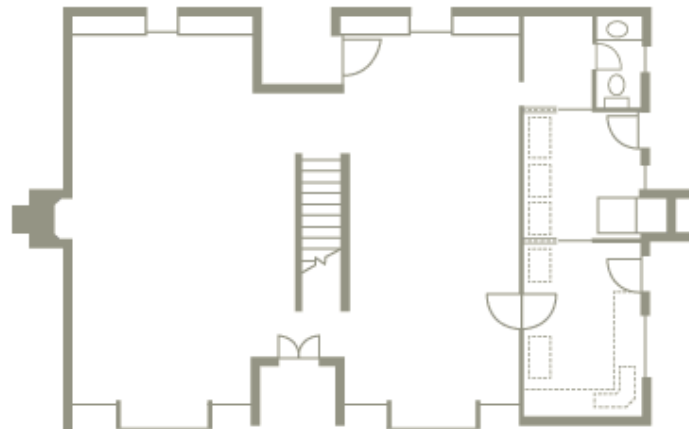
# Escherick House

Louis Kahn, 1959-1961
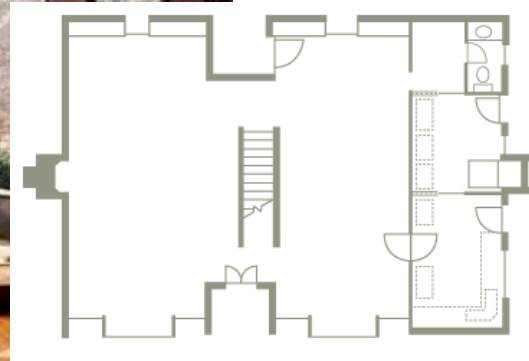204 Sunrise Lane, Philadelphia, PA
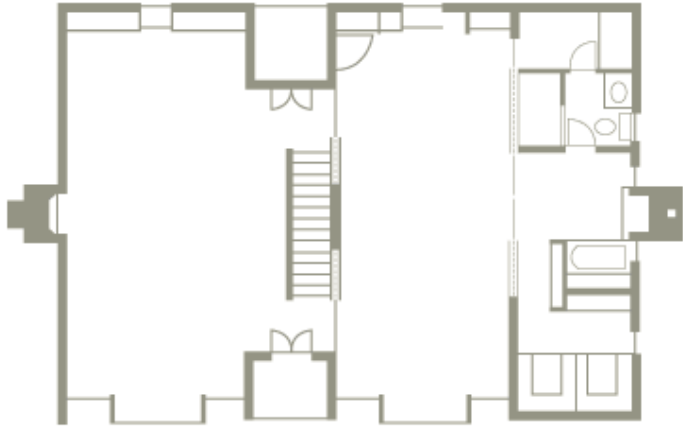


SECOND FLOOR PLAN



FIRST FLOOR PLAN

SECOND FLOOR PLAN

FIRST FLOOR PLAN

# Intro to Auto-CAD

is a computer-aided drafting software program used to create blueprints for buildings, bridges, and computer chips, among other things...

AUTODESK®
AUTOCAD® 2017

AUTODESK.

# Intro to Auto-CAD

# User Interface



Application Menu

Quick Access Toolbar

Ribbon

File Tabs

View Cube

Vieport Controls

Project Navigator

Navigation Bar

Tool Palettes

Properties Palette

Drawing Window

Application Status Bar
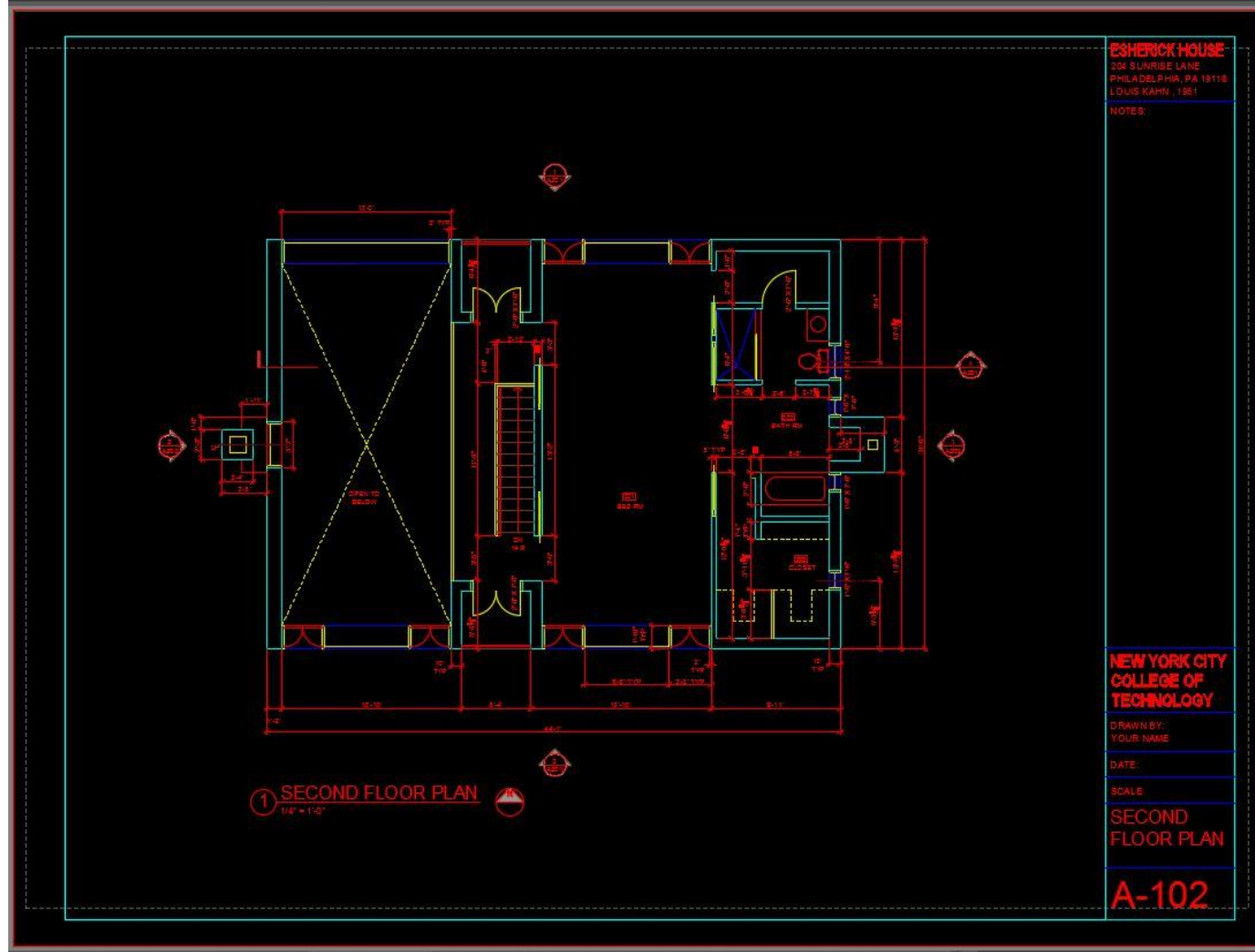
Command Window

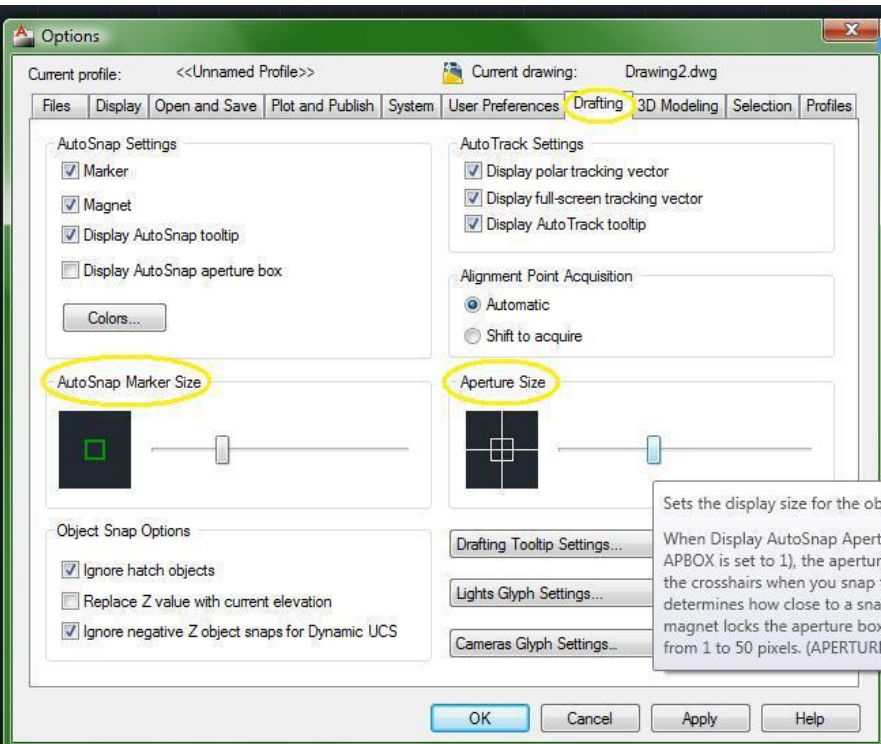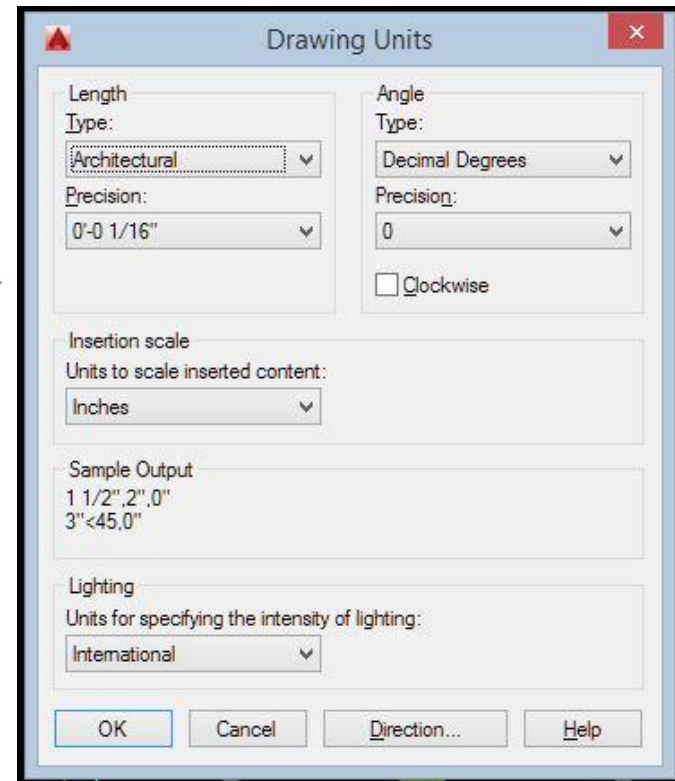Drawing Window Status Bar

# Command Interface

# CAD Techniques



- Units
- Object Snap
- Ortho Mode
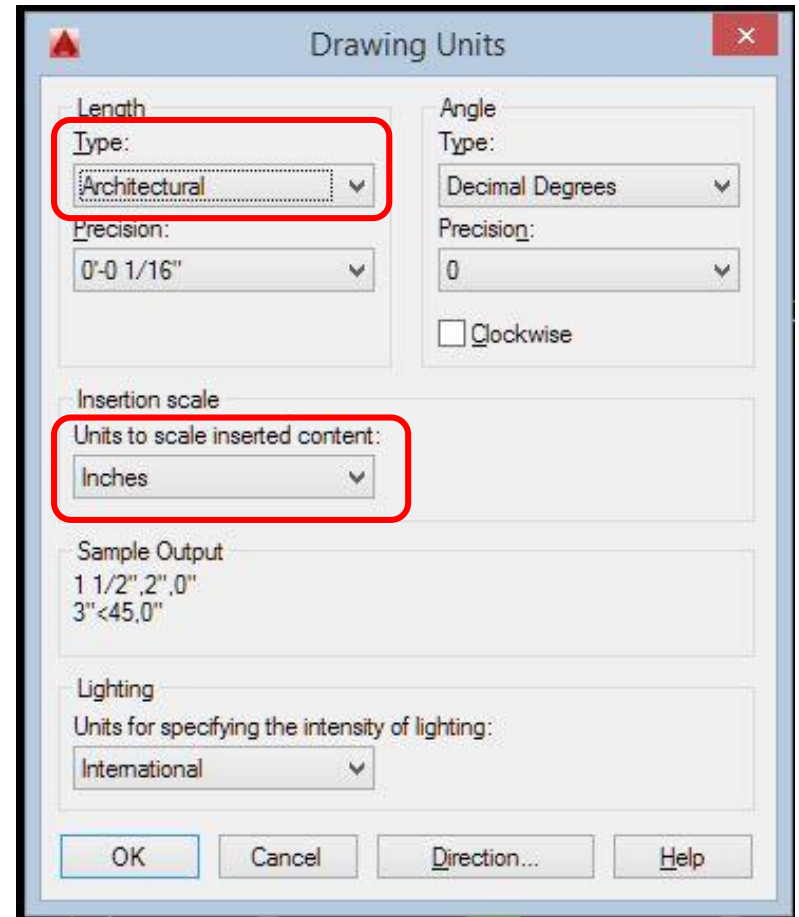- Layers
- Copy/Paste
- Construction Lines

# Getting Started
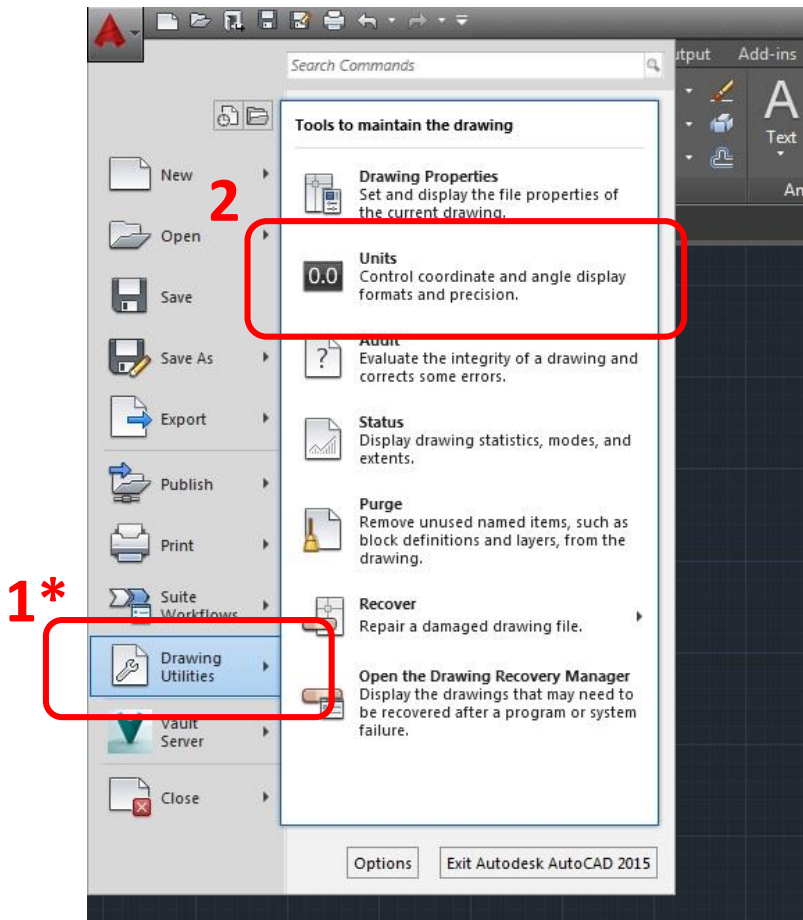
- Open a new drawing, save it!
- Check your *units*: Architectural, Inches
- You can customize your workspace with *options*
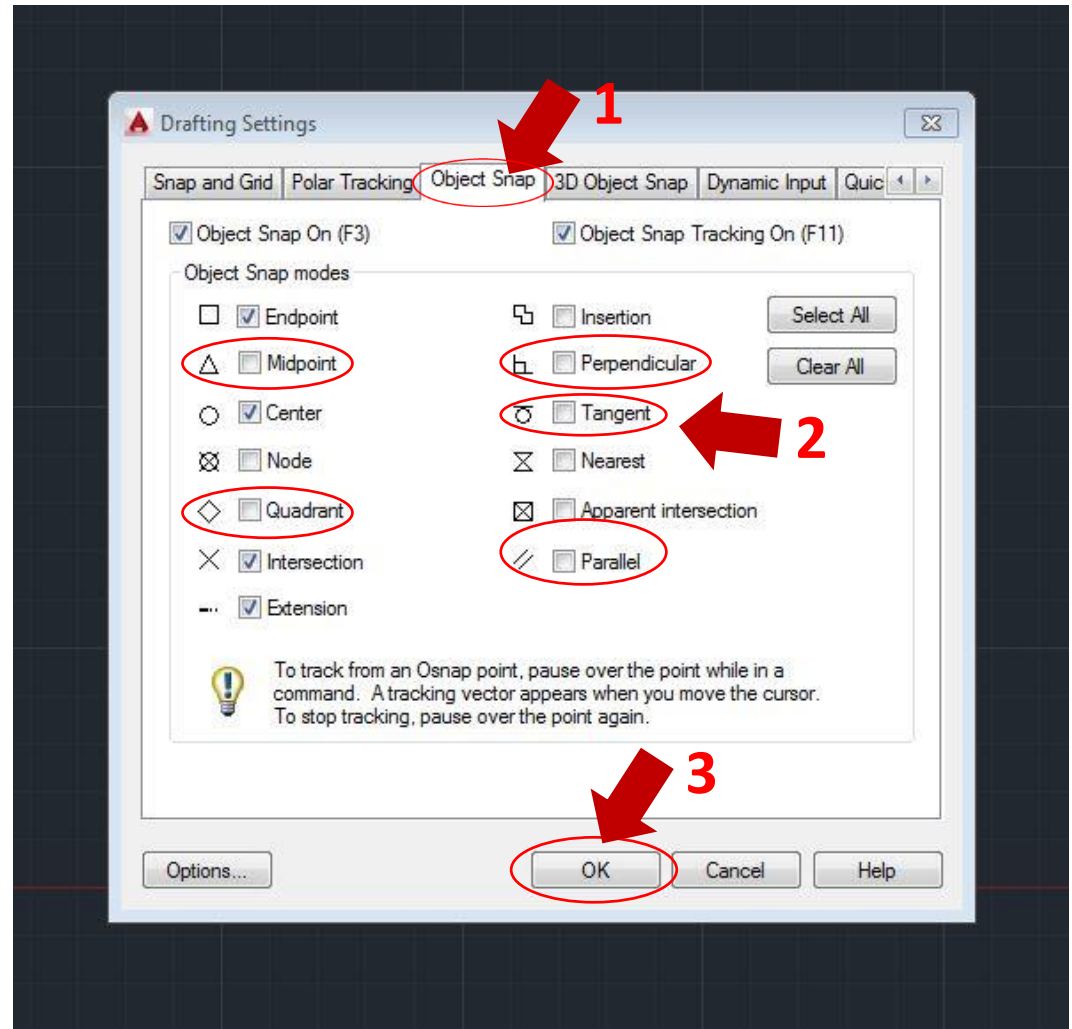- Draft your linework in *model space*

# Drawing Units



**\* Or type "units"**

1. Click the small down arrow in the grid control area
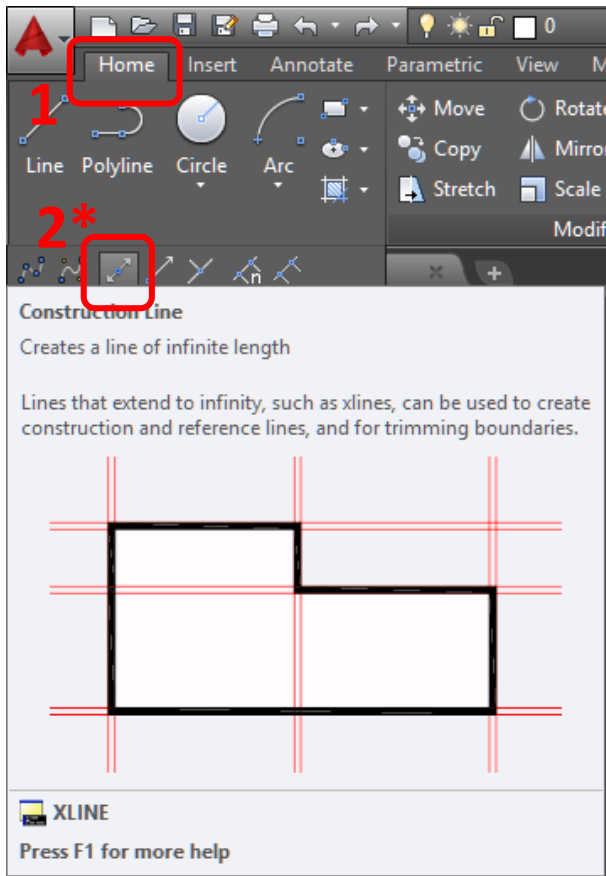
2. Select Snap Settings
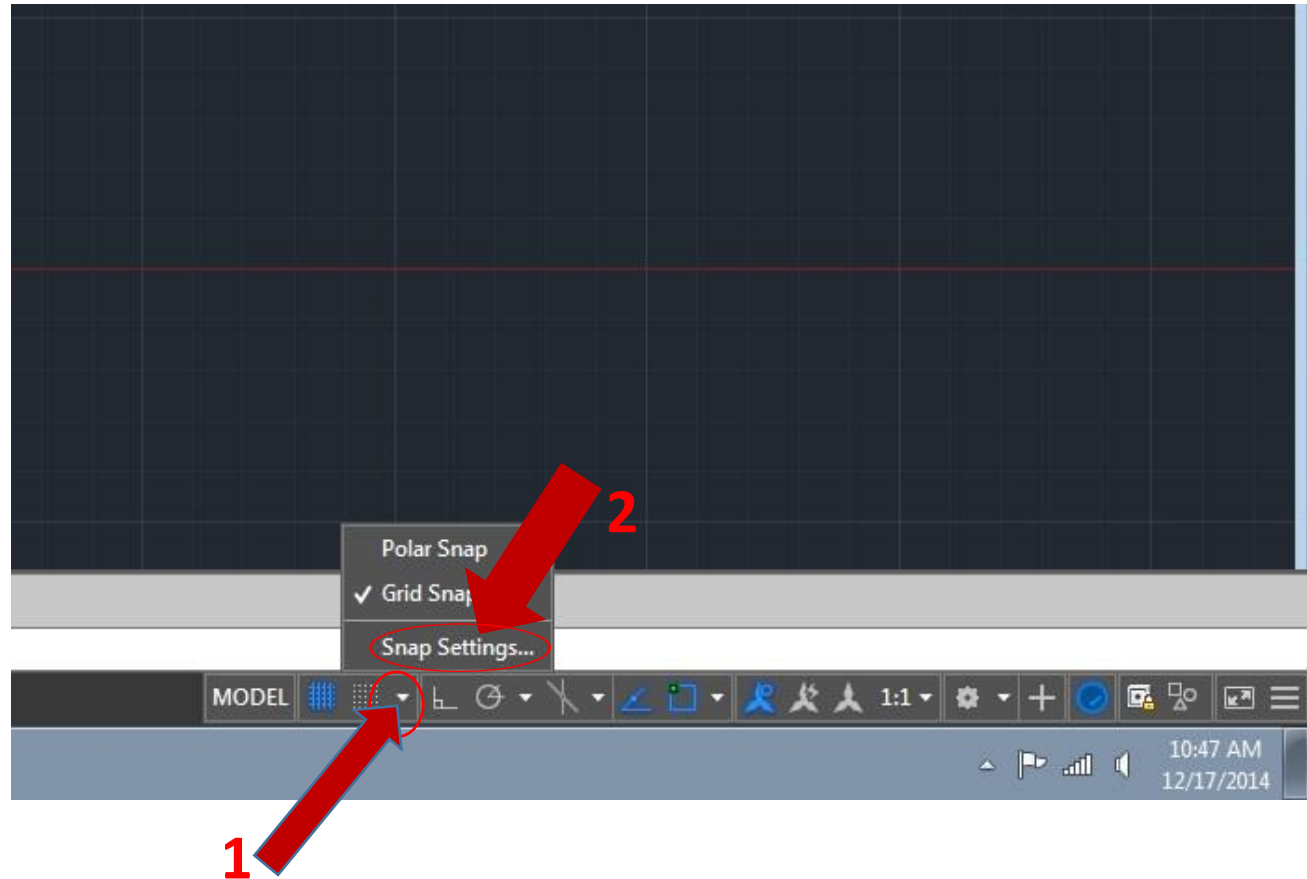
1. Click "Object Snap"

2. Check the "midpoint", "Quadrant", "Perpendicular", "Tangent" and "parallel" Boxes

3. Click "Ok" when done

# Construction Lines

Lines that extend to infinity and can be used as guidelines.



**\*or type "xl" for x-line**
- **then "h" for a horizontal line**
- **or "v" for vertical line**

# Sheet Setup & Viewports

- Use the Titleblock constructed in *paper space* for the previous assignment.
- Use *Page Setup Manager* by right-clicking paper space layout tab
- *Viewports* create a view into
  model space at a specific scale.
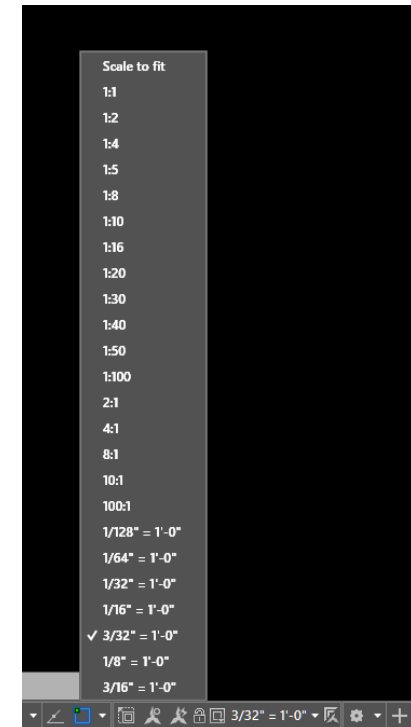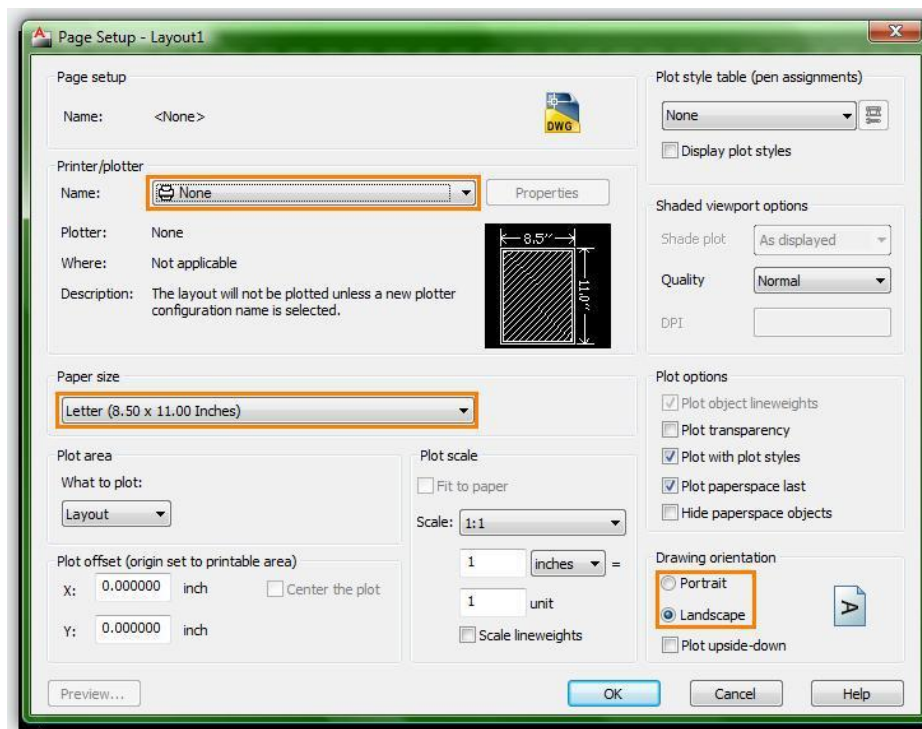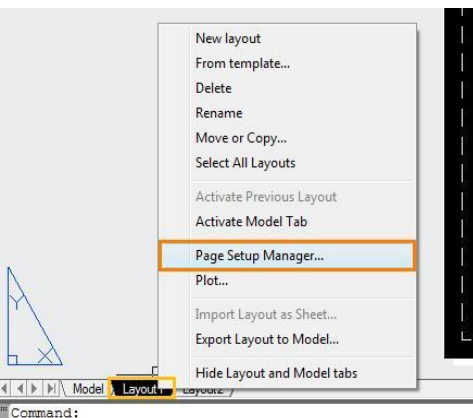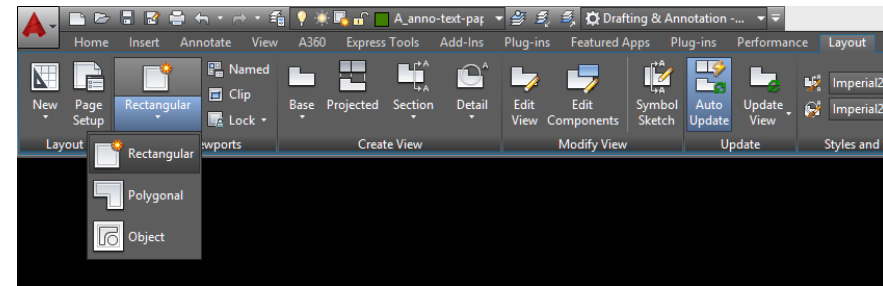
# Plot Styles

When *plotting* (*ctrl+p*) a drawing, a *plot style* must be chosen. Standard styles should be used (office standards). A *plot style* controls and object's plotted properties.

- CTB: color dependent
- STB: named
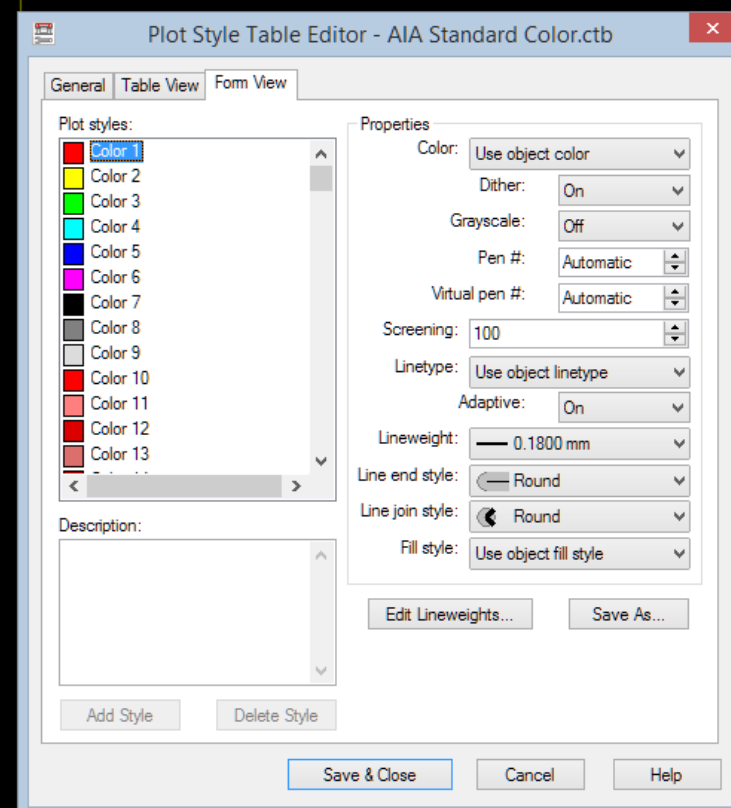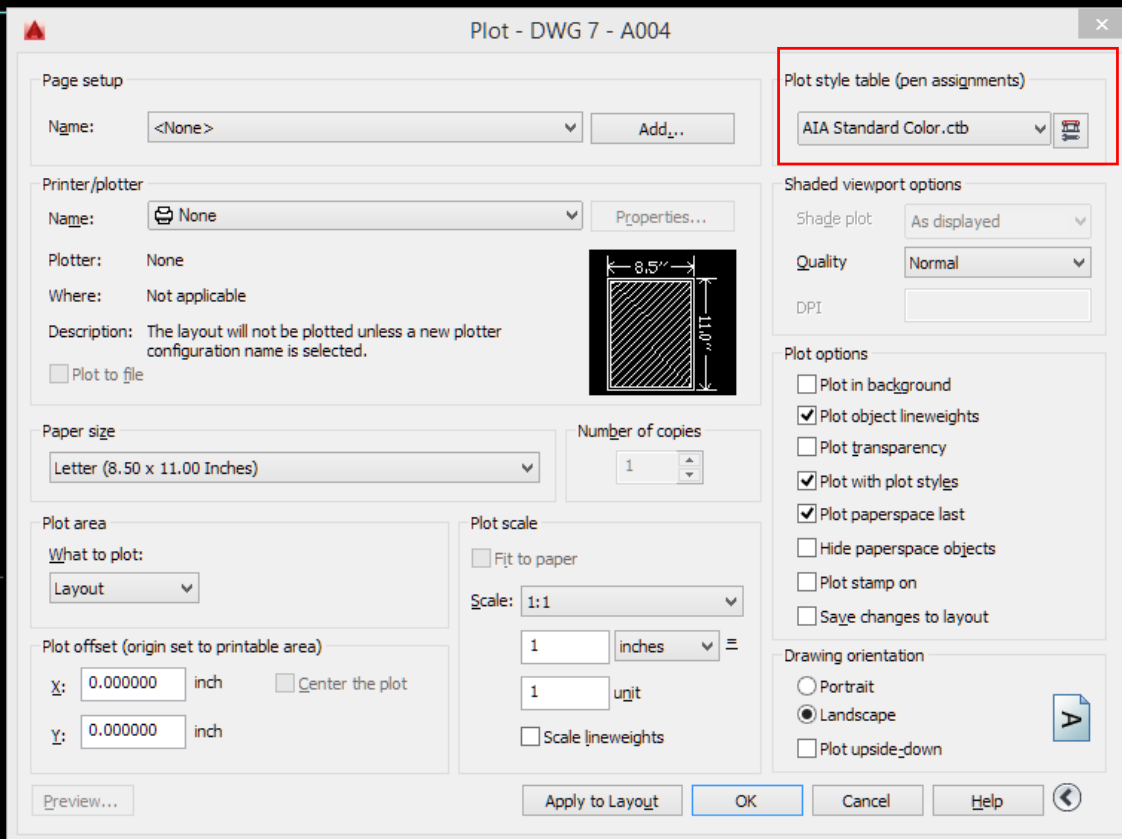
# Assignment Specifications:

- Create a Dropbox folder "T-000"
- Upload your progress drawing at the end of this class to your Dropbox folder. Name files: Last Name First Name – Assignment Title.
- Upload final submission *BEFORE THE START OF THE NEXT CLASS*
- Submit 8.5"x11" plot of each drawing *AT THE START OF THE NEXT CLASS*