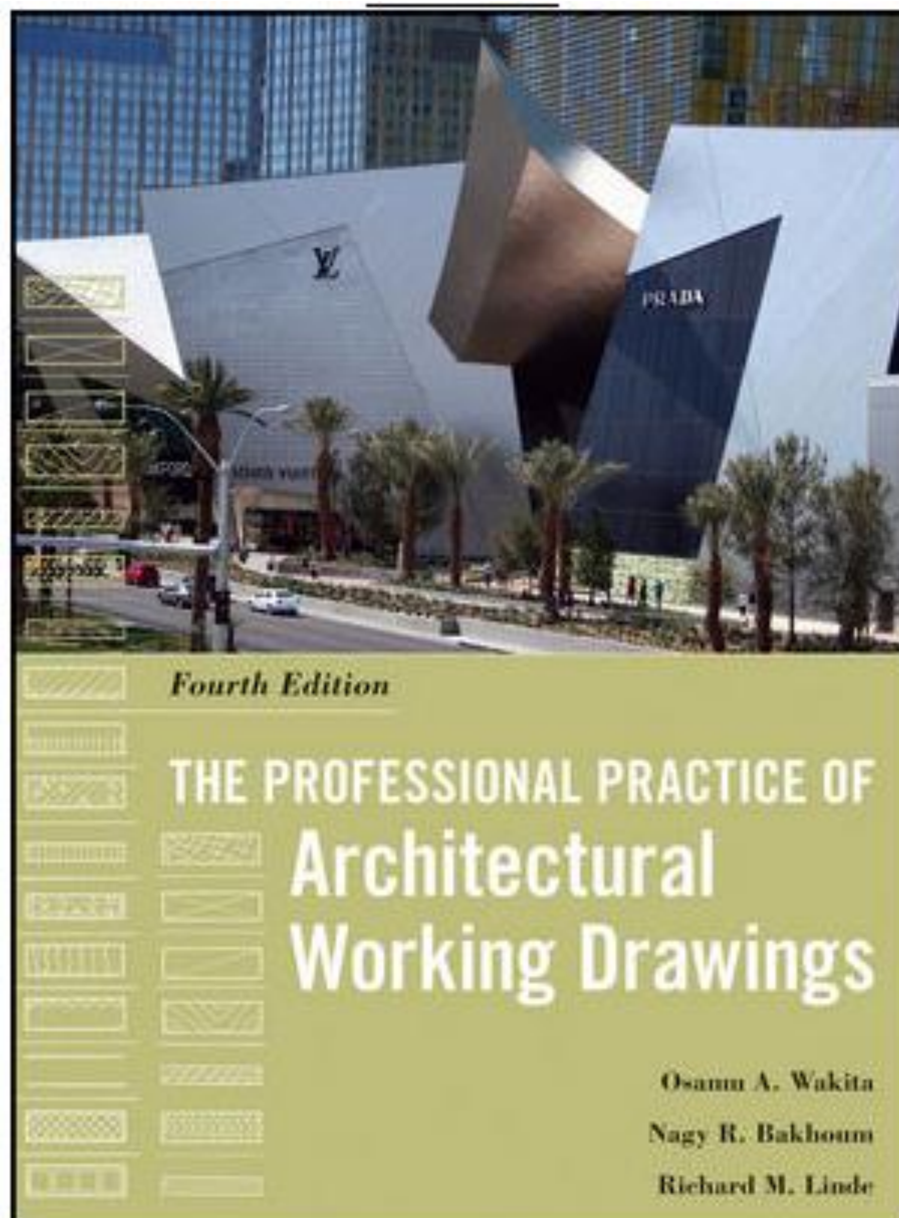
MIAMI DADE COLLEGE
SCHOOL OF ARCHITECTURE,
INTERIOR DESIGN AND BUILDING
CONSTRUCTION

BCN 1275

BUILDING
CONSTRUCTION PLAN
INTERPRETATION II



Guidelines for reading Commercial Building Structures:

- Review the information regarding the use and occupancy of the building and look for the features related to its use.

- Look over the site plan and the building elevations to create a preliminary mental image of the shape and size of the building

- Look for the North arrow in order to relate the elevation to the plan views.

- If a perspective view is provided, relate the view to the elevations and the floor plan. “Orient” yourself to the main entrance.

- Get familiar with special architectural feature, so you can related them in the floor plans.

- Identify the exterior materials.

- Review the roof plan and identify the drain slopes.

Locate and identify the "bones" of the structure.

- Look for the grid and reference lines on both the architectural and structural drawings, the "skeleton" members are associated with referenced lines.

- Study the longitudinal and transverse sections (architectural and structural).

- Look on the plan for the section symbols in order to orient these sections.

- Determine the structural system being used: Steel, reinforced concrete, timber, combination

- The foundation plan will show where columns and walls are located.

- In the section views observe how horizontal members are supported and how their loads are transferred to columns and bearing walls, and finally to the foundations.

- Relate Construction Details to the Larger Views such plans, sections and elevations.

- Determine how the mechanical equipment, plumbing and electrical wiring are related to the building

Muller, E, and Myatt,R. Reading Architectural Working Drawings, Vol.2 Commercial Construction. Prentice Hall NJ.

CHAPTER
1

Ch 1. Codes Influence in Building Design, Exit Requirements p. 13

Example 2 Story Building
Design Criteria: All four building elevations to have windows (openings).
The setback is an important factor in this case a 10'-0" **setback** minimum is required.

- Exit (egress) requirements are based on the occupancy load factor of the intended use.
- On this example: **B**usiness Occupation the load factor is 100 sq^2.
- Once the quantity of egress door (s) is determined the door location, and its minimum width needs to be determined.
- Also stairs and corridors are mean of egress and need to comply with the code. Acceptable **egress travel** = the path to a required exit.
- The **EXIT** needs to discharge outside the building.

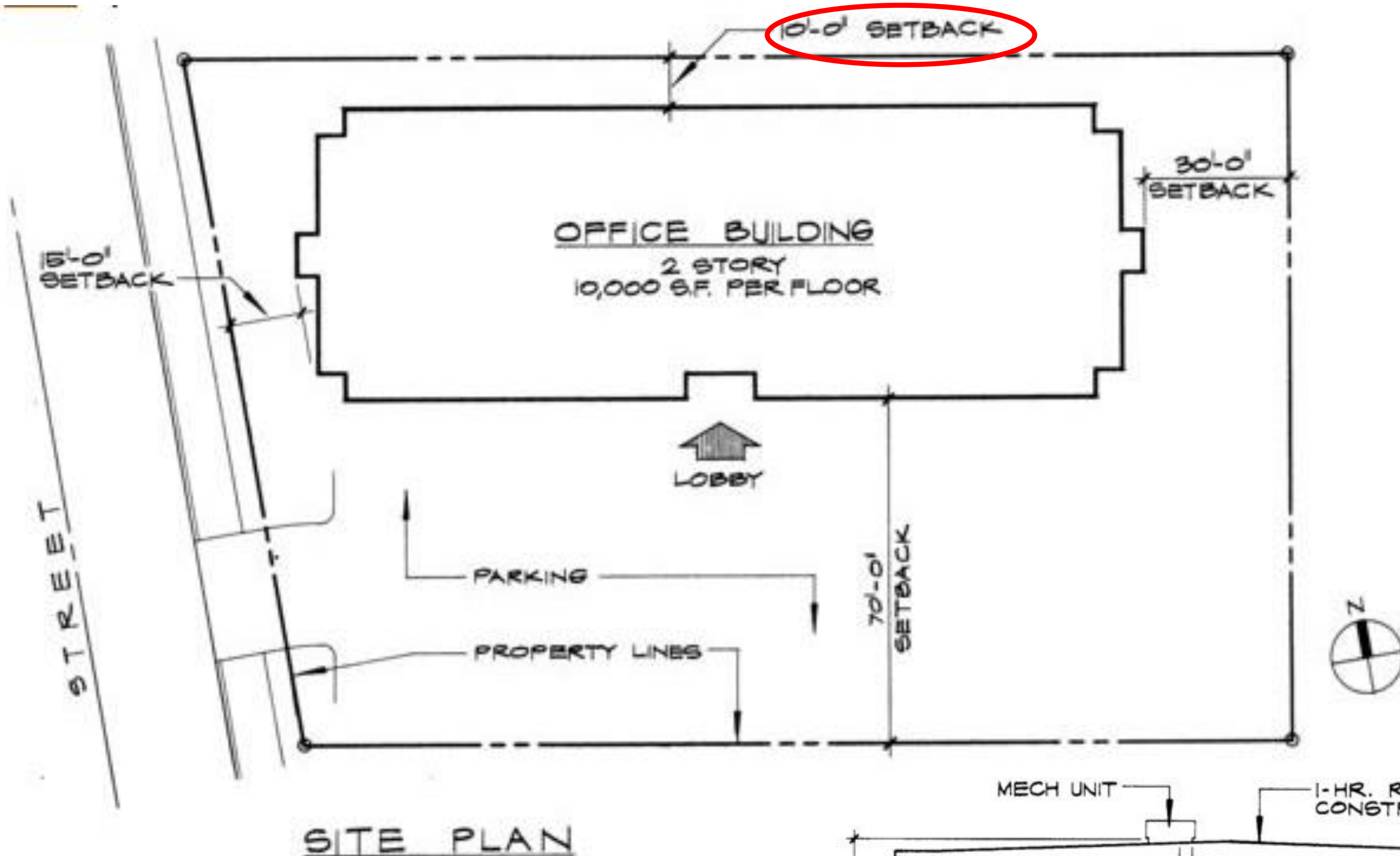


Figure 1.9 p.14 SITE PLAN

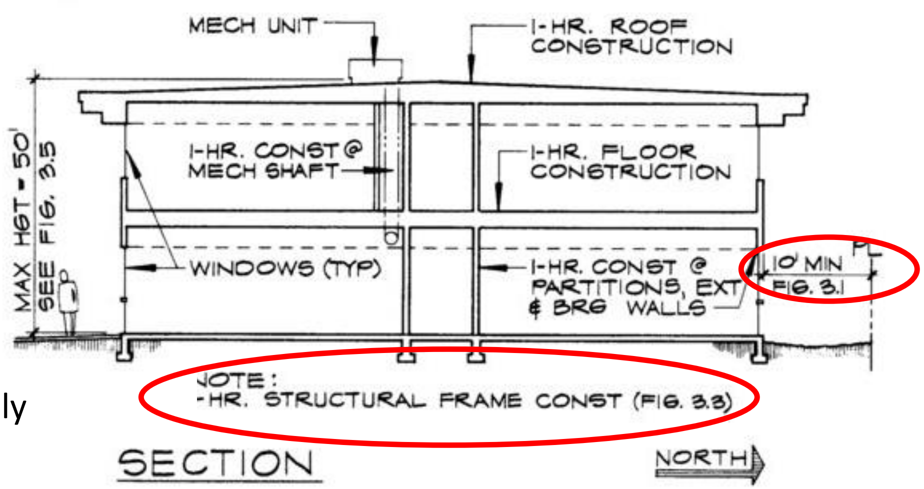


Figure 1.10 p.14 Graphic Building Section with fire rated assembly

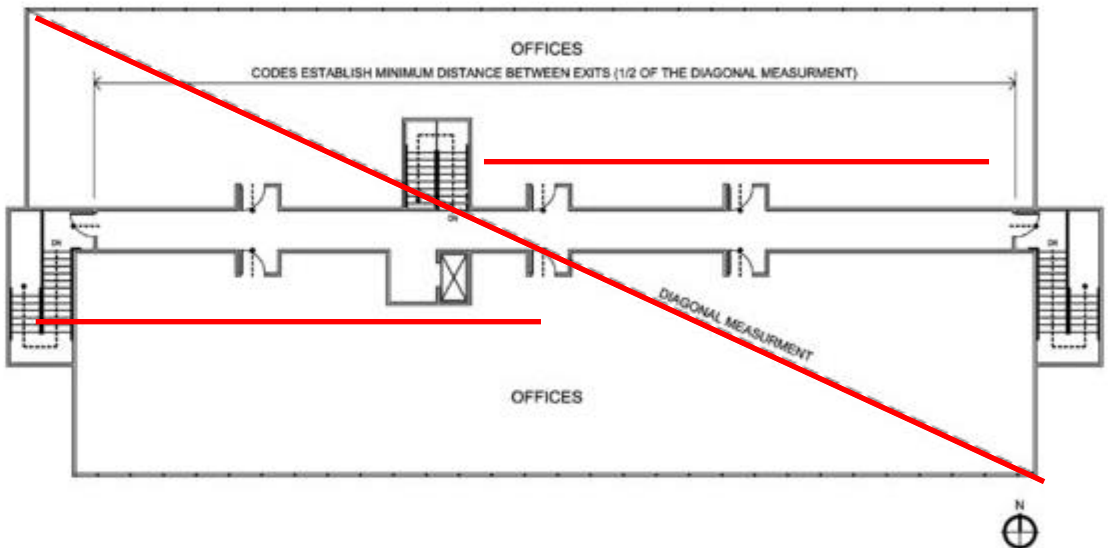


Figure 1.11 p.15 SECOND LEVEL FLOOR PLAN

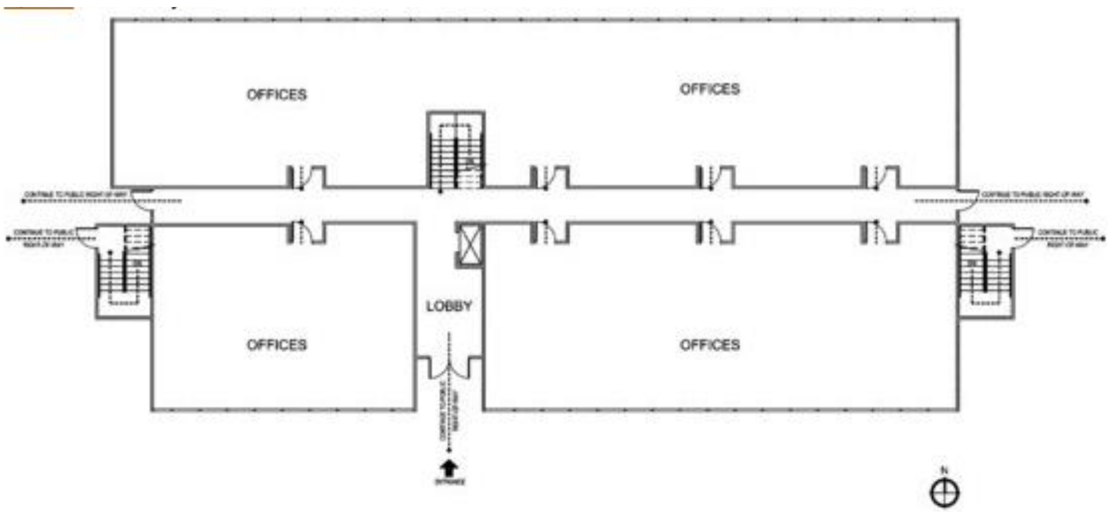


Figure 1.12 p.15 FIRST LEVEL FLOOR PLAN

CHAPTER

3

Ch. 3 HUMAN CONSIDERATIONS p. 80

The main reason buildings are design is for the use of people.

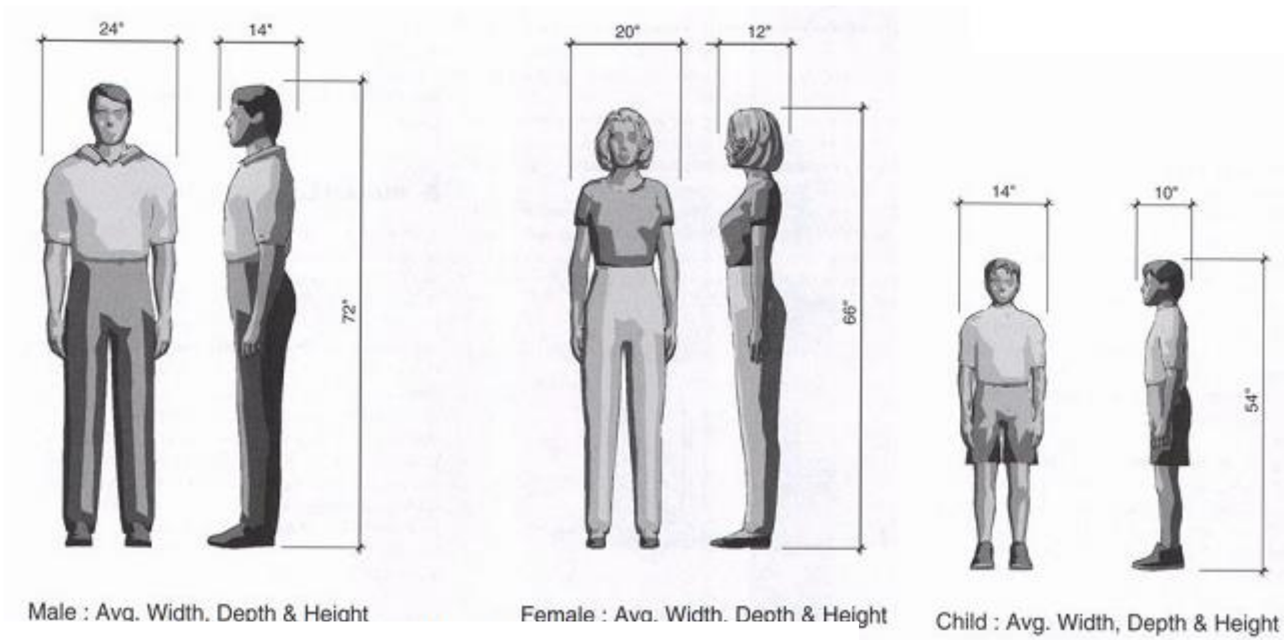
It is important to understand the critical anthropometrics data as they affect adult men and women, children, and elderly persons.

In order to create comfortable environment, we must first understand the limits of the human body. It is vital to study the required measurements for clearances under counter desks, or the maximum height a person can reach.

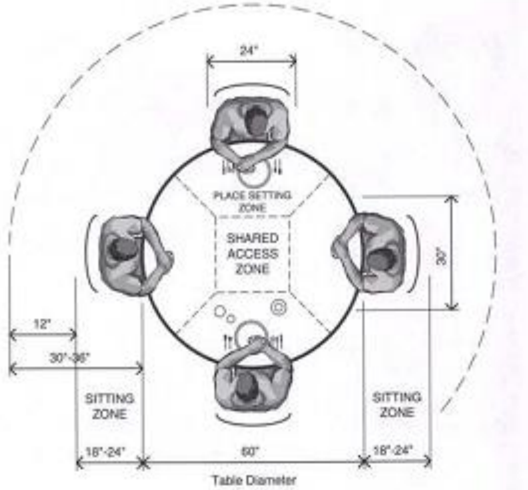
Object dimensions, used by the persons within the spaces must be considered, such as a shopping cart or a musical instrument.

This information is provided in the Graphic Standards by the American Institute of Architects (AIA).

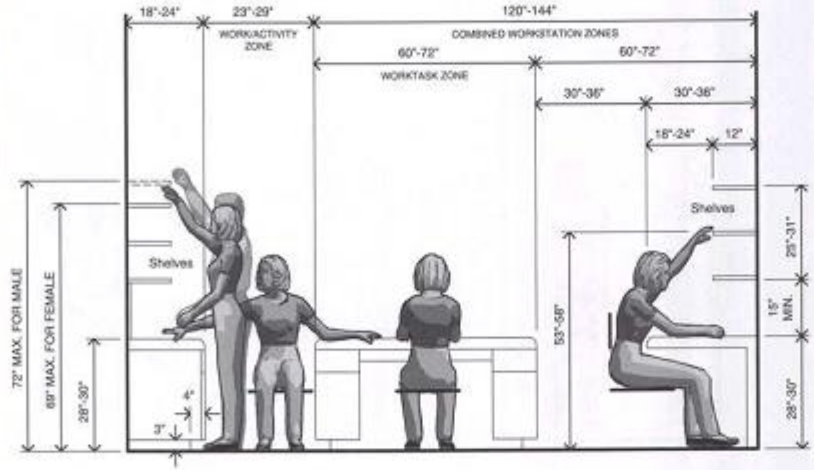
Ergonomics - The science which study how people adapt to their environments.



p. 81, Figure 3.1 Understanding the human figure: average dimensions.

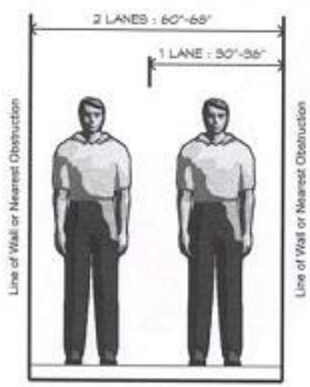


60" Diameter Circular Table for Four / Optimum Seating

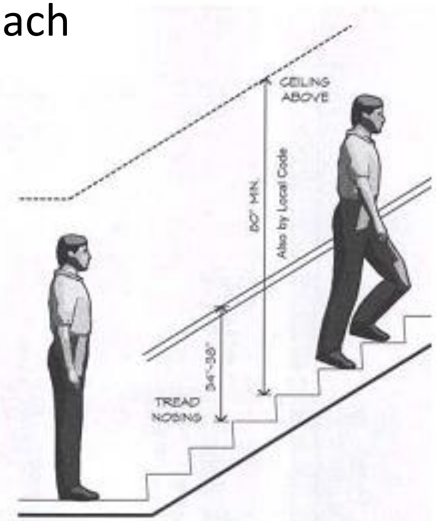


Desk and Workstation Considerations with Shelves

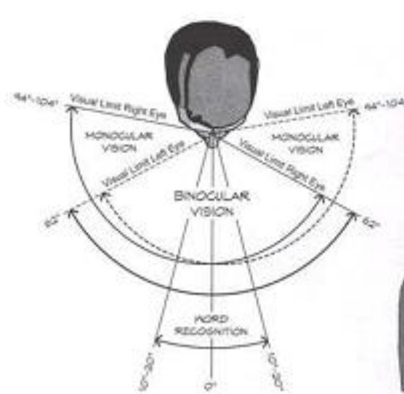
P 82, Figure 3.2 Reach



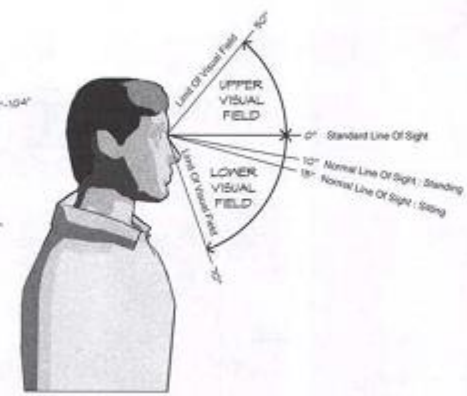
Circulation / Corridors and Passages



General Stair Dimensions



Visual Field in Horizontal Plane



Visual Field in Vertical Plane

P 82, Figure 3.3 Space Relative to sight and movement

Ch. 3 PUBLIC BUILDING ACCESSIBILITY p. 84

The American with Disabilities Act (ADA) is a civil right law, not a building code. Is the result of legislation for the protection of persons with disabilities.

List of elements that need to be considered to address accessibility and accommodation in public buildings:

- Path of travel-exterior accessibility route to the facility
- Accessible parking
- Curb ramps
- Entrances
- Interior access route
- Ramps
- Stairs
- Elevators
- Platform lifts
- Doors
- Drinking fountains
- Toilet rooms and bathrooms
- Water closets
- Urinals
- Lavatories and mirrors
- Sinks
- Bathtubs
- Shower stalls
- Grab bars
- Tub/shower seats
- Assembly areas
- Storage
- Alarms
- Signage
- Public telephones
- Seating and tables
- Automatic teller machines
- Dressing and fitting rooms

Ch. 3 PUBLIC BUILDING ACCESSIBILITY p.84

There are also recommendations for special applications that apply to the following buildings:

- Restaurants and cafeterias
- Medical care facilities
- Business and mercantile facilities
- Libraries
- Transient lodging facilities

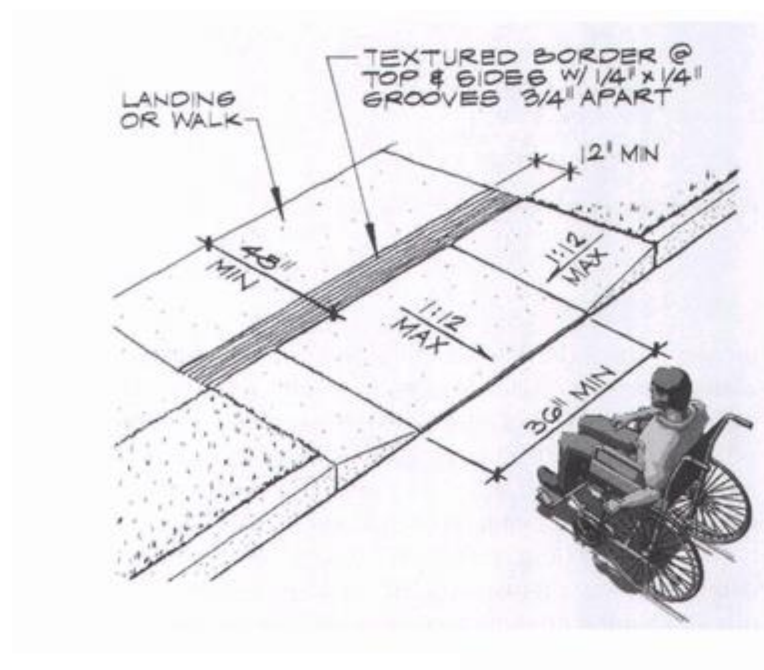
Parking Stalls and Curb Ramps
Building codes established the number of accessible parking required base on the occupancy and the amount of parking stalls provided on the project. It also provided the dimensions of such parking and the signage requirements. It is important to determine the Van accessible stalls.

Is important to consider the location, closest to the main building entrance, without crossing the access street.

- Length and width
- Access aisle
- Sign
- Pavement sign

Ch. 4 HUMAN CONSIDERATIONS p.129

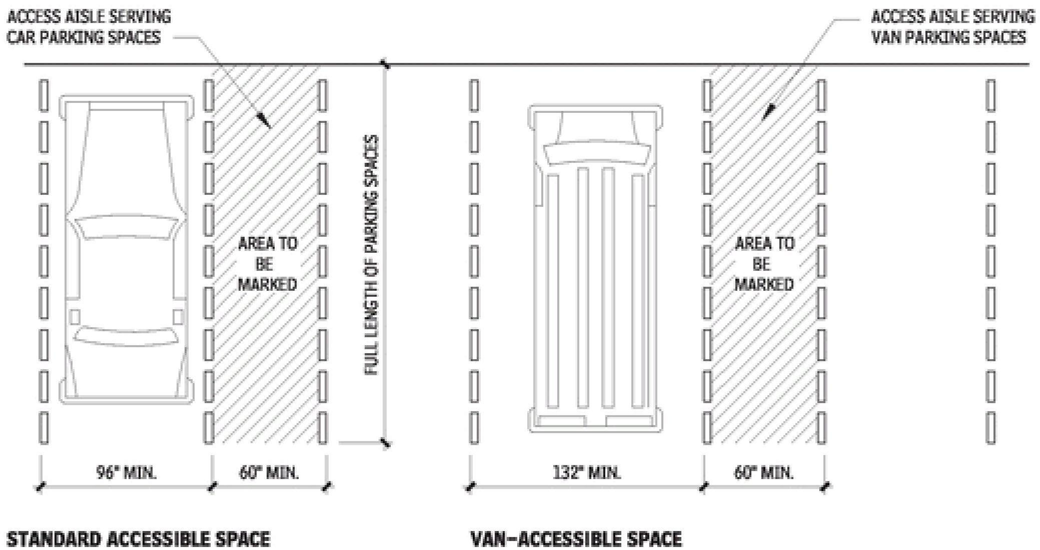
Ramps – Providing ramps is a desirable method to ensure accessibility when there are grade changes in a path of travel to a building. Ramps design and construction is regulated by ADA and the Building Code. Ramps may required handrails, guardrails ,and rest areas according to the specific design characteristics of the ramps.



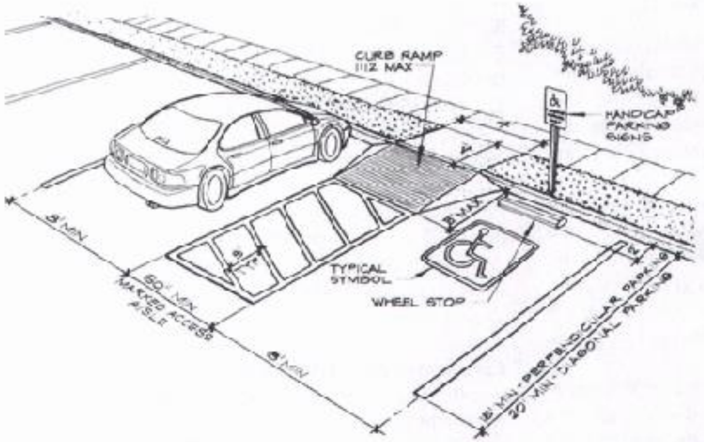
P 84, Figure 3.4 Curb Ramp

TOTAL SPACES PROVIDED	REQUIRED MINIMUM NUMBER OF ACCESSIBLE SPACES[a]
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of total
More than 1000	20, plus one for each 100 over 1000

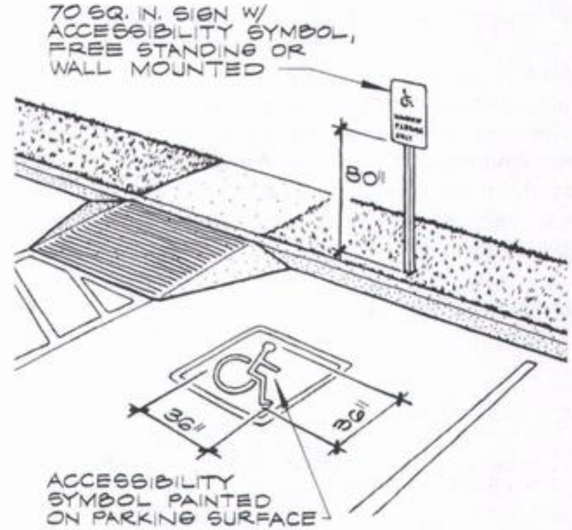
REQUIRED MINIMUM NUMBER OF ACCESSIBLE PARKING SPACES 13.61



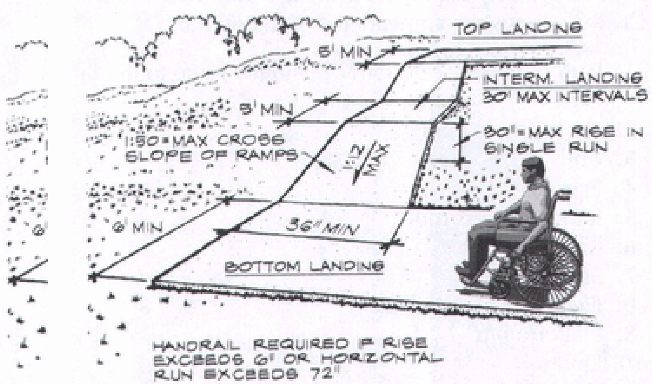
PARKING SPACE AND ACCESS AISLE LAYOUT 13.62



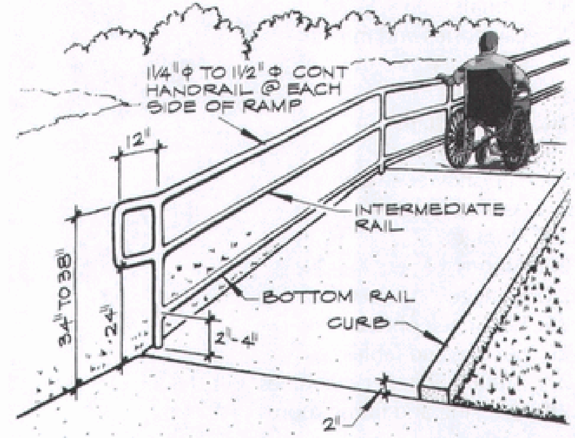
P 85, Figure 3.5 Curb Ramp



P 85, Figure 3.6 Parking sign and symbol



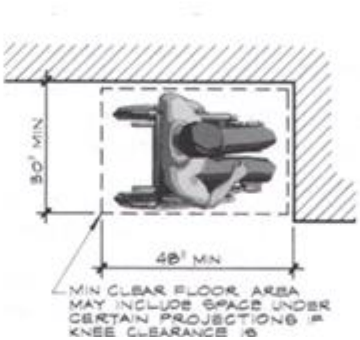
P 85, Figure 3.7 Ramp

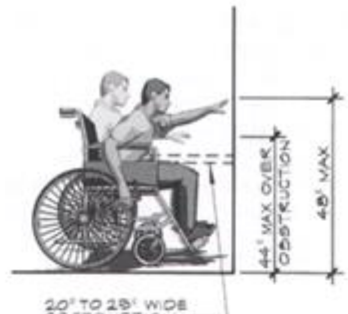


P 85, Figure 3.8 Ramp Handrail

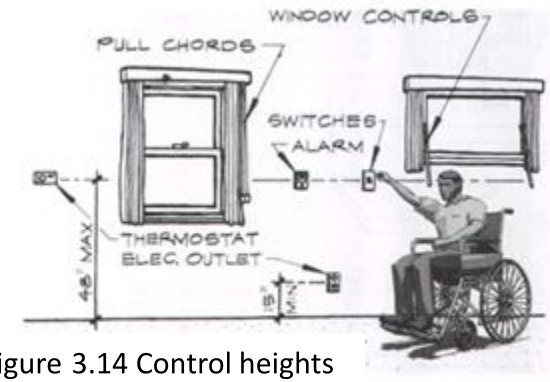
Ch. 3 HUMAN CONSIDERATIONS p. 86-87

Wheelchair space requirements and reaching dimensions that are desirable:

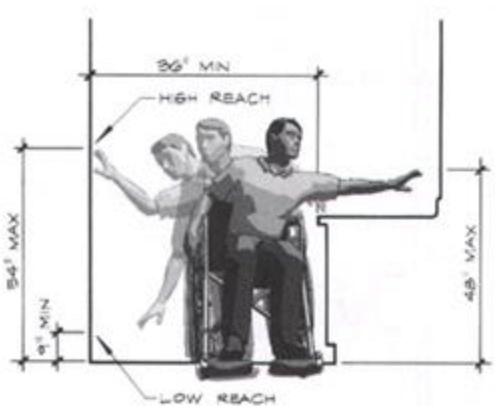


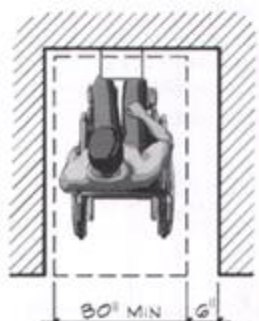


P 86, Figure 3.9 Wheelchair space requirements Figure 3.10



p. 87   Figure 3.14 Control heights





P 86, Figure 3.11 Wheelchair space requirements Figure 3.12

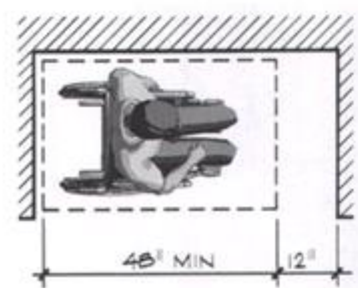
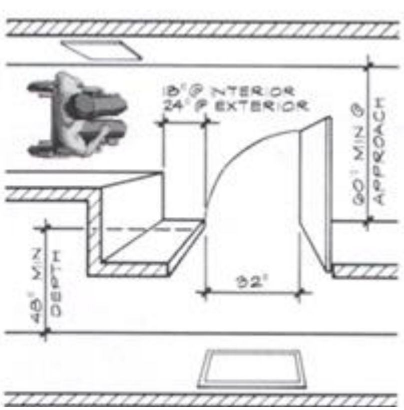


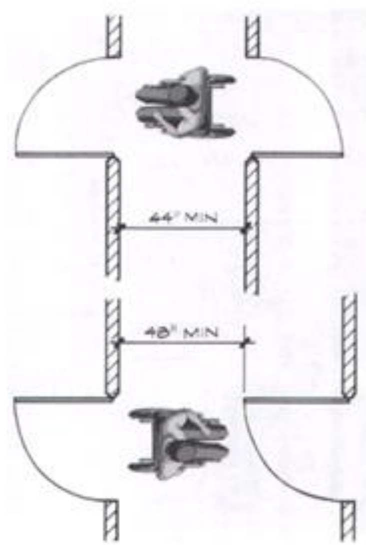
Figure 3.13

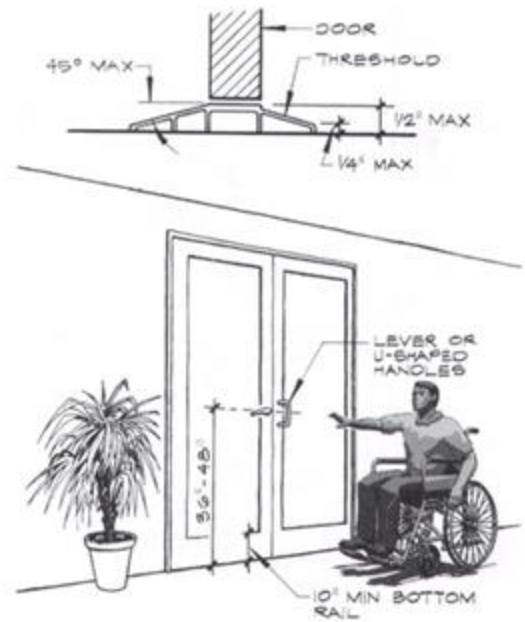
Ch. 3 HUMAN CONSIDERATIONS p. 132

DOORS AND DOORWAYS – Figure 3.16 Illustrated the maneuvering dimension required for person using wheelchairs in order to be able to pull or push the door by accessing the hardware. The doors and doorways need to consider the following:

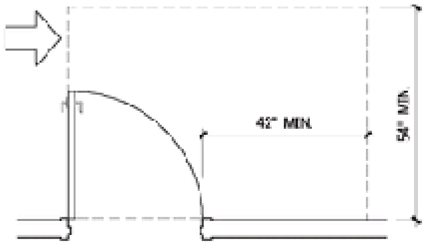
- Clear width minimums are determines by **ADA**.
- Corridor width
- Location, type, and operation of hardware
- Self closing device pressure
- Door threshold slopes and height



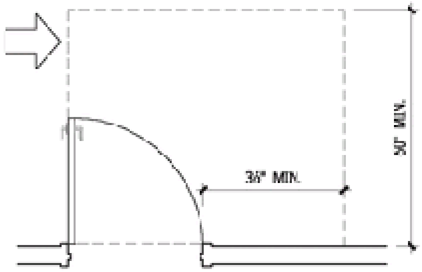




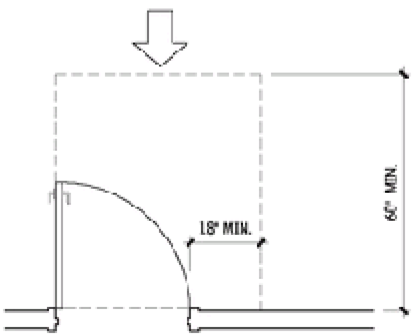
P 87, Figure 3.16 Door Maneuvering Clearance Wheelchair Figure 3.17 Figure 3.18 Threshold and door hardware



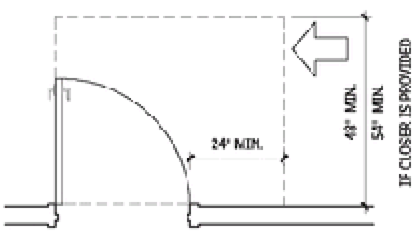
HINGE APPROACH



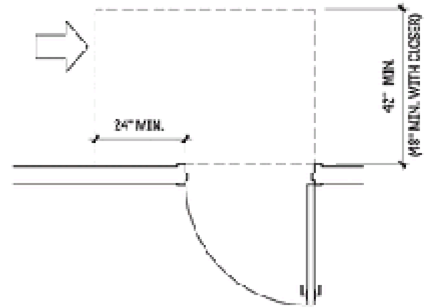
HINGE APPROACH



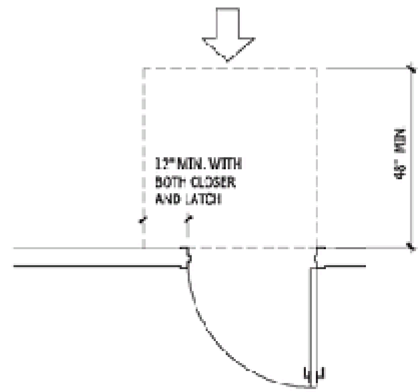
FRONT APPROACH



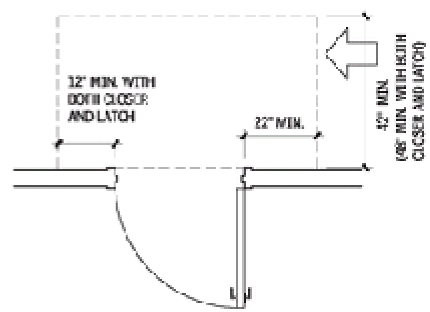
LATCH APPROACH



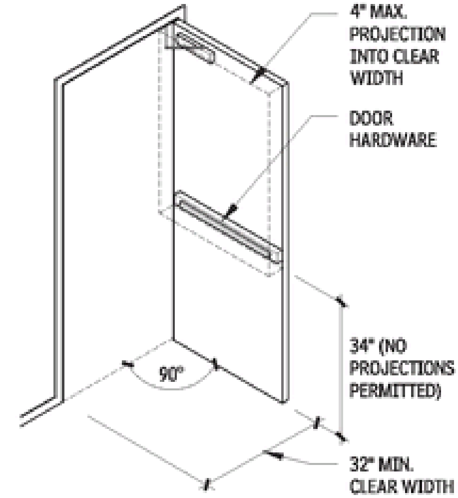
LATCH APPROACH



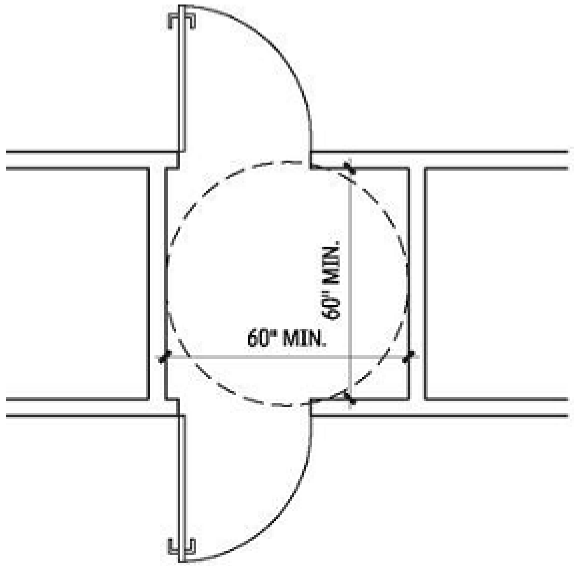
FRONT APPROACH

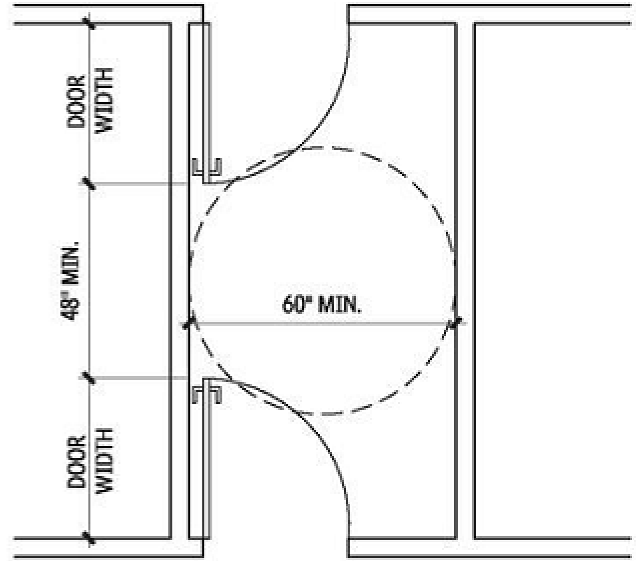


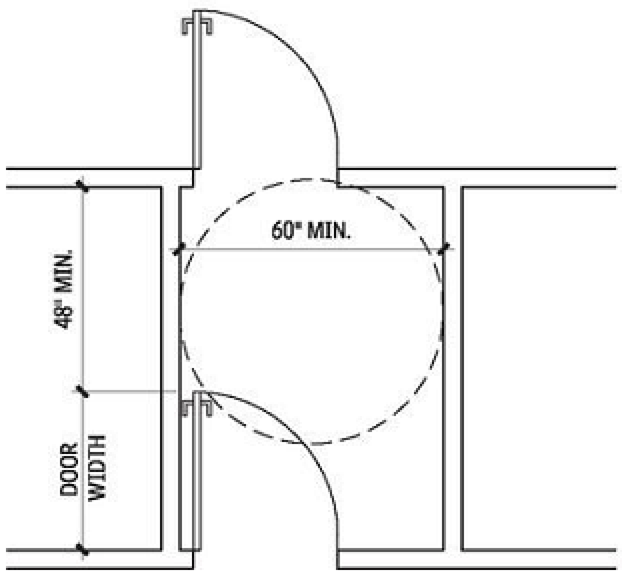
HINGE APPROACH



PROJECTIONS INTO CLEAR WIDTH 13.86


60" MIN.
60" MIN.


DOOR WIDTH
48" MIN.
60" MIN.
DOOR WIDTH

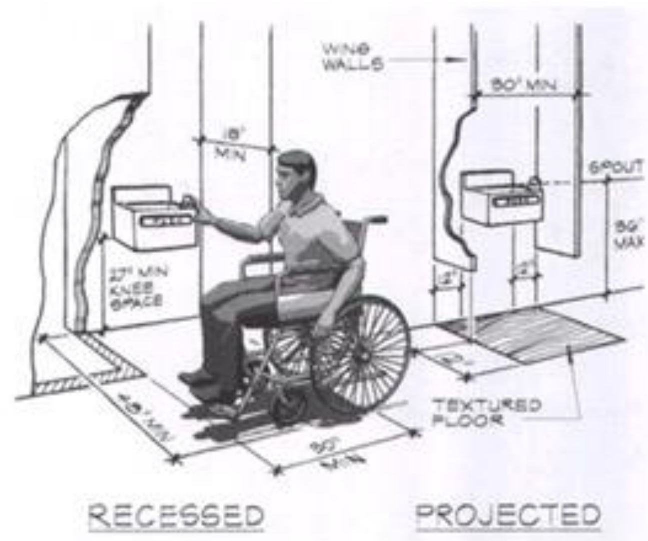

60" MIN.
48" MIN.
DOOR WIDTH

CH.3 HUMAN CONSIDERATIONS P. 88-89

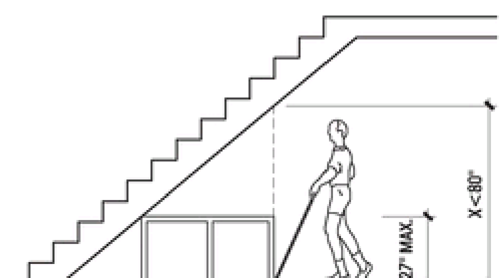
Drinking Fountains

Projection from a wall are regulated by **ADA**

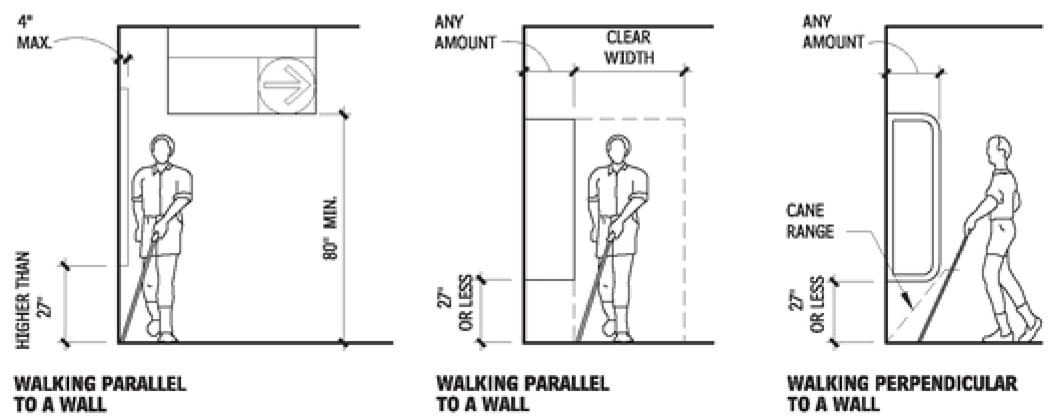
Underside of stair protection



P 86, Figure 3.19 Drinking Fountains



OVERHEAD HAZARD PROTECTION —EXAMPLES 13.51

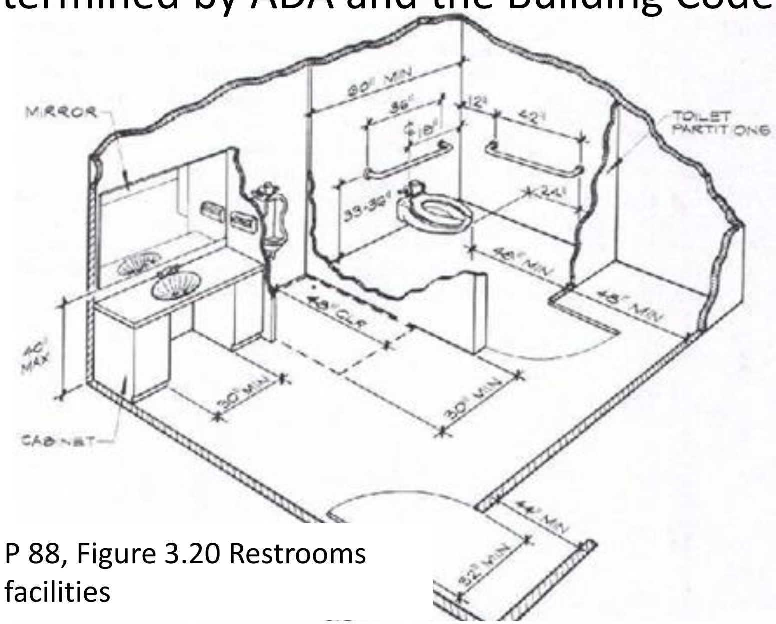


ACCESSIBLE ROUTES AND WALKING SURFACES

Ch. 3 HUMAN CONSIDERATIONS p. 87-89

Plumbing Facilities Requirements – Fixture need to be selected, arranged, and located according to the ADA in order to provide maneuvering clearance to users.

- Water closets
- Lavatories
- Urinals
- Mirrors
- Soap dispensers
- Paper dispensers
- Grab bars
- Protection for hot water piping
- The amount of fixture that are required to be accessible are based in the occupancy determined by ADA and the Building Code



P 88, Figure 3.20 Restrooms facilities

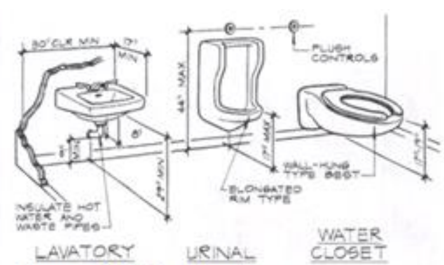
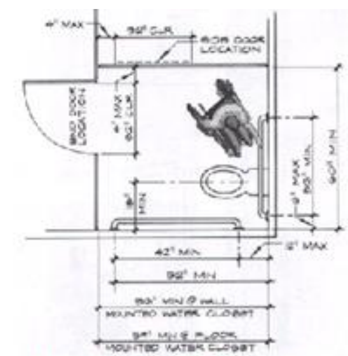
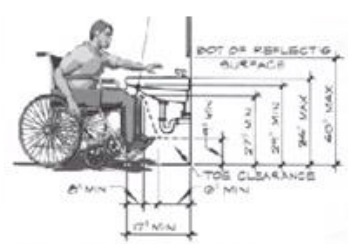


Figure 4.71 Plumbing fixtures.

P 89, Figure 3.21 Plumbing fixtures

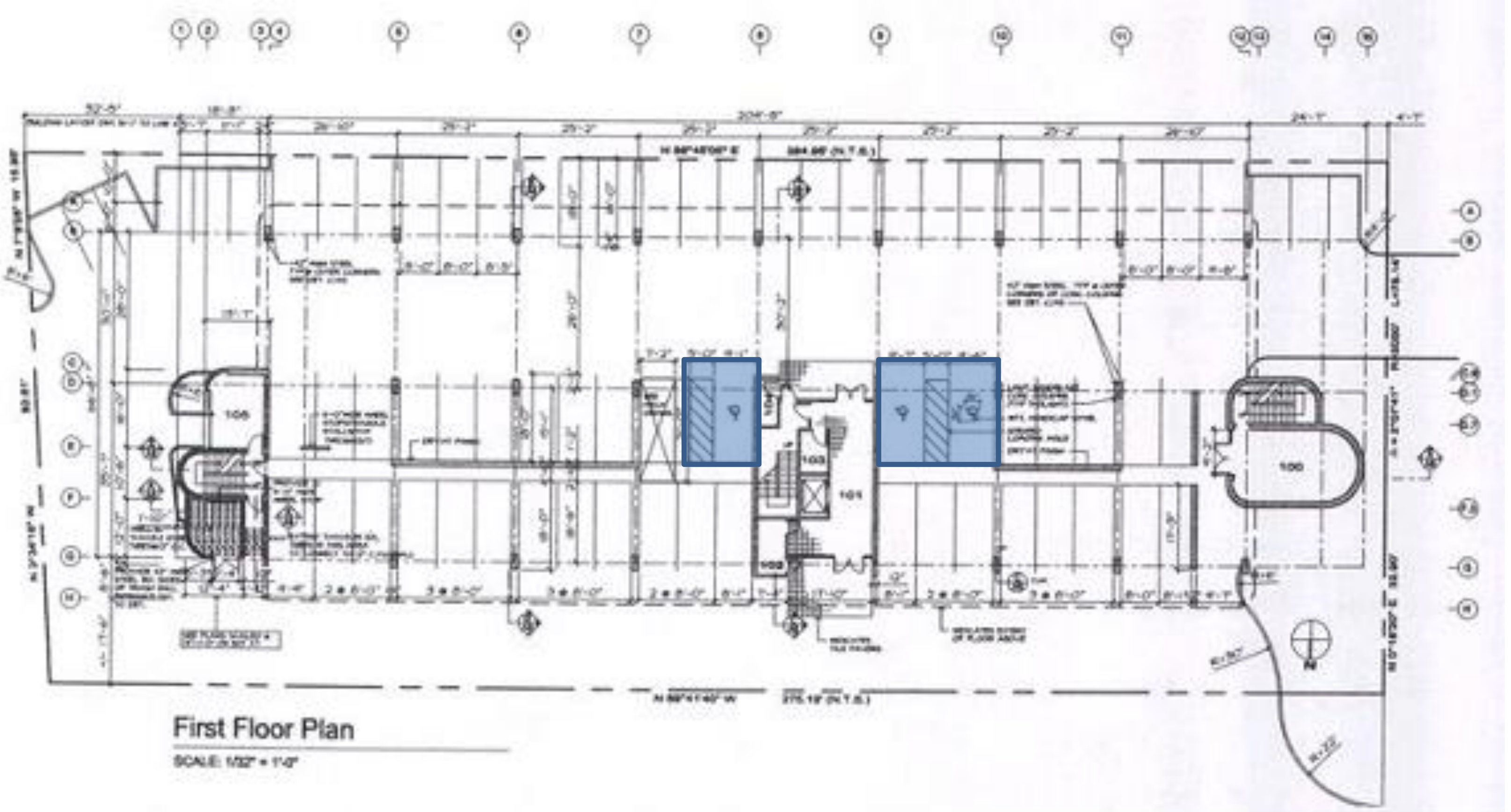


P 89, Figure 3.23 Toilet compartment plan



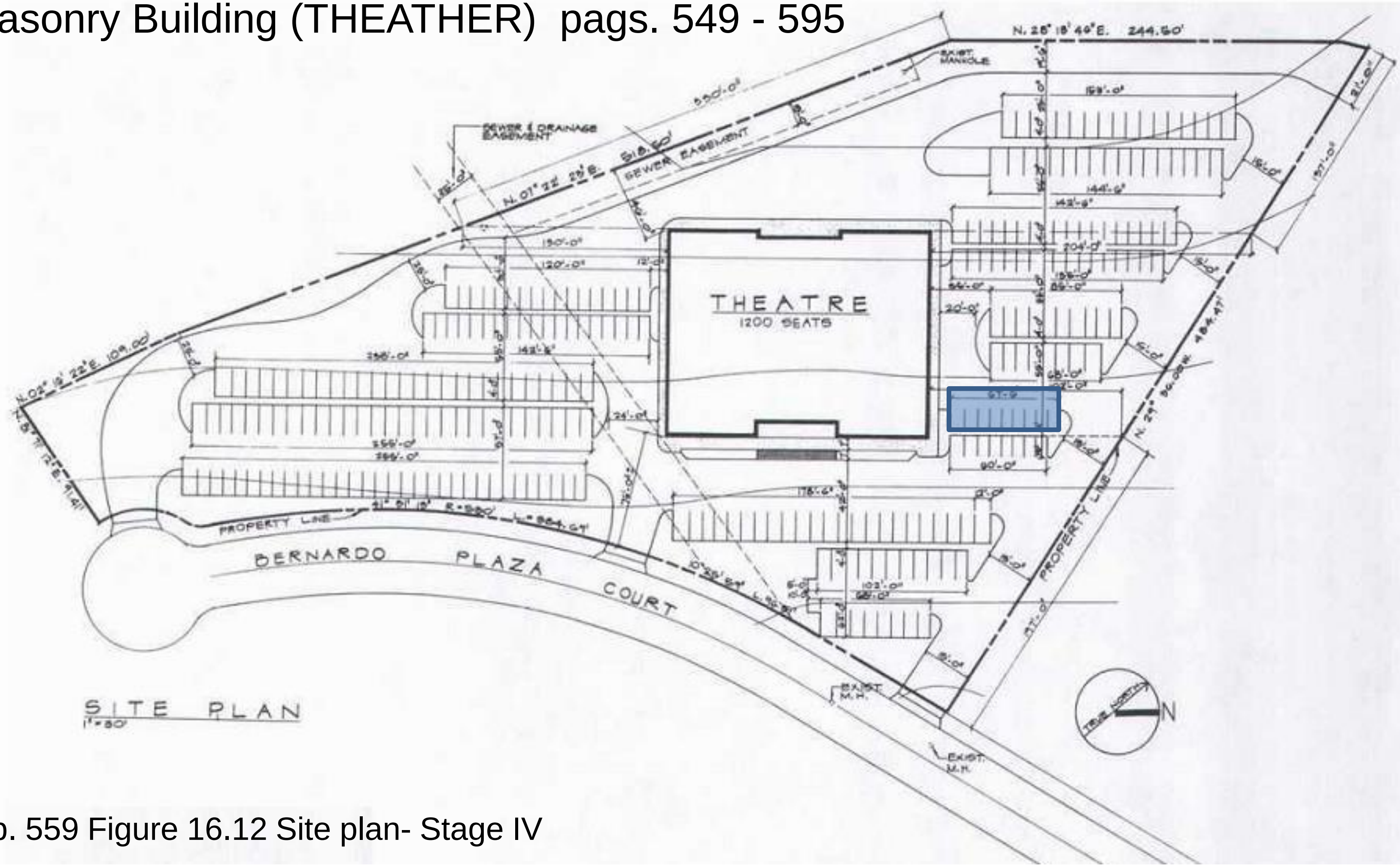
P 89, Figure 3.22 Lavatory access

Chapter 17 Madison Building pages 598-625



p. 606 Figure 17.12 Stage II: Ground –floor working drawings.

Chapter 16 Conceptual Design and Construction Documents for a Steel and Masonry Building (THEATHER) pags. 549 - 595



p. 559 Figure 16.12 Site plan- Stage IV

CHAPTER

4

Ch.4. Environmental and Human Considerations. P.108

One can not merely place a building on a site without being aware of the impact the structure will have on the immediate environment

1. wind
2. snow
3. seismic activity
4. fire
5. energy
6. foundation design
7. flooding
8. distribution of loads
9. structural design
10. frost depth
11. hurricanes
12. insulation
13. American with Disabilities Act (ADA)
14. water table
15. roof loads
16. temperature
17. rain
18. frost
19. exterior finishes
20. drainage
21. vertical loading
22. sun (light, heat, and ultraviolet)
23. sound
24. deterioration

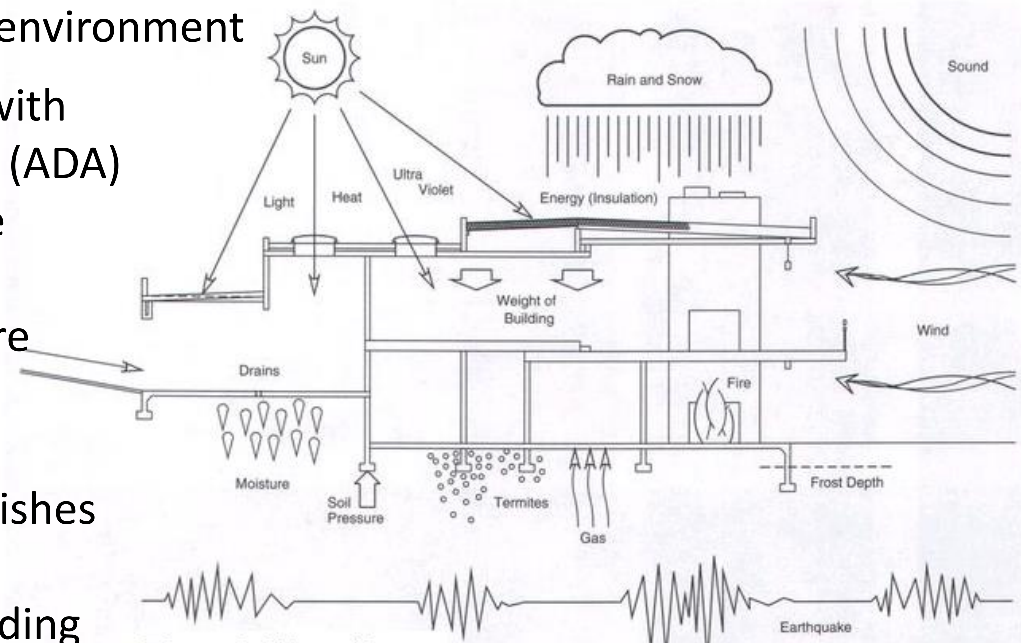


Figure 4.1 Natural forces.

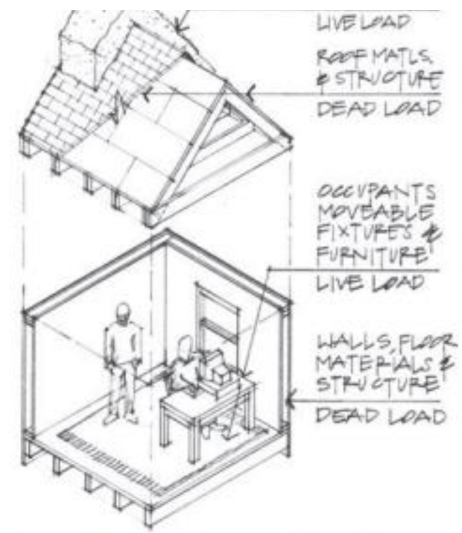


Figure 1.12 Typical building loads.

- SUSTAINABLE ARCHITECTURE
- LATERAL INFLUENCES
- ENERGY
- SOUND
- SNOW
- FIRE
- SMOKE
- TEMPERATURE
- DETERIORATION
- DRAINAGE/RAINFALL
- UNDERGROUND GAS CONTROL
- WATER TABLE
- FROST LINE/FROST DEPTH
- TERMITES/TREATMENT
- HUMAN CONSIDERATION
- PUBLIC BUILDING ACCESSIBILITY

Ch.4 SUSTAINABLE ARCHITECTURE p.108

Sustainable Architecture – To calculate the load a designed structure produces on its immediate surroundings and to provide a successful solution to reduce this load via natural forces such as sun, wind, heat gain and heat loss.

"The terms "green building" and "sustainable design" are often used interchangeably to describe any building design in an environmental sensitive manner. However sustainability calls for a whole systems approach to development that encompass the notion of green building but also addresses broader social, ethical, and economic issues, as well as community context of the building. As an essential component of sustainability, green building seeks to provide healthy environment in a resource-efficient manner using ecologically based principles."

Ching, F. Building Construction Illustrated (BCI).

Ch 4. LATERAL INFLUENCES p. 109

Lateral forces affect building that are subjected to high wind conditions and earthquakes.

The total wind pressure factor is calculated at the roof and at the floor diaphragm.

Horizontal diaphragm – a rigid floor structure acting as a flat, deep beam, transfer lateral loads to lateral shear wall, braced frames, or rigid frames.

Rigid Frame – A steel or reinforced concrete frame with rigid joints capable of resisting changes in angular relationships

Shear Wall – A wood, concrete, or masonry capable of resisting changes in shape and transferring lateral loads to the ground foundation.

Braced Frame – A timber or steel frame braced with diagonal members.

Ch.4 LATERAL INFLUENCES p.109

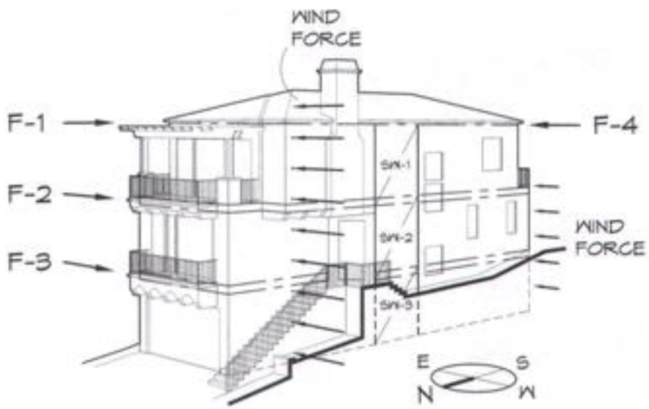


Figure 4.2 Lateral forces on a building

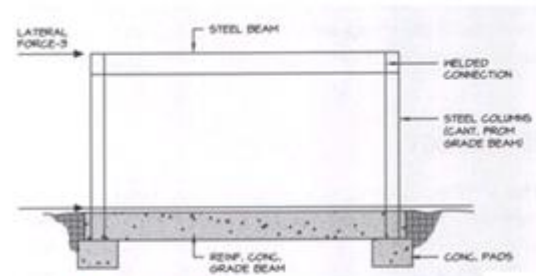


Figure 4.3 Example of steel frame—cantilevered columns.

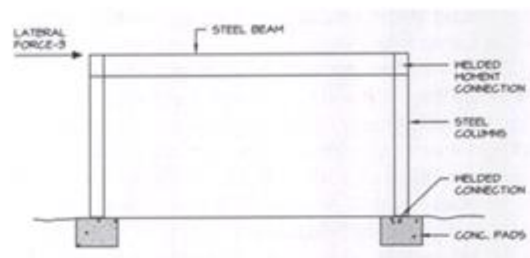


Figure 4.4 Example of steel moment frame.

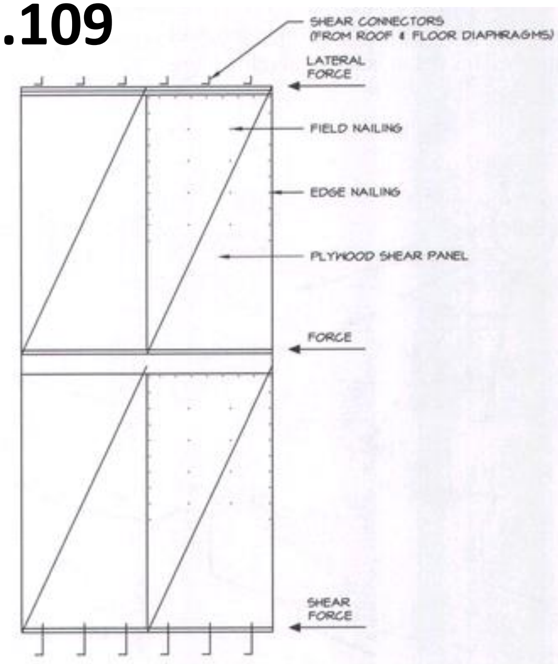
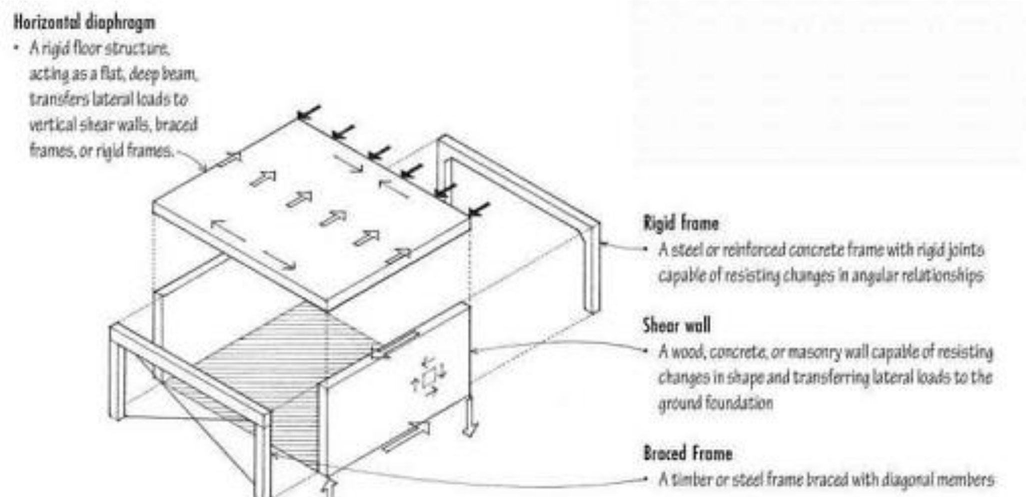


Figure 4.5 Plywood shear panels

Moment Frame. www.strongtie.com



BCI 2.22 Lateral Stability

Building Construction Illustrated (BCI) by Francis Ching

Ch. 4 ENERGY CONSERVATION p.110

The Architect, Mechanical and Electrical Engineers must constantly design and provide methods to conserve energy. These method mostly deals with insulation allocated at the roof, wall and floor assemblies, including foundations.

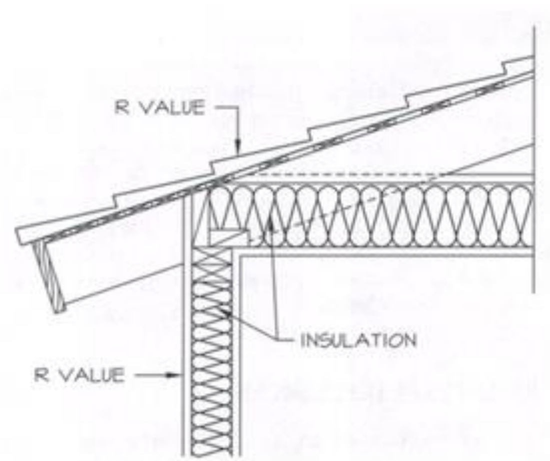


Figure 4.7 Roof/ceiling and wall insulation.

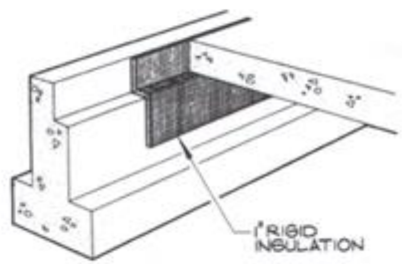


Figure 4.8 Footing insulation.

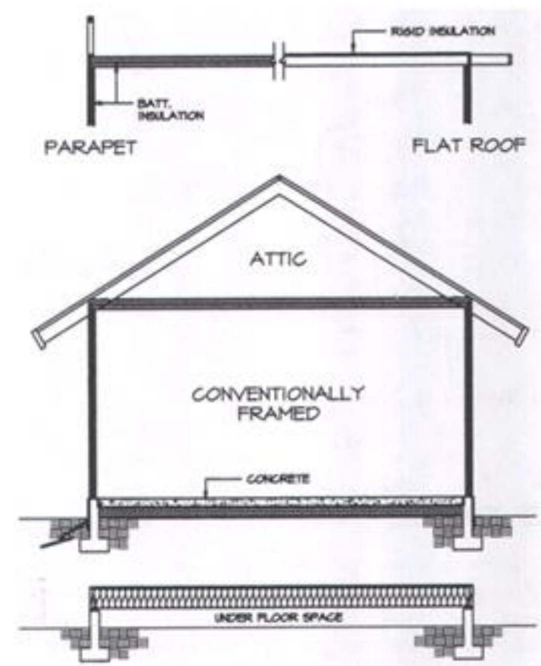


Figure 4.10 Creating an envelope.

About Solatube International | Media Resources | Dealership Opportunities

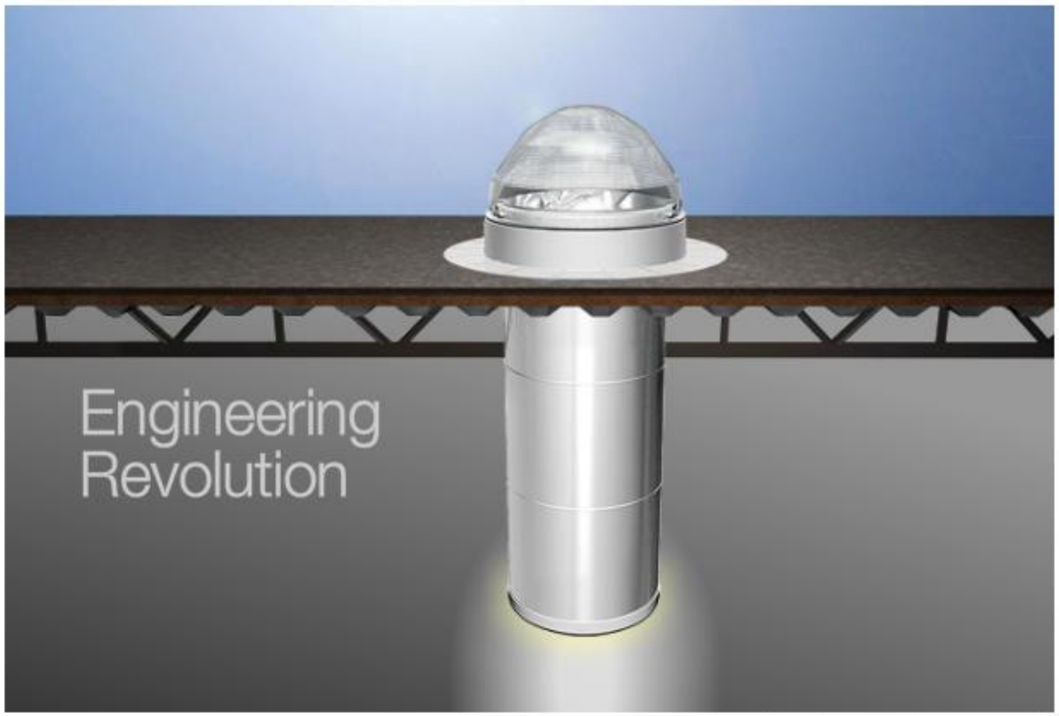
SOLATUBE
Innovation in Daylighting.

Residential | Commercial

Daylighting | Project Portfolio | Product Catalog | News | Customer Service | Technical Resources | Find a Commercial Expert

Home ▸ Commercial ▸ Daylighting

SHARE



PAUSE | SEARCH | AUDIO

Knowledge Base

Get answers about Solatube Products with our searchable Knowledge Base.

GO

Top Lighting Vs. Side Lighting

Discover how Solatube Daylighting Systems fit into your overall daylighting strategy

GO

Solatube International, Inc.
2210 Oak Ridge Way | Vista, CA 92081-8341 |
888.765.2882

Sitemap

Become a Fan on Facebook

Follow us on Twitter

Ch. 4 FIRE AND SMOKE p.116

Fire and smoke are **major** concerns in the design of all types of structures. Building fires may be attribute to both external and internal causes.

Underwriters Laboratories (UL), a testing laboratory, test various material or a combination of materials, and rate them according to their fire resistivity, which is expressed in minutes and hours that takes the assembly or material to catch fire.

Smoke infiltration is a grave concern because most death in a fire are cause by the smoke.

The planning of a building requires that the architect and consultants (fire protection consultant) provide clearly defined pathway to fire exits. Fire exits and their layouts are determined by the governing fire protection agency and the existing building codes. Florida Fire Prevention Code NFPA 1 Uniform Fire Code and NFPA 101 Life Safety Code.

- Distance between stair exits
- Number of exits
- In multilevel buildings , a correct stairwell (2 hours rated) design will allow people to move quickly and safe downstairs to the exterior street level, without any interference or obstruction on the egress path
- All exit fire rated doors must swing in the direction of the exit path.
- AHJ = AUTHORITY HAVING JURISDICTION

- AHJ = AUTHORITY HAVING JURISDICTION

JEFF ATWATER, CHIEF FINANCIAL OFFICER

FLORIDA DEPARTMENT OF FINANCIAL SERVICES

Home News Contact Us About the Agency Español Search

State Fire Marshal Welcome

Division of State Fire Marshal

Bureau of Fire Prevention

Bureau of Fire and Arson Investigations

- Arson Case Search
- Report Arson

Bureau of Fire Standards and Training

- State Fire College
- Firefighter Safety

Division of State Fire Marshal

Florida Fire Prevention Code

The 2007 Edition of the Florida Fire Prevention Code

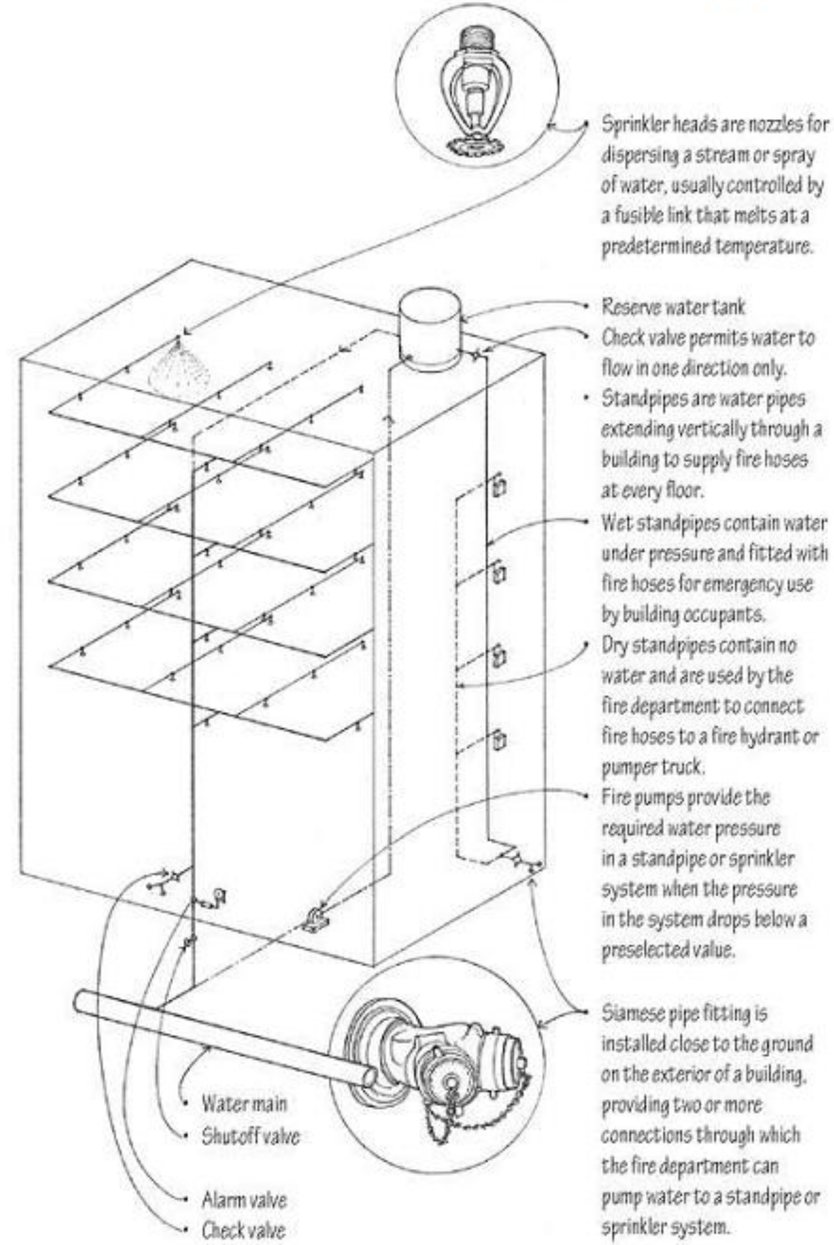
The Division of State Fire Marshal has completed the development of the 2007 edition of the Florida Fire Prevention Code (FFPC). The base documents for the 2007 edition of the FFPC are the NFPA 1, Uniform Fire Code and NFPA 101, Life Safety Code, 2006 editions. The FFPC is now available from BNi Publications at the address listed below.

The Division of State Fire Marshal will continue to work with the Florida Fire Code Advisory Council (FCAC) and the Florida Building Commission to make the FFPC as coordinated as possible when used in conjunction with the Florida Building Code. The FCAC meets at least quarterly and each meeting is listed on our web site. The public is invited to attend and actively participate in all meetings.

For more information on any of the services of the Bureau of Fire Prevention, please contact the Bureau Office at 850-413-3620 or by Email at Fire.Prevention@MyFloridaCFO.com

The 2007 Florida Fire Prevention Code (print version) is now available from:

CSI MasterFormat 21 00 00 Fire Suppression



www.ul.com

MyHome @UL

User Name ●●●●●●●● Login Register Now | Forgot Password?

Perspective ▼ | UL Worldwide ▼ | English ▼

About UL | Careers | Newsroom | Contact Us

Businesses Industries Services Certifications Standards

Search UL Advanced

Building Products

Air Ducts, Air Connectors and Closure Systems

Combustible Materials for Use in Air-Handling Spaces (Plenums)

Florida Requirements for Exterior Building Products

Marine Products

Roofing Materials

Surface

Home > Industries > Building Materials > Fire Safety Engineering > Building Products > Florida Requirements for Exterior Building Products

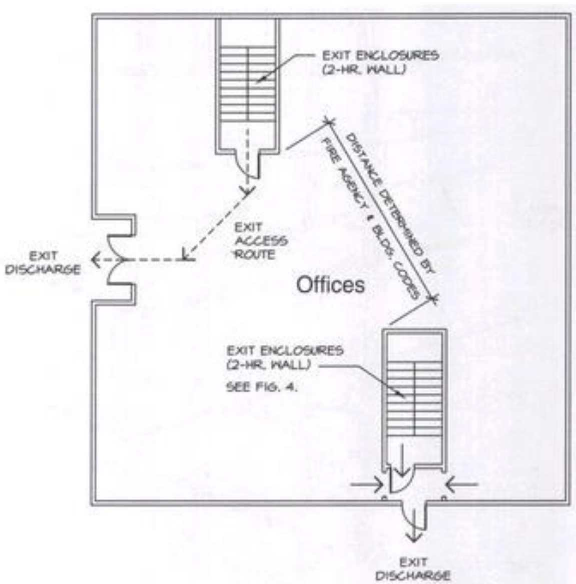
Florida requirements for exterior building products

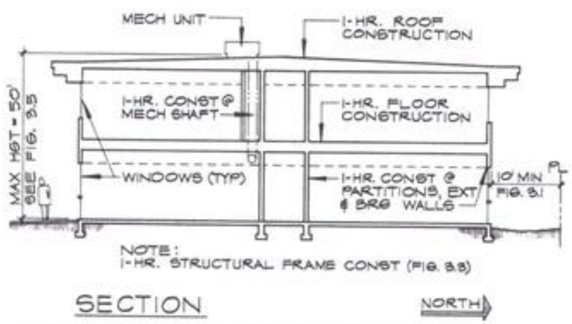
On October 1, 2003, the state of Florida enacted changes to their product approval system for exterior building products, affecting these products: panel walls, exterior doors, roofing products, skylights, windows, shutters and structural components.

Products used in Florida must be approved by the Florida Building Commission. The process basically consists of two steps:

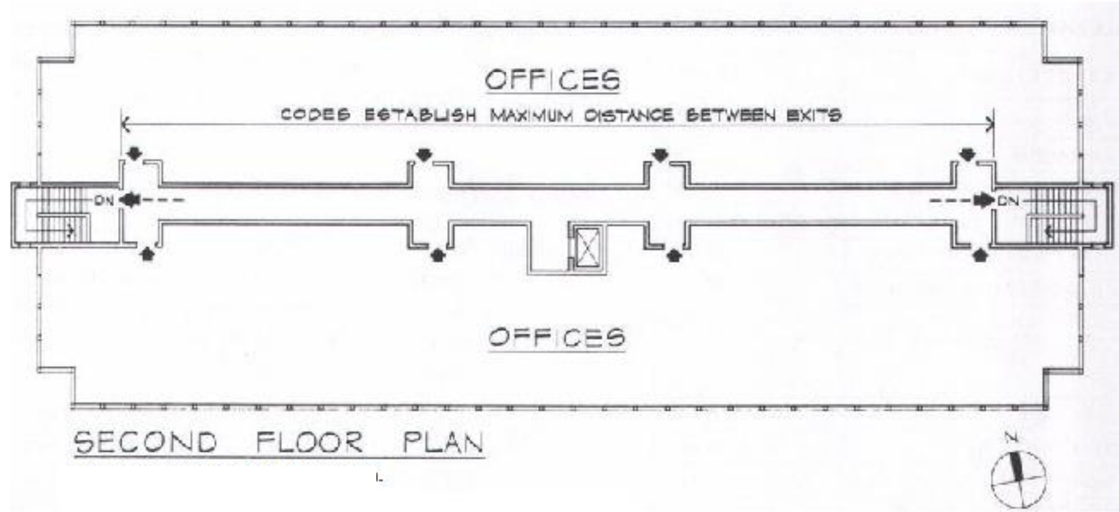
- Demonstration of compliance with the Florida Building Code and establishment of a quality assurance program for the product
- Submittal, by the manufacturer, to the Florida Building Commission for product approval when testing is completed and quality assurance is established. Information regarding the submittal process can be found at www.floridabuilding.org.

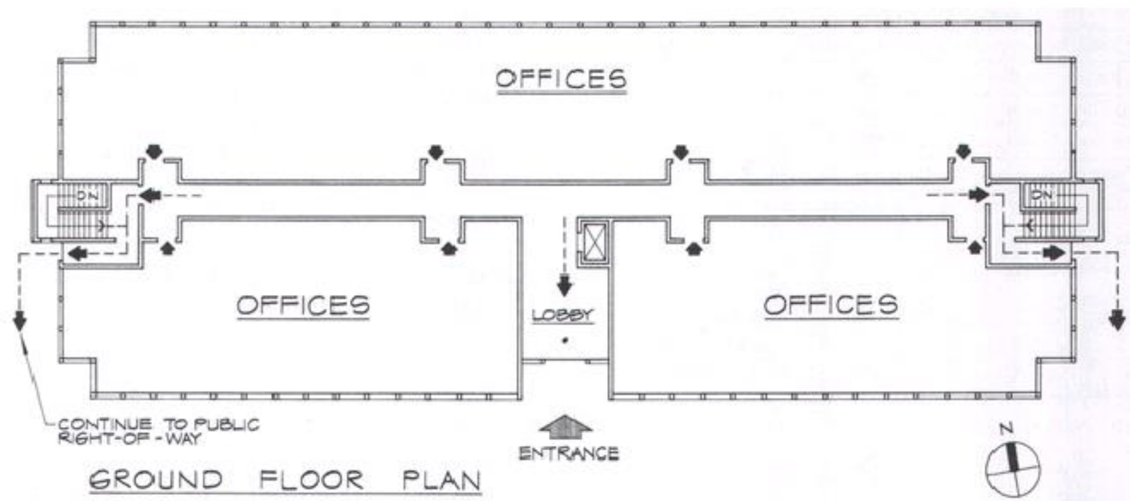
Ch. 1 & 4 FIRE





F. 1.10 Graphic building section.





p. 14

p. 15

Ch. 4 SMOKE p. 118

The exhausting of smoke is a major concern in fires occurring in buildings.

A common method of exhausting smoke from a building interior is the use of **roof hatch ventilators**.

Designers and contractors need to be aware of the following:

- How occupants exit from a building in fire and smoke conditions.
- Fire rating of materials and code requirements
- Methods of preventing smoke infiltration and the spread of fire
- Vulnerable area within a structure
- Method of reducing the spread of fire
- How to protect the integrity of the structural members from fire
- Methods of exhausting smoke to the outside (the major concern)

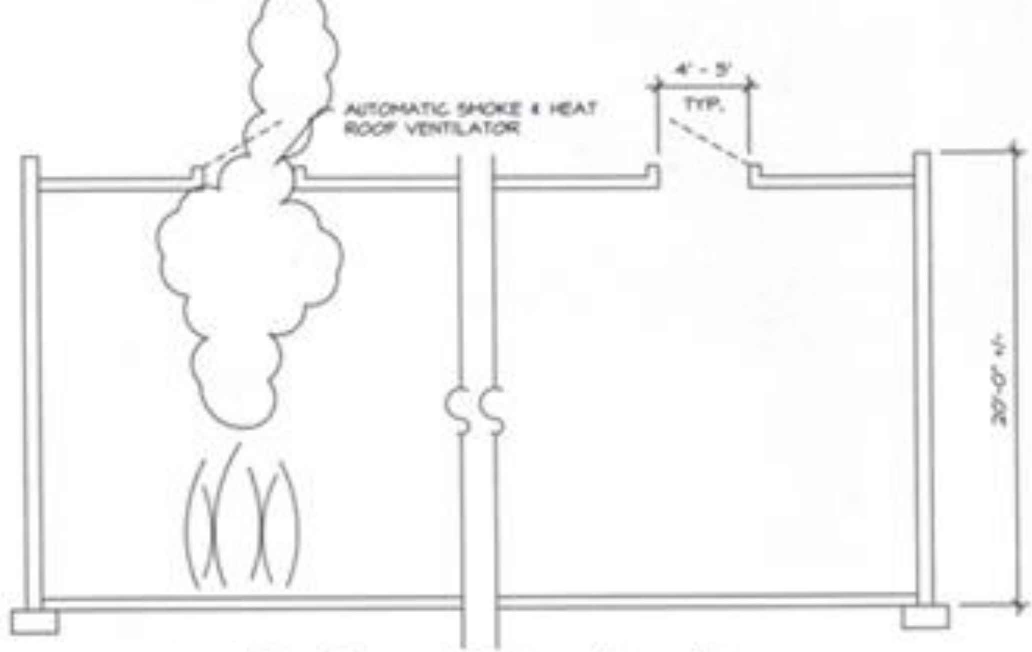


Figure 4.27 Smoke and heat roof ventilators.

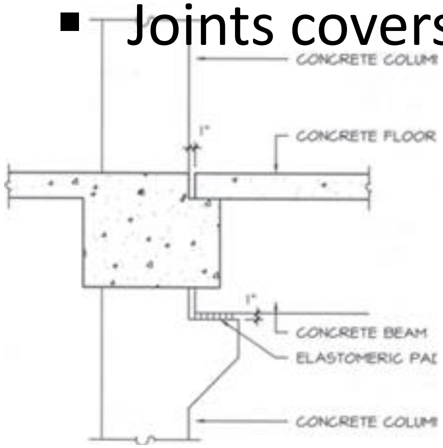
Ch.4 TEMPERATURE p. 119-120

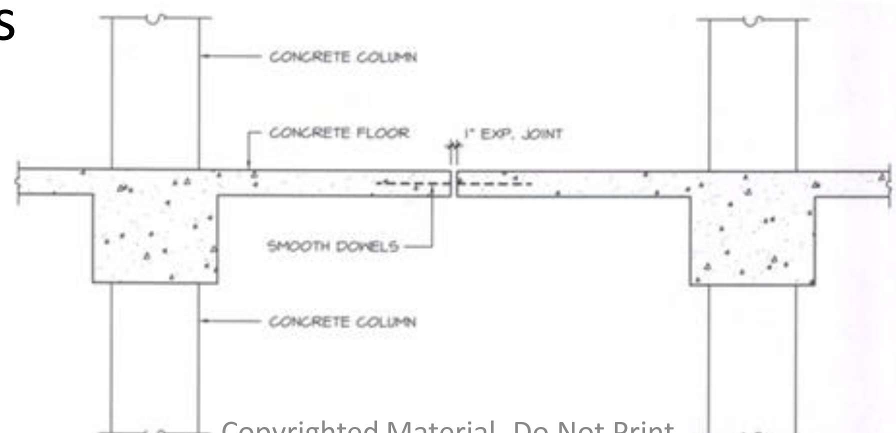
Outside temperature affects the design of building structures interiors spaces, **comfort**, requiring the installation of HVAC systems.

Temperature also affect the structural integrity of the buildings.

Building material expand and contract with changes in temperature. Details shall illustrate the gaps to allow the movement as well as materials such as:

- Expansion joints
- Elastomeric pads
- Joints covers





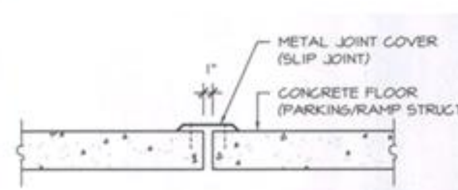


Figure 4.29 Floor expansion joint.

Figure 4.30 Expansion joint cover

Ch.4 DRAINAGE/RAINFALL p. 121-122

Water accumulation may lead to erosion and flooding problems.
Architect , Civil Engineers, and Plumbing Engineers by analyzing the amounts of rainfall recorded for the zone under study , design to avoid problems on the site conditions and the building structure.

Any development of a site interrupts the existing drainage pattern and creates additional water flow from constructed roof areas and paved surfaces. Site drainage is necessary to prevent erosion and the collection of excess surface water or groundwater resulting from new construction.

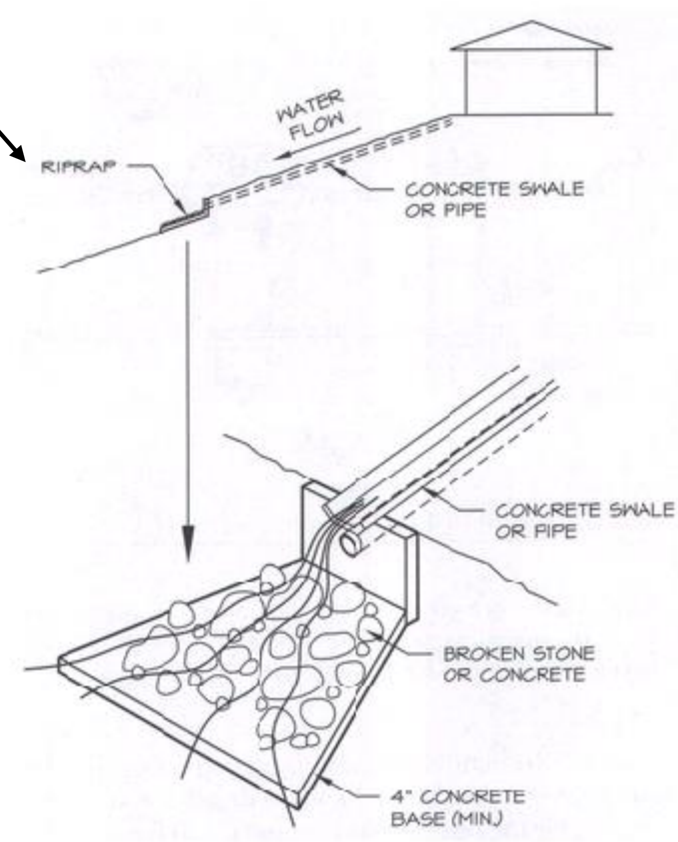
There are two basic types of site drainage: **subsurface** and **surface drainage** systems.

Subsurface drainage consists of an underground network of piping for conveying groundwater to a point of disposal, as a storm sewer system or a natural outfall at a lower elevation of the site. Excess groundwater can reduce the load-carrying capacity of a foundation soil and increase the hydrostatic pressure on a building foundation.

Surface drainage refers to the grading and surfacing of a site in order to divert rain and other surface water into natural drainage patterns or a municipal storm sewer system. A holding pond may be necessary when the amount of surface runoff exceeds the capacity of the storm sewer system.

Ch.4 DRAINAGE/RAINFALL p. 121-122

In order to control erosion on the site, if sloped, the use of swales (shallow depressions form by the intersection of two ground slopes, designed to direct or divert the runoff of surface water) or drainages pipes is recommended on the down slopes to collect the rain water to erosions devices such as **"riprap"**



Ch. 4 DRAINAGE/RAINFALL p. 121-122

Roof Drainage – Roof design (shape and slopes), and drainage devices on a roof are designed and detailed to dissipate and control rainwater.

The sizes of the drainage system are determined by the plumbing engineer based on the tributary area of the roof surface.

The drain in the hardscape areas of site plan need also address by the use of grates to collect the storm water. These grates need to comply with ADA (American with Disabilities Act) since they are located in public access areas.

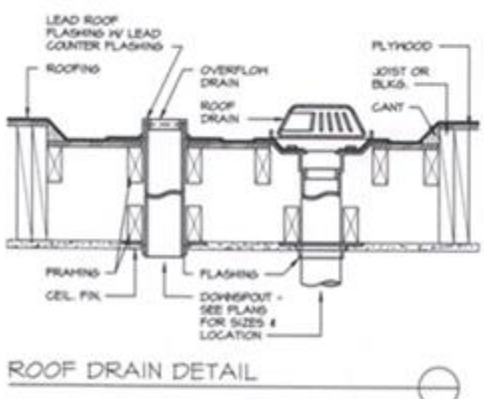


Figure 4.36 Roof drain section

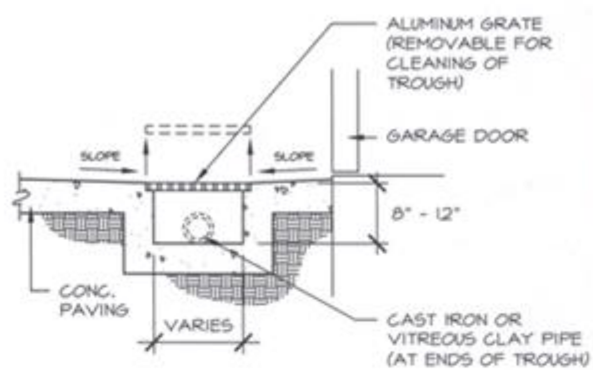
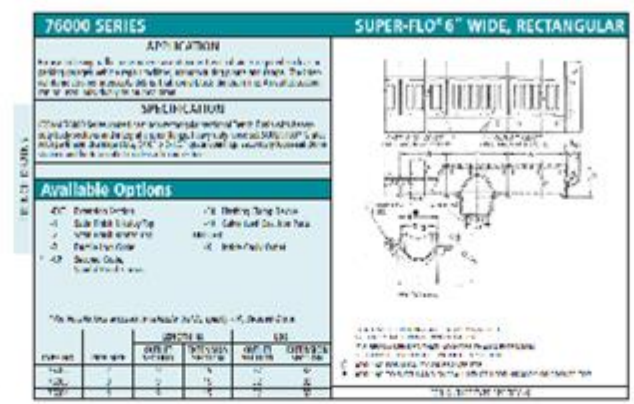
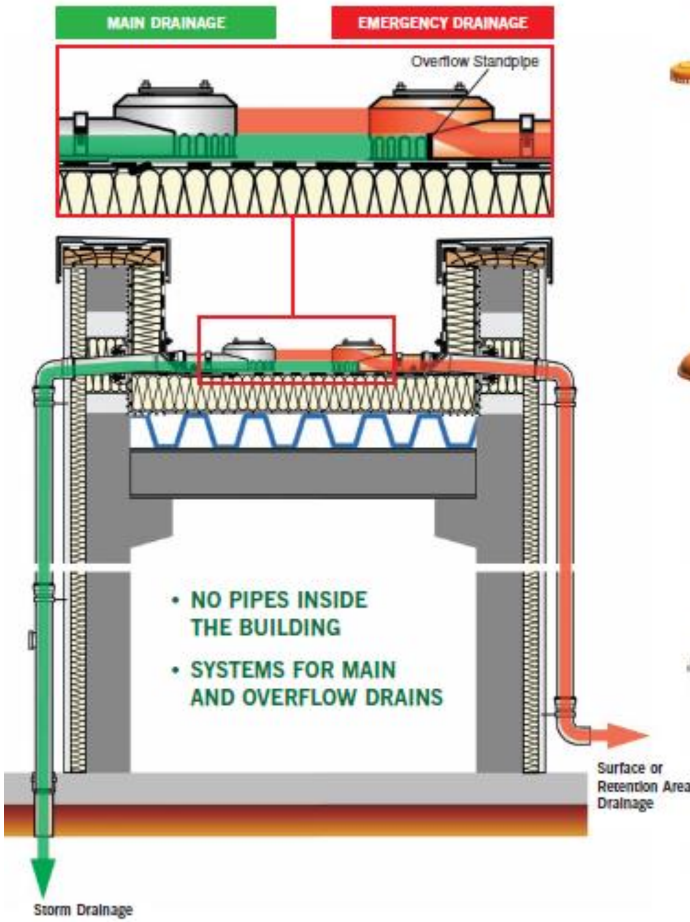


Figure 4.37 Trough drain detail



Siphonic Scupper Roof Drainage Systems

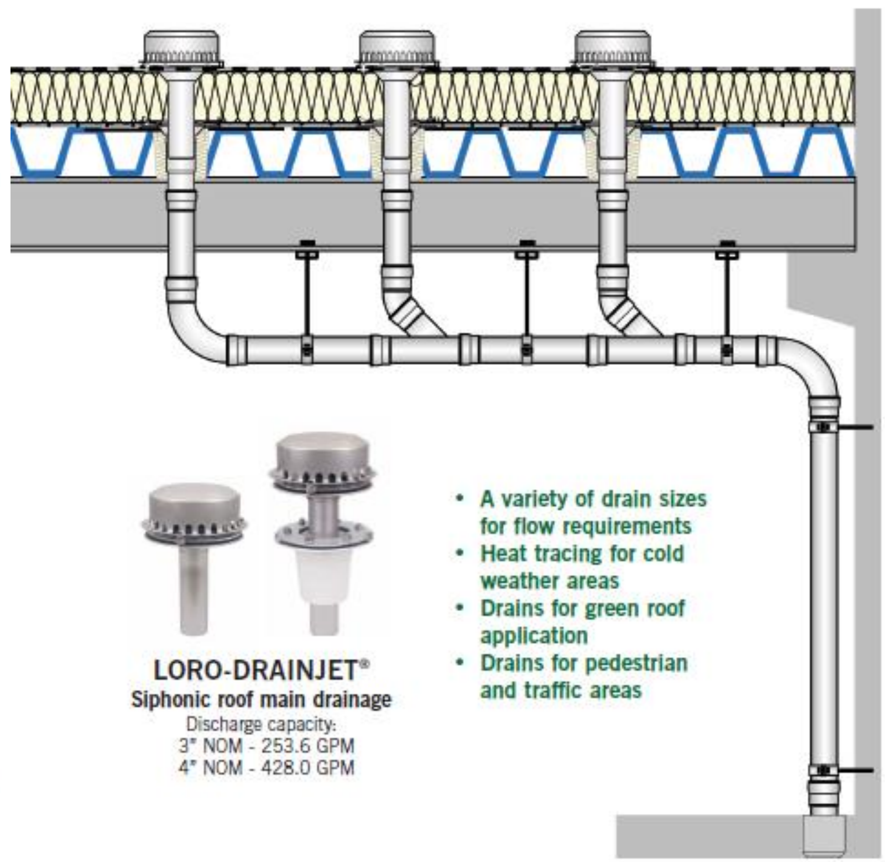
Manufactured, Engineered, Calculated and Built by LORO-JOSAM

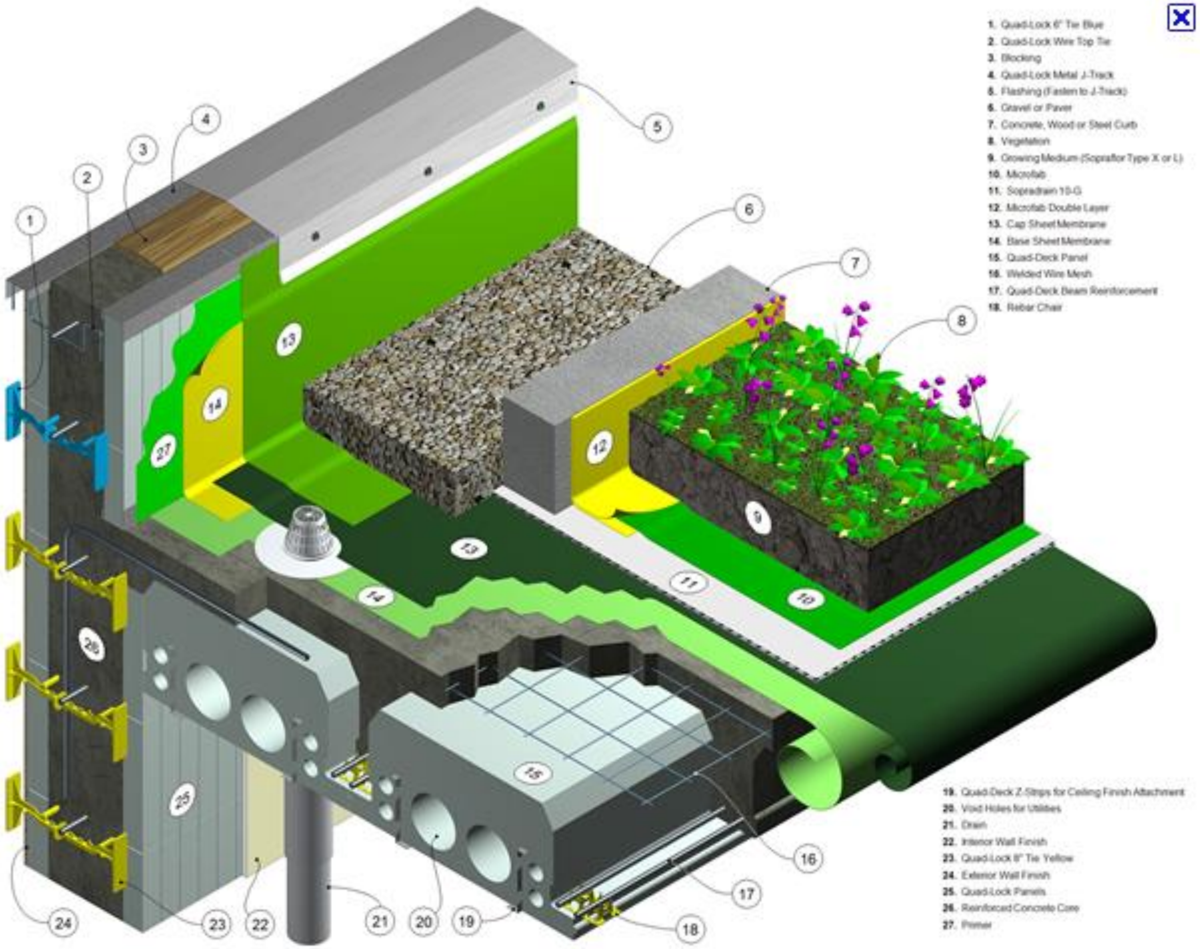


LORO JOSAM

Siphonic Roof Drainage Systems

The Most Complete Range of Siphonic Drains





http://www.quadlock.com/insulated-concrete-forms/green_roofs.htm

http://www.emilioambaszandassociates.com/portfolio/image_window/8955-211.html

Ch.4 WATER TABLE p. 123

The elevation at which groundwater is atmospheric. The underground surface beneath the earth is saturated with water.
http://www.ce.berkeley.edu/~paulmont/165/tremie.pdf

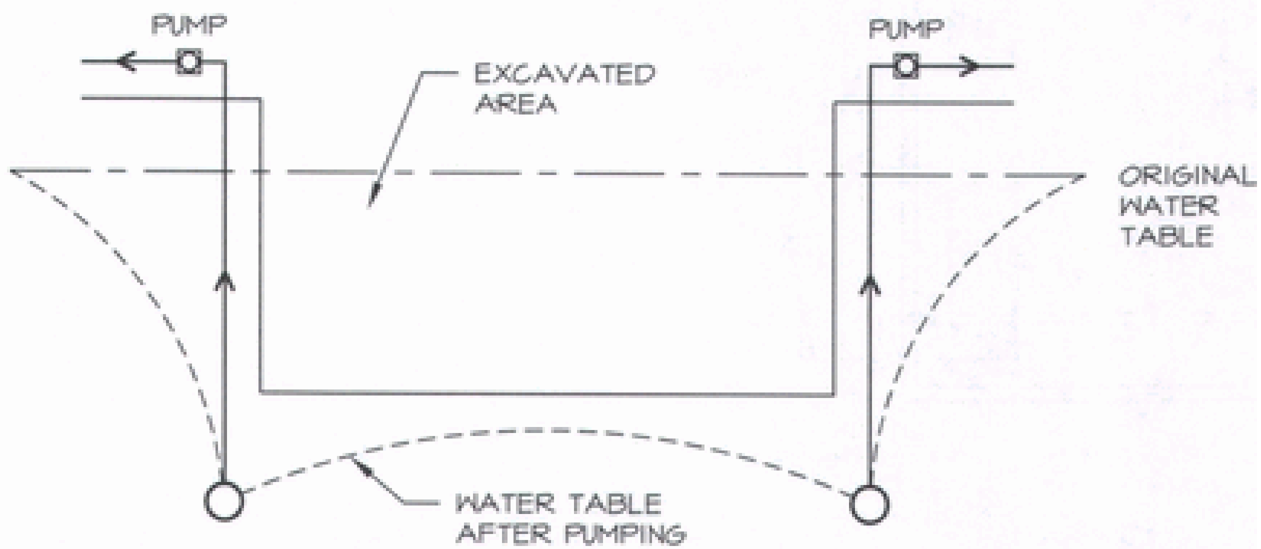


Figure 4.41 Diagram of dewatering.

CHAPTER
5

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.136-138

Building construction incorporates various building systems, material and construction principles. These systems, materials and principles are generally selected for the following reasons:

- The type and use of the proposed structure
- Governing building code requirements
- Design and planning solutions
- Structural concepts
- Economical considerations
- Environmental Influences
- Energy requirements

The primary materials utilized in construction systems are the following:

- Wood-saw lumber and engineered lumber
- Concrete
- Structural steel and light steel framing
- Masonry
- Composite systems and combination of materials
- Recycled reclaimed

The use of one or more of the aforementioned materials may be predicted on reasons such as building code requirements or the building occupancy; architectural design; energy and climatic conditions; and the influence of natural forces, including high winds, seismic, infestation , and moisture. The primary components of construction systems include the foundation, floor systems, an the wall and roof systems.

Ch.5 CONSTRUCTION MATERIALS AND METHODS

WOOD
•Wood Floor Systems
•Wood Wall Systems
•Wood Roof Systems

CONCRETE
•Concrete Floor Systems on Grade
•Concrete Floor Steel Reinforcing
•Concrete Floor System Above Grade
•Precast Prestressed Concrete Systems
•Concrete Wall Systems
•Concrete Tilt-Up Wall Systems
•Precast Concrete Wall System
•Precast Concrete Roof System

STEEL
•Steel Floors System
•Steel Studs Wall Framing System
•Steel Decking Roof System
•Light Steel Roof Framing System

MASONRY
•Masonry as a Wall System
•Masonry Veneer Wall

COMPOSITE SYSTEM and Combination of Materials

Concrete floor systems:

Monolithic system also know as one pour system where the foundation and the floor are poured in one operation, where trenches serves as the formwork.

The trenches are the form.

Two pour system, the foundation walls and footings are drawn first followed by the floor slab. The foundation will require formwork.

On a multistory building the ground floor slab is poured last in order to adjust any difference in elevations due to acceptable settlement.

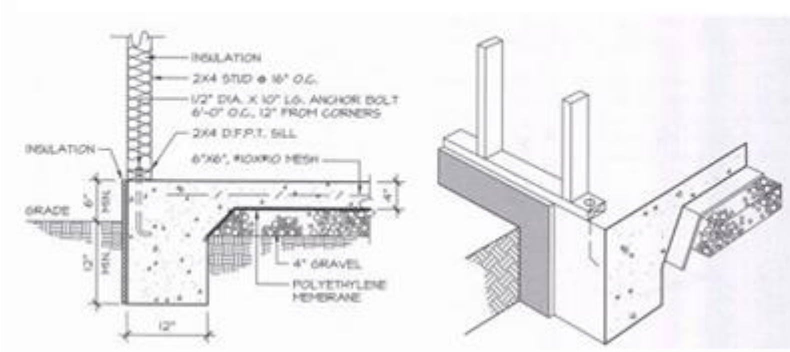


Figure 5.24 Detail of a one-pour footing and floor.

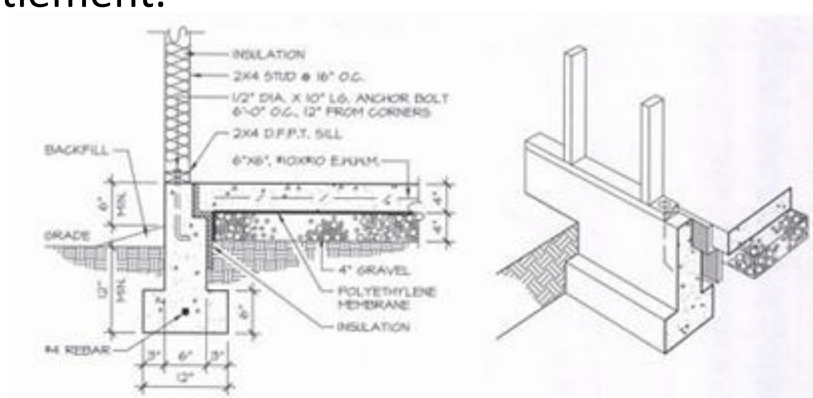


Figure 5.25 Detail of a two-pour footing and concrete floor.

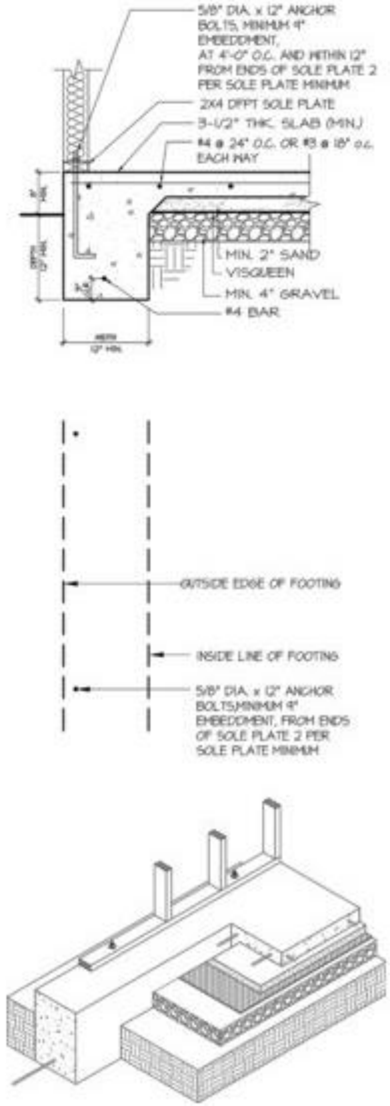


Figure 5.24 Detail of one-pour footing and floor.

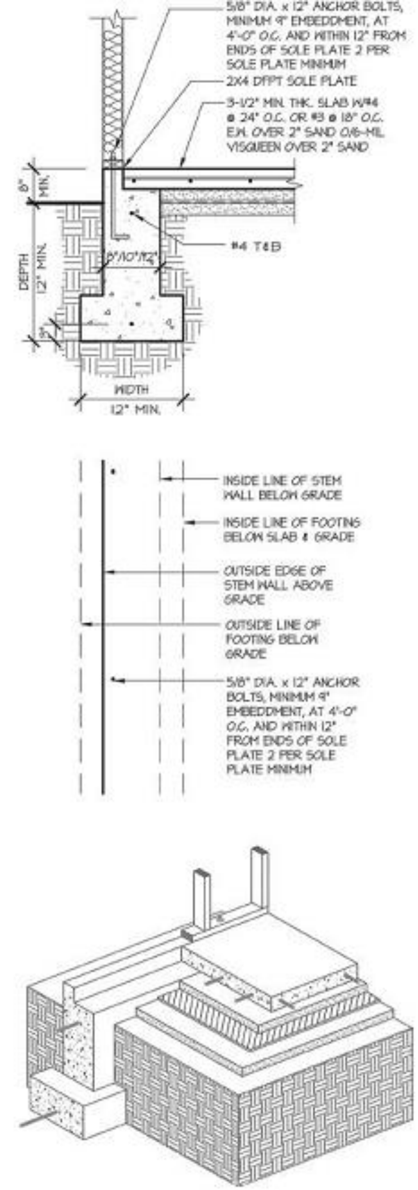


Figure 5.25 Detail of two-pour footing and concrete floor.

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.150

Concrete floor systems need to be reinforce to prevent cracking. Following the types of reinforcing steel:

Welded Wire Mesh - Usually gage (#10) and 6" apart on each direction (EW) 6"x6" # 10 Gage (gauge) Any of various standards for designating the thickness or diameter of a thin object, as the thickness of sheet metal, or the diameter of a wire or screw.

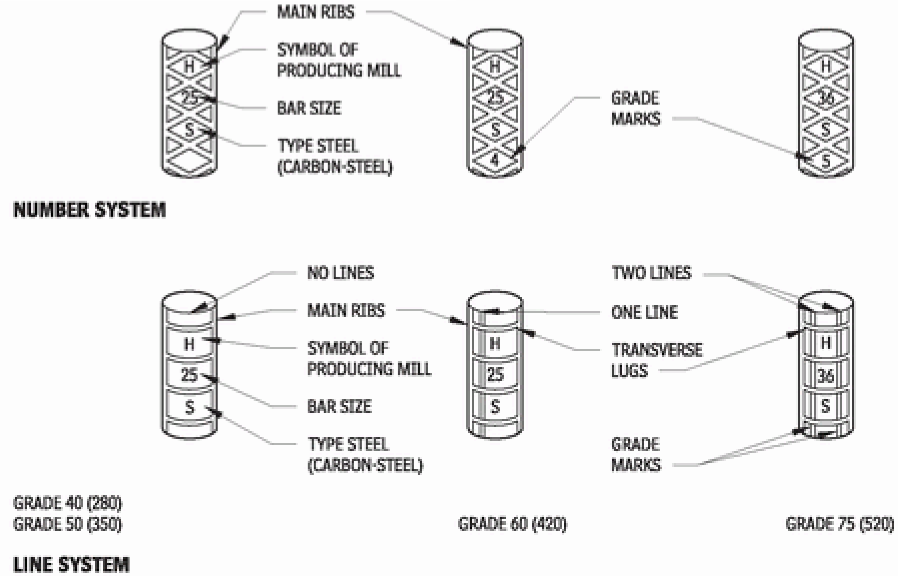
Deformed steel reinforcing bars which size is bases on an 1/8", for example a #4 deformed bar will be ½" Ø (diameter).

Dowels are deformed reinforced steel bars to connect two pour systems. For example a second floor pour along the first pour in order to avoid differential movement. (the difference in level must be constant through the building lifecycle)

DEFORMED REINFORCING STEEL BARS SIZES AND MARKS

ASTM BAR DESIGNATION	CROSS-SECTIONAL AREA (SQ IN.)	NOMINAL WEIGHT (LB/FT.)	DIAMETER (IN.)
#3	0.11	0.376	0.375
#4	0.20	0.668	0.500
#5	0.31	1.043	0.625
#6	0.44	1.502	0.750
#7	0.60	2.044	0.875
#8	0.79	2.670	1.000
#9	1.00	3.400	1.128
#10	1.27	4.303	1.270
#11	1.56	5.313	1.410
#14	2.25	7.65	1.693
#18	4.00	13.60	2.257

ASTM STANDARD REINFORCING BAR SIZES 8.38



REINFORCING BAR-GRADE MARK IDENTIFICATION 8.42

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.150

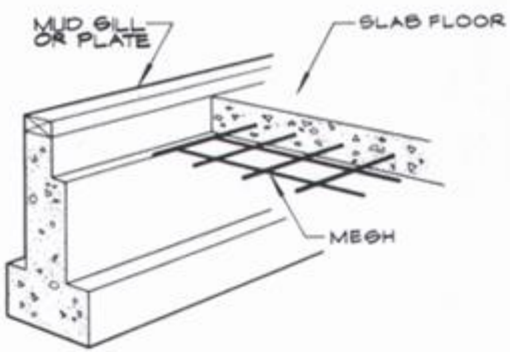


Figure 5.26 Concrete floor reinforcing.

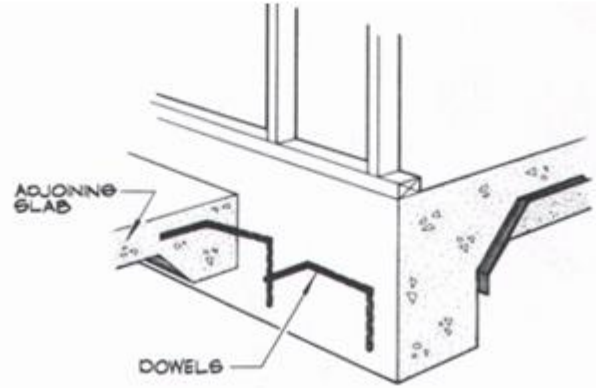


Figure 5.27 Use of steel dowels to tie porch slab to concrete floor.

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.150

Reinforced Concrete Floor Systems for above grade and multilevel concrete floor construction

These systems are:

- **Cast in Place**

- Precast Pre-stressed Concrete Systems

Cast in place need preparation on the construction site for it placement.
They are classified according to their span and cast form

Span – the extent of space between to support of a structure.

-Clear span the distance between the inner faces of the supports of a span

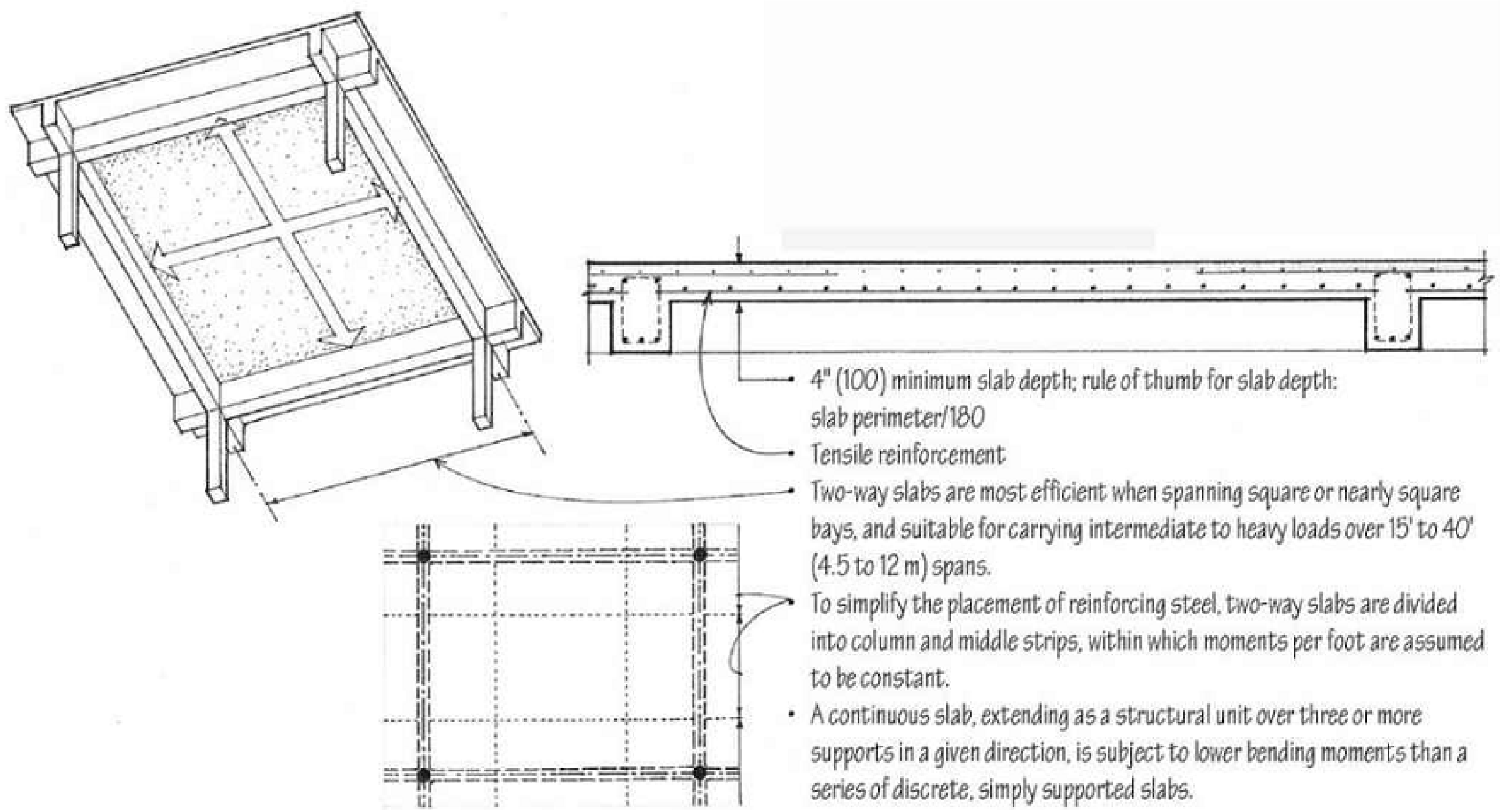
-Effective span – the center – to – center distance between the supports of a span.

Two way flat slab – the formwork is flat, and the steel reinforcement is accommodated within the slab thickness (usually from 6” to 12”) to withstand the varying loads.

The Reinforced Concrete floor systems are designed and calculated by the Structural Engineer.

Two-Way Slab and Beam

A two-way slab of uniform thickness may be reinforced in two directions and cast integrally with supporting beams and columns on all four sides of square or nearly square bays. Two-way slab and beam construction is effective for medium spans and heavy loads, or when a high resistance to lateral forces is required. For economy, however, two-way slabs are usually constructed as flat slabs and plates without beams.

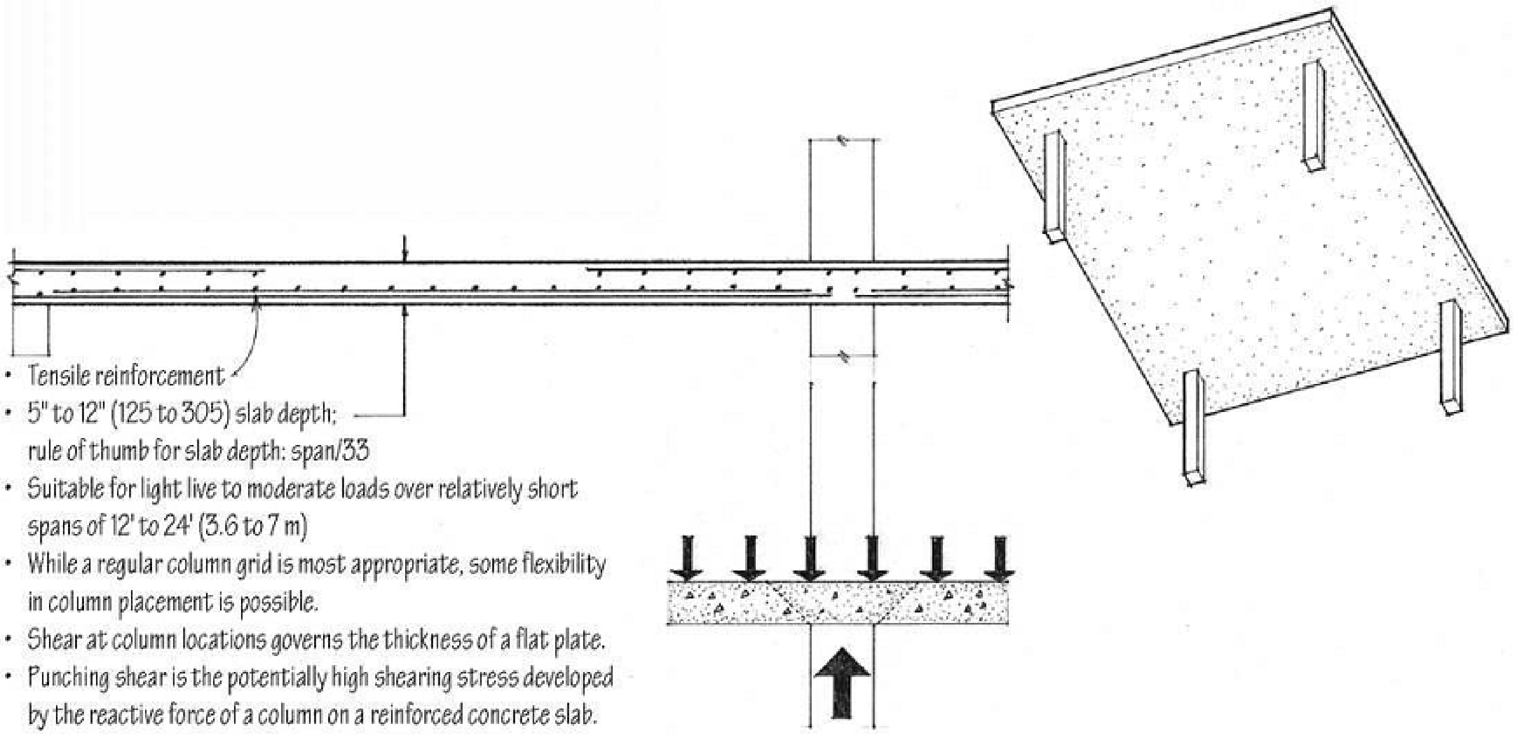


http://www.concretebuildings.org/tiltup/index.html

4.07 CONCRETE SLABS

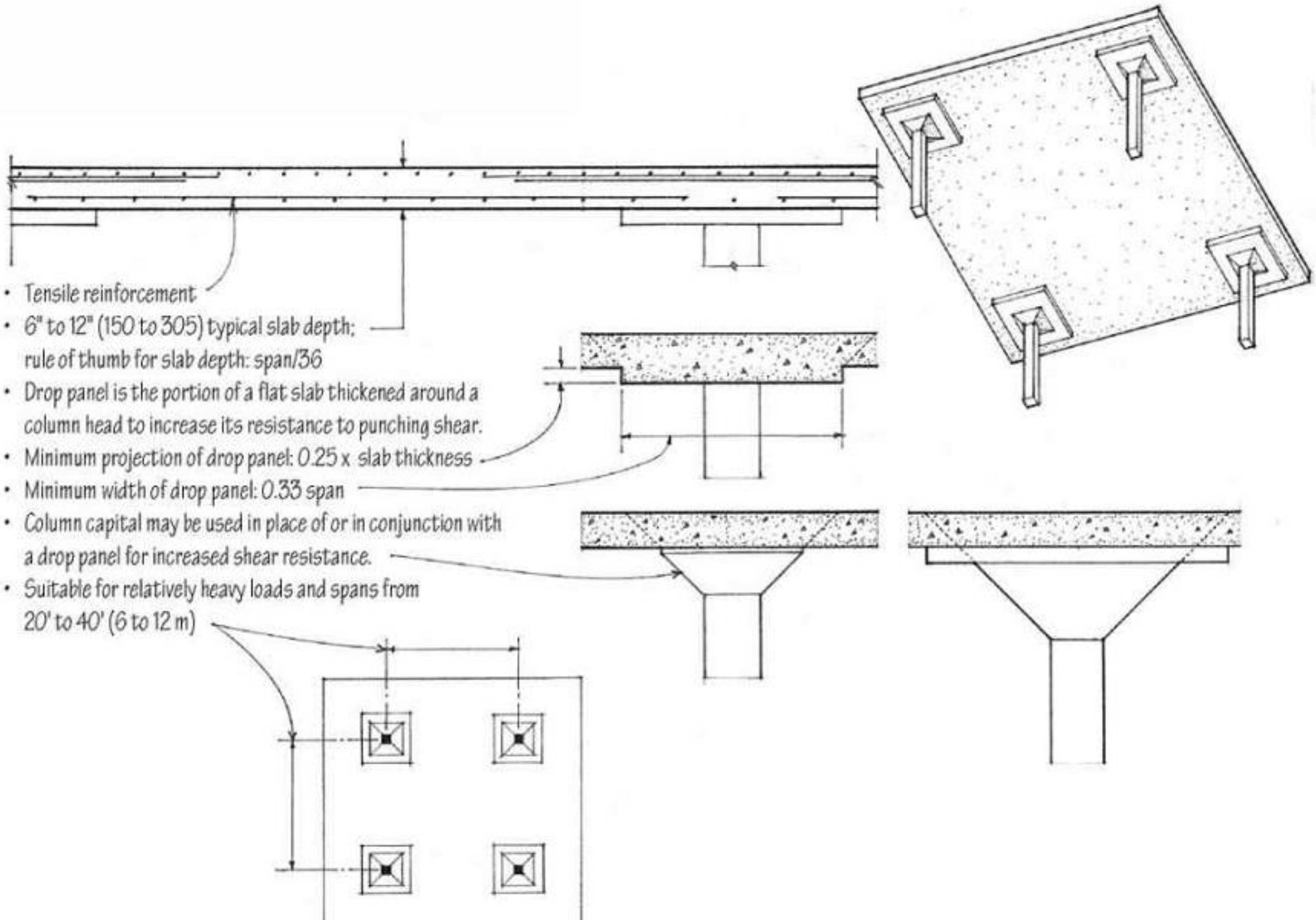
Two-Way Flat Plate

A flat plate is a concrete slab of uniform thickness reinforced in two or more directions and supported directly by columns without beams or girders. Simplicity of forming, lower floor-to-floor heights, and some flexibility in column placement make flat plates practical for apartment and hotel construction.



Two-Way Flat Slab

A flat slab is a flat plate thickened at its column supports to increase its shear strength and moment-resisting capacity.



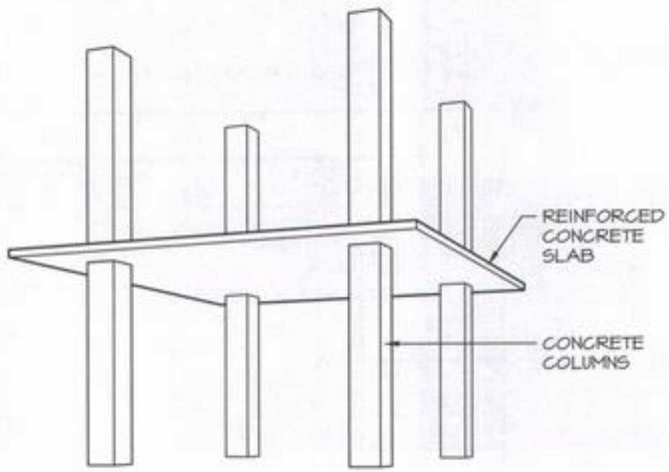


Figure 5.28 Flat slab floor system.

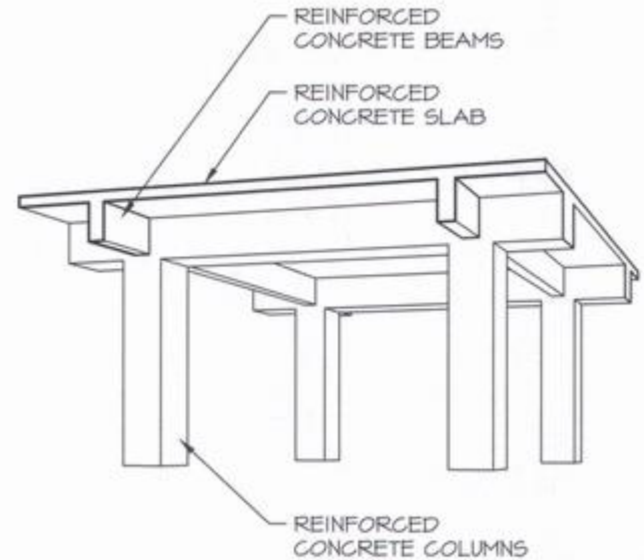
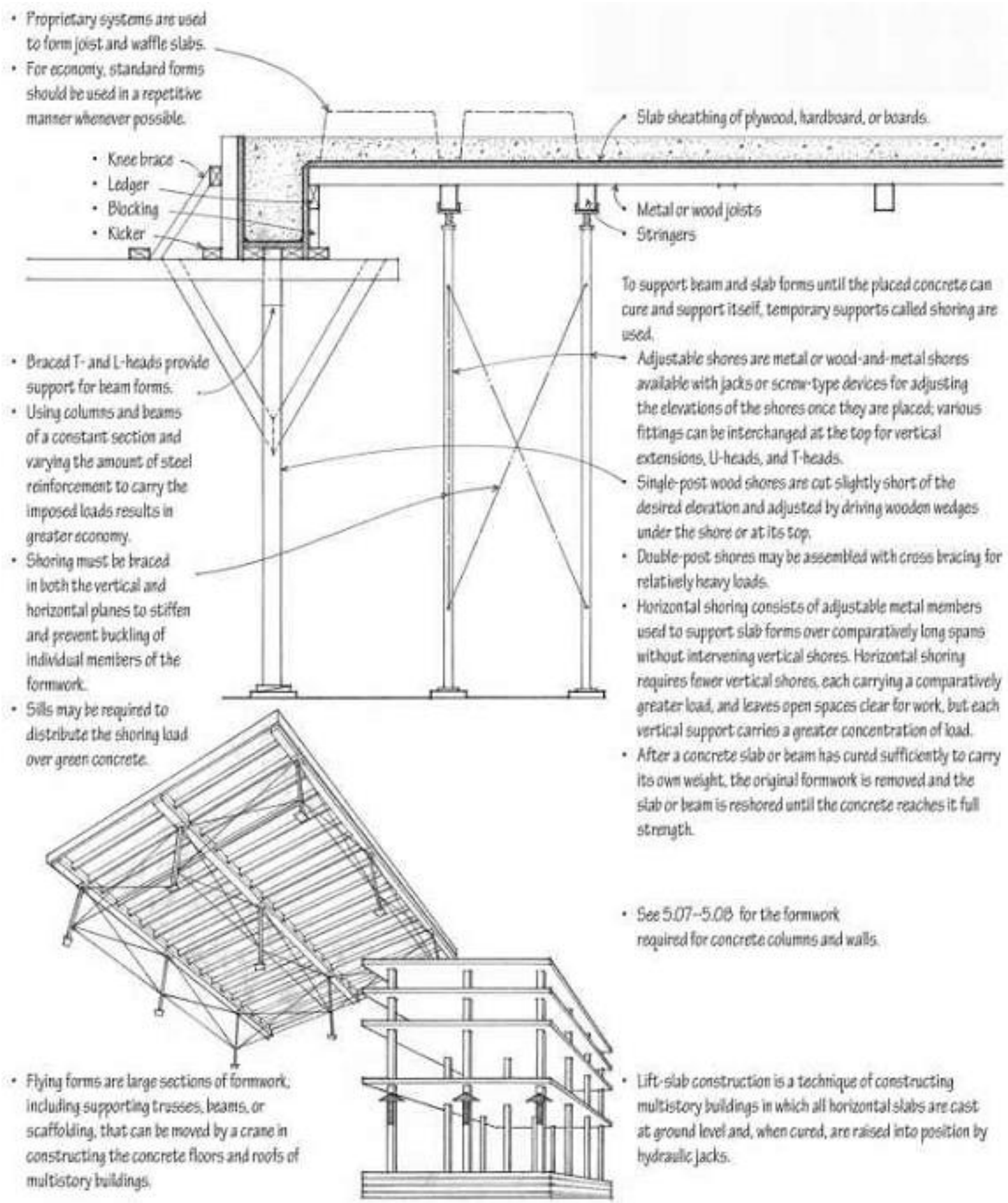


Figure 5.29 Two-way solid slab system.

Fresh concrete must be shaped and supported by formwork until it cures and can support itself. This **formwork** is often designed as a separate structural system by an engineer because of the considerable weight and fluid pressure a concrete mass can exert on it.
BCI 4.10

http://www.youtube.com/watch?v=Mo2Xqpsb3a4



http://www.youtube.com/watch?v=tbBo7UYVSog

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.152

Precast Pre-stressed Concrete Systems

These members are manufactured at a pre-casting plant, which offer excellent quality control of material and workmanship.

- Slabs
- Beams
- Girders
- Columns
- Wall panels

http://www.youtube.com/watch?v=jZk3rI-PTyk

http://www.youtube.com/watch?v=pjwrXLWhISE

http://www.youtube.com/watch?v=7JsuNg5r4Is

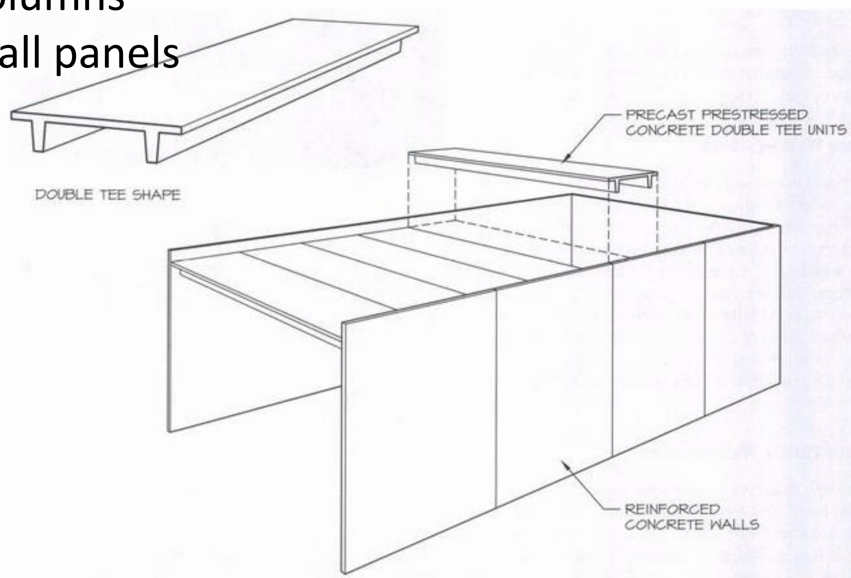


Figure 5.30 Precast prestressed slab system.

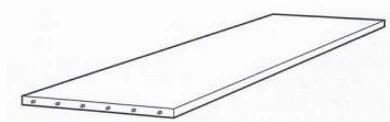


Figure 5.31 Precast prestressed solid flat slab.

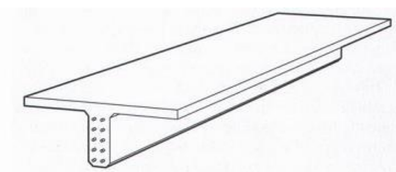


Figure 5.33 Precast prestressed concrete single tee.

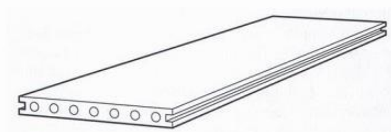
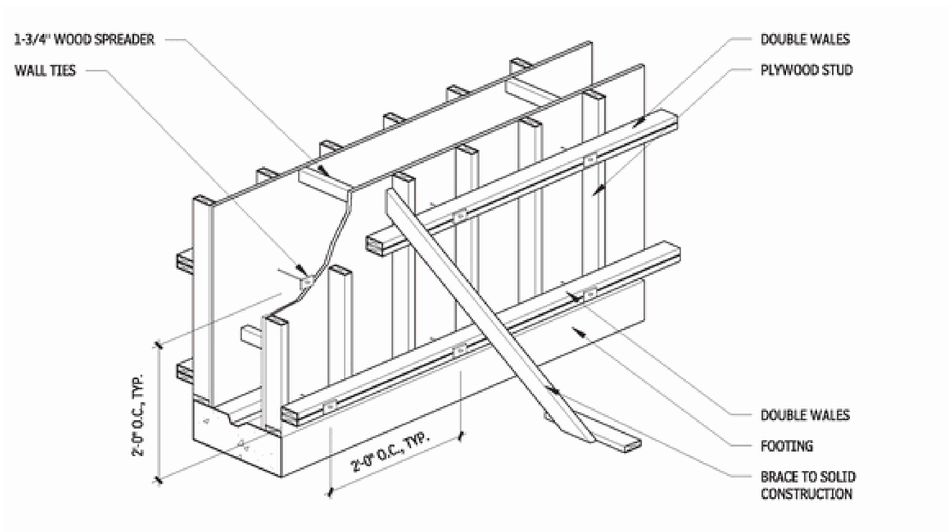


Figure 5.32 Precast prestressed hollow-core slab.

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.152

Concrete Wall Systems – **Cast in Place**
Reinforced Concrete Walls are usually built by "pour in place"
Pour in place most of the time requires a **formwork** - erected with wood, composite panels, foam, and or metal panels, and tied together with metal to resist the fluid pressure and weight of **workable** concrete mix.



TYPICAL SITE-BUILT WALL FORMWORK 8.13

Concrete Tilt-up Wall Systems

Precast Construction Method – Cast on Job site

Structural systems to support roof and floor loads and serve as shear wall to resist lateral loads (high winds and earthquakes) . Usually used for one or two story buildings.

Wall panels are made of reinforcing steel, concrete and metal inserts (structural connectors) to lift or tilt them with a crane. Crane weight must be considered if it is needed to be place on the building floor slab. It may exert more weight than building Live and Dead load.

The building concrete floor serves as a casting platform which must be level, smoothly finished, and treated with a bond-breaker agent to permit easy separation.

Opening on the wall may be provided for, doors, windows, and louvers.

This method reduce the formwork and labor and eliminates transportation requirements that may limit the panel size.

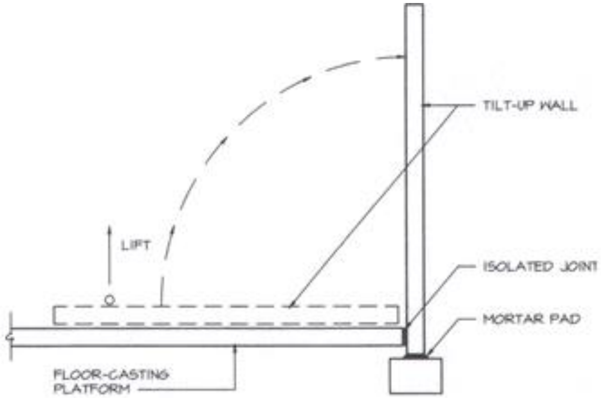
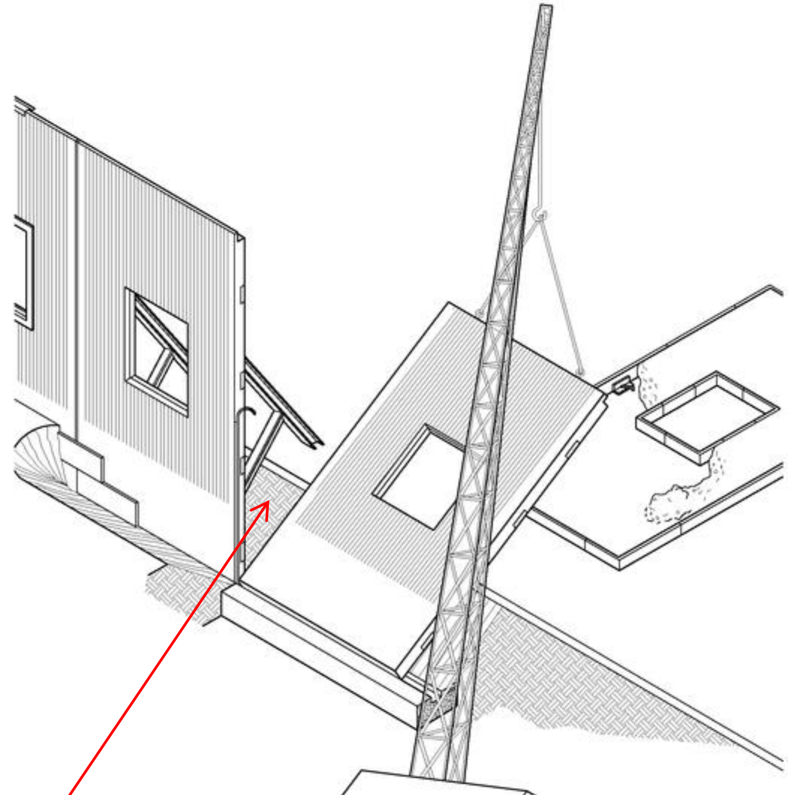


Figure 5.36 Tilt-up wall installation.



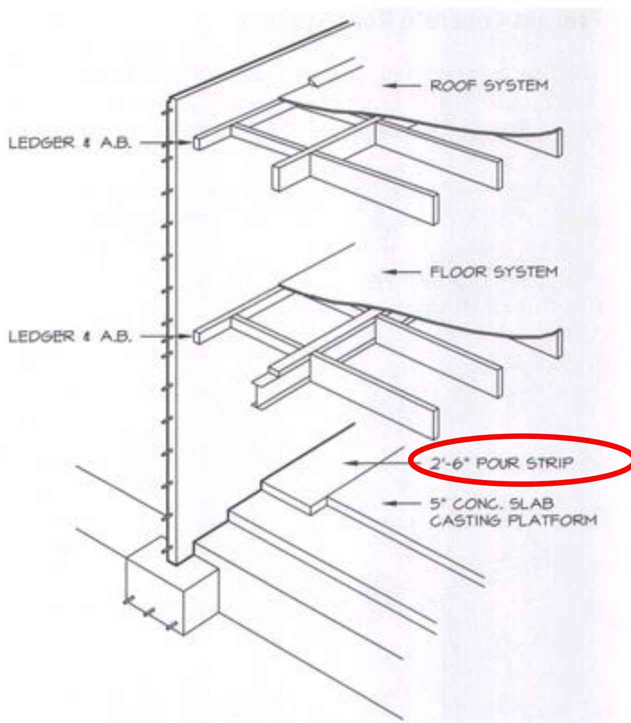
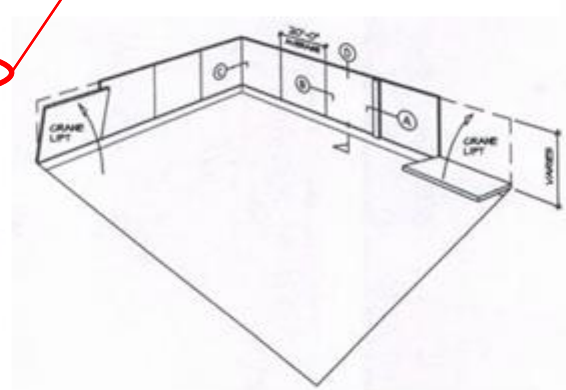
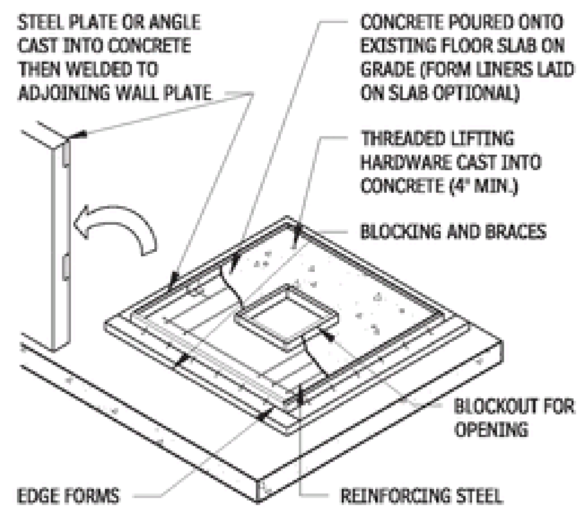
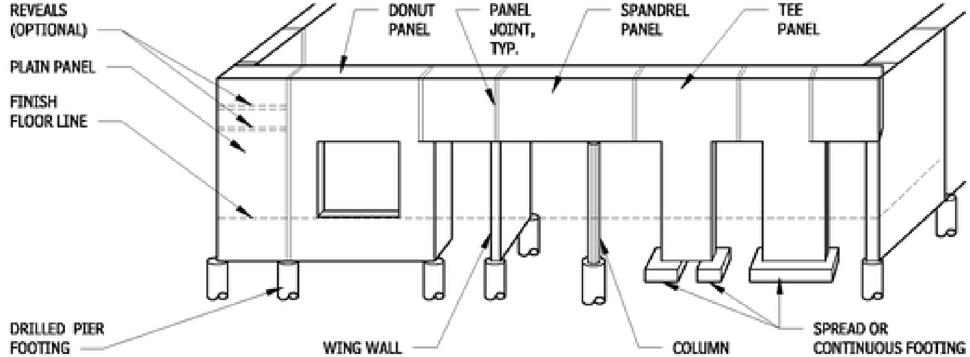


Figure 5.38 Concrete tilt-up wall.

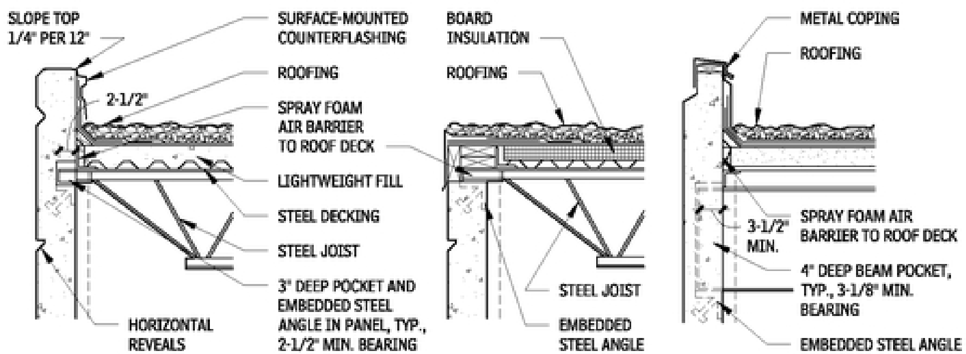
TILT-UP CONCRETE 2.237





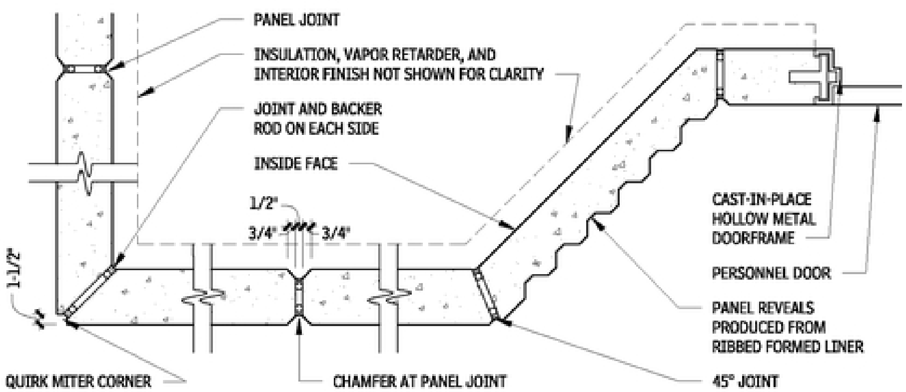


TILT-UP CONCRETE PANEL TYPES 2.238

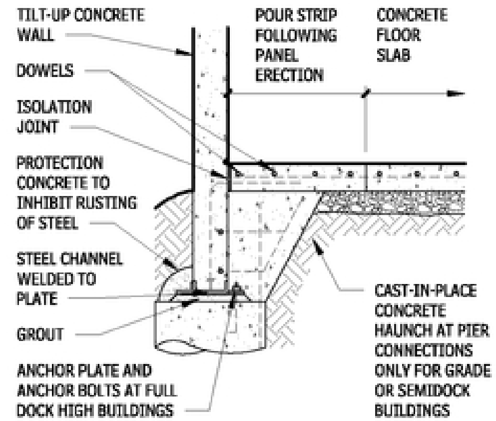


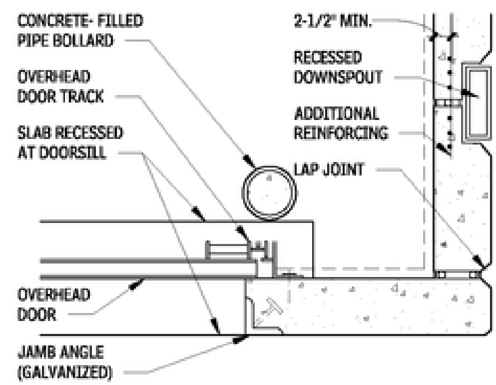
PARAPET AT JOIST MULTIBAY **FLAT** **PARAPET AT BEAM MULTIBAY**

TILT-UP CONCRETE PANEL CONNECTIONS AT ROOF 2.239



TILT-UP CONCRETE PANEL DETAILS 2.240





PIER CONNECTION (SECTION) 2.241

ARCHITECTURAL GRAPHIC STANDARD 11 EDITION JOHN WILEY & SONS AMERICAN INSTITUTE OF ARCHITECTS (AIA)

Tilt-up panels are constructed on a concrete slab, either the slab that will be the floor slab of the building or a casting slab that will be removed after construction. Sometimes casting slabs are used as parking lots after building completion. The slab must be smooth, because any imperfections will end up reflected in the panels.

The contractor positions side forms and applies bond breaker to the slab—proper bond breaker is essential to successfully lifting the slabs. Workers then position reinforcement, lifting hardware, bracing hardware, embedments, window and door blockouts, form liners, and thin-brick sections then place the concrete. Concrete is typically 3000 psi compressive strength with a 4-inch slump. The wall panels are usually 6 to 8 inches thick.

When the concrete has reached the necessary strength—usually in about 7 days—the lifting rigging and the braces are attached to the panel. A mobile crane then lifts the panels in the proper sequence. The panel is braced and plumbed. Adjacent panels are not normally connected to one another. Once all of the panels are in place the roof trusses are positioned to tie everything together. Grout is then injected at the panel's bottom and the braces are removed. Viola! A complete tilt-up building!

A concrete block pattern will be created on this tilt-up panel using an elastomeric rolled liner. Fitzgerald Formliners

Ch.5 CONSTRUCTION MATERIALS AND METHODS p. 154

Precast Concrete Wall Systems

Precast Construction Method – Casting Plant

Structural wall systems for bearing and nonbearing walls.

Walls are manufactured at casting plants and delivered to the building site (limitation is size due to transportation which must be considered.

Wall panels are made of reinforcing steel, concrete and metal inserts.

Pre-cast concrete construction system - the structural engineer will determine the thickness of exterior and interior wall depending on the load requirements, bearing or non bearing wall.

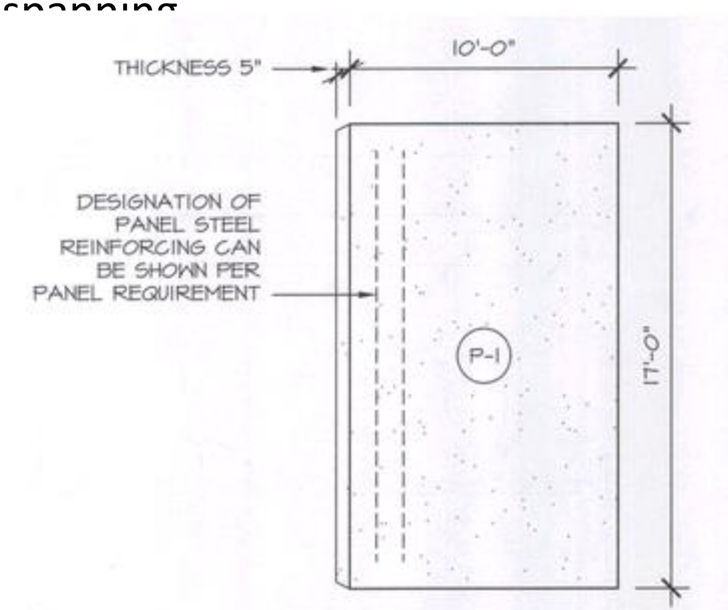
Ch.5 CONSTRUCTION MATERIALS AND METHODS CONCRETE AS MATERIAL p. 166-169

The use of matrix (grid) system provides clarity for identifying the various precast concrete panels locations

Along Matrix lines 1-9 are load bearing wall 7” thick walls

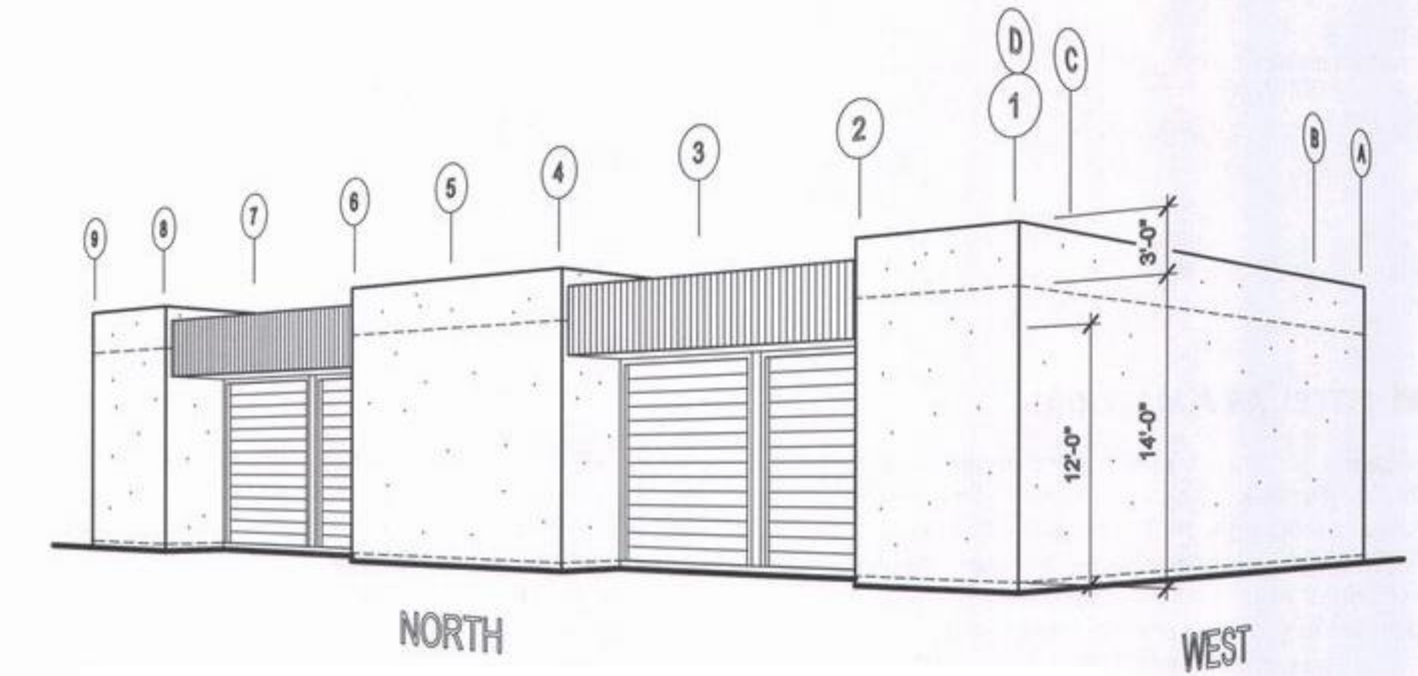
A, B, and D are non load bearing 5” thick walls

Roof panels are also precast hollow cored (HC) are 6” thick . Directional open arrows span from 1-3, 3-5, 5-7 and 7-9, illustrate the spanning



p. 169 Figure 5.75 Pre-cast concrete panel

Ch.5 CONSTRUCTION MATERIALS AND METHODS
CONCRETE AS MATERIAL p. 166-169



p. 169 Figure 5.74 View of North/West elevations

Ch. 5 CONCRETE AS MATERIAL p. 166-169

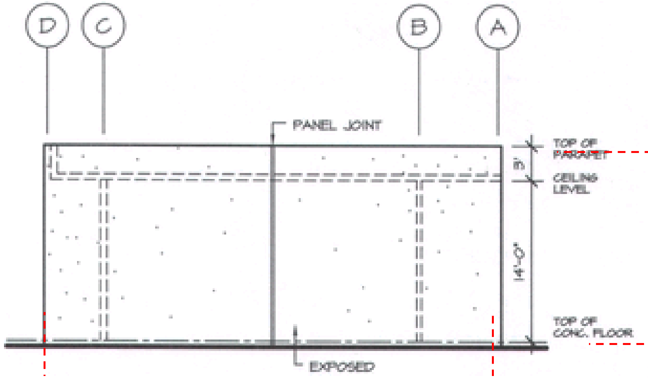


Figure 5.73 West Elevation

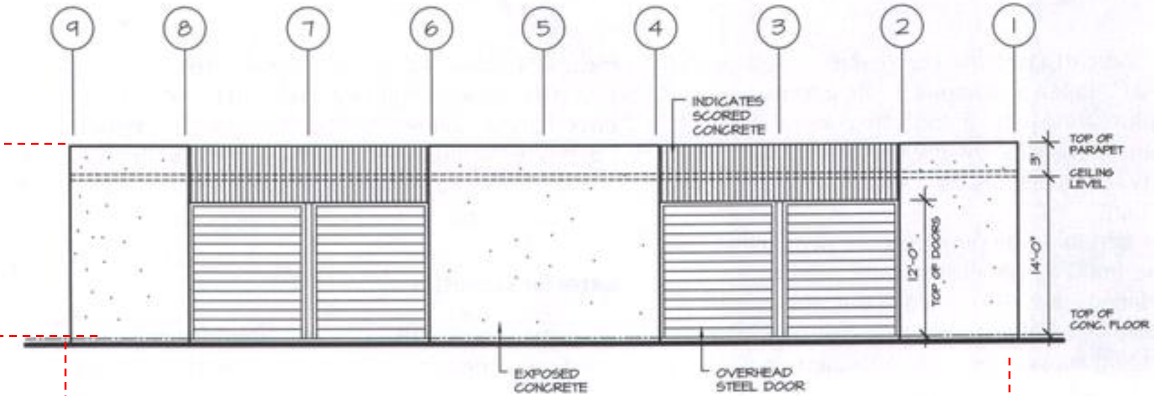


Figure 5.72 North Elevation

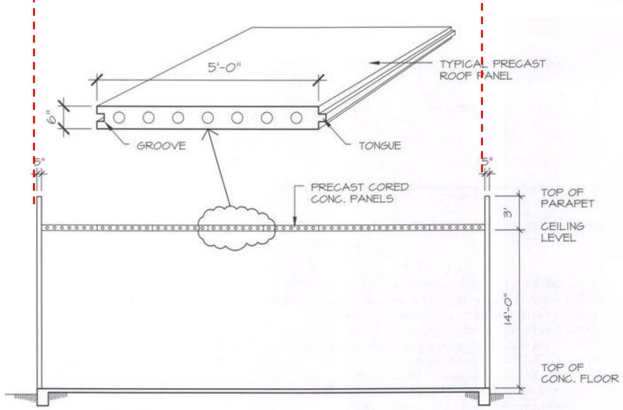


Figure 5.76 Building Section on S-1

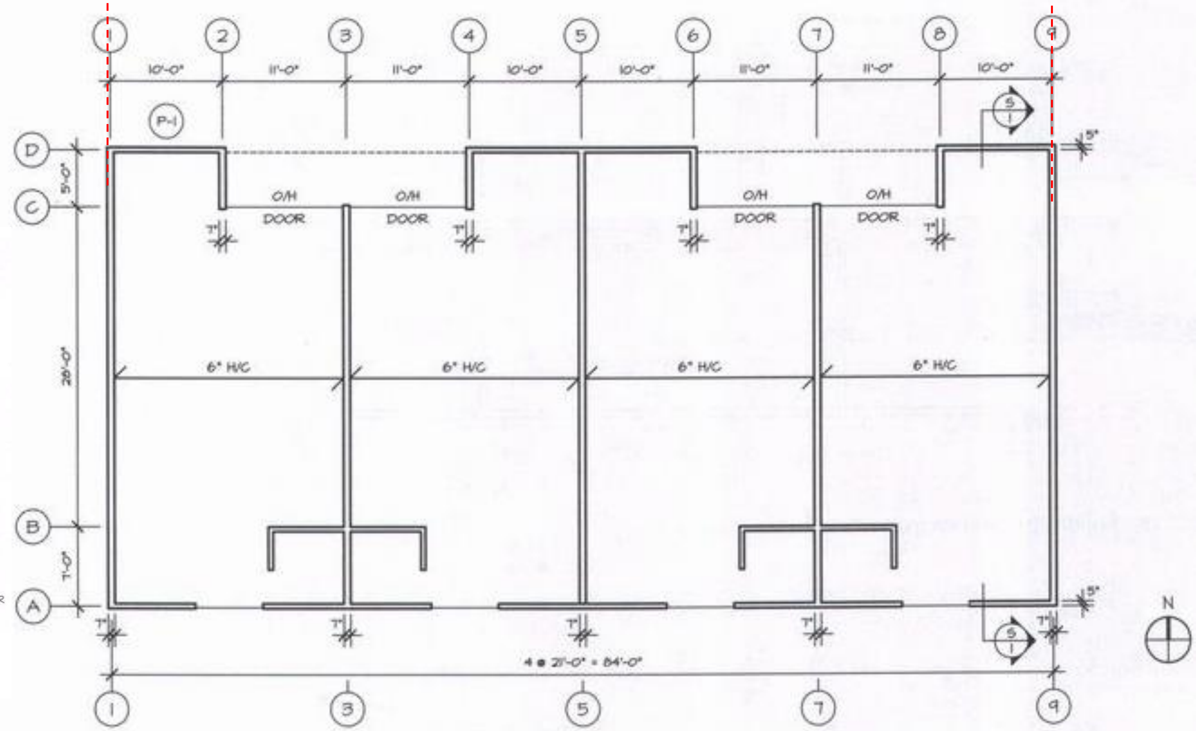


Figure 5.71 Plan Layout- precast concrete walls

Ch. 5 CONCRETE AS MATERIAL p. 166-169

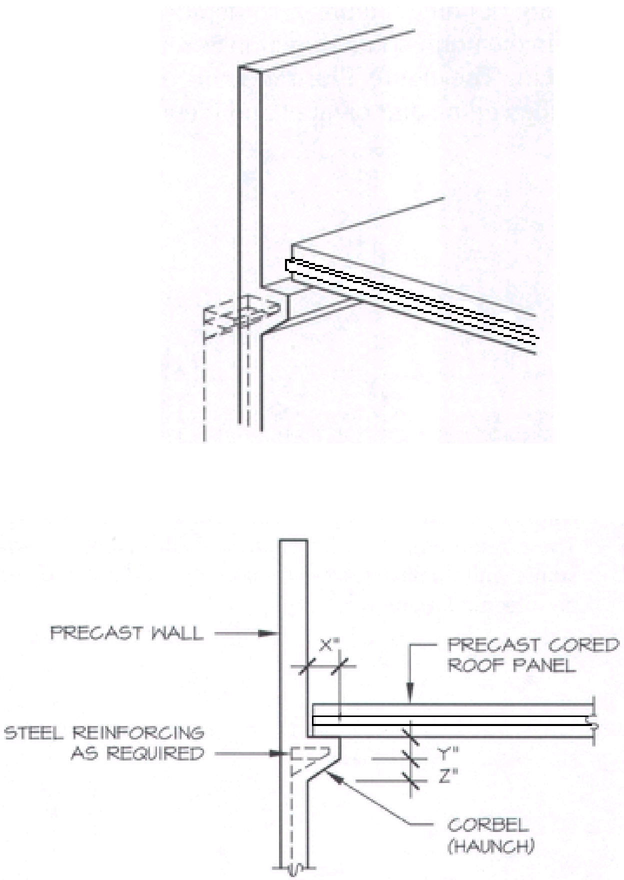


Figure 5.77 Wall Corbel

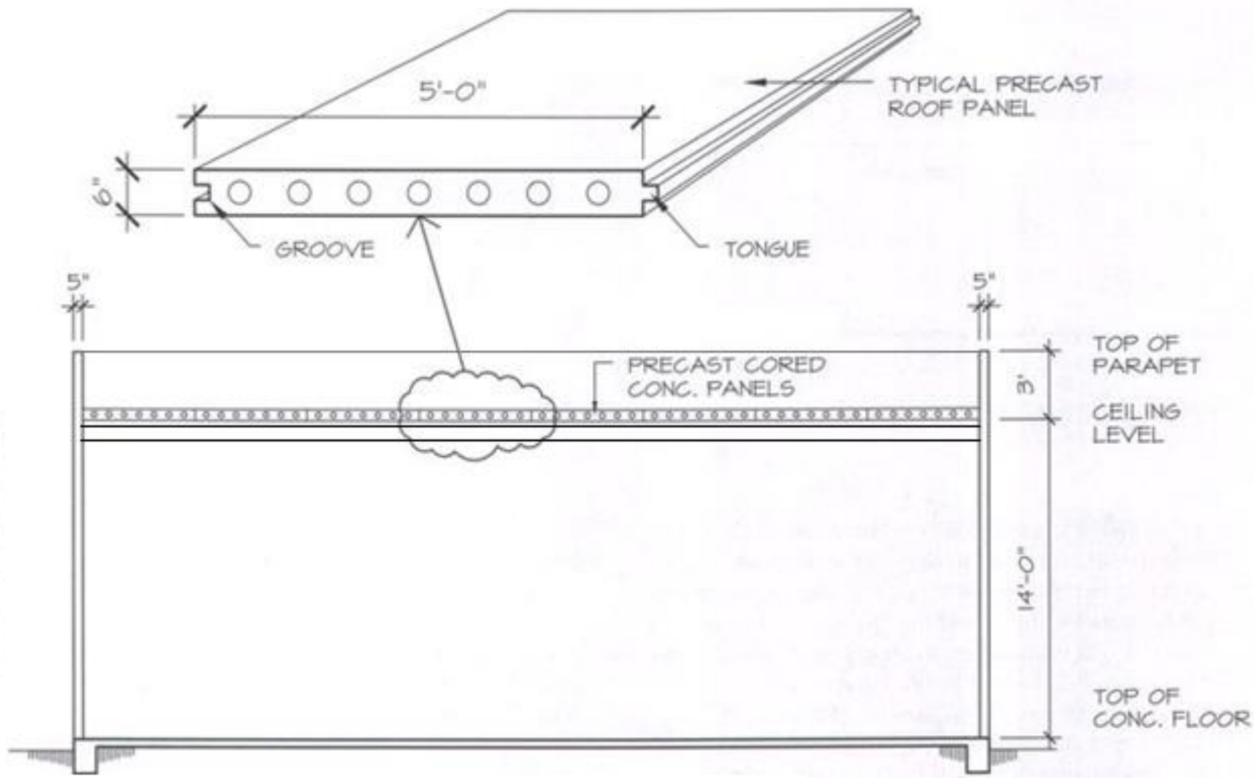
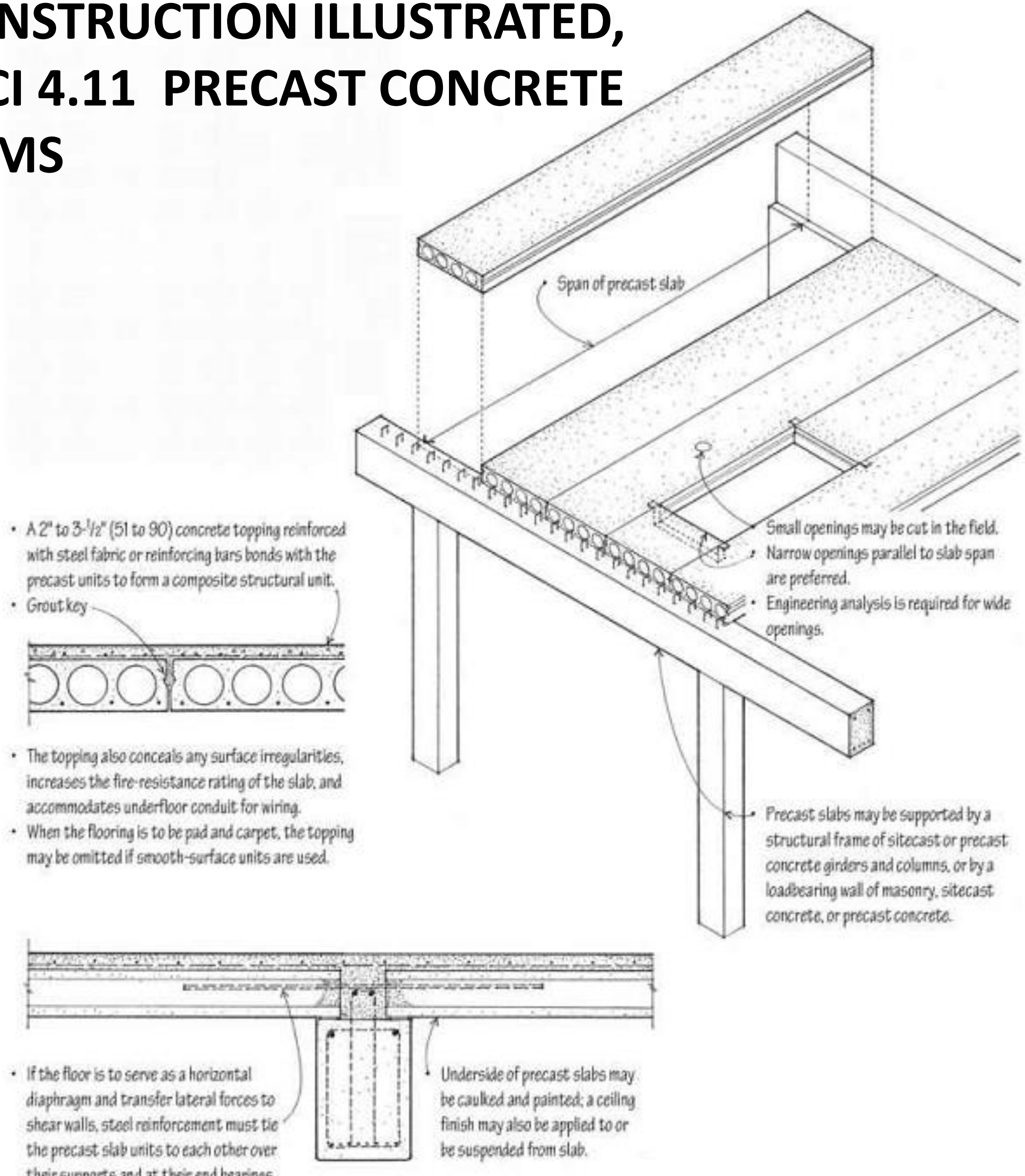
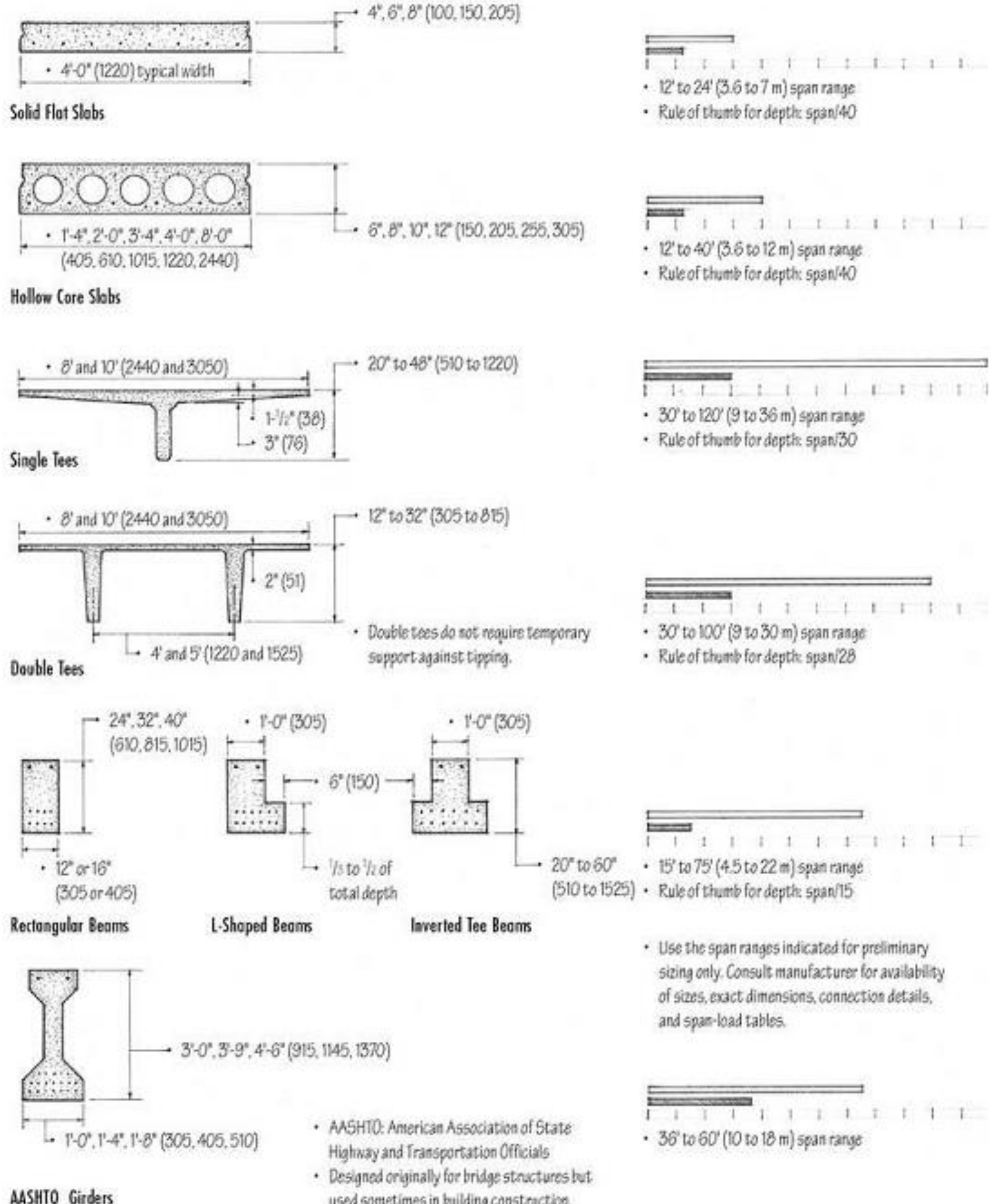


Figure 5.76 Building Section on S-1

BUILDING CONSTRUCTION ILLUSTRATED, DK. CHING)BCI 4.11 PRECAST CONCRETE FLOOR SYSTEMS



BCI 4.12 PRECAST CONCRETE UNITS



Ch.5 CONSTRUCTION METHODS AND MATERIALS
STEEL AS A MATERIAL

It is recommended that the properties of the steel members are verified by referring to Steel Construction Manual.

Ch.5 CONSTRUCTION METHODS AND MATERIALS
STEEL FLOOR SYSTEM p.155-157

Structural Steel Members
Light Steel Framing

Structural Steel Members
Examples of structural Steel Members Shapes are
“W” shapes
“S” shapes
“C” Channels

Preferably use a matrix (grid) identification system

The structural engineer will determine the appropriate span of the structural members according to the spatial requirement of the building design.

Ch.5 CONSTRUCTION METHODS AND MATERIALS p.155

Steel floor system are a combination of steel decking and concrete.
Corrugated steel decking provide reinforcing for the concrete, as well as serve as the form.
Corrugated steel is available in various:

- Shapes
- Depth---1 ½" to 3"
- Gauges (GA)---18 to 24

Installation: **Steel stud** are welded to the top **flange** of the supporting beam these stud create a bond between the concrete and the metal decking, providing lateral support to the structure. The floor systems acts as a **diaphragm**. In order to achieve this the edge of the system need to be continuously welded
http://www.prodeck-fixing.co.uk/stud-welding.html

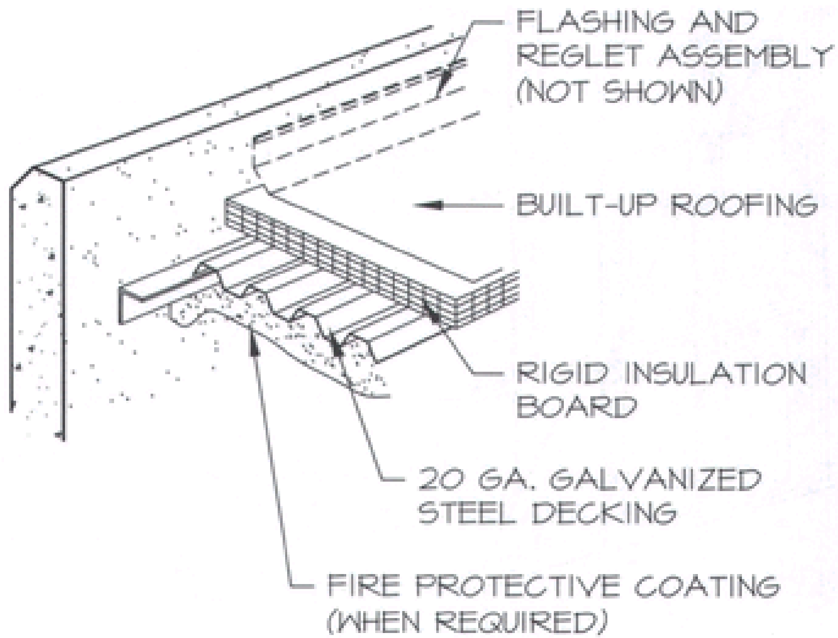


Figure 5.45 Steel roof decking system.

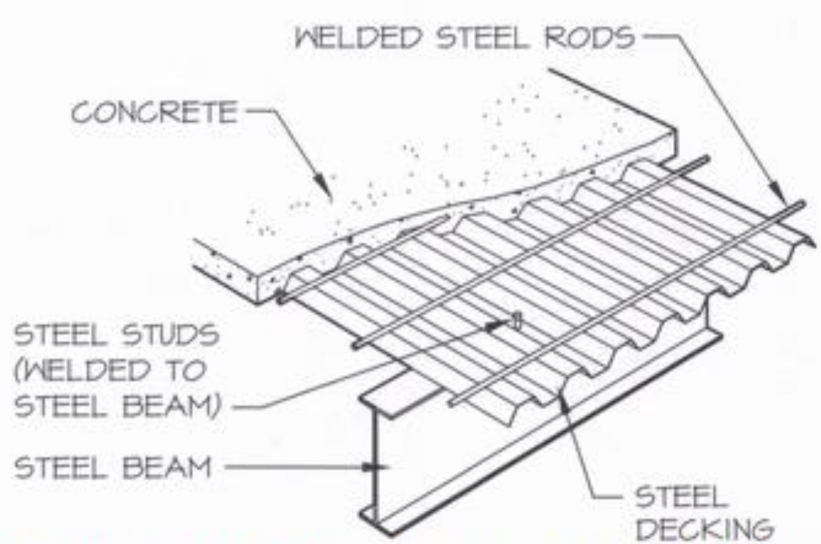


Figure 5.42 Composite steel decking floor system.

Ch.5 CONSTRUCTION METHODS AND MATERIALS p.156-157

Lightweight, cold formed steel stud members
Load-bearing and non-load bearing walls
Incombustible construction
Well suited for pre-assembling
Gauge (GA) 14-20
Sizes 3 5/8” to 10” in depth.
Members names:

- Channel track (runner track)
- Studs
- Bridging – “C” channels

running through the punch-out and secured by welding

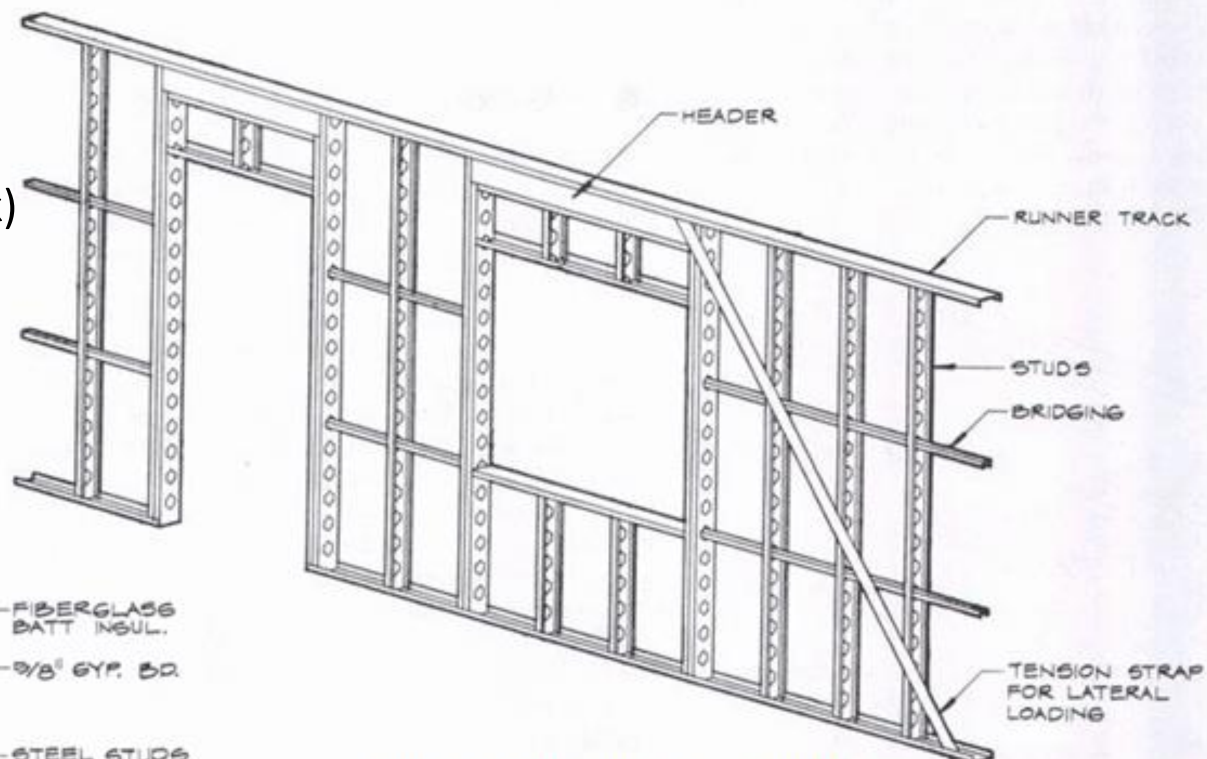


Figure 5.43 Isometric of steel stud wall.

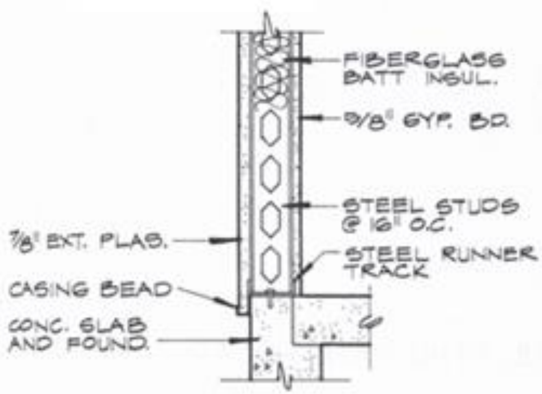


Figure 5.44 Partial steel stud wall section.

Ch.5 CONSTRUCTION METHODS AND MATERIALS
STEEL FLOOR SYSTEM p. 155-157

Structural Steel Member call out:

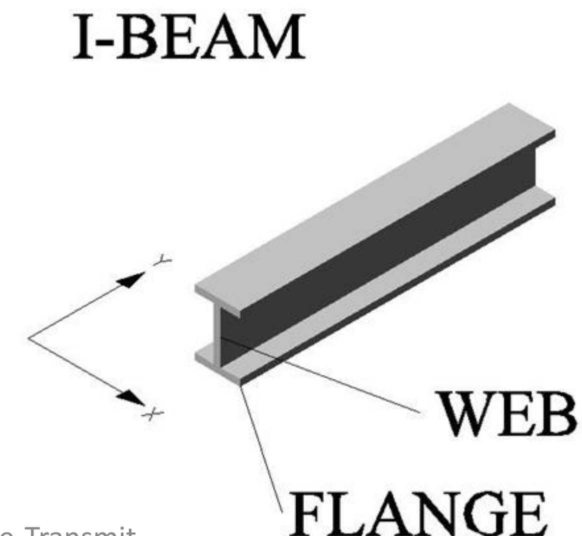
W8 x 15 means:

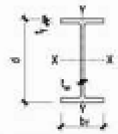
W – describe the shape of the structural member

8 – the depth in inches 8”

X – by

15 – represents the weight in pound per linear foot.

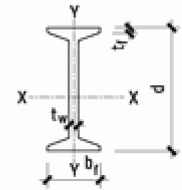




d = DEPTH
b_f = WIDTH
t_f = FLANGE THICKNESS
t_w = WEB THICKNESS

DESIGNATION		DEPTH (IN.)	FLANGE WIDTH (IN.)	FLANGE THICKNESS (IN.)	WEB THICKNESS (IN.)
W 36	× 300	36-3/4	16-5/8	1-11/16	15/16
	× 280	36-1/2	16-5/8	1-9/16	7/8
	× 260	36-1/4	16-1/2	1-7/16	13/16
	× 245	36-1/8	16-1/2	1-3/8	13/16
	× 230	35-7/8	16-1/2	1-1/4	3/4
W 36	× 210	36-3/4	12-1/8	1-3/8	13/16
	× 194	36-1/2	12-1/8	1-1/4	3/4
	× 182	36-3/8	12-1/8	1-3/16	3/4
	× 170	36-1/8	12	1-1/8	11/16
	× 160	36	12	1	5/8
	× 150	35-7/8	12	15/16	5/8
	× 135	35-1/2	12	13/16	5/8
W 33	× 241	34-1/8	15-7/8	1-3/8	13/16
	× 221	33-7/8	15-3/4	1-1/4	3/4
	× 201	33-5/8	15-3/4	1-1/8	11/16
W 33	× 152	33-1/2	11-5/8	1-1/16	5/8
	× 141	33-1/4	11-1/2	5/16	5/8
	× 130	33-1/8	11-1/2	7/8	9/16
	× 118	32-7/8	11-1/2	3/4	9/16
W 30	× 211	31	15-1/8	1-5/16	3/4
	× 191	30-5/8	15	1-3/16	11/16
	× 173	30-1/2	15	1-1/16	5/8
W 30	× 132	30-1/4	10-1/2	1	5/8
	× 124	30-1/8	10-1/2	15/16	9/16
	× 116	30	10-1/2	7/8	9/16
	× 108	29-7/8	10-1/2	3/4	9/16
	× 99	29-5/8	10-1/2	11/16	1/2
W 27	× 178	27-3/4	14-1/8	1-3/16	3/4
	× 161	27-5/8	14	1-1/16	11/16
	× 146	27-3/8	14	1	5/8
W 27	× 114	27-1/4	10-1/8	15/16	9/16
	× 102	27-1/8	10	13/16	1/2
	× 94	26-7/8	10	3/4	1/2
	× 84	26-3/4	10	5/8	7/16
W 24	× 162	25	13	1-1/4	11/16
	× 146	24-3/4	12-7/8	1-1/16	5/8
	× 131	24-1/2	12-7/8	15/16	5/8
	× 117	24-1/4	12-3/4	7/8	9/16
	× 104	24	12-3/4	3/4	1/2
W 24	× 94	24-1/4	9-1/8	7/8	1/2
	× 84	24-1/8	9	3/4	1/2
	× 76	23-7/8	9	11/16	7/16
	× 68	23-3/4	9	9/16	7/16
W 24	× 62	23-3/4	7	9/16	7/16
	× 55	23-5/8	7	1/2	3/8
W 21	× 147	22	12-1/2	1-1/8	3/4
	× 132	21-7/8	12-1/2	1-1/16	5/8
	× 122	21-5/8	12-3/8	15/16	5/8
	× 111	21-1/2	12-3/8	7/8	9/16
	× 101	21-3/8	12-1/4	13/16	1/2

W SHAPES—DIMENSIONS FOR DETAILING 10.17



d = DEPTH
b_f = WIDTH
t_f = FLANGE THICKNESS
t_w = WEB THICKNESS

DESIGNATION		DEPTH (IN.)	FLANGE WIDTH (IN.)	FLANGE THICKNESS (IN.)	WEB THICKNESS (IN.)
S 24	× 121	24-1/2	8	1-1/16	13/16
	× 106	24-1/2	7-7/8	1-1/16	5/8
S 24	× 100	24	7-1/4	7/8	3/4
	× 90	24	7-1/8	7/8	5/8
	× 80	24	7	7/8	1/2
S 20	× 96	20-1/4	7-1/4	15/16	13/16
	× 86	20-1/4	7	15/16	11/16
	× 75	20	6-3/8	13/16	5/8
	× 66	20	6-1/4	13/16	1/2
S 18	× 70	18	6-1/4	11/16	11/16
	× 54.7	18	6	11/16	7/16
S 15	× 50	15	5-5/8	5/8	9/16
	× 42.9	15	5-1/2	5/8	7/16
S 12	× 50	12	5-1/2	11/16	11/16
	× 40.8	12	5-1/4	11/16	7/16
	× 35	12	5-1/8	9/16	7/16
	× 31.8	12	5	9/16	3/8
S 10	× 35	10	5	1/2	5/8
	× 25.4	10	4-5/8	1/2	5/16
S 8	× 23	8	4-1/8	7/16	7/16
	× 18.4	8	4	7/16	1/4

S SHAPES—DIMENSIONS FOR DETAILING 10.22

Ch.5 CONSTRUCTION METHODS AND MATERIALS
STEEL AS A MATERIAL p.169-174

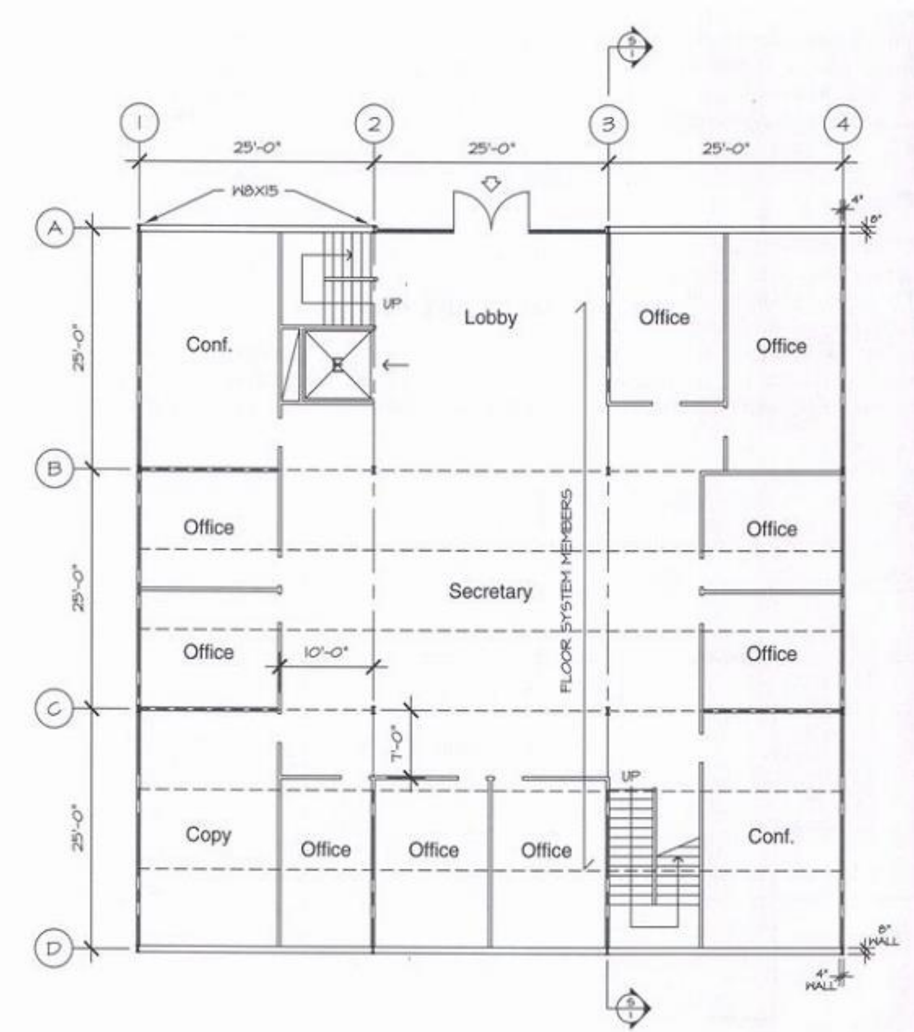


Figure 5.78 Ground Level Floor Plan

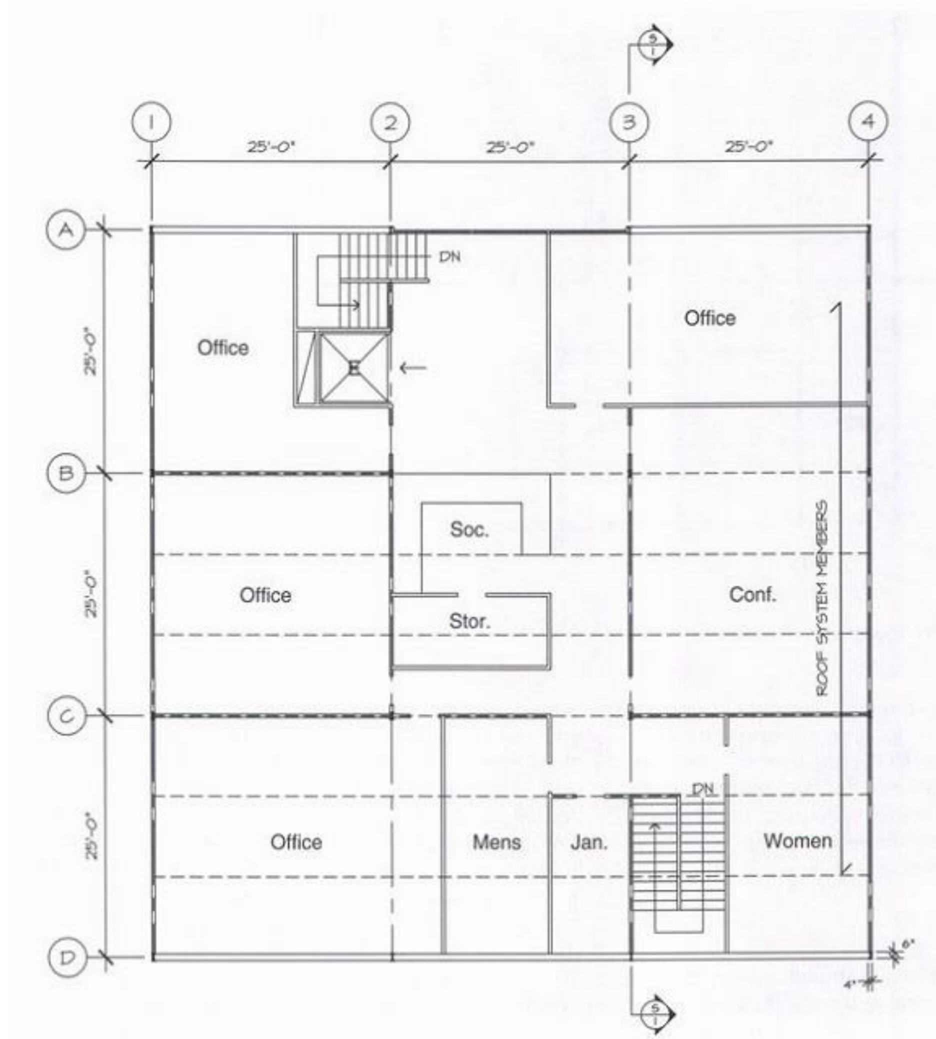


Figure 5.79 Second Level Floor Plan

Ch.5 CONSTRUCTION METHODS AND MATERIALS
STEEL AS A MATERIAL p.169-174

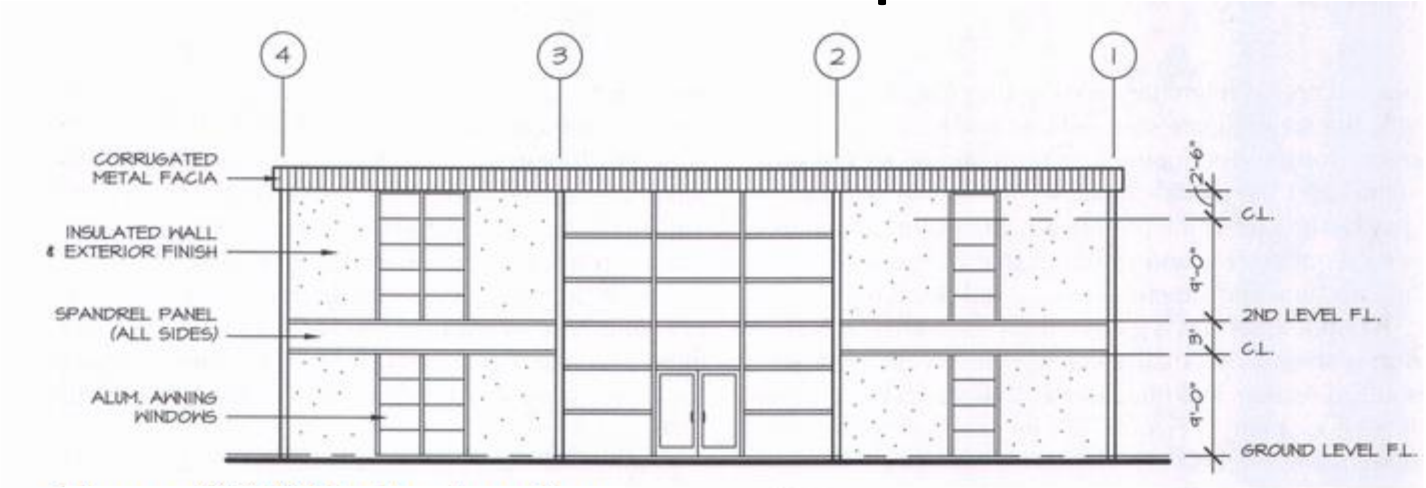


Figure 5.80 North Elevation

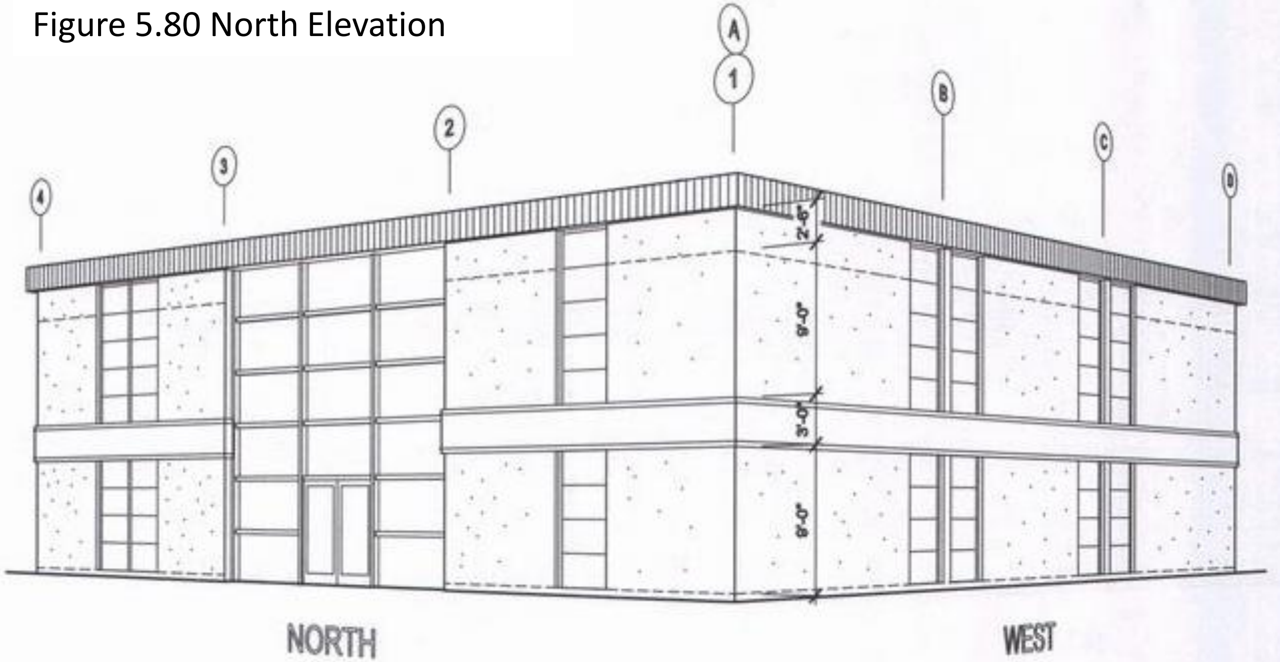


Figure 5.81 Building Section

Ch.5 CONSTRUCTION METHODS AND MATERIALS
STEEL AS A MATERIAL p.169-174

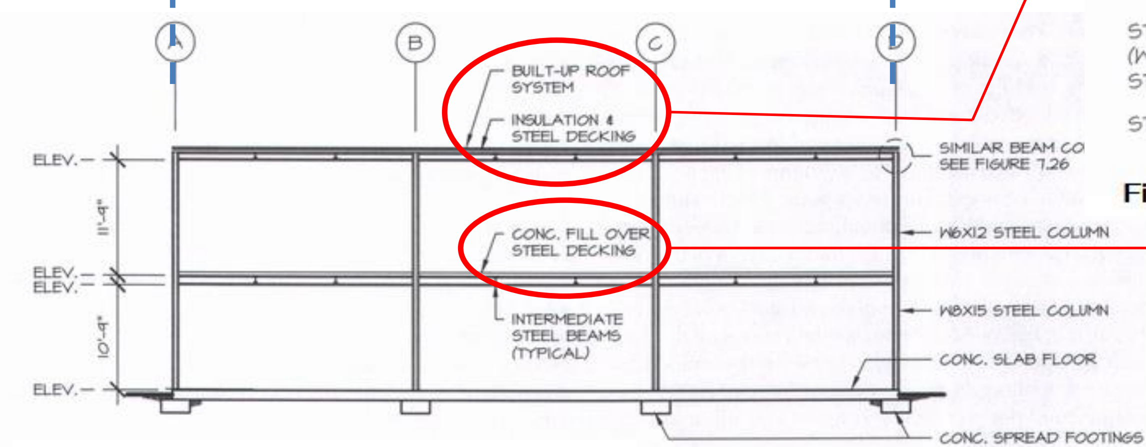


Figure 5.81 Building Section

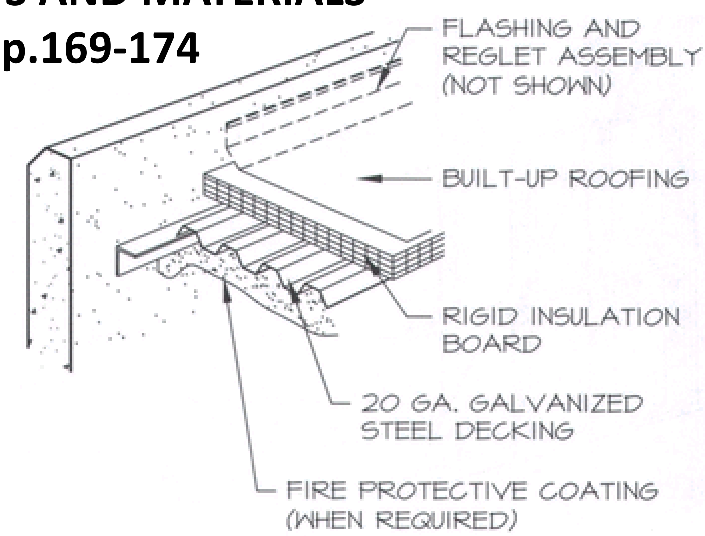


Figure 5.45 Steel roof decking system.

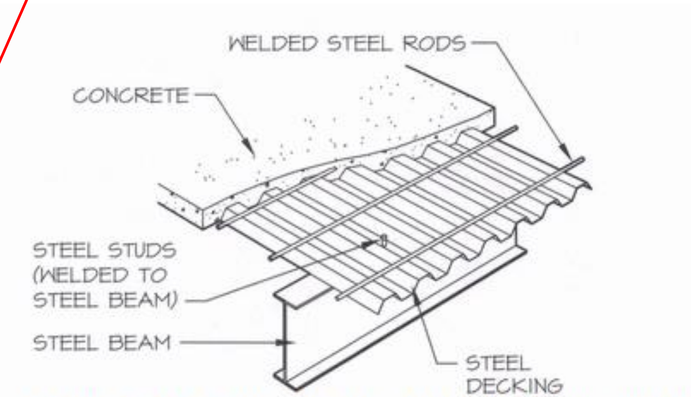
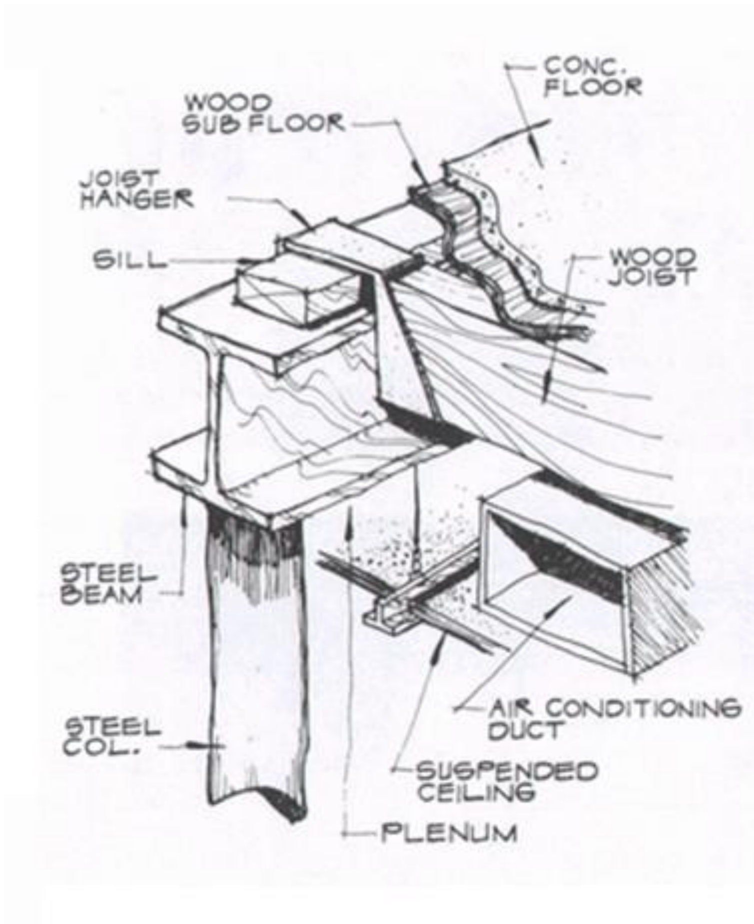


Figure 5.42 Composite steel decking floor system.

Plenum Area is the allocated space between the top of the finished ceiling and the bottom of the floor and roof system members. This space is use for heating and cooling ducts, plumbing lines, fire protection pipes, and lighting fixtures.



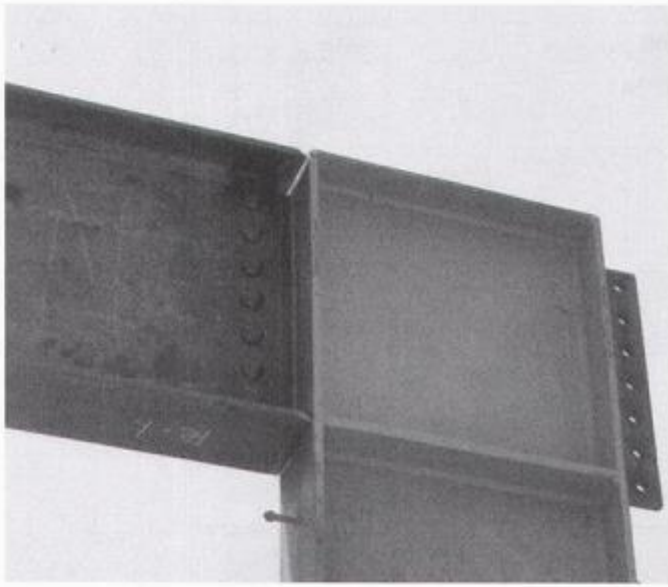
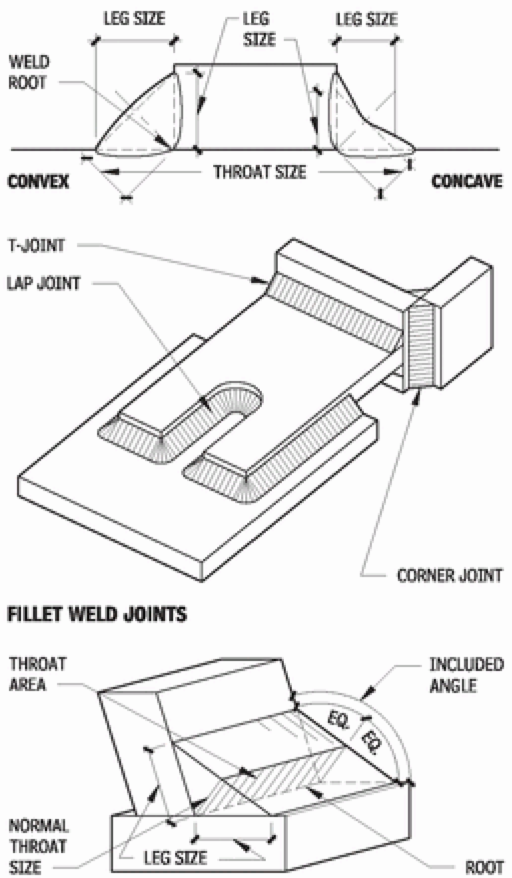
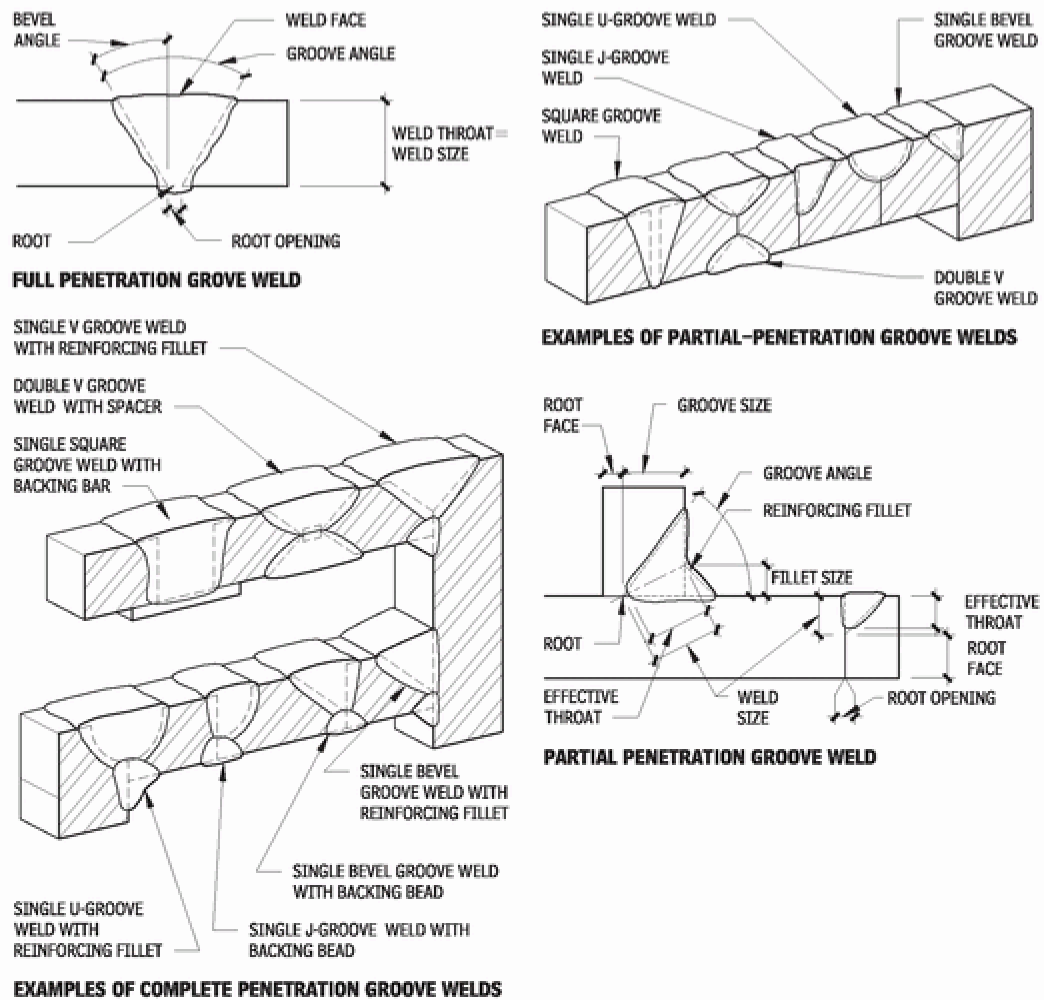


Figure 5.83 Photograph similar corner-column and beam connection. (Courtesy of Rich Development.)

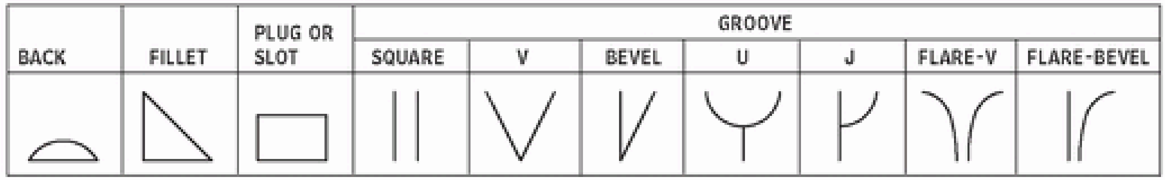
Figure 5.84 Photograph ground floor steel columns and beam.



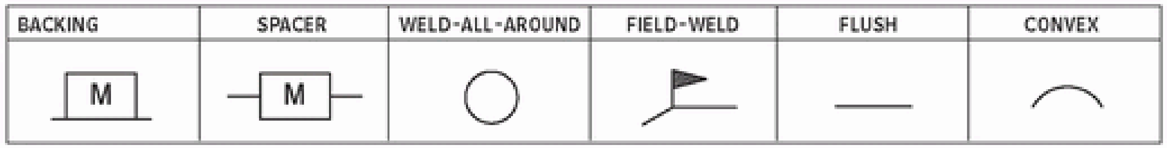
FILLET WELDS 10.7



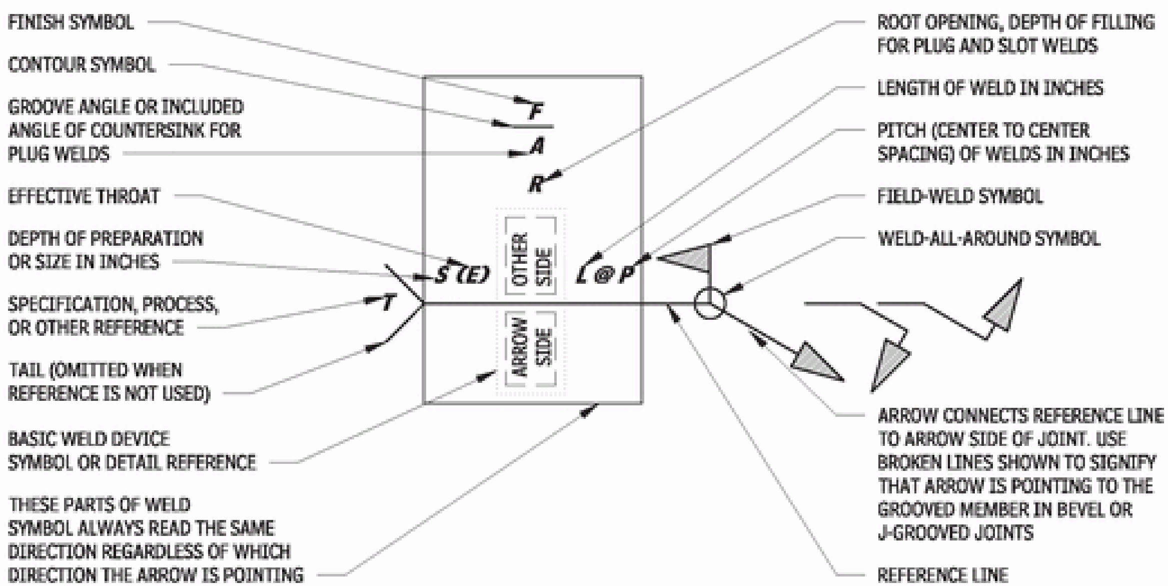
GROOVE WELDS 10.8



BASIC WELDING SYMBOLS 10.11



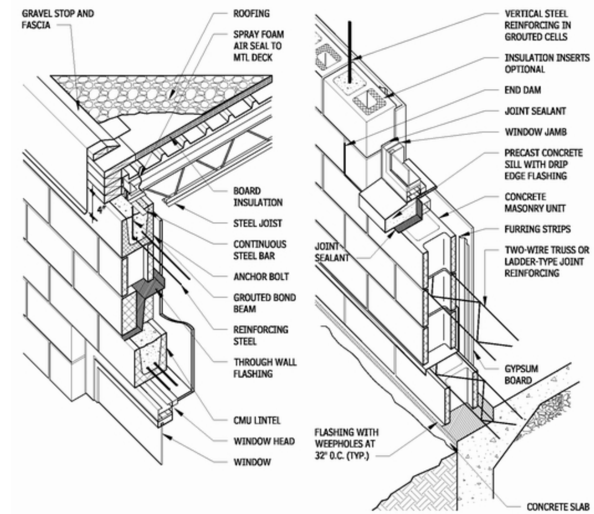
SUPPLEMENTARY WELD SYMBOLS 10.12



STANDARD LOCATION OF ELEMENTS OF A WELDING SYMBOL 10.13

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.157

MASONRY AS A WALL SYSTEM



SINGLE-WYTHE MASONRY WALL DETAILS 2.263

Brick – Net Size 2 ½” x 3 ⅞” x 8 ¼”

Concrete Blocks-Concrete Masonry Units (CMU)

- Nominal Size – 8 x 8 x 16
- Net size - 7 ⅝” x 7 ⅝” x 15 ½”

Installed in two basic patterns:

- Running bond (staggered)
- Stack bond- Units are staked so the vertical joints form a straight line

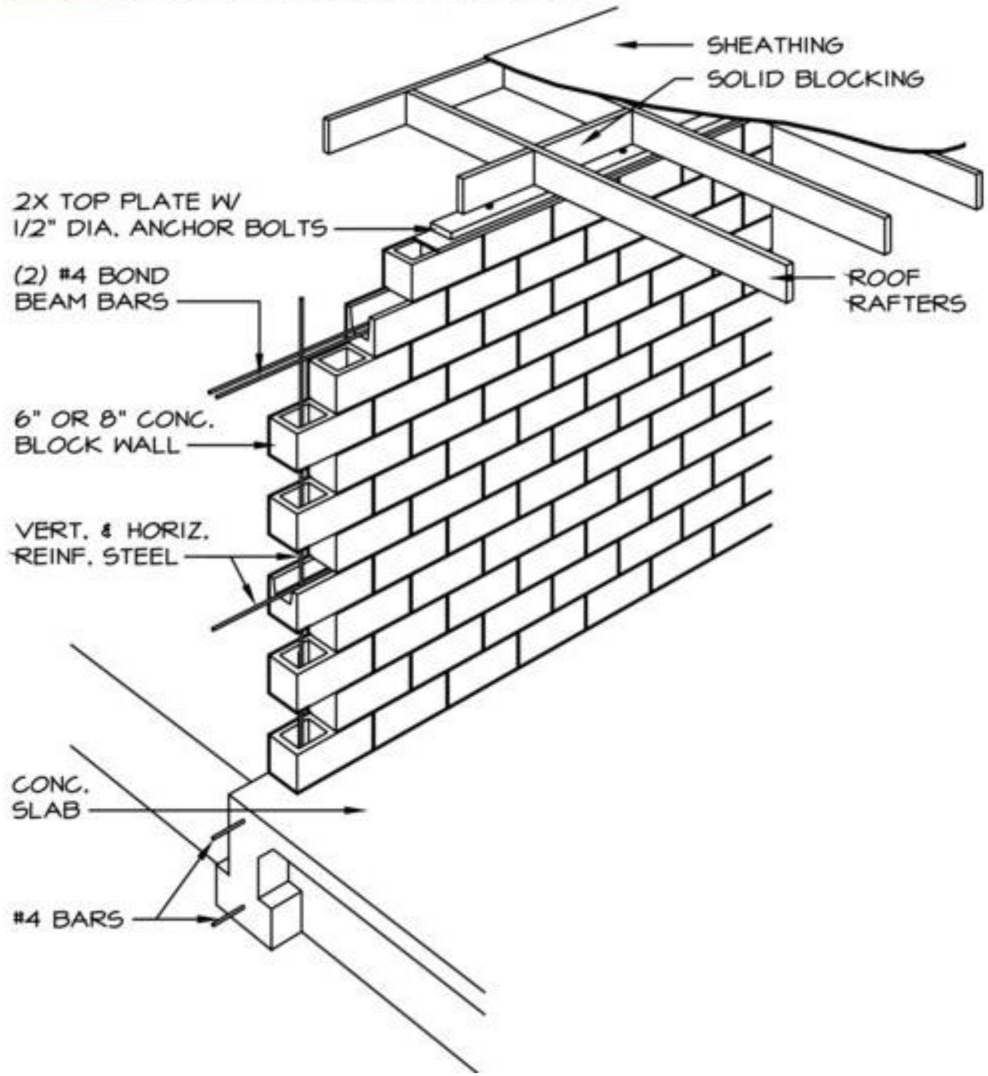
Available in many sizes, shapes, textures, and colors

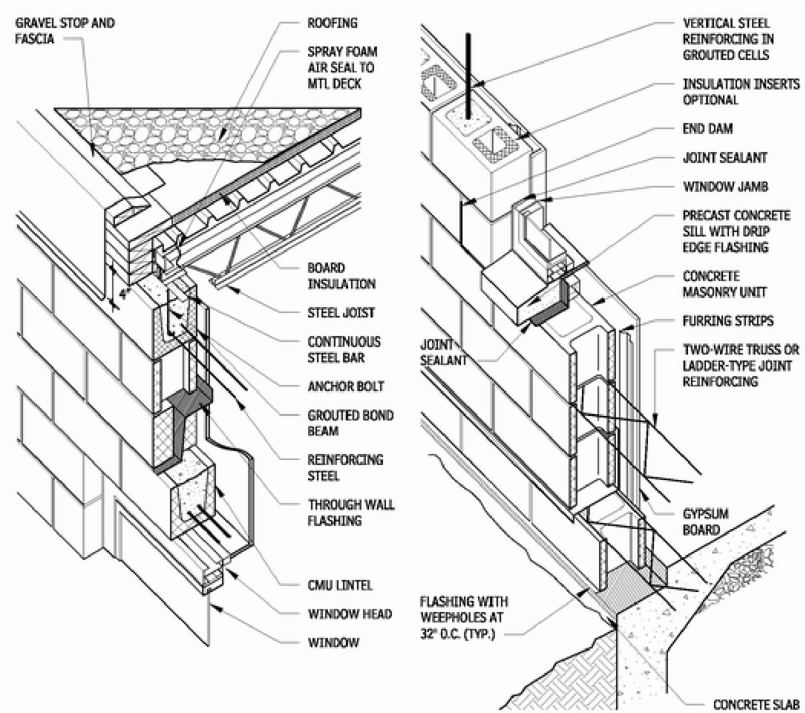
Excellent fire ratings ranging from 2-4 hours or more

Reinforcing is required for supporting lateral loads : horizontal joint reinforcements, vertical and horizontal deformed re-bars

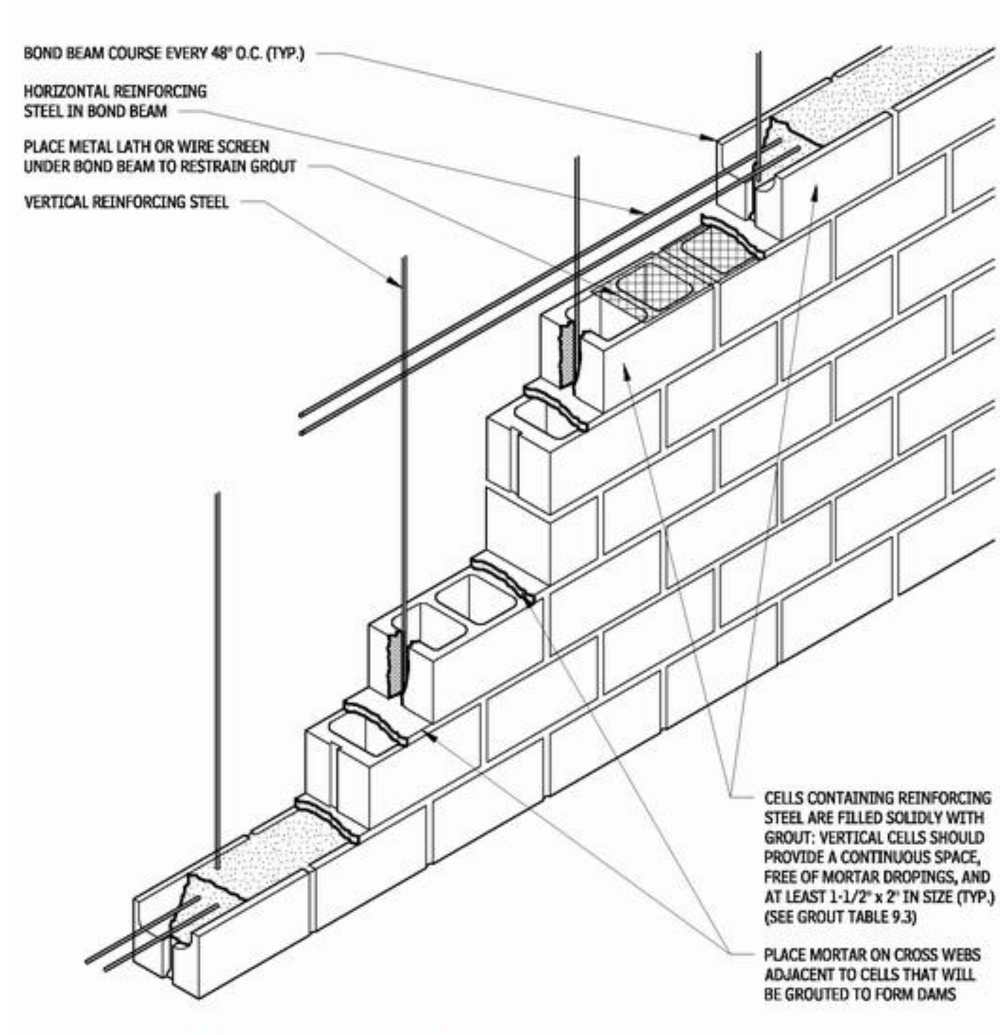
It is more practical and efficient to layout the walls vertical wall heights and building architectural elevations with the standard concrete block modular size in order to eliminate the need of saw cutting reducing the construction cost and time.

Figure 5.49 Reinforced concrete block wall section.

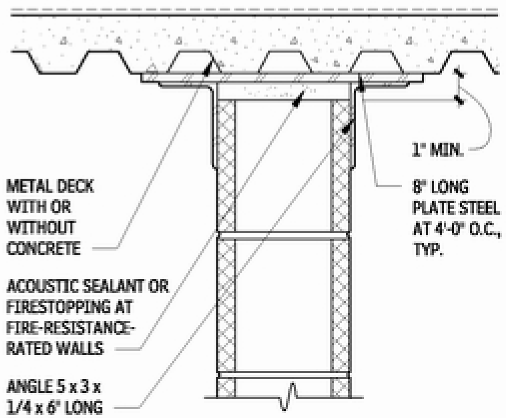




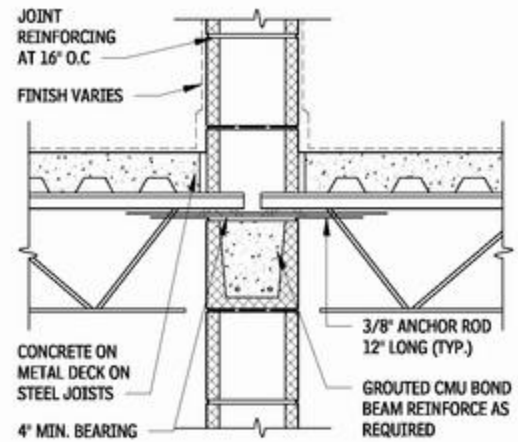
SINGLE-WYTHE MASONRY WALL DETAILS 2.263



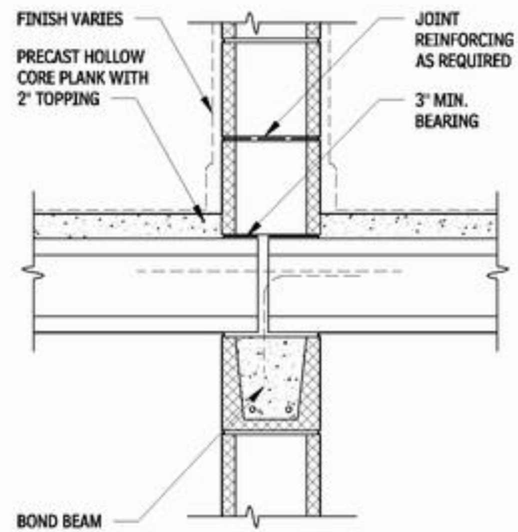
METHODS OF REINFORCING 2.269



HORIZONTAL SUPPORT FOR NON-LOAD-BEARING WALLS—METAL DECK 2.266



CMU WALL TO STEEL JOIST ANCHORAGE



CMU WALL TO CONCRETE JOIST ANCHORAGE

WALL ANCHORAGE DETAILS 2.268

www.titanamerica.com

Tarmac Block Product Catalog

All Tarmac block units meet the ASTM C-90 standard specification for load-bearing concrete masonry units. All 8" units have the equivalent thickness to meet a 2-hour fire rating as required in ACI table 216.1 and Florida Building Code table 709.3.1.

Ch.5 CONSTRUCTION MATERIALS AND METHODS p.157

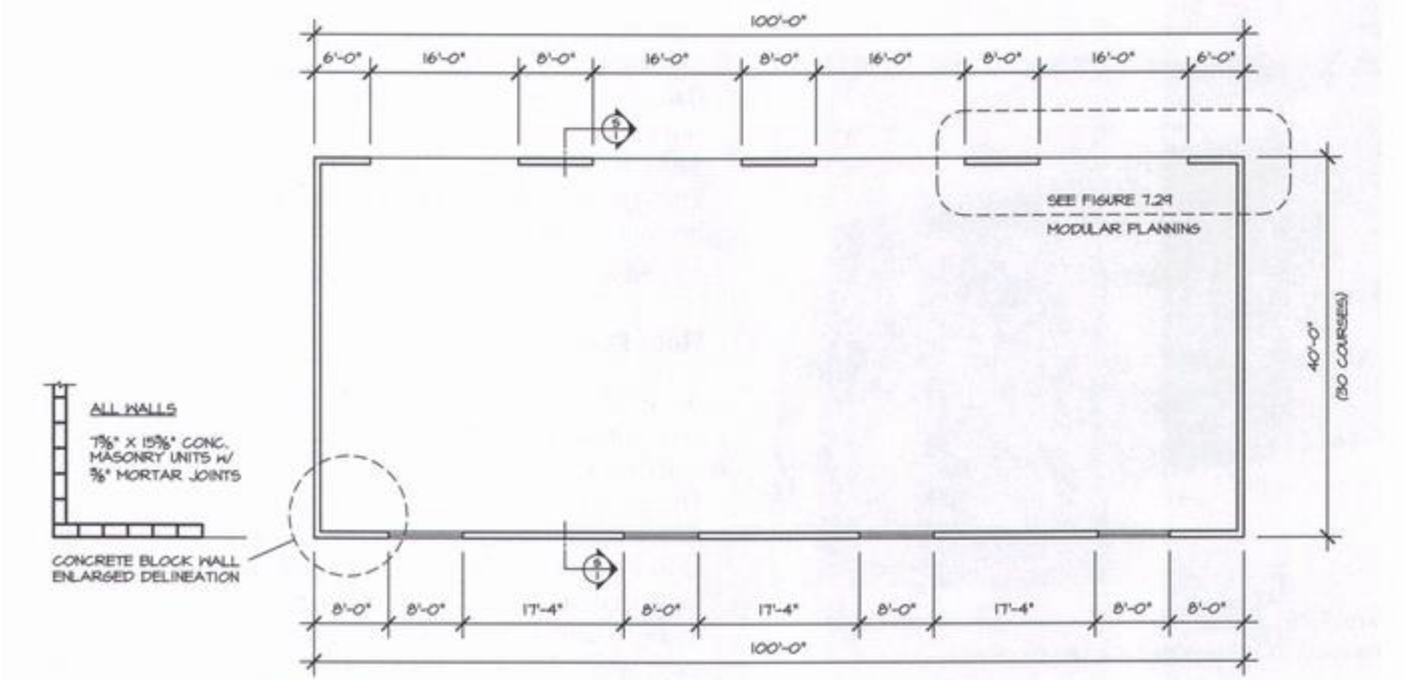


Figure 5.85 Concrete masonry modular units floor plan.

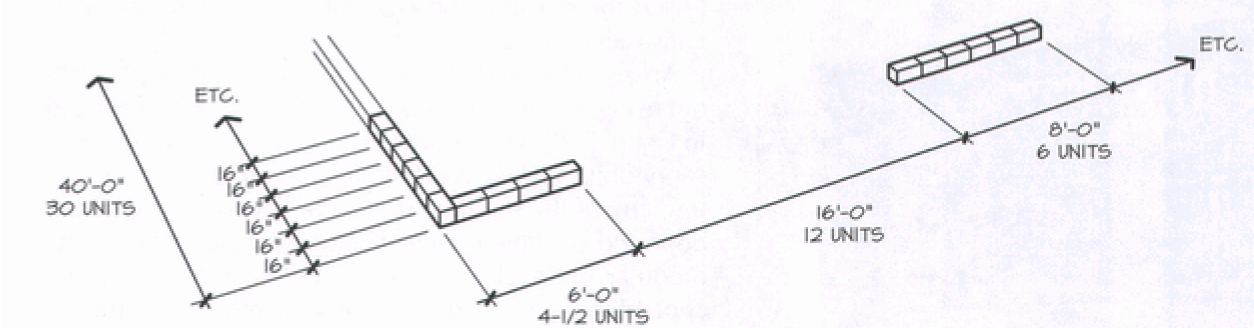


Figure 5.86 Blocks using a modular floor-plan layout.

Ch.5 CONSTRUCTION MATERIALS AND METHODS p. 175-176

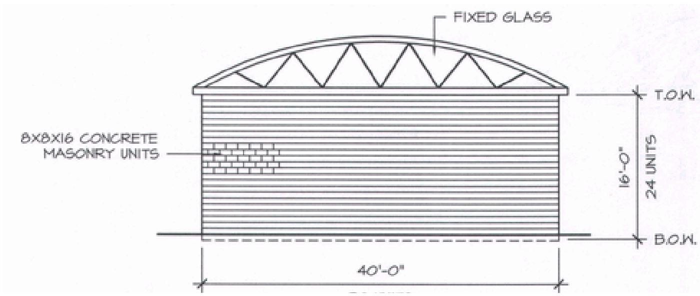


Figure 5.88 East Elevation

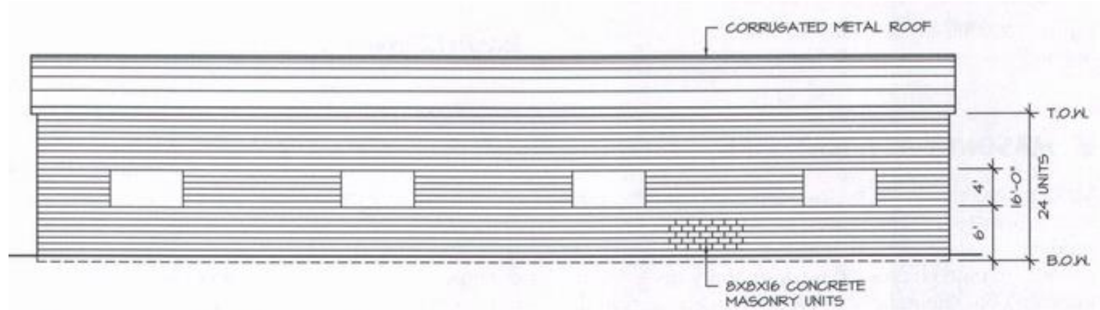


Figure 5.87 South Elevation

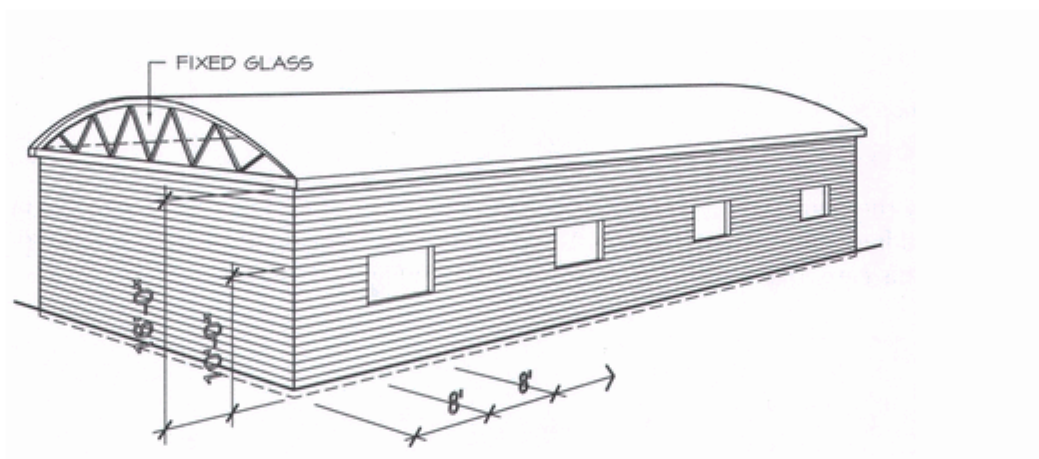


Figure 5.89 North/West elevation view.

Ch.5 CONSTRUCTION MATERIALS AND METHODS p. 175-176

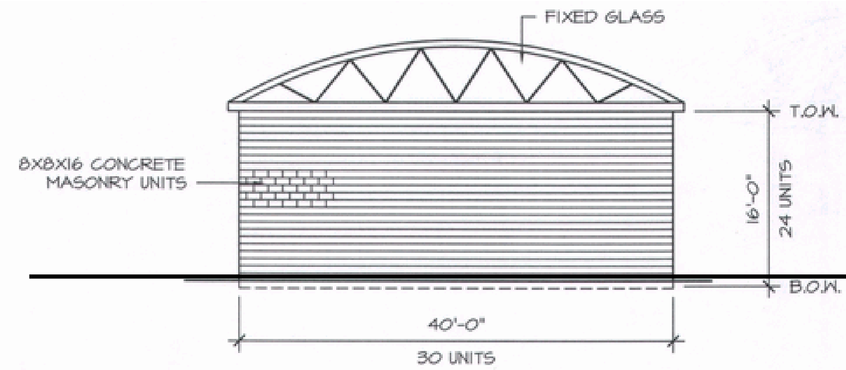


Figure 5.88 East Elevation .

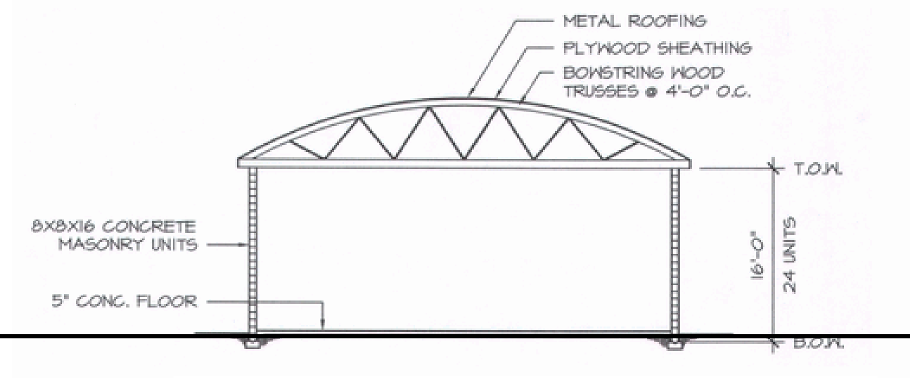
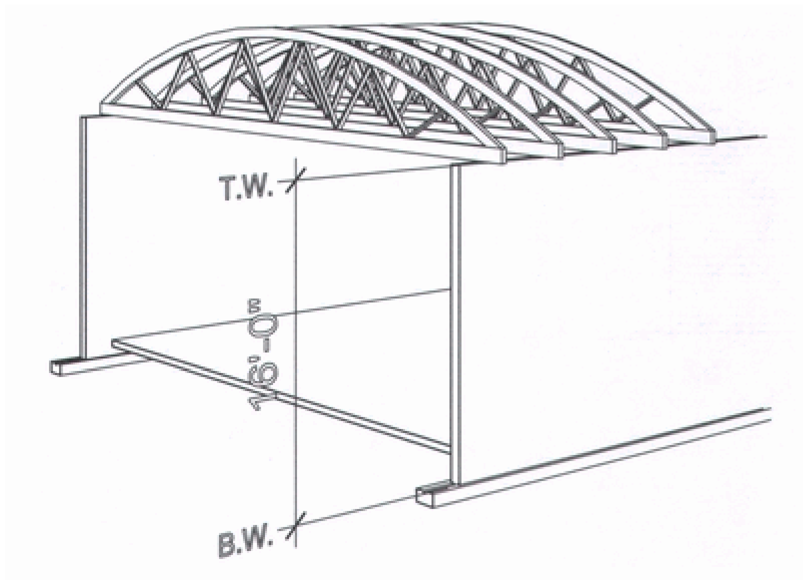


Figure 5.90 Building Section S-1



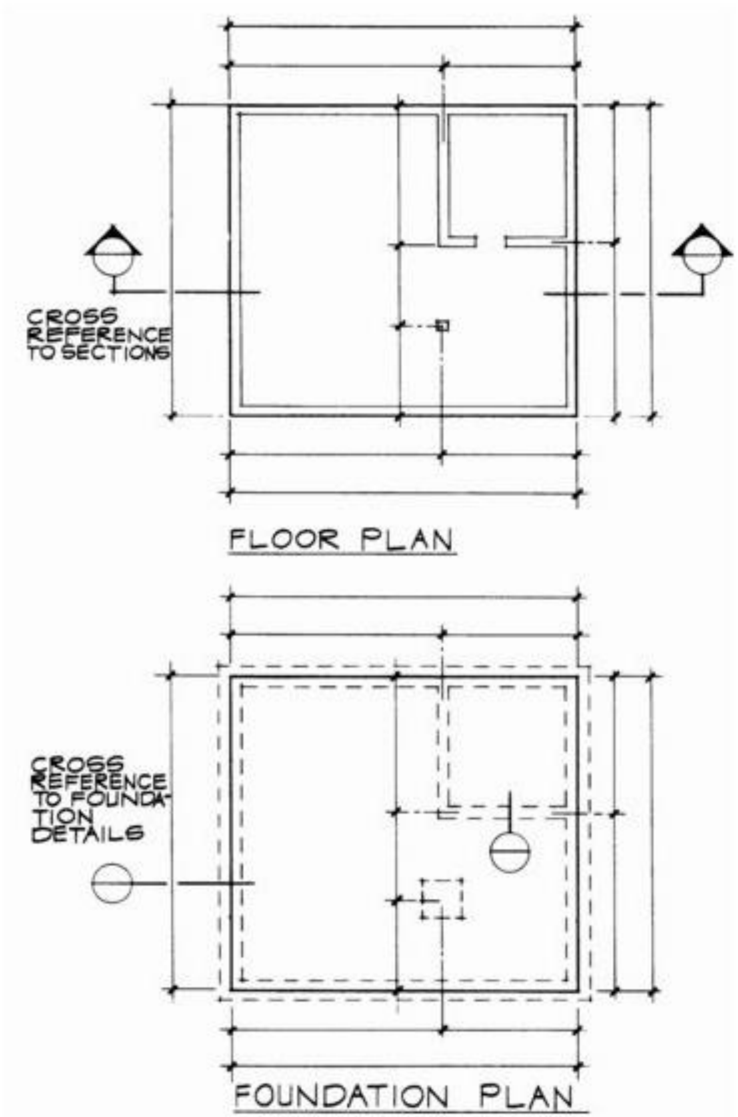
T.W. TOP OF WALL;
B.W. BOTTOM OF WALL

CHAPTER
6

P 186. INTERRELATIONSHIP OF DRAWINGS When you develop construction documents, you must have consistent relationships between the drawings for continuity and clarity. These relationships vary in their degree of importance. For example, the relationship between the foundation plan and the floor plan is most important, because continuity of dimensioning and location of structural components for both are required. See Figure 6.16. The dimensioning of the floor plan and the foundation plan are identical, and this provides continuity for dimensional accuracy. Figure 6.16 Relationship of foundation plan and floor plan.

The relationship between drawings for the electrical plan and the mechanical plan is also critical. The positioning of electrical fixtures must not conflict with the location of mechanical components, such as air supply grilles or fire sprinkler heads. Cross-reference drawings with important relationships such as these and constantly review them during preparation of the construction documents. The utilization of programs such as Revit is designed to identify conflicts and aid in determining where revisions are required. This cross-referencing and review is not as critical with drawings that are not so closely related, such as the electrical plan and the civil engineering plans, or the interior elevations and the foundation plan. Nevertheless, it can still be important.

P 186.

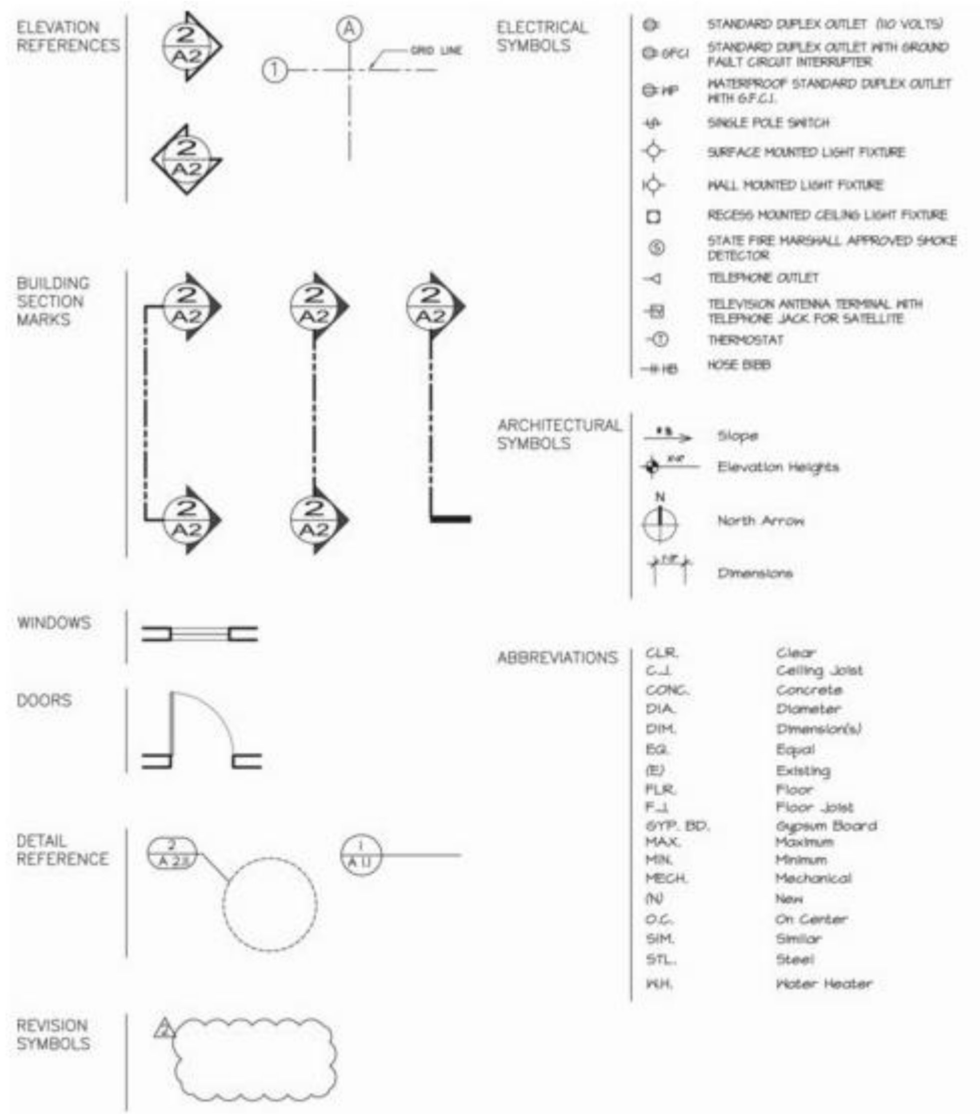


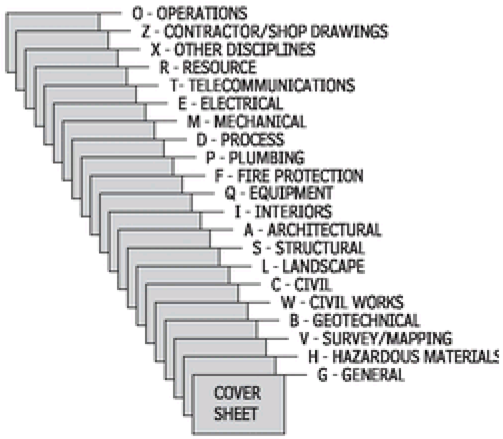
CROSS REFERENCE TO SECTIONS
FLOOR PLAN
CROSS REFERENCE TO FOUNDATION DETAILS
FOUNDATION PLAN

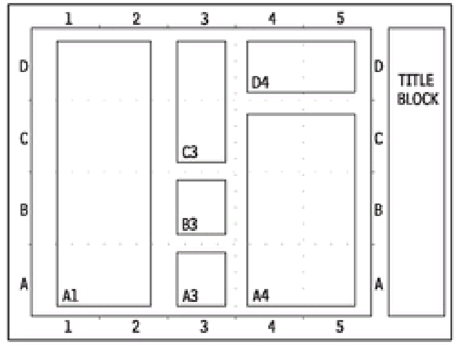
P. 192

Legal Description Every project has some type of legal description. A simple description might look like this: Lot #_______________ Block #______________ Tract #___, as recorded in book ___, page ___, of the __________________ County recorder's office.

This description must appear on the set of working drawings. It may be on the title sheet or, more appropriately, on the site plan or survey sheet. The legal description is used when researching your client's site: zoning requirements and limitations, setback requirements, height limits, or any other information you might need for a specific design feature of the project.

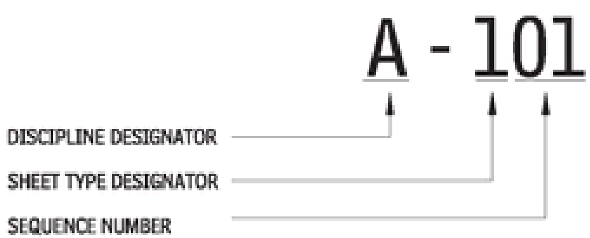

ELEVATION REFERENCES
2
A2
A
1
GRID LINE
BUILDING SECTION MARKS
WINDOWS
DOORS
DETAIL REFERENCE
REVISION SYMBOLS
ELECTRICAL SYMBOLS
STANDARD DUPLEX OUTLET (110 VOLTS)
GFCI
STANDARD DUPLEX OUTLET WITH GROUND FAULT CIRCUIT INTERRUPTER
WP
WATERPROOF STANDARD DUPLEX OUTLET WITH G.F.C.I.
SINGLE POLE SWITCH
SURFACE MOUNTED LIGHT FIXTURE
WALL MOUNTED LIGHT FIXTURE
RECESS MOUNTED CEILING LIGHT FIXTURE
STATE FIRE MARSHALL APPROVED SMOKE DETECTOR
TELEPHONE OUTLET
TELEVISION ANTENNA TERMINAL WITH TELEPHONE JACK FOR SATELLITE
THERMOSTAT
HB
HOSE BIBB
ARCHITECTURAL SYMBOLS
Slope
Elevation Heights
N
North Arrow
Dimensions
ABBREVIATIONS
CLR. Clear
C.J. Ceiling Joist
CONC. Concrete
DIA. Diameter
DIM. Dimension(s)
EQ. Equal
(E) Existing
FLR. Floor
F.J. Floor Joist
GYP. BD. Gypsum Board
MAX. Maximum
MIN. Minimum
MECH. Mechanical
(N) New
O.C. On Center
SIM. Similar
STL. Steel
W.H. Water Heater





DRAWING SHEET ORGANIZATION A.41

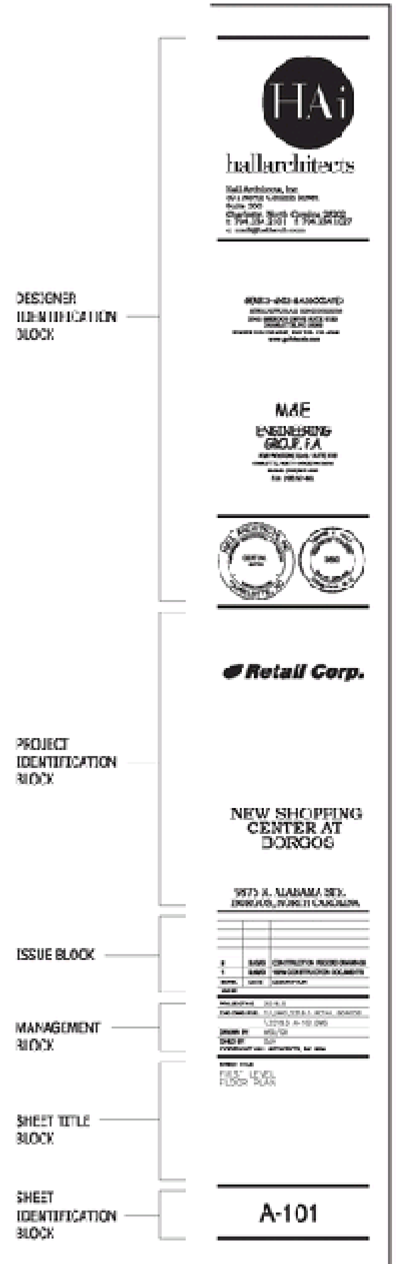
DRAWING SET HIERARCHY A.40

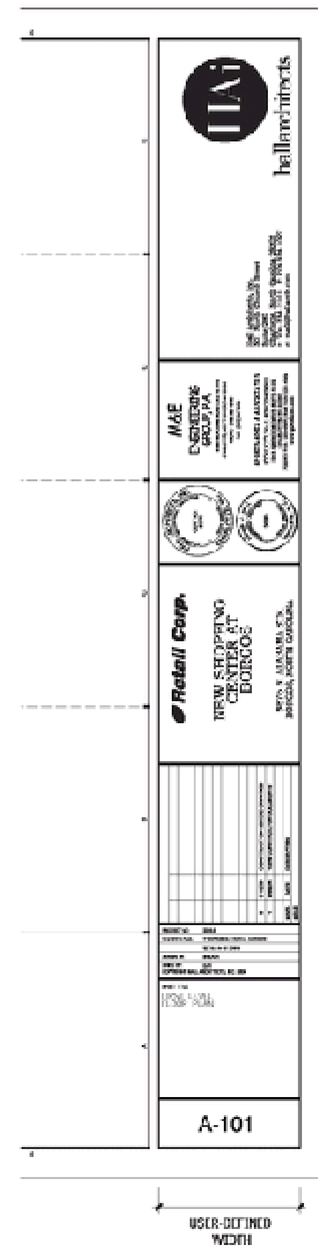


DISCIPLINE DESIGNATORS	
G	GENERAL
C	CIVIL
L	LANDSCAPE
S	STRUCTURAL
A	ARCHITECTURAL
F	FIRE PROTECTION
P	PLUMBING
M	MECHANICAL
E	ELECTRICAL
R	RESOURCE INFORMATION

SHEET TYPE DESIGNATORS	
G	GENERAL
1	PLANS
2	ELEVATIONS
3	SECTIONS
4	LARGE SCALE VIEWS
5	DETAILS
6	SCHEDULES AND DIAGRAMS
7	----
8	----
9	3D VIEWS, ISOMETRICS PERSPECTIVES AND PHOTOS

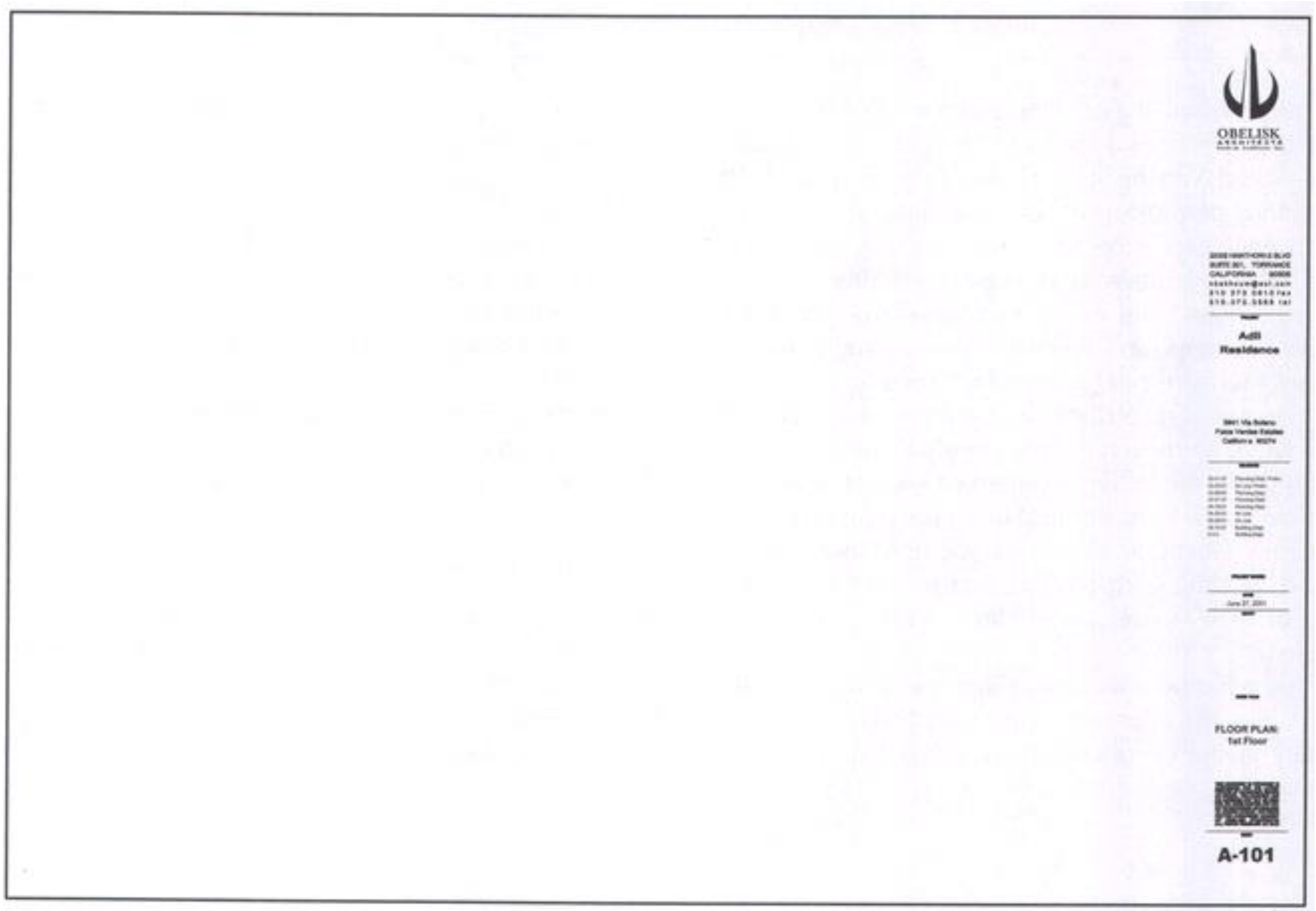
SHEET IDENTIFICATION FORMAT A.44





VERTICAL TEXT FORMAT

Architectural Graphic Standard 11 ed. American Institute of Architect. Wiley



Wakita, Osamu (Art) A. (2002). The Professional Practice of Architectural Working Drawings (p.214). Wiley.

CHAPTER

7

Ch.7. Site Analysis. p. 220.

The purpose of the site analysis is to determine the best use of the site, and find a layout that capitalizes on site attributes to optimized fulfillment on the client's needs while respecting the inherent site conditions. A site analysis is an specific study of the project site.

Important components of research in site analysis include but not limited to determining:

- Boundaries
- Topography
- Drainage
- Traffic (vehicular ,pedestrian, transportation)
- Setbacks
- Weather 9rain, sun, snow, wind)
- Lot shape (orientation
- Site utilities (electric, gas, telephone , TV, water)
- Zoning (easement, covenants)
- Vicinity
- Neighborhood Character
- Past present and future conditions.

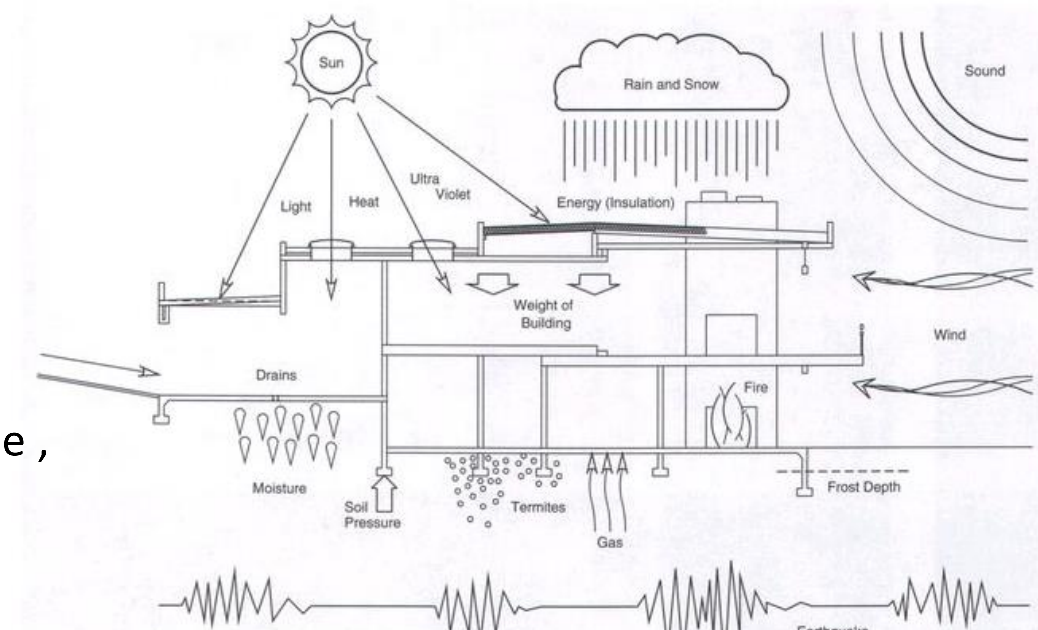
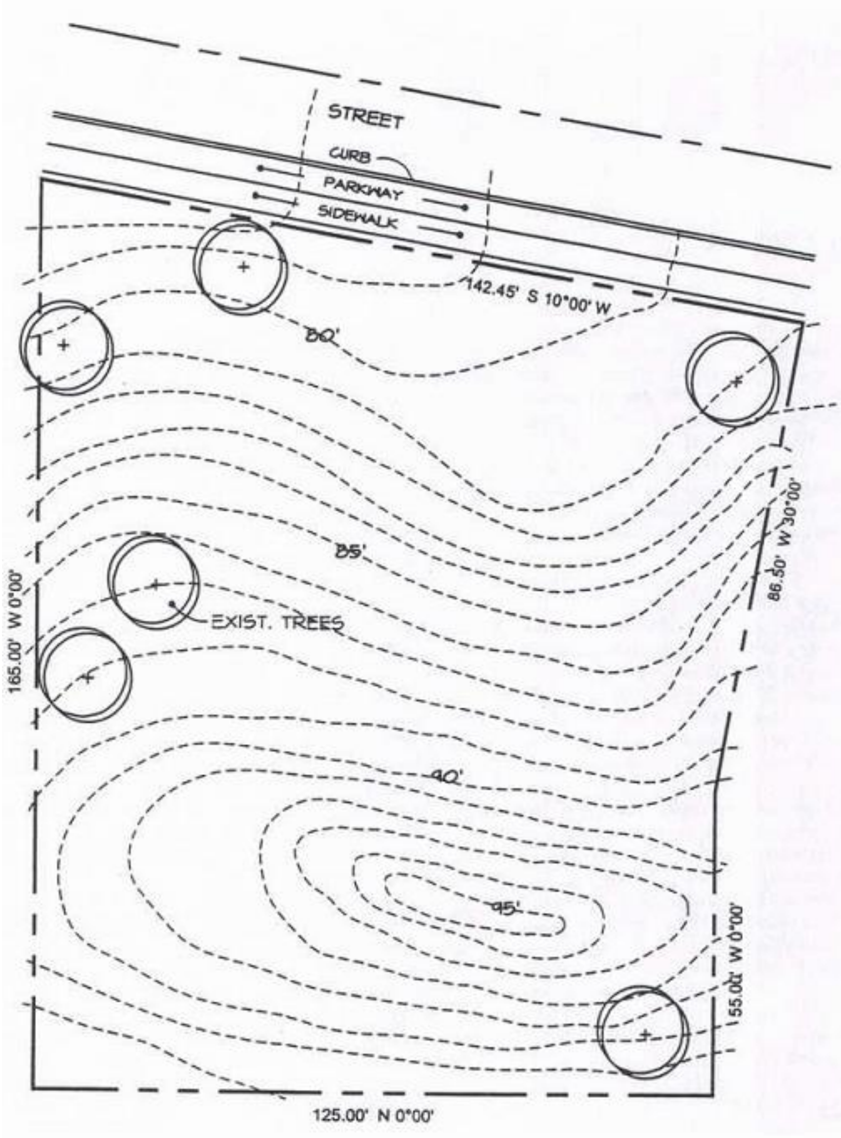


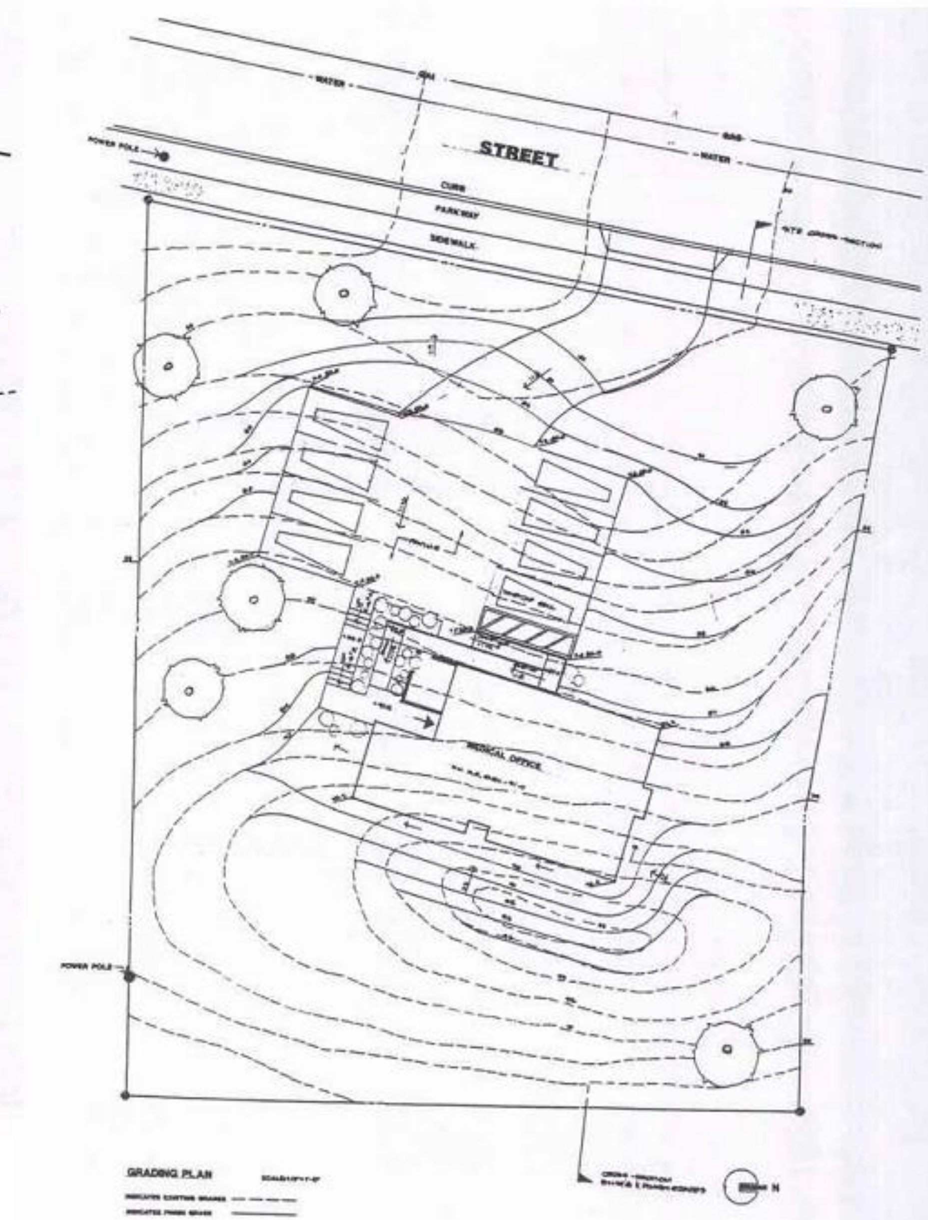
Figure 4.1 Natural forces.

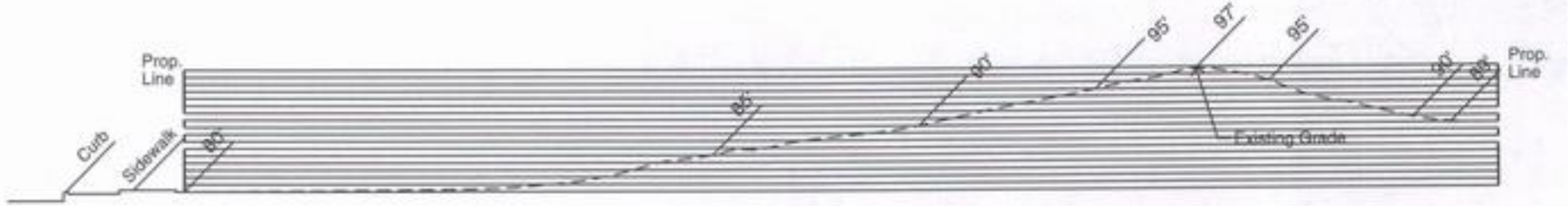
Commercial Site Grading

For sloping sites that are going to be developed for commercial and office use, the grading design will need to address automobile and pedestrian access to the building. Access from the street to the parking area should provide an ease of access relative to the driveway slope and the slope of the parking area. Grade transitions that require stairs and landings will also require ramps for people using wheelchairs and others with disabilities.

topography plan for a site that is developed for use by a small medical building. The governing planning department requires parking for eight cars and one stall for handicapped use. The car stall sizes and turning radii have also been established by the planning department.

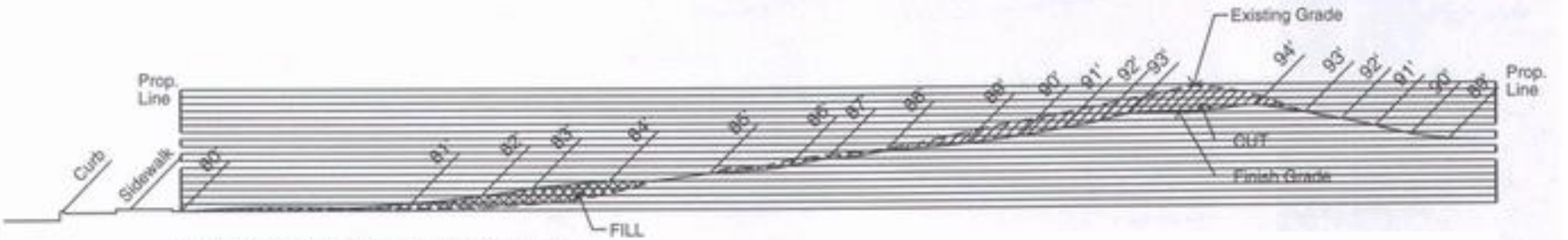

STREET
CURB
PARKWAY
SIDEWALK
142.45' S 10°00' W
80'
85'
EXIST. TREES
90'
95'
165.00' W 0°0'0"
86.50' W 30°00'
55.00' W 0°00'
125.00' N 0°00'


STREET
CURB
PARKWAY
SIDEWALK
MEDICAL OFFICE
GRADING PLAN



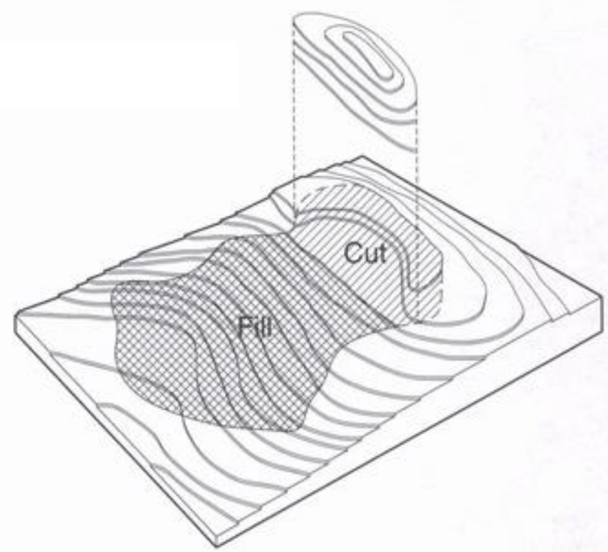
Site Cross-Section : Existing Grade

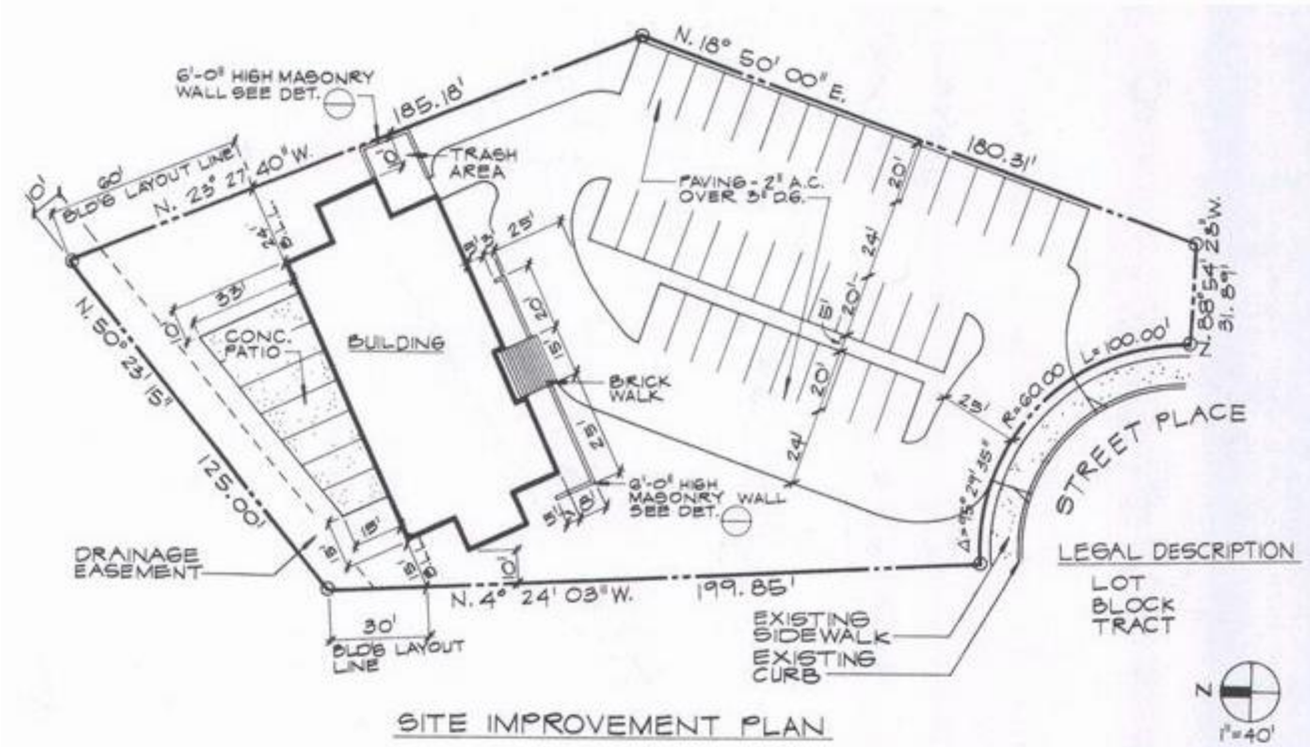
Scale : 1/8" = 1'-0"



Site Cross-Section : Finish Grading

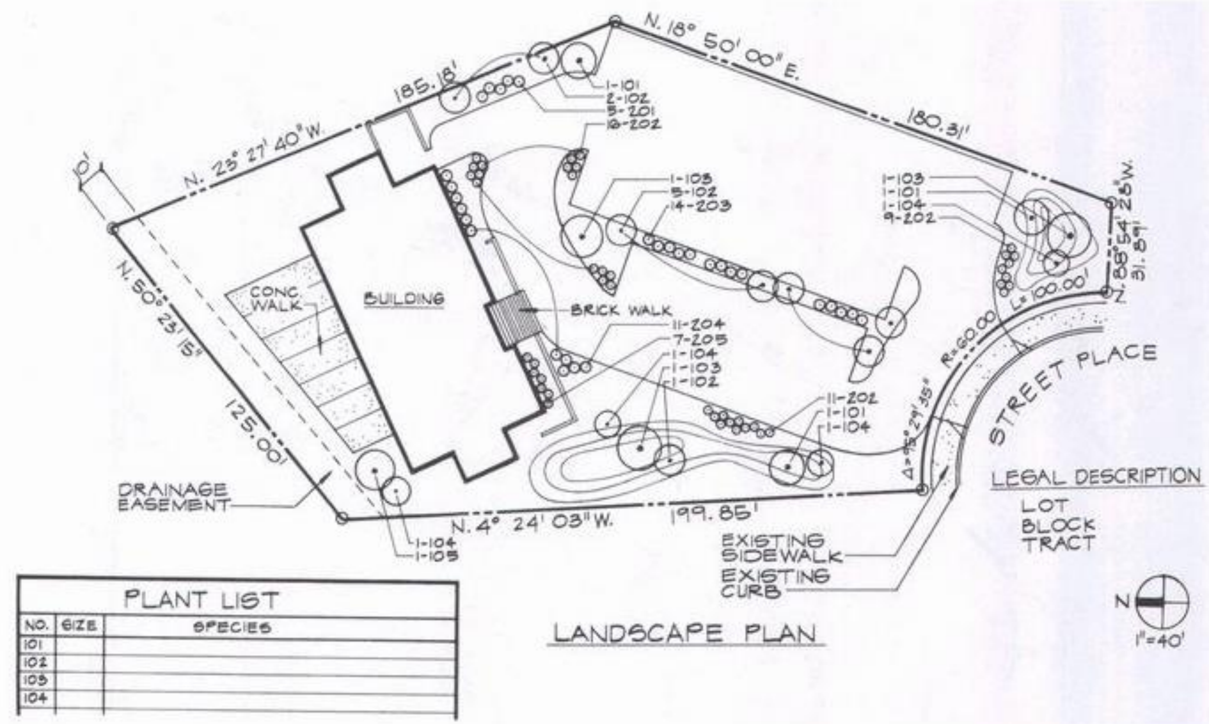
Scale : 1/8" = 1'-0"





The primary information to be found in the site improvement plan is as follows:

1. Site lot lines with accompanying bearings and dimensions
2. Scale of the drawing
3. North arrows
4. Building location with layout dimensions
5. Paving, walks, walls with their accompanying material call-outs, and layout dimensions



p.246 **Landscape Plan and Plant List**

The final stage of site development for most projects is landscaping. The landscape drawing shows the location of trees, plants, ground covers, benches, fences, and walks. Accompanying this is a plant list, identifying plant species with a symbol or number and indicating the size and number of plants.

Irrigation Plan

An irrigation plan often accompanies the landscape plan. This shows all water lines, control valves, and types of watering fixtures needed for irrigation.

Driveway and Curb

Often one side of your site is bound with a sidewalk, parkway, and a small curb. In most cities this portion, adjacent to a street, is maintained by the Department of Public Works or some such agency. To break the curb for a driveway, permits are obtained from such an agency or a subdivision, perhaps the Road Department Bureau. Based on the size of the curb, the agency will configure an angle at which you can cut the curb to form the driveway. Figure 7.44 is a before-and-after type drawing showing the appearance of a driveway.

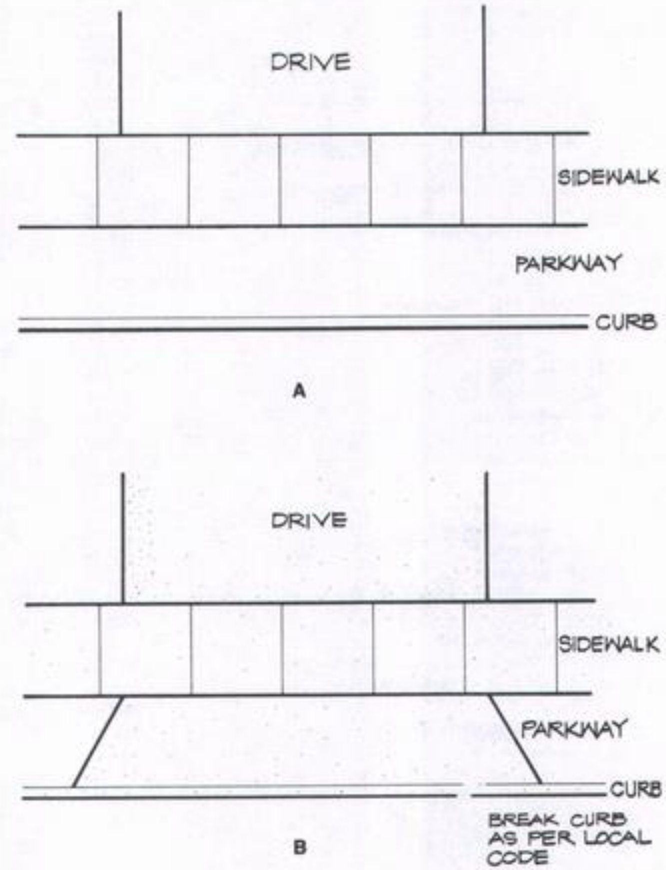


Figure 7.44 How to break a curb for a driveway

SITE PLAN

The primary purpose of the site plan was to locate the structure on the lot and indicate the proposed parking plan. Depending on its complexity, the site plan may or may not be combined with the grading plan. For this project, the grading plan, the site plan, and the paving plan were done separately. Figure 16.8 aerial photo of the completed project.

http://www.youtube.com/watch?v=3QN9runMi9w

Figure 16.8 Aerial photo of the finish site.

Our first step was to describe with lines the perimeter of the lot. A formal description of the site is obtained from the client or the civil engineer. The civil engineering survey shows and locates easements (right-of-access). In this case, the easement was a sewer easement, shown by dotted lines through the center and at the top of the lot.

The property contour is shown with a center-line type line to contrast it with the dotted lines of the easement. Property contours are shown with dotted lines or central-line type lines.

The center line of the road is shown here as a solid line, as are the road itself and the sidewalk. The circle at the left indicates a cul-de-sac (the end of the road with an area for turning around).

Our main task at this stage was to locate the structure. Location must always be done very carefully, using the preliminary site plan and the civil engineer's site plan. In this case, the easement through the center of the lot was a key factor in locating the structure.

The 400 parking stalls were next located. We needed to take into account such regulations as:

1. . Turning radius of a standard car
2. . Parking stall requirements
3. . Permissible ratio of compact stalls to regular stalls
4. . Aisles required between rows of parking
5. . Dedicated green space requirement, if any
6. . Ratio of parking spaces for persons with disabilities, their required distance to the point of entry, etc.

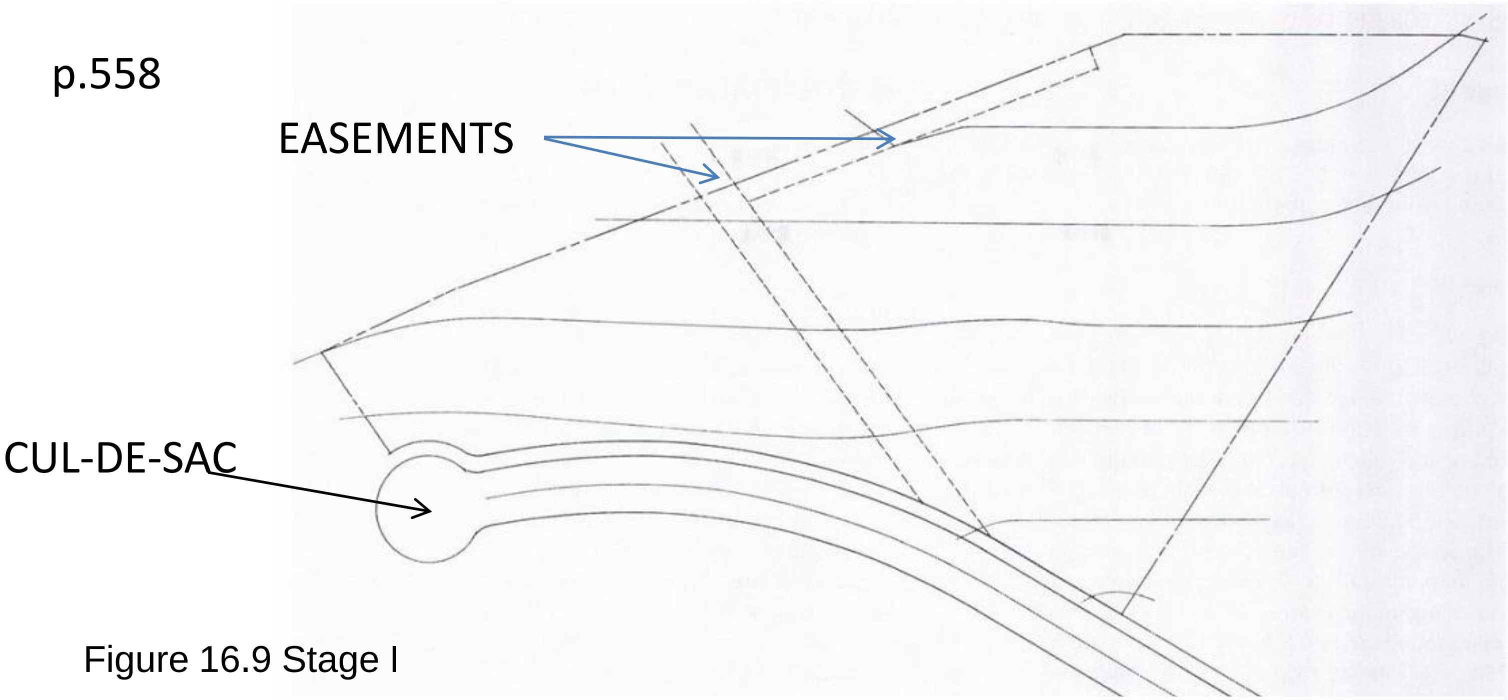


Figure 16.9 Stage I

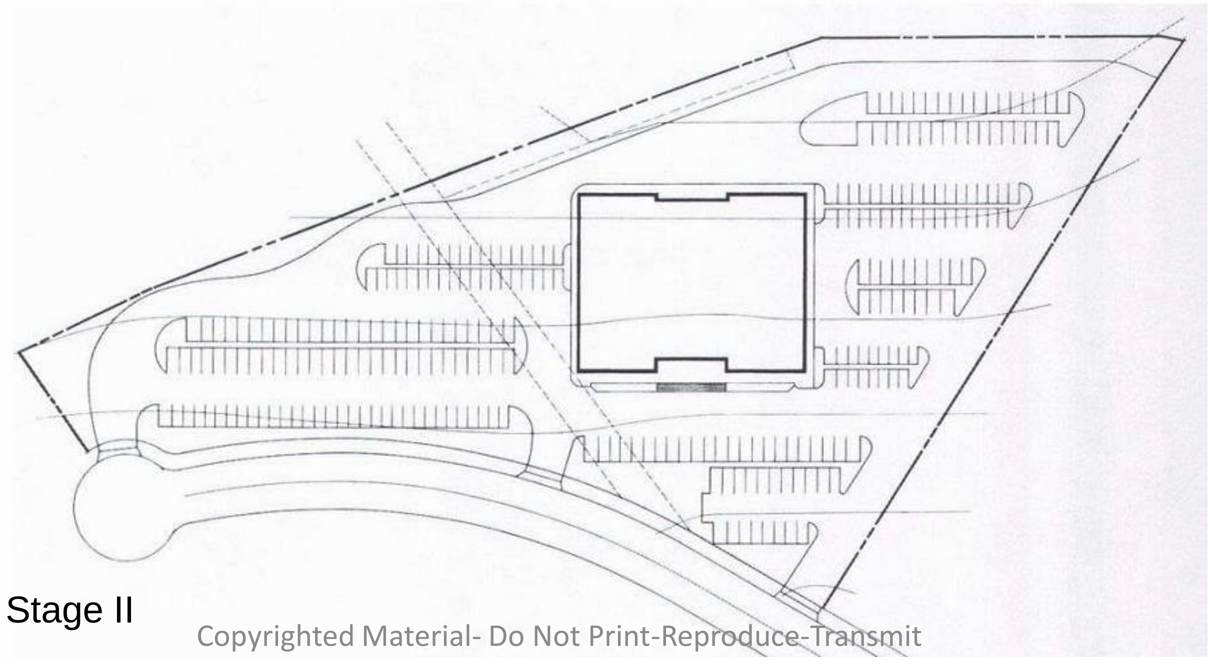


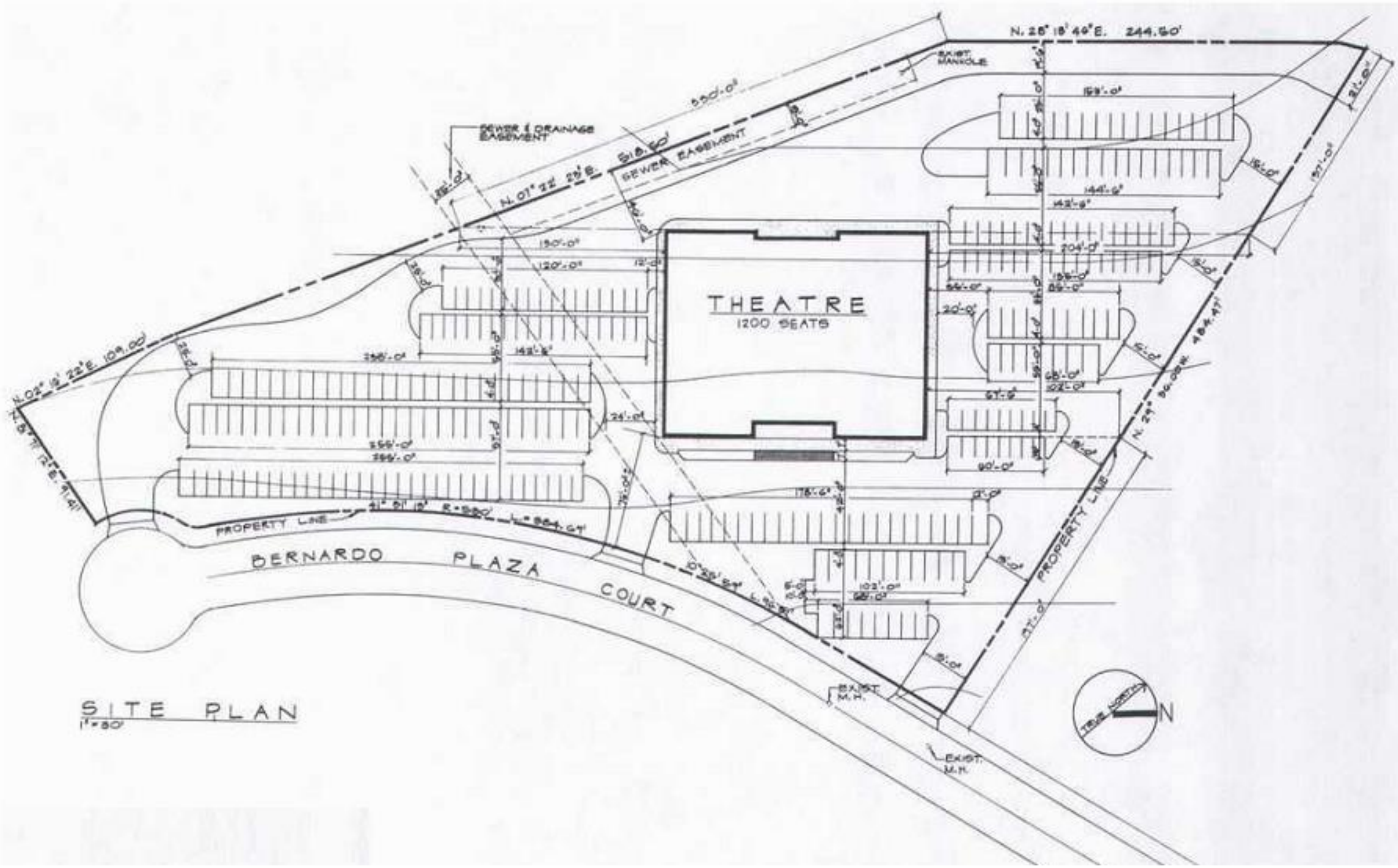
Figure 16.10 Stage II

Here, we added the property lines with their North orientations and respective lengths. The dimensions that located this structure were added next.

Parking stalls and islands were dimensioned and located next. Notice again that the parking layout follows the contour lines. Streets were labeled, and the drawing titled. The scale and North arrow were added.

The shape of the site was complicated and we had many parking stalls to show, so we drew a separate partial grading plan. Figure 16.13 A shows the overall site with a shaded area that is enlarged in Figure 16.13 B The letters "T.C." means "top of curb." The number on the top indicates the elevation to the bottom of the curb. These numbers are expressed in decimals; a difference of 0.5 is equal to 6 inches. By following the numbers around the curb, the direction of water flow can be determined. A 1 % and a 2% slope are also shown periodically.

p. 559 Figure 16.12 Site plan



T.C. TOP OF CURB

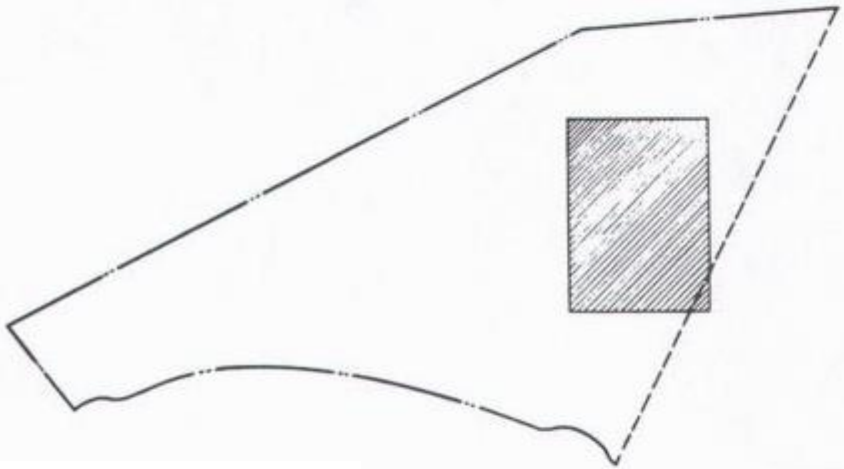


Figure 16.13 A Portion of grading plan to be enlarged.

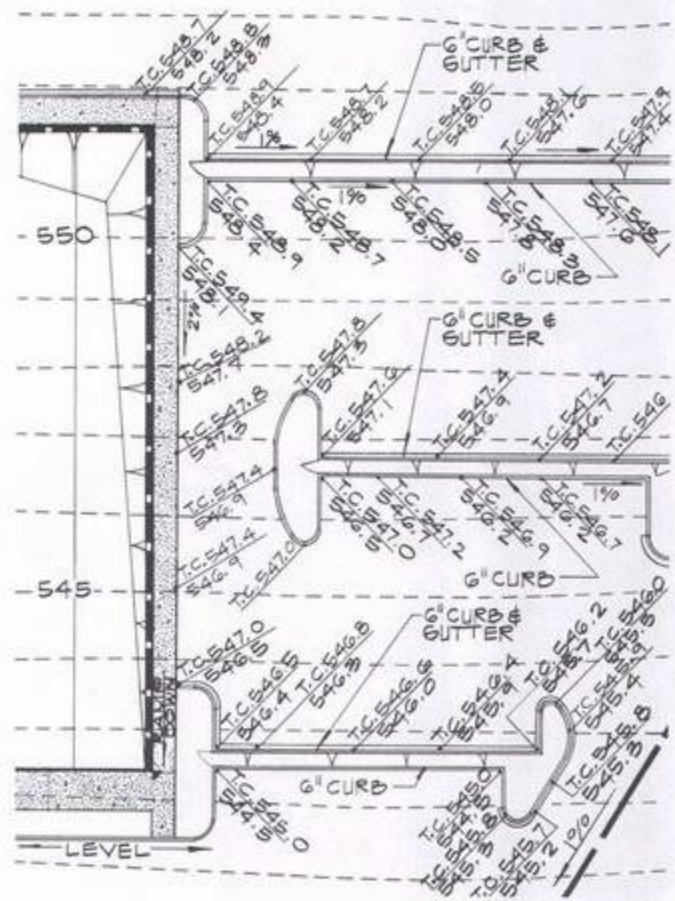
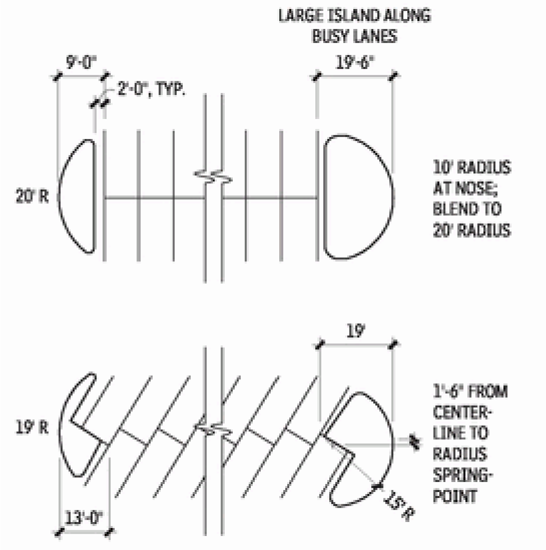


Figure 16.13 B Portion of grading plan enlarged.



END ISLANDS 7.14

FLORIDA BUILDING CODE CHAPTER 11

Total Parking in Lot	Required Minimum Number of Accessible Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of total
1001 and over	20 plus 1 for each 100 over 1000

Figure 16.15 Grading the property.

Figure 16.14 Graded site without structure. (William Boggs Aerial Photography. Reprinted with permission.)

http://www.gemtec.ca/civil/site-development.html

Figure 16.19 Trenched Footing

Figure 16.17

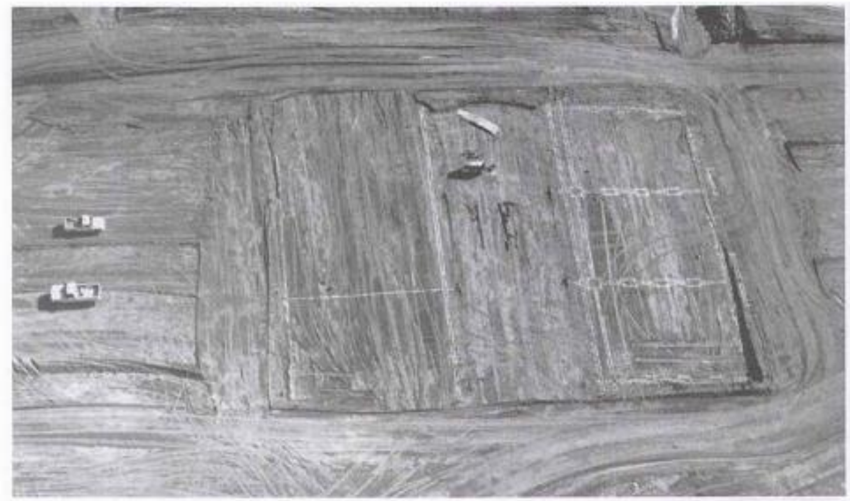
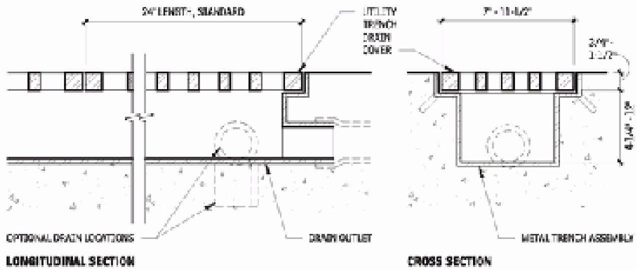
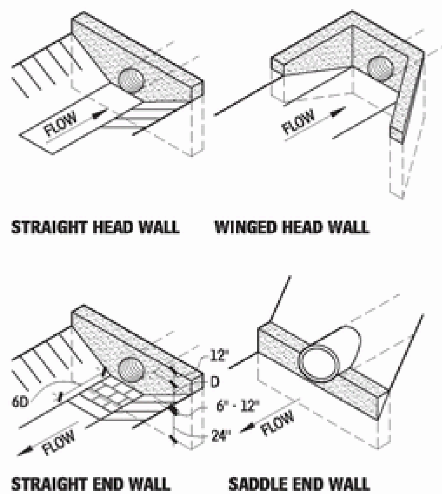


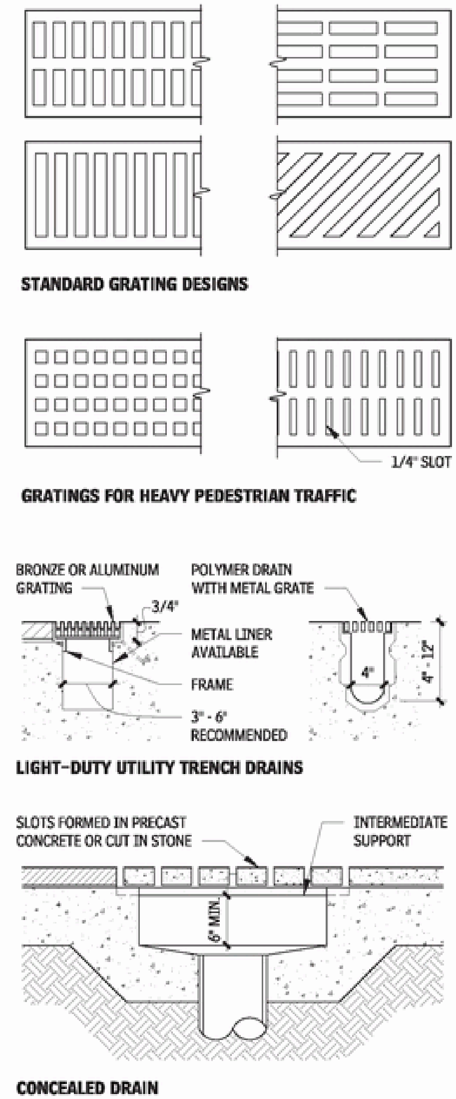
Figure 16.18 Chalked lines ready for trenching. (William Boggs Aerial Photography. Reprinted with permission.)



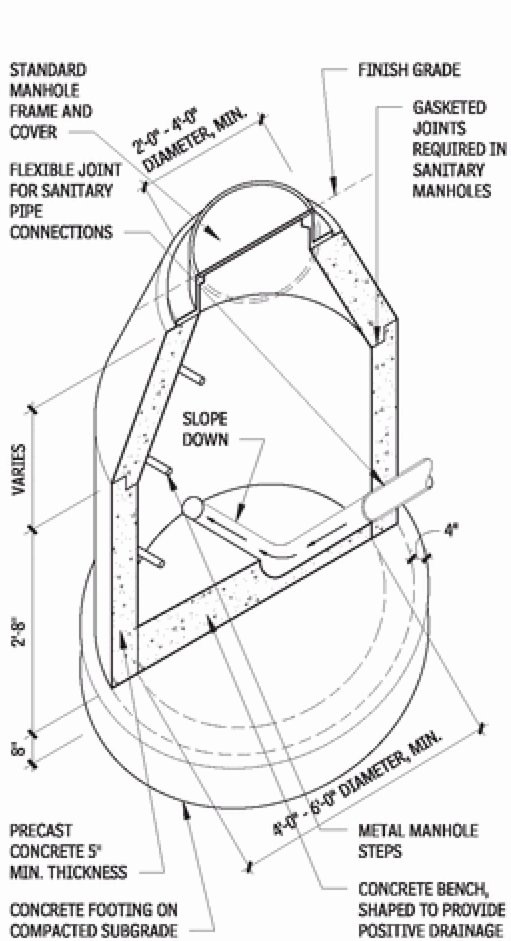
METAL UTILITY TRENCH DRAIN ASSEMBLY 7.140



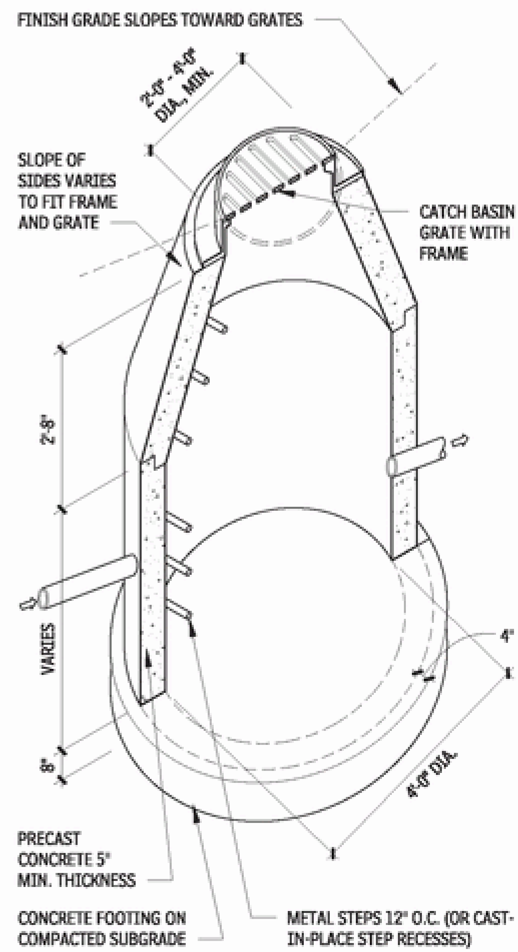
HEAD WALLS AND END WALLS 7.142



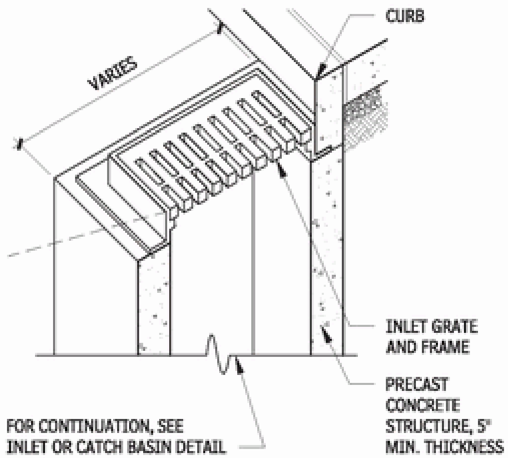
MISCELLANEOUS TRENCH DRAINS 7.143

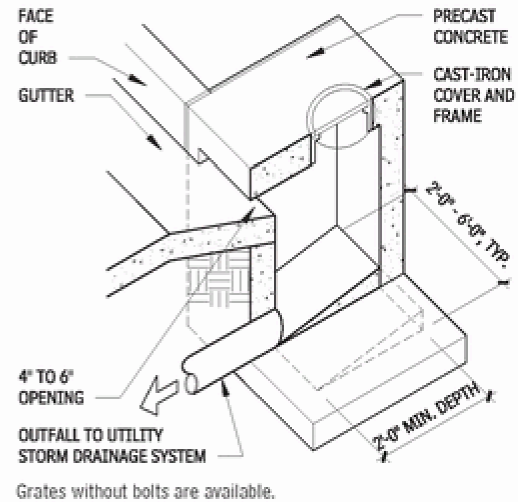


SANITARY UTILITY SEWERAGE STRUCTURE 7.152



STORM DRAINAGE STRUCTURE 7.153



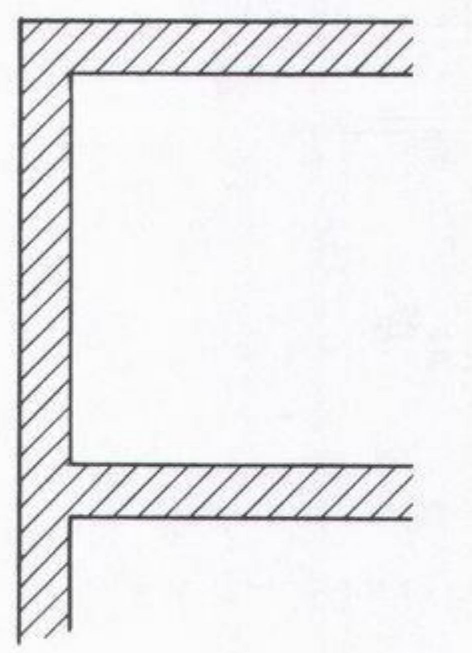


GUTTER INLET STORM DRAINAGE STRUCTURE 7.155

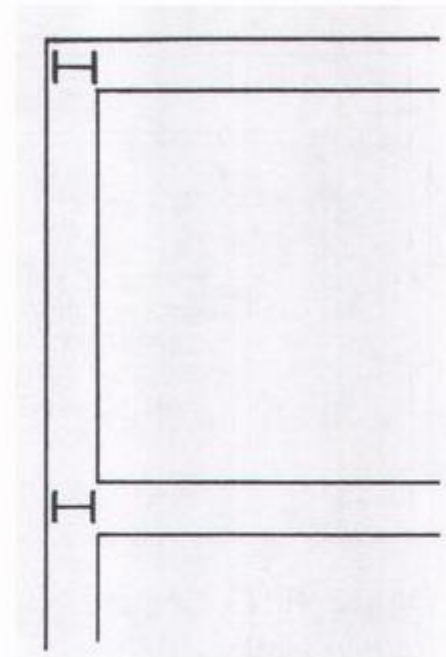
CURB INLET STORM DRAINAGE STRUCTURE 7.156

CHAPTER
8

Ch. 8 Floor Plan p. 257



p. 257. Figure 8.8 Floor Plan Representation of masonry.



p. 257. Figure 8.9 Representation of steel frame.

Ch. 8 Floor Plan p. 260-261

Pilasters, that is, columns built into the wall by widening the walls, are dimensioned to the center. The size of the pilaster itself can be lettered adjacent to one of the pilasters in the drawing. Another method of dealing with the size of these pilasters is to refer the reader of the plan to a detail with a note or reference bubble. **See Figure 8.23** All columns consisting of masonry or masonry around steel are also dimensioned to the center.

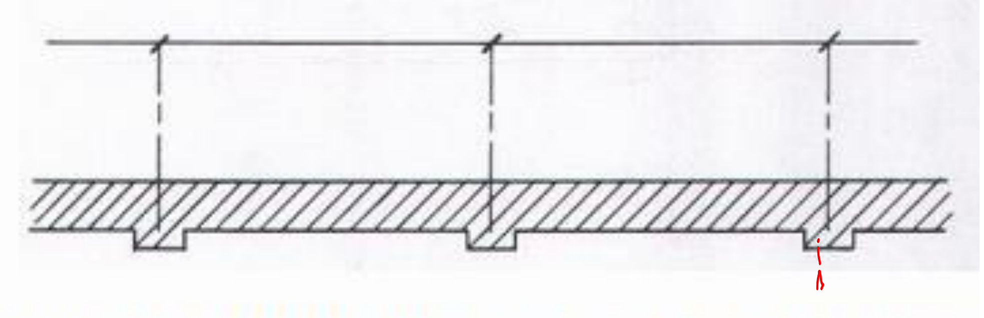


Figure 8.23 Dimensioning Pilasters.

Ch. 8 Floor Plan p. 261

Windows and Doors. Windows and doors create a unique problem in masonry units. In wood structures, windows and doors are located by dimensioning to the center and allowing the framing carpenter to create the proper opening for the required window or door size. In masonry, the opening is established before the installation of the window or door. This is called the "**rough opening**"; the final opening size is called the "**finished opening.**"

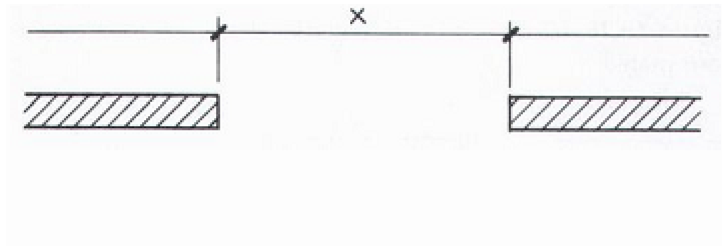


Figure 8.24 Rough opening in masonry wall

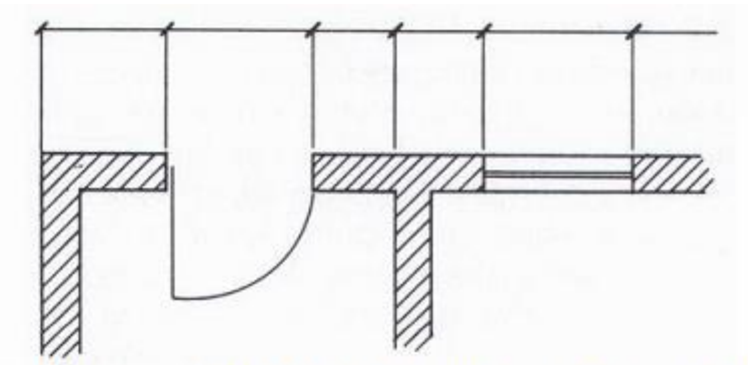
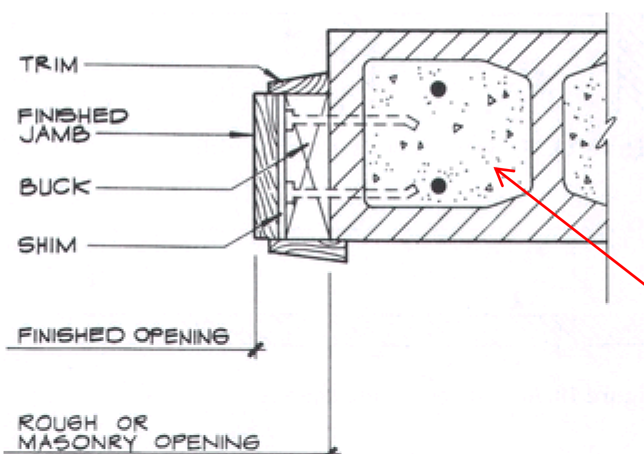


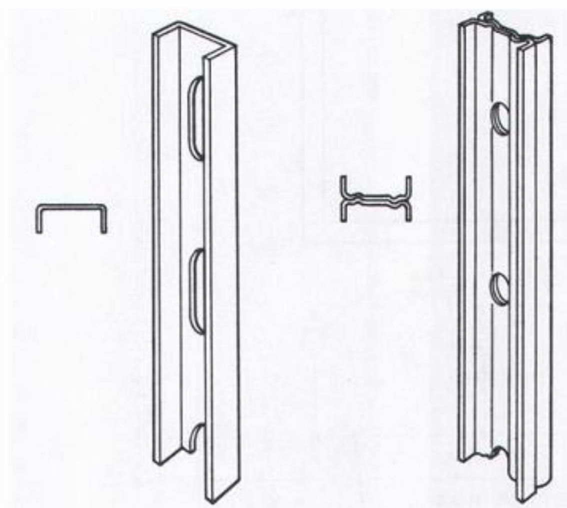
Figure 8.26 Locating door and windows



Fill cell with reinforcement

Figure 8.25 Door Jamb and masonry opening

Ch. 8 Floor Plan p.302 Steel



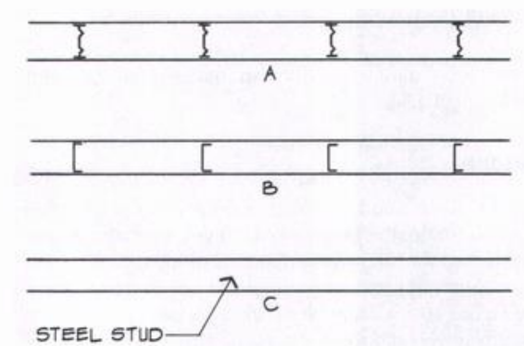
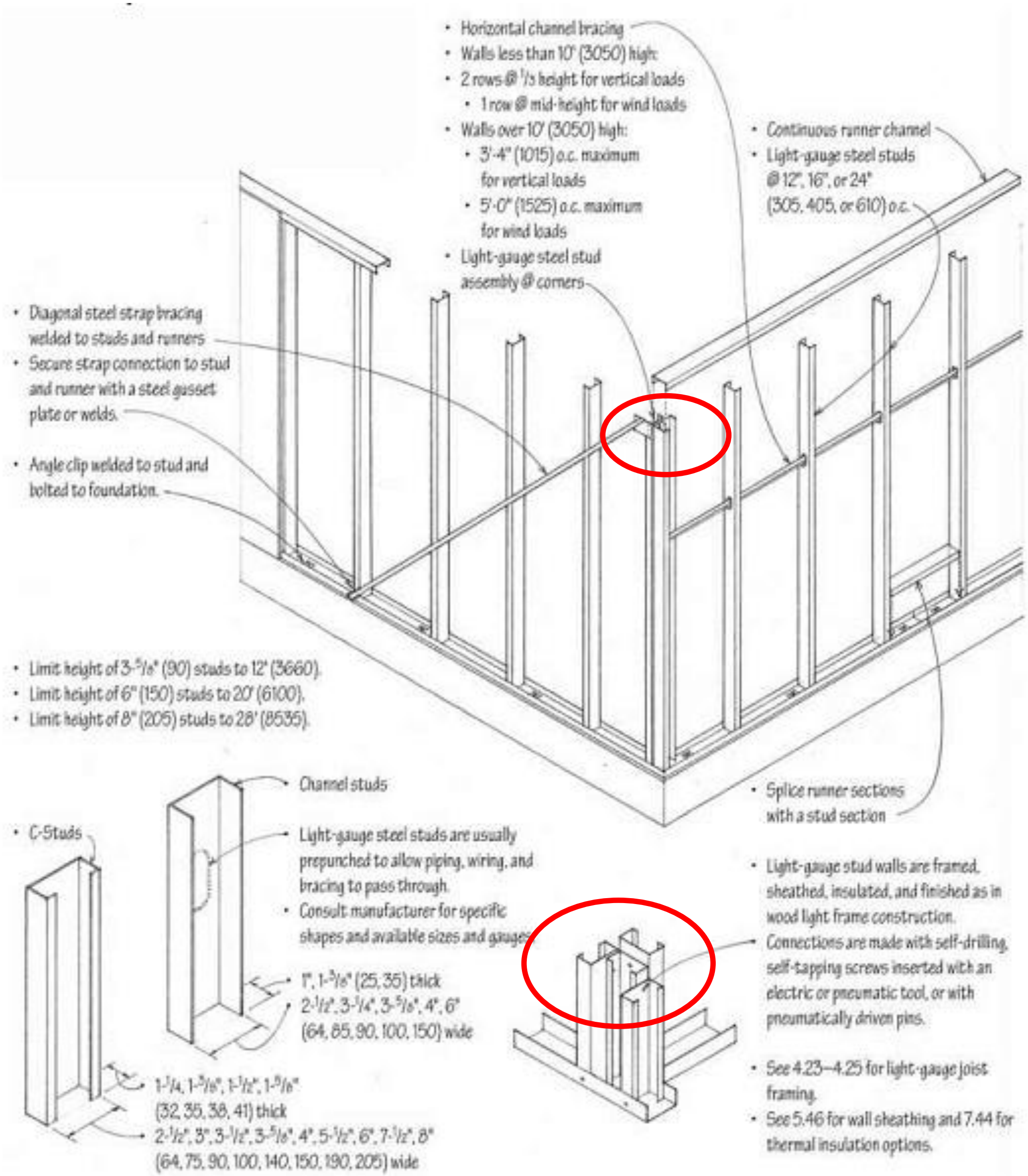
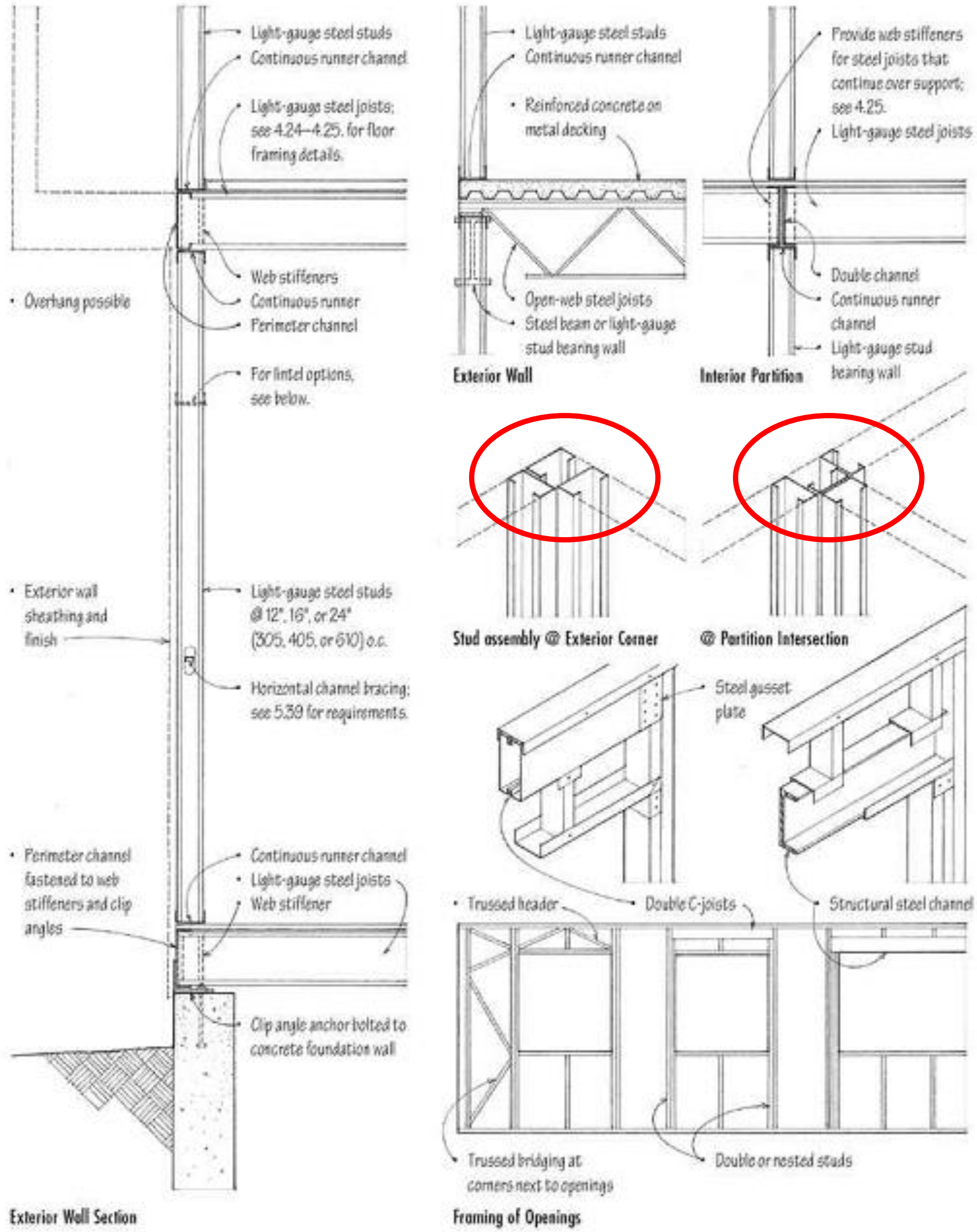


Figure 8.28 Basic steel stud shapes


• Horizontal channel bracing
• Walls less than 10' (3050) high:
• 2 rows @ 1/3 height for vertical loads
• 1 row @ mid-height for wind loads
• Walls over 10' (3050) high:
• 3'-4" (1015) o.c. maximum for vertical loads
• 5'-0" (1525) o.c. maximum for wind loads
• Light-gauge steel stud assembly @ corners
• Continuous runner channel
• Light-gauge steel studs @ 12", 16", or 24" (305, 405, or 610) o.c.
• Diagonal steel strap bracing welded to studs and runners
• Secure strap connection to stud and runner with a steel gusset plate or welds.
• Angle clip welded to stud and bolted to foundation.
• Limit height of 3-5/8" (90) studs to 12' (3660).
• Limit height of 6" (150) studs to 20' (6100).
• Limit height of 8" (205) studs to 28' (8535).
• Splice runner sections with a stud section
• Channel studs
• Light-gauge steel studs are usually prepunched to allow piping, wiring, and bracing to pass through.
• Consult manufacturer for specific shapes and available sizes and gauges.
• 1", 1-3/8" (25, 35) thick
• 2-1/2", 3-1/4", 3-5/8", 4", 6" (64, 85, 90, 100, 150) wide
• C-Studs
• 1-1/4, 1-3/8", 1-1/2", 1-5/8" (32, 35, 38, 41) thick
• 2-1/2", 3", 3-1/2", 3-5/8", 4", 5-1/2", 6", 7-1/2", 8" (64, 75, 90, 100, 140, 150, 190, 205) wide
• Light-gauge stud walls are framed, sheathed, insulated, and finished as in wood light frame construction.
• Connections are made with self-drilling, self-tapping screws inserted with an electric or pneumatic tool, or with pneumatically driven pins.
• See 4.23–4.25 for light-gauge joist framing.
• See 5.46 for wall sheathing and 7.44 for thermal insulation options.


Light-gauge steel studs
Continuous runner channel
Light-gauge steel joists; see 4.24–4.25. for floor framing details.
Web stiffeners
Continuous runner
Perimeter channel
Overhang possible
For lintel options, see below.
Exterior wall sheathing and finish
Light-gauge steel studs @ 12", 16", or 24" (305, 405, or 610) o.c.
Horizontal channel bracing; see 5.39 for requirements.
Perimeter channel fastened to web stiffeners and clip angles
Continuous runner channel
Light-gauge steel joists
Web stiffener
Clip angle anchor bolted to concrete foundation wall
Exterior Wall Section
Light-gauge steel studs
Continuous runner channel
Reinforced concrete on metal decking
Open-web steel joists
Steel beam or light-gauge stud bearing wall
Exterior Wall
Provide web stiffeners for steel joists that continue over support; see 4.25.
Light-gauge steel joists
Double channel
Continuous runner channel
Light-gauge stud bearing wall
Interior Partition
Stud assembly @ Exterior Corner
@ Partition Intersection
Steel gusset plate
Trussed header
Double C-joists
Structural steel channel
Trussed bridging at corners next to openings
Double or nested studs
Framing of Openings

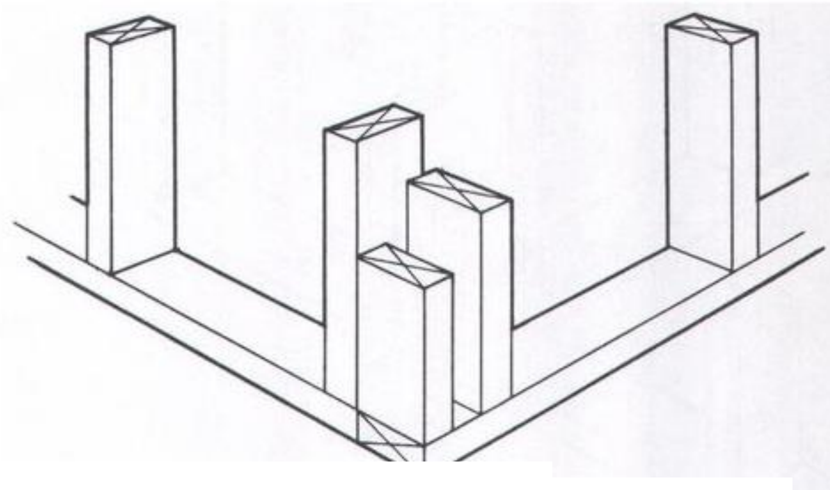


Figure 8.10 Pictorial Corner at sill

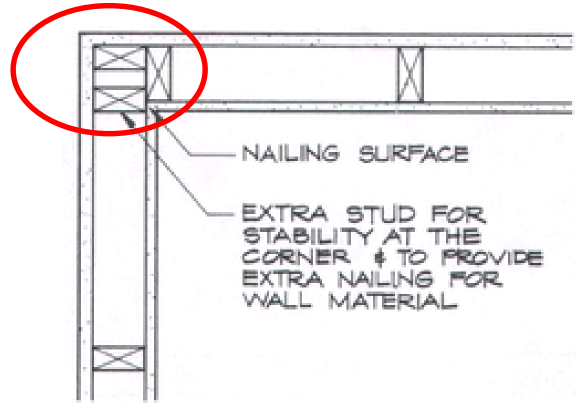


Figure 8.10 Plan Corner at sill

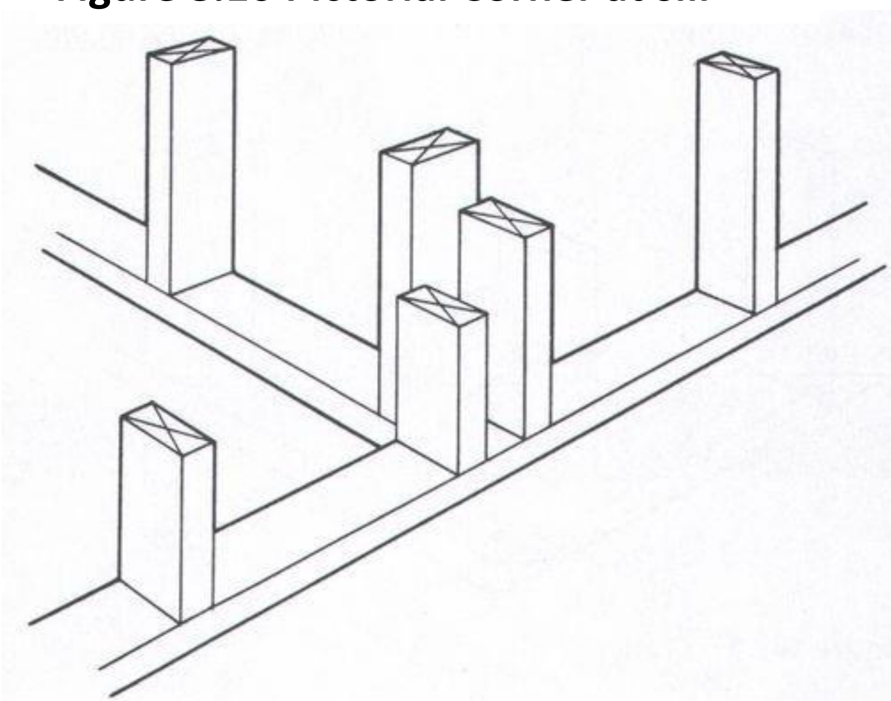


Figure 8.11 Pictorial Intersection of exterior wall in interior wall

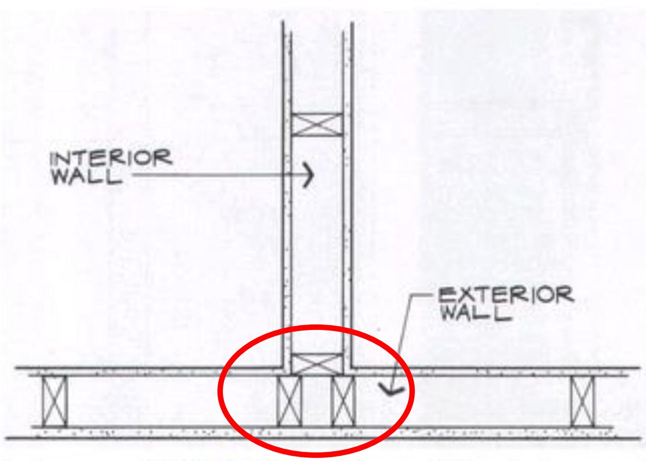


Figure 8.11 Plan Intersection of exterior wall in interior wall

Ch. 8 Floor Plan p. 263

Dimensioning Walls. Walls, especially interior walls that do not fall on the established grid, need to be dimensioned—but only to the nearest dimension grid line. **Figure 8.37** is a good example of an interior wall dimensioned to the nearest column falling on a grid.

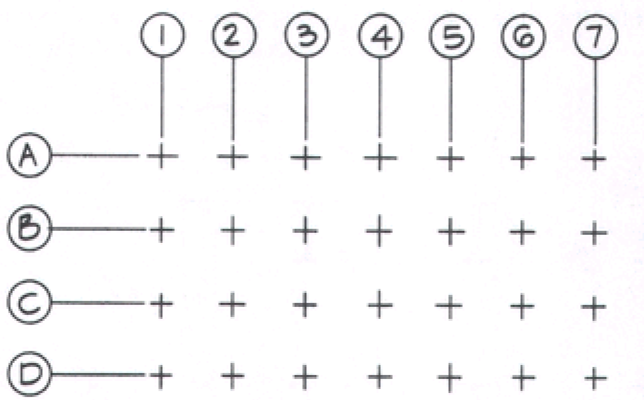


Figure 8.36 Columns forming a grid pattern

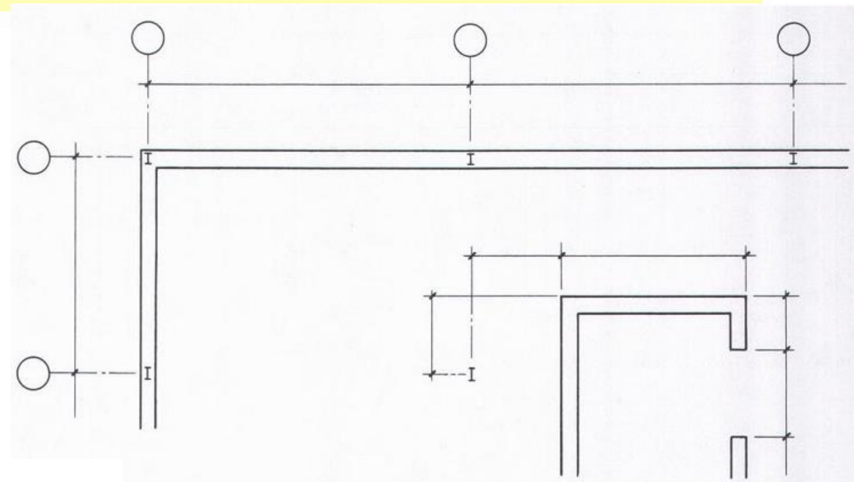


Figure 8.37 Locating interior walls from axial reference bubbles

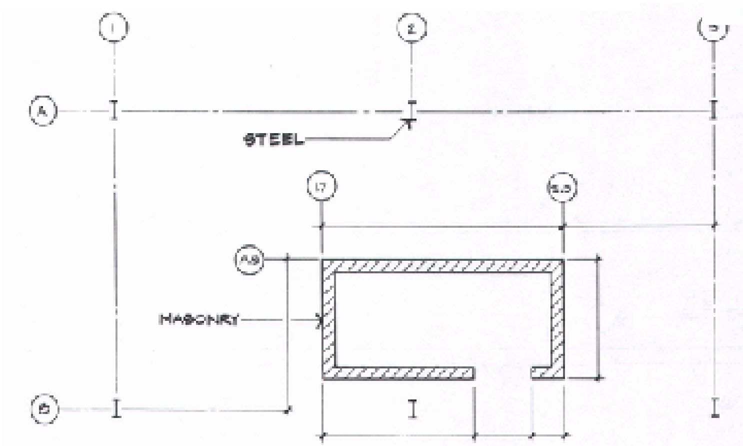
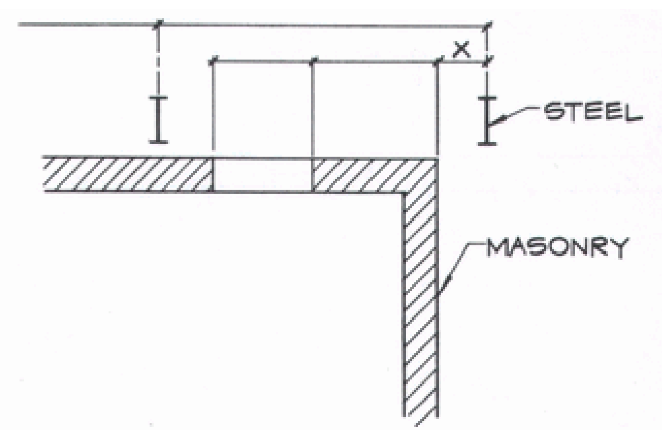


Figure 8.41 Steel and masonry



F **Figure 8.41 Steel and masonry**

Ch. 8 Floor Plan p. 262

Dimensioning Columns. Steel columns are commonly used to hold up heavy weights. This weight is distributed to the earth by means of a concrete pad. See **Figure 8.31** This concrete pad is dimensioned to its center, as **Figure 8.32** shows. When you dimension the steel columns, which will show in the floor plan, dimension them to their center. See Figure 10.46B. This relates them to the concrete pads. Dimensioning a series of columns follows the same procedure. **See Figure 8.34** The dimensions are taken to the centers of the columns in each direction.

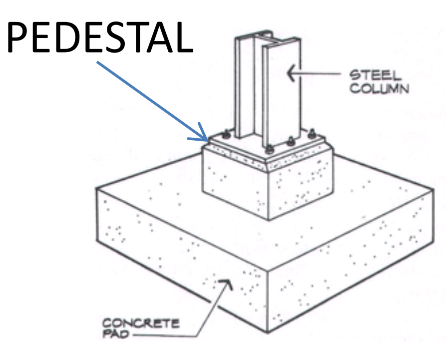


Figure 8.31 Steel column and concrete pad

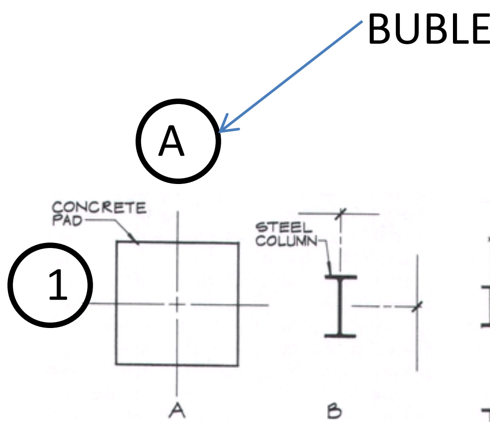


Figure 8.32 Dimensioning concrete pads and steel columns

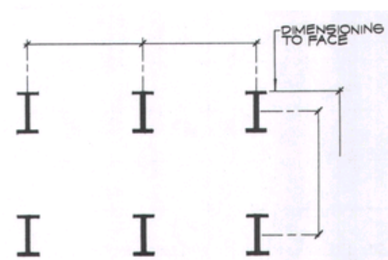


Figure 8.33 Dimensioning a series of column

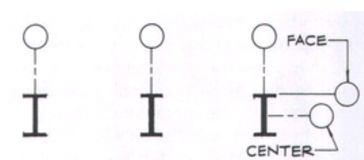


Figure 8.34 Dimensioning a series of column by way of the axial reference way

Ch. 8 Floor Plan p. 273

OTHER FLOOR PLAN CONSIDERATIONS

It is often necessary to show more than one or two building materials on a floor plan. Let us take a college music building as an example of a structure that has a multitude of walls of different materials, including:

1. Masonry 2. Wood studs 3. Two types of soundproof partitions 4. Low walls 5. Low walls with glass above

We need to establish an acceptable symbol for each material and to produce a legend similar to that in **Figure 8.52** sample of a partial floor plan using some of these materials symbols is shown in **the Music building partial floor plan.**

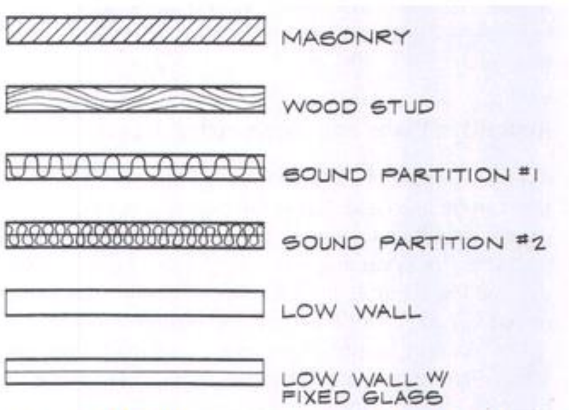
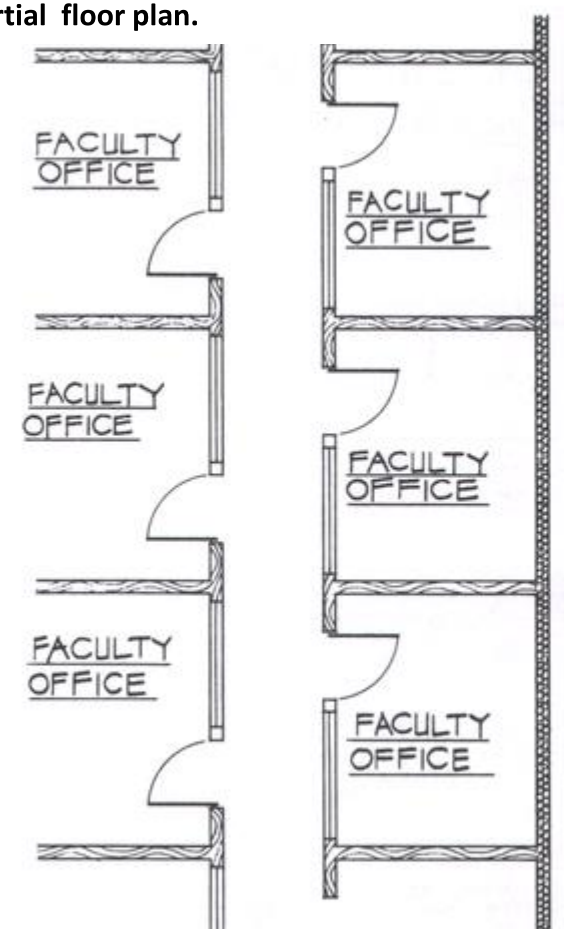


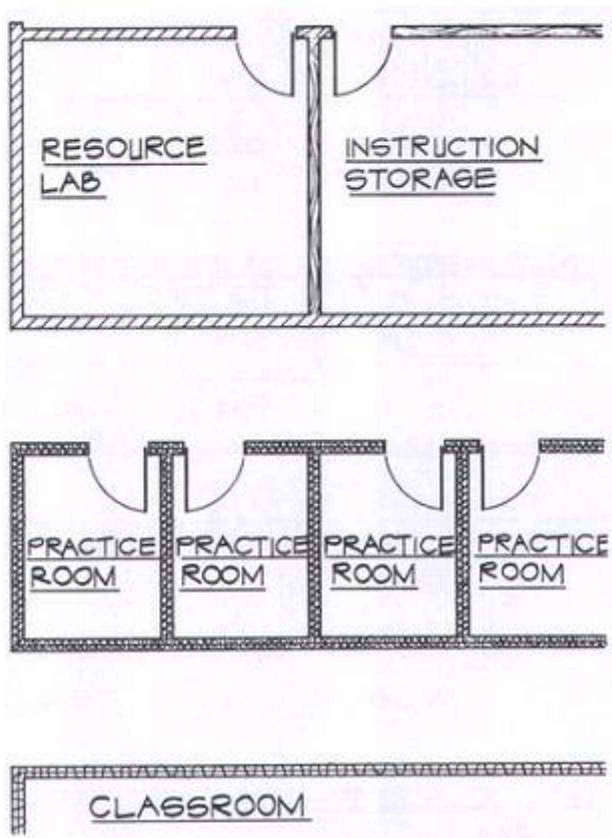
Figure 8.52 Legend for music building floor plan



Music building partial floor plan

Ch. 8 Floor Plan p. 274

Because of ecological requirements (such as insulation); structural reasons; aesthetic concern; and fire regulations, materials must be often be combined.



Music building partial floor plan

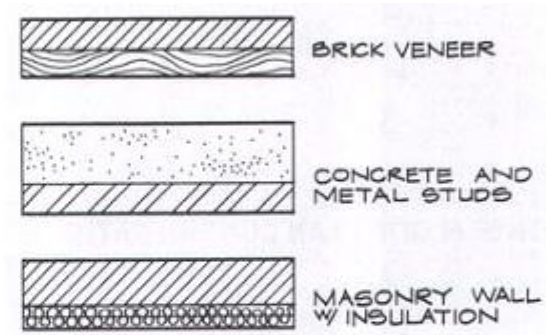


Figure 8.53 Combination of materials

Ch. 8 Floor Plan p. 275

Repetitive Plans and Symmetrical Items

If a plan or portions of a plan are symmetrical, a center line can be used and half of the object dimensioned. If a plan is repetitive—for example, an office building or an apartment or condominium—each unit is given a letter designation (Unit A, Unit B, etc.). These are then referenced to each other and only one is dimensioned.

For example, suppose you were drafting a floor plan for an eight-unit apartment structure; these eight units are to be divided into four one-bedroom units and four two-bedroom units, all using the same basic plans. Your approach could be to draft the overall shape of the structure and then to draft the interior walls only on one typical unit and label it completely. The remaining units (three of each) are referenced to the original unit by a note such as “See Unit A for dimensions and notes.”

Refer to the theater example Ch. 16
p 569 Foundation Plan
NOTE: SLOPES AT AUDITORIUM
#1 TYP. (TYPICAL) OF 6
p. 574 Ground Floor
AUDITORIUM
102 #2
NOTE: SLOPES SIM. (SIMILAR) ALL AUDITORIUM

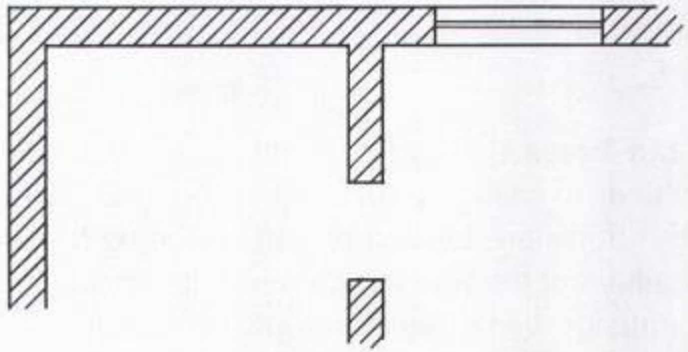


Figure 8.20 Masonry floor plan.

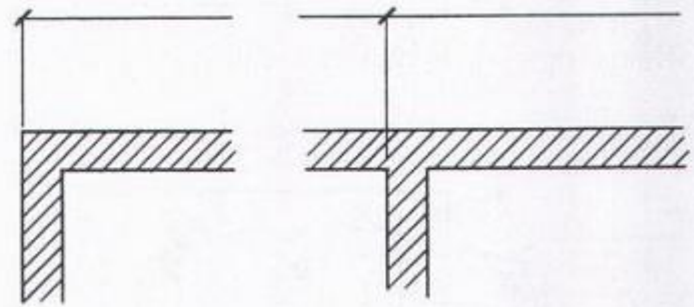


Figure 8.20 Dimensioning masonry
mason

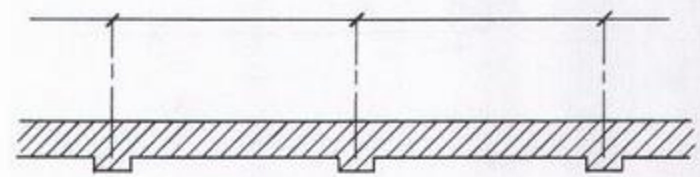


Figure 10.38 Dimensioning plasters.

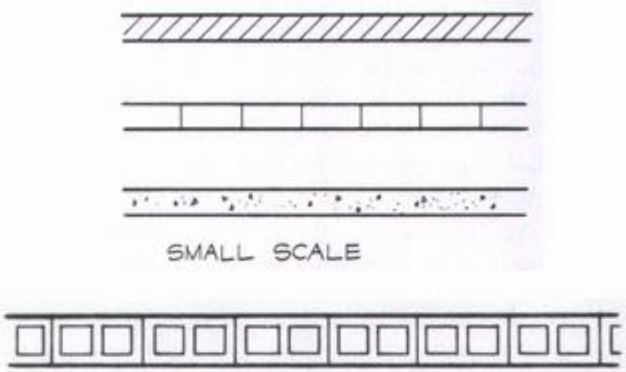


Figure 10.36 Concrete block material designations used on floor plans.

CHAPTER 9

Concrete Slab Floor: Foundation Plans

If you have selected concrete as the floor material for a specific project, first investigate the types of **foundation footing details** required to support the structure before drawing the foundation plan. The **footing design** will be influenced by many factors such as the vertical loads or weight it is to support, regional differences, allowable soil bearing values, established frost line location, and recommendations from a soils and geological report as reinforcing requirements. Figure 9.1 illustrates a concrete footing and concrete floor with various factors influencing design.

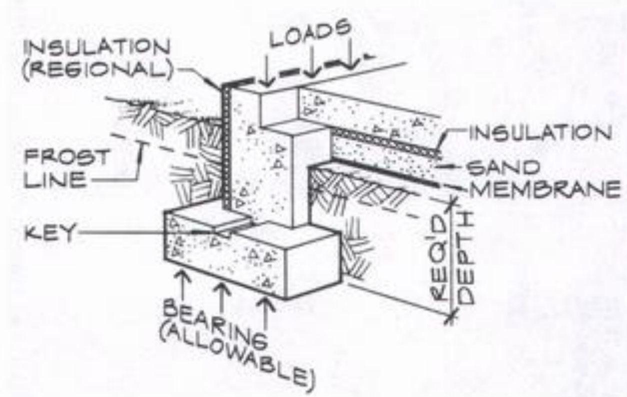


Figure 9.1 Concrete footing and concrete floor with various influencing design factors.

Ch. 9 p. 289-290

Strengthening Floors. Requirements for strengthening concrete floors with reinforcing vary for specific projects, so it is important to show their size and spacing on the foundation plan. Figure 9.8's foundation plan calls for a 6" x 6″—#10 x #10 welded wire reinforcing mesh to strengthen the concrete floor. This call-out tells us that the mesh is in 6" x 6" squares and made of number 10 gauge wire. Figure 9.8 shows how the reinforcing mesh and a plastic membrane are placed before the concrete is poured. Deformed reinforcing bars are also installed to strengthen concrete slab floors. The size and spacing of these bars are determined by factors such as excessive weights expected to be carried by the floor and unfavorable soils conditions.

WELDED WIRE REINFORCNG
DEFORMED REINFORCING BARS

Sloping Concrete Areas. When concrete areas have to be sloped for drainage, indicate this, too, on the foundation plan. You can do this with a directional arrow, noting the number of inches the concrete is to be sloped. See Figure 9.6 here a garage slab is sloped to a door.

Your foundation plan dimensioning should reflect the identical dimension line locations of the floor plan. For example, center line dimensions for walls above should match center line dimensions for foundation walls below. This makes the floor and foundation plans consistent. When you lay out dimension lines, such as perimeter lines, leave space between the exterior wall and first dimension line for foundation section symbols. As Figure 9.6 shows, you must provide dimensions for every foundation condition and configuration. Remember people in the field do not have the luxury of protractors or other measuring devices and therefore rely on all the dimensions you have provided on the plan.

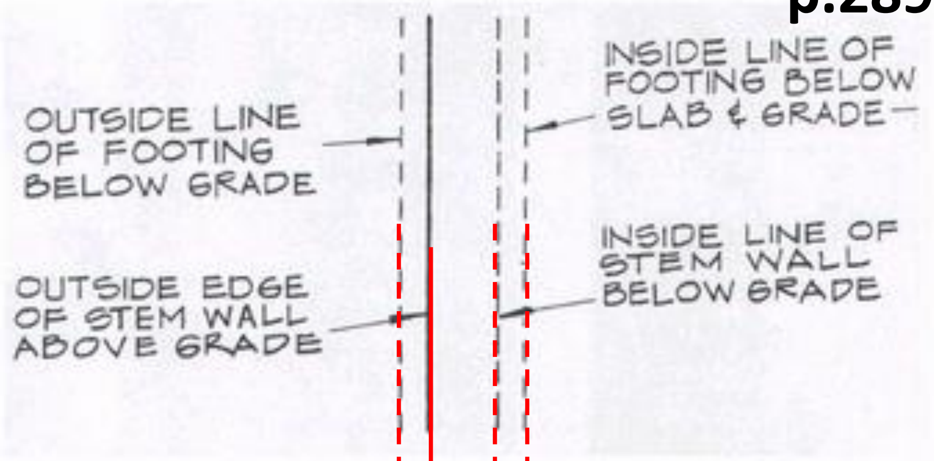


Figure 9.2B Plan view of foundation detail.

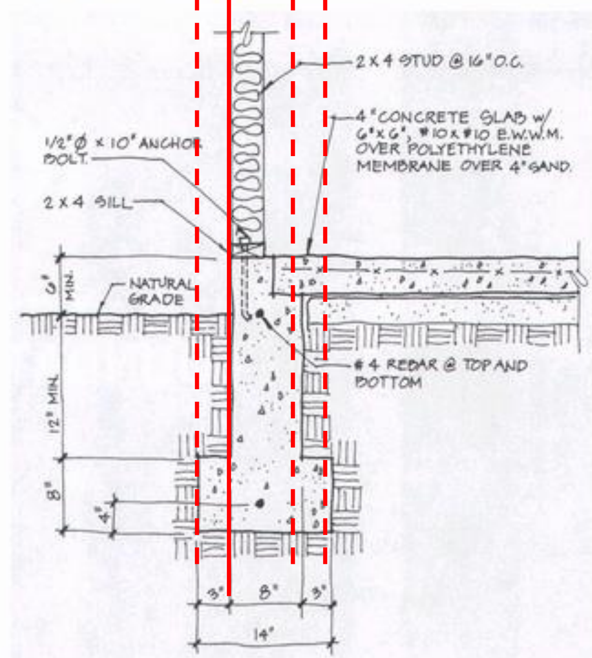
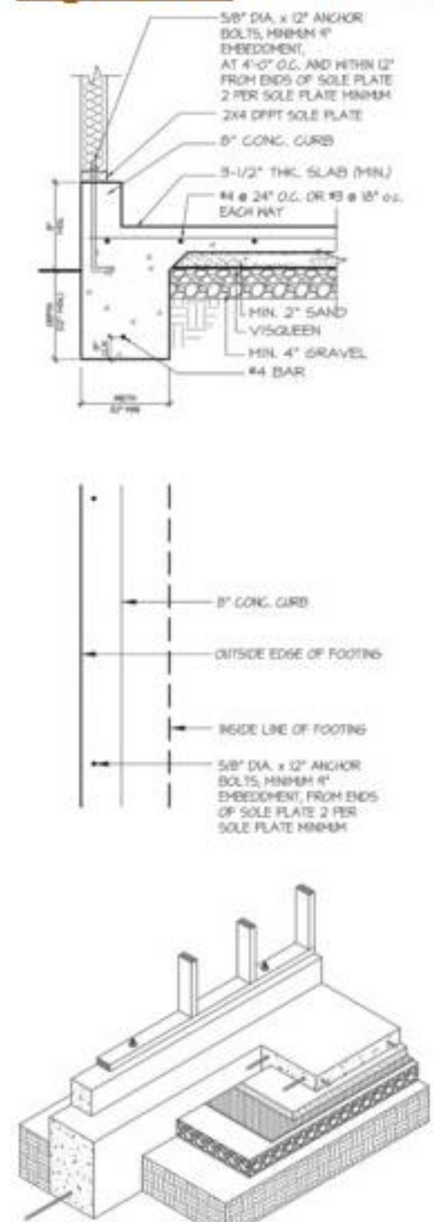


Figure 9.2A Exterior bearing

Figure 9.3 Exterior bearing footing



Ch. 9 p. 295-297

Example 1: A Building with Masonry Walls

When projects use concrete or masonry for exterior and interior walls, the walls may continue down the concrete footing. Figure 9.30 shows an exterior masonry wall and concrete footing.

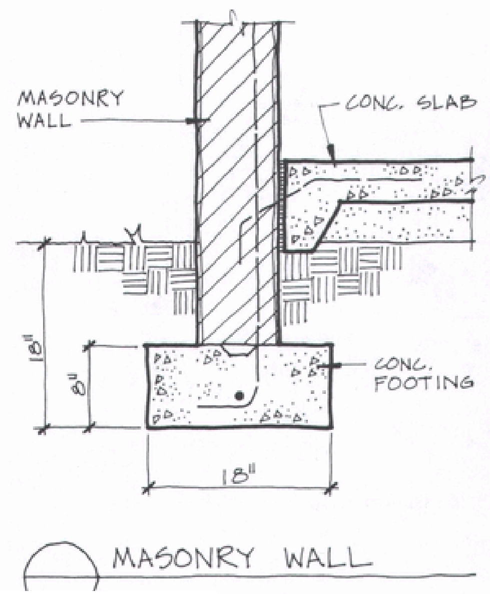
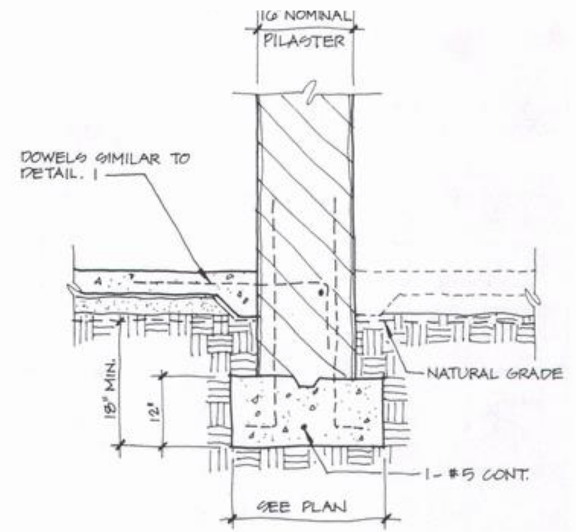


Figure 9.19 Exterior masonry wall and footing.



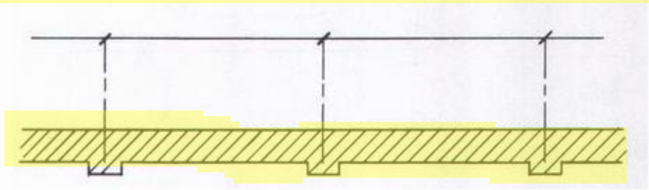
p.295

The building in this example is a theatre with exterior and interior masonry walls. Its foundation plan, details, and photographs of the construction of the foundation follow.

The foundation plan, shown in Page 569 defines all the masonry wall locations as per Figure 9.30 and 9.32. The footings are drawn with a broken line. For this project **pilasters** are required to support steel roof beams. A pilaster is a masonry or concrete column designed to support heavy axial and/or horizontal loads. The footing width is not called out but refers to the foundation plan for a specific pilaster footing dimension. Many projects do this because the total loads acting on the pilaster vary. SCHEDULE

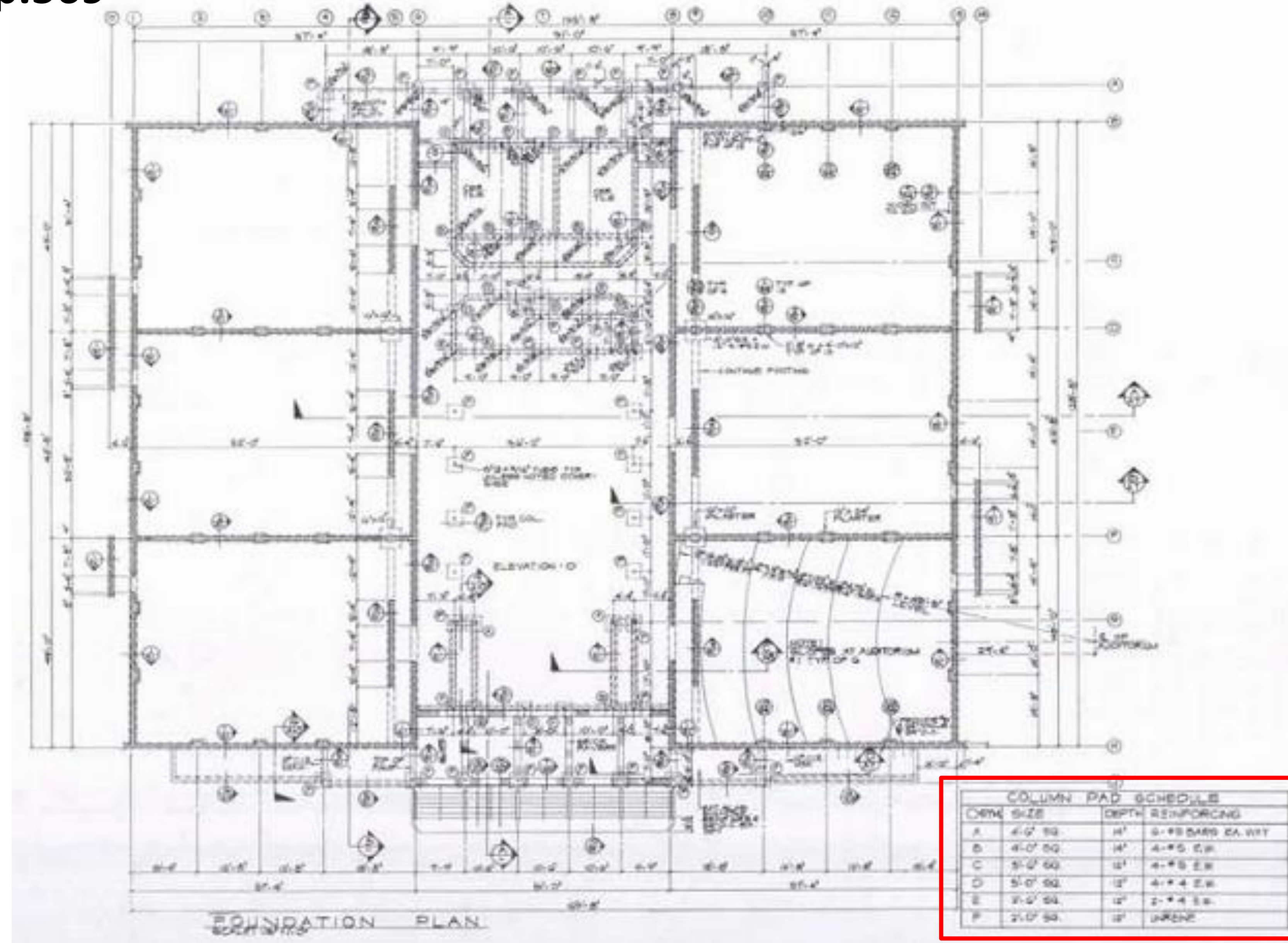
Steel columns are also required to support heavy axial loads and they, in turn, require a foundation. These foundation members are commonly referred to as concrete piers or **concrete pads**. The size of these pads varies with different loading conditions. Because of the various pad sizes, you may need to use a column pad schedule. This schedule should note the column designation, size, depth, and required steel reinforcing.

- COLUMN DESIGNATION
- SIZE
- DEPTH
- REQUIRED STEEL REINFORCING



PILASTERS

Figure 10.38 Dimensioning plasters.



COLUMN PAD SCHEDULE			
SYM	SIZE	DEPTH	REINFORCING
A	4'-6" SQ.	14"	6-#5 BARS EA. WAY
B	4'-0" SQ.	14"	4-#5 E.W.
C	5'-0" SQ.	12"	4-#5 E.W.
D	5'-0" SQ.	12"	4-#4 E.W.
E	3'-6" SQ.	12"	2-#4 E.W.
F	2'-0" SQ.	12"	NONE

Ch. 9 p.271

Pad Schedule shall be located on the foundation plan sheet

Dimension for all footings, walls and pad location with reference symbols shall be clearly defined for specific conditions.

Notes are also very important, they should be fully read and comprehended.

Notes are provided for many different design consideration.

In the example notes (with leaders) are provided for ramps, floor slopes, pilasters sizes, and required steel reinforcing.

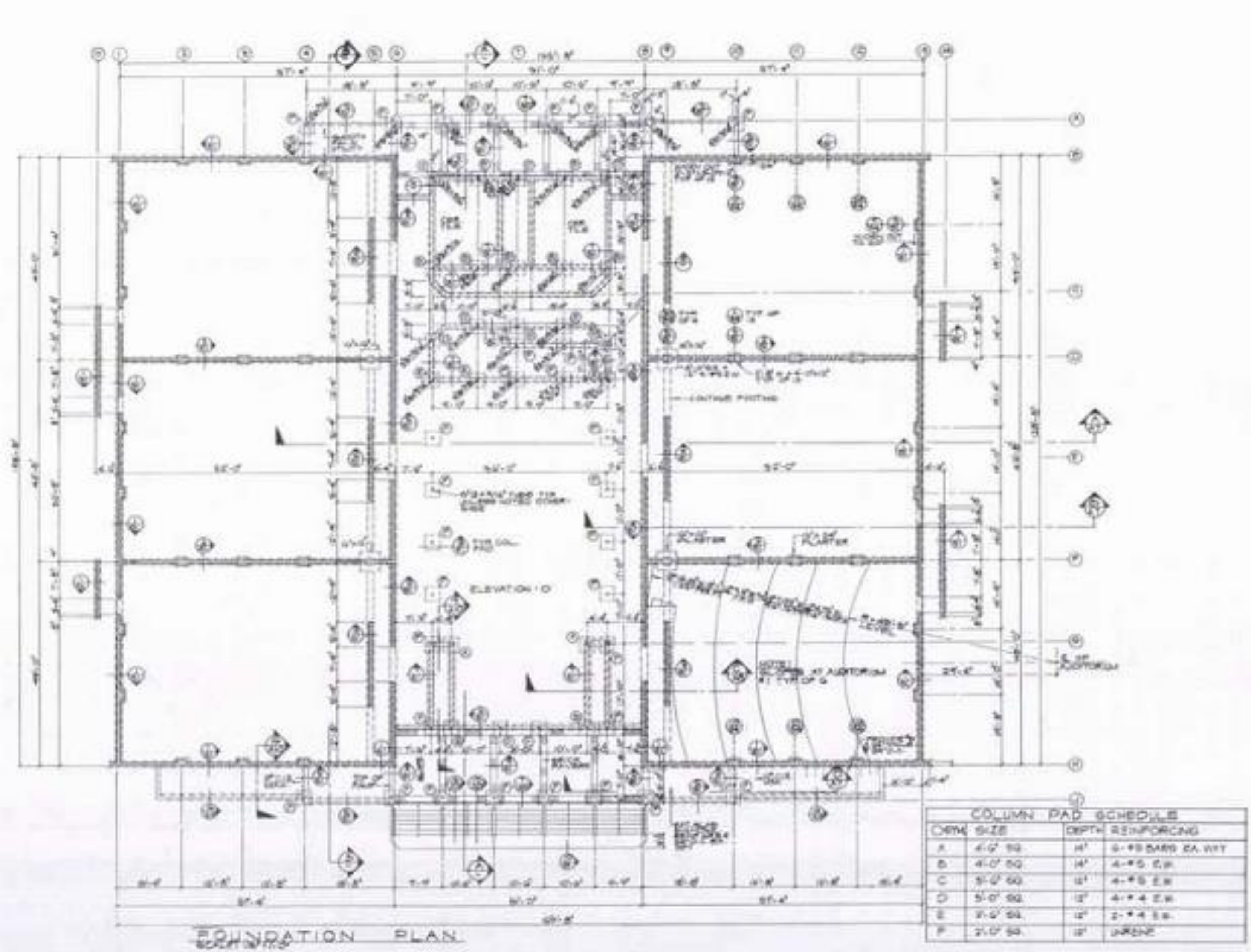


Figure 9.31 Foundation Plan- masonry walls.

page. 301 Figure 9.22   Foundation Development

Example 2: A Foundation Using Concrete Pads and Steel Columns

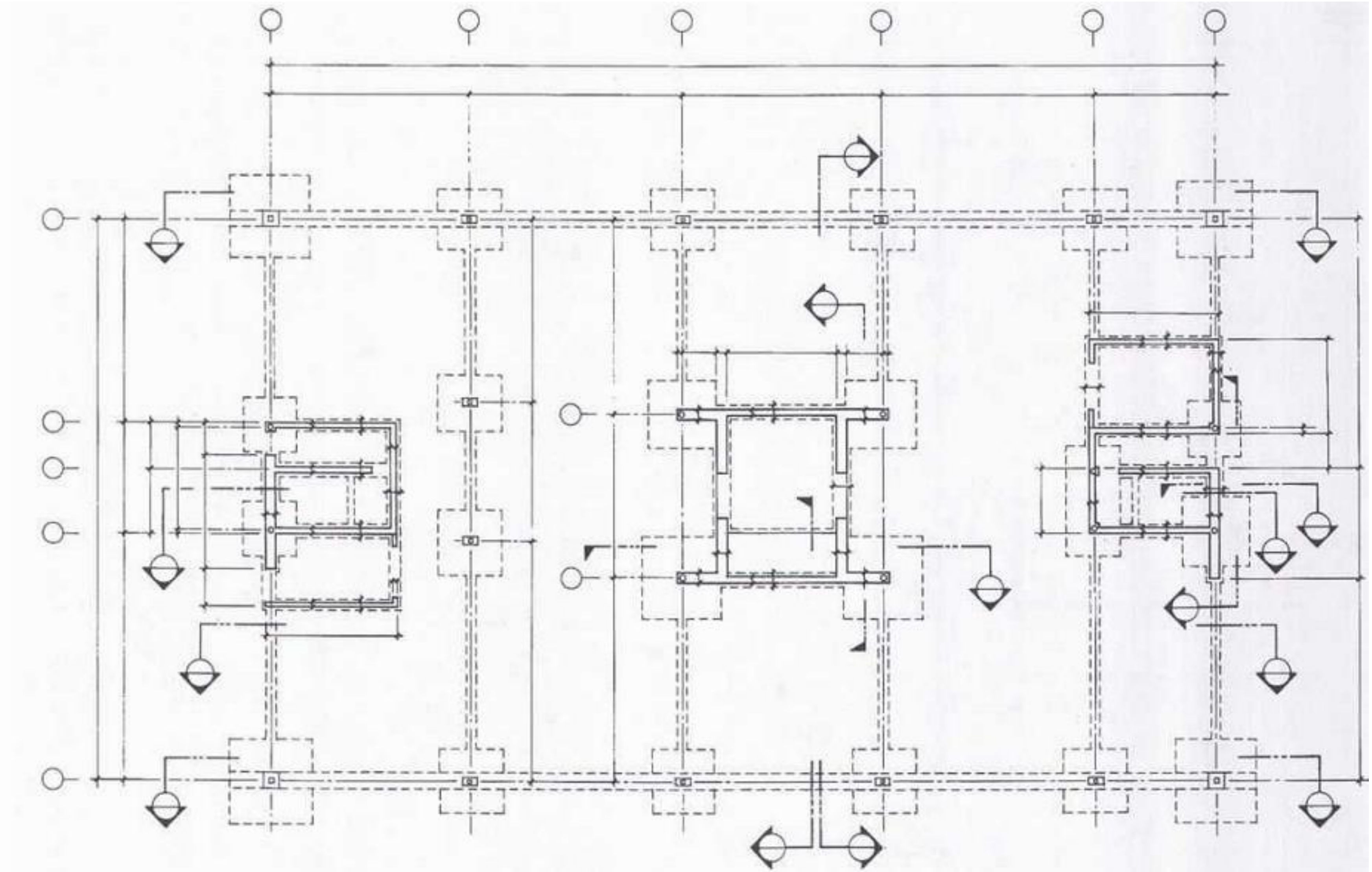
Drawing foundation plans varies depending on the foundation requirements of the method of construction for a specific structure. The example that follows uses a structure requiring concrete pads to support steel columns with a continuous footing to support masonry walls.

This foundation plan, as Figure 9.23 shows, is handled differently from the foundation plan in Example 1. As you place the tracing paper directly over the floor plan tracing, first establish the column locations as they relate to the axial reference locations. Masonry walls are then drawn and delineated. Concrete pads, located under a concrete floor, are represented with a broken line. See Figure 9.23 Figure 9.24 provides a visual example of this column pad footing detail in section. The column pad sizes may vary due to varying loads, and may be sized using a pad schedule or noted directly on the foundation plan. In this case, sizes are noted on the foundation plan. These pads are drawn to scale, relative to their required sizes, rather than their actual sizes. Provide, at the bottom of the foundation plan drawing, a legend defining the size and shape of the steel column and the base stem that supports it.

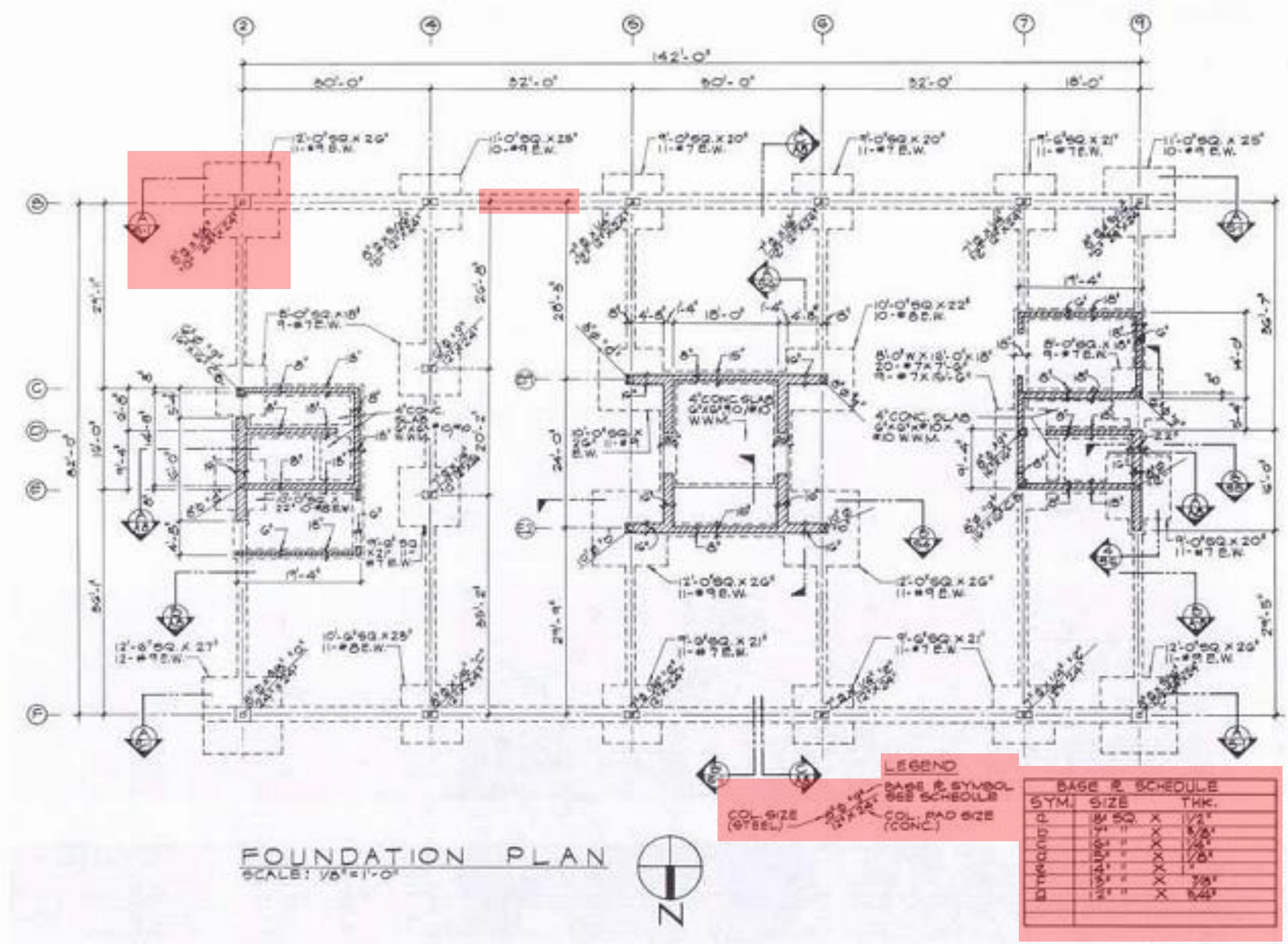
Because of all the critical information required in the field, a schedule for column base plates and their required anchorage may be necessary. Put this at the bottom of the plan. Dimensioning this type of foundation depends on the axial reference locations, which are identical to the floor plan referencing. Other foundation conditions are dimensioned from these axial reference lines.

After you complete all the necessary dimensioning, show section reference symbols and notes. Figure 9.23 has a double broken line representing a continuous footing underneath, which connects to all the concrete pads. The main purpose of this footing is to provide continuity for all the components of the foundation.

The concrete pads are the main supports for this structure. Figure 9.25 shows the trenching and some formwork for a concrete pad. Note particularly the placement of the reinforcing steel and the footing, which is used to tie all the pads together. After the concrete is poured and anchor bolts embedded, the steel column with the attached base plate is bolted to the concrete pad. See Figure 9.26



p. 289 Figure 9.60 Foundation Plan – Stage IV



p. 302 Figure 9.23 Foundation Plan – Concrete pads

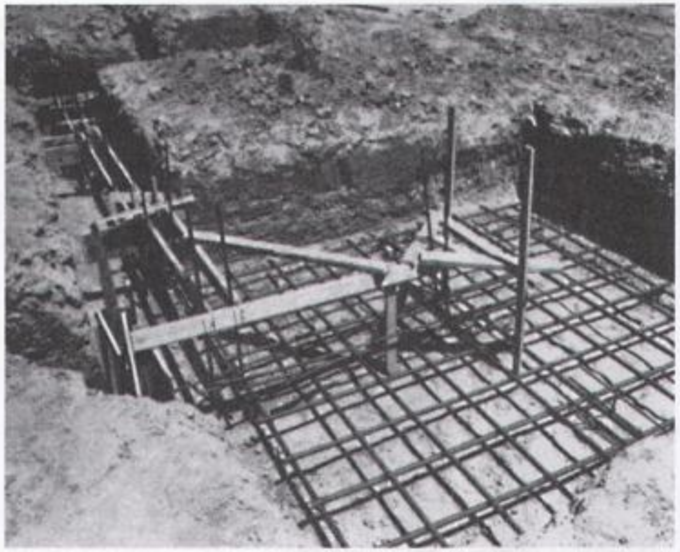


Figure 9.25 Forming for concrete pad.

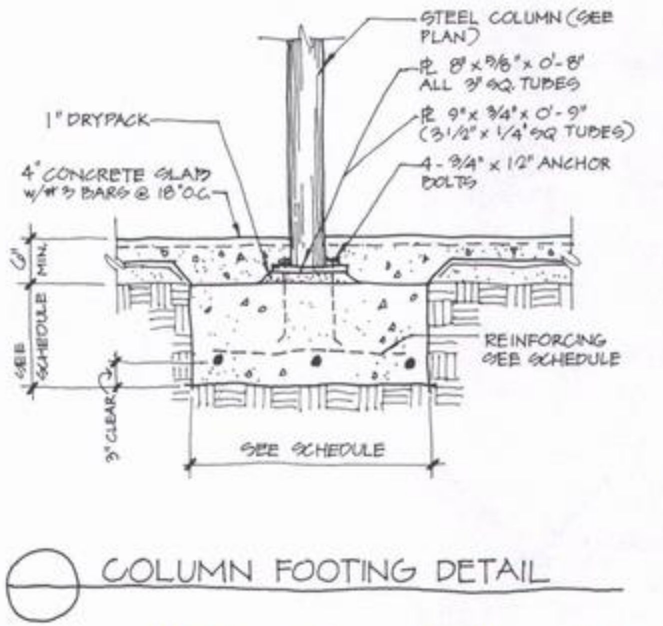
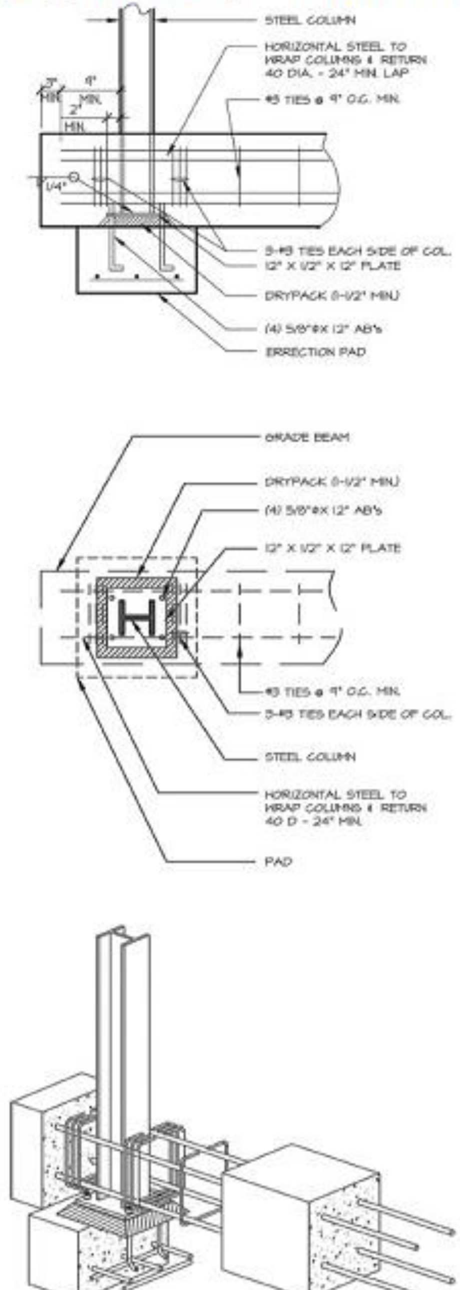


Figure 9.26 Steel column on concrete pad.

Figure 9.24 Column to footing detail



DRYPACK

http://www.marbri.net/product10-61.php

Grouts > DRY PACK GROUT

Euclid Chemical

DRY PACK GROUT is a natural aggregate, high strength, non-shrink material designed specifically for mixing and placing at a damp pack consistency. When mixed with a minimum of water, it can be placed into voids and spaces where forming or containment of self-leveling grouts is not possible or desirable.

FEATURES / BENEFITS

- Extremely cohesive at damp pack consistency
- Non-staining and similar to concrete in appearance
- Contains no chloride based or corrosive ingredients
- High compressive strengths for maximum bearing capability
- Non-shrink for long term support

PRIMARY APPLICATIONS

- Structural baseplates
- Equipment and machinery
- Anchor bolts
- Precast elements
- Honeycombing

Note: Every effort has been made to ensure the accuracy of this product information. However, Marbri does not make any claim on the accuracy of the information provided. For up to date specifications and product information, please visit this supplier's website.

To order this product, please contact us.

p. 299 When columns are used for structural support, **concrete caissons** may be needed in unfavorable soil conditions. A concrete caisson is a reinforced column designed specifically for the loads it will support and is located at a depth that provides good soil bearing. The concrete caisson shown in **Figure 9.27** is used on a sloping site to provide firm support for a wood column which in turn is part of the structural support for a building. **Figure 9.28** shows a job site drilling rig providing holes for concrete caissons.

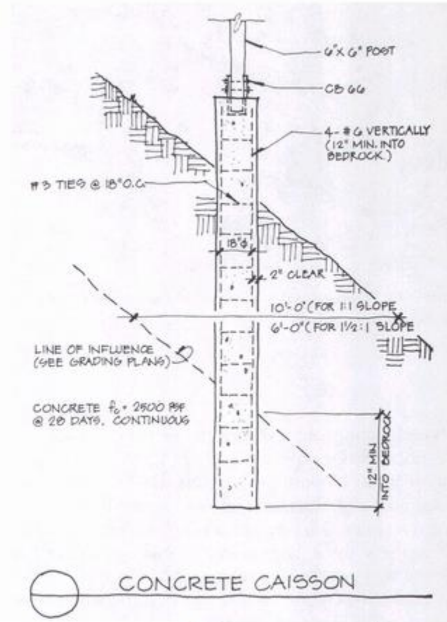
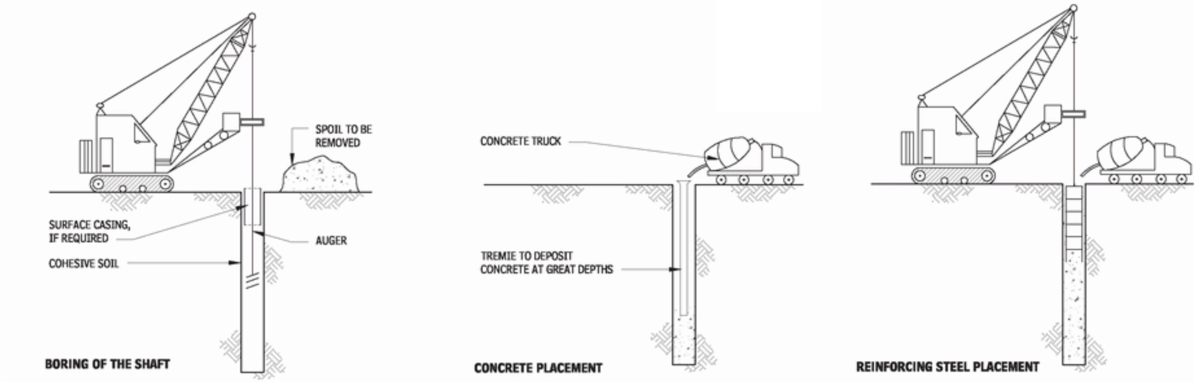


Figure 9.27 Concrete caisson.

PILE TYPE	MAXIMUM LENGTH (FT)	OPTIMUM LENGTH (FT)	SIZE (IN.)	MAXIMUM CAPACITY (TONS)	OPTIMUM LOAD RANGE (TONS)	USUAL SPACING
TIMBER						
Timber	110	45–65	5–10 tip; 12–20 butt	40	15–25	2'–6" to 3'–0"
STEEL						
Steel H pile	250	40–150	8–14	200	50–200	2'–6" to 3'–6"
Pipe—open end, concrete-filled	200	40–120	7–36	250	50–200	3'–0" to 4'–0"
Pipe—closed end, concrete-filled	200	30–80	10–30	200	50–70	3'–0" to 4'–0"
Shell—mandrel, concrete-filled; straight or taper	100	40–80	8–18	75	40–60	3'–0" to 3'–6"
Shell—no mandrel, concrete-filled	150	30–80	8–18	80	30–60	3'–0" to 3'–6"
Drilled caisson, concrete-filled	250	60–120	24–48	3500	1000–2000	6'–0" to 8'–0"
CONCRETE						
Precast concrete	100	40–50	10–24	100	40–60	3'–0"
Prestressed concrete	270	60–80	10–24	200	100–150	3'–0" to 3'–6"
Cylinder pile	220	60–80	36–54	500	250–400	6'–0" to 9'–0"
Drilled pier with socket	120	10–50	30–120	500	30–300	3'–0" to 8'–0"
Drilled pier with bell	120	25–50	30–120	500	30–200	6'–0"
Auger cast grout or CFA (Continuous Flight Auger) pile	120	40–80	12 - 40	500	75–150	3'-0"
Minipiles	200	25–70	2.5–7	100	5–40	2'–0" to 4'–0"
COMPOSITE						
Helical pier	120	20–70	1-1/2" sq. to 4-1/2 dia.	100	15–60	4'- 0" to 15'–0"
Helical pulldown micropile	100	20–70	4" dia. to 7" dia.	150	20–80	4'- 0" to 15'–0"
Concrete—pipe	180	60–120	10–23	150	40–80	3'–0" to 4'–0"
Steel H pile and prestressed concrete	200	100–150	20–24	200	120–150	3'–6" to 4'–0"
Pile stem with precast concrete tip	80	40	13–35 tip; 19–41 butt	180	30–150	4'–6"

GENERAL PILE DATA 1.71

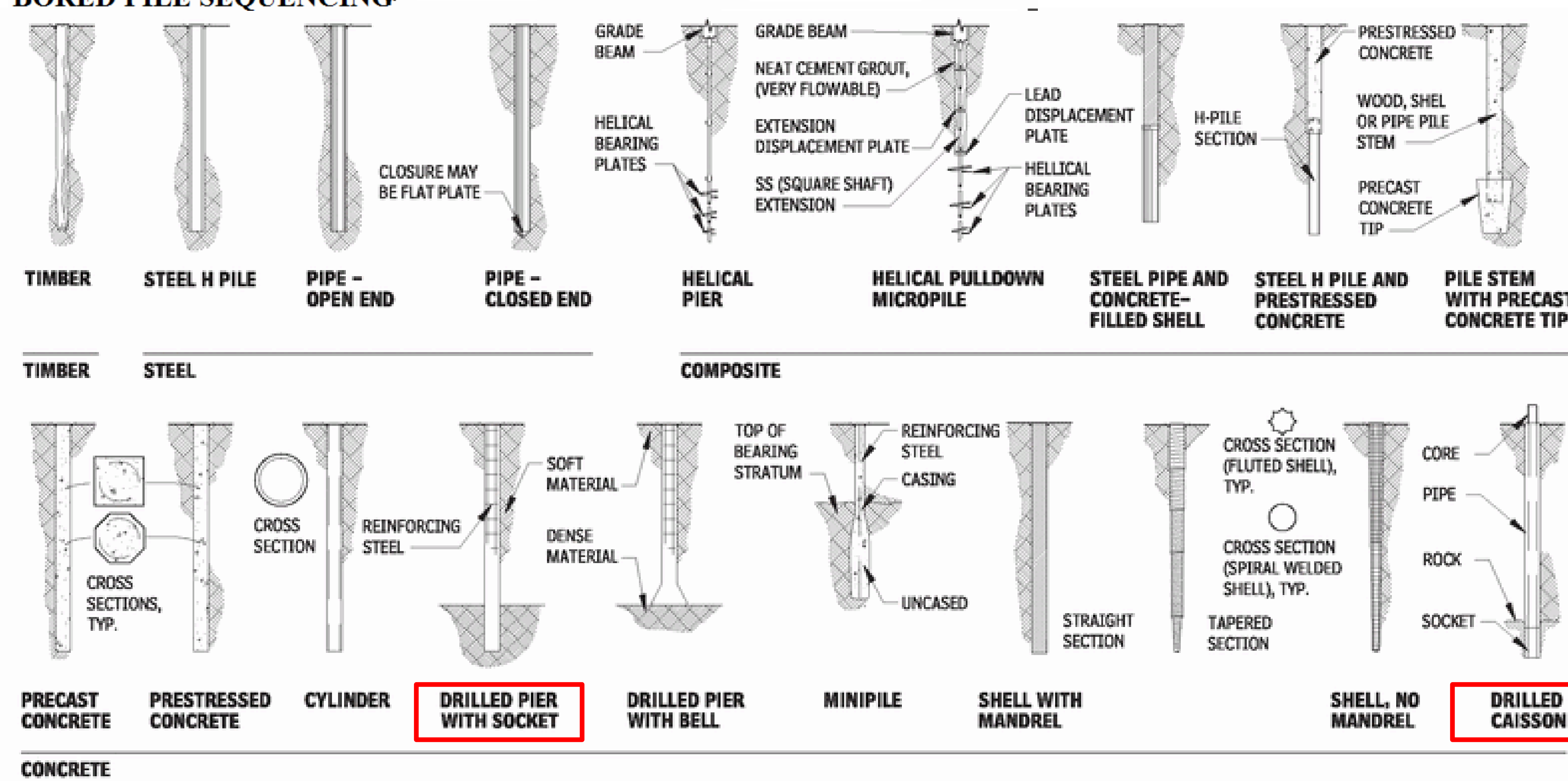
Figure 9.28) Drilling holes for concrete caissons.



http://www.youtube.com/watch?v=fCANsnCXXYY&feature=related

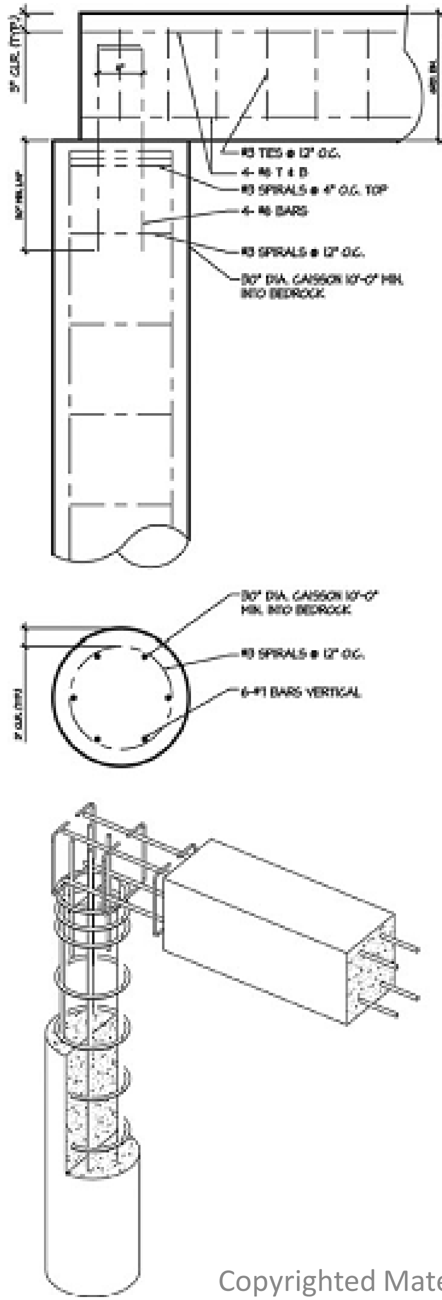
http://www.youtube.com/watch?v=peQVA2rKstA&feature=related

BORED PILE SEQUENCING

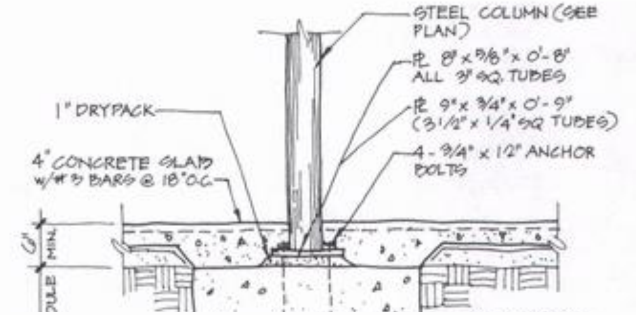


PILE TYPES 1.70

Figure 9.29 Caisson design with grade beam system.



Ch. 9 Foundation Plan
A STEEL STRUCTURE p. 306
Stage VI p.306

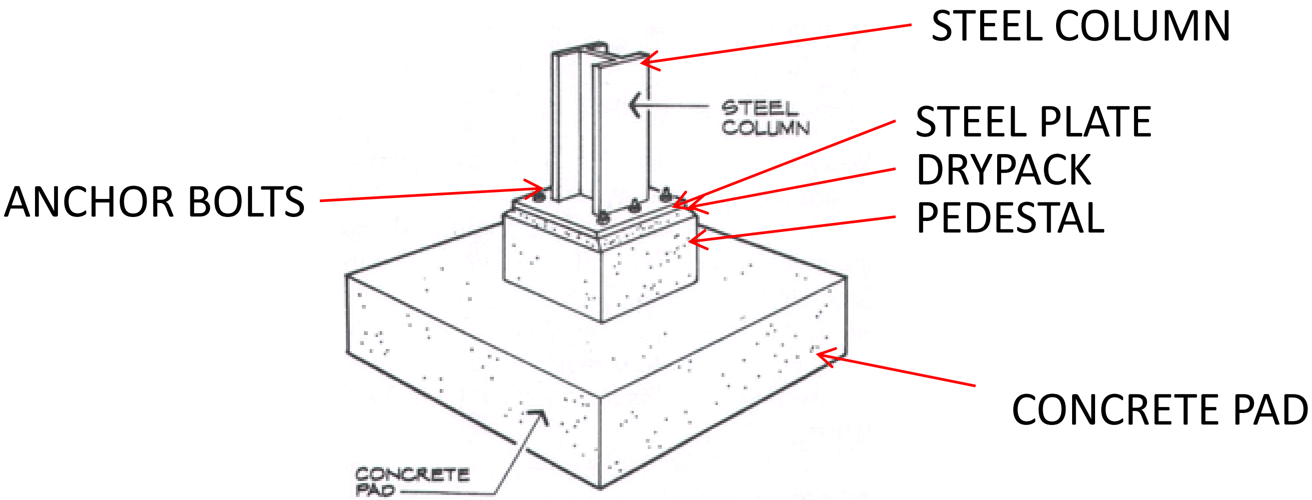


Concrete pads distribute weight

Around the perimeter of the structure are a series of squares drawn with dotted lines. These represent concrete pads that distribute the weight bearing down on the columns. A special type of noting is used here. The leader pointing to the hidden line indicates the size and thickness of the concrete pad and reinforcing. For example, 9'-0" sq. x 20", 11—#7 EW, means the concrete pad is 9' square and 20" thick and that there are 11 Number 7 (⅞") reinforcing bars running each way.

At the center of these hidden lines is another rectangle with a smaller rectangle inside, representing a steel column. The leader pointing to this area explains these. For example, 7"□ × ¼" "e", 12 " x 24 ", means that the column is a 7"-square column, ¼" thick (wall thickness), mounted onto an "e" base plate. This "e" base plate size can be found in the base plate schedule below Figure 9.62. Here, "e" is equal to a 14"-square by 1 "-thick plate. This plate rests on another concrete pad often called a pedestal, 12" by 24".

Contained within the masonry walls are some steel columns, with concrete pads that are also noted using the schedule. Next to the schedule is a legend explaining the noting method. The title and North arrow finished this sheet.



p. 264 Figure 8.31 Steel column and concrete pad.

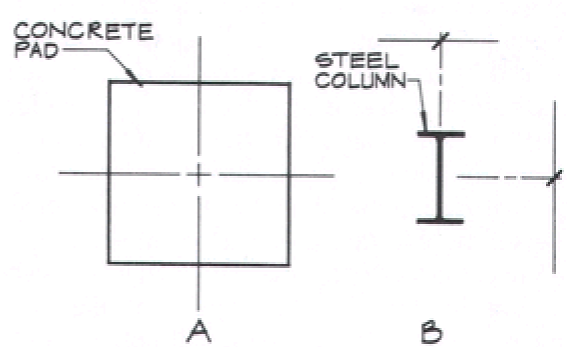
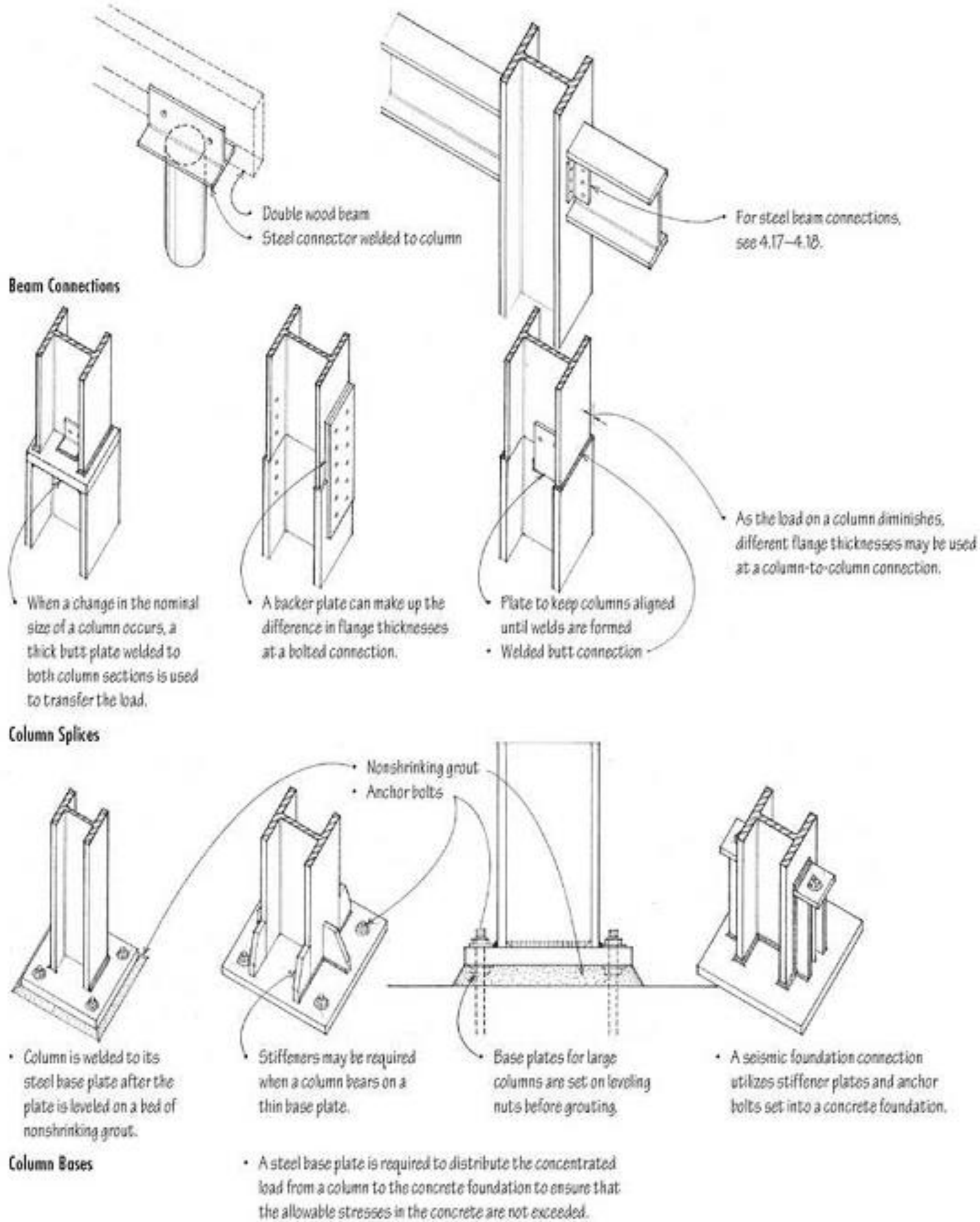


Figure 8.32 Dimensioning concrete pads and steel columns.


Double wood beam
Steel connector welded to column
For steel beam connections, see 4.17–4.18.
Beam Connections
When a change in the nominal size of a column occurs, a thick butt plate welded to both column sections is used to transfer the load.
A backer plate can make up the difference in flange thicknesses at a bolted connection.
Plate to keep columns aligned until welds are formed
Welded butt connection
As the load on a column diminishes, different flange thicknesses may be used at a column-to-column connection.
Column Splices
Nonshrinking grout
Anchor bolts
Column is welded to its steel base plate after the plate is leveled on a bed of nonshrinking grout.
Stiffeners may be required when a column bears on a thin base plate.
Base plates for large columns are set on leveling nuts before grouting.
A seismic foundation connection utilizes stiffener plates and anchor bolts set into a concrete foundation.
Column Bases
A steel base plate is required to distribute the concentrated load from a column to the concrete foundation to ensure that the allowable stresses in the concrete are not exceeded.

p. 300

A. Plan view of an exterior bearing footing for a slab-on-ground.

B. Plan view of a footing with a concrete curb

Also represents bearing footing for a wood floor system original, as seen in

C. Plan view of an interior bearing footing for a slab-on-the-ground system.

D. Convention could represent a pier, as or as a concrete pad for a column.

E. A widening of the footing portion of a foundation for a column, actually a combination of B and D.

F. A plan view of a masonry wall,

G. A system showing a pier and girder convention,

p. 308

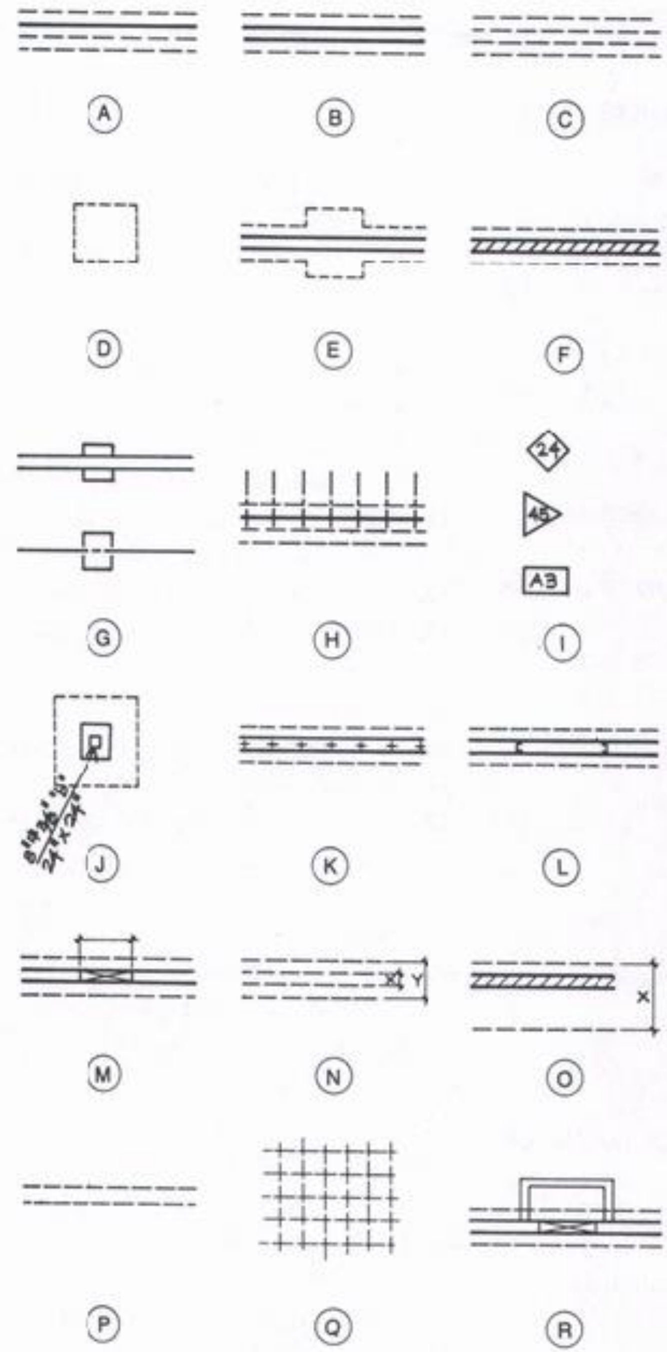


Figure 9.34 Convention used on foundation plan

H. Short perpendicular center lines as shown here represent dowels.

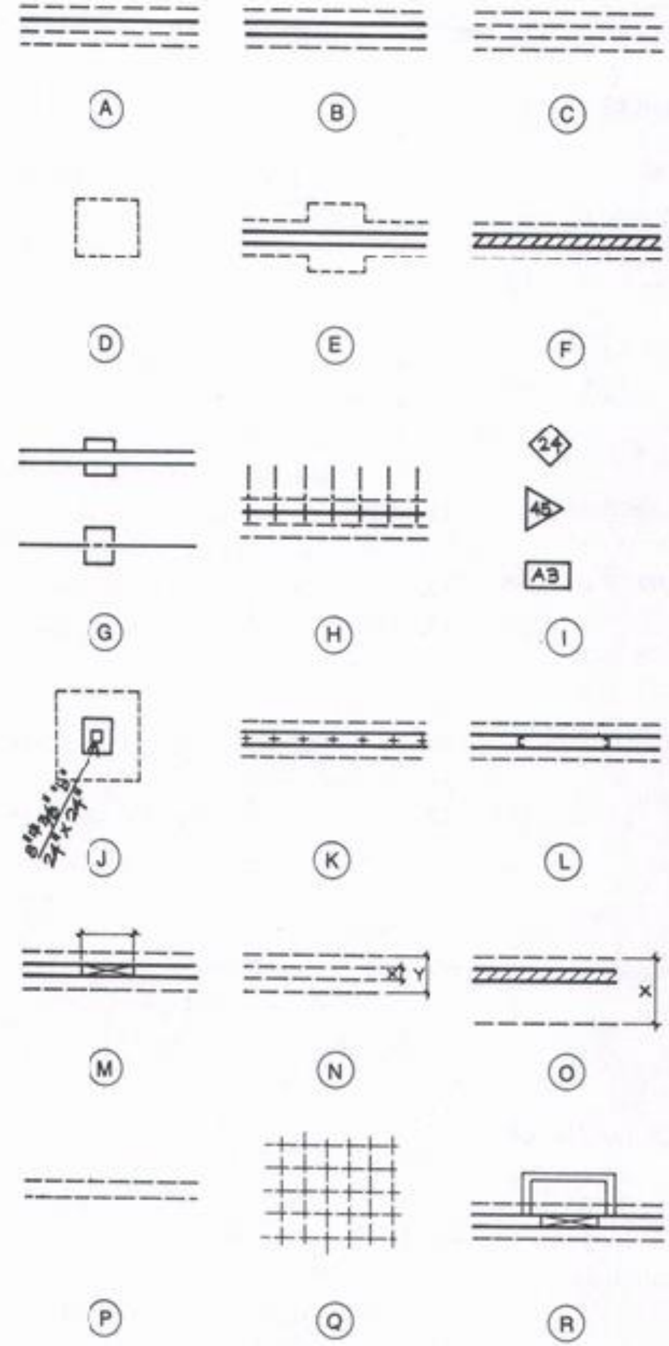
I. The diamond shape, triangle, and rectangle are used to identify such things as anchor bolt spacing, shear wall finishes, and spacing of framing anchors.

J. This is a multiple convention, indicating pad, pedestal, steel column, and base plate sizes. The letter refers you to a schedule in which the plate size, pad size, or even the reinforcing are described.

K. The (+) symbols represent anchor bolt locations for shear walls. This symbol should be accompanied with a note similar to the following:

> ½″ dia. A.B. @ 12” o.c. (shear wall)
> Note: All hardware in place prior to pouring of concrete.

p. 308

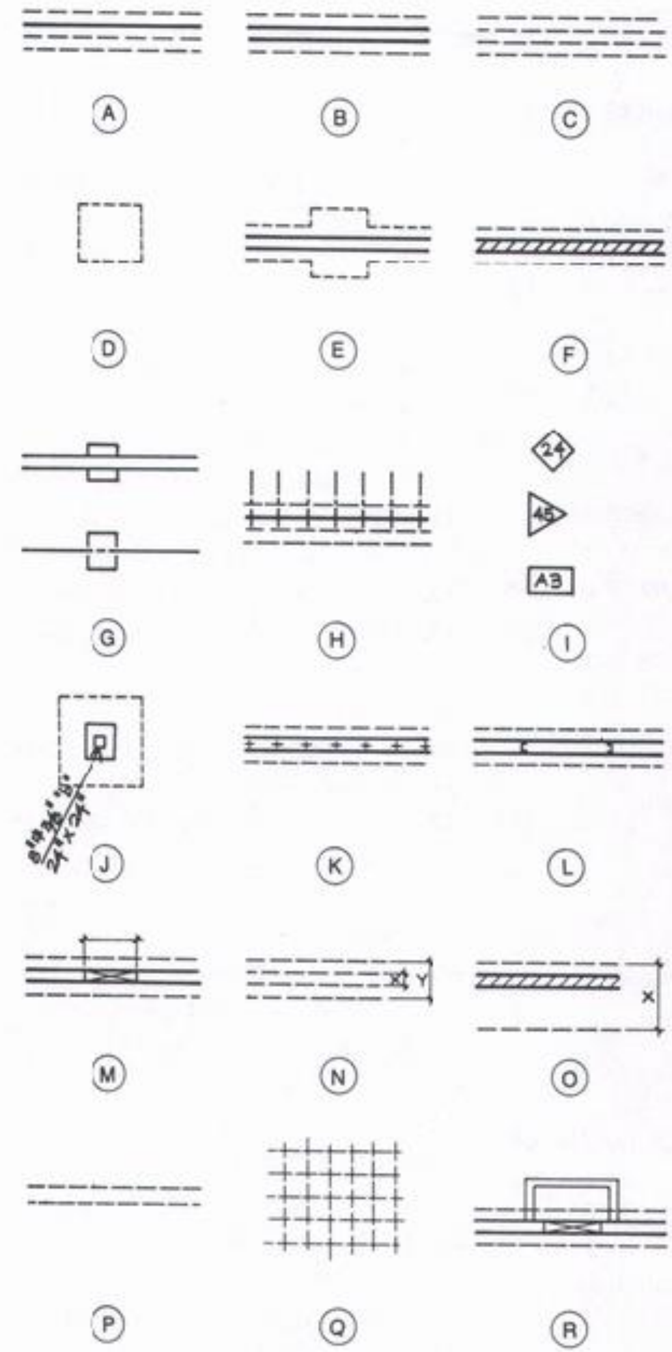


p. 308

L. The ([) shapes represent hold-downs at shear walls.

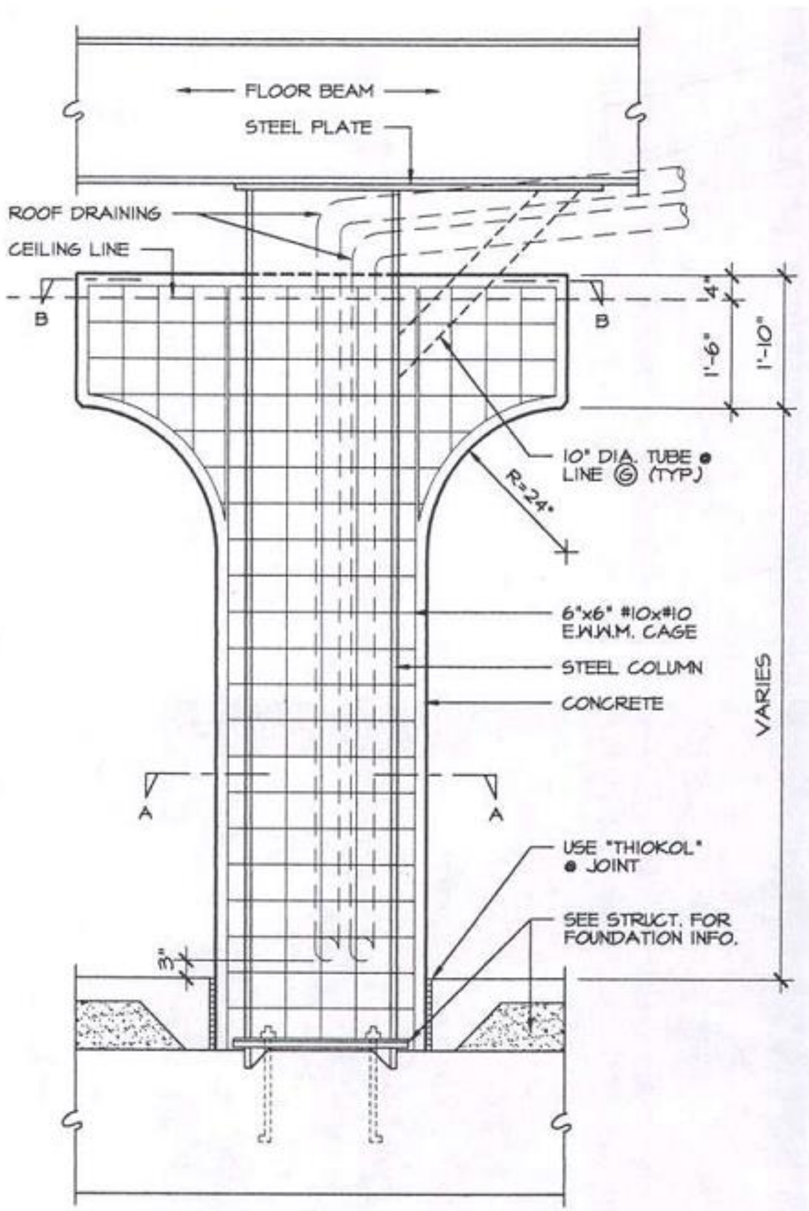
It is critical to include a note to the effect of “all hardware in place prior to pouring of concrete.”

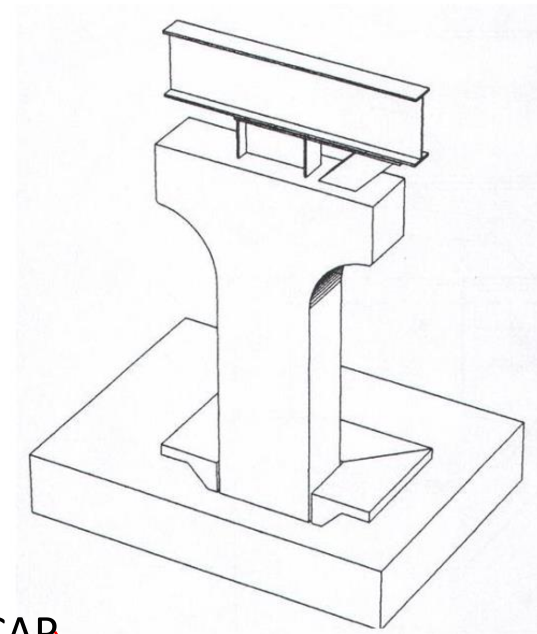
Q. This matrix is used to represent concrete slab reinforcement. The size of the reinforcing is to be determined by the structural engineer, for example, #4 @ 18” o.c. ea./way. It is not shown throughout the foundation plan, but only on a portion of it.



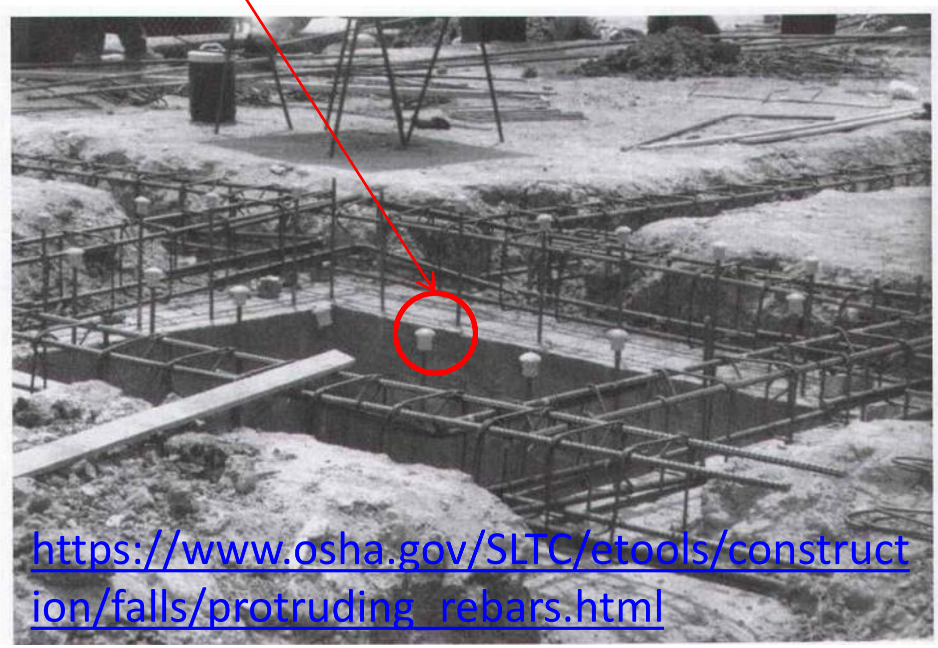
p.624

Figure 20.44 Steel/concrete column.





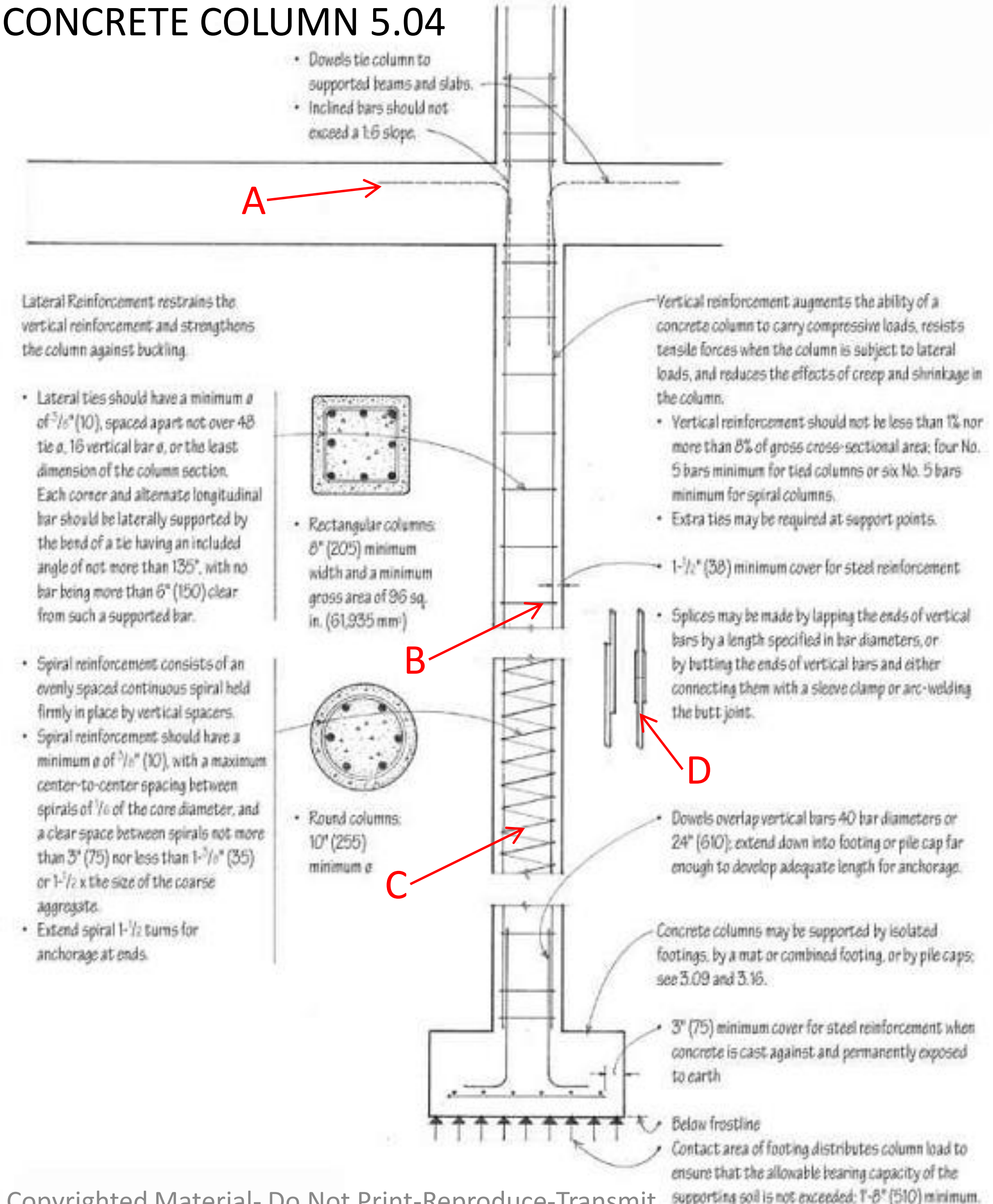
REBAR CAP



https://www.osha.gov/SLTC/etools/construction/falls/protruding_rebars.html

REINFORCED CONCRETE COLUMN 5.04

A. DOWELS
B. LATERAL TIES
C. SPIRAL
D. SPLICES



Ch. 9 ROOF PLAN AND FRAMING SYSTEMS P. 308-346

ROOF PLAN FRAMING SYSTEMS

As you look at the various framing plans, there may be many conventions that require clarification. For this reason we have included a chart of typical conventions in Figure 9.50 . You may find it helpful to flag this chart as you look at the various framing plans and use it as you would a dictionary; that is, a reference table that defines the conventions used. The explanations to these conventions are listed below (letters correspond to the chart).

a. A beam, header, or lintel over an opening, door, or window within a wall.
b. Used to show the direction of a framing member or a system of framing members, such as floor joist, rafters, or ceiling joist. Lettering occurs right along the line indicating size, name, and spacing, for example, ”2 x 6 ceiling joist at 16” o.c.” Note that a half arrowhead is on one side and another half on the opposite side.
c. The line with the half arrowheads is the same as described in definition B. The diagonal line with a full arrowhead on both ends indicates the duration of the system, for example, where a particular system of ceiling joists begins and ends. When sizes of the ceiling joists vary on the structure, for example, this symbol is used to convey to the contractor where one size ends and another begins.

i. “W12 x 44” is a call-out for a steel beam or girder. When these members are sequentially repeated the center lines are still drawn to represent them, but the description (call-out) is abbreviated with the letters DO, which is short for “ditto.”

l. The rectilinear box that contains the 8’-2” dimension is a convention used to indicate height of an object in plan view. In this example, the two dotted lines may represent the top of a beam or the plate line at a wall, and the numbers indicate height.

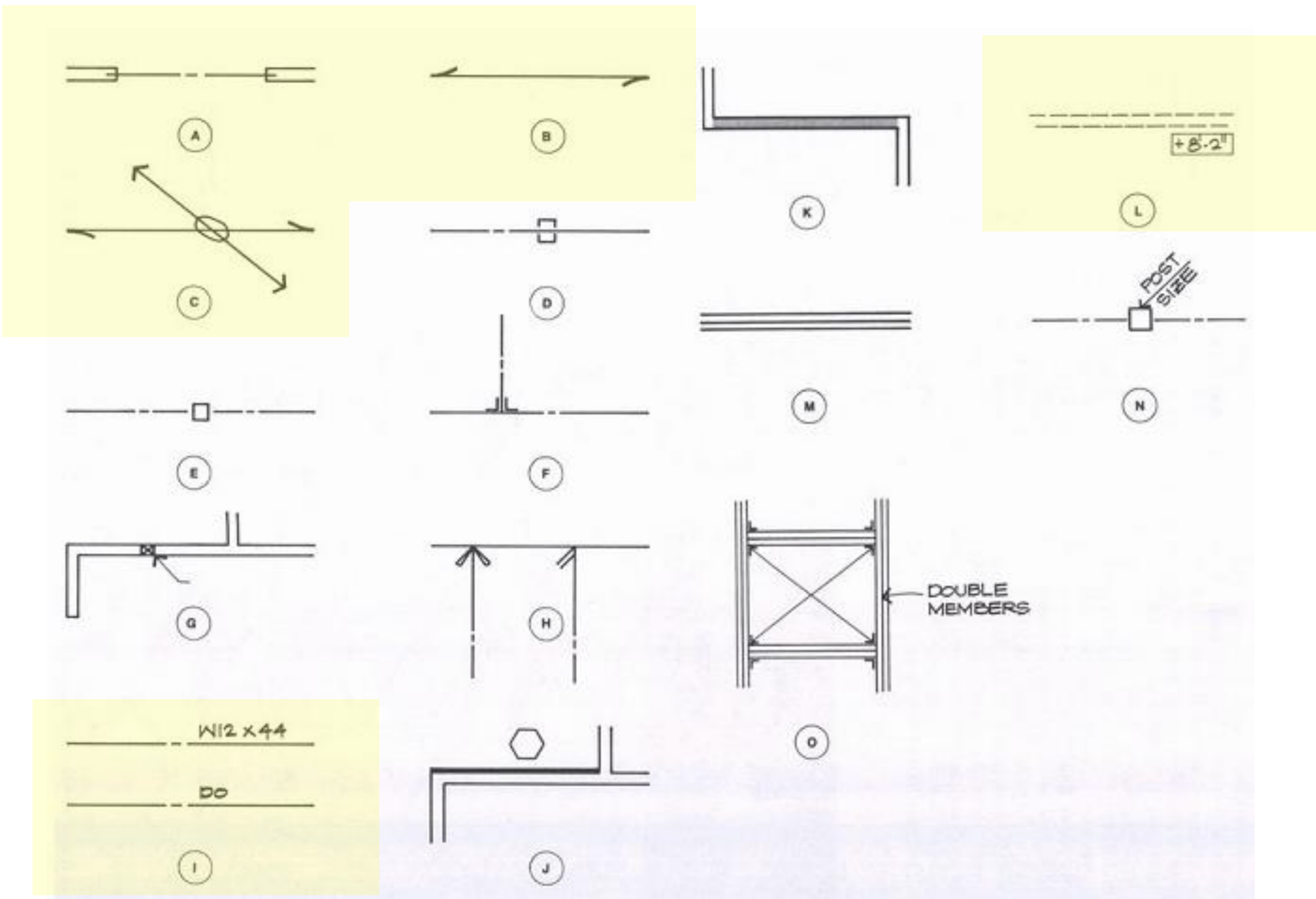


Figure 9.50 Summary of typical framing conventions.

Ch. 9 ROOF PLAN AND FRAMING SYSTEMS P. 333-337

Framing Plan: Steel Members p. 333

- Steel members are shown with heavy single center lines
- Walls are drawn using broken line to distinguish the structural steel framing
- Beam sizes are noted directly on the steel members
- "DO" –ditto- means the member is identical to the one noted on the same framing bay.
- Beams also may be called as RB-1 on so forth RB meaning Roof Beam which are described on the Roof Beam Schedule as well as used by the structural engineer calculation for identification purposes.
- Roof openings shall be illustrated
- A framing plan is very useful to show identify reference symbols for connections, which can't be shown on sections.
- Axial references (matrix/grid) lines for the basis for dimensioning steel framing systems, which shall be the same used on the Foundation Plan.

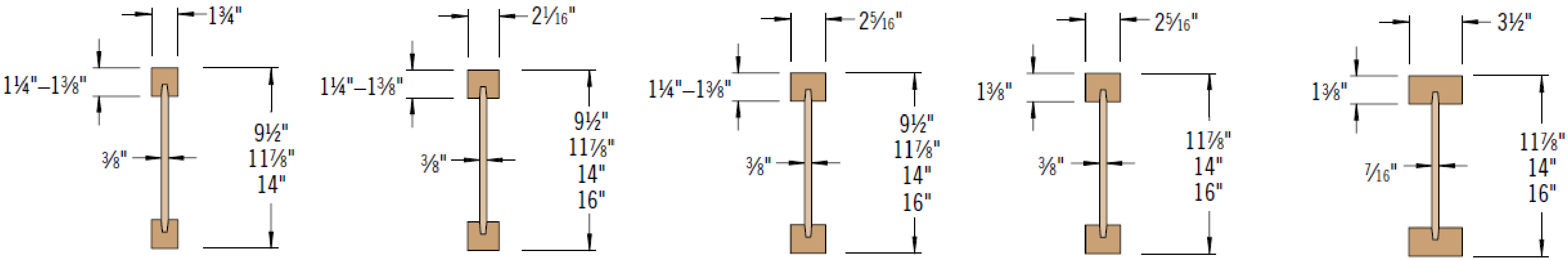
ditto: a thing mentioned previously or above —used to avoid repeating a word —often symbolized by inverted commas or apostrophes

Ch. 9 ROOF PLAN AND FRAMING SYSTEMS P. 333-337

•Beam and column heights are often shown on the framing plan
•A diagonal line is positioned at the structural element to be described. If the elevation is at top of the line , it refers to the elevation at the top of the beam. If the height information is required at the bottom of the beam it is written under the diagonal line
•Columns usually only required the elevation on the top of the column.

Framing Plan: Wood and Steel Members p.335
•Steel members are shown with heavy single center lines
•Wood Joist – "FJ" Floor Joist are illustrated by continuous line with half arrows at both ends (opposite) The information regarding the joist are presented in the joist schedules, as well as the notation is used by the structural engineer calculation for identification purposes
•"TJ" Truss Joist, is joist type, the "I" is a model

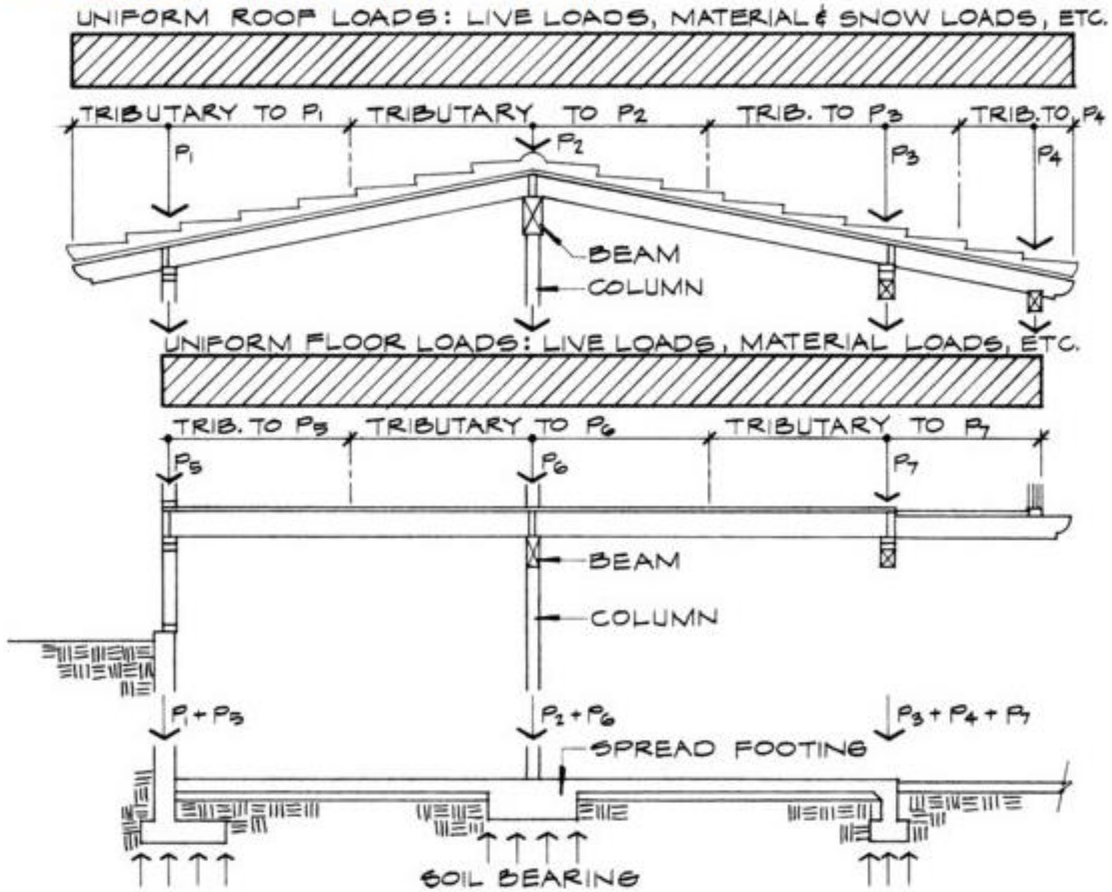
- “TJ” Truss Joist, is joist type, the “I” is a model

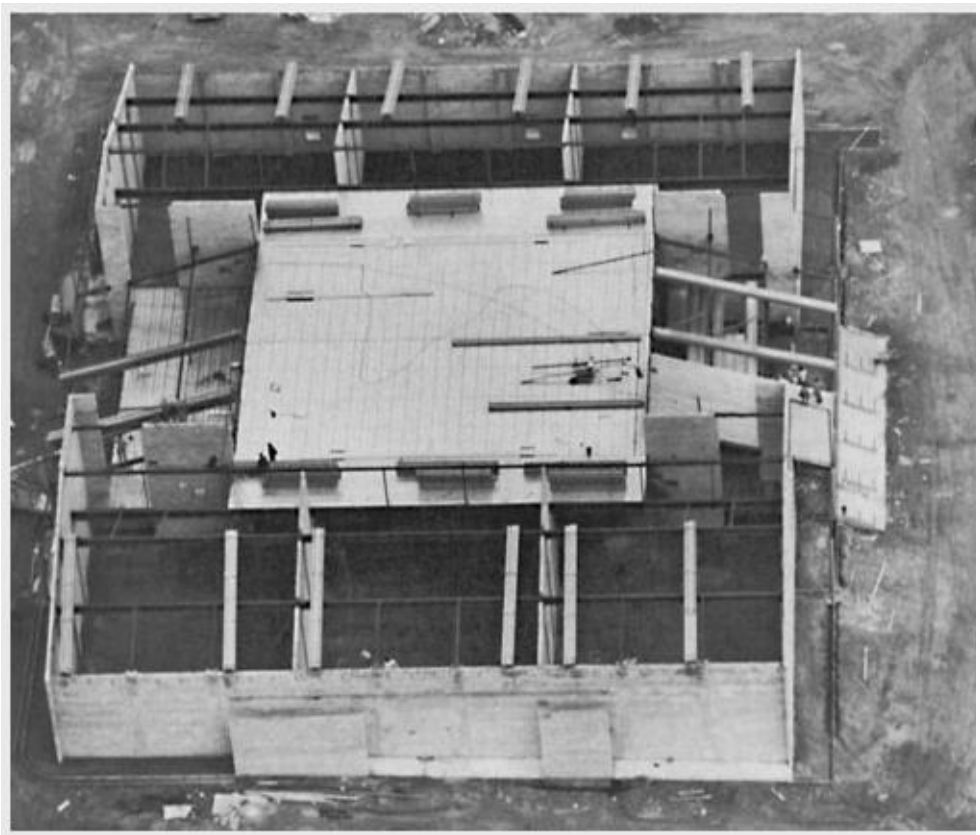


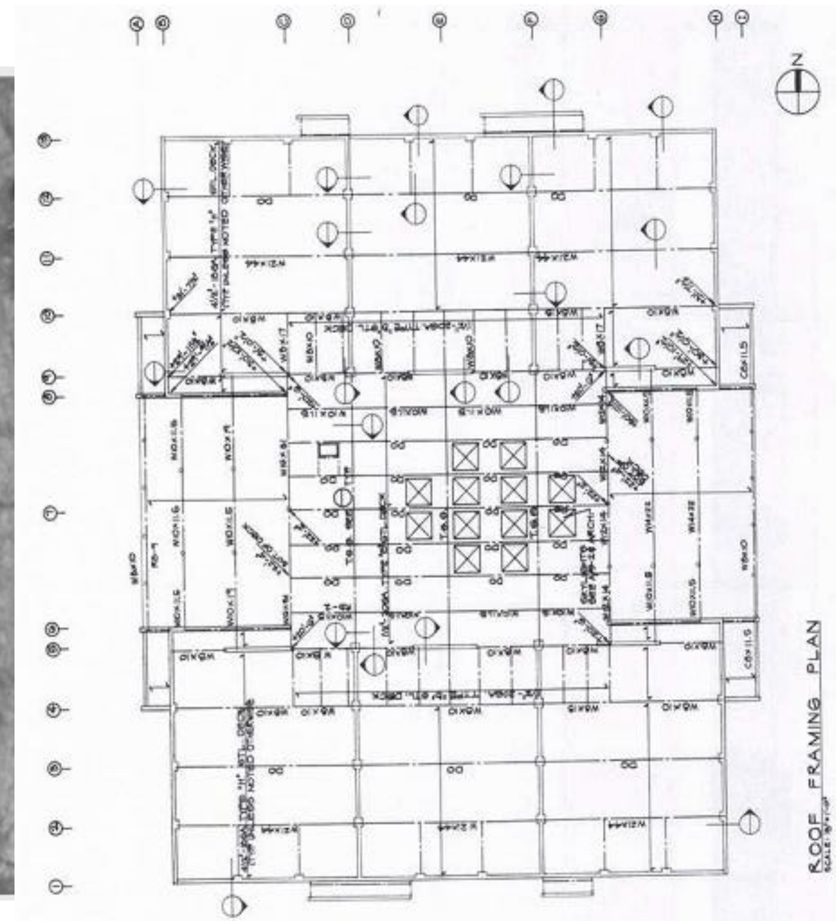
TJI® 110 Joists TJI® 210 Joists TJI® 230 Joists TJI® 360 Joists TJI® 560 Joists

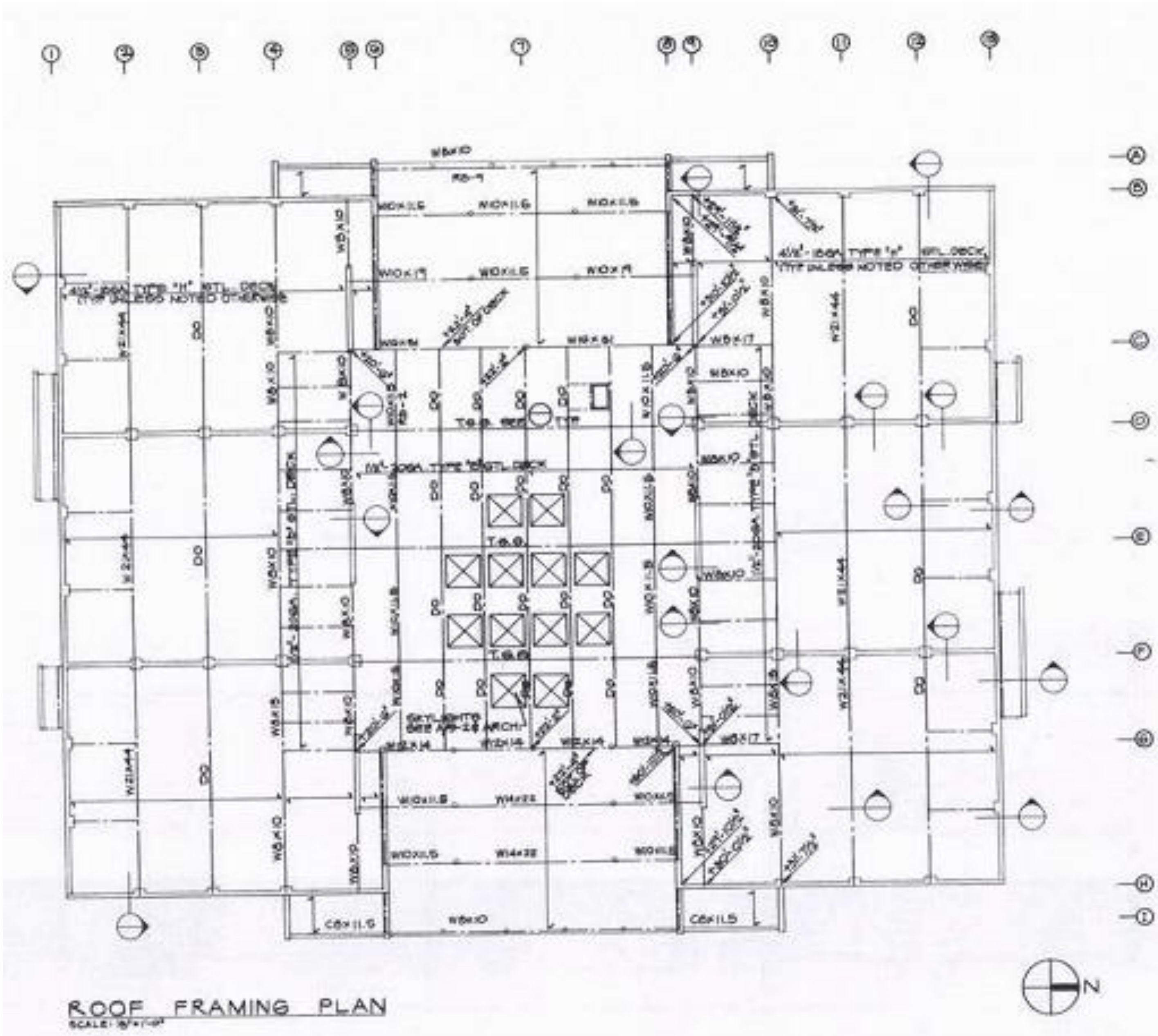
The structural design of beams and footings is calculated by finding the total loads that are distributed to any specific member. This total load is found by computing the tributary area affecting that member. Figure 9.81 illustrates a cross-section showing the various tributary areas that contribute loads to the ridge beam, floor beam, and foundation footing.

Figure 9.81 Tributary loading section.






ROOF FRAMING PLAN

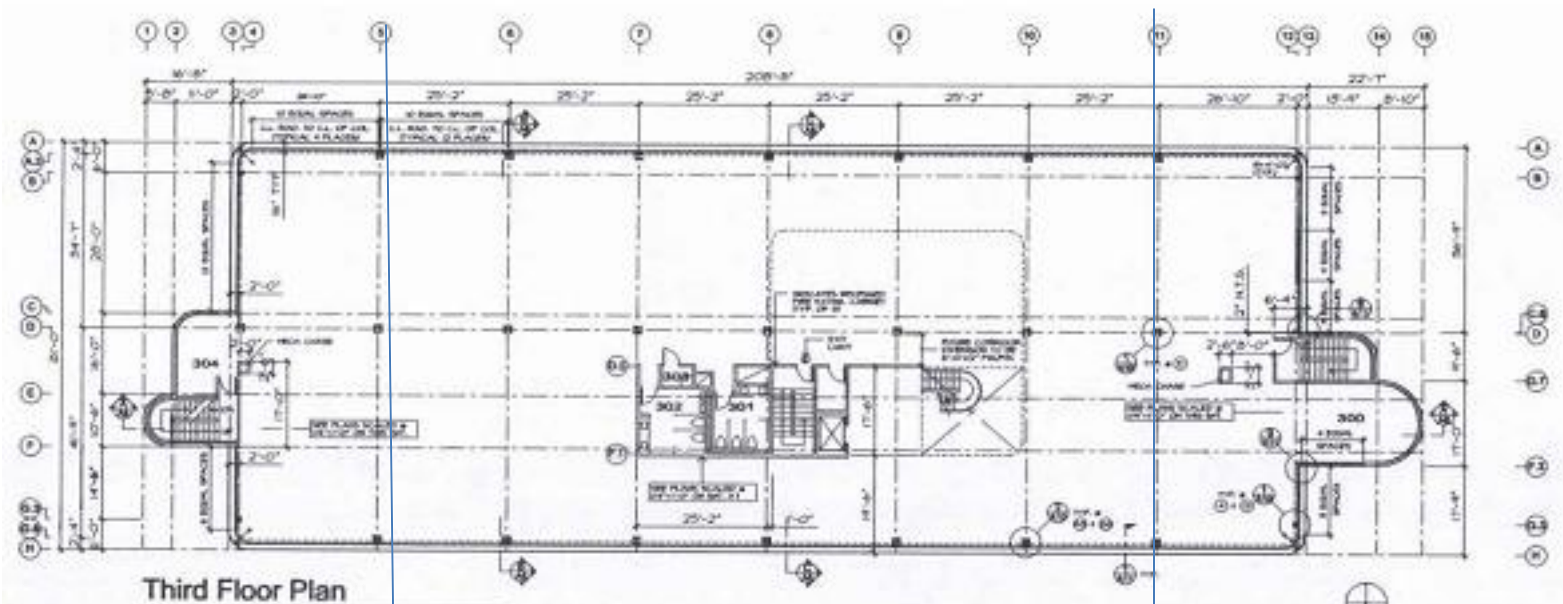


W8x10
W10x11.5
W10x19
W10x17
4 1/2" - 18GA. TYPE "H" STL. DECK
(TYP UNLESS NOTED OTHERWISE)
W21x44
W8x10
W14x22
C8x11.5
T.O.G.
SKYLIGHTS
SEE A9-26 ARCH.
W12x14
W8x17
N
ROOF FRAMING PLAN

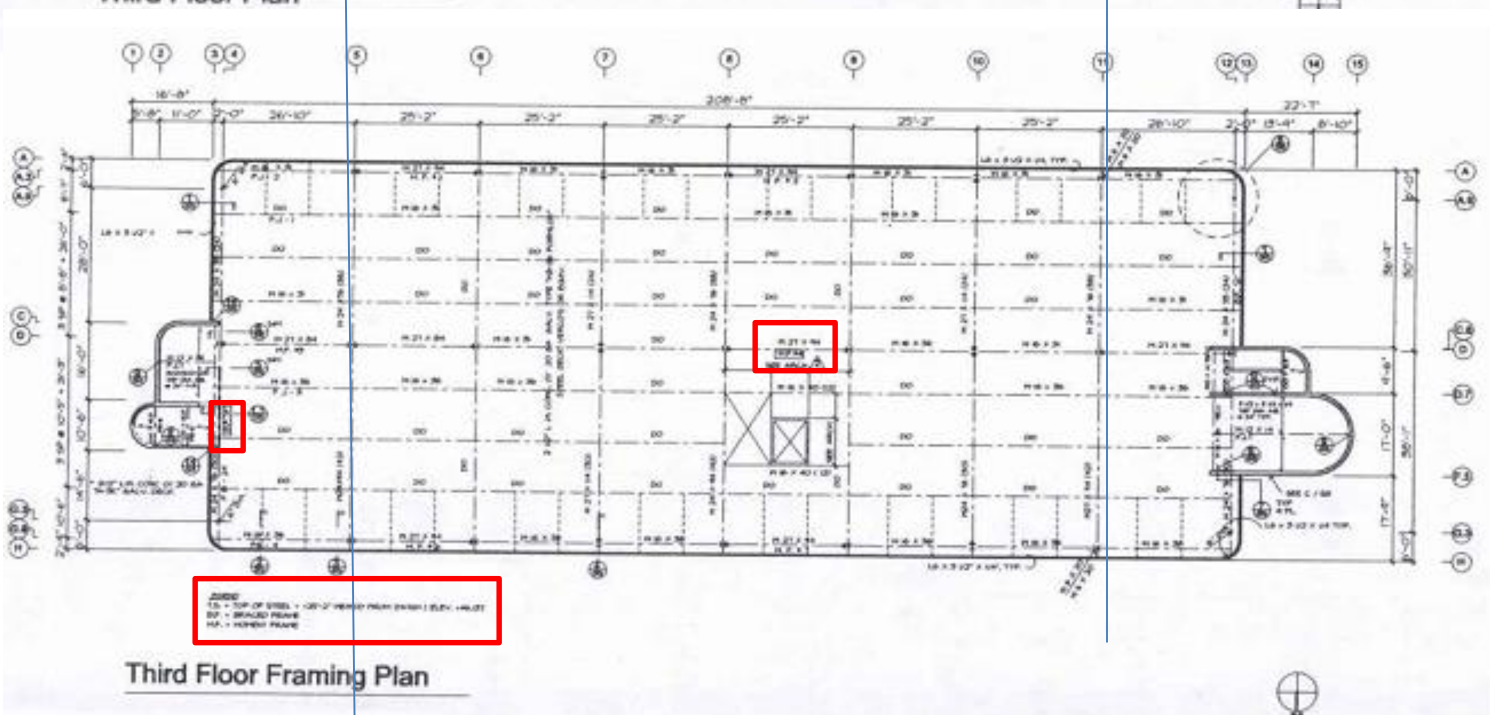
Roof Framing Plan Punch List

- Specific framing plan
- Tributary loads
- Floor framing
- Ceiling
- Roof framing
- Framing around openings for chimney, stairs, skylights
- Proper representation of beams, headers, girders, and the like
- Representation for roof sheathing
- Proper representation of ridges, valleys, and their size
- Beam with post over or under
- Structural post within a wall
- Representation of two framing systems on a single drawing
- Correct call-outs for steel members and wood members
- Proper designations for height of framing members
- Proper representation of double members

p.614



p.619



Third-Floor Framing Plan (Working Drawings) Punch List

- Draw in dimensions according to the structural engineer's work.
- Check dimension values; this is critical to maintaining structural simplicity.
- Indicate notes, referencing, and detail reference in the elevation area.
- Include various structure detail reference bubbles (Figure 17.32).
- Include beam and steel column sizes (Figure 17.33).
- Add general notes defining thickness of concrete floor filling and the gauge of corrugated steel decking substance between matrix lines 6 and 7, as well as stairwell areas.
- Include legend (Figure 17.34).

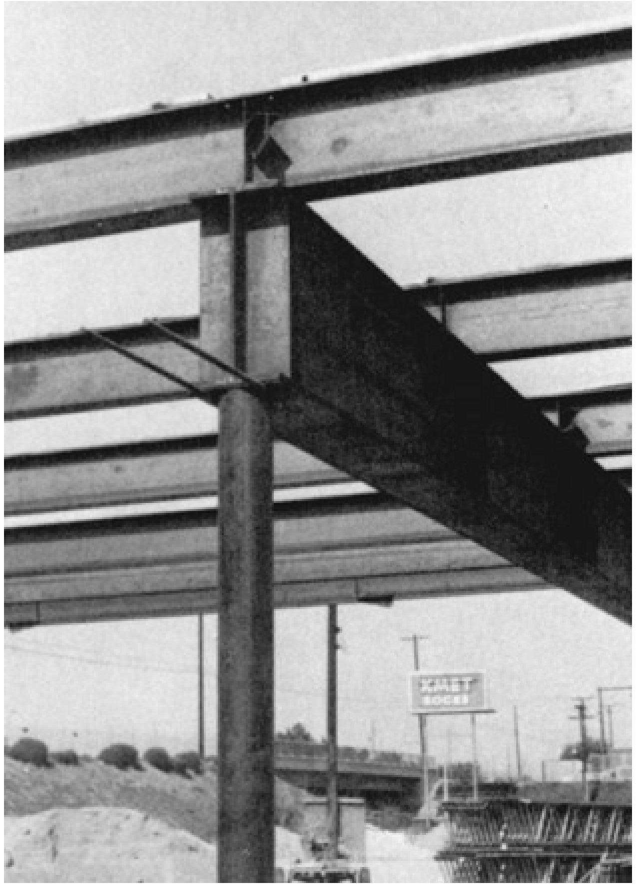
B.F. and M.F. are defined as lateral forces, such as earthquake or strong wind, and are resized by moment connections, found at steel beam and column connections.

T.S. – top of steel

B.F.- braced frame

M.F. – moment frame

- M.F. show on north/south walls.
- B.F. is noted on materials 4 and 12.



Framing Plan Checklist

1. Titles and scales.

2. Indicate bearing and non-bearing walls.

a. Coordinate with foundation plan.

b. Show all openings in walls.

3. Show all beams, headers, girders, purlins, etc.

4. Show all columns; note sizes and materials.

5. Note roof access way to attic—if occurs.

6. Note ceiling joist sizes, direction, spacing.

7. Draw all rafters; note sizes and spacing.

a. Show skylight penetrations.

b. Show chimney penetrations.

8. Draw overhangs.

a. Indicate framing for holding overhangs up.

b. Dimension width of footings.

9. Note shear walls and length of wall.

10. Note roof sheathing type, thickness, and nailing.

11. Indicate all ridges and valleys. Note sizes.

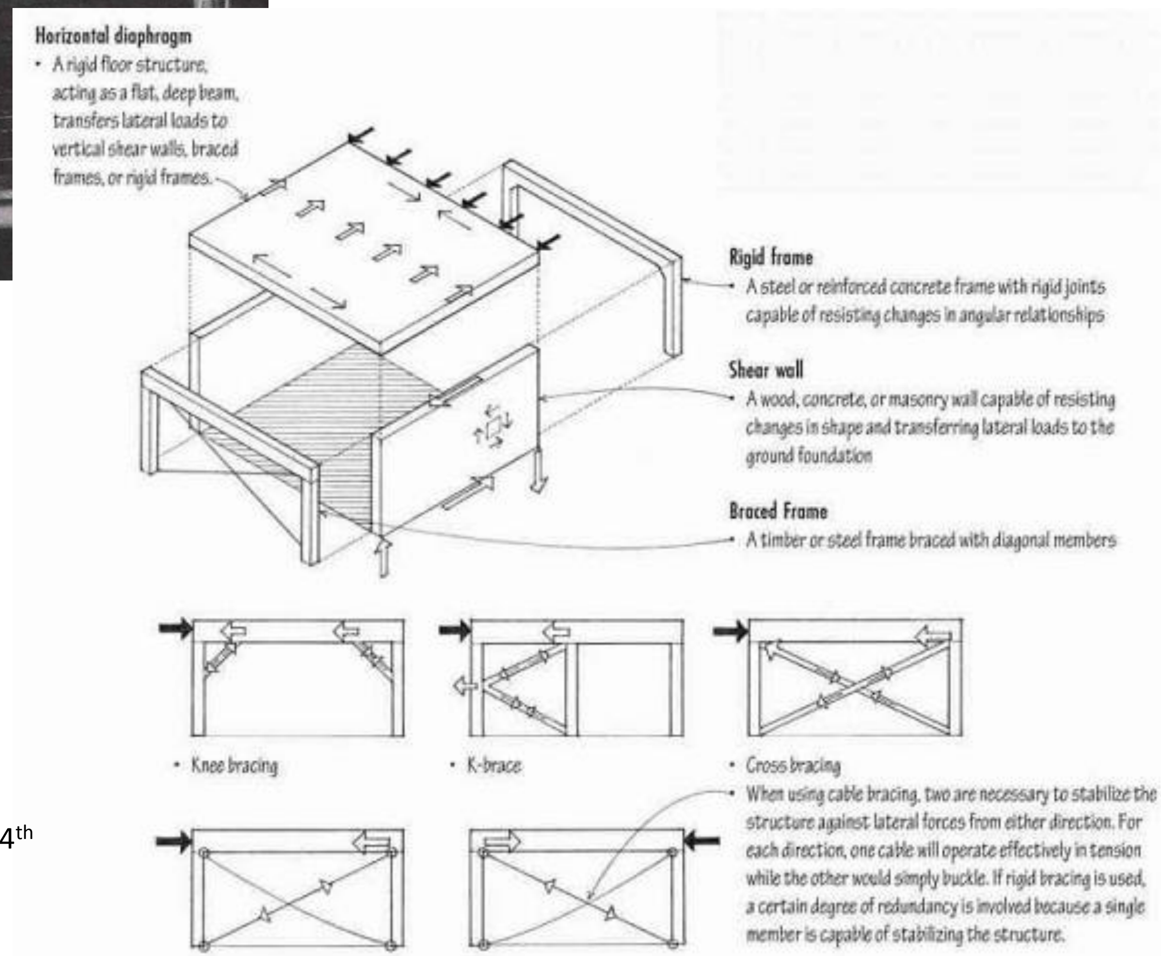
12. Note all differences in roof and floor levels.

13. Provide all shear schedules.

14. Provide material specifications.

15. Provide nailing schedule.

16. Note structural observation requirements.



Francis DK Ching Building Construction Illustrated 4th edition

CHAPTER

10

Chapter 10 p. 348

Building section

Building section cuts a slice through a structure or part of a structure. Building Section are done by making a cross-section giving relevant architectural and structural information.

Building section will illustrate the following information:

- Type of foundation
- Floor system
- Exterior and interior wall construction
- Beam and column sizes and their materials
- Plate and/or wall heights
- Floor elevations
- Floor members (size and spacing)
- Floor sheathing, material and size
- Ceiling members (size and spacing)
- Roof pitch
- Roof sheathing material and size
- Insulation requirements
- Finish roof material
- Ceiling heights

wall Sections

Simple structural conditions may only require wall sections to convey the necessary building information. Structural sections for a small industrial building, for example, might use wall sections.

In most cases, wall sections can be drawn at larger scales such as ½″ = 1′-0″. These larger scale drawings allow you to clearly elaborate building connections and call-outs without having to draw separate enlarged details.

Figure 10.8, 10.9, 10.10, 10.11 show an industrial building and also show how wall sections are incorporated into a set of construction documents. Figure 10.8 shows the floor plan with two main exterior and one interior bearing wall conditions. These wall conditions are referenced to wall sections and are shown in Figure 10.8, 10.9, 10.10, 10.11

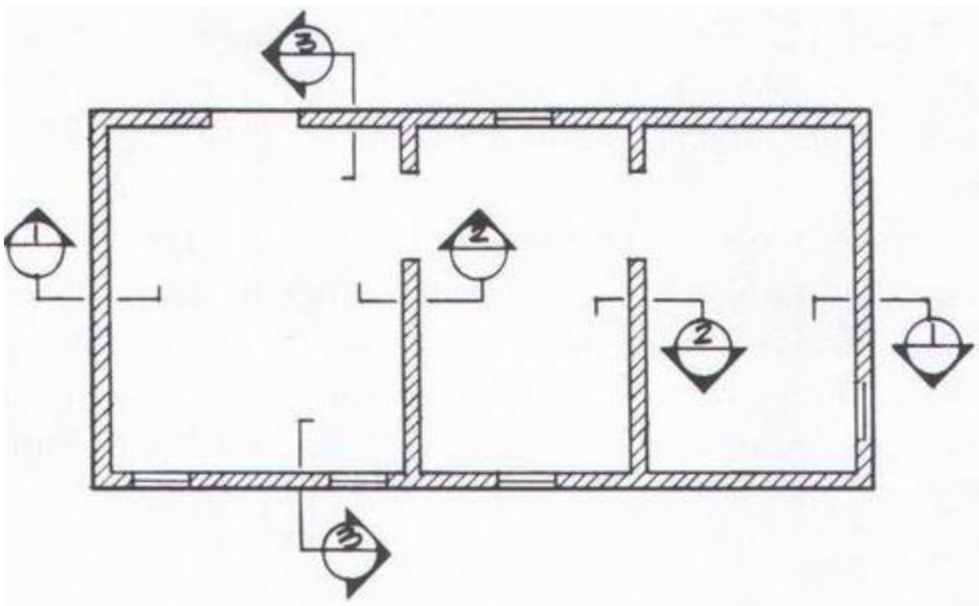


Figure 10.8 Floor plan—industrial building.

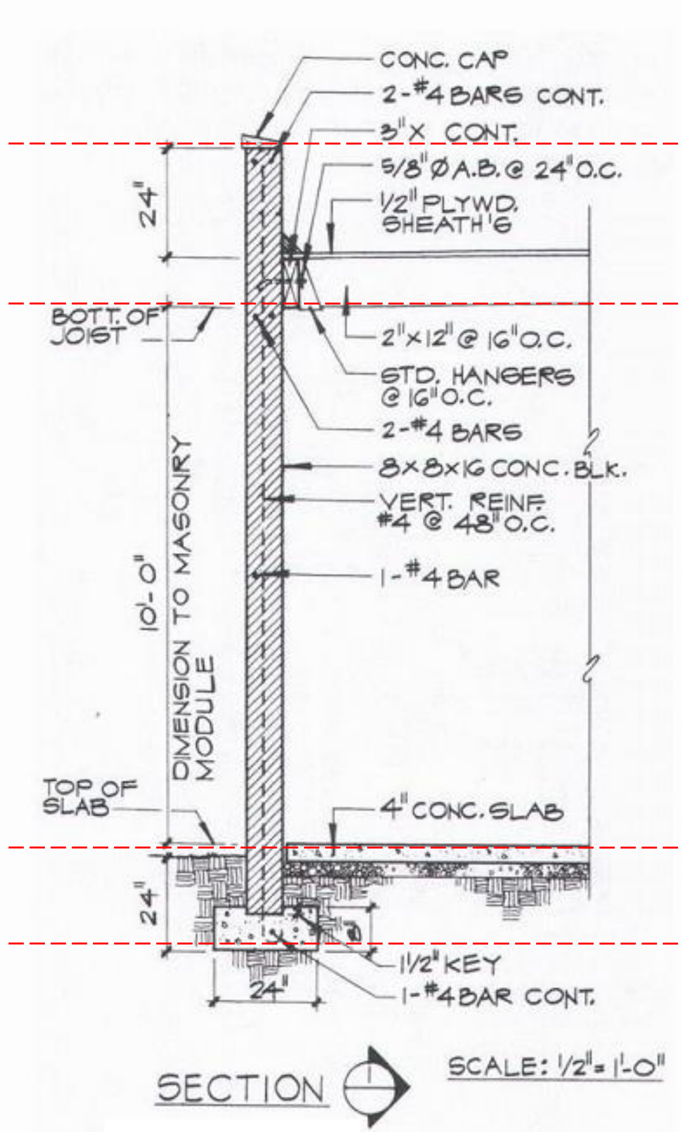


Figure 10.9 Exterior wall section.

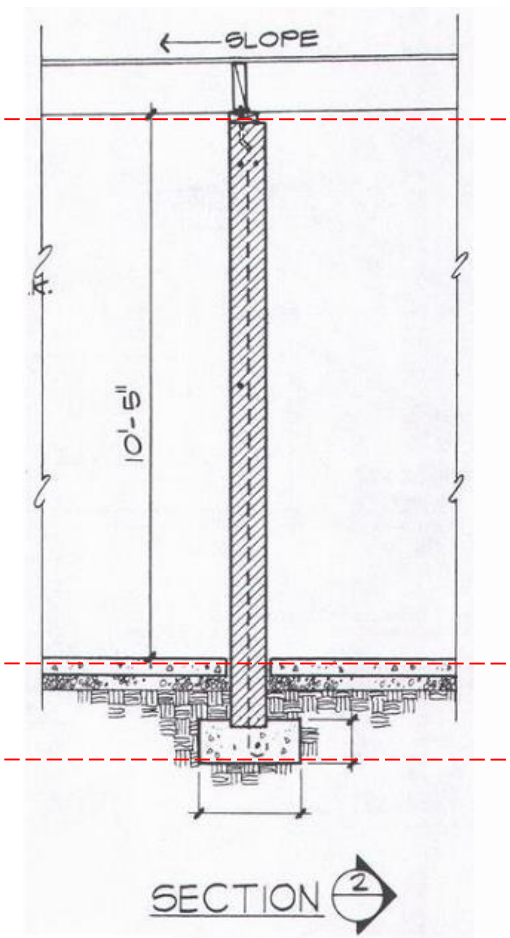


Figure 10.10 Interior wall section.

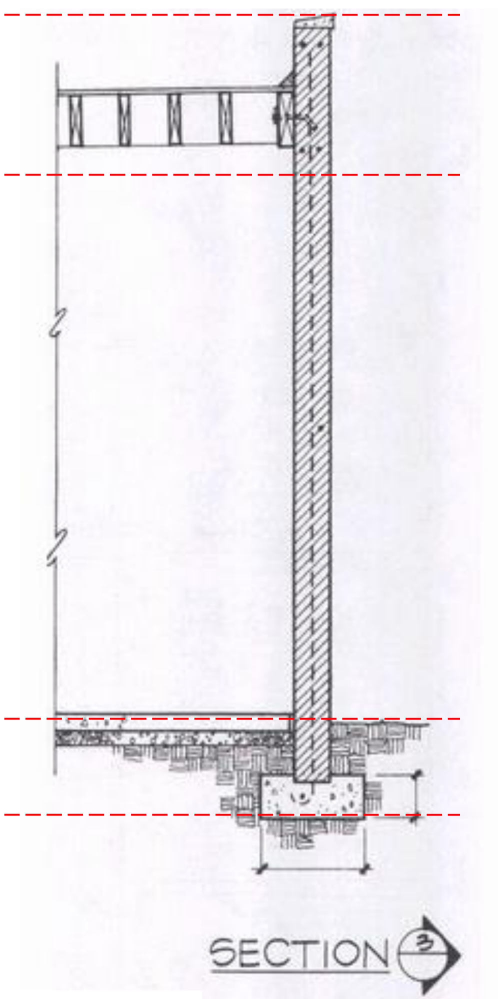


Figure 10.11 Exterior wall section.

Steel Sections

For buildings built mainly with steel members, use elevations to establish column and beam heights. This approach coincides with the procedures and methods for the shop drawings provided by the steel fabricator.

Figure 10.19 shows a structural section through a steel-frame building. In contrast to sections for wood-frame buildings, where vertical dimensions are used to establish plate heights, this type of section may establish column and beam heights using the top of the concrete slab as a beginning point. Each steel column in this section has an assigned number because the columns are identified by the use of an axial reference matrix on the framing plan, shown in Figure 10.21

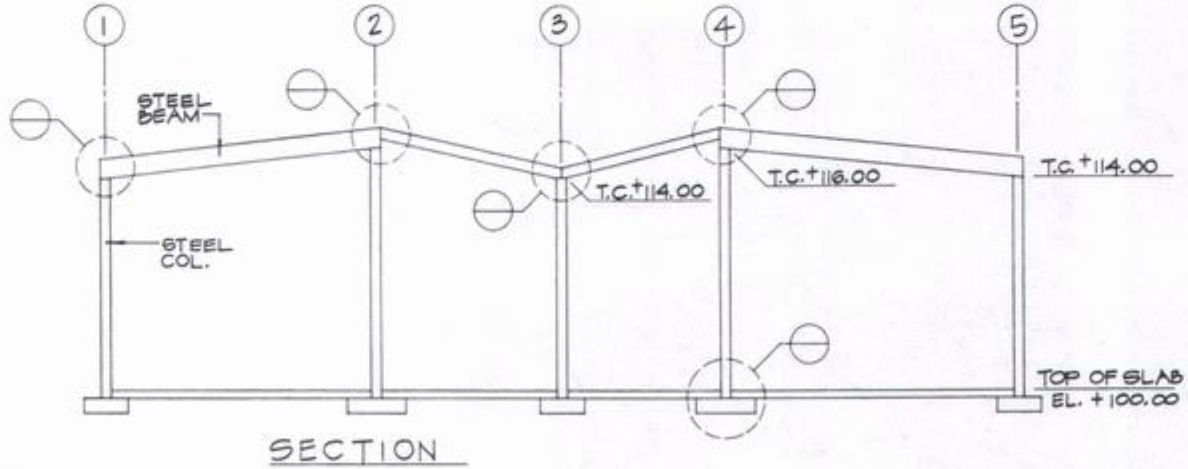


Figure 10.19 Steel frame section.

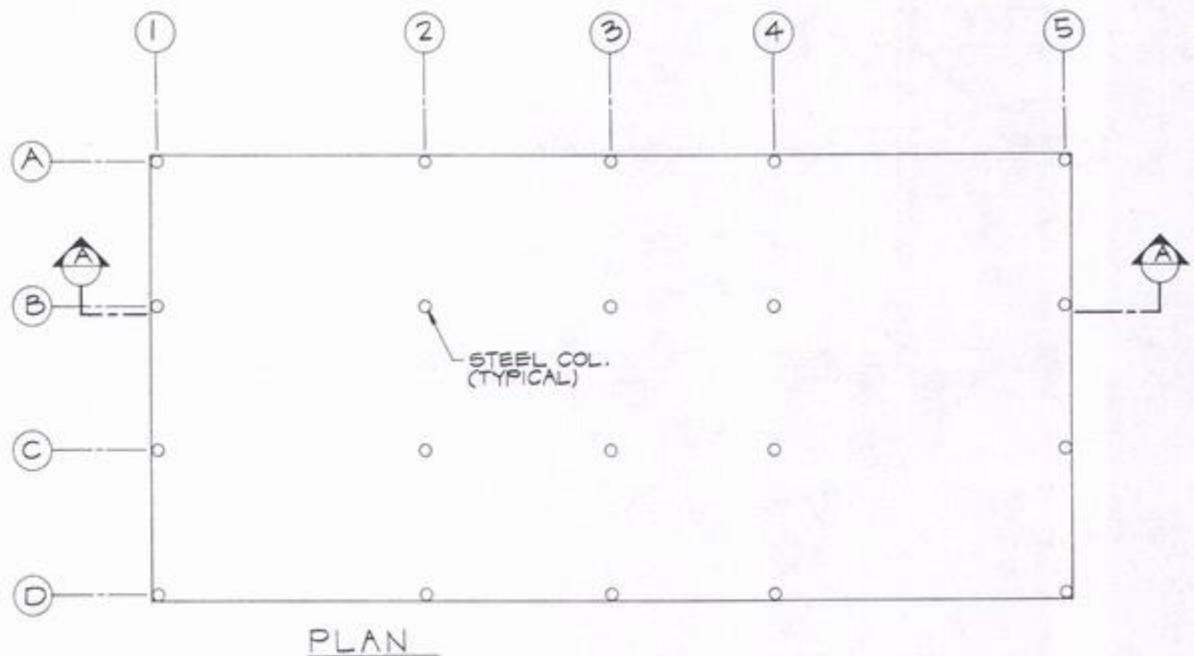


Figure 10.20 Column matrix.

DRAFTING A BUILDING SECTION

After deciding where a section is to be taken that reveals the greatest amount of the structure, a grid pattern is drafted. The horizontal lines of the grid represent the floor line and the plate line (at the top of the two top plates). All of the vertical lines represent the walls of the structure or column locations. See Figure 10.21

Before you decide on a smaller scale, explore the possibility of removing portions of the building that are redundant by virtue of break lines. See Figure 10.9

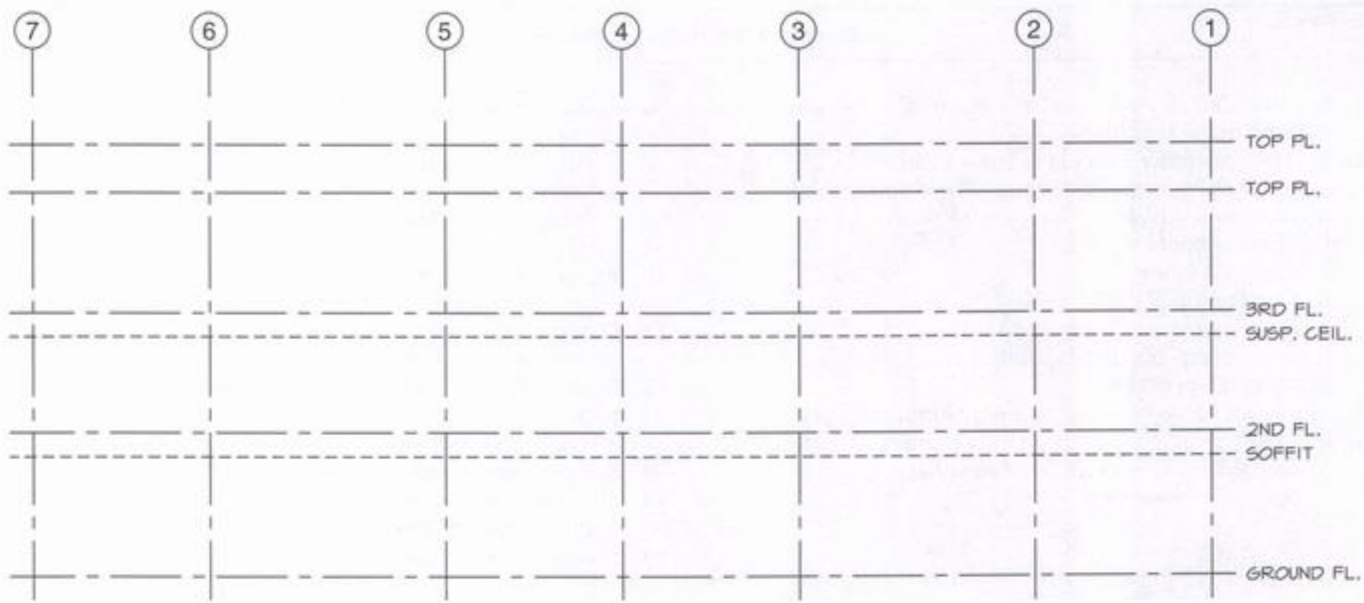
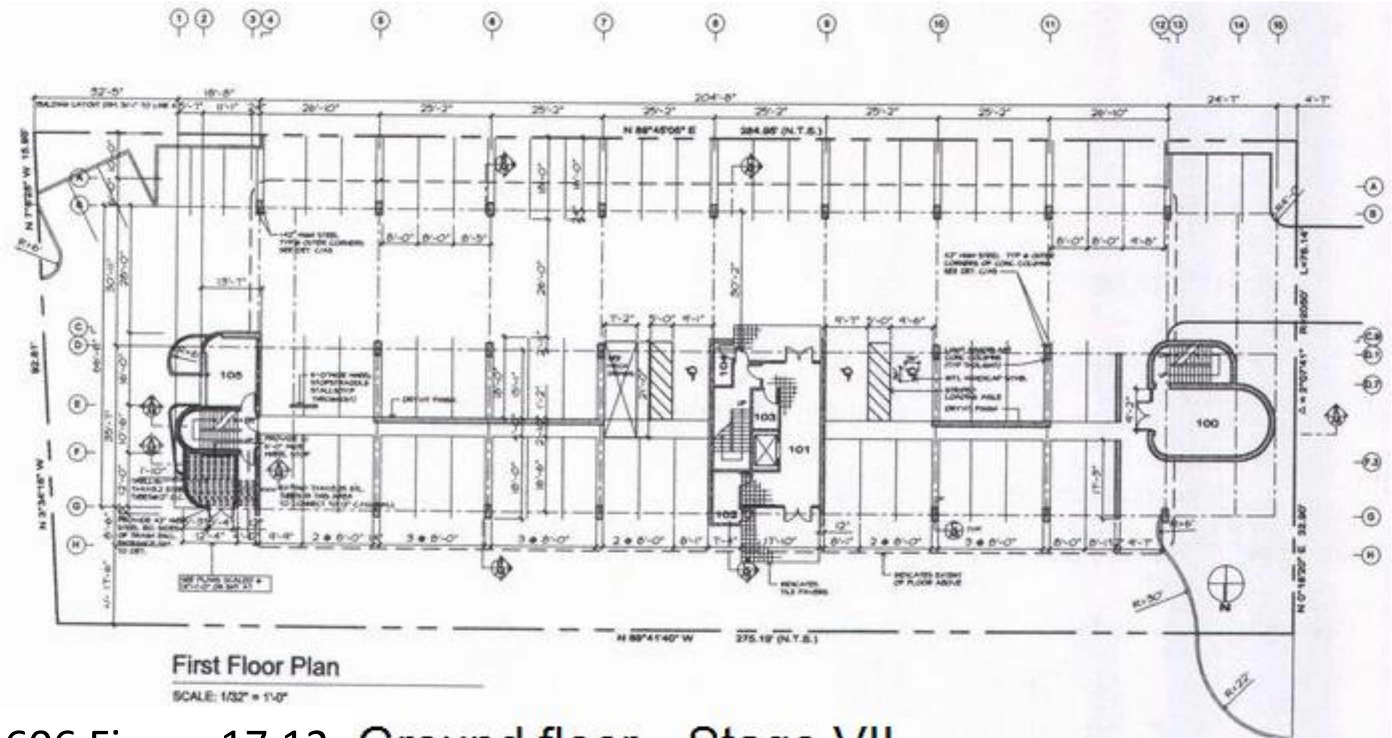
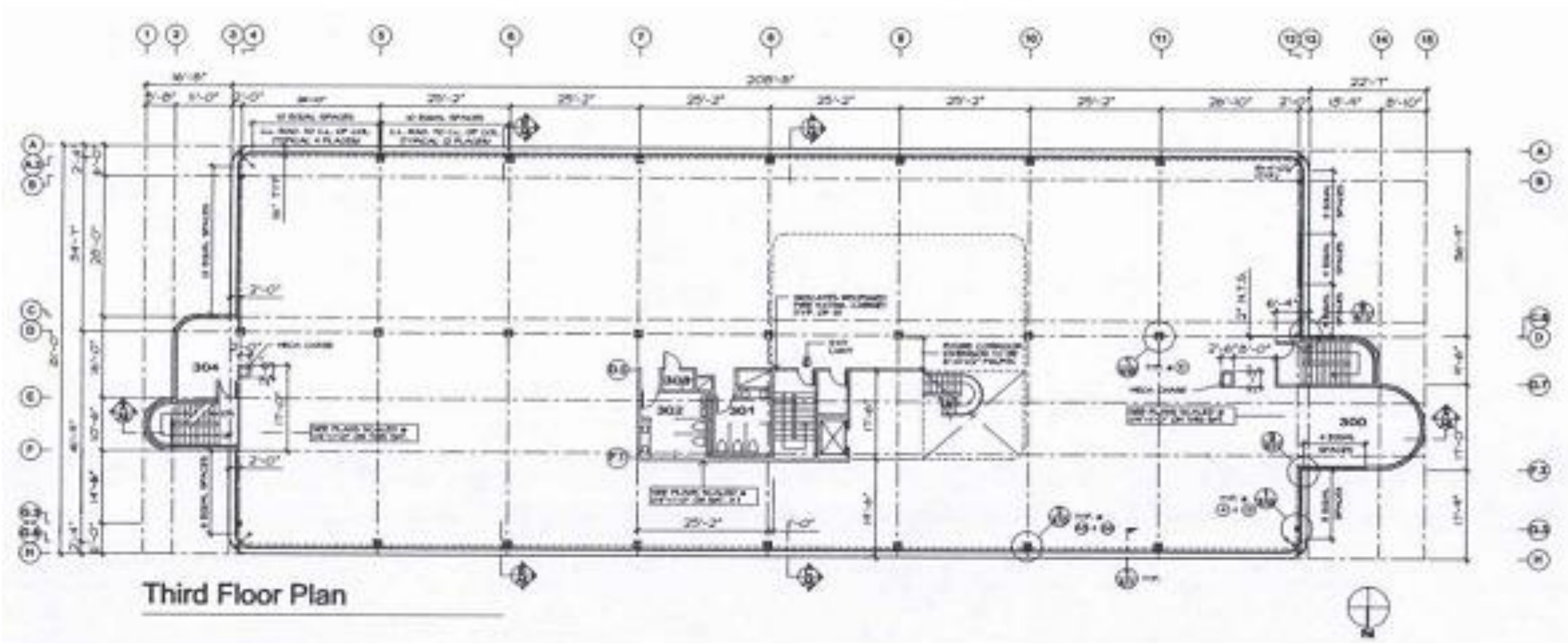


Figure 10.21 Layout of the grid pattern.

Chapter 17 Madison Building pages 598-625



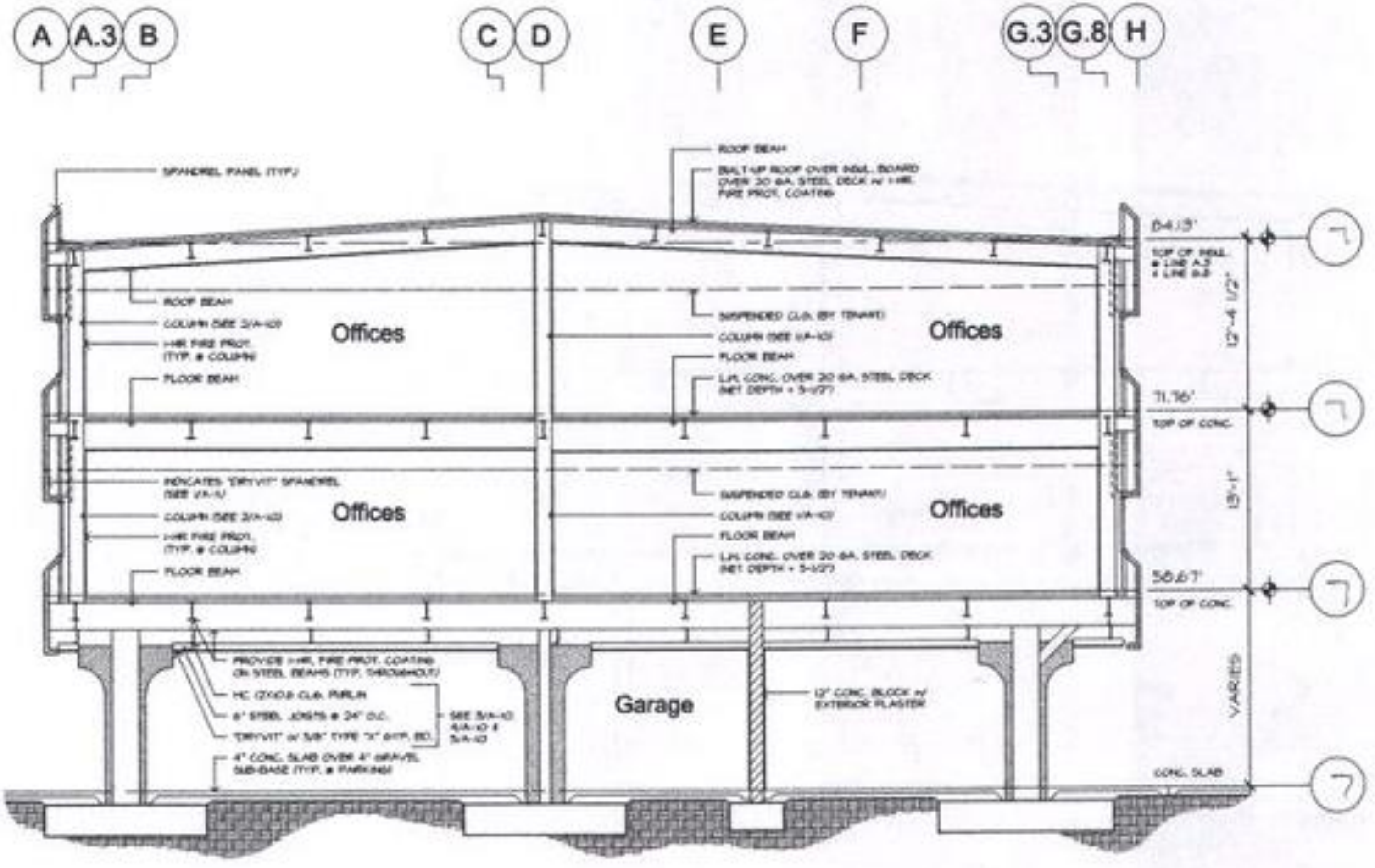
p. 606 Figure 17.12 Ground floor—Stage VII.


Third Floor Plan
304
303
302
301
300
208'-8"
25'-2"

Building Section Working Drawings Punch List p. 618

- For clarity and ease of reading, the matrix and numbers and letters were kept large; so were the bubbles containing references. Note how this was solved by offsetting the matrix lines below the call-outs (Figure 17.38).
- The top of the concrete floor level elevation and the top of the roof insulation are located adjacent to the parapet wall.
- Spaces have been designated for offices and garage use (Figure 17.39).
- A broken line designates the extent of the suspended ceiling.
- The steel roof and supporting floor beams are defined. The size and weight of these members will be designated on the framing plans.
- The depth of the concrete floor topping and the gauge of the corrugated steel decking have been noted.
- Detail references for items requiring a one-hour fire-rated assembly have been noted for the supporting columns and the ground-floor ceiling.

- The concrete-block shear wall is cross-hatched for definition, and the height of this wall is shown.
- The types of roofing and insulation materials are indicated, and the steel decking and fire protection requirements are noted.
- The size of the steel ceiling joists and their spacing are noted for the ground-floor ceiling.
- The thickness of the ground-floor concrete and its substrate is noted.
- The concrete shape encasing the steel columns at the ground-floor level has been shaded for clarity.
- The graphic designation for earth has been indicated for reasons of clarity.
- To understand how the beams and columns were attached, see Figures 17.40 and 17.41.
- Slope of parking is noted to drain water from this open area; the dimension is listed as "varies" (see Figure 17.42).
- For the concrete-covered columns, see Figure 17.42.
- Finally, the designation of the building section title has been lettered in, along with the scale of the drawing.



Section B-B

Figure 17.39 Building section B-B—Stage V.

http://www.tmtco.com/products/beam.html

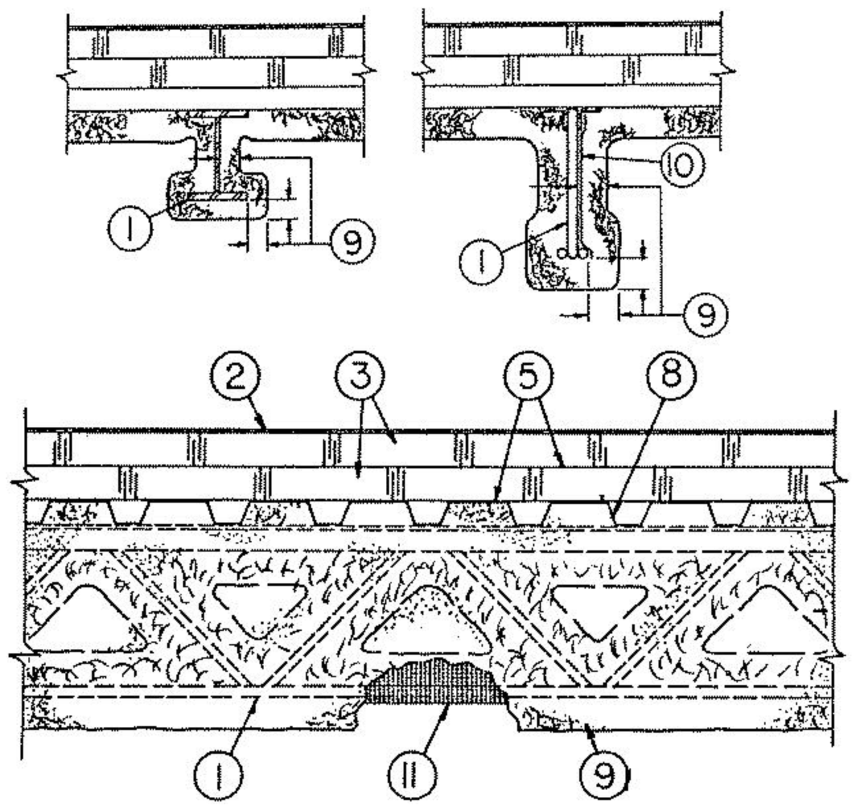
http://www.dryvit.com/home/default.asp

BXUV.P819
Fire Resistance Ratings - ANSI/UL 263

Page Bottom

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.



1. **Beam** — W6x16 min size, or Steel Joist min size (See Item 9).

p. 623

Figure 17.40 illustrates a structural detail with a series of steel connections involving steel roof beams and steel floor beams and engineered assembly members for their connection to a steel column. This particular structural detail occurs on matrix lines D and 7. Note that a steel pipe column may be used as an alternative to a wide flange column for reasons of concealment at the first floor level. This detail is one of many to be found in the structural detail that is part of a set of working drawings.

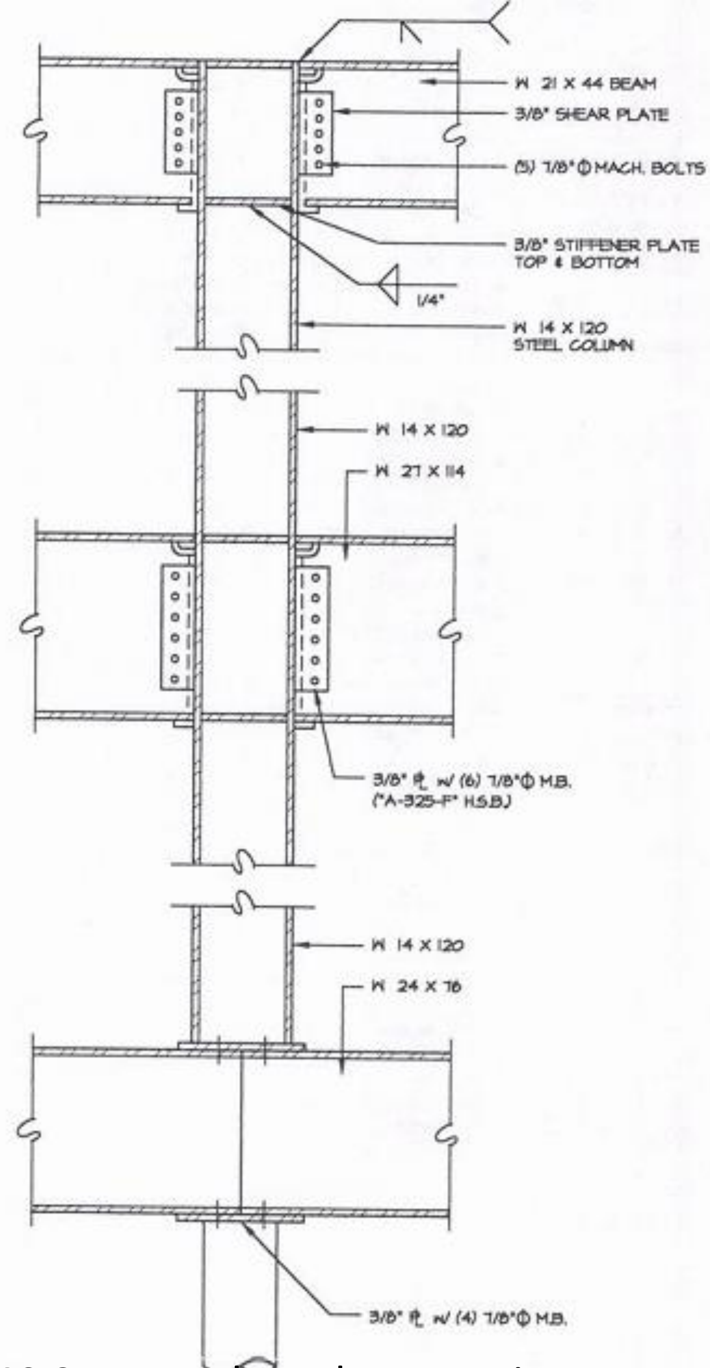


Figure 17.40 Structural steel connections

Once the structural engineer and the architect have finalized the member sizes for the structural skeleton, the architectural detailing may commence. These details, and there will be many, will be predicated on the sizes and connections of the steel framing members. An example of an architectural detail that has been designed and detailed for the assembly of the exterior wall members and their attachment to the steel frame is shown in Figure 17.41 These members incorporate the use of light steel framing members, gypsum board, and 2" foam insulation board.

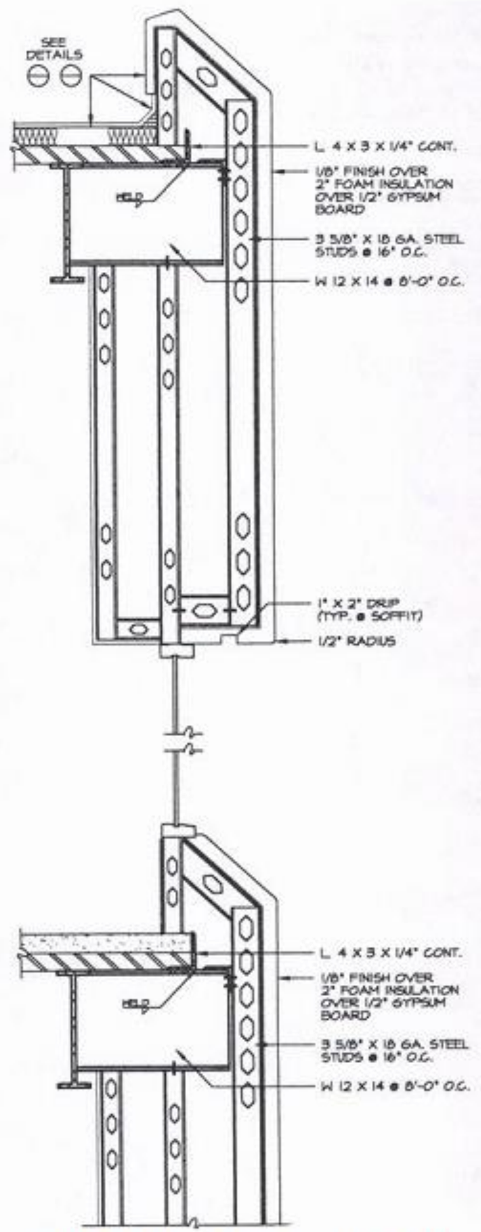


Figure 17.41 Architectural details

p. 624

As previously mentioned, the steel columns at the ground floor level are to be encased in concrete and formed to give a desirable architectural appearance. The concrete encasement will also provide the necessary fire protection around the steel columns. This column detail is shown in Figure 17.42 and is applicable along matrix lines 4 through 12 and along lines B, D, and G. Note that the roof drainage pipe lines are concealed within the composite column, with their termination occurring 3" above the parking floor level. As mentioned earlier, the vertical dimension line titled "Varies" is so designated because of the change of floor levels in the parking floor for the purpose of providing proper water drainage.

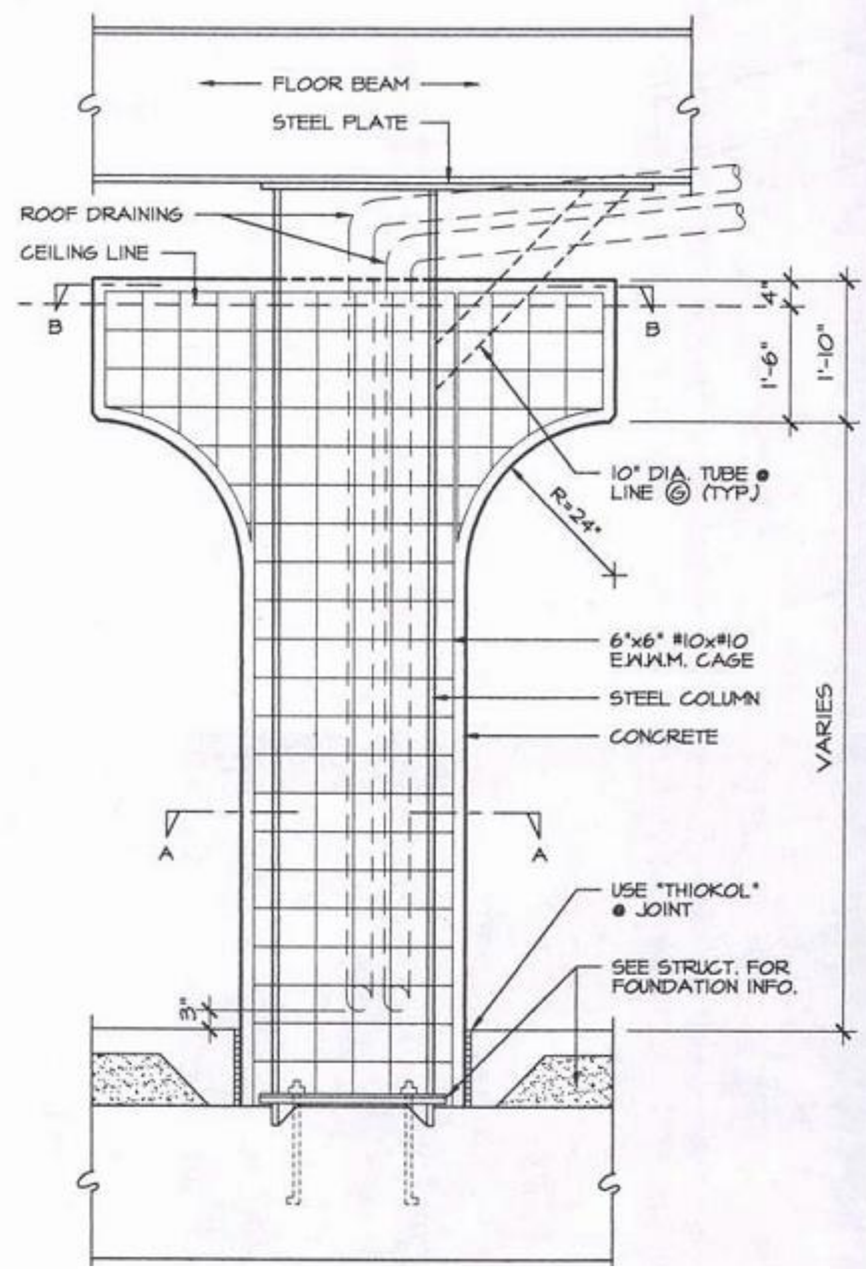


Figure 17.42 Steel/concrete column

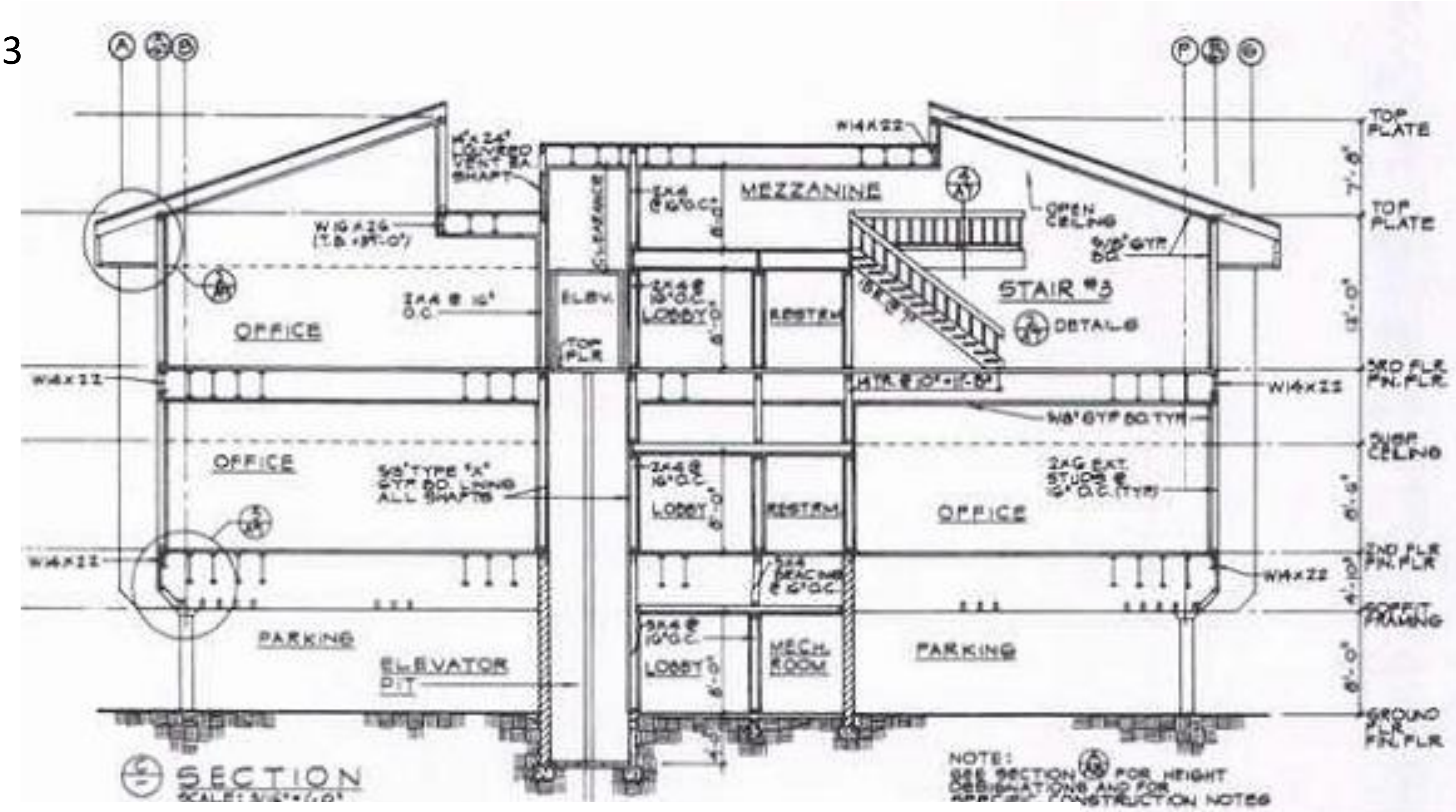
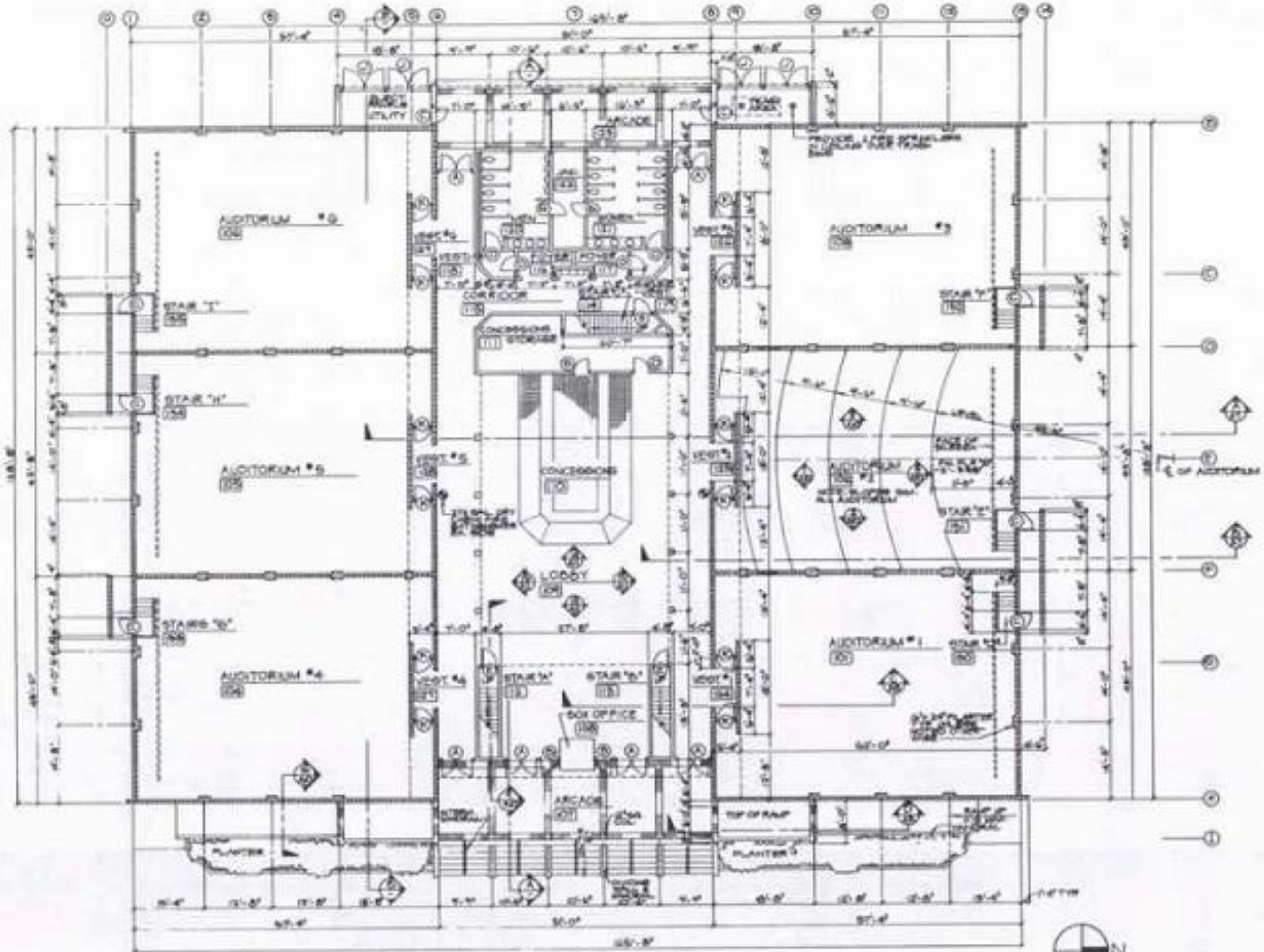


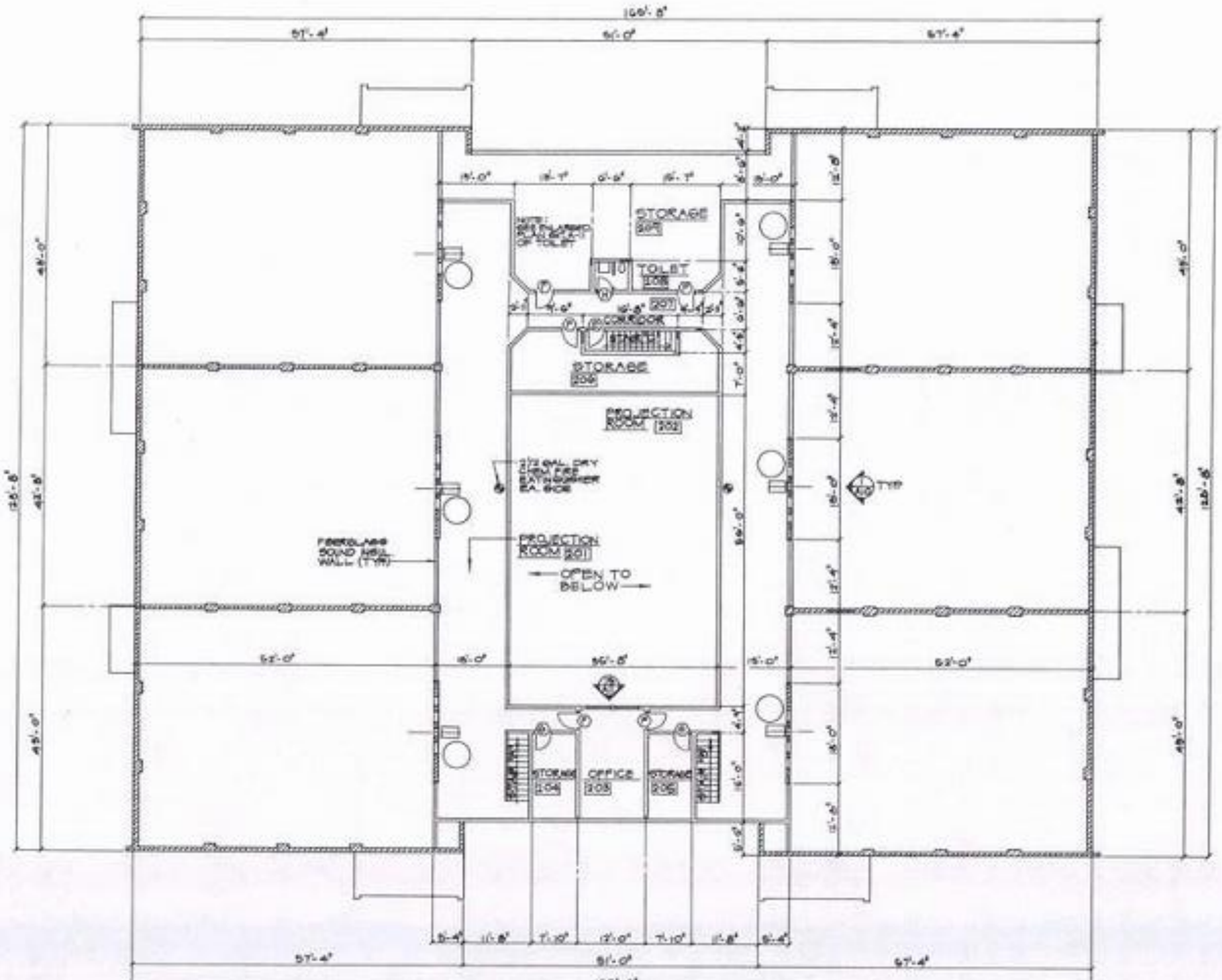
Figure 11.41 Section of a Steel Wood structure.

Built-up roofing – a continuous covering for flat or low pitched roofs, consisting of alternating layer or piles of roofing felt and heated bitumen, surfaced with a cap sheet or a layer of gravel or slag in a heavy coat embedded in bitumen.

Type “X” Gypsum board. A gypsum board having a core containing additives for increased fire resistance.



GROUND FLOOR PLAN



UPPER FLOOR PLAN

SCALE: 1/8"=1'-0"

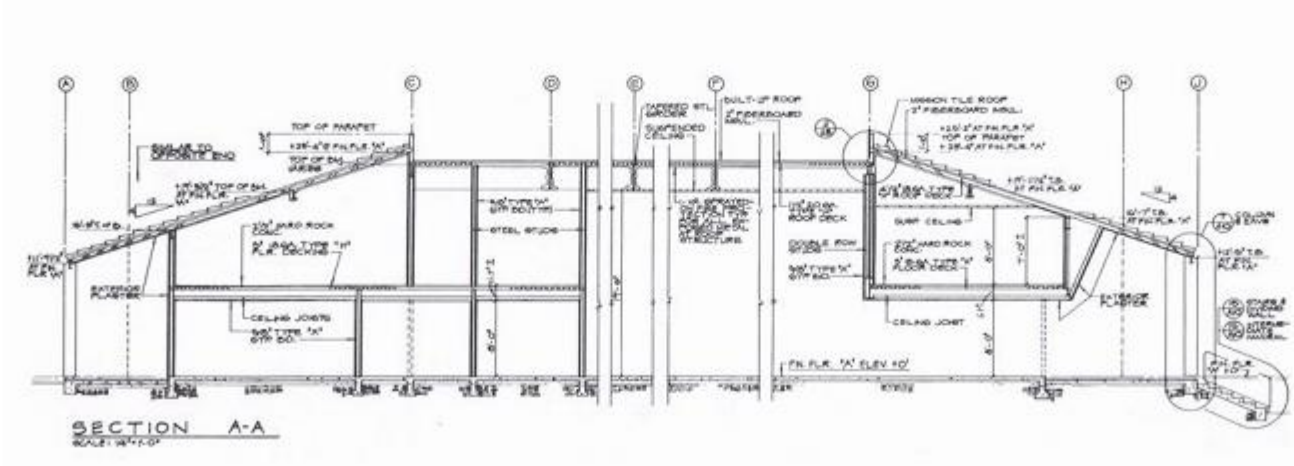


Figure 16.58 Building section, East-West direction.

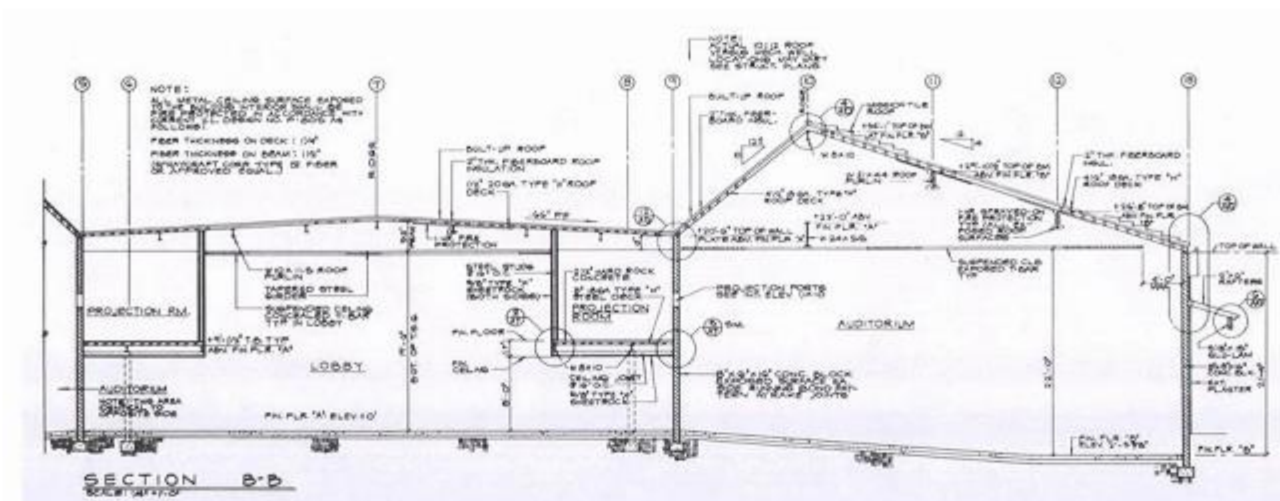


Figure 16.58 Building section, North-South direction.

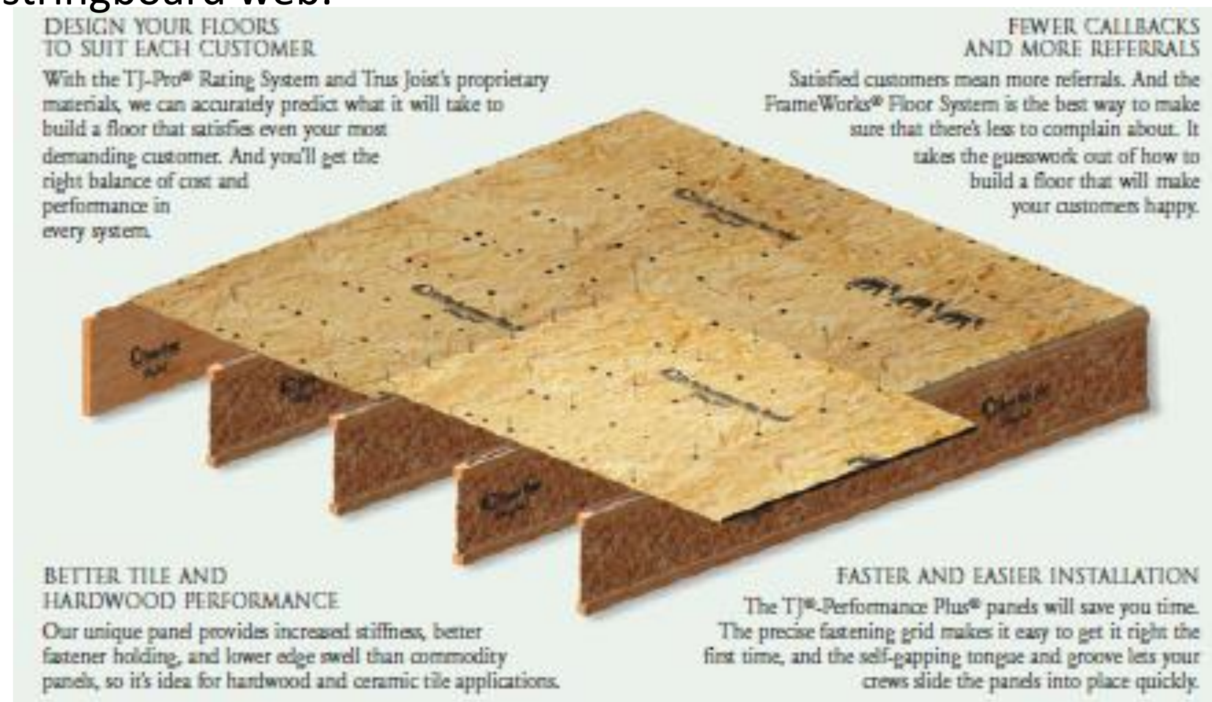
ARC 2681 Environmental Technology

R-VALUE R-Value is a rating given in construction to indicate how well a material insulates. The higher the number, the more insulation you are getting and the more money you are saving in energy costs. Please be aware that a lot of window companies will say they have an R-Value of 25 on one component (say, just the frame of their window). However, you need to be sure to get the R-Value of the window as an entire unit, which is realistically between 2 and 4.

U-VALUE U-Value is similar to R-Value, but there are two major differences. First, the U-Value rates an entire window or door unit, whereas the R-Value only measures specific materials. Second, the lower the U-Value, the more energy efficient your home will be (as compared to the higher R-Value being more energy efficient). This difference in scale exists because R-Value rates how much heat is retained, whereas U-Value rates how much heat is lost. Energy Swing windows meet Energy Star efficiency standards with a U-Value of 3.

TJI wood joist

I-beam or I-joist a beam made by gluing sawn or laminated veneer lumber flanges along the top and bottom edges of a single plywood or oriented stringboard web.



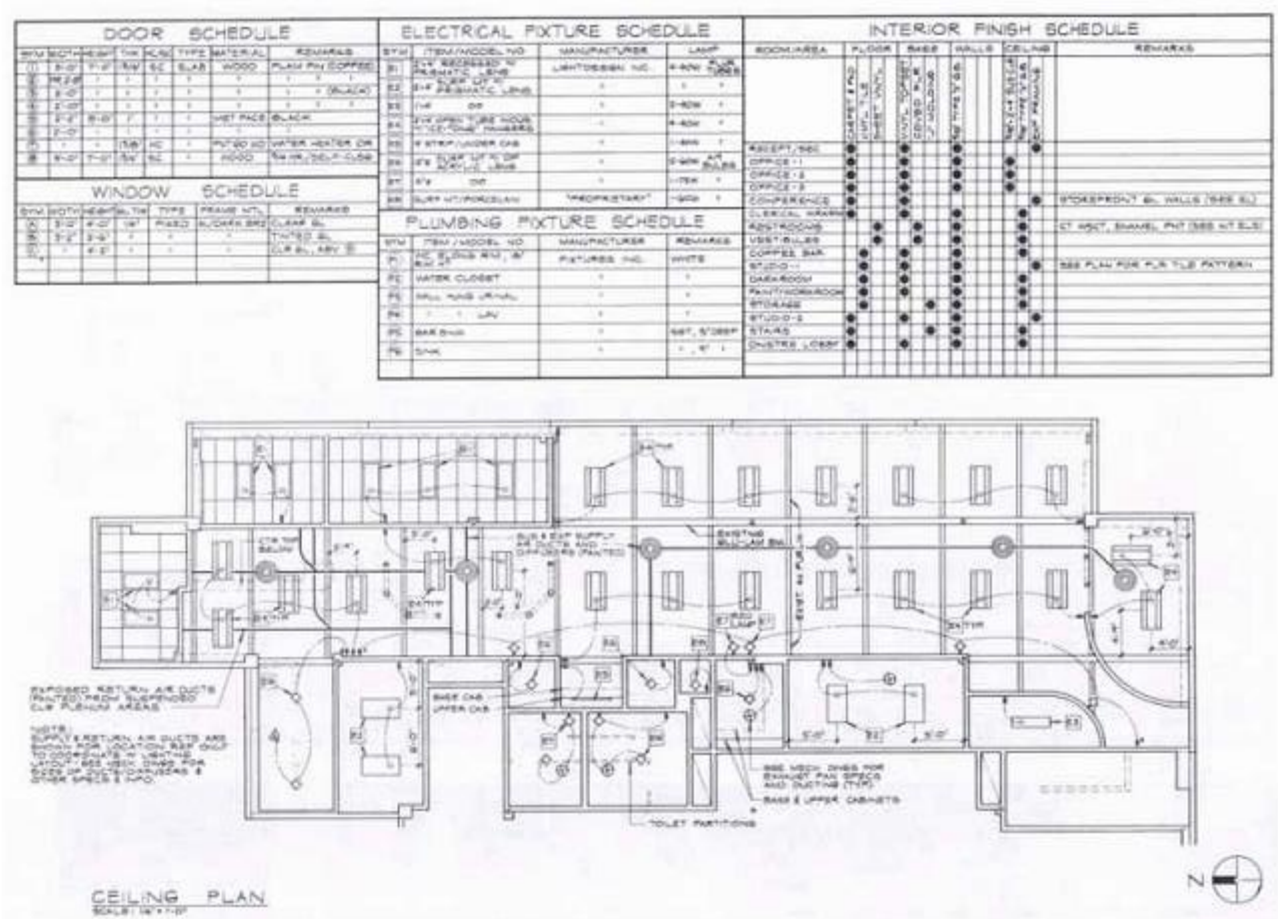
Prefabricated Wood I-joist - a structural member manufactured using sawn or structural composite lumber flanges and structural panel webs, bonded together with exterior exposure adhesives, forming an "I" cross-sectional shape. These members are primarily used as joists in floor and roof construction.

Glued-laminated timber- a structural lumber product made by laminating stress-grade lumber with adhesive under controlled conditions, usually with the grain of al piles being parallel.

Figure 1: Reinforced glulam used in a roof beam of a commercial building

Structural Glued Laminated Timber (Glulam) - a product produced in a laminating plant under controlled conditions of temperature and pressure by gluing together suitable selected and prepared pieces of lumber, normally of 2-in. or 1-in. nominal thickness, with the grain of all pieces essentially parallel to the longitudinal axis of the member.

p. 652



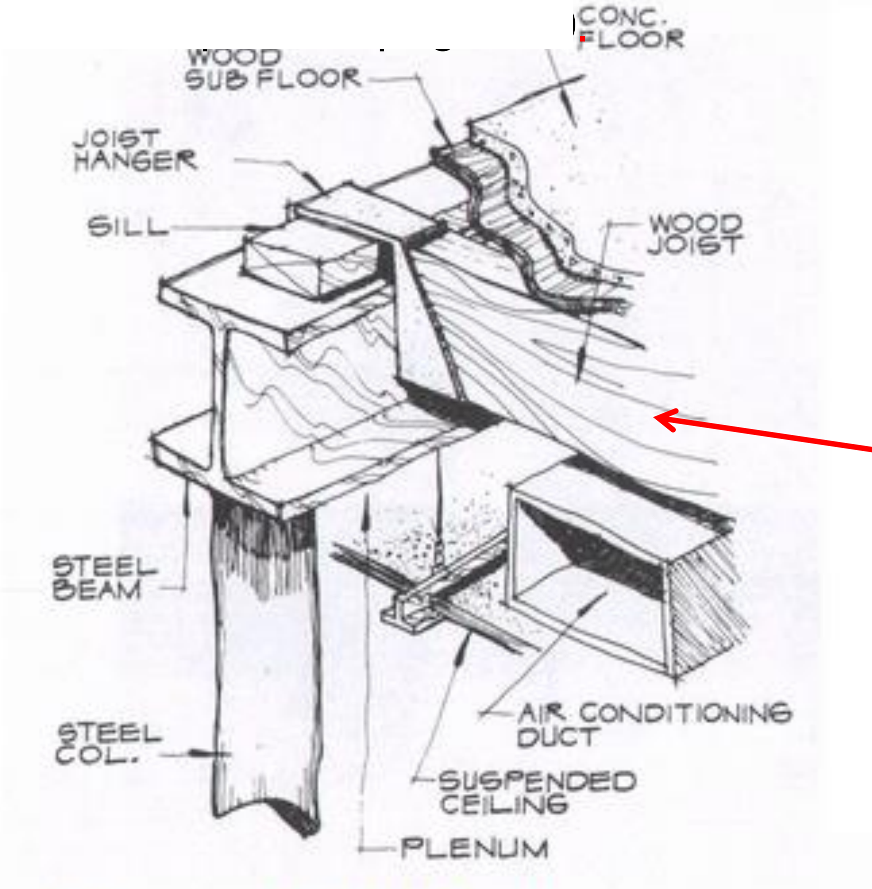
suspended ceiling - a ceiling suspended from a overhead floor or roof structure to provide space for pipes ductwork, lighting fixtures, or other service equipment.
acoustical ceiling – a ceiling of acoustical tile or other sound absorbing material.
acoustic tile – tile made in various sizes and textures from a soft, sound absorbing material, as cork, mineral fiber, or glass fiber.

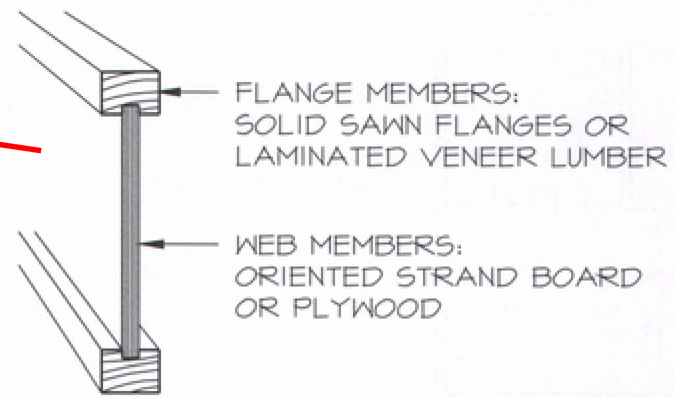
Glossary:

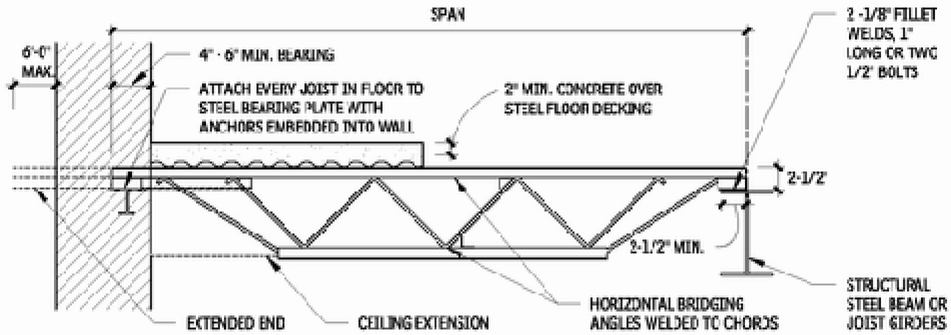
soffit – The underside of an architectural element, as an arch, beam, cornice, or staircase.

trusses- A structural frame based on the geometrical rigidity of the triangle and composed of linear members subject only to axial tension and compression.

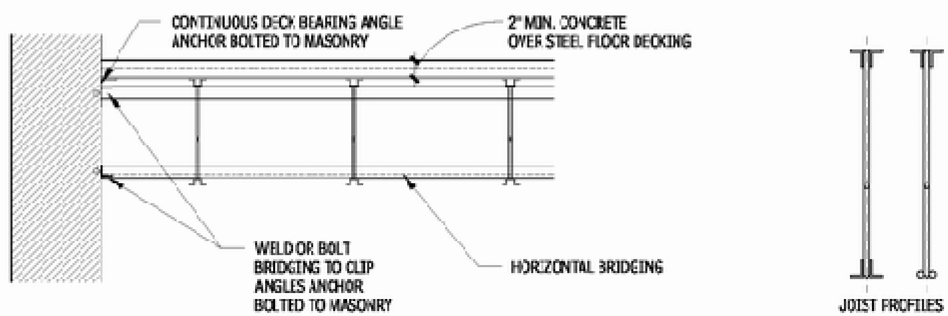
plenum area – The space between a suspended ceiling and the floor structure above, especially one that serves as a receiving chamber for conditioned air to be distributed to inhabited spaces or for return air to be conveyed back to the central plant for processing. The space required for mechanical and electrical components.


CONC.
FLOOR
WOOD
SUB FLOOR
JOIST
HANGER
SILL
WOOD
JOIST
STEEL
BEAM
STEEL
COL.
AIR CONDITIONING
DUCT
SUSPENDED
CEILING
PLENUM

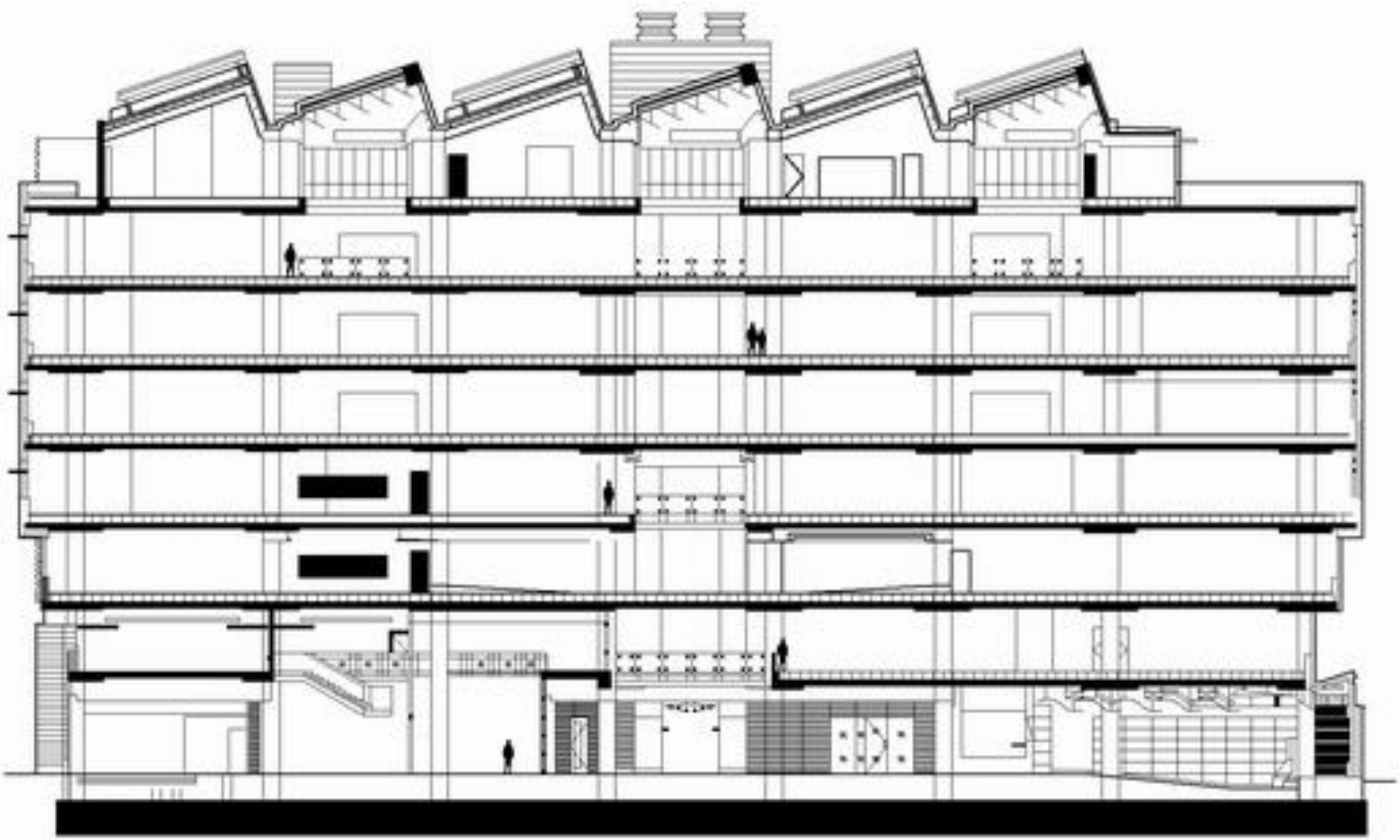

FLANGE MEMBERS:
SOLID SAWN FLANGES OR
LAMINATED VENEER LUMBER
WEB MEMBERS:
ORIENTED STRAND BOARD
OR PLYWOOD



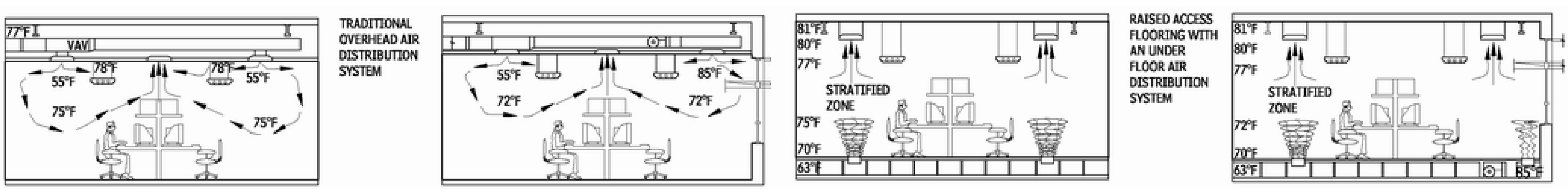
SECTION-THROUGH OPEN WEB STEEL JOIST BEARING 2.36



SECTION-THROUGH OPEN WEB STEEL



BUILDING SECTION FROM EAST



RAISED ACCESS FLOORING: COOLING

RAISED ACCESS FLOORING: HEATING

CHAPTER
11

Ch. 11 Building Elevations p. 366

Exterior elevation – Are an important part of the construction documents because they can show information not found anywhere else in the drawing set.

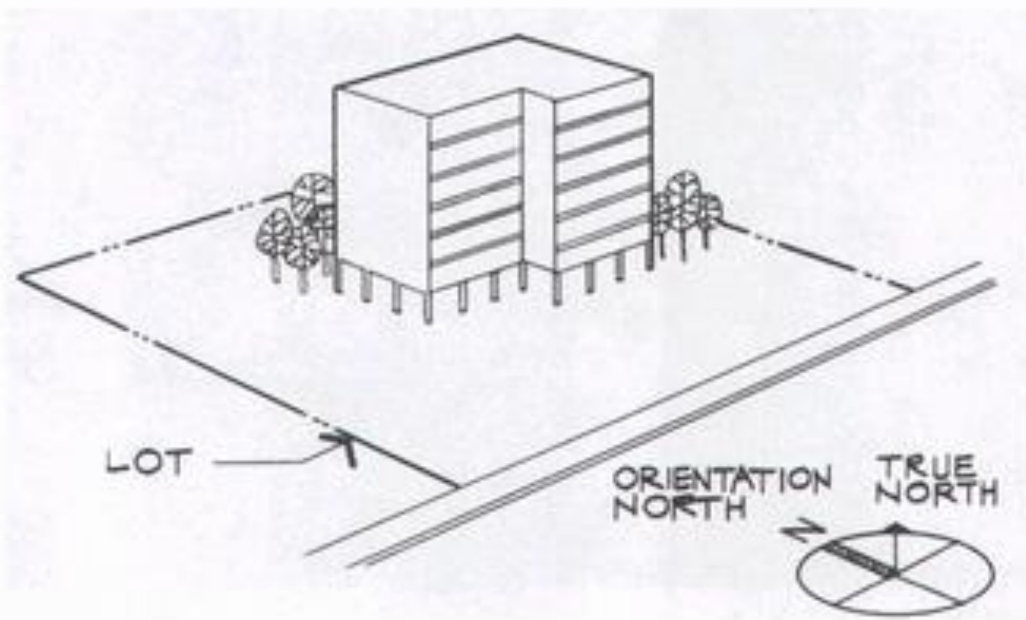


Figure 11.3 Use of orientation North.

Ch. 11 Building Elevations p. 374

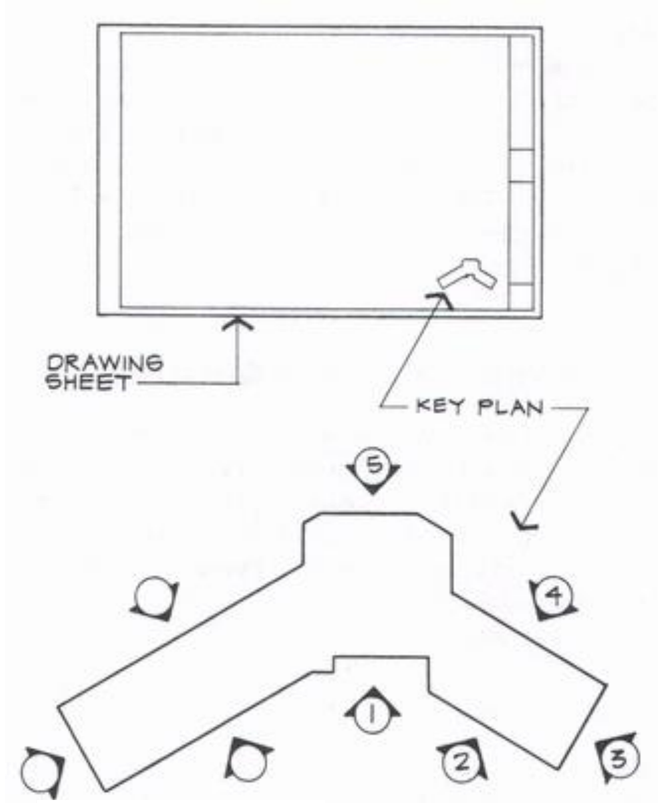


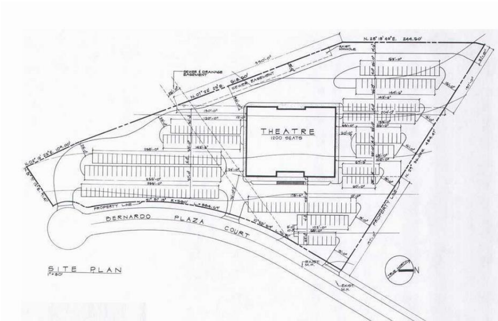
Figure 11.18 Using a key plan.

p. 370

Pivot Point- Is the point at which the end of one elevation becomes the beginning of another elevation. Figure 11.17

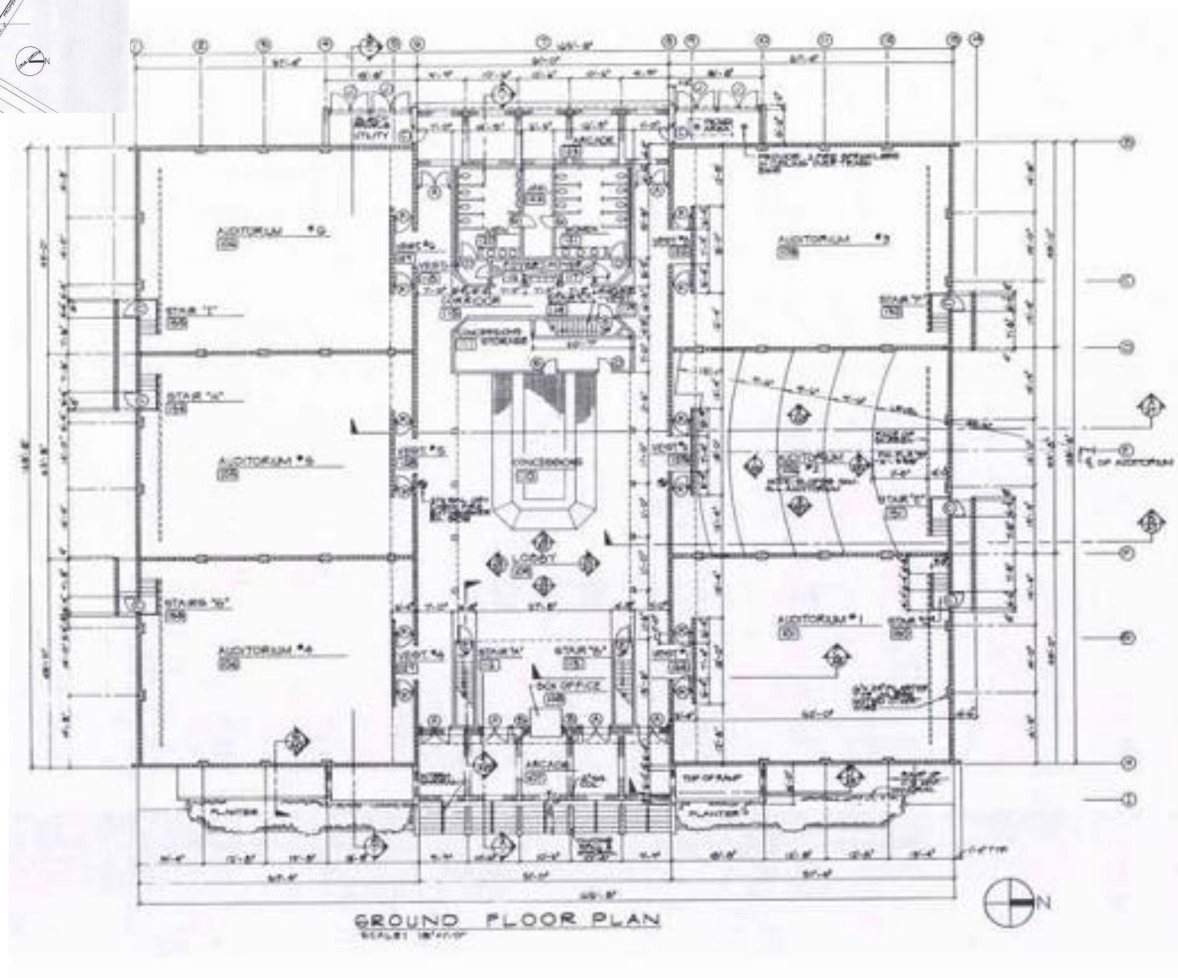
Key plan – The key plan is usually drawn on the bottom right corner of the drawing sheet. It used reference bubbles to identify the elevations. Refer to Figure 11.18

Chapter 16 Theater, p. 574



W

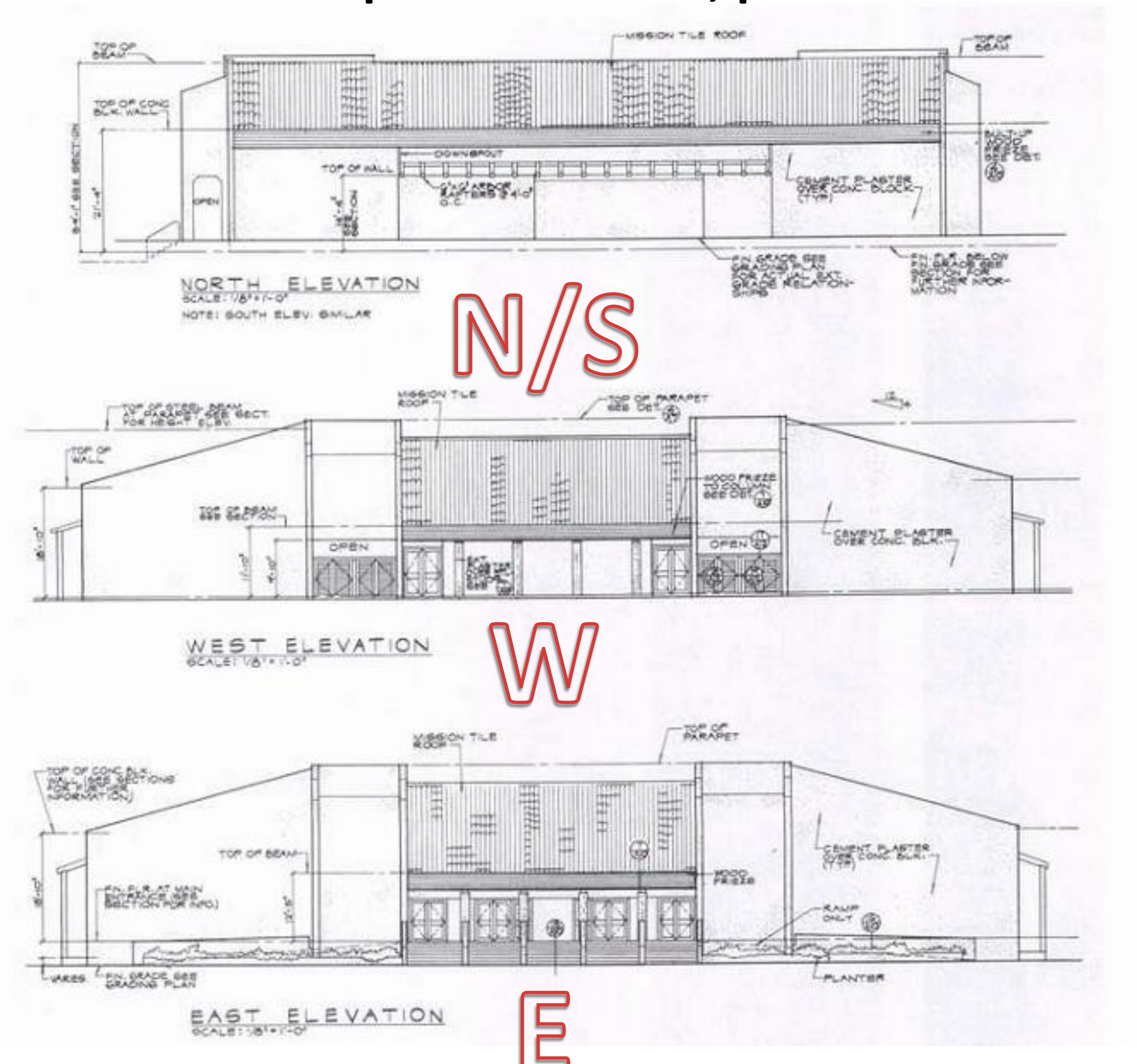
S



N

E

Chapter 16 Theater, p. 582



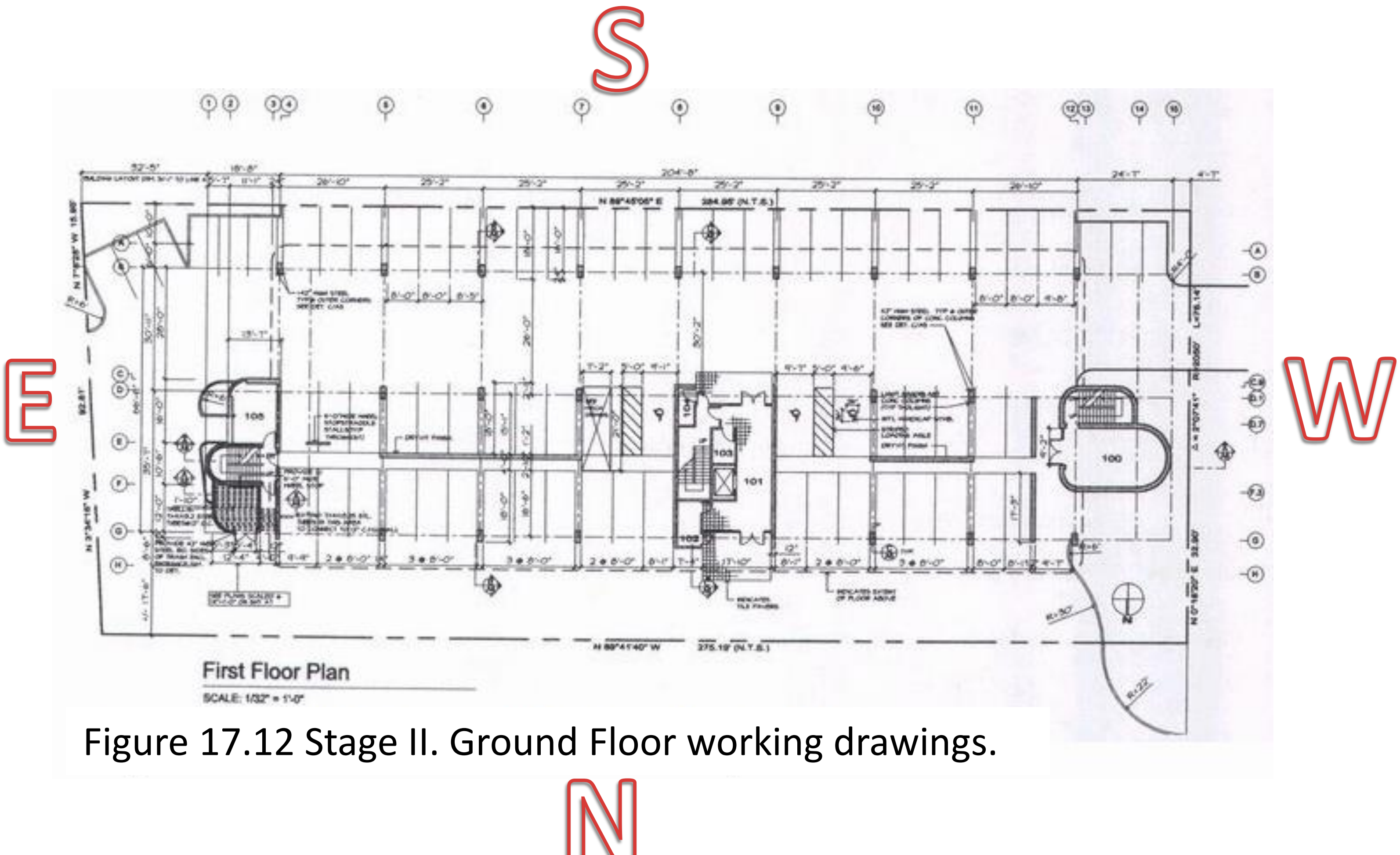


Figure 17.12 Stage II. Ground Floor working drawings.

Chapter 17 MADISON BUILDING, p. 614

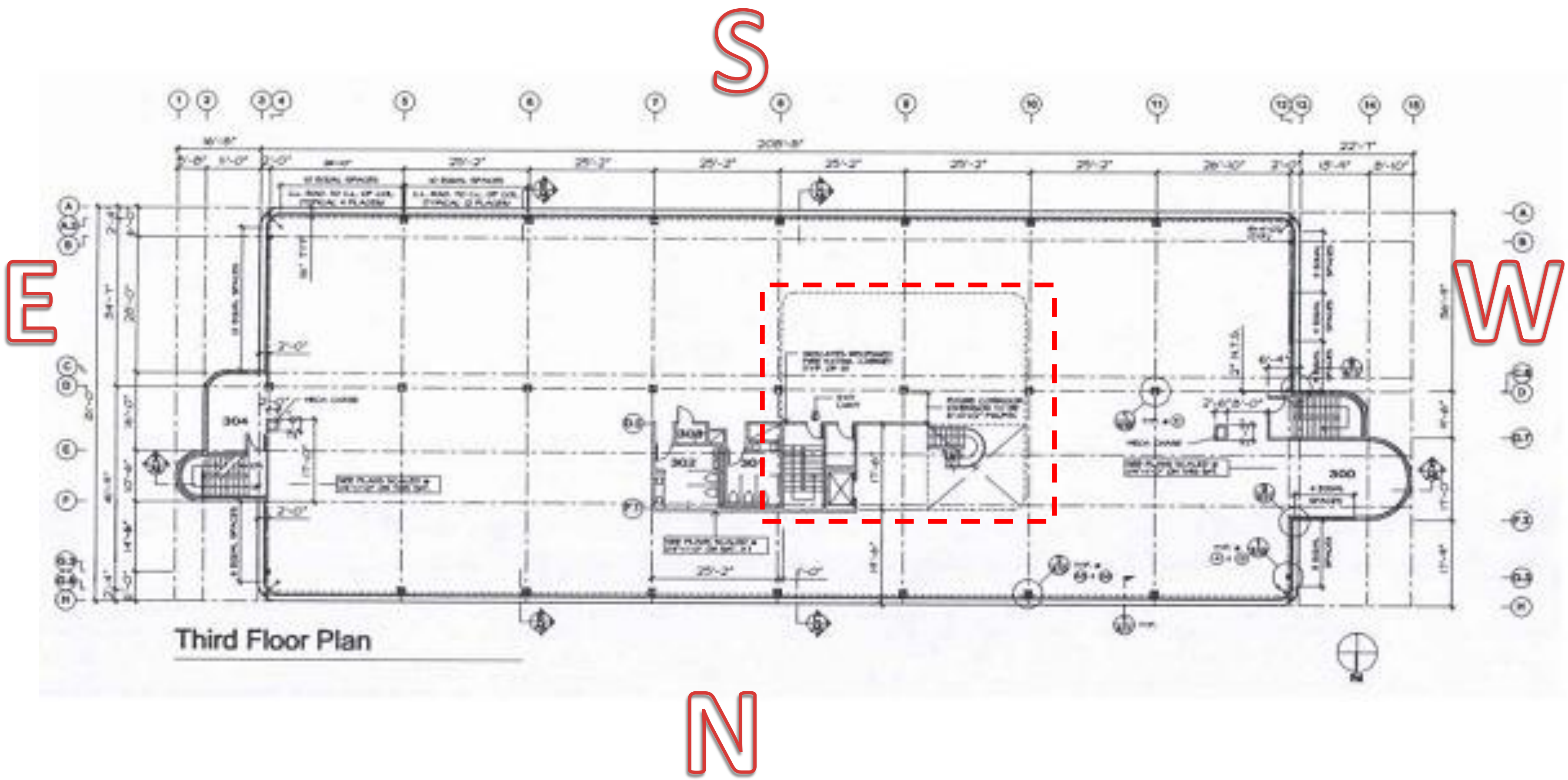
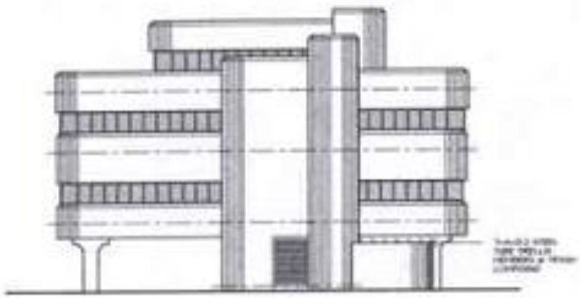


Figure 17.23 Third-floor plan working drawing.

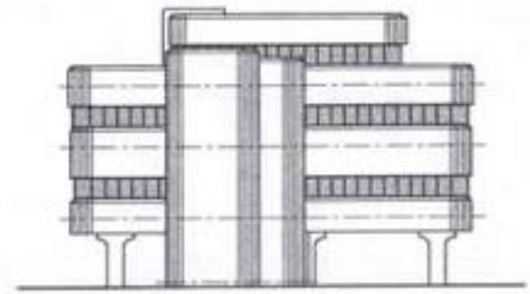
Chapter 17 MADISON BUILDING, p. 616



East Elevation

SCALE: 1/32" = 1'-0"

E

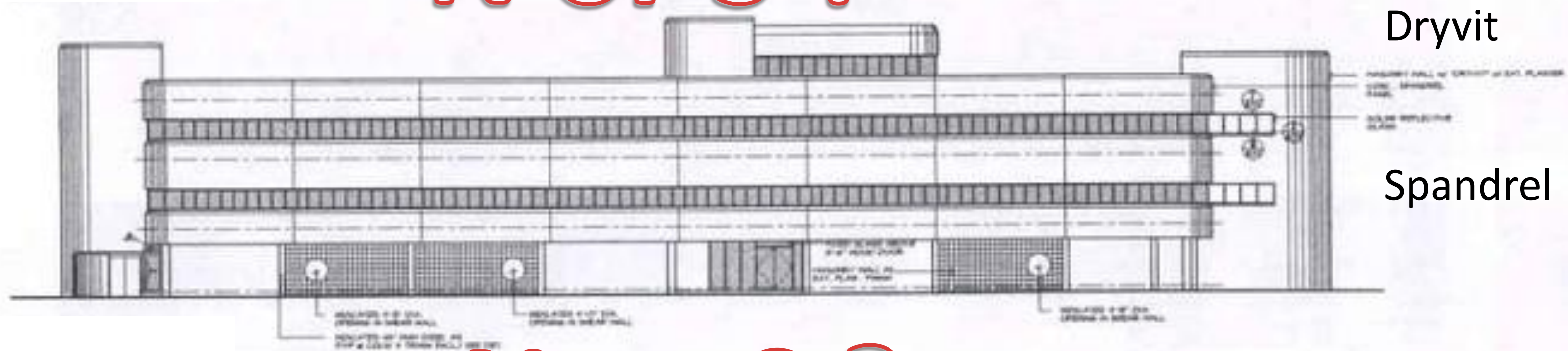


West Elevation

SCALE: 1/32" = 1'-0"

W

N or S ?



Dryvit

Spandrel

N or S ?

Chapter 11 EXTERIOR ELEVATIONS, p. 375

Order of Notes:

1. Size of the object
2. Name of Material
3. Any additional information:
    a. Spacing
    b. Quantity
    c. Or method of installation

Noting Practice – A set of Technical specification are often provided with the construction documents.

If there is a difference between the construction drawings and the technical specification regarding a construction material or assembly, the specification have priority

SPANDREL

The term spandrel, borrowed from Medieval Architecture, meaning the rough triangular area between arched openings.

In the context of modern architecture, the term spandrel describes the area filling the space between the head of the window in one story and the sill of the window in the story above.

Genzyme Center , Cambridge, MA. USA.
Planning and Construction 2000-2004
Architects: Behnisch Architecten, Los Angeles California
http://www.behnisch.com/site_files/index_flash.html


500

Ch. 11 Building Elevations p. 378

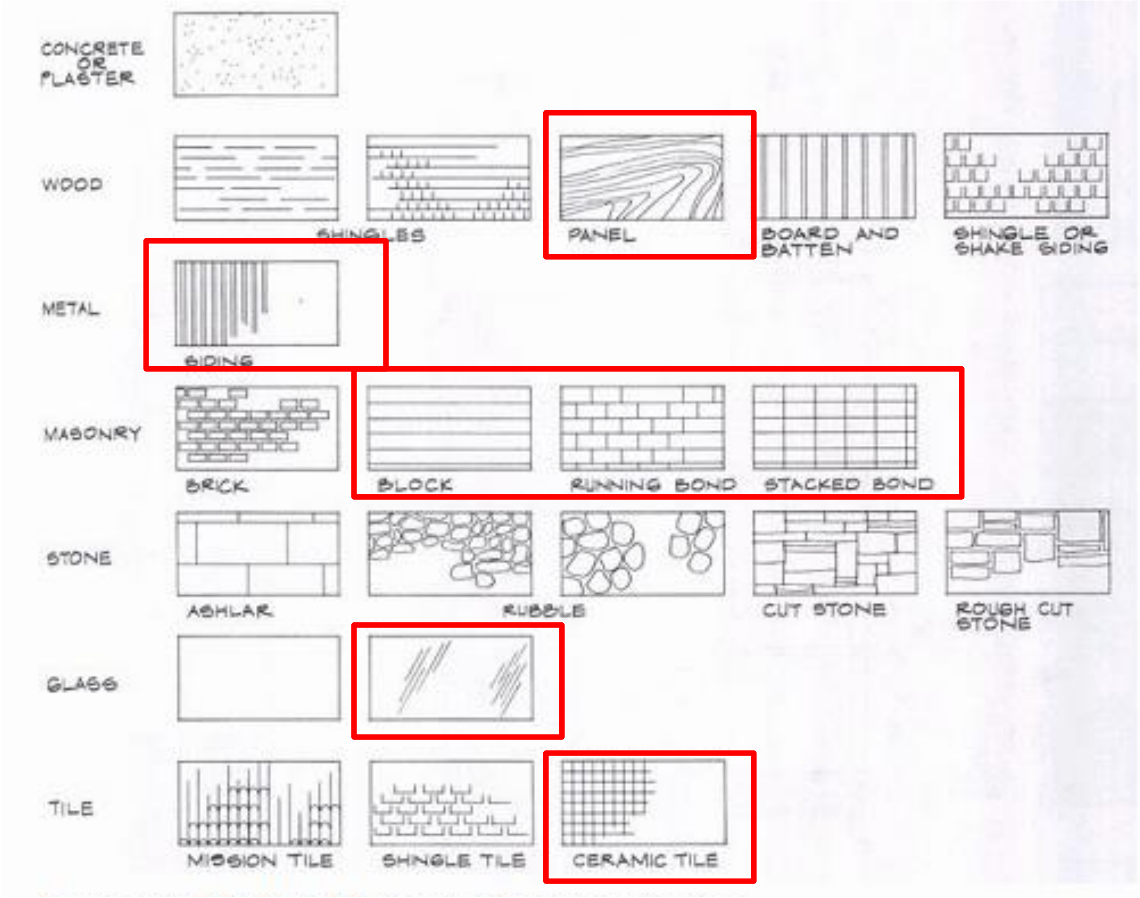


Figure 11.31 material designations.

CURTAIN WALL

A **curtain wall** is defined as thin, usually aluminum-framed wall, containing in-fills of glass, metal panels, or thin stone. The framing is attached to the building structure and does not carry the floor or roof loads of the building. The wind and gravity loads of the curtain wall are transferred to the building structure, typically at the floor line.

Curtain wall systems range from manufacturer's standard catalog systems to specialized custom walls. Custom walls become cost competitive with standard systems as the wall area increases. This section incorporates comments about standard and custom systems. It is recommended that consultants be hired with an expertise in custom curtain wall design for projects that incorporate these systems.

Retrieved from:

http://www.wbdg.org/design/env_fenestration_cw.php

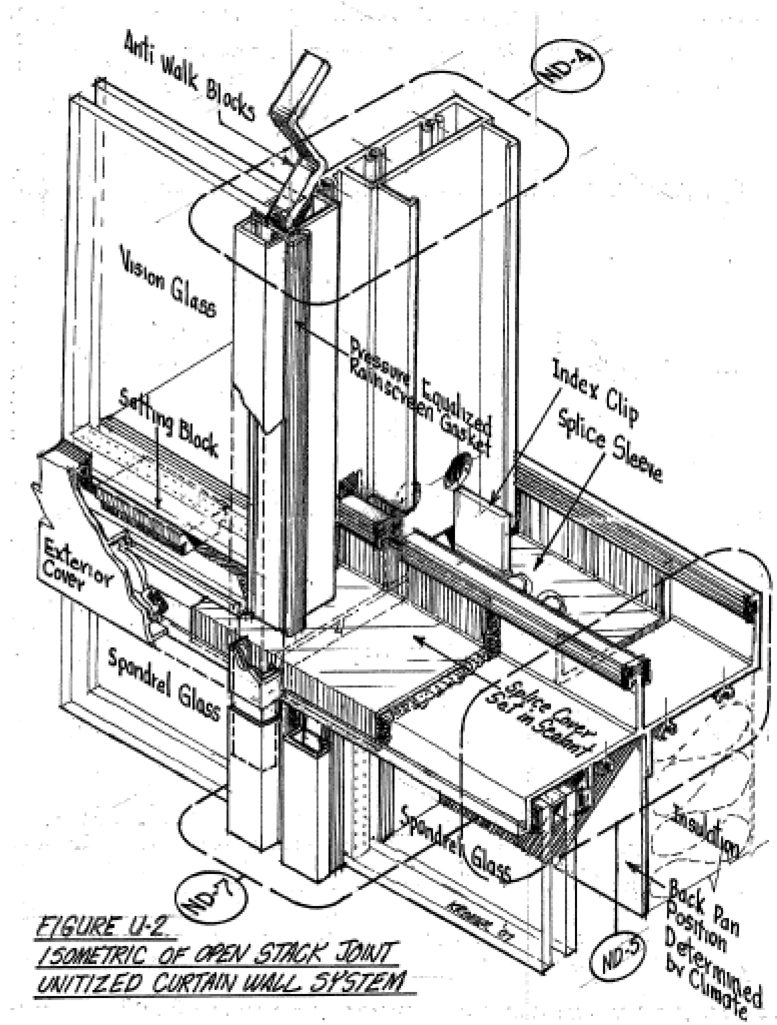


FIGURE U-2
ISOMETRIC OF OPEN STACK JOINT
UNITIZED CURTAIN WALL SYSTEM

GLASS

Glass has been used for thousands of years to allow daylight into our buildings, while providing weather protection. The development of the float glass process in the 1950s allowed the economical mass production of high quality flat glass and virtually all architectural glass is now produced by this process. The vast majority of new windows, curtain walls and skylights for commercial building construction have insulating glazing for energy efficiency and comfort.

Architectural glass comes in three different strength categories.

Annealed glass is the most commonly used architectural glass. Because it is not heat-treated and therefore not subject to distortion typically produced during glass tempering, it has good surface flatness. On the downside, annealed glass breaks into sharp, dangerous shards.

Heat-strengthened and fully-tempered glass are heat-treated glass products, heated and quenched in such a way to create residual surface compression in the glass. The surface compression gives the glass generally higher resistance to breakage than annealed glass. Heat-strengthened glass has at least twice the strength and resistance to breakage from wind loads or thermal stresses as annealed glass. The necessary heat treatment generally results in some distortion compared to annealed glass. Like annealed glass, heat-strengthened glass can break into large shards.

Fully-tempered glass provides at least four times the strength of annealed glass, which gives it superior resistance to glass breakage. Similar to heat-strengthened glass, the heat-treatment generally results in some distortion. If it breaks, fully-tempered glass breaks into many small fragments, which makes it suitable as safety glazing under certain conditions.

Laminated glass consists of two or more lites of glass adhered together with a plastic interlayer. Because it can prevent the fall-out of dangerous glass shards following fracture, it is often used as safety glazing and as overhead glazing in skylights. The plastic interlayer also provides protection from ultraviolet rays and attenuates vibration, which gives laminated glass good acoustical characteristics. Because laminated glass has good energy absorption characteristics, it is also a critical component of protective glazing, such as blast and bullet-resistant glazing assemblies.

Coated glass is covered with reflective or low-emissivity (low-E) coatings. In addition to providing aesthetic appeal, the coatings improve the thermal performance of the glass by reflecting visible light and infrared radiation.

Tinted glass contains minerals that color the glass uniformly through its thickness and promote absorption of visible light and infrared radiation.

Insulating glass units (ig units) consists of two or more lites of glass with a continuous spacer that encloses a sealed air space. The spacer typically contains a desiccant that dehydrates the sealed air space. The air space reduces heat gain and loss, as well as sound transmission, which gives the ig unit superior thermal performance and acoustical characteristics compared to single glazing. Most commercial windows, curtain walls, and skylights contain ig units. Retrieved from: http://www.wbdg.org/design/env_fenestration_glz.php

NATIONAL INSTITUTE OF BUILDING SCIENCE

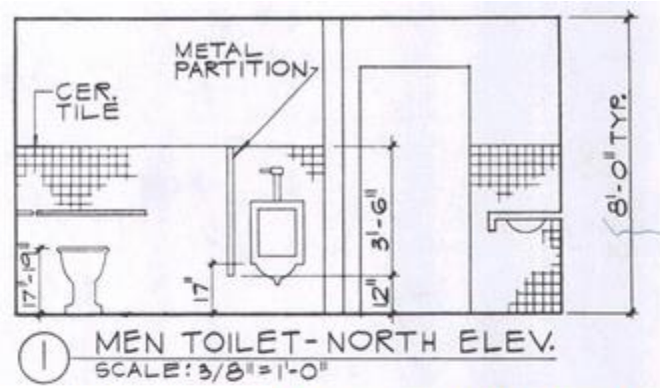


Figure 11.71 Men's toilet: North elevation.

Planning for Children and Persons with Disabilities

Always have information available on standards affecting facilities that should be usable by children and persons with disabilities. Here are some of the standards established by several states for disabled persons:

1. Door opening: minimum size 2'-8" clear
2. Restroom grab bars: 33-36" above the floor
3. Towel bars: 3'-4" maximum above floor
4. Top of lavatory: 34" maximum above floor
5. Drinking fountains: 3'-0" maximum

Many standards can be obtained by writing to the proper authority, such as the State Architect's office. Most standards are presented in the form of a drawing; see Figure 15.1 for an example.

Chapter 11 Interior Elevations, p. 397

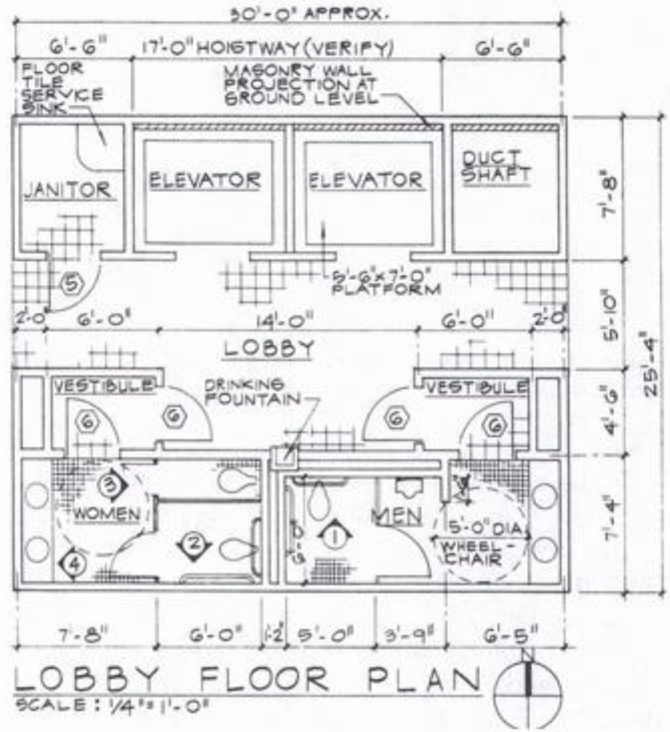


Figure 11.70 Partial floor plan of lobby and restroom.

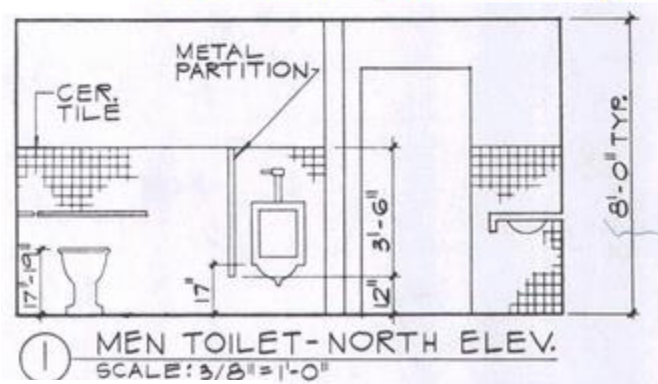
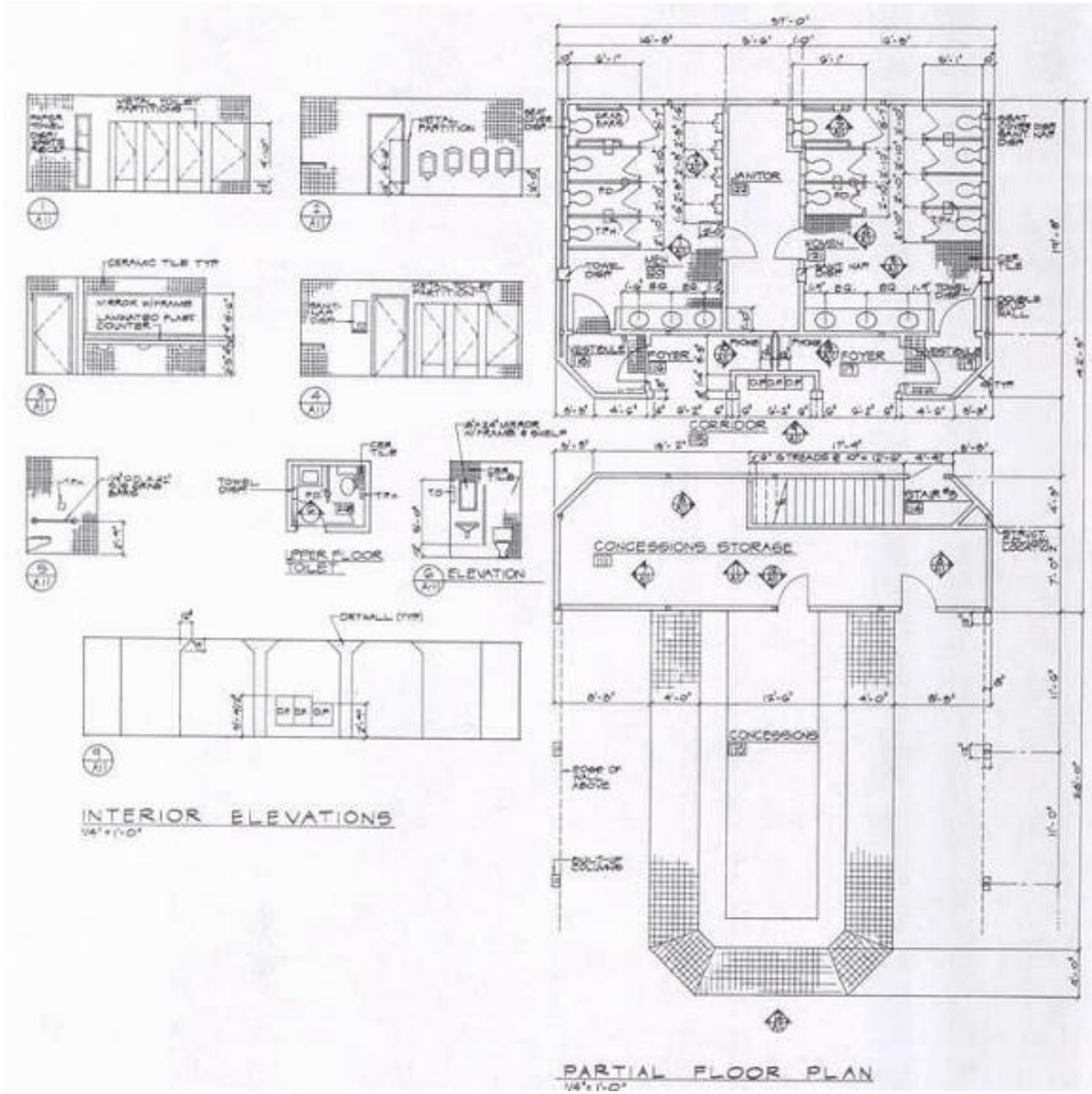


Figure 11.71 Men's toilet: North elevation.

Chapter 16 THEATER, p. 580



Chapter 11: Interior Elevations, p. 392

Dotted lines are also used to show the outline of objects to be added later or those **not in the contract** (designated as “**N.I.C**”)

CHAPTER 12

P 404. CHAPTER 12 SCHEDULES: DOOR, WINDOW, AND FINISH

THE PURPOSE OF SCHEDULES

A schedule is a list or catalog of information that defines the doors, windows, or finishes of a room. The main purpose for incorporating schedules into a set of construction documents is to provide clarity, location, sizes, materials, and information for the designation of doors, windows, roof finishes, plumbing and electrical fixtures, and other such items.

TABULATED SCHEDULES: DOORS AND WINDOWS

Schedules may be presented in **tabulated** or **pictorial** form. While tabulated schedules in architectural offices vary in form and layout from office to office, the same primary information is provided.

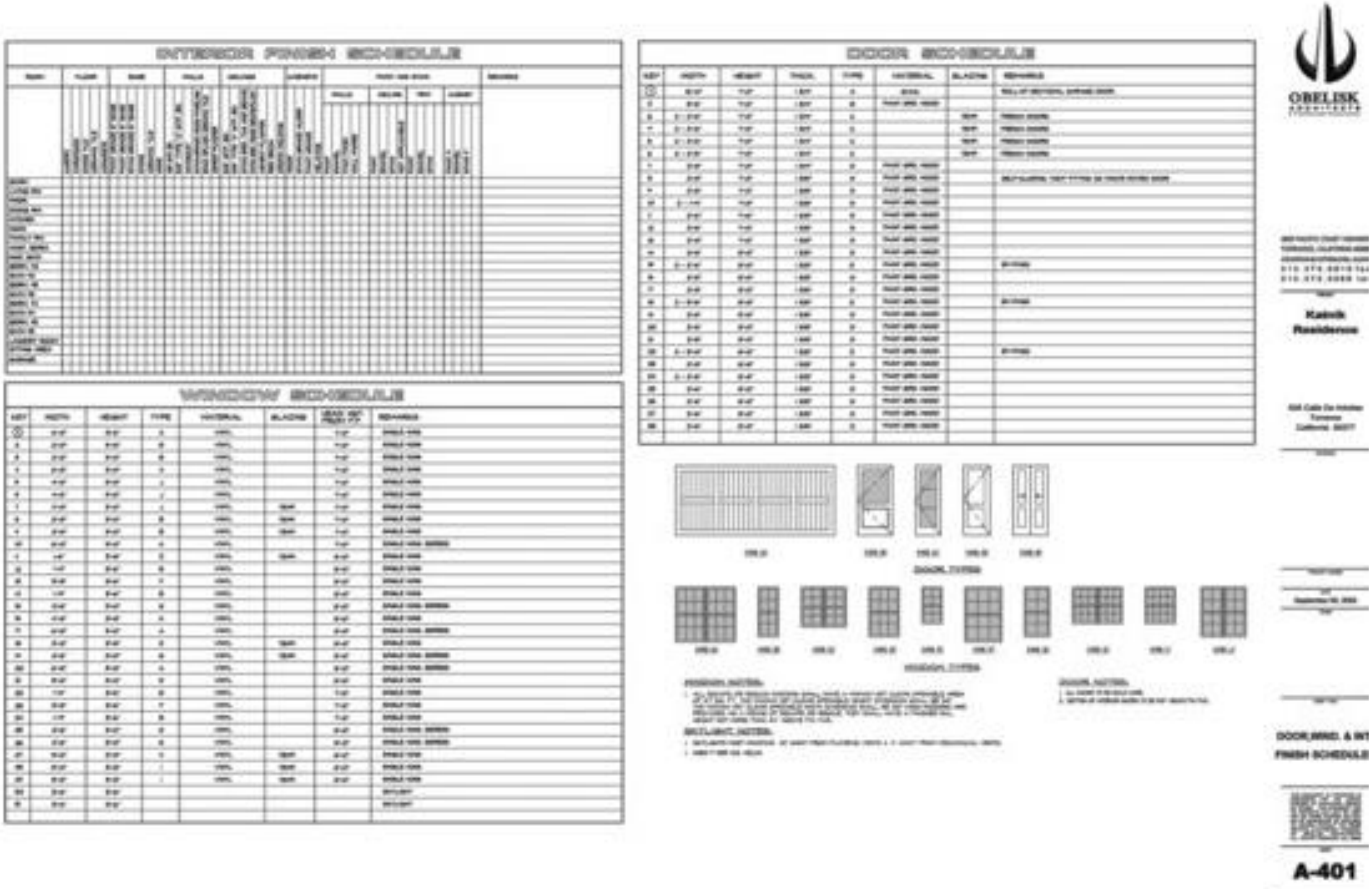
Figure 12.1 and 12.2 are examples of tabulated **door and window schedules.** The door schedule provides a space for the symbol, the width and height, and the thickness of the door. It also indicates whether the door is to be solid core (SC) or hollow core (HC). The "type" column may indicate that the door has raised panels, or that it is a slab door or french door, and so forth.

information

The material space may indicate what kind of wood is to be used for the door, such as birch or beech. Space for remarks is used to provide information such as the closing device or hardware to be used, or the required fire-rated door. In some cases, where there is insufficient space for remarks, an asterisk (*) or symboled number may be placed to the left of the schedule or in the designated box and referenced to the bottom of the schedule with the required information. This information must under no circumstances be crowded or left out. For any type of schedule including lettering, provide sufficient space in each frame so that your lettering is not cramped or unclear.

Symbols

Symbol designations for doors and windows vary in architectural offices and are influenced by each office's procedures. For example, a circle, hexagon, or square may be used for all or part of the various schedules. Figure 12.3 illustrates symbol shapes and how they may be shown. There are various options, such as using a letter or number or both, and choosing various shapes. Door and window symbol shapes should be different from each other. To clarify reading the floor plan, the letter "D" at the top of the door symbol and the letter "W" at the top of the window symbol are used. The letter "P" is used for plumbing fixtures, "E" for electrical fixtures, and "A" for appliances. Place the letter in the top part of the symbol. Whatever symbol shape you select, be sure to make the symbol large enough to accommodate the lettering that will be inside the symbol.



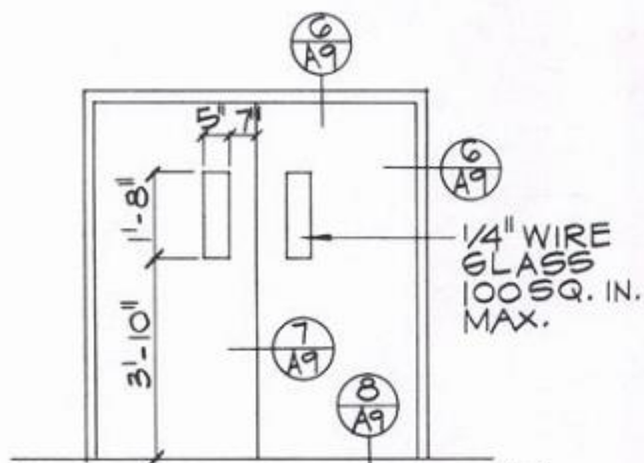
p. 418 Figure 12.21 Completed door, window, and finish schedules on a plot sheet

Pictorial Representation

In many cases, tabulated schedules cannot clearly define a specific door or window. In this case, you can add to a schedule a call-out with a pictorial drawing of a door or window adjacent to your schedule, as in Figure 12.4 Door 1 is difficult to explain so a pictorial representation makes it clearer.

DOOR SCHEDULE

SYM.	WIDTH	HEIGHT	THK.	HC/SC	TYPE	MATERIAL	REMARKS
1	PR.3'-2"	7'-0"	1 3/4"	HC	NL	STEEL	1-HR. SELF CLOSING, PANIC HDW.
2	3'-0"	"	"	"	FLUSH	"	" " " NO GLASS
3	"	"	"	SC	SLAB	WOOD	
4	"	6'-8"	"	"	"	"	1-HR, SELF CLOSING, MTL. JAMBS
5	"	"	"	"	"	"	
6	"	"	"	"	"	"	SELF CLOSING, PUSH PLATES



ELEVATION - DOOR 1

Figure 12.4 Pictorial representation on a tabular schedule.

Pictorial Schedules

A pictorial schedule, as distinct from a pictorial representation, is totally pictorial. Each item is dimensioned and provided with data such as material, type, and so forth. Figure 12.5 provides a pictorial schedule of a window. A pictorial schedule provides section references for the head, jamb, and sill sections, so you no longer need to reference the exterior elevations. (The head is the top of a window or door, the jamb refers to the sides of a window or door, and the sill is the bottom of the window **or door.)**

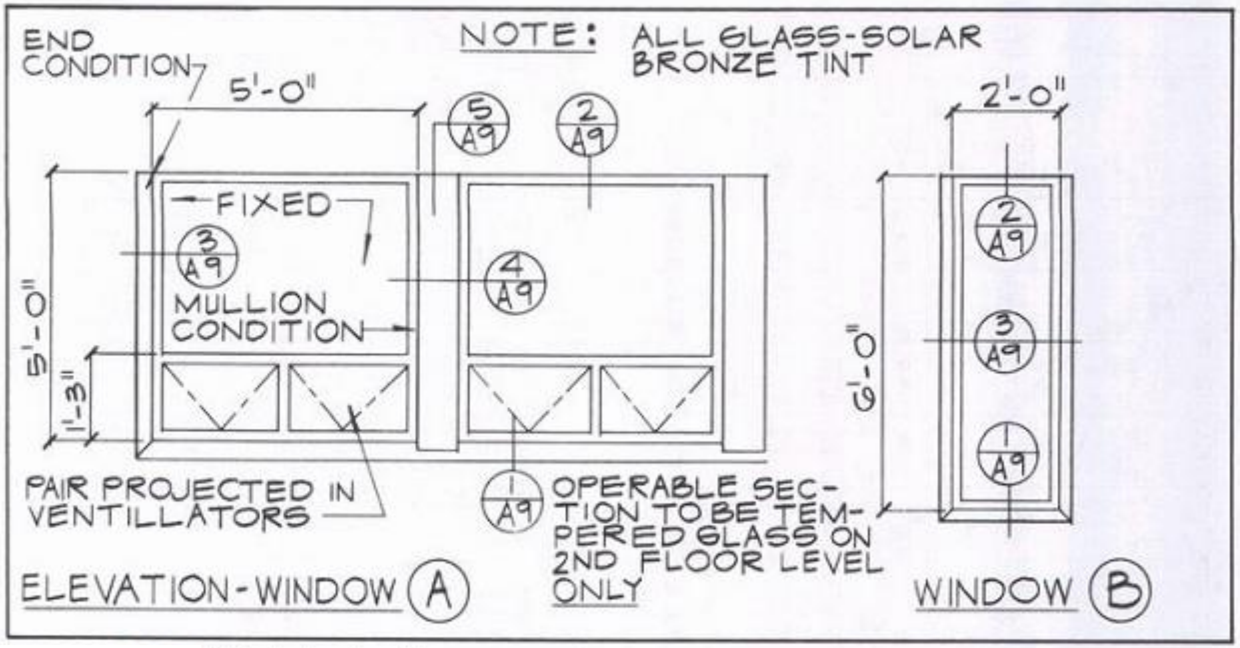
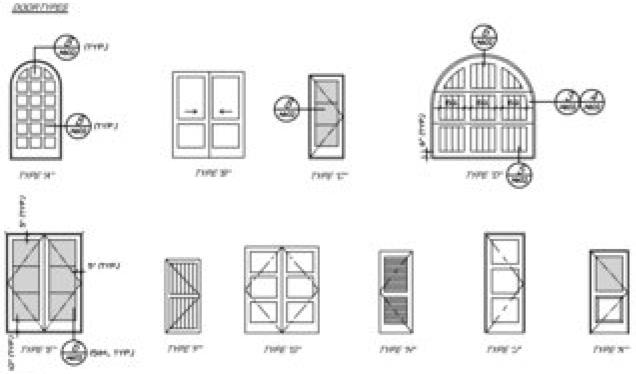


 Figure 12.5 Pictorial schedule.

DOOR SCHEDULE

KEY	WIDTH	HEIGHT	THICK	TYPE	MATERIAL	GLAZING	REMARKS
1	2'-8"	6'-8"	2 1/4"	C	PAINT GRD. WOOD	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
2	(2)-3'-0"	8'-0"	2 1/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
3	4'-0"	8'-0"	2 1/4"	A	STAIN GRD. WOOD		
4	8'-6"	8'-3"		D			GARAGE OVERHEAD SECTIONAL DOOR (SEE ELEVATIONS)
5	8'-6"	8'-3"		D	"		GARAGE OVERHEAD SECTIONAL DOOR (SEE ELEVATIONS)
6	3'-0"	6'-8"	2 1/4"	K	PAINT GRD. WOOD		
7	(2)-2'-0"	3'-0"		F	"		TRASH AREA, GATE
8	(2)-3'-0"	8'-0"	2 1/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
9	(2)-3'-0"	8'-0"	2 1/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
10	(2)-3'-0"	8'-0"	2 1/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
11	(2)-2'-6"	6'-8"	2 1/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
12	2'-8"	6'-8"	1 3/4"	J	"		
13	(2)-2'-0"	6'-8"	1 3/4"	G	"		
14	3'-0"	6'-8"	1 3/4"	J	"		20 MIN RATED, SELF-CLOSING & TIGHT FITTING
15	2'-8"	6'-8"	1 3/4"	J	"		
16	2'-6"	6'-8"	1 3/4"	J	"		
17	(2)-2'-0"	6'-8"	1 3/4"	G	"		
18	(2)-2'-0"	6'-8"	1 3/4"	G	"		
19	2'-6"	6'-8"	1 3/4"	J	"		
20	(2)-2'-6"	6'-8"	1 3/4"	G	"		
21	(2)-3'-0"	8'-0"	1 3/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
22	(2)-3'-0"	8'-0"	1 3/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
23	(2)-2'-6"	6'-8"	1 3/4"	E	"	TEMP.	FRENCH DOORS (SEE ELEVATIONS)
24	(2)-2'-0"	6'-8"	1 3/4"	G	"		
25	(2)-2'-0"	6'-8"	1 3/4"	G	"		
26	2'-6"	6'-8"	1 3/4"	J	"		
27	2'-8"	6'-8"	1 3/4"	J	"		
28	2'-8"	8'-0"	1 3/4"	J	"		
29	2'-6"	8'-0"	1 3/4"	J	"		
30	(2)-1'-6"	8'-0"	1 3/4"	G	PAINT GRD. WOOD		
31	2'-6"	8'-0"	1 3/4"	J	PAINT GRD. WOOD		
32	(2)-1'-0"	8'-0"	1 3/4"	G	"		
33	2'-6"	8'-0"	1 3/4"	J	"		
34	2'-8"	6'-8"	1 3/4"	H	"		
35	2'-6"	6'-8"	1 3/4"	J	"		
36	(2)-4'-0"	6'-8"	1 3/4"	B	"		
37	2'-6"	6'-8"	1 3/4"	J	"		

DOOR TYPES

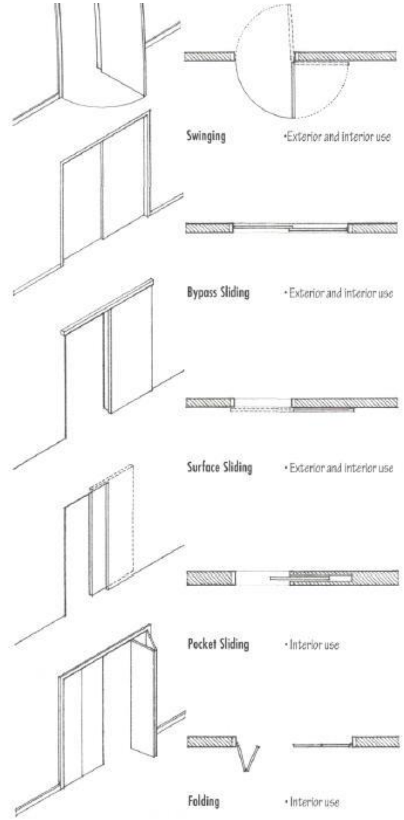


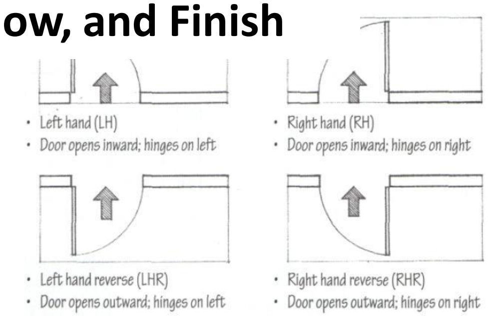
NOTES:
1. ALL DOORS TO BE SOLID CORE.
2. BOTTOM OF INTERIOR DOORS TO BE 3/8" ABOVE FIN. FLR.

Fire Doors

UL Label	Rating	Glazing Permitted: 1/4" (6) wired glass
A	3 hour	No glass permitted
B	1-1/2 hour	100 sq. in. (0.06 m^2) per leaf
C	3/4 hour	1296 sq. in. (0.84 m^2) per leaf: 54" (1370) max. dimension
D	1-1/2 hour	No glass permitted
E	3/4 hour	720 sq. in. (0.46 m^2) per light; 54" (1370) max. dimension

- Fire door assemblies, consisting of a fire-resistive door, doorframe, and hardware, are required to protect openings in fire-rated walls. See 2.07.
- Maximum door size: 4' x 10' (1220 x 3050)
- Doorframe and hardware must have a fire-resistance rating similar to that of the door.
- Door must be self-latching and be equipped with closers.
- Louvers with fusible links are permitted for B and C label doors; maximum area = 576 sq. in. (0.37 m^2)
- No glass and louver combinations are permitted.

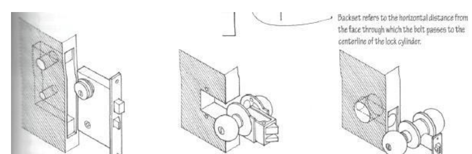




Door Hand Conventions

Door hand conventions are used in specifying door hardware such as locksets and closers. The terms right and left assume a view from the exterior of the building or room to which the doorway leads.

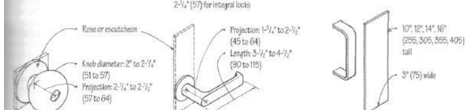
DR DOOR　　PR PAIR
GRD. GRADE　TEMP. TEMPERED



Mortise Lock
- Mortise lock is housed within a mortise cut into a door edge so that the lock mechanism is covered on both sides.
- Lock is concealed except for a faceplate at the door edge, knobs or levers, a cylinder, and operating trim.
- Backset: 2-1/2" (64) for 1-3/8" (35) doors; 2-3/4" (70) for 1-3/4" (45) doors

Unit and Integral Locks
- Unit lock is housed within a rectangular notch cut into the edge of a door.
- Integral lock fits into a mortise cut into the edge of a door.
- Unit and integral locks combine the security advantages of a mortise lock with the economy of a cylinder lock.
- Backset: 2-3/4" (70) for unit locks; 2-1/4" (57) for integral locks

Cyliner Lock
- Cylinder lock is housed within two holes bored at right angles to each other, one through the lock stile of a door and the other in the door edge.
- Cylinder locks are relatively inexpensive and easy to install.
- Backset: 2-3/8" (60) for standard locksets; 2-3/4" (70) for heavy-duty locksets



Door Knobs
- Rose refers to a round or square ornamental plate surrounding the shaft of a doorknob at the face of a door.
- Escutcheon is a protective or ornamental plate that may be substituted for a rose.

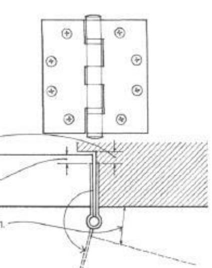
Lever Handles
- Lever-operated mechanisms, push-type mechanisms, and U-shaped handles are generally easier for people with disabilities to grasp.

Pull Handles and Push Plates

ADA Accessibility Guidelines
- Door handles, pulls, latches, and locks should be easy to grasp with one hand without tight grasping, pinching, or twisting of the wrist.
- The force required for pushing open or pulling open a door should be no greater than 5.0 lbs. (22.2 N).

8.18 DOOR HINGES

- The pin in the knuckle may be removable (loose) so that a door can be unhung by separating the two leaves or fixed (nonrising). Self-locking pins which cannot be removed when the door is closed are also available for security.
- 5/16" (8) for doors up to 2-1/4" (57) thick; 7/16" (11) for doors over 2-1/4" thick
- 1/4" (6) for doors up to 2-1/4" (57) thick; 3/8" (10) for doors over 2-1/4" thick
- Check clearance required for surrounding trim.



Hinge Size
- Hinge width is determined by door thickness and clearance required.
- Hinge height is determined by the door width and thickness.

Door Thickness	Door Width	Hinge Height	Clearance Required	Hinge Width
3/4" to 1" (19 to 25)	To 24" (610)	2-1/2" (64)		
1-1/8" (29)	To 36" (915)	3" (75)		
1-3/8" (35)	To 36" (915)	3-1/2" (90)	1-1/4" (32)	3-1/2" (90)
	Over 36" (915)	4" (100)	1-3/4" (45)	4" (100)
1-3/4" (45)	To 36" (915)	4-1/2" (115)	1-1/2" (38)	4-1/2" (115)
	36" to 48" (915 to 1220)	5" (125)	2" (51)	5" (125)
2-1/4" (57)	To 42" (1065)	5" (125)	1" (25)	5" (125)
	Over 42" (1065)	6" (150)	2" (51)	6" (150)

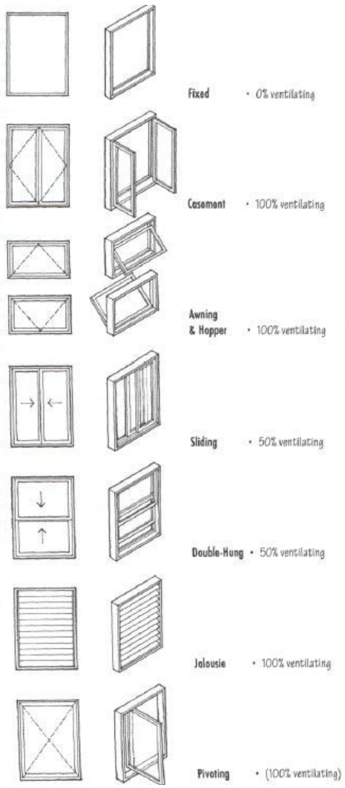
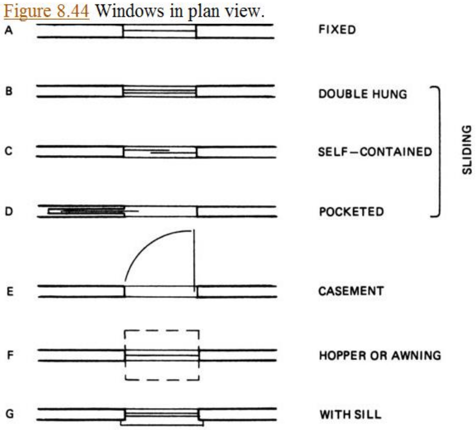


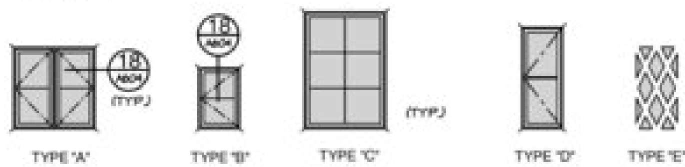
Figure 8.44 Windows in plan view.



WINDOW SCHEDULE

KEY	WIDTH	HEIGHT	TYPE	MATERIAL	GLAZING	HEAD HGT. FROM F.F.	REMARKS
1	2'-4"	5'-0"	D	PAINT GRD. WOOD		8'-0"	CASEMENT
2	2'-4"	5'-0"	D	"		8'-0"	CASEMENT
3	4'-8"	5'-2"	A	"		8'-0"	FRENCH CASEMENT
4	4'-8"	4'-0"	A	STAIN GRD. WOOD	TEMPERED	6'-8"	FRENCH CASEMENT
5	4'-8"	5'-0"	A	PAINT GRD. WOOD		8'-0"	FRENCH CASEMENT
6	2'-0"	4'-0"	D	"	TEMPERED	6'-8"	CASEMENT
7	2'-0"	4'-0"	D	"		6'-8"	CASEMENT
8	2'-0"	4'-0"	D			6'-8"	CASEMENT
9	2'-0"	5'-0"	B	"		8'-0"	CASEMENT
10	6'-0"	4'-0"	C	"		6'-8"	FIXED
11	2'-0"	4'-0"	D	"		6'-8"	CASEMENT
12	4'-0"	4'-0"	A	"		6'-8"	FRENCH CASEMENT, EGRESS (12.25 SQ. FT.)
13	4'-0"	3'-6"	A	"		6'-8"	FRENCH CASEMENT
14	2'-0"	3'-0"	B	"	TEMPERED	6'-8"	CASEMENT
15	2'-0"	4'-0"	E	"		6'-8"	FIXED, SEE ELEV
16	4'-0"	4'-0"	A	"	TEMPERED	6'-8"	FRENCH CASEMENT
17	2'-0"	4'-0"	D	"		6'-8"	CASEMENT
18	2'-0"	4'-0"	E	"	TEMPERED	6'-8"	INSWING CASEMENT, SEE ELEV
19	2'-0"	4'-0"	D	"	TEMPERED	6'-8"	CASEMENT
20	2'-0"	4'-0"	E	"		6'-8"	INSWING CASEMENT, SEE ELEV
21	2'-0"	3'-0"	B	"		6'-8"	CASEMENT

WINDOW TYPES



NOTES:

1. ALIGN TOP OF WINDOWS WITH TOP OF DOORS SO THAT TOP EDGES OF DOORS AND WINDOWS ALIGN IN A LEVEL PLANE ABOVE FINISH FLOOR.

2. ALL ESCAPE OR RESCUE WINDOWS SHALL HAVE A MINIMUM NET CLEAR OPENABLE AREA OF 5.7 SQ. FT.. THE MINIMUM NET CLEAR OPENABLE HEIGHT DIMENSION SHALL BE 24". THE MINIMUM NET CLEAR OPENABLE WIDTH DIMENSION SHALL BE 20" WHEN WINDOWS ARE PROVIDED AS A MEANS OF ESCAPE OR RESCUE. THEY SHALL HAVE A FINISHED SILL HEIGHT NOT MORE THAN 44" ABOVE FIN. FLR.

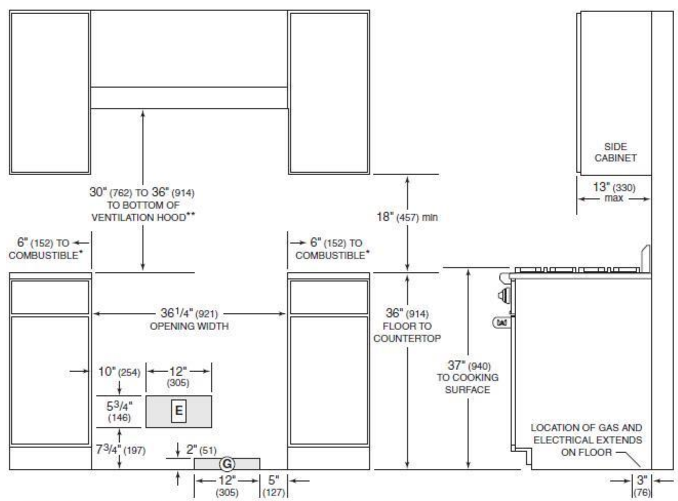
3. SKYLIGHTS SHALL HAVE A NON-COMBUSTIBLE FRAME GLAZED WITH DUAL GLAZING OF HEAT STRENGTHENED OR FULLY TEMPERED GLASS OR SHALL BE A 3/4-HOUR FIRE-RESISTIVE ASSEMBLY.

4. WINDOWS WITH SILLS LESS THAN 5'-0" ABOVE TUB OR SHOWER FLOOR SHALL BE TEMPERED.

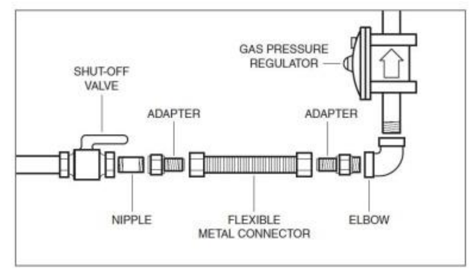
Figure 12.10 Appliance fixture schedule.

APPLIANCE SCHEDULE				
SYM.	ITEM	MANUFACTURER	CATALOG NO.	REMARKS
1	COOKTOP	APPLIANCES INC.	RU38V	WHITE
2	MICROWAVE	"	JKP65G	
3	DISHWASHER	"	GSD2500	WHITE
4	DISPOSER	"	GFC510	

INSTALLATION



*Minimum clearance from rough opening to combustible materials up to 18" (457) above countertop.
**36" (914) minimum clearance, 44" (1118) for charbroiler, from countertop to combustible materials without ventilation hood.
NOTE: For island installations, 12" (305) minimum clearance from back of range to combustible rear wall above countertop.



Gas supply line connection.

Figure 8.51 Appliance and plumbing fixtures.

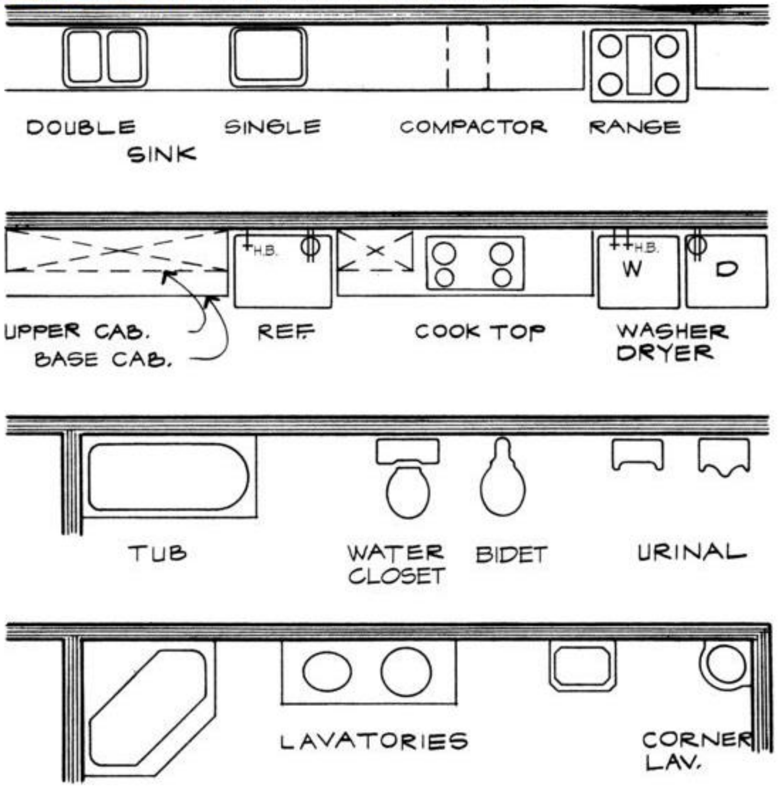


Figure 12.9 Plumbing fixture schedule.

FIXTURE SCHEDULE

SYMB.	EQUIPMENT DEASCRIPTION	MOUNTING LOCATION	MFR / MODEL NO.	FIN NOTES
1	WATER CLOSET FLUSH VALVE	SURFACE / FLOOR	AMERICAN STD 3043.102	WHITE
2	URINAL FLUSH VALVE	SURFACE / WALL	AMERICAN STD 6541.132	WHITE
3	LAVATORY (SEE 8/501) (SELF-RIMMED)	SURFACE / COUNTERTOP	AMERICAN STD 0410.021	WHITE
4	FLUSH VALVE		SLOAN OPTIMA	CHROME
5	FAUCET	CENTER SET	SLOAN OPTIMA	CHROME

ACCESSORY SCHEDULE

SYMB.	EQUIPMENT DESCRIPTION	MOUNTING LOCATION	MFR / MODEL NO.	FIN NOTES
1	PAPER TOWEL DISPENSER	SURFACE / WALL	BRADLEY 237-II	STAINLESS STEEL
2	SOAP DISPENSER	SURFACE / COUNTERTOP	BRADLEY 6326-68	STAINLESS STEEL
3	PAPER TOWEL DISPENSER	SEMI-RECESS WALL	BRADLEY 237-10	STAINLESS STEEL
4	SANITARY NAPKIN/ TAMPON DISPENSER	SURFACE/ WALL	BRADLEY 426-FREE	STAINLESS STEEL
5	1 1/4" DIA. GRAB BAR (SEE DTL. 4/501)	SURFACE / WALL	BRADLEY 812-7	STAINLESS STEEL
6	TOILET SEAT COVER DISPENSER	SURFACE/ WALL	BRADLEY 583	STAINLESS STEEL
7	TOILET TISSUE DISPENSER	SURFACE/ WALL	BRADLEY 5402	STAINLESS STEEL
8	SANITARY NAPKIN DISPOSAL	SURFACE/ WALL	BRADLEY 4722-15	STAINLESS STEEL
19	GEOMETRIC HC SYMBOLS (SEE DETAIL 3/501)	SURFACE/ WALL		PLASTIC
20	ACCESSIBLE RESTROOM SIGN (SEE DETAIL 1/501)	SURFACE/ WALL		PLASTIC

INTERIOR FINISH SCHEDULES

Interior finish schedules provide information such as floor and wall material, trim material, and ceiling finish. Architectural offices vary in their layout of an interior finish schedule because of their office philosophy and specific information they receive for various types of projects.

Figure 12.6 and 12.7 shows an interior finish schedule. The column allocated for room designation may show the room name or an assigned space number or both. This selection may be dictated by the project itself.

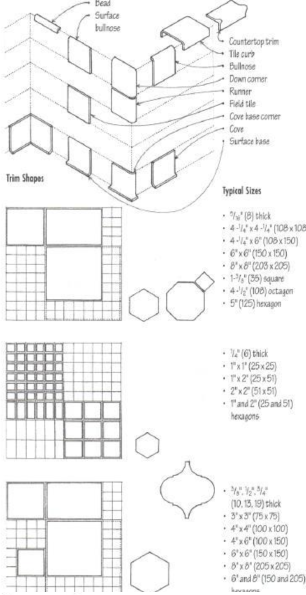
INTERIOR FINISH SCHEDULE

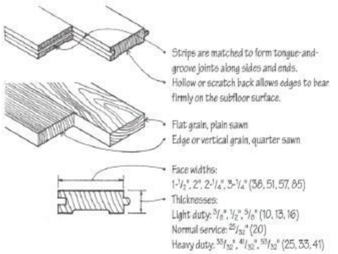
ROOM	FLOOR								BASE					WAINSCOT						WALLS							CEILING						REMARKS
	RESILIENT FLR	CARPET	EXP. CONC.	LINOLEUM	VINYL ASBES	HARDWOOD	CER. TILE	TERRAZZO	TOPSET	WOOD	CER. TILE	COVED	PAINT		CER. TILE	TERRAZZO	PAINT			PLASTER	EXP. MASONRY	EXP. WOOD	5/8" DRYWALL	WALLPAPER	PAINT	CEILING HEIGHT	PLASTER	AC PLASTER	EXP. WOOD	5/8" DRYWALL	ILLUM.	EXP. JST. & SUBFLR.	
ENTRY							●					●											●							●			
GALLERY						●																	●							●			
LIVING ROOM		●								●													●						●				
DINING ROOM						●				●													●							●			
DEN				●								●											●							●			
KITCHEN				●								●											●							●			
PANTRY				●								●											●							●			
POWDER RM.						●				●													●										
STORAGE																																	
MASTER BEDRM.		●								●													●							●			
WARDROBE		●								●													●							●			
VANITY NO. 1				●								●											●							●			
BATH NO. 1				●								●											●							●			USE WATER PROOF DRYWALL
BEDROOM NO. 2		●								●													●							●			
BEDROOM NO. 3		●								●													●							●			
VANITY NO. 2				●								●											●							●			
BATH NO. 2				●								●											●							●			USE WATER PROOF DRYWALL
STUDIO NO. 1			●						●												●				●				●				
HALL						●				●													●							●			
STUDIO NO. 2						●				●													●						●				
WORKSHOP			●										●								●				●				●				
SAUNA			●								●												●							●			
JACUZZI							●				●										●				●					●			
BATH NO. 3				●								●											●							●			USE WATER PROOF DRYWALL
SHOP						●				●													●						●				
STAIR (BASEMENT)			●																		●											●	
STAR (1ST FLR)						●				●													●							●			
STAR (2ND FLR)						●				●													●							●			

Figure 12.16 Interior finish schedule.

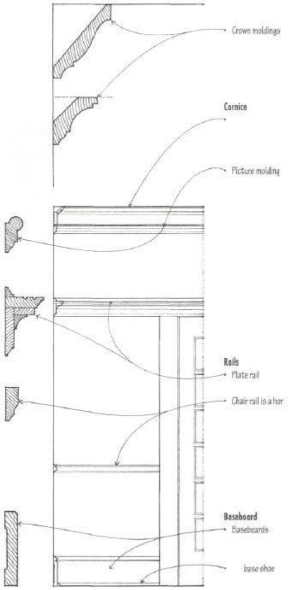
INTERIOR FINISH SCHEDULE

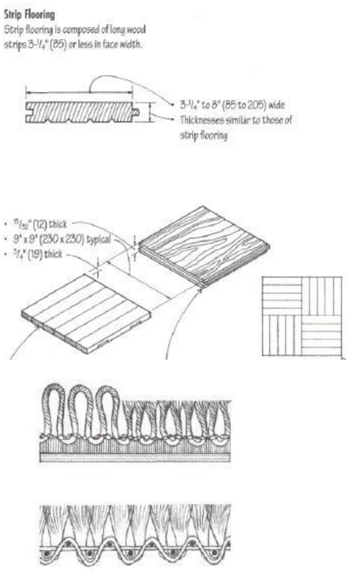
ROOM	FLOOR					BASE						WALLS						CEILINGS						CABINETS				PAINT AND STAIN																	REMARKS
																												WALLS					CEILING				TRIM				CABINET				
	CARPET	HARDWOOD	STONE	CERAMIC TILE	CONCRETE	PAINT GRADE 8" BASE	PAINT GRADE 5" BASE	STAIN GRADE 6" BASE	STONE	CERAMIC TILE	NONE	5/8" GYP. BD. W/SKIM-COAT	CERAMIC TILE WAINSCOT	WAINSCOT	STAIN-GRD WOOD PANELING	FULL-HEIGHT CERAMIC TILE	STUCCO	5/8" TYPE 'X' GYP BD	STAIN GRD. WOOD PANELING	STAIN GRD. T&G AND BEAMS	STAIN GRD WOOD BEAMS/PLAS.	STUCCO	RED BRICK	STAIN GRADE ALDER	PAINT GRADE	MELAMINE		PAINT	ENAMEL	FAUX FINISH	WALL PAPER		PAINT	ENAMEL	STAIN	NOT APPLICABLE	PAINT	ENAMEL	STAIN		PAINT *	ENAMEL	STAIN *		
LIVING RM.		X				X						X						X												X			X												
DINING RM.		X				X						X						X												X			X												2X6 WOOD PLANK DECKING AT FAM. RM. DECK
FAMILY RM.	X					X						X						X										X					X												
KITCHEN				X		X						X						X						X					X						X								X		
NOOK				X		X						X						X										X					X												
POWDER			X			X						X						X							X			X					X								X				
LAUNDRY				X						X		X	X					X								X			X				X												
2-CAR GARAGE					X						X	X						X										X																	
STAIRWELL		X				X						X						X										X																	
HALL	X						X					X						X										X					X												
MAST. BDRM.	X					X						X						X										X					X												
MAST. BATH			X						X			X						X						X						X				X									X		
WALK-IN CLOSET	X						X					X						X						X				X					X								X				
BED RM. #2	X						X					X						X										X					X												
BATH #2				X						X		X	X					X							X				X					X								X			
BED RM. #3	X						X					X						X										X					X												
BATH #3				X						X		X	X					X							X				X					X							X	X			
BED RM. #4	X						X					X						X										X					X												
BATH #4				X						X		X	X					X							X				X					X								X			
CELLAR					X						X	X						X										X					X												
WINE					X						X	X						X										X					X												





Images Retrieved from:http://www.obeliskarchitects.com/residential.html





P. 408 Schedules as they related to Structural entities

For building projects that may require various structural components, such as shear walls resisting lateral forces or spread concrete footings of various sizes carrying different loads, it is good practice to provide schedules for the various structural entities so as to maintain clear drawings.

Another example of a schedule that is related to a structural entity is a pier and/or spread footing schedule. This type of schedule is recommended when there are numerous spread footings of various sizes. This occurs on many commercial buildings. Figure 12.13 illustrates an example of a pier/spread footing schedule. Note the variances in the steel reinforcing requirements, the sizes of the base plates, the number and sizes of the anchor bolts, and other items. Figure 12.14 depicts how the schedule symbols may be shown on a structural foundation plan.

P.404-405 Chapter 12 Schedules

A schedule is a list or catalog of information that defines the doors, windows, or finishes of a room. The main purpose of incorporating schedules into a set of construction documents is to provide clarity, location, sizes, materials, and information for the designation of doors, windows, room finishes, plumbing and electrical fixtures, and other such items.

Information The material space may indicate what kind of wood is to be used for the door, such as birch or beech, and if it is paint-grade or stain-grade quality. Space for remarks is used to provide information, such as the closing device or hardware to be used, or the fire rating required for the door. In some cases, where there is insufficient space for remarks, an asterisk (*) or symbol number may be placed to the left of the schedule or in the designated box and referenced to the bottom of the schedule with the required information. This information must under no circumstances be crowded or left out. For any type of schedule that includes lettering, provide sufficient space in each frame so that your lettering is not cramped or unclear.

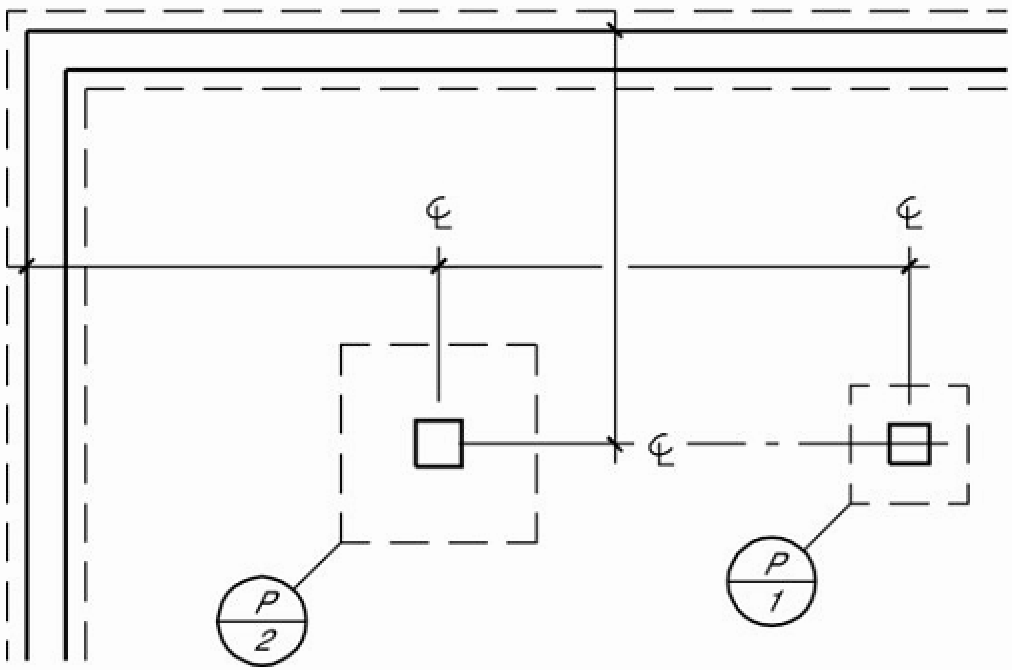
P. 408 Structural schedules

For building projects that may require various structural components, such as shear walls resisting lateral forces or spread concrete footings of various sizes carrying different loads, it is good practice to provide schedules for the various structural entities so as to maintain clear drawings.

Figure 12.13 Pier/spread footing schedule example.

Pier/Spread Footing Schedule						
Sym	Size	Depth	Reinforcing	Base Plate Size	Anchor Bolts & Number	Remarks
P 1	1'-6" X 1'-6"	10"	(3) 1/2" DIA. BARS ONE WAY	N.A.	N.A.	KEEP STEEL 3" CLR. OF EARTH
P 2	2'-6" X 2'-6"	12"	(4) 1/2" DIA. BARS EACH WAY	6" X 6" x 1/4"	(2) 5/8" DIA.	KEEP STEEL 3" CLR. OF EARTH
P 3	3'-6" X 3'-6"	12"	(5) 1/2" DIA. BARS EACH WAY	7" X 7" X 3/8"	(4) 5/8" DIA.	KEEP STEEL 3" CLR. OF EARTH
P 4	-	-	- -	-	-	-
- -	-	-	- -	-	-	-
- -	-	-	- -	-	-	-

Figure 12.14 Pier/spread footing example.



CHAPTER 13

Chapter 13 **ARCHITECTURAL DETAILS AND VERTICAL LINKS p. 422**

THE PURPOSE OF ARCHITECTURAL DETAILS

Details are larger scale drawings usually ¾" = 1'-0" and larger (using the Architectural scale 1"= 1'-0", 1 ½ "= 1'-0", 3"=1'-0") of specific design assemblies.

Architectural details are prepared by the architect, examples:

- Change of level
- Openings (Door, Windows, Louvers)
- Millwork (Cabinetry)
- Miscellaneous metals
- Different plane angle connection (Floor and wall, wall and roof, roof and parapet.
- Roof Eaves

Structural details are prepared by the structural engineer

- Footings
- Connections

The contractor may request additional details in the construction stage:

- RFI – Request for information
- Clarification Drawing (ASK- Architectural Sketch) prepared by the architect

Details: Theatre (See Chapter 16)

In some projects, structural complexities may dictate various construction assemblies. For example, a masonry and steel structure has many architectural details that are governed by structural engineering requirements. The detailer must coordinate these details with the structural engineer. **Figure 13.14** shows a detail for a steel beam connection where the beam, steel decking, and concrete floor thickness have been designed by the structural engineer. From these required members, the architectural detail is developed, showing wall materials, ceiling attachment, and underfloor space for mechanical and electrical runs. Figure **Figure 13.14** has a note to "SEE STRUCTURAL." This refers the reader to the structural engi-neer's drawings, which provide such information as type and length of welds for steel connections, and size and weight of steel members. Note the call-out on the steel beam of "W 8 × 10." The "W" refers to the shape of the beam (here a wide **flange**), the "8" refers to the depth of the beam (here 8 inches), and the "10" refers to the weight of the beam per lineal foot (here 10 lb per linear foot).

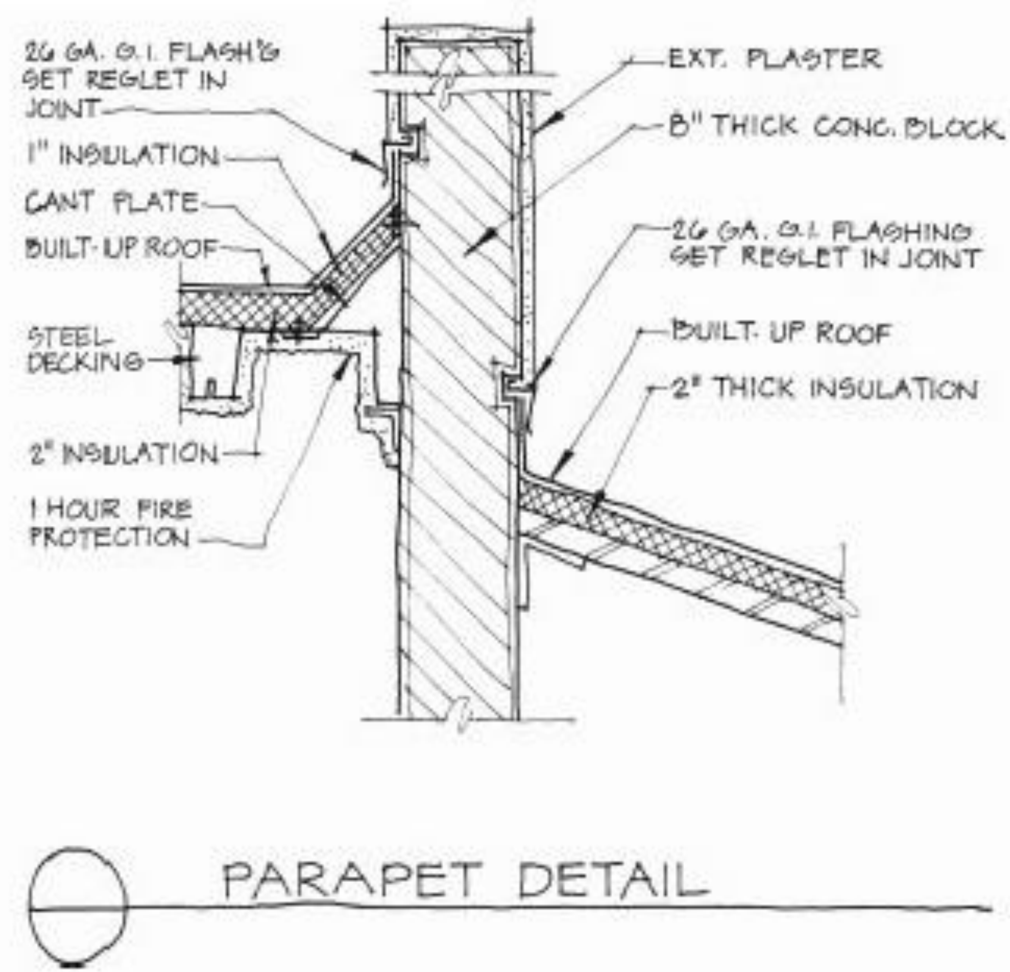
A second example is shown in **Figure 13.15** The steel stud framing is terminated at the bottom of the steel beam, and extensive galvanized iron flashing has been used to cover and protect the intersection of the various members at the ridge.

Some architectural details become complex and require much study before the finished detail is drafted. See Figure 13.16 This eave and column detail is intricate and shows the entire column assembly from the foundation to the roof, including the eave detail. Notes refer the viewer to other details for more information. Usually, it is unnecessary and unadvisable to repeat all the information from one detail to another; changes made on one detail must be made on any other affected.

Many projects require a specific architectural detail to show conditions that will satisfy a governing building code requirement. Figure 13.17 'or example, shows ex-actly where a fire protection coating is required under a steel roof decking that covers the structural steel angle on a masonry wall. This information is combined with a roof parapet deta Figure 13.18 shows another detail for areas requiring fire protection.

P. 428 Figure 13.17

Figure 13.17 Parapet detail.



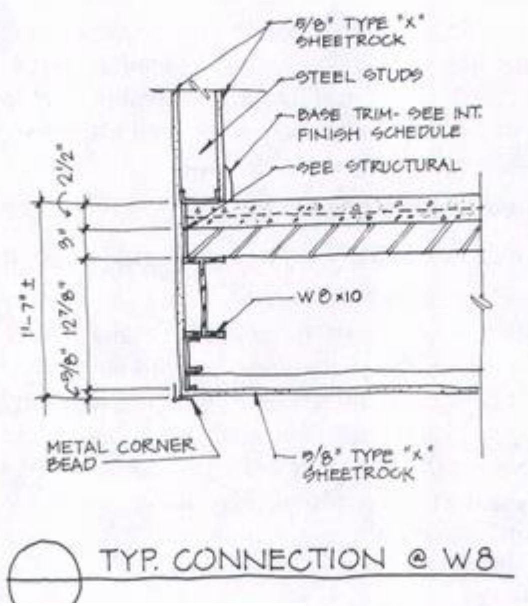


Figure 13.14 Detail of typical connection at a steel beam.

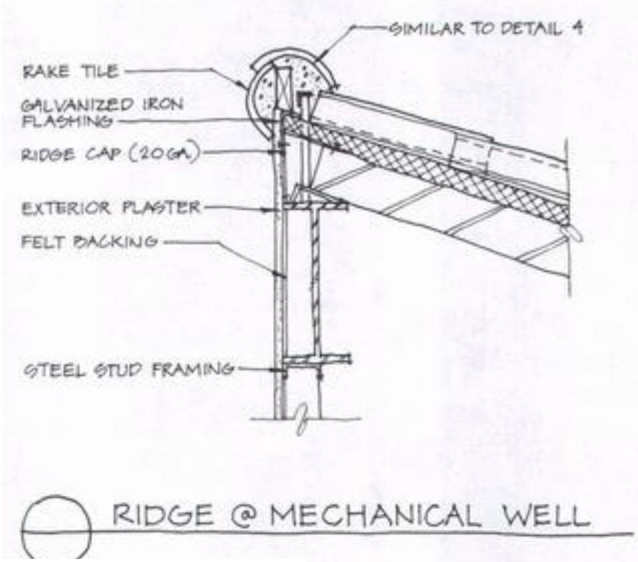


Figure 13.15 Detail of ridge at mechanical well.

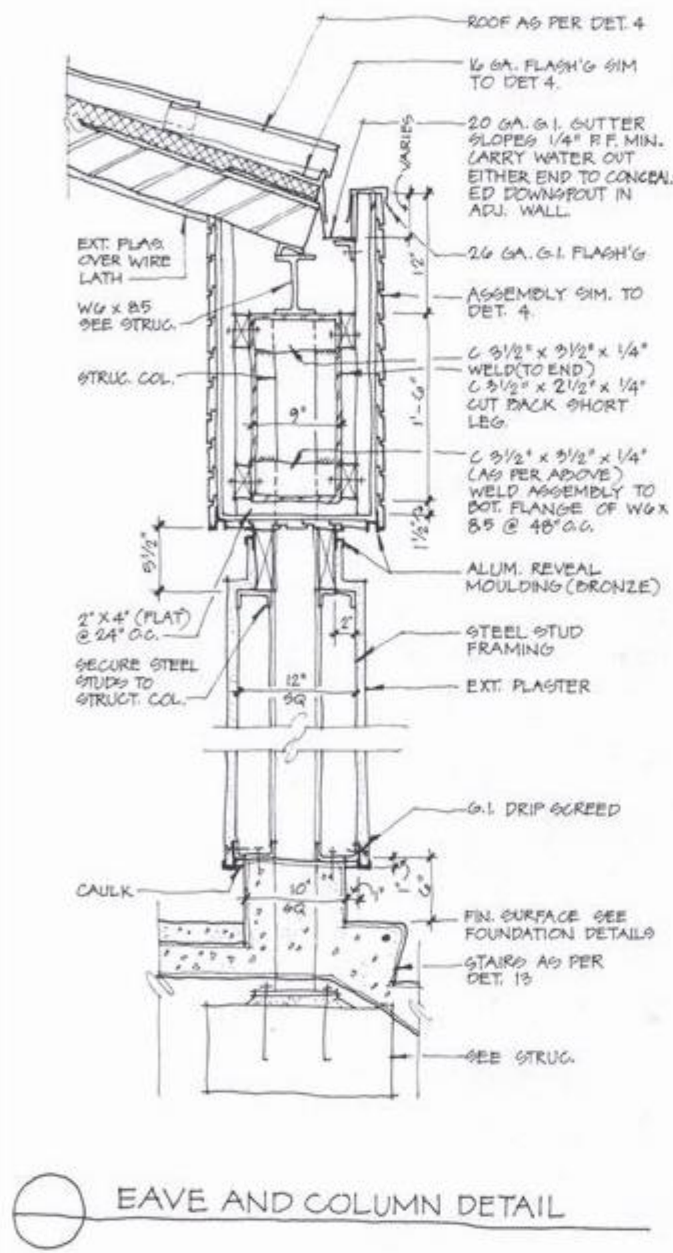


Figure 13.16 Eave and column detail.

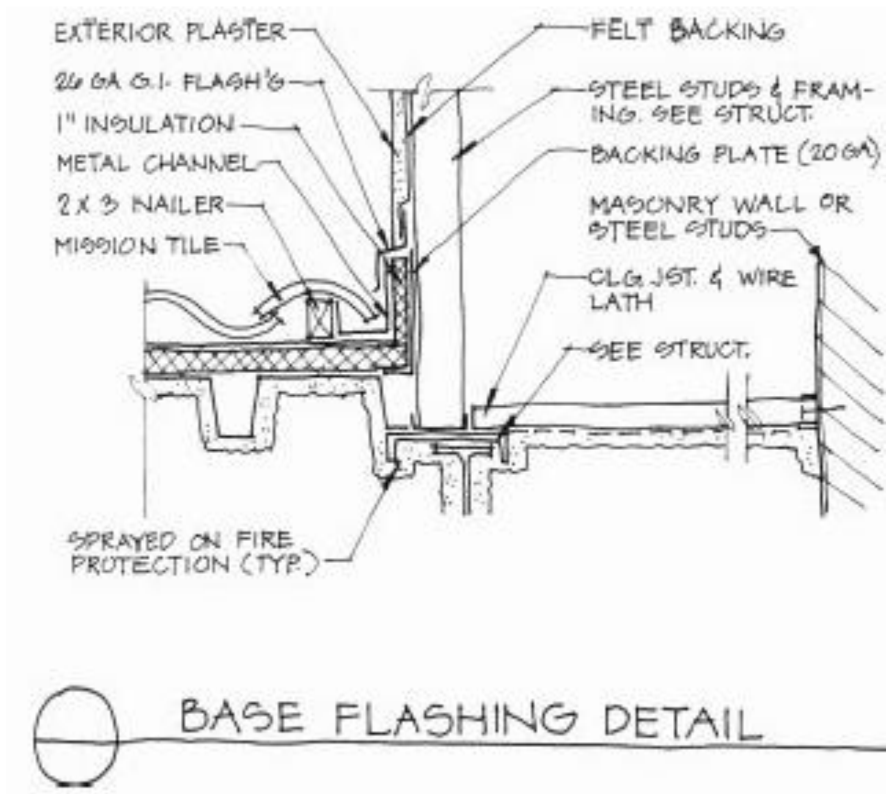
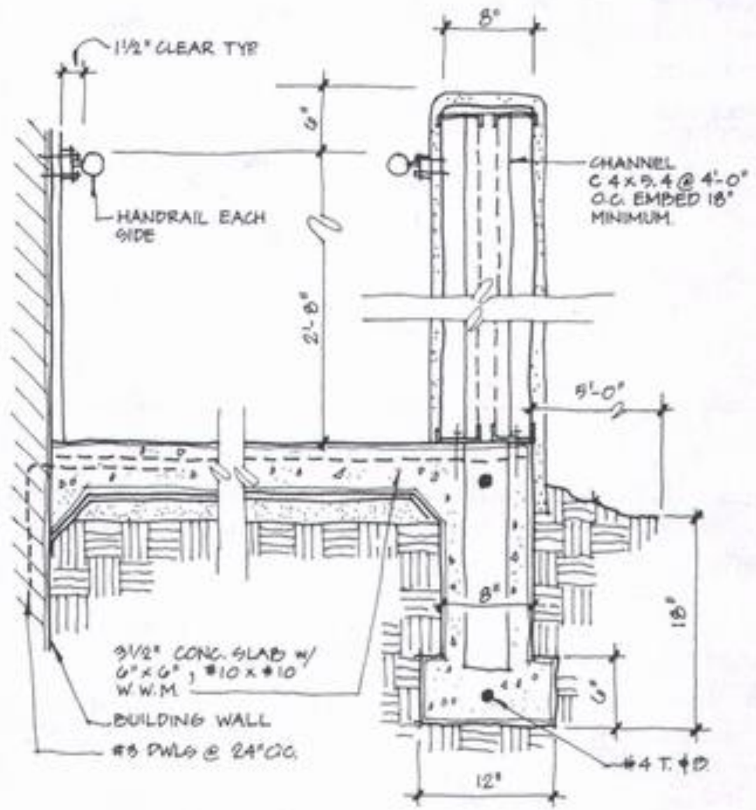


Figure 13.18 Base Flashing Detail


1½" CLEAR TYP
8"
6"
HANDRAIL EACH SIDE
CHANNEL C 4 x 5.4 @ 4'-0" O.C. EMBED 18" MINIMUM
2'-8"
5'-0"
8"
18"
6"
3½" CONC. SLAB w/ 6"x6", #10 x #10 W.W.M.
BUILDING WALL
#3 DWLS @ 24" O.C.
#4 T. & B.
12"

RAMP DETAIL

An important factor in architectural detailing is providing details that are an integral part of the architectural design of the building

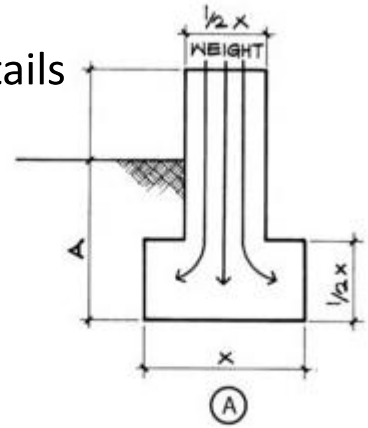
Approach to detailing, p.428-429:

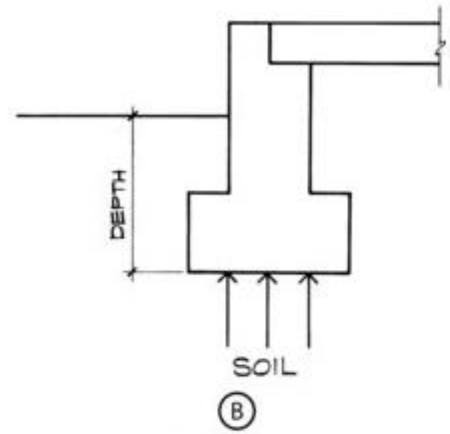
A. A. Structural
B. Architectural
C. Environmental
D. Human Needs
E. Connection
F. Material Limits

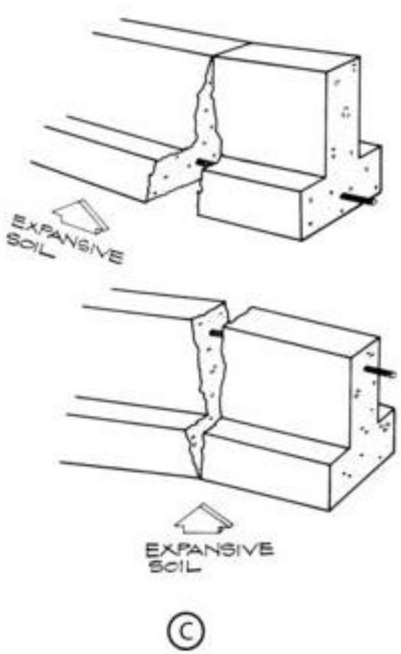
Figure 13.22 Footing concerns. (Reprinted by permission from *The Professional Practice of Architectural Working Drawings,* 3d Ed., © 2003 by John Wiley & Sons, Inc.)

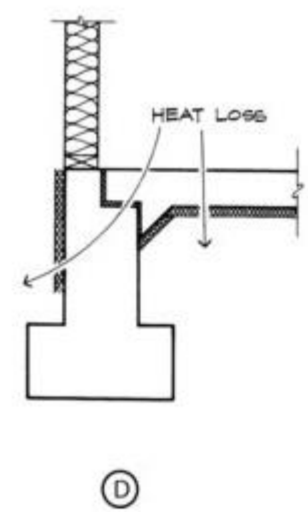
p.430-432 Footing Details Consideration:

A. Configuration
B. Soil
C. Strength
D. Energy

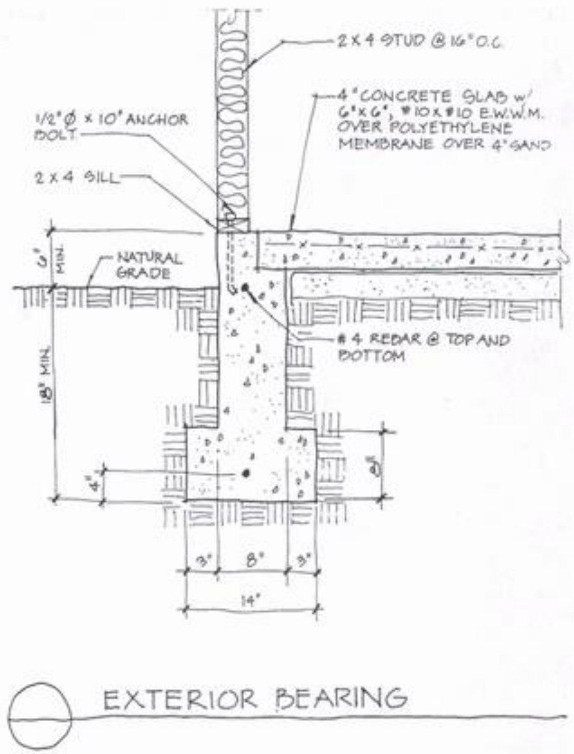




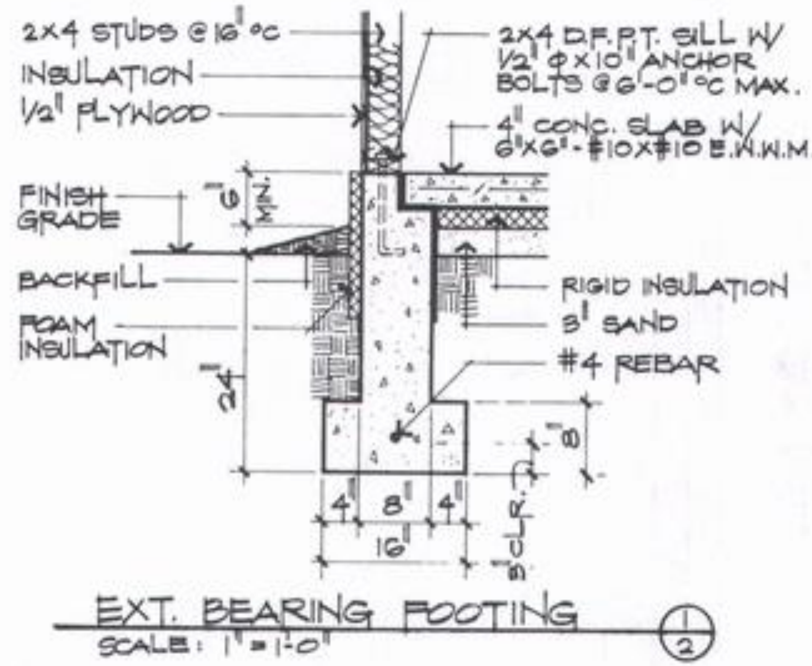




Chapter 13: Footing Details



p. 426 Figure 13.9 Detail of Exterior bearing footing



p. 433 Figure 13.26 Stage IV Exterior bearing footing

Ch. 13 p.443 Stair Design and Vertical Links

Stair design considerations:

Stair as a mean of vertical circulation serves as a mean of egress.
The sizes of tread and risers have to comply with the building code:

Stair width

Headroom

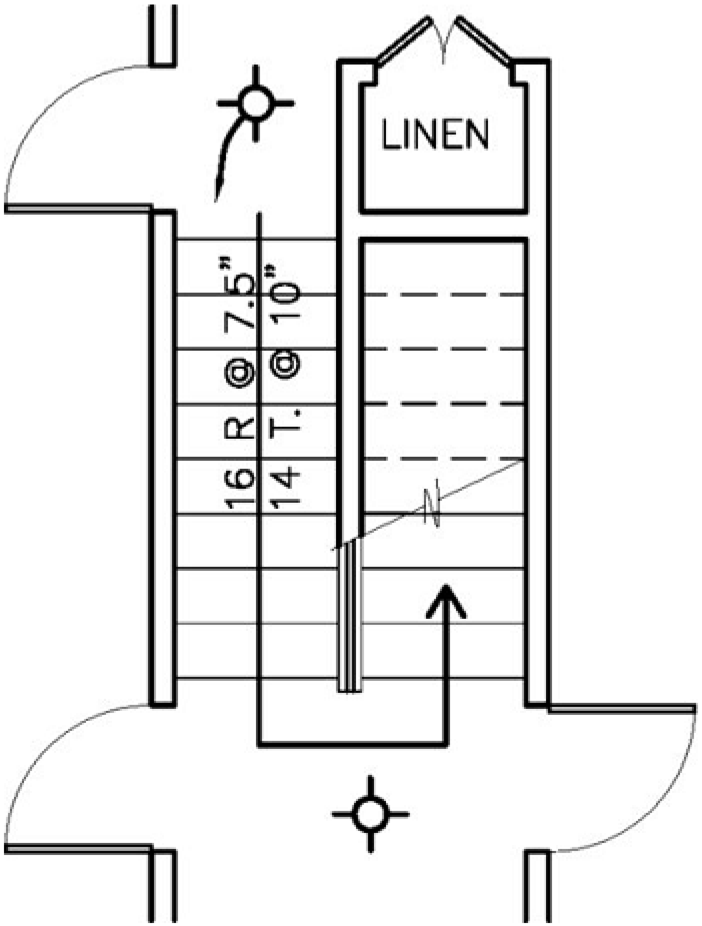
Maximum run of stair

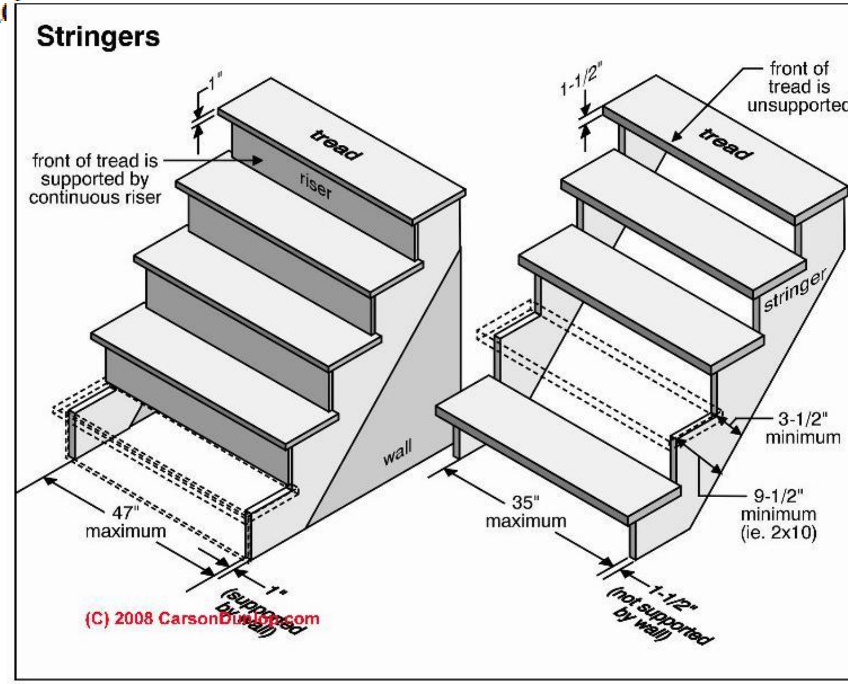
Riser and tread sizes

Handrails

For most stairway design the number of treads will be 1 - #R.
Construction Materials:
Wood
Steel
Pored in Place Concrete
Precast Concrete
Combination

Figure 8.55 Stair directions and number of tread



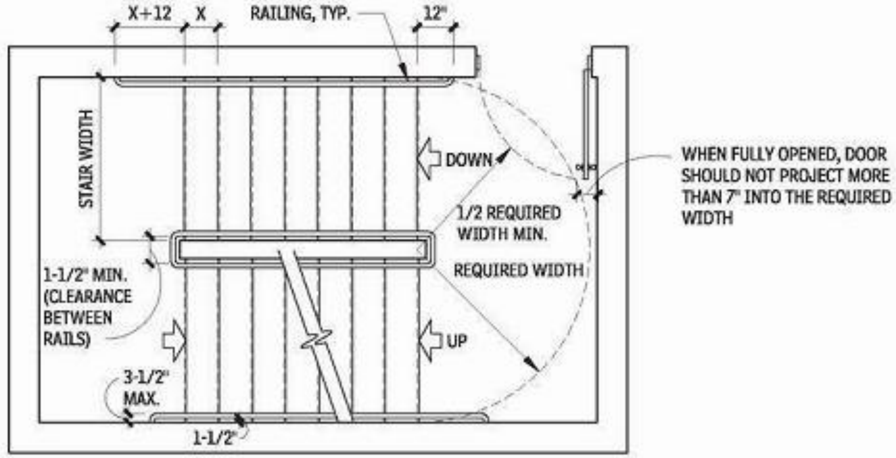


eved from: ttp://www.inspectapedia.com/interiors/2027s.jpg

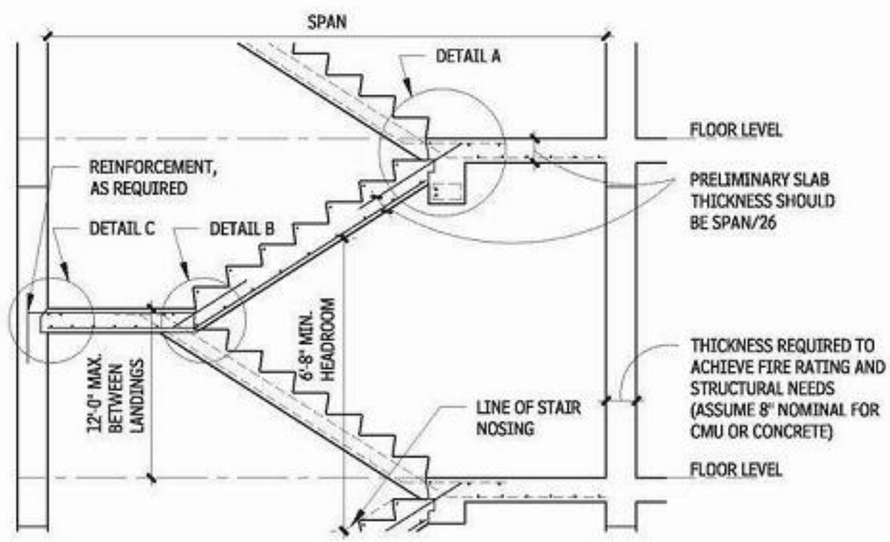
Stringer – one of the sloping boards running alongside a staircase to support or cover the ends of the treads and risers.

Chapter 8 p. 276

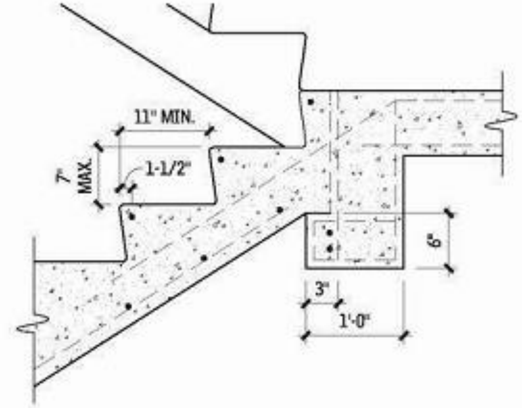
Stairs - An arrow is used on the stair shown in the floor plan to show the direction in which the stair raises and the number of raiser and treads with their dimensions



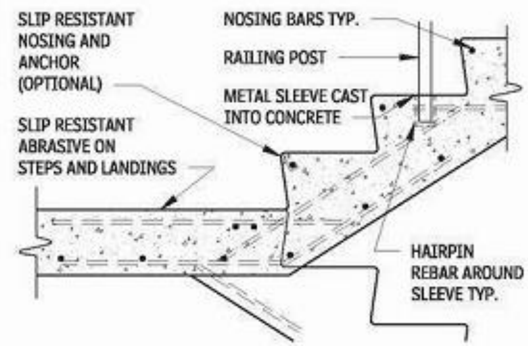
PLAN



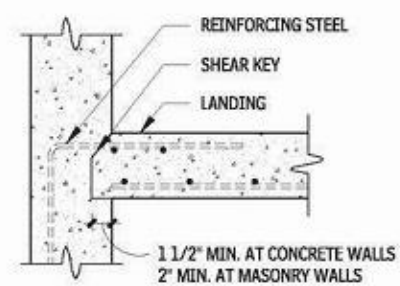
SECTION



DETAIL A



DETAIL B



DETAIL C

U–TYPE CONCRETE STAIRS 3.170

Illustrations are from the Architectural Graphic Standard, American Institute of Architects 11th Ed. Wiley and Sons continuity

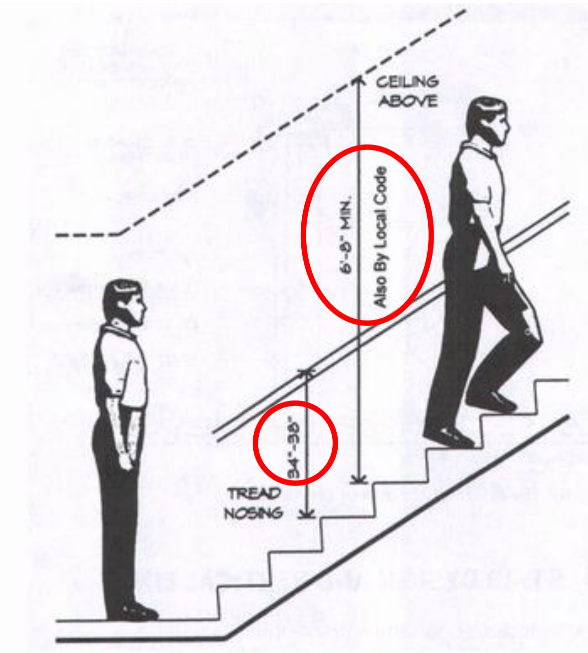


Figure 13.54 Headroom clearance

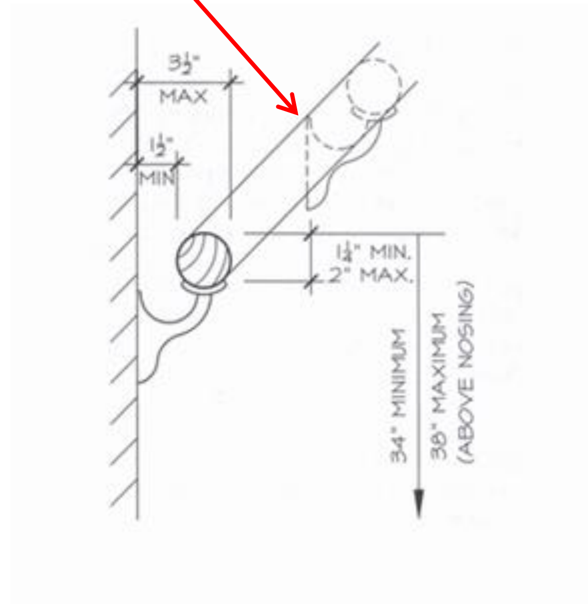


Figure 13.53 Handrail requirements

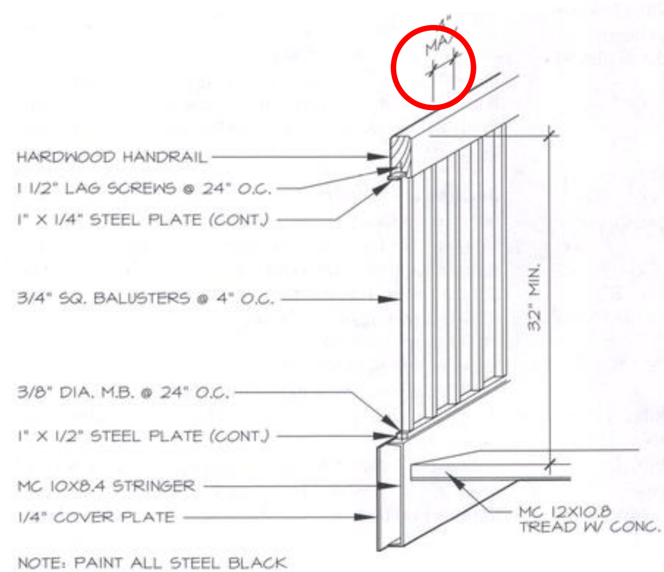
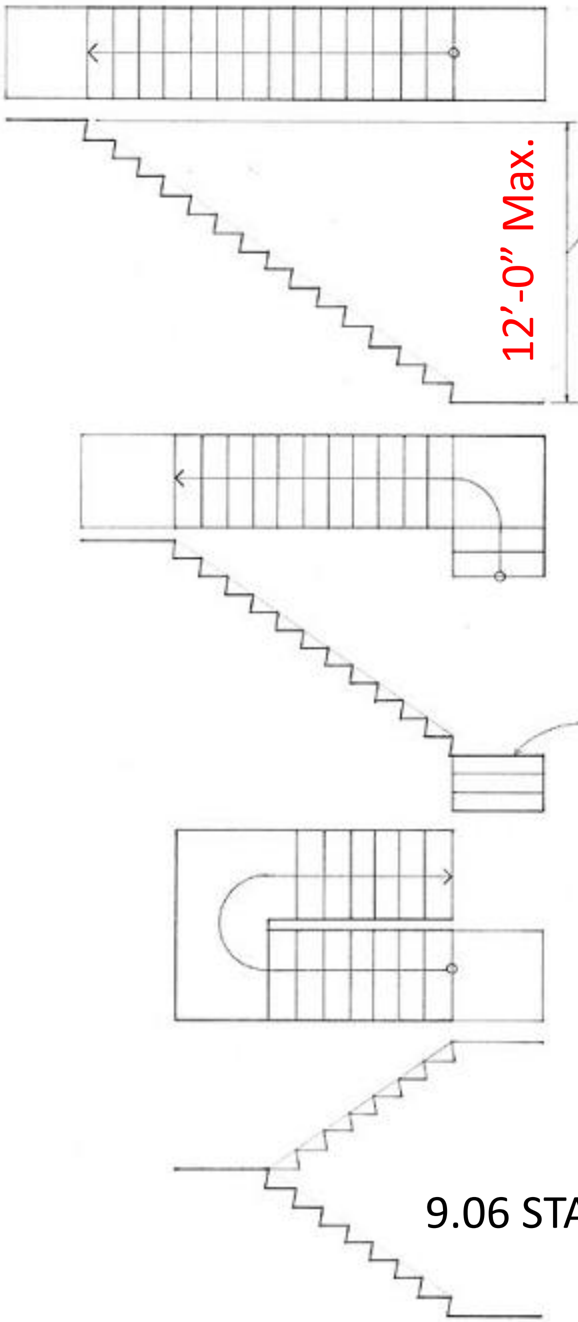
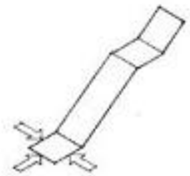


Figure 13.55 Balustrade detail



Straight-Run Stair

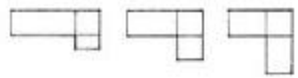
- A straight-run stair extends from one level to another without turns or winders.
- Building codes generally limit the vertical rise between landings to 12' (3660).



- A stairway may be approached or departed either axially or perpendicular to the stair run.

Quarter-Turn Stair

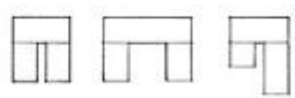
- A quarter-turn or L-shaped stair makes a right-angled turn in the path of travel.
- The two flights connected by an intervening landing may be equal or unequal, depending on the desired proportion of the stairway opening.



- Landings that are below normal eye level and provide a place to rest or pause are inviting.

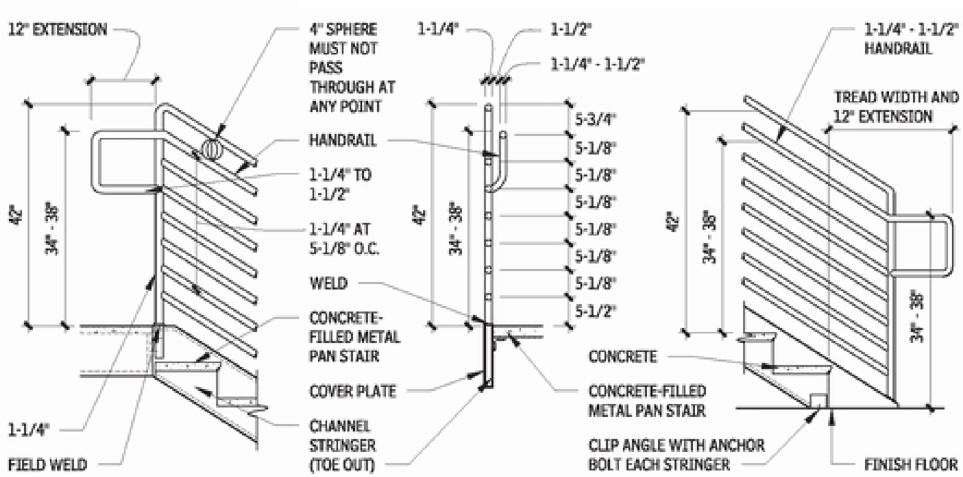
Half-Turn Stair

- A half-turn stair turns 180° or through two right angles at an intervening landing.
- A half-return stair is more compact than a single straight-run stair.
- The two flights connected by the landing may be equal or unequal, depending on the desired proportion of the stairway opening.

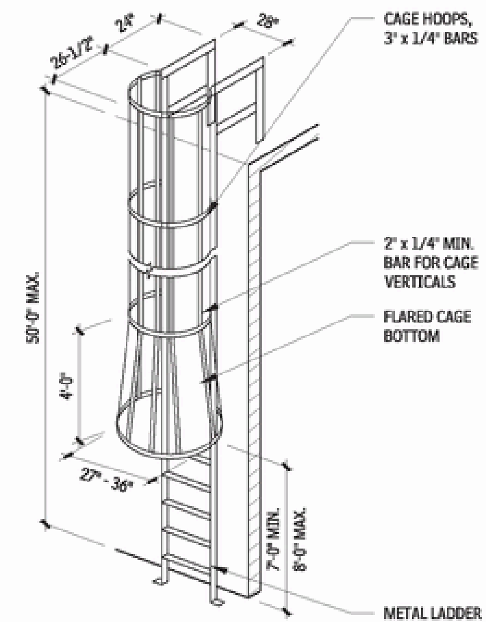


9.06 STAIR PLANS. BUILDING CONSTRUCTION ILLUSTRATED, BY CHING

Guardrails. Guardrails are safety devices found on stairway landings, balconies, and decks where their height is 30" or more above the adjacent grade or floor below. The structural design to stabilize the supporting vertical members is predicated on a horizontal force of 20 pounds per linear foot. Allowable openings in the guardrail assembly, as required by most building codes, depends on the occupancy classification and the use of the structure. For residential use the maximum clear openings must not exceed 4". For commercial and industrial structures the maximum clear openings must not exceed 8". In commercial and industrial-type structures that are not accessible for public use, the openings may be a maximum of 12". An example of a guardrail assembly is shown in a three-dimensional drawing in Figure 16.91.



STAIR RAILS 3.176



Illustrations are from the Architectural Graphic Standard, American Institute of Architects 11th Ed. Wiley and Sons

FIXED VERTICAL LADDER (50 FT OR LESS) 3.177

Steel Stairway Details

Beginning at the ground floor level, the steel stringers, fabricated from a standard steel channel, are attached to the concrete floor with ¼" steel plates and ½'-0 x 10" anchor bolts. The typical tread design is a standard steel channel MC10x84 welded to the web of the channel stringer and filled with concrete. This detail assembly is illustrated in Figure 13.64

The next connection detail is the stringer attachment at the intermediate landings and the support of the concrete at the landings, as shown in Figure 13.65 . Note that the steel channel at the landing is used to support the steel stringers and the concrete at the landings. All connections are accomplished by assigned welds. The final detail for the steel stairway assembly is shown for the various floor levels. This detail illustrates a steel channel for the floor support and the support of the stringers. Steel angles are used for intermediate floor supports. These members are illustrated in the detail shown in Figure Figure 13.66

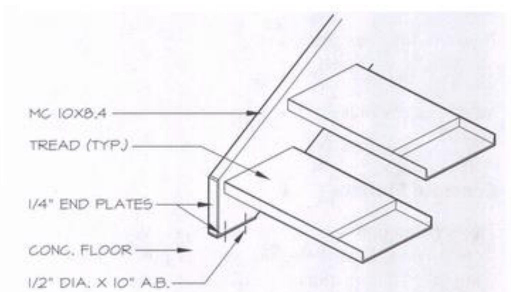


Figure 13.64 Stringer to concrete.

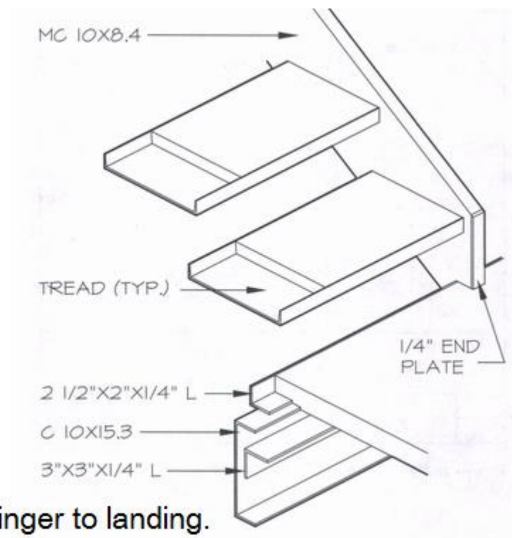
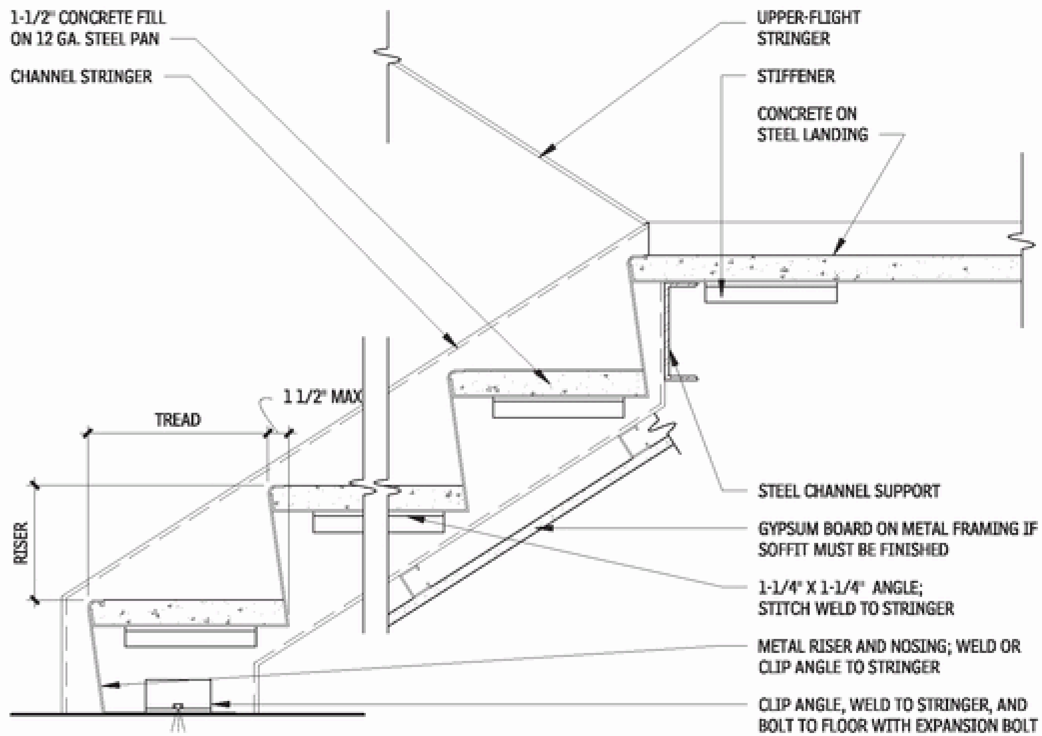


Figure 13.66 Stringer to landing.



METAL PAN STAIR SECTION 3.174

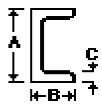
Illustrations are from the Architectural Graphic
Standard, American Institute of Architects 11th Ed.
Wiley and Sons

http://www.tmtco.com/products/channels.html

Steel Channels

C-Shapes Channels Structural Steel & MC-Shapes Miscellaneous Channels

Miscellaneous Channels Structural Sizes



Channels are available in Carbon, Stainless Steel, and Aluminum. Sizes shown are for Carbon only.

Please call for information on Stainless, Aluminum and other channel sizes.

MC-Shapes	A Depth in Inches	B Width in Inches	C Web in Inches	Weight Lbs.			
				Per Ft.	20-Ft.	30-Ft.	40-Ft.
MC 3 x 7.1	3	1.938	.312	7.1	142	213	284
MC 4 x 13.8	4	2.500	.500	13.8	276	414	552
MC 6 x 12	6	2.497	.310	12.0	240	360	480
MC 6 x 15.3	6	3.500	.340	15.3	306	459	612
MC 6 x 16.3	6	3.000	.375	16.3	326	489	652
MC 6 x 18	6	3.504	.379	18.0	360	540	720
MC 7 x 17.6	7	3.000	.375	17.6	352	528	704
MC 7 x 19.1	7	3.452	.352	19.1	382	573	764
MC 7 x 22.7	7	3.603	.503	22.7	454	681	908
MC 8 x 8.5	8	1.875	.188	8.5	170	225	340
MC 8 x 18.7	8	2.978	.353	18.7	374	561	748
MC 8 x 20	8	3.025	.400	20	400	600	800
MC 8 x 21.4	8	3.450	.375	21.4	428	642	856
MC 8 x 22.8	8	3.502	.353	22.8	456	684	912
MC 9 x 23.9	9	3.450	.400	23.9	478	717	956
MC 9 x 25.4	9	3.500	.450	25.4	508	762	1016
MC 10 x 6.5	10	1.125	.150	6.5	130	195	260
MC 10 x 8.4	10	1.500	.170	8.4	168	252	336
MC 10 x 22	10	3.315	.290	22	440	660	880
MC 10 x 25	10	3.405	.380	25	500	750	1000
MC 10 x 28.5	10	3.950	.425	28.5	570	855	1140

Concrete Stairs

The construction of concrete stairways may be achieved in two ways. First, there are various precast concrete companies that manufacture different types of concrete stairs and will deliver and install them on the building site. Second, concrete stairways may be formed in the construction of the building by incorporating the required steel reinforcing bars and then pouring the concrete in place. For many projects a precast concrete stairway is desirable, because there is no cost of forming and subsequently removing the forms. When using a poured-in-place concrete stair, it is necessary to provide details, with the required steel reinforcing as part of the working drawings. A three-dimensional detail for a poured-in-place concrete stairway is depicted in Figure 13.67

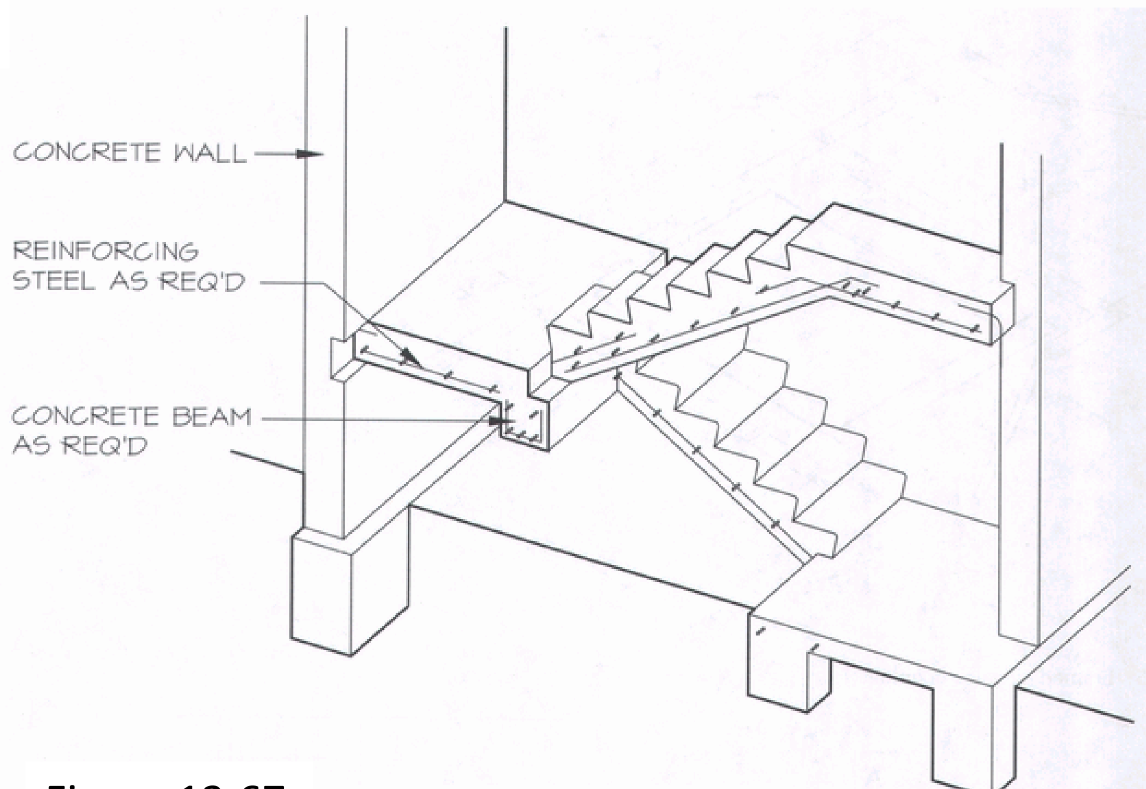


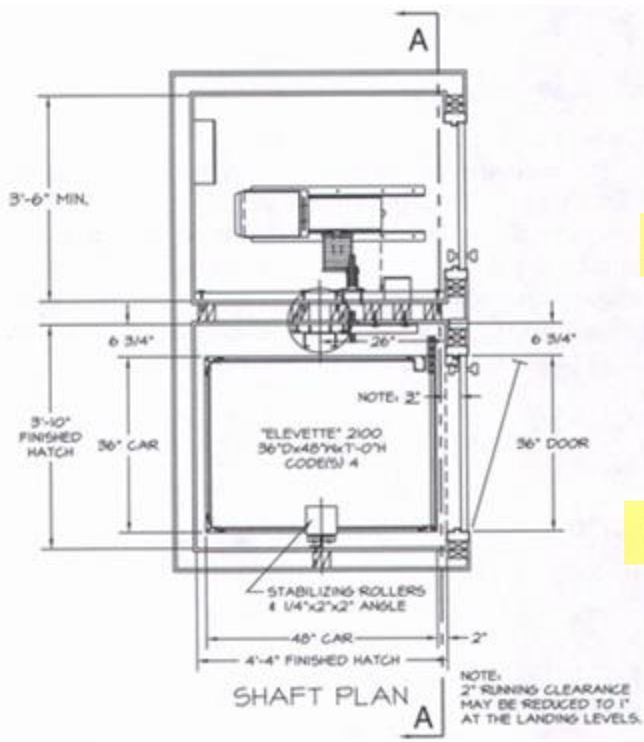
Figure 13.67 U-shaped concrete stairs.

The drawings for elevators of all types and various lifting devices such as wheelchair lifts, chair lifts, and others must include the detailing necessary to satisfy the installation requirements. An example of a residential-type electric elevator is shown in Figure 13.70 The planned area for the wall framing and the openings that surround the electric elevator car must adhere to all the clearances required by the elevator manufacturer. The planning must also include the required space designated by the manufacturer for the machine room equipment. This room is located adjacent to and under the stairway run. A three-dimensional drawing of the framed opening is shown in Figure 13.69 . This particular elevator has a lift capacity of approximately 750 pounds.

A more detailed example of a manufacturer's requirements is shown in the plan view illustrated in Figure 13.70. This drawing, as furnished by a specific elevator manufacturer, shows the information an architect or designer will need to integrate into the working drawings. Note that the shaft dimension requirements, the clearances for this specific elevator, and the electrical supply must be shown in the working drawings. A section through the elevator shaft and machine room is shown in Figure 13.71 This drawing depicts the length of the vertical travel, the electrical supply location, and the required 8"-deep pit depression that is required for the cab clearance. The area and dimensions for the pit area must be shown accurately on the foundation plan of the working drawings.

Elevator design and construction considerations:

- Shaft dimensions requirements
- Clearances
- Electrical Supply
- Machine room requirements
- Vertical Travel
- Pit Depression – This information shall be presented on the foundation plan of the working drawings.



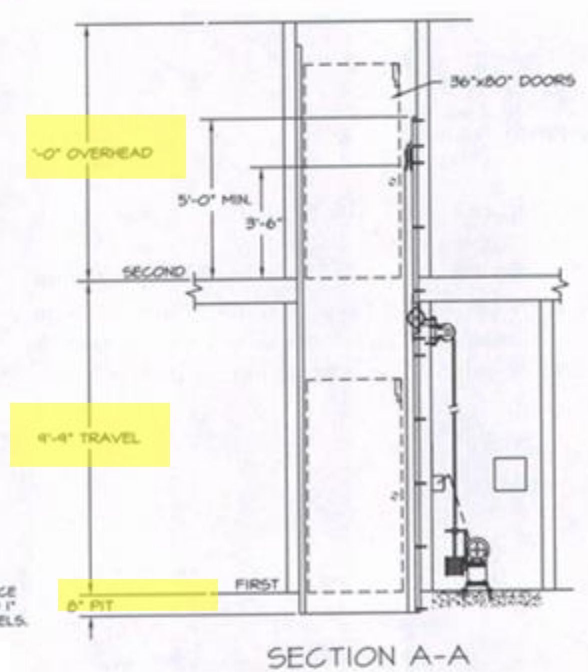


Figure 13.70 Shaft Plan

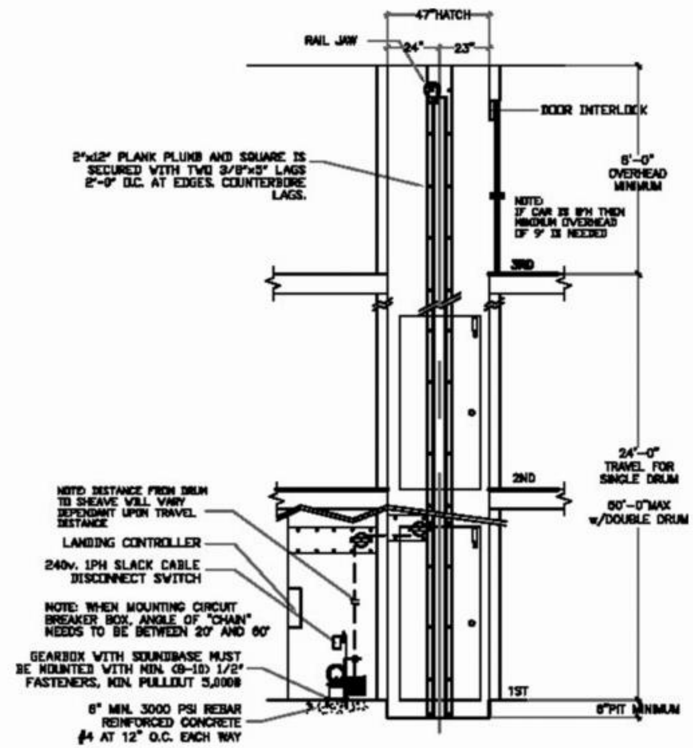
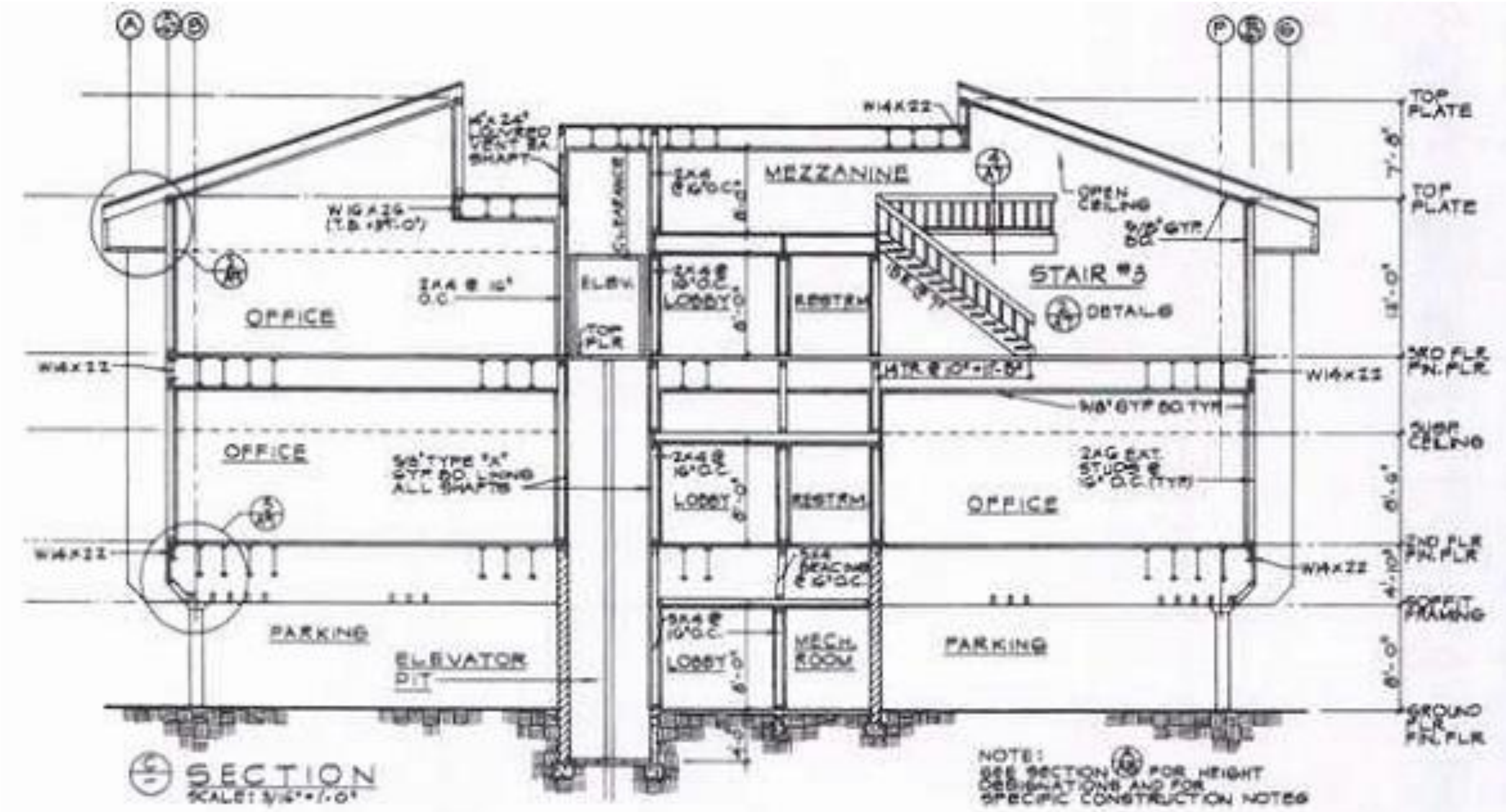


Figure 13.71 Section A-A



p. 383 Figure 11.41 Office building section—North-South direction.

9.14 ELEVATORS

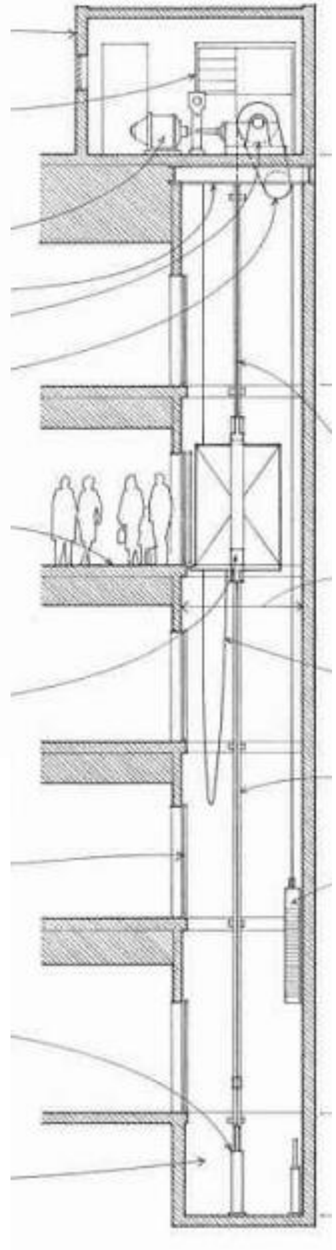
Elevators travel vertically to carry passengers, equipment, and freight from one level of a building to another. The two most common types are electric elevators and hydraulic elevators.

Electric Elevators

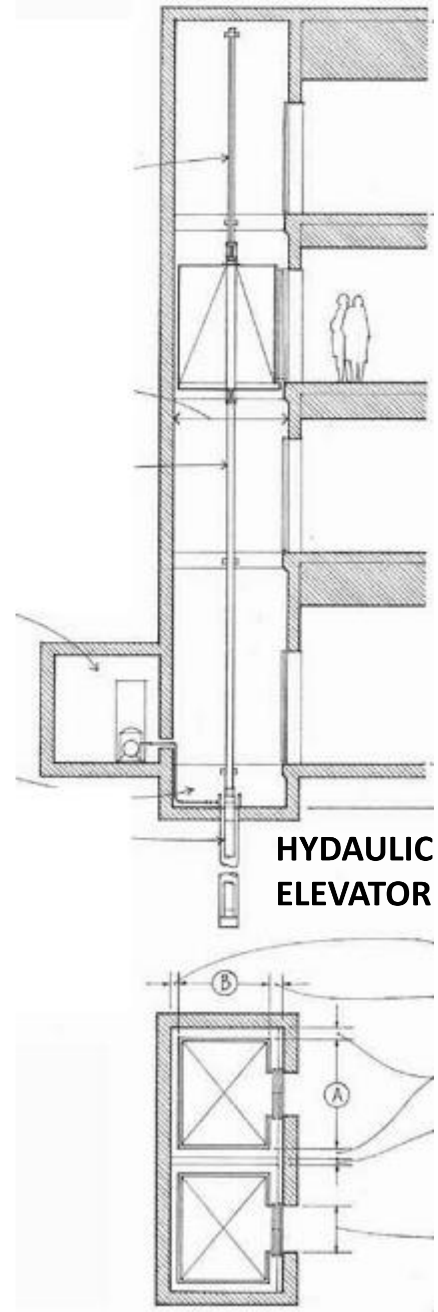
Electric elevators consist of a car that is mounted on guide rails, supported by hoisting cables, and driven by electric hoisting machinery in a penthouse. Geared traction elevators are capable of speeds up to 350 fpm (1.75 m/s) and are suitable for medium-rise buildings. Gearless traction elevators are available with speeds up to 1200 fpm (6 m/s) and typically serve high-rise buildings.

CSI MasterFormat 14 20 00 Elevators

Hydraulic elevators consist of a car supported by a piston that is moved by or moves against a fluid under pressure. A penthouse is not required, but the hydraulic elevator's lower speed and piston length limit its use to buildings up to six stories in height.

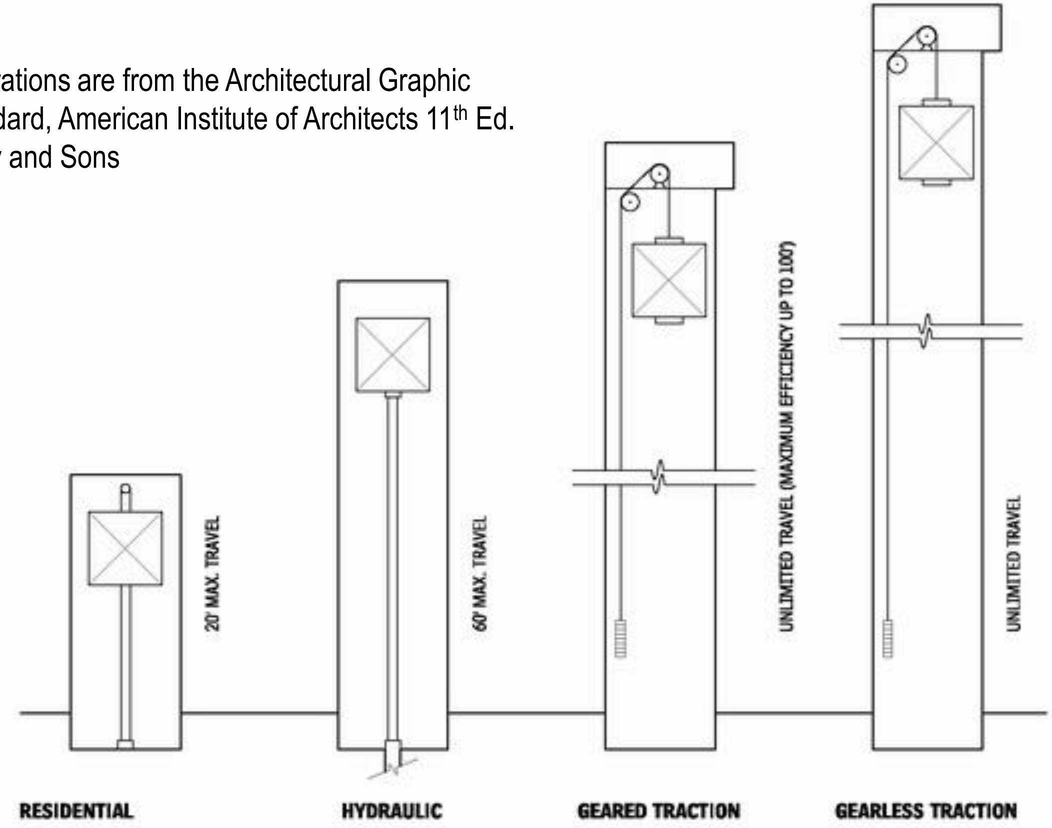


ELECTRIC ELEVATOR



HYDAULIC ELEVATOR

Illustrations are from the Architectural Graphic Standard, American Institute of Architects 11th Ed. Wiley and Sons



ELEVATOR TRAVEL DISTANCES 4.1

Geared traction machines are driven by AC or DC electric motors. Geared machines use worm gears to control mechanical movement of elevator cars by "rolling" steel hoist ropes over a drive sheave which is attached to a gearbox driven by a high speed motor. These machines are generally the best option for basement or overhead traction use for speeds up to 500 ft/min (2.5 m/s).

Gearless traction machines are low speed (low RPM), high torque electric motors powered either by AC or DC. In this case, the drive sheave is directly attached to the end of the motor. Gearless traction elevators can reach speeds of up to 2,000 ft/min (10 m/s), or even higher. A brake is mounted between the motor and drive sheave (or gearbox) to hold the elevator stationary at a floor. This brake is usually an external drum type and is actuated by spring force and held open electrically; a power failure will cause the brake to engage and prevent the elevator from falling (see inherent safety and safety engineering).

CHAPTER
18

AS BUILT

EXISTING BUILDINGS

It is imperative that the first step in drafting a set of construction documents for a tenant improvement project be production of a drawing called as built. This drawing features the dimensions of the structure as it stands; hence the name **"as built."** Often the original set of construction documents is available to the tenant improvement drafter, but the parameters of the inside of the structure must be re-measured. The reason is that a structure is rarely built to the precise size shown on the original drawing. The as-built drawing becomes the datum or base for the entire set of construction documents from this point on, whether drawn by hand or on the computer. If the original set of documents is available, the as-built drawing is derived by making the necessary corrections on the existing drawings: moving walls, column locations, and so forth.

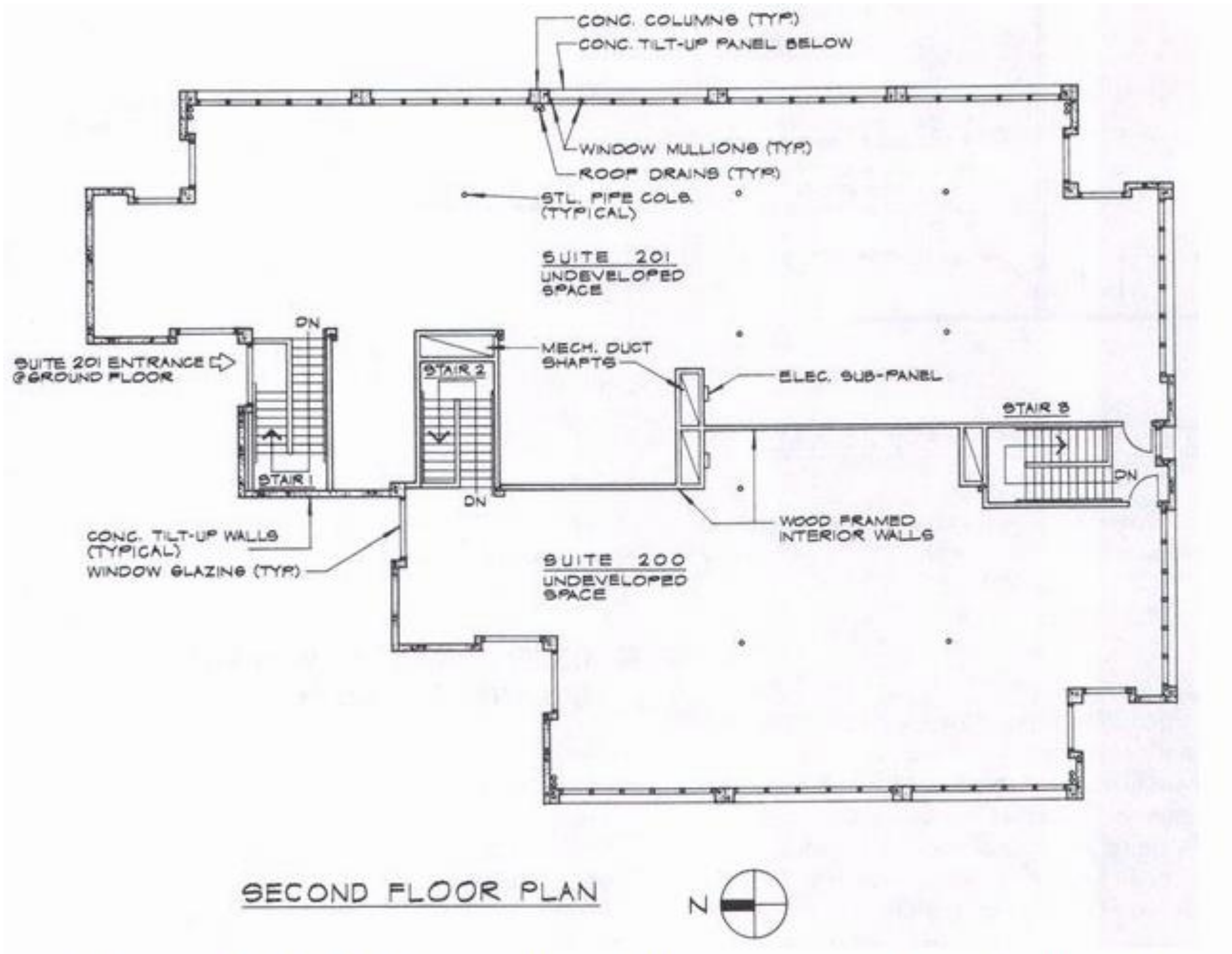
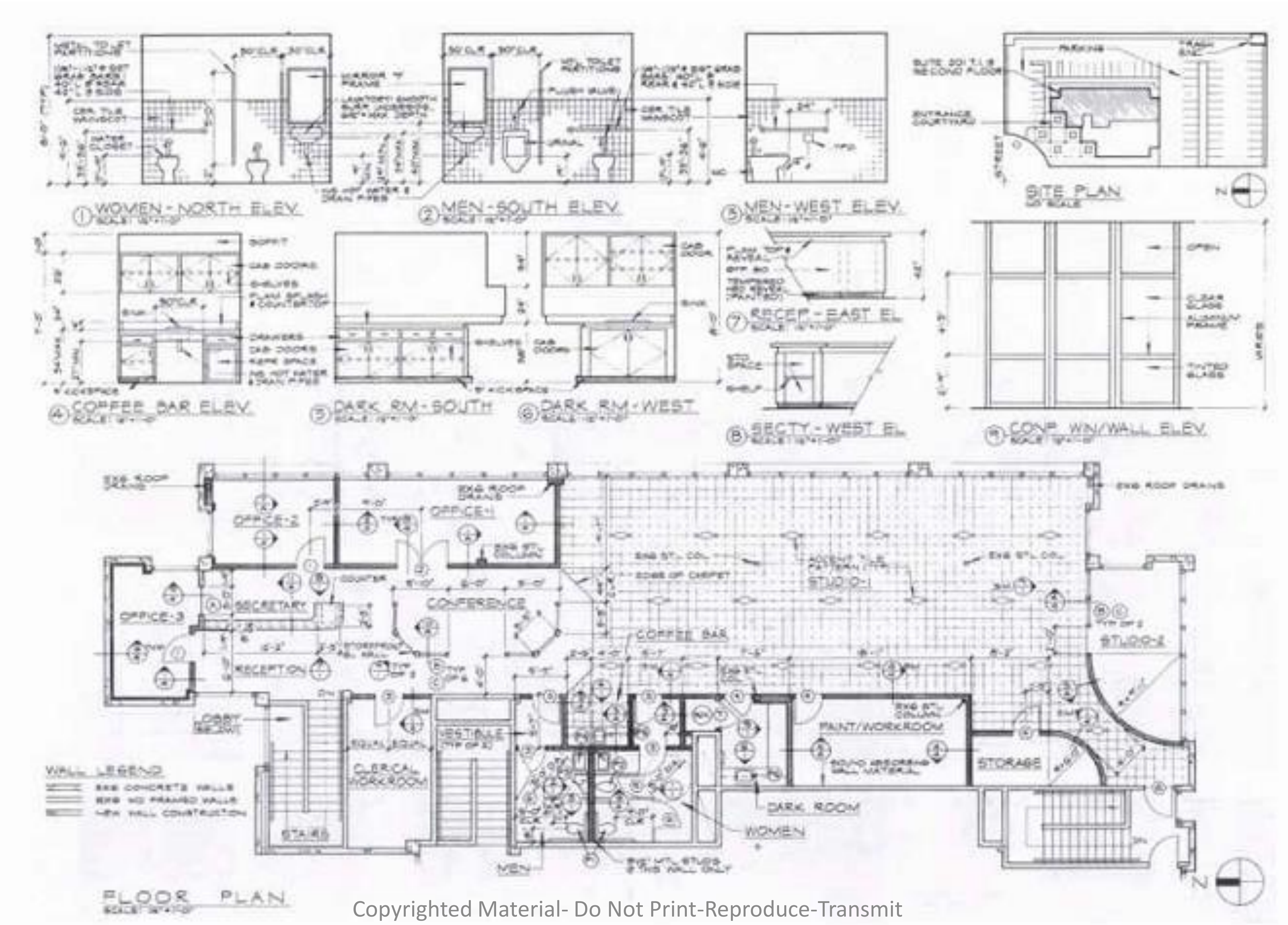


Figure 18.9 Undeveloped floor area plan – Building B

Chapter 18 TENANT IMPROVEMENT, p.646



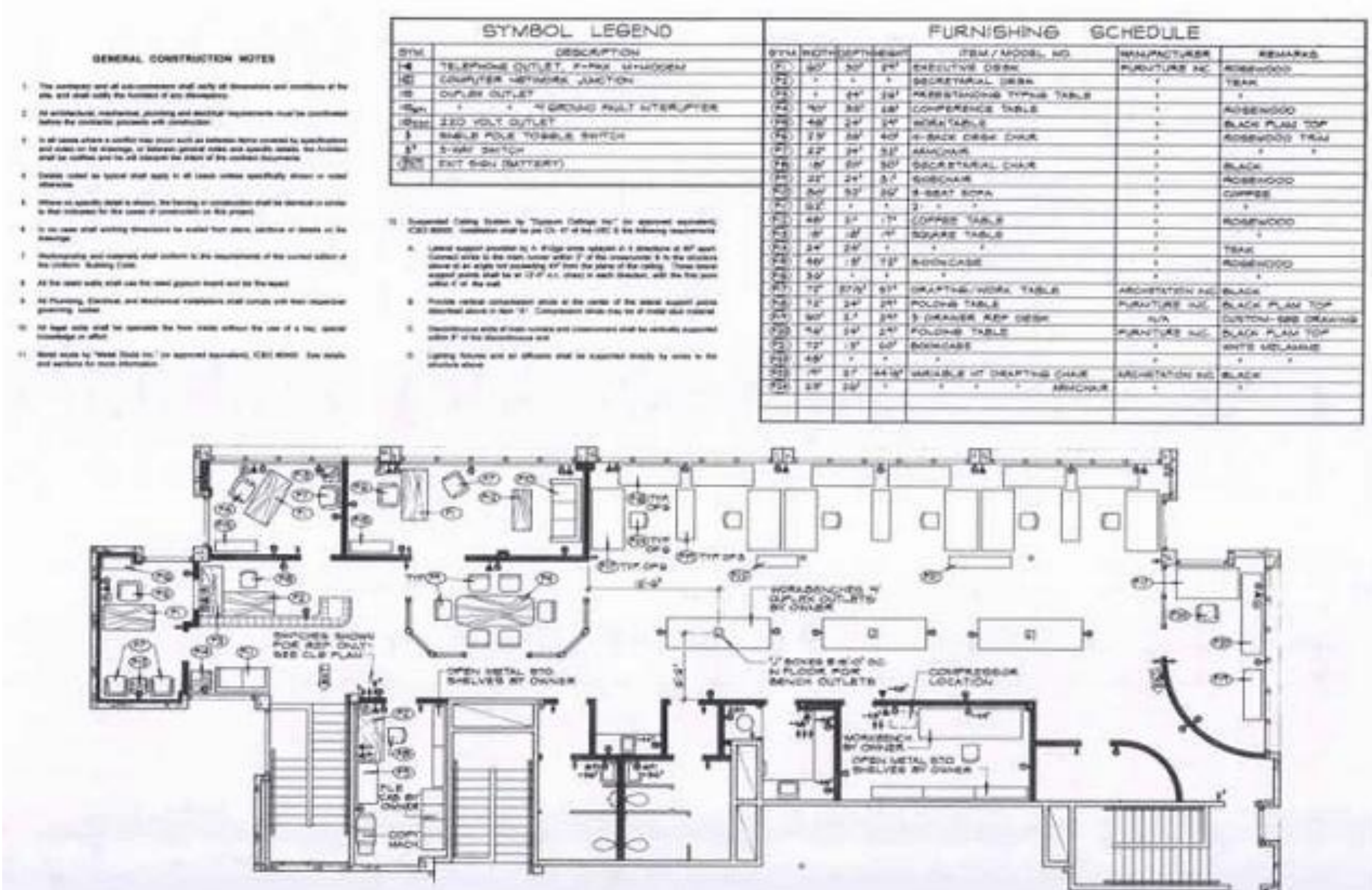


Figure 18.35 Electrical plan – Furnishing layout

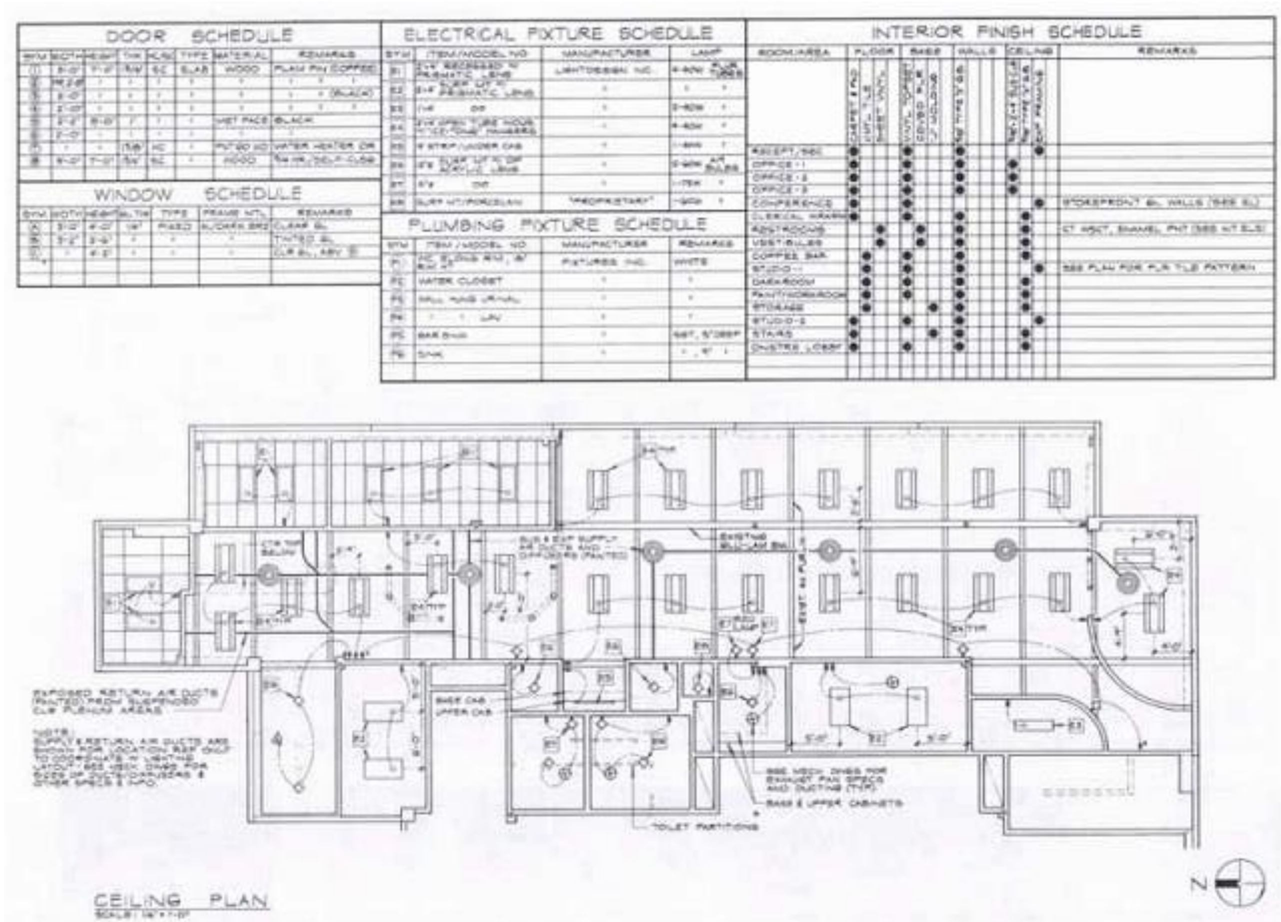
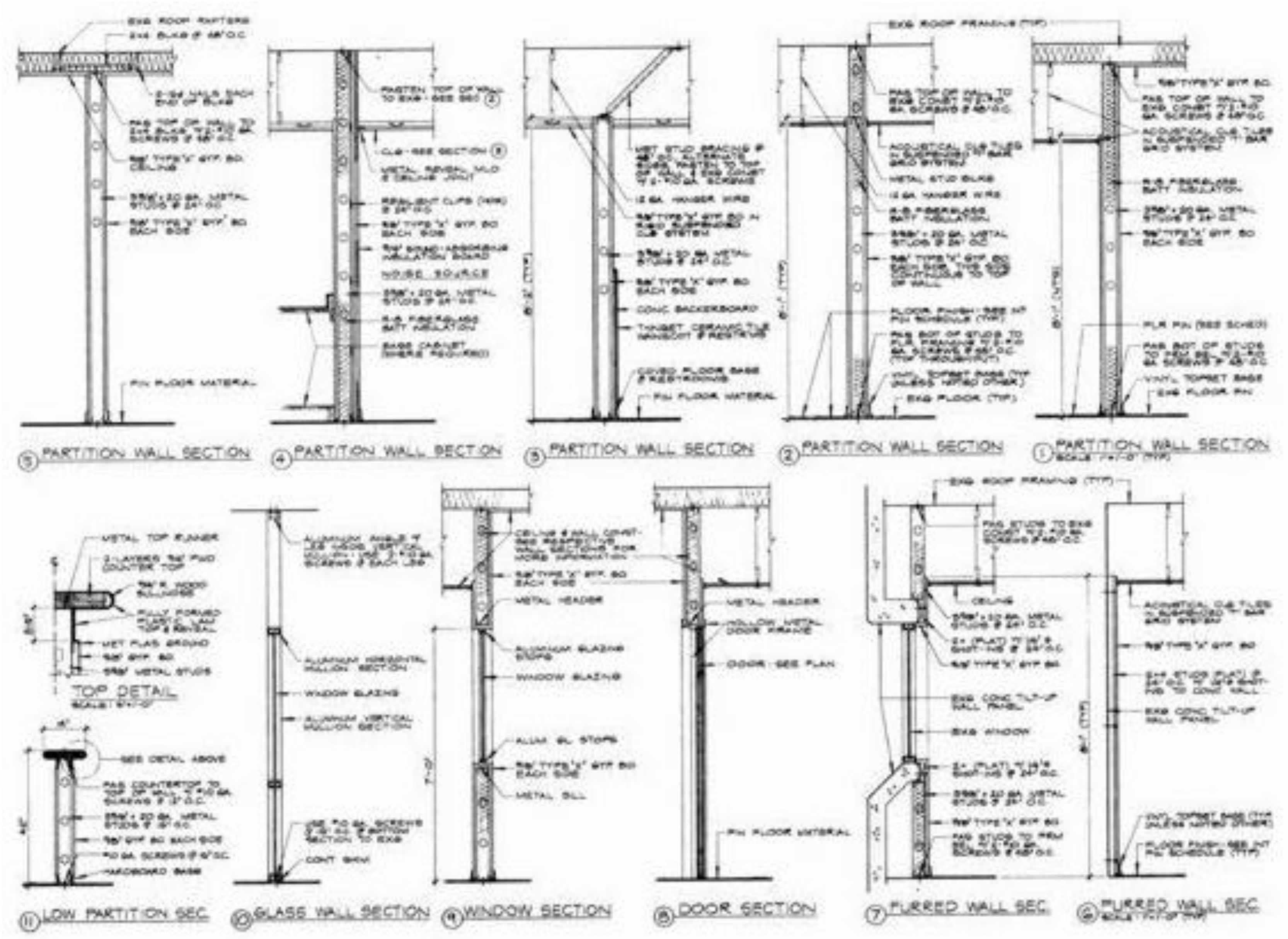


Figure 18.38 Ceiling Plan



p. 455 Figure 13.84 Completed partitions wall sections

Figure 13.85 Glazed corridor wall (non-load-bearing).

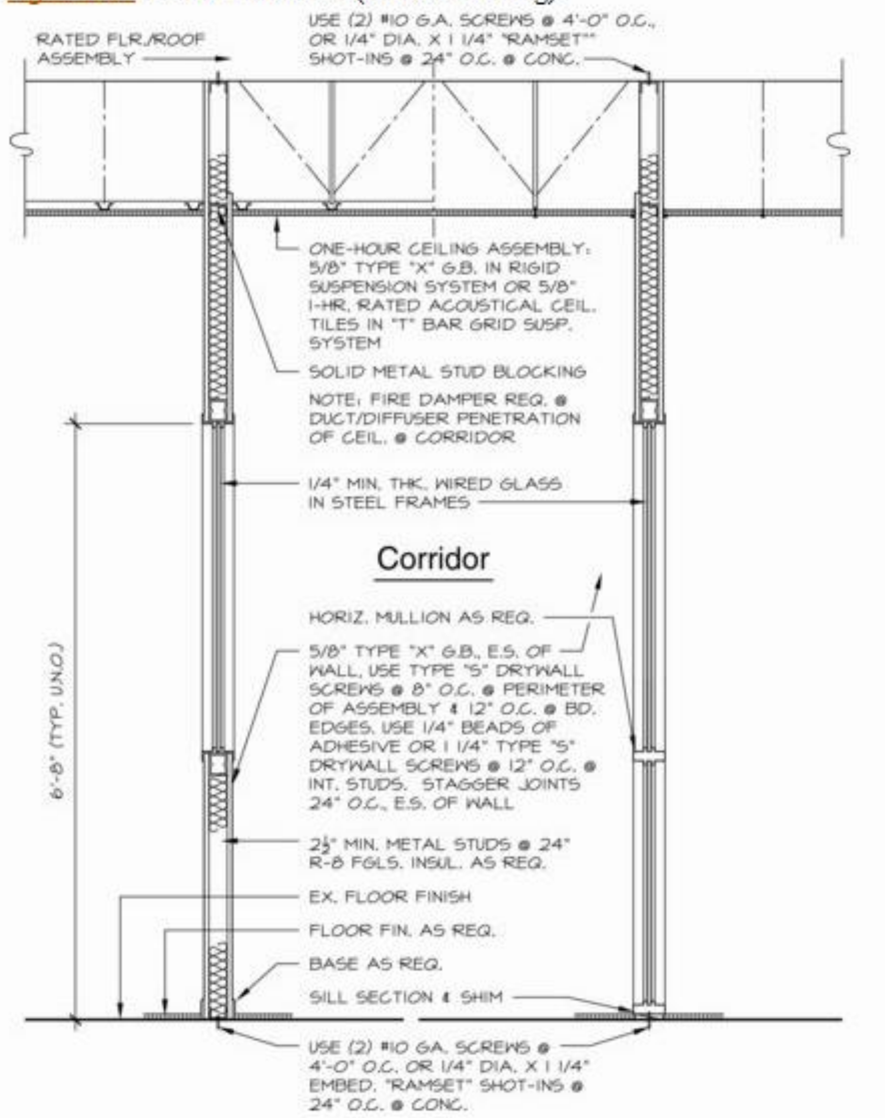
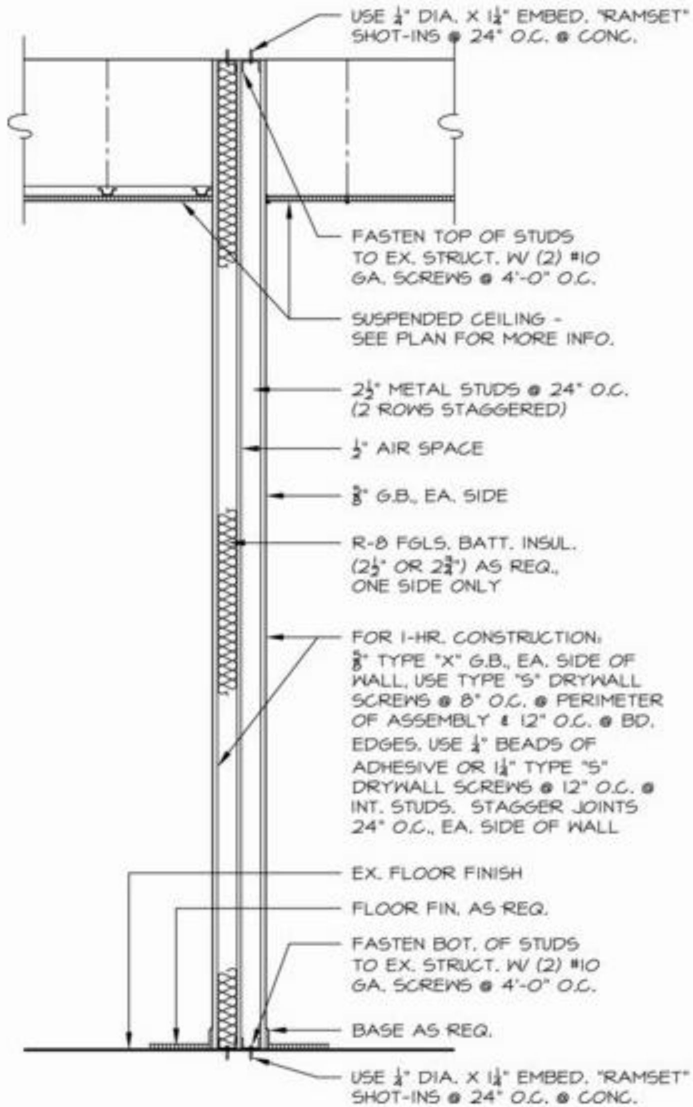


Figure 13.86 Fire and sound wall (non-load-bearing).



[Figure 13.87](#) Interior door and fixed panel.

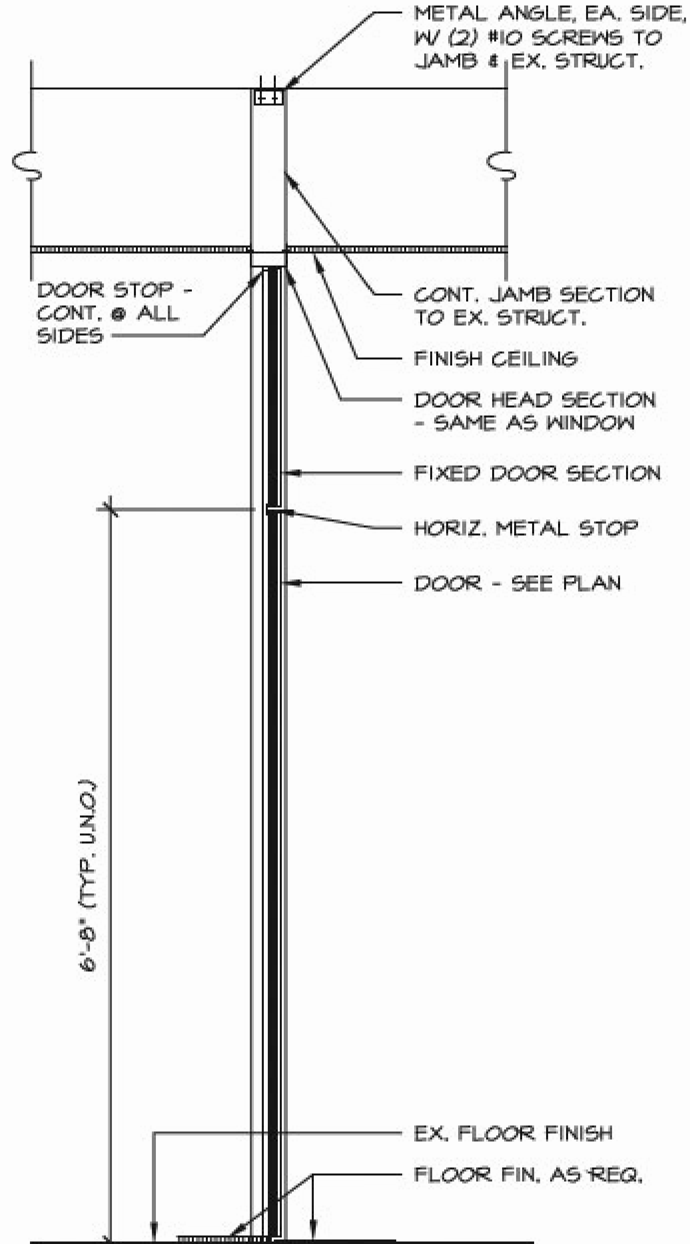


Figure 13.88 Restroom partition (non-load-bearing).

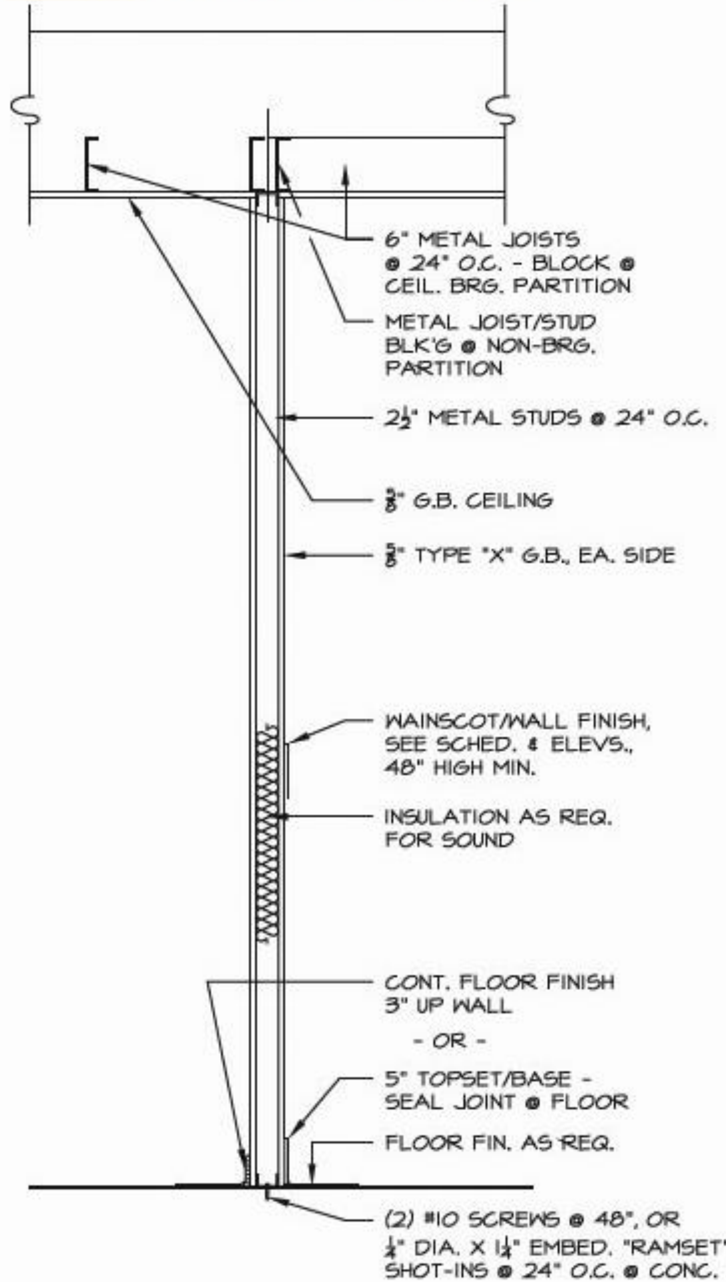
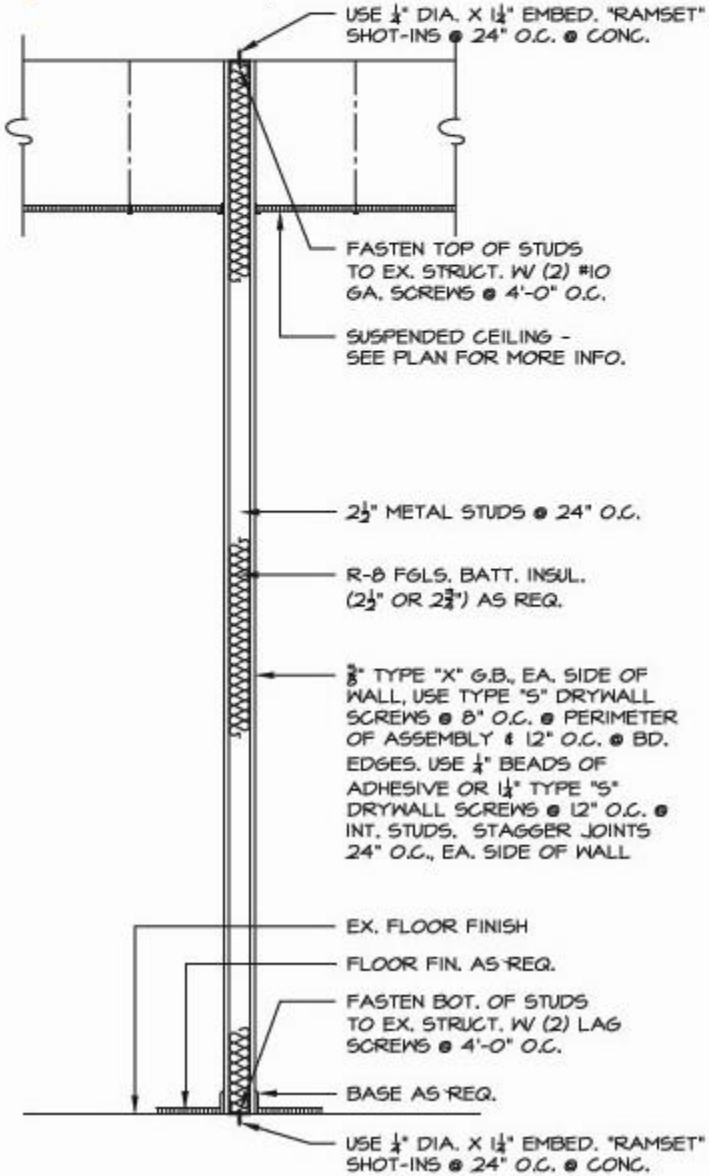
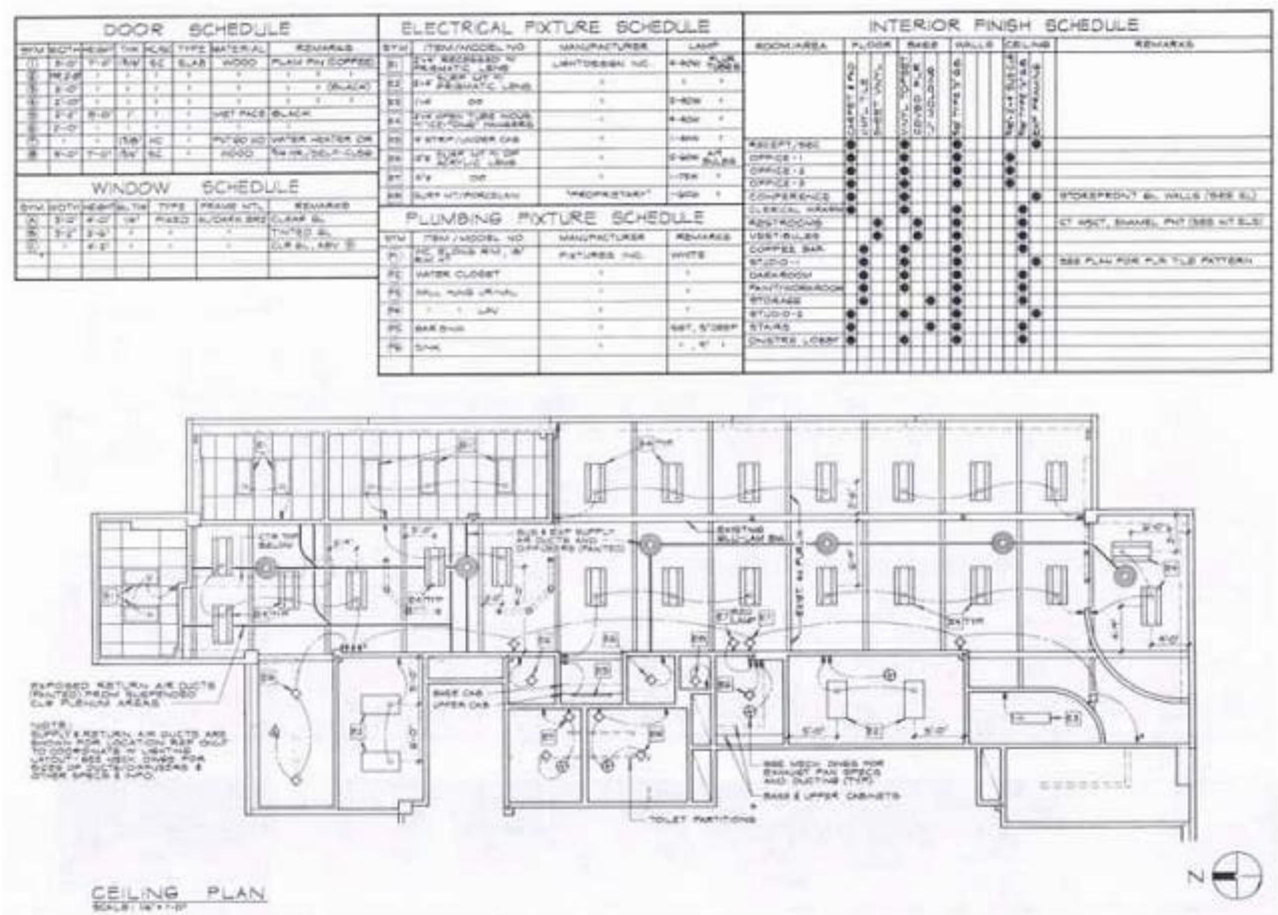


Figure 13.89 One-hour separation wall (non-load-bearing).

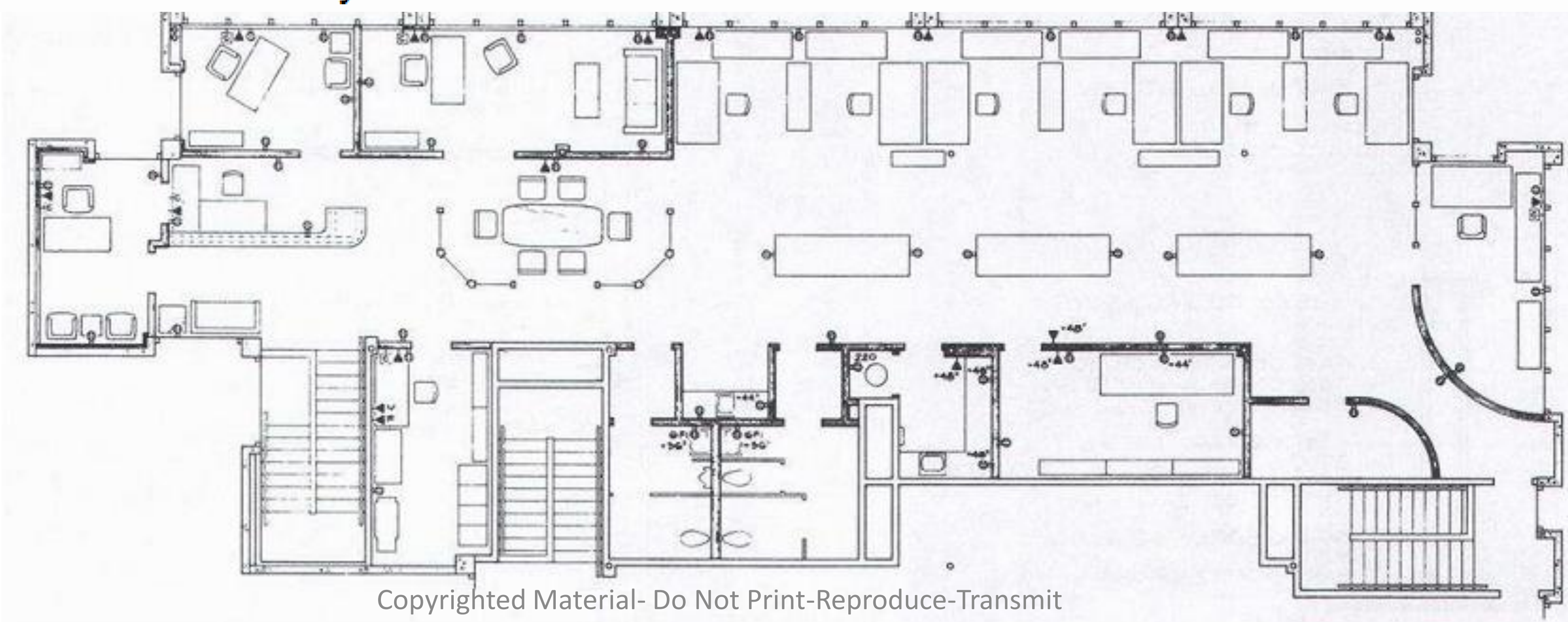




suspended ceiling - a ceiling suspended from a overhead floor or roof structure to provide space for pipes ductwork, lighting fixtures, or other service equipment.
acoustical ceiling – a ceiling of acoustical tile or other sound absorbing material.
acoustic tile – tile made in various sizes and textures from a soft, sound absorbing material, as cork, mineral fiber, or glass fiber.

Electrical and Communication Plan p.702

After the locations of partition walls, doors, windows, and furniture have been established, the architect or space planner, consulting with the tenant, may now proceed to develop an electrical and communication plan. The electrical portion of this plan will consist of the location of convenient electrical outlets installed approximately 12 inches above the floor, unless noted otherwise by a dimension at the outlet. The communication installation will comprise telephone jacks, a connection for the facsimile (fax) equipment, and a rough-in electrical service for the tenant's computer hardware. An electrical and communication plan prepared for this tenant of Building B is illustrated in Figure 21.26. It should be noted that on some projects the electrical and communication design may be so complex that separate plans must be provided and delineated for clarity.



Ceiling Plan p.702

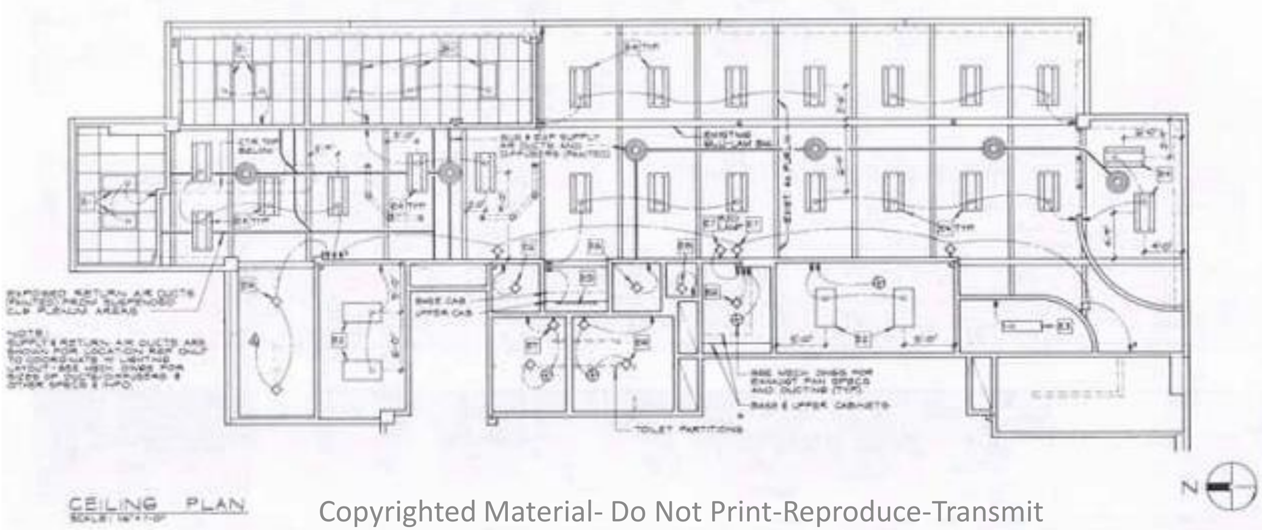
A ceiling plan will be drawn to delineate the following: location of ceiling lighting fixtures, symbolized for reference to the lighting fixture schedule; suspended ceiling design; the type of system to be specified; and other types of ceiling finishes. Switch locations for the various lighting fixtures will also be shown on this plan.

For this project, it was decided that a suspended ceiling system with recessed lighting fixtures would be specified for offices 1, 2, and 3. As mentioned earlier and detailed in Figure 21.13, the walls will be installed first, thus providing the designer with greater design flexibility for the layout of the suspended ceiling grid system and the location of lighting fixtures. To illustrate the design flexibility of this wall installation method, the ceiling plan shown in Figure 21.27 shows the suspended ceiling and lighting fixtures to be symmetrical within the offices, thereby creating a more pleasing ceiling design and lighting fixture location. Mechanical ducts for heating and cooling these offices will be installed and concealed above the suspended ceiling system. Note that the walls are drawn with two lines only, inasmuch as there are no wall openings at the ceiling level.

At the request of the tenant, the remaining rooms and task areas will not have a suspended ceiling system; rather, gypsum wallboard will be attached directly to the existing structural roof members, with the gypsum board being finished and painted. For wall reference, see Figure 21.19.

The selection of the ceiling finish and location was to allow the mechanical ducts to be exposed and painted. These round mechanical ducts, exposed and painted, will provide a decor compatible with the artwork and graphic design produced by this tenant. A photograph of the exposed mechanical ducts and lighting fixtures is shown in Figure 21.28. On the ceiling plan, as depicted in Figure 21.27, the designer has shown the desired location of the mechanical ducts and supply registers. The consulting mechanical engineer will specify the sizes of the ducts, type of supply registers, and type of equipment to be used, in the mechanical drawings.

As previously mentioned, the lighting fixtures will be given a reference symbol that will also be on the electrical fixture schedule. The schedule will provide a description of the fixtures, including the manufacturer and model numbers. Designation of the finished ceiling material may be shown on the ceiling plan for convenience; in any case, these finishes will be designated on the interior finish schedule. Electrical and interior finish schedules, as well as other schedules, are discussed and illustrated later in the chapter.



MEP

MEP MECHANICAL ELECTRICAL AND PLUMBING AND FIRE PROTECTION

MECHANICAL & ELECTRICAL SYSTEMS

This chapter discusses the mechanical and electrical systems that are required to maintain the necessary conditions of environmental comfort, health, and safety for the occupants of a building. The intent is not to provide a complete design manual but to outline those factors that should be considered for the successful operation of these systems and their integration with other building systems.

Heating, ventilating, and air-conditioning systems condition the interior spaces of a building for the environmental comfort of the occupants. A potable water supply is essential for human consumption and sanitation. The efficient disposal of fluid waste and organic matter is necessary in order to maintain sanitary conditions within a building and in the surrounding area. Electrical systems furnish light and heat for a building's occupants, and power to run its machines.

These systems require a significant amount of space. Because much of the hardware for these systems is normally hidden from view—within concealed construction spaces or special rooms—the layout of these systems should be carefully integrated with each other as well as with the structural and enclosure systems of the building.

Francis D.K. Ching Building Construction Illustrated 4th. Ed. Wiley

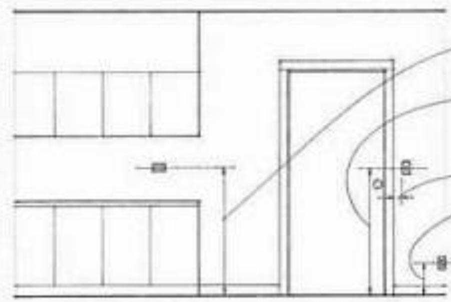
ELECTRIC POWER

The electrical system of a building supplies power for lighting, heating, and the operation of electrical equipment and appliances. This system must be installed according to the building and electrical codes in order to operate safely, reliably, and effectively. All electrical equipment should meet Underwriters' Laboratories (UL) standards. Consult the National Electrical Code for specific requirements in the design and installation of any electrical system.

Electrical energy flows through a conductor because of a difference in electrical charge between two points in a circuit.

- Volt (V) is the SI unit of electromotive force, defined as the difference of electric potential between two points of a conductor carrying a constant current of one ampere, when the power dissipated between the points is equal to one watt.
- Ampere (A) is the basic SI unit of electric current, equivalent to a flow of one coulomb per second or to the steady current produced by one volt applied across a resistance of one ohm.
- Watt (W) is the SI unit of power, equal to one joule per second or to the power represented by a current of one ampere flowing across a potential difference of one volt.
- Ohm is the SI unit of electrical resistance, equal to the resistance of a conductor in which a potential difference of one volt produces a current of one ampere. Symbol: Ω

Power is usually supplied to a building by the electric utility company. The schematic diagram below illustrates several voltage systems that may be furnished by the public utility according to the load requirements of a building. A large installation may use its own transformer to step down from a more economical, higher supply voltage to the service voltage. Generator sets may be required to supply emergency electrical power for exit lighting, alarm systems, elevators, telephone systems, fire pumps, and medical equipment in hospitals.



- Outlet above counter: 4'-0" (1220); 3'-6" (1220) for accessibility
- Switch on latch side of door: 4'-0" (1220) maximum for accessibility
- 2-½" (64) minimum
- Outlet above floor: 12" (305); 18" (455) for accessibility

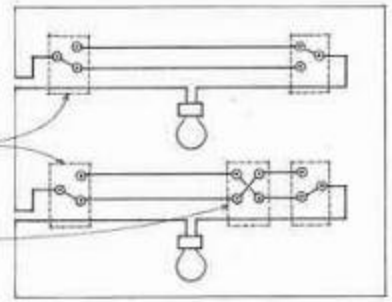
Heights of Switches and Outlets

Residences
- One outlet every 12' (3660) along walls in a living space
- One outlet every 4' (1220) along countertops in kitchens
- One GFI protected outlet in bathrooms

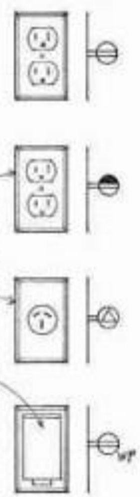
Offices
- One outlet every 10' (3050) along walls, or
- One outlet every 40 sf ($3.7\ m^2$) of floor area for the first 400 sf ($37\ m^2$) and one outlet for every 100 sf ($9.3\ m^2$) thereafter

Number of Convenience Outlets

Switches
- Toggle switch has a lever or knob that moves through a small arc and causes the contacts to open or close an electric circuit.
- Three-way switch is a single-pole, double-throw switch used in conjunction with another to control lights from two locations.
- Four-way switch is used in conjunction with two three-way switches to control lights from three locations.
- Dimmer is a rheostat or similar device for regulating the intensity of an electric light without appreciably affecting spatial distribution.



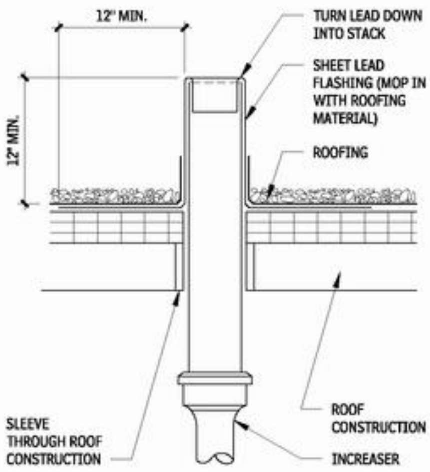
Receptacles
- Duplex receptacles, also called convenience outlets, are usually mounted on a wall and house one or more receptacles for portable lamps or appliances.
- Split-wired receptacles contain one outlet that is always energized and a second outlet that is controlled by a wall switch.
- Special receptacles designed to serve a specific type of appliance will be polarized and have a specific configuration so that only attachments from that appliance will fit the receptacle.
- Outdoor receptacles should have a water-resistant cover.
- In all wet locations, receptacles should be protected by a ground fault interrupter (GFI).



Typical Electrical Plan Symbols

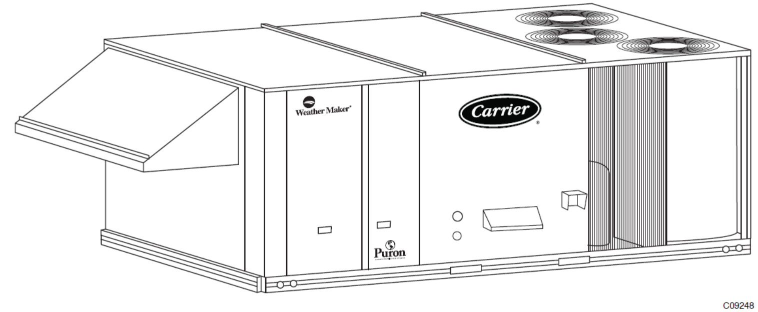
HEATING & COOLING SYSTEMS

The siting, orientation, and construction assemblies of a building should minimize heat loss to the outside in cold weather and minimize heat gain in hot weather. Any excessive heat loss or heat gain must be balanced by passive energy systems or by mechanical heating and cooling systems in order to maintain conditions of thermal comfort for the occupants of a building. While heating and cooling to control the air temperature of a space is perhaps the most basic and necessary function of a mechanical system, attention should be paid to the other three factors that affect human comfort—relative humidity, mean radiant temperature, and air motion.

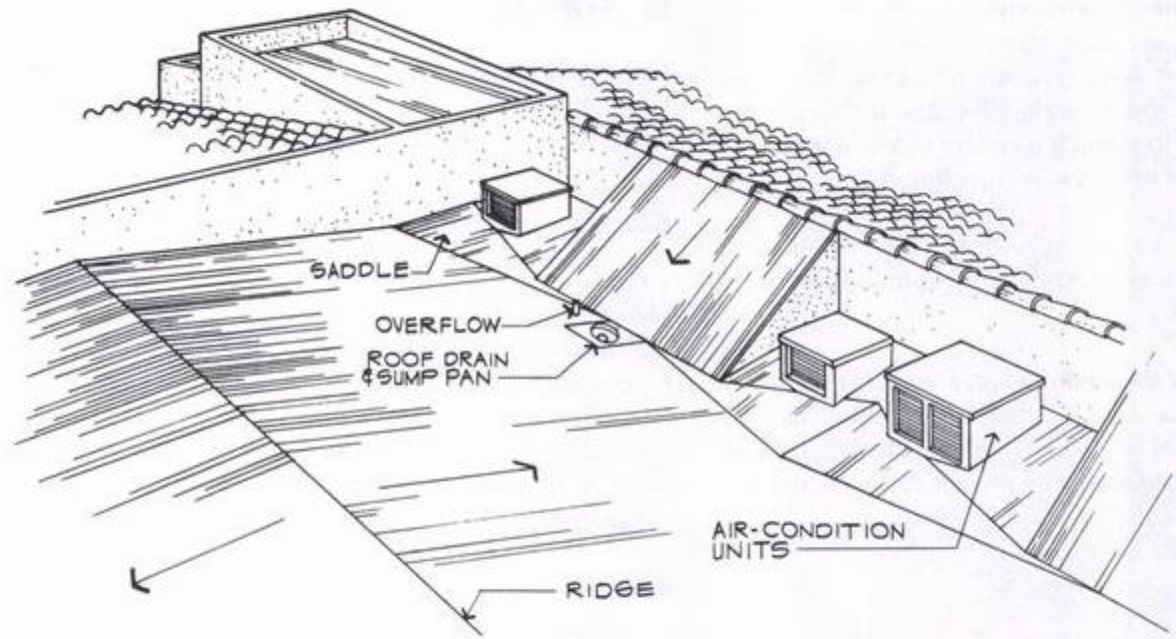


ROOF VENT DETAIL 4.144

http://products.construction.com/swts_content_files/15415/256003.pdf



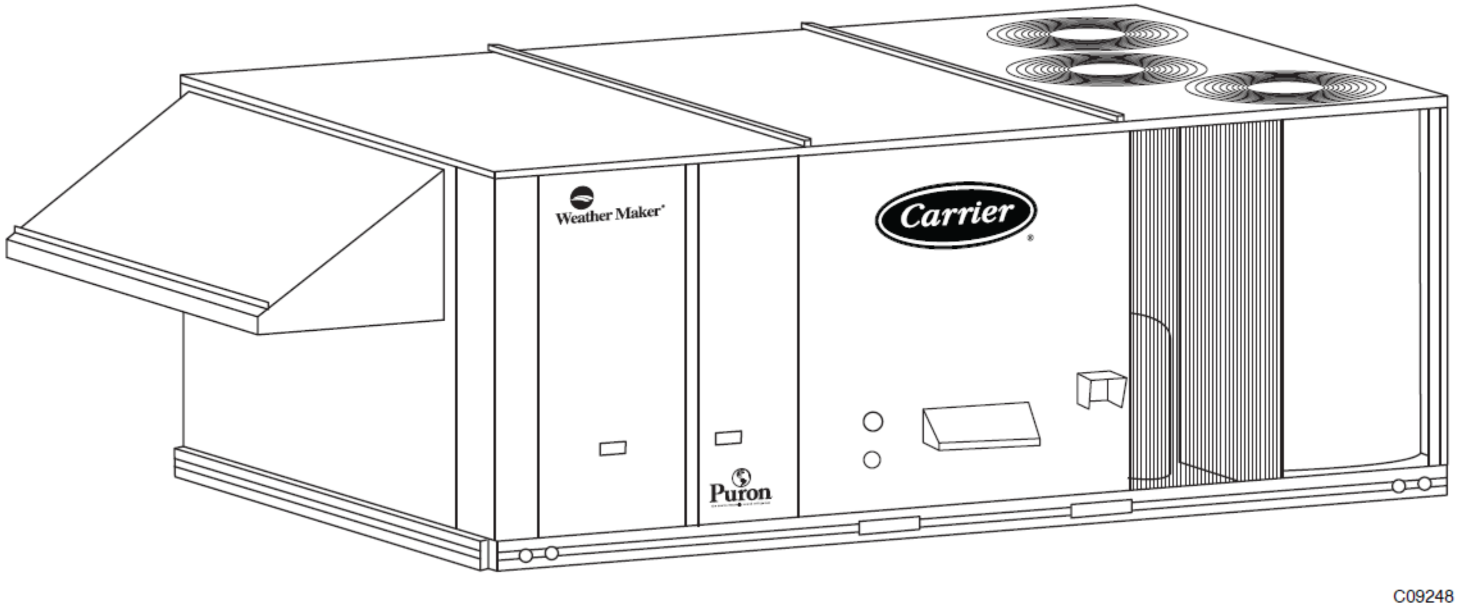
(Unit shown with optional economizer.)



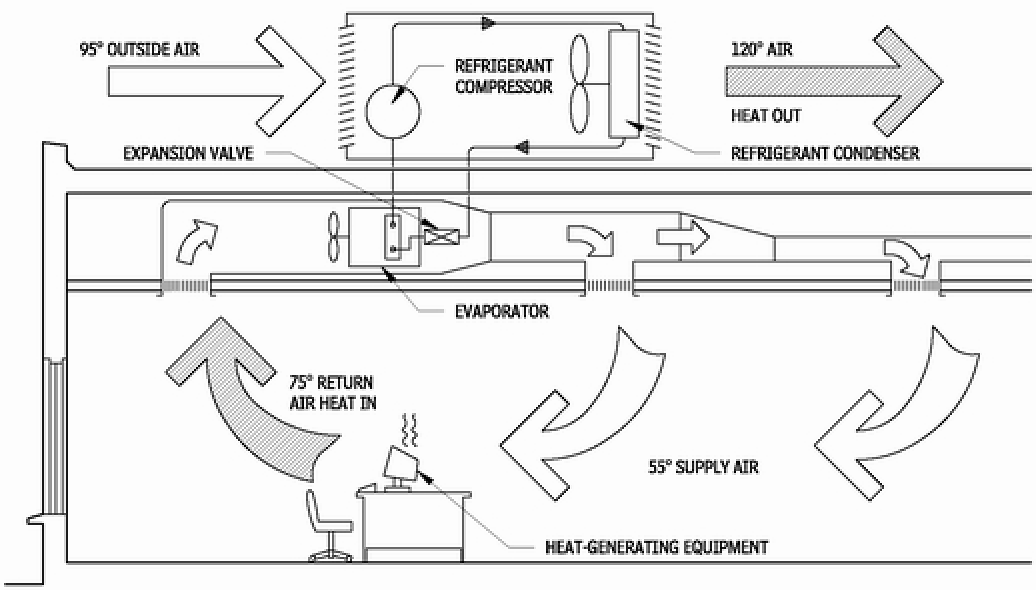
p. 638

Figure 19.57 Corner of central portion of roof.

http://www.docs.hvacpartners.com/idc/groups/public/documents/techlit/48tc-06pd.pdf

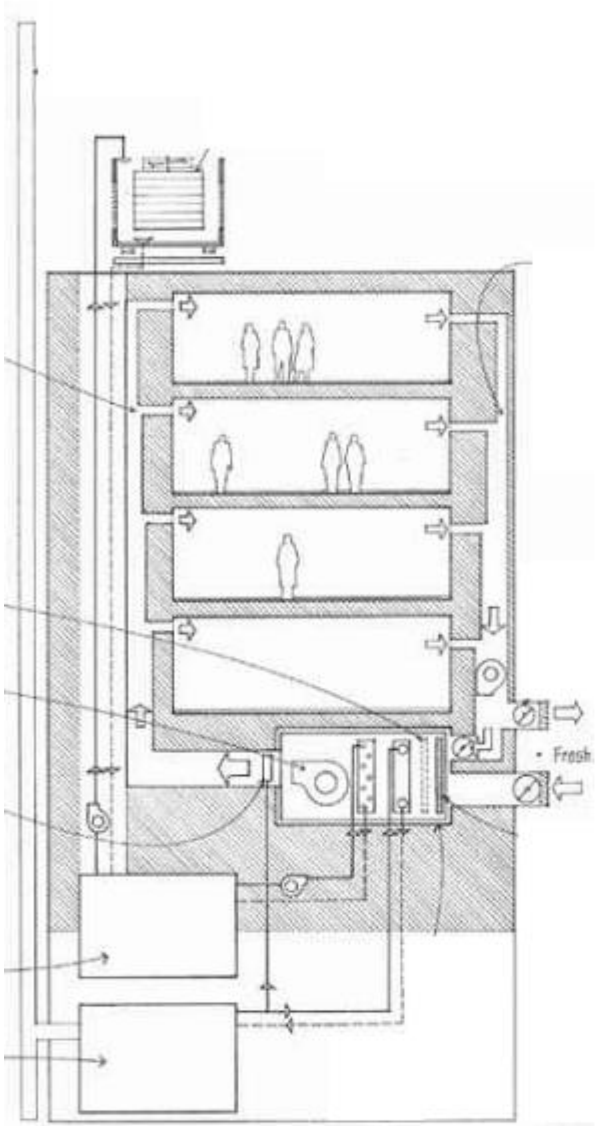


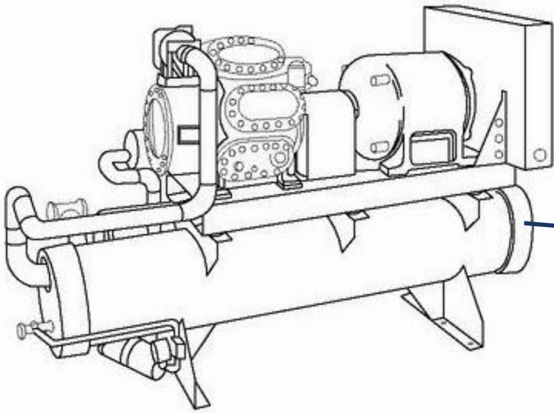
(Unit shown with optional economizer.)



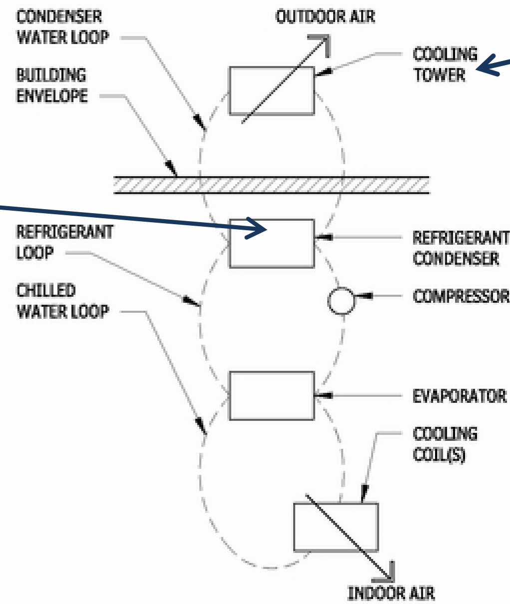
TYPICAL BUILDING APPLICATION 4.212

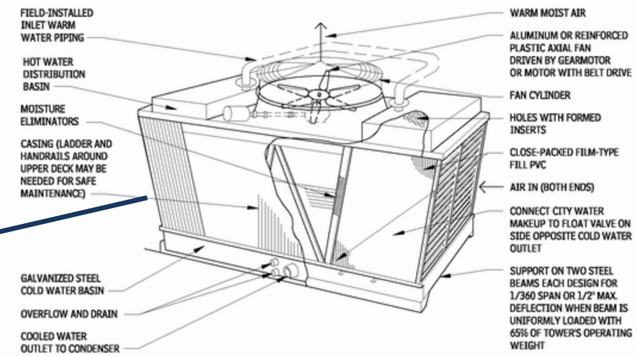
PACKAGED SYSTEM


Fresh

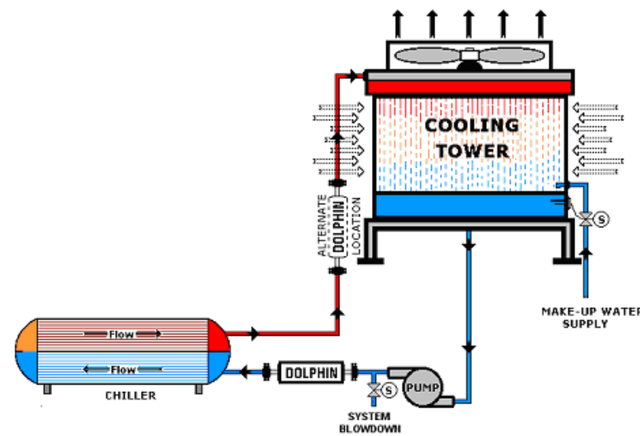


RECIPROCATING WATER CHILLER 4.218





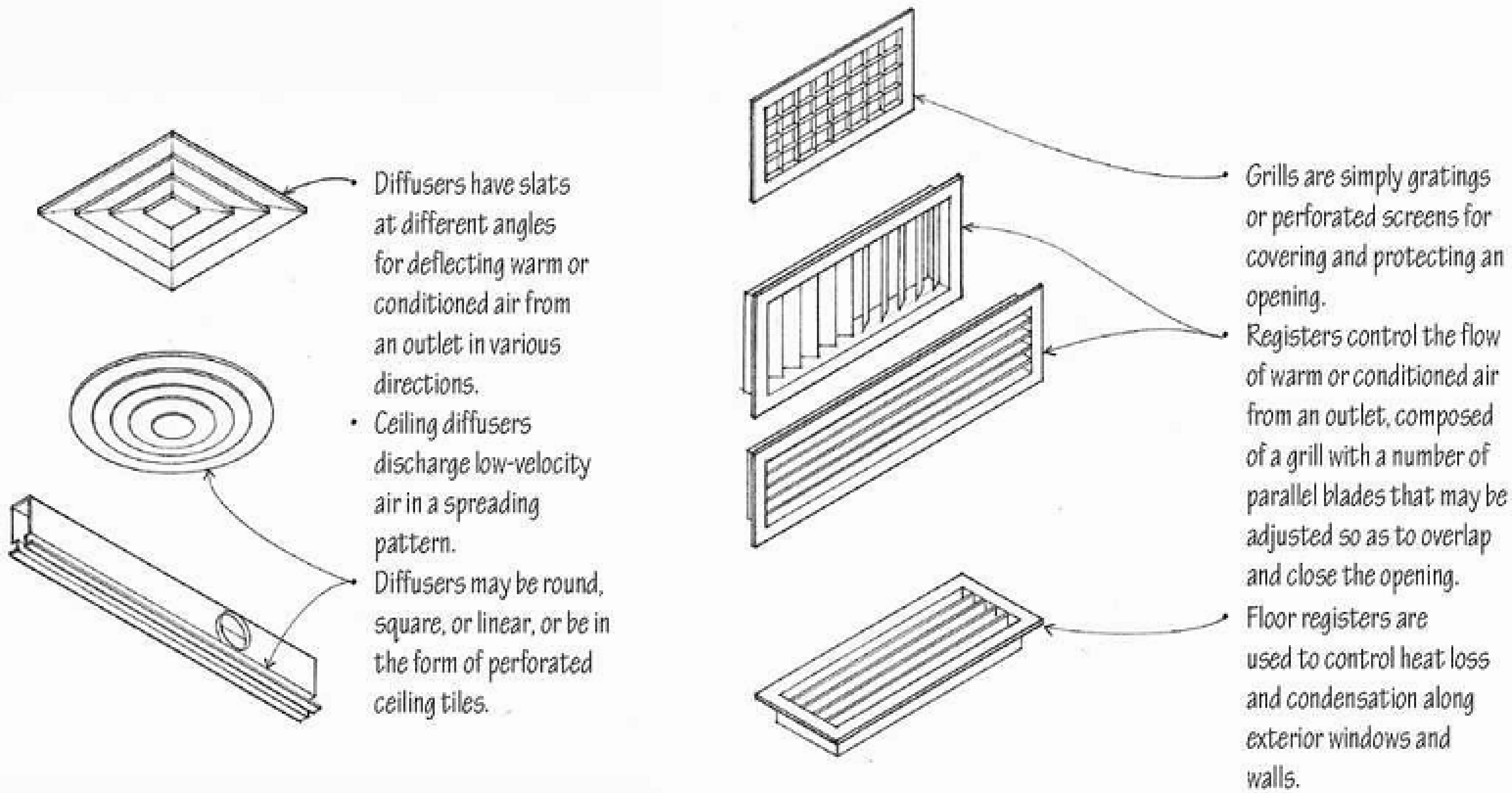
CROSSFLOW-INDUCED, DRAFT-PACKAGED COOLING TOWER—4.225



CENTRAL SYSTEM WITH CHILLER AND COOLING TOWER 4.175

Those central systems that use only air to distribute heating and cooling effects to the occupied spaces are called all-air systems, and require a ductwork distribution tree. An all-water system uses only water to supply and remove heat from the spaces; such a system requires a piping distribution network. Air-water systems deliver both air and water to the occupied spaces and require both ductwork and piping distribution networks.

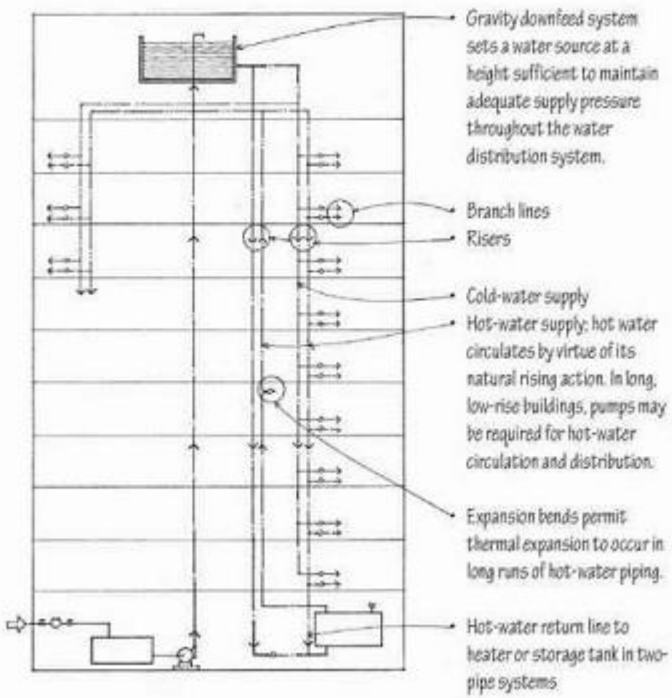
Central systems are secondarily classified by the location of the primary comfort control mechanism relative to the occupied spaces. In a number of systems, control resides at the air-handling unit, which makes changes in zoning and distribution layout difficult or impossible. Other systems use control mechanisms located adjacent to occupied spaces, which provide greater flexibility for change but require distribution of more equipment throughout the building, often in tight or hard-to-reach places.



Air supply outlets should be located to distribute warm or cool air to the occupied areas of a space comfortably, without noticeable drafts, and without stratification. The throw distance and spread or diffusion pattern of the supply outlet should be carefully considered along with any obstructions that might interfere with the air distribution.

WATER SUPPLY SYSTEMS

Water supply systems operate under pressure. The service pressure of a water supply system must be great enough to absorb pressure losses due to vertical travel and friction as the water flows through pipes and fittings, and still satisfy the pressure requirement of each plumbing fixture. Public water systems usually supply water at about 50 psi (345 kPa).



SANITARY DRAINAGE SYSTEMS

The water supply system terminates at each plumbing fixture. After water has been drawn and used, it enters the sanitary drainage system. The primary objective of this drainage system is to dispose of fluid waste and organic matter as quickly as possible.

Since a sanitary drainage system relies on gravity for its discharge, its pipes are much larger than the water supply lines, which are under pressure. Drainage lines are sized according to their location in the system and the total number and types of fixtures served. Always consult the plumbing code for allowable pipe materials, pipe sizing, and restrictions on the length and slope of horizontal runs and on the types and number of turns allowed.

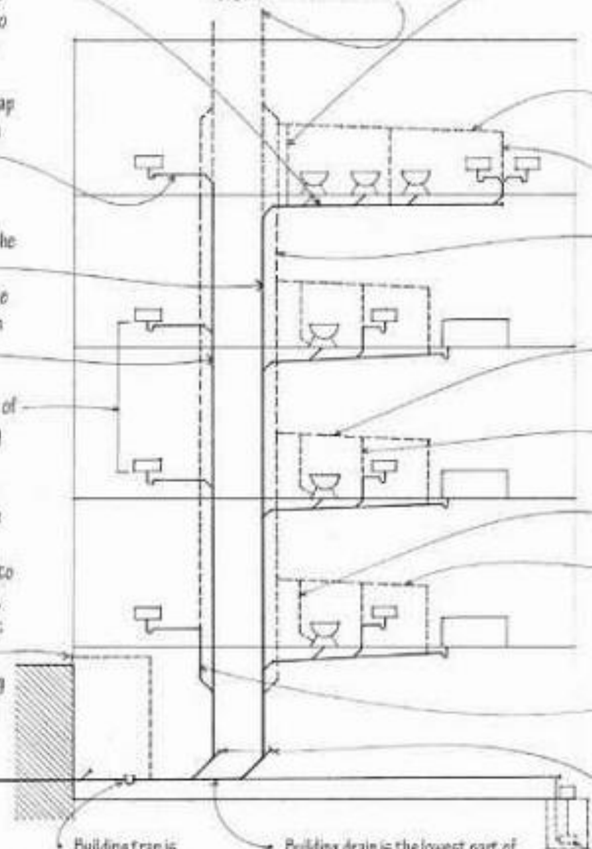
Drainage lines may be of cast iron or plastic. Cast iron, the traditional material for drainage piping, may have hubless or bell-and-spigot joints and fittings. The two types of plastic pipe that are suitable for drainage lines are polyvinyl chloride (PVC) and acrylonitrile-butadiene-styrene (ABS). Some building codes also permit the use of galvanized wrought iron or steel.

Vents

The vent system permits septic gases to escape to the outside and supplies a flow of fresh air into the drainage system to protect trap seals from siphonage and back pressure.

- Stack vent is an extension of a soil or waste stack above the highest horizontal drain connected to the stack; extend 12" (305) above roof surface and keep away from vertical surfaces, operable skylights, and roof windows.

- Branch drain connects one or more fixtures to a soil or waste stack.
- Horizontal drain lines should slope 1/8" per foot (1:100) for pipes up to 3" (75) ø, and 1/4" per foot (1:50) for pipes larger than 3" (75) ø.
- Fixture drain extends from the trap of a plumbing fixture to a junction with a waste or soil stack.
- Soil stack carries the discharge from water closets or urinals to the building drain or building sewer.
- Waste stack carries the discharge from plumbing fixtures other than water closets or urinals.
- Minimize bends in all stacks.
- Branch interval refers to a length of soil or waste stack corresponding to a story height but never less than 8' (2440), within which the horizontal branch drains from one floor are connected.
- Fresh-air inlet admits fresh air into the drainage system of a building, connected to the building drain at or before the building trap.
- Building sewer connects a building drain to a public sewer or private treatment facility.



- Relief vent provides circulation of air between a drainage and a venting system by connecting a vent stack to a horizontal drain between the first fixture and the soil or waste stack.
- Loop vent is a circuit vent that loops back and connects with a stack vent instead of a vent stack.
- Common vent serves two fixture drains connected at the same level.
- Vent stack is a vertical vent installed primarily to provide circulation of air to or from any part of a drainage system.
- Branch vent connects one or more individual vents with a vent stack or stack vent.
- Continuous vent is formed by a continuation of the drain line to which it connects.
- Back vent is installed on the sewer side of a trap.
- Circuit vent serves two or more traps and extends from in front of the last fixture connection of a horizontal branch to the vent stack.
- Wet vent is an oversized pipe functioning both as a soil or waste pipe and a vent.
- Cleanouts

- Sanitary sewers convey only the sewage from plumbing fixtures and exclude storm water; storm sewers convey rainfall drained from roofs and paved surfaces; combined sewers carry both sewage and storm water.
- Building trap is installed in the building drain to prevent the passage of sewer gases from the building sewer to the drainage system of a building. Not all plumbing codes require a building trap.
- Building drain is the lowest part of a drainage system that receives the discharge from soil and waste stacks inside the walls of a building and conveys it by gravity to the building sewer.
- Building storm drain conveys only rainwater or similar discharge to a building storm sewer, which in turn leads to a public storm sewer, combined sewer, or other point of disposal.
- Sump pump removes the accumulations of liquid from a sump pit. It is required for fixtures located below the street sewer.

FIRE PROTECTION SYSTEMS

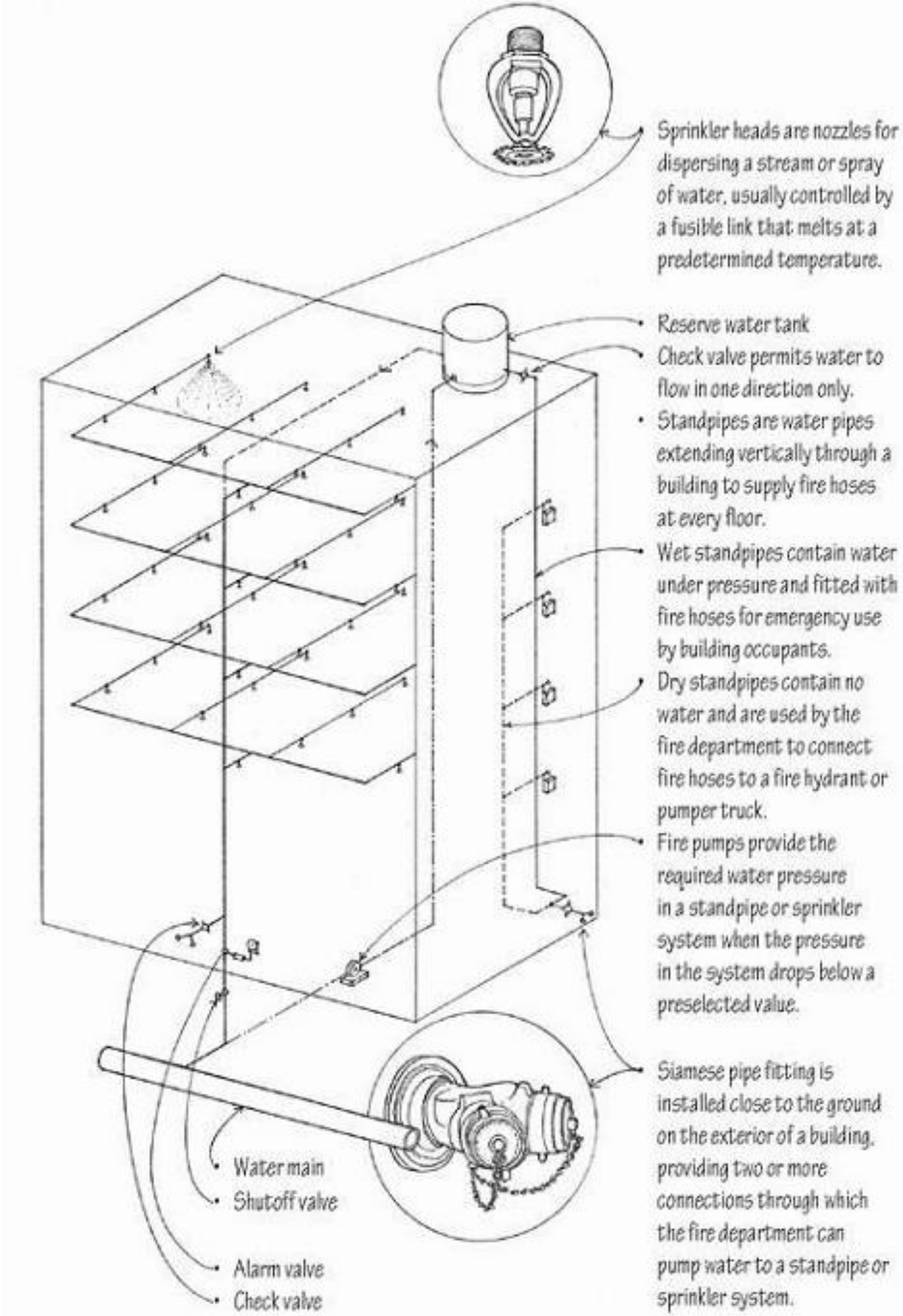
Fire-alarm systems are installed in a building to automatically sound an alarm when actuated by a fire-detection system. The fire-detection system may consist of heat sensors such as thermostats, or smoke detectors that are actuated by products of combustion. Most jurisdictions require the installation and hard-wiring of smoke detectors in residential occupancies and hotel/motel units. Refer to the National Fire Protection Association's (NFPA's) Life Safety Code for recommendations concerning the type and placement of heat and smoke detectors.

In large commercial and institutional buildings where public safety is an issue, building codes often require a fire sprinkler system; some codes allow an increase in floor area if an approved sprinkler system is installed. Some jurisdictions require the installation of fire sprinkler systems in multifamily housing as well.

located in or below ceilings, connected to a suitable water supply, and supplied with valves or sprinkler heads made to open automatically at a certain temperature. The two major types of sprinkler systems are wet-pipe systems and dry-pipe systems.

- Wet-pipe systems contain water at sufficient pressure to provide an immediate, continuous discharge through sprinkler heads that open automatically in the event of a fire.
- Dry-pipe systems contain pressurized air that is released when a sprinkler head opens in the event of fire, allowing water to flow through the piping and out the opened nozzle. Dry-pipe systems are used where the piping is subject to freezing.
- Preaction systems are dry-pipe sprinkler systems through which water flow is controlled by a valve operated by fire-detection devices more sensitive than those in the sprinkler heads. Preaction systems are used when an accidental discharge would damage valuable materials.
- Deluge systems have sprinkler heads open at all times, through which water flow is controlled by a valve operated by a heat-, smoke-, or flame-sensing device.

CSI MasterFormat 21 00 00 Fire Suppression

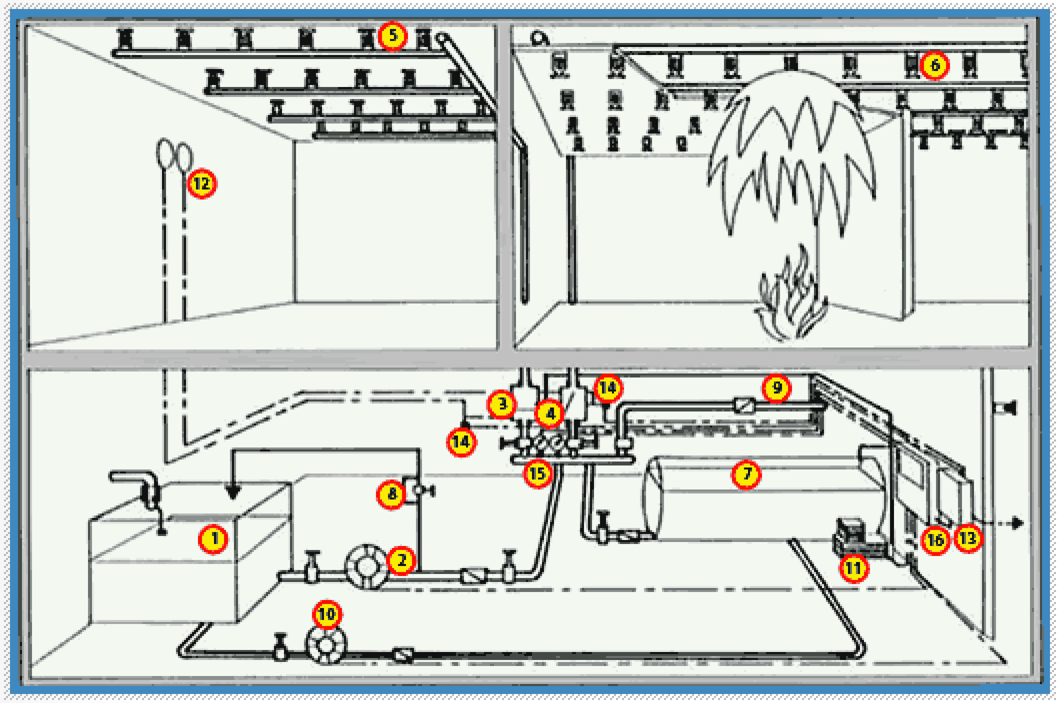

Sprinkler heads are nozzles for dispersing a stream or spray of water, usually controlled by a fusible link that melts at a predetermined temperature.
Reserve water tank
Check valve permits water to flow in one direction only.
Standpipes are water pipes extending vertically through a building to supply fire hoses at every floor.
Wet standpipes contain water under pressure and fitted with fire hoses for emergency use by building occupants.
Dry standpipes contain no water and are used by the fire department to connect fire hoses to a fire hydrant or pumper truck.
Fire pumps provide the required water pressure in a standpipe or sprinkler system when the pressure in the system drops below a preselected value.
Siamese pipe fitting is installed close to the ground on the exterior of a building, providing two or more connections through which the fire department can pump water to a standpipe or sprinkler system.
Water main
Shutoff valve
Alarm valve
Check valve

FIRE SUPRESSION SYSTEMS

caption:

1. main water tank
2. main water pump
3. main pilot valve (dry)
4. pilot valve (wet)
5. sprinkler head - standing configuration
6. sprinkler head - hanging configuration
7. pressure tank
8. testing piping
9. testing piping
10. filling piping
11. compressor
12. alarm bell
13. fire central
14. alarm bell
15. pressure gauge
16. switchboard

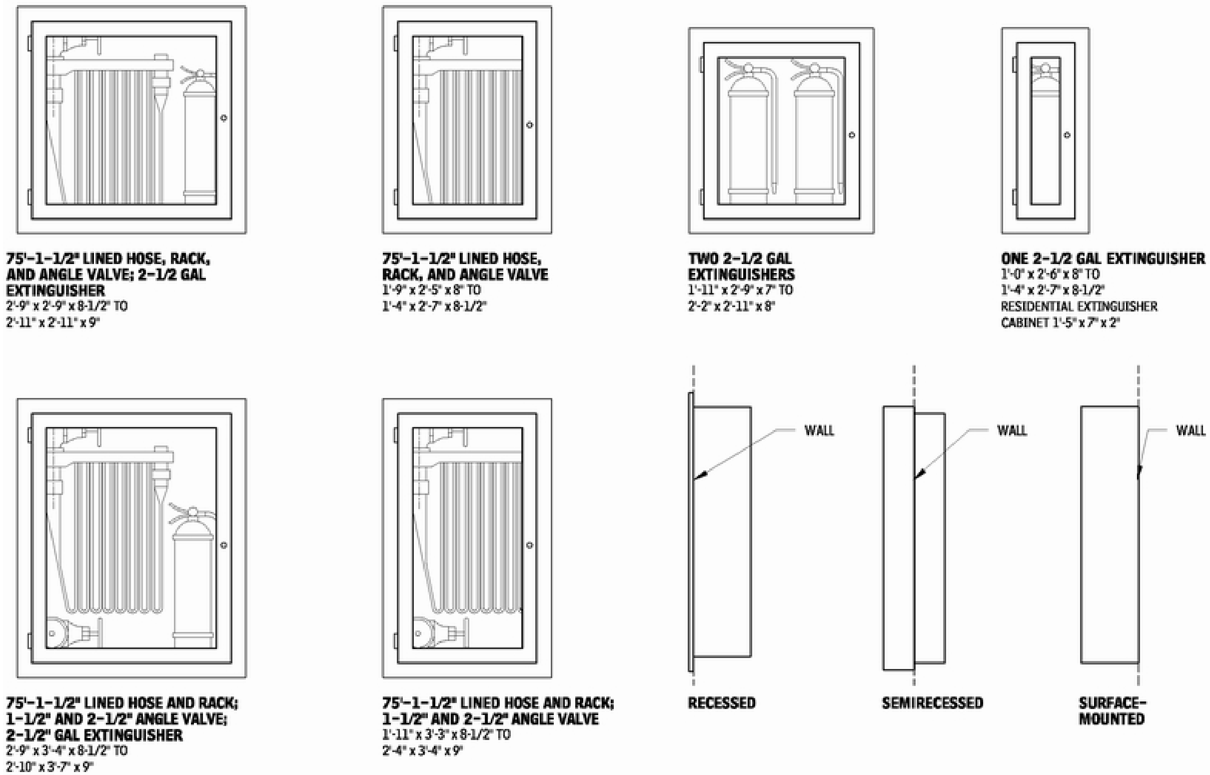
AUTOMATIC FIRE SPRINKLERS: Sprinkler system schema



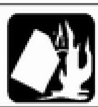
Basic data

- Fire sprinklers are widely recognized as the single most effective method for fighting the spread of fires in their early stages - before they can cause severe injury to people and damage to property.
- When one fire sprinkler head goes off to fight a fire the entire sprinkler system does not activate. Sprinklers react to temperatures in individual rooms.
- Installation of fire sprinklers can provide discounts on insurance premiums.

http:/
isher
IZQd
mM:
%26r
ct=rc
pdD4



FIRE HOSE AND EXTINGUISHER CABINETS 4.293

LETTER SYMBOL AND COLOR	PICTURE SYMBOL	DESCRIPTION
Green A		Class A: Fires involving ordinary combustible materials (such as wood, cloth, paper, rubber, and many plastics) that require the heat-absorbing (cooling) effects of water or water solutions, or the coating effects of certain dry chemicals that retard combustion.
Red B		Class B: Fires involving flammable or combustible liquids, flammable gasses, greases, and similar materials that are best extinguished by excluding air (oxygen), inhibiting the release of combustible vapors, or interrupting the combustion chain reaction.
Blue C		Class C: Fires involving energized electrical equipment where safety to the operator requires the use of electrically nonconductive extinguishing agents.
Yellow D		Fires involving combustible metals (such as magnesium, titanium, zirconium, sodium, lithium, and potassium).

FIRE CLASSIFICATIONS FOR SELECTING FIRE EXTINGUISHERS 4.298

END OF PRESENTATION