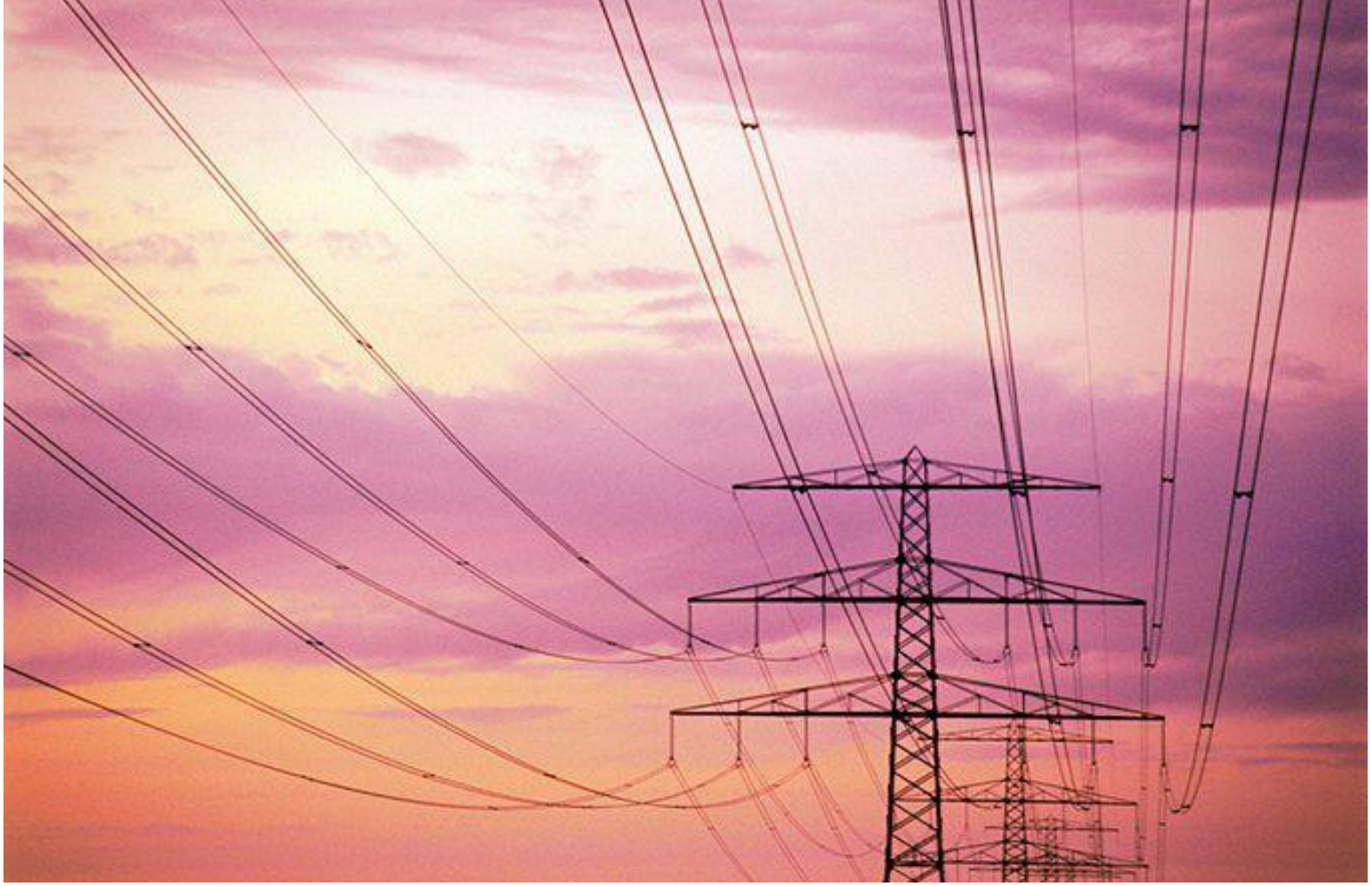

Lecture 7

Power and Communication

POWER AND COMMUNICATION

References

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Harmon, S. K. (2005). The codes guidebook for interiors (3rd ed.). New York: John Wiley and Sons.

Egan, M. D., (1988). Architectural acoustics. New York: McGraw-Hill.

Florida Building Code

POWER SYSTEM REQUIREMENTS

For lighting, convenience outlets, and fixed equipment

Electrical engineer or electrical contractor specifies the exact type of circuiting, wire sizes, and other technical aspects of the electrical systems

The interior designer is responsible for schematically showing the desired location of outlets and switches and where power is required for special built-in equipment

Most codes are found in the National Electric Code (NEC)

Other additional electrical standards

ANSI American National Standards Institute

UL Underwriters Laboratories. Test/Standards for Electrical Equipment

POWER SYSTEM REQUIREMENTS, CON'T

Distribution System

Controlled by Electrical Utility Company ex. FPL

***Transformer lowers voltage* before it enters building**

Premises Wiring System

System within the building

Begins* where the utility *connection is made to the structure

The National Electrical Code (NEC) regulates only the premises wiring system

POWER SYSTEM REQUIREMENTS, CON'T

Electrical Panels/Rooms

Main disconnect switch

Secondary switches

Circuit Breakers

Fuses

Switchboard Room - First and largest service entry

There must be *3' clearance* in front of this panel

Room must be *ventilated*

Power Panel Boards

Housed in closet or cabinet placed against a wall

Should be *stacked above each other* in multiple floor buildings

Branch Panel Boards

Typically these closets *do not* have to be rated

POWER SYSTEM REQUIREMENTS, CON'T

Electrical Boxes:

Outlet boxes

Switch boxes

For single switches and duplex outlets, they measure about *2 in. x 4in*.

Boxes are about *1-1/2 in. or 2-1/8 in. deep*

Residential

***Code specifies* that all rooms should have a *switch* for lighting**

At least *one* outlet in a hallway.

Commercial

Requirements are *not as specific* as residential

Does *not* specify the frequency of electrical boxes

POWER SYSTEM REQUIREMENTS, CON'T

Electrical Boxes, Con't

ADAAG

Locate boxes at least *15"* above the floor to the bottom of the box

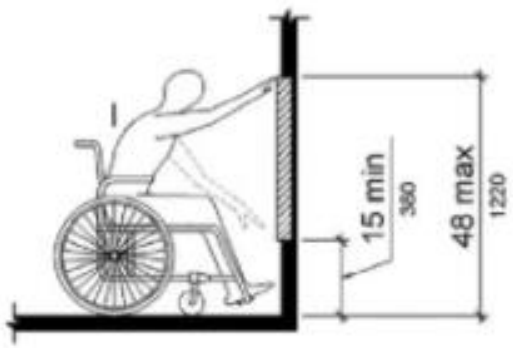


Figure 308.2.1
Unobstructed Forward Reach

Junction Boxes

Used to connect various cable connections and to allow for *future access*

Must be *accessible at all times* – could be a concern for gyp ceiling systems

Junction boxes are also required where *light fixtures are connected* to the electrical system.

POWER SYSTEM REQUIREMENTS, CON'T

Circuit protection

- The *codes* *limit the voltage and amperage* for circuits

  So it is important to supply the engineer with an accurate quantity of equipment for calculations

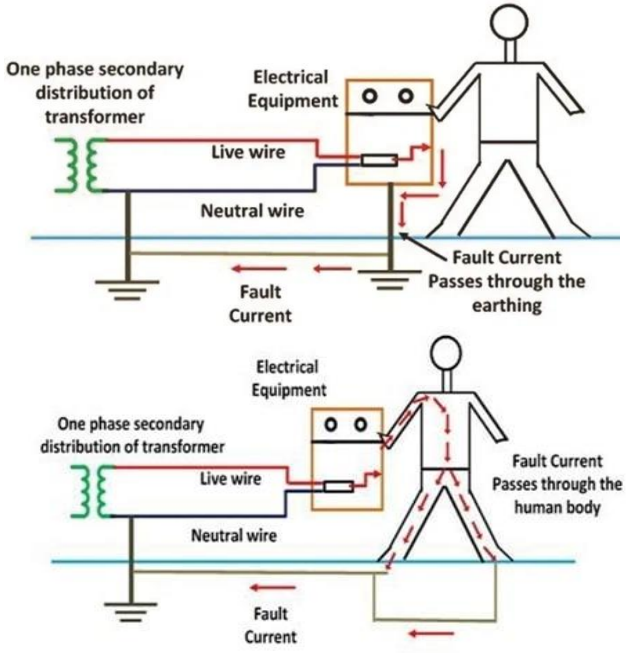
- The first protection is *grounding*, which is a separate wire in addition to the two that provide power

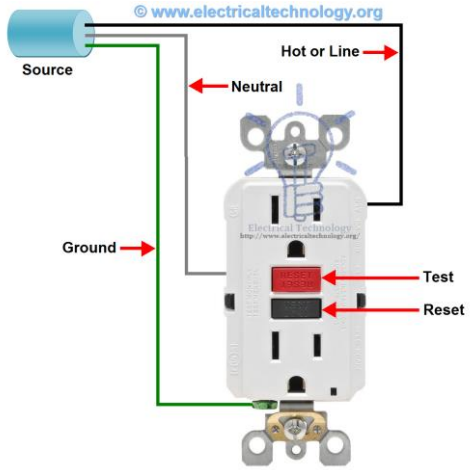
  The ground wire *provides a path for the fault*

- Ground Fault Interrupters (GFIs) are devices that detect small current leaks and disconnect the power to the circuit or appliance.

  GFIs are required for outdoor outlets and in bathrooms and kitchens as well as other locations as referenced in the National Electrical Code.

  Required on every outlet in room where there is water except where water not readily accessible





GFCI
Ground Fault Circuit Interrupter

POWER SYSTEM REQUIREMENTS, CONT

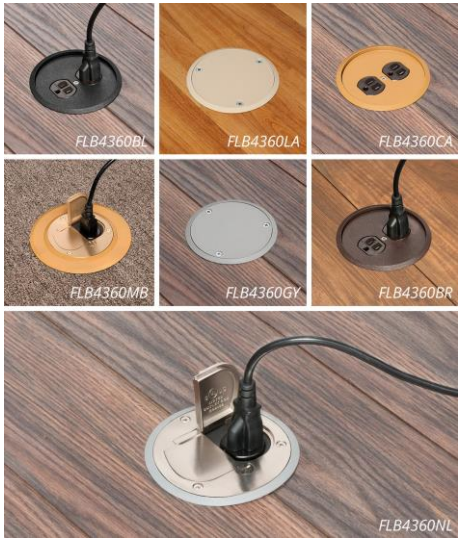
Can locate electrical and telecommunication, outlets on several plans

Construction Floor Plan – Residential usually

A separate Power Plan – for commercial

Electrical (Power) Plan – drawn by the *electrical engineer* using the power plan generated by the interior designer

Furniture Plan – directly *relate* to the placement of furniture – or include furniture on interior designer's Power Plan



Telephone and Communication System Requirements

You usually show telephone and communication systems on the *same plan as the power plan*

The *interior designer is responsible* for indicating the location of such items as *telephones, intercommunication systems, public address speakers, buzzers, and computer terminals*

Actual circuiting, wire sizes, and connections to central equipment are usually determined by the *electrical engineer or electrical contractor*

Telephone and communication systems are *low-voltage* - in many cases the wire is run within the walls and ceiling spaces *without conduit*

Interior Designer's Power Plan

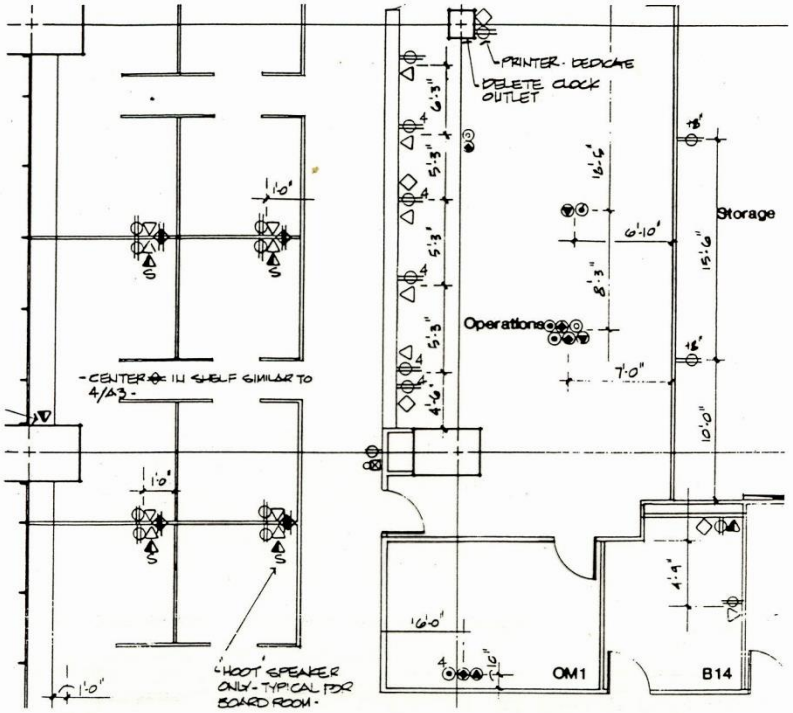


Figure 7.1 Interior Designer's Power Plan

PROFESSIONAL PUBLICATIONS, INC., BELMONT, CA

Electrical Engineer's Power Plan

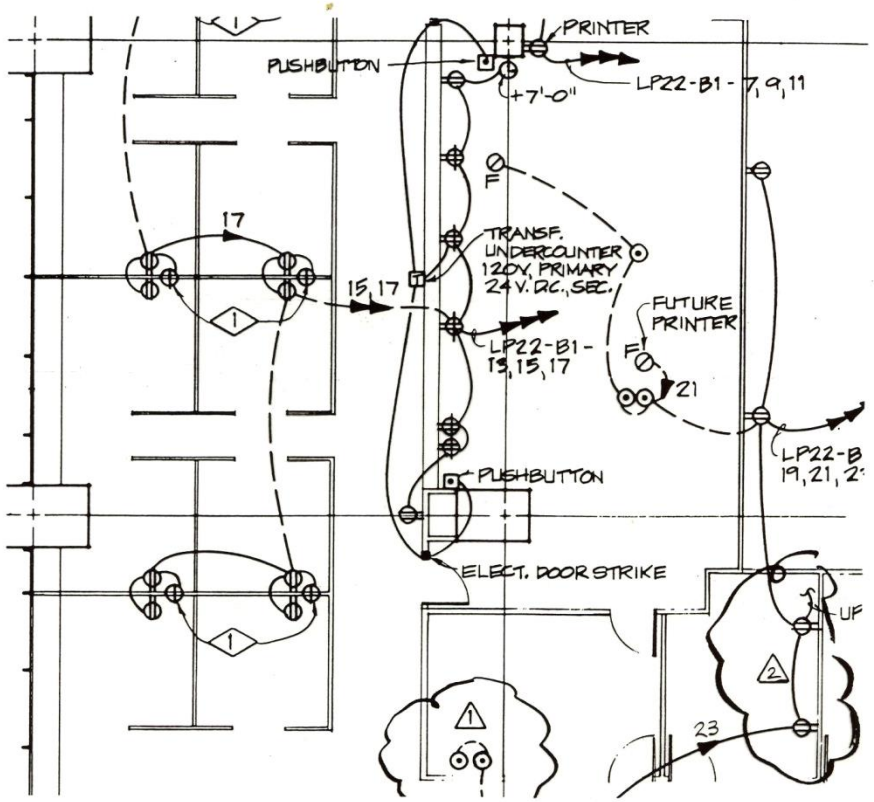


Figure 7.2 Electrical Engineer's Power Plan

PROFESSIONAL PUBLICATIONS, INC., BELMONT, CA

Electrical & Lighting Symbols

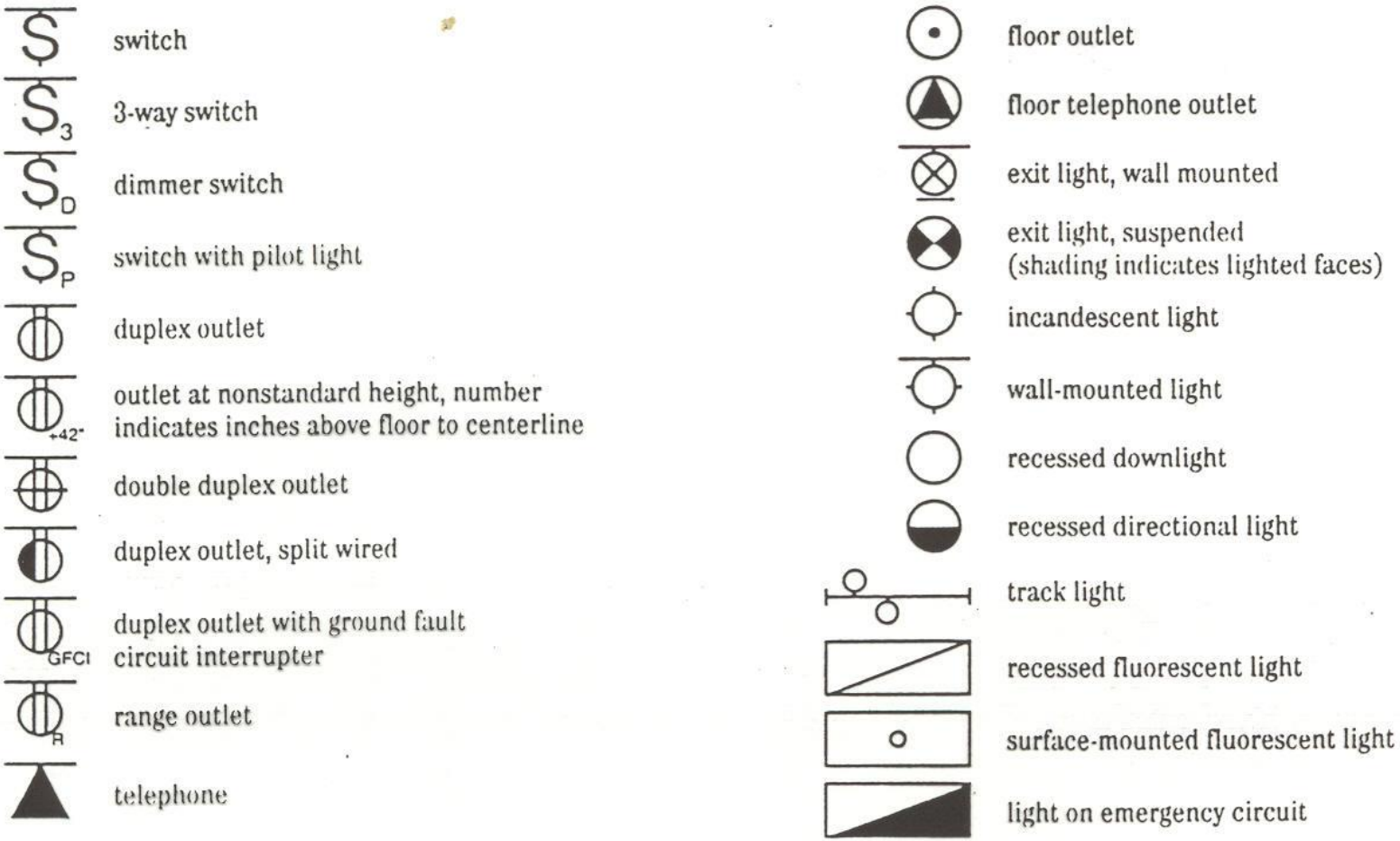
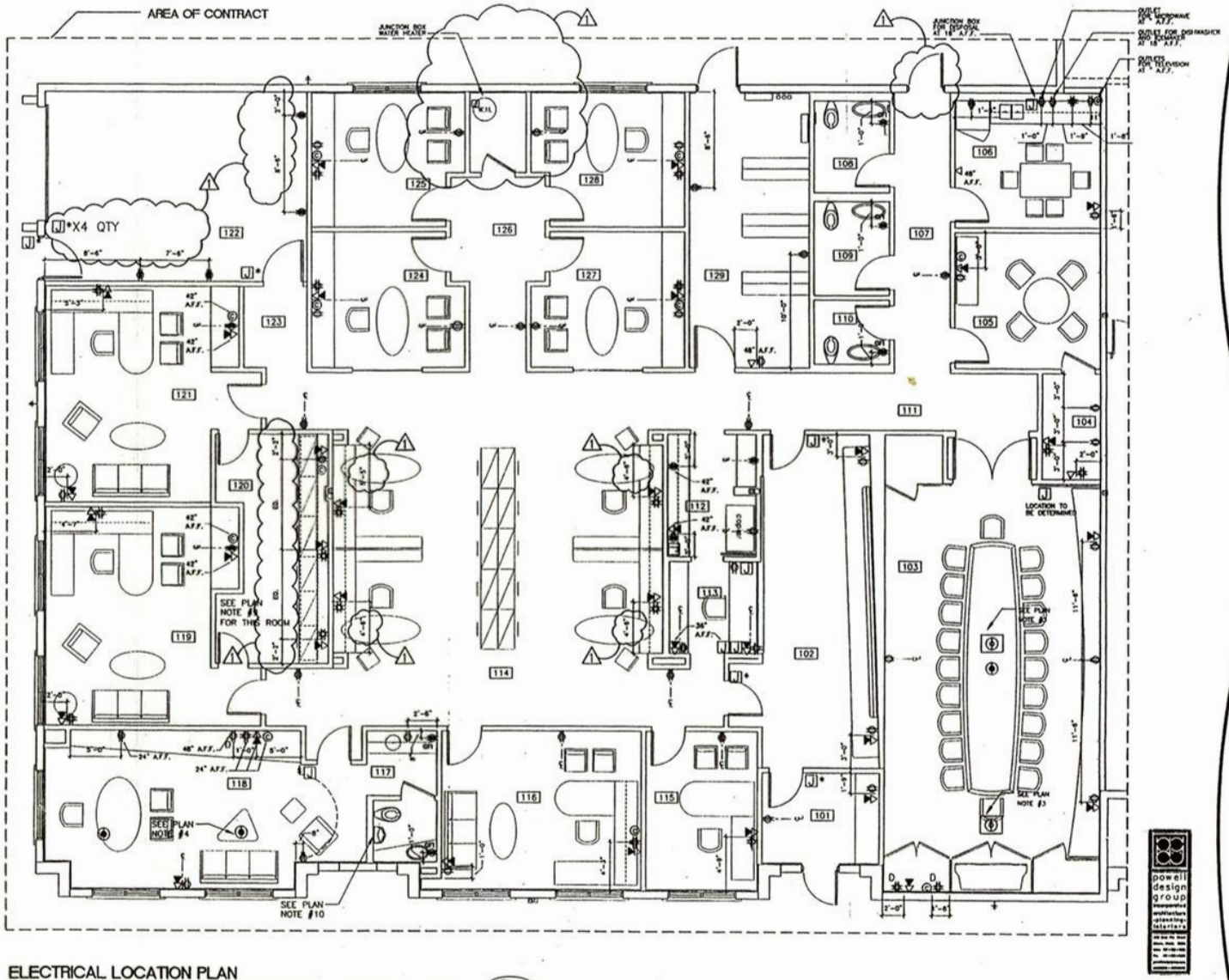


Figure 7.17 Electrical and Lighting Symbols



ROOM LEGEND

101 ENTRY VESTIBULE
102 RECEPTION
103 CONFERENCE ROOM
104 FILE SERVER
105 SMALL CONFERENCE
106 BREAK ROOM
107 CORRIDOR
108 MEN'S ADA COMPLIANT TOILET ROOM
109 WOMEN'S ADA COMPLIANT TOILET ROOM
110 WOMEN'S TOILET ROOM
111 CORRIDOR
112 WORK ROOM
113 RECEPTIONIST
114 OPEN WORK AREA
115 GUEST OFFICE
116 PRESIDENT'S OFFICE
117 MEN'S RESTROOM
118 PRESIDENT OFFICE
119 CFO OFFICE
120 SECURED STORAGE
121 VICE PRESIDENT OFFICE
122 GARAGE
123 GARAGE VESTIBULE
124 OFFICE
125 OFFICE
126 CORRIDOR
127 OFFICE
128 OFFICE
129 SUPPLIES

PLAN NOTES

1. THIS SHEET TAKES PRECEDENCE OVER ENGINEERING FOR LOCATION OF OUTLETS
2. CONTRACTOR IS TO COORDINATE ELECTRICAL WITH APPLIANCES
3. INSTALL DEDICATED POWER OUTLET AND JUNCTION BOX IN CEILING FOR FUTURE TELE-VIDEO EQUIPMENT.
4. ALL COMPUTER CABLING WILL BE 2 CAT-5 LINES.
5. RUN 1 1/2" CONDUIT FROM FLOOR BOX TO TELEPHOON LOCATION.
6. SEE REFLECTED CEILING PLAN, SHEET A-2 AND A-2.1 FOR LIGHT FIXTURES THAT REQUIRE JUNCTION BOXES.
7. CONTRACTOR IS TO PROVIDE JUNCTION BOXES FOR SECURITY EQUIPMENT LOCATIONS TO BE DETERMINED.
8. CONTRACTOR IS TO COORDINATE LOCATION OF FLOOR OUTLETS WITH FURNITURE IN THE FIELD. DO NOT SCALE FROM PLANS.
9. INSTALL ALL OUTLETS AND JUNCTION BOXES AT 44" A.F.F., ON CENTER.
10. INSTALL TOUCHLESS FLUSHING SENSOR FOR URINAL.

LEGEND

- WALL MOUNTED DUPLEX OUTLET, 15" A.F.F., UNLESS OTHERWISE NOTED
- WALL MOUNTED FOURPLEX OUTLET, 15" A.F.F.
- WALL MOUNTED DUPLEX OUTLET, 42" A.F.F.
- WALL MOUNTED FOURPLEX OUTLET, 42" A.F.F.
- WALL MOUNTED DUPLEX OUTLET, 36" A.F.F.
- WALL MOUNTED TELEPHONE OUTLET, 15" A.F.F.
- WALL MOUNTED PHONE/DATA DUAL JACK, 15" A.F.F.
- COMPUTER CABLE CONNECTION
- CABLE OUTLET
- FLOOR MOUNTED QUAD OUTLET AND PHONE/DATA DUAL JACK - FLUSH MOUNT
- CEILING MOUNTED DUPLEX OUTLET AND PHONE/DATA DUAL JACK
- GFI GROUND FAULT INTERRUPTER
- J JUNCTION BOX (height as indicated)
- J* JUNCTION BOX TO BE INSTALLED PER DETAILS 11 AND 12, SHEET A-7
- CENTERLINE OF WALL
- D DEDICATED

ELECTRICAL LOCATION PLAN

scale: 1/4"=1'-0"

N

blakeslee design

Interior Architecture and Design

303 East Par Street
Orlando, Florida 32804
407.628.9040
fax 628.9041

ETW Corporation
8934 Conroy - Windermere Rd.
Orlando, Florida

ELECTRICAL LOCATION PLAN

PROJECT NO: 2051
CREATED BY: KER/DB/JJ
CHECKED BY: RLB
ISSUE DATE: 1.22.01

REVISION:
3.08.01

SHEET NO. A-3

powell design group

PLAN NOTES

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4. ALL COMPUTER CABLING WILL BE 2 CAT-5 LINES.
5. RUN 1 1/2" CONDUIT FROM FLOOR BOX TO TELEVISION LOCATION.
6. SEE REFLECTED CEILING PLAN, SHEET A-2 AND A-2.1 FOR LIGHT FIXTURES THAT REQUIRE JUNCTION BOXES.
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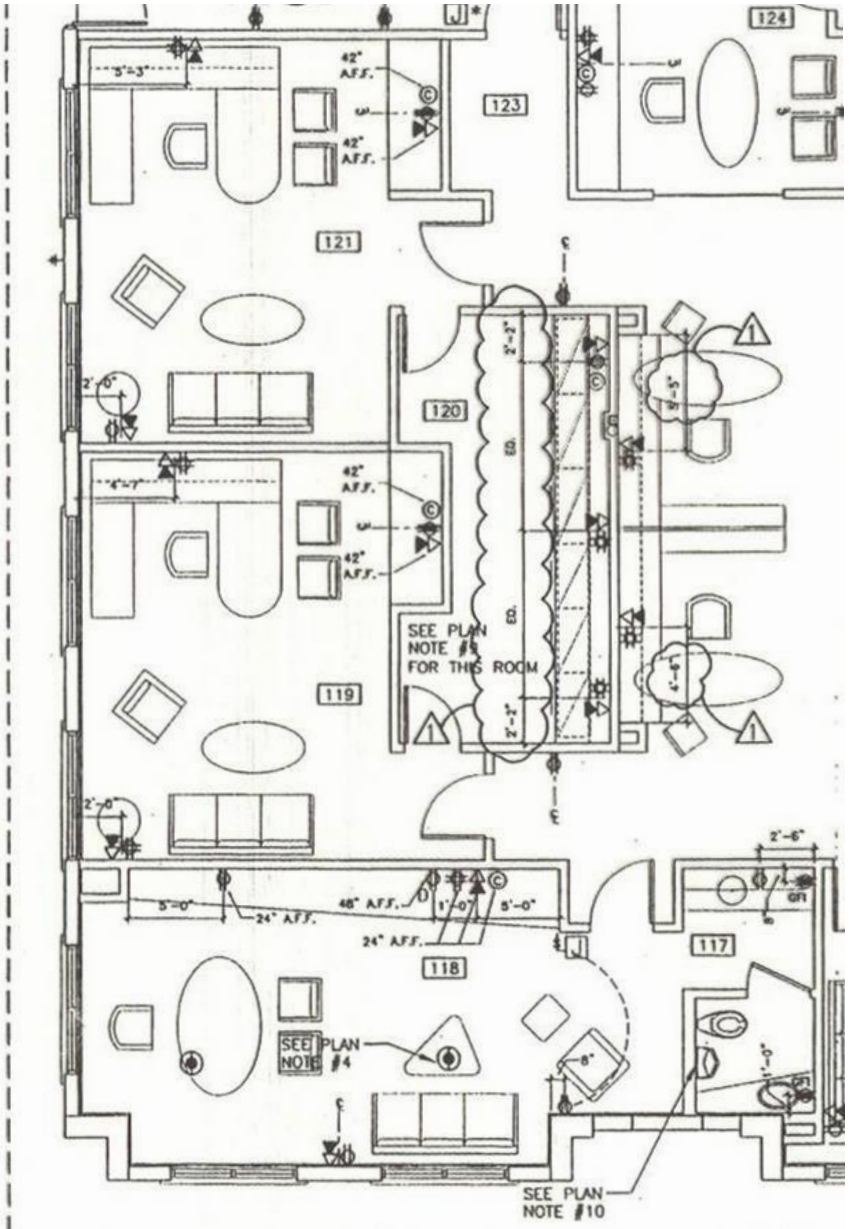
- ℄ CENTERLINE OF WALL
- D DEDICATED



ELECTRICAL LOCATION PLAN

scale: 1/4"=1'-0"

ETW Corporation

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REVISION:
3.08.01 1

SHEET NO.
A-3

powell design group
incorporated
architecture
-planning-
interiors

Telephone and Communication System Requirements

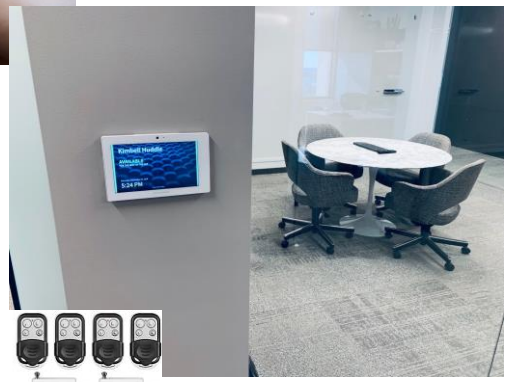
Communication Elements

- Intercoms
- Telephones
- Computers
- Wireless
- Security and background music
- Assistive listening systems as required by ADAAG
- Television systems

  Surveillance equipment

  Cable services

  Satellite hookups



Telephone and Communication System Requirements

Communication Rooms / IT Rooms

- Locate as close as possible to communication service entry
- *Consult* communication system company to determine the size of the room
- Communication Closet
- Satellite Closet

LIGHTING SYSTEMS

- **The type of *lighting system* selected determines the required construction detailing**
  - **Wired**
  - **Solar**
  - **Wireless**
- **For some large, recessed incandescent down lights, it may be necessary to *relocate HVAC duct work, conduit, and plumbing* pipes to accommodate the location and space**
- **An alternate is to select *low clearance fixtures*.**

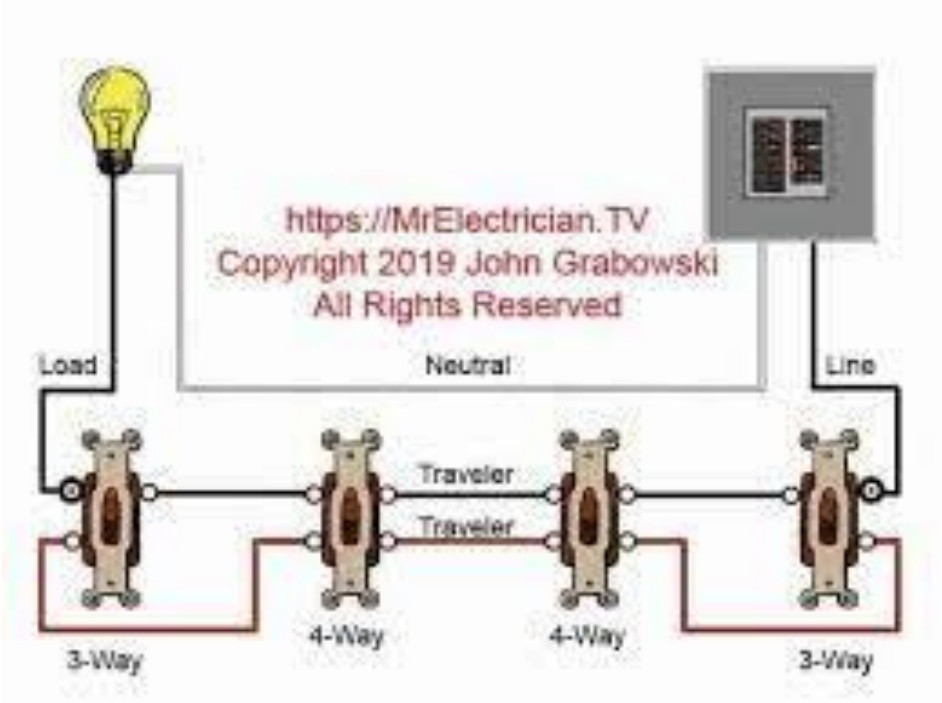
LIGHTING SYSTEMS

Control Devices

The interior designer should decide how the lighting in a space will be *switched*

***Three or four-way* switches can be used - these allow a fixture to be switched at *two or three* different locations, respectively**

Incandescent and LED lighting should be on a circuit *separate* from fluorescent lighting. Incandescent and LED lighting may need to be on separate circuits as well – may depend on dimming requirements (LED often requires special dimmers)



LIGHTING SYSTEMS

Light Fixtures

- **It is important to specify *UL approved***

  Do not assume that all fixtures are UL!!!

- **Fixtures that weigh *less than 50 lbs* may be supported by the outlet box**

- **Place so that *both* the fixture and the lamp may be replaced**

EMERGENCY ELECTRICAL SYSTEMS

- **Artificial lighting is required in the *path of an exit discharge* when the building is in use**
- **Lighting should be available for *1 to 1-1/2 hour* in case of power failure**
- **Consider including some of the existing fixtures on a *separate emergency lighting circuit* (overlapping light pattern to insure lighting)**

https://www.youtube.com/watch?v=6IjVLLi3ESw&t=5s

The Future

- Wireless Power
- Wireless Electricity
- Smart Homes/Offices
- Sustainable Design
- Wind and Solar Power

Innovations

- 3D Wallpaper
- Switchable “Smart” Glass (Privacy Glass)
- Soundproof Blinds

https://www.youtube.com/watch?v=j_DxN01PBdw