

ARE

EXAM GUIDE

Schematic Design

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SCHEMATIC DESIGN

OVERVIEW

DIVISION STATEMENT

Apply knowledge and skills required for the schematic design of buildings and interior space planning.

Vignettes

INTERIOR LAYOUT

Design an interior space plan and furniture arrangement responding to program, code, and accessibility requirements.

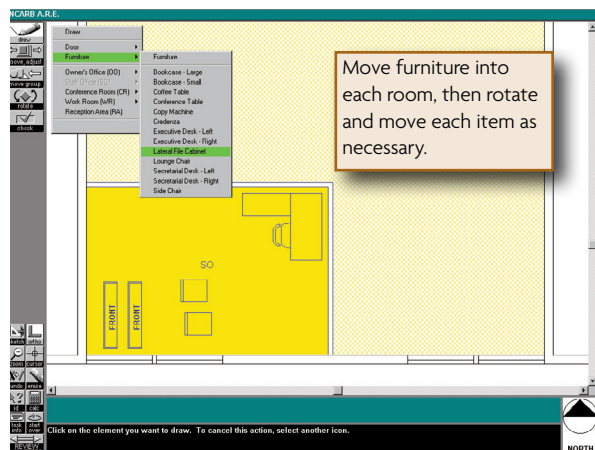
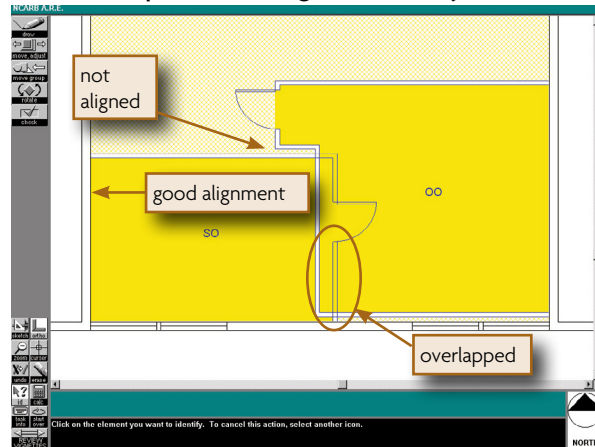
BUILDING LAYOUT

Develop a schematic design for a two-story building addressing program, code, site, and environmental requirements.

SCHEMATIC DESIGN

INTERIOR LAYOUT VIGNETTE

General Tips for Taking Interior Layout



Directions

The plan on the work screen shows a vacant office space that is to be developed in accordance with the given program and code requirements.

Using the tools provided, draw all required spaces (other than the reception or circulation space). As each space is drawn, it is enclosed by walls. To avoid having double walls between adjacent spaces, you must move the walls together until the two walls merge into a single wall. The reception or circulation space is defined by exterior walls and/or the walls of the other spaces. You must use the label that has been provided to identify it. Complete your solution by drawing doors and placing all required furniture.

Before beginning your solution, you should review the program and code information that can be accessed through the Vignette Index screen and familiarize yourself with the plan of the area to be developed on the work screen.

Program

Mr. Jones and Mr. Smith are opening a law office in a historic building. The space is a vacant corner suite of approximately 1,200 ft².

- ▶ All spaces and workstations shall comply with the accessibility requirements stipulated in the code. Each program space shall include one clear space for a wheelchair to make a 180-degree turn as described in the code. A continuous path that meets the minimum clear distance requirement of the code shall be provided to each work table and to the seating area behind each desk.
- ▶ The furniture layout must allow for reasonable clearances and access to all of the furniture elements.

SCHEMATIC DESIGN

INTERIOR LAYOUT VIGNETTE

Space and Furniture Requirements

1. Reception and Business Office (RBO)
 - ▶ The configuration and furniture layout of this space must allow a clear view of the suite's main entrance door from a secretarial desk.
 - ▶ This is the only space to be used for circulation.
 - ▶ All spaces must have direct access to this space.
 - ▶ Furniture requirements:

2 secretarial desks	1 work table
3 lateral file cabinets	2 lounge chairs
1 square coffee table	
2. Mr. Jones' Office (JO)
 - ▶ Must have an exterior window.
 - ▶ Furniture requirements:

1 executive desk	1 table for four
1 credenza	2 arm chairs
3. Mr. Smith's Office (SO)
 - ▶ Must have an exterior window.
 - ▶ Must have direct access to the Library and Conference Room.
 - ▶ Furniture requirements:

1 executive desk	3 arm chairs
1 round coffee table	1 small bookcase
4. Library and Conference Room (LCR)
 - ▶ Furniture requirements:

1 conference table	2 large bookcases
1 arm chair	1 square coffee table
5. Copy Room (CR)
 - ▶ Furniture requirements:

1 copy machine	1 storage cabinet
1 small bookcase	

Code

Comply with the following code requirements. These are the **ONLY** code-related criteria you are required to use.

General

1. The space required for a wheelchair to make a **180-degree turn** is a clear space of 60 inches in diameter, as shown in Figure 1.
2. The **minimum clear distance** between walls or between a wall and any other obstruction along an aisle, corridor, or passageway shall be 36 inches.

Doors

1. **Clear width:** Doorways shall have a minimum clear opening of 32 inches with the door open 90 degrees, measured between the face of the door and the opposite stop.
2. **Maneuvering clearances:** Minimum maneuvering clearances at doors shall be as shown in Figure 2. The floor or ground area within the required clearances shall be level and clear. No door, when open to 90 degrees, shall interfere with the maneuvering clearance of another door.
3. **Double-leaf doorways:** If doorways have two independently-operated door leaves, then at least one leaf shall meet the requirements above for **clear width** and **maneuvering clearances**.

FIGURE 1: TURNING SPACE

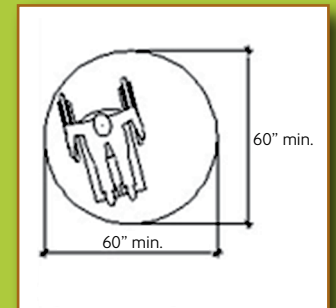
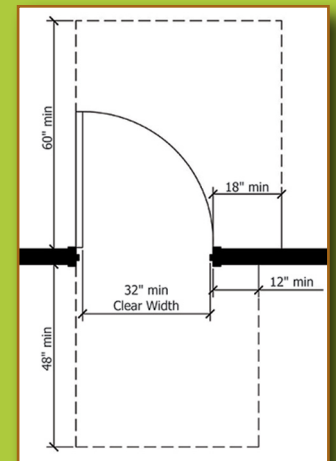
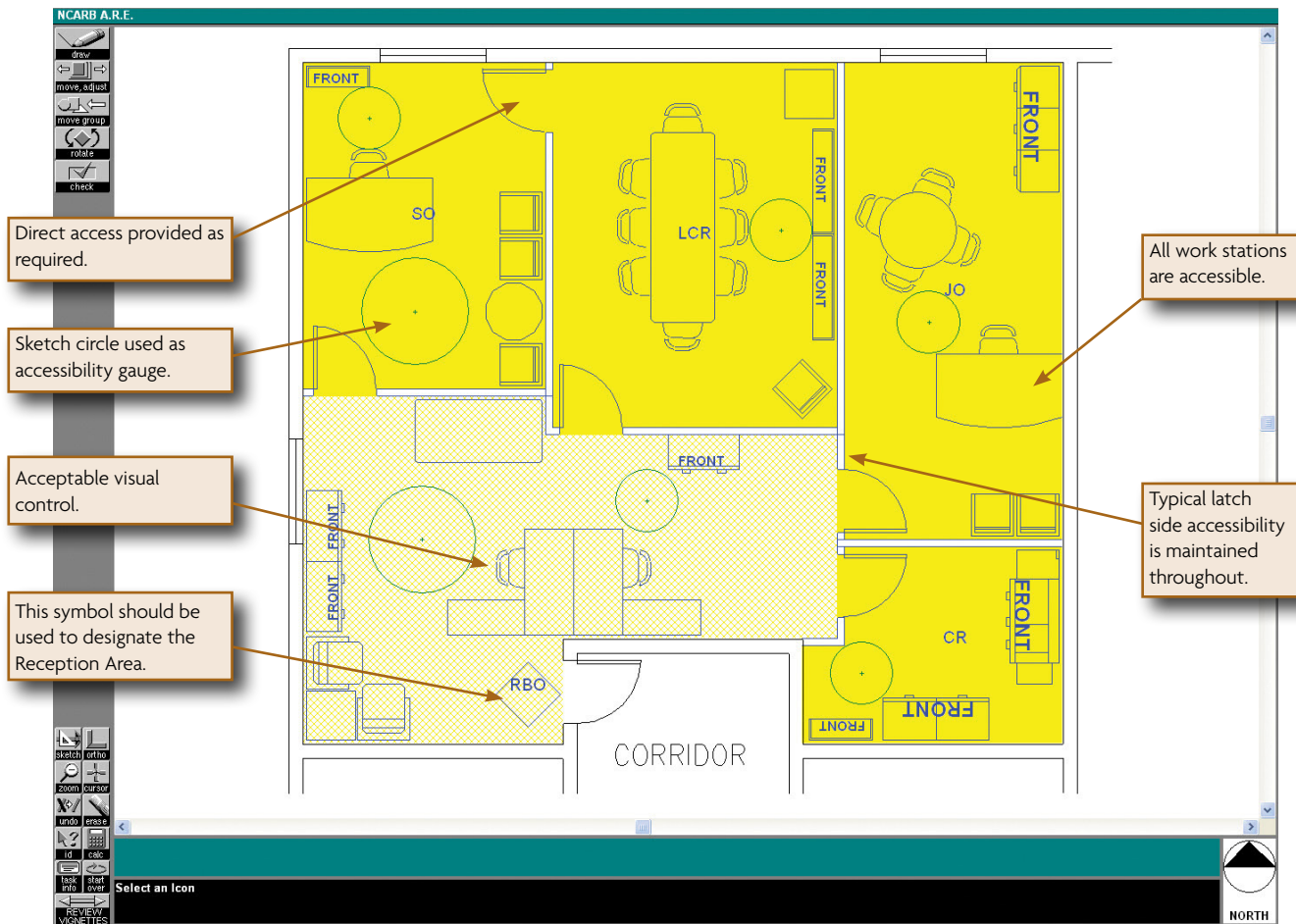


FIGURE 2: MANEUVERING CLEARANCES AT DOORS



SCHEMATIC DESIGN

INTERIOR LAYOUT VIGNETTE - Sample Passing Solution



This solution has appropriate access to all workspaces as required by the code. Each room has enough space for a wheelchair to turn around in as well as to allow access to all furniture. The reception and business office (RBO) allows for a clear view of the main entrance from a desk, controls access to all other spaces, and is the only space used for circulation.

Mr. Smith's office (SO) has the required direct access to the library and conference room (LCR). All doors have correct clearances required for accessibility, the two spaces required to have windows are properly located, and all of the furniture is provided as stated in the program.

Procedural Tips

- Check overlaps while you are working through your solution.
- Be sure to keep scrolling until you have seen all of the Program information. Click on the down arrow on the scroll bar to ensure that you have seen all of the text.
- When elements overlap, you may have trouble selecting a particular element. If this happens, keep clicking (without moving the mouse) until the desired element highlights.

Warnings

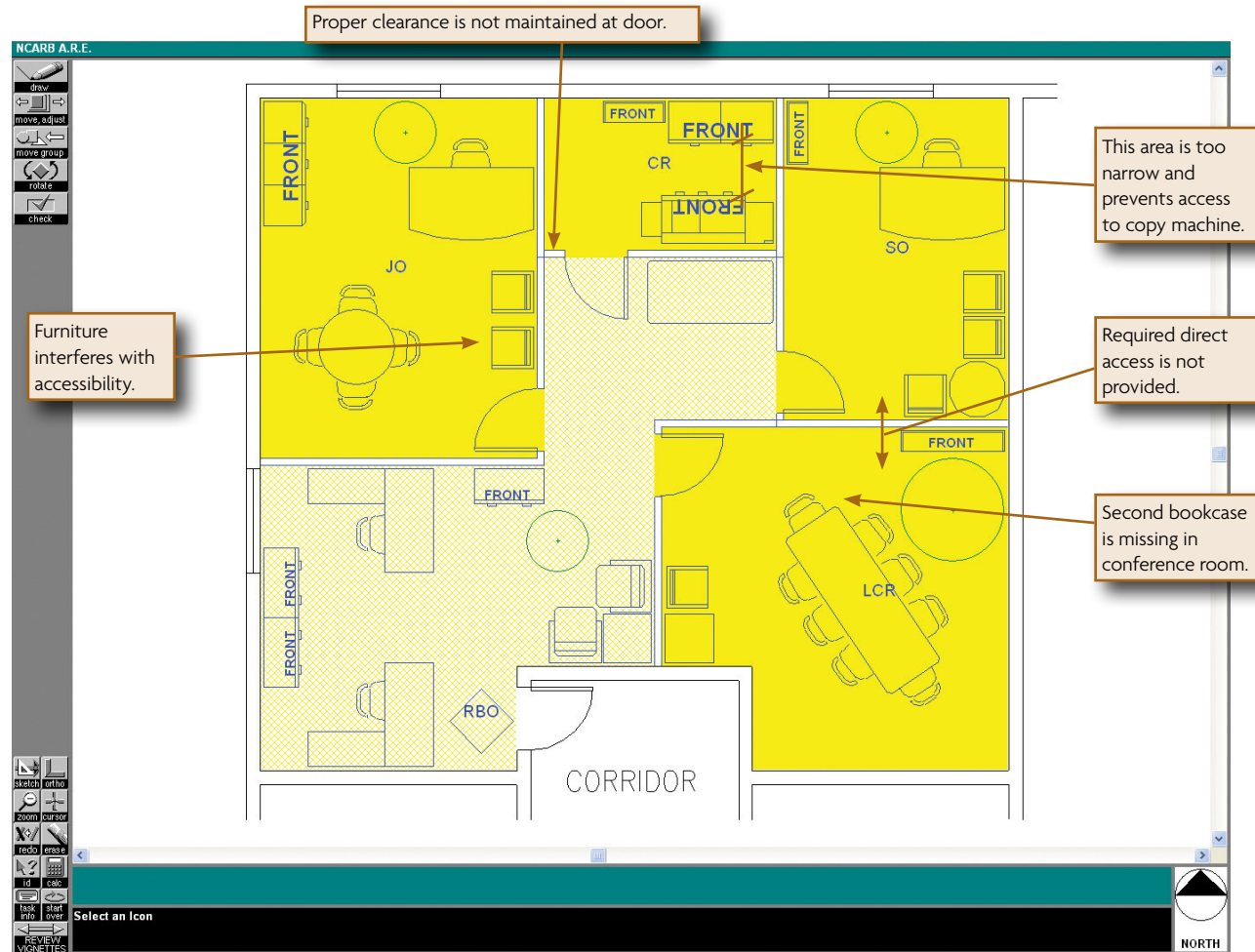
- Doors cannot be attached to existing walls. They are only for walls of rooms you draw.

Tools You Might Find Useful

- Zoom is especially useful in this vignette to:
 - see whether walls overlap
 - adjust overlapping elements
 - check clearances
 - enlarge a room before you furnish it
- Sketch grid tool to get an idea of the scale of the rooms you want to lay out.

SCHEMATIC DESIGN

INTERIOR LAYOUT VIGNETTE - Sample Failing Solution



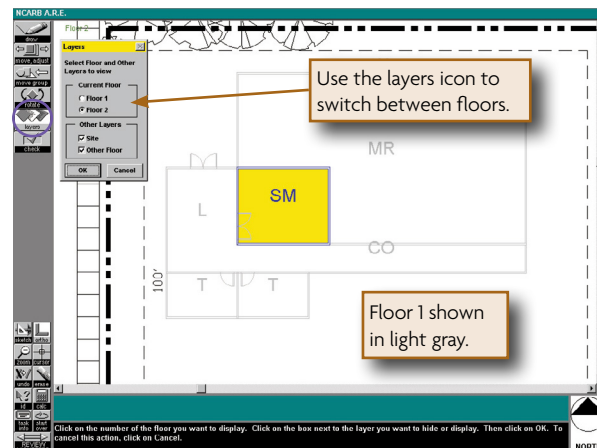
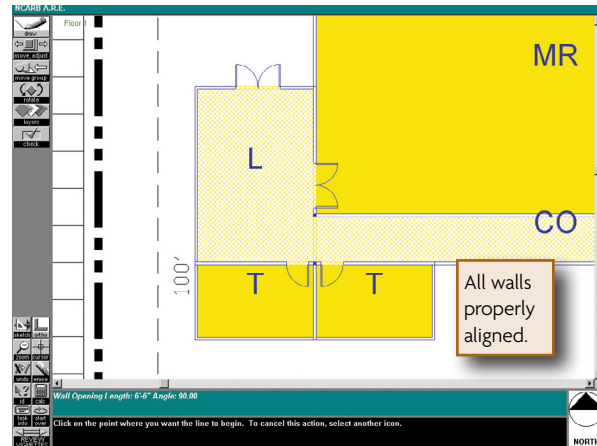
This solution has a number of accessibility mistakes that cause it to fail. Walls and/or furniture encroach or block the necessary clearances in Mr. Jones' office (JO) and the work room (WR). Mr. Smith's office (SO) does not have the required direct

access to the library and conference room (LCR), and the work room (WR) is too narrow at the copier to allow proper access. The library and conference room (LCR) is also missing a piece of furniture.

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE

General Tips for Taking Building Layout



Directions

Using the tools provided, develop floor plans for the two-story building described in the program. Your floor plans should be responsive to given program and code requirements and should reflect principles of sound design logic. Adequate and code-compliant circulation should be provided, and the orientation of the building should be responsive to site influences.

Develop your floor plans by sizing and locating all required spaces and any necessary corridors on the site plan provided on the work screen. Indicate all windows, doors, and wall openings, and use the “Open to Below” tool that has been provided to indicate the upper story of the two-story space. To avoid having double walls between adjacent spaces, you must move the walls together until the two walls merge into a single wall.

Before beginning your solution, you should review the program and code information that can be accessed through the Vignette Index screen and familiarize yourself with the site plan on the work screen.

Program

The family life center will provide recreational and fellowship facilities for a community church.

1. The site is located on Market Street adjacent to a community church. Parking is available off the site.
2. The major view is to the north.
3. The receptionist is to have visual control of the entry to each of the following spaces: the lobby, the game room, and the children's room.
4. The main entrance door shall face west.
5. All spaces shall have a 9 ft ceiling height except the multi-purpose room, which shall have an 18 ft ceiling height.
6. The area of each space shall be within 10 percent of the required program area.
7. The total corridor area shall not exceed 25 percent of the total program area.
8. The second floor envelope must be congruent with or wholly contained within the first floor envelope with the exception that doors to the exterior may be recessed for weather protection.

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE

Program—Spaces

Tag	Name	Area (ft ²)	Requirements
ST	Stair	800	2 per floor @ 200 ft ² per stair
E	Elevator Shaft	200	1 per floor @ 100 ft ² each; Minimum dimension = 7 ft
EE	Elevator Equipment Room	100	
EM	Electrical/Mechanical Room	500	
AO	Assistant Director's Office	200	Exterior window required; Direct access to Secretarial Office
CR	Children's Room	750	Exterior window required; Near Multi-purpose Room
DO	Director's Office	350	Exterior window required; Direct access to Secretarial Office
GR	Game Room	1,350	View—exterior window required
L	Lobby	700	Main Entrance
LM	Large Meeting Room	1,000	Exterior window required
LR	Locker Rooms	200	2 @ 100 ft ² each; Exterior windows prohibited; Direct access to Multi-purpose Room
MP	Multi-purpose Room	2,600	View—exterior window required; 18 ft ceiling; 2 exits; First floor
R	Receptionist	400	Exterior window required; Near Lobby
SM	Small Meeting Room	750	Exterior window required; Near Large Meeting Room
SO	Secretarial Office	500	Exterior window required; Near Large Meeting Room; Second Floor
SW	Social Worker	500	Exterior window required
TR	Toilet Rooms	800	2 per floor @ 200 ft ² each
TS	Table/chair Storage	300	Near Multi-purpose Room
TOTAL PROGRAM AREA		12,000	ft ²

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE

Code

Comply with the following code requirements. These are the **ONLY** code-related criteria you are required to use.

Definitions

1. **Means of egress:** A continuous and unobstructed path of travel from any point in a building to a public way. A means of egress comprises the vertical and horizontal means of travel to an exit and includes intervening doors, interior wall openings, corridors, circulation areas, and stairs.
2. **Circulation area:** A lobby or a space designated as an “area.”
3. **Exit:** That portion of a means of egress that provides a protected route of travel to the exit discharge. Exits include both exterior exit doors and exit stairways.

Exiting Requirements

1. Provide a minimum of two exits from each floor separated by a travel distance equal to not less than 1/2 of the length of the maximum overall diagonal dimension of the floor to be served.
2. Every room shall connect directly to a corridor or circulation area.
Exception: elevator equipment rooms and rooms with an area of 50 ft² or less may connect to a corridor or circulation area through an intervening space, but not directly to a stair.

3. In rooms required to have two exit doors, separate the two exit doors by a distance equal to not less than 1/2 of the length of the maximum overall diagonal dimension of that room.
► Exit doors may discharge directly to the exterior of the building at grade.
4. Required exit doors shall swing in the direction of egress travel.
5. Door swings shall not reduce the minimum clear exit path to less than 3 ft.

Corridors

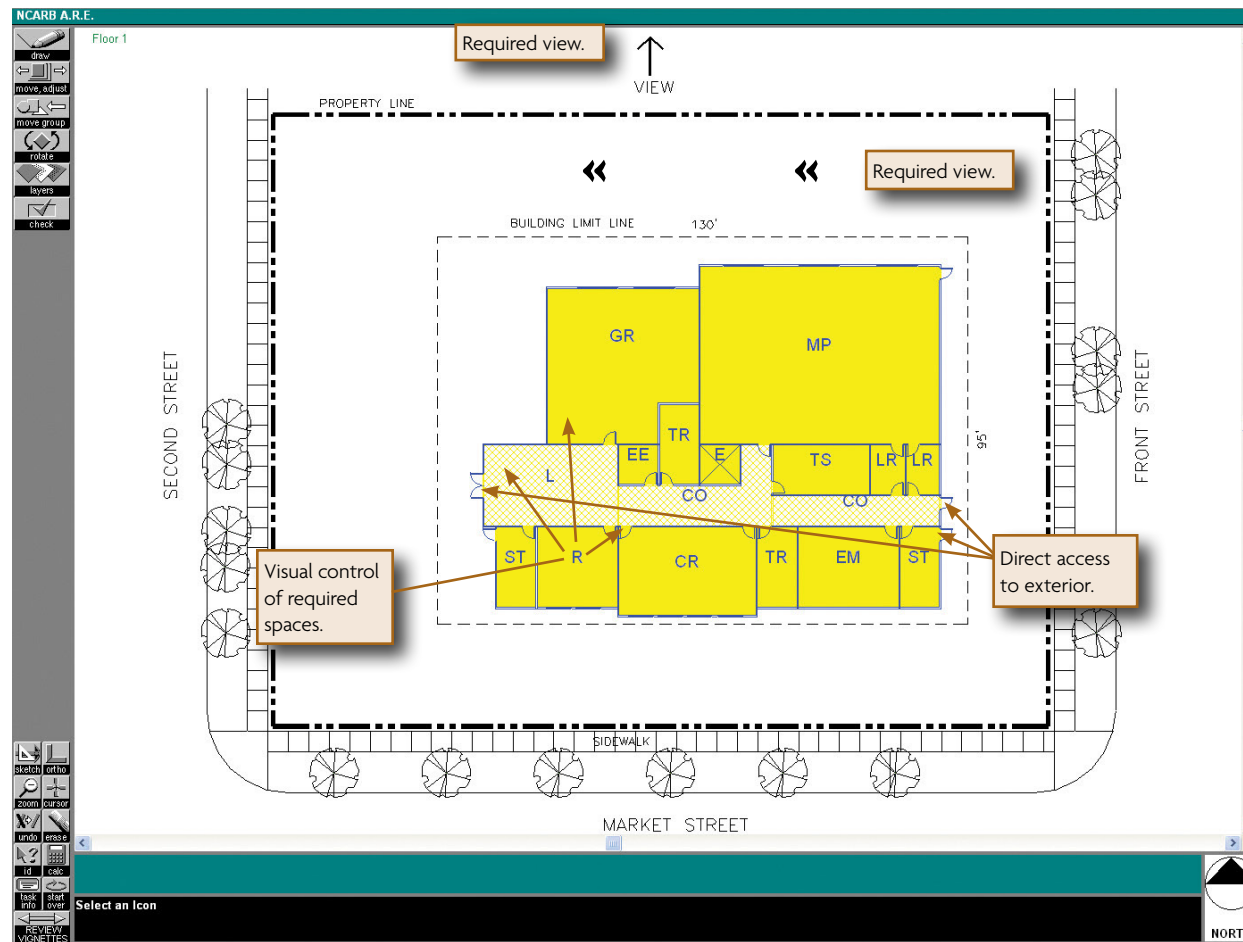
1. Discharge corridors directly to the exterior at grade or through stairs or circulation areas.
2. Do not interrupt corridors with intervening rooms—circulation areas are not considered to be intervening spaces.
3. Maximum length of dead-end corridors: 20 ft.
4. Minimum clear width of corridors: 6 ft.

Stairs

1. Discharge stairs directly to the exterior at grade.
2. Connect stairs directly to a corridor or circulation area at each floor with exit access doors.
3. Minimum width of stairs: 4 ft.

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE - Sample Passing Solution



Floor 1

This solution succeeds in meeting all of the program requirements. The main entrance is from the west, and the receptionist (R) has good visual control of the entrances to the lobby (L), the game room (GR), and the children's room (CR).

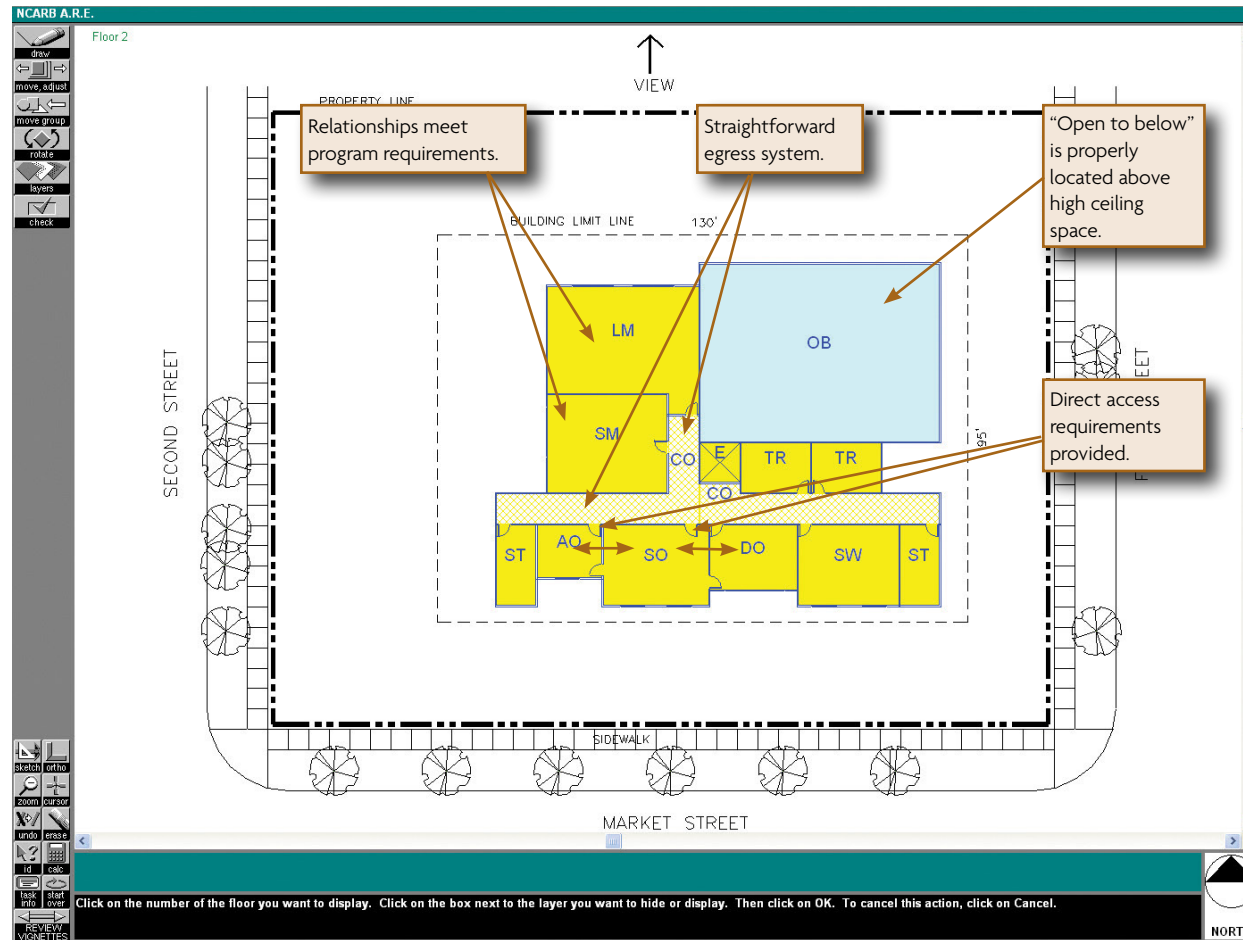
The locker rooms (LR) have direct access to the multi-purpose room (MP), and the table/chair storage (TS) is near the multi-purpose room (MP).

Procedural Tips

- ▶ Before you begin, it helps to toggle between the Program and the work screen, looking at each in the context of the other.
- ▶ Read the Program and Program Spaces listing carefully.
- ▶ Be sure to keep scrolling until you have seen all of the Program information. Click on the down arrow on the scroll bar to ensure that you have seen all of the text.
- ▶ You may want to draw each space so that it has approximately the required area, assemble the spaces into a finished floor plan, then adjust the areas if necessary. Note that the dimensions that are given as you draw a space are from wall centerline to wall centerline. It is especially important to take this into consideration when you are drawing corridors to code-required widths, which are measured from one edge of the corridor to the other.
- ▶ Keep layers from the other floor turned on to help you see the limits of the building.
- ▶ Check for overlaps while you are drawing. Be sure to use the check tool on both floors.
- ▶ You are not required to show doors or wall openings in elevator walls.

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE - Sample Passing Solution



Floor 2

On the second floor, the small meeting room (SM) is near the large meeting room (LM). The director's office (DO) and the assistant director's office (AO) are directly connected to the secretarial office (SO). The corridor system is straightforward

with exit stairs at each end on the second floor and exits to the exterior on the first floor. There are no dead-end corridors that exceed the 20-foot limit established in the code.

- ▶ When elements overlap, you may have trouble selecting a particular element. If this happens, keep clicking (without moving the mouse) until the desired element highlights.

Warnings

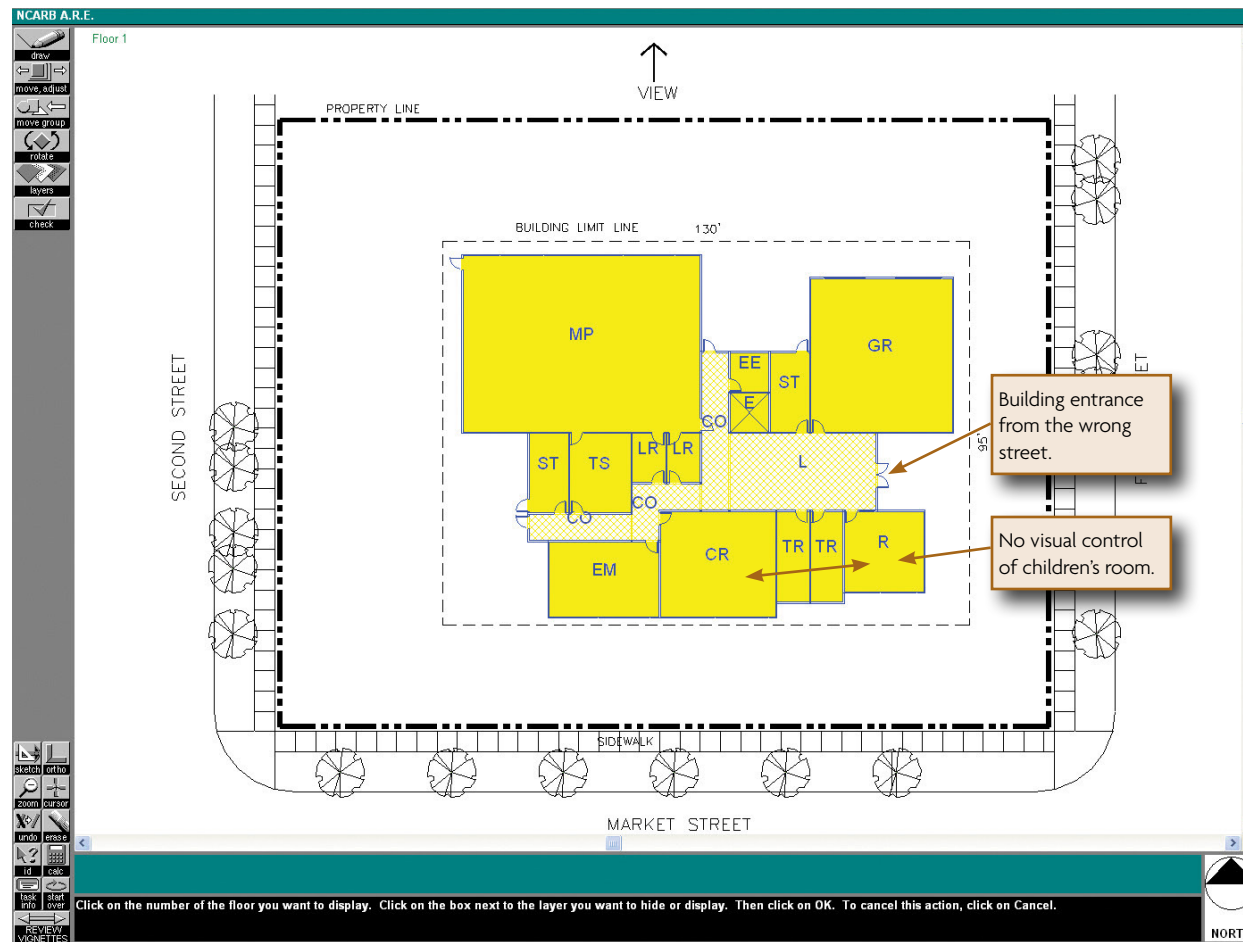
- ▶ Wall openings may be drawn only between circulation areas (including corridors). Circulation areas are indicated by a lighter hatched background.
- ▶ Be sure that the walls of adjacent circulation areas (including corridors) are opened by doors or wall openings.
- ▶ Remember that you cannot move elements from one floor to another.

Tools You Might Find Useful

- ▶ Zoom to see the walls more clearly
- ▶ Full-screen cursor to help you line up the walls
- ▶ Sketch grid tool to help you align elements

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE - Sample Failing Solution

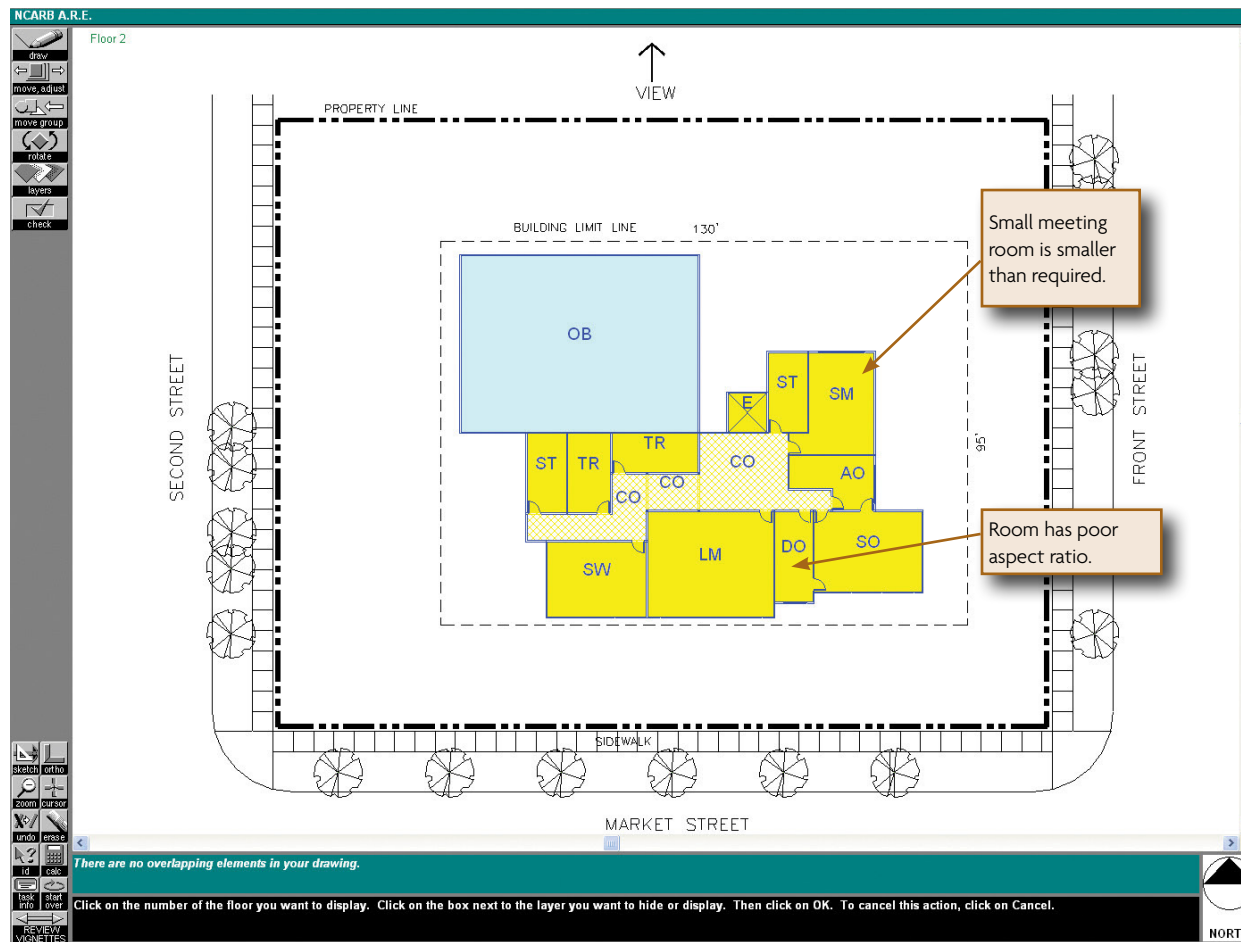


Floor 1

This solution has many problems that resulted in a failing score. The main entrance is from the east instead of from the west, as required. The receptionist (R) does not have adequate visual control over the entrance to the children's room (CR).

SCHEMATIC DESIGN

BUILDING LAYOUT VIGNETTE - Sample Failing Solution



Floor 2

On the second floor, the director and assistant director's offices (DO and AO, respectively) are directly connected to the secretarial office (SO), but the aspect ratio of one of the rooms is unacceptable. Though less important, the small meeting room (SM) is smaller than the program allows.

SCHEMATIC DESIGN

REFERENCES

The following references are presented to assist candidates in preparation for the examination. This list represents texts that have content covered in this division of the examination. This is not intended to be an exhaustive list of all possible reference materials for the subject area. NCARB makes no guarantee that the various references are currently in print.

**The Architect's Studio Companion: Technical Guidelines
for Preliminary Design**

Edward Allen and Joseph Iano
John Wiley & Sons, latest edition

Architectural Graphic Standards

Charles G. Ramsey and Harold R. Sleeper
The American Institute of Architects
John Wiley & Sons, latest edition

Time-Saver Standards for Architectural Design Data

Donald Watson, Michael Crosbie, and
John Hancock Callender, Editors
McGraw-Hill, latest edition