Factors to consider in the selection, design, and installation of heating, ventilating, and air-conditioning system:

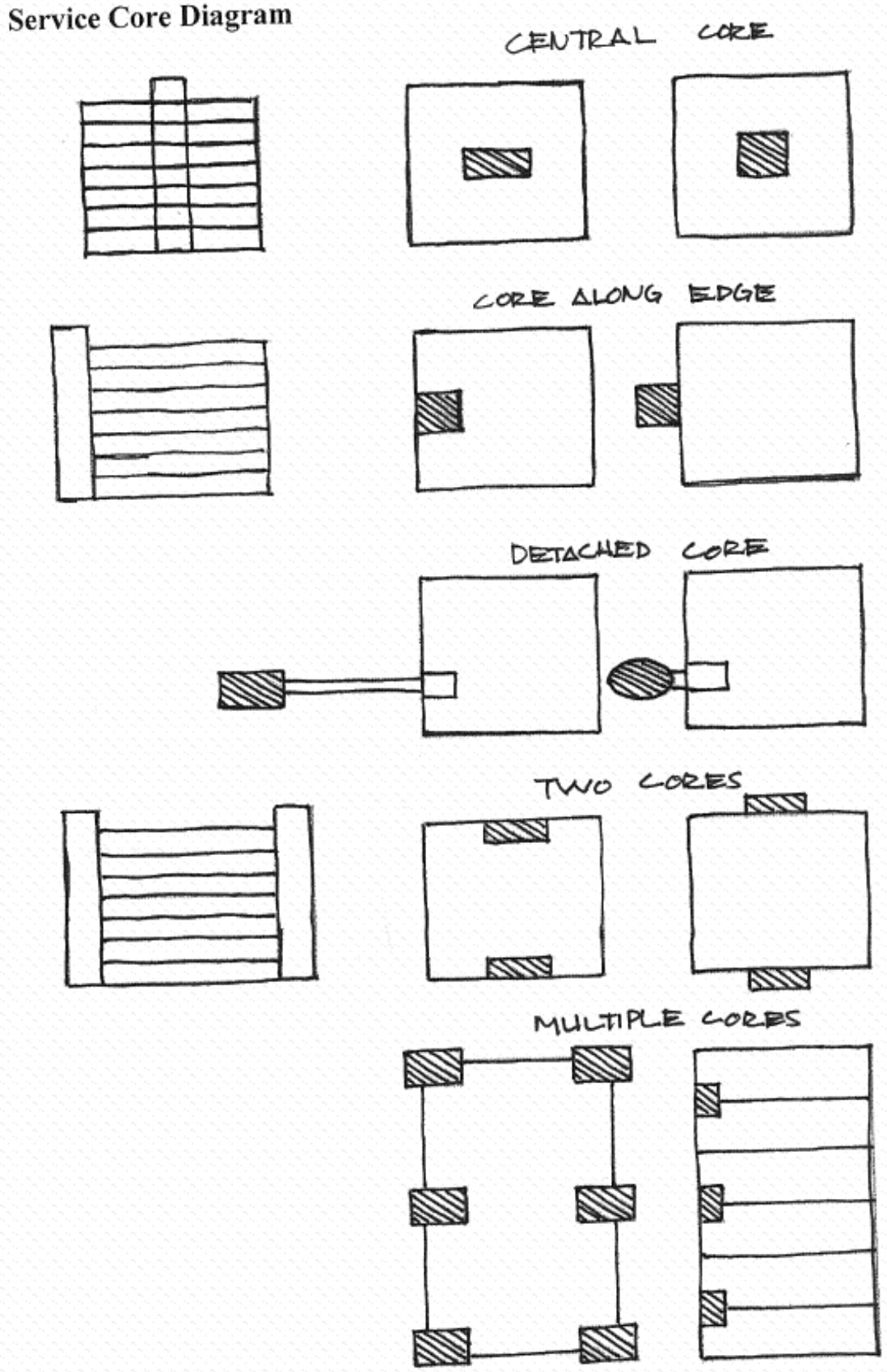
- Performance, efficiency and both the initial and life cost of the system
- Fuel, power, air, and water required and the means for their delivery and storage: some equipment may require direct access to outdoors
- Flexibility of the system to service different zones of a building, which may have different demands because of use or site orientation. Decentralized or local system are economical to install, require short, distribution runs, and allow each space or zone to have individual temperature control, while central system are generally more energy efficient, easier to service and offer better control of air quality.
- Type and layout of the distribution system used for the heating and cooling media. To minimize friction loss, ductwork and piping should have short, direct runs with a minimum of turns and offsets.
- Space requirements for mechanical equipment and its distribution systems. The heating, ventilating and air-conditioning equipment of a building can often occupy 10%-15% of the area of the building; some pieces of equipment also require space or a domain for access, service, and maintenance. Air ducts system require more space than either pipes carrying hot or chilled water or wiring for electric resistance heating. Duct work should therefore be carefully laid out to be integrated with the structure and spaces of a building, as well as with its plumbing and electrical system.
- Access required for service and maintenance.
- Construction requirements for enclosure of the plant, fire resistance, and noise and vibration control.
- Structural requirements imposed by the weight of the equipment.
- Degree of visibility, whether concealed with the construction or exposed to view. If ductwork is to be left exposed, the layout should have a visually coherent order and be coordinated with the physical elements of the space.

Service core

The service core or cores of the building house the vertical distribution of mechanical and electrical services, elevators shafts, and exit stairways. These cores must be coordinated with the structural layout of columns, bearing walls, and shear walls or lateral bracing as well as with the desired patterns of space, use, and activity.

- A single core is often used in high-rise building to leave a maximum amount of unobstructed rentable area.
- Central locations are ideal for short runs and efficient distribution pattern.
- Placing the core along an edge leaves an unobstructed floor space but occupies portion of the daylight perimeter.
- Detached cores leave a maximum amount of floor space but require long service runs and cannot serve as lateral bracing.
- Two cores may be symmetrically placed to reduce service runs and to serve effectively as lateral bracing, but the remaining floor area losses some flexibility in layout and use.
- Multiple cores are often used in broad, low-rise buildings in order to avoid long horizontal runs.
- The cores may be dispersed to better serve spaces or zones that have different demands and load requirements.
- In apartment buildings and other structures housing repetitive units, the cores may be situated between the units or along interior corridors.

Service Core Diagram



Heating and Cooling Distribution Diagram: