

STRUCTURAL ASSESSMENT

EXISTING SYSTEM

The buildings are concrete framed 11 storey buildings with basement. Internal column supports on isolated spread footings. External columns and walls are supported on continuous strip footings.

The primary framing system consists of reinforced concrete Flat Slab of 6 to 9 inch thickness supported on column grid and spandrel beam of reinforced concrete. The column spacing ranges from 8'-8" to 15'-4".

The central core of restrooms and common areas is supported on framing of beams and columns with two way span reinforced slab.

The live load capacity of the structural system as noted on the drawing and as determined by our analysis is as follows.

Locations	Live load (Drawing)	Live load (per Analysis)
Rooms and offices	40 psf	50 psf
Corridors, lounges, stairs etc.	100 psf	110 psf
Roof	20 psf	35 psf

The lateral load is resisted by a moment resisting frame of reinforced concrete beams and columns near the central core.

The existing flooring meets the current live load requirement of OBC. However, the building was not designed for current requirement of seismic loading. Nevertheless, the building is "Grandfathered" from the seismic requirement, if there is no change of use group.

STRUCTURAL CONSTRAINTS

The primary structural requirement of the proposed project will be floor penetrations and support of HVAC equipment of 25-40 Kips weight on the roof. The structural feasibilities of achieving the objectives are as follows.

1. Pipe penetration up to 10" diameter is feasible without any additional reinforcing. Identify the existing reinforcing location. Install new pipe sleeves – grout sleeves solid. A maximum one bar of reinforcing may be cut. Space the penetrations minimum 24" apart, if no bars are cut. Space the penetration minimum 36" apart if one bar is cut in making the opening.
2. Locations of penetrations at exterior walls have significant limitation due to existing spandrel beams - See exhibit "A" for the constraints.
3. Penetrations, 10" X 22" can be made without reinforcing, the formation shown in Exhibit B - field identify existing reinforcing location. Limit maximum reinforcing cut to one bar.
4. Larger openings if required can be made by providing necessary reinforcing. The reinforcing design will require special structural design consideration.
5. Roof top equipment of 25-40 kips can be supported on a new platform constructed on the top of the existing columns (14"X14" – 4 #7) - see exhibit C

Consideration of the height of the equipment platform should be made based upon the maintainability of roofing and aesthetic considerations. Grating and secondary beams can be used as per orientation of equipment.

Fall protection if desired by the University, it can be installed adequately on the roof framing system.

CONNECTOR BUILDING

The connector building discussed would connect Park and Stradley Halls. It shall be designed with a basement level and partial sub-basement below the basement to accommodate the Mechanical equipment required for a chiller plant of sufficient size to provide chilled water to the south campus as discussed in Section 1. The sub-basement footprint shall be reduced to the extent possible so that the required excavation is beyond the zone of influence of the existing footings and the requirements for underpinning are minimized.

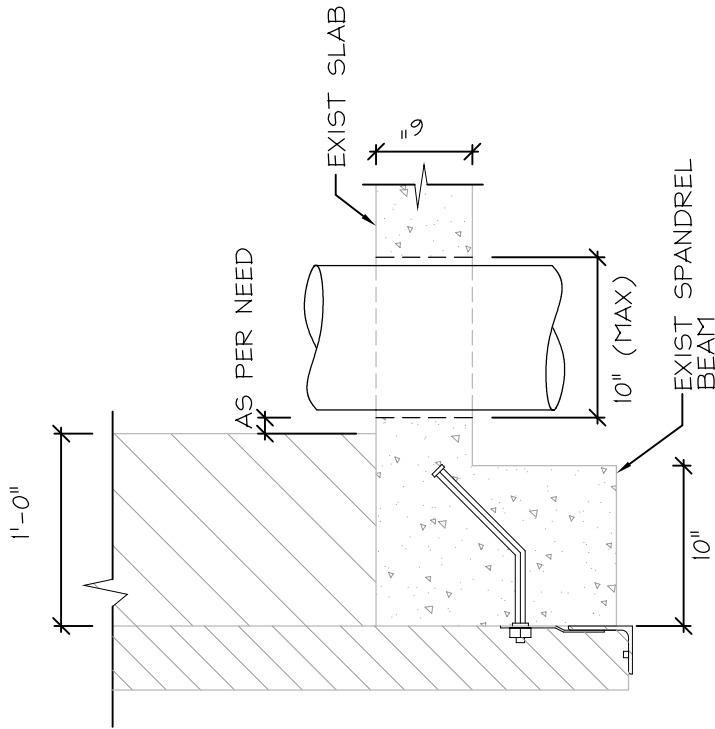
The substructure shall be constructed of reinforced concrete columns, walls, and slab up to the main floor level. Structural steel framing will be utilized for the remaining 10 floors with composite concrete floor deck. The structure shall be designed to support the rooftop HVAC equipment so as to remove this load from the existing buildings.

All floors and structural components shall be designed for the OBC required loading including seismic and wind loads. Load reduction of columns and footing allowed by the code for high-rise buildings shall be utilized.

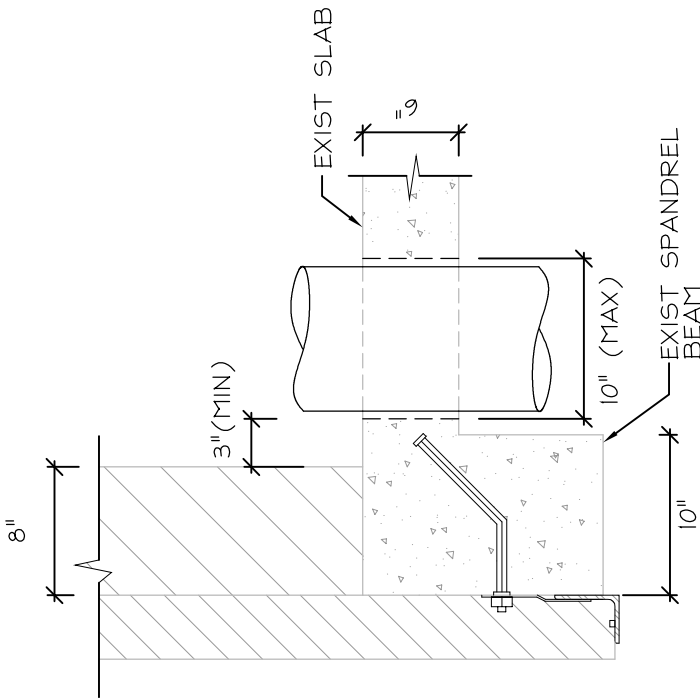
The following are critical considerations for design of the connector building:

1. Verify the floor elevations of each building and design the transition.
2. Provide expansion joint at each existing building.
3. Consideration should be given for the accessibility of installation and subsequent servicing of HVAC equipment while designing the framing system of the basement and sub-basement. Construction of an area well for the basement may be required to address this concern.

4. Design column locations to facilitate HVAC equipment and for designing the superstructure with the desired room layout.
5. Designing the floor plate with composite beam deck will allow us to maintain the floor-to-floor height compatible with the existing buildings. The floor deck shall be 5 1/2" lightweight concrete on 2" composite deck. Therefore, fire protection will be required for only beam and column elements. The floor deck will not need fireproofing (ULD920) for 2 hour rating.
6. Elevator and stair core, if required, shall be reinforced masonry to provide lateral resistance. Strategic bracing of the column shall be designed to minimize moment frames.



NORTH & SOUTH EXTERIOR
WALL SECTION



EAST & WEST EXTERIOR
WALL SECTION

NOTE:
REFER TO D.S. LOCATION IN DWG SHEET -8
(PLAN OF FLOOR 2 TO 11)

SECTION SHOWING ACCEPTABLE PENETRATION THROUGH FLOOR
W/O ADDITIONAL REINFORCEMENT

EXHIBIT A



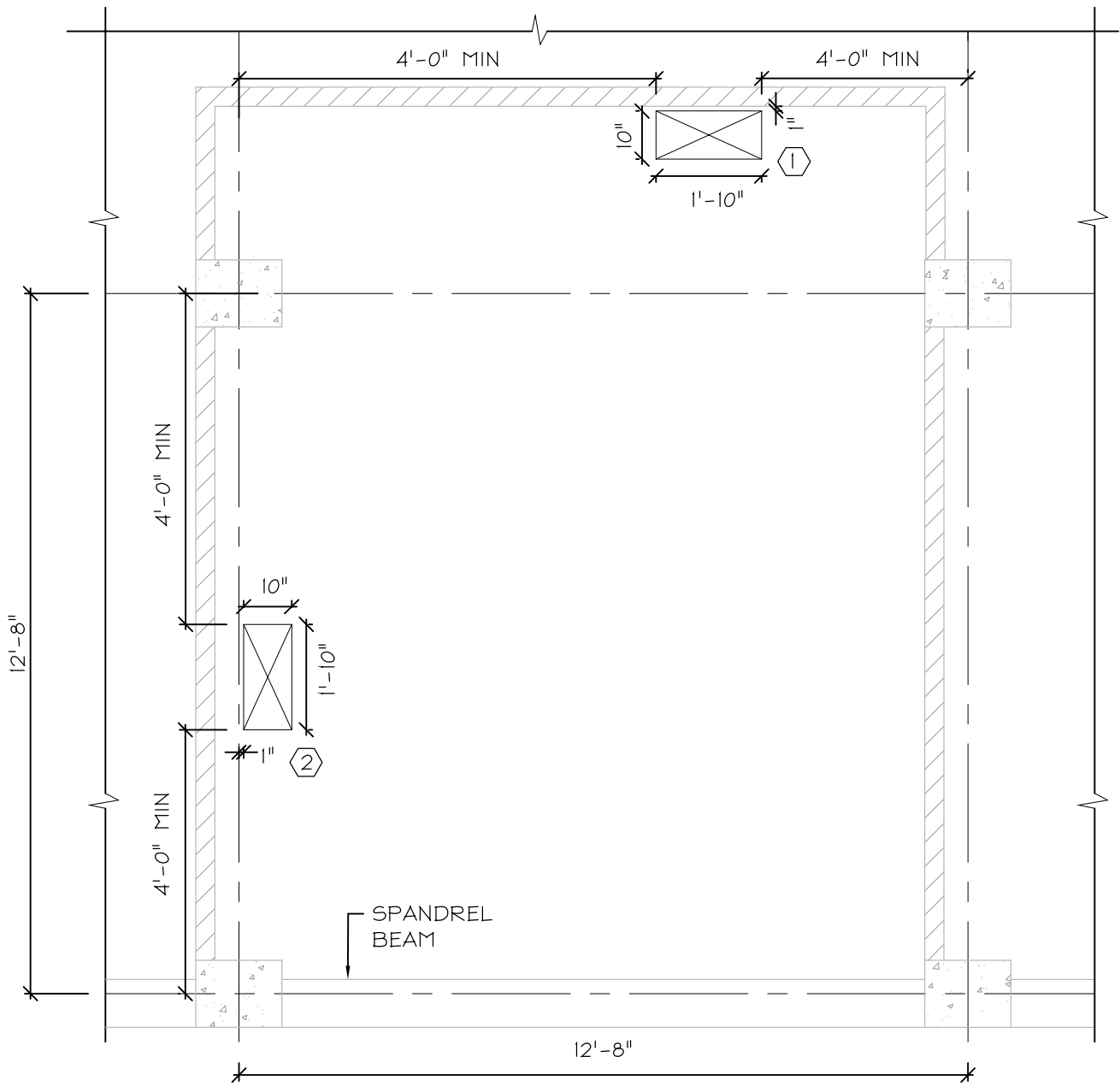
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**SOUTH HIGH RISE BUILDINGS
OHIO STATE UNIVERSITY**

Scale: NTS. Drawing Name: Exhibit A

CODED NOTES

- ① MOST PREFERRED LOCATION.
- ② SECONDARY PREFERRED LOCATION.



TYPICAL BAY PLAN SHOWING DUCT PENETRATION
W/O ADDITIONAL REINFORCEMENT



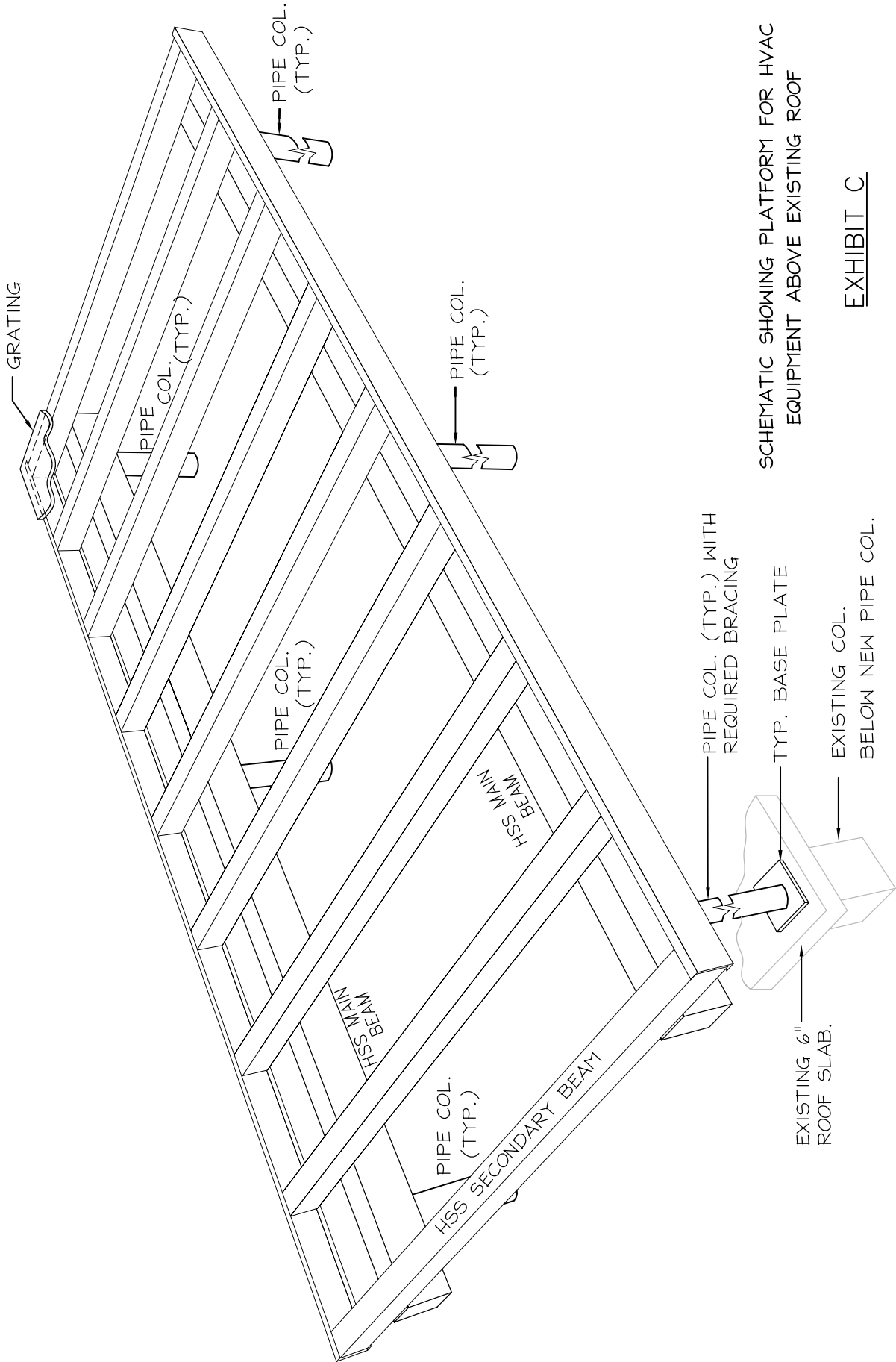
EXHIBIT B



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**SOUTH HIGH RISE BUILDINGS
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Scale: NTS Drawing Name: Exhibit B



SCHEMATIC SHOWING PLATFORM FOR HVAC
EQUIPMENT ABOVE EXISTING ROOF

EXHIBIT C



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**SOUTH HIGH RISE BUILDINGS
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Scale: NTS. Drawing Name: Exhibit C