HEARTWOOD MEDICAL CENTER

University of California, Los Angeles

"Heartwood"

"Heartwood" is the innermost wood of a tree known for its hardness, density and resistance to decay and is prized in lumber

Strength and decay-resistance are desirable for a hospital building subject to seismic activity

Connects to Seattle's love of nature and abundant biodiversity

Architectural Inspiration

Glass facade fits in with the Downtown area of Seattle and lets in natural light beneficial for patient well-being

Ridges provide subtle 3D texture.
As the sun moves across the Seattle sky, this architectural detail produces unique shadows every hour that mimic the Cascade Range

Silhouette fits in with the Seattle skyline yet provides visual variation against the other buildings

Environmental Considerations

Rooftop recreation area to provide areas of respite. Filled with native plants for outdoor water use reduction.

Use of tinted glass to allow for natural light indoors, allowing for stunning views of Seattle and reduced interior lighting.

Using water efficient appliances for laundry, food services, bathrooms, and medical equipment for indoor water use reduction.

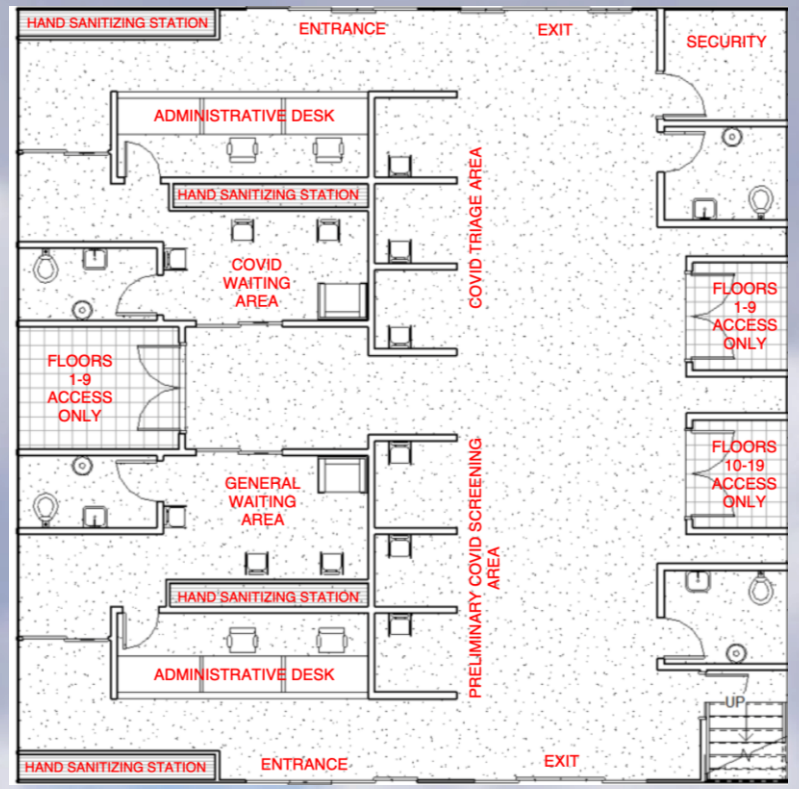
Monitoring air quality and filtration of outdoor air, especially during construction and for higher COVID precautions.

Following ASHEAE 50% Advanced Energy Design Guide for Large Hospitals to increase energy efficiency.

Responsible materials sourcing and a Building Life-Cycle Impact Reduction plan to reduce the amount of new materials used.

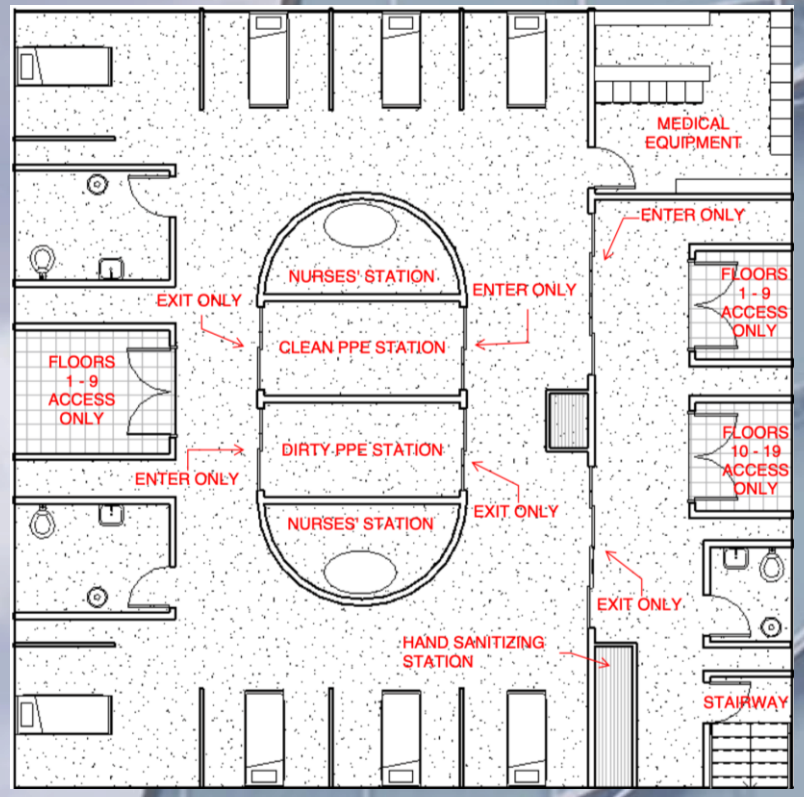
Interior Floor Plans

GROUND FLOOR



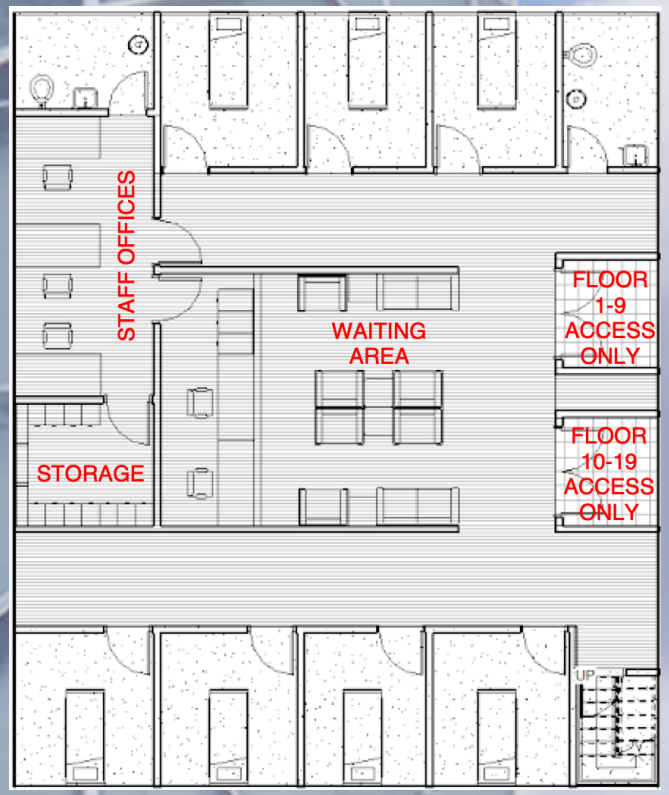
- Separate entrances, administrative desks, and waiting areas for COVID and general patients.
- Triage and screening area to evaluate patient symptoms
- Designated elevators for COVID and General Care floors

COVID WARD (FLOORS 2-9)



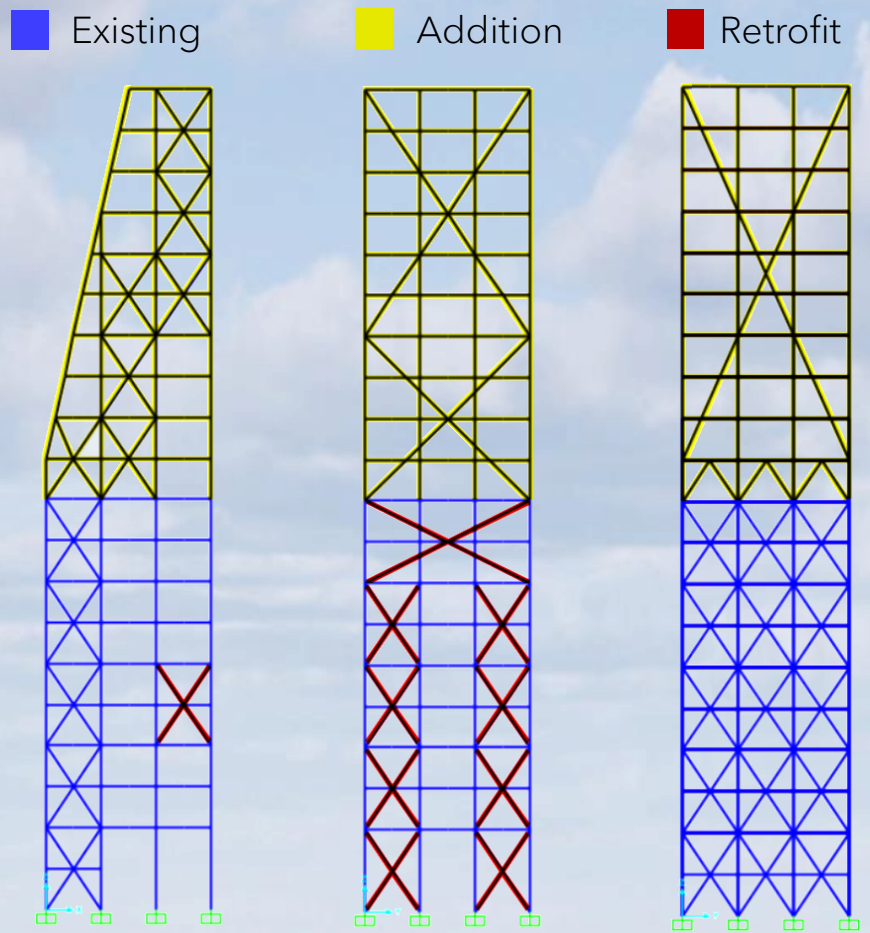
- Effective environment for COVID-related care and operations
- Open floor plan for greater air ventilation
- Isolated PPE and nurse stations
- Directed flow for reduced traffic

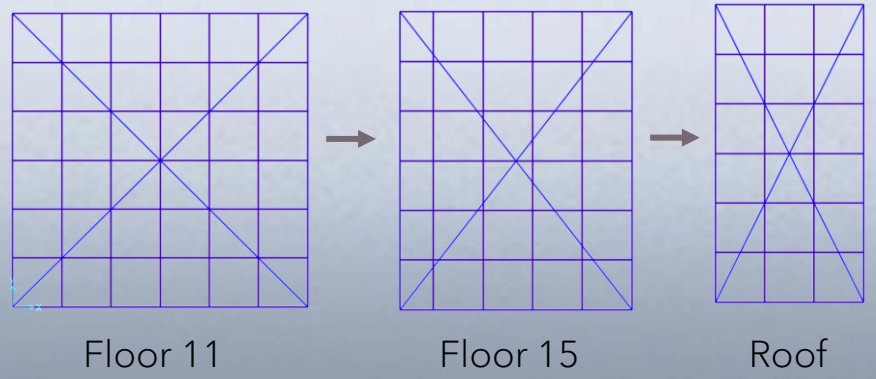
GENERAL CARE (FLOORS 10-19)



- Individual hospital rooms to be used for general practice or COVID care
- Floor plans reduce in size due to the tapering wall which reduces number of rooms

Structural Design





ADDITION

North/South Walls: X-bracing that transitions from the West to East Walls in order to maintain the stiffness of the existing portion and match the tapering of the West Wall

East and West Walls: Large X-braces spanning multiple floors to reduce the difference in stiffness between the East and West walls and minimize the effects of a sudden increase in stiffness between the existing building and the addition

Floors: One large X-brace to assist in reducing torsion

RETROFIT

North/South Walls: Single X-brace to reduce maximum drift

East Wall: Additional bracing of varying sizes to balance the stiffness of the West Wall and move the center of rigidity closer to the center of mass to reduce torsional effects.

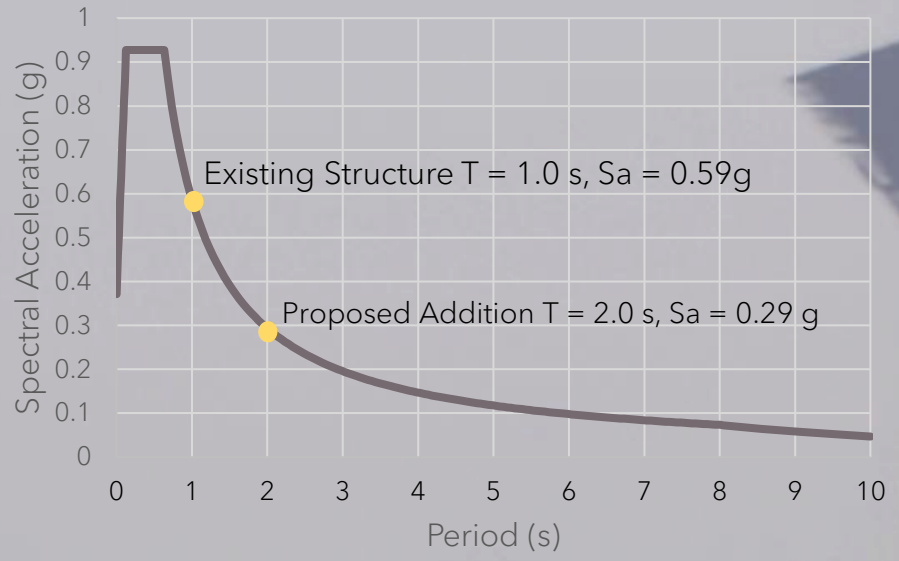
Geotechnical/Seismicity

Seismicity and Subsurface Conditions

- Located in the Cascadia Subduction Zone (CSZ), near Seattle Fault
- Megathrust earthquake every 200 to 1,100 years
- Liquefiable soil from 10 – 90 ft
- Pile foundations should go 115 ft below the surfaces
- $V_{s,30}$= 573.5 m/s after ground improvements

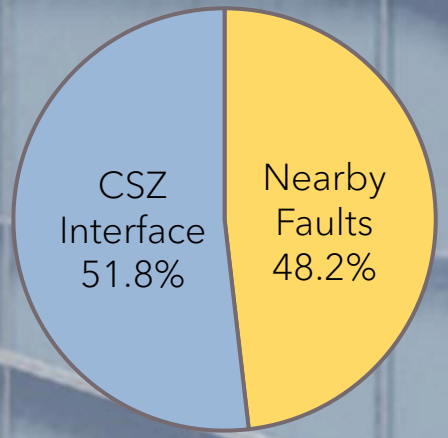
Design Response Spectrum

Risk Category IV, Site Class D

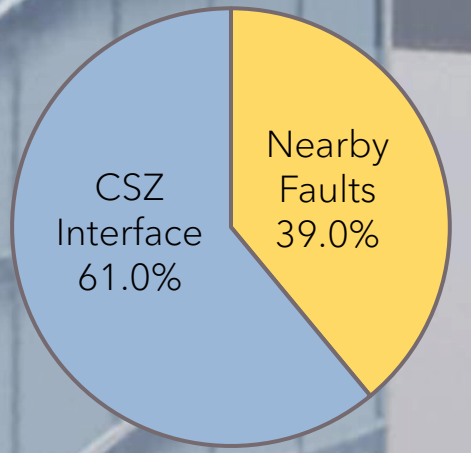


Hazard Contribution

Existing Structure (T = 1 sec)



Proposed Addition(T = 2 sec)



Ground Motion Selection

- Five representative seed motions

Date/Location	Rupture Mechanism
1985 Nahanni, Canada	Crustal (Reverse Oblique)
1989 Loma Prieta, California	Crustal (Reverse Oblique)
2011 Tohoku, Japan	Subduction (Interface)
2010 Maule, Chile	Subduction (Interface)
2001 Arequipa Peru	Subduction (Interface)

- Selected PEER ground motion: 1980 Irpinia, Italy