

Case Studies in Design Excellence for Mid-Sized Urban / Inner Suburban Medical Centers

Compiled by AIA Potomac Valley Chapter,
Envision Prince George's Community Action Team for Transit-Oriented Development,
and Coalition for Smarter Growth

DECEMBER 2012



Preface

Over the last two years, the Community Action Team for Transit-Oriented Development, formed under the *Envision Prince George's* initiative, has worked to educate and engage the public and decision-makers about the opportunity to create walkable communities and transit-oriented development in Prince George's County, Maryland. This group is composed of local civic activists, architects, developers, and concerned residents who seek to create an awareness of the best opportunities for their county's growth and development. The Community Action Team, in collaboration with the non-profit Coalition for Smarter Growth and other partners has convened a series of public forums and tours to examine how the county can realize the potential for creating great neighborhoods and mixed use districts around the county's fifteen Metro existing stations.

As the state and county announced an agreement to create a new leading Regional Medical Center to be located in Prince George's County, the Envision Community Action Team, partnering with AIA Potomac Valley (the local AIA chapter) and the Coalition for Smarter Growth, began to study and compile research for the prospects of building a medical center that could take advantage of a Metro station location, be designed to foster a vibrant, walkable, mixed use environment and be the impetus to bring other development to one of these transit oriented sites. The group analyzed a variety of candidate sites, focusing on existing Metro stations that would have the transportation access and land availability to accommodate the intense demand of a bustling mid-sized hospital center for the region. In July of this year, a public forum was developed and held with medical center design and development experts to discuss the trends in healthcare design and explore how Prince George's can best take advantage of good design, community connections and transit access to bolster prospects of success for a flagship Regional Medical Center to serve both the county and Southern Maryland. This series of local grass roots meetings lead the group to strongly support the idea of locating the medical Center at one of the existing Metro station sites, believing that many positive opportunities for Prince George's County would result.

The group continued to study hospital precedents and examples, and decided there would be value in sharing this information with stakeholders. Working with AIA Potomac Valley, the nation's leading architectural firms were asked to provide case studies on similarly sized hospital centers in similar contexts, with the hope this would inspire and inform the design and planning decisions for our Prince George's facility. The result is the following publication which compiles these exciting "Case Studies in Design Excellence for Mid-sized Urban/inner Suburban Medical Centers." Leading medical architectural design firms, recognized experts in the medical design field, have provided case studies of hospitals and related facilities that demonstrate design excellence in terms of architecture, site design, relationship to surrounding uses, and transit-oriented facility access.

The intention of this publication is to inspire the stakeholders in this process and provide them with leading examples of the very best in design of medical facilities. We hope these case studies will inform and illuminate the decision process to create a state of the art medical center for Prince George's County and Southern Maryland. The Community Action Team for Transit-Oriented Development, with AIA Potomac Valley and the Coalition for Smarter Growth believe this facility has the potential to create pivotal development opportunities for smart growth in Prince George's County, and that it will play an extremely important part in shaping the of future of our county.

Respectfully,

Envision Prince George's Community Action Team for Transit-Oriented Development,
AIA Potomac Valley, and the Coalition for Smarter Growth

Case Study Summary

FIRM	AECOM	AECOM	CANNON DESIGN	CANNON DESIGN	ZGF	ZGF	ZGF	SMITHGROUP JJR	SMITHGROUP JJR	SMITHGROUP JJR	SMITHGROUP JJR	
FACILITY NAME	Mary Catherine Bunting Center at Mercy	American Hospital Dubai	Kaiser Permanente, Orange County Medical Center	Centre Hospitalier De L'Universite De Montreal (CHUM)	Seattle Children's Hospital		Legacy Salmon Creek Medical Center	Children's Hospital Colorado	University of Virginia Medical Center Master Planning	Sutter Health, California Pacific Medical Center Cathedral Hill Replacement Hospital (CPMC)	Kaiser Permanente Los Angeles Medical Center	George Washington University Replacement Hospital
SITE LOCATION	Baltimore Maryland	Dubai, United Arab Emirates	Anaheim, California	Montreal, QC, Canada	Seattle, Washington		Vancouver, WA	Denver, Colorado	Charlottesville, Virginia	San Francisco, California	Los Angeles, California	Washington, DC
BEDS	260	350	262	772	600		220	270	610 (replacement hospital), 72 acuity adaptable beds	929	448	371
BUILDING SQ FT	700,000	700,000	350,000	3,597,000	2,125,000 sf		1,124,000	1,440,000	1.2m sf replacement hospital 127k sf Patient Tower Exp.	1.2 million	912,000	450,000
BUILDING HEIGHT	21 stories	8-9 stories	6-7 stories	20 stories	8 stories		6 stories	9 stories	9 stories	13 stories	7 stories	6-7 stories
SITE AREA	1.5 acres (parking offsite)	11 acres	28 acres	6.77 acres	28.4 acres		24 acres	48 acres	8 acres	2.43 acres	3 acres	2 acres
AFFILIATED SUPPORT USES	Surrounding blocks include outpatient clinic, parking	3 main buildings: original hospital (180,000 sf), outpatient clinic (190,000 sf), new hospital/bed tower (430,000 sf)	Medical office building (MOB1) (117,000 sf), MOB2 hospital support (178,000 sf), central plant (32,000 sf), Phase 3: MOB3 (100,000), admin bldg & garage (130,000 sf)	Diagnostic & therapeutic plinth & bed tower (2m sf), B1 ambulatory (628,574 sf), B2 ambulatory (185,905 sf), B3 office tower (482,483 sf), B4 auditorium (36,479 sf)	850,000 sf medical office & outpatient services		Two four-story medical office buildings	Administrative pavilion with materials management, medical records, fitness center, blood donor center, training center, faculty & admin offices	Children's outpatient center (28,000 sf), 7000 sf outpatient cancer center, parking structures, heating/chiller plant	MOBs, outpatient services	MOBs off site	MOBs off site
TRANSPORTATION ACCESS	Bus route stops within 1 block, Light Rail & Subway stations ½ mile away	Bus route stops at hospital's front entrance; 2 Metro stops within 0.25 miles	Metrolink rail station within ¼ miles;	Metro station 350 meters from main entrance; several bus routes	Transit station for shuttles, buses; bicycling facilities, enhanced pedestrian pathways, trail access		Bus stop on a C-Tran bus route	Bus stop on the University of Colorado medical loop & on the main city bus route. (Site next to a planned future light rail line.)	University Transit Service, Charlottesville Area Transit, free shuttle	Site is city block on arterials with major bus lines, planned BRT, BART & MUNI light rail 11-12 blocks away	Red line Metro light rail station within one block; major bus routes	Metro rail station at entrance; bus routes; Capitol Bikeshare; bicycle access & facilities
PARKING	800-car structure offsite	825 spaces—400 above- & 400 below-grade w/ 125 surface	1,500 underground parking spaces	1,215 underground spaces	3,100 spaces		1,464 spaces in a 7-story structure	1173 spaces—506 for staff garage & 667 for visitor garage		513		Off site
HELICOPTER TRANSPORT			Helistop	Heliport planned	Heliport on-site		Heliport on-site	Heliport on-site	Helipad			
GREEN SPACE FEATURES	8th floor multilevel rooftop garden; ground level historic Preston Gardens	Main plaza/fountain, interior courtyards	Healing garden, subsidiary garden, courtyard spaces, gardening spaces, fountains & contemplative areas	Open spaces throughout project, providing sunlight, contemplative spaces, views to the city, entry garden with amphitheatre	Certified LEED Gold, garden courtyard, green roofs, green perimeter & south edge garden zone, walking paths with garden edges & landscaped core, 41% of site is open space		Rooftop healing gardens, central courtyard with fountains & seating, pedestrian bridges linking hospital with medical office buildings	Roof decks, terraces, outdoor gardens & with children's play areas, \ views of the Rocky Mountains to the south & west	Plan provides a series of legible, connected & pleasant open spaces, takes advantage of the natural beauty of the site, helps connect Medical Facility to rest of UVA campus			
COMMUNITY CONTEXT	Within ½ mile of housing, offices, restaurants, hotels, retail	Within ½ mile walk of mixed uses: housing, offices, restaurants, hotels, retail	Within ½ mile of malls, restaurants & commercial industrial businesses, housing	Occupies 2 full blocks in heart of downtown Montreal, close to subway stops	Urban neighborhood, close to residential retail		Residential, suburban neighborhood	Located on the 160 acre Anschutz Medical Campus at the University of Colorado Denver	On University campus with restaurants, cafes, food stores, & within ½ mile of other retail & services	Dense urban site located at edge of downtown	Dense urban downtown Los Angeles	Mixed use urban context, edge of downtown
YEAR BUILT	Bunting Center Completed in 2010	Project master plan: 2001 – 2011 (original: 1997)	2012 – phases 1 & 2; phases 3 & 4 are future development	Phase 1 – 2016, Phase 2 - 2019	2011-2013		2003-2005	2004-2007	2004, Patient Tower: 2012	2015	2008/2013	2002

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Prepared for AIA Potomac Valley Chapter,
Envision Prince George's Community Action
Team for Transit-Oriented Development, and the
Coalition for Smarter Growth

**Design Excellence for Mid-Sized Urban/Inner
Suburban Medical Centers**

October 10, 2012





10 October, 2012

Attention:
 Cheryl Cort, Chairperson, Envision Prince George's County Community Action Team for Transit Oriented Development; Policy Director, Coalition for Smarter Growth
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 Washington, DC 20002-4939
 O: 202-675-0016 x 122
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RE: Call for Case Studies in Design Excellence for Mid-Sized Urban/Inner Suburban Medical Centers

Dear Ms. Cort:

AECOM is pleased to submit the enclosed information regarding our most recent experience in designing urban hospitals.

Formed from some of the world's leading consultancies, including renowned healthcare architecture firm Ellerbe Becket (now practicing under the AECOM brand name), we are configured to address the complex challenges facing clients as they embark on projects involving land, community or infrastructure. From local studios and offices we serve clients in more than 125 countries, drawing on a worldwide network of knowledge and expertise.

AECOM is ranked among the top healthcare design consultancies in the world, with a more than 100-year legacy of innovative healthcare planning and design. We are one of only a handful of firms with a formalized program in healthcare education and research. We pride ourselves on bringing forth innovative design solutions to deliver global healthcare projects that are operationally efficient, state-of-the-art, and culturally sensitive. We believe that the ultimate architectural outcome must be holistic and integrated – meeting the healthcare goals of our clients and sustaining the communities they serve.

If you have any questions or comments please feel free to contact us. We hope you find this information to be helpful in your efforts.

Sincerely,

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Although most of human history has seen the vast majority of people living in rural environments, the population of urban areas has been steadily on the rise over the last two centuries. The 1800s started with just three percent of the world's population living an urban lifestyle. By 1900 the percentage had grown to 14 percent and then doubled to almost 30 percent by 1950. In 2008, for the first time, the world's population was evenly split between urban and rural areas. Urban growth is projected to continue its increase with expectations that 70 percent of the world population will be urban by 2050. In the United States, according to the 2010 census, the urban population is already more than 80 percent of the population.

This urban growth trend places a particular emphasis on developing sound strategies for designing hospitals within the city. From a sustainability standpoint, there are many positives to channeling healthcare development into urban areas. These include reduction of automobile pollution, reduction of development footprint, reducing heat islands, limiting disruption of natural water flows, and enhancing density and community connectivity. At the same time, building a modern hospital within the density of a city presents challenges. Described below are the three primary challenges that AECOM faces when designing urban hospitals. Two of our most recent urban hospital designs, The Mary Catherine Bunting Center at Mercy Hospital (Baltimore, Maryland) and the American Hospital Dubai (Dubai, United Arab Emirates) are used to illustrate how these challenges can not only be overcome but can be opportunities for synergistic design solutions that provide state-of-the-art healthcare while adhering to sound urban design principles. A more complete description of these two hospitals can be found on the following pages.

Access

One of the primary success factors for proper healthcare design is convenient and easy access to and from the facility. This includes simple way-finding, safe and weather-protected vehicular drop-offs, and convenient access to parking. In addition, a modern healthcare facility requires multiple entrances, four at a minimum: main patient entrance, emergency department entrance, ambulance entrance, and service dock. Such access is often at odds with urban planning trends, which attempt to minimize the impact of vehicular transportation in favor of more pedestrian-oriented buildings. Solutions that blend the needs of a healthcare facility with those of its urban surrounding must be sought.

The parking demand of an urban hospital is generally lower than that of its suburban or rural counterparts (exact amounts will vary by facility). Access to public transportation and housing within walking distance creates opportunities for staff and certain patients and visitors to avoid vehicular commuting altogether. This reduces the polluting impact of automobiles and can minimize the size of required parking facilities. It should be noted, however, that even with these reductions, hospitals will still generally create a much higher parking demand per square foot than a typical urban office building. This is due to the acuity levels of patients, a population that tends to skew toward seniors, and the increased parking demands of a 24-7 operation where staff shifts overlap by up to an hour and those coming or going at night-time are less likely to rely on public transit. The best practice is for the design team to meet as early as possible with zoning officials to begin the discussions of parking requirements so that working together, appropriate targets and strategies can be put in place.

The Bunting Center at Mercy Hospital (Baltimore, MD) established one main drop-off on the west side of campus and an emergency department drop off on the east side, shared by both patients and ambulances. Both drop-offs are positioned beneath the footprint of the building, bordered along the road by an arcade. This allows the building to continue the urban edge established by



the neighboring facades. An 800 car parking structure was constructed one block east of the Bunting Center and a pedestrian “sky-bridge” was constructed to provide safe and convenient access.

At the American Hospital Dubai (Dubai, United Arab Emirates) there was a need for three major public entrances: the main hospital, specialty clinics, and an outpatient center. The strategy developed was to create one main curb cut through which vehicles enter into an urban piazza, surrounded on three sides by buildings, each side containing one of the three major entrances. Parking was hidden away on two levels beneath the piazza, providing simple wayfinding and extremely convenient access via elevators directly into the main lobby.

Limited Footprint and Future Growth

A general “rule of thumb” size requirement for a suburban or rural 200-bed hospital site is a minimum of 40 acres. This would provide adequate room for the initial building, associated drop-offs and parking as well as room for future growth. Whether it is the expansion of the hospital itself, outpatient clinics, or specialty centers, growth must always be anticipated. Urban hospitals must plan for similar growth, but within sites that are often 10 acres or less. From a sustainability standpoint, this limited footprint obviously disturbs less land, reduces the heat island effect, and limits the disruption of natural water flows. The challenge is to create a design that does not compromise the necessary flows and functions of the medical practice.

At the Bunting Center, built on a 1.5-acre site, vertical stacking was the key to a successful design. Departments such as emergency and radiology, which generally function side-by-side were stacked one over the other. Public and service elevators were consolidated into one block and positioned in the southwest corner of the site. This allowed a maximum amount of footprint to remain free from vertical obstructions so it can contain regular medical planning modules. Knowing that the vertical expansion would be a challenge above the patient floors, the 21-story height was completely built out in the initial construction, even though all of the floors were not immediately necessary. Over time, Mercy will continue to fit out the vacant floors as demand increases. Diagnostic departments that may require future expansion are located adjacent to “soft-space,” such as administrative areas. These are spaces that could function outside of the hospital, in neighboring buildings if required, creating room for future diagnostic growth.

The American Hospital Dubai started on an 11 acre footprint. The key to its success was the early establishment of a master plan for continued growth across the site. This allowed future additions to be constructed in a way that always contributed to the campus and the urban fabric as a whole, rather than having a series of piecemeal developments with conflicting design intentions that many hospitals often succumb to.

The planning of both hospitals also took into account their overall surroundings. While the immediate footprint may be smaller than most of their rural counterparts, the ability to have pedestrian connections to the surrounding community allows the experience for patients, visitors and staff, to be larger reaching. Whether it’s walking to a nearby restaurant to avoid yet another meal in the hospital cafeteria or the convenience of a nearby hotel for someone visiting a sick relative, the advantages of an urban location in terms of supporting services cannot be overstated.

Connecting to the Natural Environment

Study after study has concluded that a natural environment is essential to creating a genuine state-of-the-art healing environment. Spending time in outdoor places of respite has been shown to reduce stress (important for staff and visitors) and views to nature have been credited with



reduced pain levels and shorter hospital stays. Both the American Hospital and the Bunting Center demonstrate that in terms of access to nature, urban hospitals need not concede anything to their rural counterparts.

The American Hospital Dubai, which sits within a desert climate, takes a courtyard approach to places of respite. The major components of the campus are each centered on a shaded courtyard or atrium containing interior landscape and fountains. Connected by arcaded walkways, these courtyards create the major circulation sequence across the campus. Each of the courtyards allows views out onto the main entry plaza, uniting the campus into a whole.

The Bunting Center had the advantage of being located across the street from a small linear park, the historic Preston Gardens in the heart of Baltimore. The main entrance and visitors lobby was situated to view directly out onto the gardens. Paving patterns were designed to calm traffic along the street in front of the Hospital and allow pedestrian connections to and from the park.

However, the centerpiece of the Bunting Center’s healing environment is the multi-level roof garden, located midway up the 21-story building. Comprising a third of the building’s footprint, the three-level garden offers unexpected views to nature and places of respite within a bustling urban environment. All occupants have access to the main garden on the 8th floor. A vibrant healthcare community is formed as visitors, patients, and staff mingle among the seasonal gardens and lunch under the trellis while enjoying views of Baltimore’s skyline. The 9th floor garden serves as a private upper level retreat for the ICU department. In this high-stress environment, families and staff have direct access to the garden from the ICU waiting room. The 10th level garden combines with the 2 levels below to complete a landscaped tapestry which is appreciated from the patient rooms above.

The roof-garden itself is a key sustainable design element in that it minimizes the building’s heat-island effect, reduces demand on storm water systems, improves surrounding air quality, and reduces noise pollution. As such, it not only provides an amenity for the building’s occupants, but is respectful of the wider community as well.





The Mary Catherine Bunting Center at Mercy Baltimore, Maryland

Beds – 260 beds

Building Area – 700,000 sf

Site Area - 1.5 acres (a parking structure was built separately, not included in this zone)

Affiliated Support Uses – The Bunting Center is primarily an inpatient hospital consisting of nursing units and diagnostic and treatment spaces. Within the surrounding blocks are existing related facilities, namely an outpatient clinic, the original hospital (currently being regenerated into outpatient and administrative functions), as well as associated parking structures).

Transportation Access – Bus route stops within one block of the Bunting Center. Light rail and Subway stops are within approximately 0.5 miles.

Parking – The Bunting Center is supported by an 800-car parking structure

Community Context – The Bunting center is within a half-mile's walk of a variety of mixed-use functions, including housing, offices, restaurants, coffee shops, pharmacy, hotels, and retail.

Year Built – The Bunting Center was completed in December 2010. Mercy Hospital has had a presence in Baltimore as far back as 1847.

Mercy Medical Center takes green architecture to a new level—the 8th floor, to be precise—by creating an expansive, multilevel rooftop oasis in the center of downtown Baltimore. Instead of moving to the suburbs, as some urban hospitals have, Mercy Medical Center brings the verdant landscape of the country garden to the city and continues its mission of providing healthcare to Baltimore's needy that dates to 1847. The architecture embodies this dual role of service to the city and to its citizens by respecting urban context and streetscape and by recognizing the importance of the human scale.

Providing High Quality Healthcare Design and Sustainable Solutions

Locating the hospital in the city represents a commitment to a core principle of green design: a site that sustains existing infrastructure and amenities. With the main entrance and lobby directly across from Preston Gardens, the building contributes directly to city life by inviting the use of the park and enlivening the streetscape. A generous entrance arcade brings visitor traffic into the hospital's footprint and out of the sidewalk zone. A stair tower clad in translucent glass marks the intersection of two significant pedestrian paths and becomes a beacon of light at night, a symbol of the hospital's charitable mission.

The theme of light and luminosity continues throughout the main public spaces and creates an atmosphere of serenity and openness. Translucent art glass panels engraved with the hospital's history welcome visitors to the lobby. The serene Chapel of Light occupies a prominent spot off the lobby and features a wall of engraved glass softly backlit with natural light. With all public elevators located in one corner of the footprint, visitors to the nursing units (above the 8th floor) pass through glass-walled corridors offering daylight and views to the garden below that are both calming and orienting.

Designing Places of Respite

As an urban gesture, the roof garden, which spans from the 8th to 10th floors, functions as an addition to the landscape of Preston Gardens, setting aside a third of the building's footprint for open space. As a centerpiece of the hospital's healing environment, the garden offers views to nature for nearly all visitors, with access from the 8th floor to the main lower garden and from the ICU waiting area on the 9th floor to a private upper-level retreat. By establishing a ground plane on the 8th floor level, the garden minimizes the perceived height of the building and introduces a more human scale.

Image and Principle Mission—Contextually Sensitive, Architecturally Inspirational

The massing and articulation of the design also demonstrate an appreciation for scale, both in terms of urban context, as well as human perception and experience. The building takes advantage of a steeply sloped site to minimize height at the principal façade on St. Paul Street, with the main entrance on the 3rd floor. Given the deep setback at the roof garden, the building presents a relatively modest six-story face to the street, a scale that belies the hospital's actual size and complements the character of Preston Gardens and the 19th century townhouses on the other side of the park.

The crisp contrast of taut glass and aluminum against panels of soft red brick further articulate the building into overlapping and interwoven layers. This subtle play on planes breaks down the massing into smaller elements that engage the eye and invite observation and discovery. This active interaction between architecture and observer conveys a sense of permeability and openness, a fitting metaphor for the hospital's traditional mission of outreach and care as well as for its renewed commitment to the city and urbanism.



The Mary Catherine Bunting Center at Mercy Baltimore, Maryland



As an urban gesture, the rooftop gardens serve as a tiered extension of the historic Preston Gardens.

AECOM's Involvement – AECOM served as the architect; medical planner; interior designer; and mechanical, electrical, plumbing, and structural engineer for the Mary Catherine Bunting Center.



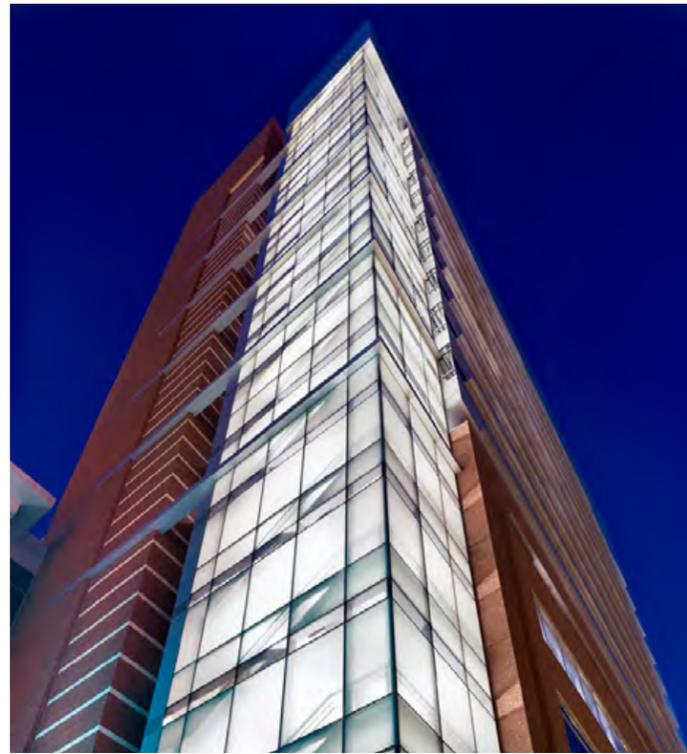
Public spaces: main entrance and two pedestrian skyways (below) converge upon a welcoming lobby (left).



The Mary Catherine Bunting Center at Mercy Baltimore, Maryland



8th floor level roof garden



Stair tower clad in translucent glass

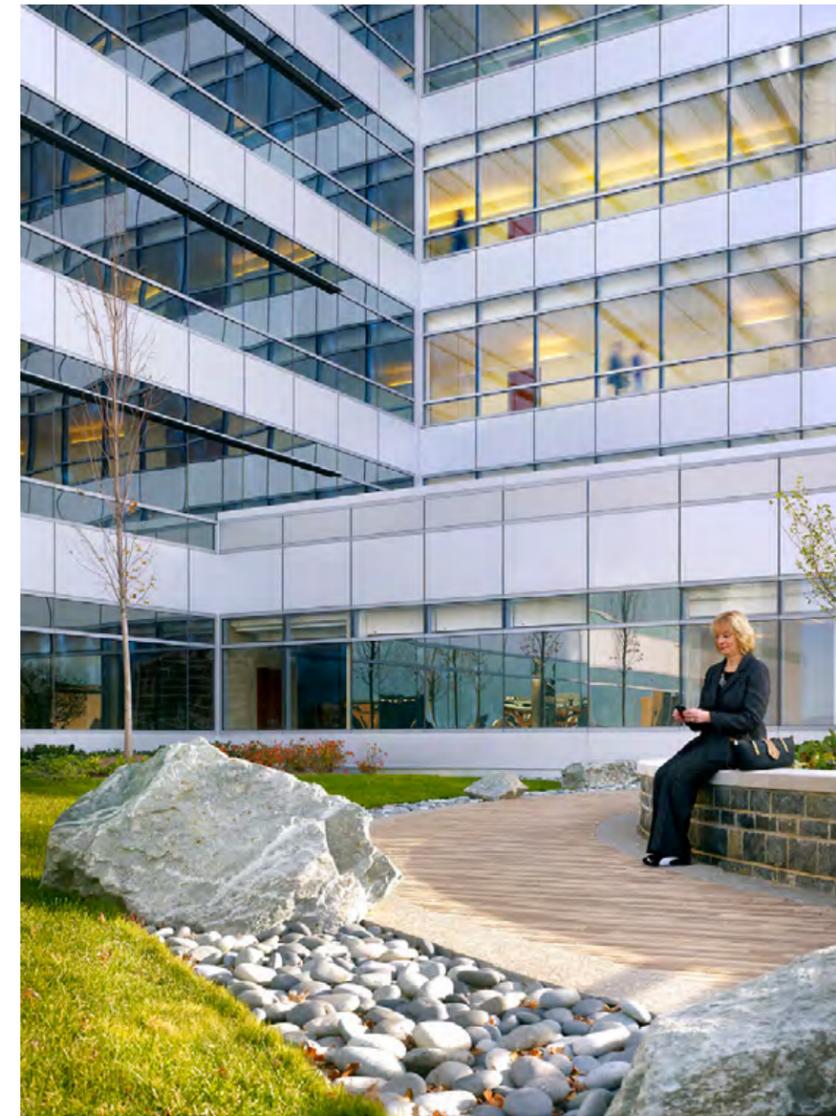


View of west and south elevations



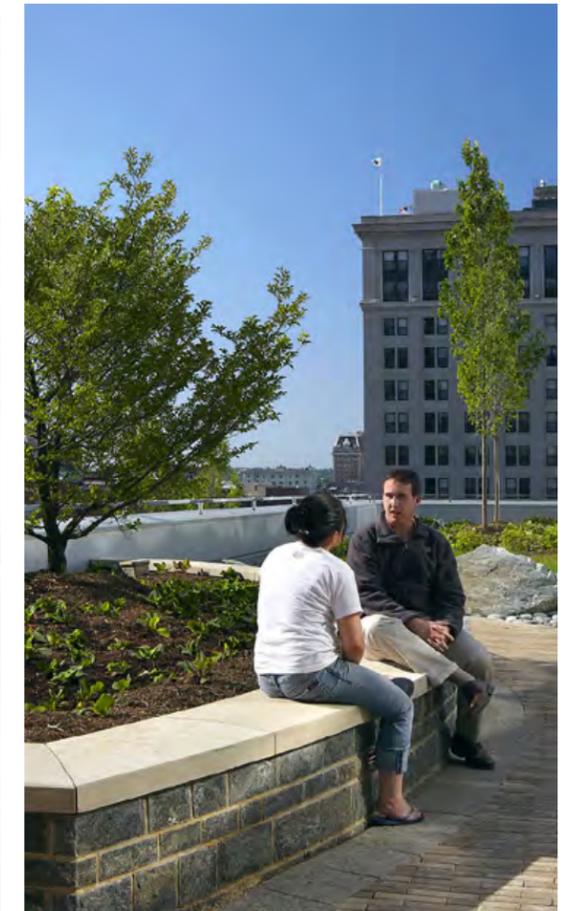
View of north and west elevations

The Mary Catherine Bunting Center at Mercy Baltimore, Maryland



Places of Respite

Staff members takes a break from a high-stress environment on the rooftop garden

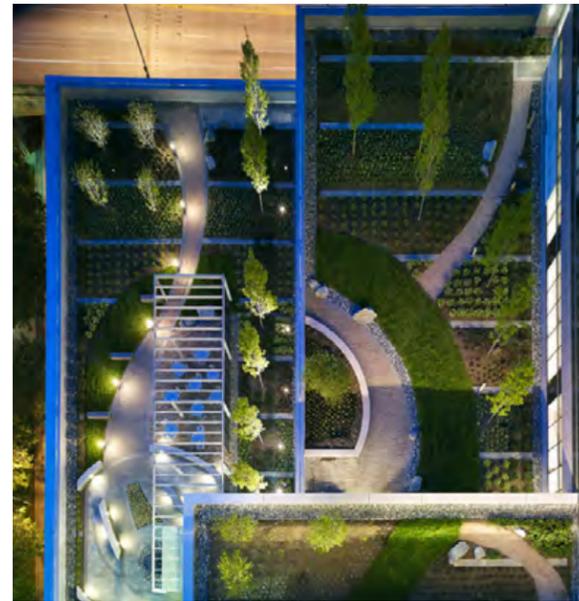


Patients view nature on the rooftop garden and the city skyline



Family members see the iconic downtown from the surgery waiting room

The Mary Catherine Bunting Center at Mercy Baltimore, Maryland



Visitors pass through glass-walled corridors that offer natural light and views of the rooftop gardens that offer views and places of respite to the users of this building.



American Hospital Dubai Dubai, United Arab Emirates

Beds – 350 beds

Building Area – 700,000 sf (includes inpatient hospital and outpatient facilities)

Site Area – 11 acres (contains inpatient hospital, outpatient facilities, parking structures – above and below grade)

Affiliated Support Uses – The site is made up of three main buildings: the original hospital (180,000 sf) consisting of nursing units and diagnostic and treatment spaces, an outpatient clinic (190,000 sf), and a new hospital/bed tower addition (430,000 sf) consisting of nursing units, conferencing/administrative space and a cancer center.

Transportation Access – Bus route stops at the Hospital's front entrance. two Metro stops are within approximately 0.25 mile.

Parking – The hospital campus contains a total of approximately 825 parking spaces (400 in an above-ground structure, 400 below-grade, and 125 surface spaces).

Community Context – The American Hospital Dubai is within a half-mile's walk of a variety of mixed use functions, including housing, offices, restaurants, coffee shops, hotels and retail.

In 1997, when the American Hospital Dubai first opened the doors of its modest 100-bed, American-style community hospital, the structural feats that would soon define the image of Dubai—man-made islands, indoor ski slopes, and the world's tallest building—were still architectural dreams. In contrast to the build big, build fast spirit that would mark the local building industry's ethos over the next decade, the American Hospital, working with AECOM, focused on establishing a thought-out master plan that could be methodically implemented over time. This allowed for assets to be maximized and provided flexibility for evolving programs, while maintaining a campus-like sense of place and organization. Fifteen years later, with half-completed skeletons of overly-ambitious projects dotting the Dubai landscape, the American Hospital opened a sparkling new addition. This crown jewel on a campus that had steadily grown through a process of expansions and renovations became one of the premier healthcare facilities in the Middle East and includes 350 beds, an outpatient clinic, and a solid platform for expanding centers of excellence.

Programmatic Response—Setting a Vision for the Future

The original three-story hospital was a simple, non-descript building situated in the northeast corner of an 11-acre site, surrounded by surface parking. By 2000, increased patient volumes placed growing pressure on the facility and operations. AECOM developed a master plan for continued growth across the site and established an image appropriate for an institution with a fast-developing reputation as the premier healthcare facility in the region.

This master plan focused on maximizing the available real estate, while creating a pathway for campus growth that would support quality healthcare delivery in an environment that was both welcoming and state-of-the-art. The plan called for measured growth and renovation, to be implemented in four phases, responding to projected operational needs and budgets. The first three phases were completed in the 10 years that followed.

- **Phase 1** was designed to quickly respond to immediate barriers to continued success. The team identified non-critical functions that could be temporarily decanted, freeing space within the existing envelope for an expanded emergency department, nuclear medicine program, and cardiac catheterization department.
- As part of AECOM's master plan, **Phase 2** included constructing an above-ground parking structure along the site's western perimeter. Not only would this absorb the growing parking demand, but would also transform current surface lots into viable platforms for future projects. The phase also included an outpatient facility to flank the western edge of the entry plaza. This construction allowed for the consolidation of all outpatient functions into one central location and created a permanent home for the functions decanted in Phase 1. This phase was designed by another firm and completed in 2006.
- **Phase 3** included the construction of a major addition along the east edge of the entry plaza that would provide expansion for the growing inpatient needs and serve as the Hospital's new main entrance with a grand atrium appropriate to the growing campus. The team identified soft departments, such as administration, conference, education, admissions, and retail, to be relocated in the new tower, allowing for backfilled growth of diagnostic and treatment departments in the original building.
- A planned **Phase 4** calls for a two-level vertical expansion of the original hospital. Since this construction requires vacating the existing top-floor nursing units, it is planned as the final phase of the master plan implementation, so that the temporary decanting of beds can be absorbed within the Phase 3 tower.

Image and Principle Mission—Culturally Sensitive, Architecturally Inspiring

A guiding principle for design intent was set forward during the master planning phase: all renovation and additions should reflect the hospital's high-quality standard of care, and consist of a hospitality-inspired environment that would appeal to both local and international clientele. The



American Hospital Dubai
Dubai, United Arab Emirates

American Hospital Dubai
Dubai, United Arab Emirates

healthcare market in the Middle East is highly competitive; therefore, hospitals must be attractive to both patients and physicians in terms of available amenities, leading-edge technology, high quality finishes, and overall quality of care. Through a complex series of renovations and additions, the design team provided the American Hospital with private rooms off single-loaded corridors, which improve patient safety, comfort, and privacy, while also providing ample support space for staff. It is customary in this region for a patient to be accompanied by both immediate and extended family members. In recognition of this, provisions for large families are provided in both patient and public spaces. Amenities such as fully serviced tea kitchens within waiting areas and day rooms are located throughout the facility, and sleep-in space is provided in all patient rooms.

The arrangement of subsequent additions around the existing main plaza and fountain organizes the campus into a logical whole. All entries dispersed around the main court feature multiple height lobbies, creating a sense of arrival and serving as a series of interior courtyards around which related programs are organized. The main public circulation connects these interior courts by wrapping arcades compactly about the entry court, allowing views toward adjacent wings through the exterior landscape, a nod to the familiar Islamic courtyard.

At the head of the entry court, the new atrium of the Phase 3 addition becomes the intuitive focal point and an obvious main entrance to the hospital. Bold architectural elements such as the broad, sheltering overhang and expanse of glass forge a cohesive, unified design, speaking to notions of transparency and modernity. Patient services and amenities, such as admitting, education, retail, and refreshment, are conveniently accessed via the new atrium, providing an active space.

Flexibility—Adaptability for the Future

Flexibility for future needs was both a guiding principle of the master plan and a primary driver of all renovations. The designers located vertical cores to allow convenient access for visitors along the front edge of clinical spaces, while service cores are spread across the back edge, allowing the transfer of in-patients and supplies. Modular healthcare planning layouts, free from major vertical penetrations, allow for acuity adaptable spaces and future flexibility. We designed two patient floors within the bed tower to be shell-space, which will easily accommodate future renovations.

Successful Design

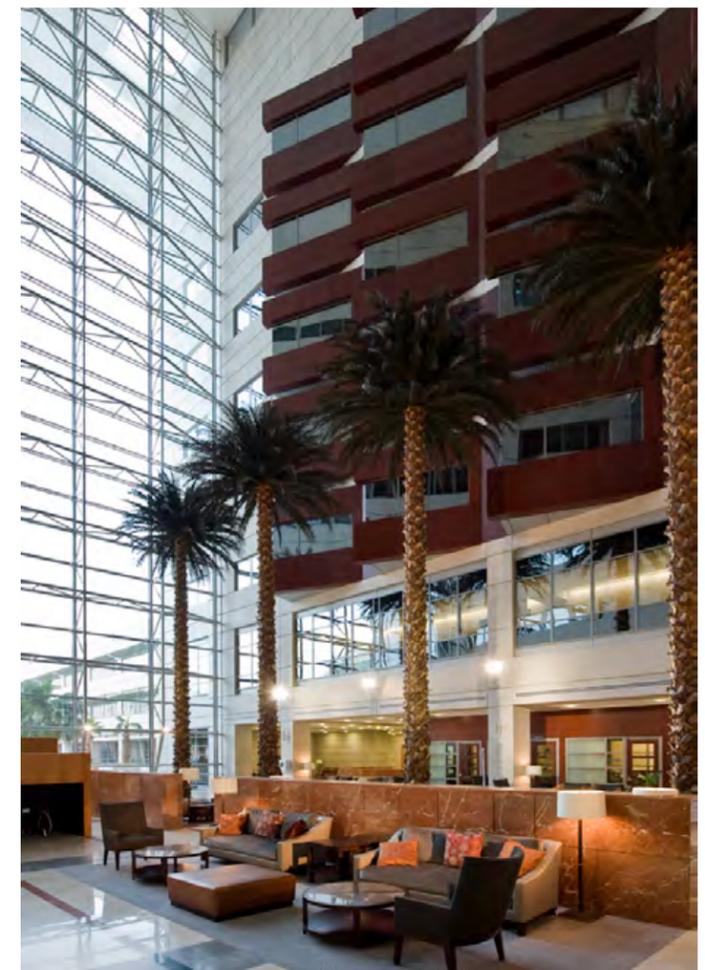
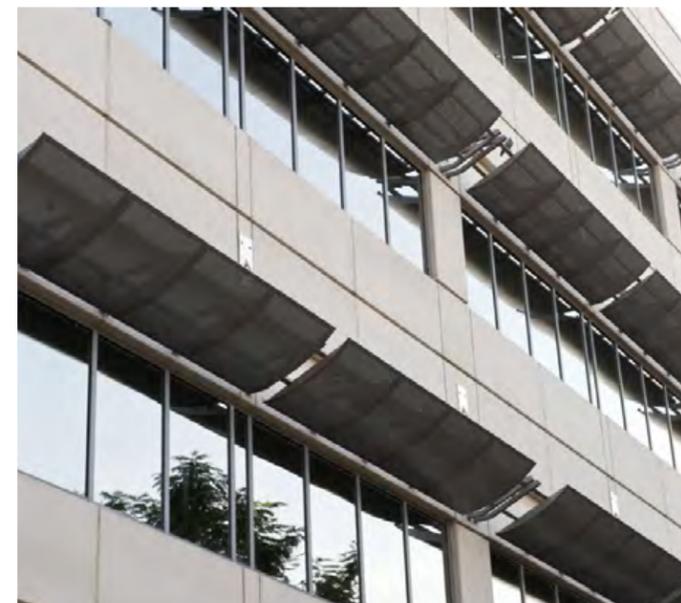
As the master plan components have been completed one-by-one, the hospital has seen resounding success. The facility's high-quality of care continues to attract patients who also appreciate the hospitality-inspired, culturally-sensitive environment. The lesson of American Hospital Dubai is clear: adherence to a comprehensive master plan, a deliberate and measured approach to renovation and growth, and design that meets economic demands result in success for the long term. American Hospital Dubai bucked an economic downturn and the aggressive development strategies of less-established competitors and came out ahead, primed for the continued delivery of healthcare excellence now and well into the future.

Year Built – The original hospital was completed in 1997. The remaining buildings were completed in a phased approach between 2001 and 2011.

AECOM Involvement – AECOM developed the 2001 master plan and was the architect; medical planner; interior designer; and mechanical, electrical, plumbing and structural engineer for the major hospital/bed tower addition and multiple hospital renovations and additions

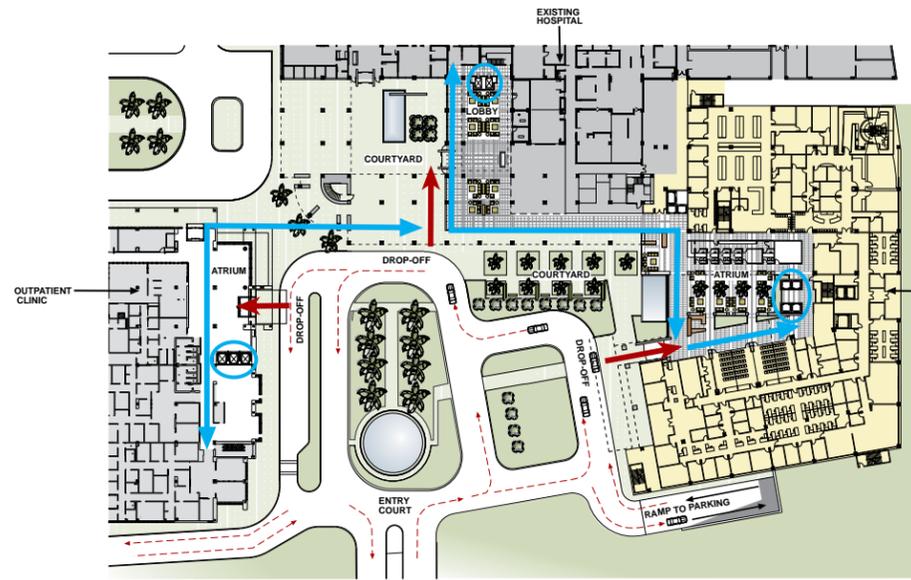


Sustainability takes precedence with the challenge of passively mitigating the heat gain in this desert climate, while allowing the benefits of indirect natural light to penetrate deep within the facility. Perforated metal panels acting as sun screens become a unifying theme across the exterior of the facility. Glass-enclosed exterior corridors are layered behind arcades. Rather than viewing directly to the exterior, patient rooms view into the main atrium and the screened curtainwall beyond, which serves as a double skin and allows indirect light into rooms but filters the harsh glare and heat gain. Patient room windows project into the atrium, providing individual areas for prospect and repose—a modern interpretation of the traditional mashrabiya, prominent throughout Arabic culture.



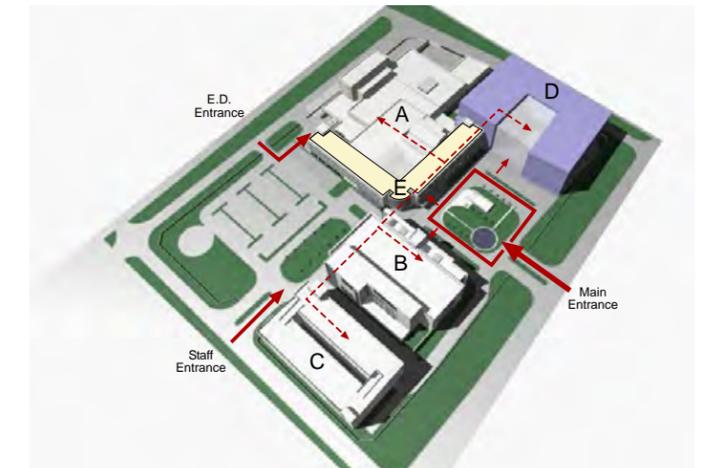
American Hospital Dubai Dubai, United Arab Emirates

American Hospital Dubai Dubai, United Arab Emirates



The finished campus features a network of pedestrian arcades passing through and along a series of courtyards, designed with a sense of permanence. Beyond this public front a variety of functional spaces, serviced from behind, is arranged in simple modules allowing for easy renovation, expansion, and contraction as required without disturbing the main flow throughout the campus.

All entrances are visible from the moment one arrives on campus. This arrangement simplified way-finding and allowed a single welcoming image to remain as the hospital's brand.



KAISER PERMANENTE | ORANGE COUNTY MEDICAL CENTER

CALL FOR CASE STUDIES IN DESIGN EXCELLENCE FOR MID-SIZED URBAN/
INNER SUBURBAN MEDICAL CENTERS

October 12, 2012





KAISER PERMANENTE | ORANGE COUNTY MEDICAL CENTER

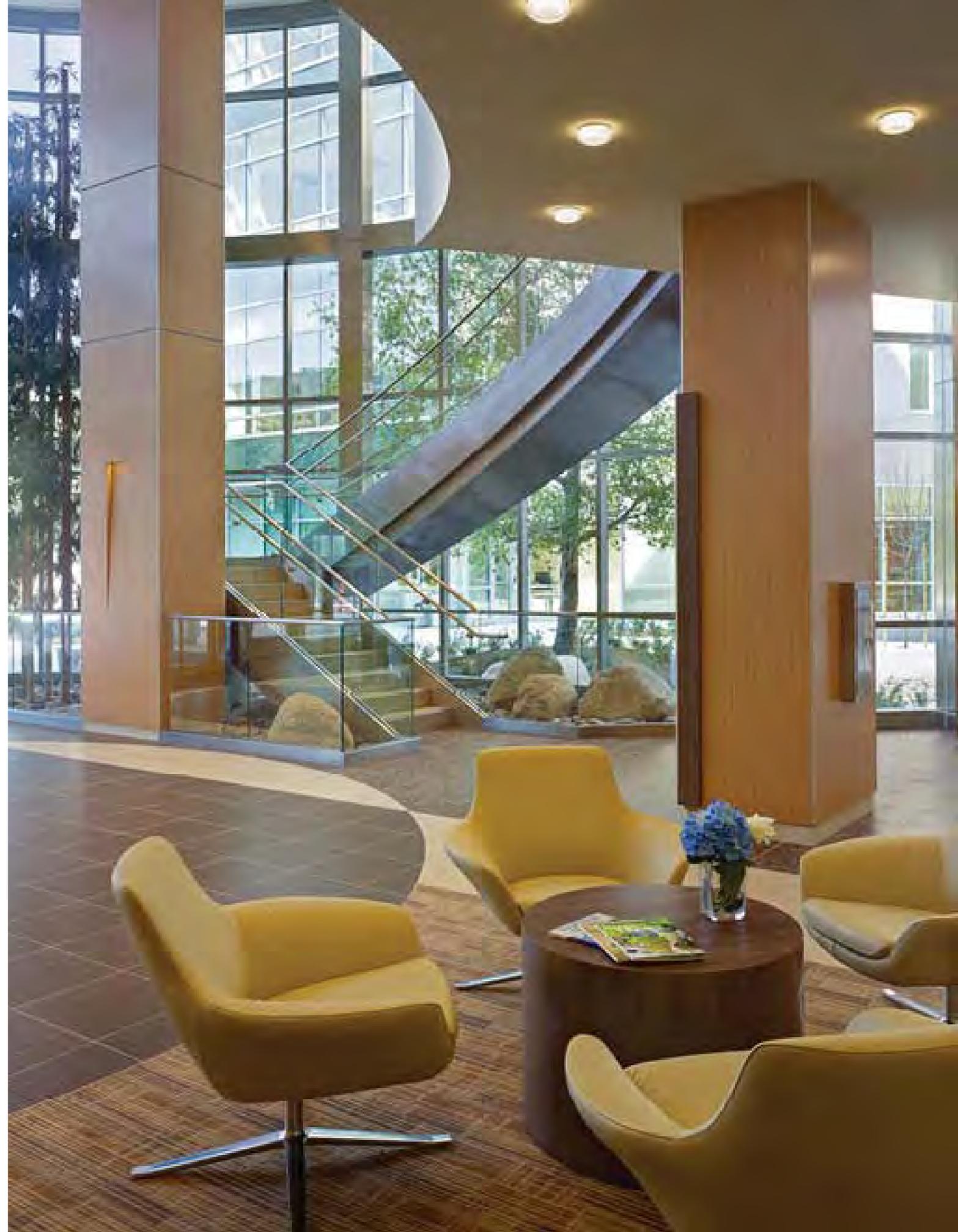
Anaheim, California

In an effort to streamline the design and delivery of new facilities, the client has developed a template hospital which can be adapted and reproduced on multiple sites. This prototype model has shortened project schedules by reducing design and production time and expediting state approval processes in addition to helping standardize delivery of care. The new facility is leading a renaissance of its light-industrial neighborhood. With a master plan inwardly focused upon a “healing garden,” the hospital crystallizes a destination point that links to future retail and residential developments and the nearby Anaheim Canyon Metrolink station. The biggest challenge was to adapt the template hospital to a challenging site while creating a meaningful and contextually appropriate medical campus that promotes healing and well-being. In addition to the template hospital, the design includes an attached hospital support building (HSB), a medical office building, and 1500-car parking garage as the first phase of a multiphase master plan.

Effort is made throughout the building to directly connect all users to the outdoor environment. The final master plan is based upon a three acre healing garden that serves as a focal point around which all buildings on the campus

are organized, subsidiary garden and courtyard spaces that serve as areas of refuge in a hectic healthcare environment. In addition to serving as an anchor for the city’s greenway plan, these areas support patient centered care through multifunctional capabilities such as exterior PT/OT rehabilitation spaces, gardening spaces, fountains and contemplative areas. Large, mature plant species, indigenous to the area and drought tolerant, were used extensively throughout the site, creating an immediate “forested” environment supporting the garden area.

Internally, visual connections to the outdoors reinforce linkages to the healing garden, internal courtyards and side gardens which combine to create a richly detailed campus landscape. Material and color selections echo the natural environment throughout the building, highlighting the correspondence between healing and nature. These regionally-based finishes and colors were specifically selected to reduce an institutional feel, and include the use of natural plant and floral materials embedded in translucent dividers and wall treatments as well as a rich sculptural and visual art collection.





Number of beds, square feet of building/s;

262-beds
350,000 sf

Acres of site;

28

Affiliated support uses – medical office buildings, outpatient clinics, etc. in square feet:

- Affiliated uses in Phase 1 and 2 (completed)
- 117K SF MOB
- 178K SF Hospital Support Building (MOB2)
- 350K SF Hospital
- 32K SF Central Plant, 1536 car parking structure
- Phase 3 includes and additional 100K SF MOB
- 130K SF Administration building, and an additional parking garage

Transportation facilities and access:

Public Transit Accessibility – proximity of hospital to major transit services, integration of transit stops/station into hospital site, and/or pedestrian connections provided to stops/station; general information on level of transit service, e.g., types of transit services available (rail, local bus, bus rapid transit or other type of enhanced bus service, etc.), service frequency;

There is a Metrolink rail transit station within 1/4 mile of the hospital site. This is a major transit link into Los Angeles from the outlying communities.

Shuttle system – shuttle frequency, hours of service and destinations (e.g. to bus or railtransit station, satellite parking lots, etc);

No shuttle system is currently provided although one is planned.

Parking – parking supply for employees and for visitors;

1,500 underground parking spaces

Helicopter ambulance transport;

The project has a helistop utilized for emergency services.

Primary use is for transport of patients out of the facility to higher acuity facilities.

Community or mixed-use context – pedestrian accessibility of nearby businesses that are not affiliated with the medical center (e.g. restaurants, coffee shops, food stores), within a 1/2 mile walk of the site;

The site is located in a developed urban area. Within 1/2 mile of the facility there are numerous malls composed of commercial and industrial businesses including large national brand stores, an array of restaurants and numerous small commercial industrial establishments.

Year built and or phasing of build out;

Year completed 2012. Phases 1 and 2 complete. Phases 3 and 4 are future development.

Description of firm’s experience in hospital design.

Long recognized as one of the top ten architecture / engineering firms in the U.S., Cannon Design has planned, programmed and designed over one billion square feet of healthcare facilities in twelve countries around the world. We are currently ranked in the top five healthcare design firms in the world by magazines including *World Architecture*, *Modern Healthcare*, and *Building Design + Construction*. However, we are far more than a healthcare design firm. Because we understand that facility, care delivery and operations are inextricably linked, we have evolved into a full-service healthcare consultancy that assists our clients with a complete continuum of issues.

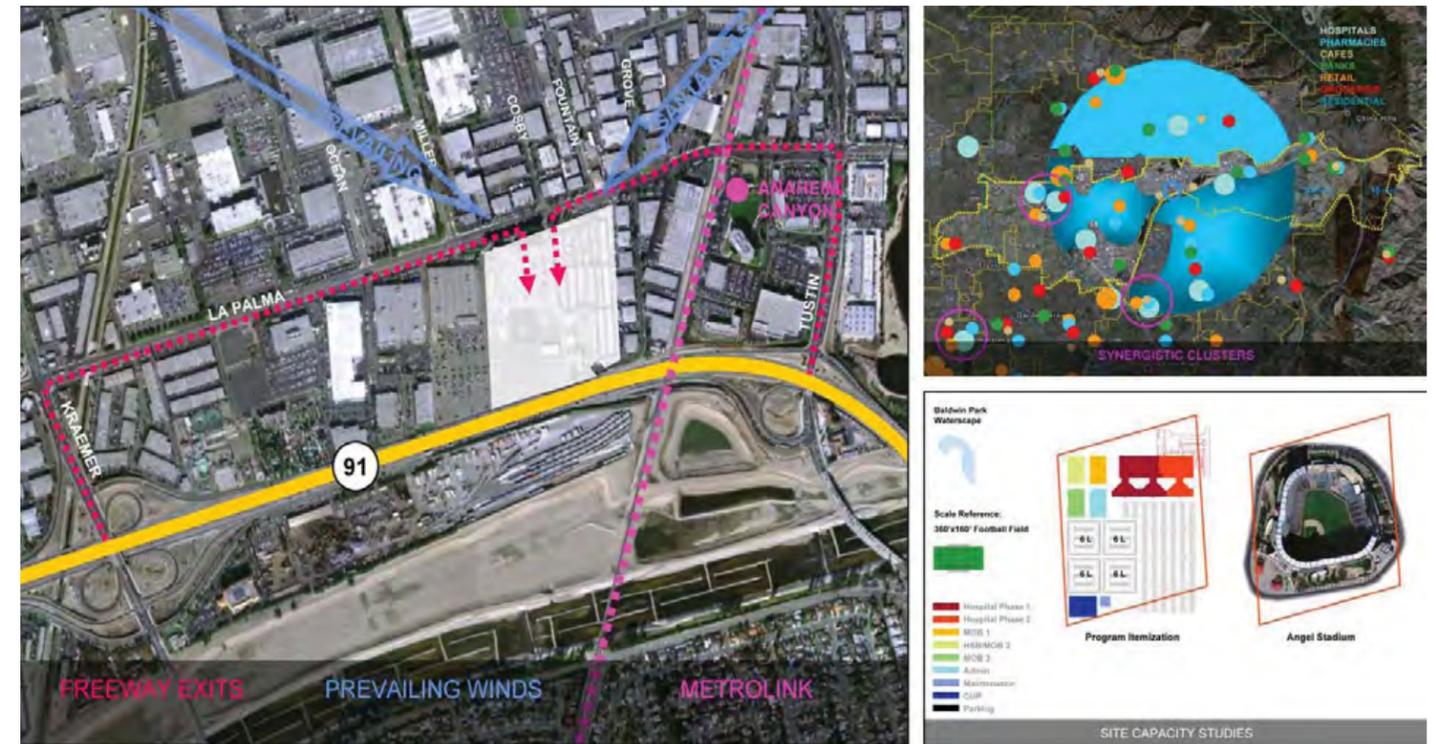
Challenges:

Clearing site of existing low rise commercial and light industrial buildings and obtaining soils contamination clearances. Traffic control during construction was a significant concern particularly during large mat slab continuous pours (24 hour duration) and steel erection. Dust soil erosion control to prevent contamination of neighboring businesses was of great concern. Daily control on construction trade traffic during construction to minimize impact on neighbors.

Benefit of site location:

The convenience of a nearby rail transit station and bus lines offer alternative transportation solutions. There is a new housing development adjacent to the transit station and close to the hospital where a large number of staff have relocated. The site is also adjacent to a major arterial freeway in the region, allowing easy access for staff and patients.





CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTREAL (CHUM)

CALL FOR CASE STUDIES IN DESIGN EXCELLENCE FOR MID-SIZED URBAN/
INNER SUBURBAN MEDICAL CENTERS

October 10, 2012



Perfusion center with terraces overlooking panoramic views of the city and the Mont Royal mountain.



View to the east of the central circulation node



View from Saint-Denis Street and Viger Street

CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL (CHUM)

Montreal, QC, Canada

Occupying two full blocks in the heart of downtown Montreal, the Centre hospitalier de l'Université de Montréal (CHUM) will be one of North America's largest academic medical centres. The 20-story, 3,597,000 sf research hospital will serve 345,000 ambulatory patients, 22,000 inpatients, and 65,000 emergency patients per year, encompass 35 medical disciplines, and provide 772 single-patient rooms, ambulatory and diagnostic centres, surgery, intensive care, clinical laboratories, and a research centre. Cannon Design is providing programming, planning, and design services for this public-private partnership (P3) project, teamed with DCYSA Architecture + Design, Innisfree, and OHL Construction Canada. The entire project team, including all consultants, will develop the entire project using building information modeling.

CHUM will promote an active street life by harmonizing with the neighborhood context, reestablishing a link with old Montreal's historic quarter, and thoughtfully incorporating heritage buildings. A large underground parking component, integration with the subway system, and plentiful

open space further improve convenience and quality of life for patients, physicians, and staff. The project is targeted for LEED Silver certification.

CHUM will be an engine of development and an urban unifier, safeguarding the memory of its site and healing the city of Montréal. An anchor at the heart of the new Quartier de la Santé, it will combine teaching, research, healthcare, and culture and progressively merge with major urban elements, redefining the identity of the district around the site.



Number of beds, square feet of building/s;
772-beds
3,597,000 sf

Acres of site;
6.77

Affiliated support uses – medical office buildings, outpatient clinics, etc. in square feet:

- D-Diagnostic and therapeutic plinth and bed tower Building (Phase 1) = 2,075,657 sqf
- B1-Ambulatory Building (Phase 1) = 628,574.69 sqf
- A-Logistics building (Phase 1) = 347,059.69 sqf
- B2-Ambulatory Building (Phase 2) = 185,905.65 sqf
- B3-Office tower = 482,483.67 sqf
- B4-Auditorium = 36,478.89 sqf
- Grand Total = 3,756,159 sqf



Transportation facilities and access:

Public Transit Accessibility – proximity of hospital to major transit services, integration of transit stops/station into hospital site, and/or pedestrian connections provided to stops/station; general information on level of transit service, e.g., types of transit services available (rail, local bus, bus rapid transit or other type of enhanced bus service, etc.), service frequency;

Project is designed to have a pedestrian linkage to a future offsite transit hub. The location of the building is conducive to the use of public transportation not only by its proximity to four Metro stations but also accessibility, within 400 meters, several bus routes.

Parking – parking supply for employees and for visitors;

1,215 underground parking spaces

Helicopter ambulance transport;

A heliport envisioned at the roof of the diagnostic and therapeutic plinth with bed towers

Community or mixed-use context – pedestrian accessibility of nearby businesses that are not affiliated with the medical center (e.g. restaurants, coffee shops, food stores), within a ½ mile walk of the site; The Carrefour de Sciences consists of a legible series of public spaces, beginning with the library on the

corner of René Lévesque and St. Denis Street. As one moves south through the project, the auditorium, meeting rooms and retail component become a major element defining the street and animating the entrance sequence to the hospital.

Year built and or phasing of build out;

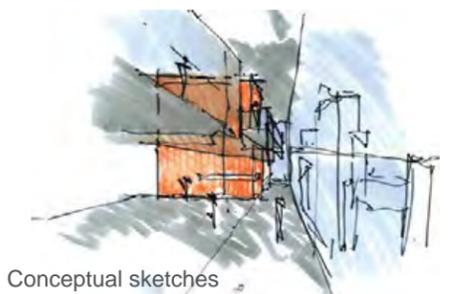
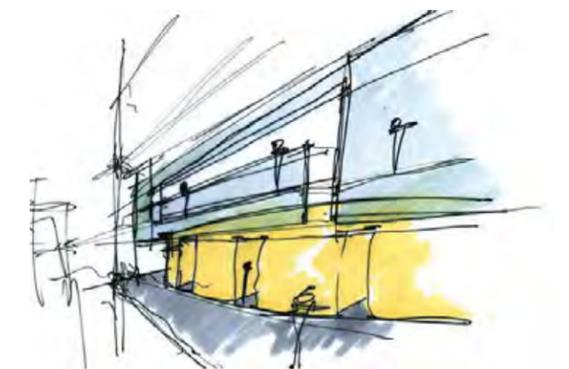
Phase 1 – 2016
Phase 2 -2019

Comprehensive Legisibility:

The city, with its admirable history of great buildings that respond elegantly at a large scale, demands that this project also respond at a coarse, large, urban scale. The project does so through its 'three tower' massing strategy and the relationship between these towers and the base, or plinth level. This is the scale that responds to the city at an iconic scale, where components of the building are related to other iconic building and important topographical elements of the city.

Description of firm's experience in hospital design.

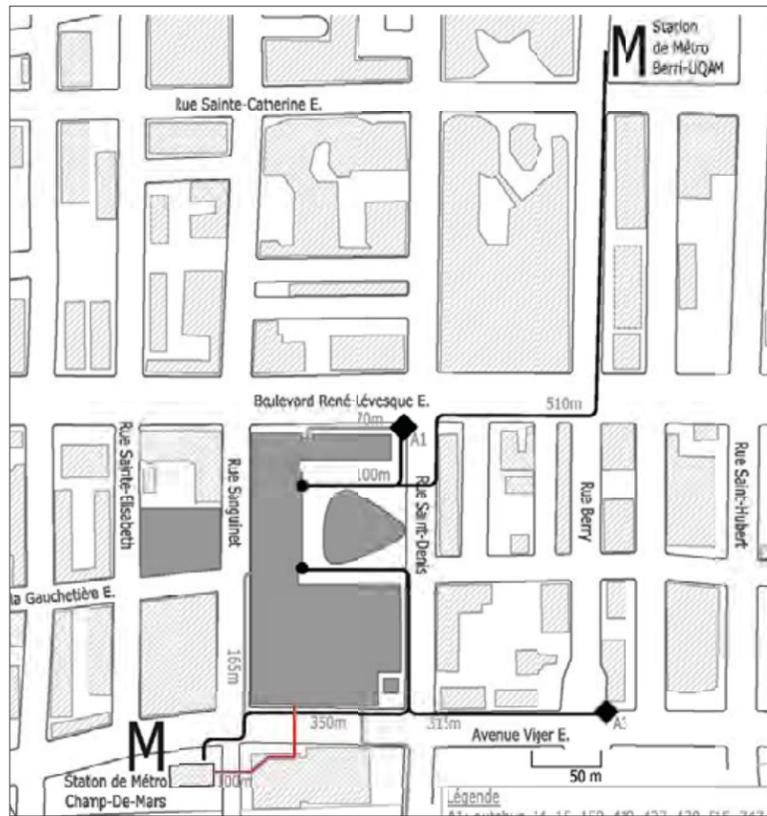
Long recognized as one of the top ten architecture / engineering firms in the U.S., Cannon Design has planned, programmed and designed over one billion square feet of healthcare facilities in twelve countries around the world. We are currently ranked in the top five healthcare design firms in the world by magazines including *World Architecture*, *Modern Healthcare*, and *Building Design + Construction*. However, we are far more than a healthcare design firm. Because we understand that facility, care delivery and operations are inextricably linked, we have evolved into a full-service healthcare consultancy that assists our clients with a complete continuum of issues.



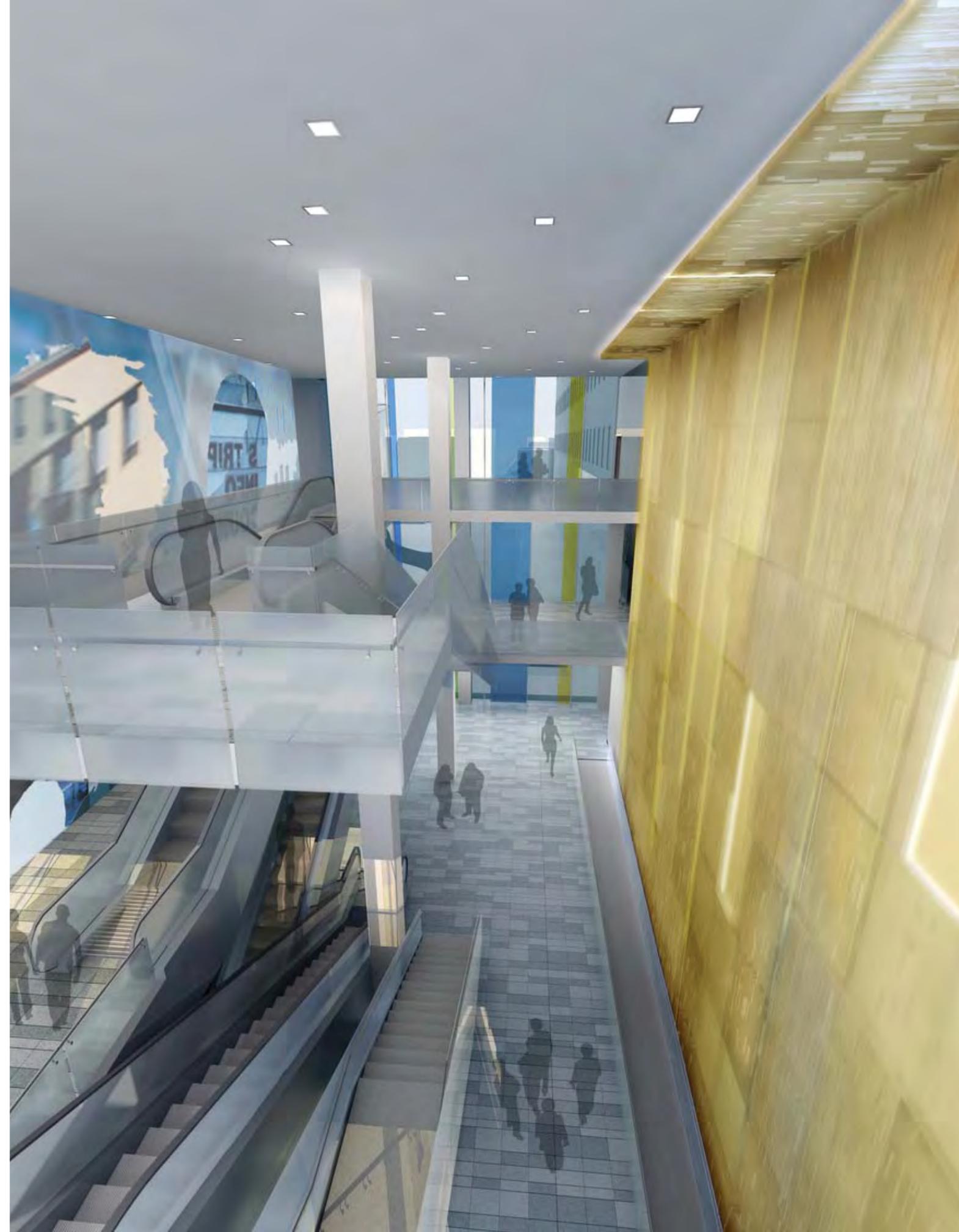
Conceptual sketches



View from Saint Denis Street and René-Lévesque Boulevard at night



You can easily reach on foot and without hindrance to the Metro station Champ de Mars is situated 350m from the main entrance.





Call for Case
Studies in Design
Excellence for
Mid-Sized Urban
/ Inner Suburban
Medical Centers

ZGF

ZIMMER GUNDEL FRASCA ARCHITECTS LLP



Dana-Farber Cancer Institute, Yawkey Center for Cancer Care BOSTON, MA

“There are at least three ways any building can be good. First, it can be a wonderful place to inhabit, to live in or work in, or maybe see a performance in. Second, it can be a beautiful object as viewed from outside, a kind of sculpture, like the Taj Mahal or Hancock Tower. Or third, it can take on the tougher job of helping to shape and invigorate a larger public space. The Yawkey Center scores well on all three criteria.”

ROBERT CAMPBELL,
BOSTON GLOBE ARCHITECTURE CRITIC



NIH, Mark O. Hatfield Clinical Research Center
BETHESDA, MD

“In some ways the Hatfield Center will be to hospital architecture what Eero Saarinen’s Dulles International Airport in Washington, DC, in its original state, was to the architecture of air travel.”

ALLAN TEMKO, FORMER ARCHITECTURE CRITIC, SAN FRANCISCO CHRONICLE

WWW.ZGF.COM
1800 K STREET NW, SUITE 200
WASHINGTON, DC / 202.380.3120



ZGF

ZIMMER GUNSUL FRASCA ARCHITECTS LLP

ZGF Architects LLP is an award-winning architectural, planning, and interior design firm with offices in Washington, DC; Portland, Oregon; Seattle; Los Angeles; and New York. Our portfolio features a diverse mix of projects for both private and public institutions, including work for healthcare, research, academic, civic, corporate, and commercial clients.

Healthcare projects comprise about one-third of our annual workload. We have programmed, designed, and completed hospitals and clinical facilities for major medical institutions across the country including M.D. Anderson Cancer Center, National Institutes of Health, Kaiser Permanente, Providence Health & Services, Legacy Health, Memorial Sloan-Kettering Cancer Center, Dana-Farber Cancer Institute, Children’s Hospital Los Angeles and the University of California. We have worked with a number of healthcare institutions as they have addressed changes in delivery of services, and we are able to combine design excellence with architectural solutions to accommodate multiple user groups, changing technology, research, and clinical protocols.

Our design philosophy is centered on the premise that excellence should be reflected in each and every aspect of a building—its fit within the community and campus, its function and relationship to users, its building systems, and its cost. This dedication to design excellence at every level has resulted in recognition by numerous national, regional, and local awards, including the prestigious Architecture Firm Award from the American Institute of Architects, which recognizes the firm’s “high standards, humanistic concerns, and unique ability to capture the spirit of a place and the aspirations of its inhabitants.”

WWW.ZGF.COM
1800 K STREET NW, SUITE 200
WASHINGTON, DC / 202.380.3120



UNC HOSPITALS North Carolina Cancer Hospital
Chapel Hill, North Carolina



DANA-FARBER CANCER INSTITUTE Yawkey Center for Cancer Care
Boston, Massachusetts



PROVIDENCE HEALTH & SERVICES Providence Regional Medical Center Everett
Everett, Washington



NATIONAL INSTITUTES OF HEALTH Mark O. Hatfield Clinical Research Center
Bethesda, Maryland

Relevant Project for Prince George's County

Seattle Children's Hospital

With the successful completion of the Master Plan and Major Institution Master Plan (MIMP) approval by the City Council, ZGF began work on the 330,000 SF, Phase 1 Seattle Children's expansion. Before design began, the team held over 20 Lean design workshops with top level hospital administrators and key leadership, department heads and staff to identify operationally efficient, flexible design objectives and address campus-wide issues. These included patient, staff and resource flow; departmental adjacencies; critical space deficiencies; and horizontal-travel distance targets. The client group clearly identified patient and family safety, comfort, satisfaction and experience as primary factors in success of any design outcome. Value stream mapping exercises were then used to investigate various scenarios for placement of key departments, services and resolution of larger, campus circulation and parking issues against these key patient factors. As part of their commitment to fostering healthy environments, Seattle Children's also implemented new energy-reducing mechanical systems and daylighting, ventilation, and water-capturing utilities throughout the site with a target of LEED Gold certification.



- Construction of Phase I began February 2011 with estimated completion April 2013
- 28.4 acre site
- Phased construction to minimize start-up complexity
- 600 beds
- 2.125 million square feet over eight stories and one basement level
 - ~1.275 million square feet of inpatient services
 - ~850,000 square feet of medical office and outpatient services
- Mass transit and alternative commute support
 - Support for 170 cyclists per day
 - 1,730 shuttle bus boardings per day
 - 1,175 bus rides per day
 - Enhanced pedestrian pathways and access to Burke Gilman Trail
- ~3,100 total parking spaces: 1,100 inpatient and emergency visitors, 1,200 staff, and 800 outpatient visitors
- Emergency department with on-site heliport
- Designed with Revit / BIM software





Seattle Children's Institutional Master Plan sets several goals for the inclusion of green space on campus. The hospital has set aside 41% of the campus as open space, creating a balance of the development on campus with the surrounding community. A green transition zone around the perimeter screens the hospital from neighboring residences, and a garden zone along the south edge both screens the hospital and provides an amenity to patients and visitors. Pedestrian paths are provided through the entire campus to help promote pedestrian traffic and to offer outdoor connections.

The new Emergency Department features a garden courtyard with a transplanted native Japanese maple. Newly developed and visible rooftops will be green roofs—with many incorporating garden elements. Design options include planting the roof of the hematology / oncology unit so that the lounge and physical therapy gym space above will look out onto the planted roof, which will potentially be accessible for outdoor use.

The campus also has its own greenhouse and botanical landscaping staff, which improves and maintains the high quality plantings and landscaping.



Relevant Project for Prince George's County

Legacy Salmon Creek Hospital Vancouver, Washington

ZGF planned and designed a six-story, 469,000 SF hospital that includes capacity for 220 beds with an emergency room and heliport; two four-story medical office buildings totaling 189,000 SF with a connecting atrium; and a seven-story parking structure for 1,464 cars.

Legacy Salmon Creek Hospital is a facility with an emphasis on patients and their families—a hospital complex that is ultra-efficient, yet aesthetically beautiful, with a “healing” environment that is comforting and uplifting. The design intent was to create clear, definable circulation systems to orient patients, staff, and visitors beginning at the first entry to the site. Overhead glass-enclosed pedestrian bridges link the entire complex. The hospital building includes two L-shaped patient towers over a two-story base.

The patient towers are angled to maximize views of the adjacent natural habitat and Mount Hood. Indigenous landscaping, pervious surface treatments, natural storm detention design, and sensitive site lighting have all been incorporated as sustainable design features in consideration of nearby natural resources. The hospital was named one of America's Top 10 Greenest Hospitals by the Green Guide for Healthcare, and in a US Department of Health and Human Services survey, patients gave the facility the highest overall quality rating among Portland-Vancouver area hospitals



Relevant Project for Prince George's County

Children's Hospital Colorado

Denver, Colorado

ZGF served as design architect, working in association with H + L Architecture as architect of record, for a new 1,440,000 SF replacement facility for Children's Hospital Colorado, located next to the University of Colorado Denver, School of Medicine.

Evidence-based design principles informed the design process of this award-winning Pebble Project®, which houses 270 inpatient beds, outpatient clinics, offices, research and education space, and parking. All facilities are state-of-the-art, with flexible technology infrastructure to anticipate the evolution of medicine and the care of children beyond the next century. The idea of clarity and comfort and family-centered care infuses all design aspects of the project. The result reflects the thoughts given to all factors that can influence healing: color, texture, natural light, art, access to the outdoors, and amenities. The focal point of the building is a central atrium, which serves as the family living room and introduces light into the heart of the building. It also provides a clear reference point for the arrangement of the various components of the large complex. Spaces such as roof decks, terraces, and gardens, adjacent to the cafeteria and conference center, expand activities to the outdoors. Energy-saving measures and other sustainable design features within the building and landscape take the region's varying weather into account.



AIA Potomac Valley

Case Studies in Design Excellence: Mid-Sized Urban/Inner Suburban Medical Centers



SMITHGROUP JJR



SmithGroupJJR

Specialists in Healthcare Planning & Design

SmithGroupJJR is one of the largest architecture, engineering and planning firms in the U.S. With a staff of 800, we specialize in the healthcare, workplace, higher education, and science & technology sectors. Our integrated practice offers depth in all disciplines serving the built and natural environment, including architecture, engineering (civil, structural, mechanical, electrical and plumbing), landscape architecture, urban design and environmental science.

Founded in 1853, we know the meaning of longevity, integrity and adaptability. Today, as a multidisciplinary design firm, we continue to grow in the U.S. and internationally. SmithGroupJJR clients benefit from the technical expertise, creativity, and high level of quality that our integrated practice brings. As one of the nation's leading sustainable design firms, SmithGroupJJR has long been in the forefront with innovative strategies for resource efficiency. In fact, sustainable design has always been central to our corporate culture and sense of professional responsibility. Given our dedication to environmental stewardship, we incorporate sustainable design solutions into all our projects and have adopted the rigorous energy targets of the Architecture 2030 Challenge.

SmithGroupJJR has dedicated over eight decades to healthcare planning and design, ranging from single room renovations to major replacement hospitals and academic medical centers. We have many areas of specialized experience including build-ings for people with mental illness where we aim to create protective, therapeutic environments. In recent years, SmithGroupJJR has successfully:

- Garnered nearly 90 healthcare design awards, including eight from *Modern Healthcare*
- Planned over 30 national medical center campuses
- Designed over 10 million sf of advanced ambulatory care facilities
- Developed national centers of excellence for oncology, cardiology, emergency medicine, and rehabilitation
- Planned or designed facilities for 13 NCI-designated cancer centers

Our experienced team has a long-standing reputation for design excellence with expertise in architecture and interior design, mechanical and electrical engineering, structural engineering, landscape architecture, campus and urban design, and medical programming, planning and design. At our core, we are a group of knowledgeable, dedicated professionals who have focused our entire careers on healthcare planning and architecture—working directly with administrative, operational and clinical staff to adapt or create healthcare facilities that have the ability to improve system capacities, work processes, safety, access and privacy issues, and overall delivery and quality of care. Our goal is to create:

- Beautiful buildings that draw both patients and staff to your facility—giving you a competitive advantage.
- Environments that comfort and heal—using natural light, air, views, color, and space to enhance the quality of care and increase patient staff satisfaction.
- Intelligent spaces that work—using flexible design strategies to reduce capital and operating costs, enhance efficiency, and adapt to the inevitable changes in clinical methods and technologies.
- Sites that address growth and development while creating pleasant pedestrian experiences and clear connections between facilities.

Fast Facts

Established
1853, by Sheldon Smith

Employees
800

Offices
Ann Arbor, Michigan
Chicago, Illinois
Dallas, Texas
Detroit, Michigan
Durham, North Carolina
Los Angeles, California
Madison, Wisconsin
Phoenix, Arizona
San Francisco, California
Washington, DC

National Practices
Health
Science + Technology
Learning
Workplace
Campus, Community + Waterfronts

Website
www.smithgroupjlr.com

Case Studies



University of Virginia Medical Center Master Planning

Charlottesville, Virginia

SmithGroupJJR has provided services to the University of Virginia Medical Center since 1978. During this time we have completed several master planning projects and numerous facility initiatives ranging from small renovations to a 1.2 million sf replacement hospital.

The Medical Center, one of the nation's most respected, is a major tertiary center providing advanced medical care in multiple specialties. Over the years, our team has set the framework for the health precinct's continued growth and development, determining feasibility and appropriateness for a variety of functional uses including research, medical education, and clinical activities. Physical and functional relationships to existing University context and facilities and the surrounding city and neighborhoods were established.

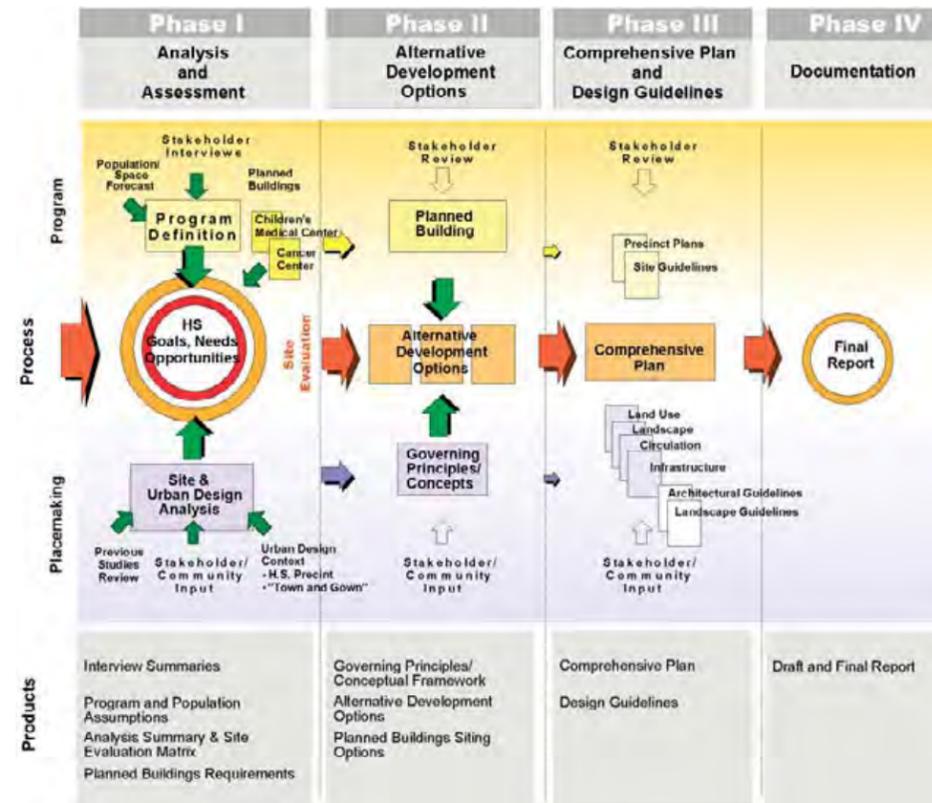
Major planning initiatives included pedestrian and vehicular circulation, parking, land acquisition strategies, growth and expansion modelling, utilities and infrastructure, phasing and implementation, operational and long-range conceptual planning for allocation of programs, as well as redevelopment of the current precinct for projected uses.

SmithGroupJJR, in collaboration with medical center leadership, facilitated an extensive process of strategic facility planning and developed a conceptual master plan. Extensive programming and concept testing, organizational modelling and facility options development were components of the process. Numerous stakeholder group meetings with representatives from all constituencies. Far ranging alternatives were generated, evaluated, debated, and embraced. Studies included physical, urban impact, economic, and circulation issues. Recommendations included siting for new hospital development, research and educational assets, and long-range planning strategies for planning horizons of 10, 20, and 50 years. SmithGroupJJR also assisted UVA with the planning efforts for a new Children's Medical Center for several years, first completing an initial draft of the Children's Center Master Plan in January 1999.

The initial Comprehensive Master Plan set the vision for an ambitious re-engineering of the entire Medical Center. An urban design framework and facilities strategy was developed to create a unified medical precinct and to achieve the medical center's goals, while at the same time integrating it with the physical fabric of the University and surrounding city. Due to the urban nature of the campus, it was important to provide efficient solutions to the existing campus that will adapt and expand as patient, visitor, and staff requirements evolve and change. Important considerations included identifying vehicle-free zones and vehicle-intensive zones and also providing multi-modal transportation alternatives. There are several transportation services available to patients, students, staff and faculty including University Transit Service (UTS), Charlottesville Area Transit (CAT), free regular shuttle service on the medical campus, and regional rail. The Charlottesville Amtrak station is located just two miles from the University. Also, there are multiple restaurants, coffee shops, food stores, and other retail options within a half mile of the campus. The Charlottesville Downtown Mall has more than 120 shops and 30 restaurants on and around historic Main Street. Convenient parking in nearby garages and surface lots, as well as a free trolley service that connects the Mall to the University of Virginia.

Based on our successful performance, the University selected SmithGroupJJR to develop a new comprehensive master plan for the entire University of Virginia Health System, encompassing academic, clinical and research facilities. This latest initiative examined potential programmatic and functional change and growth in the context of both the larger University family and the City of Charlottesville's planning process. Designed to project impact in increments of 2, 5, 10, 20, and 50 years, the master plan identified multiple strategies for long-term growth and investment, including the utilization of additional university-owned remote sites and very specific siting alternatives for a new Children's Medical Center and a Comprehensive Cancer Center.

The process included focus meetings with numerous stakeholders, representing very diverse constituencies and agendas. Strategic issues related to new services, changing missions, research initiatives, city/university relations, land acquisition, decanting of ambulatory services, image, fund-raising, staff recruitment and retention, remote services, upgraded utility infrastructure, traffic and transportation modifications, patient and family-focused care-all became major drivers of the process. Outcomes include recommendations for a "hospitals within a hospital" concept, site acquisitions, development opportunities, facility build-out strategies, long-term smart growth planning, and key initiatives with city and county authorities.



Project Size:
1.2 million sf

Construction Cost:
N/A

Completion Date:
2004

Initiatives resulting from Master Plan:

- 1.2 million sf replacement hospital
- Renovation of existing hospital facilities
- Parking garages and link connections
- Central utility plant/infrastructure upgrades
- Remote site acquisition and development
- Road and transportation upgrades
- Pedestrian connections throughout the campus
- Medical education facilities
- Comprehensive Cancer Center
- Children's Medical Center



University of Virginia West Main Street Corridor Urban Design Study

Charlottesville, Virginia

Project Size:
2 linear miles

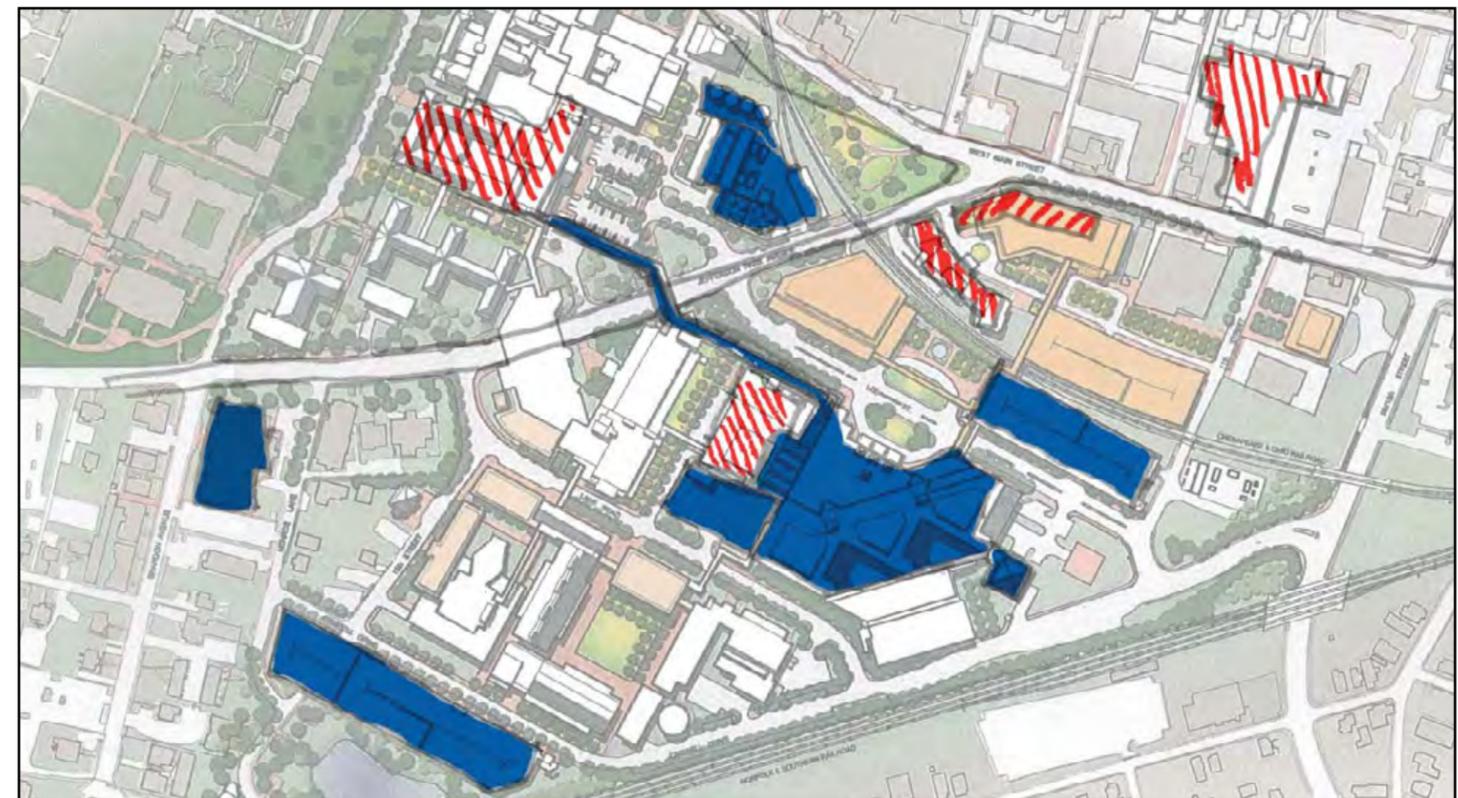
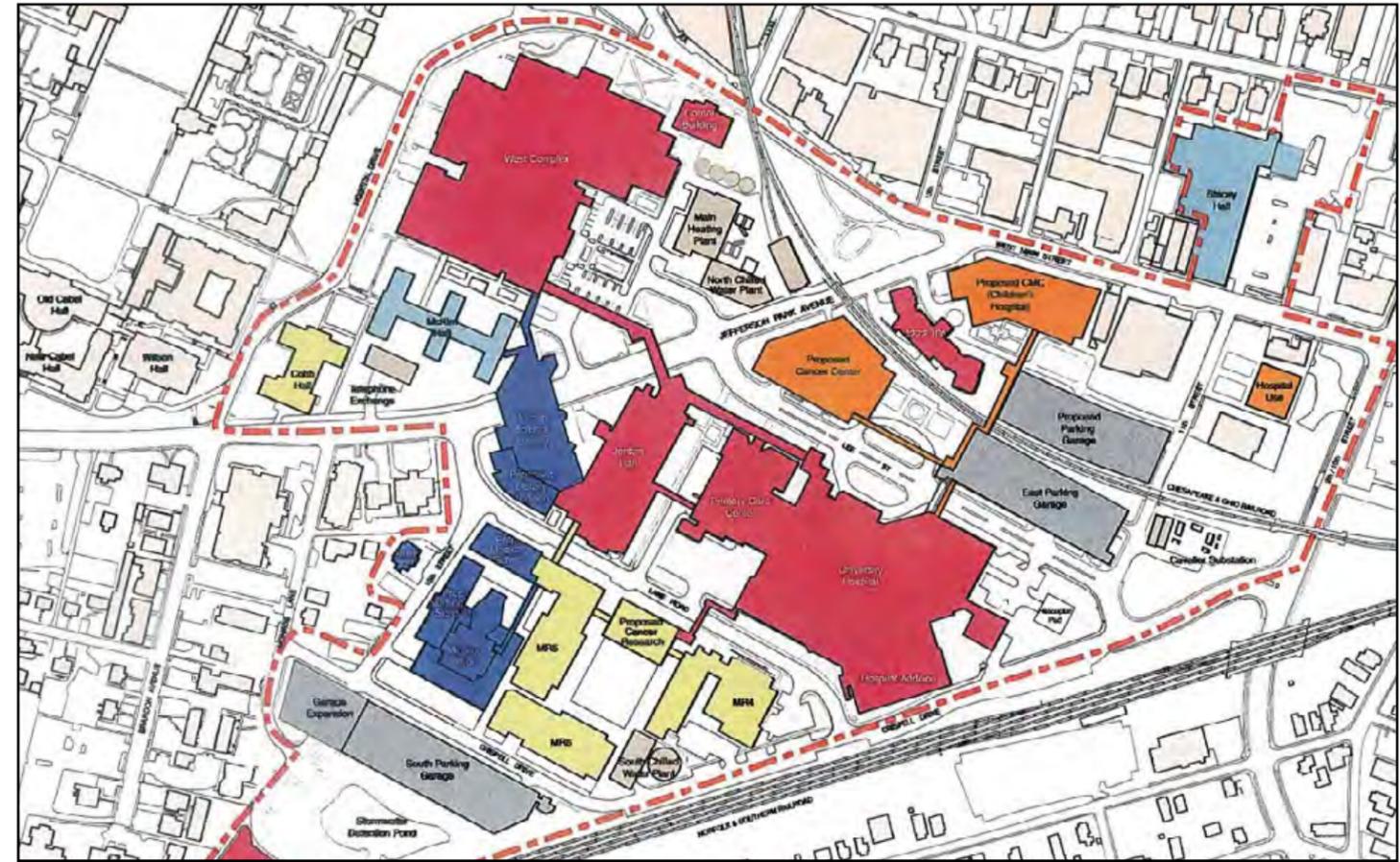
Construction Cost:
N/A

Completion Date:
1993

Concurrent with the Medical Center Master Plan, SmithGroupJJR was engaged in the West Main Street Corridor Urban Design Study. Historically, this area was the prime shopping district for its adjacent neighborhoods and served as a connection between downtown Charlottesville and the University of Virginia. Despite its vibrant history, over time it became a district of decreasing economic activity, vacant lots, and empty buildings.

The goal of Urban Master Plan was to rebuild and strengthen those connections and establish West Main Street as a common ground between the adjacent neighborhoods, downtown, and the University. The plan proposed a set of building and green space elements which responded to the needs of the City of Charlottesville, the adjacent neighborhoods, and the University. The plan considered a corridor that is capable of growing to meet present and future needs while maintaining affordability for the present communities. SmithGroupJJR achieved the visions of The Urban Master Plan by:

- **Establishing West Main Street as common ground.** The plan encouraged a diversity of activity, facilitating neighborhood involvement in the district, and strengthening West Main Street as a set of effective connections to downtown, adjacent neighborhoods, and the University.
- **Establishing a scale and density for the West Main Street District which does not overwhelm the adjacent neighborhoods.** By maintaining moderate scale and limiting buildings to three or four stories, new development along West Main Street repaired the existing fabric of the corridor.
- **Generating a safe 24-hour district that provides economic opportunity.** Establishing new conventional and student housing was a cornerstone of the plan. It also created a strong pedestrian presence with steady retail activity on West Main Street, meeting the daily needs of its adjacent neighborhoods (drugstore, cleaners, hardware store, movie theater, grocery store, etc).
- **Creating a district identity consisting of several elements.** In addition to increased retail activity, the plan created a series of small defined open spaces which link the entire district.



University of Virginia Medical Center Replacement Hospital

Charlottesville, Virginia

Project Size:
1.2 million sf

Construction Cost:
\$210 million

Completion Date:
Ongoing

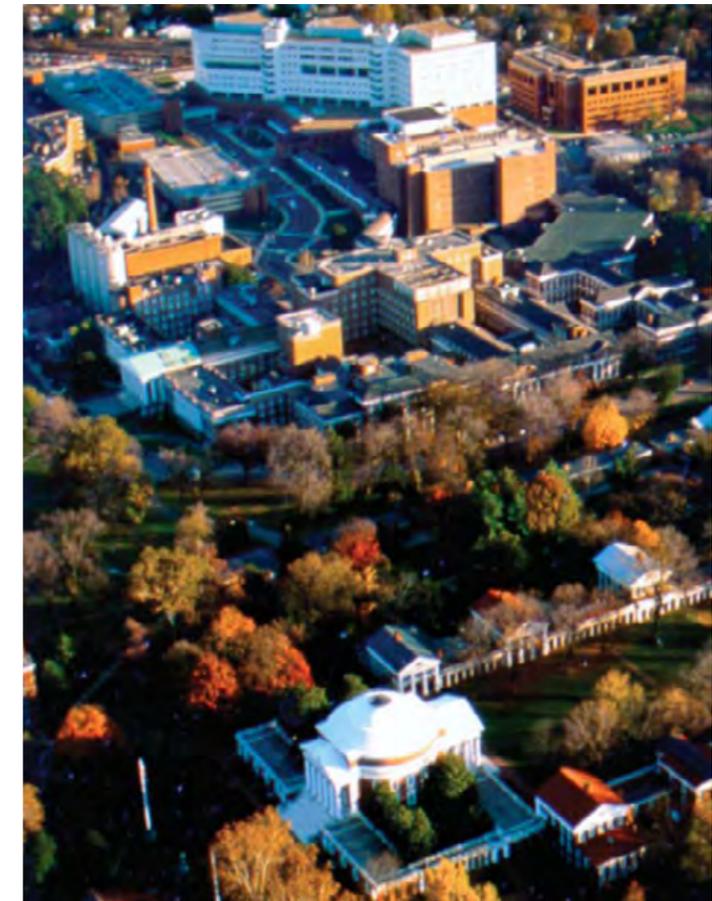
Affiliated Services:

- Endocrinology
- Cancer
- ENT
- Urology
- Neurology and neurosurgery
- Respiratory disorders
- Geriatrics
- Kidney disease

SmithGroupJJR has provided services to the University of Virginia Medical Center since 1978, including master planning and designing a new 610-bed tertiary care teaching replacement hospital, as well as a 28,000 sf children's outpatient center and a 7,000 sf outpatient cancer center. Ranked as one of America's Best Hospitals by *U.S. News & World Report*, the hospital offers state-of-the-art care in endocrinology, cancer, ENT, urology, neurology and neurosurgery, respiratory disorders, geriatrics, and kidney disease. Ongoing renovations and expansions in both hospital buildings have accommodated the hospital's new standards of patient-centered care and the most advanced technologies, including a Gamma Knife unit and neuroangiography suite.

Replacement of this tertiary care teaching hospital, encompassing over 1 million sf, was the largest building project ever undertaken by the Commonwealth of Virginia at the time. Other components of the work included master plan of the Medical Center, design of a new, 2-story covered walkway linking the new and existing buildings, a new parking structure, upgraded heating/chiller plant, and site improvements. Fast-track scheduling was used so that construction could progress rapidly, with more than 50 separate bid packages prepared. The replacement project also included the evaluation and programming of the old hospital for reuse.

SmithGroupJJR continues to serve UVA Medical Center in planning, design and construction phase services on a variety of projects including ambulatory care clinic components, systems planning, and the replacement of the NICU.



University of Virginia Medical Center Patient Tower Expansion and Helipad

Charlottesville, Virginia



Project Size:
127,000 sf

Construction Cost:
Patient Tower: \$69 million
Helipad: \$6.2 million

Completion Date:
2012

Project Details:

- 72 acuity adaptable beds ICU capable
- Seismic upgrade
- Complex phasing
- BIM model to generate design consensus

After successfully completing the master plan update, SmithGroupJJR provided medical programming/planning, architecture and interior design services for the new Patient Tower Expansion project. This complex, multi-phased project infilled the front facade of the hospital and increased capacity to accommodate high-acuity cases in modern critical care units. Working in a highly collaborative process with administrative and clinical staff, SmithGroupJJR programmed and planned 72 acuity adaptable rooms—the preferred scheme for critical care and step down functions which represents the direction for these facilities in future expansion projects.

Utilizing Building Information Modeling, the architectural design team could automatically generate drawings and reports, perform design analysis, and schedule simulation and facilities management functions. This tool enabled the team to focus on the information and their decisions, rather than the documentation tools and process.

Major challenges included developing sophisticated structure and erection strategies and complex phasing of new and renovated functions to keep the hospital operational at all times. The complex planning and scheduling of construction was continuous to ensure an on-time, on-budget project completion.

The rooftop helipad project is a supporting project currently under construction adjacent to the existing ground pad. The intent is to get aircraft away from the cranes used in that construction project in this increasingly urban campus setting. This project was preceded by a series of feasibility studies to explore the most cost effective and architecturally supportive scheme that minimized patient travel distance. A detailed wind tunnel modeling simulation of the Health Sciences Center was developed as part of the design process to fully understand the effects of exhaust contaminants on the safety of the patients, staff and visitors to the facility. Extensive acoustic surveys have also been conducted and the position of the flight paths and the existing concrete roof construction have attenuated aircraft noise during critical takeoff and landing operations.

Sutter Health, California Pacific Medical Center Cathedral Hill Replacement Hospital

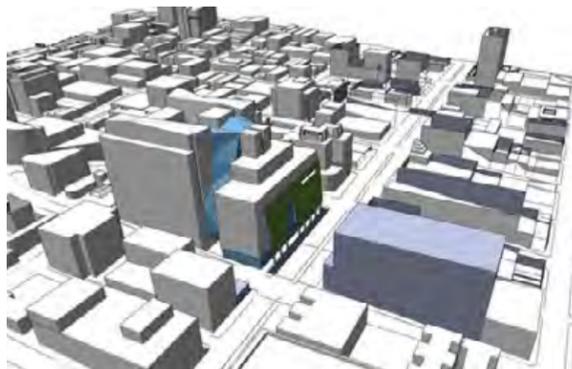
San Francisco, California

Project Size:
1.2 million sf / 2.43 acres (full city block)

Construction Cost:
Confidential

Completion Date:
2015

Parking:
513 cars on-site (above code-allowed and more than needed for an urban hospital, but making up parking shortfall of adjacent MOB buildings)



The 929-bed CPMC system is one of the largest not-for-profit, tertiary teaching hospitals in the U.S., and the premier private, acute care enterprise in Northern California. The new, 13-story hospital, designed to accommodate 555 beds for adults and women/children, along with affiliated medical offices, specialty outpatient services, emergency services and parking, will occupy a full city block.

Working with Sutter Health, SmithGroupJJR is delivering this large, complex replacement hospital using the techniques of Lean Design, Integrated Project Delivery and BIM—which has never before been done on a healthcare project of this scale.

To rein in costs, a validation target area of 858,000 buildable gross square feet (bgsf) was set, a 21% reduction in scope, which required a re-examination of the entire care delivery process.

The program validation sought ways to dissolve departmental boundaries, both functional and physical, to reintegrate them around the point of service to enhance patient care and improve the workflow and productivity of the whole system. The most significant application of this strategy was the creation of an integrated interventional platform that functions as a combined surgery, interventional imaging, cardiac catheterization and special procedures floor, wrapped around a singular PACU and prep/Level-2 recovery operation.

By incorporating Lean methodologies and BIM into the design and construction of the facility, this project is targeted to be delivered on time and within budget. The building's efficient design, dictated by both its site and the program, unites two of CPMC's existing urban campuses onto one major city block creating two hospitals—adult-acute care and women's and children's—in one. As form responds to function, the diagnostic/treatment programs, requiring sizable floor plates to house needed adjacencies, are at the podium of the steel and glass building. The nursing tower rises up 15-stories from the base showcasing breathtaking panoramic views of the city, the Bay and the Golden Gate Bridge, while harmonizing with the Cathedral Hill neighborhood.

Urban Context

Designing in urban high traffic environments requires special attention to wayfinding, safety, identity, and overall campus flow. In our planning for CPMC, the design challenges were great from the surrounding community. Issues of circulation, parking access, patient pick-up and drop-off, onsite loading, and emergency ambulance access, were all interwoven into the hilly dense San Francisco context. Creating a friendly pedestrian focused environment around the base of each building was key to keeping hospital access simple and easy. The site is located on the edge of the Central Business District, at the intersection of two-major transportation arterials through the City: Van Ness Ave, which is Hwy 101- running north/south, and Geary Blvd. running east/west and



Sutter Health, California Pacific Medical Center Cathedral Hill Replacement Hospital (cont'd)

San Francisco, California

connecting downtown to the western neighborhoods. Both streets are heavily used by vehicular traffic and public transit, with several major MUNI bus line routes. A Bus Rapid Transit system is planned for the future along Van Ness Ave. The nearest Bay Area Rapid Transit District (BART) stop is 11-blocks away, and the nearest MUNI light-rail stop is 12-blocks away.

Different massing and design options were studied in the urban context of the city of San Francisco for this massive urban project. Several urban blocks adjacent to the site were modeled in Revit and were used for preliminary urban studies. The selected design option's impact on the urban context was further studied by exporting the model to 3-d max software for rendering and the photo montage was finished in Photoshop. These photo montages have been very effectively used to explain the massing and design concept to city planning officials and the cathedral hill neighborhood community and it has also been an effective tool for designers to validate their massing concept.



Kaiser Permanente Los Angeles Medical Center

Los Angeles, California



Project Size:
912,000 sf / 3 acres

Construction Cost:
Confidential

Completion Date:
Phase 1 2008 / Phase 2 2013

Parking:
Some onsite parking space - not part of scope

Kaiser Permanente Los Angeles Medical Center (LAMC) is a multi-phased project that occupies nearly three city blocks in downtown Los Angeles. The 448-bed flagship facility provides comprehensive acute inpatient care, including the most advanced tertiary care and other intensive services to serve Kaiser's members well into the 21st century. One of Kaiser's largest inpatient teaching hospitals in California, LAMC serves as Kaiser's Southern California center for cardiovascular surgery, pediatric and neonatal intensive care, neurosurgery, spine surgery and high-risk obstetrics.

The team developed detailed functional and space programs and a concept design that encompasses a series of "hospitals within a hospital"—a series of specialty hospitals vertically integrated within the building structure—that effectively responds to the regional system's needs. The design encompasses a 20-OR and Interventional Imaging suite with dedicated beds (ICU and M/S); an integrated Heart Hospital with six cardiovascular ORs, a Cardiac Cath with nine cath labs, CVSICU, CCU, and cardiac medical beds; a Children's Center

with pediatric intensive care and acute care nursing units; and a separate Women's Center with 11 labor and delivery suites.

Urban Context

One of the greatest challenges of LAMC was inserting a 912,000 sf facility within an existing campus in downtown Hollywood. An additional challenge was that the existing facility must remain fully operational throughout design and construction in order to adequately care for their existing patient-base. SmithGroupJJR and the design team planned and designed the replacement hospital using a multi-phased approach that didn't require the existing facility to shut down. By coordinating early with local agencies and KP, our planners and designers created the most effective phasing plan possible for the least amount of impact to patients and visitors during construction. The Los Angeles municipal rail system station is one block from the hospital, offering convenient transportation alternatives.

George Washington University Replacement Hospital

Washington, DC

The George Washington University replacement hospital is the premier healthcare facility for Washington, DC – serving the president and congress when in session. The 371-bed hospital, known worldwide for clinical expertise in cancer, labor and delivery, heart disease, surgery and minimally invasive surgery, emergency medicine and disaster preparedness, neurological care, and orthopedics, is dedicated to providing diagnostic treatment and ambulatory care services with centers of excellence in cardiovascular research/treatment.

The hospital offers emergency, diagnostic imaging, neurology/cardiology procedure areas, pharmacy, laboratory, central sterile processing and public functions such as educational spaces, dining area, gift shop, and administrative and business offices. Primary care and specialty outpatient care clinics are also available through 280 Medical Faculty Associates – comprised of 41 specialties and subspecialty areas. A surgery center with 12 operating rooms – including two open-heart rooms – and an endoscopy center is included in the hospital. The hospital also houses the Childbirth Center, which includes an LDR unit, postpartum unit, a well-baby nursery and NICU.

The hospital's premier Level I Trauma Center gained national recognition by successfully treating President Ronald Reagan in 1981 after an assassination attempt. The emergency room (ER) was estimated to serve more than 46,000 patients per year – yet was one of the smallest in the region. The ER now boasts a 250 percent growth with its 12,000 sf space in the new hospital.

Urban Context

The project presented numerous site challenges, including its tightly constrained urban site atop a Metro rail station. In addition, because the new hospital is located in a prominent and predominately residential area of the city—directly on Washington Circle in the historic Foggy Bottom district—SmithGroupJJR needed to successfully navigate the District's inherently complex approval processes, as well as obtain approval from the National Capital Planning Commission and the Commission of Fine Arts. SmithGroupJJR also proactively addressed the concerns of community and civic groups, as well as the DC Office of Planning and representatives from the DC Department of Public Works. SmithGroupJJR made several successful design presentations to the Foggy Bottom Advisory Neighborhood Commission (ANC). SmithGroupJJR dealt successfully with the community's concerns regarding noise, redirected and increased traffic, loss of parking, and obstructed views in order to build proactive support for the new hospital setting and design.



Project Size:
450,000 sf / 2 acres

Construction Cost:
\$115 million

Completion Date:
2002



