



Healthcare

We create environments that improve
the quality of care



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Founded in
1979

1,300 passionate
professionals
including engineers, scientists,
planners, and designers

24 offices
throughout the east coast

Who We Are

We are VHB. We are passionate about making meaningful contributions to the world through the work we do.

Healthcare and VHB

A healthcare institution's mission is to heal; our mission is to help. VHB's team of skilled professionals are experienced in the planning, design, and permitting of complex healthcare facilities with an emphasis "outside-the-building-walls."

Our engineers, planners, and scientists brings a sophisticated understanding of contemporary healthcare environments. We thrive within collaborative design teams, engaging architecture, construction management, and development firms. Whether addressing aging infrastructure, parking needs, wayfinding, patient satisfaction, resiliency planning, or regulatory requirements, VHB is committed to serving our healthcare clients as they build for the future. By incorporating an innovative and sustainable design approach, we help create environments that improve the quality of care.

*Project Office

Professional Services

VHB offers the focus and personal attention of a small consulting firm backed by the in-house resources of a 1,300-person, multidisciplinary company. Our team provides solutions to many of the special challenges associated with healthcare environments such as **academic medical centers**, in which research, teaching, and clinical care functions coexist. We recognize the importance of the patient-centered model within **specialized hospitals**, and develop responsive site designs, parking facilities, and wayfinding systems that affect a positive patient experience. We successfully address the unique requirements of **community hospitals** including constrained capacity and increased demand, and the necessity to remain fully operational 24 hours a day, 7 days a week. We also understand the financial challenges facing healthcare delivery and support our healthcare system clients as they reposition lower-acuity service lines out to the lower-cost, ambulatory/outpatient environments.

VHB develops solutions that enable our healthcare clients to focus on delivering quality patient care.

Site/Civil Engineering

VHB's site/civil practice focuses on the planning and design of healthcare facilities. Our engineers provide comprehensive site planning and design services that assist our clients with implementation of minor site improvements to major capital programs, encompassing a broad range of healthcare facility types. Our civil design responds to program and budget requirements, while integrating with existing site conditions in an environmentally responsive manner. Our engineers take a leading role in securing necessary approvals and permits from regulatory agencies and utility providers, representing our clients and projects in public hearings and meetings.

We implement a sustainable design approach with more than 85 LEED-accredited professionals and over 100 Envision™ Sustainability Professionals (ENV-SP's) representing the major physical design disciplines.

Transportation Planning and Engineering

A healthcare setting presents a unique set of transportation and mobility issues. Solutions focus on integration of all modes of transportation, requiring a balanced program of policy, operational management, and capital investments. VHB's transportation practice serves healthcare clients by improving pedestrian and vehicular environments, addressing access needs for patients, visitors, staff, as well as service and emergency personnel.

Our traffic engineers and parking professionals address challenges through the thoughtful design of access, parking, and circulation improvements. We apply state-of-the-art modeling and simulation technology that provides a clear understanding of a project's transportation requirements and impacts. We use these analyses to identify a range of potential multi-modal solutions to meet those needs, ranging from capacity enhancements to existing roadways and intersections; design of new transportation corridors and planning for transit systems; valet systems

planning and pedestrian/bicycle accommodations. We formulate transportation plans that support our client's sustainability initiatives by developing transportation demand management and trip reduction strategies. Our work is supportive of broader healthy community design initiatives, an issue that is being increasingly being addressed by our healthcare clients.





85 LEED-
accredited
professionals and over
100 Envision™
Sustainability Professionals

Environmental Permitting and Regulatory Compliance

VHB's environmental engineers, planners and scientists provide environmental services as part of an integrated services approach or as a specific regulatory compliance or permitting strategy. Our highly trained and diverse team of environmental professionals includes biological and environmental scientists, geologists, air quality engineers, hazardous material managers, water resource engineers, designers, public health planners, and GIS/IT professionals. Our staff is experienced with environmental regulations at the federal, state, and local levels, and engaged with both new and existing facilities and operations.

Infrastructure Resiliency Planning and Hazard Mitigation

VHB offers a comprehensive services approach to healthcare facilities—we combine resiliency planning and hazard mitigation capabilities as an embedded best-practice within our site/civil engineering, environmental, and transportation planning and design services. Our engineers, sustainability planners, and security and emergency management specialists help clients respond to local, regional, and national preparedness challenges.

VHB's security and emergency management practice specializes in the application of standards and program models formulated by the Department of Defense, Department of Homeland Security, Department of Justice, Environmental Protection Agency, National Fire Protection Association, and Nuclear Regulatory Commission.

Landscape Architecture

Our landscape architects enhance the growth and expansion of hospitals, medical centers and clinics, developing context-driven solutions that support their mission to provide better care. We understand our client's goals and vision for enhanced site improvements and apply design solutions that meet those goals. Our team recognizes the value and restorative power of healing landscapes. We approach our projects as a team member with facility managers and groundskeepers who understand the capabilities of their staff, available budget, and the importance of specifying durable materials and proven construction methods.

From planning through construction, we help our clients respond to changing needs and increasing demands.

Transportation Planning and Engineering

Transportation master planning
Parking facility and systems planning
Parking demand studies, utilization analysis, and optimization
Mobility needs assessments for site accessibility
Traffic impact and simulation analysis
Valet system operational planning and assessment
Shuttle system operational analysis
Planning and design of patient drop-off areas
EMS vehicle circulation and drop-off analysis
Service area operations analysis
Pedestrian safety studies
Emergency operations analysis
Medevac/helicopter operations analysis

Site/Civil Engineering

Due diligence
Site yield analysis and feasibility studies
Site master planning
Civil engineering
Land surveying
Utility system planning and design
Stormwater management planning and design
Floodplain modeling and FEMA certification

Landscape Architecture

Landscape master planning
Hardscape and landscape design
Healing garden design
Wayfinding
Landscape operation and maintenance standards development

Infrastructure Resiliency Planning and Hazard Mitigation

Site vulnerability assessments
Climate adaptation planning
Resiliency planning and hazard mitigation strategy development
Continuity of operations plan development
Transportation management planning including site logistics and emergency supply/evacuation plans
FEMA expeditor services including grant assistance, hazard mitigation planning, and post-disaster assistance



Environmental Compliance/Regulatory Permitting

Environmental Assessments and Planning

Phase I and II environmental site assessments

Environmental impact statements

Hazardous materials remediation design and implementation

Air Quality and Noise Abatement

Emissions modeling and permitting

Wind dispersion analysis

Congestion mitigation and air quality analysis

Noise studies

Noise attenuation analysis and design

Environmental Compliance And Permitting

Regulatory compliance audits and evaluations

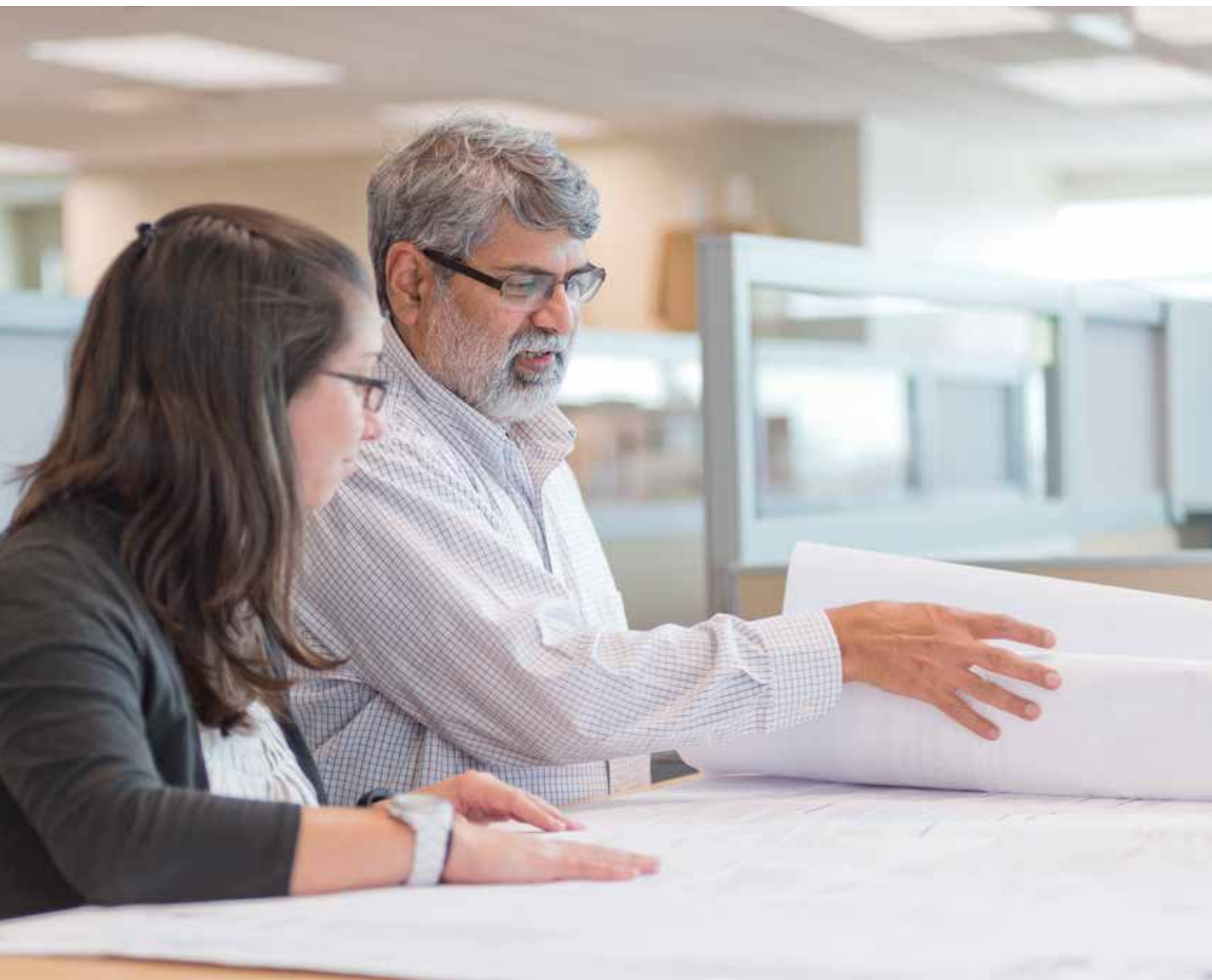
Fuel and medical gas storage tank permitting and compliance

Spill prevention control and countermeasures plan development

Stormwater pollution prevention plans

Industrial waste-stream discharge assessments and permitting

Assistance with regulatory notices and consent orders



Architects

Array Architects
Ballinger
Cannon Design
Ennead
EwingCole
Flad Architects
Francis Cauffman
FreemanWhite
Gresham Smith
HDR
HGA
HKS
HOK
NBBJ
Payette
Perkins+Will
Perkins Eastman
The S/L/A/M Collaborative
Shepley Bulfinch
Steffian Bradley Architects
TRO Jung|Brannen Inc.
Tsoi/Kobus & Associates
Wilmot Sanz
ZGF

Construction Management

Balfour Beatty Construction
Barton Malow Company
Gilbane Building Company
Hourigan Construction
Skanska
Shawmut Design and Construction
Suffolk Construction
Turner Construction Company
W.M. Jordan Company
Walsh Brothers
Walsh Construction
Whiting Turner Contracting Co.

Strategic/Development Advisors

Blue Cottage Consulting
CBRE
Colliers International
Hammes Company
Health Strategies & Solutions, Inc.
Jones Lang LaSalle
Kaufman Hall
Kurt Salmon
Stroudwater Associates
Trammell Crow Company

How We Work

Our best work is a result of fruitful collaborations with our peers.

A Culture of Collaboration

The majority of our healthcare assignments involve partnering with peer firms with expertise in allied disciplines such as healthcare strategic planning, facility master planning, architecture, and real estate advisory services. We recognize that our clients are best served by a united, integrated team approach to design. We understand our role as part of a team, offering our ideas, technical skills, and judgment as a participant in an iterative design process.

We work with many healthcare industry leaders including Top 100 industry peer firms as ranked by Modern Healthcare's Annual Construction and Design Survey and other industry sources.



VHB is an active member of the American Society for Healthcare Engineering, the U.S. Green Building Council, and a Charter Member of the Institute for Sustainable Infrastructure (ISI). We have credentialed more than 100 employees as ISI Envision™ Sustainability Professionals (ENV SPs).



Longwood Medical Area
Boston, MA

“Sustainability
is at the core
of who we are
and what we do
at VHB.”

—BOB BRUSTLIN, CEO

Design for a Sustainable Future

Sustainable design is the paradigm for our practice. For three decades—as environmental regulations have evolved and new sustainability imperatives have emerged—VHB has been a leader and innovator in the planning and design of sustainable transportation, infrastructure, and environmental systems. Our interdisciplinary approach integrates engineering, planning, and science professionals, resulting in comprehensive and cost-effective solutions for healthcare facilities and operations. VHB professionals are skilled at addressing design issues across a broad range of scales and contexts: from regional to site specific, and from urban to rural. Our healthcare practitioners are knowledgeable of green-oriented healthcare design standards/guidelines such as LEED for Healthcare 2.0 and the Green Guide to Health Care, as well as research programs such as the Pebble Project sponsored by the Center for Health Design.

Today, there are a great many motivations for healthcare institutions to advance the principles and goals of sustainable development. Consistent with a mission to heal, sustainable, healthier environments are especially essential in the healthcare industry, as facility design and operational changes can aid in a patient’s recovery. Whether fulfilling a vision to improve the health of patients, staff, and the community, or addressing sustainability in the context of increasing operational efficiency, VHB is uniquely suited to help our clients and partners in healthcare achieve their sustainability objectives.

Building Information Modeling

Building Information Modeling, or BIM, is an increasingly important tool in our design process. As a firm we have historically focused on the last two words of BIM—Information Modeling—in our design methodologies. With over 25 years of proven expertise in the major computer-aided design and drafting platforms, VHB is well versed in both Autodesk and Bentley design products, and using these tools in a BIM-ready project workflow. VHB engineers have been using information modeling techniques for design, impact analysis, cost estimating, constructability evaluation, project scheduling, and design visualization since these tools were first introduced in the industry. Currently, more than 500 of our civil and transportation engineers use Civil 3D, Land Development Desktop, InRoads, GeoPAK, MxRoads, and EaglePoint in both the AutoCAD and MicroStation environments.

Our extensive experience using Civil BIM on our transportation, infrastructure, and structural design projects has involved a focus on extracting construction quantities from design and existing conditions models using various design

applications as required by our clients. We develop project visualizations using our design model for nearly all large-scale projects, and find it especially effective for construction phasing and traffic control design when managing complex, multiphase projects. VHB also uses modeling of proposed underground utilities and drainage networks for conflict detection, cost estimating, and design validation. When working on multidisciplinary project teams, our expertise



allows for seamless exchange of design model information between Civil 3D, Revit, Land Desktop, and other design applications.

To stay abreast of all current design tools and techniques, VHB's Information Technologies (IT) group includes professionals with over 50 years of combined design experience who implement regular training efforts throughout the company. Additionally, members of our IT group regularly engage with project teams and clients in a quality control capacity to ensure that design model standards are met. VHB's design and IT staff are also active participants in both Autodesk and Bentley's beta programs, not only keeping VHB cognizant of available tools, but also allowing our designers to adjust workflow to prepare for the changes in procedures based on new design tools.

Currently, over 500 of our civil and transportation engineers use **Civil 3D, Land Development Desktop, InRoads, GeoPAK, MxRoads, and EaglePoint** in both the AutoCAD and MicroStation environments.



Brigham & Women's Hospital
Boston, MA



Delivering Results

We bring a deep understanding of healthcare facility planning, design, and operations.

Key Considerations

Your healthcare facility challenge is our problem to solve. We address issues head-on by delivering integrated service offerings that leverage more than three decades of healthcare facility design and operations.

Our approach to six key considerations that we routinely address on healthcare campuses are summarized on the following pages:

Transportation Systems

Continuity of Operations

Infrastructure Resiliency and Hazard Mitigation

Healing Landscapes

Stormwater Management

Environmental Compliance

Our solutions combine engineering, planning, and design coupled with a robust knowledge of healthcare facility operations.



ROB SMEDBERG
Principal/Healthcare Sector Leader

25 years of experience advising healthcare clients on capital project planning and development

Transportation Systems

A healthcare facility is a hub of activity, with 24/7/365 operational requirements. A key component of facility operations is transportation, with a need to accommodate often thousands of people and multiple functions in a safe, patient-centered and cost-effective manner. Patients, families, visitors, staff, and service and emergency personnel each have different transportation and mobility needs, with safety and ease of access being paramount concerns.

Activities such as valet operations, patient drop-off/pick-up, visitor/staff parking, emergency access, service and loading, transit system support, and ongoing construction frequently overlap in terms of schedule and physical adjacency. During periods of peak operation, unpredictable events and congested off-site traffic operations may stress the overall transportation system and compromise the patient-centered healthcare environment. With older healthcare facilities—particularly those located in dense, urban locations—space is often at a premium to accommodate the multiple user groups and functions, requiring careful consideration of design, operational, and management issues.

Having worked on hundreds of assignments across the full range of healthcare facility types—emergency department expansions, tertiary patient care centers, complex on-/off-site parking systems—our team of healthcare practitioners offer transportation planning and traffic engineering skills specifically directed to address the unique mobility needs of each facility type. We are recognized leaders in this specialized practice area, having authored best practices programs for world-class healthcare facilities throughout the United States.

Continuity of Operations

If hospitals are the structural body of healthcare, then utilities are the life-blood. No other building type requires the range of utilities nor the level of service reliability as hospitals. The loss of even a single utility service can be detrimental—causing operational paralysis and potential gaps in care. In such circumstances, reputational risks are also at play. Uninterrupted utility service is mission-critical to successful healthcare facility operations.

VHB understands that as existing healthcare campuses continue to modernize their facilities, increased demands are placed on already-taxed utility systems. We also recognize the fiscal challenges facing hospitals and that aging infrastructure makes it increasingly difficult to meet performance demands amidst a dynamic regulatory environment. VHB brings the experience and capability to assess complex utility systems and optimize distribution design strategies to deliver peak-operational efficiency and reliability. Our in-house utility modeling skills supports each project, driving cost-effective, thoughtful, and long-term sustainable solutions.

Environmental Compliance

As environmental concerns and regulations continue to evolve, VHB has developed the experience to advise our clients on the full range of environmental compliance issues that may influence daily operations and affect regulatory reporting requirements. VHB provides regulatory compliance, environmental permitting, hazardous materials management, and environmental risk management services to our healthcare clients to assist them in navigating the ever-changing regulatory framework and help mitigate associated financial and reputational risks.

Regulatory compliance with local, state, and federal regulations is a routine function of hospital operations. VHB professionals offer comprehensive regulatory support, guiding our clients through environmental compliance processes. Our strategic approach is based on a thorough understanding of environmental issues, the governing statutes, and the technical basis upon which the regulations were written. Our track record of success is the result of effective communication and relationships with regulatory agencies, as well as the ability to convey key regulatory and technical information.

Infrastructure Resiliency and Hazard Mitigation

By their very mission, healthcare institutions are held to a higher-standard of performance than any other facility. Hospitals must endure and function seamlessly through the most adverse circumstances including catastrophic weather events, acts-of-terror, and mass casualty incidents. While brick and mortar may protect the inner workings of hospitals, extreme events such as Superstorm Sandy, Hurricanes Katrina and Irene, and the Boston Marathon bombing have highlighted other weak-link vulnerabilities in critical healthcare infrastructure systems located outside-the-walls. Transportation linkages, utility services, and supply-chain continuity must all be maintained to support a fully-functioning hospital. Without means of ensuring these critically important operational elements, hospitals are quickly crippled and patient care compromised.

From our east coast locations, we conduct resiliency planning in our nation's most vulnerable risk zones to include the coastal regions from Key West to Virginia and New England. We apply that knowledge to each assignment resulting in thoughtful planning and enduring healthcare facilities.



Saint Luke's Hospital
New Bedford, MA

Stormwater Management

We recognize the special aspects of designing, operating, and maintaining a stormwater management system within a healthcare campus. A campus is in many ways a small city with extended roadway systems, expansive parking areas, multiple buildings, and paved storage areas. Stormwater systems may have been expanded as the facility has grown over time, with structures of varying age, design, and maintenance. A healthcare institution may have to operate and maintain its system under stringent permitting and discharge criteria.

VHB has a dedicated team of nationally recognized professionals with extensive experience in low impact development stormwater design, hydrology, hydraulics, and permitting. Our integrated team is composed of engineers, scientists, and planners with in-depth knowledge of contemporary and sustainable approaches to stormwater management, including the latest regulatory requirements, operational and maintenance regimes, and innovative budgetary approaches. Team members are recognized as thought leaders in key aspects of stormwater management, demonstrating leadership by participating on national professional organization committees, presenting technical papers, and conducting training sessions and courses for institutions.

Healing Landscapes

VHB's landscape architects and civil engineers support the growth and expansion of hospitals, medical centers and clinics, with creative context-driven solutions. Our work is guided by a principle and evidence that great site planning and design contribute to the quality of healthcare delivery. This holistic approach enhances the experience of patients, visitors, and staff from the moment of arrival by adding clarity and reassurance to wayfinding and providing landscaped spaces that calm, restore, and extend the mission to heal. Our landscape architecture practice engages healthcare clients in creating opportunities to extend the healing mission of the institution by maximizing restorative landscapes beyond the building walls. Designing accessible garden retreats that invite patients, their families, visitors and healthcare providers to expand their senses through natural settings of smell, sound, texture, color, scale, and artistic interest is central to our approach. Our healing gardens are welcoming places providing the quiet and contemplative beauty to reflect, experience a greater sense of serenity and reduced stress, and welcome the restorative relationship of compassionate care, the natural world, and health.

Our work is guided by a principle and evidence that great site planning and design contribute to the quality of healthcare delivery.



Transportation Master Planning and Engineering

Challenges

Facility orientation and wayfinding

Access management

Transportation system/cost optimization

Traffic congestion

Aged transportation infrastructure

Capital program demand

Boston Children's Hospital
Boston, MA

Memorial Sloan Kettering
New York, NY

Johns Hopkins Institutions
Baltimore, MD

**Barnes-Jewish Hospital/
St. Louis Children's Hospital**
St. Louis, MO

**VCU Children's Hospital
of Richmond Pavilion**
Richmond, VA

**UNC Hospital
Hillsborough Campus**
Hillsborough, NC

Solutions

Transportation impact assessment, identification of associated traffic mitigation measures and master planning to support the fast-track permitting and entitlement of two major facilities located in a dense, urban healthcare campus.

In an effort to achieve operational cost effectiveness, evaluated vehicular accessibility and delivery mode optimization for the routing of clinical samples to include drop-off, circulation, and parking for a new laboratory facility on Upper East Side.

Strategic effort to align transportation systems and achieve operational efficiencies among its diverse campuses, proposed optimizing privately-provided shuttle systems and leveraging access to publicly-provided transportation services.

As part of an integrated team, developed state-of-the-practice virtual modeling and cumulative impacts simulation/assessment to support the renewal of a dense, urban campus involving demolition of three buildings and \$1.2 billion expansion.

Recognizing special academic medical center needs/operations, developed innovative traffic management approach that including directional conversion of adjacent roadway, alternative parking geometry, and traffic management for three phases of construction associated with new pavilion.

With an emphasis on enhancing the patient experience and wayfinding, designed preferred access points, pedestrian crossings and treatments, drop-off/pick-up area geometrics, and intersection mitigation measures.



SEAN MANNING
Principal | Healthcare Transportation Leader

Recognized leader in providing innovative transportation solutions for complex healthcare environments



DAVE BOHN
Principal | Senior Project Director

35 years of experience across a broad array of healthcare facilities



MGH Lunder Building
Boston, MA

Image courtesy of NBBJ

Parking Management

Challenges

Limited parking availability

Increased parking demands

Remote/undesirable parking areas

Safety/security concerns

Massachusetts General Hospital *Boston, MA*

Solutions

Developed innovative transportation demand management measures to reduce automobile dependency and increase alternative modes of travel. Features include off-site employee parking, transit pass subsidies, shared parking strategies and alternative mode transportation amenities.

Winthrop-University Hospital *Mineola, NY*

On a tight suburban site, developed parking strategies that leveraged nearby transit service and shared parking to mitigate parking demands associated with new research facility. Strategies were incorporated within an expedited permitting process.

UNC Hospitals *Chapel Hill, NC*

Addressed constrained land area and capital/operational costs associated with new parking; implemented strategies that significantly reduced parking demand for 6 mgsf of new academic/ medical program space expansion.

St. Luke's Hospital *New Bedford, MA*

In response to community concerns, developed an innovative approach to "infill" parking expansion within existing campus for patient/visitor use subsequently reinforcing positive community relationships.



Duke University Medical Center
Durham, NC

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Emergency Department Area Planning, Design, and Operations

Challenges

ED area utilization
management

Circulation and
maneuverability

Capacity deficiencies

Patient safety and
security

Rhode Island Hospital
Providence, RI

**University of Virginia
Health System**
Charlottesville, VA

Northwell Health
Long Island, NY

**Brigham and Women's
Hospital**
Boston, MA

Miriam Hospital
Providence, RI

Solutions

Increased patient flow and peak period accommodation resulting reorganized orientation and circulation of existing ED drop-off area; also eliminated vehicle exhaust emissions into the ED area.

With a deep understanding of the larger healthcare campus, surrounding roadway context, and primary emergency vehicle arrival route, developed signage sequencing strategies to facilitate effective wayfinding from the interstate to the ED front door.

As part of an integrated strategy to better serve patient population, consolidate fleet operations and manage operational costs for a 17-hospital system, designed system-wide facility site plans, directional signage and parking facilities.

For this Level 1 Trauma Center located in a busy urban setting with combined street/campus operational demands, designed geometric improvements and maneuverability optimization for the ED drop-off area.

In response to increased ED throughput and modern emergency vehicle demands, developed access and geometric modifications to enhance improved operations at a highly constrained emergency vehicle drop-off zone.

Patient Drop-off/ Pick-up

Challenges

Patient/visitor arrival
experience

Pedestrian safety

Queue lengths

Orientation and
wayfinding

Kaiser Permanente
Tysons Corner, VA

**Duke University
Medical Center**
Durham, NC

**Care New England,
Women & Infants Hospital**
Providence, RI

Queens Hospital
Queens, NY

Solutions

In support of a first-of-its-kind specialty hub concept, developed access and front entry retrofit improvements to meet the operational demands involving the repurposing of an existing commercial office building for clinical use.

For a major expansion of the medical center that combined multiple functions, designed a new loop road to support the growth associated with its School of Medicine, Nursing, and Hospital Pavilion/Cancer Center. Developed simulations to provide efficient operations under peak-hour and shift-change scenarios that informed architectural/site planning decisions.

Understanding the unique requirements associated with a new neo-natal intensive care pavilion, designed a drop-off loop/plaza to support the volume demands and special mobility limitations of the design patient population.

Recognizing that the first and last experiences with a healthcare facility leave the largest impression, evaluated access and drop-off scenarios for the redevelopment of an existing hospital and the adjacent construction of a new ambulatory care pavilion.



Northwell Health System
Long Island, NY



DAN WINKELMAN
Senior Transportation Engineer

Deep understanding of transportation relationships
among multi-campus healthcare systems

Utility Master Planning and Design Optimization

Challenges

Aging utility infrastructure

Capital program demand

Continuity of operations

Facility resiliency

Operation and maintenance standards

**Duke University
Medical Center**
Durham, NC

**Sentara Princess Anne
Campus**
Virginia Beach, VA

**Massachusetts General
Hospital**
Boston, MA

**Care New England,
Women & Infants Hospital**
Providence, RI

Solutions

Located within a constrained site that included a coal delivery rail line, led utility master planning for a central utility corridor involving a utility tunnel accommodating chilled, domestic, fire protection water; stormwater drainage, sanitary sewer, fiber-optics, telephone, electrical power, and natural gas.

For a large regional healthcare campus located in a rapidly developing area, developed a comprehensive utility master plan to support a multi-phased development consisting of a new hospital and medical office buildings. Modeled peak flow operation of the city's downstream pump station to confirm reserve capacity with no possible interruption of service to the campus.

As part of an integrated design team, led the civil design and permitting for a complex infill project consisting of new 14-story clinical building located at the heart of historic main campus. Developed phased, enabling utility and expedited permitting strategy.

As a central component of mission critical utility infrastructure for a new NICU pavilion, led the master utility planning, design, and permitting of an on-site tank farm to provide redundant supply of medical oxygen.



MYRINA GAGLIONE
Associate | Senior Civil Engineer

Experienced manager servicing major private healthcare systems as well as the Veterans Health Administration



Sentara Princess Anne Campus
Virginia Beach, VA



Brigham & Women's Hospital
Boston, MA



HOWARD MOSHIER
Associate | Senior Civil Engineer

Skilled healthcare infrastructure designer offering extensive collaborative experience

Stormwater Management/ Sustainability

Challenges

Stormwater quality regulations

Best management practices

System optimization/retrofits

Operation and maintenance standards

Physical space constraints

Green infrastructure aspirations

Lifespan, Rhode Island Hospital
Providence, RI

Bon Secours, Mary Immaculate Hospital
Newport News, VA

Memorial Sloan Kettering
Commack, NY

Partners HealthCare, Spaulding Rehabilitation Hospital
Charlestown, MA

Solutions

Integration of an innovative stormwater management program to manage campus discharges to an impaired waterbody. Incorporation of low impact development solution consisting of surface biofilters and subsurface infiltration.

Prepared stormwater master plan incorporating innovative strategies to manage a problematic drainage channel that constrained hospital operations/development. Designed sustainable solution of non-intrusive open conveyance that mitigated insect-borne disease transmission concern and allowed implementation of growth plan.

Within a highly constrained site and stringent environmental regulations, developed stormwater design and permitting strategy for new outpatient/infusion center incorporating integration of stormwater appurtenances and infiltration features to allow for on-site management up to 100-year event.

Located on the Boston waterfront, the new facility was designed to respond to rising sea levels. Site grading and resiliency-oriented utility design supported LEED-NC Gold certification of the first new free-standing hospital in Boston in over 30 years.



Spaulding Rehabilitation Hospital
Charlestown, MA

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JEAN GARBIER
Associate | Senior Landscape Architect

30 years of experience in the design of outdoor healing environments and wayfinding systems

Healing Gardens and Exterior Rejuvenating Spaces

Challenges

Space availability

Landlocked campuses

Existing infrastructure

Acoustics and visual distractions

Maintenance

Kaiser Permanente
Tysons Corner, VA

Norwalk Hospital
Norwalk, CT

St. Luke's Hospital
New Bedford, MA

Care New England, Women & Infants Hospital
Providence, RI

Northwell Health, University Hospital
Manhasset, NY

Lifespan, Rhode Island Hospital
Providence, RI

Solutions

Incorporated healing garden to offer area of contemplation as part of repurposing of a former commercial building to a 24-hour outpatient services center. Used relatively simple paving materials, sweeps of native plantings, rain gardens, and careful preservation of existing trees to create a setting that reinforced the Kaiser Permanente advocacy of the "Total Health Environment".

Creative space-making for a new healing garden by way of double-duty use of space to be shared by utility infrastructure vaulting supporting a new outpatient services pavilion.

As part of a phased site improvement strategy, incorporated a new healing garden respite feature into the existing hospital campus within a constrained site.

For the first LEED-NC Gold Certification for a facility of its type in New England, optimized LEED site credit points by integration of landscape architecture, site engineering, and stormwater management design resulting in 25% of overall LEED credits.

Strategic design of landscape features located within the influence of medivac helicopter rotor downwash. Designed wind-tolerant plantings utilizing a stabilizing treatment of a geo-mesh with an application-specific soil strata.

As part of a permitting effort and to improve community relations, developed a campus-wide landscape inventory and implemented follow-on streetscape greening/ landscape enhancement project in collaboration with the City.



SUE COURTEMANCHE

Principal | Director, Oil & Hazardous Material Services

Trusted advisor to healthcare clients on a range of environmental regulatory compliance strategies



University of Pennsylvania Health Center
Philadelphia, PA

Environmental Permitting

Challenges

Regulatory complexities

Performance standards

Facility and/or operational noncompliance

Community relations

Children's Hospital of the King's Daughters *Virginia Beach, VA*

Winthrop-University Hospital *Mineola, NY*

The Jackson Laboratory at UConn Health Center *Farmington, CT*

Partners HealthCare, Spaulding Rehabilitation Hospital *Charlestown, MA*

University of Pennsylvania Health System *Philadelphia, PA*

Solutions

Developed and implemented innovative environmental permitting strategy for a new ambulatory surgery center—designed exclusively for children—to meet an aggressive construction schedule.

Expanded Environmental Assessment for a new research facility, addressing issues of land use, zoning, consistency with comprehensive plan, transportation and parking, community facilities and services, and aesthetic resources.

First-of-its-kind emissions and noise permitting of fossil fuel-burning equipment for a new genomics laboratory facility, fuel storage permitting for a new 20 kgal underground storage tank proximate to an environmentally sensitive area.

Developed and implemented an integrated federal/state/local environmental permitting strategy for new hospital facility located adjacent to Boston Harbor. Permitting addressed a range of complex issues including sea level rise.

As part of an integrated design team, provided technical engineering support associated with parallel permitting efforts related to development of a new outpatient facility, children's pavilion, and future redevelopment of an adjoining site.

Risk Management and Environmental Compliance

Challenges

Facility characterization

Risk management

Health and safety

Dynamic regulatory environment

Reputational risk

The Jackson Laboratory at UConn Health Center

Farmington, CT

Lifespan, Outpatient Women's Health Facility

North Attleboro, MA

Landmark Medical Center

Woonsocket, RI

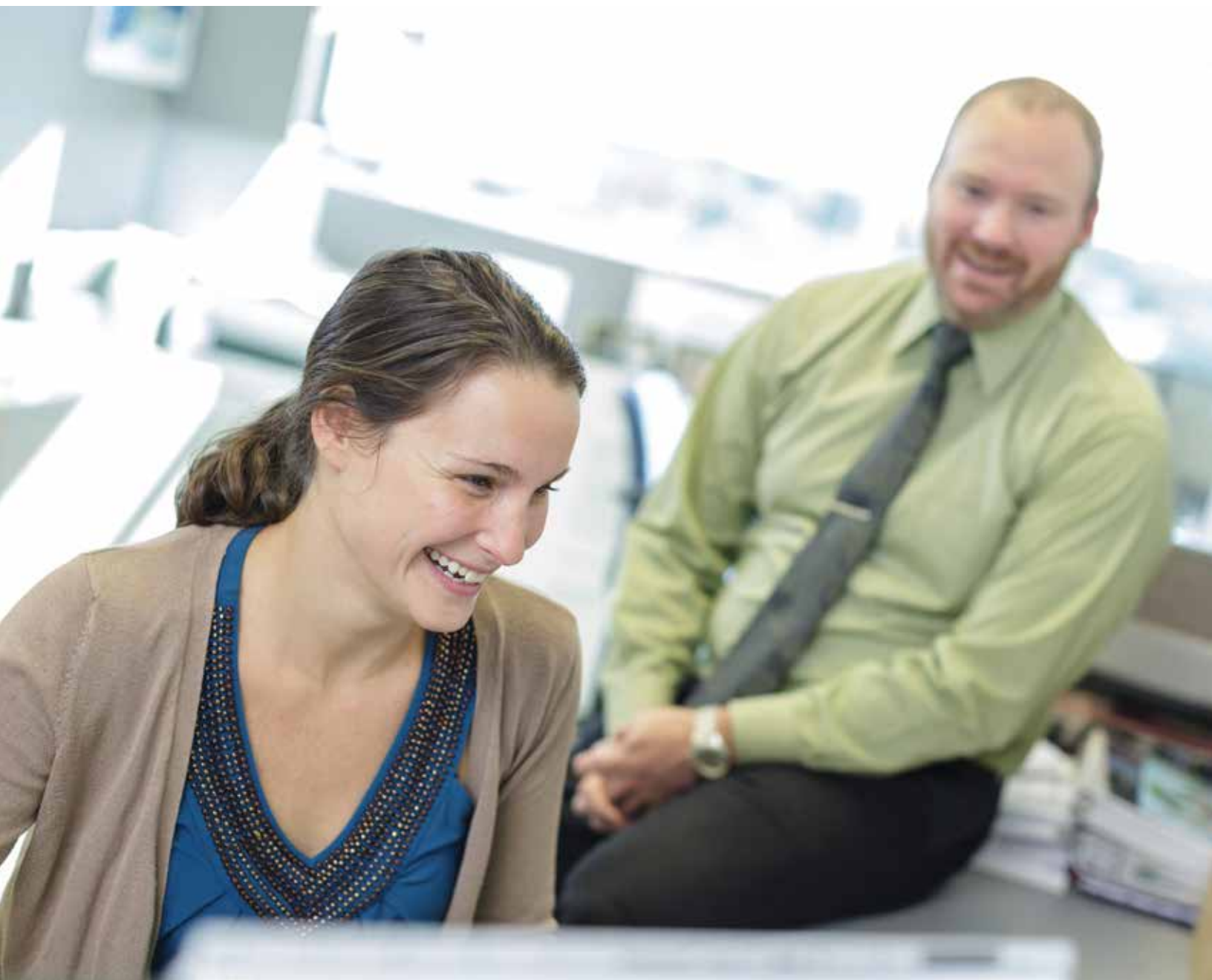
Solutions

Developed first-of-its-kind regulatory compliance strategy in the state related to unique facility discharge permits related to water treatment, non-contact cooling and heat-pump water and wastewater associated with food preparation discharges, quarantine and radiation rooms.

As part of a larger system facility acquisition and integration initiative, undertook an expedited regulatory compliance audit and operational/reporting deficiencies assessment related to asset acquisition.

Rapid preparation of an environmental impact characterization and development/implementation of a remediation plan for soils/groundwater impacted by a leaking underground storage tank.





Healthcare Experience

Your mission is to heal. Our mission is to help.

Clients and Services

VHB's healthcare clients count on our dedicated team to support their academic medical center, acute care hospital, and ambulatory facilities projects outside the building walls—from the earliest stages of master planning through design, permitting, and construction.

The following table lists our representative healthcare clients and illustrates the integrated services we have provided for each client.

35+ years
of healthcare experience

1,300 strong
with a core team
of healthcare-focused
professionals

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Anna Jaques Hospital <i>Newburyport, MA</i>	•			•		•	•
Arbour-Fuller Hospital <i>South Attleboro, MA</i>				•			
Atrius Health Worcester Medical Center <i>Worcester, MA</i>	•	•	•	•			
Baystate Health Baystate Franklin Medical Center <i>Greenfield, MA</i>				•			
Baystate Medical Center <i>Springfield, MA</i>	•	•		•		•	
Beth Israel Deaconess Healthcare (CareGroup) Beth Israel Deaconess Hospital—Milton <i>Milton, MA</i>	•	•	•	•		•	•
Beth Israel Deaconess Medical Center <i>Boston, MA</i>	•	•	•	•	•		•
BJC HealthCare Barnes-Jewish Hospital <i>St. Louis, MO</i>	•						
St. Louis Children's Hospital <i>St. Louis, MO</i>	•						
Bon Secours Health System Good Samaritan Regional Medical Center <i>Suffern, NY</i>			•				
Mary Immaculate Hospital <i>Newport News, VA</i>		•					
Imaging Center at Reynolds Crossing <i>Richmond, VA</i>		•	•	•	•		•
St. Mary's Hospital <i>Richmond, VA</i>	•	•	•	•	•		
Boston Medical Center <i>Boston, MA</i>	•	•					
Brockton Hospital <i>Brockton, MA</i>	•	•					
Bronx Psychiatric Center <i>Bronx, NY</i>	•	•					
Cambridge Health Alliance <i>Cambridge, MA</i>	•	•					
Cape Cod Healthcare Cape Cod Hospital <i>Hyannis, MA</i>	•	•	•	•			



150+
healthcare clients

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Falmouth Hospital Falmouth, MA	●						
Care New England Health System Kent Hospital Warwick, RI	●	●	●	●	●	●	
Women & Infants Hospital Providence, RI	●	●	●	●	●	●	●
Caring Health Center Springfield, MA	●			●			●
Catholic Health Services of Long Island Good Samaritan Hospital Medical Center West Islip, NY			●				
St. Francis Hospital Roslyn, NY	●	●	●				
Centra Health Lynchburg, VA	●						
Charles River Hospital Wellesley, MA							●
Children's Hospital Boston Boston, MA	●	●	●	●	●		●
Children's Hospital of Philadelphia Philadelphia, PA	●	●					
CHKD Health System Children's Hospital of the King's Daughters Norfolk, VA			●	●			●
Oakbrooke Health Center Chesapeake, VA			●	●			●
Princess Anne Health and Surgery Center Virginia Beach, VA			●	●			●
Southgate Commons Virginia Beach, VA			●	●			●
Dana-Farber Cancer Institute Boston, MA	●	●	●	●	●		●
Dartmouth-Hitchcock Cheshire Medical Center Keene, NH	●	●		●			
Dartmouth-Hitchcock Medical Center Lebanon, NH	●						
Duke University Medical Center Durham, NC	●	●		●	●	●	
Eastern Virginia Medical School Norfolk, VA	●	●	●	●	●	●	●

Design approximately
\$100 million
of healthcare transportation
and infrastructure annually

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Elliot Hospital <i>Manchester, NH</i>	●	●					
Emerson Hospital <i>Concord, MA</i>	●						
Exeter Hospital <i>Exeter, NH</i>	●						
Florida Hospital <i>Orlando, FL</i>	●			●			
Flushing Hospital Medical Center <i>Queens, NY</i>	●	●					
Frisbie Memorial Hospital <i>Rochester, NH</i>	●	●					
Gouverneur Healthcare Services <i>New York, NY</i>	●	●					
Granite Healthcare System Catholic Medical Center <i>Manchester, NH</i>	●	●	●	●		●	●
Concord Hospital <i>Concord, NH</i>	●						
Wentworth-Douglass Hospital <i>Dover, NH</i>	●	●					
Hallmark Health System Hallmark Health Medical Center <i>Reading, MA</i>							●
Lawrence Memorial Hospital <i>Medford, MA</i>	●	●					
Melrose-Wakefield Hospital <i>Melrose, MA</i>	●	●		●			
Harrington Memorial Hospital <i>Southbridge, MA</i>				●			
Hartford HealthCare Hartford Hospital <i>Hartford, CT</i>	●	●					
William W. Backus Hospital <i>Hartford, CT</i>	●	●					
Harvard Medical School <i>Boston, MA</i>	●	●	●	●	●		●
Harvard Pilgrim Health Care <i>Quincy, MA</i>	●						
Hospital Corporation of America West Creek Campus <i>Goochland, VA</i>	●						
Johns Hopkins University Hospital <i>Baltimore, MD</i>	●						

Deep
understanding
of healthcare-specific
regulatory issues from design
and construction through
operations

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Joslin Diabetes Center <i>Boston, MA</i>	●	●	●	●			●
Kaiser Permanente <i>West McLean, VA</i>		●		●			
King Faisal Specialty Hospital & Research Centre <i>Riyadh, Saudi Arabia</i>	●	●					
Lahey Health Beverly Hospital Ambulatory Care Center <i>Danvers, MA</i> Hunt Medical Center <i>Danvers, MA</i> Lahey Clinic <i>Burlington, MA</i> Winchester Hospital <i>Winchester, MA</i>	● ● ● ●	 ● ●	● ● ●	 ● ●			
Landmark Medical Center <i>Woonsocket, RI</i>	●	●		●			●
Lawrence & Memorial Hospital <i>New London, CT</i>	●			●	●	●	●
Lawrence General Hospital <i>Lawrence, MA</i>	●						
Lemuel Shattuck Hospital <i>Jamaica Plain, MA</i>	●	●		●			
Lifespan Health Bradley Hospital <i>East Providence, RI</i> Miriam Hospital <i>Providence, RI</i> Rhode Island Hospital <i>Providence, RI</i>	 ● ● ●	 ● ● ●	 ● ● ●	● ● ●	 ● ●		● ● ●
Loyola University Medical Center <i>Maywood, IL</i>	●						
Maine Medical Center <i>Portland, ME</i>	●	●					
Mary Washington Hospital <i>Fredericksburg, VA</i>	●	●	●	●	●		●
Massachusetts Eye & Ear Infirmary <i>Boston, MA</i>	●	●					
Memorial Sloan Kettering Cancer Center <i>New York, NY</i>	●	●	●	●	●		●
Mercy Medical Center <i>Springfield, MA</i>							●



Nationally recognized leaders

in healthcare transportation
and infrastructure system
planning and design

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Middlesex Hospital <i>Middletown, CT</i>	●	●	●				
Morristown Medical Center <i>Morristown, NJ</i>	●	●					
Mount Auburn Hospital <i>Cambridge, MA</i>	●	●		●	●	●	●
Nassau University Medical Center <i>East Meadow, NY</i>	●	●	●		●		
New England Baptist Hospital <i>Boston, MA</i>	●	●		●			●
New York City Health and Hospitals Corporation Harlem Hospital Center <i>New York, NY</i> Kings County Hospital <i>Brooklyn, NY</i> Queens Hospital Center <i>Queens, NY</i>	● ● ●	● ● ●					
Northwell Health Center for Advanced Medicine <i>Lake Success, NY</i> Franklin Hospital <i>Valley Stream, NY</i> Glen Cove Hospital <i>Glen Cove, NY</i> Lenox Hill Hospital <i>New York, NY</i> North Shore University Hospital <i>Manhasset, NY</i> Plainview Hospital <i>Plainview, NY</i> Southside Hospital <i>Bay Shore, NY</i>	● ● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ●	● ● ● ● ● ● ● ● ●		● ● ● ● ● ● ● ● ●
Northern Westchester Hospital <i>Mt. Kisco, NY</i>			●				
Norwalk Hospital <i>Norwalk, CT</i>	●	●	●	●	●		●
Novant Health Hospice House <i>Manassas, VA</i> Prince William Hospital <i>Manassas, VA</i>		● ●	●		●		●
Osteopathic Hospital of Maine <i>Portland, ME</i>	●	●					



CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Partners HealthCare							
Brigham & Women's Hospital <i>Boston, MA</i>	●	●	●	●	●		●
Cooley Dickinson Hospital <i>Northampton, MA</i>	●	●	●				●
Faulkner Hospital <i>Boston, MA</i>	●	●	●	●	●	●	●
Massachusetts General Hospital <i>Boston, MA</i>	●	●	●	●	●	●	●
McLean Hospital <i>Belmont, MA</i>	●		●	●			
North Shore Medical Center <i>Salem, MA</i>	●	●	●	●			
Spaulding Rehabilitation Hospital <i>Boston, MA</i>	●	●	●	●	●		●
Riverside Health System							
<i>Newport News, VA</i>	●						
Sentara Healthcare							
Albemarle Hospital <i>Elizabeth City, NC</i>		●		●			
BelleHarbour <i>Suffolk, VA</i>		●		●			
Greenbrier HealthPlex <i>Chesapeake, VA</i>		●		●			
Independence (formerly Bayside Hospital) <i>Virginia Beach, VA</i>		●	●	●	●	●	●
Kitty Hawk Medical Center <i>Kitty Hawk, NC</i>		●		●			
Leigh Hospital <i>Norfolk, VA</i>		●		●	●	●	●
Norfolk General Hospital <i>Norfolk, VA</i>		●		●			
Princess Anne Hospital <i>Virginia Beach, VA</i>	●	●	●	●	●	●	●
Sentara Healthcare Corporate Headquarters <i>Norfolk, VA</i>		●			●		
Virginia Beach General Hospital <i>Virginia Beach, VA</i>		●		●			
Southcoast Health							
Charlton Memorial Hospital <i>Fall River, MA</i>		●					
St. Luke's Hospital <i>New Bedford, MA</i>	●	●	●	●	●	●	

Partner with
over 75%
of the top healthcare
architect/construction
management companies

Experience with
full array
of healthcare facility types

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
South County Hospital <i>Wakefield, RI</i>	●			●			
South Nassau Communities Hospital <i>Oceanside, NY</i>	●	●	●		●		
South Shore Hospital <i>South Weymouth, MA</i>	●	●	●	●			
Steward Health Care System Holy Family Hospital <i>Methuen, MA</i>	●				●		
Norwood Hospital <i>Norwood, MA</i>		●					
St. Elizabeth's Medical Center <i>Boston, MA</i>	●	●	●	●			●
St. John's Riverside Hospital <i>Yonkers, NY</i>			●				
St. Joseph's Healthcare Center <i>Lowell, MA</i>	●						
Stony Brook University Hospital <i>Stony Brook, NY</i>	●	●	●		●		
Symmes Hospital <i>Arlington, MA</i>	●						
Tufts University School of Dental Medicine <i>Boston, MA</i>	●		●	●			
UConn Health <i>Farmington, CT</i>	●	●	●	●	●		●
UMass Memorial Health Care Leominster Hospital <i>Leominster, MA</i>		●	●	●			
UMass Memorial Medical Center <i>Worcester, MA</i>	●	●	●	●			●
UNC Healthcare <i>Chapel Hill, NC</i>	●						
University Hospitals of Cleveland <i>Cleveland, OH</i>	●	●					
University of Massachusetts Medical School <i>Brockton, MA</i>	●	●	●	●	●		●
University of Pennsylvania Health System <i>Philadelphia, PA</i>	●						
University of Virginia Health System <i>Charlottesville, VA</i>	●	●		●			

100+
healthcare assignments
completed annually

 40+ projects
recognized by healthcare
awards programs

CLIENT	Traffic/Transportation	Parking	Permitting	Civil Engineering/ Infrastructure	Site Planning	Landscape Architecture	Land Survey
Veterans Health Administration							
VAMC Boston <i>Brockton, MA</i>	●	●	●	●			
VAMC Boston <i>Jamaica Plain, MA</i>	●	●	●	●			
VAMC Brooklyn <i>Brooklyn, NY</i>	●	●					
VAMC Hampton <i>Hampton, VA</i>				●			●
VAMC Northampton <i>Northampton, MA</i>	●	●		●	●		
VAMC Orlando <i>Orlando, FL</i>			●				
VAMC Providence <i>Providence, RI</i>	●	●					
VAMC Richmond <i>Richmond, VA</i>		●	●	●	●		●
Virginia Commonwealth University Medical Center <i>Richmond, VA</i>	●	●	●	●			
WakeMed Health & Hospitals							
WakeMed Cary Hospital <i>Cary, NC</i>	●	●					
WakeMed Garner Healthplex <i>Garner, NC</i>	●	●					
WakeMed North Hospital <i>Raleigh, NC</i>	●	●					
WakeMed Raleigh Campus <i>Raleigh, NC</i>	●	●					
Warren Alpert Medical School of Brown University <i>Providence, RI</i>	●			●			
Weill Cornell Medical College <i>New York, NY</i>		●					
Westchester Medical Center <i>Valhalla, NY</i>			●				
Winthrop-University Hospital <i>Mineola, NY</i>	●	●					
Youville Hospital & Rehabilitation Center <i>Cambridge, MA</i>	●	●		●			●



BJC HealthCare
St. Louis, MO

Rendering courtesy of HOK

Select Experience

VHB has had the privilege of working closely with more than 150 healthcare clients as they seek to establish, grow, and maintain their facilities.

Delivering Results

We have worked closely with healthcare clients as they seek to improve patient care and satisfaction as well as respond to the demands of 21st century healthcare challenges. Our representative project experience is highlighted in detail on the following pages.

Massachusetts General Hospital

Partners HealthCare System | Boston, MA

Opened in 2011, the Lunder Building is a major new addition to the clinical facilities at the MGH flagship campus. Located on a compact, 42,000-sf urban site, the building is split into a procedural program base and an upper bed tower, connecting to five existing buildings via bridges and walkways. The Yawkey Center for Cancer Care was completed as the first phase of the expansion and includes an underground parking garage. The site and building design provides patients, visitors, and employees the option of remaining in a weather-protected environment between buildings, and offers a convenient route to the MBTA station.

640
kgsf

150
new beds

725
structured parking
spaces

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Architect: NBBJ



Architect: Perkins+Will



Spaulding Rehabilitation Hospital

Partners HealthCare System
Charlestown, MA

Opened in 2013, Spaulding is consistently ranked among the top five rehabilitation hospitals in the country. From initial site selection on through design and implementation, VHB supported our longstanding client—Partners—and the architect over a four year process that encompassed an extensive permitting process. The site design for the LEED NC Gold replacement hospital addressed anticipated sea level rise and other special design parameters associated with the former brownfield harborfront site. Over 75% of the ground floor is open for public use and connects with the adjoining Harborwalk.

262
kgsf

132
new beds

2 levels
underground parking

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Architect: Cannon Design/NBBJ



Brigham & Women's Hospital: Carl J. and Ruth Shapiro Cardiovascular Center

Partners HealthCare System
Boston, MA

Located in the heart of the Longwood Medical Area (LMA), the Shapiro Cardiovascular Center is the first LEED Silver hospital in New England. The technologically-innovative facility opened in 2010 and is notable for its creative use of underground/under street space for clinical use that extends 60 feet below street level. Development of the site within the dense context of the LMA involved complex utility relocations that had to maintain uninterrupted operations to existing facilities. VHB developed a permitting strategy that allowed for rapid and phased local approvals as construction proceeded.

420
kgsf

40
kgsf of usable
underground space

136
new beds

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Beth Israel Deaconess Medical Center: Carl J. Shapiro Clinical Center

Beth Israel Deaconess | Boston, MA

Architect: Rothman, Rothman and Heinemann/Chan Krieger



BIDMC hosts nearly 800,000 patient-visits annually at its flagship campus located in the heart of the Longwood Medical Area. In an effort to meet burgeoning clinical and research demand as well as address its aging infrastructure, BIDMC undertook a complex real estate transaction that led to the acquisition of the former campus of the Mass College of Art. As a longstanding VHB client, we supported BIDMC through the detailed planning, design, and permitting of this award-winning major clinical expansion that preserved the historic elements of the campus and created a new park along Brookline Avenue.

380

kgsf expansion

Transportation planning
Traffic engineering
Permitting

Boston Children's Hospital

Boston Children's Hospital
Boston, MA



Our work with BCH began in 1984 with a traffic impact study for a medical office building on Longwood Avenue. Over the past 30 years, we have continued to support BCH as it has added nearly 1 mgsf of clinical/research space, parking facilities, and undertaken roadway/ infrastructure upgrades as technology and demands on the facility have increased. Consistently ranked among the top pediatric medical centers in the country, the 365-bed facility is also among the busiest with nearly 500,000 annual patient-visits and approximately 60,000 emergency department visits annually.

1 million

gsf

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Baystate Medical Center

Baystate Medical Center | Springfield, MA

Conceived as a “Hospital of the Future,” the three-phase addition to the Baystate Health Campus provides a state-of-the-art replacement facility for this tertiary/quaternary complex. The campus is the sole Level 1 Trauma Center for the region and is supported by a new helipad operation. Development of the campus is to be phased over an eight-year period, requiring an innovative approach to utility infrastructure. The high water table condition was a key design parameter in the development of seven underground tunnels that connect the sprawling campus.

630
kgsf

314
new beds

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Architect: Steffian Bradley Architects



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Lahey Hospital and Medical Center

Lahey Health | Burlington, MA

Since 2003, VHB has supported Lahey with its main campus expansion in Burlington. The 317-bed, Level II trauma center serves nearly 3,000 patients per day. The campus is characterized by an extensive wetlands system, adjoining residential neighborhoods and complex local/regional traffic conditions. Since an initial clinical expansion completed in 2007, subsequent development has involved a complex "infill" program for a new emergency department/oncology wing, structured parking and cogeneration plant. In addition to leading the civil/traffic engineering effort, VHB has been responsible for securing permits from eight jurisdictions.

350
kgsf Phase I

160
kgsf "infill" Phase II

1,465
parking spaces

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting

Architect: FreemanWhite



Rhode Island Hospital

Lifespan | Providence, RI

Architect: HOK



Rhode Island Hospital is the largest acute-care hospital in the state and home to Hasbro Children's Hospital, the state's sole facility dedicated to pediatric care. The hospital achieved its emergency department expansion through an efficient program consisting of a three-story addition above two new levels of underground parking. The design mitigated the loss of surface parking spaces and allows patients arriving by vehicle direct access to the facility. An innovative approach to urban stormwater treatment resulted in enhanced stormwater quality discharges to the Providence River.

200

kgsf emergency department

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Women & Infant's Hospital

Women & Infant's Hospital
Providence, RI

Architect: Anshen & Allen



Women & Infant's Hospital has seen tremendous growth serving as the regional perinatal center for southeastern New England. The new neonatal intensive care unit (NICU) was developed on a highly constrained site, complicated by the presence of a major combined sewer line that traverses the campus and required an innovative approach to site development. In 2010, the NICU expansion was recognized as the first LEED-NC Gold facility in New England, the first of many environmental awards for the facility.

150

kgsf

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting

Harlem Hospital Center

New York City Health and Hospitals Corporation | New York, NY

Architect: HOK



© Paul Marchal Photography

The \$325 million modernization of this historic Harlem institution connects previously separate facilities across two city blocks, creating a single integrated campus for the 286-bed facility. In support of the design and permitting effort, we assessed modifications to the local roadway network, circulation patterns, multimodal access to transit /parking facilities and relocated emergency and service functions. One of the largest investments in public health facilities in the city's history, the project has transformed this area of Harlem and improved the quality of patient care/experience.

260

kgsf

Transportation planning
Traffic engineering
Permitting

Norwalk Hospital

Norwalk Hospital | Norwalk, CT

Architect: FreemanWhite



The new outpatient pavilion and cancer center represents the first major reorganization of this 120-year old hospital. The \$107 million expansion repositions the emergency department, and incorporates a healing garden between the expansion and adjacent related development of a six-story garage. Extensive use of BIM during the initial design phase allowed for early-stage enabling work that sustained hospital operations.

130

kgsf outpatient facility

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting
Survey

Sentara Enterprises

Sentara Healthcare | Virginia Beach, VA

Serving a critical need for the broader region, Sentara Princess Anne Health Campus provides a single destination that offers acute care as well as outpatient services and community uses within an integrated, master planned campus. The natural qualities of the site provide an organizing framework with new roadways, buildings, water features, and open spaces carefully arranged to reinforce the overall health and wellness of the new campus.

70 acres
regional campus

160
beds

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting
Survey



Raymond and Ruth Perelman Center for Advanced Medicine

Children's Hospital of Philadelphia | Philadelphia, PA

As the largest capital project undertaken in the CHOP system, the Perelman Center occupies a strategic location amidst CHOP and Penn Tower, separated by major roadways serving the multiple uses of the medical center campus and adjacent uses. The transportation planning effort supported the initial master plan and subsequent design strategies focused on easing wayfinding and clear separation of various modes and access points that anticipates increased use of transit.

500
kgsf

Transportation planning
Traffic engineering

Architect: Rafael Vinoly/Perkins Eastman



Stony Brook University Hospital

Stony Brook University Hospital
Stony Brook, NY



The modernization and expansion program was the most significant investment in the campus since its initial development in 1980. Planning addressed current parking/access operational issues and modeled future impacts associated with added program, including an ambulatory care facility. The regulatory context in Stony Brook is such that traffic impacts are “first and foremost” in public assessment of the project, requiring expertise in healthcare facility-related transportation/traffic assessment.

320
kgsf

300-space
parking garage

Transportation planning
Permitting

Children’s Hospital of Richmond

Virginia Commonwealth University
Health System | Richmond, VA

Architect: HKS



Occupying a strategic, highly visible and heavily traveled location in downtown Richmond, the new pavilion consolidates many pediatric functions within a single facility that were previously distributed across the campus. Strategic transportation design solutions early-on focused on consolidating parking adjacent to the pavilion, conversion of a busy two-way street to one-way, integrating loading/emergency access within the urban site, and developing transportation management plans that allowed continuous operation during construction.

640
kgsf

600-space
parking garage

Transportation planning
Traffic engineering
Permitting

University of Virginia Health System

University of Virginia Health System | Charlottesville, VA

This complex expansion program required an innovative scheduling approach. Multiple enabling packages were used to allow for major utility relocations, principal roadway work, and relocation of an existing MRI facility—each of which was sequential and needed to be complete before the clinical care and emergency department expansions. Particularly challenging was the need to access a multistory emergency department expansion across a two-story grade change within a highly constrained area.

470

kgsf expansion

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Architect: Perkins+Will



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Duke University Health System

Duke University Hospital
Durham, NC

Architect: Cooper Robertson/Tsoi Kobus & Perkins+Will



The utility and transportation infrastructure required to support development of the new pavilion and adjoining cancer center played an important role in organizing the development program on the medical campus. A master utility tunnel accommodates civil, thermal, power, and communications systems along a former coal transport line. Parking and valet operations were carefully planned to safely and efficiently accommodate multiple user groups across varying peak operational periods, and to ease wayfinding.

830

kgsf

Site/civil engineering
Transportation planning
Traffic engineering
Permitting

Dana-Farber Cancer Institute: Yawkey Center for Cancer Care

Dana-Farber Cancer Institute
Boston, MA

Architect: ZGF Architects, LLP/Miller Dyer Spears



The Yawkey Center for Cancer Care provides a signature gateway to the Dana-Farber Cancer Institute urban campus and to its clinical and research partners. The LEED Gold facility animates a busy intersection with street-level retail. An innovative approach to stormwater management supports green roofs—on multiple levels—as well as a healing garden. Transportation planning addresses desired origin-destination movements that encourages interactions among the research/clinical/academic users and eases wayfinding to and within the facility.

285

kgsf

455

underground parking
spaces

Site/civil engineering
Transportation planning
Traffic engineering,
Permitting

Winthrop-University Hospital

Winthrop-University Hospital
Mineola, NY

Architect: Perkins Eastman



Located on the edge of the Winthrop University academic medical center campus, the translational research facility acts as a gateway to both the campus and village. Key issues that were addressed through a comprehensive design and environmental review process related to land use and zoning variances, proximity to parking, reinforcing the pedestrian environment, and visual impacts associated with a prominent building occupying a key entry to Mineola.

95
kgsf

Transportation planning
Permitting

Catholic Medical Center

Catholic Medical Center
Manchester, NH

Architect: Stratton Brook/HKS



Located on a constrained urban site, the new medical office building accommodates both ambulatory care services and expanded physician office space. The project spans a busy urban arterial with a 150-foot-long enclosed pedestrian bridge that connects a new 750-space parking garage to the new pavilion building and to the existing hospital's main lobby. The enclosed bridge system improves site wayfinding and provides a safe environment for travel.

50
kgsf

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting

Northwell Health System

Northwell Health | Lake Success, NY

Northwell Health saw the need to consolidate physician practice groups and ambulatory care services on a single campus in order to allow for growth of inpatient services at the system's 18 hospital campuses. The Center for Advanced Medicine includes services for academic medical practices, outpatient surgery/cancer care, radiology, urology, women's health, primary care, and other specialty practices in an innovative one-stop service model. The diverse range of users/patients required a unique approach to developing parking and mobility options that could both enhance operations and address regulatory concerns.

475
kgsf

Transportation planning
Traffic engineering
Permitting

Architect: EwingCole



Memorial Sloan Kettering

Memorial Sloan Kettering Cancer Center | New York, NY

In medical testing, speed matters. MSK is driving operational efficiencies by consolidating its primary laboratory test functions into a single-purpose facility in Manhattan. In collaboration with medical logistics staff, we modeled a wide array of mode delivery options and routes from seven MSK facilities, under eight different operating periods to derive an optimal solution. We translated this into an efficient medical sample drive-through design, and developed a site-wide access and circulation strategy that met stringent City approvals.

90
kgsf

Transportation planning
Permitting

Architect: Perkins+Will



Children's Hospital of the King's Daughters

Children's Hospital of the King's Daughters | Virginia Beach, VA



CHKD states it best—"One priority, one mission, one focus: children." CHKD chose to locate its new pediatric surgery center within the Princess Anne Health Campus to reinforce its connection to the community and provide a comprehensive healthcare setting for its patients. One of its three pediatric-focused surgery centers, the Princess Anne facility serves the growing population of southern Virginia Beach and northeast North Carolina within a "kid-friendly" environment.

62
kgsf

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting
Survey

Kaiser Permanente Health System

Kaiser Permanente
Tysons Corner, VA

Architect: Stantec



Kaiser has repurposed a commercial office building for its first "Specialty Hub" facility in the East, combining primary and specialty care functions within a single facility, capable of serving the most complex of outpatient needs. The comprehensive site design clarifies site access/circulation, addresses complex stormwater management, and incorporates softscape and healing gardens in a complete transformation of this strategic asset.

240
kgsf renovation

400-space
parking garage

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting
Survey

Architect: Tsoi Kobus/Centerbrook Architects



Jackson Lab for Genomics Medicine

The Jackson Laboratory
Farmington, CT

Located on the UConn Health Center campus, the state-of-the-art genomics research facility is a key component of the larger “Bioscience Connecticut” initiative underway across the state. Challenging site characteristics, highly specialized building functions and operating requirements, unprecedented permitting processes, and an aggressive construction schedule were addressed through an integrated, proactive planning approach.

183
kgsf

Natural resources
assessment
Environmental permitting
Hydrologic/floodplain
analysis

Florida Hospital

Adventist Health System
Orlando, FL



Conceived as a holistic approach to total health and well-being, Health Village is located near Florida Hospital’s existing campus in downtown Orlando. The 20-year development plan will transform the area surrounding the campus with as many as 7,000 employees. A new SunRail station provides transit access, while design and development standards that address site design and utility infrastructure will guide implementation of the project over time.

172-acre
regional mixed-use
“village”

Site/civil engineering
Transportation planning
Traffic engineering
Landscape architecture
Permitting

Dartmouth-Hitchcock Medical Center

Dartmouth-Hitchcock Medical Center | Lebanon, NH

Opened in 1991, the new campus consolidated the Mary Hitchcock Memorial Hospital (the state's sole Level 1 Trauma Center with 396 beds), Dartmouth Medical School, Children's Hospital and Cancer Center on a contiguous 225-acre site. Recognized by ACHA with a Legacy Award, the comprehensive approach towards planning for access to the new campus—beginning “from the Interstate to the front door”—was supported by detailed engineering design and a robust public outreach and approval strategy.

1.2M
gsf

225
acres

Transportation planning
Traffic engineering
Permitting

Architect: Shepley Bulfinch



Image courtesy of Dartmouth-Hitchcock

BJC Healthcare/Washington University Medical Center

BJC Healthcare | St. Louis, MO

Architect: HOK



BJC has set guiding principles for this major transformation of its major academic medical center to include the following—
“Patients and their families, visitors and staff will have a safe and intuitive path for arrival, parking, wayfinding and departure.”
To address this principle, as part of a collaborative, multidisciplinary team that includes urban designers, healthcare architects and logistics specialists, we developed an integrated transportation and parking solution that assesses parking demand, defines patient and employee access alternatives, uses sophisticated traffic analyses and simulations, and recommends hospital facility and parking options.

1M
gsf (new)

3,500-space
parking garage(s)

Transportation planning
Traffic engineering

Johns Hopkins Institutions

Johns Hopkins University
Baltimore, MD



As the largest employer in Baltimore with over 50,000 employees, JHI reviewed its existing transit operations as part of addressing its development and growth plans. It recognized that it needed to respond to the ever-changing needs of moving students, faculty, employees, and visitors within its six major distributed urban and suburban locations safely, securely, and efficiently. Elements of the project include optimizing privately-provided shuttle systems, leveraging access to publicly-provided transportation services, and providing financial analysis to support institutional decision-making.

Transportation planning

University of North Carolina Health Care

UNC Health Care | Chapel Hill, NC

For over two decades, as UNC Health Care has grown to serve all of North Carolina and emerge as a leading academic medical center, our work in support of its growth has focused on developing safe and efficient mobility options, and optimal parking solutions. Our work has been integral to several master plan efforts and multiple capital projects, to include the new Hillsborough campus.

Transportation planning
Traffic engineering
Permitting



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