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HALIFAX, NOVA SCOTIA

QE II REDEVELOPMENT PROJECT
MASTER PLANNING REPORT Vol. 02

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Project Team

Kasian is the prime consultant retained by DTIR to complete the Master Programming, Functional Programming and Master Planning Project for the QEII Redevelopment Project. Kasian is collaborating with the following consultant team to develop a comprehensive master programming and planning report that will guide future developments at the Halifax Infirmary (HI) and Victoria General (VG) sites.

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Acknowledgements

The design team would like to acknowledge the time, input and effort from DTIR & NSHA in delivering the master programming/ planning project. Extensive input was provided by a broad spectrum of stakeholders including; physicians and other clinicians, ancillary service providers, support services staff, the project management office, members of the executive team, the Board of the NSHA and officials and politicians from a variety of related government departments. This degree of consultation with both internal and external stakeholders will help to ensure that this master program and master plan for the long term redevelopment of the Halifax Infirmary and Victoria General Hospital sites that will enable the QEII HSC to achieve its clinical and community objectives; delivering Connected Care for all Nova Scotians.

The Master Programming/ Master Planning document is a result of a highly collaborative effort between many different participants. The Design & Programming team would like to thank the following for their contributions & efforts:

QEII Facility Renewal Executive Committee

Co-Chair: Paula Bond, VP, Integrated Health Services Program 1 Central Zone, NSHA
Co-Chair: John O'Connor, Executive Director - Major Infrastructure Projects, DTIR
DHW, Craig Beaton, Executive Director, Strategic Operations
DTIR, Brian Ward, Director of Major Infrastructure
NSHA, Victoria van Hemert, Senior Director, QEII/ DGH Redevelopment
NSHA, Allan Horsburgh, VP, Stewardship & Accountability and Chief Financial Officer
NSHA, Janice Johnston, Director- Infrastructure, QEII Redevelopment
NSHA, Dr. David Kirkpatrick, Department Head of Surgery
NSHA, Rita Morrison, Clinical Director, QEII Redevelopment

QEII / DGH Facility Renewal (Steering) Committee

Co-Chair: Paula Bond, VP Integrated Health Services Program 1 Central Zone, NSHA
Co-Chair: John O'Connor, Executive Director - Major Infrastructure Projects, DTIR

QEII Facility Renewal Executive Committee and:
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DHW, Shelley Bonang, Finance - Physician Services and Capital Planning
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Acknowledgements

QEII Steering Committee

Co-Chair: Victoria van Hemert, Sr. Director- QEII/ DGH Redevelopment, NSHA (commencing Dec 15/17)
Co-Chair: Karen Mumford, Senior Director, QEII/ DGH Redevelopment, NSHA (to Dec 15/17)
Co-Chair: Dr. David Kirkpatrick, Department Head of Surgery, NSHA

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Mental Health and Addictions: Trevor Briggs
Veteran's Services and Geriatrics – Heather White
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Volunteer Services – Sara Langford
Food and Nutrition Services – Brenda MacDonald
Biomedical Engineering – Michael Hamilton
Facility Management – Steve Button
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Tanya Davis, Manager- Strategic Transportation Planning Program
Peter Duncan, Manager- Infrastructure Planning
Patricia Hughes, Manager- Halifax Transit

Extensive consultation took place with the following user groups in the development of the master program and master plan:

- Ambulatory Care
- Critical Care
- Medical/ Surgical Inpatient Units
- Perioperative Services
- Diagnostic Imaging
- Laboratory Services
- Pharmacy
- Research and Learning
- Administrative Services
- Emergency
- Support Services
- Cancer Care
- Renal Program
- Respiratory Services
- Mental Health and Addictions
- Rehabilitation Services
- Heart Health
- Veteran's Services and Geriatrics
- Volunteer Services

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VOL. 01 Master Planning Research Report (Submitted in a separate volume)

Note: Master Program and Functional Programs are under a separate volume. Submitted separately to DTIR, NSHA & DHW.

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Table of Contents

Notes:

Master Program and Functional Programs are under a separate volume. Submitted separately to DTIR, NSHA & DHW.

Cost Estimate is under a separate volume. To be submitted separately to DTIR, NSHA & DHW in January 2018.

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List of Illustrations

Introduction

The master plan concepts were developed with the information provided in the QEII Functional Program and Master Program (08 23 17). Functional programs were developed for priority clinical departments, while the support services were developed to a master program level of detail. The next steps for this project will be to develop functional programs for all the support services to align with the clinical departments.

At this phase of the master plan, we do not foresee any major risks of developing a master plan without the detailed information of a functional program. While the master program provides global numbers for each of the support services located at the HI site, the planning concepts assumes that the services will be divided up and located within the new proposed buildings. For example, Public Areas, Facilities Management and Supply Chain space allocations have been included within each new proposed building.

Assumptions to Master Planning Options

The master plan concepts presented in this report includes the following assumptions, based on user group consultations during the master programming and functional programming phase of the project. These concepts reflect the key space drivers and directions for planning as detailed in the QEII Functional Program and Master Program (08 23 17). Other planning assumptions are based on discussions with DTIR throughout this process.

A. Supply Chain

Just-in-time (JIT) will be implemented across the zone. Departmental specific Totes carrying supplies broken down into units of issue, are received at the appropriate loading dock and then delivered directly to the receiving program. This supply chain model, thus eliminates the need to retain a large in-house central stores warehouse. (Note; a much smaller area must still be retained in house to store some med surg supplies for emergency replenishment only)The projected space requirement noted in the master program reflects the implementation of JIT.

B. Nutrition and Food Services

It was assumed during the programming phase that a new kitchen would be required to eliminate reliance on leased space in the Veterans Memorial Building (VMB). Since the completion of the master program, NSHA has confirmed that VMB is owned by NSHA and therefore the kitchen could be renovated/ expanded in its current location, or relocated elsewhere. The kitchen must be able to support the Room Service model for inpatient food. To confirm the validity of this food service model, NSHA is currently piloting an evaluation of this model by creating a Food Service Centre in an existing patient unit in the Halifax Infirmary Building. Once the pilot is complete, NSHA will A Food Services Consultant will be required at this stage to work with NSHA to determine the future direction (renovation vs new kitchen), including a cost analysis of each. Refer to Food Services Section 9.7 of this report for options on the kitchen redevelopment.

Food Services Centres- Pilot program in the existing inpatient unit at the Halifax Infirmary is currently underway. The pilot is looking at capacity, type of food, and diet which will determine if the kitchenette on the units will work and what the space requirements are. NSHA anticipates that the space requirement for the food service centres to have a ratio of 500sq.ft/ 140 inpatient units. Since the new inpatient units will have 36 beds per floor, it would be it acceptable for a food services centre to serve more than one floor provided that there will be access to clean service elevators during peak meal times. An update to the Medical/ Surgical Inpatient Unit Functional Program to accommodate the Food Services Centres within the unit will be required once the pilot program is complete and a direction has been provided by NSHA.

C. Services to be located offsite

Through consultation with NSHA during the master and functional programming process, a number of programs and services were identified to be located off site as part of the redevelopment project. The actual locations for these departments have not been identified as part of this master plan report. Further discussions between NSHA and DTIR will be required to review the appropriate location of these services. The list of services to be located off site can found in Appendix A1-1 of the QEII Functional Program and Master Program (08 23 17).

D. NSHA IT Vision

QEII is approaching a period of rapid information technology (IT) transformation and growth, where a much higher level of automation is possible. The foundation of this plan is One Person/ One Record. Please refer to Appendix A2: Future State Enterprise-Wide Systems and Services of the QEII Functional Program and Master Program (08 23 17) for details.

E. Sustainability

DTIR has set a standard that all new construction projects in the Province of Nova Scotia, including health care facilities, are to be designed for LEED Silver certification at a minimum. This requirement has been captured within the costing analysis and report for the redevelopment project. However, this does not preclude NSHA and DTIR to explore other innovative sustainable strategies during the next phase of design. At the time of the submission of this report, DTIR has approved the consultants to conduct a feasibility study for the development of a cogeneration plant to serve the new HI site.

Executive Summary

Introduction

The QEII Health Sciences Centre (QEII HSC), one of only 17 academic health sciences networks in Canada, provides primary and secondary care services to people in the Central Zone catchment area, and specialized tertiary care- including heart surgery and cancer treatment- to residents from across Nova Scotia, New Brunswick and Prince Edward Island. Additionally, the QEII provides quaternary care services such as organ and stem cell transplantation to patients throughout Atlantic Canada. The QEII is situated on two sites located in downtown Halifax - Halifax Infirmary and Victoria General- situated within close, 4 block, walking distance of each other.

Project Intent

This stage of the Master Plan project focuses on the development of options to physically express the space planning objectives as outlined in the Master Program and Functional Programs developed by Agnew Peckham. Each option was assessed and evaluated against a set of key design drivers and guiding principles. Three distinct concepts were considered, until it became apparent that the space implications based on the final acute care and ambulatory care programs far exceeded the capacity to build over the existing Emergency Department, even though it was designed with structural capacity for an additional five floors. Thus, the option to expand ambulatory care or inpatient units above the Emergency Department was dropped.

Ultimately, the Master Plan is a document that lays out a logical, achievable site development strategy that accommodates, not only the current facility priorities (Victoria and General site) onto the Halifax Infirmary Site and a Community Outpatient Centre at Bayers Lake, but within the context of a longer-term site development plan that will help to enable the provision of Connected Care for Nova Scotians for the next 50 years.

Consultation

Extensive input was provided by a broad spectrum of stakeholders including; patients and families, physicians and other clinicians, ancillary service providers, support services staff, the project management office, members of the NSHA executive team, the Board of the NSHA, municipal officials, provincial government officials including representatives from the Department of Transportation and Infrastructure Renewal, The Department of Health and Wellness, The Department of Finance, The Department of Internal Services (Procurement) and elected representatives from each of these wings of government. This degree of consultation with both internal and external stakeholders will help to ensure that this master program and master plan for the long-term redevelopment of the Halifax Infirmary and Victoria General Hospital sites enables the QEII HSC to achieve its clinical and community objectives; delivering Connected Care for all Nova Scotians.

Note: Kasian participated in and led separate workshops with the Patient, Family and Public Advisory Committee of the QEII redevelopment Project. These workshops included a Journey Mapping exercise whereby individual patient and family experiences were shared in order to better understand their perspectives on their individual interactions with the NSHA and its facilities. In addition to Journey Mapping, the committee was oriented to the two alternative master plans to better understand the advantages and disadvantages of each and how well they align with the various design objectives and master planning guiding principles.

Methodology and Approach

This phase of the project followed the research phase where existing conditions were documented, and planning assumptions and guiding principals were agreed to. With the completion of the master and functional programs, earlier test fitting of massing was refined and re-evaluated to ensure viability and relevance. Each alternative master plan option evolved through an iterative series of revisions in response to more refined space and circulation due diligence and testing that was applied to each option. Massing that reflected both the clinical and operational imperatives as noted in the master and functional programs were tested and retested in consultation with each relevant user group to ensure the viability of each alternative. Using a series of highly engaging design charrettes that employed large scale site and massing models, users were able to cycle through a variety of alternatives to better understand the implications, advantages and disadvantages of each option on a floor by floor basis. Where preferred adjacencies were unachievable due to existing site constraints, users and consultants explored potential trade-offs to ensure patient safety and operational efficiency could still be achieved.

In parallel with these charrettes, a detailed parking, traffic and site circulation study complemented the master planning options.

Executive Summary

Master Planning Key Drivers and Principles

The Master Plan is influenced by and reflects a variety of key drivers and guiding principles including the need to:

1. Reflect the values and vision of the hospital;
2. Supports operational efficiency
3. Maximize site utilization and density
4. Preserve real estate to accommodate future longer-term growth
5. Create a rational growth pattern,
6. Allow for flexibility, growth and change over time,
7. Support a phased approach to redevelopment,
8. Enhance urban connectivity with the City and adjacent parks,
9. Clarity in wayfinding, internal circulation and access,
10. Support continuous clinical functionality at each phase,
11. Enhance the patient and visitor experience through healingv environments with views to nature and ample natural light,
12. Reflect a philosophy of sustainability,
13. Optimize cost-benefit and value-for-money scenarios,
14. Support. integrate and express the importance of the academic teaching and research mandates,
15. Consolidate outpatient services, and
16. Capitalize on ancillary and related amenity opportunities

Many of these drivers fall within the broader categories that define project success that were captured in the co-created" Balanced Checklist". This scorecard summarizes project objectives under four categories: Image and Message, impact and Function, Value for Money and Legacy.

Conclusions and Next Steps

In consultation with the stakeholders, a comprehensive evaluation matrix was developed to capture the pros and cons for each of the two alternative master plan schemes. The evaluation criteria included such items as alignment with the NSHA Mission, Vision and a Values, Principles of good urban planning, Clinical and Operational Effectiveness and Efficiency, The Patient Experience, Technical Engineering implications, Constructability and cost. As of the time of the drafting of this report, the direction to the consulting team was to summarize the pros and cons of each option but to not make a recommendation as to which is the preferred option. This will be a decision made by government.

The original scope of the project included renovations to the Dickson Building to enable it to continue to function as Cancer Centre. As the QEII Redevelopment project progressed, it became apparent to the NSHA that due to potential risks to patient care, it would be prudent to complete a feasibility study to explore the feasibility of relocating the cancer care program to the HI site. If this study results in a decision to include the relocation of the Cancer Centre programs to the HI site, then it is conceivable, that the ultimate site master plan for the HI site will be significantly different than the one submitted under this report. It is anticipated that this additional scope of work will be completed in the early summer, 2018.

Procurement Strategy:

Once approved, it is anticipated that the capital redevelopment of the HI site, the VG site (if the Dickson remains on that site) and the Bayers Lake site, can proceed under any number of alternative financing and procurement methodologies including Stipulated Sum, Construction Management, P3 (Design Build, Design Build Finance, Build Finance, Design Build Finance Maintain). Under a separate contract, DTIR have engaged Deloitte Management Consultants to provide advice on how to best procure this capital redevelopment project.

Definitions & Abbreviations

DEFINITIONS

BUILDING HEIGHT

Building Height is the vertical distance measured from grade to the roof level and excludes mechanical penthouses.

DEPARTMENTAL GROSS SQUARE FOOTAGE (DGSF)

Departmental Gross Area (Also referred to as component gross area) is the space required to house a whole department or functional area. It includes all the individual net areas required by the departmental functions, circulation space as necessary to link together the net spaces and area occupied by internal walls. It excludes all engineering spaces and interdepartmental circulation elements such as main corridors, stairways, elevators and dumbwaiters.

GROSS FLOOR AREA (GFA)

Gross floor area is the total of the horizontal areas of each floor of a building or structure, measured from the exterior face of the exterior walls or from the centerline of a common wall separating two buildings or structures, above the finished grade. The finished grade is the final level of the ground surface after grading.

NET SQUARE FOOTAGE (NSF)

Net Area is the usable space, usually comprising a single room or floor area, allocated to a function or group of related functions. It excludes the area occupied by walls, corridors and space for engineering installations including duct shafts and chases.

SITE COVERAGE

The portion of a building site that is occupied by any building or structure, typically expressed as a percentage of occupied footprint area to total site area.

SETBACKS

Setbacks are the distance from a property line within which building is prohibited. Setbacks are set in municipal ordinances or zoning by-laws.

GROSS TO NET RATIO

The Gross to Net Ratio is a factor which yields the departmental gross area when applied to a given net area or sum of net areas. Net to gross ratios are empirical and vary according to function and also by lesser amounts according to the individual programmer or designer applying them.

ABBREVIATIONS

HI Halifax Infirmary

VG Victoria General

COC Community Outpatient Centre

AJLB Abbie J Lane Building

VMB Veterans Memorial Building

ED Emergency Department

NSHA Nova Scotia Health Authority

DTIR Department of Transportation & Infrastructure Renewal

HRM Halifax Regional Municipality

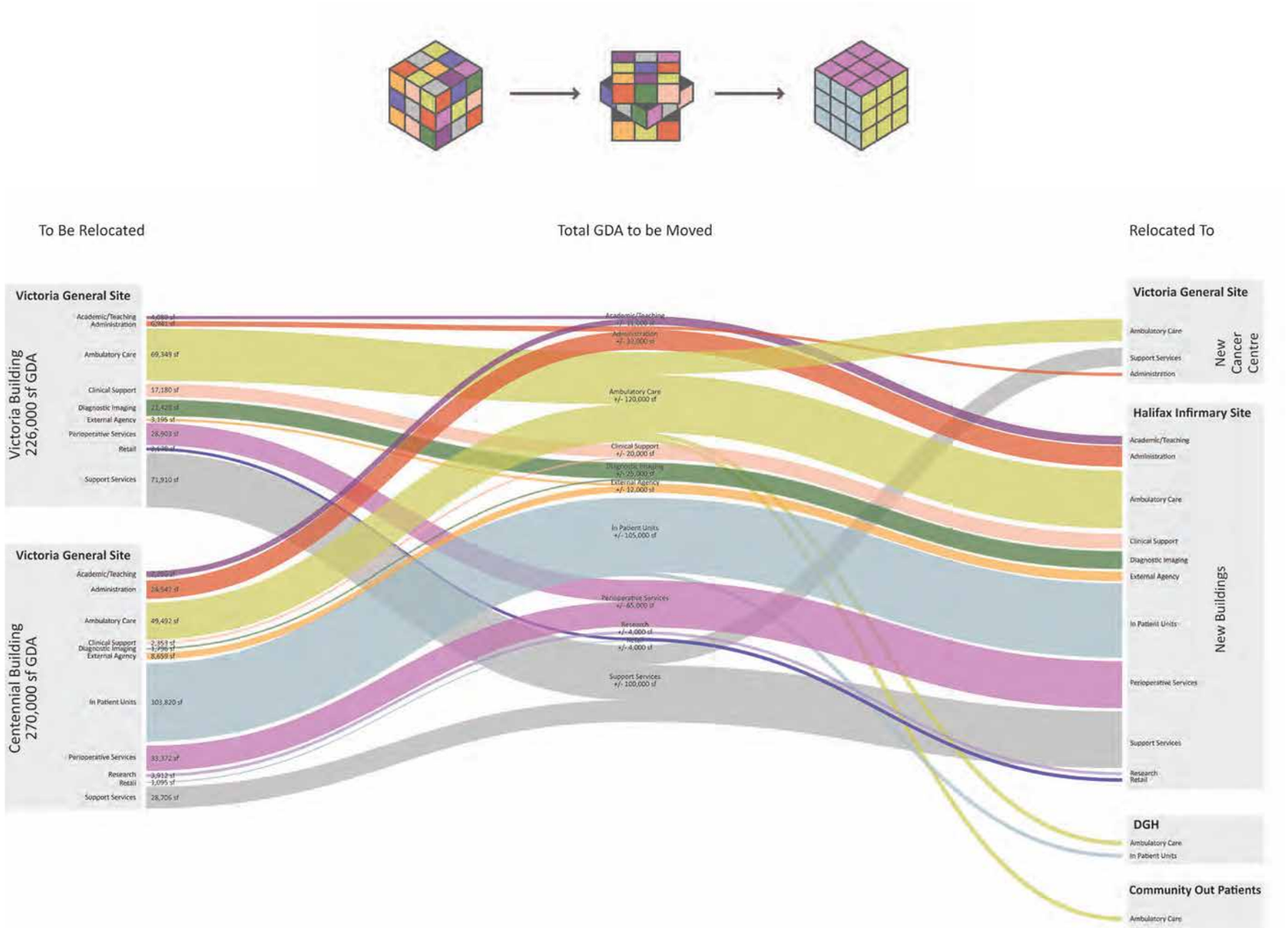
AMB Ambulatory

INP Inpatient

Volume 2, The Preferred Options Development for the QE II Redevelopment Project logically follows and is informed by Volume 1, Master Planning Research Report. Volume 1 can be characterized as all pre-design related research, review and exploration required to set the guiding principles and technical land spatial requirements for the master planning stage as described in Vol 2. Among the tasks associated with Vol 1 was a comprehensive review of the existing physical building stock that constitutes the facilities of the QEII Health Sciences Centre on both the HI site and the VG site. Guiding principles for planning and development for the project were also co-created in consultation with a broad group of stakeholders that would be used to help guide both the evolution of massing options and their eventual evaluation against those same principles.

Additionally, Volume 1 included many months of consultative work by planning and programming consultants who met with a broad group of clinical and support services users to confirm current activity metrics, and to project utilization for each program and service based on current national standards and best practices benchmarking to establish targets for activity in 5, 10, 15 and 20-year projections. Eight critical priority areas were planned to the Functional Program level of detail, while the remaining programs and services, were projected to a master program level of detail. For the purposes of this master plan, only those clinical programs currently housed within the VG facilities that must be relocated to new facilities at the HI site, were programmed to the Functional Program Level.

Together these documents describe the preferred operating model for each clinical and support service program based on industry best standards and generally accepted best practices, project the space required to achieve the activity projections for each clinical and support service and describes the critical departmental adjacencies required to facilitate the most efficient operations within the projected spaces. It is these comprehensive planning documents; the Functional Programs and the Master Programs, that serve to inform much of the master planning scope that is led by the architectural team as described within the deliverables of Volume 2, The Preferred Development Options.



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9

Halifax Infirmary (HI) Site

9.0 Preferred Options Development

Introduction to Design Principles and the Concepts

Prior to initiating our methodology to explore site opportunities and constraints, our team, lead by our Facilitator Sharon Vanderkaay and PIC, Ian Sinclair, engaged a broad group of stakeholders from both clinical and non-clinical areas of the NSHA, different government departments, the project management team and the Senior Leadership team in a workshop called “Common Ground”. The intent of this kick off event, was to galvanize stakeholders around a common set of project objectives, set the tone for overall engagement and to establish a common understanding of the project purpose and the setting of the overall bar to define project success. A tangible result of this workshop, was a single page document that was co-created by the stakeholders capturing the most salient guiding principals for the Master Plan project. The Balanced Scorecard categorized these principles among 4 broad categories:

1. Image and Message
2. Impact and Function
3. Value for Money
4. Legacy

In addition to and building upon these general guiding principals, the following key drives and Principles were developed and eventually became integrated into an evaluation matrix used to assess the relative merits and demerits of each master plan alternative.

Each of the master plan alternatives for the HI site have been evaluated based upon each scheme’s relative successes at achieving these principles. The relative cost for each of the two finalist schemes were also considered in the evaluation. From the outset, three alternative schemes were pursued until it became evident that the ability to accommodate the density and height required to meet the final program for either the ambulatory care facility or the acute care building (ORs, ICU’s and IPUs) in a building immediately above the Emergency Department was no longer viable. As a result, two viable alternative schemes to accommodate the ambulatory care facility and the acute care facility on the HI site were pursued and evaluated. One Scheme is referred to as the Willow Tree Concept (given its proximity to and reverence for the historical willow tree on the corner of Quinpool Road, Bell Street and Robie Street) and the Commons Concept, in reference to its relationship to the Halifax Commons property.

Master Planning Key Drivers and Principles

The Master Plan is influenced by and reflects a variety of key drivers and guiding principles:

1. Reflect the values and vision of the hospital;
2. Supports operational efficiency
3. Maximize site utilization and density
4. Preserve real estate to accommodate future longer-term growth
5. Create a rational growth pattern,
6. Allow for flexibility, growth and change over time,
7. Support a phased approach to redevelopment,
8. Enhance urban connectivity with the City and adjacent parks,
9. Clarity in wayfinding, internal circulation and access,
10. Support continuous clinical functionality at each phase,
11. Enhance the patient and visitor experience through healing environments with views to nature and ample natural light,
12. Reflect a philosophy of sustainability,
13. Optimize cost-benefit and value-for-money scenarios,
14. Support. integrate and express the importance of the academic teaching and research mandates,
15. Consolidate outpatient services, and
16. Capitalize on ancillary and related amenity opportunities

The Balance Checklist was designed to monitor planning "vital signs" so that success factors identified at project launch time are not lost or diminished as the plan proceeds through to final approval. It is a quick reference guide to be employed at the sponsor's discretion, to evaluate how well the actual deliverable aligns with these success factors Refer to the Evaluation Matrix Section on pgs. 302-305 for in depth analysis of the pros and cons of each development option.

The **PURPOSE** of this project is to enhance our capacity to achieve excellence in health, healing and learning through working together.

IMAGE & MESSAGE

- The Master Plan conveys a sense of safety, security and quality.
- The Master Plan aligns with and supports the overall QEII HSC objectives as a leading academic, teaching and research organization.
- The Master Plan applies evidence-based approaches to help advance the project through all approval authorities.
- A strategic communication plan serves to keep stakeholders informed including, patients, staff, physicians, the broader community, the media and all authorities with jurisdiction.

IMPACT & FUNCTION

- The Master Plan supports the principles of patient-centered care within a context of operational efficiency.
- The Master Plan enables inter-professional collaboration delivering integrated care, learning and research.
- The Master Plan enhances QEII's reputation for provision of high quality care to all people across the Maritimes.
- The Master Plan reflects service locations that improve access for all users.

VALUE for MONEY

- The Master Plan builds on previous planning studies and Guiding Principles.
- The Master Plan embodies principles of sustainability, maintainability and optimal, affordable operating conditions.
- The Master Plan includes the potential for enhanced revenue generating opportunities.
- The Master Plan is aligned with procurement models that will help to ensure optimal value for money.

LEGACY

- The Master Plan will be leveraged to attract and retain the brightest and the best.
- The Master Plan reflects "future-proofing" strategies to enable adaptability as healthcare delivery and government priorities change over the next 30-50 years.
- Aligned with our Values, the Master Plan contributes to an effective and sustainable health and wellness system in Nova Scotia.

DATE: 3 March 2017

Fig. 901 QEII Balanced Checklist

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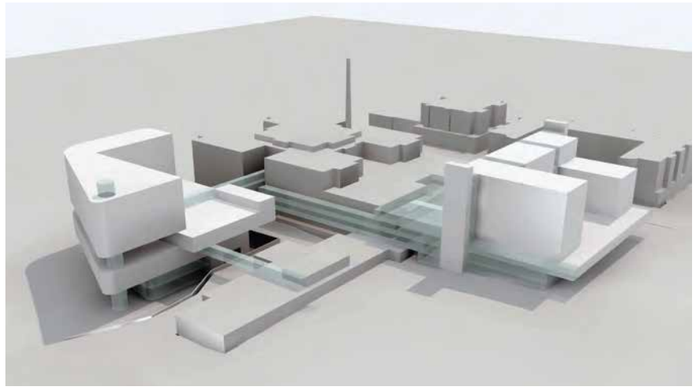
Fig. 902 QEII Workshop Photo 1

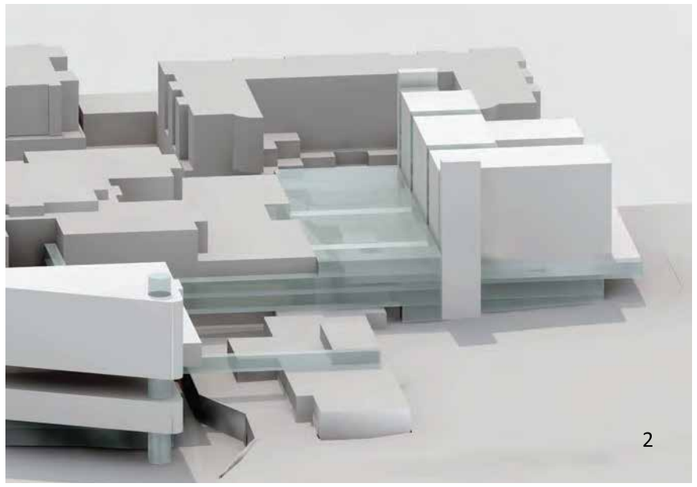
Fig. 903 QEII Workshop Photo 2

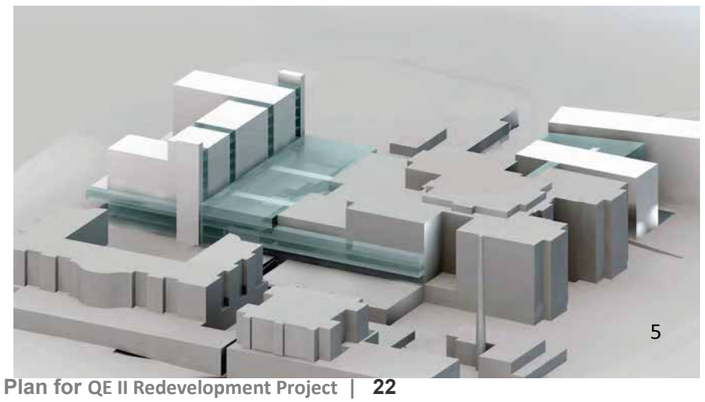
9.0 Preferred Options Development

Willow Tree Progress

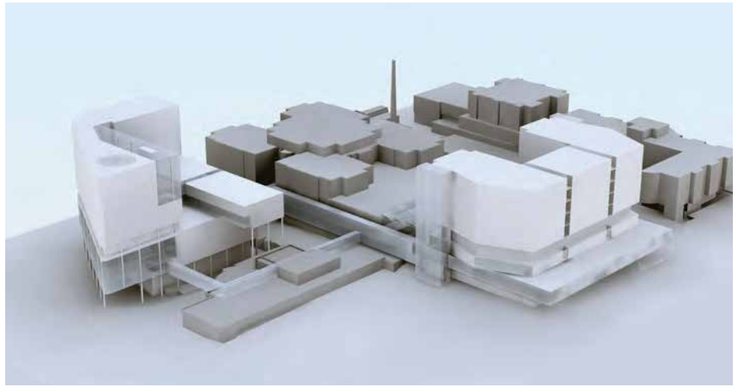
Workshop 3 (June 6-9, 2017)

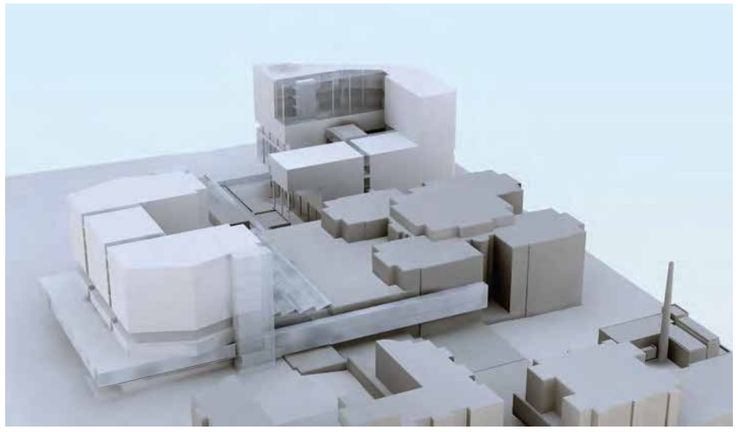


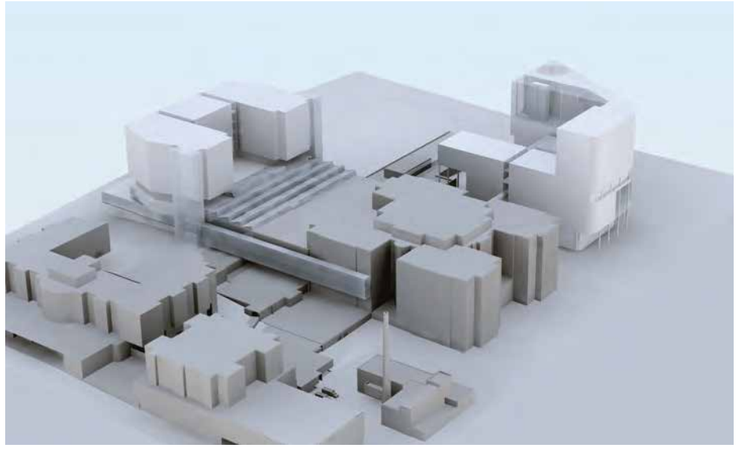




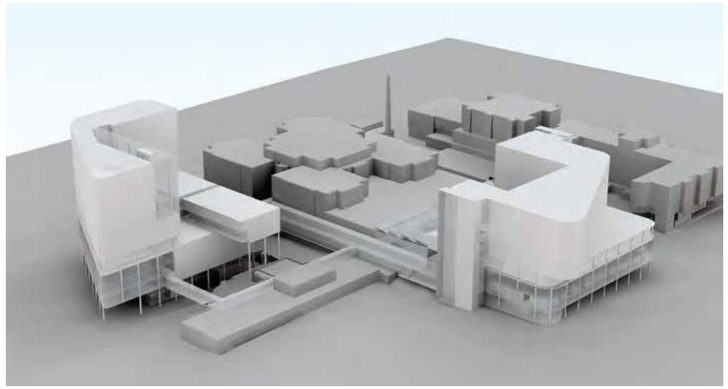
Workshop 5 (August 22-24, 2017)

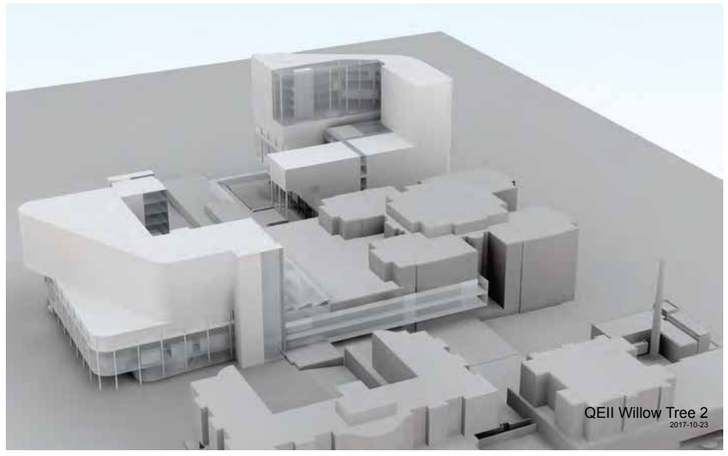


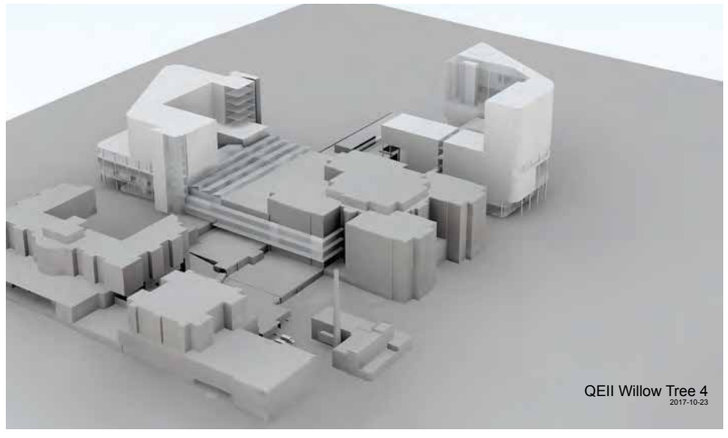




Workshop 6 (October 24-27, 2017)



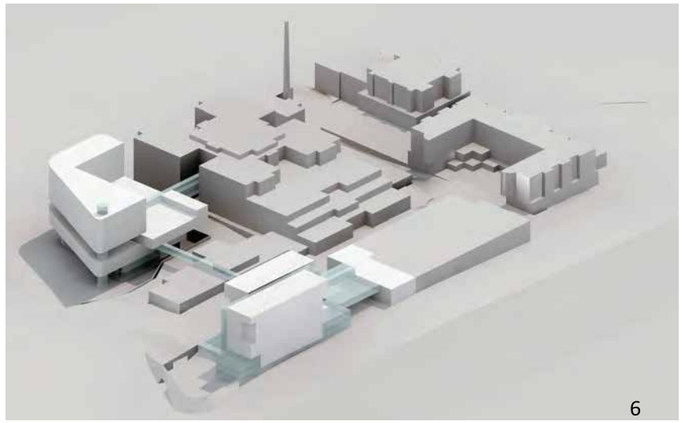


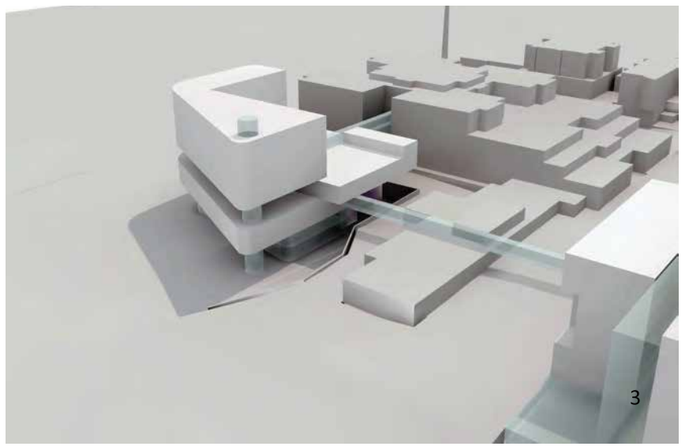


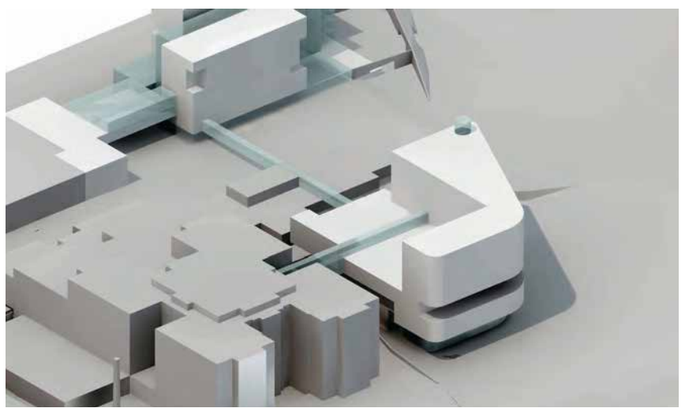
9.0 Preferred Options Development

Commons Concept Progress

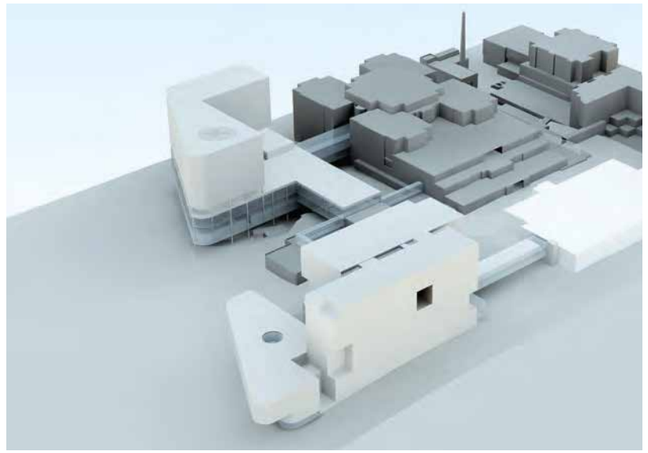
Workshop 3 (June 6-9, 2017)

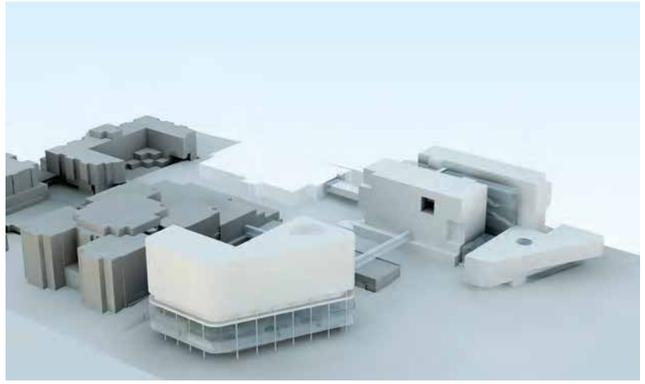


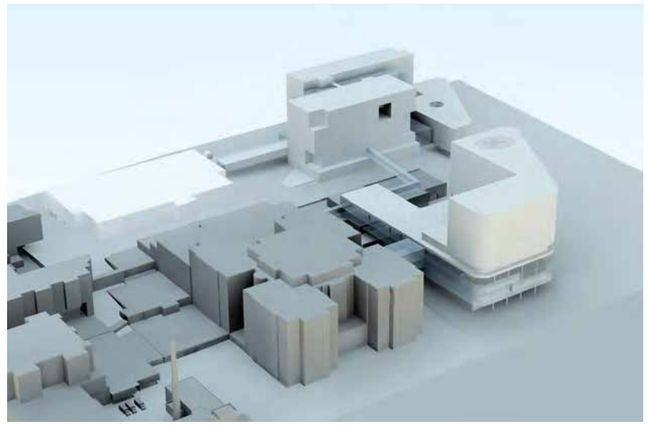




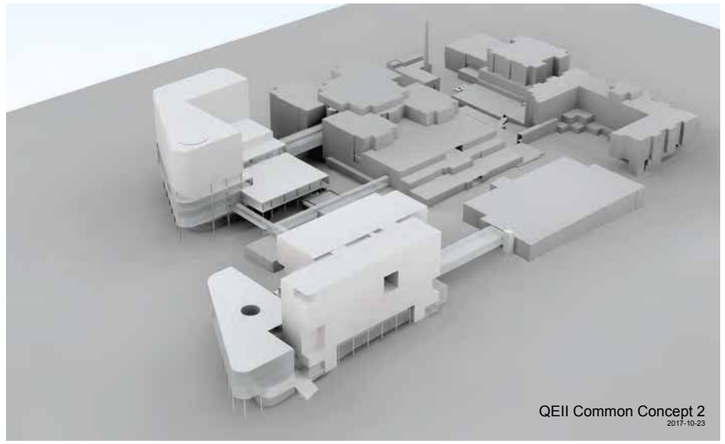
Workshop 5 (August 22-24, 2017)

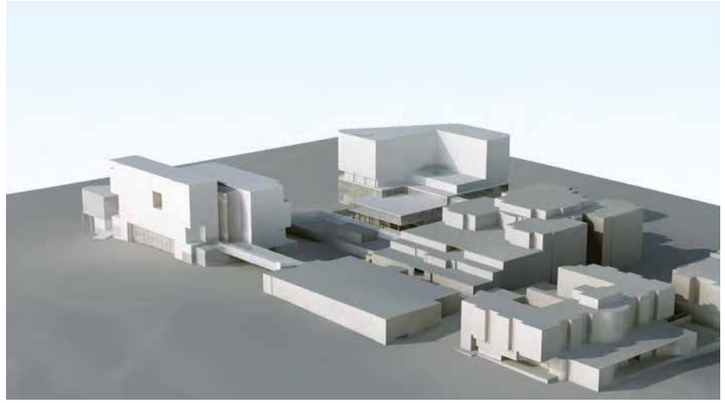






Workshop 6 (October 24-27, 2017)





9.1 Willow Tree Concept

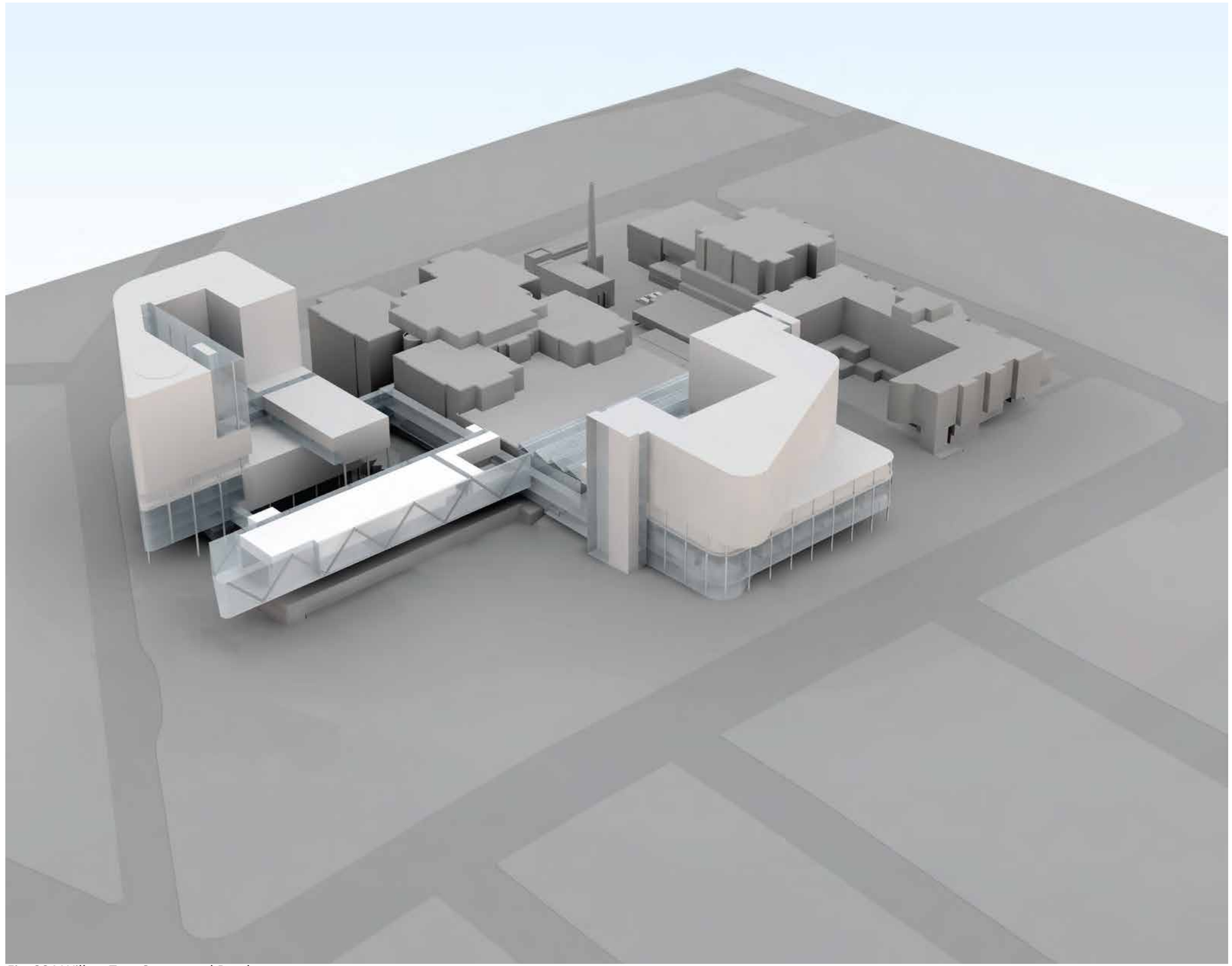


Fig. 904 Willow Tree Conceptual Render

9.1 Willow Tree Concept
Introduction

The Willow Tree Concept consists of a 9 storey Inpatient / OR building on the former site of the parking structure, a 13 storey ambulatory Building on the CBC site and a 2 storey Centre for Research and Innovation situated above the mechanical floor on the Emergency Department. The existing parking structure along Robie Street will need to be decommissioned and relocated to the VG site (or alternate location) to accommodate the Willow Tree Concept. The Urban Garden site remains available for future development and expansion in Willow Tree. This concept was developed with considerations to the following principles:

- **Site Massing.** Orientation and massing of buildings were developed to capitalize on views of the Commons and reflect the edge condition on the street. The massing contains green roof terraces and healing spaces. Orientation to southerly sun was also considered.
- **Green Space.** Great effort was taken to connect to the adjacent parks as well as the existing pedestrian network. Green Space within the Concept is meant to extend and expand the Halifax Commons network.
- **Connectivity and Links.** New buildings within the Willow Tree Concept connect and link to existing buildings to achieve critical adjacencies and linkages. Two circulation corridor ‘arms’ hug the existing HI building connecting it to the new Inpatient/OR building. These links, ‘arms’ and maintained global levels within the HI site are all key factors in improving wayfinding.
- **Urban Edge Conditions.** The existing streetscape along Bell Road and Robie Street were considered. Amenity locations will improve the pedestrian experience. Overhangs and covered entryways will protect visitors from the elements while also creating an urban design focusing on the human scale.
- **Light Wells.** Both the Ambulatory and Inpatient/OR buildings contain a centralized light well. These will serve as a primary meeting place and a starting point for wayfinding and signage within each of these respective buildings. They will introduce natural light and create an open and welcoming space.
- **Multiple Entry Points.** Multiple entries were included as a response to the varying nature of visitors. Whether being dropped-off by vehicle, arriving via foot or transit, or parking then entering, patients and staff will be able to use an entrance that works best for them. A new main entrance into HI is created closer to the streetfront, connecting both to the new Inpatient/OR building and the HI building.
- **Vehicular Circulation.** A rational traffic circulation pattern was developed which responded to traffic analysis as well as the existing urban context. Visitors will be able to seamlessly drop-of / pick-up patients, find parking and circulate in and out of the campus.

The Inpatient / OR building is located on the former site of the parking structure along Robie Street. It will create a new primary entrance for the Halifax Infirmary Site along Robbie Street and connect directly to the existing HI building via the ‘light well’ a multi-storey atrium space. New public corridors will ‘hug’ the existing HI building and will provide circulation and improved wayfinding when navigating from the new Inpatient/OR building into the existing HI. A Wellness Garden has been proposed near the front entrance adjacent to Robie Street, inside the ground floor will contain various types of amenity space, such as a café, spiritual rooms, a wellness gallery and a reception kiosk to name a few. The primary drop off will be situated along the southern side of the building between the existing Camp Hill Veterans Memorial building, access to below grade parking as well as shipping and receiving will be here, with an additional parking entrance on the north side of the building. Pedestrian entrances will be situated along Robie Street, further enforcing that edge condition. Level 5 will contain the new OR and will connect directly to the existing HI OR via bridges within the ‘light well’. A 36 bed Critical Care unit will be located on the 6th floor, while five 36 bed inpatient units can be found on levels 8-12. The U-shaped orientation of the Inpatient unit floors will ensure each room contains ample windows with views to the Citadel, Halifax Commons, or southerly facing windows orientated to the suns path.

The new Inpatient/ OR Building creates a new front door for the hospital that is connected to the urban streetscape. Upon arrival at the front entrance, patients, visitors and staff are greeted with a generous public space, and a large atrium which brings natural light into the public areas creating the sense of a healing environment.

The Ambulatory Care building in the Willow Tree concept is located on the CBC Site and it’s massing respects the street edge along Bell Road. A centralized multi-storey atrium space acts as the primary gathering point on the main floor. A vehicle drop-off and entry is located on the west side of the building, while the pedestrian entry way is located off of Bell Road. Access to the below grade parking, shipping and receiving as well as an ambulance drop-off is situated along the south side of the building between the existing HI building. A level 4 bridge connection to the existing ED is accompanied with an Ambulatory Procedure Unit. Bridge connections to the Existing HI building occur on level 4 and 5. Level 7 contains a public café as well as access to a rooftop terrace.

A two storey Centre for Research and Innovation is situated above the existing ED with connections to the Existing HI building and was designed to capitalize on the bridge construction experience that exists across atlantic Canada and could be prefabricated for ease of construction. It contains a multi-storey auditorium and gathering space with views to the Halifax Commons and will have direct connections to the existing HI building on Level 5. It will be a highly visible Centre, reinforcing QEII as a leaders in research and education and as the potential to raise the profile of QEII as a leading edge academic research and teaching institution.

9.1 Willow Tree Concept

9.1.1 Site Plan

The Willow Tree Concept consists of an Inpatient / OR building on the former site of the parking structure, an Ambulatory Care building on the CBC site and a two storey Centre for Research and Innovation situated above the mechanical floor of the Emergency Department. The Urban Garden site may be utilized for interim surface parking.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Green Space

Buffer Zone

Green Space

Roof Terraces / Healing Spaces

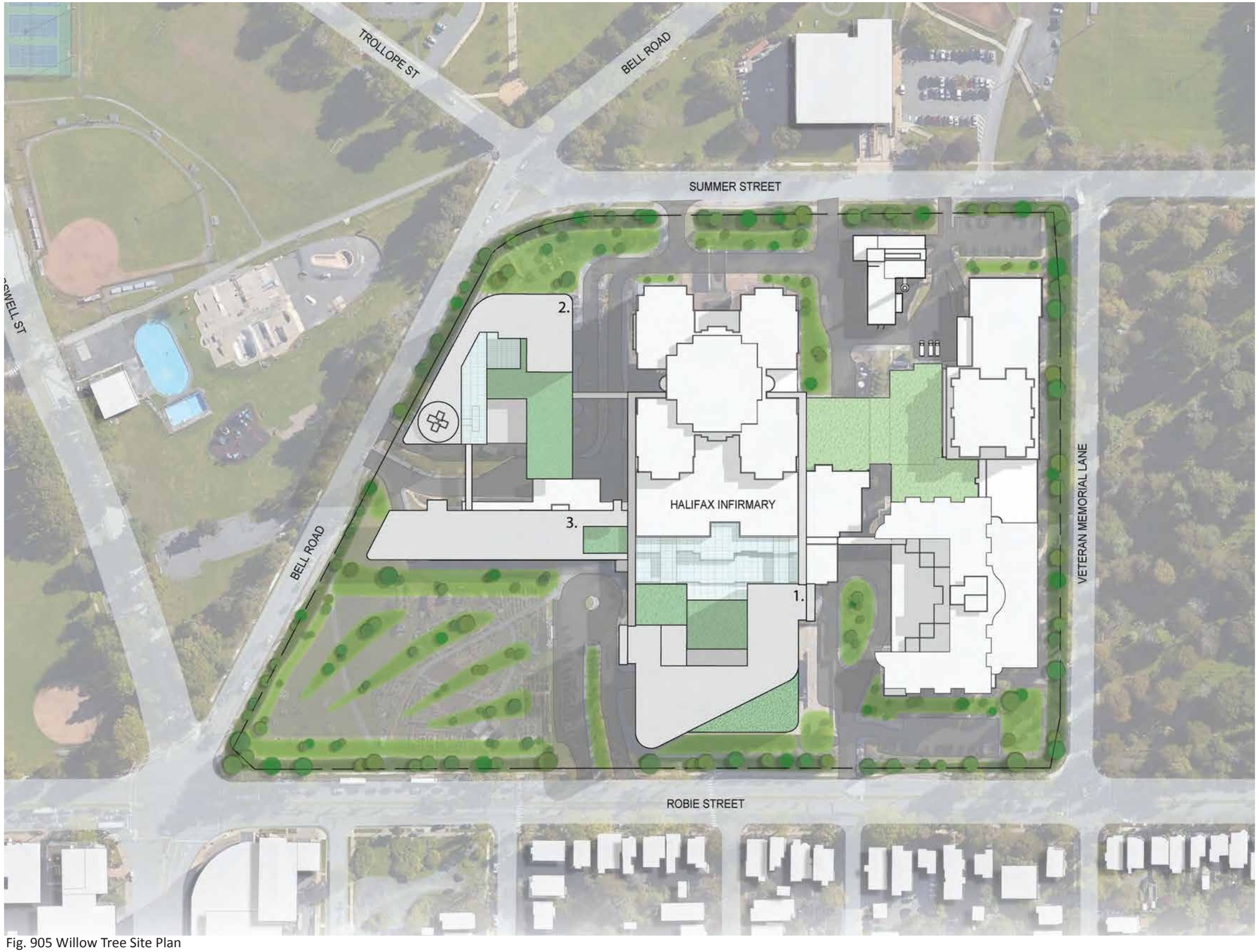


Fig. 905 Willow Tree Site Plan

9.1 Willow Tree Concept

9.1.2 Site Utilization

Vehicular Traffic

Vehicular Circulation within the site was developed as a response to traffic analysis and the existing urban roadway system. A new signalized intersection is proposed at Robie and Shirley Streets to improve traffic movement into and out of the site. A new in/out entrance is proposed for the Ambulatory Care Building on Bell Road.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Vehicular Circulation/Entrances

- Vehicular Entrance
- Service / Parking Entrance
- Driveway
- Signalled Intersection
- Bus Stop

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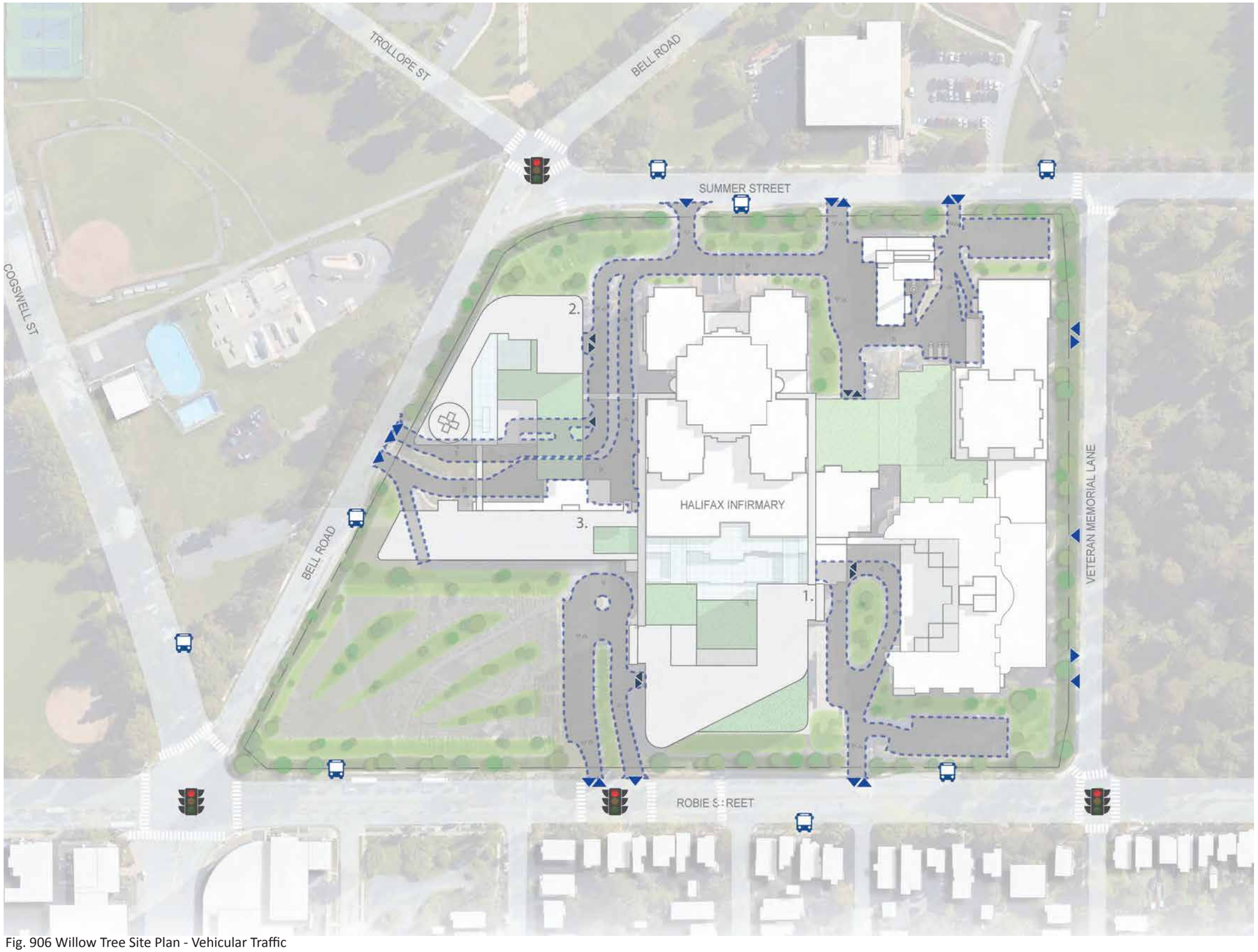
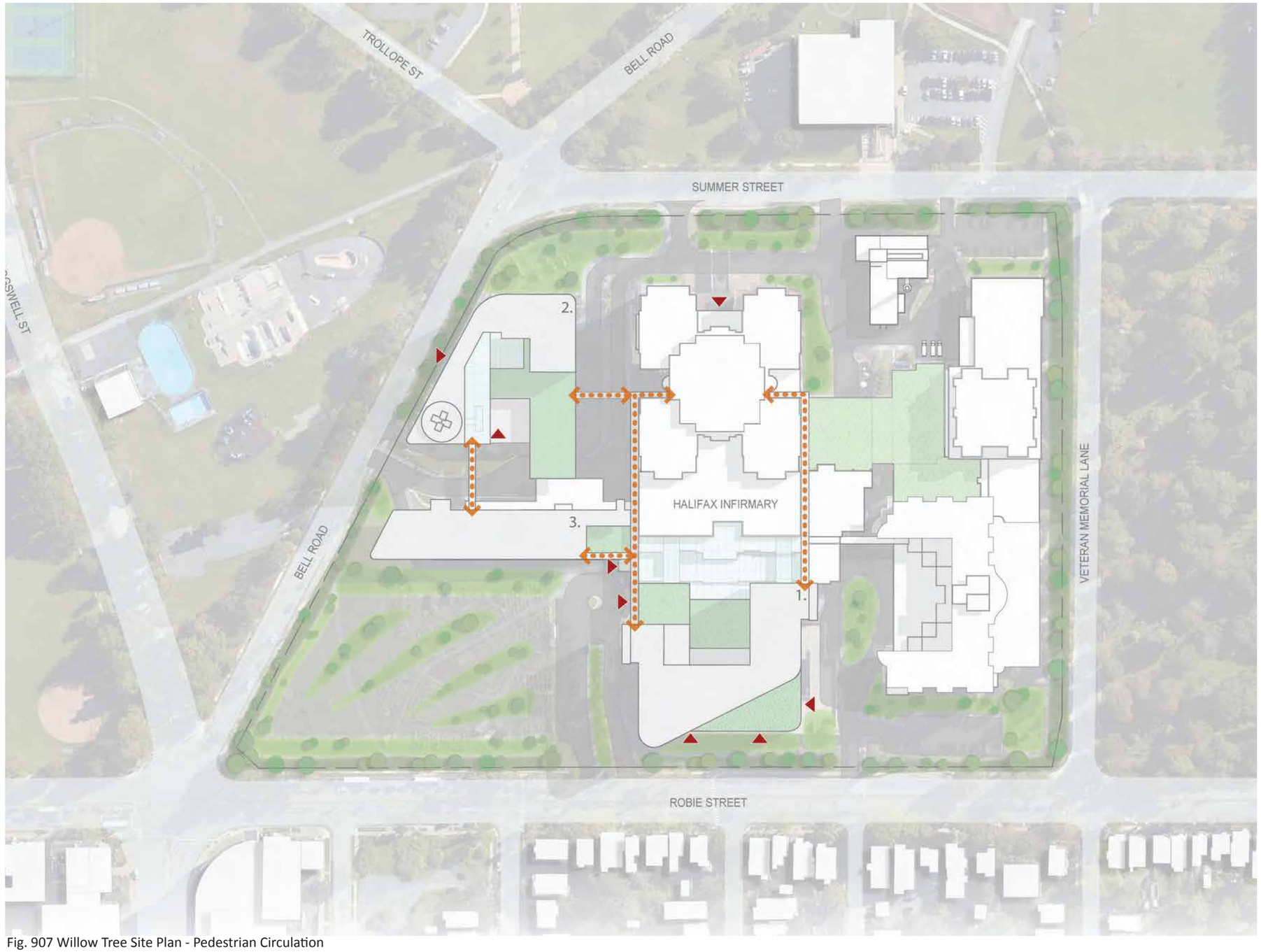


Fig. 906 Willow Tree Site Plan - Vehicular Traffic

9.1 Willow Tree Concept

9.1.2 Site Utilization Pedestrian Circulation and Links

A new main entrance for the HI site is envisioned along Robie Street. The Inpatient/OR building will have multiple entrances; two along Robie Street for pedestrians and one vehicular drop-off on both the north and south side of the building. New public corridors 'hugging' the existing HI building will facilitate interior circulation linking the new buildings and the existing HI building. These new public corridors also make wayfinding in the hospital intuitive for all- by locating the main circulation links on the outside of the building, patients and staff will be able to orient themselves in the building based on the views out to the surroundings. A bridge connection between the new Ambulatory Care Building and the ED as well as the existing HI building will help link the new and old buildings together.



1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Pedestrian Circulation/Entrances

Pedestrian Entrance

Internal Circulation / Links

N

Fig. 907 Willow Tree Site Plan - Pedestrian Circulation

9.1 Willow Tree Concept
9.1.2 Site Utilization Green Spaces

Green Space within the Willow Tree Concept connects to the existing parks and pedestrian paths surrounding the HI site. Green space is provided through a series of roof terraces, courtyards, and pocket parks. A green buffer zone surrounds the site, enforcing the existing edge condition.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Green Space
- Buffer Zone
- Green Space
- Roof Terraces / Healing Spaces

Fig. 908 Willow Tree Site Plan - Green Spaces

9.1 Willow Tree Concept

9.1.2 Site Utilization Views and Solar Optimization

The massing of the Ambulatory Care Building and the Inpatient / OR building were designed to capitalize on views of the surrounding green space and city and optimized for maximum natural light.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Views/Solar Diagram

Views to Halifax Commons

Solar Optimization

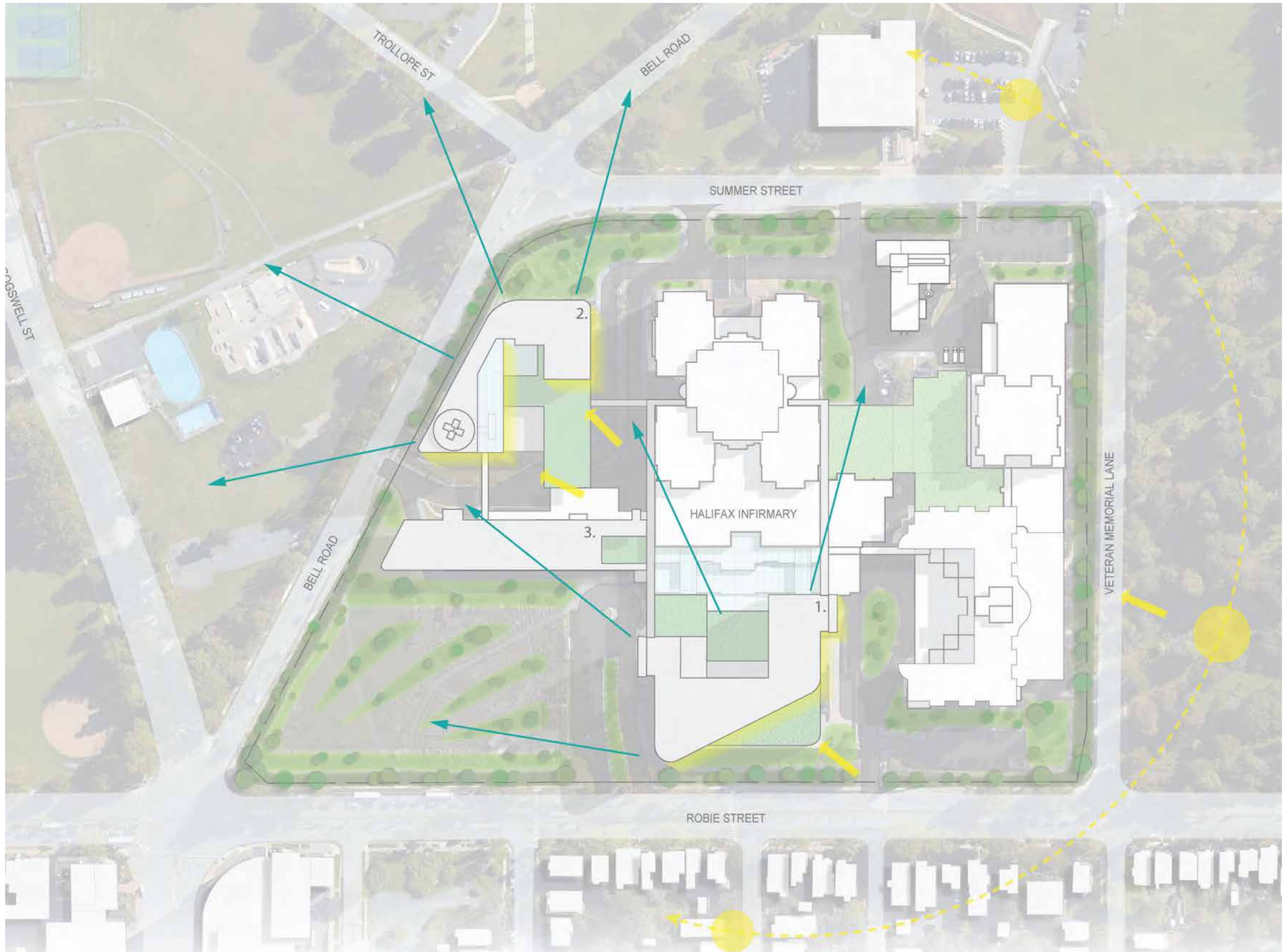
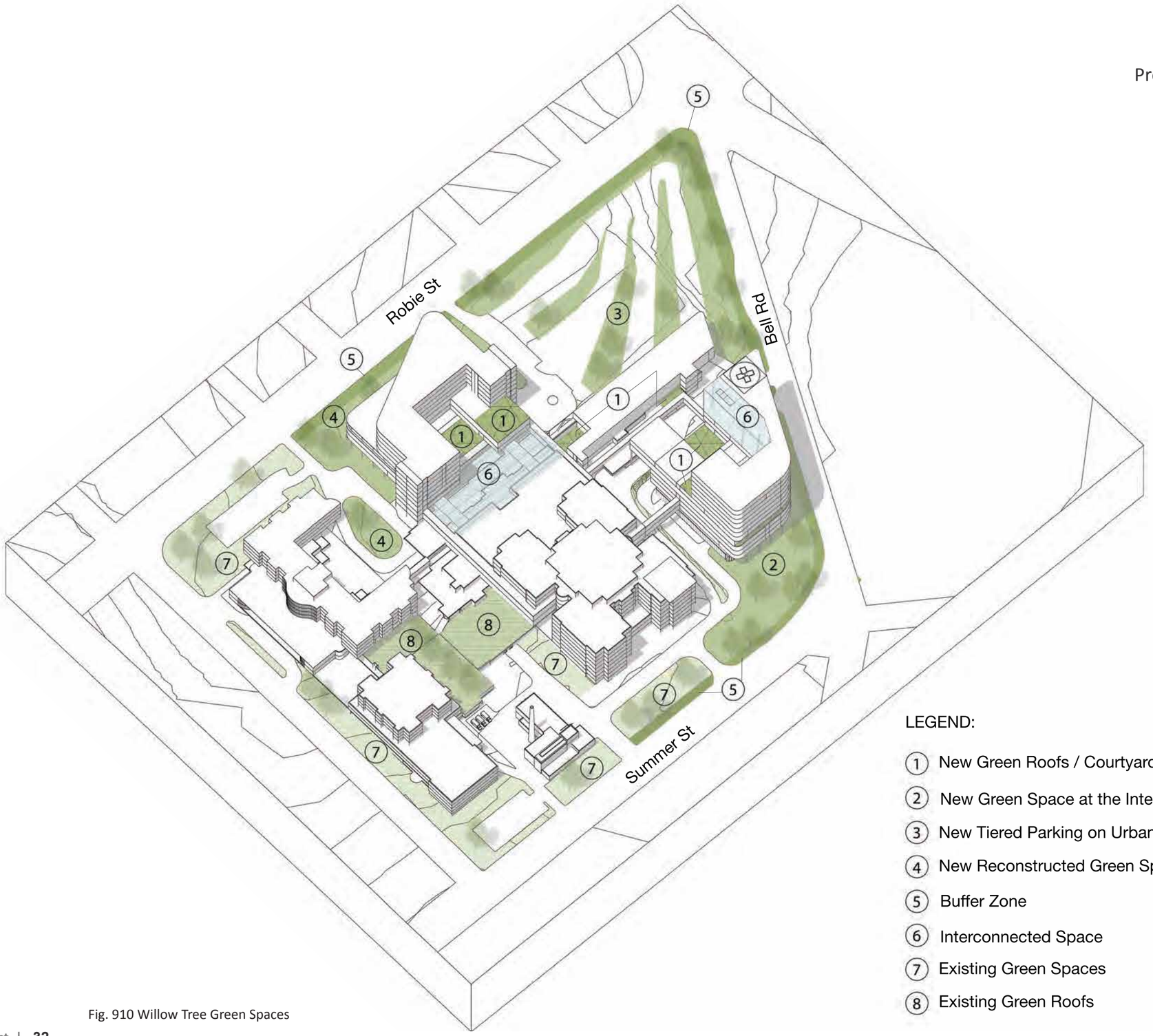


Fig. 909 Willow Tree Site Plan - Views and Solar Optimization



LEGEND:

1. New Green Roofs / Courtyards / Pocket Parks
2. New Green Space at the Intersection of Bell and Summer
3. New Tiered Parking on Urban Garden Site
4. New Reconstructed Green Space
5. Buffer Zone
6. Interconnected Space
7. Existing Green Spaces
8. Existing Green Roofs

Fig. 910 Willow Tree Green Spaces

9.1 Willow Tree Concept

QE II Green spaces and Pocket parks

The HI site has an area of 940,838 Sq ft, with an existing building footprint of 370,368 Sq Ft representing 39% site coverage. The proposed building footprint is 412,895 Sq Ft (44% site coverage) for the Willow Tree concept.

The master plan objective is to maximize the site utilization within the area where the proposed buildings are located. This avoids where possible unnecessary spread of the building footprint and allows for more green spaces and pocket parks within the site. The green spaces and parks contribute to the creation of a healing environment, while also blurring the boundary between the hospital and community, making the hospital an integral part of the community.

Connection to the existing parks, pedestrian paths, edge conditions and buffer zones for each of the concepts are outlined in the introductions of the respective concepts; it is proposed at this stage of the master plan that edge conditions and buffer zones are enhanced only in the areas impacted by new construction and not the whole site perimeter.

To compensate for the high intensity of development at grade, the intent of the master plan is to allow the opportunity to create green roofs and terraces at upper levels which will in fact act as “pocket parks”.

“Successful “pocket parks” have four key qualities: they are accessible; allow people to engage in activities; are comfortable spaces and have a good image; and finally, are sociable places: one where people meet each other and take people to when they come to visit”

The roof terrace / elevated pocket parks identified in each of the proposed concepts provide the following:

- They act as a miniature oasis within the healing health care environment. These are areas of refuge, intimate, simple, a sense of scale with minimal maintenance
- Their orientation takes advantage of the sun at varying times of the day
- They are directly linked to indoor spaces, reinforcing the indoor / outdoor relationship reflected in many parts of the concept
- They can be themed with a distinctive ambiance
- They should provide an opportunity to be community supported
- Encourage increased physical activity
- The design is being focused on giving patient, caregivers and staff an area of refuge and relief
- Sustainable
- Designed for children and pets
- Accessible to all

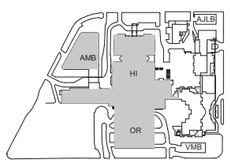
The Willow Tree Concept:

Some distinctive features of the Willow Tree concept with respect to green space and pocket parks is the creation of a new front door along Robie Street. The front lobby overlooks a contemplative garden space and patient drop off and exiting from below grade parking is strategically located along the sides of the building rather than at the front to avoid conflict between pedestrian and vehicular traffic, and also to create a seamless green space along Robie Street, setting the hospital redevelopment in a park like setting . The existing urban garden site is proposed to be converted to tiered surface parking area with minimum grade changes. The second major new green space is one that faces Bell Road and Summer Street. It is another major opportunity for a distinctive pocket park that is visually linking with the Commons creating an indoor/ outdoor relationship for the ambulatory care building.

9.1 Willow Tree Concept
9.1.4 Floor Plans

DGSF of Programs in Existing Halifax Infirmary (HI)

Categories	Department Name	Designed Area
Academic/Teaching	Academic/Teaching	12,146 SF
		12,146 SF
Administration	Academic Medical Staff/ Admin Services	55,032 SF
Administration	Corporate administration	18,485 SF
Administration	Foundation/ volunteers and auxiliary support	429 SF
Administration	Medical offices	17,166 SF
		91,111 SF
Clinical Support	Ancillary	1,736 SF
Clinical Support	Emergency	48,365 SF
Clinical Support	Laboratory	13,889 SF
Clinical Support	Pharmacy	9,648 SF
		73,638 SF
Diagnostic Imaging	Diagnostic Imaging	43,789 SF
		43,789 SF
External Agency	External Agency	1,544 SF
		1,544 SF
Inpatient Unit	Critical Care	79,770 SF
Inpatient Unit	Medical/Surgical Units	113,822 SF
		193,593 SF
Perioperative Services	Perioperative Services	49,662 SF
		49,662 SF
Research	Research	11,542 SF
		11,542 SF
Retail	Retail	6,532 SF
		6,532 SF
Support Services	Bio Med Engineering	6,205 SF
Support Services	Facility management	1,531 SF
Support Services	Food Services	13,068 SF
Support Services	Health information/ service registration	2,612 SF
Support Services	IT	589 SF
Support Services	M+E	75,147 SF
Support Services	MDR	19,211 SF
Support Services	Security	939 SF
Support Services	Staff services (lockers etc)	11,858 SF
Support Services	Supply chain (warehouse), procurement	4,142 SF
		135,301 SF
Total DGSF		**618,857 SF**
Existing Gross Builidng Area		**± 744,000 SF**



KEY PLAN- HALIFAX INFIRMARY SITE

DGSF of Willow Tree - Inpatient/OR Extension (OR)

Categories	Department Name	Designed Area	AP Program
Amenities	Amenities	16,004 SF	
		16,004 SF	
Building Support	M+E	51,464 SF	
		51,464 SF	
Inpatient Unit	Critical Care	45,965 SF	39,904 (36 beds)
Inpatient Unit	Medical/Surgical Units	155,249 SF	149,930
		201,214 SF	
Perioperative Services	Surgical Suite	56,641 SF	52,365
		56,641 SF	
Support Services	MDR	1,277 SF	20,860
Support Services	Shipping & Receiving	3,151 SF	
		4,429 SF	
Total DGSF		**329,752 SF**	

DGSF of Willow Tree - Ambulatory (AMB)

Categories	Department Name	Designed Area	AP Program
Ambulatory Care	Ambulatory Clinic	132,352 SF	128,530
Ambulatory Care	Ambulatory Procedure Unit	34,686 SF	35,025
Ambulatory Care	Dialysis	30,815 SF	30,230
Ambulatory Care	Eye Centre	41,875 SF	42,055
Ambulatory Care	Heart Health	47,822 SF	47,950
Ambulatory Care	Hyperbaric	8,521 SF	8,640
Ambulatory Care	Medical Day Care	9,851 SF	10,285
Ambulatory Care	Outpatient Specimen Collection	4,603 SF	4,675
		310,526 SF	
Amenities	Amenities	5,379 SF	
Amenities	Cafeteria	1,941 SF	
		7,320 SF	
Building Support	M+E	41,206 SF	
		41,206 SF	
Diagnostic Imaging	Diagnostic Imaging	14,099 SF	14,003
		14,099 SF	
Support Services	Bio Med Engineering	880 SF	
Support Services	Shipping & Receiving	4,236 SF	
		5,116 SF	
Total DGSF		**378,268 SF**	

DGSF of Willow Tree - Research and Innovation Centre (RES)

Categories	Department Name	Designed Area	AP Program
Research	Research	33,316 SF	34,430 SF
		33,316 SF	
Total DGSF		**33,316 SF**	

Gross Building Area of Willow Tree - Inpatient/OR Extension

Categories	Designed Area
Amenities	16,004 SF
Building Support	51,464 SF
Inpatient Unit	201,214 SF
Perioperative Services	56,641 SF
Public	70,698 SF
Support Services	4,429 SF
Vertical Circulation	30,047 SF
Total	**430,497 SF**
GROSSING FACTOR X 10% for Building Envelope	43,050 SF
GFA	**473,547 SF**

Gross Building Area of Willow Tree - Inpatient/OR Extension - Parking

Categories	Department Name	Designed Area
Public	Parking	**202,114 SF**
3 LEVELS TO BEDROCK		

Gross Building Area of Willow Tree - Ambulatory

Categories	Designed Area
Ambulatory Care	310,526 SF
Amenities	7,320 SF
Building Support	41,206 SF
Diagnostic Imaging	14,099 SF
Public	50,527 SF
Support Services	5,116 SF
Vertical Circulation	15,011 SF
Total	**443,806 SF**
GROSSING FACTOR X 10% for Building Envelope	44,380 SF
GFA	**488,186 SF**

Gross Building Area of Willow Tree - Ambulatory - Parking

Categories	Department Name	Designed Area
Public	Parking	**77,217 SF**
1 LEVEL TO BEDROCK		

Gross Building Area of Willow Tree - Research and Innovation Centre (RES)

Categories	Designed Area
Public	14,513 SF
Research	33,316 SF
Vertical Circulation	2,563 SF
Gross Building Area	**50,391 SF**
GROSSING FACTOR X 10% for Building Envelope	5,039 SF
GFA	**55,430 SF**

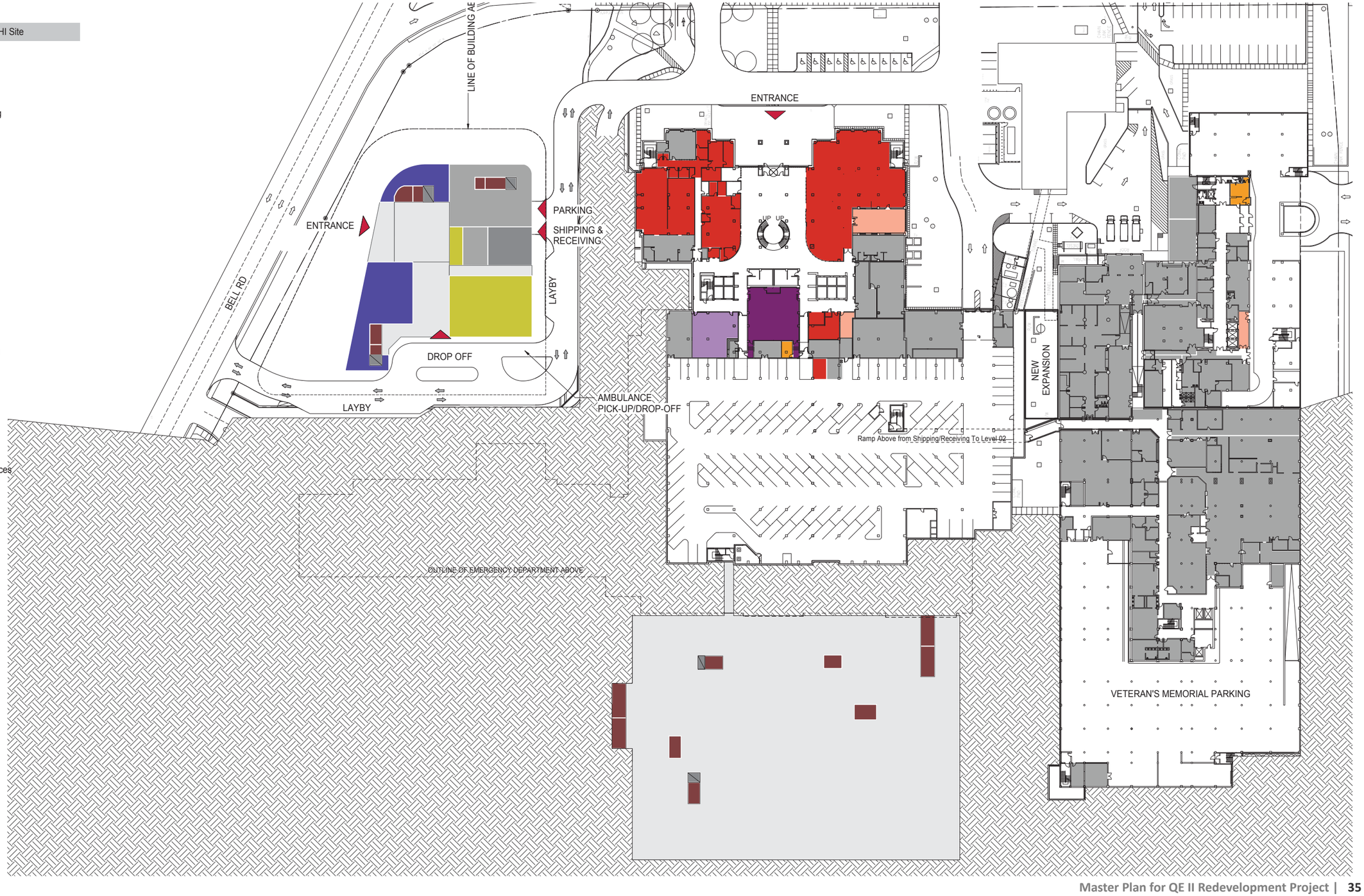
9.1 Willow Tree Concept

Overall Plan: Level 01

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



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9.1 Willow Tree Concept
Overall Plan: Level 02

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation

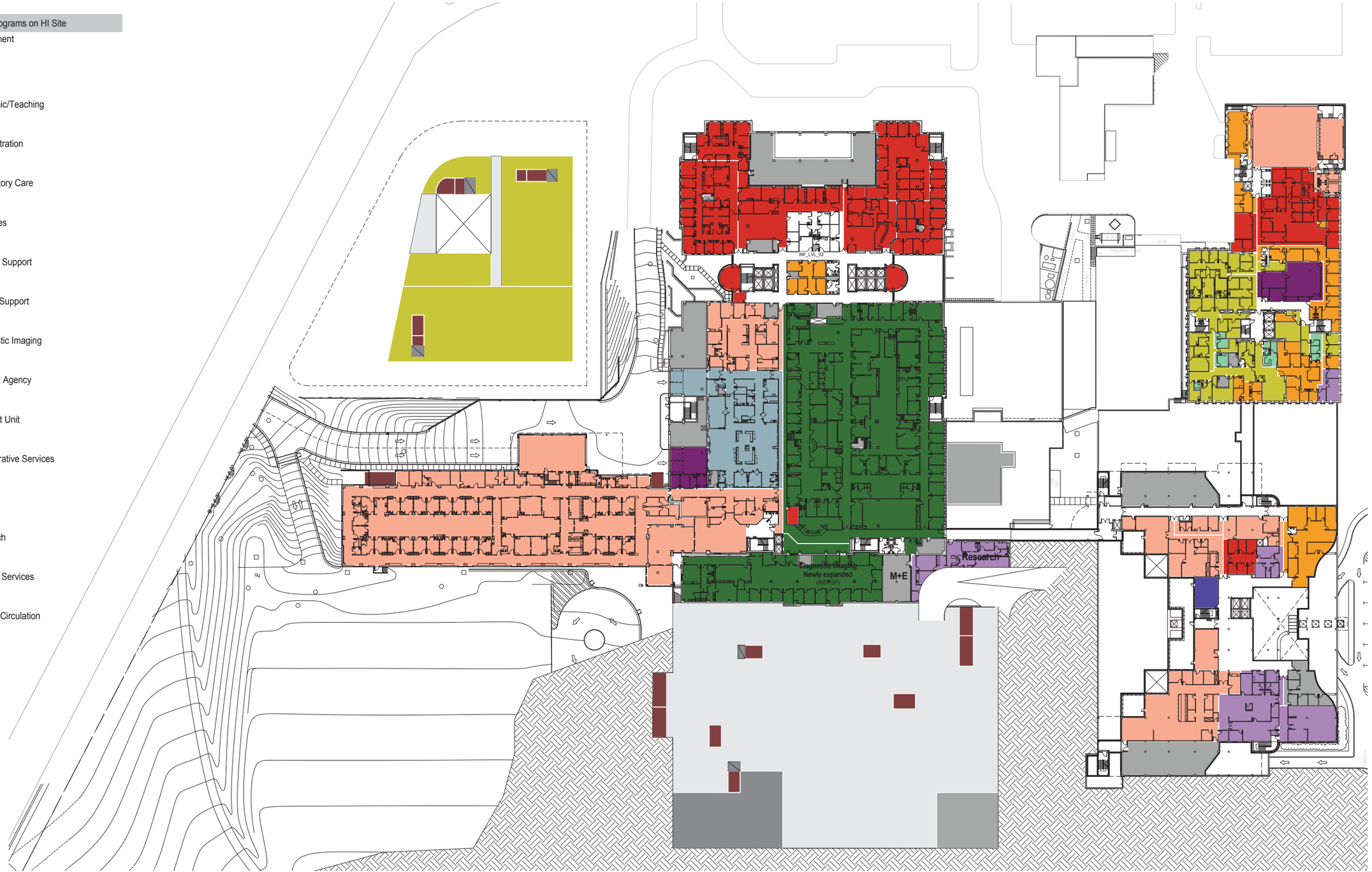
9.1 Willow Tree Concept

Overall Plan: Level 03

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



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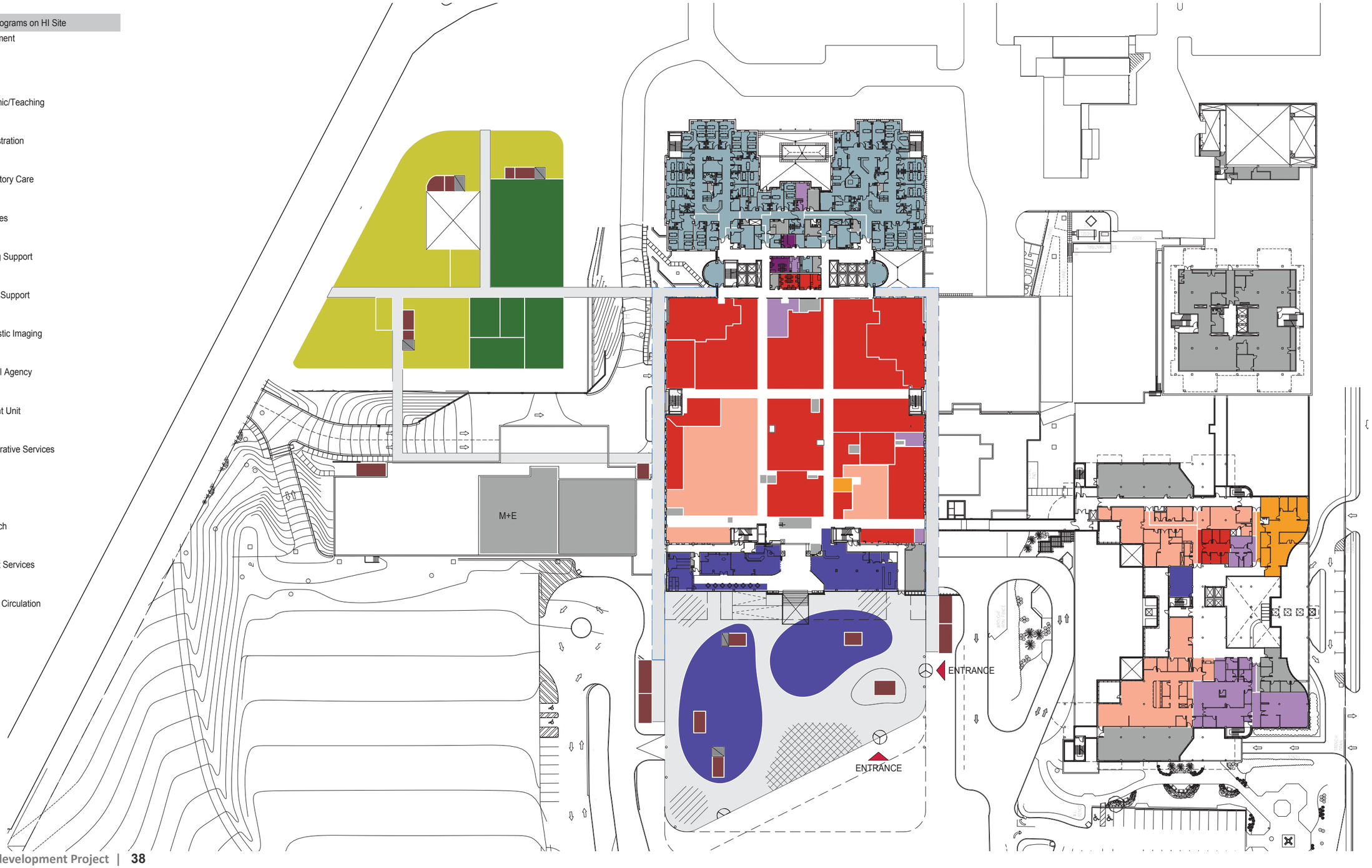
9.1 Willow Tree Concept
Overall Plan: Level 04

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



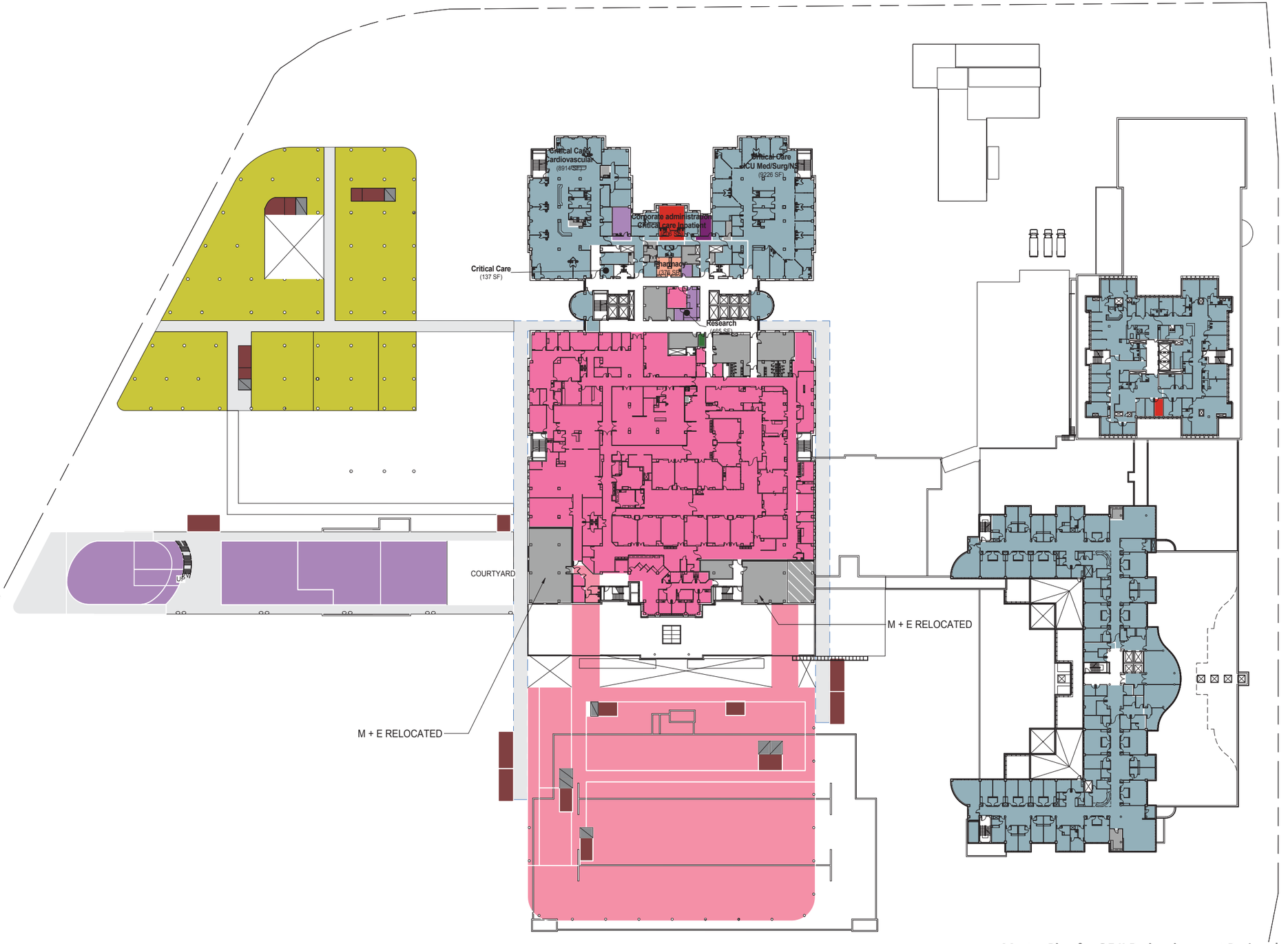
9.1 Willow Tree Concept

Overall Plan: Level 05

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



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9.1 Willow Tree Concept
Overall Plan: Level 06

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation

N

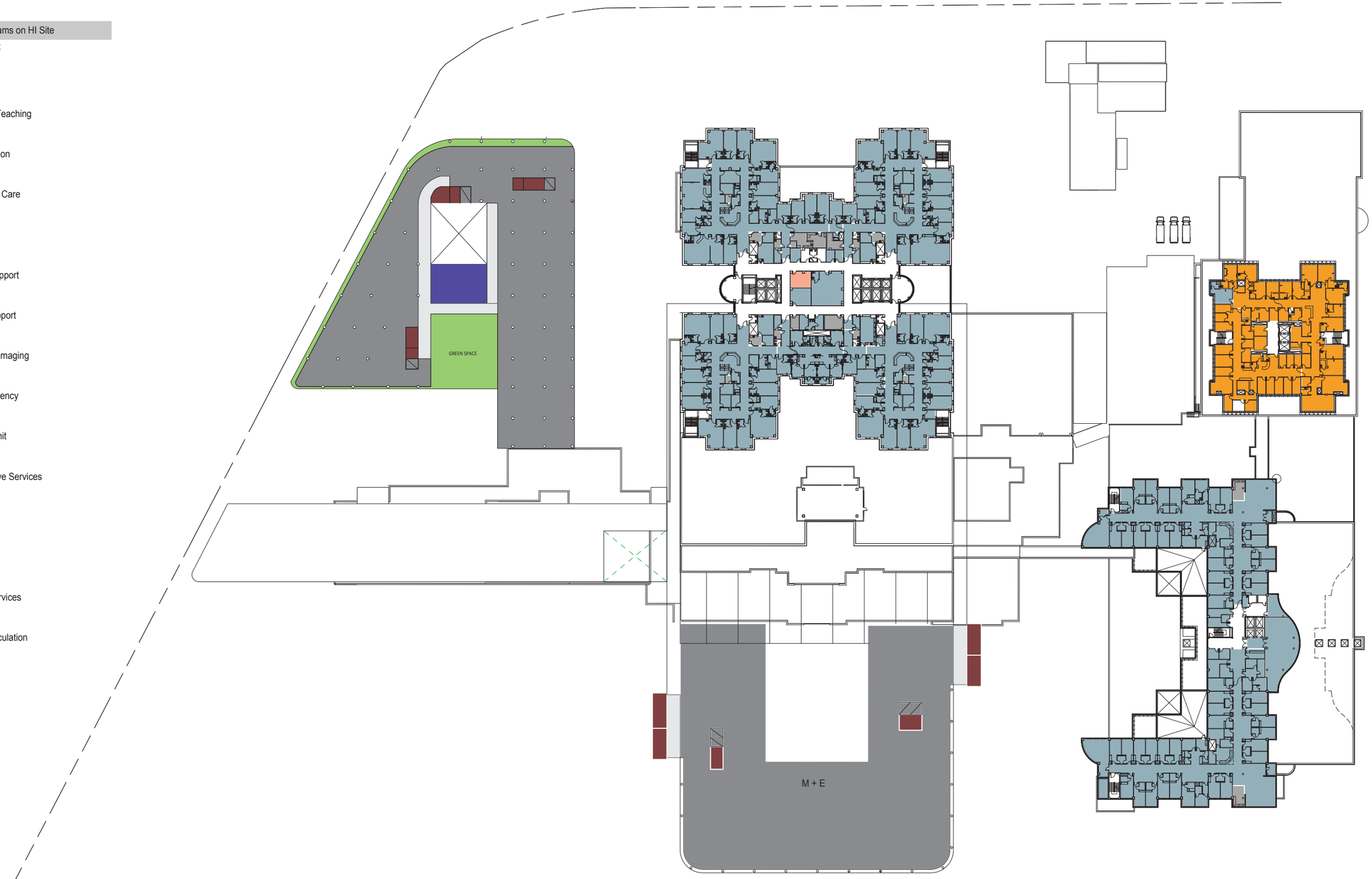
9.1 Willow Tree Concept

Overall Plan: Level 07

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



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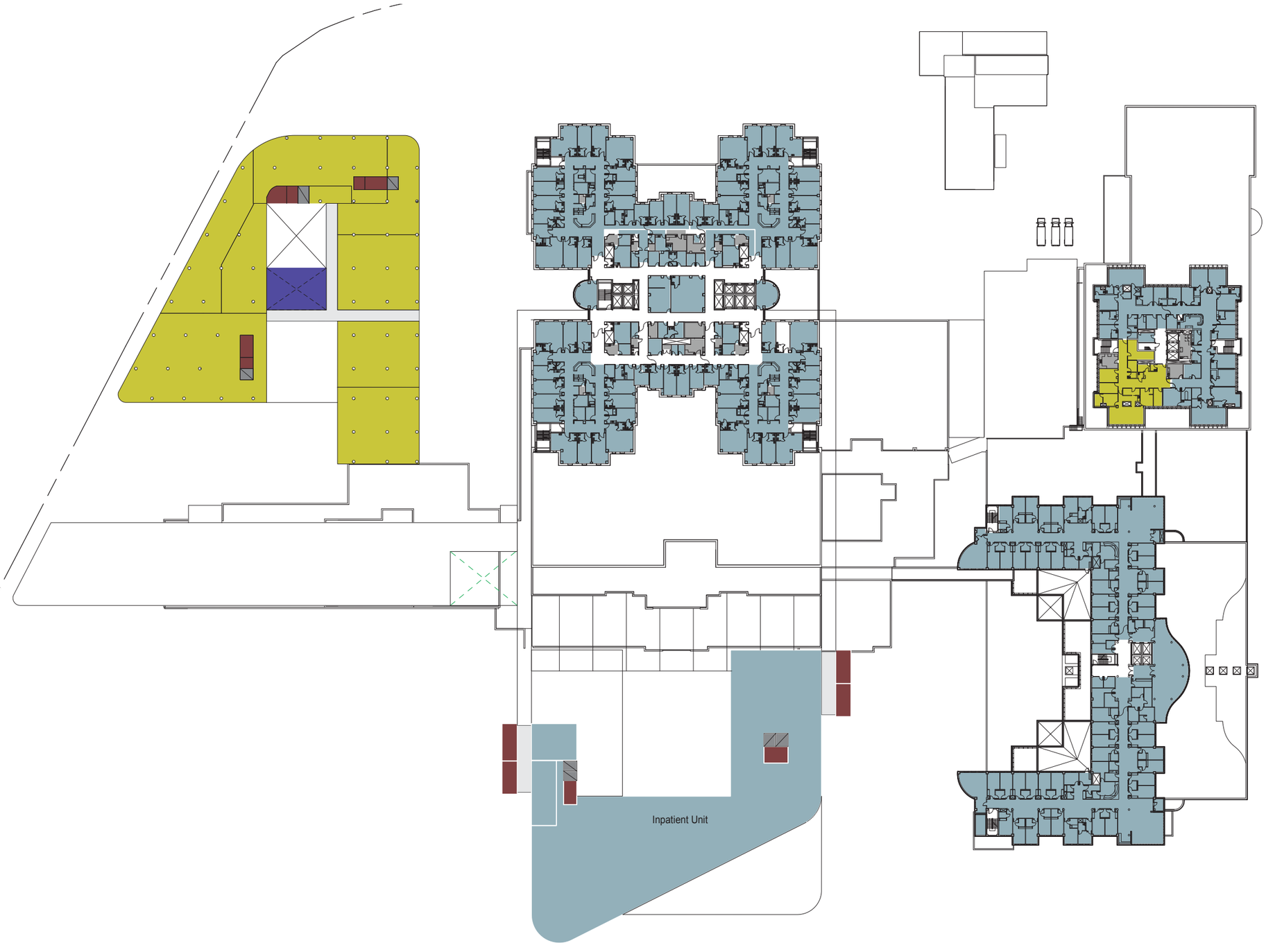
9.1 Willow Tree Concept
Overall Plan: Level 08

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



N

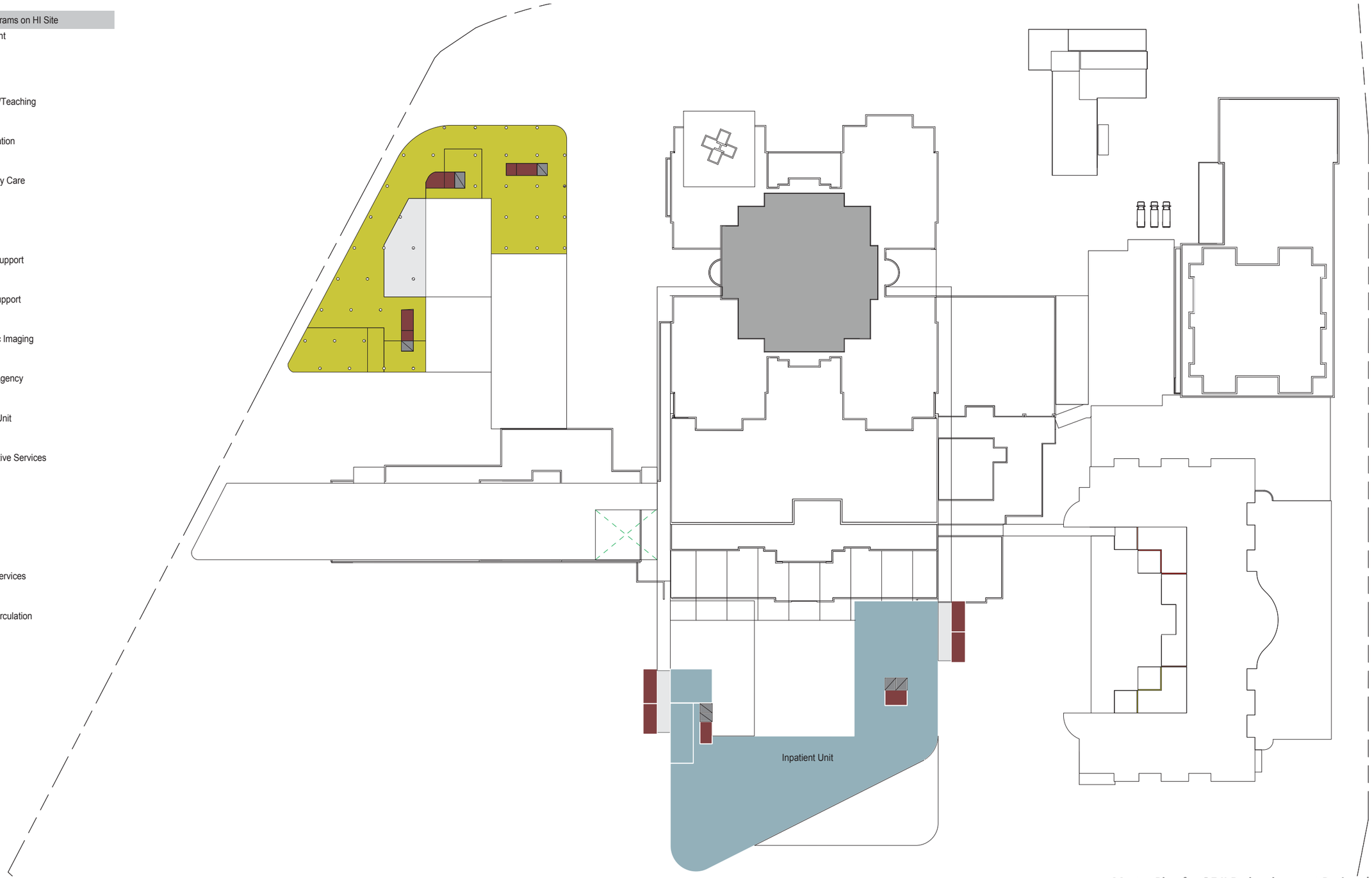
9.1 Willow Tree Concept

Overall Plan: Level 09

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation

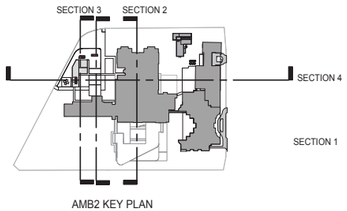


9.1 Willow Tree Concept
Sections

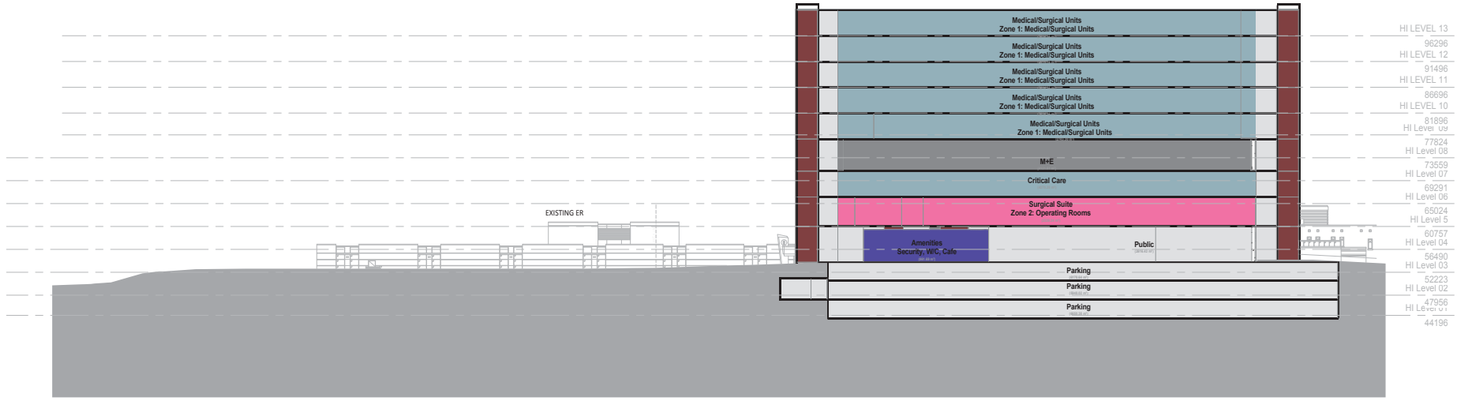
Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation

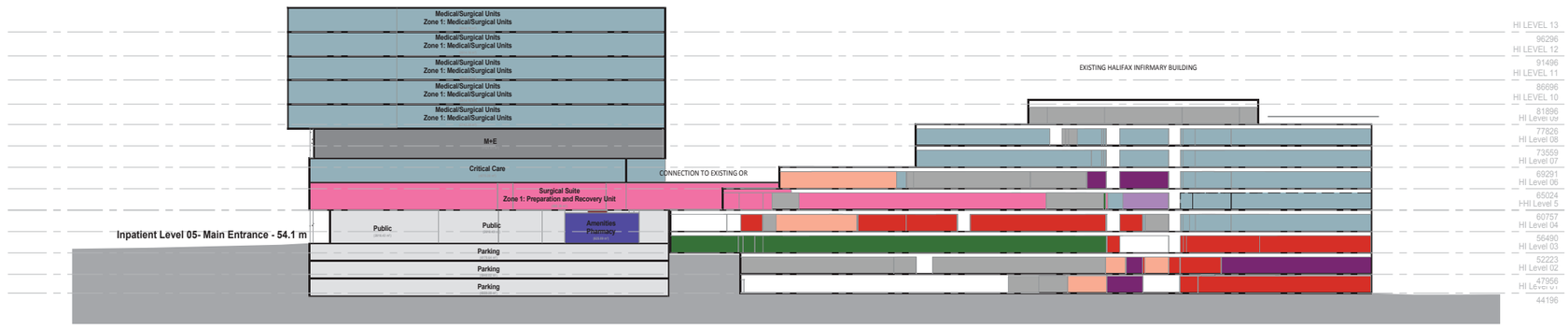


AMB2 KEY PLAN



WILLOW TREE - SECTION 01

SCALE: 1 : 500



WILLOW TREE - SECTION 02

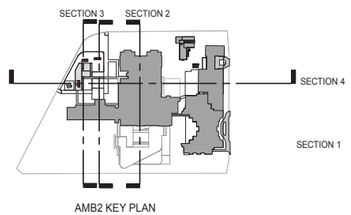
SCALE: 1 : 500

9.1 Willow Tree Concept
Sections

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



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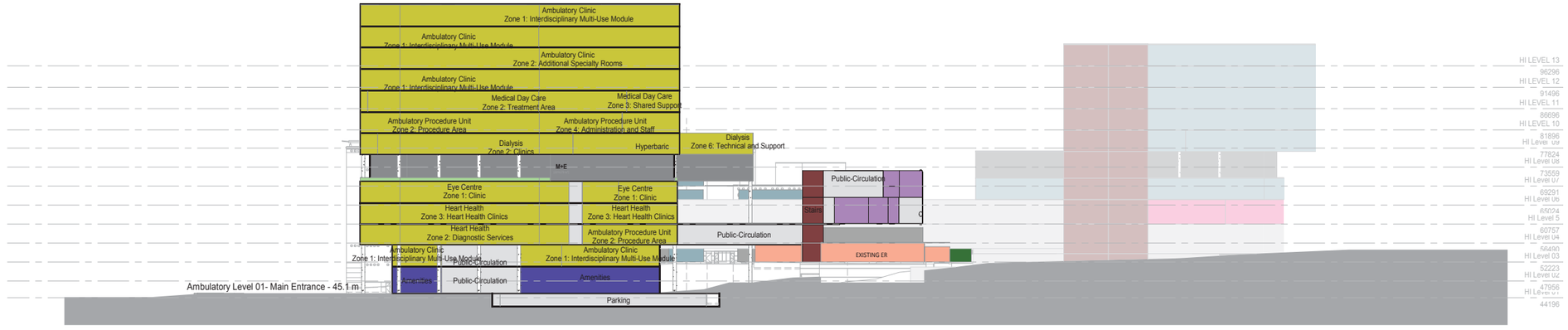
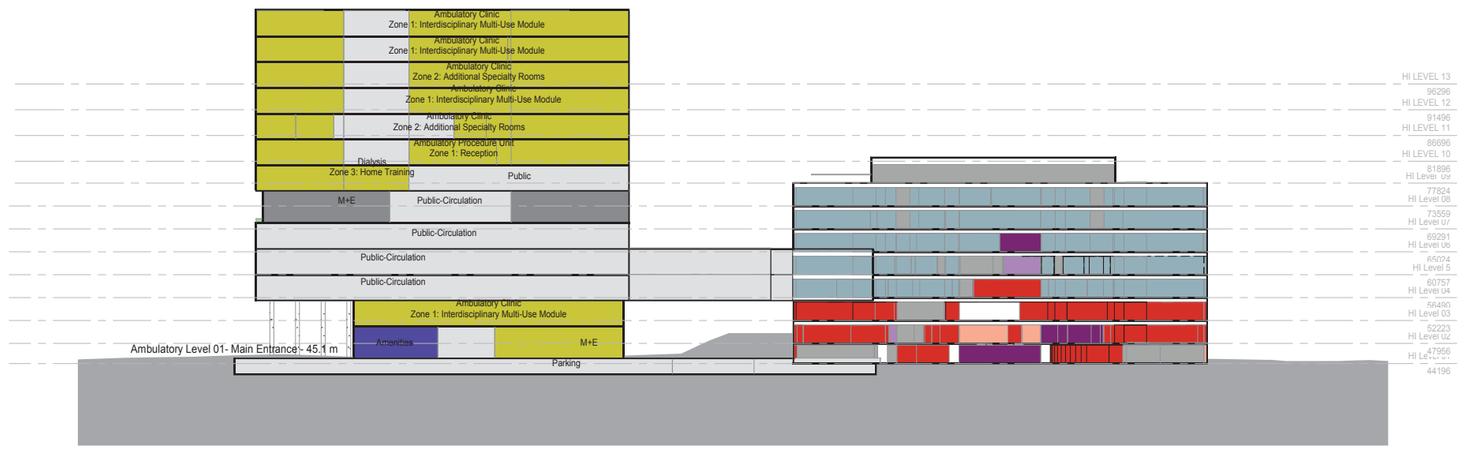


WILLOW TREE - SECTION 03

SCALE: 1 : 500



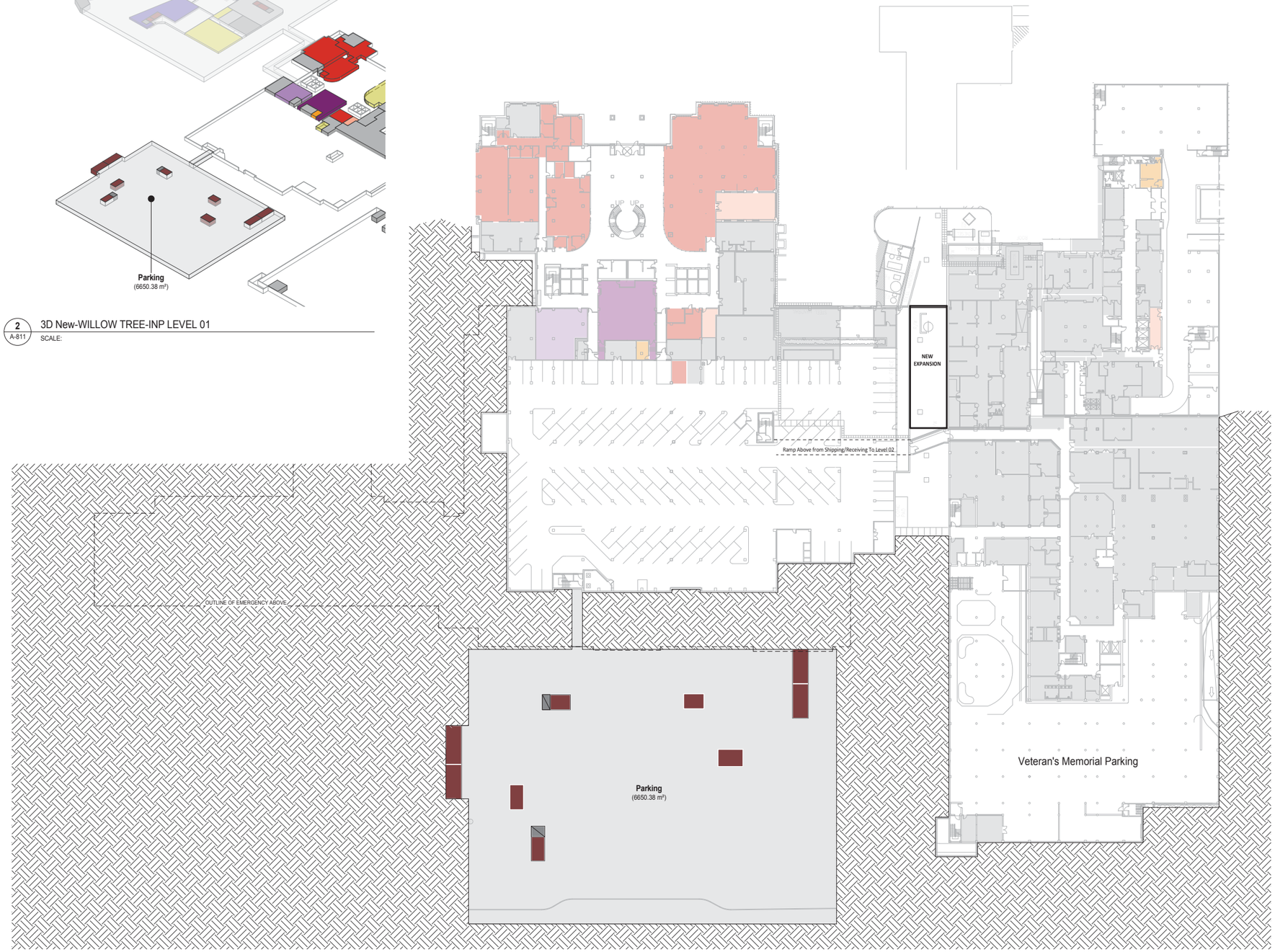
WILLOW TREE - SECTION 04

SCALE: 1 : 500

9.1 Willow Tree Concept
Inpatient/OR Building: Level 01

DGSF of Willow Tree - New Inpatient/OR Extension - Level 01		
Categories	Department Name	Area
Public	Parking	71,584 SF
		71,584 SF
Vertical Circulation	Vertical Circulation	2,862 SF
		2,862 SF
Total DGSF		**74,446 SF**

2 A-811 3D New-WILLOW TREE-INP LEVEL 01
SCALE:



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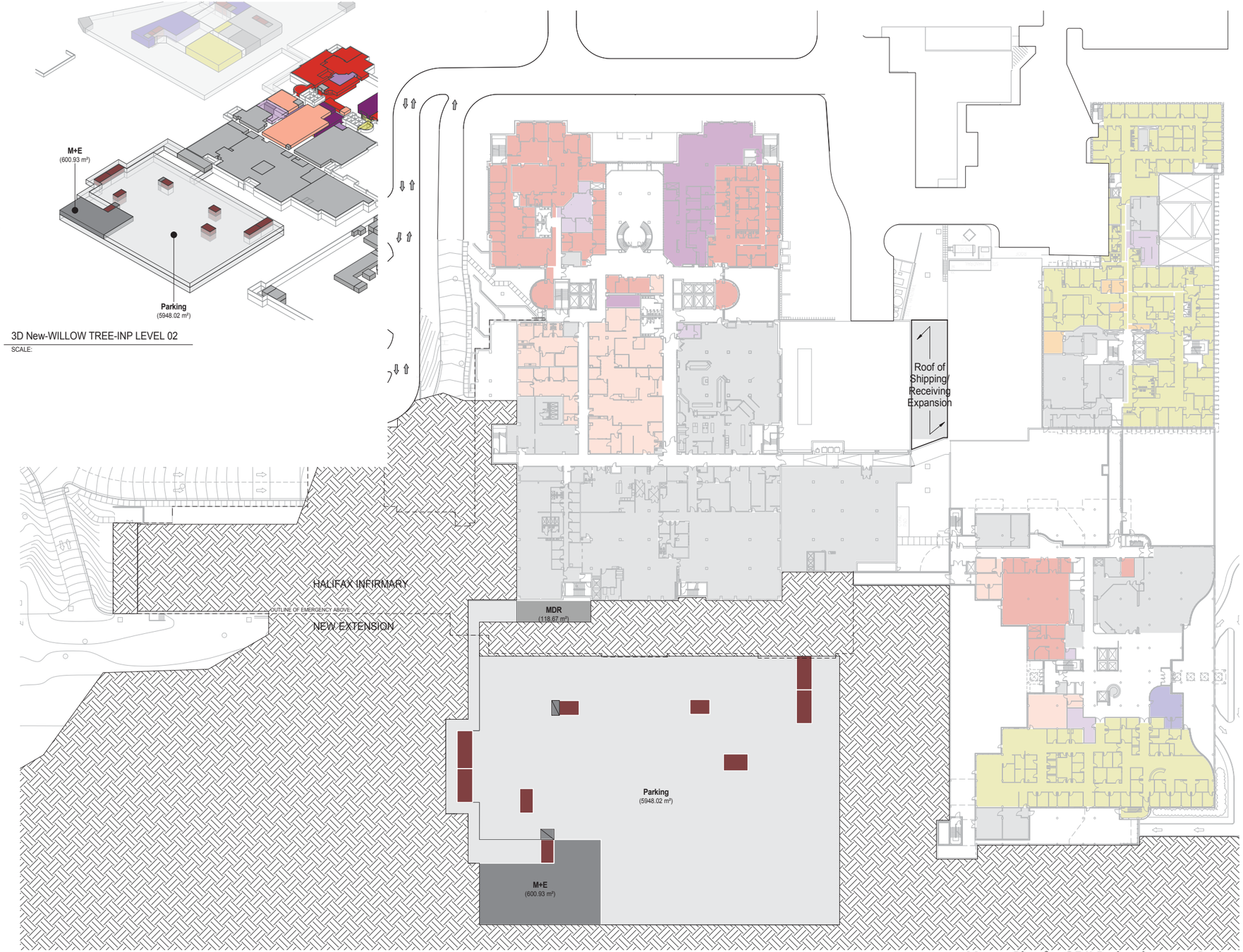
9.1 Willow Tree Concept
Inpatient/OR Building: Level 02

DGSF of Willow Tree - New Inpatient/OR Extension - Level 02		
Categories	Department Name	Area
Building Support	**M+E**	6,468 SF
		6,468 SF
Public	**Parking**	64,024 SF
Public	**Public-Circulation**	4,354 SF
		68,378 SF
Support Services	**MDR**	1,277 SF
		1,277 SF
Vertical Circulation	**Vertical Circulation**	2,862 SF
		2,862 SF
Total DGSF		**78,986 SF**

3D New-WILLOW TREE-INP LEVEL 02
SCALE:



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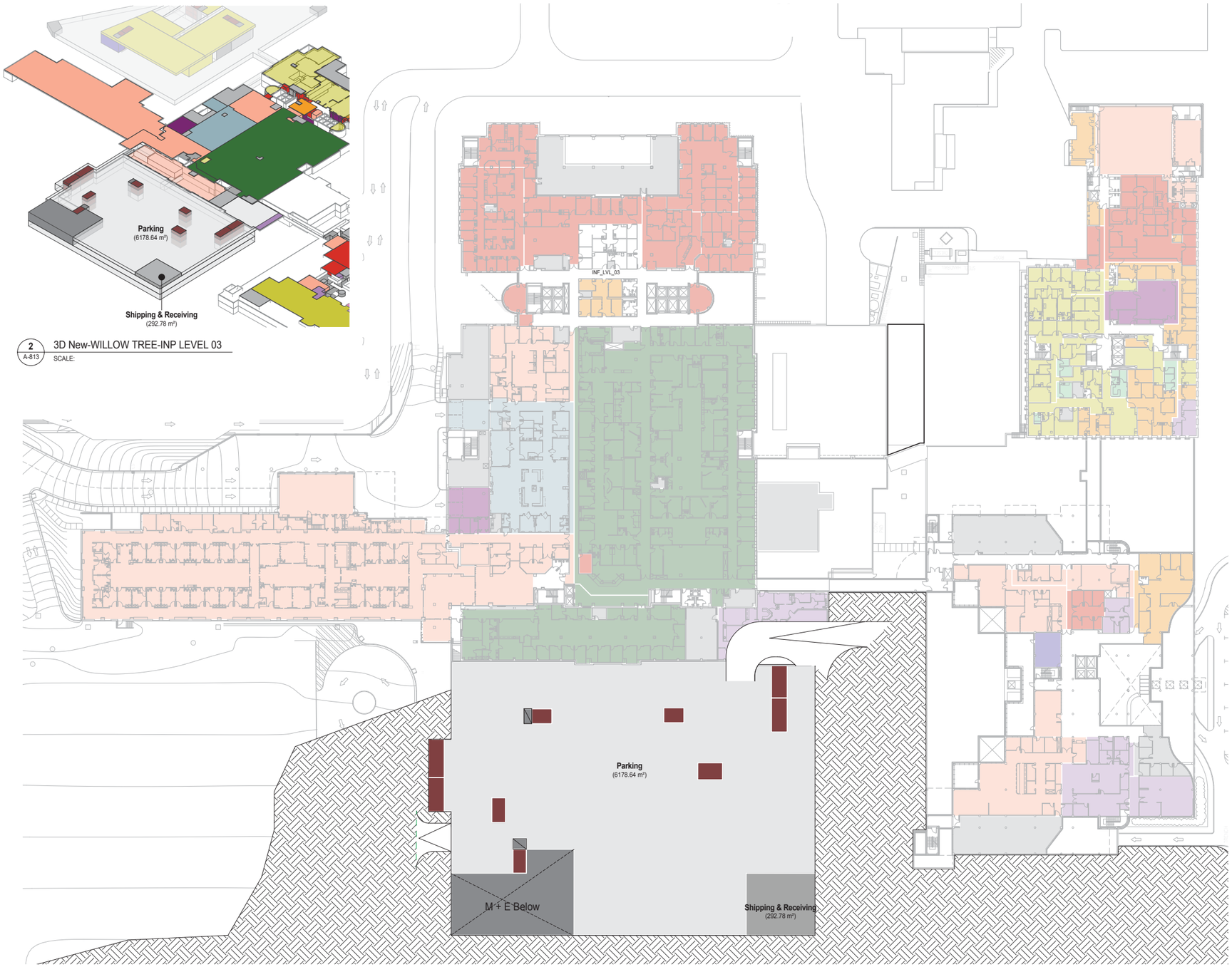
9.1 Willow Tree Concept
Inpatient/OR Building: Level 03

DGSF of Willow Tree - Inpatient/OR Extension - Level 03		
Categories	Department Name	Area
Public	**Parking**	66,506 SF
		66,506 SF
Support Services	**Shipping & Receiving**	3,151 SF
		3,151 SF
Vertical Circulation	**Vertical Circulation**	3,652 SF
		3,652 SF
Total DGSF		**73,310 SF**

2 A-813 3D New-WILLOW TREE-INP LEVEL 03
SCALE:



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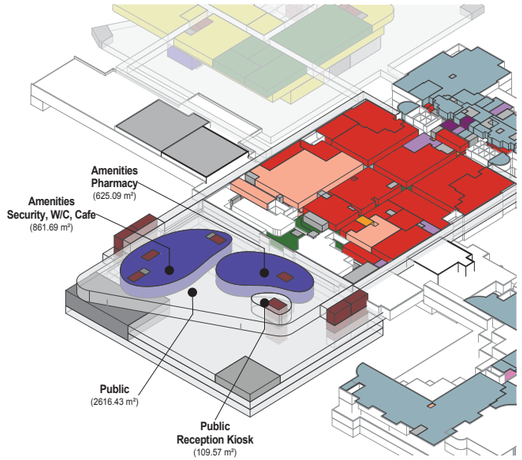
9.1 Willow Tree Concept

Inpatient/OR Building: Level 04

DGSF of Willow Tree - Inpatient/OR Extension - Level 04		
Categories	Department Name	Area
Amenities	**Amenities**	16,004 SF
		16,004 SF
Public	**Public**	28,163 SF
Public	**Public-Circulation**	10,665 SF
		38,828 SF
Vertical Circulation	**Vertical Circulation**	2,862 SF
		2,862 SF
Total DGSF		**57,693 SF**

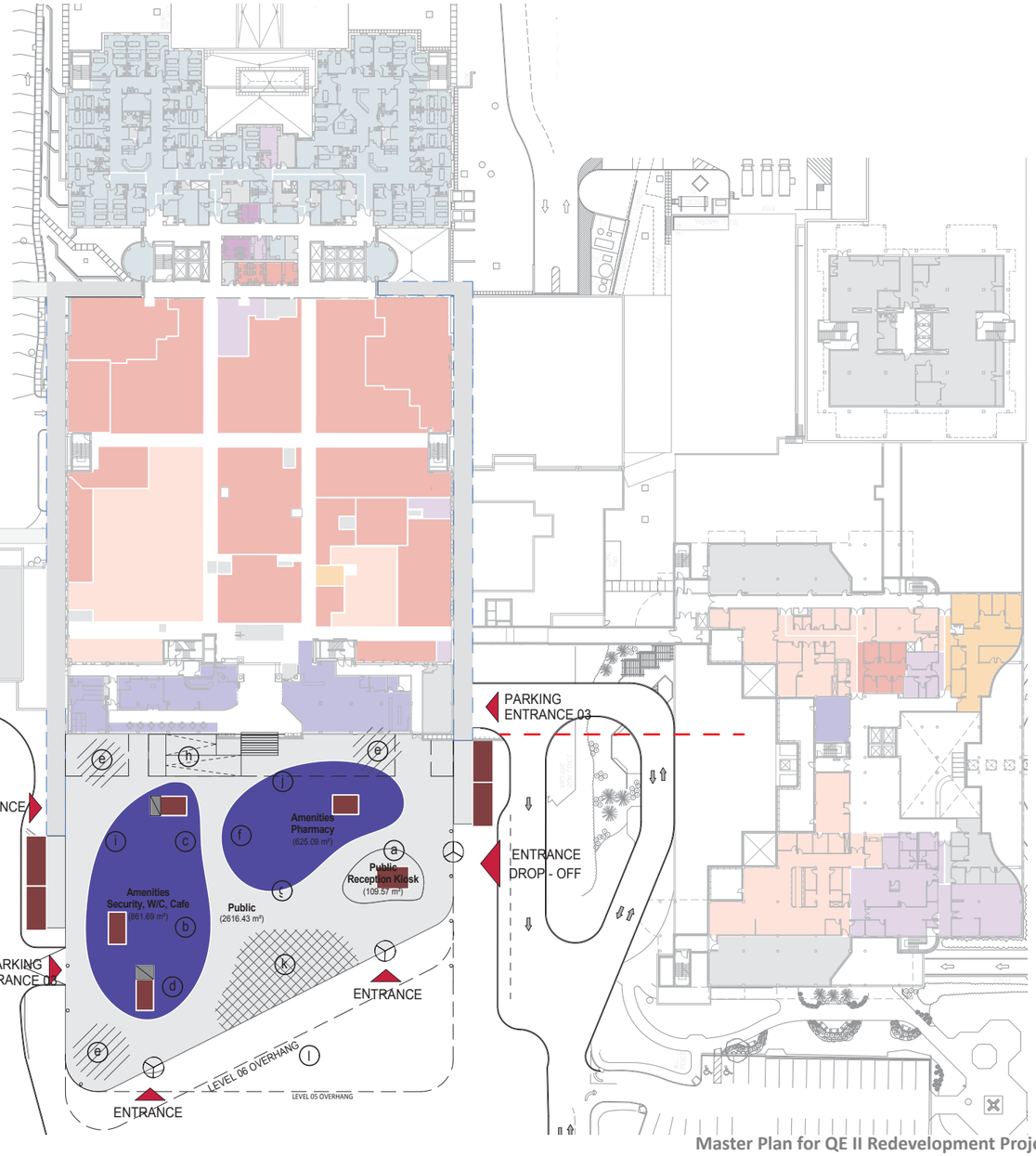


2 A-814 3D New-WILLOW TREE-INP LEVEL 04

SCALE:

INPATIENT ENTRY LEVEL 04 COMPONENTS

- (a) Reception Kiosk
- (b) Security
- (c) Gift Shop
- (d) Cafe / Restaurant
- (e) Seating/Waiting
- (f) Washrooms
- (g) Doner Wall
- (h) Ramp to Existing level 04
- (i) Foundation Office
- (j) Spiritual Room
- (k) Wellness Gallery
- (l) Wellness Garden



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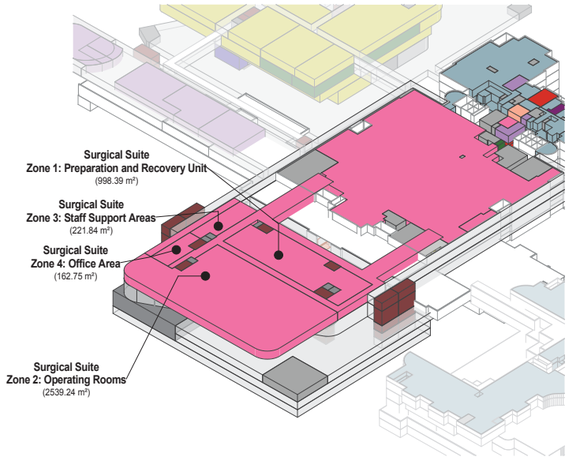
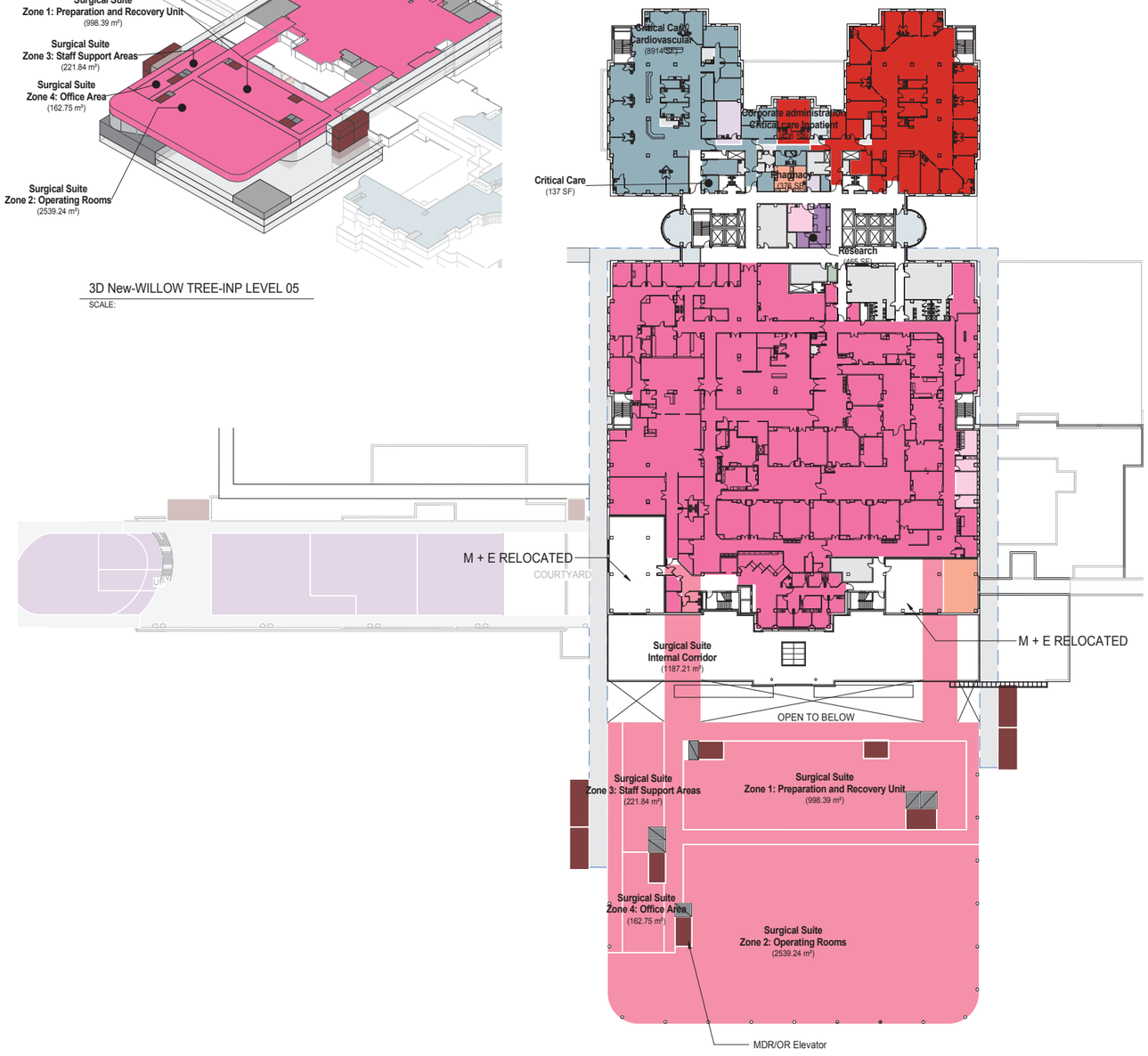
9.1 Willow Tree Concept
Inpatient/OR Building: Level 05

DGSF of Willow Tree - Inpatient/OR Extension - Level 05		
Categories	Department Name	Area
Perioperative Services	Surgical Suite	54,997 SF
		54,997 SF
Public	Public-Circulation	10,665 SF
		10,665 SF
Vertical Circulation	Vertical Circulation	2,862 SF
		2,862 SF
Total DGSF		**68,524 SF**



3D New-WILLOW TREE-INP LEVEL 05
SCALE:



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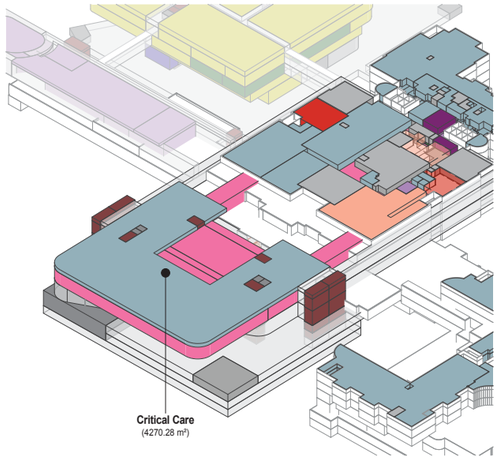
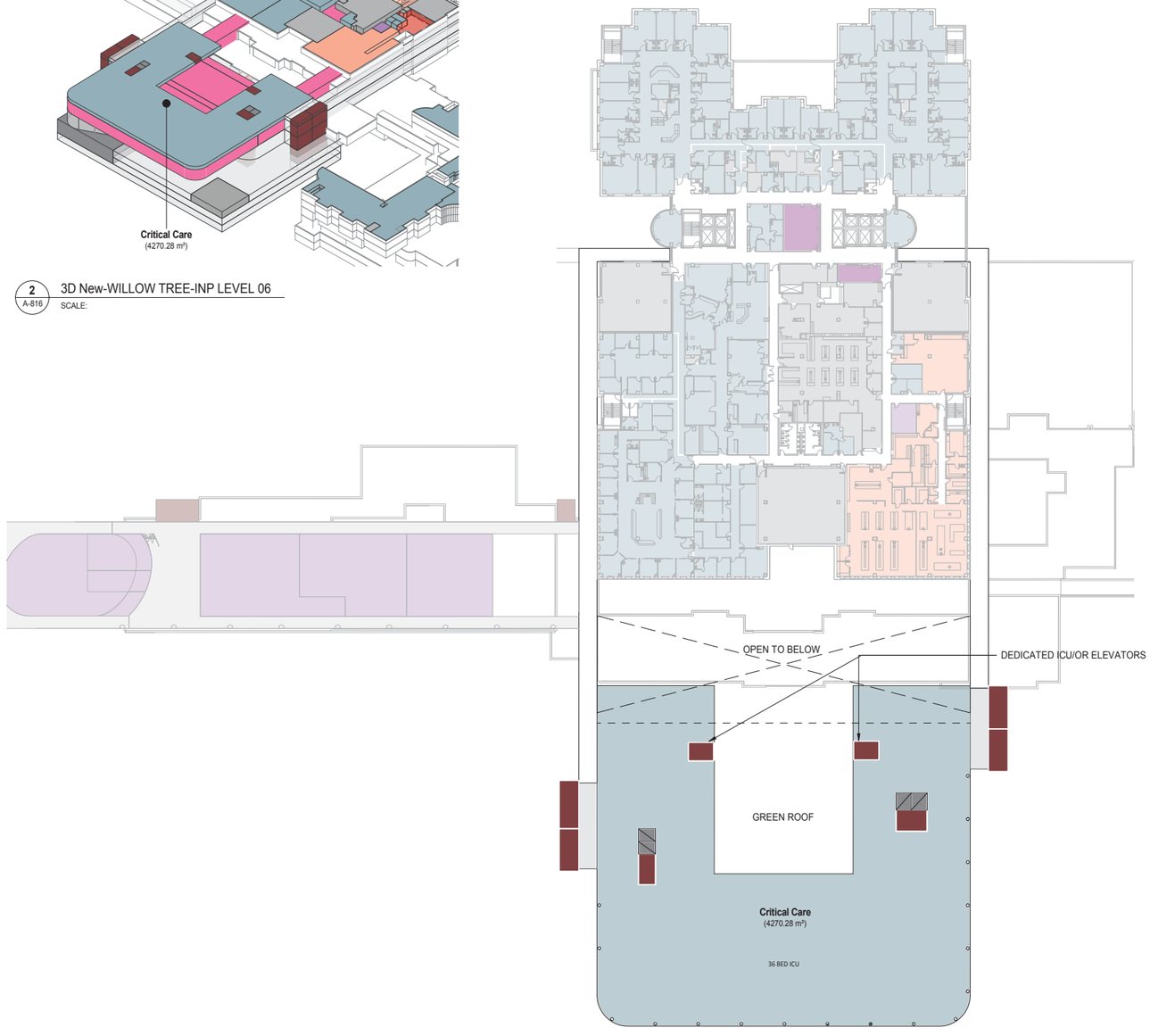
9.1 Willow Tree Concept
Inpatient/OR Building: Level 06

DGSF of Willow Tree - Inpatient/OR Extension - Level 06		
Categories	Department Name	Area
Inpatient Unit	**Critical Care**	45,965 SF
		45,965 SF
Public	**Public-Circulation**	1,427 SF
		1,427 SF
Vertical Circulation	**Vertical Circulation**	1,836 SF
		1,836 SF
Total DGSF		**49,228 SF**



2 A-816 3D New-WILLOW TREE-INP LEVEL 06
SCALE:



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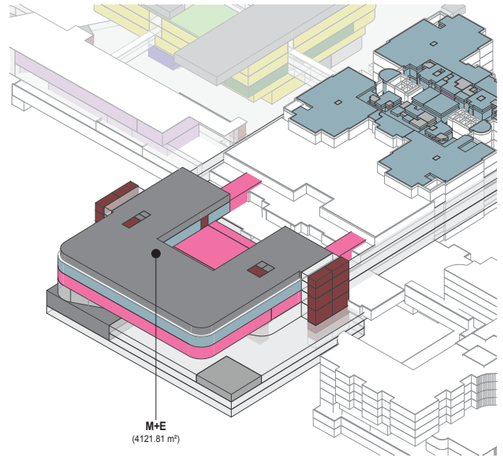
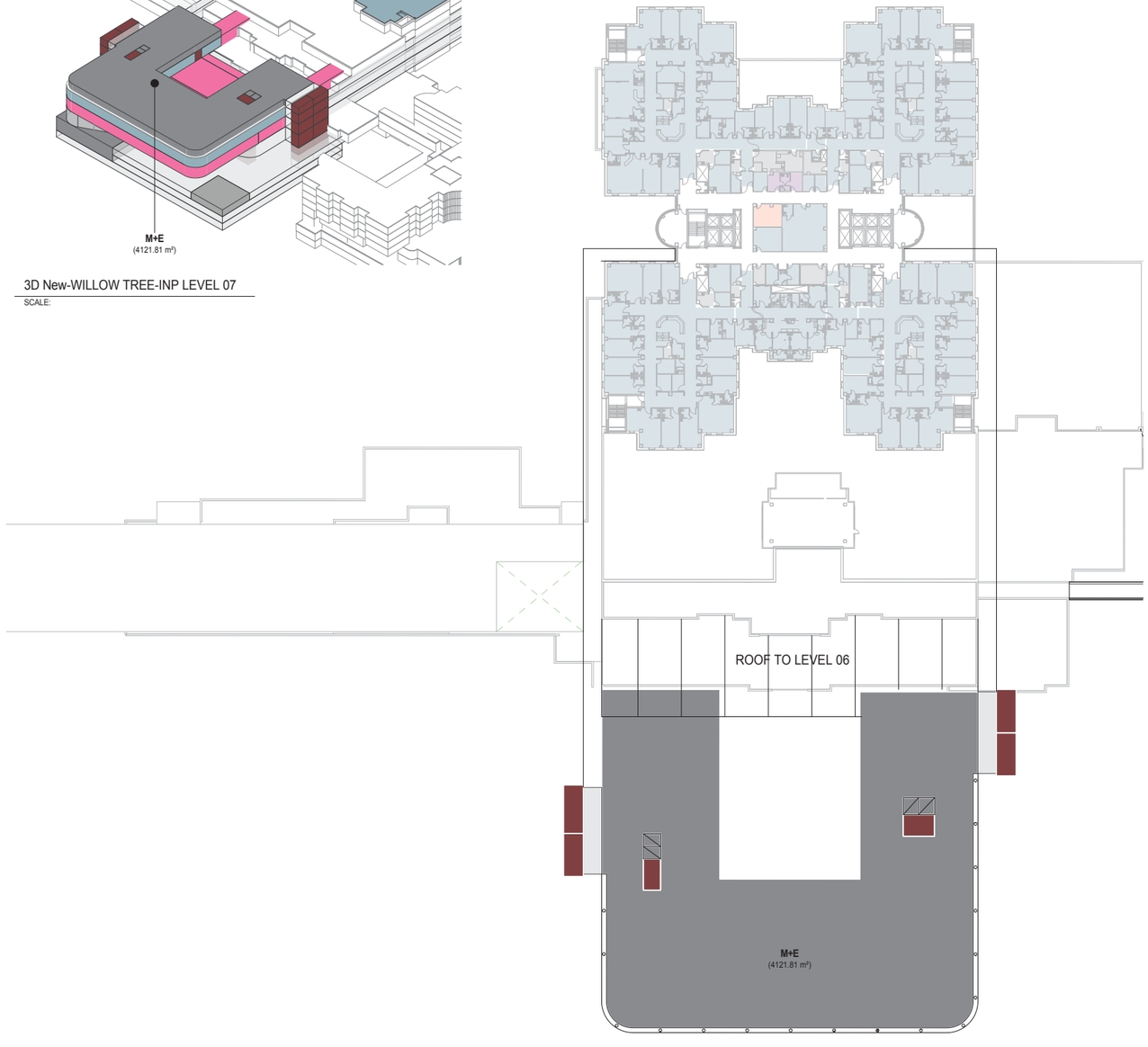
9.1 Willow Tree Concept
Inpatient/OR Building: Level 07

DGSF of Willow Tree - Inpatient/OR Extension - Level 07		
Categories	Department Name	Area
Building Support	**M+E**	44,367 SF
		44,367 SF
Public	**Public-Circulation**	1,425 SF
		1,425 SF
Vertical Circulation	**Vertical Circulation**	2,185 SF
		2,185 SF
Total DGSF		**47,977 SF**



3D New-WILLOW TREE-INP LEVEL 07
SCALE:



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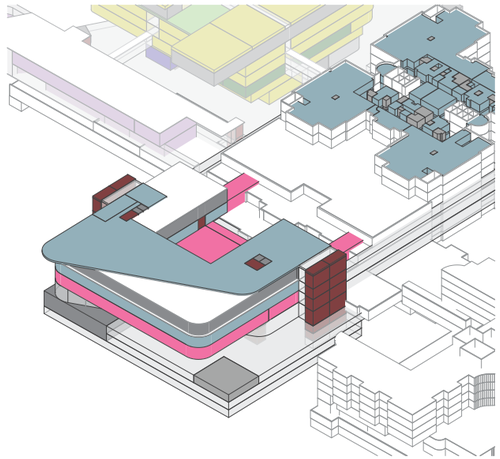
9.1 Willow Tree Concept
Inpatient/OR Building: Level 08

DGSF of Willow Tree - Inpatient/OR Extension - Level 08		
Categories	Department Name	Area
Inpatient Unit	**Medical/Surgical Units**	32,079 SF
Public	**Public-Circulation**	1,425 SF
Vertical Circulation	**Vertical Circulation**	2,185 SF
Total DGSF		**35,689 SF**



3D New-WILLOW TREE-INP LEVEL 08
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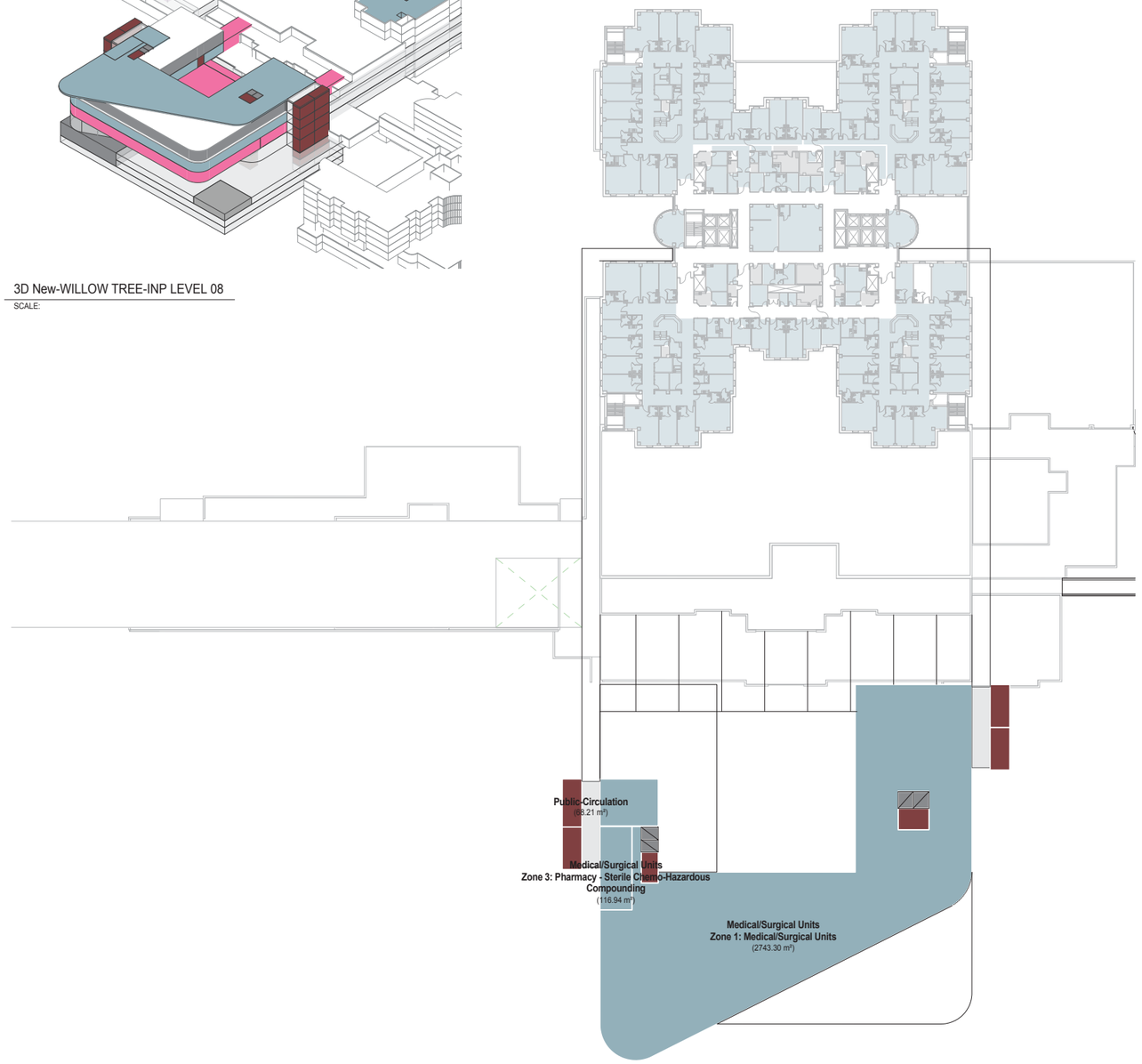

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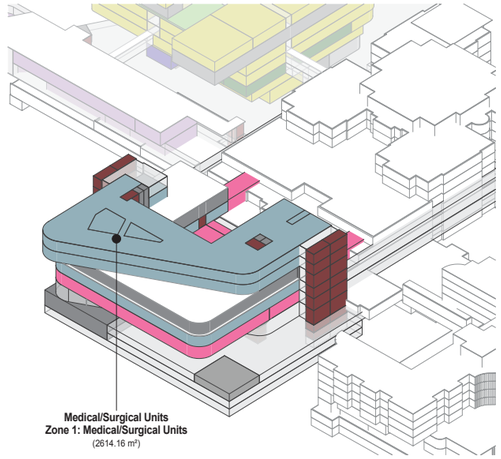
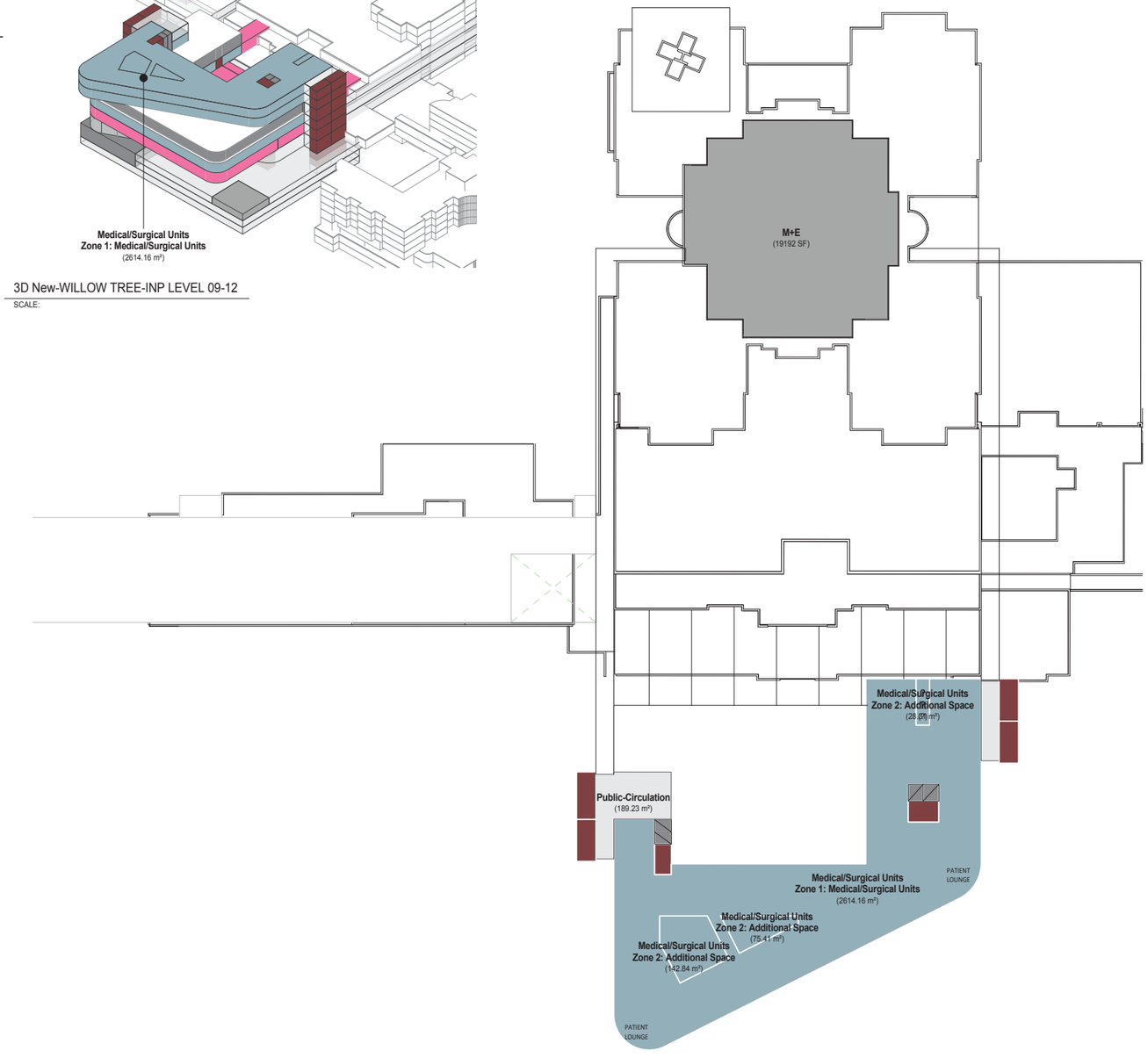
9.1 Willow Tree Concept
Inpatient/OR Building: Level 09-12

DGSF of Willow Tree - Inpatient/OR Extension - Level 09-12		
Categories	Department Name	Area
Inpatient Unit	**Medical/Surgical Units**	30,793 SF
Public	**Public-Circulation**	2,728 SF
Vertical Circulation	**Vertical Circulation**	2,185 SF
Total DGSF		**35,706 SF**



3D New-WILLOW TREE-INP LEVEL 09-12
SCALE:



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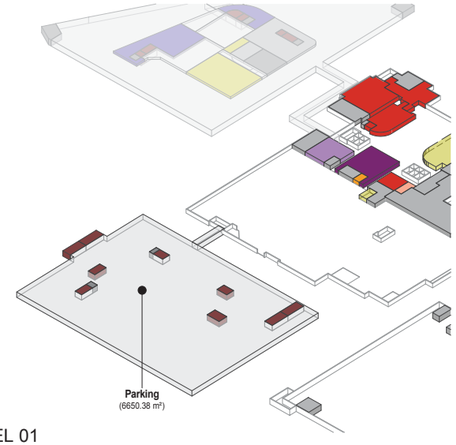
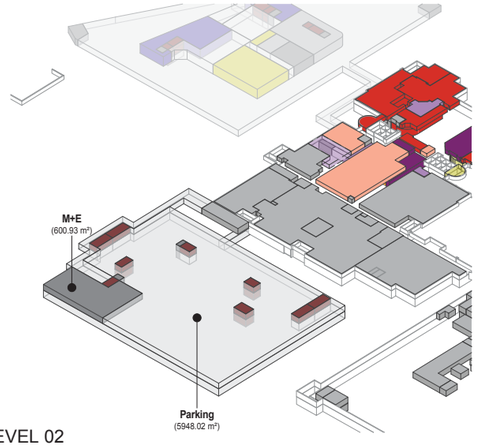
9.1 Willow Tree Concept

Inpatient/OR Building: 3D Diagrams



LEVEL 01



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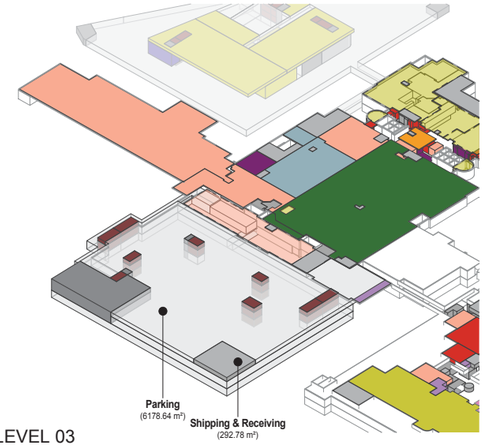

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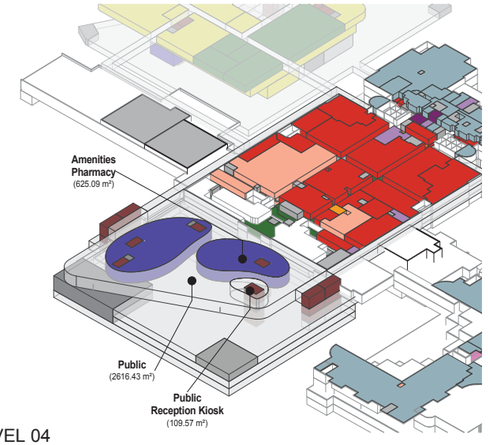

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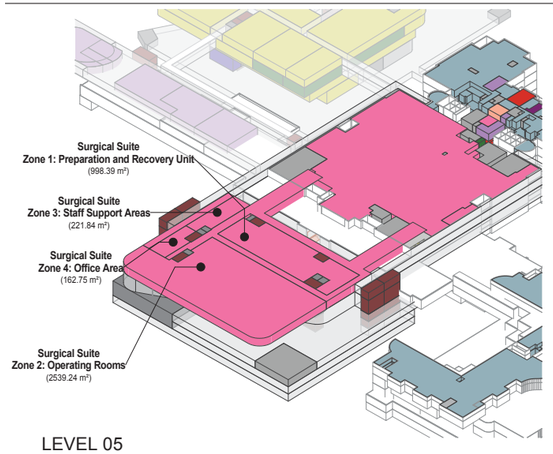

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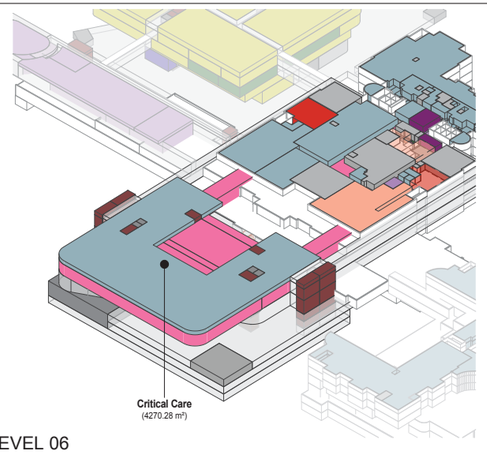

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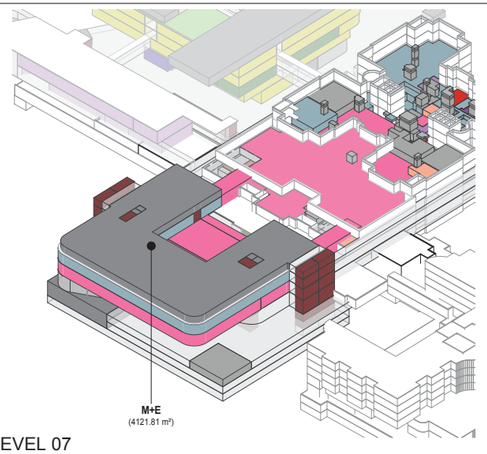

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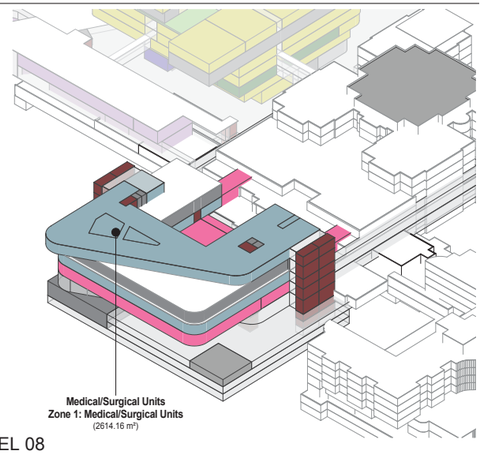
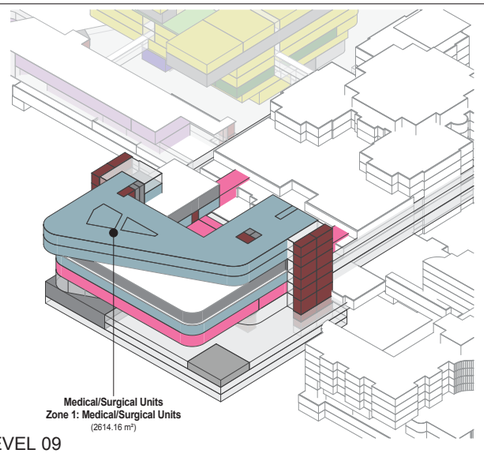


LEVEL 08



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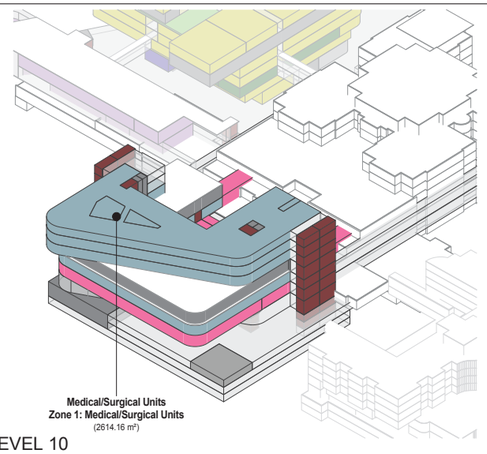
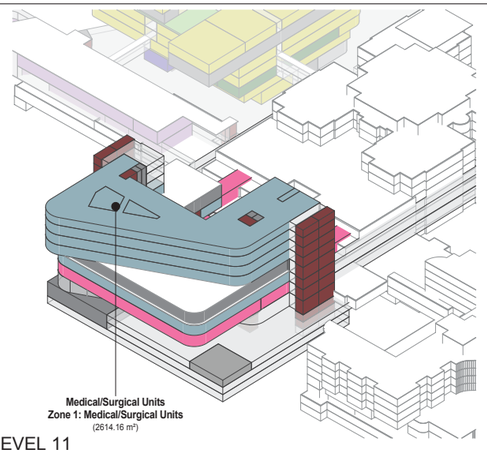


LEVEL 10



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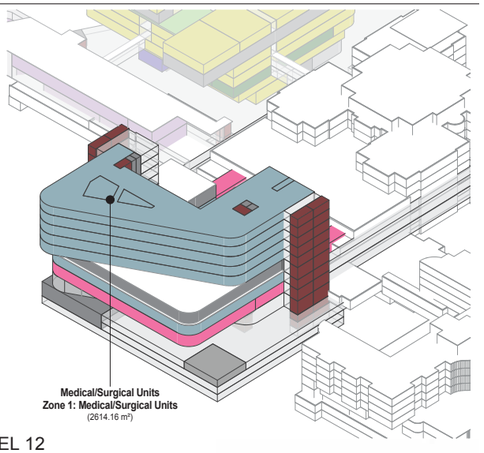
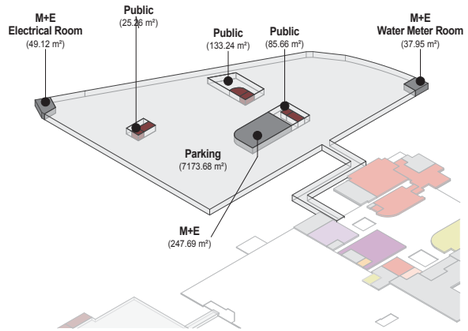


LEVEL 12

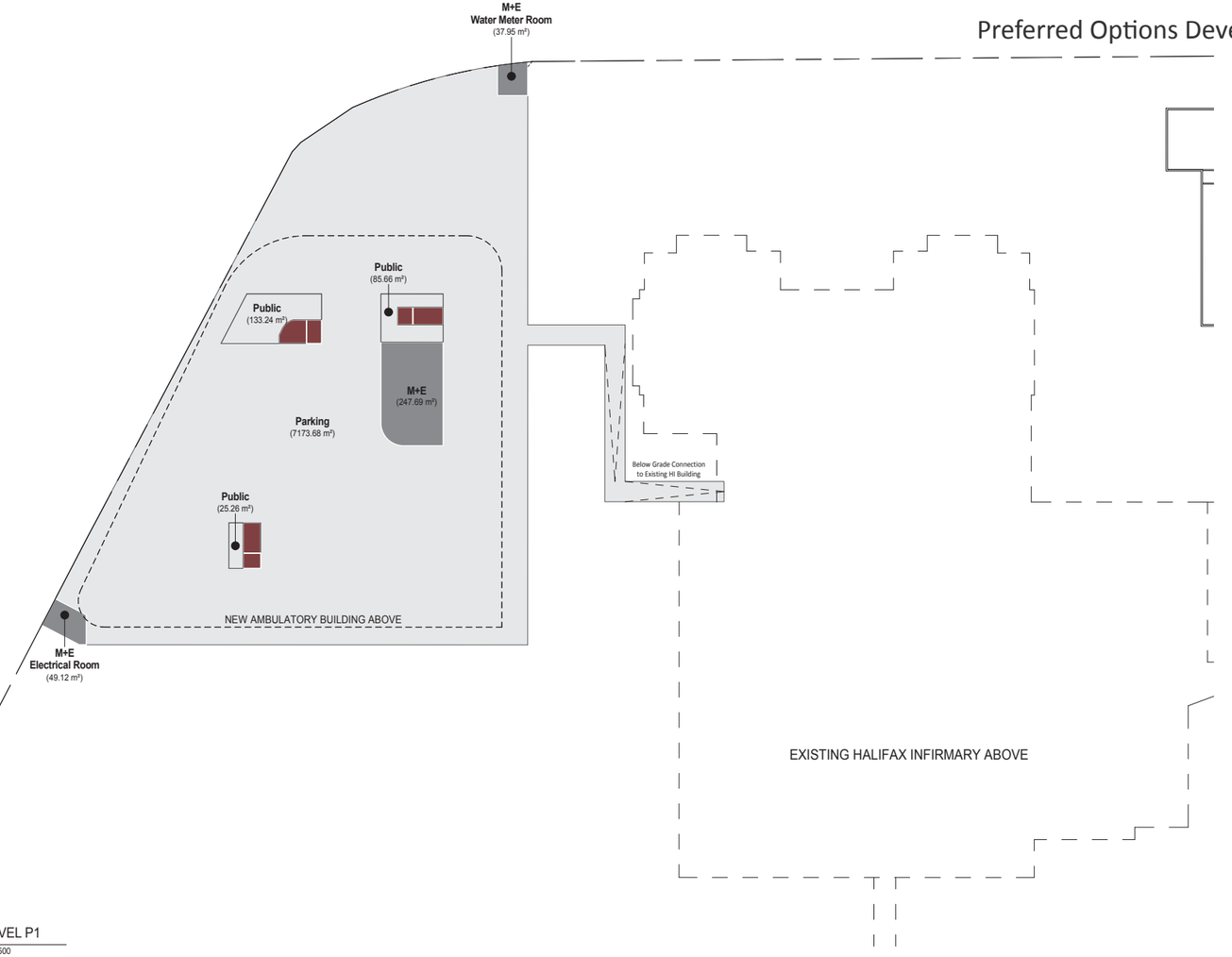
9.1 Willow Tree Concept
Ambulatory Building: Level P1

00-Department Gross Area - AMBULATORY BUILDING - Level P1		
	Department Name	Area
	M+E	3,603 SF
	Parking	77,217 SF
	Public	2,628 SF
	Vertical Circulation	1,072 SF
Grand total		**84,521 SF**



3D New AMB1 LEVEL P1

SCALE:



AMB-LEVEL P1

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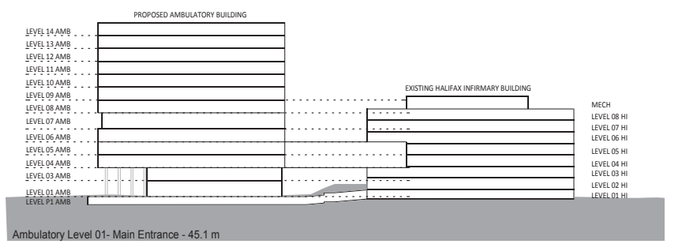
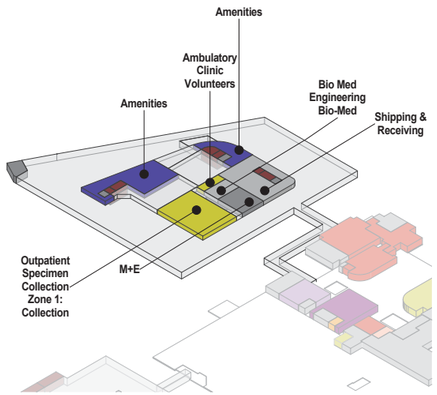


9.1 Willow Tree Concept

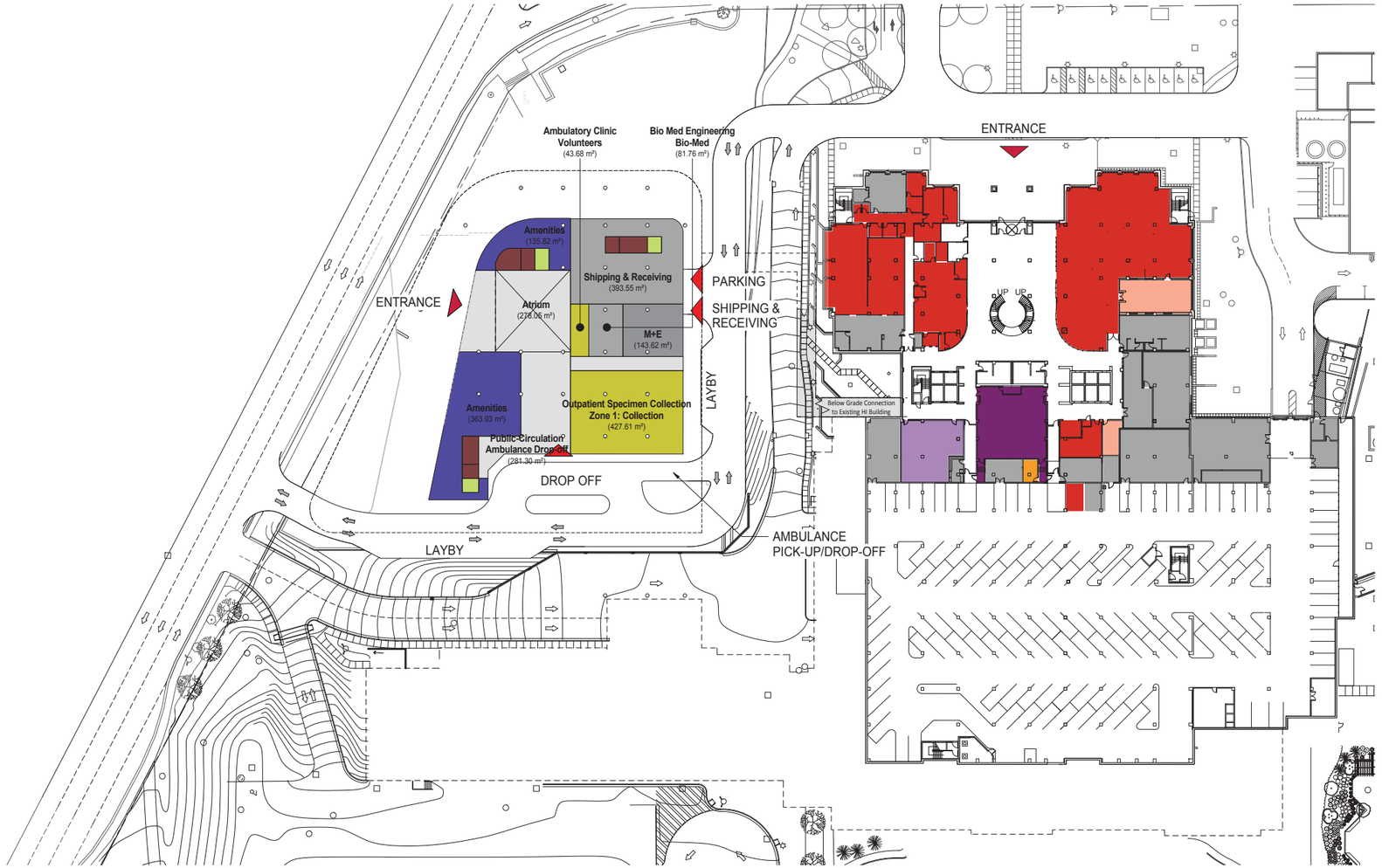
Ambulatory Building: Level 01

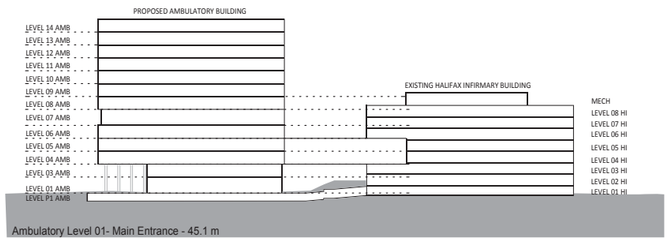
00-Department Gross Area - AMBULATORY BUILDING - Level 01		
	Department Name	Area
	Ambulatory Clinic	470 SF
	Outpatient Specimen Collection	4,603 SF
	Amenities	5,379 SF
	M+E	1,810 SF
	Atrium	2,993 SF
	Public-Circulation	4,930 SF
	Bio Med Engineering	880 SF
	Shipping & Receiving	4,236 SF
	Vertical Circulation	1,072 SF
Grand total		26,373 SF



3D New AMB1 LEVEL 1

SCALE:





AMB-LEVEL 01

SCALE: 1 : 500

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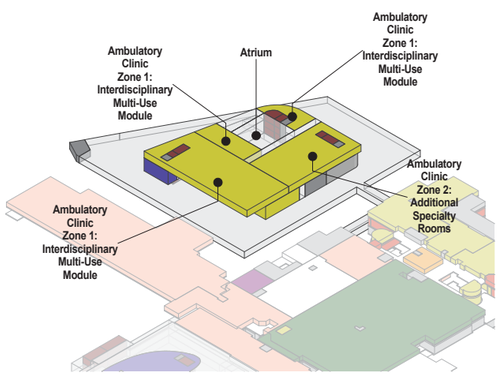
9.1 Willow Tree Concept
Ambulatory Building: Level 03

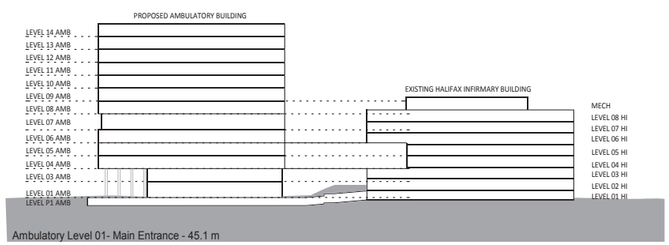
00-Department Gross Area - AMBULATORY BUILDING - Level 03		
	Department Name	Area
	Ambulatory Clinic	24,040 SF
		24,040 SF
	M+E	113 SF
		113 SF
	Public-Circulation	2,356 SF
		2,356 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		**27,582 SF**



3D New AMB1 LEVEL 03
SCALE:

NOTE: For Ambulatory Building on CBC Site, level 1 is double height followed directly by level 3 to match the global HI Site levels.

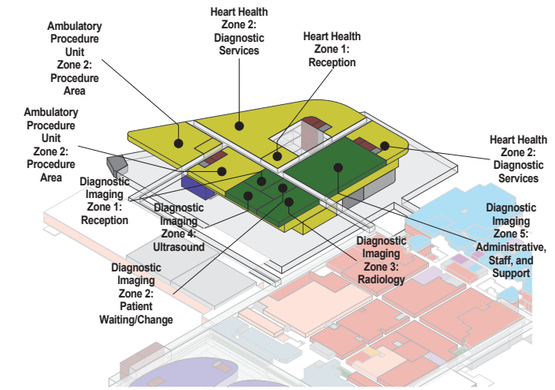
AMB-LEVEL 03
SCALE: 1 : 500



9.1 Willow Tree Concept

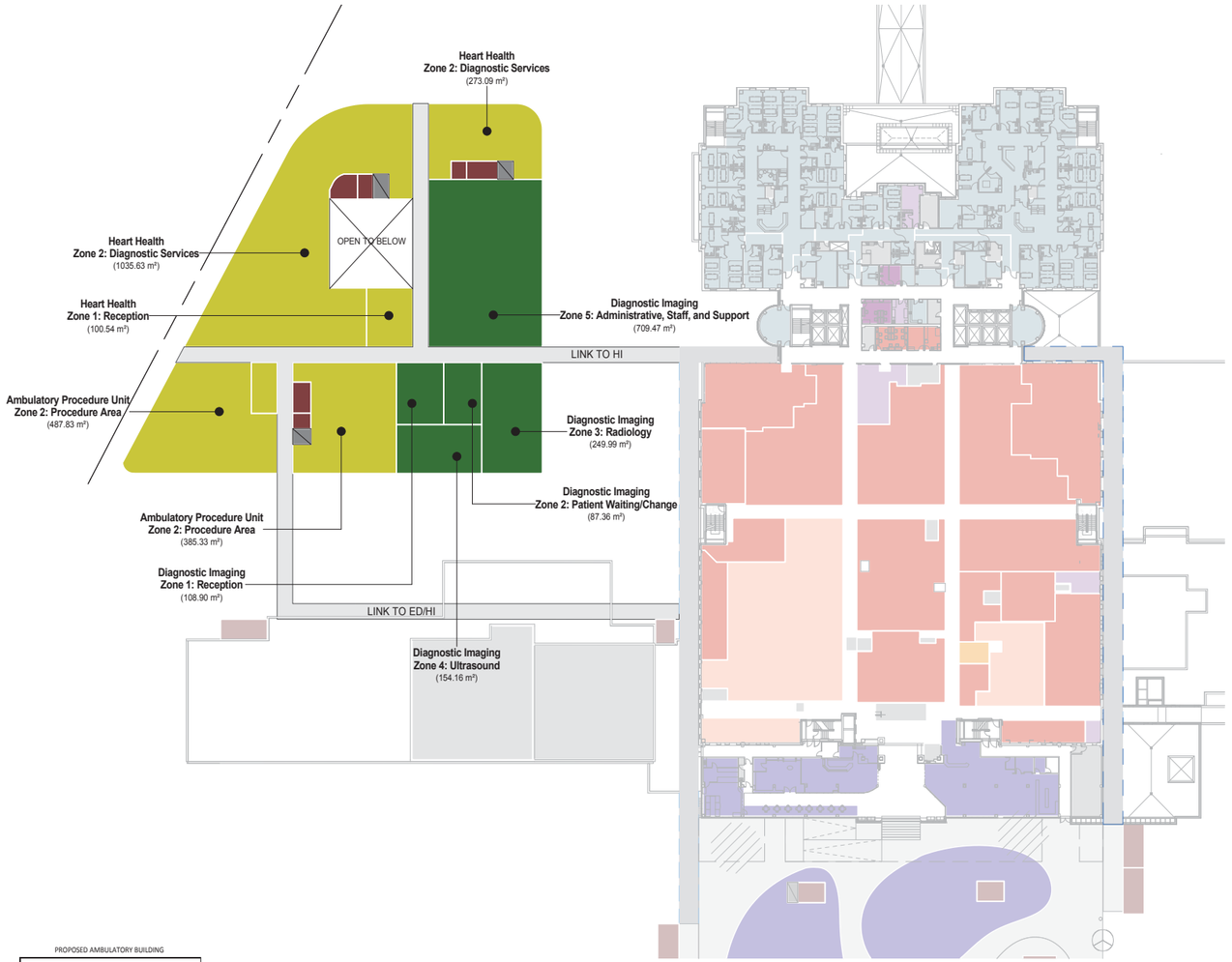
Ambulatory Building: Level 04

00-Department Gross Area - AMBULATORY BUILDING - Level 04		
	Department Name	Area
	Ambulatory Clinic	10,437 SF
	Ambulatory Procedure Unit	9,926 SF
	Heart Health	15,169 SF
		35,532 SF
	Diagnostic Imaging	14,099 SF
		14,099 SF
	Public	489 SF
	Public-Circulation	8,627 SF
		9,117 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		**59,820 SF**



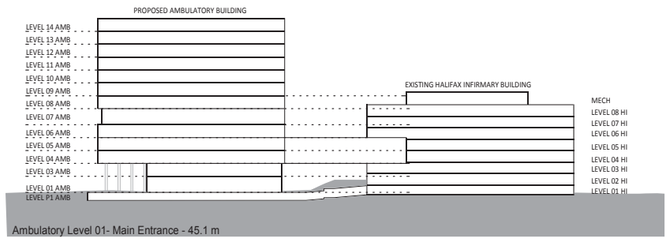
3D New AMB1 LEVEL 04

SCALE:



AMB-LEVEL 04

SCALE: 1 : 500

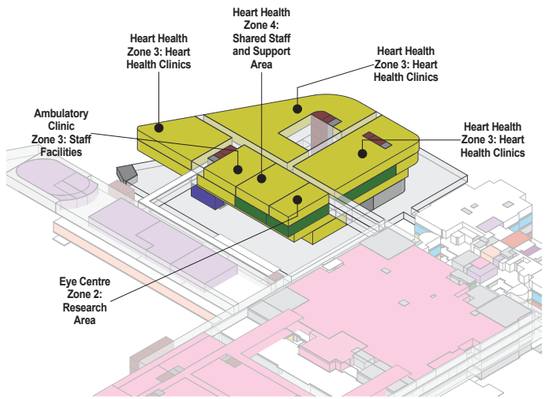


Building Levels Legend AMB to HI

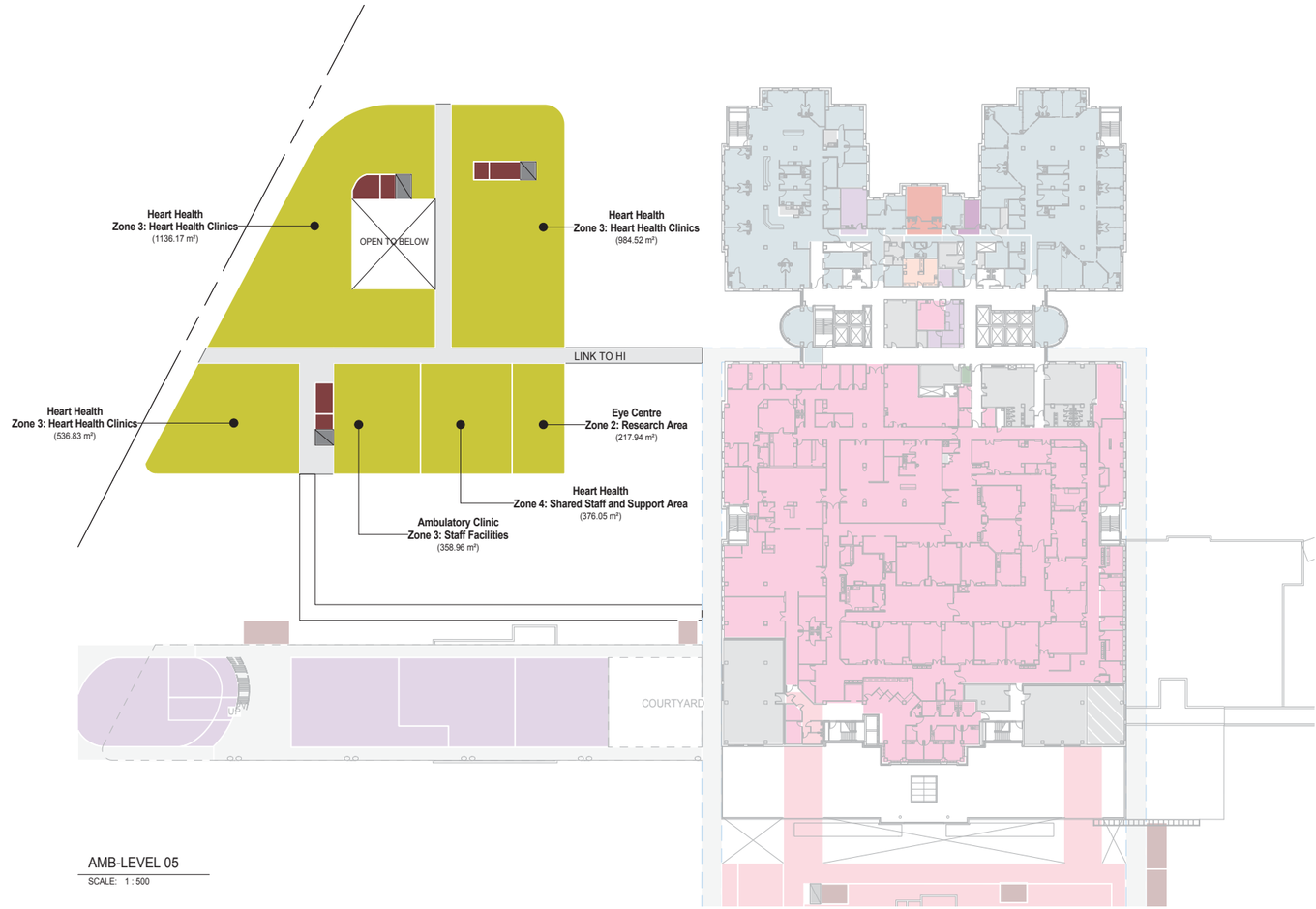
N

9.1 Willow Tree Concept
Ambulatory Building: Level 05

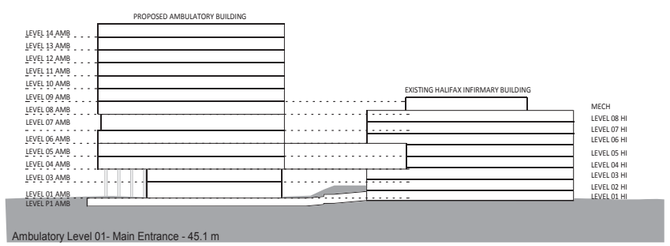
00-Department Gross Area - AMBULATORY BUILDING - Level 05		
	Department Name	Area
	Ambulatory Clinic	3,864 SF
	Eye Centre	2,346 SF
	Heart Health	32,653 SF
		38,863 SF
	Public-Circulation	5,668 SF
		5,668 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		**45,603 SF**



3D New AMB1 LEVEL 05
SCALE:



AMB-LEVEL 05
SCALE: 1 : 500

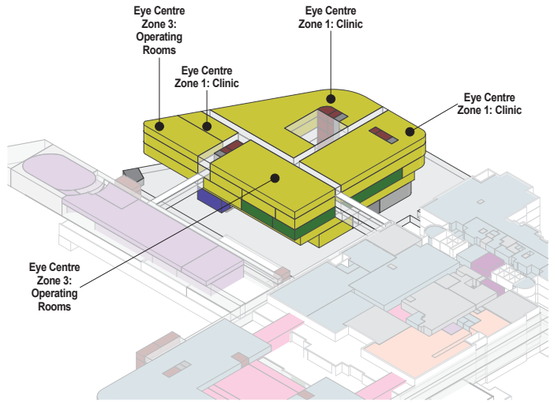


Ambulatory Level 01- Main Entrance - 45.1 m

9.1 Willow Tree Concept

Ambulatory Building: Level 06

00-Department Gross Area - AMBULATORY BUILDING - Level 06		
	Department Name	Area
	Eye Centre	38863 SF
		38863 SF
	Public-Circulation	4814 SF
		4814 SF
	Vertical Circulation	1072 SF
		1072 SF
Grand total		**44749 SF**

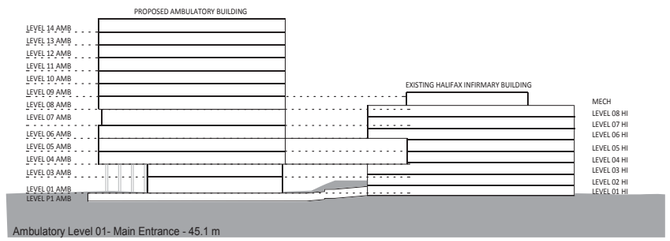


3D New AMB1 LEVEL 5

SCALE:

AMB-LEVEL 06

SCALE: 1 : 500



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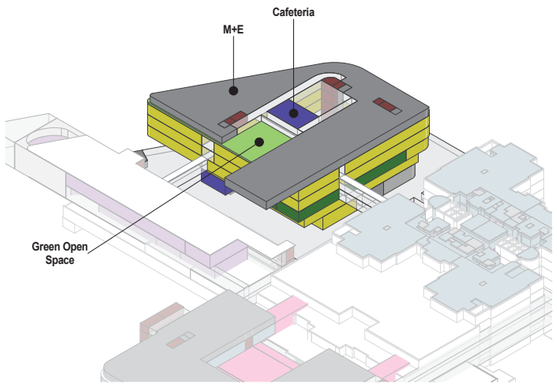
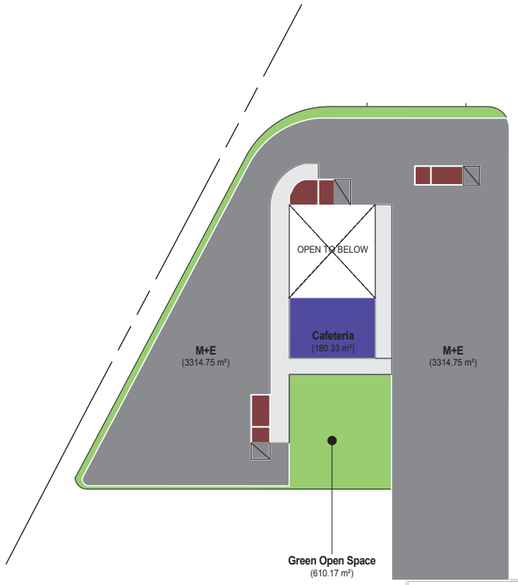
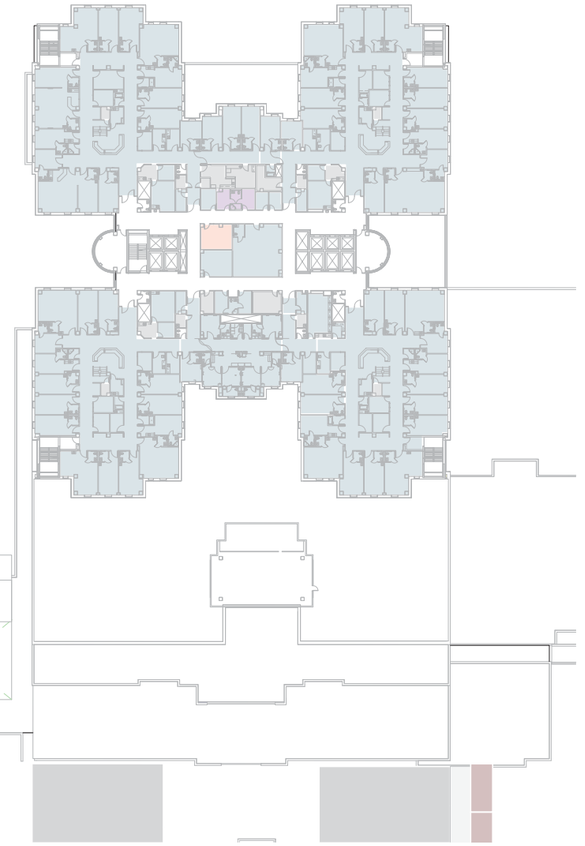
9.1 Willow Tree Concept
Ambulatory Building: Level 07

00-Department Gross Area - AMBULATORY BUILDING - Level 07		
	Department Name	Area
	Cafeteria	1,941 SF
		1,941 SF
	M+E	35,680 SF
		35,680 SF
	Public-Circulation	3,618 SF
		3,618 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		**42,311 SF**

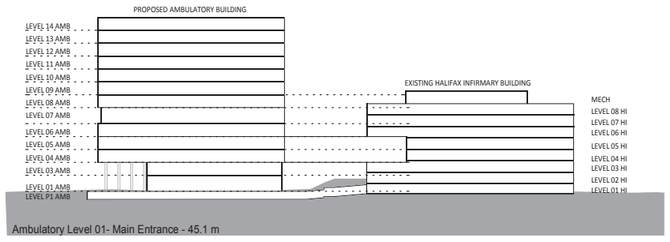


3D New AMB1 LEVEL 6
SCALE:





AMB-LEVEL 07
SCALE: 1 : 500

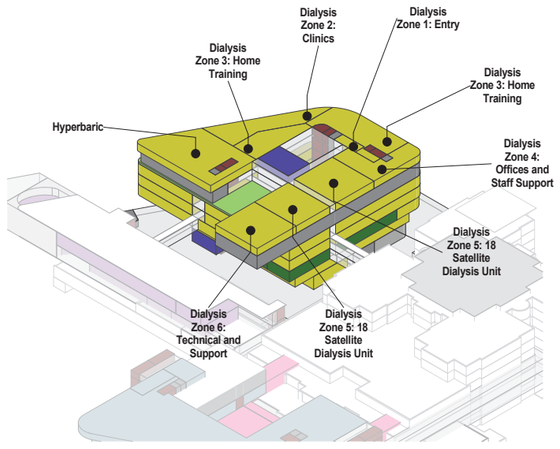


Building Levels Legend AMB to HI

9.1 Willow Tree Concept

Ambulatory Building: Level 08

00-Department Gross Area - AMBULATORY BUILDING - Level 08		
	Department Name	Area
	Dialysis	30,815 SF
	Hyperbaric	8,521 SF
		39,336 SF
	Public	2,249 SF
		2,249 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		**42,657 SF**

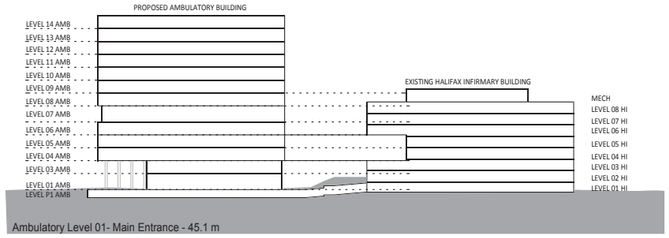


3D New AMB1 LEVEL 7

SCALE:

AMB-LEVEL 08

SCALE: 1 : 500



Building Levels Legend AMB to HI

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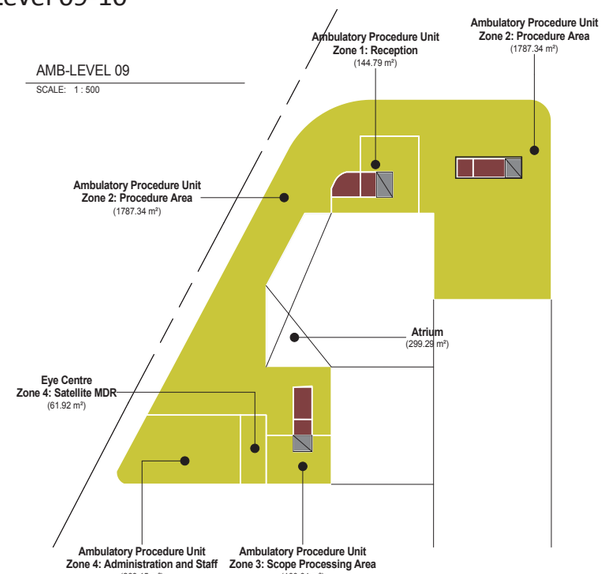
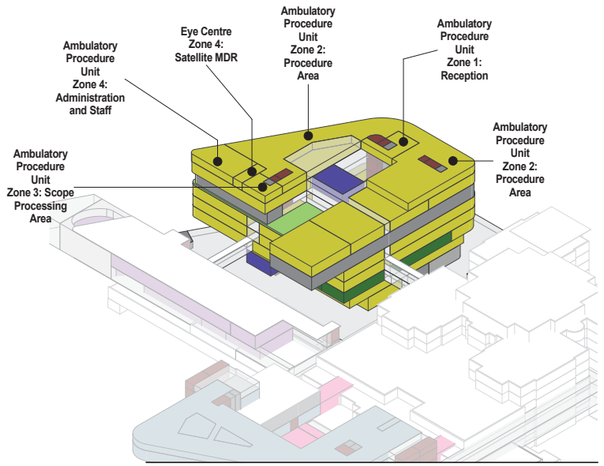
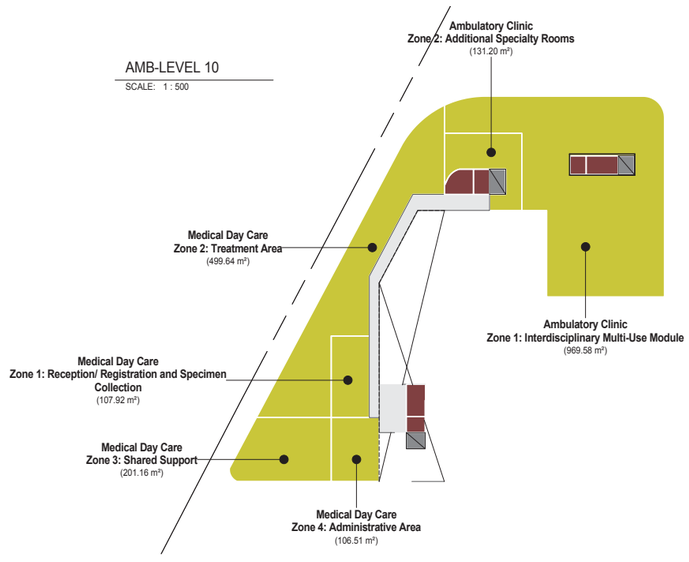
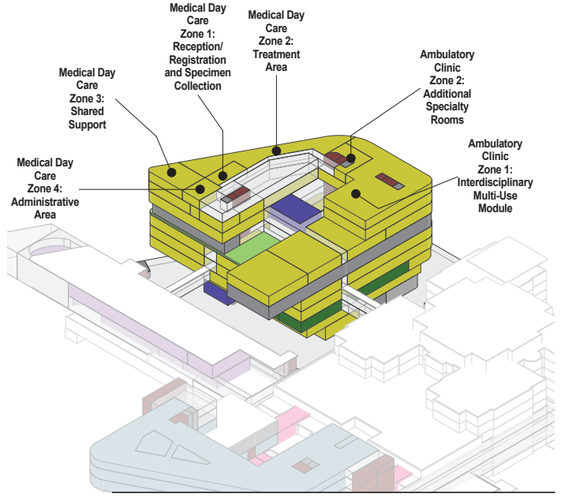
9.1 Willow Tree Concept
Ambulatory Building: Level 09-10





00-Department Gross Area - AMBULATORY BUILDING - Level 09		
	Department Name	Area
	Ambulatory Procedure Unit	24,760 SF
	Eye Centre	667 SF
		25,427 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		26,499 SF

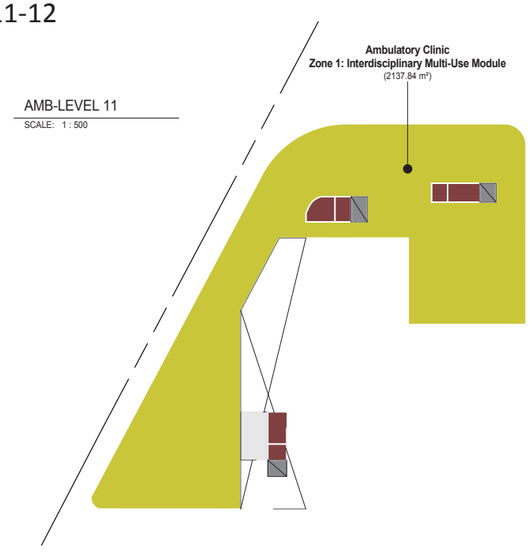


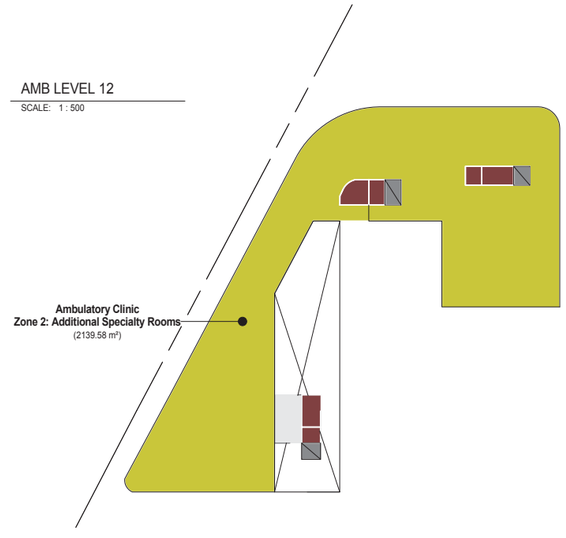


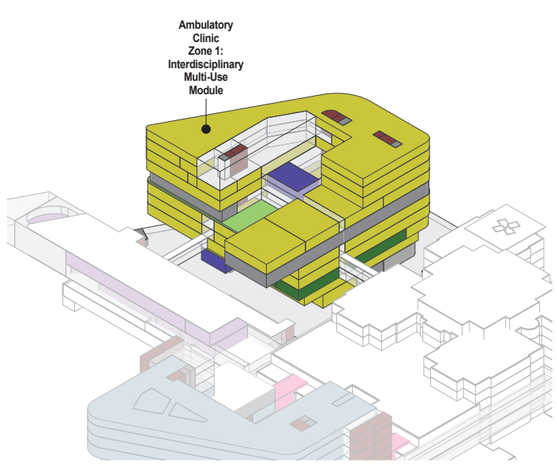
00-Department Gross Area - AMBULATORY BUILDING - Level 10		
	Department Name	Area
	Ambulatory Clinic	1,412 SF
	Medical Day Care	9,851 SF
		11,264 SF
	Public	1,837 SF
		1,837 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		14,173 SF

9.1 Willow Tree Concept

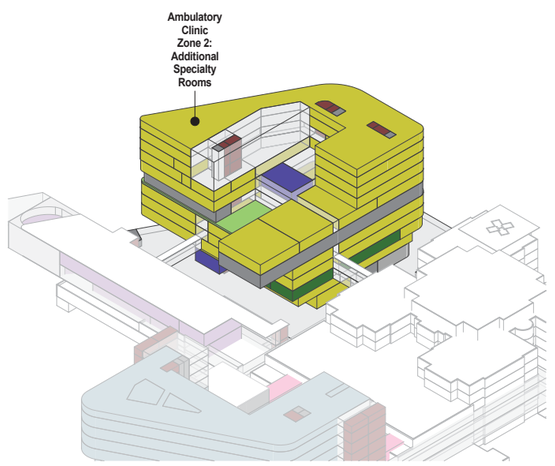
Ambulatory Building: Level 11-12







00-Department Gross Area - AMBULATORY BUILDING - Level 11		
	Department Name	Area
	Ambulatory Clinic	23,011 SF
		23,011 SF
	Vertical Circulation	1,072 SF
		1,072 SF
Grand total		**24,084 SF**



00-Department Gross Area - AMBULATORY BUILDING - Level 12		
	Department Name	Area
	Ambulatory Clinic	23,030 SF
	Public	489 SF
	Vertical Circulation	1,072 SF
Grand total		**24,592 SF**

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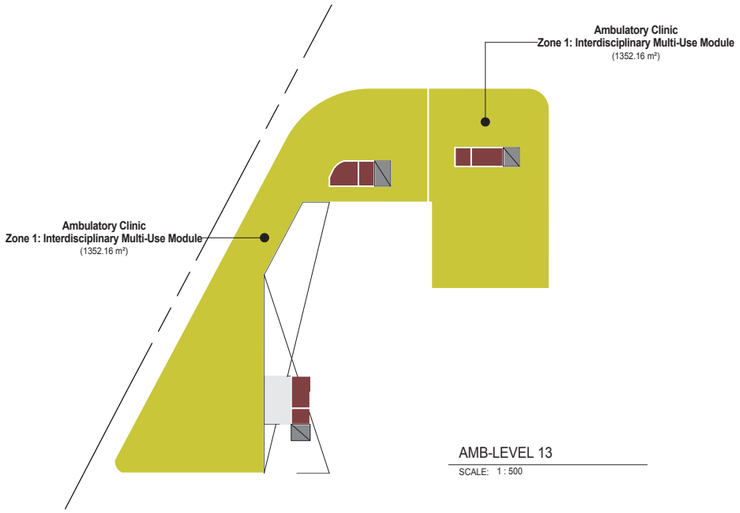
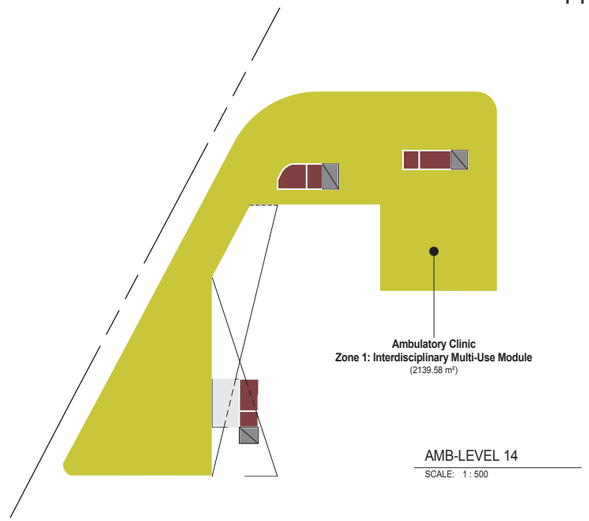
9.1 Willow Tree Concept
Ambulatory Building: Level 13-14



00-Department Gross Area - AMBULATORY BUILDING - Level 13

Department Name	Area
Ambulatory Clinic	23,057 SF
Public	489 SF
Vertical Circulation	1,072 SF
Grand total	**24,618 SF**

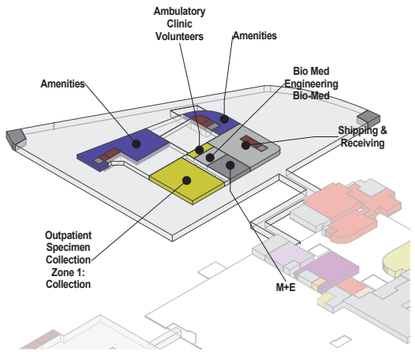


00-Department Gross Area - AMBULATORY BUILDING - Level 14

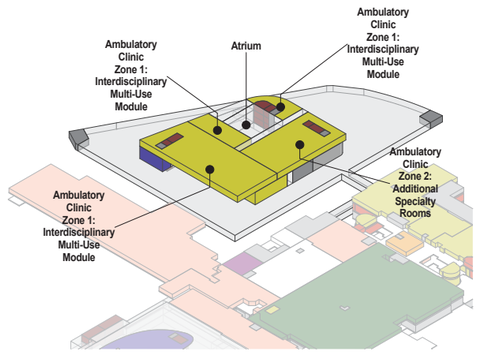
Department Name	Area
Ambulatory Clinic	23,030 SF
Public	489 SF
Vertical Circulation	1,072 SF
Grand total	**24,592 SF**

9.1 Willow Tree Concept

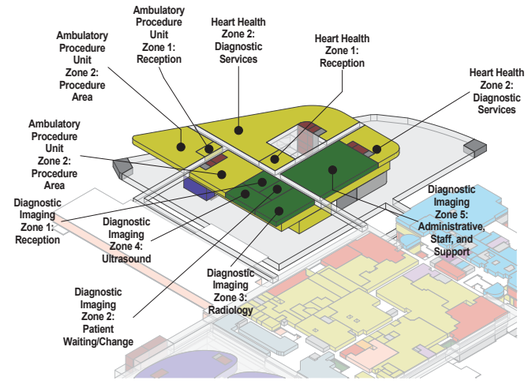
Ambulatory Building: 3D Diagrams



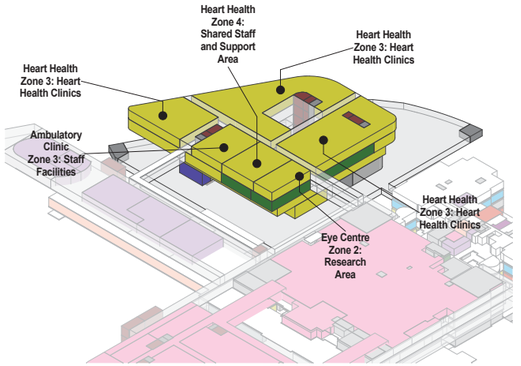
LEVEL 01



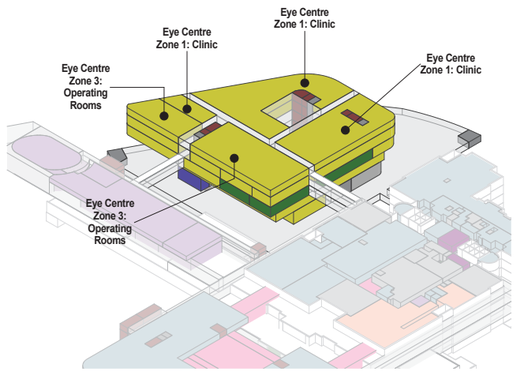
LEVEL 03



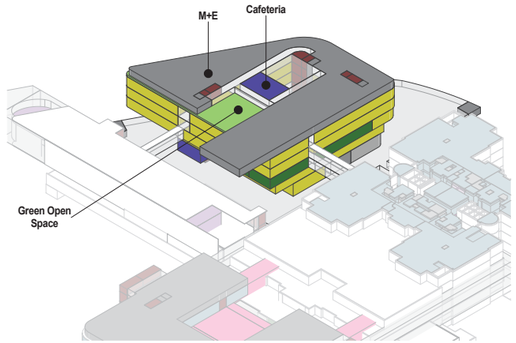
LEVEL 04



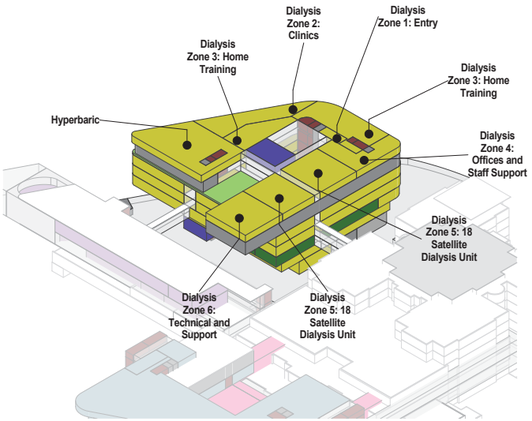
LEVEL 05



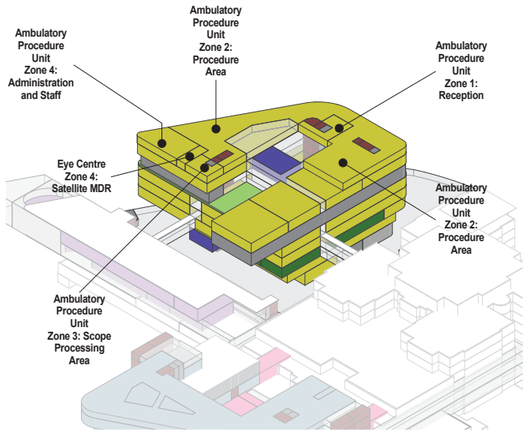
LEVEL 06



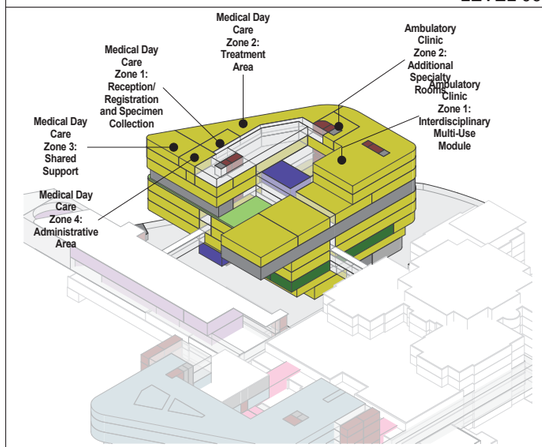
LEVEL 07



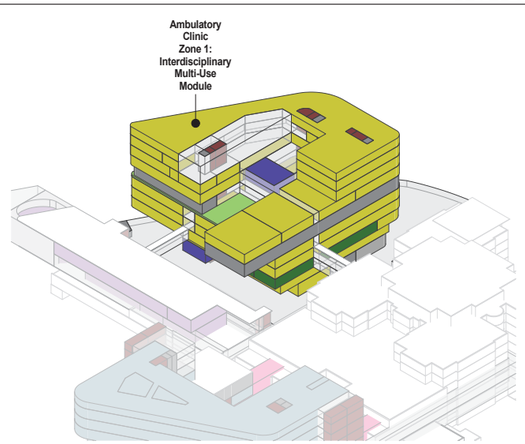
LEVEL 08



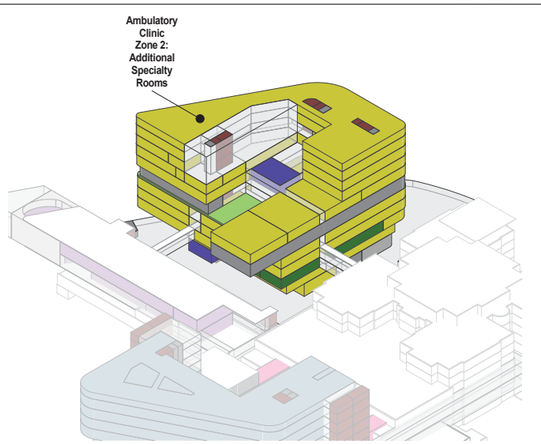
LEVEL 09



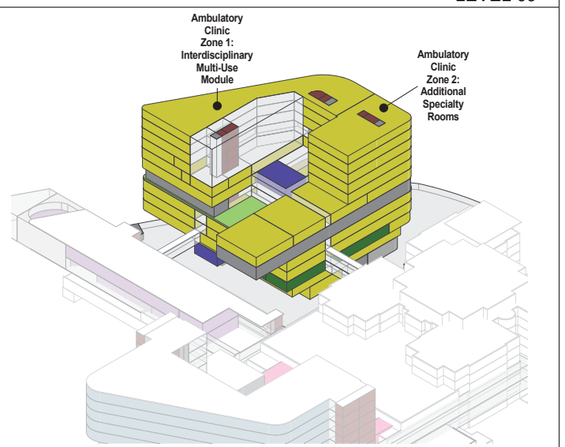
LEVEL 10



LEVEL 11

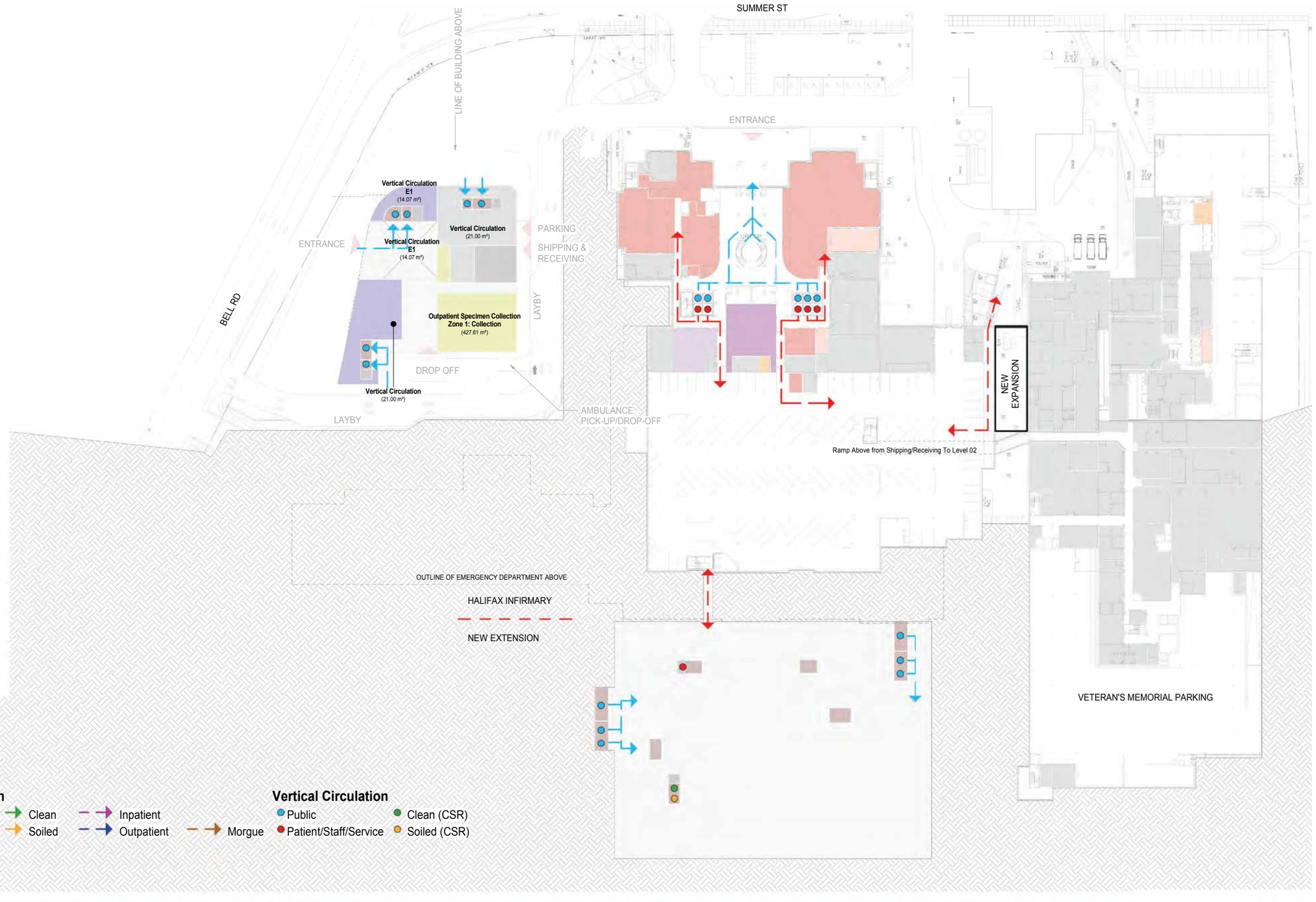


LEVEL 12



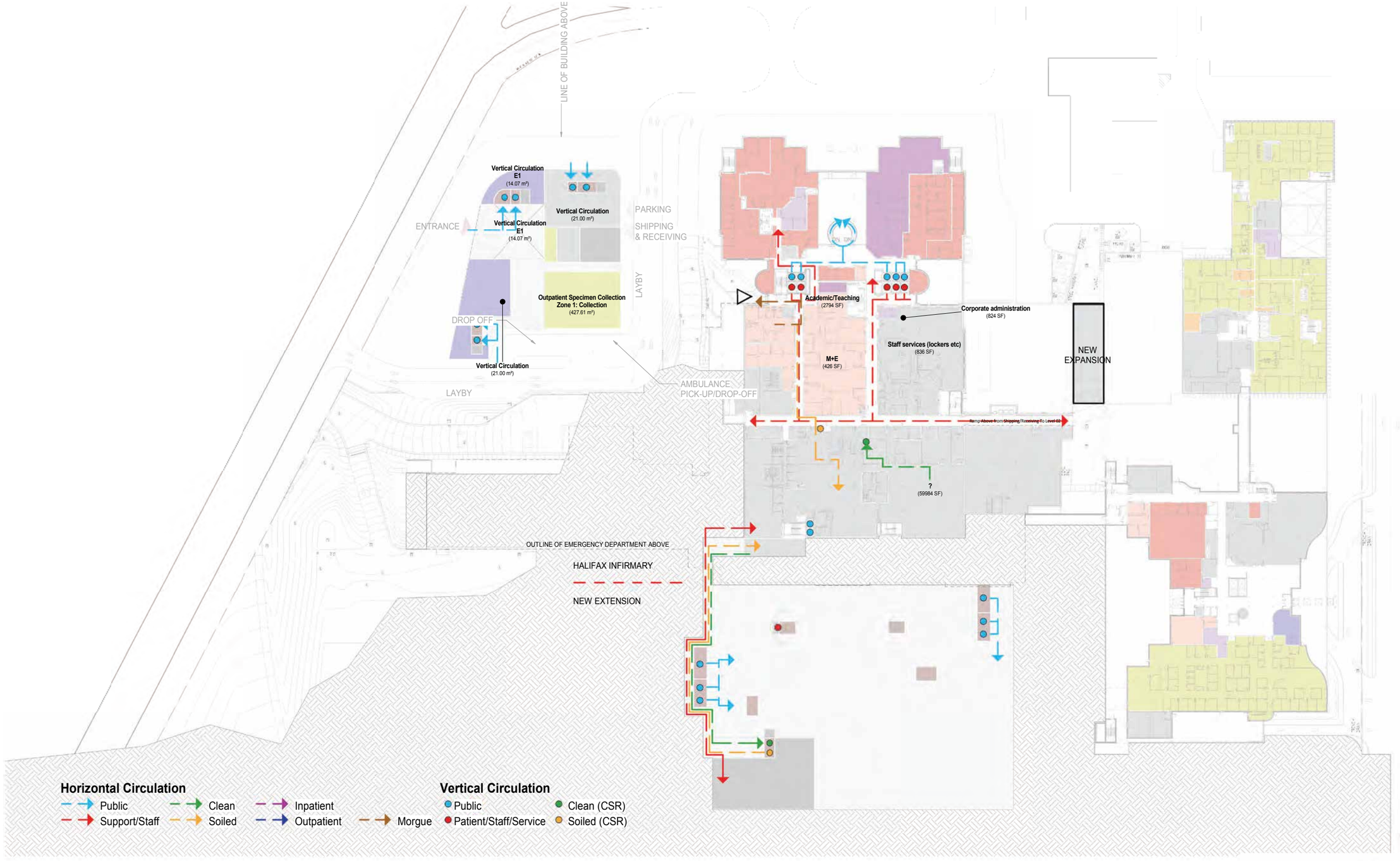
LEVEL 13

9.1 Willow Tree Concept
Circulation Level 01

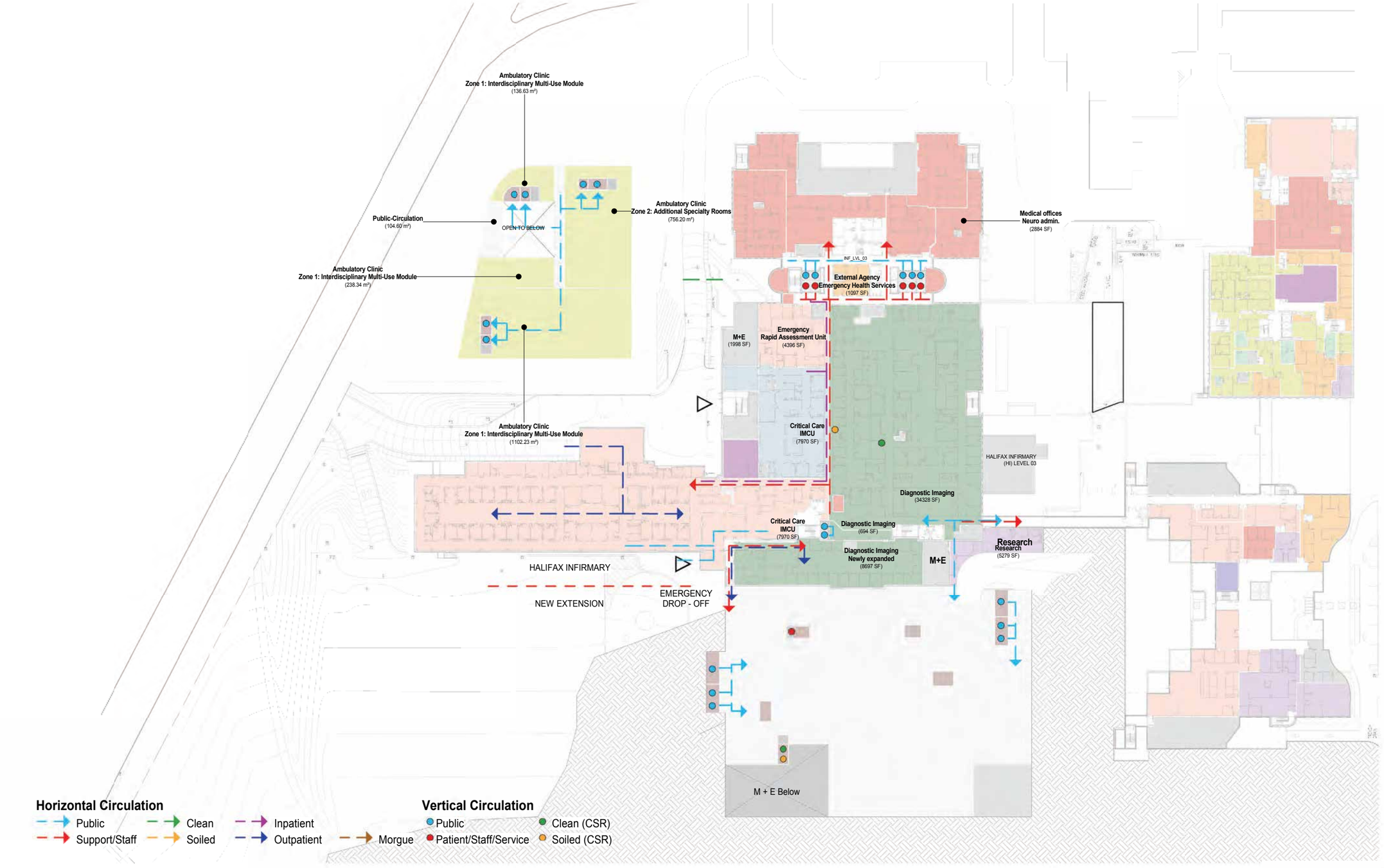


9.1 Willow Tree Concept

Circulation Level 02

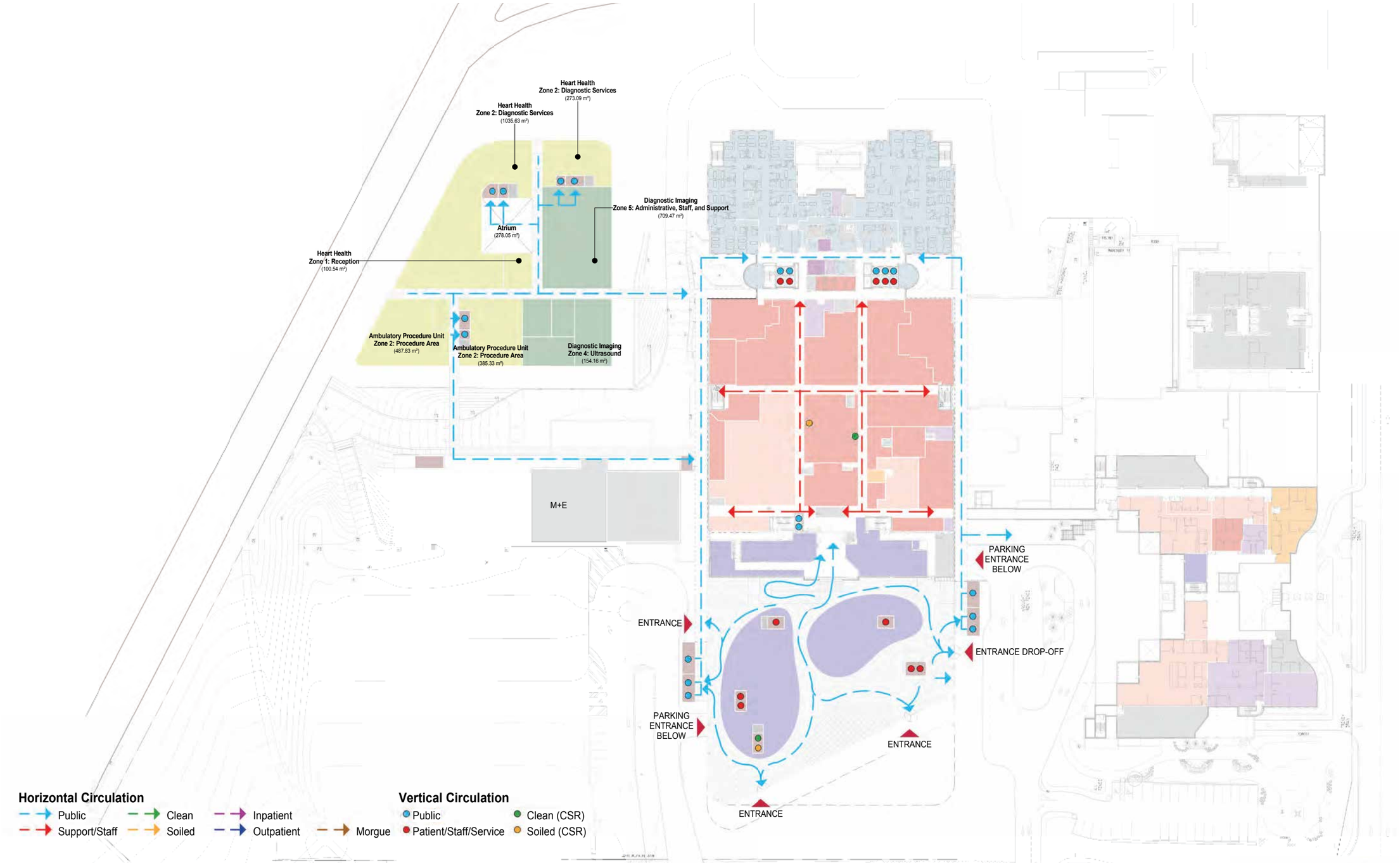


9.1 Willow Tree Concept
Circulation Level 03



9.1 Willow Tree Concept

Circulation Level 04



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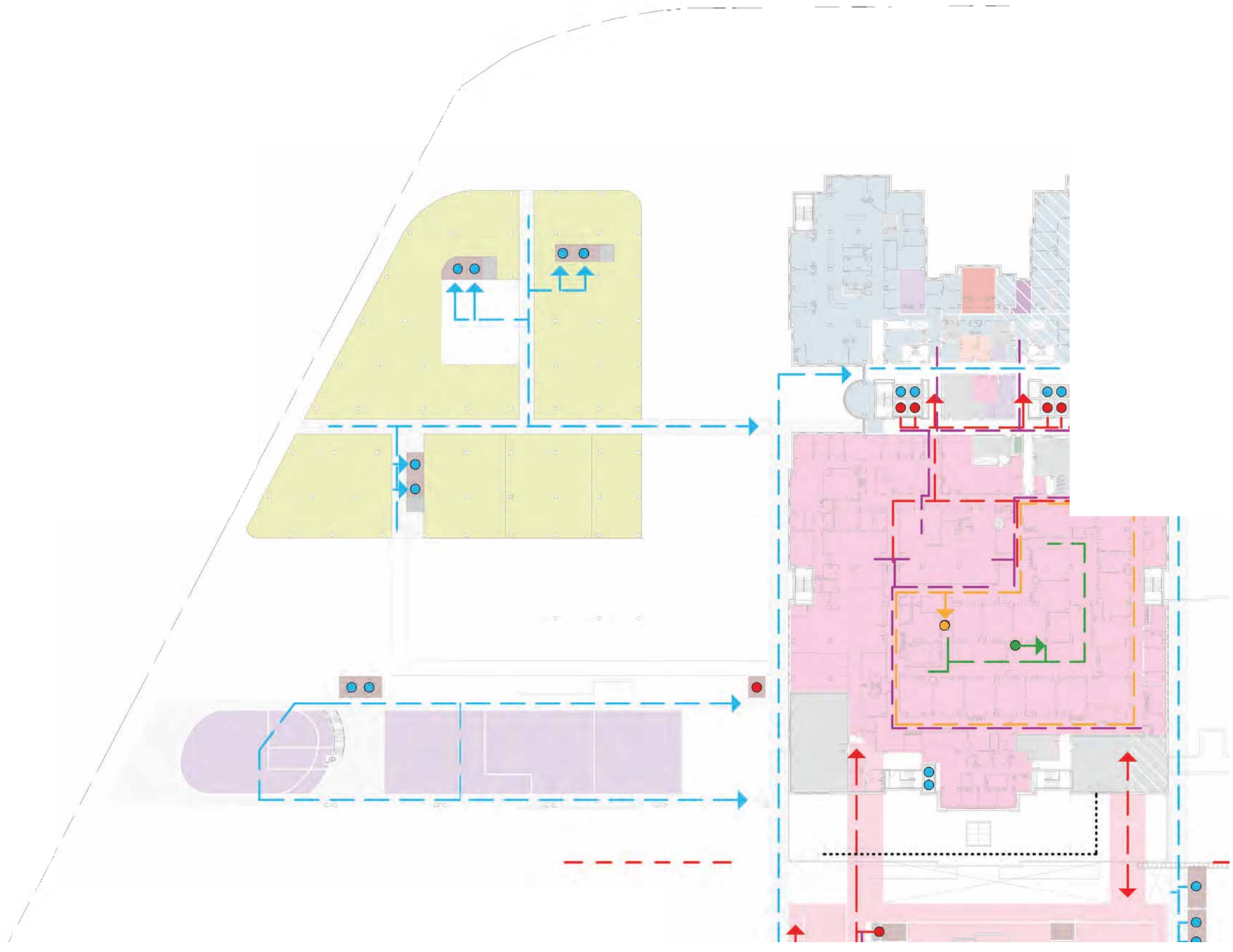
9.1 Willow Tree Concept
Circulation Level 05



9.1 Willow Tree Concept
Circulation Level 06

N

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9.1 Willow Tree Concept
Circulation Level 07

N

9.1 Willow Tree Concept
Circulation Level 08

N

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LEVEL 10-13
SCALE: 1 : 500

Ambulatory Procedure Unit
Zone 2: Procedure Area
(1787.34 m²)

EXISTING
NEW EXTENSION

EXISTING
NEW EXTENSION

PATIENT LOUNGE

PATIENT LOUNGE

Horizontal Circulation
- Public
- Support/Staff
- Clean
- Soiled
- Inpatient
- Outpatient
- Morgue

Vertical Circulation
- Public
- Patient/Staff/Service
- Clean (CSR)
- Soiled (CSR)

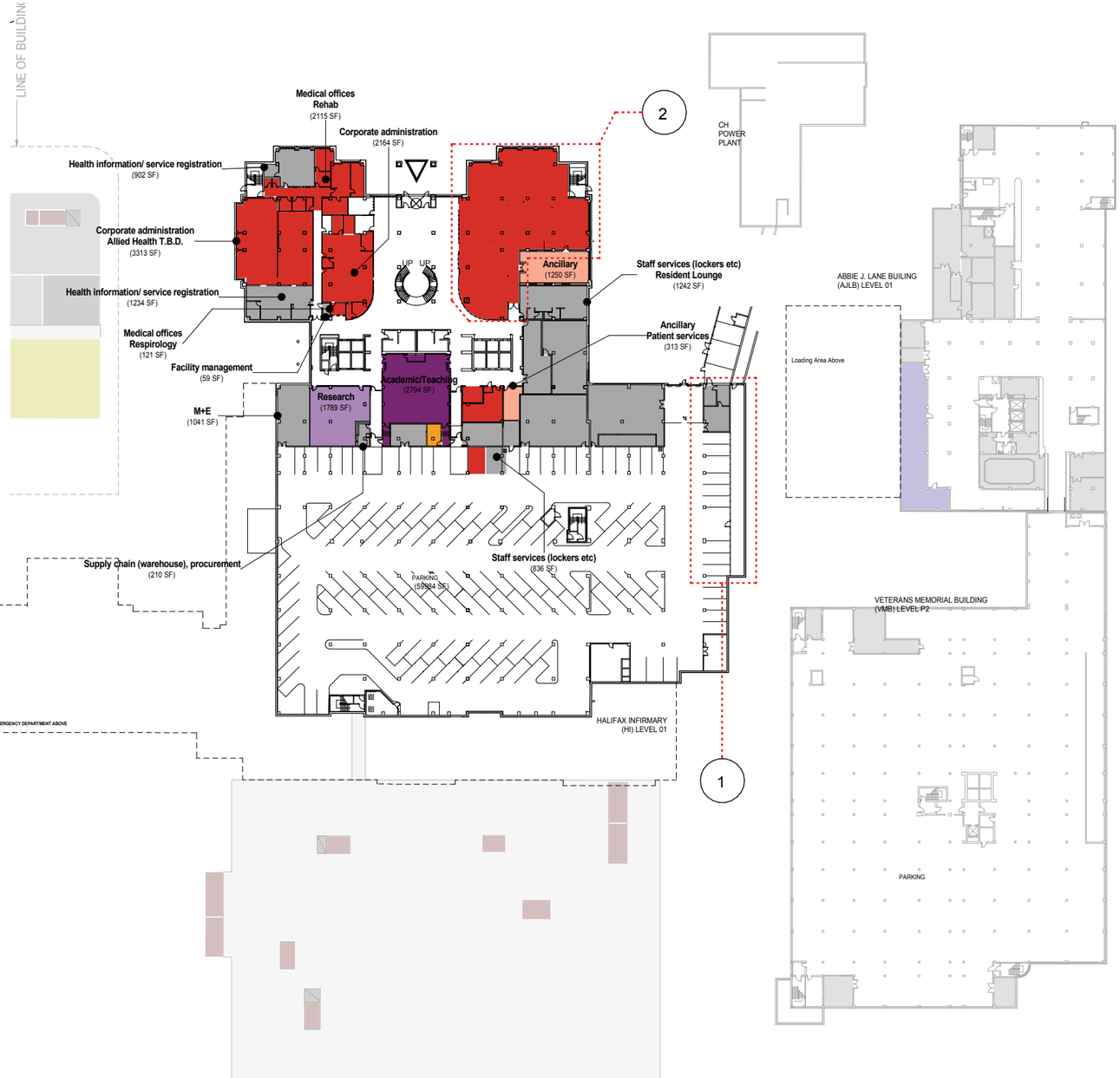
N

9.1 Willow Tree Concept

9.1.5 Halifax Infirmary Renovations & Decanting Level 01

INFIRMARY BUILDING - WILLOW TREE

	Existing	Renovated Space
- Level 1	37,000 DGSF	
- Level 2	79,800 DGSF	5,400 DGSF
- Level 3	133,400 DGSF	25,000 DGSF
- Level 4	85,700 DGSF	37,300 DGSF
- Level 5	83,700 DGSF	5,300 DGSF
Grand Total	**419,600 DGSF**	**73,600 DGSF**



PROGRAMS FOR DECANTING RENOVATION

(1) FACILITY MANAGEMENT EXPANSION (T.B.D. SF)

(2) OUT: DIALYSIS TO AMBULATORY CARE BUILDING UNDER A SEPARATE RENO PROJECT (8,000 SF)

IN: ADMINISTRATION SERVICES

N

SCALE: 1 : 500

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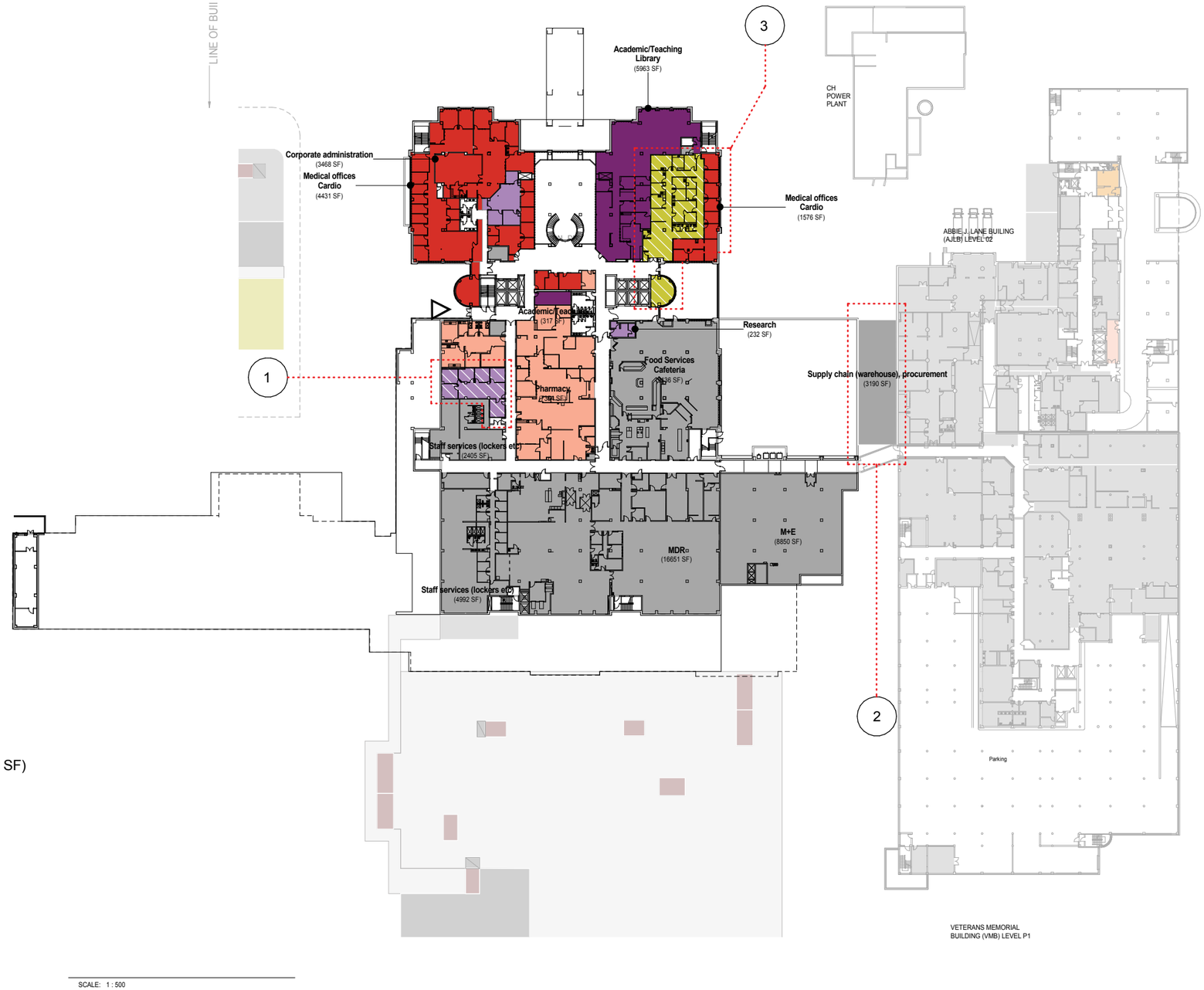
9.1 Willow Tree Concept

Halifax Infirmary Renovations & Decanting: Level 02

Department Gross Area - Removed Only - Infirmary - Level 02	
Department	Area
Ambulatory Care	3,861 SF
Research	1,542 SF
Grand total	**5,403 SF**



SCALE: 1 : 500

PROGRAMS FOR DECANTING RENOVATION

1. OUT: RESEARCH
   NEW IN: PHARMACY EXPANSION (1,540 SF)
2. EXPAND SHIPPING / RECEIVING AND FACILITY MANAGEMENT
3. OUT: AMBULATORY CARE
   IN: EXPANSION OF ADMINISTRATION (3,860 SF)

N

9.1 Willow Tree Concept

Halifax Infirmary Renovations & Decanting: Level 03

Department Gross Area - Removed Only - Infirmary - Level 03	
Department	Area
Ambulatory Care	16,306 SF
Clinical Support	8,697 SF
Grand total	**25,003 SF**

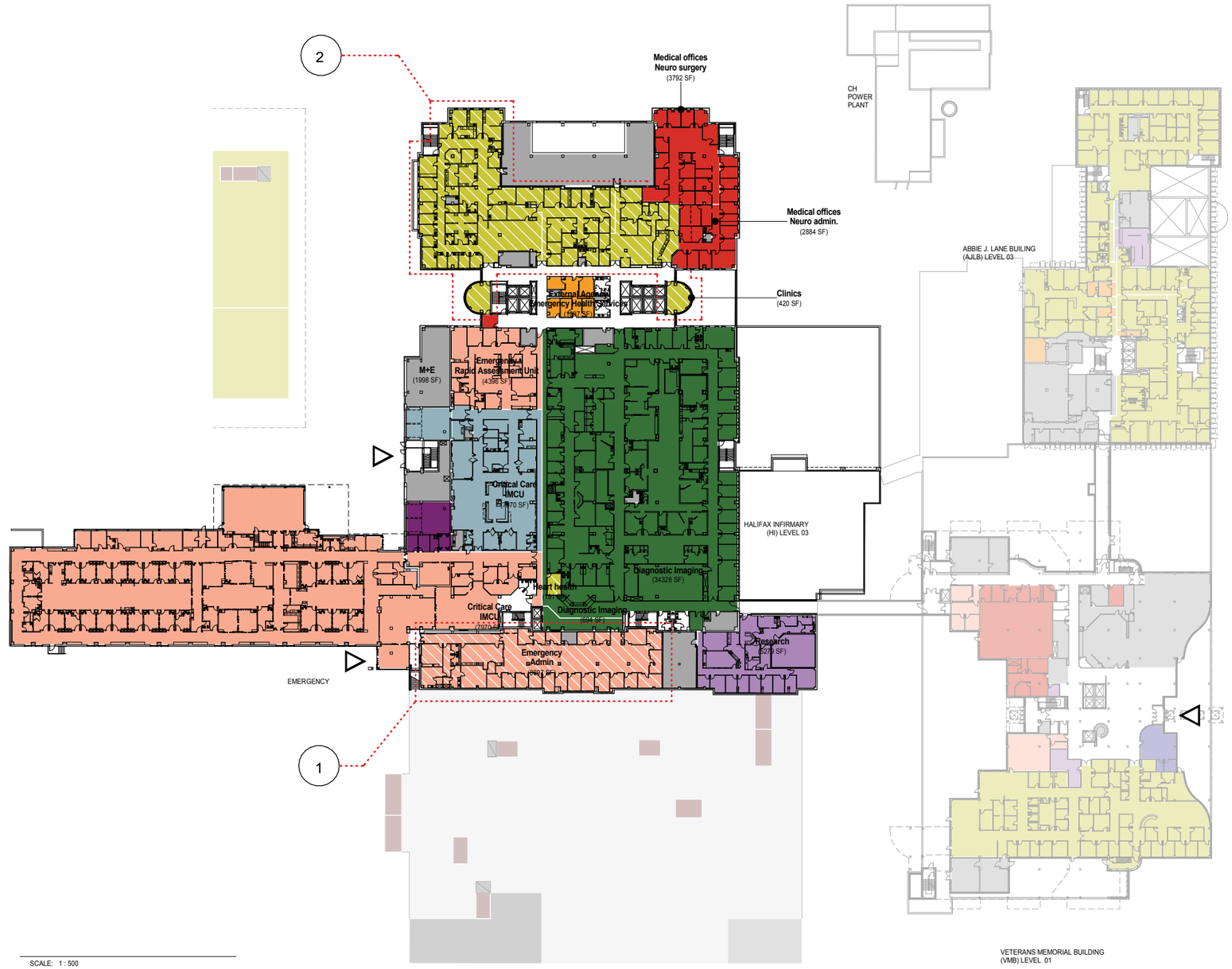
PROGRAMS FOR DECANTING RENOVATION

① OUT: EMERGENCY ADMIN (8,700 SF)
- RELOCATED TO 4TH FLOOR

IN: DIAGNOSTIC EXPANSION

② OUT: HEART HEALTH (16,300 SF)
- RELOCATED TO AMBULATORY CARE BUILDING

IN: ACADEMIC MEDICAL STAFF/ ADMINISTRATION SERVICES



9.1 Willow Tree Concept

Halifax Infirmary Renovations & Decanting: Level 04

Department Gross Area - Removed Only - Infirmary - Level 04	
Department	Area
Ambulatory Care	37,358 SF
Grand total	**37,358 SF**

PROGRAMS FOR DECANTING RENOVATION

① OUT: ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING (28,300 SF)

IN: ADMIN, EDUCATION AND RESEARCH RELOCATION

② OUT: ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING (8,700 SF)

NEW IN: RELOCATE ADMIN FOR EMERGENCY DEPARTMENT

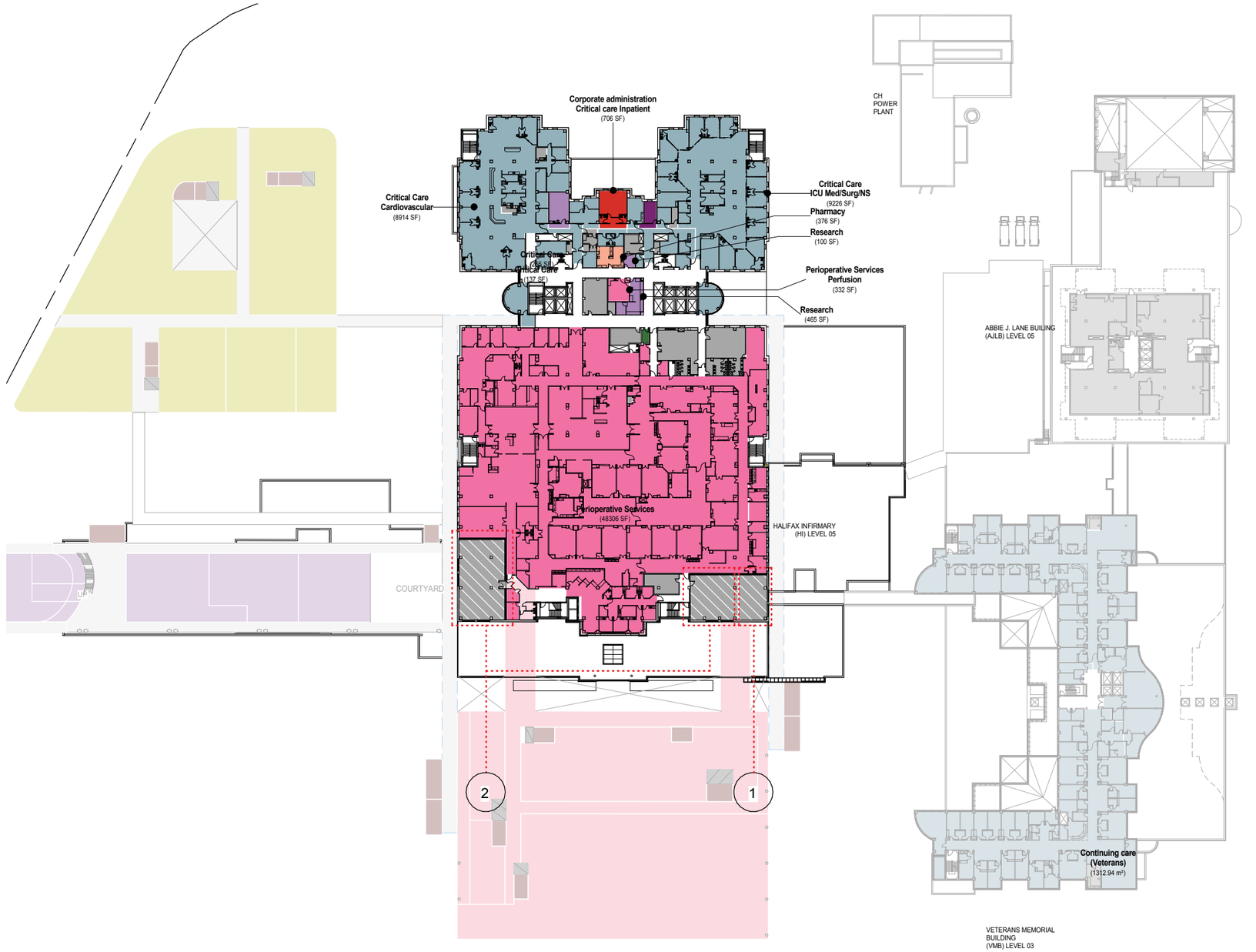
N

SCALE: 1 : 500

9.1 Willow Tree Concept

Halifax Infirmary Renovations & Decanting: Level 05

Department Gross Area - Removed Only - Infirmary - Level 05	
Department	Area
Academic/Teaching	**261 SF**
Inpatient Unit	0 SF
Support Services	5,040 SF
Grand total	5,301 SF



PROGRAMS FOR DECANTING RENOVATION

① OUT: EXISTING M + E ROOMS TO BE RELOCATED TO ROOF OF EMERGENCY DEPARTMENT

NEW IN: SATELLITE LAB (900 SF) + CORRIDORS

② OUT: EXISTING M + E ROOMS TO BE RELOCATED (4,100 SF)

NEW IN: CIRCULATION AREAS CONNECTING TO EXPANDED PERIOPERATIVE SERVICES

N

SCALE: 1 : 500

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9.1 Willow Tree Concept

9.1.6 Transforming the Site

Site Transformations

The prime objective of the master plan is to ensure that any future development allows for a rational and unrestricted growth pattern in the next twenty to fifty years. The growth patterns proposed must be a frame work for creative opportunities while maintain the Vision of QE II.

An intensive process, as outlined in volume 1, went from a process of explorations of opportunities, taking a divergent view of the possibilities, to a convergence into options for which the Willow Tree concept and the Commons concept were derived.

The illustrations demonstrate a pattern of development in time, where aging infrastructure will force the demolition of buildings in a sequential manner thus creating new opportunities. A possible sequence of changes in time are mapped in the attached illustrations.

Through a wayfinding system of proposed connections, links and node points a coherent sense of wholeness is proposed bringing together existing and new as a single entity. The proposed growth patterns hope to avoid haphazard growth with an orderly transformation of the site.

Long term growth must reinforce and maintain contextual connections, ensure the development of creative design solutions, create a sense of place, identity and healing environments- a cohesive thematic character is essential. Phasing and flexibility are an integral part of the development.

The state of aging infrastructure, deferred maintenance and cost associated with infrastructure renewal will inform which buildings are to be demolished and generate future growth patterns.

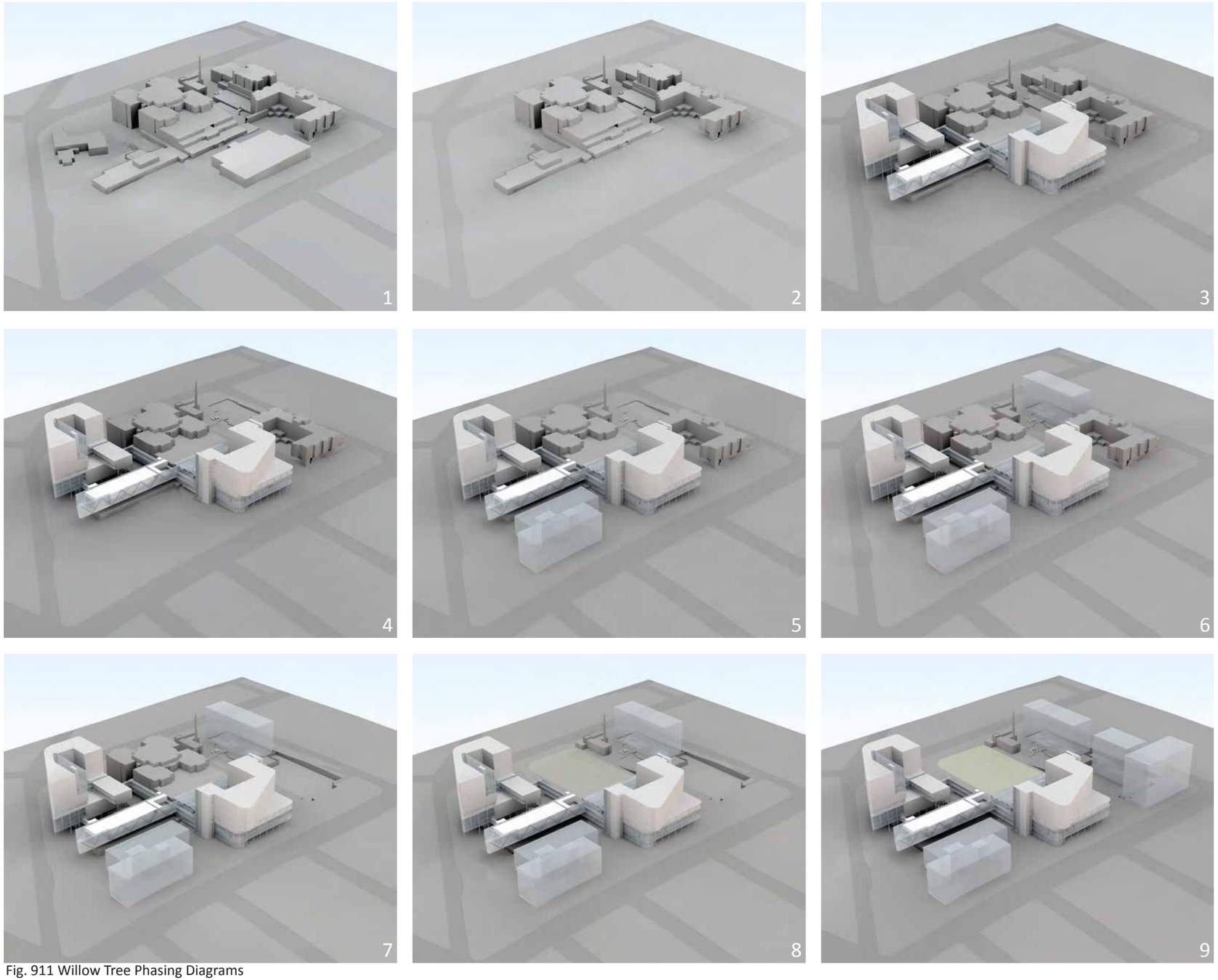


Fig. 911 Willow Tree Phasing Diagrams

9.1 Willow Tree Concept

The Willow Tree Concept

The Willow Tree Concept creates a new front entrance on Robie Street, with the relocation of the existing garage. It capitalises on the land value and location previously taken up by the existing garage and refocuses on expansion reinforcing critical hospital adjacencies. It retains the urban garden site as a future health care opportunity, used in the interim for surface parking only. In time, aging infrastructure will result the demolition of the Abbie J Lane building, follow by the Veterans Memorial and ultimately the main existing Halifax Infirmary Building; this will result in creating a hospital within a park. The site is transformed with time yet maintaining the coherent sense of wholeness outlined in this initial stage.

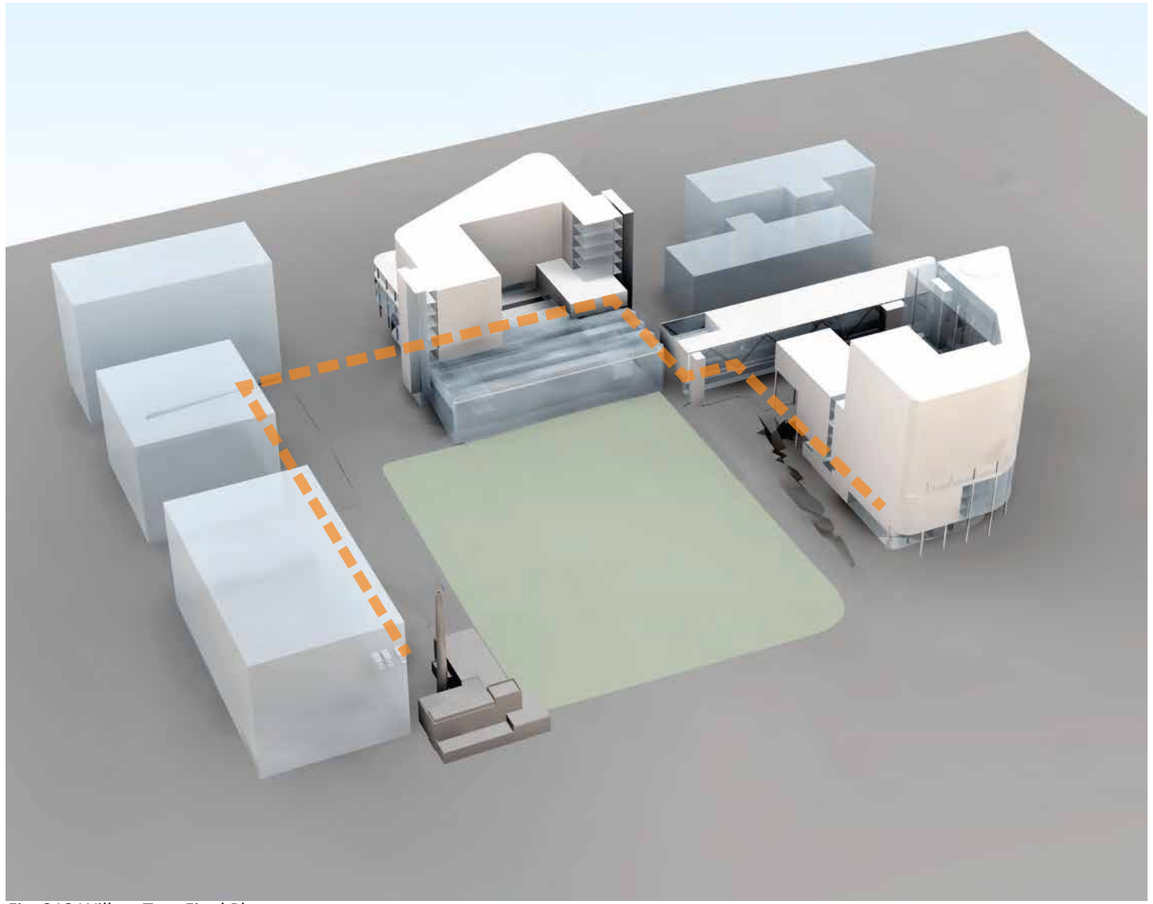


Fig. 912 Willow Tree Final Phase

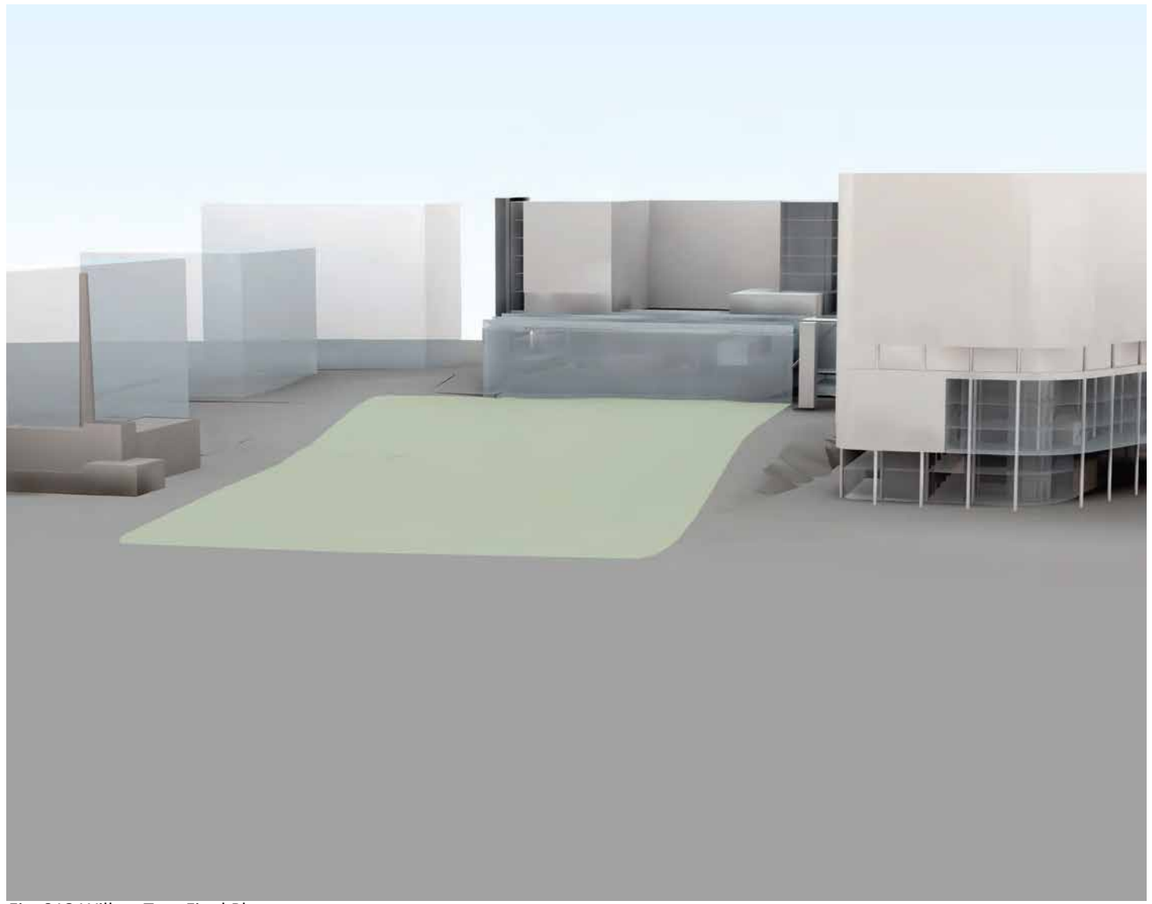


Fig. 913 Willow Tree Final Phase

9.2 Commons Concept

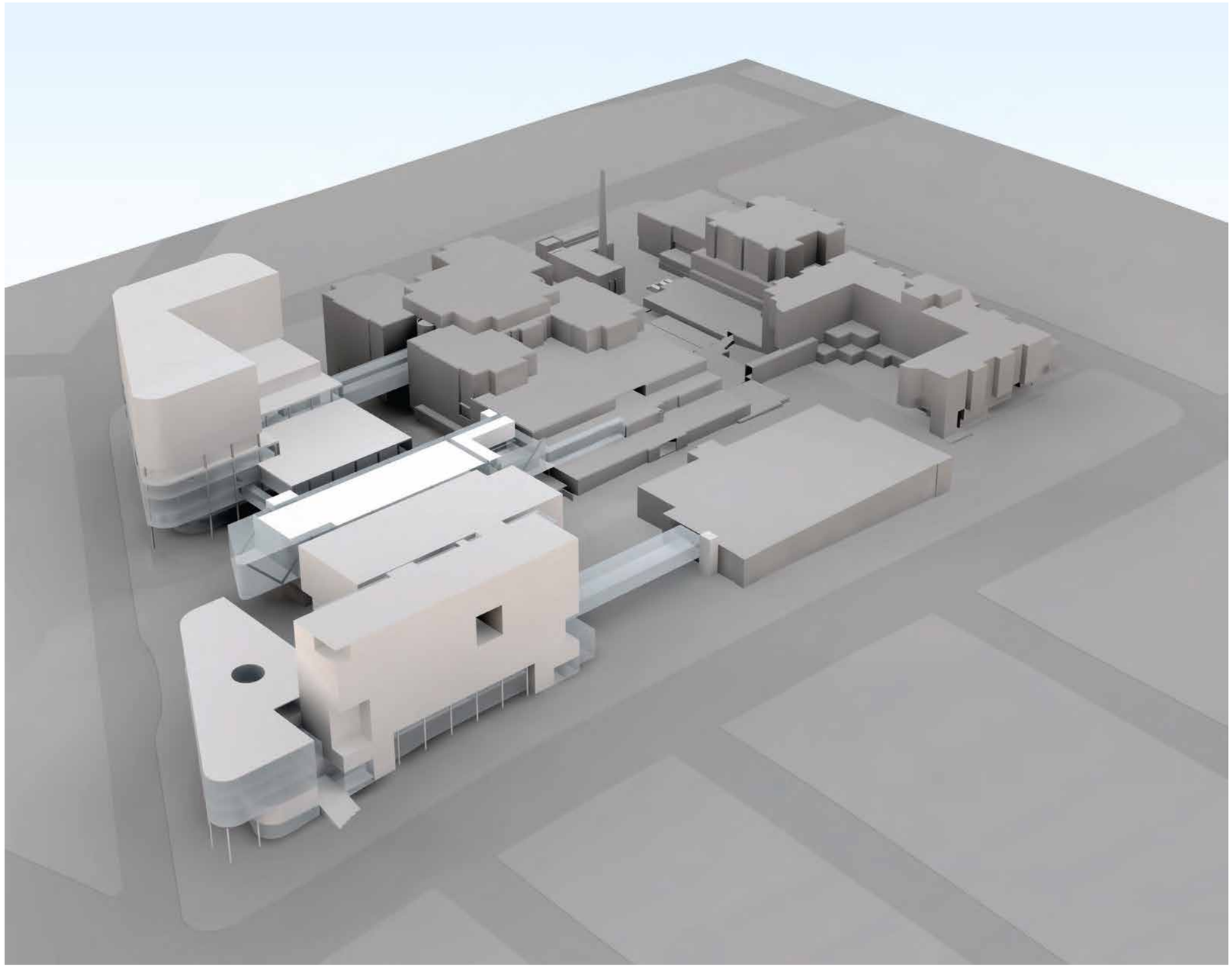


Fig. 914 Commons Concept Conceptual Render

9.2 Commons Concept
Introduction

The Commons Concept consists of a 10 storey Inpatient / OR building on the CBC site, an 10 storey Ambulatory Care building on the Urban Garden site and a two storey Centre for Research and Innovation situated above the mechanical floor of the Emergency Department. All readily available land is utilized in this concept, future expansion may continue in the future following the demolition/decommissioning of the Abbie J. Lane building or the relocation of the parking structure. This concept was developed with considerations to the following principles:

- **Site Massing**. Orientation and massing of buildings were developed to capitalize on views of the Commons and reflect the edge condition on the street. The massing contains green roof terraces and healing spaces. Orientation to southerly sun was also considered.
- Green Space. Great effort was taken to connect to the adjacent parks as well as the existing pedestrian network. Green Space within the concept is meant to extend and expand the Halifax Commons network.
- **Connectivity and Links**. New buildings within the Commons Concept connect and link to existing buildings to achieve critical adjacencies and linkages. A direct connection between the existing parking structure and the Ambulatory building will streamline visits to this building.
- **Urban Edge Conditions**. The existing streetscape along Summer Street, Bell Road and Robie Street were considered. Amenity locations will improve the pedestrian experience. Overhangs and covered entryways will protect visitors from the elements while also creating an urban design focusing on the human scale. A continuous and consistent street edge was also accomplished which will contribute to the urban design of the area.
- **Light Wells.** Both the Ambulatory Care and Inpatient/OR buildings contain a centralized light well. These will serve as a primary meeting place and a starting point for wayfinding and signage within each of these respective buildings. They will introduce natural light and create an open and welcoming space.
- **Multiple Entry Points**. Multiple entries were included as a response to the varying nature of visitors. Whether being dropped-off by vehicle, arriving via foot or transit, or parking then entering, patients and staff will be able to use an entrance that works best for them.
- **Vehicular Circulation**. A rational traffic circulation pattern was developed which responded to traffic analysis as well as the existing urban context. Visitors will be able to seamlessly drop-of / pick-up patients, find parking and circulate in and out of the campus.

The Inpatient / OR building located on the CBC site follows the form of Bell Road and contains a large, multi-level light well which serves as the primary meeting and entry space. A vehicle drop-off and entry is located on the west side of the building, while the pedestrian entry way is located off of Bell Road. Access to the below grade parking, shipping and receiving as well as an ambulance drop-off is situated along the south side of the building between the existing HI building. Amenity space is included on the ground-floor to serve the hospital as well as pedestrians along Bell Road and visitors to the Commons. Level 4 contains 48 Critical Care beds while Level 5 contains the OR with direct connection to the existing OR in the HI building via a bridge. The 6th floor contains a café as well as a bridge connection to the HI building. This level also contains access to the green roof terraces. Levels 7-11 consist of Inpatient units; each level contains 3 pods of 12 beds respectively. Northerly facing inpatient rooms will provide views to the Halifax Commons and the Citadel, while southerly facing rooms will receive ample sunlight and views to the green roof terraces.

The Ambulatory Care building consists of two slender buildings with an interconnected multi-level atrium connecting them. These slender slabs are staggered to optimize solar performance while capitalizing on views to the Commons. A lower scale component along Bell Road and Robie Street ensures the sites conditions are respected and good urban design principles are followed. This ambulatory care building has a direct connection to the existing parking structure making access for patients arriving by vehicle easier. There is also the potential to create opportunities for some patient amenities such as a café along the bridge connection. Level 4 contains the Ambulatory Procedure Unit and has a direct connection to the emergency department as well as the HI building via an overhead bridge. A consolidated Eye Centre is located on Level 5. Green rooftop terraces are accessible on Level 7 and 11 respectively. Large public patios are provided on several floors throughout the building provide gathering and outdoor space for visitors and staff alike.

A two storey Centre for Research and Innovation is situated above the existing ED with connections to the Existing HI building and was designed to capitalize on the bridge construction experience that exists in the community and could be prefabricated for ease of construction. It contains a multi-storry auditorium and gathering space with views to the Halifax Commons and will have direct connections to the existing HI building on Level 5. It will be highly visible Centre, reinforcing QEII as a leader in research and education and as the potential to raise the profile of QEII as a leading edge academic and teaching hospital.

9.2 Commons Concept

9.2.1 Site Plan

The Commons Concept consists of an Inpatient / OR building on the CBC site, an Ambulatory Care building on the Urban Garden site and a two storey Centre for Research and Innovation situated above the mechanical floor of the Emergency Department.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Green Space

- Buffer Zone
- Green Space
- Roof Terraces / Healing Spaces

Fig. 915 Commons Concept Site Plan

kasian

9.2 Commons Concept

9.2.2 Site Utilization Vehicular Circulation

Vehicular Circulation within the site was developed as a response to traffic analysis and the existing urban roadway system. A new signalized intersection is proposed on Robie and Shirley Streets to improve traffic movement into and out of the site. Two new in/out entrances are proposed foron Bell Road, one serving the new Ambulatory Care Building and another serving the new Inpatient / OR building. The existing circulation surrounding the parking structure and drop off at the HI Building will remain as it is.

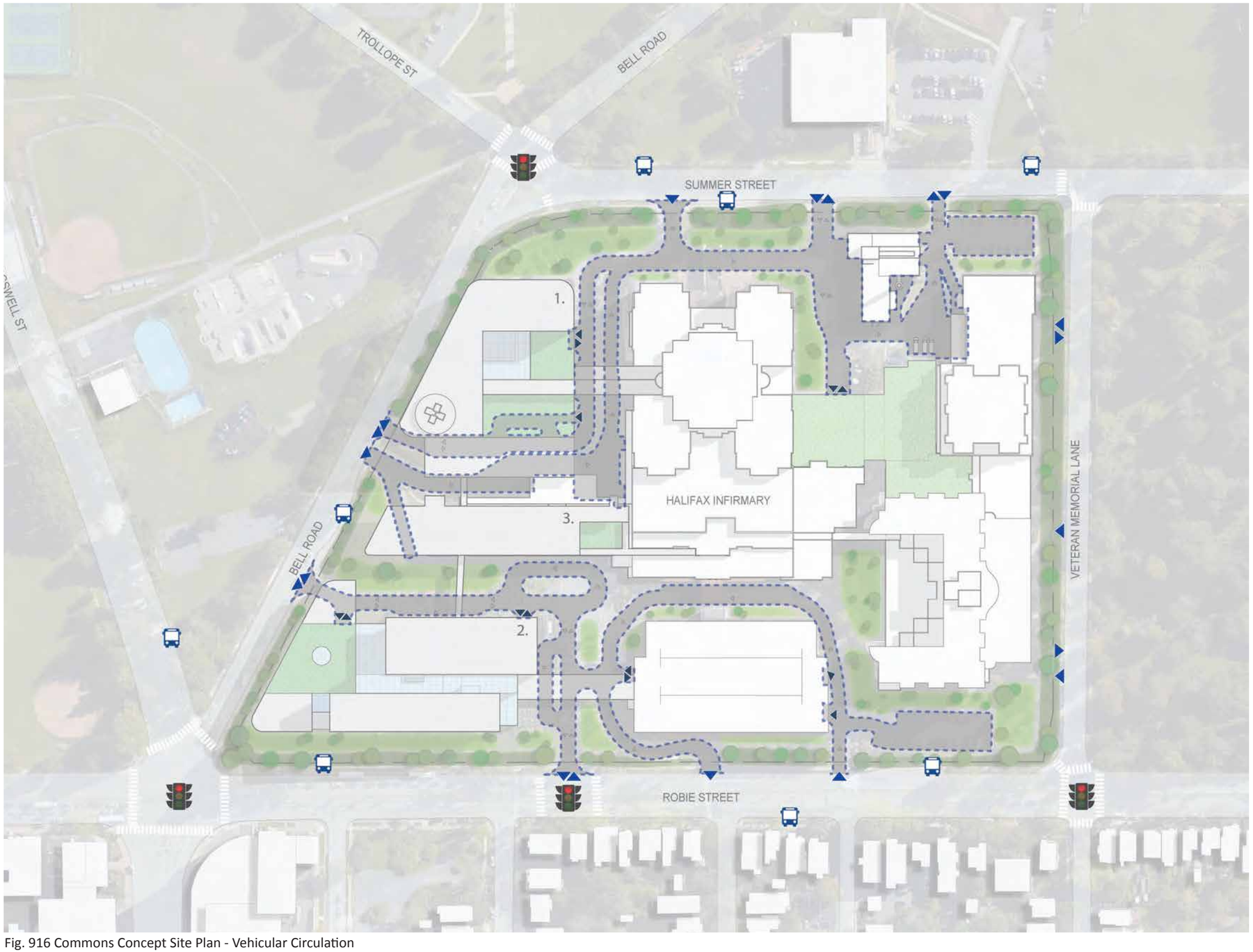
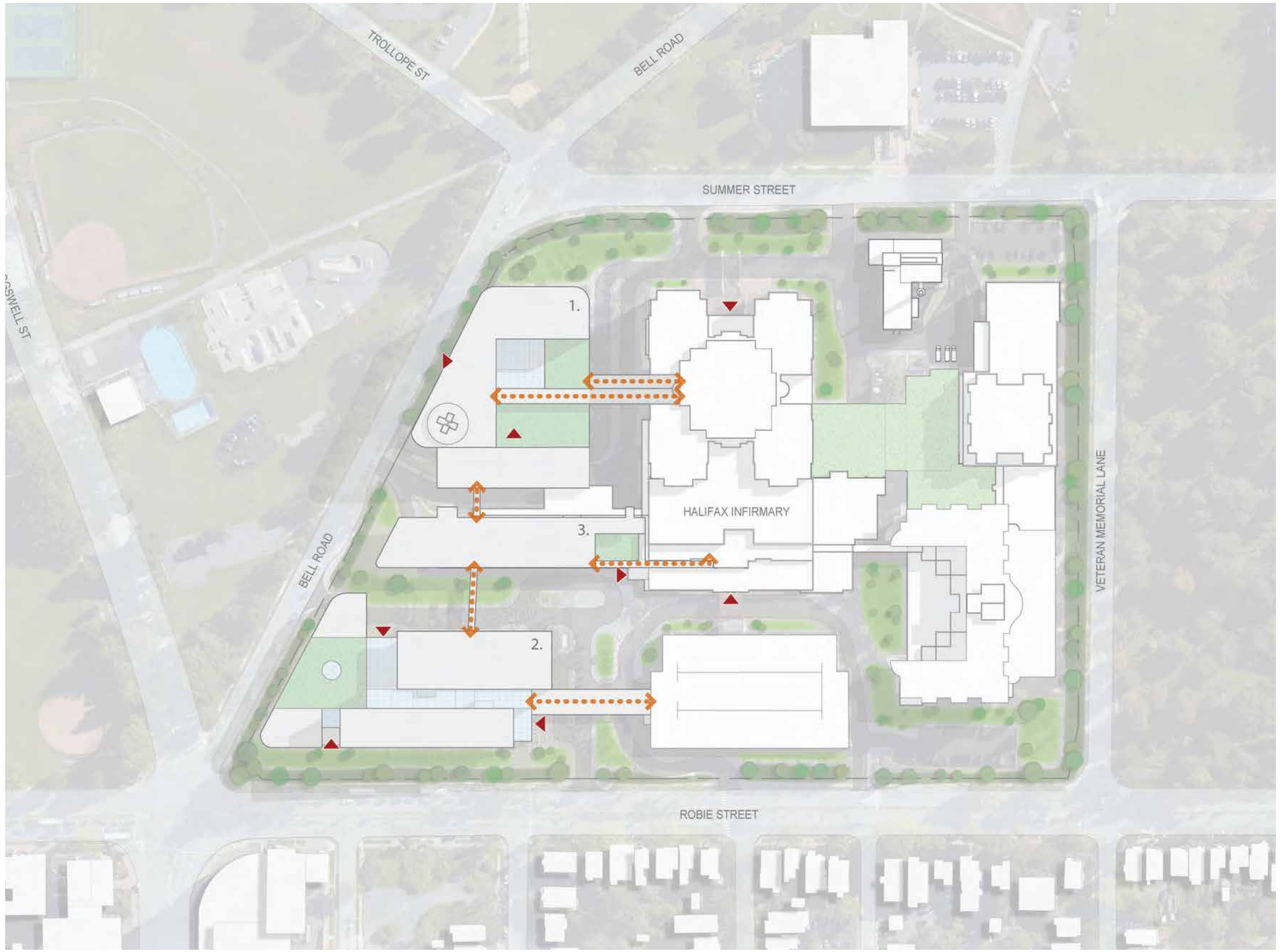


Fig. 916 Commons Concept Site Plan - Vehicular Circulation

9.2 Commons Concept
Major Internal Circulation and Links

The existing primary entrance of the HI building near the parking structure will remain. The Ambulatory Care Building on the urban garden site will have multiple entrances, one for pedestrians entering off of Robie Street, and two others associated with vehicular drop-offs. The Inpatient / OR building will also have two entrances which feed into the centralized interconnected space. Linkages and bridges will connect the new buildings to one another as well as the existing HI building. A bridge connection will link the existing parking structure to the new Ambulatory Care building, making access to this high volume as easy as possible for patients



1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Pedestrian Circulation/Entrances

Pedestrian Entrance

Internal Circulation / Links

N

Fig. 917 Commons Concept Site Plan - Pedestrian Circulation and Links

9.2 Commons Concept
Green Spaces

Green Space within the Commons Concept connects to the existing parks and pedestrian paths surrounding the HI site. Green space is provided through a series of roof terraces, courtyards, and pocket parks. A green buffer zone surrounds the site, enforcing the existing edge condition.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Green Space
- Buffer Zone
- Green Space
- Roof Terraces / Healing Spaces

Fig. 918 Commons Concept Site Plan - Green Spaces

9.2 Commons Concept
Views and Solar Optimization

The massing of the Ambulatory Care Building and the Inpatient / OR building were designed to capitalize on views of the surrounding green space and optimized to provide natural light. The Ambulatory Care Building achieves this by its design comprised of two slender, staggered 'towers' with an interconnected space between them.

1. New Inpatient/OR Building
2. New Ambulatory Building
3. New Centre for Researcn and Innovation

Views/Solar Diagram

Views to Halifax Commons

Solar Optimization

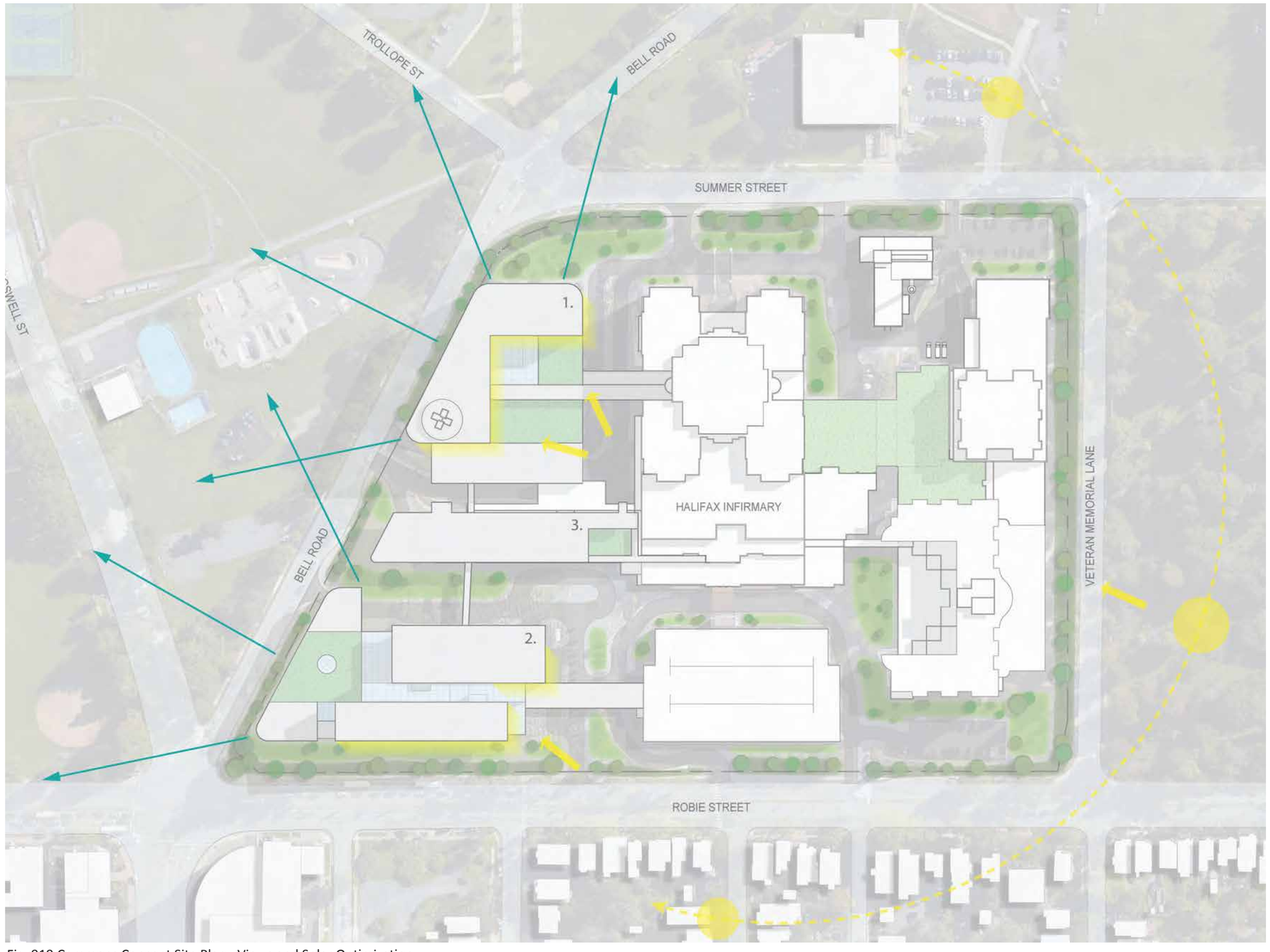


Fig. 919 Commons Concept Site Plan - Views and Solar Optimization

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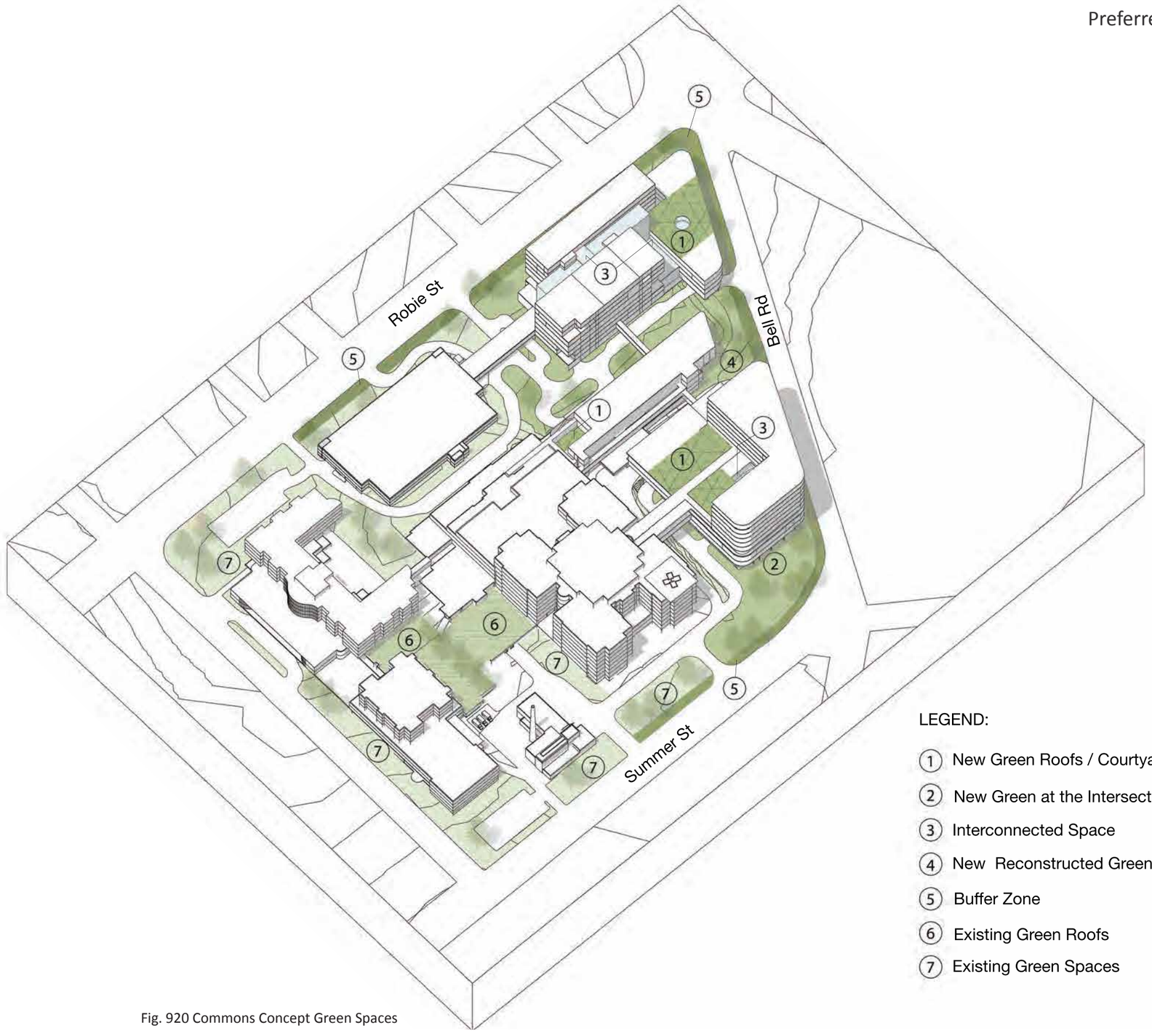


Fig. 920 Commons Concept Green Spaces

9.2 Commons Concept

QE II Green spaces and Pocket parks

The HI site has an area of 940,838 Sq ft, with an existing building footprint of 370,368 Sq Ft representing 39% site coverage. The proposed building footprint is 496,139 Sq Ft (53% site coverage) for the Commons concept.

The master plan objective is to maximize the site utilization within the area where the proposed buildings are located. This avoids where possible unnecessary spread of the building footprint and allows for more green spaces and pocket parks within the site. The green spaces and parks contribute to the creation of a healing environment, while also blurring the boundary between the hospital and community, making the hospital an integral part of the community.

Connection to the existing parks, pedestrian paths, edge conditions and buffer zones for each of the concepts are outlined in the introductions of the respective concepts; it is proposed at this stage of the master plan that edge conditions and buffer zones are enhanced only in the areas impacted by new construction and not the whole site perimeter.

To compensate for the high intensity of development at grade, the intent of the master plan is to allow the opportunity to create green roofs and terraces at upper levels which will in fact act as “pocket parks”.

“Successful “pocket parks” have four key qualities: they are accessible; allow people to engage in activities; are comfortable spaces and have a good image; and finally, are sociable places: one where people meet each other and take people to when they come to visit”

The roof terrace / elevated pocket parks identified in each of the proposed concepts provide the following:

- They act as a miniature oasis within the healing health care environment. These are areas of refuge, intimate, simple, a sense of scale with minimal maintenance
- Their orientation takes advantage of the sun at varying times of the day
- They are directly linked to indoor spaces, reinforcing the indoor / outdoor relationship reflected in many parts of the concept
- They can be themed with a distinctive ambiance
- They should provide an opportunity to be community supported
- Encourage increased physical activity
- The design is being focused on giving patient, caregivers and staff an area of refuge and relief
- Sustainable
- Designed for children and pets
- Accessible to all

The Commons Concept:

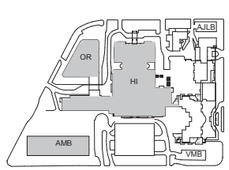
Some distinctive features of the Commons Concept with respect to green spaces and pocket parks is the creation of the open space at the intersection of Bell Road and Summer Street. The OR/ Inpatient building has upper level pocket parks which are directly accessible from the interior by patients and staff, and connect to the proposed light well of the building, The ambulatory care building maximised the use of the available lot, but nevertheless creates an upper level pocket park.

9.2 Commons Concept

9.2.4 Floor Plans

DGSF of Programs in Existing Halifax Infirmary HI

Categories	Department Name	Designed Area
Academic/Teaching	Academic/Teaching	12,146 SF
		12,146 SF
Administration	Academic Medical Staff/ Admin Services	55,032 SF
Administration	Corporate administration	18,485 SF
Administration	Foundation/ volunteers and auxiliary support	429 SF
Administration	Medical offices	17,166 SF
		91,111 SF
Clinical Support	Ancillary	1,736 SF
Clinical Support	Emergency	48,365 SF
Clinical Support	Laboratory	13,889 SF
Clinical Support	Pharmacy	9,648 SF
		73,638 SF
Diagnostic Imaging	Diagnostic Imaging	43,789 SF
		43,789 SF
External Agency	External Agency	1,544 SF
		1,544 SF
Inpatient Unit	Critical Care	79,770 SF
Inpatient Unit	Medical/Surgical Units	113,822 SF
		193,593 SF
Perioperative Services	Perioperative Services	49,662 SF
		49,662 SF
Research	Research	11,542 SF
		11,542 SF
Retail	Retail	6,532 SF
		6,532 SF
Support Services	Bio Med Engineering	6,205 SF
Support Services	Facility management	1,531 SF
Support Services	Food Services	13,068 SF
Support Services	Health information/ service registration	2,612 SF
Support Services	IT	589 SF
Support Services	M+E	75,147 SF
Support Services	MDR	19,211 SF
Support Services	Security	939 SF
Support Services	Staff services (lockers etc)	11,858 SF
Support Services	Supply chain (warehouse), procurement	4,142 SF
		135,301 SF
Total DGSF		**618,857 SF**
Existing Gross Builidng Area		**± 744,000 SF**



KEY PLAN- HALIFAX INFIRMARY SITE

DGSF of Common Concept - Inpatient/OR Extension (OR)

Categories	Department Name	Designed Area	AP Program
Amenities	Amenities	5,067 SF	
Amenities	Cafeteria	4,920 SF	
		9,987 SF	
Building Support	M+E	31,778 SF	
		31,778 SF	
Inpatient Unit	Critical Care	61,599 SF	53,205 (48 beds)
Inpatient Unit	Medical/ Surgical Units	144,628 SF	149,930
		206,228 SF	
Perioperative services	Surgical Suite	54,370 SF	52,365
		54,370 SF	
Support Services	MDR	19,322 SF	20,860
Support Services	Shipping & Receiving	6,668 SF	
		25,990 SF	
Total DGSF		**328,353 SF**	

DGSF of Common Concept - Ambulatory (AMB)

Categories	Department Name	Designed Area	AP Program
Ambulatory Care	Ambulatory Clinic	120,386 SF	128,530
Ambulatory Care	Ambulatory Procedure Unit	34,359 SF	35,025
Ambulatory Care	Dialysis	29,429 SF	30,230
Ambulatory Care	Eye Centre	42,527 SF	42,055
Ambulatory Care	Heart Health	48,602 SF	47,950
Ambulatory Care	Hyperbaric Medicine	8,754 SF	8,640
Ambulatory Care	Medical Day Care	9,784 SF	10,285
Ambulatory Care	Outpatient Specimen Collection	4,047 SF	4675
		297,887 SF	
Amenities	Amenities	5,001 SF	
Amenities	Cafeteria	5,037 SF	
		10,038 SF	
Building Support	M + E	39,634 SF	
		39,634 SF	
Diagnostic Imaging	Diagnostic Imaging	14,609 SF	14,003
		14,609 SF	
Support Services	Bio Med Engineering	971 SF	
Support Services	MDR	484 SF	
Support Services	Shipping & Receiving	4,989 SF	
		6,445 SF	
Total DGSF		**368,613 SF**	

DGSF of Common Concept - Research and Innovation Centre (RES)

Categories	Department Name	Designed Area	AP Program
Research	Research	33,379 SF	34,430 SF
		33,379 SF	
Total DGSF		**33,379 SF**	

Gross Building Area of Common Concept - Inpatient/OR Extension

Categories	Designed Area
Amenities	9,987 SF
Building Support	31,778 SF
Inpatient Unit	206,228 SF
Perioperative services	54,370 SF
Public	58,276 SF
Support Services	25,990 SF
Vertical Circulation	25,329 SF
Gross Building Area	**411,958 SF**
GROSSING FACTOR X 10% for Building Envelope	41,196 SF
GFA	**453,154 SF**

Gross Building Area of Common Concept - Inpatient/OR Extension - Parking

Categories	Department Name	Designed Area
Public	Parking	76,809 SF
1 LEVEL TO BEDROCK		

Gross Building Area of Common Concept - Ambulatory

Categories	Designed Area
Ambulatory Care	297,887 SF
Amenities	10,038 SF
Building Support	39,634 SF
Diagnostic Imaging	14,609 SF
Public	59,429 SF
Support Services	6,445 SF
Vertical Circulation	23,960 SF
Gross Building Area	**452,002 SF**
GROSSING FACTOR X 10% for Building Envelope	45,200 SF
GFA	**497,202 SF**

Gross Building Area of Common Concept - Ambulatory - Parking

Categories	Department Name	Designed Area
Public	Parking	139,453 SF
2 LEVELS TO BEDROCK		

Gross Building Area of Common Concept - Research and Innovation Centre (RES)

Categories	Designed Area
Public	16,068 SF
Research	33,379 SF
Vertical Circulation	2,563 SF
Gross Building Area	**52,009 SF**
GROSSING FACTOR X 10% for Building Envelope	5,200 SF
GFA	**57,209 SF**

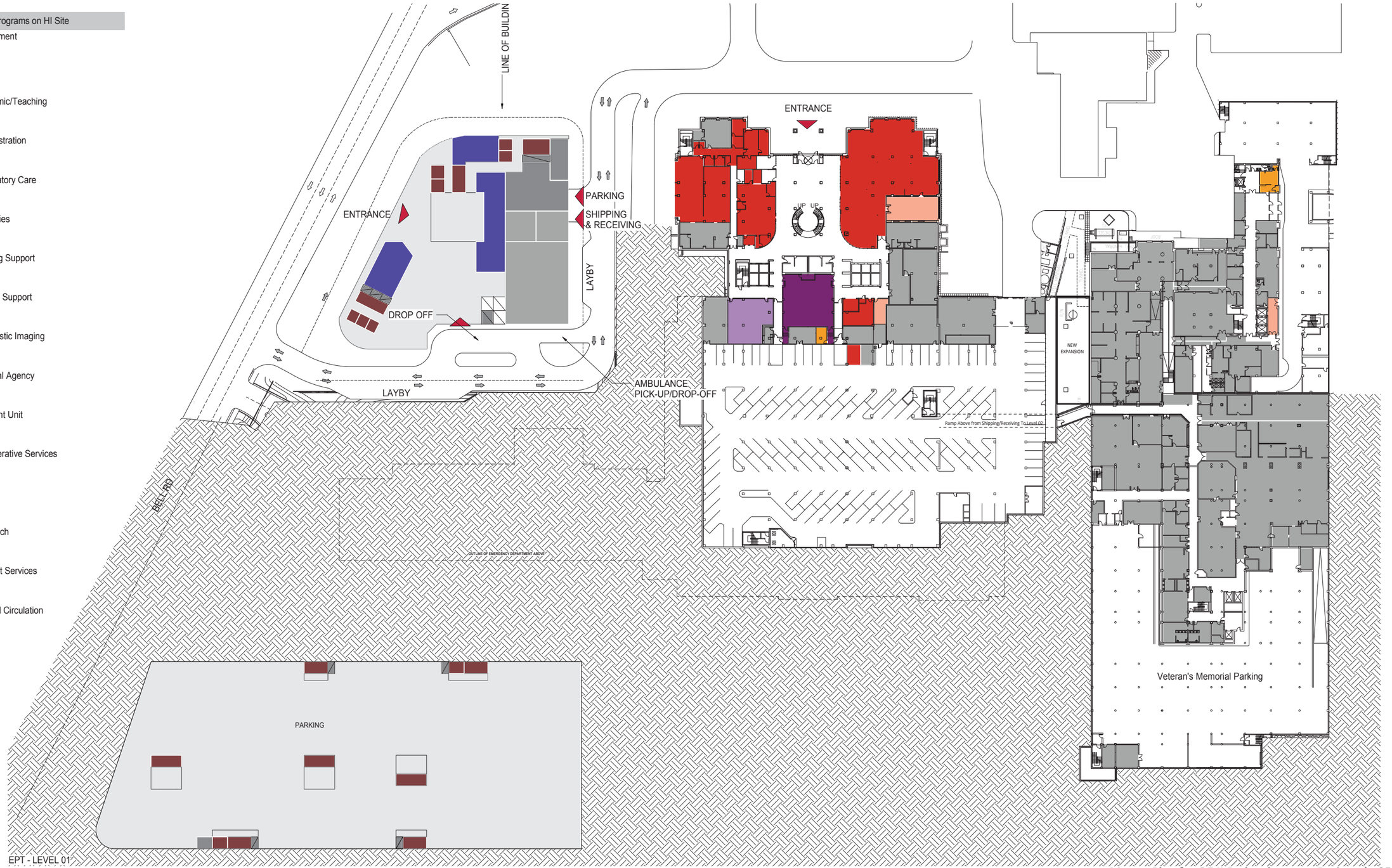
9.2 Commons Concept

Overall Plan: Level 01

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation

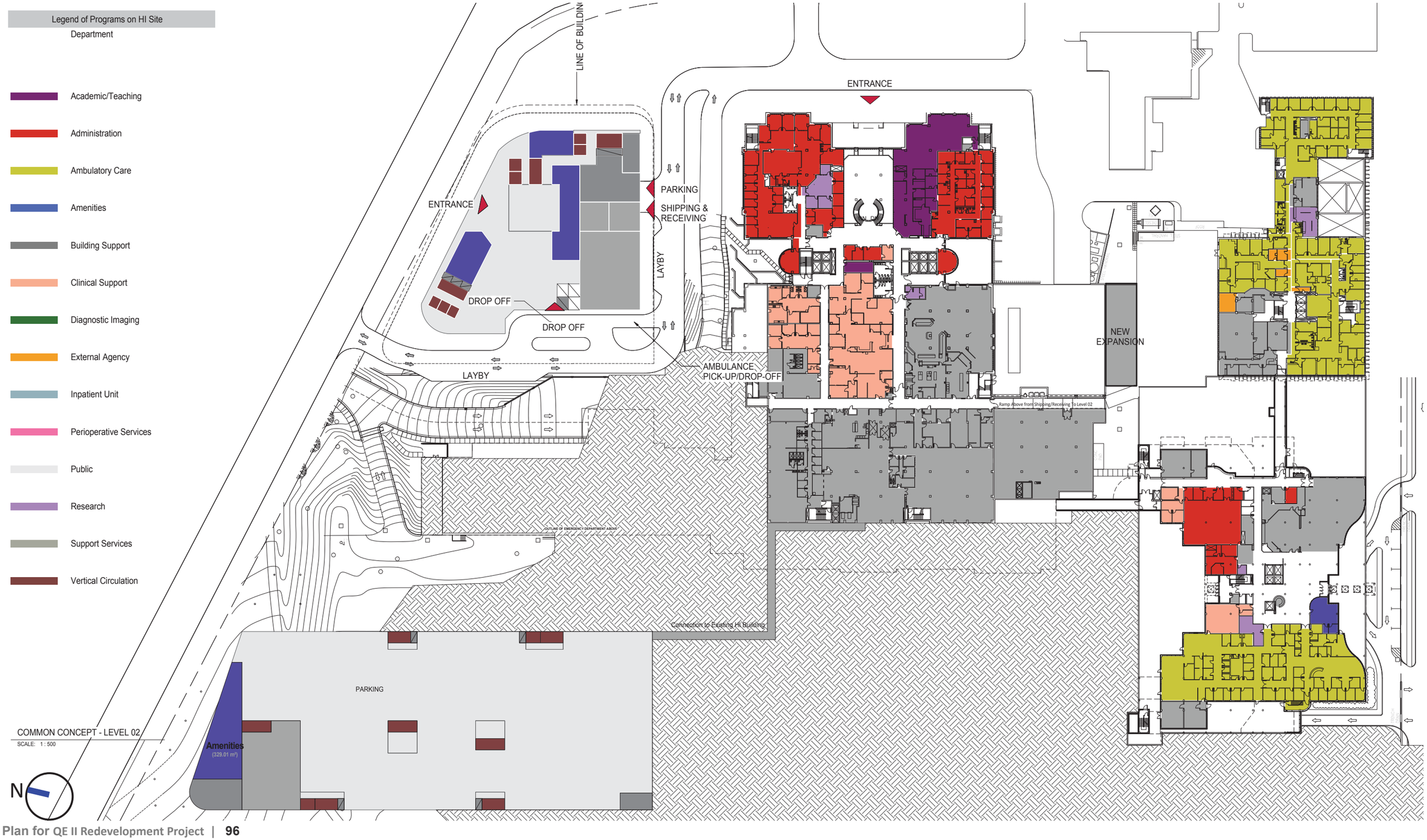


9.2 Commons Concept
Overall Plan: Level 02

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



COMMON CONCEPT - LEVEL 02

SCALE: 1 : 500

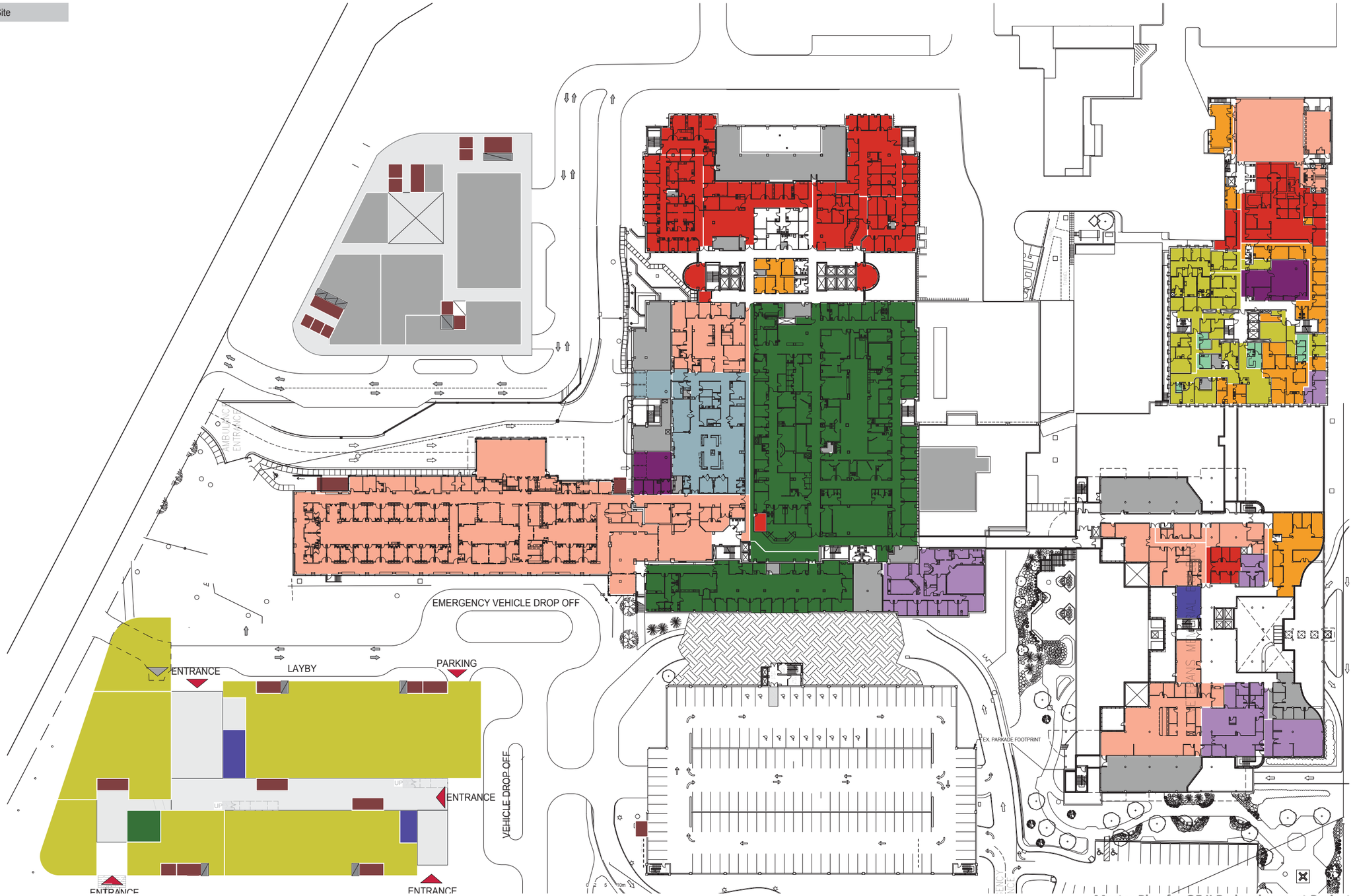
9.2 Commons Concept

Overall Plan: Level 03

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



COMMON CONCEPT - LEVEL 03

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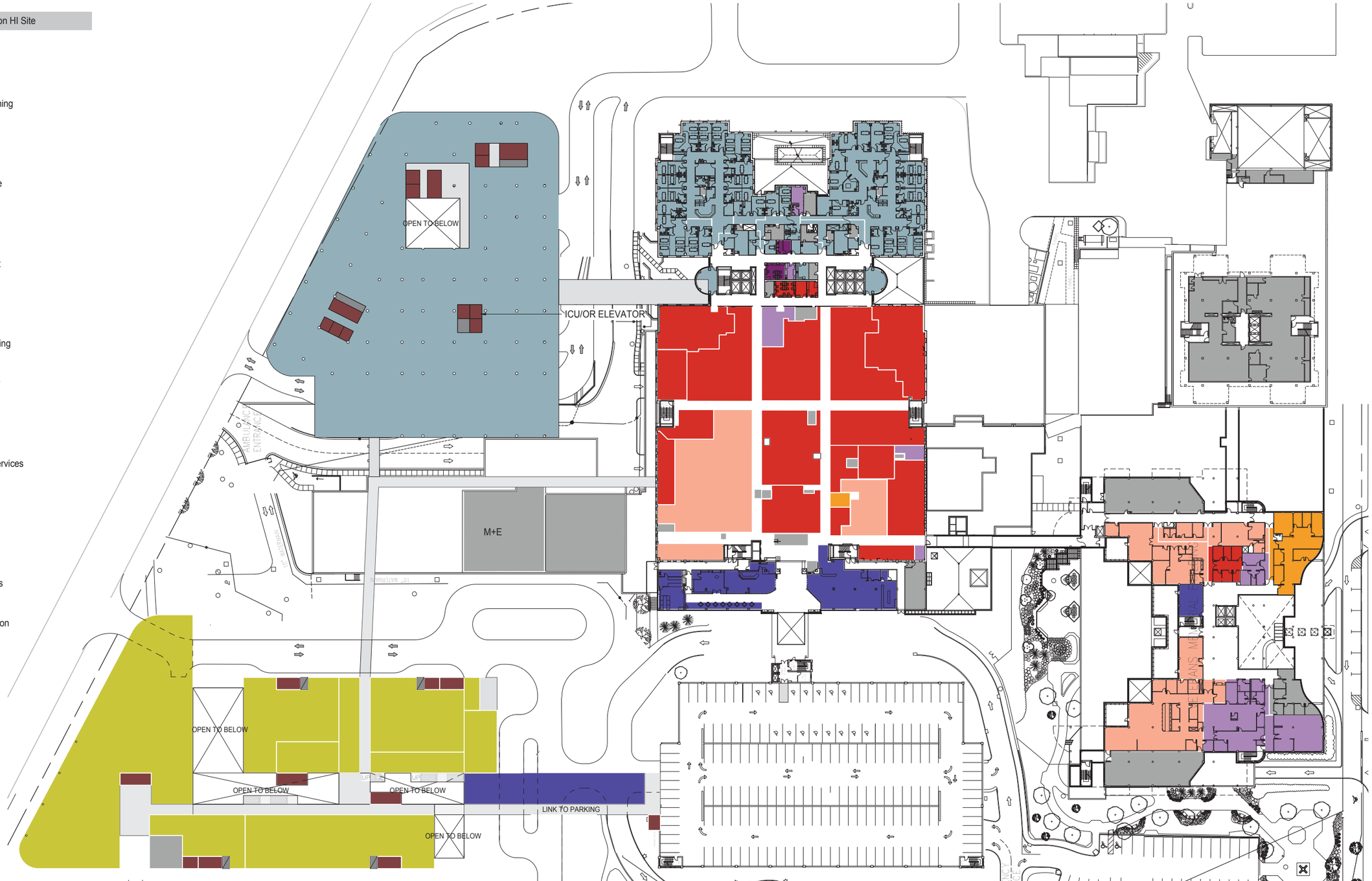
9.2 Commons Concept
Overall Plan: Level 04

Legend of Programs on HI Site
Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



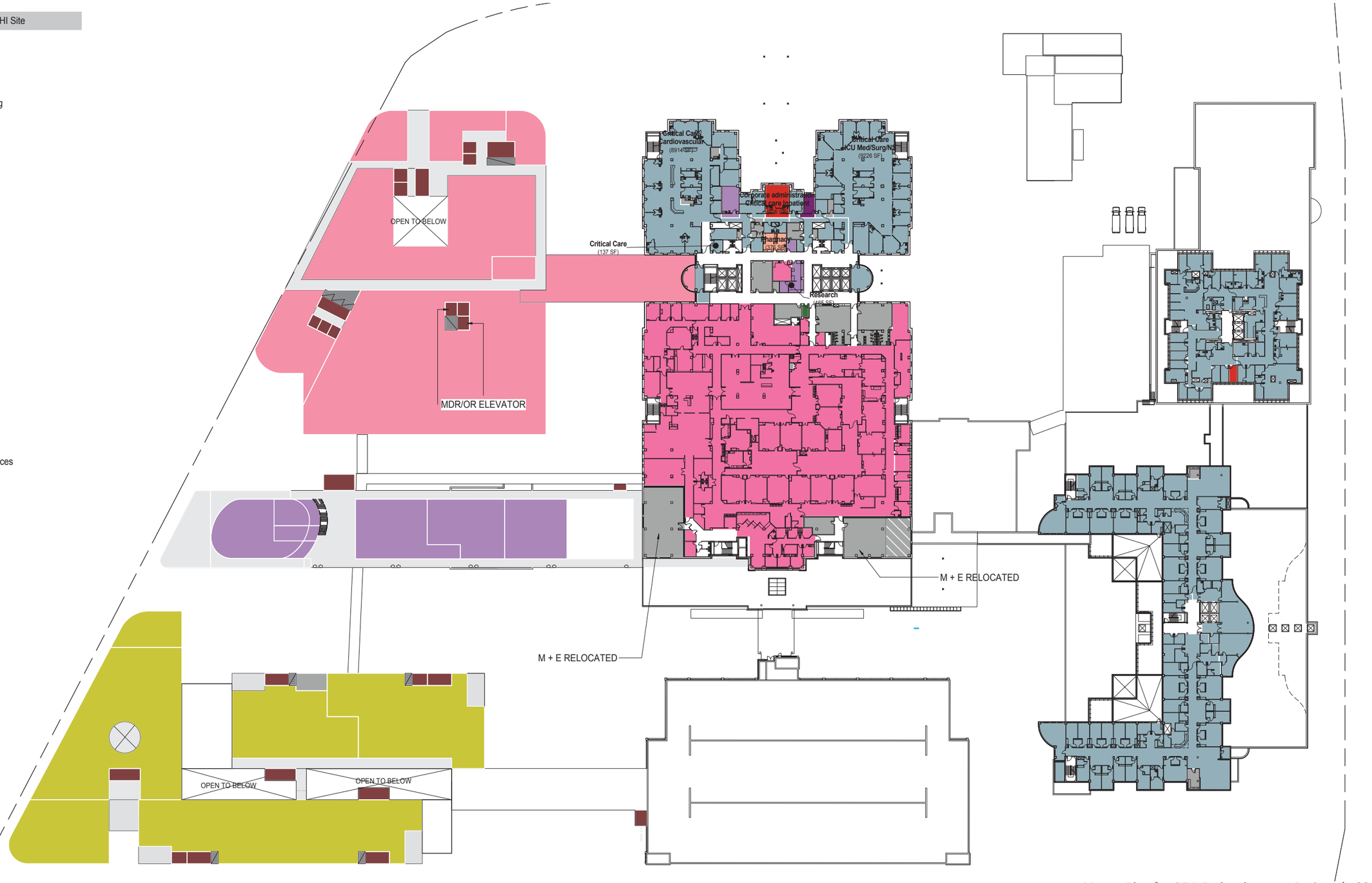
9.2 Commons Concept

Overall Plan: Level 05

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



WILLOW TREE - Level 05

SCALE: 1 : 500

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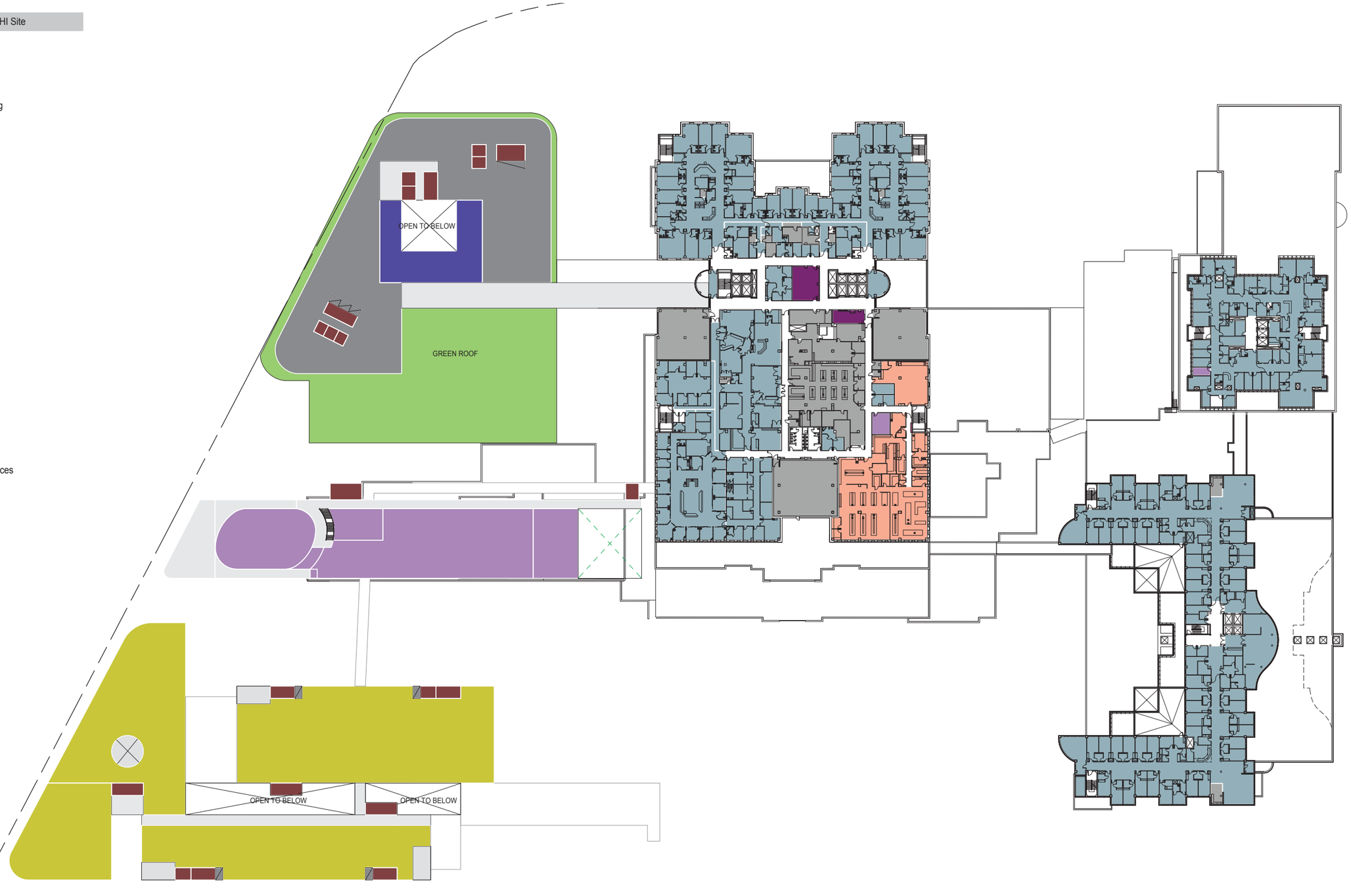
9.2 Commons Concept
Overall Plan: Level 06

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



WILLOW TREE - Level 06

SCALE: 1 : 500

N

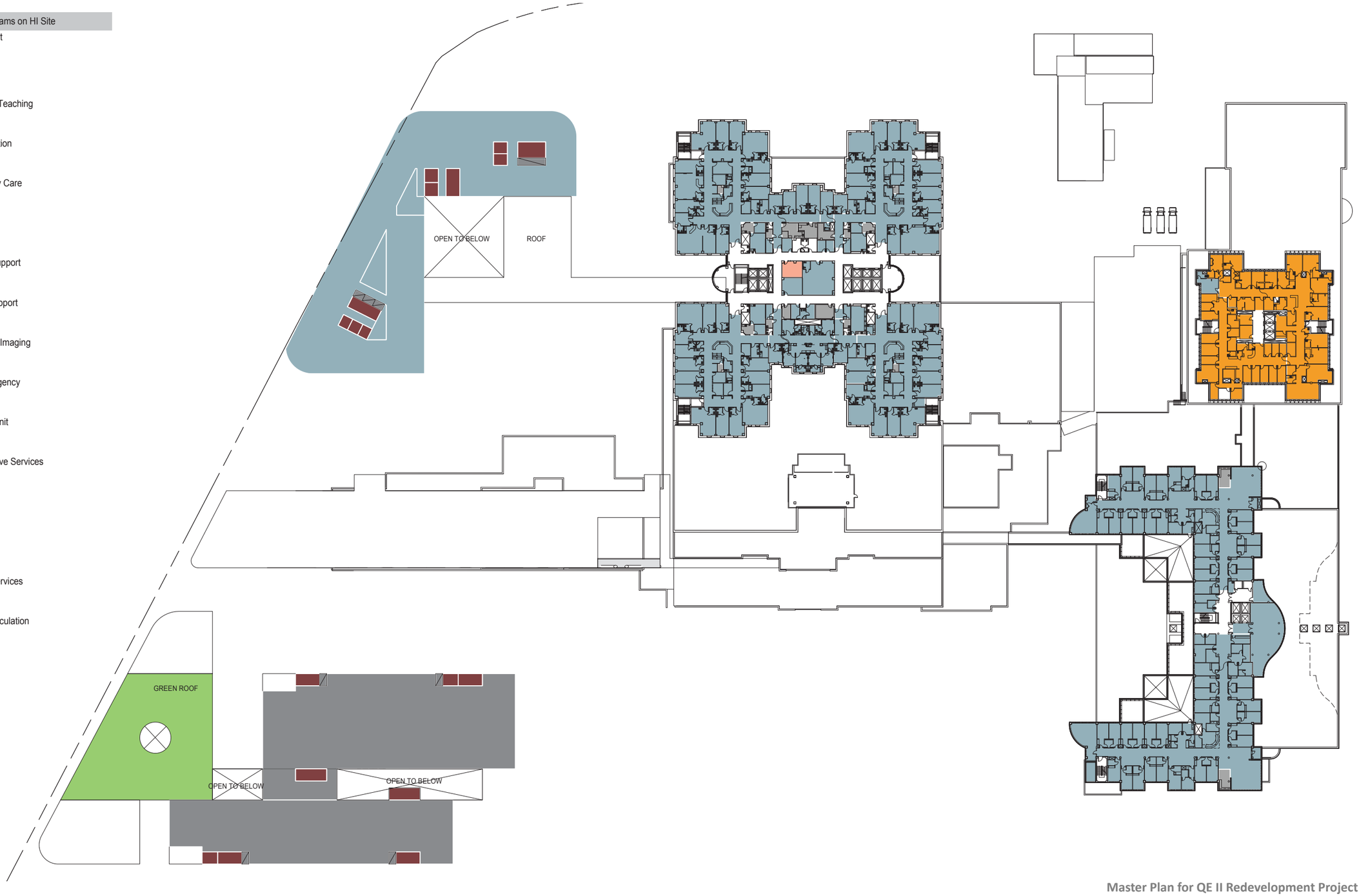
9.2 Commons Concept

Overall Plan: Level 07

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



WILLOW TREE - Level 07

SCALE: 1 : 500

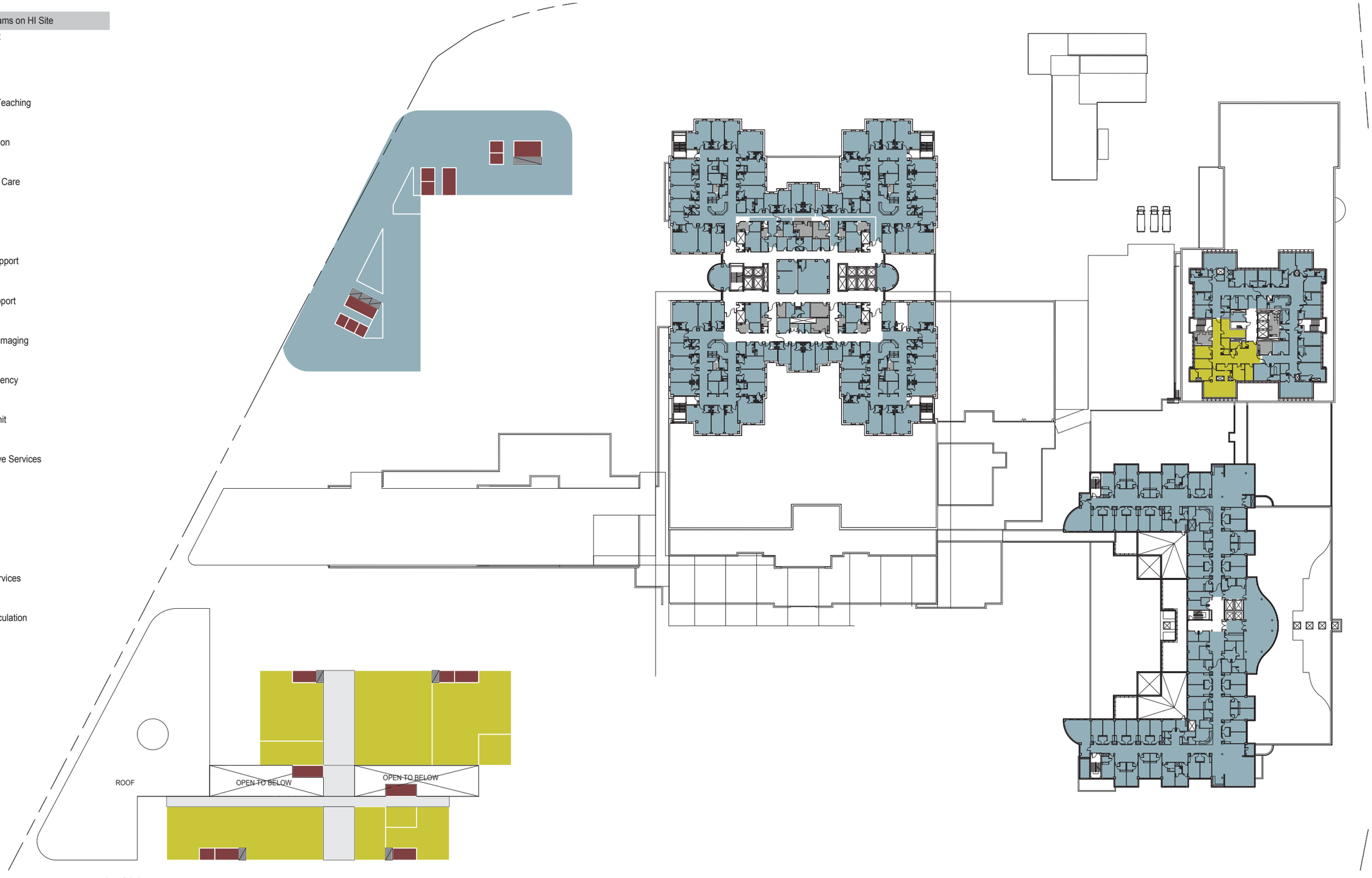
N

9.2 Commons Concept
Overall Plan: Level 08

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



HI - INF Level 08

SCALE: 1 : 500

N

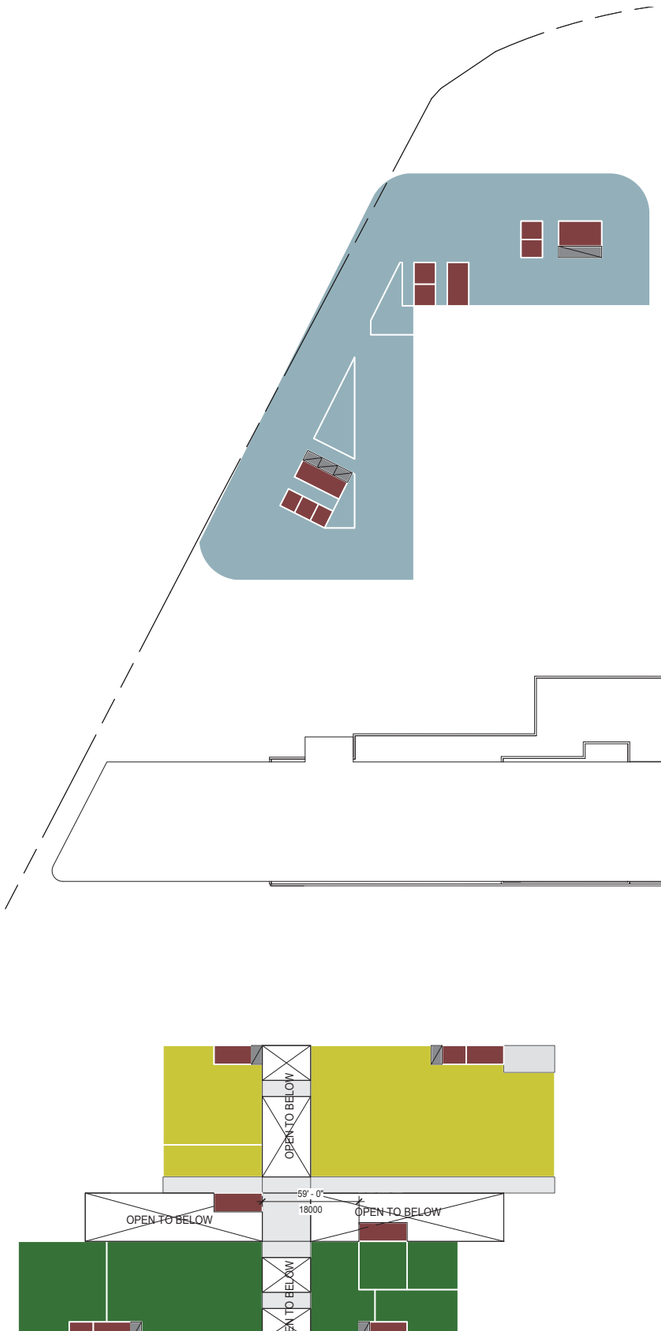
9.2 Commons Concept

Overall Plan: Level 09

Legend of Programs on HI Site

Department

- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



HI - INF Level 08

SCALE: 1 : 500

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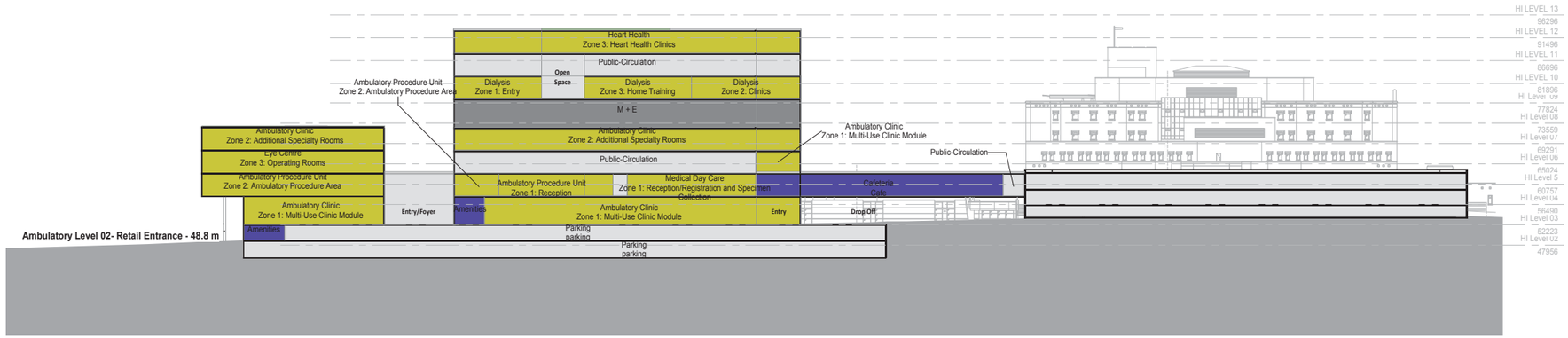
9.2 Commons Concept
Overall Sections

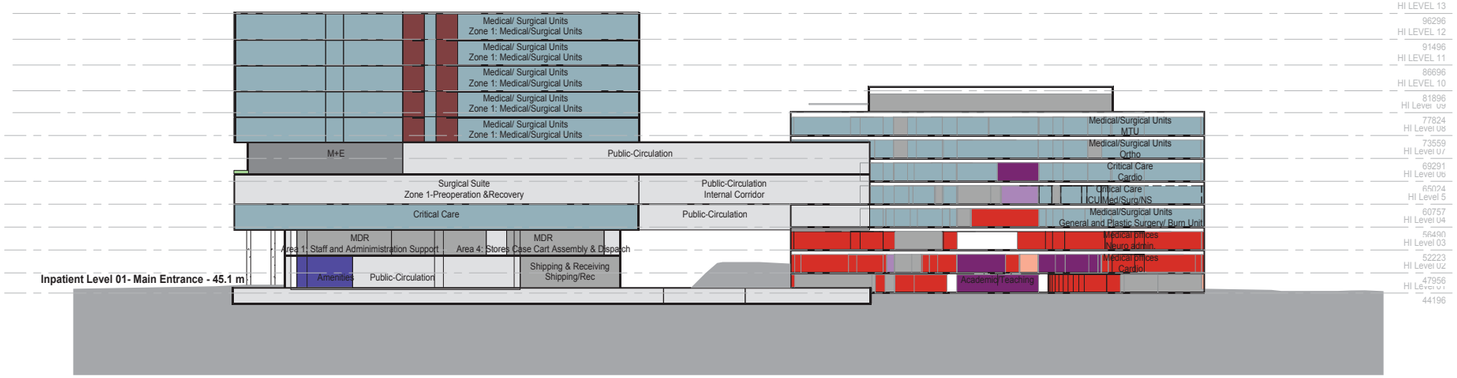
Department

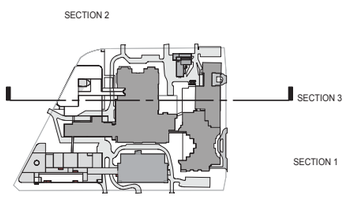
- Academic/Teaching
- Administration
- Ambulatory Care
- Amenities
- Building Support
- Clinical Support
- Diagnostic Imaging
- External Agency
- Inpatient Unit
- Perioperative Services
- Public
- Research
- Support Services
- Vertical Circulation



COMMONS CONCEPT - SECTION 01
SCALE: 1 : 500

COMMONS CONCEPT - SECTION 02
SCALE: 1 : 500



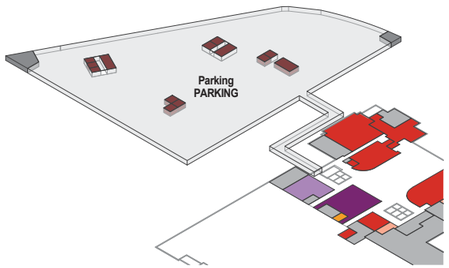


AMB2 KEY PLAN

9.2 Commons Concept

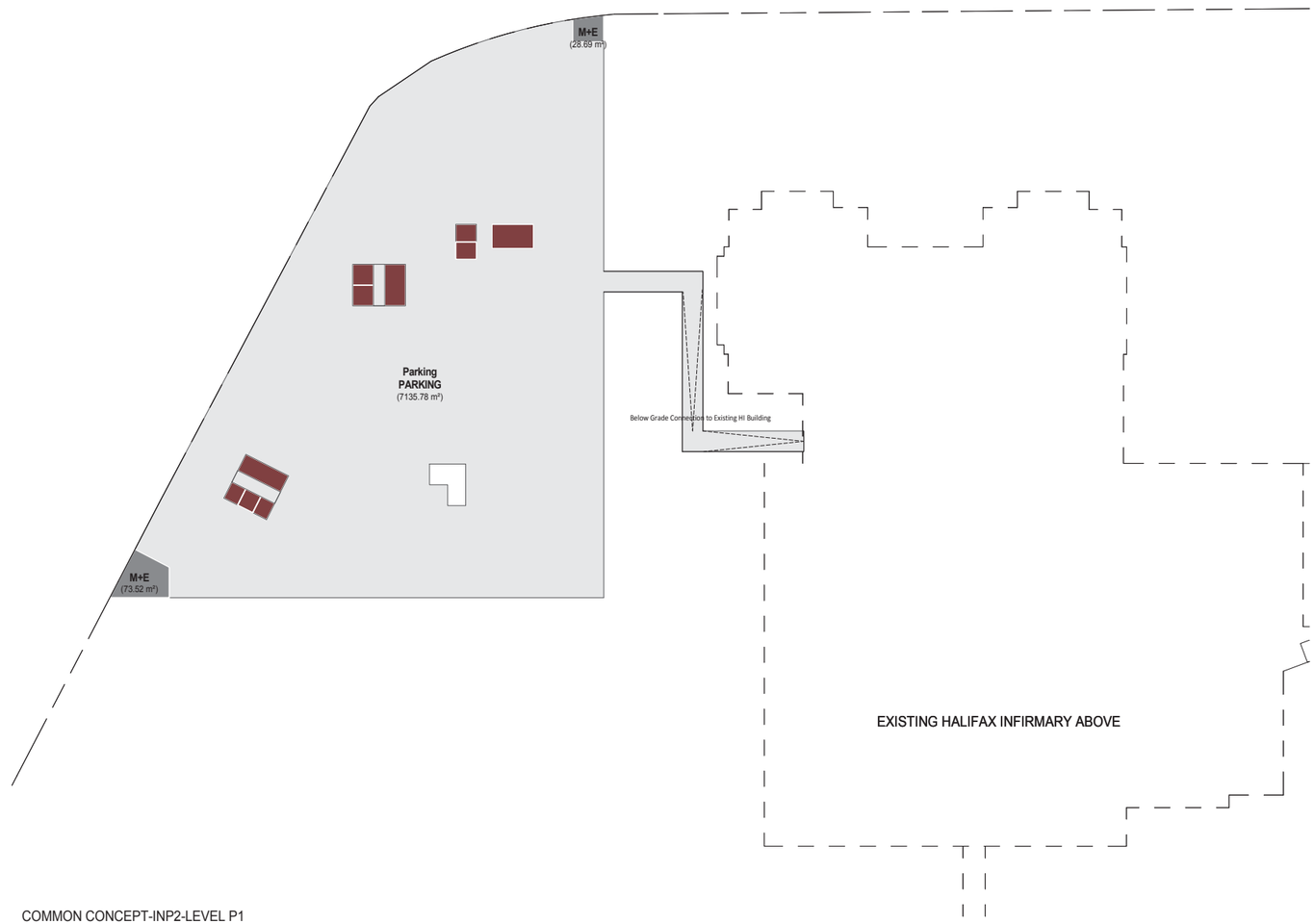
Inpatient/OR Building: Level P1

00-Department Gross Area -NEW INPATIENT - Level P1 Parking		
	Department Name	Area
	M+E	1,100 SF
		1,100 SF
	Parking	76,809 SF
		76,809 SF
	Vertical Circulation	2,551 SF
		2,551 SF
Grand total		80,460 SF



3D New IMP2 LEVEL P1

SCALE:



COMMON CONCEPT-INP2-LEVEL P1

SCALE: 1 : 500

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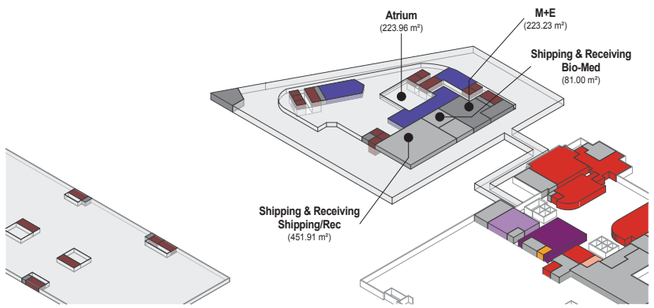
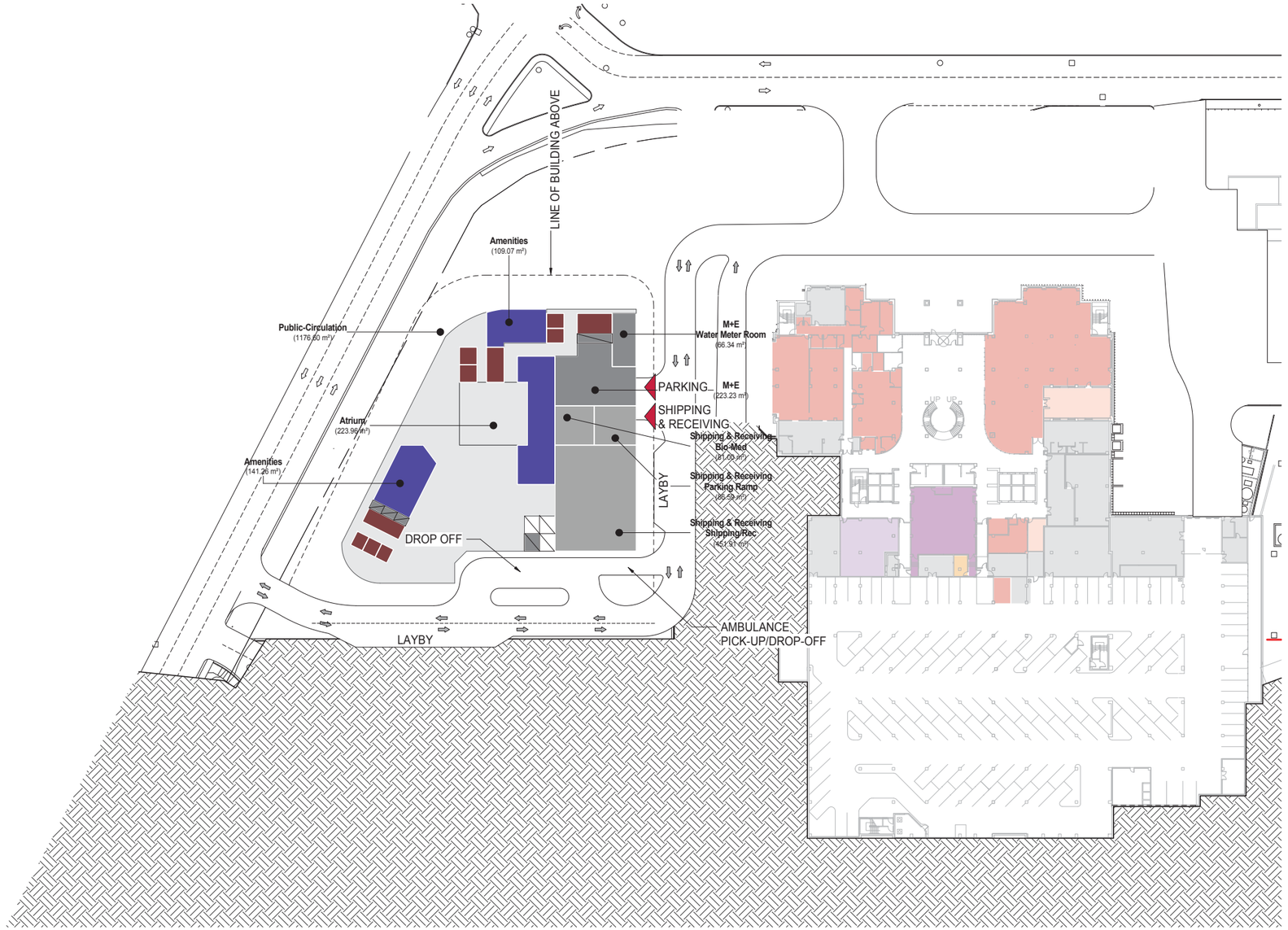
9.2 Commons Concept
Inpatient/OR Building: Level 01

00-Department Gross Area -NEW INPATIENT - Level 01		
	Department Name	Area
	Amenities	5,067 SF
		5,067 SF
	M+E	3,864 SF
		3,864 SF
	Atrium	2,411 SF
	Public-Circulation	14,268 SF
		16,679 SF
	Shipping & Receiving	6,668 SF
		6,668 SF
	Vertical Circulation	2,551 SF
		2,551 SF
Grand total		34,830 SF



3D New IMP2 LEVEL 1
SCALE:



COMMON CONCEPT-INP2-LEVEL 01A
SCALE: 1 : 500

N

9.2 Commons Concept

Inpatient/OR Building: Level 03

00-Department Gross Area - NEW INPATIENT - Level 02		
	Department Name	Area
	Public-Circulation	12,654 SF
		12,654 SF
	MDR	19,322 SF
		19,322 SF
	Vertical Circulation	2,551 SF
		2,551 SF
Grand total		34,527 SF

NOTE: For Inpatient/OR Building on CBC Site, level 1 is double height followed directly by level 3 to match the global HI Site levels.

COMMON CONCEPT-INP2-LEVEL 02

SCALE: 1 : 500

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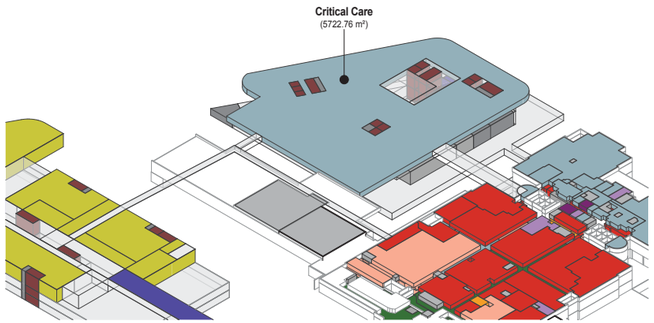
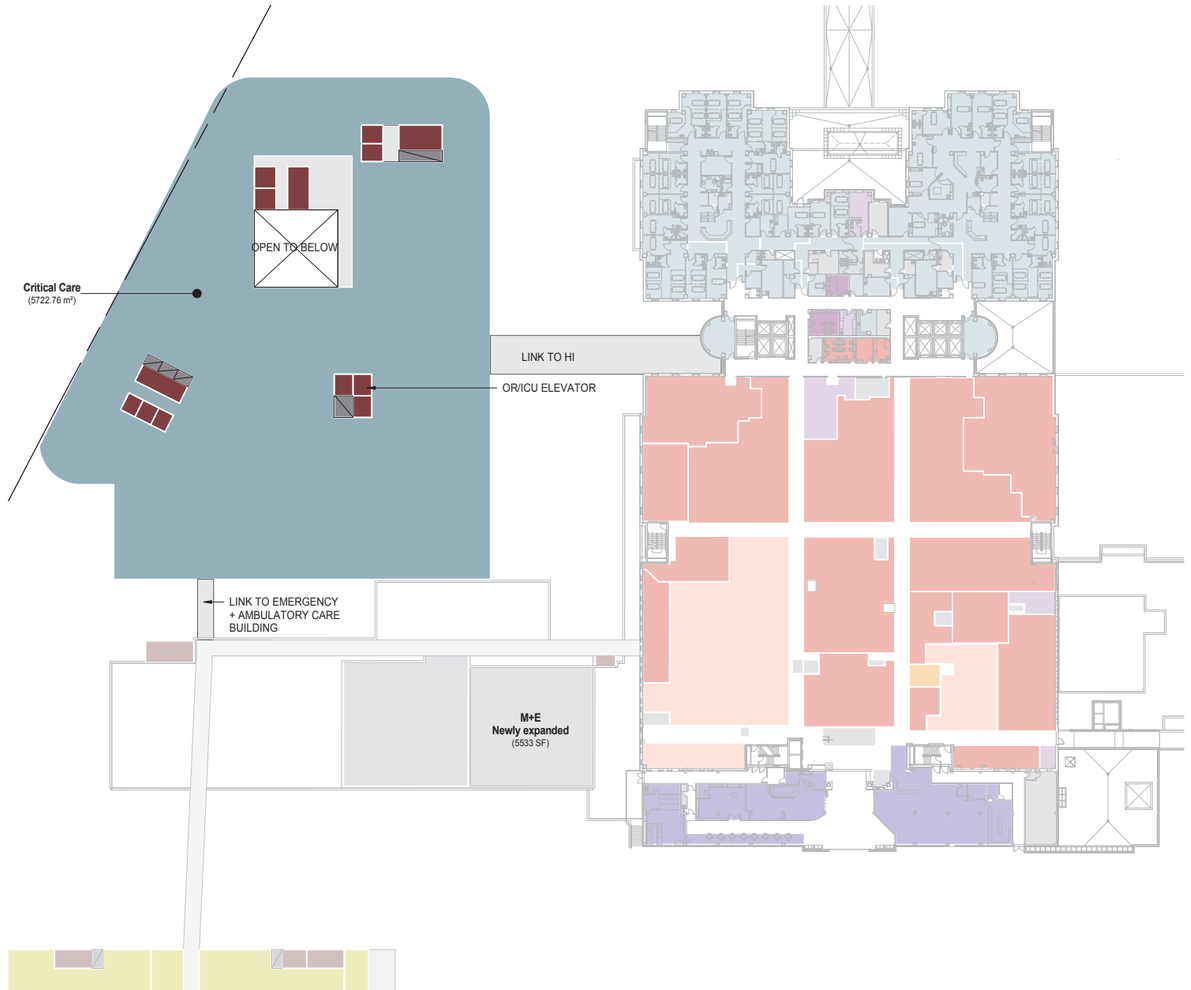
9.2 Commons Concept
Inpatient/OR Building: Level 04

00-Department Gross Area - NEW INPATIENT - Level 03		
	Department Name	Area
	Critical Care	61,599 SF
		61,599 SF
	Public-Circulation	5,606 SF
		5,606 SF
	Vertical Circulation	2,551 SF
		2,551 SF
Grand total		69,757 SF



3D New IMP2 LEVEL 04
SCALE:

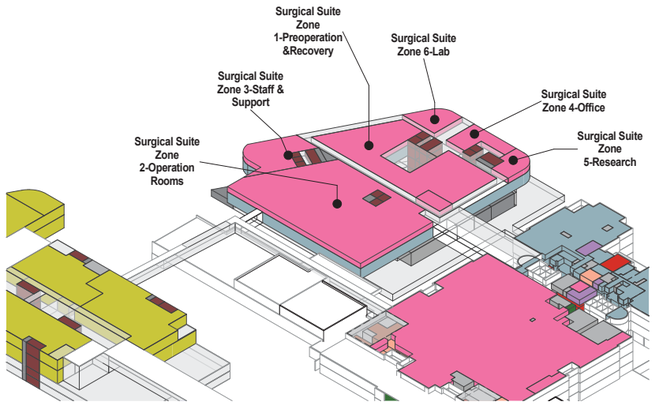


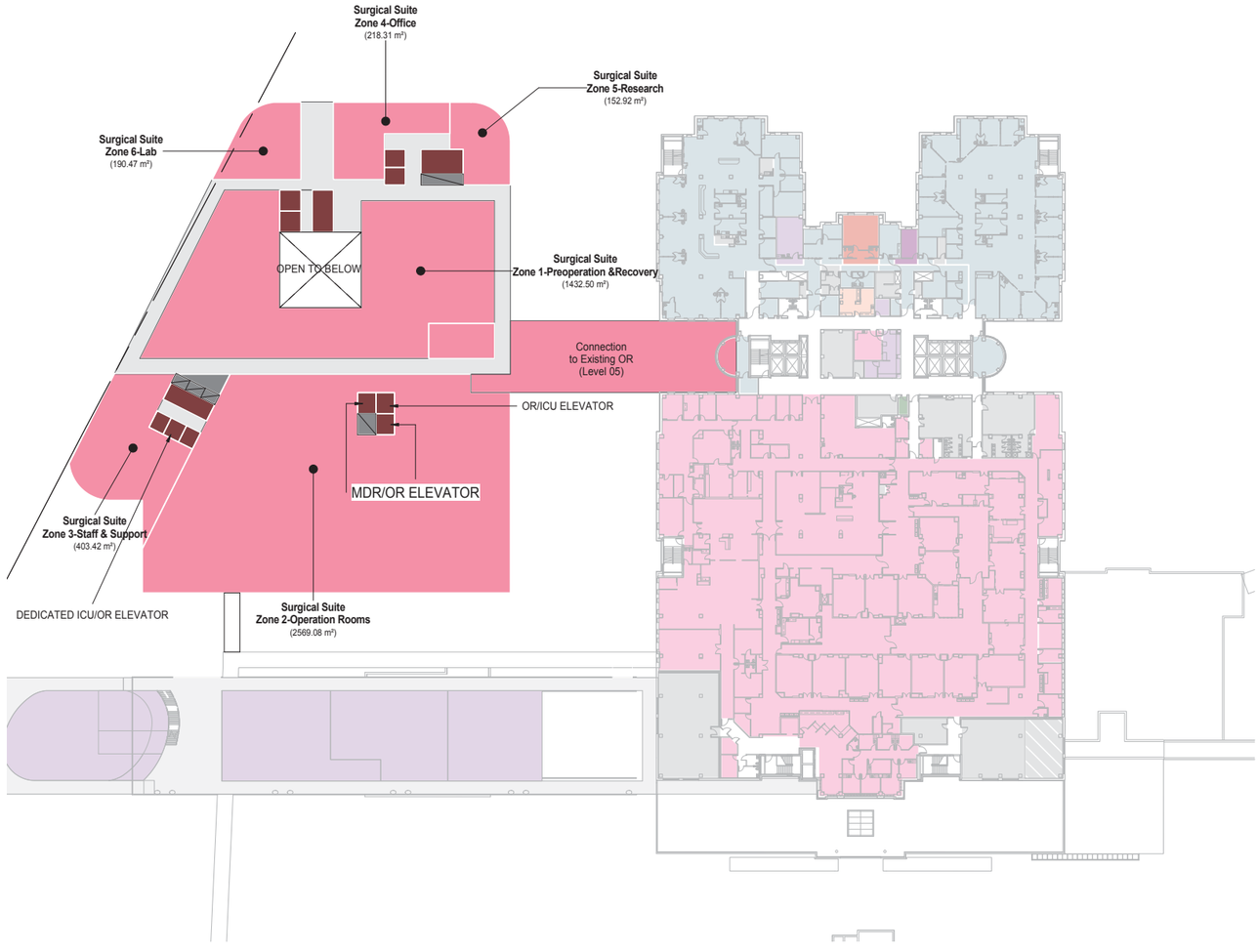
COMMON CONCEPT-INP2-LEVEL 04
SCALE: 1 : 500

N

9.2 Commons Concept
Inpatient/OR Building: Level 05

00-Department Gross Area - NEW INPATIENT - Level 04		
	Department Name	Area
	Surgical Suite	54,370 SF
		54,370 SF
	Public-Circulation	15,304 SF
		15,304 SF
	Vertical Circulation	2,551 SF
		2,551 SF
Grand total		72,225 SF





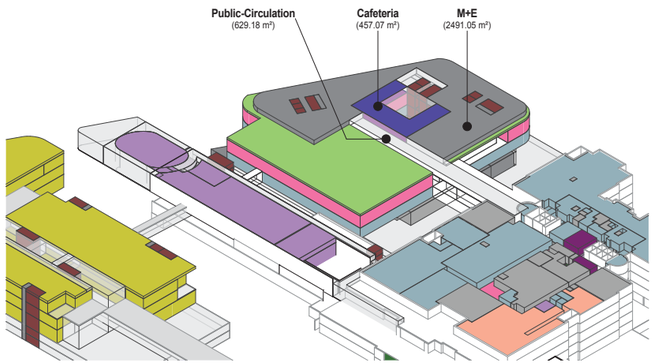
COMMON CONCEPT-INP2-LEVEL 04

SCALE: 1 : 500

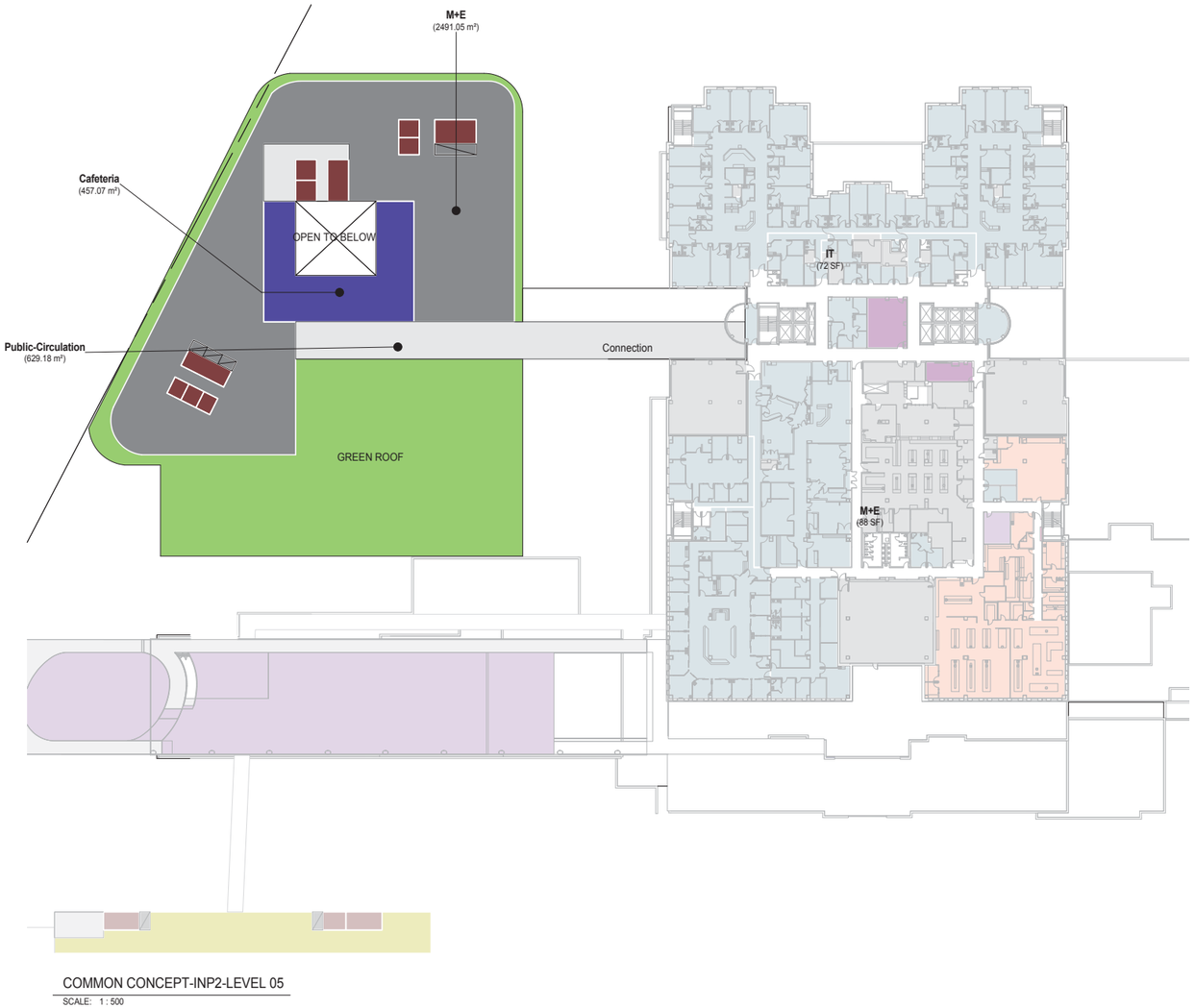
N

9.2 Commons Concept
Inpatient/OR Building: Level 06

00-Department Gross Area - NEW INPATIENT - Level 05		
	Department Name	Area
	Cafeteria	4,920 SF
		4,920 SF
	M+E	26,813 SF
		26,813 SF
	Public-Circulation	8,033 SF
		8,033 SF
	Vertical Circulation	2,095 SF
		2,095 SF
Grand total		41,862 SF



3D New IMP2 LEVEL 5
SCALE:

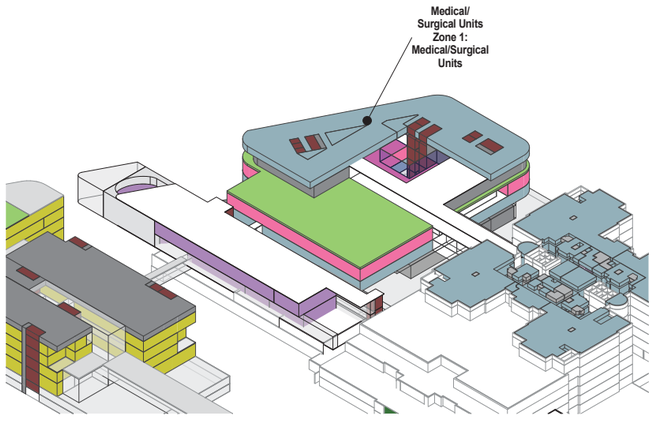


COMMON CONCEPT-INP2-LEVEL 05
SCALE: 1 : 500

9.2 Commons Concept

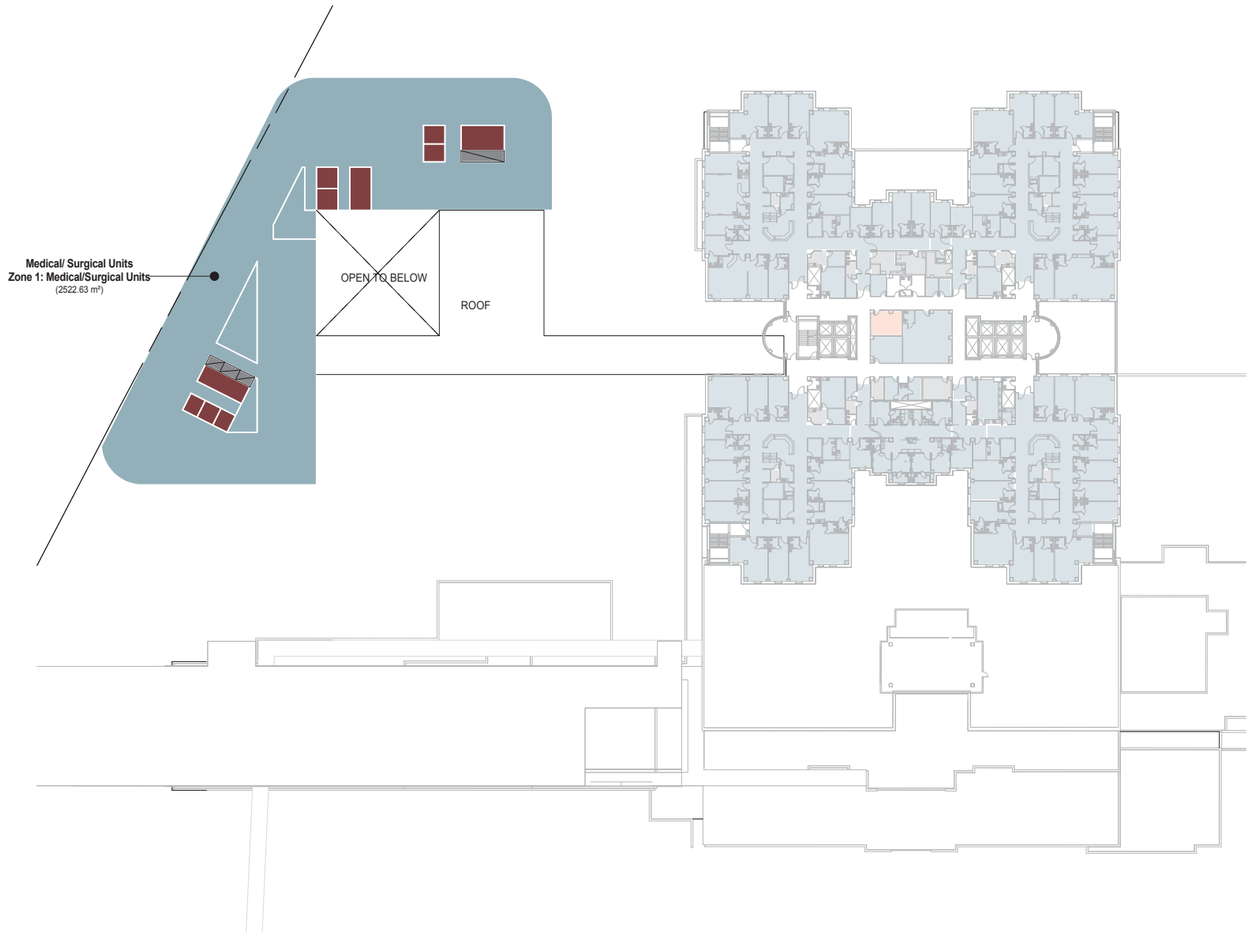
Inpatient/OR Building: Level 07

00-Department Gross Area - NEW INPATIENT - TYPICAL LEVEL 7-12		
	Department Name	Area
	Medical/ Surgical Units	28,925 SF
		28,925 SF
	Vertical Circulation	2,095 SF
		2,095 SF
Grand total		31,020 SF



3D New IMP2 LEVEL 7

SCALE:



COMMON CONCEPT-INP2-LEVEL 06

SCALE: 1 : 500

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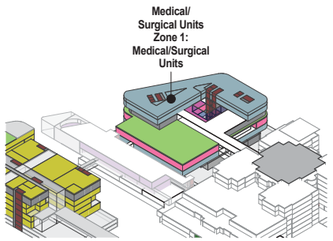
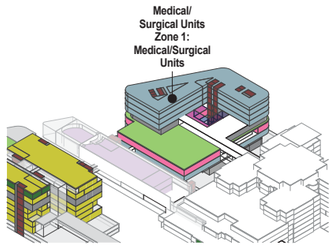
9.2 Commons Concept
Inpatient/OR Building: Level 08-11

00-Department Gross Area - NEW INPATIENT - TYPICAL LEVEL 7-12		
	Department Name	Area
	Medical/ Surgical Units	28,925 SF
		28,925 SF
	Vertical Circulation	2,095 SF
		2,095 SF
Grand total		31,020 SF



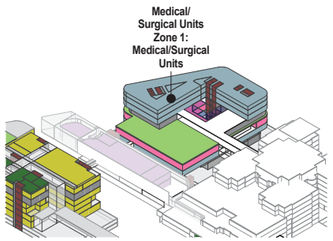
3D New IMP2 LEVEL 8

SCALE:



3D New IMP2 LEVEL 10

SCALE:



3D New IMP2 LEVEL 9

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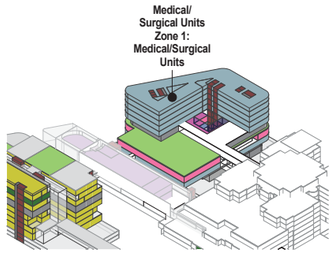

3D New IMP2 LEVEL 11

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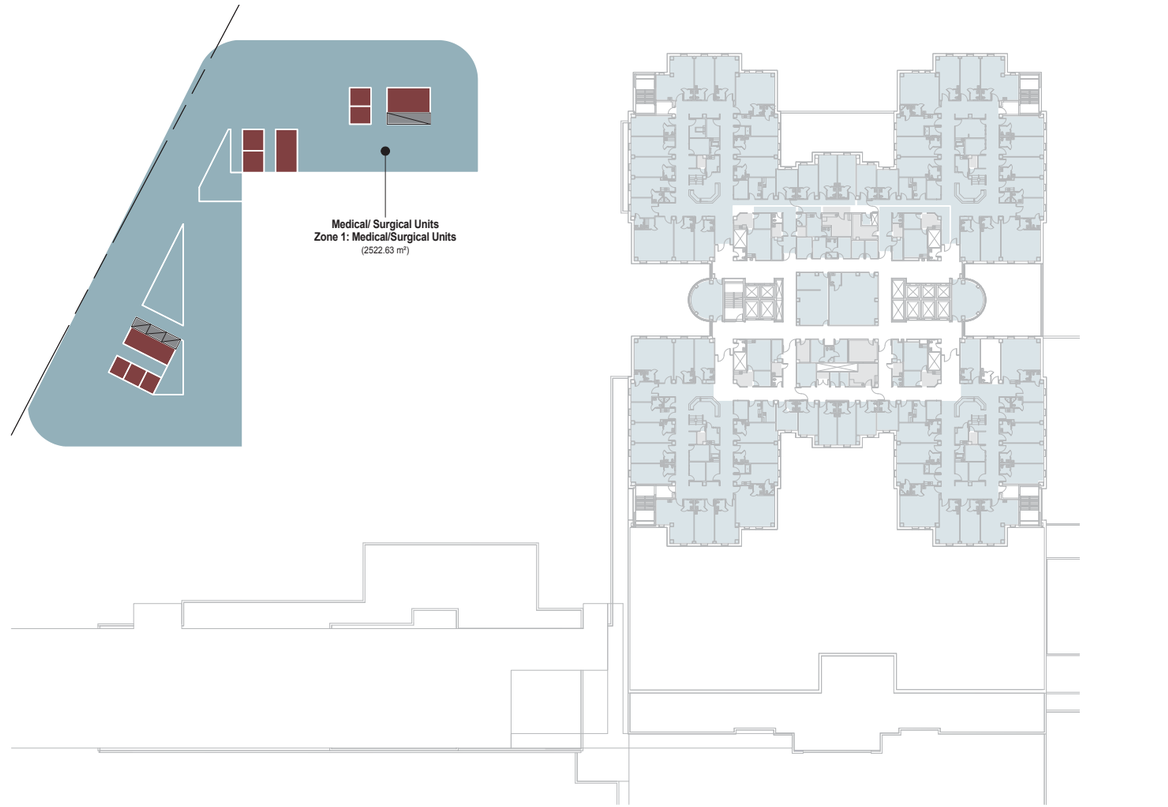


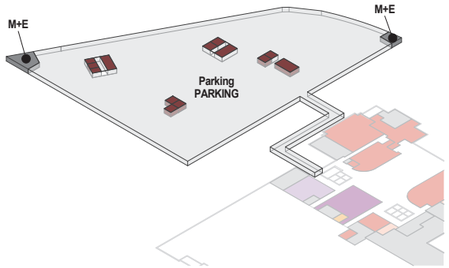
COMMON CONCEPT-INP2-LEVEL 08-11

SCALE: 1 : 500

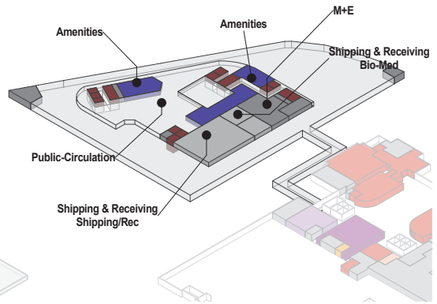
N

9.2 Commons Concept

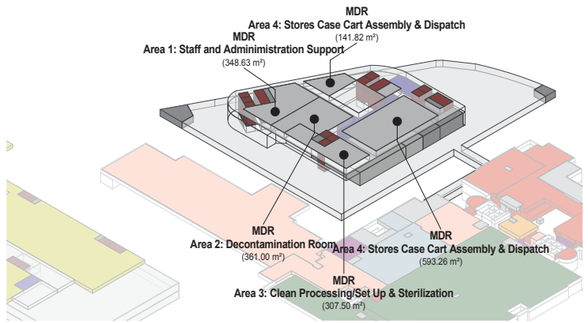
Inpatient/OR Building: 3D Diagrams



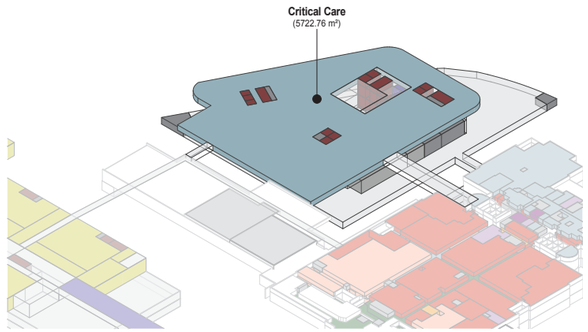
LEVEL P1



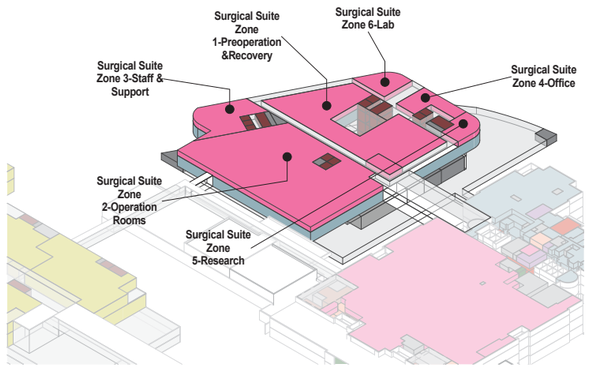
LEVEL 01



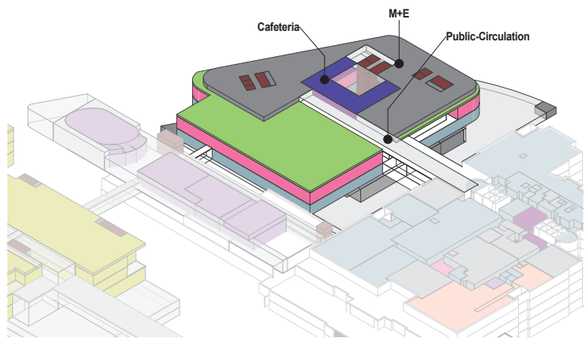
LEVEL 02



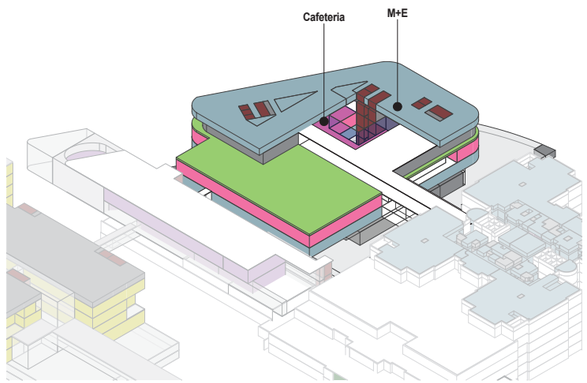
LEVEL 03



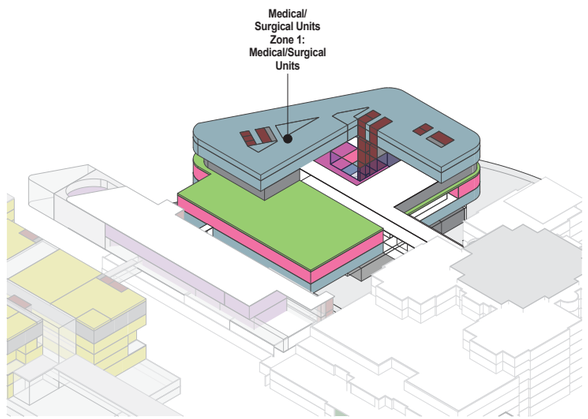
LEVEL 04



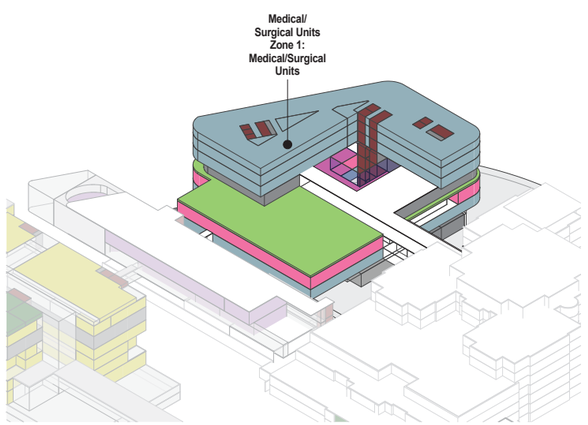
LEVEL 05



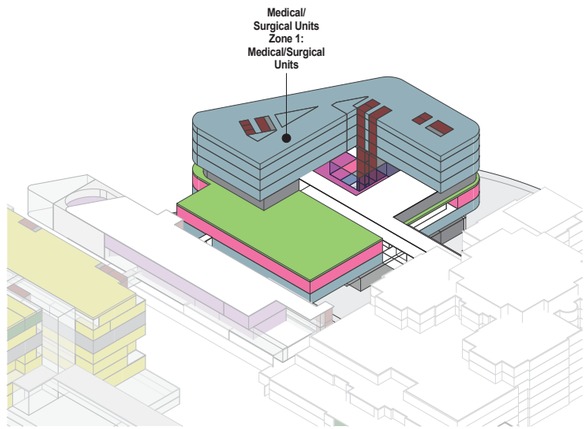
LEVEL 06



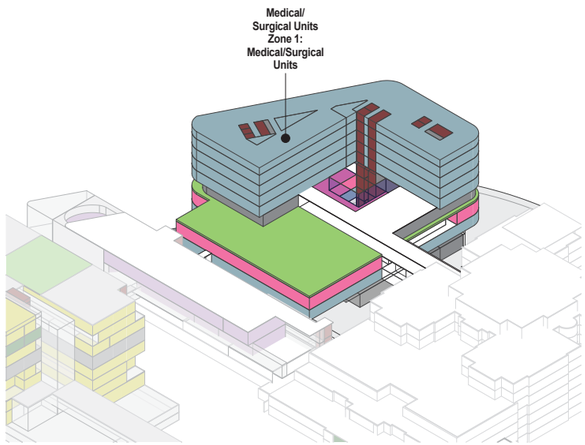
LEVEL 07



LEVEL 08



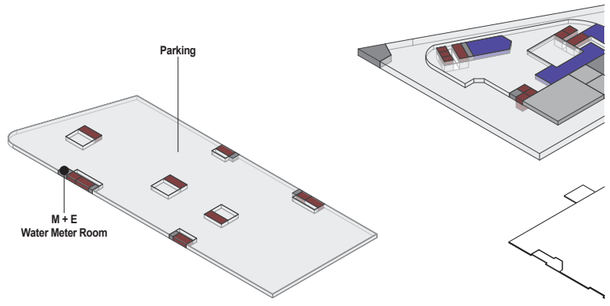
LEVEL 09



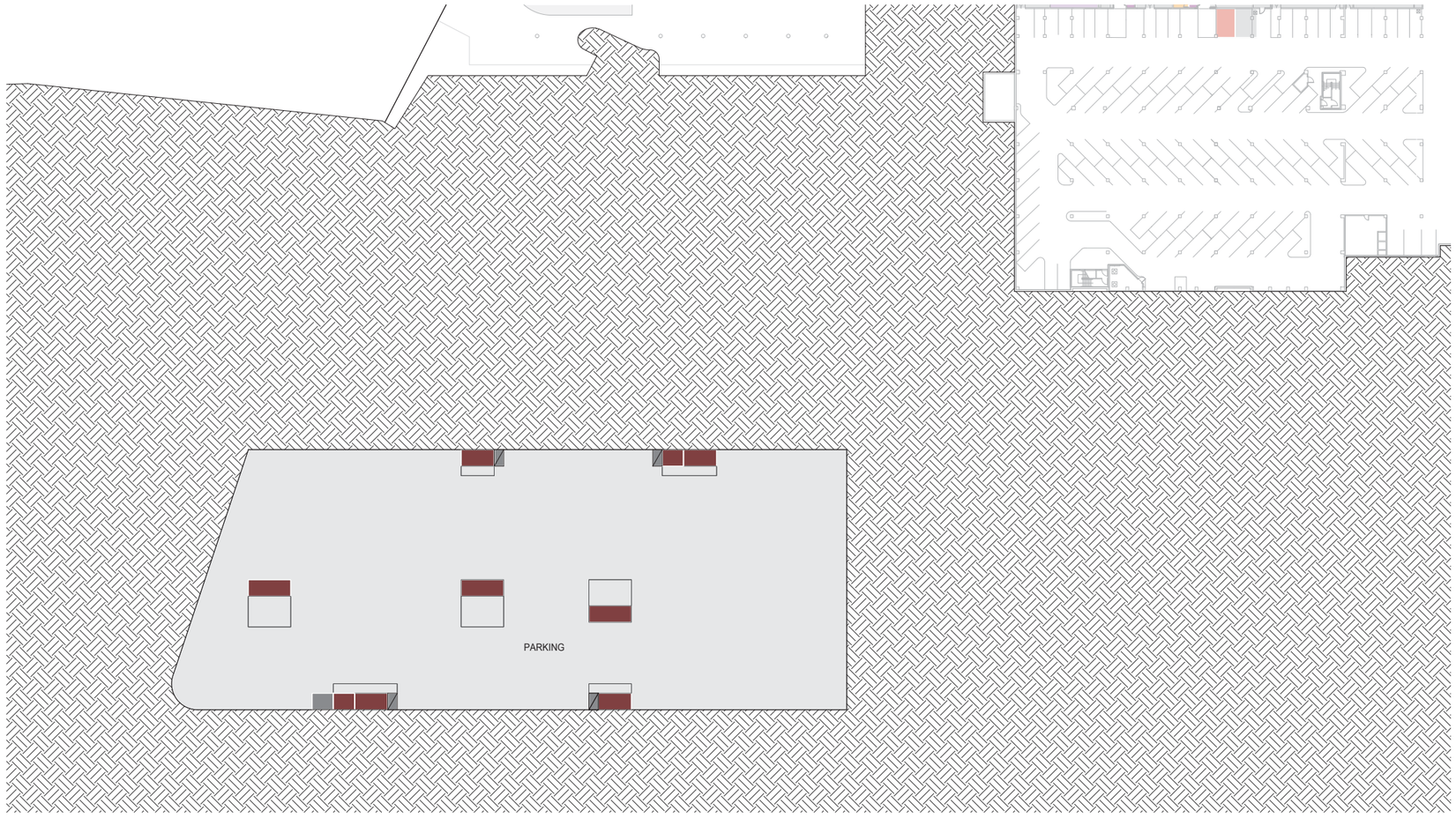
LEVEL 10

9.2 Commons Concept
Ambulatory Building: Level 01

DGSF of Common Concept - Ambulatory Building - Level 01	
Department Name	Area
Parking	74,749 SF
Public-Circulation	2,671 SF
	77,420 SF
Vertical Circulation	2,411 SF
	2,411 SF
Grand total	**79,831 SF**



3D New AMB2 LEVEL 1
SCALE:



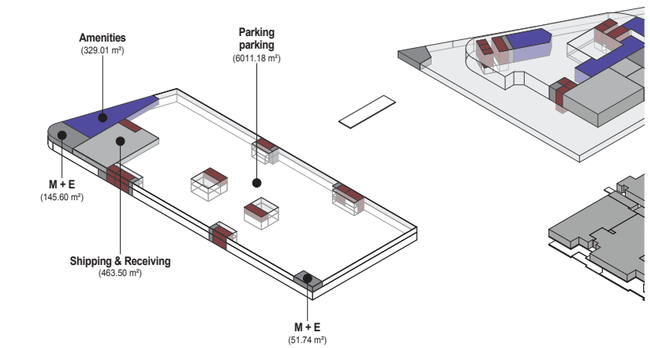
AMBULATORY - LEVEL-01
SCALE: 1 : 500

N

9.2 Commons Concept

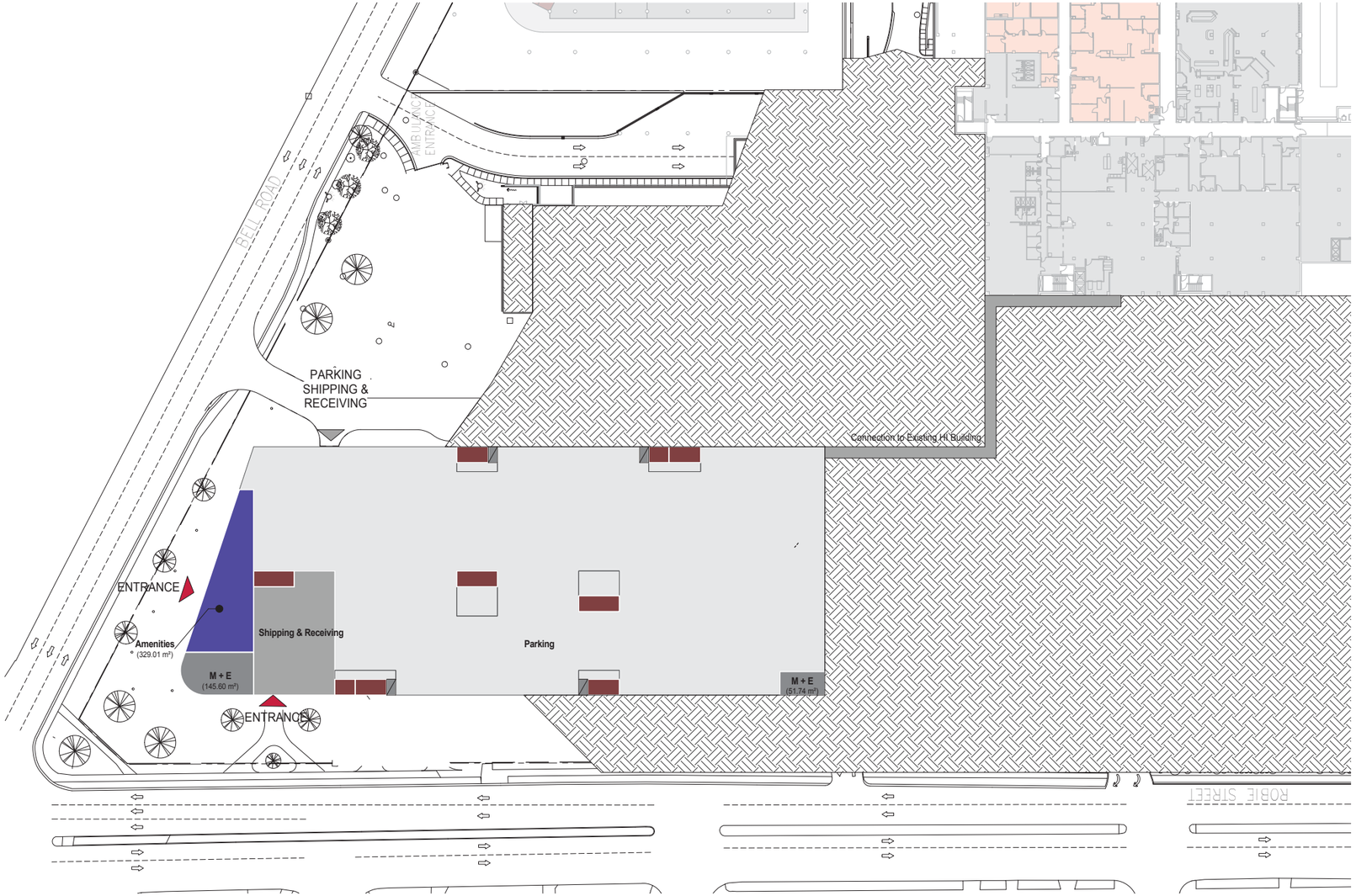
Ambulatory Building: Level 02

DGSF of Common Concept - Ambulatory Building - Level 02		
	Department Name	Area
	Amenities	3,541 SF
		3,541 SF
	M + E	1,567 SF
		1,567 SF
	Parking	64,704 SF
	Public-Circulation	2,086 SF
		66,790 SF
	Shipping & Receiving	4,989 SF
		4,989 SF
	Vertical Circulation	2,411 SF
		2,411 SF
Grand total		**79,299 SF**



3D New AMB2 LEVEL 2

SCALE:



AMBULATORY - LEVEL-02

SCALE: 1 : 500

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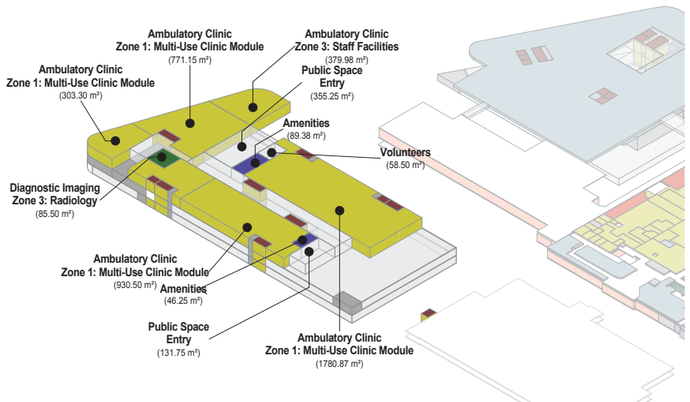
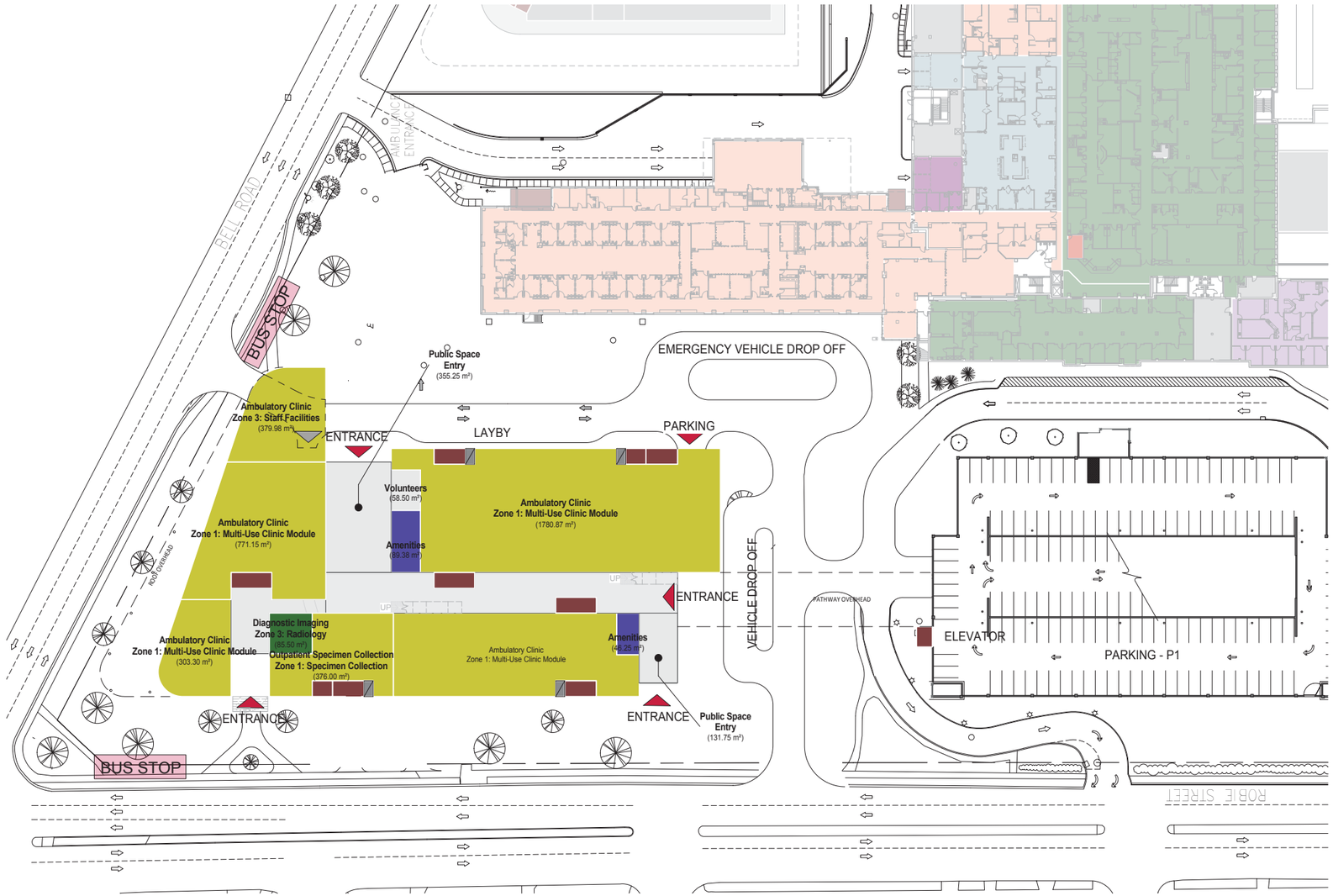
9.2 Commons Concept
Ambulatory Building: Level 03

DGSF of Common Concept - Ambulatory Building - Level 03	
Department Name	Area
Ambulatory Clinic	44,840 SF
Outpatient Specimen Collection	4,047 SF
	48,888 SF
Amenities	1,460 SF
	1,460 SF
Diagnostic Imaging	920 SF
	920 SF
Public Space	12,120 SF
Public-Circulation	1,744 SF
Volunteers	630 SF
	14,494 SF
Vertical Circulation	2,581 SF
	2,581 SF
Grand total	**68,342 SF**



3D New AMB2 LEVEL 3

SCALE:



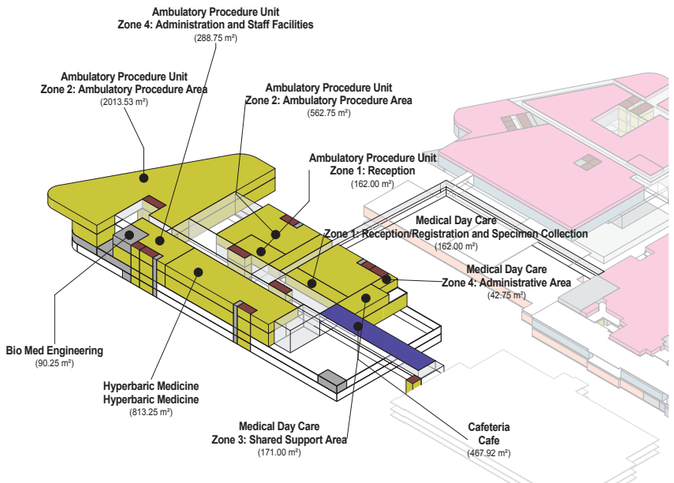
AMBULATORY - LEVEL-03

SCALE: 1 : 500

9.2 Commons Concept

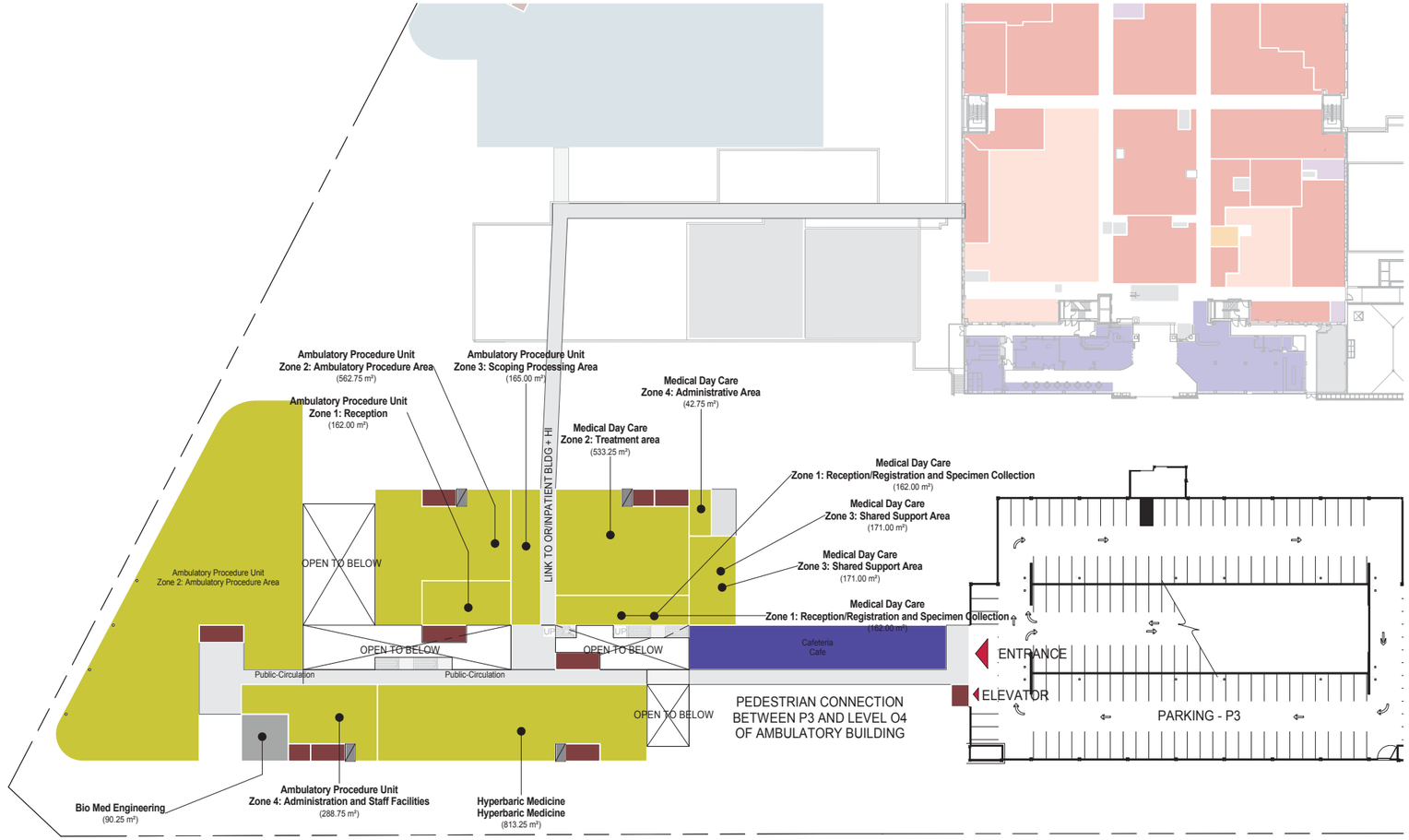
Ambulatory Building: Level 04

DGSF of Common Concept - Ambulatory Building - Level 04	
Department Name	Area
Ambulatory Procedure Unit	34,359 SF
Hyperbaric Medicine	8,754 SF
Medical Day Care	9,784 SF
	52,897 SF
Cafeteria	5,037 SF
	5,037 SF
Public-Circulation	13,270 SF
	13,270 SF
Bio Med Engineering	971 SF
	971 SF
Vertical Circulation	2,411 SF
	2,411 SF
Grand total	**74,586 SF**



3D New AMB2 LEVEL 4

SCALE:



AMBULATORY - LEVEL-04

SCALE: 1 : 500

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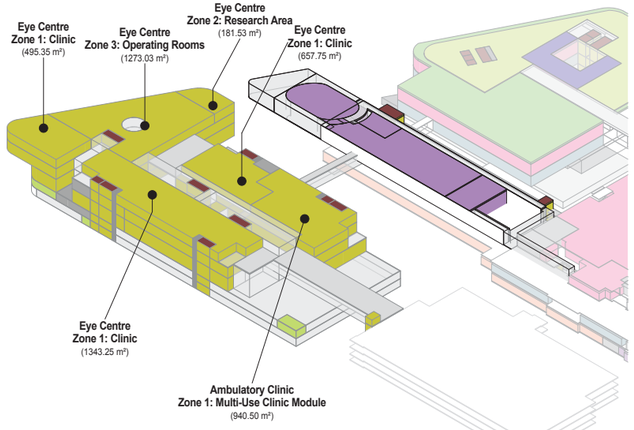
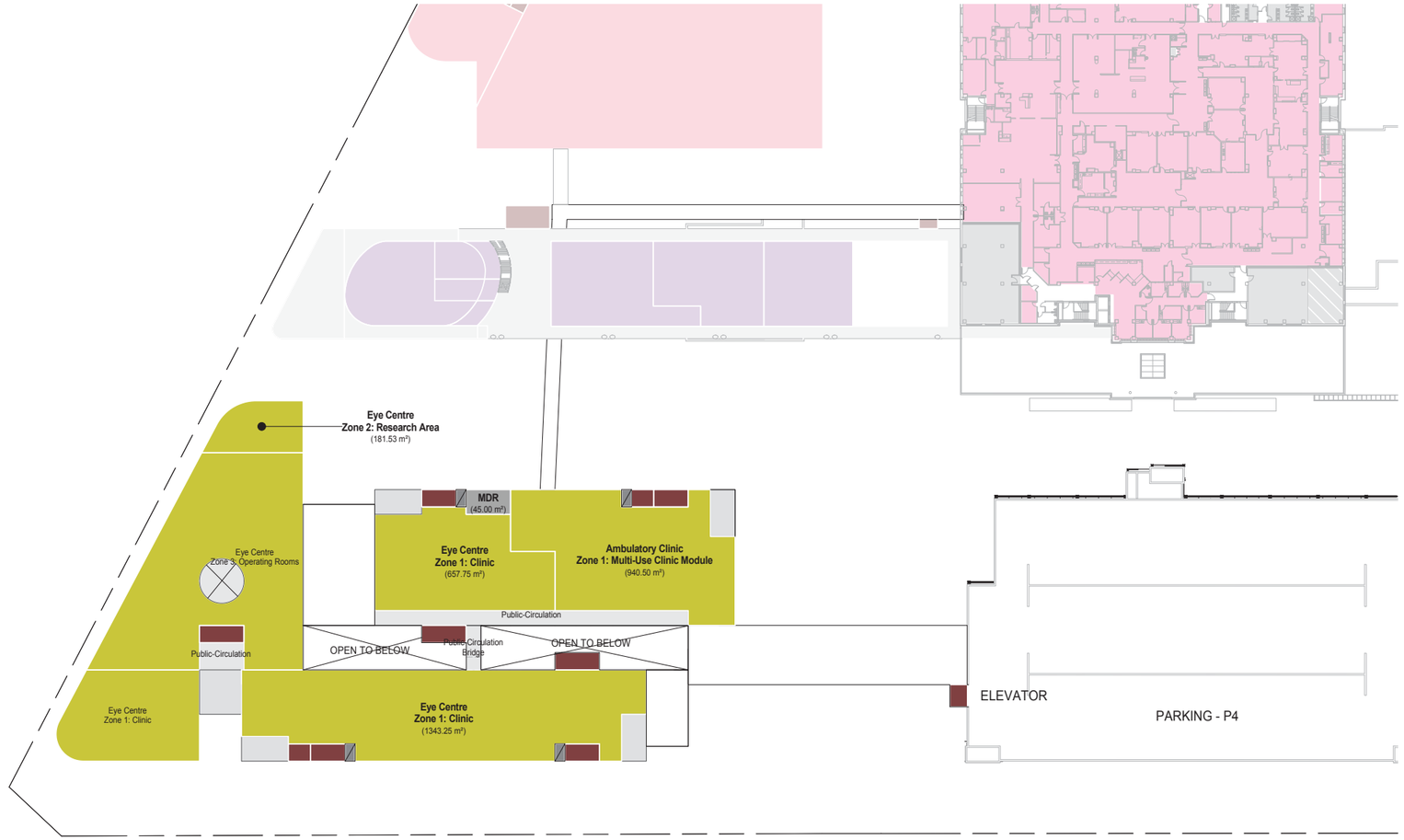
9.2 Commons Concept
Ambulatory Building: Level 05

DGSF of Common Concept - Ambulatory Building - Level 05		
	Department Name	Area
	Ambulatory Clinic	10,123 SF
	Eye Centre	42,527 SF
		52,651 SF
	Public-Circulation	5,093 SF
		5,093 SF
	MDR	484 SF
		484 SF
	Vertical Circulation	2,411 SF
		2,411 SF
Grand total		**60,639 SF**



3D New AMB2 LEVEL 5
SCALE:

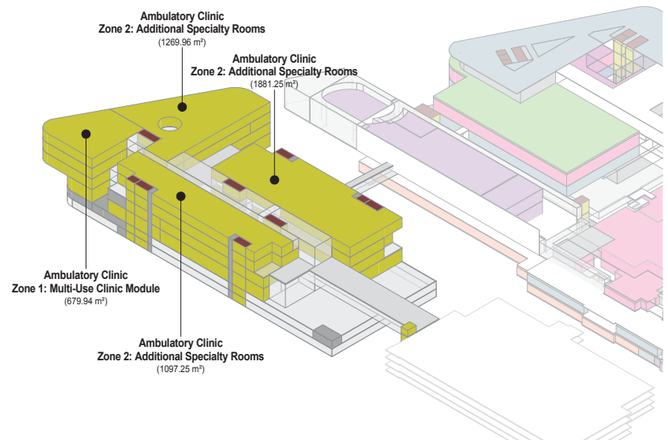


AMBULATORY - LEVEL-05
SCALE: 1 : 500

N

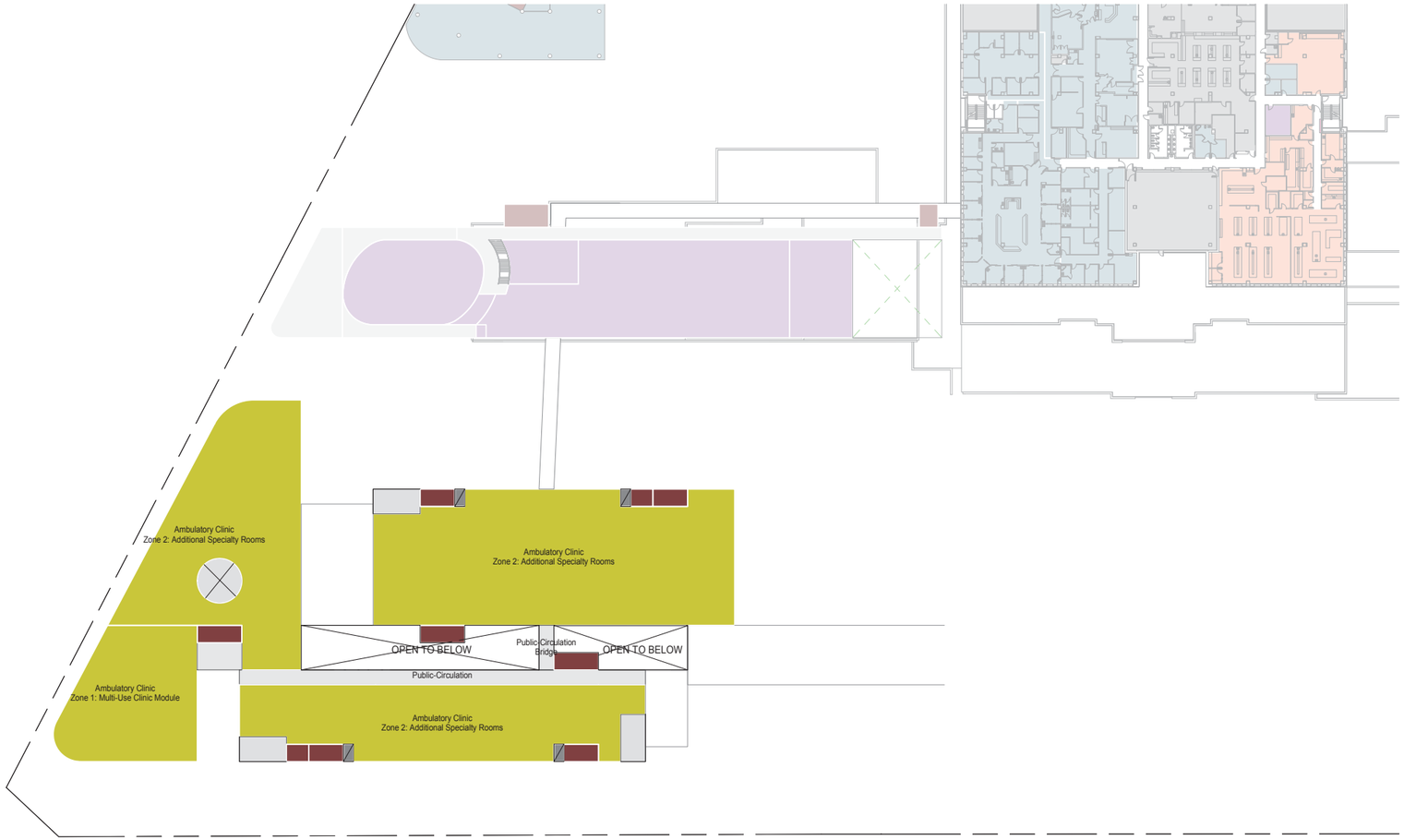
9.2 Commons Concept
Ambulatory Building: Level 06

DGSF of Common Concept - Ambulatory Building - Level 06		
	Department Name	Area
	Ambulatory Clinic	53,049 SF
		53,049 SF
	Public-Circulation	3,471 SF
		3,471 SF
	Vertical Circulation	2,411 SF
		2,411 SF
Grand total		**58,931 SF**



3D New AMB2 LEVEL 6

SCALE:



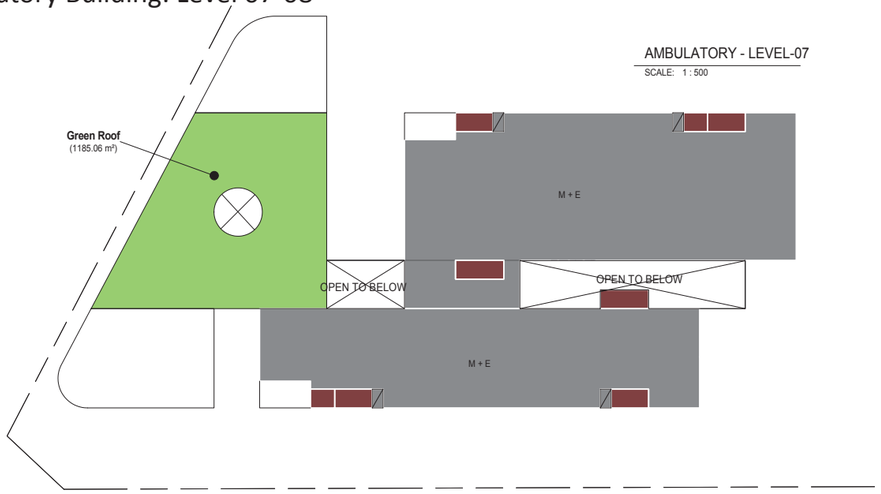
AMBULATORY - LEVEL-06

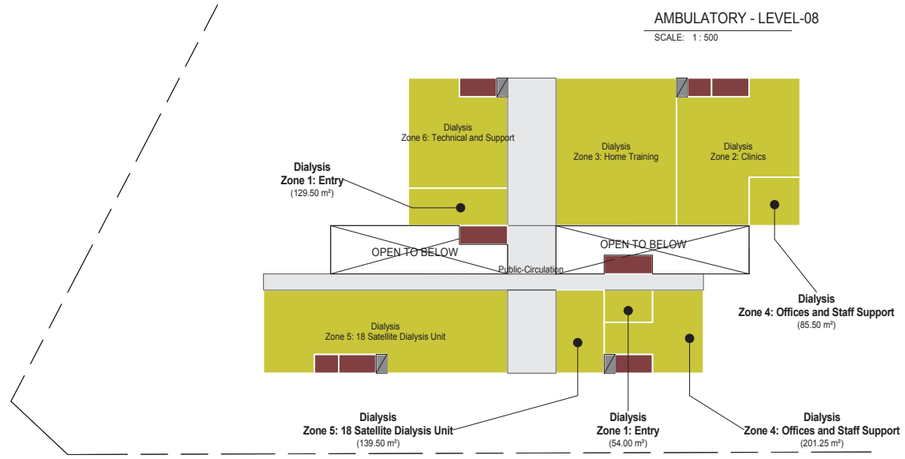
SCALE: 1 : 500

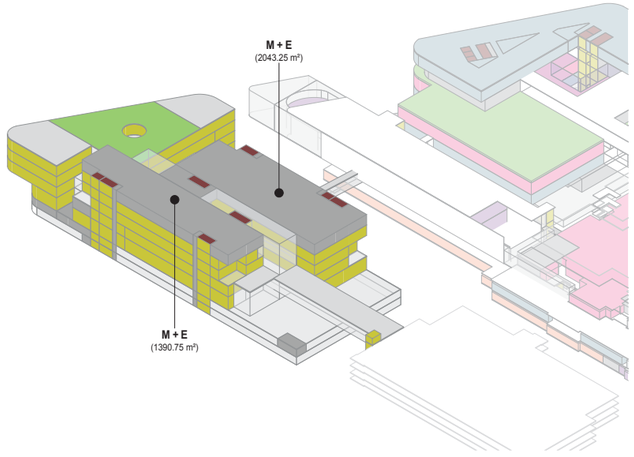
N

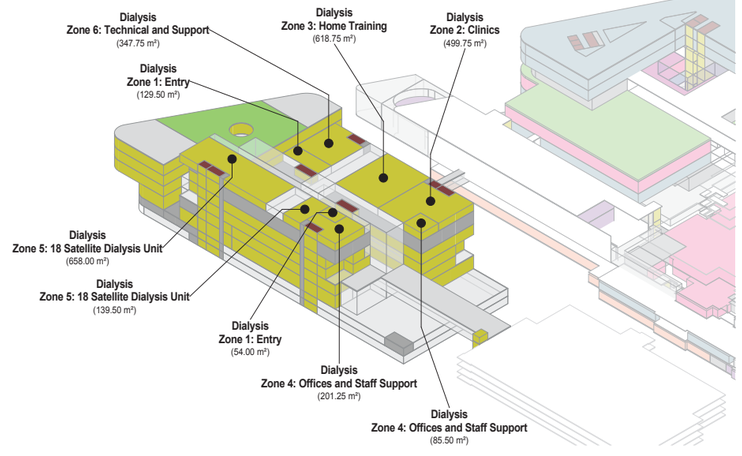
9.2 Commons Concept

Ambulatory Building: Level 07-08









DGSF of Common Concept - Ambulatory Building - Level 07

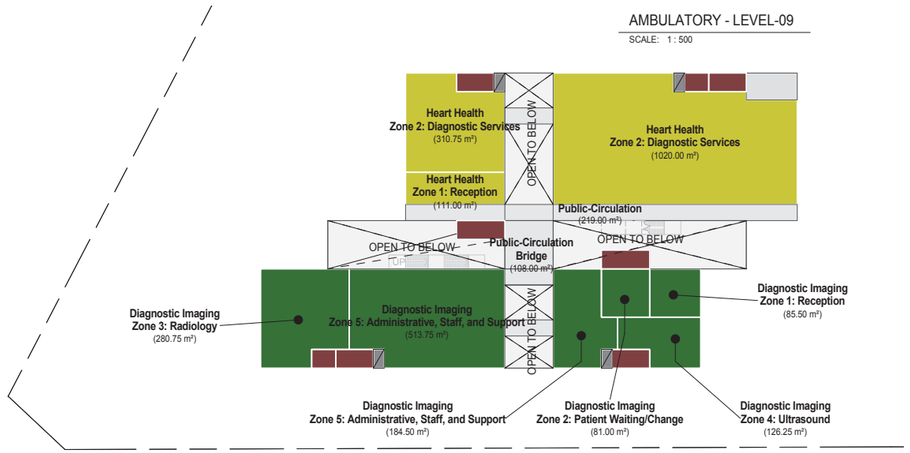
Department Name	Area
M + E	36,963 SF
	36,963 SF
	9,105 SF
	9,105 SF
Vertical Circulation	2,072 SF
	2,072 SF
Grand total	**48,140 SF**

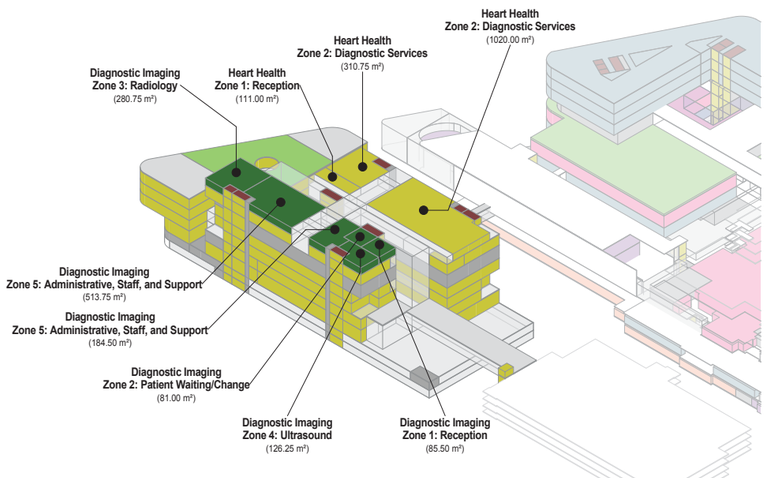
DGSF of Common Concept - Ambulatory Building - Level 08

Department Name	Area
Dialysis	29,429 SF
	29,429 SF
Public-Circulation	7,685 SF
	7,685 SF
Vertical Circulation	2,072 SF
	2,072 SF
Grand total	**39,186 SF**

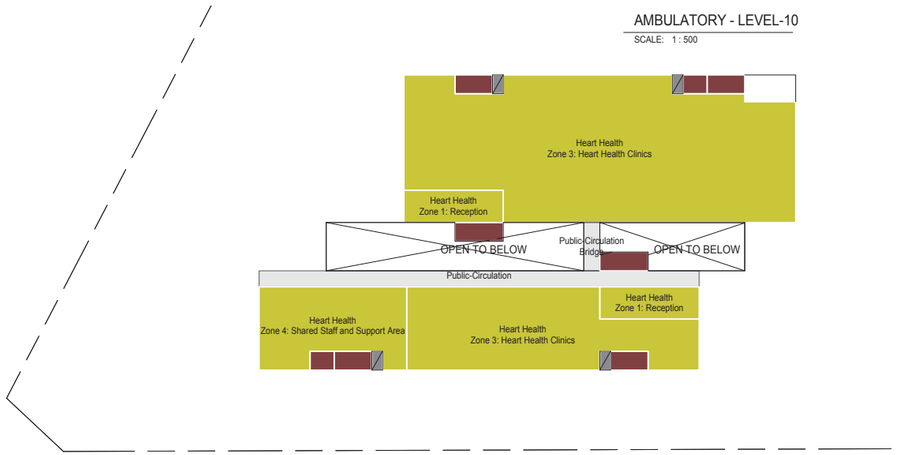
9.2 Commons Concept

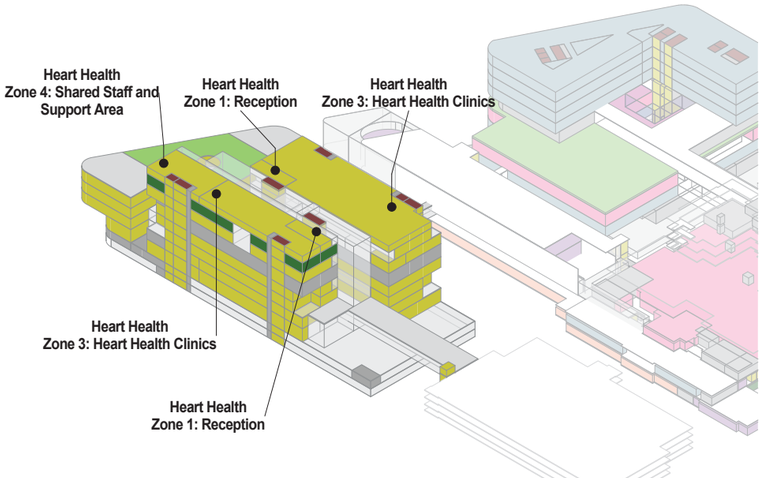
Ambulatory Building: Level 09-10





DGSF of Common Concept - Ambulatory Building - Level 09		
	Department Name	Area
	Heart Health	15,519 SF
		15,519 SF
	Diagnostic Imaging	13,689 SF
		13,689 SF
	Public-Circulation	4,612 SF
		4,612 SF
	Vertical Circulation	2,072 SF
		2,072 SF
Grand total		**35,892 SF**





DGSF of Common Concept - Ambulatory Building - Level 10		
	Department Name	Area
	Heart Health	33,083 SF
		33,083 SF
	Public-Circulation	2,939 SF
		2,939 SF
	Vertical Circulation	2,072 SF
		2,072 SF
Grand total		**38,093 SF**

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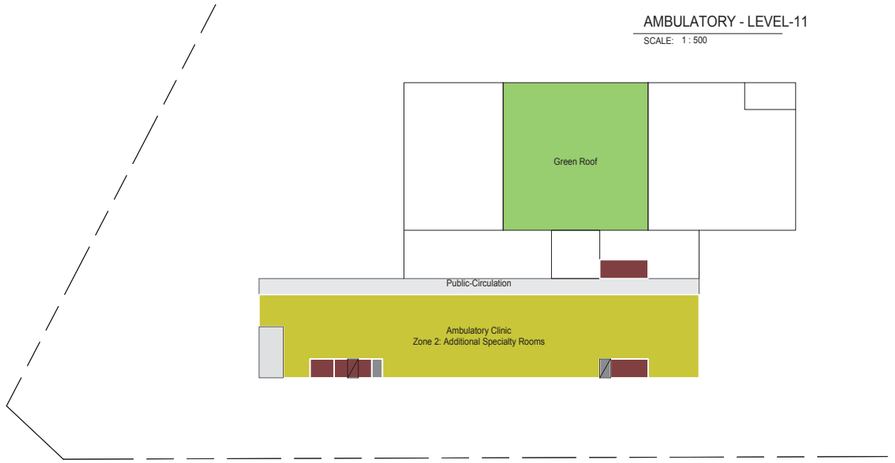
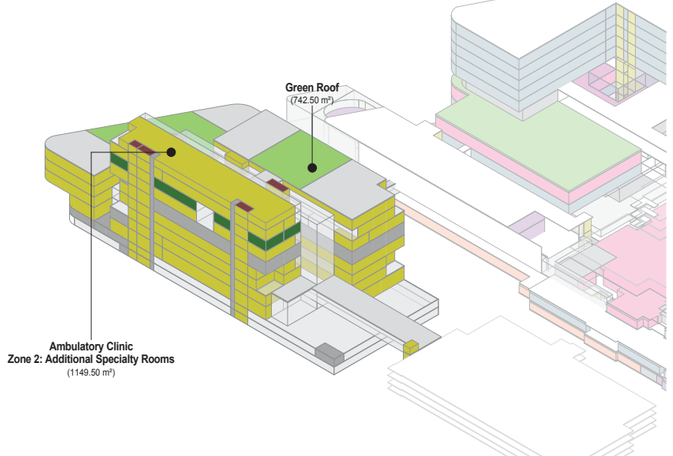
9.2 Commons Concept
Ambulatory Building: Level 11



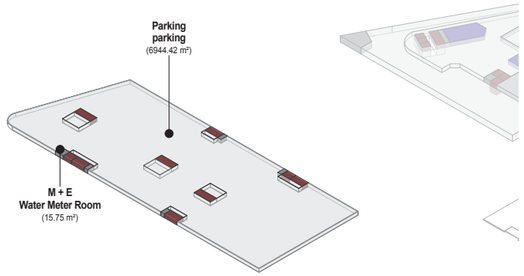


DGSF of Common Concept - Ambulatory Building - Level 11

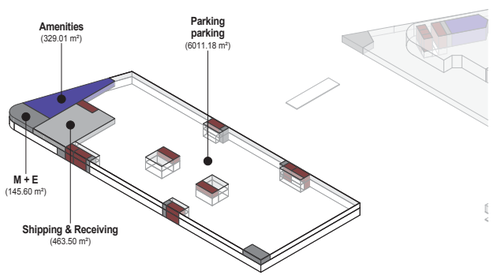
Department Name	Area
Ambulatory Clinic	12,373 SF
	12,373 SF
Public-Circulation	3,108 SF
	3,108 SF
Vertical Circulation	1,036 SF
	1,036 SF
Grand total	**16,517 SF**

9.2 Commons Concept

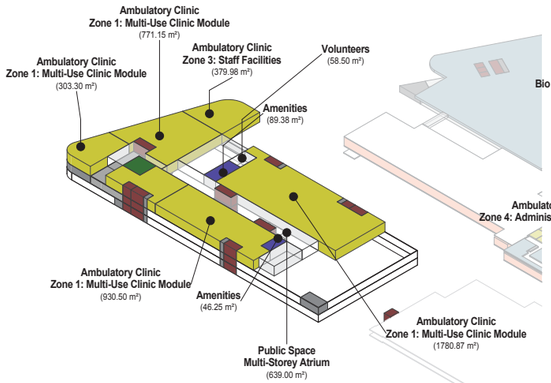
Ambulatory Building: 3D Diagrams



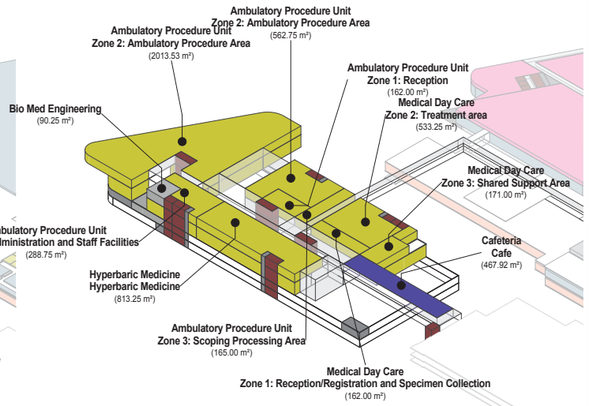
LEVEL 01



LEVEL 02



LEVEL 03



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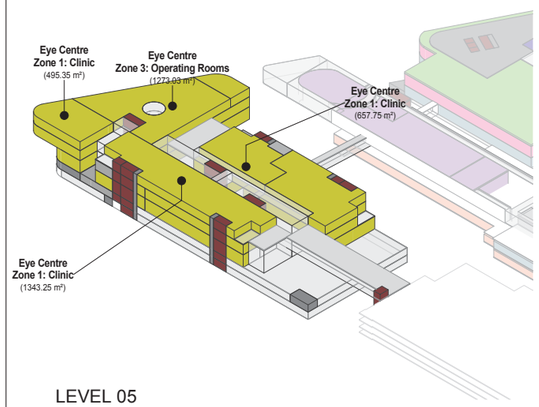
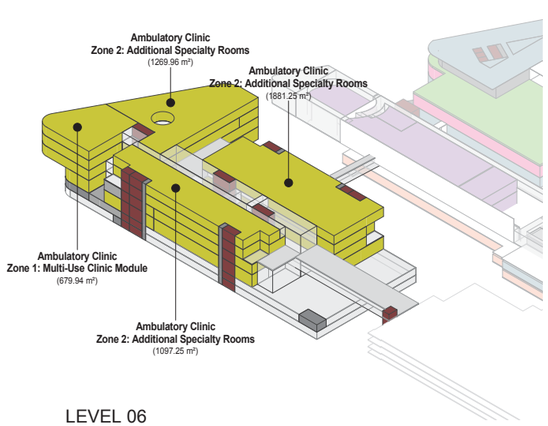
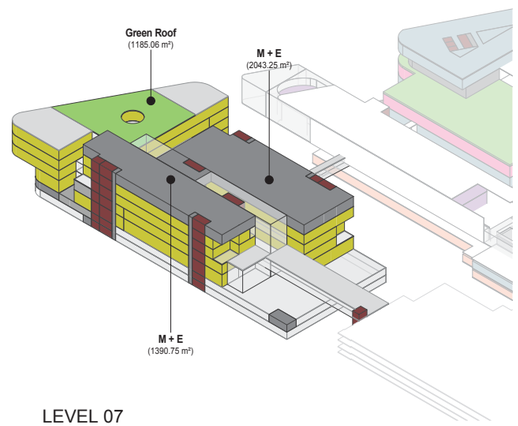


LEVEL 05



LEVEL 06



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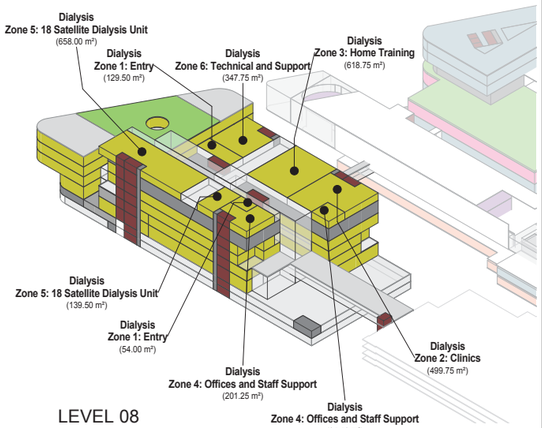
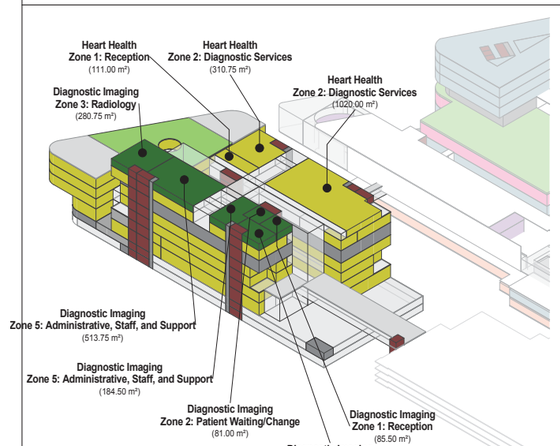


LEVEL 08



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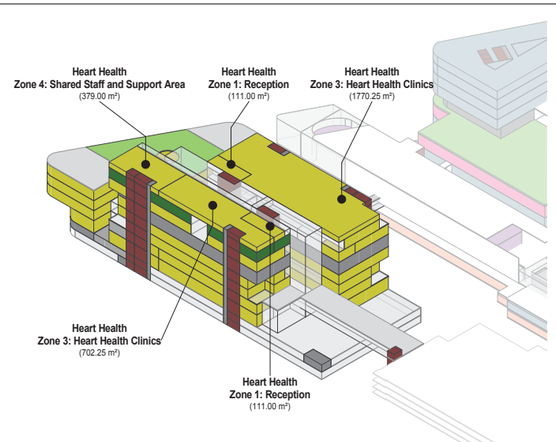
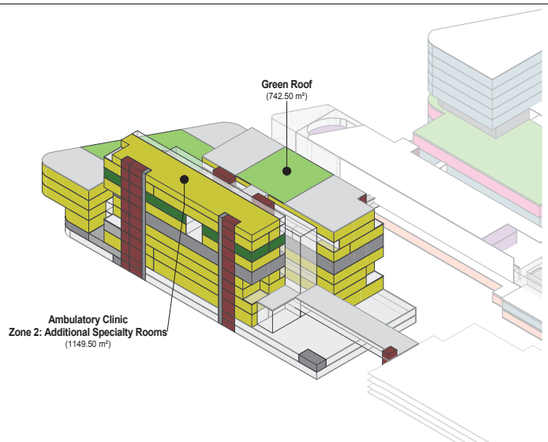


LEVEL 10



LEVEL 11

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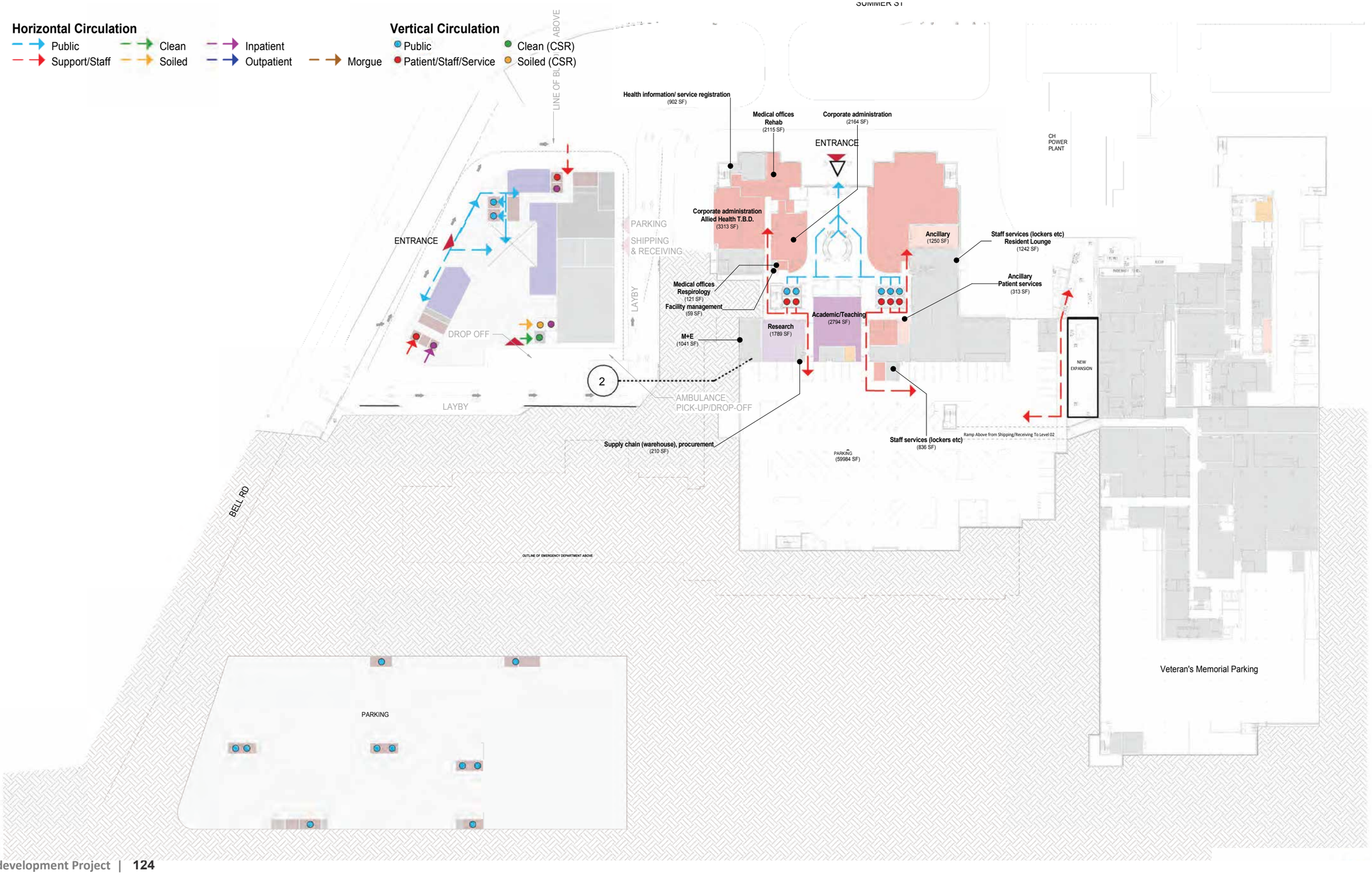
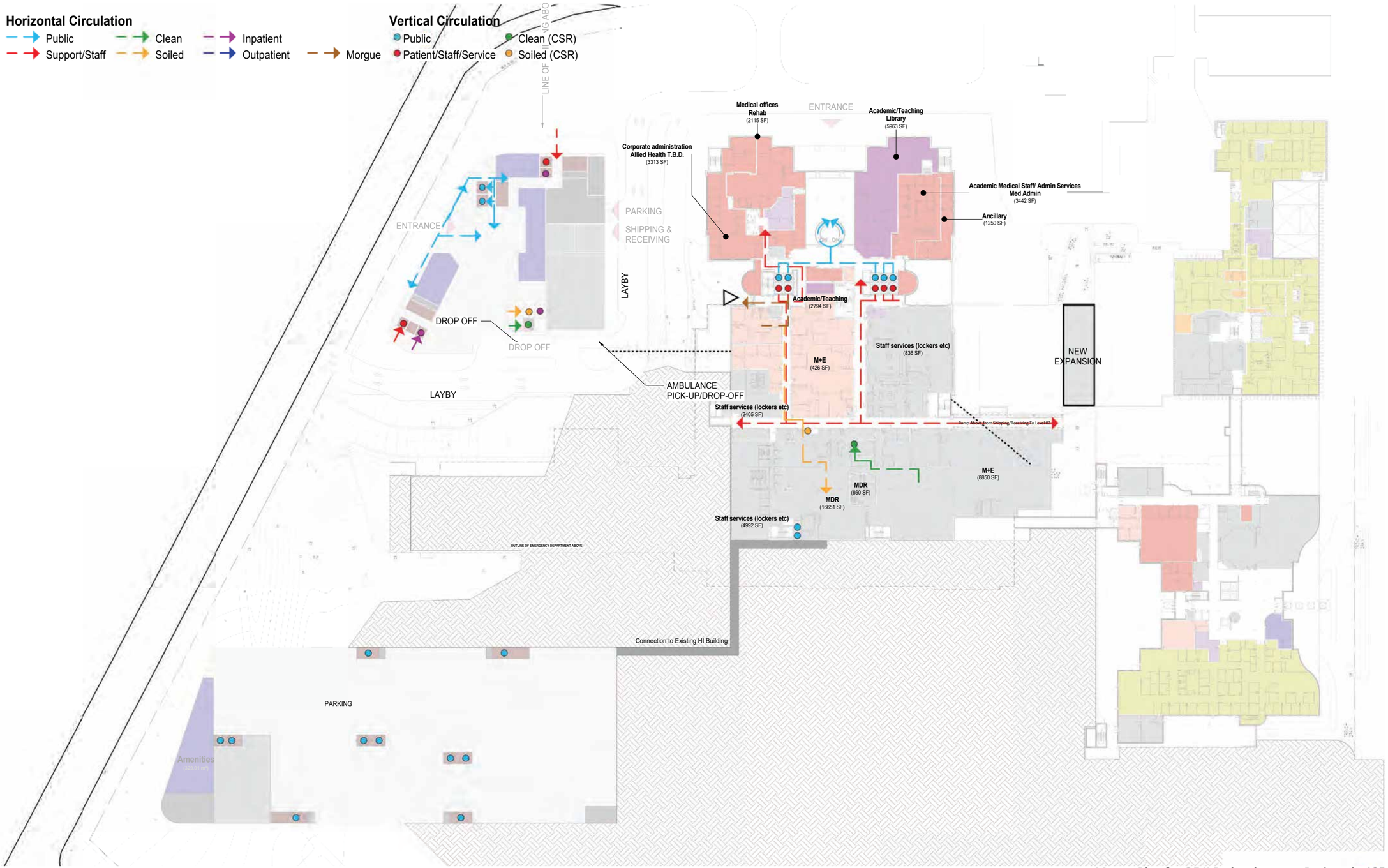
9.2 Commons Concept
Circulation Level 01

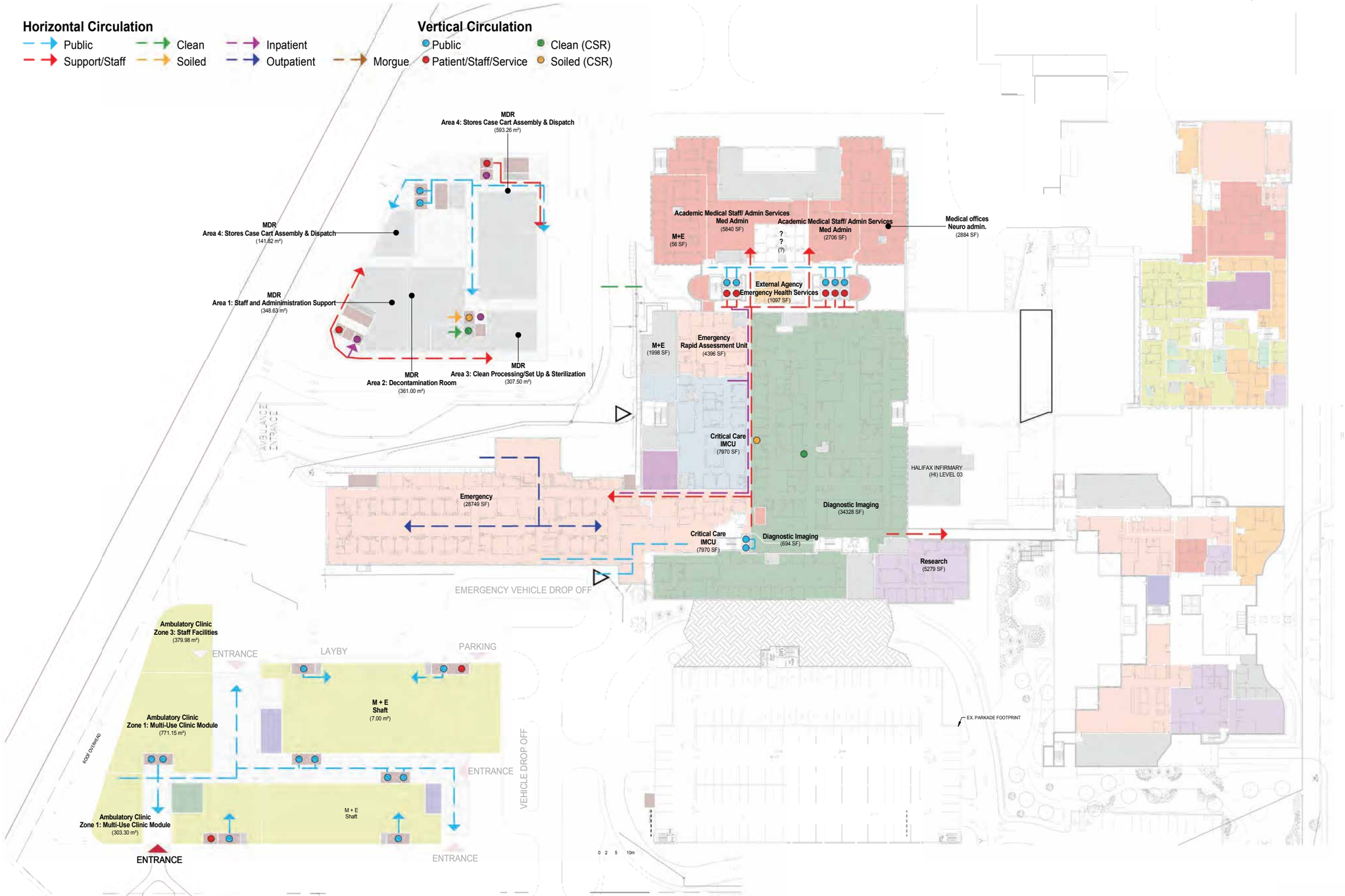


9.2 Commons Concept

Circulation Level 02

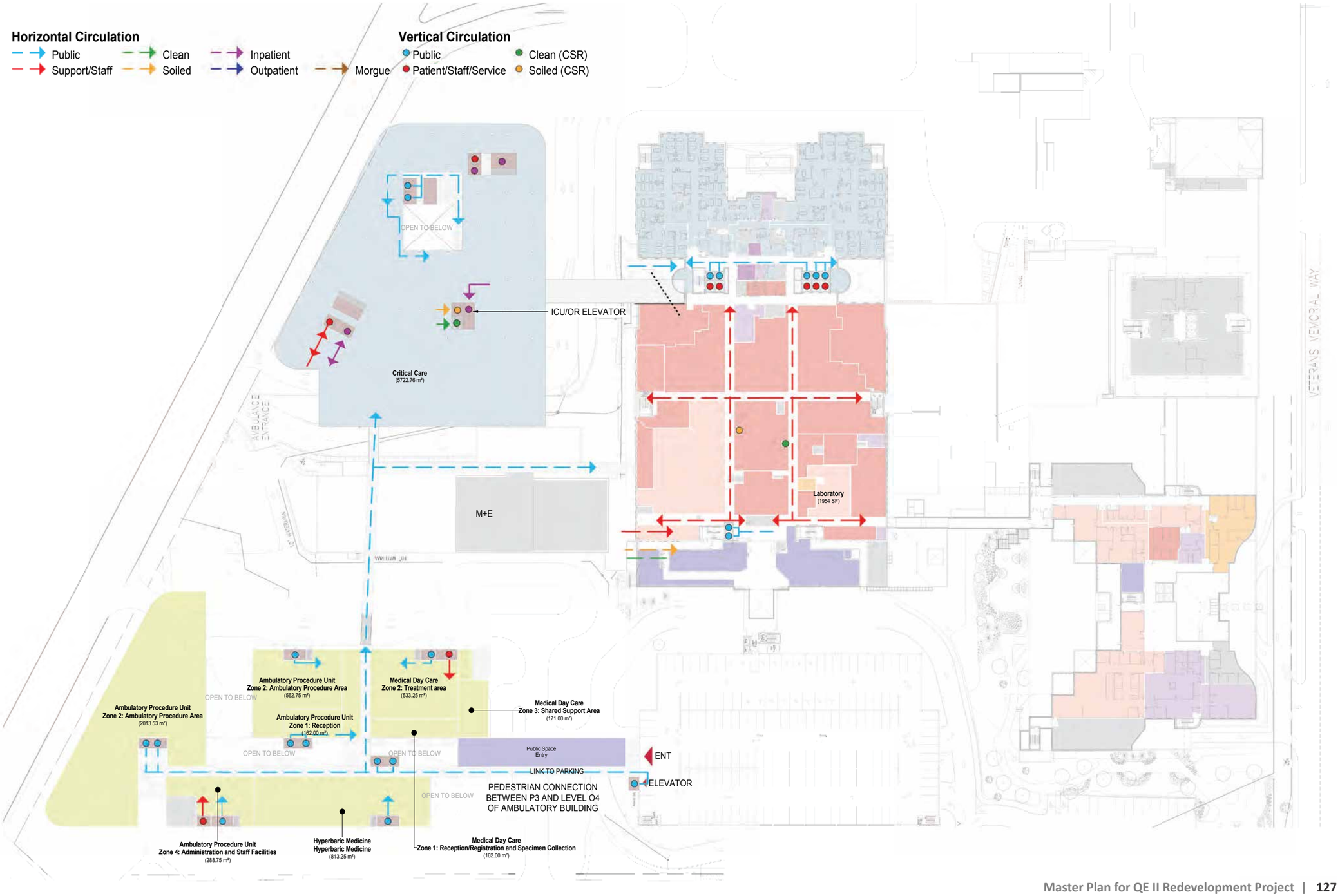


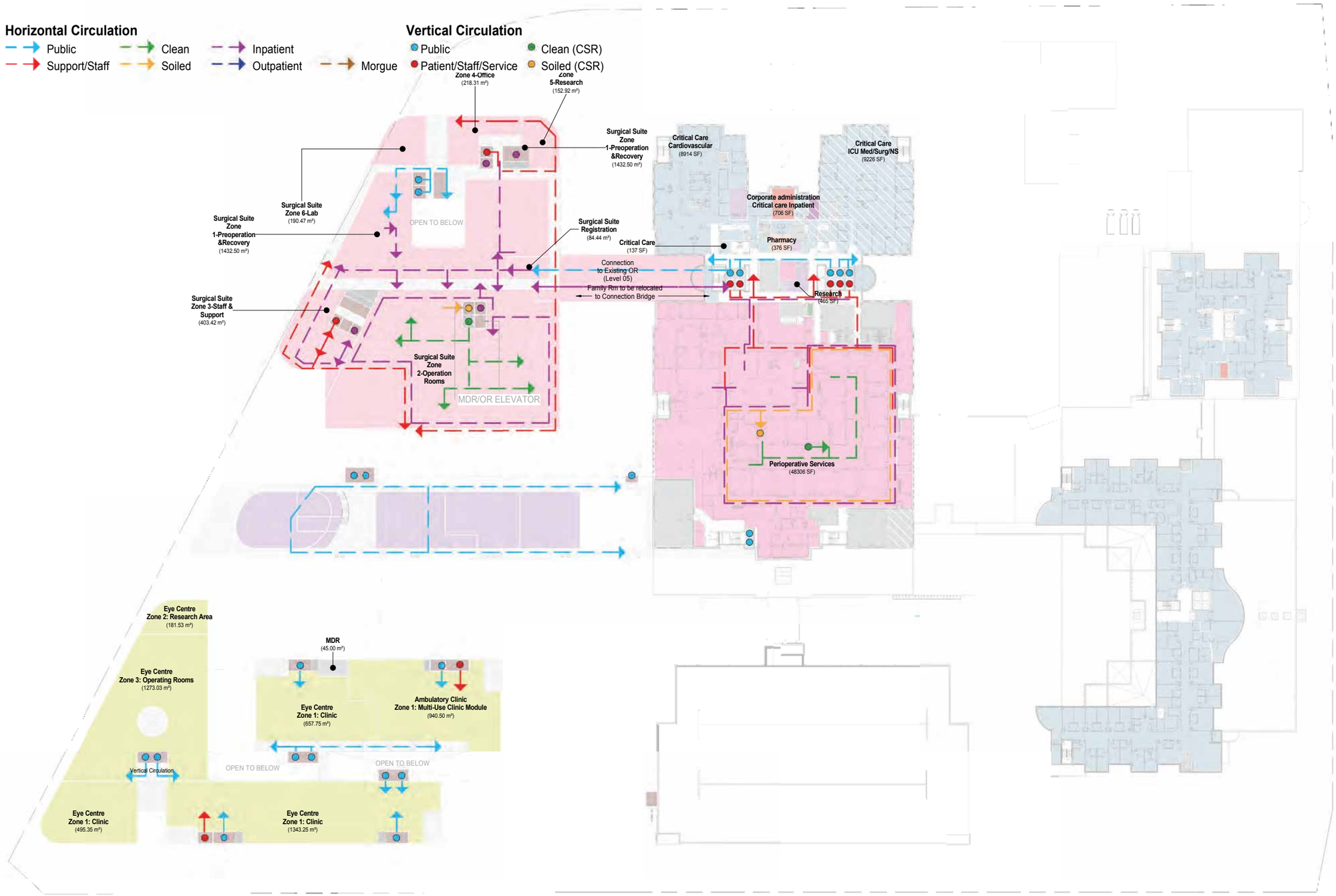
9.2 Commons Concept
Circulation Level 03



9.2 Commons Concept

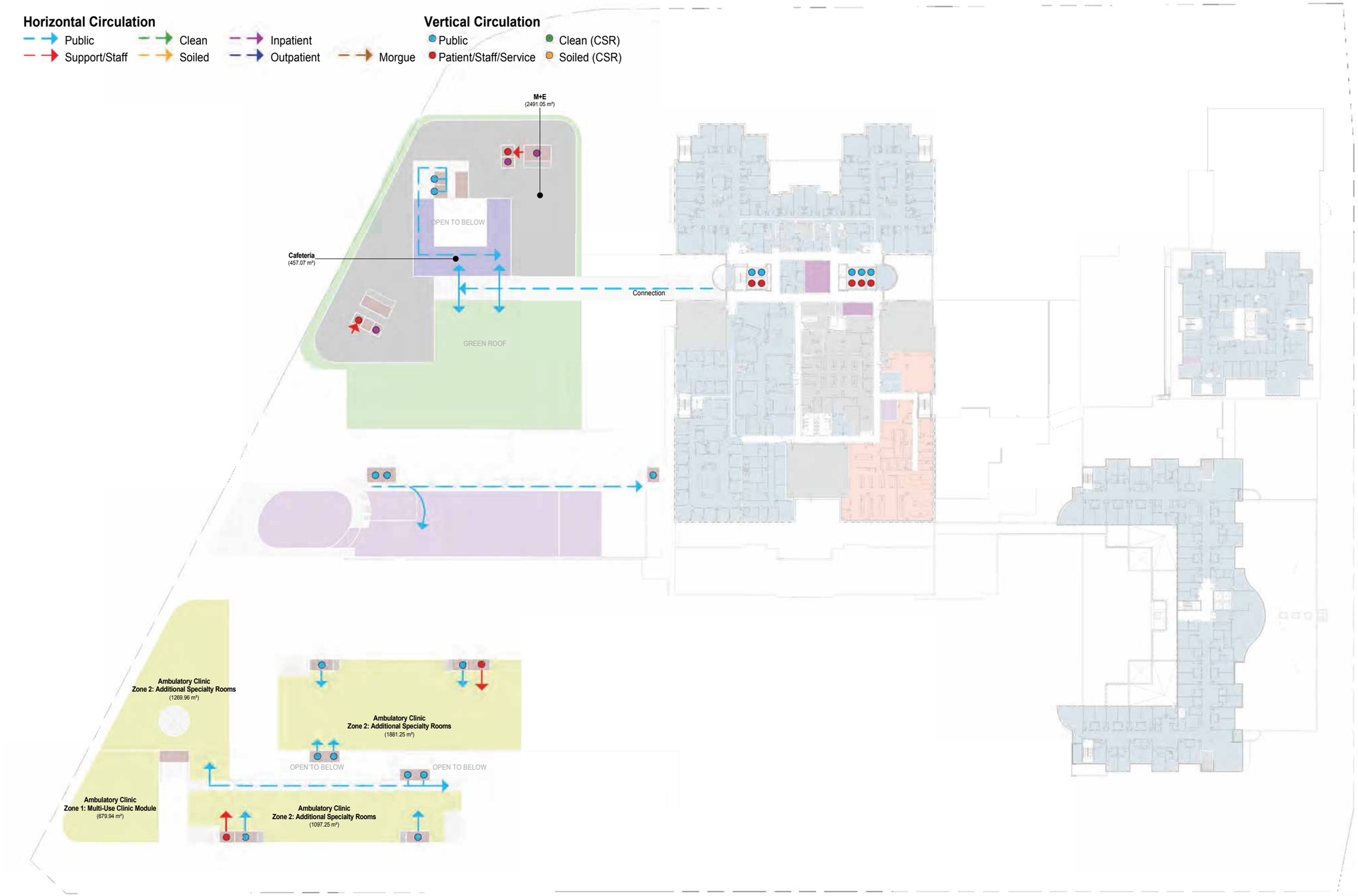
Circulation Level 04




Horizontal Circulation
Public
Support/Staff
Clean
Soiled
Inpatient
Outpatient
Morgue
Vertical Circulation
Public
Patient/Staff/Service
Clean (CSR)
Soiled (CSR)
Zone 4-Office
(218.31 m²)
Zone 5-Research
(152.92 m²)
Surgical Suite Zone 1-Preoperation &Recovery
(1432.50 m²)
Surgical Suite Zone 6-Lab
(190.47 m²)
Surgical Suite Zone 1-Preoperation &Recovery
(1432.50 m²)
OPEN TO BELOW
Surgical Suite Registration
(84.44 m²)
Surgical Suite Zone 3-Staff & Support
(403.42 m²)
Surgical Suite Zone 2-Operation Rooms
MDR/OR ELEVATOR
Critical Care Cardiovascular
(8914 SF)
Critical Care ICU Med/Surg/NS
(9226 SF)
Corporate administration Critical care Inpatient
(706 SF)
Critical Care
(137 SF)
Pharmacy
(376 SF)
Connection to Existing OR (Level 05)
Family Rm to be relocated to Connection Bridge
Research
(465 SF)
Perioperative Services
(48306 SF)
Eye Centre Zone 2: Research Area
(181.53 m²)
MDR
(45.00 m²)
Eye Centre Zone 3: Operating Rooms
(1273.03 m²)
Eye Centre Zone 1: Clinic
(657.75 m²)
Ambulatory Clinic Zone 1: Multi-Use Clinic Module
(940.50 m²)
Vertical Circulation
OPEN TO BELOW
OPEN TO BELOW
Eye Centre Zone 1: Clinic
(495.35 m²)
Eye Centre Zone 1: Clinic
(1343.25 m²)
N

9.2 Commons Concept

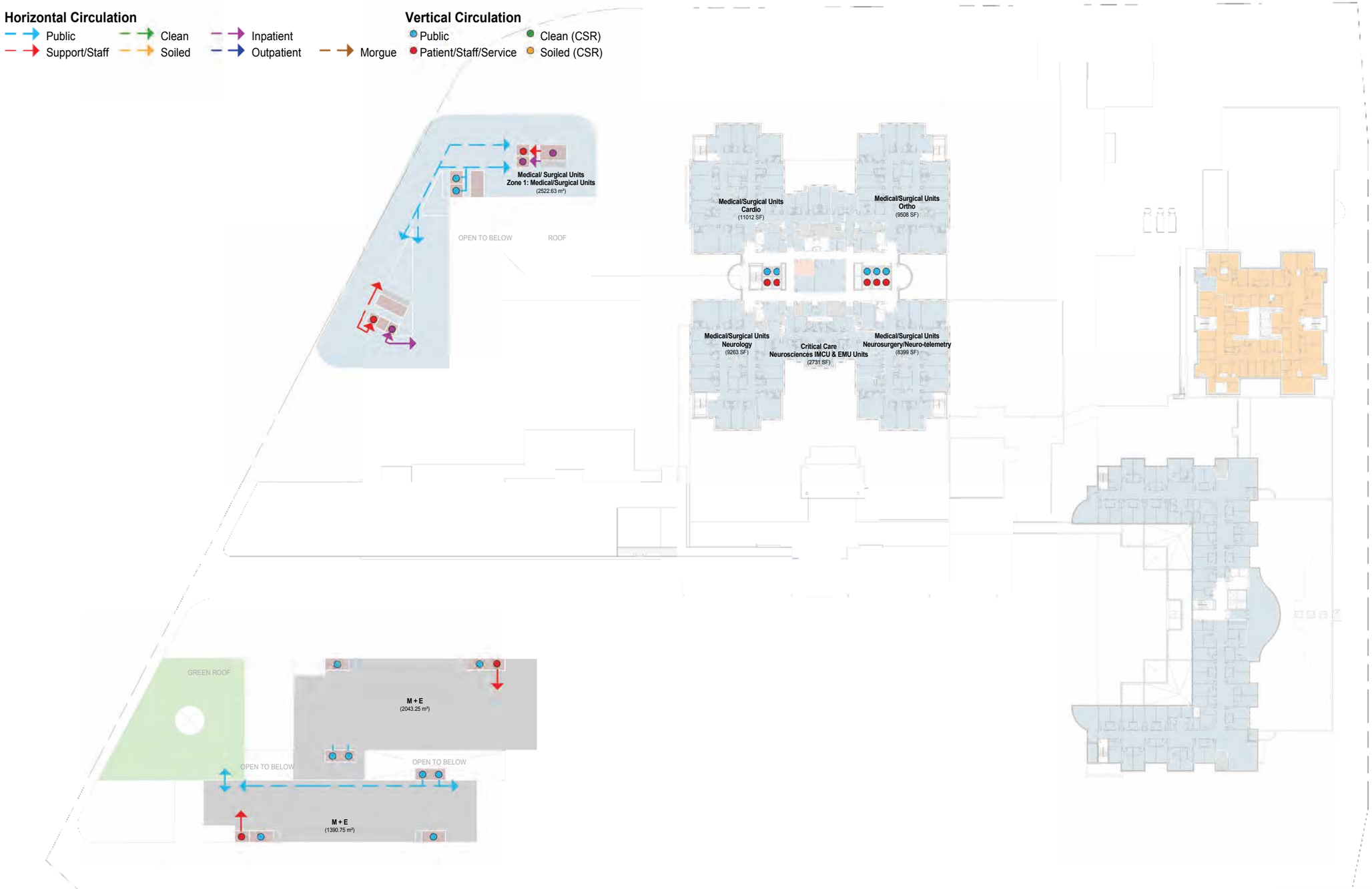
Circulation Level 06



N

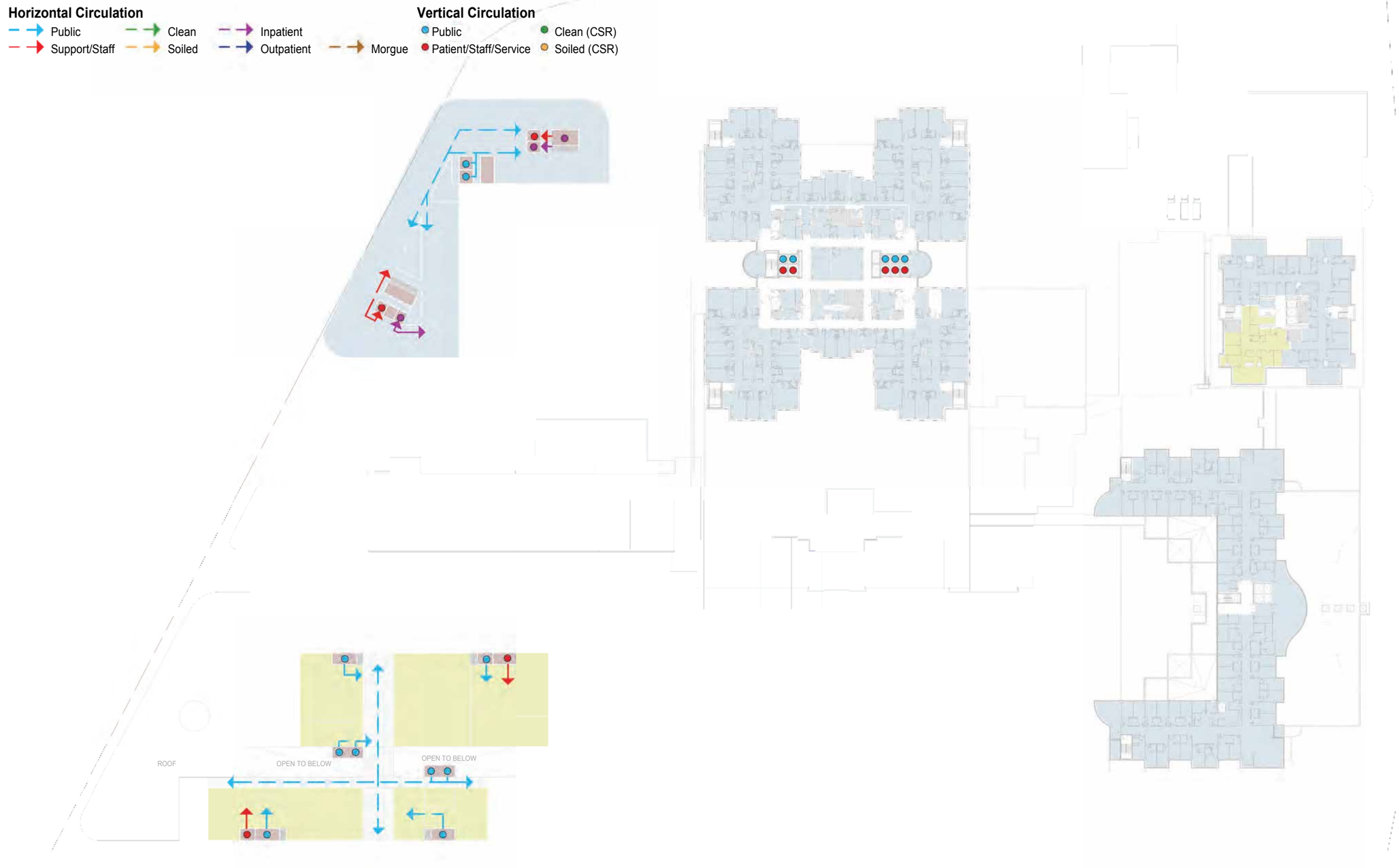
WILLOW TREE - Level 06

9.2 Commons Concept
Circulation Level 07

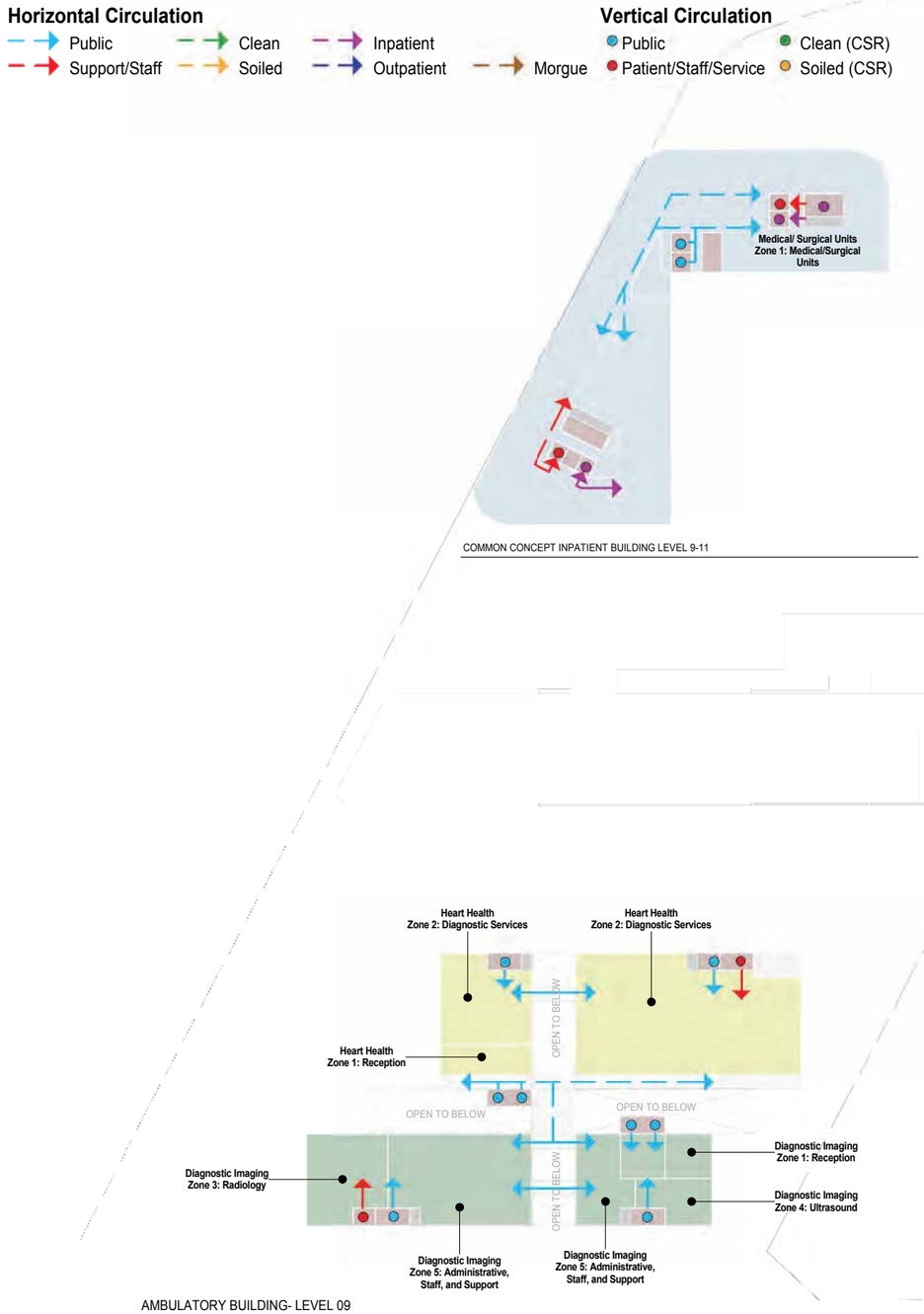


9.2 Commons Concept

Circulation Level 08



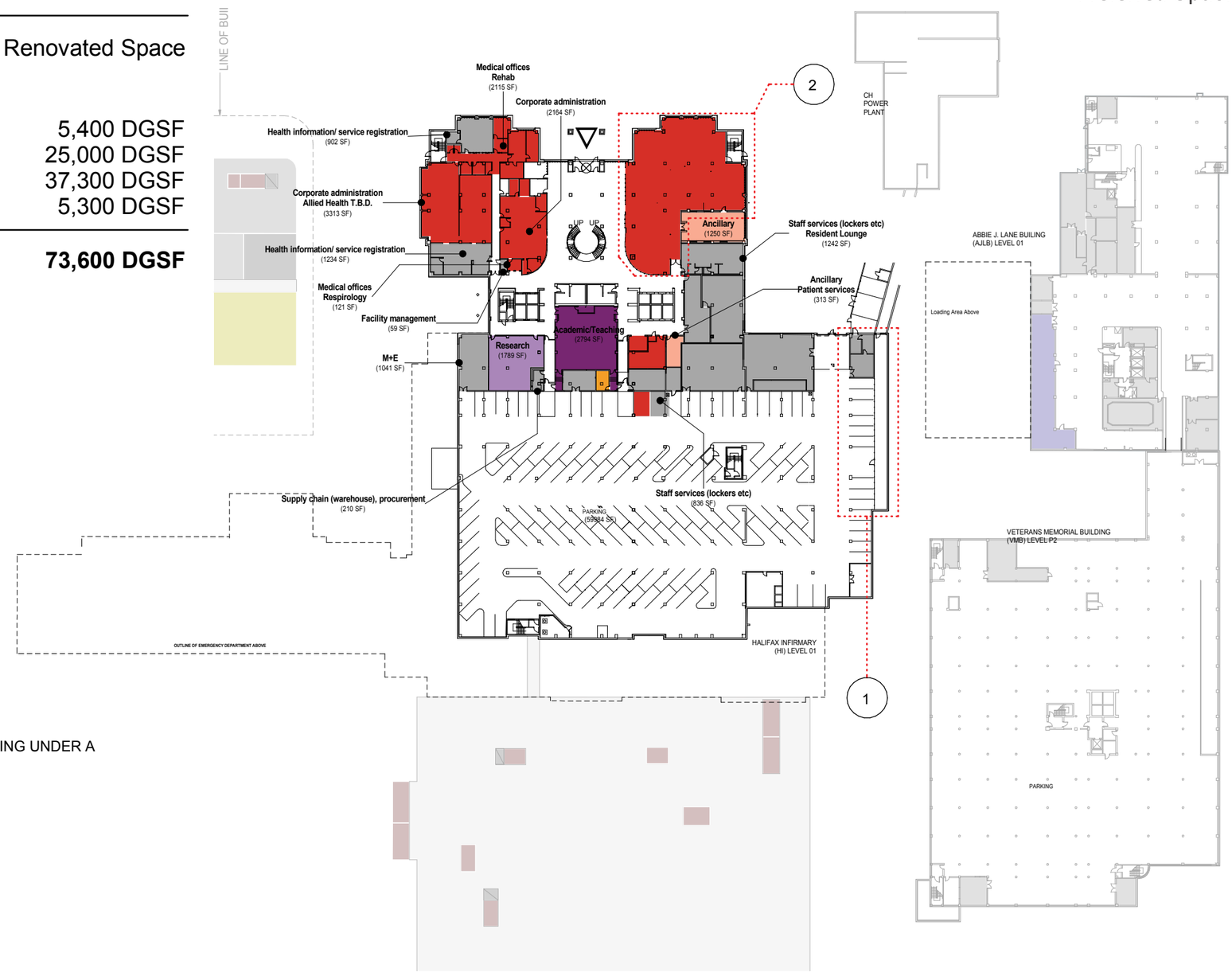
9.2 Commons Concept
Circulation Level 09-11



9.2 Commons Concept

9.2.5 Halifax Infirmary Renovations and Decanting : Level 01

	Existing	Renovated Space
- Level 1	37,000 DGSF	
- Level 2	79,800 DGSF	5,400 DGSF
- Level 3	133,400 DGSF	25,000 DGSF
- Level 4	85,700 DGSF	37,300 DGSF
- Level 5	83,700 DGSF	5,300 DGSF
Grand Total	**419,600 DGSF**	**73,600 DGSF**



SCALE: 1 : 500

PROGRAMS FOR DECANTING RENOVATION

① FACILITY MANAGEMENT EXPANSION (T.B.D. SF)

② OUT: DIALYSIS TO AMBULATORY CARE BUILDING UNDER A SEPARATE RENO PROJECT (8,000 SF)

IN: ADMINISTRATION SERVICES

N

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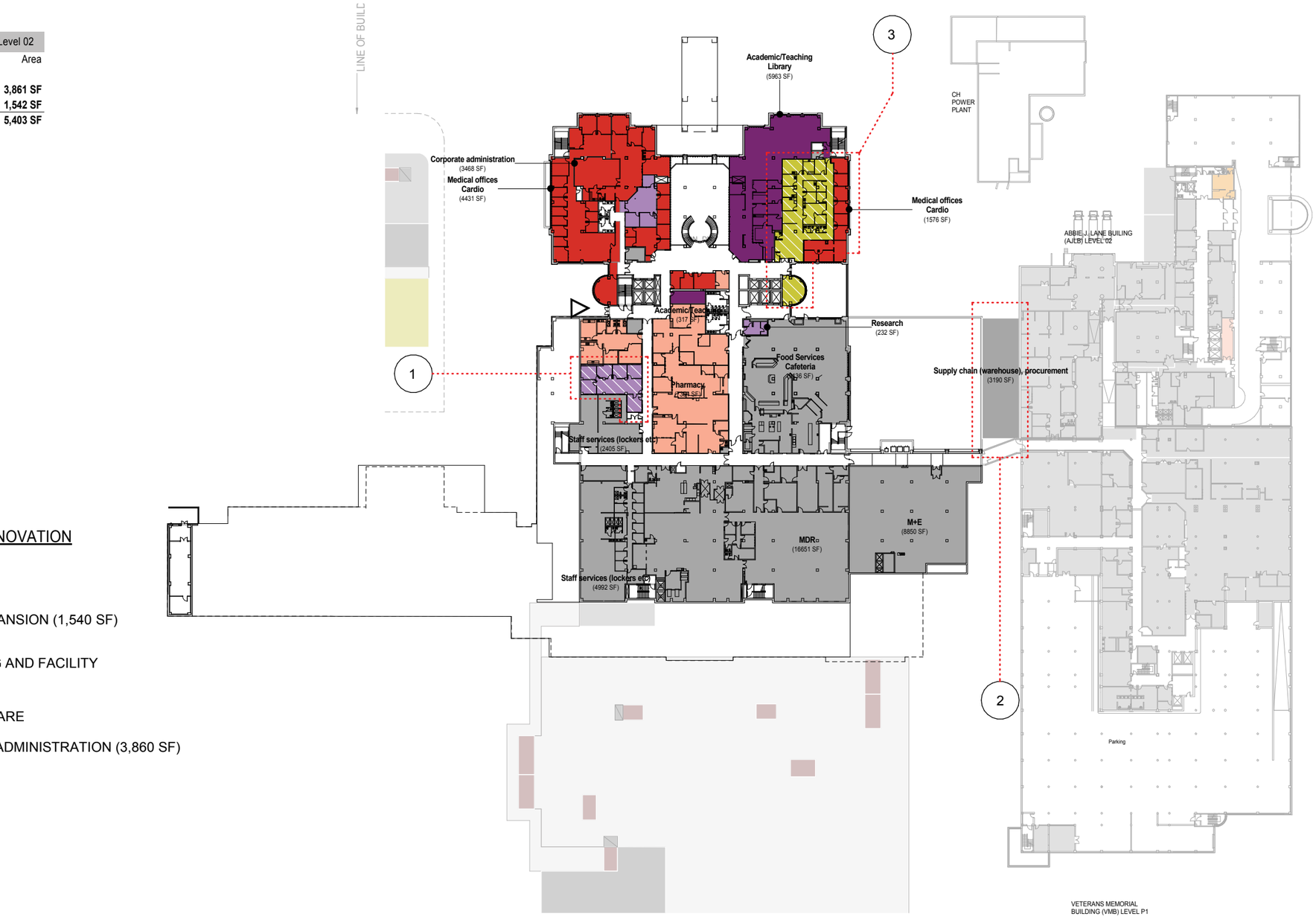
9.2 Commons Concept
(HI) Renovations and Decanting: Level 02

Department Gross Area - Removed Only - Infirmary - Level 02	
Department	Area
Ambulatory Care	3,861 SF
Research	1,542 SF
Grand total	**5,403 SF**



SCALE: 1 : 500

PROGRAMS FOR DECANTING RENOVATION

1. OUT: RESEARCH
   NEW IN: PHARMACY EXPANSION (1,540 SF)
2. EXPAND SHIPPING / RECEIVING AND FACILITY MANAGEMENT
3. OUT: AMBULATORY CARE
   IN: EXPANSION OF ADMINISTRATION (3,860 SF)

N

9.2 Commons Concept

(HI) Renovations and Decanting: Level 03

Department Gross Area - Removed Only - Infirmary - Level 03	
Department	Area
Ambulatory Care	16,306 SF
Clinical Support	8,697 SF
Grand total	25,003 SF

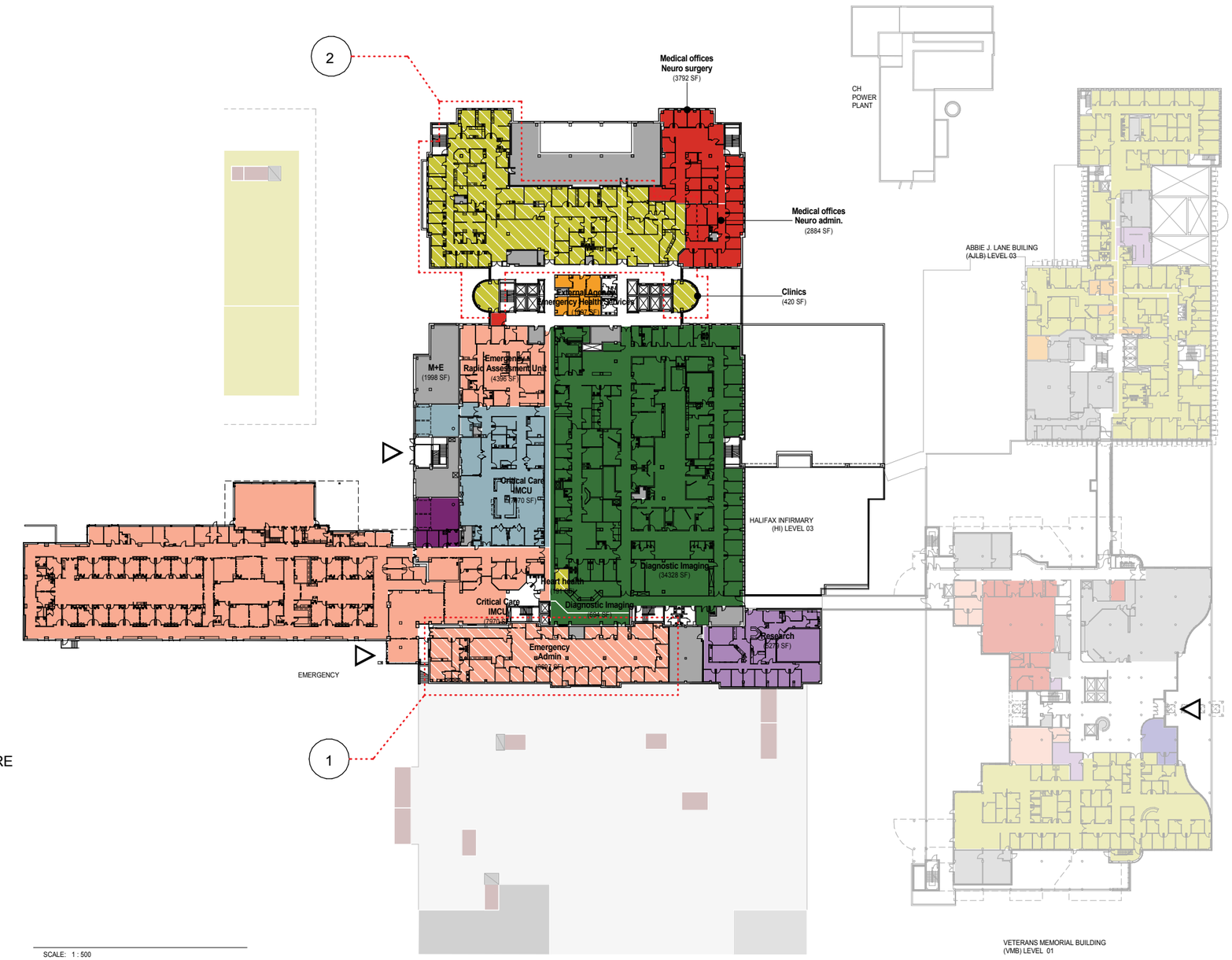
PROGRAMS FOR DECANTING RENOVATION

① OUT: EMERGENCY ADMIN (8,700 SF)
- RELOCATED TO 4TH FLOOR

IN: DIAGNOSTIC EXPANSION

② OUT: HEART HEALTH (16,300 SF)
- RELOCATED TO AMBULATORY CARE BUILDING

IN: ACADEMIC MEDICAL STAFF/ ADMINISTRATION SERVICES



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9.2 Commons Concept

(HI) Renovations and Decanting: Level 04

Department Gross Area - Removed Only - Infirmary - Level 04	
Department	Area
Ambulatory Care	37,358 SF
Grand total	**37,358 SF**

PROGRAMS FOR DECANTING RENOVATION

(1) OUT: ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING (28,300 SF)

IN: ADMIN, EDUCATION AND RESEARCH RELOCATION

(2) OUT: ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING (8,700 SF)

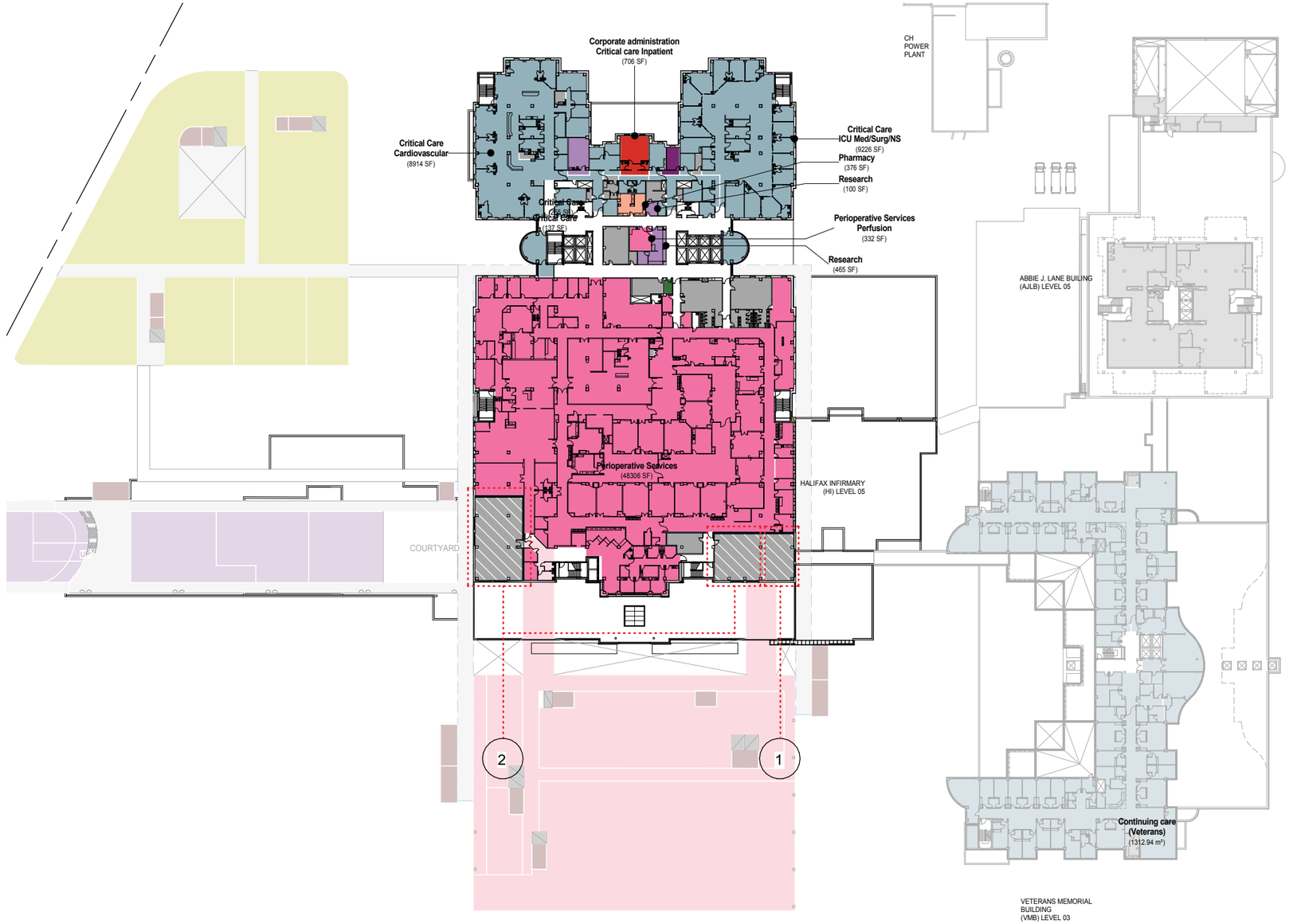
NEW IN: RELOCATE ADMIN FOR EMERGENCY DEPARTMENT

N

9.2 Commons Concept

(HI) Renovations and Decanting: Level 05

Inpatient Unit	0 SF
Support Services	5,040 SF
Grand total	5,301 SF



SCALE: 1 : 500

PROGRAMS FOR DECANTING RENOVATION

① OUT: EXISTING M + E ROOMS TO BE RELOCATED TO ROOF OF EMERGENCY DEPARTMENT

NEW IN: SATELLITE LAB (900 SF) + CORRIDORS

② OUT: EXISTING M + E ROOMS TO BE RELOCATED (4,100 SF)

NEW IN: CIRCULATION AREAS CONNECTING TO EXPANDED PERIOPERATIVE SERVICES

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9.2 Commons Concept

9.2.6 Transforming the Site

Site Transformations

The prime objective of the master plan is to ensure that any future development allows for a rational and unrestricted growth pattern in the next twenty to fifty years. The growth patterns proposed must be a frame work for creative opportunities while maintain the Vision of QE II.

An intensive process, as outlined in volume 1, went from a process of explorations of opportunities, taking a divergent view of the possibilities, to a convergence into options for which the Willow Tree concept and the Commons concept were derived.

The illustrations demonstrate a pattern of development in time, where aging infrastructure will force the demolition of buildings in a sequential manner thus creating new opportunities. A possible sequence of changes in time are mapped in the attached illustrations.

Through a wayfinding system of proposed connections, links and node points a coherent sense of wholeness is proposed bringing together existing and new as a single entity. The proposed growth patterns hope to avoid haphazard growth with an orderly transformation of the site.

Long term growth must reinforce and maintain contextual connections, ensure the development of creative design solutions, create a sense of place, identity and healing environments- a cohesive thematic character is essential. Phasing and flexibility are an integral part of the development.

The state of aging infrastructure, deferred maintenance and cost associated with infrastructure renewal will inform which buildings are to be demolished and generate future growth patterns.

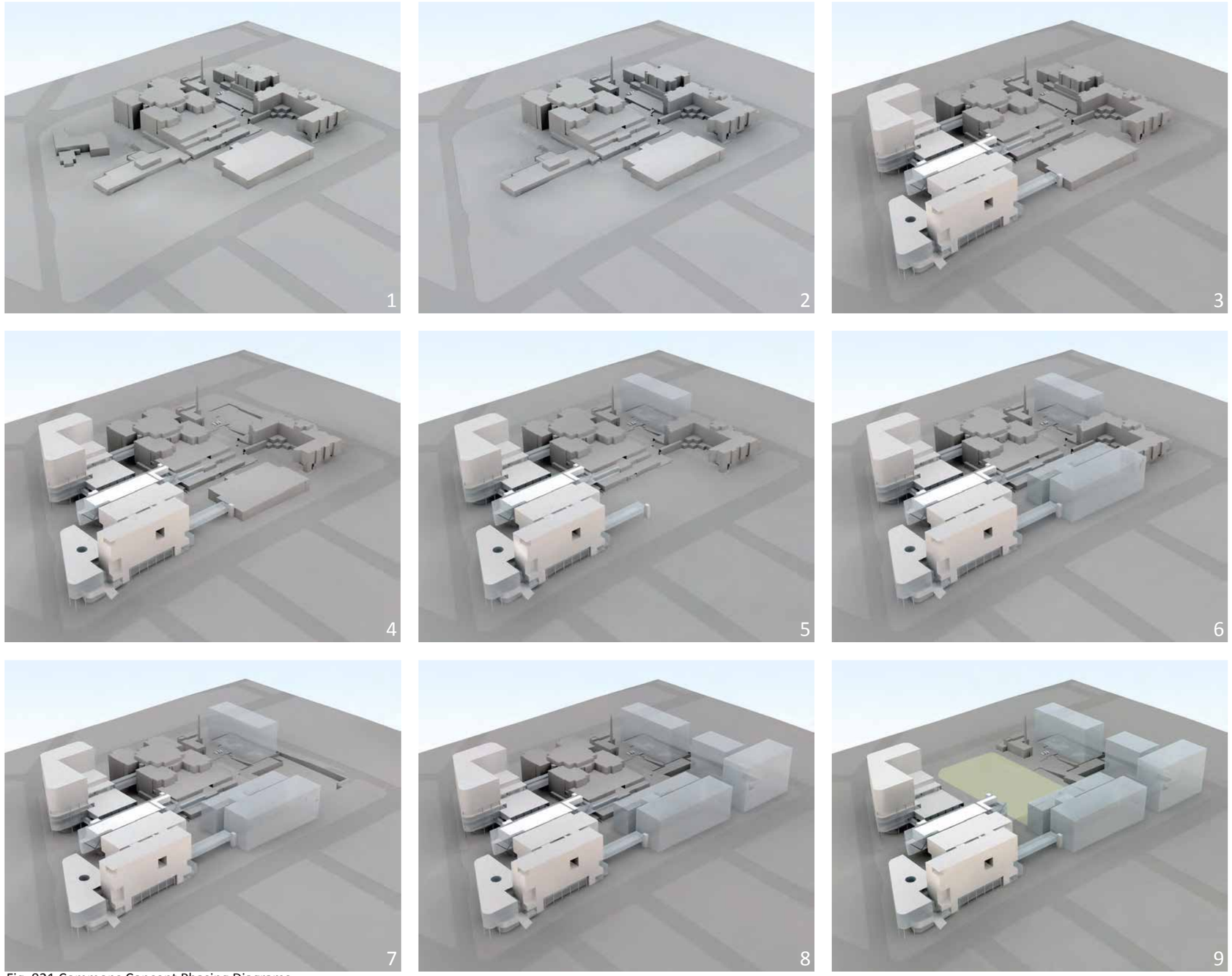


Fig. 921 Commons Concept Phasing Diagrams

9.2 Commons Concept

9.2.6 Transforming the Site

The Commons Concept

The Commons Concept focuses on the utilization of the existing sites, i.e., the CBC site and the urban garden site resulting in off centering of the main development to the N / NW of the site towards Bell Road. The existing entrances to the hospital are maintained. In time, transformation of the site will be inevitable. Abbie J Lane Building will be past its useful life, based on the facility assessments reviews, as will the existing parking structure and Veteran Memorial Building. The patterns of growth and the site transformations are illustrated in the attached images. The clockwise aging of buildings creates a natural pattern of growth and change, reimaging and transforming the site in time. In the 25 / 50-year time frame the HI building will itself need to be replaced. The images illustrate a growth pattern and transformation in time.

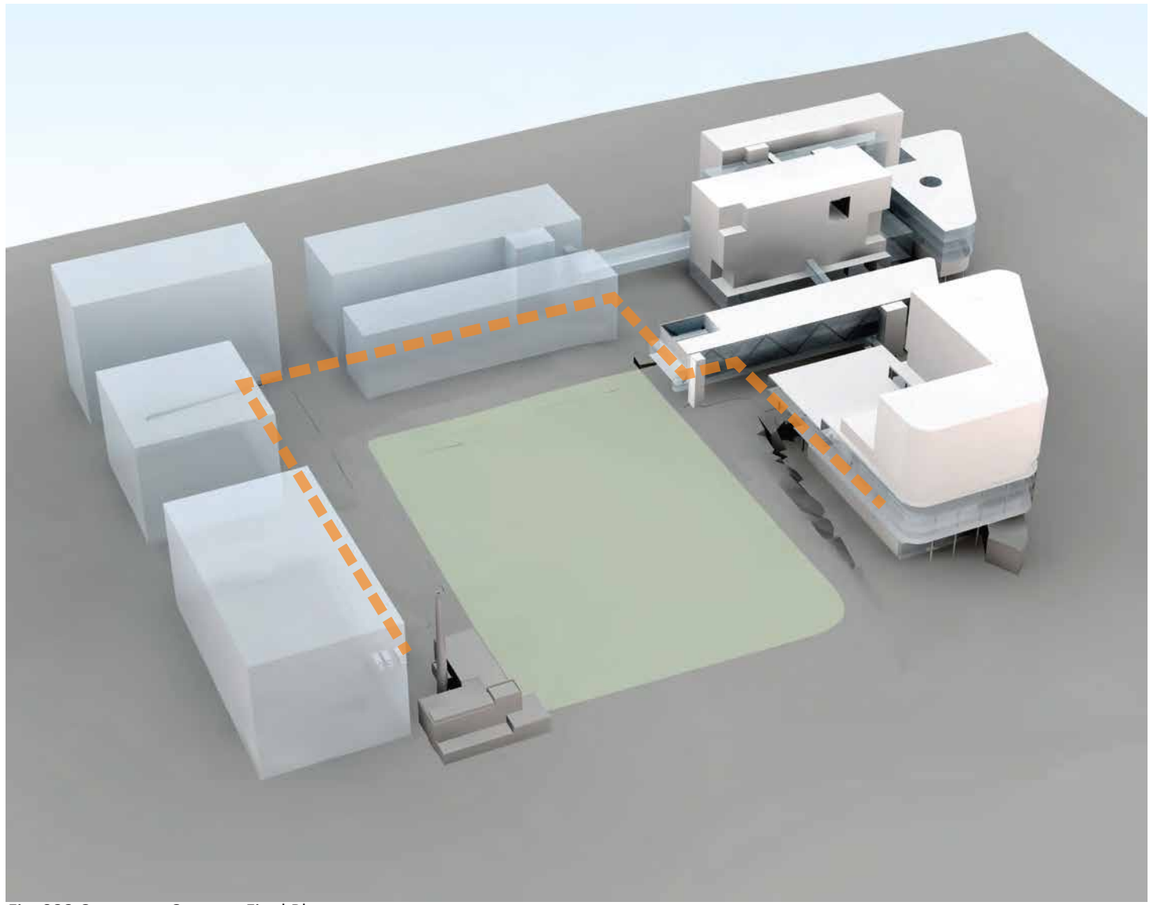


Fig. 922 Commons Concept Final Phase

Fig. 923 Commons Concept Final Phase

9.3 Research & Education
Introduction

Integral to the planning for the QEII redevelopment project, dedicated spaces to support and enable the achievement of the NSHA Vision for teaching and research has been captured in the Functional Program and reflected in the Master Plan. Central to achieving this vision, is a commitment to emphasizing interprofessional education as opposed to discipline specific education. As described in the NSHA Research and Learning related Space Planning Principles document, the Vision for Academic Research and Learning includes an integrated simulation-based learning facility that combines the functions (currently being provided across three buildings) of the Simulation Lab, Skills Centre and the RNPDC Simulation Lab, to be located on the HI site. This will allow for operating efficiencies, simulation program expansion and growth of research initiatives.

Although some of the teaching and educational spaces are decentralized or co-located near patient care areas, it was proposed by the design team, that it may advantageous to consolidate several components of the zones captured in the functional program in an effort to elevate the profile and public exposure of the NSHA's commitment to Teaching and Research. For example, Zone 1, Auditorium, Zone 2, Simulation Centre, Zones 3 and 4, Classrooms/Meeting rooms can be collocated within an iconic facility that is intentionally separated from the main hospital yet conveniently connect to it, to emphasize to the broader community, the commitment the organization has to academic teaching and research.

This idea is expressed in the following schematic illustrations. This expression of dedicated Teaching and Research space can be accommodated in either the Willow Tree Concept or the Commons Concept.

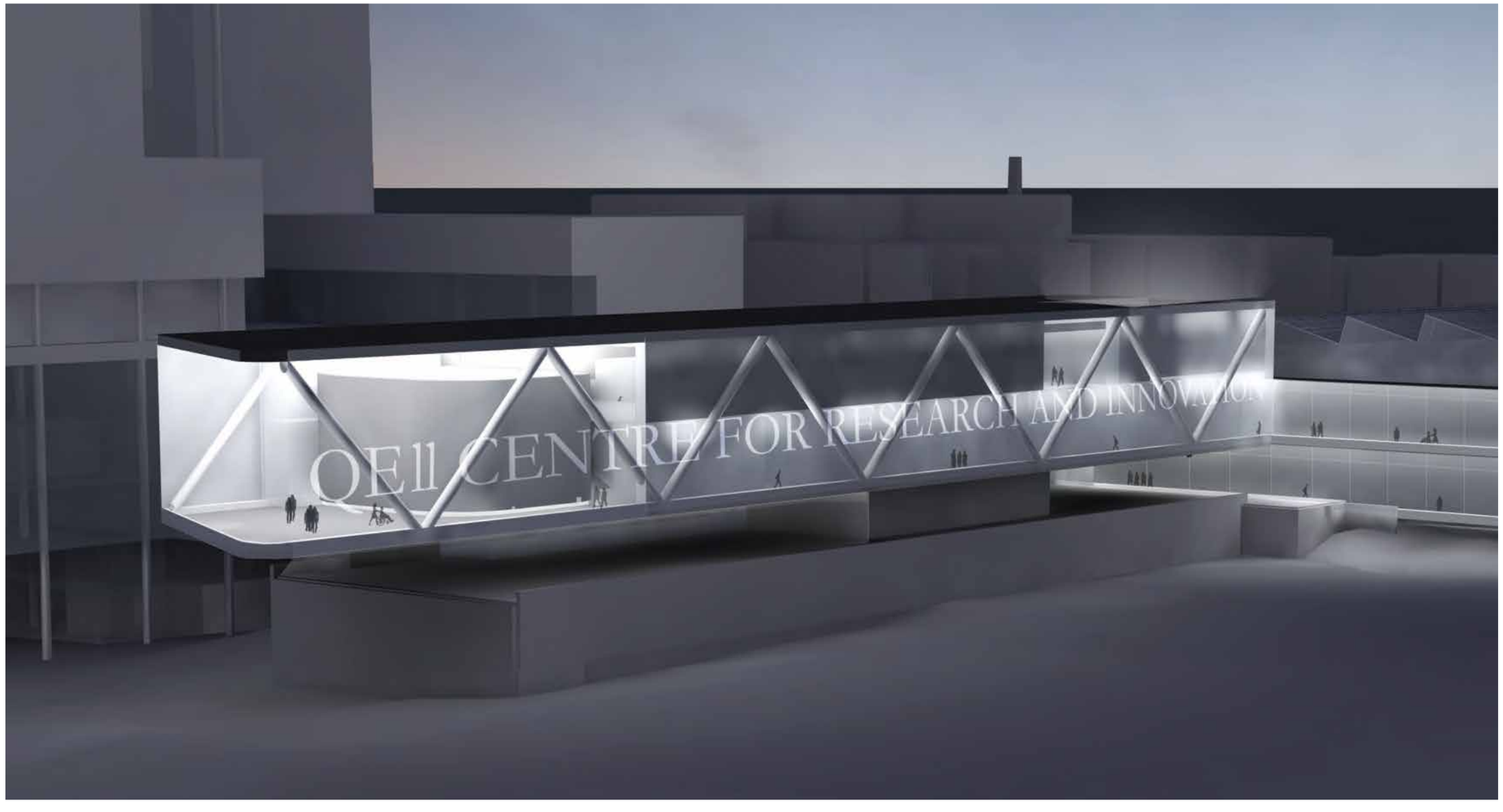


Fig. 924 Centre for Research & Innovation Conceptual Render

9.3 Research & Education

9.3.1 Precedents

Nova Scotia Connections- Structure

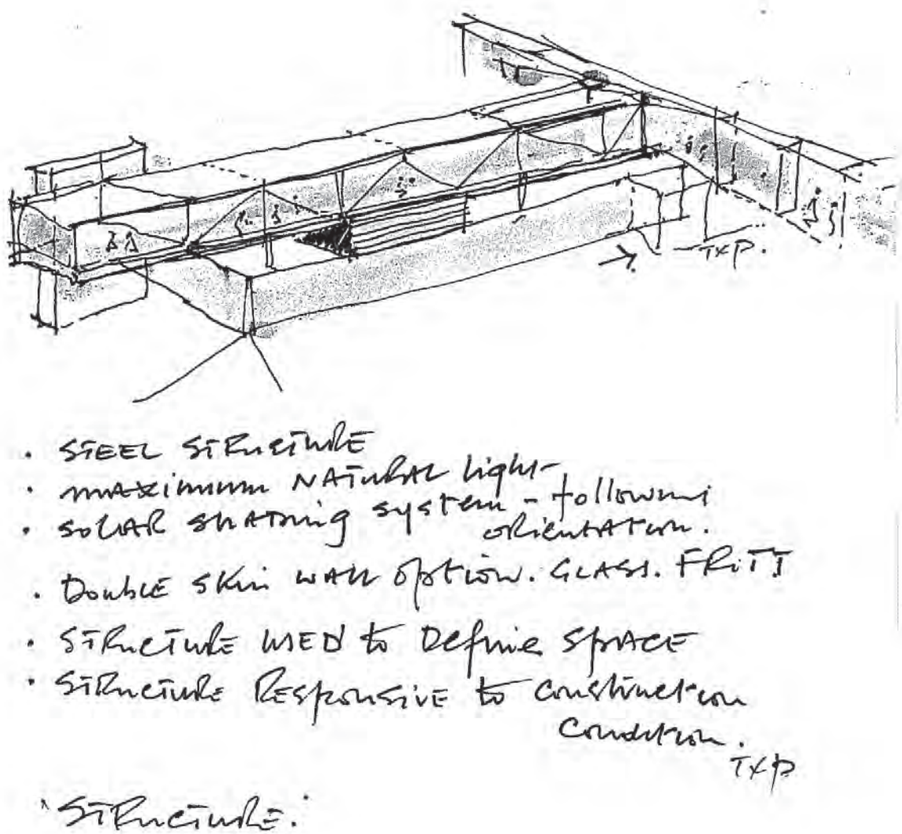
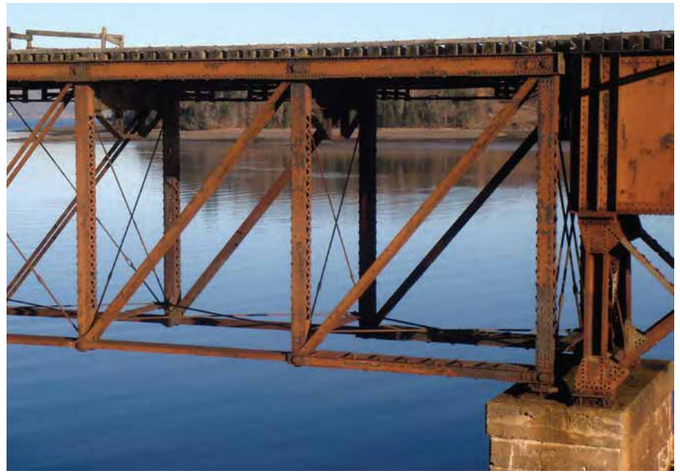


Fig. 925 Research Structure Sketch 1

Horton Covered Bridge / Kings County, Nova Scotia /1952

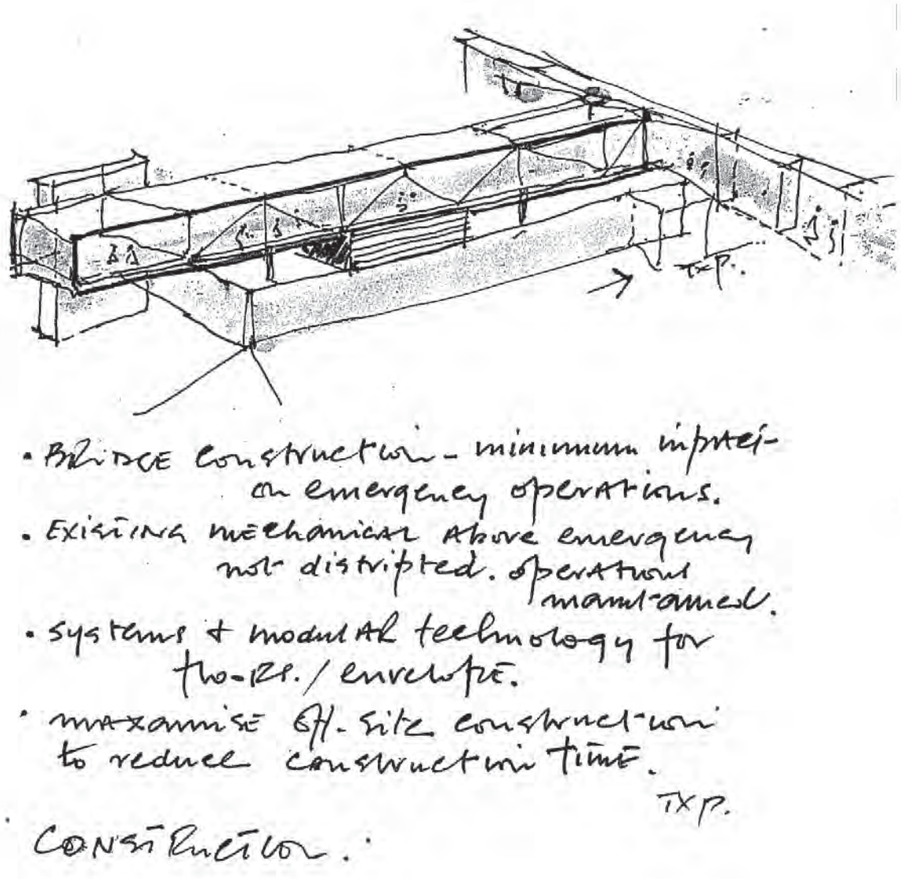
DAR Bridge / Bridgetown Nova Scotia

Horton Covered Bridge / Kings County, Nova Scotia /1952



Bear River Bridge / Digby County, Nova Scotia

Prefabrication and Constructability



'The Big Lift' / Macdonald Bridge /Halifax, Nova Scotia

Fig. 926 Research Structure Sketch 2

The ‘Floating’ Box

Kaihua County 1101 Project and City Archives/ Kuihua, Zhejiang China / Architectural Design and Research Institute of Zheijang University

Unilever Debrug/Rotterdam, Netherlands / JHK Architecten

Clinton Presidential Center/ Little Rock, Arkansas/ Polshek Partnership Architects

Branding/Gathering

Escarpment Cancer Research Institute at the Juravinski Cancer Centre and Hospital, Hamilton, ON, Kasian Architecture

Escarpment Cancer Research Institute at the Juravinski Cancer Centre and Hospital, Hamilton, ON, Kasian Architecture

Light Box

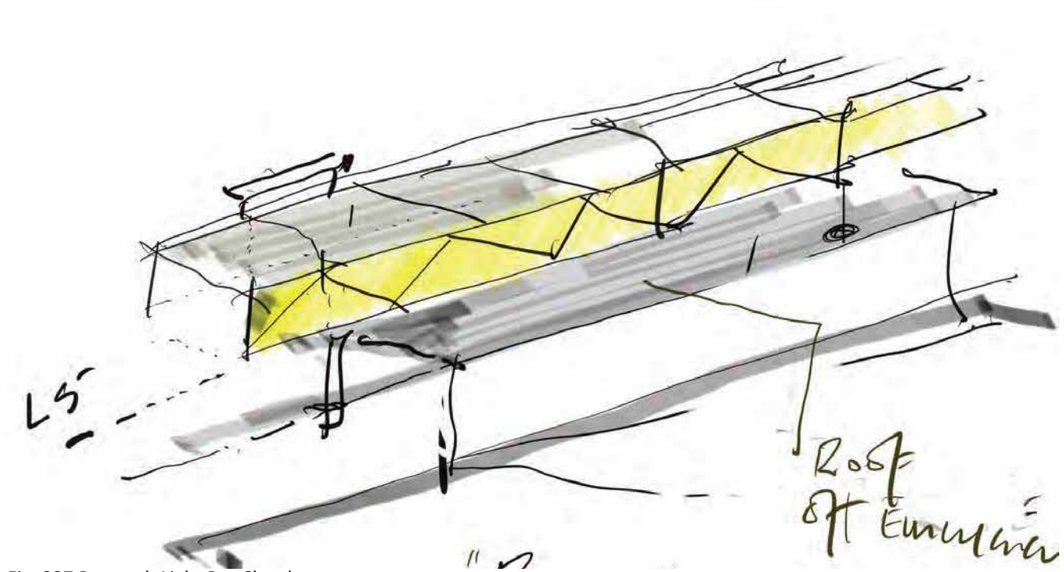
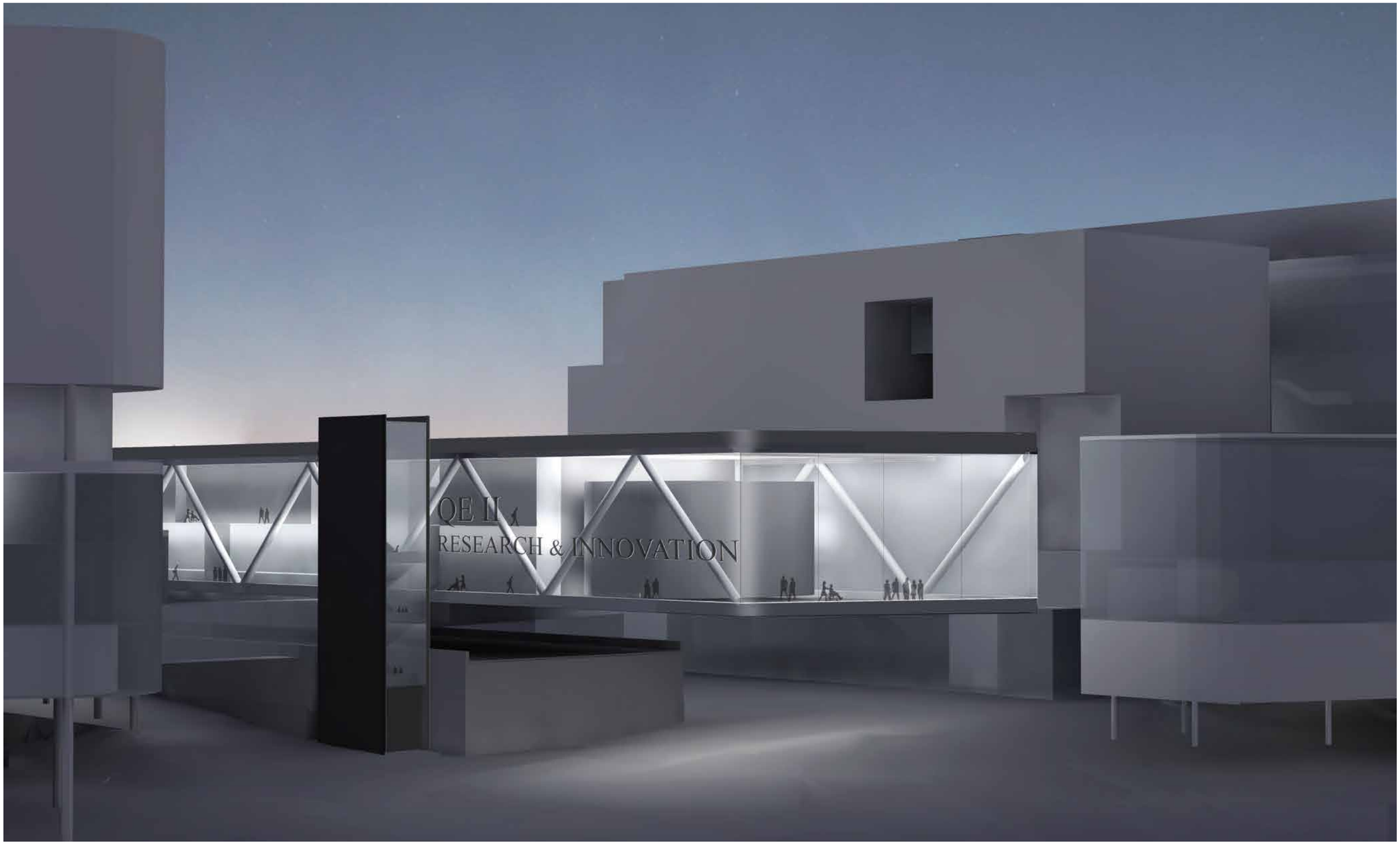


Fig. 927 Research Light Box Sketch

Halifax Central Library/ Halifax, Nova Scotia/ Fowler, Bauld & Mitchell in collaboration with Schmidt Hammer Lassen Architects

Villa Kogelhof / Kamperland, Netherlands / Paul de Ruiter Architects

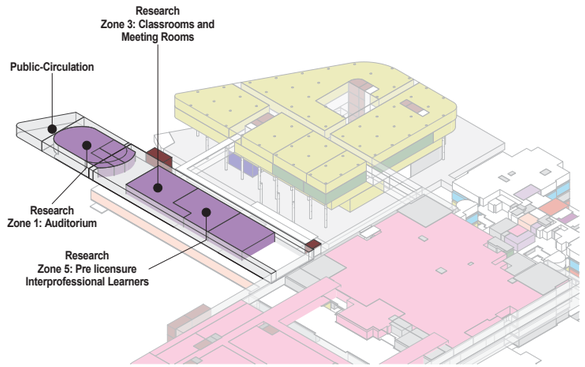
Lightbox/ Taipei City, Taiwan / Hsuyuan Kuo Architect & Associates


QE II
RESEARCH & INNOVATION

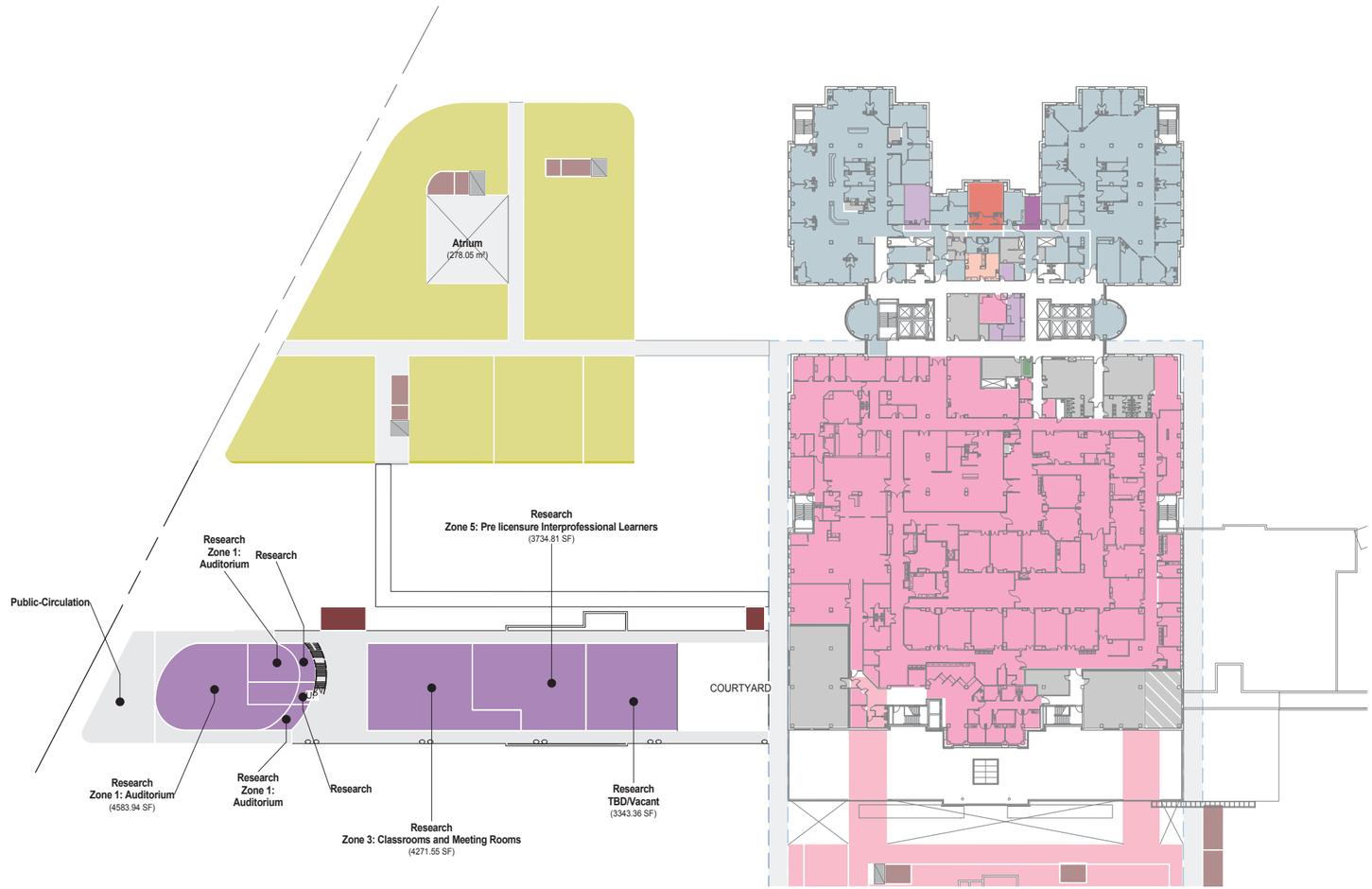
9.3 Research & Education

9.3.2 Floor Plans: Willow Tree Level 05

00-Department Gross Area - RESEARCH BUILDING - Level 05		
	Department Name	Area
	Public-Circulation	11390 SF
		11390 SF
	Research	13254 SF
		13254 SF
	Stairs	641 SF
		641 SF
Grand total		**25285 SF**



3D New RES2 LEVEL 05



RES-LEVEL 05

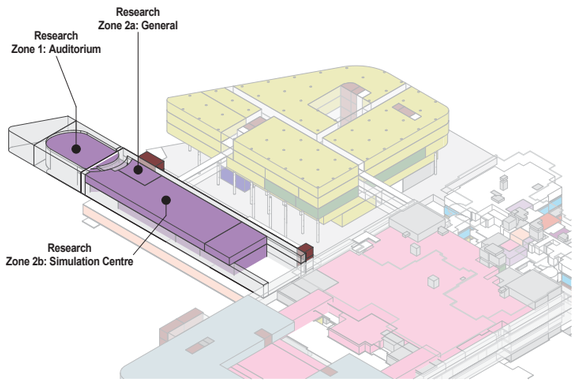
SCALE: 1 : 500

N

9.3 Research & Education

Floor Plans: Willow Tree Level 06

00-Department Gross Area - RESEARCH BUILDING - Level 06		
	Department Name	Area
	Public-Circulation	3122 SF
		3122 SF
	Research	15478 SF
		15478 SF
	Stairs	641 SF
		641 SF
Grand total		**19241 SF**



3D New RE LEVEL 06

RES-LEVEL 06

SCALE: 1 : 500

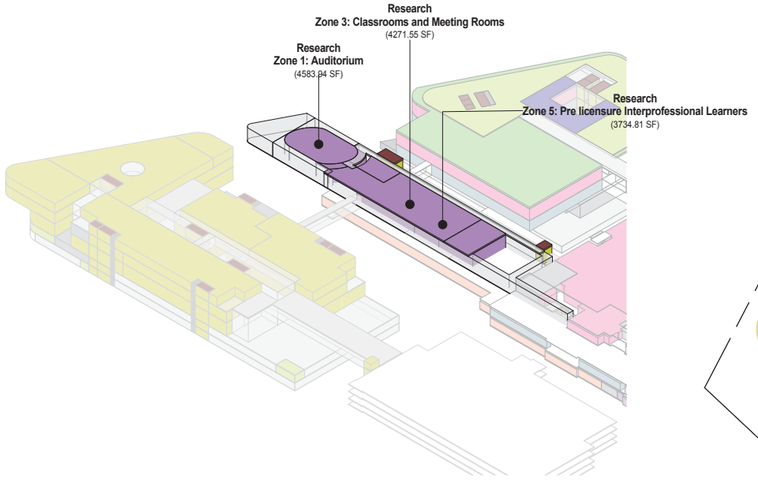
N

kasian

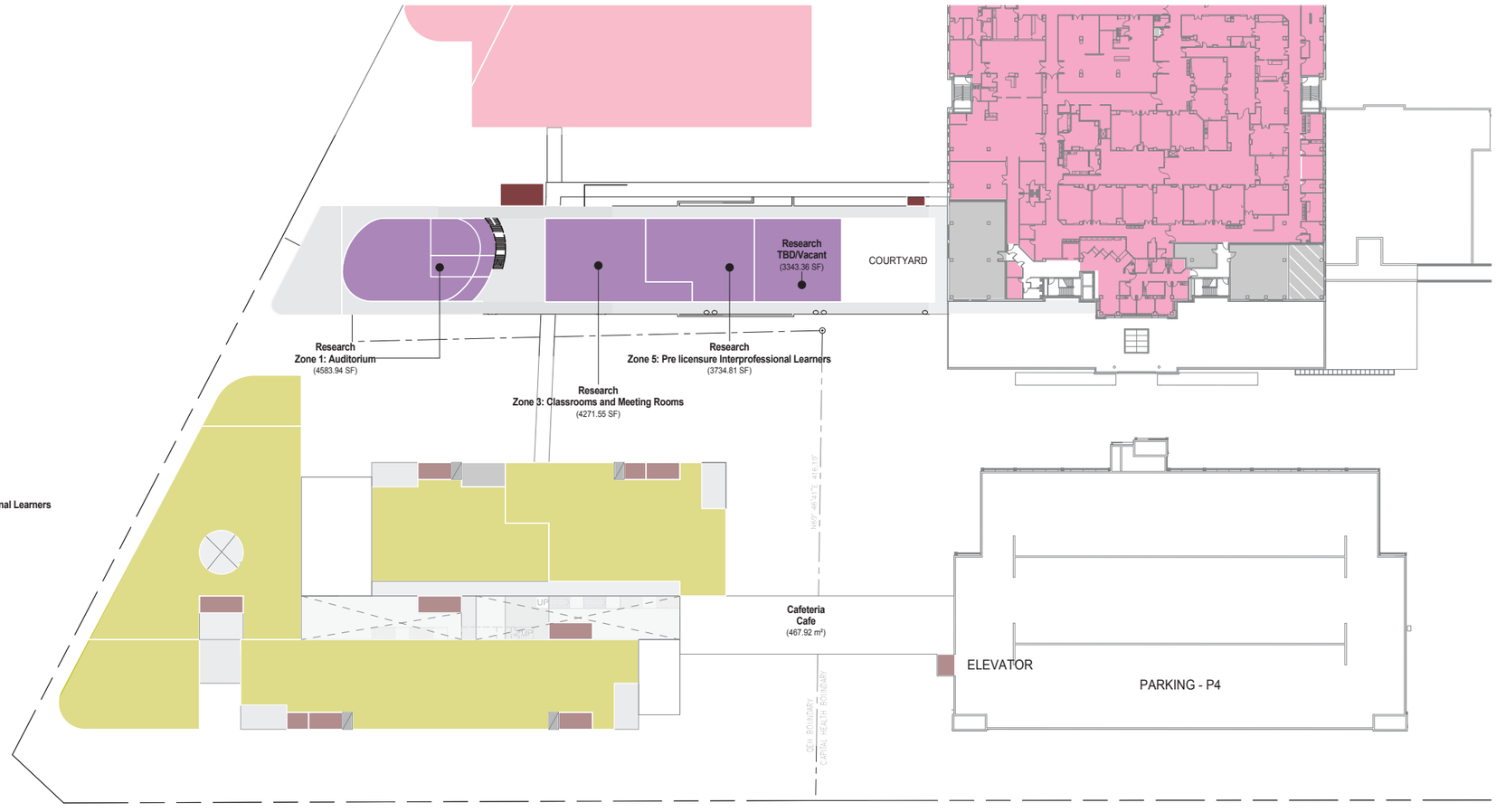
9.3 Research & Education
Floor Plans: Commons Concept Level 05

DGSF of Common Concept - Research Building - Level 05

Department Name	Area
Public-Circulation	12,969 SF
	12,969 SF
Research	17,602 SF
	17,602 SF
Stairs	641 SF
	641 SF
Grand total	**31,212 SF**



3D New RES2 LEVEL 5



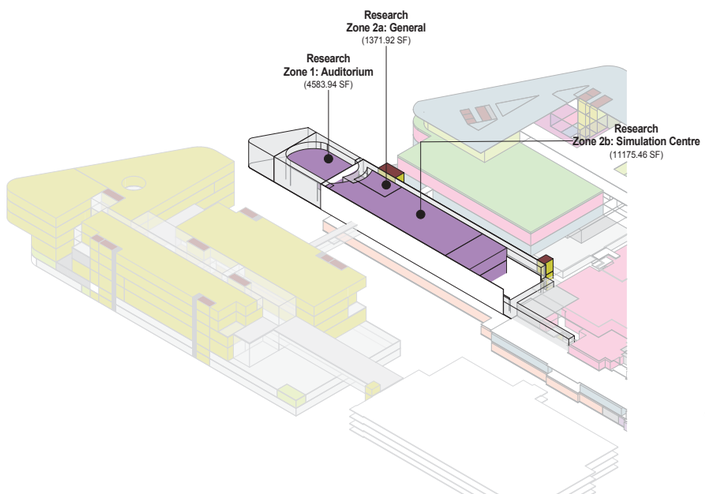
RES2- LEVEL-05
SCALE: 1 : 500

N

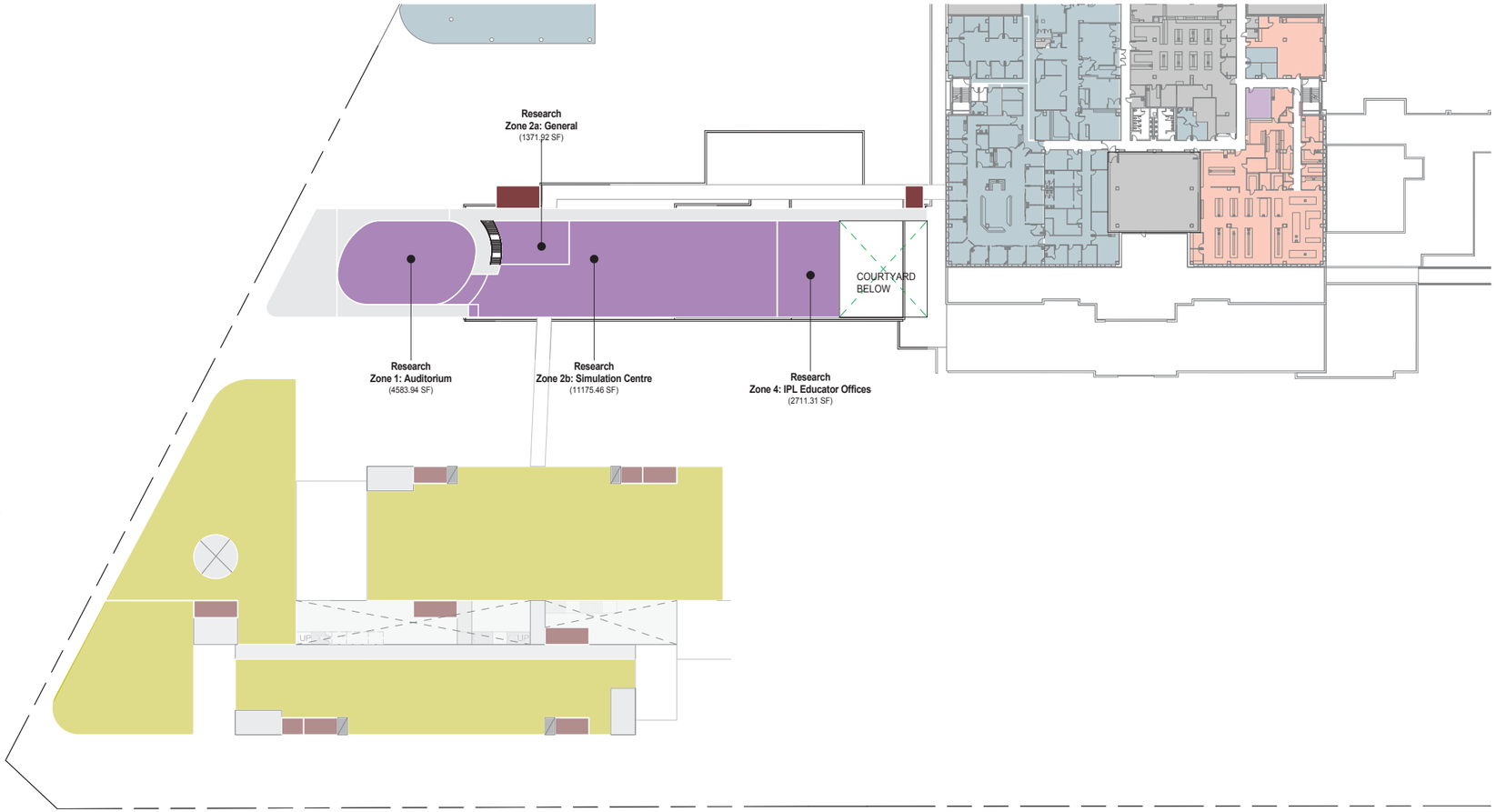
9.3 Research & Education

Floor Plans: Commons Concept Level 06

DGSF of Common Concept - Research Building - Level 06		
	Department Name	Area
	Public-Circulation	3,099 SF
		3,099 SF
	Research	15,259 SF
		15,259 SF
	Stairs	641 SF
		641 SF
Grand total		**18,998 SF**



3D New RES2 LEVEL 6



RES2 - LEVEL-06

SCALE: 1 : 500

N

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9.4 Inpatient & ICU Studies
9.4 Introduction

Introduction

This section of the report explores potential test fits for the Medical/ Surgical Inpatient Units and the Critical Care Unit, including explorations of renovating existing space in the Halifax Infirmary and test fit in the proposed new builds of the Willow Tree and Commons Concepts.
At this stage of the master plan project, the intention of the test fits is to confirm that the programs fit within the proposed development footprints in a logical and efficient manner that meets the required adjacencies while achieving the guiding principles developed by NSHA for patient care. During the next phase of the project, further development and enhancement of the layouts will be required through detailed consultation with the program leads and user groups

Design Principles

Medical/ Surgical Inpatient Units

The following principles were considered for the layout of the Medical/ Surgical Inpatient Units:

- Designed with flexibility to accommodate future expansion or space reduction
- Standardized room layouts, configurations and services for maximum flexibility in use and ease of orientation for users
- Planned to support various technologies
- Meeting rooms should be modular and flexible to accommodate different types of functions
- Requirements for surge capacity and for growth capacity should be addressed in determining departmental adjacencies
- Rooms shall reflect patient and family care by accommodating within each patient room:
  - Comfortable Seating
  - A bed area where a family member can remain overnight
  - designated washroom per patient for infection prevention and control
- On each medical/surgical inpatient unit:
  - A lounge with an adjacent nourishment room
  - A quiet/consultation room for private conversations and space for reflection
  - Accessible washrooms
- 2-bed room design requirements:
  - Ensure each 2-bed room can easily be converted to 1-bed room in the future to anticipate evolving standards
  - Provides 1 washroom per patient
  - Incorporates best practice for infection control and patient privacy

Crticial Care Unit

The following principles were considered for the layout of the Critical Care Unit:

- Patient and family centred care will be supported by contemporary facility design. The new QEII care facilities will provide a comforting, healing and supportive environment, will allow families to be together, and will reduce the stress, anxiety and grief associated with illness.
- Designed with flexibility to accommodate future expansion or space reduction
- Standardized room layouts, configurations and services for maximum flexibility in use and ease of orientation for users
- Planned to support various technologies
- Meeting rooms should be modular and flexible to accommodate different types of functions
- Requirements for surge capacity and for growth capacity should be addressed in determining departmental adjacencies (locate soft space such as offices and meeting rooms adjacent that can be easily renovated for future use
- On each 12 bed critical care unit:
  - A family room immediately adjacent to each patient room with seating, washroom and kitchenette
  - Two rest/sleep rooms with adjacent washroom/shower
  - Two quiet/ consultation rooms
- On a palliative Care Unit:
  - A family Room
  - An adjacent washroom with shower

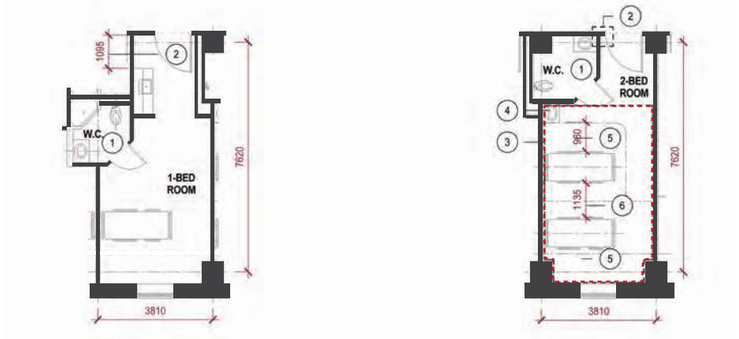

Bridgepoint / Toronto, ON / HDR Architecture & Diamond Schmitt Architects
Halifax inserted in the background


Precedent Inpatient room with Halifax inserted in the background

9.4 Inpatient & ICU Studies

9.4.1 Room Study

Existing Inpatient Rooms



Typical 1- Bed Room

① Washroom does not meet current space and accessibility requirements.

② Minimum dimension at front approach without obstructions at door into bedroom not met. (min. 1500mm)

Typical 2- Bed Room

① Washroom does not meet current space standards and accessibility requirements. There is no shower in WR.

② Entrance to room does not meet accessibility standards.

③ Bed area does not meet current space standards.

④ Handwashing sink not in ideal location.

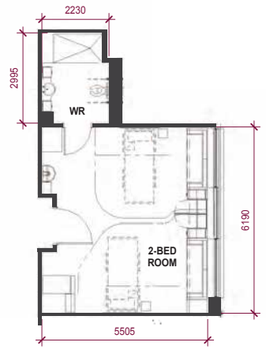
⑤ Minimum distance between bed and non-transfer/ fixed surface not met.

⑥ Minimum distance between beds not met.

Bedroom Sizes	Existing (sf)	Current Standards (sf)
1- Bed Room		
Bedroom	259	230
WR	38	60
2- Bed Room		
Bedroom	277	385
WR	38	60
1- Bed Room (Bariatric)		
Bedroom	-	235
WR	-	75

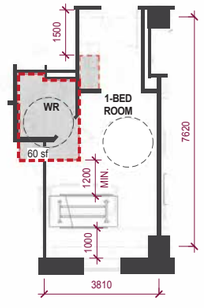
Sample Room Types (Current Standards)

Typical 1- Bed Room

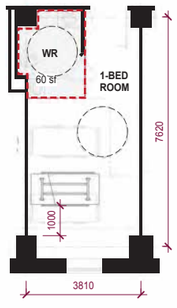


Typical 2- Bed Room

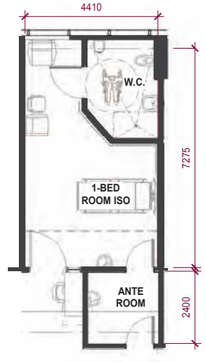
Upgrades to Meet Current Standards



Renovate washroom to meet current space and accessibility standards.



Convert 2-bed rooms into 1-bed room, and renovate washroom to meet current space and accessibility standards.



Typical Bed Room - ISO

Fig. 928 Inpatient Room Concepts

Inpatient Room Analysis - 2017.05.10

Inpatient Room Counts

Halifax Infirmary Level 7

Current Bed Count:

Bed room type	No. of Rooms	No. of Beds	
1-Bed Room	4	4	(27%)
2-Bed Room	16	16	(53%)
3-Bed Room	6	6	(13%)
4-Bed Room	4	4	(7%)
15 rooms		30 beds total	

Preliminary Inpatient Unit Concepts

1- Bed Room

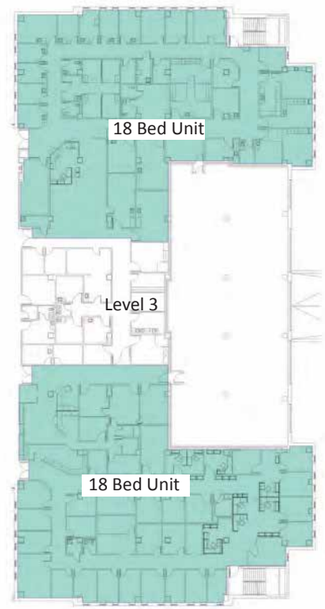
2- Bed Room

Option A

12 x 1-Bed Rooms	12 beds (80%)
3 x 2-Bed Rooms	6 beds (20%)
Total:	18 beds

Option B

6 x 1-Bed Rooms	6 beds (40%)
9 x 2-Bed Rooms	18 beds (60%)
Total:	24 beds



Option C

Renovation of Level 3 HI to accommodate 80% 1-bed rooms and 20% 2- bed rooms.

Number of Inpatient Beds in HI: 336		
Option A:	Option B:	Option C:
• 10 units of 18 = 180 beds • Additional 156 new beds required	• 10 units of 24 = 240 beds • Additional 96 new beds required	• Existing bed capacity in HI to remain unchanged • Renovation of Level 3 HI to accommodate 80% 1-bed room and 20% 2-bed room to create 2 units of 36.

Fig. 929 Inpatient Unit Concepts

Inpatient Unit Analysis - 2017.05.10

Existing Inpatient Room Analysis

An analysis was completed to look at the existing inpatient rooms at the HI Building to determine the feasibility of upgrading the rooms to meet current codes and standards. While the existing 1-bed rooms and 2-bed rooms met the minimum area requirements for today's standards, the configurations of these rooms do not provide the required clearances at the entrance to the rooms and around the bed. Furthermore, the washrooms are undersized and do not meet accessibility standards (AODA) and would therefore need to be renovated to meet accessibility standards.

Existing Inpatient Units

Based on the analysis of the inpatient rooms, a review of inpatient units in the HI building was completed. Two potential options were explored as follows:

- A. Renovate existing 2-bed rooms into 1-bed rooms, and existing 3 and 4- bed wards into 2-bed rooms which would create an 80-20% split of 1-bed rooms to 2-bed rooms for a total of 18 beds in each wing. While the bed room types (80% 1-bed room and 20% 2 bed-rooms) meet NSHA's guiding principle for patient centered care, the number of beds per unit would not be operationally efficient from a staff perspective.
- B. Renovate existing 3 and 4- bed wards into 2- bed rooms, and existing 2-bed rooms will remain as 2-bed rooms or be renovated into 1- bed rooms for a total of 24 beds in each wing. This would result in a 40-60% split of 1- bed rooms to 2- bed rooms which is not aligned with NSHA's guiding principle for patient- centred care. This analysis was completed to look at the potential to increase bed numbers in each unit that would operationally viable.

Based on these analyses, Kasian looked at how it may be implemented on Level 3 of the HI Building (Units 3.1 and 3.2) to create two units of 18 beds. It was concluded that renovating this space for new inpatient units were not viable as there is a large mechanical room in this area which would block natural light and views to a number of patient rooms, thereby reducing the number of bed rooms achievable in each unit even further. As well, the lack of continuity between the two units also poses further challenges from a staffing perspective. Based on this, the team decided that it would be best to re-purpose Level 3 for Admin space. (refer to Pre-Decanting floor plans for further details).

9.4 Inpatient & ICU Studies

9.4.2 ICU Floor Plans
3 POD Study

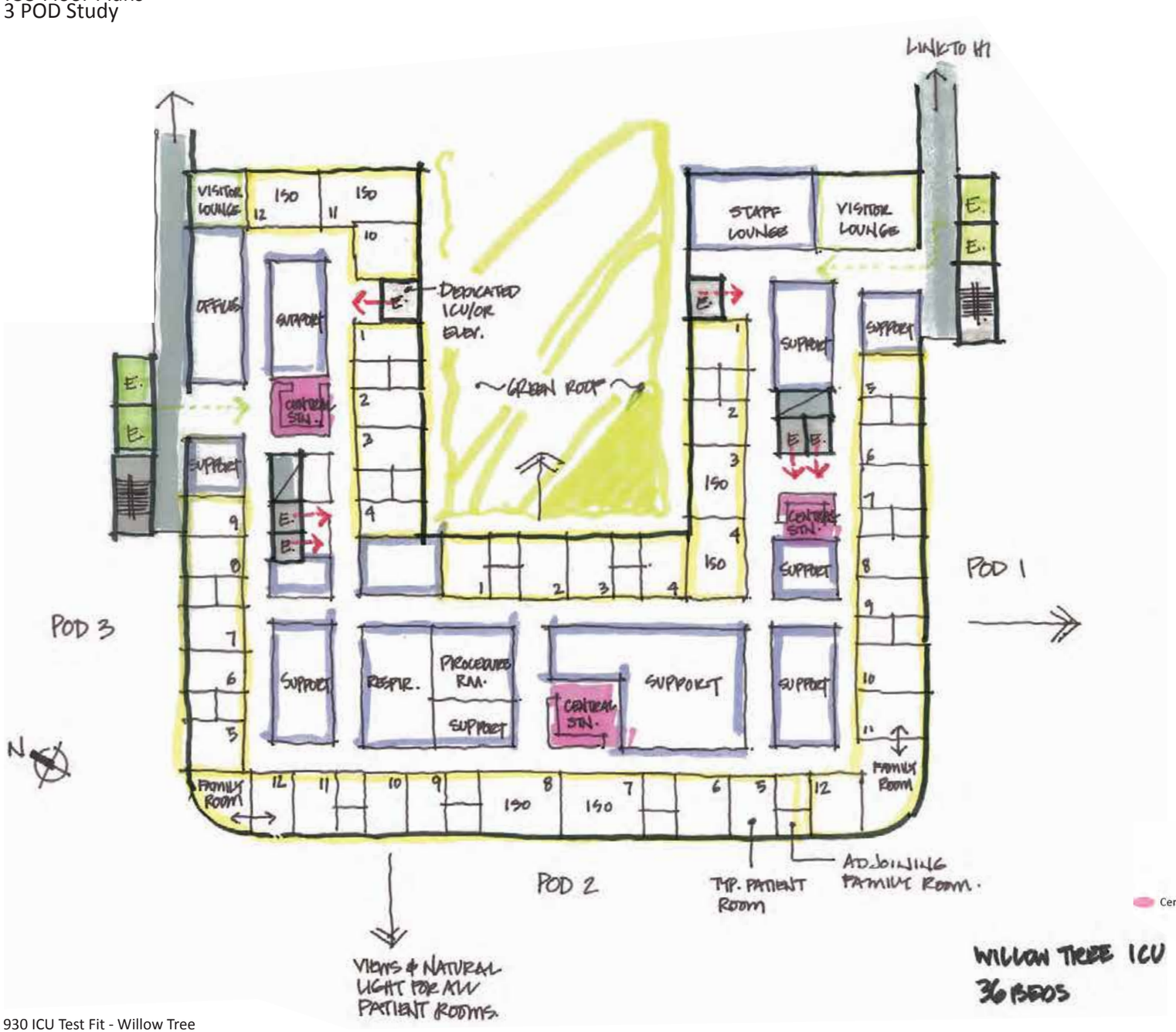
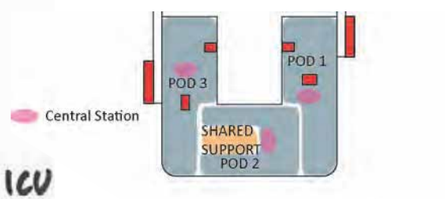


Fig. 930 ICU Test Fit - Willow Tree

Critical Care Unit Test Fit

A test fit of the critical care unit was completed for both the Willow Tree and Commons Option applying the design principles noted in the section above. While both options can achieve NSHA's design principles, the key difference between the Willow Tree and Commons Concept is that the Commons Concept can accommodate 48 ICU beds (including 12 IMCU designed to ICU standards) on one floor plate, allowing these beds to function as ICU beds depending on patient volumes. In the Willow Tree option, 36 ICU beds can be accommodated on one floor with the 12 IMCU beds located in the HI Building level 5, adjacent and in close proximity to the existing operating rooms. The following summarizes the key characteristics of the plans:

- All bedrooms are located along the perimeter to maximize natural light and views for patients to create a healing environment
- All patient rooms have an adjacent family room that supports patient and family centred care
- Each 2 pods also has a large family room adjacent to the bedroom, allowing it to be used as a palliative care suite
- Dedicated elevator between Perioperative and ICU for efficient and convenient patient transfer
- Staff lounges located along the perimeter to maximize natural light and views for staff
- Wayfinding is clear and intuitive
- Clear separation between public, staff/ services circulation



Willow Tree ICU

9.4 Inpatient & ICU Studies

9.4.2 ICU Floor Plan

1 POD Study in Halifax Infirmary

IMCU Test Fit - HI Building

A test fit of the current Unit 5.2 was completed to look at the feasibility of renovating the existing space for the 12 bed IMCU. As illustrated in the test fit floor plan on this page, the space is suitable to be converted into an IMCU. However, further study would be required during the next phase of the design to determine if the adjacent family rooms can be accommodated.

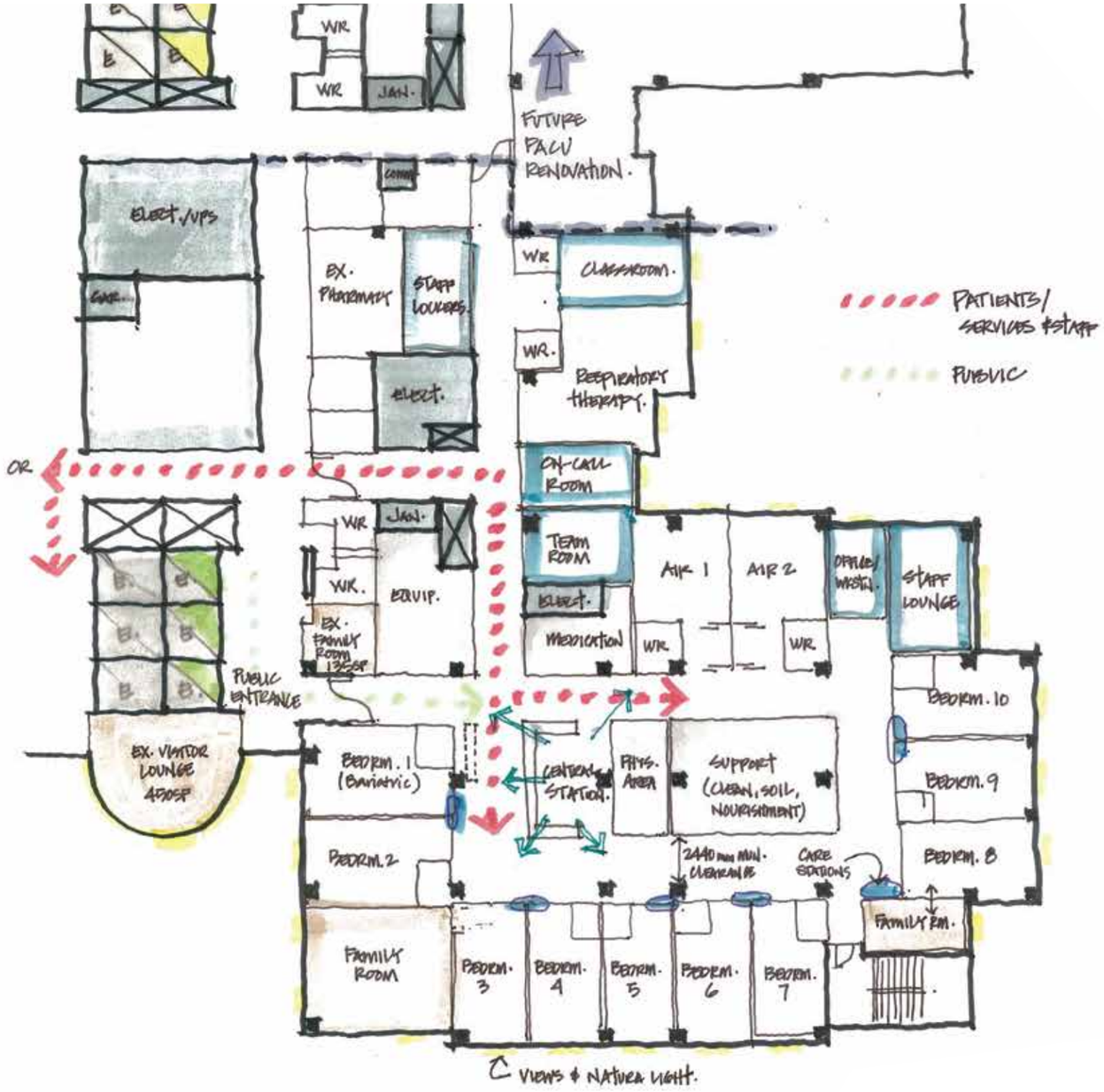


Fig. 931 IMCU Test Fit - HI Building

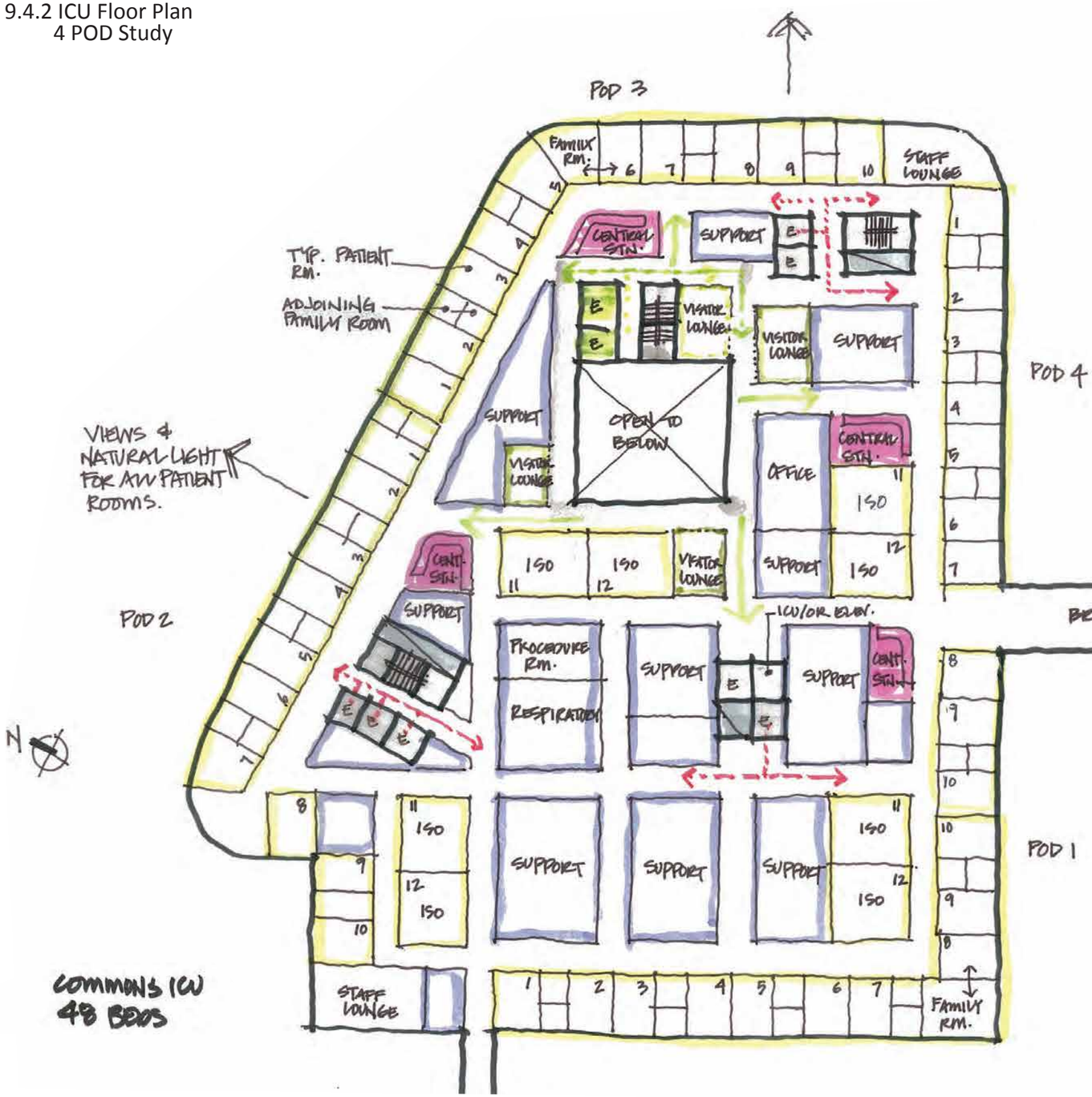


Fig. 932 ICU Test Fit - Commons Concept

Precedent

Precedent: Stanford University ICU Room with Family room

Precedent: Bridgepoint Toronto On,

9.4 Inpatient & ICU Studies

9.4.3 Inpatient Floor Layouts

Medical/ Surgical Inpatient Unit Test Fit

A test fit of a typical medical/ surgical inpatient unit was completed for the Willow Tree Scheme applying the design principles noted in the section above. A similar layout can be achieved with the Commons Option. The following summarizes the key characteristics of this plan:

- 36-bed unit per floor (3 pods of 12)
- All bedrooms are located along the perimeter to maximize natural light and views for patients to create a healing environment
- Narrow floor plate allows natural light to penetrate into all areas including staff support spaces
- Configuration and shape of floor plate is efficient
- Wayfinding is clear and intuitive
- Integration of inter-professional learning and research within the unit
- Clear separation between public, staff/ services circulation

Precedent: Bridgepoint Toronto On,

Precedent: San Antonio Polytrauma, VA

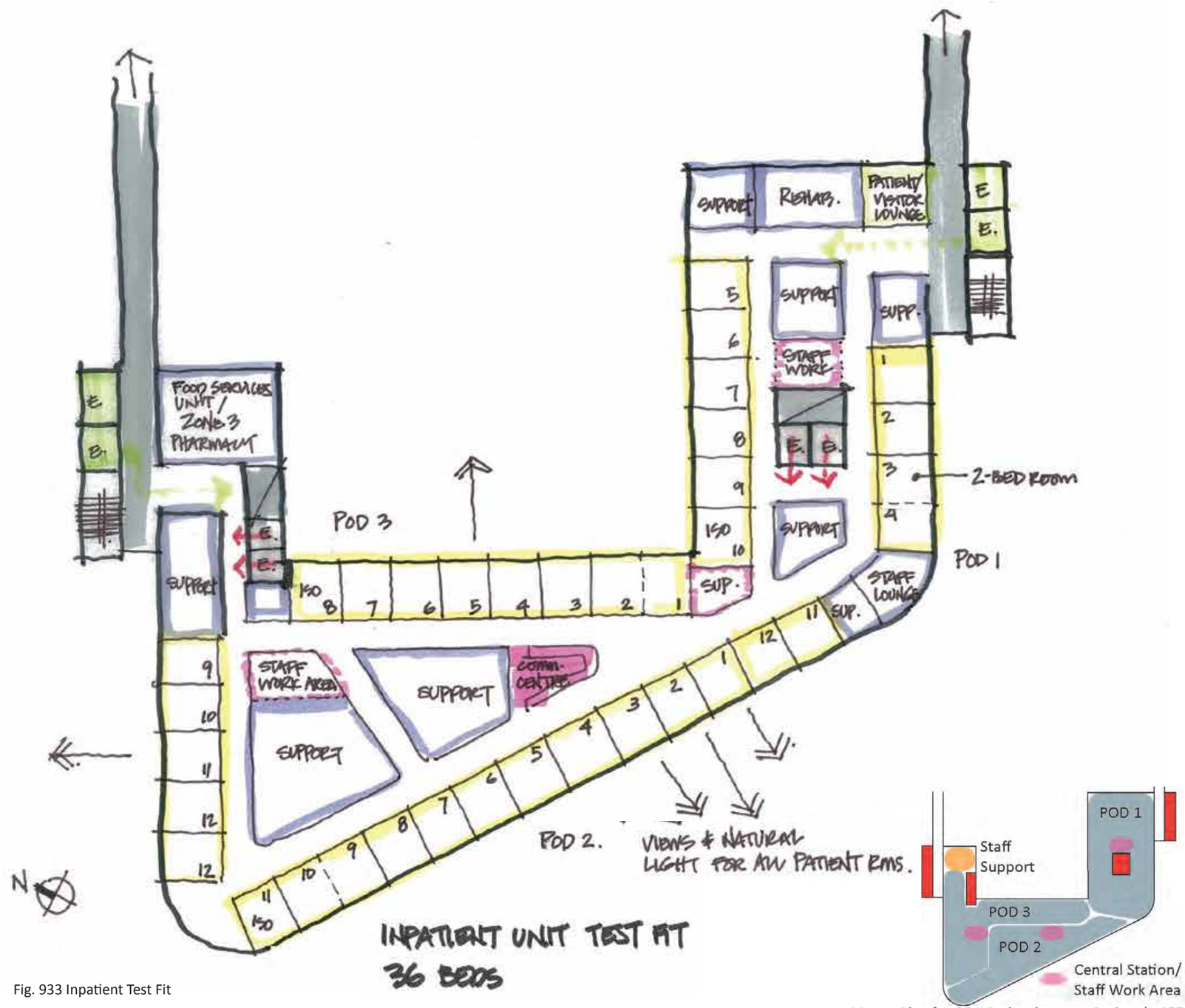


Fig. 933 Inpatient Test Fit

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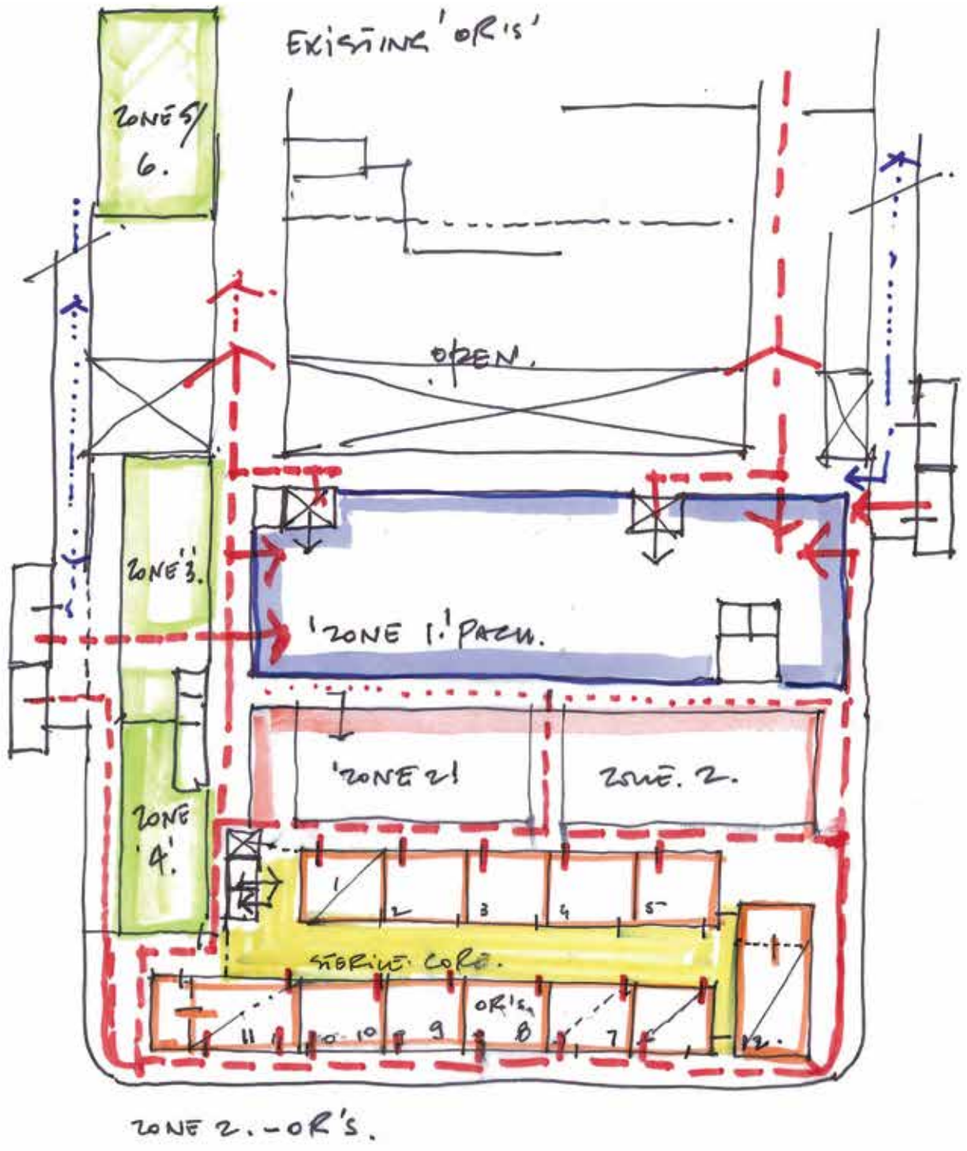
Perioperative Services

Among the many criteria against which the two alternative master plans have been evaluated, none is more salient than Clinical Functionality. Among the various clinical departments being assessed under this category, the relationship between the expanded perioperative services and the existing perioperative services in the HI Building, the MDR department and the ICU has garnered the greatest scrutiny from a broad collection of stakeholders. The current surgical suite at HI includes 15 operating rooms(OR) and 2 interventional suites (one of which is to be converted into an OR resulting in 16 OR's total).

The Functional Program calls for Perioperative Services to be relocated from the VG site to the HI site, including an accommodation for growth. **A salient driver for the master plan therefore, was to assess how alternatively located new build structures could accommodate the overall perioperative space program such that the entire service was on the same floor (Level 5)**. Finding the optimal configuration of buildings that would optimize the adjacency required between the existing perioperative services and the new, relocated perioperative services from the VG site while simultaneously achieving the most direct vertical linkage between the MDR and the OR's and the OR's and the ICU's was of primary importance when considering the alternative master plans.

Comparatively, the Willow Tree Concept offers enhanced clinical functionality over the Commons Concept as it relates to the Perioperative Services. The ability to extend the existing perioperative floor plate in the HI allows for enhanced connectivity and a more rational layout between the existing OR functions and the expanded OR functions in the Willow Tree Concept as compared to the Commons Concept where the linkages are physically limited to a bridge connection. Additionally, to facilitate the operations of the OR, a large satellite MDR is required in the Commons Concept, whereas a much smaller expansion is required in the Willow Tree Concept. The Willow Tree Concept also offers more convenient access between the IPU and the existing DI department as compared to the Commons Concept. Otherwise, both concepts offer equivalent access between the IPU floors and the ED, the ICU (located one floor from the Perioperative floor but connected by a dedicated patient elevator) and the ambulatory care procedure units.



The expansion is proposing to include 12 new OR's (2 with robotics/ interventional guided therapeutics) and will be organized by 6 zones, excluding MDR .

- Zone 1 preparation and recovery unit
- Zone 2 operating rooms.
- Zone 3 staff Support area
- Zone 4 office area
- Zone 5 education / research
- Zone 6 pathology laboratory

Key objectives in the master plan is to:

- Take a holistic view of all perioperative planning and services on L5, as a system in terms of patient flow, material and patients improving clinical efficiencies.
- Design for flexibility and change to accommodate future technological and digital transformations i.e. image guided surgery.
- Provide direct links to MDR
- Right size the OR's, control rooms and support spaces.
- Ensure that planning does not compromise the opportunity for research and learning.

9.6 Academic Medical Staff & Administrative Services

Academic Medical Staff/ Administrative Services Analysis:

Willow Tree Concept

- the current shortfall as identified in the attached drawings is 37, 640 sq. ft
- However, the existing cafeteria and food service will become redundant as a food court is provided at the main entrance of the Willow Tree concept. The area of the existing cafeteria is 9100 sq ft. that is available for conversion to academic medical staff/ administrative services. This will be confirmed when functional programming for this function is complete.
- The existing library is 5,900 sq ft. It is recommended that the library be relocated into the Centre for Research and Innovation wing 3,500 sq. ft is available for this function. A state of the art digital library will require less space than the existing library
- Therefore, the total existing space available for Academic Medical staff / Administrative services is 9,100 + 5900 = 15,000 sq. ft. The shortfall is **22,640 sq. ft.**
- The option to relocate some of these spaces into vacant space in the Dickson Building is not a workable proposition for NSHA
- To make up the 22, 600 sq. ft. =the option is to build a partial floor on to the ambulatory care building on the CBC site

The Commons Concept

- The current short fall identified in the attached drawings is 27,140 sq ft.
- However, the existing cafeteria and food service will become redundant as acafeteria is provided within the bridge in the ambulatory care building in the connection to the parking structure and a second food court is also provided on the ground floor of the inpatient / OR building on the CBC site. The area of the existing cafeteria is 9100 sq. ft that will become available for conversion to academic medical staff/ administrative services. This will be confirmed when functional programming for this function is complete.
- The existing library is 5,900 sq ft. It is recommended that this be relocated into the Centre for Research and Innovation wing 3,500 sq. ft is available for this function. A state of the art digital library will require less space than the existing library.
- Therefore, the total existing space available for Academic Medical Staff / Administrative services is 9,100 + 5900 = 15,000 sq. ft. The shortfall is 27,140 sq ft -15,000 sq. ft = **12, 000 sq ft.**
- The option to relocate some of these spaces into vacant space within the Dickson Building is not workable proposition for NSHA.
- To accommodate the required area the proposal is to a) build an extra partial floor within the ambulatory care building, and b) if the research and education wing is rotated and connects the ambulatory care and inpatient / OR building in this concept, building an additional floor on to the connecting bridge is a viable alternative option.

ACADEMIC MEDICAL STAFF/ADMINISTRATIVE SERVICES

New Program Requirement (in addition to existing) 82,240 SF

- Medical Office 72,915 SF
- Corporate Office 9,325 SF

Total Available in Existing HI 44,600 SF (With option of additional 10,500 SF available in Commons Concept Only)

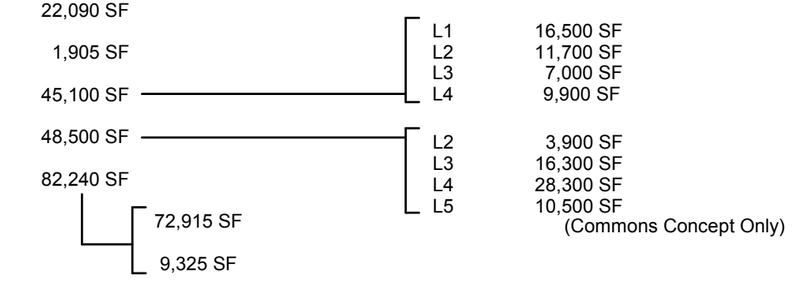
	Available Space Following Move out of Ambulatory Function	Existing in HI
- Level 1		16,500 SF
- Level 2	3,900 SF	11,700 SF
- Level 3	16,300 SF	7,000 SF
- Level 4	28,300 SF	9,900 SF
Subtotal (all options)	48,500 SF	45,100 SF

Grand Total: 93,600 SF

Level 5 (Commons Concept Only)	10,500 SF
Subtotal (Commons Concept Only)	59,000 SF

Grand Total: 104,100 SF

1. Amount of Administrative Services in Victoria to be moved to HI — 16,980 SF
2. Amount of Adminstrative Services in Centennial to be moved HI — 22,090 SF
3. Amount of Administrative Services in Dickson (non-Cancer) to be moved to HI — 1,905 SF
4. Existing Administrative Services in HI — 45,100 SF
5. Space available in HI following move out of Ambulatory functions — 48,500 SF
6. Agnew Peckham Program Requirement — 82,240 SF
   - (a) Medical Offices — 72,915 SF
   - (b) Corporate Services — 9,325 SF



ACADEMIC MEDICAL STAFF/ADMINISTRATIVE SERVICES

Option 1: Summary (Dec. 6, 2017)

Agnew Peckham's requirements for Academic Medical Staff / Administrative Services	82,240 SF
Available space created by decanting at HI	48,500 SF
Shortfall option for discussion, relocate some of the shortfall in Dickson Building	33,740 SF
Available space in Dickson T.B.C. following discussion with QEII	95,900 SF

Option 2: Summary (Jan. 15, 2018)

Agnew Peckham's requirements for Academic Medical Staff / Administrative Services	82,240 SF
Available space created by decanting at HI (Commons Concept Only)	59,000 SF
Shortfall option for discussion, relocate some of the shortfall in Dickson Building	23,240 SF
Available space in Dickson (Top Floor Total) Top Floor Excluding Mechanical	19,800 SF 14,900 SF

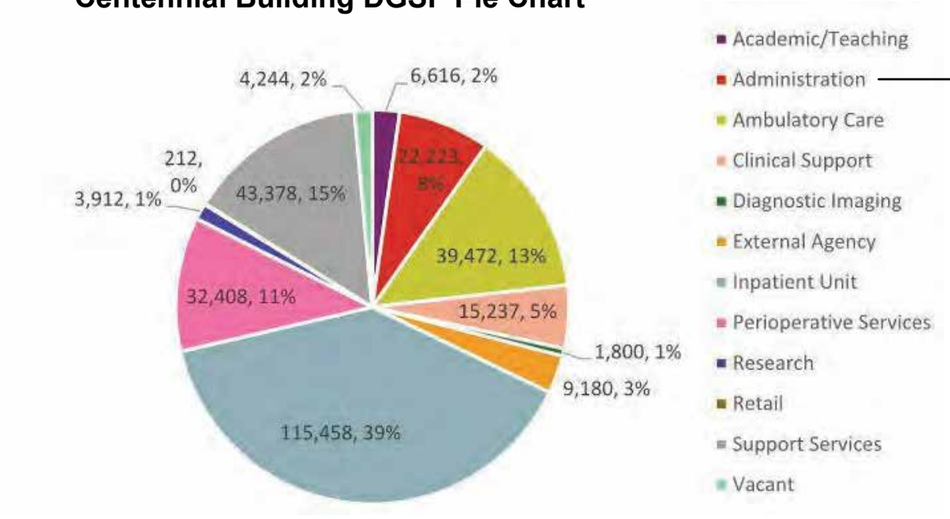
QE II to prioritize which programs are best suited to be located in Dickson building and which programs are to be located at HI Site.

PROGRAM AREA	DGSF
Dalhousie Dept./Division Offices and Physicial Offices	
Department of Anesthesia, Pain Management and Perioperative Medicine	7,395 SF
Division of General Surgery	5,665 SF
Department of Surgery	5,275 SF
Department of Oral and Maxillofacial Surgery	3,220 SF
Division of Otolaryngology	3,930 SF
Division of Thoracic Surgery	1,660 SF
Department of Urology	2,780 SF
Department of Ophthalmology and Visual Services	6,580 SF
Department of Critical Care	4,515 SF
Division of Infectious Diseases	2,065 SF
Division of Endocrinology and Metabolism	2,370 SF
Multi-Organ Transplant Program (MOTP)	5,685 SF
Zone Executive Medical Director	2,085 SF
Division of Digestive Care and Endoscopy	4,035 SF
Division of Clinical Dermatology and Cutaneous Science	2,340 SF
Division of General Internal Medicine	4,145 SF
Division of Nephrology	3,040 SF
Department of Medicine Administration	6,130 SF
Subtotal - Dalhousie Dept./Division Offices and Physicial Offices	**72,915 SF**
Corporate Services	
Business Development- Partners for Care	1,325 SF
Business Office- Accounts Receivable/Cashier	390 SF
Volunteers HI (new) VMB	 1,870 SF 195 SF
Hotelling- Offsite Administration and Prov. Program Staff	1,220 SF
Quality and Patient Safety (QPS)	3,570 SF
Support Space- Distribute Across All Areas	755 SF
Subtotal - Corporate Services	**9,325 SF**
Total - Department Gross Area (Square feet)	**82,240 SF**

9.6 Academic Medical Staff & Administrative Services

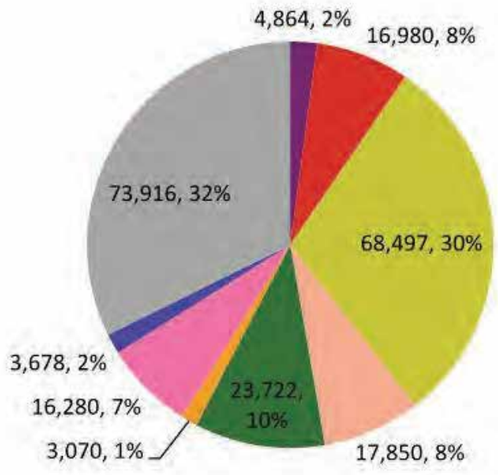
DGSF Summary

Centennial Building DGSF Pie Chart



Corporate Services	12,229 DGSF
Finance	2,684 DGSF
Sub Total	14,913 DGSF
Medical Offices	3,278 DGSF
Foundation/Volunteer	2,325 DGSF
HR/Occupational Health	1,576 DGSF
Sub Total	7,179 DGSF
Total	**22,090 DGSF***

Victoria Building DGSF Pie Chart



Corporate Services	4,688 DGSF
Medical Offices	12,292 DGSF
Total	**16,980 DGSF**

Total Academic Medical staff/Administrative Services to be moved out **39,070 DGSF***

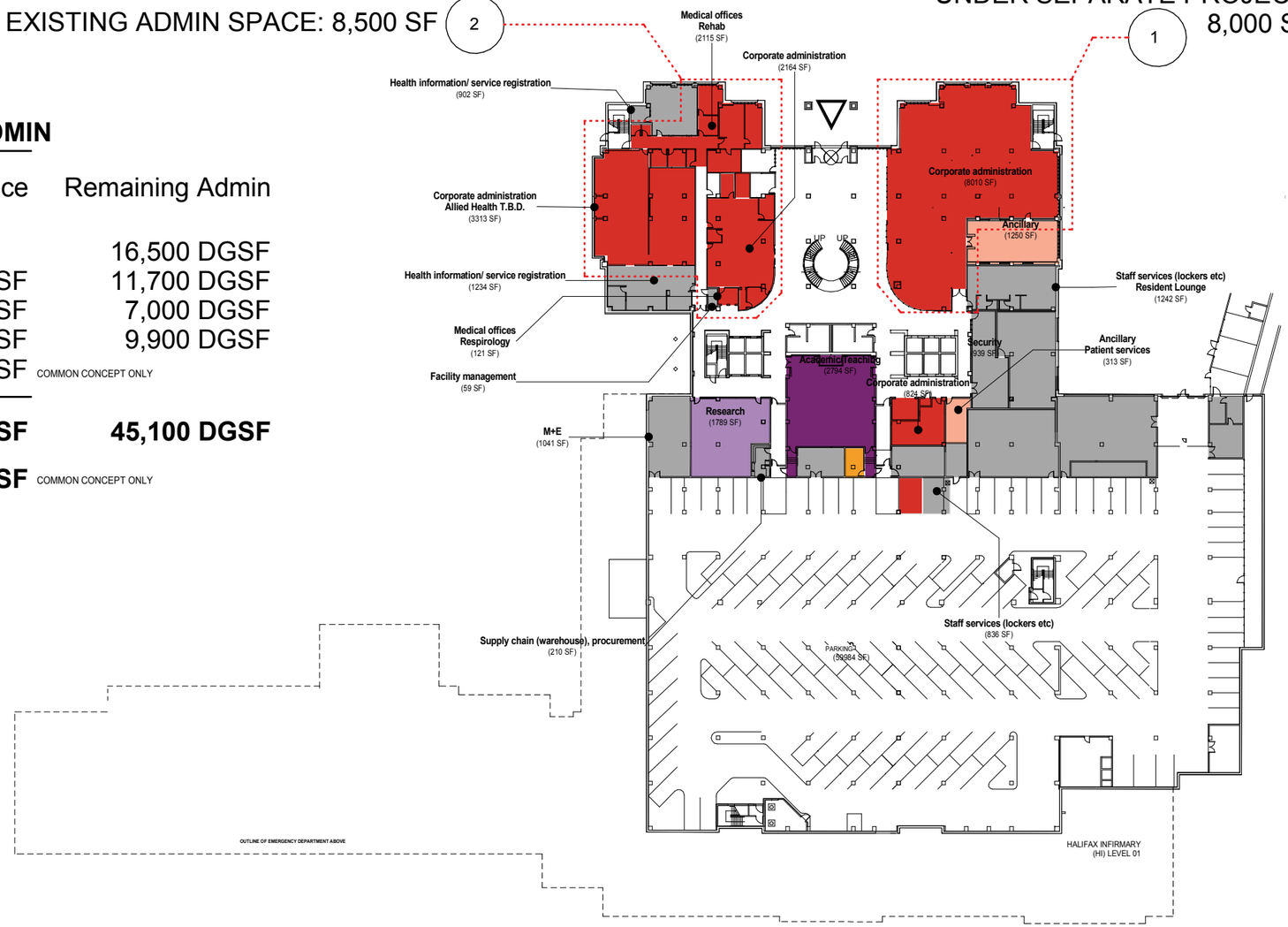
* According to Agnew Peckham (Aug. 23), the area of Medical Staff/Admin in Bethune Building is 3,854 SF; this area and the other areas of administrative function in Bethune, that are associated with the decanted clinics in Victoria and Centennial, are excluded in the AP's program as well as the calculation shown above;

LEVEL 1 - EXISTING ADMIN SPACE: 8,500 SF (2)

ADMIN SPACE RENOVATED UNDER SEPARATE PROJECT: 8,000 SF (1)

INFIRMARY BUILDING - ACADEMIC MED. STAFF/ADMIN

	Existing	Renovated Space	Remaining Admin
- Level 1	37,000 DGSF		16,500 DGSF
- Level 2	79,800 DGSF	3,900 DGSF	11,700 DGSF
- Level 3	133,400 DGSF	16,300 DGSF	7,000 DGSF
- Level 4	85,700 DGSF	28,300 DGSF	9,900 DGSF
- Level 5	83,700 DGSF	10,500 DGSF	COMMON CONCEPT ONLY
Grand Total	**419,600 DGSF**	**48,500 DGSF**	**45,100 DGSF**
		59,000 DGSF	COMMON CONCEPT ONLY



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PROGRAMS FOR DECANTING RENOVATION

(1) OUT: DIALYSIS TO AMBULATORY CARE BUILDING UNDER A SEPARATE RENO PROJECT (8,000 SF)

IN: ADMINISTRATION SERVICES

(2) 8,500 SF OF CORPORATE ADMINISTRATION TO REMAIN IN EXISTING LOCATION

N

9.6 Academic Medical Staff & Administrative Services
Level 01

Department Gross Area - Existing Available Space in Infirmary - Level 01 ADMIN ONLY		
Department Name	Comments	Area
Corporate administration		824 SF
Corporate administration		2,164 SF
Corporate administration		8,010 SF
Corporate administration	Allied Health T.B.D.	3,313 SF
Academic Medical Staff/ Admin Services	Med Admin	264 SF
Medical offices	Rehab	2,115 SF
Medical offices	Respirology	121 SF
Grand total		16,811 SF

N

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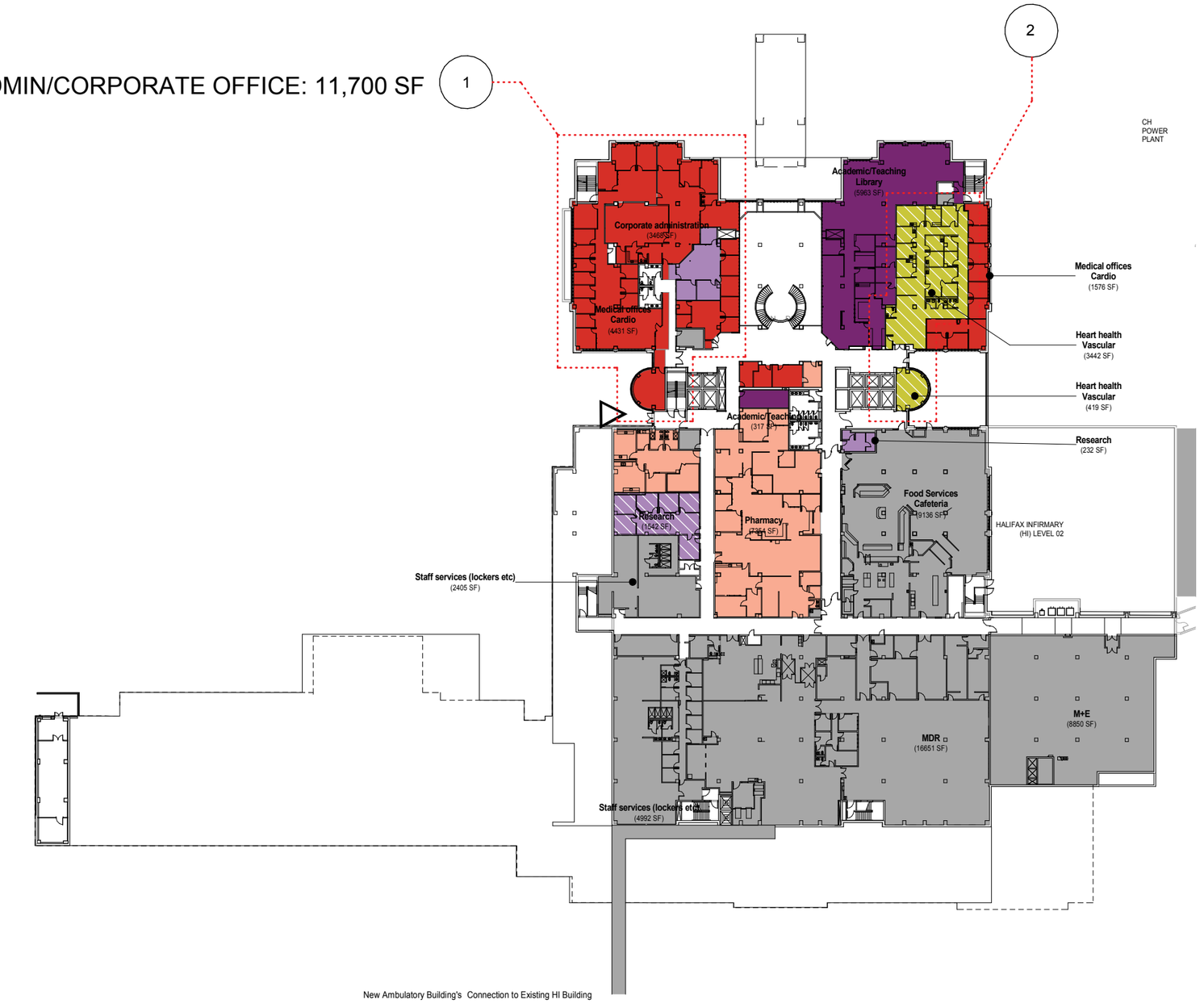
9.6 Academic Medical Staff & Administrative Services
Level 02 Pre-Decanting

LEVEL 2 - EXISTING ADMIN/CORPORATE OFFICE: 11,700 SF

Department Gross Area - Existing Available Space in Infirmary - Level 02...	
Department	Area
Ambulatory Care	3,861 SF
Research	1,542 SF
Grand total	**5,403 SF**



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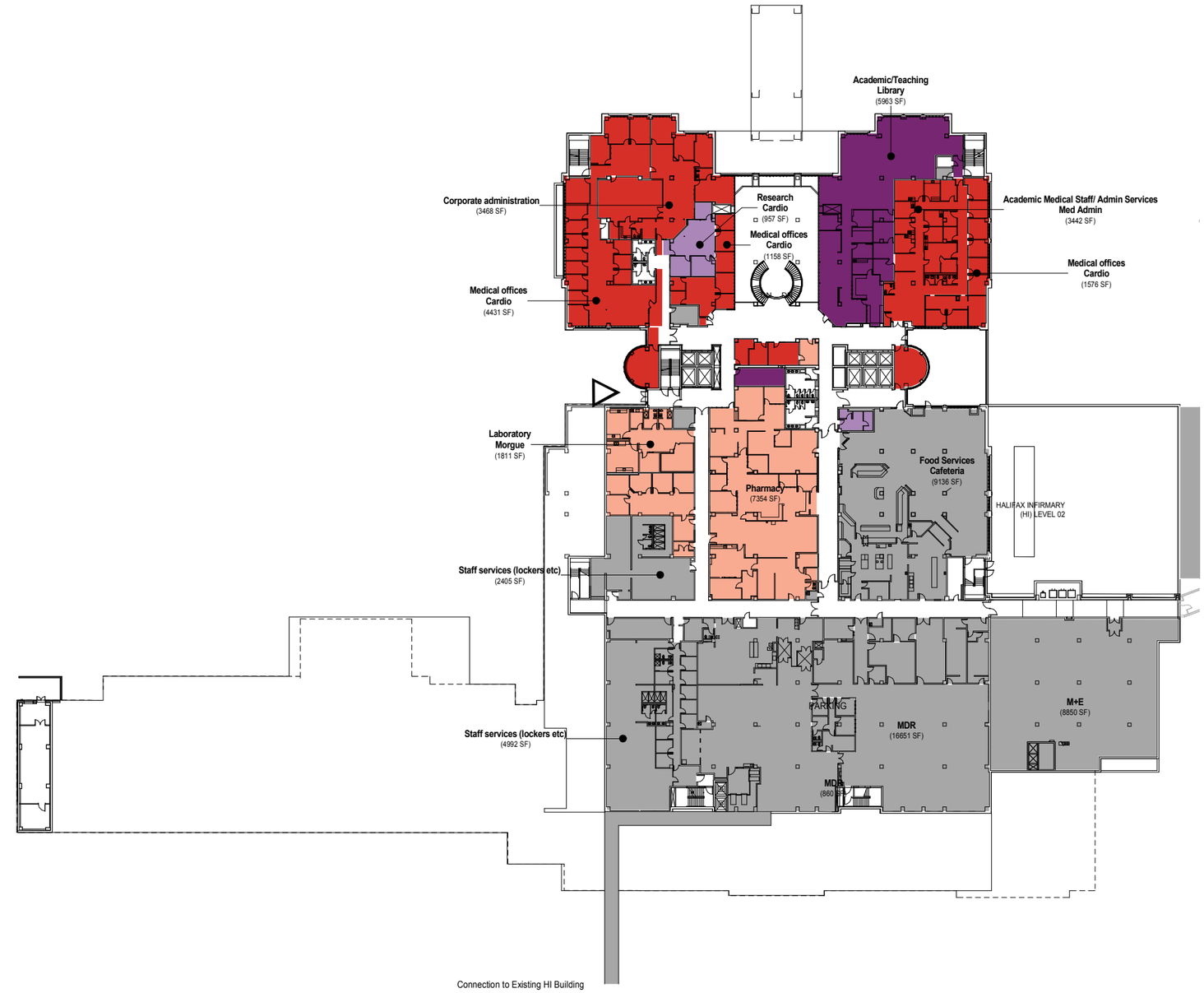
PROGRAMS FOR DECANTING RENOVATION

1. 11,700 SF CORPORATE ADMINISTRATION TO REMAIN
2. OUT: AMBULATORY CARE (3,900 SF)
   IN: EXPANSION OF MEDICAL OFFICE

N

9.6 Academic Medical Staff & Administrative Services
Level 02

Department Gross Area - Existing Available Space in Infirmary - Level 02 ADMIN ONLY		
Department Name	Comments	Area
Corporate administration		3,468 SF
Medical offices	Cardio	553 SF
Medical offices	Cardio	1,158 SF
Medical offices	Cardio	4,431 SF
Medical offices	Cardio	535 SF
Medical offices	Cardio	1,576 SF
Academic Medical Staff/ Admin Services	Med Admin	3,442 SF
Academic Medical Staff/ Admin Services	Med Admin	419 SF
Grand total		15,582 SF



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LEVEL 3 - EXISTING ADMIN /CORPORATE OFFICE: 7,000 SF

LEVEL 3 - HEART HEALTH MOVED OUT AND UTILIZED BY ADMIN: 16,300 SF

Department Gross Area - Existing Available Space in Infirmary - Level 03...	
Department	Area
Ambulatory Care	16,306 SF
Clinical Support	8,697 SF
Grand total	**25,003 SF**

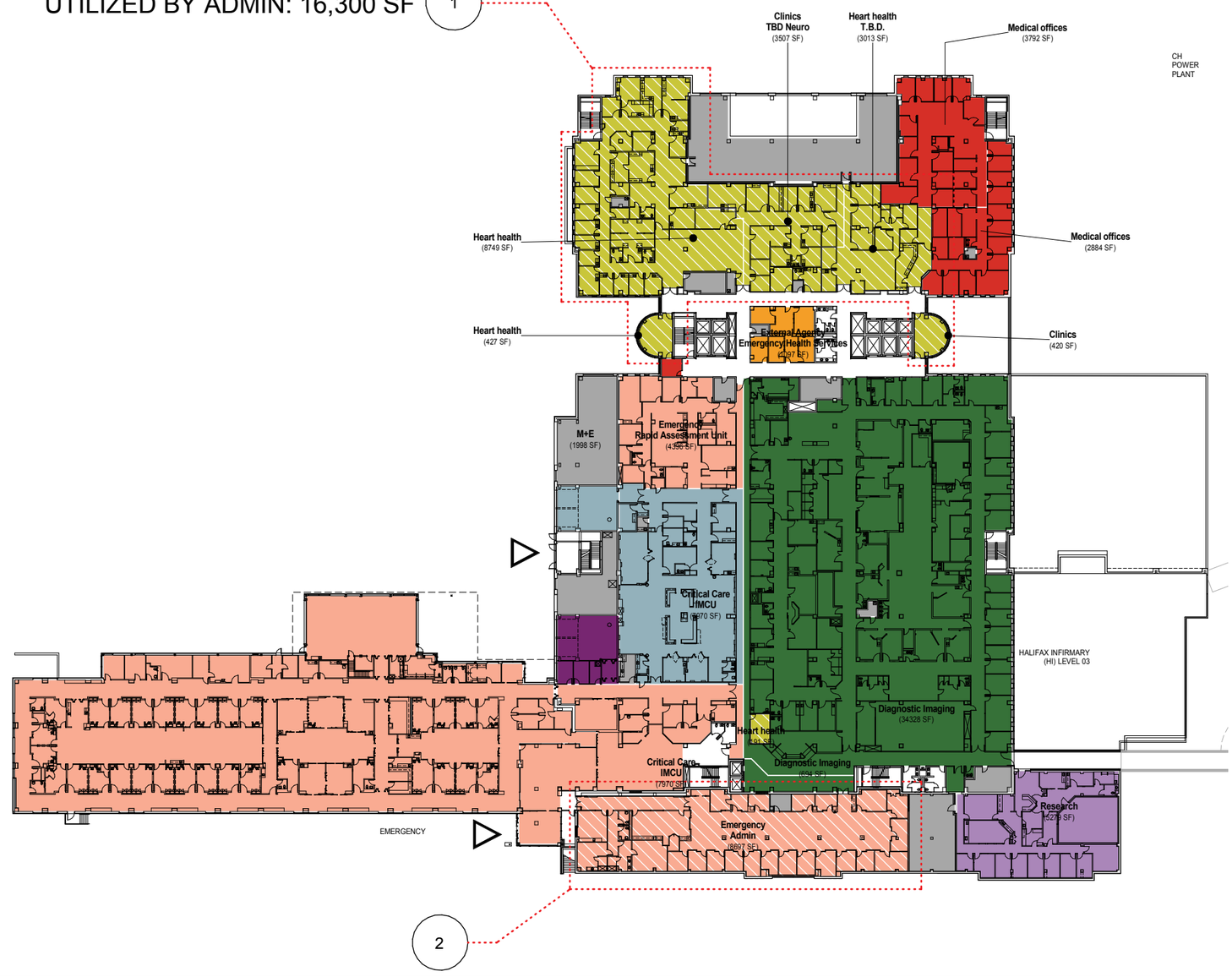
PROGRAMS FOR DECANTING RENOVATION

① OUT: HEART HEALTH (16,300 SF)
- RELOCATED TO AMBULATORY CARE BUILDING

IN: ACADEMIC MEDICAL STAFF/ ADMINISTRATION SERVICES

② OUT: EMERGENCY ADMIN (8,700 SF)
- RELOCATED TO 4TH FLOOR

IN: DIAGNOSTIC EXPANSION



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9.6 Academic Medical Staff & Administrative Services

Level 03

Department Gross Area - Existing Available Space in Infirmary - Level 03 ADMIN ONLY		
Department Name	Comments	Area
Academic Medical Staff/ Admin Services		123 SF
Academic Medical Staff/ Admin Services	Med Admin	2,706 SF
Academic Medical Staff/ Admin Services	Med Admin	4,766 SF
Academic Medical Staff/ Admin Services	Med Admin	420 SF
Academic Medical Staff/ Admin Services	Med Admin	5,840 SF
Academic Medical Staff/ Admin Services	Med Admin	427 SF
Academic Medical Staff/ Admin Services	Med Admin	191 SF
Medical offices	Neuro admin.	2,884 SF
Medical offices	Neuro surgery	3,792 SF
Grand total		21,148 SF

SCALE: 1 : 400

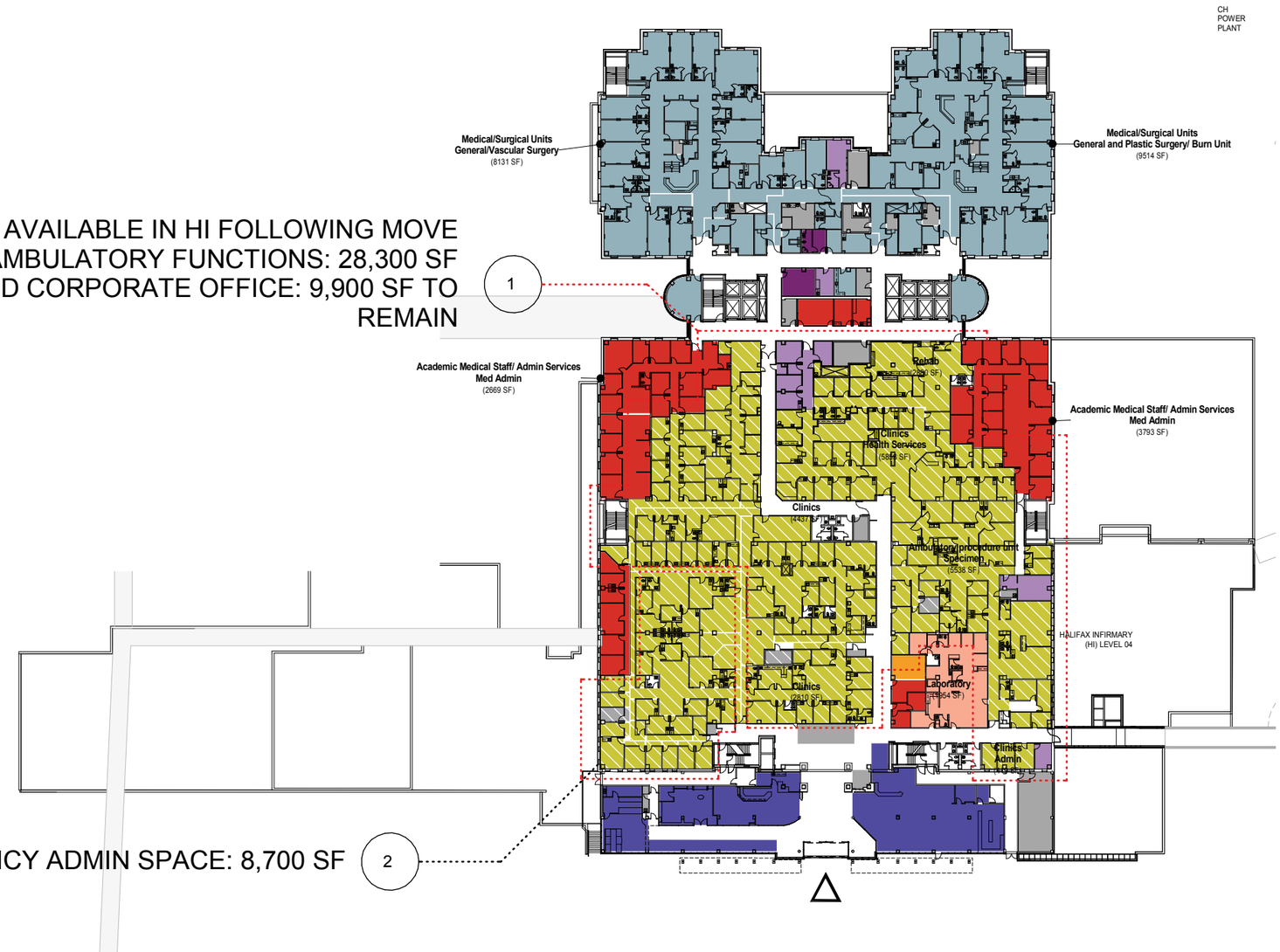
N

9.6 Academic Medical Staff & Administrative Services
Level 04 Pre-Decanting

Department Gross Area - Existing Available Space in Infirmary - Level 04...	
Department	Area
Ambulatory Care	37,358 SF
Grand total	37,358 SF

LEVEL 4 - SPACE AVAILABLE IN HI FOLLOWING MOVE OUT OF AMBULATORY FUNCTIONS: 28,300 SF
EX. ADMIN AND CORPORATE OFFICE: 9,900 SF TO REMAIN

LEVEL 4 - EMERGENCY ADMIN SPACE: 8,700 SF



PROGRAMS FOR DECANTING RENOVATION

1 OUT: ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING (28,300 SF)

IN: ACADEMIC MEDICAL STAFF/ ADMINISTRATION SERVICES

2 OUT: ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING (8,700 SF)

NEW IN: RELOCATE ADMIN FOR EMERGENCY DEPARTMENT

N

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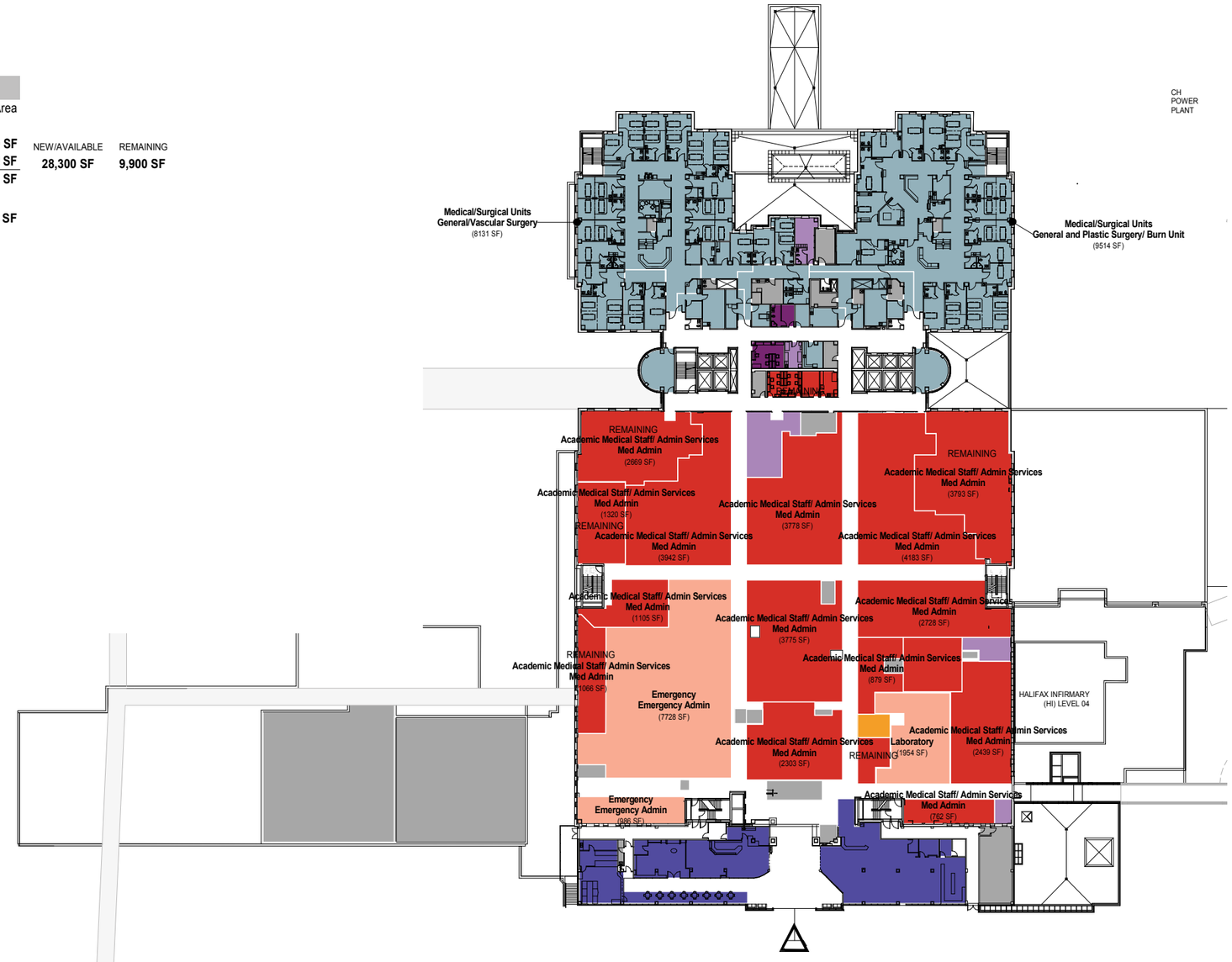
9.6 Academic Medical Staff & Administrative Services
Level 04

Department Gross Area - Existing Available Space in Infirmary - Level 04 ADMIN ONLY					
Department Name	Comments	Area			
Foundation/ volunteers and auxiliary support		429 SF	NEW/AVAILABLE	REMAINING	
Academic Medical Staff/ Admin Services	Med Admin	36,434 SF	28,300 SF	9,900 SF	
Grand total		36,863 SF			
Clinical Support	Emergency Admin	8,713 SF			

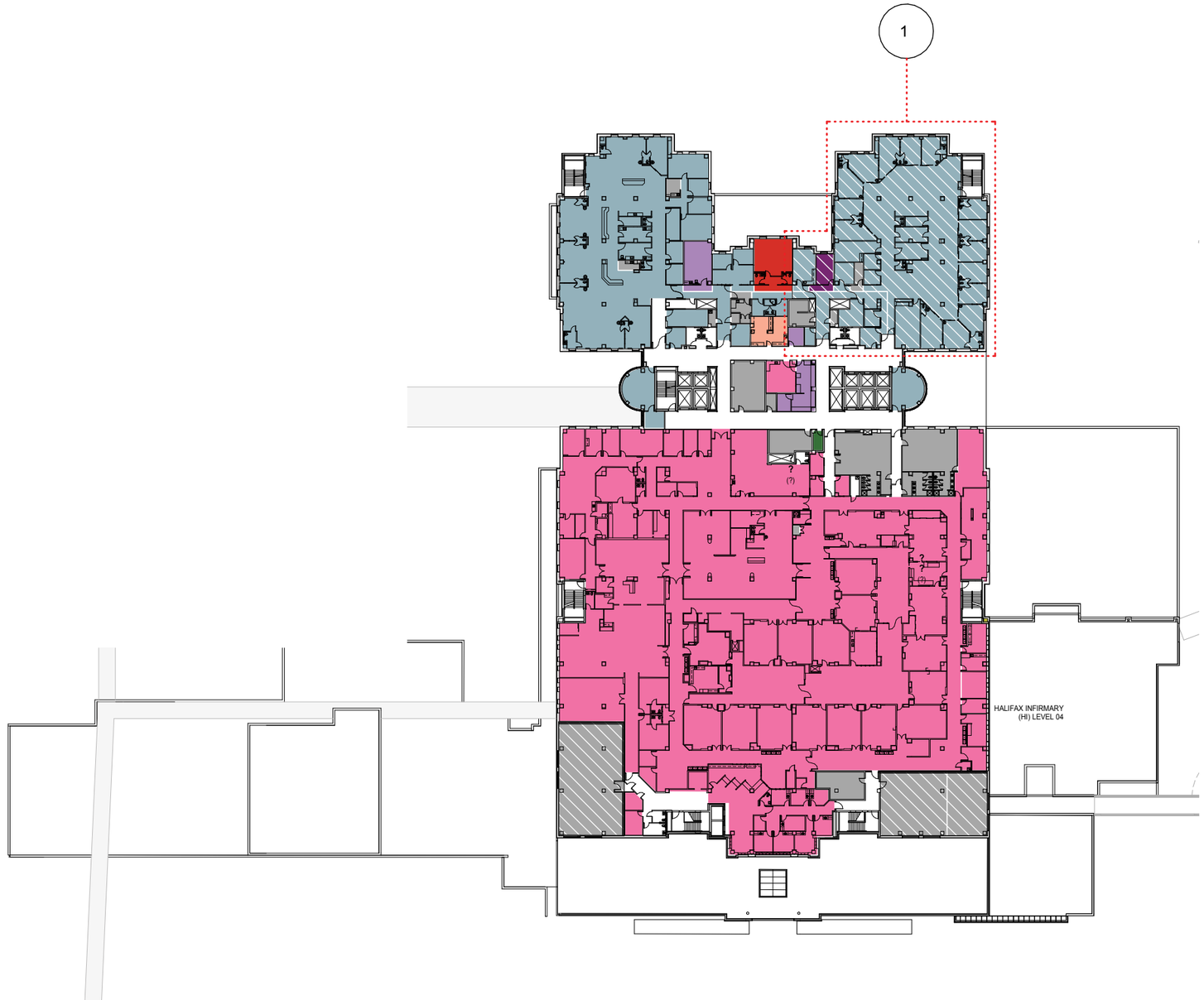


9.6 Academic Medical Staff & Administrative Services
Level 05 Pre-Decanting

PROGRAMS FOR DECANTING RENOVATION
(OPTION IN COMMONS CONCEPT ONLY)

(1) OUT: MEDICAL/SURGICAL ICU (10,500 SF)

IN: ACADEMIC MEDICAL STAFF/ ADMINISTRATIVE SERVICES



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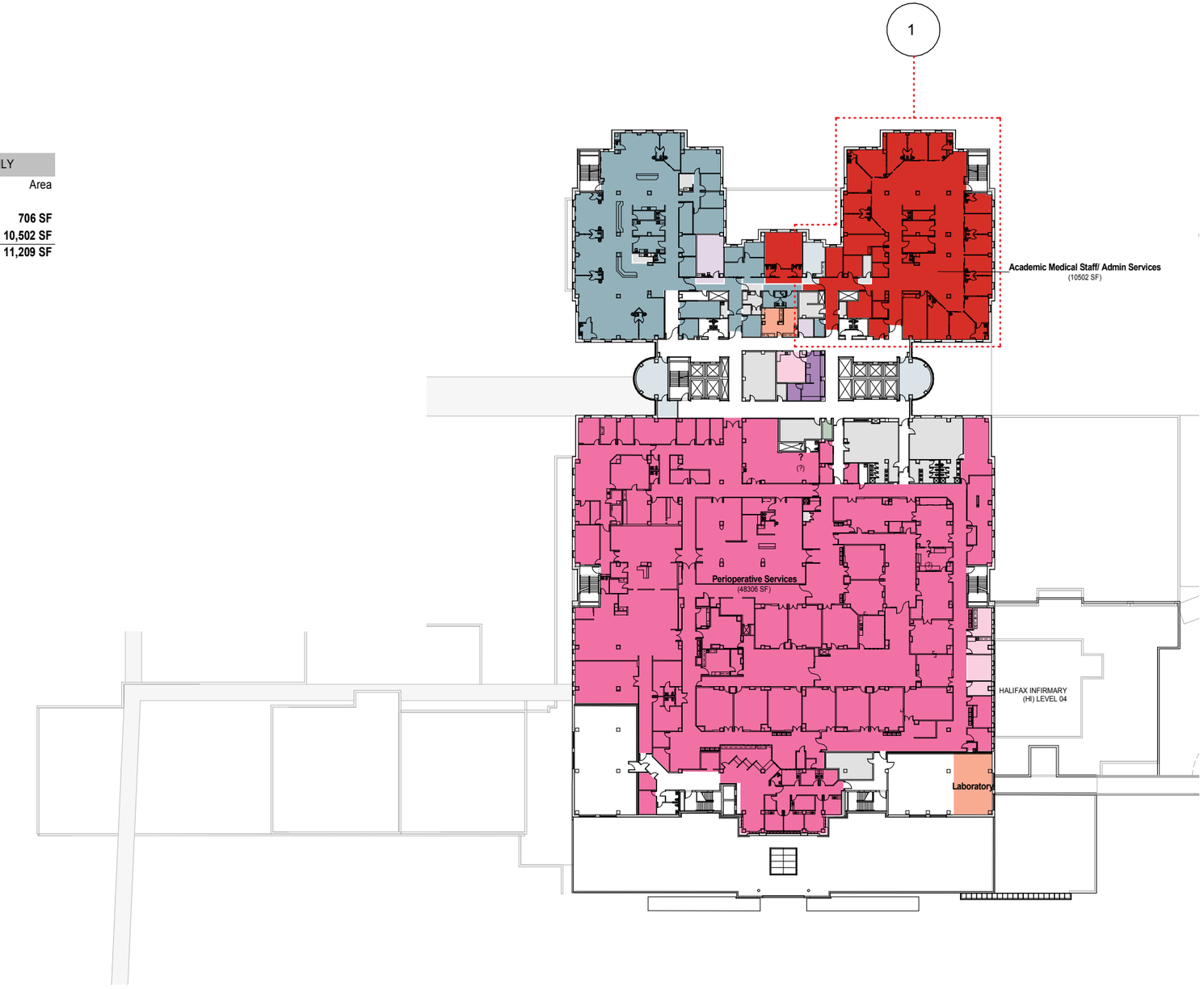
9.6 Academic Medical Staff & Administrative Services
Level 05

Department Gross Area - Existing Available Space in Infirmary - Level 05 ADMIN COMMONS CONCEPT ONLY		
Department Name	Comments	Area
Corporate administration	**Critical care Inpatient**	**706 SF**
Academic Medical Staff/ Admin Services	**Med Admin**	**10,502 SF**
Grand total		**11,209 SF**



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9.7 Wayfinding, Lightwells and Atriums

A key driver and principle in the development of the master plan concepts is wayfinding. It is a key consideration in generating the concepts, from understanding how patients, staff and visitors arrive to the site to how they can navigate through the hospital. The objective in clear, intuitive wayfinding is to ensure that no unnecessary stresses are imposed on patients, visitors and staff as they navigate through the hospital.

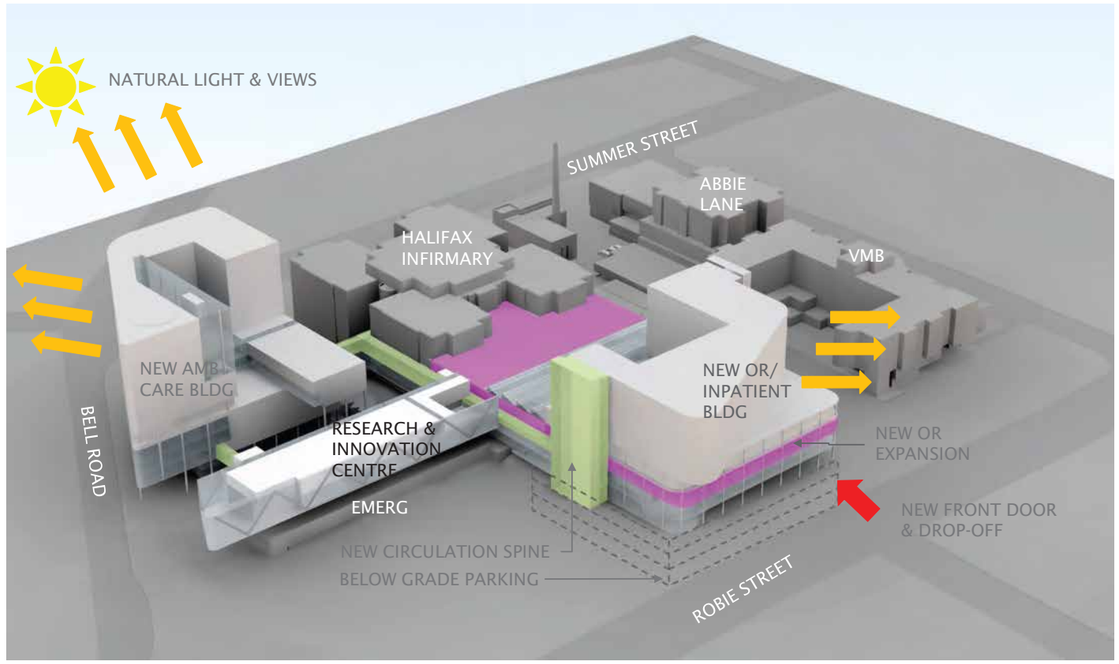
As part of the wayfinding system, central distinctive **node points** within the plan inform individuals where they are in terms or orientation. In the concepts presented, central light wells that penetrate the buildings are key node points within the scheme. They not only inform individuals where they are but also give them a sense of time and space i.e. the creation of a **"sense of place"** and are landmarks within the network of corridors. Transparency is associated with these spaces, in addition, these node points will require extra design focus since these are strategically located at key intersections and the spaces should contain memorable art work as an integral part of the space.

The **connectors** incorporated into the design are also key elements in way finding, in most cases these are incorporated to the exterior or building and on the edge of the structures and they inform the individuals moving between buildings where they are in time, space and relative to the city context. These connectors are a cost-effective solution in minimising expensive renovations within the existing facility. For repeat and first-time visitors to the hospital the journey through the building will become more predictable, allowing individuals to quickly construct mental maps of their paths and in so doing reducing stress and creating a healthy environment hospital.

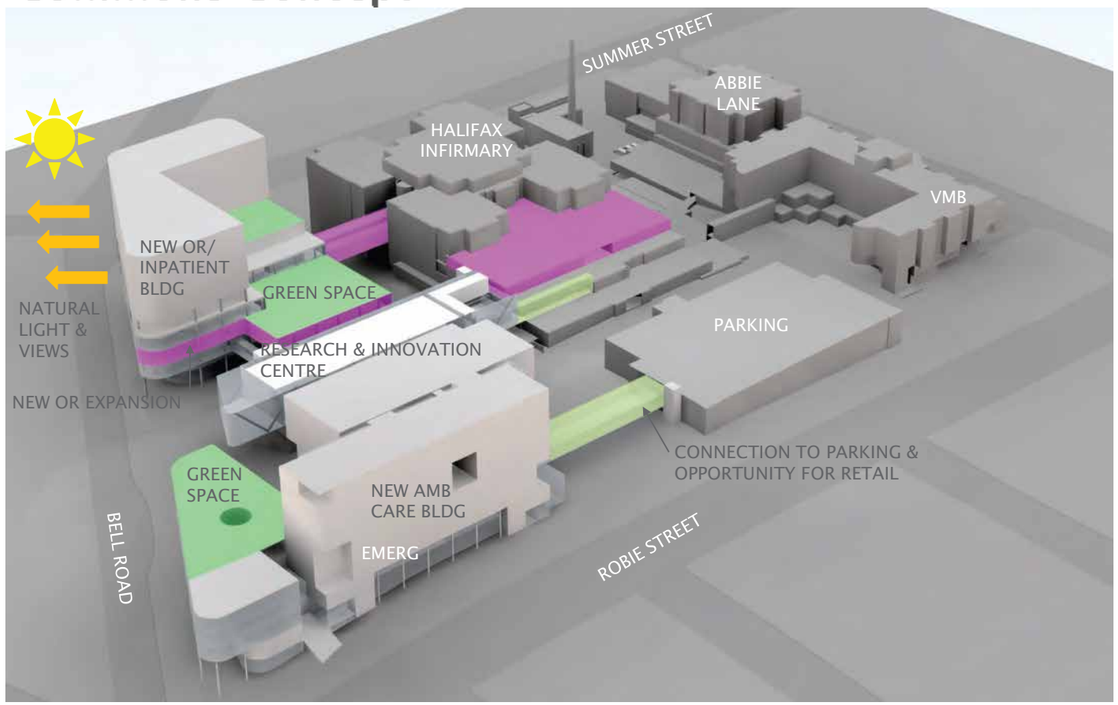
The **"concept of legibility"** is introduced into the design concepts and is defined as the ease in which people understand the layout of the place. Another benefit of the simplified system of connectors is that it creates an effective path for the use of robotics that will be an inevitable future requirement.

As the master plan moves forward to the next phase of design, it is these design elements reflected within the master plan that will provide opportunity for future exploration thus advancing the wayfinding design thinking that is incorporated.

Willow Tree Concept

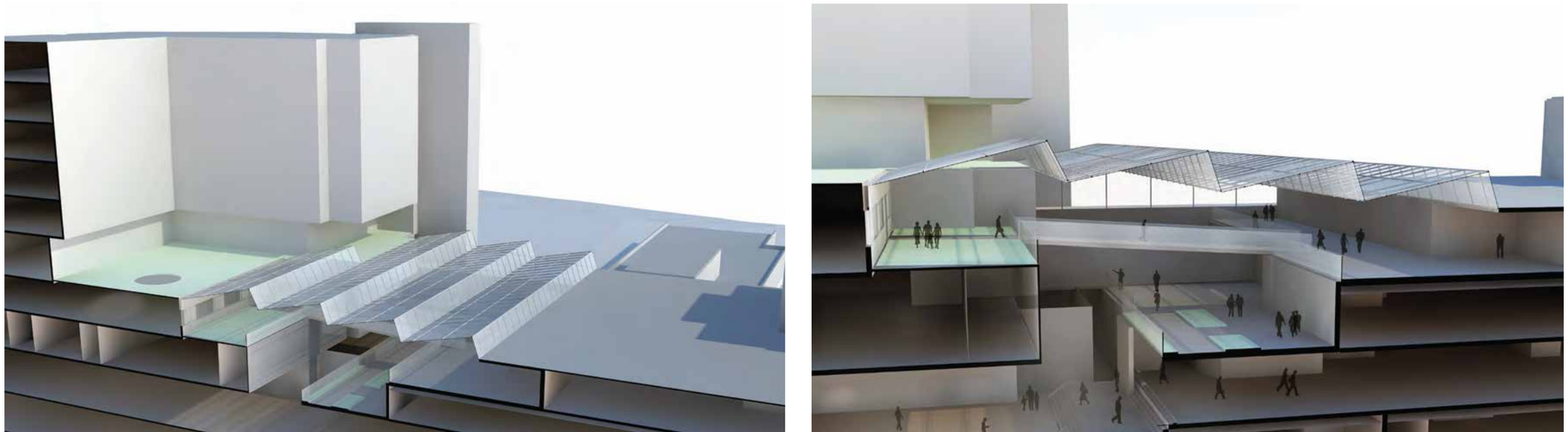


Commons Concept



9.7 Wayfinding, Lightwells and Atriums

*"In fact, the best type of wayfinding is that which is **intuitive**. Intuitive wayfinding is much like navigating via waypoints—moving from point to point to point. The skill in designing intuitive wayfinding is understanding the visual and physical clues that help pull people through a space without the need for intensive signage. In doing so, the interpretive journey is much less stressful and therefore, much more enjoyable"*

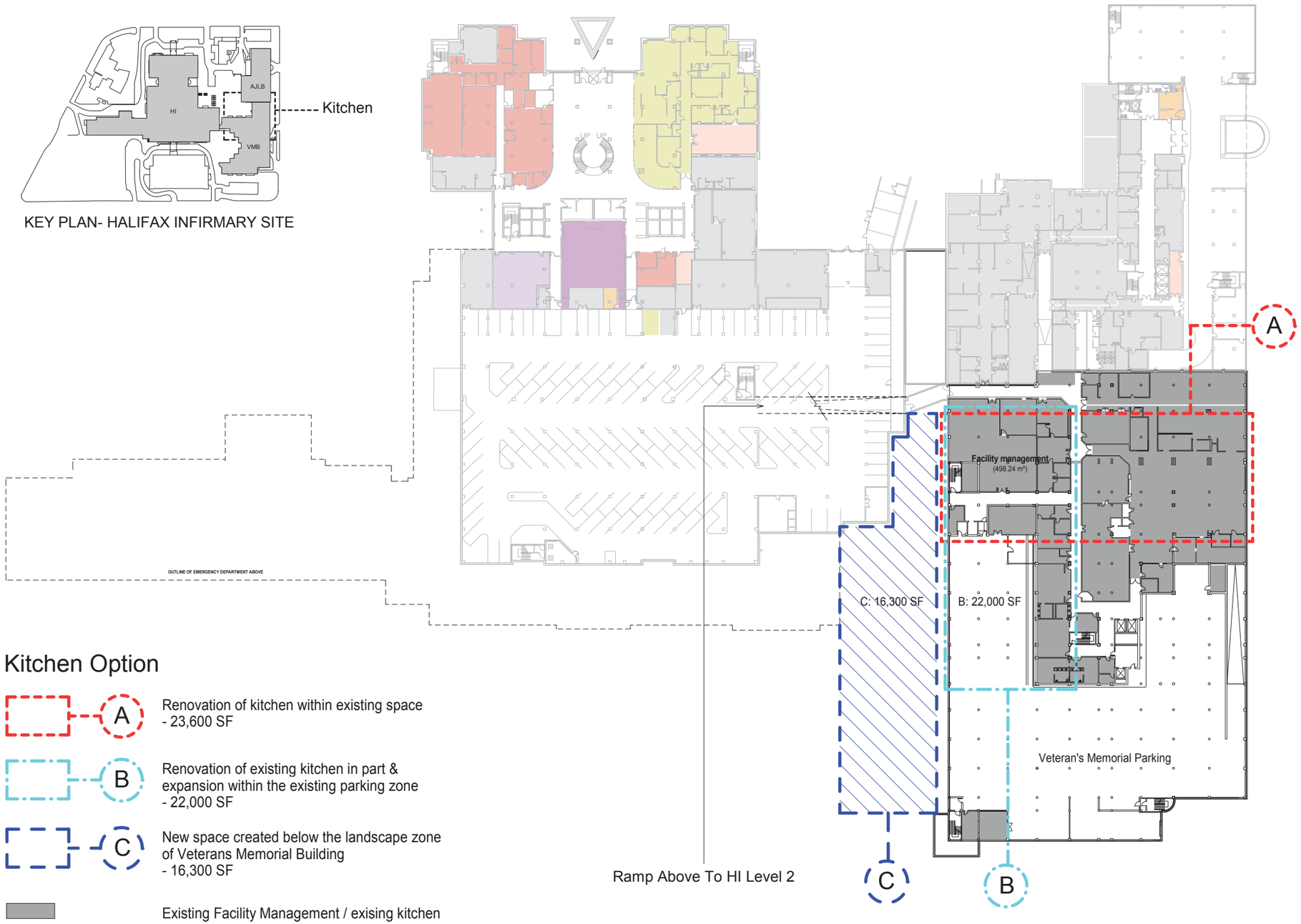


Lightwells and Atrium Opportunity in the Willow Tree Concept

Precedent: The Royal Children's Hospital Atrium / Melbourne, Australia /2012

kasian

KEY PLAN- HALIFAX INFIRMARY SITE



Kitchen Option

A — Renovation of kitchen within existing space
- 23,600 SF

B — Renovation of existing kitchen in part & expansion within the existing parking zone
- 22,000 SF

C — New space created below the landscape zone of Veterans Memorial Building
- 16,300 SF

Existing Facility Management / exising kitchen

9.8 Kitchen Expansion Options

NSHA has initiated a pilot project to establish the best food service model for inpatients at the HI site. The pilot project will determine the feasibility and benefits of moving to a room service model where meals will be prepared on order from food service centres located in the inpatient units. The pilot test is looking at capacity, type of food, diet and related operational needs to determine if the kitchenette within the existing units will be able to satisfy the patient dietary needs and to determine the area required per unit. There appears to be a positive read that the food service centers will work.
At the conclusion of the pilot project, NSHA will confirm if the room services model with food service centre on each inpatient floor will function as planned.

Since the food services centre pilot test is currently underway, further study will be required at the next stage of design, once the outcome of the study is finalized, to determine the impact on the existing main kitchen facility.

The existing kitchen is located in the Veterans Memorial Building and is set-up to produce bulk meals and cold plated meals for re-therm. To satisfy the needs of the new proposed service model redevelopment of the existing kitchen will be required.

In anticipation of the direction moving forward for food services, Kasian has mapped out three high level options for the redevelopment of the kitchen area as follows:

- A - Renovate the kitchen within the existing space, an area of 23,600 sq ft as per the master program requirement.

- B-Renovate the existing kitchen in part with expansion in the existing parking space, the rational for this option is that existing operations will need to be maintained through out the construction and may worked for a phased fit out.

- C- Construct a new kitchen between the Veterans Memorial building and the inpatient/ OR building for the Willow Tree concept. The rational for this concept is that the existing operations can be maintained uninterrupted in its entirety during the fit out of the new kitchen planned to align with the new food service delivery model. The existing kitchen refitted for expanded facility needs.

Each of the options listed will require detailed analysis, including review of equipment requirements to support the new food services model and a costing analysis for the renovation of the main kitchen in order to make a decision on how the kitchen will be expanded.

9.9 Helipad Relocation

Proposed QE II Helipad

The Master Plan proposes a new location and helipad construction in both the Willow Tree concept and the Commons concept. This decision is dictated in part by the height of the proposed buildings on the CBC site which will create an obstacle along the existing flight path. The existing helipad is located on the existing HI building.

While it may be possible to leave the existing helipad in its existing location and circumvent the proposed buildings during take off and landing, this proposal is subject to confirmation by the authorities who may respond negatively to such a plan; a likely risk management issue.

The advantages of the proposed new location are:

- Providing an obstacle free path
- There is minimum realignment of the approach and take off paths
- It will most likely alleviate the problem of air intake into existing building mechanical louvers systems of the HI building
- It will replace an aging helipad, and reduce ongoing maintenance cost
- It will reduce patient transfer times from helipad to the existing emergency department, OR's or ICU departments
- Elevator management used for patient transfer can be better managed within a new elevator plan

Steps that must be undertaken to process the change in the helipad location will include:

- Approval by Transport Canada on the flight path realignment
- Fire Marshall approval
- Nova Scotia Department of Environment on fire retardants utilized in the event of a fire
- Halifax Regional Municipality review

Fig. 934 Helipad Tower Example

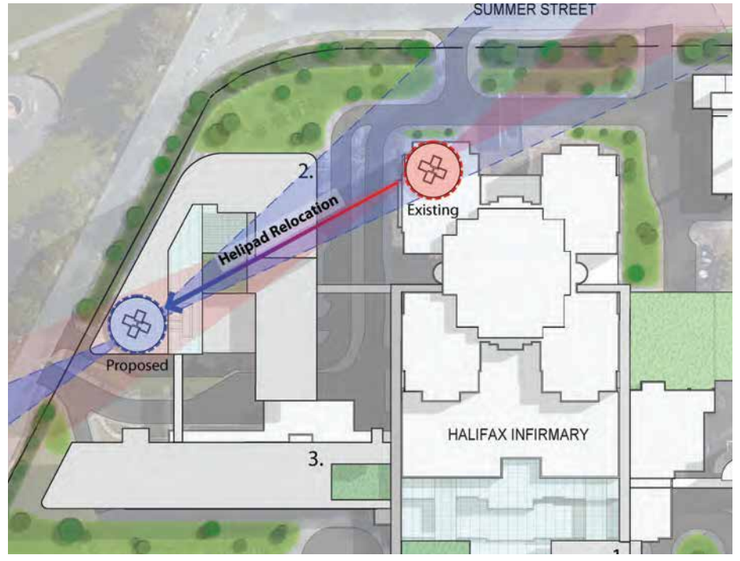


Fig. 935 Willow Tree Concept Helipad Relocation

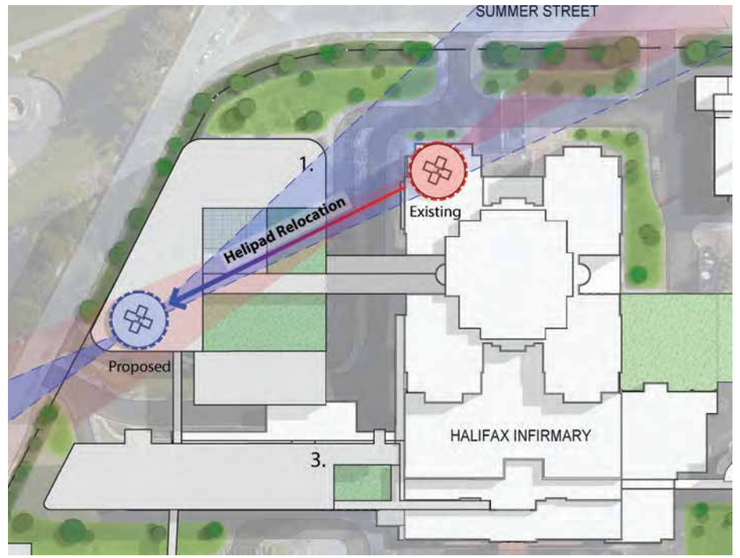


Fig. 936 Commons Concept Helipad Relocation

9.10 Mechanical, Electrical & Structural

Electrical

Halifax Infirmary Site

The electrical system design will be in accordance with the applicable requirements of

.1 Latest approved edition of the National Building Code of Canada (NBC), errata, revisions, and supplements,

.2 Latest edition of the Canadian Electric Code (CEC),

.3 ASHRAE/IES 90.1 - Energy Limitations for Lighting Systems,

.4 Illuminating Engineering Society North America (IESNA),

.5 CAN/ULC S524 Canadian Standard for Installation of Fire Alarm Systems,

.6 Provincial Department of Labour,

.7 Labour Code of Canada,

.8 Nova Scotia Power Building Inspection Department,

.9 Nova Scotia Building Code Regulations,

.10 LEED V4 Canada,

.11 NSTIR's DC 350 Document

.12 CAN/ULC S524 Canadian Standard for Installation of Fire Alarm Systems,

.13 CSA – Z32 Electrical Safety and Essential Electrical Systems in Health Care Facilities,

.14 CSA – C282 Emergency Electrical Power Supply for Buildings,

.15 Provincial Department of Labour,

.16 Labour Code of Canada,

.17 Nova Scotia Power, Building Inspection Department,

.18 Nova Scotia Building Code Regulations.

.19 ANSI/TIA-1179A Healthcare Facility Telecommunications Infrastructure Standard

HI Site:

This site is serviced with two deferent utility 25kV HV services – one over head utility service is derived from Lower Water Street substation and a second independent over head utility service is derived from Kempt Road substation. Each of these services have a maximum loading profile of 14MWs – this is for all connected services (healthcare and non-healthcare loads). Both utility services are routed underground the property in front of the Halifax Infirmary site, once combined a local common HV metering point is established.

These services, which are primary metered, are responsible for feeding the following buildings at the HI site:

- Halifax infirmary – (2) 3000kVA exterior pad mount transformers.
  - Sub feeds the power plant, parking structure and the new emergency department.
- Abbie Lane – (3) 333kVA interior "vault configured" transformers.
- Veterans Memorial Building – (1) 1500kVA exterior pad mount transformer.

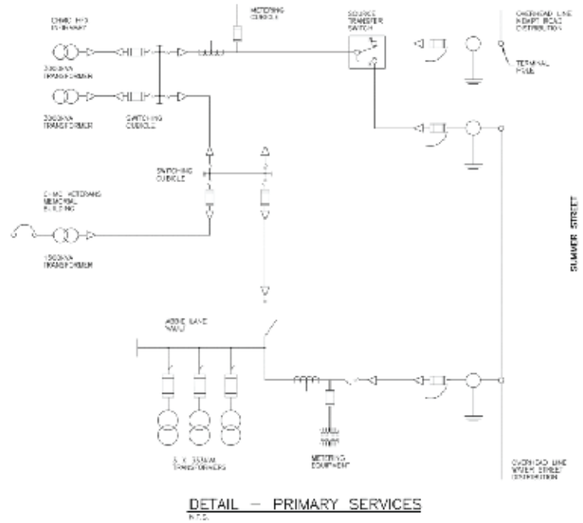


Figure 1 Current HV Arrangement for HI Site

Common or Willow Street Options:

With the planned expiation to this site – whether the "Common or Willow Street" option is selected, the HV services requirements will be the same.

For each new building the client requires a two-new incoming "utility owned" pad mount transformers (Side A and Side B) connected through a switching cubicle. The primary utilization voltage will be 25kV and the secondary utilization voltage will be 600V 3 Ph, 4W.

The initial capacity/building demand for each new building located at this site will be 3000kVA (for side A and For Side B).

Charles V. Keating Emergency & Trauma Centre – (Emergency Department)

The emergency department which has multiple 600V feeders and is currently fed from the main 600V

"utility owned" pad mount transformers (Side A and Side B) connected through a switching cubicle. The primary utilization voltage will be 25kV and the secondary utilization voltage will be 600V 3 Ph, 4W.

The initial capacity/building demand for each new building located at this site will be 1500kVA (for side A and For Side B).

General Site:

Depending on the final arrangements with NSPI the HV metering cubicle that serves the infirmary may be displaced by a new HV metering cubicle on each of the utility feeders.

Under ground HV feeders will be single conductors installed in common ducts and routed underground to each switching cubicle as required by NSPIs current standards. The coordination and costs of the utility owned services/upgraders shall be included in this project. All NSPI standards wrt grounding, conductor terminations, common transformer pads/switching cubicle pads, B-36 document adherence form part of the scope.

This topology meets the owners' requirements as well as the current CSA Z32 standard.

Under this project their area no planned changes to the HV services to Abbie Lane and Veterans Memorial Building.

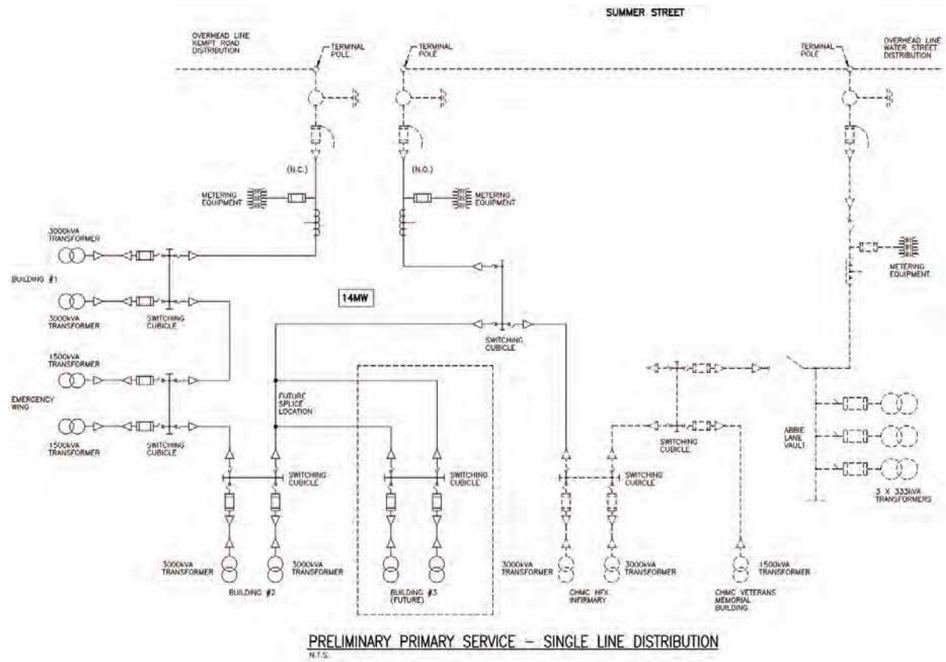


Figure 2 Proposed HV Arrangement for HI Site

Low Voltage Normal Power Requirements:

Abbie Lane: No changes prescribed for this building under this project.

Veterans Memorial Building: No changes prescribed for this building under this project.

Power Plant: No changes prescribed for this building under this project.

Halifax Infirmary: The normal power electrical services at this building are reaching their designed capacity and can not support any new additions/expansions to the building with the emergency wing connected. There is sufficient normal power capacity to address internal decanting / renovation process as describe throughout the master planning.

Charles V. Keating Emergency & Trauma Centre – (Emergency Department): With the proposed expansion to the Emergency Department and the Infirmary it has been decided that the emergency department receive its own incoming utility, normal, and selectively coordinated emergency power distribution system. The electrical system shall be fully compliant to CSA-282 and CSA-Z32 standards.

9.10 Mechanical, Electrical & Structural

Electrical

Initial electrical systems capacity requirements: 1500kVA.

Common or Willow Street Options: Each of the prosed buildings identified in the master plan shall have their own incoming utility, normal, and selectively coordinated emergency power distribution system. The electrical system shall be fully compliant to CSA-282 and CSA-Z32 standards

Initial electrical systems capacity requirements: 3000kVA/building.

Emergency Power Requirements:

Abbie Lane: No changes prescribed for this building under this project.

Veterans Memorial Building: No changes prescribed for this building under this project.

Power Plant: No changes prescribed for this building under this project.

Halifax Infirmary: The emergency power electrical services at this building are reaching their designed capacity and can not support any new additions/expansions to the building with the emergency wing connected. There is sufficient emergency power capacity to address internal decanting / renovation process as describe throughout the master planning.

Charles V. Keating Emergency & Trauma Centre – (Emergency Department): With the proposed expansion to the Emergency Department and the Infirmary it has been decided that the emergency department receive its own selectively coordinated emergency power distribution system. The electrical system shall be fully compliant to CSA-282 and CSA-Z32 standards.

Initial electrical systems capacity requirements: 1500kVA.

Common or Willow Street Options: Each of the prosed buildings identified in the master plan shall have their own selectively coordinated emergency power distribution system. The electrical system shall be fully compliant to CSA-282 and CSA-Z32 standards

Initial electrical systems capacity requirements: 3000kVA/building.

Fire Alarm:

Abbie Lane: No changes prescribed for this building under this project.

Veterans Memorial Building: No changes prescribed for this building under this project.

Power Plant: No changes prescribed for this building under this project.

Halifax Infirmary: The existing fire alarm system consists of a network of Simplex 4100 series control panels and respective fire alarm devices. The system and evinces have reached their service life and are no longer being manufactured. This product will be available for the next 7 years. A new addressable, microprocessor based, zoned, non-coded, electrically supervised, Class A two stage fire alarm system will be provided to meet the requirements of the requirements of the National Building Code, the Canadian Electrical Code, CAN/ULC S524. Verification of the fire alarm system shall be to CAN/ULC S537.

Charles V. Keating Emergency & Trauma Centre – (Emergency Department): The existing fire alarm system consists of a network of Simplex 4100 series control panels and respective fire alarm devices. The system and evinces have reached their service life and are no longer being manufactured. This product will be available for the next 7 years. A new addressable, microprocessor based, zoned, non-coded, electrically supervised, Class A two stage fire alarm system will be provided to meet the requirements of the requirements of the National Building Code, the Canadian Electrical Code, CAN/ULC S524. Verification of the fire alarm system shall be to CAN/ULC S537.

Common or Willow Street Options: A new addressable, microprocessor based, zoned, non-coded, electrically supervised, Class A two stage fire alarm system will be provided to meet the requirements of the requirements of the National Building Code, the Canadian Electrical Code, CAN/ULC S524. Verification of the fire alarm system shall be to CAN/ULC S537.

IT Infrastructure / Communication / Telecommunications/CCTV Systems:

Abbie Lane: No changes prescribed for this building under this project.

Veterans Memorial Building: No changes prescribed for this building under this project.

Power Plant: No changes prescribed for this building under this project.

Halifax Infirmary: A voice and data communications infrastructure was installed at the Halifax Infirmary in accordance with the standards that applied at the time of construction. The infrastructure is still standard compliant, but the cabling cannot support the high-speed networks that have been developed in recent years.

A new structured wiring system will be installed in the proposed expansion in accordance with the ANSI/TIA-1179A Healthcare Facility Telecommunications Infrastructure Standard. Telecommunications Rooms will be installed on every floor. Backbone voice and data cables will interconnect these rooms; horizontal voice and data cables will be routed from these rooms to the work areas in the spaces they serve.

The Halifax Infirmary voice services are supplied from the Telephone Equipment Room in the sub-basement of the Abbie J. Lane Building. It lacks the spare capacity to serve the proposed expansion. A plan to serve the proposed expansion will be developed in consultation with Capital Health's Information Technology Department.

A new backbone data cable will connect the new data communications infrastructure to the existing Halifax Infirmary local area network.

Charles V. Keating Emergency & Trauma Centre – (Emergency Department): A voice and data communications infrastructure was installed at the emergency department in accordance with the standards that applied at the time of construction. The infrastructure is still standard compliant, but the cabling cannot support the high-speed networks that have been developed in recent years.

A new structured wiring system will be installed in the proposed expansion to the emergency department in accordance with the ANSI/TIA-1179A Healthcare Facility Telecommunications Infrastructure Standard. Telecommunications Rooms will be installed on every floor. Backbone voice and

9.10 Mechanical, Electrical & Structural

Electrical

data cables will interconnect these rooms; horizontal voice and data cables will be routed from these rooms to the work areas in the spaces they serve.

The emergency department (through the Halifax Infirmary) voice services are supplied from the Telephone Equipment Room in the sub-basement of the Abbie J. Lane Building. It lacks the spare capacity to serve the proposed expansion. A plan to serve the proposed expansion will be developed in consultation with Capital Health's Information Technology Department.

A new backbone data cable will connect the new data communications infrastructure to the existing Halifax Infirmary local area network.

Common or Willow Street Options: A new structured wiring system will be installed in the proposed buildings in accordance with the ANSI/TIA-1179A Healthcare Facility Telecommunications Infrastructure Standard. Telecommunications Rooms will be installed on every floor as sized to meet the minimum requirements of the referenced health care standard. Backbone voice and data cables will interconnect these rooms; horizontal voice and data cables will be routed from these rooms to the work areas in the spaces they serve.

Telecommunications pathways and spaces for the new buildings will feature telecommunications diversity (redundancy) that will allow normal operations to continue with as little interruption as possible during a catastrophic event. The extent of diversity designed into the system is a balance of risk vs. cost and it will be determined by the stakeholders before space is allocated on the floor plans.

One of the new buildings will house two telecommunications entrance facilities that will serve both new buildings. The entrance facilities will be physically separated from each other, and each will be served via a separate underground entrance route. The underground entrance routes will be physically separated from each other and be terminated at two different streets if practicable.

The other new building will have two main equipment rooms that will be served via separate underground interbuilding backbones from the first building.

Underground interbuilding backbone pathways will be routed from the new buildings to existing buildings on the HI site for increased diversity where practicable.

Telecommunications backbone pathways within the two new buildings and within the expanded portions of existing buildings will also include some diversity.

New entrance facilities will be sized and located in accordance with ANSI/TIA-1179-A.

New equipment rooms will be larger than required by ANSI/TIA-1179-A, to accommodate unique healthcare requirements, such as nurse call, RTLS, and biomedical systems. Storage rooms could be located adjacent to the equipment rooms and used for future expansion of the equipment rooms if necessary.

New telecommunications rooms will be sized and located as required by ANSI/TIA-1179-A, with a growth factor built in to accommodate future biomedical equipment/RTLS, etc. The growth factor could be in the form of an adjacent storage room that could be given up if necessary.

Nurse Call:

Abbie Lane: No changes prescribed for this building under this project.

Veterans Memorial Building: No changes prescribed for this building under this project.

Power Plant: No changes prescribed for this building under this project.

Halifax Infirmary: NS Health has entered in to an agreement with a IP based nurse call supplier to provide a common platform for all their assets that meets their functional requirement around providing acute health care delivery/patient support. The design and placement of devices will be typical of an acute health care environment. The new IP based system components shall be supplied, installed and programmed by others, all associated costs will be included in the manufacturer's price to the owner.

Charles V. Keating Emergency & Trauma Centre – (Emergency Department): NS Health has entered in to an agreement with a IP based nurse call supplier to provide a common platform for all their assets that meets their functional requirement around providing acute health care delivery/patient support. The design and placement of devices will be typical of an acute health care environment. The new IP based system components shall be supplied, installed and programmed by others, all associated costs will be included in the manufacturer's price to the owner.

Common or Willow Street Options: For each of the proposed buildings, NS Health has entered in to an agreement with a IP based nurse call supplier to provide a common platform for all their assets that meets their functional requirement around providing acute health care delivery/patient support. The design and placement of devices will be typical of an acute health care environment. The new IP based system components shall be supplied, installed and programmed by others, all associated costs will be included in the manufacturer's price to the owner.

In Patient Entertainment System: NS Health has entered in to an agreement with a IP based supplier to provide a common platform for all their assets that meets their functional requirement around provide accurate health care delivery/patient support. The design and placement of devices will be typical of an acute health care environment. The new IP based system components shall be supplied, installed and programmed by others, all associated costs will be included in the manufacturer's price to the owner.

Electronic Access Control:

Abbie Lane: No changes prescribed for this building under this project.

Veterans Memorial Building: No changes prescribed for this building under this project.

Power Plant: No changes prescribed for this building under this project.

Halifax Infirmary: The facility has an IP-based card access system that permits staff with ID cards access to designated areas through secure doors. It consists of a server, database software, monitoring software, control panels, and peripheral devices. These peripheral devices include card readers, digital keypads, door contacts, motion sensors, alarm buttons, door strikes, and magnetic locks. The server and control panels are connected to the Capital Health LAN/WAN.

9.10 Mechanical, Electrical & Structural

Electrical

The access control system will be extended into the new expansion. New control panels will be installed and connected to the LAN, and new peripheral devices will be connected to the control panels.

Charles V. Keating Emergency & Trauma Centre – (Emergency Department): The facility has an IP-based card access system that permits staff with ID cards access to designated areas through secure doors. It consists of a server, database software, monitoring software, control panels, and peripheral devices. These peripheral devices include card readers, digital keypads, door contacts, motion sensors, alarm buttons, door strikes, and magnetic locks. The server and control panels are connected to the Capital Health LAN/WAN.

The access control system will be extended into the new expansion. New control panels will be installed and connected to the LAN, and new peripheral devices will be connected to the control panels.

Common or Willow Street Options: The proposed buildings will require an IP-based system that will be integrated to the existing systems to allow for transparent flow between buildings based established access/user rights, etc. This new IP-based card access system shall permit staff with ID cards access to designated areas through secure doors. It will consist of a server, database software, monitoring software, control panels, and peripheral devices. These peripheral devices include card readers, digital keypads, door contacts, motion sensors, alarm buttons, door strikes, and magnetic locks. The server and control panels are connected to the Capital Health LAN/WAN.

The access control system will be extended throughout the proposed buildings. New control panels will be installed and connected to the LAN, and new peripheral devices will be connected to the control panels.

MECHANICAL

Codes, Standards, and Guidelines:

The mechanical systems design shall be in accordance with the following codes, standards, and guidelines:

- CSA Z8000-11, Canadian Health Care Facilities.
- CSA Z8001-13, Commissioning of Health Care Facilities.
- CAN/CSA Z317.1-16, Special Requirements for Plumbing Installations in Health Care Facilities.
- CAN/CSA Z317.2-15, Special Requirements for Heating, Ventilation, and Air-Conditioning (HVAC) Systems in Health Care Facilities.
- CAN/CSA Z317.13-17, Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities.
- CAN/CSA Z320-11, Building Commissioning.
- CAN/CSA Z7396.1-12, Medical Gas Pipeline Systems - Part 1: Pipelines for Medical Gases, Medical Vacuum, Medical Support Gases, and Anaesthetic Gas Scavenging Systems.

- CAN/CSA B139-09 (reaffirmed 2014), Installation Code for Oil-Burning Equipment.
- CAN/CSA B149.1-15, Natural Gas and Propane Installation Code.

- National Building Code of Canada - 2015.
- National Plumbing Code of Canada - 2015.
- National Fire Code of Canada - 2015.
- National Energy Code of Canada for Buildings - 2011.

- Nova Scotia Building Code Regulations - 2017.
- LEED V4 Canada.
- DTIR Document DC-350, Design Requirements Manual - 2010.

- NFPA 10-13, Standard for Portable Fire Extinguishers.
- NFPA 13-13, Standard for the Installation of Sprinkler Systems.
- NFPA 14-13, Standard for the Installation of Standpipe and Hose Systems.

- ASHRAE Standards and Handbooks.

Halifax Infirmary (HI) Site:

PLUMBING - DOMESTIC WATER

Existing:
The HI Site is served by the municipal domestic water mains; the domestic water enters the site from Summer Street into the Central Heating Plant (CHP) that houses the three (3) domestic water booster pumps and a newly installed fire pump. A 10"domestic water ring main begins at the CHP, runs along Summer St., turns and runs adjacent to Veteran's Memorial Drive, turns and runs adjacent to Robie St.. The ring main extends past the parking garage and wraps around the Emergency Department, then around the Infirmary, and finally closes the loop back at the CHP.

Domestic hot water is generated in a large domestic hot water heater for the Abbie Lane building and through instantaneous, steam-fired (i.e. tankless) heaters for the Halifax Infirmary and VMB buildings. The domestic hot water distribution piping for the Abbie Lane and VMB are piped a conventional way without localized mixing valves; this does not meet the requirements of the CSA 317.1 standard. The domestic hot water distribution piping within the Halifax Infirmary is piped to meet the requirements of the CSA Z317.1 standard with localized mixing valves.

Commons Concept & Willow Tree Concept:
Based on preliminary calculations, each new building will require a 6" diameter domestic water main that will have to connect into the HI site ring main independently. The water meter and associated backflow preventers will be located in a water entrance room in each new building for either concept. The new buildings for both concepts are higher than the existing Halifax Infirmary; therefore, it is anticipated that each building will require a triplex domestic water booster system to provide the required pressure to the upper floors.

Domestic hot water for the two (2) new buildings would be generated by instantaneous steam-fired (i.e. tankless) water heaters; the distribution piping would be piped throughout in accordance with the CSA Z317.1 standard utilizing localized mixing valves.

PLUMBING - SANITARY & STORM DRAINAGE

Existing:
Municipal sanitary and storm services are located under Robie St., Bell Road, and Summer St.. The three (3) existing buildings connect independently into the municipal sanitary and storm services.

Commons Concept & Willow Tree Concept:
The two (2) new buildings will require independent service connections to the existing municipal services. At this stage, each new building will require a 10"sanitary and 10"storm main that will extend to the municipal sanitary and storm services. Low-flow, high-efficiency plumbing fixtures will be installed to reduce the water consumption for the site. Controlled-flow roof drains would be utilized on the roof to minimize the additional flow rate to the municipal storm services.

MEDICAL GASES

Existing:
Currently the HI Site is serviced with the following medical gas systems: oxygen, medical air, medical vacuum, nitrous oxide, and nitrogen.

The oxygen supply is fed from a 9,000 USGal bulk storage tank and a 780 USGal reserve tank that are located adjacent to the entrance to the underground parking in the Infirmary building. The existing oxygen tanks are typically filled every (15) days.

The existing nitrous oxide supply system is served by a 3-ton horizontal bulk storage tank located adjacent to the oxygen bulk storage system. The nitrous oxide system is filled approximately three (3) times per year (every 4 months).

The existing nitrogen system consists of a 500 USGal storage tank located adjacent to the oxygen and nitrous oxide tanks.

9.10 Mechanical, Electrical & Structural

Mechanical

The existing medical air system is comprised of a triplex 25HP compressors with a duplex air dryer package. The air dryer package was installed in 2006; the triplex compressor package was installed in 2008-2009.

The existing medical vacuum system consists of a quad 12HP pumps that were installed in 2010.

The Halifax Infirmary is not equipped with an active Anaesthesia Gas Scavenging System (AGSS); the current standards require an active AGSS be used.

Commons Concept & Willow Tree Concept:
Basically none of the above systems can handle the additional capacity requirements of two (2) new buildings added to the HI site.

In discussions with the local medical gas supplier, the oxygen, nitrous oxide, and nitrogen systems can be expanded in their current area. The oxygen bulk storage tank would change from the 9,000 USGal tank to a 13,000 USGal tank. The nitrous oxide system would change from a 3-ton bulk storage tank to a 6-ton storage tank. The nitrogen system would be upgraded to a 700 USGal tank. Additional distribution piping from these sources would have to extend from the source, through the Infirmary Parking level and connect to the two (2) new buildings for distribution within each new building.

New medical air, medical vacuum, and anaesthesia gas scavenging systems would be required to serve the two (2) new buildings in either concept. For either concept, the medical air, medical vacuum, and AGSS systems could be combined at one building and medical gas lines extended to the other building through the proposed link connecting the two (2) buildings. Alternatively, install independent medical air, medical vacuum, and AGSS systems for each new building. This way, the systems could be piped together for redundancy purposes and/or replacement purposes in the future.

Currently carbon dioxide is not a medical gas installed at the HI site; but does exist at other healthcare facilities in the province. Discussions with the health authority should be done during the design stage to determine whether carbon dioxide is needed for the two (2) new buildings.

STEAM & HYDRONIC HEATING

Existing:
Abbie Lane Building: High-pressure steam from the CHP is reduced in pressure through pressure reducing valves to provide low-pressure steam which serve the following: perimeter & reheat coil convertors; the AHU heating coil convertor; the two (2) absorption chillers; and the steam-to-steam humidifiers. The heating for the Abbie Lane building is generated by steam-to-water, shell & tube convertors that supply hot water heating to the terminal reheat coils located throughout the building. Electric baseboard heaters are located on the lower levels to supplement the terminal reheat coils. Another steam-to-glycol/water, shell & tube convertor provides heating to the preheat and heating coils within the air handling units.

Veteran's Memorial Building: High-pressure steam from the CHP is reduced in pressure through pressure reducing valves to provide medium & low pressure steam which serve the following: kitchen equipment; perimeter & reheat coil convertors; the AHU heating coil convertor; humidification steam for the AHU's; and the instantaneous domestic hot-water heaters. The heating for the VMB is generated by steam-to-water, shell & tube convertors that supply hot water heating to the terminal reheat coils and perimeter baseboard radiation located throughout the building.

Halifax Infirmary: High-pressure steam from the CHP is reduced in pressure through pressure reducing valves to provide medium and low pressure steam which serve the following: perimeter & reheat coil convertors; the AHU heating coil convertors; the humidification steam generators; the instantaneous steam-fired domestic hot water heaters, and the sterilizing equipment, etc. located within the MDR (Medical Device Reprocessing) Department. The heating for the Halifax Infirmary is generated by steam-to-water, shell & tube convertors that supply hot water heating to the perimeter heating and terminal reheat coils located throughout the building. Steam-to-glycol/water, shell & tube convertors provide heating to the preheat and heating coils within the air handling units.

Emergency Expansion: High-pressure steam from the steam header located within the Infirmary mechanical room 2801 is reduced in pressure through pressure reducing valves to provide low-pressure steam which serve the following: perimeter & reheat coil convertors; the AHU heating coil convertors; the humidification steam generator; and the instantaneous steam-fired domestic hot water heaters. The heating for the Emergency Expansion is generated by steam-to-water, shell & tube convertors that supply hot water heating to the perimeter heating and terminal reheat coils located throughout the building. A steam-to-glycol/water, shell & tube convertor provide heating to the preheat and heating coils within the air handling units. Radiant ceiling panels are installed in all spaces located along the exterior of the expansion.

Commons Concept & Willow Tree Concept:
The baseline design approach for the two (2) new buildings is to utilize high-pressure steam from one of the four (4) proposed Central Heating Plant (CHP) options - refer to separate section on CHP Options. High-pressure steam would extend from the existing CHP (or from a supplemental CHP; or from a new CHP) through the existing (or new) steam tunnels, through the Infirmary parking level; and extend through new service tunnels adjoining to each of the two (2) new buildings. The high-pressure steam would then pass through pressure reducing stations according to the requirements of the loads. For instance, 80 psig steam would be piped to a new MDR located with the IPU/OR building. High pressure steam would be used to supply steam to clean-steam generators for humidification purposes for the new air handling units in both new buildings. Low-pressure steam would be piped to steam-to-water convertors that will be used to supply hot water heating for perimeter and terminal reheat coil distribution loops within each new building. Low-pressure steam would also be piped to steam-to-glycol/water convertors to supply hot glycol/water heating to the air handling units for each of the new buildings. Lastly, high-pressure steam will be used to heat the domestic hot water needs through instantaneous steam-fired domestic hot water heaters.

Fully redundant convertors, pumps, steam generators (humidification), and domestic water heaters will be provided for each of the systems mentioned above in order to maintain service if/when equipment failure occurs or maintenance shut-downs are required.

COOLING

Existing:
Each of the existing buildings (i.e. Infirmary, Abbie Lane, and VMB) have dedicated chillers and cooling towers.

9.10 Mechanical, Electrical & Structural

Mechanical

Abbie Lane Building: The Abbie Lane's cooling is primarily served by two (2) absorption type chillers located in the Level 500 mechanical room; two (2) induced-draft cooling towers are located on the roof of the building and were replaced in 2000.

Veteran's Memorial Building: The VMB's cooling is provided by a centrifugal chiller located in the Level 100 mechanical room and the cooling tower located on the roof of the building.

Halifax Infirmary: Two (2) centrifugal chillers (each 1,050 cooling tons) are located in Mechanical Room 2801 and provide cooling to the air handling units serving the Halifax Infirmary. These chillers are original when the building was built and do not have spare capacity. The condenser water from the chillers are piped to two (2) induced-draft cooling towers (1,050 ton each) and are located on the landscaped roof area towards the east above the parking level. These cooling towers were refurbished in 2011. A third cooling tower is located adjacent to the main towers that runs year-round and provides condenser water to localized heat pumps that are serving some dedicated equipment room loads.

Emergency Expansion: A separate air-cooled chiller (135 cooling tons) was installed during the Emergency Wing expansion project and serves only this area; the chiller is located directly above the Emergency Wing Ambulance Bay.

Commons Concept & Willow Tree Concept:
None of the existing chilled water plants have capacity to serve any portion of the new buildings.

The two (2) new buildings will require new chilled water systems to provide cooling for the air handling units and critical cooling loads. We recommend independent chilled water systems for each new building complete with variable-speed chillers, pumps, and cooling towers.

The initial cooling capacity for the IPU/OR building in either concept is 1,600 tons.
The initial cooling capacity for the Ambulatory building in either concept is 1,400 tons.
The initial cooling capacity for the Research & Innovation Centre in either concept is 135 tons.

Note: These capacities are based at a high level without specific details on the building envelope, equipment, occupancies, etc. Detailed heat loss/heat gain calculations would have to be completed to confirm the actual cooling requirements.

The CSA Z317.2-15 standard requires redundancy be built in the major equipment and distribution pumps; therefore, we propose redundant pumps for both the chilled water and tower/condenser water systems; install three (3) chillers each sized for 50% of the load; that way if one chiller fails or is shut-down, the other two (2) chillers can satisfy the cooling load; likewise for the cooling towers. We are proposing separate chilled water plants for each of the new buildings because of the distribution losses and better part-load performance compared to a much larger chilled water plant.

VENTILATION

Existing:
Each of the existing buildings (i.e. Infirmary, Abbie Lane, and VMB) have air handling units that were sized on the ventilation rates required at the time of their design/construction. Some of the ventilation rates do not meet the ventilation rates of today's standards.

Abbie Lane Building: The ventilation for the Abbie Lane is provided by eight (8) air handling units, all located within the Level 500 mechanical room. Half of the AHU's serve the floors above, and the other half serve the remainder of Level 500 and below. All of the AHU systems are of the mixed-air type; i.e. they bring in the minimum outside air and mix with return air from the zone that the AHU serves.

Veteran's Memorial Building: The ventilation for the VMB is provided by eight (8) air handling units, three (3) of which are 100% outside air systems, and five (5) AHU's that are of the mixed air type; i.e. they bring in the minimum outside air and mix with return air from the zone that the AHU serves. Four (4) of the AHU's are located in mechanical room 2703 on the west side of Level 200; and three (3) AHU's are located in mechanical room 2708 on the east side of Level 200. The last AHU is located in mechanical room 0160 on Level 100 and serves the kitchen areas on Level 100.

Halifax Infirmary: The ventilation for the Infirmary is provided by (27) air handling units located within (11) mechanical rooms scattered throughout the facility. Fourteen (14) of the AHU's are 100% outside air systems; the remaining (13) AHU's are the mixed air type; i.e. they bring in the minimum outside air and mix with return air from the zone that the AHU serves.

Emergency Expansion: The ventilation for the Emergency Expansion is provided by two (2) 100% outside air systems with heat recovery. These units are located within the mechanical penthouse located directly above the emergency department. A separate dedicated, suspended air handling unit serves the ambulance bay of the emergency expansion.

Commons Concept & Willow Tree Concept:

Both new buildings will require ventilation air handling units to satisfy the building needs and the CSA Z317.2-15 minimum ventilation requirements. Parallel (redundant) air handling units will be provided for systems serving Type 1 spaces as identified in the CSA Z317.2-15 standard. The CSA Z317.2-15 standard allows mixed air systems to be utilized in healthcare facilities; however, many clients and consultants utilize 100% outside air systems because of the concerns or perceptions associated with mixing return air (i.e. possibly contaminated) air back into the supply airstream. Therefore, heat recovery systems need to be incorporated into any 100% outside air systems to reduce the energy costs associated with these types of units. For the baseline design, we propose to utilize True 3 Angstrom heat wheels due to their thermal heat recovery performance.

For budgetary purposes at this stage, we recommend basing the ventilation rate on 1cfm/sq.ft.. Final heat loss/heat gain and CSA ventilation rate calculations would have to be completed through the design process.

The ductwork distribution will be completely ducted for the supply, return, and exhaust airstreams. Each space will be equipped with a supply air terminal box with reheat coil and an associated exhaust air terminal box; the supply and exhaust terminal boxes will ensure the required room pressure is maintained.

An allowance will have to be made for Airborne Isolation Rooms (AIR) located in the two (2) new buildings. These spaces require HEPA filtered exhaust air with completely redundant HEPA filter housings and associated exhaust fans.

9.10 Mechanical, Electrical & Structural

Mechanical

The underground parking levels within each new building will have to be ventilated with tempered air (glycol/water coils) to the minimum ventilation rate of 0.77 cfm/sq.ft.. Carbon monoxide and nitrogen dioxide monitoring systems will have to be installed in the underground parking levels of the two (2) new buildings.

FIRE PROTECTION & STANDPIPE SYSTEMS

Existing:
Each of the existing buildings (i.e. Infirmary, Abbie Lane, and VMB) are connected to the HI site 10"diameter ring main.

Abbie Lane Building: Different sections of the building are protected by the following systems: wet-pipe sprinkler systems serving all heated occupied spaces; dry-pipe sprinkler systems in areas susceptible to freezing (i.e. parking level); and standpipe systems in the stairwells.

Veteran's Memorial Building: Different sections of the building are protected by the following systems: wet-pipe sprinkler systems serving all heated occupied spaces; dry-pipe sprinkler systems in areas susceptible to freezing (i.e. parking level); and standpipe systems in the stairwells.

Halifax Infirmary: The Emergency Expansion is primarily served by a wet-pipe sprinkler system; a small glycol loop is installed within the ambulance bay.

Commons Concept & Willow Tree Concept:
Both of the new buildings will connect into the existing HI Site 10"diameter ring main; a new 8"diameter line will extend into a mechanical room located on the floor below grade level for each building. The sprinkler tree within each building, will house the backflow preventer and sprinkler mains will be zoned from this header; the parking levels will be served by dry-pipe systems; the remainder of the building will be fed from the wet-pipe sprinkler system zoned per floor; a standpipe riser system will be piped to each of the stairwells.

EMERGENCY POWER GENERATION

Commons Concept & Willow Tree Concept:
A new emergency power generation building will be located on the HI Site to provide emergency back-up power to the two (2) new buildings. The ventilation for the generators will be provided by outside air intake louvers and dampers; ducted radiator exhaust air louvers and dampers; combustion air louvers and dampers; and generator chimney exhaust stacks equipped with mufflers and extend a minimum of 9'-0" above the roof level.

Each of the generators will be piped to a daytank (minimum 4-hour storage); dedicated duplex pump packages will pump fuel from the main diesel fuel storage tanks to the corresponding daytank. The main fuel diesel fuel storage tanks will provide a minimum 72-hour fuel storage for each of the operating generators; dedicated fuel polishing systems will be provided for each of the main diesel fuel storage tanks. The aboveground, double-walled diesel fuel storage tanks will be protected by a 8'-0"high fenced enclosure.

CENTRAL HEATING PLANT (CHP) OPTIONS

The following is a summary table of the three (3) existing buildings located on the HI Site.

Building	Year Built	Building Age (Years)	GDA Gross Department Area (sq.ft.)	GFA Gross Floor Area (sq.ft.)
Halifax Infirmary	1998	19	568,150	744,373
Abbie J. Lane	1968	49	156,671	212,724
Veteran's Memorial	1986	31	211,075	351,551
			935,896	**1,308,648**

Table M.1

The following two (2) tables summarize the floor areas for the two (2) concepts.

Commons Concept:				
Ambulatory Building				494,923
Inpatient/OR Building				451,202
Research & Innovation Centre				50,850
				996,975

Table M.2

Willow Tree Concept:				
Ambulatory Building				488,186
Inpatient/OR Building				463,685
Research & Innovation Centre				46,354
				998,225

Table M.3

The following table is a summary of the existing steam boilers located within the HI CHP.

HI Site Central Plant:

Boiler #	Installed	Age (Years)	Manufacturer	Fuel Type	Steam/Hot Water	Output Rate (lb/hr)	Capacity (Btu/hr)
Boiler #1	1995	22	Volcano	N.G./Oil #2	Steam	42,000	50,106,000
Boiler #2	1995	22	Volcano	N.G./Oil #2	Steam	42,000	50,106,000
Boiler #3	1995	22	Volcano	N.G./Oil #2	Steam	42,000	50,106,000

9.10 Mechanical, Electrical & Structural

Mechanical

According to NSHA, the peak winter time steam load is 55,000 lb/hr. The peak summer time steam load is approximately 17,000 lb/hr. Based on the load profile of the existing buildings the estimated additional steam capacity for the two (2) new buildings is 45,000 lb/hr; for a total combined peak steam load of 100,000 lb/hr. Therefore, during the peak winter heating months, the projected steam load would require all three (3) boilers to operate to meet the load demands. The CSA Z317.2-15 standard requires "The capacity, arrangement, and number of boilers/units shall be such that if the largest boiler or heating unit is out of service, the remaining boiler(s) or heating unit(s) is capable of providing a minimum of 100% of a Class A" healthcare facility. Therefore, the existing CHP steam capacity will have to be expanded in some form to meet the new HI site demands.

At this stage, four (4) options for the Central Heating Plant (CHP) were evaluated and matrices generated that outline the pros and cons of each option. A brief description of the scope of work for each option is provided to assist the Cost Consultant in determining a rough estimate. The following are the individual matrices for each of the four (4) proposed options:

Note:

A CoGen Plant study including three (3) options is being considered for the project and may be incorporated into the final report.

Alternative to CHP Steam:

In addition to the four (4) central heating plant options included, and possibly the CoGen Plant study, an alternative to these approaches is to install decentralized, hydronic hot water heating boilers in each of the two (2) new buildings. Natural gas lines would have to be piped to each new building and extended to the boiler room; the proposed location for the boilers would be in a mechanical penthouse on top of each building; that way the chimney length and the pressure rating of the boilers would be minimal.

Consideration to the location of the boiler stacks in relation to the relocated helipad to one of the two (2) new buildings must be evaluated.

A second fuel source would have to be provided with fuel storage located in close proximity to each new building. The boilers would have to be dual-fuel boilers capable of firing natural gas and fuel oil #2 (for example).

This decentralized approach would not have an impact on the existing Central Heating Plant steam capacity.

Low-temperature hydronic hot water distribution should be considered for this approach in order to utilize condensing boilers that would maximize boiler efficiency.

A purely hydronic hot water heating solution can satisfy the building perimeter, terminal reheat coil, and AHU heating coil needs; however, a higher temperature source would be necessary to serve the domestic hot water supply requirement as per the CSA Z317.1-16 standard.

In addition, typically MDR equipment utilizes high pressure (80 psig) steam to serve the sterilizers and cart washers, etc.; therefore, a natural gas-fired steam boilers would have to be provided OR these units would have to be the electric type which increases the electric demand and consumption.

Another consideration is humidification; if steam boilers were installed to serve the MDR equipment; then the capacity size can be increased to provide capacity for the humidification loads of the air handling units. Otherwise, electric or natural gas-fired humidifiers would have to be provided to provide the required humidification loads.

CHP Option #1 - Add fourth Boiler to Existing Central Heating Plant

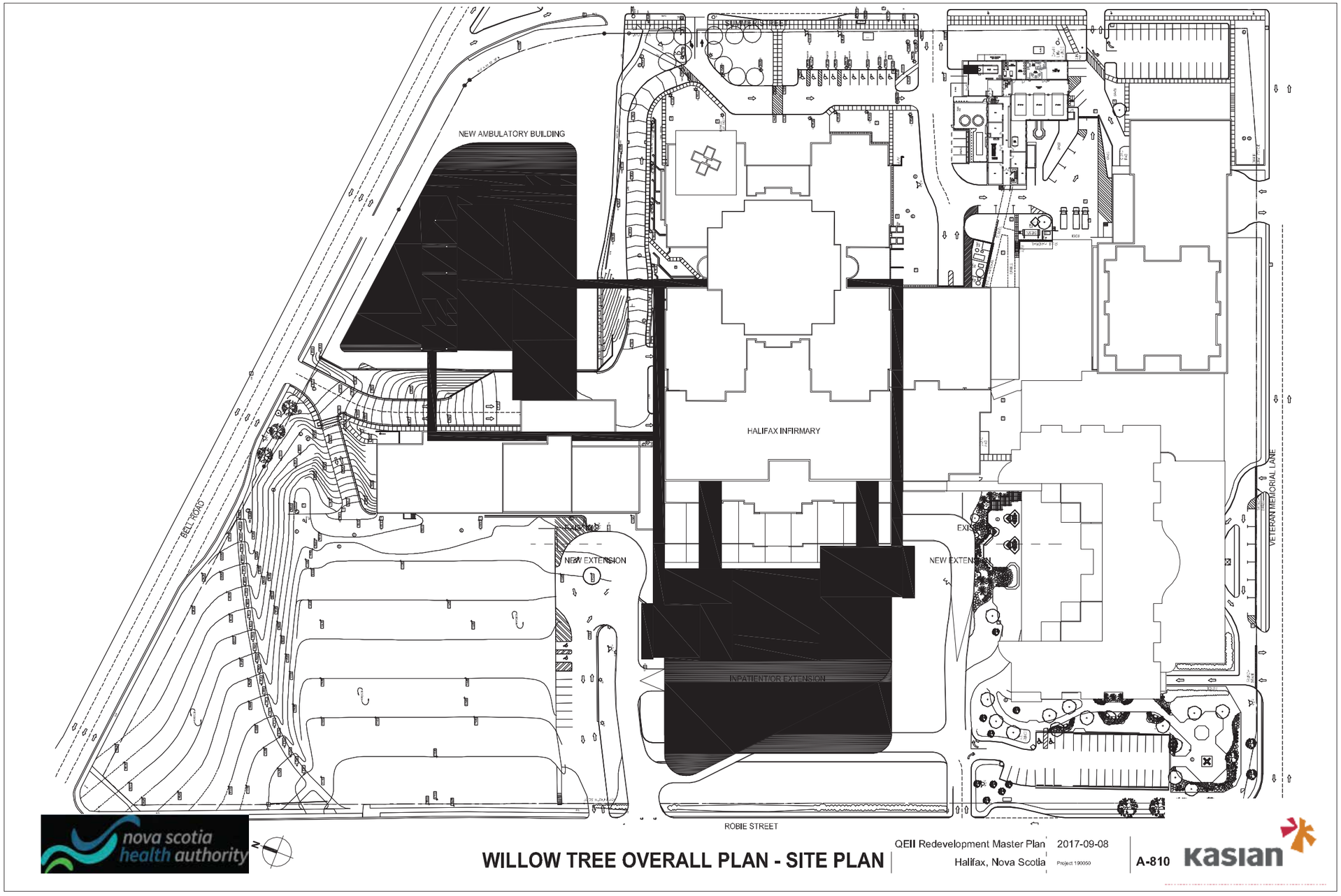
NSHA Master Planning/Programming

Central Heating Plant Options Matrix:

CHP#1 - Add Fourth (4th) Boiler in Existing Central Heating Plant:			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Install New High Pressure Steam Boiler (42,000 lb/hr capacity) in existing Central Heating Plant. Either concept requires three (3) boilers to operate; CSA Z317.2-2015 requires a redundant boiler for a Class A healthcare facility.	- Keep Central Plant staff in one location.	- This option limits the growth opportunity for the remainder of the site after the Willow Tree or Commons concepts are constructed. If another tower is constructed, the CHP would have to expand again.
	- Have to install 2nd stack in order to operate a 3rd boiler; the existing stack can only handle two (2) boilers operating; new expansion (Willow Tree or Commons) requires three (3) boilers to operate during peak months.	- Utilizes existing CHP boilers which are approx. (22) years old (mid-life) and should have another (18) years to go. New Boiler (#4) should last (40) years; older boilers will have to be replaced when the new boiler reaches its mid-life.	- Have to relocate office space where the proposed 4th Boiler will be located.
	- Have to relocate office spaces and possibly raise the roof of the proposed location of the 4th Boiler. Temporary demo and extension of existing exterior wall to get new boiler into CHP.	- Existing emergency generator has sufficient capacity to serve the 4th Boiler.	- When both HP steam mains operate in the service tunnels, may have to add cooling to maintain temperatures within the service tunnels.
	- Have to modify breeching so only two (2) boilers go to each stack; i.e. Boilers #1 & #2 go to (e)stack; Boilers #3 & #4 (new) go to the (n)stack.	- Lowest capital cost of the four (4) options.	- Keeping the existing CHP limits any improvement on the existing entrance/exit to the shipping / receiving area.

Central Heating Plant Options Matrix:

CHP#1 - Add Fourth (4th) Boiler in Existing Central Heating Plant:			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Have to modify/extend steam and condensate headers. Requires a plant shut down.		- Emergency generators will have to be located within the footprint of each new building of the Willow Tree or Commons Concepts.
	- Have to connect new boiler into existing natural gas and fuel oil #2 systems.		
	- Have to upgrade existing CHP controls to accommodate the New Boiler (#4).		
	Currently (2) 8"dia. HP steam mains run through the service tunnel (only (1) main is active at any time. Would have to operate both mains during winter months when the Willow Tree or Commons Concepts are built.		
	- Electrical: Recommend upgrading the wiring, replace MCC, etc.; all outdated.		


NEW AMBULATORY BUILDING
HALIFAX INFIRMARY
BELL ROAD
NEW EXTENSION
INPATIENT/OR EXTENSION
ROBIE STREET
VETERAN MEMORIAL LANE
nova scotia health authority
WILLOW TREE OVERALL PLAN - SITE PLAN
QEII Redevelopment Master Plan
Halifax, Nova Scotia
2017-09-08
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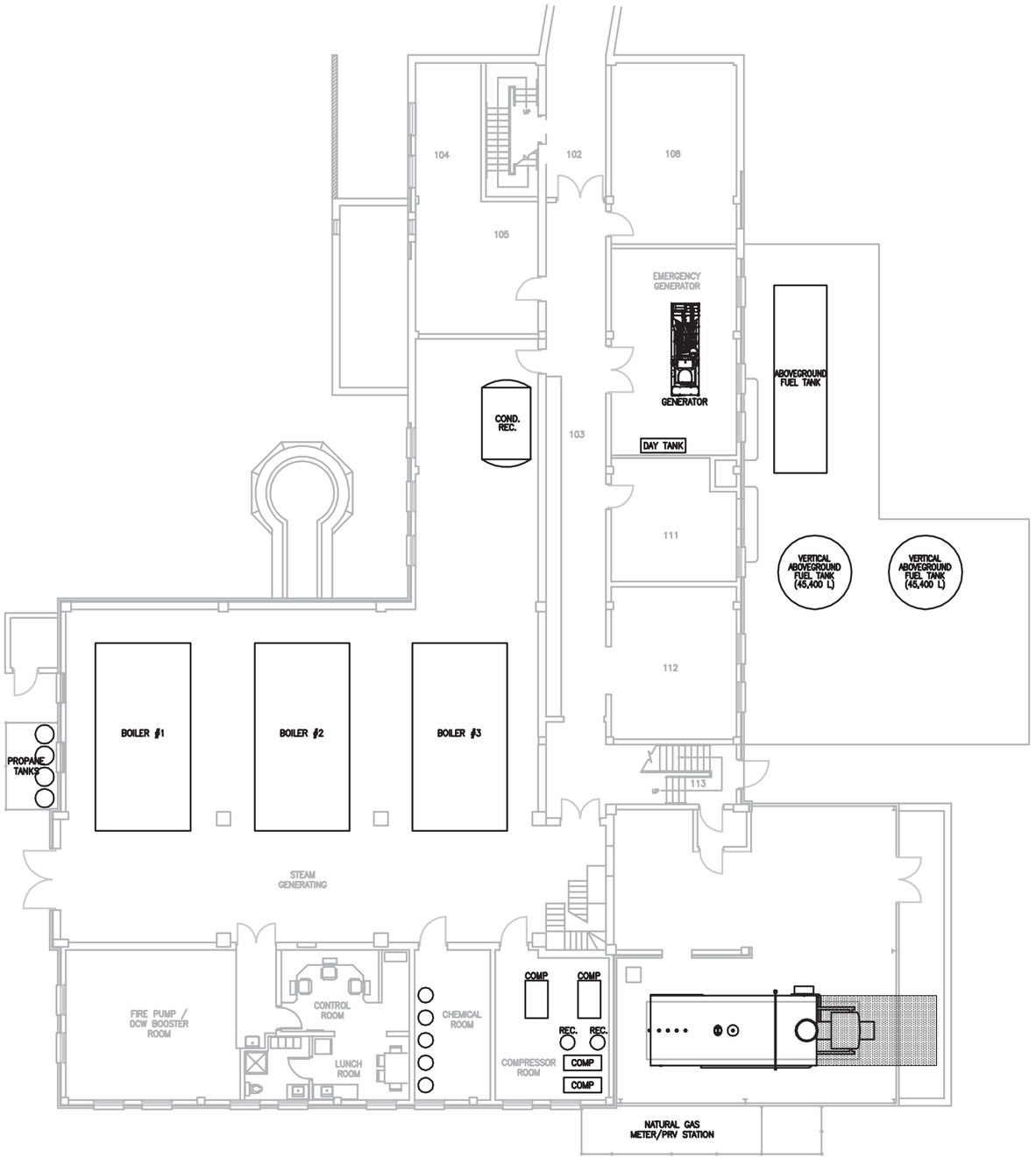
9.10 Mechanical, Electrical & Structural

Mechanical



CHP Option #2 - Supplemental Central Heating Plant - Intersection of Summer/Veterans Memorial Way

NSHA Master Planning/Programming

Central Heating Plant Options Matrix:

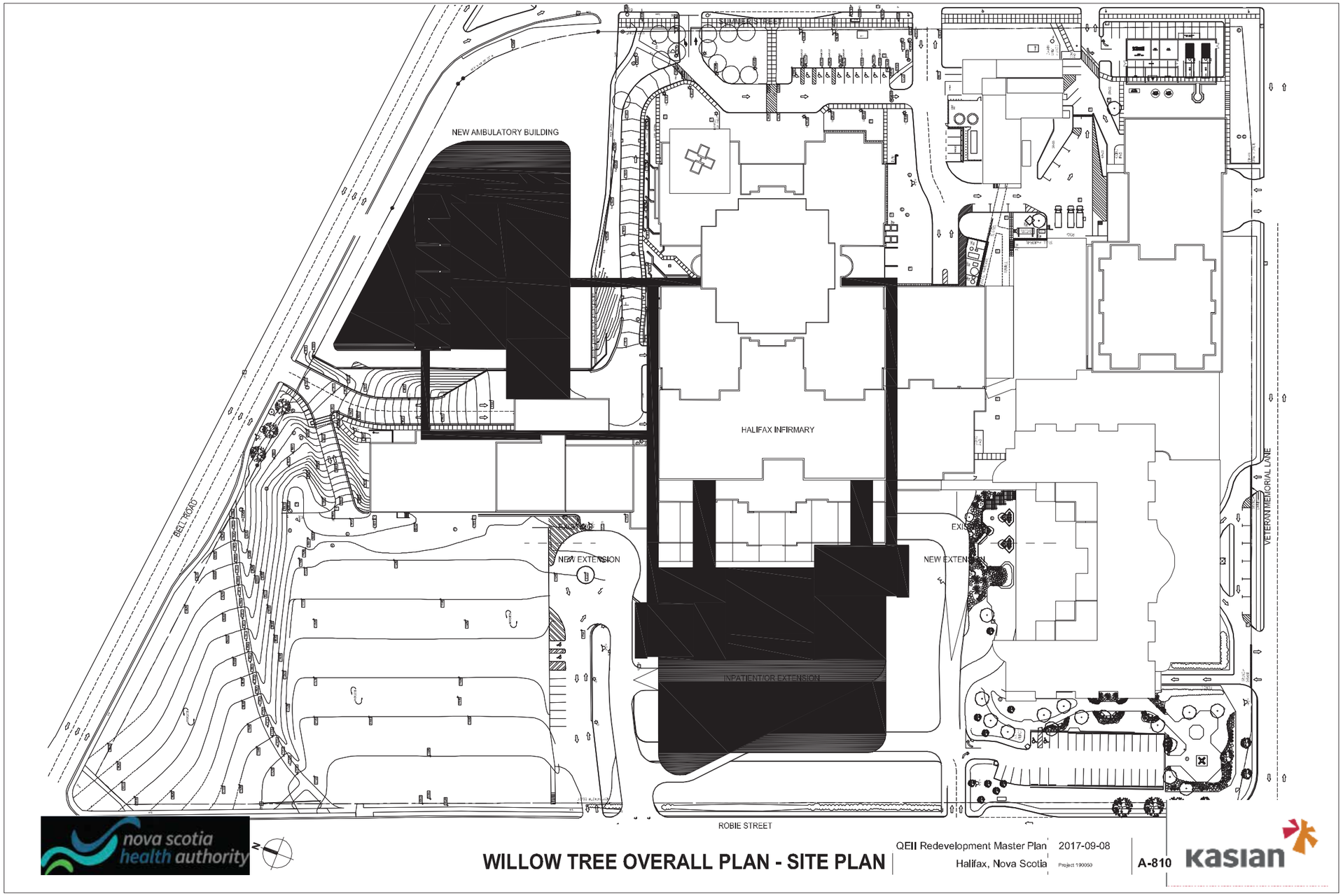
CHP#2 - Supplemental Central Heating Plant - Intersection of Summer/Veterans Memorial Way:			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Install Two (2) New High Pressure Steam Boilers (42,000 lb/hr capacity each) in a new Supplemental Central Heating Plant located in parking lot at corner of Summer Street & Veterans Memorial Way.	- Utilizes the existing CHP whose boilers are approx. (22) years old (mid-life) and should have another (18) years to go.	- Need two (2) Central Plant staff to operate the existing CHP and the new Supplemental CHP. Current CHP staff is (11) staff & (1) Chief. Supplemental CHP would have to have (11) staff; the Chief can oversee both plants.
	- Install a new stack to serve the two (2) new boilers in the new Supplemental Central Heating Plant (CHP).	- Will have two (2) new boilers and a new stack that should last (40) years.	- The site services plan indicates the existing water main (ring main) runs below the existing parking lot; may have to be routed around the new Supplemental CHP.
	- Have to install a natural gas meterset and PRV station; and connect into the Heritage Gas main.	- The Supplemental CHP could be designed to expand in the future when the existing boilers need replacement; an addition would have to be added to house two (2) boilers and a new stack. At that time, the original boilers/stack could be removed and one (1) CHP staff could operate the CHP.	- Interconnecting the two (2) CHP's can be done with direct-buried pipes or pipes within an inverted trench; a service tunnel is not likely; but needs further investigation.
	- Have to install a new aboveground No.2 fuel oil tank (capacity: 45,400 L); requirement for an alternate fuel source as per CSA Z317.2-2015.		- Lose (29) parking stalls that will have to be added into the overall site parking count.

Central Heating Plant Options Matrix:

CHP#2 - Supplemental Central Heating Plant - Intersection of Summer/Veterans Memorial Way:			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Have to connect the two (2) Central Steam Plants together; underground steam and condensate lines to the existing CHP.		
	- Have to construct a new building to house the new boilers, control room, chemical room, compressor room, etc.		
	- Electrical: Feed New CHP from the existing normal/emergency power distribution (completed by ONSA in 2014).		

9.10 Mechanical, Electrical & Structural

Mechanical



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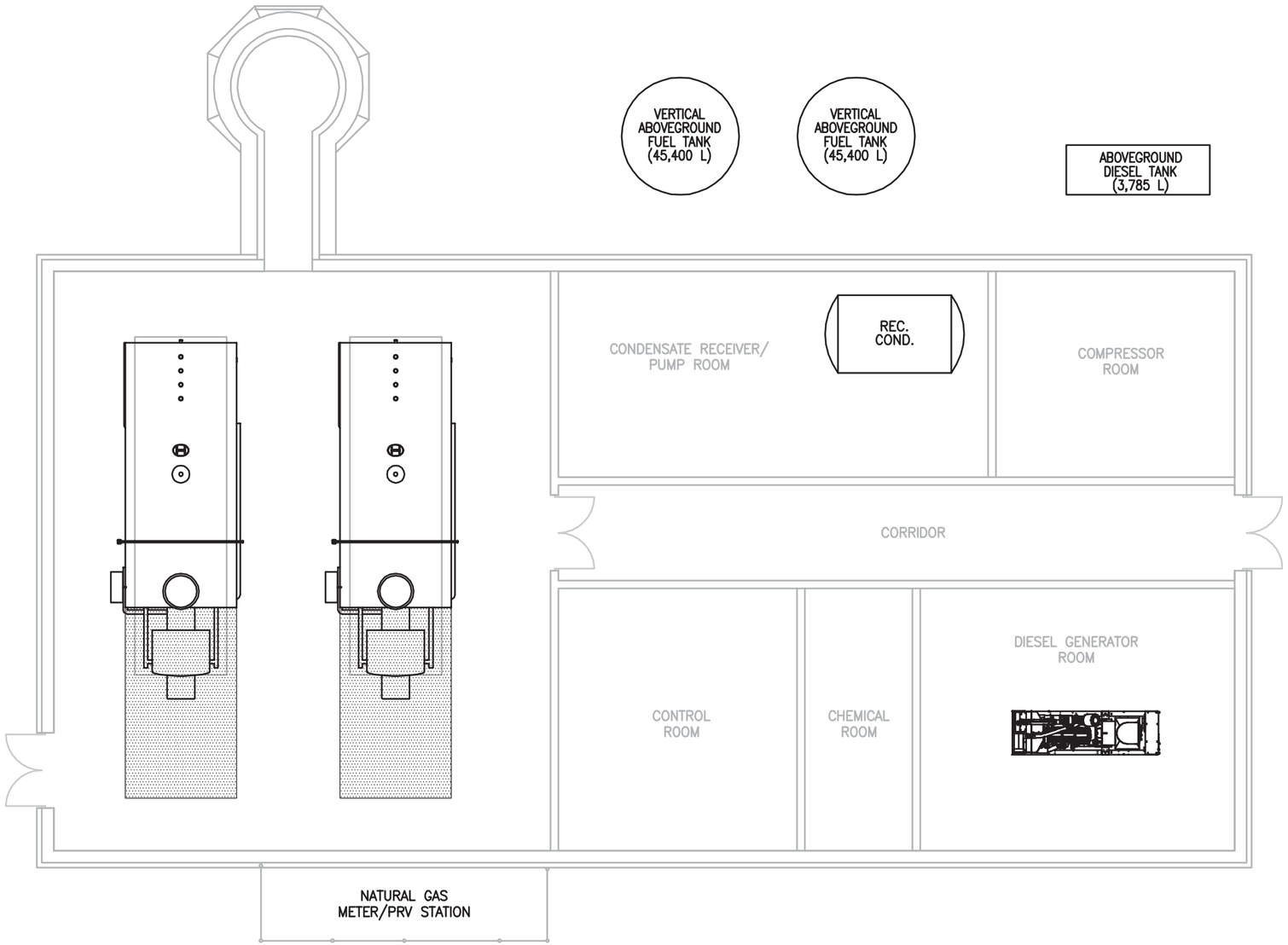
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ABOVEGROUND DIESEL TANK (3,785 L)
CONDENSATE RECEIVER/ PUMP ROOM
REC. COND.
COMPRESSOR ROOM
CORRIDOR
CONTROL ROOM
CHEMICAL ROOM
DIESEL GENERATOR ROOM
NATURAL GAS METER/PRV STATION

CHP Option #3 - Standalone Central Heating Plant - Intersection of Summer St./Bell Rd.

NSHA Master Planning/Programming

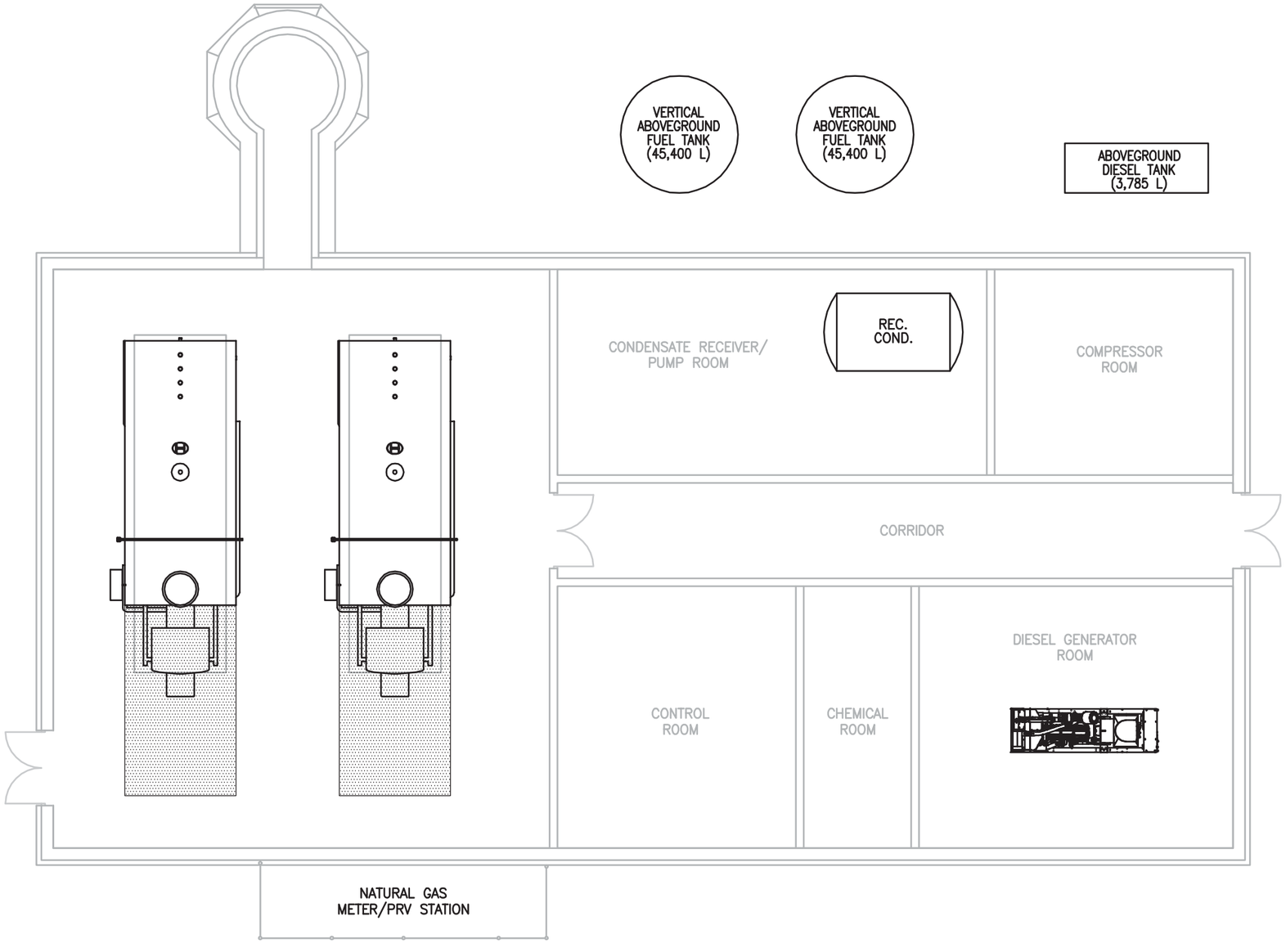
Central Heating Plant Options Matrix:

CHP#3 - Standalone Central Heating Plant - Intersection of Summer St./Bell Rd.			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Install Two (2) New High Pressure Steam Boilers (2@55,000 lb/hr capacity) in new Standalone Central Heating Plant located at intersection of Summer St./Bell Road. This CHP would be dedicated to the buildings associated with either the Willow Tree or Commons Concepts. They will be separate from the (e)CHP - HI/Abbie/VMB.	- The New Standalone CHP may be attractive for a P3 Consortium project for the Willow Tree or Commons Concepts. The P3 Consortium would have to staff and operate the new Standalone CHP.	- After the P3 commitment expires, need two (2) Central Plant staff to operate the existing CHP and the New Standalone CHP. Current CHP staff consists of (11) staff and (1) Chief. The new Standalone CHP would require (11) staff; the chief can oversee both plants.
	- Install a new stack to serve the new boilers in the new Standalone Central Heating Plant.	- Utilizes the existing CHP boilers which are approx. (22) years old (mid-life) and should have another (18) years to go.	- Will have to extend HP steam and condensate lines across Summer St.; either direct-buried or pipes within an inverted trench; a service tunnel is highly unlikely; but requires further investigation.
	- Have to install a natural gas meterset and PRV station; and connect into the Heritage Gas main.	- Will have two (2) new boilers and a new stack that should last (40) years.	
	- Have to install a new aboveground No.2 fuel oil tank; requirement for an alternate fuel source as per CSA Z317.2-2015.	- This option has the opportunity to house the emergency generators for the two (2) new buildings as part of the Standalone CHP.	

Central Heating Plant Options Matrix:

CHP#3 - Standalone Central Heating Plant - Intersection of Summer St./Bell Rd.			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- No Interconnect between the two (2) CHP's; the Existing CHP serves the HI/Abbie/VMB; the New Standalone CHP serves the two (2) new buildings of the Willow Tree or Commons Concepts.	- The Standalone CHP can be configured to be expandable in the future, say (20) years when the existing boilers have to be replaced; an addition and another stack can be added to the new building to house all of the boilers.	
	- Have to construct a new building to house the new boilers, control room, chemical room, compressor room, etc.		
	- Have to extend the CHP steam and condensate piping from the new CHP to the two (2) new buildings. The piping could be direct-buried; or installed in an inverted trench; or installed within a service tunnel - further investigation is required to determine the feasibility of this option.		
	- Have to install a new emergency generator, including: exhaust, louvres, fuel tank, day tank, fuel polishing system, etc.		


Bell Rd
Bell Rd
Bell Rd
Bell Rd
Trollope St
Bell Rd
Bell Rd
Robie St
Indigo
Halifax Infirmary
Robie Street Entrance
Tim Hortons
Halifax Infirmary
Summer St Entrance @...
Summer St
Museum of
Natural Histor
QEII Health
Sciences Centre
Carbon Arc C
Robie St
Shoppers Simply
Pharmacy
Abbie J Lane
Memorial @ QEII
Halifax Infirmary
(QEII HSC)
Cedar St
Robie St
Veterans Memorial Ln
Veterans Memorial Ln
Summer St
Virginia Kinfolks B & B
Memorial Ln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COMPRESSOR ROOM
CORRIDOR
CONTROL ROOM
CHEMICAL ROOM
DIESEL GENERATOR ROOM
NATURAL GAS METER/PRV STATION

CHP Option #4 - New Entire Site Central Plant - Intersection of Summer St./Bell Rd.

NSHA Master Planning/Programming

Central Heating Plant Options Matrix:

CHP#4 - New Entire Site Central Plant - Intersection of Summer St./Bell Rd.			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Install Three (3) New High Pressure Steam Boilers (3@75,000 lb/hr capacity) in new Standalone Central Heating Plant located at intersection of Summer St./Bell Road. This option would have the capacity to serve an additional tower on the site beyond the Willow Tree or commons Concepts.	- The New CHP may be attractive for a P3 Consortium project.	- Difficulty in extending the steam and condensate mains to feed the entire site; service tunnels would be preferred; however, may have to be direct-buried or pipes installed within an inverted trench.
	- Alternative: Install Four (4) New High Pressure Steam Boilers (4@55,000 lb/hr capacity) in new Standalone Central Heating Plant located at intersection of Summer St./Bell Road.	- After the P3 commitment expires; only need one (1) CHP staff to operate the site.	- Existing boilers are approx. (22) years old (mid-life) and should have another (18) years to go.
	- Install two (2) new stacks to serve the new boilers in the new Supplemental Central Heating Plant for the entire site.	- Will have three (3) (or four (4) Alternative) new boilers and new stacks that should last (40) years.	- If demo existing CHP, then would have to relocate the fire pump, and install a new domestic water booster system.
	- Alternative: Instal a stack for each boiler.	- Has the opportunity to locate the emergency generators in one central location for the two new buildings of either the Willow Tree or Commons Concepts.	
	- Have to install a natural gas meterset and PRV station; and connect into the Heritage Gas main.	- Allows opportunity to reconfigure/enhance the existing shipping/receiving at the Abbie Lane.	

Central Heating Plant Options Matrix:

CHP#4 - New Entire Site Central Plant - Intersection of Summer St./Bell Rd.			
	Scope of Work	**List of Advantages**	**List of Disadvantages**
	- Have to install a new aboveground No.2 fuel oil tank(s); requirement for an alternate fuel source as per CSA Z317.2-2015.		
	- Have to extend HP steam and condensate mains from the new CHP to feed the existing HI/Abbie/VMB and two (2) new buildings.		
	- Abandon and remove the existing boilers, stack, No.2 fuel tanks; natural gas entrance (meterset & PRV station) in the existing CHP.		
	- Have to construct a new building to house the new boilers, control room, chemical room, compressor room, etc.		
	- Have to install a new emergency generator, including: exhaust, louvres, fuel tank, day tank, fuel polishing system, etc.		


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Robie St
Halifax Infirmary
Robie Street Entrance...
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Memorial @ QEII...
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(QEII HSC)
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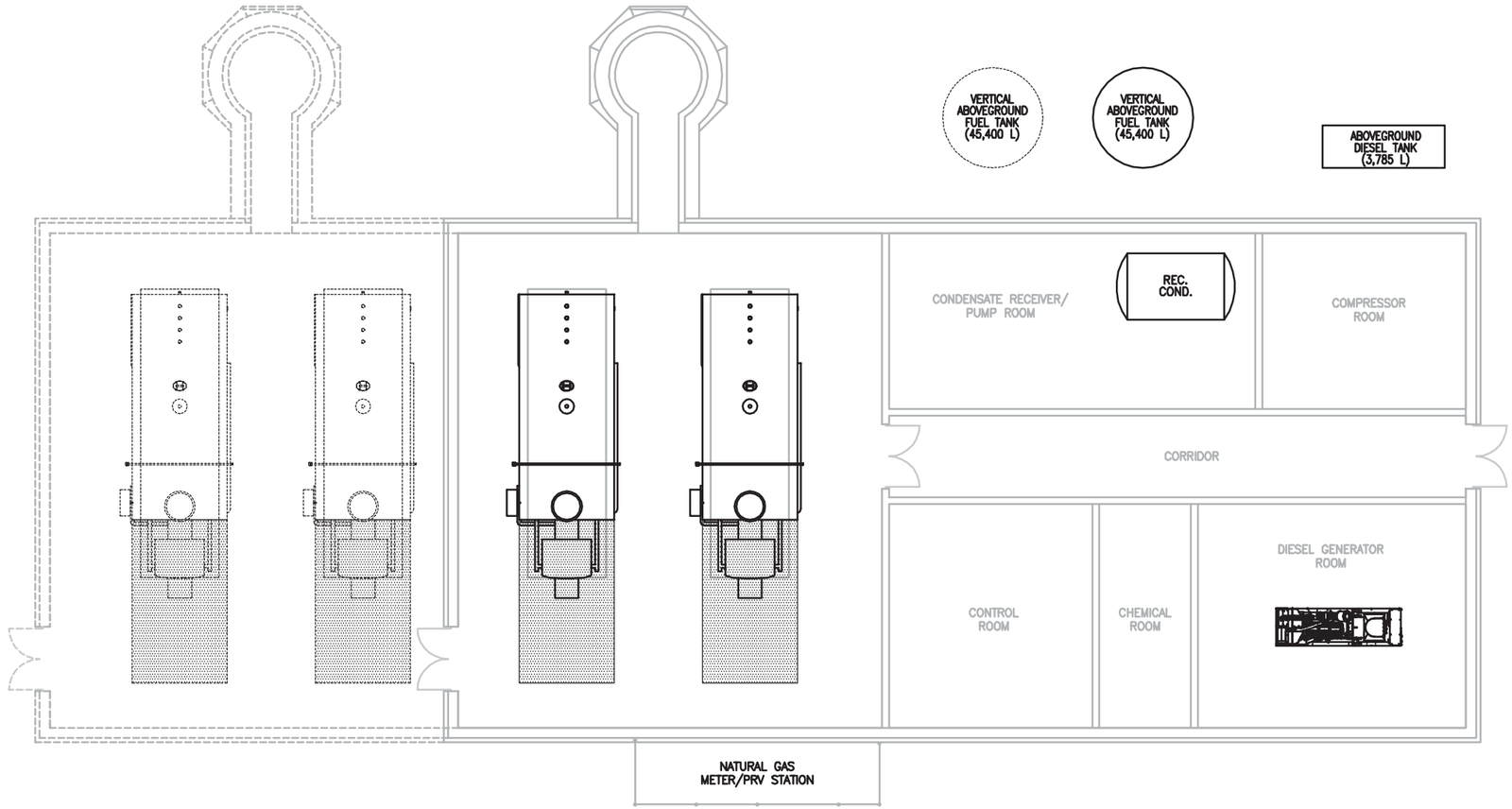
Robie St
Veterans Memorial Ln
Veterans Memorial Ln
Summer St
Cadmus Ct
Virginia Kinfolks B & B
Memorial Ln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CONTROL ROOM
CHEMICAL ROOM
DIESEL GENERATOR ROOM
NATURAL GAS METER/PRV STATION

QEII REDEVELOPMENT PROJECT
HALIFAX, NS

STRUCTURAL ENGINEERING IMPLICATIONS

Prepared for:

Kasian Architecture Ontario Incorporated

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Prepared by:

BMR STRUCTURAL ENGINEERING

5413 Doyle Street,
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B3J 1H9

April 17, 2017

INTRODUCTION

BMR Structural Engineering Limited has been engaged by Kasian Architecture to review structural implications of various options for the Redevelopment of the QEII Hospital sites. This review covers both the Halifax Infirmary (HI) Site and the Victoria General (VG) Site.

HALIFAX INFIRMARY SITE

HI 1.0 Vertical Expansion Above Existing Emergency Department

Although the columns and foundations supporting the New Emergency Department were designed and constructed to support five additional floors, there are some serious issues which should be considered before moving too quickly on this front.

Currently, the main floor of the Emergency Department (ED) is a slab on grade at level 300. There is a small section of basement at the very North end. The mechanical penthouse floor is at Level 400 which is also the current main roof of emergency. The Roof over the mechanical penthouse is currently at or near Level 500.

The south end of the ED (nearest the original hospital) was only designed for two additional floors to match the existing adjacent hospital at this location.

In addition to this absolutely no allowance was designed into the existing ED structure to resist lateral loads from future vertical additions. There is no core or stairs or elevators and therefore nothing to resist lateral loads for any addition. The intent was that any future addition would include a lateral load resisting system. This means that new stair and elevator cores will have to be constructed somewhere outside of the footprint of the existing building unless significant renovations are done within the existing ED.

It will be a very complex and difficult endeavor to construct a five storey addition directly above a working hospital. There will no doubt be significant noise, vibration and many other inconveniencies.

HI 2.0 Demolition and Relocation of Existing Robie Street Parking Structure

BMR has reviewed the condition of the existing precast concrete structure and are of the opinion that the parking structure is in good condition and that the structural components could be disassembled, transported to another site and reconstructed at some savings versus building a new parking structure from scratch.

Based on boreholes from a year 2000 geotechnical report, the bed-rock surface under the parkade is in the range of Elevation 150-155 feet which is significantly lower than the elevation of the

lowest existing parking level which is at Elevation 174 feet, therefore there is potential to construct one or two additional levels below grade without encountering much bed-rock. Unfortunately based on this same year 2000 geotechnical report there is a layer of "construction waste material" and slate rock fill beneath at least a portion of the parking structure. This material would need to be removed from the site in order to claim the volume beneath the current parkade as occupiable space. There could be some significant costs in disposing of the construction waste material and slate rock fill?

HI 3.0 CBC Site

BMR had access to a geotechnical investigation report carried out on the CBC site in 1989. This report indicates that the bed-rock surface elevation ranges from approximately 139 feet to 144 feet. This indicates there may be some potential to get one underground storey without having to remove too much bed-rock?

HI 4.0 Urban Garden Site

BMR put together information from five Geotechnical Investigations carried out over the years and illustrated on one complete HI site drawing the elevation of the bed-rock surface as could be determined from these reports. We have no information on the Urban Garden corner of the site (the former QE2 High School site). We recommend getting five or six boreholes drilled down to bed-rock on this portion of the site so we can fully understand the elevation of the bed-rock surface and the opportunities and/or challenges this may pose to future development.

HI 5.0 Existing Buildings

BMR has first-hand knowledge of the structure of several of the buildings on the site having been the structural consultants of record when the buildings were designed and constructed. This includes the Halifax Infirmary, the addition on the west side of the infirmary including the Brain Repair Centre, the Parking Structure and the Emergency Department expansion. These buildings were designed and constructed to meet the Building Codes in effect at the time of construction. Since the construction of these buildings there have been some significant revisions to the building codes resulting in higher snow loads, wind loads and seismic loads particularly for "Post-Disaster" Buildings such as hospitals. The older buildings on site including the VMB, Abbie Lane and Power Plant would have been constructed to even earlier building codes and are probably less compliant with the current codes.

It would be a very expensive proposition to bring the buildings on site up to current standards and it is the opinion of the undersigned that it is not necessary to do so. It does not state in the current building code that buildings constructed to previous codes must be up-graded. The largest short-comings would be in the area of resistance to seismic loads and Halifax is not a high risk area for significant seismic events. Having said this however if significant structural revisions or additions are proposed for existing buildings, these buildings should be upgraded to meet current standards at least in the areas of significant revisions or additions.

To the best of our knowledge other than the Emergency Department there are no buildings or parts of buildings on the HI site which were designed and constructed to accommodate vertical expansion.

VICTORIA GENERAL SITE

VG 1.0 Existing Buildings

BMR has significant knowledge about the structure of most of the buildings on the VG site having been involved on numerous projects within most of these buildings at one time or another although BMR were not the original structural designers of any of the buildings.

All of the buildings on the VG Site were designed and constructed at a time long before the current editions of the National Building Code of Canada (NBCC) came into effect. In fact The Clinical Research Building (1922) was constructed before the very first edition of the NBCC was introduced in 1941. Since the construction of these buildings there have been some significant revisions to the building codes resulting in higher snow loads, wind loads and seismic loads particularly for "Post-Disaster" Buildings such as hospitals.

It is understood that the Victoria Building and the Centennial Building will be demolished as part of the redevelopment plan however this leaves several other aged buildings on the site which no doubt have structural short-comings versus the current NBCC.

It would be a very expensive proposition to bring the remaining buildings on site up to current standards and it is the opinion of the undersigned that it is not necessary to do so. It does not state in the current building code that buildings constructed to previous codes must be up-graded. The largest short-comings would be in the area of resistance to seismic loads and Halifax is not a high risk area for significant seismic events. Having said this however if significant structural revisions or additions are proposed for existing buildings, these buildings should be upgraded to meet current standards at least in the areas of significant revisions or additions.

To the best of our knowledge there are no buildings or parts of buildings on the VG site which were designed and constructed to accommodate vertical expansion.

Fig. 937 QE II Team sharing the concepts with NSHA staff

Fig. 938 QE II Team sharing the concepts with NSHA Staff

10

Victoria General Site

10.1 Victoria General (VG) Site
Introduction

Dickson Building for Cancer Care

The proposed plans reflect a consolidation of Cancer Care at the Dickson building, to assess this objective and conduct an detail test fit all non-cancer care functions were decanted out of Dickson. The 2024 DGSF requirements is 124,400 sq ft. the 2035 requirements is 136,900 sq ft.; a 12,500 sq ft. growth requirement post 2024. The drawings reflect the 2035 requirements.

In terms of long term planning this allows 12,500 sq ft flexibility is space utilization post 2024.

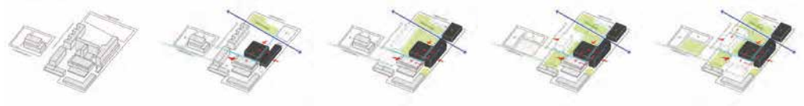
The demolition of the Centennial and Victoria building, requires a new front along the east facade giving the building a new image and identity to the cancer centre. It should be noted however that since a majority of existing functions are retained in its present location creating a enhanced patient experience in terms of the healing journey is somewhat limited.

Demolition of the surrounding buildings does give the opportunity for creating a building in a park like setting.

Fig. 1001 Victoria General Site Avenue Massing

- **Create a Healthcare Facility within a Park like setting**
- **Demolition and Removal of Victoria and Centennial**
- **New Image / Frontage**
- **New Below Grade and Surface Parking Lots**
- **New Greenspace**

1. Demolition of Victoria and Centennial Buildings
2. Construct new below grade parking by capitalizing on excavation left behind from Victoria
3. Create new lobby and vertical circulation for Dickson building with views of adjacent greenspace and entrances
4. New entrances and extended drop-off to Dickson
5. New surface parking on top of below grade parking
6. Temporary surface parking on Centennial site
7. Centennial site retained for future development
8. Substantial new green space
9. Option to create a parking structure fronting South Park Street



10.1 Victoria General (VG) Site
Introduction

Fig. 1002 Dickson Isometric Section

The series of images below represent a sequential long-term evolution of the site. The initial 3D image depicts the existing Victoria, Centennial and Bethune buildings in place. There is no visibility of the Dickson building from its east exposure. With the demolition of the Victoria and Centennial, the east face of the Dickon building is immediately visible, lending itself to a face lift and the possibility of creating a new image and identity for the cancer centre. This new image is created by way of an interconnected public space along the east edge.

The third image represents a view of the site after the Bethune building is demolished.

The site is now transformed into a “building within a park”, the proposed boulevard on to the site reinforcing this image. Finally allowing for a proposed development along the SE edge of the site as it continues to evolve.

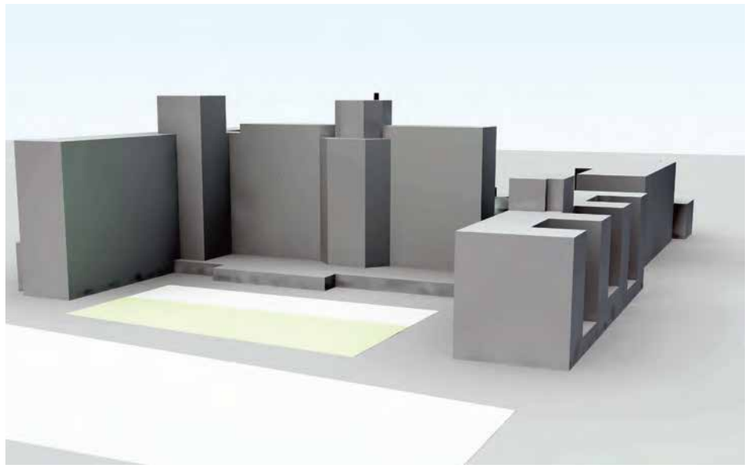


Fig. 1003 Victoria General - Existing Condition

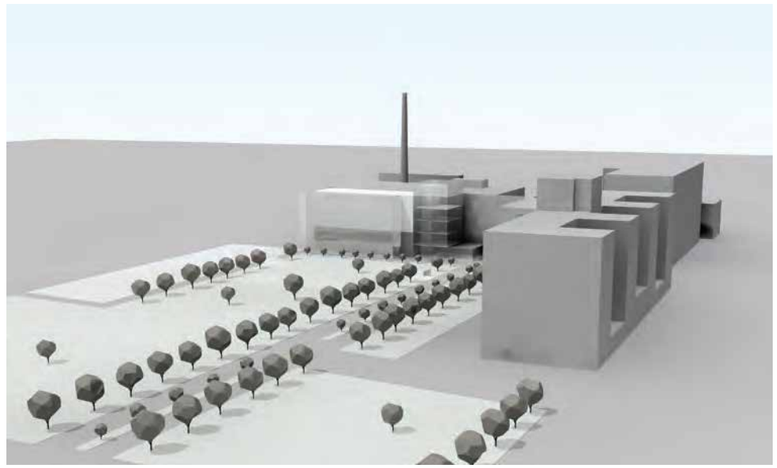


Fig. 1004 Victoria - Victoria and Centennial Demolished

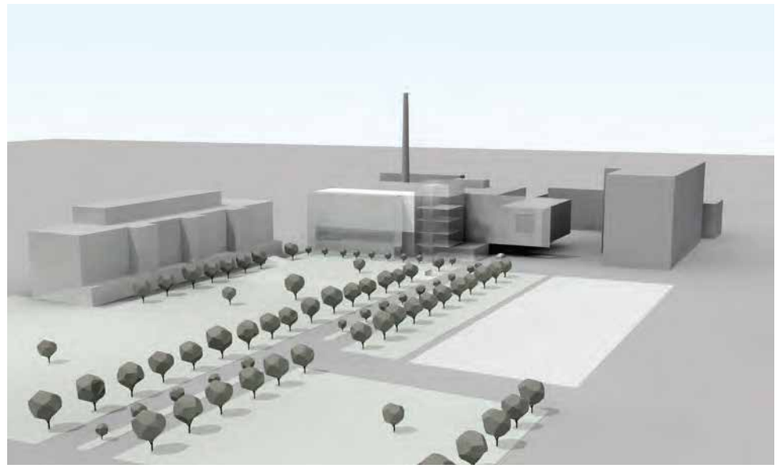
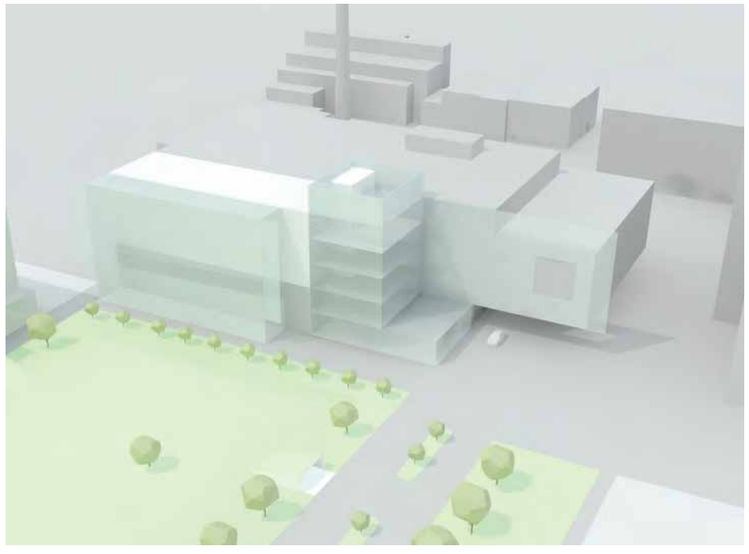


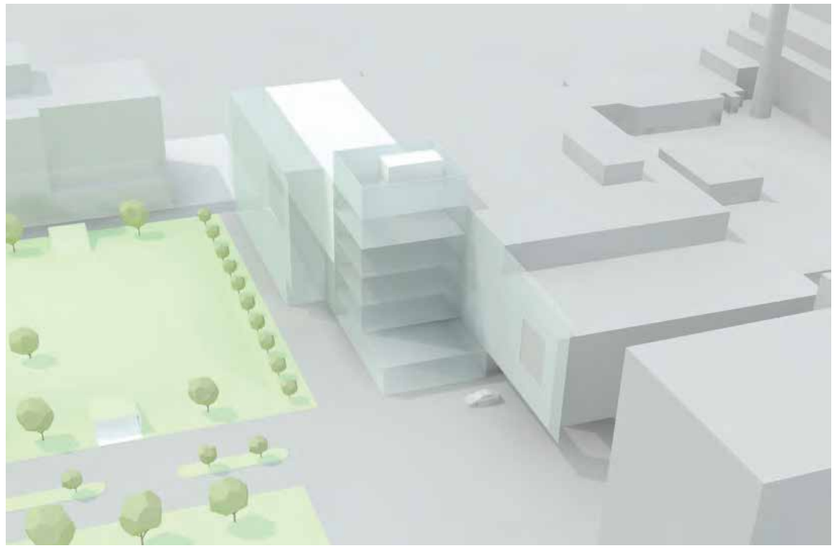
Fig. 1005 Victoria - Bethune Demolished, New Building

10.1 Victoria General (VG) Site



Dickson Building, Axonometric

Dickson Building, Axonometric

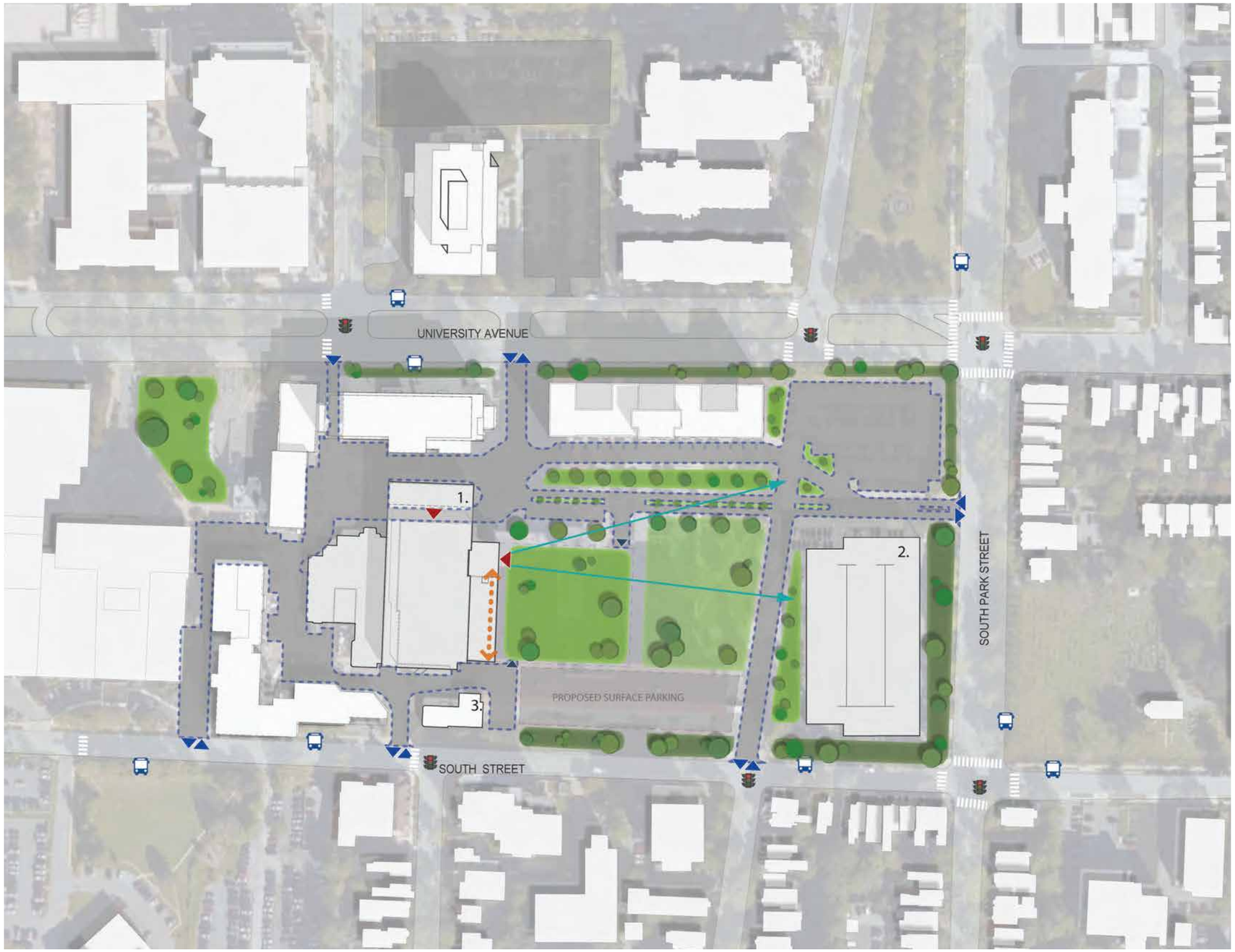


Dickson Building, Axonometric

10.1 Victoria General (VG) Site

10.1.1 Site Plan

The Victoria General site is re-envisioned as a Cancer Care Centre. Both the Victoria and Centennial buildings are demolished to allow for new green space, below grade parking and surface parking. A new tree lined avenue provides views of the updated Dickson building. Views of the new green space are emphasized. The Cyclotron will remain and continue to be operational.



1. Dickson Cancer Centre
2. Relocated Parking Structure from HI Site
3. Cyclotron

Green Space
- Buffer Zone
- Green Space
- Roof Terraces / Healing Spaces

Vehicular Circulation/Entrances
- Vehicular Entrance
- Service / Parking Entrance
- Driveway
- Signalled Intersection
- Bus Stop

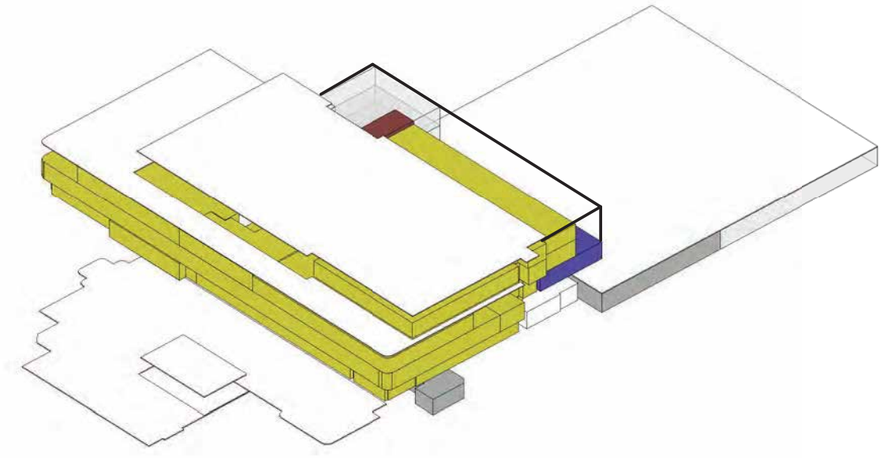
Pedestrian Circulation/Entrances
- Pedestrian Entrance
- Internal Circulation / Links

Views
- Views to Halifax Commons

Fig. 1006 Victoria General (VG) Site Plan

10.1 Victoria General (VG) Site

Proposed DGSF - Dickson Building				
Category	Department		Area	Program Required
Ambulatory Care	Cancer care administration		25,874 SF	24,156 SF
Ambulatory Care	Cancer care clinic		46,159 SF	43,557 SF
Ambulatory Care	Cancer care radiation treatment		48,455 SF	44,848 SF
Ambulatory Care	Cancer care systemic oncology		24,791 SF	24,427 SF
		Subtotal	145,280 SF	
Amenities	Amenities		901 SF	
Amenities	Cafe		5,977 SF	
		Subtotal	6,878 SF	
Diagnostic Imaging	Diagnostic Imaging		20,209 SF	
	Cyclotron		4,560 SF	
		Subtotal	24,769 SF	
New Public	New Public		13,355 SF	
		Subtotal	13,355 SF	
Support Services	Bio Med Engineering		12,705 SF	
Support Services	Food Services		5,068 SF	
Support Services	Health information/ service registration		976 SF	
Support Services	M+E		5,949 SF	
Support Services	New Shipping and Receiving		5,231 SF	
Support Services	Staff services (lockers etc)		2,730 SF	
		Subtotal	32,659 SF	
TBD	TBD		3,646 SF	
		Subtotal	3,646 SF	
Total			226,586 SF	
	Parking		32,500 SF	



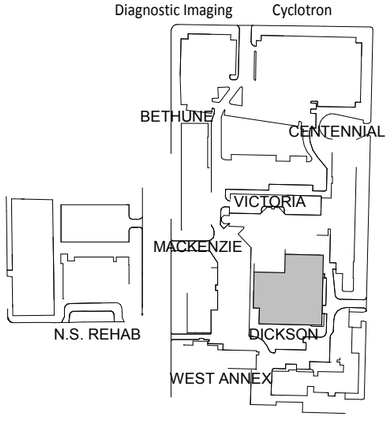
N

10.1 Victoria General (VG) Site

10.1.2 Floor Plans: Level 01

Proposed DGSF - Dickson Building - Level 01

Category	Department		Area
Ambulatory Care	Cancer care radiation treatment		5194 SF
		Subtotal	5194 SF
New Public	New Public		2333 SF
		Subtotal	2333 SF
Support Services	Bio Med Engineering		12705 SF
Support Services	Health information/ service registration		976 SF
Support Services	New Shipping and Receiving		5231 SF
Support Services	Staff services (lockers etc)		2730 SF
		Subtotal	21642 SF
TBD	TBD		3646 SF
		Subtotal	3646 SF
Grand total			32815 SF
			4,560 SF



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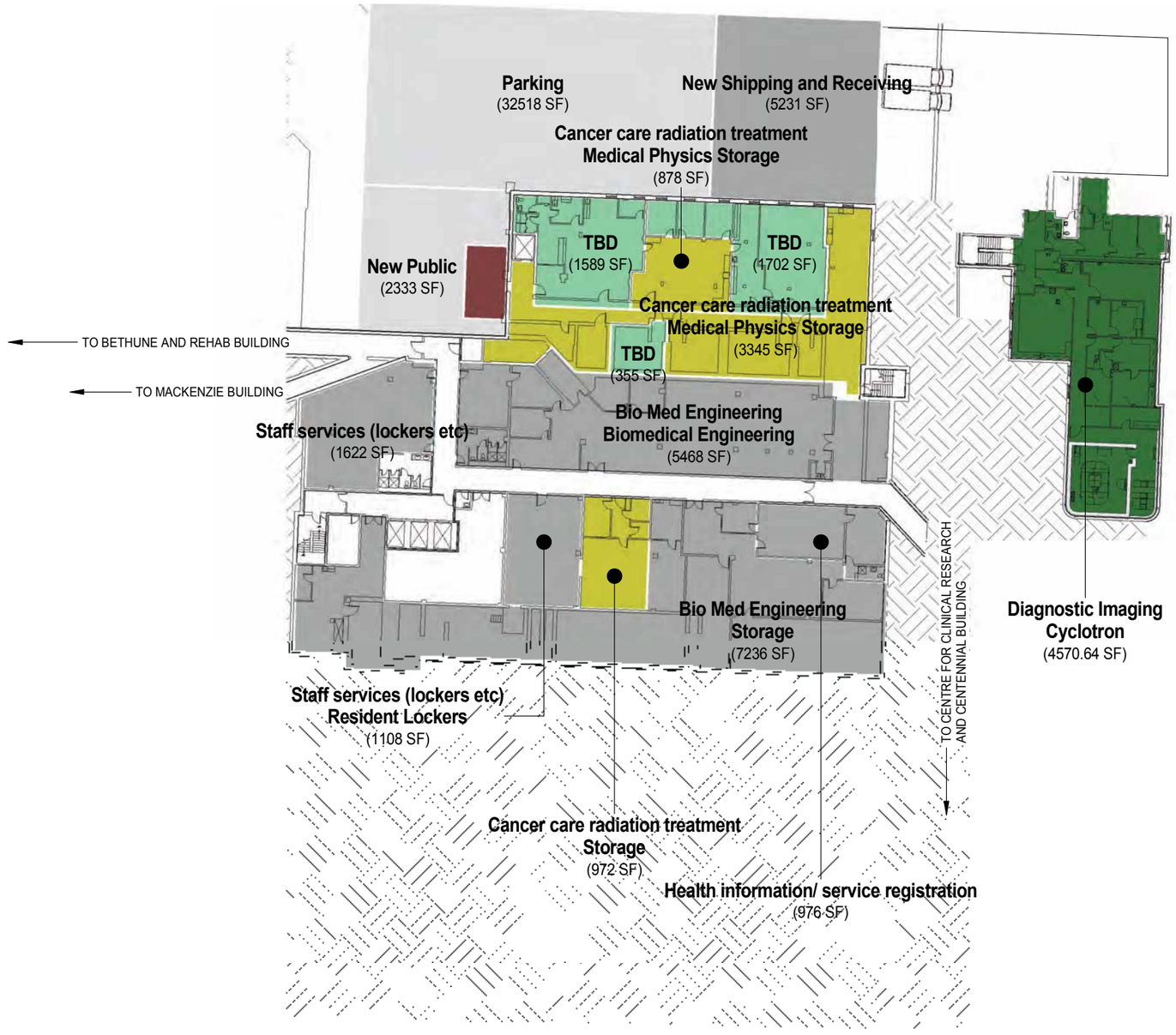
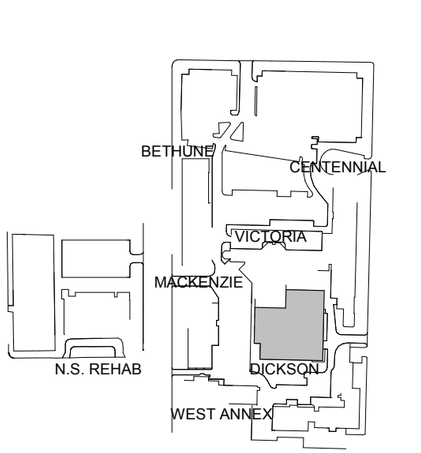


N

10.1 Victoria General (VG) Site

Floor Plan: Level 02

Proposed DGSF - Dickson Building - Level 02			
	Category	**Department**	**Area**
	Ambulatory Care	Cancer care radiation treatment	43261 SF
		Subtotal	43261 SF
	Amenities	Amenities	901 SF
		Subtotal	901 SF
	New Public	New Public	2993 SF
		Subtotal	2993 SF
Grand total			47154 SF



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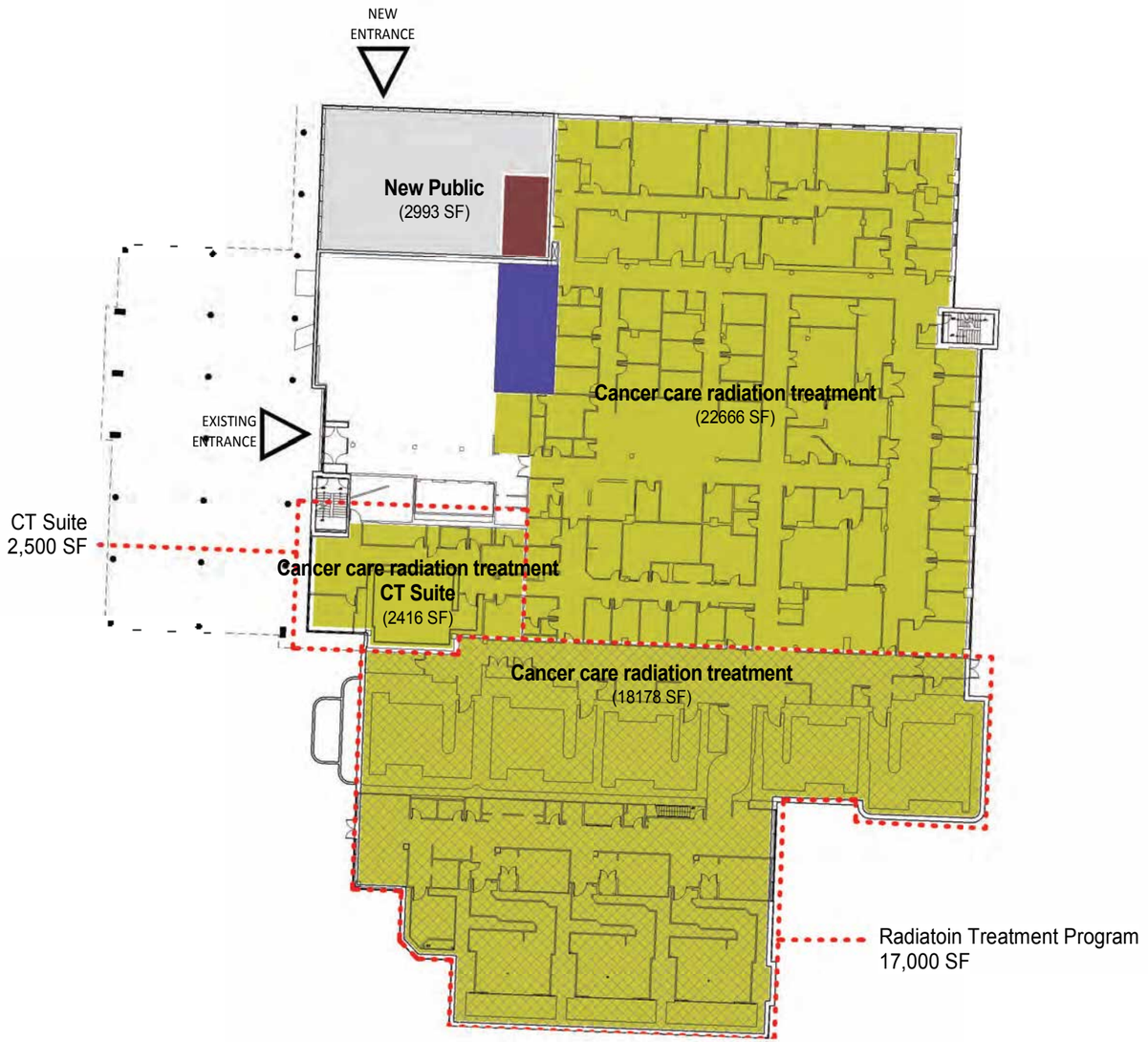
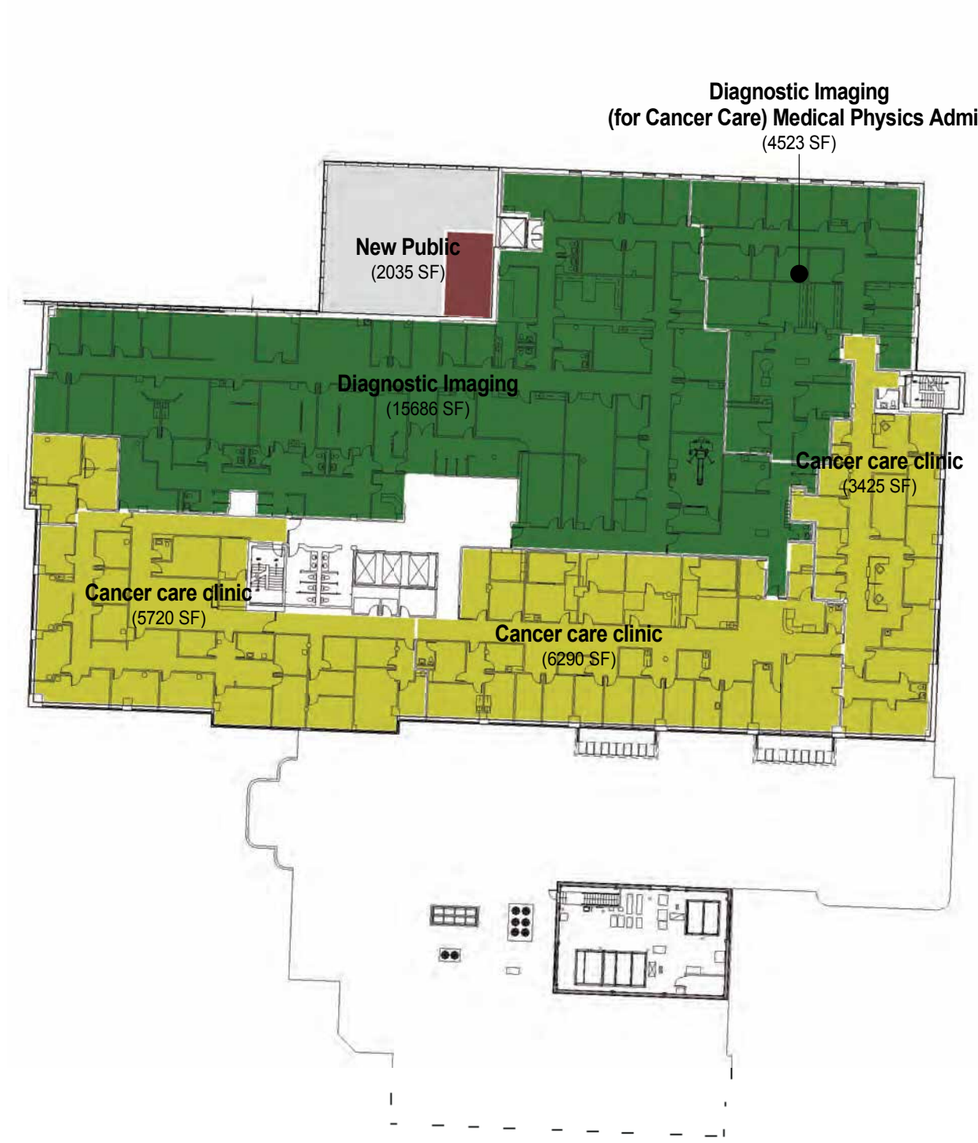
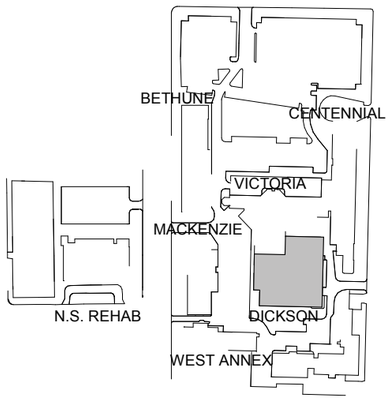


N

10.1 Victoria General (VG) Site
Floor Plan: Level 03

Proposed DGSF - Dickson Building - Level 03			
Category	**Department**		**Area**
Ambulatory Care	Cancer care clinic		16085 SF
		Subtotal	16085 SF
Diagnostic Imaging	Diagnostic Imaging		20209 SF
		Subtotal	20209 SF
New Public	New Public		2035 SF
		Subtotal	2035 SF
Grand total			38328 SF





KEY PLAN- VICTORIA GENERAL SITE

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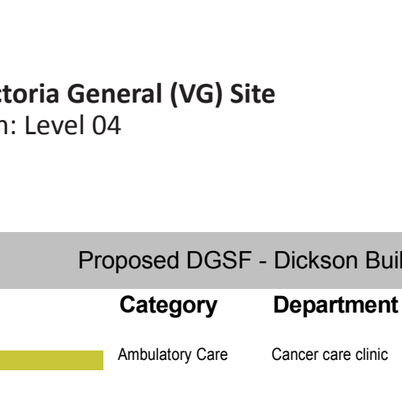
N

10.1 Victoria General (VG) Site

Floor Plan: Level 04

Proposed DGSF - Dickson Building - Level 04			
	Category	**Department**	**Area**
	Ambulatory Care	Cancer care clinic	30074 SF
		Subtotal	30074 SF
	Amenities	Cafe	5977 SF
		Subtotal	5977 SF
	New Public	New Public	2035 SF
		Subtotal	2035 SF
	Support Services	Supply chain (warehouse), procurement	2107 SF
		Subtotal	2107 SF
Grand total			40193 SF



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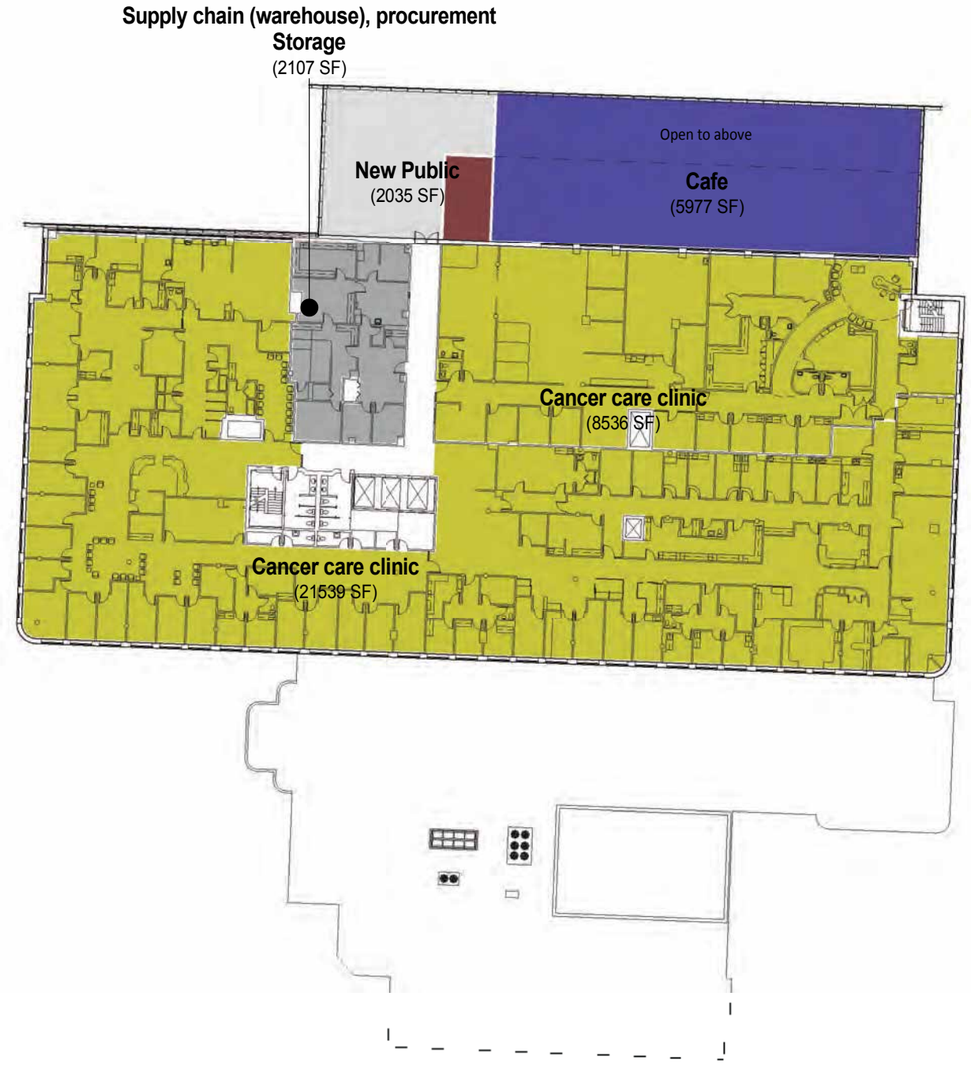
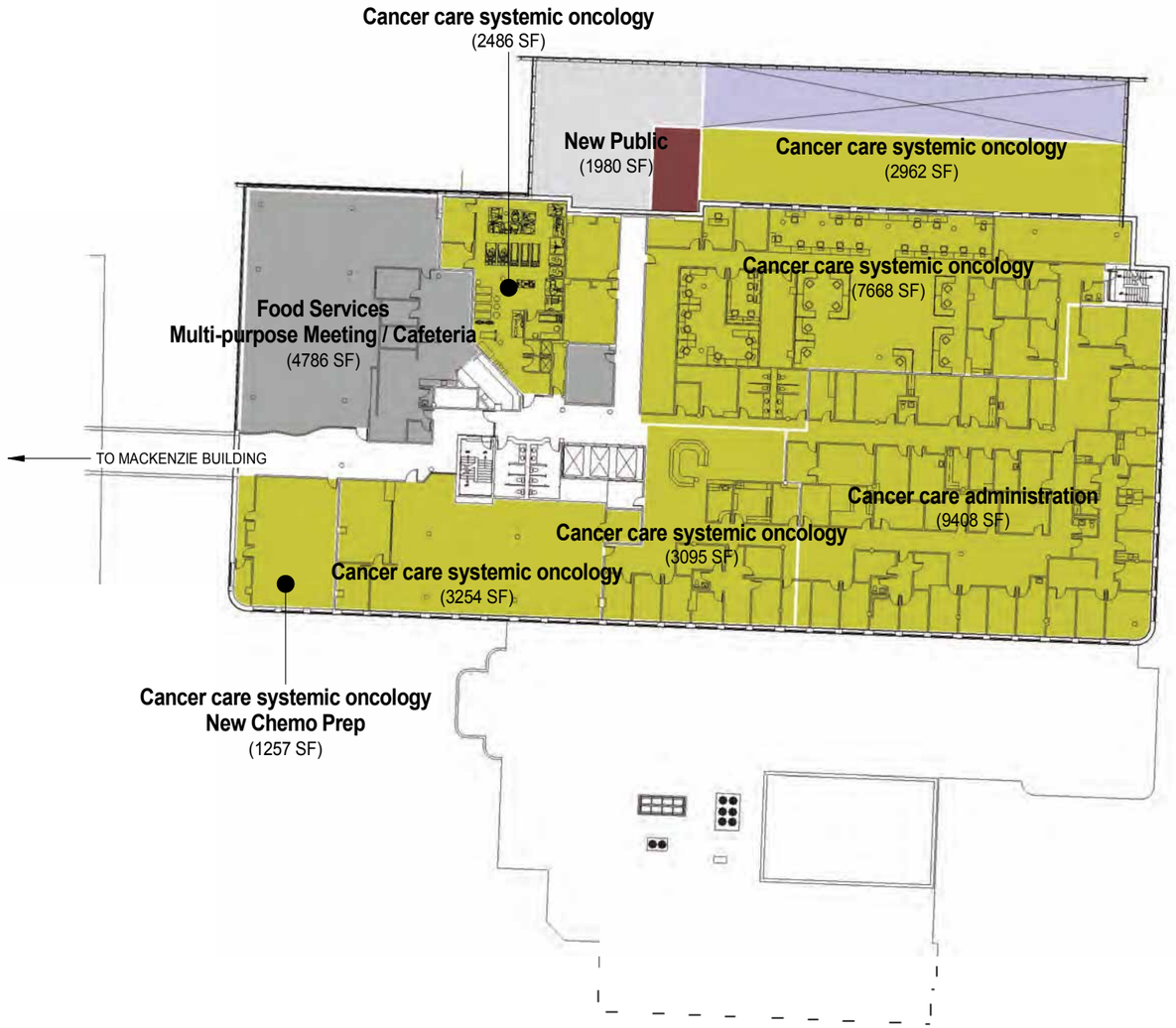
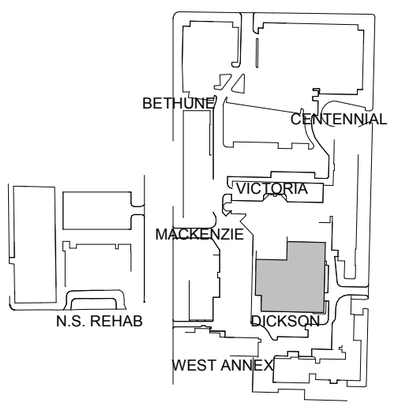


10.1 Victoria General (VG) Site
Floor Plan: Level 05

Proposed DGSF - Dickson Building - Level 05			
Category	**Department**		**Area**
Ambulatory Care	Cancer care administration		9408 SF
Ambulatory Care	Cancer care systemic oncology		20722 SF
		Subtotal	30130 SF
New Public	New Public		1980 SF
		Subtotal	1980 SF
Support Services	Food Services		5068 SF
		Subtotal	5068 SF
Grand total			37178 SF





KEY PLAN- VICTORIA GENERAL SITE

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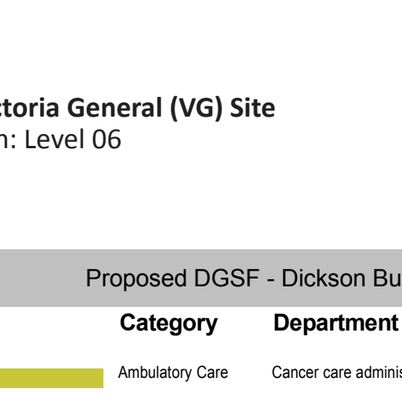
N

10.1 Victoria General (VG) Site

Floor Plan: Level 06

Proposed DGSF - Dickson Building - Level 06			
	Category	**Department**	**Area**
	Ambulatory Care	Cancer care administration	18,421 SF
		Subtotal	18,421 SF
	New Public	New Public	1,980 SF
		Subtotal	1,980 SF
	Support Services	M+E	5,949 SF
		Subtotal	5,949 SF
Grand total			26,350 SF



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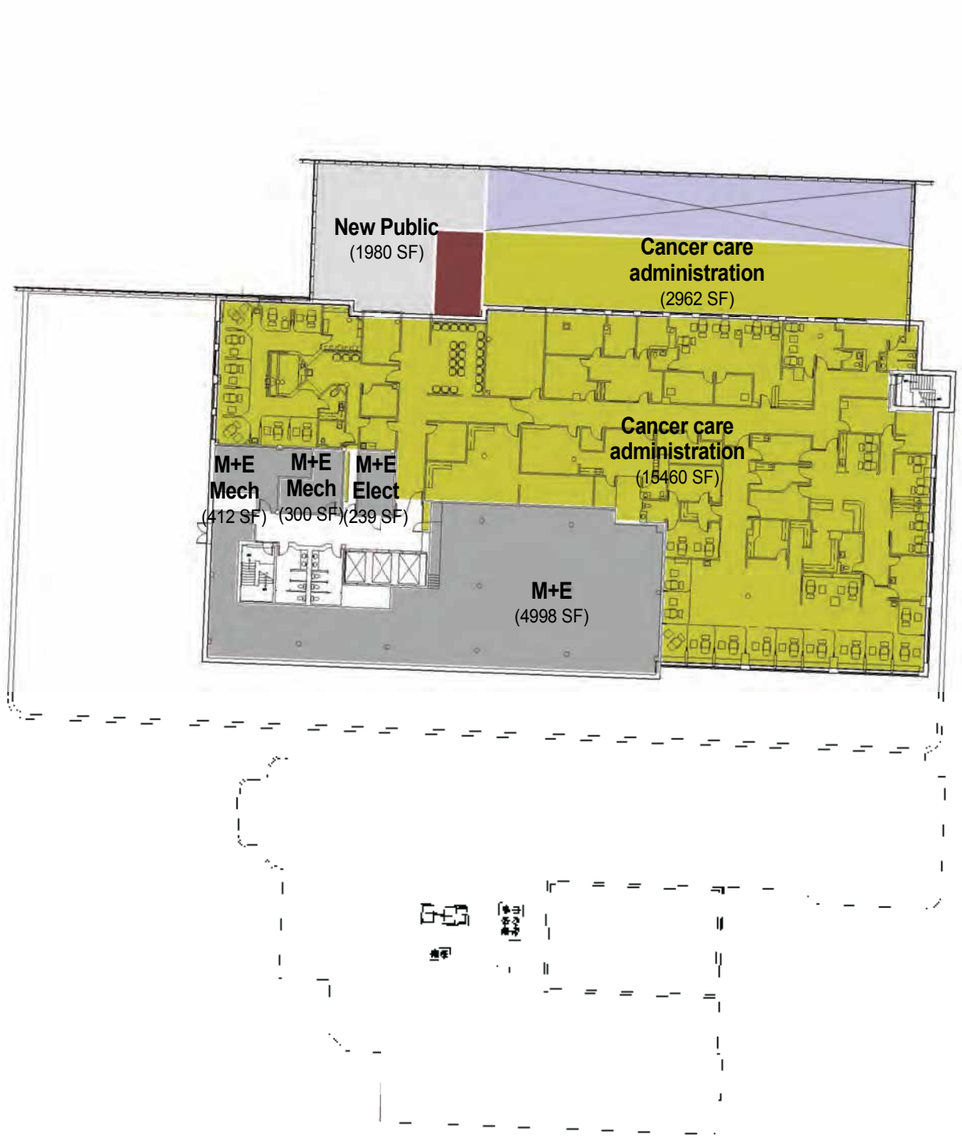


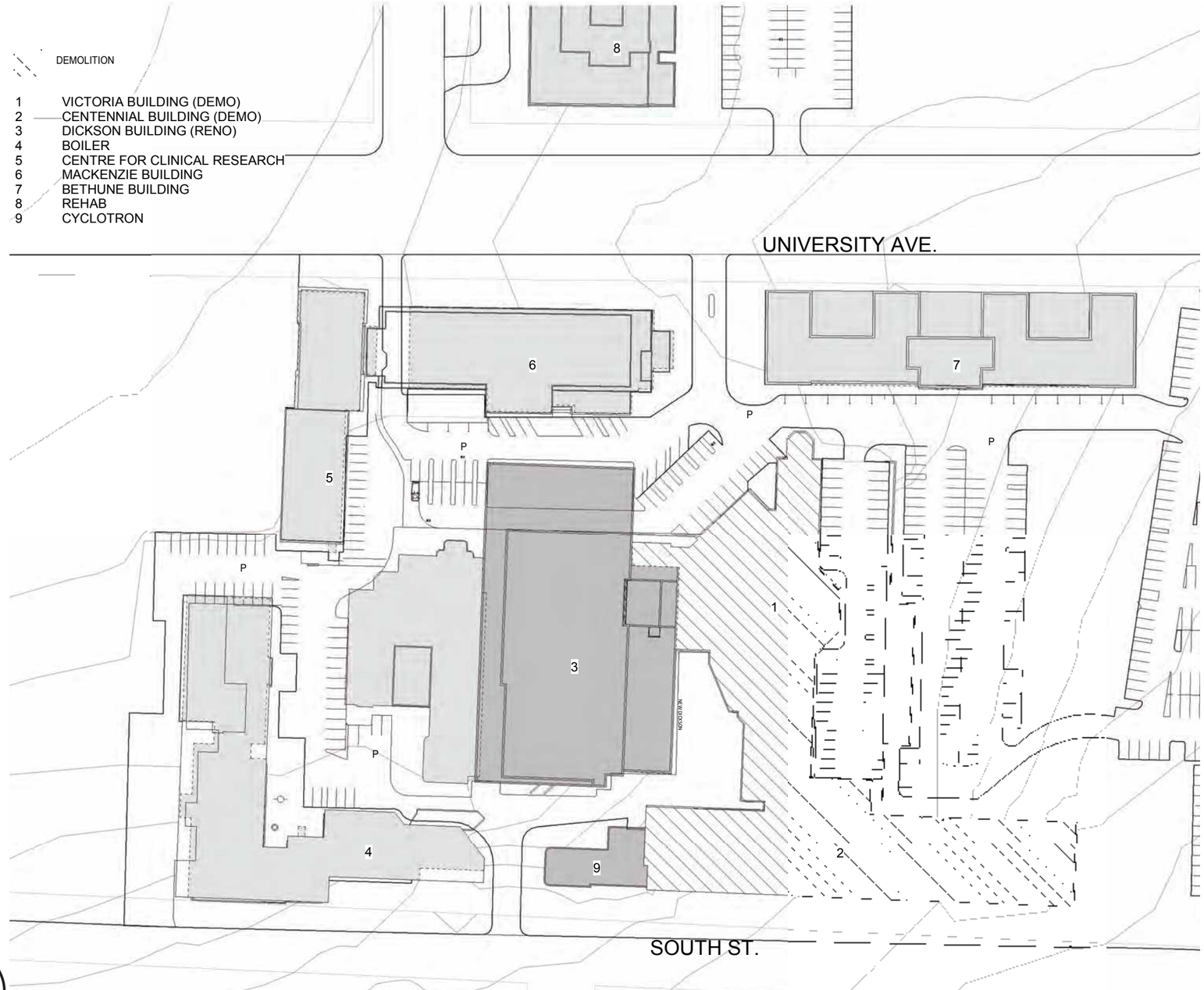
N

10.1 Victoria General (VG) Site

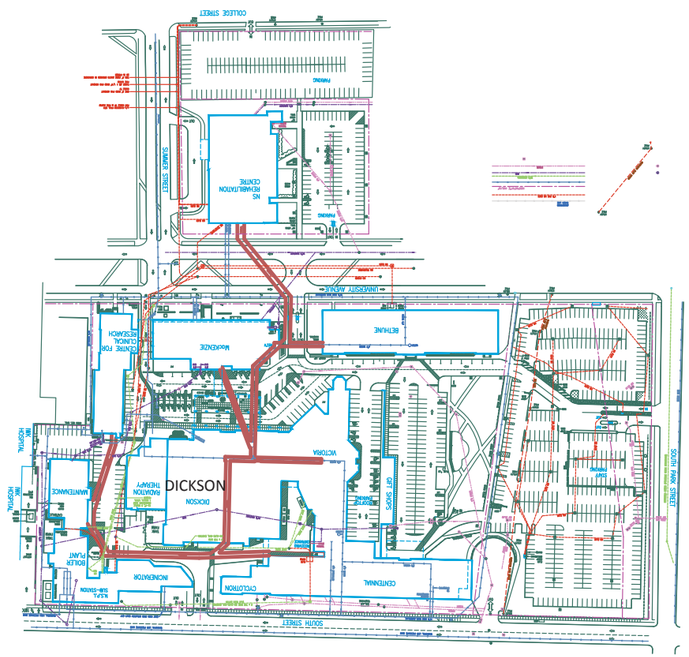
10.1.3 Renovations and Decanting

DEMOLITION

1 VICTORIA BUILDING (DEMO)
2 CENTENNIAL BUILDING (DEMO)
3 DICKSON BUILDING (RENO)
4 BOILER
5 CENTRE FOR CLINICAL RESEARCH
6 MACKENZIE BUILDING
7 BETHUNE BUILDING
8 REHAB
9 CYCLOTRON



VG SITE TUNNELS

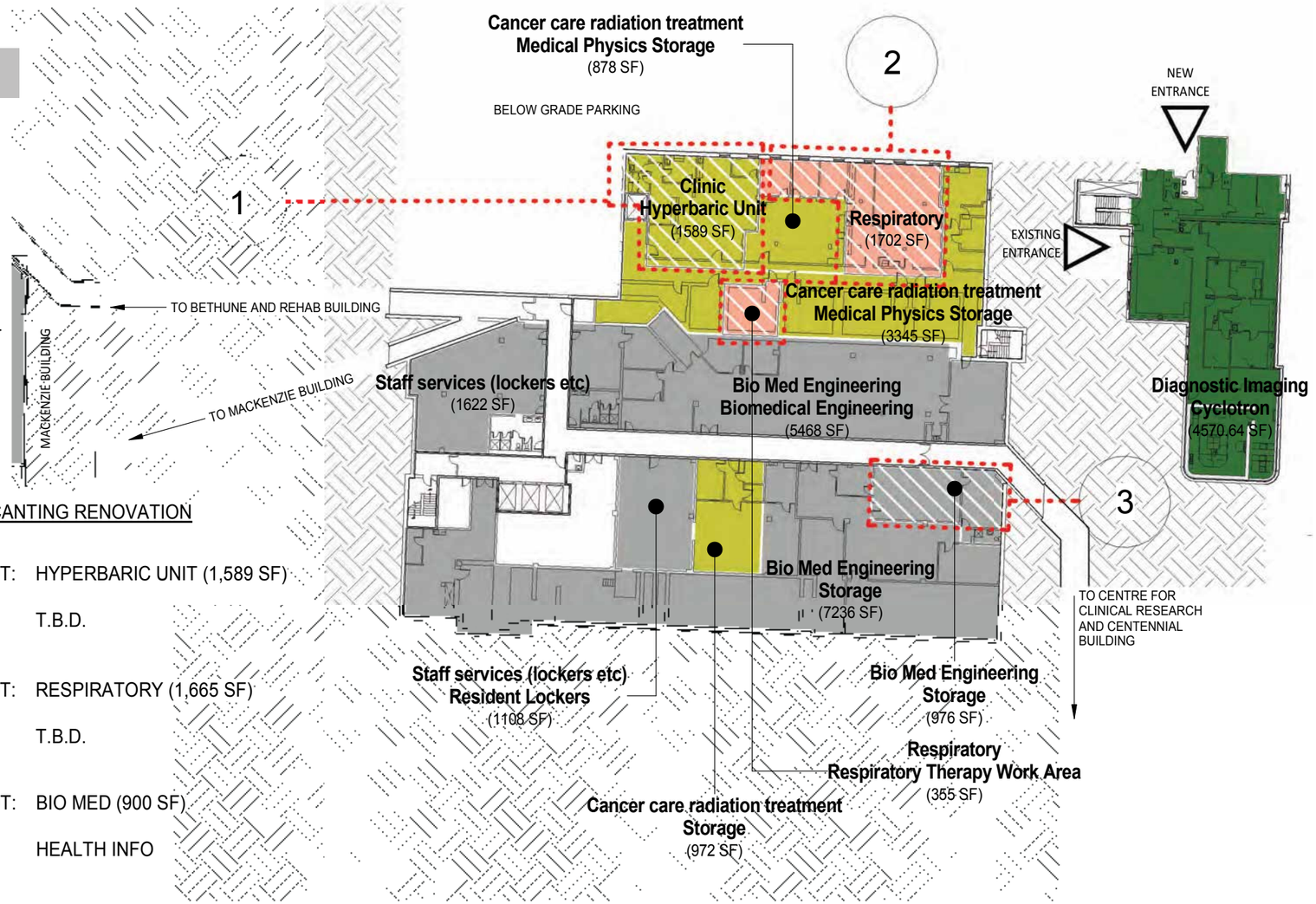


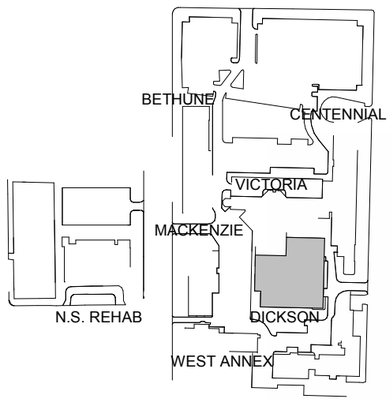
NOTE: Existing tunnels in VG Site to remain following the deconstruction of Victoria and Centennial buildings.

10.1 Victoria General (VG) Site

Dickson Renovation and Decanting: Level 01

Decanted DGSF - Dickson Building - Level 01			
Category	**Department**		**Area**
Ambulatory Care	Clinic		1589 SF
		Subtotal	1589 SF
Clinical Support	Respiratory		2057 SF
		Subtotal	2057 SF
Support Services	Bio Med Engineering		976 SF
		Subtotal	976 SF
Grand total			4622 SF





KEY PLAN- VICTORIA GENERAL SITE

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1:500

PROGRAMS FOR DECANTING RENOVATION

1 OUT: HYPERBARIC UNIT (1,589 SF)
IN: T.B.D.

2 OUT: RESPIRATORY (1,665 SF)
IN: T.B.D.

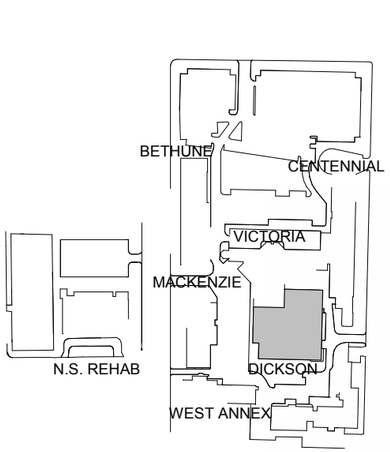
3 OUT: BIO MED (900 SF)
NEW IN: HEALTH INFO

N

10.1 Victoria General (VG) Site

Dickson Renovation and Decanting: Level 02

Decanted DGSF - Dickson Building - Level 02			
	Category	**Department**	**Area**
	Ambulatory Care	Clinic	588 SF
		Subtotal	588 SF
	Support Services	Facility management	747 SF
		Subtotal	747 SF
Grand total			1335 SF



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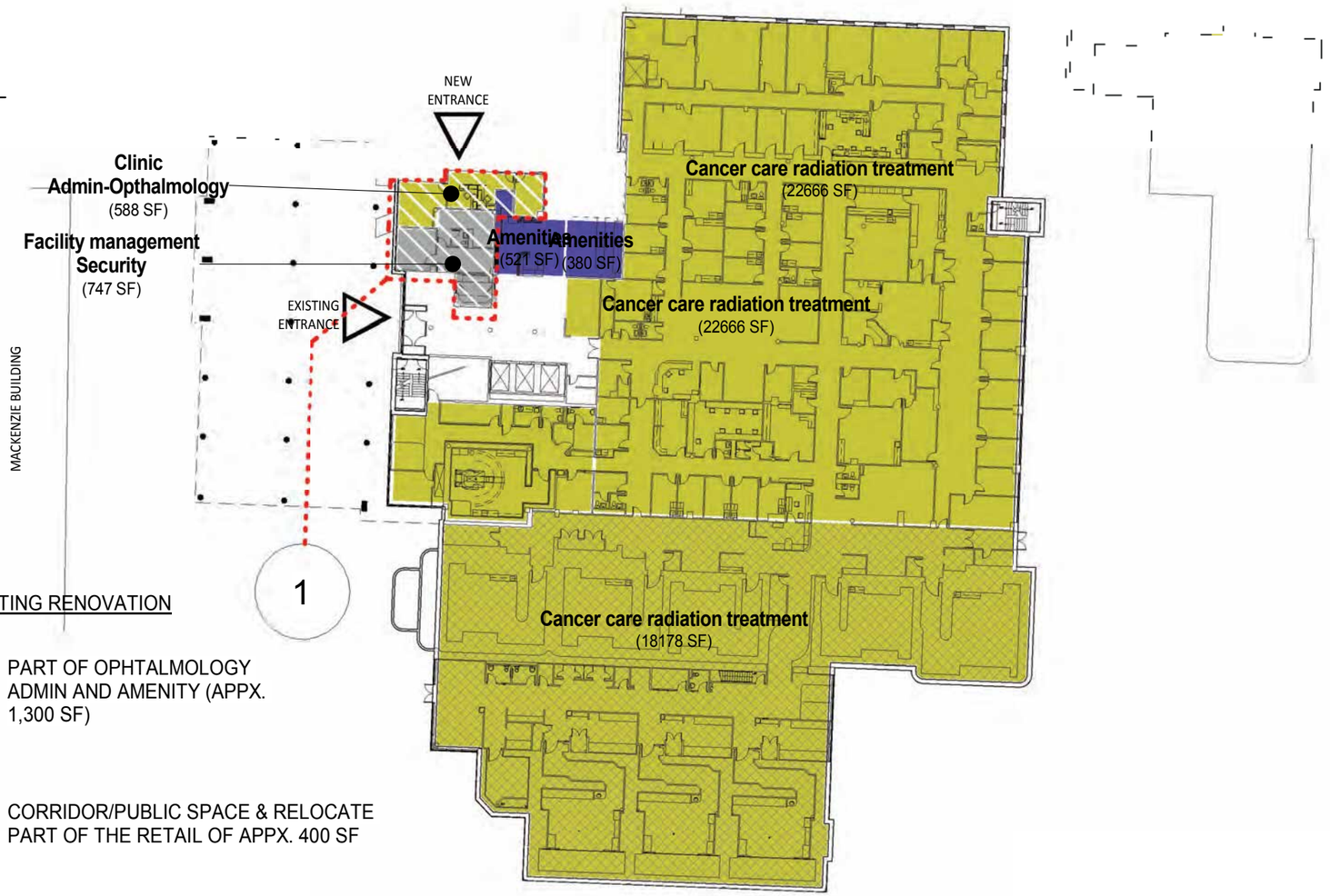


PROGRAMS FOR DECANTING RENOVATION

1

OUT: PART OF OPHTALMOLOGY ADMIN AND AMENITY (APPX. 1,300 SF)

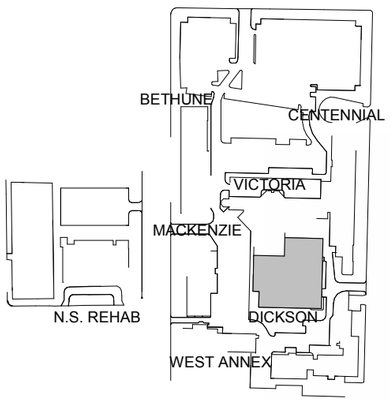
IN: CORRIDOR/PUBLIC SPACE & RELOCATE PART OF THE RETAIL OF APPX. 400 SF

N

10.1 Victoria General (VG) Site

Dickson Renovation and Decanting: Level 03

Removed DGSF - Dickson Building - Level 03			
	Category	**Department**	**Area**
	Ambulatory Care	Clinic	9199 SF
		Subtotal	9199 SF
	External Agency	External Agency	6228 SF
		Subtotal	6228 SF
	Research	Research	650 SF
		Subtotal	650 SF
Grand total			16077 SF



KEY PLAN- VICTORIA GENERAL SITE

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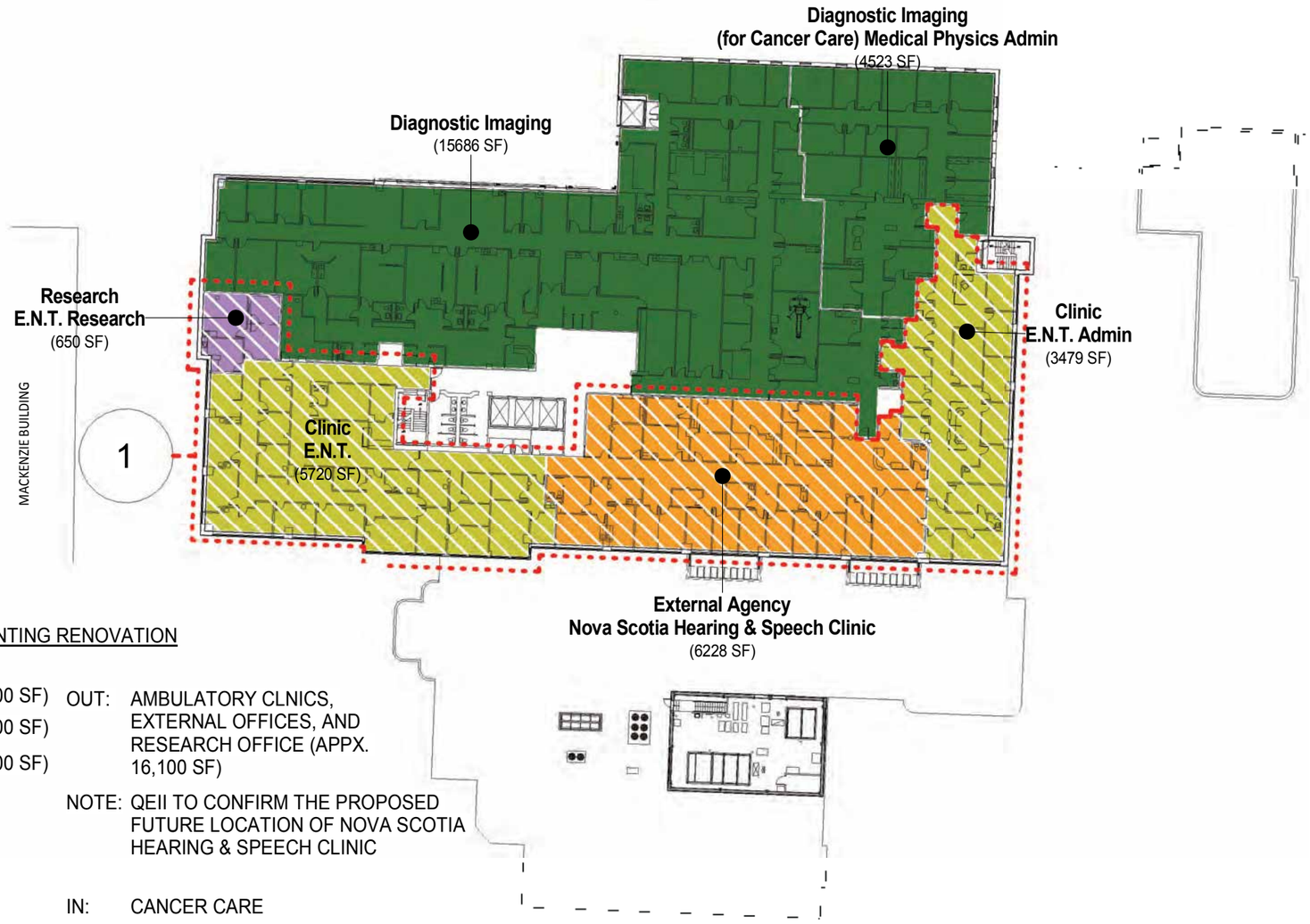


PROGRAMS FOR DECANTING RENOVATION

1

(9,200 SF) OUT: AMBULATORY CLNICS, EXTERNAL OFFICES, AND RESEARCH OFFICE (APPX. 16,100 SF)

(600 SF)

(6,200 SF)

NOTE: QEII TO CONFIRM THE PROPOSED FUTURE LOCATION OF NOVA SCOTIA HEARING & SPEECH CLINIC

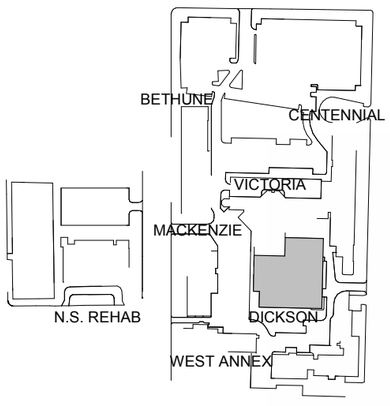
IN: CANCER CARE

N

10.1 Victoria General (VG) Site

Dickson Renovation and Decanting: Level 04

Decanted DGSF - Dickson Building - Level 04			
	Category	**Department**	**Area**
	Ambulatory Care	Clinic	21545 SF
		Subtotal	21545 SF
	Clinical Support	Rehab	4781 SF
		Subtotal	4781 SF
	Research	Research	3728 SF
		Subtotal	3728 SF
Grand total			30053 SF



KEY PLAN- VICTORIA GENERAL SITE

0 5 10 15 20m
1:500

PROGRAMS FOR DECANTING RENOVATION

1
- OUT: AMBULATORY CLINICS (21,500 SF)
- IN: CANCER CARE CLINICS

2
- OUT: REHAB (4,800 SF)
- IN: CANCER CARE CLINICS

3
- OUT: RESEARCH (3,700 SF)
- IN: CANCER CARE CLINICS

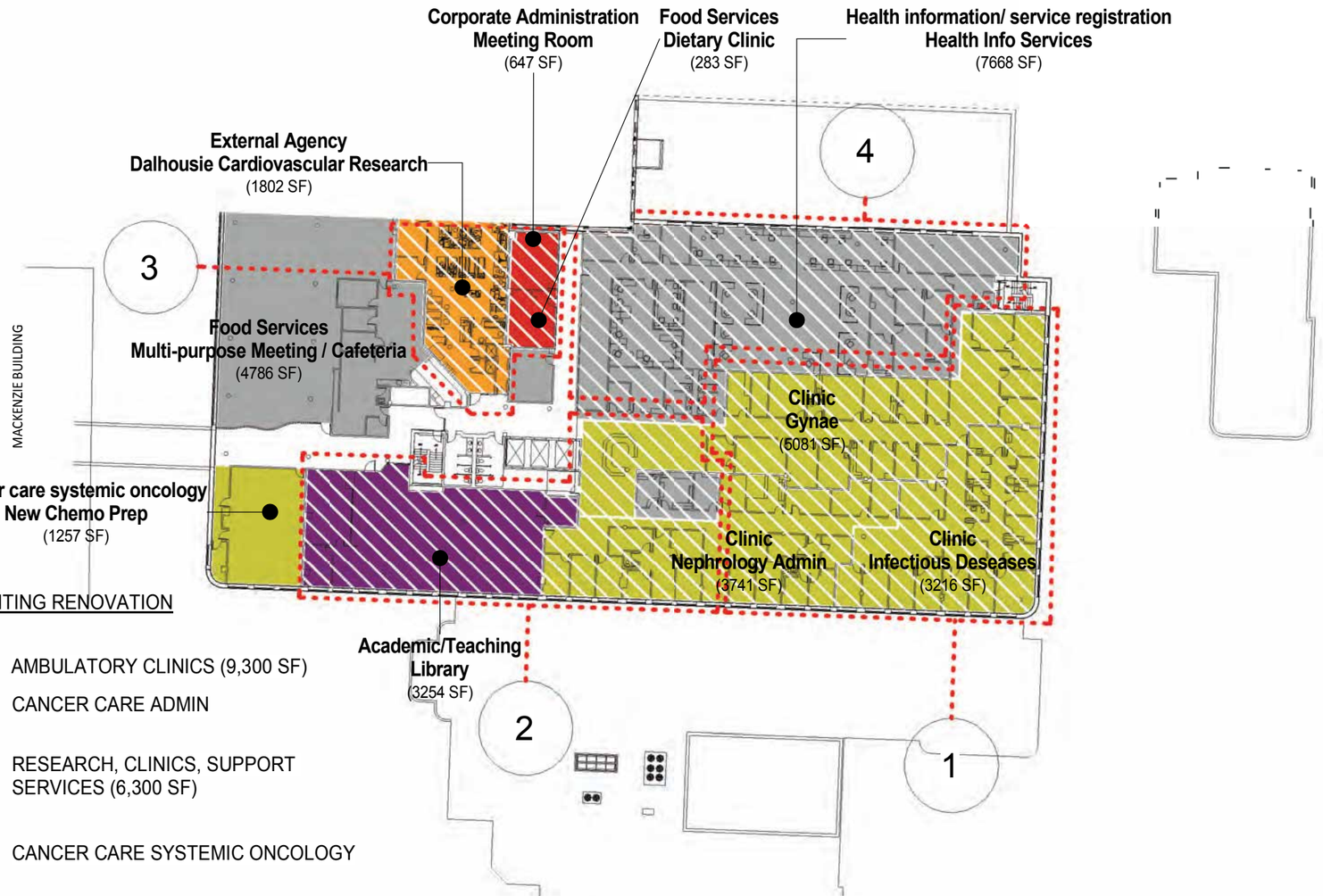
N

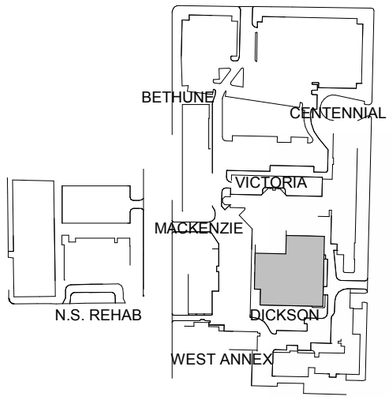
10.1 Victoria General (VG) Site

Dickson Renovation and Decanting: Level 05

Decanted DGSF - Dickson Building - Level 05

Category	Department		Area
Academic/Teaching	Academic/Teaching		3254 SF
		Subtotal	3254 SF
Administration	Corporate Administration		647 SF
		Subtotal	647 SF
Ambulatory Care	Clinic		12038 SF
		Subtotal	12038 SF
External Agency	External Agency		1802 SF
		Subtotal	1802 SF
Support Services	Food Services		473 SF
Support Services	Health information/ service registration		7668 SF
		Subtotal	8140 SF
Grand total			25882 SF





KEY PLAN- VICTORIA GENERAL SITE

0 5 10 15 20m
1:500

PROGRAMS FOR DECANTING RENOVATION

1
- OUT: AMBULATORY CLINICS (9,300 SF)
- IN: CANCER CARE ADMIN

2
- OUT: RESEARCH, CLINICS, SUPPORT SERVICES (6,300 SF)
- IN: CANCER CARE SYSTEMIC ONCOLOGY

3
- OUT: EXTERNAL, ADMIN (2,500 SF)
- IN: CANCER CARE SYSTEMIC ONCOLOGY

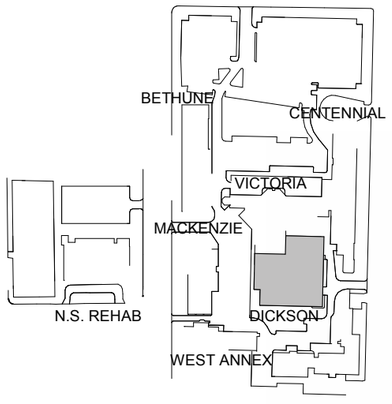
4
- OUT: HEALTH INFO (7,700 SF)
- IN: CANCER CARE SYSTEMIC ONCOLOGY

N

10.1 Victoria General (VG) Site

Dickson Renovation and Decanting: Level 06

Decanted DGSF - Dickson Building - Level 06			
	Category	**Department**	**Area**
	Ambulatory Care	Dialysis	15247 SF
		Subtotal	15247 SF
	Support Services	Food Services	213 SF
		Subtotal	213 SF
Grand total			15461 SF



KEY PLAN- VICTORIA GENERAL SITE

0 5 10 15 20m
1:500

PROGRAMS FOR DECANTING RENOVATION

1 OUT: AMBULATORY CLINICS AND OTHERS (15,200 SF)

IN: CANCER CARE ADMIN

N


N

11
Transportation

QUEEN ELIZABETH II HOSPITAL MASTER PLAN

Transportation Considerations – Executive Summary

Prepared For: QEII Hospital, Halifax, Nova Scotia

February 12, 2018

11.1 Transportation (BA Group)

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11.1 Transportation (BA Group)

1.0 INTRODUCTION

BA Group is retained by Kasian Architects to assist with the urban transportation elements of the Master Program for the QEII Hospital. This report summarizes the key transportation aspects of the QEII redevelopment, which proposes to remove facilities from the Victoria General Site and construct an Ambulatory Care Facility and an In-patient/OR building on the Halifax Infirmary site. For site context please refer to **Figure 1.**

1.1 KEY CHANGES IN FLOOR AREAS (DGSF)

Based on the functional program and information provided by Kasian Architects, the Halifax Infirmary site will increase in size by roughly 65% and the Victoria General site will reduce in size by roughly 45%. Although, it is important to note that considering both sites in conjunction, the net new department gross floor areas for Ambulatory and In-patient on both Hospital sites is only 11,681 square metres. Also, new standards for room sizes have been incorporated into the proposed In-patient building, meaning there is more floor area built for the same activity level. Overall, general growth in Hospital visits and number of staff is still anticipated.

1.2 SITE PLAN OBJECTIVES

Through discussion with the QEII Redevelopment team and Kasian Architects, BA Group has come up with the following site plan objectives:

- Improve site access and capacity
- Provide proper internal circulation
- Provide appropriate drop-off facilities
- Improve and/or minimize impact on emergency walk-in entrance
- Provide separate ambulance entry from Bell Road
- Provide parking supply opportunities

BA Group has based our transportation works with these objectives in mind and come up with three options.

Distance Between Sites: 1.1km
15 minute walk
5 minute drive

SITE CONTEXT

Date Plotted: February 7, 2018 Filename: P:\7832\01\Graphics\Fig01-00-SC.dwg

BA Group

Queen Elizabeth II Health Sciences Centre (QEII)
7832-01 February, 2018

Figure 1

2.0 PARKING

2.1 EXISTING PARKING CONDITIONS

There are currently 1,302 parking spaces provided on the Halifax Infirmary site and 919 parking spaces provided on the Victoria General site (total of 2,221 parking spaces). This on-site parking supply is lower than what is seen at a typical Hospital. Staff and to a lesser extent visitor parking is being accommodated formally and informally off-site. The availability of parking on-site and the need to rely upon parking off-site is a long standing issue at both the Halifax Infirmary and Victoria General sites.

2.2 PARKING SUPPLY PRINCIPALS

The Hospital has determined a number of parking principals to be the basis for their decision making. The principals are as follows:

- The priority for on-site parking at the Halifax Infirmary is to serve the needs of our patients and families
- Parking resources at both the Halifax Infirmary and Victoria General sites will be optimally utilized. Access between sites will be supported by a shuttle service
- Off-site (street) parking will continue to be utilized, in compliance with city by-laws
- Additional off-site parking resources will be required on an interim basis
- Parking and transportation solutions will safeguard staff safety and security at all times

2.3 PARKING SUPPLY STRATEGY

The parking strategy for the QEII redevelopment is to find a balance between on-site and off-site parking. To accomplish this, the Hospital will need to provide optimum parking on the Halifax Infirmary site, provide the residual parking supply on the Victoria General site, and maintain but not increase the current amount of off-site parking. These factors will minimize the need for new structured parking on both Hospital sites. It is important to note that for the purpose of meeting parking requirements, both sites are being considered as one. For a detailed on-site parking strategy please refer to **Appendix A**.

2.4 PARKING SUPPLY PROJECTIONS

Based on the proposed department gross floor areas provided by Kasian Architects, the new Ambulatory Care Facility will be roughly 25,200 square metres. Based on a parking ratio of 3 per 100 square metres, the building will require a supply of 750 parking spaces. The new In-patient/OR building will be roughly 33,200 square metres. Based on a parking ratio of 1.5 per 100 square metres, the In-patient/OR building will require 500 parking spaces. This is a net new parking demand of 1,250 parking spaces.

On the Victoria General site there is reduction in parking demand due to the demolition of the Victoria Building and the Centennial Building. Based on the existing QEII parking rates of 1 per 100 square metres for Ambulatory Care and 0.8 per 100 square metres for In-patient, the net reduction in parking demand on the Victoria General site is 450 parking spaces. Therefore, with the establishment of shuttle services between Halifax Infirmary and Victoria General, the 450 parking space surplus on Victoria General can be added to the net new supply for facilities built on the Halifax Infirmary site.

Overall, the total proposed parking supply for both Halifax Infirmary and Victoria General is 3,000 parking spaces (779 net new parking spaces required).

2.5 PARKING SUPPLY OPTIONS

Based on the parking supply projections, BA Group has come up with three potential parking supply options (two for the Willow Tree Concept, one for the Common Concept). All three options incorporate underground parking levels below the proposed Ambulatory Care Facility and In-patient/OR building.

2.5.1 Willow Tree Concept

The first option is based on the Willow Tree Concept and involves maintaining the Urban Garden site as surface parking and relocating the existing Halifax Infirmary parking structure to the Victoria General site. The net new parking supply over both sites would be 773 spaces for a total parking supply of 2,994 parking spaces over both sites. For parking supply diagrams please refer to **Figure 2**. It is also noteworthy that an alternative Willow Tree option was considered which would incorporate a parking structure on the Urban Garden site. For information please refer to our Superseded presentations in **Appendix I**.

2.5.2 Commons Concept

The third option is based on the Common Concept. The Halifax Infirmary parking structure would remain and Victoria General parking supply would be maintained. The net new parking supply over both sites would be roughly 790 spaces for a total parking supply of 2,986 parking spaces over both sites. For parking supply diagrams please refer to **Figure 3.**

TABLE 1 QEII PARKING SUPPLY OPTIONS

Parking Supply	Willow Tree Concept	Commons Concept
Existing parking supply on HI	1,302	1,302
Existing Parking supply on VG	919	919
Newly built parking on HI site	1,219	2,067
Newly built parking on VG site	1,775	919
Total Parking supply over both sites	**2,994**	**2,986**

11.1 Transportation (BA Group)

FIGURE 2: PARKING SUPPLY – WILLOW TREE CONCEPT

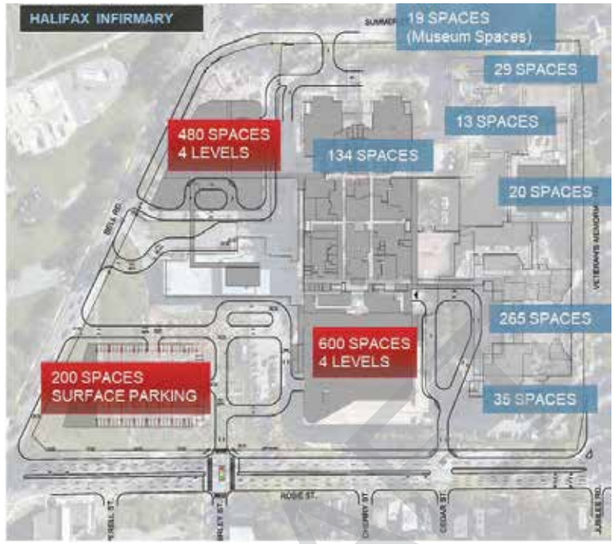
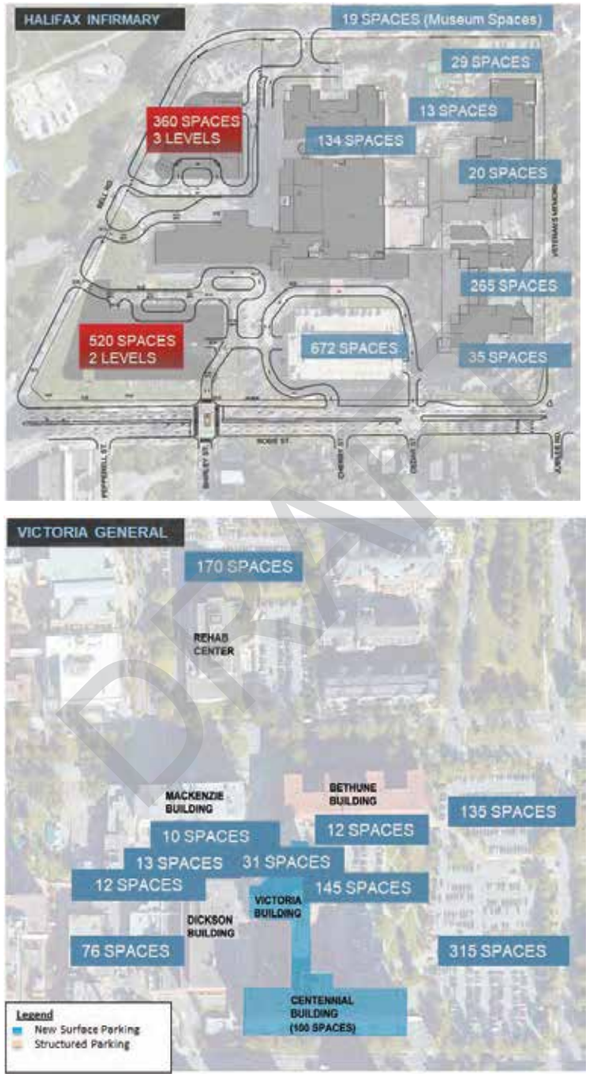


FIGURE 3: PARKING SUPPLY – COMMONS CONCEPT



2.6 INTERIM PARKING DEMAND

During the phases of the QEII Redevelopment, there will be interim parking requirements due to the demolition of existing parking. Below is a description of the shortfalls in parking supply for each concept. Please consider that concepts may be subject to additional shortfalls in parking supply due to staging and other aspects of construction.

For the Willow Tree Concept, there is an immediate gain of approximately 200 parking spaces once the Urban Garden surface lot is complete. The maximum total parking shortfall of 307 spaces over both sites occurs during the construction of new buildings on the Halifax Infirmary site. For a detailed breakdown of parking demand during each phase, please refer to **Appendix A**.

For the Commons Concept, there is will be a reduction of 90 parking spaces once demolition begins on the CBC site. There is also an additional loss of 25 spaces from the emergency lot during construction of the Ambulatory Care building. Therefore, the maximum shortfall off 115 spaces occurs during the construction of new buildings on the Halifax infirmary site. For a detailed breakdown of parking demand during each phase, please refer to **Appendix A**.

3.0 TRAFFIC CONSIDERATIONS

While the net increase in total programming space between the two Hospital sites is small, the amount of activity on the HI site will be increasing substantially. There is less off-site parking available surrounding the HI site compared to the VG site. Therefore, the net increase in traffic across the Halifax road network will be limited, but traffic impacts will occur locally adjacent to the proposed on-site parking.

BA Group has analyzed the site plan options produced by Kasian Architects and has come up a number of traffic considerations for the Halifax Infirmary Redevelopment. In order to accommodate the increase in traffic within the Halifax Infirmary site, additional accesses must be provided along Robie Street and Bell Road. To improve circulation within the site, BA Group has produced site plans for the Willow Tree and Common concepts.

3.1 WILLOW TREE CONCEPT

For the Willow Tree concept, a loop is proposed on the southern side of the IP/OR building which allows vehicles to use pick-up / drop-off and either exit onto Robie Street or access the underground parking facility. Providing a separate access to pick-up / drop-off on the southern portion of the In-Patient building alleviates traffic congestion near the emergency access. A loop to the north of the In-Patient building provides connection between the emergency entrance, In-Patient underground parking, and Urban Garden parking lot. This will provide vehicular connection between Robie Street and Bell Road.

3.2 COMMONS CONCEPT

For the Common concept, the existing access to the Halifax Infirmary Building will remain. An additional access will be provided from Robie Street south of the existing parking structure. This access will service the proposed Ambulatory Care Facility on the Urban Garden site. A loop to the north of the Ambulatory building provides connection between the emergency entrance and the Ambulatory building underground parking. This will provide vehicular connection between Robie Street and Bell Road. A pick-up / drop-off loop is proposed on the east side of the Ambulatory building. Access to underground parking and loading/servicing is proposed on the east side of the building.

3.3 CBC SITE CIRCULATION

The proposed site circulation for the CBC site is the same for both the Willow Tree and Common concepts. Access will be provided from Bell Road and from the existing access from Summer Street. A pick-up / drop-off loop is proposed on the west side of the site with a dedicated space for scheduled ambulance transfers. Access to underground parking and loading/servicing is proposed on the south side of the site. The existing Summer Street access will be inbound only and the internal roadway will be one way.

The site plans for both the Willow Tree and Common concepts are available in **Appendix B**.

3.4 TRAFFIC OPERATIONS – HOSPITAL IMPACT

The key intersection that must be taken under consideration is where Robie Street, Quinpool Road and Bell Road converge. The existing conditions show that this intersection is near capacity. An option that is being taken under consideration is to propose a traffic signal along Robie Street adjacent to the Halifax Infirmary site.

3.5 CITY POLICY CONSIDERATIONS

The City is focused on minimizing / reducing parking at the Hospital. Emphasis has been put on improving public transit and other non-automotive travel modes. So far, there have been no new vehicular street improvements proposed (e.g. street widenings) near the Hospital site.

11.1 Transportation (BA Group)

4.0 EMPLOYEE AND VISITOR SURVEY RESULTS

QEII staff conducted both electronic and paper based staff and visitor surveys at both the Halifax Infirmary site and the Victoria General sites to get a better understanding of the following transportation characteristics:

- Travel modes that staff and visitors take to the Hospital
- Whether staff and visitors are parking on-site or off-site
- Where staff live, relative to the Hospital sites
- What travel options other than driving are available to staff
- How many staff regularly travel between the Halifax Infirmary and Victoria General sites
- How to best incentivize staff to travel by alternative means

The Survey results confirmed a number of assumptions we made with respect to transportation considerations. The results revealed the following:

- A large portion of Hospital visitors drive to the Hospital and park on-site
- Roughly half (50%) of employees drive to work and a significant portion that drive parks off-site, either on-street or external parking lots

Employees were asked arrival and departure times in order to estimate duration of stay. The majority of employees are at the Hospital for 8 hours (69%) or 12 hours (9%) which is consistent with typical employee shifts.

Roughly 16% of Hospital employees travel to work using public transit, 9% walk to the Hospital, and 3 % ride their bike. Although, half of employees that drive to work say that they would consider a travel mode switch and out of those respondents, a large percentage said they would use public transit if there were more frequent transit routes.

Visitors respondents were asked to identify the purpose of their visit (i.e. in-patient, out-patient, visitor or other) and their mode of travel. Approximately 70% of survey respondents were out-patients followed by visitors accompanying individuals to their appointments (30%). Visitor respondents were asked to identify the mode of travel they used to arrive at the Hospital the day they filled out the survey. The results show that the private automobile was the predominant mode of travel amongst all patient and visitor survey respondents (82%) followed by car passengers (10%).

A more detailed summary of the transportation survey results are available in the report written by BA Group Entitled “Queen Elizabeth II Hospital Master Plan – Transportation Survey” in **Appendix C**..

APPENDIX A:
On-Site Parking Strategy

QEII Master Plan – On-Site Parking Strategy

Willow Tree Concept – Option 1

Phase	Duration	Description	HI + VG Sites (Combined)			HI Site Only			VG Site Only		
			Total Site Supply	Total Site Demand[1]	Total Site Surplus / Deficit	HI Site Supply	HI Site Demand[1]	HI Site Surplus / Deficit	VG Site Supply	VG Site Demand[1]	VG Site Surplus / Deficit
0		Existing parking supply	2,221	2,221	0	1,302	1,302	0	919	919	0
Pre HI Hospital Building Construction											
1	6 months	Add 200 temporary parking spaces to Urban Garden site	2,421	2,221	+200	1,502	1,302	+200	919	919	0
2	1 year	Remove 250 parking spaces from Victoria General site for construction of new parking structure	2,171	2,221	-50	1,502	1,302	+200	669	919	-250
3		Build new parking structure on Victoria General site	2,171	2,221	-50	1,502	1,302	+200	669	919	-250
4		New parking structure complete on Victoria General site (+550 spaces)	2,721	2,221	+500	1,502	1,302	+200	1,219	919	+300
5	4 months	Demolish existing parking structure on Halifax Infirmary site (-672 spaces)	2,049	2,221	-172	830	1,302	-472	1,219	919	+300
6	6 months	Demolish existing CBC building and leased parking spaces on CBC site (-90 spaces)	1,959	2,221	-262	740	1,302	-562	1,219	919	+300
HI Building Construction											
7	3-4 years	Provide laydown area / construction office at Urban Garden site (-20 spaces)	1,939	2,221	-282	720	1,302	-582	1,219	919	+300
8		Demolish emergency parking lot for construction of new Inpatient building (-25 spaces)	1,914	2,221	-307	695	1,302	-607	1,219	919	+300
9		Start construction on In-Patient and Ambulatory Buildings	1,914	2,221	-307	695	1,302	-607	1,219	919	+300
10		HI In-Patient and Ambulatory Buildings completed (+1,080 spaces)	2,994	2,221	+773	1,775	1,302	+473	1,219	919	+300
Post HI Building Construction											
11		Relocate facilities from VG to HI	2,994	3,000	-6	1,775	2,550	-775	1,219	450	+769

Consider shuttle bus service from HI to VG and/or closer off-site parking opportunities [2]
Consider shuttle bus service from VG to HI and/or closer off-site parking opportunities [2]
Consider providing additional parking off-site for any total combined site deficit of over 50 spaces, in addition to a shuttle bus service
Comprehensive permanent shuttle bus operation between HI and VG and/or closer off-site parking is required [2].

1. The existing informal parking demand that is occurring in the immediate site environs of HI and VG is assumed to be to be maintained and is estimated as 300 spaces for HI and 500 spaces for VG (800 total).
2. The staff component of the target parking supply could be reduced at the VG site during construction and at completion by way of improved public transit, TDM and Hospital policy directives. This would reduce the number of staff that needs to be shuttled between the VG and HI sites in the current concept.

11.1 Transportation (BA Group)

BA Group

QEII Master Plan – On-Site Parking Strategy

Commons Concept

Phase	Duration	Description	HI + VG Sites (Combined)			HI Site Only			VG Site Only		
			Total Site Supply	Total Site Demand[1]	Total Site Surplus / Deficit	HI Site Supply	HI Site Demand[1]	HI Site Surplus / Deficit	VG Site Supply	VG Site Demand[1]	VG Site Surplus / Deficit
0		Existing parking supply	2,221	2,221	0	1,302	1,302	0	919	919	0
Pre HI Hospital Building Construction											
1	6 months	Demolish existing CBC building and leased parking spaces on CBC site (-90 spaces)	2,131	2,221	-90	1,212	1,302	-90	919	919	0
HI Building Construction											
2	3-4 years	Demolish emergency parking lot for construction of new Ambulatory building (-25 spaces)	2,106	2,221	-115	1,187	1,302	-115	919	919	0
3		Start construction on In-Patient and Ambulatory Buildings	2,106	2,221	-115	1,187	1,302	-115	919	919	0
4		HI In-Patient and Ambulatory Buildings completed (+880 spaces)	2,986	2,221	+765	2,067	1,302	+765	919	919	0
Post HI Building Construction											
5		Relocate facilities from VG to HI	2,986	3,000	-14	2,067	2,550	-483	919	450	+469

Consider providing the deficient parking off-site for any total combined site deficit over 50 spaces

Comprehensive shuttle bus operation between HI and VG and/or closer off-site parking is required [2].

1. The existing informal parking demand that is occurring in the immediate site environs of HI and VG is assumed to be to be maintained and is estimated as 300 spaces for HI and 500 spaces for VG (800 total).
2. The staff component of the target parking supply could be reduced at the VG site during construction and at completion by way of improved public transit, TDM and Hospital policy directives. This would reduce the number of staff that needs to be shuttled between the VG and HI sites in the current concept.

BA Group

APPENDIX B:

TRANSPORTATION CONSIDERATIONS

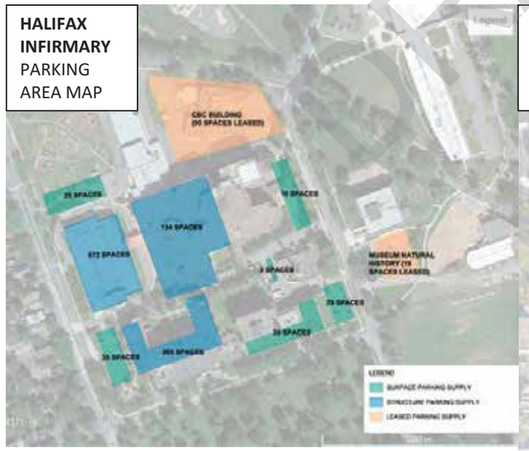
BA Consulting Group Ltd.

February 12, 2018

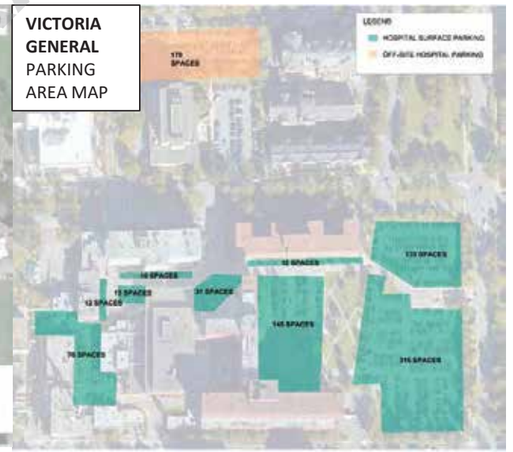
Parking – Existing Conditions

1. On-site parking supply at HI and VG lower than at typical Hospital
2. Staff and to a lesser extent visitor parking is being accommodated formally and informally off-site
3. The availability of parking on-site and the need to rely upon parking off-site is a long standing issue at both HI and VG

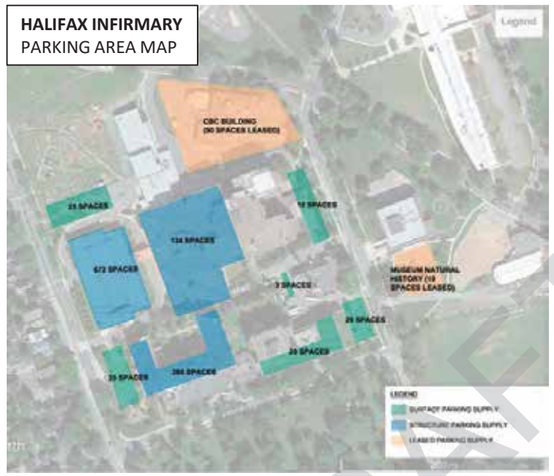
HALIFAX INFIRMARY PARKING AREA MAP



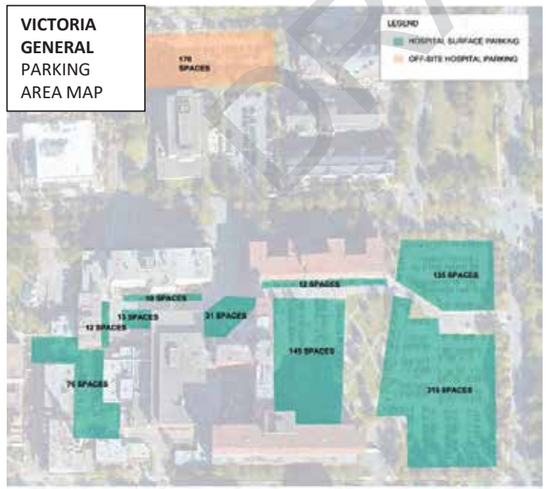
VICTORIA GENERAL PARKING AREA MAP



Existing Parking Supply

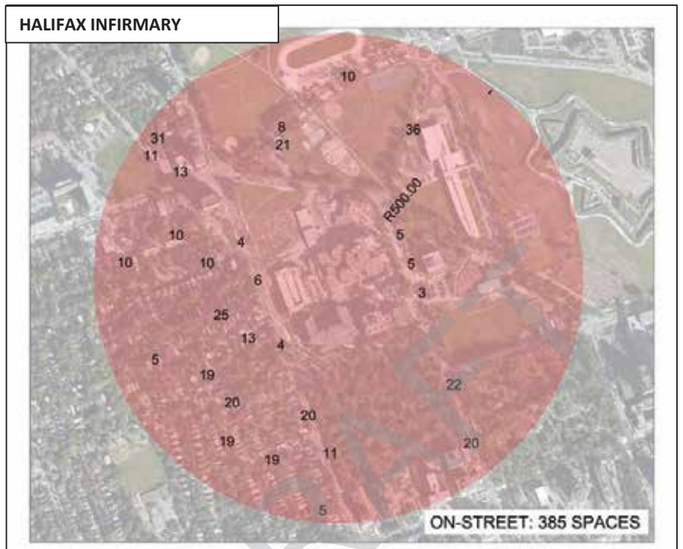


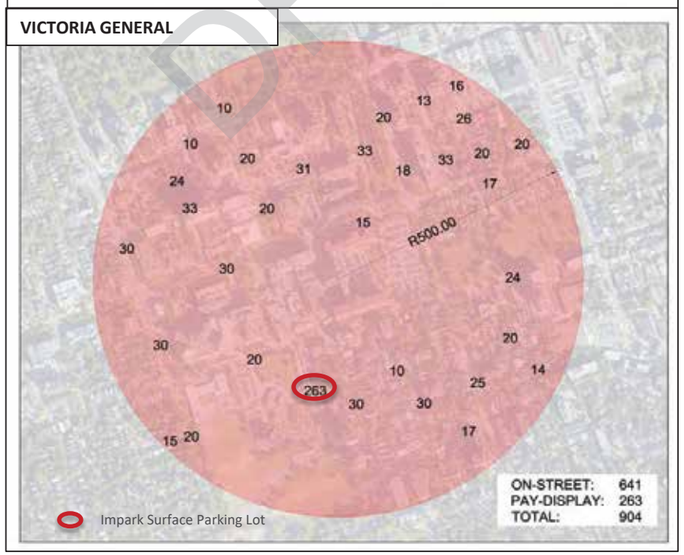
Existing HI Parking Supply
On-Site Parking Supply:
1,193 spaces
Leased Supply:
109 spaces
Total Supply:
1,302 spaces



Existing VG Parking Supply
On-Site Parking Supply:
749 spaces
Off-Site Supply:
170 spaces
Total Supply:
919 spaces

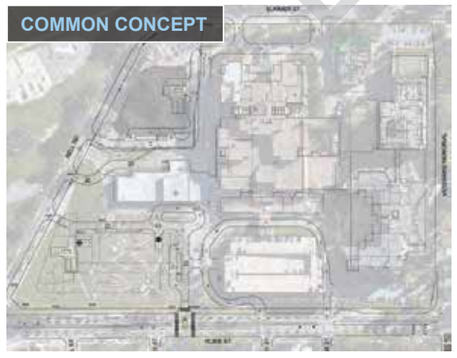
QEII: Estimated Area Public Parking

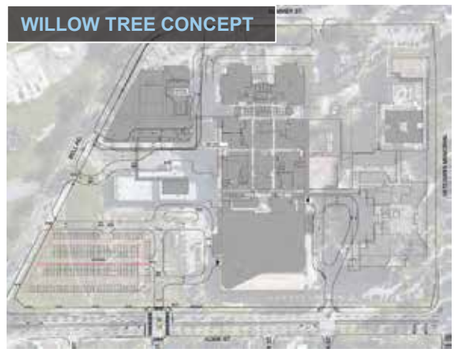




Key Changes in Floor Areas (DGSF)

- Net New Ambulatory and In-patient across both HI & VG sites: 125,735 sq ft (11,681 sm)
- HI significantly increasing in size – 65%
- VG significantly reducing in size – 45%
- General growth in Hospital visits and staff anticipated on HI site
- New standards for size of
- In-patient building – more floor area for the same activity level





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Traffic Operations – Hospital Impact

1. Function of the number of new parking spaces provided across the two sites
2. Key Intersection: Bell Street / Robie Street at / near capacity

Off-site Improvements:

3. Consider traffic signal on Robie Street and related works
4. Potential improvements along Bell / Summer Streets

City Policy Considerations:

- Policy Focus is on minimizing / reducing parking at the Hospital
- Emphasis on improved public transit – non-auto travel
- No new vehicular street improvements (e.g. street widenings)

- Distance between sites: 1.1km
- 15 minute walk
- 5 minute drive

6

Parking Supply Principles

The Hospital has determined the following parking principals:

1. The Priority for on-site parking at the Halifax Infirmary is to serve the needs of our patients and families

2. Parking resources at both the HI and VG sites will be optimally utilized. Access between site will be supported by a shuttle service

3. Off-site (street) parking will continue to be utilized, in compliance with city by-laws

4. Additional off-site parking resources will be required on an interim basis

5. Parking and transportation solutions will safeguard staff safety and security at all times

Parking Supply Options

1. Maintain the garden site at HI for surface parking (Willow Tree Concept)

   - Up to 1,630 new structured parking spaces

2. Maintain the existing parking structure (Commons Concept)

   - Up to 880 structured parking spaces

- Shuttle bus required for both options (between VG and HI)

- On-site parking supply on HI/VG may be reduced if existing off-site parking at VG can be utilized

Parking Supply Strategy

Find balance between on-site and off-site parking

- Provide optimum parking supply on the HI site
- Provide residual parking supply on the VG site
- Maintain but do not increase off-site parking
- Minimize the need for new structured parking on both sites

Note: The net new DGFA for both HI and VG is **11,681 square metres**. Considering both sites as one consolidated system reduces the need for net new parking.

New Hospital Ambulatory Building Examples

1. Jim Patterson Outpatient Care and Day Surgery (Surrey, BC)

- 175,000 DGSF (16,258sm)
- 672 parking spaces
- 3.5 spaces per 100 sm
- 40% visitor / 60% staff
- 15% transit use out of all trips to Hospital

New Hospital Ambulatory Building Examples

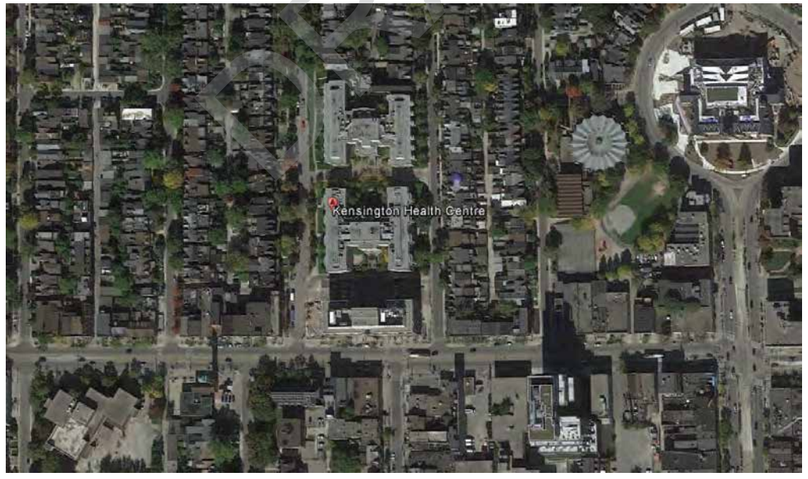
2. Kaye Clinic (Edmonton, AB)

- 390,00 DGSF (36,232 sm)
- 900 parking spaces
- 2.5 spaces per 100 sm
- 35% transit use out of all trips to Hospital

New Hospital Ambulatory Building Examples

3. Kensington Health Centre (Toronto, Ontario)

- 105,055 DGSF (9,760sm)
- 225 parking spaces
- 2.5 per 100 sm
- 50% transit use out of all trips to Hospital



Site Plan Objective

Objectives

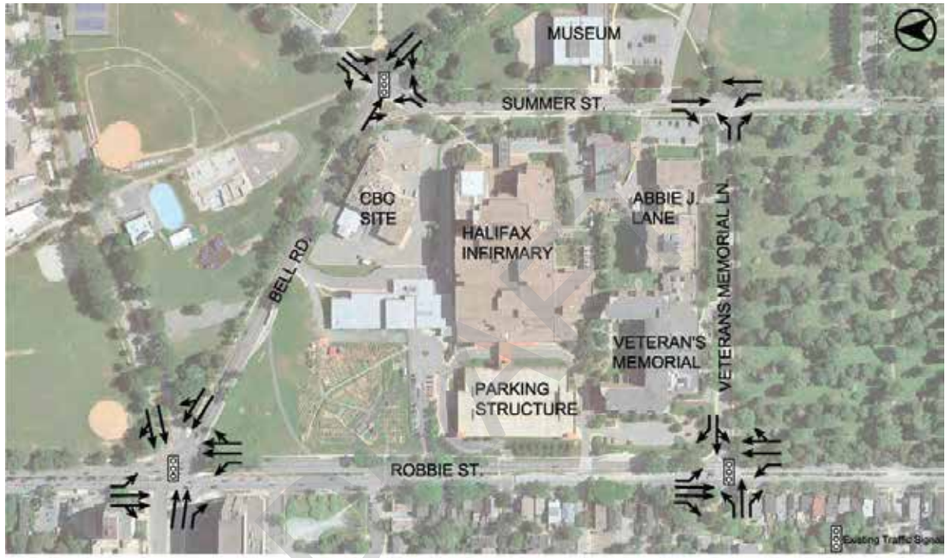
- Improve Site Access & Capacity
- Provide the best possible Internal Circulation
- Provide Appropriate Drop-Off Facilities
- Improve and/or Minimize Impact on Emergency Walk-In Entrance
- Provide Separate Ambulance Entry from Bell Street
- Provide Parking Supply Opportunities

Transportation Survey Conclusions

Factors confirmed by survey results

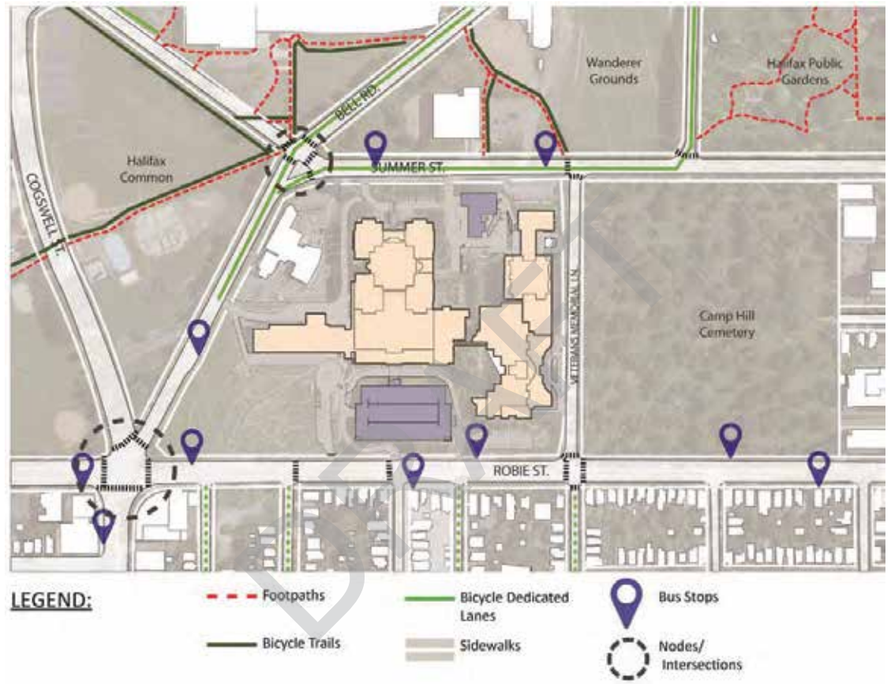
- Large portion of Hospital visitors park on-site
- Roughly half of Hospital employees drive to work
- Approximately 60% of Hospital employees who drive to work, park off-site
- Majority of Hospital employees work regular 8 hour days (9am to 5pm)
- Approximately 50% of Hospital employees would consider alternative modes of travel

Traffic Control



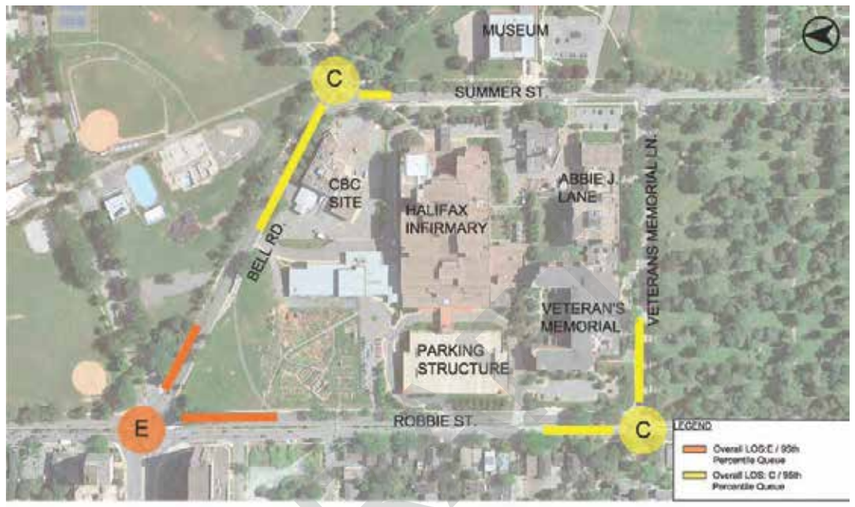
LANE CONFIGURATION

Bus Stops



- At least 12 bus routes with stops along Robie Street, Bell Road, and Summer Street

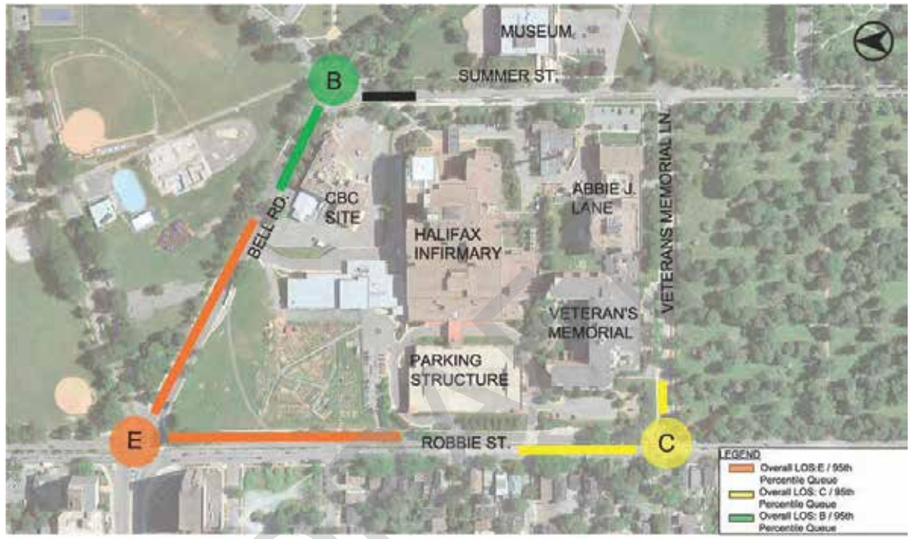
Level of Traffic Service



LEVEL OF SERVICE / 95th PERCENTILE QUEUE (AM)

- Weekday Morning Street Peak Hour (7:45 – 8:45)

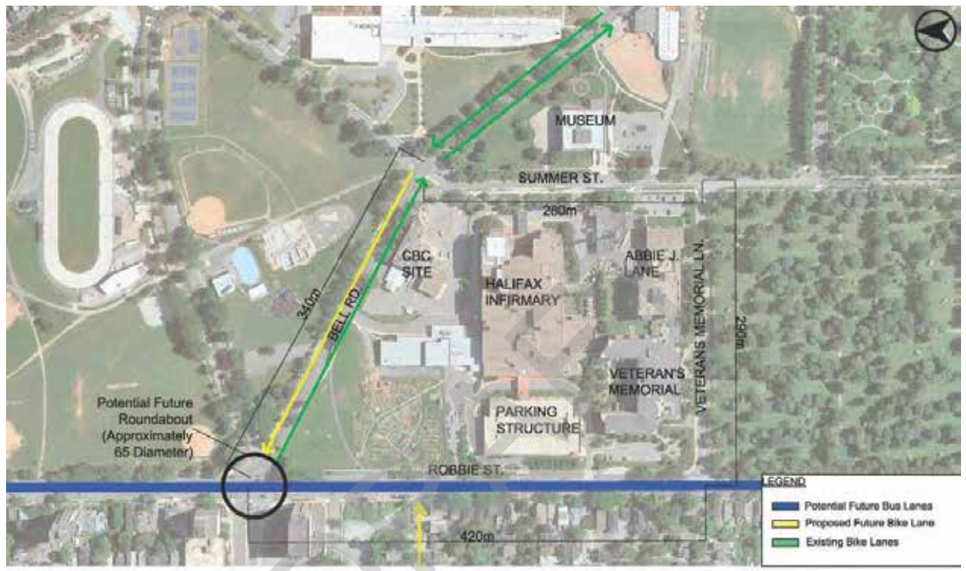
Level of Service



LEVEL OF SERVICE / 95th PERCENTILE QUEUE (PM)

- Weekday Afternoon Street Peak Hour (4:00- 5:00)

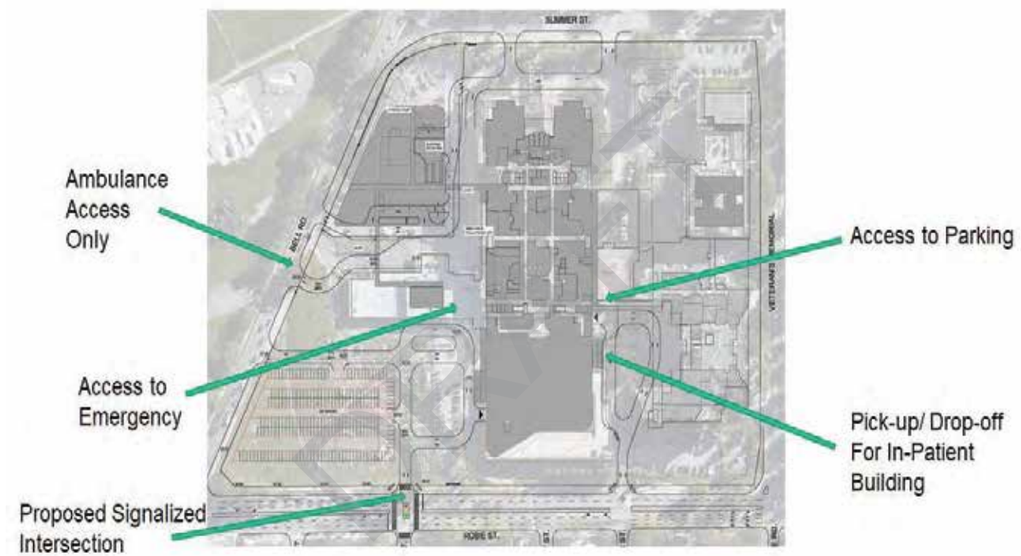
Future Bike Lanes and Bus Lanes



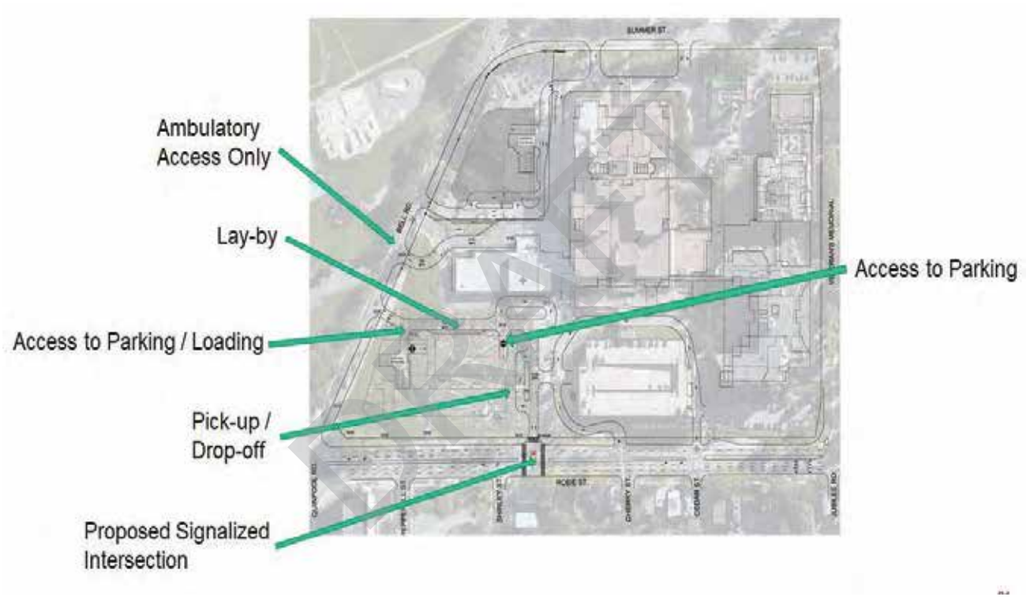
EXISTING - FUTURE BIKE LANES / FUTURE BUS LANES

- North Side of Bell
- Street may be widened with implication on R.O.W.

Site Circulation – Willowtree Concept



Site Circulation – Common Concept



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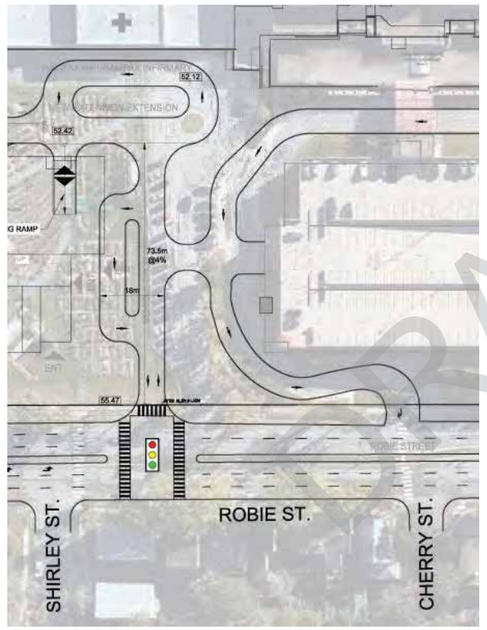
Site Circulation – Robie Street Access Options

OPTION A



OPTION B

42

Site Circulation – CBC Site

COMMUNITY OUTPATIENT CENTRE


COC Department Gross Area_COC_TOTAL

Type Image	Categories	Department Name	Area (sf)
	Administration	Administrative and Support Services	11334.4 SF
			11334.4 SF
	Ambulatory Care	Rehabilitation	10298.3 SF
	Ambulatory Care	Mental Health and Wellness	13434.4 SF
	Ambulatory Care	Medical Surgical Clinics	19310.5 SF
	Ambulatory Care	Family Practice and Urgent Care	8851.1 SF
	Ambulatory Care	Dialysis/Renal Services	13124.5 SF
			84998.8 SF
	Diagnostic Imaging	Diagnostic Services	7239.5 SF
			7239.5 SF
	Public	Public Space	9872.5 SF
	Public	Public	3031.5 SF
			12904.0 SF
	Retail	Retail	433.9 SF
			433.9 SF
	Support Services	WC	3360.1 SF
	Support Services	M + E	5231.3 SF
			8591.5 SF
Total			104932.1 SF

- 101,603 sq.ft (9,439sm) DGSF
- 5 spaces per 100 sm
- Parking demand: 472 spaces

Existing Parking Supply Ratios

HOSPITAL		NUMBER OF SPACES	PARKING RATIO (DGSF)[12]
Halifax Infirmary	Existing HI Parking Supply (including off-site leased parking)	1,302 spaces	1.4 spaces per 100 sm
	Estimated On-Street HI Parking Supply (within 500 metres)[3]	300 spaces	0.3 spaces per 100 sm
	Total Parking Supply (on and off-site)	1,602 spaces	1.8 spaces per 100 sm
Victoria General	Existing VG Parking Supply	919 spaces	0.9 spaces per 100 sm
	Estimated On-Street VG Parking Supply (within 500 metres)[3]	500 spaces	0.5 spaces per 100 sm
	Total Parking Supply (on and off-site)	1,419 spaces	1.4 spaces per 100 sm
QEII Total	Existing Parking Supply	2,221 spaces	1.16 spaces per 100 sm
	Estimated On-Street Parking Supply (within 500 metres)	800 spaces	0.42 spaces per 100 sm
	Total Parking Supply (on and off-site)	3,021 spaces	1.6 spaces per 100 sm

NOTES:
1. The existing Halifax Infirmary DGSF (90,090 m²) was provided by Kasian Architecture on July 13, 2017.
2. The existing Victoria General DGSF (100,934 m²) excludes the NS Rehab building and was provided by Kasian Architecture on July 13, 2017.
3. On-street parking related to the hospital was estimated based on the available supply within a 500 m radius

Parking Supply Projections – HI

HI	PARKING RATIO ON-SITE PER 100SM DGSF	# OF SPACES	STAFF	VISITORS
EXISTING (90,091 sm)	1.4 per 100 sm	1,300	550 (40%)	750 (60%)
NEW AMBULATORY (25,247 sm)	3.0 per 100 sm	750	450 (60%)	300 (40%)
NEW INPATIENT (33,196 sm)	1.5 per 100 sm	500	300 (60%)	200 (40%)
TOTAL: 148,524 sm	1.7 per 100 sm	2,550	1,300 (50%)	1,250 (50%)
NET NEW: 58,4443 sm	2.1 per 100 sm	1,250	750 (55%)	500 (45%)

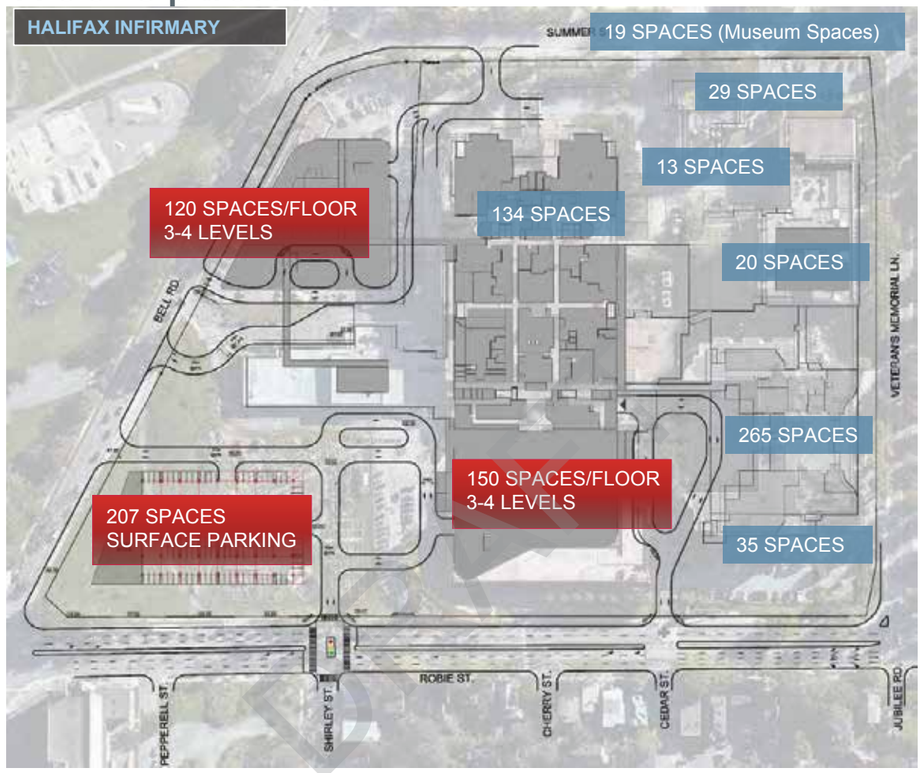
Parking Supply Projections – VG

VG	PARKING RATIO ON-SITE PER 100 SM DGSF	# OF SPACES	STAFF	VISITORS
EXISTING (100,934 sm)	0.9 per100 sm	900	300 (35%)	600 (65%)
REDUCED AMBULATORY (-19,755 sm)	1.0 per 100 sm	-225	-75 (30%)	-150 (70%)
REDUCED INPATIENT (-27,003sm)	0.8 per100 sm	-225	-125 (60%)	-100 (40%)
TOTAL: (54,176 sm)	0.8 per 100 sm	450	100 (15%)	350 (85%)
NET NEW: (46,758 sm)	1.0 per 100	-450	-225 (50%)	-225 (50%)

Parking Supply Projections – HI, VG & Combined

HI	PARKING RATIO ON-SITE PER 100 SM DGSF	# OF SPACES	STAFF	VISITORS
TOTAL: 148,524 sm	1.7 per 100 sm	2,550	1,300 (50%)	1,250 (50%)
NET NEW: 58,4443 sm	2.1 per 100 sm	1,250	750 (55%)	500 (45%)
VG	**PARKING RATIO ON-SITE PER 100 SM DGSF**	**# OF SPACES**	**STAFF**	**VISITORS**
NET NEW: 58,4443 sm	2.1 per 100 sm	1,250	750 (55%)	500 (45%)
NET NEW: (46,758 sm)	1.0 per 100	-450	-225 (50%)	-225 (50%)
COMBINED	**PARKING RATIO ON-SITE PER 100 SM DGSF**	**# OF SPACES**	**STAFF**	**VISITORS**
TOTAL: (202,706)	1.48 per 100 sm	3,000	1,400	1,600
NET NEW: (11,681)	6.8 per 100 sm	800	525	275

Potential Parking Supply – Willow Tree Option A



NEW PARKING SUPPLY

Ambulatory Building UG:	360 - 480
In-Patient Building UG:	450 - 600
Surface Parking:	207
New Constructed Parking:	**1,017 – 1,287**

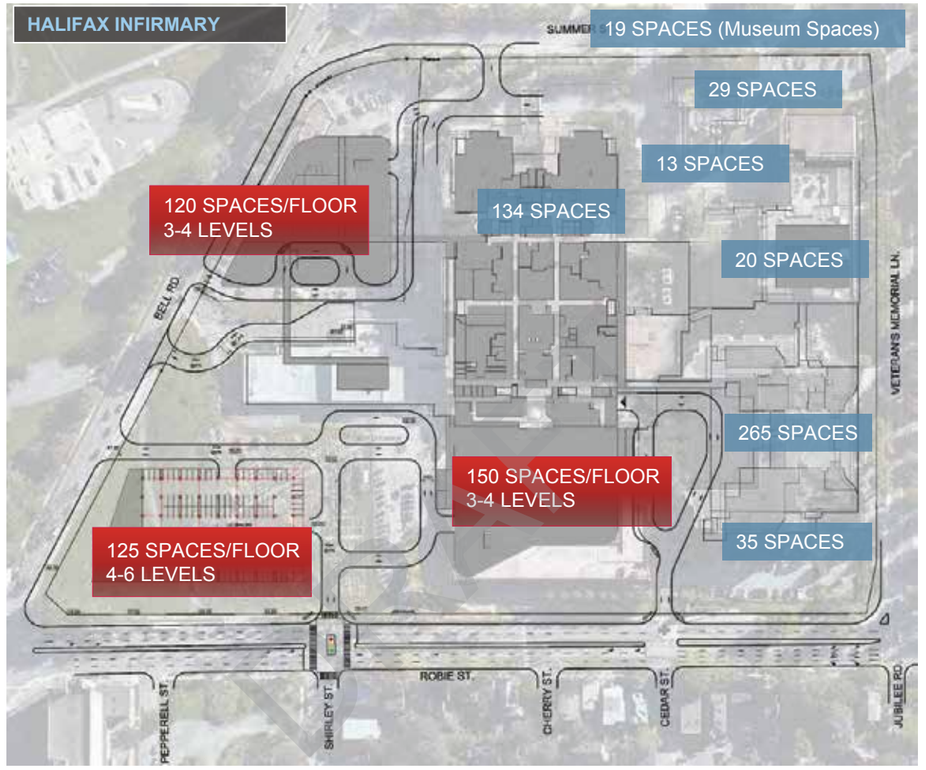
Existing Parking Remaining: 515

Total On-Site:
1,532 – 1,802 spaces

Existing Parking:
1,302 spaces

Net New HI Parking: 230 - 500

Potential Parking Supply – Willow Tree Option B



NEW PARKING SUPPLY

Ambulatory Building UG:	360 - 480
In-Patient Building UG:	450 - 600
Parking Structure:	500 – 750
New Constructed Parking:	**1,310 – 1,830**

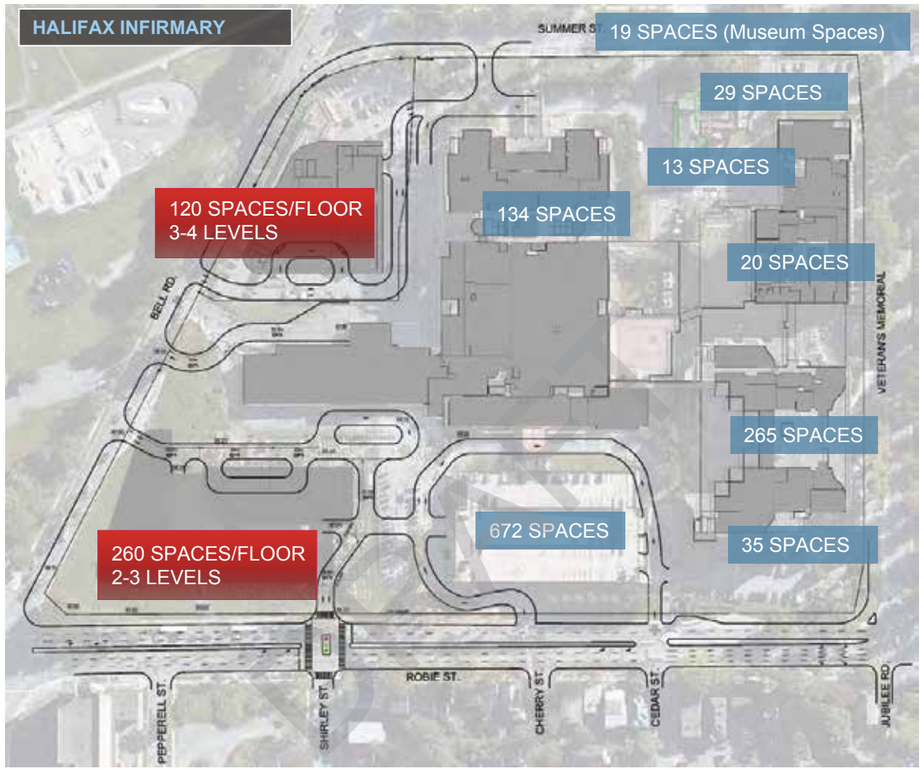
Existing Parking Remaining: 515

Total On-Site:
1,825 – 2,350

Existing Parking:
1,300

Net New HI Parking:
523 – 1,048

Potential Parking Supply – Commons Concept



NEW PARKING SUPPLY	
In-Patient Building UG:	360 - 480
Ambulatory Building UG:	520 – 780
New Constructed Parking:	**880 – 1,260**

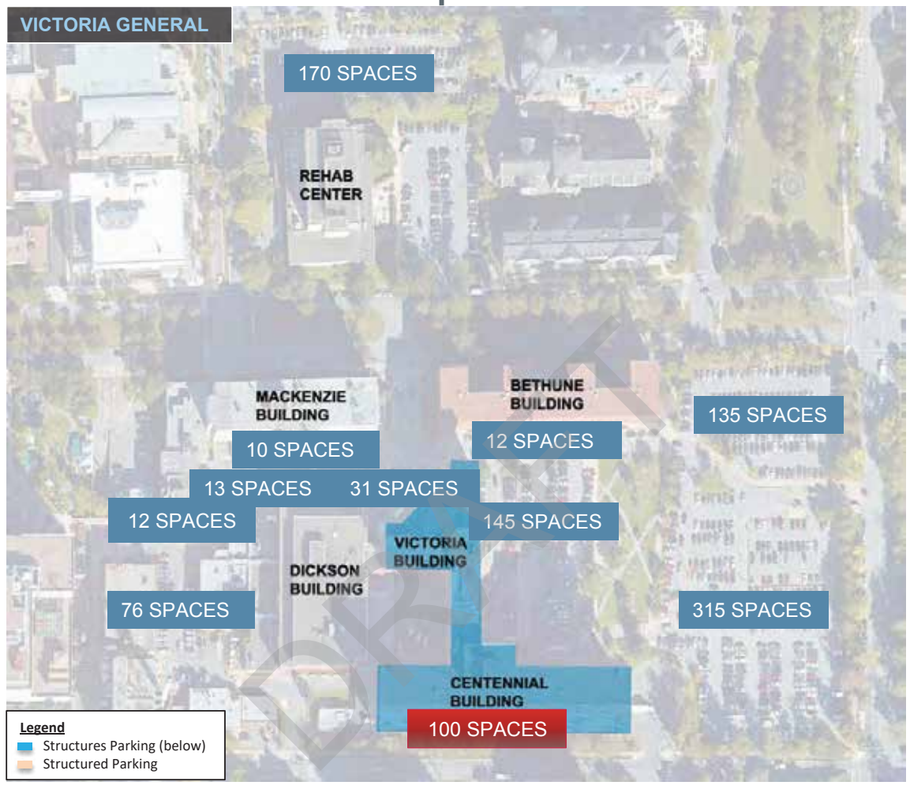
Existing Parking Remaining: 1,187 spaces

Total On-Site:
2,067 – 2,447

Existing Parking:
1,300

Net New HI Parking:
765 – 1,145

Potential Parking Supply – Victoria General Option A



NEW PARKING SUPPLY	
New Surface Parking:	100 spaces
New Constructed Parking:	**100 spaces**

Existing Parking To Remain: 919 spaces

Total On-Site:
1,019 spaces

Net New VG Parking:
100 spaces

Parking Demand on VG:
450 spaces

Surplus Parking :
619 spaces

Potential Parking Supply – Victoria General Option B

NEW PARKING SUPPLY

Parking Structure: 672 spaces

New Constructed Parking: 672 spaces

Existing Parking To Remain: 704 spaces

Total On-Site:
1,376 spaces

Net New VG Parking:
457 spaces

Parking Demand for VG:
450 spaces

Surplus Parking :
876 spaces

Two (2) Parking Location Options

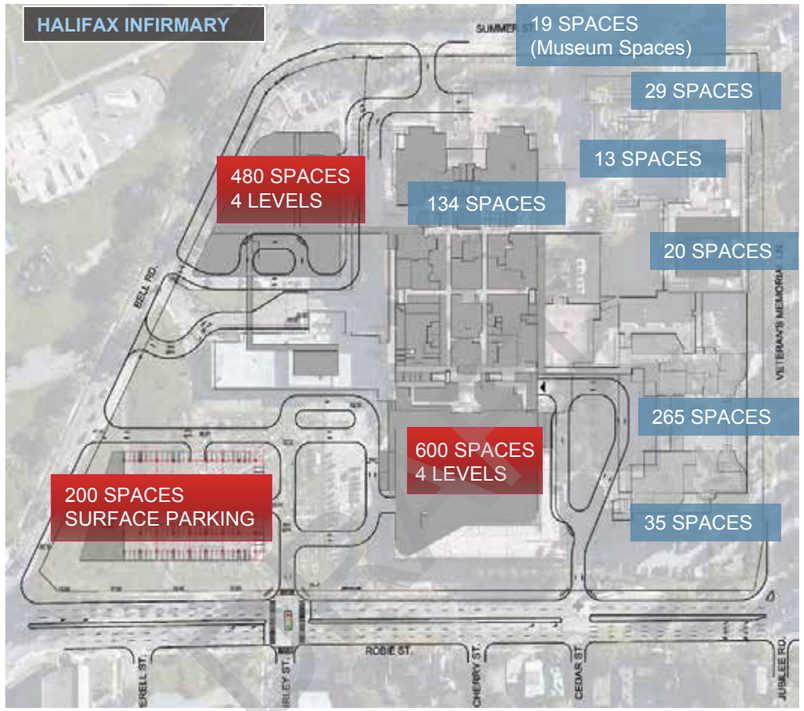
1. Willow Tree Concept - Maintain the Garden Site at HI

- New Parking Structure at VG

2. Commons Concept - Maintain existing Parking Structure at HI

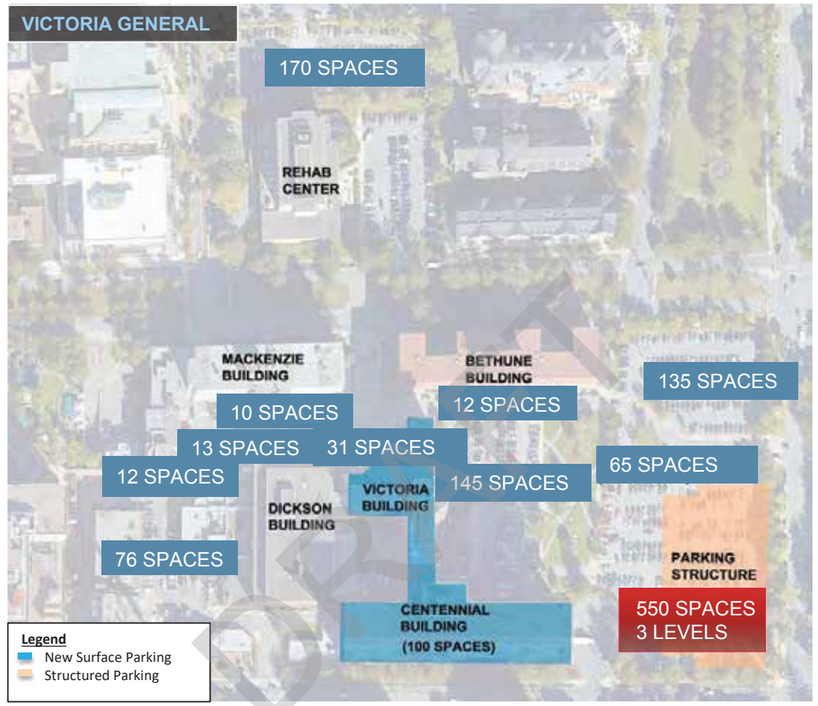
- Use existing Surface Parking at VG

Willow Tree Concept



	HI	VG	TOTAL
Existing Parking:	1,302	919	2,221
Lost Parking:	807	250	1,057
New Parking:	1,280	550	1,830
Net New Parking:	473	300	773
Total Parking:	**1,775**	**1,219**	**2,994**

Willow Tree Concept



	HI	VG	TOTAL
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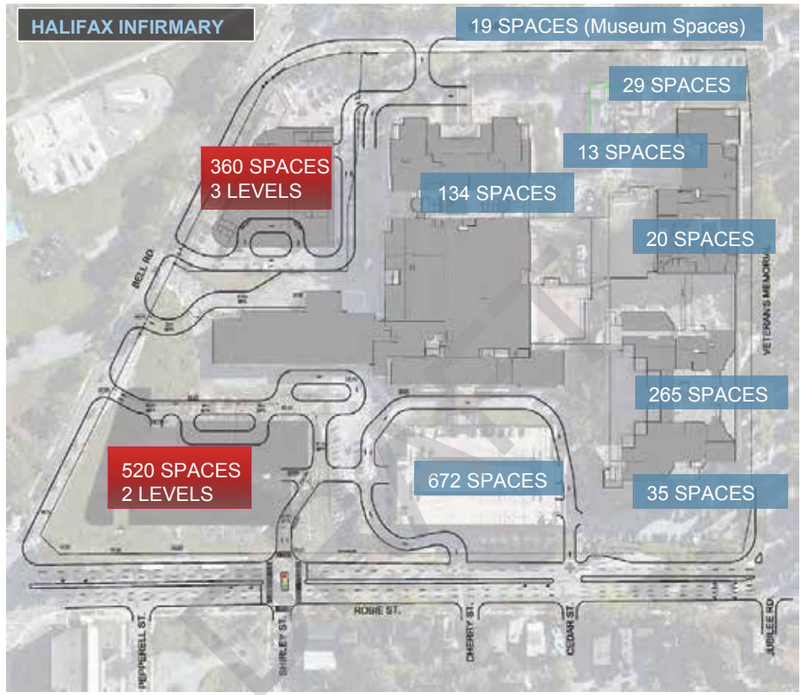
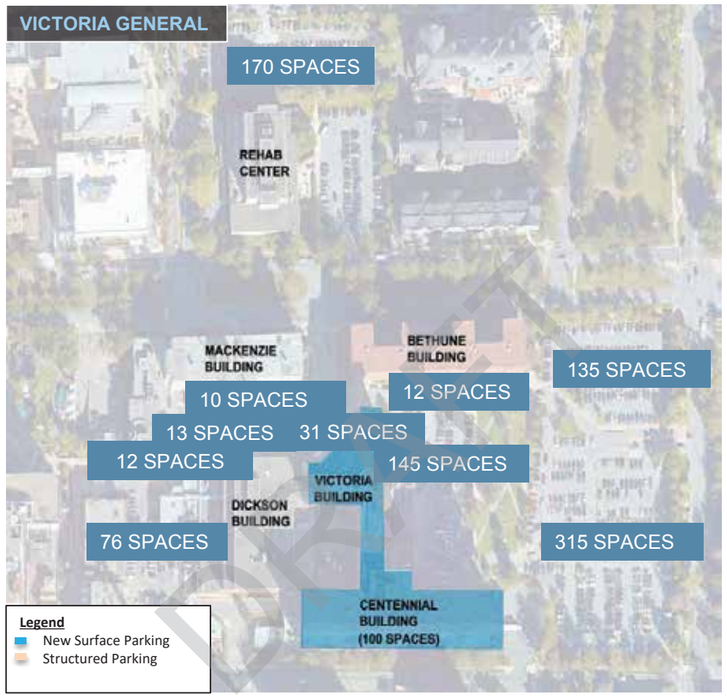
Total Parking:	**1,775**	**1,219**	**2,994**

Commons Concept



	HI	VG	TOTAL
Existing Parking:	1,302	919	2,221
Lost Parking:	115	0	115
New Parking:	880	0	880
Net New Parking:	765	0	765
Total Parking:	**2,067**	**919**	**2,986**

Commons Concept



	HI	VG	TOTAL
Existing Parking:	1,302	919	2,221
Lost Parking:	115	0	115
New Parking:	880	0	880
Net New Parking:	765	0	765
Total Parking:	**2,067**	**919**	**2,986**

DRAFT

11
Transportation

BA Group

QUEEN ELIZABETH II HOSPITAL MASTER PLAN

Transportation Survey

Prepared For: QEII Hospital, Halifax, Nova Scotia

February 12, 2018

APPENDIX C:
Transportation Survey Summary

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Toronto, ON M4V 1K9
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kasian

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QUEEN ELIZABETH II HOSPITAL TRANSPORTATION STUDY
February 12, 2018 7832-01
P:\78\32\01\Report\Survey Summary\QEII Parking Report-FEB12-2018-DRAFT6.docx

11.1 Transportation (BA Group)

1.0 INTRODUCTION

BA Group is retained by Kasian Architects to assist with the urban transportation elements of the Master Program for the QEII Hospital. This report summarizes the results of a transportation survey of visitors and staff conducted by the Hospital from November 7th to 9th, 2017. The survey was distributed to Hospital employees on both sites; Halifax Infirmary site (bounded by Robie Street to the west, Veteran's Memorial Lane to the south, Summer Street to the east, and Bell Road to the north) and Victoria General Site (bounded by IWK Children's Hospital to the west, South Street to the south, South Park Street to the east, and University Avenue to the north). The site context is provided in **Figure 1**.

QEII staff conducted both electronic and paper based staff and visitor surveys at both the Halifax Infirmary site and the Victoria General sites to get a better understanding of the following transportation characteristics:

- Travel modes that staff and visitors take to the Hospital
- Whether staff and visitors are parking on-site or off-site
- Where staff live, relative to the Hospital sites
- What travel options other than driving are available to staff
- How many staff regularly travel between the Halifax Infirmary and Victoria General sites
- How to best incentivize staff to travel by alternative means

A summary of key findings is provided in the body of the report. The employee and visitor surveys are provided in **Appendix D** and **Appendix E**, respectively. Summary tables of the employee and visitor responses are also provided in the in **Appendix F** and **Appendix G.**

Distance Between Sites: 1.1km
15 minute walk
5 minute drive

Date Plotted: February 7, 2018 Filename: P:\78\32\01\Graphics\Fig01-00-SC.dwg

SITE CONTEXT

BA Group

Queen Elizabeth II Health Sciences Centre (QEII)
7832-01 February, 2018

Figure 1

2.0 EMPLOYEE TRAVEL CHARACTERISTICS

The employee survey was performed to better understand existing employee travel characteristics. The questionnaire was administered electronically, as well as paper based to Hospital employees (staff, physicians, volunteers and students) on both Hospital campuses. The staff surveys were sent out via email on November 7th and concluded on November 9th, 2017. Employees were asked a series of questions related to their existing mode of travel to QEII, and what factors would encourage carpooling, transit, cycling or walking. A copy of the survey questionnaire form is included in **Appendix A**.

2.1.1 Response Rate

A total of 1,808 respondents completed the survey. It is estimated that 23 percent of all Hospital employees responded to the survey. A breakdown of responses based on position and type of employment is summarized in **Table 1**.

TABLE 1 QEII EMPLOYEE SURVEY RESPONSE RATE

	Full-Time		Part-Time		Casual		Total	
Physician	69	89%	6	8%	2	3%	**77**	**100%**
Staff	1,543	90%	123	7%	48	3%	**1,714**	**100%**
Student	15	88%	2	12%	0	0%	**17**	**100%**
Total Responses	**1,627**	**90%**	**131**	**7%**	**50**	**3%**	**1,808**	**100%**

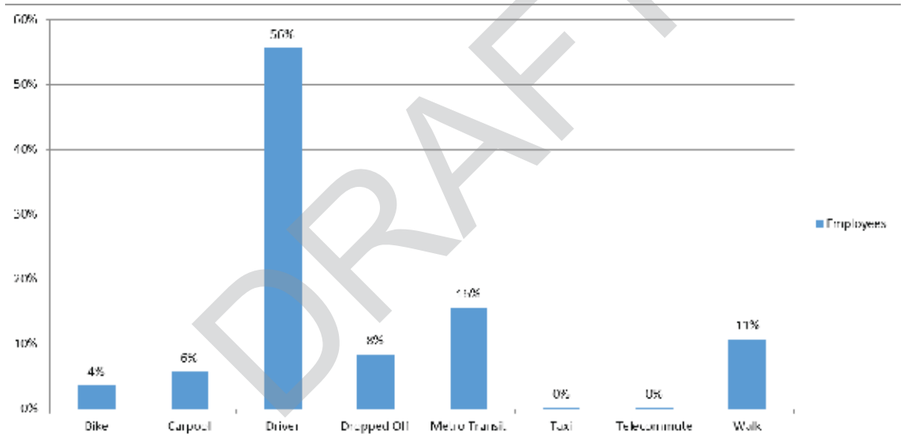
2.1.2 Mode of Travel

Survey respondents were asked to identify the mode of travel used to get to QEII on the survey dates and other primary modes of travel they typically use. Of the 1,808 survey respondents, 1,005 indicated that they drove to work (56%) while the remaining 803 respondents indicated that they were either a car passenger, took public transit, carpooled, walked or cycled. Survey results are summarized in **Table 2** and **Figure 2**.

TABLE 2 EMPLOYEE MODE OF TRAVEL SURVEY RESULTS

	Staff		Physician		Student		Total	
Car Driver	961	53%	41	3%	3	0%	**1,005**	**56%**
Car Passenger	148	8%	2	0%	1	0%	**151**	**8%**
Public Transit	278	16%	2	0%	2	0%	**282**	**16%**
Carpool	101	6%	3	0%	0	0%	**104**	**6%**
Walk	164	9%	22	1%	8	1%	**194**	**11%**
Bicycle	55	3%	7	1%	3	0%	**65**	**4%**
Total	1,707		77		17		**1,801**	**100%**

FIGURE 2 EMPLOYEE MODE OF TRAVEL SURVEY RESULTS

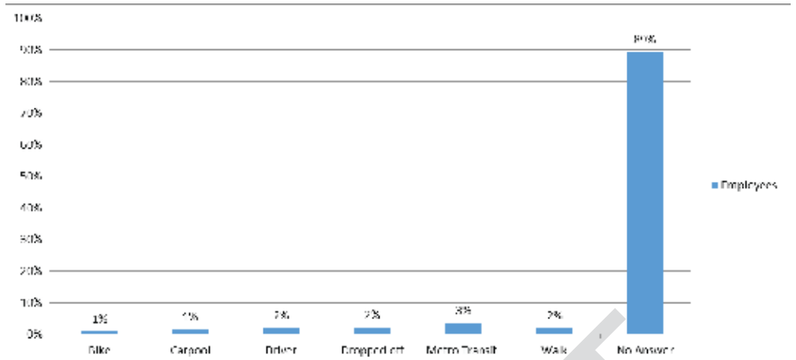


2.1.3 Other Primary Mode

Employees were asked to state their primary mode of travel, if they used an alternative mode of travel the day they filled out the survey. Out of the total completed surveys, 89% of employees had no answer for this question, meaning the majority of employees used their primary mode of travel to get to work throughout the duration of the survey (November 7th to 9th, 2017). The summary of other modes of travel is provided in **Figure 3**.

11.1 Transportation (BA Group)

FIGURE 3 OTHER MODE OF TRAVEL SURVEY RESULTS



2.1.4 Duration of Stay

Employees were asked arrival and departure times in order to estimate duration of stay. The majority of employees are at the Hospital for 8 hours (69%) or 12 hours (9%) which is consistent with typical employee shifts.

2.1.5 Parking Location

Hospital employees were asked to state where they park, if they drive to work. Survey results are provided in **Table 3** and **Table 4**.

TABLE 3 PARKING LOCATIONS – HALIFAX INFIRMARY SITE

Position	HI and VG	HI Parking Garage	HI Surface Parking	HI Underground Parking Lot	On-site Subtotal	On-Street	Rental Off-Site	Off-site Subtotal
Physician	3	6	0	12	21	0	0	0
Staff	1	74	36	48	159	183	111	294
Student	0	1	0	0	1	0	0	0
Total	**4**	**81**	**36**	**60**	**181**	**183**	**111**	**294**
Percent	**0%**	**17%**	**8%**	**13%**	**38%**	**39%**	**23%**	**62%**

As shown in **Table 3**, 39% of employees working at Halifax Infirmary are parking on-street in the neighborhoods surrounding the Halifax Infirmary site and 23% are paying for parking on external private lots.

TABLE 4 PARKING LOCATIONS – VICTORIA GENERAL SITE

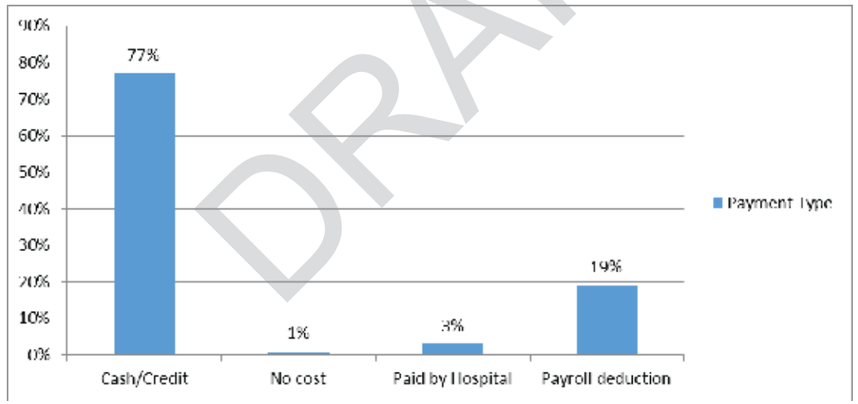
Position	HI and VG	HI Site	VG Parking Lot	Neighborhood On-Street	Rental Off-Site	Other
Physician	6	0	15	1	0	0
Staff	5	8	122	147	291	2
Student	0	0	0	1	0	1
Total	**11**	**8**	**137**	**149**	**291**	**3**
%	**2%**	**1%**	**23%**	**25%**	**49%**	**0%**

As shown in **Table 4**, 25% of employees working at Victoria General are parking on-street in the neighborhoods surrounding the Victoria General site and 49% are paying for parking on external private lots

2.1.6 Payment of Parking

Employees were asked to state the method of payment they used if they parked on either of the hospital sites. The results are provided in **Figure 4**.

FIGURE 4 PAYMENT OF PARKING



2.1.7 Employee Reason For Driving

Twenty-seven percent of the Hospital employee survey respondents who drove to work indicated convenience as their main motivation for driving and 28% indicated needing their vehicle for personal activities. Only 7% of employee survey respondents indicated that they drive because they live too far away from the Hospital. A summary is provided in **Figure 5**.