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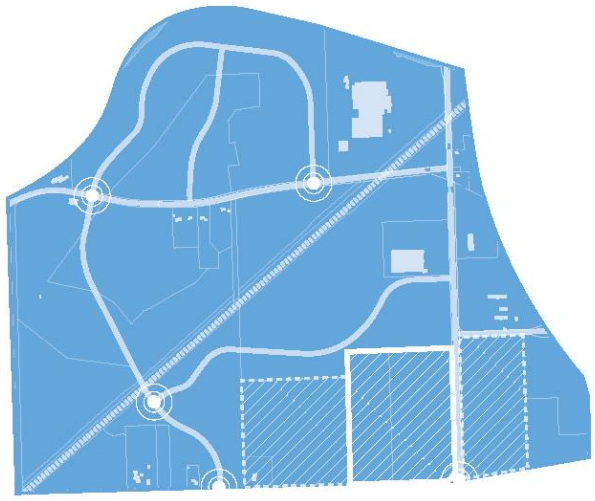

Niagara Health
South Niagara Hospital
Campus Plan Report
November 2019

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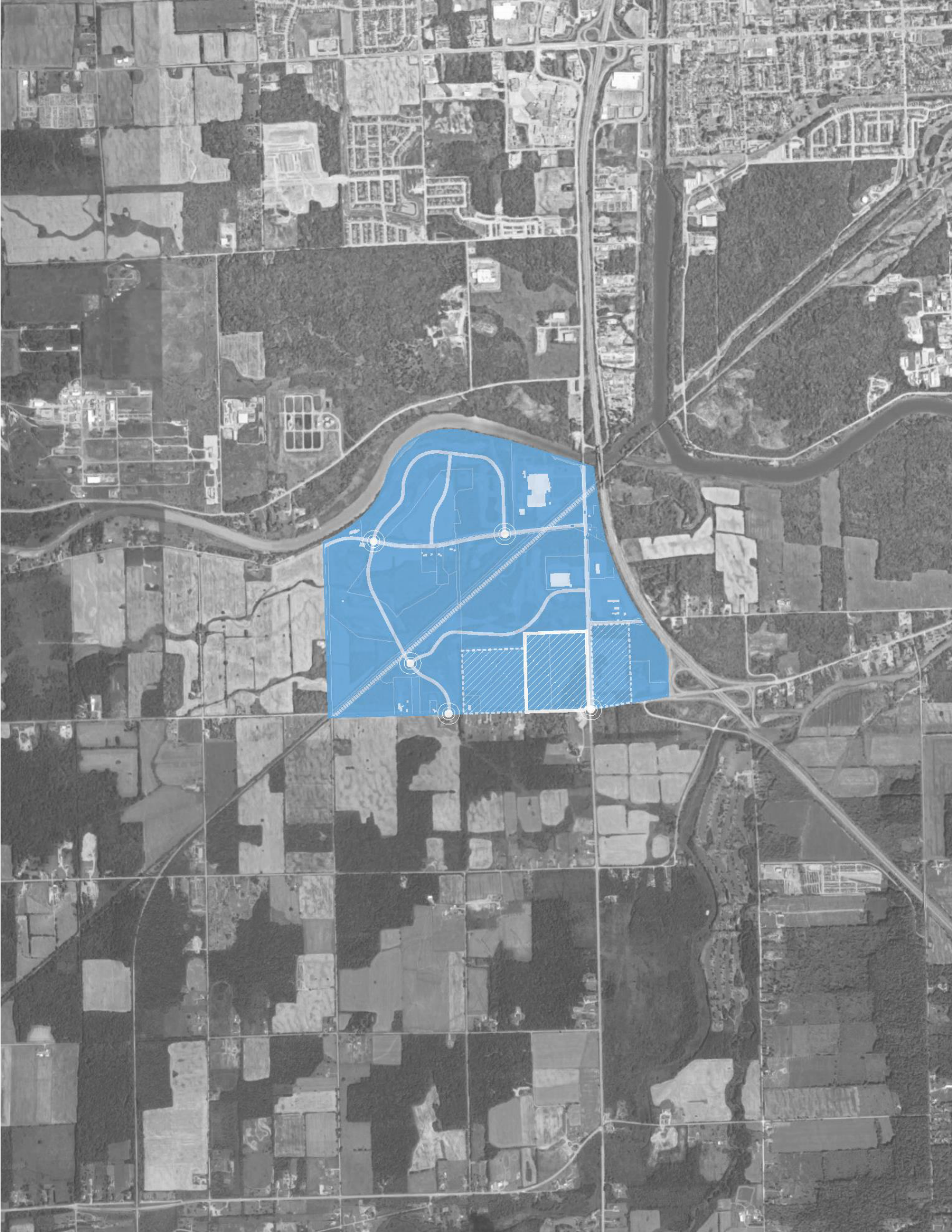
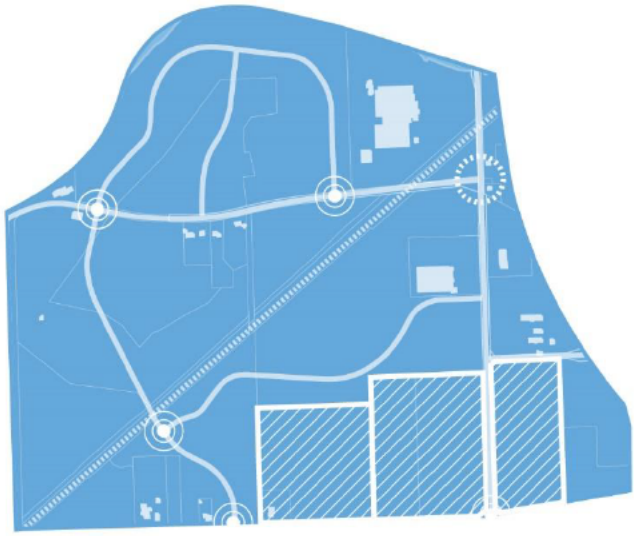




FOREWORD

Executive Summary

A New Campus for Niagara Health

NIAGARA HEALTH

Niagara Health is the Niagara Region's primary health care provider, providing up to 90% of all acute health services in the region. In partnership with other regional health services, Niagara Health also provides post-acute services including Complex Care, Long Term Care and Long Term Mental Health Services.

Niagara Health is developing a greenfield site for the construction of a new hospital campus. The future South Niagara Hospital (SNH) will improve health services in the Niagara Region by concentrating expertise and services in a single and centralized health care campus. The proposed SNH program will provide care in a partnered geriatric medical and mental health model and will consolidate complex care beds and services currently dispersed across four other sites in the Niagara Health network.

CAMPUS PLAN REPORT

Niagara Health achieved significant milestones in the capital planning for SNH in 2019, specifically with the recent SNH Stage 2 submission to the Ministry of Health and Long Term Care (MOHLTC). In the period between Stages 2 and 3, however, Niagara Health has sought to increase certainty in the overall site development strategies being proposed. To that end, Niagara Health commissioned Stantec and BA Group (the Project Team) to produce a Campus Plan Report and additional Blocking and Stacking studies of the SNH site.

The Campus Plan Report is intended to help guide the campus design direction, project procurement, implementation and operations planning of SNH, prior to the next stages of the MOHLTC and City of Niagara planning processes. The report establishes a framework for the SNH site design, construction and facilities management requirements, in a manner that will be suitable for incorporation into a future Project Specific Outcome Specification (PSOS). The PSOS document will set out the comprehensive technical requirements for the design and construction of the new SNH, within the Project Agreement (PA). The PA will govern the obligations of the entity selected (Project Co.) to Design-Build-Finance-Maintain the new facility, pursuant to Infrastructure Ontario's Public-Private Partnership (P3) procurement model.

The Project Team recognizes that the Campus Plan Report scope of work is not typically afforded in the Ministry's Capital Planning process. As this report precedes Stage 3, Block Schematics (or Schematic Design) and PSOS, it presents an opportunity to validate, augment, and/or challenge the recommendations of the Stage 1 and 2 planning, with appreciation that the Stage 1B concept plans may well be integrated with the clinical and support services planning parameters defined in the Stage 1A Master Program and revised Stage 2B Functional Program.

CAMPUS PLAN OBJECTIVES

The following were primary objectives of the Campus Plan Report process:

- To engage with various project stakeholders for information gathering and feedback: Niagara Health users; Niagara Health leadership; City of Niagara (the "City"); Niagara Region (the "Region"); Niagara Peninsula Conservation Authority (NPCA); and utilities providers;
- To review the existing conditions and critique the Master Plan submitted to MOHLTC in March 2019, including both the Site Plan and the Blocking & Stacking diagrams;
- To study and develop significantly different Site Plan options, to ensure all options have been considered, and to propose evaluation criteria and design guidelines for the selection of a preferred option and to inform the next stage of the project.

The process was structured into three phases in alignment with the above objectives: Phase 1 Understanding, for information gathering from May – June 2019; Phase 2 Analysis, for development of Campus Plan strategies and Blocking & Stacking from July – August 2019; and Phase 3 Synthesis, for determination of preferred Campus Plan strategy and development of guidelines from September – October 2019.

CAMPUS PLAN ENGAGEMENT

The following authorities were engaged during meetings and directly by the project team to inform/confirm the current report information and to review the campus planning options for their feedback and guidance:

- City of Niagara Falls
  - Business Development
  - Planning Building and Development
  - Municipal Works Engineering
  - Transportation Engineering
  - Fire Department
- Niagara Region
  - Planning & Development

    - Public Works (Transportation)
    - Public Works (Waterways, Water Services)
    - Inter Municipal Transit
- Niagara Peninsula Conservation Authority (NPCA)
- Utility Companies
    - Bell Canada / Telus/ Cogeco Cable Solutions / Niagara Regional Broadband Network
    - Enbridge
    - Niagara Peninsula Energy Inc.

Regular meetings / presentations ensured that all stakeholders had the opportunity to actively participate in the design process in each phase, and were conducted as follows:

May 21 – City/Region/NPCA/Utility Co. interviews

May 29 – Niagara Health Staff interviews and lessons learned from SCS site planning

June 11 (half day) – Workshop: Opportunities and Constraints

June 24 – Inter Municipal Transit Consultation

June 26 – Workshop: Blocking & Stacking Principles 1

July 09 – Workshop: Blocking and Stacking Principles 2

July 09 – Workshop: Outdoor Therapeutic Spaces

July 18 (half day) – Workshop: Opportunities and Constraints

August 12 – Workshop: Blocking and Stacking Options Analysis

August 23 – Workshop: Design Charrette

September 05 – City / Region / Utility Co.: Off-site Infrastructure Early Works

September 11 – Niagara Health Leadership review and endorsement

October 16 – Niagara Health / City / Region / Utility Co.: Campus Planning final presentation

PREFERRED CAMPUS PLAN

Following an iterative design process, two strategies for development of building form or massing emerged as viable solutions for the SNH site, in addition to and as a further development of the one submitted to the MOHLTC in Stages 1 and 2.

The Horizontal Strategy stacks the Inpatient Unit (IPU) programs in an 8 storey + penthouse building connected horizontally to a 3 storey main Diagnostic and Treatment (D&T) block. The D&T block has two parts that can be distinctly expressed in volume and architectural treatment: one volume housing the Emergency, Diagnostic Imaging and Surgical departments, and one volume containing Ambulatory Care functions.

The Vertical Strategy places the Inpatient Unit floors above a 3 storey D&T podium. Multiple elevator cores would be required to provide important and dedicated clinical connections. This strategy offers the most compact ground floorplate, allowing the maximum surface parking accommodation, as well as potential for allied development.

The Vertical Strategy emerged from the planning process as the preferred and recommended direction to be pursued in further development of the overall campus and building design. This recommendation was made in consideration of the Vision and Key Design Drivers established by Niagara Health, the Evaluation Criteria developed by the Project Team to reflect this Vision, and the site planning, transportation, and blocking and stacking studies conducted by the team.

The numerous advantages of the Vertical Strategy direction and any challenges that need to be addressed are discussed in Chapter 7 Preferred Campus Plan.

NEXT STEPS

This report is intended to help in the continuous refinement of the vision for the SNH campus. In the next project stages, it is also intended to inform the development of the PSOS. As such, the document frames the components of the project vision in clear, easy to follow statements and includes, where appropriate, performance metrics to assist with the evaluation of competing proponent designs in the DBFM procurement process. The document is also structured to organically extract enforceable PSOS statements that will bring specificity to the Stage 3 work.

Structure of this Report

This report is organized into four parts – Part 1 Understanding, Part 2 Analysis, Part 3 Synthesis and Part 4 Appendices. These parts are sequenced in the order of the previously described project milestones that defined the process. It is also the intent that each part of this report be handed off to be integrated into the Output Specifications and RFP documents developed for the Stage 3 MOHLTC submission, as follows:

> **Part 1 Understanding**: Background, Research and Appendices will inform the Background Documentation of the RFP.
>
> **Part 2 Analysis:** Opportunities and Constraints will inform the design of the campus, and Evaluation Criteria will be developed into the site related criteria for the DBFM proponents' evaluation, as part of the RFP Schedules.
>
> **Part 3 Synthesis:** Design Guidelines and Performance Metrics will inform the development of the Output Specifications Part 1 design requirements related to site, as well as Implementation, Approvals, Phasing and Off-site Infrastructure Early Works requirements.
>
> **Part 4 Appendices:** In addition to Part 1, Appendices will inform the Background Documentation of the RFP.

The full consultant team was involved in all investigations contributing to this report. All contributing consultant reports and associated background reporting are appended to this document. Excerpts are included in the body of this report as needed.

PART 1 UNDERSTANDING

Part 1 establishes the background of the project and is supplemented with research of best practices, trends and lessons learned. This research forms the basis of Part 2 Analysis.

Part 1 includes a detailed review of site context and project relevant background materials including:

- Niagara Health Strategic Needs and Vision
- Draft Project Design Vision and Guiding Principles
- Site Studies and Reports
- Grand Niagara Secondary Plan
- City and Region's Urban Design Guidelines

- Summary of findings from Information Gathering Sessions, to inform the campus plan by listening to key stakeholders' initial assessment of the opportunities and constraints for the project.
- Lessons learned from the various stakeholders' groups and from the extensive experience of the project team.

PART 2 ANALYSIS

Based on the understanding of the accumulated information set out above and the Niagara Health Vision, Part 2 studies the site-specific opportunities and constraints that will potentially influence the outcome of the SNH campus development. Part 2 includes the development of Evaluation Criteria for the selection of a preferred alternative. It is intended that the evaluation criteria set out in this report will also work as an analysis tool for future phases of the project. Also included are:

- A preliminary servicing study confirming services availability and capacities
- A transportation reporting documenting any required infrastructure improvements
- Opportunities and constraints organized by the themes of the Planning Vision and Guiding Principles developed for the Campus Plan.
- Performance-based evaluation criteria

PART 3 SYNTHESIS

Part 3 includes a review/critique of the Master Plan of Stage 1B and Block Diagrams of Stage 2B, prepared in conjunction with the Functional Program. Alternative campus strategies are presented, and a preferred option is identified and selected, based on the application of the Part 2 Evaluation Criteria. Also, included in Part 3 are design guidelines, performance metrics, land development approvals and Off-site Infrastructure Early Works implementation strategy.

PART 4 APPENDICES

Part 4 includes background documents, project presentations and Campus Plan drawings.

Abbreviations

AFP	Alternative Financing and Procurement
CCC	Complex Continuing Care
CAPE	Canadian Association of Healthcare Professionals
CBRN	Chemical, Biological, Radiological and Nuclear Defense
CPTED	Crime Prevention Through Environmental Design
DBFM	Design, Build, Finance and Maintain
DI	Diagnostics & Imaging
DT	Diagnostics & Treatment
EA	Environmental Assessment
ED	Emergency Department
EIS	Environmental Impact Study
EMS	Emergency Medical Services
EPA	Environmental Protection Area
EV	Electric Vehicle
ICAT	Information Communication and Automation Technology
ICU	Intensive Care Unit
IO	Infrastructure Ontario
IPU	Inpatient Unit
LEED	Leadership in Environmental Design

LTC	Long Term Care
MOB	Medical Office Building
MOHLTC	Ontario Ministry of Health and Long-Term Care
NH	Niagara Health
NPCA	Niagara Peninsula Conservation Authority
NPEI	Niagara Power Energy Inc.
OPA	Official Plan Amendment
PDC	Planning, Design and Compliance
P3	Public-Private Partnership
PA	Project Agreement
PSOS	Project Specific Output Specifications
SCS	St Catharines Site
SNH	South Niagara Hospital
SPS	Sanitary Pumping Station
SWM	Stormwater Management
TDM	Transportation Demand Management
QEW	Queen Elizabeth Way

UNDERSTANDING

01

1 Project Context

1.1 Regional Context

1.1.1 THE REGION OF NIAGARA

Geography

The site of the new South Niagara Hospital is located within the City of Niagara Falls, in the Region of Niagara. The region contains the municipalities of City of Niagara Falls, Town of Fort Erie, Town of Grimsby, Town of Lincoln, Town of Niagara-on-the-Lake, Town of Pelham, City of Port Colborne, City of St. Catharines, City of Thorold, Township of Wainfleet, City of Welland and the Township of West Lincoln.

The Region of Niagara is located on the Niagara Peninsula. Situated between Lake Ontario and Lake Erie, the Niagara Peninsula occupies the southernmost tip of the Province of Ontario, along the Canada-US border, and is an important gateway between the two countries. Niagara Falls, the Niagara River, the Welland River and the Welland Canal are all important natural features of the area and make up part of the Great Lakes Waterways and St. Lawrence Seaway networks.

Economy

Tourism and associated service industries account for one third of employment in the Niagara Region. The sights and entertainments of Niagara Falls attract large numbers of tourists, while the Niagara Peninsula is remarkable for its local climate, which is ideally suited to the cultivation of vineyards and orchards. Winemaking is therefore an important agriculture and tourism industry for the region. The area is home to dozens of wineries offering tours and tastings, and ice wine is a local specialty and global export.

The next strongest sectors in the region are manufacturing and finance.

The development of a new hospital employment campus could support economic growth in the health and social sciences sectors in the region, as it will offer enhanced employment and entrepreneurial opportunities in these fields.

Demographics

The Region of Niagara has an existing population of 445,000 people. The Region has the second oldest Ontario population by percentage of age and by census division. Twenty percent of the population is over the age of 65, compared to the Ontario average of 15 percent. Critically, the number of senior Niagara residents 65+ is expected to further increase by 35 percent over the next 10 years.

The Region's general population growth rate is behind that of the rest of the province. Within the next ten years, the Region expects a population growth of 4 percent, while the current expected provincial average is 11 percent. It is anticipated, however, that the arrival in Niagara of the expanded GO Train network will push population growth to be on par with the provincial average.

1.1.2 REGIONAL AUTHORITIES

Niagara Peninsula Conservation Authority (NPCA)

The Niagara Peninsula Conservation Authority (NPCA) is a regional conservation authority. The NPCA oversees the Niagara Peninsula watershed, an area that covers the Niagara Region and portions of the City of Hamilton and Haldimand County. A watershed is an area of land, defined by its geology, that catches precipitation and drains it into marshes, streams, rivers, lakes or groundwater.

The NPCA's services include regulating development near watercourses and other natural features, providing programs designed to further the conservation, restoration, development and management of natural resources within its jurisdiction, and providing comment to municipalities on the suitability of planning applications occurring within its jurisdiction. The NPCA may recommend conditions for development or improvement based on Ontario Regulation 155/06: Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses.

1.2 Policy Context

1.2.1 SITE LOCATION

The South Niagara Hospital site was selected for its central position within the Niagara Region and the Niagara Health network, as well as for the site's proximity to the QEW highway. Location and driving distance are illustrated in Figures 1.2.1-1 and 1.2.1-2.

The chosen site lies within the municipality of the City of Niagara Falls. This Campus Plan Report was consequently prepared within the existing planning and policy context of municipality. The policy and planning documents listed here are discussed in the following sections:

- Grand Niagara Secondary Plan
- Grand Niagara Secondary Plan Urban Design Guidelines
- City of Niagara Falls Zoning By-Law

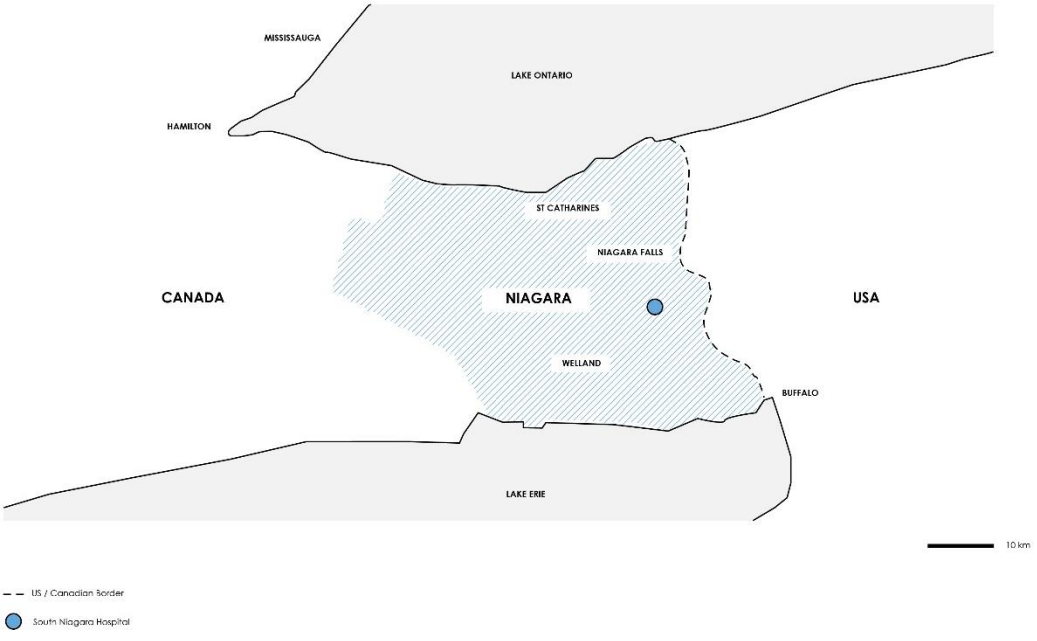


Figure 1.2.1-1: The Region of Niagara

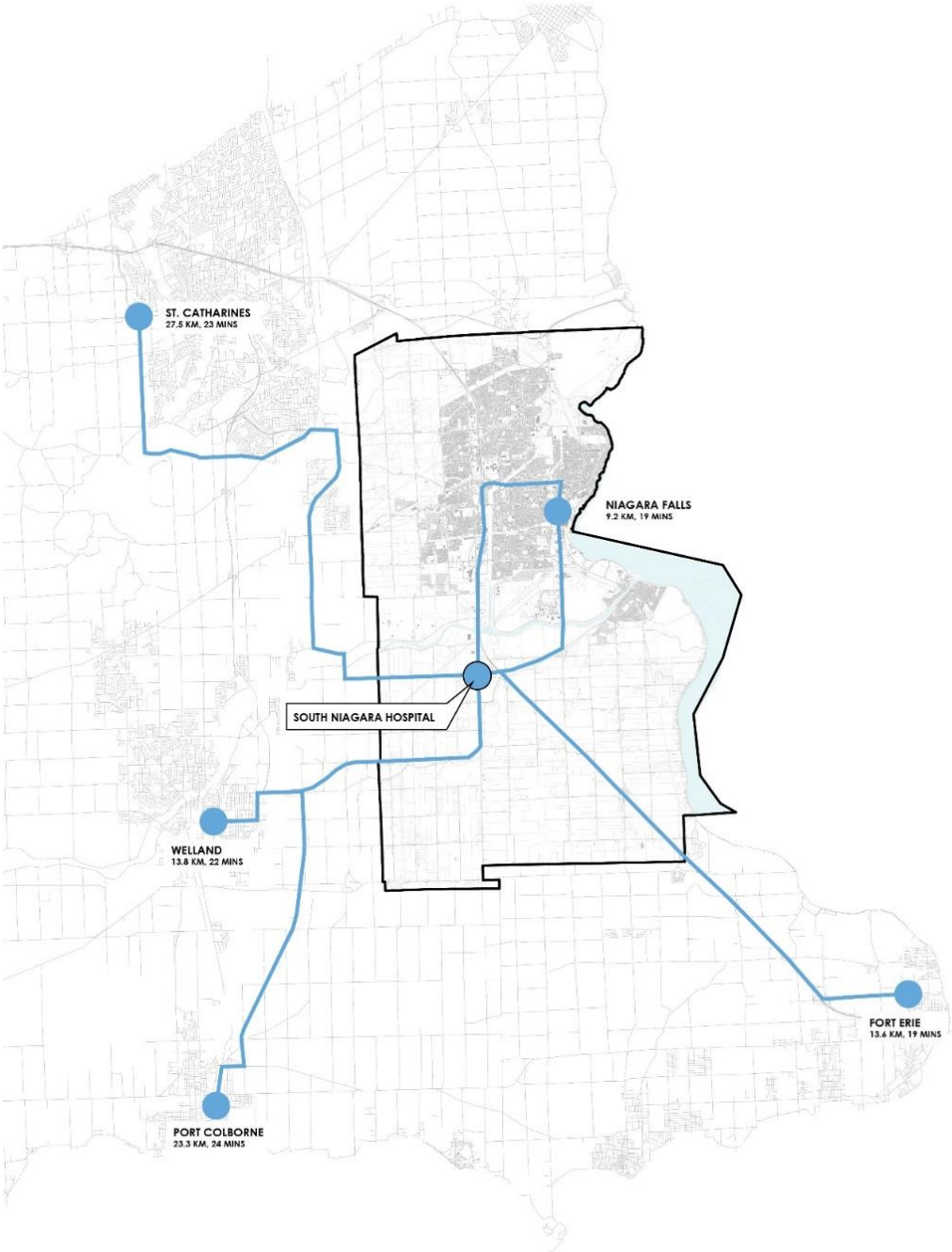


Figure 1.2.1-2: The Niagara Health Services Network

1.2.2 GRAND NIAGARA SECONDARY PLAN (OPA 118)

Overview

The South Niagara Hospital site is situated in the local land use planning context of the Grand Niagara Secondary Plan, illustrated in Figure 1.2.2-1. Located at the southernmost edge of the City of Niagara Falls' Urban Area Boundary, the Grand Niagara Secondary Plan Area consists of 330 hectares of land bordered by Biggar Road to the south, the Welland River to the North, Crowland Avenue to the West and the QEW to the East.

Official Plan Amendment No. 118 for the Grand Niagara Secondary Plan was adopted and approved by the City of Niagara Falls on June 19th, 2018. The plan provides a detailed policy framework effecting land use, transportation, servicing and environmental protections for the Grand Niagara Secondary Plan Area, which features a combination of Greenfield and Built-Up lands. These include the built-up lands of the Grand Niagara Golf Course, which are planned for redevelopment as part of the Secondary plan. The Greenfield lands north of Biggar Road and south of the golf course are planned to accommodate the development of a Hospital Campus Employment Designation (HECD) area. An map of the Secondary Plan Area is shown in Figure 1.2.2-2.

The Grand Niagara Secondary Plan area is intended to develop as a sustainable, healthy and complete community. The vision is to connect distinct, livable neighbourhoods through green spaces and multimodal mobility options to the employment opportunities available in the development of the HECD area. The South Niagara Hospital site is located at the centre of the HECD and as such is an important social, economic and environmental development focus for the Grand Niagara Secondary Plan.

At build-out, the Grand Niagara Secondary Plan Area is designed to provide a development yield of approximately 3,500 to 4,300 people, occupying 1,350 to 1,800 dwelling units and with a capacity for up to 3,600 jobs. The Secondary Plan area is divided into four neighbourhoods comprising three residential neighborhoods and the hospital campus. Important community elements central to each neighbourhood are given suggested locations in the plan. These include school sites, parks and amenity areas. All community site locations within the plan support walkable distances. Further, the creek, surrounding woodlots and hospital campus are all located within a 5-minute walk of each neighbourhood.

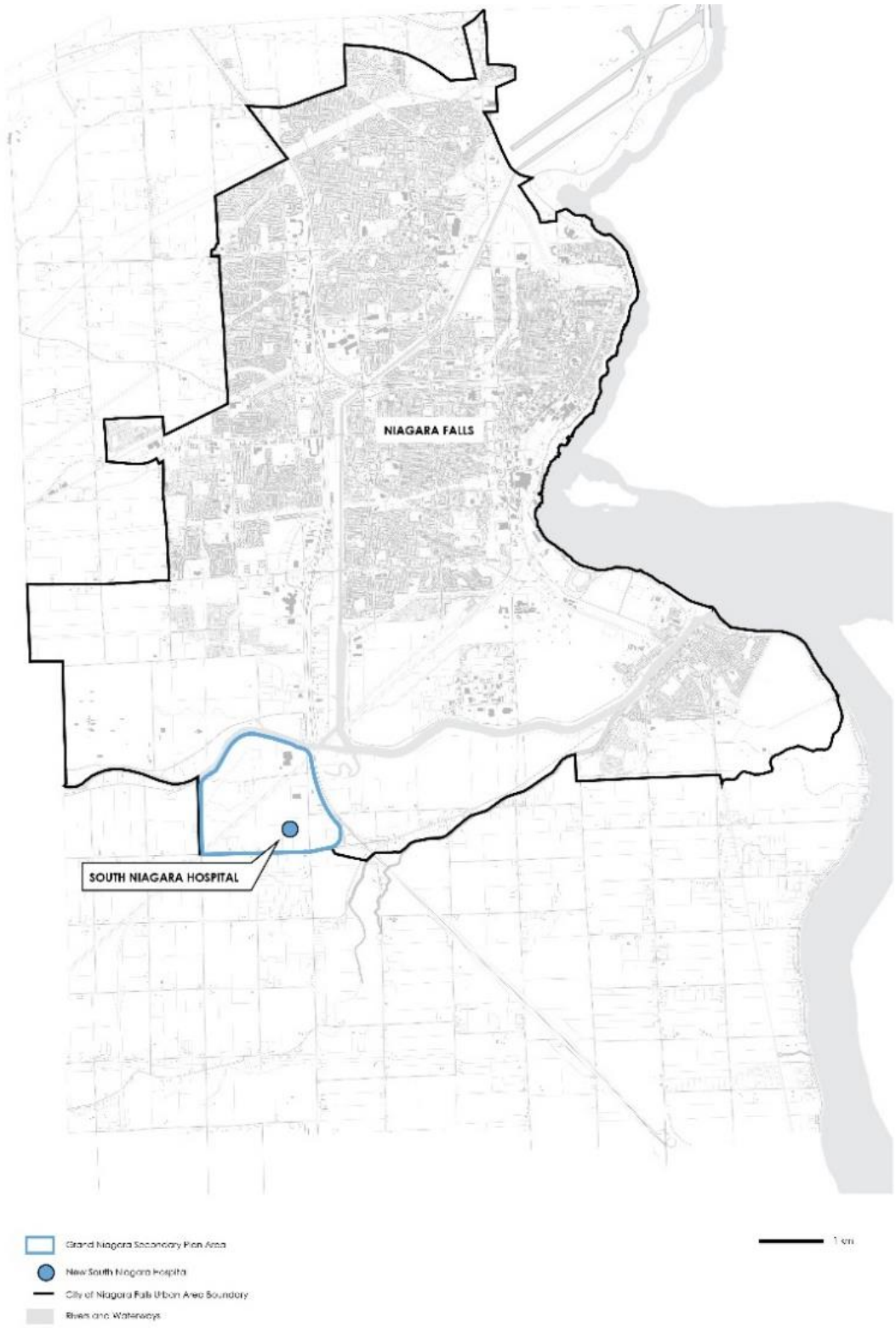


Figure 1.2.2-1: Location of the Grand Niagara Secondary Plan

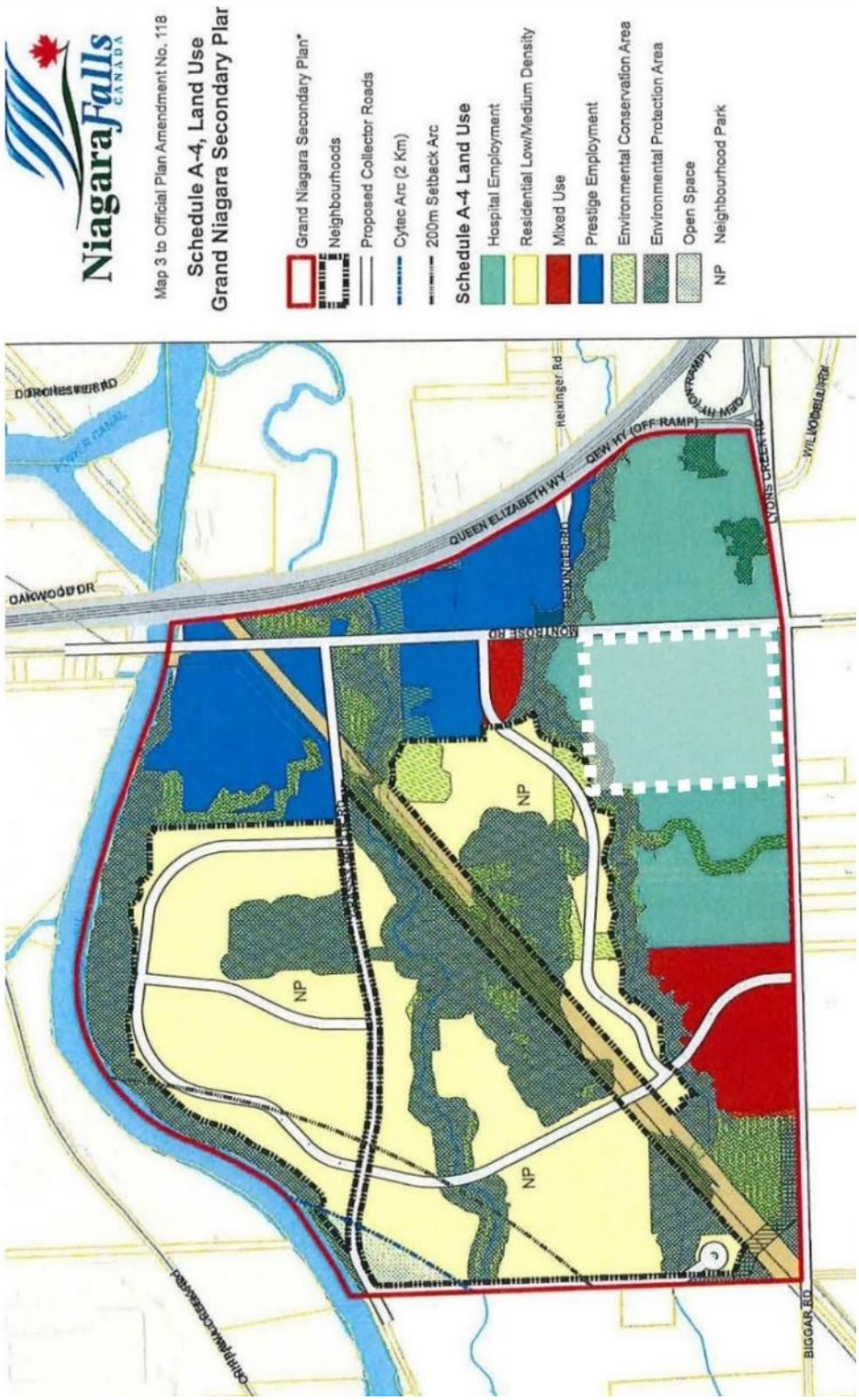


Figure 1.2.2-2: Schedule A4 of the Grand Niagara Secondary Plan

Objectives and Applicable Policies

Guiding Principles

The Grand Niagara Secondary Plan is guided by a series of nine (9) principles and associated objectives:

1. Protect and restore natural heritage features.

    - To provide a functional and highly interconnected network of natural heritage resources, parks, and stormwater management facilities for the community that are accessible and visible to residents.

2. Promote the responsible use of resources.

    - To utilize Low Impact Design Standards that emphasize the use of bio-swales, innovative stormwater practices, at-source infiltration, greywater re-use systems and alternative water conservation measures.
    - To utilize opportunities for passive solar gains through building orientation.

3. Promote place-making.

    - To create an urban form that supports an interconnected street system that is transit supportive and pedestrian friendly to effectively transport people and vehicles
    - To promote place-making that instills a sense of civic pride.

4. Create a diverse community.

    - To create transit supportive neighbourhoods.

5. Promote active transportation.

    - To ensure all roads will be designed as important components of the public realm to provide a network that is appealing for pedestrians, cyclists, transit facilities, and motor vehicles.
    - Create a connected and integrated open space and trails system
    - To utilize the existing Natural Heritage System as key trail elements to link the community.

6. Create a connected and integrated open space and trails system.

    - To utilize the existing Natural Heritage System as key trail elements to link the community.
    - To provide parks and open spaces close to medium density residential development and to integrate schools and parks with the trail system.

- To provide a variety of trails and pathways such as on-road bike lanes, boulevard multi-use pathways, and off-road multi-use pathways.

7. Create employment opportunities.

    - To recognize the economic importance of the Regional Hospital in attracting a range of employment opportunities within this community and beyond
    - To promote office uses and services associated with the planned Regional Hospital
    - To provide active transportation connections between residential and employment areas

8. Manage Growth.

    - To create jobs concurrent with residential growth to ensure a long-term balanced economy while encouraging closer live and work proximity

9. Promote green infrastructure and building.

    - To utilize green infrastructure to make use of the absorbing and filtering abilities of plants, trees, and soil to protect water quality, reduce runoff volumes, and recharge groundwater supplies
    - To utilize drought tolerant and native tree and shrub species in parks and along streetscapes to reduce water use

Sustainability

In addition to the principles outlined above, the Secondary Plan encourages conformity with LEED© (Leadership in Energy and Environmental Design - Canada) or equivalent alternatives (policy 1.10.1). Green infrastructure and Low Impact Design Standards are also encouraged within the context of an interconnected open space network (policy 1.10.3 and .5).

The South Niagara Hospital Campus should consider orienting the building(s) to maximize potential for passive and active solar energy (policy 1.10.7) and provide opportunities for local food production, where feasible (policy 1.10.8).

Natural Heritage System

The northwest corner of the SNH site is part of an identified Natural Heritage System. A 30m buffer from provincially significant wetlands and valley lands is required to protect their ecological and hydrogeological functions. The Secondary Plan identifies a 10m buffer from retained woodlands (policy 3.5.6). The potential of a woodland in the southeast corner of the South Niagara Hospital Campus is currently being investigated, but a preliminary report shows that no protected habitat or species have been found.

Hospital Employment Campus Designation (HECD)

As identified in Schedule A-4 of the Grand Niagara Secondary Plan and Figure 1.2.2-2 of this report, a Hospital Employment Campus Designation (HECD) applies to the lands located east and west of Montrose Road and north of Biggar Road/Lyons Creek Road.

The primary use on the HECD lands will be the proposed South Niagara Hospital and allied uses and facilities. The development of the hospital and allied uses will allow for the provision of comprehensive and concentrated health and wellness services and employment for the Niagara Health regional network and for the developing Grand Niagara community.

The Plan recognizes the separate planning processes required for the development of the hospital campus. Additionally, the HECD designation is intended to encourage complimentary uses on the adjacent lands to the west and the east of the proposed South Niagara site. These lands are intended to support medical and supporting uses, such as:

- Large scale institutional uses, medical clinics, laboratory uses that serve or support the hospital;
- Prestige employment uses including R&D facilities and business and administrative office buildings;
- Community infrastructure (indoor recreational facilities and fire/emergency services); and,
- Complimentary employment, office, retail, small scale commercial, hotels, restaurants, structured parking, assisted living for special needs groups and long-term care facilities for seniors.

Other land uses designated in the plan are Mixed-Use lands to the west and northwest of the Hospital Employment campus; prestige employment to the north; low to medium density residential to the northwest; and environmental conservation and environmental protection areas.

Development of the HECD will be directed by the policies of the Grand Niagara Secondary Plan. The South Niagara Hospital Campus Plan is required to be consistent with the following development policies:

Density Targets

- In accordance with Policy 3.3.3, the minimum gross target density for the HECD is 30 jobs per hectare; however, it is generally recognized that the South Niagara Hospital will generate a higher density.

Transportation

- Driveway access to Biggar and Montrose Roads (Arterials) is limited and shared access across the HECD is encouraged (Policy 3.3.6).
- Active transportation and public transit facilities are intended to connect the HECD (Policy 3.3.7).

Development Requirements

- Policy 3.3.8 establishes a series of development requirements for the South Niagara Hospital Campus, including:
  - At grade parking areas in front yards or side yards that are to be paved and designed with internal and perimeter landscaping;
  - Parking spaces for employees and clients that are clearly delineated;
  - Structured parking utilized whenever possible;
  - Street edges that are clearly articulated with landscaping;
  - Lighting that is directed away from adjacent uses;
  - Processing areas and waste management facilities that are adequately screened from view; and,
  - Active transportation connections within and between the employment designation and other uses.

Gateways

- The intersection of Biggar and Montrose Roads is considered a gateway. Policy 3.3.9 requires that the South Niagara Hospital Campus support the gateway initiative by achieving higher design standards that create compatible and context sensitive building, site and streetscapes.

Structured Parking

- According to Policy 3.3.12, structured parking on the South Niagara Hospital Campus should:
  - Have active uses on at least two sides, and any side that faces a road;
  - Provide screening to minimize the visual impact of the structured parking where it abuts a road;
  - Integrate with the architecture and overall design of the site; and,
  - Be no more than 3 storeys in height.

1.2.3 GRAND NIAGARA SECONDARY PLAN URBAN DESIGN GUIDELINES

Overview

Urban Design Guidelines were developed by The Planning Partnership as Appendix A to the Grand Niagara Secondary Plan. The Guidelines support the City's objectives for a safe, pedestrian friendly and environmentally sustainable neighborhood communities. They describe a suggested built form, open space and street system for the Grand Niagara community and neighbourhoods.

The South Niagara Hospital (SNH) site is centrally located within the HECD of the Grand Niagara Secondary Plan. The site's development will play an important role in the formation of the character and community identity of the adjacent HECD and mixed-use neighbourhood. The hospital will also be a central employment and visitor destination within the context of the larger Secondary Plan Area. As such, the SNH Campus Plan is encouraged to be consistent with the Grand Niagara Secondary Plan Urban Design Guidelines; it is anticipated, however, that refinement in keeping with the specific planning of the hospital will be considered through the submission of an Urban Design Brief (Policy 1.11).

Objectives and Applicable Guidelines

The Guidelines identify the following design and planning approaches relevant to development of the new South Niagara Hospital.

Focus Area

- The mixed use and HECD area north of Biggar Road is a Focus Area within the Secondary Plan with the opportunity to create an active edge along the northern side of Biggar Road.
- The Guidelines identify the opportunity for condominium or apartment-style buildings for seniors and/or special needs groups directly adjacent to the HECD.

Community Identity

- To promote distinct community character, define community edges and entrances, and to encourage congruency between neighbourhoods, the following are suggested:
  - Community identity features should occur along Biggar Road and at entries to the community from Arterial Streets; and,
  - Identity features should enhance the desired pedestrian-oriented character of the community. (Guidelines 3.5.1 and 3.5.6)

Open Space System

- Trails, bike paths, boulevard multi-use pathways and off-road multi-use pathways should be provided.
- Regard should be shown for the principles of the Crime Prevention Through Environmental Design (CPTED) and the Accessibility of Ontarians with Disabilities Act (AODA).
- It is an objective to provide a variety of recreational experiences, and to provide relief from continuous built form.
    - Guidelines 4.2.1.1 and 4.2.1.2 state that open spaces should be clearly identifiable in character, have edge definition, and encourage accessibility between sites.

Stormwater Management Facilities

- Suggested locations for stormwater management ponds are distributed throughout the Secondary Plan Area as part of the Open Space System.
    - Guideline 4.2.7.1 states that stormwater management (SWM) facilities should adhere to all regulatory agency guidelines and requirements;
    - Innovative approaches to Stormwater Management Design are encouraged (Guideline 4.2.7.2);
    - SWM facilities should be physically and visually accessible from the street where possible. (Guideline 4.2.7.3);
    - Rehabilitation planting should be indigenous and ecologically complementary (Guideline 4.2.7.5); and,
    - Interpretive signage and overlooks are encouraged. Pathways should be provided where possible which link to adjacent spaces and encourage safe and efficient circulation. (Guidelines 4.2.7.13 and 4.2.7.14).

Pathway System

- An objective of the Guidelines is to create connections to the Regional Bicycle Network System.
    - Special treatment such as feature paving shall occur at street crossings and intersections, and sidewalks and multi-use trails shall be separated from the street with a landscaped boulevard. (Guidelines 4.2.8.15 and 4.2.8.16).

Arterial Streets

- The Guidelines state that Arterial Streets shall have a 26.0 m right-of-way, shall accommodate 2 to 4 lanes of vehicular traffic, and provide sidewalks on both sides of the street. It should be noted, however, that roads are subject to study by EA to determine street design.

Hospital Employment Campus

- The Guidelines state that planning for the proposed hospital will be undertaken by a separate Provincial planning review exercise, and that the guidelines pertaining to the Hospital Employment Campus apply only to the HECD lands adjacent to the hospital site.
    - Guideline 6.7.4 states that HECD lands are to be well served by public transit and well connected to active transportation facilities; and,
    - To ensure compatible and sensitive building, Guideline 6.7.6 states that higher design standards shall be applied to properties visible from Arterial and Collector Streets, or where having exposure to the QEQ; and on properties adjacent to, or across the street from a residential, commercial, or park use, a large scale public institutional use, or other sensitive land use.

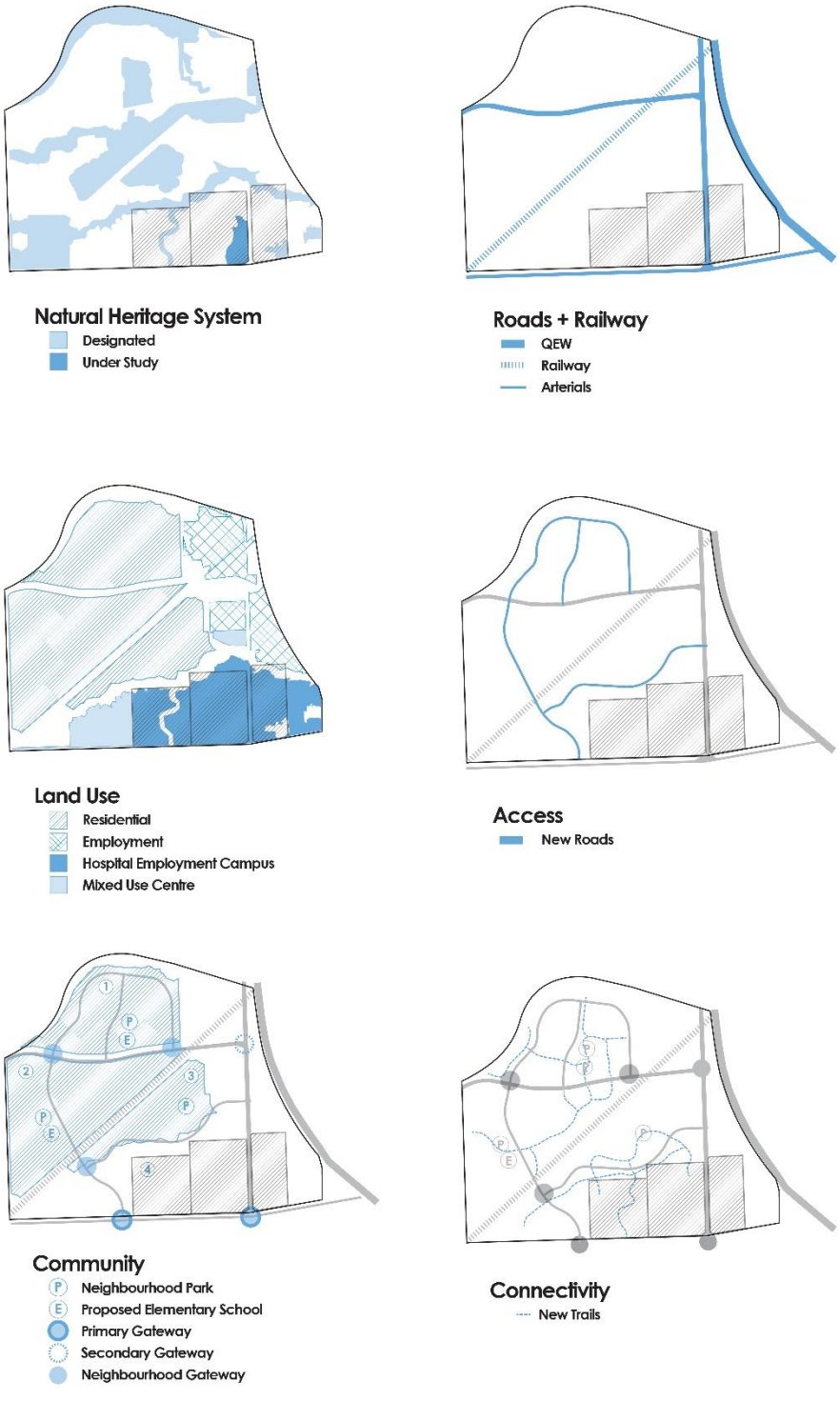


Figure 1.2.3-1: Analysis of the Grand Niagara Secondary Plan

1.2.4 CITY OF NIAGARA FALLS ZONING BY-LAW

Zoning By-Law 79-200, as Amended by By-Law 2018-99

The SNH Campus is zoned Institutional (I) under By-law 79-200, as amendment by By-law 2018-99 specifically for the site.

Permitted Uses

- Permitted uses include (but are not limited to): Hospital; Long Term Care Home; Emergency Care Residence; Nursing home and Accessory buildings; and accessory structures to any of the principle uses.

Regulations

- Minimum Lot area (hospital): 2 hectares
- Minimum lot frontage (hospital): 150 m
- Minimum front yard depth: 10 m
- Minimum internal side yard width: 5 m
- Minimum exterior side yard width: 10 m
- Minimum rear yard depth: 10 m
- Maximum lot coverage: 35%
- Minimum landscaped open space: 5%

Parking and Access Requirements

- Hospitals are required to provide parking at a rate of 1 space for each 2 beds and Home for the Aged, Nursing Home at a rate of 2 parking spaces for each 5 beds.
- Loading spaces are requires at a rate of 3 spaces for up to 9,300 sq.m. of Building Floor Area plus 1 additional loading space for each 4,600 sq.m. of floor area thereafter.

Building Height

- A site-specific exception to the I zone regulations has been approved for the South Niagara Hospital Campus, to permit a Maximum height of 28 m for a building or structure.
- Through the Campus Plan consultation process, the City has confirmed that the maximum building height can be amended to reflect the preferred Campus Plan.

1.3 MOHLTC Capital Planning Context

1.3.1 MOHLTC PROJECT HISTORY

Completed Planning to Date:

- Stage 1 Approval to Plan (2014)
- Clinical Vision and Service Planning (2015)
- Stage 2 Submission (2016)
- Revised Stage 1 Submission (2018)
- Updated Revised Stage 1 Submission (2019)
- Stage 2 Re-Submission (March 2019)
- Response to MOH Stage 2 Submission comments (September 2019)

Future Planning:

- Stage 3: 2019-2021
- Stage 4: 2021-2022
- Stage 5: 2022-2025
- Stage 6: 2025-2026

This Campus Plan Report was produced as part of a series of studies and reports, including:

- Clinical Servicing Report
- HQ1: Process Improvement Report
- HQ2: ICAT Report
- HQ3: Patient Experience Report
- Community Wellbeing Report
- Environmental Report
- Workplace Strategy Report
- Wayfinding Strategy Report

1.3.2 FUNCTIONAL PROGRAM REQUIREMENTS

The Functional Program information used in this report is from the Stage 2 Submission prepared and coordinated by Agnew Peckham Health Care Planning Consultants, March 15, 2019, and includes September 2019 area updates made to the program as a result of bed number reductions.

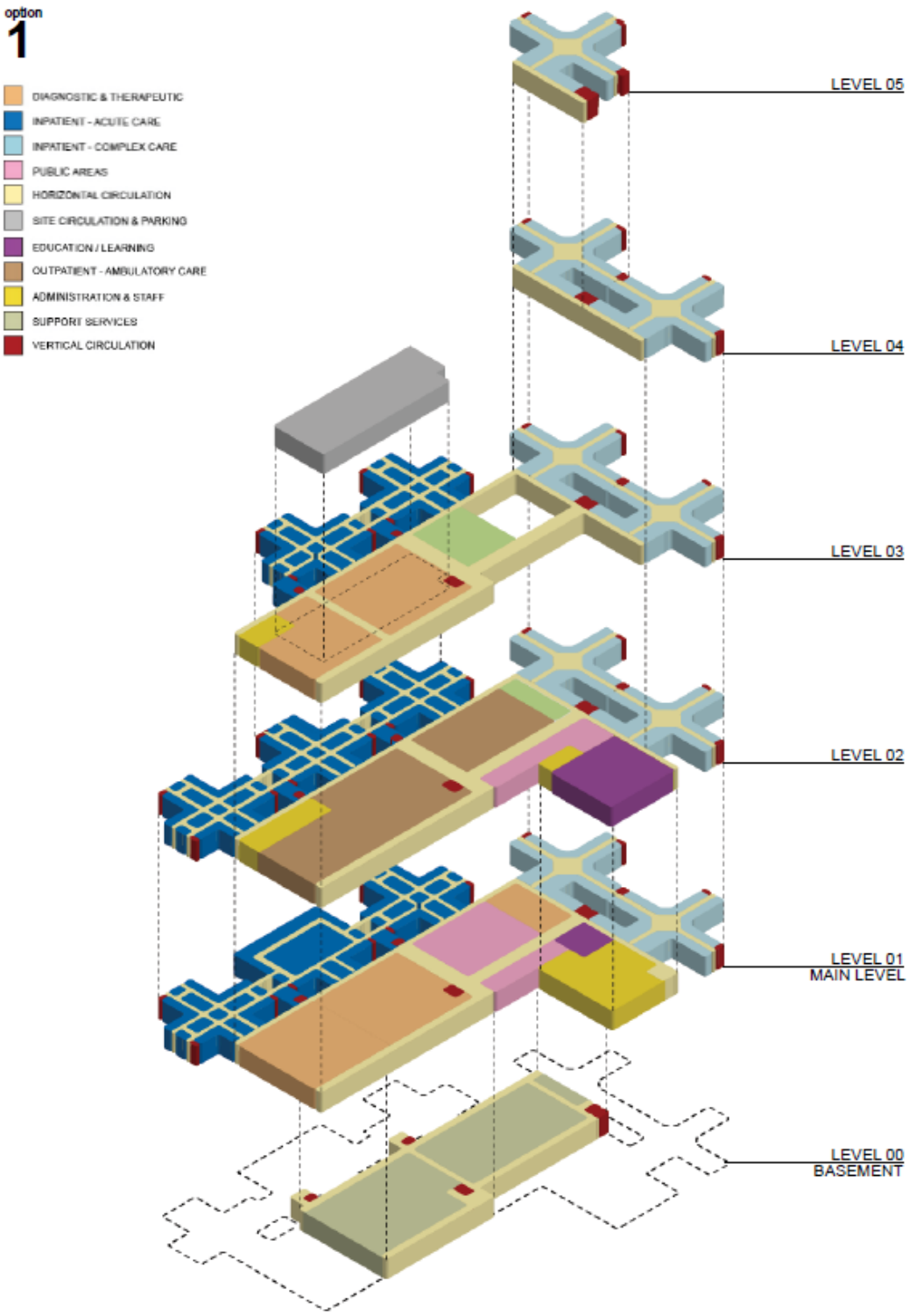


Figure 1.3.2-1: Stage 1 Submission (Cannon Design)

Figure 1.3.2-2: Stage 2 Submission Site Plan (Cannon Design)

02

2 Project Research

2.1 Trends and Strategic Insights

2.1.1 STRATEGIC APPROACHES TO ADAPTABILITY AND FUTURE EXPANSION

Hospitals are among the most complex and costly of building types in the public sector in Ontario. The initial capital investment in design and construction, however, is outstripped by operating costs within a few years. Therefore, the overall quality of the building design, its floor plan layouts enabling efficient clinical functions and the arrangement and capacity of building systems infrastructure must not only deliver fit-for-purpose environments for the prescribed programs on opening day, but also anticipate growth and changes in programs and services provided, through the facility's life-cycle.

Without reliable projections (beyond 5-10 years) of new services coming on stream or the next significant advancements in medical and information technologies, certain strategies in process and planning are nevertheless available to project teams to maximize flexibility and adaptability.

Design Process and Concepts

- Whole Building Design, which draws upon concepts of synergies and interconnectedness and consists of two components: an integrated design approach and an integrated team process.
- An integrated design team should investigate concepts at an early stage, including:
  - Design for site circulation redundancy and future extensions;
  - Design for change in volumes and arrival patterns through entrances and public circulation flexibility / capacities;
  - Plan structured routes for building services / utilidors;
  - Plan open ended bays for expansion
  - Maximize floor-to-floor heights;
  - Design public and patient-family circulation system for increased volumes and modes of travel; and,
  - Design logistics circulation system for AGV (common or segregated corridors and elevators from receiving to point of use to waste management streams).
- Use design modelling technologies to analyze and simulate:
  - Flows and volumes of patients, staff and materials;

- Space utilization scenarios for specific functions at different times and seasons; and,
- Scenarios in outbreak, surge and demographic events.

Planning

- Design for circulation, structural and building services systems flexibility / capacities.
- Plan for evolving continuum of care, including:
  - Ontario Health Teams;
  - Increases in home care and eHealth;
  - Associated LTC developments in the Niagara Region;
  - Potential advent in the Niagara-Hamilton regions of new/expanded centres and specialty hospitals in brain, cancer, heart, rehab and chronic conditions, and paediatrics; and,
  - How changing volumes will be facilitated at the SNH site and Niagara Health network regionally (decreases or increases beyond the current program projections at 10 and 20 yr. planning horizons).
- Moving non-clinical services to off-campus locations or non-hospital facilities on-campus:
  - Target all non-critical-clinical storage as off-site, extreme JIT.
- Moving administrative staff and outpatient services to off-campus locations or non-acute hospital facilities on-campus:
  - Target / collocate as soft space; and,
  - Evaluate cost/benefit of future relocates by phasing for growth and change.
- Plan post-acute IP units to transition to acute or other:
  - Plan for program transitions for inpatient units: post-acute care to acute care and vice versa.
- IPU transition - Shifting recovering patients away from non-acute inpatient facilities.
- Clinical Planning: Design for *permanently emerging* medical technology and related ICAT:
  - Plan for distributed and de-aggregated imaging modalities through rapid increase in mobile devices and point of care diagnostics and remotely conducted/analyzed/monitored diagnostics virtual DI.;
  - Reconfigured floor plates esp. adjacent to ED and ICU;
  - Major expansion of virtual medicine;

- Include virtual consultations, remote monitoring of vital signs, access to online medical records and targeted community health screening events;
- Re-allocation of conference, patient-family accommodations, specialist physician and radiologist accommodations; and,

Community Context

- Hospital developments are catalysts for city-building.
- Anticipate and influence adjacent site developments and zoning for complimentary uses:
  - Allied health commercial;
  - Research, light-industrial, biomedical;
  - Retail; and,
  - Amenities.
- Anticipate transit evolution in transit, micro-transit, ridesharing and autonomous vehicles.
- Understand and influence potential for implementing "complete street" design concepts:
  - By the City of Niagara on Montrose Road; and,
  - By the Region of Niagara on Biggar Road.
- Influence nature of inter-site connections for vehicular, pedestrian and cycling infrastructure.
- Consider the Active Travel Toolkit produced by the Canadian Association of Healthcare Professionals (CAPE), which identifies several active travel initiatives in support of health facilities and campuses, including:
  - Surveying staff about their current commuting habits and interest in alternatives;
  - Offering bicycle repair workshops and providing bicycle racks, parking cages, and shower areas for cyclists;
  - Developing incentives and/or subsidies for staff to use lower-impact options such as transit;
  - Charging daily parking rates;
  - Providing shuttle buses between campuses; and,
  - Supporting car-pooling initiatives.

2.1.2 STRATEGIC APPROACHES TO SITE DEVELOPMENT

- Leverage natural heritage and micro topographic, geologic and climatic site conditions.
- Establish campus land use and functional zoning for structured expansion and flexibility.
- Plan for site circulation redundancy, re-purposing and new connections over time.
- Integrate public transit in the design.
- Plan for potential allied developments on SNH Campus:
    - Location to attract potential partners and to benefit from functional and physical connections to the Hospital.
- Investigate potential for on-site amenities (non-core program) in health education and promotion, staff recruitment and revenue generation.
- Design for CPTED security measures, including impact at site plan level.

2.1.3 STRATEGIC APPROACH TO PARKING AND FUTURE AUTOMATED VEHICLE ADAPTATION

- Plan for distributed parking and entrances for safety, convenience, human scale, traffic management.
- Consider adaptability of parking and pick-up/drop-off facilities to accommodate future implementation of autonomous vehicle and/or an increase in the reliance on taxi/ridesharing/vehicle co-ownership, including dedicated lanes, drop off area design and short-term parking areas.
- Explore automated shuttle vehicles between Niagara Health sites and to potential remote staff parking.
- Plan physical and operational improvements into site plans, in order to anticipate future parking needs in the current design, provide for interim measures that could be implemented directly, and allow for expedited implementation of more extensive site works, if required.

2.1.4 STRATEGIC APPROACH TO BUILDING MASSING AND ORIENTATION

- Design for clarity:
  - Legibility of form; and,
  - Intuitive wayfinding.
- Establish strong and distinctive identity, including:
  - Building orientation and location with respect to main site approach and visibility;
  - Differentiation of volume treatment based on internal functions to inform orientation; and,
  - Distinction of purpose and importance of access points.
- Plan for closer integration of landscaped, outdoor areas with interior public, social and private patient zones, at all scales.
- Establish characteristics and quality of materials: local, sustainable and designed for aging well.
- Consider pursuing WELL building standard as it addresses occupancy wellbeing.
- LEED target level to include impact at site plan level.

2.2 Lessons Learned

2.2.1 CAMPUS PLANNING LESSONS LEARNED

The following case studies are three examples of recently completed or under construction hospital projects. For maximum relevance, these cases illustrate acute care hospitals within Ontario that were commissioned through the same Alternative Financing and Procurement (AFP) process as is anticipated for use with SNH (DBFM – Design, Build, Finance and Maintain). The case study hospitals are:

- The Oakville Trafalgar Memorial Hospital, Oakville, Ontario
- The Mackenzie Vaughan Hospital, Vaughan, Ontario
- The Milton District Hospital redevelopment, Milton, Ontario

Two of the case studies illustrate new hospitals of similar size, programmatic elements, location and site topography and site context (greenfield sites) as SNH. The third case study is smaller in size and is built on an existing hospital site but has similar site elements and site design approach to that of SNH.

These projects were analyzed from the point of view of the Vision and key design drivers identified by Niagara Health:

- Accessible & Inclusive (Elderly Friendly)
- Patient, Family & Staff Experience
- Community Connectedness
- Environmental Leadership
- Operational Excellence
- Flexible, Adaptable and Responsive

For a full account of the case studies, please refer to Appendix A-3 Case Studies. The following are short summaries of the of the Lessons Learned from each case study.

Lessons Learned from this research were incorporated into the Chapter 4 Opportunities & Constraints of this Report.

Oakville Trafalgar Memorial Hospital

Located on the northern edge of Oakville, the new Oakville Trafalgar Memorial Hospital (OTMH) features a hybrid campus model, combining an acute Diagnostic and Treatment block with an Inpatient Units tower, an Ambulatory treatment block and CCC/Rehab units. Each component has a distinct architectural identity with dedicated, conveniently located entrances and parking lots. The facility is completed by a parking structure dedicated to patients and directly linked to the hospital public spaces, as well as a helipad and a stormwater pond with naturalized borders.

The campus planning provides a civic plaza towards the main streets' intersection, an urban edge along the Third Line Road and a double oriented main lobby (east-west), to allow easy first access from the city as well as direct access from the parking facilities. An Allied Facility (MOB) was developed early on the property and became operational shortly after the hospital's opening day, as a first step in the development of a larger healthcare hub centered on the new Oakville Hospital. Soon after, a new children's hospital - ErinoakKids – was built just north of the site, continuing the development of the healthcare platform, as originally intended.

While located on a slightly smaller lot than the future SNH, the OTMH has a comparable number of beds and is 20% larger. The site design provides clear site views, multiple canopy-protected entrances, a few dedicated courtyards and terraces, and a landscape strategy proposing a pedestrian circuit and links to the adjacent streets. Three transit stops are provided within the site close to the main entrances. The growth strategy combines significant shell and soft space for later fit-out, with incremental building additions and a site reserve for complete site regeneration.

Figure 2.2.1-1: Oakville Trafalgar Memorial Hospital: Master Plan, Planning, Design and Compliance Lead - Stantec Architecture Ltd, Designer of Record Parkin/Adamson Architects in Joint Venture

Mackenzie Vaughan Hospital

The Mackenzie Vaughan Hospital (MVH) features a compact, vertical campus model, stacking two Inpatient Unit towers over an acute Diagnostic & Treatment and Ambulatory platform. The hospital is linked to a parking structure by a protected path. Multiple entrances allow access from all four sides of the buildings.

While the building size is very close to the future SNH size, the lot is significantly smaller and surrounded by an already existing low residential/ commercial area. The site design provides multiple site access points, canopy-protected entrances, a publicly accessible sunken courtyard and green terraces, as well as pedestrian links to the adjacent streets. A standalone central utility plant serves the building and is available for a potential link to district services. One transit stop is located on site close to the main entrance. The growth strategy combines shell and soft space for later fit-out, with future support/ administrative building additions.

Figure 2.2.1-2: Mackenzie Vaughan Hospital
Designer of Record Stantec Architecture Ltd
PDC – Zeidler Architects

Milton District Hospital

Located on the southern edge of Milton, the existing Hospital dating from 1950/1980s has been recently (2017) redeveloped and features a horizontal campus model, proposing a new acute Diagnostic and Treatment block separate from a new Inpatient units' tower and form the original building which remains in temporary in operation for Ambulatory services. Each component has a distinct architectural identity, with dedicated, conveniently located entrances and parking lots. The facility is completed by a new helipad, at grade parking and extensive landscape, which buffers the hospital from the adjacent newly developed low residential areas.

Figure 2.2.1-3: Milton District Hospital
Master Plan, Planning, Design and Compliance - Stantec Architecture Ltd.;
Designer of record - B+H Architects / RTKL

2.2.2 TRANSPORTATION PLANNING LESSONS LEARNED

Helipad

SNH is planned to be a Level II trauma centre. A list of Level I and Level II Ontario trauma centres and their helipad locations relative to the hospital's emergency department is provided in Appendix T-1. In most cases, the helipad is either in direct vicinity (rooftop access) or within 500 m of the emergency department. There are also a few examples of helipads relocated from ground to rooftop access.

Parking & Access Requirements

Parking characteristics from the following suburban large format hospitals and strategies for the proposed site are provided in Appendix T-2:

- Trillium Health Partners (THP) – Credit Valley Hospital
- THP - Mississauga Hospital
- Niagara Health – St. Catharines Site
- Oakville Trafalgar Memorial Hospital, Oakville, ON
- William Osler Brampton Civic Hospital

Based on the above-noted sites and appended parking review memo, there is an average parking demand of 1.89 vehicles per 100 sq.m. of building gross floor area and a demand of 2.12 vehicles per 100 sq.m. of building gross floor area based on an 80th percentile proxy large suburban hospital site. An additional review of parking demands compared to full time equivalent (FTE) staff indicates a proxy demand in the range of 1.00±10% vehicles per FTE based on a limited data set.

When a 15% buffer is applied to the above noted rates to reflect supply conditions with a good level of service, the average and 80th percentile rates reflect a range of 2.17 to 2.44 spaces per 100 sq.m. of building gross floor area.

Typically, hospitals within Ontario with over 1,500 spaces have parking structures for two primary reasons: 1) space constraints; and 2) walking distance.

Hospital sites around Ontario are also seeking out many physical and operational strategies to address travel demands of staff and visitors, including:

- Expansion of parking supply in a structured facility;
- Off-site parking and shuttle services (to parking and between hospital sites);
- Transit incentives;
- Valet Parking; and,
- Expanding/Occupying in Phased Development.

- Ontario hospitals also implement physical and operational Transit Demand Management (TDM) strategies to help offset the overall single-occupant vehicle demands largely related to staff activity.
- Successful TDM programs require sustained effort, early buy-in and commitment from all levels of staff. Notably, St. Catharines, Oakville, and London (Victoria) which each have some measures of TDM, elected to expand their parking supply soon after opening/expansion to meet forecasted demands.

Loading

Loading characteristics from the following large format hospitals are provided in Appendix T-3:

- Oakville Trafalgar Memorial Hospital, Oakville, ON
- Humber River Regional Hospital
- Mackenzie Vaughan Hospital
- Niagara Health – St. Catharines Site

Experience at other hospitals indicates the following characteristics for large format acute care hospitals:

Supply:

- Range of supply dependent upon size of Hospital but supply is not linear and should serve the specific needs of the functional program.
- 8 to 10 loading bays is typical for large hospitals.
- A large portion of loading activity are cars/vans.
- Service and delivery routes are separated from public traffic to the extent practical.

Configuration:

- Size of loading bays varies. Ideally (by Functional Program) all loading bays are Type A (semi-trailer).
- Unlikely to receive more than two semi-trailers at any given time.
- Majority of hospitals use one consolidated loading area to service entire site.
- Loading area is often paired with the Power Plant and/or parking garage.
- Majority of loading areas are open air with canopy covering loading dock.
- Loading bays are located at the basement level, if possible.
- Refuse collection typically in one location; many different configurations possible.

Transportation Demand Management

Transportation Demand Management (TDM) plans are used by hospitals to encourage active transportation and use of public transit, rather than single user vehicles, in order to respond to a changing and evolving context and offer better transit and non-automobile travel opportunities for the master plan area.

Support for and promotion of the use of area transit services for both short and long-distance travel by visitors and employees will reduce the overall use of a vehicle and the need to own one.

Objectives of a TDM Plan (or Mobility Choice Travel Plan) include:

- Encouraging the use of alternative travel modes
- Shifting travel to off-peak periods
- Increasing vehicle occupancy; and,
- Reducing vehicle kilometres travelled.

A Mobility Choice Travel Plan includes both: 1) Infrastructure and 2) Programs, Operations, and Collaborations elements.

Infrastructure

Infrastructure elements include:

- Mixed-use land uses that reduce the need to travel off-site for typical daily activity.
    - **Pick-up / Drop-offs** that provide a convenient location for passengers to board/alight vehicles. Shared use of vehicles (carpool, rideshare, taxi) also allows employees and visitors of the site to utilize other autos in lieu of driving and parking a personal vehicle.
- Car-share Parking
    - **Car-Share Programs** provide “on-demand” access to a fleet of vehicles located within the site’s vicinity. The convenience and easy access reduce the need to own a personal vehicle and also encourages the use of other non-automobile commuting methods.

- Travel Information Centre
    - **Enhanced Public Realm** that provides high-quality and safe connections between the hospital and transit stops, cycling networks and the public street system can encourage employees and visitors to travel between the site and surrounding neighbourhoods without the use of a vehicle.
    - **EV Charging Stations** provide for designated, marked parking spaces for future electric vehicles to encourage the use of low-emitting, fuel efficient vehicles.
    - **Secure Bicycle Parking** provided in a convenient and viable location cab be a good travel alternative to the personal automobile.

Programs, Operations and Collaboration

Coordinated on-site travel demand strategies and the effective dissemination / promotion of program and service information can facilitate users to utilize alternative modes of transportation. Elements include:

- Shuttle Bus
- Transportation Management Association
- Carpool/Rideshare Program
- TDM Coordinator
- Emergency Ride Program
- Staff Travel Mode Surveys
- Customized Travel Information Packages
- Monitoring and adaption of TDM operation to meet changing needs and improve services

Planning for Autonomous Vehicles

In order to mitigate the risks associated with substantially reduced parking demand induced by the eventual deployment of fully automated AV's and the increased use of ridesharing/hailing over the next 25 years, the following solutions should be considered:

1. Recover the capital and operating costs for new parking over a period of 20 to 25 years.
2. Avoid overbuilding parking by creating a much tighter supply-demand balance.
3. Maximize the use of shared parking between different land uses and separate property owners.
4. Implement parking demand management to reduce parking demand.
5. Minimize the amount of parking provided in garages versus surface lots.
6. Minimize the amount of parking provided in underground garages versus above ground garages.
7. Use valet parking in order to minimize the amount of space devoted to parking.
8. Design garages for conversion to other uses.
9. Design garages for conversion to reduced parking space sizes and increased pick-up/drop-off.
10. Use temporary above grade garages.

Key takeaways for hospital sites:

- Curbside, drop off, and short-term parking strategies and design will be significantly more important in the future.
- Hospitals should accommodate patient and staff activity for at least 20 years in conventional ways for risk management purposes.
- Endeavour to ensure that the parking facilities are, to the extent practical, adaptable to future changes (i.e. reductions or increases) in demand. Give particular attention to curbside, drop off, and short-term parking strategies and design.

Assessment of parking facility types for potential conversion are provided in Appendix T-4.

2.3 Niagara Health Staff Engagement

2.3.1 NIAGARA HEALTH FACILITIES MANAGEMENT AND SUPPORT STAFF INTERVIEWS

Interviews were conducted with Niagara Health St Catharines Site Facilities Management (FM) and Support Staff to gain insights on Lessons Learned from the recent post-occupancy operations of the hospital. These interviews formed part of the background information collection and research for this report.

2.3.2 ST CATHARINES CRITIQUE

The major topics and conclusions of the NH FM staff feedback are summarized below. For details and specific comments, please refer to Appendix A-4.

Lessons Learned from this research were incorporated into the Chapter 4 Opportunities & Constraints of this Report.

Site circulation & Main Entrance

- Segregate traffic flows as much as possible, especially Transit.

Main Entrance

- Prioritize a through driveway vs. slow traffic driveway drop-off.
- Avoid pedestrian crosswalks interfering with high traffic vehicle routes.

Ambulance access

- Ambulance access can be shared with public so long as it is separate from transit, service and other major traffic.
- ENS should be consulted about development planning
- A dedicated Ambulance entrance / path on site would be ideal.

Service access / loading

- The Service site access to the site must be as far away from the other site access nodes.
- Service access only has traffic 5 days a week from 7am to 5pm and can potentially have ambulance vehicles come in through that entrance. Not much interference.
- At SCS there is an emergency ring road - very valuable.

Parking areas

- SCS has currently 1746 parking stalls – quite busy around noon or staff shift change, finding a spot can be a problem.
- Handicap accessible stalls design requirements to be coordinated with the municipality; ideally, the municipality should enforce and regulate the handicap accessible parking use.
- Later installed control gates restrict the size of vehicles necessary for snow removal.
- SCS – the second transit route has not reduced the vehicle parking demand. The bus is more expensive than it is to park.
- Travel distances and driving around times at parking lots is already burdensome and moving to a larger facility will exacerbate this.

Landscaped areas

- Landscape open spaces are not used – scorching hot in summer, and too cold in winter - need shade structures.
- The beautiful stormwater retention pond is not visible because the naturalized vegetation is high.

Building orientation

- Building Orientation (SCS): Wind direction is pushing exhaust from generator, boilers and idling vehicles into the mechanical intakes. Need a wind study to inform the Campus Master Planning.

Figure 2.3.2-1: St. Catharines Site Plan Diagram (NHS)

ANALYSIS

03

3 Existing Conditions

3.1 Existing Site Conditions

3.1.1 LOCATION & LAND USE

The proposed site of the South Niagara Hospital is bounded to the east by Montrose Road and to the south by Lyons Creek Road / Biggar Road. The Queen Elizabeth Parkway (QEW) runs north-south to the east of the site, with on and off ramps located 1.4km east of the intersection of Montrose and Biggar.

The site is located within the Grand Niagara Secondary Plan area and forms one third of the land under Hospital Campus Employment Designation (HECD). As the main health operator and central site within the HECD development area, the SNH hospital campus will be a defining environment and a community for the future Grand Niagara development.

3.1.2 ROADS & ACCESS

It is possible to provide signalized driveway access to the site from both Biggar and Montrose roads, provided a minimum of 200m is established between the existing signalized intersection at Biggar and Montrose and any new intersection.

Most car trips to the site from the west will arrive from the QEW via Lyons Creek Road / Biggar Road, suggesting that the primary site entrances points should be located off Biggar. Secondary site entrances can be provided off Montrose.

3.1.3 TOPOGRAPHY

The majority of the site is relatively flat. There is, however, a gentle slope northwest towards Lyons Creek and significant sloping in immediate proximity of the creek. In the southeast-northwest direction, there is a 1.3% slope, or 4.5 m, total elevation difference across the site. In the east-west direction, there is a 1% slope, or 1.5 m, total elevation difference across the site.

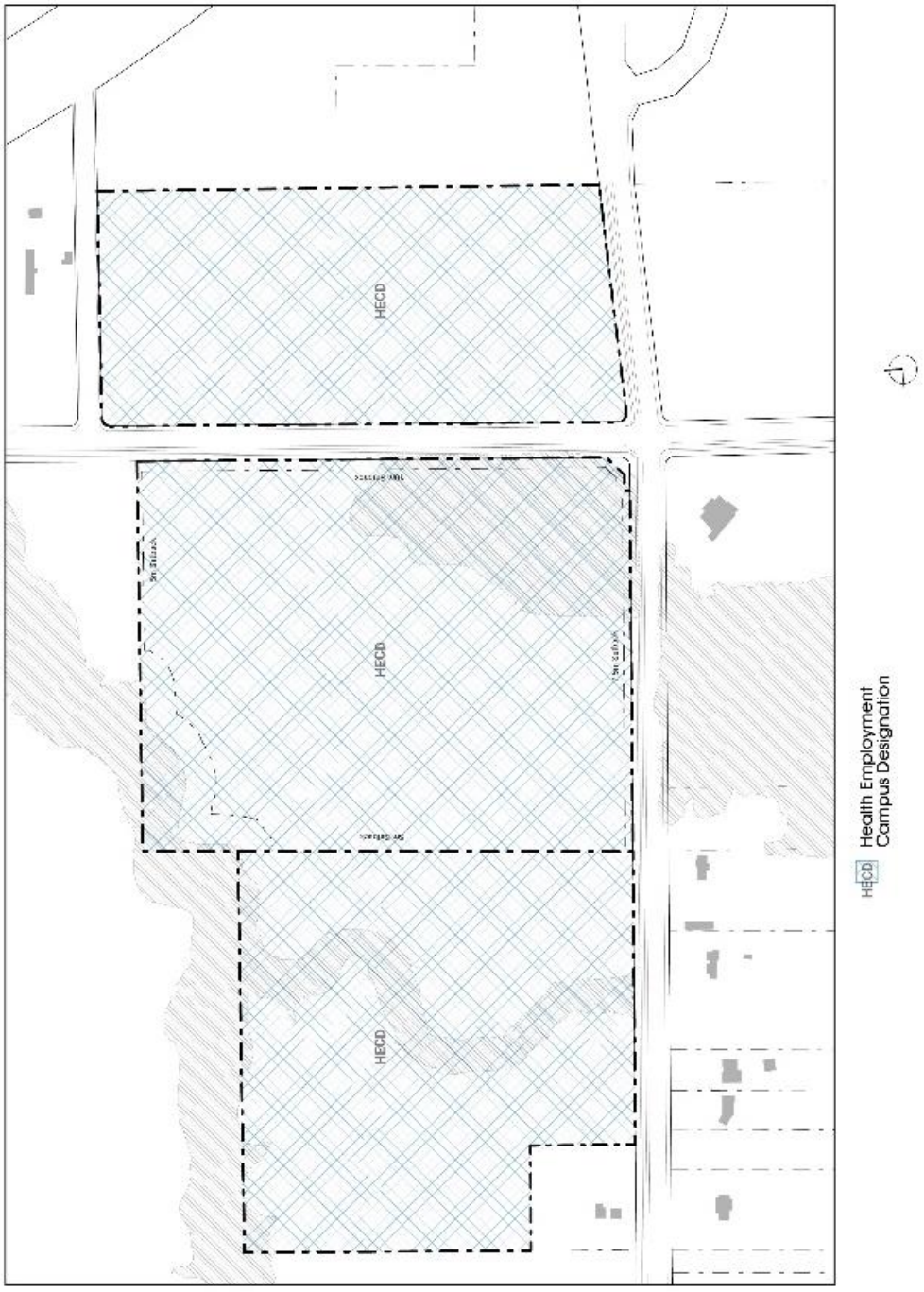


Figure 3.1.3-1: Health Employment Campus Designation (HECD) Area

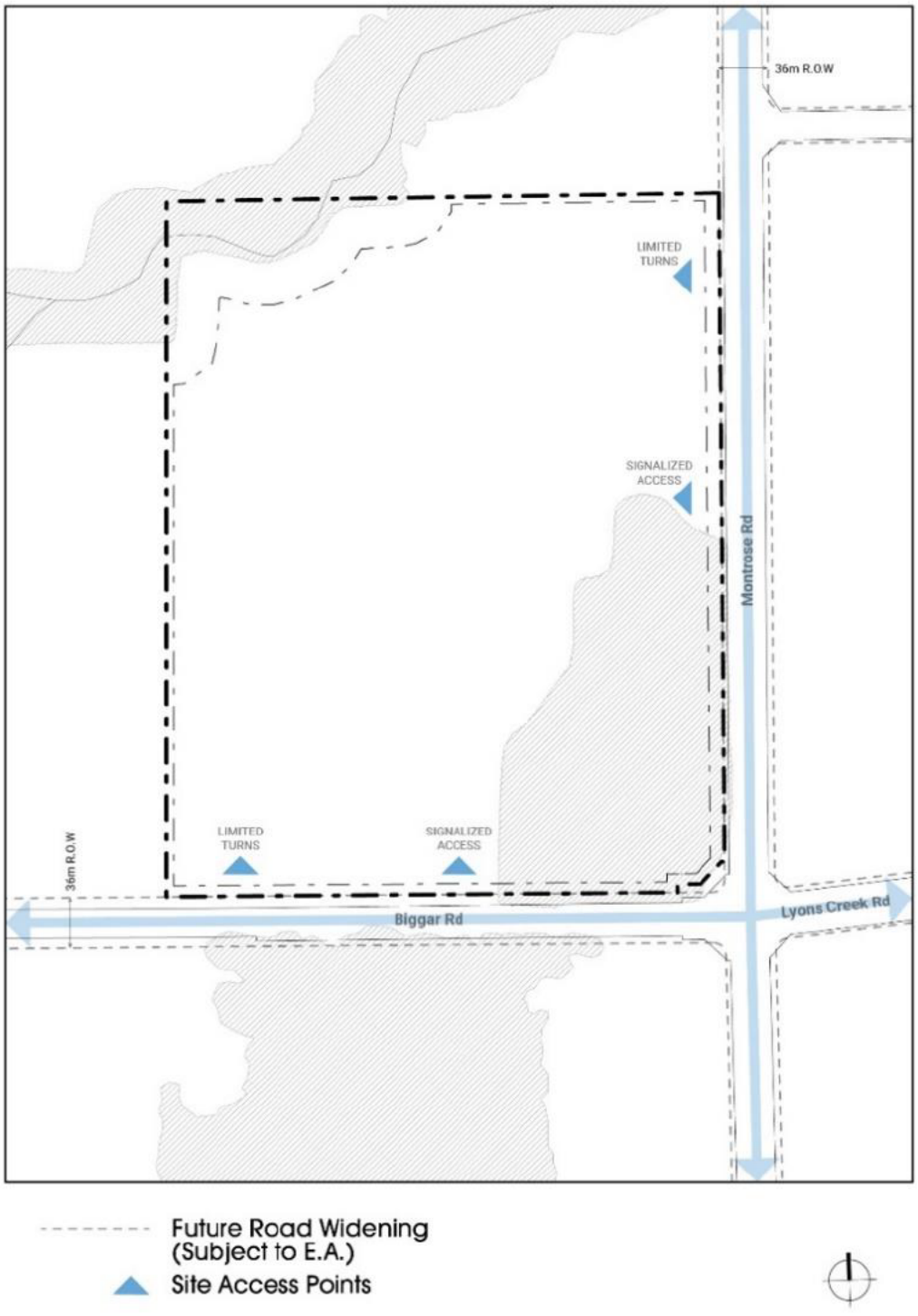


Figure 3.1.3-2: Existing Roads & Opportunities for Site Access

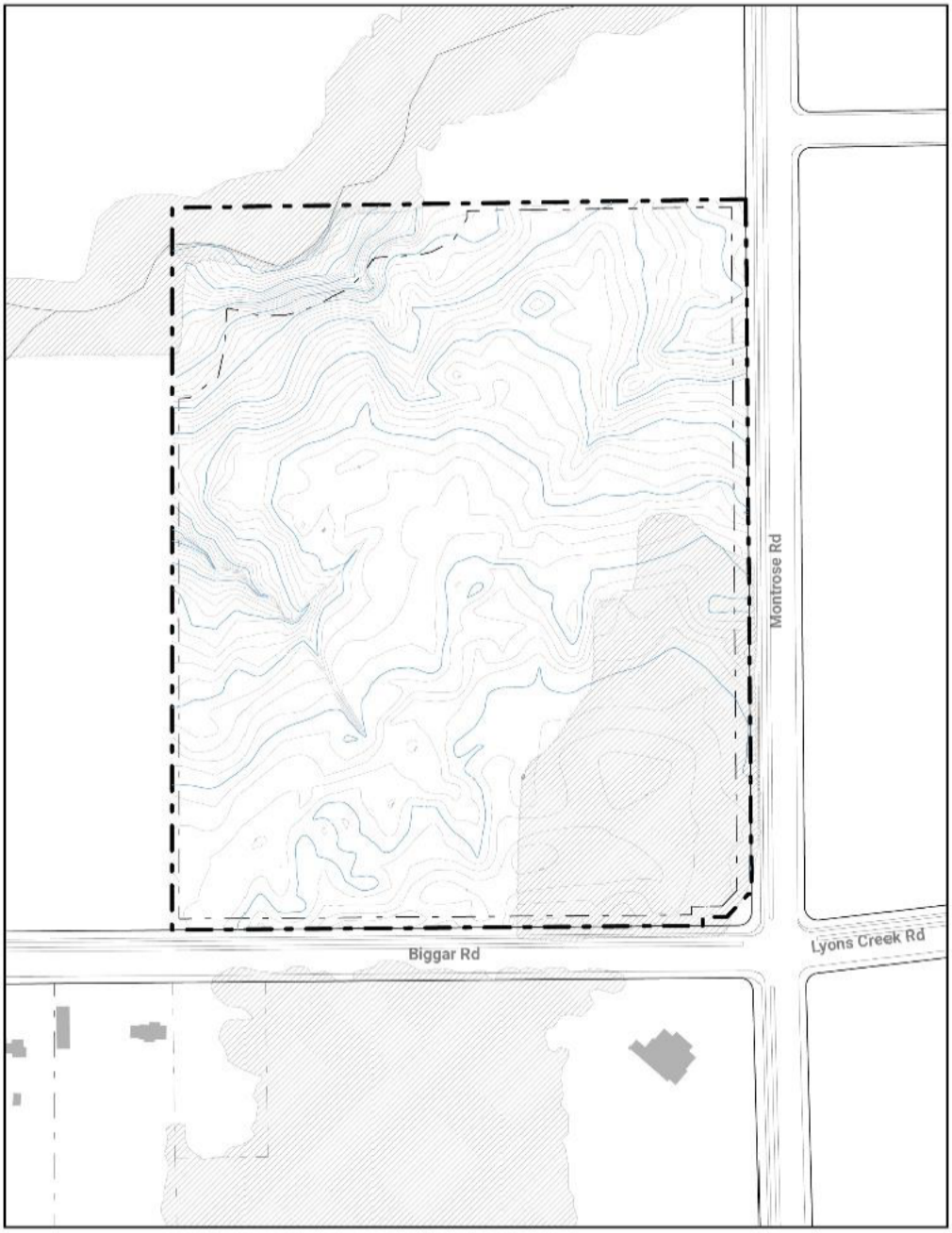


Figure 3.1.3-3: Existing Site Topography

3.1.4 NATURAL FEATURES

The Niagara Peninsula Conservation Authority is responsible for the review of planning applications affected by the natural environment through the Region of Niagara's municipal approvals process.

An Environmental Impact Study (EIS) was conducted as part of the Grand Niagara Secondary Plan. This study was revised in May 2016, however the SNH site was not included in the study area. A new Environmental Conservation Area Study was therefore commissioned to assess the importance of an existing woodlot at the southeast corner of the SNH site. This study found that the woodlot was not of natural heritage significance. As such, it is understood that no further studies of the woodlot are required.

A natural swale occurs in the northeast-southwest direction, located at the centre of the SNH site. To the north, the site neighbors a regionally significant Environmental Protection Area (EPA) wetland and flood plain. This area drains into Lyons Creek, which in turn drains into the Welland River. The extent of the wetland is the existing vegetated area. A 30m setback applies from the edge of vegetation. There is potential that an Environmental Impact Study (EIS) would be required if reductions to this setback are proposed, as Lyons Creek is identified as a Critical Fish Habitat Type 1 and a significant wildlife habitat. A trail system and other associated passive recreations are, however, identified as favourable for this area, so long as no substantial site alterations occur.

A second wetland is located opposite the site to the south of Biggar Road. This wetland corresponds to a small patch of land on the SNH site survey labelled ‘Part 3’ land. An EIS study of the wetland in relation to the SNH development would normally be required for this land. The NPCA has waived this requirement, however, as in this case the connection between the wetland and the Part 3 land is already disturbed by the crossing of Biggar Road and the former agricultural use of the site.

A new Geotechnical & Hydrogeological Study has not yet been conducted, but planning is underway. As previously identified in the Stage 1 Report, it remains that the creation of structures on this site will impact the natural flow and paths of water. Resolving the interruption of water on the site in a creative way will aid in a sustainable strategy for development.

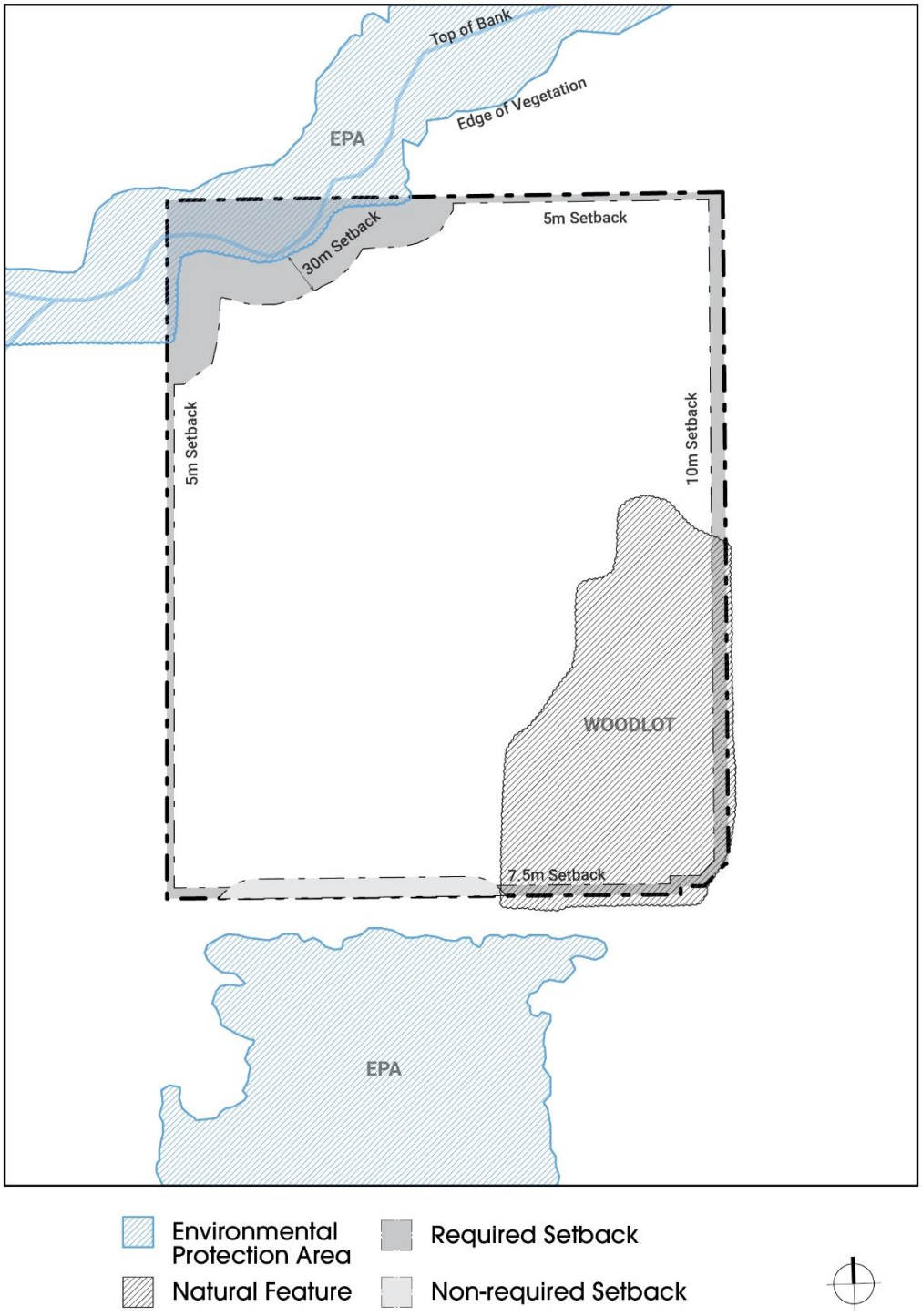


Figure 3.1.4-1: Environmental Protection Areas & Natural Features

3.1.5 SITE VIEWS

The existing views to and from the site are of rural farming landscapes and small woodlots. Significant view directions include: north, towards the designated natural heritage lands surrounding the Lyons Creek; southeast, towards the woodlot at the corner of Montrose and Biggar; and south, towards the agricultural lands and residential properties along Biggar.

Figure 3.1.5-1: View of Montrose and Biggar Roads Northwest Corner, facing North

Figure 3.1.5-2: Representative view along Biggar Road, Facing West

Figure 3.1.5-3: Representative view along Biggar Road, Facing East

Figure 3.1.5-4: Representative view of site from Biggar Road, Facing North

Figure 3.1.5-5: View of Montrose and Biggar Roads intersection, Facing North

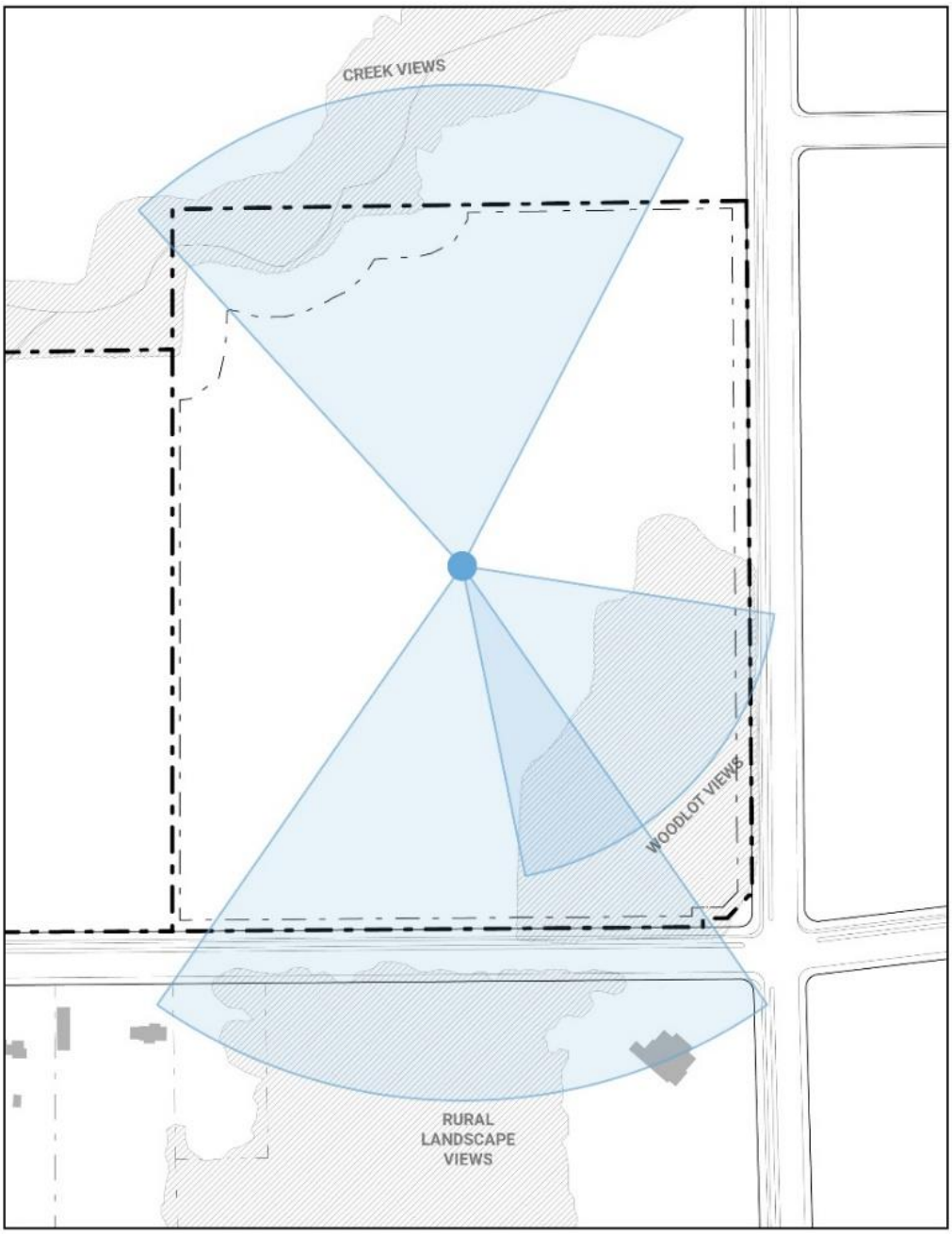


Figure 3.1.5-6: Site Views

3.1.6 WIND & SOLAR EXPOSURE

Microclimate

Solar Exposure

There are no restrictions for orienting the Hospital to take full advantage of the solar exposure opportunities available to the site: the orientation of the site is aligned with the cardinal directions and there are no existing constructed elements on or adjacent to the site that might cast shade.

The woodlot in the southeastern corner offers an additional opportunity for natural shade in the vicinity of the tree edge.

Wind Exposure

The dominant winds on site are from the south-southwest, with secondary winds directed from the west-southwest and south. Eastern storm winds are usually expected from the east-northeast.

Wind and snow accumulation studies are necessary to confirm precipitation levels in detail and to collect recommendations for building and landscape design features, including mitigation measures for wind effects to improve microclimates on site.

Noise Exposure

The site area is relatively quiet at present and has generally low volumes of passing traffic, although some traffic noise is generated from the QEW highway to the east. In future, the hospital itself will be the primary source of noise in the area. Helicopter landings, emergency vehicles, mechanical equipment and increased vehicle traffic will all contribute to significantly increased levels of noise in the area.

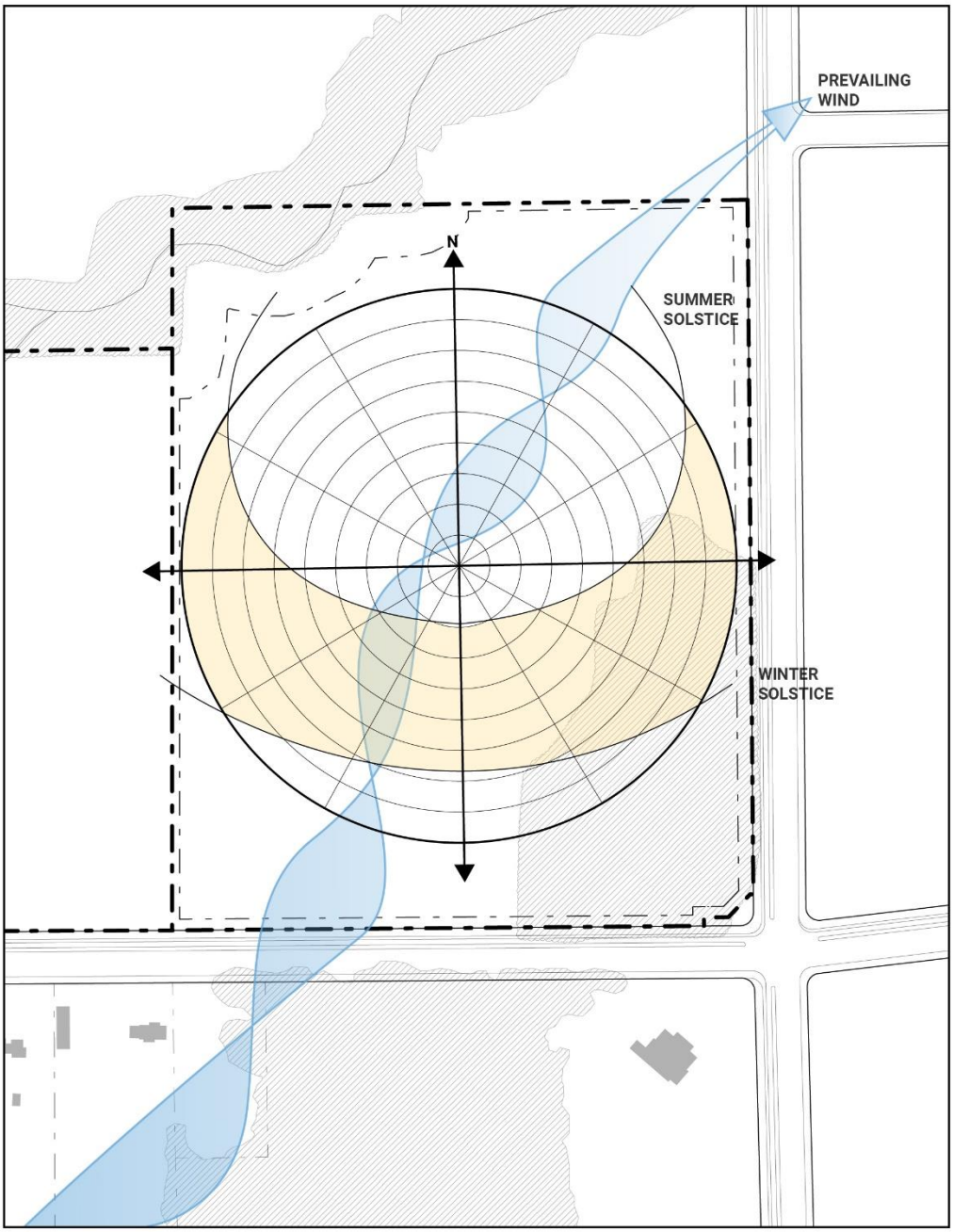


Figure 3.1.6-1: Site Wind & Solar Exposure

3.2 Existing Servicing Conditions & Background Studies

The City is undertaking an Environmental Assessment (EA) for lands within the Secondary Plan boundary, which will bring substantial new residential development in the immediate vicinity of the hospital property. Therefore, the development of the new hospital property will be closely linked to this EA.

3.2.1 **WATER**

There are existing 300mm diameter distribution watermains on Montrose Road (site east boundary) and Grassy Brook Road (north of the site). These watermains are part of a distribution network connecting to the Regional watermain on McLeod Road. According to the *Preliminary Municipal Servicing Report Grand Niagara Secondary Plan*, prepared by WSP, dated November 2016, the Niagara Falls water distribution system has a capacity of 145.5 million litres per day. This capacity meets the long-term water supply needs of the City of Niagara Falls, including that of the Grand Niagara Secondary Plan. It has been estimated that the water demand resulting from the anticipated full build-out scenario (i.e., year 2031 with both hospital and Grand Niagara Secondary Plan built out) is 112.81 million litres per day (or approximately 78% of the total capacity of the water supply system). The study recommends that detailed water modelling, including hydrant flow tests, be conducted during subsequent planning applications to confirm existing flow rates to ensure adequate domestic and fire flows can be achieved within the Secondary Plan area.

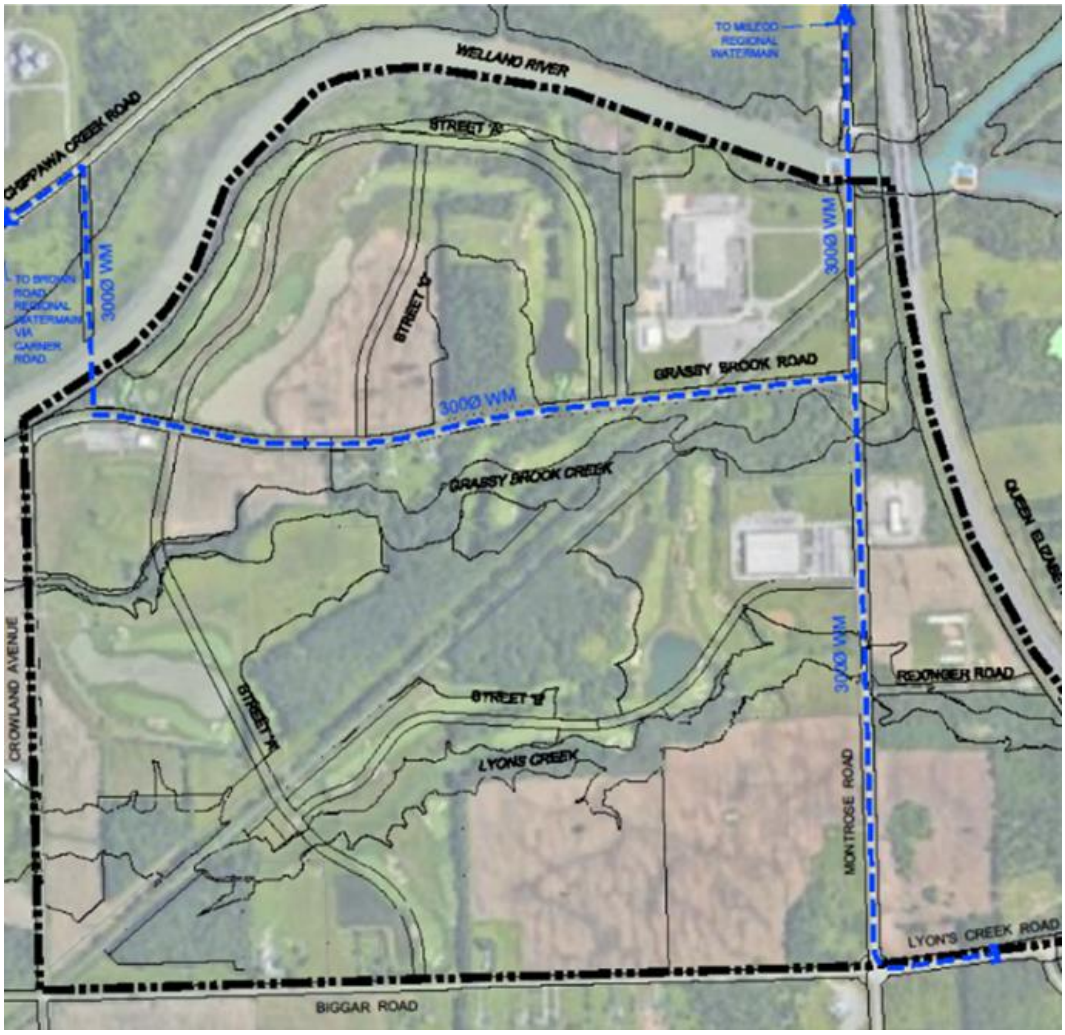


Figure 3.2.1-1: Existing Water Distribution System (Preliminary Municipal Servicing Report Grand Niagara Secondary Plan, WSP, Nov.2016)

3.2.2 SANITARY

The existing sanitary sewer infrastructure in the vicinity of the subject site includes the existing 300-450mm diameter sanitary sewers on Montrose Road and the existing 300-375mm diameter sanitary sewers on Grassy Brook Road. Both sanitary sewer systems discharge to the Grassy Brook Road Sanitary Pumping Station (SPS) located approximately 50m north of the intersection of Montrose Road and Grassy Brook Road. The sanitary flows from the Grassy Brook Road SPS are conveyed northerly via an existing forcemain to a gravity sanitary sewer system located at the intersection of Montrose Road and Brown Road.

The *Preliminary Municipal Servicing Report Grand Niagara Secondary Plan*, prepared by WSP, dated November 2016, addresses the servicing needs of the subject site. According to this study, the estimated maximum flow rate calculated for the proposed development within the Secondary Plan area is 119.23 L/s. The existing leg of gravity sewer upstream of the Grassy Brook Road SPS is critical for the site as it will convey the most flow. This sewer leg is 450mm in diameter with a slope of 0.23%, which yields a capacity of 136.7 L/s. The sewer will therefore reach 87% of its capacity once the Secondary Plan area is fully built out, which is acceptable per City standards. Furthermore, the Grassy Brook Road SPS currently operates with two pumps, each with a capacity of approximately 21 L/s. In order to meet the needs of the full build-out of the Secondary Plan area, the Grassy Brook Road SPS will undergo upgrades in the near future to increase its capacity to 138 L/s. In subsequent planning applications, the design flows to the Grassy Brook Road SPS should be reviewed with greater accuracy, as estimated land-use and populations become more defined.

The sanitary drainage from the Secondary Plan area ultimately drains to the existing Niagara Falls Wastewater Treatment Plant (WWTP) which has a capacity of 789 L/s and as of 2011, treats a sanitary sewage flow of 579 L/s. It has been estimated that at full build-out, the plant will be required to treat a sewage flow of 885 L/s.

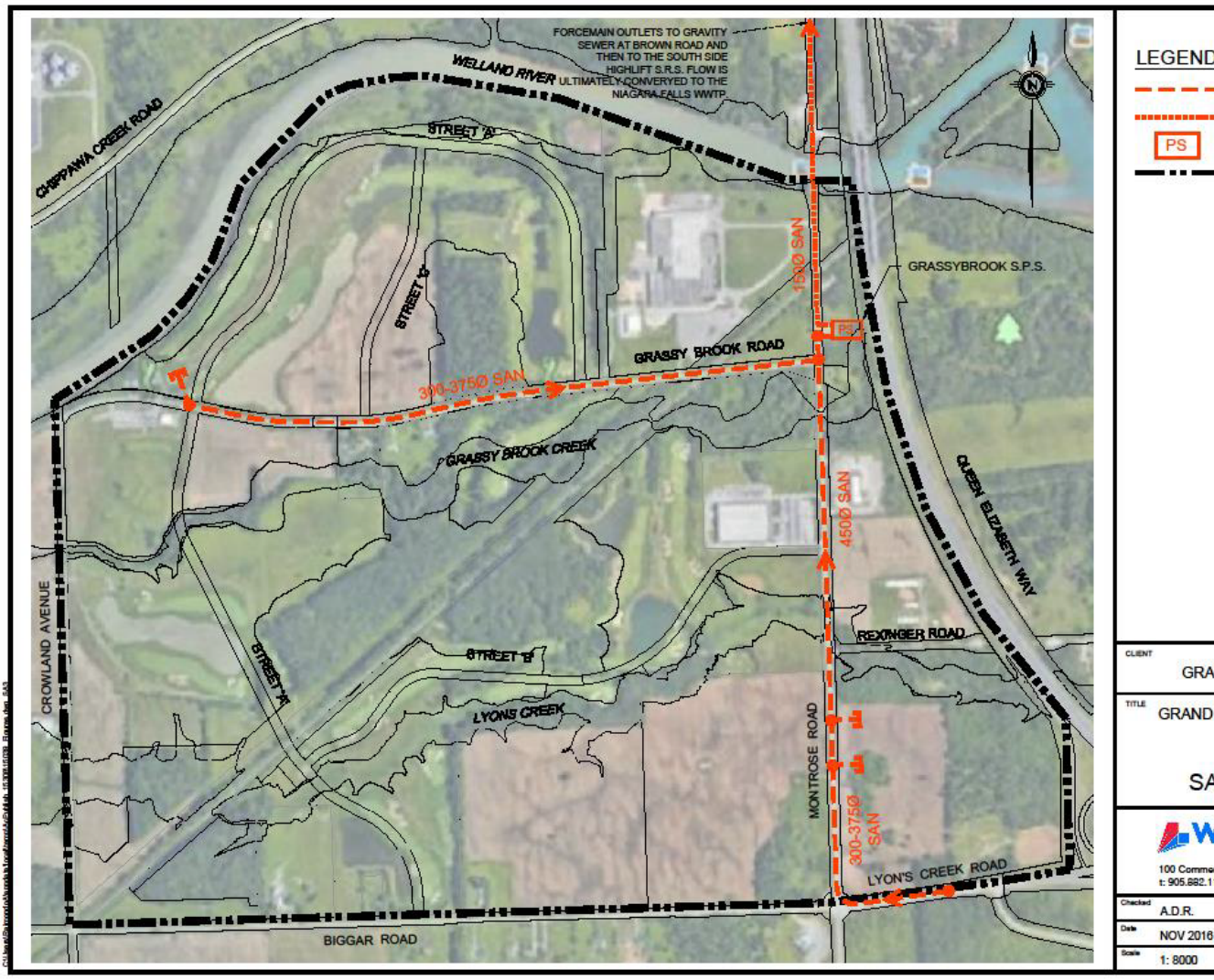


Figure 3.2.2-1: Existing Sanitary Sewer System (Preliminary Municipal Servicing Report Grand Niagara Secondary Plan, WSP, Nov.2016)

3.2.3 STORM DRAINAGE AND STORMWATER MANAGEMENT

Stormwater runoff from the subject site generally flows from the south to the north limits of the site, towards the direction of Lyons Creek. An existing south-north ditch, located approximately at the midpoint of the site, picks up drainage from the site area and conveys it northerly. There are no existing storm sewers in the vicinity of the subject site.

The City of Niagara Falls' Development Charges By-law includes new municipal storm sewers on Biggar Road and Montrose Road as part of ongoing road improvement projects, which will be designed to service the proposed hospital. The City is responsible for conveyance of flows from the above mentioned new municipal storm sewers on Biggar Road and Montrose Road to Lyons Creek.

Potential constraints associated with existing stormwater outfalls to Lyons Creek will need to be evaluated in future phases of development, if they continue to be utilized in the ultimate hospital site design.

3.2.4 GAS

The proposed hospital campus site is currently not serviced with natural gas. However, there is one (1), existing, 8", extra high-pressure natural gas main available approximately 550m north of Biggar Rd., on Montrose Rd. (near Grassy Brook Rd.). Based on preliminary capacity calculations, Enbridge has indicated that this line has enough capacity to meet the hospital's requirements. Enbridge has cautioned that although capacity is available now and will likely be available in the future, they cannot make any guarantees until they receive a formal commitment for service. There are no additional gas mains in the area which present a feasible option for alternate supply routing or redundancy.

3.2.5 HYDRO

Stantec met with Niagara Peninsula Energy (NPE) in July to discuss existing power service in the area and proposed requirements for the hospital. The existing energy system includes overhead power lines at 13.8KV. The capacity of 2 x 15 MVA lines required is not currently available for the site.

3.2.6 COMMUNICATIONS

Bell Canada has some copper and fiber cabling close to the hospital site but prefers to move away from copper cabling. Cogeco Cable has existing fibre cabling on Biggar Road abutting the south side of the property. Other service providers, Niagara Region Broadband Network, Telus, Freedom and Rogers are in the area as well.

3.3 Existing Transportation Conditions

3.3.1 TRAFFIC PATTERNS

The site is bordered by the following existing road network:

- **Montrose Road (Regional Road 98)** is a two-lane Regional arterial roadway that runs north-south through the City of Niagara Falls parallel and west of the Queen Elizabeth Way (QEW). Montrose Road has a speed limit of 80 km/h and is signalized at its intersection with Biggar Road.

  The Niagara Region will be conducting an Environmental Assessment for Montrose Road within the vicinity of the site that will determine the ultimate cross-section, intersection control, and alignment of the roadway between Chippewa Creek Road and Lyons Creek Road.

- **Biggar Road** is a two-lane City arterial roadway that runs east-west along the southern City Limits of Niagara Falls, between the Welland Canal and the QEW, where it becomes a Regional Road (Lyons Creek Road, RR47) just west of the QEW. Biggar Road has a speed limit of 80 km/h and is signalized at its intersection with Montrose Road.

- **Lyons Creek Interchange** is a "Parclo A-4 with four-lane crossing" interchange design. The freeway exit ramps are currently unsignalized.

Initial studies for the Grand Niagara Secondary Plan and Hospital indicate that:

- At minimum, Montrose Road and Biggar Road will both require a partial or full widening to four lanes along the hospital frontage and signalized traffic control is recommended for the hospital site;
- Signalized traffic control is also recommended at the off-ramp intersections of the QEW.

The CIMA+ TIS was reviewed by the City, Region, and MTO and is required to be updated to inform the Environmental Assessment for Montrose Road, site access operations, and interchange operations upon full buildout of the hospital.

The Secondary Plan suggests:

- A road cross-section of 26 metres along the arterial roads. The Niagara Region Complete Streets Guideline, Updated Traffic Impact Study for the site, and the forthcoming Montrose EA will supersede this cross-section design.
- Montrose / Biggar roundabout identified in the Secondary Plan is to be determined through the EA for Montrose

The Region's Complete Streets Guidelines suggest:

- A road cross-section of 36 metres along arterial roads.

The Niagara Falls and Niagara Region Official Plans suggests the following right-of-way for the study area roadways:

- Montrose Road: 26.2 metres
- Biggar Road: 26.0 metres
- Lyons Creek Road: 26.2 metres

3.3.2 PUBLIC & ACTIVE TRANSPORTATION

No transit services currently service the site. The Region's Transportation Master Plan identifies this area for the introduction of fixed route service. The City's Development Charges Review identifies funding for additional specialized buses, as well as additional conventional buses in the vicinity of the site serving Chippewa East and West, Niagara Health Future Hospital Site and Thundering Waters. The City's Development Charges Review also identifies infrastructure costs for a "Bus Turn-Around/Hub" at the Niagara Health Future Hospital Site.

The Niagara Region and City of Niagara Falls transit authorities anticipate approximately six bus routes at a 'mini hub' at this location that will facilitate a mix of local and regional routes. The primary hub will remain at Niagara Square. Their immediate transit needs for this area include four bus stops to accommodate two conventional buses (40') and two articulated buses (60'). These could be integrated on-site and facilitated with a center island (terminal style), or integrated roadside. Neither the Region nor the City currently has a preference for layout of the facilities, but each options has advantages and disadvantages in regards to distance to front door, bus transfers, service times, expansion capability for further transit and total area footprint.

IBI is conducting a Specialized Transit Service study for Niagara Region with results expected in fall 2019. Pick-up/drop-off facilities for the hospital should be designed to anticipate paratransit vehicles. Niagara Region is also conducting a Conventional Transit study – timeline within in the next year, but further out than the IBI Specialized Transit Study.

Both Montrose and Biggar Road are planned Active Transportation routes and a trail network is planned to connect into the north edge of the SNH site.

3.3.3 PARKING

Based on former site studies, the required area to demonstrate 3,014 surface parking spaces is generally illustrated in Figure 3.3.3-1 below. This illustration does not account for any site design elements beyond parking spaces and their related aisles and shows that even so, a supply of 3,014 spaces will not fit with the other planned site plan elements on the site.

Figure 3.3.3-1: Parking Area based on hard surface area required to implement 3,014 spaces on the 2016 Master Plan. (BA Group)

04

4 Opportunities & Constraints

4.1 Project Vision

4.1.1 NIAGARA HEALTH VISION

Niagara Health's vision of "a true acute care hospital of the future within a campus that supports health and wellness" is at the intersection of Facility Design, Clinical Planning and ICAT Connectedness.

This vision is expressed in design goals that were discussed as part of a design charrette, and which resulted in six themes for design, listed below. These themes were referenced throughout the Campus Planning process, including in the identification of the Opportunities and Constraints, the establishment of Evaluation Criteria, and in the campus design process itself.

1. Accessible and Inclusive
2. Patient, Family and Staff Experience
3. Community Connectedness
4. Environmental Leadership
5. Operational Excellence
6. Flexible, Adaptable and Responsive

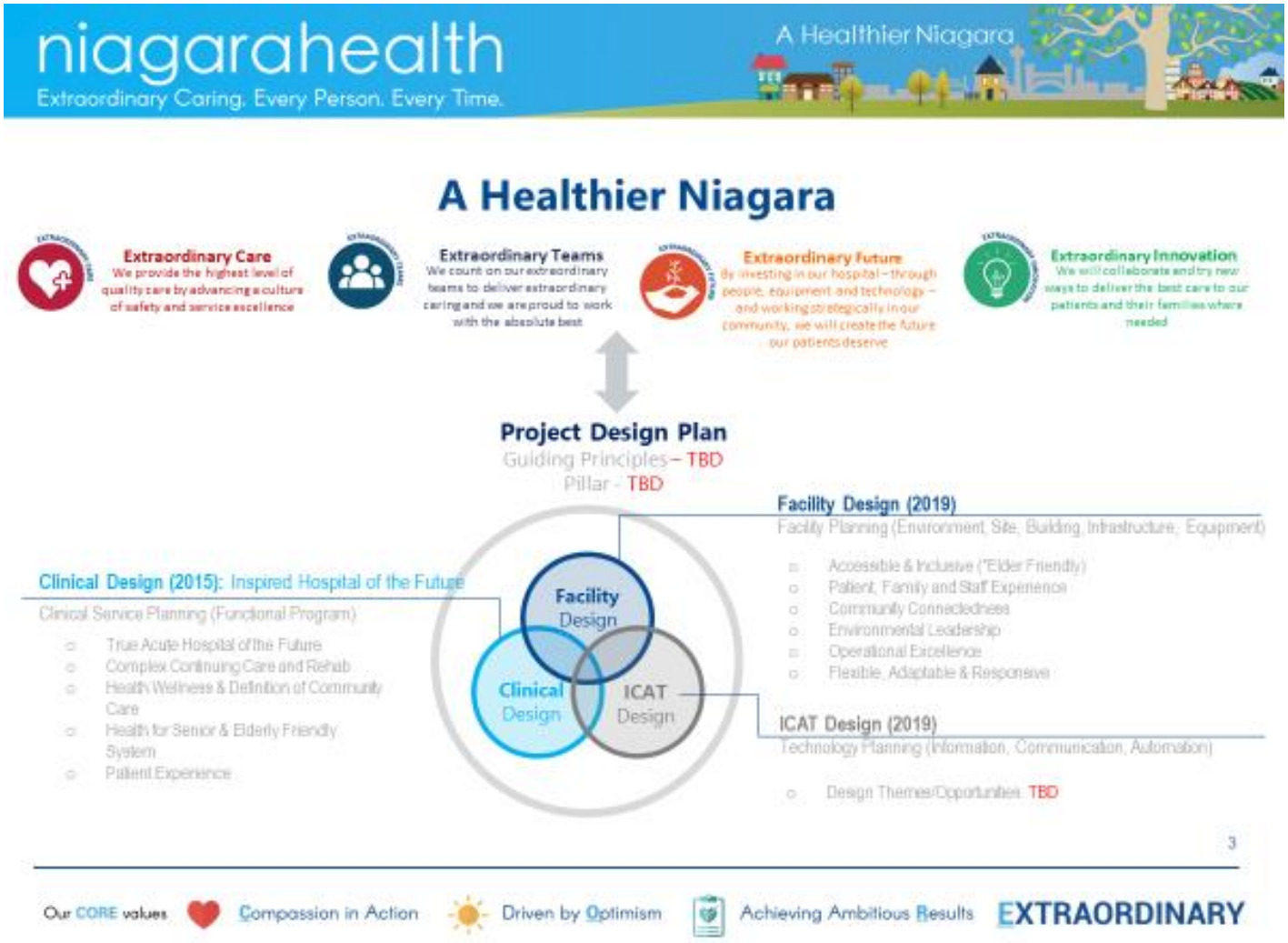


Figure 4.1.1-1: Niagara Health Vision

4.1.2 KEY DESIGN DRIVERS

Niagara Health authored a list of Key Design Drivers to expand on the six high-level Niagara Health Vision goals. The Key Design Drivers, listed below, were presented as a non-exhaustive list and were used to inform the Opportunities & Constraints analysis of the site:

1. Optimization and Separation of Traffic Flows
2. Efficiency of Facility Operations
3. Optimal Parking/Loading/On-Site Circulation
4. Critical Event Preparedness
5. Meeting the Priority 1 Program Adjacencies
6. Optimizing the 7 Flows of Healthcare
7. Flexibility, Adaptability and Expansion for Facility Resiliency
8. Elderly Friendly Design
9. Safety and Accessibility
10. Strong Connection to Nature
11. Wayfinding (including Ground Floor Legibility)
12. Energy Efficiency
13. Low Impact Design (LID) for Site
14. Building as a Focus Point Integrated in the Community
15. Site Placement/Integration with Context
16. Community Wellness
17. Budget & Resource Efficiency

4.2 Opportunities & Constraints

The following analysis of opportunities and constraints is organized according to the Vision Goals and Key Design Drivers established by Niagara Health and previously described in Section 4.1.1 and 4.1.2. Under each Vision goal, Design Goals are given to expand on the vision and relate it more specifically to the regional context, site conditions and programmatic requirements of the SNH site. These Design Goals are accompanied with corresponding notes on potential implementation opportunities and challenges, as identified by the project team.

While some of these Design Goals did not directly translate into either Evaluation Criteria or Design Guidelines, and while some of the categories evolved during the campus plan design process, the Design Goals developed at this stage nevertheless permeated and informed the campus strategies adopted in the next stages of the design, evaluation and guidelines process.

4.2.1 ACCESSIBLE & INCLUSIVE DESIGN

Goal 1. Create Supportive Outdoor Environments

Implementation Opportunities:

- Wayfinding/legibility of design.
  - Clarity of design includes intuitive wayfinding – clear hierarchy of space and approach sequences.
- Safe and welcoming environment.
- Clarity of access.
  - Visible and identifiable destinations; Multiple drop-offs.
- Generous thresholds between indoor and exterior.
- Landscaped walking circuits with rest areas.

Implementation Challenges:

- Dispersed regional catchment area.
- Equitable opportunity for access to parking and transit.
  - Plan for location of accessible parking spaces and location of the transit stops.
- Limited transportation choices for outpatients.

Goal 2. Improve Patient & Visitor Access

Implementation Opportunities:

- Minimize Travel Distance for Patient Visitors from Parking to Building Entrance(s)
- Parking structure linked to main entrances
- Generous drop-off approach to diffuse traffic at main entrance
- Integration with civic plaza
- Opportunity to control the curb to maximize access

Implementation Challenges:

- Tight turns at drop-off and curb access
- Distance to Parking Facilities

4.2.2 PATIENT, FAMILY & STAFF EXPERIENCE

Goal 3. Ensure Recognizable Hospital Image & Identity

Implementation Opportunities:

- Create a wellness destination
- Image/identity facilitate employment opportunities
  - This is a community asset, it should have the look and feel of a community campus not a hospital, it should be welcoming to all with a strong integrated continuous campus landscape, employment opportunities and an array of retail and café experiences. Develop intuitive and legible wayfinding.
- Develop a civic gathering space
  - Strong connection of civic space to community programming within the Hospital and anticipation of future community activities
- Opportunity to establish the vision for the community
  - First development responsibility
- Strong urban edge opportunity along Montrose
  - Active ground floor retail and other uses; relationship to outdoor gathering space program

Implementation Challenges:

- Site context (urban edge)
  - There is no context yet
- Potential gateway visibility constraints
- Early adopter syndrome
  - Risks of setting a direction for the surrounding development
- Disperse Niagara Health network
- Biggar Rd is the edge of the urban boundary
  - Risks of anticipating future development

Goal 4. Create Therapeutic Landscapes

Implementation Opportunities:

- Protect woodlot
- SWM pond acting as naturalized area
- Outdoor Patient Programs
  - Clearly identify accessible green areas with meaningful shelters and furniture and directly connected to departments or social / public areas. - nature that is easily identifiable, accessible, visible, connected, comfortable, well lit, safe and heavily programmed.
- Therapeutic gardens included in the design
  - Seating, public art, feeding stations, play all in the naturalized areas. Cameras offering close ups on feeders and other features for those too sick to walk to window.
- Roof Landscapes
  - Four Season Green Roofs that are visible from multiple inside/outside.
- Vegetable/kitchen gardens option to be explored – CC and Rehab courtyards

Implementation Challenges:

- Building shade
- Soil depth for planting roof landscapes
- Controlled access to outdoor spaces
- Maintenance program challenges

Goal 5. Promote Responsive Winter Design

Implementation Opportunities:

- Safe and comfortable access (linked parking structure)
- Protection from wind exposure
  - Plan for mitigation measures: landscape, building elements
- Orientation for solar access
- Building colour to animate the public realm

Implementation Challenges:

- Safety concern due to the distance of parking facilities from the hospital
- Wind protection of open spaces adjacent to the building
  - Building design responsive to prevailing winds
- On-site snow storage

4.2.3 COMMUNITY CONNECTEDNESS

Goal 6. Take A Campus Approach

Implementation Opportunities:

- Walking and cycling connections
- Create a community Hub
- Promote current and future employment opportunities on site
- Hospital will set the tone for the nature of the wellness campus and connection to surrounding neighborhoods

Implementation Challenges:

- Development costs may need to be front ended with no certainty of future development timing
- Surrounding community will develop after the hospital, making connections uncertain

Goal 7. Create a Connected Hospital

Implementation Opportunities:

- Campus can evolve with surrounding development
- Medical Office Building and or Parking Structure may offer an urban edge
- Green connectivity across the site
- Pedestrian and cycling routes to infiltrate the site
    - Strong pedestrian/cycling patterns to anticipate connection to surrounding future development

Implementation Challenges:

- Integrating nature into the urban experience
- Parking yield vs. nature
- How do you translate horizontal or vertical massing of the site?
- Potential natural heritage site at the Gateway

4.2.4 ENVIRONMENTAL LEADERSHIP

Goal 8. Respond to Site Opportunities

Implementation Opportunities:

- Orient the building in response to site opportunities
- Increased access to daylighting and views
- Roof landscapes
- Maximize visual interest of the north landscape area
- Buffer through naturalized planting, tree placement and wayfinding

Implementation Challenges:

- Building height limits stacking and orientation options
- At grade parking demand restricts connection to nature

Goal 9. Promote Daylighting and Views

Implementation Opportunities:

- Limit depth of Building Footprint to increase access to daylighting and views from a maximum of spaces
- Roof landscapes visible from maximum of programs
- Courtyards

Implementation Challenges:

- Building massing
  - Managing building depth vs. programmatic requirements and cost
- Internal Programming requirements – blocking and stacking
- Depth of courtyards
  - Access to direct sunlight

Goal 10. Create Low Impact Design Landscapes

Implementation Opportunities:

- Natural Heritage Site S/E
  - Integration in public landscape amenity
- Rainwater Retention and/or reuse for irrigation to reduce discharge to municipal storm sewers
- Stormwater Filtration, Bioswales, Reuse
- Naturalization of campus landscape
  - Tree canopy and planting to reduce heat island effect
  - Wind shadow shaping and planting
  - Native planting encouraging pollination and migration
- Resilient Landscapes

- Green roof areas

Implementation Challenges:

- Redundant water service
- Natural heritage site S/E
  - Possible protected species driving up costs and affecting approvals schedule
- High water table at the site limits the function of at grade LID features

Goal 11. Promote Energy efficiency, Reduce Carbon Footprint and Increase Conservation of Resources.

Implementation Opportunities:

- LEED Gold, Platinum, or Net Zero
- Building massing responsive to energy factors
  - Preference E/W that works with summer breezes, and solar path
- On-site renewable energy generation
  - District energy/solar panel arrays
- Artificial lighting reduction strategies
- Water reuse and conservation strategies that will treat water as a resource
- Waste management program
- Active & Shared transportation options
- Electric vehicle charging infrastructure
- Unknowns related to future wastewater treatment facility and adjacent municipal infrastructure.

Implementation Challenges:

- Building Height Limits
  - Should a vertical scheme have advantages over other options?
- Budget Constraints
  - Lifecycle costs to be considered

4.2.5 OPERATIONAL EXCELLENCE

Goal 12. Maximize Access

Implementation Opportunities:

- Separation of traffic flows: emergency, public/visitor, service /staff
- Welcoming drop-off options
- Transit stop on site, near one or two entrances
- Centrality of main entrance and loading area

- Ambulance access (from two main roads; redundancy on site)
- Appropriate number and type of building entrances
- Allow outpatient services to continue even during inpatient outbreak
- Emergency/service ring road around building
- Alternative routes for emergency vehicles
- Loading area separation

Implementation Challenges:

- Building massing, orientation and location
- Limited number of site access points
- Access points minimum distance to main intersection
- Parking at grade – unprotected long travel distance
- Potentially Natural Heritage Protection at South East part of site.
- By-law setbacks

Goal 13. Optimize Helipad

Implementation Opportunities:

- Rooftop: land saving and reduced surrounding properties interference
- At grade: adjacency to ED

Implementation Challenges:

- Rooftop: extra costs, noise to inpatients, elevator travel to reach Emergency
- At grade: strict fight path impact on site structures and surrounding roads and properties

4.2.6 FLEXIBLE, ADAPTABLE AND RESPONSIVE

Goal 14. Anticipate Change

Implementation Opportunities:

- Multiple opportunities to expand on-site and across the Hospital Employment Campus
    - Develop an integrated approach to campus planning in various health scenarios, and over the life of the community as it grows up around the hospital.
- Parallel and integrated municipal infrastructure planning opportunities to support the vision of the hospital
- Integrated urban design approach for infrastructure
- Universal IPU configuration – to support a future adaptation/expansion strategy
- Potential MOB
- CBRN adaptability

- Universal IPU design
    - IPUs to be flexible/universal to allow growth/swing/switch between acute and non-acute

Implementation Challenges:

- Implementation framework needs to be adaptable.
- Parking structure: phased in with expansion versus the upfront cost of constructing in first phase
- New infrastructure needs to be in place for hospital delivery
- Potential MOB
    - Financing and procurement risks
- Space for Total Facility Regeneration
- Redundant water service to the site
- Routing of site services must not impede future expansion plans

05

5 Evaluation Criteria

5.1 Evaluation Criteria

5.1.1 EVALUATION PROCESS

The campus plan process requires a rigorous approach to evaluation in order to ensure a resulting plan that is robust and has the highest potential to be developed in future design phases into a successful project that fulfils the Niagara Health Vision, satisfies the established design guidelines and integrates well into the physical and community context.

This project team developed an Evaluation Criteria for the campus plan through the following process:

- Developed sets of criteria, within established categories;
- Refined the criteria in consultation with internal and external stakeholders;
- Utilized the “choosing by advantage” method to test the performance of the options or strategies for Campus development;
- Presented the results of the evaluation process to the Niagara Health Senior Leadership Team, along with recommended next steps.

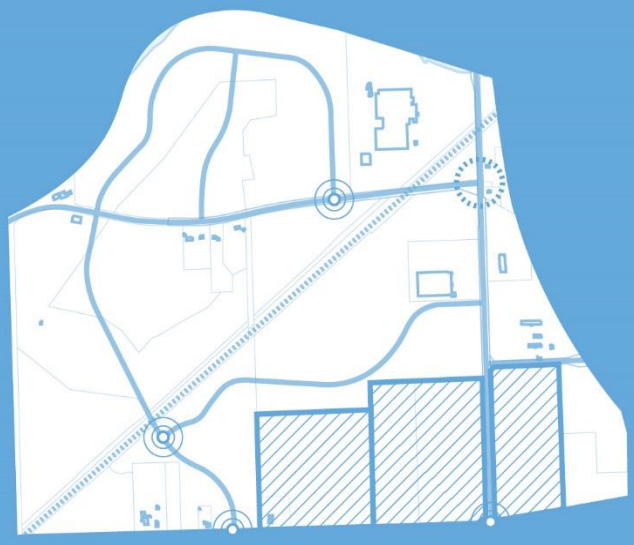
5.1.2 CAMPUS PLAN EVALUATION CRITERIA

The Campus Plan Evaluation Criteria were the result of an incremental development process conducted in consultation with the Niagara Health team. The Niagara Health Vision goals were used as a continuing organizing factor. The opportunities and constraints identified in Chapter 4, as well as the design process itself, provided additional sources for the criteria, with a focus on items that could be differentiated between schemes.

Seventeen (17) specific groups of criteria resulted as a means to organize the individual items, ranging from site planning to internal clinical functionality. The list of criteria was presented and discussed with external stakeholders including the City of Niagara Falls, the Niagara Region and the NPCA. The criteria list was also presented and discussed internally with Niagara Health hospital staff.

Ultimately, a combined and coordinated set of criteria was assembled and used by the project team to evaluate two campus plan strategies, a Horizontal Strategy and a Vertical Strategy. These strategies were also evaluated against the scheme submitted for MOHLTC Stage 2.

For the full Evaluation Criteria list, please refer to Appendix A-2a. This list also provides a source for future option evaluation exercises and is coordinated, to the extent practicable, with the guidelines that follow in Chapter 8 of this report.



SYNTHESIS

06

6 Campus Plan Development

6.1 Site Planning Approach

6.1.1 SITE PLAN VISION

The vision statement developed by Niagara Health sees the future SNH to be a "true acute care hospital of the future, within a campus that supports health and wellness." From this vision statement, and from the Niagara Health Vision and Key Design Drivers described in Chapter 4 of this report, the following site plan objectives emerged and informed the site planning approach of the Campus Plan:

1. Operational Functionality

The site plan and building configuration should support functional and efficient campus operations, including parking demand strategies, efficient site circulation, easy wayfinding, legibility of entrances, primary access from Biggar and Low Impact Development (LID) stormwater management strategies.

2. Clinical Functionality

The site planning and building configuration should support the Priority 1 flows and adjacencies necessarily to ensure clinically functionality of the hospital facility.

3. Future Growth and Adaptation

The site planning and building configuration should maintain potential for future growth and adaptation. This includes accommodation for:

- Future horizontal expansion of key clinical programs on the D&T podium
- Future fit out of shell space
- Future renovation of soft space
- Universal IPUs - Future Adaptation of Inpatient Units (e.g. CCC/Rehab IPU adaptation to Medical Surgical IPU's)
- Future ancillary campus development with complementary uses
- Future parking garage structure

4. Long Term Campus Potential

The site planning and building configuration should adopt a campus approach to the assembly of different buildings, forms or blocks. Each site building element should have its own character and identity, and complementary functions and shared parking strategies should be planned so that relationships and partnerships can be fostered through future ancillary developments.

5. Health and Wellness

The site planning and building configuration reinforce an identity related to health and wellness, a strong connection to nature, and healing gardens.

6. Affordability of Construction

The site planning and building configuration should support affordable approaches to constructability.

7. Ground Floor Legibility and Flexibility

The site planning and building configuration should support easy access, circulation, and wayfinding, and the ground floor should offer the greatest flexibility for expansion or incremental growth around the building.

6.1.2 SITE PLAN APPROACH

NHS' development of the new South Niagara Hospital represents the continuing evolution of healthcare services in the Niagara region and of the facilities and environments in which those services are provided. Following extensive studies by NHS and consultations with their provincial, regional and municipal partners, the selected site for the new SNH presents opportunities to *improve overall access* to new and expanded health services, *promote a positive identity* of NHS-SNH and to be a *catalyst for development* of the new health precinct within the City of Niagara Falls' Grand Niagara Secondary Plan.

The emphasis of the Grand Niagara Secondary Plan area is on redevelopment, neighbourhood creation, streetscape activation and gateway development at intersections. The new area is intended to be a healthcare destination for the city as well as the wider region, within which the South Niagara Hospital campus is a focus site and flagship civic space.

The Secondary plan emphasizes the thoughtful and sensitive integration of development with and views to the Natural Heritage System and the Welland River. Accordingly, there is opportunity to contribute to the protection and enhancement of these existing landforms through the hospital's campus planning process and design concepts. Development of the hospital campus should take cues from the existing landscape and natural geography. Internal streets within the health campus, as well as the hospital itself, can promote place-making and therapeutic experiences by retaining and

maximizing exposure to the existing natural features and corresponding significant views. Further, the relatively flat topography of the site presents opportunities for convenient site access and clarity of circulation, universal design, segregated logistics traffic and overall operational efficiencies.

The design of the South Niagara Hospital campus is also seen as an opportunity to establish a flagship presence in a largely rural area, and as an inspiration for future surrounding development. The proposed approach of the campus development is consistent with the City of Niagara vision for the surrounding HECD lands and the creation of a health precinct, such that the campus can be developed as a good neighbour to the future surrounding developments to the extent possible.

From the outset of this Campus Planning study, therefore, the need to plan for the long-term potential of the site and to anticipate and consciously plan for expanded connections with the community have been strong determinants of building form and site development strategies.

Equally critical to the ultimate project's success will be the effectiveness and efficiency of clinical operations within the new hospital. The proposed Functional Program for SNH sets the types and quantities of clinical program areas, bed numbers and treatment spaces, as well as public, staff amenities and support functions.

As an integral, or *whole facility*, the Functional Program does not of itself, however, mandate *whole site* requirements, beyond dictating actual building entrances. It is left to the site specifics to present opportunities and constraints for non-hospital-based functions (eg. allied health facilities, medical offices etc.) and for solving long-term facility growth or *whole facility* regeneration.

Further, the site is envisioned to be a Campus of Health and Wellness in which the hospital and future ancillary developments partners may work together, not as a singular building, but as an expression and assembly of different identities set in a landscaped environment that promotes wellness, connection to nature, and connection to the community.

This study mandate has therefore included both a whole site or campus planning focus (outside-in) and a clinical planning or blocking and stacking area of focus (inside-out). Resolving for both vantages, the emerging vision statement for the SNH project encapsulates both the internal environment for operations and patient experience and the external environment for community connections and a sustainable future.

6.2 Landscape Approach

6.2.1 LANDSCAPE VISION

The overall landscape vision for the Niagara Health campus shall be built on the principles of the overall vision for the Niagara Health campus plan. Creating a holistic approach to the landscape that provides a safe, accessible and pleasant experience for patients, family and staff, and is environmentally sustainable, while at the same time incorporates efficient and innovative solutions. It should be integrated to form a cohesive and functional mix between all areas of the site. Perimeter landscapes, naturalized areas, parking facilities, pedestrian and bicycle infrastructure together with the therapeutic and dedicated garden areas shall be woven into a single theme and approach that embodies a strong sense of identity and recognition for the entire facility.

The vision should include connections and references to the historical, geographical and cultural aspects of the Niagara Falls community which will provide context to the landscape design. Examples include the unique land formations that created the Falls and the escarpment, the rural nature of the lands to the south and the vibrant local fruit and wine industry. These elements, along with others, should assist in creating an overall vision to the landscape that connects it to its past and ties it to the future development of the area.

In addition, the goal of the landscape design is to create healing outdoor environments that respond to the special needs and conditions of the residents in the specific clinical programs within dedicated therapeutic courtyards. Resident care is promoted through the development of a variety of outdoor spaces that encourages exposure to and a connection with nature.

Figure 6.2.1-1: Bridgepoint Active Healthcare Redevelopment

Overarching Principles

The overarching principles that shall be utilized throughout all of the landscape design development shall include but not be limited to:

- Universal access and adherences to AODA Guidelines.
- Adherence to CPTED Guidelines.
- A strong indoor/outdoor connection with the landscape from all interior spaces, maximizing the benefits of views from patient areas.
- Outdoor spaces shall be protected from extreme micro-climate conditions including sun and glare, wind, and temperature extremes.
- Provide adequately sized areas for snow storage throughout the site.
- The utilization of native, drought tolerant plant material that will grow in the micro-climate of the area. A balanced, full season approach to the selection of plant species including deciduous and coniferous species as well as low maintenance shrubs, perennials and ornamental grasses.
- The use of windbreaks to mitigate the effects of the prevailing winds.
- The use of LID (Low Impact Development) sustainability techniques.
- The retention of existing trees where applicable.
- Hard surfaces for terraces, patios and sidewalks shall be constructed of durable, non-slip materials such as concrete, coloured concrete, natural stone or precast concrete unit paving.
- Retaining walls shall be constructed of CIP concrete or decorative (structural) precast concrete block.
- Fencing shall be constructed of material that is durable, low maintenance and provides a level of security that is appropriate for the area it is enclosing. Aesthetic qualities and heights shall be determined by the intended use of the adjacent space and shall vary from utilitarian design for areas not seen by the general public to a high level of design for areas where patients, visitors and employees are present.
- Where wood is used in outdoor areas, the use of pressure treated lumber is prohibited.
- Site furniture shall be safe, ergonomically functional and be constructed of powder coated steel or aluminum. Wood members shall be Ipe or Jacoba wood. Site furniture shall consist of benches, tables and chairs, shade umbrellas, litter bins, bollards and bicycle racks. Benches shall include, backs, without backs, with arms and without arms. Litter receptacles shall include both litter and recycle chambers. Bollards shall be either concrete or stainless steel and be designed to withstand an impact from a vehicle as determined by the security level requirements of the zone they are protecting.

6.2.2 LANDSCAPE CATEGORIES

Civic Places and Campus Green Areas

Civic places shall include the site perimeter, entrances, community spaces, roads and parking as well as bicycle and pedestrian infrastructure. Campus green areas shall include the helipad, low impact development, the storm water management facilities, and the loading area. Primarily functional in nature, civic places shall include a connected system of pedestrian walkways, shade trees, and mass plantings as well as screening of utility areas. Campus green areas are devoted to areas of the site that are not programmed with specific uses and would include storm water management facilities and the existing natural buffer along the north boundary of the site. These areas would incorporate a more naturalistic approach with native trees and shrubs and low maintenance turf. Plant material would be chosen based on the environmental and climatic condition of the facility for which it is being selected (i.e. moisture loving plants for wet areas).

Gardens for General Use

Gardens for general use will include all public areas such as the Main Entrance and all other building entrances around the facility. Ranging in size and complexity these spaces will see a variety of uses that will include passive seating, waiting areas and of course the interaction of vehicular movements. Care must be taken to ensure these areas are safe and function appropriately for the intended users.

Therapeutic and Dedicated Gardens

Therapeutic gardens will have direct connections to the facilities programs and will include a spiritual and healing garden, a mental health garden and a complex care garden and terraces. Located directly adjacent to the program element, these landscapes will employ special design criteria directly related to the function of the internal programs.

Dedicated gardens will include the cafeteria garden, staff garden and a senior's wellness garden. Similar to the therapeutic gardens, these spaces will include specific design criteria to meet the needs of the users.

6.3 Functional Planning Approach

6.3.1 ADJACENCIES AND CIRCULATION TYPES

The analysis and critique of the MOHLTC Stage 2 scheme determined that, in order to fully explore the challenges and opportunities of this Campus Planning exercise, a revisiting of the blocking and stacking components of the SNH hospital was necessary.

The highest priority adjacencies and circulation types provided by Agnew Peckham provided the starting point for the blocking and stacking exploration. While this exploration was done as a high-level exercise, the satisfaction of these high priority relationships and flows are fundamental for the new facility. Below is the table updated early in July 2019, with input from the user groups.

Niagara Health – Niagara Falls Site

July 9th, 2019 Workshop: Adjacencies and Circulation Types (highest priority)

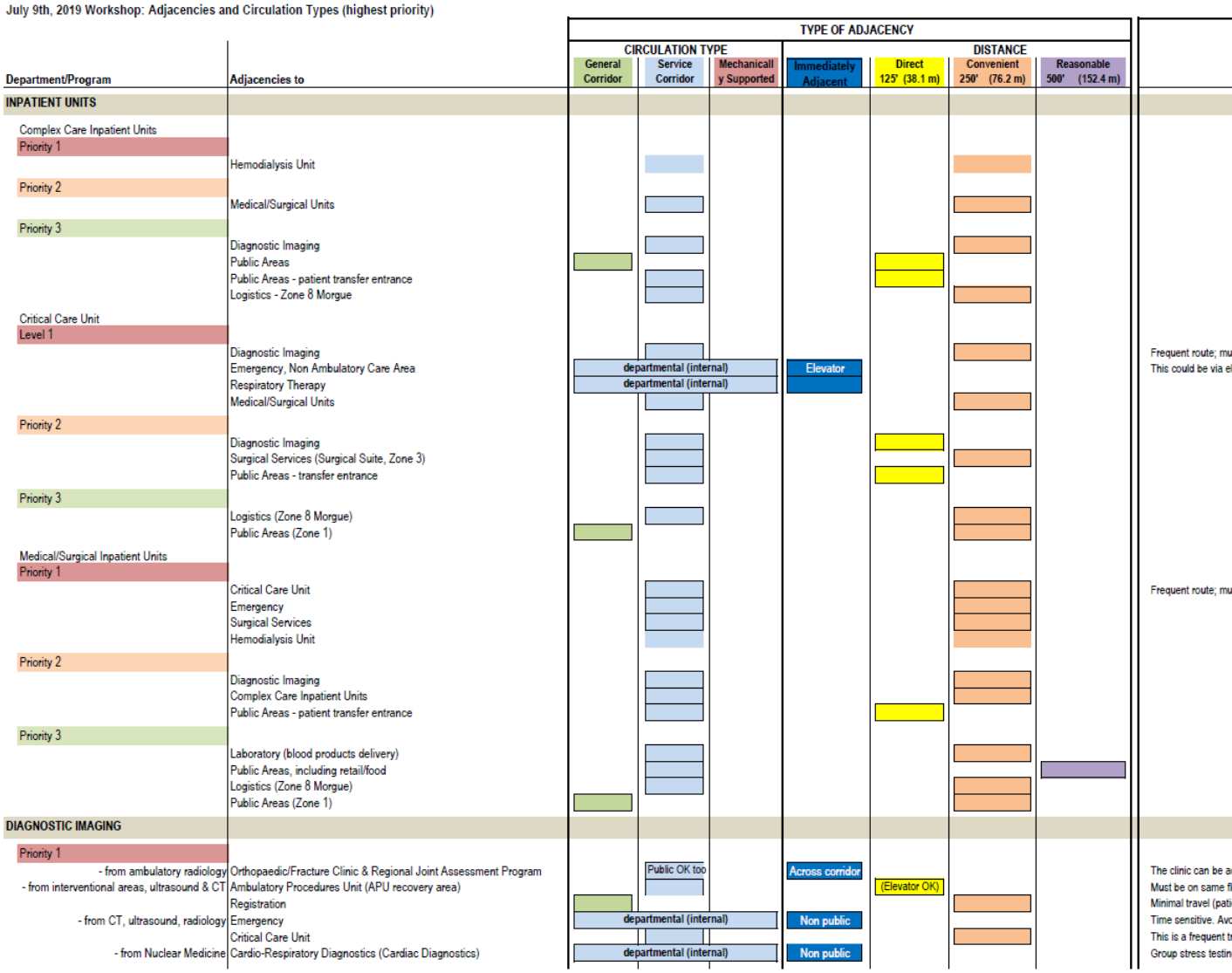


Figure 6.3.1-1a: Functional Planning Adjacencies & Circulation Types

Niagara Health – Niagara Falls Site

July 9th, 2019 Workshop: Adjacencies and Circulation Types (highest priority)

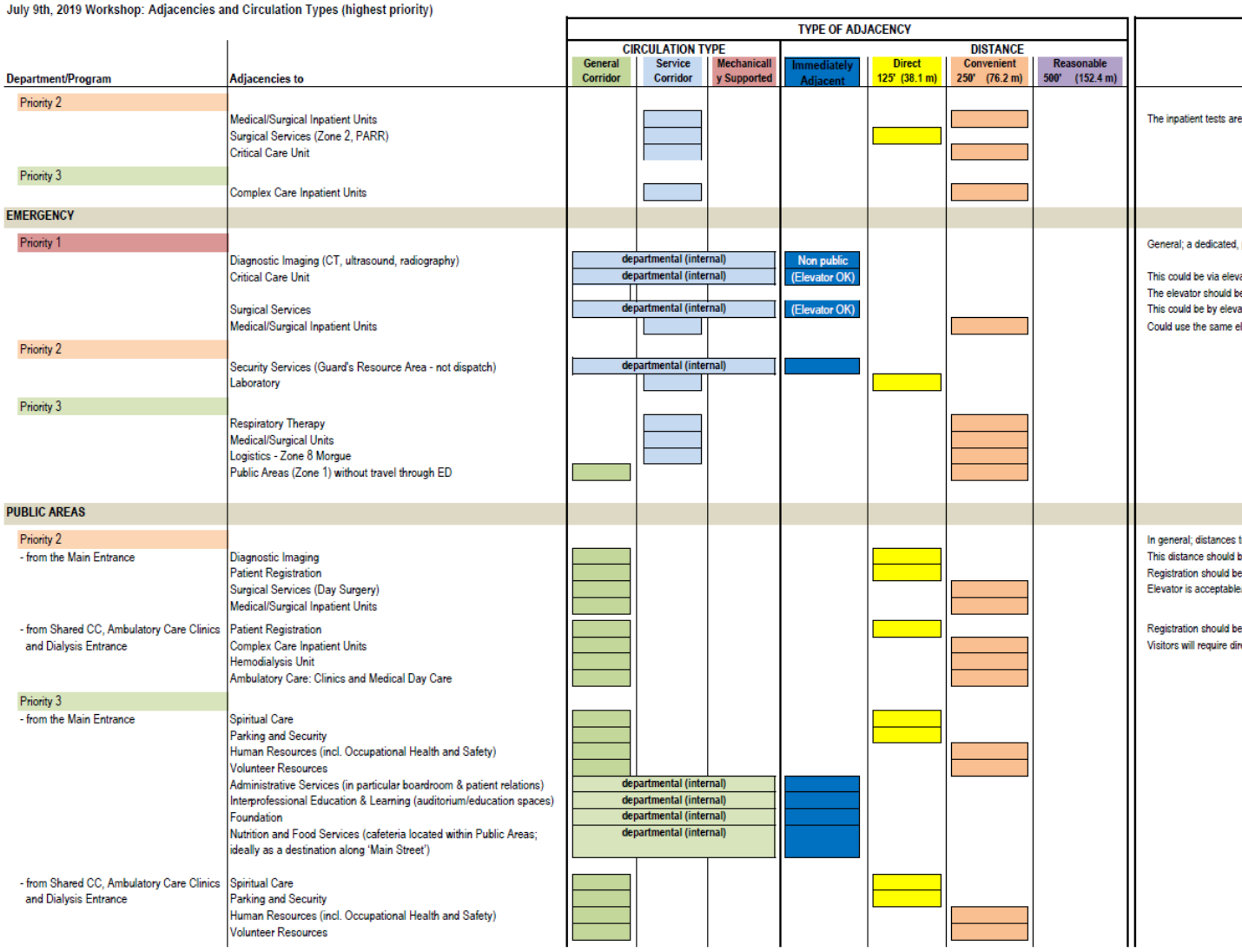


Figure 6.3.1-1b: Functional Planning Adjacencies & Circulation Types

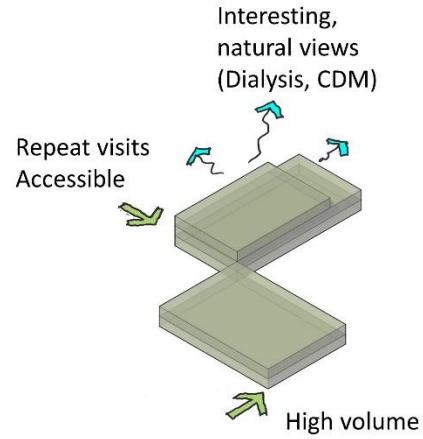
Figure 6.2.2-1: Bridgepoint Active Healthcare Redevelopment

6.3.2 MAJOR PROGRAM COMPONENTS

A careful analysis of the Functional Program prepared by Agnew Peckham as part of the MOHLTC Stage 2 submission has revealed a few program groupings that share either adjacency requirements or functional synergies:

Figure 6.3.2-1: Major Program Groupings

The following diagrams illustrate the characteristics presented by each of these functional groupings, together with their major components and their program departmental areas. All program information is from the Functional Program - MOHLTC Stage 2 submission of 15 March 2019, by Agnew Peckham.



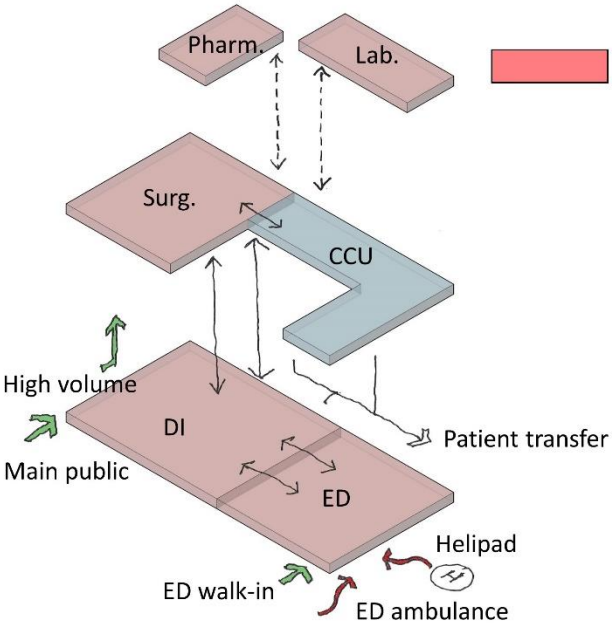
Ambulatory Care

- Ambulatory Care Clinics
- Ambulatory Procedures Unit

- Dialysis
- Chronic Disease Management
- Ambulatory Mental Health

- 122,670 DGSF
- 3 Levels

Figure 6.3.2-2: Ambulatory Care Program



Clinical, Diagnostic & Therapeutic

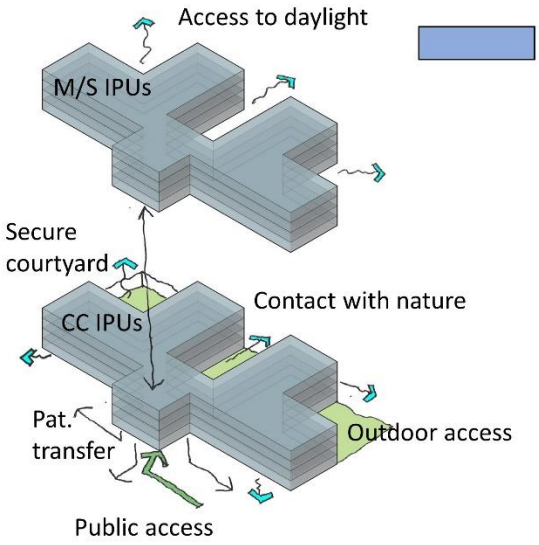
- Emergency Department
- Diagnostic Imaging
- Surgical Services

- CCU – IP unit w. tight connections to D&T block

- Laboratory
- Pharmacy

- +/- 172,460 DGSF
- 3 Levels

Figure 6.3.2-3: Clinical, Diagnostic & Therapeutic Program



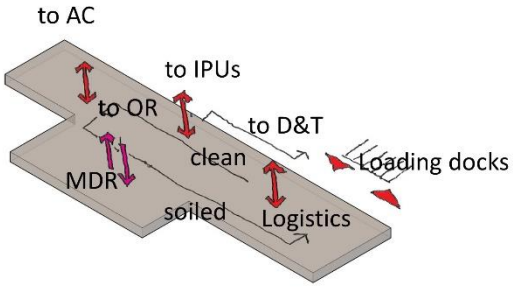
Inpatient Units

- Medical / Surgical IPUs – 4 levels
- Complex Care IPUs – 4 levels

- +/- 50,215 DGSF per floor M/S
- +/- 52,475 DGSF per floor CCC

- Universal IPU shape to accommodate both programs

Figure 6.3.2-4: Inpatient Unit Program

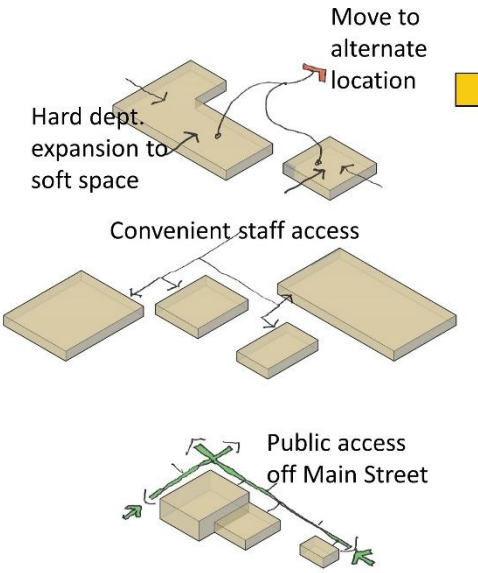


Support Services

- Food – public access
- 13,600 DGSF on Level 1

- Back-of-House:
  - Service loading access
  - Optimal flows
  - Separation Clean / Soiled
  - Discreet / dignified access for Morgue
  - Convenient connection to functional blocks – service elevators
- +/- 89,245 DGSF on lower level

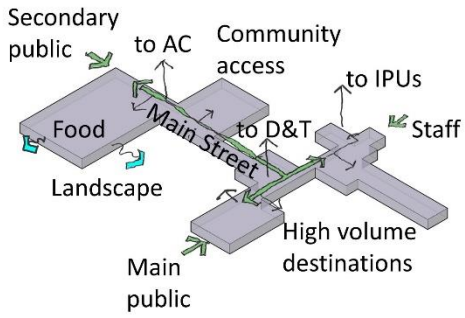
Figure 6.3.2-5: Support Services Program



Administration

- Public Access / Visibility:
  - Registration
  - Foundation
  - Auditorium
  - Security
  - Spiritual Care
- Staff Convenience:
  - Medical Staff – Health Rec.
  - Interprofessional Learning
  - ICT
- Soft space strategy:
  - Clinical Support
  - Admin
  - Human Resources

Figure 6.3.2-6: Administration Program



Public Spaces

- Main Street connecting:
  - Exterior building entrances
  - Registration
  - Highly accessible destinations
  - High volume destinations
  - Elevator banks
  - Foundation
  - Food – café
  - Retail
  - Exterior gardens

Figure 6.3.2-7: Public Spaces Program

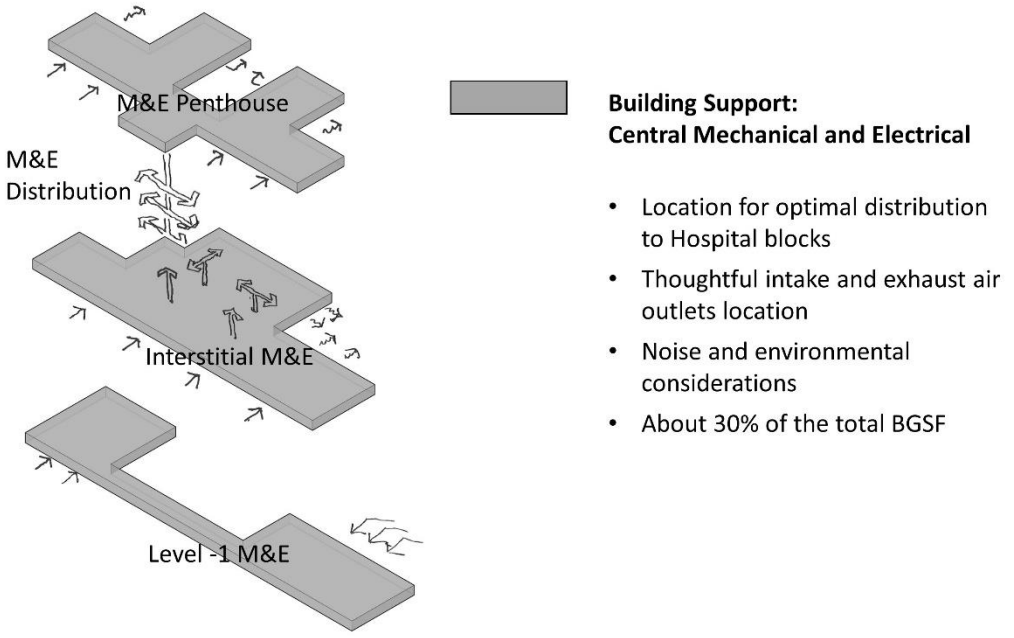


Figure 6.3.2-7: Building Support Program

These program groups sum up the Departmental Gross (DG) area which includes the net area of each space in the Functional Program, the circulation spaces (corridors) and all the partitions delimiting the spaces within each department.

The total Building Gross (BG) area which is reflected in any cost estimate includes the DG area, any inter-departmental circulation, vertical circulation (elevators, escalators) exiting stairs and corridors, the thickness of the exterior envelope and spaces for building services. While some of these building services – mechanical, electrical and IT spaces – are distributed on the various floors and must be accommodated in a multiplying factor when blocking the various components, there is a significant area required for centralized mechanical and electrical equipment. Figure 6.3.2-7 is a diagram indicating the considerations for planning these centralized areas within the context of the whole building volume.

6.3.3 UNIVERSAL IPU STUDY

An essential part of the approach for the Blocking and Stacking study was the development of a “Universal Inpatient Unit” which could offer future proofing flexibility of conversion from one program to another. This would be particularly important for future, system-wide strategic directions. This is further reinforced by the fact that the basic repetitive element, the Patient bedroom and washroom, is virtually the same in both programs.

The typical Medical /Surgical Inpatient Unit (IPU) is structured in two pods of 18 beds, leading towards an L-shaped plan configuration. The unit includes support spaces shared between the two pods, as well as support spaces shared between two 36 bed units paired on each floor.

Test Fit (Stage 2 layout for Medical Surgical IPU):
Two 18 bed pods per 36 bed unit; paired units per floor

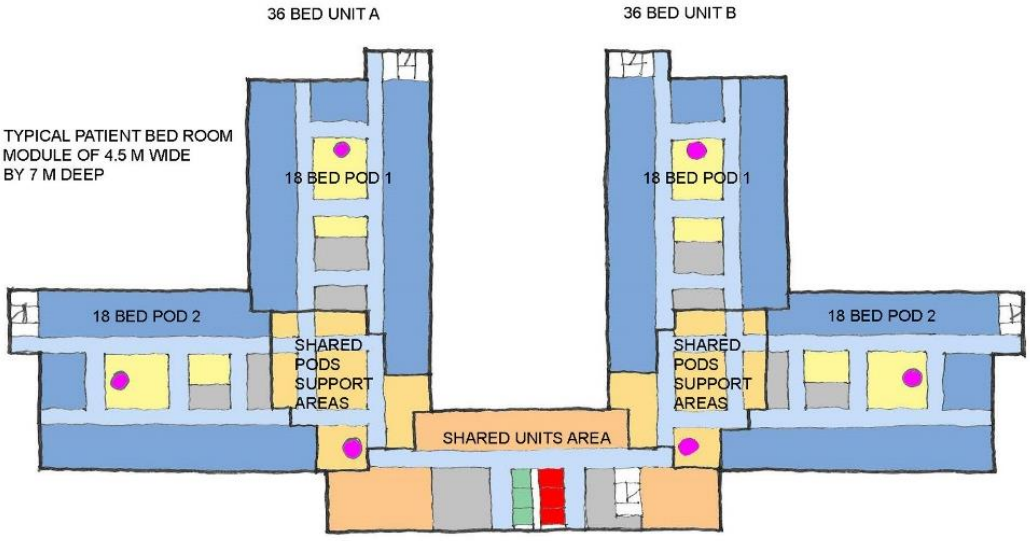


Figure 6.3.3-1: Medical Surgical IPU Layout Test Fit

The typical Complex Care (CC) IPU is structured in 3 pods of 10 beds each. The support spaces for the CC IPUs area are, however, larger in area for the various day and rehabilitation activities required by these longer staying patients. Therefore, the floor containing the typical CC IPU pair of units is about 2,200 square feet larger.

Our study suggests that the CC program can be accommodated with minimal and acceptable concessions in the same L shaped floor plan. With careful space planning, a conversion from one program to another could affect the support spaces only, which are more flexible than the patient room modules.

In addition to the flexibility for future program changes, this study informs the general blocking and stacking strategies by the providing the opportunity to stack the IPUs together and in order to generate a more compact building footprint on the site.

Test Fit:
Three 10 bed pods per 30 bed unit; paired units per floor

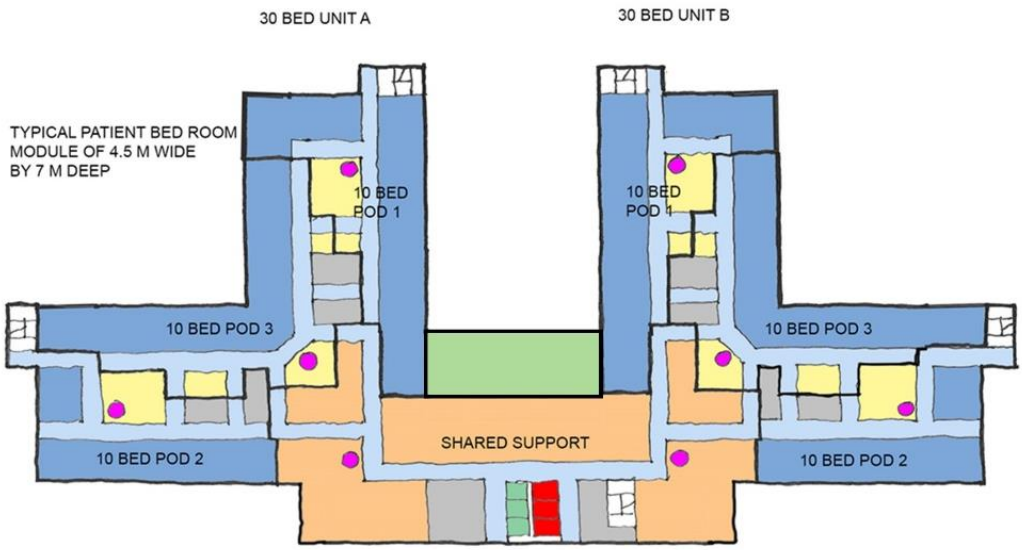
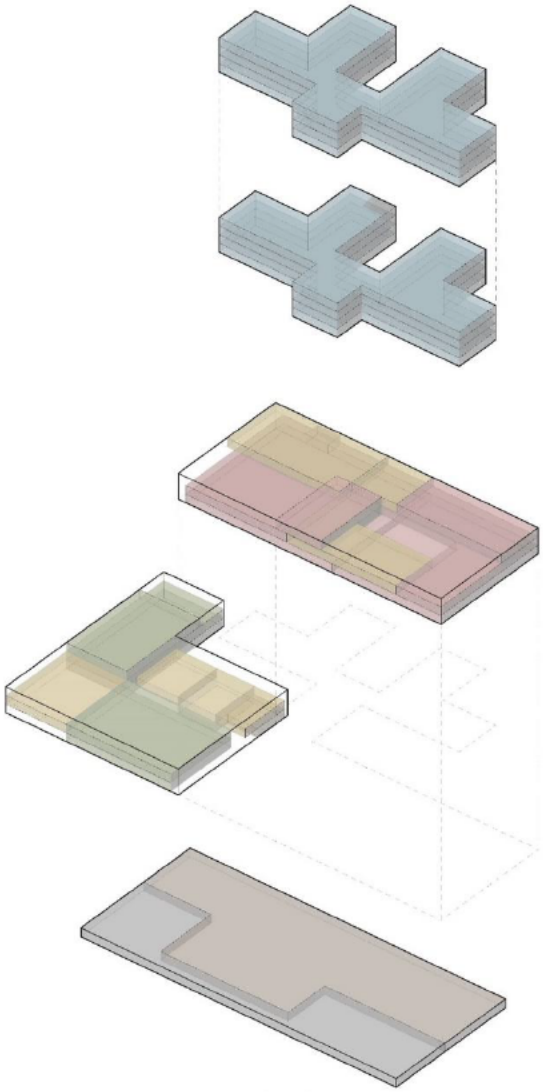


Figure 6.3.3-2: Complex Continuing Care IPU Test Fit

6.3.4 MAJOR BUILDING BLOCKS

The clinical flows connecting the functional program groupings highlighted above determine their further assembly into three major building blocks:



3 Major Building Blocks:

- IPUs
  +/- 61,400 SF footprint
- D&T:
  +/- 122,000 SF footprint
- Ambulatory
  +/- 102,000 SF footprint

- Back-of-house Service required to connect to all blocks

- Public and Service Circulation to be separated to a highest degree

Figure 6.3.4-1: Assembly of Major Building Blocks

6.4 Campus Plan Options Development

6.4.1 STAGE 2 MOHLTC PLAN

The scheme submitted for MOHLTC Stage 2 utilized a strategy of five (5) distinct buildings or blocks, comprising:

1. Complex Care
2. North Ambulatory – repeat clients: Haemodialysis, CDM, Mental Health
3. Diagnostic and Treatment
4. South Ambulatory – high volume: Ambulatory Clinics, Ambulatory Procedures, Pre-surgical Clinics
5. Inpatient Beds

This strategy resulted in a facility with extensive use of the site, significantly longer distances between departments and general challenges in wayfinding. Figure 6.4.1-1 offers a summarizing critique of the Stage 2 scheme.

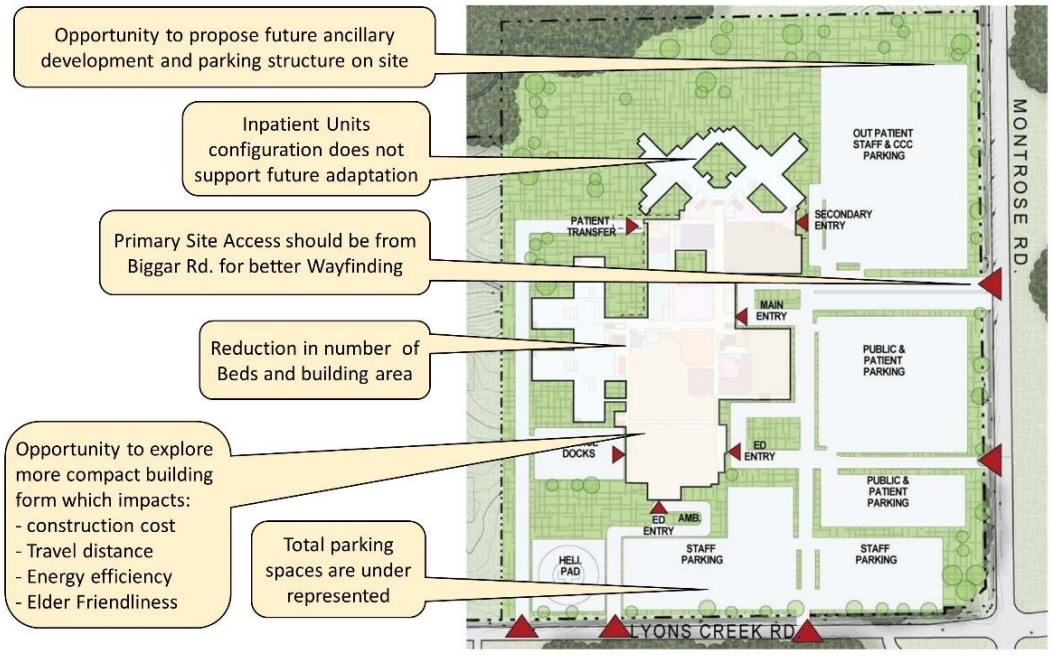


Figure 6.4.1-1: Stage 2 Plan Observations & Critique

6.4.1 DESIGN ITERATIONS & DEVELOPMENT

In consideration of the critiques of the Stage 2 submission and the site planning, landscape and functional planning approaches described above, a series of site plan investigations were developed. These investigations were iterative and tested the range of issues that influence a successful healthcare campus.

The campus plan concepts evolved with consideration to the following features or elements:

- Access from main road;
- Destination visibility;
- On-site circulation;
- Parking;
- Views to natural features; and,
- Functional relationships of program blocks.

A series of high-level site plan strategies developed from these investigations. These strategies are illustrated on the following pages.

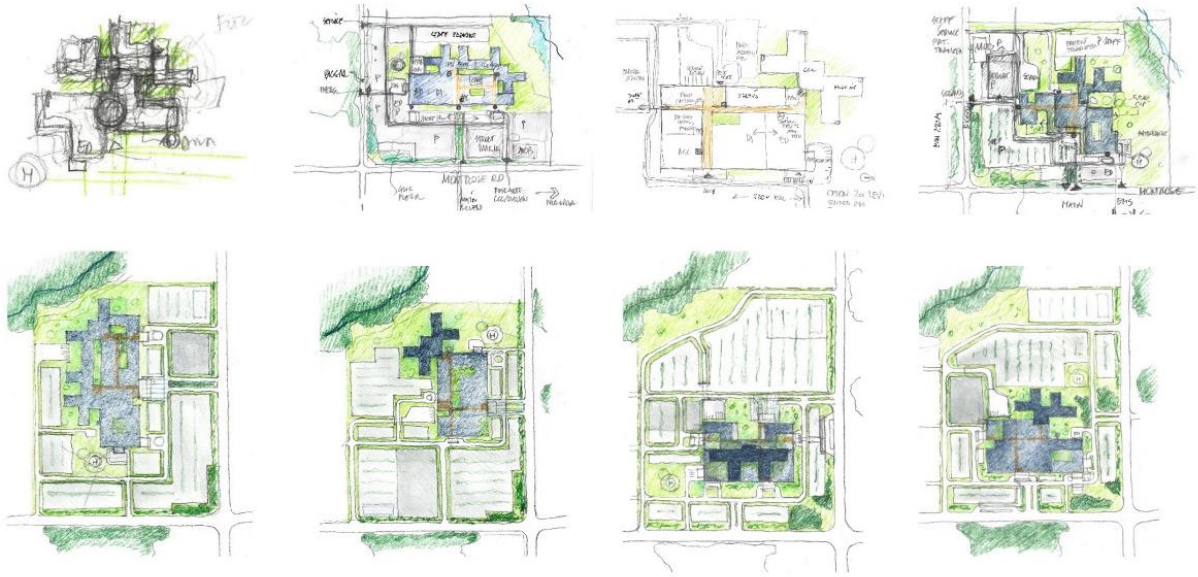


Figure 6.4.1-1: Campus Plan Design Iterations

Access & Entrances

With most expected car trips to the site arriving from the west via the QEW, primary entrances are proposed off Biggar Road and secondary entrances off of Montrose.

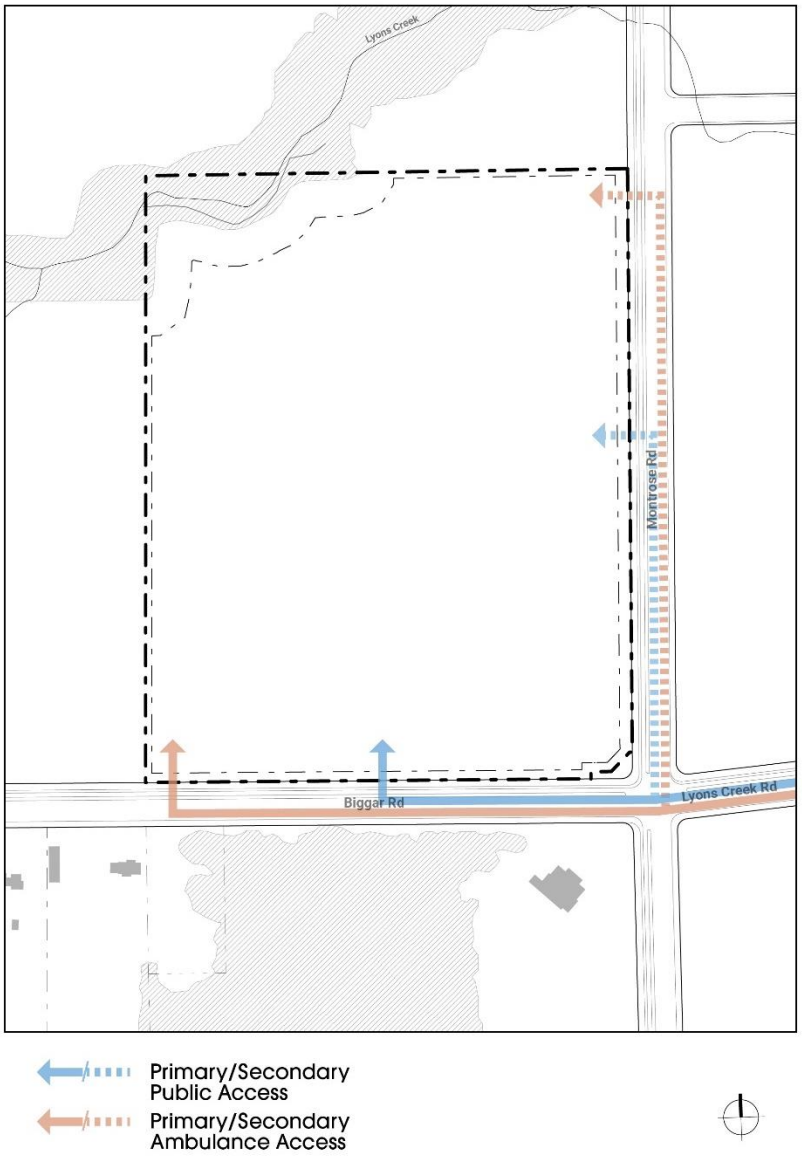


Figure 6.4.1-2: Approach to Access & Entrances

Identity & Wayfinding

The street frontages of Biggar and Montrose are vital to establishing the civic presence of the hospital. Landscaped public streetscapes can connect the hospital to the community and help support orientation and wayfinding. By creating strong physical and visual connections to the street, the hospital can also help to establish its identity and reflect its position in the community as a place of excellence in care and wellbeing.

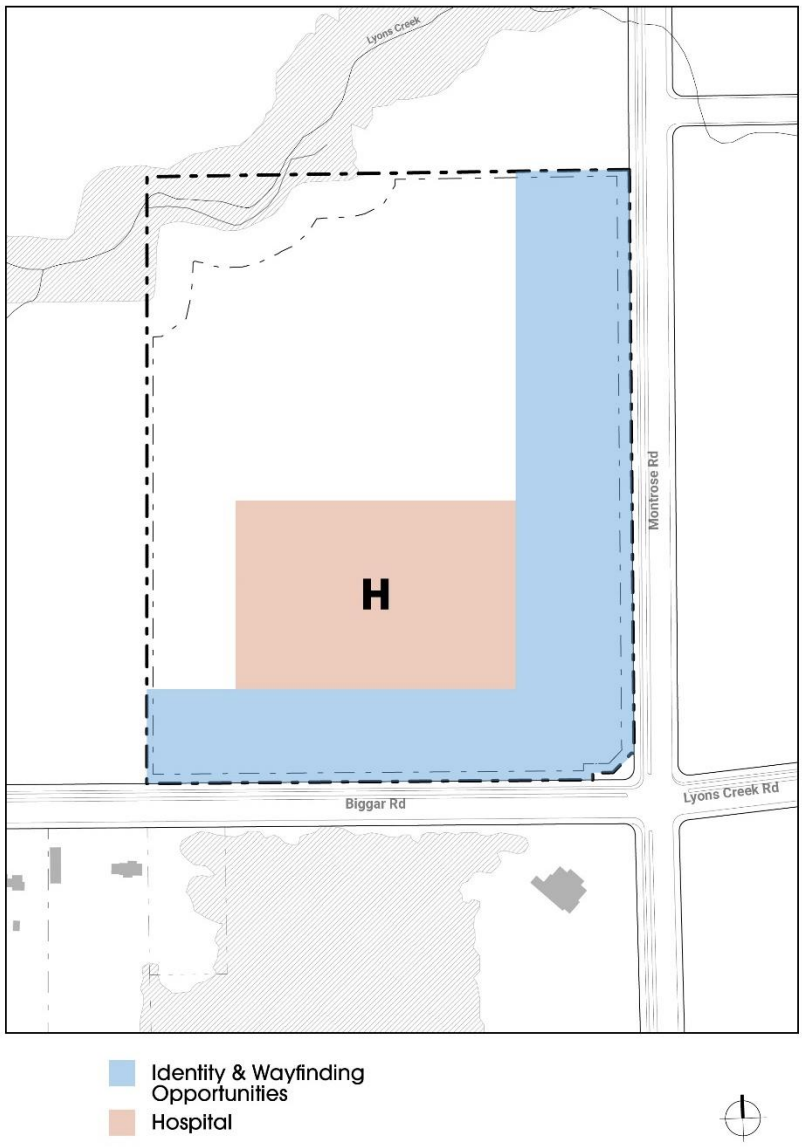


Figure 6.4.1-3: Approach to Identity & Wayfinding

Stormwater & Low Impact Design

The stormwater drainage from the site is tributary to Lyons Creek, which is under the jurisdiction of the Niagara Peninsula Conservation Authority (NPCA). The main policy of the NPCA is to ensure that sufficient stormwater management controls are provided on-site to ensure that flooding, pollution, surface erosion, and impacts to conservation do not occur as a result of development. The site plan for the future hospital will need to incorporate a SWM design that is compliant with the requirements of the City of Niagara Falls and the guidelines of the NPCA.

Enhanced Level 1 quality control of stormwater runoff will need to be provided in accordance with the requirements of the Ministry of Environment, Conservation and Parks (MECP). Water balance impacts are to be evaluated as part of the design of the on-site SWM design. Best efforts should be made to match pre-development infiltration volumes to the extent practical and feasible.

One of the visions for the hospital is to feature low impact development techniques into the site development plan. Therefore, the site plan should consider potential features such as bioswales, permeable pavers and a stormwater management pond to support this initiative and positively contribute to SWM guidelines. A soil investigation will be completed in the near future, which will confirm the overall suitability of LID strategies and the site's capability to infiltrate water. All of these factors will impact the proposed development site plan.

By locating the primary hospital services at the southern edge of the site, the northern campus can maximize retention of existing site drainage patterns and consolidate LID landscape features. This approach also mirrors the functional division between the 1/3 parking demand for emergency/short stay and the 2/3 parking demand for staff and long-term parking.

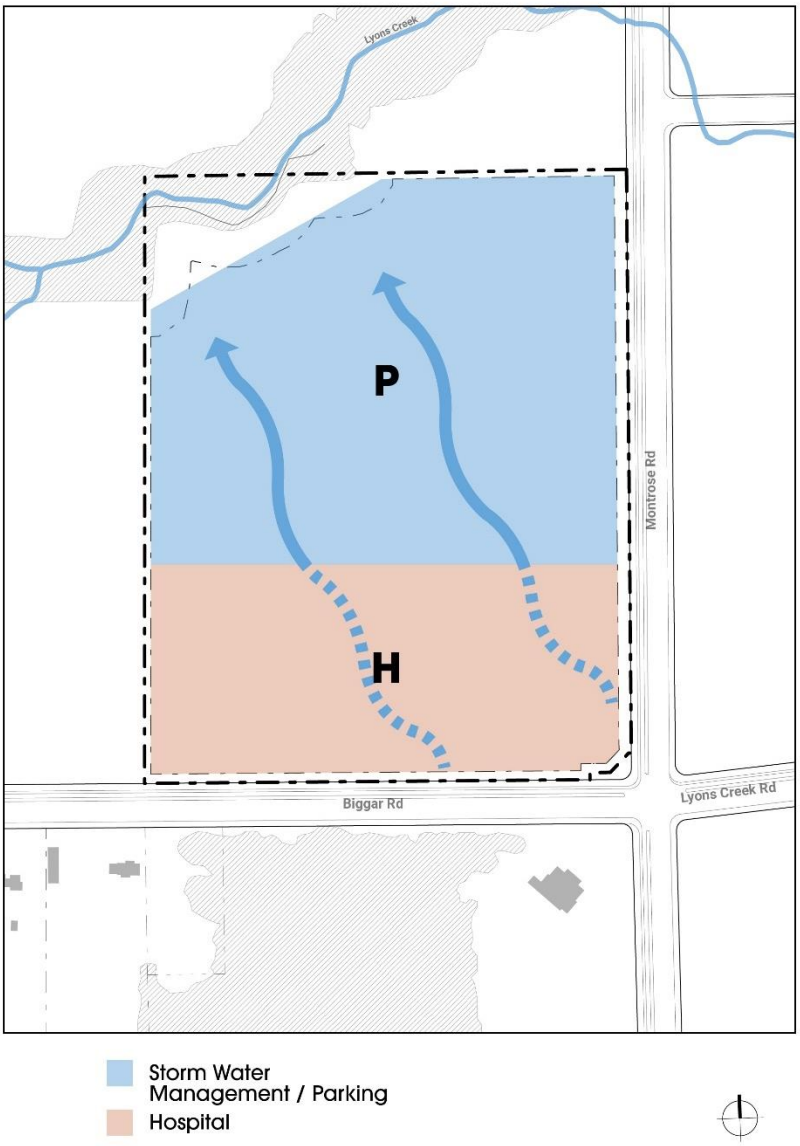


Figure 6.4.1-4: Approach to Stormwater & Low Impact Design

Growth & Future Campus Development

The South Niagara Hospital campus is expected to grow and intensify over time. The location of the hospital to the south allows for the potential development of a network of allied buildings to the north and west, while the hospital's identity and functional circulation can be maintained via the street frontages of Biggar and Montrose.

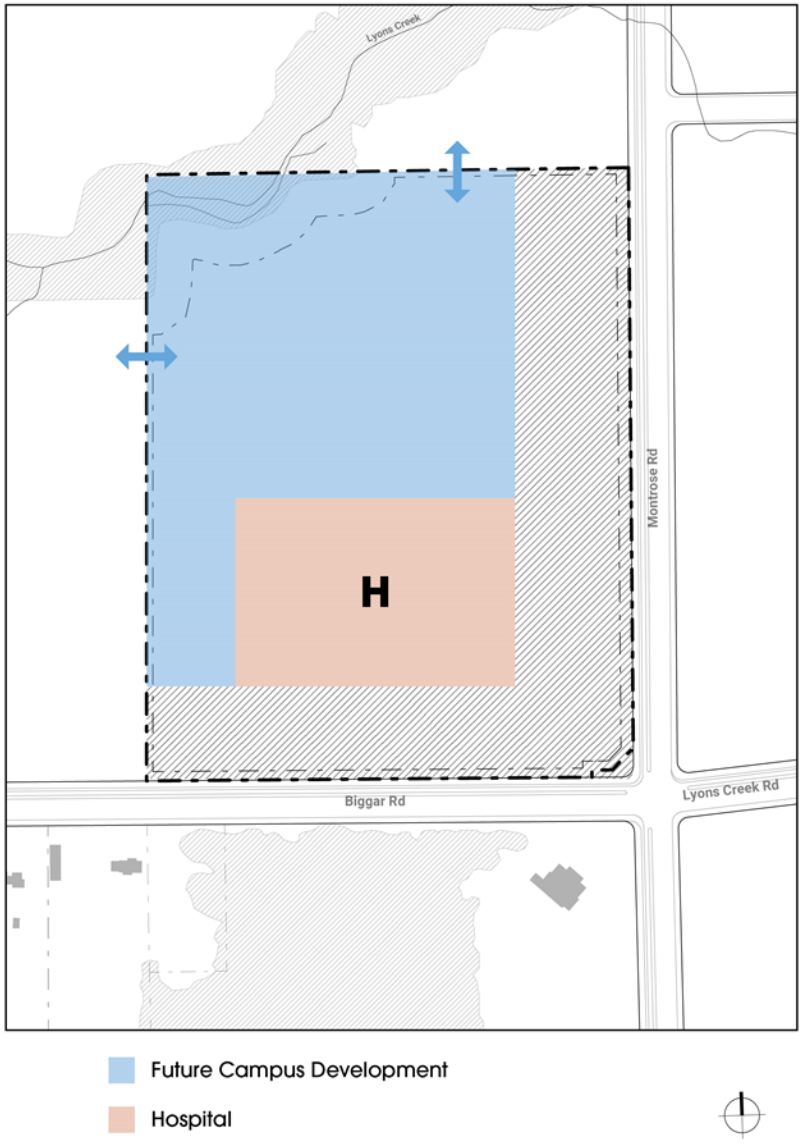


Figure 6.4.1-5: Approach to Growth and Future Campus Development

Public & Active Transportation

It is anticipated that a public bus service will loop into the campus, following a N-S route along Montrose. Incorporating looped walking and cycling connections can further promote public and active transportation connections between the city, the neighbourhoods of Grand Niagara and the hospital. These trails can also provide pleasant, safe and accessible routes for leisure and therapeutic use within the hospital campus.

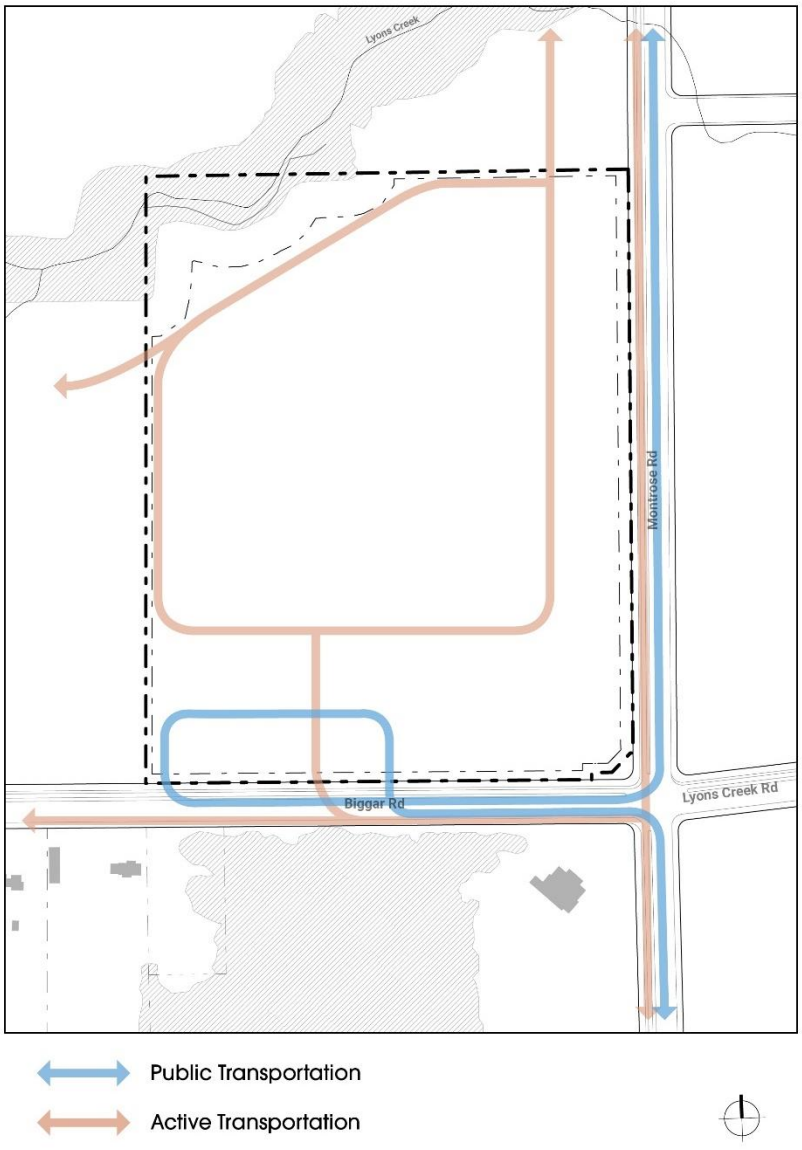


Figure 6.4.1-6: Approach to Public and Active Transportation Connections

6.5 Two Alternative Strategies

Based on the analysis described earlier in the report and on consultations with various internal and external stakeholders, two major planning strategies emerged for configuring the blocking and stacking of the Hospital.

The main access for both strategies is from Biggar Road, as 60% of the traffic will arrive westward on that road. Both plans also have a perimeter internal road providing alternative access for loading and emergency vehicles, as well as distributed exiting from parking at busy times such as shift changes.

6.5.1 HORIZONTAL STRATEGY

The Horizontal Strategy stacks the IPU programs in an 8 storey + penthouse building connected horizontally to the 3 storey main Diagnostic and Treatment (D&T) block. The D&T block has two distinct parts that can be expressed in volume and architectural treatment: one housing the ED, DI and Surgical departments and one containing mainly Ambulatory functions.

Distinct entrances provide clarity of access to various destinations. The Main Entrance, off Biggar, is close to the high-volume functions (DI, Ambulatory Clinics, Day Surgery); ED walk-in access is also provided off the main site entrance, while a separate dedicated ambulance access is proposed further west. The building entrance for Dialysis, Chronic Disease Management and visitors to the Inpatient programs is proposed on the east, from Montrose Road. A Service court is aligned with the lower level of the hospital and is accessed via a ramp from the north. Also on the north are a staff entrance and a discreet non-emergency patient transfer access.

The building footprint of this configuration is approximately 300,000 sq. ft. which allows accommodation for approximately 1,900 surface parking spaces.

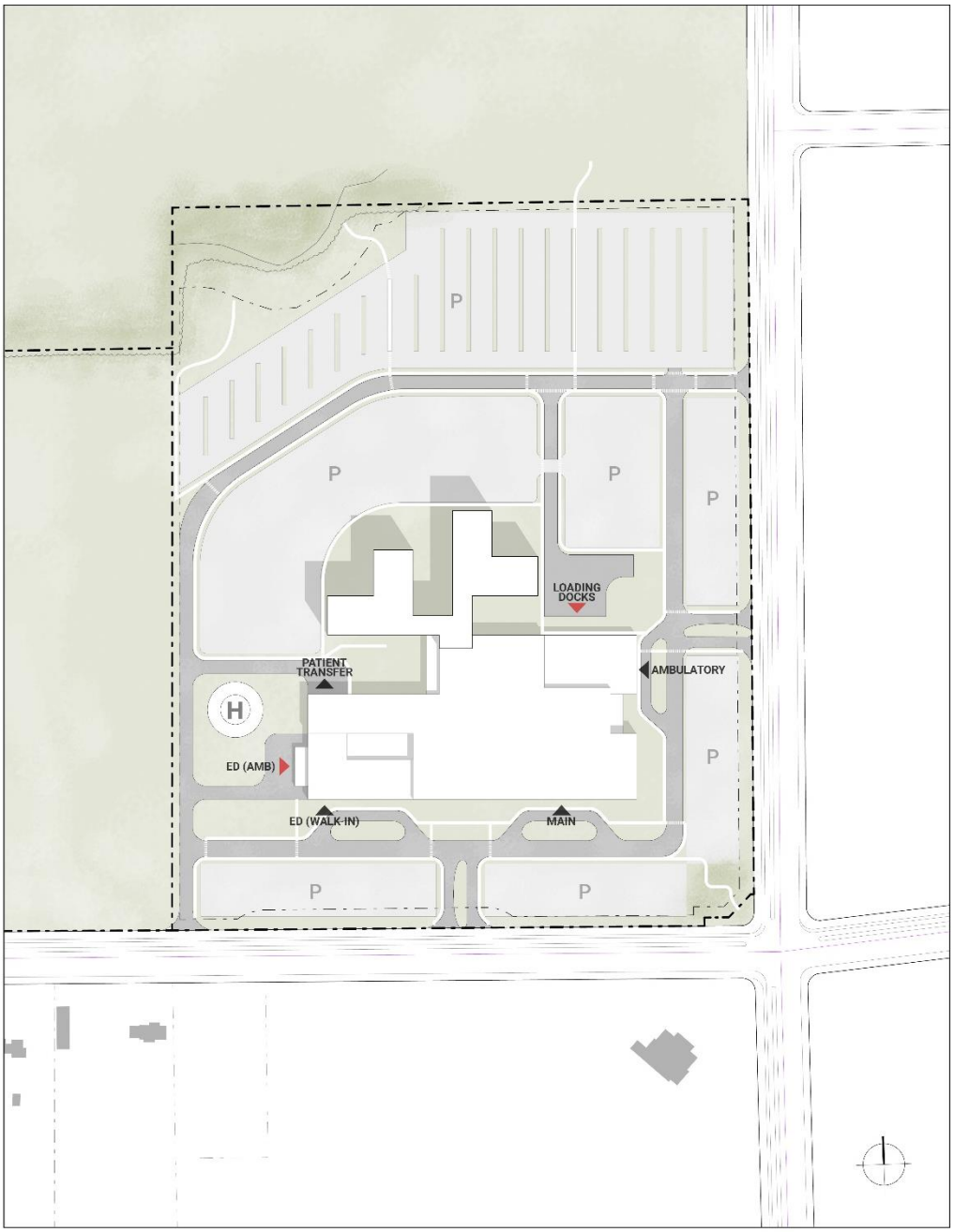


Figure 6.5.1-1: Horizontal Strategy Site Plan

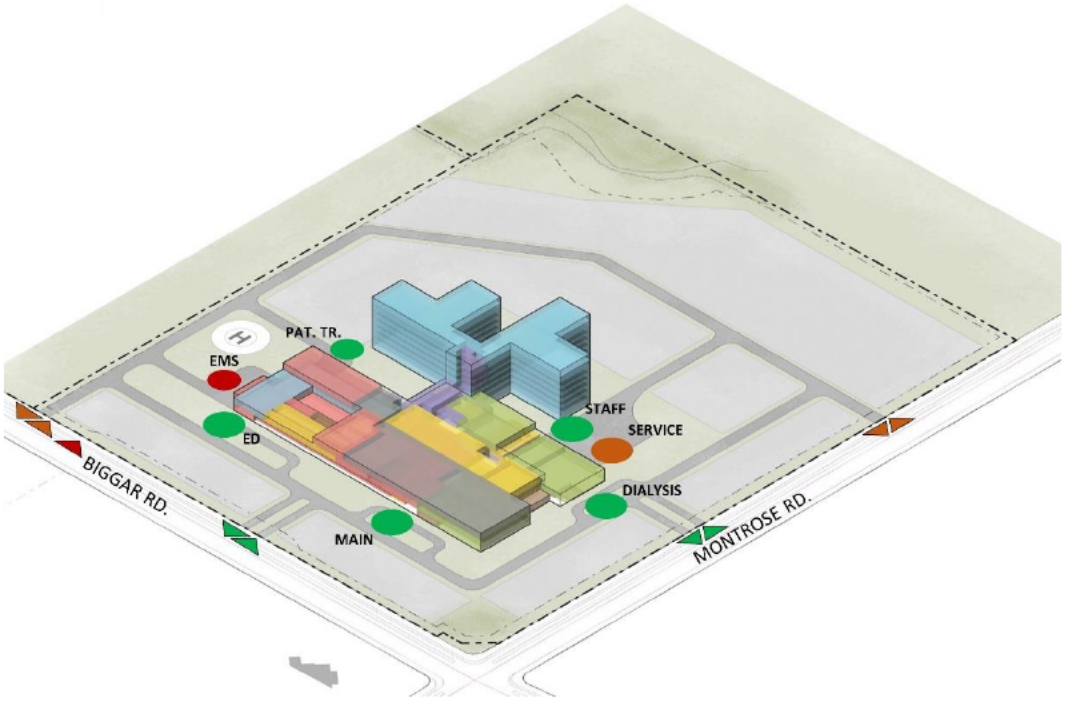


Figure 6.5.1-2: Horizontal Strategy Blocking

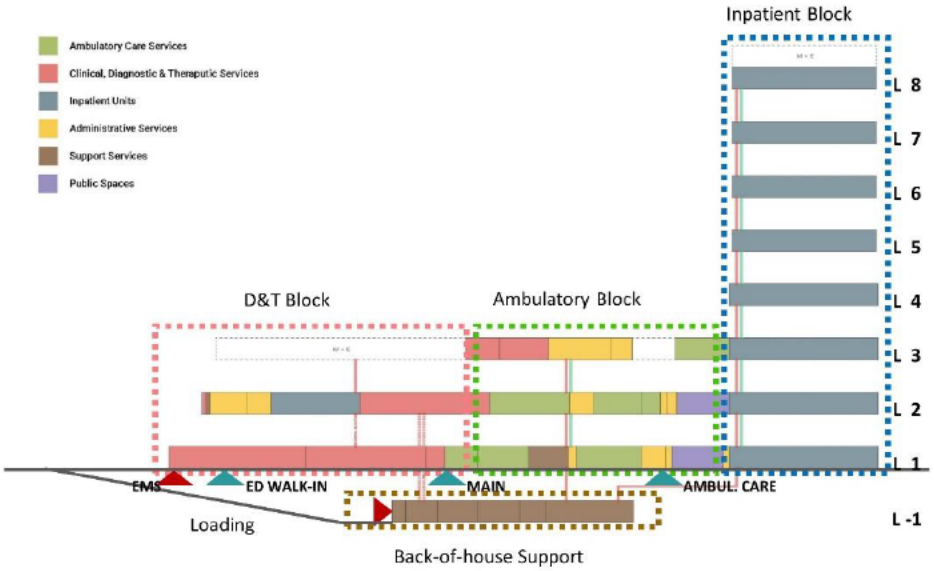


Figure 6.5.1-3: Horizontal Strategy Stacking

Connection to Nature

A high variety of exterior healing landscaped spaces can be accommodated around the perimeter of the building. The lower levels of the Inpatient Block benefit from contact with nature, being placed on the ground.

Figure 6.5.1-4: Horizontal Strategy Site Landscape

Future Growth & Flexibility

Future growth flexibility is accommodated through strategies ranging from displacement of soft space to long term external additions and shell space fit-out.

Figure 6.5.1-5: Horizontal Strategy Future Growth & Flexibility

Internally, the ground level circulation is structured by two “main streets” linking the elevator banks and the various high-volume departments located on this level and animated by a multitude of public functions including food, retail, spiritual care.

The equal distance from both public entrances to the Main Street intersection is a good feature while the relatively longer distance from ED to the IPU elevators and the limited visibility of the IPU public elevators are the main critique for this floor.

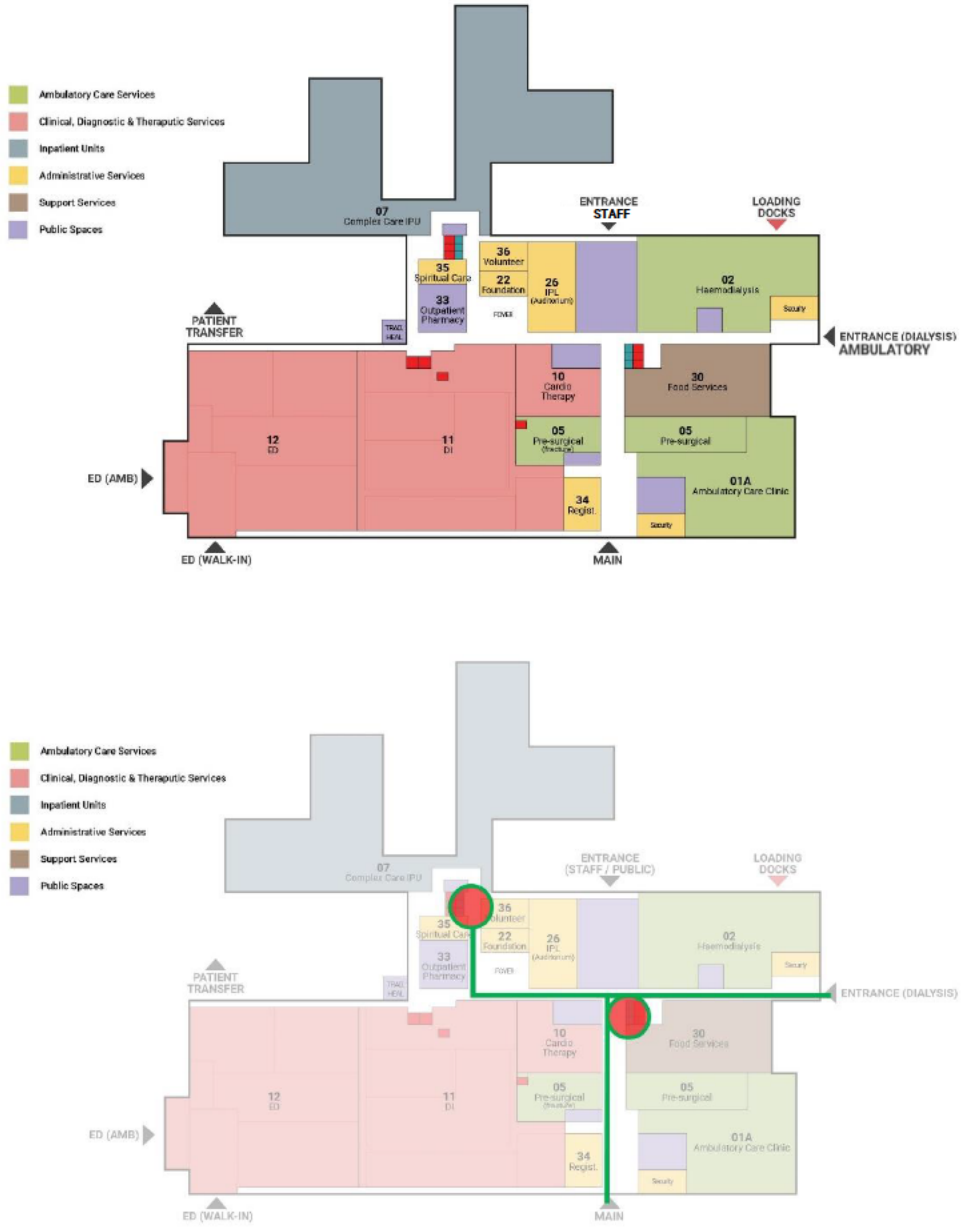


Figure 6.5.1-6: Horizontal Strategy Future Ground Floor

Level 2 provides the same good separation of the Ambulatory from the more acute patient flows. One good feature is the location of the CCU adjacent to the Surgical Services.

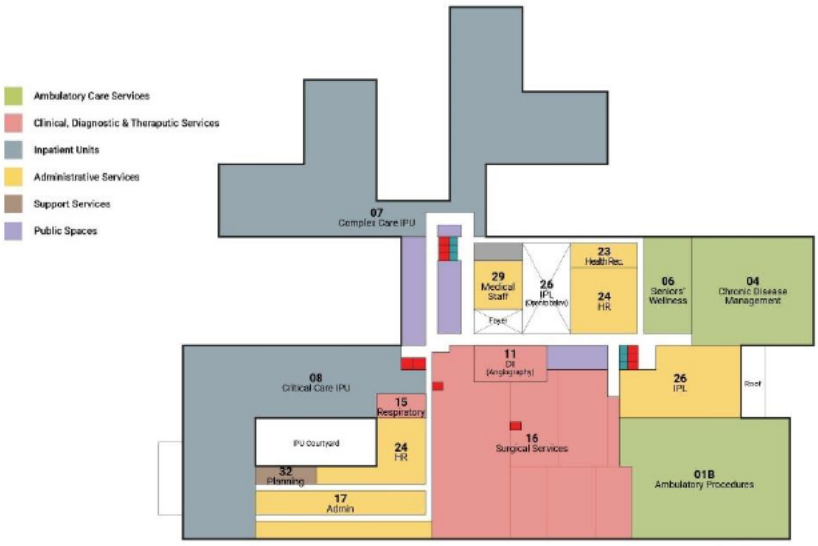


Figure 6.5.1-7: Horizontal Strategy Level 2 Plan

The Ambulatory Mental Health department located on Level 3 is discreetly accessed from 2 alternative elevator banks and the Laboratory and Pharmacy can expand by displacing soft space.

Figure 6.5.1-8: Horizontal Strategy Level 3 Plan

The Inpatient Block is proposed to be stacked with the Complex Care units on the lower 4 floors and the 4 Medical Surgical floors above. This stacking includes shell space for future growth.

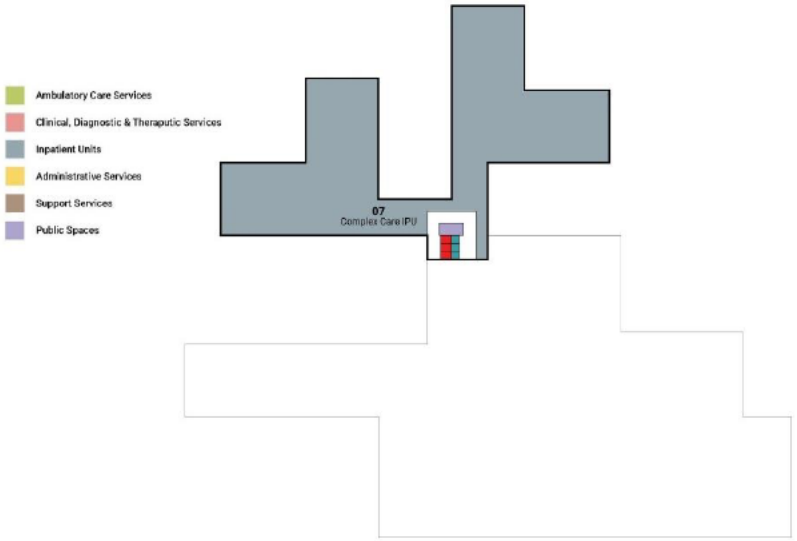


Figure 6.5.1-9: Horizontal Strategy Level 4 Plan

Level -1 houses the "back-of-house" functions of the Hospital. A clear separation of the clean and soiled flows can be achieved on the corridor loop of this floor, connecting all functions and the elevator banks.

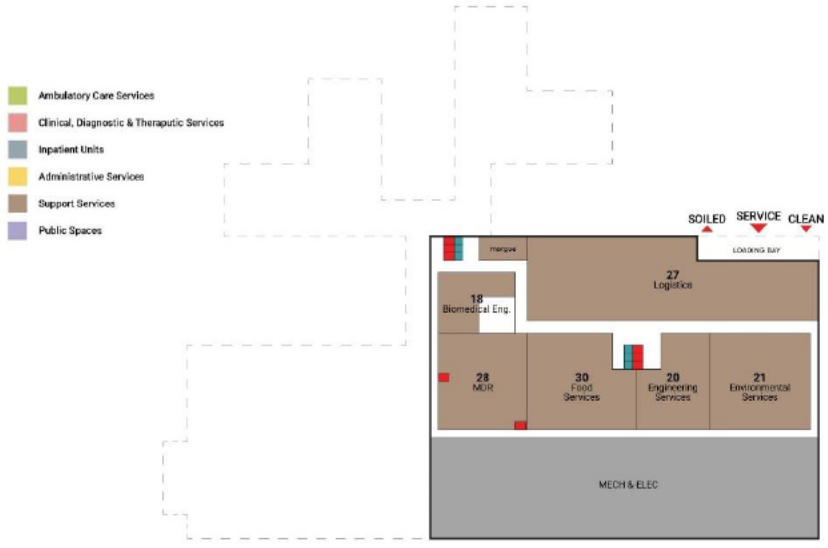


Figure 6.5.1-10: Horizontal Strategy Level -1 Plan

6.5.2 VERTICAL STRATEGY

The vertical strategy places the Inpatient floors above a 3 storey D&T podium. It offers the most compact ground floorplate, allowing the maximum surface parking accommodation, as well as potential for allied development. Similar to the other scheme, the D&T podium has two distinct parts that can be expressed in volume and architectural treatment: one housing the ED, DI and Surgical departments and one containing mainly Ambulatory functions.

Due to its compact floorplate a looped vehicular circulation can be accommodated around the building, connecting the entrances on all sides of the facility. The relative importance of each access point can be modulated so that the maximum intuitive wayfinding is achieved.

The main site access is off Biggar Road with a secondary public access off Montrose Road. Both these access points will be signalized. An additional access point is provided on each of the roads, providing alternative access for loading and emergency vehicles, as well as distributed exiting from parking.

Building entrances are distributed on all sides. The Main Entrance, off Biggar is close to the main street intersection; due to the compact plan, all destinations are close to this point; ED walk-in access is on the west side of the building, with a separate dedicated ambulance around the northwest corner. The building entrance for Dialysis, Chronic Disease Management and visitors to the Inpatient programs is proposed on the north, however the department is close to the ambulatory entrance on the east, from Montrose Road. Like in the other scheme, a service court is aligned with the lower level of the hospital and is accessed via a ramp from the north. Staff entrance and a discreet non-emergency patient transfer access is shared with the north access. Giving appropriate emphasis to each of the building access points must be carefully studied to reduce potential confusion for the visitors. However, once inside, the destinations are as close and as visible as possible.

The building footprint of this configuration is approximately 247,000 sq. ft. which allows accommodation for approximately 2,050 surface parking spaces.

Figure 6.5.2-1: Vertical Strategy Site Plan

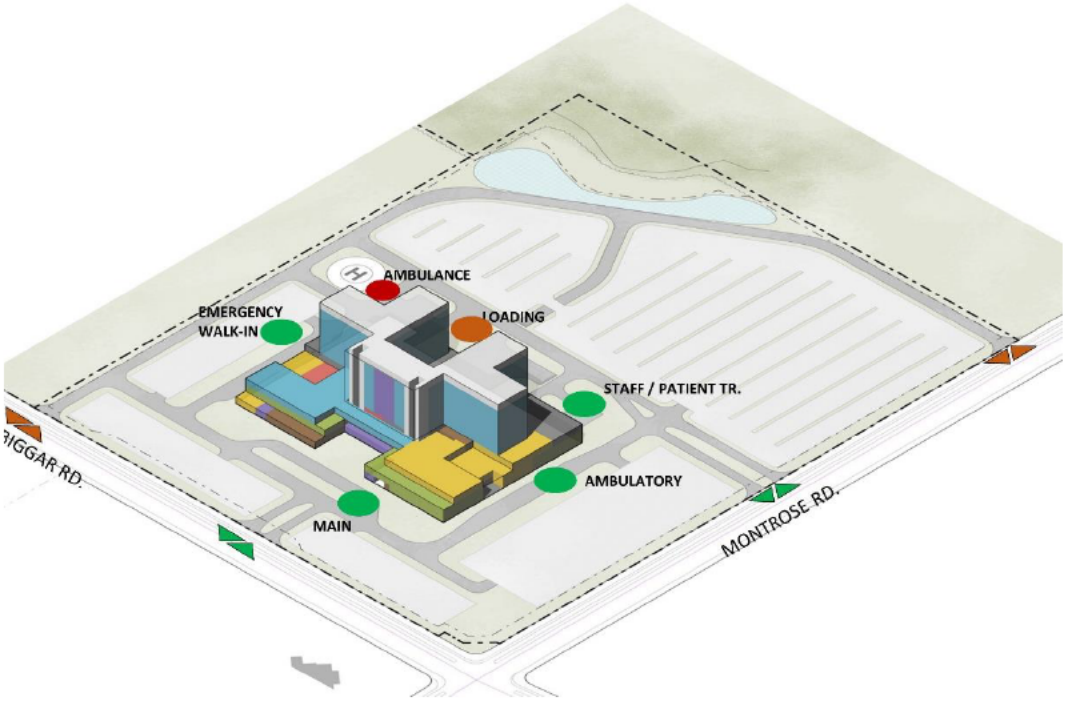


Figure 6.5.2-2: Vertical Strategy Blocking

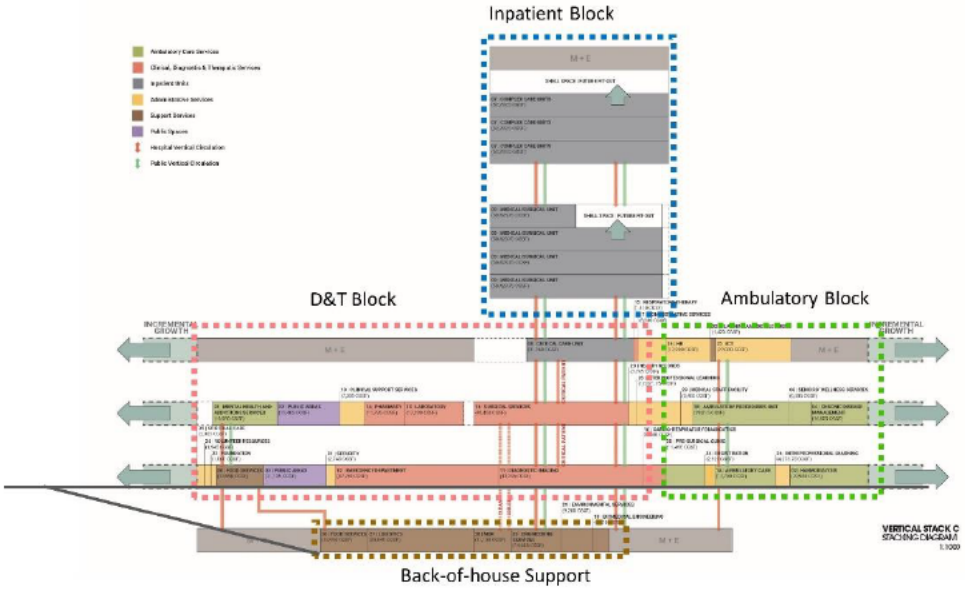


Figure 6.5.2-3: Vertical Strategy Stacking

Connection to Nature

A main civic plaza is proposed adjacent to the Main Entrance, on the south, contributing to the community connections the Hospital will encourage. Exterior healing landscaped spaces can be accommodated around the perimeter of the building, refer to the Landscape section 8.3. The lower levels of the Inpatient Block benefit from an appropriate amount of roof landscape and therapeutic active outdoor spaces.

Figure 6.5.2-4: Vertical Strategy Site Landscape

Future Growth & Flexibility

wSimilar to the Horizontal scheme, future growth flexibility is accommodated through strategies ranging from displacement of soft space to long term external additions and shell space fit-out. Although an additional stack of IPUs cannot easily be added to this scheme, the expansion for these departments is accounted for with soft space displacement and fit-up of shell space built-in at the onset of the project. The potential of adapting to future healthcare delivery trends of the universal IPU also minimizes the risks of the relative reduction of flexibility of the vertical scheme.

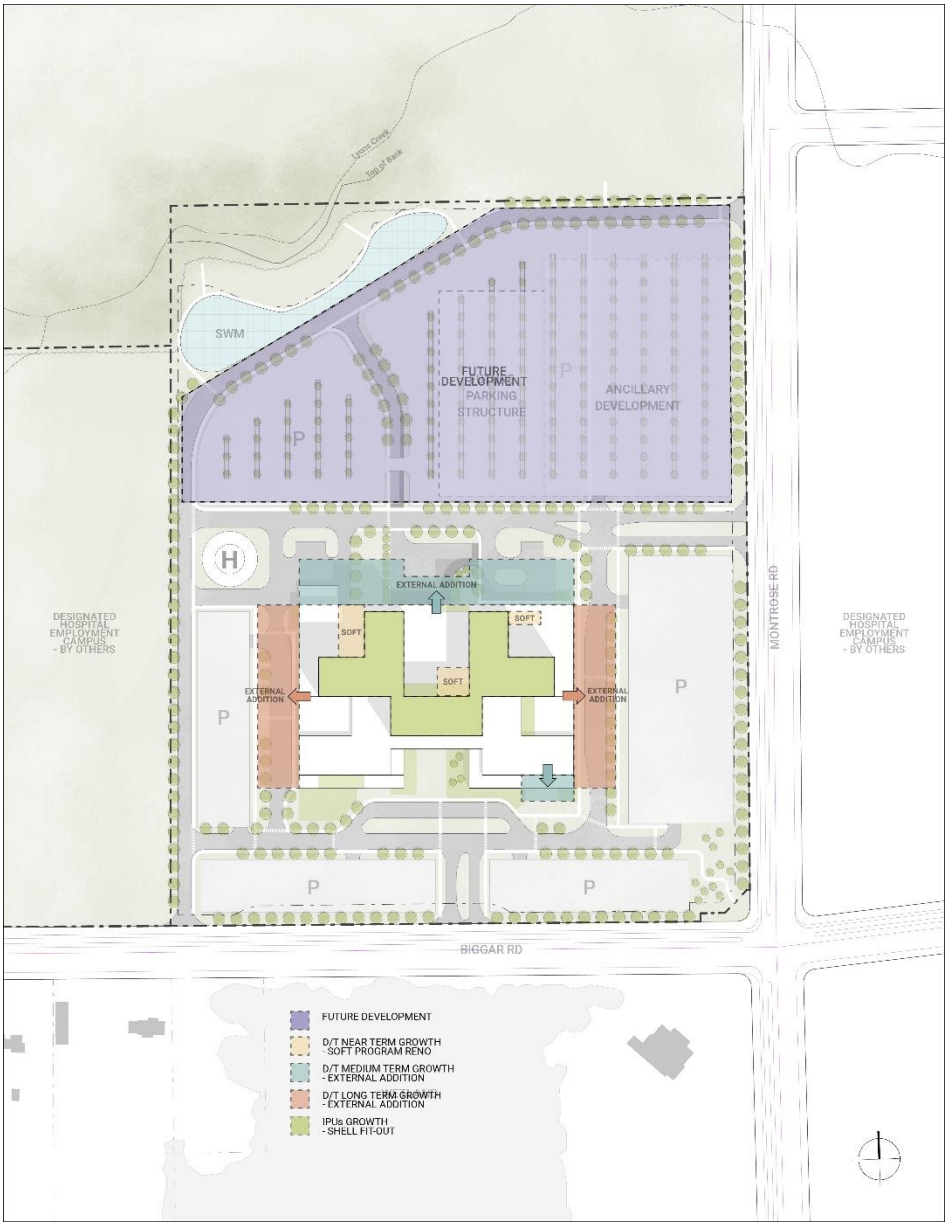


Figure 6.5.2-5: Vertical Strategy Future Growth & Flexibility

The ground level circulation is a clear intersection of two main streets linking the elevator banks and the various high-volume departments located on this level. The destinations are clearly visible, maximizing the intuitive wayfinding no matter which building entrance one uses.

Public functions including food, retail, and spiritual care are strategically grouped and animate the public realm of the Ground floor. Main and secondary waiting areas for DI, clinics and ED can, with careful departmental planning benefit from direct natural light

Figure 6.5.1-6: Vertical Strategy Future Ground Floor

On Level 2, the Surgical Services and Ambulatory Procedures Unit are co-located for operational synergies. The Ambulatory Mental Health is accessible through an elevator bank that ensures discrete stigma reduction. The Chronic Disease Management and Senior Wellness is conveniently accessible from two elevator banks connected to the main or secondary entrances on the Ground Floor, as well as from the CC inpatient floors. Laboratory and Pharmacy can expand by displacing the Clinical Support soft space.

Figure 6.5.1-7: Vertical Strategy Level 2 Plan

The CCU is located on Level 3. Although not on the same level with Surgical Services, two elevators dedicated to connecting CCU to the Operating Room area as well as to DI and ED departments provide an excellent acceptable link. CCU growth is ensured through soft space displacement.

A significant area is planned on this level for mechanical and electrical space, essentially an interstitial level allowing distribution to both up and down levels.

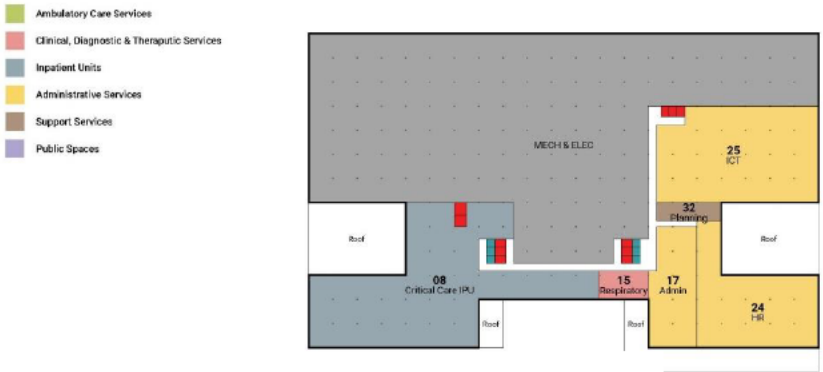


Figure 6.5.1-8: Vertical Strategy Level 3 Plan

Starting on Level 4, the stacked Inpatient departments benefit from outdoor spaces on the roof of the podium and from distant views around the site. The public elevator arrival on each floor is in a lobby with exterior views, essential in wayfinding and partially compensating the increased elevator use characterizing a vertical scheme.

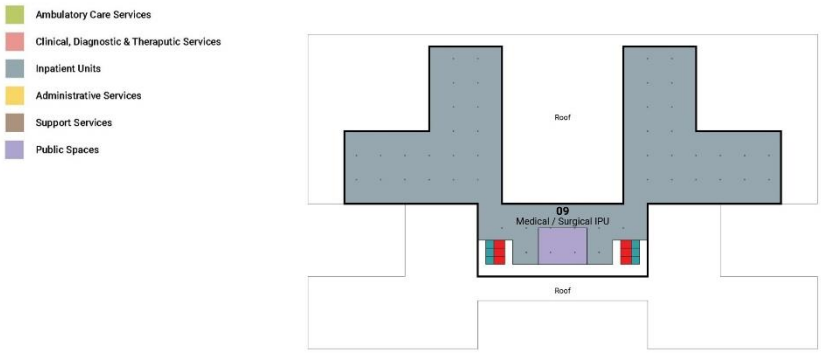


Figure 6.5.1-9: Vertical Strategy Level 4 Plan

Level -1 houses the back-of-house support departments. The Logistics department is centrally located and efficiently connected to the rest of the support spaces. A looped circulation provides the required clean-soiled separation. Additional building support spaces can be accommodated on this level, as required in further design development.

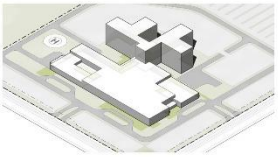
Figure 6.5.1-10: Vertical Strategy Level -1 Plan

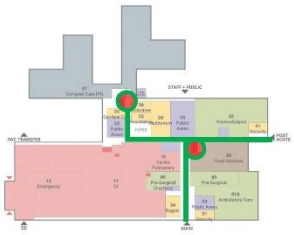
6.6 Campus Plan Options Evaluation

6.6.1 HORIZONTAL STRATEGY EVALUATION

The tables below summarize the positive characteristics and the shortcomings of the Horizontal Scheme, organized along the 6 key design drivers.

Key Design Drivers		Performance
1	Operational Functionality	+ equal distance from 2 main entrances to Main Street intersection + clear EMS access
2	Clinical Functionality	+ discreet access from IPUs to Dialysis + CCU and Surgical services on same level
3	Future Growth and Adaptation	+ good growth flexibility and event adaptability + less disruptive future construction + structural flexibility IPUs vs. D&T block
4	Health and Wellness	+ variety of landscape spaces & patient and staff experience
5	Long Term Campus Potential	+ clear volume articulation potential
6	Affordability of Construction	+ more flexible construction methods





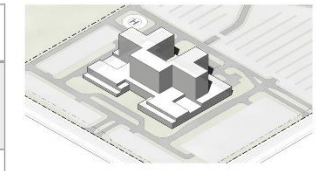
Key Design Drivers		Performance
1	Operational Functionality	- distance / visibility of IPU elevators on Level 1
2	Clinical Functionality	- longer path from ED to IPUs - longer path from IPUs to Hemodialysis
3	Future Growth and Adaptation	- more extensive site use – less flexibility
4	Health and Wellness	- less clear ground floor wayfinding
5	Long Term Campus Potential	- larger footprint, site coverage
6	Affordability of Construction	- more foundations

Figure 6.6.1-1: Summary of Design Drivers in the Horizontal Strategy

6.6.2 VERTICAL STRATEGY EVALUATION

Similarly, the vertical strategy characteristics are listed in the tables below.

Key Design Drivers		Performance
1	Operational Functionality	+ better optimization of site traffic + efficient material delivery distance + access from all sides – multiple addresses
2	Clinical Functionality	+ shorter horizontal distances
3	Future Growth and Adaptation	+ maximized site use and development flexibility
4	Health and Wellness	+ optimal elevator location + good ground floor legibility
5	Long Term Campus Potential	+ flexibility of site options / orientation + clear identifiable destinations + good access and egress from site + central location for public plaza
6	Affordability of Construction	+ fewer foundations



Key Design Drivers		Performance
1	Operational Functionality	- less visible ED access
2	Clinical Functionality	- reliance on elevators
3	Future Growth and Adaptation	- reduced growth flexibility / event adaptability
4	Health and Wellness	- patient and staff experience influenced by elevator use - contact with nature: CC with roofscape only; less variety of landscape at grade
5	Long Term Campus Potential	
6	Affordability of Construction	- less flexible, more complex structure

Figure 6.6.2-1: Summary of Design Drivers in the Vertical Strategy

6.6.3 SUMMARY COMPARISON

The following table summarizes the two Strategies side by side.

Key Design Drivers		Horizontal Strategy	Vertical Strategy
1	Operational Functionality	+ equal distance from 2 main entrances to Main Street intersection + clear EMS access - distance / visibility of IPU elevators on Level 1	+ better optimization of site traffic + efficient material delivery distance + access from all sides – multiple addresses - less visible ED access
2	Clinical Functionality	+ discreet access from IPUs to Dialysis + CCU and Surgical services on same level - longer path from ED to IPUs - longer path from IPUs to Hemodialysis	+ shorter horizontal distances - reliance on elevators
3	Future Growth and Adaptation	+ good growth flexibility and event adaptability + less disruptive future construction + structural flexibility IPUs vs. D&T block - more extensive site use – less flexibility	+ maximized site use and development flexibility - reduced growth flexibility / event adaptability
4	Health and Wellness	+ variety of landscape spaces & patient and staff experience - less clear ground floor wayfinding	+ optimal elevator location + good ground floor legibility - patient and staff experience influenced by elevator use - contact with nature: CC with roofscape only; less variety of landscape at grade
5	Long Term Campus Potential	+ clear volume articulation potential - larger footprint, site coverage	+ flexibility of site options / orientation + clear identifiable destinations + good access and egress from site + central location for public plaza
6	Affordability of Construction	+ more flexible construction methods - more foundations	+ fewer foundations - less flexible, more complex structure

Figure 6.6.3-1: Summary of Design Drivers in the Campus Plan Strategies

6.6.4 EVALUATION EXERCISE

The evaluation process used the "Choosing by Advantage" method which simplifies the process by identifying in the table with 1 point the scheme that best satisfies each given criterion: winners takes all. In case two or more solutions are equal, no points are awarded. The scheme with most advantages wins.

Upon evaluating according to the established criteria and methodology the two strategies compared with the Stage 2 scheme, the Campus plan using the Vertical Strategy is the clear winner with more than double the number of advantages.

Below is a summary of the results of the evaluation process. The full evaluation table can be found in Appendix A-2b.

Campus Plan Evaluation Criteria

Version 1.0 - Sept 04, 2019

	Original (Canon)	Option 1	Option 2
OPERATIONAL FUNCTIONALITY			
SUBTOTAL	1	3	12
CLINICAL FUNCTIONALITY			
SUBTOTAL	3	3	7
FUTURE GROWTH AND ADAPTATION			
SUBTOTAL	0	3	1
HEALTH AND WELLNESS			
SUBTOTAL	6	4	10
LONG TERM CAMPUS POTENTIAL			
SUBTOTAL	3	3	9
AFFORDABILITY OF CONSTRUCTION			
SUBTOTAL	0	0	1
GRAND TOTAL	**13**	**16**	**40**

Figure 6.6.4-1: Campus Plan Options Evaluation

07

7 Preferred Campus Plan

7.1 The Preferred Campus Plan

Following the rigorous process of developing two alternative strategies, discussing them with internal and external stakeholders, refining the schemes with input from feedback sessions, analyzing them along established design drivers and evaluating an objective comparison between them and the Stage 2 proposal, we recommend that the Vertical Strategy be followed in future development of the project.

Figure 7.1-1: The Two Alternative Campus Plan Strategies

7.1.1 RECOMMENDATION

We recommend the new South Niagara Hospital be designed according to the Vertical Strategy:

- Maximized site potential including allied development and parking
- Clarity of access and wayfinding through distributed entrances
- Better internal clinical functionality – adjacencies and travel distances are optimized
- Building footprint: 247,200 sq.ft.
- +/- 2,050 parking spaces

Figure 7.1.1-1: The Recommended (Vertical) Strategy Site Plan

7.1.2 OPERATIONAL FUNCTIONALITY

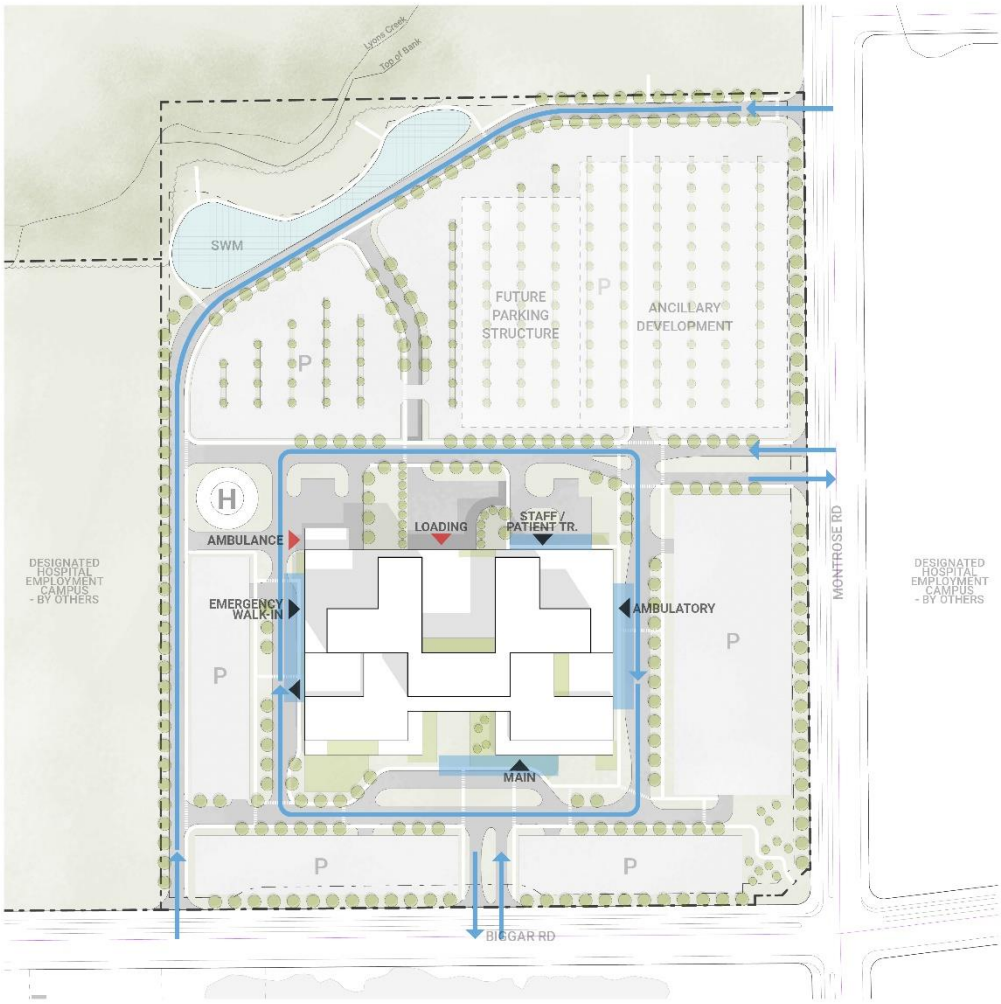


Figure 7.1.2-1: Recommended Strategy Site Traffic

Better Optimization of Site Traffic

The site planning utilizes entrances and drop-offs on all sides & to multiple addresses.

Figure 7.1.2-2: Recommended Strategy Vehicular Flow

Vehicular Flow

An Updated review of parking demands was undertaken for the current Campus Plan.Estimated demands (2600 vehicles) exceed the supply that can be achieved through providing only surface parking (approximately 2000 spaces).A Parking Management Strategy will be required for the site to address:

- Parking demand reduction strategies: i.e. Transportation Demand Management programs, paid parking, good access to transit
- And Parking deployment strategies: i.e. valet, off-site parking, structured parking

Figure 7.1.2-3: Recommended Strategy Emergency Vehicular Flow

Emergency Vehicular Flow

Unobstructed ambulance access with little interference of public traffic

Figure 7.1.2-4: Recommended Strategy Emergency Public Transit Flow

Public Transit Flow

Unobstructed public transit loop with little interference of public traffic

Figure 7.1.2-5: Recommended Strategy Loading

Efficient Loading Dock Distance

Unobstructed service flow with little interference of public traffic

7.1.3 CLINICAL FUNCTIONALITY

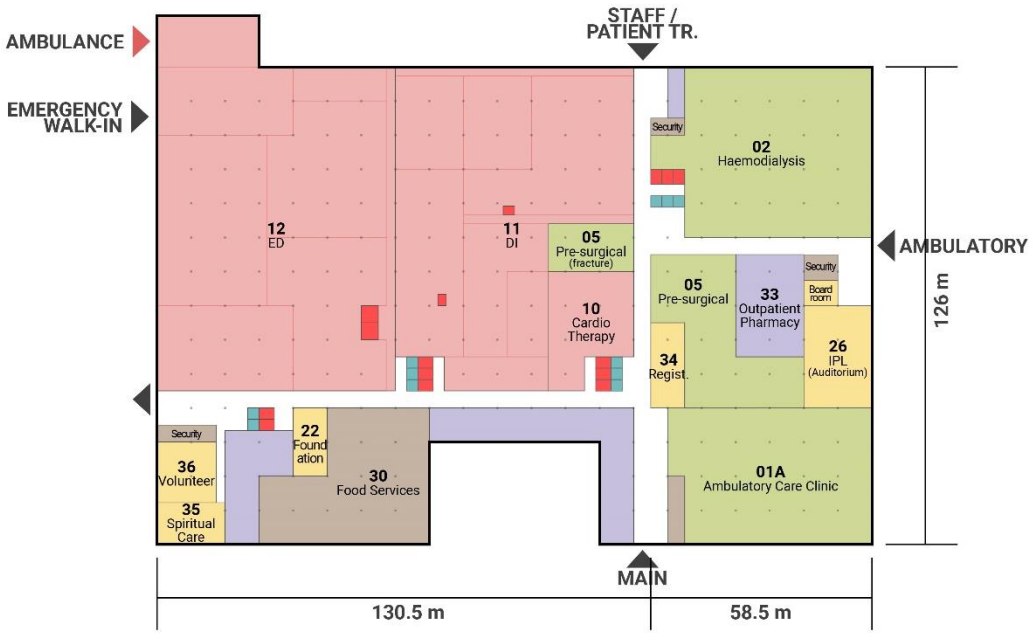


Figure 7.1.3-1: Recommended Strategy Ground Floor Entrances

Shorter Horizontal Travel Distances

The compact Vertical Strategy allows for shorter travel distances from various entrances to the hospital 'main street' intersection.

7.1.4 **FUTURE GROWTH & FLEXIBILITY**

Figure 7.1.4-1: Recommended Strategy Future Growth & Flexibility

Maximized Site Use and Development Flexibility

Growth flexibility is accommodated on all sides of the podium; IPU growth is through shell fit-out

- FUTURE DEVELOPMENT
- D/T NEAR TERM GROWTH - SOFT PROGRAM RENO
- D/T MEDIUM TERM GROWTH - EXTERNAL ADDITION
- D/T LONG TERM GROWTH - EXTERNAL ADDITION
- IPUs GROWTH - SHELL FIT-OUT

7.1.5 HEALTH & WELLNESS

Figure 7.1.5-1: Recommended Strategy Destinations

Clearly Identifiable Destinations

Ensuring clearly identifiable destinations will support strong campus identity and character.

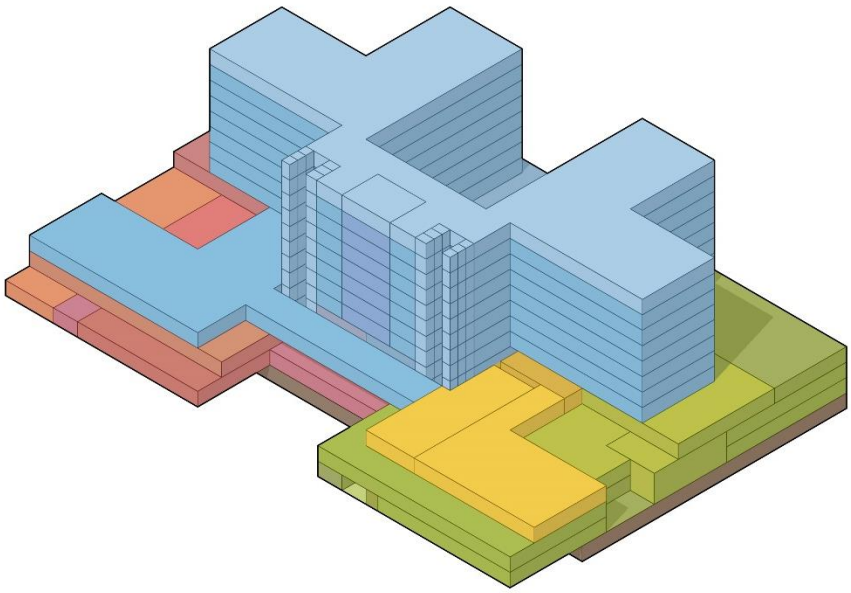


Figure 7.1.5-2: Recommended Strategy Programs & Massing

Clearly Identifiable Destinations

Massing articulates strong identity and clear division of programs.

- Ambulatory Care Services
- Clinical, Diagnostic & Theraputic Services
- Inpatient Units
- Administrative Services

Figure 7.1.5-3: Recommended Strategy Landscape

Outdoor Therapeutic Space Strategy

- (S) SECONDARY ENTRANCE COURTYARD
- (C) COMMUNITY PLAZA / MAIN ENTRANCE
- (M) MENTAL HEALTH TERRACE
- (A) AMBULATORY CARE ENTRANCE COURTYARD
- (D) DIALYSIS ENTRANCE COURTYARD
- (E) EMERGENCY DEPT. ENTRANCE COURTYARD
- (SC) SPIRITUAL CARE / TRAD. HEALING GARDEN
- (CD) CAFETERIA / DINING PATIO
- (SW) SENIORS' WELLNESS (2nd FL)
- (L) LOADING
- (CC) COMPLEX CARE
- (SG) STAFF GARDEN

Figure 7.1.5-4: Recommended Strategy Ground Pedestrian Trails & Connections

Pedestrian Trails and Community Connections

Promote personal wellness through walking paths and trails for exercise and feature stairs.

Figure 7.1.5-5: Recommended Strategy Cycling Trails & Connections

Cycling Access for Community Connections

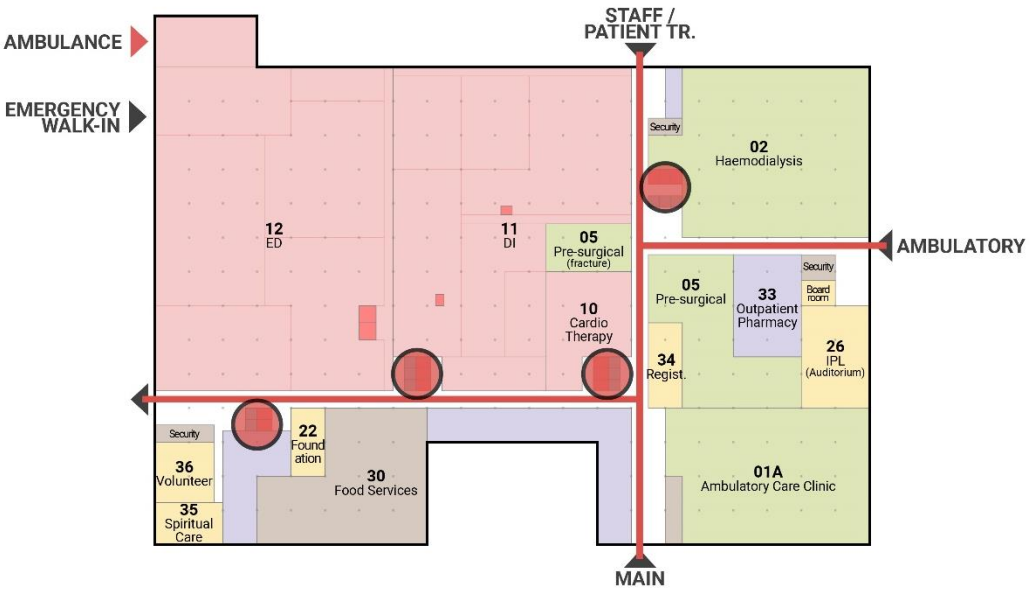


Figure 7.1.5-6: Recommended Strategy Ground Floor Elevators

Optimal Elevator Location for Patients

7.1.6 LONG TERM CAMPUS POTENTIAL

Figure 7.1.6-1: Recommended Strategy Orientation Opportunities

Flexibility of Site Options & Orientation

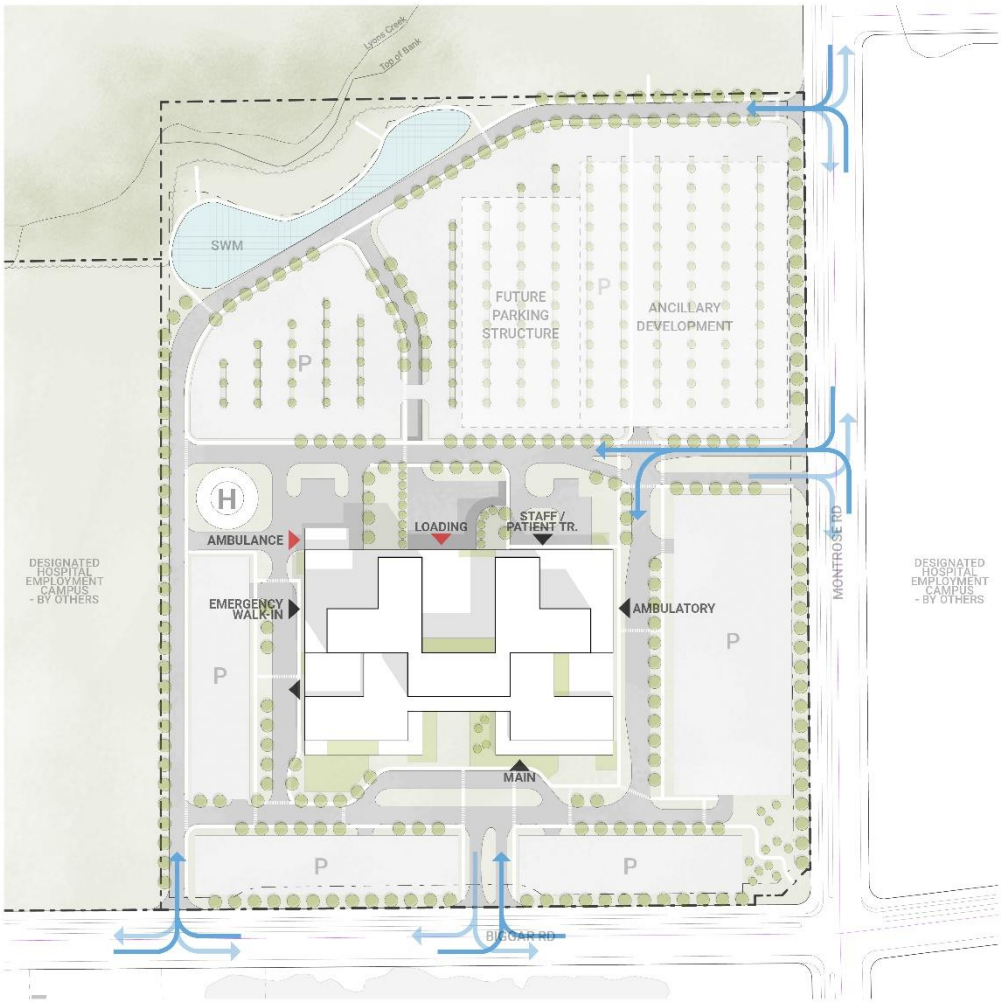


Figure 7.1.6-2: Recommended Strategy Site Access & Egress

Good Access & Egress from Site

Figure 7.1.6-3: Recommended Strategy Public Plaza & Community Gateway

Central Location for Public Plaza and Community Gateway

7.1.7 GROUND FLOOR LEGIBILITY & FLEXIBILITY

Figure 7.1.7-1: Recommended Strategy Ground Floor Program Legibility

Good Legibility at Ground Floor

7.1.8 ENDORSEMENT BY SENIOR TEAM

A brief presentation of the Campus Planning process and the results of the evaluation were presented to the Niagara Health Senior Team. The group endorsed the recommendation to develop the Vertical Scheme in future phases of the project.

7.1.9 STRATEGIC DIRECTION

While this Campus Plan still needs to be tested through the rigor of the developing design process, the direction of using a vertical strategy for the Blocking and Stacking of the new South Niagara Hospital shall structure the future design phases, due to the advantages presented above and scrutinized in the evaluation process. The design guidelines in the following Chapter are also based on this premise.

08

8 Campus Design Guidelines

The South Niagara Hospital Campus Plan is a comprehensive and flexible framework to guide the Hospital's development over the next decade. As such, the Campus Design Guidelines have been developed with near and long-term planning horizons, to provide a framework for development and growth over time.

The Campus Design Guidelines are organized into the following sections: 8.1 Urban Design Guidelines; 8.2 Landscape Guidelines; 8.3 Transportation Guidelines; 8.4 Built Form Guidelines; 8.5 Sustainability Guidelines; and 8.6 Utility & Infrastructure Guidelines.

The Campus Design Guidelines are written to be discipline and site specific.

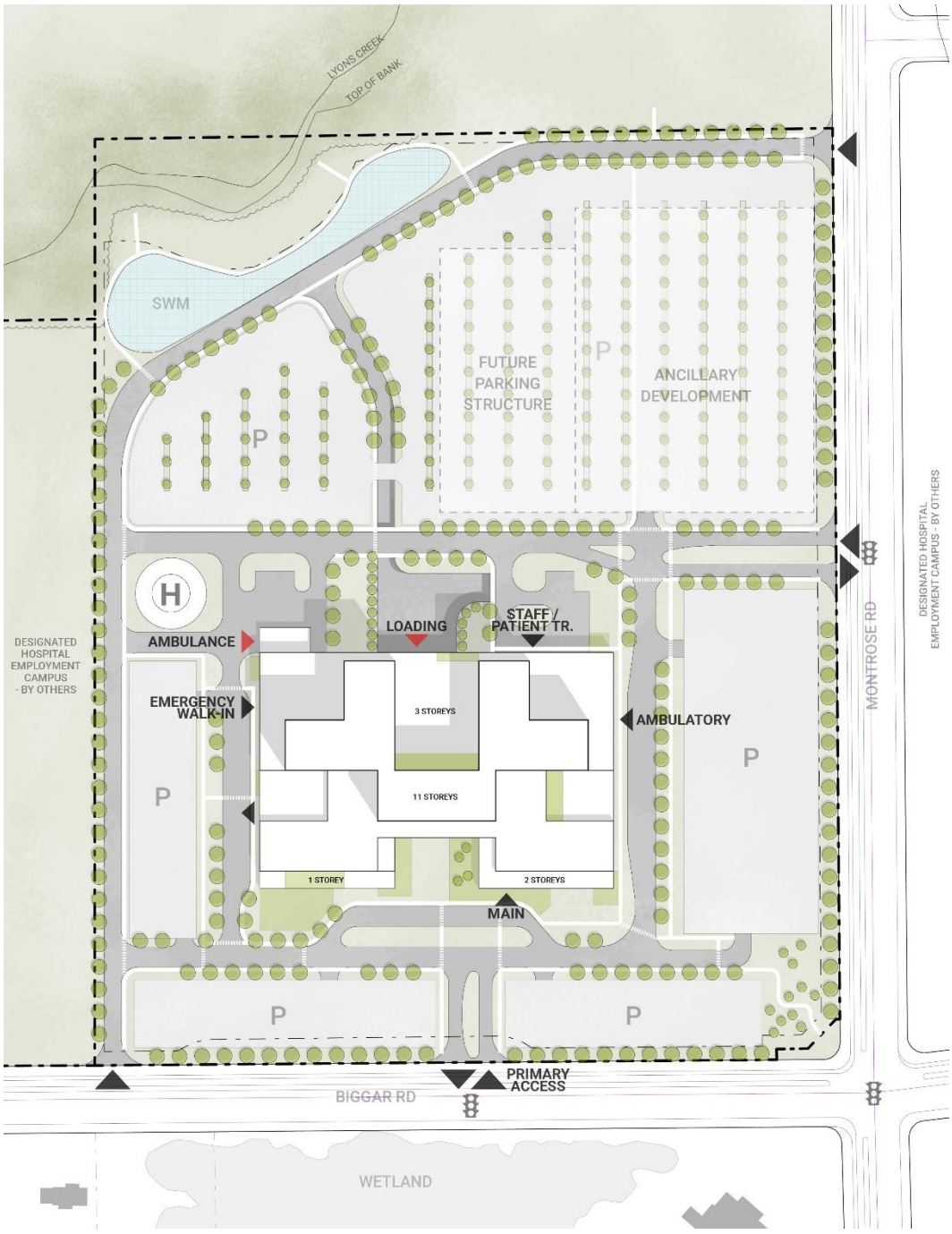


Figure 8 -1: Recommended (Vertical Strategy) Site Plan

8.1 Urban Design Guidelines

The purpose of the Urban Design Guidelines is to ensure that the quality and relationships within the built environment of the SNH campus support the vision set out by Niagara Health, both now and well into the future. The goal of the Urban Design Guidelines is to promote an inclusive, experiential and connected campus that embeds environmental leadership, operational excellence and resilience in each design decision. The campus shall promote health and wellness and the individual campus buildings shall be both identifiable as distinct and integrated with each other so that the sum is greater than the parts.

8.1.1 APPROACH & ARRIVAL

Perimeter Circulation, Community Access

Potential Users

Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services

- Access to public road networks shall be provided on both Biggar and Montrose Road.
- Design shall encourage multiple, distributed and clearly indicated points of entrance and exit.
- Wayfinding and site access design shall facilitate distribution of traffic to and from the QEW.
- Redundancy shall be designed into site entrances and exits.
- There shall be clear separation for ambulatory traffic between ED, patient, transfer and helipad.
- There shall be perimeter and internal looped circulation paths for both pedestrians and cyclists that connect to all building access points and to the perimeter entrances to the site.
- All pedestrian internal and perimeter circulation paths shall be tree lined.
- The perimeter and internal circulation paths shall provide a variety of seating arrangements that accommodate a minimum of four people each at a minimum of 10 metre intervals.
- Entrances shall be designed with a hierarchy of scale and distribution that communicates their intended use as a part of the building and campus way-finding system.
- The external and internal roads and paths shall connect to identifiable, dedicated entrances for the: Main Entrance / Ambulatory Entrance / Ambulance Entrance / Emergency Walk-In Entrance / Patient Transfer Entrance / Staff Entrance and Loading Entrance.

Figure 8.1.1-1: West Park Healthcare Centre (Plenary PCL Partnership)

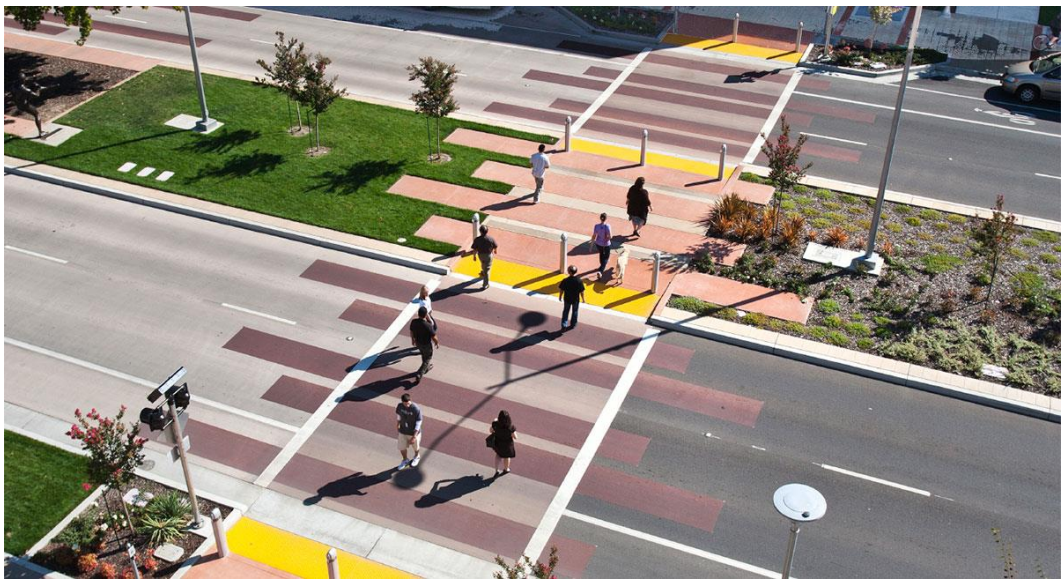


Figure 8.1.1-2: West Sacramento Crosswalk (MIG)

Figure 8.1.1-3: Betty Ruth & Milton B. Hollander Healing Garden, Smilow Cancer Hospital (Anton Grassl / Esto)

8.1.2 IDENTITY & CHARACTER

The three key elements of the future South Niagara Hospital Identity and Character are:

- Campus – The development shall be treated as an assembly of different buildings, forms or blocks, each with its own character and identity (e.g. Main Diagnostic & Treatment Block, Ambulatory Block, Inpatient Block, Future Ancillary Building, Future Parking Garage).
- Health and Wellness – The development shall reinforce an identity related to health and wellness, a strong connection to nature and effective use of healing gardens.
- Community Connectedness – The development shall establish an identity that connects back to the community, recognizes the importance of the hospital as a gateway into the Secondary Plan, and where possible supports the activation of the street.

Image

Potential Users

Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services

- The hospital shall be easily visible and iconic on the urban scale from the surrounding community and must be a symbolic projection of the integrity of the hospital.
- The materiality of the hospital site shall convey a sense of trusted institution.
- High quality landscaping and street furnishings shall be used to build a high level of trust and underscore the level of care being provided.
- The corner of Biggar and Montrose and the street frontage on Biggar shall provide the iconic face of the hospital to the community and should be protected for clarity of presence in the community.
- The campus plan shall anchor the South Niagara Hospital to the south and east street frontages.
- The campus plan shall create a clear, visible and strong image at the public intersection of Biggar and Montrose roads.

Gateways

Potential Users

All Drivers, including: Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services.

- The Hospital itself shall be designed as a QEW highway Gateway. The high-rise component of the hospital acts as the first gateway as seen from the highway or when arriving from the highway and from other 'vehicular' distances.
- The transition from arterial roadway to complete street within the campus shall be the second gateway signifier upon entry into the campus.
- The Site Perimeter Gateways of the hospital shall clearly convey a sense of arrival through the ease and flow of mobility and the scale of the street and street furniture.
- The design of the choreography of landmarks within the site shall take the form of street furniture, lighting and plantings.
- Gateway landmarks shall include courtyards, tree stands, gardens, water features and public art.
- Gateways shall be designed to be welcoming.
- Gateways shall include natural materials, motifs, and references to Niagara itself.

Community Connection

Potential Users

The Community is everyone who enters the campus: Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services

- The South Niagara Hospital shall include campus connections to the already existing regional greenways and pathways at the perimeter of the site as well as the internal fitness and physiotherapy walks, cycling trails, building courtyards, therapeutic gardens, and rooftop gardens.

Materiality

- The public realm shall be built with a consistent and minimal palette of durable, natural and local materials.
- The design and materials shall be deployed to separate pedestrian, cycling and driving routes while at the same working within a similar durable, natural, and local palette of materials.
- The materiality of the public realm shall be clear, natural, warm, consistent and resilient.

Site Safety and Accessibility

Potential Users

Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services

Patients, family, friends and staff all need to feel safe and secure upon entering the South Niagara Hospital campus.

- The site elements including the tree canopies, street trees, stormwater treatments trains, and all other landscape and public realm elements shall address safety.
- All site lighting shall be warm and welcoming, as well as safe and secure, while avoiding light pollution into the adjacent community.
- The lighting for both roadways and walkways shall use a variety of fixtures, from high level area lighting to local, user level ambient lighting.
- The sidewalk, pathway and trail lighting shall provide sufficient illumination for safety.
- The parking lot lighting shall be safe, comfortable and secure for pedestrians, cyclists, pedestrian and drivers.
- All areas in the public realm, including the therapeutic gardens, shall provide ambient lighting and shall be devoid of any hiding or entrapment areas.
- The accessible site areas shall address all users universally, whether they are familiar or unfamiliar with the site.
- The site access, driveways and pedestrian networks shall follow a wayfinding strategy which is consistent and accessible to all.

Figure 8.1.2-1: Bridgepoint Active Healthcare Redevelopment (Stantec / KPMB)

Figure 8.1.2-2: Division Street (KPG Interdisciplinary Design)

Figure 8.1.2-3: Partners HealthCare Corporate Campus (OJB Landscape)

8.1.3 FUTURE EXPANSION & GROWTH

A key component of the vision for the South Niagara Hospital campus is its function as a growing campus that is connected to the wider Niagara community and is able to grow and evolve according to the needs of the community.

Campus

The design of the Hospital shall include planning for future campus expansion and its impact on entrances, parking, circulation and all contiguous pathways, trails and landscaped spaces.

- The future expansion of building shall incorporate the following expansion strategies into the design:
  - Internal Incremental Expansion;
    - There shall be provision of shelled space and soft spaces located adjacent to the programs most likely to grow.
  - External Incremental Expansion;
    - There shall be planning and preservation of areas at the perimeter of the hospital where expansion can occur.
    - Future expansion shall be able to occur without major disruption of building entrances, infrastructure and emergency vehicle circulation.
  - Site Regeneration:
    - Sufficient vacant land shall be retained on the site to accommodate future replacement facilities.
- Development capacity of the site shall be preserved in order to support activity of other campus partners.
- The campus design shall consider a location for the future parking garage that is easy to access from the patient entrances into the building.
- Mobility and Transportation flows shall remain completely unaffected by the areas of the site reserved for future buildings and/or
- Future buildings and or structures shall be integrated into a sustainable campus network.
- The designer shall pay special attention to existing site infrastructure such as utilities, roadways, and pedestrian paths and how they are affected by campus growth,
- Both the Hospital and the designer shall test appropriate capacity of the site to ensure that introducing a new health alliance project does not create a burden to the health campus and surrounding area.
- Future buildings and/or structures shall contribute to the aesthetic of the site

- Growth of the campus shall adhere to the campus palette for building and landscape materials, walkways, lighting, signage, and street furniture
- Growth of the campus shall grow an active streetscape adjacent to the new building and or structure.
- New buildings shall reinforce connections within the campus and maintain entries, courtyards, and landscaped open space.
- Future buildings/blocks shall promote distinct architectural identities, to participate to the Campus identity of the development.
- Attention shall be given to the careful arrangement, shaping and detailing of buildings and spaces between new partnership buildings such that they provide a suitable microclimate and consequential benefits to comfort levels.
- Partnership buildings shall ensure that their public realm extends the use of outdoor pathways and gardens.

Identity & Growth

- The designer shall ensure the maintenance of a clear identity of the Hospital throughout future phases of growth.
- The future phases shall maintain visibility of the hospital from the south and the east
- Parking shall not increase at the South and East Frontages as the identity and visibility from Biggar and Montrose are critical to the success of the South Niagara Hospital.
- There shall be capability for growth around the hospital podium
- The integration of existing open space and both interior and exterior pathways shall be maintained as growth occurs.
- As Niagara Health develops the South Niagara Hospital Campus physical grounds, it shall ensure that the massing of new buildings allow daylight to reach active outdoor spaces and that the shared campus experience remains inclusive and connected.
- Allied partnership designers shall reduce impervious surfaces and shall require sustainability, resilience and Low Impact Design and Development landscapes with the new projects.
- Allied partnership designers shall incorporate innovative stormwater management practices into the building design.
- Allied partnership designers shall incorporate alternative means of access, such as walking, cycling and public transit, into the building's design.
- Bicycle storage space and facilities shall be provided to make commuting by bicycle a truly viable option.
- The use of public transportation shall be provided, supported, expanded and maintained for all current and future campus projects.

Ground Floor Activation

- Biggar and Montrose shall be the focus of ground floor animation with allied health partners such as retail and other services.
- The goal of the retail and cultural animation strategy for the Biggar and Montrose frontage, is to engage patients, visitors and staff with the South Niagara Hospital Campus as it grows.
- The ground floor shall offer a variety of opportunities to connect to the therapeutic gardens and linear landscapes.
- The ground floor shall set the stage for a variety of health partners/ ancillary development to grow the campus together.
- Montrose shall be the focus of ground floor animation for the future allied health partners / ancillary development.

Figure 8.1.3-1: Galatyn Commons (Stantec)

8.1.4 LOW IMPACT DEVELOPMENT, DESIGN, RESILIENCE & SUSTAINABILITY

Topography & Natural Features

- The hospital campus shall function as an ecologically dynamic natural space.
- The hospital campus shall play host to smaller eco-systems while also connecting to the wider ecology of the region around it.
- The hospital campus shall act within its power to honour and connect habitat and stream corridors that pass through the site.
- the hospital campus shall incorporate native, drought tolerant plants throughout the Campus Site.

Microclimate & Healing Environments

- All public realm environments shall be designed to extend the outdoor life of the campus further into the shoulder seasons, both further into the fall and earlier in the spring.
- All public realm design solutions shall modify microclimate through use of grading to provide areas to face the sun, and areas to provide protection from the wind.
- All public realm design solutions shall modify the microclimate through the planting of deciduous groves for shade and coniferous groves for wind shelter belts.
- All public realm solutions shall connect the campus's open spaces, tree groves, healing gardens, therapeutic walkways, and trails into a network of green around the campus The South Niagara Hospital.
- The public realm shall include a series of interconnected small-scale gardens along the trails to attract butterflies and other healthcare compatible wildlife.

Public Realm Design

- The design team shall radically reduce stormwater runoff within its campus through the maximization of permeable and soft surfaces throughout the public realm.
- The design team shall maximize the planting of streetscape trees and groves of both deciduous and coniferous groves on campus to support the City of Niagara's commitment to reforestation.
- Landscaping on campus shall use only native species throughout in order to increase the attraction of native fauna, and to reduce the need for irrigation, chemical treatments, and general maintenance.
- All stormwater produced on site shall be harnessed and treated on site.
- All buildings, green roofs, roads, trails, walkways and landscapes shall be designed to retain stormwater on site in a closed loop approach.

Figure 8.1.4-1: Healing Garden (Source Unknown)

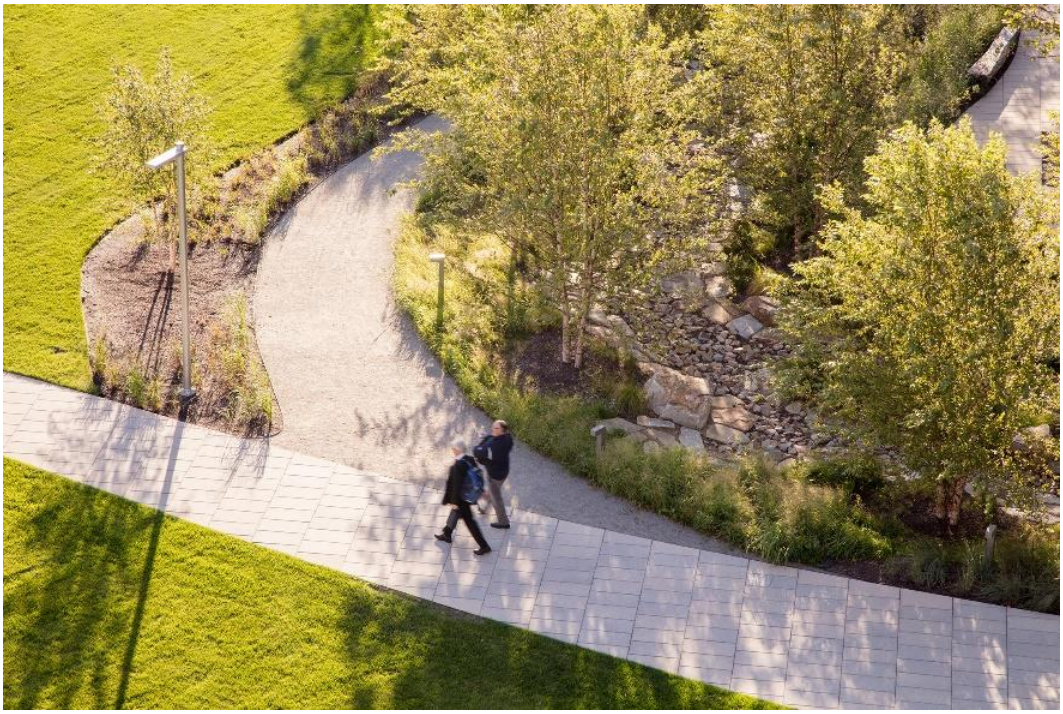


Figure 8.1.4-2: Partners HealthCare Corporate Campus (OJB Landscape Architecture)

Figure 8.1.4-3: Bioswale Planting (Source Unknown)

8.2 Landscape Guidelines

8.2.1 PUBLIC & CIVIC AREAS

Perimeter Landscapes, Community Space

Potential Users

Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services

- The perimeter of the site will form the connection between the hospital lands and the civic realm of the adjacent streets. These areas will be long and narrow and shall be planted with a mixture of deciduous and coniferous trees combined with berms.
- Walkway connections shall be continuous from the street to all building entrances complete with adequate lighting and intuitive wayfinding signage.
- Community spaces shall include all green areas of the campus that are comprised of natural areas, storm water management and general open space. These areas shall include landscapes that are a mixture of deciduous trees, coniferous trees and ornamental shrubs.
- Community spaces shall be arranged in an informal and naturalistic style that is complimentary to the adjacent native landscapes. Turf shall be low maintenance.

Roads and Parking

Potential Users

Patients, Employees, Visitors, Transportation and Delivery, Ambulance and Emergency Services

- Internal road systems and parking lots shall include large form deciduous trees to provide shade and reduce the heat island affect.

  Understory shall be a combination of low shrubs and perennials and/or grasses with an equal amount of low maintenance turf.

Bicycles, Trails and Connections

Potential Users

Patients, Employees, Visitors, Adjacent Neighbours

- Bicycles routes shall be provided from the main perimeter roads to bicycle parking areas at established entrances.
- Bicycle parking shall be provided in accordance with local requirements and shall include a combination of secured, protected and lockable storage solutions and shall be safe and intuitive and built into the walkway network.
- Trails shall be provided to connect to the existing trail system at the north end of the site and to all naturalized areas of the site. They shall be a hard, durable surface and meet AODA requirements.
- A circuitous system of walkways shall be employed around the campus connecting all entrances of the building. The walkways shall double as outpatient rehabilitation routes and include distance markers.

Helipad

Potential Users

Helicopter, and Emergency Care Givers

- The landscape around the helipad shall conform to all applicable regulations governing the safe integration of helipads including plant material selection, maximum heights and setback requirements.

LID and Sustainability

Potential Users

Patients, Employees, Visitors, Natural Habitat

- Low impact development shall be utilized throughout the site. This will include bioswales in medians integrated into the parking lots, the potential use of permeable pavements, infiltration trenches, cisterns and green roofs as well as storm water management facilities. The measures shall be designed to encourage viewing from the walkway and trail systems.
- Green roofs shall be included in the building roof tops in all areas where a roof can be seen from an internal program area. The green roof type shall be extensive.

Loading and Maintenance

Potential Users

Delivery Trucks, Salt and Storage Facilities, Refuse and Recycle

- The loading and maintenance area shall be screened from all adjacent uses with the use of a combination of solid screening (acoustic if required) and coniferous plant material. If sloped areas are required, they shall be vegetated with low maintenance plant material excluding turf.

Figure 8.2.1-1: West Park Healthcare Centre (Plenary PCL Partnership)

8.2.2 GARDENS FOR GENERAL USE

Main Entrance/Community Plaza

Approximate Size: 10,000 SF

Potential Users

Patients, Employees, Visitors, Transportation and Delivery

- The main entrance to the facility shall be a welcoming and pleasant experience for all users. It shall function as a drop off area but shall be designed to not hinder the direct approach to the entrance for pedestrians.
- The drop off area shall be covered and of sufficient size to meet the needs of the main entrance area. Places for sitting and waiting shall be incorporated into the landscape design and shall include an even balance between hard and soft landscape elements.
- The area shall be designed to exemplify and create a strong visual identity to the facility and include decorative paving for both the vehicular and pedestrian areas.
- Low walls and or fencing shall be utilized as necessary to direct pedestrian movements in a safe and intuitive manner and to provide definition to the various uses of the space.
- The area shall include a larger hardscape that will provide opportunities for community events and hospital functions including BBQ facilities.
- Adequate lighting shall be provided together with intuitive wayfinding signage.

Figure 8.2.2-1: Bench in Garden (Source Unknown)

Ambulatory Care Entrance Courtyard

Approximate Size: 1,000 SF

Potential Users

Patients, Employees, Visitors, Transportation and Delivery

- The Ambulatory Care entrance courtyard shall receive similar treatment as the main entrance but with an emphasis on the program identity.
- There shall be an even balance between hard and soft landscape areas. Seating areas shall be integrated into a garden like setting with screening from adjacent roadways and public walkways.
- Walkway connections from any drop off area shall be direct and separate from the courtyard. Adequate lighting shall be provided together with intuitive wayfinding signage.

Figure 8.2.2-2: Bridgepoint Active Healthcare Redevelopment

Emergency Department Courtyard

Approximate Size: 1000 SF

Potential Users

Patients, Employees, Visitors, Transportation and Delivery

- The Emergency Department entrance courtyard shall receive similar treatment as the main entrance but with an emphasis on the program identity.
- There shall be an even balance between hard and soft landscape areas. Seating areas shall be integrated into a garden like setting with screening from adjacent roadways and public walkways.
- Walkway connections from any drop off area shall be direct and separate from the courtyard. Adequate lighting shall be provided together with intuitive wayfinding signage.

Secondary (Staff/Patient Transfer) Courtyard

Approximate Size: 500 SF

Potential Users

Patients, Employees, Visitors, Transportation and Delivery

- The Secondary entrance courtyard shall receive similar treatment as the main entrance but with an emphasis on the program identity.
- There shall be an even balance between hard and soft landscape areas. Seating areas shall be integrated into a garden like setting with screening from adjacent roadways and public walkways.
- Walkway connections from any drop off area shall be direct and separate from the courtyard. Adequate lighting shall be provided together with intuitive wayfinding signage.

Secondary Entrance Courtyard

Approximate Size: 500 SF

Potential Users

Patients, Employees, Visitors, Transportation and Delivery

- The secondary entrance courtyard shall receive similar treatment as the main entrance but with an emphasis on the program identity.
- There shall be an even balance between hard and soft landscape areas. Seating areas shall be integrated into a garden like setting with screening from adjacent roadways and public walkways.
- Walkway connections from any drop off area shall be direct and separate from the courtyard. Adequate lighting shall be provided together with intuitive wayfinding signage.

Figure 8.2.2-3: Alex's Butterfly Garden, London Health Sciences Centre (Vafiades Landscape Architect)

8.2.3 THERAPEUTIC AND DEDICATED GARDENS

A hospital environment can be a stressful place both physically and mentally requiring opportunities for users to find alternative places to reduce their anxiety. Therapeutic and dedicated garden spaces provide opportunities for patients, visitors and staff to disengage from the hospital environment and relax in an outdoor environment that offers a quiet refuge for contemplation and relaxation. These outdoor spaces should be designed to maximize the amount of greenery, take advantage of a mixture of settings for both social interaction and quiet introspection and stimulate the senses. They should have well defined seating areas, easily readable walkways, and provide for a safe and secure environment, with a strong connection to nature and local, cultural context.

8.2.4 DESIGN GOALS

- Provide sensory stimuli that is noninvasive in character to draw attention away from the initial feeling state to an external focus.
- Facilitate physical and psychological movement with walkways and views to a variety of spaces which will assist in changing perspective.
- Create areas that provide seclusion as well as social interaction to assist with the resolution of metal and physical issues.

Figure 8.2.4-1: Garden (Source Unknown)

8.2.5 **DESIGN ELEMENTS**

- Provide for an abundance of plantings that are colourful, textured and seasonal.
- Plant material shall be locally grown, acclimatized to the region, native, drought and salt resistant
- Utilize plant material for specific uses; herbs for healing gardens, vegetable garden for the cafeteria and flower gardens for patient interaction, flowering perennials to attract butterflies and trees with leaves that move in the breeze and provide varying degrees of shade and shadows.
- Sculptural elements that attract birds such as bird feeders and bird baths
- Water features to provide ambient sound and visual interest
- Screens constructed of hard materials or plant material to provide screening of utility areas
- Walkways that are smooth surfaced and meander and offer places to rest with key points that frame vistas or focal points
- Safe, effective lighting together with electrical outlets for sponsored functions and other outdoor activities.
- A variety of seating arrangements including group seating, individual seating (semi-private), moveable seating, with the use of benches (with and without backs and arms) and tables chairs
- The use of shade elements such as pavilions, gazebos, trellis, umbrellas and canopies to provide shelter from the sun and rain
- The implementation of art and / or sculpture to connect the user to local cultural context and to provide a central focal point to a garden.

Spiritual Care/Traditional Healing Garden

Approximate Size: 8,000 Sf

Potential Users

Patients, Employees, Family and Friends, Visitors,

- The Spiritual Care and Traditional Healing garden shall be located adjacent to the Spiritual Care program and connected to the Main Entrance courtyard
- The garden shall incorporate both hard and soft landscape elements with a larger percentage of the space dedicated to softscape elements.
- Hardscapes shall include walkways, and a variety of seating arrangements that accommodate one or two individuals in a private setting to areas for 3 to 4 people as well as an area for small group activities.
- It shall be screened from adjacent roadways and public walkways with both coniferous plantings and walls or fencing. A labyrinth shall be incorporated into the design of the space.
- Opportunities for the introduction of sculptures shall be incorporated in the design.
- Plant material shall include selections that promote healing and shall be organized to allow direct interaction with patients, including trees, shrubs, perennials and ornamental grasses.
- A small water feature and facilities for traditional ceremonies including a Sweat Lodge shall be discussed as opportunities with stakeholders.

Figure 8.2.5-1: Lavender (Source Unknown)

Mental Health Terrace

Approximate Size: 2,000 SF

Potential Users

Patients, Employees, Family and Friends

- The Mental Health Terrace shall provide the users with an outdoor environment that promotes physical and mental well-being. It shall be located directly adjacent to the mental health program and shall facilitate clear sight lines as per CPTED principles.
- All elements shall be designed to have no sharp corners, be fixed, non-climbable, ligature proof, tamper-proof and non-toxic.
- The terrace shall include fixed seating for individuals of one to three people as well as for group activity.
- Hard surfaces shall be durable, slip resistant and complimentary to the overall architectural design of the facility.
- An overhead shade structure shall be provided and shall be non-climbable and ligature proof.
- Plant material shall be placed in raised planters and shall be seasonal, colourful, non-toxic, textured, native, low maintenance and drought resistant and shall include, trees, shrubs, perennials and ornamental grasses.
- Accent lighting shall be provided to extend the outdoor use into the evening hours.

Figure 8.2.5-2: Labyrinth (Source Unknown)

Nutrition and Food Services

Approximate Size: 4,000 SF

Potential Users

Patients, Employees, Family and Friends, Visitors

- The nutrition and food services area shall provide the users of the facility an outdoor oasis that is welcoming and pleasant.It shall be located adjacent to the food services program..
- This space shall include a hard surface to accommodate tables and chairs (both fixed and nomadic) and shade structures or umbrellas.
- The space shall be organized to encourage group seating together with areas that will accommodate 2-4 individuals.
- Plant material shall include a variety of trees, shrubs, perennials and ornamental grasses. The space shall include screening from adjacent roadways and public walkways as well as fencing where required and appropriate lighting.
- Potential for a water feature shall be discussed with stakeholders.

Figure 8.2.5-3: Partners HealthCare Corporate Campus
(OJB Landscape Architecture)

Staff Garden

Approximate Size: 2,000 SF

Potential Users

Employees

- The staff garden adjacent to the facilities administrative program will provide an outdoor area of relaxation and quiet contemplation for staff and employees.
- The space shall include a hard surface to accommodate tables and chairs (both fixed and nomadic) and shade structures or umbrellas.
- The space shall be organized to encourage group seating together with areas that will accommodate 2-4 individuals.
- Plant material shall include a variety of trees, shrubs, perennials and ornamental grasses.
- The space shall include screening from adjacent roadways and public walkways as well as fencing where required and appropriate lighting.

Figure 8.2.5-4: Sitting in Garden (Source Unknown)

Complex Care Courtyard and Terraces

Approximate Size: 1,500 SF Per IPU

Potential Users

Patients, Employees

- The complex care courtyard shall be located adjacent to the complex care in- patient units providing an outdoor garden that will encourage healing, reduce stress and allow for direct interaction with nature.
- The space shall have a balanced mix of both hard and softscapes. Walkways with adjacent small seating areas will be intermixed among generous planting beds with all season plant material.
- Spaces shall be designed to accommodate mobile devices together with mobility assistance elements such as railings. Seating types will include tables and chairs as well as tables only and benches.
- Sculptural elements that reflect the local history shall be incorporated into the design to encourage a sense of familiarity helping to reduce stress and connecting the patient to the local community.
- Elements that will encourage the interaction of local wildlife habitat such as birds and butterflies shall be incorporated in the garden design.
- Where complex care units are located above the ground floor level, an outdoor covered terrace shall be provided. One shared terrace accessible from each 10-bed pod shall be provided and shall include a hard surface seating area together with outdoor tables and chairs as well as plantings in raised planters at the perimeter of the terrace.

Seniors Wellness Terrace

Approximate Size: 2,000 SF

Potential Users

Patients, Employees

- The seniors' wellness terrace shall be located directly adjacent to the senior's program and public space.
- This courtyard shall provide outdoor seating areas for 1 or 2-4 people. Seating areas shall be designed to accommodate mobility devices and shall be intermixed with a variety of plant material in raised planters and shall encourage views to nature.

8.3 Transportation Guidelines

8.3.1 ACCESS

- Access to the public road network shall be provided on both Biggar Road and Montrose Road, with a minimum of two driveways along each frontage.
- Signalized intersections shall be located a minimum of 200 metres from the intersection of Montrose Road / Biggar Road.
- A minimum of one signal on Biggar Road shall be provided, with the design and provision to implement an additional signal along Montrose Road.
- Access design shall encourage multiple and distributed points of entry/exit to promote circulation and redundancy.
- Planning and design shall promote Biggar Road as the primary access point into the Campus.
- The Main Entrance shall be designed with a primary relationship to, and be highly visible from, Biggar Road. Wayfinding and site access design shall facilitate the primary routing of traffic travelling to/from Highway QEW and the hospital site along Biggar Road, reducing the number of turning movements required to travel between the site and highway.

8.3.2 CIRCULATION

General Circulation

- Internal circulation paths for pedestrians, circulation trails for cyclists, and internal roads for cars shall connect to all site access points and to the external paths, trails and roadways beyond the site.
- A continuous, safe and enjoyable pedestrian loop immediately adjacent to the hospital building shall be provided to ensure convenient access to the grounds from multiple points within the building acting as a therapeutic and leisure resource.
- Pick-up / drop-off facilities shall be provided to serve the following entrances:
    - Main Entrance
    - Ambulatory Entrance
    - Emergency Walk-in Entrance
    - Secondary / Patient Transfer Entrance
- All pick-up / drop-off facilities shall be designed to accommodate the clearance, width and turning requirements for both a side and rear-loading para transit vehicle.
- A looped circulation road (minimum 9m pavement width, sidewalk on both sides) shall be provided around the perimeter of the hospital for both

circulation and fire access. The circulation road shall link primary accesses, parking lots, transit stops, loading areas, and drop-offs.

- Separation shall be provided, to the extent possible, of ambulatory traffic, clear and unencumbered path for ambulatory and medical bus ('mobile hospital') between ED, patient transfer, and the helipad.

Drop-offs

- All internal roadways shall be constructed with generous drop-off zones, as the need for drop-off areas and accessibility areas is only likely to increase into the future with the growth of shared vehicle use and the growth of our senior population.
- Drop-off zones shall be integrated with each major entrance.
- Drop-off zones shall be designed with adequate space such that queuing does not interfere with operations on the circulation road.
- Drop-off zones shall be inclusive and welcoming.
- The design shall encourage short term use only and provide a clear route to the long term parking facilities and public road accesses when exiting the drop-off.
- Drop off Zones shall all be connected (if not continuous) to a circulation road with sidewalks on both sides that provide a minimum of 4.5 metres of sidewalk on both sides of the circulation road.

8.3.3 PARKING

Surface Parking

- A comprehensive, connected parking plan shall:
  - Integrate street furniture, designated walking loops and stormwater treatment trains into the parking plan.
  - Provide minimal crossing of main thoroughfare when walking to entrances with effective barriers where high traffic areas require guidance to a formal crossing location.
  - Provide clear wayfinding signage and pavement markings within parking areas.
- Parking areas for staff and visitors shall be clearly delineated and controlled with a gated pay-on-foot parking management system.
- Patient parking shall be distributed by department with designated, appropriately sized visitor parking lots located immediately adjacent the ambulatory, main, and emergency entrances.
- Planning of parking shall consider a distribution including 2/3 of the target parking supply for staff and 1/3 for visitors and patients.
- Preferential parking shall be provided for low-emitting and fuel-efficient vehicles, carpools and vanpools servicing employees.

- Surface parking modules shall be designed to maximize surface parking supply while continuing to respect industry design standards. The following parking standards are recommended to be adopted as a site-specific standard and should be sought for approval as part of the rezoning process:
    - Parking Module: 17.4 metres
    - Minimum two-way aisle width of 7.0 metres
    - Minimum parking stall length of 5.2 metres
    - Minimum parking stall width of 2.6 metres
    - Minimum accessible parking dimensions in accordance with the Accessibility for Ontarians with Disabilities Act (AODA)
- Accessible parking supply shall be provided above minimum AODA standards at a rate of 0.11 per 100 square metres of Building Gross Floor Area (˜5% of overall estimated parking demand),
- Provide a designated motorcycle parking area.
- Provide, to the extent possible, the most efficient layout for parking areas based on parking module dimensions and rectangular layout.

Parking Demand Strategy

- Baseline parking demands for the hospital will exceed what can be provided on site without development of a parking structure.
- Initial planning for the hospital will be based on the construction of a minimum 1.79 spaces per 100 sq.m. Building Gross Floor Area of surface parking on site combined with a parking management strategy that addresses an estimated target parking supply of 2.26 spaces per 100 square metres Building Gross Floor Area by concurrently considering:
    - A compressive and highly progressive travel demand management (TDM) plan developed in consultation with Niagara Health, Niagara Region, and the City of Niagara Falls designed to minimize staff and visitor parking demands. The goal of this program will be to reduce overall demand to the greatest extent possible. This plan will require financial incentives (subsidized public transit, shuttles, etc.) and disincentives (charging staff to park, etc.) and active monitoring to achieve the desired parking demand rate.
    - A Travel Management Association (TMA) shall be established to facilitate transportation programs for staff such as carpooling, shuttle services, and active transportation services coupled with emergency ride home services.
    - The parking strategy shall consider TDM and TMA in combination with strategies to provide additional parking supply through means such as:
        - Identifying and securing an additional off-site parking supply

- Exploring additional methods to maximize on-site parking supply efficiencies (i.e. valet parking)

- Provide adaptability within parking control for multiple purposes (valet, escape lanes, time of day or change in use).
- Design for physical barriers (wall, bollards, etc.) where barrier-free parking is adjacent to vulnerable road users or high traffic areas (transit shelters, pedestrian thoroughfares).

Future Parking Garage

- Plans shall be developed for the introduction of an above-grade parking structure to achieve an overall parking supply of 2.26 spaces per 100 square metres.
- The design shall include the location of the garage on the site, vehicular circulation, parking supply, and vertical circulation.
- A direct, enclosed connection to the Hospital shall be provided from the parking garage.
- The design shall be progressed to the extent required to allow Niagara Health to rapidly proceed to detailed design and construction.

8.3.4 LOADING

- Loading shall be located at the rear of the building and screened by built form and/or landscaping such that visibility of loading from public areas is minimized.
- Based on the functional program, the following service bays are suggested in the primary loading area:
  - Clean Bays: 1 food, 1 linen, 2 supplies/materials
  - Soiled Bays: 1 linen, 1 waste
  - Multi-waste roll-off bay
  - Waste Handling Bays: 1 with trash compactor, 1 with cardboard compactor, 1 with mixed recyclables compactor
  - Morgue Bay
- Clean and Soiled loading areas shall each accommodate the turning requirements of a WB20.5 tractor trailers. Ensure room for trucks to maneuver while adjacent docks are occupied.
- Loading docks shall be equipped with dock-levelers.
- Other loading areas to be provided shall include:
  - Small Truck Area (delivery vehicles such as cube vans, couriers etc.)
  - Power Station
  - Praxair Station
  - Dialysis Vehicle Space

- Consideration for vendor services loading area in proximity to cafeteria/retail based on location and distance to services

8.3.5 HELIPAD

- The location and design of the helipad shall be reviewed by an aviation or heliport consultant and discussed with the future operator, to ensure the requirements of the hospital, operators, and aviation regulations are met.

8.3.6 PUBLIC & ACTIVE TRANSPORTATION

Transit

- Sheltered public transit facilities shall be provided on-site and within close proximity to the public entrances.
- Transit drop-off and pick up locations shall seamlessly connect with campus trails, paths, and sidewalk loops.
- Transit stops shall provide comfort and protection from wind, rain and UV.
- Transit stop design shall:
  - Minimize delay to local and regional transit routes.
  - Allow transfers between bus routes.
  - Provide short and direct access to the hospital, which will be a major transit trip generator in the City.
  - Be a comfortable, social and daylit experience.
  - Provide an abundance of bench seating, to accommodate waiting and create opportunities for hospital community interactions.
- Consult with transit providers on the ultimate design of the transit stop, to ensure that the connection with the Niagara community routes is integrated into the campus plan and the campus transit platform design. It is expected that patients, family, friends, and staff of the South Niagara Hospital will in fact be a significant user of the City of Niagara transit system.
- Provide transit scheduling, wayfinding and ticketing information on-site in a visible and public location.
- Provide bus routing through the site that adequately meets the turning requirements for conventional and articulated buses, and reduces, to the extent possible, congestion with other vehicles on the site that would incur delay.

Cycling

- Secure and weather-protected bicycle parking facilities shall be provided for staff.
- Highly visible, potentially weather protected short-term bicycle parking (bike racks) shall be provided for visitors and/or staff.
- Incorporate facilities that compliment cycling activity, such as cyclist showers and an air pump and repair station.
- Coordinate with the City of Niagara and Niagara Region to ensure the proposed campus trails integrate with the surrounding network and reflect the regional strategy for cycling and pedestrian walkways.
- Connectivity shall be provided between on street and on-site cycling facilities.
- Clear and consistent cycling trail wayfinding shall be provided.

Pedestrians

- Strong and clear relationships between the site and the individual building pathways and destinations shall be provided for all modes of arrival on campus – by foot, bicycle, transit or car.
- Provide green and inclusive connectivity for pedestrians via tree-lined campus pathways, trails and sidewalks and public pathways, trails and sidewalks.
- Coordinate with the City of Niagara and Niagara Region to ensure integration of the proposed campus trails with the surrounding network.
- A positive sense of arrival shall be promoted on site for the individual via navigable walkways, generous outdoor seating and abundant landscaping.
- Generous sidewalks and walkways shall be designed into the campus to support an inclusive and barrier-free approach.
- Sidewalks shall be inclusive with safe pavers, planting, seating and lighting to ensure that all patients, family, friends and staff can move easily around the hospital.
- There shall be a continuous sidewalk system along the South Niagara Hospital frontages.
- A looped pedestrian pathway network shall be maintained around the site and reinforced by landscaping, to encourage exercise and walking across the campus.
- Roadways serving emergency or service vehicles shall be safely separated from pedestrian and cycling areas.

Transportation Demand Management

- A Transportation Demand Management (TDM) program shall be established by the health system to survey staff travel behavior, facilitate transportation programs for staff (carpool, shuttle, emergency ride-home, active transportation programs), and provide input as demands and behaviours change. This program will have influences on both operational and physical improvements around the hospital.
- Build opportunities for transportation demand management into the campus design and planned operations that:
    - Provides high level of transit service
    - Provide cost incentives for use of transit over parking for staff
    - Provides desirable connections and facilities for active transportation; and that.
    - Encourage ridesharing programs

8.4 Built Form Guidelines

8.4.1 GUIDING PRINCIPLES

– The following guiding principles shall be considered in the development of the building form:

- The South Niagara Hospital shall be developed as an assembly of different buildings, or blocks, each with its own character and identity (the Main Diagnostic & Treatment Block, the Ambulatory Block, the Inpatient Block, the Future Ancillary Building and the Future Parking Garage).
- The architectural expression of the built form shall reinforce and distinguish each of these different building blocks from each other, in an attempt to:
    - break down the mass of the building into smaller recognizable parts
    - support easy wayfinding to particular areas of the hospital that have a distinct identity and dedicated entrances.
    - reinforce the concept of the project as an assembly of complimentary functions or uses that support the NH mission.

- Ensure the massing and overall scale of the building is well considered as it will be experienced from the surrounding community, the approach along Biggar and Montrose Roads and within the site.
- Provide clearly identifiable, accessible and separated entrances.
- Maximize opportunities for future expansion and site development.
- Maximize opportunities for connections to landscaped spaces within the site.
- Encourage visual connections from the hospital to the nearby naturalized areas, distant agrarian landscape and the skyline of Niagara Falls.
- Encourage the incorporation of natural light wherever possible.

8.4.2 MASSING AND FORM

- The hospital shall have significant setbacks from all adjacent roads and property lines to ensure clear sightlines to key entrances, reduced shadows cast on adjacent properties, and internal buffering from street noise.
- All floor plates shall have significant articulation to reduce the perception of the overall building mass, create visual interest and promote intuitive wayfinding. The overall mass of the new hospital shall be organized within the following elements:
    - A podium base containing all services except the inpatient units and limited to a maximum of 3 storeys in height.
    - A multi-storey inpatient tower stacked directly on top of the podium accommodating two paired inpatient units per floor.
    - Mechanical and electrical service spaces integrated within the inpatient tower mass and/or within a penthouse.
- The Podium articulation shall express as much as it practicable and compositionally justifiable the principal functional components within: DI / ED / Surgical; Ambulatory Clinics; Post-acute ambulatory programs (Dialysis, CDM, Ambulatory MH),
- The overall perimeter of the inpatient units shall be designed to ensure that the future reconfiguration of the CCC inpatient units to Acute Care Inpatient Units can be achieved without the need to add floor area or significantly revise the building envelope.
- The floor to floor height of every storey must accommodate the maximum anticipated depth of mechanical and electrical services within the ceiling space allowing for ease of maintenance and ceiling heights that accommodate medical equipment suitable for the anticipated clinical services.
- Mechanical and electrical services spaces not located at the penthouse level shall be integrated into the overall building mass.
- The volume of the penthouse level shall be treated in harmony with the architectural treatment of the levels below either by material selection and detail coordination or through setback differentiation.
- The overall height of the penthouse must accommodate the anticipated equipment, ductwork and appropriate service clearances around equipment.
- Views outward from the lower Inpatient floors shall not be obstructed by mechanical and electrical equipment and rooms serving the podium level.
- The massing shall consider the impact on the surrounding microclimate through articulation strategies that shield pedestrians from wind and minimizes snow accumulation at entrances and outdoor amenity spaces.
- Roof top equipment shall be consolidated. Any equipment higher than one meter shall be screened.

8.4.3 **EXTERIOR TREATMENT**

- All podium level elements (including canopies) shall be proportioned and detailed to address 'human scale'.
- The design shall incorporate a variety of complimentary materials, textures and levels of transparency deployed to break down the overall mass and scale of the building.
- The exterior treatment shall employ materials and colours traditionally found in the region in a contemporary application that reflects the image of Niagara Health as a modern healthcare provider.
- Significant areas of transparency shall be incorporated into public spaces and circulation routes to create a welcoming environment, promote wellness, activate spaces and reinforce wayfinding strategies.
- The extent of glazing shall be determined by the function of the interior spaces, particularly the need to maintain patient privacy and the functionality of treatment spaces.
- A combination of curtain wall, strip, and punched windows shall be employed in the facades.
- Curtain wall glazing in public areas and circulation corridors shall be floor to ceiling.
- No mirrored or highly reflective glass shall be used.
- No intensely coloured glazing shall be employed in mental health departments or areas where a significant number of patients may have dementia.
- The exterior cladding shall be sustainably manufactured, require minimal maintenance, be appropriate for the climate, and highly durable.
- Exterior cladding shall be designed to rain-screen principles.
- The mechanical/ electrical penthouse shall be clad in one consistent material detailed to reduce its visual impact relative to the remainder of the building.
- Mechanical and electrical rooms contained within the overall building mass shall be clad in the same materials as the adjacent floors with louvred areas aligned with the surrounding fenestration.
- Large undifferentiated exterior wall surfaces shall be avoided.
- Select exterior cladding materials shall be carried into the interior public areas to reinforce the building identity, interior-exterior spatial relationships, wayfinding and articulation strategies.

8.4.4 BUILDING ENTRANCES

- Entrances shall be designed and located with a hierarchy of scale that communicates their intended use as a part of the building and site way-finding system.
- The following shall be provided with identifiable, dedicated entrances:
  - Main Entrance – general public
  - Ambulatory Entrance – convenient access to ambulatory services (e.g. dialysis, geriatric specialty services, mental health outpatients)
  - Secondary / Staff Entrance – staff use
  - Emergency Ambulance Entrance – ambulance entrance to emergency department
  - Emergency Walk-In Entrance – walk-in entrance to emergency department
  - Secondary / Patient Transfer Entrance – discrete ambulance entrance patient drop-off and transfer to/from inpatient units
  - Loading Entrance
- The Main Entrance shall be clearly identifiable and have a prominent visual presence from Biggar Road, the surrounding roadways and within the site.
- Consideration shall be given to promoting the visibility of the Emergency Walk-In Entrance from the surrounding roadways and within the site. This statement constitutes a critique of the current preferred scheme.
- The Main Entrance and its related interior space shall be two storeys in height.
- The articulation and finishes of the Main and Ambulatory Entrances shall be significant; supporting wayfinding and reinforcing the identify established for the new hospital.
- The Main and Ambulatory Entrances shall be immediately connected to major public spaces and circulation.
- All publicly accessible entrances shall be designed to guide patients and visitors with minimal reliance on signage.
- The Main, Ambulatory, Emergency Walk-In and Secondary / Patient Transfer Entrances shall have significant canopies to protect the related vehicular drop-off and pedestrians from inclement weather. Protection from the elements shall be provided on both passenger and driver sides of the vehicles for the length of the vehicular layby.
- The Secondary / Staff Entrance shall have a canopy to protect the access from inclement weather.
- There shall be continuous pedestrian scale protection canopy from the vehicular layby to the Main, Ambulatory, Emergency Walk-In and Secondary / Patient Transfer Entrances into the Hospital.

- The Emergency Ambulance Entrance shall be provided with an appropriately sized, clear span enclosure with incoming and outbound overhead doors to accommodate the anticipated number of Emergency vehicles, patient offloading space and side by side accommodation of vehicles.
- The Secondary / Patient Transfer Entrance canopy shall accommodate an ambulance and provide protection for stretcher on/offloading and the entire route to/from the entrance doors.
- The protective canopies over vehicular drop-off areas shall have overhead clearances appropriately designed for the anticipated vehicles including all service and transport vehicles.
- All canopy designs shall be coordinated with Emergency vehicle routes and clearances.
- Automatic revolving doors shall be provided at the Main and Ambulatory Entrances. Automatic sliding doors shall be used at all other entrances.
- Vestibules shall be provided at the Emergency Ambulance, Emergency Walk-In, Secondary / Patient Transfer and Secondary / Staff Entrances.
- Vestibules shall be designed to minimize cold air infiltration. In locations with dominant wind exposure, the depth of the vestibules shall be sufficient to allow the first door to close behind a person walking normally, before the next door opens.
- The Emergency Walk-In Entrance shall be capable of accommodating stretchers in the event that the Emergency Ambulance Entrance is not accessible (minimum depth shall be no less than 4.5m).
- The Secondary / Patient Transfer Entrance shall accommodate stretchers (minimum depth shall be no less than 4.5m).
- A dignified access shall be provided for the hearse for discreet transfer of the deceased from the morgue.
- The Loading Dock and Loading Entrance shall be provided with sufficient docks designed to accommodate a range of delivery vehicle sizes including at-grade docks provisioned with dock levelers.
- Insulated metal-skinned sectional overhead doors complete with weather seals and bumpers shall be used at the loading docks serving Materials Management.
- Double swing doors shall be provided for delivery and service personnel to access the Materials Management area.

8.4.5 COURTYARDS, ROOF TERRACES AND BALCONIES

- Convenient access to outdoor space for patients and staff shall be provided at grade and the podium roof level as much as is practicable and without interfering with the secure operation of the hospital.
- Opportunities for the incorporation of courtyards within the podium level shall be investigated. These courtyards can be located inside the building mass, enclosed on three or four sides. They can be passive, live landscape gardens to allow for daylight penetration, visual engagement and to support wayfinding.
- A minimum distance shall be established based on best practice between facing walls across courtyards to ensure patient privacy and maximum daylight penetration.
- Courtyards, terraces and balconies shall be incorporated in appropriate locations throughout the facility to take advantage of near and distant views of landscape and nature. These elements shall be placed in locations protected from wind, glare and noise.
- Dedicated outdoor space for each level of the IPU tower shall be incorporated in the building design, as determined by the Functional Program.
- The lowest level of the IPU tower shall have direct access to an outdoor protected terrace area located on the roof level of the podium.
- Patients with cognitive or mental health impairments and other IPUs that may require longer patient stays shall have direct access to protected roof terraces or balconies from within a secured portion of the IPU, positioned to ensure observation by staff.
- Green Roofs shall be located to ensure maximum visibility by public, staff and visitors.

8.4.6 DAYLIGHT AND VIEWS

- Access to natural light shall be provided to the majority of regularly occupied spaces.
- The planning shall prioritize the location of regularly occupied spaces along the perimeter of the building.
- Where spaces are deep in plan to address clinical planning, borrowed light strategies shall be investigated.
- Large expanses of glazing shall be balanced with the need for privacy.
- Positive distraction for patients shall be provided through views to outdoor spaces. Long stay patients (Acute IPUs, CCC / Rehab) or outpatients with repeated presence in the facility (Hemodialysis, Chronic Disease, Mental Health and Addictions, Seniors' Wellness) shall be provided with meaningful views to exterior landscaped areas.

- Access to views shall be provided to the landscaped spaces within the site, the surrounding naturalized areas and distant agrarian landscape from all public or semi-public spaces including waiting areas, lounges and public circulation.
- Roof monitors may be used but shall not replace perimeter glazing in the provision of daylighting requirements.
- The daylighting and views strategies shall be coordinated with LEED and WELL targets and standard measurements including appropriate levels of daylight and the prevention of glare and heat gain (energy efficiency).

8.5 Sustainability Guidelines

Sustainability shall be a central consideration guiding all elements of the design, construction and operation of the new Hospital.. Ultimately, the building and site design should seek to be *regenerative* to both the local environment and occupants.

In October 2019 WSP prepared and Environmental Report that evaluated the recommended design opportunities for the South Niagara Hospital in relation to Niagara Health eight categories of sustainable design impact.

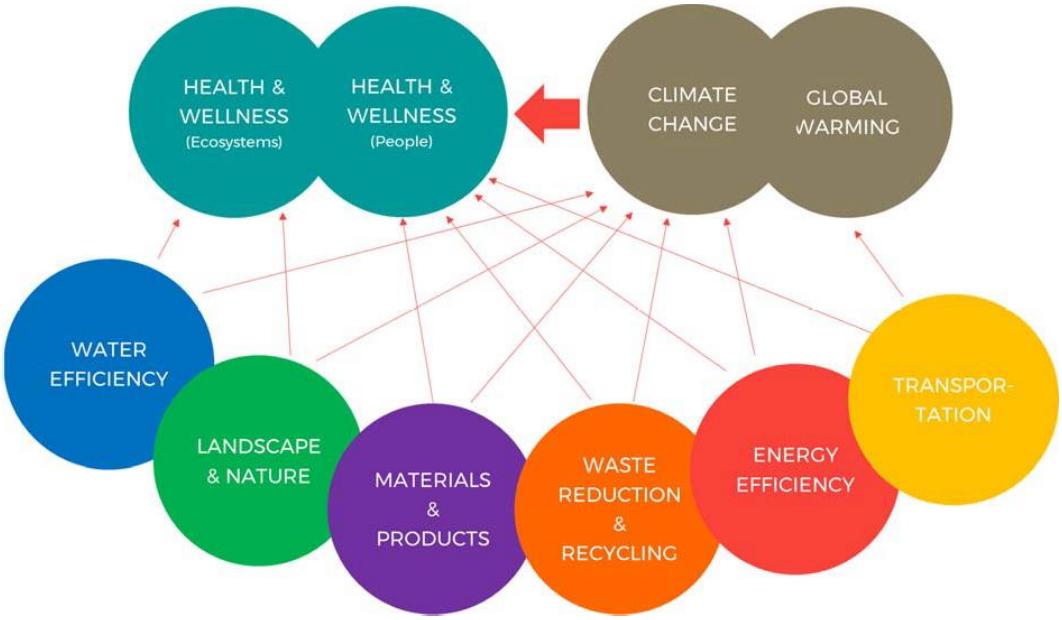


Figure 8.5-1: Categories of Sustainable Design Impact (WSP)

Based on the priorities identified through engagement sessions with Niagara Health, these recommendations represent the most cost-effective design measures that facilitate achievement of WELL Gold certification and reduced energy consumptions. Notably some of the key design measures include:

- Geo-exchange plant for heating and cooling
- On-site photovoltaics to supply 5% of energy consumption
- 230 m3 cistern to collect rainwater to supply site irrigation systems
- A visible main staircase
- At grade food gardens
- E-bike charging stations and staff/locker/shower facilities.

In total the following sustainable design measures have been recommended through the Environmental Report:

Health & Wellness

- Annual air quality design & testing
- Meet accessibility codes
- Perform annual occupant comfort surveys
- Local materials, art & flora used in entry areas and landscaped areas
- Achieve 23 out of 23 preconditions and 60 out of 100 points to achieve WELL Gold Certification
- Enhanced air quality testing
- Visual & physical ergonomics
- Active facades
- Aesthetic hallways and staircases
- Policies and programs

Landscape & Nature

- Green wall and green roof design
- Rooms designed to take advantage of views to landscape
- LID/GI strategies to manage 95th percentile rainfall events
- Native/ drought-tolerant plant design
- Public healing gardens featured in courtyard and entry area
- Dedicated healing gardens for patient/ visitors and staff
- Provide at-grade food garden
- Pollinator-friendly plant species/ beehives
- Natural materials, patterns, colours used in interior design
- Provide indoor restorative space for patients and visitors
- Natural element design to cover 25% of site area

Transportation

- Short and long-term bicycle parking infrastructure
- Shower and changing facilities for staff and visitors
- Dedicated EV parking spots and EV charging stations
- Dedicated carpool parking spots
- Exterior therapeutic walking paths
- Bicycle user lockers/maintenance tools
- E-bike charging stations in interior bicycle storage locations
- Carpool program
- Shuttle service

Materials & Products

- Fundamental commissioning of mechanical and electrical
- Use of low-emitting materials including interior paints and coatings; interior adhesives and sealants; flooring; composite wood; ceiling, walls, thermal and acoustic insulation; furniture; and exterior applied products.
- Environmental product declarations including sourcing raw materials and focusing on material ingredients
- Whole building life cycle assessment
- Enhanced commissioning of mechanical, electrical, and envelope system

Energy Efficiency

- Base passive systems for building envelope design focusing on insulation and low e-coating
- Base space use and occupant comfort for internal loads
- Base active systems for mechanical HVAC
- Improvements in process-related systems
- Optimal passive systems for continuous insulation for opaque constructions, attention to detailing for reducing thermal bridging and infiltration, exterior shading, premium performance glazing, and HR upgrade vs BASE.
- Occupant based control ventilation
- Optimal geo-exchange
- Bio-mass- Partial CHP
- On-site photovoltaics

Water Efficiency

- Water conserving fixtures, process, and lab equipment
- Cooling tower water treatment system
- Irrigation and landscape design
- Drought tolerant plants
- Ongoing water quality testing
- Rainwater harvesting for irrigation and cooling towers
- Cooling tower elimination
- Water submetering
- Filtered water fountains and ongoing drinking water taste quality testing

Waste Reduction & Recycling

- Construction waste diversion with a target of >85%
- Recycling infrastructure including cardboard compacting and refrigerated organic waste storage
- Paperless ICAT environment
- Interactive sorting bins pilot project
- Tracking food waste and food packaging
- Waste management consultant for operational waste

8.6 Utilities & Infrastructure Guidelines

8.6.1 CENTRAL UTILITY PLANT

- The central utility plant will support the facility with the heating plant, cooling plant, steam plant, emergency power plant, natural gas and domestic water. The heating source shall contain dual fuel heating boilers; primarily natural gas, secondarily fuel oil. The capacity and arrangement shall be such that if the largest boiler is out of service, the remaining boilers can provide full heating capacity. The same principal shall also be applied to ancillary heating equipment. The minimum timeframe for continued operation for each component during and emergency shall be 72 hours.
- Steam plants shall have provisions for an alternative or standby makeup water supply to allow for continual operation of the health care facility if there is a failure of the normal water supply. Continual operation shall be based on design day calculations but only for essential loads.
- The cooling plant will be sized such that with the largest chiller or ancillary piece of equipment (pumps, cooling towers, air handlers, etc.) out of service, the remaining system is capable of providing 50% of design day peak load for the entire facility or 100% of the design day peak load of critical areas (whichever is the largest demand). The chillers in the facility will be connected to emergency power generators. Cooling distribution shall be designed such that non-critical loads can be isolated from the system. Cooling systems for critical operations must be able to run year-round.
- The central utilities plant shall group all mechanical and electrical services industrial occupancies in one area of the site. Patient, staff and public areas of the facility shall not be impacted by major noise and emission sources.
- Equipment in the utilities plant will be selected to maximize energy and resource use, in-line with the overall project sustainability targets. Grouping the main service plant in one central location allows opportunities for further energy savings through the use of cogen or geo-thermal systems.
- The central utilities plant will also see the main site service entry points into the campus.

8.6.2 CIVIL

Water

- The domestic water consumption or demand for the proposed hospital development will be estimated based on a population density of 4 persons/bed, per the Region of Niagara's Project Design and Technical Specifications Manual.
- The required firefighting flows will be estimated based on the guidelines of the Fire Underwriters Survey (FUS). Hospitals require two separate water service connections for safety, redundancy, and health reasons (e.g. redundant supply is required by code).
- Based on CSA standards, a secondary municipal potable water supply with two distinct points of entry into the facility will be required to provide adequate water service for the hospital. As there is only an existing watermain on Montrose Road fronting the site, a secondary municipal source will be required. The new watermain extensions to the subject site could potentially come from the northwest (as part of the proposed Secondary Plan development) or east of the site on Lyons Creek Road. Each option requires further exploration with municipal staff and will come with challenges to have in place in time for the hospital development.

Sanitary

- The existing Niagara Falls WWTP currently has adequate capacity for the hospital and Secondary Plan development under dry weather conditions but cannot accommodate wet weather flow conditions. Therefore, both the Grassybrook SPS and Niagara Falls WWTP will need to be upgraded to provide adequate capacity to service the future development of the Niagara hospital.
- The sanitary flows for proposed Niagara Hospital development will be estimated based on a population density of 4 persons/bed, per the Region of Niagara's Project Design and Technical Specifications Manual.
- New sanitary infrastructure service to the hospital (as required) is expected to be in place for end of 2023 as part of adjacent road widenings. A critical consideration will be the location of the wastewater treatment plant, whether north or south of the Welland River as this would directly impact the design of the local sanitary sewers that will service the hospital. The location of the new WWTP plant is expected to be confirmed by the Region in early 2020.

Storm

A completely new storm sewer system will be designed and constructed for the roads surrounding the hospital as part of the ongoing road widening projects that will urbanize the neighbourhood. New storm sewers for the hospital site and surrounding roads will be constructed in accordance with current City of Niagara Falls design guidelines and likely outlet to Lyons Creek.

The *Stormwater Management Plan Grand Niagara Secondary Plan*, prepared by WSP, dated November 2016, addresses the stormwater management needs of the subject site. According to this study, the subject site is tributary to Lyons Creek, which is under the jurisdiction of the Niagara Peninsula Conservation Authority (NPCA). The general policy of NPCA is articulated in their guidelines which states that "sufficient stormwater management controls are required by the NPCA to ensure that flooding, pollution, surface erosion and conservation of land impacts due to development do not occur."

The storm drainage design for the proposed hospital development will need to comply with municipal, regional, conservation authority, and provincial guidelines and requirements. The above referenced stormwater management study recommends the following criteria be adapted for the development of the subject site:

1. **Quantity/Flood Control**
    - On-site stormwater quantity control is not required given the site's proximity to the existing receiving creek.
    - Major overland flow routes are to be designed to safely convey the storm runoff from the regulatory event (100-year storm).
2. **Erosion Control**
    - Detention and release of the 25mm, 4-hour Chicago design storm over a 24-hour period shall be provided for all receiving systems.
3. **Quality Control**
    - Enhanced level (Level I) of water quality treatment (80% TSS Removal) shall be required for all development areas draining to the receiving watercourses, in accordance with MOE guidelines.
    - Properly sized oil & grit separators for stormwater quality control may be considered for commercial, industrial, or infill developments.
4. **Water Balance**
    - Water balance impacts to be evaluated as part of the design of the on-site stormwater management plan. Best efforts should be made to match pre-development infiltration volumes to the extent practical and feasible.
    - During subsequent design phases of the hospital, site specific stormwater management guidelines will be confirmed with City staff. It is expected that quantity control guidelines will be mandated as the site transitions from discharge from Lyons creek to an urbanized discharge to surrounding municipal sewers.

8.6.3 ELECTRICAL

- Given the size of the new load, estimated to be 15 MVA connected, a voltage of 44 kV would be preferred. The local utility, Niagara Peninsula Energy operates at 13.8 kV.
- To accommodate the projected load and to provide the dual feeder redundancy required, NPEI will need to construct two new feeders to supply the hospital. Refer to the Off-site Infrastructure Early Works requirements in Chapter 10.

8.6.4 GAS

A new natural gas service along Montrose Road to the hospital site will be required.

- The natural gas service shall be sized to meet the day one opening loads with allowances for future growth of the facility over the 30-year project plan. Preliminary calculations estimate this peak load to be 130,000CFH. Temporary provisions may be required to ensure the new gas service is useable by workforces during hospital construction.
- Fuel oil shall also be made available on the hospital's campus.
- Fuel oil shall be stored on site to supply heating equipment should the gas service be unavailable; a 72-hour peak load operation capacity shall be maintained on site at all times.

8.6.5 COMMUNICATIONS

High speed Internet and wireless communication systems are needed.

- Two (2) dedicated Entrance Facility (EF) rooms for the incoming services shall be proposed.
- These rooms should be in different locations in the Hospital for redundancy and reliability.
- Infrastructure consisting of underground concrete encased duct banks shall connect the EF rooms to the location of the incoming services from the service provider(s).
- Several Telecommunication Rooms, throughout the Hospital shall connect to the EF rooms.

09

9 Performance Metrics

The following is not an exhaustive list of items for which measurable performance metrics can be established. The specific detail requirement for each item will be subject of further consultation with stakeholders and comparison to similar case studies.

9.1 Site Metrics

9.1.1 TRAVEL DISTANCES

Establish an appropriate distance between the heliport, emergency department, and patient transfer facilities.

- Establish design parameters for location of helipad.
- Determine queuing area within pick-up / drop-off facilities and design to reduce, to the greatest extent possible, and spill back of queueing activity onto the main circulation route.
- Potential specific distance comparators:
  - From street sidewalk to Main Entrance
  - From street sidewalk to Secondary Entrance
  - From public transport stop to building entrance(s)
  - From Helipad to Emergency Ambulance Entrance

9.1.2 ACCESSIBILITY

- Establishing a preferred and maximum acceptable distance between any visitor and accessible parking space and the public entrances to the hospital.
- Establish the number of accessible parking spaces that must be provided within circulation road and public entrances to the hospital.
- Ensure parking design meets or exceeds municipal and AODA standards.
- Potential specific accessibility comparators:
  - Percent or number of disabled parking within set distance from Main Entrance
  - Percent or number of disabled parking within set distance from Emergency Walk-in Entrance
  - Percent or number of disabled parking within set distance from entrance to Dialysis and Chronic Disease Management programs

9.2 Built Form Metrics

9.2.1 TRAVEL DISTANCES

- Potential specific distance comparators:
  - All high priority circulations and adjacencies identified in Functional Program tables
  - From Main Entrance to elevator to IPU floors
  - From Main Entrance to elevator to Day Surgery and APU
  - From Main Entrance to Ambulatory Clinics waiting area
  - From Secondary Entrance to Dialysis program
  - From Secondary Entrance to Chronic Disease Management (including elevator)

9.3 Utilities Metrics

9.3.1 CENTRAL UTILITY PLANT

All mechanical systems shall be designed to minimize energy consumption, design to exceeding SB-10 standards.

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10 Implementation Strategy

10.1 Lands Development Approvals Strategy

The new South Niagara Hospital will be delivered through a DBFM (Design-Build-Finance-Maintain) project delivery model. In this model, Niagara Health looks to the private sector to design, build, finance and maintain a facility over a 30 year period. Three consortia teams (DBFM Consortiums) are formed and invited to bid on the project through an extended Request for Proposals (RFP) process, as illustrated in Figure 10.1-1 below. Niagara Health, working in partnership with Infrastructure Ontario, retains a Planning and Design Conformance (PDC) consultant to develop a comprehensive design-requirements document known as an Output Specifications - that is used to evaluate a base level of design conformance through the RFP process and beyond.

The Municipal Planning Approvals process present perceived uncertainty to the DBFM model, introducing an element of risk. Therefore, Niagara Health, acting through the PDC consultant, retains the obligation of obtaining Municipal Planning Approvals related to Zoning By-Law Amendment and Site Plan Control conditions based on an Illustrative Schematic Design (an indicative design that reflects the site plan control conditions).

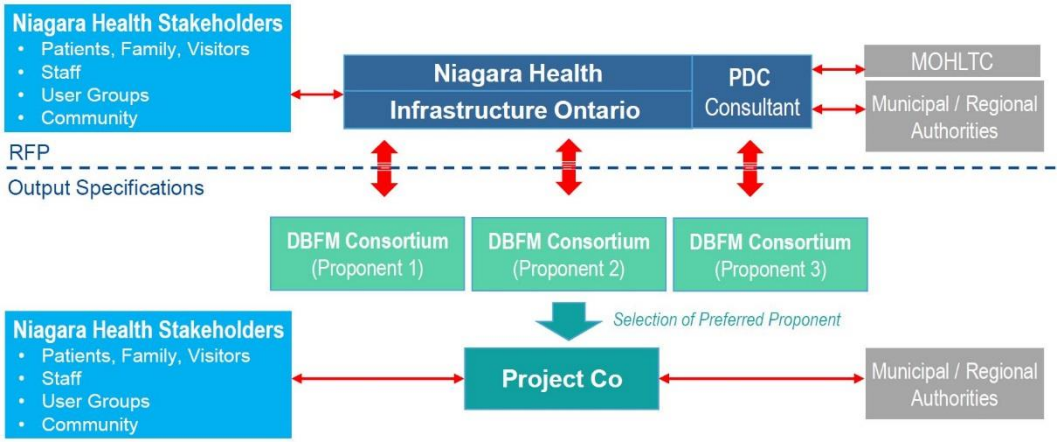

Figure 10.1-1: RFP Process Stakeholders

Municipal and Regional authorities have agreed to implement a 2-Stage Site Plan Approval process to support Infrastructure Ontario's DBFM Project Delivery model. A 2-Stage Site Plan Approval process involves:

Campus Master Plan

- Campus Planning Consultant prepares a Campus Master Plan Report that establishes an overarching site plan approach, vision and design guidelines.

Stage 1 SPA

- PDC Consultant prepares Output Specification that establishes the design guidelines/rules for the Design-Build RFP
- PDC Consultant submits the Zoning By-law Amendment and Site Plan Applications based on the Illustrative Schematic Design.
- The City of Niagara Falls adopts the Zoning By-Law Amendment and issues Notice of [Site Plan] Approval Conditions (NOAC) based on an Illustrative Schematic Design

Stage 2 SPA

- Three DBFM Consortium teams bid to Design and Build the project, each developing a unique design that responds to the Output Specifications and the NOAC.
- The successful DBFM Consortium has the option of meeting the NOAC or seeking limited design specific amendments through discussion with the City of Niagara Falls, which can lead to the City issuing amending approval conditions.
- The successful DBFM Consortium obtains sequential Excavation, Shoring and Foundation Permits prior to the Site Plan Agreement.

10.2 Municipal Class Environmental Assessment (MCEA) – Municipal Road Projects

On September 5th, 2019, the Agencies Having Jurisdiction (AHJ) met with Niagara Health to coordinate the Off-site Infrastructure Early Works program for the South Niagara Hospital. The Region and City agreed to jointly commission an MCEA for the Municipal Road Projects including:

- Road Widenings: Biggar Road and Montrose Road
- Intersection Design: Biggar Road/Lyons Creek and Montrose Road
- Signalization Design: QEW southbound off-ramp at Lyons Creek Road

All necessary utilities to service the hospital (i.e., water, sanitary, storm, power and communications) shall also be included in the MCEA to ensure that the full range of infrastructure required by the hospital operation will be implemented in a fully coordinated and efficient manner.

Stakeholders of this MCEA will include NHS, City of Niagara Falls, Niagara Region, MTO and potentially private developers. Note that Shallow Utility Providers (Gas, Power and Telecommunications) will be included in the MCEA process. The MCEA process is preliminarily scheduled to provide a 30% level of design by the fall of 2020. This is projected to be after the proposed submission of some Municipal Planning Approvals applications; however, coordination of design schedules will continue to be discussed by Niagara health and the AHJ to improve alignment.

10.3 Municipal Planning Approvals

10.3.1 ZONING BYLAW AMENDMENT APPLICATION

The City of Niagara Falls passed a site-specific Zoning By-Law (2018-99) on August 14, 2018 for the Hospital site. The By-law regulates the maximum height of buildings and structures on the hospital site to 28 metres. As the Master Plan is projecting a height of 50 metres, the City of Niagara Falls will require a Zoning By-law Amendment application to permit the proposed increase in height.

By-law 79-200 establishes the Institutional Zone provisions applicable to the Hospital site, save and except the height provision mentioned above. The Illustrative Schematic Design prepared by the PDC consultant may identify additional variances from the applicable zoning provisions (such as setbacks, lot coverage, parking standards, etc.). Therefore, it is recommended that the Zoning By-law Amendment Application accompany the Site Plan Control Application. The City of Niagara Falls typically processes Zoning By-law Amendments separately from Site Plan Control Applications since the former is a public process, and Site Plan Approval is conditional on compliance with applicable zoning.

The Zoning By-law Amendment Application process in the City of Niagara Falls typically requires four-months to complete. This timeline will not have a significant effect on the Site Plan Approval process, descripted below, and both can be reasonably achieved concurrently within the Municipal Approvals workstream of the Project Schedule.

10.3.2 COMPLETE APPLICATION REQUIREMENTS

The requirements for a complete application for Zoning Bylaw Amendment include the following, subject to confirmation by Planning & Development through the pre-consultation checklist:

- City of Niagara Falls Zoning Bylaw Amendment (complex) application fee ($12,200.00)
- Niagara Region Development Services review fee ($1,270)
- Zoning Bylaw Amendment application form
- Deed of the property
- Legal survey or reference plan
- Context plan
- Site Plan and massing drawings with details of development (site statistics) and design (drawing information) *
- Coloured rendering*
- Landscape plan*

- Floor and roof plans*
- Sections and elections*
- Sun/shadow drawings*
- Pedestrian-level wind study*
- Planning Rationale
- Transportation Impact Study
- Functional Servicing and Stormwater Management Report

Note: the submission requirements listed above with an * are preliminary and are limited compared to the requirements for Site Plan Control application requirements. With concurrent applications, these requirements will be reflective of the information and details required for Site Plan Control.

10.3.3 ZONING BYLAW AMENDMENT PROCESS

Pre-consultation with City Planning staff is required in order to identify the information required (i.e. pre-consultation checklist) to constitute a Complete Application for Zoning By-law Amendment.

- The above Zoning Bylaw Amendment application requirements are submitted to the Planning Division of the City of Niagara Falls and within 30 days the City provide a notice of complete application.
- The application is circulated to various relevant departments and agencies for comments for a period of 30 days. Comments are collected by Planning staff and forwarded to the applicant to be addressed (i.e. resubmission).
- The City's Planning and Development staff host an Open House approximately 5 weeks before the Public Meeting before Council. Open Houses are designed to inform surrounding property owners about the proposed development.
- Planning staff prepare a report to Council and schedule the Public Meeting.
- Following the Public Meeting the applicant considered the circulation comments and public comments and makes a resubmission.
- The Resubmission is circulated to the commenting departments and agencies for further comment for a period of 30 days.
- Provided all comments have been addressed to the satisfaction of the City staff, a recommendation report is prepared to be presented to Council for a Decision.

The City of Niagara Falls Zoning Bylaw Amendment process is typically four-months from notice of complete application to a decision by Council.

10.3.4 SITE PLAN CONTROL APPLICATION

The Site Plan Control process is administered by the Planning Division of the City of Niagara Falls and approved by the Director of Planning, Building and Development following the review of the Site Plan Review Committee. As a pose to the Zoning Bylaw Amendment process described above, the Site Plan Control process does not require a statutory Public Meeting and Council decision.

In addition to the Site Plan Review Committee, Niagara Region, Niagara Peninsula Conservation Authority and the Ministry of Transportation will all be circulated for comment on the Site Plan Control application. The Site Plan Conditions of Approval will require Niagara health to have prepared an updated Reference plan with the necessary conveyances for road widenings, etc.

10.3.5 COMPLETE APPLICATION REQUIREMENTS

The requirements for a complete application for Site Plan Control include the following, subject to confirmation by Planning & Development through the pre-consultation checklist:

- City of Niagara Falls Site Plan Control application fee: $4,000.00
- Niagara Region review fees: Storm Water Review $1.830 + Major Urban Design Review $600 + Hydrogeological Review $1,785 + Major Environmental Impact Study review $2,200
- Niagara Peninsula Conservation Authority Development Review Fees: $765 + Storm Water Review $610 + Major Urban Design Review $600 + Hydrogeological Review $1,285 + Major Environmental Impact Study Review $2,200
- Environmental Impact Study
- Tree Inventory and Preservation Plan (note: for tree removals the City's Tree Bylaw requires the replacement at a ratio of 2:1 or cash in-lieu for the second tree, subject to a Tree Permit)
- Geotechnical Study
- Stormwater management Plan
- Hydrogeological Study
- Erosion and Sediment Control Plan
- Landscaping and Vegetation Plans
- Survey (topographic and legal)
- Site Plan (including the dedication of road widenings and daylighting triangles in accordance with City Standards)

10.3.6 **SITE PLAN CONTROL PROCESS**

- Attend a pre-consultation meeting with Planning Division staff (can be combined with the pre-consultation requirements for the Zoning Bylaw Amendment application).
- Submit a complete Site Plan Control application to the Planning Division of the City of Niagara Falls.
- Application is circulated to various departments and agencies for comments.
- Comments are received by the applicant to make modifications to the submission materials.
- Note: a concurrent Zoning Bylaw Amendment and Site Plan Control applications process is recommended. However, the City may choose to address the Zoning Bylaw Amendment process prior to revising the site plan materials based on circulation comments. This may result in a 2-3 month delay in the processing of the Site Plan control application which would typically be processed in four-moths.
- A resubmission of revised site plan materials is prepared and recirculated by the Planning Division to department and agencies that had comments from the first submission.
- Planning Division provides notice of approval and requires the final site plan drawings and cost estimates for on-site works is submitted.
- Note: at this stage Niagara Health will defer the final site plan drawings and cost estimate for on-site works to ProjectCo. ProjectCo may choose to modify the site plan drawings further which the Planning Division may choose to recirculate to various departments and agencies before advancing to the final site plan approval stage.
- ProjectCo will submit the final site plan drawings for approval and cost estimate for on-site works following review and revision (as necessary) to the notice of approval.
- The Site Plan is approved by the Director of Planning, Building and Development.
- The City and Niagara health execute the Site Plan Agreement and the city registers the Agreement following the post of securities/letter of credit and cash in-lieu of parkland fees.
- Note: Development Charges are typically paid in advance of the issuance of building permits are discussed further below.
- Planning Division forwards site plan approval clearance to the Building Division for issuance of the Building Permits.

10.4 Development Charges

Development Charges are recovered by the City of Niagara Falls and Niagara Region under their respective DC Bylaws. there is currently no exemption for Hospitals in either applicable DC Bylaw. The hospitals in St. Catharines and Grimsby have received “special situations” status under the current Niagara Region DC Bylaw, which is precedent for Niagara Health to make written submissions to both the Region and City for exemption from Development Charges for the South Niagara Hospital. This can be coordinated with the Municipal Planning Approvals applications but will require a separate Council decision from both Niagara Region and the City of Niagara Falls.

10.5 Off-Site Infrastructure Early Works

Off-site Infrastructure Early Works are improvements outside the development property that must be completed ahead of the Hospital's design and/or construction in order to enable and support the design and construction process. It is critical that Off-site Infrastructure Early Works are in place well in advance of the new hospital's grand opening to inform the RFP design process and provide temporary egress, sewer, power and gas during construction. An ideal scenario for Infrastructure Ontario would have all Off-site Infrastructure Early Works designed by October 2020 – so that these designs can be included in IO's Design-Build RFP process – and constructed by October 2021 – a year before the RFP's financial close milestone. Because the timing of new residential development in the vicinity of the hospital will be driven by private interests and cannot be confirmed at this time, a servicing strategy for the new hospital must be developed that is not dependent on private development works.

The following mandatory Off-site Infrastructure Early Works have been identified for the hospital. As noted in Section 10.2, an MCEA process will govern the design and construction of the Off-Site Infrastructure Early Works. The conceptual design work for the hospital that has been completed to date will be integrated into the MCEA and the PDC consultant will coordinate with stakeholders throughout the process to ensure the hospital's needs are met.

10.5.1 **WATER**

There is existing watermain service along Montrose Road immediately east of the hospital site, which will be maintained. In order to provide the redundant water service that is required for hospital operations, the City must provide a second 300mm diameter watermain service to the hospital frontage. Two design options have been identified as summarized below and depicted in Figure 10.5.1-1:

- New watermains on Biggar Road and Crowland Avenue or future Street A that connect the existing watermain on Montrose Road to the existing watermain on Grassy Brook Road. Note that this option would require creek crossings.
- New watermain on Lyons Creek Road that connects the existing watermain on Montrose Road to the existing municipal networks further east. This option would provide redundancy by feeding the system from a second looped connection.

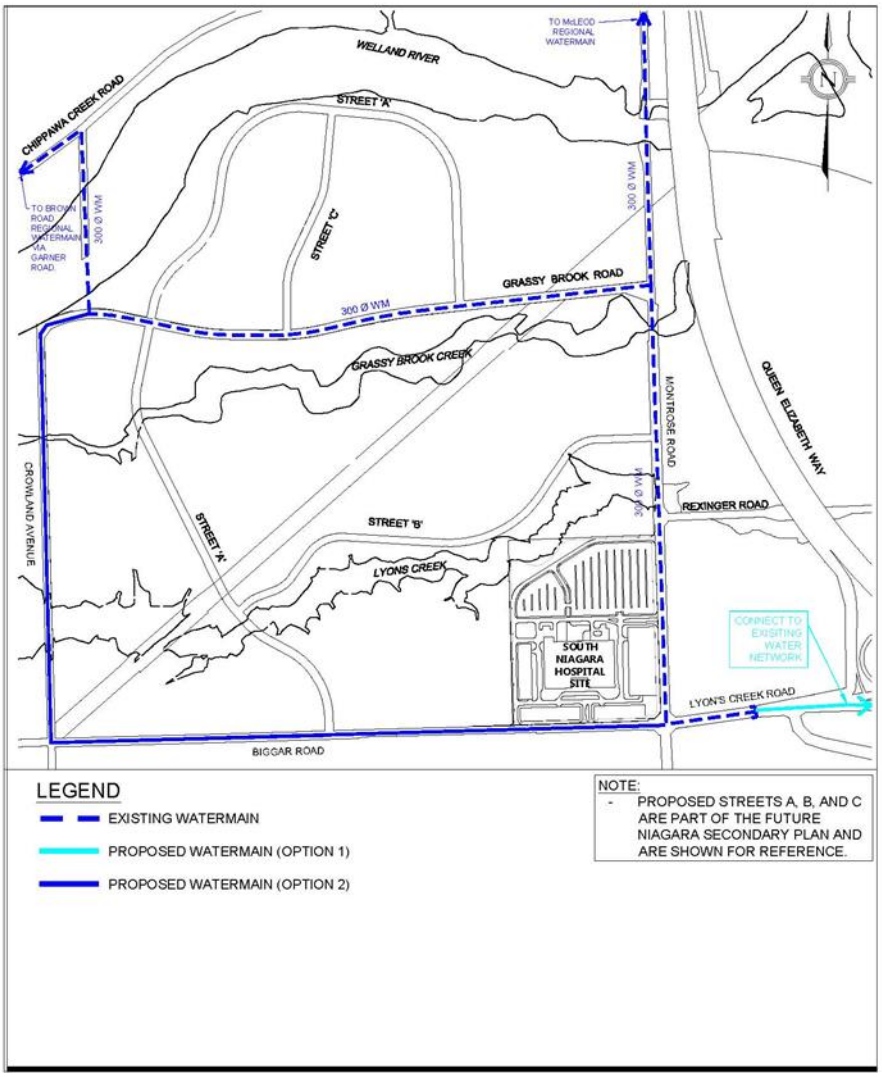

Figure 10.5.1-1: Off-Site Water Requirements

10.5.2 **SANITARY**

There is an existing 300mm diameter sanitary sewer on Montrose Road which has adequate capacity to service the subject site. Two phases of sanitary Off-site Infrastructure Early Works are anticipated. Upgrades to the Grassybrook Road SPS and the existing Niagara Falls Waste Water Treatment Plant (WWTP) will ensure the future hospital can be adequately serviced on an interim basis until the ultimate WWTP is operational. Refer to Figure 10.5.2-1 more details.

The Region is undertaking the development of a new Wastewater Treatment Plan. It is expected to be operational prior to the Hospital's substantial completion. Depending on the location of the new WWTP, the existing sanitary sewer on Montrose Road may need to be modified or realigned. The location of the WWTP is expected to be finalized by the Niagara Region in early 2020, which will inform the final sanitary Off-site Infrastructure Early Works plan and schedule.

The following high-level schedule for the new WWTP is anticipated:

- Conceptual design expected in Fall of 2020
- Detailed design of off-site infrastructure projects in 2022
- Plant design from 2023 to 2024
- Plant operation by 2025

10.5.3 **STORM**

New municipal storm sewers are anticipated on both Biggar Road and Montrose Road as part of the urbanization and expansion of these streets. The City will be required to design one of these storm sewers to convey hospital flows to service the hospital outlet to Lyons Creek. It is understood that this will take place on Montrose Road as shown on Figure 10.5.3-1.

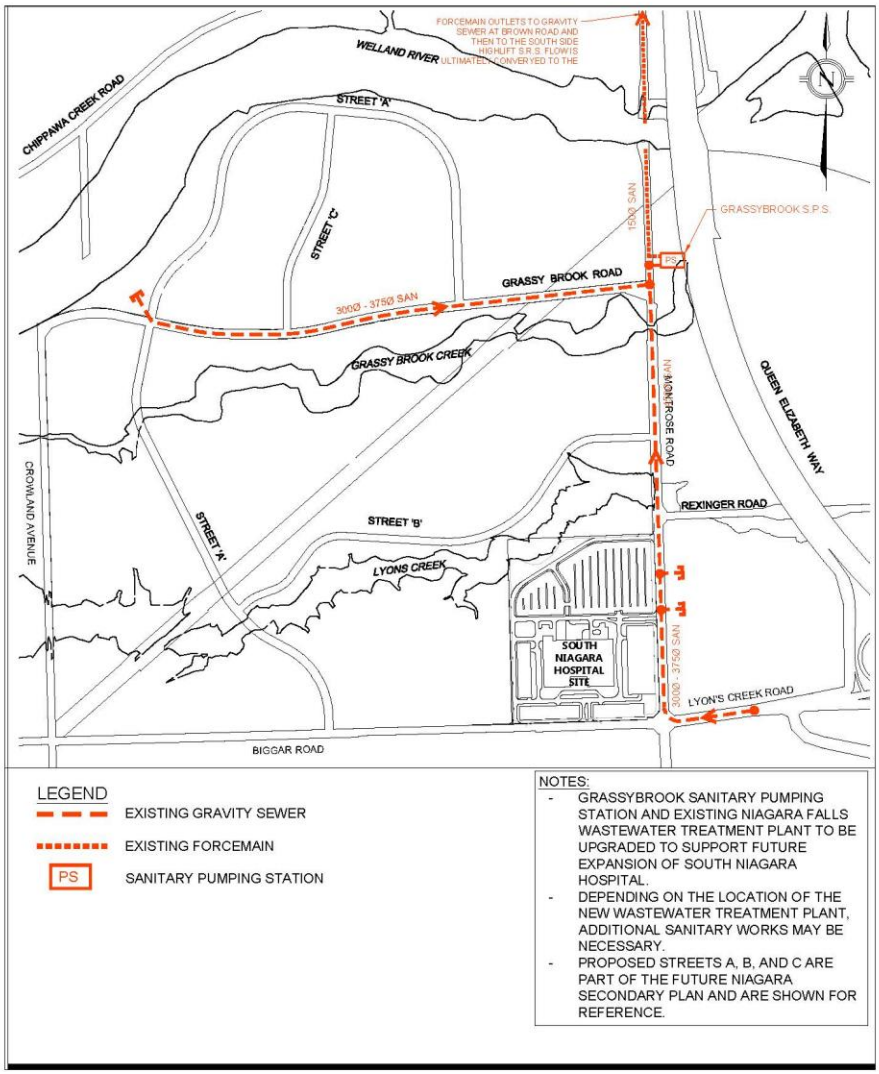

Figure 10.5.3-1: Off-Site Sanitary Requirements

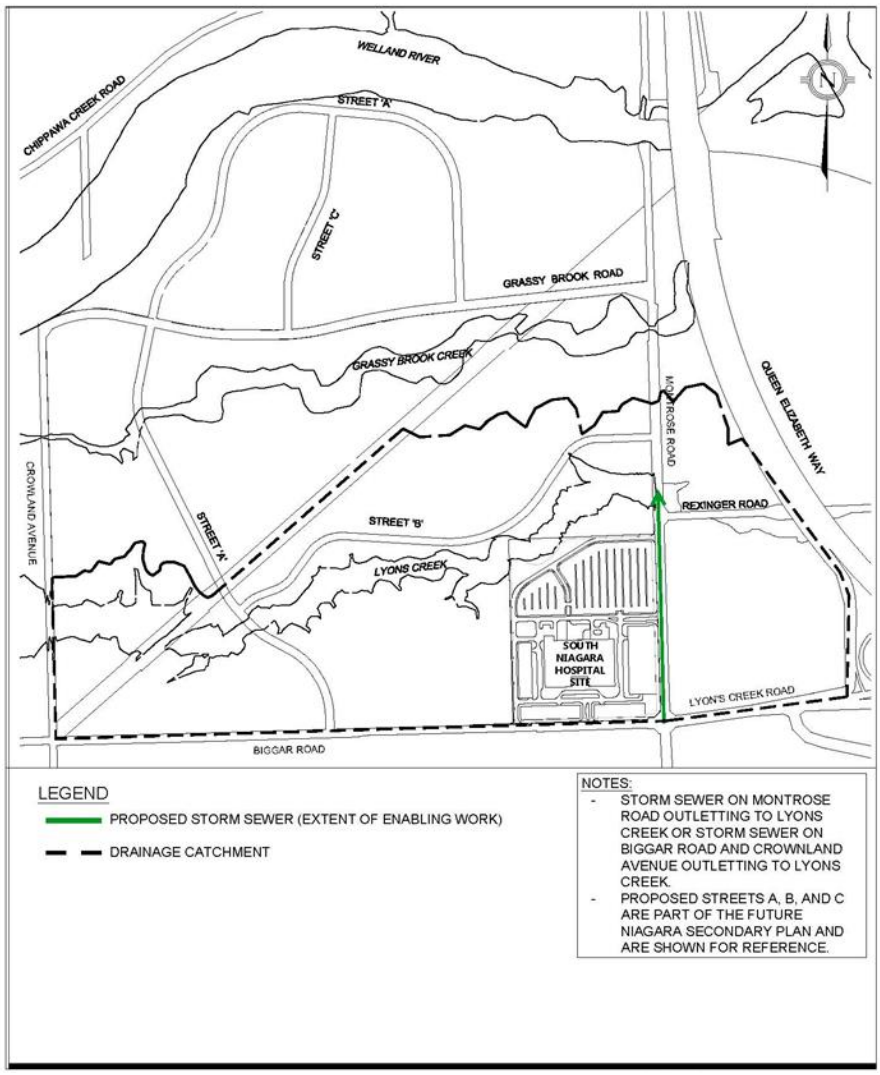

Figure 10.5.3-2: Off-Site Storm Requirements

10.5.4 SHALLOW UTILITIES (I.E., GAS, POWER AND TELECOMMUNICATIONS)

An entire new program of shallow utilities will be required to accommodate the proposed hospital development as summarized below:

Gas

To serve the hospital's campus, Enbridge will extend the extra-high-pressure line south down Montrose Rd. towards the future hospital's campus. The size / pressure of this line will be determined by Enbridge after the load and station location is finalized. It is recommended that the hospital budgets a minimum of 18 months of time for the application, permitting and construction processes.

Enbridge has indicated that when the extra high-pressure gas service is brought to the campus the pressure will first be reduced to approximately 55 psi within a standard green box (1.2m x 1.2m). Enbridge will then continue the gas service to the hospital's gas plant where the pressure will be reduced to approximately 20 psi. At this point continuation of service will be the hospital's responsibility. Previous experience indicates the size of this gas plant would be approximately 9m x 4m.

Urgency shall be placed on bringing gas servicing to the campus such that it is available for the construction process. Additional work is required to reduce the gas pressure so that it is useable during the construction period. The pressure required to service the hospital long term is likely too high to be useable during construction. This should be coordinated with Enbridge.

There are no additional gas mains in the area which present a feasible option for alternate supply or redundancy.

Power

The requested services at 44 kV are not present or available in the area. The local Utility, NPEI, proposes to extend their 13.8 kV system for a distance of approximately 10 km from their existing substation to our site. Two (2) 13.8 kV overhead feeders, for redundancy, each having the capacity of 15 MVA still be brought to the site. The final routing of these lines needs to be determined as it involves crossing over the Welland River and one rail line.

Present day estimate for the construction of the new lines is at around $4 Million. The anticipated construction is to be spread over a three (3) year period and be ready for 2023.

The Hospital will receive the two (2) new 13.8 kV lines at Biggar Road and establish the location for and outdoor substation, complete with power transformers, 13.8 kV switchgear and power distribution equipment and systems, as needed.

Telecommunication

Once a preferred telecommunication provider is identified, new fibre service along Montrose Road or Biggar Road that extends to the hospital site will be required.

All relocations of existing shallow utilities relocations should be completed prior to the start of road and deep servicing construction by the City and Region.

10.5.5 ROAD

The road network surrounding the new hospital will be substantially improved as follows:

- Intersection of Biggar Road and Lyons Creek Road will be widened with turn lanes added
- Intersection of Biggar Road and Montrose Road will be widened with turn lanes added.
- Signalization will be added to QEW Southbound off-ramp at Lyons Cree Road.
- Montrose Road will be widened.
- Biggar Road will be widened.

A project meeting took place on September 5, to discuss the Off-site Infrastructure Early Works program, which included representatives from Niagara Hospital, the City of Niagara Falls and Niagara Region. It was determined at this meeting that all infrastructure improvements should be installed as part of the road widening projects. Further, in order to ensure coordination amongst all stakeholders, a new EA should be jointly commissioned by the City and Region to maximize efficiency and coordinate an effective schedule for the Off-site Infrastructure Early Works listed above. Shallow utility providers are automatically included in the municipal EA process.

The following schedule was discussed for the EA and subsequent construction:

- December 2020 – EA completion that includes minimum of 30% level of design of roads and services.
- End of 2021 – completion of detailed design of recommended works.
- End of 2023 – completion of construction of EA works.

Additional meetings with all stakeholders will continue to take place to formalize this EA process and document completion dates for the Off-site Infrastructure Early Works.

10.6 Gap Analysis

The following Gap Analysis has been prepared based on the background studies (due diligence) that Niagara Health has commissioned (completed), received from secondary sources (adopted) and requested to be completed (updated) for the South Niagara Hospital site. This analysis has been placed in the context of the requirements for Municipal Planning Approvals to inform the PDC stage.

10.6.1 BACKGROUND STUDIES COMPLETE

Land Use Planning

- The subject land is currently designated Hospital Campus Employment Designation (HECD) Area in the Grand Niagara Secondary Plan, City of Niagara Falls, Official Plan Amendment No. 118 (dated June 19, 2018).
- The City of Niagara Falls pass Zoning By-law 2018-99, zoning the subject land Institutional, with site specific provisions.
- The Campus Planning Report prepared by Stantec addresses the Municipal Planning Approvals Strategy for the South Niagara Hospital.

Surveying

- A legal survey (Plan 59R-15796) of the subject land was completed by J.D. Barnes Limited, dated March 9, 2017.
- A preliminary topographic sketch of the subject lands was completed by J.D. Barnes Limited, dated December 24, 2015.

Archaeological Assessments

- Detritus Consulting Ltd. has completed Stage 2 and 3 Archaeological Assessment in July 2013 and a Stage 4 Archaeological Assessment was entered into the Ontario Public Register of Archaeological Reports on November 20, 2016.

Environmental Site Assessment/ Record of Site Condition

- Phase 1 and 2 Environmental Site Assessments were carried out by WSP (dated October 2016) in accordance with Ontario Regulation 153/04 to support the filing of a Record of Site Condition with the Ministry of the Environment and Climate Change (MOECC).
- Record of Site Condition Number 223225 has been filed in the Environmental Site Registry on May 8, 2017.

Natural Heritage Assessment

- Colville Consulting Inc. completed a Natural Heritage Assessment for the South Niagara Hospital site in October 2019.

Transportation Impact Study

- CIMA Canada completed a Transportation Impact Study (dated July 5, 2017) to assist the Master Planning process.

10.6.2 BACKGROUND STUDIES BEING IPDATED

Environmental Impact Study

Previous work completed by Colville Consulting may require updating to be consistent with the Terms of Reference for an Environmental Impact Study by the Niagara Peninsula Conservation Authority (NPCA), including an assessment of the Provincially Significant Wetlands on the opposite side of Biggar Road. The updated study will be required for a complete application for Municipal Planning Approvals for the South Niagara Hospital.

Survey

The Topographic Sketch previously completed by J.D. Barnes for the subject land is incomplete. A topographic survey including, utility locates, trees on and adjacent to the property, the adjacent rights of way, the top and bottom of slope for part 2 on Plan 59R-15796 will be required, which provides both PDF and CAD files, including digital terrain model data to support detailed design.

Plan 59R-15796 will need to be revised to covey daylighting triangles and road widenings for the adjacent Biggar and Montrose Roads as a condition of the Municipal Planning Approvals.

Traffic Impact Study

A traffic Impact Study is being updated by CIMA to reflect the September 2019 Ministry of Health Stage 2 submission and the Campus Master Plan. The updated Traffic Impact Study will be completed by December 2019. A further update may be required based on the Illustrative Schematic Design prepared by the PDC consultant, and reflective of the Municipal Class Environmental Assessment (MCEA) Municipal Road projects for Biggar and Montrose Roads. The Traffic Impact Study will include Transportation Demand management, parking Justification and Truck Turning Movements for emergency and transit vehicles to satisfy Municipal Planning Approvals.

Geotechnical and Hydrogeological Investigations

Niagara Health has retained a geotechinical consultant to complete geotechnical and hydrogeological reports be undertaken as part of the pre-transaction work program. These due diligence reports will also be required for the Municipal Planning Approvals, and should provide design guidelines for all structural, civil, stormwater management, geothermal and low impact development considerations for the project.

10.6.3 SUPPLEMENTARY BACKGROUND STUDIES TO BE UNDERTAKEN BY NIAGARA HEALTH

Duty to Consult with First Nations

Consultation meetings with representatives from appropriate First Nations groups will be required to confirm the role these groups may have on the proposed development plan.

Municipal Class Environmental Assessment (MCEA) to support Off Site Infrastructure Early Works

It is anticipated that an overall MCEA will be undertaken to support the entire Off Site Infrastructure Early Works program that is required for the proposed Hospital development. The following stakeholders are anticipated to be involved: Niagara Health Services, City of Niagara Falls, Niagara Region, private developers, Ministry of Transportation (due to connections to QEW) and Utility providers.

Tree Inventory and Preservation Plan

The Municipal Planning Approvals will require the submission of a Tree Inventory and Preservation Plan to be prepared by an Arborist and coordinated with the Topographic Survey.

10.6.4 PDC BACKGROUND STUDIES REQUIRED FOR MUNICIPAL PLANNING APPROVALS

In addition to the background studies listed above, the following requirements will need to be undertaken by the PDC consultant to complete applications for Zoning Bylaw Amendment and Site Plan Control.

- Site Plan and massing drawings with details of development (site statistics) and design (drawing information)
- Coloured renderings
- Landscape plan
- Building Elevations
- Floor and roof plans
- Sections and elevations
- Sun/shadow drawings
- Pedestrian-level wind study
- Planning Rationale
- Functional Servicing and Stormwater Management Report
- Site Servicing and Grading Plans
- Erosion and Sediment Control Plans
- Photometrics plan
- Waste Management Plan
- Pending the results of the MCEA, Off-site traffic and civil engineering design drawings may be required

10.7 Implementation Roadmap

An Implementation Roadmap of the critical next steps in the hospital development is provided in Table 10.6-1 and summarized in more detail below.

Nov. 2019 - Mar. 2020	PDC RFP procurement to facilitate PDC consultant start by April 2020.
Nov. 2019 - Dec. 2020	Hospital due diligence and coordination period: – Traffic Impact Study (anticipated to be updated by CIMA by December 2019), which will reflect the Campus Master Plan and be utilized in the background materials for the MCEA for the road projects. – Engagement with First Nations representatives – Geotechnical and Hydrogeological investigations. Note that a geotechnical consultant has already been retained and work is currently in progress, taking about 1 year and finalizing the report in time for it to inform the Illustrative Schematic Design and Municipal Planning Approvals applications. – Tree Inventory and Preservation plan. – Topographic survey including utility locates, trees on and adjacent to the property, adjacent right-of-ways, top and bottom of slope for part 2 on Plan 59R-15796, digital terrain model data. – Legal and topographic survey of the road widenings. – Initiate discussions with the gas, power and communication providers. Significant off-site work is required for these utilities and a minimum duration of two years should be allowed to facilitate the associated application, design, permitting and construction processes.

Jan. 2020- Dec. 2020	Parking Management Strategy Development to accommodate anticipated demand, inform zoning by-law amendment application and contribute to the illustrative schematic design. – Plan A: Demonstrate a parking plan with surface lots – Plan B: Demonstrate a parking plan with structured parking that will accommodate 2600 spaces (or equivalent based on floor area if it changes) that can be implemented as required.
	Business Case Assessment for Ancillary Development.
Nov. 2019 - Feb. 2020	City and Region engage MTO and other stakeholders, prepare terms of reference for the MCEA and manage RFP process to facilitate the start of the study. A servicing strategy that is independent of the Secondary Plan development is required to ensure schedule control.
Jan. 2020	Region confirms location of future WWTP to inform MCEA design.
Mar. 2020 - Oct. 2020	MCEA consultant completes minimum 30% design of Off-Site Infrastructure Early Works to inform Hospital RFP process.
Mar. 2020 - Dec. 2021	Duration of the MCEA process to facilitate detailed design preparation of associated infrastructure.
Q1 2021 - Q4 2021	Detailed design of Off-site Infrastructure Early Works.

Q4 2020 Q1 2021	Development Charge discussions with City of Niagara Falls and Niagara Region to exempt the South Niagara Hospital for Development Charge By-laws. This is a separate Council decision from the Zoning Bylaw Amendment but should be advanced concurrently.
Q4 2020 - Q2 2021	Zoning By-Law Amendments (4 months to run concurrently with the Stage 1 SPA process). Not to be advanced before completion of the Illustrative Schematic Design in order to ensure compliance with applicable zoning provisions, as amended.
Q4 2020 - Q3 2021	Stage 1 SPA (including SPA submission, SPA reviews and comments, Delivery of Site Plan Approval Conditions – NOAC).
Q3 2021 - Q3 2022	RFP Open Period – (including availability for a couple of commercially confidential meetings between AHJ and Project Co.
Q4 2022	Substantial completion of Off-site Infrastructure Early Works is achieved.
Q1 2023	Hospital implementation starts by Project Co.
Q1 2023 - Q3 2023	Stage 2 SPA (including revised SPA submission and approvals / site plan agreement).
Q4 2023	Final completion of Off-site Infrastructure Early Works is achieved.
Q4 2025	Hospital commissioning commences.
Q2 2026	Substantial completion of the hospital is achieved.

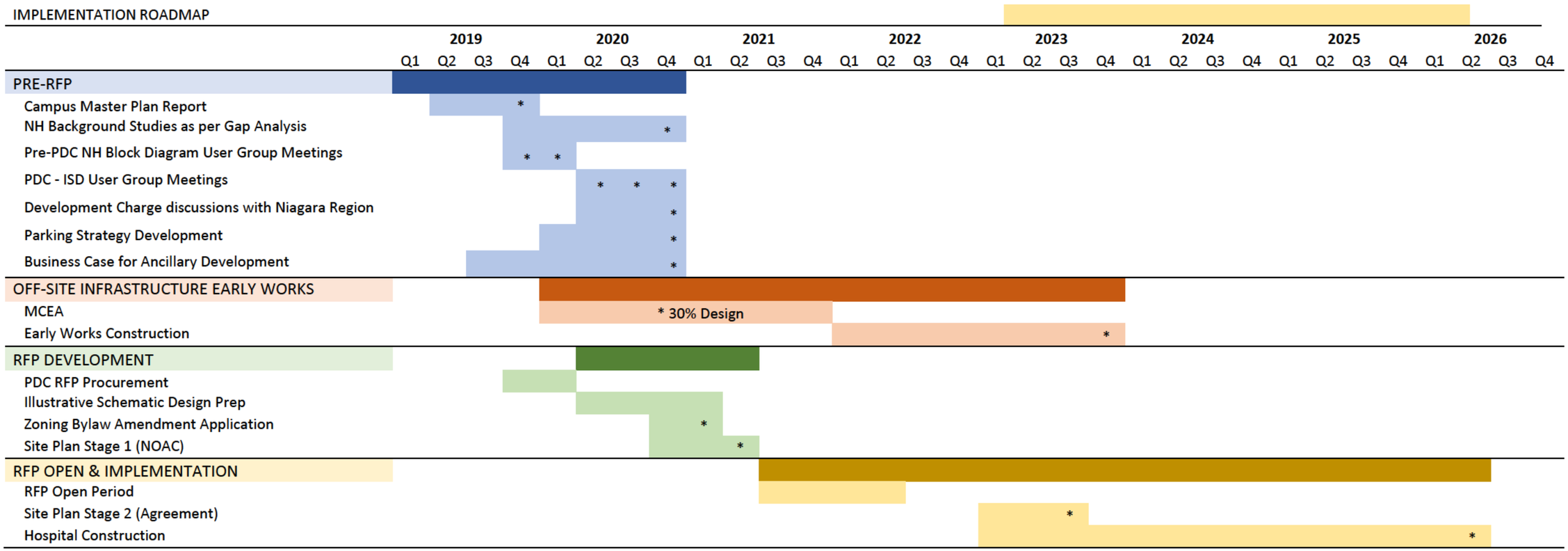

Figure 10.6-1: Implementation Roadmap

APPENDICES

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A-1 Campus Plan Drawing Package

A-2a Evaluation Criteria

A-2b Campus Plan Options Evaluation

A-3 Case Studies

A-4 St Catharines Site Critique

Transportation

T-1 Ontario Major Trauma Centre Heliport Information

T-2 Parking Demand and Supply Review

T-3 Other Hospital Experience with Loading

T-4 Parking Facility Types for Potential Conversion for Autonomous Vehicle Parking

Background Information

A-1

Campus Plan Drawing Package
Stantec
November 2019

A-2a

Evaluation Criteria
Stantec
November 2019

A-2b

Campus Plan Options Evaluation
Stantec
November 2019

A-3

Case Studies
Stantec
November 2019

A-4

St Catharines Site Critique
Stantec
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Ontario Major Trauma Centre Heliport Information
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Parking Demand and Supply Review
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Other Hospital Experience with Loading
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Parking Facility Types for Potential Conversion for Autonomous Vehicle Parking
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