3.1 High Level Master Plan

High Level Master Plans are planning projects that include clinical and facilities studies (i.e. Clinical Service Plans and current facilities condition assessments, respectively) to inform Site and/or Facilities Master Plans and accommodate projected service growth over the short-, medium- and long-term. Site and/or Facilities Master Plans include high level budgets, phased schedules and climate resilience strategies. High Level Master Plans characterize the broader community of care with a review of key characteristics, indicators and trends, such as demographics and population growth.

Relevance to Climate Risks & Resilience

High Level Master Plans are key opportunities to contextualize climate risks for a site in terms of impacts on people, assets and infrastructure, and health services over time. They should outline climate hazard **exposure**, **sensitivity** and **adaptive capacity** at the census scale[1] (see Section 6.1 for definitions).

HLMP also should outline potential **resilient planning opportunities** (see below) at the scale of action (e.g. site and community). Descriptions of health service delivery areas include community-level sensitivity and adaptive capacity to climate hazard exposure in the timeframe of the High Level Master Plan, including present day. Presenting projected community vulnerabilities alongside projected demographic and socio-economic trends can provide a valuable perspective to decision-making on health services and programs.

High Level Master Plans should anchor the project in the local climate planning context through references to key local government plans, progress and actions, including official community plans, climate adaptation plans and climate emergency declarations. The extent that critical infrastructure is planned, designed and operated with climate risk in mind has a bearing on all health services, whether provided at the site, in homes and in the community, or by the broader health system for all British Columbians (e.g. quaternary care). Similarly, a community's resilience to climate shocks and stresses has a bearing on the demand for health services at the site, service delivery area, and health system levels.

Responsibilities

Site planners are responsible for developing the High Level Master Plan. Capital project managers are responsible for providing updated data, information and analysis on climate hazards and risks for integration into the relevant High Level Master Plan.

Expected Results & Outputs

The High Level Master Plan should be a key resource for capital projects and planning on climate risks and resilience at the site, service delivery area, and health system levels.

Key Steps & Information

The primary steps in completing a High Level Master Plan include the following:

1) Review local government resources and community health vulnerability information for relevant information, including potential synergies or conflicts with meeting projected service growth. Examples include:
    - Conducting multi-hazard risk assessment rezoning condition to improve post-disaster functionality of critical infrastructure and services.

[1] Vancouver Coastal Health & Fraser Health (2020). *My Health My Community Survey.*

- Achieving zero emissions by 2050 as outlined in the City of Vancouver's *Climate Emergency Action Plan*.
- Enhancing the urban forest canopy and reduce the urban heat island effect to lessen the risk of extreme heat exposure, which is currently being prioritized by the City of Surrey[2] and others.

2) Carry out a Climate Hazard Exposure Screen (as described in Section 6.1) with key stakeholders in local government and the community of care. Where possible, carry out resilient planning (see below) to better understand the sensitivity and adaptive capacity of communities, assets and infrastructure. Exchange information with key health systems stakeholders to support completion of a Health Vulnerability Assessment[3].

3) Develop plans and actions to advance collaboration in reducing exposure and sensitivity to climate hazards, and enhance capacity to adapt (described in detail in Section 6.1).

4) Incorporate results into the relevant High Level Master Plan to ensure project access to the most updated information.

Resilient Planning Opportunities

High Level Master Plans characterize a dynamic community of care that is served by a network of critical infrastructure including health facilities, roads and utilities (e.g. water, sewerage, power). Key information about the exposure, sensitivity and adaptive capacity of people, assets and infrastructure should be included in a review of a community's key characteristics, indicators and trends. The tools and processes described below may be used to:

a) Map exposure, sensitivity and adaptive capacity (for service delivery areas);

b) Quantify the costs of action (for sites and infrastructure portfolios); and

c) Achieve co-benefits for health and climate resilience (for sites and communities).

A: Mapping climate hazard exposure, sensitivity and adaptive capacity at the community level

Site planners can use information on community vulnerability to inform service demand projections in High Level Master Plans and Concept Plans. For example, heat, wildfire smoke and flood vulnerability maps, such as those developed through the HealthADAPT project[4] (Figure 3) can be used to:

- Pinpoint physiological and social determinants of health that play key roles in climate vulnerability
- Identify neighbourhoods or communities that may need more resources or support to cope
- Mobilize multi-sectoral efforts to improve community health outcomes

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[2] City of Surrey. (2020). *Urban Heat Ready.*

[3] See the Health Canada *Health Vulnerability Adaptation Assessment Workbook* (2020) for guidance on assessing and planning for adaptation using a community health lens.

[4] The maps were developed as part of the Fraser Health and Vancouver Coastal Health *HealthADAPT Project* funded by Health Canada's Climate Change and Health Adaptation Capacity Building Contribution Funding Program. The maps were developed on the basis of a preliminary study by UBC's School of Population and Public Health. For more information, see *Mapping Spatial* **Patterns in *Vulnerability* to Climate Change-Related Health Hazards: 2020 Report** (Yu, Jessica; Castellani, Kaitlin; Yao, Angela; Cawley, Krista; Zhao, Xuan; Brauer, Michael; 2020).

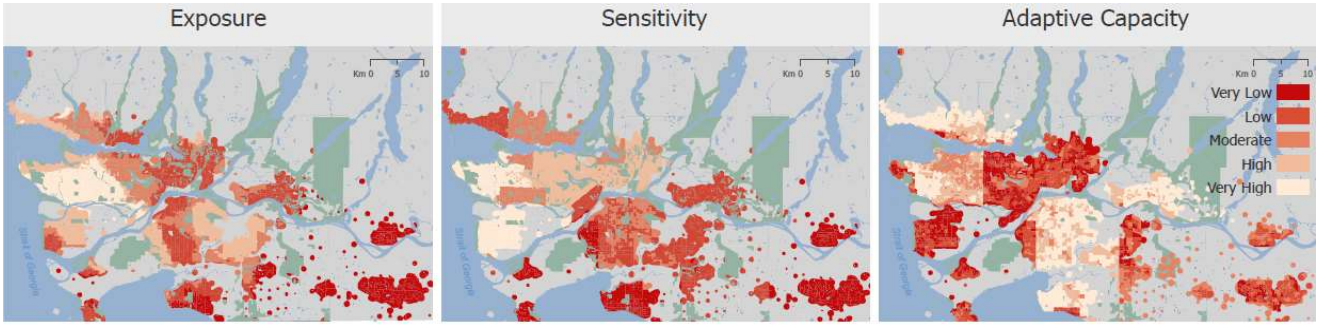

Figure 1: *Community exposure, sensitivity and adaptive capacity to days above 25°C in recent past (Source: HealthADAPT, 2020).*

In this example, when considering the risk of extreme heat events, exposure is linked to projected temperature changes and sensitivity is determined by two key factors that affect individual health: the age of the population and their pre-existing health conditions (e.g. older people are more prone to heat-related illnesses such as heat stroke and heat exhaustion). Adaptive capacity, the ability to respond to extreme heat events, is determined by factors such as income, housing, education and literacy. The maps in Figure 3 were created by GIS specialists, interpreted by public health experts, and developed into Story Maps to support local stakeholder engagement.

Such maps can further support collaboration among health system operators (e.g. facilities management, public health, emergency management, disease monitoring and surveillance), local governments, social housing and others to ensure that public services, such as clean air shelters and cooling centres, are located in areas of highest need.

B: Quantifying costs of action at the site and infrastructure portfolio levels

Site planners can also use interactive tools to better understand the value of investing in resilience today, as opposed to at the end of critical asset and infrastructure service lives. For example, the BC Climate Action Secretariat, Health Authorities and others piloted in 2019/20 the XDI Globe Cross Dependency Initiative, an online platform for assessing climate hazard risk for off-site assets and infrastructure that are critical to health facility functionality, and costing adaptation pathways for on-site health facility assets and infrastructure (Figure 4).

Figure 2: *Interactive analysis of climate risk for critical infrastructure in BC (Source: XDI Globe).*

C: Achieving co-benefits for health and climate resilience at the site and community levels

Site plans can also include information on the use of green infrastructure, green space and urban forest canopy to achieve co-benefits for patients, health workers, and community over a facility's lifespan.

Table 3 provides examples of evidence-based design strategies to integrate health and climate resilience co-benefits of urban greening at the site and community levels. See the Resilience Guidelines' companion document *Green Design for Climate Resilience & Well-Being* for illustrations and descriptions of an experiential pathway of green designs from inside a health facility to green space in the surrounding neighbourhoods.

Table 1: Urban greening strategies for health and climate co-benefits (Source: UBC Collaborative for Advanced Landscape Planning, 2020)

Green Design Strategy	Anticipated Health & Climate Co-benefits
View from Within	• Visual biophilic experiences • Wildlife habitat and biodiversity
Plant Entrances	• Social gathering space • Orientation/navigation • Shade provisioning/cooling • Building energy savings
Bring Nature Nearby	• Social gathering space • Wildlife habitat provision and biodiversity • Stormwater mitigation
Retain the Mature	• Air filtration • Building energy savings • Carbon storage and sequestration • Shade provisioning/cooling
Generate Diversity	• Visual biophilic experiences • Wildlife habitat provision and biodiversity
Create Refuge	• Social gathering space for cohesion and enhanced social capital • Shade provisioning/cooling • Air filtration • Wildlife habitat and biodiversity
Connect Experiences	• Visual biophilic experiences • Shade provisioning/cooling • Wildlife habitat provision and biodiversity (e.g. ecological corridors) • Stormwater mitigation
Optimize Infrastructure	• Urban heat island mitigation • Carbon storage and sequestration • Stormwater mitigation • Wildlife habitat provision and biodiversity