# **APPENDICES**

# PERKINS-WILL

# **LIST OF APPENDICES**

APPENDIX A.	Background Case Studies	166
APPENDIX B.	Design Cabinet: Interviews	173
APPENDIX C.	December 6, 2016 Workshop Minutes	179
APPENDIX D.	Description of the Exercise Discussed on the December Workshop	189
APPENDIX E.	Classification of Elements of Liveability Resulting from December Workshop	190
APPENDIX F.	Elements of Liveability Cards Resulting from December Workshop	192
APPENDIX G.	01A. Access to Sunlight on Parks and Open Spaces - Research	196
APPENDIX H.	01A. Access to Sunlight on Parks and Open Spaces - Testing	201
APPENDIX I.	01B. Access to Sunlight onto Streets - Research	219
APPENDIX J.	01B. Access to Sunlight onto Streets - Testing	222
APPENDIX K.	01C. Pedestrian-Level Winds - Research	228
APPENDIX L.	02. Daylighting for Indoor Spaces - Research	233
APPENDIX M.	03. Privacy - Research	240
APPENDIX N.	04. Connectivity - Research	244
APPENDIX O.	05. Interface with Public Realm - Research	254
APPENDIX P.	06. Transition - Research	257
APPENDIX Q.	07. Sky-Views - Research	261
APPENDIX R.	08. Skyline - Research	264
APPENDIX S.	09. Mixed-Use and Flexible Base Buildings - Research	268
APPENDIX T.	10. Heritage - Research	277
APPENDIX U.	Studies and Reports References	282

# **APPENDIX A.** BACKGROUND CASE STUDIES

A survey of case studies that are project-based and policy-based has been conducted to identify innovative approaches to challenges that are similar to those Toronto is facing. The cities that were reviewed exhibit many similar context and built form typologies as Toronto, such as Singapore, Hong Kong, London and New York.

### **Amenity Spaces**

The provision of usable and quality amenity and communal spaces integrated into high-rise residential development is important in addressing the well-being of residents and in accommodating diverse users.

# Singapore

#### Landscaping for Urban Spaces and High-Rises Program

In Singapore, there has been a steady increase in new commercial, residential and mixed-use developments integrating green spaces as a form of amenity into the development. This increase of skyrise greenery is the result of several programs implemented by Singapore's Urban Redevelopment Authority (URA) and the National Parks Board. One of these programs is the URA's enhanced Landscaping for Urban Spaces and High-Rises (LUSH) program, which includes a Landscape Replacement Policy and GFA Bonusing for provision of green spaces. The Landscape Replacement Policy states that the developers must replace greenery displaced by buildings and lost from the site due to development with greenery in other areas within the development. This Policy applies to all new developments within designated areas, including Singapore's Downtown Core. The objectives of the guidelines include:

- Access to communal spaces that are well landscaped with greenery as the environment becomes more built up;
- Enhancement of the quality of life in urban areas by providing spaces of relief and greenery closer to users; and
- Mitigation of the urban island heat effect and improvement of the air quality.

In addition, the National Parks Board has in place a Skyrise Greenery Incentive Scheme, which offers incentives and subsidies to encourage the installation of skyrise greenery. As a result of these efforts, plants covering built exteriors totaled more than 61 hectares as of 2013.



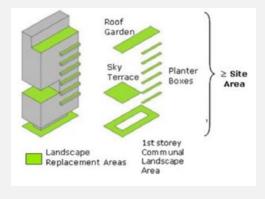


Figure A1. Singapore: Sky Terrace case study for amenity spaces (image credit: designboom)

## Access To Sunlight And Day Lighting

As the downtown grows denser, it is important to ensure that residential units and office spaces receive an adequate amount of sunlight and daylight. Built form consideration should be given to building orientation in response to the sun, as well as façade and glazing design to maximize solar access during winter and minimize solar gain during the summer. In addition, separation distance between buildings can help to minimize the shadow impacts of one building onto another.

#### Queensland, Australia

#### **High-Density Liveability Guide**

The guidelines produced by the Queensland University of Technology including the liveability benefits of improved natural light in the home are:

- Physical and psychological health benefits such as reduction in stress, better emotional health, improved communication and a sense of belonging to a community or place;
- Economic savings due to reduced reliance on artificial lighting and reduced dwelling energy costs;
- Developing effective daylighting strategies is based on an understanding of the sun's path within the study area. This means maximizing sunlight in the winter for passive solar warming and minimizing light and heat gain during the summer to reduce energy usage. As described in the guide, morning (eastern) sunlight is generally preferable to afternoon (western) sunlight, especially in kitchens and dining areas. Indirect light on the southern side of the dwelling, or filtered light on the northern side, is often preferred and may be important to those who work from home or who spend the majority of their time in the dwelling during the day.



Figure A2. Queensland excerpt from High-Density Liveability Guide

#### **Sunlight Preservation On Public Realm Spaces**

The public realm is an important component of a liveable city. The diversity of public spaces Downtown serves unique and necessary functions for local residents, workers, and visitors to the City. However, with a growing population and increasing demand for quality public realm, these spaces need to be protected from the potential impacts of shadows and wind from development. Currently, the tools used by municipalities to mitigate shadow impacts are through cumulative shadow analysis and where applicable, "no net new shadow" policy provisions. However, there are examples of an emerging exploration of using angles of the sun's rays and its path to inform the built form.

## **New York City, USA**

#### **Solar Carve Tower** (under construction)

Situated next to one of the city's most prominent green spaces - the High Line – the angles of this building maximize solar access onto the park. In addition to solar rays, views from the High Line towards the Hudson River were also considered as a part of the design. This method of shaping the built form is projected to bring over 200 hours of additional day light (annually) to the High Line. This practice, called the Solar Envelope, is a zoning strategy by Ralph Knowles to prevent new development from threatening access to sunlight. From understanding the incident angles of the sun's rays, the architecture of the building can be molded to allow the light to reach critical public realm spaces at the ground level. It is a tool that regulates development within limits set by the sun and its motion; it advocates that we should see this as a method

of embracing nature rather that viewing it as a restriction to our developments.

This 'solar carving' technique has been done on other Studio Gang projects, including the Solstice on the Park in Chicago. The architects explored both the social and environmental benefits of shaping built form for solar access in both the winter and summer seasons.



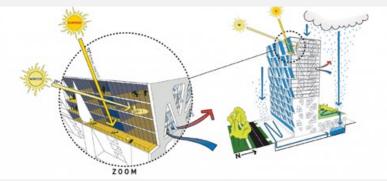


Figure A3. New York City solar carve tower as strategy to preserve sunlight onto open spaces and streets (image credit: Archdaily)

## **Diverse Open Spaces**

The provision of a diverse range of parks and open spaces is an important aspect of a liveable downtown but is also challenging to implement. The limited availability of developable land means that existing park spaces have to work harder to accommodate the growing population, and new parks have to be provided through unconventional means. While the Downtown Parks and Public Realm Plan will provide recommendations for these challenges, there are opportunities for new developments to expand and enhance the public realm.

### Fukuoka, Japan

#### **ACROS Fukuoka Prefectural International Hall**

As the last piece of developable land in the city situated next to an existing city park, the design of the building integrates a nearly 100,000 square-metre park in the city centre on 15 stepped terraces. The result is an extension of the adjacent green space that is also publicly accessible.

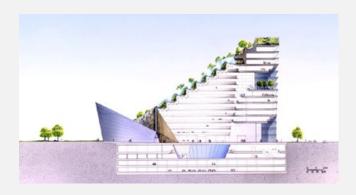




Figure A4. Design of building in Fukuoka, Japan is an example of the use of under-utilized space as a park or open space (image credit: Greenroofs.com)

#### **Neighbourhood Character and Context**

Downtown consists of diverse neighbourhoods, each with their own character, scale and built form. To maintain and enhance the liveability of the neighbourhoods, new development must evaluate and respond to the existing neighbourhood character and context.

#### **London, United Kingdom**

#### Central St. Giles Mixed-Use Development, Camden

The existing neighbourhood fabric consists of a complex network of medieval streets and a mix of modern and historical blocks. Insights from the existing urban fabric informed the design of this development, which has been fragmented and appropriately scaled to match the surrounding buildings. The approach to design is also unique through the usage of vibrant colours for each façade, and changes in height and orientation for each building volume to maximize natural light.





The City of London has also released a Supplementary Planning Guidance document called Shaping Neighbourhoods: Character and Context that supports the 2011 London Plan. This guide outlines several benefits and key principles of understanding the character and context of a place. More importantly, it provides a summary of the steps in the process of understanding the character of a place. In this document, the elements of a place have been divided into three categories: physical; cultural, social and economic; and, perception and experience. Only with the full analysis of all three categories can the character of a place then be defined. Specifically, for evaluating the physical elements of a place, it breaks down into a sub-group of architectural and urban form considerations: massing, density, height, scale, building:open space ratio, materials, details, permeability, movement, and access.



Figure A5. London case study of Central St. Giles as an example of compatibility and fit of new developments (image credit: Renzo Piano)

# **Energy and Resiliency**

As the climate changes, there are implications on how buildings, landscapes, infrastructure and the public realm will be designed to adapt. As the density of Downtown increases, it will experience a higher vulnerability to power outages, extreme weather and added pressure to its infrastructure. Solutions must be designed to create a resilient Downtown, such as integrated energy solutions for new and existing developments.

#### Seoul, South Korea

#### **Seoul Energy Corporation**

Launched in February 2017, the Seoul Energy Corporation launched to look over the capital's energy policies, as part of their "One Less Nuclear Power Plan" initiative<sup>1</sup>. This project identified the need to expand renewable energy production to adapt to climate change impacts in many ways such as improving institutions to promote sustainable energy. There are four key initiatives from this project that will work towards encouraging self-sufficiency: eco-friendly and distributed energy supply project; low-consumption energy distribution project; energy sharing project; and interregional cooperation project. The Corporation will be looking to establish the "Seoul Energy Management System" by 2020 which will reduce energy consumption of energy by 5 to 10 percent using information technology, especially from "guzzling public facilities such as purification plants, sewage treatment centers, and hospitals".

Seoul Metropolitan Government. Seoul Launches "Seoul Energy Corporation", City News, 2017





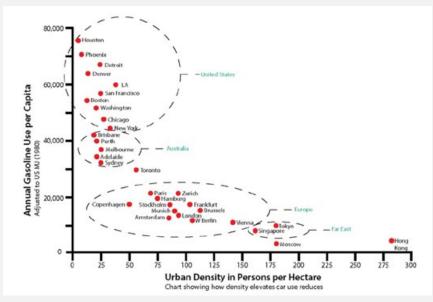
Figure A6. Seoul case study discussing the One Less Nuclear Power Plan initiative and the goal of reducing energy consumption by 5 to 10 percent by 2020 (image credit: Seoul Metropolitan Government)

### Chicago, USA

#### Dense Downtown vs. Suburban Dispersed: Study on Urban Sustainability

A pilot study published in the CTBUH International Journal of High-Rise Buildings analyzed sustainability by comparing the levels of energy consumption between high rise residential buildings in Downtown Chicago with low rise homes in suburban Chicago (Oak Park). The study highlighted the general trend between urban density and gasoline use (below); however, this trend is less prevalent in cities in the United States due to its mix of urban and suburban communities. Therefore, this spotlight study on Chicago focused on how density has a direct impact on other factors of resiliency and sustainability.

The high rise neighbourhood in the study had an approximate density ranging from 12,000 people/km<sup>2</sup> to 7,200 people/km² whereas Oak Park, which is 14 kilometres away from Chicago's City Center, had an average density of 4,262 people/km<sup>2</sup>. The analysis was based on six factors: home operational energy use; energy of the dwelling; home water consumption; mobility and transport; infrastructure; and quality of life. The preliminary findings were outlined after a series of surveys, stakeholder engagement sessions, and analyses of household demographics. These findings showed that operational energy across both areas were virtually the same whereas embodied energy in Oak Park was a third less than the urban neighbourhood. In the suburban context, water consumption is a third more, residents travel 41% more distance; spending 7% more time travelling, and the suburban infrastructure showed a 714% increase over the amount of urban infrastructrure, on a per person basis. This research highlights the need to "better understand both the operating and embodied energy of infrastructure provision, and how this can be maximized even further in a concentrated urban environment". In order to ensure our sustainable cities in the future, it is important to take every step possible in reducing the energy spent on construction, materials, and maintenance of buildings and communities.



1 Wood, Antony & Du, Tony. (2017). Dense Downtown vs. Suburban Dispersed: A Pilot Study on Urban Sustainability. *International Journal of High-Rise Buildings*, 6(2).

Figure A7. Study of the impacts of urban versus suburban densities on sustainability (image credit: CTBUH)

# APPENDICES

# APPENDIX B. DESIGN CABINET: INTERVIEWS

As part of the background research strategy a "Design Cabinet" was organized, made up of prominent experts in high-rise residential design drawn from Perkins+Will's internal network. Through a series of interviews, the Design Cabinet was intended to advise on trends and challenges in building for liveability in other cities. As the lead of the Design Cabinet, Karen Alschuler also participated in the December workshop with City staff as part of Task 1. Below is the summary of the interviews:

#### **SEATTLE**

#### INTERVIEW WITH: BRAD HINTHORNE (AIA, LEED AP)

Brad is the Managing Director of the Perkins+Will Seattle office. He has over 29 years of experience in the practice of architecture, including leadership roles on master planning, programming and design efforts for a diversity of public and private clients. Brad has expertise in high-rise mixed use and residential developments.



#### On Mixed-use:

- · Residential development in Seattle is mostly rental and not condominiums
- Seattle places common areas and amenities in the most desirable space including the upper most floors
- The only way mixed-use projects are feasible is when there is a market for all of the uses in the building. At the moment there is demand in Seattle for residential, office, retail and hotel uses, especially in the downtown
- It is important to understand how much of the use is pseudo-private versus pseudo-public, which translates to how the lobbies and amenity spaces are located and designed within the mix of use and how to activate the street and podium
- Residential amenity is 5% of the residential area, half of that can be enclosed

#### On Unit Sizes:

- There are not a lot of micro-units in the market. Typically a large percentage of the market is one-bedroom units that average 550-650 square feet
- There are very few family-sized units. Two bedroom units are typically 900 to 1,100 square feet
- The demographic downtown is still predominantly young professionals
- Typical floorplates for development range between 10,800 to 12,000 square feet for residential and non-residential uses

#### On Building Setback and Transition:

Building transition such as step-backs are utilized to protect view corridors to the shoreline and water

#### **VANCOUVER**

#### INTERVIEW WITH: RYAN BRAGG (AIBC, MAA, MRAIC, LEED AP BD+C)

Brad is a Principal in the Perkins+Will Vancouver office. He has 20 years of experience in architectural design and management. His extensive portfolio includes large-scale, transit-oriented projects and associated municipal policies.



#### On Podiums:

- Toronto's approach to podiums is a challenge typically the podium massing is overwhelming and keeps pedestrians "starved" for a human-scaled public realm. Vancouver approaches podiums differently, typically 4-5 storeys
- Podiums should avoid dark glazing it takes away from the interaction between the private and public realm

#### On Market Condominiums to Purpose-Built Rental:

Purpose-built rentals speak more to amenities and liveability issues than condos, in that generally they are part of the marketing strategy to target specific demographics. For example, there is opportunity to place amenities in more desirable locations such as democratizing the rooftop for everyone

#### On Unit Sizes:

- Vancouver is pushing forward a new policy that requires developers to provide a minimum of 35% of all units in new projects to be either two or three bedrooms. Developers would be required to include 25% two bedroom units and 10% three bedroom units. The same policy will also apply to new secured market rental buildings
- The intention is good, but the problem is the affordability of these family-sized units
- The more adaptable a unit is, the better it can adapt to different options for different users and how users can use the space over time. For people to age-in-place, versatile units need to be encouraged
- The market has not been balancing out amenities with small unit sizes usable amenity spaces are an important extension of the living spaces for those living in small units

#### On Density:

- Vancouver is experiencing dense developments that are purely driven by market demand. Cities need to have bolder visions
- A proposal for the redevelopment of a post office building in Vancouver is an example of a dense development that looks "bulky" because the developer wants to maximize FAR but is also restricted by height
- Although architecture is also becoming more expressive, cities need to distinguish good architecture that are enduring from "trendy" architecture

#### On Building Performance:

Vancouver has excellent building performance standards - example being window to wall ratio. Vancouver is at about 50% (whereas Toronto is 80-90%)

#### **SAN FRANCISCO**

#### INTERVIEW WITH: KAREN ALSCHULER (FAICP, LEED AP)

As the leader of Perkins+Will's global Urban Design discipline, Karen has become known for projects which define the new generation of urban waterfronts, set design parameters for transformation of large urban districts and provide for expanded cultural and educational facilities.



#### On Liveability:

- Liveability is about the connection between the physical plan and the experience and the health; it explores the interconnection between the built form and other aspects of the human experience
- Look back from the conditions you want to create start with the places that you want to have tree cover, climate, character, the needs of families, the different uses, etc.

### On Land Use:

• There must be a right balance of residential and non residential: San Francisco changed from non-residential to residential too quickly

#### On Scale:

- Any mistake is a big mistake when building at high-density; it is necessary to have further control of larger buildings
- Streets need to be sizeable Copenhagen is a great example of the effect of light even inside the buildings

#### On Open Space:

• Singapore has limited land space, and in order to make sure you connect people to the public spaces, you need to be creative about the uses of <u>all</u> the spaces around the building

#### INTERVIEW WITH: NOAH FRIEDMAN (AICP, LEED AP)

Noah is an emerging leader in the field of urban design with a broad range of expertise including project types ranging from: regional and large scale master plans; regulating plans and design guidelines; and concept and vision plans. He was the project manager of the Lower Yonge Built Form Study in Toronto.



#### On Affordability:

- A liveable place must be a mixed-income place
- Moratoriums on development is going to make cities more affordable
- "As of right" development should be enforced: if you meet our form-based zoning, and if you provide a certain percentage of affordable housing, your project will be approved as-of-right without going through the planning process
- Skepticism about the affordability of micro units and their effect on the crowding of immigrant populations

#### On Unit Sizes:

- In San Francisco, smallest size units are 250 square feet. Families are leaving downtown, micro units are targeting young people
- Recognition of a new typology multi-family units with shared services does every unit need to have a kitchen?

#### On Open Spaces:

- Any rezoning within a certain distance from the water requires a city referendum
- Meaningful outdoor space in a downtown should replicate the sense of safety of private outdoor space outside the downtown (e.g. residential backyards)
- The public needs to be educated on how cities work, and how their expectations should be based on where they live in terms of location/proximity to services. Everyone needs to be within an one-minute walk to a meaningful open space. As a reference number, 15-20% of land should be public open space

#### On Sunlight:

- No net new shadows permitted on SF parks on December 31st, which generally affects buildings over
- Need to be clear on which part of the streets get the sun

#### On Transitions:

 45 degree angular planes seem an arbitrary tool – transitions policies should be related to privacy, views and/or sun

These are some of the projects that were referenced to exemplify trends raised during the interviews. They help to inform the summary of trends included in the report:

NAME: VIA6 (SEATTLE)

YEAR: 2013

THEME: RETAIL PODIUMS, AMENITIES



**Lessons learned:** Ground floor of podium design encourage an indoor market place and active retail street design that serves both the residents of the development and the neighbourhood.

NAME: WEWORK + WELIVE (SEATTLE)
YEAR: UNDER CONSTRUCTION

THEME: MIXED CO-WORKING + CO-LIVING SPACES



**Lessons learned:** The development accommodates the increasing demand for co-working and co-living spaces as a result of a fast-emerging market of entrepreneurs and start-ups.

NAME: FRYE RESIDENTIAL TOWERS (SEATTLE)

YEAR: UNDER CONSTRUCTION

THEME: HERITAGE, CULTURAL VENUE, INFILL



**Lessons learned**: The development is an infill on an existing parking lot across from the Frye Art Museum, it is also a way for the museum to expand its sources of revenue.

NAME: TOWN HALL TOWERS (SEATTLE)

YEAR: UNDER REVIEW

THEME: HERITAGE, CULTURAL VENUE, MIXED-USE



**Lessons learned:** This development explores synergy between a heritage performance venue and new mixed-use towers, including coordinated event programming for the proposed plaza.

# NAME: POST OFFICE DEVELOPMENT (VANCOUVER)

YEAR: PROPOSAL

THEME: HERITAGE REVITALIZATION



Lessons learned: an example of too much density on a site due to restrictions on height from a view corridor policy, resulting in a bulky built form.

# NAME: CENTRAL ST. GILES COURT (LONDON)

YEAR: 2010

THEME: PUBLIC REALM



Lessons learned: Complex volumes of buildings fragmented and reduced in scale to match the surrounding buildings. The buildings are clustered around a large courtyard connected by publicly accessible routes.

# NAME: SMITHE AND RICHARDS PARK (VANCOUVER)

YEAR: 2017

THEME: PUBLIC REALM SPACES



Lessons learned: Example of implementation of the Greenest City Action Plan, which ensures that every person lives within a 5 minute walk of a park, greenway or other public space by 2020.

### NAME: RIVER NORTH FIRE STATION YEAR: UNDER REVIEW

THEME: PODIUMS, MIXED USES, FACILITIES



Lessons learned: Intensification of a fire station into more compact development, procuring revenue for the City.

# APPENDICES

# **APPENDIX C.** DECEMBER 6, 2016 WORKSHOP MINUTES

By: Lucy Gao		Date:	December 14, 2016	
Meeting Date:	December 6 <sup>th</sup> , 2016	Project Name:	TOcore Building for Liveability Study	
Meeting Time:	2-5PM	Project Number:	441647	
Meeting Location:	Perkins+Will office	Attendees:	See attached	
Next Meeting Date:	TBD	Cc:	Paul Kulig	

#### **Discussion**

Item No.	Description
2016-12-06.01	The meeting started with an introduction of each attendee. Shawna Bowen from the City of Toronto provided a brief introduction of TOcore Building for Liveability and the scope of work for this study:
2016-12-06.01	Sarah Phipps provided an update to the entire TOcore study, including the timing for the Draft Secondary Plan which is to be released by June of next year. The scope of the Building of Liveability study is similar to the Yonge and Eglinton study, except analysis will not be conducted on a block by block basis but should take a more strategic approach. There is also a quick start to the built form policy include the recent OPA/ZBLA for Tower Separation Distance at 25m.
2016-12-06.03	James provided an overview of his workshop (presentation attached) on liveability that he organized as a part of CTBUH, key findings include:  • Examples of separation distances within Toronto as viewed from different offices/condo units. 25m seems inadequate in certain instances (e.g. the view out of Ann-Marie's office)  • Separation distances vary from Mumbai to Dubai, also it should be considered from a life safety perspective (fire).  • Access to sunlight also varies, Melbourne measures luminance to the back of the kitchen and China mandates one hour of sunlight everyday  • View corridors as exemplified in London is the "cheesegrater" building which is slanted on one side as a result of the view corridor policies  • Hong Kong uses BIM for view analysis and microclimate

The foregoing constitutes our understanding of matters discussed and conclusions reached. Other participants are requested to review these items and advise the originator in writing of any errors or omissions.

Item No.	Description	
	<ul> <li>studies</li> <li>Singapore has a more sophisticated type of living (e.g. green plot ratio and the landscape replacement policy)</li> <li>In summary, liveability equates to loveability</li> </ul>	
2016-12-06.04	.04 Paul presents a summary of the trends and challenges (presentation attached):	
	<ul> <li>Paul reiterates the list that makes up "Downtown's DNA", adding that Toronto should also be viewed as an "arrival city" that is welcoming to immigrants</li> <li>A list of trends gathered based on background research and interviews with other Perkins+Will leaders was presented</li> <li>Paul also presented an overview of the challenges facing the City of Toronto, concluding that these issues may be further exacerbated given the population projections</li> <li>Ann-Marie emphasized that the population number is just a projection and not a target, and the TOcore study can both validate and influence that projection through a new planning framework</li> </ul>	
2016-12-06.05	A discussion was initiated after Paul's presentation, whereby participants were asked to identify the top challenges facing the City:	
	<ul> <li>There was a comment on the objectives of this study – which is to provide a built form "toolkit" with a liveability lens that is comprehensive and robust</li> <li>Current application of policies are too inconsistent due to challenging sites</li> <li>The elements of liveability should be both quantitative and qualitative (especially qualitative elements since the City has been successful at developing measurable criteria)</li> </ul>	
On office development:		
	<ul> <li>Office has been identified as a priority followed by the Health Sciences District over residential development</li> <li>The Office Replacement Policy encourages offices development in the Kings but appropriate built form has not been discussed</li> <li>Small unit sizes will be addressed in the Growing Up Study, the working draft of the Guidelines will be shared by the City</li> </ul>	
	On small sites:	
	The City is not only interested in understanding how to deal with tall buildings on small sites, but also small sites in general – there needs to be certain criteria to evaluate these	

#### Item No. Description

proposals, and influencing coordination between sites

#### On public and private realm:

- Interface between the public and private realm is about the lower floors of buildings (look at Gehl's work), there should be spatial continuity to the public realm and adequate setback on streets that don't have such continuity
- There is tension within heritage areas in King Spadina, especially as it relates to expanding the public realm around heritage and maintaining the street wall – so the built form study should explore solutions for continuous and nonaligned street wall

#### On podiums:

- The City will be working on Retail Design Guidelines for the TOcore study area. These will be modelled on the New York Retail Guidelines, Melbourne and Copenhagen also have good retail guidelines
- There is a shift towards "podiumization" "podiums to a fault" problem
- The City identified the Yonge and Eglinton Centre, Manulife Centre and early mixed-use development which included movie theatres, shopping, interior shopping concourses were great examples, we need to push for more of these types of development
- An example of interesting mixed use is in Shanghai aka "the Shanghai Sandwich" which is a mix of retail, office, residential and hotel

#### On solar access:

- In terms of building performance vs. solar access to park spaces and the public realm, the City's OP identifies solar access to parks as a priority
- Noah suggested that based on work done in Pittsburg, solar gains do not make a huge different in building performance until you get to passive house level

#### On building typologies:

 The City's Tall Buildings Guidelines is helpful with guidance on the typologies, , perhaps the next step is to have a greater range of typologies (such as typologies that include an open space) and looking at a variety of podium-tower form

#### On neighbourhood characteristics:

 The nine existing secondary plans give a good framework for preserving neighbourhood characteristics

#### On floorplate:

Item No.	Description
	<ul> <li>The 750 sq.m. towers should be further explored for different typologies</li> <li>There should be a continuum of built form typologies; a suite of best practices would be helpful so that the City can be consistent in assessment of innovative development applications</li> <li>Noah suggested the Tower Area Ratio (or Open Space Ratio), which is agnostic about building form and building typologies and there are a wide variety of towers that fit into the TAR</li> </ul>
2016-12-06.06	<ul> <li>Karen Alschuler's presentation (attached) on the realms and scales of liveability:</li> <li>Karen provided an overview of the realms of liveability (basic needs, resilient systems and ability to thrive) within three scales (home, community and city), and examples from Beijing, Sao Paolo, Singapore and New York that speak to liveability</li> </ul>
2016-12-06.07	<ul> <li>Built form Downtown can not solely rely on transit access or proximity to define scale or height, given the number of stations/modes in the Downtown. We should be proactive and shape built form around elements of liveability</li> <li>There was a comment that the City should use future development as an opportunity to get things that you needs to create a complete community</li> <li>Developers often do not want to build child care and community centres because they are not part of their business model. Perhaps there are ways for cities to work with developers on the programming and integration of these facilities in developments</li> </ul>
2016-12-06.08	Presentation from Lucy Gao on the Elements of Building for Liveability (attached)  The elements were developed based on the Proposals Reports, background research and precedents analysis  The list focuses on elements as they related to the three scales: home, community and city  Lucy provided case studies on how these elements are addressed or misinterpreted in other cities
2016-12-06.09	Exercise on identifying which elements are to be addressed

#### Item No. Description

through this study, ways to implement the elements and the prioritization of these elements (presentation and photos of the workshop attached):

#### Home/Office/Shop

#### Sunlight/access to light/visual privacy/sky-view:

- To be included in built form study
- James identified this element as important and informed through tower separation distances, among other built form measures

#### **Usable and Quality Amenity Space:**

- To be included in built form study
- Refers to both indoor and outdoor spaces and keeping sunlight on amenity spaces: is that feasible? how is amenity space is altered by different typologies? should we move beyond those typologies and how are those impacted?
- The Growing Up Study will have input into the type and provision of amenity spaces
- Small sites are unable to provide adequate amenity spaces.
   However how do you deal with a whole block of small sites and none of them provide any amenity space
- Also look at provision of amenity spaces in office developments

#### Diverse unit types + Adequate Storage:

- Not directly part of the built form study since these matters are addressed by other initiatives
- Storage in residential development is also addressed by other initiatives
- One thing the built form study will identifying whether there are certain building shapes that could give you the most family-sized units, or could family units be located in the podium?
- Slabs vs. podiums (shallow floor plates) look at reinventing the slab

#### **Community**

#### Attractive and vibrant streets:

- To be included in built form study
- Methods to implement it include: active frontages, setbacks, weather protection systems and ground floor uses
- For ground floor uses, look at providing a hierarchy from inactive to vibrant on both retail and residential streets (e.g. Charles Street is not a retail street but has visible and large ground floors)

# Item No. **Description** Issues with sterile lobbies were identified. These types of spaces could be reconsidered to resemble hotel type lobbies where people linger and are programmed Encourage buildings with generous canopies and entrances Widened sidewalks Access to sunlight on sidewalks Diverse range of parks and open spaces: To be excluded from the built form study Public realm will be a consideration of the study, including setbacks - explore where you can create different kinds of spaces such as forecourt and POPS Comfortable Public Realm: To be included in built form study Thermal comfort, including wind and sunlight Requirement for tower step-back (e.g. how can you hold the street wall but have to protect wind at the ground level) **Neighbourhood Character and Context** To be included in built form study Ways to maintain context: transition, scale and setback Explore tools for measuring the character of a neighbourhood; an example of measuring character is identifying "rhythm of the street" which relates to the lot pattern Noah used Mission Rock as an example of a well-loved neighbourhoods, where the number of doors were measured **Community Services and Facilities:** To be included in built form study The issue is identifying how to make it work physically in podiums or lower levels and relations to the public realm **Heritage Character:** TBD if it should be addressed in the built form study Protected through HCD Explore a new typology of a combination building where the base of a building remains and new structures are built on top Ellen commented that it's hard to see what people are keeping when developing on heritage properties, there are implications for "hollowing" out the buildings There is a difference between the HCDs in the Downtown the older ones are localized and contextualized and more prescriptive towards built form, newer ones are more generalized

#### Item No. Description

#### **Downtown Mobility**

- TBD if Mobility should be addressed in the built form study
- There is a relationship between skyline and levels of transit access – urban structure/areas of growth based on different orders of transit. However, not every subway stop needs to have the tallest building
- Bicycle infrastructure that be integrated into new development
- Setbacks wider setbacks for pedestrian movement
- · Mobility is about how people move around

#### Jobs and Trade:

- To be excluded from the built form study
- Encourage office floorplates that are smaller and marketable
   not just large floorplates
- We need to understand built form implication on office uses

# Education combined with community services and facility (should also capture healthcare)

- · To be excluded from the built form study
- Integration with podiums
- Access to sunlight for institutional open spaces

#### Infrastructure:

- Infrastructure (hard and soft) will inform the built form in terms of scale and intensity, but is not directly part of this study
- Infrastructure support certain densities, then liveability takes over
- New development should be assessed against infrastructure capacities

## Affordable and Diverse Housing Choices:

- To be excluded from the built form study
- Should explore purpose-built rental which allows new types of housing/built form (e.g. democratization of amenity spaces)
- They could still be podium towers but there may be shifts in the internal allocation of public spaces
- Another built form implication for rental buildings is address drop off areas

#### Views:

- To be included in the built form study
- Speaks to views of heritage, open spaces and squares
- Deals with open spaces and squares
- OPA 199 deals with views, but should also look at the City

# Item No. Description Plan from 1991 which contains a series of additional views Skyline: To be included in the built form study Skyline reflects good planning, however it is an outcome and not a driver **Natural Environment:** To be excluded from the built form study Additional Elements/Categories: Small Sites: need specific guidance on development on small sites, including sunlight and privacy, servicing, retail access, role of lanes (NYC has a small sites policy) New built form types: podiums, integration of offices and office amenity spaces, family sized units Approach to height: revisit the Tall Buildings Guidelines no net new shadow, density, transition, and height within Mixed Use Areas 1, 2 and 3 Diversity: explore diversity as it relates to buildings, neighbourhood, types and uses but ensure that Toronto's unique character is captured **Other Comments:** Height and density: Vision Height Map – is it policy driven or a height map that is produced at the end of the study? James emphasized that density is equally important to height, height should become self-evident after all the criteria have been applied Noah suggested that shadow impact studies on public spaces can shape height **Common Outdoor Space:** NYC in 1763 there was density bonusing for a plaza. However, we should be cautious with having public open space on every site, instead, explore opportunities for negotiating combined open space **Prioritization of Elements** The numbers corresponds with the number of people that identified the element as a priority: **Short Term:** Approach to height 1

Item No.	Description	
	<ul> <li>Small sites 2</li> <li>Comfortable public realm 5 (not just thermal comfort and spaciousness) – expanding the public realm – we cannot go back to recapturing public spaces</li> <li>Sunlight and privacy as it relates to small sites 1</li> <li>Building forms 1</li> </ul>	
	Long Term:	
	<ul> <li>Diversity (in all aspects) 3</li> <li>Community spaces 2</li> <li>Attractive and vibrant streets 1</li> <li>Affordable housing 1</li> <li>Approach to height 2</li> </ul>	
	Summary:	
	Take these elements and "Toronto-fy" them, recognizing the unique aspects of Toronto including its Main Streets, Villages, the PATHetc	

# TOcore Building for Liveability Workshop – List of Attendees:

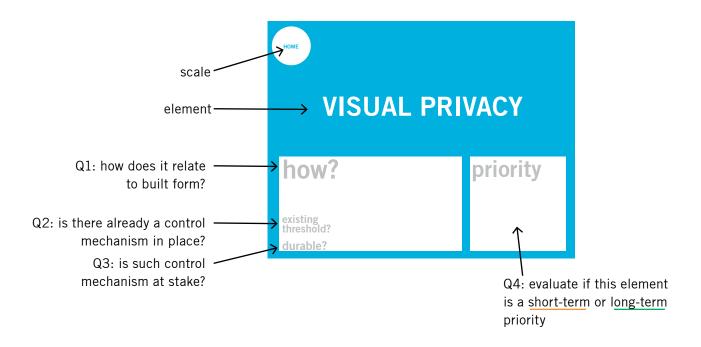
1.	Paul Kulig	Perkins+Will
2.	Saeran Vasanthakumar	Perkins+Will
3.	Ellen Kowalchuk	THA
4.	Marian Prejel	City of Toronto
5.	Ann-Marie Nasr	City of Toronto
6.	Gregg Lintern	City of Toronto
7.	Andrew Farncombe	City of Toronto
8.	Paul Farish	City of Toronto
9.	Lucy Gao	Perkins+Will
10.	Helen Coombs	Perkins+Will
11.	Karen Alschuler	Perkins+Will
12.	Nasim Adab	City of Toronto
13.	James Parakh	City of Toronto
14.	Clara Romero	City of Toronto
15.	Angela Stea	City of Toronto
16.	Shawna Bowen	City of Toronto
17.	Oren Tamir	City of Toronto
18.	Kristina Reinders	City of Toronto
19.	Leo DeSorcy	City of Toronto

Perkins+Will

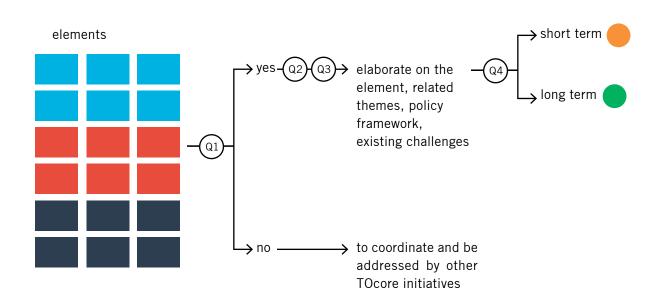
20. Noah Friedman (Skype)

# APPENDIX D. DESCRIPTION OF THE EXERCISE DISCUSSED ON THE DECEMBER WORKSHOP

#### **HOW DO ELEMENT CARDS WORK?**



#### **EXERCISE FLOW:**



# APPENDIX E. CLASSIFICATION OF ELEMENTS OF LIVEABILITY RESULTING FROM DECEMBER WORKSHOP

#### PRELIMINARY LIST OF ELEMENTS BY RELATIONSHIP TO BUILT FORM related to built form **VISUAL PRIVACY VISUAL PRIVACY SUNLIGHT SUNLIGHT ADEQUATE STORAGE USABLE & QUALITY AMENITY SPACES DIVERSE UNIT TYPES** new -**MEANINGFUL PODIUMS USABLE & QUALITY AMENITY SPACES** new ADEQUATE USE OF SITE (AKA SMALL SITES) ATTRACTIVE & VIBRANT STREETS new **NEW & ACCOMMODATING BUILDING FORMS COMFORTABLE PUBLIC REALM** ATTRACTIVE & VIBRANT STREETS EIGHBOURHOOD CHARACTER & CONTEXT BOOS **COMFORTABLE PUBLIC REALM** PROTECTION OF HERITAGE CHARACTER NEIGHBOURHOOD CHARACTER & CONTEXT BOOST **COMMUNITY SERVICES & FACILITIES HERITAGE CHARACTER DIVERSE RANGE OF PARKS AND OPEN SPACES COMMUNITY SERVICES & FACILITIES** MOBILITY new -**DIVERSITY & UNIQUENESS SUPPORT TO JOBS & TRADE** new **DIVERSE CULTURE RIGHT APPROACH TO HEIGHTS EDUCATION** somewhat related **VIEWS & SKYLINE DIVERSE UNIT TYPES** AFFORDABLE HOUSING CHOICES **MOBILITY** SOCIAL SERVICES & HEALTHCARE NATURAL ENVIRONMENT **VIEWS & SKYLINE** RESILIENT INFRASTRUCTURE pertain to other studies **ADEQUATE STORAGE DIVERSE RANGE OF PARKS AND OPEN SPACES SUPPORT TO JOBS & TRADE DIVERSE CULTURE EDUCATION** AFFORDABLE HOUSING CHOICES SOCIAL SERVICES & HEALTHCARE **NATURAL ENVIRONMENT** RESILIENT INFRASTRUCTURE

top elements that address existing challenges

NEW & ACCOMMODATING BUILDING FORMS

ADEQUATE USE OF SITE (AKA SMALL SITES)

ATTRACTIVE & VIBRANT STREETS

COMFORTABLE PUBLIC REALM

COMMUNITY SERVICES & FACILITIES

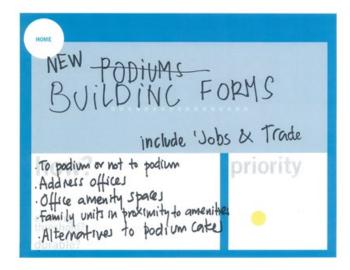
top elements that address long-term challenges

**DIVERSITY & UNIQUENESS** 

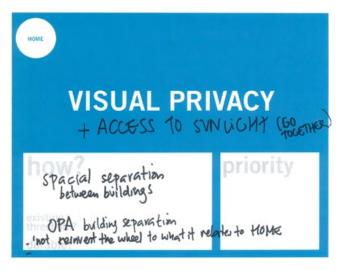
**DIVERSE UNIT TYPES** 

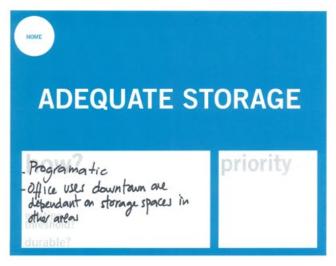
RIGHT APPROACH TO HEIGHTS

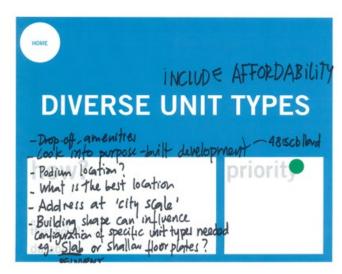
# APPENDIX F. ELEMENTS OF LIVEABILITY CARDS RESULTING FROM DECEMBER WORKSHOP

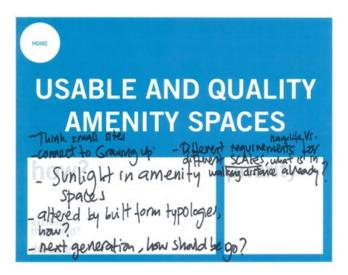










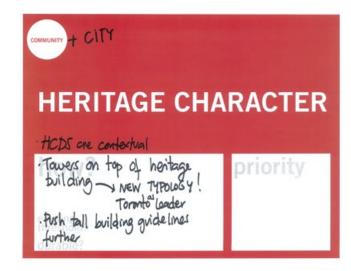








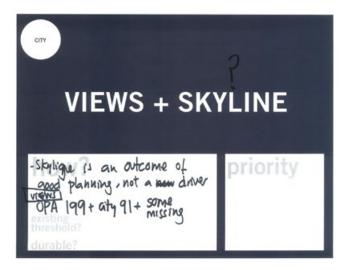




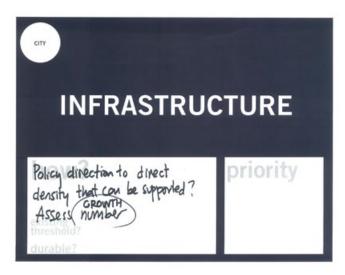


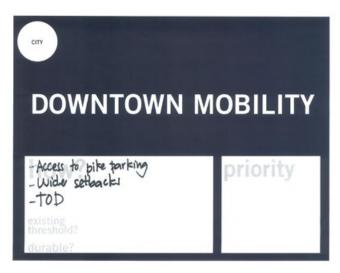


















# APPENDIX G. 01A. ACCESS TO SUNLIGHT ON PARKS AND OPEN SPACES - RESEARCH

# TORONTO PLANNING & REGULATORY CONTEXT

#### Official Plan (2015)

#### 3.1.2 BUILT FORM

"3. New development will be massed and its exterior façade will be designed to fit harmoniously into its existing and/or planned context, and will limit its impact on neighbouring streets, parks, open spaces and properties by: d) providing for adequate light and privacy".

#### 3.1.3 BUILT FORM - TALL BUILDINGS

"When poorly located and designed tall buildings can physically and visually overwhelm adjacent streets, parks and neighbourhoods. They can block sunlight, views of the sky and create uncomfortable wind conditions".

"Most of the proposed intensification in this Plan is anticipated to be achieved with street oriented, grade related or mid-rise building types that define and support sunny, comfortable and vital streets, parks and open spaces".

#### 4.2 APARTMENT NEIGHBOURHOODS

"2. Development in Apartment Neighbourhoods will contribute to the quality of life by: c) locating and massing new buildings to frame the edge of streets and parks with good proportion and maintain sunlight and comfortable wind conditions for pedestrians on adjacent streets, parks and open spaces...".

#### City-Wide Tall Building Guidelines (2013)

#### 1.3 FIT AND TRANSITION IN SCALE

"a. Apply angular planes, minimum horizontal separation distances, and other building envelope controls (such as stepping height limits, building setbacks and stepbacks), to [...] maintain access to sunlight and sky view for surrounding streets, parks, public or private open space".

#### Downtown Tall Buildings: Vision and Supplementary Design Guidelines (2012)

#### 1.3 FACTORS MITIGATING HEIGHT

"Three mitigating factors take precedence over heights [...] heritage properties located on or adjacent to the development site; sunlight on parks and open spaces; and views of prominent and heritage properties, structures and landscapes"

#### 3.2 SUPPLEMENTARY DESIGN GUIDELINE #2

"Locate and design tall buildings to not cast new net shadows on:

- a) Parks and open spaces identified as "Signature Parks/Open Spaces" between 10:00 AM and 4:00 PM on September 21st. Signature Parks/Open Spaces include: Allan Gardens; Berczy Park; David Crombie Park; Grange Park; Moss Park; Nathan Phillips Square; St. James Park and Queen's Park), and
- b) All other parks located within and adjacent to the Downtown Tall Buildings: Vision and Supplementary Design Guideline boundary area, between 12 Noon and 2:00 PM on September 21st".

"Locate and design tall buildings to best mitigate all new net shadowing of:

• c) Jesse Ketchum Park, School Playground & Open Space and Ramsden Park in the Bloor-Yorkville/ North Midtown Area and St. James Cathedral's park lawn & spire, throughout the entire day for all seasons of the year".

#### Tall Buildings Shadow Studies: Appendix 3 (2013)

#### FIRST TIER PARKS

"First Tier Parks are those City-owned parks and open spaces Downtown that have special historic and/or cultural significance that currently receive sunlight throughout most of the day (March to September):

 Allan Gardens, Berczy Park, David Crombie Park, Grange Park, Moss Park, Nathan Phillips Square, Queen's Park, St. James Park".

"New tall buildings cannot, under any circumstance, add net new shadows to any of these parks between 10 AM and 4 PM on September 21st".

#### SECOND TIER PARKS

"Second Tier Parks are those remaining City-owned parks and open spaces Downtown that have widespread public use, are visible from the public realm, currently receive sunlight through the middle of the day, are coherent, and are of significant size:

• Dundas Square, Metro Hall Square, Metropolitan United Church, Wellesley-Magill Park, Osgoode Hall Gardens, Opera Place, Town Hall Square, Trinity Square".

"On these Second Tier Parks no net-new shadow may be added from 12:00pm to 2:00pm, which runs through the lunch hour and into the early afternoon, as this is the time of day that the parks are most used Downtown"

#### Site and Area Specific Policies

#### SITE AND AREA SPECIFIC POLICY 82

"This policy area is bounded by Jarvis Street, Carlton Street, Sherbourne Street, and Queen Street East. It provides shadow prevention policies for two significant City parks as well as a school yard".

"SASP 82 also recognizes the importance of parks and open spaces in the area, including Allan Gardens, Moss Park and the school playground of École élémentaire Gabrielle-Roy, as public realm anchors in the area, with no net-new shadows to be allowed on these open spaces:"

- "3.5 No net-new shadows are permitted on Allan Gardens as measured on March and September 21 from 10 a.m. to 6 p.m.".
- "3.6 No net-new shadows are permitted on conservatory buildings in Allan Gardens or any significant permanent structures that exist or are planned at the time of the development application, as measured on March 21, September 21, June 21 and December 21 at all times of the day".
- "3.7 No net-new shadows are permitted on Moss Park as measured on March 21 and September 21 from 10 a.m. to 6 p.m.".
- "3.8 No net-new shadows will be allowed on the playground of École Gabrielle Roy measured from September 21 to June 21 from 10 a.m. to 4 p.m.".

#### Design Guidelines for Privately-Owned Publicly-Accessible Spaces (POPS) (2014)

#### 2.2 ENHANCING BUILDING & SITE PROGRAM

"d. Consider the microclimate created by surrounding buildings. Ensure that locations for uses such as patios or other outdoor gathering spaces are located in areas of sunlight and protected from adverse wind conditions".

#### 3.1 COURTYARDS

"Located to have access to sunlight during midday".

#### 3.2 PLAZAS

"Locate and orient plazas to maximize sunlight access throughout the day and provide uses that take advantage of the sunny location".

#### 3.3 GARDENS

"Gardens should be located and oriented to maximize sunlight access during midday".

#### 3.4 WALKWAYS / MID-BLOCK PEDESTRIAN CONNECTIONS

"Walkways should be open to the sky and the scale of enclosing walls should provide for adequate sun and sky views".

#### 4.1 PEDESTRIAN COMFORT

- "a. Locate POPS within the block to maximize sky-views and sunlight in the space".
- "b. Encourage south-facing POPS, as they maximize the space's exposure to direct sunlight".

## PRECEDENTS OF GUIDELINES & REGULATIONS IN OTHER CITIES

#### Mississauga, Ontario - Standards for Shadow Studies (2014)

#### 3.1 RESIDENTIAL PRIVATE OUTDOOR AMENITY SPACES

"Shadow impacts should not exceed one hour in duration for private rear yards, decks, patios and pools on June 21, September 21".

"No more than 2 hours of shadow impact in the space ("No Impact Zone") between the exterior wall of the dwelling that abuts the space and 7.5 metres from the rear wall".

"If less than 2 hours of sunlight already exists in the No Impact Zone, no new shade may be added".

## 3.2 COMMUNAL OUTDOOR AMENITY AREAS

"[...] include children's play areas, school yards, tot lots, and park features such as sandboxes, wading pools etc., and outdoor amenity areas used by seniors and those associated with commercial and employment areas during spring, summer, fall and winter".

"Shadows from proposed developments should allow for full sun on the above places at least half the time, or 50% sun coverage all the time, on each of the following dates: June 21, September 21, December 21".

 "Sun Access Factor = As(ave) / A<sub>T</sub> = Average of the Areas in Sunshine for each of the test times from 1.5 hours after sunrise to 1.5 hours before sunset both inclusive / Total Area of the Space or Feature"

#### 3.3 PUBLIC REALM

"Public Open Spaces, Parks and Plazas: Provide a Sun Access Factor of at least 50%, on September 21".

#### 3.4 TURF AND FLOWER GARDENS IN PUBLIC PARKS

"Provide full sun on any 7 test times on September 21, from 1.5 hours after sunrise to 1.5 hours before sunset (for March to October growing season)".

### Boston, USA - Shadow Laws (1990, 1993)

City of Boston Common Shadow Law (Ch. 362, 1990)

- Restricts new shadows on the Common to first hour after sunrise (or 7:00 am, whichever is later)/last hour before sunset
- No new shadows for more than two hours between 8:00 am and 2:30 pm from March 21 to October 21
- Created a Shadow Bank, which is one acre where the City can allow developers to "withdraw" for shadows that are cast longer than the two-hour exemption, calculated from March 20, 1989.

Public Garden Shadow Law (Ch. 384, 1993)

- Restricts new shadows on the Public Garden to the first hour after sunrise (or 7:00 am, whichever is later) or last hour before sunset
- Within the Midtown Cultural District, new shadows are allowed before 10:00 am between March 21 and October 21

#### Sydney, Australia - Local Environmental Plan (2012)

#### CLAUSE 6.17 SUN ACCESS PLANES

"The front of each plane is a line between two specified points (X and Y) and the sides of the plane extend back from those points along a specified horizontal bearing (B) and vertical angle (V)".

"For the Belmore Park 1A sun access plane:

- a) X is a point at 34067E, 49731N, 30RL, and
- b) Y is a point at 34297E, 49681N, 34RL, and
- c) B is 359.0 degrees, and
- d) V is 32.7 degrees."

"Dates and times of protection vary for each place according to the type of activities occurring in that place that benefit from sunlight, when those activities are likely to occur, and existing levels of sunlight and overshadowing".

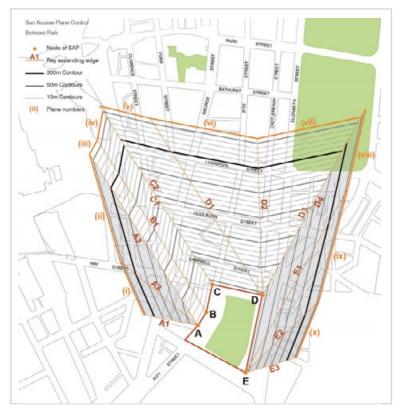


Figure A8. Sun access planes on Belmore Park, from Sydney DCP 2012 Planning Review Amendment, April 2013 draft

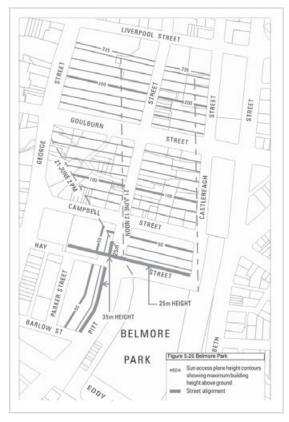


Figure A9. An indication of the maximum height achievable for land affected by sun access planes, from Sydney DCP 2012



Figure A10. Screenshot from New York City interactive shadow map - December 21, annotating amount of day in shadow over Tompkins Square Park, Manhattan (image credit: The New York Times)