Planning the Sustainable Urban Design Roadmap

Community Design That Anticipates The Next Generation

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Daniel H. Leeming  BA, DIP CP, MES, FCIP, RPP
The Planning Partnership ; Partner, Urban Design and Planning
CONVERGING ISSUES

- **Rising Costs of Energy**
  - Days of cheap energy are over

- **Aging Population**
  - In 20 years, 1 in 4 Canadians will be 65+

- **Public health**
  - Last 20 years has seen a 2 or 3 times increase in diseases, asthma, diabetes,
  - depression, hearth disease

- **Climate Change**
  - CO₂ levels are the highest in 500,000 years and growing

All of these issues are linked to how we design and build our communities

With the convergence of these issues, we have just one generation to make serious change before things get out of hand.
CONVERGING ISSUES

May 25, 2011 - Shelia Fraser, Auditor General, warns of the harsh choice Canadians will have to face – tax hikes or program cuts due to:
1. An aging population
2. Aging infrastructure
3. Effects of climate change

Shelia Fraser discusses the impacts:
• “... we can expect people will need more health care services and will be drawing on public pensions. Obviously, balancing these fiscal pressures will be a major challenge.”

• “Melting permafrost is undermining roads, buildings and pipelines... and climate change could also affect key economic sectors such as forestry, mining, fisheries and agriculture.”
Earth’s oil capacity: 2 trillion barrels

Remaining capacity at peak: 1 trillion barrels

Consumption: 27 billion barrels/year

Final consumption: 2041 (37 years)

Population 1800: 1 billion

Population 2000: 6 billion
### Converging Issues: Earth's Resources, One Planet Living

<table>
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<tr>
<th>Country</th>
<th>Renewable ha/person</th>
<th>Planets</th>
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<tr>
<td>United States</td>
<td>9.5</td>
<td>5</td>
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<tr>
<td>Canada</td>
<td>7.6</td>
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<td>Norway</td>
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<td>United Kingdom</td>
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<tr>
<td>Zambia</td>
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<tr>
<td>One Planet</td>
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<td>1</td>
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*Renewable ha/person*
- Increased demand on cooling systems & power demand; 2010 hottest summer on record.

- Even if CO2 emissions were eliminated today, it could stay in the atmosphere for up to 200 years.

- World population has doubled since 1960, and parallels the steepest climb of CO2. Rocketing economies of China & India, with more than 1 billion people each, ensures that CO2 will continue to rise.
CONVERGING ISSUES  EARTH’S RESOURCES, ONE PLANET LIVING

- An increase of 1 to 2 degrees Celsius in global temperature =
  - Sea Coasts – storms & rising sea levels cause growing erosion of coasts
  - Species – 30% at risk of extinction; increasing coral reef death
  - Flooding and depleted croplands in Pakistan / Bangladesh

- An increase of 4 to 5 degrees Celsius in global temperature results in ‘Positive Feedback Loops’ =
  - Melting of Arctic Tundra, warming of Southern oceans & melting of ice caps
  - Wheat and rice crop failures
  - A 30% increase in China’s rice needs means 50% of world production
CONVERGING ISSUES  AGING POPULATION

- ‘Working-to-aged ratio’ increases from 100:44 to 100:61 by 2031

- Household formation growing faster than population growth

- 3 to 5 year backlog for Long-Term Care

- Increasing health care costs

<table>
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<tr>
<th>Year</th>
<th>Age 65+ Seniors % of Society</th>
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<tr>
<td>2001</td>
<td>13%</td>
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<tr>
<td>2021</td>
<td>18%</td>
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<tr>
<td>2031</td>
<td>24%</td>
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-Census of Canada
CONVERGING ISSUES  PUBLIC HEALTH WELFARE

- Disease of the 19th Century
  TB
  Cholera
  Yellow Fever

- Treatment
  Public Works
  Water Quality / Treatment
CONVERGING ISSUES  EARTH’S RESOURCES, ONE PLANET LIVING

- Disease of the 19th Century
  - Typhoid

- Appalling typhoid death rates until;
  - 1910 Chlorination
  - 1914 Milk Pasteurization

‘American City Magazine’
CONVERGING ISSUES

The Shift from Communicable Diseases to Chronic Diseases

Diseases of the 21st Century (Chronic)

Hypertension, Diabetes, Heart Disease, Cancer, Osteoarthritis and; Depression
- All have doubled or tripled in the last 20 years
- Diabetes has doubled worldwide since 1980
- Child obesity has tripled in 20 years
- 3 million people have diabetes in Canada, est. cost by 2020- $17 billion

Treatment
- Diet & Education
- Exercise, 60 minutes of moderate activity daily, for adults; 90 minutes for children
- Improve / Build Environments that encourage walking / cycling / recreation at all levels
Diseases of the 21st Century

Respiratory Health
- Doubled in the last 20 years, greatest increase is with children
- Transportation and buildings are the worst offenders (buildings, in the city; transportation, in the suburbs)

Treatment
- Promote alternatives to high automobile dependence
- Promote alternative low emissions energy sources
- Better education on land use planning & lifestyle choices
Diseases of the 21st Century

Mental Health
- Mental health disorders, depression & anxiety have tripled in the last 20 years
- Depression affects 121 million people worldwide, the leading cause of disability and 4th leading contributor to global disease (WHO)

Treatment
- Improve / encourage exercise opportunities
- Improve opportunities for social interaction at all levels
- Build better public meeting places (structured and unstructured) into communities at all scales
CONVERGING ISSUES  CHILDREN’S HEALTH

Statistics
- In 1971, the average age at which children began to watch TV was 4 years; today, it is 5 months.
- > 90% of kids begin watching TV before the age of 2, despite recommendations that screen time should be zero for children under 2, and limited to 1 hour for kids 2-5.
- National data shows 15.2% of 2-5-year-olds are overweight and 6.3% are obese.
- Regional data shows that 24% of children and youth use active transportation to get to and from school.
ICES ATLAS- Institute for Clinical Evaluative Sciences
*(Neighbourhood Environments & Resources for Healthy Living- A Focus on Diabetes in Toronto)*

**CONVERGING ISSUES**

**HEALTH ISSUES**

Diabetes Prevalence Rates

Exhibit 2.3: Age- and sex-adjusted diabetes prevalence rates per 100 persons of all ages, by neighbourhood, in Toronto, 2001/02

**Findings**

- In 2001/02, the overall age- and sex-adjusted diabetes prevalence rate (per 100 persons of all ages) was 5.5; rates were highest in the northwest and east of the city. In contrast, rates were lowest in neighbourhoods in central and southwestern parts of the city.
- Scientific evidence that regular physical activity can reduce various chronic disease by 50%.

- The costs of many diseases have been clearly linked to our built environment.

- The doubling every 20 years of health care costs is not sustainable, healthcare already struggling.

- Rising fuel costs will replace building, transportation, food production systems.

- Climate change is just starting as greenhouse gasses spike upward.

- Goals of 20% CO2 reduction by 2030 and 80% by 2050 means profound change.

- Two generations to get to 80% is too little, too late.
LEARNING FROM THE PAST  STREET CONNECTIVITY
LEARNING FROM THE PAST OPEN SPACE
Market Place Realities

Consequences:

- Vanishing house and degraded streetscape

- An old model of house building trying to adapt to new economic realities
LEARNING FROM THE PAST  STREET RIGHT-OF-WAY

20m ROW and 8m setback

15.5m ROW and 3m setback
- Permeable by design;
- Natural traffic calmers;
- Contribute to livability of a community;
- Their defined hierarchy acts to identify location in communities; and,
- Provide 30% of public realm.
LEARNING FROM THE PAST

TRANSIT PERCEPTION

The fast track to owning in the city

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- Create compact urban form that builds upon existing urban areas and decreases regional sprawl;

- Build mixed-income, diverse housing and walkable neighbourhoods in both Greenfield and infill locations;

- Ensure equitable distribution of housing mix with transportation options;

- Reinvest in urban areas to support the economic well being of an entire region;

- Create and revitalize visible, accessible and linked range of open space opportunities

- Build neighbourhoods and towns in patterns that accommodate peoples everyday needs; and,

- Preserve a region’s agricultural heritage and environmental systems;

- Use infrastructure investments wisely and set performance criteria for allocation of government funds.
PROVIDING FOR OUR FUTURE

**Energy**
- Onsite renewable energy sources
- Reduced demand
- Reduction of petroleum-based fuels
- Solar orientation
- Heat Island reduction
- Local food production

**Waste**
- Waste management reduction
- Recycle content
- Existing building reuse

**Air Quality**
- Reduced greenhouse gasses
- Reduced auto use
- Improved public transit
- Housing and job proximity

**Water**
- Enhanced stormwater management
- Waste water management
- Water efficient landscaping
- Infrastructure energy efficient

**Green Infrastructure Technology**
- Certified green building
- Building energy efficiency
- Building water efficiency
- District heating and cooling
- Infrastructure energy efficiency

✓ Good Urban Design is an excellent platform from which to build a good sustainability program upon

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The race is on to improve built and natural environments before the damage is out of control...
CASE STUDIES  URBAN INFILL

WEST DON LANDS

- Former Brownfield
- 64 ha (157acs), 883 Units
- Major new community in Toronto,
  42 ha (104 ac)
- 6,000 units (1,200 assisted living); 15,000 population
- District Energy (DE) plant combined with public uses and parkland features
- District Energy plant serves the entire plan area, construction to begin late 2009
- Mixed use, public transit, high order public realm, starts October 09
- City owned, mandatory hook-up; LEED-ND points were a consideration
- 40% energy reduction target
CASE STUDIES  URBAN INFILL

EVERGREEN BRICKWORKS

-Opened in 1889, and for the next 100 years the site was one of the best brickyards in Canada

-In the 1980’s the site was taken over by the City of Toronto, Toronto Region Conservation Authority (TRCA), and the Province of Ontario.

-The site opened to the public in 1996

-$6 million dollars were raised to transform the site

-Received LEED Platinum certification

-Preserved many of its geological and industrial heritage features

-16 historic factory buildings have been revitalized through adaptive re-use

-Converted into a publicly accessible park, natural area, and a community environmental centre

-Site focuses on nourishing a sustainable lifestyle though social programming such as workshops, markets, education and site operations.
ARTSCAPE WYCHWOOD BARNs

- Conversion of the old TTC streetcar repair barn into a multipurpose community centre with residential units, office space, and gallery

- Original building constructed between 1913 and 1921

- Artscape began in 2008 in partnership with the City of Toronto and The Stop Community Food Centre

- Received LEED Gold certification

- Geo-thermal heating, energy-efficient lighting, a storm-water recycling system and several other conservation features

- Utilized surrounding lands to develop a new city park

- Focuses on arts, culture, ecological stewardship, historical preservation, urban agriculture, and affordable housing

The site has become home to 26 artists and their families, 17 other individual artists, and offices for 11 non-profit organizations
CASE STUDIES  NEW URBAN DESIGN

MARKHAM CENTER

- 98 ha (243 ac); 9,500 people
- LEED Gold / Urban Design
- Medium and High Density
- District Energy Utility owned by Town of Markham
- BRT / LRT Central Route
- Voluntary hook-up
- 100% of buildings connected to date: office, high rise, mid rise
- Density Drives:
  Walkable urban centres; New economic regimes; High levels of transit; Social, cultural mix; Sustainable initiatives.

District Energy Plant

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CASE STUDIES  NEW URBAN DESIGN

MOUNT PLEASANT

- Major new community in Brampton
- Transit Hub - GO Transit station and Brampton Transit
- Diversity of uses within the core area
- Promotes walkability (active transportation)
- Strong Urban Design promotes liveability
- Diversity of housing promotes life cycle housing
- Joint Use for common buildings – School, Library, Community Center
CASE STUDIES  NEW URBAN DESIGN

OAKVILLE UPTOWN CORE

- Initiated in the Mid-90’s
- Strong New Urbanist principles
- Poor Market Condition
- Vision Delayed
- Challenge of Big Box Scale
- Major influx of High Density Residential Buildings
CASE STUDIES  NEW URBAN DESIGN

OAKVILLE UPTOWN CORE

- Established Urban Form
- Significant High Density
- Connected Main Street
- Big Box Transformation

5 year Plan (Phase 1)

25 year Plan (Phase 2)

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CASE STUDIES  GREENFIELD DEVELOPMENT

ECO TECH VILLAGE

- 64 ha (157acs), 883 Units
- 5 min. walk to central shops and transit
- Mixed Use / Diverse Housing
- Transit Node
- 95% Passive Solar Alignment
- Engineered wetland / Stormwater Management
- Bio Swale Connected to Stormwater Facilities
- Underground Greywater Storage
- Community Allotment Gardens
- Photovoltaic Roof Panels
- Centralized Compost Area
- Communal Geothermal
- Walkable School with Green Roof
- Greenbelt Linkage
- Environmental Home Display
Community Design
Layering of Functional Needs:

- Would have scored well in LEED for Neighbourhood Development Program
CORNELL COMMUNITY

- Major new community in Markham
- Based on New Urbanist principles
- Compact, connected and complete; 40,000 population
- Diverse Housing Range
- 5 min. walk neighbourhoods
- Transit service
- Diverse open Space System
- Cornell centre includes: Regional Hospital, BRT/LRT system, mid-high density residential, retail, office
- DE plant can support 4,000,000 ft², opens 2011
- Heating/cooling/steam – hospital; heating/cooling – Cornell Centre
- DE is influencing Urban Design plans for Centre Area

District Energy Plant
CASE STUDIES  GREENFIELD DEVELOPMENT

CORNELL COMMUNITY
CASE STUDIES  SUSTAINABLE GUIDELINES

SEATON COMMUNITY

- **Developed** in conjunction with the Amendment Policies, the Neighbourhood Plans, and Landowner meetings

- **Approach** – holistic sustainability, including energy, water, solid waste, in addition to public health, social/cultural and natural environmental considerations Secondary Plan

- **Combined Document** – Urban Design & Sustainable Guidelines
CASE STUDIES  SUSTAINABLE GUIDELINES

SEATON COMMUNITY

Seaton, New Town scale → 65,000 people
CASE STUDIES

REGION OF PEEL HEALTH STUDY

- Measures health impacts of the built environment
- Inform planning decisions
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1255 Bay Street, Suite 201
Toronto, Ontario
M5R 2A9