Redesigning Cities and Public Space for Innovative Mobility System

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Andrew Au, City of Toronto, North District, Transportation Planning
“The future is here. But it is not evenly distributed”

– William Gibson
Overview

Why: Mobility Needs and Trends

What: New Mobility Planning

Where: Mobility Redesign Framework

How: Redesign Template and Examples

Future City: End Result
1. Shifting Culture and Economy

**Fourth Industrial Revolution: New Emerging Economy**

<table>
<thead>
<tr>
<th>20TH CENTURY</th>
<th>21ST CENTURY</th>
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<td>CREDIT +</td>
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<td>ADVERTISING +</td>
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<td>INDIVIDUAL OWNERSHIP</td>
<td>SHARED ACCESS</td>
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<td>Hyper Consumption</td>
<td>Collaborative Consumption</td>
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Asset-light Business Model  
Pay-as-you-go

**I NEED...**  
**YOU HAVE...**
- Efficiency
- Trust


2. Paradigm Shift in Auto Industry

3. A Climate Change Era: Resource depletion & marginal growth

Source: Seth Wynes and Kimberly A Nicholas, The climate mitigation gap: education and government recommendations miss the most effective individual actions, IOP Publishing Ltd, 12 July 2017.
From Mass Transit to MaaS Service

Mobility-as-a-Service

Invisible Boundary Between Modes

Finland’s Multimodal MaaS Model

Micro-Transit

Multimodal Hubs

On-demand Mobility

Micro-mobility

MaaS Examples Around The World
Autonomous Vehicle is a Tool, Not a Mobility Mode

Public/Shared Transport
- Rapid Transit
- Bus + Shuttle
- Taxi
- Ride-share + Ride Sourcing
- Car-sharing

Private Transport
- Private Car
- Private AV Car

Transformation
- High Capacity Transit
- Large Network of Shared Electric Autonomous Vehicles
- Premium Ride Services

Impact of 0-Occupancy
- 40% (High Capacity Transit)
- 60% (Large Network of Shared Electric Autonomous Vehicles)

Trading Impact of 0-Occupancy = 3 Times Road Network
Layers of New Urban Mobility

1 Process
New Mobility Planning Process & Assessment

2 Needs
Eco (Mobility) Hub
Reducing Auto Trips & Parking

3 Design
EcoMobility Placemaking
People in Public Space

Integration of Multimodal Plan & New Mobility/Technology

MULTIMODAL PLANNING

INNOVATIVE MOBILITY

PARKING REDUCTION

One-stop Multimodal Service Points
Reducing Land-use Impact for parking
Create New Public Space & Realm on Street Corner
Active, Art, Culture and Community of Public Realm for People
Tippett-Wilson Regeneration Study

Initial Multimodal Model

- Pedestrian: 942
- BICYCLE: 333
- Transit: 1,954
- Vehicle: 1,869
- Auto Passenger: 577

Total: 5,794

Final Multimodal Ecosystem

- Car-share: 116
- Carpool: 174
- Auto Passenger: 577
- Bikeshare: 203
- Ridesourcing: 174
- Ridesharing: 261
- Micro-mobility: 232
- Shuttle: 87
- Telecommuting: 87
- Shared-Transit: 119

Total: 5,794

New Mobility = New Growth Planning

2
Multimodal-Oriented Design (MOD): Network Design
New Parking and Space Management

Traditional

Private Parking

Innovative Options

Innovative Mobility Solutions

Innovative Strategy
New Technology Starts with Primitive Mode

30 → Private/Autonomous Vehicle

50 → Maximum Deviation from Desire Line

50~100 → Max. Distance to Sidewalk/Bicycle Parking

200~400 → To Bus/Shared/Micro Transit Stop

150~300 → One-way Car-share/EV Station

300~400 → Bike-share/BRT Stations

300~450 → One-way Car-share/EV/Carpool/Rideshare

200~530 → 2-way Car-share/Shared Transit

800~900 → Rapid-Transit Station
EcoMobility: Context & Components

EcoHub Elements

- Smart Screen
- Car Share Space
- Electric Vehicle + Charging
- Taxi Stand
- Carpool/Rideshare Space
- Kiss-n-Ride Space
- Subway/Station Link/Entrance Connections
- Kiosks
- Micromobility + Charging
- Scooter/MicroCars + Charging
- Bike Stations/Accessories
- Bike Corrals
- Service Delivery
- Waiting Shelter
- Bus/Shared Transit Stops

Context

1. On-Street
2. Bus-stop
3. Mobility Park
4. Transit Station
5. Private
6. Underground Parking

Image of EcoHub Elements and Context
Policy Innovations: Place, Mobility, Innovation

Shepard West Secondary Plan
Higher Order Pedestrian Zone

Tippett Regeneration Area
Designated Hubs

Dufferin Avenue Secondary Plan
Cycling Interchange
EcoMobility and Places: Small Scale

- Smart Screen
- Taxi Stand
- Carpool/ Rideshare Space
- Car Share Space
- Electric Vehicle + Plugins
- Shared Bicycles
- Bike Station (#)
- Bike Corrals
- Service Delivery
- Subway Entrance Improvements
- Kiss-n-Ride Space

Tippett Regeneration Area

Designated Hubs

EcoMobility Stations

Subway Entrances
Planning Framework of EcoMobility

ConsumersNext TMP
New Place: Placemaking with Innovative Mobility

PUBLIC SPACE = Parks & Open Space + POPS + EcoMobility Places

Placemaking Typology

Best Practice Examples

Adding 60~90 Reclaimed Places

Montreal

Uxbridge

Charlottetown

Hamilton
Redesigning Places: Transit Station and Public Parking

Transit Station = EcoMobility Hub
Redesigning Places: Transit Station and Public Parking

Transit Station = EcoMobility Hub

Public Parking = EcoMobility Park

Best Practice Examples

- Bikeshare, Rideshare, Delivery
- Carshare & Art
- Shared Private Parking in Private Space
- Shared On-street Drop-off
- Bicycle Parking with Repair Stand
- Park Edge with On-Street
Corner Placemaking with Mid-size EcoMobility Hub
Redesigning Places: Neighbourhood Corners/Gateway

Corner Placemaking with Mid-size EcoMobility Hub

Best Practice Examples

- Traffic Island Reclaimed for Park
- Curb Extended for Bikeshare
- Bike Parking Corners
- Extended Active Corners
- Landscaped Layby for Shared Vehicle

- Micro-Mobility at Building Entrance
- Bikeshare on Layby
- Pedestrian Amenity from Narrower Lanes
- On-street Low-emission Vehicle
- On-street Bike-Corral
Redesigning Places: Private Space on Public Edge

Driveway, Laneway, Setback in Small EcoMobility Hub
Redesigning Places: Private Space on Public Edge

Driveaway, Laneway, Setback in Small EcoMobility Hub

Best Practice Examples

- Smart Transport Display
- Public Bike Repair & Parking in Private Space
- Secured Bike Lockers at Entrance
- Laneway Redesign
- Carshare on Driveway
- Bike shelter on Private Laneway
- Micro-mobility in Setback
- EV Carshare on Building Corner

Reuse of Underground Parking
Tippett + Dufferin + Downsview Area

XX% - Benefits of Transit + Walking + Cycling
(XX%) - Benefits of Shared Mobility

Measured in Percent

* Not Quantified
“Technology without Spirit is Worthless” – Inca Proverb

The human spirit must prevail over technology.

Level-of-Service

People: A+
Economics: A+
Mobility: A+

People: F
Economics: F
Mobility: F
Thank you

Questions & Answers