indicators

The following indicators were derived from the discussions at Workshop 1 and previous indicator research undertaken by the Design Centre for Sustainability and its partner research groups.*

The proposed Mobility Indicators are:

Transit Proximity

Greenway Proximity

Street Network Connectivity

Community Connectivity

Pedestrian and Bicycle Route Connectivity

Transit Supportive Land Use Intensity

Shipping Land Use Intensity

Modal Diversity

Shipping Mode Diversity

Ron Kellett, Sara Fryer & Isabel Budke. 2009 Specification of Indicators and Selection Methodology for a Potential Community Demonstration Project. Report for CMHC/NRCan.

Transit Proximity

mobility

INDICATOR

Transit Proximity reveals the degree to which frequent transit service is located sufficiently close to regional, city and neighbourhood services (regional services being central libraries, full service grocery stores, higher education institutions; city services being banks, restaurants, full service grocery, high schools; and, neighbourhood being elementary schools, corner stores, coffee shops).

DESIGN METRICS

- % of transit stops with regional services (i.e. hospitals, educational institutions, major grocery store) within X metres
- % of transit stops with City-scale services (i.e. bank, restaurant, grocery store, library) within X metres
- % of transit stops with neighbourhood commercial services (i.e. coffee shop, corner store) within X metres
- % of homes within 400m of a frequent transit network
- % of jobs within 400m of a frequent transit network

SUPPORTING STRATEGIES

- Provide housing for higher percent of demographics more reliant on transit (families with children, seniors, lower income families) within 400m of frequent transit networks
- Providde a low average distance between neighbourhood, local, and frequent transit stops
- Pay ahead bus fares; improved maps and transit guides at stops and stations to enhance convenience
- Better integration of land use and transportation planning at the local and regional level, and among Metro, Translink and the Province
- Dedicate 90% of transit service to electrical energy supply by 2020

Greenway Proximity

mobility

INDICATOR

Greenway Proximity reveals the degree to which multi-modal, dedicated bicycle, and greenway routes are sufficiently near frequent transit service. Greenways provide active leisure space, are psychologically restorative, and serve as safer commuting alternatives for non-motorized transportation.

DESIGN METRICS

- % of population within 800m of a greenway or cycling route
- Number of homes within 400 metres of greenways with restorative characteristics (natrual systems and/or naturalized amenities)
- % of schools within 200m of a greenway

SUPPORTING STRATEGIES

Street Network Connectivity

mobility

INDICATOR

Street Network Connectivity reveals the degree to which streets are directly connected to join diverse trip origins and destinations. A highly connected street network throughout the community increases the diversity of trip origins and destinations that can be efficiently linked, and increases the travel route options for local trips. Increasing route options can assist in reducing traffic congestions and travel time.

DESIGN METRICS

- Ratio of local street intersections per hectare per dwelling
- % of arterial street length with segments greater than 125m
- % local streets with segments greater than 60m
- Ratio of local street intersections to local street dead ends
- Average block perimeter

SUPPORTING STRATEGIES

- Improve crosswalks and safety elements of streets

mobility

Community Connectivity

INDICATOR

Community Connectivity reveals the degree to which a street network joins or intersects with adjacent communities' streets. A high number of external community street connections increases the diversity of trip origins and destinations that can be efficiently linked, and increases the travel route options for regional trips. Increasing route options can assist in reducing traffic congestion.

DESIGN METRICS

- Connections to adjacent communities per kilometer of boundary

SUPPORTING STRATEGIES

mobility

Pedestrian and Bicycle Route Connectivity

INDICATOR

Pedestrian and Bicycle Route Connectivity reveals the degree to which a robust network of pedestrians and bicycle routes join trip origins and destinations, such as frequent transit service. A network of well-configured and connected pedestrian routes increases the walkability of a neighbourhood and increases mode options other than the car for local trips. A mode shift from the car to walking or biking reduces transportation energy demand, related greenhouse gas emissions and traffic congestion, as well as the amount of paved land needed for cars.

DESIGN METRICS

- Number of pedestrian oriented feeder systems to frequent transit stop
- Number of intersections with designated crosswalks through streets per hectare
- Number of bicycle route intersections per hectare
- Number of bicycle oriented feeder systems to frequent transit stop

SUPPORTING STRATEGIES

- Improve bicycle crossings, paths and safety elements on streets

mobility

Transit Supportive Land Use Intensity

INDICATOR

Transit Supportive Land Use Intensity reveals the land use density, or dwelling units per hectare, required to support viable transit ridership. If land use densities are below the required transit service threshold, the service will not obtain the ridership required to support the costs of the service.

DESIGN METRICS

- % of developed land meeting the convenient transit threshold

SUPPORTING STRATEGIES

- Provide high transit service intensity with a frequent average transit speed of 45km/hr
- Provide transit service that is on average 10km faster than private travel
- Provide a frequent transit service of 7 to 8 minutes
- Encourage lower energy use for transit options
- Distribute transit service equitable throughout cities and the region
- Improved integration of land use and transportation planning at the local and regional level, and among Metro, Translink and the Province
- Provide high speed service to Hope, Seattle, Bellingham and Portland
- Reduce the carbon footprint of transportation
- Measure the carbon footprint of transit related infrastructure

mobility

Shipping Land Use Intensity

INDICATOR

Shipping Land Use Intensity reveals the intensity of land use associated with and surrounding the Port, that influences transportation and shipping options. A more efficient handling system and space use frees up land for other uses.

DESIGN METRICS

- Annual number of containers handled per hectare

SUPPORTING STRATEGIES

Modal Diversity

mobility

INDICATOR

Modal Diversity reveals the extent to which public right of ways incorporate a diversity of travel modes. The greater the diversity or number of multimodal systems, the greater the travel options a community can provide. Providing efficient and viable options for transit, walking, and cycling on as many routes as possible reduces reliance on cars.

DESIGN METRICS

- Mode diversity index
- % of right of way dedicated to cars
- % of right of way committed to "slow lanes" for mopeds, scooters, segways
- % of site dedicated to pedestrian movement
- % of buildings with dedicated bike storage
- % of non-car based feeder systems to homes
- % of corridors providing multi-modal service
- length of designated pedestrian routes per hectare of developed area
- Length of dedicated bicycle routes per hectare of developed area
- # of bikeway, and pedestrian oriented feeder systems to frequent transit stop
- % of transportation infrastructure allocated to impervious travel or parking surface
- % parking spaces

SUPPORTING STRATEGIES

- Provide transit service that is on average 10km faster than private travel
- Provide 7 to 8 minute frequent transit service intervals
- Employ queuing streets in residential areas
- Minimize municipal public parking facilities

mobility

Shipping Mode Diversity

INDICATOR

Shipping Mode Diversity reveals the extent to which freight is distributed by different modes of travel such as truck, railway or ship. Greater diversity of freight travel modes can increase the options for freight delivery to help reduce the reliance on truck travel and assist in alleviating traffic congestion.

DESIGN METRICS

- km of dedicated truck lanes or railways

SUPPORTING STRATEGIES

- % of containers distributed by modes other than trucking
- % of freight travel on dedicated truck lanes or railways

summary notes

The following summary notes were synthesized from the notes recorded during Workshop 1. The summaries identify themes that assist in describing key issues and developing design-based indicators.

mobility

Mobility Discussion Summary – April 16, 2009

Vision / Goal:

1. Frequent transit network
2. Reallocation of road space
3. Different transportation systems hierarchy:
   a. Transit
   b. Cycling
   c. Roads
   d.Pedestrians
4. Staging change is key (major decisions need to be made by 2020)

The group focused their discussion on indicators and metrics that would help to measure mobility strategies to achieve a future mobility vision for the region. The content of the discussion has been organized under regional, city-wide, neighbourhood and site design-based indicators or metrics. Supporting policies are also identified.

Regional Indicator/Metrics:

- Average frequent transit network speed of ## km/hr (45 km target?) (similar to B-line Express systems)
- Transit routes performance of ## km (10 km target) faster than automobile performance (or auto routes designed to perform ## km slower than transit)
- % of dedicated transit route included in right of way
- Standard service time (7-8 minute target) for regional frequent transit network
- % of rapid transit stops with regional services (i.e. hospitals, educational institutions, major grocery store) within X metres
- % of transit service powered by electricity (target: by 2020 80% to 90% of passenger transit should be powered by electrical grid
- % of buses, transit systems powered by renewable sources and/or generating their own power (solar, wind other?)
- % of freight travel done on dedicated truck lanes or railways
- # km of freight truck travel done on dedicated truck lanes or railways
- # of containers distributed by modes (water ?) other than freight trucks
- Some kind of land use indicator related to Ports and truck use (lots of confusion around what is happening at Ports to address transportation issues--still many questions here)

City-wide Indicator/Metric(s):

- % of corridors providing multi-modal service
- % of right or way dedicated to cars
- % of right of way designed to accommodate for travel use other than cars
- % of right of way committed to "slow lanes" for mopeds, scooters, segways
- % parking spaces
- % of transit stops with City-scale services (i.e. bank, restaurant, grocery store, library) within X metres

- % of schools within X metres of frequent transit service
- % of demographics (families with children, seniors) more reliant on transit service within X metres frequent transit networks
- % of schools where drop off is more than _____ metres (300 or 400 metres?)
- # of greenways with restorative characteristics within _____ metres of homes

Neighbourhood Indicators/Metrics

- % of right or way dedicated to cars
- # of bikeway, and pedestrian oriented feeder systems to frequent transit stop
- % of right of way committed to "slow lanes" for mopeds, scooters, segways
- % of homes within walking distance (400 metres) to frequent transit network
- % of homes within greenway or cycle route catchment (800 metres?)
- % of transit stops with neighbourhood commercial services (i.e. coffee shop, corner store) within X metres
- % of single lane residential streets for cars travel
- % parking spaces
- % road space allocated to impervious surface
- % of non-car based feeder systems to homes
- # of safety elements and/or cross walks through streets

Site Indicator/Metrics

- % of transportation infrastructure allocated to impervious travel or parking surface
- % site dedicated to pedestrian movement
- % parking space for cars occupying a site
- % dedicated bike storage
- % embodied carbon in transit station and system infrastructure

Related Policies:

- Create a 80 to 90% GHG emission reduction target for transportation
- Apply pre-paid bus fare to improve convenience and access
- Better maps and service information at bus stops; better access to service information
- Minimize municipalities' role in providing public parking
- Ensure an electric-based future for transportation energy
- Provide a high speed service to Hope, and south to Seattle, Portand
- Better intergovernmental coordination amongst Translink, local and provincial government.
- Better integrated land use transportation planning amongst municipalities, regional and provincial levels of government

workshop 1 notes

The following un-edited notes were recorded during the Research Roundtable Workshop 1 group discussions.

Mobility Group - Discussion and presentation notes:

Chair: Duncan Cavens
Discussion Assistant: Sara Muir Owen

Participants:
Liliana Quintero, Civil Engineering Student, UBC
Josh van Loon , SCARP PHD Candidate, UBC
Jack Becker, Vancouver Area Cycling Coalition
Maged Senbel, SCARP, UBC
Eric Doherty, BCSEA
Ugo Lachapelle, SCARP, PHD Candidate, UBC
Margaret Mahon, BEST

- Vision for mobility at charrette and hot to measure it
- **What would it look like key**
- Discuss, also congestion
- **Single priority and lane designation for transit /bus**
- Public mobility → plan for urban density model and work paces → need layered network of capacity with freedom ok choice of where to go:
- **Layers of capacity: frequent → local service → also connectivity is key**
- Movement of goods → railways why don't we use this for trucking?
- **Costs of intermodal shipment big improvement**
- Passenger – intermodal depends on trip time
- **Multi-modal with walking and cycling priority separate bikeways**
- Bus fare paid ahead, convenient, map
- **Shift from major infrastructure to more diverse and pedestrian friendly mode – dispersed network that offers choice**
- Layered network with enhanced capacity plus removal of vehicles; radically less vehicles from GHG, space, peak oil and economics, air quality, serious "road diet"
- **Use of space for roads, serious waste**
- Road diet, road infrastructure → and replace ridership
- **Need to re-distribute resources**
- Translink vs. <u>regional and local government designing, independently → disintegration of land use and transportation</u>
- **Adapt land use all over region or follow on special land use hubs**

- Extent of network → need more serious look at future scenario, post-climate change and use of ALR as major employment layer → need to plan for major employment shift in the future with new industry and all sectors of post peak oil world
- **Post peak oil; people will travel smaller distances, more localized**
- Target of mode share that reflects post oil
- **Need to integrate planning and land use, three organizations trying to plan region - Metro, TransLink and Province**

Vision

- Frequent transit network
- **Role for cars, but diminished**
- More hierarchy for transportation systems

- **How fast should the fastest mode be?**
- Needs things up around B-line express ave, speed 45km/hr
- **People generate towards tracks**
- Guideline: Go train vs. freeway;
    - Transit 10 km faster, principle applied at all scales → regional and local
- "Slow lanes" at the localized level – segways, trikes, mopeds

- **Street provide Layers for travel use; break from modes of cars**
- **Role in future for mare high speed service to Seattle, Bellingham, Past, Hope**
- Most interested in what happens to 2020, these will make or break the transportation future
- **Currently transit network being used to increase capacity for cars**
- Transit should be included in roadways
- **Electric based transit future**
- FTRs – 3 minutes, minimum 1, maximum 9
- **7-8 minutes standard FTS, assumes cars are awail (???), fuel is cheap**
- Should change these standards as cars become more expensive? Is it necessary?
- **3-5 minutes, standard of FTS is quite real**

- Studies show 7.5 min, FSN (FTN) is sufficient and, if schedule is reliable can get increased time of service
- **FTN good step forward**
- Poor understanding of trips by transit is lower density areas
- **Feeder systems to a FTN through bikeways, public bikes hare systems.**
- Role of public parking – municipalities should get out of this business
- **Transportation measure must reduce GHG emissions by___?**
- Half as many parking spaces; 30-40% less road space for cars
- **% of homes within walking distance of FTN**
- Reduce carbon footprint of transportation
- **Measurement of carbon footprint of subway**
- How many people live within in cycling areas, catchment
- **Road diet → purpose of street → one lane of traffic, especially on residential streets**
- X% of roadways allocated to new standards /roadway allowance
- **Multi-mode level service increase**
- Accessibility → how to describe street shape along corridor. % of bus stops have café and grocery store within X meteres
- **Transit stops of transfer points provide certain services including local and or regional**
- **___% of road space allocated to impervious (or pervious) surface**
- Relate indicators to demographics → # of children vs. adults in area, or all schools with FTS
- **Number of school where you can't drop off child within 300 or 400 metres**
- # of feeder systems to homes that are not car based
- **# of safety elements of crosswalks through streets**
- # of greenways with characteristics of restorative network → escape of noise, traffic, ease of crossing, arterials, etc. Could include slow-modes i.e. electric mobility scoters
- **Cycling includes in-line skating, other modes…**
- Mode of power of transit system → % amount of electrical

- **20/20 time frame, 80-90% of passenger transit should be overhead electrical grid**
- What about link to wind, solar, other "E" sources? Buses generating their own power.

- GDP peak already happened?
- **Indicators on freight:**
  - **Trucking destination bound → % of travel done on dedicated truck lanes**
  - **X km of truck distance on lanes or railway lines**
- Opportunity to move more goods through high efficiency either land or water
- **Indicators at break service, at the port → confusion over what's happening at ports.**
- Need a lot more containers not to travel by truck → implies industry distribution on water
- **Land use indicator related to port, truck use, etc.**

Mobility Vision

1. Frequent transit network
2. **Reallocation of road space**
3. Different transportation systems hierarchy:
   a. Transit
   b. Cycling
   c. Roads
   d. Pedestrians
4. **Staging change is key**