Infrastructure for Health

“the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.” (WHO, 2017)
$$\$, to scale

$100$

\[ \frac{1}{2} " \]

$10,000$
$$ $$, to scale

$100,000

$1 Million
$\text{\$ \$\$}, \text{ to scale}

$100 \text{ Million}$

$1 \text{ Billion}$
$1 Trillion, to scale
2015 U.S. Healthcare Expenditure

$3.2 Trillion

$10,348 per American
2015 U.S. Healthcare Expenditure

MONEY WELL SPENT?
The United States has not seen an increase in life expectancy to match its huge outlay on health care.

UNITED STATES
Health-care spending accounts for about 17% of US GDP
In 2015, the United States spent 17.8% of GDP on healthcare. That’s 3.2 trillion dollars (Centers for Disease Control and Prevention). At best, this massive investment lead to a 20% improvement in health outcomes. Environmental, behavioral and socio-political factors account for 80% of health outcomes. The consensus in public health is that:

“Building a healthier America will hinge largely on what we do outside of the healthcare system.”
(Robert Wood Johnson Foundation)

We can leverage healthcare spending to build more equitable cities with greater opportunities for physical activity, healthy food and community life. Investing in healthy cities also addresses underlying socioeconomic barriers to health: access to affordable housing, education and good jobs.

Rise of Lifestyle Diseases

7/10
Communicable Diseases
- Polio
- Measles
- Whooping Cough
- Malaria

3/10
Chronic Diseases
- Asthma
- Heart Disease
- Type 2 Diabetes
- Cancers
- Stroke
- Obesity
- Arthritis

Projected main causes of death, worldwide, all ages,
- Cardiovascular diseases 30%
- Other chronic diseases 9%
- Diabetes 2%
- Chronic respiratory diseases 7%
- Injuries 9%
- Cancer 13%

Total deaths 2005: 58 million

Source: https://mpkb.org/home/pathogenesis/epidemiology
West Bellevue residents live 10 years longer than those in South Auburn, WA
Infrastructure for Health

“the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.” (WHO, 2017)
Fewer than 4% of Americans walk or bike.

We can change that.
Physical inactivity is the 4th leading risk factor in global mortality
WHY FOCUS ON PEOPLE
Mobility for Health

Streets are anywhere between 25-35% of a City’s land area.
What could this look like?
Planning for Health

HEALTH
- Active Aging
- Open Space
- Livability
- Sense of Play
- Quality of Life

ECONOMY
- Mobility
- Connectivity
- Attraction + Retention
- Education

ENVIRONMENT
- Air Quality
- Tree Canopy
- Water Quality

EQUITY
- Prioritizing People
- Culture
- Multi-Generational
- Access
90% of air pollution in cities is attributable to Traffic.
Streets account for 70% of city-owned open space.
Environment

A short walk improves creative problem solving by 50% and short term memory by 20%
Economic Benefits

200%+ investment return for sidewalks for health & air quality vs. sidewalk installation costs

$1,800 yearly health benefit for drivers who switch to cycling over a 3-mile commute
Economic Benefits

Investing in better streets provides $11.80 per $1

65% Pedestrians spend more $$$ than drivers
Social Benefits + Safety

+3.1 more friends per person

on streets w/ 2,000 daily cars vs 16,000 daily trips
Health Benefits

Physical activity has declined 32% in the past 45 years in the US...

-22% reduction in early death via 15 min daily exercise
Health Benefits

Obesity rates drop 4.8% for every \( \frac{3}{4} \) mile walked, on average, a day.
So what do we do?
How do we Thrive?
So what do we do?

What do we Retrofit?
Planning for Health
Return of Great Streets

- Roadway: 20’
- Trees: 6’
- Pedestrian ROW: 30’
- Café: 8’
- Trees: 6’
- Roadway: 20’
- Sidewalk: 8’

Café: 8%
Sidewalk: 15%
Pedestrian Row: 28%
Trees: 11%
Road: 38%
How?

1. Visualize VALUE;

2. Think CORRIDORS, instead of ‘stations’;

3. Think COMMUNITY, instead of ‘transportation’;

4. Think PARTNER, instead of ‘competitor’; and

5. Think CHAMPIONS, instead of ‘stakeholders’.
A Focus on Corridors
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A Focus on Corridors
How?

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public realm transformation
human and environmental health and well-being

“...safely connect people to places, things, and experiences they care about...” Cruise
The car doesn’t need to see anything . . . anymore and . . . they are quiet, safe, and don’t smell
A new “sense” of place

1. taste  
   Urban ag

2. hear  
   65db to 45db

3. see

4. smell  
   fresh air

5. touch  
   clean water

6. feel  
   cooler environment
Building Community

- Vitamin D
- Eye health
- Improved sleep
- Clean air
- More energy
- Nature
- Psychological health

get outside

- healthy immune system + serotonin
- nearsightedness + vision
- circadian environment
- Increase your attention span
- Connect to nature not caffeine
- Boost your immune system
- Feel happier
The Central City Streetcar

Streetcars are convenient, integrate with everyday street life, and respect the human scale of the city. A streetcar system:

- will not require separation from automobile traffic
- will not disrupt existing on-street parking
- will not require special platforms
- will be non-polluting

will reduce short-distance automobile travel, which accounts for 2/3 of all auto travel. Short-distance trips typically occur on urban streets and are 8 miles or less in length

will utilize existing technology that has worldwide acceptance
Water Runs from High Points to Low

Seattle on Yoda

Every year, millions of gallons of dirty stormwater runoff from Capitol Hill are piped through the Cascade neighborhood and flow into Lake Union, adding pollution to the lake with oil, heavy metals, and bacteria.

The Swale on Yoda will help to clean 150 million gallons of that stormwater annually. It will be tested into a stormwater outlet in the Cascade neighborhood. It is the first such swale in the United States located in a dense urban area.

Vegetation Naturally Cleanses Stormwater

Particulates and pollutants in stormwater runoff will be removed through planted channelled “bio swales.”

Where is it?

Seattle, South Lake Union and Cascade Neighborhood

Problem:

Stormwater from Capitol Hill flows across streets and surfaces collecting pollutants as it heads into Lake Union. Typical stormwater treatment facilities built to remove such pollutants are expensive and visually unappealing.

Solution:

Stormwater is directed through a vegetated filter called a biofiltration swale, or bio swale. As stormwater flows through the swale, solids settle out. From in the swale acts as a natural filter to help remove contaminants in the water. Seattle Public Utilities (SPU) has had a long history of biofiltration projects, as part of a new development in the Cascade neighborhood that will naturally clean 150 million gallons of stormwater every year, removing an estimated 2.1 tons (19 cubic yards) of sediment and pollutants from the stormwater annually.

How does it work?

Understanding the Swale

Low Water Velocity

Combined with Thin-Stemmed Plants - Allow Pollutants to Settle Out of the Stormwater

Swale Facts

From each system is a dense urban area

Annually, the swales clean 150 million gallons of runoff.

Annually, the swales treat 150 acres

Annually, the swales remove 2.1 tons (19 cubic yards)

More sustainable and cheaper to build with maintenance in an additional facility

Typical Swale Removal Rates

Pollutant        Removal Rate
Sediment          80-100%
Pollutants         30%
E. coli            25%
TSS                10-20%
What if
... air was fresh and good for your immune system? phytoncides
... the street wasn’t a heat-sink, but lush, shaded, soft and comfortable?
... it was quiet and conversations where easily heard? 45db
... streets were dimmer, cars don’t need light, a circadian city for humans and wildlife?
... streets and blocks cleaned water?

forest bathing
What if

... asphalt was reduced and pavement was permeable?
... the street felt like front porch and yard that the AV passes through?
... nature moved in and song birds replace sirens and honking?
... cleaning stormwater was an amenity?
AUTONOMOUS VEHICLE STUDY
What if

... the street catered to walkers, runners, and bicycles?
... kids could play in the street again? risk and scaffolding play
... streets contributed to a decrease in diabetes, lower blood pressure?
... streets contributed to an increase in physical and mental well-being?
What if the street was home to climbing walls, boccie ball, and other physical games? Streets could accommodated the expansion of building activities outdoors? Streets contributed to the reduction of a 70% obesity rate for adults and children saving an estimated 150 billion dollars in health care per year and billions more in lost worker productivity?
AUTONOMOUS VEHICLE STUDY
What if 
... retail and commerce replaced parked cars and car lanes?
... outdoor seating for restaurants in a fresh air and quiet environment was plentiful?
... if there were as many people outside as inside and streets felt safe?
universal street
Omotesando Tokyo Japan
What if
... retail and commerce replaced parked cars and car lanes?
... outdoor seating for restaurants in a fresh air and quiet environment was plentiful?
... if there were as many people outside as inside and streets felt safe?
What if there were new ways to capture revenue?

INVESTMENT DEVELOPMENT REVENUE

- quality of street materials/environment
- social equity/entrepreneur
- business incubation
- stormwater infrastructure
- affordable housing funds

…and more.

1 to 100 year leases
fixed-non fixed elements
temporary/permanent structure

20’ - 26’…

commerce + culture
“Toes in the Water”
Autonomous Vehicles
“toes in the water” projects

1. subdistrict showcase
2. connective campus
3. a bigger event
4. shopping center city
5. Ferry and forest
6. singles should mingle
7. driven to nature
Sub-district Showcase

What if a mixed-use project within a district connected to nearby transit by AV with exceptional public realm + street environments?

- Early AV infrastructure as an amenity and showcase
- Benchmark with WELL + Living Community, ULI Healthy Places Leed ND + other protocols
- Connect a catalytic district enhancing livability and activity
What if a campus loop connected the campus core to significant transit connections and parking located or built away from the campus core?

- Use AV networks to create safe and world class pedestrian streets and public realm environments
- Consider “town and gown” loops for campuses, neighborhoods, and larger transit connections
- Pursue flexibility to adapt to connective relationships between housing, academic, sports and other institutional and cultural elements of campuses
How can AV enhance and extend fan and community experience during large sporting and entertainment events and give back during the non-event period?

“The timing of this Milo technology could not be better,” said Rob Matwick, executive vice president of business operations for the Texas Rangers. “To be able to give our fans the opportunity to experience this innovative technology and give them the convenience to deliver them close to the ballpark or AT&T Stadium is outstanding. We are all about customer service and making memories here at the ballpark.”
What if we extended mall concourses into an integrated AV and pedestrian network connecting mixed-use and connected to regional transit?

What if “brands” become co-investors and community builders?
TargetPlay [parks] or NikeRun [trails]
What if AVs connected low and medium density environments to existing or emerging TODs?

- What if AV supported aging in place connecting people to pharmacies, grocery, dining and entertainment
- What if the frequency and presence of AV could eliminate the need to build park and ride garages in an effort to increase density and activity and enhance nodes of 20 minute living.
What if AV loops connected new denser mixed-use environments minimizing sprawl, ferry terminal surface parking and other ferry infrastructure?

- What are the public private opportunities for co-investment?
- What if AV ferry boarding was prioritized and less costly for riders?
- What if FOD development provided commuter connectivity and off commute connectivity to main streets and town centers?
driven to nature

How can AV help protect our national parks from the noise, light and air pollution of combustible engine cars minimizing the impact and cost of infrastructure upkeep and diminishing budgets?
Jerome Unterreiner  jerome.unterreiner@hok.com
A Rae Smith       rae.smith@hok.com
Dylan Morgan      dylan.morgan@place.la
Sterling Rung     sterling.rung@place.la

Thank you