# Healthy Communities:







### **GETTING CONNECTED**

Why connectivity is important and how to improve it

# 20%

school-aged children (ages 6–19) has obesity



## Comparison of the Usual Travel Mode to School for K-8<sup>th</sup> Grade Students, 1969 and 2009



Source: National Center for Safe Routes to School

## Comparison of Walk/Bike to School for K-8<sup>th</sup> Grade Students, 1969 and 2009



Source: National Center for Safe Routes to School

#### Across the state, people want to...

70% 58% 46%

walk more

bike more

take transit more





#### Utahns want better accessibility...

#### 

# 

23% Improving how convenient it is to get around without a car 22%

Limiting traffic congestion

18%

Making sure daily services and amenities are close to where people live



#### Utahns want their destinations close...





### And this is a priority...

A top transportation priority should be to improve the connectivity of streets and sidewalks for shorter distance trips







**Source**: Determinants of Health and Their Contribution to Premature Death, JAMA 1993, via Tyler Norris, Kaiser Permanente.



#### What can we do about it?

#### Provide infrastructure







## But infrastructure is only part of the answer





#### Street networks matter, connectivity matters





## What is street connectivity?



(A) Conventional suburban hierarchical network.



(B) Traditional urban connected network.

» Connectivity is...multiple routes and connections serving the same origins and destinations...An area with high connectivity has multiple points of access around its perimeter as well as a dense system of parallel routes and cross-connections within the area.

> Jim Daisa Metro Regional Street Design Study





## Why improve connectivity?

#### Why Improve Connectivity?

Connected streets led to more walking



of students in Daybreak walk to school



Of students in similar, less walkable neighborhoods walk to school





**Source**: Napier, Melissa, et al. "Walking to School: Community design and child and parent barriers." Journal of Environmental Psychology, March 2011.



Source: Utah Street Connectivity Guide

#### **Utah Street Connectivity Guide**



- » Define benefits of street connectivity
- » Inform decision makers
- » Provide guidelines for implementation





#### **Case Studies**











Benefits



### Street connectivity benefits

#### In all areas, improving the connectivity improved traffic mobility:

	Lehi	Layton	Tooele Valley
Delay	-24%	-4%	-18%
Travel time	-13%	-9%	Small increase

Compared connectivity scenario to a widening scenario:

- Widening attracted more traffic on major streets.
- **Connectivity** scenario **distributed traffic better** reduced VMTs on major streets by up to 10 percent.
- Connectivity scenario reduced delay as well as or better than widening scenario.
- Connectivity scenario created more overall network capacity generally 10 to 13 percent over base scenario





## How does this improve walking, biking, and health?

## Estimate active transportation benefits - Lehi

•

	Existing	Future mid-level estimate	Difference
Bicycle commute mode share	0.25%	1.75%	+1.5%
Walk commute mode share	0.85%	4.46%	+3.61%
Hours of physical activity	319,000	844,000	+525,000
Residents who met recommended physical activity	4.72%	12.49%	+7.77%
Healthcare cost savings	\$60,000	\$338,000	+\$278,000





How can we improve connectivity?

#### Get out there – walk and ride!



#### One size does NOT fit all







#### How can we improve connectivity?

- » Metrics
- » Plans & policies
- » Street & development standards
- » Retrofit tools





### Metrics, plans, & policies

- » Assess where you are:
  - » Connectivity index the relative level of connection
  - » Intersection density network density
  - » Travel sheds ability to connect to specific destinations
  - » Walk shed/pedestrian gaps accommodation of most vulnerable users





#### Street & development standards

#### Section 37.050. Connectivity Standards

A. Purpose. These standards are intended to create a connected transportation system between neighbor-hoods and commercial areas within the City. The specific purposes of this Section include:

- 1. Promoting walkability through additional connections and shorter block lengths.
- 2. Improving emergency response time.
- 3. Increasing effectiveness of delivery access.

4. Providing better routes to schools and parks.

5. Reducing impacts of development on Master Planned arterial and collector roads by providing alternative route

6. Preventing isolated developments that increase dependency on automobiles

#### B. Definitions.

1. Block Length - The distance along any giv en road frontage between two intersections with 3 or more connecting links (see Figure 25). Links that connect into a cul-de-sac shall not be considered the termination point of a block length.



2. Chicane - An extension of a curb typicall on a local street to provide an element of traffic calming

3. Connectivity Index - A ratio of roadway

#### links and nodes that serves as a metric for measuring the level of connectivity

4. Cul-de-sac Length - The distance from the street intersection to the throat of the cul-de-sac bulb (see Figure 26).



5 Ourb Extension - An extension of a curb in a roadway to narrow the road at pedestrian crossings to provide additional safety for pedestrians and serves as a traffic calming measure.

6. Links - Streets that connect to nodes or external streets not included in the proposed development.

1. The circulation plan must address street

connectivity, pedestrian circulation, emergency

access, and parking movements. In cases where

cut-through traffic is likely, traffic calming measures such as curb extensions, chicanes,

raised crossings, or other features may be re-

2. The circulation plan shall show the connec-

re 26. Example of cul-de-sac length

cation.

quired

Figure 27. Example connectively index calculation showing nodes and links. This example shows 23 links and 13 nodes which 7. Node - Street intersection or cul-de-sac lo-cated within a proposed development. A street intersection exists where two or more named 1. For the purposes of calculating the number roads intersect

of total links, one link beyond each node shall be included in the connectivity index calculation. C. <u>Circulation Plan</u> A circulation plan shall be pro-vided as part of a preliminary subdivision plat appli-Street stubs that provide future access to adjacent properties or streets that connect to existing streets are considered links.

> 2. An additional 1/2 link shall be included in the connectivity index calculation for each of the following: (a) Hard surface pedestrian connection

(a) Fraid surface pedestrial connection through a cul-de-sac with a minimum width of ten (10) feet including an additional two (2) foot soft shoulder on each side (see Fig ure 28); (b) Hard surface master planned trail con

ry index of 1.73

locations if it will increase the connectivity with-

4. A circulation plan will be required for pro posed developments with more than one acre in

in an adjacent property.

tivity index, block length dimensions, cul-de-sac length dimensions, pedestrian facilities, and any proposed traffic calming features. nection with a minimum width of (10) feet including an additional two (2) foot soft shoulder on each side (see Figure 29); (c) Internal hard surface trail segment con 3. The circulation plan must take into account necting two roads with a minimum width of ten (10) feet including an additional two (2) foot soft shoulder on each side (see figure

access and connectivity on adjacent parcels. On a case-by-case basis the Planning Director and City Engineer may require changes to stub road





E. Residential Connectivity Standards. All new residential subdivisions with ten (10) or more units or more than one acre shall meet the following connec-tivity index, block length, and cul-de-sac length standards for public roads. Private roads shall be reviewed on a case-by-case basis: however, a public road may be required to prevent a private road in a subdivision from stubbing into a future or existing public road.

> 1. Required Connectivity Index. The minimum required connectivity index shall be required based on the project density as identified in the



PUTCHE 1900 N. PUBLICHING



# Connecting stub streets





#### Retrofits



#### DIVIDING LARGER BLOCKS

Figure 4.4-1 | Sugar House Business District Circulation Plan





Source: Lehi City and Sugar House Business District Circulation Plan

## Cul-de-sac flashpoint





#### Cul-de-sac flashpoint





#### Cul-de-sac connections





## Pedestrian links between developments





#### Get connected!

- » Connectivity provides multiple wins
- » The Utah Street Connectivity Guide can help
- » It's never too late!








### http://wfrc.org/studies/utah-street-connectivity/

For more information, contact: Julie Bjornstad julieb@wfrc.org

## DRAPER CITY TRAILS AND OPEN SPACE



- Open Space Land Acquisitions
- Open Space Master Plan
- Infrastructure
- Public Education
- City Staff
- Volunteers









## **Open Space Acquisitions**

4,600 acres of city owned open space along Traverse Range (Point of the Mountain to Corner Canyon)

- 2005 Corner Canyon Purchase (\$13.6 M) 1,021 acres
  - Citizen Bond Election (passed at 59%)
  - Partnership between Draper City, Salt Lake County, and State
- 2009 Little Valley Purchase (\$2.75 M)– 142 acres
  - Partnership between Draper City and Salt Lake County
- 2012 Suncrest Open Space Purchase (\$5.6 M) 2,400 acres
  - City purchased land from Zion's Bank after development bankruptcy
- Various Open Space Parcels Deeded with Development







## **Open Space** Master Plan











#### Guiding Initiatives



Phasing. Discourage recreation access in new areas until facility and resource conditions are improved. Phase improvements based on the availability of funding and community desires.

USFS Partnership. Continue to partner with US Forest Service to create and maintain a wide range of passive recreation access points that are compatible with protection of natural and cultural resource objectives. Work with the US Forest Service to identify, construct, and maintain new potential access points.

Launch and Landing Areas. Provide additional designated launch and landing area(s) for hang gliding and paragliding.

Commercial Uses and Large Special Events. Support appropriate events/ activities that increase awareness and support of the open space. Manage commercial uses and special events to reduce impacts on departmental resources, liabilities and/or visitor expectations.

Revenue Generating Uses. Consider appropriate commercial uses (e.g. any permanent/seasonal activity and/or facility) that could be a long-term revenue generating source occurring on the Draper open space consistent with Table 6.

Plan for Universal Access. Becognize that all users are only temporarily "able-bodied". Whether born with a disability, too young, too old, injured, or caring for someone with impairments, at some point the outdoors will be less accessible to users without universally accessible services and facilities. The open space system should be developed to reasonably accommodate people with disabilities. Implement infrastructure and service improvements through a universal access philosophy aimed at removing barriers by providing gentle grades for parking areas, picnic facilities, buildings, restrooms and walkways that connect facilities.

Management Strategies Large Special Events/Commercial Use Management, Concessionaire Management, Universal Design Approach Staffing:

To be determined based on potential new agreements and uses.

#### EAGLE RIDGE

#### RECREATION

**OPPORTUNITIES**  Future South Maple Hollow regional trailhoud at twest end of Brockside Drite (with tonter, electric, and sever), restrooms, shelter, picnic tables. Future Off-Street Parking with potential for event/nace

staging. On-street Parking (200 spaces) on Brookside Driv

- Dog Off Leash Area, with expansion up to 100 acres. Controlled access. Consider feasibility of an
- actes, controlet access. Contain fundatory of an annual pass to recover management cests. Expand existing Eigle Ridge Traiband to north Primary traibead to serve off-leash dog area Neighborhood Access Points
- Disc Golf Course Disc Golf Course Dearthill Mountain Bile Course Maple Holiote Trail realignment and use
- restablishment
- Zip Lines (pending business feasibility study)
  Ropes Course, (pending business feasibility study)
  Improved trail crossing of Souccest Drive

Legend

Management Zones C Existing Trails Frontcountry 11 Existing Trailhead Backcountr N Rest upper City Limits





Zip Line

## Open Space Master Plan User Specific Trails



Through a public process, city staff and the committee developed the following:

- Need Multi-Use Trails for linkages and loops (BST, Ann's Trails, Eagle Crest)
- Provides loops for different user groups
- No downhill bike travel benefits all users, including bikers

## Open Space Master Plan User Specific Trails

TRAIL TYPE MIX & AMOUNT RECOMMENDATIONS								
December 2016	Actual				Recommendation			
	2006		2016 (Current)		2018 (2-yr plan)		2025 (Master Plan)	
	Approx.		Approx.		Approx.		Approx.	
Trail Type	Miles	%	Miles	%	Miles	%	Miles	%
Multi-use	32	100%	45	82%	51	74%	45	45%
Equestrian/Hiking/								
Uphill Bike	0	0%	2	4%	4	5%	20	20%
Equestrian/Hiking/								
Nature Path	0	0%	2	4%	6	9%	15	15%
Mountain Bike Only								
(Downhill single								
direction)	0	0%	6	11%	8	12%	20	20%
Total Miles/Percent	32	100%	55	100%	69	100%	100	100%
	2006		4% 2016		2018		2025	
		%		82%	12% 9% 5%	74%	20% 15% 20%	45%

## Little Valley Instructional Trails

### **TRAILS**

#### Main Trail (Beginner) -

A 0.2 mile, double track, two-way multi-use trail that leads you to the top of the other instructional trails. This wide trail can be used in both directions to help first time riders become more comfortable before using the more narrow trails.

#### A Line Trail (Beginner) -

A 0.2 mile, wide, one-way (down hill traffic only), bike only trail. This flow-type trail has some smaller humps and wide turns.

#### B Line Trail (Intermediate) -

A 0.2 mile, single track, one-way (down hill traffic only), bike only trail. This flow-type trail has larger humps and tighter turns than the A Line Trail. The last segment of the trail combines with the A Line Trail.

#### C Line Trail (Intermediate) -

A 0.4 mile, single track, two-way, multi-use trail that is typical of many machine built trails in the area. This trail incorporates different switch back styles, and bridge crossings.

#### D Line Trail (Intermediate) -

A 0.2 mile, single track, two-way, multi-use trail that is typical of many hand built trails in the area. This trail width is more narrow than the C Line Trail.

#### Technical Trail (coming in 2018)



## Little Valley Instructional Trails





- Public Education
  - Online video <u>https://www.youtube.com/watch?v=W-</u> <u>FtYo KAbl</u>
     Trail User Responsibilities
  - Education pamphlet
  - Trail Ambassador Program







- City Staff
  - Trails and Open Space Division
    - 2 Full-time Employees & 3-4 Seasonal Employees
    - Trained in trail design and open space management





#### Trail Dozer Video





- City Staff
  - Park Ranger









## VOLUNTEERS Parks and Trails Committee



- VOLUNTEER LABOR & FUNDING
  - Volunteer Labor (4,000 to 5,000 hours/year)
    - City staff member assigned to oversee volunteers
  - Corner Canyon Trails Foundation
    - Funded over half of new trails past year
  - Partnerships w/ Groups/Business/Agencies
    - Healthy Draper Little Valley Instructional Trails Ralph Wadsworth - Bear Canyon Suspension Bridge





Switchback Shindig \$35 Dinner/Fundraiser October 6th, 2017 6:00pm Noah's South Jordan CornerCanyonTrails.com









## **Building Healthy Communities**

Shawn Seager, Director of Regional Planning Mountainland Association of Governments



### **Trail User Counts – Utah County**

Annual Trips: 2,189,598

Daily Average: 5,164

Highest Month: June = 252,817



Lowest Month: January = 49,998

### **Trail User Counts – Utah County**

Annual Trips: 2,189,598

Daily Average: 5,164

Highest Month: June = 252,817

Lowest Month: January = 49,998



## **Trail User Survey Results**

- 54% are over 45 years
- 89% visit 3 or more times per week
- Even split between male and female
- Use for commute (19%) and for recreation (77%)

Proximity is key:

86% live within 1 mile of trail

## Life Enhancing



## Next Up:

- Bridge at Provo Intermodal Center (TIGER)
- Bridge over SR 92 (TIGER)
- Provo River Trail Gap

### Provo Pedestrian Bridge (\$4.3 m)





## SR 92 Pedestrian Bridge (\$5.3 m)











Healthy physical activity near North Temple: Design realities and possibilities

Wasatch Choice 2050 and Mayor's Metro Solutions 1/23/18, Salt Lake City

### Barbara B. Brown

The MAPS (*Moving Across Places Study*) team: Ken Smith, Carol Werner, Wyatt Jensen, Calvin Tribby, et al.

Funding: Research reported in this publication was supported (in part) by grant number CA157509 from the National Cancer Institute at the National Institutes of Health and the Robert Wood Johnson Foundation.

### Bad news: Insufficient physical activity can be deadly

- Puts you at greater risk for
  - Type 2 diabetes
  - Cardiovascular disease
  - Some cancers, especially colon & breast
  - Sleep apnea
  - Mental health risks
  - Bone health risks
  - Early death

Lee et al., 2012, The Lancet

### Good news: Gym membership not required

- Physical activity public health goals are clear
  - 150 minutes (2.5 hrs) per week
  - Moderately intense physical active
  - In "bouts" of activity  $\geq$  10 minutes at a time
- What % of adults do you guess achieves this?

# % in U.S. who say they achieve 150 min./wk of physical activity in 10-min bouts (BRFSS 2005)



Kruger et al. MMWR 2007;56(46):1209-1212 from Pate 2008

% in U.S. who achieve 150 min./wk of physical activity in 10-min bouts using objective measures (NHANES data)



Troiano et al. Med Sci Sports Exerc 2008;40(1):181-188

## Back to good news: Just walking more would improve health

- Walking is a moderate intensity activity (3 "METS" or metabolic units)
- About a normal walking pace in healthy adults
  - About 2.7-3.1 mph (Rowe et al, 2013; Ainsworth et al., 2011)
- Walking = the most popular physical activity in U.S.

(Simpson et al., 2003)

### But we designed the U.S. for cars, not active travel



**Figure 2** — Obesity (BMI  $\ge$  30 kg · m<sup>-2</sup>) prevalence and rates of active transportation (defined as the combined percentage of trips taken by walking, bicycling, and public transit) in countries of Europe, North America, and Australia. BMI was computed from self-reported height and weight. Data were obtained from national surveys of travel behavior and health indicators conducted between 1994 and 2006 (see text for details).
# Do "Complete Street" interventions support healthier physical activity?

 Reconceptualize roads as places for pedestrians & cyclists—as well as cars



## Complete Street policies booming in popularity

Policy adoptions:

- By 33 states
- >1200 policies (2015)

#### But

- Implementation is still a work-in-progress
- Evaluation for health benefits is rare





Complete Streets Policies

- RESOLUTION
- POLICY
- LAWS/ORDINANCES
- PLAN
- DESIGN MANUALS/GUIDES
- INTERNAL POLICY/EXECUTIVE ORD...

We test whether N. Temple Complete Streets makeover + TRAX supports physical activity

- Emphasis on transit riders because each transit trip involves 4 walks
- We counted
  - People at N. Temple transit stops
  - People along N. Temple sidewalks
  - Nearby residents who used TRAX, parks, & rec centers
- Also measured psychological orientations that predict transit ridership





### Before & after Complete Street makeover



- No TRAX light rail
  - No bike lane
- Narrow sidewalk
- 3 lanes, each direction
- No pedestrian lighting
- Overhead power lines



- TRAX light rail
  - Bike lane
- Wide sidewalk
- 2 lanes, each direction
  - Landscaping
  - Pedestrian lights
- No overhead power lines

### Travel patterns measured by GPS data loggers & accelerometers



Wearable GPS GlobalSat DG-100



Activity Monitor Actigraph GT3X+

Worn together for a week





#### Procedures: sampling & data collection





- Adults living near (<1km) and far (1-2 km) from N. Temple sampled
- Visited at home
  - Surveys given
  - Height & weight measured
- Before & after TRAX started (2012 & 2013)
- 536 adult residents with data both times





## Does Complete Street $\rightarrow$ more transit users? Yes

• 677% more

people waiting for transit in 2013 (bus & TRAX) than 2012 (bus only)

(Werner et al., 2016)





Does Complete Street → more pedestrians overall? Yes

- We counted changes in all street users, not just those at transit stops
- Users of the Complete Street increased from 2011 to 2013 & 2015, especially for blocks:
  - In the less urban (western) section
  - On weekends

Weekday

Weekend



# Our objective physical activity measure = accelerometer "counts per minute" (CPM)



- CPMs relate to weight
- Compared to healthy weight people:
  - Overweight get 12 CPM less
  - Obese get 57 CPM less 287 CPM (Tudor-Locke, 2010)



# Transit use changes & activity changes: Mean change over time (unadjusted)



\**p*<.05 Effect contrasts significant, controlling for age, female, Hispanic, college grad, married, self-reported health, days between measures, temperature differences (Brown et al., PMR, 2017)

#### Park use changes & activity changes: Mean change over time



\**p*<.05 Effect contrasts significant, controlling for age, female, college grad, time1 wear time & accelerometer counts, & changes in employment, temperature, health, automotive time, days between measures, and wear time (Brown et al., PMR, 2017)

# Recreation center use changes & activity changes: Mean change over time



\**p*<.05 Effect contrasts significant, controlling for age, female, college grad, time1 wear time & accelerometer counts, & changes in employment, temperature, health, automotive time, days between measures, and wear time (Brown et al., PMR, 2017)

Psychological orientations predict ridership: Transit riders are neighborhood optimists

- Greater place attachment
  - Neighborhood pride & sense of belonging
- More positive city & TRAX attitudes
  - TRAX makes me eager to go downtown, live near TRAX, learn about places near TRAX, and generally like SLC more (Brown et al., JEP, 2016)
- Among those expecting to use TRAX, actual users had more optimism about
  - TRAX economic boosts: Housing improvements/values
  - TRAX neighborhood boosts: Sense of community/reputation (Brown et al, T, 2017)

### In sum, TRAX is more than just transportation

- TRAX use reflects neighborhood optimism
- TRAX supports healthy activity—objectively measured
  - U.S. adults need every opportunity for moderate walking
- TRAX activity gains comparable to park & rec center use
  - But serves a different subset of people, making it more important to provide that activity opportunity



### Complete Streets can be encouraged for health reasons

- We planned & built it
- Residents use it
- And gain "stealth health"
- Can we think of designs & policies to transform more residents into "neighborhood optimist riders?"
- Cities might want to employ place-attached residents as "transit ambassadors"

Before:



After:



Can we brainstorm more ways to promote ridership?

- Prioritize transit riders by design & development
- Promote designs & policies that encourage pride in place
- Involve residents
  & highlight
  positive changes
  to the
  neighborhood



Paris bookstall/ phone recharge bus stop

Montreal's musical swings at transit stop



## **Questions?**

