URBAN DESIGN 4 HEALTH

2019-2020 San Joaquin County Health Outcome Update & Small Area Focus Studies

Executive Summary

Master Contract & Task Order #:

- C-18-019, TO#3

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SAN JOAQUIN COUNCIL OF GOVERNMENTS

About this Report

Urban Design 4 Health, Inc. (UD4H) prepared this report. UD4H's mission is to support clients with innovative and objective information and tools to achieve the health, environmental, economic, and quality of life goals that are intrinsic in efforts to build new communities and to retrofit existing ones. Learn more at www.ud4h.com.

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Eric Fox served as the Project Manager for this study. Eric Fox identified and organized the methodological procedures used, completed data analysis, and was the lead author for this report. Jim Chapman contributed to methodology development, project design, and assisted with the writing of this report. Dr. William Bachman led health outcome model development and calibration. Dr. Larry Frank reviewed the analysis approach and provided critical input and feedback.

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This work builds on the original health equity study (C-18-019, #1) completed for SJCOG by UD4H in 2017-2018. UD4H acknowledges Nicole Iroz-Elardo, Principal, UD4H (currently at the University of Arizona, School of Landscape Architecture and Planning) who led the 2017-2018 study, and Jessica Schoner, Lead Analyst & Project Manager, UD4H (currently at Toole Design Group) who managed the National Public Health Assessment Model (NPHAM) version 1.0 analysis for the original study.

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1 Introduction

A growing body of evidence suggests that transportation and land use investments and policies can have broad-reaching implications for population health, access to economic opportunities, and climate change.[1-6] Transportation systems link people with social and health-promoting resources, such as employment, education, food, recreation, social services, and health care.[7-10] Transportation systems influence healthy behaviors such as walking and biking. The resulting health outcomes from increases in physical activity for both utilitarian and leisure transportation are well documented.[11]

In a 2018 pilot study, Urban Design 4 Health applied its National Public Health Assessment Model (NPHAM) tool (developed with support from the US Environmental Protection Agency) to San Joaquin County. NPHAM used natural and social environment metrics as inputs to estimate current conditions of public health (e.g. physical activity levels and health outcomes).[1] Health outcomes were generated for three alternative scenarios (Scenario 1, 2, and 3) that were developed by SJCOG for the 2018 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) implementation efforts.[2]

In 2019, an enhanced version of NPHAM (v. 2.0) with additional health outcomes was used to update health outcome estimates for the county. NPHAM was applied to the baseline (2015) and the alternative scenario (Scenario 2A) that was adopted for the 2018 RTP. The analysis results were prepared in the separate report: *Regional Physical Activity & Health Outcome Update for San Joaquin County*.[3]

NPHAM v. 2.0 was also used to analyze the South Stockton Promise Zone (SSPZ) subarea in the City of Stockton, with a focus on three subareas within it. The NPHAM tool was used to calculate updated health outcomes for the baseline and two new alternative scenarios.[4]

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[1] 2018 RTP/SCS SJCOG – Public Health Analysis of Draft Scenarios, 2018.
[2] It is anticipated that these health metrics will be applied for the 2022 RTP/SCS planning efforts underway as of June, 2020.
[3] 2019-2020 San Joaquin County Health Outcome Update & Small Area Focus Studies: Task 2: Regional Physical Activity & Health Outcome Update for San Joaquin County: ***SJCOG_RTP_Stockton_T2_SJC_NPHAM_Findings_Report_06112020_submitted.pdf***
[4] 2019-2020 San Joaquin County Health Outcome Update & Small Area Focus Studies: Task 3: South Stockton Promise Zone Subarea Analysis & Task 4: Translation of Health Outcome Analysis into Investment Guidance: ***SJCOG_RTP_Stockton_T3_T4_SSPZ_Health_Outcome_Findings_Report_06292020_submitted.pdf***

2 Built, Natural & Social Environment in the SSPZ

The South Stockton Promise Zone (SSPZ) is a public, private and non-profit collaborative initiative with the principal aim of "empower[ing] residents to transform their community – to affect the root causes of intergenerational poverty through improvements in safety, education, housing, job creation, economic development, and health."[5] The SSPZ includes large sections of Downtown Stockton and areas south of the Downtown Core within the municipal limits, as well as the unincorporated area of Kennedy. The SSPZ contains a total of 53 census block groups, with a total population of around 75,000 people in 2015[6], comprising just under one-third of Stockton's population.

Three demographics designations categorize areas within the City of Stockton. The first are areas of disadvantaged communities identified using the CalEnviroScreen index developed by the California Environmental Protection Agency.[7] The second are areas of concentrated populations of people of color, referred to in this report as areas of concentrated minorities. [8] Lastly, areas of concentrated poverty characterize low-income populations.[9]

2.1 Traffic Safety & Injury Prevention

Safety is a key driver for retrofitting existing roadways and intersections. Reducing fatalities and injuries on streets requires a systems approach that includes both planning and project design. A pedestrian and bicycle traffic crash analysis identified the most dangerous intersections in the SSPZ. The analysis methods included:

- Summarization of pedestrian or bicycle involved crashes by county, city, SSPZ, intersections/road segments, and road functional class;
- Traffic crash hotspot (spatial clustering of crashes) analysis[10]
- Most severe traffic crash locations[11]; and
- Corridors with a higher incidence of severe and fatal crashes[12]

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[5] South Stockton Promise Zone Plan, City of Stockton, 2016.
[6] 2015 American Community Survey 5-Year Estimate, U.S. Census Bureau, 2015.
[7] CalEnviroScreen provides an index of disadvantaged communities. The 207 census block groups (CBGs) in San Joaquin County that rank within the top quartile of all California CBGs were flagged for analysis.
[8] Concentrations of Minorities are located using the American Community Survey (2015, 5-year estimate, B03002 dataset) to identify census tracts where at least 75% of a census block group's population consists of races and ethnicities, which are not non-Hispanic White. Within San Joaquin County, 136 CBGs meet the threshold and are defined as areas of concentrated minority populations.
[9] Concentrated Poverty locations are identified using the American Community Survey (2015, 5-year estimate, S1701 dataset). Census tracts were used where 30% or more of the population is identified as having an income "below the federal poverty level." A total of 31 census tracts in the County meet the 30% threshold, resulting in 89 block groups being defined as areas of concentrated poverty.
[10] Getis Ord Gi* test statistic was used to identify spatial clustering of traffic crashes.
[11] Killed or Severely Injured (KSI) index used to quantify pedestrian and cyclist injury and death.
[12] High Injury Network (HIN) developed to identify the most dangerous corridors.

Pedestrians and bicyclists in the SSPZ were exposed to higher levels of traffic crashes in comparison to the City of Stockton and even more so when compared to San Joaquin County. Non-motorized traffic crashes are more clustered in the western and southern edges of the Downtown area. The *most dangerous* corridors for pedestrians and cyclists were in the southern and eastern edges of Downtown. Injuries or deaths were reported at thirteen of the fourteen (92.9%) intersections for pedestrians and eight of the fourteen (57.1%) intersections for cyclists (Figure 1).

Select areas for improvement also included western areas of Downtown where non-motorized crashes are more likely, even if the resulting injuries were less severe. Sections along Dr. Martin Luther King Jr. Blvd. to the east and west of Airport Way also have a high number of pedestrians and cyclists involved in collisions with automobiles and may require infrastructure upgrades to improve safety. The results of these analyses can be used to help target areas where safety improvements are needed the most and encourage the development of Vision Zero policy goals[13], which include reducing collisions in the SSPZ.

[13] Vision Zero is a Swedish initiative pioneered in 1994 to eliminate deaths or serious injuries on Sweden's roads. It has been widely adopted in Europe and North America and includes a series of core principles: 1) Traffic deaths and serious injuries are preventable, 2) No loss of life is acceptable on roadways, 2) Transportation systems must be designed to allow human error and 4) The first priority is eliminating collisions that result in death or serious injuries.

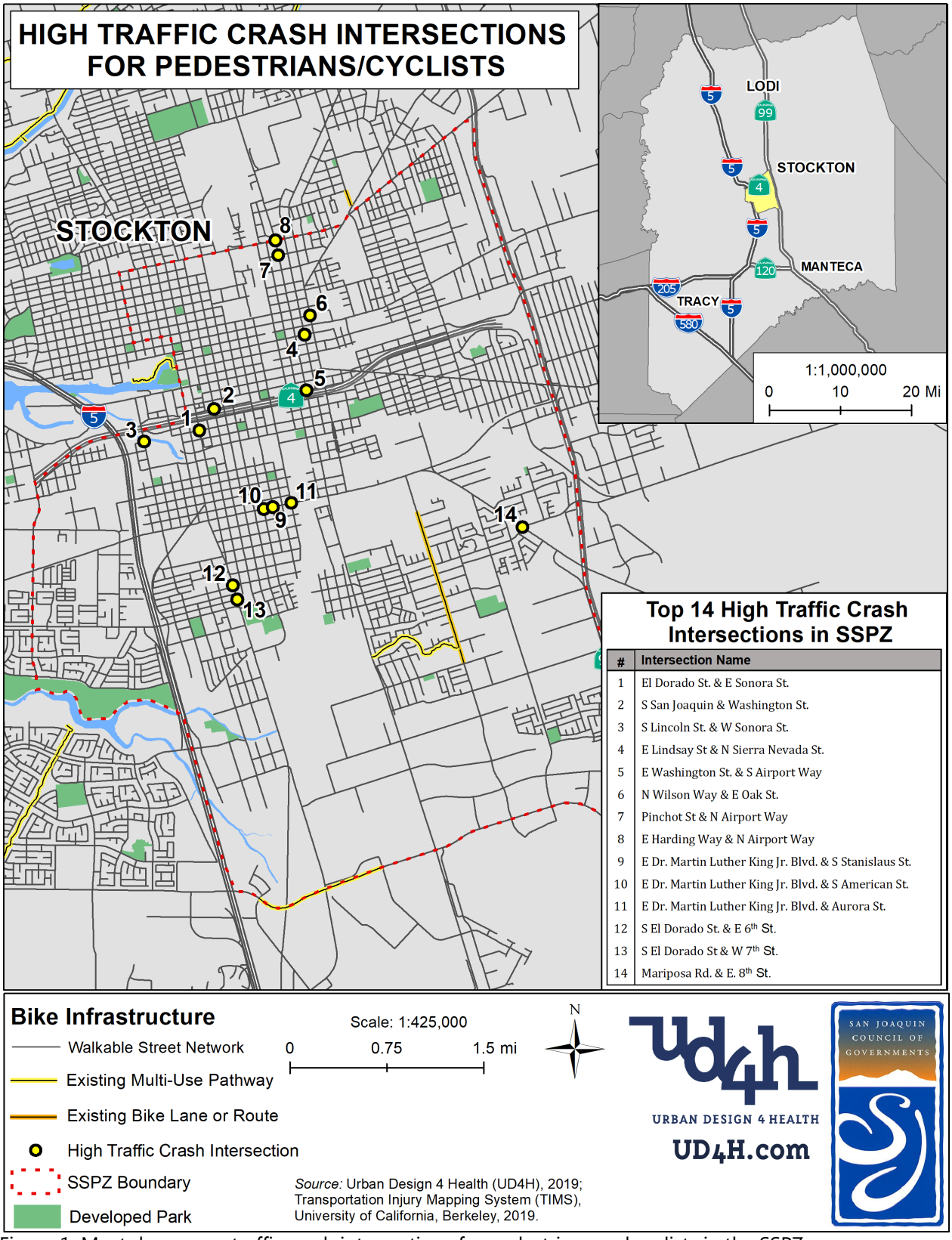

Figure 1: Most dangerous traffic crash intersections for pedestrians and cyclists in the SSPZ.

2.2 Bicycle Infrastructure

Cities that have invested in bicycle infrastructure have higher rates of bicycle commuters compared to those with fewer bicycle facilities.[12,13] Bicycle infrastructure primarily includes bike paths, bike lanes, and cycle tracks, but also can include sidewalks where bicycling is permitted, bike racks/storage, and specialized traffic signs and signals. Access to safe, connected bicycle networks and infrastructure can help combat perceived barriers to cycling, promote more utilitarian and recreational bicycling, and provide an important travel option to those with reduced access to private automobiles.

There are only 2.19 miles of existing bicycle infrastructure in the SSPZ, with 52.5 miles of planned infrastructure. The existing facilities complete only 4.0% of the total planned network. The SSPZ bicycle infrastructure has three gaps where shorter segments of infrastructure are needed to complete these portions of the network (Figure 2). The gaps are located along E Fremont St., while others are on the eastern edge of downtown Stockton on or near Airport Way. Given the limited existing infrastructure, filling in these gaps first may be a priority for the City of Stockton as opposed to embarking on larger projects to add larger sections to the network. Six other high-priority gaps to complete existing bike lanes and routes were also identified (Table 1).

Table 1: Identified gaps in on-street bicycle infrastructure in the SSPZ.

#	*Infrastructure Type*	*Identified Gaps*		
		Road Name	*Start of Gap*	*End of Gap*
1	Bike Lane	S Airport Way	E Miner Ave	E Weber Ave
2	Bike Lane	S Airport Way	E Main St.	E Anderson St
3	Bike Route	E 8th St	S Airport Way	Bieghle St
4	Bike Route	E Fremont St	N Filber St	N Broadway Ave
5	Bike Route	N Filbert Street	Roosevelt St	E Fremont St
6	Bike Route	S Golden Gate Ave	E Main St	E Dr. Martin Luther King Jr. Blvd.

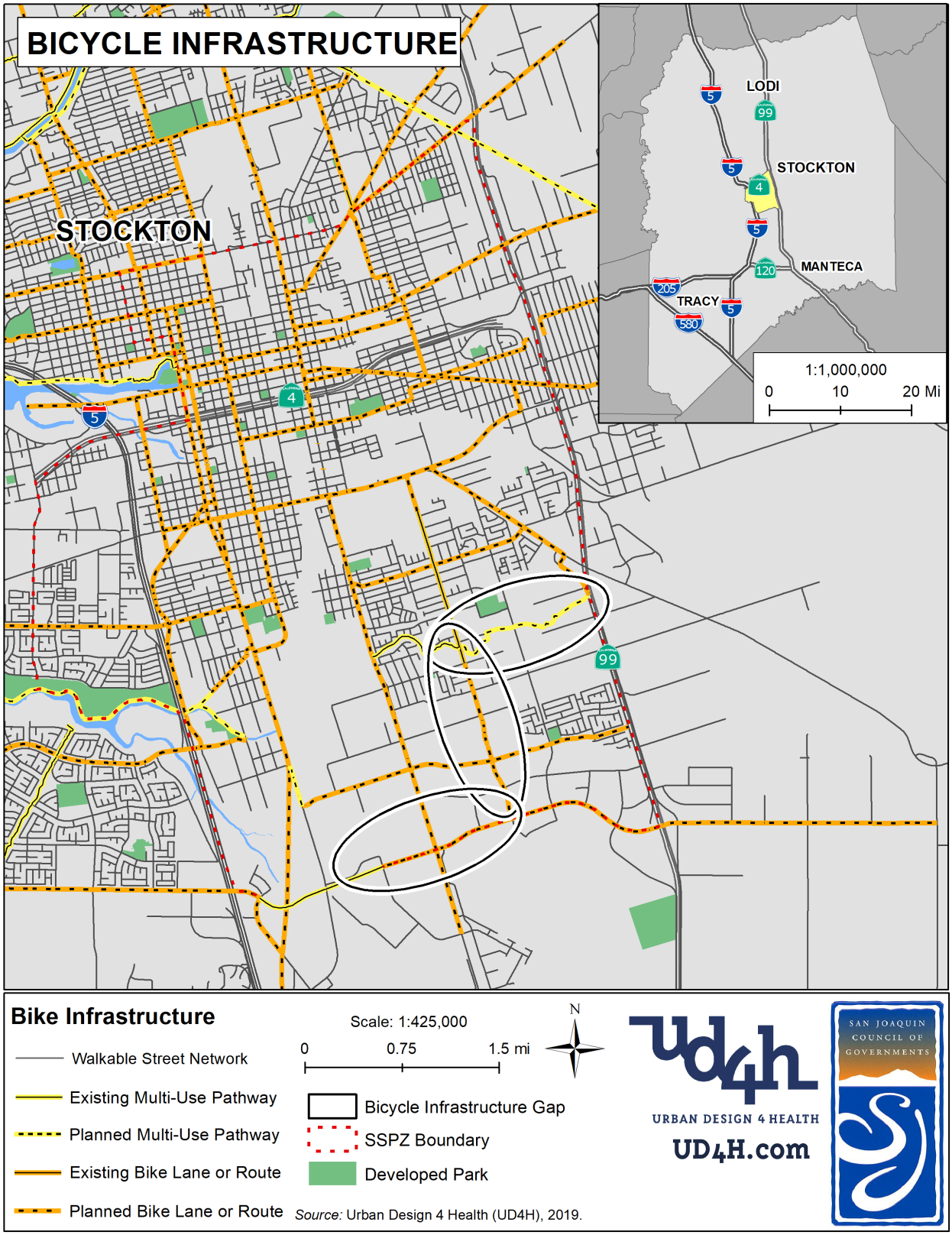

Figure 2: Existing and planned bicycle infrastructure in Stockton. The three gaps (identified by white ovals) are located west of SR 99 and would connect Mariposa Rd. to Arch Airport Rd.

2.3 Green Infrastructure

Developed parks offer places to play, exercise, socialize, and interact with nature, and can function as an important respite from daily stress. Parks and open space have been associated with positive physical and mental health outcomes, in addition to social ones. In the SSPZ, there are more small parks (n=20) than large parks (n=13). The large parks cover 129.8 acres of land, and the small parks cover 56.4 acres of land. Three new parks are planned for the SSPZ: 1) Missassi Park, 2) Susan Park, and 3) John Peri Park.[14]

Among single family dwellings, 72.3% of SSPZ residents had access to a park within a 10-minute walk (Figure 3). This number increased to 91.5% of single family residents with park access within a 20-minute walk. Approximately 90% of SSPZ residents living in multi-family residential units had access to a park within a 10-minute walk, which increased to 98.5% within a 20-minute walk of a park. The map also shows areas with access to an undeveloped park within 10 minutes (1 km) by foot, as well as vacant parcels of land. Nearly all of the downtown area has access to parks with a 1km walk due to a large number of small parks in this area and the highly connected road network that allows for greater accessibility by foot. The map shows two distinctive large gaps of residents that do not have park access within 10 minutes: 1) a smaller area in the northeast of the SSPZ near E. Fremont St. and N. Filbert St. and 2) northeast Kennedy near Mariposa Road.

[14] Missassi Park (0.73 acres), Susan Park (1.46 acres), John Peri Park (5.9 acres).

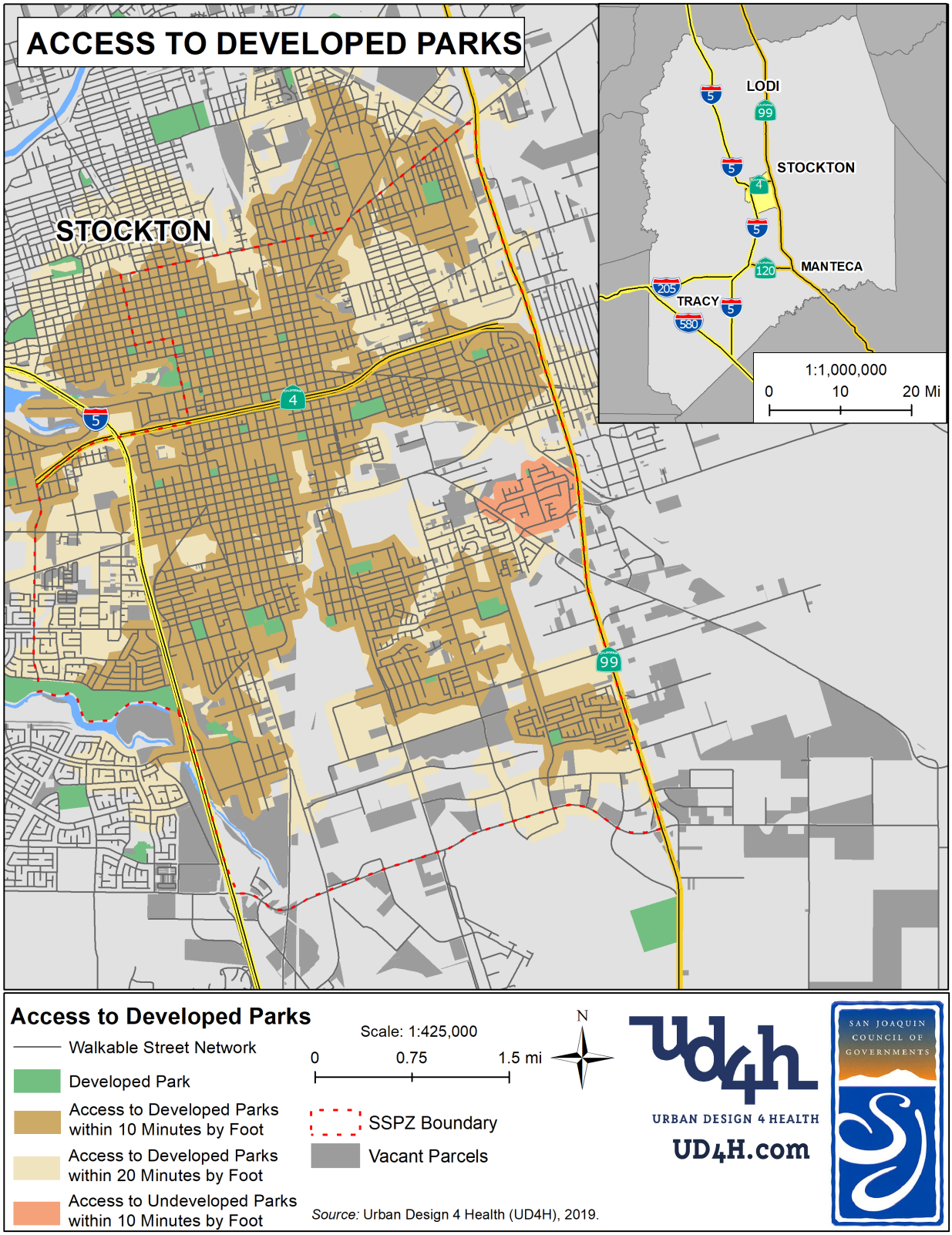

Figure 3: Access to developed parks within 1km (10-minute walk) and 2km (20-minute walk) in the SSPZ.

2.4 2035 Land Use Scenario Development

As part of the 2018 RTP/SCS development process, three 2035 scenarios were developed by SJCOG.[15] The adopted Scenario 2 provided the foundation to develop two new scenarios (Scenario 4 and 5) for the SSPZ.

The updated scenarios included a significant increase in the density and intensity of development. These create an aspirational outlook for what a future South Stockton could look like in 2035. Scenario 4 applied a substantially increased density for residential, commercial, and mixed-use building types beyond what was forecasted as part of the 2018 RTP/SCS for Scenario 2. Scenario 5 follows the same trends as Scenario 4, but applies an even greater increase in density (Table 2). Including new, denser development in the alternative scenarios for the SSPZ demonstrates how more intensive and compact development, as well as mixed land uses, may produce more positive health outcomes in the future.

Table 2: Estimated demographic and employment characteristics for the two new development scenarios in the SSPZ.

Variable	*Baseline (2015)*	*Component (%)*	*Scenario 4 (2035)*		*Scenario 5 (2035)*	
			Change (%)	*Component (%)*	*Change (%)*	*Component (%)*
Demographics						
Population	75,512	100%	+32%	—	+49%	—
Households	21,460	100%	+55%	—	+84%	—
Multi-Family Units	6,652	27%	+154%	45%	+256%	64%
Single-Family Units	16,389	67%	+5%	46%	+2%	45%
Townhouse Units	1,282	5%	+120%	8%	+130%	8%
Other Units	317	1%	0%	1%	0%	1%
Housing Units	24,639	100%	+51%	100%	+78%	117%
Employment						
Retail Jobs	2,603	8%	+147%	13%	+214%	14%
Office Jobs	6,423	20%	+217%	40%	+322%	46%
Industrial Jobs	10,479	32%	+2%	21%	+1%	18%
Other Jobs*	13,347	41%	0%	26%	0%	23%
Total Jobs	32,852	100%	+55%	100%	+79%	100%
Total Workers†	23,918	100%	+40%	100%	+60%	—

* "Other jobs" include public jobs, education jobs, and other employment. The placetypes used to indicate land use and employment changes in Scenarios 4 and 5 did not impact these job types; therefore, their count is held constant from baseline to 2035.

† "Workers" denote the home residence location of the total population that is employed.

[15] 2018 Regional Transportation Plan/Sustainable Communities Strategy, SJCOG, 2019.

3 Health Outcome Findings in the SSPZ

The benefits and impacts of land use and transportation investment policies and investment are not always evenly distributed across regions, cities, or neighborhoods. One of the core advantages of UD4H's NPHAM tool is the ability to estimate the spatial distribution of public health outcomes at a relatively fine-grain spatial scale (census block group). Population-weighted average predicted health outcomes, including physical activity, health behavior, and cardiovascular disease, were estimated for Scenario 4 and 5 in the SSPZ using the NPHAM tool.

3.1 Physical Activity & Travel Behavior

Population-weighted estimated travel and leisure behavior were evaluated for both physical activity duration in minutes and percent of participation for each type. Highlights include:

- **Walking Behavior –** Scenario 4 and 5 were predicted to produce significant increases in the duration and the percentage of the population that walk for transportation. Daily minutes of walking for transport increased by around 25% to an average of nearly 2 minutes for both scenarios. Even higher increases were shown in participation in transportation walking (around +35% to +40%).
- **Bicycling Behavior –** Both scenarios generated a large increase in cycling for transportation (between +45% and +50%) and slight increases in daily minutes of transportation bicycling of 2.6% and 2.8%, respectively.

Figure 4 shows that the highest increases in daily minutes of walking for transportation for Scenario 4 were located in Downtown Stockton (nearly double) and just south of with the Robert J. Cabral Station (> 65% increase). Other high concentrations of walking for transport were located along E. Charter Way/Dr. Martin Luther King Jr. Blvd. corridor.

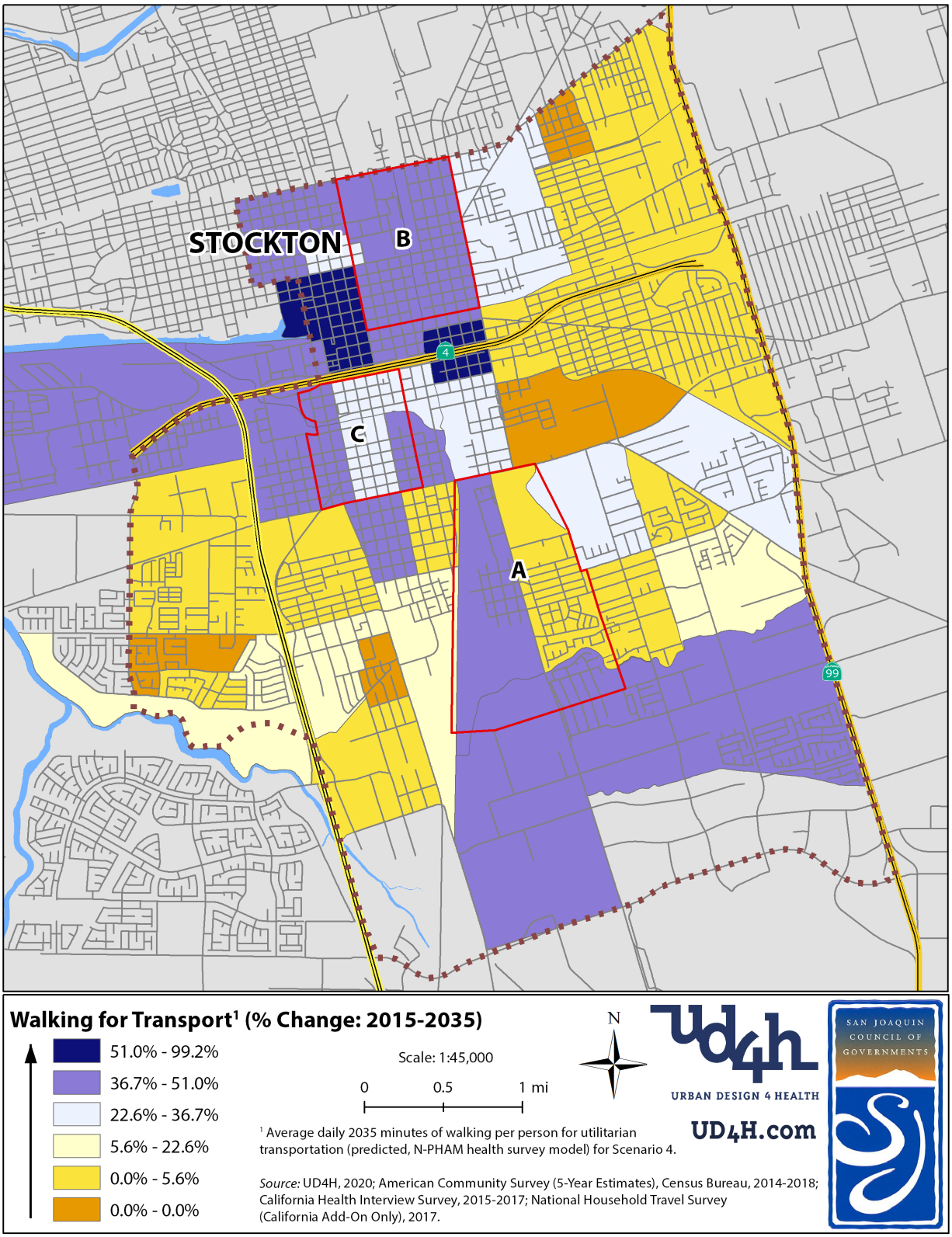

Figure 4: Estimated percent change in daily walking between 2015 and 2025 for Scenario 4 in the SSPZ with three key subareas highlighted.

3.2 Health Behavior, Cardiovascular Disease & Mental Health

Population-weighted estimates for health behaviors, including BMI, type 2 diabetes, cardiovascular diseases, and mental health, were estimated for the baseline and Scenario 4 and 5 for the SSPZ. Highlights include:

- **Body Mass Index –** Body mass in both scenarios indicated markedly improved results with average weighted BMI being reduced by 1.25% and the percentage of the population which is obese being reduced by around 7% in 2035.
- **Cardiovascular Diseases –** High blood pressure estimates indicated an SSPZ average of 29.7% of the population in 2015, decreasing to about 27.5% in 2035. Coronary heart disease comprises a much smaller percentage of the population (around 4%), but the results showed similar patterns decreasing by over 5% in 2035.
- **Type 2 Diabetes –** Of people with diabetes, type 2 was estimated to represent between 90% and 95% of all cases in the US.[16] In 2015, San Joaquin County reported a countywide average of 9.5% of the population and the SSPZ reported an average of 11% with type 2 diabetes. Type 2 diabetes was forecasted to be reduced by around 9.5% to an average of approximately 10% in 2035.
- **Fair or Poor General Health Status –** Fair or poor general health is much worse (nearly double the rate) in the SSPZ in comparison to San Joaquin County as a whole. Both scenarios indicated improvements in the portion of the SSPZ population with fair or poor general health status, with a reduction of about 2.5%. The highest reductions were located in the northern sections of Downtown and Midtown, as well as some clusters in the extreme south of the SSPZ.
- **Mental Health –** Depression in the SSPZ was reduced by 2% for both scenarios in 2035 to a weighted average of 32%. The percentage of the population reporting psychological distress[17] showed reductions of more than 6% to an average of 5.7%.

In 2015 (baseline) and 2035, 30.3% of the population in the SSPZ (nearly double that of the San Joaquin County weighted average) indicated a fair or poor general health status, with 33% estimated to have experienced some form of depression in the last 30 days[18] and about 6% reporting psychological distress.

[16] Bullard KM, Cowie CC, Lessem SE, et al. Prevalence of Diagnosed Diabetes in Adults by Diabetes Type – United States, 2016. MMWR Morb Mortal Wkly Rep 2018;67:359-361. DOI: http://dx.doi.org/10.15585/mmwr.mm6712a2

[17] Derived from multiple questions including: "Likely has had psychological distress in the past month?"

[18] Depression based on the following survey question: "How often did you feel so depressed that nothing could cheer you up?"

4 Summary

The results of the health impact assessment showed significant changes in the healthy direction for 16 of the 17 health indicators evaluated in both Scenario 4 and 5. The largest changes were observed in physical activity, especially walking and bicycling for transportation, as a result of more mixed-use and multi-family residential development. The study also indicated that changes in the built environment can improve health outcomes, including through the addition of planned bicycle infrastructure and improved access to parks and greenspace.

Short-Term Recommendations:

1. Traffic Safety & Injury Prevention
    a. Improve pedestrian and bicycling infrastructure and facilities at the 14 most dangerous intersections in the SSPZ
2. Bicycle Infrastructure:
    a. Complete the three identified short gaps in the existing bicycle network to complete one more continuous route in the SSPZ
    b. Prioritize the improvement of larger gaps in the network on six key bike lanes and bike routes in the SSPZ
3. Green Infrastructure
    a. Develop three new identified parks, especially Missassi Park and Susan Park to provide residential access to park and recreation facilities in these neighborhoods

Medium/Long-Term Recommendations:

1. Land Use Development:
    a. Encourage the development of more mixed-use buildings and higher density residential, especially in and around Downtown Stockton
    b. Continue to develop transportation infrastructure and options that promote more complimentary, walking-supportive employment land use, including retail, commercial, and office jobs
    c. Target investments in land-use and transportation systems shown to be supportive of improved health along target strategic corridors, including:
        i. N. California St. and Wilson Way east of Downtown
        ii. E. Charter Way/Dr. Martin Luther King Jr. Blvd.
        iii. Airport Way Corridor south of E. Charter Way/Dr. Martin Luther King Jr. Blvd.

References

1. Frank LD, Greenwald MJ, Winkelman S, Chapman J, Kavage S. Carbonless footprints: promoting health and climate stabilization through active transportation. *Prev Med.* 2010;50 Suppl 1:S99-105.
2. Frumkin H, Hess J, Luber G, Malilay J, McGeehin M. Climate change: the public health response. *Am J Public Health.* 2008;98(3):435-445.
3. Zhou J, Wang Y, Schweitzer L. Jobs/housing balance and employer-based travel demand management program returns to scale: Evidence from Los Angeles. *Transport Policy.* 2012;20:22-35.
4. Hu L. Job Accessibility of the Poor in Los Angeles. *Journal of the American Planning Association.* 2015;81(1):30-45.
5. de Nazelle A, Nieuwenhuijsen MJ, Anto JM, et al. Improving health through policies that promote active travel: a review of evidence to support integrated health impact assessment. *Environ Int.* 2011;37(4):766-777.
6. Frank L, Kerr J, Miles R, Sallis J. A Hierarchy of Sociodemographic and Environmental Correlates of Walking & Obesity. *Prev Med.* 2008;47(2):172-178.
7. Neutens T. Accessibility, equity and health care: review and research directions for transport geographers. *Journal of Transport Geography.* 2015;43:14-27.
8. Julien D, Richard L, Gauvin L, et al. Transit use and walking as potential mediators of the association between accessibility to services and amenities and social participation among urban-dwelling older adults: Insights from the VoisiNuAge study. *Journal of Transport & Health.* 2015;2(1):35-43.
9. Grengs J. Nonwork Accessibility as a Social Equity Indicator. *International Journal of Sustainable Transportation.* 2014;9(1):1-14.
10. Caspi CE, Sorensen G, Subramanian SV, Kawachi I. The local food environment and diet: A systematic review. *Health & Place.* 2012;18(5):1172-1187.
11. Sallis JF, Floyd MF, Rodriguez DA, Saelens BE. Role of built environments in physical activity, obesity, and cardiovascular disease. *Circulation.* 2012;125(5):729-737.
12. Dill J, Carr T. Bicycle Commuting and Facilities in Major U.S. Cities: If you build them, Commuters will use them – Another Look. TRB Annual Meeting; 2003.
13. Pucher J, Dill J, Handy S. Infrastructure, programs, and policies to increase bicycling: An international review. Prev Med. 2010;50:S106-S125.