

Appendix C:

Additional Existing Conditions
Data



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Benefit Impact Analysis

Health Benefits

The implementation of a well-designed, connected bicycle network across Long Beach will encourage a shift from energy-intensive modes of transportation such as cars and trucks to active modes of transportation such as bicycling and walking. The impact analysis model evaluates and quantifies the estimated increase in bicycling trips, the estimated increase in hours of physical activity, and the annual savings resulting from reduced healthcare costs. In order to evaluate these health factors, the project team analyzed readily-available data inputs. The primary inputs into the health component of the impact analysis model come from five-year estimates of commute trip data from the U.S. Census Bureau. Five-year estimates were chosen because they are the most reliable dataset available from the U.S. Census Bureau between the 10-year censuses and because they allow for analysis at the individual census tract level.

Currently, with Long Beach's 1.1 percent bicycle mode share, there are 4,821,000 estimated annual trips by bicycle. Through those trips, the citywide vehicle miles traveled (VMT) is estimated to be reduced by 5,754,000. Additionally, 2,000 people are currently categorized as "active" (residents who meet the CDC, or Centers for Disease Control and Prevention, minimum number of hours of physical activity per day *through bicycling*), and the annual direct and indirect healthcare costs

are for those 2,000 active people are reduced by \$3,358,000.

Accounting for continued increases in population, employment, and student enrollment rates, should Long Beach achieve a 10 percent bicycle mode share by 2026 (ten years after Plan adoption), annual estimated bike trips will rise to 21,503,000; VMT will be reduced by 24,564,000; there will be 10,000 newly "active" people; and annual healthcare cost savings from those active people will be \$14,806,000.

If Long Beach achieves a 20 percent bicycle mode share by 2036, bike trips will rise to 77,968,000, reducing VMT by 97,317,000; there will be 37,000 newly active people, resulting in an annual healthcare cost savings of \$53,507,000. These numbers account for an increase in population, employment, and student enrollment rates.

Should Long Beach reach a 30 percent bicycle mode share by 2046, there will be an estimated 179,246,000 bicycle trips annually, leading to a 224,016,000 VMT reduction; 85,000 newly active people, will result in \$122,959,000 of healthcare cost savings. Again, these numbers account for an increase in population, employment, and student enrollment rates.

Environmental Benefits

While the causes of physical inactivity and pollution stem from many sources, the implementation of the recommended bicycle projects and policies in Long Beach will contribute to a shift from energy-intensive modes of transportation such as cars and trucks to active modes of transportation such as bicycling and

walking. The impact analysis model evaluates and quantifies the estimated increase in bicycling trips and the annual savings from reduced vehicle emissions. Using the same estimates of VMT reduction calculated in the health benefits analysis, changes in hydrocarbon, particulate matter, nitrous oxides, carbon monoxide, and carbon dioxide were analyzed.

Right now, with the 1.1 percent bicycle mode share, 0.3 metric tons of particulate matter are not being released into the air annually if those riders were driving instead. Also not being released are 5.27 metric tons of nitrous oxide, 0.04 metric tons of sulfur dioxides, 6.89 metric tons of volatile organic compounds (VOCs), and 2,800 metric tons of carbon dioxide (CO₂). This adds up to about \$292,000 in savings related to environmental damage or clean-up per year.

Accounting for population, employment, and student enrollment rates rising, should Long Beach achieve a 10 percent bicycle mode share by 2026, Table C-1 shows the reduction in the amount of each pollutant being released into the environment. This leads to a \$1,348,000 savings in related environmental damage or clean-up per year.

Table C-1: Estimated Environmental Benefits with a 10 Percent Bicycle Mode Share

Pollutant	Amount Reduced Annually, in Metric Tons
Particulate Matter	1.4
Nitrous Oxides	24.33
Sulfur Dioxides	0.2
VOCs	31.84
CO ₂	13,000

If Long Beach achieves a 20 percent bicycle mode share by 2036, Table C-2 shows the

resulting reduction in the amount of each pollutant being released into the environment. This leads to a \$4,937,000 savings in related environmental damage or clean-up per year. These numbers account for increases in population, employment, and student enrollment.

Table C-2: Estimated Environmental Benefits with a 20 Percent Bicycle Mode Share

Pollutant	Amount Reduced Annually, in Metric Tons
Particulate Matter	5.14
Nitrous Oxides	89.08
Sulfur Dioxides	0.75
VOCs	116.62
CO ₂	48,000

Should Long Beach achieve a 30 percent bicycle mode share, Table C-3 shows the resulting reduction in the amount of each pollutant being released into the environment. This would lead to an \$11,365,000 savings in related environmental damage or clean-up per year.

Table C-3: Estimated Environmental Benefits with a 30 Percent Bicycle Mode Share

Pollutant	Amount Reduced Annually, in Metric Tons
Particulate Matter	11.82
Nitrous Oxides	205.06
Sulfur Dioxides	1.72
VOCs	268.44
CO ₂	111,000

Transportation Benefits

A strong and well-designed bicycle network provides a connection between activity centers and residences. While no money may change hands, real savings can be estimated from the reduced costs associated with congestion, vehicle crashes,

road maintenance, and household vehicle operations. Utilizing the same calculations for estimated increases in annual bicycle and annual VMT reductions used in the health and environmental components, transportation-related cost savings can be calculated. By multiplying the amount of VMT reduced by established multipliers for traffic congestion, vehicle collisions, road maintenance, and vehicle operating costs, monetary values can be assigned to the transportation-related benefits.

Currently, with Long Beach's 1.1 percent bicycle mode share, riding a bicycle contributes to a \$3,605,000 annual household transportation cost savings. It also contributes to a \$319,000 in traffic congestion cost savings, saves \$1,910,000 in costs associated with collisions, and \$832,000 in roadway maintenance.

Should Long Beach achieve a 10 percent bicycle mode share by 2026, accounting for population, employment, and student enrollment increases, households could save \$16,650,000. Additionally, \$1,475,000 would be saved from traffic congestion, \$8,823,000 from collision costs, and \$3,845,000 from roadway maintenance.

If Long Beach achieves a 20 percent bicycle mode share by 2036, households could save \$60,972,000 in transportation costs. Also, \$5,403,000 would be saved from traffic congestion, \$32,308,000 from collision costs, and \$14,079,000 from roadway maintenance. These numbers account for increases in population, employment, and student enrollment.

Should Long Beach reach a 30 percent bicycle mode share, households could save \$140,352,000 in transportation costs. \$12,437,000 could be saved in traffic congestion costs, \$74,374,000 in collision costs, and \$32,410,000 in maintenance.

Total Benefits

Currently, with the 1.1 percent bicycle mode share, these health, environmental, and transportation benefits lead to \$10,317,000 in savings. A 10 percent mode share by 2026 could lead to \$46,947,000 in savings. A 20 percent mode share could lead to a savings of \$94,793,000 (with a 3 percent discount rate). A 30 percent mode share by 2046 could lead to \$51,745,000 in additional savings (with a seven percent discount rate).