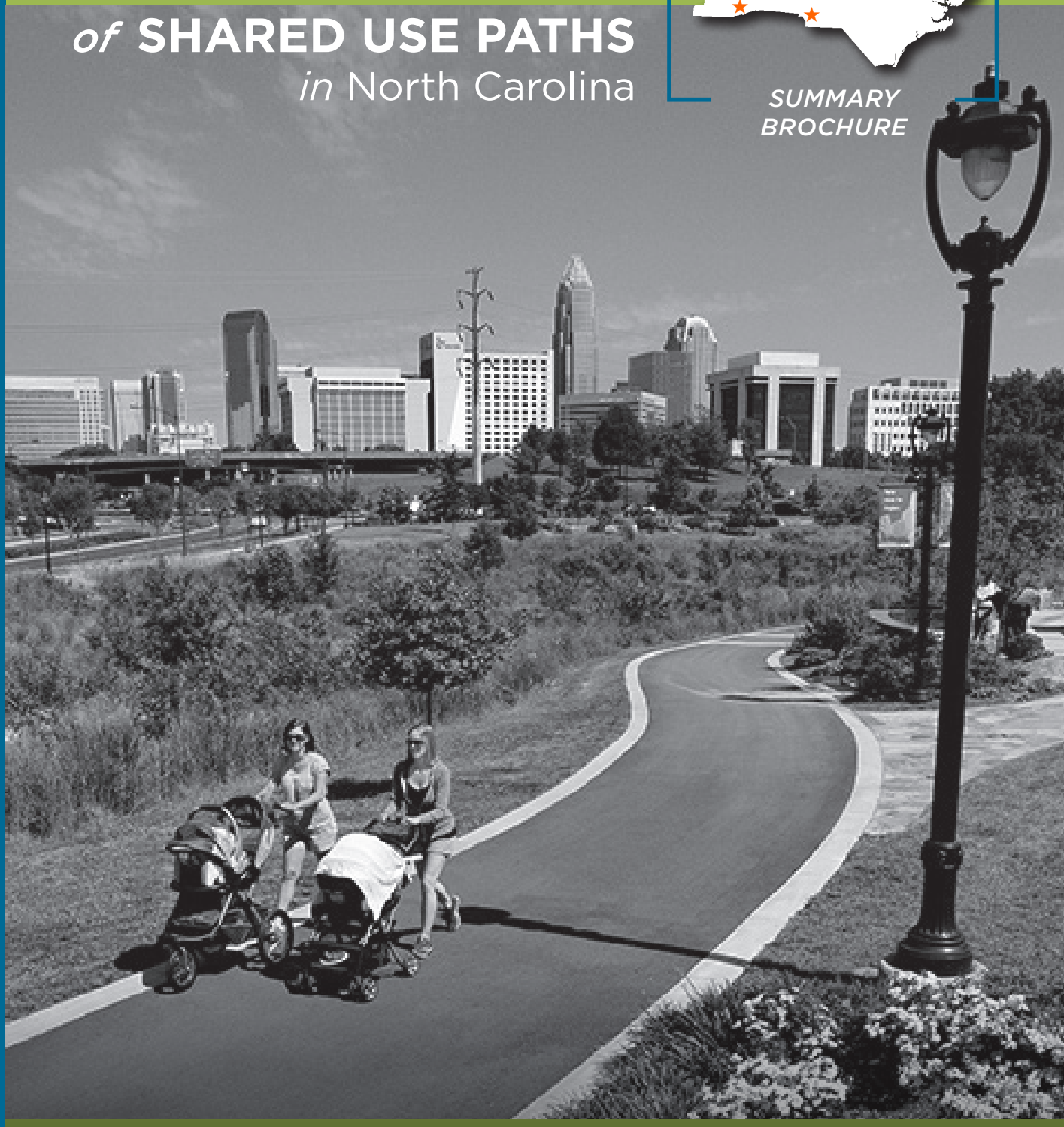
Evaluating the **ECONOMIC IMPACT** *of* **SHARED USE PATHS** *in* North Carolina

2015 - 2017

SUMMARY BROCHURE

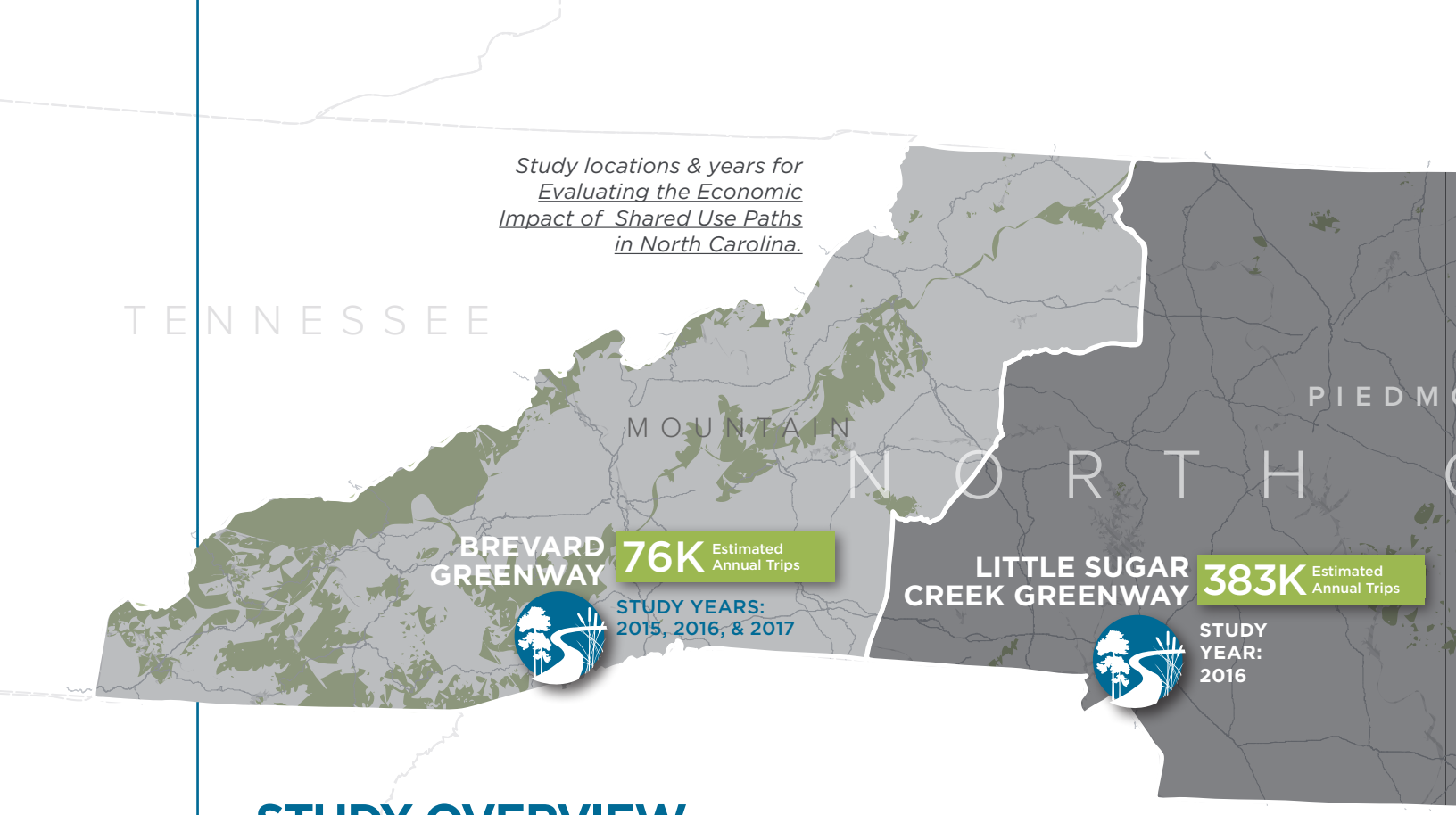


ITRE

alta PLANNING + DESIGN

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Division of Bicycle & Pedestrian Transportation



Study locations & years for Evaluating the Economic Impact of Shared Use Paths in North Carolina.

STUDY OVERVIEW

Shared use paths (SUP), also known as greenways or trails, are unique facilities physically separated from motor vehicle traffic that allow a shared space in which bicyclists, pedestrians, and sometimes equestrian or other non-motorized users can travel.

While some research has been conducted in North Carolina to understand the economic contribution that specific facilities like SUPs may have in a community, North Carolina is lacking in a comprehensive approach to evaluate the economic returns currently being generated by existing trails of regional significance that may lead to economic benefits to the state.

The objective of this project was to design and test a methodology for consistently evaluating the economic contribution of shared use paths in North Carolina. Four SUPs were selected to test the methodology. The American Tobacco Trail (ATT) and the Brevard Greenway (BG) were studied iteratively for three years, while the Little Sugar Creek Greenway (LSC) and Duck Trail (DT) served as cross-sectional case studies. The iterative cases allowed for comparison of results across years to test the reliability of the methodology and potentially identify factors that may influence its application, such as seasonality. The additional cross-sectional cases provided a broader mix to test the methodology on different types of SUPs based on their land use contexts, user types, and expected trip purposes. This project structure allowed for eight separate studies to be conducted to test the methodology across three years.

The shared use paths studied were selected because they:

- Have a state or regional significance.
- Have good opportunities to capture economic revenue.
- Were not impacted by construction, significant maintenance, or detouring during the project period.
- Are relatively 'established' (i.e. at least 5 years old with minimal adjacent land use changes anticipated).
- Have the ability to demonstrate a transportation function.
- Are geographically dispersed across North Carolina.
- Are a good mix between urban and rural areas.

SUP Benefits

Menu of factors contributing to the overall economic benefit of a SUP

- **Business Benefits**
  - Trail Use Contributions
    - Trip Expenditures
  - Traditional Economic Contributions
    - O & M Expenditures
    - Capital Expenditures
  - Jobs
  - Wages
  - Business Output
  - Value Added/Gross State Product
- **Community Benefits**
  - Property Values
  - Property Taxes
  - Environment
- **Trail User Benefits**
  - Leisure Time
  - Health

FIELD DATA COLLECTION

For each SUP case, field data were collected primarily through two sources: intercept surveys and manual counts. The research team administered the survey to trail users. In order to ensure surveyors were consistent in technique, each person was trained in how to intercept a trail user and administer the survey.

Multiple data collection stations were used along each SUP to understand overall trail usage. Survey and count data were collected at each station on each trail. The number of stations varied by trail length and frequency of access points. Spacing of stations was driven by the desire to potentially count each pedestrian on the SUP. This required spacing stations typically no more than 2 miles apart (the average distance a pedestrian travels). Generally, three people worked each station – two surveyors and one counter (see Example Data Collection Station on opposite page).

THIS STUDY *BY THE NUMBERS:*

8,349
Total # of surveys collected across all trails and study years

54,532
Total # of counts collected across all trails and study years

187
The total number of "bodies" or "manpower" needed to gather all the data across this 3-year study.
The actual number of unique individuals that collected data was much lower (108), since some people collected every year and at each SUP.

DATA COLLECTION SCHEDULE & TOTAL NUMBER OF RECORDS COLLECTED

SHARED USE PATH	# OF STATIONS	YEAR	DAY OF WEEK	TOTAL # OF COUNTS	TOTAL # OF SURVEYS	EST. # OF UNIQUE USERS
American Tobacco Trail	9	2015	**Thurs**, Oct 8	4,434	905	1,472
			Sun, Oct 11	11,788	1,496	3,539
		2016	**Sat**, May 14	8,954	1,230	2,525
			Mon, May 16	4,141	766	1,354
		2017	**Tues**, May 16	4,165	757	1,328
			Sat, May 20	7,745	911	2,274
Brevard Greenway	3	2015	**Wed**, Oct 14	505	137	240
			Sat, Oct 17	523	133	273
		2016	**Thurs**, May 19	307	93	135
			Sat, May 21	546	147	261
		2017	**Sun**, Aug 13	539	131	237
			Mon, Aug 14	411	99	191
Duck Trail	2	2016	**Mon**, Jun 20	2,127	211	1,009
			Tues, Jun 21	2,212	313	1,020
Little Sugar Creek Greenway	4	2016	**Tues**, Oct 18	2,521	543	1,188
			Sat, Oct 22	3,614	477	1,768

EXAMPLE DATA COLLECTION STATION

KEY DATA POINTS COLLECTED WITH SURVEYS

- Trip origin and destination or turnaround points on the trail
- Trip purpose
- Mode of travel
- Physical activity indicators
- Economic activity indicators
- Demographic information
- Residential or visitor status

KEY DATA POINTS COLLECTED WITH COUNTS

Manual counts also were conducted by the research team and included recording characteristics such as:

- Mode of travel
- Direction of travel
- Age category
- Gender
- Group size

For more on this topic, see the Field Data Collection section of the Final Report, starting on page 55.

Typically, data were collected on one weekday and one weekend day during daylight hours. The exact days and collection period time was informed by the season and travel patterns seen in volume data collected on each SUP using automated technology (pneumatic tubes, infrared, and/or inductive loops.) Since survey data are extrapolated to understand annual usage of the SUP and its annual economic contributions, understanding how volume fluctuates on a given trail ensures that survey data are collected during peak using, thereby maximizing staff time on the trail collecting the data. It also ensures that the full range of typical trail users are intercepted so that the data are more likely to be representative of the population of trail users.

All completed survey and count forms were manually reviewed for errors, omissions, and quality control prior to entering the data into spreadsheets.

ESTIMATING UNIQUE USERS AND ANNUAL TRIPS

A simple summation of counts from each station would result in double or multi-counting people who passed more than one station during their trip. When combining raw counts from each station to develop a comprehensive estimate of trail usage, survey data were used to define where respondents entered, exited and/or turned around on the trail to reduce the raw count at each station by the people who would have been counted at another station. Using several calculations, the number of unique users on each SUP was determined.

Note that adjustments for users making roundtrips or those making longer distance trips (thereby passing more stations) does not result in a true count of individual persons using the trail. Some may have visited the SUP on more than one data collection day, or made more than one trip per day, or traced a unique travel pattern not otherwise captured in the survey responses. Unique users can only be understood on a per day basis. Count data from continuous count stations on each SUP were adjusted to convert unique users to an estimate of annual trips.

STUDY RESULTS

BUSINESS AND EMPLOYEE BENEFITS

Findings from this project demonstrated that SUPs support substantial economic benefits to businesses and their employees. Bicyclists and pedestrians who used the American Tobacco Trail, the Brevard Greenway, the Little Sugar Creek Greenway, and the Duck Trail made purchases at businesses along these trails, which increased the productivity of these regions and contributed to the state's overall economy. For example, trail users made purchases that supported jobs, wage income, and business output in the grocery, retail, bike rental, real estate, restaurant, and entertainment industrial sectors in North Carolina. The economic activity that arose from trip expenditures captured via the intercept surveys includes direct, indirect, and induced/multiplier impacts. **These benefits are highlighted for each SUP, on pages 12-19 of this summary brochure.**

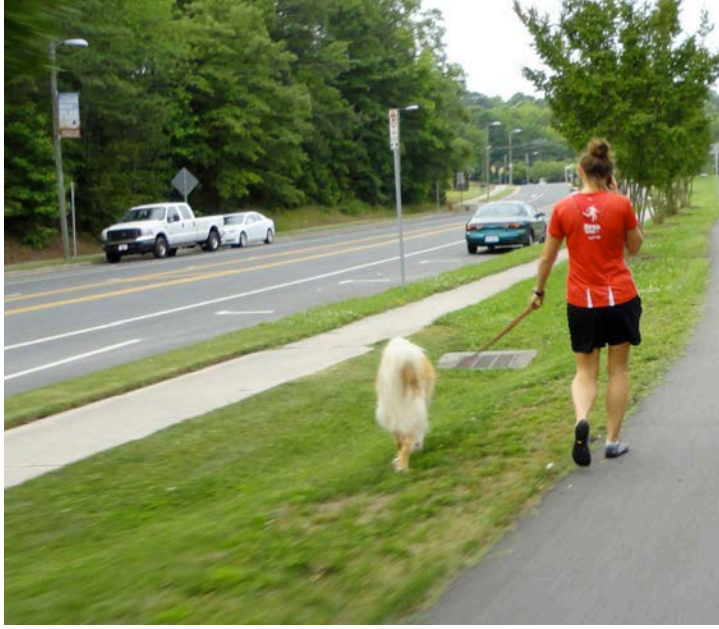
$19.4M

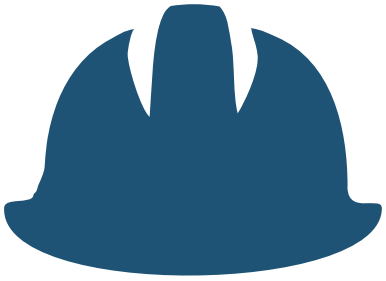
In total estimated annual business output resulting from sales revenue at businesses along all four SUPs in this study.

790 JOBS

Are supported annually through construction* of all four SUPs and direct expenditures of people using the trails in this study.

**530 construction jobs may be the labor equivalent to full-time employment over the course of one year; assumes different crews were utilized to build each trail.*





$684K

In total estimated annual local & state tax collections resulting from trip expenditures for all four SUPs in this study.

RETAIL SALES TAX BENEFITS

When bicyclists and pedestrians make purchases at stores, restaurants, hotels, or various other types of commercial establishments it also generates retail tax revenue for local and state governments. Sales tax impacts were estimated by considering expenditures on different types of goods and services, and modeling the tax revenue generated from these transactions using IMPLAN. **The total annual estimated local and state tax collections resulting from trip expenditures for all four SUPs is $$683,900.**

$48.7M

In total estimated business output resulting from construction of all four SUPs in this study.

TRAIL CONSTRUCTION BENEFITS

The construction of SUPs supports economic activities including preliminary engineering, design and environmental review, construction, inspection, and oversight. Expenditures made in each of these categories support jobs, wages, and business output. Of these categories, business output was most significant, **with $48.7 million in total business output from construction for all four SUPs.**

$25.7M

In total estimated savings associated with increased physical activity and reduction in congestion, traffic injuries, and air pollution from use of all four SUPs in this study.

HEALTH, CONGESTION, AND POLLUTION REDUCTION BENEFITS

Examples of benefits measured under this category include, but are not limited to:

- Annual Regional Cost Savings Attributable to Physical Activity
- Annual Regional Cost Savings Attributable to Decreased Risk of Road Traffic Injuries
- Reduced Household Vehicle Operation Costs
- Annual Reduced CO_2 Emissions (lbs)

PROPERTY VALUE IMPACTS

This project applied and examined two methods to explore the impact of SUPs on property values: 1) comparing property values for residential properties that are near to a SUP to those that are far from a SUP using a buffer analysis, and 2) using linear regression to determine the effect of SUP proximity on property sales prices by controlling for neighborhood characteristics, including proximity to other "property value boosters" (e.g. schools, parks, bodies of water, shopping, employment centers, and socioeconomic demographics). While the results from the buffer analysis indicated that proximity to the SUP had a positive effect on assessed property values for the ATT and LSC, further hedonic price modeling showed that proximity to a SUP had no statistically significant effect on sales prices when controlling for factors such as other environmental and neighborhood features. **These results underline how difficult it is to isolate the true effect of SUP proximity on property values, particularly given each SUP's unique location and context.** If a property values benefits analysis is desired for a trail, the effect of competing features must be considered when interpreting the results.

For more on these and other SUP economic benefit results, see Chapter 5: Study Results in the main report.

ECONOMIC VALUATION METHODOLOGIES

This table represents the recommended approach to estimate economic contributions of SUPs based on testing these and other methods to derive specific types of benefits from each of the eight case studies conducted. The matrix allows one to select from a menu of benefit types and quickly see at a high-level the types of data sources and key steps it would take to implement the recommended method in order to calculate the value of the economic benefit of interest.

Category	Sub-category	Data Required	Methodology or Value Used
Impacts to SUP-related businesses and employees	***Trail User Expenditures*** *(includes special events and tourism expenditures that result from existence of trail)*	***Intercept Survey*** • Expenditures by type and trail user • Frequency of trips per user ***Manual Count*** • User count by mode, age, and gender ***Automated Count*** • Expanded count of users by mode for extrapolation	**Step 1:** Estimate average expenditures per user type from intercept survey **Step 2:** Evaluate sample of completed surveys with manual user counts for representativeness of the survey (further analysis if adjustments are needed) **Step 3:** Extrapolate average expenditures to an annual amount with automated counts and predictive model (if needed) **Step 4:** Estimate multiplier effects of annual expenditures using IMPLAN
	Retail Sales Tax Benefits *(function of trail user expenditures)*	***Intercept Survey*** • Expenditures by type ***NC Department of Revenue*** • State and local tax rates ***Municipal Real Estate Schedule of Values*** • Regional average of competitive space	**Step 1:** Use estimated expenditures per user type derived from steps 1-3 above (Trail User Expenditures) **Step 2:** Estimate the local and state tax contribution resulting from these expenditures, based their respective tax rates **Step 3:** Divide expenditures by regional average of competitive space to get retail square footage supported
Impacts to NC's Economy from SUP Investment	***Capital Expenditure***	***NC Department of Transportation*** • SUP capital expenditures ***Local Agency*** • SUP capital expenditures	**Step 1:** Obtain and summarize capital expenditures data **Step 2:** Normalize data to economic base year **Step 3:** Estimate multiplier effects of capital expenditures using IMPLAN
	Operational Expenditure	***NC Department of Transportation*** • SUP operational expenditures ***Local Agency*** • SUP operational expenditures	**Step 1:** Obtain and summarize operational expenditures data **Step 2:** Normalize data to economic base year **Step 3:** Estimate multiplier effects of operational expenditures using IMPLAN or TREDIS
Impacts to Land Values for Properties within SUP Proximity	***Property Value Impacts*** *– Rough Assessment*	***County Parcel Data Records*** • Property assessed values in proximity to trail • Assessed values of similar properties not in proximity to the trail	**Step 1:** Evaluate property values in ½ mile proximity to SUP relative to similar property values ½-1 mile away from SUP **Step 2:** Use GIS to create a ½ mile buffer around SUPs (influence area). Create another ring buffer ½ -1 mile out (outside area). Compare the difference in values of the two areas.
	Property Value Impacts *– Hedonic Pricing Method*	***Real Estate Sales Data*** • Property neighborhood factors • Property structural factors (bedrooms, bathrooms, square footage) • Property sales prices ***American Community Survey*** • Block group demographics • Vacancy rate ***Public Tax Records*** • Assessed tax value	**Step 1:** Generate base linear model by regressing the sales price on the core predictors for properties within ½ mile of SUP **Step 2:** Evaluate geospatial residual pattern for under- or over-predicted areas to identify additional control variables based on SUP context **Step 3:** Iteratively refine and re-run model with customized variables to test their inclusion for best fit. **Step 4:** Test for statistical significance of effect on sales prices from proximity to SUP.

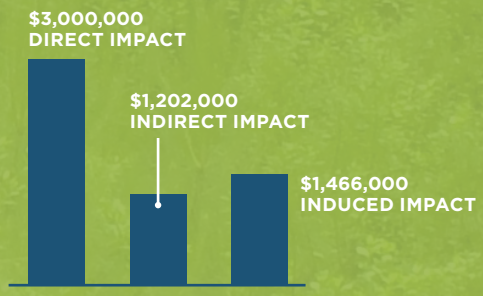
Category	Sub-category	Data Required	Methodology or Value Used
User and Societal Benefits	***Health Benefits***	***Federal Highway Administration*** • Statistical value of human life ***Centers for Disease Control and Prevention*** • Burden of Disease ***Intercept Survey*** • Average time spent on SUP (duration, trip frequency, and/or distance) • Average exercise met from SUP use	**Step 1:** Estimate total number of SUP users and their average trip lengths from counts and intercept surveys. **Step 2:** Use number of users, their trip length, FHWA's value of statistical life, and CDC's mortality rates by cause as inputs into the Integrated Transport and Health Impact Modeling Tool (ITHIM) to derive the economic value of mortality rate improvements that result from SUP use.
	Congestion Benefits	***Intercept Survey*** • Mode to/from SUP • Trip purpose • Number of users who would make same trip by driving if SUP didn't exist ***Tiger Benefit-Cost Analysis Resource Guide*** • Congestion cost per vehicle mile	**Step 1:** Survey trail users about travel mode, trip purpose, and whether they would have made that trip if the SUP did not exist. **Step 2:** Calculate vehicle miles traveled from origin to destination for users who would have made trip with another mode. **Step 3:** Use info from steps 1-2 to estimate societal benefits that arise from avoided motorized transport external costs
	Air Pollution Reduction Benefits	***Intercept Survey*** • Mode to/from SUP • Number of users who would make same trip by driving if SUP didn't exist ***Environmental Protection Agency*** • Exposure to fine particulate matter	**Step 1:** Survey trail users about travel mode and whether they would have made that trip if the SUP did not exist. **Step 2:** Use info from step 1 to estimate societal benefits that arise from avoided motorized transport external costs.
	Safety Benefits	***Intercept Survey*** • Average time spent on SUP (duration, trip frequency, and/or distance) ***NC Division of Motor Vehicles*** • Serious and fatal collisions ***Federal Highway Administration*** • Statistical value of human life	**Step 1:** Survey trail users about trip duration, frequency, and distance. **Step 2:** Collect collision data for the study area and parallel paths. **Step 3:** Use info from steps 1-2 to estimate societal benefits that arise from avoided motorized transport collision costs

AMERICAN TOBACCO TRAIL (ATT)

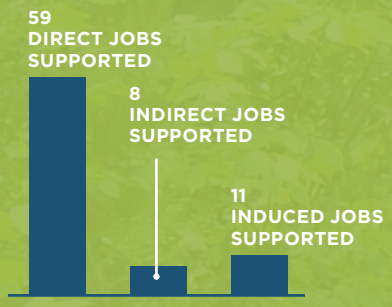
Approximately **480,800** annual ATT trips* made by bicyclists and pedestrians were estimated to contribute to the following economic activity in North Carolina on an annual basis:

$5,668,000

GENERATED IN **BUSINESS OUTPUT** (SALES REVENUE).

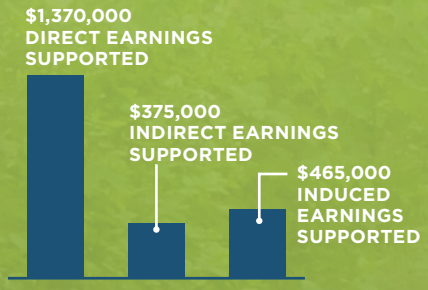


78 **JOBS SUPPORTED THROUGH TRAIL USER EXPENDITURES**



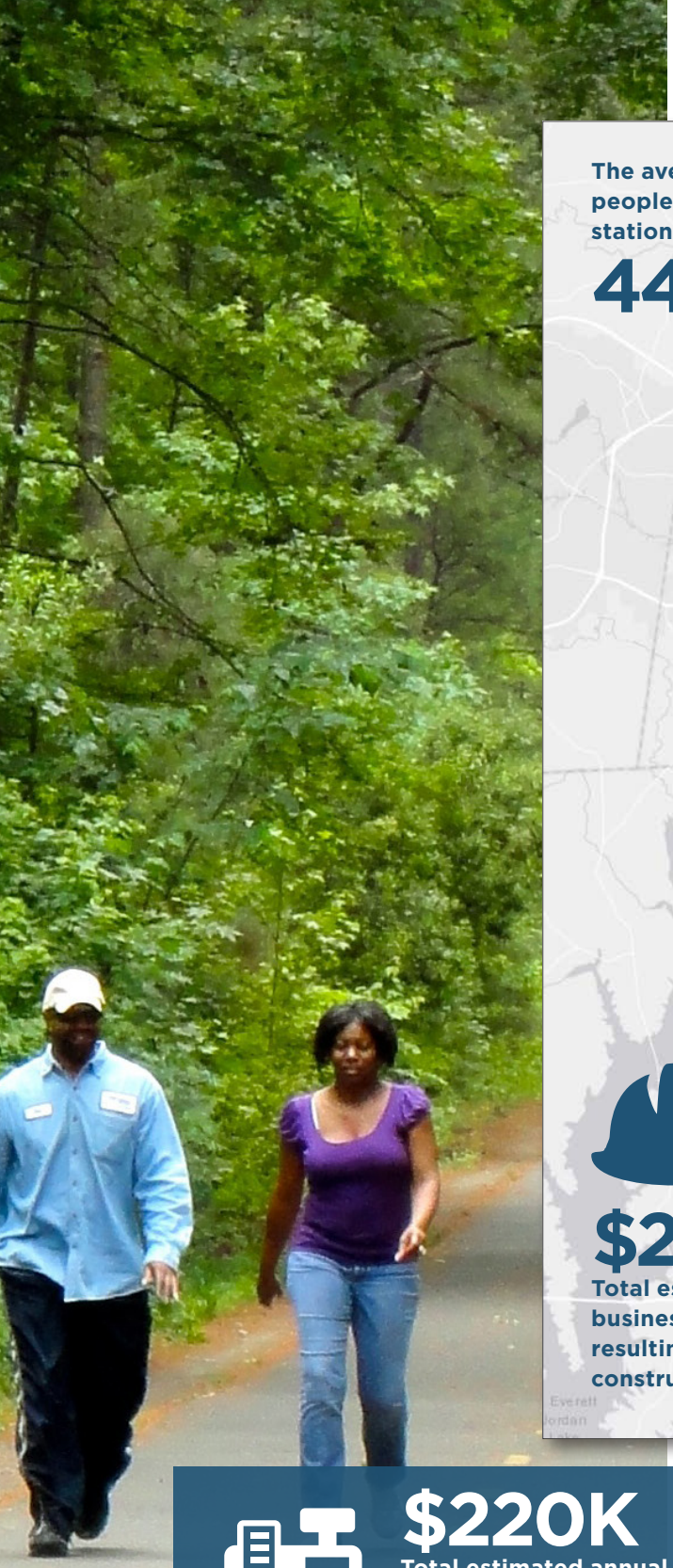
$2,211,000

GENERATED IN **LABOR INCOME**

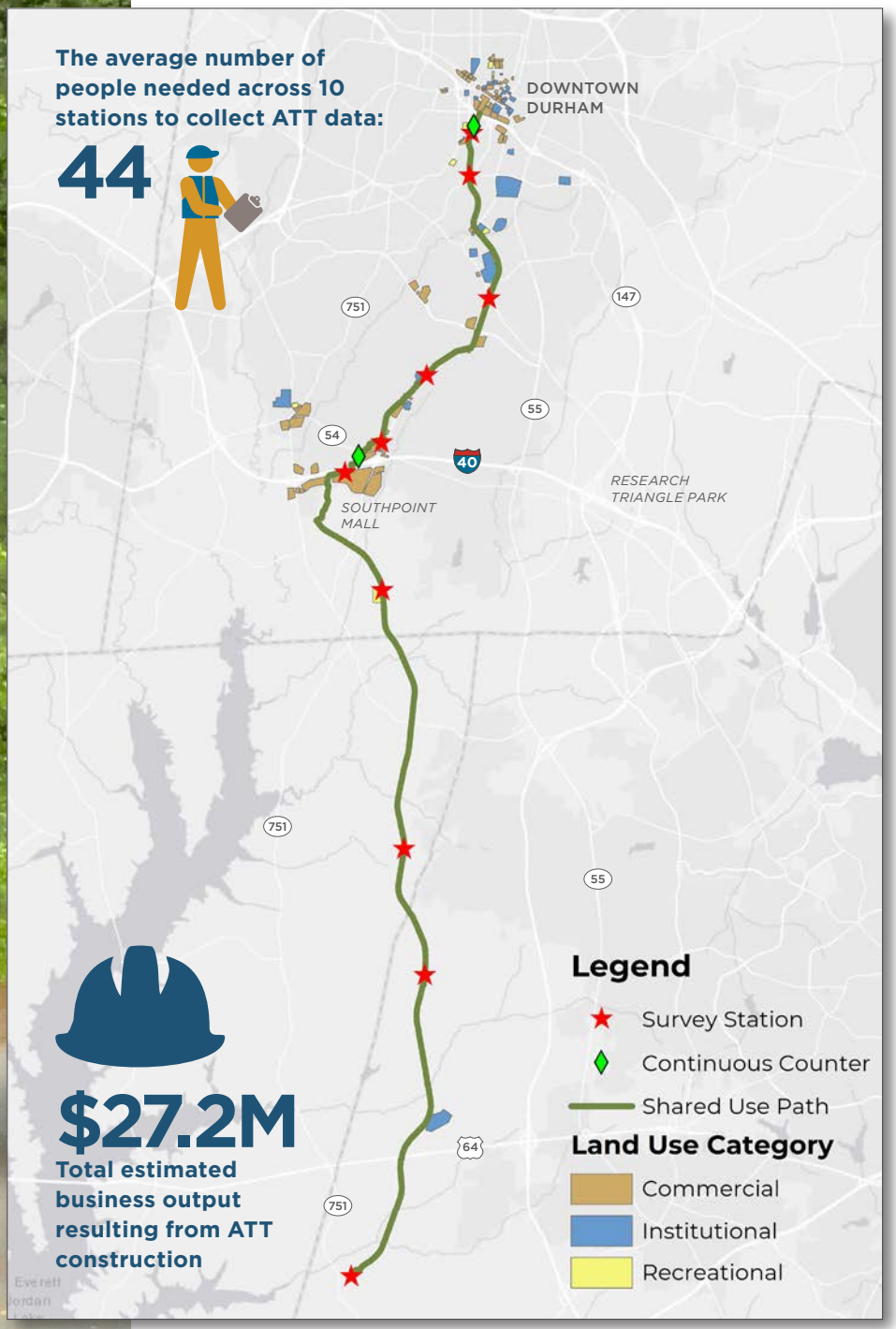


**Annual trips reported here are an average for the three-year study of the ATT.*

The American Tobacco Trail, Durham, NC.



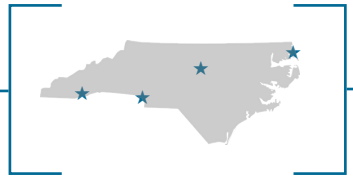
Map of ATT Survey Stations



$220K
Total estimated annual local and state tax collections resulting from ATT trip expenditures

$1.4M
Total estimated healthcare cost savings associated with increased physical activity from use of the ATT

For more on these and other ATT economic benefit results, see Chapter 5: Study Results in the main report.

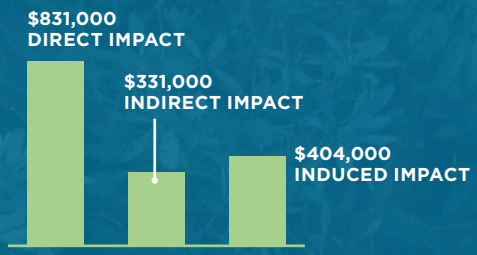


BREVARD GREENWAY (BG)

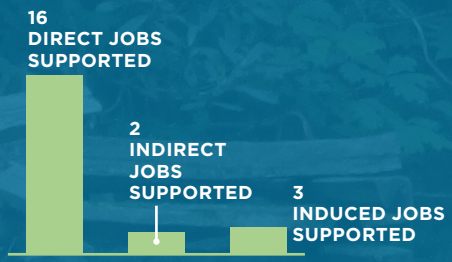
Approximately **76,000** annual Brevard Greenway trips* made by bicyclists and pedestrians were estimated to contribute to the following economic activity in North Carolina on an annual basis:

$1,566,000

GENERATED IN **BUSINESS OUTPUT** (SALES REVENUE).

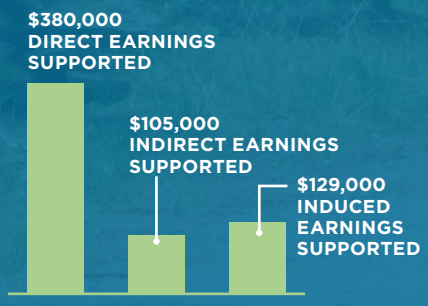


21 JOBS SUPPORTED THROUGH TRAIL USER EXPENDITURES



$614,000

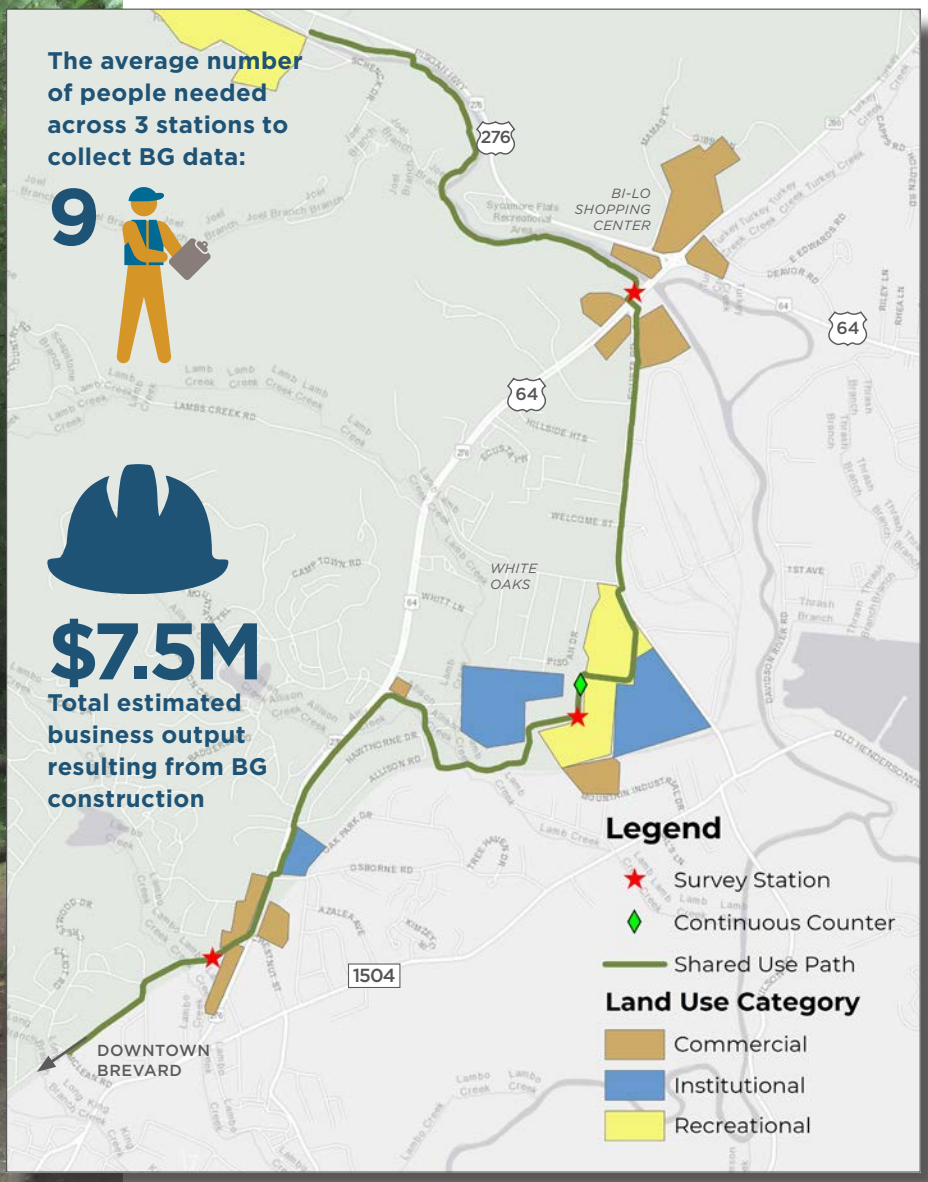
GENERATED IN **LABOR INCOME**



**Annual trips reported here are an average for the three-year study of the BG.*

The Brevard Greenway, Brevard, NC.

Map of BG Survey Stations



$53K
Total estimated annual local and state tax collections resulting from BG trip expenditures

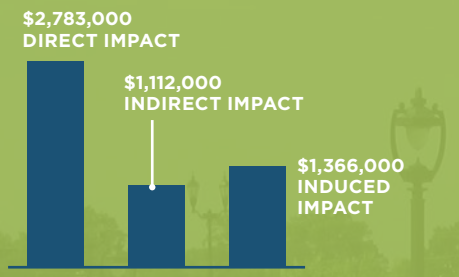
$51K
Total estimated healthcare cost savings associated with increased physical activity from use of the BG

For more on these and other BG economic benefit results, see Chapter 5: Study Results in the main report.

LITTLE SUGAR CREEK GREENWAY (LSG)

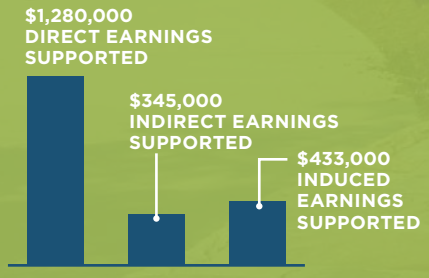
Approximately **382,600** annual LSG trips made by bicyclists and pedestrians were estimated to contribute to the following economic activity in North Carolina on an annual basis:

$5,261,000
GENERATED IN **BUSINESS OUTPUT** (SALES REVENUE).

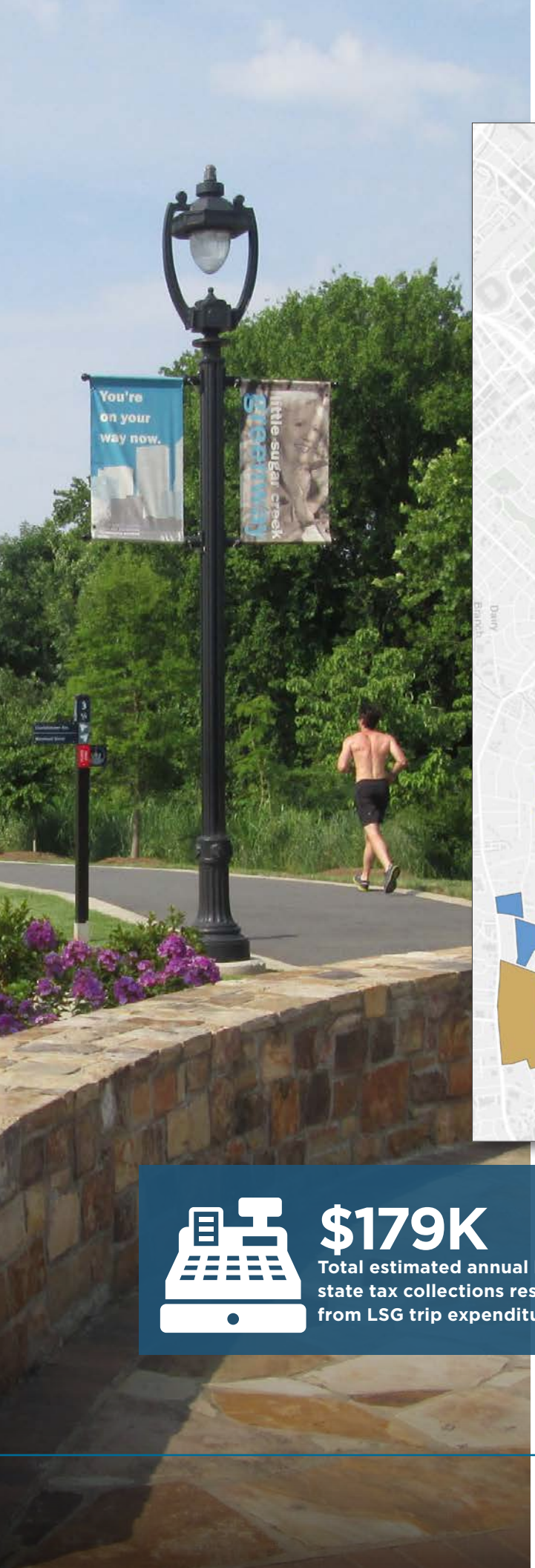


73 **JOBS SUPPORTED** THROUGH TRAIL USER EXPENDITURES

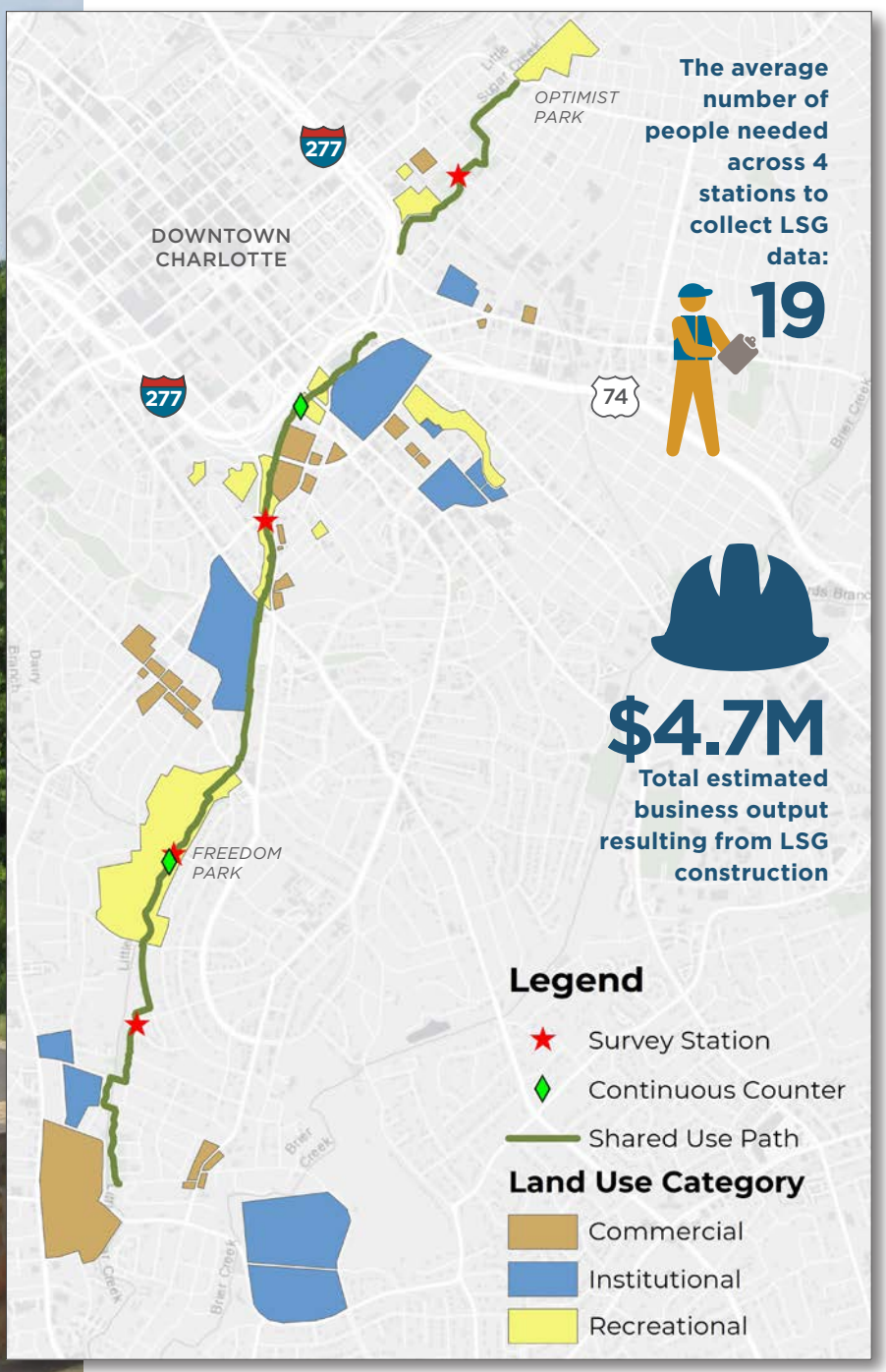
$2,059,000
GENERATED IN **LABOR INCOME**



Little Sugar Creek Greenway, Charlotte, NC.



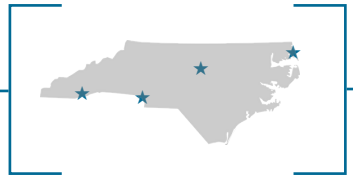
Map of LSG Survey Stations



$179K
Total estimated annual local and state tax collections resulting from LSG trip expenditures

$243K
Total estimated healthcare cost savings associated with increased physical activity from use of the LSG

For more on these and other LSG economic benefit results, see Chapter 5: Study Results in the main report.

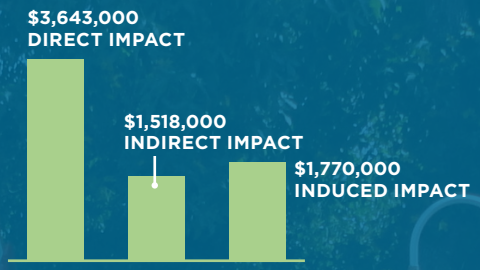


DUCK TRAIL (DT)

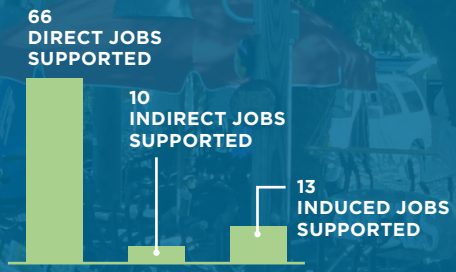
Approximately **145,700** annual Duck Trail trips made by bicyclists and pedestrians were estimated to contribute to the following economic activity in North Carolina on an annual basis:

$6,931,000

GENERATED IN **BUSINESS OUTPUT** (SALES REVENUE).

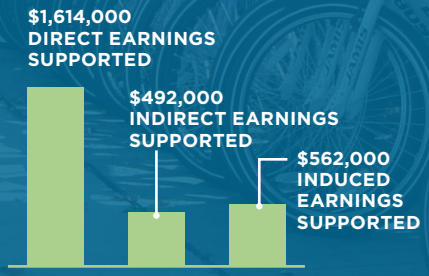


89 JOBS SUPPORTED THROUGH TRAIL USER EXPENDITURES



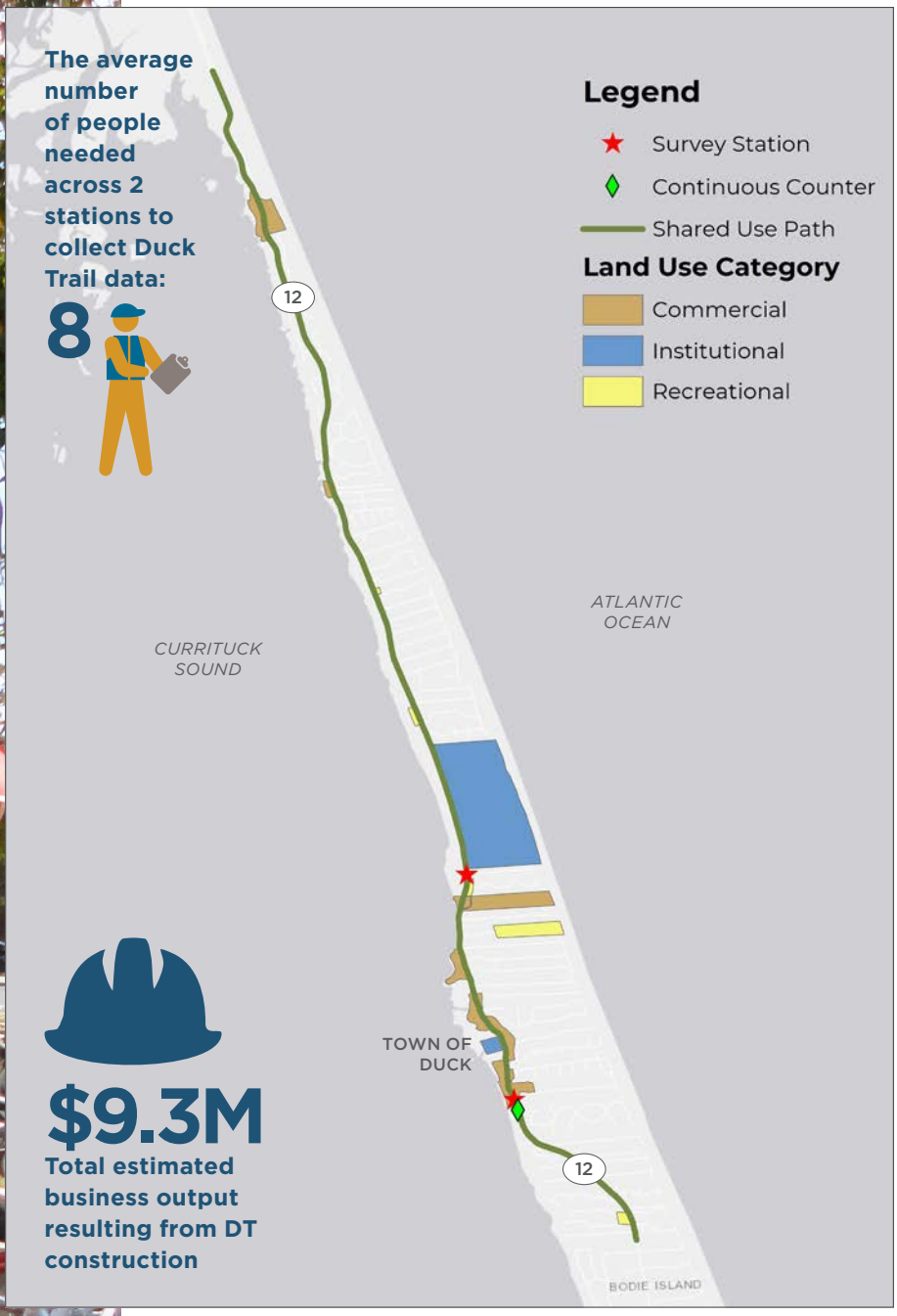
$2,668,000

GENERATED IN **LABOR INCOME**



Bicycle shop along the Duck Trail in Duck, NC.

Map of Duck Trail Survey Stations



$232K
Total estimated annual local and state tax collections resulting from DT trip expenditures

$2K
Total estimated healthcare cost savings associated with increased physical activity from use of the DT

For more on these and other DT economic benefit results, see Chapter 5: Study Results in the main report.

Prepared by

Institute for Transportation Research and Education
and Alta Planning + Design

Prepared for

North Carolina Department of Transportation,
Division of Bicycle and Pedestrian Transportation,
Hanna Cockburn, Director

For more details on the methods tested to evaluate the economic contribution of shared use paths and all the study results, please visit the full report at https://itre.ncsu.edu/focus/bike-ped/SUP-Economic-Impacts/

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Division of Bicycle & Pedestrian Transportation

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