

# Deschutes County – Terrebonne Community School

## Baseline Data Evaluation Report



**FINAL June 24, 2020**

### Introduction

This Case Study Evaluation measures the impacts of Oregon Safe Routes to School (SRTS) 2019-2020 Competitive Infrastructure (IN) Grants in communities across the state. The evaluation will assess the effectiveness of individual SRTS projects, techniques, and programs designed to reduce barriers to biking and walking to and from school. Evaluation research questions include:

- What are the impacts for standalone IN grants, and combined Non-IN and IN grants?
- How do different combinations of interventions effectively address the barriers identified by communities and affect mode shift, safety and perceptions of safety, program lifespan, and equity?

The Baseline Data Evaluation Report represents the “pre-construction” data and provides an overview of existing travel conditions and school site attributes. The Baseline Data Evaluation Report is intended to contain the majority of the information needed to plan for the post-construction data collection. The baseline report summarizes the funded improvement project, demographics of affected schools, and data from Oregon Department of Transportation (ODOT) and local roadway authority crash records, parent surveys, and student travel hand tallies.

### Plan for the Final Case Study Evaluation Report

The Final Case Study Evaluation Report will represent the “post-construction” data. A draft outline for this report is included in Appendix A. For data consistency, the post-construction data will be collected in the spring immediately after construction is complete, or as soon as is feasible thereafter. This will reduce weather-related impacts and also allow time during the school year for families to establish or change their travel habits. In addition to the standard parent surveys and student travel hand tallies, post-construction data collection methods for the evaluation report may also include parent focus groups and surveys or interviews with school staff.

The Final Case Study Evaluation Report will measure shifts using the evaluation metrics laid out in this document to identify the successes of SRTS projects and provide insight on opportunities for further improvement. SRTS performance metrics measured during this evaluation process will include:

- **Mode split:** Are more students walking and biking to school after a project’s completion than at the time of baseline data collection?
- **Access to safe infrastructure:** Do students have better access to sidewalks, bike lanes, or safe crossing locations on their route to school after the completion of the project?
- **Safety/perception of safety:** Do parents and students feel safer or more comfortable walking and biking to school after the project’s completion?
- **Program lifespan/partnerships:** Is the SRTS program functioning efficiently and providing adequate support for partner jurisdictions, schools, and districts?

- **Equity:** Are students from a diversity of ethnic/racial and socioeconomic backgrounds benefiting from the investments being made?

In addition to reporting on grant effectiveness, data presented in the Baseline Data Evaluation Report and the Final Case Study Evaluation could be used for a variety of transportation and program planning purposes at the local level. Having a comprehensive set of quantitative data and qualitative feedback on transportation conditions and trends around these sites could help inform decisions on school/district policy, SRTS event and program planning by schools/districts/local jurisdictions, planning future infrastructure projects, as well as providing supporting documentation for future grant applications.

## Baseline SRTS Snapshot: Terrebonne Community School

### Summary

Terrebonne Community School is K-8 public school located in the City of Terrebonne in Deschutes County. The school serves 361 students. Terrebonne Community School is a Title 1 School, and 41% of students attending this school qualify for Free and Reduced-Price Lunch.

Residents and parents have expressed concern about bicycle and pedestrian access and safe street crossings in the vicinity of Terrebonne School. The majority of the school's walking and biking traffic is generated from the neighborhoods to its north. However, C-Avenue (along the northern frontage) lacks sidewalk infrastructure, and the existing street crossing poses a considerable barrier for most school-age children.

The Oregon SRTS 2019-2020 Competitive IN Grant funded sidewalk improvements along the northern frontage of the school (both sides of the street), as well as curb extensions at the major crossing point, 8<sup>th</sup> Street. These changes will reduce vehicle/pedestrian conflict points by channelizing pedestrians to this safe crossing location. In addition, the improved crossing itself will be staffed by a crossing guard provided by the school. These improvements will supplement prior ODOT investment in pedestrian infrastructure on sidewalks along US Highway 97, increasing access for students and other community members using active transportation modes.

At this time, Terrebonne Community School does not participate in any SRTS encouragement or engagement activities due to lack of resources and limited staff capacity, in addition to challenges accessing the school via walking or biking. To help navigate these challenges, Terrebonne Community School and Deschutes County created a SRTS Plan through the ODOT Project Identification Program (PIP). The SRTS Plan, completed in the fall of 2019, addressed both additional infrastructure needs and strategies for SRTS outreach and education. The Plan recommended activities such as education programs for parents and students, schoolwide campaigns, and encouragement programs (for example, policies and events). These outreach and education initiatives would complement new SRTS infrastructure near the school and promote safe walking and bicycling for students and families.

Key information from Terrebonne parent surveys:

- Approximately 67% of students ride in a family vehicle to school, while 59% ride home. About 24% ride the school bus to school, and 33% ride it home.
- About 4% of students walk to school, while no students reported biking.

- Parents report that the length of time spent commuting is the most common barrier to walking/biking to school. Other barriers include:
  - poor driver behavior,
  - lack of facilities,
  - personal safety concerns, and
  - convenience of driving.
- Most parents believed that walking or biking to/from school was healthy for their student (54%). However, only 23% felt it would be fun for their student.

## Contact Information

JURISDICTION:	Deschutes County
CONTACT:	Chris Doty: chris.doty@deschutes.org
SCHOOL DISTRICT:	Redmond School District
CONTACT:	District Office: (541)923-5437
OTHER CONTACTS:	None

## Enrollment and Demographics

Terrebonne Community School is a public school enrolling 361 students from Kindergarten to 8<sup>th</sup> grade. The school serves students in rural Deschutes County and the City of Terrebonne, with 41% of students eligible for in the Free and Reduced-Price Lunch Program. English is the primary language spoken by students, and only 1% of students are registered to have limited English proficiency.<sup>1</sup>

ENROLLMENT: 361	GRADE LEVELS SERVED AND SCHOOL TYPE: K-8, Public
STUDENT ETHNIC/RACIAL DEMOGRAPHICS: American Indian/Alaska Native: 0.3% Asian: 0.3% Hispanic or Latino: 8.3% Native Hawaiian/Pacific Island: 0.3% Multiracial: 4.7% Black/African American: 0.3% White: 85.9%	PREDOMINANT LANGUAGES SPOKEN IN REDMOND SCHOOL DISTRICT: English: 6,999 Spanish: 881
STUDENTS LIVING WITHIN 1-MILE OF SCHOOL: 26% <sup>2</sup>	TITLE 1 STATUS: Yes <sup>3</sup>
EVER ENGLISH LEARNERS: Fewer than 10 students or data not available <sup>4</sup>	FREE AND REDUCED-PRICE LUNCH ELIGIBILITY: 41%

<sup>1</sup> Unless otherwise noted, demographic data are from the Oregon Department of Education 19-20 SY, collected October 1, 2019

<sup>2</sup> SRTS Program parent surveys 2019

<sup>3</sup> Title 1 schools are schools where 40% or more of students are enrolled in USDA's Free and Reduced-Price Meals Program.

<sup>4</sup> Number of students who have been served or were eligible for an English language development program during 2018-19 or at any time in the past. Oregon Department of Education 18-19 SY collected May 1, 2019.

## Community Context and Place Type

Place type describes attributes of a built environment, including: access to destinations, density, walkability, mixing of uses, and presence of transit. The evaluation team compiled Oregon Department of Land Conservation and Development’s (DLCD) measures of [place type](#) for each community studied.<sup>5</sup> Each attribute is rated as “**Very Low, Low, Medium, or High**” by block group. Place type characteristics provide important context for transportation opportunities and challenges in a community and influence the transportation decisions people make.

Terrebonne Community School is located in the City of Terrebonne and serves the city and wider rural Deschutes county. The block group encompasses city limits and a large swath of county jurisdiction. According to the Place Type Tool, the area surrounding Terrebonne Community School is categorized as a Low Density/Rural, meaning it contains very low density development and the surrounding census block group generally contains more residential than commercial development, with 1,597 people residing and 114 people working within the census block. The area has a very low level of access to regional employment centers and destinations. The overall level of street connectivity in the area is characterized as “very low.”

<p>AREA TYPE describes the role of each neighborhood district compared to the rest of the region (regional center, close-in community, suburban/town, low density/rural)</p>	<p>Low Density/Rural</p> <ul style="list-style-type: none"> <li>• Very low densities of jobs and housing</li> <li>• Very low accessibility to jobs and services</li> <li>• Generally outside of UGB or undeveloped areas within UGB</li> <li>• Auto dependent transportation, due to low densities of jobs and services</li> </ul>
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<p>DEVELOPMENT TYPE describes more detailed physical characteristics of each neighborhood (transit supportive development, mixed use, employment, residential, rural/ low density):</p>	<p>Low Density/Rural</p> <ul style="list-style-type: none"> <li>• Very low densities of jobs and housing</li> <li>• Very low accessibility to jobs and services</li> <li>• Generally outside of UGB, or undeveloped areas within UGB</li> <li>• Auto dependent transportation, due to low activity densities</li> </ul>
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JURISDICTION POPULATION (ACS 5-YEAR ESTIMATES):	City of Terrebonne 1,257 people Deschutes County 157,773 people
CENSUS BLOCK GROUP POPULATION (2010):	1,597 people
NUMBER OF JOBS IN CENSUS BLOCK GROUP (2010):	114 jobs
ACCESS TO DESTINATIONS describes the number of regional jobs within 5 miles:	Very Low
DENSITY LEVEL- jobs and households per acre within ¼ mile:	Very Low
DESIGN LEVEL- level of street connectivity, pedestrian-oriented street density:	Very Low
DIVERSITY LEVEL- Mix of housing and employment:	Very Low
TRANSIT LEVEL- Afternoon peak hourly transit service within ¼ mile:	Very Low

<sup>5</sup> More information about OLCD’s Place Type Tool is available at: [www.oregon.gov/lcd/CL/Pages/Place-Types.aspx](http://www.oregon.gov/lcd/CL/Pages/Place-Types.aspx)

## Project Description

A map of the project improvements from the Terrebonne grant application is included in Appendix B.

**PROBLEM STATEMENT:** Pedestrian access to the Terrebonne Community School primarily occurs on the north side of the school. (C-Avenue), which has no sidewalk infrastructure. Pedestrian/vehicle conflicts occur on the north frontage.

**DESCRIPTION OF BARRIERS TO WALKING AND BIKING:** C-Avenue is a collector roadway with higher volumes and speeds than the adjacent low volume neighborhood streets that connect to the north. Parents are less inclined to allow their student to walk or bike to school without a safer, channelized crossing of C-Avenue.

**PROJECT DESCRIPTION:** This project will construct sidewalk along the north frontage of the school (both sides of C-Avenue) and channelize pedestrians to a safe crossing location at 8th Street. The project will significantly reduce vehicle/pedestrian conflict points.

**ESTIMATED PROJECT TIMELINE:** August, 2019

**PRIORITY SAFETY CORRIDOR?<sup>6</sup>** Yes

**OUTREACH AND EDUCATION:** Terrebonne Community School does not currently participate in any SRTS encouragement or engagement activities due to the lack of resources and staff capacity, in addition to challenges accessing the school via walking or biking. However, they participated in a PIP SRTS Plan in fall 2019 which recommended activities such as education programs for parents and students, schoolwide campaigns, and encouragement programs (such as policies and events) to improve and promote safe walking and bicycling to and from school and in the community.

Commute Options, a Bend-based SRTS non-infrastructure provider, works with select schools in the Redmond School District with funding from an ODOT SRTS Non-Infrastructure grant. While the schools have been pre-selected, if any opt out of the program, Terrebonne Community School could be an alternative to be considered for that technical assistance.

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<sup>6</sup> A road where the posted speed or 85<sup>th</sup> percentile speed of traffic is 40 mph or greater OR if and two of the following apply: posted speed limit of 30 mph or greater, more than two lanes or a crossing distance greater than 30 feet, 12,000 AADT or greater, has a demonstrated history of crashes related to school traffic.

## Access Analysis for Students Walking and Biking to School

The project team conducted an analysis to estimate the number of people who would gain walking and biking access to Terrebonne School when the project improvements are constructed, shown in Table 1 and Figure 1. First, the project improvements were evaluated to understand the geographic areas that would gain safe access to the school once the funded project was constructed. Next, American Community Survey (ACS) data was combined with zoning data to estimate the number of people and school-age children that live within the new access areas.

This analysis estimates that approximately 17 students, or 7% of the Terrebonne Community School student body living within a mile of the school, would gain safer walking or biking access to the school.

Table 1. Access Analysis Results<sup>7</sup>

METRIC	VALUE
Total Population of New Access Areas	81
School Age Population of New Access Areas <sup>8</sup>	17
Percentage of Students within the School Areas Gaining Access <sup>9</sup>	7%

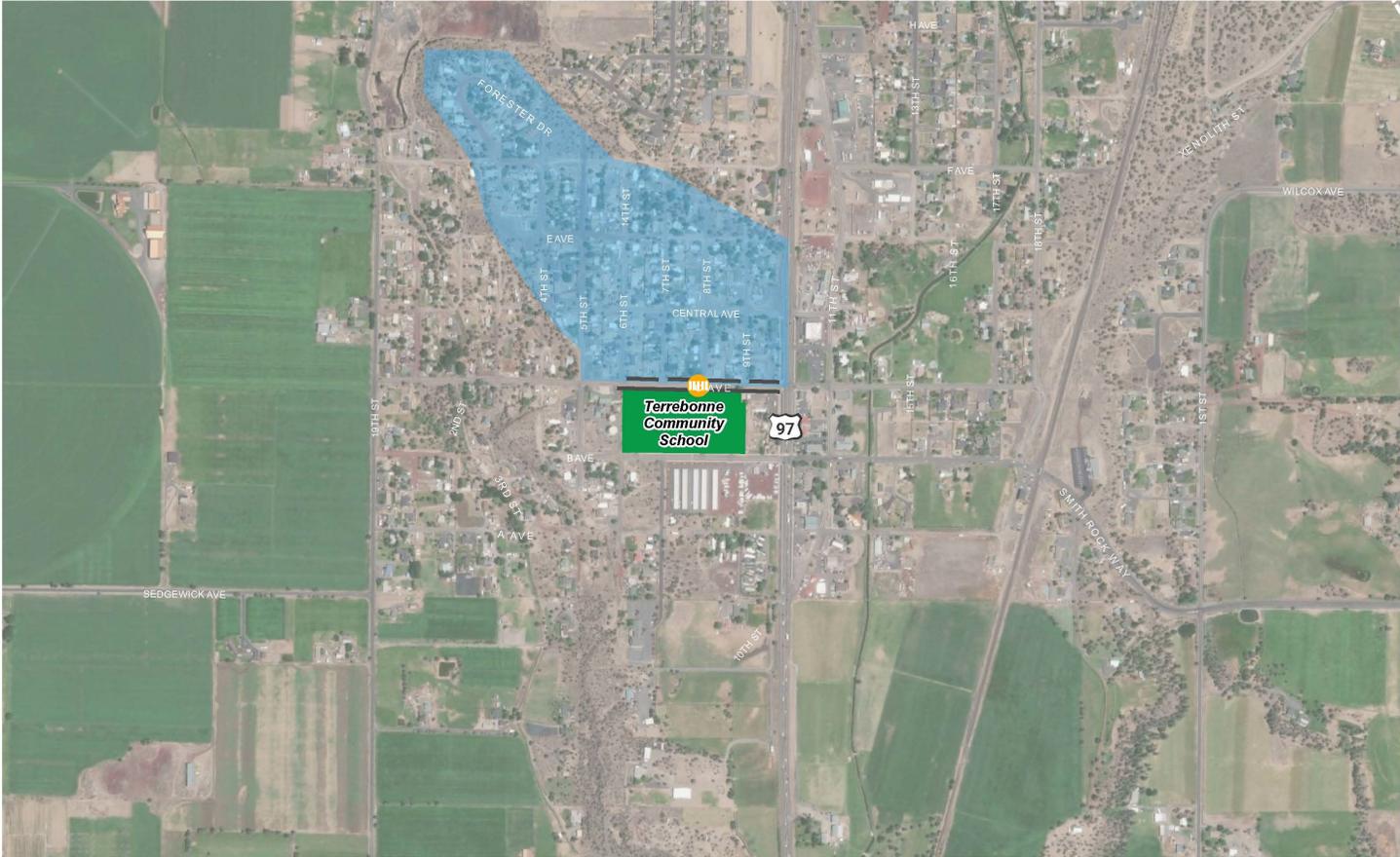
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<sup>7</sup> New Access Area assumptions: This analysis assumes that residents east of 5th Street and north of C Ave would be able to access the sidewalk starting at 6th street.

<sup>8</sup> Calculated using the proportion of school-age children (5-17 years old) within the City of Terrebonne.

<sup>9</sup> The School Area is defined as the area within the school enrollment area that is within one mile of the school.

Figure 1. Terrebonne Community School New Access Area for Students Walking and Biking



**Terrebonne Community School**  
 Students with New Access to Walking and Biking

Estimated Number of Students: **17**  
 Proportion of Students within 1 Mile: **7%**  
 To view the methods for this analysis, please see Appendix

0 0.25 0.5 Miles

- Applicant School
- Other School
- New Access Area
- New Crossing Improvement
- New Sidewalks

SafeRoutes  
 Oregon Safe Routes To School

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 PLANNING + DESIGN

## Baseline Data

The following section presents pre-construction data, which will be compared against similar data collected after the project has been construction, in order to estimate the impact of the improvements.

### Hand Tallies

DATE COLLECTED:	May, 2019
DATA COLLECTION PROCESS:	13 classrooms surveyed about their trip to and from school. Alta Planning + Design staff collected the data with assistance from a school parent volunteer.
NUMBER OF STUDENTS:	337 students participated in hand tallies
TRIPS RECORDED	1,172 trips recorded by the hand tallies

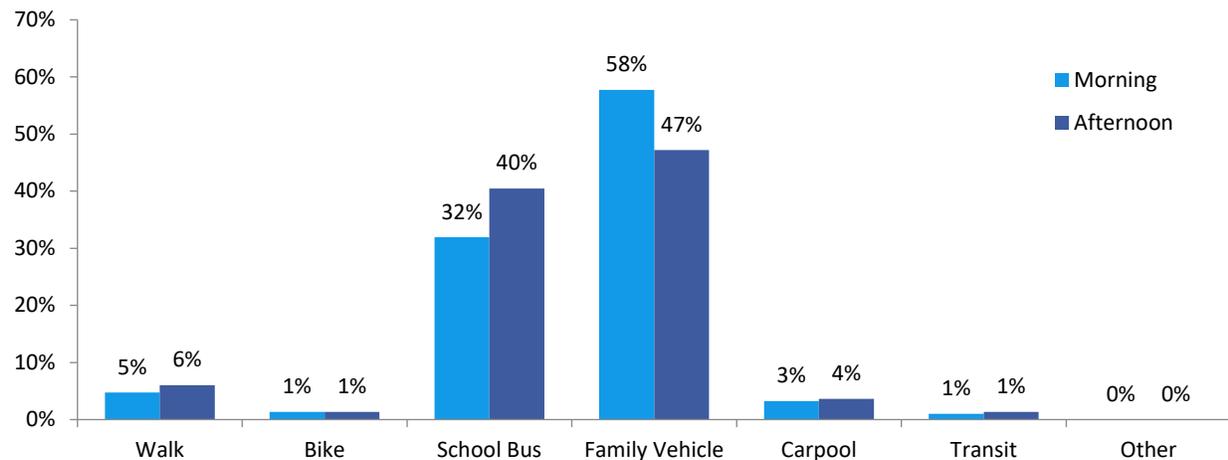
#### SUMMARY OF DATA COLLECTION AND METHODOLOGY

The May 2019 baseline hand tally data from Terrebonne Community School includes 1,172 recorded trips collected from 337 students in 13 classrooms. The hand tally process surveyed all students in each classroom on which transportation mode(s) they had used to get to and from school the day of the survey and the day prior to the survey. The consultant team used the Oregon SRTS's hand tally data collection form and process to collect the data. This data provides a snapshot of student travel behavior trends.

#### SUMMARY OF RESULTS:

Terrebonne Community School hand tally data from 2019 indicates that a majority of students surveyed ride in a family vehicle in the morning and afternoon (see Figure 2 and Table 2). Riding the school bus was the second most common student travel mode. Five percent of students walk in the morning and six percent of students walk home in the afternoon. Eight students reported biking to/from school.

Figure 2. Student Mode Split by Time of Day, 2019 Hand Tally Data



Note: Percentages may not total 100% due to rounding.

**Table 2. Count of Student Mode Split to and From School, 2019 Hand tally Data**

TIME OF DAY	WALK	BIKE	SCHOOL BUS	FAMILY VEHICLE	CARPOOL	TRANSIT	OTHER
Morning	28	8	188	340	19	6	0
Afternoon	35	8	236	275	21	8	3

### Parent/Caregiver Surveys

DATE COLLECTED: June, 2019

DATA COLLECTION PROCESS: The Oregon Department of Transportation SRTS parent/caregiver survey was distributed online to parents at Terrebonne Community School to assess family perceptions about school travel options and behavior. The survey was available in English and Spanish.

NUMBER OF SURVEYS: 56; 16% response rate

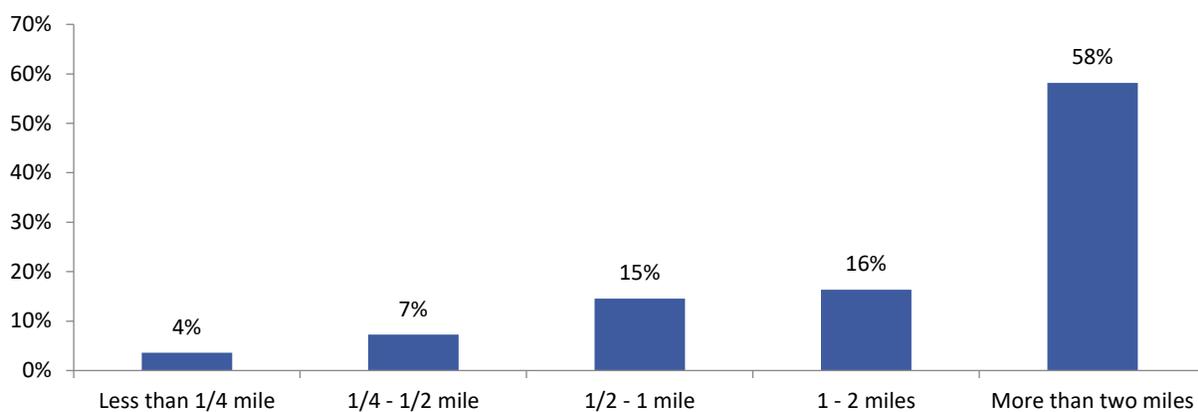
#### SUMMARY OF DATA COLLECTION AND METHODOLOGY

The parent/caregiver survey data included in this report was collected in June of 2019 from 56 participants with students attending Terrebonne Community School. The consultant team supported data collection by providing outreach materials and data collection strategy. Survey was available in hard copy and online in English and in Spanish.

#### SUMMARY OF RESULTS:

Parent/caregiver survey analysis revealed that over half of respondents live more than 2 miles from Terrebonne, with an additional 16% living between one and two miles of the school site (see Figure 3). Only 11% of surveyed parents and caregivers live within a half-mile of the school, with 15% more living between a half-mile and a mile away. This indicates that the majority of students are eligible for school bussing and live too far to easily walk or bike to school.

**Figure 3. How Far Does your Family Live from School?, 2019 Parent/Caregiver Survey**



For those students living within a quarter-mile of Terrebonne Community School, half traveled to school by family vehicle, while the other half used active modes. Shared travel modes were the most commonly utilized transportation option for students living between a quarter-mile and a half-mile away from school (see Figure

4 and Table 3). A majority of students who commute a half-mile or more rode in a family vehicle. Among those who live two miles away or more, 44% used shared modes, such as riding the school bus, carpooling, or taking public transit. Students living more than one mile from Terrebonne Community School did not use active modes to get to school.

Figure 4. Mode Split by Distance from School, 2019 Parent/Caregiver Survey

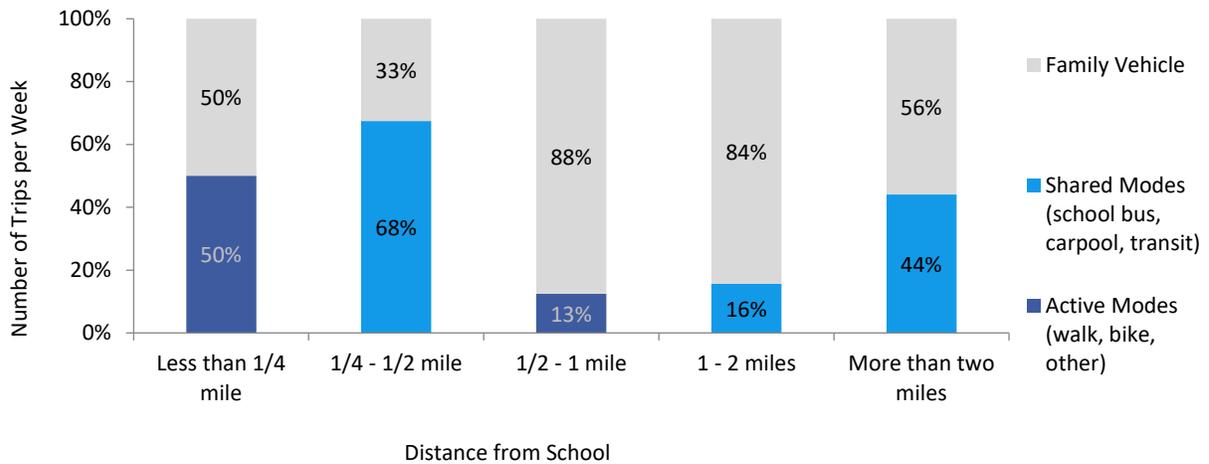
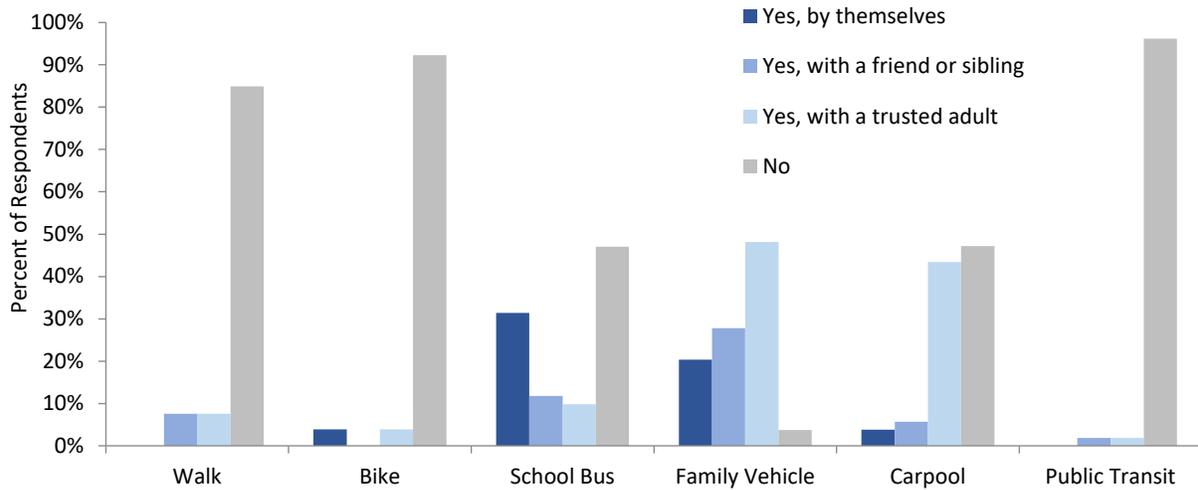


Table 3. Count of Trips by Distance the Family Lives from School, 2019 Parent/Caregiver Survey

DISTANCE	WALK	BIKE	SCHOOL BUS	FAMILY VEHICLE	CARPOOL	TRANSIT	OTHER
Less than 1/4 mile	10	0	0	10	0	0	0
1/4 mile up to 1/2 mile	0	0	0	13	25	2	0
1/2 mile up to 1 mile	10	0	0	70	0	0	0
1 mile up to 2 miles	0	0	14	76	0	0	0
More than 2 miles	0	0	141	179	0	0	0

As Figure 5 illustrates, 85% of parents and caregivers surveyed reported that they would not allow their student to walk to/from school. However, 8% would allow walking if the student were accompanied by a friend or sibling, and another 8% would allow it if a trusted adult were present. Additionally, 92% reported that they would not allow their student to bike, with only 4% reporting that they would allow this with the accompaniment of a trusted adult.

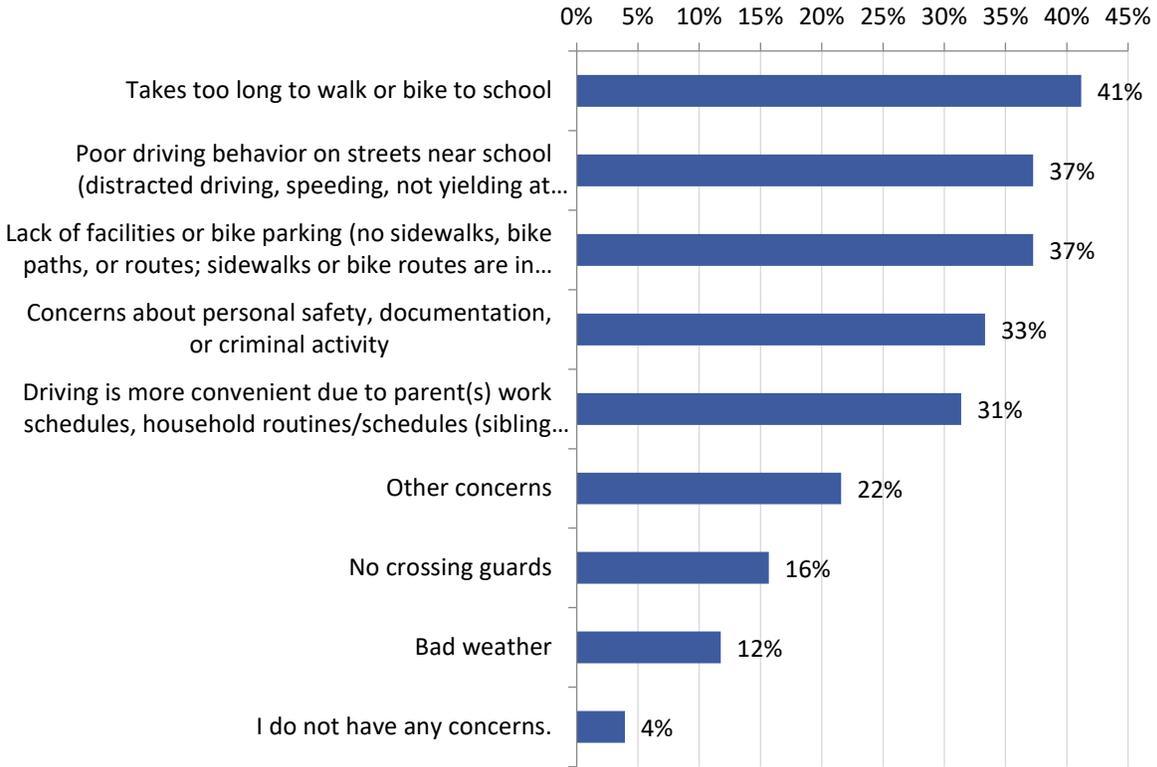
Figure 5. Do You Allow this Student to Travel to School in the Following Ways?, 2019 Parent/Caregiver Survey



While parents and caregivers reported varying concerns that limit their student’s ability to walk or bike to school, some were more commonly expressed than others (see Figure 6). The following were top concerns for the Terrebonne Community School community:

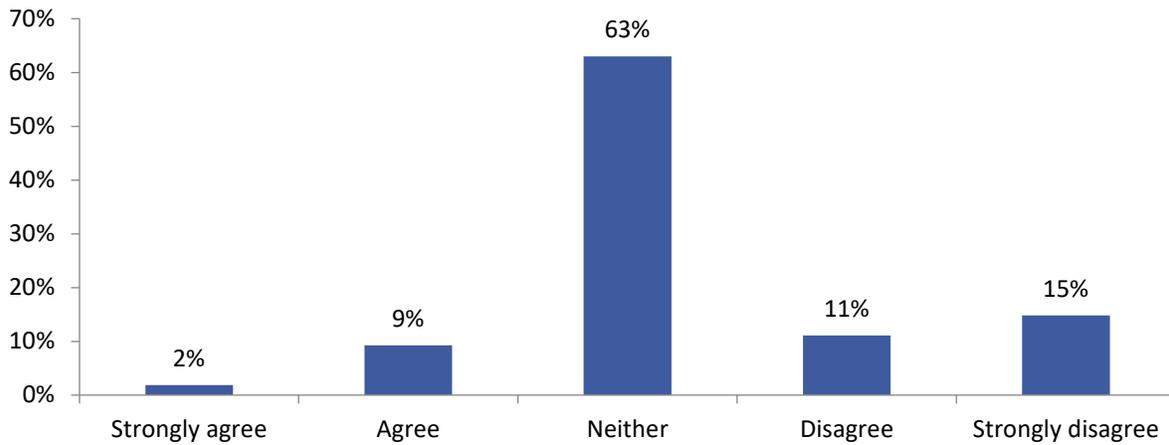
- The amount of time it takes to bike to/from school
- Poor driver behavior
- A lack of facilities or parking for walking and/or biking
- Concerns about the student’s safety

**Figure 6. What Concerns Limit Your Student’s Ability to Walk or Bike to/from School?, 2019  
Parent/Caregiver Survey**



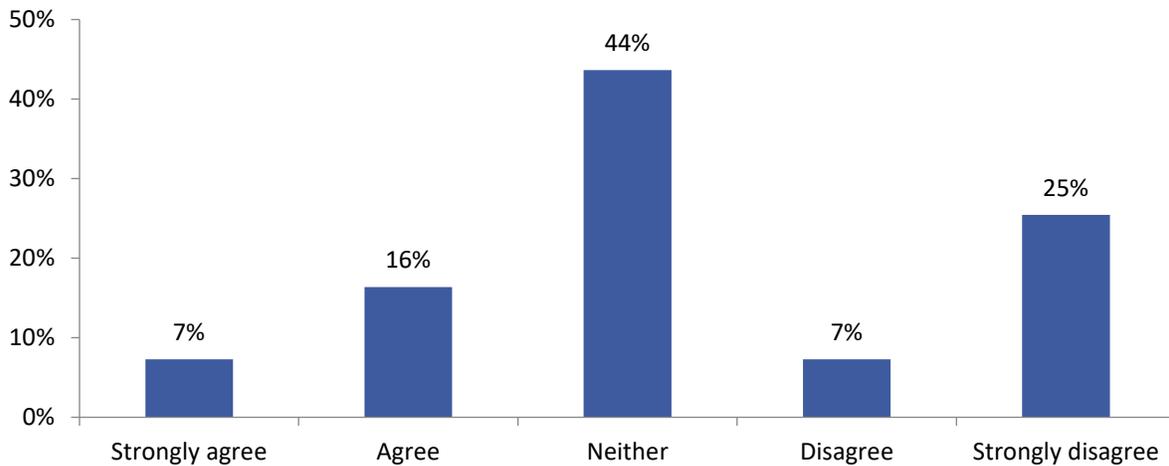
A majority of parent and caregiver respondents (63%) felt Terrebonne Community School neither encouraged or discouraged students from walking and biking to school at the time of the survey. An additional 11% felt the school encouraged or strongly encouraged active transportation, while 26% characterized the school as discouraging walking and biking (see Figure 7).

Figure 7. Agree/Disagree: Walking/Biking to/from School is Encouraged by my Student's School, 2019 Parent/Caregiver Survey



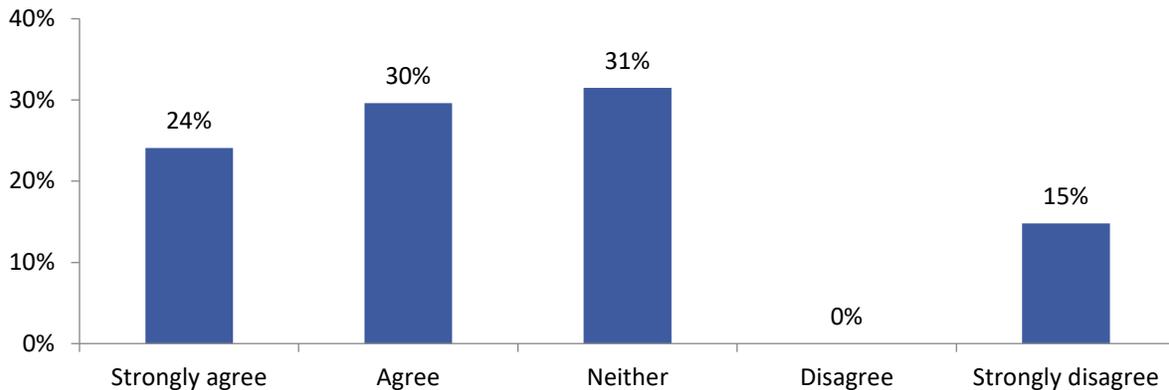
At the time of the survey, about a quarter (23%) of parents and caregivers agreed that walking or biking to school would be a fun activity for their students, while 32% believed the activity would not be fun. Almost half of the respondents (44%) were neutral or unsure on whether their student would enjoy walking and biking to school (Figure 8).

Figure 8. Agree/Disagree: Walking/Biking to/from School is Fun for my Student, 2019 Parent/Caregiver Survey



A majority of parents and caregivers recognized the health benefits of active transportation, with 54% reporting that walking or biking to school would be healthy or very healthy for their student. An additional 31% were neutral regarding the health benefits of walking and biking, while 15% did not agree that these activities would be healthy for their student (see Figure 9).

**Figure 9. Agree/Disagree: Walking/Biking to/from School is Healthy for my Student, 2019 Parent/Caregiver Survey**



### Crash Data

DATE COLLECTED: 2012-2016

DATA COLLECTION PROCESS: Crash Data included in this report originates from the ODOT SRTS Web Map Application. This analysis does not determine whether the grant intervention *caused* any change in the occurrence of crashes, due to small sample size. Additionally, due to insufficient mode split data to calculate crash *rates*, this report offers a count and description of reported incidents.

NUMBER OF REPORTED CRASHES INVOLVING BIKES AND PEDESTRIANS WITHIN 1 MILE OF SCHOOL: Between 2012 and 2016, two crashes involving a bicyclist or pedestrian were reported within one mile of the school.

TIME OF REPORTED CRASHES INVOLVING BIKES AND PEDESTRIANS WITHIN 1 MILE OF SCHOOL\*: Both of the reported crashes occurred during PM school commuting hours. \* For these purposes school commuting hours were defined as 6 AM to 9 PM.

NUMBER OF REPORTED INJURIES BY SEVERITY WITHIN 1 MILE OF THE SCHOOL: Both of the reported crashes involved an injury to a bicyclist or pedestrian, and both were non-fatal. Figure 10 illustrates the location of the crashes by type and injury severity.

ADDITIONAL CRASH DATA CONSIDERATIONS:

### Notes on Community Context or other Relevant Information:

None.



## Follow-Up Data Collection Plan

### Timeline

Post-grant field visits to collect follow-up data will be scheduled to take place the spring following the completion of each grant intervention. The project was completed in August 2019.

### Follow-up Data Collection Process

METHOD	PLANNED AT THIS SITE?	TARGET SAMPLE SIZE	TARGET FIELD WORK DATE
STUDENT HAND TALLIES:	Yes	At least 2 classrooms per grade per school	Late spring 2022
PARENT SURVEYS:	Yes	At least 30 parents per school	Late spring 2022
PARENT FOCUS GROUPS:	Yes	4-10 parents	Late spring 2022
STAFF SURVEYS:	Yes	1-3 school staff and administration	Late spring 2022
CRASH DATA:	Yes	N/A	N/A
OTHER (LIST):	None	N/A	N/A

# Appendix A. Final Report DRAFT Outline

*Note: The following Final Report outline is subject to change.*

## Chapter 1. Introduction

- Description of SRTS IN Grant Program
- Description of Final Report purpose and contents

### SUMMARY OF FUNDED INFRASTRUCTURE IMPROVEMENTS

- Project description
- Map of improvements
- Project timeline

### BACKGROUND

- School demographics
- Summary of Non-Infrastructure SRTS Work
- Place Type

## Chapter 2. Data Collection and Results

### HAND TALLY DATA

- Data Collection Methods
- Change in walking and biking rates

### PARENT SURVEY DATA

- Data Collection Methods
- Change in mode split by distance from school
- Change in barriers to walking and biking
- Change in perceptions of walking and biking
- Other observations

### FOCUS GROUPS

- Data Collection Methods
- Change in barriers to walking and biking
- Change in perceptions of walking and biking

### CRASH DATA

- Data included in analysis
- Change in crash data (*If available, otherwise this will provide updated baseline crash data from ODOT*)

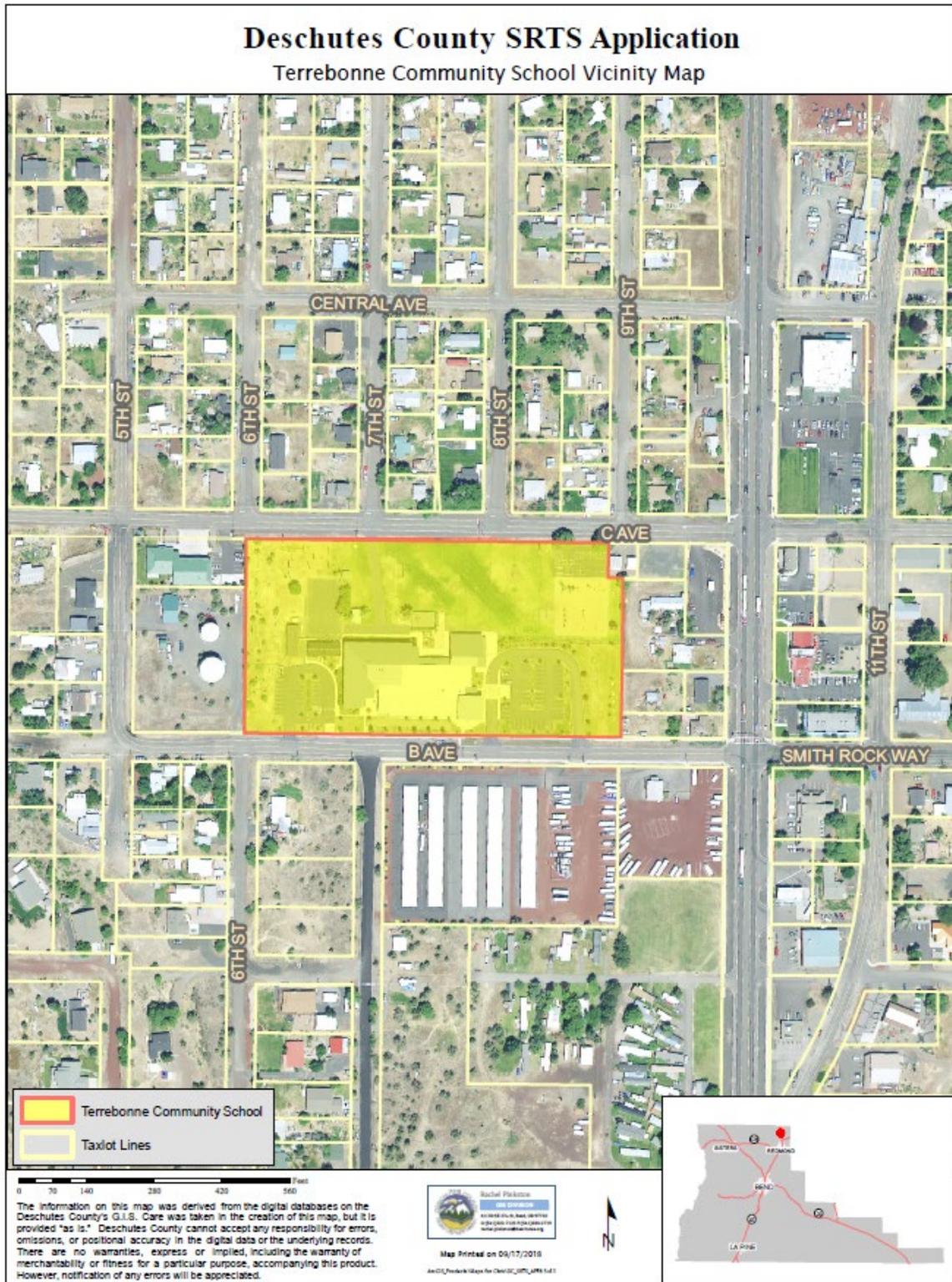
## Chapter 3. Findings

- Impact of Infrastructure improvements on mode split
- Impact of Infrastructure Improvements on Access to Safe Infrastructure

- impact of infrastructure improvements on safety/perception of safety
- Impact of Infrastructure Improvements on Program lifespan/partnerships
- impact of infrastructure improvements on equity
- Other Findings
- Next Steps and Recommendations

# Appendix B.

Figure 11. Terrebonne Community School Competitive SRTS IN Grant Funded Project Map



# Appendix C. Access to SRTS Detailed Methodology

## Purpose

The access map analysis was designed to estimate the number of students with new or significantly improved access to school upon the implementation of a proposed walking or biking facility. While determining the number of students who benefit from a proposed project is not an exact science, this analysis provides a common approach that utilizes school district boundaries, census population data and local zoning codes to generate rough estimates. These estimates lend greater insight into the impact of a particular Safe Routes to School project, allowing facility improvements to be compared and thus aid in prioritizing investments. This memo outlines the data sources, methods, and assumptions that inform the access map analysis described in this report.

## Data Sources

Three primary data sources were used in this analysis in conjunction with the information provided in each project application:

Name	Source
American Community Survey (ACS) Population Estimates	<a href="#">US Census Bureau</a>
Oregon School District Boundaries	<a href="#">Oregon Department of Education</a>
2017 Oregon Statewide Zoning Map	<a href="#">Oregon Department of Land Conservation and Development</a>

## Methods

The analysis establishes two geographical areas in which census block population data are apportioned to: 1) the school area and 2) the access area. The school area is defined as the area that is within a 1-mile radius of the applicant school or within the enrollment boundary, whichever is closer. This area covers residents within reasonable walking or biking distance of the to school. The access area is the area that covers all residents who would experience new or significantly improved access to school upon the implementation of the proposed walking or biking facility.

Once both of these areas have been established, the consultant team identified the census blocks that intersect each. We then apportioned the population data from the census blocks to the school area and the access area, based on the relative coverage of each census block. To account for varying residential densities in each census block, we used residential zoning data to determine the proportion of the population that should be attributed to the school area and access area.

After the estimated populations of both the school area and the access area are calculated, the local jurisdiction's youth rate is applied to each to get the number of people ages 5-17 in those areas, which we refer to as the 'school age population'. Finally, the school age populations of the access area and the school area are compared. The percentage of school age students with new or improved access to school represents the proportion of students impacted by the project out of all the students in the school area who could reasonably walk or bike to school.

## Defining the Access Area

The boundary of the school area is readily calculable using GIS and the rules described above. By contrast, the access area boundary was determined manually based on the project description and professional judgement of impact. While this method inherently includes subjective judgement, the high variability and nuance in the transportation context surrounding the proposed project makes this method more suitable for determining the residential areas would benefit from its implementation than a purely GIS-based workflow. The following assumptions and rules of thumb were adopted in order to make the assessment of the access areas as uniform as possible:

1. The analysis assumes people are willing to "walk around the block" half the distance of their street in the opposite direction of school in order to utilize a safe path to school.
2. The analysis assumes that Google Earth street view imagery is up to date, as this was used to determine sidewalk connectivity and condition, which informed the access areas.
3. Places without sidewalks, particularly in small towns, are considered walkable if the street is narrow, residential, and designed for a low volume of traffic (i.e., lacks a centerline)
4. The access areas consider ADA accessibility and account for those in wheelchairs or other mobility devices.
5. The access areas may include residents who have to walk more than one mile to school, based on the available street network.
6. Even if some residents may have already had access to school, they might be included in the access area if the proposed project would significantly improve their access to school.

## Apportioning Census Population Data

As described above, census population data was apportioned to both the school area and the access area based on how much a census block covered them. However, to account for varying population densities across census blocks, residential zones in the census blocks were identified.

The statewide zoning data provided by the Oregon Department of Land Conservation and Development groups residential zones across all jurisdictions in the state into 13 categories of increasing density. Our team further consolidated these categories into just 4: Low Density, Medium-Low Density, Medium-High Density, and High Density. We then weighted these categories by their relative density compared to Low Density:

Residential Zone Group	Population Density Factor
Low Density	1
Medium-Low Density	2
Medium-High Density	5
High Density	15

These factors serve to more accurately distribute the population data across the residential zones within the census block. In other words, if the census block contained only Low Density residential zones, then the population of any given area within that census block is equal to the proportion of the census block that that area covers. By contrast, if a census block contains Low Density residential zones and High Density zones, we attribute 15 times the population of the census block to the High Density zones than the Low Density zones. The density factors were determined using the typical number of dwellings per acre in in each zone.

The analysis uses these four zoning categories to identify the spatial distribution of the population of the census block and apportion it to the overlaying school area and access areas based on how much those areas cover the residential zones of the census block.

## General Assumptions

- This analysis assumes that the Oregon Statewide Zoning code reflects the actual residential densities of the current built environment.
- Areas that were zoned for housing that had no development on them according to the latest satellite imagery (and significantly impacted the output) were removed from the analysis in order to improve the accuracy of the estimates. This was only utilized in a few low-population jurisdictions.
- This analysis assumes that families are evenly distributed between each of the four residential zone groups.
- The reported number of school-age students includes all students ages 5-17, not just elementary or middle school students. Thus, the number of students who actually attend the applicant school is likely much lower than the reported figure.