

City of Gresham – Hogan Cedars Elementary School

Baseline Data Evaluation Report



FINAL July 27, 2022

Introduction

This case study evaluation measures the impacts of Oregon Safe Routes to School (SRTS) 2021 Competitive Construction 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 construction grants, and combined outreach and education and construction 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?

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

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 as soon as possible after construction is complete, likely starting in spring 2024. 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 caregiver surveys and student travel hand tallies, post-construction data collection methods for the evaluation report may also include: caregiver 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 caregivers 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 Report 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, and planning for future infrastructure projects, as well as providing supporting documentation for the future.

Baseline SRTS Snapshot: Hogan Cedars Elementary

Summary

Hogan Cedars Elementary School is a public elementary school serving students in the City of Gresham and rural Multnomah County. Hogan Cedars is a Title 1 school, with more than 65% of students eligible for the Federal Free and Reduced-Price Lunch Program. English and Spanish are the primary languages spoken by students, and 30% of students are registered as Ever English Learners.¹

City staff identified Hogan Cedars Elementary School as a high priority site for SRTS improvements due to motorist's high speeds that make it unsafe for students walking and biking to school.

The Oregon SRTS 2021 Competitive Construction Grant funded three established school zone flashers that will flash during school arrival and dismissal times. The flashers will make motorists more aware of the school zone and reduced speed during arrival and dismissal times.

In addition to these planned infrastructure improvements, the City and the Gresham-Barlow School District have completed a District SRTS Action Plan and completed Walking Maps for every school in the district in 2019.

Key information from Hogan Cedars Elementary caregiver surveys and staff interview:

- 70% of students live within a mile of the school.
- Approximately 43% of students ride in a family vehicle to school and home; 43% of students take the school bus to school and home.
- Caregivers report that travel time is the most common barrier to walking/biking to school. Other barriers include:
 - Concerns about safety, documentation, or criminal activity
 - Convenience of driving
 - Poor driver behavior
- Many caregivers recognize the value of walking/biking to school—70% described it as healthy, and 42% described it as fun for their student.

¹ 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, 2022.

Contact Information

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OTHER CONTACTS:	Elaine Luckenbaugh, Principal, luckenbaugh@gresham.k12.or.us

Enrollment and Demographics

Hogan Cedars Elementary School is a Title 1 public school enrolling 468 students in Kindergarten through 5th grade. The school serves low-income populations in the City of Gresham; approximately 68.1% of students are eligible for the Free and Reduced-Price Lunch Program. English and Spanish are the primary languages spoken by students, and 29% are registered to be Ever English Learners.²

ENROLLMENT: 468 ³	GRADE LEVELS SERVED AND SCHOOL TYPE: K-5 th , Public
STUDENT ETHNIC/RACIAL DEMOGRAPHICS: American Indian/Alaska Native: 1% Asian: 5% Hispanic or Latino: 2% Native Hawaiian/Pacific Island: 37% Multiracial: 8% Black/African American: <1% White: 46%	PREDOMINANT LANGUAGES SPOKEN IN GRESHAM-BARLOW SCHOOL DISTRICT: ⁴ English: 8409 Spanish: 2306 Russian: 264 Arabic: 119 Romanian: 78 Ukrainian: 71 Hmong: 50 Tagalog: 24
STUDENTS LIVING WITHIN 1 MILE OF SCHOOL: NA	TITLE 1 STATUS: Yes ⁵
EVER ENGLISH LEARNERS: 30% ⁶	FREE AND REDUCED-PRICE LUNCH ELIGIBILITY: 68.1% ⁷

² Unless otherwise noted below, demographic data are from the Oregon Department of Education Fall Membership Report SY2020-2021 Data, <https://www.oregon.gov/ode/reports-and-data/students/Pages/Student-Enrollment-Reports.aspx>

³ Oregon Department of Education, SY 2020-2021 <https://www.ode.state.or.us/data/reportcard/Media.aspx>

⁴ Oregon Department of Education Language Use Survey, SY 2020-2021 <https://www.oregon.gov/ode/schools-and-districts/grants/ESEA/EL/Pages/LanguageUseSurvey.aspx>

⁵ Title 1 schools are schools where 40% or more of students are enrolled in USDA's Free and Reduced-Price Meals Program. Oregon Department of Education, SY 2018-2019 <https://www.oregon.gov/ode/schools-and-districts/reportcards/reportcards/Pages/Accountability-Measures.aspx>

⁶ Oregon Department of Education, SY 2020-2021 <https://www.ode.state.or.us/data/reportcard/Media.aspx>

⁷ Oregon Department of Education, SY 2020-2021 <https://www.oregon.gov/ode/students-and-family/childnutrition/cacfp/Documents/Site%20Eligibility%20for%20CACFP%20and%20SFSP.pdf>

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.⁸ 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.

Hogan Elementary School is located in the City of Gresham. According to the Place Type Tool, the area surrounding Hogan Cedars Elementary School is categorized as Suburb/ Town, meaning it contains lower density development. Its development type is characterized as Residential meaning the surrounding area is dominated by housing. With 1,684 people residing and 233 people working within the census block group, the area has a low level of access to regional employment centers and destinations, and a high mix of uses; however, the overall level of street connectivity in the area is characterized as “low.”

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)

Suburb/ Town

- Lower densities of jobs and/or housing
- Lower accessibility to regional jobs
- Lower densities decrease multi-modal access to jobs

DEVELOPMENT TYPE describes more detailed physical characteristics of each neighborhood (transit supportive development, mixed use, employment, residential, rural/ low density):

Residential

- Land use is dominated by housing
- Low diversity of land uses
- Jobs/Housing balance: mostly housing
- Missing either the density or street design required of mixed use

JURISDICTION POPULATION (ACS 5-YEAR ESTIMATES):

City of Gresham 109,379 people

CENSUS BLOCK GROUP POPULATION (2010):

1,684 people

NUMBER OF JOBS IN CENSUS BLOCK GROUP (2010):

233 jobs

ACCESS TO DESTINATIONS describes the number of regional jobs within 5 miles:

Low

DENSITY LEVEL- jobs and households per acre within ¼ mile:

Low

DESIGN LEVEL- level of street connectivity, pedestrian-oriented street density:

Very Low

DIVERSITY LEVEL- Mix of housing and employment:

High

TRANSIT LEVEL- Afternoon peak hourly transit service within ¼ mile:

Low

⁸ More information about OLCD's Place Type Tool is available at: www.oregon.gov/lcd/CL/Pages/Place-Types.aspx

Project Description

A map of the project improvements from the Hogan Cedars Elementary grant application is included in Appendix B.

PROBLEM STATEMENT: The City of Gresham has several School Zones located on high-speed arterial and collector streets with speeds of 35 mph. During school times the school zone reduces the speed to 20 mph for safety. Motorists often don't see the school zone signs and drive too fast in the school zone making it unsafe for students walking and biking to school.

DESCRIPTION OF BARRIERS TO WALKING AND BIKING: Motorists often drive too fast in the school zone making it unsafe for students walking and biking to school.

PROJECT DESCRIPTION: This project adds flashers to three established school zones that will flash during school arrival and dismissal times. The flashers make motorists more aware of the school zone and the school zone reduced speed during arrival and dismissal times. By reducing speeds along these arterial and collector streets a safer and more pleasant environment for walking and biking to school is created. Gresham currently has nine school zones with flashers to attract motorist attention.

ESTIMATED PROJECT TIMELINE: December 2022 Completion

PRIORITY SAFETY CORRIDOR?⁹ Yes

OUTREACH AND EDUCATION: The City has worked with the Gresham-Barlow School District to complete a District SRTS Action Plan and completed Walking Maps for every school in the district in 2019. City staff investigated issues of vehicle queuing at arrival and dismissal at Hogan Cedars in 2019, providing options to the principal for new circulation options. At principal request the City installed a new ADA compliant crossing across SE Fleming St to provide students a clear crossing from adjacent neighborhoods.

The Multnomah County SRTS Coordinator supports SRTS efforts in Gresham, including at Hogan Cedars Elementary.

⁹ A road where the posted speed or 85th percentile speed of traffic is 40 mph or greater OR where 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, or 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 Hogan Cedars Elementary 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 the number of school-age children that live within the new access areas.

This analysis estimates that approximately 379 students, or 53% of the school-aged population living within a mile of the school, would gain safer walking or biking access to the school.

Table 1. Access Analysis Results

METRIC	VALUE
Total Population of New Access Areas	1,501
School Age Population of New Access Areas ¹⁰	379
Percentage of Students within the School Areas Gaining Access ¹¹	53%

¹⁰ Calculated using the proportion of school-age children (5-17 years old) within the City of Gresham.

¹¹ The School Area is defined as the area within the school enrollment area that is within one mile of the school.

Figure 1. Hogan Cedars Elementary New Access Area for Students Walking and Biking



Hogan Cedars Elementary School Students with New Access to Walking and Biking

Estimated Number of Students: 379
Proportion of Students within 1 Mile: 53%
To view the methods for this analysis, please see Appendix.



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

Baseline Data

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

Staff Interview

DATE COLLECTED: March 29, 2022

DATA COLLECTION PROCESS: Staff interview with Heidi Blakely, school Principal

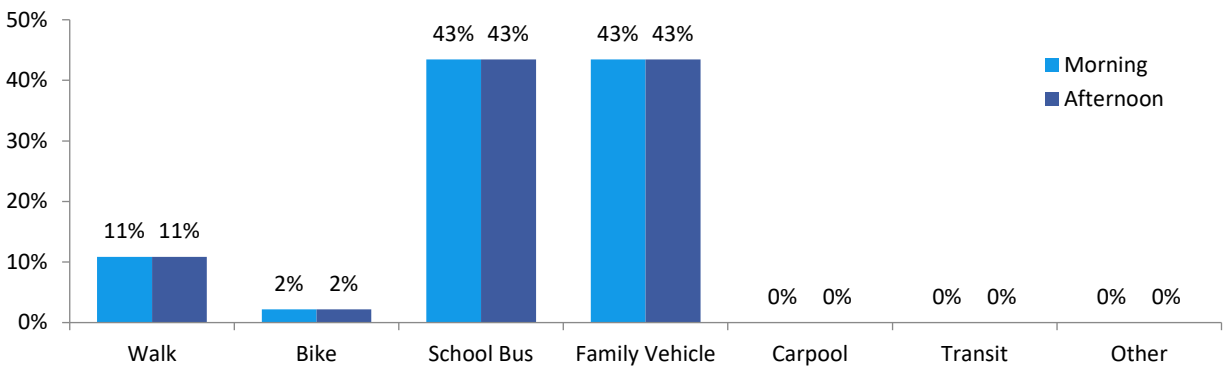
SUMMARY OF DATA COLLECTION AND METHODOLOGY

Due to the COVID-19 pandemic and the risk in conducting in-person travel tallies at Hogan Cedars Elementary, Heidi Blakely, the principal at the school, provided the Alta Planning + Design Safe Routes to School team an account of current travel conditions at Hogan Cedars Elementary. Heidi Blakely answered questions about typical travel mode-share to and from Hogan Cedars Elementary at the time of the interview.

SUMMARY OF RESULTS:

Hogan Cedars Elementary staff interview data from 2022 indicates that an equal number (43%) of students travel by school bus and family vehicle in the morning and afternoon (see Figure 2 and Table 2). Bikes were used by 2% of students to get to school and home, and carpool was used by none of the students to and from school. Approximately 11% of students traveled to and from school by walking.

Figure 2. Student Mode Split by Time of Day, 2022 Staff Interview Data



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

Table 2. Count of Student Mode Split to and From School, 2022 Staff Interview Data

TIME OF DAY	WALK	BIKE	SCHOOL BUS	FAMILY VEHICLE	CARPOOL	TRANSIT	OTHER
Morning	50	10	200	200	0	0	0
Afternoon	50	10	200	200	0	0	0

Caregiver Surveys

DATE COLLECTED: March/April 2022

DATA COLLECTION PROCESS:

The Oregon Department of Transportation SRTS caregiver survey was distributed electronically and by hard copy to caregivers at Hogan Cedars Elementary School to assess family perceptions about school travel options and behavior. The survey was available in English and Spanish.

NUMBER OF SURVEYS:

102 respondents (9 online, 93 hard copies, 13 Spanish, 89 English)

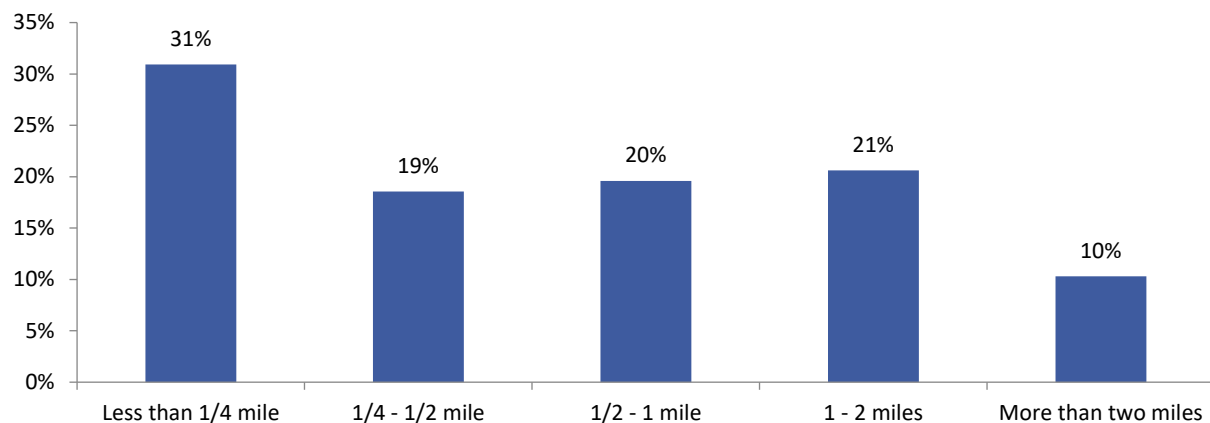
SUMMARY OF DATA COLLECTION AND METHODOLOGY

The caregiver survey data included in this report was collected in March and April of 2022 from 102 participants with students attending Hogan Cedars Elementary. Alta Planning + Design staff created a promotional flier which included details about the Safe Routes to School program, project contact information, a link to the online survey and instructions on where to return hard copies of the paper surveys. Caregivers who completed the survey were entered into a raffle for a walking/biking safety kit.

SUMMARY OF RESULTS

Caregiver survey analysis revealed that 70% of respondents live within one mile of Hogan Cedars Elementary, with an additional 21% living between one and two miles of the school site (see Figure 3); 10% of surveyed caregivers live more than two miles from the school.

Figure 3. How Far Does Your Family Live from School?, 2022 Caregiver Survey



Family vehicles modes were the most commonly used transportation option for students living over two miles from the school (see Figure 4 and Table 3). For students who live under one mile from school, shared modes were the most popular transportation. Active transportation modes were the least frequent method of transportation, with the greatest percentage (21%) reported by caregivers living within a quarter mile of Hogan Cedars Elementary.

Figure 4. Mode Split by Distance from School, 2022 Caregiver Survey

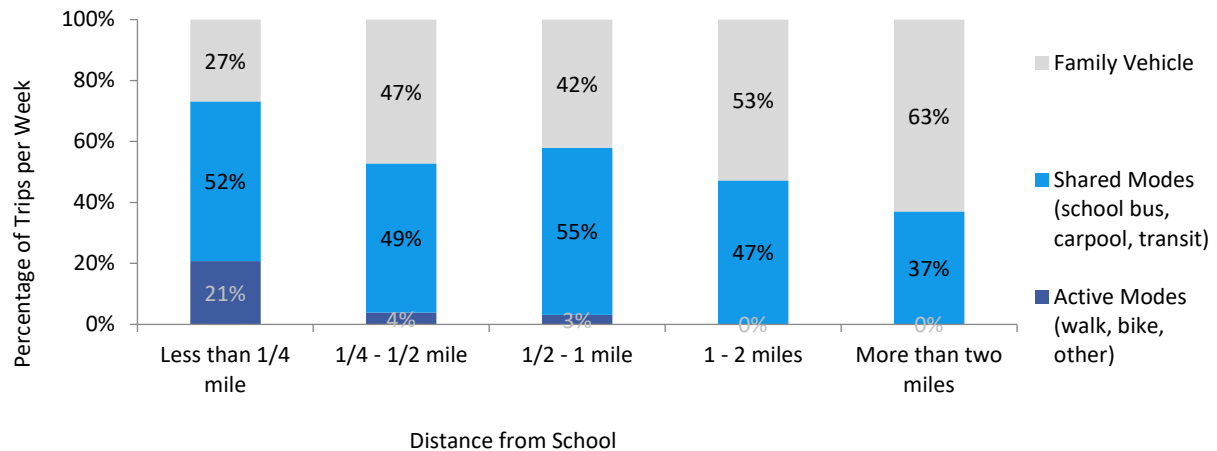
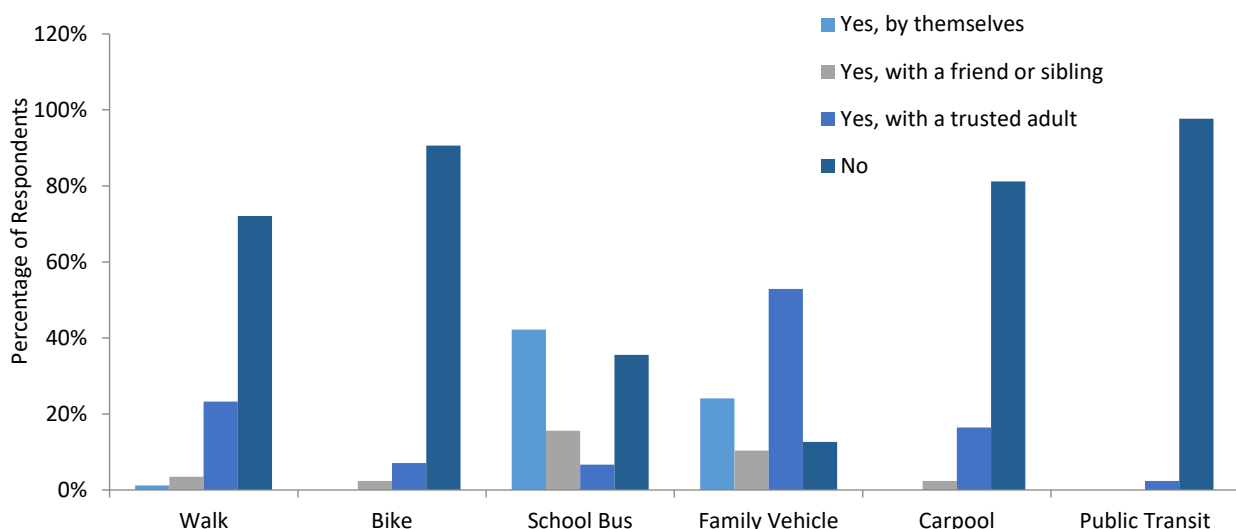


Table 3. Count of Trips by Distance the Family Lives from School, 2022 Caregiver Survey

DISTANCE	WALK	BIKE	SCHOOL BUS	FAMILY VEHICLE	CARPPOOL	TRANSIT	OTHER
Less than 1/4 mile	0	0	0	10	0	0	0
1/4 mile up to 1/2 mile	0	0	35	15	0	0	0
1/2 mile up to 1 mile	3	0	16	21	0	0	0
1 mile up to 2 miles	0	0	34	25	1	0	0
More than 2 miles	0	0	18	135	7	0	0

As Figure 5 illustrates, 72% of caregivers surveyed reported that they would not allow their student to walk to/from school. However, 23% responded that they would allow their student to walk if they were accompanied by a trusted adult, and another 3% would allow them to walk with a friend or sibling; 91% said they would not allow their student to bike, and only 7% would allow biking with a trusted adult present.

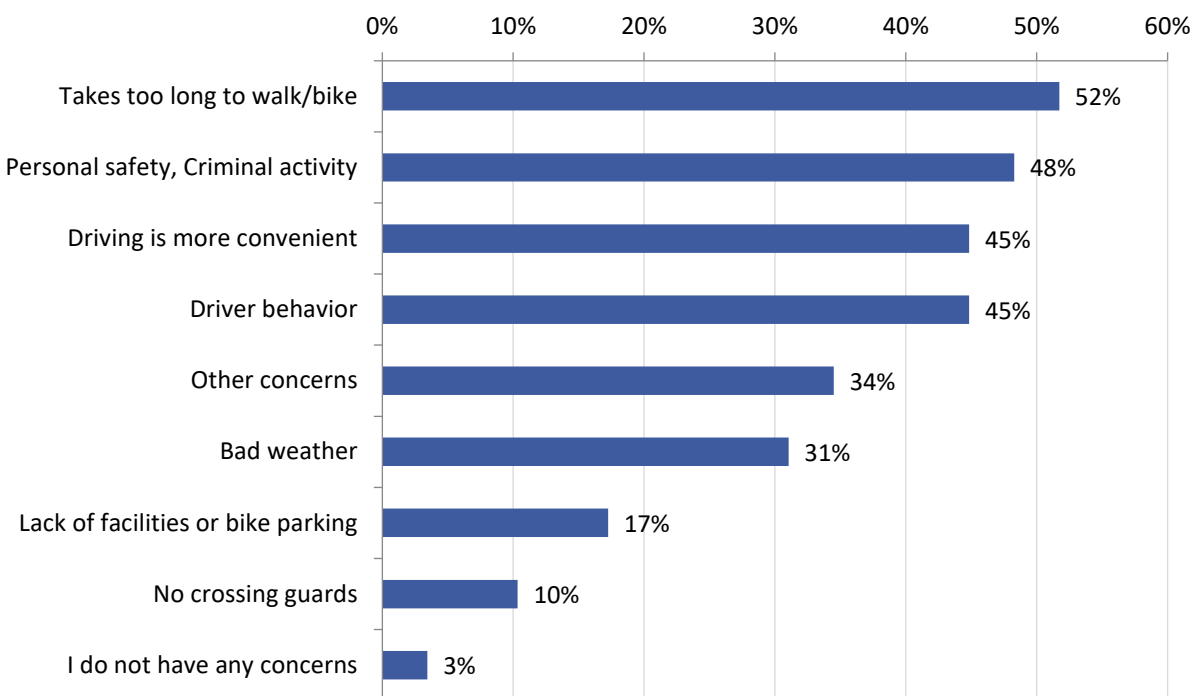
Figure 5. Do You Allow this Student to Travel to School in the Following Ways?, 2022 Caregiver Survey



While 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). Many surveyed caregivers faced the following barriers:

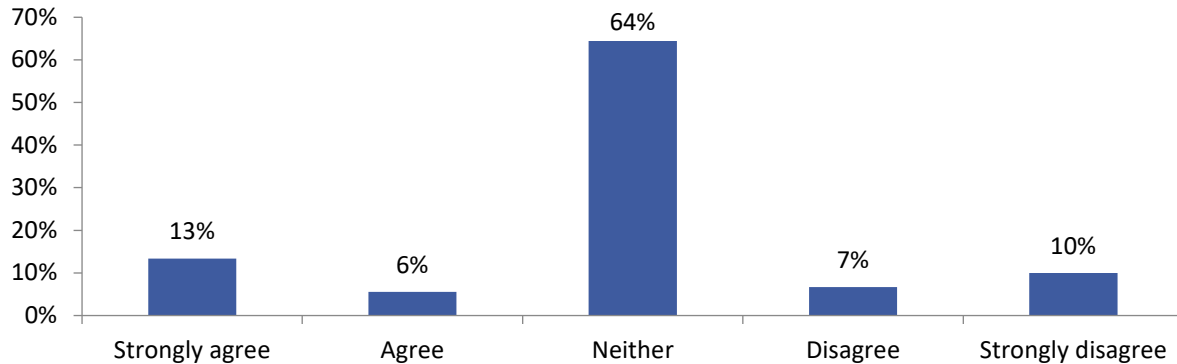
- The length of time it takes to walk or bike to school
- Concerns about safety, documentation, or criminal activity
- Convenience of driving
- Poor driver behavior

Figure 6. What Concerns Limit Your Student's Ability to Walk or Bike to/from School?, 2022 Caregiver Survey



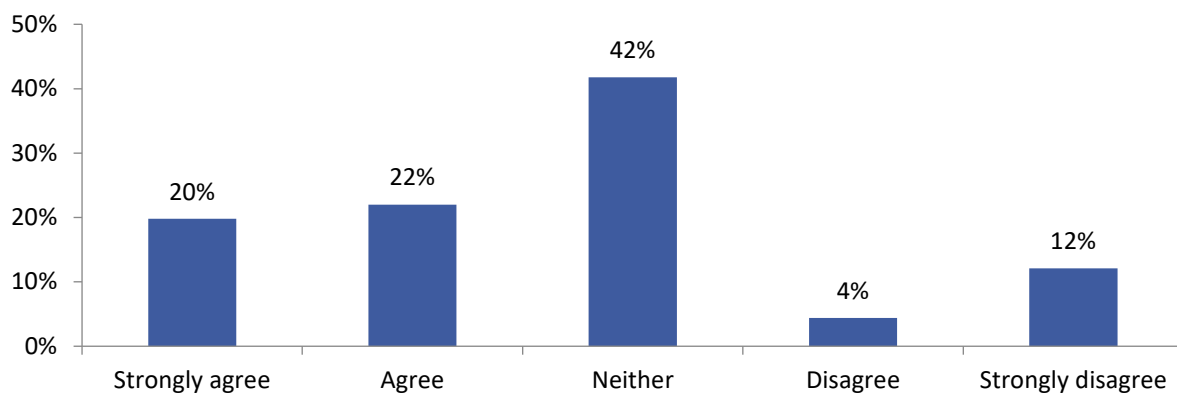
A majority of caregiver respondents (64%) felt Hogan Cedars Elementary neither encouraged or discouraged students from walking and biking to school at the time of the survey. An additional 19% felt the school encouraged or strongly encouraged active transportation, while 17% characterized the school as discouraging walking and biking (see Figure 7).

Figure 7. Agree/Disagree: Walking/Biking to/from School Is Encouraged by My Student's School, 2022 Caregiver Survey



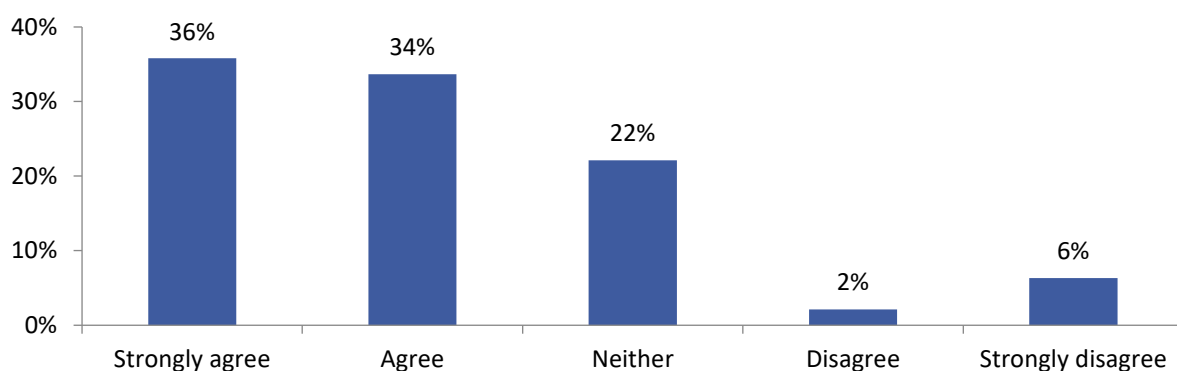
At the time of the survey, 42% of caregivers agreed that walking or biking to school would be a fun activity for their students, while only 16% believed the activity would be boring. An additional 42% were neutral or unsure on whether their student would enjoy walking and biking to school (Figure 8).

Figure 8. Agree/Disagree: Walking/Biking to/from School Is Fun for My Student, 2022 Caregiver Survey



A majority of caregivers recognized the health benefits of active transportation, with 70% agreeing that walking or biking to school would be healthy for their student. An additional 22% were neutral regarding the health benefits of walking and biking, and 8% did not feel that the activities would be healthy for their student (see Figure 9).

Figure 9. Agree/Disagree: Walking/Biking to/from School Is Healthy for My Student, 2022 Survey

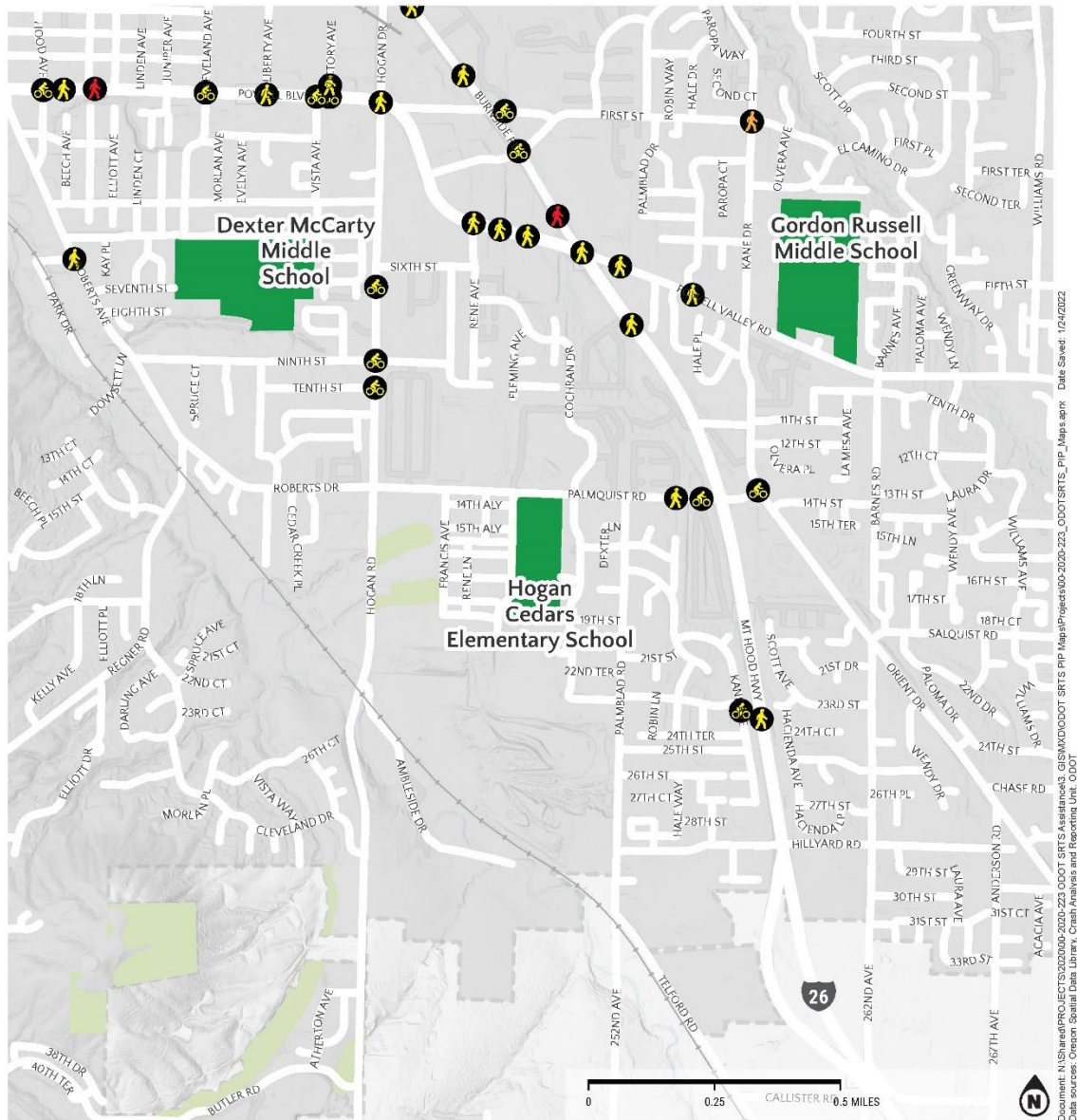


Crash Data

DATE COLLECTED:	2014-2018¹²
DATA COLLECTION PROCESS:	Crash data included in this report originates from relevant roadway jurisdictions, as well as the ODOT SRTS Web Map Application for the years 2014-2018. This analysis does not determine whether the grant intervention <i>caused</i> any change in the occurrence of crashes, due to small sample size. Additionally, due to insufficient mode split data to calculate crash <i>rates</i> , this report offers a count and description of reported incidents.
NUMBER OF REPORTED CRASHES INVOLVING BIKES AND PEDESTRIANS WITHIN 1 MILE OF SCHOOL:	Between 2014 and 2018, 22 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*:	Seventeen of these reported crashes occurred during school commuting hours; the rest occurred outside these hours. <i>* For these purposes school commuting hours were defined as 6 AM to 9 PM.</i>
NUMBER OF REPORTED INJURIES BY SEVERITY WITHIN 1 MILE OF THE SCHOOL:	All 22 of these reported crashes involved an injury to a bicyclist or pedestrian. All 8 of the reported crashes involving a bicyclist were non-fatal. Of the 14 reported crashes involving a pedestrian, 13 were non-fatal and one was fatal. Figure 10 illustrates the location of the crashes by type and injury severity. <i>(Note that some crashes may be shown on the map that are not included in this total; they occurred outside a 1-mile radius from the school. Additionally, some crash icons may be beneath others if they occurred at the same location).</i>
ADDITIONAL CRASH DATA CONSIDERATIONS:	N/A

¹² During the writing of the report, only data from 2014-2018 was available.

Figure 10: Hogan Cedars Elementary School Bicycle & Pedestrian Collisions (2014-2018)



**COLLISIONS WITH
PEOPLE WALKING
AND BIKING
2014-18**



Pedestrian Collisions

- Pedestrian Injury
- 2 or more Pedestrian Injuries
- Pedestrian Fatality

Bicyclist Collisions

- Bicyclist Injury
- 2 or more Bicyclist Injuries
- Bicyclist Fatality

- Railroad
- School Property
- Parks
- Water
- City Boundary

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 City of Gresham estimates the project will be completed by August 2022.

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	Spring 2024 (assuming project completion)
CAREGIVER SURVEYS:	Yes	At least 30 caregivers per school	Spring 2024 (assuming project completion)
CAREGIVER FOCUS GROUPS:	Yes	4-10 caregivers	Spring 2024 (assuming project completion)
STAFF SURVEYS:	Yes	1-3 school staff and administration	Spring 2024 (assuming project completion)
COMMUNITY SURVEYS:	Yes	At least 20 community members	Spring 2024 (assuming project completion)
CRASH DATA:	TBD	N/A	(2024-2027 will likely be available in 2031)
OTHER:	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 Construction 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

CAREGIVER 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 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. Competitive SRTS Infrastructure Grant Funded Project Map

Figure 11. Hogan Cedars Elementary School and Springwater Trail High School Zone Flasher Locations

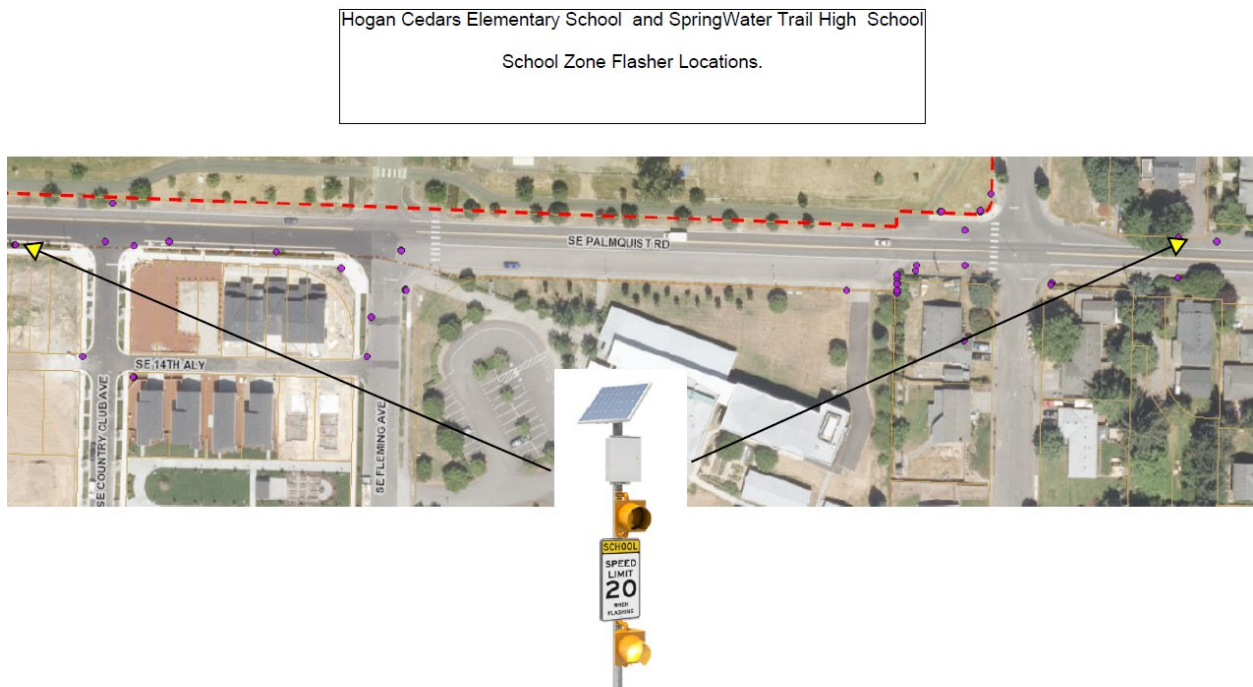
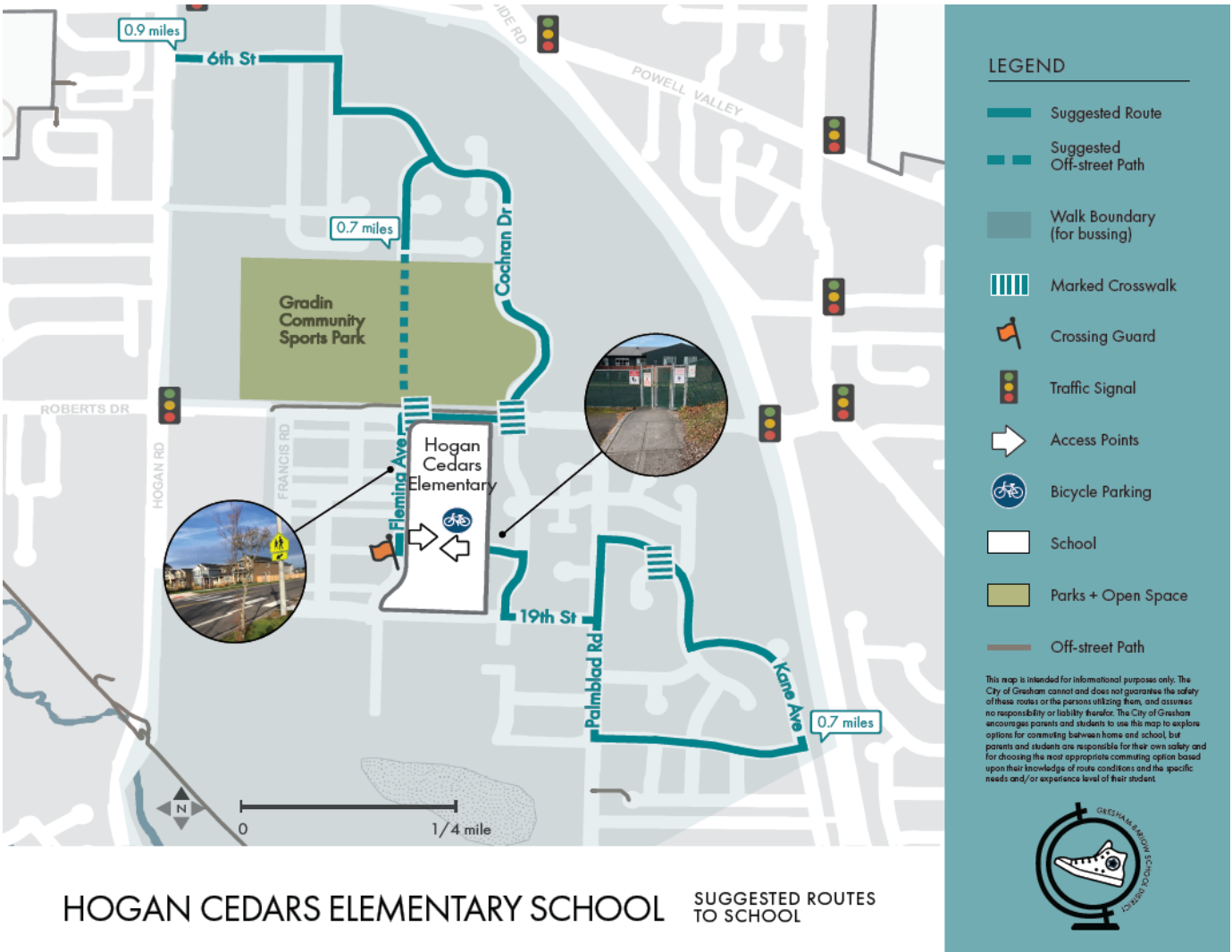


Figure 2. Existing Conditions near Hogan Cedars



Appendix C. Access Analysis 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	US Census Bureau
Oregon School District Boundaries	Oregon Department of Education
2017 Oregon Statewide Zoning Map	Oregon Department of Land Conservation and Development

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 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 were 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 apportioned that 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

Residential Zone Group	Population Density Factor
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 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 therefore 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.
- For rural schools with no local residential zoning reported, the population of the appropriate block group is assumed to be evenly distributed across the school zone and the percentage of people served is equal to the percentage of the school zone covered by the new access area.
- 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.