City of Madras – Madras Elementary 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. 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: Madras Elementary

Summary

Madras Elementary School is a Title 1 K-5 public school in the Jefferson County School District serving 405 students, 77% of whom are eligible for the Federal Free and Reduced-Price Lunch Program. The school community is racially and ethnically diverse, with 45% of the student body identifying as White and 40% identifying as Hispanic or Latino.

Madras Elementary is located to the east of downtown Madras. The area around Madras Elementary lacks a sufficient and ADA-compliant sidewalk network to allow students to safely commute to school on foot or by bike. There is a two-block section on B Street (one of Madras's busiest streets) between 5th and 7th Street that has either no sidewalk, no curb ramps, or damaged sidewalk, making it difficult for pedestrians to travel safely.

The Oregon SRTS 2019-2020 Competitive Infrastructure Grant has provided funding for new sidewalks along both sides of B Street along with adding curb ramps at the intersections of B and 6th to provide a safe connection to the existing sidewalk network. In 2018, the Jefferson County School District identified this as one of six priority areas for improving access for students walking and biking to school. Multiple other priority projects are also planned for the area near Madras Elementary.

In terms of non-infrastructure activities around SRTS, the Jefferson County School District has engaged in a bicycle rodeo and traffic safety education course conducted through school counselors, which will complement the planned street improvements.

Key information from Madras Elementary parent surveys:

- 37% of students live within a mile of the school, while 54% live more than two miles from school.
- Approximately 66% of students ride in a family vehicle to school.
- 5% of students walk to school, and 6% walk home. 30% take the school bus in the morning, while 25% use it to return from school.
- No parents surveyed allowed their student to bike to/from school, even accompanied by another child or adult.
- Parents report that the convenience of driving is the most common barrier to walking/biking to school. Other barriers include:
    - Poor driver behavior,
    - Lack of facilities,
    - concerns about safety, and
    - time spent traveling.

Most parents (75%) view walking/biking to school as healthy for their student, while 41% described it as fun for their student.

Contact Information

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SCHOOL DISTRICT:	Jefferson County School District
CONTACT:	District Office: (541)475-3520
OTHER CONTACTS:	Chris Wyland, cwyland@509j.net

Enrollment and Demographics

Madras Elementary School is a Title 1 public school enrolling 405 students ranging from Kindergarten to 5th grade. The school serves low income populations in the City of Madras and rural Jefferson County, with more than 95% of students eligible for the Federal Free and Reduced-Price Lunch Program. English and Spanish are the primary language spoken by students, and 26% are registered to have limited English proficiency.[1]

ENROLLMENT: 405

GRADE LEVELS SERVED AND SCHOOL TYPE: K-5, Public

STUDENT ETHNIC/RACIAL DEMOGRAPHICS:
American Indian/Alaska Native: 9.6%
Asian: 0.5%
Hispanic or Latino: 40.5%
Native Hawaiian/Pacific Island: 0.5%
Multiracial: 3.0%
Black/African American: 0.7%
White: 45.2%

PREDOMINANT LANGUAGES SPOKEN IN JEFFERSON COUNTY SCHOOL DISTRICT:
English: 2,420
Spanish: 705

STUDENTS LIVING WITHIN 1-MILE OF SCHOOL: 54%[2]

TITLE 1 STATUS: Yes[3]

EVER ENGLISH LEARNERS: 26%[4]

FREE AND REDUCED-PRICE LUNCH ELIGIBILITY: >95%

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[1] Unless otherwise noted below, demographic data are from the Oregon Department of Education 19-20 SY, collected October 1, 2019
[2] SRTS Program parent surveys, 2019
[3] Title 1 schools are schools where 40% or more of students are enrolled in USDA's Free and Reduced-Price Meals Program.
[4] 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. 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.

According to the Place Type Tool, the area surrounding Madras Elementary School is categorized as Suburban/Town, meaning it contains low density development, and Employment, meaning the surrounding census block group generally contains more commercial than residential development with 1,149 people residing and 897 people working within the census block. The area has a low level of access to regional employment centers and destinations. The overall level of street connectivity in the area is characterized as "very 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)	Suburban/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):	Employment • Land use is dominated by commercial or industrial activities • Low diversity of land uses • Jobs/Housing balance: mostly jobs • Missing either the density or street design required of mixed use
JURISDICTION POPULATION (ACS 5-YEAR ESTIMATES):	City of Madras 6,674 people
CENSUS BLOCK GROUP POPULATION (2010):	1,149 people
NUMBER OF JOBS IN CENSUS BLOCK GROUP (2010):	897 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

Project Description

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

PROBLEM STATEMENT:	An insufficient and non-compliant sidewalk network in the City of Madras is a significant barrier for children of all ages to walk safely to school. Especially when those routes are on high traffic volume streets in town.
DESCRIPTION OF BARRIERS TO WALKING AND BIKING:	Consistent sidewalks and ADA ramps are missing through this two-block section, making it dangerous for children to walk to school.
PROJECT DESCRIPTION:	This project will replace a two-block section of sidewalk that is non-compliant and unsafe for children to use on one of our busiest streets in town. It includes adding ADA ramps, new curbing and sidewalk, and drainage, and paving.
ESTIMATED PROJECT TIMELINE:	June 2020 Completion
PRIORITY SAFETY CORRIDOR?[5]	Yes
OUTREACH AND EDUCATION:	The school has held a bicycle rodeo and also offers general safety education through school counselors.

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[5] A road where the posted speed or 85th 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 Madras Elementary 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 11 students, or 2% of the Madras Elementary 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[6]

| METRIC	VALUE
Total Population of New Access Areas	59
School Age Population of New Access Areas[7]	11
Percentage of Students within the School Areas Gaining Access[8]	2%

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[6] New Access Area assumptions: 1.) It is assumed that residents east of 7th street will not utilize the new sidewalks between 5th and 7th on B Ave. It is also assumed that only residents north of B street and West of Hwy 97 will utilize the sidewalks to access the school, with the exception of a half block south of B street in the New Access Area. The other residents west of HWY 97 and south of B street are assumed to walk south to D street to go east towards the school, rather than walking north to go east. 2.) The housing in the new access area all falls in commercial zoning. Comparing the densities of neighboring residential areas, it was determined that the new access area has a medium-low density factor.

[7] Calculated using the proportion of school-age children (5-17 years old) within the City of Madras.

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

Figure 1. Madras Elementary New Access Area for Students Walking and Biking
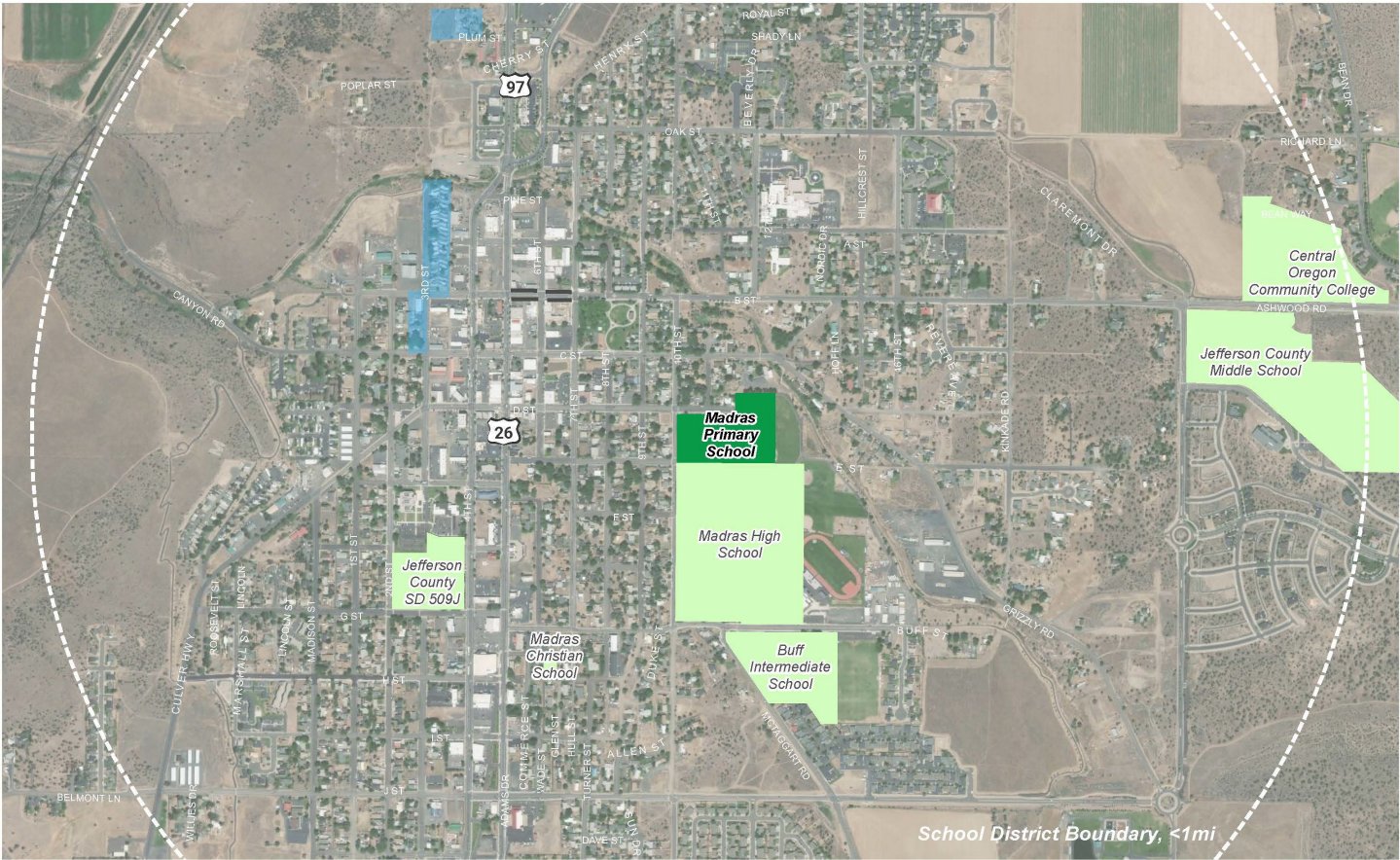
Madras Primary School
Students with New Access to Walking and Biking

Estimated Number of Students: 11

Proportion of Students within 1 Mile: 2%

To view the methods for this analysis, please see Appendix

Legend:
- Applicant School
- Other School
- New Access Area
- New Sidewalks

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:	12 classrooms surveyed about their trip to and from school
NUMBER OF STUDENTS:	282 students participated in hand tallies
TRIPS RECORDED	976 trips recorded by the hand tallies

SUMMARY OF DATA COLLECTION AND METHODOLOGY

The May 2019 baseline hand tally data from Madras Elementary includes 976 recorded trips collected from 282 students in 12 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 National Center for SRTS's standard hand tally data collection forms and process were used. This data provides a snapshot of student travel behavior trends.

SUMMARY OF RESULTS:

Madras Elementary hand tally data from 2019 indicates that a majority of students (51%) surveyed ride in a family vehicle to school, while almost half rode the school bus home (see Figure 2 and Table 2). Approximately 9% of students walk in the morning and 11% of students walk home in the afternoon. Four students reported biking to school.

Figure 2. Student Mode Split by Time of Day, 2019 Hand Tally Data
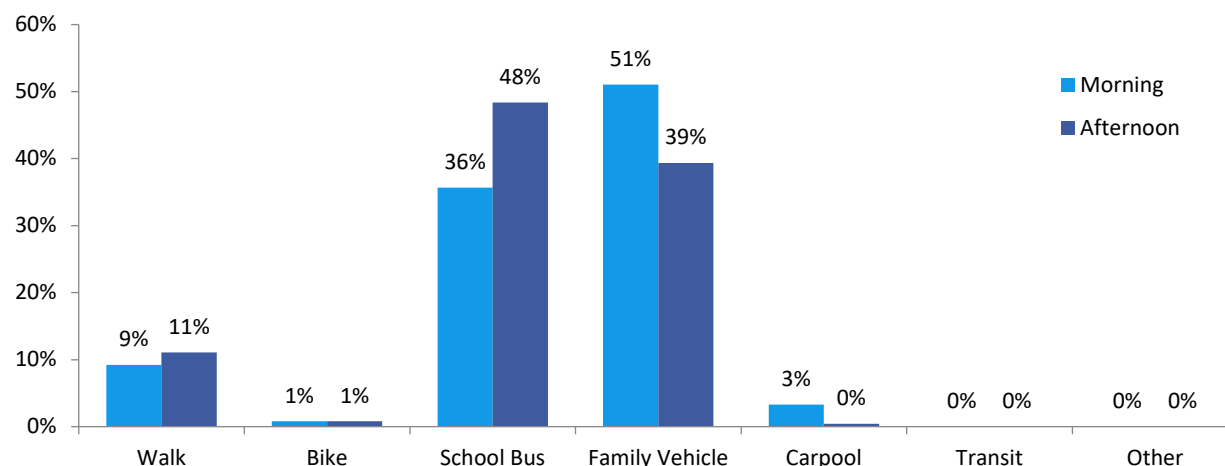
Note: Percentages may not total 100% due to rounding.

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	45	4	174	249	16	0	0
Afternoon	54	4	236	192	2	0	0

Parent/Caregiver Surveys

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DATE COLLECTED:	**Spring 2019**
DATA COLLECTION PROCESS:	The Oregon Department of Transportation SRTS parent/caregiver survey was distributed online to parents at Madras Elementary School to assess family perceptions about school travel options and behavior, with support from Alta Planning + Design for data collection materials and methods.
NUMBER OF SURVEYS:	36; 9% response rate

SUMMARY OF DATA COLLECTION AND METHODOLOGY

The parent/caregiver survey data included in this report was collected from 36 participants with students attending Madras Elementary.

SUMMARY OF RESULTS:

Parent/caregiver survey analysis found that just over one third of respondents live within one mile of Madras Elementary, with an additional 9% living between one and two miles of the school site (see Figure 3). A majority (54%) live more than two miles from the school. 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
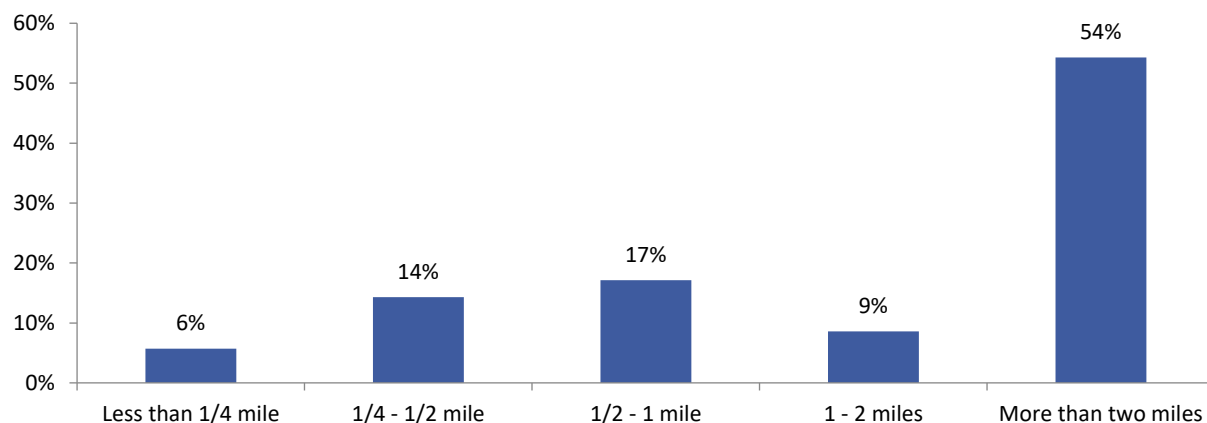
Driving in a family vehicle was the most commonly-used transportation option for the students of parents surveyed, regardless of how far they live from school. Among those who live less than a quarter mile from Madras Elementary, 29% used active modes. However, 33% of students living one to two miles from school also used active modes. (see Figure 4 and Table 3). Students living more than two miles from Madras Elementary do not use active modes to get to school. A majority of these longer-distance commuting

students travel to and from school in family vehicles (59%), while 41% use shared modes, such as riding the school bus, carpooling, or taking public transit.

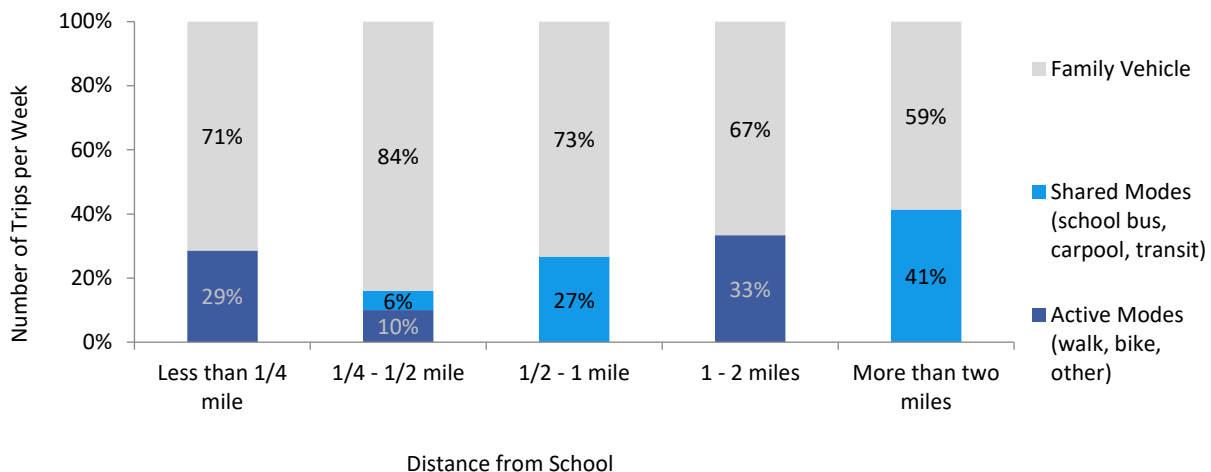Figure 4. Mode Split by Distance from School, 2019 Parent/Caregiver Survey


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	4	0	0	10	0	0	0
1/4 mile up to 1/2 mile	5	0	3	42	0	0	0
1/2 mile up to 1 mile	0	0	16	44	0	0	0
1 mile up to 2 miles	10	0	0	20	0	0	0
More than 2 miles	0	0	77	109	0	0	0

As Figure 5 illustrates, a small number (3%) of parents and caregivers surveyed reported that they would allow their student to walk to school by themselves. An additional 14% would allow walking if the student were accompanied by another child or sibling, while 11% more would allow them to walk with a trusted adult. However, no parents surveyed reported that they would allow their student to bike, regardless of whether they were alone or accompanied.

Figure 5. Do You Allow this Student to Travel to School in the Following Ways?, 2019 Parent/Caregiver Survey
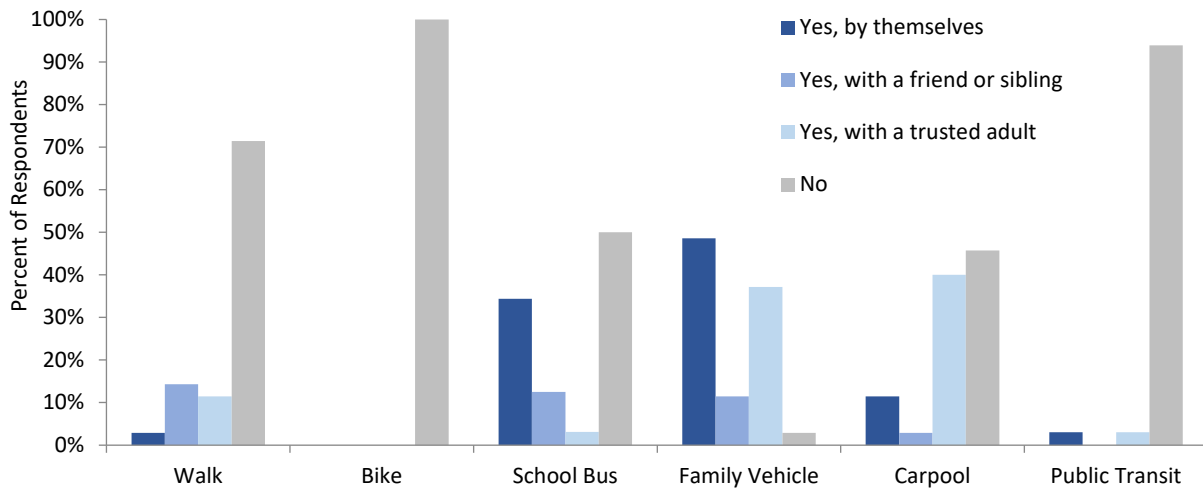
While parents and caregivers reported varying concerns that limit their student's ability to walk or bike to school, some were more commonly expressed than others (see Figure 6). The following were top concerns for the Madras Elementary School community:

- The greater convenience of driving compared to other modes
- Poor driver behavior on streets near the student's school
- The amount of time it takes to walk/bike to school
- Lack of facilities or bike parking
- Concerns about personal safety, documentation or criminal activity

Figure 6. What Concerns Limit Your Student's Ability to Walk or Bike to/from School?, 2019 Parent/Caregiver Survey
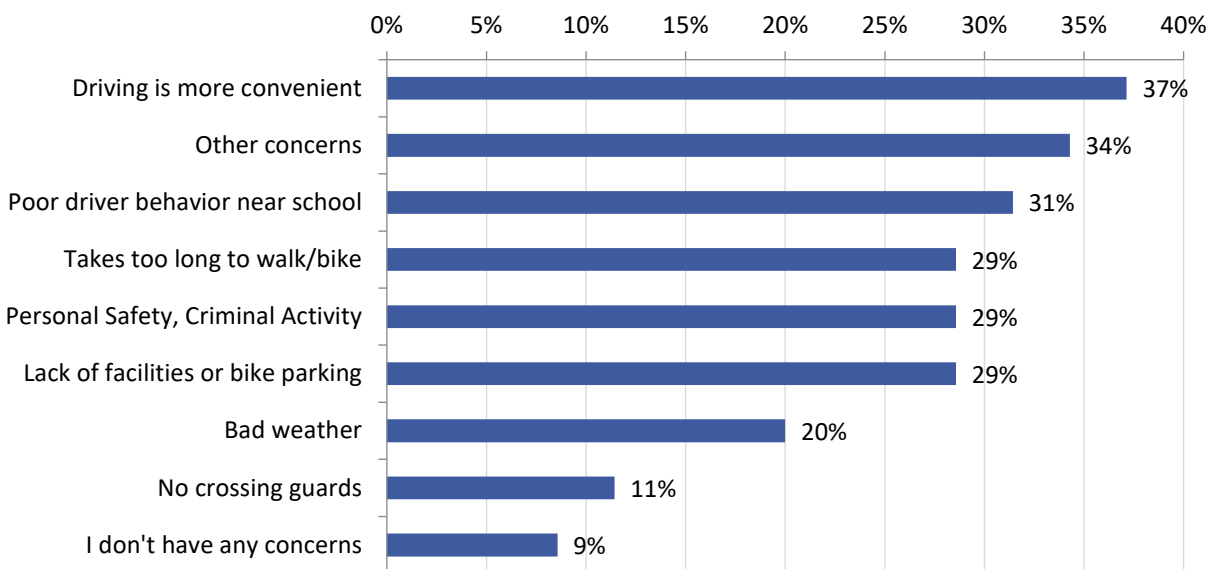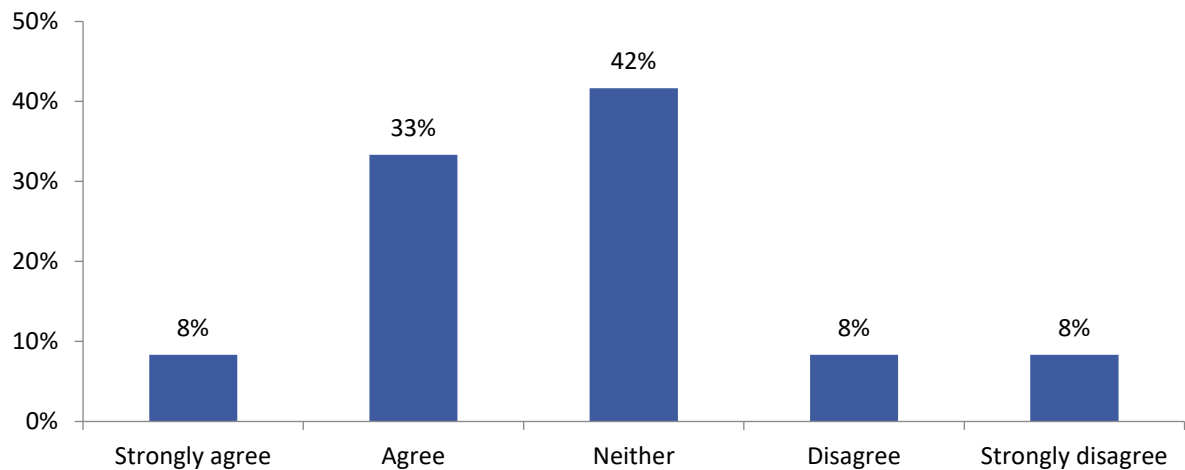
A majority of parent and caregiver respondents felt Madras Elementary neither encouraged or discouraged students from walking and biking to school at the time of the survey (69%). An additional 21% felt the school encouraged or strongly encouraged active transportation, while only 8% characterized the 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
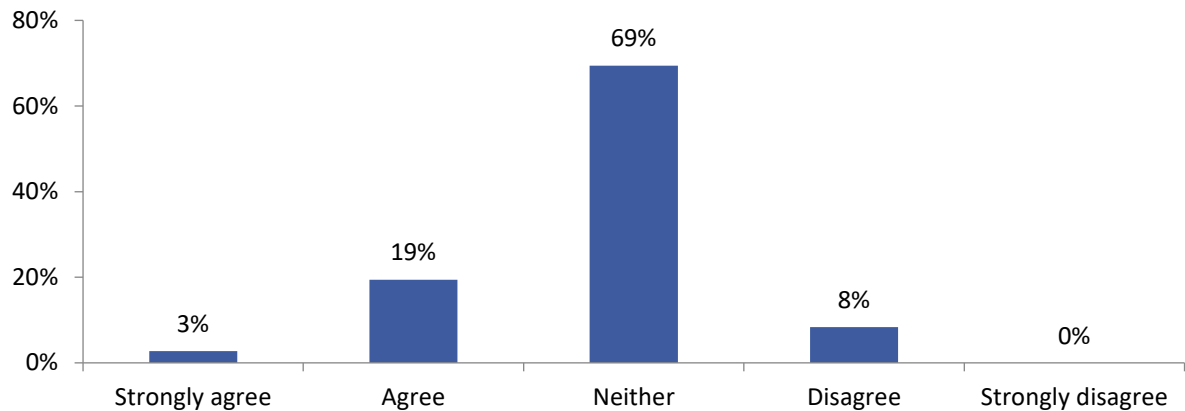

At the time of the survey, 41% of parents and caregivers reported that they agreed walking or biking to school would be a fun activity for their students, while 16% disagreed. An additional 42% were neutral or unsure on whether their student would enjoy walking and biking to school (Figure 8).

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

A majority of parents and caregivers recognized the health benefits of active transportation, with 75% reporting that walking or biking to school would be healthy for their student. An additional 19% were neutral regarding the health benefits of walking and biking, and just 6% didn't believe 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
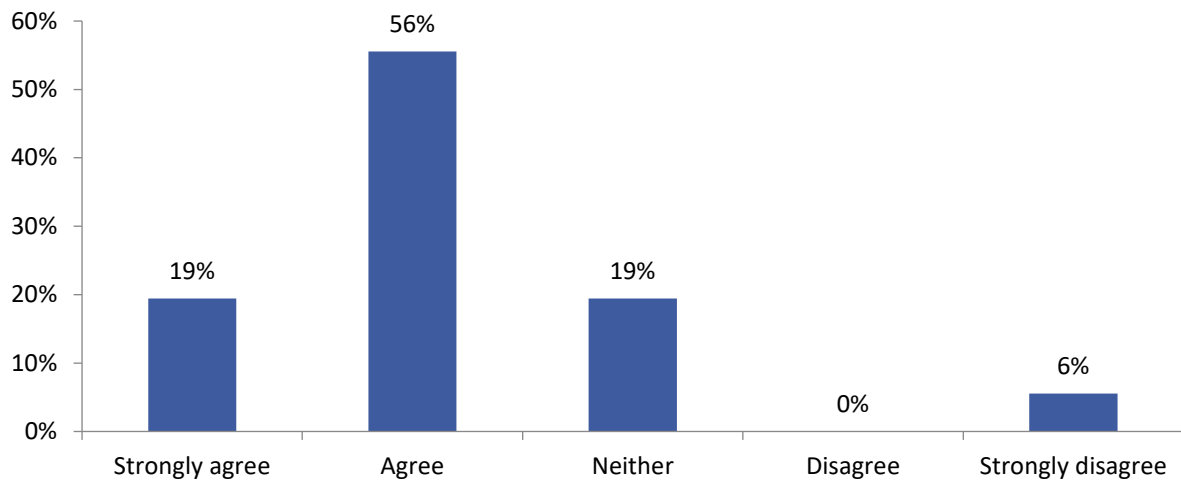
Crash Data

|	
DATE COLLECTED:	**2012-2016**
DATA COLLECTION PROCESS:	Crash Data included in this report originates the ODOT SRTS Web Map Application, with supplemental data from roadway jurisdictions as available. 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, 9 crashes involving a pedestrian were reported within 1 mile of the school.
TIME OF REPORTED CRASHES INVOLVING BIKES AND PEDESTRIANS WITHIN 1 MILE OF SCHOOL*:	8 of these reported crashes occurred during school commuting hours; the majority of these occurred during PM 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:	All 9 of these reported crashes involved a non-fatal injury to a pedestrian. Figure 10 illustrates the location of the crashes by type and injury severity.
ADDITIONAL CRASH DATA CONSIDERATIONS:	N/A

Notes on Community Context or other Relevant Information:

None.

Figure 10: Madras Elementary School Bicycle & Pedestrian Collisions (2012-2016)
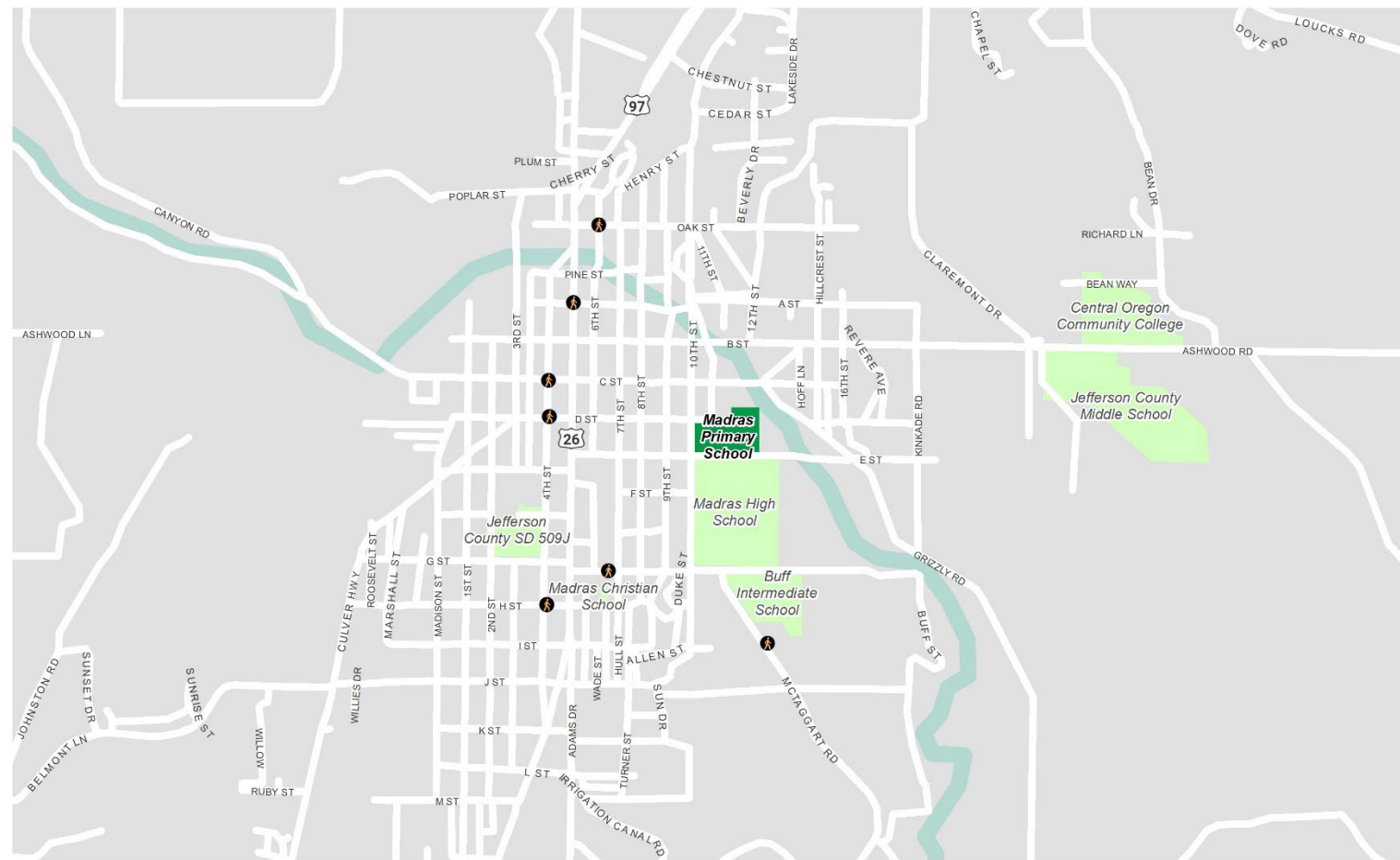
Madras Primary School
Bicycle and Pedestrian Collisions (2012-2016)

- Bicycle: Fatal Injury
- Bicycle: Non-Fatal Injury
- Bicycle: No Injury
- Pedestrian: Fatal Injury
- Pedestrian: Non-Fatal Injury
- Pedestrian: No Injury
- Primary Affected School
- Other School

Map displays bike and pedestrian crashes at all times of day.

Source: Crash Analysis and Reporting Unit, ODOT (2012-2016)

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 Madras estimates project completion is planned for June 2020.

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 (assuming project completion)
PARENT SURVEYS:	Yes	At least 30 parents per school	Late spring 2022 (assuming project completion)
PARENT FOCUS GROUPS:	Yes	4-10 parents	Late spring 2022 (assuming project completion)
STAFF SURVEYS:	Yes	1-3 school staff and administration	Late spring 2022 (assuming project completion)
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 infratructure 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 IN Grant Funded Project Map

Figure 11. Madras Elementary 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	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 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.