Caldwell Pathways and Bicycle Route Master Plan

November 2020

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1. Why is a Plan Needed?

The City of Caldwell initiated an internal effort to develop a citywide bicycle and pedestrian plan in 2017. The plan includes common plan elements such as trail connections via canals, bicycle routes, and policy recommendations. Due to a variety of limiting factors, the plan was missing key components necessary for a comprehensive and contextually appropriate active transportation network.

The 2020 effort adds features to the 2017 plan, including:

- A menu of bicycle facility types;
- Pedestrian design and policy treatments based on land use;
- Short and long term projects; and
- Development policies that guide growth to accommodated the needs of people who walk and bike.

It was also recognized that there is greater need to document and adopt a set of common design guidelines for facilities for people who walk and bike. The active transportation design realm is the fastest-evolving element of modern transportation design, with many new treatments and concepts endorsed by agencies like the Federal Highway Administration since 2017 or ones that may have not been incorporated in the 2017 plan.

Safety

Nationwide, pedestrian and bicyclist deaths and serious injuries continue to rise, based on annual crash statistics published by the National Highway Traffic Safety Administration. These increase are attributed to a number of factors, as noted by the Governors Highway Safety Association (GHSA) and National Transportation Safety Board (NTSB). These include:

- High speed street design with limited features to separate motor vehicle traffic from vulnerable road users;
- Increase in the number of larger and heavier vehicles on the road;
- Distracted driving due to smart phone technology and in-vehicle infotainment systems;
- Increased speed limits and travel speeds; and
- Disconnects between land use and transportation design decisions.

These findings also show the traffic safety industry is realizing that efforts such as enforcement and educa-

tion do very little to combat traffic fatalities when things like vehicle and road design dramatically increase crash severity. This is based on the fact that even the best education and enforcement efforts impacts only a fraction of road users a fraction of the time; whereas road design impacts 100% of users 100% of the time.

Economic Development

Another reason for a strong bicycle and pedestrian plan is for the purposes of economic development. Throughout the nation, developers are recognizing the value of safe and enjoyable walking and bicycle facilities and seek to build in locations with such features. Additionally, many developers see the value in contributing to a more balanced transportation system as the features improving walking and bicycling can attract talented workers who want to live in communities where active transportation is promoted and accommodated. https://www.woodardcurran.com/blog/the-economic-benefits-of-infrastructure-investment-part-ii-walking-paths-bike-trails-and-parks

Another element of economic development and walking and bicycling is land use design. When developers who embrace and promote active transportation truly seek to construct in ways that optimize both modes, they design projects in ways that minimize vehicle conflicts, maximize ease of access to things like the front door, direct sidewalks, or bike racks, and implement projects that appeal to the comfort and attractiveness of those not using motorized vehicles.

Health

The US is facing a nationwide public health crisis in the form of obesity and diabetes. Americans are suffering from chronic diseases associated with physical inactivity and poor nutrition habits. Nutrition is not directly effected by a strong walking and bicycling network but physical activity is. Fostering a community where choosing to transport as a pedestrian or bicyclist as the easiest choice takes time and dedication of resources. However, without affording people such choices more often than not, they will chose to drive to a destination which continues a pattern of a sedentary lifestyle. Research shows that most trips people make are within 2 miles of their homes. Even more, within one mile of a residence is shown to prompt up to 50% of people to walk or bike. However, this is strictly based on a linear distance and does not account for safety, perceptions of comfort, or dedicated facilities and crossings that assure a more direct route.

Filling gaps in walkway may be a priority before full-scale widening on key routes, such as roadways that access schools, parks, and other community gathering places. Interim improvements may consist of expanding the shoulder on this road and installing curbing with gaps for drainage to flow to mimic the function of a sidewalk at a much lower cost.

Environmental Stewardship

Use of motorized vehicles is directly attributed to pollution that results in degraded air quality, greenhouse gases, and toxic particles. Walking and bicycling do not generate such pollution. To help improve many environmental concerns in Caldwell and beyond, the more trips people take by walking or bicycling means the fewer trips by motorized vehicles, which ultimately translates into a healthier and safer environmental world.

Freedom of Movement

One final purpose of developing a more robust bicycle and pedestrian plan is to allow a personal freedom to chose how, when, and where people seek to travel. If a street system is missing key components of walking and bicycling, such options for freedom of mobility do not exist. These result is people being relegated to their vehicle or someone else's. Once a safe, equitable, connected, and comfortable system is in place, people will have a level of personal freedom that allows them to chose for themselves how they wish to traverse the City of Caldwell.

Plan Approach

As part of an ongoing effort in Caldwell, supported by funding from United Way and Trinity Health Network, an evaluation of city streets was conducted.

The specific series of plans can determine how city and state roadways can be improved through infrastructure projects to make walking and bicycling safer and more appealing. Each part of Caldwell is unique in its circumstances and this plan will be used for consideration by City staff to implement recommendations.

The lens through which this report is written and compiled is through the 4C concept. Each of the four C's—Comfort, Context, Connectivity, and Crossings, add to the concept of walkability in their own way. Below are descriptions of these:

- **Comfort:** What human beings need to be comfortable while walking—their walk speeds, their operational needs, and how we experience walking through our senses.
- **Context:** Where we are drawn when walking, what we avoid—how land use, land forms, traffic volumes, traffic speeds, road width and lighting impact the desirability of a place.
- **Connectivity:** How linkages in sidewalks and pathways along streets, through parks, and within varying types of land development pose opportunities and barriers for people of all ages and abilities.
- **Crossings:** How access to crosswalks, crosswalk types, pedestrian signals, and signal timing influence how safe a crossing can be in terms of access, driver compliance, and suitability for walking.

If the elements are perfected over time, walking and bicycling rates should increase, safety figures improve, and a more hospitable and welcoming environment for all realized. Infrastructure remains the key component of this effort for usability and safety purposes. Efforts like education and enforcement are effective when the infrastructure is in place and safe for all users of all ages and abilities.

Justifying Improvements

The City and its many transportation partners are encouraged to utilize federal design guides aimed at promoting creative applications at lower costs. Improve infrastructure for vulnerable road users like children or older adults should be a top priority given the value these age cohorts have to the vibrancy of cities.

Exhibit 1.1: Designing Healthy Community: Testing the Walkability Model

Some of the recommendations contained in this report do not resemble traditional curb, gutter, and sidewalk applications or conventional traffic signals. These treatments may be more costly than necessary or may reflect a design philosophy that viewed things like vehicle level of service as a mandate, which it is not. The design realm for people who walk and bike is very complex and only now are prevailing design guidelines starting to understand these subtleties. Adhering only to a set of guidelines or street cross sections aimed, first and foremost, at motorist level of service limits the ability to achieve City goals and promote safety, mobility, and economic opportunities for everyone.

This plan includes a detailed section of the latest federal and state design and policy documents that showcase the emerging needs for designing for the safety of all road users. No individual within a special purpose government is expected to know all of these, just as one set of local street design cross sections can address every situation. Some design guides used to develop and referenced in this plan include:

- FHWA *Small Town and Rural Multimodal Networks Guide*;
- NACTO *Urban Street Design Guide and Urban Bikeway Design Guide*;
- AASHTO *A Guide for Achieving Flexibility in Highway Design*;
- AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities*;

- AASHTO's *Guide for the Development of Bicycle Facilities*; and
- AASHTO's *A Policy on Geometric Design of Highways and Streets* (aka The Green Book)

A community's land uses are places of employment, household and personal need, social gathering places, spiritual and environmental locations, and much more. When distances and purposes for active transportation are considered, people are more willing to travel there via walking or bicycling.

It is essential that the route people use to get to destinations are connected and has safe crossings with driver compliance. It must also be well lit, have continual dedicated spaces and adequate width to accommodated walkers and bicyclists, and be buffered from moving traffic to maximize comfort and safety.

With each degradation of the route, fewer people are likely to walk or bike, which equals a lost opportunity for activity, a reduction in mobility choice, and a degradation of quality of life goals every community seeks. Therefore it is important to look at sites beyond the immediate street and intersections and continually address improvements within such one-mile distances. The graphic below shows the types of destinations and time for which people are wiling to ride a bike or walk.

Data like this are important for cities to consider since the only other available data source common to all places is Census and its journey to work data. The Census does not attempt to measure mode choice for people for other trips they take during the day. Even if someone is not able to walk or bike to work, they may already be doing so for other trip purposes or they may have a desire to walk or bike when not driving for their daily commute.

Exhibit 1.2: Where and How Far People are Willing to Walk, according to USDOT FHWA

(Above) US DOT national Household Travel Survey shows how far we are willing to walk to places such as schools.

Why Infrastructure Matters Most?

One particular segment of Caldwell's population worth additional care and concern are children. Children have physical and cognitive limitations, by nature, that make navigating streets and interpreting common traffic laws difficult. Its hard to see these factors at play as adults plan for, design, and implement school walk and bike route investments. There is a tendency to default to educating students on proper walking and bicycling skills in an attempt to overcome issues with unsafe street design.

While repetition about looking both ways, making eye contact, and waiting for cars to stop, is worthwhile, it must be recognized that its impacts are limited. The table below is from the Transportation Research Board and its National Cooperative Highway Research Program. The report titled *Improving Pedestrian Safety at Unsignalized Crossings* has a section on pedestrians that identifies the common walking characteristics of children. These factors aren't only applicable to unsignalized crossings, but for children navigating streets in any situation.

It is imperative that these factors, and others such as motor vehicle characteristics are understood and considered in roadway design decisions. Even the seemingly common sense advice to "make eye contact" is made practically impossible for a child when considering both modern-day window tinting practices and windshield glare.

Vision Zero—a safe systems engineering approach to road design—is the emerging philosophy that prioritizes the safety of all road users by understanding that humans will never be perfect operating on the roads. Streets must be designed to account for errors and the limitations of the human body to survive a crash when mistakes are made.

This is why targeted engineering practices such as speed management, proactive signalization of school crossings, raised crosswalks and curb extensions, along with treatments like roundabouts, work to slow cars and raise the visibility of children when they navigate streets. Streets designed through the lens of Vision Zero then give an opportunity for enforcement and education efforts to address outliers in behavior. Engineering influences 100% of a street's users 100% of the time whereas education and enforcement, at best, only influence a fraction of users a fraction of the time.

Exhibit 1.3: Walking Characteristics & Abilities of Different Pedestrian Groups

Young Children

At a young age, children have unique abilities and needs. Since children this age vary great in ability, it is important for parents to supervise and make decisions on when their child is ready for a new independent activity. Young children

- Can be impulsive and unpredictable,
- Have limited peripheral vision and sound source not located easily,
- Have limited training and lack of experience,
- Have poor gap/speed assessment,
- Think grown-ups will look out for them,
- Think close calls are fun,
- Are short and hard to see,
- Want to run and desire to limit crossing time, and
- Like to copy the behavior of older people.

Preteens

By middle school years, children have many of their physical abilities but still lack experience and training. Now there is greater desire to take risk. Preteens

- Lack experience,
- Walk and bicycle more and at different times (higher exposure),
- Ride more frequently under risky conditions (high traffic),
- Lack positive role models,
- Walk across more risky roadways (collectors and above), and
- Are willing to take chances.

High School Age

By high school and college age, exposure changes and new risks are assumed. Many walk and bicycle under low-light conditions. High school children

- Are very active and can go long distances and to new places;
- Feel invincible;
- Still lack experience and training;
- Are capable of traveling at higher speeds;
- Will overestimate their abilities on hills, curves, etc.;
- Attempt to use bicycles and in-line skates based on practices carried over from youth; and
- Are willing to experiment with alcohol and drugs.

Despite a century of efforts to try to perfect human behavior on American roads, we have the highest traffic fatalities rates among the world's wealthy nations. This is due, in part, to a traffic safety philosophy that has historically relied on a premise we now know to be false: That we can perfect human behavior on the roads.

This table shows why expecting road users, especially children, to be perfect is counter to human nature.

Source: NCHRP Report 562 *Improving Pedestrian Safety at Unsignalized Crossings* .

2. What Does the Public Say?

Getting members of the Caldwell public to contribute to the process of identifying barriers and opportunities to a more walkable and bikable city was part of the planning effort. Initially, the public was asked to participate through a send home Safe Routes to School survey that was answered by over 770 households with children in elementary and middle schools. Those surveys contained valuable information as to why students do not walk or bike, what concerns parents may have for allowing their children to walk or bike to school, and the types of improvements and locations they would like to see at or near the campus.

Another survey was created and sent to members of every Caldwell committee including City Council and the Caldwell Pathways committee. Those surveys helped gain an understanding of the general feeling of safety for walkers and bicyclists as well as the locations for improvements most needed.

Lastly, an attempt was made to get the perspectives of area residents at the annual Indian Creek Days celebration held in late summer. A large areal map was made for participants to view and place stickers on. The stickers represented the locations of streets residents are particularly are fond of, land uses they would like to access on a regular basis, and locations viewed as particularly difficult to navigate and in need of further infrastructure.

When combined, all three measures help paint a picture of the various safety concerns and land uses people would like to get to if improved and completed bicycle and pedestrian infrastructure was constructed.

Committee Surveys

The committee surveys revealed that many of the City's appointed committee members vary drastically in their perspective of safety while walking or bicycling in the city. Furthermore, the answers also showed that making both pedestrian and bicycle infrastructure a higher priority is important when determining how to improve the network facilities.

The committee survey was submitted by 18 individuals. The survey asked participants several questions that included both pedestrian and bicyclist related questions. The breakdown of the survey is as follows:

Exhibit 2.1: How safe do you feel as a pedestrian?

Ranging from 1-10, 10 being safest, how safe do you feel as a pedestrian from traffic harm? Average 6.5 with a range from 1 to 10. Most common answer: 8 (6)

How much of a priority should pedestrian projects be from 1-10, 10 being highest? Average 8.5 with a range from 2-10. Most common answer: 10 (7)

Which Caldwell streets should be highest priority for pedestrian improvements?

- 10th Street
- Linden
- Indiana
- Ustick
- Cleveland
- Blaine
- Kimball
- Highway 19
- Montana
- 9th Street

Exhibit 2.2: How safe do you feel as a bicyclist?

Ranging from 1-10, 10 being safest, how safe do you feel as a bicyclist from traffic harm? Average 5.6, ranging from 1-8. Most common answer 8 (5)

How much of a priority should bicyclist projects be from 1-10, 10 being highest? Average 8.1 with a range from 2-10. Most common answer 10/8 (5)

Which Caldwell streets should be highest priority for bicyclist improvements?

- Highway 19
- Blaine
- Cleveland
- 19th
- Kimball
- Ustick
- Montana
- Homedale
- Indiana
- Florida
- Linden
- Chicago

School Surveys

Caldwell has ten schools within the boundaries and two more that serve residents of the community but are just outside city limits. Each school was included in an effort in 2018-2019 to determine needed improvements in and around each campus to make walking and bicycling safer and more appealing for students and parents. With a total citywide student enrolment of approximately 10,000, surveys were returned from 771 households.

Exhibit 2.3: Caldwell Schools Survey Results

School Surveys	Distance to School	As Percent
<1/4	159	22.5%
1/4-1/2	81	11.5%
1/2-1	147	21%
1-2	114	16%
>2	204	29%

Morning	Mode	As %
Walk	90	11.7%
Bike	11	1.4%
Bus	379	49%
Family Vehicle	265	34%
Carpool	22	28.5%
Transit	3	.3%
Total	770	

Afternoon	Mode	As %
Walk	138	18.4%
Bike	11	1.5%
Bus	421	56.2%
Family Vehicle	159	21.2%
Carpool	16	2.1%
Transit	4	.5%
Total	749	

Noteworthy Comments

- *It is too risky in today's society. KIDS DISAPPEAR ALL The time.*
- *We need sidewalks on Ustick rd. Also, a slower speed limit with new housing developing and multiple surrounding schools.*
- *I don't want my children walking to school because of the dangers and safety.*
- *We need sidewalks on Ustick rd. Also slower speed limit with all of these surrounding schools. It's hard to encourage them to walk or ride bike to the close Middle school with those big factors.*
- *Crossing Ustick alone at an elementary age, I feel is unsafe, even with that light. Cars speed down Ustick and try to beat the light constantly.*
- *My child does not have the chance walking/biking to/from school because distance. but if we live near to the school maybe I can walk or biking with him.*
- *The intersection at Montana & Alder needs more improvement for safety. hardly any cars stop at the cross walk. More awareness intervention can be improved here.*
- *Busy intersection in the dark in the morning - cars don't see kids. it is very scary!*
- *We need sidewalks along the Marble Front hill leading to Van Buren Elementary.*

Mapping Exercise

A third effort was made to capture the impressions of Caldwell citizens. The effort included a large map exercise held at Indian Creek Festival in September, 2019. The annual festival is attended by thousands of people from all over the area, many of whom live in Caldwell. The map was displayed for people to view as they walked around the plaza. In addition to viewing, the map was used to generate conversations about where people would like to walk or bike if they could, and the streets or intersection that need additional improvements to help get them to such places. Dozens of people stopped and talked about what they regularly observe with the existing conditions. Many people also used the stickers provided to label the places and streets they were concerned with and the places they seek to access on a regular basis by foot or by wheel.

Participants were asked to place stickers on the locations they seek currently access by walking or bicycling, the places they would like to access by walking or bicycling if street improvements were made, and their general attitude towards feeling of comfort on the more commonly used roads they utilize.

Places people currently access:

- **City parks**
- **Recreational riding streets**
- **Indian Creek**

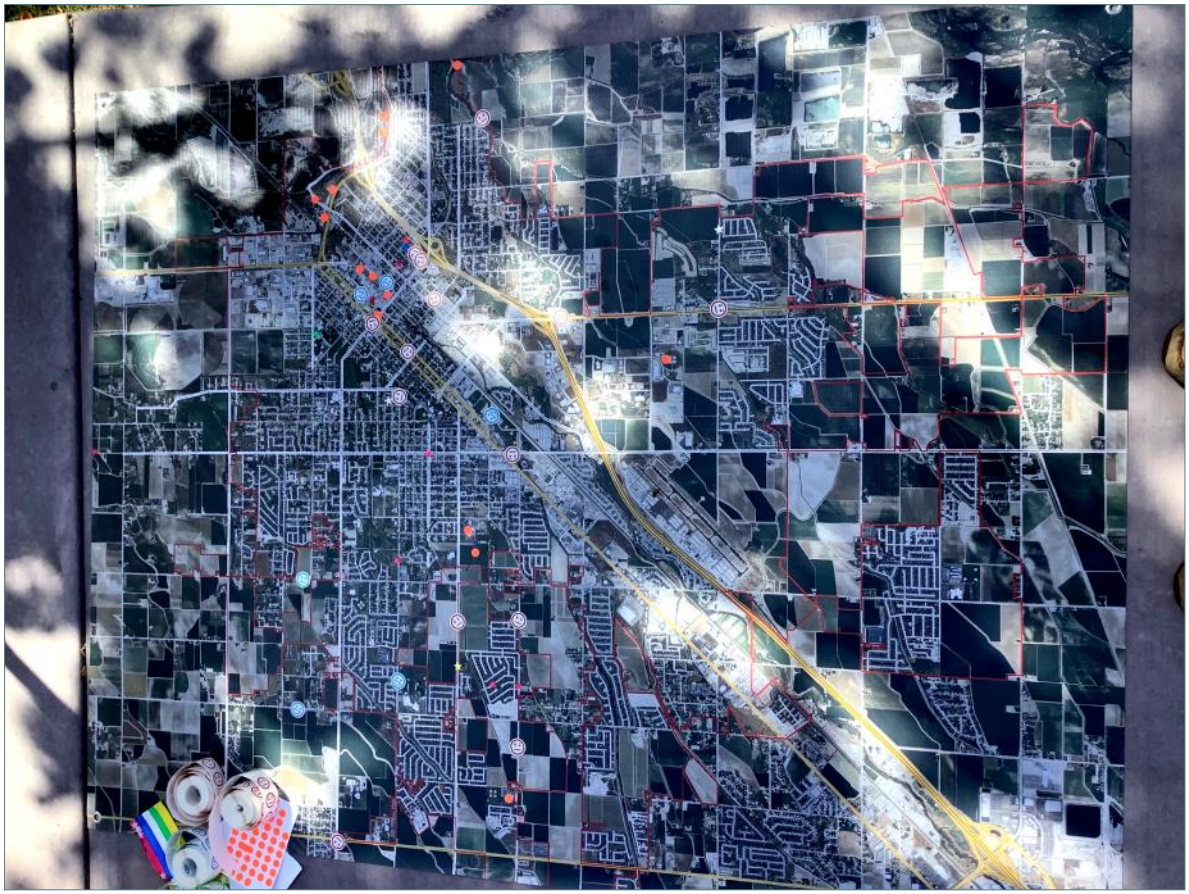
Places people want to access more:

- **Downtown Caldwell**
- **College of Idaho**
- **City parks**
- **Greenbelt paths**

Geographies in need of improvement:

- **Downtown Caldwell**
- **East Caldwell near Franklin Road**
- **South Caldwell near the YMCA**
- **The Blaine Street and Cleveland Boulevard Couplet**
- **Greenbelt access areas**

Exhibit 2.4: Public Involvement Map Used at Meetings



3. Issues Facing Pedestrians and Bicyclists

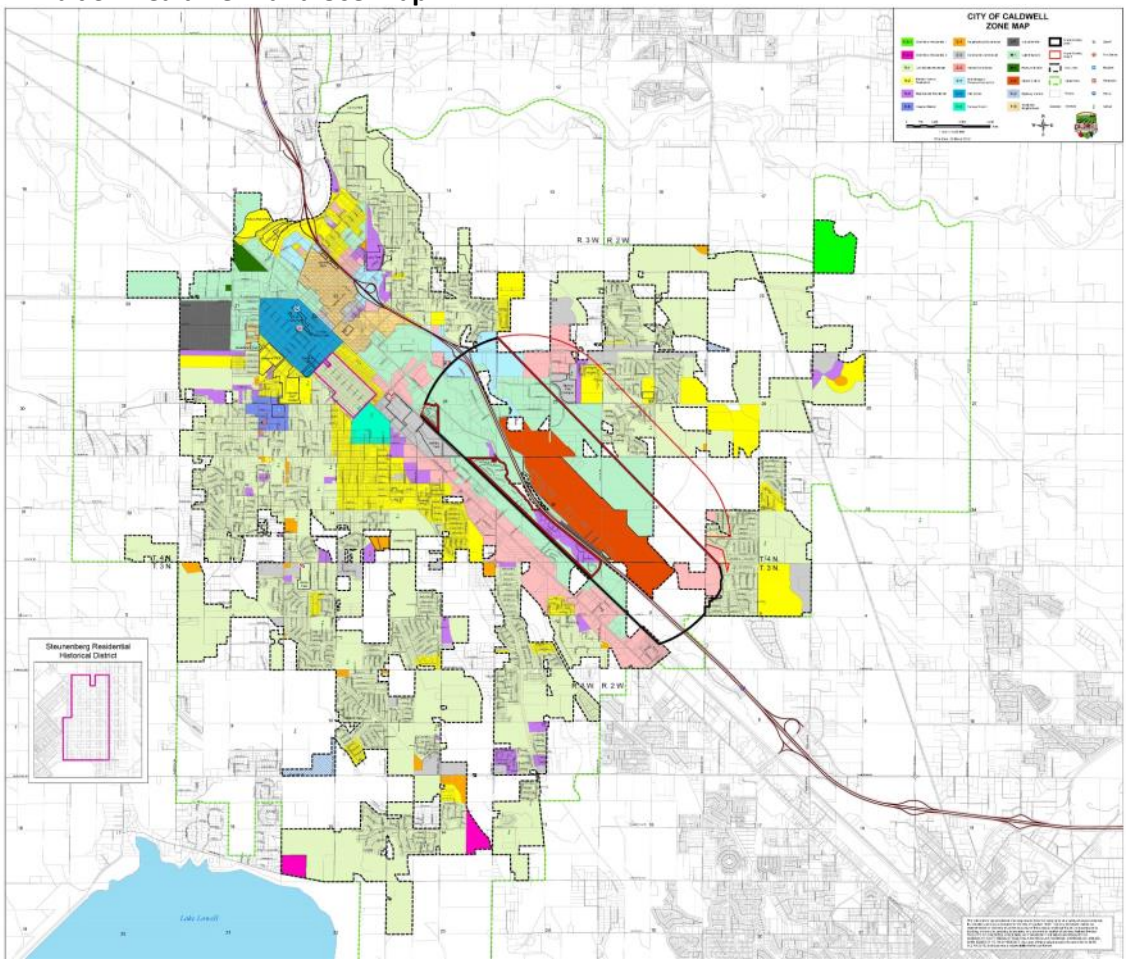
Land Use

Due to conventional land use zoning practices over the past 100 years, land in Caldwell and most places is used in a segregated fashion. Euclidian zoning separates the places people use on a daily basis by limiting like type land uses. Residential housing is often built near more residential housing. Retail and commercial uses are often permitted and built along major arterials and away from residential areas. Industrial and office spaces are typically even more isolated to pockets of like uses particularly if they generate any sort of nuisance or heavy truck traffic. It is because of this historic approach that most of the land uses people wish to seek out on a regular basis are not near their neighborhoods and instead centered at certain locations or along wide roads. For these reasons, most people choose to drive as the distance, lack of infrastructure, or concerns over safety if they do walk or bike virtually assure driving instead of walking or bicycling.

Recently, new zoning codes have been established to help change so of the historic norms such as neighborhood commercial districts. Over time, changes will continue with the hope that many services, office settings, live/work spaces, and other land uses previously relegated to arterial street locations can matriculate into more neighborhood settings to help capture shorter transportation trips.

Until this change occurs however, many of the places people seek out by walking or bicycling are accessible by arterial roads which often includes several travel lanes, complicated intersections, and a general design preference for drivers instead of pedestrians and bicyclists. To change this paradigm and attract more people not using cars, additional facilities, easier ways to cross roads, night-time provisions, and many other considerations are in need from the City of Caldwell and its transportation partner, ITD.

Exhibit 3.1: Caldwell Land Use Map

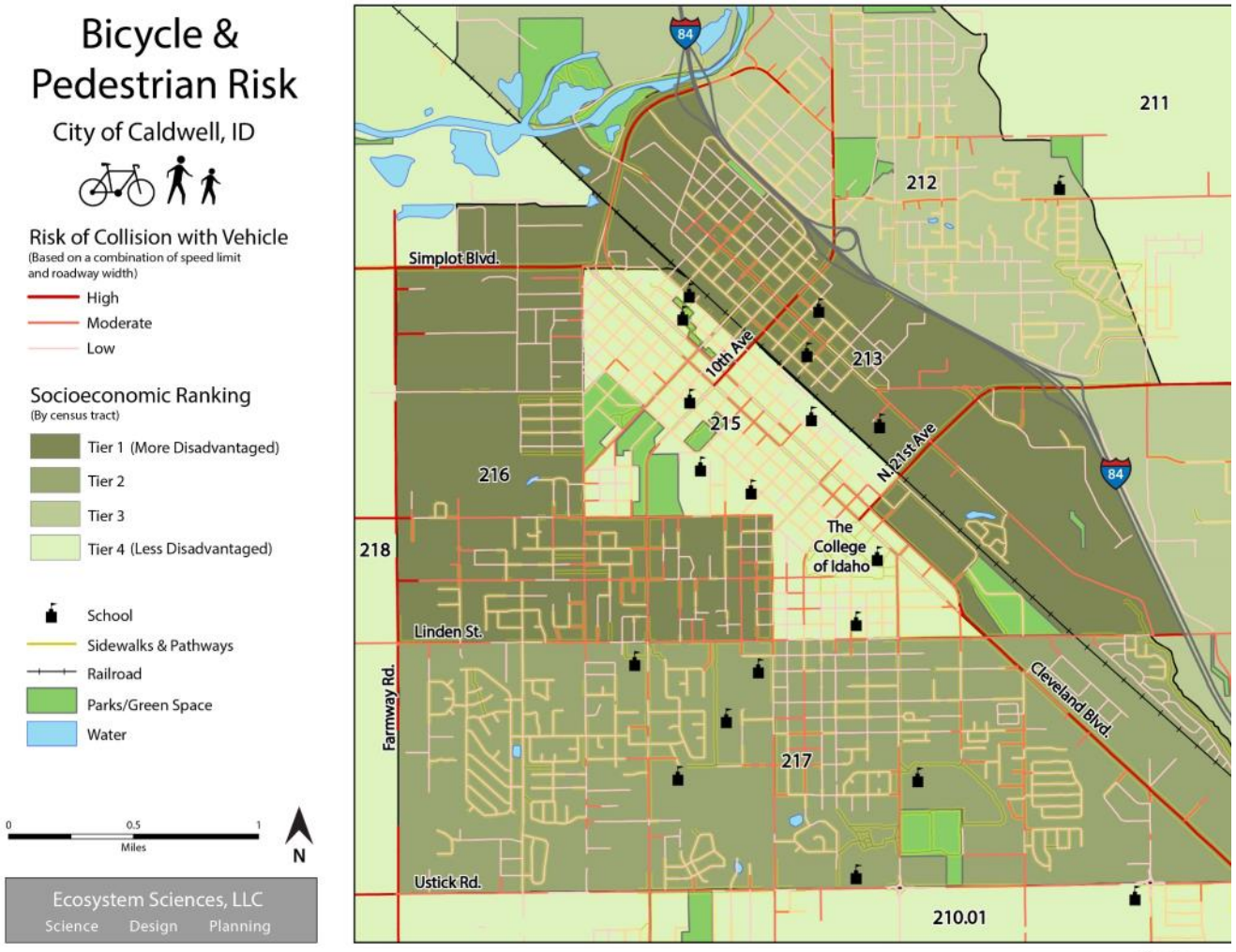


The City has continued to work hard to make Caldwell streets safer and more efficient for those walking or bicycling. Numerous bike lanes, enhanced crosswalks, dedicated flashing beacons, curb extensions and more, have been employed to better safety measures and to improve overall connectivity. Despite the many projects, there are many more locations still in need to bolstered improvements.

Another method to help determine where such needs should be considered is to look at risk. Risk is determined when probability for bodily harm to pedestrians and bicyclists may occur. The particular risks to both groups can include the speed of moving vehicles, the number of vehicles using a corridor or intersection, and the participation in walking or bicycling by area residents. To further distinguish where risks may be higher for active transportation users, a map is included below. The map is a current look at Caldwell streets, specifically by posted speed, roadway width which implies multiple travel lanes, and the Census tracts which indicate a higher probability of walking or bicycling due to social determinants of health information such as lack of vehicle access, lower incomes, and others. With all things considered, the roadways with the highest risk for pedestrians and bicyclists include the following:

- 10th Avenue;
- 21st Avenue;
- Cleveland Boulevard;
- Highway 19/Simplot Boulevard;
- Illinois Avenue; and
- Farmway Road.

Exhibit 3.2: Bicycle and Pedestrian Risk Map



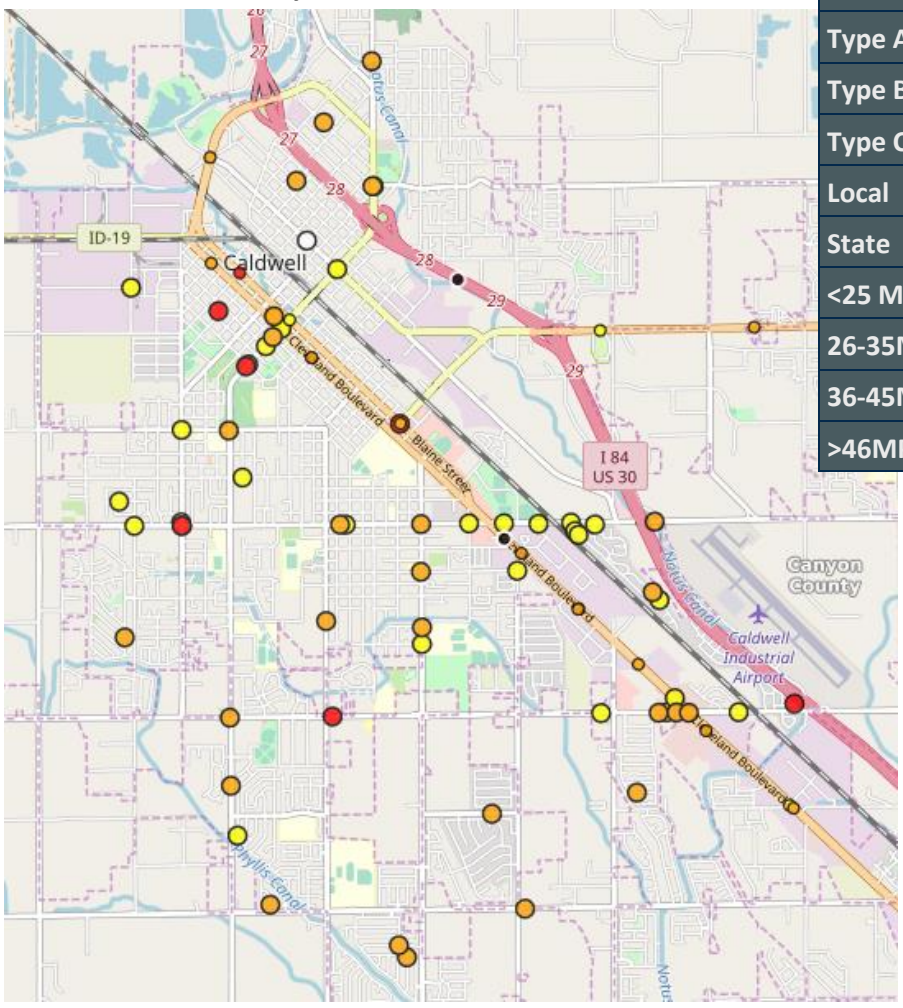
Crashes

Another input used to help determine the needs of pedestrians and bicyclists is recent crash data. The Local Highway Technical Assistance Council or LHTAC maintains a GIS database of all crashes throughout Idaho over a rotating five year period. The latest update gives crash history from 2014 through 2018. The map below is specifically the crashes involving pedestrians and bicyclists. Important to note is that the data only includes reported crashes and does not include crashes that went without reporting. This is an important distinction as many crashes do not get recorded and are unknown to authorities or decision makers. Another aspect of the map is that it may give an impression that pedestrians and bicyclists are involved in crashes in a limited few corridors. While the data does indeed show crashes are generally isolated to just a few of Caldwell major streets, this could also be an indication of pedestrians and bicyclist avoiding certain corridors due to safety concerns or other reasons. This could also be why certain corridors where someone may expect crashes to be occurring do not show crashes- because pedestrians and bicyclist are avoiding the area. As is, 79 total crashes were recorded over the five year period involving pedestrians and bicyclists. Two pedestrians were killed and six involved in serious injuries. No bicyclist was killed during the timeframe and one involved in a serious crash.

Pedestrians in crashes were stuck on local roads 81% of the time, while 19% while on state roads. For bicyclists, 73% of crashes occurred on local roads and 27% on state facilities.

2014-2018	Pedestrian	Bicyclist
Total	37	42
Fatality	2	0
Type A	6	1
Type B	14	26
Type C	15	14
Local	30	31
State	7	11
<25 MPH	13	7
26-35MPH	18	22
36-45MPH	3	9
>46MPH	1	0

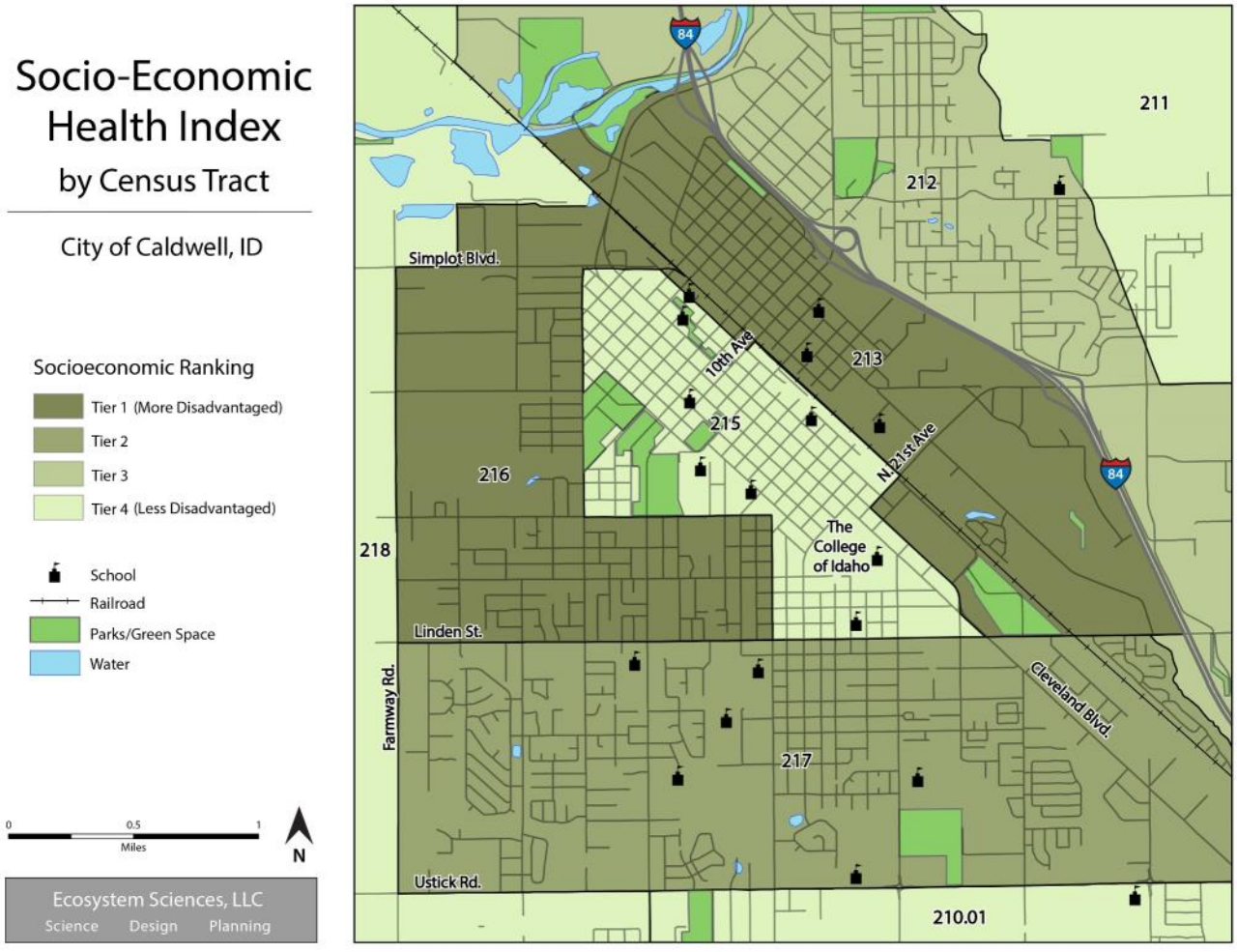
Exhibit 3.3: Caldwell Bicyclist and Pedestrian Crashes



Health

In the world of public health, data is used to help determine what the probability may be for certain types of conditions. These data points can be holistic and comprehensive and paint a picture that is useful when considering the likelihood of prevailing socio-economic issues. For this plan, several data pieces were compiled within Caldwell's nine US Census Tracts. When compared to each other, the tracts can be scored to show with of them is seeing the higher degree of challenging living conditions, generally speaking. The data includes information such as an under 18 population, vehicle access, medical insurance coverage rates, household poverty, education attainment, and many more. What is particularly important to note about this data is how it relates to walking and bicycling. For some people, walking or bicycle use is an option to driving. For others, such an option does not exist and people may be relegated to active transportation by necessity. Indicators such as vehicle access, disability rates, and income status suggest that some residents may not have the ability to access essentials of life like groceries, employment, or other needs by means other than by foot or bicycle. In these instances, improving physical conditions is not simply about recreation or enjoyment but is a matter of social equity. In tract 13 as an example, nearly 40% of households fall below poverty lines, 12.5% of people are unemployed, 21.6% of people are disabled, and 10.8% of households are without a vehicle. A closer look at tract 13 also shows it is somewhat geographically isolated with the interstate to the north and Cleveland Boulevard to the south. These two transportation corridors experience few dedicated protected crossings, have significant traffic volumes, and yet in the case of Cleveland Boulevard, contains many of the services vital to a thriving living condition.

Exhibit 3.4: Socio-Economic and Health Conditions in Caldwell



Existing Conditions

The City of Caldwell has steadily worked to improve conditions for pedestrians and bicyclists of all abilities. Projects are continually under construction such as sidewalk that fill existing gaps, curb ramp improvements, specialty crossings beyond intersections, and bicycle projects like bike lanes and pathways. Despite the progress, much work remains to finish the existing network as new streets are accepted through development that include needed infrastructure.

Many of Caldwell's streets are part of a system wide grid pattern. The major routes are typically either minor or principal arterials. The remaining streets are considered local under the functional classification system (Exhibit 3.5). The arterial roads are key to citywide movement as they permit roadway users to access various parts of the city in uninterrupted straight lines. It is essential that these streets be completed using the recommendations and tools in this plan.

With regard to pedestrian infrastructure, Caldwell has continues to require sidewalks as part of development applications. Existing sidewalks are labeled in purple and pathways in green in Exhibit 3.6. All new subdivisions, retail and commercial centers, office buildings, and most all other land uses are built with pedestrian facilities. Many of the arterials have some degree of sidewalks, but due to decisions made during previous generations, significant numbers of gaps exist that will take time and resources to fill. Other than funding, the largest challenge of filling sidewalk gaps is either right of way availability or gaining public support when construction of facilities may mean using property home and property owners have historically treated as their own. Taking out planters, trees, driveways, and other typical front yard elements will require broad support in order to the steady progress of filling out walking infrastructure. However, without such will, conditions cannot improve and the network remain unfinished. The consequences mean limited connectivity, hazardous situations between pedestrians and motorists, and a likelihood of driving to nearby destinations if safety is perceived to be compromised.

Bicycle infrastructure presents different challenges than pedestrian facilities in that most of it is located within the public right-of-way. Infrastructure can be created by repurposing existing street space, adding it when streets are widened, or built as one off projects. Existing bicycle facilities, thin blue lines below, are limited, but many routes proposed as per the plan in 2010 (Exhibit 3.7)

Exhibit 3.5: Functional Classification Map

Exhibit 3.6: Existing Sidewalks

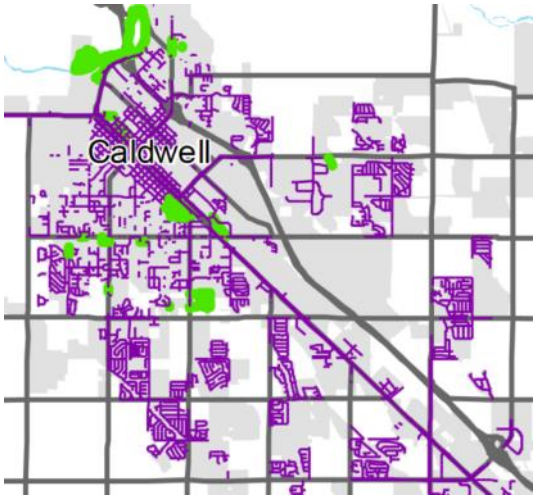
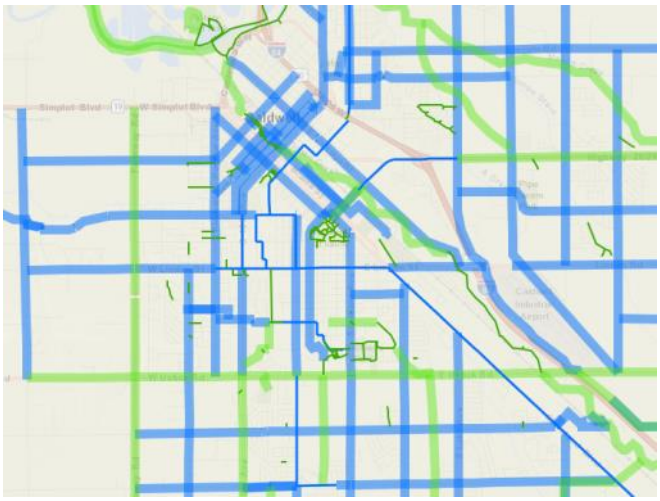


Exhibit 3.7: Existing & Proposed Bicycle Routes



4. Pedestrian Design Concepts

Walking is one of our earliest achievements. We celebrate walking as a milestone of our lives and walk every day of our lives thereafter. Humans were built to walk but also made with emotions and basic instincts that keep us from harm. With such fundamental needs, developing a holistic walking network requires more than a dedicated surface. Pedestrians need to feel safe from moving or turning vehicles, need to feel safe at night just as the day, and if a destination is too far or infrastructure indirect could easily chose to drive rather than walk. Comfort, connections, crossings, and context are the four foundational needs for pedestrians and how the recommendations for pedestrian facilities are presented in this plan.

Comfort

What human beings need to be comfortable while walking—their walk speeds, their psychological needs, and how we experience walking through our senses.

The tools to address comfort are extensive. One of the primary concepts however is that the faster traffic travels on a speed the greater the need for buffering for pedestrians. Buffers include hardscaped, landscaped or greenscaped, and even on-street parking and bicycle facilities. Other features of comfort can include trees and vegetation, lighting, benches, active streetscapes, and building façades with windows for greater activation with people.

Context

Where we are drawn when walking, what we try to avoid—how land use, land forms, traffic volumes and speeds, road width and lighting impact the desirability of a place.

To maximize context, pedestrian infrastructure needs to be considerate of adjacent land uses. In residential settings for example, a detached 5'-8' sidewalk with a 2' landscape buffer with street trees may be appropriate. Meanwhile, in an industrial area, an attached 5' sidewalk with minimal enhancements may be more appropriate. Using the various types of land uses as a guide, pedestrian facilities should optimize the land uses rather than conflict or fail to meet anticipated pedestrian demands and needs.

Connectivity

How linkages in sidewalks and pathways along streets, through parks, and within varying types of land development pose opportunities and barriers for people of all ages and abilities. Connections come in the form of straight and direct pedestrian facilities such as a pathway, sidewalk, or even pavement. Without proper connections, pedestrians either cannot access a destination, may have to walk with mixed traffic, or for go the destination altogether.

Crossings

How access to crosswalks, crosswalk types, pedestrian signals, and signal timing influence how safe a crossing can be in terms of access, driver compliance, and suitability for walking.

According to ITE, pedestrians seek to cross streets at 300' intervals. In other words, if there is an expectation that a pedestrian travel farther than 300' to cross a street, there exists a high probability the person will not "cross at the nearest crosswalk" and continue where and when they feel it necessary.

Therefore, implementing a system of marked, perhaps signalized, and consistently spaced crossings is critical to the efficiency of the system and the predictability of crossing pedestrians.

Exhibit 4.1: What helps kids meeting physical activity goals?

Types of Pedestrians

A one-size-fits-all approach to pedestrians will not address the short– and long-range needs of people who walk in Caldwell. Exhibit 4.2 illustrates different types of pedestrians and their characteristics. Just as we don't design roads for the most common motor vehicles, we should not engineer roads for the most common pedestrians.

Additionally, there can sometimes be an incorrect assumption that because the design of a curb ramp or timing of a pedestrian signal is safe because it meets a minimum standard. A street system for people who walk should be engineered to be safe and comfortable for a child who is eight years old and an adult who is 80 years old. If this occurs, then the system will most likely work for everyone else. Another way to look at it is to ask if a person could be born, grow up, then age in place until death in this neighborhood or along this route and still find it easy and safe to walk.

Factors such as land use, Census tract data on age and disability status, proximity to schools, access to senior housing or senior centers, and overall community goals for livability should all factor into how the system is designed.

Exhibit 4.2: Types of Pedestrians and Their Design Needs

Common

The most common pedestrians we see are people walking or jogging alone. Most are trying to get somewhere for transportation or recreation. They can more easily overcome obstacles and tend to move at the fastest pace among pedestrians. Just as we don't design roads for the most common motorists, we shouldn't design roads for the most common pedestrians.

Mobility First

Mobility First individuals need more operating space and crossing time than common pedestrians. They may be disabled and require a mobility device, walk slower due to age or disability, or have fears of tripping or falling in the pedestrian realm. Engineering practices reflect their basic needs and realize that meeting an accessibility standard does not necessarily mean it is safe.

Children

Children are unpredictable, have physical and cognitive limitations when judging speed and risk, and are not seen as well due to their height. As with Mobility First pedestrians, engineering practices are tailored to reflect basic needs and abilities since educational efforts have limited impact. Where children are required to cross large roads, additional engineering treatments are required.

Friends & Family

Walking is a social activity. Routes should be designed to comfortably accommodate two people walking side-by-side, including considerations for a partner in a wheelchair or a parent with a stroller. Close attention must be paid to design practices that limit functional width of sidewalks—vertical barriers, lack of buffer from the top of curb, and bicyclists on shared use paths.

Curb Extensions

Curb extensions are a valuable element to the pedestrian network and have shown to improve safety for pedestrians and drivers. Curb extensions bring two sides of a street closer together, reduce turning speeds of vehicles, and improve the visibility profile of pedestrians by putting them closer to the field of view of drivers.

Curb extensions can be used extensively for most intersections as most streets are local in nature and include on-street parking. They help to enforce sight triangle requirements by limiting parking encroachment close to intersections, reducing the burdens on code compliance and law enforcement.

In some locations, especially with high percentage of long axle vehicles, curb extensions are not practical. Recommended policy for Caldwell practices include the following:

- Require all new residential street intersections to include curb extensions as a requirement of development approval. This helps avoid requests for traffic calming once it is built, as curb extensions help to reduce operating speeds.
- Require curb extension construction at all reconstructed street or chip-seal streets. Do not construct curb extensions if fundamental engineering reasons exist and are documented.
- Require curb extensions as condition of approval for major developments located along arterial or collector streets where feasible.

These curb extensions were installed as part of a roadway reconfiguration to reduce the street from four lanes to two and provide on-street parking. This application did not impact existing stormwater flows while having the same impact as a more substantial curb extension.

Curb extensions do not have to be expensive and do not have to impact existing drainage features. The example above shows a project in Boise where the extensions were built in a retrofit project that did not involve rebuilding the curbs on this street. Exhibit 4.3 shows curb ramp retrofit projects in Chubbuck where they improved safety on subdivision streets built in the 1970s while also upgrading curb ramps.

Curb extensions can use less-costly applications, such as tubular markers and parking stops that are placed in the configuration of typical curb extension. This can be used as a pilot application or remain in place longer if proven successful and made of materials that can last several years.

Exhibit 4.3: Residential Neighborhood & Pilot Project Curb Extensions

Chubbuck, ID, retrofits older subdivision streets with curb extensions to manage motor vehicles speeds in neighborhoods and improve pedestrian safety (left). Pilot applications (right) may last for a long time.

Turn Lane Aprons

In areas where there are existing right turn slip lanes, a design treatment to reduce pedestrian exposure is use of a truck apron on the outside of the slip lane. This reduces the turn radius for a vast majority of vehicles that don't need as wide of a lane while improving safety for pedestrians at these unprotected crossings. Exhibit 4.4 shows an example constructed by Oregon DOT and the City of Bend.

Potential locations for this application in Caldwell include:

- 10th Avenue ramps at I-84;
- Franklin Road ramps at I-84;
- Centennial Way at Simplot Boulevard; and
- Eastbound Cleveland Blvd at Linden Street.

ADA Compliance

The American with Disabilities Act has been national law for over 30 years. As part of the law, public right-of-way is governed and numerous specific design standards put in place. Elements include minimum pedestrian access routes of 4', sidewalk passing areas required every 200' if a 4' sidewalk is used, curb ramp design, running slope and cross slope and many other requirements.

All of the specifics are intended to make traversing Caldwell streets and neighborhoods easier and without unnecessary obstacle for those with various mobility hindrances. Beyond those for whom the law was written, others stand to benefit as well including older adults who risk trip and fall injuries, parents pushing strollers, and children who may walk at similar speeds or be similar in profile as those in wheelchairs or using a walker.

Detectable warning surfaces (aka truncated domes) must be a contrasting color to other surface features in the walking environment. Many downtown Caldwell ramps to not provide this color contrast due to prevalence of red brick color schemes on sidewalks and ramps.

The City should have an ADA Transition Plan that identifies a systematic upgrades of facilities found to be out of compliance. Upgrading facilities is not always simple and not always inexpensive. Key elements to remember when working toward ADA compliance along streets and sidewalks include:

Exhibit 4.4: Right Turn Lane Curb Extensions/Truck Aprons

Oregon DOT and the City of Bend used truck aprons to apply to right turn slip lanes. Recognizing that only trucks require this wide radius, they were able to install aprons on the outside of the lanes to slow turning speeds of a majority of motorists and reduce pedestrian crossing exposure at these unprotected crosswalks.

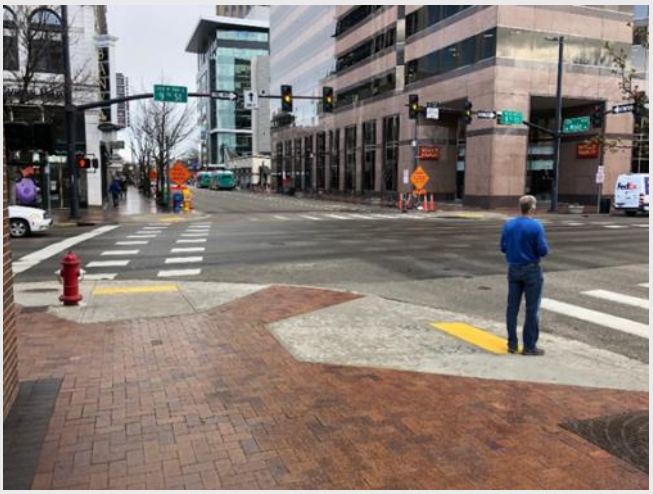
- Focus on arterials, collectors and transit routes for curb ramp upgrades;
- Incorporate arterial and collector curb ramp needs into identifying street resurfacing priorities to help ensure high priority routes are addressed (rather than responding to build ramps where street resurfacing occurs);
- Eliminate diagonal ramps as default design on arterials and collector routes (use only when constraints such as drop inlets or utility vaults require it) and install directional ramps instead (Exhibit 4.5);
- Develop a standard drawing for curb ramps linking to a shared use pathway. A typical 4-foot wide ramp does not provide adequate width for shared use pathway function. The ramp and crosswalk width should match the width of the pathway or sidewalk, with a minimum 8-foot wide ramp for a shared use path in constrained conditions;
- Adherence to MUTCD Section 6 is important to provide access to pedestrians and comply with ADA in construction zones. Pedestrians routes must not be severed for construction and detour routes should avoid lengthy, out-of-direction travel;

Push button access is sometimes overlooked when installed signals like RRFBs or when curb ramps are reconstructed. Designers should incorporate push button upgrades along with curb ramp rebuilds and ensure new signals have buttons accessible to people with disabilities.

- The detour route of a sidewalk in a construction zone must have comparable features to the route that is impacted (e.g. ramps, width, push buttons);
- In construction zones, sidewalk barricades must have bottom railings that cover the full tread width of the walkway and be detectable to a person using a cane.

Exhibit 4.5: Diagonal Ramps vs. Directional Ramps

FHWA explicitly states that diagonal curb ramps (left) are not recommended. They should not be a default design on street corners. They increase pedestrian exposure to moving traffic, require additional ADA compliance considerations for flat landings in the street, and unnecessarily lengthen pedestrian crossing times. Directional ramps (right) are the preferred option unless constraints such as drop inlets, utility vaults, existing building footprints necessitate a diagonal ramp.



Pedestrian Crossing Frequency

If people who walk are not given access and crossing opportunities that are protected and within a reasonable distance, designers cannot expect them to simply obey signs and designs that force them to walk a long way to reach a crossing.

AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities* (2004) identifies the following key concepts in providing safe pedestrian access across corridors.

- **Assumptions:** Assume that pedestrians want and need safe access to all destinations that are accessible to motorists. Additionally, pedestrians will want to have access to destinations not accessible to motorists, such as trails and parks.
- **Frequency:** Pedestrians must be able to cross streets and highways at regular intervals. Unlike motor vehicles, pedestrians cannot be expected to go a quarter-mile or more out of their way to take advantage of a controlled intersection.
- **Generators and Destinations:** All transit stops require that pedestrians be able to cross the street.

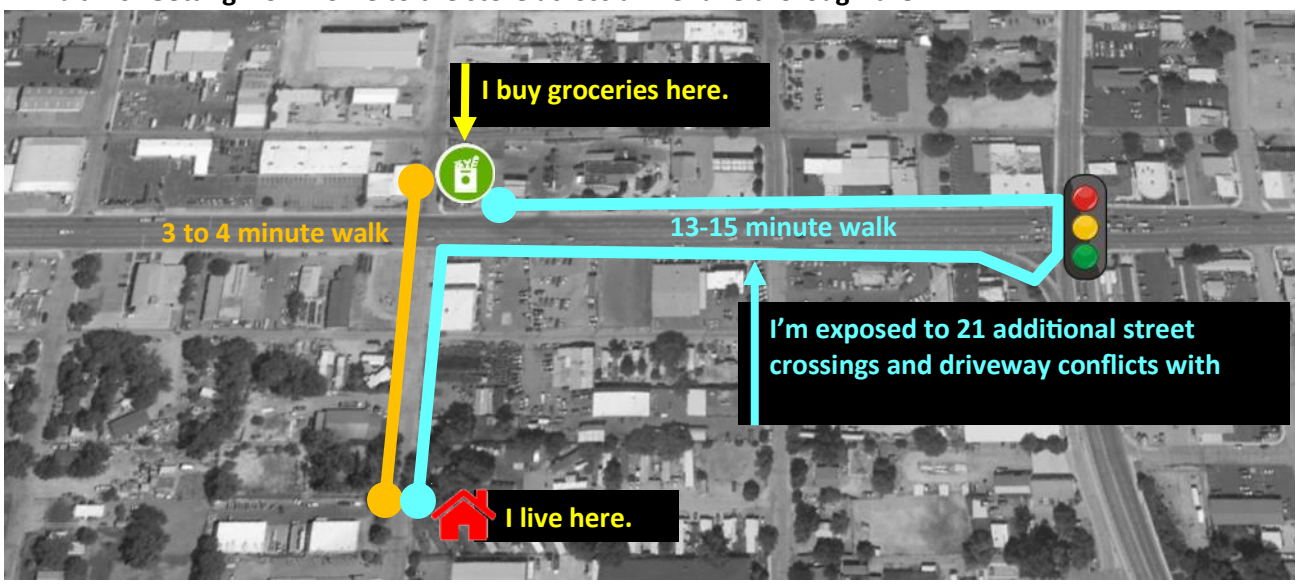
Further engineering-based support for the starting point on evaluating pedestrian crossings is found in ITE's *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* (2010), which is endorsed by Federal Highway Administration as a design guide to be used in corridor engineering.

AASHTO states "pedestrians cannot be expected to go a quarter mile or more out of their way to take advantage of a controlled intersection." Therefore, expecting them to walk 10 to 20 minutes to reach a signalized crossing is not an acceptable design approach.

- Pedestrian facilities should be spaced on blocks so block lengths in less dense areas (suburban or general urban) do not exceed 600 feet (preferably 200 to 400 fee) and relatively direct routes are available.
- Generally, however, consider providing a marked midblock crossing when protected intersection crossings are spaced greater than 400 feet or so that crosswalks are located no greater than 200 to 300 feet apart in high pedestrian volume locations."

Corridor planning and design should start out with these goals for spacing, then refine them to match existing intersection and land uses. Exhibit 4.5 shows a conceptual way to understand the out-of-direction travel and additional conflicts pedestrians are exposed to when crossings do not meet these guidelines.

Exhibit 4.6: Getting from home to the store across a five-lane thoroughfare



5. Pedestrian Facility Recommendations

For too long, sidewalks have been viewed as an amenity rather than a required safety component to major routes such as arterials and collectors. This is not unique to Idaho, as many routes across the United States remain a challenge for pedestrians due to these past decisions.

While many agencies are quick to justify acquisition of property to widen roadways or motorists, some using eminent domain, there is still a reluctance to view pedestrian safety as being on-par with motorist movement. Exhibit 5.1 shows Federal Highway Administration's Office of Safety guidance on where sidewalks are required based on roadway classification and land use. All urban and suburban lanes uses for arterials and collectors are indicated as "Sidewalks on both sides required" by FHWA.

Filling sidewalk gaps in built-out areas can be challenge along arterials and collectors if left to neighborhoods to petition for them. Utility poles, irrigation structures, fencing and landscaping may already be in the public right-of-way but difficult to remove or move due to property owner concerns.

Exhibit 5.1: Where Sidewalks are Required, per FHWA

Roadway Classification and Land Use	Sidewalk/Walkway	Future Phasing Requirements
Rural Highways (< 400 ADT)	Shoulders preferred, with minimum of 0.9 m (3 ft).	Secure/preserve right-of-way (ROW) for future sidewalks.
Rural Highways (400 to 2,000 ADT)	1.5-m (5-ft) shoulders preferred, minimum of 1.2 m (4 ft) required.	Secure/preserve ROW for future sidewalks.
Rural/Suburban Highway (ADT > 2,000 and less than 1 dwelling unit (d.u.) / .4 hectares (ha) [1 d.u. / acre])	Sidewalks or side paths preferred. Minimum of 1.8-m (6-ft) shoulders required.	Secure/preserve ROW for future sidewalks.
Suburban Highway (1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Sidewalks on both sides required.	
Major Arterial (residential)	Sidewalks on both sides required.	
Urban Collector and Minor Arterial (residential)	Sidewalks on both sides required.	
Urban Local Street (residential – less than 1 d.u. / .4 ha [1 d.u. / acre])	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.	Secure/preserve ROW for future sidewalks.
Urban Local Street (residential – 1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Both sides preferred.	Second side required if density becomes greater than 4 d.u. / 4 ha (4 d.u. / acre) or if schools, bus stops, etc. are added.
Local Street (residential – more than 4 d.u. / .4 ha [4 d.u. / acre])	Sidewalks on both sides required.	
All Commerical Urban Streets	Sidewalks on both sides required.	
All Streets in Industrial Areas	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.	

1 acre=0.4 hectares (ha)

Source: Federal Highway Administration Office of Safety, PEDSAFE Countermeasures Selection System

Sidewalk Gap Fills

Caldwell, in its 2017 Bicycle and Pedestrian Master Plan (Exhibit 5.2, next page) identified several long– and short-term projects for sidewalks. These routes collectively create a network of facilities along major roads. Given the magnitude of these improvements, Caldwell may wish to pursue projects that prioritize which gaps to fill first based on the presence of schools, parks, downtown, and other community gathering places. Caldwell has completed the recent Illinois Avenue project north of I-84 to link the school and park along this corridor.

Other improvements identified are:

- 10th Ave, I-84 to Ustick Rd;
- Kimball St, Railroad Ave to Paynter Ave;
- Indiana Ave, Cleveland Blvd to Ustick Rd;
- Linden St, Farmway Ave to Indiana Ave;
- Marble Front, Illinois Ave to eastern City limit;
- Montana Ave, Logan St to Ustick Rd;
- Paynter Ave/Kimball Ave, Simplot Blvd to Ustick.

The City should look to partner with developers in areas where they are building sidewalks to help fill gaps as development occurs. Developers may be willing to fill gaps off-site and for free, if right-of-way is available, to help better market their property's connectivity. The City may also have to pay developers in partnership to do this or pursue right of way acquisition along outparcels to address these safety needs.

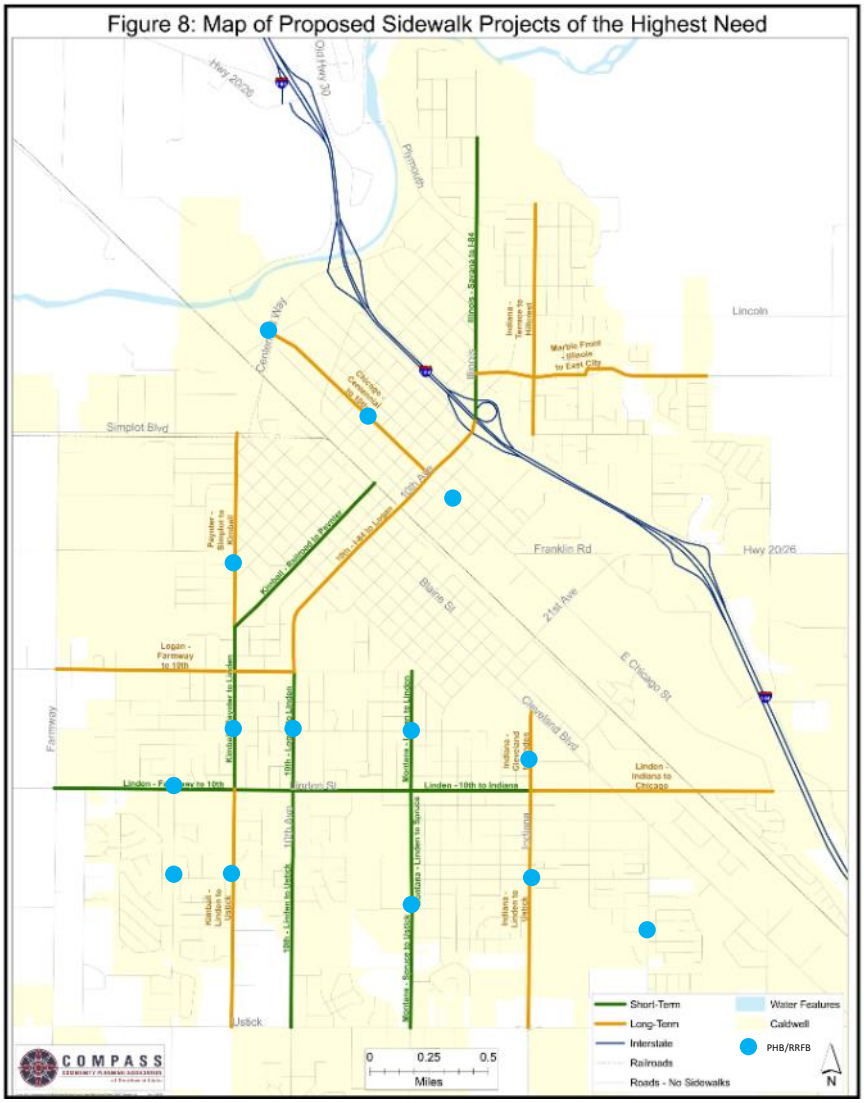
Mid-block Crossings/Key Crossings

In Idaho, every intersection is an unmarked crosswalk. Some intersections do not need markings as the typical conditions are that of low traffic volume, low vehicle speeds, and two lanes of travel. However, in other situations, larger, faster, and busier intersections often require additional pedestrian crossing markings so as to alert drivers to the presence of pedestrian activity and react accordingly. At signalized intersections, virtually all legs of intersections are marked with various crosswalk designs. Additional crosswalks are needed at key

intersections. The following list of intersections are recommended to include marked high visibility crossings. In some instances, an accompanying Rectangular Rapid Flash Beacon or Pedestrian Hybrid Beacon should also be installed to further enhance the crossing and either encourage drivers to yield or require them to stop. **Blue dots** in Exhibit 5.2 indicate these locations.

- Chicago St./Centennial Ave. (PHB)
- Chicago St./5th Avenue (RRFB)
- Chicago St./12th Avenue
- Ustick Rd./Santa Ana Ave. (PHB; not shown on map)
- Paynter Ave./Parkhurst Dr. (RRFB)
- Ash St./Kimball Ave. (RRFB)
- Ash St./10th Ave. (RRFB)
- Ash. St/Montana Ave. (RRFB)
- Indiana Ave/E. Oak St
- Linden St./Airport Ave. (RRFB)
- Linden St./Kimball Ave. (RRFB)
- Beech St./Airport Ave.
- Beech St./Kimball Ave.
- Beech St./Indiana Ave.
- Spruce St./Montana Ave. (RRFB)
- Polaris St./ S. Florida Ave. (RRFB)
- Flint Dr./S. Montana Ave. (RRFB; not on map)

Exhibit 5.2: Highest Need Sidewalks & Preferred PHB/RRFB Locations



Interim Sidewalk Options

Interim improvements to fill these gaps may be pursued to help lower the cost burden and provide adequate and safe pedestrian facilities. On some roads, on-street parking is infrequently utilized which means some parking lanes may be converted to protected pedestrian lanes by added an extruded curbing between the general purpose travel lane and converted parking lane. Studies can be done to determine parking utilization to determine which side would be most conducive to this conversion.

That's not always an easy decision because property owners tend to view public right-of-way parking spots in front of their houses as a private right. Making a determination, based on the FHWA chart above, that such conversions are in the best interest of public safety may be necessary to help overcome political reluctance to make such conversions.

In less-developed areas without curbing, an expanded shoulder combined with an extruded curb is a cost-effective option that mimics the function and protection of a sidewalk with much less cost.

Exhibit 5.3 shows an example of these options. Designers should be careful to make sure the expanded shoulder does not have a cross slope that exceeds 2% and

intersections should have detectable warnings as any curb ramp would.

Gaps are provided in the curbing to allow for drainage and flex posts or tubular markers may be installed to help delineate the space and offer greater conspicuity to motorists.

Given these arterial retrofits will be challenging and most likely result in a walkway being provided on only one side, the frequency and type of pedestrian crossings should be planned along with the temporary improvement. RRFBs and PHBs may be used in these locations.

Using the AASHTO and ITE guidance identified previously in this chapter will help guide spacing and also help facilitate safe movement of pedestrians across the corridor if the walkway has to switch sides due to constraints.

Exhibit 5.3: Low Cost, High Impact Pedestrian Walkways

Extruded Curbing: Shown below as an expanded shoulder in Kuna, Idaho, and as a conversion of a curbside parking lane in Seattle. A 2% cross slope should be maintained in expanded shoulders. Seek and document exception for street cross slope if there is a parking lane conversion.

Walking Shoulder: Kimberly and Spirit Lake, Idaho created walking shoulders on low speed, low volume routes. The project consists of a wider shoulder, a green line to add conspicuity, and a plan to add rumble strips outside the green line.

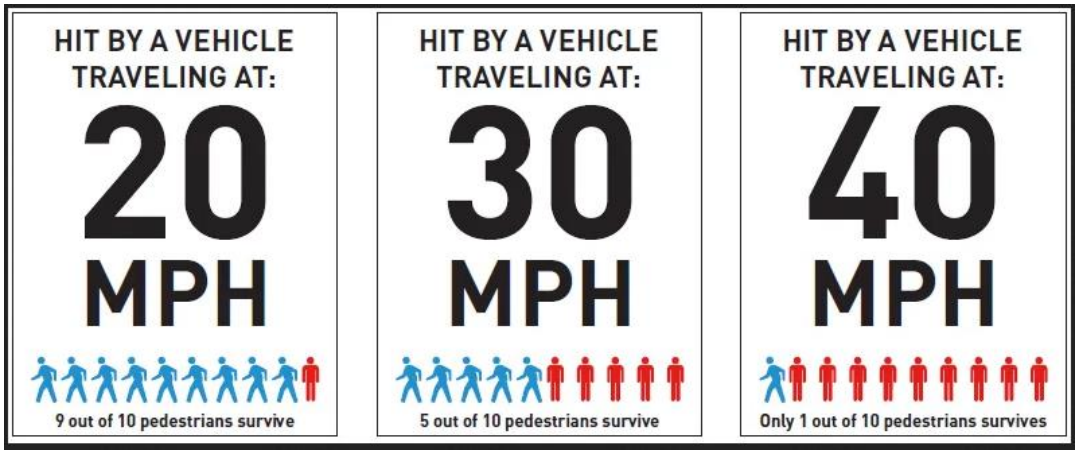
Signalized Pedestrian Crossings

Caldwell has 20 traditional signalized intersections, two Rectangular Rapid Flashing Beacon (RRFB) signals, three Pedestrian Hybrid Beacon (PHB or HAWK) signals, and one pedestrian traffic signal.

Each of the intersections has dedicated marked crossings to enhance driver awareness of pedestrians. Additional actions can be taken at signalized intersections to further improve safety and efficiencies for all users. The following steps are recommended to improve Caldwell signalized intersections:

- Ensuring pedestrian countdown signals are properly timed to meet the most recent MUTCD calculations of crossing width divided by 3.5 feet per second of walk speed. Additionally, in areas with higher concentrations of pedestrians such as downtown, use the more conservative timing plan of crossing width divided by 3.0 feet per second.
- Where possible given road geography, systematically replace existing corners with curb extensions to reduce exposure time and crossing distance and to slow turning vehicles.
- In areas of high concentrations of pedestrians such as school zones and downtown, eliminate right on red practice or restrict the movement during dedicated times of day.
- In areas of high concentrations of pedestrians, consider eliminating push buttons and programming crosswalk to be in recall mode at all times.
- If a flashing yellow arrow is used to increase intersection capacity, install pedestrian override equipment at the signal control box to override the flashing arrow in the presence of crossing pedestrians to eliminate potential crash.
- Evaluate and install overhead lighting where necessary to further illuminate crosswalks and give drivers better visual conditions so as to avoid crossing pedestrians.
- Consider transitioning to high-visibility ladder or Continental design crosswalks coincident with chip sealing projects.
- In areas with high concentrations of older adults likely slower of pace, consider upgrading pedestrian crossing call button software to allow more crossing time.
- Utilize z-crossing medians at mid-block crossings with center turn lanes, especially on five-lane roads, to help slow vehicles and discourage pedestrians and bicyclists from going straight across.

Exhibit 5.4: Fatality rate per common mile per hour traveled

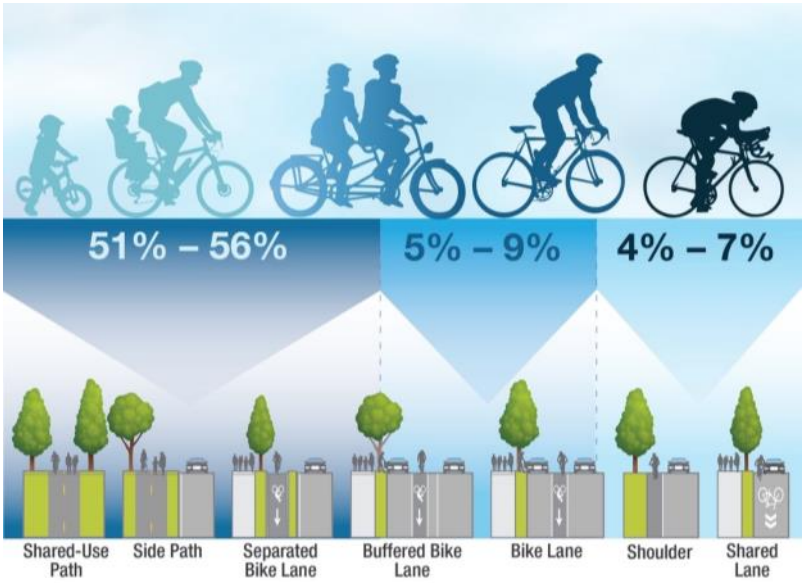


6. Bicyclist Design Concepts & Recommendations

Investing in bicycle facilities means a commitment to infrastructure that is used by more than the most confident of riders, which are shown in studies to represent between 4 and 7% of bicyclists (Exhibit 6.1).

A successful system is one that captures a majority of people who are willing to ride or even willing to try to ride to their desired destinations. To achieve this end, a plan that includes a multitude of projects that are contextually sensitive to roadway and traffic conditions yet attracts all willing participants is essential. This means that not every street needs to be addressed but also means that certain streets need considerably more investment to attain success. Simply stated, one size does not fit all.

Exhibit 6.1: Which facilities make riders feel safer?



Note: Percentages represent the level of comfort that people feel bicycling, according to peer-reviewed surveys as recently as 2016.
Source: FHWA Bikeway Selection Guide: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf
For more information, please visit FHWA's Bicycle and Pedestrian Program webpage: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/

Recently the Federal Highway Administration's Office of Safety published the *Bikeways Selection Guide*. This guide has been thoroughly vetted by transportation experts nationwide and is useful when considering the needs of Caldwell riders. The guide includes an exploration of the tenants of a successful system, the types of riders and their comfort level, and how to choose bicycle facilities given roadway characteristics.

As seen in Exhibit 6.2, a fully integrated system is considerate of seven elements that go beyond adding a bike lane or installing signage. If any rider of any ability can ride from one side of Caldwell to the other feeling comfortable, safe, directly, and enjoyably, chances are the City has met its objective. If on the other hand, very few citizens feel comfortable with riding, cannot access their destination in a direct and cohesive manner, chances are the system misses the mark.

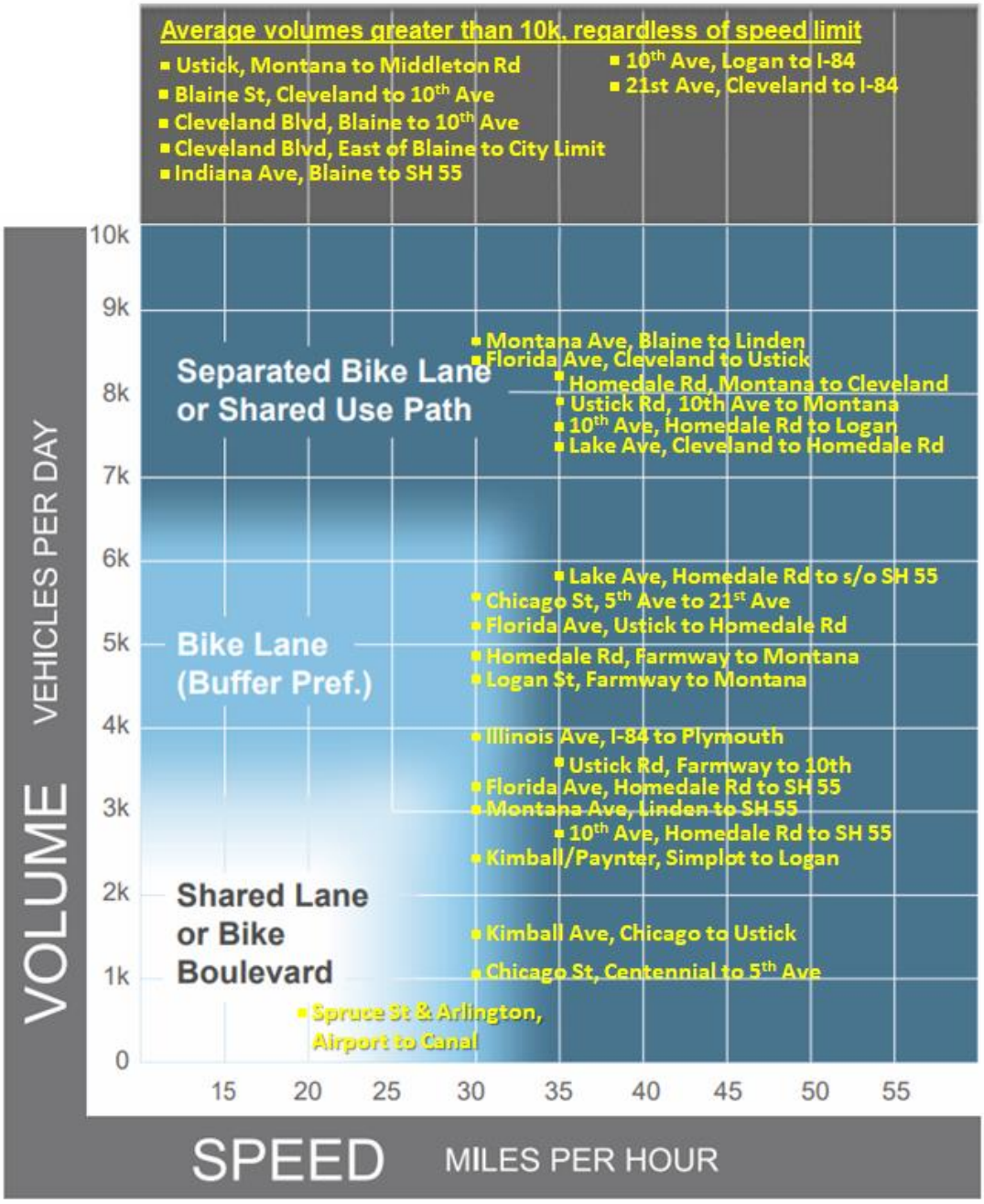
Just as motorist expect to have roads that link to their destinations when they leave their driveway, the same should be achieved by people wishing to bike. This perspective and the FHWA guidelines are the foundation of this chapter and why projects were prioritized, why designs were recommended, and why support elements identified.

Understanding the types of facilities that correspond to vehicle volumes and speeds on the adjacent road should be incorporated into project scoping and funding requests. Retrofitting corridors built recently with traditional bike lanes could be costly, so there's not an expectation that all will be upgraded. New roads with posted speed limits of greater than 30 mph and with more than 6,500 projected vehicles per day should be designed with separated facilities (Exhibit 6.3).

Exhibit 6.2: FHWA's Seven Principles of Bicyclist Network Design

Exhibit 6.3: Preferred Bikeway Type for Caldwell Roadways

The roads plotted below are based on COMPASS 2040 projected traffic volumes and prevailing speed limits in Caldwell on similar roads. This matrix should be used to guide bikeway design decisions on these and other routes.



Notes:

1. Chart assumes operating speeds are similar to posted speeds. If they differ, use operating speed rather than posted speed.
2. 2040 speeds assume 35+ mph for arterials and 30 mph for collectors
3. Advisory bike lanes may be an option where traffic volume is less than 3,000 ADT
4. See page XX for discussion of alternatives if the preferred bikeway type is not feasible.

Source: Federal Highway Administration Office of Safety, Bikeway Selection Guide (2019)

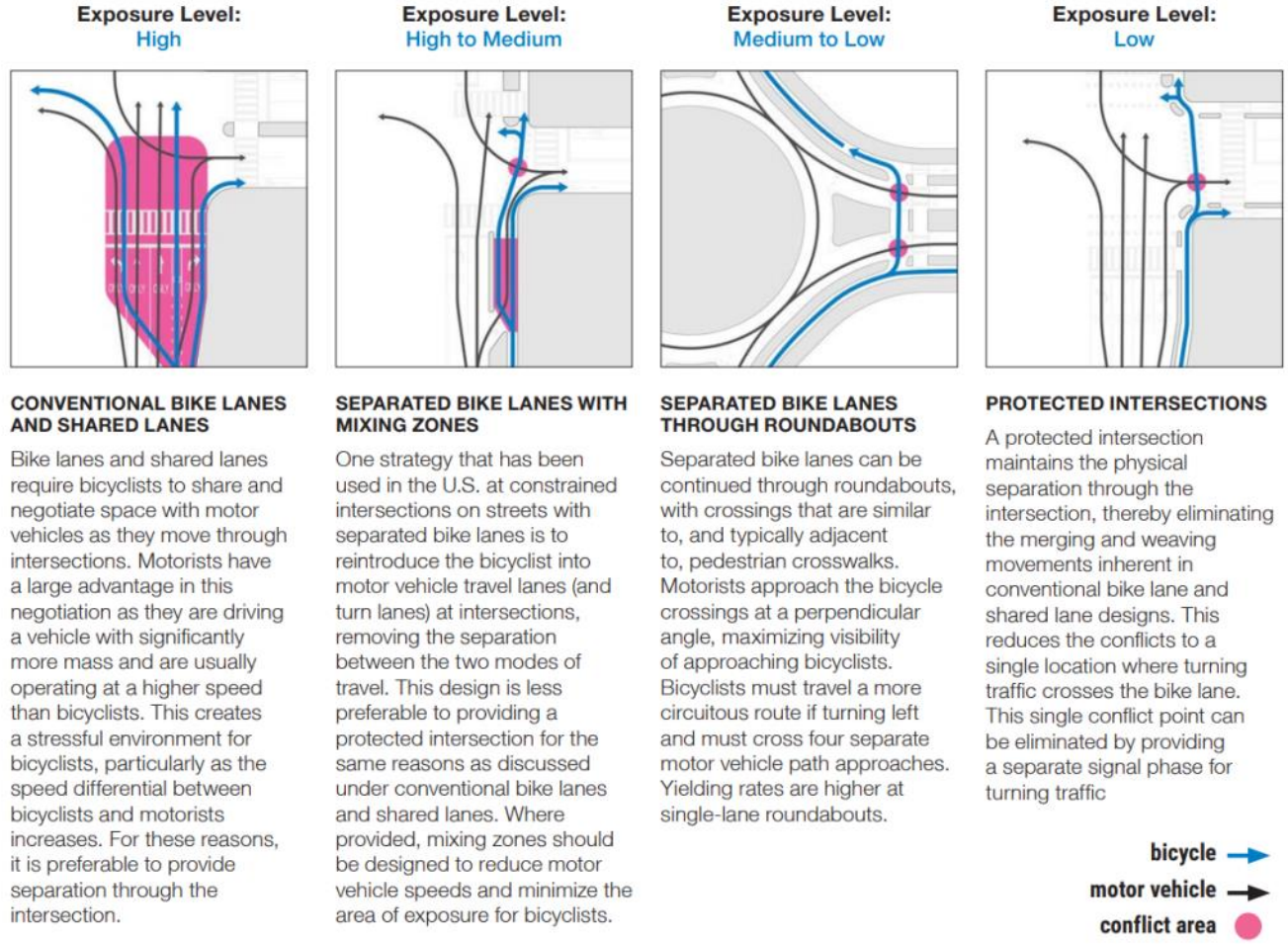
Intersections

A person will oftentimes decide whether or not to bike for a trip based on the worst obstacle they have to overcome on that trip. For many, these are intersections where wide swaths of asphalt given to motorists flank small bike lanes. Exhibit 6.5 shows FHWA's illustrations on comfort levels bicyclists feel at intersections.

Conventional bike lanes offer little comfort to a vast majority of bicyclists, especially when compared to separated bike lane (on sidepaths) through roundabouts or at protected intersections. Conventional bike lanes may be best designed to lead bicyclists into a wider sidewalk situation at intersection that are then combined with protected intersection and leading signal intervals for pedestrians and bicyclists. That's one way to retrofit a corridor to provide the most comfort at the least comfortable intersections along a route.

Bicyclists must not be put in a position where they are squeezed between motor vehicle lanes at intersections. Vehicle travel lanes may need to be reduced to 10-feet or 11-feet at intersections to ensure bike lanes are a minimum of 5-feet wide.

Exhibit 6.4: Comparison of Bicyclist Comfort and Safety at Intersections



Source: Federal Highway Administration Office of Safety, Bikeway Selection Guide (2019)

Supportive On-Pavement Markings

Caldwell has many dedicated bicycle lanes on many of its arterials and collector roads. In some instances, the lanes meet general bikeway design standards and include the accompanying signage and on-street pavement markings. When those conditions are in places, awareness for bicyclists and violations of on-street parking are both optimal which in turn fosters the intended outcomes. However, there are many bicycle lanes in the city that do not have the same frequency of signage or on-street parking.

The bike lanes can vary greatly in width from nearly 10' in some locations, to only a few inches in others. When lanes are striped to 6'-8' wide, on-street parking violations were observed to occur regularly. When people park vehicles in bike lanes, it forces bicyclists from the dedicated lanes into mixed traffic flow. The speed difference between bicyclists and motorists can easily equal 25 miles per hour or more. This type of situation can be hazardous for all involved and result in crashes and injuries. To mitigate this condition, a series of proactive steps are necessary that will delineate the spaces for bicyclists as originally intended, and to minimize potential conflicts from occurring.

For those lanes currently within federal guidance of 5', NOT including the gutter pan, the City of Caldwell can immediately begin installing posted signage denoting the presence of the lane, and that no parking is permitted. Additionally, on-street pavement markings to further illustrate the presence of the lanes will be implemented. Both signage, and on-street pavement markings should be placed at regular intervals and near intersections. MUTCD guidance is not specific for bike lanes, but does give clear guidance on sharrows marking. Using these distances as a guide, placing signs and markings immediately after intersections and no farther than 250' intervals thereafter, is recommended.

Exhibit 6.5: Bike Lane Striping Applications in MUTCD

Chapter 9 of the most recent MUTCD includes specific guidance for the use of on pavement markings. These marking along routes and through intersections will improve visibility of lanes and compliance among all users.

Figure 9C-4. Example of Bicycle Lane Treatment at a Right Turn Only Lane

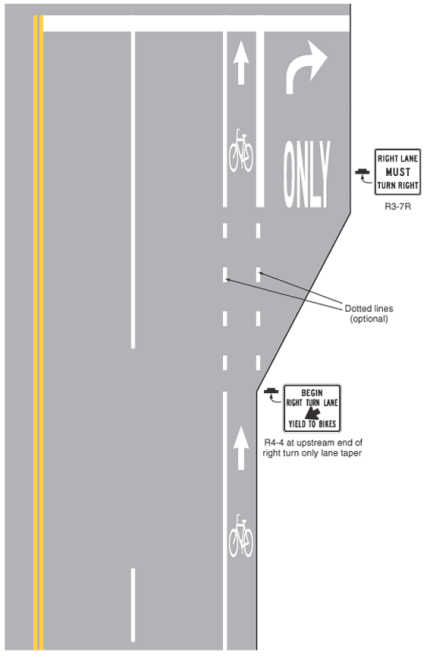
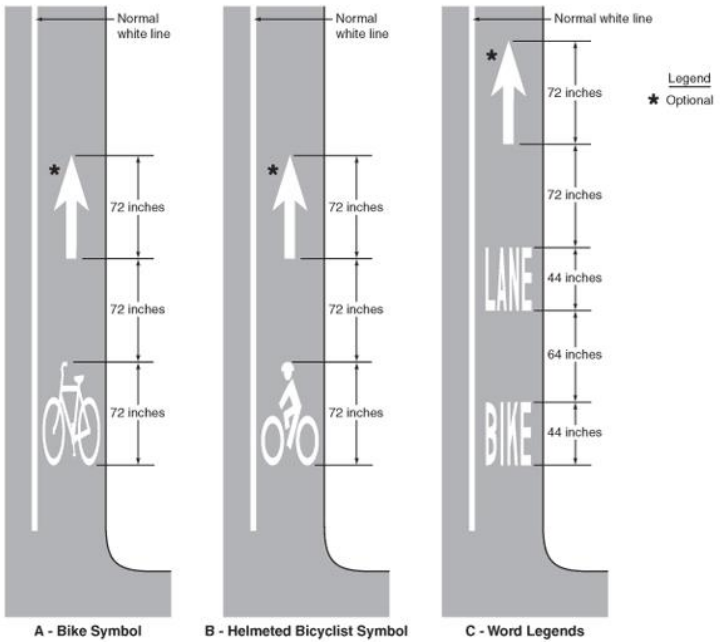


Figure 9C-3. Word, Symbol, and Arrow Pavement Markings for Bicycle Lanes



Chip Seal Coordination

One way to reduce implementation costs is to coordinate recommended projects to coincide with annual chip sealing activities. Chip sealing is used to disperse weight pressures on asphalt , reduce travel wear, and minimize asphalt cracking that leads to potholes and degraded surfaces. When chip sealing operations occur, a new roadway striping pattern is painted that will largely remain in place and repainted until the next chip sealing project occurs. The City of Caldwell has a seven-year chip sealing program that keeps streets in good working condition. This means that for most projects recommended in this plan, especially bicycle facilities, projects could be fully implemented within six years unless additional right-of-way is required such as the case of pathways. This does not eliminate the possibility of a high priority corridor and project from being carried out prior to a chip seal project. However, if an adjustment to existing striping such as adding a painted striped buffer, widening a bike lane, or adjusting lane widths are needed, it may be fiscally prudent to wait to implement the project to better align with chip sealing.

One challenge worth considering as projects are implemented with chip sealing is continuity of routes. Many of the recommended bicycle facilities span several blocks and even miles. If one segment of a route is striped in one year and others in subsequent years, the system will not be whole immediately. If this is the case, the City has two choices. First, this can be viewed as an acceptable trade off to minimize costs but maximize system implementation in one entire zone, rather than by route. Or, the City could chose to extend the route by implementing one-off projects that complete particular corridors until chip-seal operations return to that zone. These are decisions the City will have to make in the coming years.

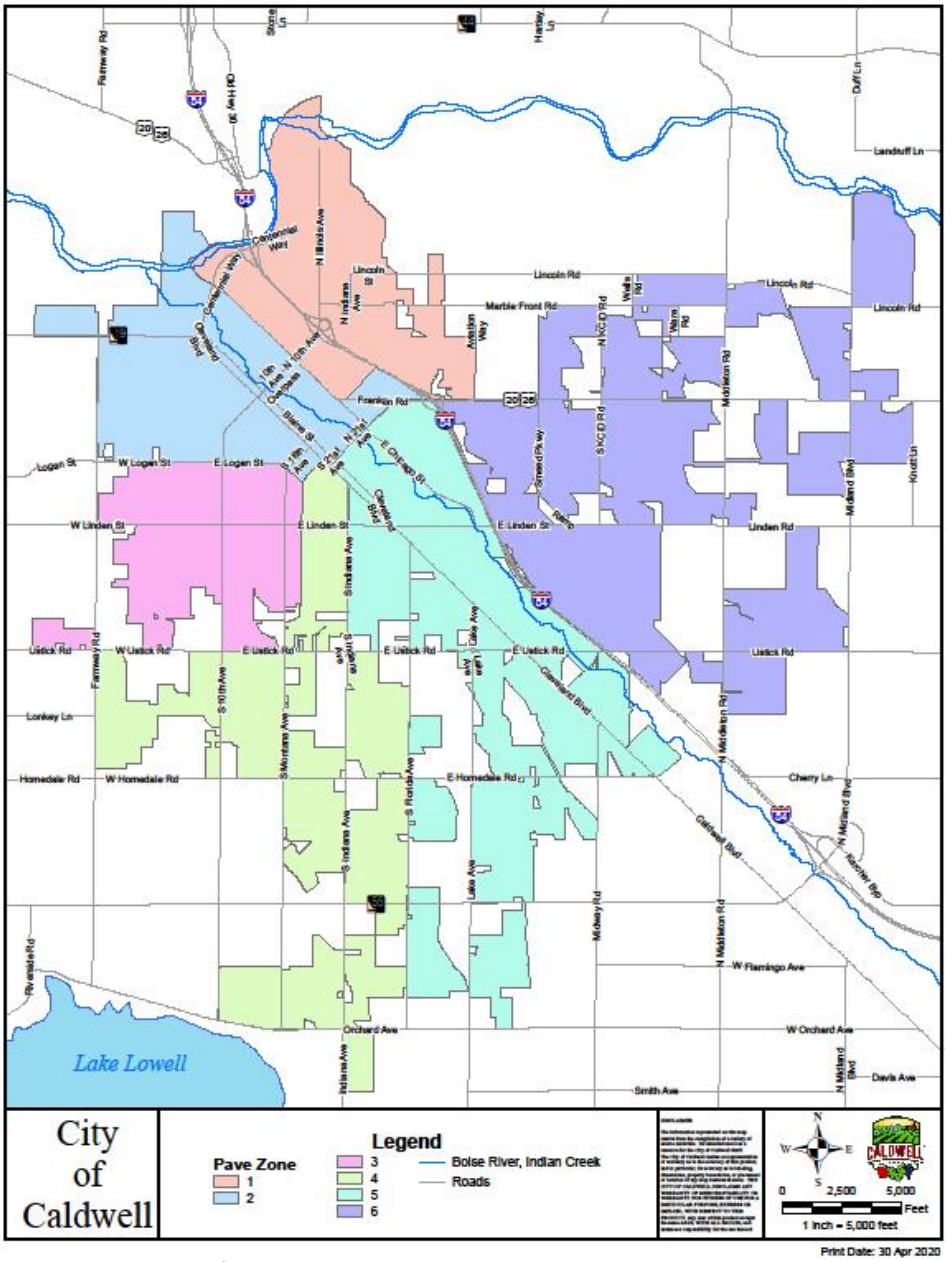
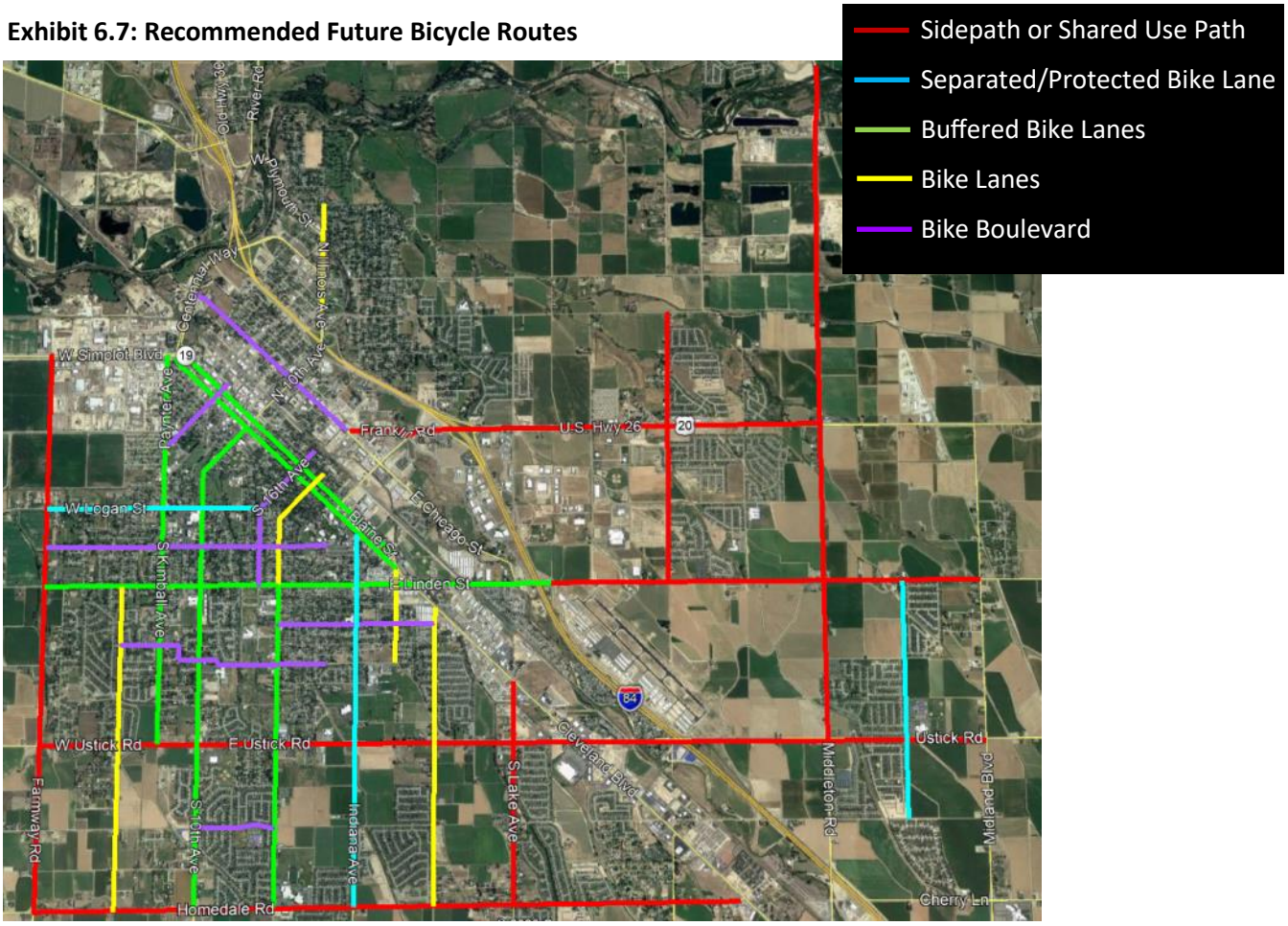


Exhibit 6.6: City of Caldwell Chip Seal Cycle

Bicycle Facility Recommendations

The next several pages include detailed descriptions of the bicycle facility recommendations the City will pursuit in the coming years. Some of the facilities will require coordinated planning, right of way acquisition through development, and investment. Other facilities can be implemented in short order through paint and signage. In the cases where facilities may be more complex in nature, a short term solution could be used until the final version constructed. In addition to providing an initial view of recommended projects, exhibit 6.7 also includes the possible temporary treatment possible in the near term.

Exhibit 6.7: Recommended Future Bicycle Routes



Priority Corridors

Sidepath or Shared Use Path	Short Term Facility
Farmway Road, Simplot Blvd to Homedale Rd	Paved Shoulder
Franklin Road, Chicago Street to Middleton Road	Buffered Bike Lanes, Restriping
Homedale Road, Farmway to Nampa-Caldwell Blvd	Paved Shoulder, Bike Lanes
Kcid Road, Marble Front Rd. to Linden Road.	Paved Shoulder
Lake Avenue, Cleveland Blvd to Homedale Rd.	Bike Lanes, Restriping
Linden Avenue, I-84 to Midland Boulevard	Restriping, Paved Shoulders, Bike Lanes
Middleton Road, Middleton to Ustick Road (amend corridor study)	Paved Shoulder, Bike Lanes
Ustick Road, Farmway Road to Midland Blvd	Paved Shoulder, Bike Lanes

Priority Corridors Continued

Separated or Protected Bike Lanes	Short Term Facility
Indiana Avenue, Blaine Street to Homedale Road	Restriping, Signage, Bike Lanes
Logan Street, Farmway Road to 16th Avenue	Striping, Bike Lanes
Santa Ana Avenue, Linden Road to Laster Lane	Paved Shoulder, Striping, Bike Lanes

Buffered Bike Lanes	Short Term Facility
10th Avenue, Dearborn Street to Homedale Road	Ready for final implementation
Blaine Street, Georgia St to Simplot Road	Ready for final implementation
Cleveland Blvd, Simplot Blvd to Georgia St.	Ready for final implementation
Kimball Avenue/Paynter Avenue, Simplot Blvd to Ustick Road	Paved Shoulder, Striping
Linden Street, Farmway Avenue to I-84.	Paved Shoulder, Striping
Montana Avenue, East Linden Street to Homedale Road	Ready for final implementation

Bike Lanes	Short Term Facility
Airport Ave/Bear Lane, Linden St to Homedale Rd	Ready for final implementation
Florida Ave, Cleveland Blvd to Ustick Rd	Restriping
Illinois Ave, Marble Front Rd to Taft St	Ready for final implementation
S Georgia Ave, Cleveland Blvd to Spruce St	Paved Shoulders, Striping
Montana Ave, Blaine St to Linden St	Ready for final implementation

Bike Boulevard	Short Term Facility
6th Avenue, Indian Creek Greenway to Memorial Park	Ready for final implementation
16th Avenue/Washington Ave, Main St to Linden St	Ready for final implementation
Arlington Ave, Beech to Spruce St	Ready for final implementation
Ash Street, Farmway Road to Wisconsin Avenue	Ready for final implementation
Beech St, Airport Ave to Arlington Ave	Ready for final implementation
Chicago St, North 21st Avenue to Rotary Park Pond/Greenbelt	Ready for final implementation
Laster St, Montana Ave to 10th Ave	Ready for final implementation
Spruce St, Arlington Ave to Wisconsin Ave/Canal	Ready for final implementation

Sidepath or Shared Use Path

Sidepaths and shared use paths are separated facilities that provide for bi-directional pedestrian, bicyclist, and small mobility (e.g. push/electric scooters) functions. While shared use pathways are typically located in parks and along waterbodies, like the Indian Creek Greenway, sidepaths run along roadways.

These pathways are the most attractive to the most users—children, adults, seniors, casual bicyclists—because they are physically separated from motor vehicle traffic.

AASHTO's bike guide designates 10' as the minimum width, noting that 14' feet is preferred in areas projected to have high usage. Widths of 8' may be used for short distances in constrained sections, or rural areas where low pedestrian volumes are expected.

Sidepaths are an application to fill gaps in shared use pathway networks to mimic the protection and function of the pathway rather than expecting less confident bicyclists to use in-street bike lanes. They may be located on one side of a street when frequent (1/3 to 1/4-mile) spacing is given to access destinations on the opposite side.

Particular care needs to be given at intersections, driveways, and mid-block crossings due to the bi-direction traffic and motorist expectations regarding bicyclists. Curb ramps and crosswalks must be the width of the pathway to maintain safety for bi-directional traffic crossing a street.

Safety & Forgiveness	👍
Functionality & Comfort	👍
Attractive to All Rider Types	👍
Economic Development	👍
Health Promotion	👍
Cost	👎
Retrofitting Existing Streets	👎

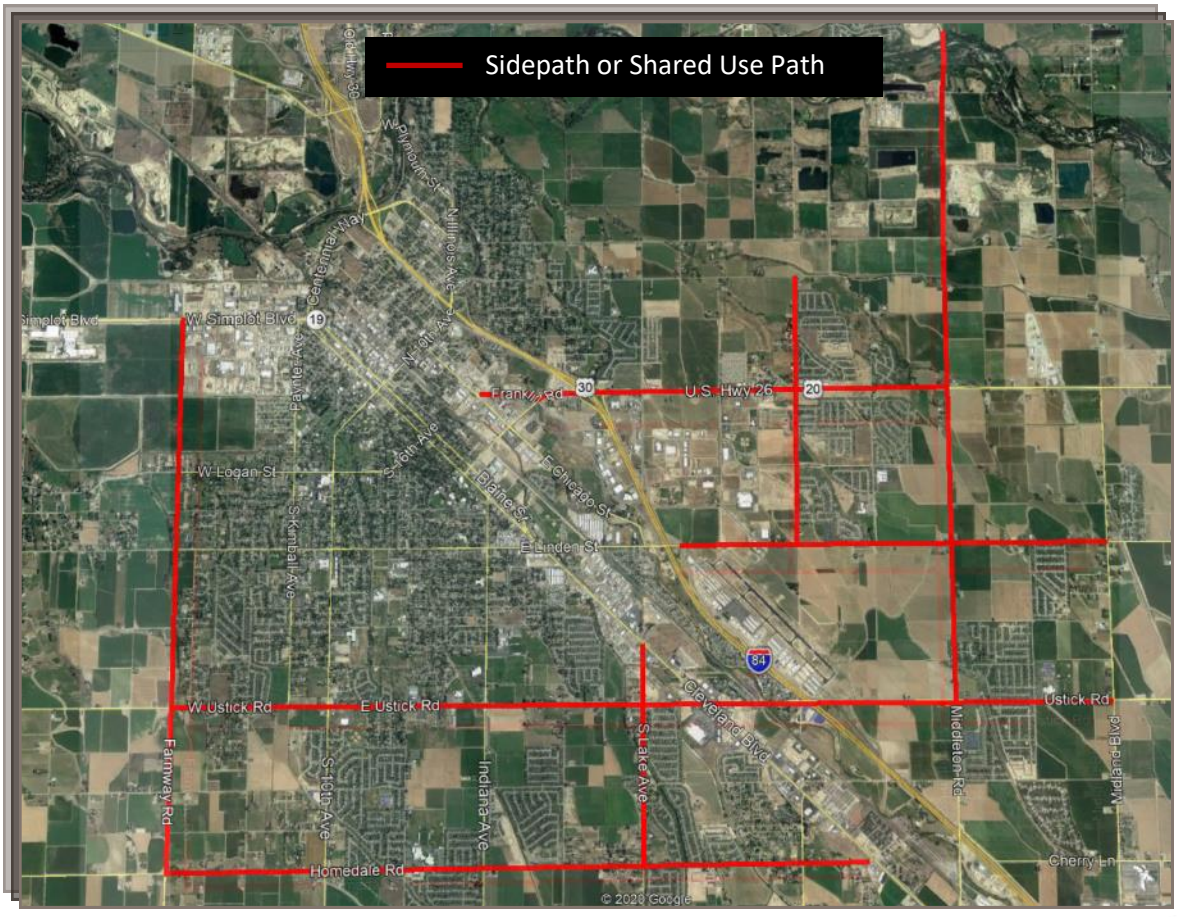
Key Considerations:

- Proper width for diverse users
- Intersection and driveway design
- Frequent crossings to access destinations
- All-season maintenance

Sidepath or Shared Use Path

Recommended Routes:

- Farmway Road, Simplot Blvd to Homedale Rd
- Lake Avenue, Cleveland Blvd to Homedale Rd.
- Kcid Road, Marble Front Rd. to Linden Road.
- Franklin Road, Chicago Street to Middleton Road
- Ustick Road, Farmway Road to Midland Blvd
- Homedale Road, Farmway to Nampa-Caldwell Blvd
- Middleton Road, City of Middleton to Ustick Road (amend corridor study)
- Linden Avenue, I-84 to Midland Boulevard



Separated or Protected Bike Lanes

Separated or protected bike lanes provide substantial vertical and horizontal separation from motor vehicle travel lanes. They are typically located along routes that are high speed and high volume from a vehicular traffic standpoint.

Like shared use pathways, these bike lanes are the most attractive to the most users—children, adults, seniors, casual bicyclists—because they too are physically separated from motor vehicle traffic.

Two-way protected lanes, like shown in the top image at right, should be used in special circumstances where there are limited driveway breaks and where the protected lanes serve as a type of extension of a pathway system. An example would be a two-way protected bike lane extending from Indian Creek Greenway within a street to Memorial Park.

Protected bike lane design concepts are included in the NACTO Urban Bikeway Design Guide and are endorsed by Federal Highway Administration. The minimum width of a two-way protected lane should be 10' (8' if constrained, not counting gutter pan). One-way lanes may be set alone between a parking lane and curb (bottom right) or atop the curb (middle right).

Particular care needs to be given at intersections, driveways, and mid-block crossings due to sight distance needs.

Safety & Forgiveness

Functionality & Comfort

Attractive to All Rider Types

Economic Development

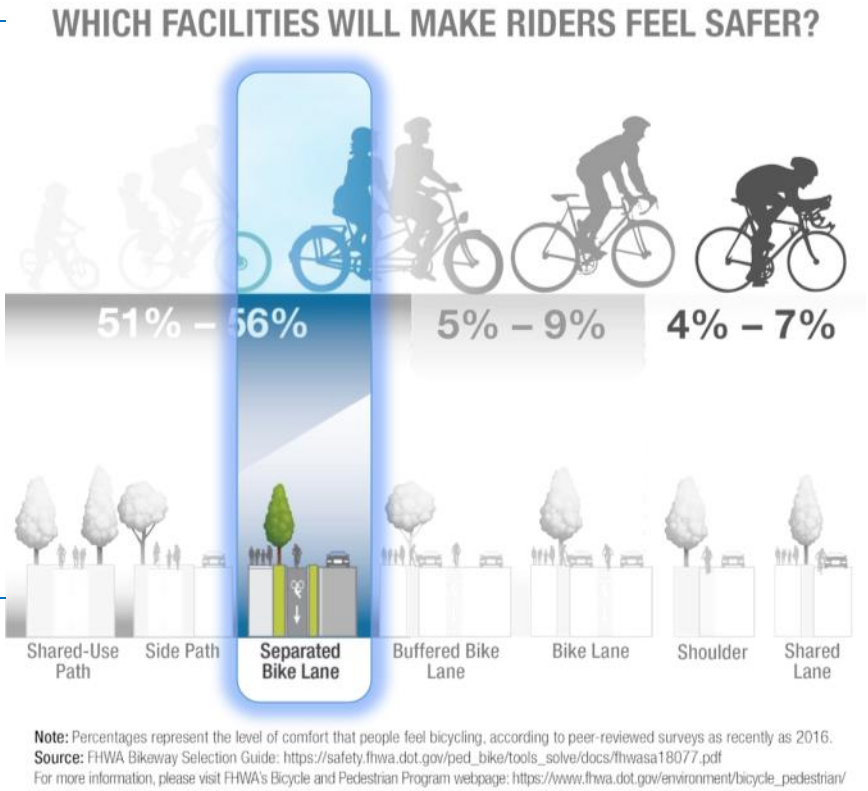
Health Promotion

Cost

Retrofitting Existing Streets

Key Considerations:

- Sight distance at driveways
- Intersection design/configuration
- Frequent crossings to access destinations
- Pedestrian access at transit stops



Note: Percentages represent the level of comfort that people feel bicycling, according to peer-reviewed surveys as recently as 2016.
Source: FHWA Bikeway Selection Guide: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf
For more information, please visit FHWA's Bicycle and Pedestrian Program webpage: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/

Separated or Protected Bike Lanes

Recommended Routes

- Indiana Avenue, Blaine Street to Homedale Road
- Santa Ana Avenue, Linden Road to Laster Lane
- Logan Street, Farmway Road to 16th Avenue

Buffered Bike Lanes

Buffered bike lanes are placed within the curb-to-curb section of street and provide a painted area between general travel lanes and the bike lanes to give a little bit more horizontal separation from motor vehicle traffic. These are meant for lower speed, lower volume collector routes where speed exposure is limited.

These pathways are most attractive to more enthused and confident riders and may be used in short segments to link other bike networks. The painted buffer offers no real protection. Flex posts or tubular markers may be provided in the buffer space to act as a vertical buffer. With a painted buffer, the bike lane may be reduced to 4' in width in a constrained section; 5' preferred (not counting gutter).

Buffered bike lanes may provide adequate mid-mile connectivity within neighborhoods and to reach middle schools or high schools. Children are still likely to use the sidewalks to ride, even with a buffered lane.

Particular care needs to be given to maintenance practices to ensure they are not covered in debris or snow, which forces bicyclists in to general travel lanes.

Buffered bike lanes may be used in situations where a bike route is preferred on a busier street, like an arterial, but retrofitting the route with a protected lane or sidepath is not feasible.

Safety & Forgiveness

Functionality & Comfort

Attractive to All Rider Types

Economic Development

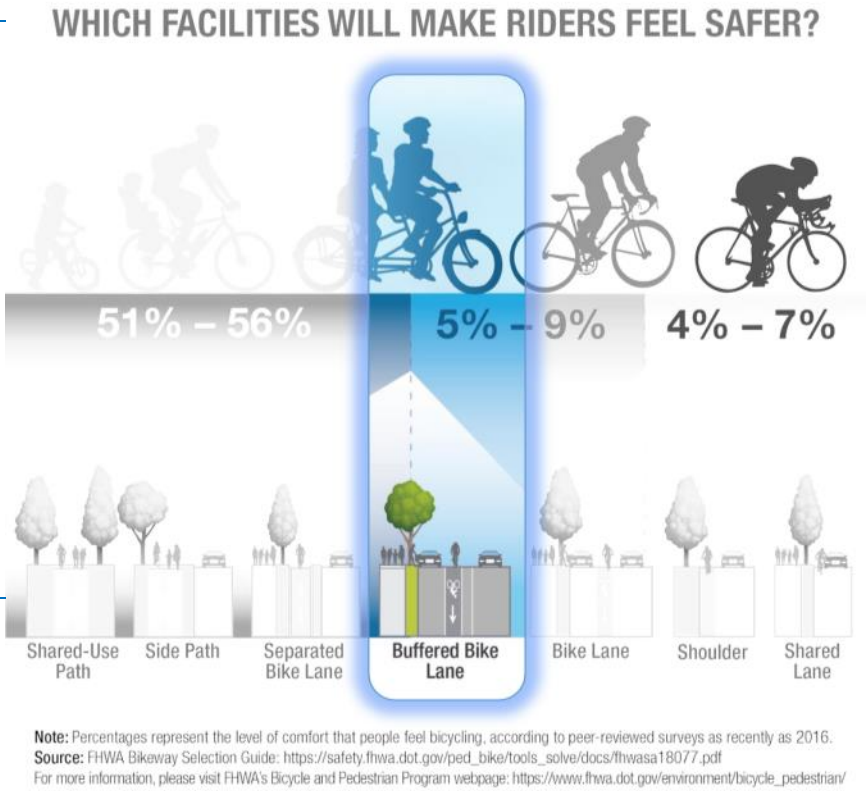
Health Promotion

Cost

Retrofitting Existing Streets

Key Considerations:

- Separation from parking lanes
- Transitions across right turn lanes
- Best for low speed collectors

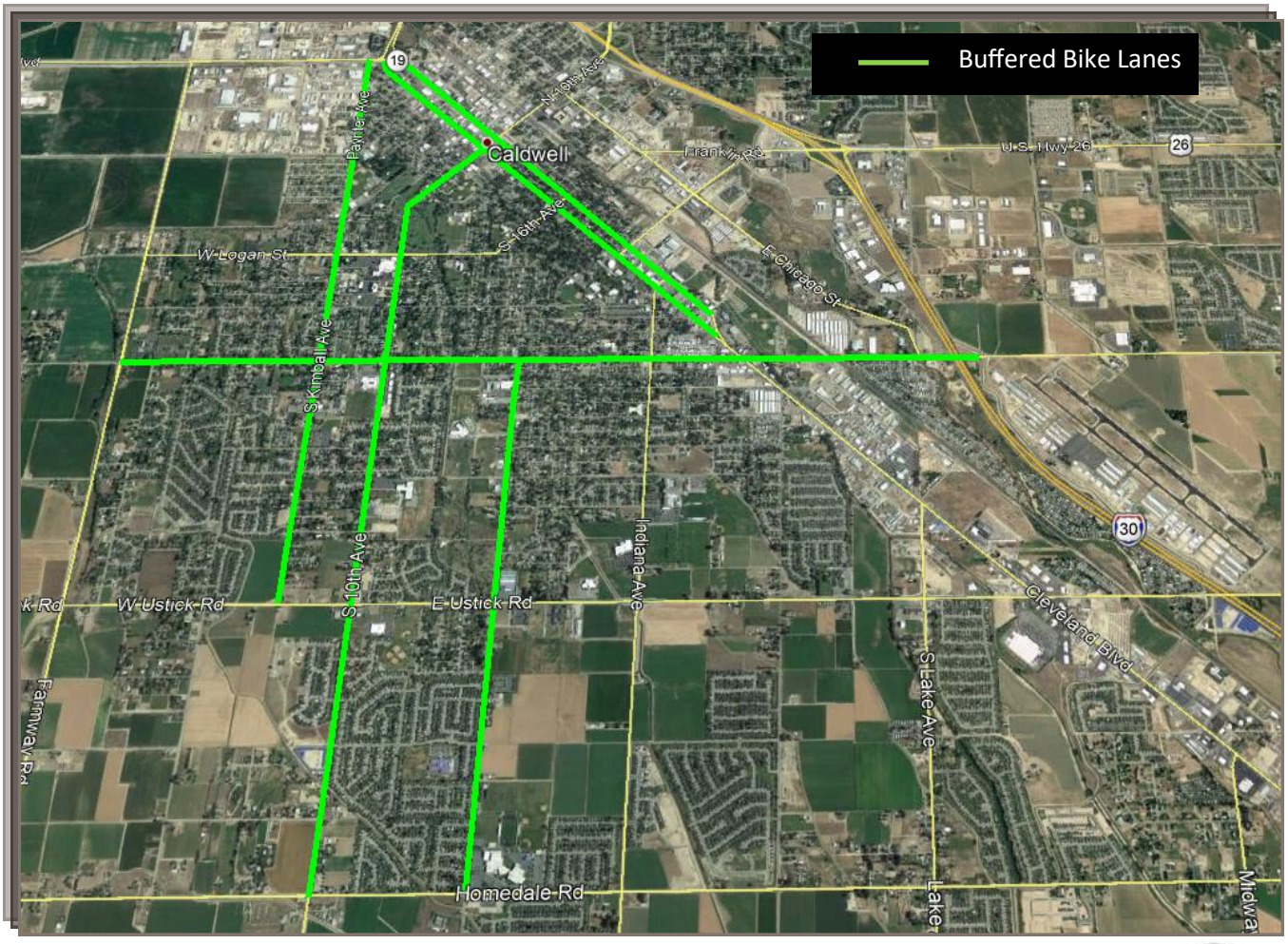


Note: Percentages represent the level of comfort that people feel bicycling, according to peer-reviewed surveys as recently as 2016.
Source: FHWA Bikeway Selection Guide: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf
For more information, please visit FHWA's Bicycle and Pedestrian Program webpage: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/

Buffered Bike Lanes

Recommended Routes:

- Kimball Avenue/Paynter Avenue, Simplot Blvd to Ustick Road
- 10th Avenue, Dearborn Street to Homedale Road
- Montana Avenue, East Linden Street to Homedale Road
- Blaine Street, Georgia St to Simplot Road
- Cleveland Blvd, Simplot Blvd to Georgia St.
- Linden Street, Farmway Avenue to I-84.



Bike Lanes

Bike lanes have been a default design approach for a couple decades on all types of roads. However, recent research shows they are not attractive or considered safe for a vast majority of bicyclists due to lack of separation and protection from fast-moving vehicle traffic. Children and less confident riders are still likely to use the sidewalk.

Bike lanes should be a minimum of 5' wide, not counting the gutter, when used and buffered from door zones if next to parking lanes (top right). When used or already existing along high speed routes, expectations for use should be tempered knowing they have limited utility for most riders.

Lower speed and lower volume applications are best for new bike lanes, as the images at right show the proper context on routes that are not multi-lane.

Particular care needs to be given at intersections if bicyclists are expected to be in a mixing zone or merge across traffic entering a right turn only lane. It is important to not include the gutter pan as part of the bike lane width as the cross slopes of the gutter are often in excess of the cross slope of the roadway, the seam between the asphalt and concrete creates a safety hazard for road bike tires, and one cycle of chip seal or overlay creates a dangerous lip at the seam between the asphalt and concrete.

Safety & Forgiveness

Functionality & Comfort

Attractive to All Rider Types

Economic Development

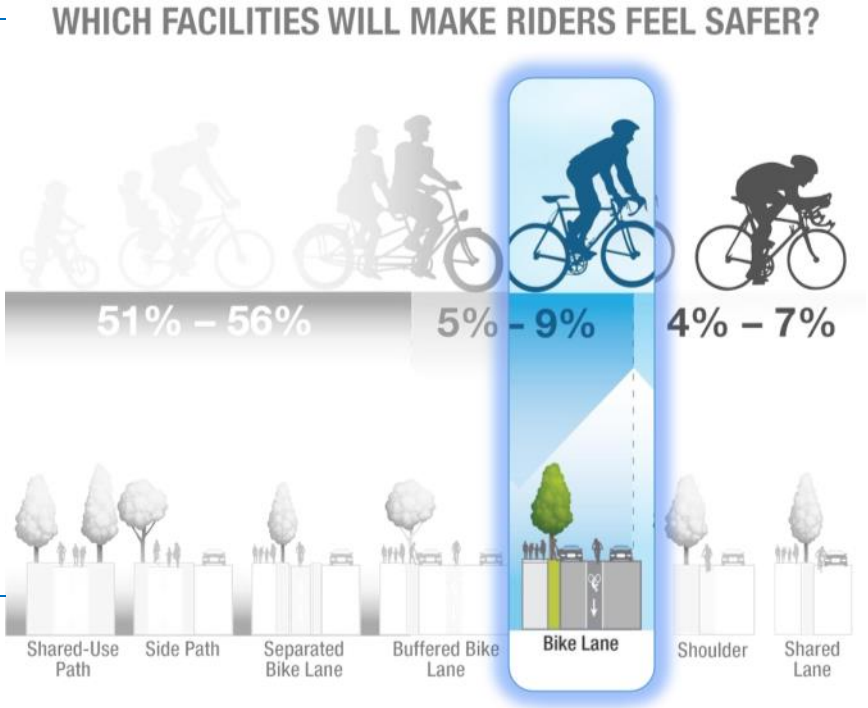
Health Promotion

Cost

Retrofitting Existing Streets

Key Considerations:

- Not appropriate for arterials
- Use in lowest speed & volume collectors
- Buffer from parking lanes
- Transition across right turn lanes

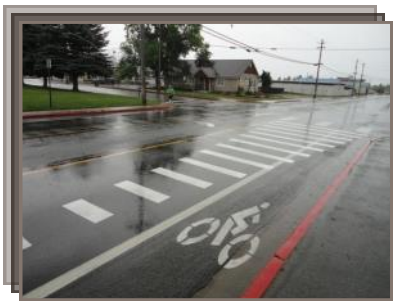


Note: Percentages represent the level of comfort that people feel bicycling, according to peer-reviewed surveys as recently as 2016.
Source: FHWA Bikeway Selection Guide: https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf
For more information, please visit FHWA's Bicycle and Pedestrian Program webpage: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/

Bike Lanes

Recommended Routes

- Airport Ave/Bear Lane, Linden St to Homedale Rd
- Montana Ave, Blaine St to Linden St
- S Georgia Ave, Cleveland Blvd to Spruce St
- Florida Ave, Cleveland Blvd to Ustick Rd
- Illinois Ave, Marble Front Rd to Taft St



Shared Road / Bicycle Boulevard

Expecting bicyclists to share the same travel lanes as motorists should be reserved for the lowest speed and lowest volume streets that help link existing bicycling networks.

When applied to higher speed and higher volume roads, shared lanes are only attractive to the most confident bicyclists, so we shouldn't expect a lot of bicyclist usage when shared lanes are applied to arterial routes.

Shared roads or bicycle boulevards should include other speed management applications in conjunction with shared lane markings. These may include speed humps with tire gaps that allow bicyclists and emergency service vehicle to pass through without having to go over the hump. Curb extensions, chicanes, and median island at intersections all help slow traffic to a safe speed for sharing of lanes with bicyclists.

Special signals and push buttons, such as RRFBs and PHBs, can be used where shared routes cross major roads. This includes placing push buttons next to the curb for bicyclists to activate the signals (middle right).

Shared lane markings should be placed outside the door zones of parked cars and generally located in the middle of the motor vehicle travel way to allow the bicyclists to properly control the lane.

Safety & Forgiveness

Functionality & Comfort

Attractive to All Rider Types

Economic Development

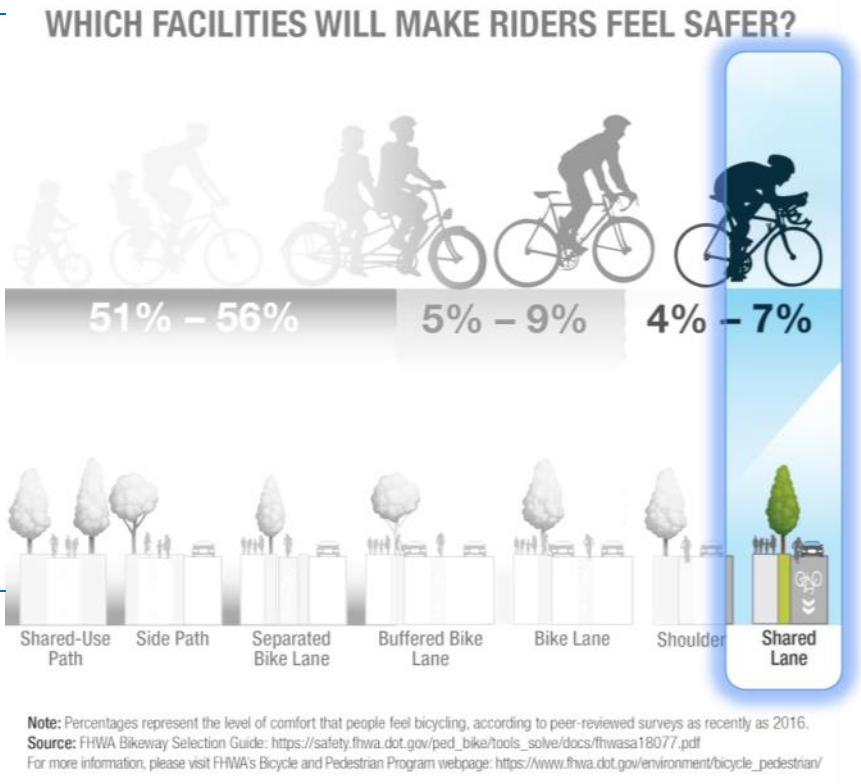
Health Promotion

Cost

Retrofitting Existing Streets

Key Considerations:

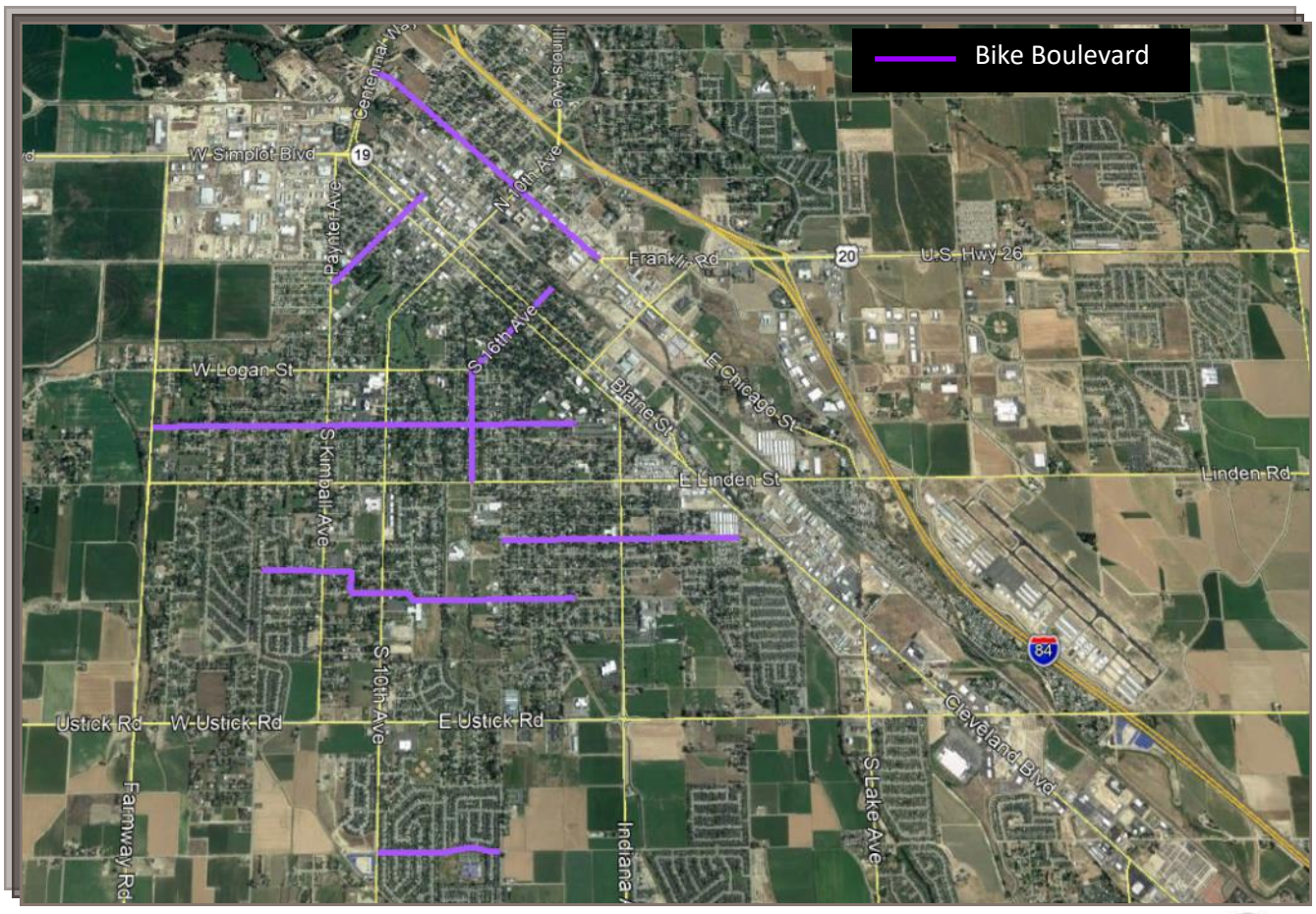
- Low speed, low volume local streets or collectors with significant speed management features
- Use to connect pathways via local routes



Bicycle Boulevard

Recommended Routes:

- 6th Avenue, Indian Creek Greenway to Memorial Park
- 16th Avenue/Washington Ave, Main St to Linden St
- Arlington Ave, Beech to Spruce St
- Ash Street, Farmway Road to Wisconsin Avenue
- Beech St, Airport Ave to Arlington Ave
- Chicago St, North 21st Avenue to Rotary Park Pond/Greenbelt
- Laster St, Montana Ave to 10th Ave
- Spruce St, Arlington Ave to Wisconsin Ave/Canal



7. Supportive Policies & Design Guides

There is no one definite source on the design for bicyclist and pedestrian facilities. This chapter profiles some of the prevailing design guides and their relevance to active transportation. This list of documents is important for reference purposes so Caldwell staff, its consultants, and citizens can utilize them to inform safe, more inclusive design.

A common misconception among planners and designers is that there are federal "standards" for the design of roads. There are no such things as federal standards, even from the AASHTO Green Book. All design elements pertaining to horizontal road dimensions like motor vehicle lane widths, sidewalk design, and bikeway design are guidelines. While there may be some minimum or maximum measurements, there is no single set dimensions and many of the prevailing federal guides point to the need for flexibility.

Another common misconception is that motor vehicle level of service (LOS) is somehow a mandate or a safety measure. It is neither. In the design realm, a strict interpretation of thresholds for level of service leads to a lessening or elimination of infrastructure for people who walk and bike.

Level of service is a comfort measure and is unfortunately applied solely to motor vehicles in things like corridor studies and traffic studies despite similar level of service measures existing for pedestrians, bicyclists and even transit.

Once designers and planners acknowledge that design guidance allows for ample flexibility, it allows cities like Caldwell to pursue a more balance transportation system and debate tradeoffs of different design and traffic engineering applications. Knowing that, for example, nothing requires an intersection to operate at Level of Service C means we can have a more equitable discussion on roadway performance for all users. Designing intersections and programming traffic signals to achieve Level of Service C oftentimes means it is Level of Service F for people who walk through that same intersection. Level of Service F for pedestrians, as FHWA research shows, means people are less likely to cross where the designers want them to or they are less likely to adhere to pedestrian walk signals when they are made to wait through long cycle lengths for cars.

The summaries in this Chapter provide a short description of various design guides from FHWA, AASHTO, ITE, NACTO and ITD. The summaries identify its relevance to Caldwell's Bicyclist and Pedestrian Plan, and a bulleted list of key concepts not oftentimes captured in local and state project decision making. Many of these manuals are available online for free, but AASHTO guides require purchase. The City of Caldwell should have these guidelines on file and hard copies of the AASHTO Guides. It is also advisable to work with the local library to have them add the AASHTO Guides to their reference library so citizens can have easy access to them.

U.S. Department of Transportation
Federal Highway Administration

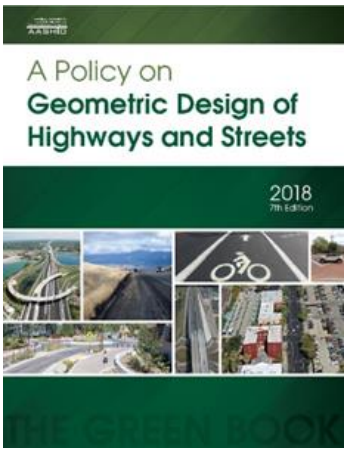
American Association of State Highway and Transportation Officials
AASHTO
The Voice of Transportation

NACTO

ITE
A Community of Transportation Professionals

Idaho Transportation Department

AASHTO A Policy on the Geometric Design of Highways and Streets (2018; 7th Edition)



This document, also called The Green Book, is developed by the national organization that represents all state DOTs. AASHTO (American Association of State Highway and Transportation Officials) has numerous committees tasked with developing this and other design guides. The Green Book is oftentimes mistakenly referred to as "AASHTO standards," which leads to an interpretation by some designers that the values included in it are mandated. The word "shall" is not used in the more than 1,000 pages of The Green Book, meaning nothing in it represents a standard. The preface to this design guide states:

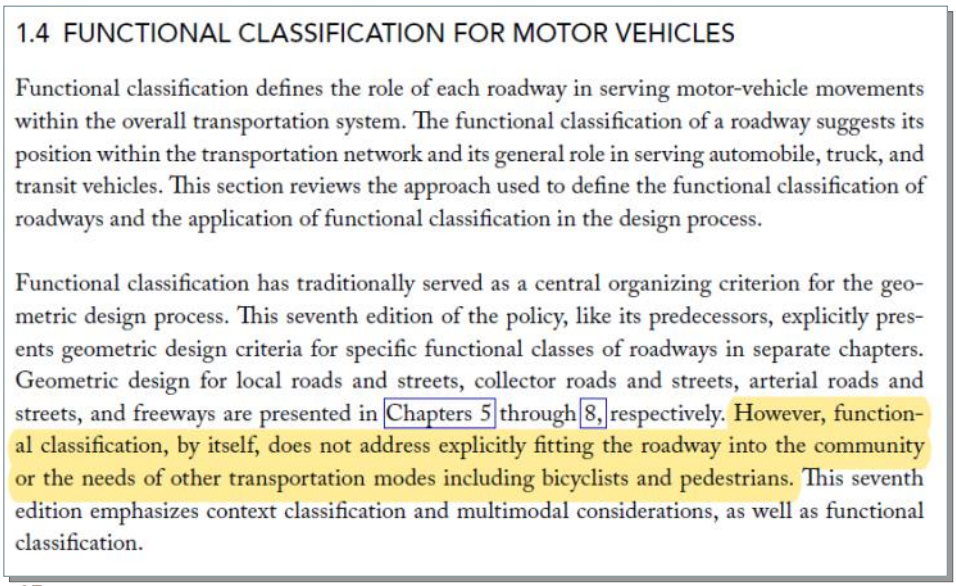
"Designers should recognize the joint use of transportation corridors by motorists, pedestrians, bicyclists, public transit, and freight vehicles. Designers are encouraged to consider no only vehicular movement, but also the movement of people, distribution of goods, and provision of essential services…This policy is not intended to be a prescriptive design manual that supersedes engineering judgment by the knowledgeable design professional."

One notable element incorporated into this version of the Green Book is the concept of a "target speed" as a method of determining design speed.

This is based on Vision Zero concepts for the "self-enforcing road" that recognizes design elements regulate and manage speed greater than enforcement efforts. Instead of using methods like the 85th percentile to determine a speed limit, a target speed approach recognizes that "lower speeds are desirable in walkable, mixed-use urban areas and this desire for lower speeds should influence the selection of the design speed…The target speed is the highest speed at which vehicles should operate…consistent with the level of multimodal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a desirable environment for pedestrians, bicyclists and public transit users. The target speed is intended to be used as the posted speed" (page 2-24).

The Green Book also recognizes that expectations placed upon pedestrians the same as we place on motorists is not a valid approach. Section 2.6.2 General Characteristics of Pedestrians states:

"Pedestrian actions are less predictable than those of motorists. Many pedestrians will cross roadways when and where they perceive it is safe to do so. Pedestrians tend to walk in a path representing the shortest distance between two points. Therefore, pedestrian crossings at mid-block locations may be appropriate to supplement those at intersections." (page 2-50).



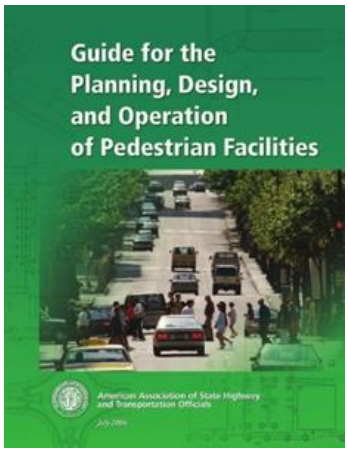
1.4 FUNCTIONAL CLASSIFICATION FOR MOTOR VEHICLES

Functional classification defines the role of each roadway in serving motor-vehicle movements within the overall transportation system. The functional classification of a roadway suggests its position within the transportation network and its general role in serving automobile, truck, and transit vehicles. This section reviews the approach used to define the functional classification of roadways and the application of functional classification in the design process.

Functional classification has traditionally served as a central organizing criterion for the geometric design process. This seventh edition of the policy, like its predecessors, explicitly presents geometric design criteria for specific functional classes of roadways in separate chapters. Geometric design for local roads and streets, collector roads and streets, arterial roads and streets, and freeways are presented in Chapters 5 through 8, respectively. However, functional classification, by itself, does not address explicitly fitting the roadway into the community or the needs of other transportation modes including bicyclists and pedestrians. This seventh edition emphasizes context classification and multimodal considerations, as well as functional classification.

For bicyclists, The Green Book dispels a common myth that the gutter pan of roads is allowed to be counted as part of the bike lane width. A common treatment is to build a bike lane on the asphalt section of the road and then count the width of the concrete gutter pan as additional bike lane width. Page 4-22 of The Green Book states "a gutter of contrasting color and texture should not be considered part of the traveled way."

AASHTO Guide for the Planning, Design, and Operations of Pedestrian Facilities (2004)



AASTHO's pedestrian guide is referenced more than 30 times in The Green Book and serves as a more detailed reference guide for proper pedestrian accommodations. It has sections on how pedestrians differ from motorist in how they experience the roadway environment:

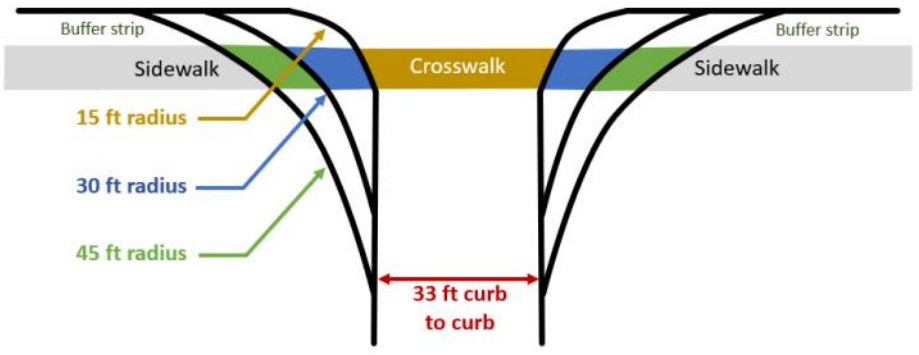
"Unlike motorists, pedestrians' slower speeds mean that they prefer more, rather than less, detail in their environment…Since pedestrians travel more slowly and are not surrounded by the protective environment of a motor vehicle, their immediate physical environment has a profound effect on their level of comfort."

Some notable elements of the pedestrian guide are sections on pedestrian factors when it comes to the characteristics of pedestrians.

- **Continuity:** Connectivity of the walking environment is just as important for pedestrian as a completely developed roadway network is for motorists.
- **Assumptions:** Assume that pedestrians want and need safe access to all destinations that are accessible to motorists. Additionally, pedestrians will want to have access to destinations not accessible to motorists, such as trails and parks.
- **Generators and Destinations:** All transit stops require that pedestrians be able to cross the street.
- **Frequency:** Pedestrians must be able to cross streets and highways at regular intervals. Unlike motor vehicles, pedestrians cannot be expected to go a quarter mile or more out of their way to take advantage of a controlled intersection.

Regarding vehicle speed and speed management, the AASHTO Pedestrian Guide notes that "absent 24 -hour enforcement," reducing travel speeds via enforcement efforts "usually have only a temporary effect."

Correspondingly, "if the anticipated 85th percentile speed of vehicular traffic is inconsistent with the anticipated level of pedestrian activity or other factors in the roadway environment, then an effective method to reduce prevailing speeds may be to reduce the roadway design speed and modify the roadway geometrics accordingly."



Curb Radius	Crosswalk Distance	Increased Crosswalk Distance*
15 feet	36 feet	3 feet
35 feet	56 feet	23 feet
45 feet	66 feet	33 feet

** Measured along centerline of sidewalk/crosswalk as compared to 33 ft curb-to-curb width.*

Source: AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities

AASHTO Guide for the Development of Bicycle Facilities (2012)

With rapid development of bikeway design guides emerging from NACTO and FHWA, the AASHTO Bike Guide is becoming increasingly outdated. A new edition to the AASHTO bicycle guide is under review and should be published in late 2020 or early 2021 to reflect the latest knowledge on this topic. The notable elements of the AASHTO Bike Guide that can be considered pertain to design elements such as separation from vehicle traffic and intersection treatments for shared use pathways. Some other elements of this guide include:

- **Snow clearance:** Many bicyclists ride year-round, especially for utilitarian or commute trips. Snow stored in bike lanes impedes bicycling in winter. The following recommendations apply:
  - On streets with bike lanes and paved shoulders that are used by bicyclists, remove snow from all travel lanes (including bike lanes) and the shoulder, where practical.
  - Do not store snow on sidewalks where it will impede pedestrian traffic.

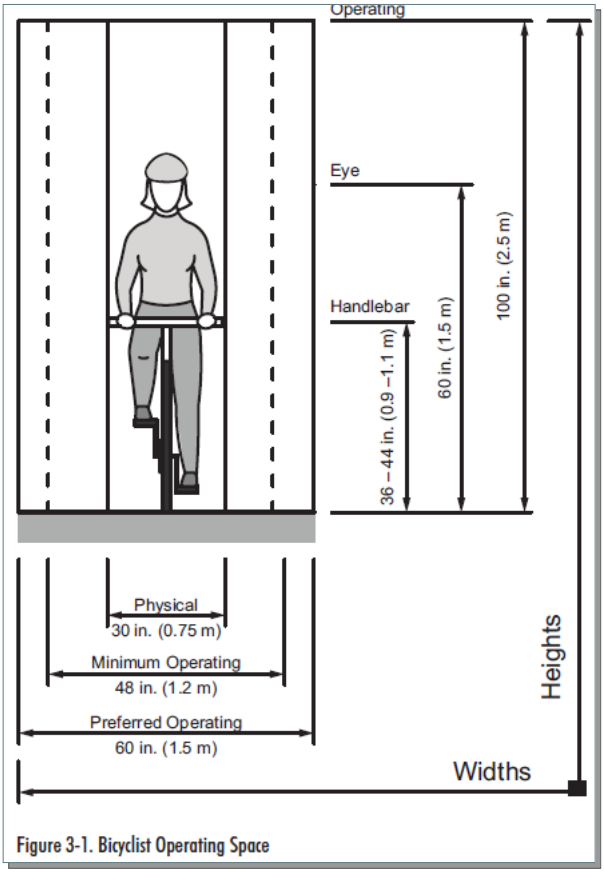
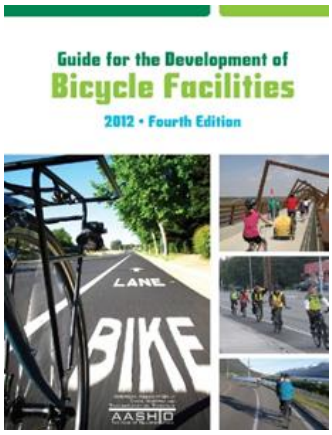


Figure 3-1. Bicyclist Operating Space

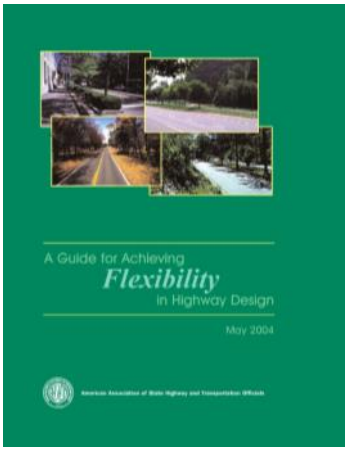


- **Chip sealing:** Where a chip seal is used on a roadway shared with bicyclists, a fine mix chip seal(3/8 in. or finer) should be used. Where shoulders or bike lanes are wide enough and in good repair, apply the chip seal only to the main traveled way.
- **Work Zones**: At the onset of planning for temporary traffic controls, it should be determined how existing bicycle facilities will be maintained during construction. Accommodation in the work zone may result in the need for the construction of temporary facilities including paved surfaces, structures, signs, and signals.

The chapter on shared use pathway design remains relevant and may not always be consulted when parks departments lead pathway design simply because they may not know this guide exists. Some notable sections on shared use path design are:

- **Width:** The minimum width for a two-directional shared use path is 10 ft. Wider pathways, 11 to 14 ft., are recommended in locations that are anticipated to serve a high percentage of pedestrians (30% or more of total pathway volume) and higher user volumes (more than 300 total users in the peak hour).
- **Sidepaths:** The minimum recommended distance between a path and the roadway curb (i.e., face of curb) or edge of traveled way (where there is no curb) is 5 ft. Where a paved shoulder is present, the separation distance begins at the outside edge of the shoulder. Thus, a paved shoulder is not included as part of the separation distance. Similarly, a bike lane is not considered part of the separation; however, an unpaved shoulder can be considered part of the separation. Where the separation is less than 5 ft., a physical barrier or railing should be provided between the path and the roadway.
- **Curb Ramps:** The opening of a shared use path at the roadway should be at least the same with as the shared use path itself. If a curb ramp is provided, the ramp should be the full width of the path, not including any side flares. Detectable warnings should be placed across the full width of the ramp.

AASHTO Achieving Flexibility in Highway Design (2004)



The Flexibility Guide was developed in 2004 as the concept of Context Sensitive Solutions advanced in road design circles. The intent of the flexibility guide was to bolster the already-flexible elements of The Green Book and further highlight how things such a motor vehicle lane widths and level of service guidelines were not intended to be sacred design doctrine.

The Flexibility Guide states in section 1.3.3 Intended Use of the AASHTO Green Book that the Green Book "does not prescribe or even favor one value over another," noting that two different states or cities may the same road design features differently, yet "both would be following the AASHTO 'policy.'" The Flexibility Guide also addresses concerns that designers have with legal liability stemming from what may be perceived as a deviation from The Green Book. Some notable sections include:

- **1.4.5 Level of Service:** Vehicle level of service is oftentimes confused for or advertised as a safety measure, which it is not. The AASHTO Flexibility Guide helps dispel this commonly-held myth, stating "Failure to achieve a level of service indicated [in the Green Book] does not constitute a non-standard design decision… Recognizing the impracticality of constructing a highway or highway network to accommodate all potential future traffic demand…the Green Book includes discussion of the implications of and recommendations for designing for congestion.

- **1.5.2 Design in the Lower Speed Environment:** Context-sensitive solutions for the urban environment often involve creating a safe roadway environment in which the drive is encouraged by the roadway's features and the surrounding area to operate a low speeds.

- **3.6.1 Lane Width:** The normal range of design lane width is between 9 ft. and 12 ft. AASHTO Green Book values for lower-speed urban street lane widths are less rigorously derived. Narrower lane widths for urban streets lessen pedestrian crossing distances, enable the provision for on-street parking and transit stops. Lesser widths also tend to encourage lower speeds, an outcome that may be desirable in urban areas. There is less direct evidence of a safety benefit associated with incrementally wider lanes in urban areas, compared with other cross sectional elements.

1.3.3 Intended Use of the AASHTO Green Book

Design guidance published in the AASHTO Green Book (1) reflect the consensus of AASHTO's member departments regarding what constitutes good design practice nationally. In arriving at a consensus, AASHTO recognizes that each region or state has different conditions, constraints, and needs.

The AASHTO Green Book (1) is not intended, and never was intended, to be used solely as a standard upon which to base the design of every highway improvement. Rather, as is noted in the foreword of the Green Book (1), "sufficient flexibility is permitted to encourage independent designs tailored to particular situations." Such flexibility may be appropriate for a state wishing to use a different basis for design from that indicated in the AASHTO Green Book (1), or for an individual designer working on a range of different projects.

3.6.1.2 Flexibility in the AASHTO Guidelines

The AASHTO Green Book (2) recognizes the need for flexibility and provides that flexibility, citing how lane width can be tailored, to a degree, to fit the particular environment in which the roadway functions (e.g., low-volume rural roads or residential areas versus higher volume rural or urban facilities). The formulation of these values demonstrates considerable flexibility.

For lower speed, lower volume rural roads and highways with little or no truck traffic, lane widths as low as 9 ft (2.7 m) may be acceptable; lane widths substantially less than 12 ft (3.6 m) are considered adequate for a wide range of volume, speed, and other conditions.

For the reconstruction of rural two-lane highways, the AASHTO Green Book (2) notes that less than 12-ft or 3.6-m lane widths may be retained "where alignment and safety record are satisfactory." In other words, widening a narrow existing highway is not mandated if its safety performance is acceptable. Flexibility is also evident for lower-class roads and streets, with recommended narrower lane widths consistent with lower design speeds on such roads.

The discussion of lane width in the AASHTO Green Book (2) for urban areas also reflects a high degree of flexibility. It is noted that lane widths "may vary from 10 to 12 ft (3.0 to 3.6 m) for arterials." For lower classification facilities, similar flexible language encourages the tailoring of an urban street cross section to site-specific conditions.

- **4.9 Importance of Fully Evaluating and Documenting Design Decisions**: In order to reduce exposure to losses due to liability claims, it is essential that the planning and design process be thoroughly documented. It is unfortunately the case that design agencies lose or settle claims not because the staff actions were inappropriate, but because the project files are incomplete or missing key documentation, and staff responsible are no longer available to explain what was done and why.

FHWA Memorandum on Bicycle and Pedestrian Design Flexibility (2013)

USDOT passed a 2010 policy on bicycle and pedestrian accommodations that states the organization "encourage transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages abilities." To bolster that policy, the 2013 memorandum issued by FHWA provided federal support and justification for agencies to use the AASHTO Guides summarized above, as well as the NACTO guides and ITE guides summarized below, to accomplish this policy directive. FHWA says it "support the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas."

More specifically, this memorandum states:

"The vast majority of treatments illustrated in the NACTO Guide are either allowed or not precluded by the Manual on Uniform Traffic Control Devices (MUTCD).

In its support of the ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, the FHWA memorandum states the "guide is useful in gaining an understanding of the flexibility that is inherent in the AASHTO 'Green Book.'

FHWA' memorandum summary states the agency "encourages agencies to appropriately use these guides and other resources to help fulfill the aims of the 2010 USDOT Policy Statement."

Memorandum

U.S. Department of Transportation
Federal Highway Administration

PDF Version (1.7 MB)

Subject: Bicycle and Pedestrian Facility Design Flexibility

From:
Gloria M. Shepherd
Associate Administrator for Planning, Environment and Realty

Walter C. (Butch) Waidelich, Jr.
Associate Administrator for Infrastructure

Jeffrey A. Lindley
Associate Administrator for Operations

Tony T. Furst
Associate Administrator for Safety

To:
Division Administrators
Directors of Field Services

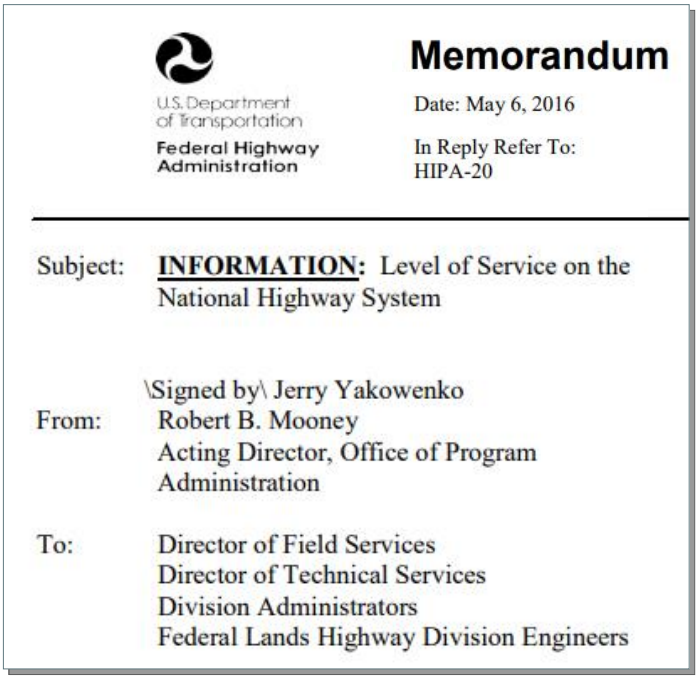
Date: August 20, 2013

Reply to: HEPH-10

FHWA Memorandum on Level of Service (2016)

In May 2016, FHWA issued a memorandum on Level of Service on the National Highway System. It notes that the Level of Service recommended values in the AASHTO Green Book "are regarded by FHWA as guidance only" and FHWA "does not have regulations or policies that require specific minimum LOS values for projects on the [National Highway System.] FHWA states that while they concur with the LOS guidance, "the recommended LOS values in [The Green Book] may not be reasonably attainable in some situations."

The purpose of the memo was to state that traffic forecasts focused solely on motorist desires are just one factor to consider in the design of projects and that context and other road users need to be considered and not just a secondary consideration after level of service goals for motorists were first accounted for in projects.



U.S. Department of Transportation
Federal Highway Administration

Memorandum

Date: May 6, 2016

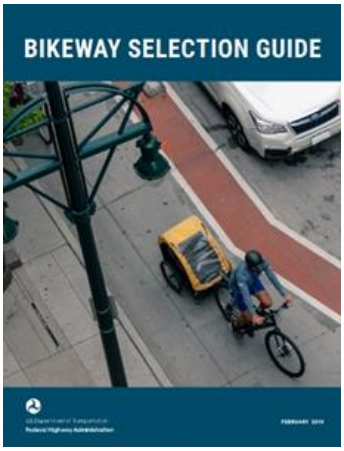
In Reply Refer To:
HIPA-20

Subject: **INFORMATION:** Level of Service on the National Highway System

\Signed by\ Jerry Yakowenko
From: Robert B. Mooney
Acting Director, Office of Program Administration

To: Director of Field Services
Director of Technical Services
Division Administrators
Federal Lands Highway Division Engineers

FHWA Bikeway Selection Guide (2019)



FHWA's Office of Safety published this new guide in February 2019:

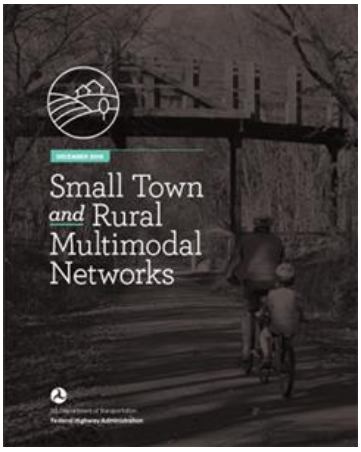
- "This guide focuses on safety, but it also emphasizes the importance of comfort to appeal to a broad spectrum of bicyclists. This will encourage more people to choose to bike and in doing so will help FHWA meet its goal to increase the number of short trips made by bicycling and walking to 30 percent by the year 2025."

It is intended to be a support tool to help guide design decisions. The Bikeway Selection Guide makes important distinctions from past bicycling infrastructure decisions. An important component of recognizing the safety needs of bicyclists and incorporating Vision Zero themes into facility design is in Table 2 of the guide under "Forgiveness (Safety)" where it denotes that shared lanes, traditional bike lanes, bikable shoulders, and bike boulevards rely on "perfect user (driver and bicyclist) behavior to avoid crashes." Because of that, the safety ratings for these treatments receive only minimal to moderate grades whereas one-way separated bike lanes and separated bike lanes and sidepaths have moderate to high ratings.

The other key component of this guide, which is incorporated in Chapter 6 of the Caldwell Bicyclist and Pedestrian Plan is Figure 9: Preferred Bikeway Type for Urban, Urban Core, Suburban, and Rural Town Contexts. That figure is shown on page 28. Note that it indicates roadways with 7,000 or more vehicles per day and/or speed limits of 35 mph or higher necessitate separated (protected) bike lanes or shared use pathways.

Intersection Performance Characteristics by Bikeway Type	Shared Lanes	Boulevards	Shoulders	Bike Lanes	One-Way Separated Bike Lanes with Mixing Zones	Separated Bike Lanes and Sidepaths with Protected Intersections
Functionality (Comfort) - Roads can be categorized by their function						
Lowest at higher vehicle speeds and volumes	✓	✓	✓	✓		
Highest at lower vehicle speeds and volumes	✓	✓	✓	✓		
Moderate to High due to separation from traffic and constrained entry point					✓	
High due to separation from traffic and constrained conflict point						✓
Forgiveness (Safety) - Infrastructure can be designed to accommodate human error						
Relies upon perfect user (driver and bicyclist) behavior to avoid crashes	✓	✓	✓	✓		
Minimal: bicyclists operating in shared space with vehicles	✓					
Moderate: application of traffic calming treatments and lower operating speeds can improve safety		✓				
Moderate: bicyclists operate in separated space from vehicles, however vehicles can encroach into the facility at any location			✓	✓		
Moderate: bicyclists operate in separated space from vehicles except for defined entry point, followed by shared operating space					✓	
High: bicyclists operate in separated space from vehicles except for defined conflict point which can be designed to reduce motorist speed, but contraflow movement from two-way operation can increase risk						✓

FHWA Small Town & Rural Multimodal Networks Guide (2017)



The Small Town and Rural Multimodal Networks Guide was released in 2017. Beyond the intent underlying its title, this guide is a useful resource for resource-challenged cities no matter their context. The goal of the guide is to provide a bridge between existing design guidance for bicyclists and pedestrians to identify lower-cost but high impact infrastructure upgrades for the safety of these modes. The guide recognizes that many residents in small cities reside within just a couple miles of major destinations like downtown, grocery stores, and parks. Trips to these destinations and of these distances can easily be taken by bike or in choosing to walk a slightly longer distance than normal if people feel safe and comfortable doing so.

The guide provides diagrams and speed/volume tables to help designers identify the appropriate context for the various applications in the guide. They range from things like painting pedestrian lanes on streets to lower-cost sidepaths that do not require full scale stormwater management systems. It also includes case studies from various cities to help designers understand how it could be applied in

FHWA PEDSAFE and BIKESAFE Countermeasures Selection System

These two countermeasures selection systems are easy-to-use online tools to guide practitioners and citizens to the appropriate engineering, education, or enforcement tools to help address a particular concern for the safety of people who walk and bike.

For pedestrians, the tool includes various countermeasures organized by theme, such as:

- Along the Roadway;
- At Crossing Locations;
- Transit;
- Roadway Design;
- Intersection Design;
- Traffic Calming;
- Traffic Management;
- Signals and Signs; and
- Other Measure

For bicyclists, the tool has sections for shared roadways, on-road bike facilities, intersections, and maintenance, and trails, among others.

Roadway Classification and Land Use	Sidewalk/Walkway
Rural Highways (< 400 ADT)	Shoulders preferred, with minimum of 0.9 m (3 ft).
Rural Highways (400 to 2,000 ADT)	1.5-m (5-ft) shoulders preferred, minimum of 1.2 m (4 ft) required.
Rural/Suburban Highway (ADT > 2,000 and less than 1 dwelling unit (d.u.) / .4 hectares (ha) [1 d.u. / acre])	Sidewalks or side paths preferred. Minimum of 1.8-m (6-ft) shoulders required.
Suburban Highway (1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Sidewalks on both sides required.
Major Arterial (residential)	Sidewalks on both sides required.
Urban Collector and Minor Arterial (residential)	Sidewalks on both sides required.
Urban Local Street (residential – less than 1 d.u. / .4 ha [1 d.u. / acre])	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.
Urban Local Street (residential – 1 to 4 d.u. / .4 ha [1 to 4 d.u. / acre])	Both sides preferred.
Local Street (residential – more than 4 d.u. / .4 ha [4 d.u. / acre])	Sidewalks on both sides required.
All Commerical Urban Streets	Sidewalks on both sides required.
All Streets in Industrial Areas	Sidewalks on both sides preferred. Minimum of 1.5-m (5-ft) shoulders required.

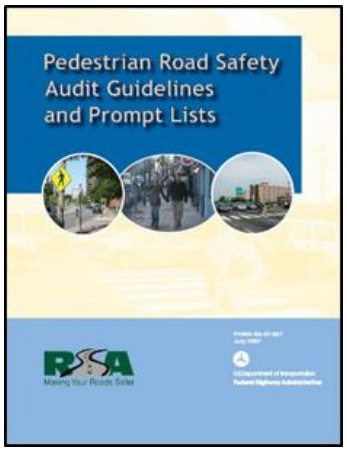
1 acre=0.4 hectares (ha)

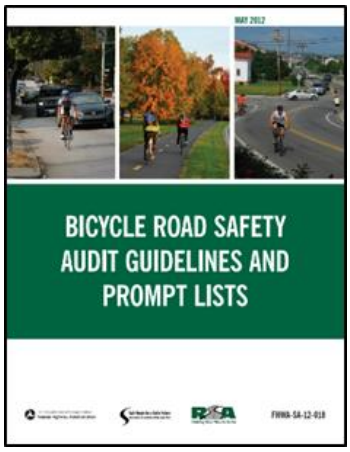
FHWA Pedestrian (2007) and Bicycle (2012) Road Safety Audit Guidelines and Prompt Lists

FHWA developed these guides to help planners and designers evaluate how project addressed the needs of pedestrians and bicyclist. These safety audit guidelines can be used in the planning, design, construction, and post-construction phases and include several prompt lists to be used in the field as projects are evaluated.

Some notable elements of the Pedestrian Guidelines include:

- **Barriers to Walking:** Physical, social and perceptual, and organizational issues may discourage people from walking. Physical barriers consist of unprotected street crossings, lengthy crossings, crossings that are spaced too far apart, interchanges, partial or nonexistent walking paths, poor quality walking surfaces, nonexistent or inappropriate crossing treatments, and high speed traffic.
- **System Connectivity:** All pedestrian facilities should be continuous, consistent, and connected along direct routes to major pedestrian traffic generators. Pedestrians of all ability levels should have continuous pedestrian routes through or around construction areas.
- **Width:** When assessing the width of a sidewalk, the RSA team should consider its usable width. Pedestrians rarely use the foot and a half of the sidewalk closest to the roadway or a building face. The RSA team should also pay attention to "choke points" that narrow the effective sidewalk width (e.g., street furniture, utility poles, poor transitions between developments, etc.).
- **Behavior:** Do pedestrians cross at uncontrolled locations because marked or controlled crossings are dangerous, inconvenient, or not placed appropriately?
- **Buffers:** Often bridges and other sidewalks are designed with only a curb separating pedestrians on the sidewalk from vehicular traffic. This measure alone is often inadequate as the curb does not form an adequate barrier between vehicular and pedestrian traffic. Vehicles traveling at speeds over 25 mph can mount a curb at relatively flat impact angles.

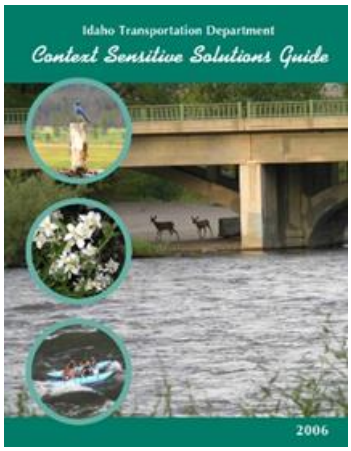




Notable elements of the Bicycle Guidelines include:

- **Design treatments:** Do accommodations for cyclists conform to the state of practice, guidelines, and relevant standards, or are there more advanced designs that would better support and enhance conditions for cycling? Here is where FHWA provides support for use of NACTO and other modern guides to help influence design.
- **Comfort:** Is the type of cycling accommodation appropriate for the primary or intended users? Bicycle accommodations should match the needs of the intended users. Cyclists, particularly less-experienced cyclists, may prefer greater separation from vehicular traffic, especially as speeds and volumes increase. Particular attention should be given to routes that access schools, parks, and other public spaces that will be frequented by children and families.
- **Continuity:** A network of bicycle-friendly roadways and paths is critical to provide cyclists with continuous and direct access to destinations. Gaps, lack of facilities, or facilities inappropriate for the context may result in indirect routes to destinations and possibly illegal or undesirable behaviors, such as riding against traffic and riding on sidewalks to reach destinations.
- **Vertical clearance:** Bicyclists may change their position on the road or path to maintain comfortable operating space from bridge railings or tunnel walls. Recommended height and shy distance for railings are detailed in the *AASHTO Guide for the Development of Bicycle Facilities*, but many variations may occur, especially at locations where ornamental railings may be used.

ITD Context Sensitive Solutions Guide (2006)



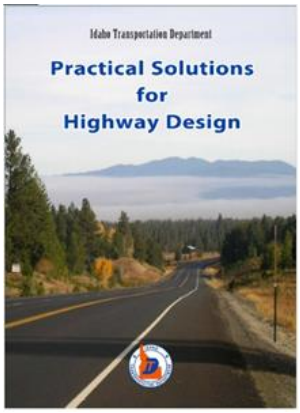
This guide from the Idaho Transportation Department was developed alongside documents like the AASHTO Flexibility Guide as Context Sensitive Solutions (CSS) emerged as a federal policy goal in the early 2000s. ITD's CSS guide states "Idaho's transportation partners will explore new methods to coordinate transportation planning and multimodal corridor preservation activities." It clearly states in its Vision that "the citizens of Idaho aspire to have a transportation system that provides convenient access throughout the state and region. They want different means of transport to support the vitality of the state's economy, an abundance of family-wage jobs."

It also recognizes that just because a corridor was constructed for a certain purpose decades ago, that design is not so sacred as to disallow adaptation to changing urban transportation needs. Specifically, the guide states "Many new needs, ideas, opportunities, and realities will arise in the next 30 years… This means that the vision and the corridor plans must be open to options, opportunities, and community input as time passes."

This guide is important for to understand as the City works with ITD on project and corridor development. Key statements in ITD's CSS guide include:

- **Integrate the transportation system:** A balanced transportation system where modal choices exist beyond private vehicles embodies the notion of meeting all the varied needs of a community.
- **Support quality of life through endorsement and acceptance:** This priority recognizes the importance of transportation to the economic, social, and environmental health of the state.
- **Provide flexible funding:** The notion that communities need support for expanding available funding to address transportation solutions needed for economic vitality and livable communities underscores the importance of utilizing a Context Sensitive Solutions approach. Having flexibility in funding solutions outside traditional grant programs enhances a community's ability to meet their diverse objectives.

ITD Practical Solutions for Highway Design



ITD notes that this guide "is intended to challenge traditional standards and develop safe and efficient solutions to solve today's project needs." It states further that "Safety will not be compromised," which provides support for integrating the latest federal and national design manual into projects. Some notable statements in this guide include:

- Some congestion is not bad. A moderate amount of congestion promotes more efficient use of the facility by promoting carpooling and/or more use of alternate transportation.
- **Design Speed**. The design speed will be the posted speed for existing facilities, or as appropriate for the context and intent of the project. The design speed of the facility will not only influence the operation of the facility, but impact the physical features of the facility. Design speed should fit the intent of the facility, surroundings and terrain and there should be continuity from one segment to another.
- There are circumstances where narrower lane widths can be used. In areas with pedestrian crossings, right of way constraints or existing development become stringent controls, the use of 10 or 11 ft. lanes may be acceptable.
- ITD values the needs of all customers including non-motorized travelers.

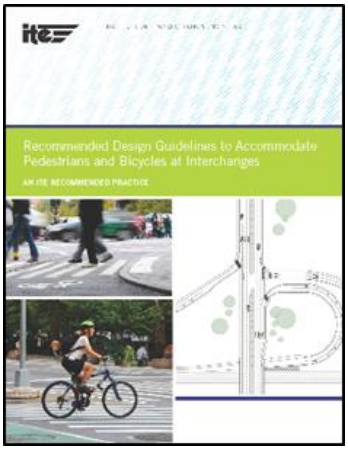
ITD Roadway Design Manual (2013)

While the design realm for pedestrians and bicyclists is evolving rapidly, guidelines such as state design manuals are still playing catch-up. The amount of new information available since ITD adopted its current Roadway Design Manual is substantial, as this chapter outlines. It's important for a City to have the other federally-endorsed design manuals on-hand when working with ITD on projects in order to ensure the safest road system for bicyclists and pedestrians.

While not particularly forward on design elements for active transportation, the ITD Roadway Design Manual provides ample support for safe features within and along the state highway system. Section 320.01.02 Guides and References cites the AASHTO *Guide for the Development of Bicycle Facilities* and AASHTO *A Guide for Achieving Flexibility in Highway Design*, as well as ITD's *Context Sensitive Solutions Guide* and the *Highway Capacity Manual*. ITD does not endorse the AASHTO Pedestrian Guide, for reasons unknown. Additionally, the Manual states:

- ITD priorities promote "accessible, affordable, and convenient transportation choices for the movement of people and goods."
- Consider bicycle/pedestrian facilities on all projects in or adjacent to urban areas and recreation areas. Bikeways should be provided when identified in a local bikeway plan.
- Vehicle, bicycle and pedestrian requirements shall be individually discussed and documented during the chartering stage of the project. (Section 325.01 Pedestrian and Bicycle Facilities)
- The cost of construction for the recommended vehicle level of service becomes prohibitive and a lower level of service is acceptable for economic reasons.
- Transportation improvements intended to accommodate bicycle use must address the needs of both experienced and less experienced riders. One solution to this challenge is to develop the concept of a "design bicyclist" and adopt a classification system for bicycle users.
- If there is less than a 5 foot width separating the multiple use path and the roadway, a physical barrier or railing must be installed.

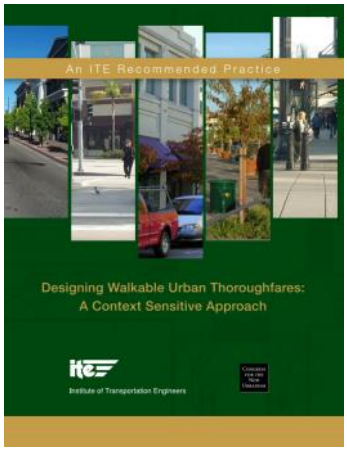
ITE Recommended Design Guidelines to Accommodate Pedestrians and Bicycles at Interchanges



These guidelines from the Institute of Transportation Engineers (ITE) identify specific dimensions, safety features, signing, pavement markings, design geometries, and other treatments. These best practices are intended to provide insight into future updates of statewide or federal highway design manuals. It identifies best practices for incorporating pedestrian and bicyclist facilities at interchanges, including:

- Provide on the minimum number of on-/off-ramp lanes needed based on projected vehicle volumes.
- Design ramp geometries to encourage slower vehicle speeds until past crosswalk.
- Locate the crosswalk at the location with the best visibility and before the point where vehicles begin to accelerate.
- Orient on- and off-ramps at right angles to local streets to encourage slower speeds.
- Provide optional ramps from bicycle lanes for sidewalk/crosswalk access, especially where complex weaves or long travel between adjacent travel lanes is otherwise required for bicyclists.
- Provide pedestrian scale lighting.

ITE Designing Walkable Urban Thoroughfares (2010)



This design guide was sponsored by and is endorsed by FHWA for use by state and local agencies. It was developed in response to widespread interest for improving both mobility choices and community character aligned with goals for walkable communities. It states that "retail and social transactions have occurred along most urban thoroughfares throughout history. It is only in the 20th century that streets were designed to separate the mobility function from the economic and social functions." The guide cites that it follows the flexibility principles inherent in the AASHTO Green Book, noting that it supplements the Green Book and other AASHTO publications. ITD's own Corridor Planning Handbook is cited as a reference in this publication.

A key tenet of this publication is that "walkable thoroughfare design is encapsulated in the phrase 'one size does not fit all,' which means the function of a thoroughfare and its design should complement the context that it serves." Perhaps the most important component of this is how the guide stresses the need to provide frequent spacing of pedestrian crossings on major thoroughfares:

Pedestrian facilities should be spaced so block lengths in less dense areas (suburban or general urban) do not exceed 600 feet (preferably 200 to 400 feet) and relatively direct routes are available. In the densest urban areas (urban centers and urban cores), block length should not exceed 400 feet (preferably 200 to 300 feet) to support higher densities and pedestrian activity.

Conventionally, design speed—the primary design control in the AASHTO Green Book—has been encouraged to be as high as is practical. In this report, design speed is replaced with target speed, which is based on the functional classification, thoroughfare type and context, including whether the ground floor land uses fronting the street are predominantly residential or commercial. Target speed then becomes the primary control for determining the following geometric design values:

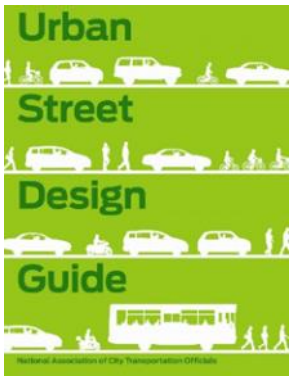
- Minimum intersection sight distance;
- Minimum sight distance on horizontal and vertical curves; and
- Horizontal and vertical curvature.

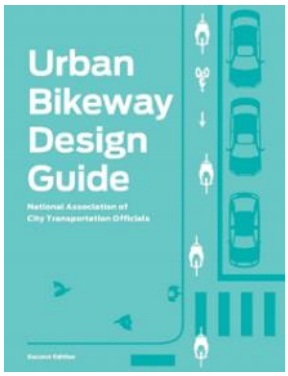
The latest AASHTO Green Book now includes a target speed section that reflects these approaches. ITE notes "the practitioner should be careful not to relate speed to capacity in urban areas, avoiding the perception that a high-capacity street requires a higher target speed."

Table 6.4 Design Parameters for Walkable Urban Thoroughfares

Thoroughfare Design Parameters for Walkable Mixed–Use Areas									
	Suburban (C–3)						General Urban (C–4)		
	Residential			Commercial			Residential		
	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street
Context									
Building Orientation (entrance orientation)	front, side	front, side	front, side	front, side	front, side	front, side	front	front	front
Maximum Setback [2]	20 ft.	20 ft.	20 ft.	5 ft.	5 ft.	5 ft.	15 ft.	15 ft.	15 ft.
Off-Street Parking Access/Location	rear, side	rear, side	rear, side	rear, side	rear, side	rear, side	rear	rear, side	rear, side
Streetside									
Recommended Streetside Width [3]	14.5–16.5 ft.	14.5 ft.	11.5 ft.	16 ft.	16 ft.	15 ft.	16.5-18.5 ft.	14.5 ft.	11.5 ft.
Minimum sidewalk (throughway) width	6 ft.	6 ft.	6 ft.	6 ft.	6 ft.	6 ft.	8 ft.	6 ft.	6 ft.
Pedestrian Buffers (planting strip exclusive of travel way width) [3]	8 ft. planting strip	6–8 ft. planting strip	5 ft. planting strip	7 ft. tree well	6 ft. tree well	6 ft. tree well	8 ft. planting strip	8 ft. planting strip	6 ft. planting strip
Street Lighting	For all thoroughfares in all context zones, intersection safety lighting, basic street lighting, and pedestrian-scaled lighting is recommended. See Chapter 8 (Streetside Design Guidelines) and Chapter 10 (Intersection Design Guidelines).								
Traveled Way									
Target Speed (mph)	25–35	25–30	25	25–35	25–35	25	25–35	25–30	25
Number of Through Lanes [5]	4–6	2–4	2	4–6	2–4	2	4–6	2–4	2
Lane Width [6]	10–11 ft.	10–11 ft.	10–11 ft.	10–12 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.
Parallel On-Street Parking Width [7]	7 ft.	7 ft.	7 ft.	8 ft.	7-8 ft.	7-8 ft.	7 ft.	7 ft.	7 ft.
Min. Combined Parking/Bike Lane Width	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.
Horizontal Radius (per AASHTO) [8]	200–510 ft.	200–330 ft.	200 ft.	200–510 ft.	200–510 ft.	200 ft.	200–510 ft.	200–330 ft.	200 ft.
Vertical Alignment	Use AASHTO minimums as a target, but consider combinations of horizontal and vertical per AASHTO Green Book.								
Medians [9]	4–18 ft.	Optional 4–16 ft.	None	4–18 ft.	Optional 4–18 ft.	None	4–18 ft.	Optional 4–16 ft.	None
Bike Lanes (min./preferred width)	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.
Access Management [10]	Moderate	Low	Low	High	Moderate	Low	Moderate	Low	Low
Typical Traffic Volume Range (ADT) [11]	20,000–35,000	1,500–25,000	500–5,000	20,000–50,000	1,500–35,000	1,000–10,000	10,000–35,000	1,500–20,000	500–5,000
Intersections									
Roundabout [12]	Consider urban single–lane roundabouts at intersections on avenues with less than 20,000 entering vehicles per day, and urban double–lane roundabouts at intersections on boulevards and avenues with less than 40,000 entering vehicles per day.								
Curb Return Radii/Curb Extensions and Other Design Elements	Refer to Chapter 10 (Intersection Design Guidelines)								

NACTO Urban Bikeway Design Guide & Urban Street Design Guide





The National Association of City Transportation Officials (NACTO) is an association of 84 major North American cities and transit agencies formed to exchange ideas, insights, and practices and co-operatively approach national transportation issues. It is led by licensed engineers, planners, and urban designers. The purpose of the NACTO Design Guides are to provide agencies with state-of-the-practice design concepts that are based on the best and safest bicycling and walking cities in the world and represent a set of combined treatments already present in many AASHTO and MUTCD applications. FHWA has endorsed the NACTO Bike Guide as a reference manual to use in designing safe bicycling infrastructure.

Many small and medium sized cities have officially endorsed NACTO as an acceptable design guide, as has Ada County Highway District through its policy manual. Nine state DOTs have also endorsed NACTO's guide as acceptable solutions, the closest to Idaho being Utah, Oregon, and Washington.

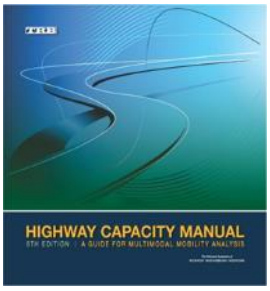
The Urban Bikeway Design Guide includes sections on:

- Cycle tracks;
- Bike lanes;
- Intersection treatments;
- Bicycle signals;
- Bikeway signing and marking;
- Bicycle boulevards; and
- Designing for all ages and abilities.

The Urban Street Design Guide includes sections on:

- Street design elements;
- Interim design strategies;
- Intersections; and
- Design controls.

Transportation Research Board Highway Capacity Manual



Caldwell's Traffic Impact Study requirements mandates that these studies identify and consider existing levels of service within a study area. The policy specifically identifies the Highway Capacity Manual (HCM) for this level of service analysis.

HCM includes level of service (LOS) measures for modes other than motorized vehicles and traffic study policies should not be limited to using only select functions of this software package when it comes to transportation evaluation. While Caldwell's policy requires evaluation of school crossings, safe routes to schools, and bikeways, it does not require traffic studies to include LOS analysis for pedestrians and bicyclists.

Performing pedestrian and bicyclist LOS analysis within HCM is simple given many of the factors the traffic study enters for motorized traffic (e.g. volume, speed, turning movements, K-factor) are also incorporated into pedestrian and bicyclist LOS. The only additional measures required to perform LOS for active modes are all observable measures related to pre-study and post-implementation or proposed features, such as buffer from traffic, presence of a sidewalk or bike lane, and Traffic signal timing. Consulting firms working with HCM software—most likely the free, open source version from Florida DOT—already have access to this analysis.

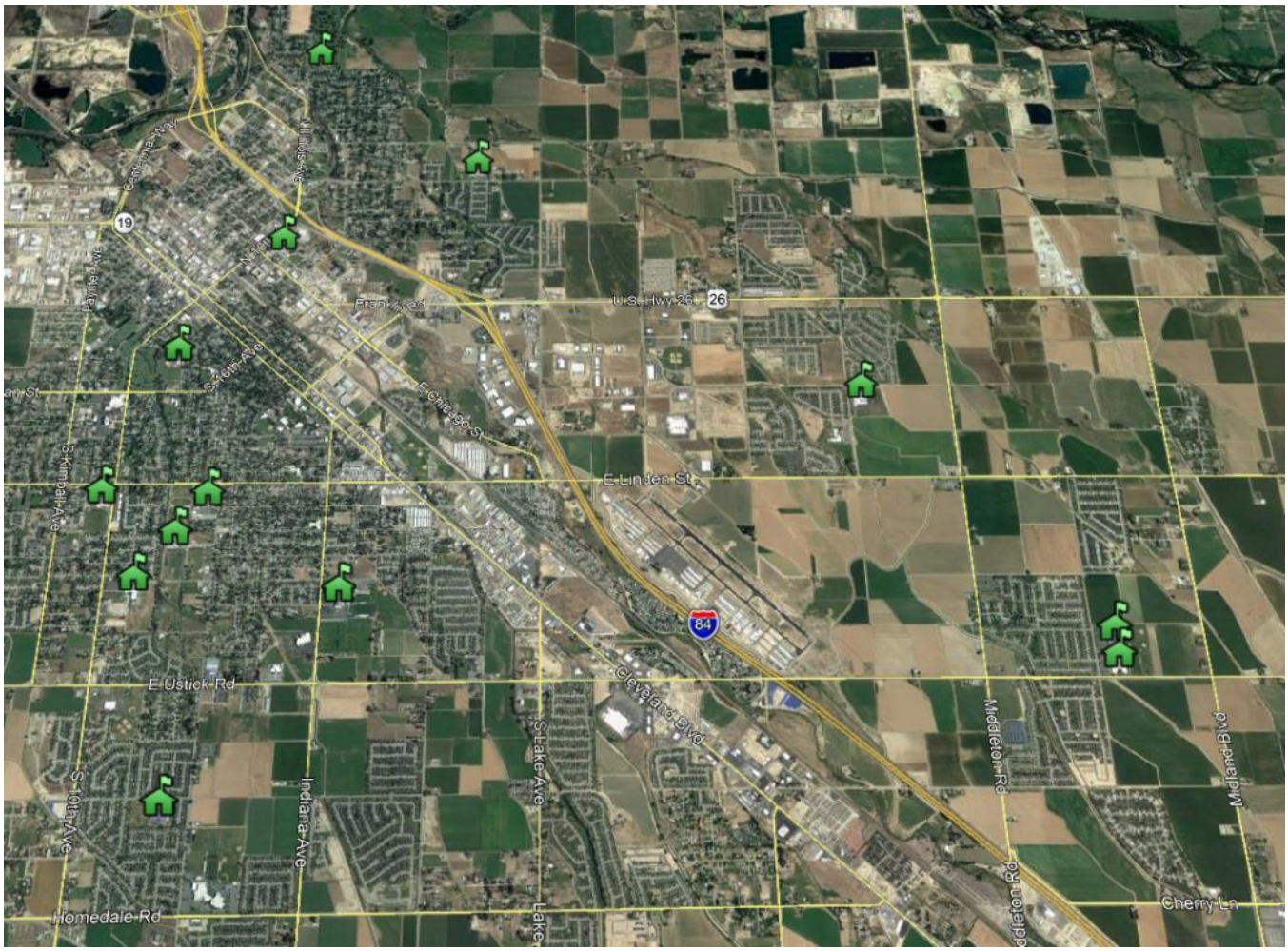
By performing multi-modal LOS analysis within traffic studies, corridor studies, and project design, the City can more objectively evaluate tradeoffs. While it may seem uncomfortable to admit that achieving LOS C for motorists means LOS F for pedestrians, it is a worthwhile endeavor so the public and elected officials understand that such decisions could make conditions unsafe for pedestrians and bicyclists or discourage the use of sidewalks and bike lanes altogether. COMPASS has performed bicycle and pedestrian LOS analysis for the region's arterial network, which provides precedent for performing such analysis on local projects.

8. Appendix

The appendix of this plan includes the school specific plans generated in 2018-2019. Each of the schools within the Caldwell District were subject to more localized planning efforts intended to identify issues surrounding walking and bicycling, and identified specific projects addressing those issues raised by students, parents, and observed in person. The plans are included as reference and were submitted to the City of Caldwell, the Caldwell School District and the Vallivue School District upon completion prior to the drafting of this city-wide plan.

Schools included:

- **Sacajawea Elementary School**
- **Caldwell High School**
- **Jefferson Middle School**
- **Van Buren Elementary**
- **Wilson Elementary School**
- **Canyon Springs High School**
- **Lincoln Elementary School**
- **Washington Elementary School**
- **Syringa Middle School**
- **Desert Springs Elementary School**
- **Sage Valley Middle School**
- **Lewis and Clark Elementary School**



Canyon Springs High School Overview

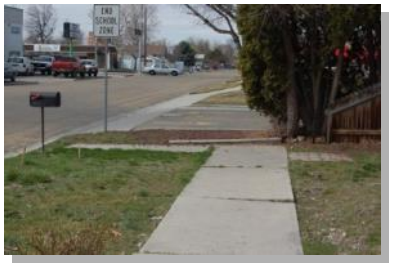
Canyon Springs High School is the alternative high school for the district and located in the center of Caldwell in the previous Van Buren Elementary School. Flanked by local neighborhoods and a busy 10th Street, the campus has seen some upgrades in the front of the school but needs additional upgrades around the perimeter and intersections. The upgrades would not only serve students who walk but also nearby residents seeking to access the greenspace and playground as well as the retail attractions on 10th Avenue.

Connections

Permitting a person to walk from one point to another in a straight line, without leaving a dedicated walk surface, without being placed in harms way of moving traffic, and without obstacles is what comprises a proper connection.

The streets and walking environment around Canyon Springs High School are in need of connections more than any other improvement. In some cases no sidewalks exist, while others simply need short additional segments or organization of parking.

East 8th Street/11th Avenue



Make connection between residential property sidewalk and the driveway of the Wendy's restaurant. This gap forces walkers into the street and minimizes utilization of existing infrastructure.

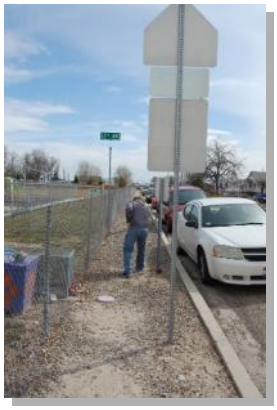
North 11th Avenue

The sidewalk segment on the north side of N. 11th Avenue needs to be better organized for safety.

The parking bays at the Salvation Army and the apartment complex promote drivers parking directly on the public sidewalk which blocks passage. The City of Caldwell and the two property owners should discuss a resolution to these conditions so that this simple problem is eliminated. Parking on public sidewalk is a clear code violation and for those with mobility impairments can be especially challenging since one parked vehicle can mean relegating a user into the street facing on-coming traffic.

East 8th Street/Denver Street/North 13th Street

The school perimeter streets are currently without sidewalk. The perimeter streets should be completed with concrete sidewalks and take advantage of the existing curbing already in place. Such projects can be jointly pursued by the District and the City and would benefit not only students, but area residents as well.

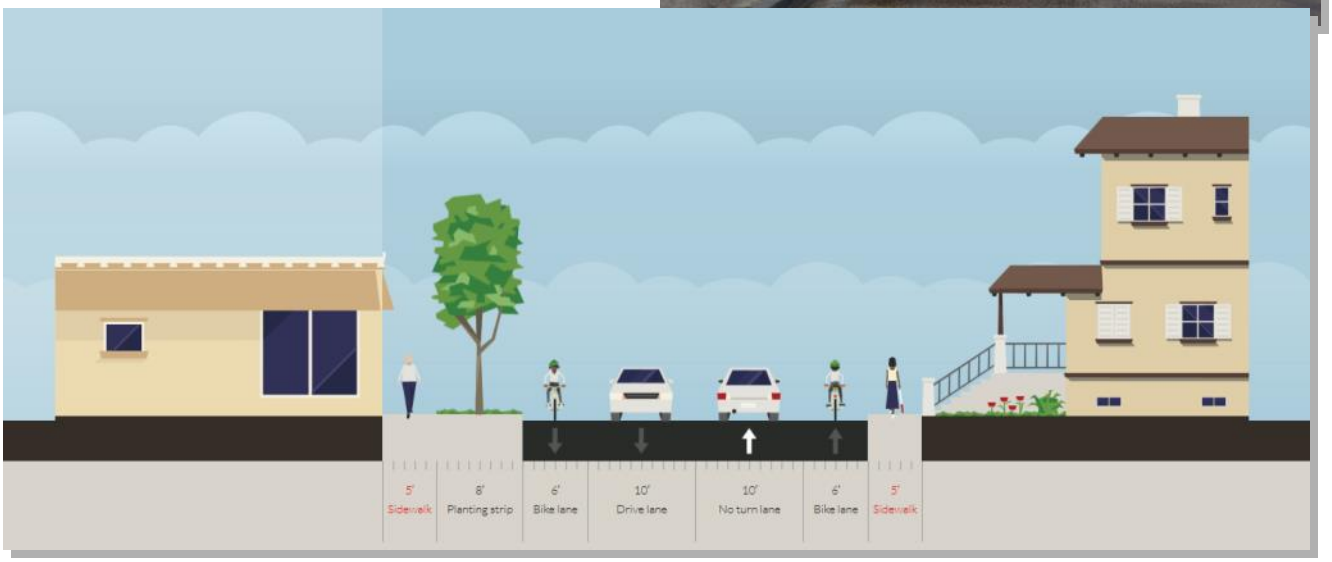


Crossings

With regard to crossings, the school is served by a Pedestrian Hybrid Beacon at the intersection of North 10th Avenue and East 8th Street and a full traffic signal and crossing at North 10th Avenue and East Chicago. Other crossings in the area are frequent and often have a high visibility crosswalk. **One crossing that needs attention is the crossing at East Denver Street and North 12th Avenue.** Due to the allowance of on-street parking, the east side entry of the crossing is obscured. This can be a hazard as drivers may not see a crossing pedestrian as they travel north. To improve this, a curb extension should be considered but not of a typical concrete and rounded curb design. Since the curb ramps were recently rebuilt, adding simple reflective candles on both sides of the crossing in an arc shape can suffice and be simple to install.

Context

East 8th Street has an opportunity due to the existing excessive width, the pedestrian hybrid beacon allowing crossings at 10th Avenue, and the less stressful parallel route to Chicago Street. Reusing the 40' of paved street, a number of new cross sections can be created to deliver a more inviting and holistic street environment. Starting with two 10' lanes (20'), the additional 20 feet could include on-street parking on one side with 6' buffered bike lanes, or could include occasional tree wells in the on-street parking lane for extra shade and esthetics. The 20' could also include newly constructed wider sidewalks with street trees or other landscaping features. The street is under used in its current configuration and considering a corridor design for the totality of East 8th Street suggested.



(Above) Redesigning the street to include tree wells in between on-street parking, and adding bike lanes for the duration of East 8th Street would improve walking and bicycling rates and safety, better serve the hybrid beacon on 10th Street, and add enhancements to the neighborhoods.

Other Suggestions

- Consider adding STOP signs to the north and south legs of the 11th/Denver intersection to permit better crossing of Denver and to add speed controls as driver speeding was viewed as a problem.
- Continue to strategically improve ADA facilities including directional curb ramps within proximity of the campus.
- The intersections near the school have minimal lighting. A night or dark time audit should occur and lighting conditions documented to determine where lighting improvements should be considered.

(Above) Details such as moving dumpsters, maintaining vegetation, enforcing parking lots, are ways to improve walkability without spending money or limited resources.

(Above) The Denver Street corridor is a parallel route to Chicago Avenue which can be busy with people and traffic. Drivers often use Denver as an alternative and have no real design prompts to slow travel speed. Adding stop controls at the 11th street intersection will reduce speeding traffic, highlight the presence of walking students, and minimize conflicts at the intersection.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school?

#	Field	Canyon Springs	
1	Walk	3.33%	3
2	Bike	0.00%	0
3	School Bus	1.58%	6
4	Family vehicle	2.64%	7
5	Carpool	0.00%	0
6	Transit	0.00%	0
7	Other	0.00%	0

How long does it take to get to school?

#	Field	Canyon Springs	
1	<5 minutes	0.00%	0
2	5-10 minute	3.18%	7
3	11-20 minute	3.73%	6
4	More than 20 minutes	1.08%	1
5	don't know/not sure	2.94%	2

How far do you live from school?

#	Field	Canyon Springs	
1		0.63%	1
2	1/4 to 1/2	0.00%	0
3	1/2 to 1	1.36%	2
4	1 to 2	3.51%	4
5	more than 2	4.41%	9

What issues affected decisions to allow walk/bike?

#	Field	Canyon Springs	
1	Distance	1.89%	6
2	Convenience	6.67%	4
3	Time	2.86%	4
4	Before/after school activities	2.44%	1
5	Speed of traffic along route	1.32%	4
6	Amount of traffic along route	1.32%	4
7	Adults to walk or bike with	1.11%	1
8	Sidewalks or pathways	2.00%	4
9	Safety of intersections and crossings	1.36%	4
10	Crossing guards	1.67%	2
11	Violence or crime	2.11%	4
12	Weather or climate	2.52%	7

How healthy is walking/biking?

#	Field	Canyon Springs	
1	Very healthy	1.41%	4
2	Healthy	2.56%	7
3	Neutral	2.80%	4
4	Unhealthy	0.00%	0
5	Very unhealthy	0.00%	0

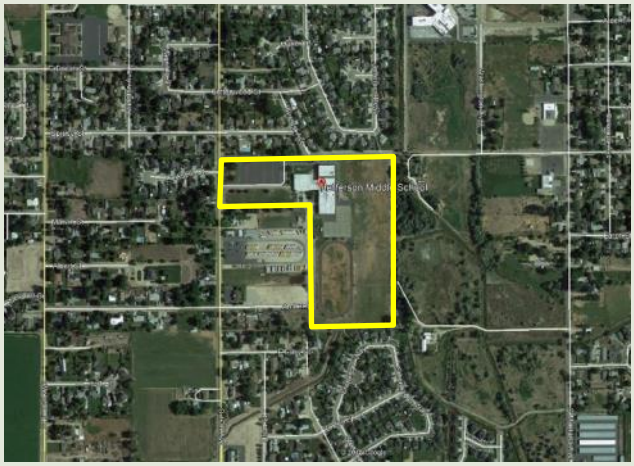
Parent comments:

"Don't allow him to walk because it is too far from school."

"Our family really likes Canyon Springs staff. We would travel as far away as needed to stay at this school."

Jefferson Middle School Overview

Jefferson Middle School is located in south Caldwell off 10th Avenue. The school has a limited few connections to nearby parcels but does have walking paths connecting with 10th Avenue, Firecrest Drive, and the canal pathway that bisects the Jefferson Middle School and Washington Elementary School campuses. The biggest barrier to walking is crossing and walking along 10th Avenue. A significant arterial road, 10th Avenue is multiple lanes in width, 35 mph, and heavily traveled for Caldwell streets.



Connections

Because the school is in a fairly established neighborhood and located between two major intersections, new connections are limited. However, there are existing connections that should be considered for improvement.

10th Street Walkways - There are a number of gaps along the 10th Street corridor near Jefferson Middle School. The gaps between Ustick Road and Linden Street should be of the highest priority to fill. In already developed areas, curb, gutter, and sidewalk should be added. In areas where future development will occur, an extruded curb and 5' asphalt treatment should be applied until the final development takes place.

Canal Pathway - The canal path is a Caldwell asset in the given area. Additions worth considering could be wayfinding signage, lighting, and vertical curbing in areas near the canal banks, especially at key junctions where a confluence of bicyclists and walkers may occur.

Spruce Street - Spruce Street/pathway between South 10th Avenue and Montana Avenue is not a fully functioning street and serves primarily walkers and bicyclists choosing to connect between the two neighborhoods, accessing the schools, or the pathway. The street can be turned into a more obvious bikeway and include designated walking space to help organize users and reduce conflicts. Also, at some point the major parcels yet to develop will see changes and Spruce will likely turn into a street. If and when this occurs, ensuring significant facilities for walkers and bicyclists is necessary to maintain the vibrancy of the trail and the connection.

Crossings

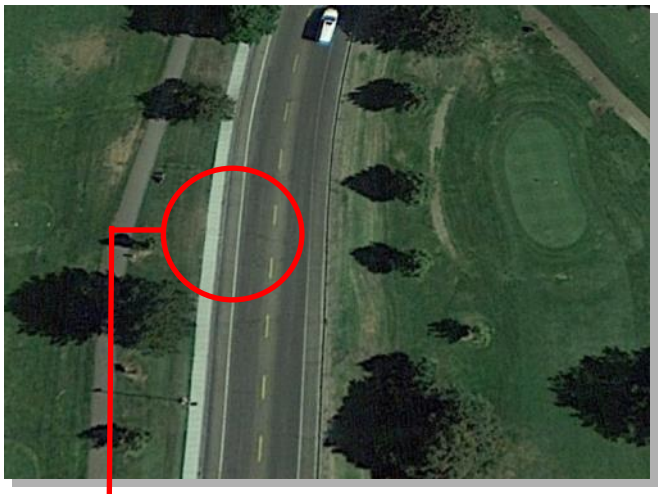
The 10th Street mid-block crossing is a good example of such a style of crosswalk given the limited number of full intersections near the front of the campus. However, the push button locations exceed ADA standards of 10" from a flat landing and need to be relocated. The push buttons should be accessible without being pulled into the street and aligned with the direction of travel.

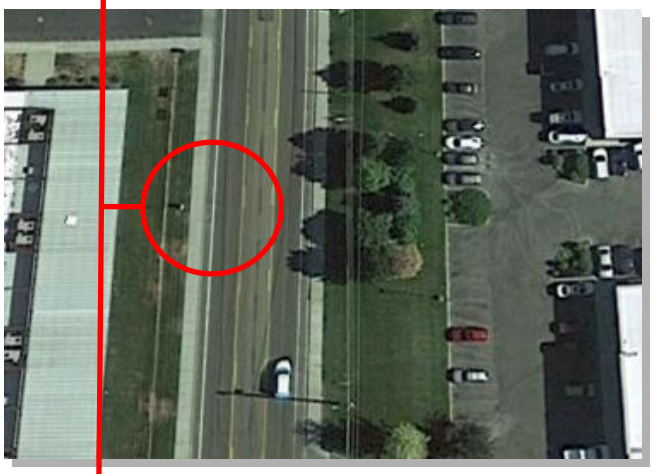
The 10th Street mid block crossing is an example that should be used throughout Caldwell in certain contexts. The flashing beacon, high visibility striping, and overhead lights work to compliment each other and improve visibility of pedestrians trying to cross.

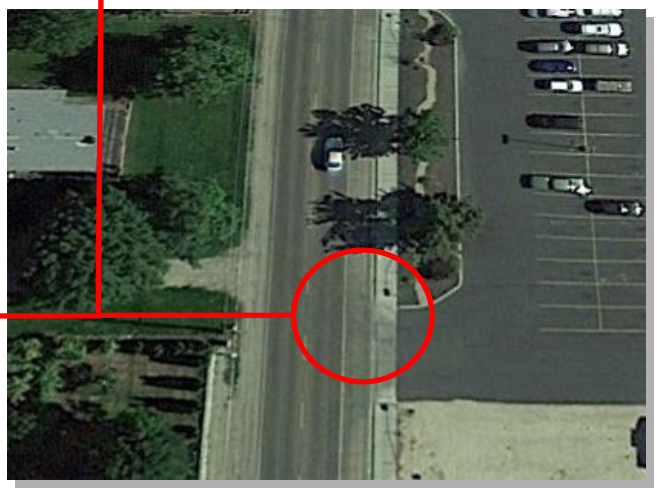
Comfort

10th Street - South 10th Avenue is a major corridor in Caldwell that connects the southern part of the city with downtown and onto Interstate 84. The roadway is important to residents, businesses, schools, and many more uses and should really be considered for a master planning effort. Currently, the road changes between a two and three lane configuration towards the south and a five lane configuration through downtown and near the Interstate. In sections the corridor includes bike lanes that can range between exceedingly narrow and excessively wide, which often gets them confused for on-street parking. In the area around Jefferson Middle School, the roadway is currently not signed as a school zone during arrival or departure times. This issue has been brought up by many individuals our team has spoken with including Caldwell Police Department.

Ideally, the road would include three lanes to maintain an adequate flow of traffic and minimize conflicts, buffered bike lanes that satisfy prevailing best practice guidelines, and sidewalks that meet the capacity and spacial needs of area pedestrians. Also, street trees, lighting, additional signalized crosswalks, and perhaps celebration of place using art and signage, can all be part of the final design.







The width of the bicycle facilities along South 10th Avenue range considerably. In certain locations the bike lanes are wider than guidelines would suggest and result in high numbers of on-street parking users while in other locations such as near Linden Avenue, bike lanes are narrower than suggested guidelines and can result in unnecessary confrontations between bicyclists and motorists.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school

#	Field	Jefferson	
1	Walk	7.78%	7
2	Bike	9.09%	1
3	School Bus	0.26%	1
4	Family vehicle	3.02%	8
5	Carpool	4.55%	1
6	Transit	0.00%	0
7	Other	0.00%	0

How long does it take to get to school?

#	Field	Jefferson	
1	<5 minutes	3.59%	8
2	5-10 minute	3.18%	7
3	11-20 minute	1.24%	2
4	More than 20 minutes	0.00%	0
5	don't know/not sure	1.47%	1

How far do you live from school?

#	Field	Jefferson	
1		2.52%	4
2	1/4 to 1/2	7.41%	6
3	1/2 to 1	3.40%	5
4	1 to 2	1.75%	2
5	more than 2	0.00%	0

What issues affected decisions to allow walk/bike?

#	Field	Jefferson	
1	Distance	0.63%	2
2	Convenience	0.00%	0
3	Time	0.71%	1
4	Before/after school activities	0.00%	0
5	Speed of traffic along route	1.32%	4
6	Amount of traffic along route	0.99%	3
7	Adults to walk or bike with	0.00%	0
8	Sidewalks or pathways	1.50%	3
9	Safety of intersections and crossings	1.02%	3
10	Crossing guards	1.67%	2
11	Violence or crime	1.58%	3
12	Weather or climate	0.36%	1

How healthy is walking/biking?

#	Field	Jefferson	
1	Very healthy	3.53%	10
2	Healthy	1.83%	5
3	Neutral	0.70%	1
4	Unhealthy	0.00%	0
5	Very unhealthy	0.00%	0

Parent comments:

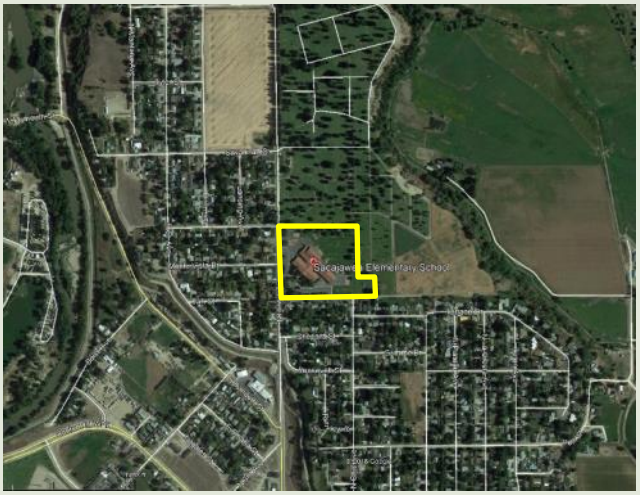
"I walk my daughter to school each morning, at least once a week we see cars not stop or turn to go around stopped cars. There is no longer a sign in the street it was hit by the snow plow 2 years ago. I'd love to see a school zone put in as well as a crossing guard. I don't feel 10th is a safe crossing area."

"Busy intersection in the dark in the morning - cars don't see kids. It is very scary!"

"He has to walk. I don't feel it is safe. Traffic is bad and I have seen incidents of bad behavior on several occasions from students walking."

Sacajawea Elementary School Overview

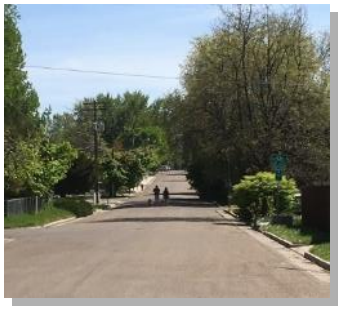
Sacajawea Elementary School is located on the bluff atop Canyon Hill. The school is situated mostly among residential areas and serves as the defacto park given there are no park facilities in the immediate area. The main street serving the school, Illinois Avenue, traverses down the hill into the rest of Caldwell. Recent and significant upgrades such a new sidewalk sections and crosswalk beacons have been added to Illinois to make walking and crossing the street safer for students.



Connections

Rochester/Monte Vista - Both Rochester and Monte Vista are historic residential streets without pedestrian facilities. Due to the low volumes and slower speeds, examining the potential to use a yield roadway or pedestrian advisory shoulder may be suitable.

Both examples are found in FHWA's STAR Guide (excerpt above) (https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf) These treatments do not require curb, gutter, and sidewalk, and can be contextually appropriate given the use and history of the streets near Sacajawea.



Ohio Avenue - Similar to Rochester and Monte Vista, Ohio Avenue is without sidewalks for most of the section. This street should have all sidewalk gaps filled over time. In the short term, approaching the pedestrian facilities using the same yield roadway or pedestrian advisory shoulder could be possible, or a third option of extruded curbs with reflective posts can also be explored.

Trail Easement - Toward the back portion of the school campus exists a trial easement via a utility corridor. The trail splits between a section aligned behind homes on Terrance Drive and one that enters the rear fence line of the school that turns and connects back with Illinois Avenue. Paving the trail connection and expanding the trail to run the perimeter of the cemetery is recommended to improve the recreational opportunities on the hill and near the school grounds.

Crossings

Taft Street - The current crosswalk spanning Ohio Avenue aligned with Illinois Avenue does not fully connect with any pedestrian facility. The crosswalk connects directly into shrubs and forces pedestrians to stray from the crosswalk in order to access the sidewalk. This is a hazard as it keeps pedestrians in a vulnerable position potentially facing on-coming turning traffic and forces them to traverse through the valley gutter. Eliminating the shrubs and extending the sidewalk with a new direction ramps is suggested.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school

#	Field	Sacajawea	
1	Walk	22.22%	20
2	Bike	0.00%	0
3	School Bus	17.15%	65
4	Family vehicle	10.57%	28
5	Carpool	4.55%	1
6	Transit	0.00%	0
7	Other	0.00%	0

How long does it take to get to school?

#	Field	Sacajawea	
1	<5 minutes	12.56%	28
2	5-10 minute	12.27%	27
3	11-20 minute	15.53%	25
4	More than 20 minutes	16.13%	15
5	don't know/not sure	23.53%	16

How far do you live from school?

#	Field	Sacajawea	
1		17.61%	28
2	1/4 to 1/2	8.64%	7
3	1/2 to 1	12.93%	19
4	1 to 2	22.81%	26
5	more than 2	8.82%	18

What issues affected decisions to allow walk/bike?

#	Field	Sacajawea	
1	Distance	14.20%	45
2	Convenience	11.67%	7
3	Time	13.57%	19
4	Before/after school activities	7.32%	3
5	Speed of traffic along route	13.25%	40
6	Amount of traffic along route	10.86%	33
7	Adults to walk or bike with	17.78%	16
8	Sidewalks or pathways	15.00%	30
9	Safety of intersections and crossings	13.27%	39
10	Crossing guards	10.00%	12
11	Violence or crime	16.32%	31
12	Weather or climate	15.47%	43

How healthy is walking/biking?

#	Field	Sacajawea	
1	Very healthy	13.78%	39
2	Healthy	11.72%	32
3	Neutral	14.69%	21
4	Unhealthy	25.00%	2
5	Very unhealthy	41.67%	5

Parent comments:

"If 10th avenue was safer I would let my kids ride their bikes... but that street doesn't have sidewalks or safe places to cross."

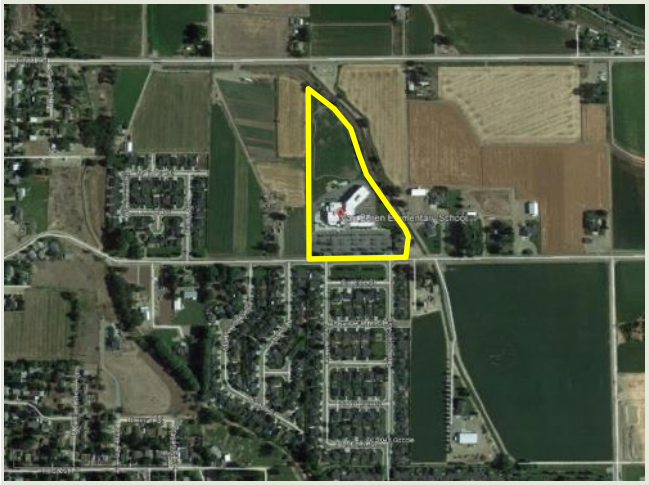
"My child will not walk or bike to school until he is in high school, and even this not sure, too many crimes going on."

"I don't feel comfortable letting my elementary child walk to school because of the increase in child abductions and the neighborhood around the school."

"People don't pay attention when driving. People get hit by cars more than need to. NOT safe at all."

Van Buren Elementary School Overview

Van Buren Elementary School is located in northeast Caldwell off Marble Front Road. Many parcels near the school are still undeveloped and those that are developed, all comprised of single family housing neighborhoods. Currently, the school has no real connections with nearby neighborhoods with the exception of crossings directly across from the campus. The area will see growth in the coming years and upgraded walking infrastructure will be needed and helpful.



Connections

Marble Front Extruded Curbs - The main road in front of the campus, marble Front Road, is a mix of developed and undeveloped properties. Because of this, many sections are without any kind of walking facilities and can be prohibitive to walking. Installing extruded curbs and adding asphalt shoulders from the campus to Illinois Avenue is recommended until such time as development install permanent curb, gutter, and sidewalks.

Using extruded curbing with shortened flex posts can be an effective way to define a walk space without the expense and challenge of full curb and gutters.

Future Subdivision Connections - Van Buren Elementary is surrounded by undeveloped properties and an adjacent canal. As the area fills in with new development, connecting with the campus to students can walk to school is essential. If such connections are not made, kids would like be unnecessarily safety bussed costing the district considerable funds.

Crossings

Midvale Avenue - The Marble Front Road and Midvale crosswalk is a high visibility crosswalk but not used for afternoon departure due school policy which is that students are required to crossing at Bridgeport Avenue due to the presence of the crossing guard. However, for many students this crosswalk is unnecessarily out of their way and adds to the length of their walk. Adding an RRFB to the Midvale crosswalk is recommended to shorten the distance and heighten awareness of crossing students to drivers.

The Bridgeport crosswalk is a full 600' farther for students who live near the Midvale Avenue crosswalk to the west.

New In Pavement Markers - Replace in pavement markers at both crosswalks along Marble Front as they are damaged and lost conspicuity.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school

#	Field	Van Buren	
1	Walk	10.00%	9
2	Bike	0.00%	0
3	School Bus	15.57%	59
4	Family vehicle	12.45%	33
5	Carpool	13.64%	3
6	Transit	0.00%	0
7	Other	0.00%	0

How long does it take to get to school?

#	Field	Van Buren	
1	<5 minutes	10.31%	23
2	5-10 minute	14.55%	32
3	11-20 minute	15.53%	25
4	More than 20 minutes	12.90%	12
5	don't know/not sure	13.24%	9

How far do you live from school?

#	Field	Van Buren	
1		9.43%	15
2	1/4 to 1/2	8.64%	7
3	1/2 to 1	13.61%	20
4	1 to 2	12.28%	14
5	more than 2	15.20%	31

What issues affected decisions to allow walk/bike?

#	Field	Van Buren	
1	Distance	13.56%	43
2	Convenience	10.00%	6
3	Time	8.57%	12
4	Before/after school activities	12.20%	5
5	Speed of traffic along route	11.92%	36
6	Amount of traffic along route	12.17%	37
7	Adults to walk or bike with	11.11%	10
8	Sidewalks or pathways	14.00%	28
9	Safety of intersections and crossings	10.20%	30
10	Crossing guards	8.33%	10
11	Violence or crime	14.74%	28
12	Weather or climate	13.31%	37

How healthy is walking/biking?

#	Field	Van Buren	
1	Very healthy	10.60%	30
2	Healthy	13.55%	37
3	Neutral	19.58%	28
4	Unhealthy	0.00%	0
5	Very unhealthy	8.33%	1

Parent comments:

"I will not let my child walk or bike to school!!"

"The hill/curve on Marble Front NEEDS a sidewalk!"

"I wish there were crossing guards at both sides of the school both before + after school, that way my kids would have a safer more direct walk home."

"He would love to walk to school but no safe path there. Crazy drivers."

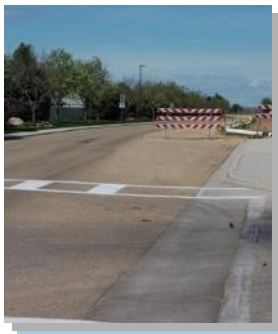
"In this day and age I wouldn't encourage anyone to walk much less a child. If you can get robbed by gun in daylight hours, I don't want to imagine what else can happen."

Desert Springs Elementary School Overview

Desert Springs Elementary School is within the Vallivue School District and located in southeast Caldwell. The school is co-located with Sage Middle School and assessed off Ustick Road. Much of the area near the campus is undeveloped, yet major projects are slated for construction, mostly comprised of single family housing units. Ustick Road is a major dividing line between existing neighborhoods and the school as it is a Principal Arterial and four lanes wide.

Connections

Santa Ana Avenue - The frontage street for both school campuses, Santa Ana Avenue is a street that will eventually be extended and completed as development occurs. The roadway should be built with full buffered bike lanes to maximize comfort for school aged children and to provide a buffer for walkers.



Using existing curb to curb pavement, adding buffered bike lanes along Santa Ana Avenue would calm traffic and add a critical element for improved active transportation use while also improving quality of life for local residents.

Undeveloped Areas Future Connections - Similar to Van Buren Elementary, Desert Springs is flanked by undeveloped areas that as they fill in, should connect with the school to minimize walking distance and the use of safety bussing. There will likely be a need for a mid-block PHB crossing on Ustick, additional crossing of Midland Avenue, and once connected, crossings of Spruce Street.

Crossings

Ustick Road - Several students were seen crossing Ustick Road to access the subdivision south on Santa Ana Avenue. There is no marked crosswalk and the midblock crossing to the west is several hundred feet away. This intersection will be fully signalized once development occurs, but adding a PHB now, and recouping the costs as development transpires is suggested to improve safety and potentially increase walking participation.

School Zone Flasher Timing - Another observation made along Ustick Road was that the school zone flashers would only illuminate after the PHB actuation button was pushed. The street is a full school zone with students crossing not only at the mid-block crossing, but also at Santa Ana. Making the school zone official complete with flashes during designated times and accompanying the zone with reduced speed limits, is advised.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school

#	Field	Desert Spring	
1	Walk	21.11%	19
2	Bike	63.64%	7
3	School Bus	15.83%	60
4	Family vehicle	33.58%	89
5	Carpool	18.18%	4
6	Transit	33.33%	1
7	Other	100.00%	1

How long does it take to get to school?

#	Field	Desert Spring	
1	<5 minutes	37.22%	83
2	5-10 minute	21.36%	47
3	11-20 minute	14.91%	24
4	More than 20 minutes	19.35%	18
5	don't know/not sure	14.71%	10

How far do you live from school?

#	Field	Desert Spring	
1		34.59%	55
2	1/4 to 1/2	28.40%	23
3	1/2 to 1	26.53%	39
4	1 to 2	17.54%	20
5	more than 2	17.16%	35

What issues affected decisions to allow walk/bike?

#	Field	Desert Spring	
1	Distance	20.50%	65
2	Convenience	28.33%	17
3	Time	26.43%	37
4	Before/after school activities	34.15%	14
5	Speed of traffic along route	25.83%	78
6	Amount of traffic along route	25.00%	76
7	Adults to walk or bike with	23.33%	21
8	Sidewalks or pathways	17.50%	35
9	Safety of intersections and crossings	25.17%	74
10	Crossing guards	30.00%	36
11	Violence or crime	19.47%	37
12	Weather or climate	24.82%	69

How healthy is walking/biking?

#	Field	Desert Spring	
1	Very healthy	25.80%	73
2	Healthy	27.47%	75
3	Neutral	17.48%	25
4	Unhealthy	12.50%	1
5	Very unhealthy	16.67%	2

Parent comments:

"We feel comfortable since there are so many kids that walk in groups and there are plenty of adults."

"Crossing Ustick...I feel is unsafe, even with light. Cars speed down to try to beat the light constantly."

"School should start later, it's DARK in the mornings and causes many safety concerns for walking..."

"The intersection of Santa Ana & Ustick needs better lighting & a crossing guard."

"The school light on Ustick is never flashing yellow. Cars speed on Ustick, + no crossing guard on Ustick for children to cross safely..."

Skyway Elementary School Overview

Skyway Elementary School is in East Caldwell and within the Vallivue School District. The nearby area is growing with new subdivisions and newer housing in the approximate area. The school is located off Ward Road. The campus currently has no direct connections to nearby neighborhoods and significant opportunity to connect with developing parcels to the east and south as development occurs. The area near the school can realize improved walking and bicycling rates with improvements and good land use policy.

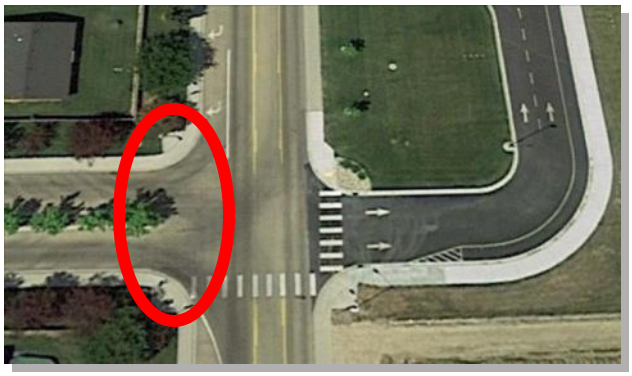
Connections

Undeveloped Area Future Connections - The Skyway Elementary campus is located in a newer part of Caldwell that has room to grow. Future connections should be made to the campus from the large parcels behind to the east, and to the south. These connections can be made safe and convenient and would save students time instead of either being bussed or driven due to the direct connection of the routes.

Pathway connections with elementary schools have been in place since schools were built. Numerous schools in the area have connections and have had them without incident. It is projects like these that can make a major difference in future years and minimize the effects of growth and new housing. Ensuring these connections are made is paramount.

Crossings

Jump Creek Drive - The entrance to a major subdivsion directly across from Skyway has only one marked crosswalk spanning Ward Road. While the intent is to channelize students, this forces students to cross Jump Creek Drive either before or after using the crosswalk to cross Ward Road. Marking the Jump Creek Drive crossing would help to further heighten awareness to drivers should the Ward Road crossing be maintained in its current configuration.



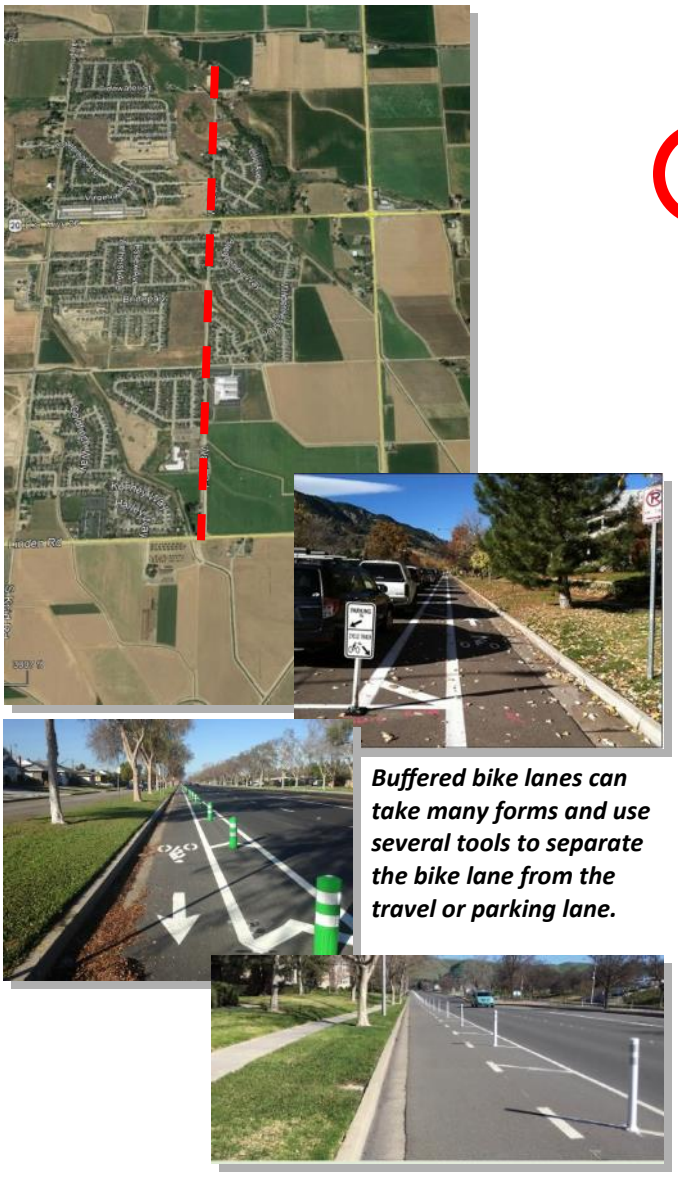
Skyway Drive - Skyway Drive is likely the busiest crossing near the campus at this time. Due to the undeveloped parcel to the west, the east/west through lane alignments are offset. One recommendation is to retrofit a curb extension on the southeast corner to minimize crossing distance and increase visibility of children. Due to the presence of on-street parking, such a treatment is feasible and does not need to be built with curb and concrete but can be done with reflective posts and other materials. Also, the northeast corner should be reconstructed with directional ramps and not diagonal ramps as currently constructed. Curb extensions can also be placed at the Saranac Court crosswalk due to the same reasons of on-street parking and diagonal ramps.

Highway 20/26 - This crossing will be or paramount importance as development continues in the area. The intersection will not likely be signalized due to ITD policy and will remain a two-way stop for the foreseeable future. For pedestrians trying to cross the road, this intersection will continue to be hazardous. Two solutions possible include the installation of a pedestrian hybrid beacon to stop traffic only when pedestrians are attempting to cross, or a full underpass that would not stop traffic yet provide a safe crossing for all users.

Comfort

Ward Road - Ward Road is a street that will continue to lengthen over time and become more of an important street for local movement. The road is a parallel route to Middleton Road and connects not only Skyline but also a number of residential subdivisions. This road is critically important and should be designed to accommodated all users with maximum comfort. Adding buffered or separated bicycle lanes now will establish the route as a comfortable, low-stress street so that as it is lengthened, the new residents of the area will understand the circumstances as is, rather than trying to retrofit the street with such facilities which may be met with resistance. This street is the ideal candidate for bicycle trips traveling north-south and can help intercept trips from being taken on a much heavier used road such as Middleton Road.

Skyway Drive - Nearly identical in nature to Ward Road, Skyline Drive is a road that will grow over time and parallels a major route, Chinden or Highway 20/26. Adding similar features to Skyline as described for Ward Road would be ideal in addition to the installation of section line road roundabouts. Roundabouts increase safety exponentially, maintain traffic flow, and have a significantly lower life cycle cost than signalized intersections. Adding roundabouts in the area is still possible, especially in the City adopts locations in their long range transportation plan prior to development applications.



Buffered bike lanes can take many forms and use several tools to separate the bike lane from the travel or parking lane.

Roundabouts continue to grow in appeal throughout the Valley and Idaho. Nearby Middleton (top) has several varieties which could be similar to those employed on Skyway Drive. Other roundabouts such as in Sandpoint (middle) are located in neighborhood areas and accommodate all vehicle types with a mountable apron and in Kuna (bottom) where a roundabout has worked as the gateway entrance into the eastern side of downtown.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school

#	Field	Skyway	
1	Walk	33.33%	30
2	Bike	27.27%	3
3	School Bus	38.79%	147
4	Family vehicle	29.81%	79
5	Carpool	50.00%	11
6	Transit	33.33%	1
7	Other	0.00%	0

How long does it take to get to school?

#	Field	Skyway	
1	<5 minutes	30.94%	69
2	5-10 minute	35.91%	79
3	11-20 minute	39.75%	64
4	More than 20 minutes	43.01%	40
5	don't know/not sure	30.88%	21

How far do you live from school?

#	Field	Skyway	
1		32.08%	51
2	1/4 to 1/2	41.98%	34
3	1/2 to 1	34.69%	51
4	1 to 2	21.93%	25
5	more than 2	47.55%	97

What issues affected decisions to allow walk/bike?

#	Field	Skyway	
1	Distance	39.43%	125
2	Convenience	38.33%	23
3	Time	40.71%	57
4	Before/after school activities	36.59%	15
5	Speed of traffic along route	37.75%	114
6	Amount of traffic along route	39.47%	120
7	Adults to walk or bike with	36.67%	33
8	Sidewalks or pathways	40.50%	81
9	Safety of intersections and crossings	40.48%	119
10	Crossing guards	38.33%	46
11	Violence or crime	35.79%	68
12	Weather or climate	33.81%	94

How healthy is walking/biking?

#	Field	Skyway	
1	Very healthy	37.10%	105
2	Healthy	34.43%	94
3	Neutral	37.76%	54
4	Unhealthy	50.00%	4
5	Very unhealthy	16.67%	2

Parent comments:

"It is too risky in today's society. KIDS DISAPPEAR ALL the time."

"The intersection at Ward and Skyway needs to be a 4-way stop for safety and for cars traveling across Skyway."

"Violence and fast traffic scares me, no cross flashing light to cross hwy 20/26."

"Both law enforcement and staff should be more present before and after school. Dropping off my child at school has become somewhat chaotic as other parents double park to pickup or drop off their children."

Washington Elementary & Syringa Middle Schools Overview

These two schools are adjacent to one another southwest of the intersection of Linden St. and Montana Ave. The school zone boundaries lie primarily east of the schools, with neighborhoods between Montana Ave and Indiana Ave serving as the residential areas most conducive to attracting walking and bicycling trips. Montana Ave lacks sidewalks on both sides, but has signed school crossings at several intersections. Survey results are for Washington Elementary only.

Connections

Montana Ave - The area to most likely draw walking and bicycling trips, both to the schools, and the pathways on the west side, is from the residential areas east of Montana Avenue. Montana Avenue lacks completed sidewalks on both side of the road between Linden and Alder St.

The street has sidewalks on the west side from Linden to Cherry St. A short-term solution to creating a walkway on both sides would be an extended shoulder of the roadway with an extruded curb. People were observed walking on dirt shoulders during the field observations. The image below shows a worn pathway adjacent to the curb along Montana Avenue just south of the Linden intersection.

Linden Sidewalks—Streets like Linden were built with curb and gutter but not sidewalks. This make them difficult to upgrade to include sidewalks due to the presence of trees, landscaping, and other features in the front yards from residential properties that front the street. Upgrading Linden to have a walkway—either a curb-protected walkway in the street or picking one side for conventional sidewalks—would increase walking and biking trips to the pathway along the Dixie Drain.

Crossings

Alder St - The Alder Street crossing to Washington Elementary has both sight distance issues and connectivity problems, as well as minimal crossing treatments. Ideally a sidewalk connection should be made to this crosswalk, with it upgraded to RRFBs in combination with a trimming or removal of shrubs that hinder the ability of driver's to see people waiting to cross or rounding the corner to access this crosswalk. The image below shows these issues.

Locust St - The Locust St crossing to Syringa Middle has sidewalks on the west side to connect to the school but lacks a receiving sidewalk on the east side. Upgrading the crosswalk to have RRFBs in combination with wrapping a short walkway onto Locust for a short distance with a ramp connecting to the street, would make this crossing more attractive.

This sign located in the pedestrian circulation route along Montana Ave, just south of Linden, does not comply with MUTCD and ADA requirements for vertical clearance. In this example, a child that is 5'2" tall illustrates how the bottom of the sign is a safety issue for her. The sign must be raised and preferably moved to the back of sidewalk instead of being mounted in the sidewalk.

An Observation

A commonly used "safety tip" used in traffic safety circles is for pedestrian and bicyclists to wear bright or reflective clothing so motorists see them.

This image of a school crossing sign placed in the middle of Montana Avenue illustrates the fallacy in that statement This sign has reflective qualities and brightness greater than any vest, jacket or clothing can provide. Yet, it shows direct evidence of motorists hitting it within the street.

This is why infrastructure, along with managing vehicle speeds, is the critical element of safe routes to schools; not bright or reflective clothing.

What the Surveys Say

Surveys were sent home with students to gauge the concerns and perceptions of parents and guardians. The surveys are from the National Safe Routes to School Partnership and include many questions such as: age, grade, nearest intersection, distance from school, travel mode, and general comments. The survey results were analyzed and used to help inform project recommendations and strategies. Survey results are as follows.

How many students walk or bike to school

#	Field	Washington	
1	Walk	2.22%	2
2	Bike	0.00%	0
3	School Bus	10.82%	41
4	Family vehicle	7.92%	21
5	Carpool	9.09%	2
6	Transit	33.33%	1
7	Other	0.00%	0

How long does it take to get to school?

#	Field	Washington	
1	<5 minutes	5.38%	12
2	5-10 minute	9.55%	21
3	11-20 minute	9.32%	15
4	More than 20 minutes	7.53%	7
5	don't know/not sure	13.24%	9

How far do you live from school?

#	Field	Washington	
1		3.14%	5
2	1/4 to 1/2	4.94%	4
3	1/2 to 1	7.48%	11
4	1 to 2	20.18%	23
5	more than 2	6.86%	14

What issues affected decisions to allow walk/bike?

#	Field	Washington	
1	Distance	9.78%	31
2	Convenience	5.00%	3
3	Time	7.14%	10
4	Before/after school activities	7.32%	3
5	Speed of traffic along route	8.61%	26
6	Amount of traffic along route	10.20%	31
7	Adults to walk or bike with	10.00%	9
8	Sidewalks or pathways	9.50%	19
9	Safety of intersections and crossings	8.50%	25
10	Crossing guards	10.00%	12
11	Violence or crime	10.00%	19
12	Weather or climate	9.71%	27

How healthy is walking/biking?

#	Field	Washington	
1	Very healthy	7.77%	22
2	Healthy	8.42%	23
3	Neutral	6.99%	10
4	Unhealthy	12.50%	1
5	Very unhealthy	16.67%	2

Parent comments:

"My biggest concerns are someone kidnapping her and her getting hit by a car. I probably will never let her go alone. "

"Don't feel safe allowing my daughter to walk because of all the inattentive drivers nowadays"

"The intersection at Montana & Alder needs more improvement for safety. Hardly any cars stop at the cross walk."

"The streets do not have sidewalks for people who walk safely."

Lewis & Clark Elementary School Overview

Lewis Clark Elementary School is in south Caldwell and within the Caldwell School District. The main road to the east, Montana Avenue, is the school district boundary with the school service area consisting primarily of residential areas surrounding it and largely undeveloped land to the west. The sidewalk network in the neighborhood is complete and there are marked school crossings along Laster Street along the north side of the school. There are no connections for children walking or bicycling on the south side of the school property. There are no survey results for Lewis and Clark Elem.

Connections—Flint Drive Connections

A great opportunity for child safety was lost when subdivisions were approved without connections to the school from the south. The neighborhood that includes Flint Drive is isolated with no linkages to the school other than requiring children to walk or bike along Montana Ave.

The unfortunate result is 120 households lack good access to the school site. The only solution would be to pursue easements between two properties or purchase one of the homes when it comes up for sale and carve off an easement to provide a micro-path connection.

While this is potentially a costly endeavor, it should be a lesson to the city and school district to more closely watch subdivision activity in the future and require micro-path connections to schools. These connections don't have to be elaborate, as the image below from a subdivision connection to a school in Blackfoot, Idaho, shows.

Crossings – Winesap and Ida Red

There are marked crosswalks with center lane signage at these two intersections. Caldwell School District staff expressed concerns over these crossings due to past motorist activities. Converting these to raised crosswalks would serve to both calm traffic and provide a more protected space for kids. Some may express concern over raised crosswalks related to emergency services and snow plows, but there is ample research and design guidance to show these are not an issue when engineered properly.

Caldwell High School Overview

Caldwell High is in southeast Caldwell and serves the overall city. Its primary access is along Indiana Avenue. Bus operations were recently moved to the northeast side of the campus, accessing the site from Georgia Avenue. The areas most conducive for drawing walking and bicycling trips are neighborhoods to the northwest and north of the campus. Undeveloped areas to the south could create more demand in the future. School release time observations revealed a large number of students walking north from the campus, with roughly half crossing to the west side. It was determined that the survey used for younger kids was not aligned for high school interests, so no survey was done.

Connections

Georgia Avenue - The movement of school bus operations to Georgia Avenue means more traffic on this route, which lacks sidewalks (image below). This impacts not only students walking or bicycling to and from school, but also neighborhood residents who use the street for those purposes. Given lack of drainage facilities, an extruded curb treatment may be most suitable along this route as an interim improvement (sample image top right.)

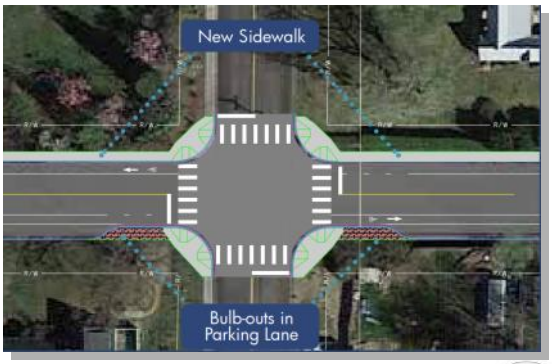
Extruded curbing, shown from Ada County, consists of an extended shoulder with curbing to create a space to walk and bike, with appropriate breaks in the curbing to allow for drainage.

Indiana Avenue - This section line road is like many in south Caldwell as it lacks sidewalks and contains curbed sections in front of residential properties.

This makes it difficult to retrofit for sidewalks as it means either placing sidewalk behind the curb and impacting existing trees and landscaping, as well as relocating utility poles, or building a protected walkway within the existing curb section.

The latter option may mean removing on-street parking from one side of the street. In terms of safety, it's a question of whether the storage of private property on the street (parking) is a greater concern than the safety of kids walking to and from school. That's a community decision to make and unfortunately, not an easy one.

ACHD in Ada County recently faced this issue on Kootenai Street on the Boise Bench. They conducted parking utilization studies to show that while on-street parking was allowed, it was rarely used. This helped decision makers adopt a street reconfiguration plan that included building a protected walking route within the existing curbed sections of the street (image below).



Crossing + Connection -

Canal - The Caldwell Lowline Canal forms the northern boundary of the Caldwell High School campus. The canal's corridor is also a walk route for students accessing the campus from the west. While likely prohibited and not welcome by Pioneer Irrigation District, the fact is this will likely continue to be an informal pathway.

There are success stories in Meridian and elsewhere in Idaho of canal corridors being used as pathways. Given the connectivity this provides for the High School, it is advised that City and School District officials pursue agreements to determine how to formalize this pathway and make it safe.

The existing walkways on the Caldwell High campus lead straight to the canal, which serves as a line of sight and thus creates walking demand for students. A crossing upgrade should also be considered in the form of a Pedestrian Hybrid Beacon at this location. While it may be desirable to try to channelize high school kids into another crossing (and could be an interim treatment), research shows that is not likely given the natural abilities and desires of adolescents and their characteristics in making walk route decisions are drastically different than what adults perceive them to be or think they should be.

View across Indiana Ave from canal to Caldwell High School.

View from high school walkway, looking toward Indiana Avenue and canal.

A *Hybrid* Pedestrian Hybrid Beacon

A notable treatment deployed in Caldwell is a modified version of a Pedestrian Hybrid Beacon (PHB, also called HAWK signal). Instead of a traditional signal, the PHB allows motorist to come to a complete stop before proceeding on a flashing red if no pedestrian are present after they fully stop for a solid red. Caldwell has designed a more cost-conscious PHB type that mounts signals on side poles rather than overhead mast arms. This treatment should provide comfort for designers to allow them in areas that may not expressly meet MUTCD warrants since MUTCD warrants for pedestrian signals are based primarily on cost considerations, with number of pedestrians being a secondary driving factor to those warrant thresholds.

Wilson Elementary Overview

Wilson Elementary School is located at the intersection of Linden Street and 10th Avenue. The area is mostly comprised of residential neighborhoods and a small commercial node directly across 10th Avenue. Most of the basic infrastructure is in place for a semi-walkable environment, however, speed and traffic volumes on both streets acts as a barrier for kids and parents.

Connections

Most of the roads near the school campus have attached sidewalks. However, one section has several gaps. (*pictured below*) Filling the sidewalk gaps along the west side of 10th Avenue from approximately Chaparro Street to the school campus, is essential. Additionally, there are two more sections south of this area without sidewalks; just north of Spruce Street and between Cottonwood Street and Bridlewood Avenue. These sections should be addressed in the near future and could be folded into one project along with the Chaparro Street section.

(Left) The three sections of sidewalks should be closed as soon as possible. The section immediately near the school is of highest priority due to proximity and an already developed lot. The other two lots are undeveloped and can be built with an improvement, though there is no certainty on timing.

There are two school entry gates that need to be replaced with a more accommodating design for kids riding bicycles to school. The first gate is located near the western edge of the front parking lot and the Windsor Place cul-de-sac. The other gate is located behind the school near the playground off Arlington Avenue. The current design is difficult to move bicycles through and would encourage more use with a compatible design.

Linden Street from 10th Avenue to Kimball Avenue has several sidewalk gaps. The gaps should be filled and can be constructed in one project. There are no sidewalks from Kimball Avenue to Windsor Drive. Adding sidewalk would mean connecting to the newer sidewalks constructed on the south side of Linden connecting with the 10th Street Intersection. The north side is without sidewalks for virtually the entire segment and should be completed when possible.

Linden Street from 10th Avenue to Montana Avenue is also without sidewalk for virtually the entire length. Adding sidewalk to this segment is recommended to benefit not only Wilson Elementary, but also Syringa Middle School, and Washington Elementary School.

10th Street from Linden Avenue to Ash Street is the final segment without sidewalks and should be improved in the near future.

All three of the roadway segments will have challenges. However, the City can reduce travel lane widths to 10’ (permitted by AASHTO). By doing so, the costs, difficulties, and severe crashes may be reduced. The City would also save approximately 5’ of existing right of way . This will further reducing the need for additional purchases and minimize impacts to properties.

(Above) The Linden Street sections from 10th Avenue to Kimball should be constructed with sidewalks. However, this will not be cheap as power poles will need to be relocated and possible right of way purchased.

Crossings

There are two crosswalks on Linden Avenue, one at Windsor Drive and the other at Fairview Avenue. To raise additional awareness of crossing pedestrians, a modest refuge island can be built (*similar to pictured below*). Due to the distance from the intersection and the presence of the center two way left turn lane, such a treatment is possible. Adding overhead lights and landscaping to further enhance the crosswalk will increase visibility and prompt drivers to slow to a safer speed in the school zone.

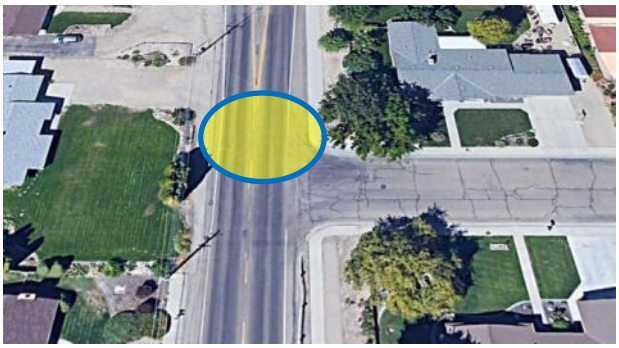
(Top) The current crossings are without overhead lighting, which is vital during the fall and winter of a school year. (Right) Adding a landscaped refuge island is possible and advised.

The 10th Avenue and Linden Street intersection is fully signalized and includes marked crosswalks and pedestrian signal timers. However, the amount of time given to cross the intersections fall short of existing federal MUTCD standards. Each leg is approximately 65'-70'. This measurement is taken from 6' from the face of the curb to the base of the opposite curb ramps as per MUTCD. Using the commonly approved pedestrian signal timing formula (width/3.5ft s), the following timing should be used:

4s-7s Walk Interval, 18.5s-20s Pedestrian Change Interval

Due to the fact that this intersection is mostly for school children however, not only should at least 7 seconds of Walk Interval be used, but a 3 second Leading Pedestrian Interval should also be used during school sessions. This is due largely to the height of school children as it relates to the turning vehicle height. Giving kids a three second head start will also limit exposure time.

A crossing is advised spanning 10th Avenue at the intersection with Chaparro (*below*). This crosswalk should be marked with high visibility crossings and an RRFB as it is located in a 35 mile per hour zone. This crossing allows a straighter, more direct line of travel for students from the east side of the street, and in particular, the subdivision accessible by Chaparro Street. This crossing is also contextually appropriate given the exact same treatment is located near Jefferson Elementary School near Larkspur Court.



Comfort

Behind the campus is a section of road that is off limits and unpaved. The short section on Arlington Avenue between Chaparro Place and Poplar Street should be made whole. This may encourage more drop offs or pick ups away from the front of school which may alleviate some of the contentiousness of such evolutions near the Linden/10th intersection.

Context

The 10th Street corridor is fast moving, without sidewalk buffer and not inductive to elementary school kids walking to and from school. One recommendation is to make the 10th Avenue corridor a dedicated school zone. This means posting the speed at 20 mph during am and pm activities along with flashers to further indicate to drivers of the reduced speed limits. Alone, speed limit changes will not likely reduce travel speeds. Additional design elements are needed to accompany the school zone speeds.

One of the design changes includes a median and street trees. There is an opportunity to make a significant difference near Wilson Elementary and not only beautify the area, but also add a gateway entrance into Caldwell. Currently there is a section of a two-way left turn lane that exists but has no functional use. The part of the lane not being used is approximately 820' and extends from just north of the bus entrance, south to the beginning of the lane. This space would be ideal for a landscaped median with lush street trees. Street trees have a well documented success at slowing traffic to desired speeds, filtering local air, and adding shade to extend pavement life. Such a treatment would add to an otherwise minimal streetscape and welcome people into this part of Caldwell.

(Above) The long section of 10th Avenue without a need for left turns affords the opportunity to add landscaped medians, including street trees.

Lincoln Elementary Overview

Lincoln Elementary School is located just off the Cleveland Boulevard corridor and Caldwell Library. The school is mostly accessed by the Grant ST./12th Avenue connection, and Oregon Avenue to the southeast. The school will soon be completely rebuilt due to age and toxic materials. Two additional streets, S10th Avenue and Everett Street are major roads also delivering students to the campus.

Connections

Oregon Avenue presents an opportunity to not only improve school access, but community movement as well. By adding a 10'-12' sidepath on the western edge of Oregon Avenue, a viable connection can be made capturing both walkers and bicyclists. Given the current existing right of way, this is very possible in front of the school, but would take cooperation and an agreement from the property owner near Logan Avenue. A sidepath would make a safer route to the campus from the south and more directly tie to the existing crosswalk at Logan Avenue.

(Right) Oregon Avenue from Logan to the terminus of the street affords an opportunity for a paved sidepath that would accommodate all users. This connection would also serve the many parks, the library, and other sites near the school.

An additional section of road near the school is without a full compliment of sidewalks. Grant Avenue from S10th Avenue to S9th Avenue has two gaps as well as a segment that badly needs reconstructing. This small block segment is critical as it aligns with the Rectangular Rapid Flash Beacon at eh intersection of S10 Avenue and Grant Street. The City likely possess the existing right of way for both missing segments and the substandard section which should translate into a project without complexities.

Additionally, the curb ramps at the S9th Street and Grant Street intersection need to be constructed and can be constructed with the sidewalk gap fills described.

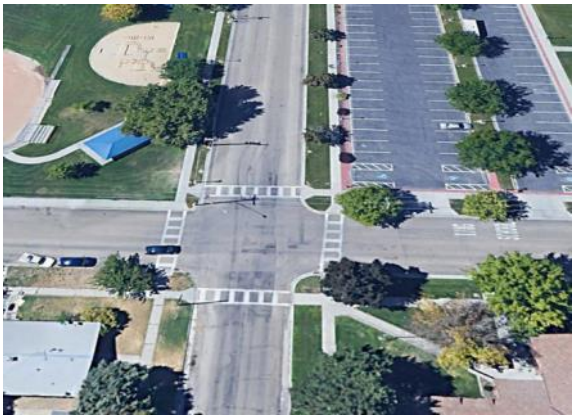
Context

The Grant/12th Avenue road in front of Lincoln is excessively wide for a two lane road. With on-street parking, the road could be as narrow as 35'. However, the road is closer to 48' and fosters traffic movement faster than desired, and allows travel alignments that translates into drivers traveling on the wrong side of the roadway. There are three crossings: the west (unmarked), directly in front, and to the east of the school. Contextually, the road should be a slower speed, and pedestrian rich. Using the existing street width, adding a formal planter would not only add to the esthetic quality of the street, but also serve to slow traffic and better align vehicular travel ways. To the west, adding a marked crosswalk and landing where the three streets come together using paint and shortened flex posts, provides safe refuge and reduces turning speeds. Just east of the two crossings would begin two long landscaped medians. These prompt better vehicle tracking and act as a traffic calming measure. The medians also eliminate U-turns which can be unsafe in a school environment.

(Above) The wide road allows for multiple approaches to calming traffic and improving safe movement of pedestrians.

Crossings

Everett Street and 12th Avenue intersection is not stop controlled. Although there are high visibility crosswalks, making the intersection a two way stop would be advised. Stopping north/south traffic on Everett to add an additional protection for crossing pedestrians would have minimal impact on traffic flow and enhance safety for school children and park users.



(Above) Adding a two-way stop to force drivers to stop at the gateway entrance to the school gives additional protections to students and park users outside of school activities.

Comfort

Near the intersection of S10th Avenue, several code violations are occurring. One (*pictured*) is the shrub growth occurring over the sidewalk along Grant Street. The other violation is the tree canopy that is blocking the overhead light of the crosswalk and RRFP at the 10th Avenue/Grant Street intersection. Both are likely reoccurring situations and need monitoring as pedestrians will chose to walk in the street if shrubs overtake the sidewalk and not realize the lack of lighting anticipated to cascade over them when tree limbs block lights.

(Right) A continual problem, large shrubs can become a hindrance to sidewalk movement.