



AGENDA



Traffic Safety Committee

Date & Time:	Thursday – January 25, 2023 6:00 pm
Location:	Sherwood Police Department, Community Room 20495 SW Borchers Drive, Sherwood
Attendees	
T.S.C. Members:	City Staff:
Jason Wuertz-Chair	Dan O'Loughlin-Police Captain
Tiffany Yandt-Vice Chair	Chris Pierce-Traffic Officer
Tony Bevel	Jason Waters-City Engineer
Dorian Libal	Joy Chang-Senior Planner
Lisa Patterson	Sabrina Sharp-Admin Assistant II
Richard Amicci (PAB Liaison)	

This meeting will be live streamed at <https://www.youtube.com/user/CityofSherwood>.

1. Call to Order (Chair)
2. Roll Call (Staff)
3. Approval of October Minutes (Chair)
4. Citizen Comments (Chair)

How to Provide Citizen Comments: Citizen comments may be provided in person or in writing. Sign-up forms will be available at the meeting for anyone who wishes to provide comments in person. Written comments must be submitted at least 24 hours in advance of the scheduled meeting start time by email to policeinformation@sherwoodoregon.gov and must clearly state that it is intended as a general Citizen Comment for this meeting. Comments are limited to 4 minutes per person. Per Council Rules Ch. 2 Section (V)(D)(5), Citizen Comments, "Speakers shall identify themselves by their name and by their city of residence." Anonymous comments will not be accepted into the meeting record

5. Business (Chair)
 - a. New Traffic Safety Requests- N/A
 - b. Pending Traffic Safety Requests
 - Request #2022-005: Request to lower speed limit, add more lighting, sidewalks, bike lanes & crosswalks on Edy Rd. (**connected to request #2022-005.1, 2022-005.2, 2022-005.3, & 2022-005.4**)
 - Update by City Engineer
 - Request #2022-006: Request to lower speed limit, install speed bumps on NB & SB Elwert Rd, or install stop signs with flashing lights.
 - Update by City Engineer
 - Request #2022-010: Parking concern on Saint Charles Way to pathway, requesting "no parking" signs in area.
 - City Engineer suggested barricade installation, will provide updates.
 - Request #2023-001 & #2023-001.1: Concern regarding Sherwood High School parking lot traffic & Haide Rd. residents request additional traffic measures.
 - School district to announce additional drop off area to parents, PD will connect with school and find out when message will be posted to public. Motion was

made to get joint messaging on solutions to the public and to continue to work with the county to improve Elwert Rd.

- Request #2023-005: Requesting improvements to Villa Rd (road repavement, speed limit signs, painted lines, etc.) **(connected to request #2023-005.1)**
 - City Engineer suggested shared use pathway or alley signage to reduce speed to 15 mph, updates provided.
- Request #2023-006: Request for speed bumps at 3-way stop at Division St & Park Row Ave
 - Awaiting City Manager/ City Council approval for stop sign installation per TSC request. Update by City Engineer
- Request #2023-007: Requesting no parking on one side of Smith Ave between Meinecke & Vintner
 - Item will remain on pending list as more analysis is needed from Engineering Department.

c. City Engineer update on pending City projects (GIS map)

- City Engineer will present to committee upon completion.

6. Committee Comments (Chair)

7. Adjourn (Chair)

If you require an ADA accommodation for this public meeting, please contact the Sherwood Police Department at (503) 625-5523, #2 or policeinformation@sherwoodoregon.gov at least 48 hours in advance of the scheduled meeting time.

Meeting Minutes



Traffic Safety Committee

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Attendees	
T.S.C. Members:	City Staff:
Jason Wuertz-Chair	Dan O'Loughlin-Police Captain
Tiffany Yandt-Vice Chair	Jason Waters-City Engineer
Tony Bevel	Joy Chang-Senior Planner
Dorian Libal	Sabrina Sharp-Admin Assistant II
Richard Amicci (PAB Liaison)	

This meeting was live streamed (and recorded) through the City of Sherwood's YouTube channel.

The video is available for viewing: <https://www.youtube.com/watch?v=X1DKlsrpp5Q>

1. Call to Order

Chair Jason Wuertz called the meeting to order at 6:05 pm.

2. Roll Call

Committee Members Present: Chair Jason Wuertz, Vice Chair Tiffany Yandt, Tony Bevel, Dorian Libal, & Richard Amicci

Committee Members Absent: Lisa Patterson

City Staff Members Present: Police Captain Dan O'Loughlin, City Engineer Jason Waters, Senior Planner Joy Chang, & Admin Assistant II Sabrina Sharp

3. Approval of Minutes

Mr Amicci moved to approve the October meeting minutes as written and Mr. Libal seconded the motion. All present committee members voted in favor.

4. Citizen Comments- N/A

5. Business (Chair)

a. New Traffic Safety Requests- N/A

Please refer to the Tracking Sheets (Exhibit “A”) for more information on the requests discussed at this meeting.

b. Pending Traffic Safety Requests

- **Request #2022-005: Request to lower speed limit, add more lighting, sidewalks, bike lanes & crosswalks on Edy Rd. (connected to request #2022-005.1, 2022-005.2, 2022-005.3, & 2022-005.4)**
This discussion begins at the 2:18 minute mark of the YouTube video.
Mr. Waters indicated that there was a missing speed limit sign at the intersection of Edy Rd & Borchers. He added that he is working on getting the sign put up but is unsure if this needs to be completed by county or city staff. This item will remain pending until the sign has been installed.
- **Request #2022-006: Request to lower speed limit, install speed bumps on NB & SB Elwert Rd, or install stop signs with flashing lights.**
This discussion begins at the 3:30 minute mark of the YouTube video.
Captain O’Loughlin stated that this request is complete since the speed limit signs have been installed. He added that no speed bumps or no flashing beacons would be added to this area and this item can be closed out unless the committee had some additional feedback. Mr. Amicci asked for clarification on where along Elwert Rd the speed limit was reduced, and wondered if an additional speed limit sign could be placed between the roundabout and Edy Rd. Mr. Libal moved to close request #2022-006 and Mr. Bevel seconded the motion. All present committee members voted in favor.
- **Request #2022-010: Parking concern on Saint Charles Way to pathway, requesting “no parking” signs in area.**
This discussion begins at the 6:43 minute mark of the YouTube video.
Mr. Waters stated he does not have a timeline on when this request will be completed, but that the recommendation is for barricades to be put up on each side of the street to indicate the crosswalk is closed. He added that the Public Works Director agrees with this solution as well and indicated that staff could put up “crosswalk closed” signs in the meantime. Captain O’Loughlin expressed that this item should remain pending until the barricades have been installed.

- **Request #2023-001 & #2023-001.1: Concern regarding Sherwood High School parking lot traffic & Haide Rd. residents request additional traffic measures.**

This discussion begins at the 8:02 minute mark of the YouTube video.

Captain O'Loughlin spoke on the item and stated that he heard back from the school district, and they informed him that the high school notified parents of the change to the parking situation and additional drop off area in the fall. He also asked the school district officials if they would send out another notice to parents and to let city staff know when so that the city could coordinate with them and announce the change simultaneously. He added that the school district would be putting up sandwich board signs to convince parents to drop their children off at the secondary drop off area. He also indicated that PD staff completed an additional study to see if the initial announcement made a difference, and they found that there was no improvement and traffic was still a major issue.

Mr. Bevel asked if the school district knows how many students are using the parking lots and Captain O'Loughlin replied that they do have an exact number, as the students need to buy parking permits to park in the lots. He added that he does not know what the exact number is but indicated that there are more parking spots available than students who utilize them. Mr. Amicci expressed that restriping on Elwert Rd would solve a lot of the traffic problems. Mr. Libal stated that county engineers are currently looking at this area and agree that restriping the road would be the best solution. Mr. Waters added that the county is on the same page as the city and is hoping to come to an agreement to rectify this issue.

Captain O'Loughlin expressed that since the school's solution is not having an impact on the traffic issue, he would like this item to remain pending until the school district makes an additional announcement to parents, PD staff posts this change on social media, and sandwich board signs are put up by the high school informing parents of the new drop off/pick up area. He added that the city piece would be closed out and restriping Elwert would be a county issue as it is within county jurisdiction and is outside of the city's purview.

- **Request #2023-005: Requesting improvements to Villa Rd (road repavement, speed limit signs, painted lines, etc.) (connected to request #2023-005.1)**

This discussion begins at the 22:02 minute mark of the YouTube video.

Mr. Waters stated that he has not discussed this item with upper management yet, therefore, this item will remain pending until further direction is obtained from the Public Works Director.

- **Request #2023-006: Request for speed bumps at 3-way stop at Division St & Park Row Ave**

This discussion begins at the 22:36 minute mark of the YouTube video.

Mr. Waters stated that he supports the recommendation for the third stop sign at the location but needs to obtain the support of the City Manager Pro Tem to move forward. If the City Manager Pro Tem approves of the signage, then this item can be closed out at the next meeting.

- **Request #2023-007: Requesting no parking on one side of Smith Ave between Meinecke & Vintner**

This discussion begins at the 23:25 minute mark of the YouTube video.

Mr. Waters stated that this item will remain pending until the GIS map is complete.

c. City Engineer update on pending City projects (GIS map)

Mr. Waters stated that the new city staff member has GIS experience and will begin working on this project. Once the project is complete, city staff will present the map to the committee.

6. Committee Comments (See Exhibit “B”)

Mr. Waters discussed the work session crosswalk safety study that was presented to the City Council on 1/16/24. He expressed that he would like to get the committee’s recommendations and suggestions on what should be done to the crosswalks at the intersections of Sunset Blvd and Timbrel Ln, and Woodhaven Dr and Sunset Blvd. Captain O’Loughlin indicated that the committee should focus on one intersection at a time, instead of discussing multiple ideas at once. Mr. Waters indicated that he recommends “Exhibit 2” for the intersection of Sunset and Woodhaven. (See 30:52 of the YouTube video)

Captain O’Loughlin asked if Mr. Waters could elaborate more on the differences between a push button rapid flashing beacon (**RFB**) and a hawk signal system. Mr. Waters stated that a hawk signal is a solid red light, which functions as a traffic signal with a stop versus the RFB, where vehicles will yield to the pedestrian when the light on the sign flashes. Ms. Chang clarified on the differences and indicated that the rectangular sign that flashes when someone pushes the button to cross would be an RFB. She added that the “hawk signal” is one where a pedestrian presses the button to cross, and the light turns red so that oncoming traffic will stop. Mr. Libal spoke on both types of crossing beacons and stated that he prefers the one where the light is constantly green until someone pushes the button to cross. He also stated that he does not like hawk signals since the signal is dark and only turns red when a pedestrian needs to cross. He added that these types of signals are extremely dangerous for both drivers and pedestrians.

Mr. Amicci asked for clarification on what a hawk signal looks like, and Mr. Libal replied that there is a flashing yellow light on the bottom of the signal, then it goes to solid yellow and there are two solid red lights on the top. Mr. Libal added that these signals are the same cost and infrastructure of a regular traffic signal, but none of the benefits. He indicated that it would be better to put up working signal heads and leave the green light lit until someone needs to cross. Mr. Waters agreed and thought that the City Council also wanted a full pedestrian crossing system as well. He also added that he is hoping to recommend a push button RFB at each intersection and wants to stick with the exhibit 2 layout in the proposed crosswalk study.

Chair Wuertz asked why some council members were not on board with RFB's and Mr. Waters replied that some council members believed that there is a false sense of security with rapid flashing beacons. Chair Wuertz indicated that the council needs to be informed about the safety of them. He also stated that he agreed with Mr. Libal's distrust in hawk signals and stressed how dangerous they are. Chair Wuertz added that this intersection should have a regular traffic signal and did not agree with the signal that stays green unless someone needs to cross the street. Mr. Libal indicated that maybe those council members should discuss their apprehension about RFB's with Tualatin's City Council as they have those types of signals all around their city.

Mr. Waters stated that RFB's are more cost effective than other options that are out there and agreed with Mr. Libal and Chair Wuertz on their dislike of hawk signals. He added that he would like to use some feedback from the TSC on the crosswalk study to bring back to council and city staff. Captain O'Loughlin stated that he had concerns with a signal at the Sunset/Woodhaven intersection and indicated that it would cause more traffic and could be more dangerous for drivers. He added that the study showed that 29 pedestrians cross Sunset/Woodhaven in a day versus Sunset/Timbrel which showed 154 pedestrians. He indicated that since the number of pedestrians who cross at Sunset/Timbrel was substantially higher than those who cross at Sunset/Woodhaven that the committee take the increased risk factor into account when making their recommendations.

Mr. Libal suggested a solar type of signal system; however, he knows that citizens would complain when the signal stops working, and reliability could be an issue and it is also a more costly option. Captain O'Loughlin indicated that he supports a hard red light at Timbrel, but when rush hour backs up traffic for cars going to Highway 99, he noticed that there could be an issue with cars turning left and that there is a sight distance issue in this area as well. Mr. Waters stated that one of the other proposed projects shows a lane widening project ("Exhibit 4") or a roundabout ("Exhibit 5") but expressed that a roundabout is not a good idea for pedestrians and would prefer a signal. Mr. Libal stated that the city would need to obtain warrants to put up a traffic signal.

Mr. Bevel expressed that there is a lot of bushes and trees at Sunset and Timbrel which causes sight distance issues for pedestrians and drivers. Captain O'Loughlin stated that if there was a solid red light at the intersection, then that would allow more space for vehicles to stop before the crosswalk. Mr. Waters stated that he met with the Public Works Director to fix the ADA ramp issues and that project is funded.

Chair Wuertz discussed getting rid of the right lane on Sunset and Woodhaven and tapering it into one lane, which would eliminate vehicles merging at the same time of a pedestrian crossing. He added that there are two different options for this, one with a right turn lane ("Exhibit 1") and one without ("Exhibit 2") and elaborated more on this option. Mr. Waters stated that he would circle back with ODOT, and Chair Wuertz indicated that would not be comfortable making this recommendation, but suggested to place ADA compliant ramps at the corners which would enable staff to place a curb extension at the southwest corner and narrow the crosswalk.

Mr. Amicci asked what time of day the study was done, and if the pedestrian count included children walking to and from school, as well as crossing guards, and other pedestrians who may live in the area. Mr. Waters stated that the study was done during the summer and when school was back in session. Captain O'Loughlin expressed that according to the study, there were 115 pedestrians counted during the morning hours and 156 pedestrians during the evening hours. Chair Wuertz asked if Mr. Bevel or Vice Chair Yandt had any additional comments or thoughts. Vice Chair Yandt stated that she agreed with Chair Wuertz and likes Exhibit 2, the option without the right turn lane.

Mr. Amicci stated that he likes the current flashing signal at the Sunset/Woodhaven intersection and felt that shortening the right turn lane might affect traffic on Highway 99. Chair Wuertz clarified that the right lane would still exist, but there would not be a dedicated right turn lane and would merge into one lane. Captain O'Loughlin expressed that there is not a lot of traffic at location and found it odd that there was a turn lane for such a small area.

A motion was made by Chair Wuertz to recommend the approval of Exhibit 2 of the shared through right on Sunset and Woodhaven, with a potential for a curb extension at the southwest corner, and to recommend rapid flashing beacons at the location. Mr. Amicci seconded the motion and all present committee members voted in favor.

Mr. Waters stated the City Council wanted the Sunset/Timbrel crosswalk to remain in the location it currently is and did not agree with ("Exhibit 3") which would relocate the crosswalk. Mr. Libal recommended to straighten out the existing crosswalk and to put an RFB up temporarily until the road can be widened.

Mr. Libal recommended a rapid flashing beacon, and three arms to control the T-intersection shown in "Exhibit 4". Mr. Amicci expressed that he would rather have a traffic signal, than a roundabout, ("Exhibit 5") and thought that a three-way signal would be beneficial for drivers.

A motion was made by Mr. Libal to straighten the existing crosswalk, have a power RFB, not solar, and to have a long-term study done for a full signal intersection at Sunset and Timbrel. The motion was seconded by Mr. Amicci and all present committee members voted in favor.

Chair Wuertz commented on the roundabout by the high school and indicated that new ADA laws require a crosswalk for a two-lane roundabout. Mr. Waters debating on completing this due to the distance of the crosswalk, crosswalks are pushed out further and would have to push all crosswalk 40 ft, 2 lanes without crosswalks are the most dangerous for pedestrians. Chair Wuertz also commented on the lighting issues within the city and stated that this should be improved as it is too dark and difficult to see cars and pedestrians at night.

Mr. Bevel asked if staff could track how students are being transported to school. Ms. Chang indicated that a survey can be taken at the beginning and end of the school year by school staff. She explained that in the past, when they did this type of survey at an elementary school, teachers would take a week to ask students how they got to school in the morning and would tally each student's answer. She added that this may pose problems if they tried to do this at the high school, as many students may carpool, walk, or drive themselves, so additional data would need to be compiled. Captain O'Loughlin stated that while staff could obtain the data, the striping on Elwert is the main issue of the traffic problem at the high school.

Mr. Amicci expressed that the new pedestrian bridge could help with the traffic issue, as students might be more inclined to walk to school. Captain O'Loughlin stated that school staff can track how many students drive to school by counting how many parking permits have been purchased. In addition, school officials stated that they are not experiencing any tardy issues due to traffic, therefore, they do not see an issue. He indicated that school officials were adamant in their decision in not wanting to open Kruger Road to public traffic.

Ms. Chang expressed that city staff is going to be meeting with school district officials to see what their vision is to improve their schools, and to see if maybe the city could qualify for any capital construction grants. Mr. Bevel asked if the school district meeting will be streamed live on Zoom and Ms. Chang replied that it will just be a small meeting and will not be open or live streamed to the public. She also stated that the local match is 40% and can only decrease if the schools have significant title one students. She added that since Sherwood schools do not have students who meet the criteria for title one, then they will

not be able to get a reduction in the local match percentage. She added that she is hoping that the city will be able to qualify for a grant instead.

7. Adjourn

With nothing further to discuss, the meeting was adjourned at 7:31pm.

The next meeting is scheduled for February 22, 2024 at 6 p.m.

Approval of Minutes:



Chair Jason Wuertz

5/23/24

Date

Attest:



Sabrina Sharp-Admin. Asst II

5/23/24

Date

TRAFFIC SAFETY COMPLAINTS / REQUESTS**Exhibit A****TRAFFIC SAFETY COMMITTEE - 2022****CITY OF SHERWOOD**

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2022-001	Complaint received by the City of Sherwood in 2019 - forwarded to the TSC for review: Concern regarding pedestrians crossing at Handley & Roellich.	C	Received by City Staff-March 2019 / Forwarded to TSC 1/13/2022	Complaint was received by Mayor Mays and then reviewed by the City Engineer in March of 2019. 1/5/2022-New City Manager requested the TSC to review information gathered at the 1/27/2022 meeting. 1/27/2022-Captain Carlson to increase police presence on Handley to see if there is still an issue. Then go from there. 3/24/2022-Capt Carlson reported that no issues were observed by officers when conducting a focused patrol (1/13-3/15/2022, 4.6 hours total). Will send update to City Manager. TSC voted to close out request.
2022-002	Corners in Old Town at Attrells & Park. Cars park on corners, making it difficult to see pedestrians, especially children. Would like "no parking" stripes on each corner of side streets in Old Town.	C	12/15/2021	1/27/2022-The PD and City will help to educate drivers regarding parking in Old Town, in part, with social media posts. Police will help to educate with warnings. Will revisit after a month. 4/28/2022-Capt Carlson met with Public Works. Per state statute, you are not supposed to park within 20 feet of a crosswalk. It was determined that some of the parking spaces do not meet that statute. Public Works is working on a way to meet the requirements without eliminating too many parking spaces. 5/26/2022-Public Works is still working out how best to make updates. SPD will be putting out a PSA soon regarding enforcement and education. 6/23/2022-Public Works removed striping for some of the parking spaces. Removing parking spaces created buffer for busses when turning on the tight corners. 7/28/2022-Some parking spaces had been removed. Parking spaces laid with brick cannot be removed. Mr. Galati will work up some potential plans for the committee. 9/22/2022-A social media post will be sent out by the PD reminding drivers of parking laws by stop signs. This request was closed out with a recommendation to the City Manager to add striping, signage and physical barriers where parking is not allowed.

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2022
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2022-003	No stop signs and poor visibility due to parked cars at SW Park and 1st Street in Old Town.	C	12/20/2021	1/27/2022-As this is similar to 002-this will be revisited after the feedback is received for 002. 4/28/2022-Public Works will be looking at this one at the same time they look into 2022-002. 5/26/2022-Public Works is still working out how best to make updates. SPD will be putting out a PSA soon regarding enforcement and education. 6/23/2022-Captain Carlson reported that there had been no crashes reported over the last 10 years at that intersection or in that area. Decision to close with recommendation for continued patrol.
2022-004.1 & .2	Exit lanes from Walmart main entrance onto Langer Farms. Request to make right or left turn only-no straight through to Target option.	C	2/21/2022	3/24/2022-TSC requests to review previous traffic studies for this location at next meeting. 4/28/2022-Several studies and analysis have been done for this area. Does not make sense to re-open. Decision to get education to drivers regarding stop bars and pedestrians to stop, look and listen before walking into street. Will look into getting copies of previous reports to TSC members for review. 5/23/2022-TIA e-mailed to all TSC members by Julia Hajduk. 6/23/2022-As all committee members hadn't yet had a chance to review the TIA report, this request will remain opened. 9/22/2022-City staff have been working on coming up with a solution and will soon present it to the City Manager. The committee will wait for Chair Wuertz to present his ideas, before closing this request out. 2/17/23-added to Feb agenda 2/27/23- As Feb mtg. was cancelled, complaint will be discussed at March mtg. <i>3/23/23- Mr. Waters came up with some solutions by removing stop bar and restriping area to prevent confusion, will be on CIP list, out of TSC scope</i>

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2022
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2022-005 .1, .2, .3 & (.4-New for 4/28)	Edy Road - Requests to lower speed, add more lighting, sidewalks, bike lanes & crosswalks.	P	2/21 & 22/2022 & 3/24/2022	3/24/2022-City Engineer still waiting for results from traffic study. Will revisit at April meeting. 4/28/2022-Ms. Hajduk to submit MSTIP application for improvements to Edy. City Engineer still working on traffic study for this and 2022-006. Application submitted to the state to reduce speeds on Edy and Elwert from 40 to 35. TSC to write letter of support to submit with the MSTIP application. Ms. Hajduk will work with Chair Wuertz to draft a letter and present at the May meeting. 5/26/2022-City Engineer presented a Traffic Volume / Speed Count Analysis. Has submitted letter to county to lower speed to 35. County has approved and now needs the state's approval. Mobile speed sign with blue and red lights will be moved from Sunset to Edy Rd soon. Public outreach and speed enforcement will help with speeding. 6/23/2022-Mr. Galati forwarded the MSTIP letter. Data has been collected by the State. Recommendations have been forwarded to ODOT. 7/28/2022-No updates to report. 4/27/23-Speed study to be approved within the next couple of months, will be on CIP list and item will remain pending until speed limit signs have been changed to 35 mph 6/27/23- Speed limit change has been approved by state, awaiting installation 10/26/23-City Engineer to follow up with Washington County to find out when speed limit signs will be installed. Motion needed to close

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2022
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2022-006	SW Elwert & Haide-lower speed limit, speed bumps on north and southbound on Elwert - OR - stop signs with flashing lights.	P	3/4/2022	4/28/2022-See above. 5/26/2022-See above. 6/23/2022-See above. Committee will wait until decision has been made regarding speed reduction from the State, before closing this request. 4/27/23-Speed study to be approved within the next couple of months, will be on CIP list and item will remain pending until speed limit signs have been changed to 35 mph 6/27/23-Speed limit change has been approved by state, awaiting installation 10/26/23-City Engineer to follow up with Washington County to find out when speed limit signs will be installed .Motion needed to close

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2022
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2022-007	Request for flashing lights @ crosswalk located at Cedar Brook Way & Meinecke Pkwy.	C	3/17/2022	4/28/2022-A similar request had already been submitted to the City, prior to the formation of the TSC. At that time, trees were cut down to improve sightline and parking spaces were moved back from crosswalk. This is also similar to TSC request #'s 2020-13 & 2020-14. Will reach out to HOA for clarification on specifics. 5/26/2022-HOA not available to provide clarification. 6/23/2022-Angie will check back in with HOA. 7/28/2022-HOA Board Member provided in person clarification of concerns. TSC moved that since modifications had already been made with trees and parking spaces removed, suggestion to the HOA for education piece to residents, setting up crossing guard schedule w/in community and possibly use orange cones and flags during school hours.
2022-008 (new #: 2022-004.2)	Concerns for Intersection at Walmart & SW Langer Farms Pkwy -Possible solution could be traffic light. Suggested going back to DKS for review. Pedestrian Crossing is confusing for drivers. Looks like 4-way stop-suggest different signage / striping.	C	7/4/2022	7/28/2022: See 2022-004.2
2022-009 & 2021-008	Concerns for ped crossing at Woodhaven and Sunset . Suggestion to add crossing beacons and change double left hand turn lane to single turn lane.	C	7/18/2022	As this request is so similar to #2021-008, the two will share the same agenda item number in moving forward. 10/27/22- TSC closed out 2021-008-ped crossing signs have been installed, crossing beacon request is a capital project and is still pending 2022-009 will remain open and is currently pending installation of crossing beacons, <i>4/19/23-on CIP list as request is an extensive city project and is outside of the TSC scope</i>

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2022
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2022-010	Parking concern on Saint Charles Way to pathway. Visibility issue in busy area. Propose "No Parking" signs.	P	9/7/2022	9/22/2022-The TSC recommended that a mid-block crosswalk, striping and signage be added on Saint Charles Way. Mr. Galati offered to type everything up and send the recommendation to City Manager, Keith Campbell, for review and approval. 4/27/23- Mr. Waters needs to compile more information and will give update at next meeting, keep pending 6/27/23-No updates, need additional info from PW and approval for signage 7/27/23-No updates, City Engineer will conduct additional research 8/24/23- Motion to look into near term options such as signage, barricades, road closure, and additional analysis for crossing sight distance, also discuss options w/ school district 10/26/23-City Engineer suggested barrciades for area, item will remain pending Motion needed to close
2022-011	Parking along Murdock Rd near Fairoaks Drive-Intersection. Parked cars impair visibility when drivers exit Fairoaks subdivision.	C	10/4/2022	10/27/2022- TSC closed out request, but awaiting compliance notice from Dan Miller stating homeowner trimmed trees blocking visibility along Murdock Rd 12/19/2022- Received notice from Dan Miller, homeowner trimmed trees/shrubbery and visibility issue has been resolved. Complainant has been contacted and request closed out.
2022-012	Driveway of 14175 SW Galbreath Drive-Request to make both sides of driveway "No Parking" zones as well as other side of street.	C	10/10/2022	10/27/2022- TSC closed out request, not necessary to add extra no parking zones as drivers have an alternate route out of the driveway and are able to turn out of the driveway without adding extra no parking zones

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2023
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2023-001	Complaint received by the City of Sherwood in 2022 - forwarded to the TSC for review: Concern regarding SHS parking lot causing overflow onto Haide Rd & Elwert Rd	P	Received by City Staff- Dec 2022 / Forwarded to TSC	Complaint was received by WACO staff and forwarded to City Staff on 12/15/22, added to TSC agenda for 1/26/23 mtg. 1/26/23-TSC discussed complaint and PD staff needs to complete additional analysis, will be tabled until Feb 2/23 mtg. 2/27/23-As Feb mtg. was cancelled, complaint will be discussed at March mtg. 3/27/23-Item will be left as pending until issues have been brought to school district board for action 6/27/23-still awaiting response from school district, no new motions <i>Motion from 3/23 mtg-leave request open with the recommendation that staff discuss proposed solutions with school district</i> <i>Motion from 4/27 mtg-leave request on pending list until school district responds with their input</i> 8/24/23- Request has been elevated to City Manager level, will leave as pending until school district responds or provides input on proposed solutions to alleviate traffic flow. Speed limit/school zone signs will be installed as well to reduce speeding at location 10/26/23-No stopping/standing signs have been installed at Haide, Orchard Hill, and Fisk Terr. Response received from school district, school will not open Krueger Rd to public traffic, but will be opening an additional drop off area, <i>Motion from 10/26/23-Recommended that the school district & PD have joint messaging announcing change, however, the committee wanted the item to remain pending on tracking sheet until changes have been implemented.</i>

TRAFFIC SAFETY COMPLAINTS / REQUESTS
TRAFFIC SAFETY COMMITTEE - 2023
CITY OF SHERWOOD

<u>Project #</u>	<u>Brief Description of Request</u>	<u>*Status</u>	<u>Date Rec'd</u>	<u>Notes</u>
2023-001.1	Concern regarding traffic flow issues at SHS- residents of Haide Rd neighborhood have safety concerns & request additional traffic measures	P	Received 2/23/23	Additional complaint received by City staff on 2/23/23, related to existing request 2023-001 3/27/23-Item will be left as pending until issues have been brought to school district board for action 6/27/23-still awaiting response from school district, no new motions Motion from 3/23 mtg-leave request open with the recommendation that staff discuss proposed solutions with school district Motion from 4/27 mtg-leave request on pending list until school district responds with their input 8/24/23-Request has been elevated to City Manager level, will leave as pending until school district responds or provides input on proposed solutions to alleviate traffic flow.No stopping, standing, or parking signs to be installed on Haide Rd. by City staff 10/26/23-No stopping/standing signs have been installed at Haide, Orchard Hill, and Fisk Terr. Response received from school district, school will not open Krueger Rd to public traffic, but will be opening an additional drop off area. Motion from 10/26/23- Recommended school district & PD have joint messaging announcing change, however, the committee wanted the item to remain pending on tracking sheet until changes have been implemented.
2023-002	Complaint received in 2021-deemed not in TSC scope, but requester asked for additional items not addressed at SW Kathy St crosswalk area leading to Murdock Park	C	Received by City Staff- Jan 2023 / Forwarded to TSC	Complaint was received by City staff and forwarded to City Engineer-crosswalks installed, requester would like additional signage & flashing lights, added to TSC agenda for 2/23/23 mtg.2/27/23- As Feb mtg. was cancelled, complaint will be discussed at March mtg. 3/23/23- Item will be closed out on TSC side, but will be put on ADA transition plan regarding the ramp not in compliance with ADA standards Motion from 3/23 mtg-Close request on TSC, but add to ADA transition plan to fix ramp and keep on City's radar
2023-003	Requesting speed limit signs, temporary speed trailer, or temporary speed radar signs to be installed on SW Pine St between Division & Sunset	C	Received 2/28/2023	3/23/23-PD will conduct additional patrol regarding stop sign violations, speeding was unfounded, PW will install speed limit signs at location 6/27/23-speed trailer has been installed, awaiting PW to put up speed limit signs at location Motion from 3/23 mtg-Recommend staff to add speed limit signs, provide extra PD patrol, and get ped counts (keep as pending request) Motion from 4/27 mtg-Keep previous motion, but remove ped counts 7/27/23-City Engineer requesting for stop bars to be moved closer, 25 mph speed limit sign, additional warning sign to help with left hand turn to be installed by PW 8/24/23- Motion was made to close request as speed limit signs have been installed.

TRAFFIC SAFETY COMPLAINTS / REQUESTS

TRAFFIC SAFETY COMMITTEE - 2023

CITY OF SHERWOOD

Project #	Brief Description of Request	*Status	Date Rec'd	Notes
2023-004	Requesting residential parking district for Orchard Hill Ln & Fisk Terrace, additional patrol 1/2 hr before and after school	C	Received 3/10/2023	3/23/23-PD staff will bring concerns to the school district for action, propose a reduction in student parking fees so residential area is not utilized for parking, Motion from 3/23 mtg- TSC will close request with the recommendation that PD will continue to monitor area to enforce current "no parking" area , out of TSC's purview
2023-005	Requesting improvements to Villa Rd to make it look more like a road rather than a pathway	P	Received 6/12/2023	6/27/23-Item will be left as pending until signage indicating the division between the sidewalk and the road is installed, currently on a Parks Master Plan, item was tabled to future mtg 8/24/23-City Engineer stated it would be an aspirational CIP project, "shared use pathway" signs, striping, or changing road to alley to reduce speed to 15 mph were suggested 10/26/23-No updates to item, City Engineer stated that Villa Rd will have to be repaved and improved. Motion needed to close
2023-005.1	Requesting to move the park entrance to SW Wildlife Haven Ct	P	Received 7/25/2023	8/24/23-Connected to request #2023-005 since request is similar, City Engineer stated it would be an aspirational CIP project
2023-006	Requesting speed bumps at 3-way stop at Division St & Park Row Ave	P	Received 6/28/2023	7/27/23-City Engineer stated he would review previous records for previous stop signs, review sight distance, researching speed cushions similar to those on Pine St, speed bumps will not be installed, but an additional stop sign would be beneficial to area, need Council approval, TSC requesting for City staff to compile additional data regarding stop sign installation 8/24/23- Motion was made to have resident trim bushes/trees to code, recommend third stop sign provided there is not a past resolution where a third stop sign was removed at complaint location 9/15/23- Trees & bushes have been trimmed and is back in compliance per Dan Miller. 10/26/23-Third stop sign was suggested, City Engineer will need to get additional stop sign approved by upper management.
2023-007	Requesting additional parking on Smith Ave, or no parking on one side of Smith Ave between Meinecke and Vintner	P	Received 7/17/2023	7/27/23-Request tabled to next month's meeting 8/24-More information needed from City staff, item will remain pending as more discussion is needed (Re: no parking signs) 10/26/23-No parking signs will need to be approved by City Manager and City Council before any progress can be made on this request.
2023-008	Requesting paved pathway from Hwy 99 to Cedar Creek Trail, and additional signage routing cyclists from Hwy 99 onto Cedar Creek Trail pathway	C	Received 7/18/2023	7/27/23- Motion was made to install guide signs for bicyclists , Captain O'Loughlin will contact complainant on request
2023-009	Requesting crosswalk on Sunset & Woodhaven	C	Received 10/2/2023	Assigned a project number, but is a duplicate request (#2022-009), item has been added to CIP list and item will be automatically entered on GIS map for records purposes.

O=Open/C=Closed/P=Pending/N=New

City Council Meeting Date: January 16, 2024

Agenda Item: Work Session

TO: Sherwood City Council

FROM: Jason Waters, P.E., City Engineer
Through: Craig Sheldon, City Manager Pro Tem

WORK SESSION: SW Sunset Blvd Crosswalk Safety Study Overview & Next Steps

Purpose:

To provide a project status report and confirm use of City budget allocations under \$150,000.

Desired Outcome:

- A. Provide a summary of the engineering crosswalk safety study that was conducted by consultants along the SW Sunset Blvd corridor between SW Pinehurst Drive and Highway 99W¹ and solicit feedback to be incorporated into the Final safety study report².
- B. Discuss the different types of crosswalk safety treatments available for each location and consultant's recommended near-term and long-term solutions for each location.
- C. Confirm City Council support for the City Manager Pro Tem directing staff to sequence safety improvements per the recommendations outlined below and pending work session discussions, and to program the projects accordingly into the current and pending fiscal year CIP plans³.

Background:

Crosswalk safety is a top priority throughout the city and the previous FY22-23 CIP Plan called for a technical study be completed to address crosswalk safety concerns along SW Sunset Blvd between SW Pinehurst Drive and Highway 99W. Work on the Sunset Blvd Crosswalk Safety Study commenced in May 2023 and was completed in August 2023⁴. The study identifies the SW Woodhaven Drive location as the top safety priority amongst the locations studied with SW Timbrel Lane to also have some immediate safety concerns.

The SW Heatherwood Lane location would likely benefit from the addition of a marked midblock crosswalk, but due to the lack of an existing crosswalk that location should be prioritized with the next TSP Update project which is slated to begin this July 2024. The SW Heatherwood Lane location is also near a low-point on SW Sunset Blvd and crosswalk enhancements could eventually get folded into a storm or sanitary sewer project at some point for the SW Heatherwood Lane location⁵.

¹ This safety project "Study Area" did not include the crosswalks at the ends of the study area at SW Pinehurst Drive or Highway 99W (not part of this study).

² Final Safety Study Report will be posted online and utilized for design & construction phases, pending work session discussion/feedback.

³ City staff is currently working with the consultant to prepare more accurate cost estimates & schematic designs for the 2 primary locations of interest, which will be presented with the draft FY 24-25 CIP Plan in March 2024.

⁴ See Work Session Summary | Attachment 3.

⁵ TBD through future storm and sanitary master plan update projects.

Based on the results of the draft SW Sunset Blvd Crosswalk Safety Study, the City Engineer is recommending the following to the City Manager Pro Tem for the current and pending FY's CIP plans:

1. Investigate whether the SW Woodhaven Drive location can be addressed with and during the upcoming pedestrian bridge project, either via formal design-bid-build process or direct appointment to the design consultant team of KPFF-DKS and separate change order request to the ped-bridge contractor Carter & Company, Inc.⁶.
2. Investigate benefits of amending Kittelson & Associates, Inc.'s crosswalk study contract to include final design plans for an interim RRFB system and 3 ADA ramp project at SW Timbrel Lane that could be incorporated into the City's upcoming small re-paving project planned for SW Timbrel Lane in May 2024⁷.
3. Prioritize remaining intersection or locations of concerns with upcoming TSP update via sidewalk, bicycle, and pedestrian action plan maps that capture and account for the entire city limits.

Financial Impacts:

\$200,000 for final design and construction of preferred treatment at SW Woodhaven Drive⁸, and \$150,000 for final design and construction of a preferred treatment at SW Timbrel Lane⁹. The SW Heatherwood Lane project will be prioritized through the City Traffic Safety Committee and upcoming TSP Update Project set to begin in July 2024.

Recommendation:

No specific recommendation or decision is requested until more information is gathered. Unless directed to do otherwise, the City Manager Pro Tem will investigate the option to complete crosswalk enhancements at SW Timbrel Lane with the City's upcoming pavement maintenance project planned for Spring 2024 and will report back to the Council. The City Manager Pro Tem will direct staff to pursue completing the safety improvements at SW Woodhaven Drive either by incorporating them into the upcoming pedestrian bridge construction project or via traditional design-bid-build process and will report back to the council. All other locations are to be prioritized w/ 2024-25 TSP Update Project.

ATTACHMENTS:

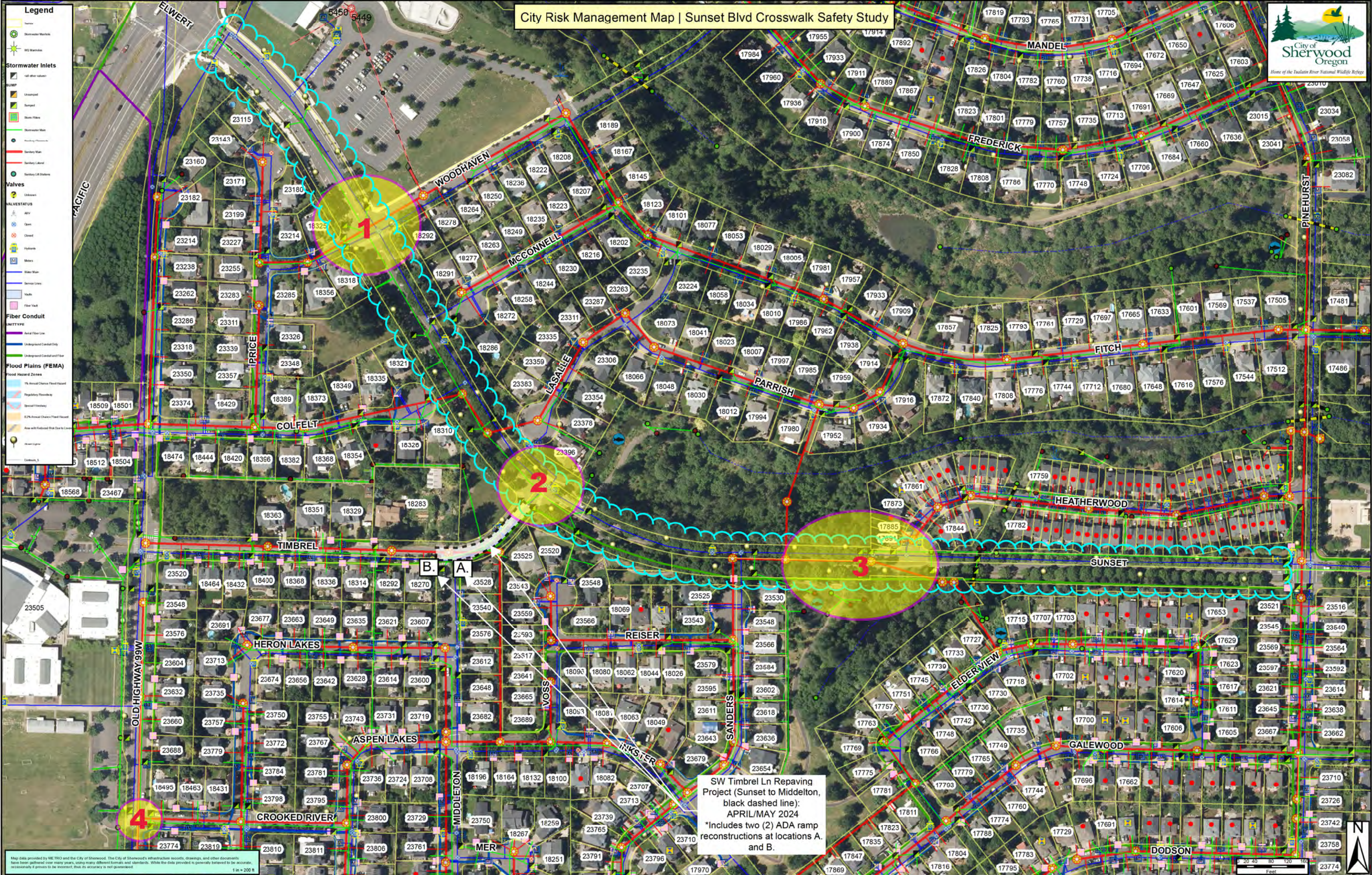
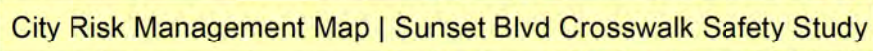
1. City Risk Management Map (.pdf, 1 page for reference during WS discussions)
2. Consultant presentation (.pptx, .pdf)
3. Technical Study: Sunset Blvd Crosswalk Safety Study, Kittelson & Associates, Inc., August 2023 (.pdf)

⁶ City Engineer believes direct appointment design fee from KPFF-DKS <\$50k and change order cost to be <\$100k (<\$150k total project cost) and therefore potentially in best interest to change order the work into the ped-bridge project, via resolution if necessary.

⁷ Additional paving is occurring on SW Sunset Blvd closer to Archer Glen this spring. The Timbrel Lane repaving area currently DOES NOT include any paving on SW Sunset Blvd or the ADA ramps on SW Sunset Blvd and City Engineer believes this RRFB design work can be completed for \$50k and additional paving and striping for the RRFB system amended into the City's paving project for \$60k-\$70k; amounts TBD by consultant if supported (should City staff pursue amending the SW Timbrel Lane safety treatments into their pavement maint. Project?). Kittelson's design plans would be incorporated into City's bid documents for upcoming Sunset Blvd paving project.

⁸ Funds for SW Woodhaven Drive to be expended next FY24-25 and would be set through the upcoming CIP Plan process.

⁹ Funds for SW Timbrel Drive to be expended this FY23-24, if funds determined to be available by City Manager Pro Tem to add to City paving project this year versus waiting until FY25-26.



Sunset Boulevard Crosswalk Safety & Enhancement Study

City Council Work Session – January 16, 2024

Agenda

- ▶ Project Objectives
- ▶ Study Area & Surrounding Context
- ▶ Activity Levels of People Walking
- ▶ Existing Condition Assessment
- ▶ Enhanced Pedestrian Crossing Analysis
- ▶ Recommendations
- ▶ Next Steps

Sherwood High School

Study Area & Surrounding Context

Study Intersections

Points of Interest

Pedestrian Pathways

Pedestrian Pathways Connection Points

Sherwood Regional Family YMCA

SW Sunset Blvd

SW Woodhaven Dr

SW McConnell Ct

SW Lasalle Ln

SW Parrish Ln

SW Fitch Dr

SW Pinehurst Dr

Woodhaven City Park

SW Heatherwood Ln

SW Sunset Blvd

SW Voss Pl

SW Sanders Tr

SW Middleton Rd

SW Timbrel Ln

SW Colfelt Ln

Pacific Hwy W

SW Old Highway 99 West

Middleton Elementary School

SW Crooked River Ln

Surrounding Context

- ▶ Many attractions and destinations for people walking
 - ▶ Sherwood High School
 - ▶ Sherwood Regional Family YMCA
 - ▶ Middleton Elementary School
 - ▶ Woodhaven City Park
- ▶ Sunset Blvd provides pleasant experience for people walking along the corridor but poses challenges for people crossing
- ▶ Safety challenges limit the potential use of Sunset Blvd as a transportation facility, particularly for children



Activity Levels of People Walking

- ▶ Sunset Blvd is a popular corridor for people walking with natural features and comfortable pathways contributing to a high-quality walking experience
 - ▶ Wide sidewalks, mature trees, shaded pathways, landscape buffers

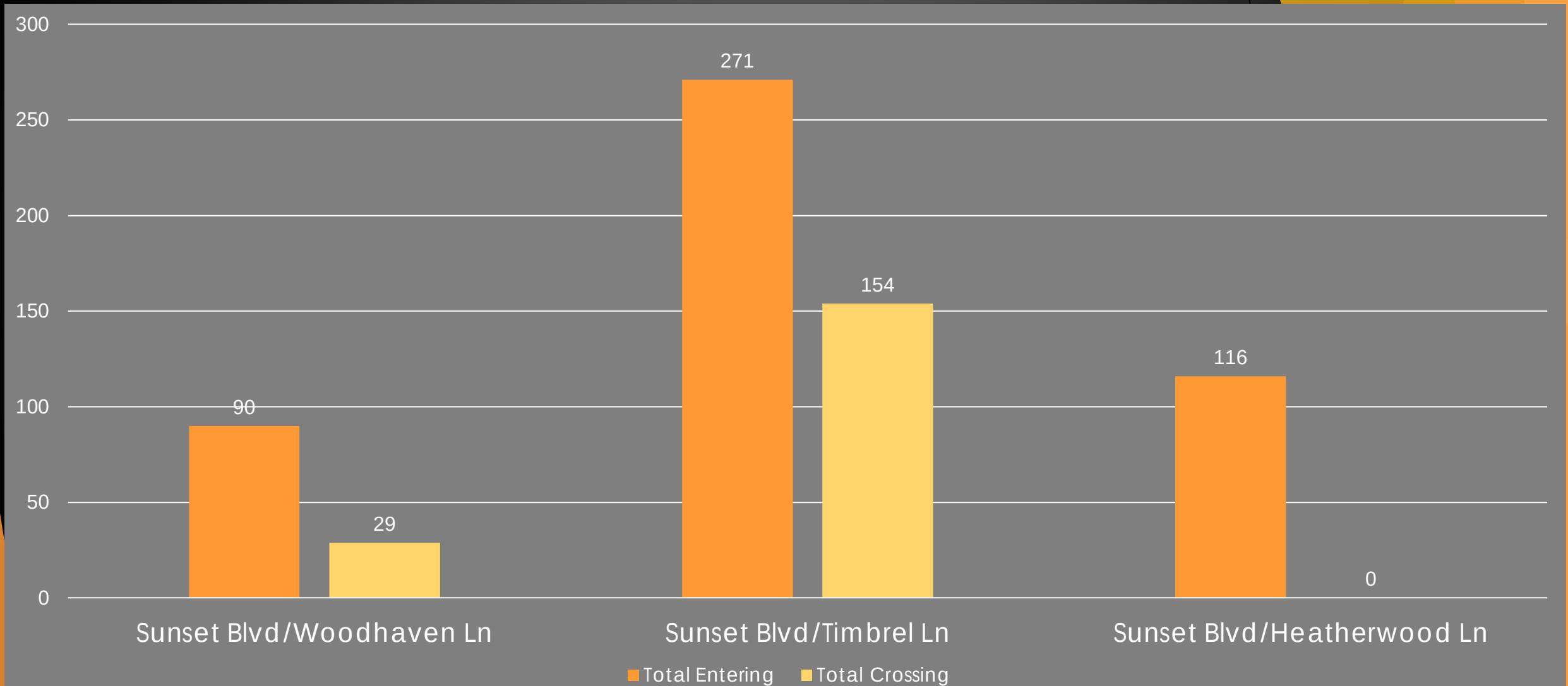


Activity Levels of People Walking

- ▶ Pedestrian activity data was collected at the following intersections on June 7, 2023
 - ▶ Sunset Blvd/Woodhaven Dr
 - ▶ Sunset Blvd/Timbrel Ln
 - ▶ Sunset Blvd/Heatherwood Ln
- ▶ Based on the data collection, 477 pedestrians were recorded entering the study intersections during the morning (7:00 – 9:00 AM) and evening (12:00 – 6:00PM) peak periods.



Activity Levels of People Walking



Existing Condition Assessment – Key Findings

▶ Key Findings:

- ▶ The eastbound right-turn drop lane at Sunset Blvd/Woodhaven Dr comes as a surprise.
 - ▶ People driving were observed accelerating to merge into the through lane while looking over their left shoulder in advance of the existing marked crosswalk.
 - ▶ Vehicular acceleration and reduced visibility resulting from the merge into the through lane increases the risk of pedestrian safety at the marked crosswalk.
- ▶ Trees located in the median and landscape buffer between the road and sidewalk reduce stopping sight distance.
- ▶ At the Sunset Boulevard/Woodhaven Drive and Sunset Boulevard/Timbrel Lane intersections, Stopping Sight Distance (SSD) is not met for vehicles traveling in the westbound direction.



Existing Condition Assessment – Crash Data

- ▶ Crash data for the five most recent years of reported crashes (2015-2020) in the study area was obtained from ODOT's.
- ▶ Eight (8) total crashes occurred within the study area during the five most recent years of reported crashes.
- ▶ No crashes were reported at the Sunset Blvd/Heatherwood Ln intersection.

Location	Crash Type			Severity		Total
	Angle	Fix	Rear	Property Damage Only	Injury	
Sunset Blvd/Woodhaven Dr	1	1	1	3	0	3
Sunset Blvd / Timbrel Ln	1	0	2	2	1	3
Sunset Blvd Segment	0	2	0	0	2	2

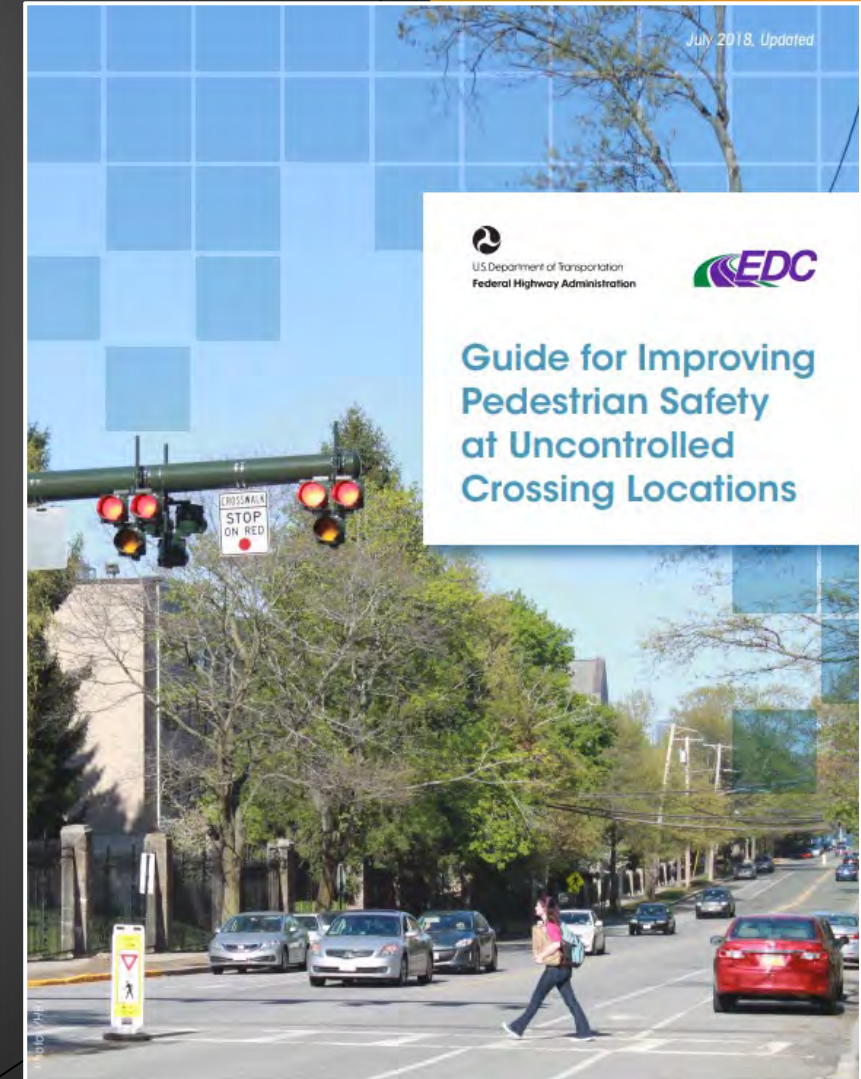
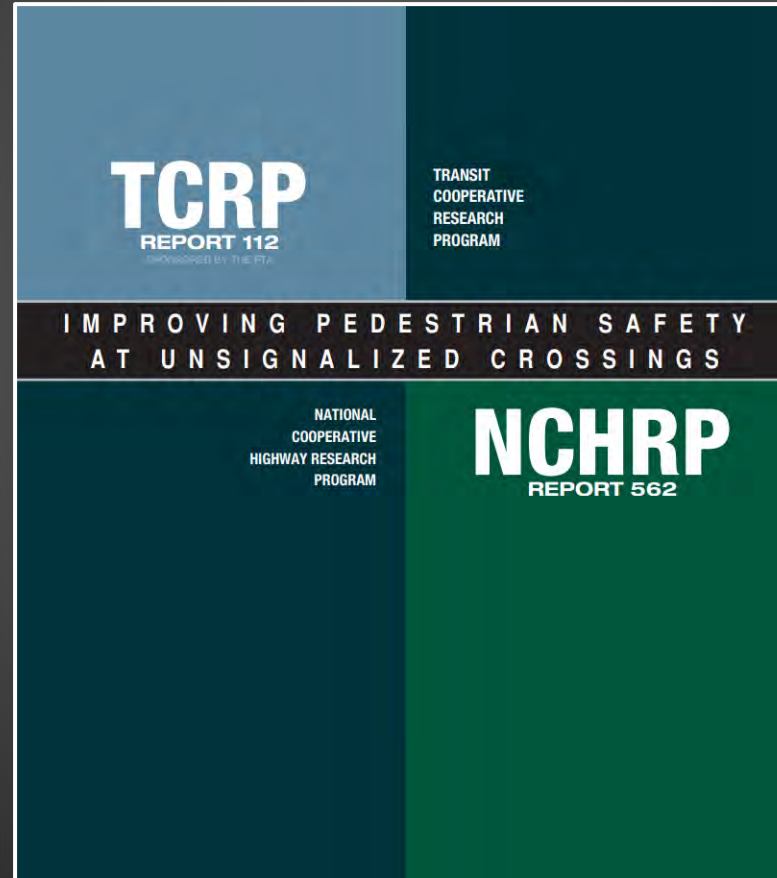
Enhanced Pedestrian Crossing Analysis

► Quantitative Attributes:

- Vehicular volume
- Vehicular speed
- Crossing volume
- Crossing distance
- Number of lanes
- Sight distance

► Qualitative Attributes:

- Origins/destinations
- Connectivity
- Attractiveness



Recommendations

- ▶ Influenced by two (2) primary considerations:
 - ▶ **Safety Countermeasures** – Based on state/national guidance i.e., NCHRP Report 562 & FHWA.
 - ▶ What safety treatments are recommended based on quantitative metrics i.e., volume, speed, crossing distance, etc.
 - ▶ **Engineering Judgement** – Based on field observations, understanding of study area, and surrounding context.
 - ▶ What safety treatments are recommended based on qualitative metrics i.e., live experienced, behavioral patterns, desire lines, community needs.



Recommendations

Sunset Blvd/Woodhaven Dr

- ▶ Relocate the existing crosswalk to the east by approximately 15 feet to improve sight distance, reduce crossing distance, and increase stopping distance for eastbound vehicles in advance of marked crosswalk.
- ▶ Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: “Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line.”
- ▶ Remove the eastbound right-turn trap lane by merging eastbound traffic into a single lane with pavement markings.

- *Reduces risk of conflict between vehicles and pedestrians crossing Sunset Blvd at east leg of intersection.*
- *Maintains right-turn lane; transitions bikes to the left of right-turn lane.*
- *Preliminary engineering cost estimate: \$238,000.*
- ***Highest priority of locations evaluated.***

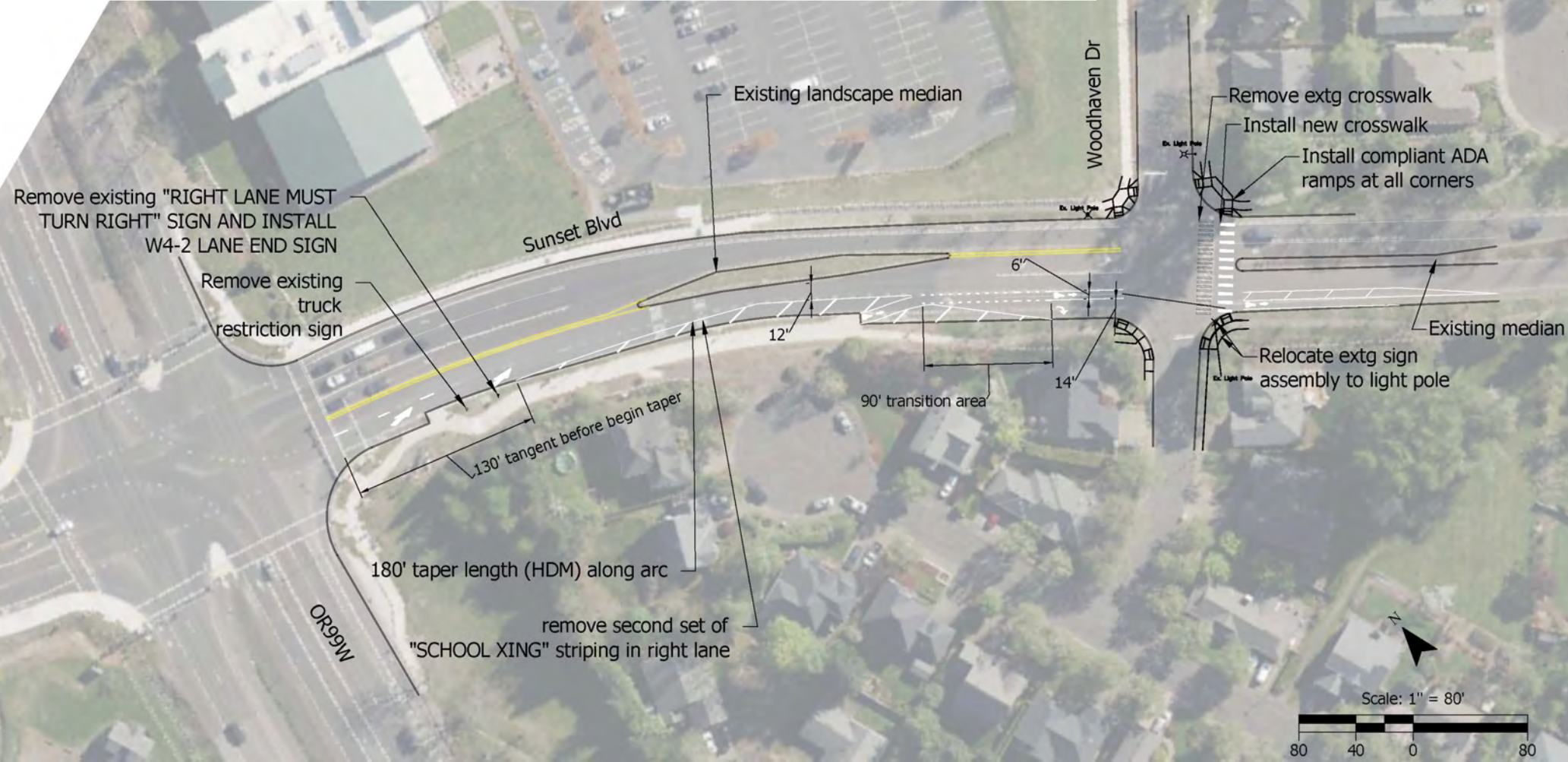
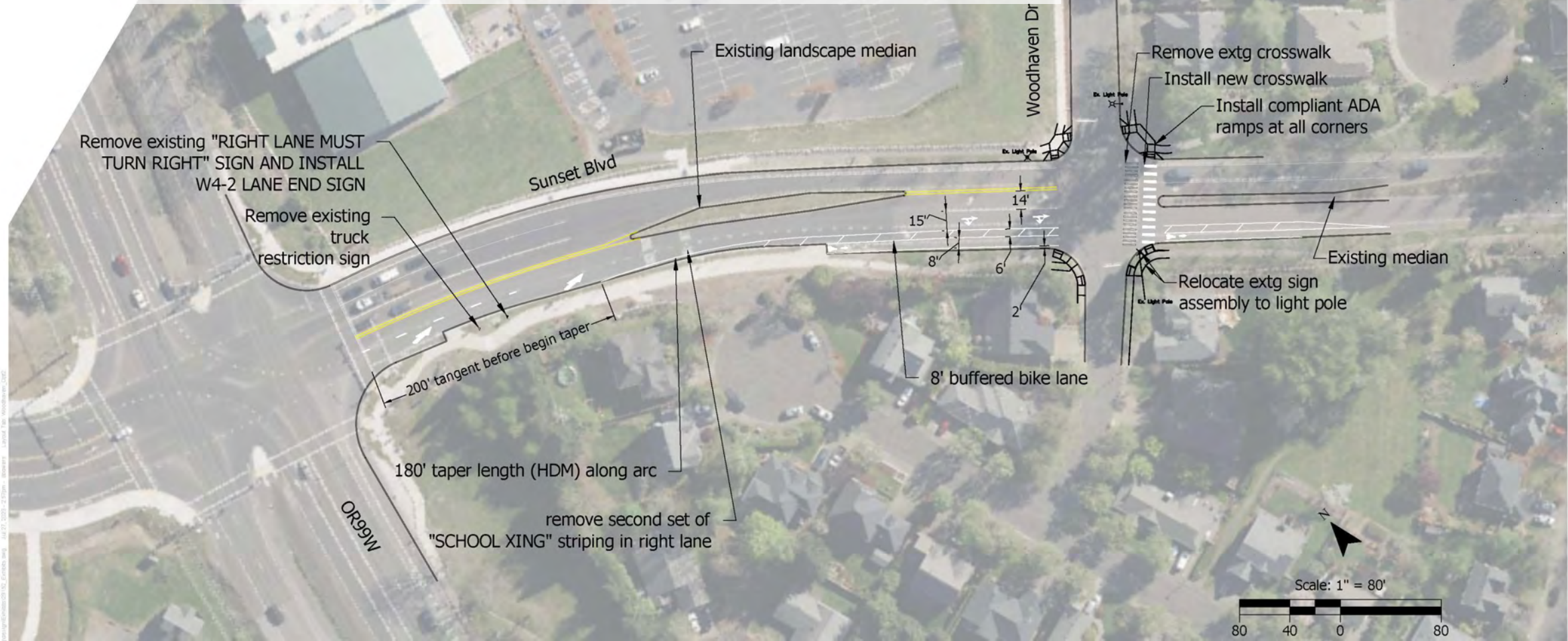


Exhibit 2: Sunset/Woodhaven - Shared Through-Right

Preliminary Design Subject to Change
Date: 7/27/2023

- *Reduces risk of conflict between vehicles and pedestrians crossing Sunset Blvd at east leg of intersection*
- *Creates shared thru right-turn lane*
- *Keeps bikes right of thru right-turn lane.*
- *Preliminary engineering cost estimate: \$208,000*
- ***Highest priority of locations evaluated.***



Recommendations

Sunset Blvd/Timbrel Ln

- ▶ Relocate the existing crosswalk to the west leg of the intersection to improve sight distance and reduce crossing distance.
- ▶ Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: “Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line.”
 - ▶ *Installing a Rectangular Rapid Flashing Beacon (RRFB) is a proven safety countermeasure to improve vehicle yielding compliance. Based on pedestrian volumes and connectivity to Middleton Elementary School, an RRFB should be considered.*

Exhibit 3: Sunset/Timbrel - Relocate Crosswalk

Preliminary Design Subject to Change
Date: 7/27/2023

- *Increases pedestrian connectivity, reduces crossing distance, reduces risk for pedestrian and vehicle conflicts.*
- *Preliminary engineering cost estimate: \$147,000.*
- **Second priority of locations evaluated.**

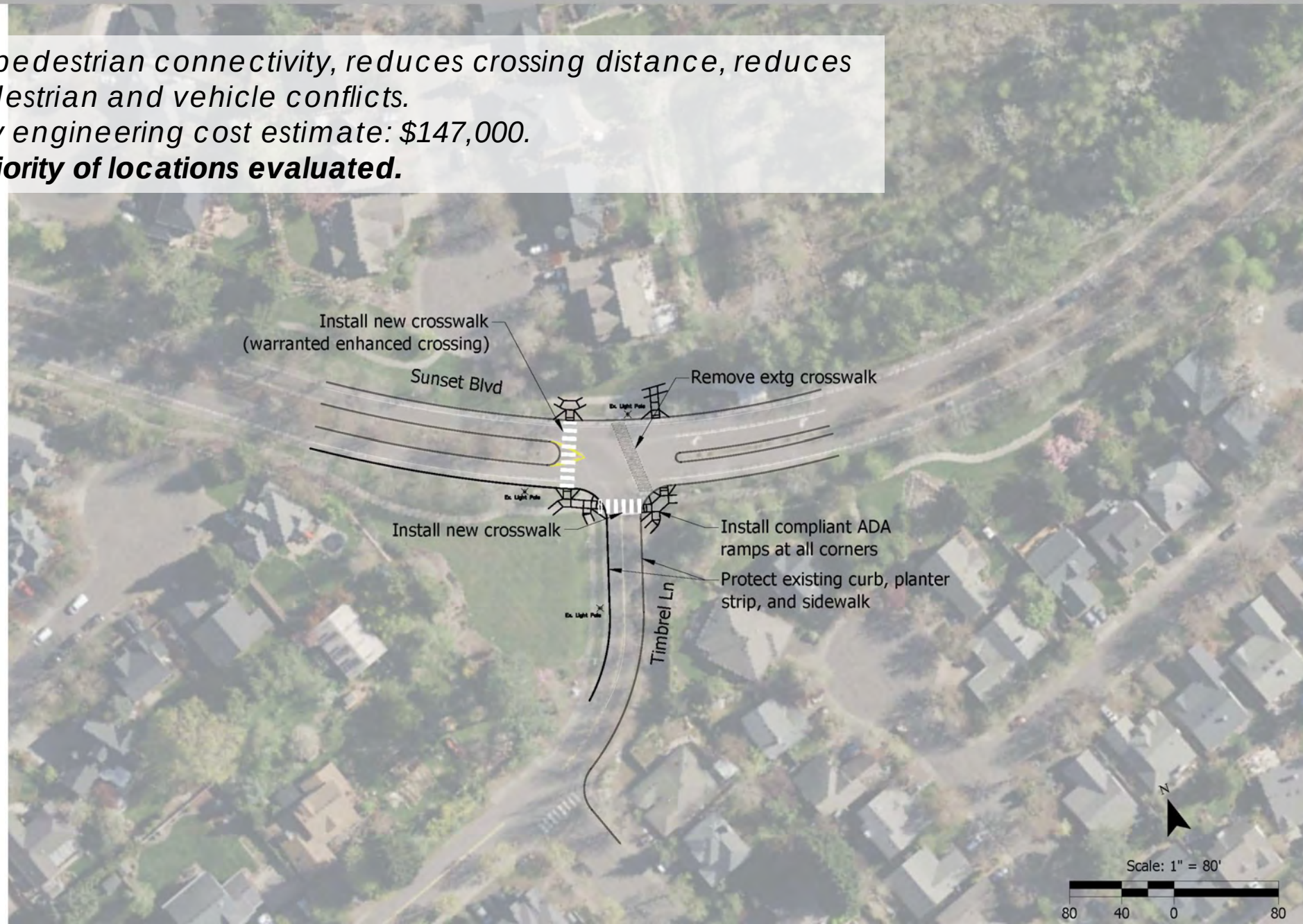


Exhibit 4: Sunset/Timbrel - Remove Sidewalk, Widen Timbrel

Preliminary Design Subject to Change
Date: 7/27/2023

- *Increases pedestrian connectivity, reduces crossing distance, reduces risk for pedestrian and vehicle conflicts, and improves vehicular operations*
- *Preliminary engineering cost estimate: \$345,000.*
- **Second priority of locations evaluated.**

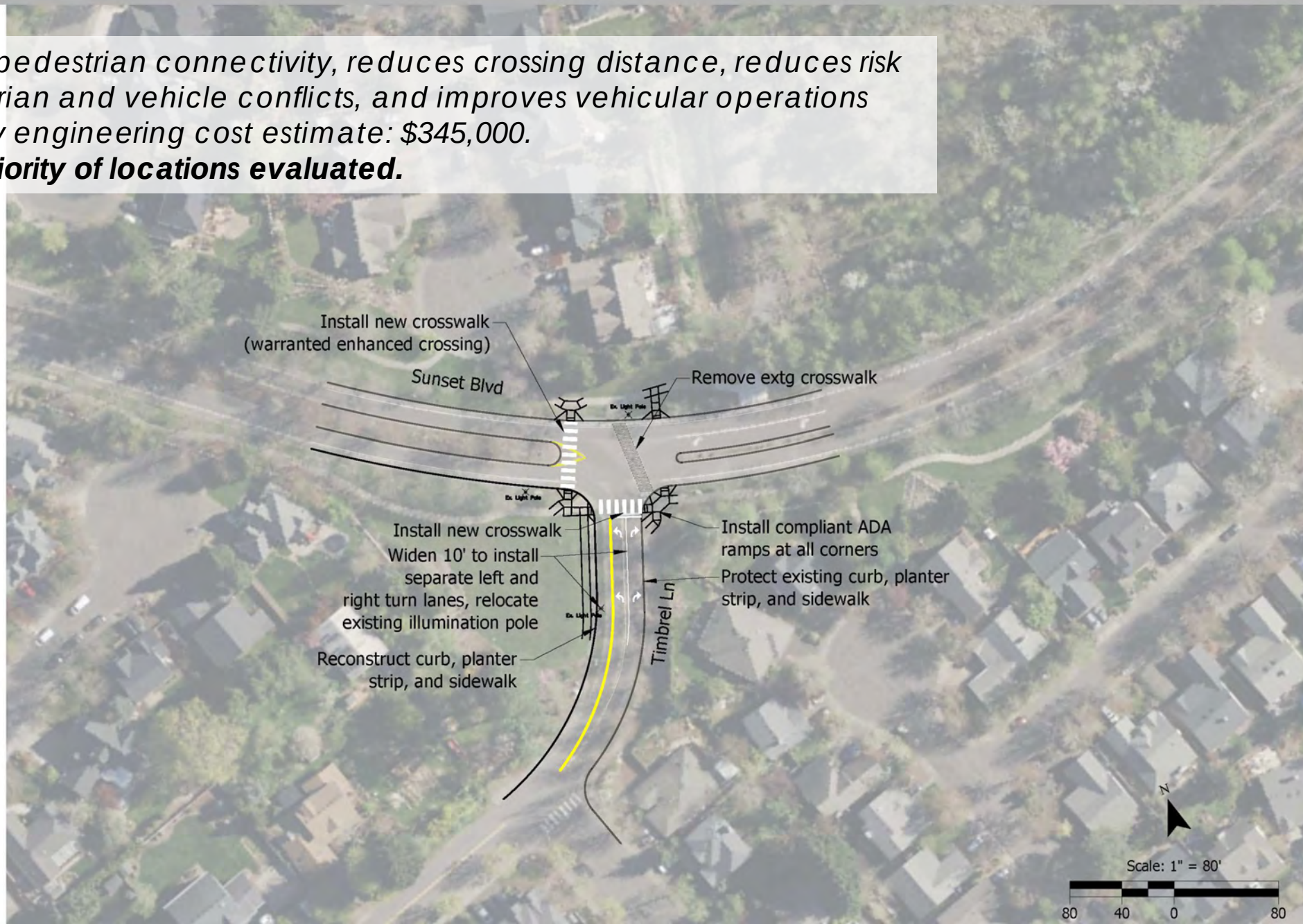


Exhibit 5: Sunset/Timbrel - Roundabout Concept

Preliminary Design Subject to Change
Date: 7/27/2023

- *Increases pedestrian connectivity, reduces crossing distance, reduces risk for pedestrian and vehicle conflicts, reduces vehicular speeds, and improves vehicular operations*
- Preliminary engineering cost estimate: \$3,426,000.
- **Second priority of locations evaluated.**



Recommendations

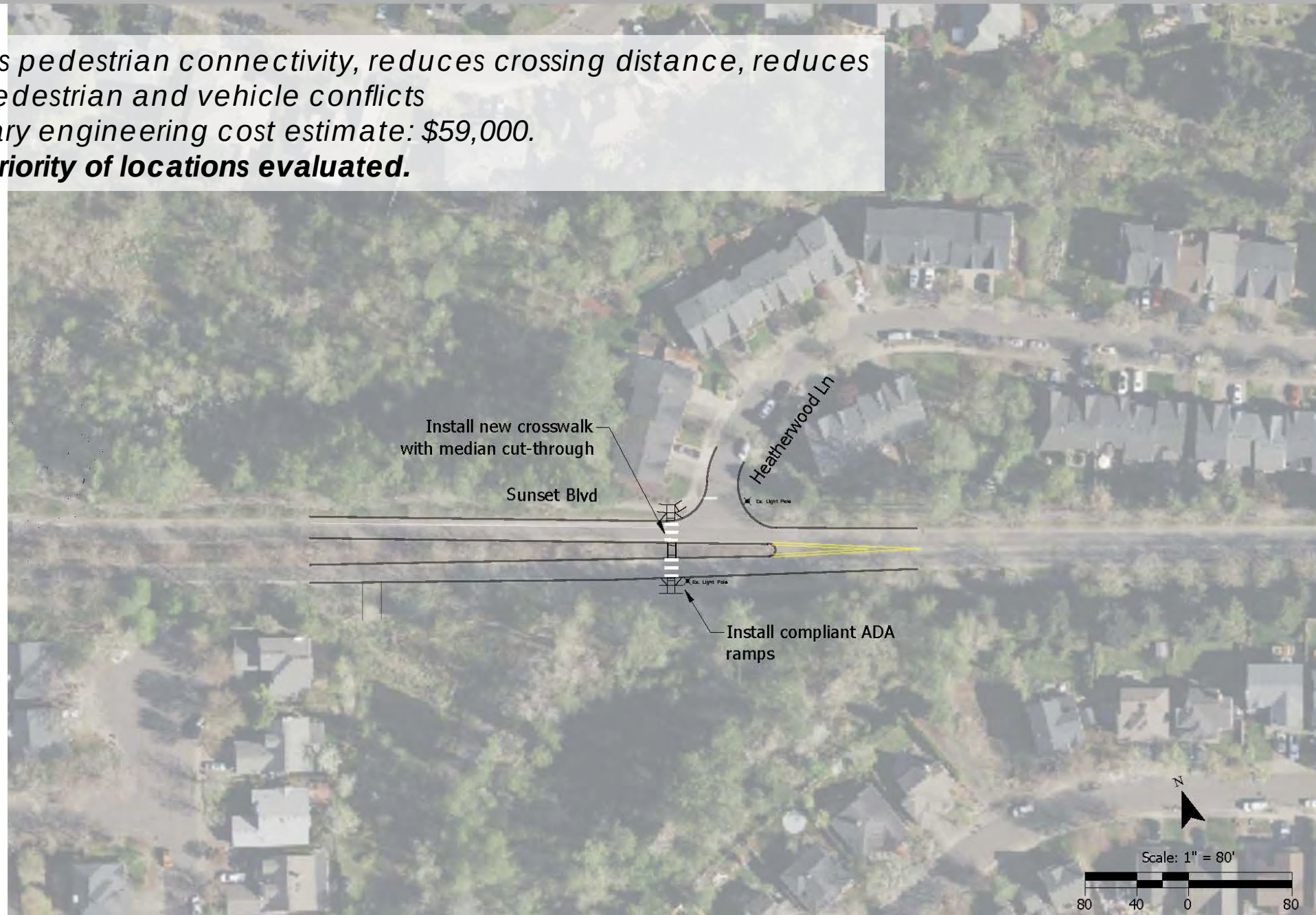
Sunset Blvd/Heatherwood Ln

- ▶ Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: “Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line.”

Exhibit 6: Sunset/Heatherwood - New Marked Crosswalk

Preliminary Design Subject to Change
Date: 7/27/2023

- *Increases pedestrian connectivity, reduces crossing distance, reduces risk for pedestrian and vehicle conflicts*
- *Preliminary engineering cost estimate: \$59,000.*
- ***Lowest priority of locations evaluated.***



Questions

Technical Memorandum

July 28, 2023

Project# 29152

To: Jason Waters, P.E.
City of Sherwood

From: Daniel Bowers; Nick Gross; Tony Roos, P.E.

RE: Sunset Boulevard Crosswalk Safety & Enhancement Study

SUNSET BOULEVARD CROSSWALK SAFETY & ENHANCEMENT STUDY

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Executive Summary

This memorandum summarizes the results of the Sunset Boulevard Crosswalk Safety & Enhancement Study (Study) prepared on behalf of the City of Sherwood. The purpose of the Study is to identify context sensitive and effective safety countermeasures to reduce risk and increase the overall pedestrian experience for people walking along and across Sunset Boulevard between Hwy 99W and Pinehurst Drive. The Study is based on field observations, enhanced pedestrian crossing analyses, National guidance for improving pedestrian safety at uncontrolled crossing locations, and conversations with the City of Sherwood. This memorandum also presents conceptual design layouts and associated cost estimates for the recommended safety countermeasure enhancements at the Woodhaven Drive, Timbrel Lane, and Heatherwood Lane intersections. Key findings are summarized below.

- Sunset Boulevard is a popular walking corridor. Within the study area, Sunset Boulevard includes wide sidewalks, mature trees, and shaded pathways contributing to a high-quality pedestrian experience for utilitarian and recreational walking trips.
- Several key pedestrian destinations are located within close proximity to Sunset Boulevard contributing to high volumes of pedestrian activity. These include the Sherwood Regional Family YMCA, Middleton Elementary School, Woodhaven City Park, and various pedestrian pathways including the Sunset Boulevard Residential Pathways.
- The Sunset Boulevard/Timbrel Lane intersection recorded the highest volumes of pedestrian activity.
 - A total of 271 pedestrians entered the intersection during the morning and evening peak periods including 154 pedestrian crossings.
 - The peak hour of pedestrian crossings occurred from 12:35 to 1:35 PM when 76 pedestrians were recorded crossing Sunset Boulevard.
- The Woodhaven Drive/Sunset Boulevard intersection also recorded high levels of pedestrian activity.
 - A total of 90 pedestrians entered the intersection during the morning and evening peak periods including 29 pedestrian crossings.
 - The peak hour of pedestrian crossings occurred from 12:25 to 1:25 PM when 9 pedestrians were recorded crossing Sunset Boulevard.
- The total daily volume traveling along Sunset Boulevard is approximately 8,211 vehicles between Timbrel Lane and Heatherwood Lane and 8,884 between Heatherwood Lane and Pinehurst Drive.

The following summarizes observations from the consultant team site visit.

- The eastbound right-turn drop lane at Sunset Boulevard/Woodhaven Drive comes as a surprise to drivers traveling eastbound on Sunset Boulevard. As a result, people driving were observed accelerating to merge into the through lane while looking over their left shoulder in advance of the existing marked crosswalk. Vehicular acceleration and reduced visibility resulting from the merge into the through lane increase the risk of pedestrian safety at the marked crosswalk.
- Stopping sight distance (SSD) was measured at the study intersections. Trees located in the median and landscape buffer between the road and sidewalk reduce SSD. At the Sunset Boulevard/Woodhaven Drive and Sunset Boulevard/Timbrel Lane intersections, SSD is not met for vehicles traveling in the westbound direction.

Recommendations

To improve conditions for people walking and reduce the risk for people crossing Sunset Boulevard, the following improvements and countermeasures are recommended. These recommendations are supported by the technical analysis summarized in this memorandum and further based on field observations.

Sunset Boulevard/Woodhaven Drive

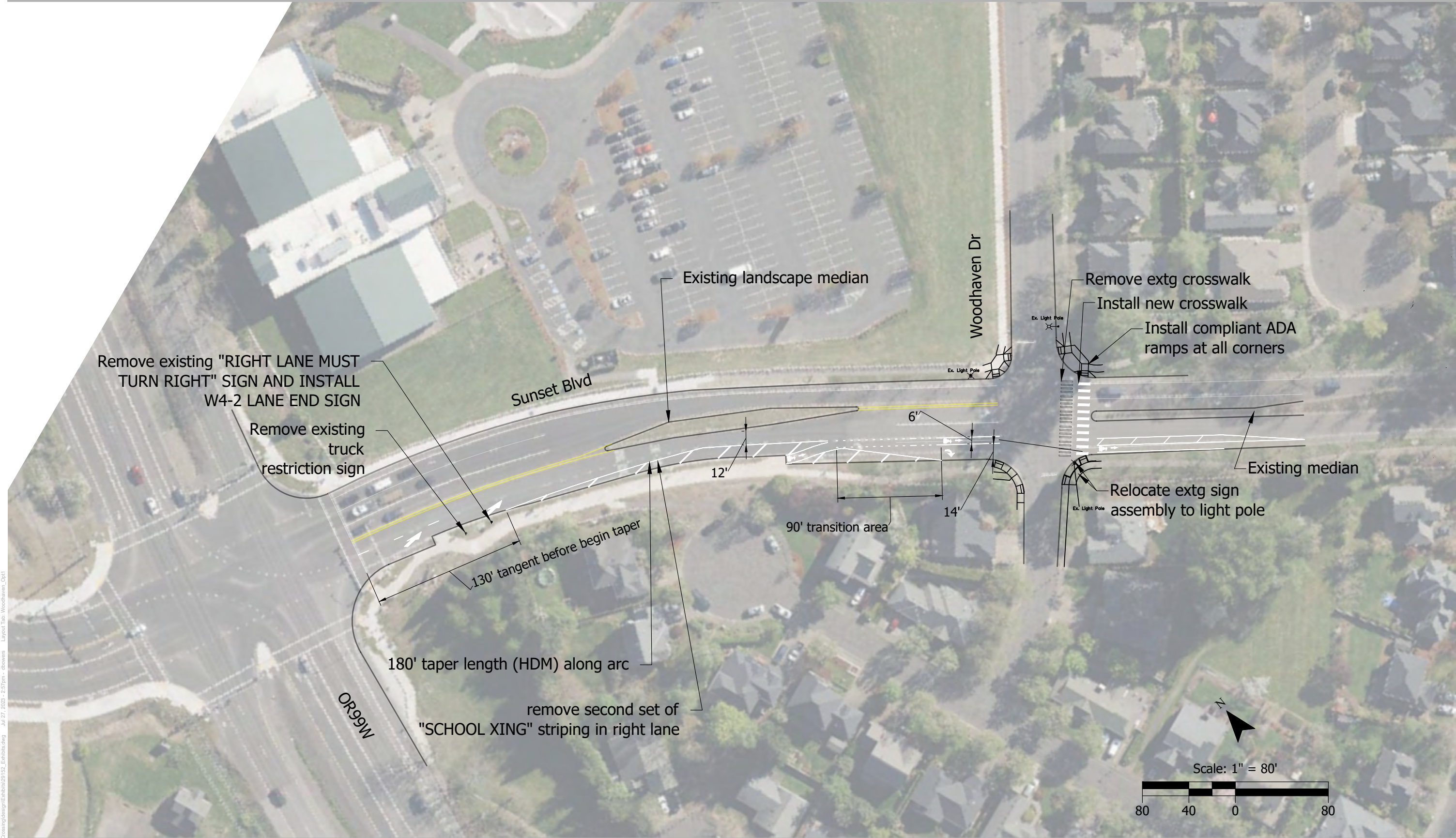
- Relocate the existing crosswalk to the east by approximately 15 feet to improve sight distance, reduce crossing distance, and increase stopping distance for eastbound vehicles in advance of marked crosswalk.
- Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: "Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line."
- Remove the eastbound right-turn trap lane by merging eastbound traffic into a single lane with pavement markings.
 - Exhibit 1 and Exhibit 2 show alternative configurations to address the removal of the eastbound right-turn trap lane: one with removal of the right turn lane and the other with maintaining a right turn lane.
- Primary benefits of intersection modifications:
 - Reduces risk of conflict between vehicles and pedestrians crossing Sunset Boulevard at east leg of intersection. Under existing conditions, people driving eastbound on Sunset Boulevard were observed looking over their shoulder and accelerating to merge, reducing sight distance, and increasing risk for vehicular and pedestrian conflicts.
- Estimated cost of improvements:
 - Exhibit 1: Dedicated Right Turn Lane – \$238,000
 - Exhibit 2: Shared Through-Right – \$208,000

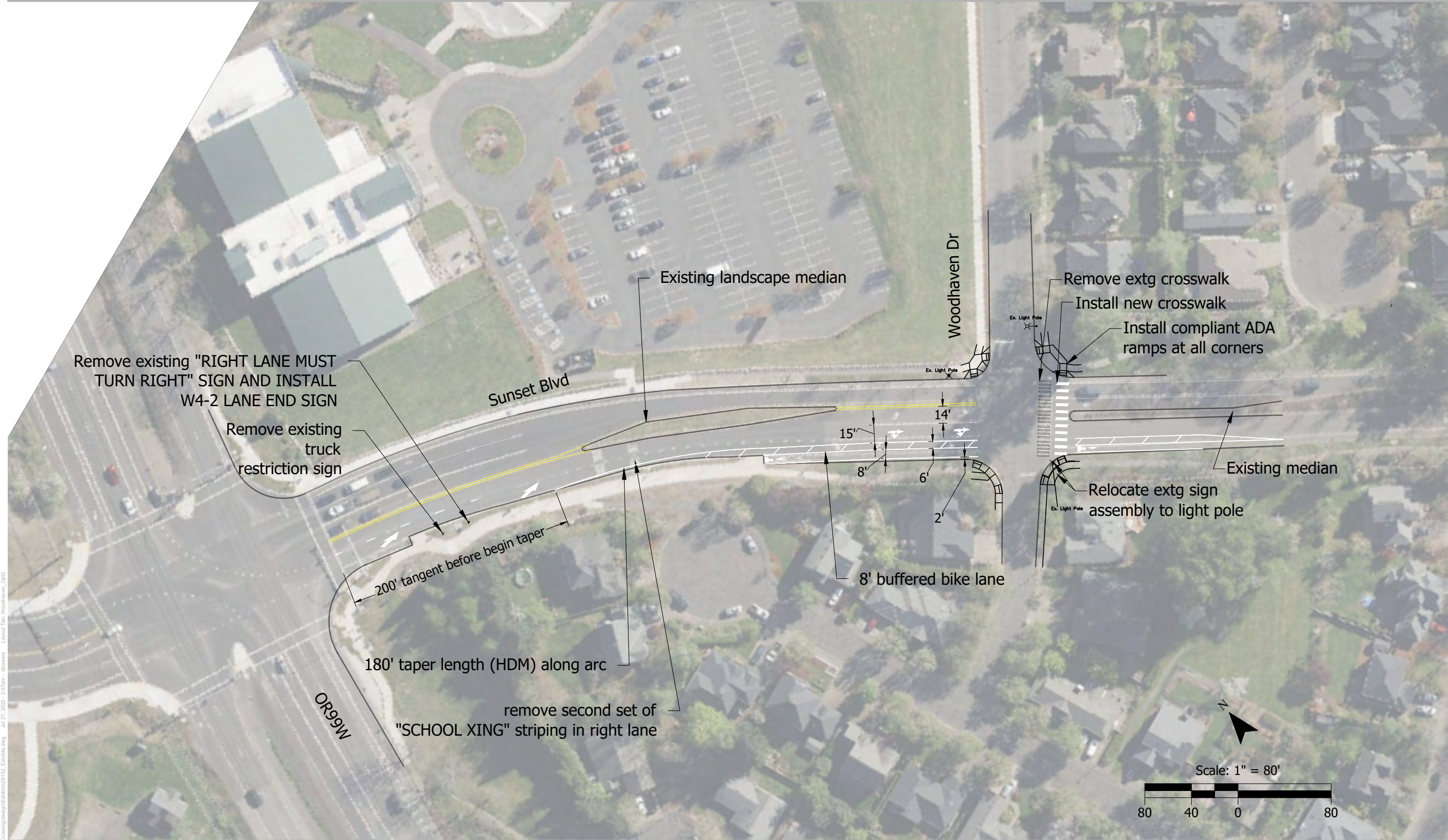
The safety countermeasures and recommended intersection modifications at the Sunset Boulevard/Woodhaven Drive intersection are the highest priority of the locations evaluated as part of the Study. The priority of improvements at this location is due to the high risk of potential conflicts, vehicular speeds, proximity to Middleton Elementary School, and volumes of pedestrian crossings¹.

¹ Additional justification on prioritization can be found on page 27 of this memo.

Exhibit 1: Sunset/Woodhaven - Dedicated Right Turn Lane

Preliminary Design Subject to Change
Date: 7/27/2023





Sunset Boulevard/Timbrel Lane

- Relocate the existing crosswalk to the west leg of the intersection to improve sight distance and reduce crossing distance.
- Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: "Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line."
- Exhibit 3, Exhibit 4, and Exhibit 5 illustrate alternative intersection configurations to increase pedestrian connectivity, reduce vehicular speeds, reduce risk for pedestrian and vehicular conflicts, and improve vehicular operations.
- Installing a Rectangular Rapid Flashing Beacon (RRFB) is a proven safety countermeasure to improve vehicle yielding compliance. Based on pedestrian volumes and connectivity to Middleton Elementary School, an RRFB should be considered.
- Estimated cost of improvements:
 - Exhibit 3: Relocate Crosswalk – \$147,000.
 - Exhibit 4: Remove Sidewalk, Widen Timbrel (install left and right-turn lanes) – \$345,000.
 - Exhibit 5: Roundabout Concept – \$3,426,000.

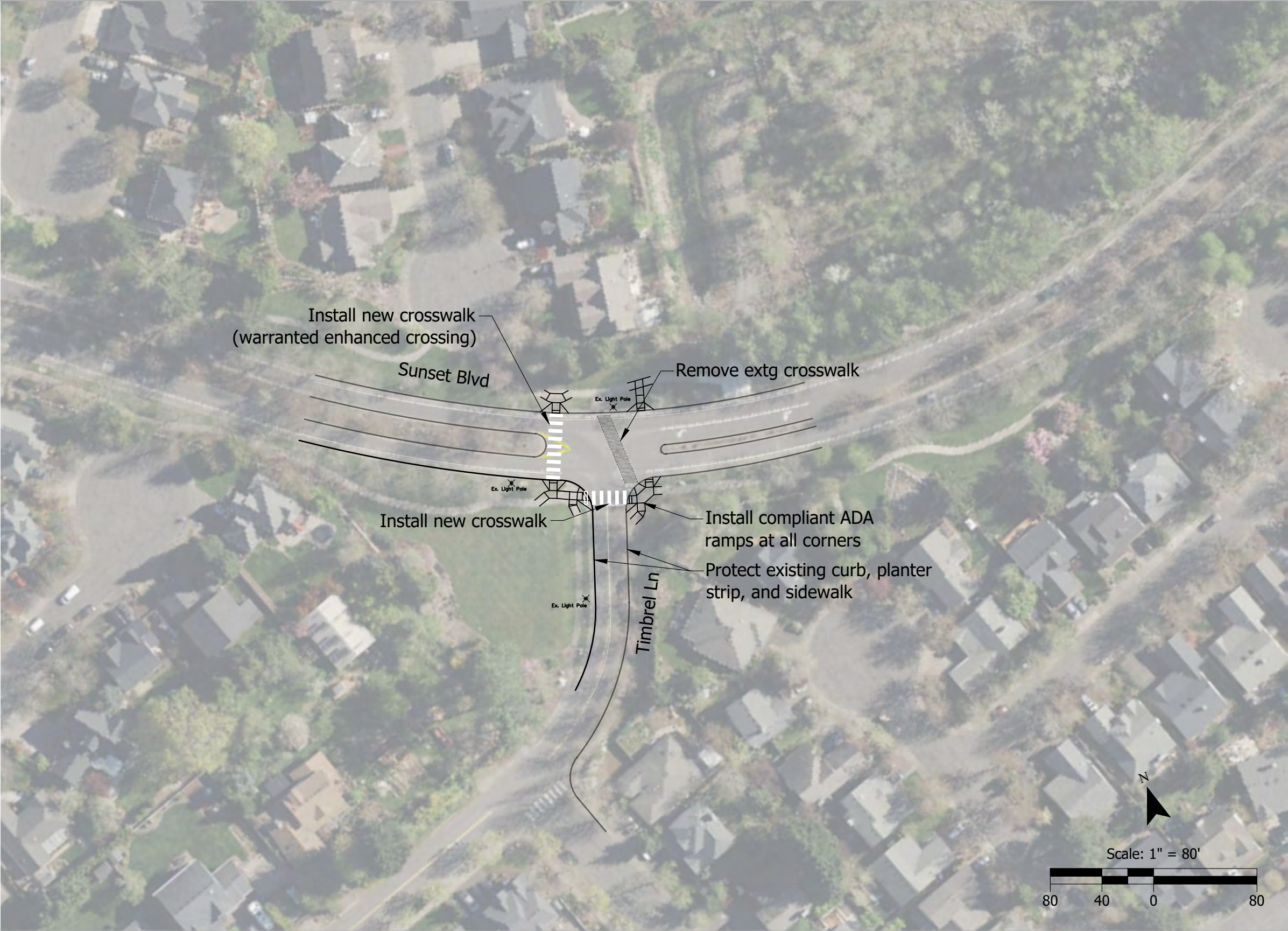
The safety countermeasures and recommended intersection modifications at the Sunset Boulevard/Timbrel Lane intersection are the second highest priority of the locations evaluated as part of the Study. The priority of improvements is due to high demand of pedestrian crossings with lower risk of pedestrian conflict due to existing roadway geometry and vehicular speeds².

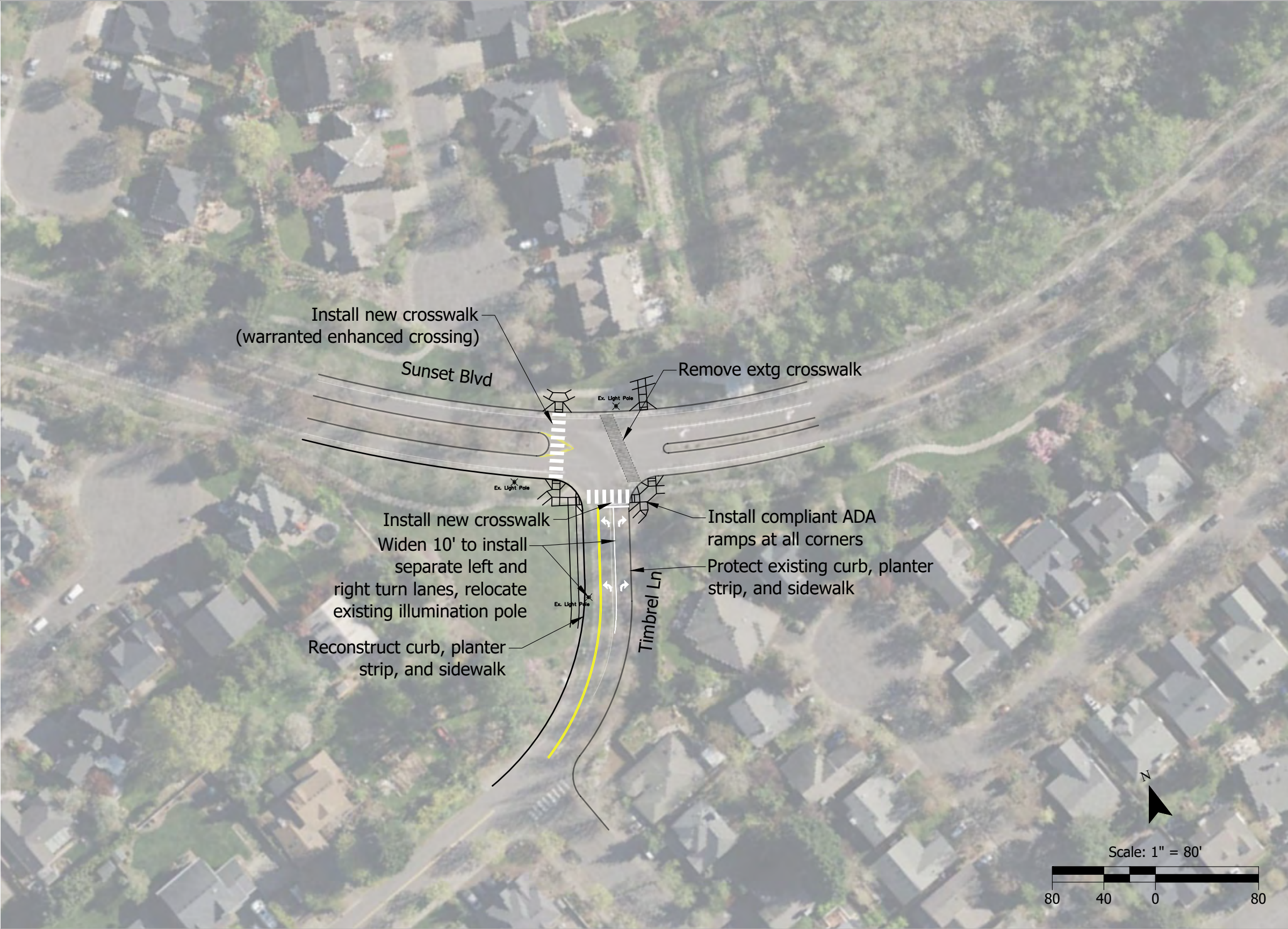
Sunset Boulevard/Heatherwood Lane

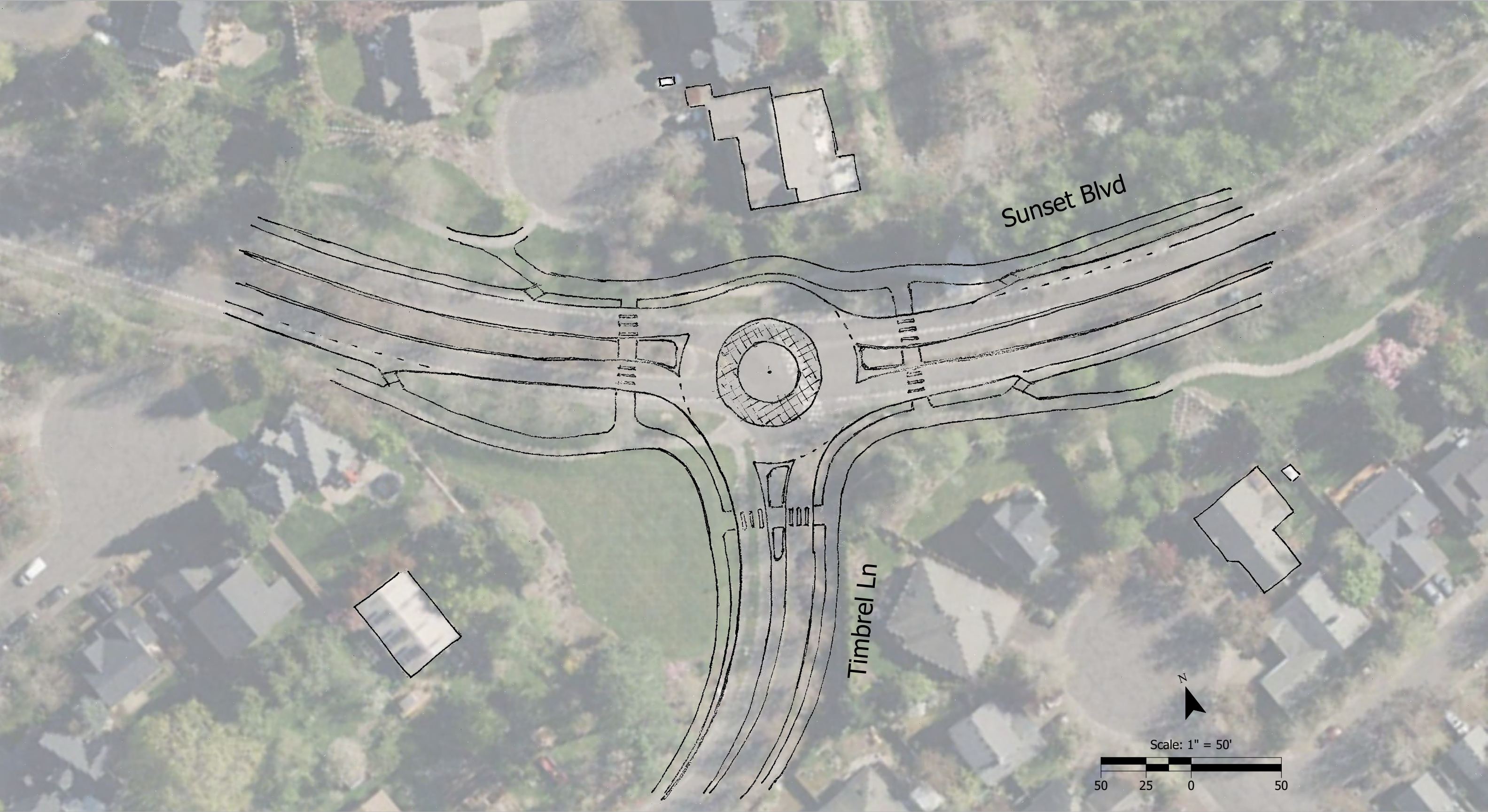
- Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: "Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line."
- Estimated cost of improvements:
 - Exhibit 6: New Marked Crosswalk – \$59,000.

The safety countermeasures and recommended intersection modifications at the Sunset Boulevard/Heatherwood Lane intersection are the lowest priority of the locations evaluated as part of the Study. The priority of improvements is due to low demand associated with lack of pedestrian volumes, limited connectivity, and resulting lower risk.

² Additional justification on prioritization can be found on page 26 of this memo.









Background

In fall 2023, the City will hire a general contractor to begin construction of a shared-use pedestrian bridge over SW Pacific Highway (OR 99) and SW Elwert Road to create a safe connection between the neighborhoods east of the highway and the Sherwood West expansion area and high school. Construction on the bridge will initially start on the north side of SW Sunset Blvd between the highway and SW Woodhaven Drive near the existing trash enclosure on the YMCA property, but unfortunately the pedestrian bridge project won't be completing any of the ADA ramp retrofits or crosswalk enhancements identified in the CIP plan at SW Woodhaven Drive & SW Sunset Blvd.

Study Area & Surrounding Context

The study area focuses on the Sunset Boulevard corridor between Woodhaven Drive and Pinehurst Drive. Particular focus is given to existing pedestrian connectivity, including pedestrian pathways and access points to the corridor as well as targeted study intersections including Sunset Boulevard/Woodhaven Drive (#1), Sunset Boulevard/Timbrel Lane (#2) and Sunset Boulevard/Heatherwood Lane (#3). Figure 1 illustrates the location of the study corridor, study intersections, pathways, and access points to the corridor.

Pedestrian Generators and Destinations

Adjacent land uses to the Sunset Boulevard corridor are primarily residential. The Sherwood Regional Family YMCA is located on the west end of the study area and Woodhaven City Park is located on the east end of the study area. Additional pedestrian destinations within the general vicinity of Sunset Boulevard include Middleton Elementary School (southwest) and Sherwood High School (northwest).

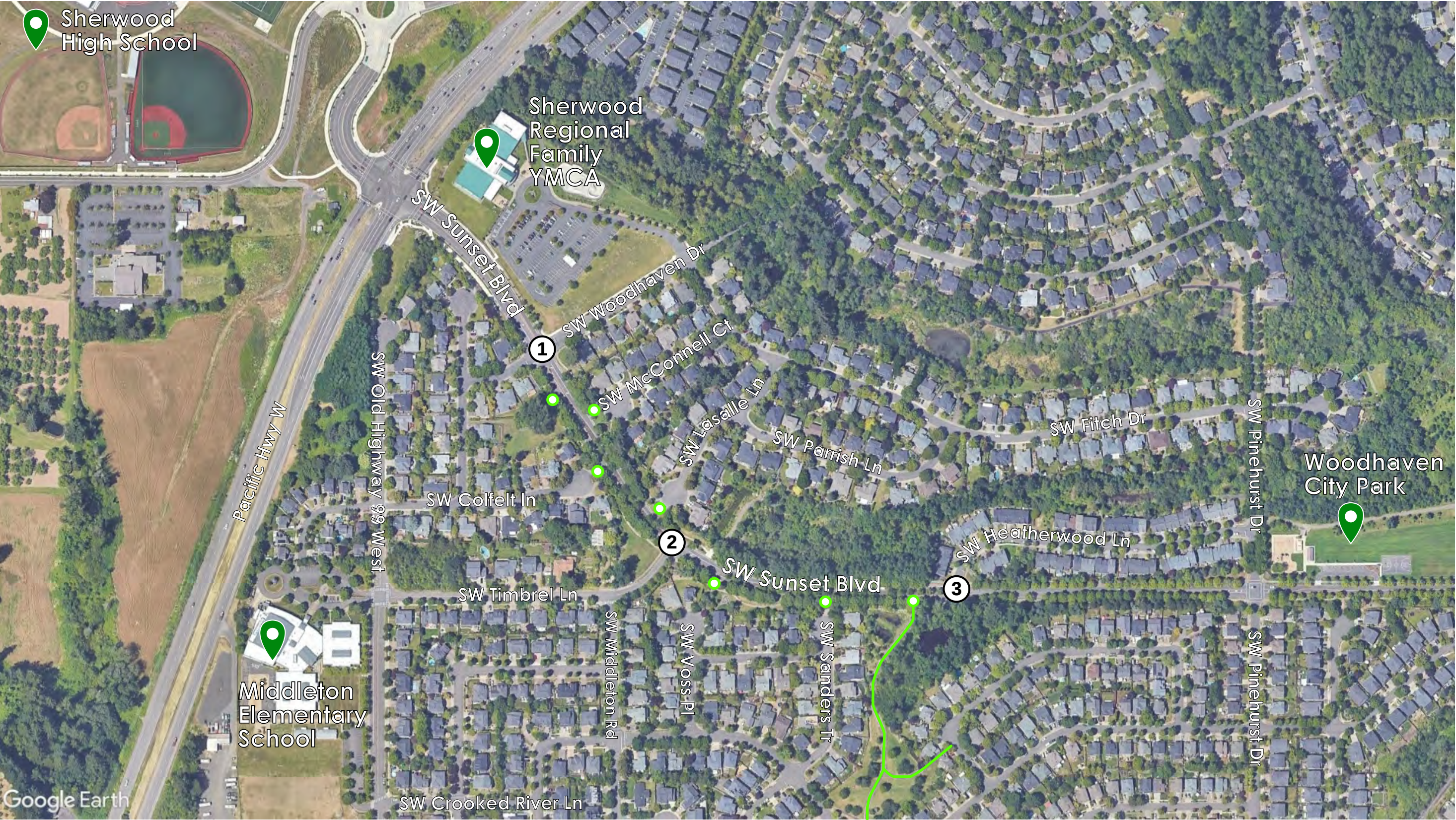
As shown in Figure 1, there are several pedestrian pathway connections from adjacent neighborhoods to the Sunset Boulevard corridor including a pedestrian pathway just east of Sanders Terrace.

Pedestrian Experience and Boulevard Treatments

Continuous sidewalks with wide landscape buffers are located on both sides of Sunset Boulevard. Mature trees providing shade and physical separation from the roadway increase the comfort and pedestrian experience for people walking. A landscaped median is located throughout the study area. In certain areas, the sidewalk deviates away from the road, increasing the level of separation and further contributing to the aesthetic and visual experience of the boulevard.



Sunset Boulevard Typical Section



Study Intersections Points of Interest Pedestrian Pathways Pedestrian Pathways Connection Points

Study Area
Sherwood, Oregon

Figure
1

Pedestrian Activity

Pedestrian counts were conducted at the study area intersections on June 7, 2023.

- Sunset Boulevard/Woodhaven Drive
- Sunset Boulevard/Timbrel Lane
- Sunset Boulevard/Heatherwood Lane

The counts include the total number of pedestrians that entered each intersection during the morning (7:00 – 9:00 AM) and evening (12:00 – 6:00 PM) peak periods.

Sunset Boulevard/Woodhaven Drive

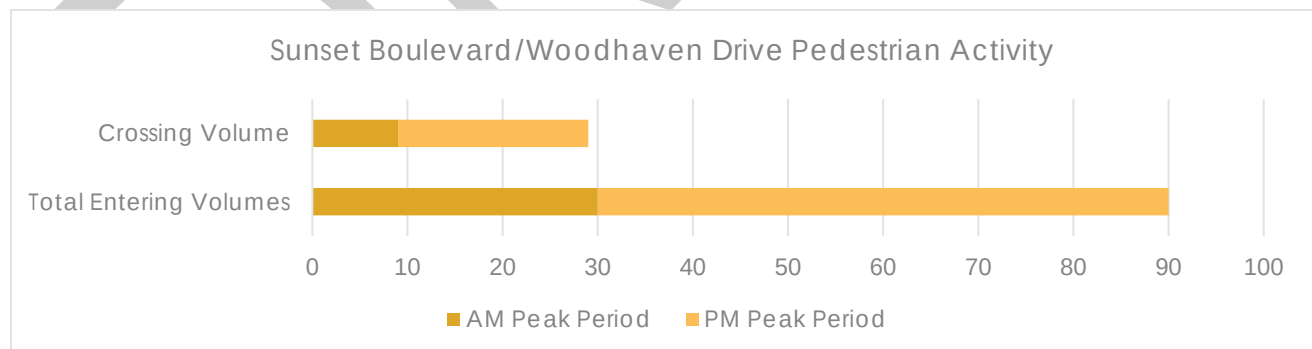
At the Sunset Boulevard/Woodhaven Drive intersection, a total of 90 pedestrians were recorded entering the intersection including 30 during the morning and 60 during the evening peak periods. The peak period of pedestrian activity occurred between 2:15 and 3:15 PM. During this time, 27 pedestrians entered the intersection.

Marked Crosswalks

A marked crosswalk is located on the east side of the intersection. Pavement markings for the crosswalk are continental style. The marked crosswalk is approximately 10 feet wide, and the crossing distance is approximately 69 feet.

Pedestrian Crossing Activity

A total of 29 pedestrians crossed Sunset Boulevard at Woodhaven Drive including 9 during the morning and 20 during the evening peak periods. The peak period of pedestrian crossings activity across Sunset Boulevard occurred between 12:25 and 1:25 PM when nine (9) pedestrians were recorded crossing Sunset Boulevard at Woodhaven Drive.



Sunset Boulevard/Timbrel Lane

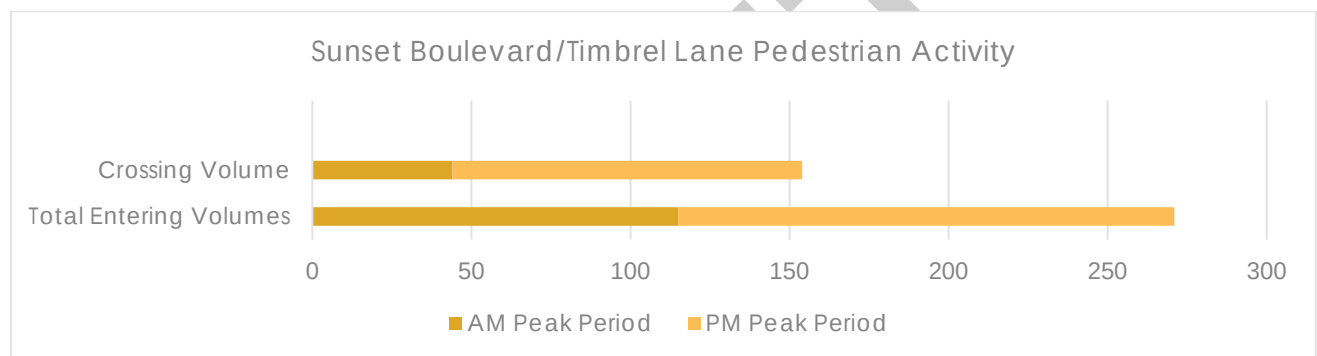
At the Sunset Boulevard/Timbrel Lane intersection, a total of 271 pedestrians were recorded entering the intersection including 115 during the morning and 156 during the evening peak periods. The peak period of pedestrian activity occurred between 12:35 and 1:35 PM. During this time, 80 pedestrians entered the intersection.

Marked Crosswalk

A marked crosswalk is located on the east side of the intersection. Pavement markings for the crosswalk are continental style. The marked crosswalk is approximately 10 feet wide, and the crossing distance is approximately 65 feet.

Pedestrian Crossing Activity

A total of 154 pedestrians crossed Sunset Boulevard at Timbrel Lane including 44 during the morning and 110 during the evening peak periods. The peak period of pedestrian crossings activity across Sunset Boulevard occurred between 12:35 and 1:35 PM when 76 pedestrians were recorded crossing Sunset Boulevard at Timbrel Lane.



Sunset Boulevard/Heatherwood Lane

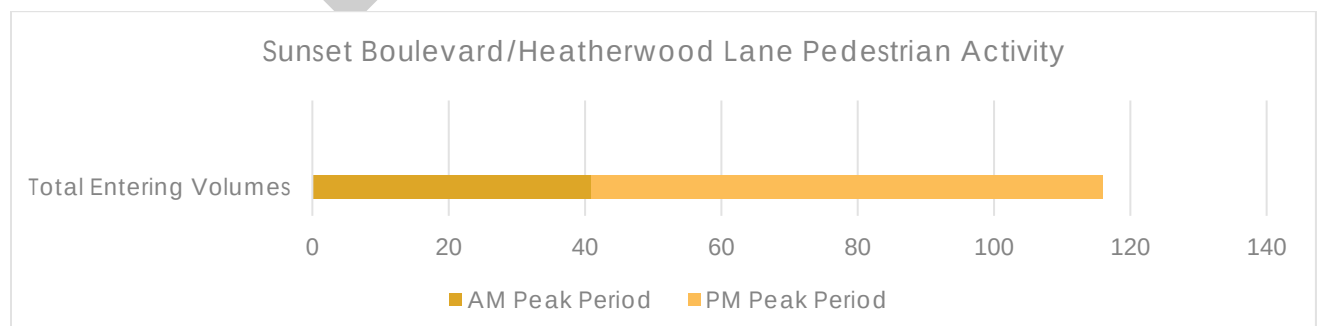
At the Sunset Boulevard/Heatherwood Lane intersection, a total of 116 pedestrians were recorded entering the intersection including 41 during the morning and 75 during the evening peak periods. The peak period of pedestrian activity occurred between 3:30 and 4:30 PM. During this time, 22 pedestrians entered the intersection.

Marked Crosswalk

No marked crosswalks are located at the Sunset Boulevard/Heatherwood Lane intersection.

Pedestrian Crossing Activity

No pedestrians were recorded crossing Sunset Boulevard at Heatherwood Lane during the morning or evening peak periods.



Sunset Boulevard Characteristics

Jurisdiction

Jurisdiction for Sunset Boulevard is held by the City of Sherwood. The City of Sherwood owns, operates, and maintains Sunset Boulevard.

Functional Classification

Sunset Boulevard is classified an arterial based on the Sherwood Transportation System Plan (TSP) functional classification. Arterials typically serve to interconnect and support the principal arterial highway system. Additionally, these roads link major commercial, residential, industrial, and institutional areas. Sunset Boulevard connects OR99W to the residential and institutional uses immediately adjacent to the corridor as well as the commercial downtown area through the intersection with Main Street.

Cross Section

Sunset Boulevard has a three-lane cross section with dedicated turn lanes at certain intersections. East of Woodhaven Drive, the two lanes of through traffic are separated by a raised median with vegetation and mature trees measuring approximately 16 feet wide. Based on project team field observations, lane widths measure approximately 12 feet throughout the study area. The exception is the eastbound left turn lane on Sunset Boulevard at Woodhaven Drive, which measures 15 feet wide.

A bicycle lane measuring 6 feet is provided along the majority of the corridor on both sides. West of Woodhaven Drive, a shared use path is provided for people biking on the south side of the road which ramps down to begin the bike lane at the intersection with Woodhaven Drive. Buffered sidewalks measuring 6 feet wide are provided on both sides of the street. The existing cross section of Sunset Boulevard meets the street design characteristics outlined in the Sherwood Transportation System Plan (TSP).

Traffic Control and Signage

There are three intersections along Sunset Boulevard within the study area.

- Sunset Boulevard/Woodhaven Drive
- Sunset Boulevard/Timbrel Lane
- Sunset Boulevard/Heatherwood Lane

Sunset Boulevard/Woodhaven Drive

Sunset Boulevard and Woodhaven Drive is a four-legged intersection that is controlled by a two-way stop. Sunset Boulevard runs free through the intersection. There are existing pedestrian crossing signs on both sides of the street at the east leg of the intersection where the continental marked crossing is located. The pedestrian crossing sign facing eastbound traffic is set back from the roadway and obstructed by trees in the existing condition. The lane configuration for Sunset Boulevard includes a dedicated left turn lane in both directions and a dedicated right turn lane in the eastbound direction in addition to one through lane in both directions.

Sunset Boulevard/Timbrel Lane

Sunset Boulevard and Timbrel Lane is a three-legged intersection that is controlled by a two-way stop. Sunset Boulevard runs free through the intersection. Timbrel Lane is a collector that provides direct access to Middleton Elementary School. There are existing pedestrian crossing signs on both sides of the street at the east leg of the intersection where the continental marked crossing is located. Sunset Boulevard includes a left turn lane for westbound traffic turning onto Timbrel Lane.

Sunset Boulevard/Heatherwood Lane

Sunset Boulevard and Heatherwood Lane is a three-legged intersection that is controlled by a two-way stop. Sunset Boulevard runs free through the intersection. The existing raised median at the intersection restricts turning movements to right-in right-out from westbound Sunset Boulevard into Heatherwood Lane.

Traffic Volumes

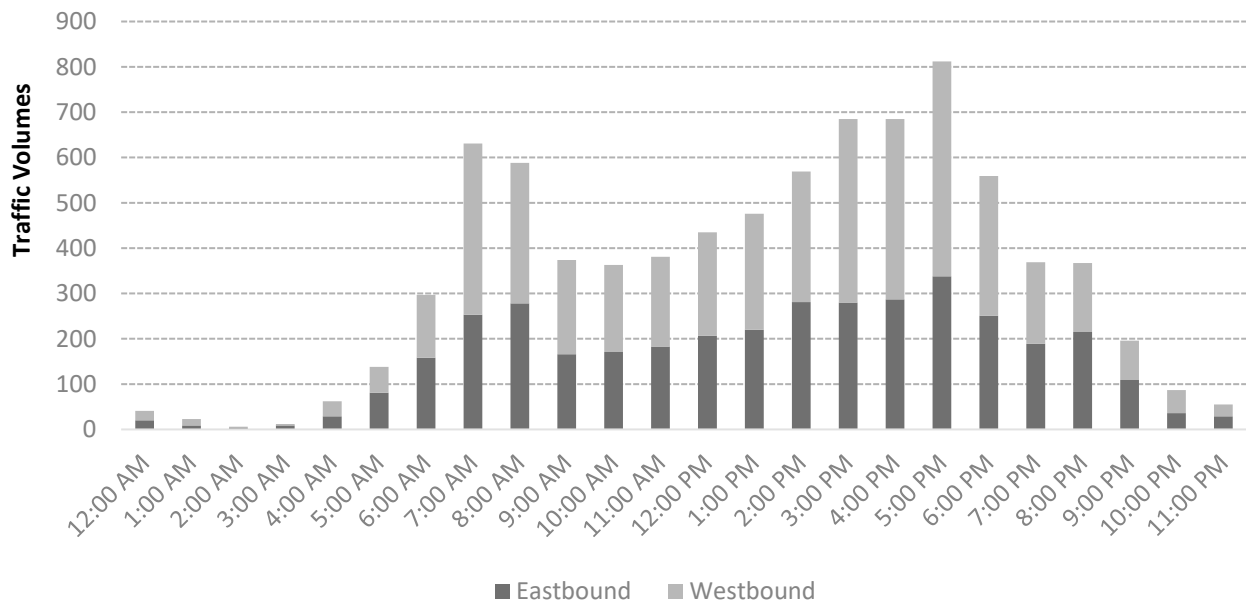
24-hour traffic volumes were collected by Quality Counts (QC) LLC over a 24-hour period on June 7, 2023, at two locations along the study area corridor.

- Sunset Boulevard between Timbrel Lane & Heatherwood Lane
- Sunset Boulevard between Heatherwood Lane & Pinehurst Drive

Sunset Boulevard (Between Timbrel Lane & Heatherwood Lane)

Based on the data, a total of 8,211 vehicles were observed traveling along Sunset Boulevard over the 24-hour period, including 3,802 vehicles in the eastbound direction and 4,409 vehicles in the westbound direction. Chart 1 displays the average weekday hourly traffic volumes on Sunset Boulevard between Timbrel Lane and Heatherwood Lane over the 24-hour period.

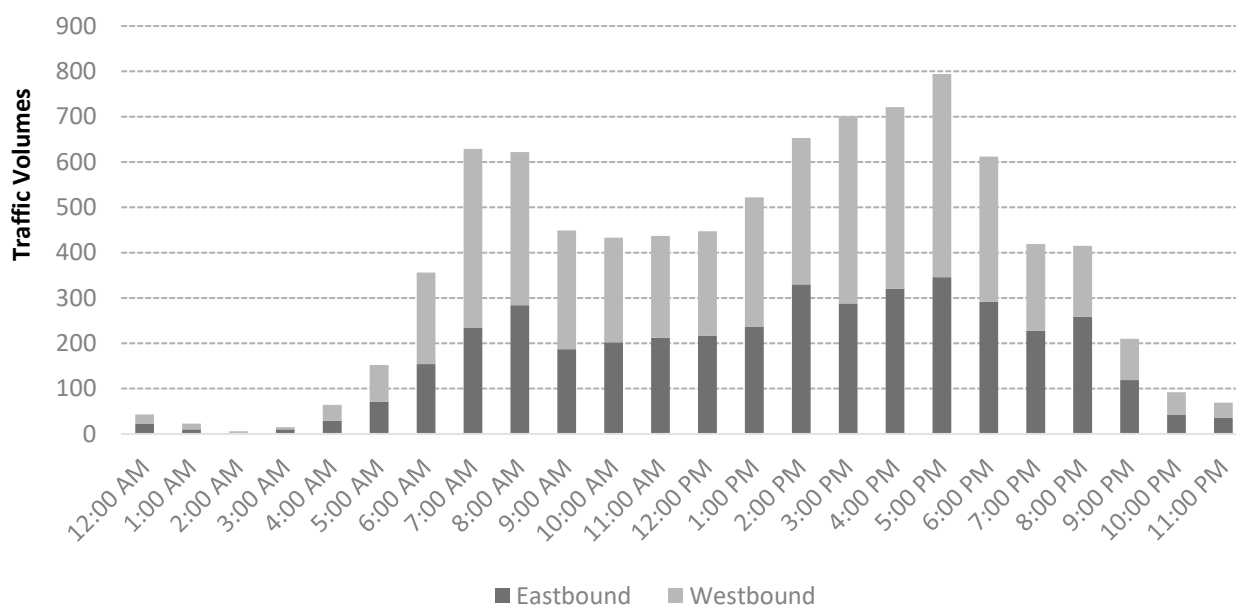
Chart 1: Average Weekday Hourly Traffic Volumes (Sunset Blvd between Timbrel Ln & Heatherwood Ln)



Sunset Boulevard (Between Heatherwood Lane & Pinehurst Lane)

Based on the data, a total of 8,884 vehicles were recorded traveling along Sunset Boulevard over the 24-hour period, including 4,131 vehicles in the eastbound direction and 4,753 vehicles in the westbound direction. Chart 2 displays the average weekday hourly traffic volumes on Sunset Boulevard between Heatherwood Lane and Pinehurst Drive over the 24-hour period.

Chart 2: Average Weekday Hourly Traffic Volumes (Sunset Blvd between Heatherwood Ln & Pinehurst Dr)



As shown in Exhibit 1 and Exhibit 2, Sunset Boulevard exhibited a distinct peak hour occurring at 5:00 PM. As described below, the PM Peak hour volumes are used to determine the appropriate level of crosswalk protection within the study area. *Traffic volume data is provided in Attachment "A".*

Travel Speeds

Sunset Boulevard has a posted speed limit of 35 miles per hour (MPH) within the study area. Speed data was obtained from tube counts at two locations described above.

Sunset Boulevard (Between Timbrel Lane & Heatherwood Lane)

At Sunset Boulevard between Timbrel Lane and Heatherwood Lane, the 85th percentile speed was found to be 31 MPH.

Sunset Boulevard (Between Heatherwood Lane & Pinehurst Lane)

At Sunset Boulevard between Heatherwood Lane and Pinehurst Drive, the 85th percentile speed was found to be 37 MPH. As described below, the 85th percentile speeds are used to determine the appropriate level of crosswalk protection within the study area. *Travel speed data is provided in Attachment "B".*

Other Roadway Considerations

Illumination

Existing ornamental streetlight fixtures line the Sunset Boulevard corridor. According to IES RP8-18 (Practice for Design and Maintenance of Roadway and Parking Facility Lighting), luminaires should be placed in advance of the crosswalk barring any constraints. At the intersection of Sunset and Woodhaven, the existing light fixture is instead placed downstream (east) of the crossing. Luminaires placed in this location relative to the crosswalk will backlight pedestrians, making them appear as dark silhouettes which are harder to react to as drivers.

Topography

The study area varies topographically along Sunset Boulevard. On Sunset Boulevard, the longitudinal grade reaches a maximum of approximately 4% in both eastbound and westbound directions. The side streets of Woodhaven Drive and Timbrel Lane have grades in excess of 5% downhill approaching the Sunset. These grades were considered when calculating required stopping sight distance.

Vegetation

Mature trees providing shade and physical separation from the roadway increase the comfort and pedestrian experience for people walking. However, the proximity of the trees to intersections at several locations limits the stopping sight distance (SSD) and visibility for pedestrians to be seen when waiting to cross the roadway.

The following section describes the sight distance calculations and obstructions in further detail.

Sight Distance

The required stopping sight distance on Sunset Boulevard was calculated at each existing marked crossing and compared to the field observed stopping sight distance (SSD). The required sight distance was calculated using *A Policy on Geometric Design of Highways and Streets, 6th Edition* published by the American Association of State Highway and Transportation Officials (AASHTO) in 2018 (commonly referred to as the *Green Book*). This reference provides methodology to calculate recommended sight distances as measured from a height of 3.5 feet at the center of the travel lane, based on the speed of the roadway. Table 1 summarizes the SSD requirements for each study intersection by direction.

Table 1: Sight Distance Review

Location	Direction of Travel	Existing Grade	Required Sight Distance (ft)	Existing Meets Required
Sunset Boulevard/ Woodhaven Drive	Eastbound	-4%	261	Yes
	Westbound	4%	234	No
Sunset Boulevard/ Timbrel Lane	Eastbound	-4%	261	Yes
	Westbound	1%	243	No
Sunset Boulevard/ Heatherwood Lane	Eastbound	-3%	257	N/A*
	Westbound	1%	249	N/A*

* No existing marked crossing at this location

As shown above, the required SSD is not met in the westbound direction at the Sunset Boulevard /Woodhaven Drive and Sunset Boulevard/Timbrel Lane intersections due to tree/vegetation obstruction.

The pictures below show the driver's viewpoint of a pedestrian waiting to cross at the existing marked crosswalk. Both locations involve existing trees as obstructions. The Woodhaven Drive intersection involves a sign mounted on a light pole as an additional obstruction. The Timbrel Lane intersection has a geometric horizontal curve on Sunset Boulevard which decreases the driver's sight lines on this approach.



Woodhaven Dr Westbound Sight Distance



Timbrel Lane Westbound Sight Distance

Crash Data Review

Crash data for the five most recent years of reported crashes (2015-2020) in the study area was obtained from ODOT's website. No crashes were reported at the Sunset Boulevard/Heatherwood Lane intersection. Eight (8) total crashes occurred within the study area during the five most recent years of reported crashes. Table 2 summarizes the reported crashes.

Table 2: Five Most Recent Years of Reported Crashes

Location	Crash Type			Severity		Total
	Angle	Fix	Rear	PDO	Injury	
Sunset Blvd/Woodhaven Dr	1	1	1	3	0	3
Sunset Blvd / Timbrel Lane	1	0	2	2	1	3
Sunset Blvd Segment	0	2	0	0	2	2

Of the three (3) total injury crashes, one occurred at the Sunset Boulevard/Timbrel Lane intersection, and two occurred along Sunset Boulevard away from intersections. No crashes involving pedestrians were reported during the five most recent years of reported crashes ending in 2020.

The intersection injury crash occurred when a driver turning left onto Sunset Boulevard from Timbrel Lane failed to yield the right of way to a vehicle traveling eastbound through the intersection on Sunset Boulevard. The driver who failed to yield the right of way was injured.

The two segment injury crashes involved vehicles striking fixed objects after exiting the road. The cause for both crashes was noted as improper driving or inattention.

Existing Transit Service

Transit service is not provided within the study area along Sunset Boulevard. Adjacent to the study area, Yamhill County Transit provides service in both directions along OR99W. The Sherwood TSP identifies Sunset Boulevard as a corridor with "potential local enhancements" for transit to be further evaluated in future planning studies.

Planned and Pending Transportation Facilities

Figure 12 of the Sherwood TSP identifies pedestrian projects that match the Plan's goals. Within the Sunset Boulevard corridor study area, the TSP identifies an aspirational project at the intersection of the pedestrian trail connection and Sunset Boulevard. The addition of this project to the TSP, though not identified as fundable, indicates a need for crossing improvements in the study area.

As described as part of the background, a shared-use pedestrian bridge is planned to cross OR 99W at Sunset Boulevard in the Sherwood Capital Improvement Plan (CIP). This project is currently planned to begin construction in Fall 2023 to create a safe connection between the neighborhoods east of the highway and the Sherwood West expansion area and high school. This project is planned to be on the north side of the OR 99W/Sunset Boulevard intersection and will emphasize the need for safe crossings of Sunset Boulevard to access the new pedestrian bridge.

Crosswalk Assessment

National Guidance and Methodologies for Analysis

Two national guidance documents and methodologies for analysis were used to understand the appropriate safety countermeasures for study area intersections to improve pedestrian safety:

- FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
- NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings

FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

The FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* (Reference 4) was produced as part of the Safe Transportation for Every Pedestrian (STEP) program and provides guidance on selecting appropriate countermeasures to help improve pedestrian safety at uncontrolled crossing locations. Table 1 of the *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* provides a matrix of countermeasure options for evaluating appropriate levels of crosswalk protection based on roadway configurations, posted speed limit, and average annual daily traffic (AADT). Exhibit 7 illustrates the countermeasure matrix and highlights the applicable matrix cell based on the roadway configuration, posted speed limit, and AADT within the study area.

Exhibit 7: Application of Pedestrian Crash Countermeasures by Roadway Feature

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	① 2 4 5 6	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9
3 lanes with raised median (1 lane in each direction)	① 2 3 4 5	① 3 5 7 9	① 3 5 7 9	① 3 4 5 7 9	① 3 5 7 9	① 3 5 7 9	① 3 4 5 7 9	① 3 5 7 9	① 3 5 7 9
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	① 2 3 4 5 6 7 9	① 3 5 6 7 9	① 3 5 6 7 9	① 3 4 5 6 7 9	① 3 5 6 7 9	① 3 5 6 7 9	① 3 4 5 6 7 9	① 3 5 6 7 9	① 3 5 6 7 9
4+ lanes with raised median (2 or more lanes in each direction)	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9	① 3 5 7 8 9
4+ lanes w/o raised median (2 or more lanes in each direction)	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9	① 3 5 6 7 8 9
Given the set of conditions in a cell, # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location. ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location. ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.* The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.					1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs 2 Raised crosswalk 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line 4 In-Street Pedestrian Crossing sign 5 Curb extension 6 Pedestrian refuge island 7 Rectangular Rapid-Flashing Beacon (RRFB)** 8 Road Diet 9 Pedestrian Hybrid Beacon (PHB)**				

NCHRP Report 562 Improving Pedestrian Safety at Unsignalized Crossings

The NCHRP Report 562 *Improving Pedestrian Safety at Unsignalized Crossings* provides a methodology for evaluating appropriate levels of crosswalk protection that considers traffic, travel speed, pedestrian crossing volumes as well as a number of other factors. Kittelson applied the NCHRP Report 562 method to the potential enhanced crossings at the study area intersections based on traffic and pedestrian data collection.

Sunset Boulevard/Woodhaven Drive

Based on vehicle volumes, speeds, and number of lanes crossed, Exhibit 8 shows the appropriate FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* safety countermeasures for consideration at the Sunset Boulevard/Woodhaven Drive intersection.

Exhibit 8: FHWA Pedestrian Crash Countermeasures: Sunset Boulevard/Woodhaven Drive

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	1 2 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	4 5 6	5 6	5 6	4 5 6	5 6	5 6	4 5 6	5 6	5 6
	7 9	7 9	9	7 9	7 9	9	7 9	9	9
Given the set of conditions in a cell, # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location. ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location. ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.* The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.									
1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs 2 Raised crosswalk 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line 4 In-Street Pedestrian Crossing sign 5 Curb extension 6 Pedestrian refuge island 7 Rectangular Rapid-Flashing Beacon (RRFB)** 8 Road Diet 9 Pedestrian Hybrid Beacon (PHB)**									

As shown in Exhibit 8, the appropriate countermeasures that should always be considered are:

- **High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs**
- **Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line**

Additional candidate treatments include:

- Curb extension
- Pedestrian refuge island
- Rectangular Rapid-Flashing Beacon (RRFB)
- Pedestrian Hybrid Beacon (PHB)

Table 3 summarizes the attributes used to complete the NCHRP Report 562 analysis at the Sunset Boulevard/Woodhaven Drive intersection during the pedestrian peak hour.

Table 3: Sunset Boulevard/Woodhaven Drive: NCHRP Report 562

Location	Pedestrian Evening Peak Period		
	Traffic Volume	Travel Speed	Pedestrian Crossings
Sunset Blvd / Woodhaven Dr	529	37	9

The NCHRP Report 562 worksheets used to conduct the analysis are included in Attachment "C".

Sunset Boulevard/Timbrel Lane

Based on the vehicle volumes, speeds, and number of lanes crossed, Exhibit 9 shows the appropriate FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* safety countermeasures for consideration at the Sunset Boulevard/Timbrel Lane intersection.

Exhibit 9: FHWA Pedestrian Crash Countermeasures: Sunset Boulevard/Timbrel Lane

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	① 2 3 4 5 6 7 9	① 3 5 6 7 9	① 3 5 6 9	① 3 4 5 6 7 9	① 3 5 6 7 9	① 3 5 6 9	① 3 4 5 6 7 9	① 3 5 6 9	① 3 5 6 9
Given the set of conditions in a cell, # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location. ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location. ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.* The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.									
1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs 2 Raised crosswalk 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line 4 In-Street Pedestrian Crossing sign 5 Curb extension 6 Pedestrian refuge island 7 Rectangular Rapid-Flashing Beacon (RRFB)** 8 Road Diet 9 Pedestrian Hybrid Beacon (PHB)**									

As shown in Exhibit 9, based on the roadway context at the Sunset Boulevard/Timbrel Lane intersection, the appropriate countermeasures that should always be considered are:

- **High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs**
- **Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line**

Additional candidate treatments include:

- Curb extension
- Pedestrian refuge island
- Rectangular Rapid-Flashing Beacon (RRFB)
- Pedestrian Hybrid Beacon (PHB)

Table 4 summarizes the attributes used to complete the NCHRP Report 562 analysis at the Sunset Boulevard/Timbrel Lane intersection during the pedestrian peak hour.

Table 4: Sunset Boulevard/Timbrel Lane Drive: NCHRP Report 562

Location	Pedestrian Evening Peak Period		
	Traffic Volume	Travel Speed	Pedestrian Crossings
Sunset Blvd/ Timbrel Ln	508	37	76

The NCHRP Report 562 worksheets used to conduct the analysis are included in Attachment "C".

Sunset Boulevard/Heatherwood Lane

Based on the vehicle volumes, speeds, and number of lanes crossed, Exhibit 10 shows the appropriate FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* safety countermeasures for consideration at the Sunset Boulevard/Heatherwood Lane intersection.

Exhibit 10: FHWA Pedestrian Crash Countermeasures: Sunset Boulevard/Heatherwood Lane

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	① 2 4 5 6	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9	① 4 5 6 7 9	① 5 6 7 9	① 5 6 7 9
Given the set of conditions in a cell, # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location. ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location. ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.* The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.				1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs 2 Raised crosswalk 3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line 4 In-Street Pedestrian Crossing sign 5 Curb extension 6 Pedestrian refuge island 7 Rectangular Rapid-Flashing Beacon (RRFB)** 8 Road Diet 9 Pedestrian Hybrid Beacon (PHB)**					

As shown in Exhibit 10, based on the roadway context at the Sunset Boulevard/Heatherwood Lane intersection, the appropriate countermeasures that should always be considered are:

- **High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs**

Additional candidate treatments include:

- Curb extension
- Pedestrian refuge island
- Rectangular Rapid-Flashing Beacon (RRFB)
- Pedestrian Hybrid Beacon (PHB)

Table 5 summarizes the attributes used to complete the NCHRP Report 562 analysis at the Sunset Boulevard/Heatherwood Lane intersection during the pedestrian peak hour.

Table 5: Sunset Boulevard/Heatherwood Lane Drive: NCHRP Report 562

Location	Pedestrian Evening Peak Period		
	Traffic Volume	Travel Speed	Pedestrian Crossings
Sunset Blvd/ Heatherwood Ln	735	35	0

The NCHRP Report 562 worksheets used to conduct the analysis are included in Attachment "C".

Potential Crossing Countermeasures

Sunset Boulevard/Woodhaven Drive

Recommended Safety Countermeasures

Based on the guidance provided by the FHWA, NCHRP Report 562 analysis, and field observations, the following safety countermeasures should be considered to improve pedestrian safety on Sunset Boulevard.

- Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: "Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line."
- Install Rectangular Rapid Flashing Beacon (RRFB)

Installing a Rectangular Rapid Flashing Beacon (RRFB) is a proven safety countermeasure to improve vehicle yielding compliance. Based on pedestrian volumes and connectivity to Sherwood Regional Family YMCA, an RRFB should be considered.

Recommendations Based on Field Observations

- The existing marked crosswalk is recommended to be relocated approximately 15 feet east to improve vehicular westbound SSD and reduce crossing distance. With the relocation of the marked crosswalk, the existing light fixture at the southwest corner of the intersection should be relocated upstream of the proposed crossing.
- People driving eastbound on Sunset Boulevard in the right-turn trap lane are caught off guard forcing them to accelerate and merge while looking over their left-shoulder in advance of the existing marked crosswalk. This creates a high-risk scenario limiting the visibility of people driving and people crossing Sunset Boulevard at the marked crosswalk. Removing the right-turn trap lane is recommended and can be achieved by creating a merge upstream of the intersection.
- Advance warning signage is provided; however, based on field observations, signage is obstructed in the eastbound direction by vegetation. As a result, signage is recommended to be relocated to improve visibility.
- Curb extensions are not recommended due to encroachment into the existing on-street bike lanes. A pedestrian refuge island is also not recommended due to physical space limitation and interest in preserving the left-turn lanes.

Sunset Boulevard/Timbrel Lane

Recommended Facility Treatments

Based on the guidance provided by the FHWA as well as the results of the NCHRP Report 562 analysis, the following safety countermeasures should be considered to improve pedestrian safety.

- Install high-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs: "Advance Yield Here To (Stop Here For) Pedestrian sign and yield (stop) line."
- Install Rectangular Rapid Flashing Beacon (RRFB)

Installing a Rectangular Rapid Flashing Beacon (RRFB) is a proven safety countermeasure to improve vehicle yielding compliance. Based on pedestrian volumes and connectivity to Middleton Elementary School, an RRFB should be considered.

Recommendations Based on Field Observations

- The existing marked crosswalk is recommended to shift from the east leg to the west left of the intersection to improve westbound SSD and reduce the pedestrian crossing distance. With the relocation of the marked crosswalk, the existing median can serve as a refuge for people crossing the road.
- Curb extensions are not recommended due to encroachment into the existing on-street bike lanes.

Sunset Boulevard/Heatherwood Lane

Recommended Facility Treatments

Based on the guidance provided by the FHWA as well as the results of the NCHRP Report 562 analysis, the following safety countermeasures should be considered to improve pedestrian safety.

- High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs

The appropriate countermeasures and candidate treatments based on the FHWA analysis are outlined in the above section. Based on the NCHRP Report 562, raised median islands, curb extensions, and traffic calming should be considered on top of adding a marked crosswalk.

Recommendations Based on Field Observations

- A new marked crosswalk west of the intersection is recommended to increase pedestrian connectivity and provide access to the existing pedestrian pathway on the southside of Sunset Boulevard (approximately 115 feet west of the intersection). The location matches what was identified in the TSP as an aspirational project.
- Curb extensions are not recommended due to encroachment into the existing on-street bike lanes.

Prioritized Improvements

The identified safety countermeasures and intersection improvements increase the comfort and experience of people walking along and across Sunset Boulevard. Recognizing the reality of funding limitations, the consultant team recommends the following sequence of safety countermeasures and intersection improvements.

Sunset Boulevard/Woodhaven Drive – Priority #1

Sunset Boulevard/Woodhaven Drive is identified as the #1 priority location for safety countermeasures and intersection improvements. Based on field observations and traffic data collection, this intersection is the highest risk location of the study area intersections. As described previously, People driving eastbound on Sunset Boulevard in the right-turn trap lane are caught off guard forcing them to accelerate and merge while looking over their left-shoulder in advance of the existing marked crosswalk. This creates a high-risk scenario limiting the visibility of people driving and people crossing Sunset Boulevard at the marked crosswalk. Removing the right-turn trap lane is recommended and can be achieved by creating a merge upstream of the intersection. The proposed intersection improvement will help mitigate this issue through the removal of the right-turn trap lane.

Sunset Boulevard/Timbrel Lane - Priority #2

Sunset Boulevard/Timbrel Lane is identified as the #2 priority location for safety countermeasures and intersection improvements. Based on field observations and traffic data collection, the intersection has the highest volume of pedestrian crossings and is a key connection across Sunset Boulevard for students and people traveling to and from Middleton Elementary School. The proposed improvement will increase comfort for pedestrians crossing.

Sunset Boulevard/Heatherwood Lane - Priority #3

Sunset Boulevard/Heatherwood Lane is identified as the #3 priority location for safety countermeasures and intersection improvements. The need for a pedestrian crossing at this location is identified in the City's TSP and could increase access to the pedestrian pathway network south of Sunset Boulevard west of the intersection. Today, the intersection is a relatively low-risk location due to no pedestrian crossing facility and limited pedestrian crossing volumes.

Conceptual Design

The recommended improvements noted above are shown in Exhibit 1 to Exhibit 6. The RRFBs at Sunset Boulevard/Woodhaven Drive and Sunset Boulevard/Timbrel Lane are not illustrated in the exhibits. Multiple concept designs are illustrated at the Sunset Boulevard/Woodhaven Drive and Sunset Boulevard/Timbrel Lane intersections to provide visuals illustrations and cost comparisons between alternatives to inform decision making.

A mini roundabout concept was also produced at the Sunset Boulevard/Timbrel Lane intersection per the City's request for a possible future treatment.

Planning Level Cost Estimates

Planning-level cost estimates were developed for each of the concept designs. The estimates are included in Attachment D.

Next Steps

The recommended safety countermeasures and intersection improvements identified in this memorandum are based on national guidance, engineering judgement, and field observations as well as Kittelson's experience analyzing similar unsignalized intersections with the purpose of improving pedestrian crossing safety.

City of Sherwood staff will review the draft memorandum and provide comments to the Kittelson. Kittelson will revise the memorandum based on comments received and produce a final memorandum for submission to City.

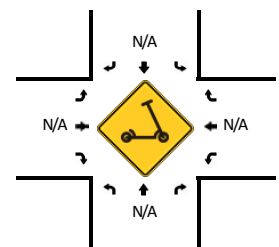
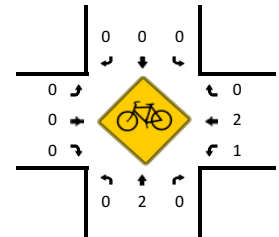
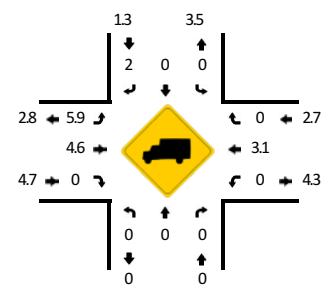
References

1. Manual on Uniform Traffic Control Devices (MUTCD)
2. *Sherwood Transportation System Plan*, City of Sherwood
3. *A Policy on Geometric Design of Highways and Streets*, AASHTO
4. *Sherwood Safe Routes to School*, City of Sherwood
5. *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*, FHWA
6. *Improving Pedestrian Safety at Unsignalized Crossings*, NCHRP

DRAFT

Attachment A
Traffic Volume Data

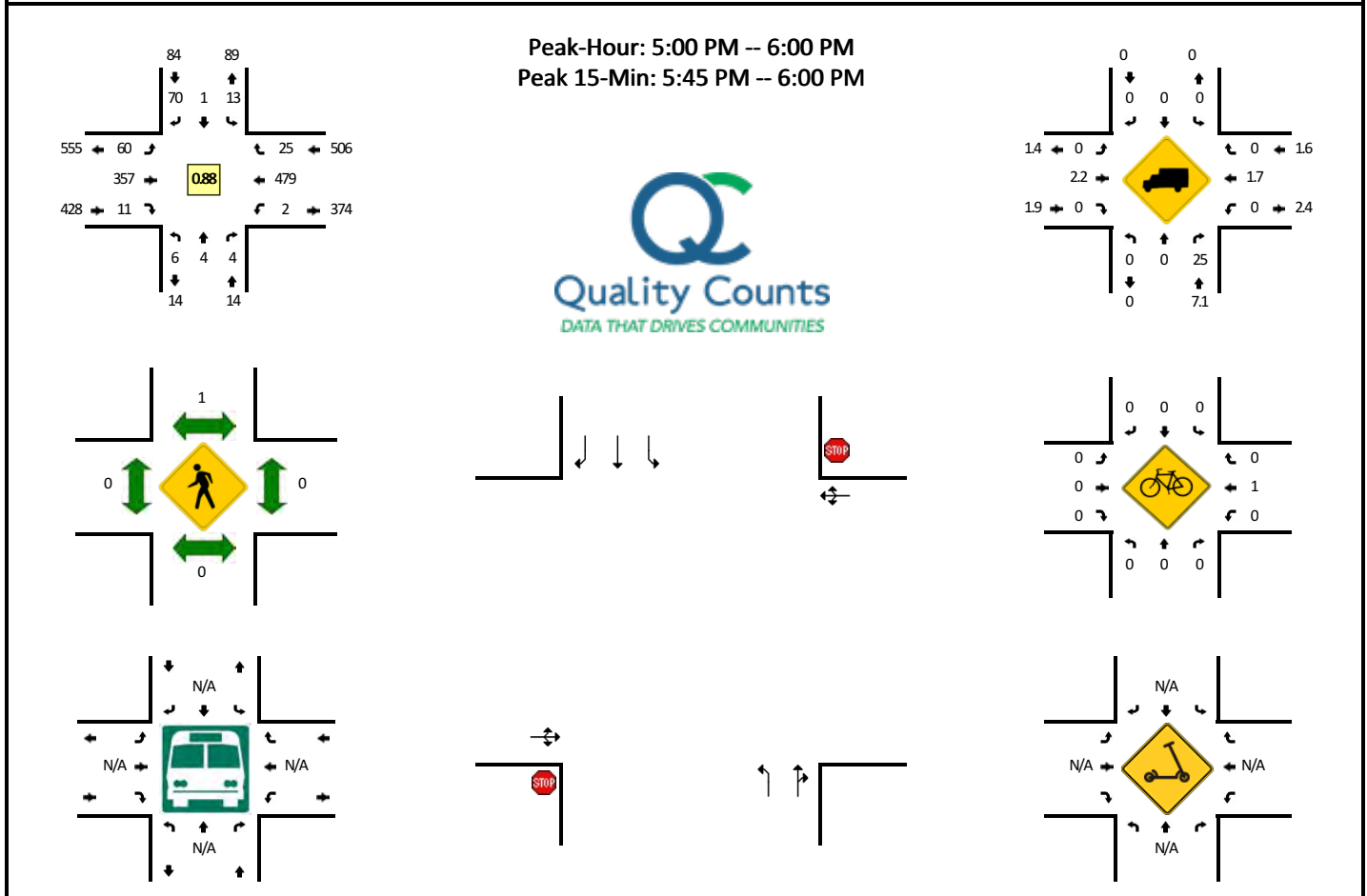
QC JOB #: 16244007
DATE: Wed, Jun 7 2023



Comments:

LOCATION: SW Woodhaven Dr -- SW Sunset Blvd
CITY/STATE: Sherwood, OR

QC JOB #: 16244008
DATE: Wed, Jun 7 2023



5-Min Count Period Beginning At	SW Woodhaven Dr (Northbound)				SW Woodhaven Dr (Southbound)				SW Sunset Blvd (Eastbound)				SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:00 PM	0	0	0	0	0	0	7	0	3	15	1	0	0	23	1	0	50	
12:05 PM	2	0	0	0	0	0	7	0	4	24	2	0	0	28	2	0	69	
12:10 PM	3	0	1	0	1	0	7	0	2	7	1	0	0	11	1	0	34	
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1:15 PM	1	5	2	0	1	0	2	0	5	22	1	0	1	10	2	0	52	628
1:20 PM	7	1	4	0	1	0	4	0	7	23	1	0	0	19	2	0	69	626
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1:35 PM	1	0	0	0	3	0	3	0	2	21	2	0	0	32	1	0	65	676
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1:55 PM	1	0	0	0	2	0	3	0	5	14	2	0	0	25	2	0	54	677
2:00 PM	0	0	0	0	0	1	4	0	1	15	0	0	1	20	2	0	44	672
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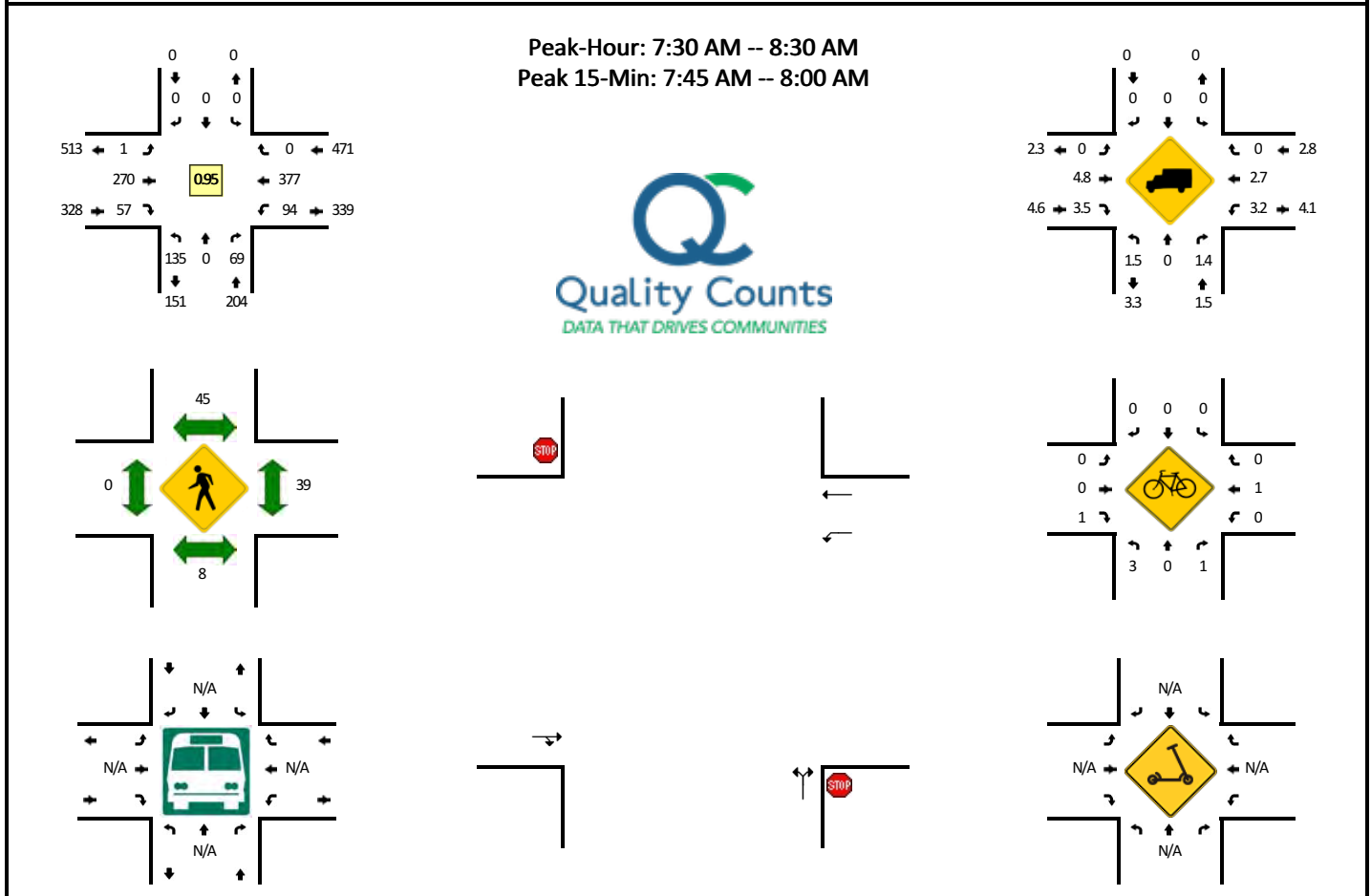
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	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
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Heavy Trucks	0	0	4		0	0	0		0	0	0		0	4	0		8	
Buses																		
Pedestrians		0				4				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		
Comments:																		

Report generated on 6/15/2023 11:20 AM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

LOCATION: SW Timbrel Ln -- SW Sunset Blvd
CITY/STATE: Sherwood, OR

QC JOB #: 16244010
DATE: Wed, Jun 7 2023

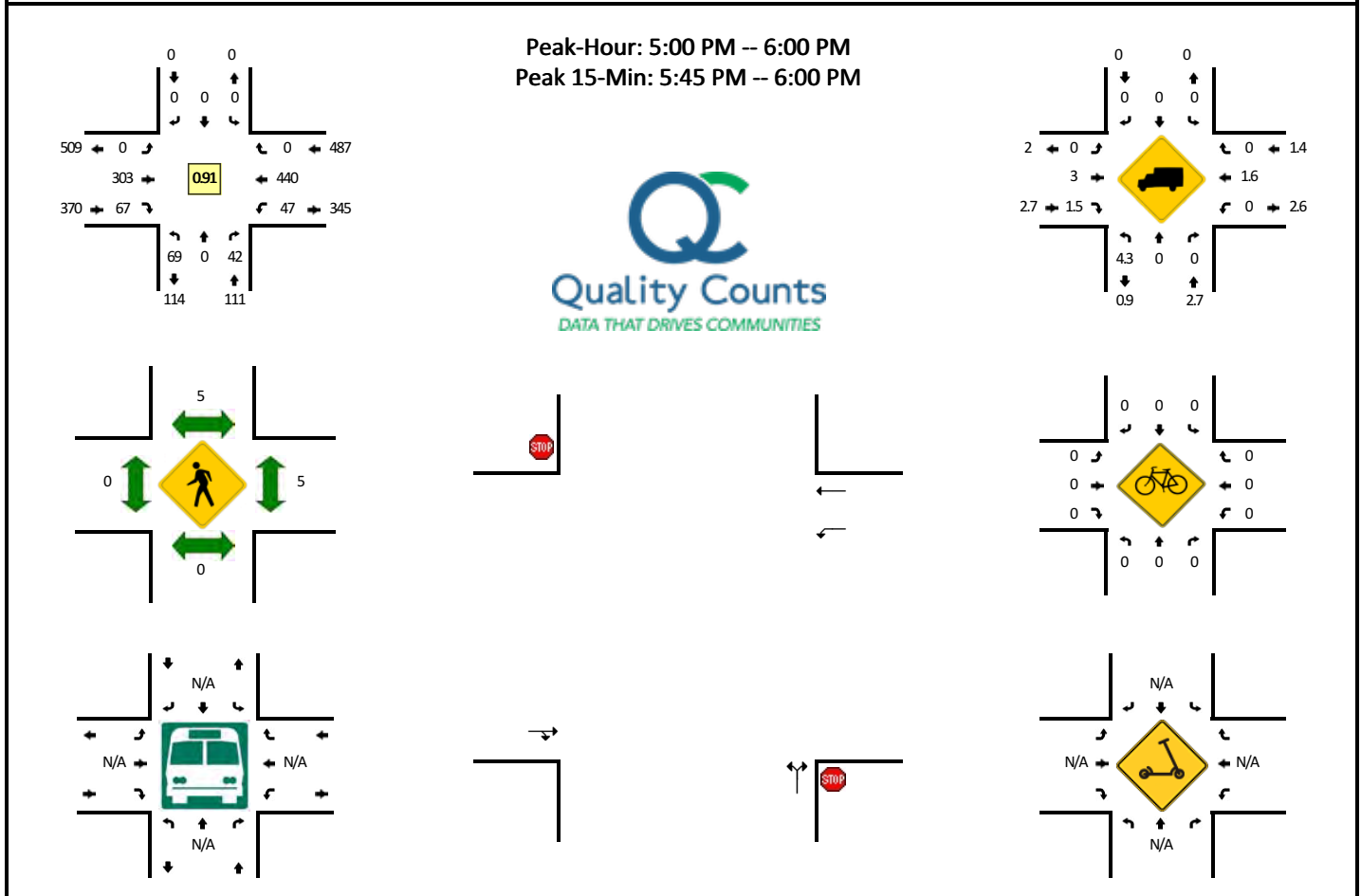


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7:15 AM	11	0	3	0	0	0	0	0	0	22	1	0	2	26	0	0	65	
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7:35 AM	14	0	14	0	0	0	0	0	0	16	1	0	14	25	0	0	84	
7:40 AM	7	0	6	0	0	0	0	0	0	15	11	0	23	26	0	0	88	
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8:55 AM	4	0	3	0	0	0	0	0	0	6	5	0	3	13	0	0	34	728
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	216	0	120	0	0	0	0	0	0	224	20	0	88	384	0	0	1052	
Heavy Trucks	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	16	
Buses																		
Pedestrians		8				32				0				36			76	
Bicycles	4	0	0		0	0	0		0	0	0		0	0	0		4	
Scooters																		

Comments:

LOCATION: SW Timbrel Ln -- SW Sunset Blvd
CITY/STATE: Sherwood, OR

QC JOB #: 16244011
DATE: Wed, Jun 7 2023



5-Min Count Period Beginning At	SW Timbrel Ln (Northbound)				SW Timbrel Ln (Southbound)				SW Sunset Blvd (Eastbound)				SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:00 PM	8	0	1	0	0	0	0	0	0	13	3	0	5	19	0	0	49	
12:05 PM	5	0	3	0	0	0	0	0	0	20	1	0	1	20	0	0	50	
12:10 PM	1	0	0	0	0	0	0	0	0	10	2	0	4	11	0	0	28	
12:15 PM	2	0	1	0	0	0	0	0	0	19	1	0	0	12	0	0	35	
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12:25 PM	8	0	2	0	0	0	0	0	0	4	2	0	2	16	0	0	34	
12:30 PM	6	0	3	0	0	0	0	0	0	23	1	0	1	18	0	0	52	
12:35 PM	3	0	0	0	0	0	0	0	0	15	5	0	1	13	0	0	37	
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1:20 PM	9	0	4	0	0	0	0	0	0	23	5	0	1	16	0	0	58	570
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1:35 PM	10	0	3	0	0	0	0	0	0	22	3	0	3	23	0	0	64	629
1:40 PM	3	0	1	0	0	0	0	0	0	11	2	0	1	16	0	0	34	613
1:45 PM	9	0	0	0	0	0	0	0	0	16	2	0	2	25	0	0	54	610
1:50 PM	7	0	5	0	0	0	0	0	0	11	3	0	2	25	0	0	53	605
1:55 PM	3	0	1	0	0	0	0	0	0	13	3	0	1	23	0	0	44	608
2:00 PM	5	0	2	0	0	0	0	0	0	13	2	0	3	25	0	0	50	608
2:05 PM	5	0	2	0	0	0	0	0	0	12	5	0	0	22	0	0	46	618
2:10 PM	11	0	1	0	0	0	0	0	0	21	3	0	0	19	0	0	55	623
2:15 PM	9	0	3	0	0	0	0	0	0	17	4	0	4	21	0	0	58	634
2:20 PM	11	0	2	0	0	0	0	0	0	30	9	0	5	20	0	0	77	653
2:25 PM	4	0	1	0	0	0	0	0	0	30	7	0	5	22	0	0	69	656
2:30 PM	2	0	0	0	0	0	0	0	0	48	13	0	11	21	0	0	95	699
2:35 PM	7	0	2	0	0	0	0	0	0	34	9	0	7	29	0	0	88	723
2:40 PM	4	0	2	0	0	0	0	0	0	17	9	0	2	23	0	0	57	746
2:45 PM	5	0	3	0	0	0	0	0	0	18	9	0	1	24	0	0	60	752
2:50 PM	6	0	0	0	0	0	0	0	0	22	8	0	1	27	0	0	64	763
2:55 PM	8	0	1	0	0	0	0	0	0	21	1	0	2	25	0	0	58	777
3:00 PM	4	0	0	0	0	0	0	0	0	14	2	0	2	22	0	0	44	771
3:05 PM	10	0	5	0	0	0	0	0	0	20	4	0	1	22	0	0	62	787

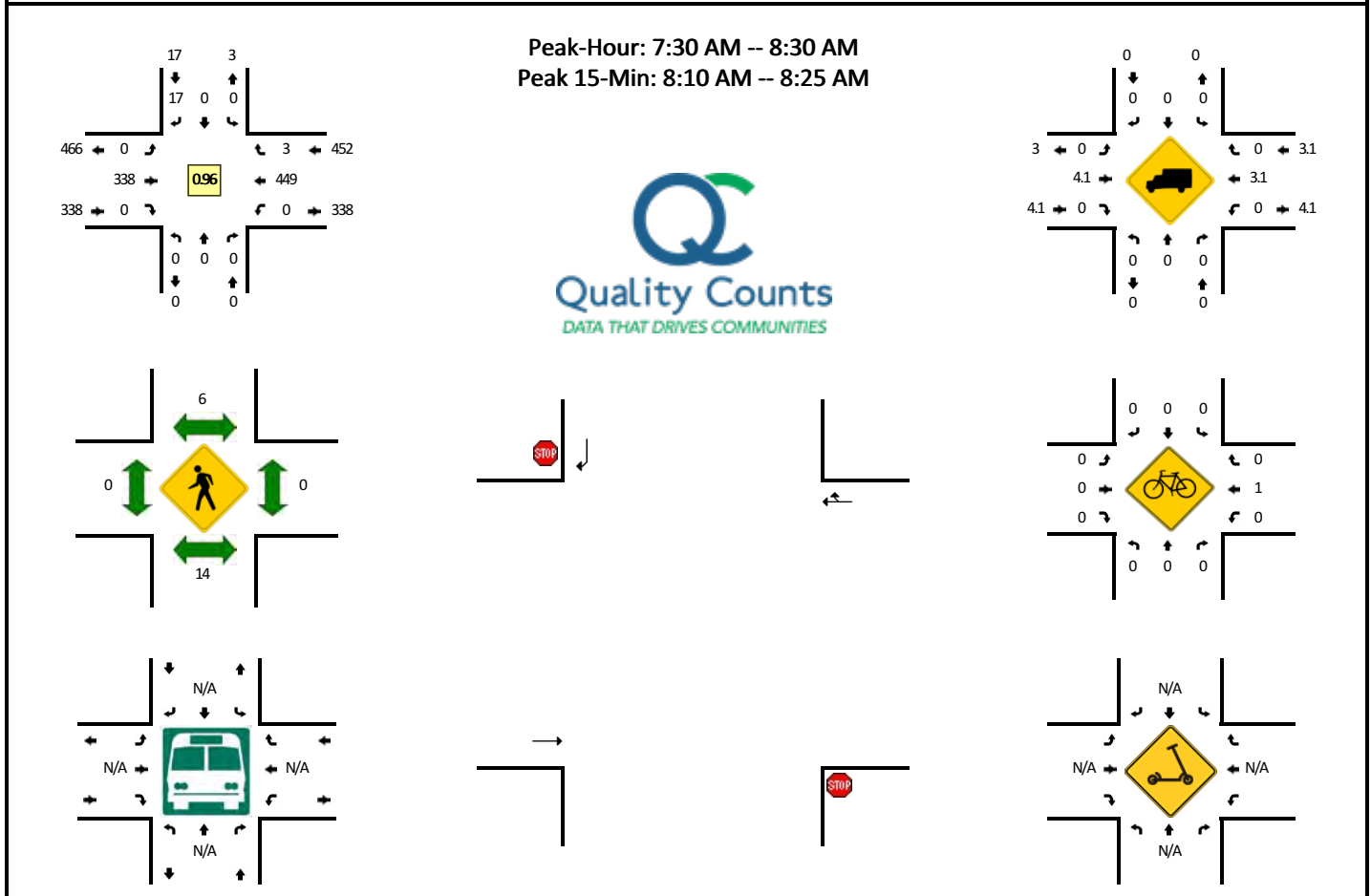
5-Min Count Period Beginning At	SW Timbrel Ln (Northbound)				SW Timbrel Ln (Southbound)				SW Sunset Blvd (Eastbound)				SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:10 PM	6	0	2	0	0	0	0	0	0	9	7	0	2	35	0	0	61	793
3:15 PM	5	0	3	0	0	0	0	0	0	29	7	0	2	30	0	0	76	811
3:20 PM	9	0	2	0	0	0	0	0	0	20	4	0	2	22	0	0	59	793
3:25 PM	5	0	4	0	0	0	0	0	0	26	3	0	3	21	0	0	62	786
3:30 PM	4	0	2	0	0	0	0	0	0	18	5	0	2	38	0	0	69	760
3:35 PM	7	0	3	0	0	0	0	0	0	30	9	0	2	35	0	0	86	758
3:40 PM	6	0	3	0	0	0	0	0	0	25	9	0	3	48	0	0	94	795
3:45 PM	4	0	2	0	0	0	0	0	0	21	5	0	5	27	0	0	64	799
3:50 PM	10	0	6	0	0	0	0	0	0	17	5	0	3	36	0	0	77	812
3:55 PM	4	0	3	0	0	0	0	0	0	30	6	0	4	40	0	0	87	841
4:00 PM	5	0	2	0	0	0	0	0	0	17	4	0	10	28	0	0	66	863
4:05 PM	8	0	2	0	0	0	0	0	0	21	6	0	7	20	0	0	64	865
4:10 PM	9	0	2	0	0	0	0	0	0	31	5	0	1	27	0	0	75	879
4:15 PM	2	0	2	0	0	0	0	0	0	14	7	0	4	31	0	0	60	863
4:20 PM	5	0	6	0	0	0	0	0	0	32	5	0	2	25	0	0	75	879
4:25 PM	5	0	5	0	0	0	0	0	0	15	8	0	4	30	0	0	67	884
4:30 PM	5	0	2	0	0	0	0	0	0	16	5	0	1	34	0	0	63	878
4:35 PM	5	0	3	0	0	0	0	0	0	15	2	0	7	33	0	0	65	857
4:40 PM	3	0	4	0	0	0	0	0	0	22	11	0	6	33	0	0	79	842
4:45 PM	6	0	1	0	0	0	0	0	0	23	6	0	5	39	0	0	80	858
4:50 PM	1	0	0	0	0	0	0	0	0	22	4	0	2	31	0	0	60	841
4:55 PM	2	0	3	0	0	0	0	0	0	31	7	0	2	37	0	0	82	836
5:00 PM	8	0	3	0	0	0	0	0	0	21	3	0	3	37	0	0	75	845
5:05 PM	7	0	5	0	0	0	0	0	0	31	2	0	6	32	0	0	83	864
5:10 PM	4	0	2	0	0	0	0	0	0	23	8	0	4	35	0	0	76	865
5:15 PM	10	0	6	0	0	0	0	0	0	22	2	0	3	36	0	0	79	884
5:20 PM	4	0	4	0	0	0	0	0	0	26	10	0	3	45	0	0	92	901
5:25 PM	5	0	5	0	0	0	0	0	0	31	7	0	2	45	0	0	95	929
5:30 PM	3	0	3	0	0	0	0	0	0	19	6	0	2	30	0	0	63	929
5:35 PM	5	0	1	0	0	0	0	0	0	22	6	0	6	24	0	0	64	928
5:40 PM	3	0	4	0	0	0	0	0	0	24	6	0	5	32	0	0	74	923
5:45 PM	7	0	6	0	0	0	0	0	0	23	6	0	6	39	0	0	87	930
5:50 PM	6	0	2	0	0	0	0	0	0	31	5	0	5	48	0	0	97	967
5:55 PM	7	0	1	0	0	0	0	0	0	30	6	0	2	37	0	0	83	968
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	80	0	36	0	0	0	0	0	0	336	68	0	52	496	0	0	1068	
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	4	0		12	
Buses																		
Pedestrians		0				12				0				0			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		
Comments:																		

Report generated on 6/15/2023 11:20 AM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

LOCATION: SW Heatherwood Ln -- SW Sunset Blvd
CITY/STATE: Sherwood, OR

QC JOB #: 16244013
DATE: Wed, Jun 7 2023

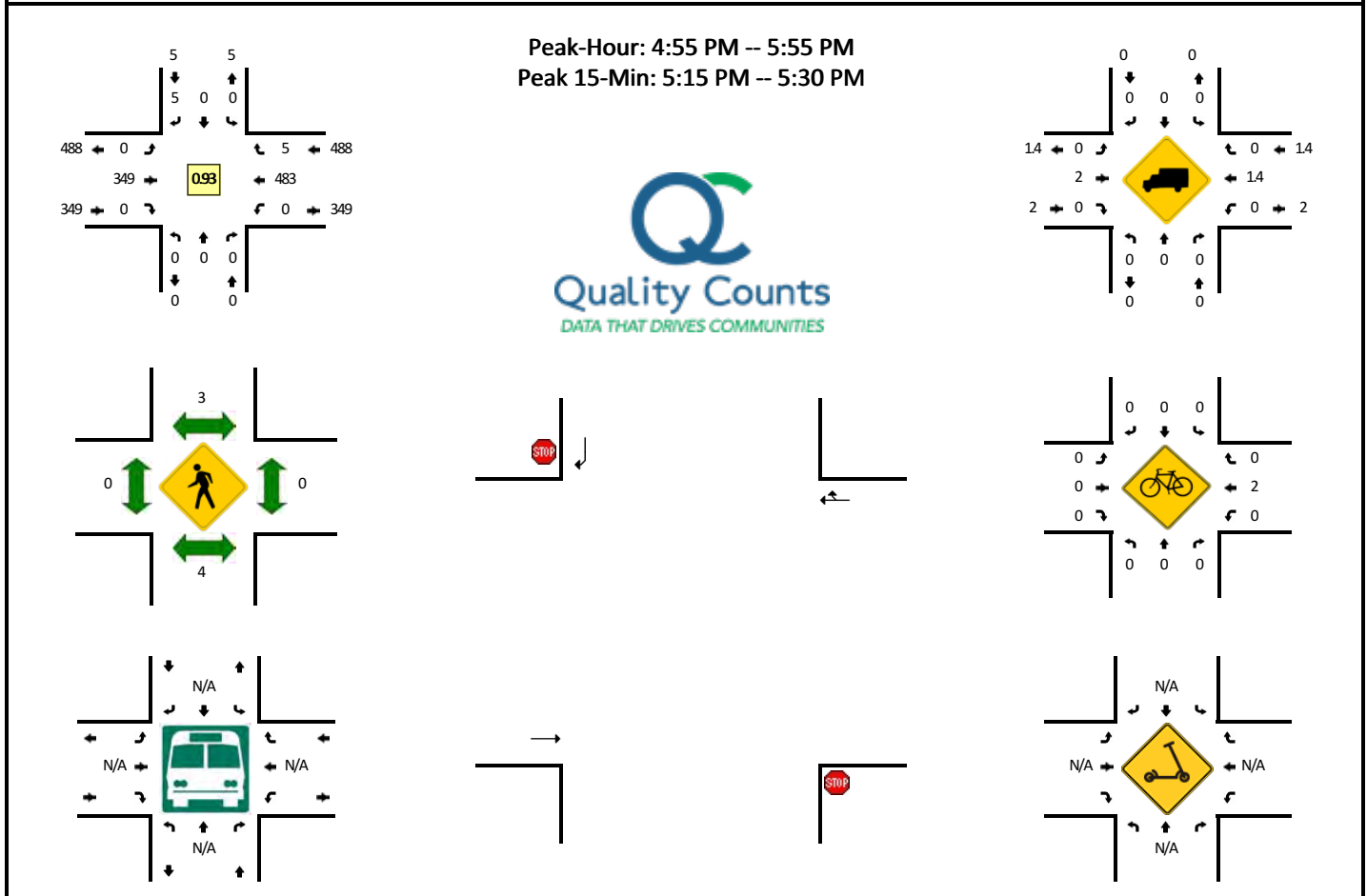


5-Min Count Period Beginning At	SW Heatherwood Ln (Northbound)				SW Heatherwood Ln (Southbound)				SW Sunset Blvd (Eastbound)				SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	15	1	0	28	
7:05 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	21	0	0	33	
7:10 AM	0	0	0	0	0	0	2	0	0	14	0	0	0	25	0	0	41	
7:15 AM	0	0	0	0	0	0	1	0	0	25	0	0	0	27	0	0	53	
7:20 AM	0	0	0	0	0	0	2	0	0	16	0	0	0	37	0	0	55	
7:25 AM	0	0	0	0	0	0	1	0	0	17	0	0	0	29	0	0	47	
7:30 AM	0	0	0	0	0	0	1	0	0	28	0	0	0	42	0	0	71	
7:35 AM	0	0	0	0	0	0	3	0	0	30	0	0	0	33	1	0	67	
7:40 AM	0	0	0	0	0	0	2	0	0	17	0	0	0	51	0	0	70	
7:45 AM	0	0	0	0	0	0	3	0	0	29	0	0	0	37	0	0	69	
7:50 AM	0	0	0	0	0	0	1	0	0	25	0	0	0	37	0	0	63	
7:55 AM	0	0	0	0	0	0	3	0	0	36	0	0	0	32	0	0	71	668
8:00 AM	0	0	0	0	0	0	0	0	0	24	0	0	0	35	0	0	59	699
8:05 AM	0	0	0	0	0	0	3	0	0	27	0	0	0	36	1	0	67	733
8:10 AM	0	0	0	0	0	0	1	0	0	21	0	0	0	43	0	0	65	757
8:15 AM	0	0	0	0	0	0	0	0	0	26	0	0	0	49	1	0	76	780
8:20 AM	0	0	0	0	0	0	0	0	0	38	0	0	0	31	0	0	69	794
8:25 AM	0	0	0	0	0	0	0	0	0	37	0	0	0	23	0	0	60	807
8:30 AM	0	0	0	0	0	0	0	0	0	22	0	0	0	22	0	0	44	780
8:35 AM	0	0	0	0	0	0	1	0	0	17	0	0	0	14	0	0	32	745
8:40 AM	0	0	0	0	0	0	0	0	0	21	0	0	0	14	0	0	35	710
8:45 AM	0	0	0	0	0	0	0	0	0	16	0	0	0	19	0	0	35	676
8:50 AM	0	0	0	0	0	0	0	0	0	19	0	0	0	13	0	0	32	645
8:55 AM	0	0	0	0	0	0	0	0	0	11	0	0	0	16	0	0	27	601
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	0	0	4	0	0	340	0	0	0	492	4	0	840	
Heavy Trucks	0	0	0	0	0	0	0	0	0	12	0	0	0	24	0	0	36	
Buses																		
Pedestrians		12				12				0				0			24	
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4	
Scoters																		

Comments:

LOCATION: SW Heatherwood Ln -- SW Sunset Blvd
CITY/STATE: Sherwood, OR

QC JOB #: 16244014
DATE: Wed, Jun 7 2023



5-Min Count Period Beginning At	SW Heatherwood Ln (Northbound)				SW Heatherwood Ln (Southbound)				SW Sunset Blvd (Eastbound)				SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:00 PM	0	0	0	0	0	0	1	0	0	15	0	0	0	23	1	0	40	
12:05 PM	0	0	0	0	0	0	0	0	0	18	0	0	0	22	0	0	40	
12:10 PM	0	0	0	0	0	0	1	0	0	14	0	0	0	14	0	0	29	
12:15 PM	0	0	0	0	0	0	0	0	0	19	0	0	0	12	0	0	31	
12:20 PM	0	0	0	0	0	0	0	0	0	25	0	0	0	22	0	0	47	
12:25 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	19	0	0	25	
12:30 PM	0	0	0	0	0	0	1	0	0	26	0	0	0	18	0	0	45	
12:35 PM	0	0	0	0	0	0	0	0	0	15	0	0	0	14	0	0	29	
12:40 PM	0	0	0	0	0	0	1	0	0	19	0	0	0	24	0	0	44	
12:45 PM	0	0	0	0	0	0	1	0	0	22	0	0	0	23	0	0	46	
12:50 PM	0	0	0	0	0	0	0	0	0	19	0	0	0	21	0	0	40	
12:55 PM	0	0	0	0	0	0	1	0	0	17	0	0	0	17	0	0	35	451
1:00 PM	0	0	0	0	0	0	2	0	0	13	0	0	0	27	0	0	42	453
1:05 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	22	0	0	31	444
1:10 PM	0	0	0	0	0	0	1	0	0	17	0	0	0	19	0	0	37	452
1:15 PM	0	0	0	0	0	0	0	0	0	21	0	0	0	10	0	0	31	452
1:20 PM	0	0	0	0	0	0	0	0	0	27	0	0	0	19	0	0	46	451
1:25 PM	0	0	0	0	0	0	0	0	0	26	0	0	0	24	0	0	50	476
1:30 PM	0	0	0	0	0	0	0	0	0	23	0	0	0	17	0	0	40	471
1:35 PM	0	0	0	0	0	0	0	0	0	24	0	0	0	26	1	0	51	493
1:40 PM	0	0	0	0	0	0	0	0	0	12	0	0	0	18	1	0	31	480
1:45 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	27	0	0	43	477
1:50 PM	0	0	0	0	0	0	1	0	0	16	0	0	0	27	0	0	44	481
1:55 PM	0	0	0	0	0	0	0	0	0	15	0	0	0	26	0	0	41	487
2:00 PM	0	0	0	0	0	0	1	0	0	15	0	0	0	25	0	0	41	486
2:05 PM	0	0	0	0	0	0	0	0	0	13	0	0	0	19	0	0	32	487
2:10 PM	0	0	0	0	0	0	0	0	0	23	0	0	0	22	0	0	45	495
2:15 PM	0	0	0	0	0	0	2	0	0	18	0	0	0	21	0	0	41	505
2:20 PM	0	0	0	0	0	0	1	0	0	31	0	0	0	25	0	0	57	516
2:25 PM	0	0	0	0	0	0	0	0	0	29	0	0	0	27	0	0	56	522
2:30 PM	0	0	0	0	0	0	1	0	0	34	0	0	0	33	0	0	68	550
2:35 PM	0	0	0	0	0	0	1	0	0	35	0	0	0	32	0	0	68	567
2:40 PM	0	0	0	0	0	0	0	0	0	20	0	0	0	25	0	0	45	581
2:45 PM	0	0	0	0	0	0	0	0	0	19	0	0	0	24	0	0	43	581
2:50 PM	0	0	0	0	0	0	0	0	0	24	0	0	0	29	0	0	53	590
2:55 PM	0	0	0	0	0	0	0	0	0	20	0	0	0	27	1	0	48	597
3:00 PM	0	0	0	0	0	0	0	0	0	15	0	0	0	26	1	0	42	598
3:05 PM	0	0	0	0	0	0	0	0	0	22	0	0	0	20	0	0	42	608
3:10 PM	0	0	0	0	0	0	0	0	0	15	0	0	0	37	0	0	52	615

5-Min Count Period Beginning At	SW Heatherwood Ln (Northbound)				SW Heatherwood Ln (Southbound)				SW Sunset Blvd (Eastbound)				SW Sunset Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:15 PM	0	0	0	0	0	0	0	0	0	33	0	0	0	34	0	0	67	641
3:20 PM	0	0	0	0	0	0	0	0	0	19	0	0	0	23	0	0	42	626
3:25 PM	0	0	0	0	0	0	0	0	0	31	0	0	0	23	0	0	54	624
3:30 PM	0	0	0	0	0	0	2	0	0	20	0	0	0	40	0	0	62	618
3:35 PM	0	0	0	0	0	0	0	0	0	35	0	0	0	39	0	0	74	624
3:40 PM	0	0	0	0	0	0	1	0	0	27	0	0	0	48	0	0	76	655
3:45 PM	0	0	0	0	0	0	1	0	0	20	0	0	0	32	0	0	53	665
3:50 PM	0	0	0	0	0	0	0	0	0	27	0	0	0	41	0	0	68	680
3:55 PM	0	0	0	0	0	0	0	0	0	32	0	0	0	43	0	0	75	707
4:00 PM	0	0	0	0	0	0	0	0	0	21	0	0	0	37	0	0	58	723
4:05 PM	0	0	0	0	0	0	1	0	0	21	0	0	0	28	1	0	51	732
4:10 PM	0	0	0	0	0	0	2	0	0	32	0	0	0	25	0	0	59	739
4:15 PM	0	0	0	0	0	0	1	0	0	17	0	0	0	33	0	0	51	723
4:20 PM	0	0	0	0	0	0	0	0	0	40	0	0	0	31	0	0	71	752
4:25 PM	0	0	0	0	0	0	2	0	0	18	0	0	0	27	0	0	47	745
4:30 PM	0	0	0	0	0	0	1	0	0	18	0	0	0	35	0	0	54	737
4:35 PM	0	0	0	0	0	0	3	0	0	20	0	0	0	38	0	0	61	724
4:40 PM	0	0	0	0	0	0	2	0	0	23	0	0	0	41	0	0	66	714
4:45 PM	0	0	0	0	0	0	1	0	0	25	0	0	0	43	0	0	69	730
4:50 PM	0	0	0	0	0	0	0	0	0	29	0	0	0	31	1	0	61	723
4:55 PM	0	0	0	0	0	0	0	0	0	34	0	0	0	37	0	0	71	719
5:00 PM	0	0	0	0	0	0	1	0	0	22	0	0	0	42	1	0	66	727
5:05 PM	0	0	0	0	0	0	3	0	0	39	0	0	0	34	2	0	78	754
5:10 PM	0	0	0	0	0	0	0	0	0	25	0	0	0	39	0	0	64	759
5:15 PM	0	0	0	0	0	0	0	0	0	26	0	0	0	40	1	0	67	775
5:20 PM	0	0	0	0	0	0	0	0	0	31	0	0	0	49	1	0	81	785
5:25 PM	0	0	0	0	0	0	1	0	0	36	0	0	0	42	0	0	79	817
5:30 PM	0	0	0	0	0	0	0	0	0	22	0	0	0	32	0	0	54	817
5:35 PM	0	0	0	0	0	0	0	0	0	24	0	0	0	31	0	0	55	811
5:40 PM	0	0	0	0	0	0	0	0	0	28	0	0	0	37	0	0	65	810
5:45 PM	0	0	0	0	0	0	0	0	0	28	0	0	0	47	0	0	75	816
5:50 PM	0	0	0	0	0	0	0	0	0	34	0	0	0	53	0	0	87	842
5:55 PM	0	0	0	0	0	0	1	0	0	28	0	0	0	35	0	0	64	835
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	0	0	4	0	0	372	0	0	0	524	8	0	908	
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	8	0		16	
Buses																		
Pedestrians		8				8				0				0			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8	
Scooters																		
Comments:																		

Report generated on 6/15/2023 11:20 AM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

DRAFT

Attachment B
Travel Speeds

Type of report: Tube Count - Speed Data

LOCATION: SW Sunset Blvd btwn SW Heatherwood Ln & SW Pinehurst Dr SPECIFIC LOCATION: CITY/STATE: Sherwood, OR															QC JOB #: 16244018 DIRECTION: WB DATE: Jun 7 2023		
Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	1	0	2	7	8	3	0	0	0	0	0	0	0	0	21	26-35	15
01:00 AM	0	0	1	4	6	0	2	0	0	0	0	0	0	0	13	26-35	10
02:00 AM	0	0	1	1	0	0	0	1	0	0	0	0	0	0	3	21-30	2
03:00 AM	0	0	0	0	2	2	0	1	0	0	0	0	0	0	5	31-40	4
04:00 AM	1	0	0	4	15	12	3	0	0	0	0	0	0	0	35	31-40	27
05:00 AM	5	1	1	17	25	30	2	0	0	0	0	0	0	0	81	31-40	55
06:00 AM	13	4	2	18	103	54	6	2	0	0	0	0	0	0	202	31-40	157
07:00 AM	37	22	78	110	111	36	1	0	0	0	0	0	0	0	395	26-35	221
08:00 AM	52	17	32	89	121	25	2	0	0	0	0	0	0	0	338	26-35	210
09:00 AM	28	2	19	39	124	43	7	0	0	0	0	0	0	0	262	31-40	167
10:00 AM	17	4	15	53	100	34	8	0	0	0	0	0	0	0	231	26-35	153
11:00 AM	23	0	11	37	115	36	3	0	0	0	0	0	0	0	225	26-35	152
12:00 PM	19	5	13	45	102	41	5	0	0	0	0	0	0	0	230	26-35	147
01:00 PM	29	8	37	93	98	18	3	0	0	0	0	0	0	0	286	26-35	191
02:00 PM	41	4	15	65	151	43	3	1	0	0	0	0	0	0	323	26-35	216
03:00 PM	53	14	22	97	173	48	4	2	0	0	0	0	0	0	413	26-35	270
04:00 PM	41	6	22	93	179	54	6	0	0	0	0	0	0	0	401	26-35	272
05:00 PM	94	29	56	103	122	39	4	1	0	0	0	0	0	0	448	26-35	225
06:00 PM	30	4	12	27	160	84	2	1	0	0	0	0	0	0	320	31-40	244
07:00 PM	13	6	2	25	89	48	6	1	0	1	0	0	0	0	191	31-40	137
08:00 PM	15	2	3	25	82	29	0	0	0	0	0	0	0	0	156	31-40	111
09:00 PM	9	0	6	26	35	15	0	0	0	0	0	0	0	0	91	26-35	61
10:00 PM	2	0	9	12	24	2	1	0	0	0	0	0	0	0	50	26-35	36
11:00 PM	0	0	1	12	14	4	2	0	0	0	0	0	0	0	33	26-35	26
Day Total	523	128	360	1002	1959	700	70	10	0	1	0	0	0	0	4753	26-35	2961
Percent	11%	2.7%	7.6%	21.1%	41.2%	14.7%	1.5%	0.2%	0%	0%	0%	0%	0%	0%			
AM Peak Volume	8:00 AM 52	7:00 AM 22	7:00 AM 78	7:00 AM 110	9:00 AM 124	6:00 AM 54	10:00 AM 8	6:00 AM 2	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	7:00 AM 395		
PM Peak Volume	5:00 PM 94	5:00 PM 29	5:00 PM 56	5:00 PM 103	4:00 PM 179	6:00 PM 84	4:00 PM 6	3:00 PM 2	12:00 PM 0	7:00 PM 1	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	5:00 PM 448		
Comments:																	

Report generated on 6/9/2023 4:28 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

LOCATION: SW Sunset Blvd btwn SW Heatherwood Ln & SW Pinehurst Dr															QC JOB #: 16244018		
SPECIFIC LOCATION:															DIRECTION: WB		
CITY/STATE: Sherwood, OR															DATE: Jun 7 2023		
Speed Range	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	523	128	360	1002	1959	700	70	10	0	1	0	0	0	0	4753	26-35	2961
Percent	11%	2.7%	7.6%	21.1%	41.2%	14.7%	1.5%	0.2%	0%	0%	0%	0%	0%	0%			
Cumulative Percent	11%	13.7%	21.3%	42.4%	83.6%	98.3%	99.8%	100%	100%	100%	100%	100%	100%	100%			
ADT 4753															85th Percentile: 35 MPH Mean Speed(Average): 30 MPH Median: 30 MPH Mode: 33 MPH		
Comments:																	

Type of report: Tube Count - Speed Data

LOCATION: SW Sunset Blvd btwn SW Timbrel Ln & SW Heatherwood Ln SPECIFIC LOCATION: CITY/STATE: Sherwood, OR															QC JOB #: 16244017 DIRECTION: EB DATE: Jun 7 2023		
Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	1	5	10	2	1	1	0	0	0	0	0	0	0	20	21-30	15
01:00 AM	0	0	0	7	2	0	0	0	0	0	0	0	0	0	9	26-35	9
02:00 AM	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3	21-30	2
03:00 AM	0	0	0	2	7	0	0	0	0	0	0	0	0	0	9	26-35	9
04:00 AM	1	0	5	12	10	1	0	0	0	0	0	0	0	0	29	26-35	22
05:00 AM	4	4	9	36	24	2	2	0	0	0	0	0	0	0	81	26-35	60
06:00 AM	6	4	31	78	34	5	0	0	0	0	0	0	0	0	158	26-35	112
07:00 AM	25	18	85	101	23	1	0	0	0	0	0	0	0	0	253	21-30	186
08:00 AM	42	19	92	98	27	0	0	0	0	0	0	0	0	0	278	21-30	190
09:00 AM	9	12	47	71	24	3	0	0	0	0	0	0	0	0	166	21-30	118
10:00 AM	6	5	45	91	22	1	1	0	0	0	0	0	0	0	171	21-30	136
11:00 AM	4	0	30	98	51	0	0	0	0	0	0	0	0	0	183	26-35	149
12:00 PM	6	4	56	105	35	1	0	0	0	0	0	0	0	0	207	21-30	161
01:00 PM	8	15	76	101	20	0	0	0	0	0	0	0	0	0	220	21-30	177
02:00 PM	69	42	66	82	20	2	0	0	0	0	0	0	0	0	281	21-30	148
03:00 PM	26	18	93	124	19	0	0	0	0	0	0	0	0	0	280	21-30	217
04:00 PM	29	20	88	120	29	1	0	0	0	0	0	0	0	0	287	21-30	208
05:00 PM	61	39	104	99	34	1	0	0	0	0	0	0	0	0	338	21-30	203
06:00 PM	17	13	64	118	37	2	0	0	0	0	0	0	0	0	251	21-30	182
07:00 PM	8	9	49	82	38	3	0	0	0	0	0	0	0	0	189	21-30	131
08:00 PM	9	13	76	90	26	1	0	0	0	0	0	0	0	0	215	21-30	166
09:00 PM	5	0	20	66	17	1	0	0	0	0	0	0	0	0	109	21-30	86
10:00 PM	1	1	9	15	8	2	0	0	0	0	0	0	0	0	36	21-30	24
11:00 PM	0	0	5	19	5	0	0	0	0	0	0	0	0	0	29	21-30	24
Day Total	336	237	1056	1626	515	28	4	0	0	0	0	0	0	0	3802	21-30	2682
Percent	8.8%	6.2%	27.8%	42.8%	13.5%	0.7%	0.1%	0%	0%	0%	0%	0%	0%	0%			
AM Peak Volume	8:00 AM 42	8:00 AM 19	8:00 AM 92	7:00 AM 101	11:00 AM 51	6:00 AM 5	5:00 AM 2	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	8:00 AM 278		
PM Peak Volume	2:00 PM 69	2:00 PM 42	5:00 PM 104	3:00 PM 124	7:00 PM 38	7:00 PM 3	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	5:00 PM 338		
Comments:																	

Report generated on 6/9/2023 4:28 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

LOCATION: SW Sunset Blvd btwn SW Timbrel Ln & SW Heatherwood Ln														QC JOB #: 16244017			
SPECIFIC LOCATION:														DIRECTION: EB			
CITY/STATE: Sherwood, OR														DATE: Jun 7 2023			
Speed Range	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	336	237	1056	1626	515	28	4	0	0	0	0	0	0	0	3802	21-30	2682
Percent	8.8%	6.2%	27.8%	42.8%	13.5%	0.7%	0.1%	0%	0%	0%	0%	0%	0%	0%			
Cumulative Percent	8.8%	15.1%	42.8%	85.6%	99.2%	99.9%	100%	100%	100%	100%	100%	100%	100%	100%			
ADT 3802															85th Percentile: 29 MPH Mean Speed(Average): 25 MPH Median: 25 MPH Mode: 28 MPH		
Comments:																	

Type of report: Tube Count - Speed Data

LOCATION: SW Sunset Blvd btwn SW Timbrel Ln & SW Heatherwood Ln SPECIFIC LOCATION: CITY/STATE: Sherwood, OR															QC JOB #: 16244017 DIRECTION: WB DATE: Jun 7 2023		
Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	1	0	4	12	4	0	0	0	0	0	0	0	0	0	21	23-32	16
01:00 AM	0	2	3	6	2	1	0	0	0	0	0	0	0	0	14	21-30	9
02:00 AM	0	0	0	2	0	1	0	0	0	0	0	0	0	0	3	21-30	2
03:00 AM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	21-30	3
04:00 AM	0	0	1	19	12	0	1	0	0	0	0	0	0	0	33	26-35	31
05:00 AM	2	1	3	29	20	2	0	0	0	0	0	0	0	0	57	26-35	49
06:00 AM	1	0	8	86	39	5	0	0	0	0	0	0	0	0	139	26-35	125
07:00 AM	11	0	52	220	91	4	0	0	0	0	0	0	0	0	378	26-35	311
08:00 AM	20	2	37	152	90	8	0	0	0	0	0	0	0	1	310	26-35	242
09:00 AM	3	1	25	118	60	1	0	0	0	0	0	0	0	0	208	26-35	178
10:00 AM	5	1	40	106	36	4	0	0	0	0	0	0	0	0	192	21-30	146
11:00 AM	6	0	21	120	43	6	1	0	0	0	0	0	0	1	198	26-35	163
12:00 PM	9	4	33	126	51	5	0	0	0	0	0	0	0	0	228	26-35	177
01:00 PM	8	0	43	149	54	2	0	0	0	0	0	0	0	0	256	26-35	203
02:00 PM	23	4	42	147	65	6	1	0	0	0	0	0	0	0	288	26-35	212
03:00 PM	24	1	30	227	109	11	3	0	0	0	0	0	0	0	405	26-35	336
04:00 PM	25	2	46	197	113	15	0	0	0	0	0	0	0	0	398	26-35	310
05:00 PM	27	0	36	248	150	12	0	1	0	0	0	0	0	0	474	26-35	398
06:00 PM	14	2	37	171	75	6	3	0	0	0	0	0	0	0	308	26-35	246
07:00 PM	3	0	26	102	43	5	1	0	0	0	0	0	0	0	180	26-35	145
08:00 PM	8	0	17	87	35	4	0	1	0	0	0	0	0	0	152	26-35	122
09:00 PM	1	3	16	47	14	6	0	0	0	0	0	0	0	0	87	21-30	63
10:00 PM	2	0	9	23	15	2	0	0	0	0	0	0	0	0	51	26-35	38
11:00 PM	0	0	5	16	4	1	0	0	0	0	0	0	0	0	26	21-30	21
Day Total	193	23	534	2413	1125	107	10	2	0	0	0	0	0	2	4409	26-35	3538
Percent	4.4%	0.5%	12.1%	54.7%	25.5%	2.4%	0.2%	0%	0%	0%	0%	0%	0%	0%			
AM Peak Volume	8:00 AM 20	1:00 AM 2	7:00 AM 52	7:00 AM 220	7:00 AM 91	8:00 AM 8	4:00 AM 1	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	12:00 AM 0	8:00 AM 1	7:00 AM 378		
PM Peak Volume	5:00 PM 27	12:00 PM 4	4:00 PM 46	5:00 PM 248	5:00 PM 150	4:00 PM 15	3:00 PM 3	5:00 PM 1	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	12:00 PM 0	5:00 PM 474		
Comments:																	

Report generated on 6/9/2023 4:28 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

LOCATION: SW Sunset Blvd btwn SW Timbrel Ln & SW Heatherwood Ln														QC JOB #: 16244017			
SPECIFIC LOCATION:														DIRECTION: WB			
CITY/STATE: Sherwood, OR														DATE: Jun 7 2023			
Speed Range	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	193	23	534	2413	1125	107	10	2	0	0	0	0	0	2	4409	26-35	3538
Percent	4.4%	0.5%	12.1%	54.7%	25.5%	2.4%	0.2%	0%	0%	0%	0%	0%	0%	0%			
Cumulative Percent	4.4%	4.9%	17%	71.7%	97.3%	99.7%	99.9%	100%	100%	100%	100%	100%	100%	100%			
ADT 4409															85th Percentile: 32 MPH Mean Speed(Average): 28 MPH Median: 28 MPH Mode: 28 MPH		
Comments:																	

Type of report: Tube Count - Speed Data

LOCATION: SW Sunset Blvd btwn SW Heatherwood Ln & SW Pinehurst Dr SPECIFIC LOCATION: CITY/STATE: Sherwood, OR															QC JOB #: 16244018 DIRECTION: EB DATE: Jun 7 2023		
Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	3	8	10	1	0	0	0	0	0	0	0	22	31-40	18
01:00 AM	0	0	1	0	1	5	2	0	0	0	0	0	0	1	10	36-45	7
02:00 AM	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3	31-40	2
03:00 AM	0	0	0	0	4	4	1	1	0	0	0	0	0	0	10	31-40	8
04:00 AM	1	0	0	1	9	13	4	1	0	0	0	0	0	0	29	31-40	22
05:00 AM	1	0	1	4	18	31	13	2	0	1	0	0	0	0	71	31-40	49
06:00 AM	15	5	1	1	35	72	21	4	0	0	0	0	0	0	154	31-40	107
07:00 AM	27	16	51	39	59	29	13	0	0	0	0	0	0	0	234	26-35	98
08:00 AM	25	13	4	41	119	71	9	1	0	0	0	0	0	1	284	31-40	190
09:00 AM	10	8	3	12	66	71	16	1	0	0	0	0	0	0	187	31-40	137
10:00 AM	12	30	5	5	56	76	17	0	1	0	0	0	0	0	202	31-40	132
11:00 AM	12	9	4	7	65	80	29	6	0	0	0	0	0	0	212	31-40	145
12:00 PM	12	13	4	5	83	75	23	2	0	0	0	0	0	0	217	31-40	158
01:00 PM	19	11	34	49	59	49	10	4	0	0	1	0	0	0	236	26-35	108
02:00 PM	29	14	8	40	127	88	18	5	1	0	0	0	0	0	330	31-40	215
03:00 PM	29	6	7	5	105	114	18	3	1	0	0	0	0	0	288	31-40	219
04:00 PM	17	15	14	5	120	123	23	2	1	0	0	0	0	0	320	31-40	243
05:00 PM	36	4	7	8	113	143	29	6	0	0	0	0	0	0	346	31-40	256
06:00 PM	15	14	11	3	90	123	33	2	1	0	0	0	0	0	292	31-40	213
07:00 PM	6	10	2	12	83	95	19	1	0	0	0	0	0	0	228	31-40	178
08:00 PM	11	15	6	30	112	67	18	0	0	0	0	0	0	0	259	31-40	179
09:00 PM	6	4	1	8	53	38	7	1	1	0	0	0	0	0	119	31-40	91
10:00 PM	0	1	0	3	19	12	7	0	0	0	0	0	0	0	42	31-40	31
11:00 PM	1	4	2	4	14	9	2	0	0	0	0	0	0	0	36	31-40	23
Day Total	284	192	166	285	1419	1399	334	42	6	1	1	0	0	2	4131	31-40	2818
Percent	6.9%	4.6%	4%	6.9%	34.4%	33.9%	8.1%	1%	0.1%	0%	0%	0%	0%	0%			
AM Peak Volume	7:00 AM 27	10:00 AM 30	7:00 AM 51	8:00 AM 41	8:00 AM 119	11:00 AM 80	11:00 AM 29	11:00 AM 6	10:00 AM 1	5:00 AM 1	12:00 AM 0	12:00 AM 0	12:00 AM 0	1:00 AM 1	8:00 AM 284		
PM Peak Volume	5:00 PM 36	4:00 PM 15	1:00 PM 34	1:00 PM 49	2:00 PM 127	5:00 PM 143	6:00 PM 33	5:00 PM 6	2:00 PM 1	12:00 PM 0	1:00 PM 1	12:00 PM 0	12:00 PM 0	12:00 PM 0	5:00 PM 346		
Comments:																	

Report generated on 6/9/2023 4:28 PM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>)

LOCATION: SW Sunset Blvd btwn SW Heatherwood Ln & SW Pinehurst Dr														QC JOB #: 16244018			
SPECIFIC LOCATION:														DIRECTION: EB			
CITY/STATE: Sherwood, OR														DATE: Jun 7 2023			
Speed Range	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	284	192	166	285	1419	1399	334	42	6	1	1	0	0	2	4131	31-40	2818
Percent	6.9%	4.6%	4%	6.9%	34.4%	33.9%	8.1%	1%	0.1%	0%	0%	0%	0%	0%			
Cumulative Percent	6.9%	11.5%	15.5%	22.4%	56.8%	90.7%	98.7%	99.8%	99.9%	99.9%	100%	100%	100%	100%			
ADT 4131															85th Percentile: 39 MPH Mean Speed(Average): 34 MPH Median: 34 MPH Mode: 33 MPH		
Comments:																	

DRAFT

Attachment C
NCHRP Report 562
worksheets

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

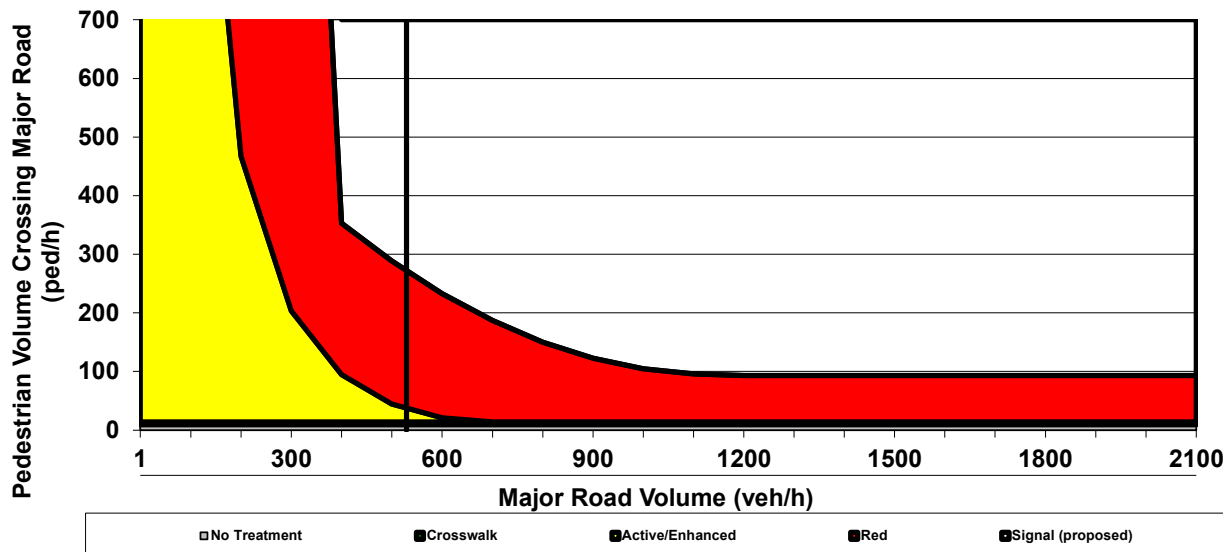
This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

Key

	Blue fields contain descriptive information.
	Green fields are required and must be completed.
	Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
	Gray fields are automatically calculated and should not be edited.

This spreadsheet is still under development, please inform TTI if errors are identified.

Analyst and Site Information			
Analyst	Kittelson	Major Street	Sunset Boulevard
Analysis Date	July 3, 2023	Minor Street or Location	Heatherwood Lane
Data Collection Date	June 7, 2023	Peak Hour	3:30 p.m. - 4:30 p.m.
Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		1a	35
Is the population of the surrounding area <10,000? (enter YES or NO)		1b	No
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		2a	0
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		3a	735
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		3b	271
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		3c	271
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter YES or NO)		3d	No
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50%.		% rate of reduction for 3c (up to 50%)	3e 50%
		Reduced value or 3c	3f 271
Result:			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		4a	50
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		4b	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		4c	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		4d	23
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}		4e	735
Major road flow rate (veh/s), v		4f	0.21
Average pedestrian delay (s/person), d_p		4g	534
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		4h	1.3
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter HIGH for High Compliance or LOW for Low Compliance		5a	Low
Treatment Category:		Consider raised median islands, curb extensions, traffic calming, etc. as feasible.	



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

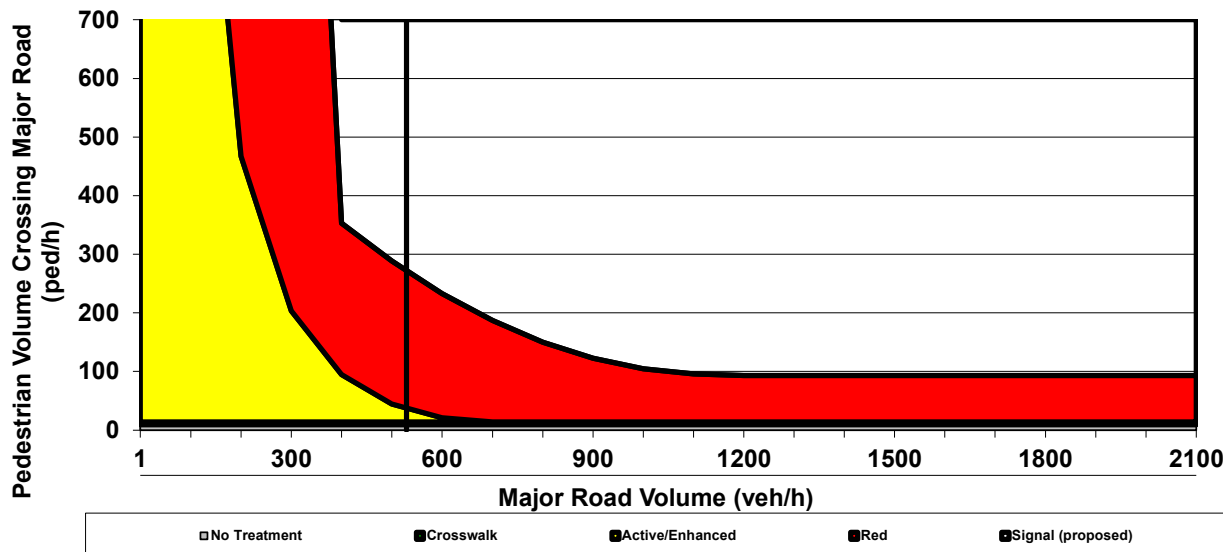
This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

Key

	Blue fields contain descriptive information.
	Green fields are required and must be completed.
	Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
	Gray fields are automatically calculated and should not be edited.

This spreadsheet is still under development, please inform TTI if errors are identified.

Analyst and Site Information			
Analyst	Kittelson	Major Street	Sunset Boulevard
Analysis Date	July 3, 2023	Minor Street or Location	Timbrel Lane
Data Collection Date	June 7, 2023	Peak Hour	1:15 p.m. - 2:15 p.m.
Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		1a	37
Is the population of the surrounding area <10,000? (enter YES or NO)		1b	No
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		2a	76
Result: Go to step 3.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		3a	508
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		3b	271
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		3c	271
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter YES or NO)		3d	No
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50%.		3e	50%
% rate of reduction for 3c (up to 50%)		3f	271
Reduced value or 3c			
Result: The signal warrant is not met. Go to step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		4a	65
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		4b	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		4c	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		4d	23
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}		4e	508
Major road flow rate (veh/s), v		4f	0.21
Average pedestrian delay (s/person), d_p		4g	534
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		4h	1.3
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter HIGH for High Compliance or LOW for Low Compliance		5a	Low
Treatment Category:		ACTIVE OR ENHANCED	



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

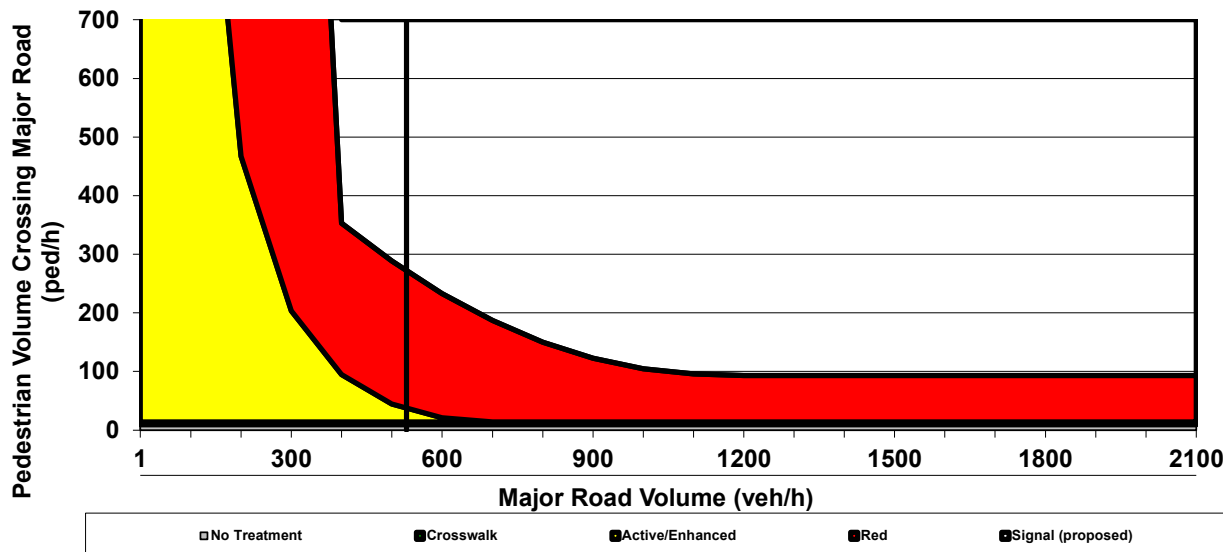
This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

Key

	Blue fields contain descriptive information.
	Green fields are required and must be completed.
	Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
	Gray fields are automatically calculated and should not be edited.

This spreadsheet is still under development, please inform TTI if errors are identified.

Analyst and Site Information			
Analyst	Kittelson	Major Street	Sunset Boulevard
Analysis Date	July 3, 2023	Minor Street or Location	Woodhaven Drive
Data Collection Date	June 7, 2023	Peak Hour	2:10 p.m. -3:10 p.m.
Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		1a	37
Is the population of the surrounding area <10,000? (enter YES or NO)		1b	No
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		2a	9
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		3a	529
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		3b	271
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		3c	271
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter YES or NO)		3d	No
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50%.		% rate of reduction for 3c (up to 50%)	3e 50%
		Reduced value or 3c	3f 271
Result:			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		4a	69
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		4b	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		4c	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		4d	23
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}		4e	529
Major road flow rate (veh/s), v		4f	0.21
Average pedestrian delay (s/person), d_p		4g	534
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		4h	1.3
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter HIGH for High Compliance or LOW for Low Compliance		5a	Low
Treatment Category:		Consider raised median islands, curb extensions, traffic calming, etc. as feasible.	



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

DRAFT

Attachment D
Planning Level Cost
Estimates

Exhibit 1: Sunset/Woodhaven - Dedicated Right Turn Lane

City of Sherwood

Engineer's Conceptual Estimate

Prepared By: Kittelson		Date: July 28, 2023		
Reviewed By: AMR				
This Estimate has a Rating of:		3C (See rating scale guide below.)		
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
Mobilization	LS	ALL	\$10,000.00	\$10,000.00
Traffic Control	LS	ALL	\$5,000.00	\$5,000.00
Construction Staging	LS	ALL	\$5,000.00	\$5,000.00
Erosion Control	AC	0.1	\$10,000.00	\$1,000.00
Removal of Structures and Obstructions	LS	ALL	\$2,000.00	\$2,000.00
Clearing and Grubbing	LS	ALL	\$2,000.00	\$2,000.00
General Earthworks	CY	25	\$40.00	\$1,000.00
Concrete Walks	SF	350	\$25.90	\$9,065.00
Detectable Warnings	EA	8	\$500.00	\$4,000.00
Pedestrian Ramps	EA	8	\$7,500.00	\$60,000.00
Pavement Markings, Complete	LS	ALL	\$6,957.50	\$6,957.50
Striping Removal	LS	ALL	\$5,000.00	\$5,000.00
Signage, Complete	LS	ALL	\$500.00	\$500.00
Illumination System, Complete	LS	ALL	\$1,000.00	\$1,000.00
TOTAL CONSTRUCTION COST				\$ 112,523
ENGINEERING SUPPORT				
Engineering & Construction Management	LS	ALL	\$46,000.00	\$46,000.00
ENGINEERING SUPPORT SUBTOTAL				\$ 46,000
TOTAL PROJECT SUBTOTAL				\$ 158,523
50% Contingency				\$ 79,270
TOTAL ESTIMATED PROJECT COST				\$ 237,793

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 8 inches ACP over 16 inches of compacted aggregate base.
- Due to the separated bicycle facility the assumed storm inlet spacing is 50 feet.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.

Exhibit 2: Sunset/Woodhaven - Shared Through-Right



City of Sherwood

Engineer's Conceptual Estimate

Prepared By: Kittelson		Date: July 28, 2023			
Reviewed By: AMR					
This Estimate has a Rating of:		3C (See rating scale guide below.)			
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
Mobilization	LS	ALL	\$10,000.00	\$10,000.00	
Traffic Control	LS	ALL	\$5,000.00	\$5,000.00	
Construction Staging	LS	ALL	\$5,000.00	\$5,000.00	
Erosion Control	AC	0.1	\$10,000.00	\$1,000.00	
Removal of Structures and Obstructions	LS	ALL	\$2,000.00	\$2,000.00	
Clearing and Grubbing	LS	ALL	\$2,000.00	\$2,000.00	
General Earthworks	CY	25	\$40.00	\$1,000.00	
Concrete Curbs - Standard Curb	LF	40	\$30.90	\$1,236.00	
Concrete Walks	SF	350	\$25.90	\$9,065.00	
Detectable Warnings	EA	8	\$500.00	\$4,000.00	
Pedestrian Ramps	EA	8	\$7,500.00	\$60,000.00	
Striping Removal	LS	ALL	\$5,000.00	\$5,000.00	
Pavement Markings, Complete	LS	ALL	\$6,992.50	\$6,992.50	
Signage, Complete	LS	ALL	\$500.00	\$500.00	
Illumination System, Complete	LS	ALL	\$1,000.00	\$1,000.00	
TOTAL CONSTRUCTION COST				\$	113,794
ENGINEERING SUPPORT					
Engineering & Construction Management	LS	ALL	\$46,000.00	\$46,000.00	
ENGINEERING SUPPORT SUBTOTAL				\$	46,000
TOTAL PROJECT SUBTOTAL				\$	159,794
30% Contingency				\$	47,940
TOTAL ESTIMATED PROJECT COST				\$	207,734

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 8 inches ACP over 16 inches of compacted aggregate base.
- Due to the separated bicycle facility the assumed storm inlet spacing is 50 feet.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.

Exhibit 3: Sunset/Timbrel - Relocate Crosswalk



City of Sherwood

Engineer's Conceptual Estimate

Prepared By: Kittelson		Date: July 28, 2023			
Reviewed By: AMR					
This Estimate has a Rating of:		3C (See rating scale guide below.)			
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
Mobilization	LS	ALL	\$7,000.00	\$7,000.00	
Traffic Control	LS	ALL	\$4,000.00	\$4,000.00	
Construction Staging	LS	ALL	\$4,000.00	\$4,000.00	
Concrete Walks	SF	300	\$25.90	\$7,770.00	
Detectable Warnings	EA	6	\$500.00	\$3,000.00	
Pedestrian Ramps	EA	6	\$7,500.00	\$45,000.00	
Pavement Markings, Complete	LS	ALL	\$4,490.00	\$4,490.00	
Signage, Complete	LS	ALL	\$1,000.00	\$1,000.00	
Illumination System, Complete	LS	ALL	\$2,000.00	\$2,000.00	
TOTAL CONSTRUCTION COST				\$	78,260
ENGINEERING SUPPORT					
Engineering & Construction Management	LS	ALL	\$32,000.00	\$32,000.00	
ENGINEERING SUPPORT SUBTOTAL				\$	32,000
ENGINEERING PERMITS					
Grading & Erosion Control Permit	LS	ALL	\$2,734.00	\$2,734.00	
ENGINEERING PERMITS SUBTOTAL				\$	2,734
TOTAL PROJECT SUBTOTAL				\$	112,994
30% Contingency				\$	33,900
TOTAL ESTIMATED PROJECT COST				\$	146,894

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 8 inches ACP over 16 inches of compacted aggregate base.
- Due to the separated bicycle facility the assumed storm inlet spacing is 50 feet.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.

Exhibit 4: Sunset/Timbrel - Remove Sidewalk, Widen Timbrel

City of Sherwood

Engineer's Conceptual Estimate

Prepared By: Kittelson		Date: July 28, 2023			
Reviewed By: AMR					
This Estimate has a Rating of:		3C (See rating scale guide below.)			
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
Mobilization	LS	ALL	\$13,000.00	\$13,000.00	
Traffic Control	LS	ALL	\$7,000.00	\$7,000.00	
Construction Staging	LS	ALL	\$7,000.00	\$7,000.00	
Erosion Control	AC	0.1	\$10,000.00	\$1,000.00	
Removal of Structures and Obstructions	LS	ALL	\$3,000.00	\$3,000.00	
Clearing and Grubbing	LS	ALL	\$3,000.00	\$3,000.00	
General Earthworks	CY	ALL	\$40.00	\$40.00	
Asphalt Roadway - Full Depth	SF	2,130	\$9.20	\$19,596.00	
Subgrade Geotextile	SY	237	\$1.50	\$355.50	
Concrete Curbs - Standard Curb & Gutter	LF	250	\$43.70	\$10,925.00	
Concrete Walks	SF	1,300	\$25.90	\$33,670.00	
Detectable Warnings	EA	6	\$500.00	\$3,000.00	
Pedestrian Ramps	EA	6	\$7,500.00	\$45,000.00	
Pavement Markings, Complete	LS	ALL	\$6,170.00	\$6,170.00	
Signage, Complete	LS	ALL	\$2,000.00	\$2,000.00	
Illumination System, Complete	LS	ALL	\$3,000.00	\$3,000.00	
TOTAL CONSTRUCTION COST				\$	157,757
RIGHT-OF-WAY COSTS					
Residential Right-of-Way Acquisition	SF	1,500	\$15.00	\$22,500.00	
RIGHT-OF-WAY SUBTOTAL				\$	22,500
ENGINEERING SUPPORT					
Engineering & Construction Management	LS	ALL	\$64,000.00	\$64,000.00	
Right-of-Way Support	EA	1	\$18,000.00	\$18,000.00	
ENGINEERING SUPPORT SUBTOTAL				\$	82,000
ENGINEERING PERMITS					
Grading & Erosion Control Permit	LS	ALL	\$2,734.00	\$2,734.00	
ENGINEERING PERMITS SUBTOTAL				\$	2,734
TOTAL PROJECT SUBTOTAL				\$	264,991
30% Contingency				\$	79,500
TOTAL ESTIMATED PROJECT COST				\$	344,491

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 8 inches ACP over 16 inches of compacted aggregate base.
- Due to the separated bicycle facility the assumed storm inlet spacing is 50 feet.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.

Exhibit 5: Sunset/Timbre - Roundabout Concept



City of Sherwood

Engineer's Conceptual Estimate

Prepared By: Kittelson		Date: July 28, 2023			
Reviewed By: AMR					
This Estimate has a Rating of:		3C (See rating scale guide below.)			
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
Mobilization	LS	ALL	\$154,000.00	\$154,000.00	
Traffic Control	LS	ALL	\$77,000.00	\$77,000.00	
Construction Staging	LS	ALL	\$77,000.00	\$77,000.00	
Erosion Control	AC	0.1	\$10,000.00	\$1,000.00	
Removal of Structures and Obstructions	LS	ALL	\$34,000.00	\$34,000.00	
Clearing and Grubbing	LS	ALL	\$30,000.00	\$30,000.00	
General Earthworks	CY	ALL	\$40.00	\$40.00	
Asphalt Roadway - Full Depth	SF	28,000	\$9.20	\$257,600.00	
Subgrade Geotextile	SY	3,112	\$1.50	\$4,668.00	
Concrete Curbs - Standard Curb & Gutter	LF	250	\$43.70	\$10,925.00	
Raised Concrete Island	SF	6,400	\$35.90	\$229,760.00	
Truck Apron (Concrete)	SF	2,000	\$36.80	\$73,600.00	
Concrete Walks	SF	12,000	\$25.90	\$310,800.00	
Detectable Warnings	EA	6	\$500.00	\$3,000.00	
Bike Ramps	EA	4	\$2,500.00	\$10,000.00	
Extra for Pedestrian Ramps	EA	6	\$1,500.00	\$9,000.00	
Storm Water Conveyance System, Complete	LS	ALL	\$501,000.00	\$501,000.00	
Permanent Landscaping	SF	8,400	\$4.20	\$35,280.00	
Pavement Markings, Complete	LS	ALL	\$6,170.00	\$6,170.00	
Signage, Complete	LS	ALL	\$14,000.00	\$14,000.00	
Illumination System, Complete	LS	ALL	\$3,000.00	\$3,000.00	
TOTAL CONSTRUCTION COST			\$	1,841,843	
ENGINEERING SUPPORT					
Engineering & Construction Management	LS	ALL	\$737,000.00	\$737,000.00	
Right-of-Way Support	EA	3	\$18,000.00	\$54,000.00	
ENGINEERING SUPPORT SUBTOTAL				\$	791,000
ENGINEERING PERMITS					
Grading & Erosion Control Permit	LS	ALL	\$2,734.00	\$2,734.00	
ENGINEERING PERMITS SUBTOTAL				\$	2,734
TOTAL PROJECT SUBTOTAL				\$	2,635,577
30% Contingency				\$	790,680
TOTAL ESTIMATED PROJECT COST				\$	3,426,257

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 8 inches ACP over 16 inches of compacted aggregate base.
- Due to the separated bicycle facility the assumed storm inlet spacing is 50 feet.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.

Exhibit 6: Sunset/Heatherwood - New Marked Crosswalk

City of Sherwood

Engineer's Conceptual Estimate

Prepared By: Kittelson		Date: July 28, 2023		
Reviewed By: AMR				
This Estimate has a Rating of:		3C (See rating scale guide below.)		
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
Mobilization	LS	ALL	\$4,000.00	\$4,000.00
Traffic Control	LS	ALL	\$2,000.00	\$2,000.00
Construction Staging	LS	ALL	\$2,000.00	\$2,000.00
Erosion Control	AC	0.1	\$10,000.00	\$1,000.00
Removal of Structures and Obstructions	LS	ALL	\$1,500.00	\$1,500.00
Clearing and Grubbing	LS	ALL	\$1,000.00	\$1,000.00
General Earthworks	CY	25	\$40.00	\$1,000.00
Concrete Curbs - Standard Curb	LF	25	\$30.90	\$772.50
Concrete Walks	SF	100	\$25.90	\$2,590.00
Detectable Warnings	EA	3	\$500.00	\$1,500.00
Pedestrian Ramps	EA	3	\$7,500.00	\$22,500.00
Pavement Markings, Complete	LS	ALL	\$1,250.00	\$1,250.00
Signage, Complete	LS	ALL	\$500.00	\$500.00
Illumination System, Complete	LS	ALL	\$4,000.00	\$4,000.00
TOTAL CONSTRUCTION COST			\$	45,613
TOTAL PROJECT SUBTOTAL			\$	45,613
30% Contingency			\$	13,690
TOTAL ESTIMATED PROJECT COST			\$	59,303

Unit Costs Note:

The associated product and material costs are based upon the most recent available cost data. Due to the current volatility of the construction market, we cannot guarantee these costs for any duration of time.

Assumptions:

- The assumed roadway section is 8 inches ACP over 16 inches of compacted aggregate base.
- Due to the separated bicycle facility the assumed storm inlet spacing is 50 feet.
- All overhead utilities will be relocated and remain above ground.
- No sound walls are required for this project.