MEMORANDUM

DATE: December 3, 2021

TO: Nikki Fowler | Newberg School District

CC: Trevor Clark |BRIC Architecture
Mary Dolan | Cornerstone Management

FROM: Lacy Brown, Ph. D., P.E. | DKS Associates
Jenna Bogert, P.E. | DKS Associates

SUBJECT: Newberg Edwards Elementary School Upgrades Project #21164-000
Transportation Evaluation

This memorandum provides a transportation evaluation of the proposed upgrades to Edwards Elementary School in Newberg, Oregon. The upgrades include increasing the total number of classrooms from 23 to 26 classrooms and updating the existing kitchen, cafeteria, and Welcome Center. Additionally, the number of early childhood suites will be increased from one to two suites with support space for a total of 3,000 square feet. The elementary school enrollment is not expected to increase due to the proposed updates, which are focused on "right-sizing" the school for the anticipated student population (550 – 560 students).

This memorandum includes an estimate of the potential increase in trip generation and an evaluation of the parking lot circulation changes that are proposed. Additionally, an analysis of the collision history on the surrounding roadways and an evaluation of safe routes to school will be included in this study.

TRIP GENERATION

Trip generation is the method used to estimate the number of vehicles added to site driveways and the adjacent roadway network by a development during a specified period (such as the PM peak hour). Trip generation for elementary schools are typically driven by student enrollment. As stated earlier, the proposed elementary school upgrades are focused on "right-sizing" the elementary school to accommodate its current student population, which is anticipated to remain the same or slightly decrease after the site changes are implemented. Therefore, no new vehicle trips associated with the elementary school students are anticipated to be generated.

However, the early childhood suites on the site will be increasing from one classroom to two classrooms. The early childhood suites provide pre-school/daycare activities for children ages 0 – 6. Currently, the early childhood suite is a 1,700 square-foot portable classroom. After the site upgrades, there will be two early childhood suites and support space totaling 3,000 square feet. The increase in size for the early childhood suites is expected to increase vehicle traffic at the

project site. To estimate this increase in trip generation, the Institute of Transportation Engineers (ITE) trip generation rates for Day Care Center (565) were used.[1] See Table 1 below for the estimate trip generation for the a.m. and p.m. peak hours and an average weekday.

TABLE 1: ESTIMATED TRIP GENERATION INCREASE

LAND USE (ITE CODE)	SIZE INCREASE	AM PEAK HOUR TRIPS			PM PEAK HOUR TRIPS			WEEKDAY TRIPS
		IN	OUT	TOTAL	IN	OUT	TOTAL	
DAYCARE (565)	1,300 square feet	7	7	14	6	8	14	62

Based on the Newberg City Development Code[2], if a project generates 40 or more p.m. peak hour trips, a full traffic impact study is required. As shown in the table above, a total 14 p.m. peak hour trips are estimated to be generated by the increased number of childhood suites. Therefore, a full traffic impact study is not required for this project.

CRASH ANALYSIS

A crash analysis for the study area was conducted based on the most recent five years (2015 - 2019) of collision data available. Collision data was obtained from the ODOT Crash Analysis and Reporting Unit and visualized using an online application developed by DKS Associates[3].

FIGURE 1: CRASH MAP (2015 – 2019)

There were a total of four collisions from 2015 to 2019 on the nearby streets as shown in Figure 1. Of the four crashes, three were property damage only and one resulted in possible injury. None of the crashes involved a pedestrian or bicyclist. The possible injury crash occurred at the 6th

[1] Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, 2021.
[2] Title 15.220, City of Newberg Development Code.
[3] https://public.tableau.com/app/profile/veronica.sullivan/viz/OregonDASH2015-2019_16265353660650/Overview

Street/Meridian Street intersection and was caused by a northbound vehicle on Meridian Street that failed to yield to an eastbound vehicle on 6th Street.

Based on the crash data, there is no indication of safety deficiencies in the study area.

INTERSECTION ANALYSIS

Intersection operations at the 6th Street/College Street intersection were determined for the AM, Afternoon, and PM peak hours based on the Highway Capacity Manual (HCM) 6th Edition methodology for unsignalized intersections.

Operations (shown in Table 2) lists the v/c ratio, delay, and LOS for the future build (2023) scenario. Under the existing conditions the intersection is a three-leg intersection with a stop sign on the southbound College Street approach. The future build scenario represents the elementary school after the upgrades, which include adding a parking lot access to the 6th Street/College St intersection, making it a four-leg intersection with stop signs on the northbound and southbound approaches. The north parking lot is estimated to provide vehicle parking for Elementary School staff and School District employees as well as accommodate parent drop-off/pick-up for some of the elementary school students and students of the Early Childhood Suites.

TABLE 2: INTERSECTION OPERATIONS – BUILD (TWO-WAY STOP-CONTROLLED)

INTERSECTION	MOBILITY STANDARD	CRITICAL APPROACH	BUILD (2023)		
			V/C	DELAY	LOS
AM PEAK HOUR					
6th Street/College Street	LOS D	Northbound	0.16	12.7	B
AFTERNOON PEAK HOUR					
6th Street/College Street	LOS D	Northbound	0.08	10.9	B
PM PEAK HOUR					
6th Street/College Street	LOS D	Northbound	0.02	9.6	A

Delay = Average delay (sec) or worst approach
LOS = Level of Service based on delay
v/c = volume-to-capacity ratio of approach with highest delay

As shown, the study intersection will meet the City of Newberg mobility standard of LOS D under future build conditions. The HCM reports are included in the attachments. There are no capacity improvements needed at this intersection.

ALL-WAY STOP WARRANT

The intersection of 6th Street/College Street was evaluated to determine whether this location warrants a multi-way stop (or all-way stop). Based on guidance from the Manual on Uniform Traffic Control Devices (MUTCD),[4] multi-way stops can be useful as safety measures to address

[4] Section 2B.07, Manual on Uniform Traffic Control Devices, 2009 Edition.

pedestrian, bicyclists, and vehicles. The following criteria should be considered when considering a multi-way stop installation.

- Traffic signal: If a traffic signal is warranted at the intersection, a multi-way stop may be installed as an interim measure.
- Crash Data: Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop (e.g., right-turn and left-turn collisions).
- Minimum volume: Total of both major street approaches average at least 300 total entering vehicles per hour for any 8 hours and the total of both minor street approaches is at least 200 units (pedestrians, bicyclists, and vehicles) per hour for the same 8 hours. The intersection must also have an average delay on the minor street of 30 seconds per vehicle during the peak hour.

This intersection does not meet the any of the criteria listed above.

There is a list of other criteria that may be considered when none of the above criteria can be met. One criterion listed says that if there is a need to control vehicle/pedestrian conflicts near the locations that generate high pedestrian volumes. Based on count data, there were a total of 91 pedestrian crossings at the College Street/6th Street intersection during the AM peak hour (7:10 – 8:10 AM) and 78 pedestrian crossings during the Afternoon peak hour (2:10 – 3:10 PM). The Newberg-Dundee School District and the City of Newberg should discuss the desire to install an all-way stop at this location.

Although an all-way stop is not warranted based on the MUTCD's primary criteria, the intersection has a high volume of pedestrians and an all-way stop could be considered. Vehicle operations (shown in Table 3) lists the v/c ratio, delay, and LOS for the future build (2023) scenario for the intersection of 6th Street/College Street as an all-way stop controlled intersection.

TABLE 3: INTERSECTION OPERATIONS – BUILD (ALL-WAY STOP-CONTROLLED)

INTERSECTION	MOBILITY STANDARD	CRITICAL APPROACH	BUILD (2023)		
			V/C	DELAY	LOS
AM PEAK HOUR					
6th Street/College Street	LOS D	Eastbound	0.21	8.2	A
AFTERNOON PEAK HOUR					
6th Street/College Street	LOS D	Eastbound	0.11	7.6	A
PM PEAK HOUR					
6th Street/College Street	LOS D	Eastbound	0.09	7.3	A

Delay = Average delay (sec) per vehicle for total intersection
LOS = Level of Service based on delay
v/c = volume-to-capacity ratio of highest approach

SAFE ROUTES TO SCHOOL

Currently, the City of Newberg is implementing Phase 2 of the Edwards Elementary Safe Routes to School (SRTS) Plan. Safe Routes to School (SRTS) is a program in Oregon that aims to make school communities safer by combining engineering tools and enforcement with education about safety to encourage students to walk and bicycle to school. SRTS plans not only improve safety, but they also encourage physical activity, increase access to school, and reduce traffic congestion and motor vehicle emissions. The SRTS Plan is an ongoing project list and projects are built as funding becomes available.

The following list is based on current recommendations from the City's Safe Routes to School Plan. A map of the projects is provided in Attachment C.

- Install/repair sidewalk along the east side of Blain Street from 3rd Street to 6th Street.
- Install a new marked crosswalk on the east leg of 6th Street/Blaine Street. Include new curb ramps on the northeast, southeast, and southwest corners.
- Install new marked crosswalks on the west, north, and south legs of 6th Street/River Street. Include new curb ramps on the northwest, southwest, and southeast corners.
- Install R1-6c signs (see right) at the following intersections on 6th Street: Howard Street, School Street, College Street, Edwards Street, and Meridian Street.

FIGURE 2: R1-6c Sign

In addition to the City's current SRTS recommendations, DKS recommends the following projects be added to the SRTS Plan.

- Consider installation of a rectangular rapid flashing beacon (RRFB) at the intersection of 6th Street/Edwards Street or at 6th Street/College Street. A pedestrian study will be required to confirm that an RRFB is appropriate for the existing vehicle traffic volumes and pedestrian crossing volumes. Note that that an RRFB is not recommended at either location if an all-way stop is installed at 6th/College. See All-Way Stop Warrant discussion.
- Install sidewalk infill and curb ramps as shown on the map in Attachment D.

DKS recommends that, as part of the Edwards Elementary School upgrade project, one of the two following SRTS improvement options are implemented along 6th Street to facilitate safe pedestrian crossings near the school building entrances.

- Maintain a two-way stop control intersection at 6th Street & College Street. Stripe crosswalks across all four approaches and build ADA compliant curb ramps on all four corners. Install R1-6c signs on the 6th Street approaches. Provide a school crossing guard during peak school start and end times.
- Install an all-way stop at the intersection 6th Street & College Street. Stripe crosswalks across all four approaches and build ADA compliant curb ramps on all four corners.

SITE EVALUATION

A conceptual site plan showing the proposed site improvements is provided as an attachment. Site improvements include a new parking area in the northwest corner of the site and some minor changes to the south parking lot.

SITE ACCESSES

The new parking lot on the northwest corner of the project site will provide access to the early childhood education classrooms, kitchen, cafeteria, and the Welcome Center. Therefore, the use of this parking lot and loading loop will be primarily for visitor parking, kitchen deliveries, and parent activity related to the early childhood education program. The majority of elementary school loading (bus and parent vehicle) will occur on 7th Street (buses) or in the south parking lot (parent vehicles). The new site access will be the fourth leg of the 6th Street/College Street intersection and does not change the access spacing along 6th Street. See the Intersection Analysis section for the estimated vehicle operations at the intersection.

Prior to occupancy, sight distance at any new or modified access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.

No modifications to the two existing site driveways on 8th Street to the south parking lot are proposed.

VEHICLE AND SCHOOL BUS CIRCULATION

The on-site circulation has been designed strategically to separate parent drop-off traffic from staff and bus drop-off traffic, which increases safety and minimizes off-site traffic impacts.

Parent Vehicle Loading Area

The majority of elementary student drop-off and pick-up activity is expected to occur in the south parking lot, based on the location of the building entrances and classrooms on site after the project construction. The south parking lot is accessed via 8th Street and will also continue to accommodate parent and visitor vehicle parking. The student drop-off/pick-up curb in the south parking lot will be slightly widened by removing existing landscaping to accommodate safer vehicle maneuvers in front of the main elementary school building.

School Bus Loading Area

The school bus loading is currently located on 7th Street adjacent to the school and will continue to be after the school upgrades. School buses will enter the site via 6th Street and travel south along 7th Street and load students on the southeast corner of the main building. To exit the site, school buses will enter the south parking lot and exit at the east driveway on 8th Street. There are five school buses that serve the elementary school.

PARKING

Vehicle parking for the site is provided via off-street and on-street parking stalls. The following sections contain a discussion on the vehicle parking changes proposed.

Off-Street Parking

The proposed project will add 24 vehicle parking stalls to the site via the new parking lot on the northwest corner of the site. This is sufficient to meet the City's parking standards.

On-Street Parking

Unrestricted on-street parking is currently available and will continue to be available on the south side of 6th Street (angle parking) and north side of 6th Street (parallel). Although some angle parking stalls will be removed to accommodate the access to the new 24-stall parking lot, no changes to the remaining on-street parking stalls are proposed.

On 8th Street, it is recommended to restrict parking between the east south parking lot driveway and the private driveway to the east (approximately 25 feet) to maximize the available turning radius on 8th Street for passenger cars and school buses to enter and exit the site driveway.

SUMMARY

The following list is a summary of the traffic analysis for the Edwards Elementary School Upgrade project.

- The estimated increase in trip generation is 14 a.m. peak hour trips and 14 p.m. peak hour trips due to the increased size of the early childhood suites on-site. A full traffic impact study is not required per City code.
- Based on the crash data, there is no indication of safety deficiencies in the study area.
- The 6th Street/College Street intersection will meet the City of Newberg operating standard of LOS D under future build conditions as a two-way stop-controlled and as an all-way stop-controlled intersection. Further discussion with the City is required to determine the desired traffic control at this intersection.
- DKS recommends that, as part of the Edwards Elementary School upgrade project, one of the two following SRTS improvement options are implemented along 6th Street to facilitate safe pedestrian crossings near the school building entrances.
    - Maintain a two-way stop control intersection at 6th Street & College Street. Stripe crosswalks across all four approaches and build ADA compliant curb ramps on all four corners. Install R1-6c signs on the 6th Street approaches. Provide a school crossing guard during peak school start and end times.
    - Install an all-way stop at the intersection 6th Street & College Street. Stripe crosswalks across all four approaches and build ADA compliant curb ramps on all four corners.

- A new 24-stall parking lot on the northwest corner of the project site will be accessed via a new connection to 6th Street at College Street. Prior to occupancy, sight distance at any new or modified access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.
- The project will increase the number of on-site vehicle parking stalls by 24 stalls.
- It is recommended to restrict parking between the east driveway on 8th Street and the private driveway (approximately 25 feet) to maximize the available turning radius on 8th Street for passenger cars and school buses to enter and exit the east driveway.

Attachments

A. HCM Reports – TWSC

B. HCM Reports - AWSC

C. City of Newberg – Edwards Elementary Safe Routes to School Map

D. Map of Additional Projects for Edwards Elementary Safe Routes to School Program

E. Conceptual Site Plan

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	62	27	18	21	17	23	13	15	30	15	9
Future Vol, veh/h	13	62	27	18	21	17	23	13	15	30	15	9
Conflicting Peds, #/hr	1	0	67	67	0	1	16	0	7	7	0	16
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	59	59	59	59	59	59	59	59	59	59	59	59
Heavy Vehicles, %	0	5	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	105	46	31	36	29	39	22	25	51	25	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	66	0	0	218	0	0	388	367	202	317	376	68
Stage 1	-	-	-	-	-	-	239	239	-	114	114	-
Stage 2	-	-	-	-	-	-	149	128	-	203	262	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1549	-	-	1364	-	-	574	565	844	640	558	1001
Stage 1	-	-	-	-	-	-	769	711	-	896	805	-
Stage 2	-	-	-	-	-	-	858	794	-	804	695	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1548	-	-	1277	-	-	486	507	785	576	501	985
Mov Cap-2 Maneuver	-	-	-	-	-	-	486	507	-	576	501	-
Stage 1	-	-	-	-	-	-	708	655	-	881	784	-
Stage 2	-	-	-	-	-	-	785	773	-	735	640	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	2.5	12.7	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	554	1548	-	-	1277	-	-	592
HCM Lane V/C Ratio	0.156	0.014	-	-	0.024	-	-	0.155
HCM Control Delay (s)	12.7	7.4	0	-	7.9	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	41	15	10	29	8	18	10	12	25	8	17
Future Vol, veh/h	16	41	15	10	29	8	18	10	12	25	8	17
Conflicting Peds, #/hr	1	0	66	66	0	1	8	0	3	3	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	6	2	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	21	53	19	13	38	10	23	13	16	32	10	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	49	0	0	138	0	0	264	246	132	192	250	52
Stage 1	-	-	-	-	-	-	171	171	-	70	70	-
Stage 2	-	-	-	-	-	-	93	75	-	122	180	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1533	-	-	1458	-	-	693	660	923	772	656	1021
Stage 1	-	-	-	-	-	-	836	761	-	945	841	-
Stage 2	-	-	-	-	-	-	919	836	-	887	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1532	-	-	1366	-	-	611	603	863	730	600	1012
Mov Cap-2 Maneuver	-	-	-	-	-	-	611	603	-	730	600	-
Stage 1	-	-	-	-	-	-	772	703	-	931	832	-
Stage 2	-	-	-	-	-	-	872	827	-	841	697	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	1.6	10.9	10.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	667	1532	-	-	1366	-	-	777
HCM Lane V/C Ratio	0.078	0.014	-	-	0.01	-	-	0.084
HCM Control Delay (s)	10.9	7.4	0	-	7.7	0	-	10.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	45	4	3	29	11	4	2	3	14	2	22
Future Vol, veh/h	5	45	4	3	29	11	4	2	3	14	2	22
Conflicting Peds, #/hr	3	0	21	21	0	3	1	0	4	4	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	4	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	7	63	6	4	40	15	6	3	4	19	3	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	58	0	0	90	0	0	175	167	91	147	163	52
Stage 1	-	-	-	-	-	-	101	101	-	59	59	-
Stage 2	-	-	-	-	-	-	74	66	-	88	104	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1559	-	-	1518	-	-	792	729	972	826	733	1021
Stage 1	-	-	-	-	-	-	910	815	-	958	850	-
Stage 2	-	-	-	-	-	-	940	844	-	925	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1555	-	-	1488	-	-	745	706	949	809	710	1017
Mov Cap-2 Maneuver	-	-	-	-	-	-	745	706	-	809	710	-
Stage 1	-	-	-	-	-	-	887	795	-	950	845	-
Stage 2	-	-	-	-	-	-	905	839	-	910	793	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.5	9.6	9.2
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	792	1555	-	-	1488	-	-	910
HCM Lane V/C Ratio	0.016	0.004	-	-	0.003	-	-	0.058
HCM Control Delay (s)	9.6	7.3	0	-	7.4	0	-	9.2
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	62	27	18	21	17	23	13	15	30	15	9
Future Vol, veh/h	13	62	27	18	21	17	23	13	15	30	15	9
Peak Hour Factor	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Heavy Vehicles, %	0	5	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	105	46	31	36	29	39	22	25	51	25	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.4	8	8.1	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	45%	13%	32%	56%
Vol Thru, %	25%	61%	38%	28%
Vol Right, %	29%	26%	30%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	51	102	56	54
LT Vol	23	13	18	30
Through Vol	13	62	21	15
RT Vol	15	27	17	9
Lane Flow Rate	86	173	95	92
Geometry Grp	1	1	1	1
Degree of Util (X)	0.108	0.206	0.116	0.117
Departure Headway (Hd)	4.517	4.287	4.385	4.606
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	794	838	818	778
Service Time	2.544	2.308	2.408	2.633
HCM Lane V/C Ratio	0.108	0.206	0.116	0.118
HCM Control Delay	8.1	8.4	8	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.8	0.4	0.4

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	41	15	10	29	8	18	10	12	25	8	17
Future Vol, veh/h	16	41	15	10	29	8	18	10	12	25	8	17
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	6	2	0	0	7	0	0	0	0	0	0	0
Mvmt Flow	21	53	19	13	38	10	23	13	16	32	10	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.5	7.5	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	45%	22%	21%	50%
Vol Thru, %	25%	57%	62%	16%
Vol Right, %	30%	21%	17%	34%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	40	72	47	50
LT Vol	18	16	10	25
Through Vol	10	41	29	8
RT Vol	12	15	8	17
Lane Flow Rate	52	94	61	65
Geometry Grp	1	1	1	1
Degree of Util (X)	0.06	0.108	0.07	0.074
Departure Headway (Hd)	4.127	4.171	4.115	4.102
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	854	850	859	859
Service Time	2.221	2.244	2.196	2.194
HCM Lane V/C Ratio	0.061	0.111	0.071	0.076
HCM Control Delay	7.5	7.8	7.5	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.4	0.2	0.2

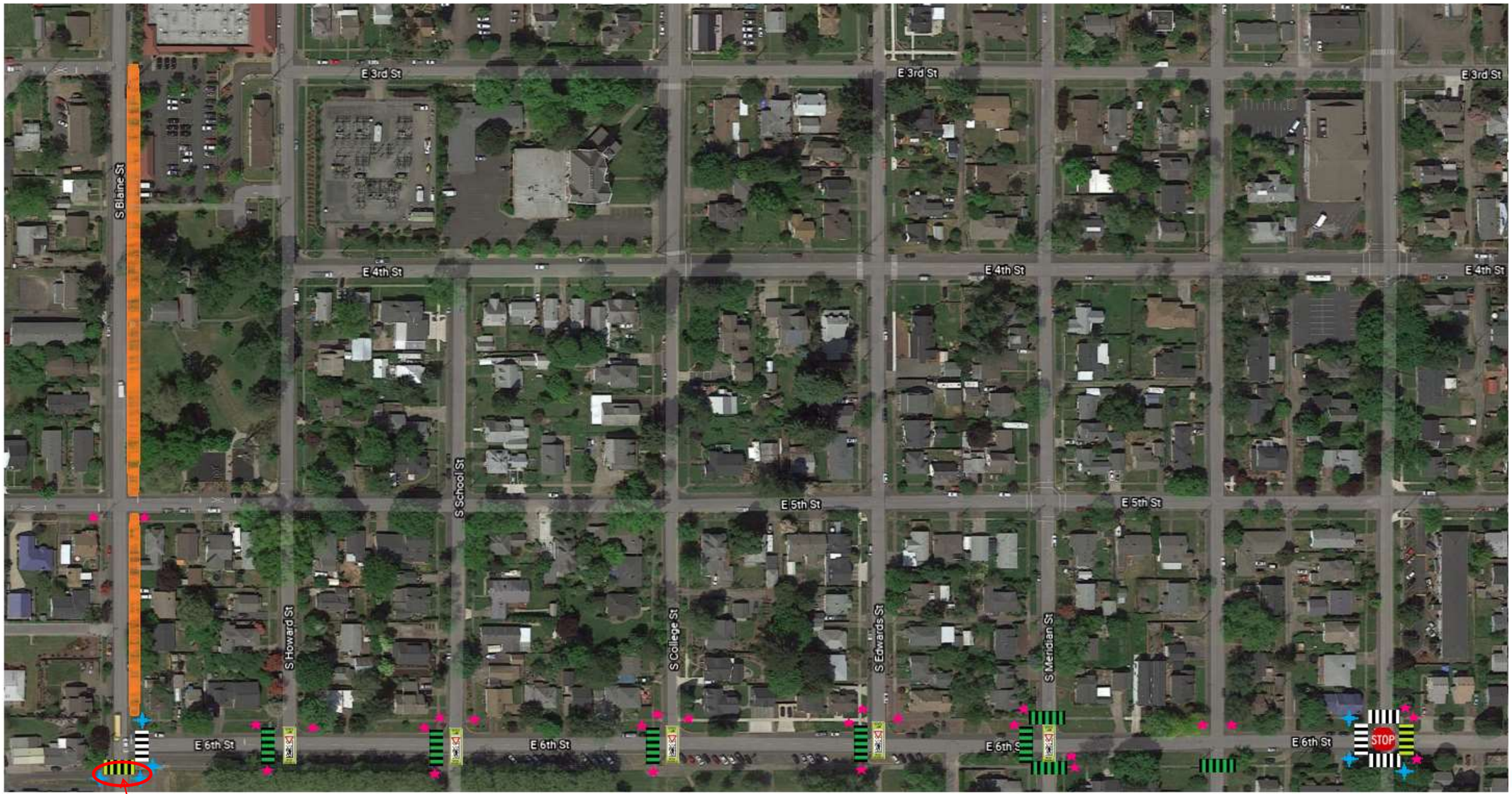
Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	45	4	3	29	11	4	2	3	14	2	22
Future Vol, veh/h	5	45	4	3	29	11	4	2	3	14	2	22
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles, %	0	4	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	7	63	6	4	40	15	6	3	4	19	3	31
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.2	7.2	7.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	44%	9%	7%	37%
Vol Thru, %	22%	83%	67%	5%
Vol Right, %	33%	7%	26%	58%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	54	43	38
LT Vol	4	5	3	14
Through Vol	2	45	29	2
RT Vol	3	4	11	22
Lane Flow Rate	12	75	60	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.014	0.084	0.065	0.057
Departure Headway (Hd)	4.063	4.033	3.931	3.868
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	872	886	907	918
Service Time	2.128	2.069	1.971	1.926
HCM Lane V/C Ratio	0.014	0.085	0.066	0.058
HCM Control Delay	7.2	7.4	7.2	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.3	0.2	0.2

Safe Routes to School Concept Plan
City of Newberg - Edwards Elementary
August 2020



Legend

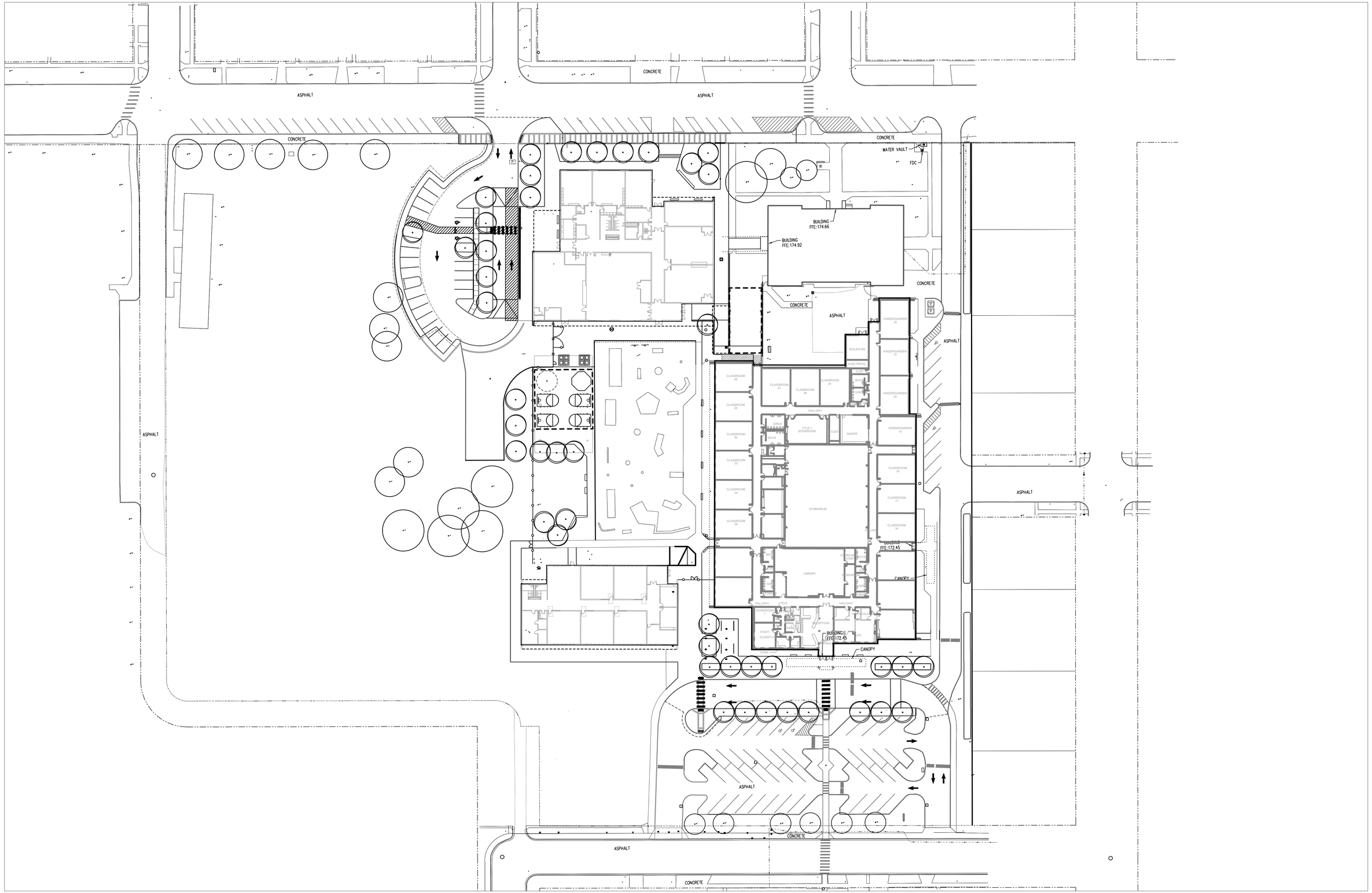
- Existing Crosswalk Replacement
- Existing Crosswalk
- Crosswalk Installation
- Existing Curb Ramp
- Curb Ramp Installation
- R1-6c Installation
- Stop Sign Installation (Change Two Way Controlled to Allway Controlled)
- Sidewalk Repair/Installation

N

Not to Scale

NOT PART OF THE PROJECT INCLUDED IN THE AUGUST 2020 SRTS GRANT APPLICATION. THESE ELEMENTS, TO BE PART OF A FUTURE PROJECT, ARE SHOWN FOR REFERENCE ONLY.


HEALINGBIOLOGICS.US
Oregon Mobile Mechanic
E 6th St
Newberg School District Office
S College St
S Howard St
S School St
E 7th St
S Center St
S River St
JoeTown Painting Services
S Blaine St
Project Site
Edwards Elementary School
Cafeli Roasters
Takeout
River Street Church of God
Renne Park
S Columbia St
S Pacific St
E 8th St
Flare & Bare Wax Studio
E 9th St
Willis Collectibles
Collectibles store
Townhouse Village Apartments
E 10th St
Recommended Sidewalk Infill
Existing School Speed Zones
Install Pedestrian Safety Improvement



EDWARDS ES SITE PLAN
WALKER MACY

0 10 20 40 80
SCALE: 1" = 40'-0"