Appendix E

California Emissions Estimator Model Results for Greenhouse Gases
and GHG Trip Estimate Update Memorandum

Windsor May Update GHG - Sonoma-San Francisco County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Windsor May Update GHG

Sonoma-San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	4.49	1000sqft	0.10	4,490.00	0
Enclosed Parking Structure	33.00	Space	0.30	13,200.00	0
Parking Lot	328.00	Space	2.95	131,200.00	0
Apartments Low Rise	12.00	Dwelling Unit	0.75	12,000.00	34
Congregate Care (Assisted Living)	119.00	Dwelling Unit	7.44	119,000.00	340
Retirement Community	141.00	Dwelling Unit	28.20	141,000.00	403
Strip Mall	19.92	1000sqft	0.46	19,920.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2030
Utility Company	Sonoma Clean Power				
CO2 Intensity (lb/MWhr)	119.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Pursuant to traffic memo May 16th 2022 w-Trans

Vehicle Trips - Consistent with w-trans study. Average of Assited Living and nursing home for congregate care.

Water And Wastewater - Wastewater treatment plant is 100% aerobic, no septic tank on site or facultative lagoons on wastewater treatment plant. https://www.townofwindsor.com/578/Water-Reclamation-Facilities

Area Mitigation -

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Water Mitigation - Calgreen

Waste Mitigation - From SB1383

Table Name	Column Name	Default Value	New Value
tblVehicleTrips	ST_TR	8.14	3.80
tblVehicleTrips	ST_TR	2.93	2.80
tblVehicleTrips	ST_TR	2.21	2.40
tblVehicleTrips	ST_TR	2.03	1.60
tblVehicleTrips	ST_TR	42.04	36.50
tblVehicleTrips	SU_TR	6.28	3.80
tblVehicleTrips	SU_TR	3.15	2.80
tblVehicleTrips	SU_TR	0.70	2.40
tblVehicleTrips	SU_TR	1.95	1.60
tblVehicleTrips	SU_TR	20.43	36.50
tblVehicleTrips	WD_TR	7.32	5.70
tblVehicleTrips	WD_TR	2.60	2.83
tblVehicleTrips	WD_TR	9.74	12.20
tblVehicleTrips	WD_TR	2.40	1.90
tblVehicleTrips	WD_TR	44.32	29.70
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.2690	2.6981	2.0674	4.2600e-003	0.6632	0.1209	0.7841	0.2948	0.1116	0.4064	0.0000	374.8770	374.8770	0.1098	1.4900e-003	378.0666
2023	0.3340	2.3048	3.1526	7.3900e-003	0.3175	0.0945	0.4119	0.0856	0.0889	0.1745	0.0000	665.5386	665.5386	0.0822	0.0292	676.2792
2024	0.3143	2.1866	3.0880	7.3400e-003	0.3199	0.0838	0.4037	0.0863	0.0788	0.1651	0.0000	661.2086	661.2086	0.0816	0.0285	671.7341
2025	0.2616	1.8536	2.7854	6.3700e-003	0.2571	0.0686	0.3257	0.0693	0.0643	0.1336	0.0000	572.7260	572.7260	0.0812	0.0220	581.3113
2026	2.0821	0.0426	0.0964	2.0000e-004	0.0116	1.8900e-003	0.0135	3.0800e-003	1.8600e-003	4.9300e-003	0.0000	17.4967	17.4967	1.2800e-003	2.4000e-004	17.6011
Maximum	**2.0821**	**2.6981**	**3.1526**	**7.3900e-003**	**0.6632**	**0.1209**	**0.7841**	**0.2948**	**0.1116**	**0.4064**	**0.0000**	**665.5386**	**665.5386**	**0.1098**	**0.0292**	**676.2792**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.2690	2.6981	2.0674	4.2600e-003	0.6632	0.1209	0.7841	0.2948	0.1116	0.4064	0.0000	374.8766	374.8766	0.1098	1.4900e-003	378.0662
2023	0.3340	2.3048	3.1526	7.3900e-003	0.3175	0.0945	0.4119	0.0856	0.0889	0.1745	0.0000	665.5383	665.5383	0.0822	0.0292	676.2789
2024	0.3143	2.1866	3.0880	7.3400e-003	0.3199	0.0838	0.4037	0.0863	0.0788	0.1651	0.0000	661.2083	661.2083	0.0816	0.0285	671.7337
2025	0.2616	1.8536	2.7854	6.3700e-003	0.2571	0.0686	0.3257	0.0693	0.0643	0.1336	0.0000	572.7256	572.7256	0.0812	0.0220	581.3110
2026	2.0821	0.0426	0.0964	2.0000e-004	0.0116	1.8900e-003	0.0135	3.0800e-003	1.8600e-003	4.9300e-003	0.0000	17.4967	17.4967	1.2800e-003	2.4000e-004	17.6010
Maximum	**2.0821**	**2.6981**	**3.1526**	**7.3900e-003**	**0.6632**	**0.1209**	**0.7841**	**0.2948**	**0.1116**	**0.4064**	**0.0000**	**665.5383**	**665.5383**	**0.1098**	**0.0292**	**676.2789**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-16-2022**	**8-15-2022**	1.0028	1.0028
2	**8-16-2022**	**11-15-2022**	1.3598	1.3598
3	**11-16-2022**	**2-15-2023**	0.9303	0.9303
4	**2-16-2023**	**5-15-2023**	0.6465	0.6465
5	**5-16-2023**	**8-15-2023**	0.6632	0.6632
6	**8-16-2023**	**11-15-2023**	0.6683	0.6683
7	**11-16-2023**	**2-15-2024**	0.6535	0.6535

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8	**2-16-2024**	**5-15-2024**	0.6149	0.6149
9	**5-16-2024**	**8-15-2024**	0.6237	0.6237
10	**8-16-2024**	**11-15-2024**	0.6285	0.6285
11	**11-16-2024**	**2-15-2025**	0.6131	0.6131
12	**2-16-2025**	**5-15-2025**	0.5689	0.5689
13	**5-16-2025**	**8-15-2025**	0.5835	0.5835
14	**8-16-2025**	**11-15-2025**	0.5019	0.5019
15	**11-16-2025**	**2-15-2026**	1.3755	1.3755
16	**2-16-2026**	**5-15-2026**	0.9067	0.9067
		Highest	1.3755	1.3755

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0623	0.0377	2.8820	1.8300e-003		0.1348	0.1348		0.1348	0.1348	12.4004	8.3994	20.7998	0.0231	8.1000e-004	21.6194
Energy	0.0142	0.1214	0.0541	7.7000e-004		9.7900e-003	9.7900e-003		9.7900e-003	9.7900e-003	0.0000	222.2098	222.2098	0.0253	5.3100e-003	224.4221
Mobile	0.4762	0.5500	4.0688	7.9400e-003	0.9483	6.4500e-003	0.9548	0.2541	6.0400e-003	0.2601	0.0000	733.4545	733.4545	0.0514	0.0403	746.7579
Waste						0.0000	0.0000		0.0000	0.0000	41.4244	0.0000	41.4244	2.4481	0.0000	102.6271
Water						0.0000	0.0000		0.0000	0.0000	7.0744	8.2817	15.3562	0.0266	0.0157	20.6887
Total	**2.5527**	**0.7091**	**7.0049**	**0.0105**	**0.9483**	**0.1510**	**1.0993**	**0.2541**	**0.1506**	**0.4046**	**60.8992**	**972.3454**	**1,033.2446**	**2.5745**	**0.0621**	**1,116.1151**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.4348	0.0233	2.0178	1.1000e-004		0.0112	0.0112		0.0112	0.0112	0.0000	3.3059	3.3059	3.1600e-003	0.0000	3.3849
Energy	0.0142	0.1214	0.0541	7.7000e-004		9.7900e-003	9.7900e-003		9.7900e-003	9.7900e-003	0.0000	222.2098	222.2098	0.0253	5.3100e-003	224.4221
Mobile	0.4762	0.5500	4.0688	7.9400e-003	0.9483	6.4500e-003	0.9548	0.2541	6.0400e-003	0.2601	0.0000	733.4545	733.4545	0.0514	0.0403	746.7579
Waste						0.0000	0.0000		0.0000	0.0000	10.3561	0.0000	10.3561	0.6120	0.0000	25.6568
Water						0.0000	0.0000		0.0000	0.0000	5.6595	7.1041	12.7636	0.0214	0.0125	17.0377
Total	**1.9251**	**0.6946**	**6.1407**	**8.8200e-003**	**0.9483**	**0.0275**	**0.9758**	**0.2541**	**0.0270**	**0.2811**	**16.0156**	**966.0744**	**982.0900**	**0.7133**	**0.0582**	**1,017.2594**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**24.59**	**2.04**	**12.34**	**16.32**	**0.00**	**81.82**	**11.24**	**0.00**	**82.05**	**30.54**	**73.70**	**0.64**	**4.95**	**72.30**	**6.33**	**8.86**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/16/2022	7/22/2022	5	50	
2	Site Preparation	Site Preparation	7/23/2022	9/2/2022	5	30	
3	Grading	Grading	9/3/2022	12/16/2022	5	75	

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4	Building Construction	Building Construction	12/17/2022	10/17/2025	5	740	
5	Paving	Paving	10/18/2025	1/2/2026	5	55	
6	Architectural Coating	Architectural Coating	1/3/2026	3/20/2026	5	55	

Acres of Grading (Site Preparation Phase): 45

Acres of Grading (Grading Phase): 225

Acres of Paving: 3.25

Residential Indoor: 550,800; Residential Outdoor: 183,600; Non-Residential Indoor: 36,615; Non-Residential Outdoor: 12,205; Striped Parking Area: 8,664 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	264.00	57.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	53.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0660	0.6430	0.5149	9.7000e-004		0.0311	0.0311		0.0289	0.0289	0.0000	84.9756	84.9756	0.0239	0.0000	85.5723
Total	**0.0660**	**0.6430**	**0.5149**	**9.7000e-004**		**0.0311**	**0.0311**		**0.0289**	**0.0289**	**0.0000**	**84.9756**	**84.9756**	**0.0239**	**0.0000**	**85.5723**

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3.2 Demolition - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4300e-003	1.0300e-003	0.0113	3.0000e-005	2.9400e-003	2.0000e-005	2.9600e-003	7.8000e-004	2.0000e-005	8.0000e-004	0.0000	2.4593	2.4593	9.0000e-005	8.0000e-005	2.4866
Total	**1.4300e-003**	**1.0300e-003**	**0.0113**	**3.0000e-005**	**2.9400e-003**	**2.0000e-005**	**2.9600e-003**	**7.8000e-004**	**2.0000e-005**	**8.0000e-004**	**0.0000**	**2.4593**	**2.4593**	**9.0000e-005**	**8.0000e-005**	**2.4866**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0660	0.6430	0.5149	9.7000e-004		0.0311	0.0311		0.0289	0.0289	0.0000	84.9755	84.9755	0.0239	0.0000	85.5722
Total	**0.0660**	**0.6430**	**0.5149**	**9.7000e-004**		**0.0311**	**0.0311**		**0.0289**	**0.0289**	**0.0000**	**84.9755**	**84.9755**	**0.0239**	**0.0000**	**85.5722**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4300e-003	1.0300e-003	0.0113	3.0000e-005	2.9400e-003	2.0000e-005	2.9600e-003	7.8000e-004	2.0000e-005	8.0000e-004	0.0000	2.4593	2.4593	9.0000e-005	8.0000e-005	2.4866
Total	**1.4300e-003**	**1.0300e-003**	**0.0113**	**3.0000e-005**	**2.9400e-003**	**2.0000e-005**	**2.9600e-003**	**7.8000e-004**	**2.0000e-005**	**8.0000e-004**	**0.0000**	**2.4593**	**2.4593**	**9.0000e-005**	**8.0000e-005**	**2.4866**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2949	0.0000	0.2949	0.1515	0.0000	0.1515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0476	0.4963	0.2955	5.7000e-004		0.0242	0.0242		0.0223	0.0223	0.0000	50.1591	50.1591	0.0162	0.0000	50.5647
Total	**0.0476**	**0.4963**	**0.2955**	**5.7000e-004**	**0.2949**	**0.0242**	**0.3191**	**0.1515**	**0.0223**	**0.1738**	**0.0000**	**50.1591**	**50.1591**	**0.0162**	**0.0000**	**50.5647**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0300e-003	7.4000e-004	8.1200e-003	2.0000e-005	2.1200e-003	1.0000e-005	2.1300e-003	5.6000e-004	1.0000e-005	5.8000e-004	0.0000	1.7707	1.7707	7.0000e-005	6.0000e-005	1.7903
Total	**1.0300e-003**	**7.4000e-004**	**8.1200e-003**	**2.0000e-005**	**2.1200e-003**	**1.0000e-005**	**2.1300e-003**	**5.6000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.7707**	**1.7707**	**7.0000e-005**	**6.0000e-005**	**1.7903**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2949	0.0000	0.2949	0.1515	0.0000	0.1515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0476	0.4963	0.2955	5.7000e-004		0.0242	0.0242		0.0223	0.0223	0.0000	50.1590	50.1590	0.0162	0.0000	50.5646
Total	**0.0476**	**0.4963**	**0.2955**	**5.7000e-004**	**0.2949**	**0.0242**	**0.3191**	**0.1515**	**0.0223**	**0.1738**	**0.0000**	**50.1590**	**50.1590**	**0.0162**	**0.0000**	**50.5646**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0300e-003	7.4000e-004	8.1200e-003	2.0000e-005	2.1200e-003	1.0000e-005	2.1300e-003	5.6000e-004	1.0000e-005	5.8000e-004	0.0000	1.7707	1.7707	7.0000e-005	6.0000e-005	1.7903
Total	**1.0300e-003**	**7.4000e-004**	**8.1200e-003**	**2.0000e-005**	**2.1200e-003**	**1.0000e-005**	**2.1300e-003**	**5.6000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.7707**	**1.7707**	**7.0000e-005**	**6.0000e-005**	**1.7903**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3451	0.0000	0.3451	0.1370	0.0000	0.1370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1359	1.4566	1.0891	2.3300e-003		0.0613	0.0613		0.0564	0.0564	0.0000	204.5048	204.5048	0.0661	0.0000	206.1583
Total	**0.1359**	**1.4566**	**1.0891**	**2.3300e-003**	**0.3451**	**0.0613**	**0.4064**	**0.1370**	**0.0564**	**0.1934**	**0.0000**	**204.5048**	**204.5048**	**0.0661**	**0.0000**	**206.1583**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8600e-003	2.0600e-003	0.0226	5.0000e-005	5.8900e-003	4.0000e-005	5.9200e-003	1.5700e-003	4.0000e-005	1.6000e-003	0.0000	4.9185	4.9185	1.9000e-004	1.7000e-004	4.9731
Total	**2.8600e-003**	**2.0600e-003**	**0.0226**	**5.0000e-005**	**5.8900e-003**	**4.0000e-005**	**5.9200e-003**	**1.5700e-003**	**4.0000e-005**	**1.6000e-003**	**0.0000**	**4.9185**	**4.9185**	**1.9000e-004**	**1.7000e-004**	**4.9731**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3451	0.0000	0.3451	0.1370	0.0000	0.1370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1359	1.4566	1.0891	2.3300e-003		0.0613	0.0613		0.0564	0.0564	0.0000	204.5045	204.5045	0.0661	0.0000	206.1580
Total	**0.1359**	**1.4566**	**1.0891**	**2.3300e-003**	**0.3451**	**0.0613**	**0.4064**	**0.1370**	**0.0564**	**0.1934**	**0.0000**	**204.5045**	**204.5045**	**0.0661**	**0.0000**	**206.1580**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8600e-003	2.0600e-003	0.0226	5.0000e-005	5.8900e-003	4.0000e-005	5.9200e-003	1.5700e-003	4.0000e-005	1.6000e-003	0.0000	4.9185	4.9185	1.9000e-004	1.7000e-004	4.9731
Total	**2.8600e-003**	**2.0600e-003**	**0.0226**	**5.0000e-005**	**5.8900e-003**	**4.0000e-005**	**5.9200e-003**	**1.5700e-003**	**4.0000e-005**	**1.6000e-003**	**0.0000**	**4.9185**	**4.9185**	**1.9000e-004**	**1.7000e-004**	**4.9731**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.5300e-003	0.0781	0.0818	1.3000e-004		4.0500e-003	4.0500e-003		3.8100e-003	3.8100e-003	0.0000	11.5863	11.5863	2.7800e-003	0.0000	11.6557
Total	**8.5300e-003**	**0.0781**	**0.0818**	**1.3000e-004**		**4.0500e-003**	**4.0500e-003**		**3.8100e-003**	**3.8100e-003**	**0.0000**	**11.5863**	**11.5863**	**2.7800e-003**	**0.0000**	**11.6557**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0167	4.5400e-003	6.0000e-005	1.8500e-003	1.7000e-004	2.0200e-003	5.4000e-004	1.6000e-004	7.0000e-004	0.0000	5.8464	5.8464	1.1000e-004	8.9000e-004	6.1131
Worker	5.0400e-003	3.6300e-003	0.0397	9.0000e-005	0.0104	7.0000e-005	0.0104	2.7600e-003	6.0000e-005	2.8200e-003	0.0000	8.6565	8.6565	3.3000e-004	2.9000e-004	8.7526
Total	**5.6600e-003**	**0.0203**	**0.0443**	**1.5000e-004**	**0.0122**	**2.4000e-004**	**0.0125**	**3.3000e-003**	**2.2000e-004**	**3.5200e-003**	**0.0000**	**14.5029**	**14.5029**	**4.4000e-004**	**1.1800e-003**	**14.8658**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.5300e-003	0.0781	0.0818	1.3000e-004		4.0500e-003	4.0500e-003		3.8100e-003	3.8100e-003	0.0000	11.5863	11.5863	2.7800e-003	0.0000	11.6556
Total	**8.5300e-003**	**0.0781**	**0.0818**	**1.3000e-004**		**4.0500e-003**	**4.0500e-003**		**3.8100e-003**	**3.8100e-003**	**0.0000**	**11.5863**	**11.5863**	**2.7800e-003**	**0.0000**	**11.6556**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-004	0.0167	4.5400e-003	6.0000e-005	1.8500e-003	1.7000e-004	2.0200e-003	5.4000e-004	1.6000e-004	7.0000e-004	0.0000	5.8464	5.8464	1.1000e-004	8.9000e-004	6.1131
Worker	5.0400e-003	3.6300e-003	0.0397	9.0000e-005	0.0104	7.0000e-005	0.0104	2.7600e-003	6.0000e-005	2.8200e-003	0.0000	8.6565	8.6565	3.3000e-004	2.9000e-004	8.7526
Total	**5.6600e-003**	**0.0203**	**0.0443**	**1.5000e-004**	**0.0122**	**2.4000e-004**	**0.0125**	**3.3000e-003**	**2.2000e-004**	**3.5200e-003**	**0.0000**	**14.5029**	**14.5029**	**4.4000e-004**	**1.1800e-003**	**14.8658**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0800e-003	0.3516	0.0987	1.5000e-003	0.0481	1.8800e-003	0.0500	0.0139	1.8000e-003	0.0157	0.0000	146.1501	146.1501	2.6500e-003	0.0221	152.8057
Worker	0.1215	0.0832	0.9422	2.3800e-003	0.2693	1.6400e-003	0.2710	0.0717	1.5100e-003	0.0732	0.0000	218.0424	218.0424	7.8100e-003	7.0400e-003	220.3352
Total	**0.1296**	**0.4348**	**1.0409**	**3.8800e-003**	**0.3175**	**3.5200e-003**	**0.3210**	**0.0856**	**3.3100e-003**	**0.0889**	**0.0000**	**364.1924**	**364.1924**	**0.0105**	**0.0292**	**373.1409**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0800e-003	0.3516	0.0987	1.5000e-003	0.0481	1.8800e-003	0.0500	0.0139	1.8000e-003	0.0157	0.0000	146.1501	146.1501	2.6500e-003	0.0221	152.8057
Worker	0.1215	0.0832	0.9422	2.3800e-003	0.2693	1.6400e-003	0.2710	0.0717	1.5100e-003	0.0732	0.0000	218.0424	218.0424	7.8100e-003	7.0400e-003	220.3352
Total	**0.1296**	**0.4348**	**1.0409**	**3.8800e-003**	**0.3175**	**3.5200e-003**	**0.3210**	**0.0856**	**3.3100e-003**	**0.0889**	**0.0000**	**364.1924**	**364.1924**	**0.0105**	**0.0292**	**373.1409**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7223	303.7223	0.0718	0.0000	305.5179
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7223**	**303.7223**	**0.0718**	**0.0000**	**305.5179**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.7700e-003	0.3512	0.0964	1.4900e-003	0.0485	1.8800e-003	0.0504	0.0140	1.8000e-003	0.0158	0.0000	144.8720	144.8720	2.7300e-003	0.0219	151.4712
Worker	0.1138	0.0743	0.8738	2.3200e-003	0.2714	1.5600e-003	0.2730	0.0722	1.4400e-003	0.0737	0.0000	212.6143	212.6143	7.0900e-003	6.5600e-003	214.7450
Total	**0.1215**	**0.4255**	**0.9702**	**3.8100e-003**	**0.3199**	**3.4400e-003**	**0.3233**	**0.0863**	**3.2400e-003**	**0.0895**	**0.0000**	**357.4863**	**357.4863**	**9.8200e-003**	**0.0285**	**366.2162**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7220	303.7220	0.0718	0.0000	305.5175
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7220**	**303.7220**	**0.0718**	**0.0000**	**305.5175**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.7700e-003	0.3512	0.0964	1.4900e-003	0.0485	1.8800e-003	0.0504	0.0140	1.8000e-003	0.0158	0.0000	144.8720	144.8720	2.7300e-003	0.0219	151.4712
Worker	0.1138	0.0743	0.8738	2.3200e-003	0.2714	1.5600e-003	0.2730	0.0722	1.4400e-003	0.0737	0.0000	212.6143	212.6143	7.0900e-003	6.5600e-003	214.7450
Total	**0.1215**	**0.4255**	**0.9702**	**3.8100e-003**	**0.3199**	**3.4400e-003**	**0.3233**	**0.0863**	**3.2400e-003**	**0.0895**	**0.0000**	**357.4863**	**357.4863**	**9.8200e-003**	**0.0285**	**366.2162**

3.5 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1422	1.2969	1.6728	2.8000e-003		0.0549	0.0549		0.0516	0.0516	0.0000	241.1962	241.1962	0.0567	0.0000	242.6137
Total	**0.1422**	**1.2969**	**1.6728**	**2.8000e-003**		**0.0549**	**0.0549**		**0.0516**	**0.0516**	**0.0000**	**241.1962**	**241.1962**	**0.0567**	**0.0000**	**242.6137**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9300e-003	0.2759	0.0747	1.1600e-003	0.0385	1.4800e-003	0.0400	0.0111	1.4100e-003	0.0125	0.0000	112.9753	112.9753	2.2100e-003	0.0171	118.1226
Worker	0.0843	0.0527	0.6424	1.7800e-003	0.2155	1.1700e-003	0.2167	0.0574	1.0800e-003	0.0584	0.0000	163.1415	163.1415	5.0900e-003	4.8400e-003	164.7104
Total	**0.0902**	**0.3286**	**0.7170**	**2.9400e-003**	**0.2540**	**2.6500e-003**	**0.2566**	**0.0685**	**2.4900e-003**	**0.0710**	**0.0000**	**276.1168**	**276.1168**	**7.3000e-003**	**0.0219**	**282.8330**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1422	1.2969	1.6728	2.8000e-003		0.0549	0.0549		0.0516	0.0516	0.0000	241.1959	241.1959	0.0567	0.0000	242.6134
Total	**0.1422**	**1.2969**	**1.6728**	**2.8000e-003**		**0.0549**	**0.0549**		**0.0516**	**0.0516**	**0.0000**	**241.1959**	**241.1959**	**0.0567**	**0.0000**	**242.6134**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9300e-003	0.2759	0.0747	1.1600e-003	0.0385	1.4800e-003	0.0400	0.0111	1.4100e-003	0.0125	0.0000	112.9753	112.9753	2.2100e-003	0.0171	118.1226
Worker	0.0843	0.0527	0.6424	1.7800e-003	0.2155	1.1700e-003	0.2167	0.0574	1.0800e-003	0.0584	0.0000	163.1415	163.1415	5.0900e-003	4.8400e-003	164.7104
Total	**0.0902**	**0.3286**	**0.7170**	**2.9400e-003**	**0.2540**	**2.6500e-003**	**0.2566**	**0.0685**	**2.4900e-003**	**0.0710**	**0.0000**	**276.1168**	**276.1168**	**7.3000e-003**	**0.0219**	**282.8330**

3.6 Paving - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0243	0.2274	0.3863	6.0000e-004		0.0111	0.0111		0.0102	0.0102	0.0000	53.0510	53.0510	0.0172	0.0000	53.4800
Paving	3.7200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0280**	**0.2274**	**0.3863**	**6.0000e-004**		**0.0111**	**0.0111**		**0.0102**	**0.0102**	**0.0000**	**53.0510**	**53.0510**	**0.0172**	**0.0000**	**53.4800**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2200e-003	7.6000e-004	9.3000e-003	3.0000e-005	3.1200e-003	2.0000e-005	3.1400e-003	8.3000e-004	2.0000e-005	8.5000e-004	0.0000	2.3619	2.3619	7.0000e-005	7.0000e-005	2.3846
Total	**1.2200e-003**	**7.6000e-004**	**9.3000e-003**	**3.0000e-005**	**3.1200e-003**	**2.0000e-005**	**3.1400e-003**	**8.3000e-004**	**2.0000e-005**	**8.5000e-004**	**0.0000**	**2.3619**	**2.3619**	**7.0000e-005**	**7.0000e-005**	**2.3846**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0243	0.2274	0.3863	6.0000e-004		0.0111	0.0111		0.0102	0.0102	0.0000	53.0510	53.0510	0.0172	0.0000	53.4799
Paving	3.7200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0280**	**0.2274**	**0.3863**	**6.0000e-004**		**0.0111**	**0.0111**		**0.0102**	**0.0102**	**0.0000**	**53.0510**	**53.0510**	**0.0172**	**0.0000**	**53.4799**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2200e-003	7.6000e-004	9.3000e-003	3.0000e-005	3.1200e-003	2.0000e-005	3.1400e-003	8.3000e-004	2.0000e-005	8.5000e-004	0.0000	2.3619	2.3619	7.0000e-005	7.0000e-005	2.3846
Total	**1.2200e-003**	**7.6000e-004**	**9.3000e-003**	**3.0000e-005**	**3.1200e-003**	**2.0000e-005**	**3.1400e-003**	**8.3000e-004**	**2.0000e-005**	**8.5000e-004**	**0.0000**	**2.3619**	**2.3619**	**7.0000e-005**	**7.0000e-005**	**2.3846**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.2000e-004	8.5800e-003	0.0146	2.0000e-005		4.2000e-004	4.2000e-004		3.9000e-004	3.9000e-004	0.0000	2.0019	2.0019	6.5000e-004	0.0000	2.0181
Paving	1.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0600e-003**	**8.5800e-003**	**0.0146**	**2.0000e-005**		**4.2000e-004**	**4.2000e-004**		**3.9000e-004**	**3.9000e-004**	**0.0000**	**2.0019**	**2.0019**	**6.5000e-004**	**0.0000**	**2.0181**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0863	0.0863	0.0000	0.0000	0.0871
Total	**4.0000e-005**	**3.0000e-005**	**3.3000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0863**	**0.0863**	**0.0000**	**0.0000**	**0.0871**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.2000e-004	8.5800e-003	0.0146	2.0000e-005		4.2000e-004	4.2000e-004		3.9000e-004	3.9000e-004	0.0000	2.0019	2.0019	6.5000e-004	0.0000	2.0181
Paving	1.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0600e-003**	**8.5800e-003**	**0.0146**	**2.0000e-005**		**4.2000e-004**	**4.2000e-004**		**3.9000e-004**	**3.9000e-004**	**0.0000**	**2.0019**	**2.0019**	**6.5000e-004**	**0.0000**	**2.0181**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0863	0.0863	0.0000	0.0000	0.0871
Total	**4.0000e-005**	**3.0000e-005**	**3.3000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0863**	**0.0863**	**0.0000**	**0.0000**	**0.0871**

3.7 Architectural Coating - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.0721					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7000e-003	0.0315	0.0498	8.0000e-005		1.4200e-003	1.4200e-003		1.4200e-003	1.4200e-003	0.0000	7.0215	7.0215	3.8000e-004	0.0000	7.0310
Total	**2.0768**	**0.0315**	**0.0498**	**8.0000e-005**		**1.4200e-003**	**1.4200e-003**		**1.4200e-003**	**1.4200e-003**	**0.0000**	**7.0215**	**7.0215**	**3.8000e-004**	**0.0000**	**7.0310**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1900e-003	2.5200e-003	0.0318	9.0000e-005	0.0114	6.0000e-005	0.0115	3.0400e-003	5.0000e-005	3.1000e-003	0.0000	8.3870	8.3870	2.5000e-004	2.4000e-004	8.4648
Total	**4.1900e-003**	**2.5200e-003**	**0.0318**	**9.0000e-005**	**0.0114**	**6.0000e-005**	**0.0115**	**3.0400e-003**	**5.0000e-005**	**3.1000e-003**	**0.0000**	**8.3870**	**8.3870**	**2.5000e-004**	**2.4000e-004**	**8.4648**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.0721					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7000e-003	0.0315	0.0498	8.0000e-005		1.4200e-003	1.4200e-003		1.4200e-003	1.4200e-003	0.0000	7.0214	7.0214	3.8000e-004	0.0000	7.0310
Total	**2.0768**	**0.0315**	**0.0498**	**8.0000e-005**		**1.4200e-003**	**1.4200e-003**		**1.4200e-003**	**1.4200e-003**	**0.0000**	**7.0214**	**7.0214**	**3.8000e-004**	**0.0000**	**7.0310**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1900e-003	2.5200e-003	0.0318	9.0000e-005	0.0114	6.0000e-005	0.0115	3.0400e-003	5.0000e-005	3.1000e-003	0.0000	8.3870	8.3870	2.5000e-004	2.4000e-004	8.4648
Total	**4.1900e-003**	**2.5200e-003**	**0.0318**	**9.0000e-005**	**0.0114**	**6.0000e-005**	**0.0115**	**3.0400e-003**	**5.0000e-005**	**3.1000e-003**	**0.0000**	**8.3870**	**8.3870**	**2.5000e-004**	**2.4000e-004**	**8.4648**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4762	0.5500	4.0688	7.9400e-003	0.9483	6.4500e-003	0.9548	0.2541	6.0400e-003	0.2601	0.0000	733.4545	733.4545	0.0514	0.0403	746.7579
Unmitigated	0.4762	0.5500	4.0688	7.9400e-003	0.9483	6.4500e-003	0.9548	0.2541	6.0400e-003	0.2601	0.0000	733.4545	733.4545	0.0514	0.0403	746.7579

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	68.40	45.60	45.60	142,932	142,932
Congregate Care (Assisted Living)	336.77	333.20	333.20	775,451	775,451
Enclosed Parking Structure	0.00	0.00	0.00		
General Office Building	54.78	10.78	10.78	100,862	100,862
Parking Lot	0.00	0.00	0.00		
Retirement Community	267.90	225.60	225.60	590,831	590,831
Strip Mall	591.62	727.08	727.08	970,722	970,722
Total	1,319.47	1,342.26	1,342.26	2,580,797	2,580,797

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Congregate Care (Assisted	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Enclosed Parking Structure	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Retirement Community	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279
Congregate Care (Assisted Living)	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279
Enclosed Parking Structure	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279
General Office Building	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279
Parking Lot	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279
Retirement Community	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279
Strip Mall	0.578487	0.054091	0.163601	0.113178	0.027971	0.007469	0.015619	0.006666	0.001080	0.000273	0.026807	0.001478	0.003279

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Windsor May Update GHG - Sonoma-San Francisco County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	82.0475	82.0475	0.0226	2.7400e-003	83.4268
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	82.0475	82.0475	0.0226	2.7400e-003	83.4268
NaturalGas Mitigated	0.0142	0.1214	0.0541	7.7000e-004		9.7900e-003	9.7900e-003		9.7900e-003	9.7900e-003	0.0000	140.1623	140.1623	2.6900e-003	2.5700e-003	140.9952
NaturalGas Unmitigated	0.0142	0.1214	0.0541	7.7000e-004		9.7900e-003	9.7900e-003		9.7900e-003	9.7900e-003	0.0000	140.1623	140.1623	2.6900e-003	2.5700e-003	140.9952

Windsor May Update GHG - Sonoma-San Francisco County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	118413	6.4000e-004	5.4600e-003	2.3200e-003	3.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	6.3190	6.3190	1.2000e-004	1.2000e-004	6.3565
Congregate Care (Assisted Living)	997420	5.3800e-003	0.0460	0.0196	2.9000e-004		3.7200e-003	3.7200e-003		3.7200e-003	3.7200e-003	0.0000	53.2261	53.2261	1.0200e-003	9.8000e-004	53.5424
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	72738	3.9000e-004	3.5700e-003	3.0000e-003	2.0000e-005		2.7000e-004	2.7000e-004		2.7000e-004	2.7000e-004	0.0000	3.8816	3.8816	7.0000e-005	7.0000e-005	3.9046
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	1.39136e+006	7.5000e-003	0.0641	0.0273	4.1000e-004		5.1800e-003	5.1800e-003		5.1800e-003	5.1800e-003	0.0000	74.2482	74.2482	1.4200e-003	1.3600e-003	74.6894
Strip Mall	46612.8	2.5000e-004	2.2800e-003	1.9200e-003	1.0000e-005		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004	0.0000	2.4874	2.4874	5.0000e-005	5.0000e-005	2.5022
Total		**0.0142**	**0.1214**	**0.0541**	**7.6000e-004**		**9.7800e-003**	**9.7800e-003**		**9.7800e-003**	**9.7800e-003**	**0.0000**	**140.1623**	**140.1623**	**2.6800e-003**	**2.5800e-003**	**140.9952**

Windsor May Update GHG - Sonoma-San Francisco County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	118413	6.4000e-004	5.4600e-003	2.3200e-003	3.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	6.3190	6.3190	1.2000e-004	1.2000e-004	6.3565
Congregate Care (Assisted Living)	997420	5.3800e-003	0.0460	0.0196	2.9000e-004		3.7200e-003	3.7200e-003		3.7200e-003	3.7200e-003	0.0000	53.2261	53.2261	1.0200e-003	9.8000e-004	53.5424
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	72738	3.9000e-004	3.5700e-003	3.0000e-003	2.0000e-005		2.7000e-004	2.7000e-004		2.7000e-004	2.7000e-004	0.0000	3.8816	3.8816	7.0000e-005	7.0000e-005	3.9046
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	1.39136e+006	7.5000e-003	0.0641	0.0273	4.1000e-004		5.1800e-003	5.1800e-003		5.1800e-003	5.1800e-003	0.0000	74.2482	74.2482	1.4200e-003	1.3600e-003	74.6894
Strip Mall	46612.8	2.5000e-004	2.2800e-003	1.9200e-003	1.0000e-005		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004	0.0000	2.4874	2.4874	5.0000e-005	5.0000e-005	2.5022
Total		**0.0142**	**0.1214**	**0.0541**	**7.6000e-004**		**9.7800e-003**	**9.7800e-003**		**9.7800e-003**	**9.7800e-003**	**0.0000**	**140.1623**	**140.1623**	**2.6800e-003**	**2.5800e-003**	**140.9952**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	48732.1	2.6521	7.3000e-004	9.0000e-005	2.6967
Congregate Care (Assisted Living)	460105	25.0399	6.8900e-003	8.3000e-004	25.4608
Enclosed Parking Structure	69300	3.7715	1.0400e-003	1.3000e-004	3.8349
General Office Building	77093.3	4.1956	1.1500e-003	1.4000e-004	4.2661
Parking Lot	45920	2.4991	6.9000e-004	8.0000e-005	2.5411
Retirement Community	599497	32.6258	8.9700e-003	1.0900e-003	33.1743
Strip Mall	206969	11.2637	3.1000e-003	3.8000e-004	11.4530
Total		**82.0475**	**0.0226**	**2.7400e-003**	**83.4268**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	48732.1	2.6521	7.3000e-004	9.0000e-005	2.6967
Congregate Care (Assisted Living)	460105	25.0399	6.8900e-003	8.3000e-004	25.4608
Enclosed Parking Structure	69300	3.7715	1.0400e-003	1.3000e-004	3.8349
General Office Building	77093.3	4.1956	1.1500e-003	1.4000e-004	4.2661
Parking Lot	45920	2.4991	6.9000e-004	8.0000e-005	2.5411
Retirement Community	599497	32.6258	8.9700e-003	1.0900e-003	33.1743
Strip Mall	206969	11.2637	3.1000e-003	3.8000e-004	11.4530
Total		**82.0475**	**0.0226**	**2.7400e-003**	**83.4268**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

Windsor May Update GHG - Sonoma-San Francisco County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.4348	0.0233	2.0178	1.1000e-004		0.0112	0.0112		0.0112	0.0112	0.0000	3.3059	3.3059	3.1600e-003	0.0000	3.3849
Unmitigated	2.0623	0.0377	2.8820	1.8300e-003		0.1348	0.1348		0.1348	0.1348	12.4004	8.3994	20.7998	0.0231	8.1000e-004	21.6194

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2072					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.1670					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.6276	0.0144	0.8642	1.7200e-003		0.1236	0.1236		0.1236	0.1236	12.4004	5.0934	17.4938	0.0199	8.1000e-004	18.2344
Landscaping	0.0606	0.0233	2.0178	1.1000e-004		0.0112	0.0112		0.0112	0.0112	0.0000	3.3059	3.3059	3.1600e-003	0.0000	3.3849
Total	**2.0623**	**0.0377**	**2.8820**	**1.8300e-003**		**0.1348**	**0.1348**		**0.1348**	**0.1348**	**12.4004**	**8.3994**	**20.7998**	**0.0231**	**8.1000e-004**	**21.6194**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2072					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.1670					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0606	0.0233	2.0178	1.1000e-004		0.0112	0.0112		0.0112	0.0112	0.0000	3.3059	3.3059	3.1600e-003	0.0000	3.3849
Total	**1.4347**	**0.0233**	**2.0178**	**1.1000e-004**		**0.0112**	**0.0112**		**0.0112**	**0.0112**	**0.0000**	**3.3059**	**3.3059**	**3.1600e-003**	**0.0000**	**3.3849**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	12.7636	0.0214	0.0125	17.0377
Unmitigated	15.3562	0.0266	0.0157	20.6887

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	0.781848 / 0.492904	0.6007	1.0400e-003	6.1000e-004	0.8093
Congregate Care (Assisted Living)	7.75333 / 4.88797	5.9574	0.0103	6.0700e-003	8.0251
Enclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	0.798025 / 0.489112	0.6105	1.0600e-003	6.2000e-004	0.8233
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Retirement Community	9.18672 / 5.79163	7.0587	0.0122	7.2000e-003	9.5088
Strip Mall	1.47552 / 0.904354	1.1288	1.9600e-003	1.1600e-003	1.5222
Total		**15.3562**	**0.0266**	**0.0157**	**20.6887**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	0.625479 / 0.492904	0.4994	8.4000e-004	4.9000e-004	0.6665
Congregate Care (Assisted Living)	6.20266 / 4.88797	4.9521	8.3100e-003	4.8600e-003	6.6095
Enclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	0.63842 / 0.489112	0.5070	8.5000e-004	5.0000e-004	0.6776
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Retirement Community	7.34937 / 5.79163	5.8676	9.8500e-003	5.7600e-003	7.8314
Strip Mall	1.18042 / 0.904354	0.9375	1.5800e-003	9.3000e-004	1.2528
Total		**12.7636**	**0.0214**	**0.0125**	**17.0377**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Windsor May Update GHG - Sonoma-San Francisco County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.3561	0.6120	0.0000	25.6568
Unmitigated	41.4244	2.4481	0.0000	102.6271

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	5.52	1.1205	0.0662	0.0000	2.7760
Congregate Care (Assisted Living)	108.59	22.0428	1.3027	0.0000	54.6101
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
General Office Building	4.18	0.8485	0.0502	0.0000	2.1021
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Retirement Community	64.86	13.1660	0.7781	0.0000	32.6182
Strip Mall	20.92	4.2466	0.2510	0.0000	10.5207
Total		**41.4244**	**2.4481**	**0.0000**	**102.6271**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	1.38	0.2801	0.0166	0.0000	0.6940
Congregate Care (Assisted Living)	27.1475	5.5107	0.3257	0.0000	13.6525
Enclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
General Office Building	1.045	0.2121	0.0125	0.0000	0.5255
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Retirement Community	16.215	3.2915	0.1945	0.0000	8.1546
Strip Mall	5.23	1.0616	0.0627	0.0000	2.6302
Total		**10.3561**	**0.6120**	**0.0000**	**25.6568**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix F

Initial Stormwater Low Impact Development Submittal

JOB NO. C20169082-12

INITIAL STORMWATER LOW IMPACT DEVELOPMENT SUBMITTAL

FOR

CLEARWATER LIVING

376 SHILOH ROAD

TOWN OF WINDSOR
SONOMA COUNTY, CA 95492

APN 059-271-059

AUGUST 2021

Owner/Developer:
Clearwater Living
5000 Birch Street, Suite 400
Newport Beach, CA 92660
Ph: (949) 333-8515

JOB NO. C20169082-12

APPLICANT/OWNER



As the Applicant/Owner, I declare that permanent stormwater Best Management Practices will be installed and maintained in accordance with this document and municipal regulations.

CIVIL ENGINEER

This document was prepared by BKF Engineers to summarize stormwater Best Management Practices proposed with this Development. Stormwater elements reflected in this document have been designed using sound engineering principles in general conformance with the municipality's guidelines.

PRELIMINARY

BKF ENGINEERS
RAMI H. SELIM, PE
NO. C-92014

JOB NO. C20169082-12

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GENERAL INFORMATION REGARDING THE PURPOSE OF STORMWATER BMPS

Stormwater runoff Best Management Practices (BMPs) are programs, processes, or engineered systems designed to reduce pollutants in stormwater. Temporary Best Management Practices such as straw wattle and silt fence are used to reduce pollutants in stormwater during construction, while permanent stormwater Best Management Practices are intended to reduce pollutants in stormwater for the life of the Development following construction.

Studies suggest approximately 85% of our annual rainfall volume is produced from the predominant population of smaller storms. Therefore, in an effort to treat stormwater in a cost-effective manner, stormwater quality management is typically designed to target these smaller events.

The Low Impact Development Technical Design Manual

The Low Impact Development (LID) Technical Design Manual is a set of guidelines established for the Santa Rosa area and other areas around Sonoma County, requiring certain projects to incorporate sustainable LID strategies that encourage infiltration and minimize the introduction of pollutants into their municipal stormwater permit.

The manual requires a "Determination Worksheet" be prepared by the Applicant to evaluate whether or not stormwater BMPs are required with each Development. Developments requiring BMPs are subject to planning review through the municipality and must include an "Initial Stormwater LID Submittal". The purpose of this submittal is to:

- Summarize the existing site condition and the proposed Development.
- Describe stormwater BMPs being incorporated into the Development.
- Demonstrate by computation that the proposed measures are appropriately sized.
- Describe maintenance and funding for the BMPs.

Developments requiring BMPs must include a final "Stormwater LID Submittal" with ministerial permit submittals such as grading, building, and encroachment permits. The final "Stormwater LID Submittal" includes all of the elements required in the "Initial Stormwater LID Submittal," maintenance measures, and a maintenance agreement between the municipality and Owner assigning the responsibility for maintaining BMPs. The agreement is recorded as a covenant, runs with the land, and passes with Title.

Permanent stormwater Best Management Practices are categorized in the LID Technical Design Manual as being Pollution Prevention Measures, Volume Control Measures, or Treatment Control Measures. These are described in the following sections of this document.

Stormwater Pollution Prevention Measures

Pollution Prevention Measures, sometimes referred to as Source Control Measures, are practices such as street sweeping, which help keep pollutants from coming into contact with stormwater rather than attempting to remove them after the fact. Educational outreach programs and stenciled stormwater inlets with graphics informing people that the stormwater drains to the creek are effective Pollution Prevention Measures.

Trees are another effective Pollution Prevention Measure and provide several stormwater management benefits. They hold water on leaves/branches and allow water to evaporate, retaining flow and dissipating the energy of runoff. Trees also reduce the amount of water coming into contact with other impervious surfaces such as parking lots, thus minimizing pollution in downstream water bodies.

Our local municipalities recognize the environmental benefit of incorporating Pollution Prevention Measures into designs. Therefore, area offset credits are allowed with the implementation of trees intercepting falling precipitation and pervious pavements, which encourage infiltration and stormwater discharge through landscape areas as a pre-treatment measure. The pollution prevention credits reduce the size of required Volume and Treatment Control Measures.

Stormwater Volume Control Measures

Increasing the amount of impervious surface area by developing bare land generally increases the rate at which stormwater flows across a site. While the impact of increasing the impervious area for a single site is often insignificant, the cumulative impact of increasing the impervious area for multiple sites may have an adverse effect on downstream facilities. This cumulative increase has the potential to increase runoff, causing downstream erosion and sediment load in the stormwater conveyance system.

In order to minimize downstream erosion and protect stream habitats, the Storm Water LID Technical Design Manual prioritizes BMPs and requires the designer first consider measures which capture stormwater runoff from impervious surfaces and encourage infiltration. If this is impractical, then BMPs may be proposed which capture the difference in stormwater runoff between the predevelopment and post-development conditions, provided that all water discharged from impervious surfaces for the selected rainfall event is treated. Developments in areas subject to contaminated vegetation or high groundwater are discouraged from integrating measures that infiltrate stormwater. However, they are required to incorporate alternative designs which harvest stormwater and treat runoff from impervious surfaces. If volume control measures are not feasible at the project site, the municipality will consider offset projects at a different location that accomplish this requirement. In some situations, payment of an offset cost may be allowed. Redevelopment projects proposing to decrease the amount of impervious surface are not required to integrate volume control measures because decreasing the amount of impervious surface generally decreases the amount of stormwater runoff.

Stormwater Treatment Control Measures

Treatment Control BMPs are engineered systems designed to remove pollutants from stormwater and are often categorized as landscape-based or mechanical. These types of BMPs are required whenever a development proposes to infiltrate less water than is discharged from new or redeveloped impervious surfaces during the target storm event.

Landscape-based treatment controls are required by most municipalities and include measures such as bioretention systems. Mechanical treatment controls such as subsurface vaults that filter stormwater through sand or engineered media are generally only allowed when used in conjunction with other landscape based BMPs.

PROJECT DESCRIPTION

The project site is located at 376 Shiloh Road, Town of Windsor, Sonoma County. The project parcel, APN 059-271-059, comprises 24.83 acres of vacant undeveloped land with Boulevard Mixed-Use and Gateway Commercial Land Use and Boulevard Commercial Zoning. The project property is bounded by Highway 101 on the west and Shiloh Road on the north, Pruitt Creek and Vineyards on the south, and undeveloped land to the east.

The majority of the existing site is relatively flat with slopes 0-5%, empty field, and improvements will attempt to have a net-zero import/export number.

The project proposes a high-end, mixed-use village with Shiloh frontage being designed in accordance with the Shiloh Vision Plan, with over 20,000 square feet of neighborhood-serving retail businesses, outdoor dining, and pedestrian-friendly sidewalks, served by parking in the rear. The southernmost building serves as a gateway element, welcoming drivers on Hwy 101 to Windsor while screening onsite parking views. A roadway is being proposed to extend from the intersection of Hembree and Shiloh eastward through the site along the south side of the commercial buildings, turning south along the neighboring property boundary.

The luxury senior living campus consists of approximately 245 units (140 Independent Active Adult Apartments, 71 Assisted Living, 26 Memory Care, and 8 garden cottages), plus approximately 20,000 sf of neighborhood-serving Retail / Mixed-Use.

Permanent storm water Best Management Practices are required with this Development because the project proposes to create or replace more than an acre of impervious surface and more than four dwelling units.

The Development proposes integrating a series of Bioretention Areas that capture site runoff during light precipitation events in accordance with the LID Technical Design Manual. Storm water for larger events will be routed to the stormdrain system and southerly to Pruitt Creek.

The site has been designed to have positive gradients away from structures with overland relief draining to storm water capture areas during light precipitation events. The storm drain system proposed with this Development is being installed as a matter of convenience to route storm water from the proposed LID features to Pruitt Creek. Nonetheless, if the storm drain system becomes overburdened during larger storm events, storm water that falls on site will run overland in a southwesterly direction similar to the current condition. Since the finished floor of the lowest building is nearly a foot above the street elevation, it is very unlikely that the buildings will experience inundation from the storm drain system's backwater effect during design storm events.

STORMWATER BMPS SELECTED FOR THIS SITE

Temporary pollution prevention and permanent stormwater Best Management Practices will be designed to minimize the introduction of pollutants in downstream water bodies following the Entitlement of this Development.

Temporary Measures

A "Sediment Control Plan" will be prepared and included with the construction drawings requiring the contractor to implement temporary stormwater BMPs. The contractor will be required to use filter fabric, gravel bags, straw wattles or similar measures to collect sediment and filter water before allowing its discharge to downstream facilities. Construction entrances/exits will be designated on the drawings as having a blanket of rock, where applicable, to assist with removing dirt from trucks to minimize soil tracked into the public street during the early stages of construction.

This drawing will also require disturbed areas be seeded to help stabilize un-vegetated areas. The project is anticipated to disturb more than 1-acre with construction. A Stormwater Pollution Prevention Plan will be prepared which more precisely identifies temporary stormwater BMPs required during different phases of construction.

Pollution Prevention Measures

As part of this project, stormwater inlets will be stenciled with graphics which identify that the inlets drain to the creek. Irrigation systems will be designed to minimize overspray.

Pollution Prevention Credits

As discussed earlier in this report, the LID Technical Design Manual allows area offset credits with the implementation of certain Pollution Prevention Measures. New trees will be planted with this Development to create an opportunity to intercept precipitation falling on impervious surfaces beneath them and will been used as reduction credits when assessing the size of BMP areas. In addition, the large existing trees which are to remain on site shall be evaluated to determine if they qualify as existing interceptors to offset BMP sizing.

Permanent Treatment Control Measures

A series of volume capture sections have been incorporated into the site to retain stormwater during light precipitation events and promote infiltration for the life of the Development. The proposed storm water measures include engineered soil which is anticipated to encourage storage and filtration.

The project geotechnical engineer reports that groundwater was encountered at the time of their subsurface exploration at approximately 19 feet below the existing ground surface and the near surface soil is Sandy Clay which is classified a class "C/D" type soil having an infiltration rate less than 0.05 in/hr.

The "State Water Resources Control Board's" "GeoTracker" system was observed and does not report groundwater contamination within 50ft of proposed stormwater treatment areas.

These measures were selected because they are the highest priority measures included in the LID Technical Design Manual that accomplish the manual objectives and can be reasonably incorporated into the site. An exhibit has been included in the Appendix of this report reflecting the proposed geometry and identifying the location(s) of these elements.

DESCRIPTION OF COMPUTATION METHODS USED TO SIZE BMPS

Treatment Control Calculations

Computations were prepared to size each BMP using the City of Santa Rosa's stormwater calculator to assess the post-development stormwater runoff volume. The design assumes bioretention areas within the private Development will use Bioswale Media Mix with a porosity of at least 50% or equivalent. Computations may be observed in Appendix B of this document and reflect that the void space in the proposed measures exceeds the required stormwater capture volume.

The treatment measures designed for this site have achieved the 100% volume capture for the 85th percentile precipitation event in accordance with the Priority 1 objective of the LID Technical Design Manual.

MAINTENANCE OF THE SELECTED PERMANENT STORMWATER BMPs

Maintenance of permanent stormwater Best Management Practices is essential to ensure BMPs continue to function effectively and do not become a nuisance. An exhibit has been included in the body of this report identifying the locations of the referenced permanent stormwater BMPs that will require inspection and maintenance. It is the Applicant/Owner's responsibility to ensure permanent stormwater BMPs are installed and maintained in accordance with the municipal policy until this responsibility is legally transferred.

The Regional Water Quality Control Board requires the legally responsible party to inspect and maintain permanent stormwater BMPs at least once a year. A sample inspection and reporting template has been included in the Appendix of this document for reference. Reports documenting maintenance activities should be completed when maintenance is performed and kept on file for a period of at least five years. These reports shall be made available to Town staff and the Regional Water Quality Control Board staff upon request.

The maintenance of permanent stormwater Best Management Practices will be performed by the property owner and includes things such as pruning, weeding, mowing, trash/sediment removal, and the inspection/replacement of plants and media. The LID Technical Design Manual requires that the Owner enters into a signed agreement and that this agreement be recorded as a perpetual covenant that runs with the land. A draft maintenance agreement has been included in the Appendix of this document for reference.

Every site requires some level of maintenance such as sweeping, restriping, pavement replacement, irrigation repair, and replanting. The following inspection and maintenance activities are additional measures necessary for this Development as a result of the required permanent stormwater BMPs:

- Drainage inlets will be stenciled with verbiage or a graphic noting that the stormwater system drains to a creek. Stenciling should be refreshed every 5 years. If the BMP has been removed or has experienced significant fading, then the BMP should be replaced.

- The surface of volume capture areas should be inspected for signs of erosion, damage to vegetation, foreign debris, and sediment accumulation on a quarterly basis and following larger storm events. The BMP should be repaired to maintain its character and function in substantial conformance with the original design.

- Additional information has been included in the Appendix of this report, which describes the function and recommends maintenance of this report's measures.

Although the proposed BMPs are anticipated to provide effective treatment for more than 10-years, their life will depend on the quality of water draining to them and how well these areas are maintained. BMP Maintenance and replacement should be conducted as required to ensure their character and function are in substantial conformance with the original design.

Approximate anticipated average annual costs are summarized below to assist the Owner(s) in budgeting for BMP inspection and maintenance activities. The costs reported are predicated on these activities being conducted while performing other routine maintenance, which would ordinarily be performed on-site.

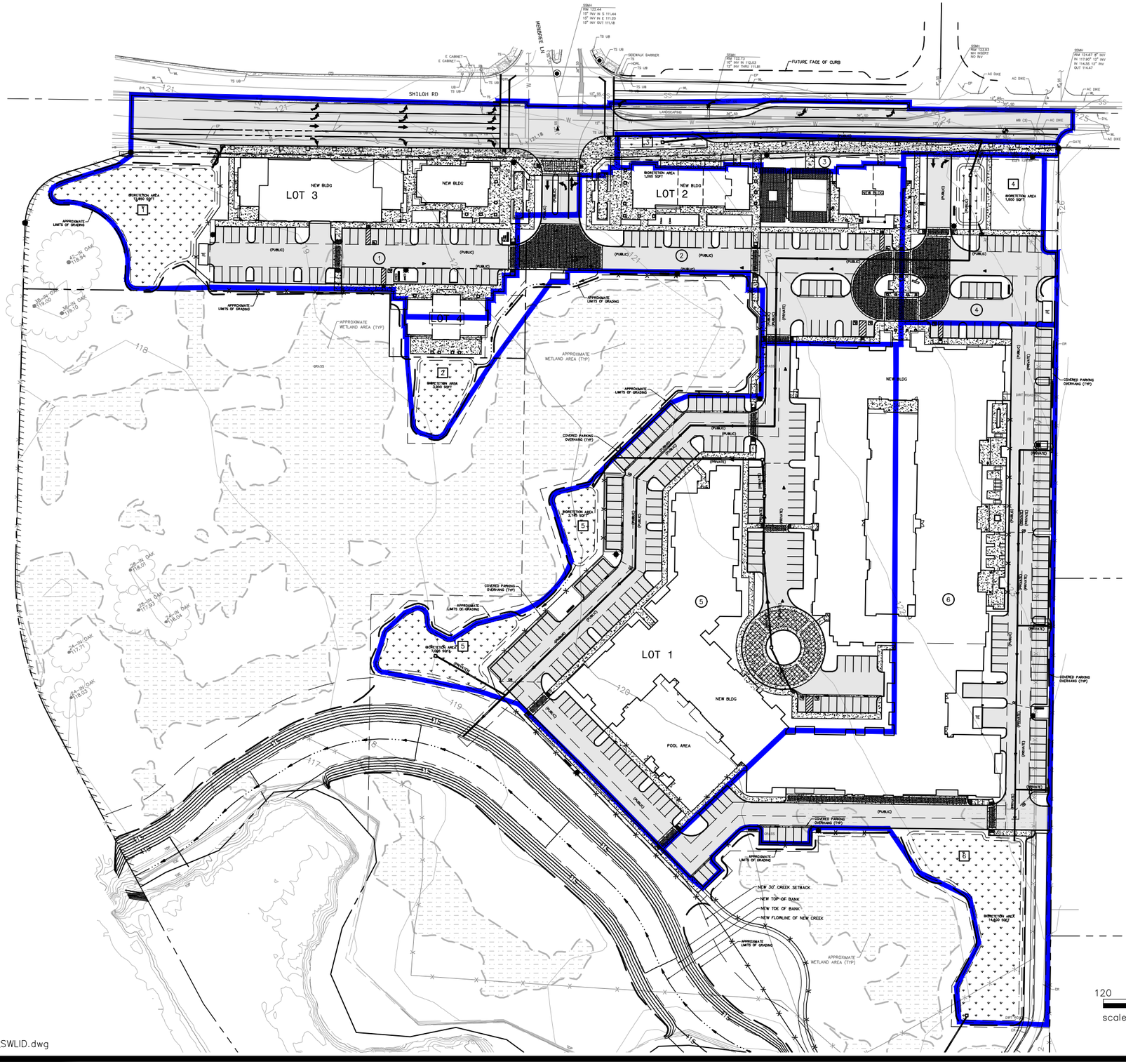
Approximate Average Annual Inspection and Maintenance Costs

Inspections and Associated Paperwork	$10,000
Stenciling Inlets	$1,000
Bioretention Area Sediment Removal/Erosion Repair	$10,000
Bioretention Area Replacement	$20,000

JOB NO. C20181469-10

APPENDIX A

SITE EXHIBIT



SYMBOLS & LEGEND

- DRAIN INLET
- STORM DRAIN MANHOLE
- STORM DRAIN
- BIORETENTION AREA
- ASPHALT
- ASPHALT GRIND & OVERLAY
- CONCRETE
- DETECTABLE WARNING
- VALLEY GUTTER
- DRAINAGE MANAGEMENT AREA BOUNDARY
- (#) DRAINAGE MANAGEMENT AREA (DMA)
- [#] BMP IDENTIFIER (BMP)

	DMA		BMP			
AREA NO.	SIZE (SF)	CN	SIZE (SF)	DEPTH (FT)	BMP TYPE	DETAIL
1	131,450	95	12,850	1.5	BIORETENTION	1, SHEET 2
2	74,020	95	3,900	2.5	BIORETENTION	1, SHEET 2
3	13,960	95	975	2.0	BIORETENTION	2, SHEET 2
4	31,600	95	1,500	2.5	BIORETENTION	2, SHEET 2
5	178,800	95	9,750	2.5	BIORETENTION	2, SHEET 2
6	149,810	95	14,600	1.5	BIORETENTION	2, SHEET 2

NOTE
THE PROJECT GEOTECHNICAL ENGINEER REPORTS THAT GROUNDWATER WAS ENCOUNTERED AT THE TIME OF THEIR SUBSURFACE EXPLORATION AT APPROXIMATELY 19 FEET BELOW THE EXISTING GROUND SURFACE AND THE NEAR SURFACE SOIL IS SANDY CLAY WHICH IS CLASSIFIED A CLASS "C/D" TYPE SOIL HAVING AN INFILTRATION RATE LESS THAN 0.05 IN/HR.

N

120 0 120
scale 1" = 120' feet

SWLID
SITE EXHIBIT
CLEARWATER LIVING

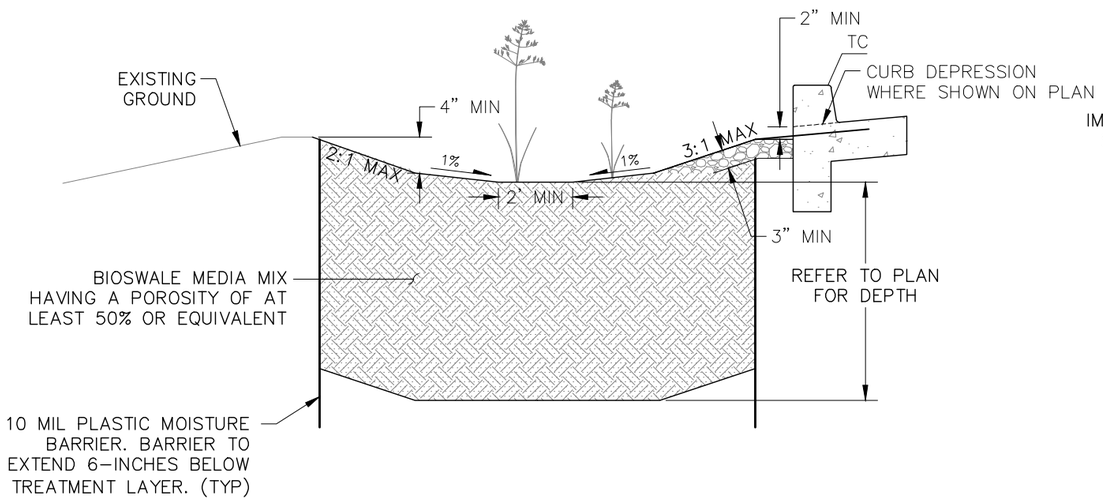
376 SHILOH ROAD
TOWN OF WINDSOR, SONOMA COUNTY, CA
AUGUST 2021

BkF
ENGINEERS / SURVEYORS / PLANNERS
200 4TH ST. STE. 300 SANTA ROSA, CA 95401
(707) 583-8500 FAX: (707) 583-8539

JOB NO. 20169082 SHEET 1 OF 2 SHEETS

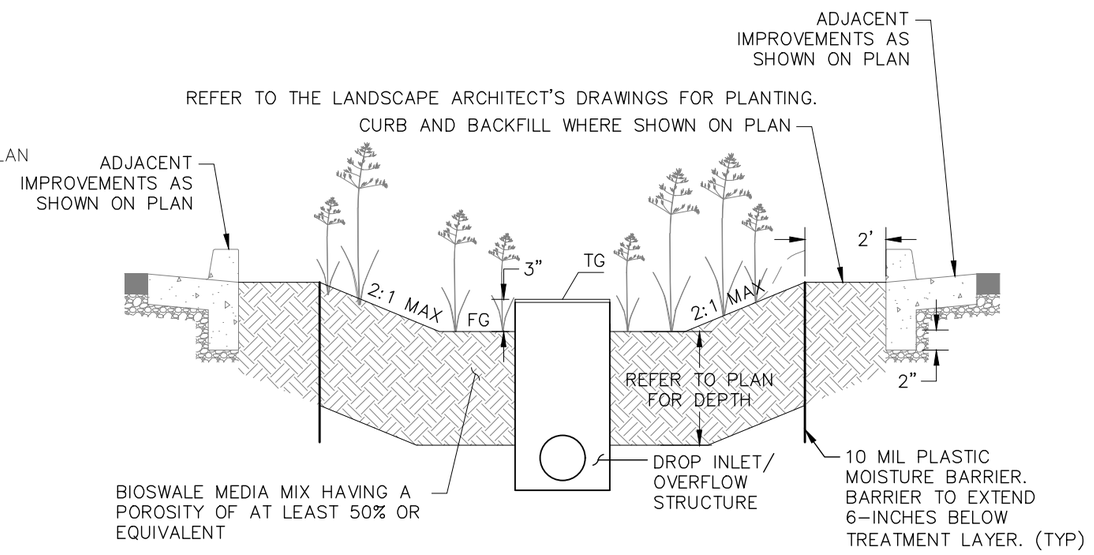
169082_SWLID.dwg

Plot Aug 10, 2021 at 3:48pm



1 — BIORETENTION AREA

NO SCALE



2 — BIORETENTION AREA

NO SCALE

BkF
ENGINEERS / SURVEYORS / PLANNERS
200 4TH ST. STE. 300 SANTA ROSA, CA 95401
(707) 583-8500 FAX: (707) 583-8539

JOB NO. C20169082-12

APPENDIX B

VOLUME CAPTURE CALCULATIONS

City of Santa Rosa WATER

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	Clearwater Living
Address/Location:	Shiloh Rd, Windsor CA 95492
Designer:	BKF Engineers
Date:	8/10/2021

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site:	35.00	(inches)
K=MSP/3(K=	1.17	
Impervious area - pre development:	75,000.0	ft^2
Impervious area - post development:	532,000.0	ft^2

Based upon the pre and post development impervious area, the post construction BMP requirement is:

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	Tributary Area (ft^2.)	Runoff Reduction Measures (Y/N)	Type of Requirement Met	Type of BMP Design	Percent Achieved	Required $V_{Hydromod}$ (ft^3)	Achieved (ft^3)	Required Q Treatment (cfs)	Achieved (ft^3)	Required Vdelta (ft^3)	Achieved (ft^3)
1	1	131,450	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	124.0	7775.2676	9637.5000				
2	2	74,020	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	111.3	4378.2832	4875.0000				
3	3	13,960	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	118.1	825.7340	975.0000				
4	4	31,600	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.3	1869.1400	1875.0000				
5	5	178,800	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	115.2	10576.0195	12187.5000				
6	6	149,810	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	123.6	8861.2617	10950.0000				
7												
8												
9												
10												
11												
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Clearwater Living**

BMP ID:	1
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	131,450.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 7,775.27 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Urban districts - Commercial and business
CN_{POST} :	95
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 123.95 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.50			
Depth below perforated pipe if present:	1.50	ft		
Depth:			0.35	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	12,850.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Clearwater Living**

BMP ID:	2
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	74,020.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 4,378.28 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Urban districts - Commercial and business
CN_{POST} :	95
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 111.35 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.50			
Depth below perforated pipe if present:	2.50	ft	Depth: 0.35	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	3,900.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Clearwater Living**

BMP ID:	3
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	13,960.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 825.73 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Urban districts - Commercial and business
CN_{POST} :	95
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 118.08 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.50			
Depth below perforated pipe if present:	2.00	ft		
Depth:			0.35	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	975.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Clearwater Living**

BMP ID:	4
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	31,600.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 1,869.14 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Urban districts - Commercial and business
CN_{POST} :	95
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.31 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.50			
Depth below perforated pipe if present:	2.50	ft	Depth: 0.35	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	1,500.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Clearwater Living**

BMP ID:	5
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	178,800.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 10,576.02 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Urban districts - Commercial and business
CN_{POST} :	95
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 115.24 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.50			
Depth below perforated pipe if present:	2.50	ft	Depth: 0.35	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	9,750.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Clearwater Living**

BMP ID:	6
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	149,810.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 8,861.26 ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Urban districts - Commercial and business
CN_{POST} :	95
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 123.57 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.50			
Depth below perforated pipe if present:	1.50	ft		
Depth:			0.35	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	14,600.00	ft^2	0.00	ft^2

JOB NO. C20169082-12

APPENDIX C

DETERMINATION WORKSHEET

SWLID SUBMITTAL GUIDE CHECKLIST

BMP SELECTION TABLES

FOR OFFICE USE ONLY:
Does this project require permanent storm water BMP's?

☐ Y ☐ N

Date Submitted: _____

Print Form

File No:	Quadrant
Related Files:	
Set:	
Department Use Only	

2017 Storm Water LID Determination Worksheet

PURPOSE AND APPLICABILITY: This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

Part 1: Project Information

Clearwater Living Project Name	Clearwater Living Applicant (owner or developer) Name
376 Shiloh Rd Project Site Address	5000 Birch Street, Suite 400 Applicant Mailing Address
Windsor/CA/95492 Project City/State/Zip	Newport Beach/CA/92660 Applicant City/State/Zip
	(949) 333-8515/nmaurillo@clearwaterliving.con Applicant Phone/Email/Fax
Permit Number(s) - (if applicable)	
BKF Engineers Designer Name	200 4th Street, Suite 300 Designer Mailing Address
Santa Rosa/CA/95401 Designer City/State/Zip	(707) 583-8528 / adezurik@bkf.com Designer Phone/Email

Type of Application/Project:

☑ Subdivison ☐ Grading Permit ☐ Building Permit ☐ Hillside Development

☑ DesignReview ☑ Use Permit ☐ Encroachment ☐ Time Extensions ☐ Other :_____

PART 2: Project Exemptions

1. Is this a project that creates or replaces *less than* 10,000 square feet of impervious surface[1], including all project phases and off-site improvements?

   ☐ Yes ☑ No

1 Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are defined as maintenance activities per section VI.D.2.b.

2. Is this project a routine maintenance activity[2] that is being conducted to maintain original line and grade, hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots?

☐ Yes ☑ No

3. Is this project a stand alone pedestrian pathway, trail or off-street bike lane?

☐ Yes ☑ No

4. **Did you answer "YES" to any of the questions in Part 2?**

☐ **YES:** This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete the "Exemption Signature Section" on Page 4.**

☑ **NO:** Please complete the remainder of this worksheet.

Part 3: Project Triggers

Projects that Trigger Requirements:
Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs as required by the NPDES MS4 Permit order No. R1-2015-0030.

1. Does this project create or replace a combined total of 10,000 square feet or more of impervious surface[1] including all project phases and off-site improvements?

☑ Yes ☐ No

2. Does this project create or replace a combined total or 10,000 square feet or more of impervious streets, roads, highways, or freeway construction or reconstruction[3]? ☑ Yes ☐ No

3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface[1] including all project phases and off-site improvements? ☑ Yes ☐ No

4. **Did you answer "YES" to any of the above questions in Part 3?**

☑ **YES:** This project will need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete remainder of worksheet and sign the "Acknowledgement Signature Section" on Page 4.**

☐ **NO:** This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the "Exemption Signature Section" on Page 4.**

---

1 Imprevious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintence activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacint, trenching and patching are defined as maintenance activities per section VI.D.2.b.

2 "Rountine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities per section VI.D.2.b.

3 "Reconstruction" is defined as work that extends into the subgrade of a pavement per section VI.D.2.b.

Part 4: Project Description

1. Total Project area: 13.2 ○ square feet ◉ acres

2. Existing land use(s): (check all that apply)

☑ Commercial ☐ Industrial ☐ Residential ☐ Public ☑ Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

The project site is located at 376 Shiloh Road, Windsor, CA. The project parcel comprises 24.83 acres of vacant undeveloped land with Boulevard Mixed-Use and Gateway Commercial Land Use and Boulevard Commercial Zoning with seasonal wetlands and Pruitt creek on the south side. Impact to site features will be avoided, and mitigation will be provided.

3. Existing impervious surface area: 1.7 ○ square feet ◉ acres

4. Proposed Land Use(s): (check all that apply)

☑ Commercial ☐ Industrial ☐ Residential ☐ Public ☑ Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

The project proposes a mixed-use village with senior living campus consists of approximately 245 units, plus approximately 20,000 sf of neighborhood-serving Retail / Mixed-Use with seasonal wetlands and Pruitt creek on the south side .Impact to site features will be avoided, and mitigation will be provided.

5. Proposed ~~Existing~~ impervious surface area: 12.2 ○ square feet ◉ acres

Acknowledgment Signature Section:

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit Order No. R1-2015-0030. *Any unknown responses must be resolved to determine if the project is subject to these requirements.

_____ 04/27/2021 _____

Applicant Signature | Date

Exemption Signature Section:

As the property owner or developer, I understand that this project as currently designed does not require permanent Storm Water BMP's nor the submittal of a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit*. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMP's.

_____ _____

Applicant Signature | Date

*** This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.**

Implementation Requirements: *All calculations shall be completed using the "Storm Water Calculator" available at: www.srcity.org/stormwaterLID*

Hydromodification Control/100% Volume Capture: Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

***Treatment Requirement*:** Treatment of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

Delta Volume Capture Requirement: Capture (infiltration and/or reuse) of the increase in volume of storm water due to development generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

Project Name: Clearwater Living

Date: 05/03/2021

Storm Water Low Impact Development Submittal Coversheet

To be submitted with all SW LID submittals

1. Submittal Information:

Submittal Date: 05/03/2021

Initial SW LIDS ☑ **Final SW LIDs** ☐

Design Manuel Used for design:

- ☐ 2005 Standard Urban Storm Water Mitigation Plan
- ☐ 2011 Storm Water Low Impact Development Technical Design
- ☑ Manuel 2017 Storm Water Low Impact Development Technical Design Manuel

2. Applicant Information:

Applicant Name (Owner or Developer): Clearwater Living

Mailing Address: 5000 Birch Street, Suite 400

City/State/Zip: Newport Beach/CA/92660

Phone/Email/Fax: (949) 333-8515 /nmaurillo@clearwaterliving.com

Project Name: Clearwater Living

Date: 05/03/2021

Storm Water Low Impact Development Submittal Coversheet

To be submitted with all SW LID submittals

3. Project Information:

Project Name: Clearwater Living

Site Address: 5000 Birch Street, Suite 400

City/State/Zip: Newport Beach/CA/92660

APN (s): 059-271-059

Permit # (s):

Subdivision	✔	Grading Permit		Building Permit		Design Review	✔
Use Permit	✔	Hillside Development		Encroachment		Time Extension	

Other:

Project Name: Clearwater Living

Date: 05/03/2021

City of Santa Rosa

Storm Water Low Impact Development Submittal Coversheet

To be submitted with all SW LID submittals

4. Design Information:

Narrative:

Project Description

- ☑ Description of proposed project type, size, location, and any specific uses or features.
- ☑ Description of any sensitive features (creeks, wetlands, trees, etc.) and whether they are going to be preserved, removed or altered.
- ☑ Description of the existing site.
- ☑ Description of how this project triggers these requirements (impervious area, CALGreen, 401 Permit, etc.).
- ☑ Describe any "on-site offset" used.

Pollution Prevention and Runoff Reduction Measures

- ☑ Description of all proposed pollution prevention measures (street sweeping, covered trash enclosures, indoor uses, etc).
- ☑ Description of all Runoff Reduction Measures (Interceptor Trees, Impervious Area Disconnection, and/or Alternative Driveway Design).

Type of BMPs Proposed

- ☑ Description of the types of BMPs selected including priority group that each is in.
- ☑ Description of level of treatment and volume capture achieved for each BMP.

Maintenance

- ☑ Description of maintenance for each type of BMP.
- ☑ Description of funding mechanism.
- ☑ Designation of Responsible Party.

Project Name: Clearwater Living

Date: 05/03/2021

City of Santa Rosa

Storm Water Low Impact Development Submittal Coversheet

To be submitted with all SW LID submittals

Exhibits:

Proposed SUSMP Exhibit:

- [x] Exhibit should include: street names, property lines, strom drainage system, waterways, title block, scale and north arrow.
- [x] Tributary areas shown for all inlets (including off-site drainage areas).
- [x] C value for each tributary area.
- [x] Soil Type of existing site.
- [x] New or replaced impervious area shown.
- [x] All inlets and BMP, shown (including unique identifier).
- [x] All interceptor trees shown.
- [x] All proposed BMPs shown including dimensions.

Existing Condition Exhibit

- [x] Exhibit should include: street names, property lines, proposed storm drainage system, waterways, title block, scale, and north arrow.
- [x] Soil Type of existing site.
- [x] Proposed tributary areas shown for all proposed inlets (including offsite drainage areas). Existing impervious areas.
- [x] Existing impervious area.

BMP Details:

- [x] Preliminary detail for each type of BMP selected- provide a preliminary 8.5”x11” detail for each BMP type or include on submitted drawings. These can be taken straight from the Fact Sheets if no significant changes are proposed.

On Plans:

- [x] Show all applicable elements of the selected BMPs on the appropriate plan sheets.

Calculations:

- [x] Calculations and summary sheet using the Storm Water Calculator found at *www.srcity.org/stormwaterLID*
- [x] Supplemental or supporting calculation if applicable.
- [ ] Calculations; from the “storm water calculator” for each inlet.

BMP Selection Table

Project Name: Cherry Creek Village

	Best Management Practice (BMP)	Detail Sheet	Detail Title	Can be used with...	High Ground Water Contamination	Slope Constraints	Achieves...	Treatment	Volume Capture	Runoff Reduction Measure	BMP in priority selected?	Yes	No	Unique Identifier of BMP per planes	Explanation of selection	Other notes:
Universal BMP- to be considered on all projects.	Living Roof	N/A	N/A		X	X	X	X	X							
	Rainwater Harvesting	N/A	N/A		X	X	X		X							
Runoff Reduction Measures	Interceptor Trees	N/A	N/A		X	X	X			X		✔				
	Bovine Terrace	RRM-01	Bovine Terrace		X					X						
	Vegetated Buffer Strip	RRM-02	Vegetated Buffer Strip							X						
	Impervious Area Disconnection	N/A	N/A		X	X	X			X						
Priority 1- to be installed with no underdrains or liners. Must drain all stading water within 72 hours.	Bioretention	P1-02	Roadside Bioretention - no C & G					X	X			✔				
	Vegetated Swale- with Bioretention	P1-06	Swale with Bioretention					X	X			✔				
	Constructed Wetlands	N/A	N/A					X	X							
Priority 2 BMPs- with subsurface drains installed above the capture volume.	Bioretention	P2-02	Roadside Bioretinton - Flush Design Roadside					X	X							
		P2-03	Roadside Bioretenion- Contiguous SW					X	X							
		P2-04	Roadside Bioretenion- Curb Opening					X	X							
		P2-05	Roadside Bioretenion- No C & G					X	X							
	Constructed Wetlands	N/A	N/A					X	X							

Date: _____ Page _____ of _____

Notes:

Interceptor trees will be incorporated into the project because they fit into the context of this site.

Roadside Bioretention and vegetated swale with Bioretention will be incorporated into the project because it fits into the context of this site.

BMP Selection Table

Best Management Practice (BMP)	Detail Sheet	Detail Title	**Can be used with...**	High Ground Water	Contamination	Slope Constraints	**Achieves...**	Treatment	Volume Capture	Runoff Reduction Measure	**BMP in priority selected?**	Yes	No	Unique Identifier of BMP per planes	Explanation of selection	Other notes:
Priority 3 BMPs- installed with subdrains and/or impermeable liner. Does not achieve volume capture and must be used as part of a treatment train.	Bioretention	P3-02		X	X	X		X								
		P3-03		X	X	X		X								
		P3-04		X	X	X		X								
	Flow Through Planters	P3-05		X	X	X		X								
	Vegetated Swale	P3-06		X	X	X		X	X							
		P3-07		X	X	X		X								
Priority 4 BMPs- does not achieve volume capture and must be used as part of a	Tree Filter Unit			X	X	X		X								
	Modular Bioretention			X	X	X		X								
Priority 5 BMPs- does not achieve volume capture and must be used as part of a treatment train.	Chambered Separator Units			X	X	X		X								
	Centrifugal Separator Units			X	X	X		X								
	Trash Excluders			X	X	X		X								
	Filter Inserts			X	X	X		X								
Priority 6 BMPs- see the "Offset Program" chapter for details.	Offset Program							N/A	N/A	N/A						
Other	Detention			X												

APPENDIX D

BIORETENTION AREA FACT SHEET

FACT SHEET- BIORETENTION

BIORETENTION

Also know as: Rain garden, roadside bioretention, and bioretention cell







DESCRIPTION

The bioretention area best management practice (BMP) functions as a soil and plant-based filtration and infiltration feature that removes pollutants through a variety of natural physical, biological, and chemical treatment processes.

ADVANTAGES

- Can be designed to achieve Treatment, Delta Volume Capture, or Hydromodification requirements.
- Enhances water quality of downstream water bodies through natural processes.
- Aesthetically pleasing.
- The vegetation can provide shade and wind breaks, absorbs noise, reduces heat island effects and improves an area's landscape.
- Provides habitat for birds and attracts other pollinators like butterflies and bees.
- Does not interrupt utility installation.
- Does not interfere with tree planting.

FACT SHEET- BIORETENTION

LIMITATIONS

- Specialized design is required for areas where street slopes exceed 10%.
- Should not be used in areas of know contamination. If soil and/or groundwater contamination is present on the site or within a 100' radius of the proposed BMP location, the North Coast Regional Water Quality Control Board will need to be contacted and the site reviewed.
- Should not be used in areas of high groundwater. In general a minimum of 2' of clearance should be provided between the bottom of the bioretention cell and seasonal high groundwater.
- Should not be used in areas of slope instability where infiltrated storm water may cause failure. Slope stability should be determined by a licensed geotechnical engineer.
- Do not use in locations that can negatively impact building foundation or footings. Location shall be approved by a licensed Geotechnical Engineer.

KEY DESIGN FEATURES

ALL BIORETENTION

- Structural soil should be used within the bioretention area requiring load bearing capacity (adjacent to roadways and/or buildings).
- Structural soil, if used, shall be installed as described in Appendix E.
- Some BMPs may not require the use of structural soil and a more organic type planting soil and/or treatment media may be used in its place. It may be possible in some cases to use native soil or to amend the native soil so that it is suitable. Use of non-structural soil will depend on evaluation of the criteria in "Chapter 4-Site Assessment" as well as consideration of structural needs and may require evaluation by a licensed Geotechnical Engineer.
- Underlining native soil should remain un-compacted to preserve infiltration capacity. Fence off the area during construction to protect it from compaction.
- Bottom of bioretention should be un-lined to allow infiltration into native soil.
- Moisture barrier must be installed vertically to protect road sub-base and any trenches adjacent to the bioretention area.
- If used, pervious concrete shall be designed and installed as described in Appendix E and protected during construction to prevent sediment loading.
- If the porous gutter design option is used additional trash and sediment capture BMPs is required.
- A curb opening type design may be used in place of a porous gutter if appropriate for the project and does not require additional trash capture.
- Bioretention areas shall be planted with plants from the approved **Plant List** and **Tree List** included in Appendix F and shall be planted to achieve 51% cover.
- All bioretention areas shall be designed with a designated high flow bypass inlet for storms larger than the design storm.

- For designs that include perforated pipe, the 6" perforated pipe must be installed a minimum of 6" below the adjacent road structural section.
- Perforated pipe shall be installed in straight runs only.
- The volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.

SIZING DESIGN- GOAL AND REQUIREMENTS

- **For all projects:** The treatment component requires that all of the runoff generated by this water quality design storm from impermeable surfaces must be treated on site for the pollutants of concern.
- ***For projects that increase the amount of impervious surface, but create or replace less than a total of one acre:*** The **Delta Volume Capture** component requires that any increase in volume due to development for the water quality design storm must be infiltrated and/or reused on site. Further discussion of the Treatment and Delta Volume Capture requirements and the accompanying formulas can be found in Chapter 6.
- ***For projects that create or replace one acre or more of impervious surface*:** These larger projects must mitigate their impacts by meeting the **Hydromodification Requirement** by capturing 100% of the post development volume generated by the water quality rain event.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

INSPECTION AND MAINTENANCE REQUIREMENTS

A maintenance plan shall be provided with the Final SWLID Submittal. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum maintenance shall include the following:

- Dry street sweeping upon completion of construction
- Dry street sweeping annually, and
    - When water is observed flowing in the gutter during a low intensity storm.
    - Algae is observed in the gutter.
    - Sediment/debris covers 1/3 of the gutter width or more.
- Inspect twice annually for sedimentation and trash accumulation in the gutter. Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- Pesticides and fertilizers shall not be used in the bioretention area.
- Plants should be pruned, weeds pulled and dead plants replaced as needed.

APPENDIX E

SAMPLE OPERATION AND MAINTENANCE INSPECTION CHECKLISTS

Form A
Storm Water Quality Feature Maintenance Check List
- Standard Conditions -

Date: _____ Inspector: _____

Start Time: _____ Project: _____

Stop Time: _____ Address: _____

Inspection Status Codes:
S = Satisfactory * = Refer to Form B (Specials) and/or Form C (Notes).
D = Deficient

Are there any special conditions and/or maintenance requirements noted for BMP(s)? Y N (circle one)
If Yes, attach Form B for Project.

	Drainage				Erosion						Vegetation				General			Special Features
	Drawdown - Drainage - Vector Risk - Pump Out-Blockage				Hydraulic Function - Failure - Sediment Clogging						Excessive Mowing - Herbicide Overuse - Health of Desired Vegetation -				Trash and Debris - Improper Modifications - Damage			
Reference code	D1	D2	D3	D4	E1	E2	E3	E4	E5	E6	V1	V2	V3	V4	G1	G2	G4	S
BMP ID:	Evidence of standing or ponding of water in the BMP area after 72 hours of dry weather?	Does the high flow bypass function as designed?	Is there sediment acumination in or around BMP?	Has water been observed flowing in the pervious concrete section during a low intensity storm?	Is there under cutting or washouts along the sidewalks and/or curbs abutting the planter area?	Is there channelization (gully) forming along the length of the planter area?	Is there accumulation of sediment (sand, dirt, mud) in the planter area ?	Observed or potential transport of mulch to drainage system?	Are there voids or holes present in the BMP?	Is there evidence of animal activity?	Is the vegetation clogging the inlet or flow path?	Evidence of Excessive Mowing and/or Herbicide Overuse?	Are there dead or dry plants or excessive weeds?	Is there an absence of correct vegetation?	Is there debris/trash accumulation in the BMP or high flow by pass?	Missing or damage structural features? (Grates, pipes, walls, curbs, etc.)	Evidence of improper modifications or removal of BMP?	**See Additional Special Conditions or Features Check List Requirement Form B**

Page 37 of 43

Office Use:
Complete: _____ Issues Corrective Action: _____ Re-Inspection Required: _____

Page _____ of _____

Storm Water Quality Special Feature Maintenence Check List

Date: _____

Start Time: _____

Stop Time: _____

Inspector: _____

Project: _____

Address: _____

Inspection Status Codes:

S = Satisfactory * - See Notes on Form C

D = Deficient

Special Feature or Conditions

Reference code	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
Additional Special Maintenance Inspection Criterial	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.
BMP ID:											

Office Use:

Complete: _____ Issues Corrective Action: _____ Re-Inspection Required: _____

Form C
Storm Water Quality Feature Maintenence Check List
- Inspection Notes -

Date: _____

Inspector: _____

Project: _____

Address: _____

BMP ID:	Reference Code	**Notes**

APPENDIX F

DRAFT MAINTENANCE AGREEMENT

RECORDING REQUESTED BY
AND WHEN RECORDED MAIL TO:

Clearwater Living
5000 Birch Street, Suite 400
Newport Beach, CA 92660

With Copy to:
Town of Windsor
Engineering Division of Public Works
8400 Windsor Rd.
Windsor, CA 95492

Project/Property: 376 Shiloh Rd
Windsor, CA 95492
APN: 059-271-059

Space above this line has been reserved for the Recorder's use

DECLARATION OF COVENANTS REGARDING MAINTENANCE OF STORM WATER BMP FACILITIES

This Declaration of Covenants Regarding Maintenance of Storm Water BMP Facilities ("Declaration") is made on this __th day of _____, 2021, by Clearwater Living Management, Inc., ("Landowner").

RECITALS

A. Landowner is the fee simple owner of certain real property located at 376 Shiloh Rd, APN 059-271-059 in the Town of Windsor ("Town"), Sonoma County, California, and more fully described in Exhibit A to this Declaration ("Property").

B. The Town's National Pollutant Discharge Elimination System ("NPDES") Municipal Separate Storm Sewer System ("MS4") Permit, Order number R1-2009-0050, issued by the North Coast Regional Water Quality Control Board, requires the Town to implement and enforce specific requirements for the construction and maintenance of onsite storm water management facilities/best management practices (collectively, "BMP") for development, redevelopment, and other applicable projects with the goal of mitigating impacts to storm water quality and runoff volume discharges into the MS4.

C. Applicable sections of the Windsor Municipal Code shall apply to the construction, inspection and maintenance of BMP facilities and the enforcement of MS4 Permit requirements.

D. On _____, 2021, the Chief Building Official approved Landowner's Building Permit Site Plan ("Plan") and Final Storm Water Mitigation Plan ("SWMP") under permit number ___-_____ for the Property which requires the construction and maintenance of BMP facilities ("BMP Facilities") on the Property by Landowner. The SWMP may be inspected at the Town of Windsor, Engineering Division of Public Works, 8400 Windsor Road upon appointment.

E. The SWMP requires that Landowner make and execute this Declaration.

DECLARATION OF COVENANTS

NOW, THEREFORE, in consideration of the foregoing recitals, Landowner hereby covenants, agrees and declares as follows:

1. Landowner shall, at Landowner's sole cost and expense, construct, inspect, and maintain the BMP Facilities in accordance with the Plan and the SWMP. Landowner shall assure that all BMP's remain fully functional and that all areas identified in the Plan and SWMP for treatment and/or volume capture discharge to the specified BMP as designed.

2. Landowner shall keep all records related to annual inspections of BMP's by Town and all records related to BMP maintenance for a period of at least five years. The records shall include records of any BMP Facilities corrections, repairs, and replacements. Landowner shall make these records available to the Town upon request.

3. In the event Landowner fails to maintain the BMP Facilities in good working condition as solely determined by the Town, the Town may enter upon the Property and take whatever steps it deems reasonably necessary to maintain and/or make in good working condition, such BMP Facilities. It is expressly understood that the Town is under no obligation to maintain or repair the BMP Facilities, and in no event shall this Declaration be construed to impose such an obligation on the Town.

4. In the event that the Town performs work of any nature, or expends any funds in the performance of such work for labor, use of equipment, supplies, materials, or the like, due to failure of the Landowner to perform its maintenance obligations under this Declaration, as solely determined by Town, Landowner shall reimburse the Town within 60 days of receipt of notice for all costs incurred by the City to undertake such work. Costs shall include, but are not limited to, the actual cost of construction, maintenance and/or repair, and administrative costs directly related to such work.

5. Any violation of the Plan or SWMP by Landowner shall be deemed a public nuisance under Section ____ of the Windsor Municipal Code and Town shall be entitled to the remedies available to it under Section ____ in addition to those available to it under Section ____. The remedies identified herein shall be in addition to and cumulative of all other remedies, criminal or civil, which may be pursued by the Town.

6. Landowner shall indemnify, defend and hold harmless the Town and its employees, officials, and agents, from and against any liability, (including liability for claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, interest, defense costs, and expert witness fees), where the same relates to, or arises out of, the construction, presence, existence, inspection, or maintenance of BMP Facilities on the Property or the performance of the covenants underlying this Declaration by Landowner, its officers, employees, agents, contractors or sub-contractors, excepting only that resulting from the sole, active negligence or intentional misconduct of the Town, its employees, officials, or agents. This indemnification obligation is not limited in any way by any limitation on the amount or type of damages or compensation payable to or for the Landowner or its agents under workers' compensation acts, disability benefits acts or other employees' benefits acts. If any judgment or claim against the Town, its officials, agents, or employees, shall be entered, Landowner shall pay all cost and expenses in connection therewith.

7. If any provisions of this Declaration shall be held to be invalid, illegal or unenforceable, the

validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

8. This Declaration shall be governed according to the laws of the State of California. The parties hereto agree that the forum for the adjudication of any dispute related to this Declaration shall be brought exclusively and solely in Sonoma County, California.

9. Landowner shall not assign this Declaration to a third party without the express prior written consent of the Town, provided that such consent will not be unreasonably withheld and that such consent shall not be required for Landowner to sell or lease the property to a third party.

10. Landowner binds itself, its partners, successors, legal representatives and assignees to the Town, and to the partners, successors, legal representatives and assigns of the Town with respect to all promised and agreements contained herein.

11. This Declaration shall be recorded by Landowner, and shall: a) constitute a "covenant running with the land;" b) be binding upon Landowner and Landowner's successors, heirs, and assigns in perpetuity; and, c) benefit the Town of Windsor, its successors, and assigns. Any breach of this Declaration shall render Landowner or Landowner's heirs, successors or assigns liable pursuant to the provisions of the Windsor Municipal Code.

12. Any notice, submittal or communication required or permitted to be served on Landowner or City may be served by personal delivery to the person or the office of the person identified below. Service may also be made by mail, by placing first-class postage, and addressed as indicated below, and depositing in the United States mail to:

Town Representative:

Town of Windsor
Utilities Department

Engineering Division
of Public Works
8400 Windsor Road
Windsor, CA 95492

Landowner or Landowner Representative:

Name: Clearwater Living Management, Inc.
Address: 5000 Birch Street, Suite 400
Newport Beach, CA 92660

Executed as of the day and year first above stated.

LANDOWNER: **Clearwater Living Management, Inc.**

Signatures of Authorized Persons:

By: _____
Print Name: _____
Title: _____

ATTACHMENTS: Exhibit A- Property Description

Notary Acknowledgment

Appendix G

Noise Measurements and Calculations

Noise Measurement 1

Data Logger 2		
Duration (seconds)		3
Weighting	A	
Response	SLOW	
Range	40-100	
L05		73
L10		71.1
L50		65.8
L90		60
L95		58.2
Lmax		83.6
Time		8/31/2021 13:25
SEL		99.5
Leq		**68.7**

No.s	Date Time	Time	dB
1	8/31/2021 13:15	1:15 PM	65.9
2	8/31/2021 13:15	1:15 PM	67.7
3	8/31/2021 13:15	1:15 PM	67.1
4	8/31/2021 13:15	1:15 PM	64.7
5	8/31/2021 13:15	1:15 PM	65.1
6	8/31/2021 13:15	1:15 PM	71.4
7	8/31/2021 13:15	1:15 PM	72
8	8/31/2021 13:15	1:15 PM	73.7
9	8/31/2021 13:15	1:15 PM	72.7
10	8/31/2021 13:15	1:15 PM	74.2
11	8/31/2021 13:15	1:15 PM	73.5
12	8/31/2021 13:15	1:15 PM	68.7
13	8/31/2021 13:16	1:16 PM	66.2
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15	8/31/2021 13:16	1:16 PM	73.3
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18	8/31/2021 13:16	1:16 PM	66.2
19	8/31/2021 13:16	1:16 PM	65.5
20	8/31/2021 13:16	1:16 PM	65.8
21	8/31/2021 13:16	1:16 PM	65.3
22	8/31/2021 13:16	1:16 PM	63
23	8/31/2021 13:16	1:16 PM	61.9
24	8/31/2021 13:16	1:16 PM	62.4
25	8/31/2021 13:16	1:16 PM	66.6
26	8/31/2021 13:16	1:16 PM	64.5
27	8/31/2021 13:16	1:16 PM	70.1
28	8/31/2021 13:16	1:16 PM	70.5

29	8/31/2021 13:16	1:16 PM	68
30	8/31/2021 13:16	1:16 PM	62.5
31	8/31/2021 13:16	1:16 PM	58.9
32	8/31/2021 13:16	1:16 PM	58.1
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34	8/31/2021 13:17	1:17 PM	61.3
35	8/31/2021 13:17	1:17 PM	66.5
36	8/31/2021 13:17	1:17 PM	68.7
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41	8/31/2021 13:17	1:17 PM	65.6
42	8/31/2021 13:17	1:17 PM	62.3
43	8/31/2021 13:17	1:17 PM	60.6
44	8/31/2021 13:17	1:17 PM	73.3
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46	8/31/2021 13:17	1:17 PM	70.8
47	8/31/2021 13:17	1:17 PM	68.4
48	8/31/2021 13:17	1:17 PM	70.3
49	8/31/2021 13:17	1:17 PM	69.9
50	8/31/2021 13:17	1:17 PM	70
51	8/31/2021 13:17	1:17 PM	67.5
52	8/31/2021 13:17	1:17 PM	69.9
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54	8/31/2021 13:18	1:18 PM	71.1
55	8/31/2021 13:18	1:18 PM	64
56	8/31/2021 13:18	1:18 PM	67.1
57	8/31/2021 13:18	1:18 PM	69
58	8/31/2021 13:18	1:18 PM	66.8
59	8/31/2021 13:18	1:18 PM	66.5
60	8/31/2021 13:18	1:18 PM	63
61	8/31/2021 13:18	1:18 PM	63.3
62	8/31/2021 13:18	1:18 PM	65
63	8/31/2021 13:18	1:18 PM	70.4
64	8/31/2021 13:18	1:18 PM	63.7
65	8/31/2021 13:18	1:18 PM	61.9
66	8/31/2021 13:18	1:18 PM	64.1
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69	8/31/2021 13:18	1:18 PM	65.2
70	8/31/2021 13:18	1:18 PM	68.2
71	8/31/2021 13:18	1:18 PM	70.6
72	8/31/2021 13:18	1:18 PM	71.2
73	8/31/2021 13:19	1:19 PM	67.4
74	8/31/2021 13:19	1:19 PM	67.2
75	8/31/2021 13:19	1:19 PM	64.9

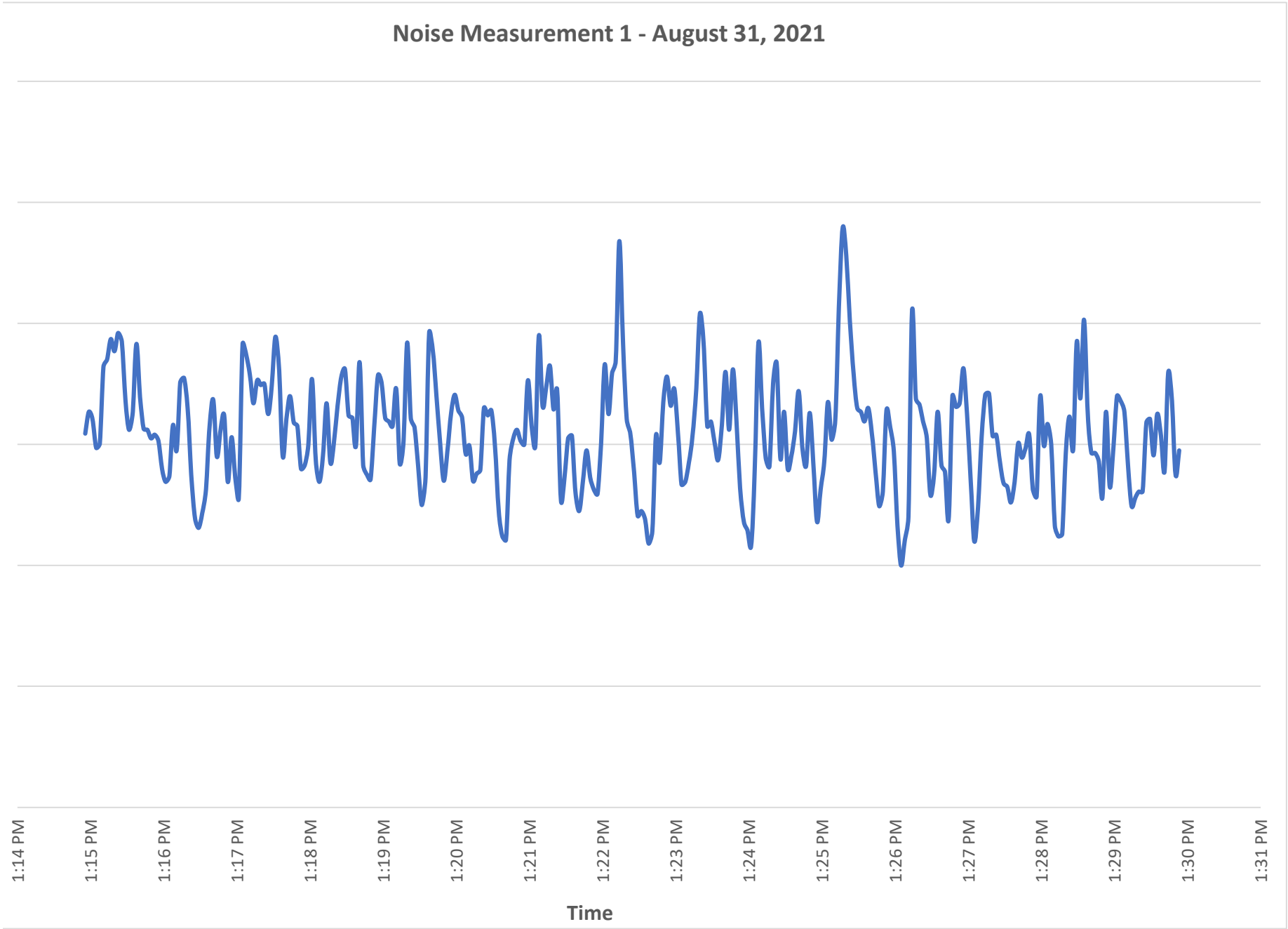
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77	8/31/2021 13:19	1:19 PM	63.3
78	8/31/2021 13:19	1:19 PM	62.5
79	8/31/2021 13:19	1:19 PM	62.1
80	8/31/2021 13:19	1:19 PM	66.4
81	8/31/2021 13:19	1:19 PM	70.7
82	8/31/2021 13:19	1:19 PM	70.1
83	8/31/2021 13:19	1:19 PM	67.2
84	8/31/2021 13:19	1:19 PM	66.9
85	8/31/2021 13:19	1:19 PM	66.5
86	8/31/2021 13:19	1:19 PM	69.6
87	8/31/2021 13:19	1:19 PM	63.4
88	8/31/2021 13:19	1:19 PM	65.3
89	8/31/2021 13:19	1:19 PM	73.4
90	8/31/2021 13:19	1:19 PM	67.2
91	8/31/2021 13:19	1:19 PM	66.4
92	8/31/2021 13:19	1:19 PM	63.2
93	8/31/2021 13:20	1:20 PM	60
94	8/31/2021 13:20	1:20 PM	62.3
95	8/31/2021 13:20	1:20 PM	74.2
96	8/31/2021 13:20	1:20 PM	72.8
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98	8/31/2021 13:20	1:20 PM	65.1
99	8/31/2021 13:20	1:20 PM	62
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101	8/31/2021 13:20	1:20 PM	67.6
102	8/31/2021 13:20	1:20 PM	69.1
103	8/31/2021 13:20	1:20 PM	67.8
104	8/31/2021 13:20	1:20 PM	67.2
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106	8/31/2021 13:20	1:20 PM	64.9
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108	8/31/2021 13:20	1:20 PM	62.6
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112	8/31/2021 13:20	1:20 PM	67.8
113	8/31/2021 13:21	1:21 PM	64.9
114	8/31/2021 13:21	1:21 PM	59.5
115	8/31/2021 13:21	1:21 PM	57.4
116	8/31/2021 13:21	1:21 PM	57.1
117	8/31/2021 13:21	1:21 PM	63.7
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120	8/31/2021 13:21	1:21 PM	65.3
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125	8/31/2021 13:21	1:21 PM	74
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127	8/31/2021 13:21	1:21 PM	69.7
128	8/31/2021 13:21	1:21 PM	71.5
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131	8/31/2021 13:21	1:21 PM	60.4
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141	8/31/2021 13:22	1:22 PM	60.9
142	8/31/2021 13:22	1:22 PM	65.1
143	8/31/2021 13:22	1:22 PM	71.6
144	8/31/2021 13:22	1:22 PM	67.5
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150	8/31/2021 13:22	1:22 PM	65.9
151	8/31/2021 13:22	1:22 PM	62.7
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153	8/31/2021 13:23	1:23 PM	59.5
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155	8/31/2021 13:23	1:23 PM	56.8
156	8/31/2021 13:23	1:23 PM	57.8
157	8/31/2021 13:23	1:23 PM	65.7
158	8/31/2021 13:23	1:23 PM	63.5
159	8/31/2021 13:23	1:23 PM	68.5
160	8/31/2021 13:23	1:23 PM	70.6
161	8/31/2021 13:23	1:23 PM	68.2
162	8/31/2021 13:23	1:23 PM	69.6
163	8/31/2021 13:23	1:23 PM	66
164	8/31/2021 13:23	1:23 PM	61.7
165	8/31/2021 13:23	1:23 PM	61.9
166	8/31/2021 13:23	1:23 PM	63.5
167	8/31/2021 13:23	1:23 PM	65.7
168	8/31/2021 13:23	1:23 PM	69.6
169	8/31/2021 13:23	1:23 PM	75.8

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171	8/31/2021 13:23	1:23 PM	66.5
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174	8/31/2021 13:24	1:24 PM	63.7
175	8/31/2021 13:24	1:24 PM	66.6
176	8/31/2021 13:24	1:24 PM	71
177	8/31/2021 13:24	1:24 PM	66.2
178	8/31/2021 13:24	1:24 PM	71.2
179	8/31/2021 13:24	1:24 PM	66.9
180	8/31/2021 13:24	1:24 PM	61.4
181	8/31/2021 13:24	1:24 PM	58.6
182	8/31/2021 13:24	1:24 PM	57.9
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184	8/31/2021 13:24	1:24 PM	62.8
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201	8/31/2021 13:25	1:25 PM	58.6
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214	8/31/2021 13:26	1:26 PM	66.9
215	8/31/2021 13:26	1:26 PM	68
216	8/31/2021 13:26	1:26 PM	65.9

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225	8/31/2021 13:26	1:26 PM	57.1
226	8/31/2021 13:26	1:26 PM	59
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231	8/31/2021 13:26	1:26 PM	65.5
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235	8/31/2021 13:27	1:27 PM	63.3
236	8/31/2021 13:27	1:27 PM	62.7
237	8/31/2021 13:27	1:27 PM	58.8
238	8/31/2021 13:27	1:27 PM	69
239	8/31/2021 13:27	1:27 PM	68.1
240	8/31/2021 13:27	1:27 PM	68.4
241	8/31/2021 13:27	1:27 PM	71.3
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248	8/31/2021 13:27	1:27 PM	69.2
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250	8/31/2021 13:27	1:27 PM	65.8
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255	8/31/2021 13:28	1:28 PM	61.9
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258	8/31/2021 13:28	1:28 PM	64.7
259	8/31/2021 13:28	1:28 PM	65.8
260	8/31/2021 13:28	1:28 PM	61.3
261	8/31/2021 13:28	1:28 PM	60.7
262	8/31/2021 13:28	1:28 PM	69
263	8/31/2021 13:28	1:28 PM	64.9

264	8/31/2021 13:28	1:28 PM	66.7
265	8/31/2021 13:28	1:28 PM	65
266	8/31/2021 13:28	1:28 PM	58.3
267	8/31/2021 13:28	1:28 PM	57.4
268	8/31/2021 13:28	1:28 PM	57.6
269	8/31/2021 13:28	1:28 PM	64.3
270	8/31/2021 13:28	1:28 PM	67.3
271	8/31/2021 13:28	1:28 PM	64.6
272	8/31/2021 13:28	1:28 PM	73.5
273	8/31/2021 13:29	1:29 PM	68.8
274	8/31/2021 13:29	1:29 PM	75.3
275	8/31/2021 13:29	1:29 PM	67.5
276	8/31/2021 13:29	1:29 PM	64.3
277	8/31/2021 13:29	1:29 PM	64.3
278	8/31/2021 13:29	1:29 PM	63.6
279	8/31/2021 13:29	1:29 PM	60.6
280	8/31/2021 13:29	1:29 PM	67.7
281	8/31/2021 13:29	1:29 PM	61.5
282	8/31/2021 13:29	1:29 PM	64.7
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284	8/31/2021 13:29	1:29 PM	68.6
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290	8/31/2021 13:29	1:29 PM	61.1
291	8/31/2021 13:29	1:29 PM	66.8
292	8/31/2021 13:29	1:29 PM	67.1
293	8/31/2021 13:30	1:30 PM	64.1
294	8/31/2021 13:30	1:30 PM	67.5
295	8/31/2021 13:30	1:30 PM	65.7
296	8/31/2021 13:30	1:30 PM	62.8
297	8/31/2021 13:30	1:30 PM	70.9
298	8/31/2021 13:30	1:30 PM	68.6
299	8/31/2021 13:30	1:30 PM	62.5
300	8/31/2021 13:30	1:30 PM	64.5


Noise Measurement 1 - August 31, 2021
1:14 PM
1:15 PM
1:16 PM
1:17 PM
1:18 PM
1:19 PM
1:20 PM
1:21 PM
1:22 PM
1:23 PM
1:24 PM
1:25 PM
1:26 PM
1:27 PM
1:28 PM
1:29 PM
1:30 PM
1:31 PM
Time

Noise Measurement 2

Data Logger 2		
Duration (seconds)		3
Weighting	A	
Response	SLOW	
Range	40-100	
L05		67.9
L10		66.8
L50		62.5
L90		54.4
L95		53.3
Lmax		74.6
Time	8/31/2021	14:22PM
SEL		93.2
Leq		**63.8**

No.s	Date Time	Time	dB
1	8/31/2021 14:21	2:21 PM	67.3
2	8/31/2021 14:21	2:21 PM	66.4
3	8/31/2021 14:21	2:21 PM	64.1
4	8/31/2021 14:21	2:21 PM	59.5
5	8/31/2021 14:21	2:21 PM	59.9
6	8/31/2021 14:21	2:21 PM	65.7
7	8/31/2021 14:21	2:21 PM	65.3
8	8/31/2021 14:21	2:21 PM	65
9	8/31/2021 14:21	2:21 PM	65.9
10	8/31/2021 14:21	2:21 PM	67.4
11	8/31/2021 14:21	2:21 PM	67.2
12	8/31/2021 14:21	2:21 PM	68
13	8/31/2021 14:21	2:21 PM	64.9
14	8/31/2021 14:21	2:21 PM	62.9
15	8/31/2021 14:21	2:21 PM	69.5
16	8/31/2021 14:21	2:21 PM	67.1
17	8/31/2021 14:21	2:21 PM	62.7
18	8/31/2021 14:21	2:21 PM	58.6
19	8/31/2021 14:22	2:22 PM	55.4
20	8/31/2021 14:22	2:22 PM	54.4
21	8/31/2021 14:22	2:22 PM	55.5
22	8/31/2021 14:22	2:22 PM	62.5
23	8/31/2021 14:22	2:22 PM	67.5
24	8/31/2021 14:22	2:22 PM	63.1
25	8/31/2021 14:22	2:22 PM	62.5
26	8/31/2021 14:22	2:22 PM	68.6
27	8/31/2021 14:22	2:22 PM	71.8
28	8/31/2021 14:22	2:22 PM	74

29	8/31/2021 14:22	2:22 PM	67.6
30	8/31/2021 14:22	2:22 PM	61.8
31	8/31/2021 14:22	2:22 PM	63.7
32	8/31/2021 14:22	2:22 PM	63.1
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47	8/31/2021 14:23	2:23 PM	60.7
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49	8/31/2021 14:23	2:23 PM	55.8
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63	8/31/2021 14:24	2:24 PM	65.1
64	8/31/2021 14:24	2:24 PM	61.5
65	8/31/2021 14:24	2:24 PM	64.2
66	8/31/2021 14:24	2:24 PM	67.9
67	8/31/2021 14:24	2:24 PM	61
68	8/31/2021 14:24	2:24 PM	56.4
69	8/31/2021 14:24	2:24 PM	54.3
70	8/31/2021 14:24	2:24 PM	64.7
71	8/31/2021 14:24	2:24 PM	64.4
72	8/31/2021 14:24	2:24 PM	58.3
73	8/31/2021 14:24	2:24 PM	64.5
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75	8/31/2021 14:24	2:24 PM	63.7

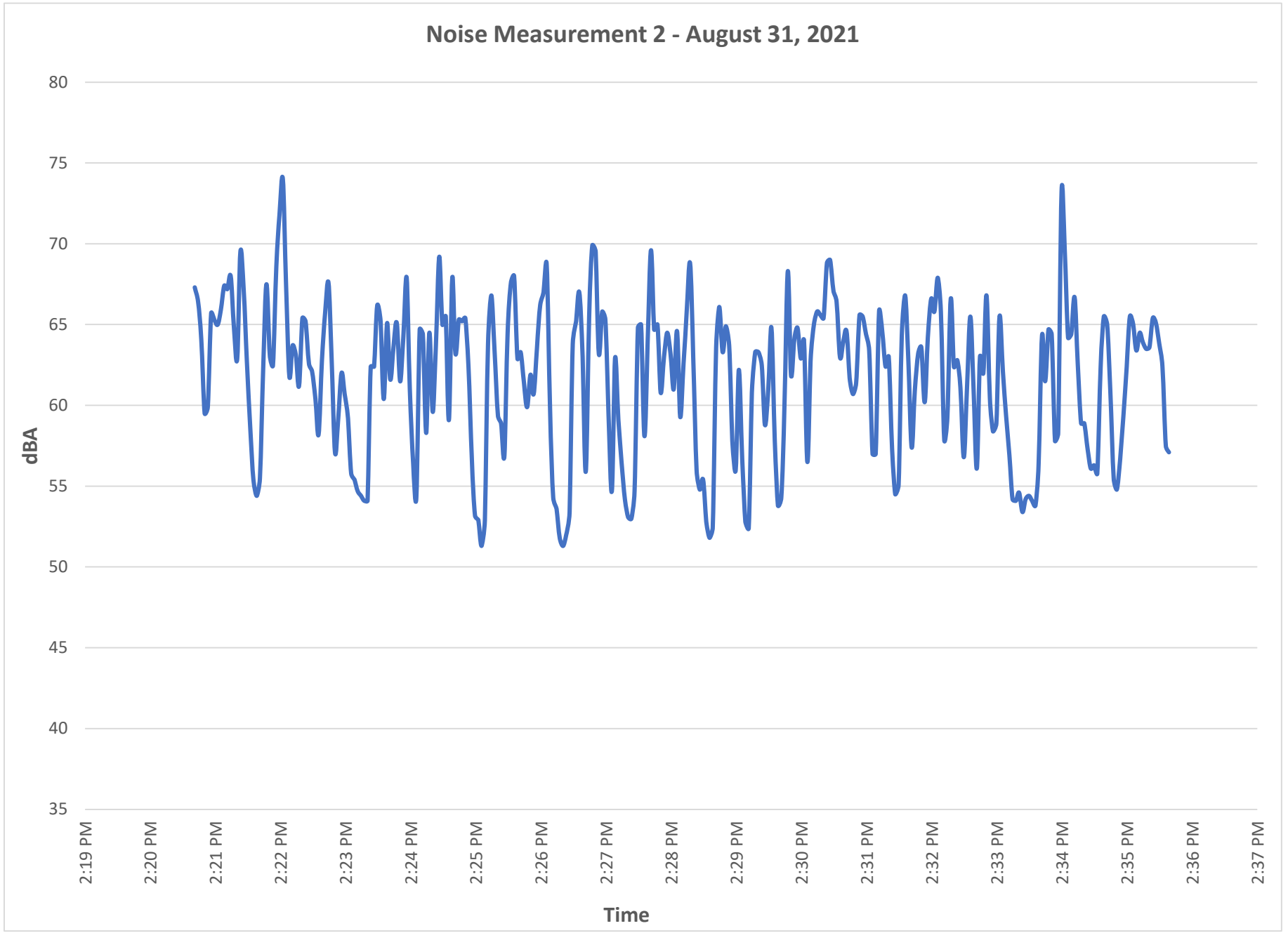
76	8/31/2021 14:24	2:24 PM	69.2
77	8/31/2021 14:24	2:24 PM	65
78	8/31/2021 14:24	2:24 PM	65.5
79	8/31/2021 14:25	2:25 PM	59.1
80	8/31/2021 14:25	2:25 PM	67.9
81	8/31/2021 14:25	2:25 PM	63.2
82	8/31/2021 14:25	2:25 PM	65.3
83	8/31/2021 14:25	2:25 PM	65.2
84	8/31/2021 14:25	2:25 PM	65.4
85	8/31/2021 14:25	2:25 PM	62.4
86	8/31/2021 14:25	2:25 PM	56.7
87	8/31/2021 14:25	2:25 PM	53.2
88	8/31/2021 14:25	2:25 PM	52.9
89	8/31/2021 14:25	2:25 PM	51.3
90	8/31/2021 14:25	2:25 PM	52.9
91	8/31/2021 14:25	2:25 PM	63.8
92	8/31/2021 14:25	2:25 PM	66.8
93	8/31/2021 14:25	2:25 PM	63.4
94	8/31/2021 14:25	2:25 PM	59.4
95	8/31/2021 14:25	2:25 PM	58.9
96	8/31/2021 14:25	2:25 PM	56.9
97	8/31/2021 14:25	2:25 PM	64.4
98	8/31/2021 14:25	2:25 PM	67.6
99	8/31/2021 14:26	2:26 PM	68
100	8/31/2021 14:26	2:26 PM	62.9
101	8/31/2021 14:26	2:26 PM	63.3
102	8/31/2021 14:26	2:26 PM	61.4
103	8/31/2021 14:26	2:26 PM	59.9
104	8/31/2021 14:26	2:26 PM	61.9
105	8/31/2021 14:26	2:26 PM	60.7
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108	8/31/2021 14:26	2:26 PM	67
109	8/31/2021 14:26	2:26 PM	68.7
110	8/31/2021 14:26	2:26 PM	59.8
111	8/31/2021 14:26	2:26 PM	54.3
112	8/31/2021 14:26	2:26 PM	53.6
113	8/31/2021 14:26	2:26 PM	51.8
114	8/31/2021 14:26	2:26 PM	51.3
115	8/31/2021 14:26	2:26 PM	52
116	8/31/2021 14:26	2:26 PM	53.4
117	8/31/2021 14:26	2:26 PM	63.8
118	8/31/2021 14:26	2:26 PM	65.2
119	8/31/2021 14:27	2:27 PM	67
120	8/31/2021 14:27	2:27 PM	63
121	8/31/2021 14:27	2:27 PM	55.9
122	8/31/2021 14:27	2:27 PM	65.5

123	8/31/2021 14:27	2:27 PM	69.9
124	8/31/2021 14:27	2:27 PM	69.5
125	8/31/2021 14:27	2:27 PM	63.2
126	8/31/2021 14:27	2:27 PM	65.8
127	8/31/2021 14:27	2:27 PM	65.3
128	8/31/2021 14:27	2:27 PM	59.5
129	8/31/2021 14:27	2:27 PM	54.7
130	8/31/2021 14:27	2:27 PM	62.9
131	8/31/2021 14:27	2:27 PM	59.1
132	8/31/2021 14:27	2:27 PM	56.5
133	8/31/2021 14:27	2:27 PM	54.2
134	8/31/2021 14:27	2:27 PM	53.1
135	8/31/2021 14:27	2:27 PM	53
136	8/31/2021 14:27	2:27 PM	54.7
137	8/31/2021 14:27	2:27 PM	64.8
138	8/31/2021 14:27	2:27 PM	65
139	8/31/2021 14:28	2:28 PM	58.1
140	8/31/2021 14:28	2:28 PM	63.8
141	8/31/2021 14:28	2:28 PM	69.6
142	8/31/2021 14:28	2:28 PM	64.7
143	8/31/2021 14:28	2:28 PM	65
144	8/31/2021 14:28	2:28 PM	60.8
145	8/31/2021 14:28	2:28 PM	63
146	8/31/2021 14:28	2:28 PM	64.5
147	8/31/2021 14:28	2:28 PM	63.2
148	8/31/2021 14:28	2:28 PM	61
149	8/31/2021 14:28	2:28 PM	64.6
150	8/31/2021 14:28	2:28 PM	59.3
151	8/31/2021 14:28	2:28 PM	62.6
152	8/31/2021 14:28	2:28 PM	65.8
153	8/31/2021 14:28	2:28 PM	68.8
154	8/31/2021 14:28	2:28 PM	63
155	8/31/2021 14:28	2:28 PM	56
156	8/31/2021 14:28	2:28 PM	54.8
157	8/31/2021 14:28	2:28 PM	55.4
158	8/31/2021 14:28	2:28 PM	52.8
159	8/31/2021 14:29	2:29 PM	51.8
160	8/31/2021 14:29	2:29 PM	52.5
161	8/31/2021 14:29	2:29 PM	63.6
162	8/31/2021 14:29	2:29 PM	66.1
163	8/31/2021 14:29	2:29 PM	63.3
164	8/31/2021 14:29	2:29 PM	64.9
165	8/31/2021 14:29	2:29 PM	63.7
166	8/31/2021 14:29	2:29 PM	57.8
167	8/31/2021 14:29	2:29 PM	56
168	8/31/2021 14:29	2:29 PM	62.2
169	8/31/2021 14:29	2:29 PM	56.7

170	8/31/2021 14:29	2:29 PM	52.8
171	8/31/2021 14:29	2:29 PM	52.4
172	8/31/2021 14:29	2:29 PM	60.8
173	8/31/2021 14:29	2:29 PM	63.3
174	8/31/2021 14:29	2:29 PM	63.3
175	8/31/2021 14:29	2:29 PM	62.5
176	8/31/2021 14:29	2:29 PM	58.8
177	8/31/2021 14:29	2:29 PM	61
178	8/31/2021 14:29	2:29 PM	64.8
179	8/31/2021 14:30	2:30 PM	57.8
180	8/31/2021 14:30	2:30 PM	53.8
181	8/31/2021 14:30	2:30 PM	54.3
182	8/31/2021 14:30	2:30 PM	60
183	8/31/2021 14:30	2:30 PM	68.3
184	8/31/2021 14:30	2:30 PM	61.9
185	8/31/2021 14:30	2:30 PM	64.1
186	8/31/2021 14:30	2:30 PM	64.8
187	8/31/2021 14:30	2:30 PM	62.9
188	8/31/2021 14:30	2:30 PM	64
189	8/31/2021 14:30	2:30 PM	56.5
190	8/31/2021 14:30	2:30 PM	62.7
191	8/31/2021 14:30	2:30 PM	65
192	8/31/2021 14:30	2:30 PM	65.8
193	8/31/2021 14:30	2:30 PM	65.6
194	8/31/2021 14:30	2:30 PM	65.4
195	8/31/2021 14:30	2:30 PM	68.8
196	8/31/2021 14:30	2:30 PM	69
197	8/31/2021 14:30	2:30 PM	67.1
198	8/31/2021 14:30	2:30 PM	66.4
199	8/31/2021 14:31	2:31 PM	63
200	8/31/2021 14:31	2:31 PM	63.9
201	8/31/2021 14:31	2:31 PM	64.6
202	8/31/2021 14:31	2:31 PM	61.7
203	8/31/2021 14:31	2:31 PM	60.7
204	8/31/2021 14:31	2:31 PM	61.4
205	8/31/2021 14:31	2:31 PM	65.6
206	8/31/2021 14:31	2:31 PM	65.5
207	8/31/2021 14:31	2:31 PM	64.4
208	8/31/2021 14:31	2:31 PM	63.4
209	8/31/2021 14:31	2:31 PM	57
210	8/31/2021 14:31	2:31 PM	57
211	8/31/2021 14:31	2:31 PM	65.8
212	8/31/2021 14:31	2:31 PM	64.6
213	8/31/2021 14:31	2:31 PM	62.4
214	8/31/2021 14:31	2:31 PM	63
215	8/31/2021 14:31	2:31 PM	57.3
216	8/31/2021 14:31	2:31 PM	54.5

217	8/31/2021 14:31	2:31 PM	55.1
218	8/31/2021 14:31	2:31 PM	64.3
219	8/31/2021 14:32	2:32 PM	66.8
220	8/31/2021 14:32	2:32 PM	62.9
221	8/31/2021 14:32	2:32 PM	57.4
222	8/31/2021 14:32	2:32 PM	60.9
223	8/31/2021 14:32	2:32 PM	63.2
224	8/31/2021 14:32	2:32 PM	63.6
225	8/31/2021 14:32	2:32 PM	60.2
226	8/31/2021 14:32	2:32 PM	64.2
227	8/31/2021 14:32	2:32 PM	66.6
228	8/31/2021 14:32	2:32 PM	65.8
229	8/31/2021 14:32	2:32 PM	67.9
230	8/31/2021 14:32	2:32 PM	65.8
231	8/31/2021 14:32	2:32 PM	57.9
232	8/31/2021 14:32	2:32 PM	59.3
233	8/31/2021 14:32	2:32 PM	66.6
234	8/31/2021 14:32	2:32 PM	62.4
235	8/31/2021 14:32	2:32 PM	62.8
236	8/31/2021 14:32	2:32 PM	61.1
237	8/31/2021 14:32	2:32 PM	56.8
238	8/31/2021 14:32	2:32 PM	61
239	8/31/2021 14:33	2:33 PM	65.5
240	8/31/2021 14:33	2:33 PM	61.2
241	8/31/2021 14:33	2:33 PM	56.1
242	8/31/2021 14:33	2:33 PM	63
243	8/31/2021 14:33	2:33 PM	62
244	8/31/2021 14:33	2:33 PM	66.8
245	8/31/2021 14:33	2:33 PM	60.5
246	8/31/2021 14:33	2:33 PM	58.4
247	8/31/2021 14:33	2:33 PM	58.9
248	8/31/2021 14:33	2:33 PM	65.5
249	8/31/2021 14:33	2:33 PM	62.1
250	8/31/2021 14:33	2:33 PM	59.4
251	8/31/2021 14:33	2:33 PM	56.9
252	8/31/2021 14:33	2:33 PM	54.2
253	8/31/2021 14:33	2:33 PM	54.1
254	8/31/2021 14:33	2:33 PM	54.6
255	8/31/2021 14:33	2:33 PM	53.4
256	8/31/2021 14:33	2:33 PM	54.2
257	8/31/2021 14:33	2:33 PM	54.4
258	8/31/2021 14:33	2:33 PM	54.1
259	8/31/2021 14:34	2:34 PM	53.8
260	8/31/2021 14:34	2:34 PM	56.4
261	8/31/2021 14:34	2:34 PM	64.3
262	8/31/2021 14:34	2:34 PM	61.5
263	8/31/2021 14:34	2:34 PM	64.7

264	8/31/2021 14:34	2:34 PM	64.4
265	8/31/2021 14:34	2:34 PM	57.8
266	8/31/2021 14:34	2:34 PM	58.3
267	8/31/2021 14:34	2:34 PM	73.2
268	8/31/2021 14:34	2:34 PM	69.7
269	8/31/2021 14:34	2:34 PM	64.2
270	8/31/2021 14:34	2:34 PM	64.4
271	8/31/2021 14:34	2:34 PM	66.7
272	8/31/2021 14:34	2:34 PM	62.6
273	8/31/2021 14:34	2:34 PM	58.9
274	8/31/2021 14:34	2:34 PM	58.9
275	8/31/2021 14:34	2:34 PM	57.3
276	8/31/2021 14:34	2:34 PM	56.1
277	8/31/2021 14:34	2:34 PM	56.3
278	8/31/2021 14:34	2:34 PM	55.8
279	8/31/2021 14:35	2:35 PM	62.4
280	8/31/2021 14:35	2:35 PM	65.5
281	8/31/2021 14:35	2:35 PM	65
282	8/31/2021 14:35	2:35 PM	60.9
283	8/31/2021 14:35	2:35 PM	55.5
284	8/31/2021 14:35	2:35 PM	54.8
285	8/31/2021 14:35	2:35 PM	56.7
286	8/31/2021 14:35	2:35 PM	59.3
287	8/31/2021 14:35	2:35 PM	62.4
288	8/31/2021 14:35	2:35 PM	65.5
289	8/31/2021 14:35	2:35 PM	65
290	8/31/2021 14:35	2:35 PM	63.4
291	8/31/2021 14:35	2:35 PM	64.5
292	8/31/2021 14:35	2:35 PM	63.9
293	8/31/2021 14:35	2:35 PM	63.5
294	8/31/2021 14:35	2:35 PM	63.6
295	8/31/2021 14:35	2:35 PM	65.4
296	8/31/2021 14:35	2:35 PM	65.1
297	8/31/2021 14:35	2:35 PM	63.8
298	8/31/2021 14:35	2:35 PM	62.4
299	8/31/2021 14:36	2:36 PM	57.5
300	8/31/2021 14:36	2:36 PM	57.1


Noise Measurement 2 - August 31, 2021
80
75
70
65
60
55
50
45
40
35
dBA
2:19 PM
2:20 PM
2:21 PM
2:22 PM
2:23 PM
2:24 PM
2:25 PM
2:26 PM
2:27 PM
2:28 PM
2:29 PM
2:30 PM
2:31 PM
2:32 PM
2:33 PM
2:34 PM
2:35 PM
2:36 PM
2:37 PM
Time

Noise Measurement 3

Data Logger 2		
Duration (seconds)		3
Weighting	A	
Response	SLOW	
Range	40-100	
L05		51.3
L10		49.8
L50		47.3
L90		45.2
L95		44.4
Lmax		57.7
Time	8/31/2021	11:00
SEL		77.8
Leq		**48.3**

No.s	Date Time	Time	dB
1	8/31/2021 10:52	10:52 AM	49.6
2	8/31/2021 10:52	10:52 AM	48.6
3	8/31/2021 10:52	10:52 AM	50.8
4	8/31/2021 10:52	10:52 AM	49.6
5	8/31/2021 10:52	10:52 AM	49
6	8/31/2021 10:52	10:52 AM	47.4
7	8/31/2021 10:52	10:52 AM	48.2
8	8/31/2021 10:52	10:52 AM	49.1
9	8/31/2021 10:52	10:52 AM	47.6
10	8/31/2021 10:52	10:52 AM	49.8
11	8/31/2021 10:52	10:52 AM	49.2
12	8/31/2021 10:52	10:52 AM	48.6
13	8/31/2021 10:52	10:52 AM	48.6
14	8/31/2021 10:53	10:53 AM	47.8
15	8/31/2021 10:53	10:53 AM	47.9
16	8/31/2021 10:53	10:53 AM	47.1
17	8/31/2021 10:53	10:53 AM	47.2
18	8/31/2021 10:53	10:53 AM	47.8
19	8/31/2021 10:53	10:53 AM	49.7
20	8/31/2021 10:53	10:53 AM	47.7
21	8/31/2021 10:53	10:53 AM	47.1
22	8/31/2021 10:53	10:53 AM	47.6
23	8/31/2021 10:53	10:53 AM	46.8
24	8/31/2021 10:53	10:53 AM	46.8
25	8/31/2021 10:53	10:53 AM	47.2
26	8/31/2021 10:53	10:53 AM	47.5
27	8/31/2021 10:53	10:53 AM	46.7
28	8/31/2021 10:53	10:53 AM	46.9

29	8/31/2021 10:53	10:53 AM	46.8
30	8/31/2021 10:53	10:53 AM	46.2
31	8/31/2021 10:53	10:53 AM	46.4
32	8/31/2021 10:53	10:53 AM	47.6
33	8/31/2021 10:53	10:53 AM	47.8
34	8/31/2021 10:54	10:54 AM	47.6
35	8/31/2021 10:54	10:54 AM	48.8
36	8/31/2021 10:54	10:54 AM	49.1
37	8/31/2021 10:54	10:54 AM	47.4
38	8/31/2021 10:54	10:54 AM	47.5
39	8/31/2021 10:54	10:54 AM	46.2
40	8/31/2021 10:54	10:54 AM	46.8
41	8/31/2021 10:54	10:54 AM	46.6
42	8/31/2021 10:54	10:54 AM	47.5
43	8/31/2021 10:54	10:54 AM	47.5
44	8/31/2021 10:54	10:54 AM	46.9
45	8/31/2021 10:54	10:54 AM	46.9
46	8/31/2021 10:54	10:54 AM	47.9
47	8/31/2021 10:54	10:54 AM	47.7
48	8/31/2021 10:54	10:54 AM	47.7
49	8/31/2021 10:54	10:54 AM	47.8
50	8/31/2021 10:54	10:54 AM	47
51	8/31/2021 10:54	10:54 AM	46.9
52	8/31/2021 10:54	10:54 AM	46.8
53	8/31/2021 10:54	10:54 AM	47.6
54	8/31/2021 10:55	10:55 AM	47
55	8/31/2021 10:55	10:55 AM	46.3
56	8/31/2021 10:55	10:55 AM	45
57	8/31/2021 10:55	10:55 AM	45.4
58	8/31/2021 10:55	10:55 AM	44.8
59	8/31/2021 10:55	10:55 AM	45.2
60	8/31/2021 10:55	10:55 AM	44.9
61	8/31/2021 10:55	10:55 AM	45.9
62	8/31/2021 10:55	10:55 AM	46.7
63	8/31/2021 10:55	10:55 AM	46.9
64	8/31/2021 10:55	10:55 AM	46.8
65	8/31/2021 10:55	10:55 AM	47.1
66	8/31/2021 10:55	10:55 AM	47.3
67	8/31/2021 10:55	10:55 AM	47
68	8/31/2021 10:55	10:55 AM	47.4
69	8/31/2021 10:55	10:55 AM	47
70	8/31/2021 10:55	10:55 AM	47.8
71	8/31/2021 10:55	10:55 AM	47.8
72	8/31/2021 10:55	10:55 AM	48.4
73	8/31/2021 10:55	10:55 AM	49
74	8/31/2021 10:56	10:56 AM	48.7
75	8/31/2021 10:56	10:56 AM	47.7

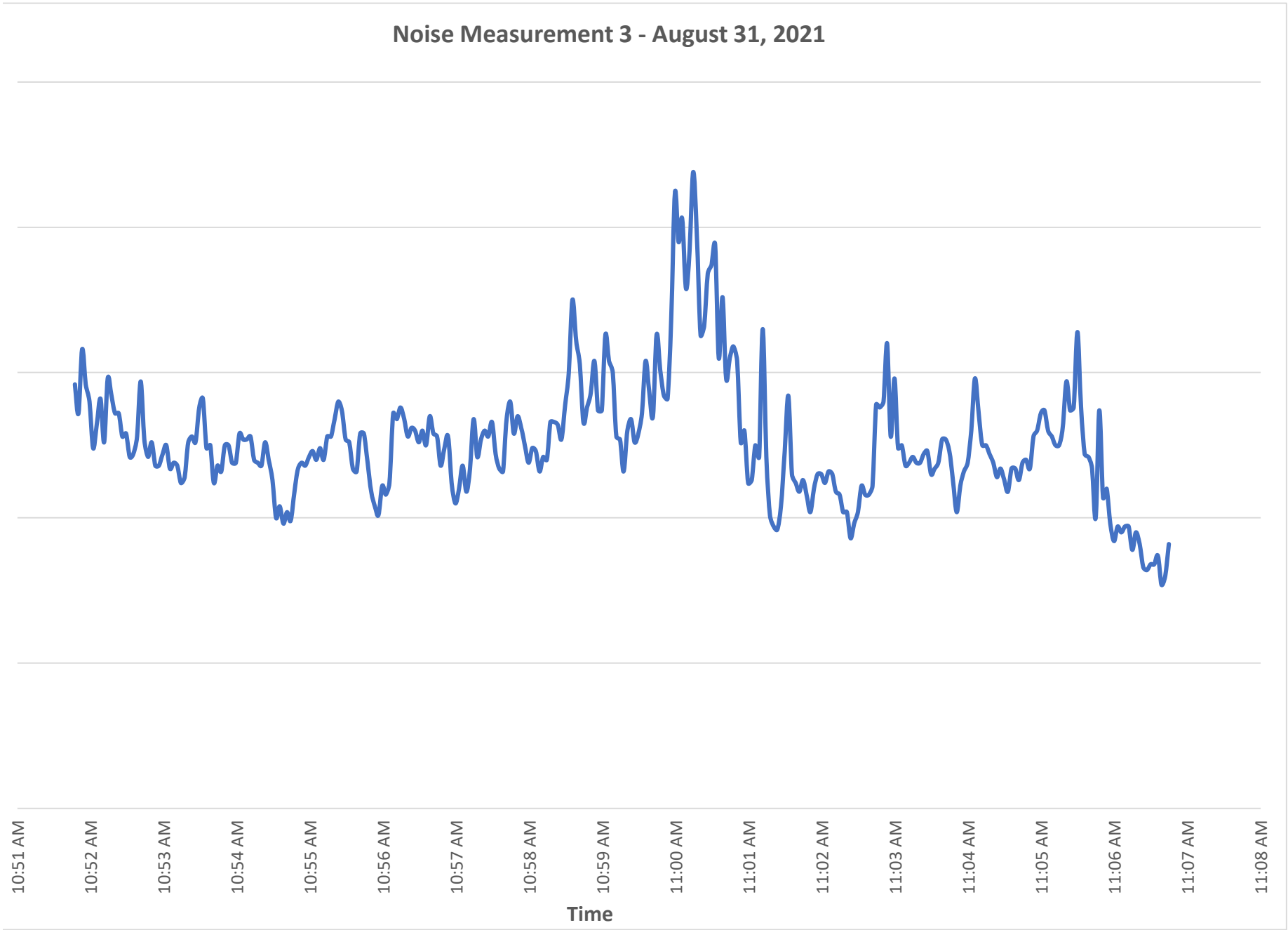
76	8/31/2021 10:56	10:56 AM	47.6
77	8/31/2021 10:56	10:56 AM	46.7
78	8/31/2021 10:56	10:56 AM	46.6
79	8/31/2021 10:56	10:56 AM	47.9
80	8/31/2021 10:56	10:56 AM	47.9
81	8/31/2021 10:56	10:56 AM	46.9
82	8/31/2021 10:56	10:56 AM	45.9
83	8/31/2021 10:56	10:56 AM	45.4
84	8/31/2021 10:56	10:56 AM	45.1
85	8/31/2021 10:56	10:56 AM	46.1
86	8/31/2021 10:56	10:56 AM	45.8
87	8/31/2021 10:56	10:56 AM	46.2
88	8/31/2021 10:56	10:56 AM	48.6
89	8/31/2021 10:56	10:56 AM	48.4
90	8/31/2021 10:56	10:56 AM	48.8
91	8/31/2021 10:56	10:56 AM	48.4
92	8/31/2021 10:56	10:56 AM	47.8
93	8/31/2021 10:56	10:56 AM	48.1
94	8/31/2021 10:57	10:57 AM	48
95	8/31/2021 10:57	10:57 AM	47.6
96	8/31/2021 10:57	10:57 AM	48
97	8/31/2021 10:57	10:57 AM	47.5
98	8/31/2021 10:57	10:57 AM	48.5
99	8/31/2021 10:57	10:57 AM	47.9
100	8/31/2021 10:57	10:57 AM	47.8
101	8/31/2021 10:57	10:57 AM	46.8
102	8/31/2021 10:57	10:57 AM	47.4
103	8/31/2021 10:57	10:57 AM	47.8
104	8/31/2021 10:57	10:57 AM	46.2
105	8/31/2021 10:57	10:57 AM	45.5
106	8/31/2021 10:57	10:57 AM	46
107	8/31/2021 10:57	10:57 AM	46.8
108	8/31/2021 10:57	10:57 AM	45.9
109	8/31/2021 10:57	10:57 AM	46.7
110	8/31/2021 10:57	10:57 AM	48.4
111	8/31/2021 10:57	10:57 AM	47.1
112	8/31/2021 10:57	10:57 AM	47.7
113	8/31/2021 10:57	10:57 AM	48
114	8/31/2021 10:58	10:58 AM	47.8
115	8/31/2021 10:58	10:58 AM	48.3
116	8/31/2021 10:58	10:58 AM	47.2
117	8/31/2021 10:58	10:58 AM	46.7
118	8/31/2021 10:58	10:58 AM	46.6
119	8/31/2021 10:58	10:58 AM	48.4
120	8/31/2021 10:58	10:58 AM	49
121	8/31/2021 10:58	10:58 AM	47.9
122	8/31/2021 10:58	10:58 AM	48.5

123	8/31/2021 10:58	10:58 AM	48.1
124	8/31/2021 10:58	10:58 AM	47.5
125	8/31/2021 10:58	10:58 AM	46.9
126	8/31/2021 10:58	10:58 AM	47.4
127	8/31/2021 10:58	10:58 AM	47.3
128	8/31/2021 10:58	10:58 AM	46.6
129	8/31/2021 10:58	10:58 AM	47.1
130	8/31/2021 10:58	10:58 AM	47
131	8/31/2021 10:58	10:58 AM	48.3
132	8/31/2021 10:58	10:58 AM	48.3
133	8/31/2021 10:58	10:58 AM	48.2
134	8/31/2021 10:59	10:59 AM	47.7
135	8/31/2021 10:59	10:59 AM	48.9
136	8/31/2021 10:59	10:59 AM	50
137	8/31/2021 10:59	10:59 AM	52.5
138	8/31/2021 10:59	10:59 AM	51.1
139	8/31/2021 10:59	10:59 AM	50.3
140	8/31/2021 10:59	10:59 AM	48.3
141	8/31/2021 10:59	10:59 AM	48.8
142	8/31/2021 10:59	10:59 AM	49.3
143	8/31/2021 10:59	10:59 AM	50.4
144	8/31/2021 10:59	10:59 AM	48.7
145	8/31/2021 10:59	10:59 AM	48.7
146	8/31/2021 10:59	10:59 AM	51.3
147	8/31/2021 10:59	10:59 AM	50.4
148	8/31/2021 10:59	10:59 AM	50
149	8/31/2021 10:59	10:59 AM	47.8
150	8/31/2021 10:59	10:59 AM	47.7
151	8/31/2021 10:59	10:59 AM	46.6
152	8/31/2021 10:59	10:59 AM	48
153	8/31/2021 10:59	10:59 AM	48.4
154	8/31/2021 11:00	11:00 AM	47.6
155	8/31/2021 11:00	11:00 AM	47.9
156	8/31/2021 11:00	11:00 AM	48.6
157	8/31/2021 11:00	11:00 AM	50.4
158	8/31/2021 11:00	11:00 AM	49.3
159	8/31/2021 11:00	11:00 AM	48.5
160	8/31/2021 11:00	11:00 AM	51.3
161	8/31/2021 11:00	11:00 AM	50.1
162	8/31/2021 11:00	11:00 AM	49.2
163	8/31/2021 11:00	11:00 AM	49.1
164	8/31/2021 11:00	11:00 AM	51.8
165	8/31/2021 11:00	11:00 AM	56.2
166	8/31/2021 11:00	11:00 AM	54.5
167	8/31/2021 11:00	11:00 AM	55.3
168	8/31/2021 11:00	11:00 AM	52.9
169	8/31/2021 11:00	11:00 AM	54.2

170	8/31/2021 11:00	11:00 AM	56.9
171	8/31/2021 11:00	11:00 AM	54.8
172	8/31/2021 11:00	11:00 AM	51.3
173	8/31/2021 11:00	11:00 AM	51.6
174	8/31/2021 11:01	11:01 AM	53.4
175	8/31/2021 11:01	11:01 AM	53.7
176	8/31/2021 11:01	11:01 AM	54.4
177	8/31/2021 11:01	11:01 AM	50.5
178	8/31/2021 11:01	11:01 AM	52.6
179	8/31/2021 11:01	11:01 AM	49.8
180	8/31/2021 11:01	11:01 AM	50.5
181	8/31/2021 11:01	11:01 AM	50.9
182	8/31/2021 11:01	11:01 AM	50.4
183	8/31/2021 11:01	11:01 AM	47.6
184	8/31/2021 11:01	11:01 AM	48
185	8/31/2021 11:01	11:01 AM	46.2
186	8/31/2021 11:01	11:01 AM	46.3
187	8/31/2021 11:01	11:01 AM	47.5
188	8/31/2021 11:01	11:01 AM	47.1
189	8/31/2021 11:01	11:01 AM	51.5
190	8/31/2021 11:01	11:01 AM	47.1
191	8/31/2021 11:01	11:01 AM	45.1
192	8/31/2021 11:01	11:01 AM	44.7
193	8/31/2021 11:01	11:01 AM	44.6
194	8/31/2021 11:02	11:02 AM	45.4
195	8/31/2021 11:02	11:02 AM	47.3
196	8/31/2021 11:02	11:02 AM	49.2
197	8/31/2021 11:02	11:02 AM	46.5
198	8/31/2021 11:02	11:02 AM	46.2
199	8/31/2021 11:02	11:02 AM	45.9
200	8/31/2021 11:02	11:02 AM	46.3
201	8/31/2021 11:02	11:02 AM	45.8
202	8/31/2021 11:02	11:02 AM	45.2
203	8/31/2021 11:02	11:02 AM	46
204	8/31/2021 11:02	11:02 AM	46.5
205	8/31/2021 11:02	11:02 AM	46.5
206	8/31/2021 11:02	11:02 AM	46.2
207	8/31/2021 11:02	11:02 AM	46.6
208	8/31/2021 11:02	11:02 AM	46.5
209	8/31/2021 11:02	11:02 AM	45.9
210	8/31/2021 11:02	11:02 AM	45.8
211	8/31/2021 11:02	11:02 AM	45.2
212	8/31/2021 11:02	11:02 AM	45.2
213	8/31/2021 11:02	11:02 AM	44.3
214	8/31/2021 11:03	11:03 AM	44.8
215	8/31/2021 11:03	11:03 AM	45.2
216	8/31/2021 11:03	11:03 AM	46.1

217	8/31/2021 11:03	11:03 AM	45.8
218	8/31/2021 11:03	11:03 AM	45.8
219	8/31/2021 11:03	11:03 AM	46.1
220	8/31/2021 11:03	11:03 AM	48.9
221	8/31/2021 11:03	11:03 AM	48.8
222	8/31/2021 11:03	11:03 AM	49
223	8/31/2021 11:03	11:03 AM	51
224	8/31/2021 11:03	11:03 AM	47.8
225	8/31/2021 11:03	11:03 AM	49.8
226	8/31/2021 11:03	11:03 AM	47.4
227	8/31/2021 11:03	11:03 AM	47.5
228	8/31/2021 11:03	11:03 AM	46.8
229	8/31/2021 11:03	11:03 AM	46.9
230	8/31/2021 11:03	11:03 AM	47.1
231	8/31/2021 11:03	11:03 AM	46.9
232	8/31/2021 11:03	11:03 AM	46.9
233	8/31/2021 11:03	11:03 AM	47.2
234	8/31/2021 11:04	11:04 AM	47.3
235	8/31/2021 11:04	11:04 AM	46.5
236	8/31/2021 11:04	11:04 AM	46.7
237	8/31/2021 11:04	11:04 AM	46.9
238	8/31/2021 11:04	11:04 AM	47.7
239	8/31/2021 11:04	11:04 AM	47.7
240	8/31/2021 11:04	11:04 AM	47.3
241	8/31/2021 11:04	11:04 AM	46.3
242	8/31/2021 11:04	11:04 AM	45.2
243	8/31/2021 11:04	11:04 AM	46.1
244	8/31/2021 11:04	11:04 AM	46.6
245	8/31/2021 11:04	11:04 AM	46.9
246	8/31/2021 11:04	11:04 AM	48
247	8/31/2021 11:04	11:04 AM	49.8
248	8/31/2021 11:04	11:04 AM	48.6
249	8/31/2021 11:04	11:04 AM	47.5
250	8/31/2021 11:04	11:04 AM	47.5
251	8/31/2021 11:04	11:04 AM	47.2
252	8/31/2021 11:04	11:04 AM	46.9
253	8/31/2021 11:04	11:04 AM	46.4
254	8/31/2021 11:05	11:05 AM	46.7
255	8/31/2021 11:05	11:05 AM	46.3
256	8/31/2021 11:05	11:05 AM	45.9
257	8/31/2021 11:05	11:05 AM	46.7
258	8/31/2021 11:05	11:05 AM	46.7
259	8/31/2021 11:05	11:05 AM	46.3
260	8/31/2021 11:05	11:05 AM	46.9
261	8/31/2021 11:05	11:05 AM	47
262	8/31/2021 11:05	11:05 AM	46.7
263	8/31/2021 11:05	11:05 AM	47.8

264	8/31/2021 11:05	11:05 AM	48
265	8/31/2021 11:05	11:05 AM	48.6
266	8/31/2021 11:05	11:05 AM	48.7
267	8/31/2021 11:05	11:05 AM	48
268	8/31/2021 11:05	11:05 AM	47.8
269	8/31/2021 11:05	11:05 AM	47.5
270	8/31/2021 11:05	11:05 AM	47.5
271	8/31/2021 11:05	11:05 AM	48.1
272	8/31/2021 11:05	11:05 AM	49.7
273	8/31/2021 11:05	11:05 AM	48.7
274	8/31/2021 11:06	11:06 AM	48.8
275	8/31/2021 11:06	11:06 AM	51.4
276	8/31/2021 11:06	11:06 AM	48.8
277	8/31/2021 11:06	11:06 AM	47.2
278	8/31/2021 11:06	11:06 AM	47.1
279	8/31/2021 11:06	11:06 AM	46.7
280	8/31/2021 11:06	11:06 AM	45
281	8/31/2021 11:06	11:06 AM	48.7
282	8/31/2021 11:06	11:06 AM	45.7
283	8/31/2021 11:06	11:06 AM	46
284	8/31/2021 11:06	11:06 AM	44.8
285	8/31/2021 11:06	11:06 AM	44.2
286	8/31/2021 11:06	11:06 AM	44.7
287	8/31/2021 11:06	11:06 AM	44.5
288	8/31/2021 11:06	11:06 AM	44.7
289	8/31/2021 11:06	11:06 AM	44.7
290	8/31/2021 11:06	11:06 AM	43.9
291	8/31/2021 11:06	11:06 AM	44.5
292	8/31/2021 11:06	11:06 AM	44.1
293	8/31/2021 11:06	11:06 AM	43.3
294	8/31/2021 11:07	11:07 AM	43.2
295	8/31/2021 11:07	11:07 AM	43.4
296	8/31/2021 11:07	11:07 AM	43.4
297	8/31/2021 11:07	11:07 AM	43.7
298	8/31/2021 11:07	11:07 AM	42.7
299	8/31/2021 11:07	11:07 AM	43
300	8/31/2021 11:07	11:07 AM	44.1


Noise Measurement 3 - August 31, 2021
10:51 AM
10:52 AM
10:53 AM
10:54 AM
10:55 AM
10:56 AM
10:57 AM
10:58 AM
10:59 AM
11:00 AM
11:01 AM
11:02 AM
11:03 AM
11:04 AM
11:05 AM
11:06 AM
11:07 AM
11:08 AM
Time

Noise Measurement 4

Data Logger 2		
Duration (seconds)		3
Weighting	A	
Response	SLOW	
Range	40-100	
L05		56.4
L10		55.1
L50		51.8
L90		50
L95		49.5
Lmax		75.3
Time		8/31/2021 11:38
SEL		86.8
Leq		**57.2**

No.s	Date Time	Time	dB
1	8/31/2021 11:36	11:36 AM	53.1
2	8/31/2021 11:36	11:36 AM	53.2
3	8/31/2021 11:37	11:37 AM	51.7
4	8/31/2021 11:37	11:37 AM	49.9
5	8/31/2021 11:37	11:37 AM	50.9
6	8/31/2021 11:37	11:37 AM	50.7
7	8/31/2021 11:37	11:37 AM	50.3
8	8/31/2021 11:37	11:37 AM	51.1
9	8/31/2021 11:37	11:37 AM	51
10	8/31/2021 11:37	11:37 AM	50.7
11	8/31/2021 11:37	11:37 AM	50.8
12	8/31/2021 11:37	11:37 AM	51
13	8/31/2021 11:37	11:37 AM	50.7
14	8/31/2021 11:37	11:37 AM	50.7
15	8/31/2021 11:37	11:37 AM	50.9
16	8/31/2021 11:37	11:37 AM	51
17	8/31/2021 11:37	11:37 AM	50.8
18	8/31/2021 11:37	11:37 AM	50.2
19	8/31/2021 11:37	11:37 AM	50.6
20	8/31/2021 11:37	11:37 AM	54
21	8/31/2021 11:37	11:37 AM	53.5
22	8/31/2021 11:37	11:37 AM	52.2
23	8/31/2021 11:38	11:38 AM	50.2
24	8/31/2021 11:38	11:38 AM	54.2
25	8/31/2021 11:38	11:38 AM	57.5
26	8/31/2021 11:38	11:38 AM	57
27	8/31/2021 11:38	11:38 AM	59.7
28	8/31/2021 11:38	11:38 AM	59.1

29	8/31/2021 11:38	11:38 AM	65.3
30	8/31/2021 11:38	11:38 AM	69.6
31	8/31/2021 11:38	11:38 AM	73.8
32	8/31/2021 11:38	11:38 AM	75
33	8/31/2021 11:38	11:38 AM	73
34	8/31/2021 11:38	11:38 AM	69.6
35	8/31/2021 11:38	11:38 AM	66.6
36	8/31/2021 11:38	11:38 AM	62.2
37	8/31/2021 11:38	11:38 AM	61.5
38	8/31/2021 11:38	11:38 AM	57.7
39	8/31/2021 11:38	11:38 AM	54.5
40	8/31/2021 11:38	11:38 AM	55.2
41	8/31/2021 11:38	11:38 AM	51.4
42	8/31/2021 11:38	11:38 AM	52.8
43	8/31/2021 11:39	11:39 AM	50.9
44	8/31/2021 11:39	11:39 AM	51.3
45	8/31/2021 11:39	11:39 AM	51.2
46	8/31/2021 11:39	11:39 AM	50.7
47	8/31/2021 11:39	11:39 AM	49.8
48	8/31/2021 11:39	11:39 AM	50.3
49	8/31/2021 11:39	11:39 AM	50.8
50	8/31/2021 11:39	11:39 AM	50.9
51	8/31/2021 11:39	11:39 AM	50
52	8/31/2021 11:39	11:39 AM	50.2
53	8/31/2021 11:39	11:39 AM	50.1
54	8/31/2021 11:39	11:39 AM	49.4
55	8/31/2021 11:39	11:39 AM	50.7
56	8/31/2021 11:39	11:39 AM	50.9
57	8/31/2021 11:39	11:39 AM	50
58	8/31/2021 11:39	11:39 AM	51.4
59	8/31/2021 11:39	11:39 AM	51.5
60	8/31/2021 11:39	11:39 AM	51.5
61	8/31/2021 11:39	11:39 AM	51.5
62	8/31/2021 11:39	11:39 AM	50.9
63	8/31/2021 11:40	11:40 AM	50.3
64	8/31/2021 11:40	11:40 AM	49.8
65	8/31/2021 11:40	11:40 AM	49.6
66	8/31/2021 11:40	11:40 AM	49
67	8/31/2021 11:40	11:40 AM	50.6
68	8/31/2021 11:40	11:40 AM	50.7
69	8/31/2021 11:40	11:40 AM	50.3
70	8/31/2021 11:40	11:40 AM	51.5
71	8/31/2021 11:40	11:40 AM	51.2
72	8/31/2021 11:40	11:40 AM	49.9
73	8/31/2021 11:40	11:40 AM	49.5
74	8/31/2021 11:40	11:40 AM	49.1
75	8/31/2021 11:40	11:40 AM	49.4

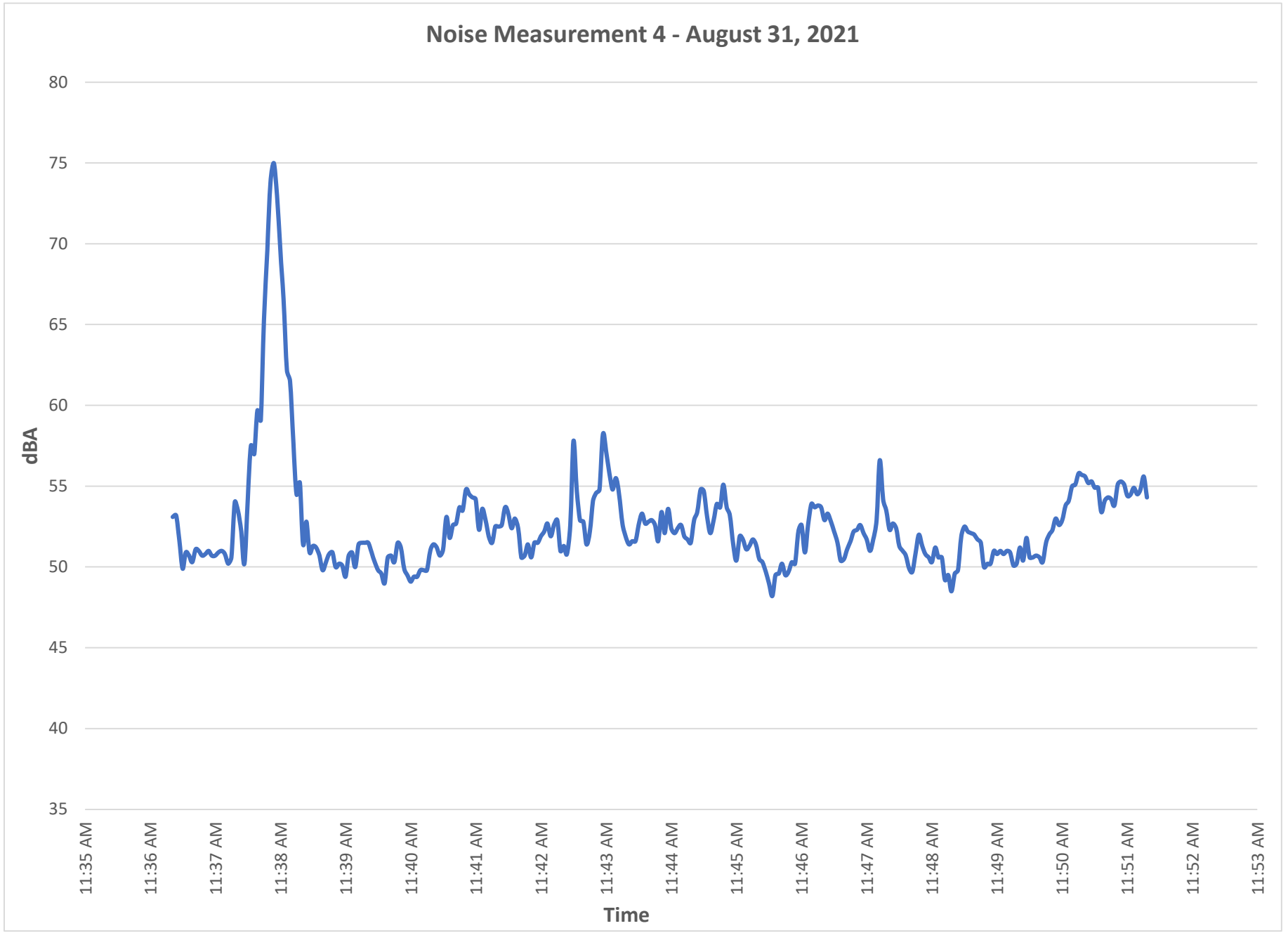
76	8/31/2021 11:40	11:40 AM	49.4
77	8/31/2021 11:40	11:40 AM	49.8
78	8/31/2021 11:40	11:40 AM	49.8
79	8/31/2021 11:40	11:40 AM	49.8
80	8/31/2021 11:40	11:40 AM	51
81	8/31/2021 11:40	11:40 AM	51.4
82	8/31/2021 11:40	11:40 AM	51.2
83	8/31/2021 11:41	11:41 AM	50.7
84	8/31/2021 11:41	11:41 AM	51.1
85	8/31/2021 11:41	11:41 AM	53.1
86	8/31/2021 11:41	11:41 AM	51.8
87	8/31/2021 11:41	11:41 AM	52.6
88	8/31/2021 11:41	11:41 AM	52.7
89	8/31/2021 11:41	11:41 AM	53.7
90	8/31/2021 11:41	11:41 AM	53.5
91	8/31/2021 11:41	11:41 AM	54.8
92	8/31/2021 11:41	11:41 AM	54.5
93	8/31/2021 11:41	11:41 AM	54.3
94	8/31/2021 11:41	11:41 AM	54.2
95	8/31/2021 11:41	11:41 AM	52.3
96	8/31/2021 11:41	11:41 AM	53.6
97	8/31/2021 11:41	11:41 AM	52.9
98	8/31/2021 11:41	11:41 AM	51.9
99	8/31/2021 11:41	11:41 AM	51.5
100	8/31/2021 11:41	11:41 AM	52.5
101	8/31/2021 11:41	11:41 AM	52.5
102	8/31/2021 11:41	11:41 AM	52.6
103	8/31/2021 11:42	11:42 AM	53.7
104	8/31/2021 11:42	11:42 AM	53.3
105	8/31/2021 11:42	11:42 AM	52.4
106	8/31/2021 11:42	11:42 AM	53
107	8/31/2021 11:42	11:42 AM	52.4
108	8/31/2021 11:42	11:42 AM	50.6
109	8/31/2021 11:42	11:42 AM	50.7
110	8/31/2021 11:42	11:42 AM	51.4
111	8/31/2021 11:42	11:42 AM	50.6
112	8/31/2021 11:42	11:42 AM	51.5
113	8/31/2021 11:42	11:42 AM	51.5
114	8/31/2021 11:42	11:42 AM	51.9
115	8/31/2021 11:42	11:42 AM	52.2
116	8/31/2021 11:42	11:42 AM	52.7
117	8/31/2021 11:42	11:42 AM	51.9
118	8/31/2021 11:42	11:42 AM	52.6
119	8/31/2021 11:42	11:42 AM	52.9
120	8/31/2021 11:42	11:42 AM	51
121	8/31/2021 11:42	11:42 AM	51.3
122	8/31/2021 11:42	11:42 AM	50.8

123	8/31/2021 11:43	11:43 AM	52.6
124	8/31/2021 11:43	11:43 AM	57.8
125	8/31/2021 11:43	11:43 AM	54.7
126	8/31/2021 11:43	11:43 AM	52.9
127	8/31/2021 11:43	11:43 AM	52.8
128	8/31/2021 11:43	11:43 AM	51.4
129	8/31/2021 11:43	11:43 AM	52.2
130	8/31/2021 11:43	11:43 AM	54.1
131	8/31/2021 11:43	11:43 AM	54.6
132	8/31/2021 11:43	11:43 AM	54.8
133	8/31/2021 11:43	11:43 AM	58.2
134	8/31/2021 11:43	11:43 AM	57.2
135	8/31/2021 11:43	11:43 AM	55.8
136	8/31/2021 11:43	11:43 AM	54.8
137	8/31/2021 11:43	11:43 AM	55.5
138	8/31/2021 11:43	11:43 AM	54.5
139	8/31/2021 11:43	11:43 AM	52.7
140	8/31/2021 11:43	11:43 AM	51.9
141	8/31/2021 11:43	11:43 AM	51.4
142	8/31/2021 11:43	11:43 AM	51.6
143	8/31/2021 11:44	11:44 AM	51.6
144	8/31/2021 11:44	11:44 AM	52.6
145	8/31/2021 11:44	11:44 AM	53.3
146	8/31/2021 11:44	11:44 AM	52.7
147	8/31/2021 11:44	11:44 AM	52.8
148	8/31/2021 11:44	11:44 AM	52.9
149	8/31/2021 11:44	11:44 AM	52.6
150	8/31/2021 11:44	11:44 AM	51.6
151	8/31/2021 11:44	11:44 AM	53.4
152	8/31/2021 11:44	11:44 AM	52.1
153	8/31/2021 11:44	11:44 AM	53.6
154	8/31/2021 11:44	11:44 AM	52.4
155	8/31/2021 11:44	11:44 AM	52.1
156	8/31/2021 11:44	11:44 AM	52.4
157	8/31/2021 11:44	11:44 AM	52.6
158	8/31/2021 11:44	11:44 AM	51.9
159	8/31/2021 11:44	11:44 AM	51.7
160	8/31/2021 11:44	11:44 AM	51.5
161	8/31/2021 11:44	11:44 AM	52.9
162	8/31/2021 11:44	11:44 AM	53.4
163	8/31/2021 11:45	11:45 AM	54.8
164	8/31/2021 11:45	11:45 AM	54.7
165	8/31/2021 11:45	11:45 AM	53.1
166	8/31/2021 11:45	11:45 AM	52.1
167	8/31/2021 11:45	11:45 AM	52.9
168	8/31/2021 11:45	11:45 AM	53.9
169	8/31/2021 11:45	11:45 AM	53.7

170	8/31/2021 11:45	11:45 AM	55.1
171	8/31/2021 11:45	11:45 AM	53.7
172	8/31/2021 11:45	11:45 AM	53.2
173	8/31/2021 11:45	11:45 AM	51.4
174	8/31/2021 11:45	11:45 AM	50.4
175	8/31/2021 11:45	11:45 AM	51.9
176	8/31/2021 11:45	11:45 AM	51.7
177	8/31/2021 11:45	11:45 AM	51.1
178	8/31/2021 11:45	11:45 AM	51.3
179	8/31/2021 11:45	11:45 AM	51.7
180	8/31/2021 11:45	11:45 AM	51.4
181	8/31/2021 11:45	11:45 AM	50.5
182	8/31/2021 11:45	11:45 AM	50.3
183	8/31/2021 11:46	11:46 AM	49.7
184	8/31/2021 11:46	11:46 AM	49
185	8/31/2021 11:46	11:46 AM	48.2
186	8/31/2021 11:46	11:46 AM	49.5
187	8/31/2021 11:46	11:46 AM	49.6
188	8/31/2021 11:46	11:46 AM	50.2
189	8/31/2021 11:46	11:46 AM	49.5
190	8/31/2021 11:46	11:46 AM	49.7
191	8/31/2021 11:46	11:46 AM	50.3
192	8/31/2021 11:46	11:46 AM	50.2
193	8/31/2021 11:46	11:46 AM	52.2
194	8/31/2021 11:46	11:46 AM	52.6
195	8/31/2021 11:46	11:46 AM	50.9
196	8/31/2021 11:46	11:46 AM	52.6
197	8/31/2021 11:46	11:46 AM	53.9
198	8/31/2021 11:46	11:46 AM	53.7
199	8/31/2021 11:46	11:46 AM	53.8
200	8/31/2021 11:46	11:46 AM	53.7
201	8/31/2021 11:46	11:46 AM	52.9
202	8/31/2021 11:46	11:46 AM	53.3
203	8/31/2021 11:47	11:47 AM	52.8
204	8/31/2021 11:47	11:47 AM	52.2
205	8/31/2021 11:47	11:47 AM	51.5
206	8/31/2021 11:47	11:47 AM	50.4
207	8/31/2021 11:47	11:47 AM	50.5
208	8/31/2021 11:47	11:47 AM	51.1
209	8/31/2021 11:47	11:47 AM	51.6
210	8/31/2021 11:47	11:47 AM	52.2
211	8/31/2021 11:47	11:47 AM	52.3
212	8/31/2021 11:47	11:47 AM	52.6
213	8/31/2021 11:47	11:47 AM	52.1
214	8/31/2021 11:47	11:47 AM	51.7
215	8/31/2021 11:47	11:47 AM	51
216	8/31/2021 11:47	11:47 AM	51.7

217	8/31/2021 11:47	11:47 AM	52.9
218	8/31/2021 11:47	11:47 AM	56.6
219	8/31/2021 11:47	11:47 AM	54.2
220	8/31/2021 11:47	11:47 AM	53.5
221	8/31/2021 11:47	11:47 AM	52.3
222	8/31/2021 11:47	11:47 AM	52.7
223	8/31/2021 11:48	11:48 AM	52.4
224	8/31/2021 11:48	11:48 AM	51.3
225	8/31/2021 11:48	11:48 AM	51
226	8/31/2021 11:48	11:48 AM	50.7
227	8/31/2021 11:48	11:48 AM	49.9
228	8/31/2021 11:48	11:48 AM	49.7
229	8/31/2021 11:48	11:48 AM	50.9
230	8/31/2021 11:48	11:48 AM	52
231	8/31/2021 11:48	11:48 AM	51.3
232	8/31/2021 11:48	11:48 AM	50.8
233	8/31/2021 11:48	11:48 AM	50.6
234	8/31/2021 11:48	11:48 AM	50.3
235	8/31/2021 11:48	11:48 AM	51.2
236	8/31/2021 11:48	11:48 AM	50.6
237	8/31/2021 11:48	11:48 AM	50.6
238	8/31/2021 11:48	11:48 AM	49.2
239	8/31/2021 11:48	11:48 AM	49.5
240	8/31/2021 11:48	11:48 AM	48.5
241	8/31/2021 11:48	11:48 AM	49.6
242	8/31/2021 11:48	11:48 AM	49.8
243	8/31/2021 11:49	11:49 AM	51.9
244	8/31/2021 11:49	11:49 AM	52.5
245	8/31/2021 11:49	11:49 AM	52.2
246	8/31/2021 11:49	11:49 AM	52.1
247	8/31/2021 11:49	11:49 AM	52
248	8/31/2021 11:49	11:49 AM	51.7
249	8/31/2021 11:49	11:49 AM	51.5
250	8/31/2021 11:49	11:49 AM	50
251	8/31/2021 11:49	11:49 AM	50.2
252	8/31/2021 11:49	11:49 AM	50.2
253	8/31/2021 11:49	11:49 AM	51
254	8/31/2021 11:49	11:49 AM	50.8
255	8/31/2021 11:49	11:49 AM	51
256	8/31/2021 11:49	11:49 AM	50.8
257	8/31/2021 11:49	11:49 AM	51
258	8/31/2021 11:49	11:49 AM	50.9
259	8/31/2021 11:49	11:49 AM	50.1
260	8/31/2021 11:49	11:49 AM	50.2
261	8/31/2021 11:49	11:49 AM	51.2
262	8/31/2021 11:49	11:49 AM	50.4
263	8/31/2021 11:50	11:50 AM	51.8

264	8/31/2021 11:50	11:50 AM	50.6
265	8/31/2021 11:50	11:50 AM	50.6
266	8/31/2021 11:50	11:50 AM	50.7
267	8/31/2021 11:50	11:50 AM	50.6
268	8/31/2021 11:50	11:50 AM	50.3
269	8/31/2021 11:50	11:50 AM	51.5
270	8/31/2021 11:50	11:50 AM	52
271	8/31/2021 11:50	11:50 AM	52.3
272	8/31/2021 11:50	11:50 AM	53
273	8/31/2021 11:50	11:50 AM	52.6
274	8/31/2021 11:50	11:50 AM	52.9
275	8/31/2021 11:50	11:50 AM	53.8
276	8/31/2021 11:50	11:50 AM	54.1
277	8/31/2021 11:50	11:50 AM	55
278	8/31/2021 11:50	11:50 AM	55.1
279	8/31/2021 11:50	11:50 AM	55.8
280	8/31/2021 11:50	11:50 AM	55.7
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284	8/31/2021 11:51	11:51 AM	54.9
285	8/31/2021 11:51	11:51 AM	54.9
286	8/31/2021 11:51	11:51 AM	53.4
287	8/31/2021 11:51	11:51 AM	54.1
288	8/31/2021 11:51	11:51 AM	54.3
289	8/31/2021 11:51	11:51 AM	54.2
290	8/31/2021 11:51	11:51 AM	53.8
291	8/31/2021 11:51	11:51 AM	55.1
292	8/31/2021 11:51	11:51 AM	55.3
293	8/31/2021 11:51	11:51 AM	55.1
294	8/31/2021 11:51	11:51 AM	54.4
295	8/31/2021 11:51	11:51 AM	54.5
296	8/31/2021 11:51	11:51 AM	54.9
297	8/31/2021 11:51	11:51 AM	54.5
298	8/31/2021 11:51	11:51 AM	54.8
299	8/31/2021 11:51	11:51 AM	55.6
300	8/31/2021 11:51	11:51 AM	54.3


Noise Measurement 4 - August 31, 2021
80
75
70
65
60
55
50
45
40
35
dBA
11:35 AM
11:36 AM
11:37 AM
11:38 AM
11:39 AM
11:40 AM
11:41 AM
11:42 AM
11:43 AM
11:44 AM
11:45 AM
11:46 AM
11:47 AM
11:48 AM
11:49 AM
11:50 AM
11:51 AM
11:52 AM
11:53 AM
Time

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/22/2021
Case Description: 376 Shiloh Road Clearwater at Windsor

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Mixed Land Use	Residential	80	70	70

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		280	0
Excavator	No	40		80.7	280	0
Scraper	No	40		83.6	280	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Grader		70	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Excavator		65.7	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Scraper		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	70	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Mixed Land Use	Residential	80	70	70

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		440	0
Excavator	No	40		80.7	440	0
Scraper	No	40		83.6	440	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	66.1	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.1	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

PROJECT SUMMARY

KEY

- (A) 2-STORY - APARTMENTS OVER PARKING
- (B) 2-STORY - RETAIL SPACE
- (C) 2-STORY - RETAIL SPACE
- (D) 2-STORY - AMENITIES: OFFICE/RETAIL SPACE WITH MODEL SENIOR LIVING SPACES
- (E) NOT IN USE
- (F) 1-STORY - RETAIL
- (G) NOT IN USE
- (H) 2-STORY - ASSISTED LIVING AND MEMORY CARE
- (I) 4-STORY - INDEPENDENT LIVING
- (J) 2-STORY - VILLA COMMUNITY (8 UNITS)

SITE - BUILDING SQUARE FOOTAGE

RETAIL	16,000 S.F.
APARTMENT GARAGES	8,321 S.F.
APARTMENTS	7,422 S.F.
AMENITIES	6,781 S.F.
MAIN BUILDING	244,264 S.F.

DEPARTMENTS IN MAIN BUILDING

MEMORY CARE	21,664 S.F.
ASSISTED LIVING	86,932 S.F.
INDEPENDENT LIVING	179,663 S.F.
INDEPT. LIVING GARAGES	6,005 S.F.

SITE - PARKING SUMMARY

MARKET VALUE PARKING CALCULATION

RETAIL, OFFICE, RESTAURANTS, ETC. - 5 SPACES/1000 S.F.:	80 SPACES
AMENITIES	X SPACES
WORK FORCE APARTMENTS-10 @ 2 SPACES/UNIT:	20 REQUIRED
ASSISTED LIV. 1 M/G - .75 SPACES/BED (191):	84 REQUIRED
INDEPENDENT LIVING - 1.3 SPACED/UNIT (104):	136 REQUIRED
	325 + X TOTAL

TOWN OF WINDSOR, CALIFORNIA ZONING 2018

BUILDING BD-A, BD-B, AND BD-C		
GENERAL RETAIL		45 SPACES
OFFICES / BUSINESS		15 SPACES
RESTAURANT		94 SPACES
MULTIFAMILY (APARTMENTS)		20 SPACES COVERED
		10 SPACES GUEST
BUILDING BD-D		
OFFICE / BUSINESS		7 SPACES
PERSONAL SERVICES: BEAUTY SHOP (6 PROS)		12 SPACES
AMENITIES		X SPACES
OUTDOOR COMMERCIAL RECREATION		-SHARED SPACES-
SENIOR LIVING		
M/C	EXTENDED CARE	12 SPACES
AL	RESIDENTIAL CARE HOMES (1 OR MORE)	54 SPACES
IL	SENIOR HOUSING	37 SPACES
		26 SPACES COVERED
		305 + X TOTAL REQUIRED

PARKING SPACES PROVIDED

SURFACE PARKING	338 SPACES PROVIDED
RETAIL AND IL HOUSING GARAGES / COVERED SPACES	33 SPACES PROVIDED
	371 TOTAL SPACES PROVIDED

WETLAND

WETLAND AREA ON SITE: 4.45 ACRES

WETLAND LOSS SHOWN 0.26 ACRE

RETAIL AREA (S.F.)

RETAIL, RESTAURANT, OFFICE AREA (S.F.)

FLOOR	A	B	C	D	F
1ST FLOOR	3,000	3,600	6,000	0	3,400
2ND FLOOR	0	0	0	0	0

APARTMENT AREA (S.F.)

FLOOR	A	B	C	D	F
1ST FLOOR	0	0	0	0	0
2ND FLOOR	7,422	0	0	0	0

AMENITIES AREA (S.F.)

FLOOR	A	B	C	D	F
1ST FLOOR	0	0	0	3500	0
2ND FLOOR	0	0	0	3,281**	0
APTS., RETAIL & AMENITIES TOTALS	10,422	3,600	6,000	6,781	3,400

GRAND TOTAL AREA: 26,586 S.F. (W/OUT COVERED GARAGES)

**MODEL APARTMENTS = 1548 S.F.

MC, AL, & IL BUILDING AREA (S.F.)

UNIT	M.C.	A.L.	I.L.	COVERED GARAGE
1ST FLOOR	21,664	33,016	39,420	6,005
2ND FLOOR	0	53,916	47,345	0
3RD FLOOR	0	0	44,066	0
4TH FLOOR	0	0	48,781	0
TOTAL	21,664	86,932	179,663	6,005

GRAND TOTAL BUILDING AREA: 294,264 S.F.

M.C. UNIT COUNT

UNIT	MC-1 SINGLE	MC-2 SINGLE	SUM
AREA	355-385 SF	275-305 SF	
1ST FLOOR	18	16	34

GRAND TOTAL M.C. UNITS: 34

A.L. UNIT COUNT

UNIT	AL ALC	AL STUDIO	AL1 1+1	AL2 1+1	AL3 2+2	SUM
AREA	520-601sf	453-487sf	643-715sf	715sf	1015-1042sf	
1ST FLOOR	7	3	8	0	7	25
2ND FLOOR	9	9	7	14	7	46
SUM	16	12	15	14	14	71

ALCOVES: 16 STUDIOS: 12 1 BEDROOMS: 29 2 BEDROOMS: 14

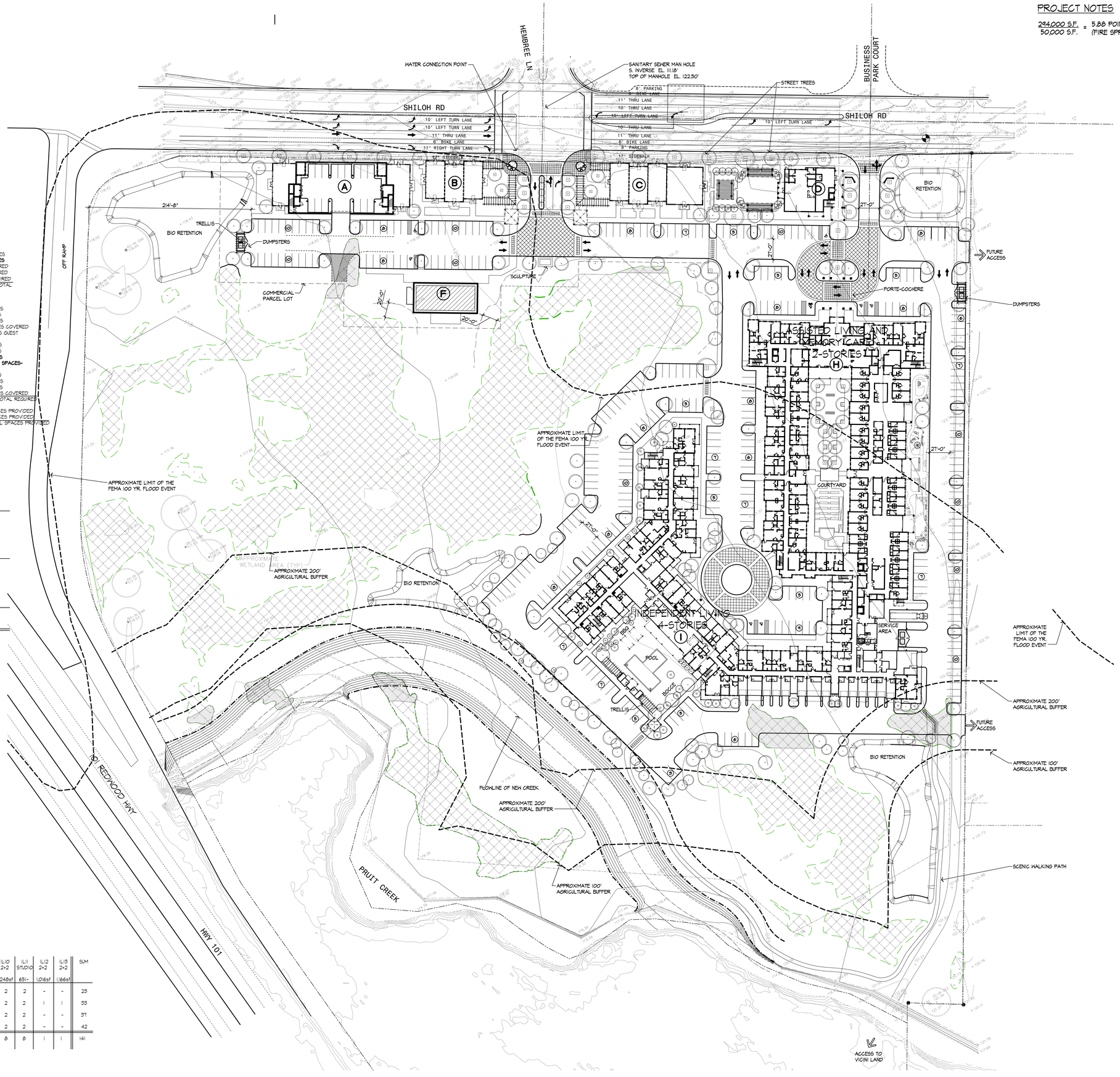
GRAND TOTAL A.L. UNITS: 71

IL UNIT COUNT

UNIT	IL1 ALC	IL2 1+1	IL3 1+1	IL4 1+1	IL5 1+1	IL6 1+1.5	IL7 2+2	IL8 2+2	IL9 2+2.5	IL10 2+2	IL11 STUDIO	IL12 2+2	IL13 2+2	SUM
AREA	566-661sf	671-758sf	758-886sf	886sf	828sf	907sf	1187sf	1214sf	1377sf	1248sf	651-1016sf	1016sf	1166sf	
1ST FLOOR	2	6	2	3	4	2	3	2	1	2	2	-	-	29
2ND FLOOR	2	5	2	5	3	1	6	2	1	2	2	1	1	33
3RD FLOOR	3	6	2	6	4	1	8	2	1	2	2	-	-	37
4TH FLOOR	3	9	2	6	4	3	8	2	1	2	2	-	-	42
SUM	10	26	8	20	15	7	25	8	4	8	8	1	1	141

ALCOVES AND STUDIOS: 18 1 BEDROOM: 76 2 BEDROOMS: 47

GRAND TOTAL I.L. UNITS: 141



PROJECT NOTES

294,000 S.F. / 50,000 S.F. = 5.88 POINTS OF SERVICE (FIRE SPRINKLER RISERS)

ARCHITECTURAL CONCEPTS INC
2401 WEST BAY DRIVE, SUITE 503, LARGO, FL 33770
Phone 727.954.7178 Fax 727.584.5155 Licenses: AA26012519 / EB0000669

SHARON RISSLING
ARCHITECT REG. NO. C-28369
2401 WEST BAY DRIVE, SUITE 503
LARGO, FL 33770

CLEARWATER LIVING

PROPOSED:

CLEARWATER AT WINDSOR

A MIXED USE RETIREMENT COMMUNITY

SHILOH ROAD,
WINDSOR, CA

DO NOT SCALE PRINTS

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PUBLICATION	DATE
CONCEPT:	
SCHEMATIC DESIGN:	
PRELIMINARY DESIGN:	
DESIGN DEVELOPMENT:	
PERMIT SET:	
BID SET:	
FOR CONSTRUCTION:	
REVISIONS:	

PLOT DATE:
2/9/2021 11:41:31 AM

FILE LOCATION:
\\ac-dc\projects\1792-1799\1792 - Clearwater Senior Living - Windsor CA\Arch\Drawings\A0.00 Site Plan.dwg

SHEET DESCRIPTION:

SITE PLAN

PROJECT NO.	SCALE:
1792	1" = 50'-0"

DRAWING NO.

A0.00

Groundborne Noise and Vibration Modeling

Notes
The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

	Reference Level Inputs			
Equipment	**PPV_{ref} (in/sec)**	**Lv_{ref} (VdB)**	**RMS_{ref} (in/sec)**	**Reference Distance**
Vibratory Roller	0.21	94	0.050	25
Hoe Ram	0.089	87	0.022	25
Large bulldozer	0.089	87	0.022	25
Caisson drilling	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

	Vibration Level at Receiver			
Equipment	**Distance (feet)**	**PPV_x (in/sec)**	**Lv_x (VdB)**	**RMS_x (in/sec)**
Vibratory Roller	205	0.0208	74	0.005
Hoe Ram	205	0.0088	67	0.002
Large bulldozer	205	0.0088	67	0.002
Caisson drilling	205	0.0088	67	0.002
Loaded trucks	205	0.0075	63	0.001
Jack hammer	205	0.0035	59	0.001
Small bulldozer	205	0.0003	38	0.000

	Vibration Contours		
	Distance to (feet)		
Equipment	**0.200 PPV**	**72.0 VdB**	**0.0080 RMS**
Vibratory Roller	26	250	133
Hoe Ram	12	120	64
Large bulldozer	12	120	64
Caisson drilling	12	120	64
Loaded trucks	10	79	42
Jack hammer	5	52	28
Small bulldozer	1	6	3

Source
California Department of Transportation (Caltrans). 2013. Transportation and Construction Last Updated: 4/11/2019

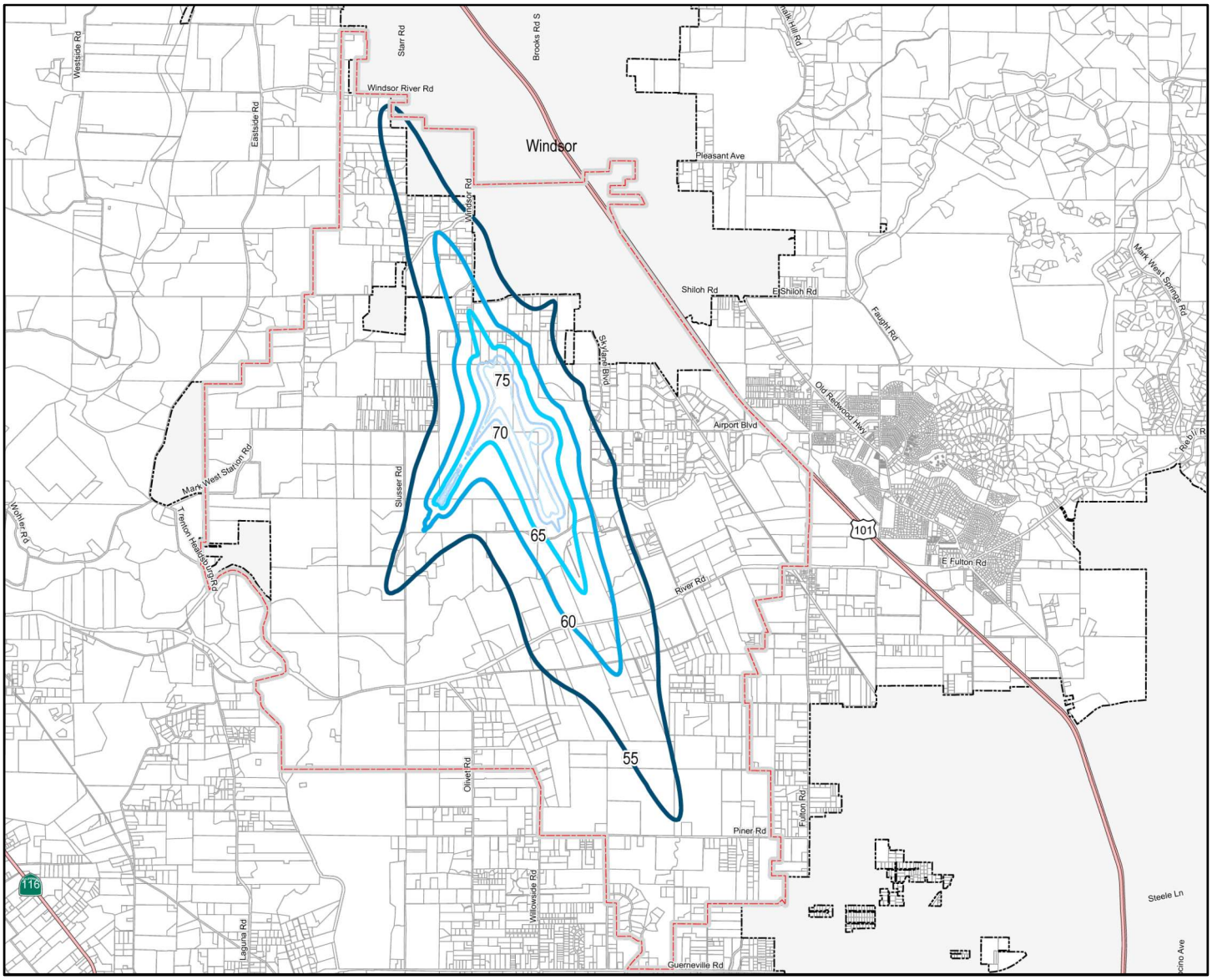
Addition and Subtraction

Addition

	dBA_1	dBA_2	dBA_3	dBA_4	dBA_5	dBA_6	dBA_7	dBA_8	dBA_9	dBA_{10}	dBA_{11}	Total Summed Noise Level (dBA)	Sum of Summed Noise Levels (dBA)	Increase in Noise Levels (dBA)
1	38.2	36.7	33.1	31.7								41.7		
2	33.1	32.7	31.6	30.9	32.2	31.3	30.5	30.1				40.7	44.2	2.5
3												0.0	44.2	0.0
4												0.0	44.2	0.0
5												0.0	44.2	0.0
6												0.0	44.2	0.0
7												0.0	44.2	0.0
8												0.0	44.2	0.0

Subtraction

Ambient Noise Level	Total Noise Level	Source Noise Level
		Cannot divde by zero
		Cannot divde by zero
		Cannot divde by zero
		Cannot divde by zero
		Cannot divde by zero
		Cannot divde by zero



2030 Projected Noise Contours

Community Noise Equivalent (CNEL)
measured in decibels (dB)

- 55
- 60
- 65
- 70
- 75
- ALUC Referral Area

Base Map Data

- Highways
- Town Limits

TOWN OF WINDSOR
2040 General Plan

Figure PHS-6: Airport Noise Contours

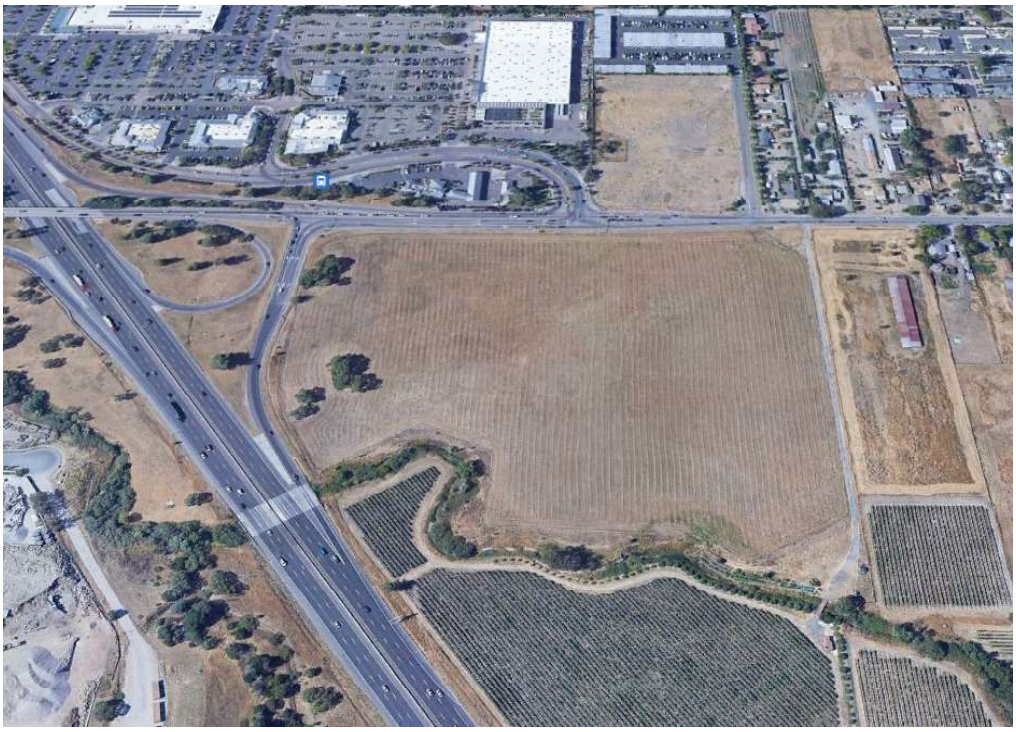
0 2,000 4,000 Feet
1:48,000

Note: Map scale and reproduction methods limit precision.
For illustrative purposes only.
Source: Sonoma County General Plan 2020 Air Transportation Element
Permit and Resource Management Department

Appendix H

Traffic Impact Study and Correspondence with W-Trans on Sidewalk

Clearwater at Windsor
Traffic Impact Study



Prepared for the Town of Windsor

Submitted by
W-Trans

August 4, 2022

TRAFFIC ENGINEERING
TRANSPORTATION PLANNING
Balancing Functionality and Livability since 1995
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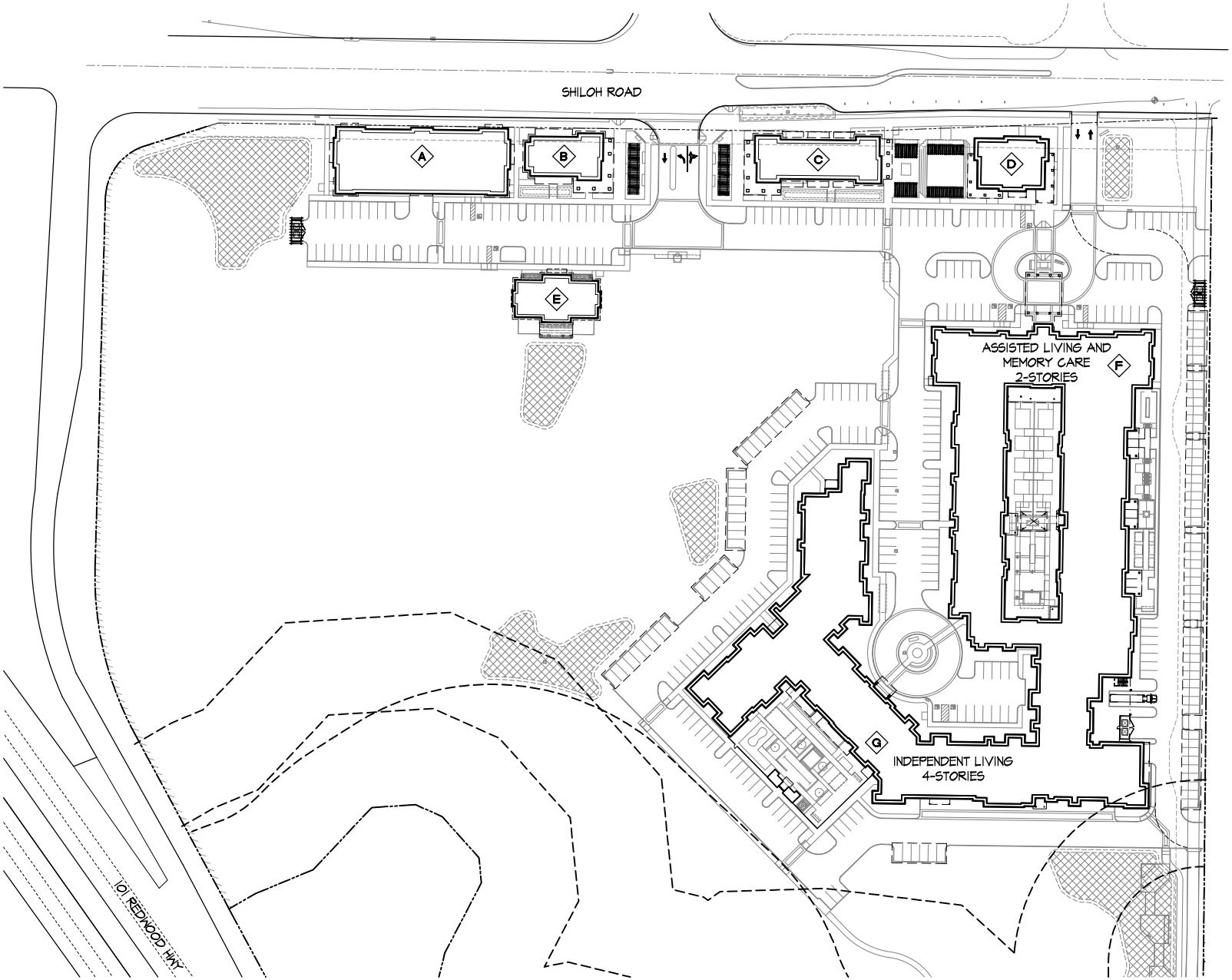
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B. Intersection Level of Service Calculations
C. Queuing Reports
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Introduction

This report presents an analysis of the potential mobility impacts that would be associated with construction of a senior living and care facility as well as commercial development on the south side of Shiloh Road just east of US 101 in the Town of Windsor. The traffic study was completed in accordance with the criteria established by the Town of Windsor and is consistent with standard traffic engineering techniques.

Project Description

Based on information and site plans contained in the project's submittal to the Town of Windsor in June of 2021, the project consists of a senior living campus and five small mixed-use buildings that would contain a mix of neighborhood commercial and residential uses. The senior complex would include 141 independent living units, 71 assisted living units containing 85 beds, and a 34-bed memory care unit. The mixed-use buildings are anticipated to include just under 21,000 square feet of neighborhood retail, restaurant, and senior community amenity uses on ground floors. Two of the mixed-use buildings would have second floor office spaces totaling approximately 5,100 square feet. Two of the mixed-use buildings would also include a total of 12 apartments, two of which would be model units for the independent living facility, as well as additional amenity space for the senior community. The project would include construction of a new driveway on the south leg of the Shiloh Road/Hembree Lane signalized intersection, as well as a driveway onto Shiloh Road opposite Business Park Court. The project site plan is shown in Figure 1.



Source: Architectural Concepts Inc. 9/20

win150.ai 9/21

Clearwater at Windsor Traffic Impact Study

Figure 1 – Site Plan

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. Existing pedestrian facilities along the proposed project site frontages as well as within a one-quarter mile distance of the project site were reviewed.

Existing Pedestrian Facilities

The project is on the edge of developed portions of Windsor. Pedestrian facilities are generally limited on Shiloh Road in the vicinity of the project. To the east, pedestrians currently walk along paved shoulders between the site and the signalized intersection at Old Redwood Highway, where crosswalks are provided and pedestrians can access pedestrian facilities within Esposti Park and along the north side of Shiloh Road further to the east. To the west of the project site on Shiloh Road, there are intermittent sidewalks on the north side of the street, though it is very difficult and uncomfortable for most pedestrians to traverse the US 101 freeway interchange due to a lack of crosswalks on uncontrolled freeway ramps. A continuous pedestrian network exists to the north of the project site on Hembree Lane, providing walking access to the shopping center as well as neighborhoods to the north. There are currently no crosswalks at the Shiloh Road/Hembree Lane signalized intersection.

Pedestrian Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue for pedestrians. Collision records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports were reviewed for the most current five-year period available, which was October 1, 2015 through September 30, 2020 at the time of the analysis. During the five-year study period there were no reported collisions involving pedestrians at the study intersections.

Project Impact on Pedestrian Facilities

Pedestrian facilities at the project would generally be limited to developed areas since wetland and rare plant habitat areas limit where trails can be established. The proposed project would include construction of the following pedestrian facilities.

- New sidewalks on the south side of Shiloh Road along the entire project frontage
- Modification of the Shiloh Road/Hembree Lane traffic signal to include new pedestrian crossings on the east, west, and south intersection legs
- New sidewalks along select drive aisles within the project site
- A walking path through the open space area in the southeast quadrant of the site

Pedestrian connectivity between the project site and existing neighborhoods to the north, including the Shiloh Center retail area, would be adequate upon completion of all proposed onsite and frontage improvements. Pedestrian connectivity to the east will be improved in the future as development and redevelopment occurs along the Shiloh Road corridor and individual developments are required to provide frontage improvements. To the west, sidewalks exist on the north side of Shiloh Road through the US 101 interchange, providing connectivity across the freeway, though the walking route would not be considered appealing or convenient by most pedestrians. The Town has initiated preliminary evaluation of upgrades to the US 101/Shiloh Road freeway interchange, with improvements to pedestrian circulation and connectivity being a key component of the project. Over time as development occurs to the east and the interchange is improved to the west, the Clearwater at Windsor project's connectivity to the surrounding pedestrian network will improve.

Shiloh Road is classified as a 5-lane Crosstown Street in the Town's General Plan. Per the Town's *Complete Street Design Guidelines* (CSDG), a six-foot landscape zone and six- to eight-foot concrete sidewalk are required for this type of street. It is noted that the CSDG specifies that landscape zones may be planter strips or tree wells. The project site plan includes 14-foot sidewalks with tree wells that function as landscape zones. Based on the proposed site plan, the project would meet the criteria set forth for pedestrian facilities in the CSDG.

Pedestrian connectivity within the site would consist of sidewalks along one or both sides of drive aisles, with decorative pavement treatments used to distinguish pedestrian crossing areas. Connectivity between the large onsite population and the proposed onsite commercial and support services along the south side of Shiloh Road would be adequate. Pedestrian connectivity between the Clearwater residential building and the western portion of the site would generally be adequate, though somewhat circuitous for those walking to the commercial building referred to as Lot 4. A more direct walking route would be preferred along the south side of the primary east-west internal drive aisle. It is recognized that this area is environmentally sensitive and could require special design treatments to implement a sidewalk or walking path. Plate 1 depicts the walking route as proposed (red line) as well as the recommended additional pedestrian connection (blue line).

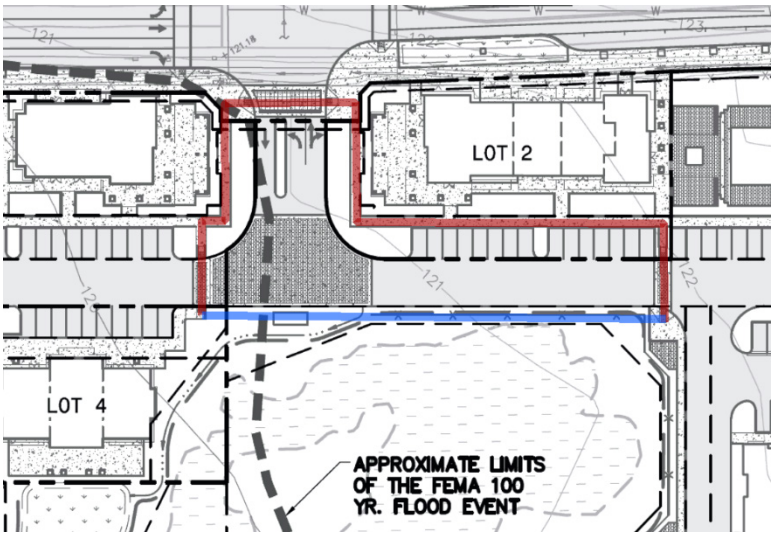


Plate 1 Recommended Pedestrian Connectivity Improvement

The internal drive aisle intersection just south of Shiloh Road/Hembree Lane would have a crosswalk on its west leg. As the project's site and landscaping plans are finalized, the applicant should provide an exhibit depicting sight triangles at this crosswalk, confirming that drivers entering the site will have an unobstructed view of pedestrians that may be crossing at this location. This is particularly important at this location given the short distance between this location and Shiloh Road, which limits the amount of perception-reaction time that drivers would have for a crossing pedestrian.

Finding – Pedestrian connectivity to and from the project site would be adequate in the near-term and would improve in the future as development occurs to the east on Shiloh Road and the US 101 interchange is improved to the west. Pedestrian facilities along the project frontage would meet the requirements specified in the *Complete Street Design Guidelines*.

Recommendation – A pedestrian sidewalk or path should be added along the south side of the internal east-west drive aisle between the Clearwater residential building and Lot 4 to provide a more direct route.

Recommendation – Once site and landscaping plans are finalized, the applicant team should submit an exhibit confirming that adequate sight triangles are available at the crosswalk of the internal drive aisle intersection just south of Shiloh Road/Hembree Lane.

Access to Transit

The Sonoma County Transit (SCT) bus stops nearest to the project site are located on both sides of Hembree Lane at Shiloh Center Drive, which is located within one-quarter mile of the project site. With the new pedestrian

facilities and signal modifications to be completed by the project, continuous walking routes to the bus stops would exist.

Finding – Walking routes to existing SCT bus stops would be adequate upon completion of sidewalk and crossing modifications at Shiloh Road/Hembree Lane to be implemented as part of the project.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

Existing and proposed bicycle facilities within one mile of the proposed project site, as contained in the *Windsor Bicycle and Pedestrian Master Plan*, were reviewed.

Existing and Planned Bicycle Facilities

In the study area, Class II bike lanes exist on Shiloh Road along the project frontage as well as on Hembree Lane from Shiloh Road to Arata Lane-Foothill Drive near the Town Limits. Bike lanes also exist on Old Redwood Highway to the north of Shiloh Road, with paved shoulders existing along Old Redwood Highway to the south beyond the Town limits. To the west of the project site, bike lanes are discontinuous on Shiloh Road through the US 101 interchange area, and it can be both difficult and uncomfortable for bicyclists to cross uncontrolled freeway onramps. As noted above, the Town has initiated preliminary work on determining potential reconfigurations of the interchange; enhancing east-west bicycle connectivity through the interchange is a key parameter that will be included in any future modifications. On the west side of the freeway interchange, on-street bike lanes resume along the Shiloh Road corridor. According to the *Windsor Bicycle and Pedestrian Master Plan*, the Class I SMART Trail is planned to be extended from Southern Town limits to north of Shiloh Road, which would further improve the bicyclist connections.

Along all other streets within the project study area, bicyclists can ride in the roadway and/or on sidewalks. Table 1 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Windsor Bicycle and Pedestrian Master Plan*.

Table 1 – Bicycle Facility Summary

Status Location	Class	Length (miles)	Begin Point	End Point
Existing				
Shiloh Rd	II	1.85	Windsor Rd	Old Redwood Hwy
Hembree Ln	II	2.6	Shiloh Rd	Arata Ln-Foothill Dr
Old Redwood Hwy	II	2.1	NB Off-Ramp-Lakewood Dr	South Town Limits
Windsor Rd	II	1.0	Windsor River Rd	Shiloh Rd
Planned				
SMART Trail	I	0.81	Southern Town Limits	North of Shiloh Rd

Source: *Windsor Bicycle and Pedestrian Master Plan*, Sonoma County Transportation Authority, 2014

Bicyclist Safety

Collision records for the study area were reviewed to determine if there had been any bicyclist-involved crashes. During the five-year study period between October 1, 2015, through September 30, 2020, there was no reported collision involving a bicyclist at any of the study intersections of Shiloh Road/Hembree Lane, Shiloh Road/US 101 South Ramp, Shiloh Road/US 101 North Ramp, Shiloh Road/ Business Park Court, and Shiloh Road/Old Redwood Highway.

Project Impact on Bicycle Facilities

The Town has provided direction to the project applicant to include a bike lane along its Shiloh Road frontage improvements, consistent with the *Complete Street Design Guidelines*. To the west of Hembree Lane, the project's site plans depict added bike lanes between the eastbound through and new right-turn lane, which is appropriate. To the east of Hembree Lane, a conventional bike lane is shown, but the Town has directed that a buffered bike lane instead be provided, including minimum two-foot-wide striped buffer between the vehicle travel lane and bike lane. Bicyclists would be able to access the surrounding bike network via existing bike lanes on Hembree Lane, Shiloh Road to the east of the project site, and Old Redwood Highway. Bicyclists traveling to and from the west on Shiloh Road would be able to traverse the existing US 101 overpass and interchange by riding on existing shoulders and within travel lanes; bike facilities on this segment are undesirable though they will be improved in the future as part of any interchange upgrades.

Finding – Existing and planned bicycle facilities would generally provide adequate access for bicyclists traveling to and from the Clearwater at Windsor site, though buffered bike lanes on Shiloh Road along the project's frontage east of Hembree Lane should be added per the Town's guidance.

Recommendation – The project should install buffered bike lanes along its Shiloh Road frontage to the east of Hembree Lane, including a minimum two-foot wide striped buffer separating the bike lane from adjacent vehicle lane.

Bicycle Parking

The Town of Windsor zoning code does not currently include requirements for bicycle parking. Nonetheless, it is recommended that bicycle parking be provided near commercial buildings on the project site for use by employees, visitors, and customers. Based on California Green Building Code Standards, a minimum of five short-term bicycle parking spaces should be provided in the site's retail/office areas. A bike rack or racks should also be provided at the Clearwater senior housing development to provide secure parking for employees and visitors that travel to the facility by bike.

Recommendation – Bicycle racks should be provided near the project's commercial buildings as well as at the residential building to provide secure bike parking for employees, visitors, and customers.

Transit Facilities

Existing transit facilities and routes serviced within one-quarter mile walking distance of the proposed project site were reviewed.

Existing Transit Facilities

Sonoma County Transit

Sonoma County Transit (SCT) provides fixed-route bus service in the Town of Windsor and within the County of Sonoma and provides service to the project site with stops on both sides of Hembree Lane at Shiloh Center Drive, which is located within one-quarter mile of the project. SCT Route 60 provides regional service between the Town of Windsor and surrounding communities. The buses for this route are currently operating on a daily schedule with approximately one-half-hour to two-hour headways between 7:30 a.m. and 10:00 p.m. The SCT routes and bus stops near the project site are shown in Plate 2.

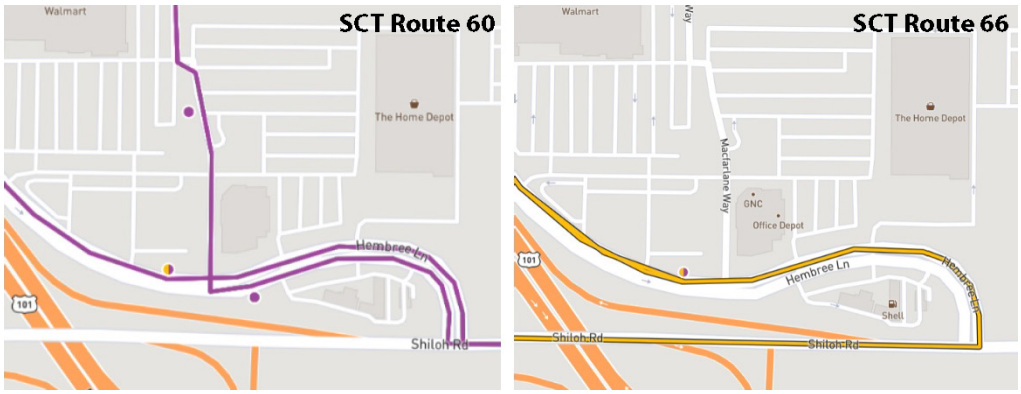


Plate 2 Internal Driveway Queues at Shiloh Road

Two bicycles can be carried on most SCT buses. Bike rack space is on a first-come, first-served basis. Additional bicycles are allowed on SCT buses at the discretion of the driver.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. SCT Paratransit is designed to serve the needs of individuals with disabilities within the Town of Windsor and the greater Sonoma County area.

Project Impact on Transit Facilities

Given the senior population that would reside at the proposed project as well as its anticipated employment, it would be beneficial to establish a new bus stop on the project's Shiloh Road frontage between Hembree Lane and the project driveway at Business Park Court to reduce the walking distance needed to reach bus service. Sonoma County Transit has indicated that this bus stop, including a pullout and shelter, will be required. The Town of Windsor will be including this improvement as a condition of approval.

Finding – Existing public transit routes are adequate to accommodate project-generated transit trips. Existing stops are within an acceptable walking distance of the site, though given the senior population and anticipated employment, it would be beneficial to provide an additional bus stop along the project's Shiloh Road frontage between Hembree Lane and Business Park Court.

Finding – Transit facilities serving the project site are adequate.

Recommendation – The project developer shall construct a bus stop including pullout and shelter along its Shiloh Road frontage, as required by Sonoma County Transit and specified by the Town as a condition of approval.

Vehicle Miles Traveled

Per Senate Bill (SB) 743, the change in Vehicle Miles Traveled (VMT) as a result of a project is now the basis for determining California Environmental Quality Act (CEQA) impacts with respect to transportation and traffic. Because the Town of Windsor has not yet adopted standards of significance for evaluating VMT, guidance provided by the California Governor's Office of Planning and Research (OPR) in the publication *Transportation Impacts (SB 743) CEQA Guidelines Update and Technical Advisory*, 2018, was used (referred to herein as the Technical Advisory). These criteria are consistent with those applied by Caltrans as outlined in the *Vehicle Miles Traveled-Focused Transportation Impact Study Guide*, California Department of Transportation, May 2020.

Significance Thresholds

The OPR Technical Advisory provides VMT threshold guidance for several land use types. Residential uses are assessed using a home-based VMT per capita metric, while office or employment-based uses are assessed using a home-based commute VMT per worker metric. For both types of uses, VMT significance thresholds are set at a level of 15 percent below the existing countywide average VMT per capita or VMT per employee. Retail uses are analyzed using a total VMT metric, with a net increase in regional VMT applied as the significance threshold; however, local-serving retail uses (typically below 50,000 square feet per OPR guidance) may generally be presumed to have a less-than-significant VMT impact since research has shown that such uses typically do not increase VMT at the regional level.

When analyzing VMT at mixed-use developments, the OPR Technical Advisory indicates that jurisdictions may choose to analyze VMT for each use separately or consider only the project's dominant use. The Clearwater project includes residential, employment, and retail uses. The retail components would consist of smaller tenant spaces and restaurants totaling less than 20,000 square feet, which would be screened out from quantitative VMT analysis since they would be considered local-serving. The project's residential and employment functions would generate similar levels of VMT. As such, it is appropriate to analyze both the project's residential VMT per capita and employment VMT per employee.

SCTA operates and maintains the regional travel demand model that produces baseline VMT estimates. The VMT thresholds and projections applied in this analysis reflect refinements made by SCTA in the summer of 2020 in a model version released in September 2020. Based on output from the SCTA model, the existing residential VMT per capita in the County of Sonoma is 16.53 miles and the existing home-based employment VMT per employee is 12.53 miles. VMT significance thresholds are set at 15 percent below these baseline levels. Accordingly, the applied VMT significance criteria applied to the Clearwater project are as follows.

The project would have a potentially significant impact on VMT if:

- The project's residential VMT per Capita would exceed a level of 15 percent below the existing Countywide average residential VMT per Capita, or 14.05 miles; or
- The project's employment VMT per Employee would exceed a level of 15 percent below the existing Countywide average VMT per Employee, or 10.65 miles.

Methodology

The SCTA travel demand model estimates the VMT associated with the aggregate land uses in each "traffic analysis zone" (TAZ). The project site is located within TAZ 869 of the SCTA model. Because the boundaries of TAZ 869 correspond to Clearwater's boundaries, and no VMT metrics are available in the model for the site since it is currently vacant, a custom run of the SCTA model was used to produce project-specific VMT data. Completing a project-specific run is also useful since the SCTA model can account for senior housing travel characteristics, which differ substantially from typical households.

The SCTA model includes a limited number of land use categories. The proposed Clearwater project was input to the model using the following land use types.

- The independent living apartments were input as senior housing units.
- The workforce housing and apartments were input as multifamily residential units.
- Residents of the assisted living and memory care units would not drive or generate VMT; these uses would, however, generate employee and visitor VMT as described below.
- Employment VMT associated with the project was captured by using an input of 15,920 square feet of institutional uses in the model. This "proxy" building size was established using a factor of 3.33 employees per 1,000 square feet for institutional uses as applied in the SCTA model, which is equivalent to the 53 daily employees anticipated to be working at Clearwater on a daily basis (the applicant indicated that 73 total employees would be associated with the combined senior living uses, working 40-hour weeks with five days on and two days off, which translates to approximately 53 employees onsite on any given day). The institutional land use also generates visitor travel in the SCTA model, capturing VMT associated with visitors of senior residents.
- The retail, restaurant, small second-floor office area, and amenity spaces were input as strip commercial.

It should be noted that the effects of certain project amenities (if offered) such as provision of onsite dining, onsite recreation and social activities, and a resident shuttle are not directly accounted for in the modeling of the project's VMT per capita. The total incremental increase in regional VMT associated with the project as calculated in the SCTA model should accordingly be considered conservative.

VMT Analysis

Residential VMT per capita represents the VMT associated with home-based trips divided by the number of residents, while VMT per employee represents the VMT associated with home-based employment trips (commute trips) divided by the number of employees. Based on output from the project-specific run of the SCTA travel demand model, the project's residents are anticipated to generate 5.59 VMT per capita. Since this is below the applied significance threshold of 14.05 VMT per capita, the resulting impact would be considered less than significant.

With respect to employee VMT, the proposed project is projected to produce an average VMT per employee of 9.90 miles, which is below the applied significance threshold of 10.65 VMT per employee, the resulting impact would be considered less than significant.

A summary of the VMT findings is provided in Table 2.

Table 2 – Vehicle Miles Traveled Analysis Summary

VMT Metric	Countywide Baseline VMT Rate	Significance Threshold	Project VMT Rate	Resulting Significance
Residential VMT per Capita	16.53	14.05	5.59	Less than significant
Employment VMT per Employee	12.53	10.65	9.90	Less than significant

Note: Residential VMT is measured in home-based VMT per Capita, or the number of daily miles driven per resident; Employment VMT is measured in VMT per Employee, or the number of daily commute miles driven per employee; Countywide averages and significance thresholds based on SCTA model version released in September 2020

Finding – The proposed project is anticipated to generate VMT per capita and VMT per employee that are more than 15 percent below Countywide averages and would thereby result in a less-than-significant VMT impact.

Vehicular Traffic Facilities

Setting

While the operation of local intersections is no longer evaluated for purposes of determining potential impacts under CEQA, an analysis of the potential impacts on traffic operation was performed to determine consistency with the Town's adopted General Plan policies.

The *Town of Windsor 2040 General Plan*, adopted in April 2018, contains the following policies applicable to the operational analysis.

> **Policy M-3.16 – Level of Service Application.** *The Town shall maintain the level of service standards that define the minimum acceptable operating characteristics for intersections and streets. A level of service D (LOS D) is defined as the minimum acceptable level of congestion during the weekday morning and evening peak periods for high-volume facilities such as freeways, crosstown streets, and signalized or all-way stop-controlled intersections. This standard should apply at all these locations except the following intersections, which are regional gateways to the Town's commercial and civic areas, and where a Level of Service E is tolerated by the Town and considered acceptable:*
>
> - *Old Redwood Highway/US 101 Northbound off-ramp/Lakewood Drive*
> - *Old Redwood Highway/US 101 Southbound ramps*
> - *Old Redwood Highway/Conde Lane/Windsor River Road*
>
> *At side-street stop-controlled unsignalized intersections, levels of service shall be determined for both controlled movements and for the overall intersection. Controlled movements operating at LOS E or LOS F are allowable if: 1) the intersection is projected to operate at LOS C or better overall, and 2) the projected traffic volume on the controlled movement is 30 vehicles or less per hour on approaches with single lanes, or on multilane approaches, 30 vehicles or less per hour per lane. If an intersection is operating at LOS E or F without project-generated traffic added, the project's impact shall be considered less-than-significant if it does not cause operation to fall from LOS E to LOS F and it increases average delay for the intersection as a whole by 5 seconds or less. Level of service standards shall not apply to minor intersections comprised of only local streets.*
>
> **Policy M-3.17 - Queuing**. *Intersection queuing shall be evaluated in tandem with LOS. Projected 95th percentile queues in left-turn pockets do not exceed the available stacking length. A queuing impact shall be considered significant if:*
>
> *a) The 95th percentile queue length can be contained within the available stacking length without the project, and the project causes the queue to exceed the stacking length; or*
>
> *b) The queue length exceeds the available stacking length without the project and the project increases the 95th percentile queue by more than 10 feet, or approximately one-half a car-length.*
>
> *Exceptions to this policy may be granted by the Town Engineer, where there is sufficient block length to accommodate projected queuing or physical constraints that make it infeasible to construct the improvement that would be necessary to achieve adequate stacking length, such as geometrics, a lack of right-of-way, adjacent slopes or hills, and soil conditions*

A description of the Level of Service methodologies applied in the analysis is provided in Appendix A.

Study Area and Periods

Given the project's location and the proposed project access points, the study area includes the section of Shiloh Road between US 101 and Old Redwood Highway and the intersections at the US 101 northbound and southbound ramps, Hembree Lane, Business Park Court, and Old Redwood Highway. Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward-bound commute.

Study Intersections

Shiloh Road/US 101 South Ramps is a signalized tee intersection operating with two phases, one serving Shiloh Road east-west movements and the other serving the southbound off-ramp. A marked crosswalk is located on the north ramp leg and bicycle lanes are marked on Shiloh Road. US 101 southbound on-ramp movements occur beyond the signalized intersection, including the eastbound-to-southbound ramp to the west and a westbound-to-southbound loop onramp to the east.

Shiloh Road/US 101 North Ramps is a signalized tee intersection with similar configuration to the adjacent southbound ramp's intersection, including two-phase signal operation and a right-turn overlap phase on the northbound off-ramp that runs concurrently with the westbound through movement. There are no marked crosswalks at the intersection. Bike lanes are striped on Shiloh Road. The westbound-to-northbound US 101 on-ramp is located just west of the intersection, and an eastbound-to-northbound loop onramp is located to the east.

Shiloh Road/Hembree Lane is a three-legged signalized intersection with protected left-turn phasing on the eastbound approach and a right-turn overlap on the southbound approach. There is a marked crosswalk on the north leg (Hembree Lane) and bicycle lanes are present on the east leg of the intersection (Shiloh Road).

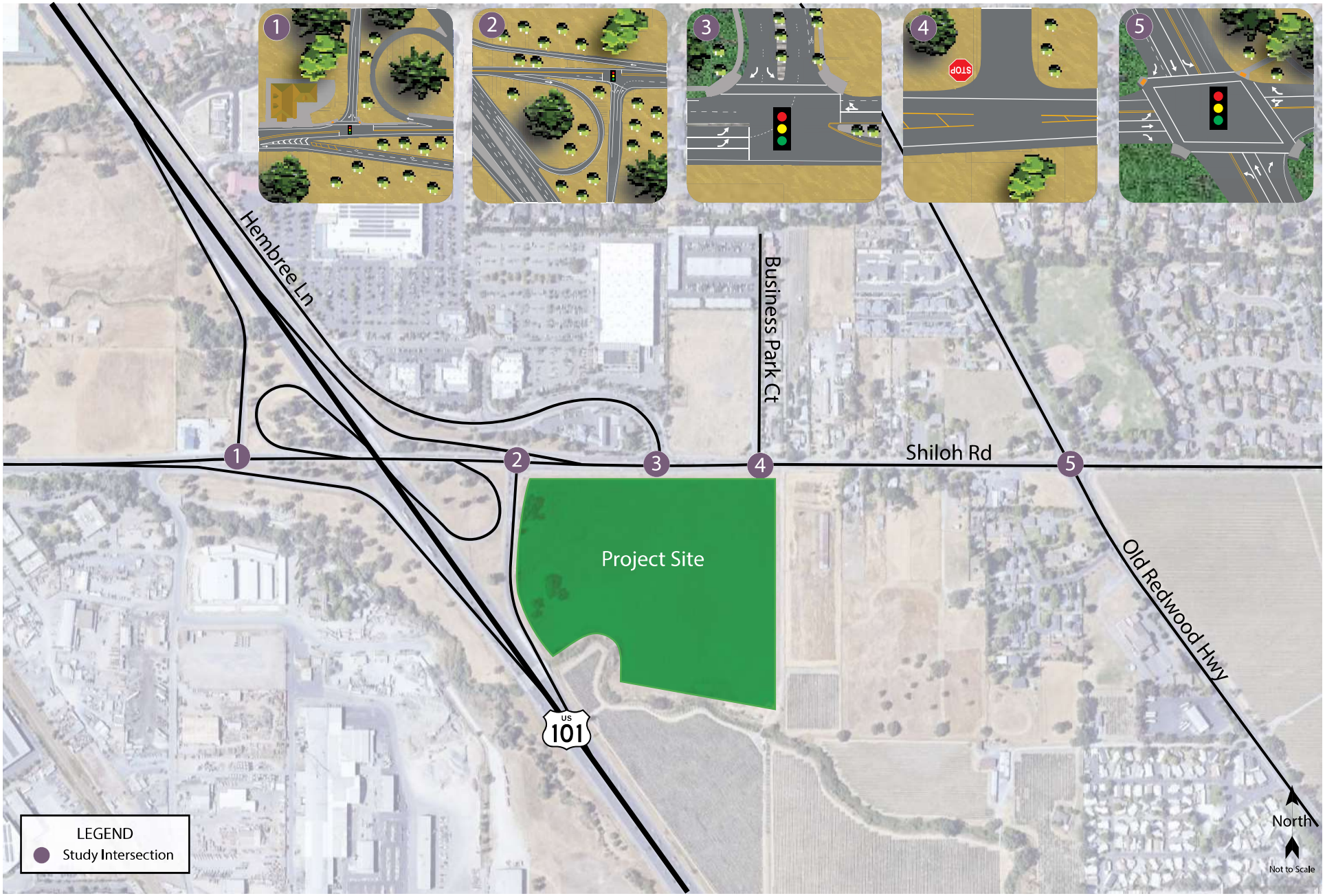
Shiloh Road/Business Park Court is an unsignalized intersection with stop controls on the minor Business Park Court approach. There are no sidewalks or marked crosswalks at the intersection. Bike lanes are striped on Shiloh Road.

Shiloh Road/Old Redwood Highway is a four-legged signalized intersection with protected left-turn phasing on the northbound and southbound approaches and split-phasing on the Shiloh Road approaches. There are crosswalks present on all four legs. Bicycle lanes are present on the north (Old Redwood Highway) and west (Shiloh Road) legs.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 2.

Existing Traffic Volumes

An extensive process was used to develop baseline traffic volumes that are reflective of existing non-pandemic conditions. Prior traffic counts obtained in December 2018 are available for the Shiloh Road intersections at Hembree Lane, Business Park Court, and Old Redwood Highway. These counts were adjusted to account for 1) potentially atypical volumes given the December data collection period, and 2) background traffic growth that has occurred since late 2018. Factors were developed using "big data" analyses available through the provider Streetlight Data, which uses anonymized personal device data (primarily cell phones) among other sources to estimate traffic volumes at most locations in the United States and Canada. Based on this assessment, the December 2018 volumes were increased by 12 percent at the Hembree Lane intersection and 5 percent at the Business Park Court and Old Redwood Highway intersections to account for seasonal influences and background growth, resulting in a set of baseline volumes that are reflective of non-pandemic conditions while schools are in session.



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Figure 2 – Study Area and Existing Lane Configurations

W-Trans

Existing Intersection Operation

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Under this scenario the study intersections are all operating acceptably at LOS C or better. A summary of the intersection Level of Service calculations is contained in Table 3, and copies are provided in Appendix B. The existing traffic volumes are shown in Figure 3.

Table 3 – Existing Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Shiloh Rd/US 101 South Ramps	16.1	B	11.5	B
2. Shiloh Rd/US 101 North Ramps	31.0	C	15.2	B
3. Shiloh Rd/Hembree Ln	11.6	B	16.9	B
4. Shiloh Rd/Business Park Ct	0.4	A	0.7	A
Southbound Approach	*13.6*	*B*	*15.6*	*C*
5. Shiloh Rd/Old Redwood Hwy	26.0	C	29.5	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

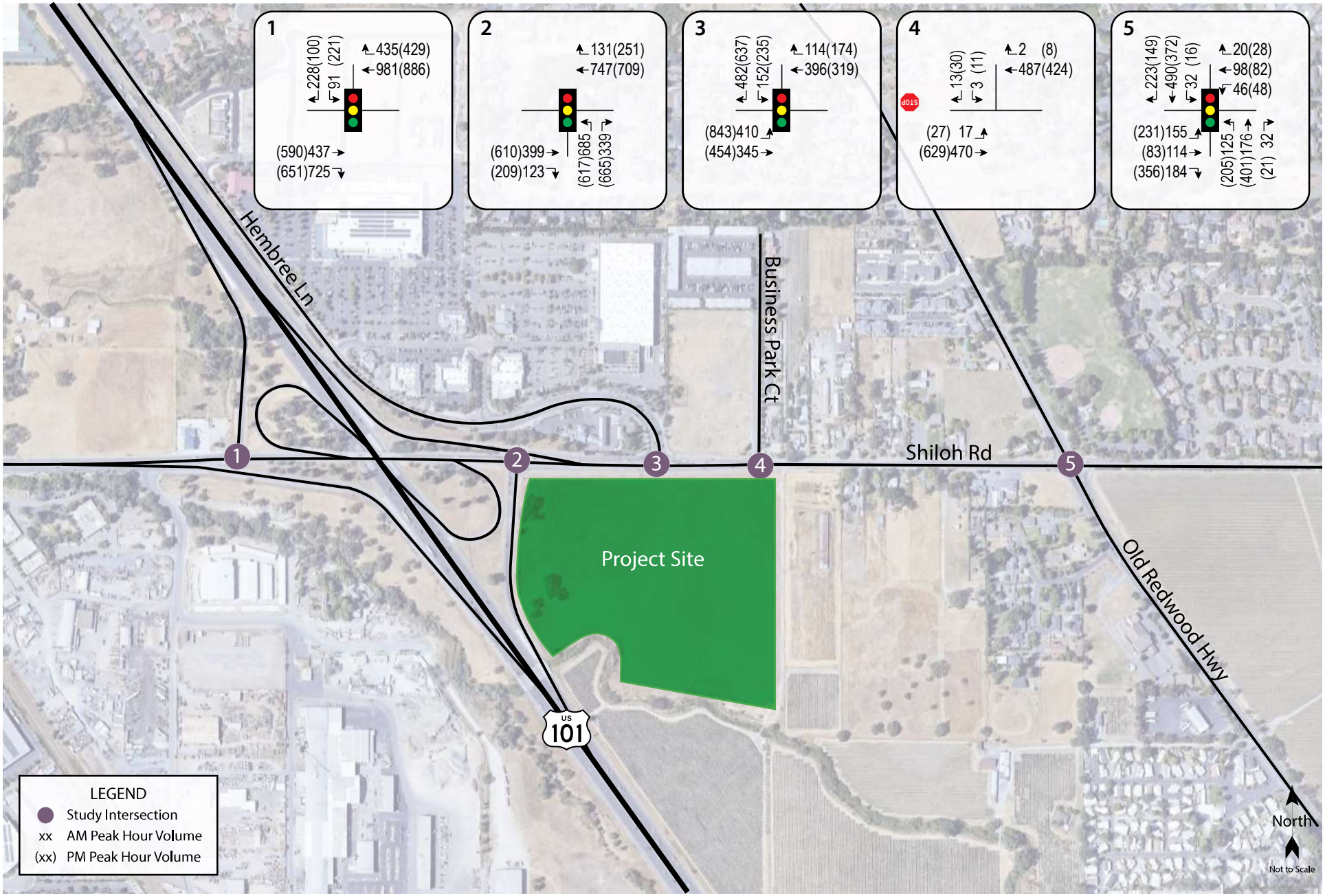
Future Planned Roadway Modifications

The Town has identified several planned future roadway modifications in the study area. Following is a brief description of how each of these changes have been incorporated into the traffic impact study.

- Shiloh Road Widening – The Town's General Plan identifies Shiloh Road as a five-lane crosstown arterial street. Since the time that the General Plan was prepared, updates have been made to the SCTA regional travel model that have resulted in lower forecasted future volumes. For the purposes of this traffic impact study the corridor was assumed to remain with one lane in each direction between Business Park Court and Old Redwood Highway.

- Old Redwood Highway/Shiloh Road Intersection – The Town has been actively studying and analyzing potential modifications to the intersection to improve operation. One option is to modify the existing signalized intersection to provide longer turn pockets, re-stripe the westbound approach to provide a left-turn lane and shared through/right-turn lane, modify the signal phasing and timing, and improve geometry to better accommodate large vehicle movements. Another option is to replace the signalized intersection with a modern roundabout that includes a single circulating lane as well as right-turn bypass lanes on the southbound and eastbound approaches. The roundabout option would perform at a better level of service than the signal though it would require more space to construct. For the purposes of this traffic impact study, the intersection was conservatively assumed to be modified with the signalized option in the future to present worst-case conditions.

- Shiloh Road/US 101 Freeway Interchange – The existing US 101 freeway interchange at Shiloh Road does not meet modern design criteria and includes inadequate facilities for pedestrians and bicyclists. The Town has begun preliminary assessment of potential interchange modifications that will alleviate these deficiencies and provide improved traffic operation. For the purposes of this traffic impact study, the interchange was assumed to remain in its current configuration. Where deficiencies are identified, the potential for them to be addressed by the future interchange project is acknowledged.



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Figure 3 – Existing Traffic Volumes

Future Intersection Operation

Segment volumes for the horizon year of 2040 were obtained using a customized run of the countywide travel demand model maintained by the Sonoma County Transportation Authority (SCTA). The purpose of completing a dedicated model run was to remove the prior land use development assumptions for the project site which included more intensive retail and hotel uses. The resulting volumes were then applied to represent the "future without project" analysis scenario, upon which traffic associated with the current Clearwater at Windsor project could be added to establish the "future plus project" scenario. The model's link-based volume projections were translated to turning movement volumes at the study intersections using the "Furness" method, which is an iterative process that employs existing turn movement data, existing link volumes, and future link volumes to project future turning movement volumes at intersections.

With the projected Future volumes, the study intersections are expected to operate acceptably at LOS D or better overall during both studied peak hours. Operation on the stop-controlled southbound approach at Shiloh Road/Business Park Court is anticipated to be LOS E during the p.m. peak hour, indicating unacceptable operation according to the Town's guidelines.

Future volumes are shown in Figure 4 and operating conditions are summarized in Table 4.

Table 4 – Future Peak Hour Intersection Levels of Service

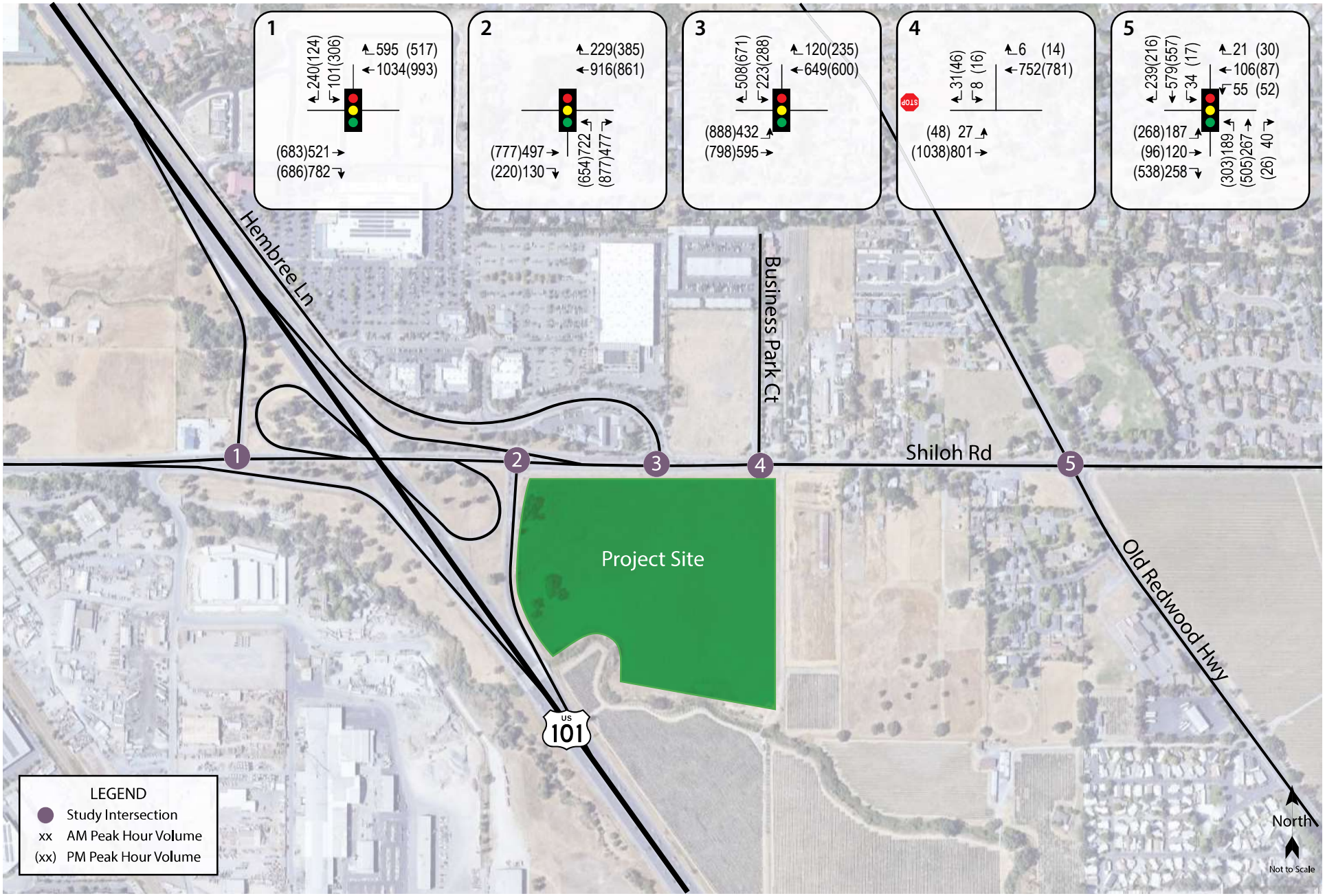
Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Shiloh Rd/US 101 Southbound Ramps	18.0	B	17.5	B
2. Shiloh Rd/US 101 Northbound Ramps	46.9	D	28.0	C
3. Shiloh Rd/Hembree Ln	14.1	B	26.0	C
4. Shiloh Rd/Business Park Ct	0.7	A	1.6	A
Southbound Approach	*23.3*	*C*	***42.2***	***E***
5. Shiloh Rd/Old Redwood Hwy[1]	23.5	C	43.2	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text indicates unacceptable operation; [1] includes planned lane configuration and signal phasing improvements

Vehicle Trip Generation

The anticipated trip generation for the proposed project was estimated using rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 10th Edition, 2017. The senior living campus would consist of three components, each of which have different travel characteristics and applied trip generation rates. The applied ITE trip generation rates are based on the "Congregate Care Facility" (LU #253) land use for the independent living units, the "Assisted Living" (LU #254) land use for the assisted living units, and the "Nursing Home" (LU #620) rates for the memory care units. The retail space was generally assumed to contain an equal split of "Shopping Center" (LU #820) and "High-Turnover Sit-Down Restaurant" (LU #932) land uses. The second floors of Buildings A and B would be office-type uses and trip rates for the "Small Office Building" (LU #712) land use applied. The mixed-use residential units were assessed using rates associated with the "Multifamily Housing (Low Rise)" (LU #220) land use.

The site plan depicts five standalone structures on the northern portion of the site labeled Buildings A, B, C, D, and E. The 16,000 square feet of commercial assumed to be split between retail and restaurant uses would be in Buildings A, B, C, and E. Building D would include 1,733 square feet associated with the senior living community including functions such as a leasing office or space for residents to rent for gatherings. Vehicular traffic associated



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Figure 4 – Future Traffic Volumes

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with this space would be captured by the rates applied for the congregate care use. Building D would also include two residential units that would be used as model units for the senior community in the near-term but may become visitation units for families of the senior community's residents. These two units are included as multifamily residential uses in the traffic analysis, which would conservatively account for either type of residential function. Finally, Building D would include 3,500 square feet of space to be used as amenity space for the senior housing community, potentially including such functions as a beauty salon. This 3,500 square feet of space is treated as retail for the purposes of the traffic analysis since specific tenant types could change over time. An additional ten residential units identified as workforce housing are include in Building A.

Note that while the development mix has the potential to generate internally-captured trips, such as those associated with residents patronizing onsite retail, this influence is likely to be relatively small and subject to fluctuations based on the retail tenant mix. No internal capture reductions were applied to the trip generation to present a conservative assessment.

Based on application of these rates, the proposed project would be expected to generate an average of 2,147 trips per day, including 141 trips during the a.m. peak hour and 198 trips during the p.m. peak hour. These results are summarized in Table 5.

Table 5 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Congregate Care Facility (Independent Living)	141 units	2.02	285	0.07	10	6	4	0.18	25	13	12
Assisted Living	85 beds	2.60	221	0.19	16	10	6	0.26	22	8	14
Nursing Home (Memory Care)	34 beds	3.06	104	0.17	6	4	2	0.22	7	2	5
Shopping Center (Neighborhood Retail)	11.75 ksf[1]	37.75	444	0.94	11	7	4	3.81	44	21	23
High-Turnover Restaurant (Neighborhood Retail)	8.21 ksf	112.18	921	9.94	82	45	37	9.77	80	45	35
Office	5.16 ksf	16.19	84	1.92	10	8	2	2.45	13	4	9
Multifamily Housing Low-Rise (Workforce Housing)	12 units[2]	7.32	88	0.46	6	1	5	0.56	7	5	2
Total Primary Trips			2,147		141	81	60		198	98	100

Notes: ksf = 1,000 square feet; [1] includes 3,540 square feet of gym/salon independent living amenity space in Building D; [2] includes 10 units workforce housing in Building A and two residential units in Building D

It should be noted that subsequent to completion of the traffic analysis, application materials for the project were revised to indicate up to 30,000 of combined commercial uses. While the combined commercial uses described above total 25,120 square feet, they also apply very conservative trip generation rates including a sizable component of "high-turnover" restaurant uses. If typical "shopping center" trip generation rates were applied uniformly to 30,000 square feet of commercial, the total trips shown in Table 5 would actually *decrease* by approximately 300 daily trips and 25 to 75 peak hour trips. In other words, while the total commercial square footage differs between the current project description and the traffic impact study, the traffic impact study's conservative assumptions compensate for the incremental difference, and the results of the analysis remain valid.

The total anticipated trip generation for the Clearwater project is much lower than prior proposals for the site. The project's dominant uses are related to senior residential functions, which generate much less traffic on a per-unit or square footage basis than many other types of land uses. Senior residential uses also tend to generate traffic

throughout the day rather than concentrating trips during peak hours; employee shift patterns at senior independent living and memory care facilities (which are staffed 24 hours per day) also tend to be less pronounced than other employment-based uses since there are multiple shifts per day with shift changes that often do not coincide with peak hour traffic.

Comparison to General Plan Land Use Assumptions

The Town's General Plan land use designations for the project site include a mix of "Gateway Commercial" and "Boulevard Mixed Use," and the site includes an overlay designating potential wetlands. For the traffic modeling completed for the General Plan EIR the land uses assumed for the project site included approximately 159,600 square feet of retail, 26,600 square feet of office, and 106,400 square feet of hotel. Based on standard ITE trip generation rates this mix of uses would be expected to result in approximately 7,640 vehicle trips per day including approximately 250 trips during the a.m. peak hour and 730 trips during the p.m. peak hour. The proposed Clearwater project would generate approximately 70 percent less traffic on a daily basis and during the p.m. peak hour, and approximately 45 percent less traffic during the a.m. peak hour than assumed based on existing land use designations.

Trip Distribution

Project trips were distributed to the surrounding street network based on a "select zone" run of the SCTA travel demand model, which includes the proposed project's land uses as well as consideration of select origin-destination analysis of existing trips using Streetlight Data. The applied distribution assumptions are shown in Table 6.

Table 6 – Trip Distribution Assumptions

Trip Origin/Destination	Percent
US 101 South of Shiloh Rd	34%
US 101 North of Shiloh Rd	21%
Old Redwood Hwy south of Shiloh Rd	14%
Hembree Ln north of Shiloh Rd	11%
Shiloh Rd west of US 101	10%
Old Redwood Hwy north of Shiloh Rd	9%
Shiloh Rd east of Old Redwood Hwy	1%
Total	**100%**

Project Impact on Intersection Operation

Intersection Modifications with the Project

The Clearwater at Windsor project would include construction of a new southern leg at the existing Shiloh Road/Hembree Lane signalized intersection. The south leg would consist of a left-turn lane and a through/right-turn lane. A new westbound left-turn lane would be constructed on the east leg and crosswalks would be added on the east, west, and south legs. The traffic signal phasing would remain split-phase in the northbound and southbound directions and the new westbound left-turn would operate with protected phasing.

Based on assessment of operation and safety at the Shiloh Road/Business Park Court intersection, it was determined by W-Trans and Town Staff that left-turns into and out of the Clearwater site would need to be prohibited given the intersection's proximity to the signalized intersection at Hembree Lane. With this

modification, eastbound left turns from Shiloh Road into Business Park Court would be maintained, though westbound left turns into the Clearwater site would be prohibited. A raised median would need to be constructed to physically reinforce the turn prohibitions. The analysis of "plus project" operation at this intersection reflects this configuration, including reassignment of existing southbound left turns at Business Park Court to become right turns followed by a westbound U-Turn at the adjacent Shiloh Road/ Hembree Lane intersection. The project's site plans do not reflect this modification, but it will be required by the Town as a condition of approval.

Existing plus Project Conditions

Upon the addition of project-related traffic to the existing volumes and with the modifications described above, the study intersections are expected to continue operating acceptably. The results are summarized in Table 7. Project traffic volumes at the study intersections are shown in Figure 5, and existing plus project traffic volumes are shown in Figure 6.

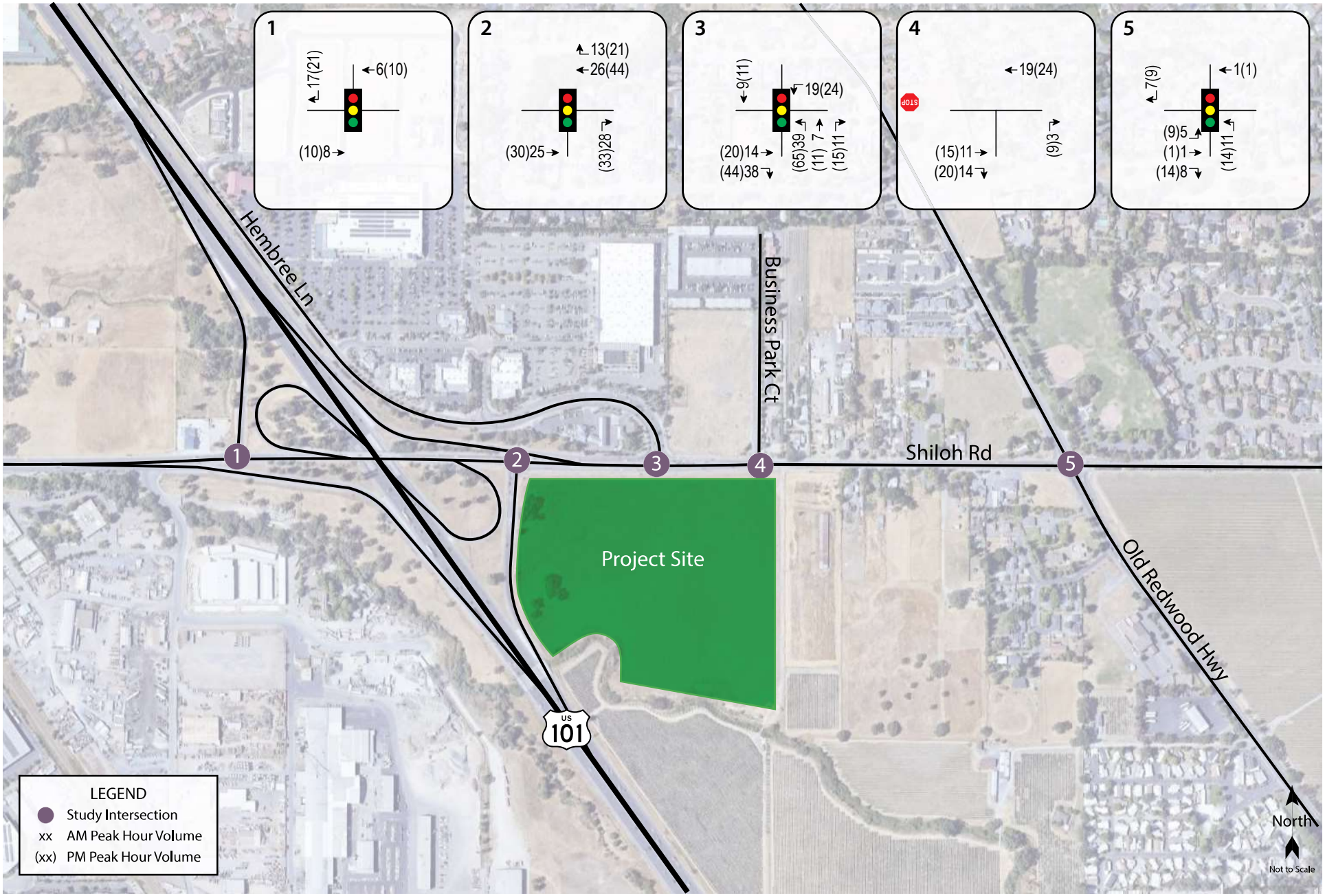
Table 7 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**Existing Conditions**				**Existing plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. Shiloh Rd/US 101 South Ramps	16.1	B	11.5	B	16.7	B	12.8	B
2. Shiloh Rd/US 101 North Ramps	31.0	C	15.2	B	33.5	C	17.4	B
3. Shiloh Rd/Hembree Ln	11.6	B	16.9	B	18.6	B	32.9	C
4. Shiloh Rd/Business Park Ct[1]	0.4	A	0.7	A	0.4	A	0.7	A
Northbound Approach	-	-	-	-	*11.6*	*B*	*13.5*	*B*
Southbound Approach	*13.6*	*B*	*15.6*	*C*	*12.0*	*B*	*11.7*	*B*
5. Shiloh Rd/Old Redwood Hwy	26.0	C	29.5	C	26.6	C	31.4	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italic;* [1] under "plus project" conditions northbound and southbound approaches would be restricted to right turns and westbound left turns into the project site would be prohibited

Future plus Project Conditions

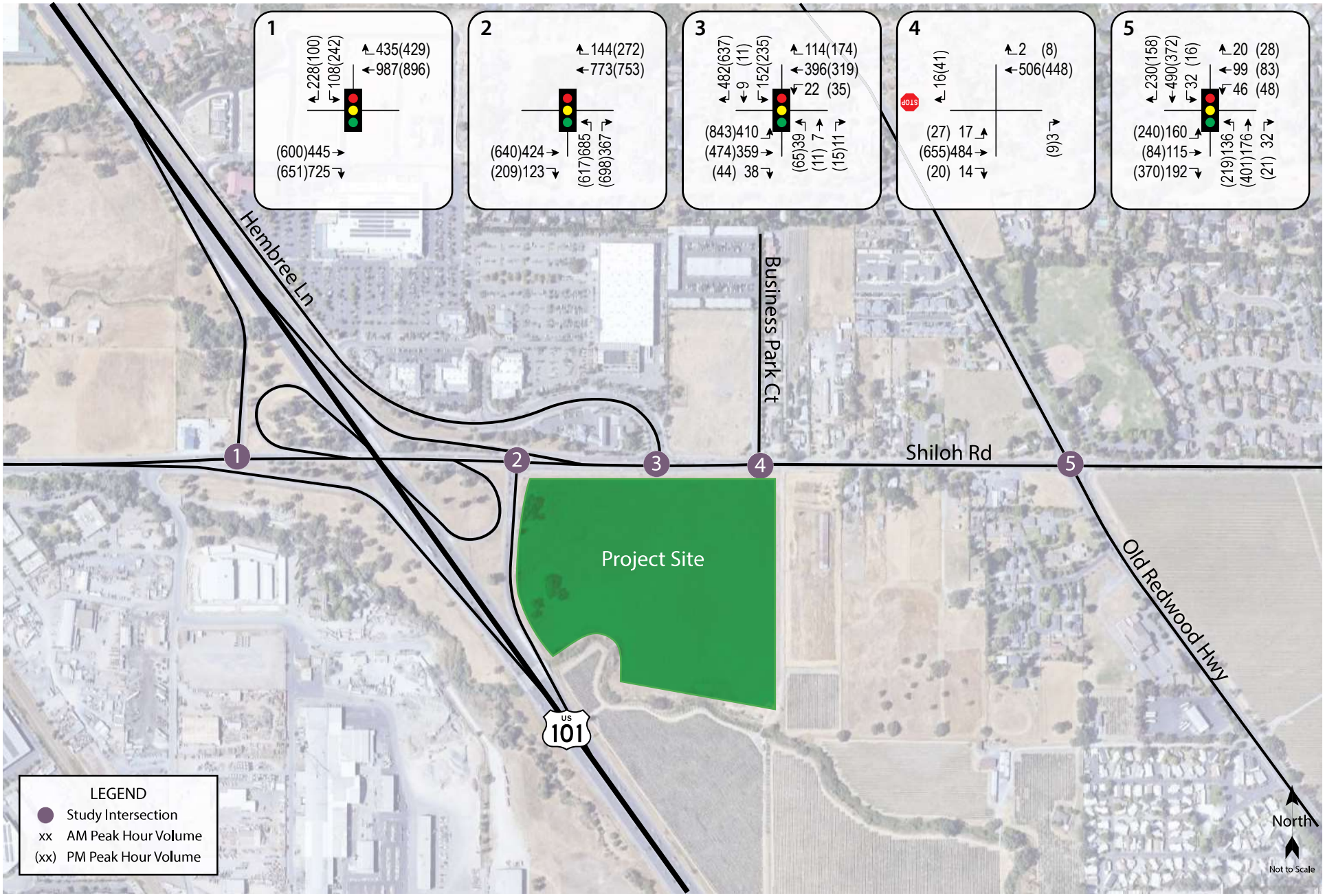
Upon the addition of project-generated traffic to the anticipated future volumes and with further modifications as previously described, the study intersections are expected to operate acceptably. The Future plus Project operating conditions are summarized in Table 8, and volumes are shown in Figure 7.



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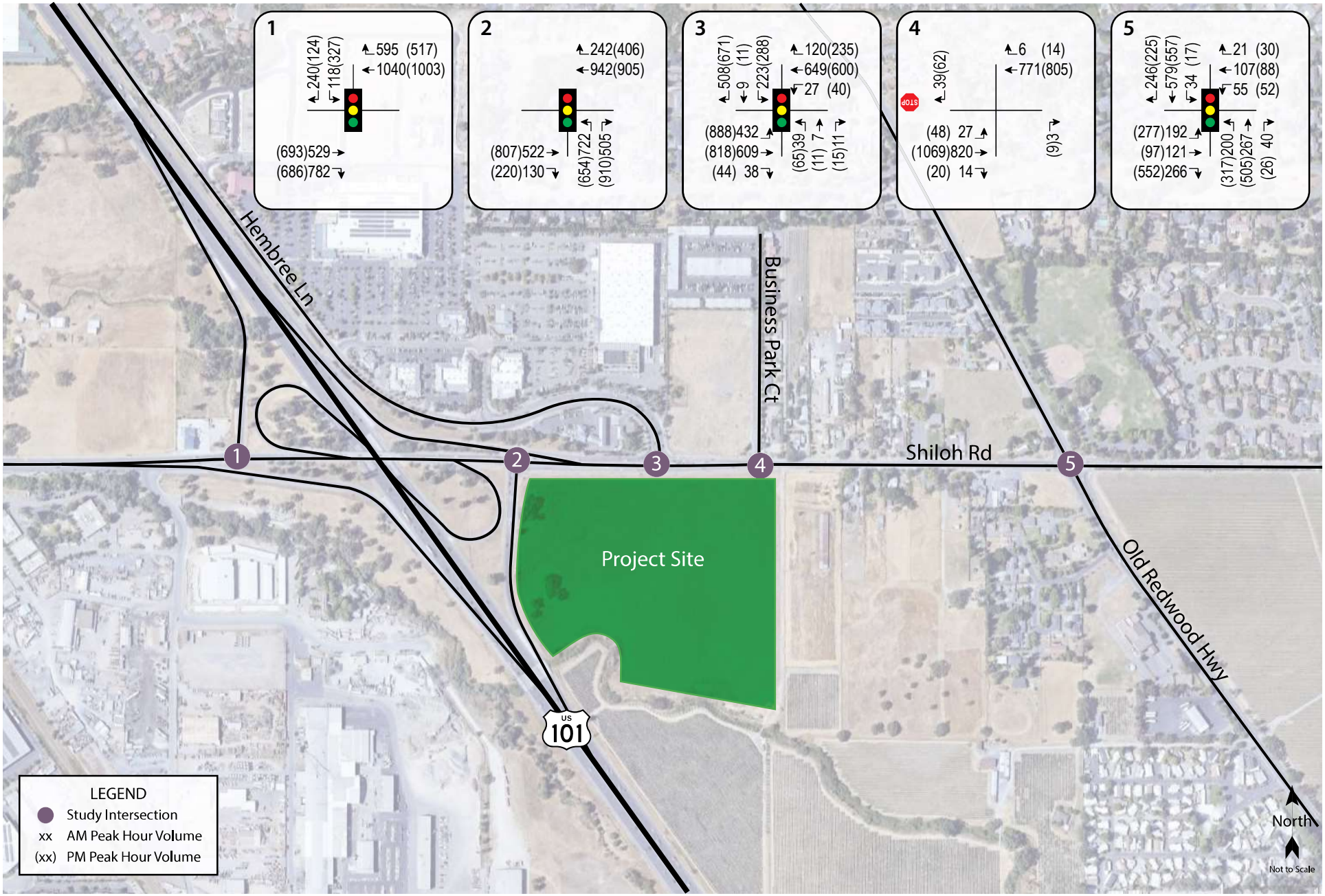
Figure 5 – Project Traffic Volumes



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Figure 6 – Existing plus Project Traffic Volumes



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Figure 7 – Future plus Project Traffic Volumes

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Table 8 – Future and Future plus Project Peak Hour Intersection Levels of Service

Study Intersection *Approach*	Future Conditions				Future plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Shiloh Rd/US 101 South Ramps	18.0	B	17.5	B	18.6	B	19.8	B
2. Shiloh Rd/US 101 North Ramps	46.9	D	28.0	C	49.6	D	32.0	C
3. Shiloh Rd/Hembree Ln	14.1	B	26.0	C	23.9	C	38.2	D
4. Shiloh Rd/Business Park Ct[1]	0.7	A	1.6	A	0.5	A	0.8	A
Northbound Approach	-	-	-	-	*15.4*	*C*	*19.6*	*C*
Southbound Approach	*23.3*	*C*	*42.2*	*E*	*15.8*	*C*	*16.8*	*C*
5. Shiloh Rd/Old Redwood Hwy	23.5	C	43.2	D	24.2	C	45.6	D

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; [1] under "plus project" conditions northbound and southbound approaches would be restricted to right-turns and westbound left-turns into the project site would be prohibited

Finding – The study intersections are anticipated to operate acceptably upon the addition of project-generated traffic to both existing and future volumes.

Queuing

Under each scenario, the projected 95th percentile queues in signalized intersection left-turn pockets were determined using the traffic simulation software Simtraffic, which is an extension of the Synchro software used to analyze LOS. As shown in Table 9, 95th percentile left-turn lane queues would generally be accommodated by the available storage, though there are three exceptions described below. Queuing calculation sheets are provided in Appendix C.

Table 9 – 95th Percentile Left-turn Queues at Signalized Study Intersection

Study Intersection Approach	Avail. Storage	95th Percentile Queues							
		AM Peak Hour				PM Peak Hour			
		E	E+P	F	F+P	E	E+P	F	F+P
1. Shiloh Rd/US 101 S Ramp									
Southbound Left-Turn Lane	320	78	90	87	94	139	148	166	173
2. Shiloh Rd/US 101 N Ramp									
Northbound Left-Turn Lane	425	412	425	**552**	**567**	308	374	397	**445**
3. Shiloh Rd/Hembree Ln									
Northbound Left-Turn Ln	75[1]	-	54	-	64	-	**90**	-	**96**
Southbound Left-Turn Ln	400	107	118	139	214	147	210	223	331
Eastbound Left-Turn Ln	550	102	111	131	156	217	228	264	306
Westbound Left-Turn Ln	120[1]	-	50	-	102	-	88	-	115
4. Shiloh Rd/Old Redwood Hwy[2]									
Northbound Left-Turn Lane	190/300[2]	139	141	196	254	**225**	**268**	**317**	**320**
Southbound Left-Turn Lane	125/175[2]	90	110	110	137	47	44	61	108
Eastbound Left-Turn Lane	375	128	115	163	178	190	179	302	317
Westbound Left-Turn Lane	50/120[2]	38	14	67	69	25	29	89	96

Notes: 95th Percentile Queue as reported using Simtraffic software and ten randomly-seeded runs; **bold** values reflect 95th percentile queues that exceed storage; all distances are measured in feet; E = Existing Conditions; E+P = Existing plus Project Conditions; F = Future Conditions; F+P = Future plus Project Conditions; [1] constructed by project; [2] future scenarios include improvements overseen by Town

The queue in the northbound left-turn pocket at Shiloh Road/US 101 North Ramps is projected to exceed available storage under future conditions. The Clearwater project would increase this projected future queue length by 15 to 20 feet during peak hours, which exceeds the 10-foot threshold considered an adverse impact per the Town's criteria. The Town has initiated preliminary work in determining the future configuration of the Shiloh Road freeway interchange, which is planned to be replaced to improve it to current design standards and improve multimodal circulation. This project is also included in the Town's Traffic Impact Fee program. All potential interchange replacement schemes would be configured to adequately accommodate queues. As such, while the Clearwater project would contribute to future queuing deficiencies if the interchange remains unchanged, this scenario is not anticipated to occur and the project's relatively modest effects on queuing are not considered to be adverse. The project would also contribute toward the costs of improving the Shiloh Road interchange through payment of traffic impact fees.

At the Shiloh Road/Hembree Lane intersection, the new southern leg to be constructed as part of the project would have limited storage of only 75 feet. The projected 95th percentile queues during the p.m. peak hour would exceed this available storage by approximately 15 to 20 feet, or in the range of one vehicle length. During these

times, drivers would queue into the internal drive aisle intersection. While such queuing is not optimal, it would not be expected to adversely affect auto safety since the queuing would most often "wrap" around the internal intersection toward the east, causing no blockages to inbound traffic entering from the Shiloh Road/Hembree Lane intersection. Inbound drivers entering from Shiloh Road would also have sufficient sight distance to stop if for some reason queues did briefly block the internal intersection. A sketch depicting the longest 95th percentile queue length of 96 feet on this movement is shown in Plate 3.

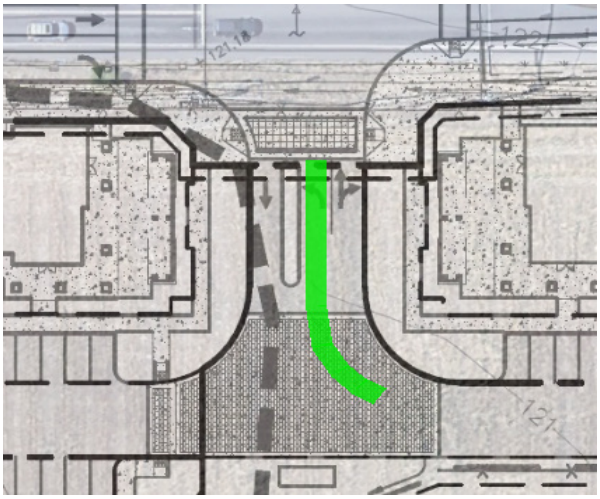


Plate 3 95th Percentile Queue Future PM Peak Hour

Despite no marked crosswalks on the north or east sides of the internal intersection, the possibility exists that some pedestrians may still choose to cross at these locations. The projected vehicle queues may present safety concerns to these pedestrians. In order to more clearly direct pedestrians to adjacent crosswalks to avoid this potential safety concern, it is recommended that some form of physical barrier be added on the northwest and northeast corners of the internal intersection where pedestrians would typically cross. These barriers would need to be three feet or less in height to preserve sight distance, and could take many forms including low decorative walls or fencing, or dense low-profile shrubs.

The projected 95th percentile queues in the northbound left-turn lane at Shiloh Road/Old Redwood Highway currently exceed the length of the striped turn pocket during the p.m. peak hour and would be expected to continue to exceed storage under Existing plus Project, Future, and Future plus Project conditions. The Clearwater project is estimated to increase these queue lengths by approximately 43 feet in the Existing plus Project scenario, exceeding the Town's criteria. Because this turn pocket transitions to a two-way left-turn lane, these peak queues could extend beyond the marked turn pocket length without spilling over into the adjacent through lane if the current pavement striping were modified. Doing so would require eliminating the current bay taper turn pocket markings and transitioning the left-turn pocket markings directly into two-way left-turn lane markings. The next major access point on Old Redwood Highway to the south is a private street called Lafayette Drive, approximately 350 feet south of Shiloh Road. Because the projected 95th percentile queues would not extend that far, allowing drivers to use the two-way left-turn lane for queuing when needed would be expected to function acceptably.

Finding – Projected queuing at the Shiloh Road/Hembree Lane intersection may extend into the project site, and partially into the adjacent internal project drive aisle intersection. While this queuing would not present a substantial concern regarding auto safety, it may result in a pedestrian safety concern.

Finding – The project would contribute to an adverse queuing condition in the northbound left-turn pocket at Shiloh Road/Old Redwood Highway.

Recommendation – Physical barriers not exceeding three feet in height should be added on the northwest and northeast corners of the internal site intersection just south of the Shiloh Road/Hembree Lane intersection, in the location where pedestrians would typically cross.

Recommendation – The project should be responsible for modifying the northbound left-turn pocket striping at Shiloh Road/Old Redwood Highway to eliminate the current double-yellow line bay taper and transition the left-turn pocket striping directly into the abutting two-way left-turn lane.

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol (CHP) as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is October 1, 2015, through September 30, 2020.

As presented in Table 10, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2018 Collision Data on California State Highways*, California Department of Transportation (Caltrans). Collision rates for all study intersections were below statewide averages. Copies of the collision rate calculations are provided in Appendix D.

Table 10 – Collision Rates at the Study Intersections

Study Intersection	Number of Collisions (2015-2020)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Shiloh Rd/US 101 S Ramp	13	0.25	0.29
2. Shiloh Rd/US 101 N Ramp	10	0.18	0.29
3. Shiloh Rd/Hembree Ln	8	0.13	0.42
4. Shiloh Rd/Business Park Ct	0	0.00	0.17
5. Shiloh Rd/Old Redwood Hwy	11	0.30	0.42

Note: c/mve = collisions per million vehicles entering

It is noted that both the US 101 northbound onramp from eastbound Shiloh Road and the southbound on-ramp from westbound Shiloh Road have encountered several "hit object" and "run off road" collisions that are not included in the above intersection-based collision rate calculations. Both of these ramps have generally high-speed configurations, wherein drivers tend to begin accelerating to freeway speeds while they are still on Shiloh Road. This undesirable design condition is anticipated to be addressed through future interchange modifications.

Based on the review of historical collision trends and consideration of modifications to be implemented as part of its frontage improvements, the proposed project is not anticipated to create adverse safety impacts.

Finding – Collision rates at the study intersections are below statewide averages, and intersection safety is not anticipated to be adversely affected by the proposed project.

Site Vehicle Access and Circulation

Site Access

Project Access Points on Shiloh Road

The project would access Shiloh Road via a new private driveway connection at the signalized intersection with Hembree Lane. A second access to the east would be constructed as a new driveway on the south side of the Business Park Court intersection. Signalization of the Business Park Court intersection, either near-term or long term, is not recommended given the short 330-foot distance to the adjacent Hembree Lane intersection due to operational and queuing concerns. Based on discussions with Town of Windsor Public Works staff, it has been determined that the Clearwater driveway would need to be restricted to right turns in and out for both safety and operational concerns given proximity to the adjacent Hembree Lane signal. Left turns into Business Park Court are to be retained, with outbound left turns from Business Park Court prohibited. A raised median on Shiloh Road and raised right-turn channelization island on the Clearwater driveway would be needed to physically restrict the prohibited left-turn movements. Note that outbound left-turn volumes from Business Park Court are very low (11 or fewer during peak hours) and that these movements would be accommodated through a U-Turn at the signalized Hembree Lane intersection.

The Shiloh Road/Hembree Lane intersection would be modified by the project. In addition to modifying the traffic signal to add a fourth leg including new pedestrian crossings, the westbound Shiloh Road approach would include a new left-turn pocket served by a protected left-turn phase. This new left-turn lane would also accommodate U-Turn movements created by the newly-restricted southbound left-turn prohibitions at the Business Park Court intersection. A new eastbound right-turn lane at the Shiloh Road/Hembree Lane intersection would also be constructed along the project frontage.

Finding – The proposed access points on Shiloh Road are projected to operate acceptably with the proposed improvements, though turn restrictions would need to be implemented at the Shiloh Road/Business Park Court intersection.

Recommendation – The Clearwater driveway at the Shiloh Road/Business Park Court should be restricted to right turns in and out. A raised median on Shiloh Road and raised channelization island on the Clearwater driveway would be required to restrict all left-turn movements except the eastbound left turn from Shiloh Road to Business Park Court.

Sight Distance

Sight distance along Shiloh Road at the unsignalized eastern project driveway opposite Business Park Court was evaluated based on sight distance criteria contained in the *Highway Design Manual,* 6th Edition published by Caltrans. Although sight distance requirements are not technically applicable to urban driveways, the stopping sight distance criterion for private street intersections was applied for evaluation purposes. The recommended stopping sight distance for the posted 40 mph speed on Shiloh Road is 300 feet. Based on a review of existing field conditions and review of the project site plan, sight lines at the driveway are anticipated to extend more than 300 feet to the west, which is adequate for the posted speed limit. The sight distance to the east also exceeds 300 feet though this sight distance is less critical if left turns are physically restricted from this driveway.

Finding – Sufficient sight distance exists at the eastern project driveway on Shiloh Road.

Onsite Circulation

Configuration of Connection to Shiloh Road/Hembree Lane Intersection

The project site plan depicts a short driveway connecting the Shiloh Road/Hembree Lane intersection to the project's internal east-west parking drive aisle. The segment includes one inbound lane, as well as two outbound lanes consisting of a left-turn lane and a through/right-turn lane on the approach to the Shiloh Road intersection. The especially short length of roadway segment is attributable to environmental constraints on the project site.

Because the project's eastern driveway is recommended to be restricted to right-turn movements, all trips exiting the site and destined to the west would need to be via the Shiloh Road/Hembree Lane intersection and the short internal driveway segment. Volumes on this new northbound approach are projected to be 57 vehicles during the a.m. peak hour and 91 vehicles during the p.m. peak hour. As discussed above in the queuing evaluation, 95th percentile queues would extend into the adjacent drive aisle intersection, though since such queues would not adversely affect traffic or pedestrian safety this is not considered to be an adverse impact. The Clearwater project would, however, consume all available queuing capacity on this short internal street segment. The connection would be unable to accommodate additional traffic from neighboring properties without causing potentially adverse queuing impacts to both pedestrians and drivers on the Clearwater site. Accordingly, Town staff and decision makers should understand that future development to the east of the Clearwater at Windsor site will need to rely on new connections to Shiloh Road rather than rely on the circulation network that passes through the Clearwater site.

Internal Circulation

The project's onsite circulation is comprised of conventional drive aisles with perpendicular parking on both sides. Drive aisles surround the periphery of the large senior community buildings. Future access points to adjacent parcels to the east are depicted at two locations. With respect to large vehicles, the site would need to accommodate access and circulation by garbage trucks and fire apparatus. The project applicant has submitted exhibits demonstrating that these vehicles can effectively maneuver throughout the site. Copies of these exhibits are included in Appendix E.

Internal circulation is anticipated to function acceptably.

Finding – The queuing capacity on the connection roadway between Shiloh Road and the internal drive aisle intersection for northbound left turns to Shiloh Road would be fully utilized by Clearwater traffic, and would be unable to accommodate additional traffic from neighboring properties.

Finding – Internal circulation on the drive aisles within the site is anticipated to function acceptably.

Shiloh Road Configuration

Frontage Configuration

To the west of the main Clearwater driveway, the project would add a new 14-foot sidewalk with street trees, 11-foot-wide eastbound right-turn lane, and a 6-foot bike lane to the existing eastbound dual left-turn lanes and single through lane. To the east of the main driveway, the project would add 14-foot sidewalks with street tree wells, a 10-foot-wide parking zone, and a 6-foot bike lane with minimum 2-foot buffer to the existing eastbound through lane. Sonoma County Transit and the Town of Windsor are also requiring installation of a bus stop with pullout and shelter along this frontage.

Based on the traffic analysis completed for the year 2040 including the proposed Clearwater at Windsor project, eastbound Shiloh Road is projected to operate acceptably with a single eastbound through lane entering and

exiting the Hembree Lane intersection. Westbound Shiloh Road would require two through lanes between Hembree Lane and Business Park Court. No changes to the existing lane configuration on Hembree Lane would be required.

The configuration of on-street parking along Shiloh Road was assessed. On-street parking is typically not recommended on a 40-mph street like Shiloh Road, though the provision of a wider 10-foot parking lane combined with buffered bike lane may alleviate some of the operational and safety concerns associated with introducing low-speed parking and backing maneuvers on a higher-speed street. It is also important to distinguish that this segment of Shiloh Road may not be a higher-speed roadway in the future. Prevailing vehicle speeds and the posted speed limit could reduce over time in response to land use intensification, increased multimodal activity, increased congestion, and the configuration of the roadway itself. It is quite likely that the street may at some point in the future have a reduced posted speed limit of 35 mph, on which unbuffered parallel parking generally functions acceptably.

It is recommended that a phased approach be taken with on-street parking along the project's Shiloh Road frontage, with no parking spaces provided in the near-term. In this case the parking zone would not include parking space striping and "No Parking" signs would be used. The Town could then periodically review prevailing speed and safety trends on the corridor after the Clearwater development (and potentially additional development in the area) comes online, introducing on-street parking spaces as conditions permit.

Finding – The Shiloh Road frontage improvements proposed to be constructed as part of the proposed project would be adequate.

Recommendation – Parking spaces should not be striped along the Shiloh Road project frontage in the near-term but may be implemented in the future at the discretion of the Town in consideration of safety conditions and vehicle speeds following completion of Clearwater and nearby development projects. "No Parking" signs should be installed as part of development of the project site.

Future Access Points and Need for Five-Lane Configuration

The long-term potential for future street connections and traffic controls on Shiloh Road to the east of Business Park Court was considered. Because the Clearwater development would fully utilize the new access point at Shiloh Road/Hembree Lane, and because the current Business Park Court intersection cannot be signalized given its proximity to the Hembree Lane signal, any new primary north-south street(s) serving future land use intensification along the corridor will need to be constructed east of the Clearwater site.

The Town's General Plan currently identifies Shiloh Road as a five-lane Crosstown Street between Old Redwood Highway and Skylane Boulevard. In support of the Clearwater analysis and other work for the Town of Windsor, the Sonoma County Transportation Authority (SCTA) has prepared updated year 2040 traffic forecasts using the latest SCTA travel demand model in tandem with year 2040 land use projections used in the Town's General Plan EIR. Based on the resulting modeling, there is mounting evidence that Shiloh Road may perform adequately and meet the Town's LOS D standard with a three-lane configuration between Business Park Court and Old Redwood Highway, and not need to be widened to a five-lane configuration. The corridor would, however, be expected to encounter more peak hour congestion and lower speeds with a three-lane configuration than with a five-lane configuration, and this will be an important consideration for decision-makers. While a three-lane section may move traffic more slowly, it would still perform adequately from an operational perspective, providing more space for non-auto modes, and potentially being more compatible with a "village" type environment if that vision is maintained by the Town.

Finding – Any primary new street connections serving future development along Shiloh Road between Business Park Court and Old Redwood Highway would need to be located east of the Clearwater at Windsor site.

Finding – The traffic analysis completed for the Clearwater project indicates that Shiloh Road may operate effectively with a three-lane configuration (one lane in each direction plus a center turn lane) between Business Park Court and Old Redwood Highway.

Parking

The project was analyzed to determine whether the proposed parking supply would be sufficient for the anticipated parking demand. The project site as proposed would provide a total of 361 standard parking spaces. Parking supply requirements are based on the Town of Windsor's Zoning Code 27.30.040 - Number of Parking Spaces Required. For project land use types are not directly classified in the Town's parking requirements, the closest match was applied. As shown Table 11, the proposed 376-space parking supply is anticipated to exceed the 308-space parking supply required by the Town's zoning code.

Table 11 – Parking Analysis Summary

Land Use	Units	Town Requirements		ITE Parking Generation			
		Rate per Zoning Code	Spaces Required	ITE Weekday		ITE Saturday	
				Rate[1]	Spaces	Rate[1]	Spaces
Independent Living	141 rooms	0.5 per unit plus 1 guest space per 10 units (senior housing)	85	0.46	65	0.33	47
Assisted Living	71 beds	0.5 per unit plus 1 guest/employee space per 4 units (residential care)	54	0.58	41	0.28	20
Memory Care	34 beds	1.0 per 3 beds (extended care)	12	0.51	17	0.62	21
Retail	16.42 ksf	1.0 per 200 square feet (general retail)	82	3.68	60	3.74	61
Amenity Space[2]	3.54 ksf	1.0 per 200 square feet (assume general retail)	18	3.68	13	3.74	13
Office	5.16 ksf	1.0 per 250 square feet	21	4.17	22	0.92	5
Apartments	12 units[3]	3 per unit (2 per unit plus one guest space per unit)	36	1.52	18	1.61	19
Total			**308**		**236**		**186**

Notes: ksf = 1,000 square feet; [1] 85th percentile parking demand; [2] gym/salon senior housing amenity space in Building D; [3]includes two model apartments

Parking demand was also estimated using standard rates published by ITE in *Parking Generation*, 5th Edition, 2019. The parking demand of the project was estimated for both weekdays and Saturdays using ITE's 85th percentile parking demand rates for each land use. The applied ITE land use categories include Congregate Care Facility (ITE LU #253) for the independent living units, Assisted Living (ITE LU #254), Nursing Home (ITE LU #620) for the memory care beds, Shopping Center (ITE LU #820) for retail and amenity space, Small Office Building (ITE LU #710), and Low/Mid-Rise Apartment (ITE LU #223).

Application of ITE parking demand rates indicates that the project's 85th percentile parking demand is anticipated to occur on weekdays at 236 spaces, which is lower than the proposed 361-space supply.

Note that while ITE data has shown that congregate care facilities generate a parking demand of well under one space per apartment, applying the assumption that one space per unit would be needed still translates to a total parking demand that is less than the proposed supply. Also note that there would be some potential for "shared parking" within the site that is not reflected in the calculations. Shared parking demand takes time-of-day and seasonal parking demand into account, recognizing that certain uses like office and retail encounter peak parking demand at different times, and that such efficiencies reduce the total number of spaces needed. Accordingly, the project's peak demand may be somewhat less than that estimated using the applied ITE rates.

Based on the parking analysis, it appears that the proposed project provides substantially more parking than needed to accommodate demand, particularly with respect to the senior residential, assisted living, and memory care functions. The northern portion of the assisted living/memory care areas are likely to accommodate some of the parking demand generated by non-residential uses on the site during peak periods; accordingly, these spaces are expected to be well-utilized. The remaining spaces to the south around the periphery of the residential buildings are unlikely to be fully utilized even during peak periods.

Research has found that provision of more parking than necessary to accommodate demand can have the unintended consequence of encouraging auto travel. The amount of space dedicated to parking should also be weighed against competing goals such as minimizing impervious surfaces and preservation of sensitive environmental resources.

Finding – The proposed parking supply would exceed both the Town's zoning code requirements and the anticipated 85th percentile parking demand. The Town may wish to consider requesting that the applicant reduce the onsite parking supply.

Conclusions and Recommendations

Conclusions

- The proposed project includes construction of 141 independent living units, 71 assisted living units containing 85 beds, and a 34-bed memory care unit. The mixed-use buildings are anticipated to include just under 21,000 square feet of neighborhood retail, restaurant, and senior community amenity uses on ground floors.

- Pedestrian connectivity to and from the project site would be adequate in the near-term and would improve in the future as development occurs to the east on Shiloh Road and the US 101 interchange is improved to the west. Pedestrian facilities along the project frontage would meet the requirements specified in the Town's *Complete Streets Design Guidelines*.

- Walking routes to existing SCT bus stops would be adequate upon completion of sidewalk and crossing modifications at Shiloh Road/Hembree Lane to be implemented as part of the project.

- Existing and planned bicycle facilities would provide adequate access for bicyclists traveling to and from the Clearwater at Windsor site.

- Existing public transit routes are adequate to accommodate project-generated transit trips. Existing stops are within an acceptable walking distance of the site, though given the senior population and anticipated employment, it would be beneficial to provide an additional bus stop along the project's Shiloh Road frontage between Hembree Lane and Business Park Court.

- Transit facilities serving the project site would be adequate.

- The proposed project is anticipated to generate VMT per capita and VMT per employee that are more than 15 percent below Countywide averages and would thereby result in a less-than-significant VMT impact.

- The proposed project would be expected to generate an average of 2,147 trips per day, including 141 trips during the a.m. peak hour and 198 trips during the p.m. peak hour.

- The project would generate substantially fewer trips than assumed for the site in the Town's General Plan EIR.

- The study intersections are anticipated to operate acceptably upon the addition of project-generated traffic to both existing and future volumes.

- Projected queuing at the Shiloh Road/Hembree Lane intersection may extend into the project site, and partially into the adjacent internal project drive aisle intersection. While this queuing would not present a substantial concern regarding auto safety, it may result in a pedestrian safety concern.

- The project would contribute to an adverse queuing condition in the northbound left-turn pocket at Shiloh Road/Old Redwood Highway. Collision rates for the study intersections are below statewide averages, and intersection safety is not anticipated to be adversely affected by the proposed project.

- The proposed access points on Shiloh Road are projected to operate acceptably with the proposed improvements, though turn restrictions would need to be implemented at the Shiloh Road/Business Park Court intersection.

- The queuing capacity on the connection roadway between Shiloh Road and the internal drive aisle intersection for northbound left turns to Shiloh Road would be fully utilized by Clearwater traffic, and would be unable to accommodate additional traffic from neighboring properties.

- Internal circulation on the drive aisles within the site is anticipated to function acceptably.

- The Shiloh Road frontage improvements proposed to be constructed as part of the proposed project would be adequate.

- Any primary new street connections serving future development along Shiloh Road between Business Park Court and Old Redwood Highway would need to be located east of the Clearwater at Windsor site.

- The traffic analysis completed for the Clearwater project indicates that Shiloh Road may operate effectively with a three-lane configuration (one lane in each direction plus a center turn lane) between Business Park Court and Old Redwood Highway.

- The proposed parking supply would exceed both the Town's zoning code requirements and the anticipated 85th percentile parking demand. The Town may wish to consider requesting that the applicant reduce the onsite parking supply.

Recommendations

- A pedestrian sidewalk or path should be added along the south side of the internal east-west drive aisle between the Clearwater residential building and Lot 4.

- Once site and landscaping plans are finalized, the applicant team should submit an exhibit confirming that adequate sight triangles are available at the crosswalk of the internal drive aisle intersection just south of Shiloh Road/Hembree Lane.

- The project should install buffered bike lanes along its Shiloh Road frontage to the east of Hembree Lane, including a minimum two-foot wide striped buffer separating the bike lane from adjacent vehicle lane.

- Bicycle racks should be provided near the project's commercial buildings as well as at the residential building to provide secure bike parking for employees, visitors, and customers.

- The project developer shall construct a bus stop including pullout and shelter along its Shiloh Road frontage, as required by Sonoma County Transit and specified by the Town as a condition of approval.

- Physical barriers not exceeding three feet in height should be added on the northwest and northeast corners of the internal site intersection just south of the Shiloh Road/Hembree Lane intersection, in the location where pedestrians would typically cross.

- The project should be responsible for modifying the northbound left-turn pocket striping at Shiloh Road/Old Redwood Highway to eliminate the current double-yellow line bay taper and transition the left-turn pocket striping directly into the abutting two-way left-turn lane.

- The Clearwater driveway at the Shiloh Road/Business Park Court should be restricted to right turns in and out. A raised median on Shiloh Road and raised channelization island on the Clearwater driveway would be required to restrict all left-turn movements except the eastbound left turn from Shiloh Road to Business Park Court.

- Parking spaces should not be striped along the Shiloh Road project frontage in the near term but may be implemented in the future at the discretion of the Town in consideration of safety conditions and vehicle speeds following completion of Clearwater and nearby development projects. "No Parking" signs should be installed as part of development of the project site.

Study Participants and References

Study Participants

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Assistant Planner	Jade Kim
Graphics	Cameron Wong
Editing/Formatting	Hannah Yung-Boxdell, Alex Scrobonia
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WIN150

Appendix A

Level of Service Methodologies

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Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual*, 6th Edition, Transportation Research Board, 2018. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersection with side street stop controls was analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections that are controlled by a traffic signal were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology.

The ranges of delay associated with the various levels of service are indicated in the following table.

Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	Signalized
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual,* 6th Edition, Transportation Research Board, 2018

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Appendix B

Intersection Level of Service Calculations

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HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	437	725	0	981	0	0	0	0	91	0	228
Future Volume (veh/h)	0	437	725	0	981	0	0	0	0	91	0	228
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	475	0	0	1066	0				99	0	199
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1144		0	1144	0				299	0	266
Arrive On Green	0.00	0.61	0.00	0.00	0.61	0.00				0.17	0.00	0.17
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	475	0	0	1066	0				99	0	199
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	6.1	0.0	0.0	23.6	0.0				2.2	0.0	5.5
Cycle Q Clear(g_c), s	0.0	6.1	0.0	0.0	23.6	0.0				2.2	0.0	5.5
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1144		0	1144	0				299	0	266
V/C Ratio(X)	0.00	0.42		0.00	0.93	0.00				0.33	0.00	0.75
Avail Cap(c_a), veh/h	0	1249		0	1188	0				809	0	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	4.6	0.0	0.0	8.0	0.0				16.8	0.0	18.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	12.4	0.0				0.2	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	0.0	7.9	0.0				0.8	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.9	0.0	0.0	20.4	0.0				17.0	0.0	19.7
LnGrp LOS	A	A		A	C	A				B	A	B
Approach Vol, veh/h		475	A		1066						298	
Approach Delay, s/veh		4.9			20.4						18.8	
Approach LOS		A			C						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	33.9	11.9	33.9
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	8.1	7.5	25.6
Green Ext Time (p_c), s	4.4	0.4	2.5

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



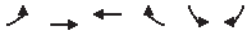
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	399	0	0	747	131	685	0	339	0	0	0
Future Volume (veh/h)	0	399	0	0	747	131	685	0	339	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	434	0	0	812	0	745	0	368			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1628	0	0	857		778	0	1219			
Arrive On Green	0.00	0.46	0.00	0.00	0.46	0.00	0.44	0.00	0.44			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	434	0	0	812	0	745	0	368			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	5.8	0.0	0.0	32.1	0.0	31.3	0.0	6.6			
Cycle Q Clear(g_c), s	0.0	5.8	0.0	0.0	32.1	0.0	31.3	0.0	6.6			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1628	0	0	857		778	0	1219			
V/C Ratio(X)	0.00	0.27	0.00	0.00	0.95		0.96	0.00	0.30			
Avail Cap(c_a), veh/h	0	1685	0	0	887		814	0	1275			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	12.9	0.0	0.0	20.0	0.0	21.0	0.0	14.1			
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	18.1	0.0	20.9	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.1	0.0	0.0	16.2	0.0	15.7	0.0	1.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.9	0.0	0.0	38.2	0.0	42.0	0.0	14.2			
LnGrp LOS	A	B	A	A	D		D	A	B			
Approach Vol, veh/h		434			812	A		1113				
Approach Delay, s/veh		12.9			38.2			32.8				
Approach LOS		B			D			C				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	39.8	39.8	37.4
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	36.6	36.6	35.3
Max Q Clear Time (g_c+I1), s	7.8	34.1	33.3
Green Ext Time (p_c), s	2.7	1.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	31.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	410	345	396	114	152	482
Future Volume (veh/h)	410	345	396	114	152	482
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	446	375	430	124	165	524
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	618	907	621	177	557	779
Arrive On Green	0.18	0.49	0.23	0.23	0.31	0.31
Sat Flow, veh/h	3456	1870	2803	773	1781	1585
Grp Volume(v), veh/h	446	375	280	274	165	524
Grp Sat Flow(s),veh/h/ln	1728	1870	1777	1705	1781	1585
Q Serve(g_s), s	4.7	5.0	5.6	5.7	2.7	9.8
Cycle Q Clear(g_c), s	4.7	5.0	5.6	5.7	2.7	9.8
Prop In Lane	1.00			0.45	1.00	1.00
Lane Grp Cap(c), veh/h	618	907	407	391	557	779
V/C Ratio(X)	0.72	0.41	0.69	0.70	0.30	0.67
Avail Cap(c_a), veh/h	2922	3417	1607	1543	1497	1616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	6.5	13.8	13.8	10.2	7.5
Incr Delay (d2), s/veh	0.6	0.2	1.5	1.7	0.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.1	1.8	1.8	0.8	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	6.7	15.3	15.5	10.3	7.9
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h		821	554		689	
Approach Delay, s/veh		11.6	15.4		8.5	
Approach LOS		B	B		A	

Timer - Assigned Phs	2		4	5	6
Phs Duration (G+Y+Rc), s	23.6		15.4	10.0	13.6
Change Period (Y+Rc), s	* 4.7		3.2	3.0	* 4.7
Max Green Setting (Gmax), s	* 71		32.8	33.0	* 35
Max Q Clear Time (g_c+I1), s	7.0		11.8	6.7	7.7
Green Ext Time (p_c), s	0.6		0.4	0.3	0.9

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	470	487	2	3	13
Future Vol, veh/h	17	470	487	2	3	13
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	511	529	2	3	14

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	533	0	-	0	1079	532
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	547	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1035	-	-	-	242	547
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1032	-	-	-	235	546
Mov Cap-2 Maneuver	-	-	-	-	235	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	578	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1032	-	-	-	437
HCM Lane V/C Ratio	0.018	-	-	-	0.04
HCM Control Delay (s)	8.6	0	-	-	13.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road 09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	114	184	46	98	20	125	176	32	32	490	223
Future Volume (veh/h)	155	114	184	46	98	20	125	176	32	32	490	223
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	124	200	50	107	22	136	191	35	35	533	242
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	320	336	277	76	162	198	207	740	612	112	640	528
Arrive On Green	0.18	0.18	0.18	0.13	0.13	0.13	0.12	0.40	0.40	0.06	0.34	0.34
Sat Flow, veh/h	1781	1870	1538	586	1255	1532	1781	1870	1546	1781	1870	1545
Grp Volume(v), veh/h	168	124	200	157	0	22	136	191	35	35	533	242
Grp Sat Flow(s),veh/h/ln	1781	1870	1538	1841	0	1532	1781	1870	1546	1781	1870	1545
Q Serve(g_s), s	6.2	4.2	8.9	5.9	0.0	0.9	5.3	5.0	1.0	1.4	18.9	8.8
Cycle Q Clear(g_c), s	6.2	4.2	8.9	5.9	0.0	0.9	5.3	5.0	1.0	1.4	18.9	8.8
Prop In Lane	1.00		1.00	0.32		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	320	336	277	238	0	198	207	740	612	112	640	528
V/C Ratio(X)	0.52	0.37	0.72	0.66	0.00	0.11	0.66	0.26	0.06	0.31	0.83	0.46
Avail Cap(c_a), veh/h	932	979	805	963	0	802	390	823	681	390	823	680
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.8	26.0	27.9	29.9	0.0	27.8	30.5	14.7	13.5	32.4	21.9	18.5
Incr Delay (d2), s/veh	1.0	0.5	2.7	2.3	0.0	0.2	2.6	0.1	0.0	1.2	5.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.8	3.2	2.6	0.0	0.3	2.2	1.8	0.3	0.6	8.3	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	26.5	30.6	32.3	0.0	28.0	33.1	14.8	13.5	33.5	27.2	19.0
LnGrp LOS	C	C	C	C	A	C	C	B	B	C	C	B
Approach Vol, veh/h		492			179			362			810	
Approach Delay, s/veh		28.6			31.7			21.6			25.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		17.2	12.6	28.9		13.5	8.7	32.8				
Change Period (Y+Rc), s		* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s		* 38	* 16	* 32		37.8	* 16	* 32				
Max Q Clear Time (g_c+I1), s		10.9	7.3	20.9		7.9	3.4	7.0				
Green Ext Time (p_c), s		1.6	0.1	3.6		1.1	0.0	1.3				

Intersection Summary	
HCM 6th Ctrl Delay	26.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	590	651	0	886	0	0	0	0	221	0	100
Future Volume (veh/h)	0	590	651	0	886	0	0	0	0	221	0	100
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	641	0	0	963	0				240	0	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1102		0	1102	0				314	0	279
Arrive On Green	0.00	0.59	0.00	0.00	0.59	0.00				0.18	0.00	0.18
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	641	0	0	963	0				240	0	44
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	9.2	0.0	0.0	18.8	0.0				5.5	0.0	1.0
Cycle Q Clear(g_c), s	0.0	9.2	0.0	0.0	18.8	0.0				5.5	0.0	1.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1102		0	1102	0				314	0	279
V/C Ratio(X)	0.00	0.58		0.00	0.87	0.00				0.76	0.00	0.16
Avail Cap(c_a), veh/h	0	1330		0	1264	0				861	0	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.5	0.0	0.0	7.5	0.0				16.9	0.0	15.0
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.0	5.8	0.0				1.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	0.0	0.0	4.9	0.0				1.9	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.0	0.0	0.0	13.3	0.0				18.3	0.0	15.1
LnGrp LOS	A	A		A	B	A				B	A	B
Approach Vol, veh/h		641	A		963						284	
Approach Delay, s/veh		6.0			13.3						17.8	
Approach LOS		A			B						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	31.3	11.8	31.3
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	11.2	7.5	20.8
Green Ext Time (p_c), s	6.1	0.3	4.6

Intersection Summary	
HCM 6th Ctrl Delay	11.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	610	0	0	709	251	617	0	665	0	0	0
Future Volume (veh/h)	0	610	0	0	709	251	617	0	665	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	629	0	0	731	0	636	0	686			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1627	0	0	856		709	0	1110			
Arrive On Green	0.00	0.46	0.00	0.00	0.46	0.00	0.40	0.00	0.40			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	629	0	0	731	0	636	0	686			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	6.5	0.0	0.0	19.5	0.0	18.8	0.0	11.0			
Cycle Q Clear(g_c), s	0.0	6.5	0.0	0.0	19.5	0.0	18.8	0.0	11.0			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1627	0	0	856		709	0	1110			
V/C Ratio(X)	0.00	0.39	0.00	0.00	0.85		0.90	0.00	0.62			
Avail Cap(c_a), veh/h	0	2315	0	0	1218		1119	0	1753			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	10.0	0.0	0.0	13.6	0.0	15.8	0.0	13.5			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	3.1	0.0	4.2	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.0	0.0	0.0	6.9	0.0	6.8	0.0	2.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.1	0.0	0.0	16.6	0.0	20.0	0.0	13.7			
LnGrp LOS	A	B	A	A	B		C	A	B			
Approach Vol, veh/h		629			731	A		1322				
Approach Delay, s/veh		10.1			16.6			16.7				
Approach LOS		B			B			B				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	30.1	30.1	26.1
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	36.6	36.6	35.3
Max Q Clear Time (g_c+I1), s	8.5	21.5	20.8
Green Ext Time (p_c), s	4.2	4.2	1.6

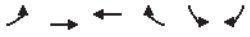
Intersection Summary	
HCM 6th Ctrl Delay	15.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	843	454	319	174	235	637
Future Volume (veh/h)	843	454	319	174	235	637
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	906	488	343	187	253	685
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1014	1018	449	239	586	986
Arrive On Green	0.29	0.54	0.20	0.20	0.33	0.33
Sat Flow, veh/h	3456	1870	2308	1180	1781	1585
Grp Volume(v), veh/h	906	488	274	256	253	685
Grp Sat Flow(s),veh/h/ln	1728	1870	1777	1617	1781	1585
Q Serve(g_s), s	15.6	10.0	9.0	9.3	6.9	17.9
Cycle Q Clear(g_c), s	15.6	10.0	9.0	9.3	6.9	17.9
Prop In Lane	1.00			0.73	1.00	1.00
Lane Grp Cap(c), veh/h	1014	1018	360	328	586	986
V/C Ratio(X)	0.89	0.48	0.76	0.78	0.43	0.69
Avail Cap(c_a), veh/h	1832	2143	1008	917	939	1300
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	8.7	23.4	23.5	16.3	7.8
Incr Delay (d2), s/veh	1.2	0.3	2.5	3.1	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	3.1	3.6	3.5	2.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.2	9.0	25.8	26.5	16.5	8.4
LnGrp LOS	C	A	C	C	B	A
Approach Vol, veh/h		1394	530		938	
Approach Delay, s/veh		17.6	26.2		10.6	
Approach LOS		B	C		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		38.6		23.7	21.3	17.3
Change Period (Y+Rc), s		* 4.7		3.2	3.0	* 4.7
Max Green Setting (Gmax), s		* 71		32.8	33.0	* 35
Max Q Clear Time (g_c+I1), s		12.0		19.9	17.6	11.3
Green Ext Time (p_c), s		0.8		0.6	0.6	0.9

Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	629	424	8	11	30
Future Vol, veh/h	27	629	424	8	11	30
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	676	456	9	12	32

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	467	0	-	0	1197	463
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	734	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1094	-	-	-	205	599
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	475	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1091	-	-	-	195	597
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	474	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1091	-	-	-	384
HCM Lane V/C Ratio	0.027	-	-	-	0.115
HCM Control Delay (s)	8.4	0	-	-	15.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road 09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	231	83	356	48	82	28	205	401	21	16	372	149
Future Volume (veh/h)	231	83	356	48	82	28	205	401	21	16	372	149
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	238	86	367	49	85	29	211	413	22	16	384	154
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	495	520	429	78	136	178	251	680	562	60	479	395
Arrive On Green	0.28	0.28	0.28	0.12	0.12	0.12	0.14	0.36	0.36	0.03	0.26	0.26
Sat Flow, veh/h	1781	1870	1544	672	1165	1530	1781	1870	1546	1781	1870	1543
Grp Volume(v), veh/h	238	86	367	134	0	29	211	413	22	16	384	154
Grp Sat Flow(s),veh/h/ln	1781	1870	1544	1837	0	1530	1781	1870	1546	1781	1870	1543
Q Serve(g_s), s	9.0	2.8	18.2	5.6	0.0	1.4	9.3	14.5	0.7	0.7	15.5	6.7
Cycle Q Clear(g_c), s	9.0	2.8	18.2	5.6	0.0	1.4	9.3	14.5	0.7	0.7	15.5	6.7
Prop In Lane	1.00		1.00	0.37		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	495	520	429	214	0	178	251	680	562	60	479	395
V/C Ratio(X)	0.48	0.17	0.86	0.63	0.00	0.16	0.84	0.61	0.04	0.27	0.80	0.39
Avail Cap(c_a), veh/h	835	877	724	861	0	717	349	738	610	349	738	608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	22.0	27.6	33.9	0.0	32.1	33.7	21.0	16.6	38.0	28.1	24.8
Incr Delay (d2), s/veh	0.5	0.1	4.0	2.2	0.0	0.3	11.0	1.1	0.0	1.7	2.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	1.2	6.5	2.5	0.0	0.5	4.5	5.9	0.2	0.3	6.8	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	22.1	31.6	36.2	0.0	32.4	44.7	22.0	16.6	39.7	31.0	25.3
LnGrp LOS	C	C	C	D	A	C	D	C	B	D	C	C
Approach Vol, veh/h		691			163			646			554	
Approach Delay, s/veh		28.1			35.5			29.3			29.6	
Approach LOS		C			D			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.6	15.6	24.8		13.6	6.9	33.5				
Change Period (Y+Rc), s		* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s		* 38	* 16	* 32		37.8	* 16	* 32				
Max Q Clear Time (g_c+I1), s		20.2	11.3	17.5		7.6	2.7	16.5				
Green Ext Time (p_c), s		1.9	0.2	2.8		1.0	0.0	2.6				

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	445	725	0	987	0	0	0	0	108	0	228
Future Volume (veh/h)	0	445	725	0	987	0	0	0	0	108	0	228
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	484	0	0	1073	0				117	0	199
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1145		0	1145	0				300	0	267
Arrive On Green	0.00	0.61	0.00	0.00	0.61	0.00				0.17	0.00	0.17
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	484	0	0	1073	0				117	0	199
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	6.2	0.0	0.0	24.1	0.0				2.7	0.0	5.5
Cycle Q Clear(g_c), s	0.0	6.2	0.0	0.0	24.1	0.0				2.7	0.0	5.5
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1145		0	1145	0				300	0	267
V/C Ratio(X)	0.00	0.42		0.00	0.94	0.00				0.39	0.00	0.74
Avail Cap(c_a), veh/h	0	1242		0	1181	0				804	0	715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	4.7	0.0	0.0	8.1	0.0				17.0	0.0	18.2
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	13.3	0.0				0.3	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	0.0	8.3	0.0				0.9	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.9	0.0	0.0	21.4	0.0				17.4	0.0	19.8
LnGrp LOS	A	A		A	C	A				B	A	B
Approach Vol, veh/h		484	A		1073						316	
Approach Delay, s/veh		4.9			21.4						18.9	
Approach LOS		A			C						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	34.1	12.0	34.1
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	8.2	7.5	26.1
Green Ext Time (p_c), s	4.5	0.4	2.2

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	424	0	0	773	144	685	0	367	0	0	0
Future Volume (veh/h)	0	424	0	0	773	144	685	0	367	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	461	0	0	840	0	745	0	399			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1643	0	0	865		775	0	1214			
Arrive On Green	0.00	0.46	0.00	0.00	0.46	0.00	0.44	0.00	0.44			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	461	0	0	840	0	745	0	399			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	6.3	0.0	0.0	34.7	0.0	32.1	0.0	7.5			
Cycle Q Clear(g_c), s	0.0	6.3	0.0	0.0	34.7	0.0	32.1	0.0	7.5			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1643	0	0	865		775	0	1214			
V/C Ratio(X)	0.00	0.28	0.00	0.00	0.97		0.96	0.00	0.33			
Avail Cap(c_a), veh/h	0	1643	0	0	865		794	0	1244			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	13.1	0.0	0.0	20.8	0.0	21.7	0.0	14.7			
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	23.6	0.0	22.3	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.2	0.0	0.0	18.6	0.0	16.4	0.0	2.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.2	0.0	0.0	44.3	0.0	44.0	0.0	14.8			
LnGrp LOS	A	B	A	A	D		D	A	B			
Approach Vol, veh/h		461			840	A		1144				
Approach Delay, s/veh		13.2			44.3			33.8				
Approach LOS		B			D			C				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	41.0	41.0	38.1
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	36.6	36.6	35.3
Max Q Clear Time (g_c+I1), s	8.3	36.7	34.1
Green Ext Time (p_c), s	2.9	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	33.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	410	359	38	22	396	114	39	7	11	152	9	482
Future Volume (veh/h)	410	359	38	22	396	114	39	7	11	152	9	482
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	446	390	41	24	430	124	42	8	12	165	10	524
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	564	790	670	330	565	161	97	37	55	523	32	744
Arrive On Green	0.16	0.42	0.42	0.21	0.21	0.21	0.05	0.05	0.05	0.31	0.31	0.31
Sat Flow, veh/h	3456	1870	1585	994	2716	775	1781	675	1013	1684	102	1564
Grp Volume(v), veh/h	446	390	41	24	280	274	42	0	20	175	0	524
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	994	1777	1715	1781	0	1688	1786	0	1564
Q Serve(g_s), s	7.2	8.9	0.9	1.1	8.6	8.8	1.3	0.0	0.7	4.4	0.0	15.5
Cycle Q Clear(g_c), s	7.2	8.9	0.9	1.1	8.6	8.8	1.3	0.0	0.7	4.4	0.0	15.5
Prop In Lane	1.00		1.00	1.00		0.45	1.00		0.60	0.94		1.00
Lane Grp Cap(c), veh/h	564	790	670	330	370	357	97	0	92	555	0	744
V/C Ratio(X)	0.79	0.49	0.06	0.07	0.76	0.77	0.43	0.00	0.22	0.32	0.00	0.70
Avail Cap(c_a), veh/h	1953	2284	1936	724	1074	1037	549	0	520	1003	0	1137
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	12.3	10.0	18.8	21.7	21.8	26.7	0.0	26.4	15.4	0.0	12.2
Incr Delay (d2), s/veh	1.0	0.4	0.0	0.1	2.4	2.6	3.0	0.0	1.2	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.1	0.3	0.2	3.4	3.4	0.6	0.0	0.3	1.6	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	12.7	10.0	18.8	24.1	24.4	29.8	0.0	27.6	15.5	0.0	12.6
LnGrp LOS	C	B	B	B	C	C	C	A	C	B	A	B
Approach Vol, veh/h		877			578			62			699	
Approach Delay, s/veh		18.5			24.0			29.1			13.3	
Approach LOS		B			C			C			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	29.4	21.3	12.5	16.8	7.7
Change Period (Y+Rc), s	* 4.7	3.2	3.0	* 4.7	4.5
Max Green Setting (Gmax), s	* 71	32.8	33.0	* 35	18.0
Max Q Clear Time (g_c+I1), s	10.9	17.5	9.2	10.8	3.3
Green Ext Time (p_c), s	0.7	0.7	0.3	1.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	484	14	0	506	2	0	0	3	0	0	16
Future Vol, veh/h	17	484	14	0	506	2	0	0	3	0	0	16
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	140	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	526	15	0	550	2	0	0	3	0	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	554	0	0	-	-	0	-	-	534	1123	1130	553
Stage 1	-	-	-	-	-	-	-	-	-	553	553	-
Stage 2	-	-	-	-	-	-	-	-	-	570	577	-
Critical Hdwy	4.12	-	-	-	-	-	-	-	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	-	-	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1016	-	-	0	-	-	0	0	546	183	204	533
Stage 1	-	-	-	0	-	-	0	0	-	517	514	-
Stage 2	-	-	-	0	-	-	0	0	-	506	502	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1014	-	-	-	-	-	-	-	546	179	200	532
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	179	200	-
Stage 1	-	-	-	-	-	-	-	-	-	507	513	-
Stage 2	-	-	-	-	-	-	-	-	-	494	493	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	11.6	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	546	1014	-	-	-	-	532
HCM Lane V/C Ratio	0.006	0.018	-	-	-	-	0.033
HCM Control Delay (s)	11.6	8.6	-	-	-	-	12
HCM Lane LOS	B	A	-	-	-	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	-	-	0.1

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road 09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	115	192	46	99	20	136	176	32	32	490	230
Future Volume (veh/h)	160	115	192	46	99	20	136	176	32	32	490	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	125	209	50	108	22	148	191	35	35	533	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	329	346	285	75	163	198	208	738	610	111	637	526
Arrive On Green	0.18	0.18	0.18	0.13	0.13	0.13	0.12	0.39	0.39	0.06	0.34	0.34
Sat Flow, veh/h	1781	1870	1539	583	1259	1532	1781	1870	1546	1781	1870	1545
Grp Volume(v), veh/h	174	125	209	158	0	22	148	191	35	35	533	250
Grp Sat Flow(s),veh/h/ln	1781	1870	1539	1841	0	1532	1781	1870	1546	1781	1870	1545
Q Serve(g_s), s	6.5	4.3	9.4	6.0	0.0	0.9	5.9	5.1	1.0	1.4	19.3	9.3
Cycle Q Clear(g_c), s	6.5	4.3	9.4	6.0	0.0	0.9	5.9	5.1	1.0	1.4	19.3	9.3
Prop In Lane	1.00		1.00	0.32		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	346	285	238	0	198	208	738	610	111	637	526
V/C Ratio(X)	0.53	0.36	0.73	0.66	0.00	0.11	0.71	0.26	0.06	0.31	0.84	0.48
Avail Cap(c_a), veh/h	917	963	792	948	0	789	383	810	670	383	810	669
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.0	26.1	28.2	30.4	0.0	28.2	31.3	15.0	13.8	32.9	22.3	19.1
Incr Delay (d2), s/veh	1.0	0.5	2.7	2.4	0.0	0.2	3.4	0.1	0.0	1.2	5.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	1.8	3.4	2.6	0.0	0.3	2.5	1.9	0.3	0.6	8.6	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	26.6	31.0	32.8	0.0	28.4	34.6	15.1	13.8	34.1	28.1	19.6
LnGrp LOS	C	C	C	C	A	C	C	B	B	C	C	B
Approach Vol, veh/h		508			180			374			818	
Approach Delay, s/veh		28.9			32.3			22.7			25.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	2	3	4		6	7	8					
Phs Duration (G+Y+Rc), s	17.8	12.8	29.2		13.7	8.8	33.2					
Change Period (Y+Rc), s	* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2					
Max Green Setting (Gmax), s	* 38	* 16	* 32		37.8	* 16	* 32					
Max Q Clear Time (g_c+I1), s	11.4	7.9	21.3		8.0	3.4	7.1					
Green Ext Time (p_c), s	1.7	0.2	3.5		1.2	0.0	1.3					

Intersection Summary		
HCM 6th Ctrl Delay	26.6	
HCM 6th LOS	C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	600	651	0	896	0	0	0	0	242	0	100
Future Volume (veh/h)	0	600	651	0	896	0	0	0	0	242	0	100
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	652	0	0	974	0				263	0	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1095		0	1095	0				337	0	299
Arrive On Green	0.00	0.59	0.00	0.00	0.59	0.00				0.19	0.00	0.19
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	652	0	0	974	0				263	0	44
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	9.9	0.0	0.0	20.2	0.0				6.3	0.0	1.0
Cycle Q Clear(g_c), s	0.0	9.9	0.0	0.0	20.2	0.0				6.3	0.0	1.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1095		0	1095	0				337	0	299
V/C Ratio(X)	0.00	0.60		0.00	0.89	0.00				0.78	0.00	0.15
Avail Cap(c_a), veh/h	0	1279		0	1217	0				828	0	737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.9	0.0	0.0	8.0	0.0				17.3	0.0	15.1
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.0	7.3	0.0				1.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.0	0.0	0.0	5.9	0.0				2.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.5	0.0	0.0	15.3	0.0				18.8	0.0	15.2
LnGrp LOS	A	A		A	B	A				B	A	B
Approach Vol, veh/h		652	A		974						307	
Approach Delay, s/veh		6.5			15.3						18.3	
Approach LOS		A			B						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	32.1	12.7	32.1
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	11.9	8.3	22.2
Green Ext Time (p_c), s	6.1	0.4	4.0

Intersection Summary	
HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	640	0	0	753	272	617	0	698	0	0	0
Future Volume (veh/h)	0	640	0	0	753	272	617	0	698	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	660	0	0	776	0	636	0	720			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1678	0	0	883		704	0	1102			
Arrive On Green	0.00	0.47	0.00	0.00	0.47	0.00	0.39	0.00	0.39			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	660	0	0	776	0	636	0	720			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	7.3	0.0	0.0	22.8	0.0	20.5	0.0	12.8			
Cycle Q Clear(g_c), s	0.0	7.3	0.0	0.0	22.8	0.0	20.5	0.0	12.8			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1678	0	0	883		704	0	1102			
V/C Ratio(X)	0.00	0.39	0.00	0.00	0.88		0.90	0.00	0.65			
Avail Cap(c_a), veh/h	0	2131	0	0	1122		1030	0	1613			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	10.4	0.0	0.0	14.5	0.0	17.4	0.0	15.1			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	5.8	0.0	6.2	0.0	0.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	2.3	0.0	0.0	8.9	0.0	8.1	0.0	3.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.5	0.0	0.0	20.3	0.0	23.6	0.0	15.3			
LnGrp LOS	A	B	A	A	C		C	A	B			
Approach Vol, veh/h		660			776	A		1356				
Approach Delay, s/veh		10.5			20.3			19.2				
Approach LOS		B			C			B				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	33.2	33.2	27.8
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	36.6	36.6	35.3
Max Q Clear Time (g_c+I1), s	9.3	24.8	22.5
Green Ext Time (p_c), s	4.4	4.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	843	474	44	35	319	174	65	11	15	235	11	637
Future Volume (veh/h)	843	474	44	35	319	174	65	11	15	235	11	637
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	906	510	48	38	343	187	71	12	16	253	12	685
Peak Hour Factor	0.93	0.93	0.92	0.92	0.93	0.93	0.92	0.92	0.92	0.93	0.92	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	969	928	786	237	414	221	102	42	55	552	26	951
Arrive On Green	0.28	0.50	0.50	0.19	0.19	0.19	0.06	0.06	0.06	0.32	0.32	0.32
Sat Flow, veh/h	3456	1870	1585	890	2223	1186	1781	727	969	1704	81	1564
Grp Volume(v), veh/h	906	510	48	38	273	257	71	0	28	265	0	685
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	890	1777	1632	1781	0	1696	1785	0	1564
Q Serve(g_s), s	25.9	19.1	1.6	3.7	14.9	15.4	4.0	0.0	1.6	11.9	0.0	31.2
Cycle Q Clear(g_c), s	25.9	19.1	1.6	3.7	14.9	15.4	4.0	0.0	1.6	11.9	0.0	31.2
Prop In Lane	1.00		1.00	1.00		0.73	1.00		0.57	0.95		1.00
Lane Grp Cap(c), veh/h	969	928	786	237	331	304	102	0	97	579	0	951
V/C Ratio(X)	0.94	0.55	0.06	0.16	0.82	0.85	0.70	0.00	0.29	0.46	0.00	0.72
Avail Cap(c_a), veh/h	1127	1318	1117	382	620	569	317	0	302	579	0	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.5	17.7	13.2	35.0	39.6	39.8	46.8	0.0	45.7	27.1	0.0	14.1
Incr Delay (d2), s/veh	12.1	0.4	0.0	0.2	3.9	4.9	8.3	0.0	1.6	0.2	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.0	7.7	0.5	0.8	6.7	6.4	2.0	0.0	0.7	5.0	0.0	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.7	18.0	13.3	35.2	43.5	44.7	55.1	0.0	47.4	27.3	0.0	16.4
LnGrp LOS	D	B	B	D	D	D	E	A	D	C	A	B
Approach Vol, veh/h		1464			568			99			950	
Approach Delay, s/veh		36.2			43.5			52.9			19.5	
Approach LOS		D			D			D			B	

Timer - Assigned Phs	2	4	5	6	8
Phs Duration (G+Y+Rc), s	54.9	36.0	31.4	23.5	10.3
Change Period (Y+Rc), s	* 4.7	3.2	3.0	* 4.7	4.5
Max Green Setting (Gmax), s	* 71	32.8	33.0	* 35	18.0
Max Q Clear Time (g_c+I1), s	21.1	33.2	27.9	17.4	6.0
Green Ext Time (p_c), s	1.0	0.0	0.5	1.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	32.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	655	20	0	448	8	0	0	9	0	0	41
Future Vol, veh/h	27	655	20	0	448	8	0	0	9	0	0	41
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	140	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	92	92	93	93	92	92	92	93	92	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	704	22	0	482	9	0	0	10	0	0	44

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	493	0	0	-	-	0	-	-	715	1262	1273	489
Stage 1	-	-	-	-	-	-	-	-	-	489	489	-
Stage 2	-	-	-	-	-	-	-	-	-	773	784	-
Critical Hdwy	4.12	-	-	-	-	-	-	-	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	-	-	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1071	-	-	0	-	-	0	0	431	147	167	579
Stage 1	-	-	-	0	-	-	0	0	-	561	549	-
Stage 2	-	-	-	0	-	-	0	0	-	392	404	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1069	-	-	-	-	-	-	-	431	140	162	578
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	140	162	-
Stage 1	-	-	-	-	-	-	-	-	-	545	548	-
Stage 2	-	-	-	-	-	-	-	-	-	373	393	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	13.5	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	431	1069	-	-	-	-	578
HCM Lane V/C Ratio	0.023	0.027	-	-	-	-	0.076
HCM Control Delay (s)	13.5	8.5	-	-	-	-	11.7
HCM Lane LOS	B	A	-	-	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	-	-	0.2

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road 09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	84	370	48	83	28	219	401	21	16	372	158
Future Volume (veh/h)	240	84	370	48	83	28	219	401	21	16	372	158
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	247	87	381	49	86	29	226	413	22	16	384	163
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	508	533	440	75	132	172	265	690	570	59	474	391
Arrive On Green	0.29	0.29	0.29	0.11	0.11	0.11	0.15	0.37	0.37	0.03	0.25	0.25
Sat Flow, veh/h	1781	1870	1544	667	1170	1529	1781	1870	1546	1781	1870	1543
Grp Volume(v), veh/h	247	87	381	135	0	29	226	413	22	16	384	163
Grp Sat Flow(s),veh/h/ln	1781	1870	1544	1837	0	1529	1781	1870	1546	1781	1870	1543
Q Serve(g_s), s	9.7	2.9	19.7	5.9	0.0	1.4	10.4	15.0	0.8	0.7	16.2	7.4
Cycle Q Clear(g_c), s	9.7	2.9	19.7	5.9	0.0	1.4	10.4	15.0	0.8	0.7	16.2	7.4
Prop In Lane	1.00		1.00	0.36		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	508	533	440	207	0	172	265	690	570	59	474	391
V/C Ratio(X)	0.49	0.16	0.87	0.65	0.00	0.17	0.85	0.60	0.04	0.27	0.81	0.42
Avail Cap(c_a), veh/h	802	842	695	827	0	689	335	708	586	335	708	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	22.5	28.5	35.7	0.0	33.7	34.9	21.5	17.0	39.6	29.4	26.2
Incr Delay (d2), s/veh	0.5	0.1	5.8	2.6	0.0	0.3	14.7	1.2	0.0	1.8	3.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	1.2	7.3	2.7	0.0	0.5	5.3	6.1	0.3	0.3	7.3	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	22.6	34.3	38.2	0.0	34.0	49.6	22.6	17.0	41.4	33.0	26.7
LnGrp LOS	C	C	C	D	A	C	D	C	B	D	C	C
Approach Vol, veh/h		715			164			661			563	
Approach Delay, s/veh		29.8			37.5			31.7			31.4	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	2	3	4		6	7	8					
Phs Duration (G+Y+Rc), s	28.1	16.7	25.5		13.7	7.0	35.1					
Change Period (Y+Rc), s	* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2					
Max Green Setting (Gmax), s	* 38	* 16	* 32		37.8	* 16	* 32					
Max Q Clear Time (g_c+I1), s	21.7	12.4	18.2		7.9	2.7	17.0					
Green Ext Time (p_c), s	2.0	0.1	2.7		1.0	0.0	2.6					

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	521	782	0	1034	0	0	0	0	101	0	240
Future Volume (veh/h)	0	521	782	0	1034	0	0	0	0	101	0	240
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	548	0	0	1088	0				106	0	206
Peak Hour Factor	0.95	0.95	0.95	0.92	0.95	0.95				0.95	0.92	0.95
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1145		0	1145	0				307	0	273
Arrive On Green	0.00	0.61	0.00	0.00	0.61	0.00				0.17	0.00	0.17
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	548	0	0	1088	0				106	0	206
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	7.5	0.0	0.0	25.2	0.0				2.4	0.0	5.8
Cycle Q Clear(g_c), s	0.0	7.5	0.0	0.0	25.2	0.0				2.4	0.0	5.8
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1145		0	1145	0				307	0	273
V/C Ratio(X)	0.00	0.48		0.00	0.95	0.00				0.35	0.00	0.76
Avail Cap(c_a), veh/h	0	1224		0	1164	0				792	0	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.0	0.0	0.0	8.4	0.0				17.0	0.0	18.4
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	15.6	0.0				0.2	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.4	0.0	0.0	9.4	0.0				0.9	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.3	0.0	0.0	24.1	0.0				17.3	0.0	20.0
LnGrp LOS	A	A		A	C	A				B	A	C
Approach Vol, veh/h		548	A		1088						312	
Approach Delay, s/veh		5.3			24.1						19.1	
Approach LOS		A			C						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	34.5	12.2	34.5
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	9.5	7.8	27.2
Green Ext Time (p_c), s	5.2	0.4	1.4

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	497	0	0	916	229	722	0	477	0	0	0
Future Volume (veh/h)	0	497	0	0	916	229	722	0	477	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	523	0	0	964	0	760	0	502			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1798	0	0	946		736	0	1152			
Arrive On Green	0.00	0.51	0.00	0.00	0.51	0.00	0.41	0.00	0.41			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	523	0	0	964	0	760	0	502			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	8.5	0.0	0.0	50.6	0.0	41.3	0.0	12.9			
Cycle Q Clear(g_c), s	0.0	8.5	0.0	0.0	50.6	0.0	41.3	0.0	12.9			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1798	0	0	946		736	0	1152			
V/C Ratio(X)	0.00	0.29	0.00	0.00	1.02		1.03	0.00	0.44			
Avail Cap(c_a), veh/h	0	1798	0	0	946		736	0	1152			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	14.3	0.0	0.0	24.7	0.0	29.4	0.0	21.0			
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	34.0	0.0	42.0	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	3.2	0.0	0.0	28.8	0.0	24.8	0.0	4.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	14.3	0.0	0.0	58.7	0.0	71.3	0.0	21.1			
LnGrp LOS	A	B	A	A	F		F	A	C			
Approach Vol, veh/h		523			964	A		1262				
Approach Delay, s/veh		14.3			58.7			51.3				
Approach LOS		B			E			D				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	55.0	55.0	45.0
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	50.6	50.6	41.3
Max Q Clear Time (g_c+I1), s	10.5	52.6	43.3
Green Ext Time (p_c), s	3.5	0.0	0.0

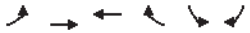
Intersection Summary	
HCM 6th Ctrl Delay	46.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	432	595	649	120	223	508
Future Volume (veh/h)	432	595	649	120	223	508
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	455	626	683	126	235	535
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	597	979	858	158	557	769
Arrive On Green	0.17	0.52	0.29	0.29	0.31	0.31
Sat Flow, veh/h	3456	1870	3069	548	1781	1585
Grp Volume(v), veh/h	455	626	408	401	235	535
Grp Sat Flow(s),veh/h/ln	1728	1870	1777	1747	1781	1585
Q Serve(g_s), s	6.0	11.6	10.2	10.2	5.0	12.6
Cycle Q Clear(g_c), s	6.0	11.6	10.2	10.2	5.0	12.6
Prop In Lane	1.00			0.31	1.00	1.00
Lane Grp Cap(c), veh/h	597	979	512	504	557	769
V/C Ratio(X)	0.76	0.64	0.80	0.80	0.42	0.70
Avail Cap(c_a), veh/h	2366	2767	1302	1280	1212	1353
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	8.2	15.8	15.8	13.1	9.6
Incr Delay (d2), s/veh	0.8	0.5	2.1	2.2	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	3.0	3.6	3.5	1.7	10.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.8	8.8	18.0	18.0	13.3	10.1
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		1081	809		770	
Approach Delay, s/veh		13.4	18.0		11.0	
Approach LOS		B	B		B	

Timer - Assigned Phs	2		4	5	6
Phs Duration (G+Y+Rc), s	29.9		18.3	11.3	18.6
Change Period (Y+Rc), s	* 4.7		3.2	3.0	* 4.7
Max Green Setting (Gmax), s	* 71		32.8	33.0	* 35
Max Q Clear Time (g_c+I1), s	13.6		14.6	8.0	12.2
Green Ext Time (p_c), s	1.1		0.4	0.3	1.4

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	801	752	6	8	31
Future Vol, veh/h	27	801	752	6	8	31
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	843	792	6	8	33

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	800	0	-	0	1696	797
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	899	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	823	-	-	-	102	387
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	821	-	-	-	95	386
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	396	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	23.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	821	-	-	-	237
HCM Lane V/C Ratio	0.035	-	-	-	0.173
HCM Control Delay (s)	9.5	0	-	-	23.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	120	258	55	106	21	189	267	40	34	579	239
Future Volume (veh/h)	187	120	258	55	106	21	189	267	40	34	579	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	197	126	272	58	112	22	199	281	42	36	609	252
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	395	415	335	86	166	203	214	772	631	102	654	534
Arrive On Green	0.22	0.22	0.22	0.14	0.14	0.14	0.12	0.41	0.41	0.06	0.35	0.35
Sat Flow, veh/h	1781	1870	1510	627	1212	1483	1781	1870	1530	1781	1870	1526
Grp Volume(v), veh/h	197	126	272	170	0	22	199	281	42	36	609	252
Grp Sat Flow(s),veh/h/ln	1781	1870	1510	1839	0	1483	1781	1870	1530	1781	1870	1526
Q Serve(g_s), s	9.5	5.5	16.8	8.6	0.0	1.3	10.9	10.2	1.6	1.9	30.8	12.6
Cycle Q Clear(g_c), s	9.5	5.5	16.8	8.6	0.0	1.3	10.9	10.2	1.6	1.9	30.8	12.6
Prop In Lane	1.00		1.00	0.34		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	395	415	335	252	0	203	214	772	631	102	654	534
V/C Ratio(X)	0.50	0.30	0.81	0.67	0.00	0.11	0.93	0.36	0.07	0.35	0.93	0.47
Avail Cap(c_a), veh/h	700	735	593	693	0	559	214	772	631	163	682	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.4	31.9	36.3	40.3	0.0	37.1	42.8	19.9	17.4	44.5	30.8	24.9
Incr Delay (d2), s/veh	0.7	0.3	3.6	2.3	0.0	0.2	42.1	0.2	0.0	1.5	18.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	2.5	6.2	3.9	0.0	0.5	7.1	4.2	0.5	0.9	16.4	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	32.2	39.9	42.6	0.0	37.3	84.9	20.1	17.4	46.1	49.6	25.3
LnGrp LOS	C	C	D	D	A	D	F	C	B	D	D	C
Approach Vol, veh/h		595			192			522			897	
Approach Delay, s/veh		36.4			42.0			44.6			42.7	
Approach LOS		D			D			D			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.0	16.0	38.6		17.7	9.8	44.7				
Change Period (Y+Rc), s		* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s		* 39	* 12	* 36		37.0	* 9	* 39				
Max Q Clear Time (g_c+I1), s		18.8	12.9	32.8		10.6	3.9	12.2				
Green Ext Time (p_c), s		1.9	0.0	1.5		1.2	0.0	2.0				

Intersection Summary	
HCM 6th Ctrl Delay	41.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
50: Old Redwood Highway & Shiloh Road (improved)

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	120	258	55	106	21	189	267	40	34	579	239
Future Volume (veh/h)	187	120	258	55	106	21	189	267	40	34	579	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	197	126	272	58	112	22	199	281	42	36	609	252
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	367	518	83	158	31	243	880	728	113	743	833
Arrive On Green	0.14	0.20	0.20	0.05	0.10	0.10	0.14	0.47	0.47	0.06	0.40	0.40
Sat Flow, veh/h	1781	1870	1539	1781	1508	296	1781	1870	1548	1781	1870	1546
Grp Volume(v), veh/h	197	126	272	58	0	134	199	281	42	36	609	252
Grp Sat Flow(s),veh/h/ln	1781	1870	1539	1781	0	1804	1781	1870	1548	1781	1870	1546
Q Serve(g_s), s	8.1	4.4	10.8	2.4	0.0	5.4	8.2	7.0	1.1	1.5	21.9	6.8
Cycle Q Clear(g_c), s	8.1	4.4	10.8	2.4	0.0	5.4	8.2	7.0	1.1	1.5	21.9	6.8
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	246	367	518	83	0	189	243	880	728	113	743	833
V/C Ratio(X)	0.80	0.34	0.52	0.70	0.00	0.71	0.82	0.32	0.06	0.32	0.82	0.30
Avail Cap(c_a), veh/h	576	928	980	171	0	484	469	1485	1228	213	1216	1224
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	26.1	20.3	35.3	0.0	32.5	31.6	12.4	10.8	33.7	20.3	9.7
Incr Delay (d2), s/veh	4.5	0.4	0.6	7.6	0.0	3.6	5.1	0.2	0.0	1.2	1.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	1.9	3.5	1.2	0.0	2.4	3.6	2.5	0.3	0.6	8.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.9	26.5	21.0	42.9	0.0	36.2	36.6	12.6	10.9	34.9	22.0	9.9
LnGrp LOS	D	C	C	D	A	D	D	B	B	C	C	A
Approach Vol, veh/h		595			192			522			897	
Approach Delay, s/veh		27.1			38.2			21.6			19.1	
Approach LOS		C			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	19.0	14.5	34.1	14.6	12.1	9.0	39.6				
Change Period (Y+Rc), s	4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s	7.3	* 37	* 20	* 49	* 24	* 20	* 9	* 60				
Max Q Clear Time (g_c+I1), s	4.5	12.8	10.2	23.9	10.1	7.4	3.5	9.0				
Green Ext Time (p_c), s	0.0	1.5	0.3	6.0	0.3	0.6	0.0	2.2				

Intersection Summary	
HCM 6th Ctrl Delay	23.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	683	686	0	993	0	0	0	0	306	0	124
Future Volume (veh/h)	0	683	686	0	993	0	0	0	0	306	0	124
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	697	0	0	1013	0				312	0	76
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98				0.98	0.92	0.98
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1080		0	1080	0				384	0	342
Arrive On Green	0.00	0.58	0.00	0.00	0.58	0.00				0.22	0.00	0.22
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	697	0	0	1013	0				312	0	76
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	12.3	0.0	0.0	24.4	0.0				8.1	0.0	1.9
Cycle Q Clear(g_c), s	0.0	12.3	0.0	0.0	24.4	0.0				8.1	0.0	1.9
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1080		0	1080	0				384	0	342
V/C Ratio(X)	0.00	0.65		0.00	0.94	0.00				0.81	0.00	0.22
Avail Cap(c_a), veh/h	0	1171		0	1114	0				758	0	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	6.9	0.0	0.0	9.5	0.0				18.2	0.0	15.8
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.0	13.9	0.0				1.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.0	0.0	0.0	9.5	0.0				2.9	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.0	0.0	0.0	23.4	0.0				19.8	0.0	15.9
LnGrp LOS	A	A		A	C	A				B	A	B
Approach Vol, veh/h		697	A		1013						388	
Approach Delay, s/veh		8.0			23.4						19.1	
Approach LOS		A			C						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	34.1	14.7	34.1
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	14.3	10.1	26.4
Green Ext Time (p_c), s	6.2	0.5	1.8

Intersection Summary	
HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	777	0	0	861	385	654	0	877	0	0	0
Future Volume (veh/h)	0	777	0	0	861	385	654	0	877	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	793	0	0	879	0	667	0	895			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1775	0	0	934		704	0	1103			
Arrive On Green	0.00	0.50	0.00	0.00	0.50	0.00	0.40	0.00	0.40			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	793	0	0	879	0	667	0	895			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	11.1	0.0	0.0	34.2	0.0	27.9	0.0	22.0			
Cycle Q Clear(g_c), s	0.0	11.1	0.0	0.0	34.2	0.0	27.9	0.0	22.0			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1775	0	0	934		704	0	1103			
V/C Ratio(X)	0.00	0.45	0.00	0.00	0.94		0.95	0.00	0.81			
Avail Cap(c_a), veh/h	0	1874	0	0	986		724	0	1134			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	12.4	0.0	0.0	18.2	0.0	22.5	0.0	20.7			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	15.5	0.0	20.9	0.0	4.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	3.8	0.0	0.0	16.2	0.0	14.3	0.0	6.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.5	0.0	0.0	33.7	0.0	43.4	0.0	24.8			
LnGrp LOS	A	B	A	A	C		D	A	C			
Approach Vol, veh/h		793			879	A		1562				
Approach Delay, s/veh		12.5			33.7			32.8				
Approach LOS		B			C			C				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	42.9	42.9	34.1
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	40.6	40.6	31.3
Max Q Clear Time (g_c+I1), s	13.1	36.2	29.9
Green Ext Time (p_c), s	5.5	2.3	0.6

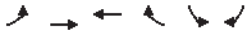
Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	888	798	600	235	288	671
Future Volume (veh/h)	888	798	600	235	288	671
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	906	814	612	240	294	685
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	983	1121	691	271	551	941
Arrive On Green	0.28	0.60	0.28	0.28	0.31	0.31
Sat Flow, veh/h	3456	1870	2558	965	1781	1585
Grp Volume(v), veh/h	906	814	441	411	294	685
Grp Sat Flow(s),veh/h/ln	1728	1870	1777	1653	1781	1585
Q Serve(g_s), s	22.0	26.7	20.6	20.6	11.8	26.8
Cycle Q Clear(g_c), s	22.0	26.7	20.6	20.6	11.8	26.8
Prop In Lane	1.00			0.58	1.00	1.00
Lane Grp Cap(c), veh/h	983	1121	498	464	551	941
V/C Ratio(X)	0.92	0.73	0.89	0.89	0.53	0.73
Avail Cap(c_a), veh/h	1516	1669	744	693	551	941
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	12.3	29.8	29.9	24.8	12.6
Incr Delay (d2), s/veh	4.9	0.7	7.6	8.3	0.5	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	9.3	9.3	8.7	4.9	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.0	13.0	37.5	38.1	25.3	15.1
LnGrp LOS	C	B	D	D	C	B
Approach Vol, veh/h		1720	852		979	
Approach Delay, s/veh		24.6	37.8		18.2	
Approach LOS		C	D		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		56.6		30.0	27.6	29.0
Change Period (Y+Rc), s		* 4.7		3.2	3.0	* 4.7
Max Green Setting (Gmax), s		* 77		26.8	38.0	* 36
Max Q Clear Time (g_c+I1), s		28.7		28.8	24.0	22.6
Green Ext Time (p_c), s		1.6		0.0	0.6	1.5

Intersection Summary	
HCM 6th Ctrl Delay	26.0
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	1038	781	14	16	46
Future Vol, veh/h	48	1038	781	14	16	46
Conflicting Peds, #/hr	2	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	1059	797	14	16	47

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	813	0	-	0	1963	806
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	1157	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	814	-	-	-	69	382
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	299	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	812	-	-	-	59	381
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	373	-
Stage 2	-	-	-	-	298	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	42.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	812	-	-	-	158
HCM Lane V/C Ratio	0.06	-	-	-	0.4
HCM Control Delay (s)	9.7	0	-	-	42.2
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.2	-	-	-	1.7

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road

09/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	96	538	52	87	30	303	505	26	17	557	216
Future Volume (veh/h)	268	96	538	52	87	30	303	505	26	17	557	216
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	98	549	53	89	31	309	515	27	17	568	220
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	596	626	512	74	124	160	228	710	582	58	532	434
Arrive On Green	0.33	0.33	0.33	0.11	0.11	0.11	0.13	0.38	0.38	0.03	0.28	0.28
Sat Flow, veh/h	1781	1870	1531	685	1151	1485	1781	1870	1534	1781	1870	1527
Grp Volume(v), veh/h	273	98	549	142	0	31	309	515	27	17	568	220
Grp Sat Flow(s),veh/h/ln	1781	1870	1531	1836	0	1485	1781	1870	1534	1781	1870	1527
Q Serve(g_s), s	13.9	4.2	38.6	8.6	0.0	2.2	14.8	27.2	1.3	1.1	32.8	13.9
Cycle Q Clear(g_c), s	13.9	4.2	38.6	8.6	0.0	2.2	14.8	27.2	1.3	1.1	32.8	13.9
Prop In Lane	1.00		1.00	0.37		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	596	626	512	198	0	160	228	710	582	58	532	434
V/C Ratio(X)	0.46	0.16	1.07	0.72	0.00	0.19	1.35	0.73	0.05	0.29	1.07	0.51
Avail Cap(c_a), veh/h	596	626	512	589	0	476	228	710	582	139	532	434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	27.0	38.4	49.8	0.0	46.9	50.3	30.6	22.6	54.5	41.3	34.5
Incr Delay (d2), s/veh	0.4	0.1	60.5	3.6	0.0	0.4	184.7	3.5	0.0	2.0	58.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	1.9	22.3	4.1	0.0	0.8	18.1	12.3	0.5	0.5	23.2	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	27.1	98.9	53.4	0.0	47.4	235.0	34.2	22.6	56.5	100.0	35.3
LnGrp LOS	C	C	F	D	A	D	F	C	C	E	F	D
Approach Vol, veh/h		920			173			851			805	
Approach Delay, s/veh		71.0			52.4			106.7			81.4	
Approach LOS		E			D			F			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		42.8	19.0	37.0		16.6	8.0	48.0				
Change Period (Y+Rc), s		* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s		* 39	* 15	* 33		37.0	* 9	* 39				
Max Q Clear Time (g_c+I1), s		40.6	16.8	34.8		10.6	3.1	29.2				
Green Ext Time (p_c), s		0.0	0.0	0.0		1.0	0.0	2.6				

Intersection Summary	
HCM 6th Ctrl Delay	83.9
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
50: Old Redwood Highway & Shiloh Road (improved)

09/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	96	538	52	87	30	303	505	26	17	557	216
Future Volume (veh/h)	268	96	538	52	87	30	303	505	26	17	557	216
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	98	549	53	89	31	309	515	27	17	568	220
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	302	571	766	68	228	79	337	908	746	58	615	771
Arrive On Green	0.17	0.31	0.31	0.04	0.17	0.17	0.19	0.49	0.49	0.03	0.33	0.33
Sat Flow, veh/h	1781	1870	1529	1781	1307	455	1781	1870	1538	1781	1870	1531
Grp Volume(v), veh/h	273	98	549	53	0	120	309	515	27	17	568	220
Grp Sat Flow(s),veh/h/ln	1781	1870	1529	1781	0	1762	1781	1870	1538	1781	1870	1531
Q Serve(g_s), s	18.2	4.6	34.3	3.6	0.0	7.3	20.6	23.6	1.1	1.1	35.4	10.2
Cycle Q Clear(g_c), s	18.2	4.6	34.3	3.6	0.0	7.3	20.6	23.6	1.1	1.1	35.4	10.2
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	571	766	68	0	307	337	908	746	58	615	771
V/C Ratio(X)	0.91	0.17	0.72	0.78	0.00	0.39	0.92	0.57	0.04	0.29	0.92	0.29
Avail Cap(c_a), veh/h	382	597	788	74	0	307	395	938	771	133	662	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	30.8	24.1	57.6	0.0	44.2	48.1	22.1	16.3	57.1	39.1	17.8
Incr Delay (d2), s/veh	20.2	0.1	2.9	35.9	0.0	0.6	23.3	0.6	0.0	2.1	17.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	2.1	12.1	2.3	0.0	3.2	11.0	9.9	0.4	0.5	18.7	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.4	30.9	27.0	93.5	0.0	44.8	71.3	22.7	16.3	59.2	57.0	17.9
LnGrp LOS	E	C	C	F	A	D	E	C	B	E	E	B
Approach Vol, veh/h		920			173			851			805	
Approach Delay, s/veh		40.0			59.8			40.2			46.4	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	41.1	27.0	43.9	24.7	25.2	8.1	62.9				
Change Period (Y+Rc), s	4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s	4.6	* 39	* 27	* 43	* 26	* 18	* 9	* 61				
Max Q Clear Time (g_c+I1), s	5.6	36.3	22.6	37.4	20.2	9.3	3.1	25.6				
Green Ext Time (p_c), s	0.0	0.6	0.3	2.3	0.3	0.4	0.0	4.4				

Intersection Summary	
HCM 6th Ctrl Delay	43.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	529	782	0	1040	0	0	0	0	118	0	240
Future Volume (veh/h)	0	529	782	0	1040	0	0	0	0	118	0	240
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	557	0	0	1095	0				124	0	206
Peak Hour Factor	0.95	0.95	0.95	0.92	0.95	0.95				0.95	0.92	0.95
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1145		0	1145	0				308	0	274
Arrive On Green	0.00	0.61	0.00	0.00	0.61	0.00				0.17	0.00	0.17
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	557	0	0	1095	0				124	0	206
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	7.7	0.0	0.0	25.7	0.0				2.9	0.0	5.8
Cycle Q Clear(g_c), s	0.0	7.7	0.0	0.0	25.7	0.0				2.9	0.0	5.8
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1145		0	1145	0				308	0	274
V/C Ratio(X)	0.00	0.49		0.00	0.96	0.00				0.40	0.00	0.75
Avail Cap(c_a), veh/h	0	1218		0	1158	0				788	0	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.0	0.0	0.0	8.5	0.0				17.3	0.0	18.5
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	16.7	0.0				0.3	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	0.0	0.0	9.9	0.0				1.0	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.4	0.0	0.0	25.3	0.0				17.6	0.0	20.0
LnGrp LOS	A	A		A	C	A				B	A	C
Approach Vol, veh/h		557	A		1095						330	
Approach Delay, s/veh		5.4			25.3						19.1	
Approach LOS		A			C						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	34.7	12.3	34.7
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	9.7	7.8	27.7
Green Ext Time (p_c), s	5.3	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	522	0	0	942	242	722	0	505	0	0	0
Future Volume (veh/h)	0	522	0	0	942	242	722	0	505	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	549	0	0	992	0	760	0	532			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1798	0	0	946		736	0	1152			
Arrive On Green	0.00	0.51	0.00	0.00	0.51	0.00	0.41	0.00	0.41			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	549	0	0	992	0	760	0	532			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	9.0	0.0	0.0	50.6	0.0	41.3	0.0	13.8			
Cycle Q Clear(g_c), s	0.0	9.0	0.0	0.0	50.6	0.0	41.3	0.0	13.8			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1798	0	0	946		736	0	1152			
V/C Ratio(X)	0.00	0.31	0.00	0.00	1.05		1.03	0.00	0.46			
Avail Cap(c_a), veh/h	0	1798	0	0	946		736	0	1152			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	14.4	0.0	0.0	24.7	0.0	29.4	0.0	21.3			
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	42.7	0.0	42.0	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	3.4	0.0	0.0	31.1	0.0	24.8	0.0	4.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	14.5	0.0	0.0	67.4	0.0	71.3	0.0	21.4			
LnGrp LOS	A	B	A	A	F		F	A	C			
Approach Vol, veh/h		549			992	A		1292				
Approach Delay, s/veh		14.5			67.4			50.8				
Approach LOS		B			E			D				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	55.0	55.0	45.0
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	50.6	50.6	41.3
Max Q Clear Time (g_c+I1), s	11.0	52.6	43.3
Green Ext Time (p_c), s	3.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	49.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	432	609	38	27	649	120	39	7	11	223	9	508
Future Volume (veh/h)	432	609	38	27	649	120	39	7	11	223	9	508
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	455	641	41	29	683	126	42	8	12	235	10	535
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	555	702	595	55	806	149	90	34	51	535	23	743
Arrive On Green	0.16	0.38	0.38	0.03	0.27	0.27	0.05	0.05	0.05	0.31	0.31	0.31
Sat Flow, veh/h	3456	1870	1585	1781	2984	550	1781	675	1013	1712	73	1564
Grp Volume(v), veh/h	455	641	41	29	406	403	42	0	20	245	0	535
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1777	1757	1781	0	1688	1785	0	1564
Q Serve(g_s), s	8.7	22.3	1.1	1.1	14.8	14.9	1.6	0.0	0.8	7.5	0.0	18.8
Cycle Q Clear(g_c), s	8.7	22.3	1.1	1.1	14.8	14.9	1.6	0.0	0.8	7.5	0.0	18.8
Prop In Lane	1.00		1.00	1.00		0.31	1.00		0.60	0.96		1.00
Lane Grp Cap(c), veh/h	555	702	595	55	480	475	90	0	85	558	0	743
V/C Ratio(X)	0.82	0.91	0.07	0.53	0.85	0.85	0.47	0.00	0.23	0.44	0.00	0.72
Avail Cap(c_a), veh/h	1767	1828	1549	78	906	895	624	0	592	704	0	871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.8	20.3	13.7	32.7	23.6	23.7	31.6	0.0	31.2	18.8	0.0	14.4
Incr Delay (d2), s/veh	1.2	3.9	0.0	2.9	3.2	3.2	1.4	0.0	0.5	0.2	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	9.1	0.4	0.5	6.0	5.9	0.7	0.0	0.3	2.9	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9	24.3	13.8	35.5	26.8	26.9	33.0	0.0	31.7	19.0	0.0	16.2
LnGrp LOS	C	C	B	D	C	C	C	A	C	B	A	B
Approach Vol, veh/h		1137			838			62			780	
Approach Delay, s/veh		25.8			27.1			32.6			17.1	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.8	30.4		24.6	14.0	23.2		6.7
Change Period (Y+Rc), s	4.7	* 4.7		3.2	3.0	* 4.7		3.2
Max Green Setting (Gmax), s	7.3	* 67		27.0	35.0	* 35		24.0
Max Q Clear Time (g_c+I1), s	3.1	24.3		20.8	10.7	16.9		3.6
Green Ext Time (p_c), s	0.0	1.3		0.6	0.3	1.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	820	14	0	771	6	0	0	3	0	0	39
Future Vol, veh/h	27	820	14	0	771	6	0	0	3	0	0	39
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	140	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	92	92	95	95	92	92	92	95	92	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	863	15	0	812	6	0	0	3	0	0	41

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	820	0	0	-	-	0	-	-	871	1744	1751	817
Stage 1	-	-	-	-	-	-	-	-	-	817	817	-
Stage 2	-	-	-	-	-	-	-	-	-	927	934	-
Critical Hdwy	4.12	-	-	-	-	-	-	-	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	-	-	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	809	-	-	0	-	-	0	0	350	68	86	376
Stage 1	-	-	-	0	-	-	0	0	-	370	390	-
Stage 2	-	-	-	0	-	-	0	0	-	322	345	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	807	-	-	-	-	-	-	-	350	65	83	375
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	65	83	-
Stage 1	-	-	-	-	-	-	-	-	-	356	389	-
Stage 2	-	-	-	-	-	-	-	-	-	308	333	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	15.4	15.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	350	807	-	-	-	-	375
HCM Lane V/C Ratio	0.009	0.035	-	-	-	-	0.109
HCM Control Delay (s)	15.4	9.6	-	-	-	-	15.8
HCM Lane LOS	C	A	-	-	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	-	-	0.4

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	121	266	55	107	21	200	267	40	34	579	246
Future Volume (veh/h)	192	121	266	55	107	21	200	267	40	34	579	246
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	202	127	280	58	113	22	211	281	42	36	609	259
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	423	342	86	167	204	212	767	627	102	652	531
Arrive On Green	0.23	0.23	0.23	0.14	0.14	0.14	0.12	0.41	0.41	0.06	0.35	0.35
Sat Flow, veh/h	1781	1870	1510	624	1215	1483	1781	1870	1530	1781	1870	1525
Grp Volume(v), veh/h	202	127	280	171	0	22	211	281	42	36	609	259
Grp Sat Flow(s),veh/h/ln	1781	1870	1510	1839	0	1483	1781	1870	1530	1781	1870	1525
Q Serve(g_s), s	9.8	5.6	17.5	8.8	0.0	1.3	11.8	10.4	1.7	1.9	31.2	13.2
Cycle Q Clear(g_c), s	9.8	5.6	17.5	8.8	0.0	1.3	11.8	10.4	1.7	1.9	31.2	13.2
Prop In Lane	1.00		1.00	0.34		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	423	342	253	0	204	212	767	627	102	652	531
V/C Ratio(X)	0.50	0.30	0.82	0.68	0.00	0.11	1.00	0.37	0.07	0.35	0.93	0.49
Avail Cap(c_a), veh/h	693	727	587	686	0	553	212	767	627	162	675	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	31.9	36.5	40.7	0.0	37.5	43.7	20.3	17.8	45.0	31.2	25.4
Incr Delay (d2), s/veh	0.7	0.3	3.7	2.4	0.0	0.2	60.7	0.2	0.0	1.5	19.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	2.5	6.5	4.0	0.0	0.5	8.5	4.2	0.6	0.9	16.8	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	32.2	40.2	43.1	0.0	37.7	104.4	20.5	17.8	46.6	51.0	25.9
LnGrp LOS	C	C	D	D	A	D	F	C	B	D	D	C
Approach Vol, veh/h		609			193			534			904	
Approach Delay, s/veh		36.5			42.4			53.5			43.6	
Approach LOS		D			D			D			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.6	16.0	38.8		17.8	9.9	44.9				
Change Period (Y+Rc), s		* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s		* 39	* 12	* 36		37.0	* 9	* 39				
Max Q Clear Time (g_c+I1), s		19.5	13.8	33.2		10.8	3.9	12.4				
Green Ext Time (p_c), s		1.9	0.0	1.4		1.2	0.0	2.0				

Intersection Summary	
HCM 6th Ctrl Delay	43.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
50: Old Redwood Highway & Shiloh Road (improved)

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	121	266	55	107	21	200	267	40	34	579	246
Future Volume (veh/h)	192	121	266	55	107	21	200	267	40	34	579	246
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	202	127	280	58	113	22	211	281	42	36	609	259
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	249	371	532	82	158	31	255	889	736	112	739	833
Arrive On Green	0.14	0.20	0.20	0.05	0.10	0.10	0.14	0.48	0.48	0.06	0.40	0.40
Sat Flow, veh/h	1781	1870	1540	1781	1510	294	1781	1870	1548	1781	1870	1546
Grp Volume(v), veh/h	202	127	280	58	0	135	211	281	42	36	609	259
Grp Sat Flow(s),veh/h/ln	1781	1870	1540	1781	0	1804	1781	1870	1548	1781	1870	1546
Q Serve(g_s), s	8.5	4.5	11.3	2.5	0.0	5.6	8.9	7.2	1.1	1.5	22.6	7.2
Cycle Q Clear(g_c), s	8.5	4.5	11.3	2.5	0.0	5.6	8.9	7.2	1.1	1.5	22.6	7.2
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	249	371	532	82	0	188	255	889	736	112	739	833
V/C Ratio(X)	0.81	0.34	0.53	0.71	0.00	0.72	0.83	0.32	0.06	0.32	0.82	0.31
Avail Cap(c_a), veh/h	560	903	970	166	0	472	457	1445	1196	208	1184	1201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	26.6	20.5	36.3	0.0	33.5	32.2	12.5	10.9	34.6	20.9	10.0
Incr Delay (d2), s/veh	4.7	0.4	0.6	8.0	0.0	3.8	5.1	0.1	0.0	1.2	2.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.9	3.7	1.2	0.0	2.5	3.9	2.6	0.3	0.7	9.1	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	27.0	21.1	44.3	0.0	37.3	37.3	12.7	10.9	35.9	23.0	10.2
LnGrp LOS	D	C	C	D	A	D	D	B	B	D	C	B
Approach Vol, veh/h		609			193			534			904	
Approach Delay, s/veh		27.6			39.4			22.3			19.8	
Approach LOS		C			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	19.5	15.2	34.7	15.0	12.3	9.0	40.9				
Change Period (Y+Rc), s	4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s	7.3	* 37	* 20	* 49	* 24	* 20	* 9	* 60				
Max Q Clear Time (g_c+I1), s	4.5	13.3	10.9	24.6	10.5	7.6	3.5	9.2				
Green Ext Time (p_c), s	0.0	1.5	0.3	6.0	0.3	0.6	0.0	2.2				

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Shiloh Road & 101 SB Off-Ramp

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	693	686	0	1003	0	0	0	0	327	0	124
Future Volume (veh/h)	0	693	686	0	1003	0	0	0	0	327	0	124
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1870	0				1870	0	1870
Adj Flow Rate, veh/h	0	707	0	0	1023	0				334	0	76
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98				0.98	0.92	0.98
Percent Heavy Veh, %	0	2	2	0	2	0				2	0	2
Cap, veh/h	0	1070		0	1070	0				404	0	360
Arrive On Green	0.00	0.57	0.00	0.00	0.57	0.00				0.23	0.00	0.23
Sat Flow, veh/h	0	1870	1585	0	1870	0				1781	0	1585
Grp Volume(v), veh/h	0	707	0	0	1023	0				334	0	76
Grp Sat Flow(s),veh/h/ln	0	1870	1585	0	1870	0				1781	0	1585
Q Serve(g_s), s	0.0	13.1	0.0	0.0	26.0	0.0				9.0	0.0	2.0
Cycle Q Clear(g_c), s	0.0	13.1	0.0	0.0	26.0	0.0				9.0	0.0	2.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1070		0	1070	0				404	0	360
V/C Ratio(X)	0.00	0.66		0.00	0.96	0.00				0.83	0.00	0.21
Avail Cap(c_a), veh/h	0	1138		0	1082	0				737	0	656
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	7.4	0.0	0.0	10.2	0.0				18.5	0.0	15.8
Incr Delay (d2), s/veh	0.0	1.3	0.0	0.0	17.4	0.0				1.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.4	0.0	0.0	11.2	0.0				3.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.7	0.0	0.0	27.6	0.0				20.2	0.0	15.9
LnGrp LOS	A	A		A	C	A				C	A	B
Approach Vol, veh/h		707	A		1023						410	
Approach Delay, s/veh		8.7			27.6						19.4	
Approach LOS		A			C						B	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	34.7	15.6	34.7
Change Period (Y+Rc), s	* 5.9	* 4.2	5.9
Max Green Setting (Gmax), s	* 31	* 21	29.1
Max Q Clear Time (g_c+I1), s	15.1	11.0	28.0
Green Ext Time (p_c), s	6.1	0.5	0.8

Intersection Summary	
HCM 6th Ctrl Delay	19.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: 101 NB Off-Ramp & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	807	0	0	905	406	654	0	910	0	0	0
Future Volume (veh/h)	0	807	0	0	905	406	654	0	910	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	0	0	1870	1870	1870	0	1870			
Adj Flow Rate, veh/h	0	823	0	0	923	0	667	0	929			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98			
Percent Heavy Veh, %	0	2	0	0	2	2	2	0	2			
Cap, veh/h	0	1804	0	0	949		696	0	1091			
Arrive On Green	0.00	0.51	0.00	0.00	0.51	0.00	0.39	0.00	0.39			
Sat Flow, veh/h	0	3741	0	0	1870	1585	1781	0	2790			
Grp Volume(v), veh/h	0	823	0	0	923	0	667	0	929			
Grp Sat Flow(s),veh/h/ln	0	1777	0	0	1870	1585	1781	0	1395			
Q Serve(g_s), s	0.0	11.8	0.0	0.0	38.3	0.0	29.1	0.0	24.3			
Cycle Q Clear(g_c), s	0.0	11.8	0.0	0.0	38.3	0.0	29.1	0.0	24.3			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1804	0	0	949		696	0	1091			
V/C Ratio(X)	0.00	0.46	0.00	0.00	0.97		0.96	0.00	0.85			
Avail Cap(c_a), veh/h	0	1809	0	0	952		699	0	1095			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	12.6	0.0	0.0	19.1	0.0	23.7	0.0	22.2			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	22.4	0.0	23.8	0.0	6.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	4.1	0.0	0.0	19.7	0.0	15.4	0.0	8.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.7	0.0	0.0	41.5	0.0	47.5	0.0	28.4			
LnGrp LOS	A	B	A	A	D		D	A	C			
Approach Vol, veh/h		823			923	A		1596				
Approach Delay, s/veh		12.7			41.5			36.4				
Approach LOS		B			D			D				

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	44.9	44.9	34.9
Change Period (Y+Rc), s	4.4	4.4	3.7
Max Green Setting (Gmax), s	40.6	40.6	31.3
Max Q Clear Time (g_c+I1), s	13.8	40.3	31.1
Green Ext Time (p_c), s	5.8	0.2	0.1

Intersection Summary	
HCM 6th Ctrl Delay	32.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
3: Shiloh Road & Hembree Lane

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	888	818	44	40	600	235	65	11	15	288	11	671
Future Volume (veh/h)	888	818	44	40	600	235	65	11	15	288	11	671
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	906	835	48	43	612	240	71	12	16	294	12	685
Peak Hour Factor	0.98	0.98	0.92	0.92	0.98	0.98	0.92	0.92	0.92	0.98	0.92	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	967	1084	919	225	674	264	101	41	55	426	17	831
Arrive On Green	0.28	0.58	0.58	0.27	0.27	0.27	0.06	0.06	0.06	0.25	0.25	0.25
Sat Flow, veh/h	3456	1870	1585	658	2476	970	1781	727	969	1715	70	1559
Grp Volume(v), veh/h	906	835	48	43	439	413	71	0	28	306	0	685
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	658	1777	1670	1781	0	1696	1785	0	1559
Q Serve(g_s), s	27.6	36.5	1.4	5.7	25.7	25.8	4.2	0.0	1.7	16.8	0.0	26.8
Cycle Q Clear(g_c), s	27.6	36.5	1.4	9.1	25.7	25.8	4.2	0.0	1.7	16.8	0.0	26.8
Prop In Lane	1.00		1.00	1.00		0.58	1.00		0.57	0.96		1.00
Lane Grp Cap(c), veh/h	967	1084	919	225	484	454	101	0	96	444	0	831
V/C Ratio(X)	0.94	0.77	0.05	0.19	0.91	0.91	0.71	0.00	0.29	0.69	0.00	0.82
Avail Cap(c_a), veh/h	1218	1341	1137	268	598	562	297	0	283	444	0	831
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.9	17.2	9.8	33.2	37.9	37.9	50.0	0.0	48.8	36.7	0.0	21.3
Incr Delay (d2), s/veh	10.6	2.0	0.0	0.3	14.9	15.8	8.7	0.0	1.7	3.8	0.0	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	14.5	0.5	0.9	12.8	12.1	2.1	0.0	0.8	7.7	0.0	15.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	19.2	9.8	33.5	52.8	53.8	58.6	0.0	50.4	40.5	0.0	27.7
LnGrp LOS	D	B	A	C	D	D	E	A	D	D	A	C
Approach Vol, veh/h		1789			895			99			991	
Approach Delay, s/veh		33.8			52.3			56.3			31.6	
Approach LOS		C			D			E			C	

Timer - Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		67.2		30.0	33.2	34.0		10.6
Change Period (Y+Rc), s		* 4.7		3.2	3.0	* 4.7		4.5
Max Green Setting (Gmax), s		* 77		26.8	38.0	* 36		18.0
Max Q Clear Time (g_c+I1), s		38.5		28.8	29.6	27.8		6.2
Green Ext Time (p_c), s		1.8		0.0	0.6	1.5		0.2

Intersection Summary		
HCM 6th Ctrl Delay		38.2
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: Shiloh Road & Business Park Court

09/15/2021

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	1069	20	0	805	14	0	0	9	0	0	62
Future Vol, veh/h	48	1069	20	0	805	14	0	0	9	0	0	62
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	Stop	-	-	None
Storage Length	140	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	92	92	98	98	92	92	92	98	92	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	1091	22	0	821	14	0	0	10	0	0	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	837	0	0	-	-	0	-	-	1102	2030	2041	830
Stage 1	-	-	-	-	-	-	-	-	-	830	830	-
Stage 2	-	-	-	-	-	-	-	-	-	1200	1211	-
Critical Hdwy	4.12	-	-	-	-	-	-	-	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	-	-	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	797	-	-	0	-	-	0	0	257	42	56	370
Stage 1	-	-	-	0	-	-	0	0	-	364	385	-
Stage 2	-	-	-	0	-	-	0	0	-	226	255	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	795	-	-	-	-	-	-	-	257	38	52	369
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	38	52	-
Stage 1	-	-	-	-	-	-	-	-	-	341	384	-
Stage 2	-	-	-	-	-	-	-	-	-	204	239	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	19.6	16.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	257	795	-	-	-	-	369
HCM Lane V/C Ratio	0.038	0.062	-	-	-	-	0.171
HCM Control Delay (s)	19.6	9.8	-	-	-	-	16.8
HCM Lane LOS	C	A	-	-	-	-	C
HCM 95th %tile Q(veh)	0.1	0.2	-	-	-	-	0.6

HCM 6th Signalized Intersection Summary
5: Old Redwood Highway & Shiloh Road

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	277	97	552	52	88	30	317	505	26	17	557	225
Future Volume (veh/h)	277	97	552	52	88	30	317	505	26	17	557	225
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	283	99	563	53	90	31	323	515	27	17	568	230
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	595	625	512	74	125	161	228	710	582	58	531	434
Arrive On Green	0.33	0.33	0.33	0.11	0.11	0.11	0.13	0.38	0.38	0.03	0.28	0.28
Sat Flow, veh/h	1781	1870	1531	681	1156	1485	1781	1870	1534	1781	1870	1527
Grp Volume(v), veh/h	283	99	563	143	0	31	323	515	27	17	568	230
Grp Sat Flow(s),veh/h/ln	1781	1870	1531	1836	0	1485	1781	1870	1534	1781	1870	1527
Q Serve(g_s), s	14.5	4.3	38.6	8.7	0.0	2.2	14.8	27.2	1.3	1.1	32.8	14.7
Cycle Q Clear(g_c), s	14.5	4.3	38.6	8.7	0.0	2.2	14.8	27.2	1.3	1.1	32.8	14.7
Prop In Lane	1.00		1.00	0.37		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	595	625	512	199	0	161	228	710	582	58	531	434
V/C Ratio(X)	0.48	0.16	1.10	0.72	0.00	0.19	1.41	0.73	0.05	0.29	1.07	0.53
Avail Cap(c_a), veh/h	595	625	512	588	0	476	228	710	582	139	531	434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	27.0	38.4	49.8	0.0	46.9	50.3	30.7	22.6	54.5	41.3	34.9
Incr Delay (d2), s/veh	0.4	0.1	69.9	3.6	0.0	0.4	210.6	3.5	0.0	2.0	58.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	1.9	23.6	4.1	0.0	0.8	19.7	12.3	0.5	0.5	23.2	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.9	27.1	108.4	53.4	0.0	47.3	260.9	34.2	22.7	56.6	100.2	35.8
LnGrp LOS	C	C	F	D	A	D	F	C	C	E	F	D
Approach Vol, veh/h		945			174			865			815	
Approach Delay, s/veh		76.7			52.4			118.5			81.1	
Approach LOS		E			D			F			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		42.8	19.0	37.0		16.7	8.0	48.0				
Change Period (Y+Rc), s		* 4.2	* 4.2	* 4.2		4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s		* 39	* 15	* 33		37.0	* 9	* 39				
Max Q Clear Time (g_c+I1), s		40.6	16.8	34.8		10.7	3.1	29.2				
Green Ext Time (p_c), s		0.0	0.0	0.0		1.0	0.0	2.6				

Intersection Summary	
HCM 6th Ctrl Delay	89.4
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
50: Old Redwood Highway & Shiloh Road (improved)

09/15/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	277	97	552	52	88	30	317	505	26	17	557	225
Future Volume (veh/h)	277	97	552	52	88	30	317	505	26	17	557	225
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	283	99	563	53	90	31	323	515	27	17	568	230
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	310	574	779	68	224	77	349	914	752	57	608	773
Arrive On Green	0.17	0.31	0.31	0.04	0.17	0.17	0.20	0.49	0.49	0.03	0.32	0.32
Sat Flow, veh/h	1781	1870	1529	1781	1311	452	1781	1870	1538	1781	1870	1531
Grp Volume(v), veh/h	283	99	563	53	0	121	323	515	27	17	568	230
Grp Sat Flow(s),veh/h/ln	1781	1870	1529	1781	0	1763	1781	1870	1538	1781	1870	1531
Q Serve(g_s), s	19.5	4.8	36.3	3.7	0.0	7.6	22.3	24.3	1.1	1.2	36.8	11.1
Cycle Q Clear(g_c), s	19.5	4.8	36.3	3.7	0.0	7.6	22.3	24.3	1.1	1.2	36.8	11.1
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	574	779	68	0	301	349	914	752	57	608	773
V/C Ratio(X)	0.91	0.17	0.72	0.78	0.00	0.40	0.93	0.56	0.04	0.30	0.93	0.30
Avail Cap(c_a), veh/h	369	577	782	71	0	301	382	914	752	128	640	800
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	31.7	24.5	59.6	0.0	46.1	49.4	22.6	16.7	59.2	40.9	18.5
Incr Delay (d2), s/veh	23.3	0.1	3.1	38.1	0.0	0.6	26.7	0.7	0.0	2.1	20.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	2.2	12.9	2.4	0.0	3.4	12.2	10.3	0.4	0.6	19.8	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.0	31.8	27.6	97.7	0.0	46.8	76.2	23.3	16.7	61.3	61.2	18.6
LnGrp LOS	E	C	C	F	A	D	E	C	B	E	E	B
Approach Vol, veh/h		945			174			865			815	
Approach Delay, s/veh		41.9			62.3			42.8			49.2	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	42.6	28.7	44.8	26.0	25.6	8.2	65.3				
Change Period (Y+Rc), s	4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2	* 4.2				
Max Green Setting (Gmax), s	4.8	* 39	* 27	* 43	* 26	* 18	* 9	* 61				
Max Q Clear Time (g_c+I1), s	5.7	38.3	24.3	38.8	21.5	9.6	3.2	26.3				
Green Ext Time (p_c), s	0.0	0.1	0.2	1.8	0.3	0.4	0.0	4.4				

Intersection Summary	
HCM 6th Ctrl Delay	45.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Appendix C

Queuing Reports

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Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	122	347	77	140
Average Queue (ft)	56	206	39	85
95th Queue (ft)	110	386	78	145
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	NB	NB	NB
Directions Served	T	T	T	L	R	R
Maximum Queue (ft)	82	103	423	389	179	64
Average Queue (ft)	52	61	269	254	52	38
95th Queue (ft)	88	110	446	412	216	68
Link Distance (ft)	1149		552		1070	
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (ft)		100		264		248
Storage Blk Time (%)	0	1		11		
Queuing Penalty (veh)	1	3		38		

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	L	T	T	TR	L	R
Maximum Queue (ft)	93	107	65	144	100	103	102
Average Queue (ft)	54	61	32	90	60	62	68
95th Queue (ft)	92	102	71	149	103	107	106
Link Distance (ft)	552	552	552	366		858	858
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					129		
Storage Blk Time (%)				2	0		
Queuing Penalty (veh)				5	0		

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	42	33
Average Queue (ft)	10	10
95th Queue (ft)	42	35
Link Distance (ft)	366	252
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	113	75	82	125	28	133	109	36	83	434	178
Average Queue (ft)	70	31	34	68	8	78	61	11	25	250	101
95th Queue (ft)	128	74	92	132	38	139	112	37	90	521	220
Link Distance (ft)		1288		904			874			799	
Upstream Blk Time (%)										1	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)			0	17		0	2			31	1
Queuing Penalty (veh)			0	3		0	4			78	4

Zone Summary

Zone wide Queuing Penalty: 137

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	127	240	131	66
Average Queue (ft)	69	141	85	38
95th Queue (ft)	129	254	139	71
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	R	R
Maximum Queue (ft)	110	118	350	48	280	153	97
Average Queue (ft)	80	80	234	7	197	84	47
95th Queue (ft)	115	123	384	101	308	149	88
Link Distance (ft)	1149		552	552		1070	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100			264		248
Storage Blk Time (%)	2	3			2		
Queuing Penalty (veh)	5	9			13		

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	L	T	T	TR	L	R
Maximum Queue (ft)	185	207	120	136	144	143	180
Average Queue (ft)	123	138	53	93	94	95	105
95th Queue (ft)	199	217	120	152	155	147	191
Link Distance (ft)	552	552	552	366		858	858
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					129		
Storage Blk Time (%)				2	2		
Queuing Penalty (veh)				7	3		

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	68	54
Average Queue (ft)	15	27
95th Queue (ft)	72	57
Link Distance (ft)	366	252
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	188	54	117	115	26	219	297	50	40	343	176
Average Queue (ft)	103	20	64	63	7	125	167	13	9	199	78
95th Queue (ft)	190	59	125	118	25	225	320	64	47	360	193
Link Distance (ft)		1288		904			874			799	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)		0	0	17	0	2	17			29	0
Queuing Penalty (veh)		0	1	5	0	8	39			48	0

Zone Summary

Zone wide Queuing Penalty: 137

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	100	299	86	130
Average Queue (ft)	54	184	48	78
95th Queue (ft)	109	354	90	134
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	R	R
Maximum Queue (ft)	110	130	442	167	369	104	67
Average Queue (ft)	53	74	305	32	247	44	38
95th Queue (ft)	112	134	493	244	425	120	64
Link Distance (ft)	1149		539	539		1070	
Upstream Blk Time (%)			1	0			
Queuing Penalty (veh)			4	1			
Storage Bay Dist (ft)		100			264		248
Storage Blk Time (%)	0	4			8		
Queuing Penalty (veh)	0	8			30		

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	TR	L	TR	LT	R
Maximum Queue (ft)	83	96	113	24	46	164	153	52	28	109	134
Average Queue (ft)	46	54	38	4	15	109	78	26	11	69	78
95th Queue (ft)	87	111	102	36	50	207	181	54	30	118	131
Link Distance (ft)	539	539	539			362	362	178	178	857	857
Upstream Blk Time (%)						0	0				
Queuing Penalty (veh)						0	0				
Storage Bay Dist (ft)				100	120						
Storage Blk Time (%)			1			8					
Queuing Penalty (veh)			0			2					

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	SB
Directions Served	L	LTR
Maximum Queue (ft)	21	27
Average Queue (ft)	4	9
95th Queue (ft)	21	30
Link Distance (ft)		233
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	110	91	82	122	14	130	118	51	111	370	188
Average Queue (ft)	62	37	31	68	4	83	64	13	26	229	105
95th Queue (ft)	115	85	84	124	14	141	128	54	110	407	221
Link Distance (ft)		1294		904			874			799	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)		0	0	19		0	3			31	1
Queuing Penalty (veh)		0	0	4		0	5			82	4

Zone Summary

Zone wide Queuing Penalty: 143

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	150	271	141	71
Average Queue (ft)	80	152	84	43
95th Queue (ft)	146	257	148	74
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	R	R
Maximum Queue (ft)	148	155	448	200	341	158	92
Average Queue (ft)	90	95	308	37	231	95	52
95th Queue (ft)	156	158	500	258	374	167	93
Link Distance (ft)	1149		539	539		1070	
Upstream Blk Time (%)			1	0			
Queuing Penalty (veh)			4	1			
Storage Bay Dist (ft)		100			264		248
Storage Blk Time (%)	4	5			7		
Queuing Penalty (veh)	12	16			46		

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	TR	L	TR	LT	R
Maximum Queue (ft)	199	214	149	13	85	167	196	87	33	209	219
Average Queue (ft)	133	154	80	3	31	120	121	47	15	129	116
95th Queue (ft)	209	228	155	13	88	203	211	90	37	210	206
Link Distance (ft)	539	539	539			362	362	178	178	857	857
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)				100	120						
Storage Blk Time (%)			4			10					
Queuing Penalty (veh)			2			3					

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	SB
Directions Served	L	LTR
Maximum Queue (ft)	33	34
Average Queue (ft)	10	23
95th Queue (ft)	35	42
Link Distance (ft)		233
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	169	55	153	111	28	250	282	60	37	294	152
Average Queue (ft)	106	24	75	67	9	164	163	13	9	172	59
95th Queue (ft)	179	61	159	115	29	268	291	65	44	312	153
Link Distance (ft)		1294		904			874			799	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)			1	20	0	7	19			26	1
Queuing Penalty (veh)			4	5	0	30	47			46	3

Zone Summary

Zone wide Queuing Penalty: 220

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	106	304	89	124
Average Queue (ft)	61	189	50	81
95th Queue (ft)	116	336	87	131
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	R	R
Maximum Queue (ft)	141	159	521	292	478	593	160
Average Queue (ft)	74	95	415	108	376	235	80
95th Queue (ft)	151	169	612	473	552	779	208
Link Distance (ft)	1149		552	552		1070	
Upstream Blk Time (%)			4	1		1	
Queuing Penalty (veh)			22	5		0	
Storage Bay Dist (ft)		100			264		248
Storage Blk Time (%)	2	8			33	0	
Queuing Penalty (veh)	5	19			158	0	

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	L	T	T	TR	L	R
Maximum Queue (ft)	102	125	134	309	226	129	174
Average Queue (ft)	65	77	73	211	153	89	98
95th Queue (ft)	106	131	146	391	304	139	179
Link Distance (ft)	552	552	552	366		858	858
Upstream Blk Time (%)				6			
Queuing Penalty (veh)				44			
Storage Bay Dist (ft)					129		
Storage Blk Time (%)				36	7		
Queuing Penalty (veh)				160	21		

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	162	173	52
Average Queue (ft)	50	64	29
95th Queue (ft)	186	337	62
Link Distance (ft)	366	1288	252
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	3		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	153	96	126	154	69	226	322	47	122	748	191
Average Queue (ft)	91	43	64	92	14	176	172	12	34	555	153
95th Queue (ft)	165	107	130	162	69	294	411	36	122	936	258
Link Distance (ft)		1288		904			874			799	
Upstream Blk Time (%)										14	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)		0	1	25	0	23	10			53	2
Queuing Penalty (veh)		1	2	5	0	71	22			145	14

Intersection: 50: Old Redwood Highway & Shiloh Road (improved)

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	162	108	126	64	124	179	128	31	110	410	222
Average Queue (ft)	91	53	55	30	65	120	75	15	30	270	81
95th Queue (ft)	163	119	122	67	134	196	142	39	110	428	241
Link Distance (ft)		1324			902		867			799	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375		300	120		300		100	126		265
Storage Blk Time (%)					2		5		0	33	
Queuing Penalty (veh)					1		11		0	89	

Network Summary

Network wide Queuing Penalty: 798

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	195	344	163	88
Average Queue (ft)	103	220	108	49
95th Queue (ft)	180	391	166	88
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	NB	NB	NB
Directions Served	T	T	T	L	R	R
Maximum Queue (ft)	150	163	412	366	221	177
Average Queue (ft)	99	115	274	263	129	111
95th Queue (ft)	155	171	435	397	223	183
Link Distance (ft)	1149		552		1070	
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			1			
Storage Bay Dist (ft)		100		264		248
Storage Blk Time (%)	4	8		11	0	0
Queuing Penalty (veh)	15	33		94	2	1

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	L	T	T	TR	L	R
Maximum Queue (ft)	237	257	208	266	260	211	228
Average Queue (ft)	158	173	131	179	178	144	128
95th Queue (ft)	248	264	226	281	276	223	219
Link Distance (ft)	552	552	552	366		858	858
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				3			
Storage Bay Dist (ft)					129		
Storage Blk Time (%)				21	18		
Queuing Penalty (veh)				112	55		

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	237	18	88
Average Queue (ft)	109	4	48
95th Queue (ft)	297	39	103
Link Distance (ft)	366	1288	252
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	5		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	236	277	226	147	43	292	866	89	81	802	191
Average Queue (ft)	138	79	158	84	10	279	624	19	12	672	156
95th Queue (ft)	246	242	255	149	45	330	1076	94	70	987	256
Link Distance (ft)		1288		904			874			799	
Upstream Blk Time (%)							33			31	
Queuing Penalty (veh)							0			0	
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)		1	13	30	0	76	26			65	1
Queuing Penalty (veh)		4	46	9	0	401	84			151	4

Intersection: 50: Old Redwood Highway & Shiloh Road (improved)

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	264	175	287	71	122	285	324	56	55	460	252
Average Queue (ft)	173	72	191	41	62	199	170	13	11	325	118
95th Queue (ft)	302	300	346	89	125	317	313	64	61	521	326
Link Distance (ft)		1324			902		867			799	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375		300	120		300		100	126		265
Storage Blk Time (%)			4	1	2	3	14			42	
Queuing Penalty (veh)			13	1	1	18	47			97	

Network Summary

Network wide Queuing Penalty: 1195

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	142	296	83	122
Average Queue (ft)	71	188	48	77
95th Queue (ft)	156	341	94	127
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	R	R
Maximum Queue (ft)	172	166	557	343	472	602	120
Average Queue (ft)	78	103	415	106	358	209	73
95th Queue (ft)	177	180	625	459	567	715	121
Link Distance (ft)	1149		539	539		1070	
Upstream Blk Time (%)			6	1		2	
Queuing Penalty (veh)			35	8		0	
Storage Bay Dist (ft)		100			264		248
Storage Blk Time (%)	2	8			27		
Queuing Penalty (veh)	5	20			138		

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	TR	L	TR	LT	R
Maximum Queue (ft)	146	150	394	73	113	286	262	59	42	199	224
Average Queue (ft)	94	105	197	11	28	211	162	27	14	134	153
95th Queue (ft)	156	166	430	72	102	362	333	64	43	214	272
Link Distance (ft)	539	539	539			362	362	178	178	857	857
Upstream Blk Time (%)			0			6	1				
Queuing Penalty (veh)			2			24	5				
Storage Bay Dist (ft)				100	120						
Storage Blk Time (%)			19		0	36					
Queuing Penalty (veh)			7		0	10					

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	WB	SB
Directions Served	L	TR	LTR
Maximum Queue (ft)	41	147	40
Average Queue (ft)	15	58	21
95th Queue (ft)	45	360	46
Link Distance (ft)		1294	233
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	140		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	160	87	123	166	29	240	369	57	136	751	191
Average Queue (ft)	93	40	66	98	8	185	203	16	36	545	163
95th Queue (ft)	164	89	133	176	38	307	482	68	128	880	256
Link Distance (ft)		1294		904			874			799	
Upstream Blk Time (%)							2			10	
Queuing Penalty (veh)							0			0	
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)		0	1	28	0	31	11			54	3
Queuing Penalty (veh)		0	2	6	0	97	27			152	21

Intersection: 50: Old Redwood Highway & Shiloh Road (improved)

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	170	101	116	62	128	229	188	79	149	428	234
Average Queue (ft)	100	48	53	32	70	142	99	19	40	263	83
95th Queue (ft)	178	109	123	69	137	254	204	80	137	436	246
Link Distance (ft)		1324			902		867			799	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	375		300	120		300		100	126		265
Storage Blk Time (%)					3	0	7		0	30	
Queuing Penalty (veh)					2	1	17		0	84	

Network Summary

Network wide Queuing Penalty: 663

Intersection: 1: Shiloh Road & 101 SB Off-Ramp

Movement	EB	WB	SB	SB
Directions Served	T	T	L	R
Maximum Queue (ft)	164	369	171	94
Average Queue (ft)	110	226	114	49
95th Queue (ft)	193	406	173	89
Link Distance (ft)	374	1149	446	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				271
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: 101 NB Off-Ramp & Shiloh Road

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	R	R
Maximum Queue (ft)	144	172	491	259	383	293	220
Average Queue (ft)	83	118	326	72	266	169	127
95th Queue (ft)	136	178	549	367	445	444	233
Link Distance (ft)	1149		539	539		1070	
Upstream Blk Time (%)			1	0		0	
Queuing Penalty (veh)			7	1		0	
Storage Bay Dist (ft)		100			264		248
Storage Blk Time (%)	2	12			14	0	0
Queuing Penalty (veh)	10	47			132	1	3

Intersection: 3: Shiloh Road & Hembree Lane

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	TR	L	TR	LT	R
Maximum Queue (ft)	278	298	342	55	132	312	346	88	42	280	277
Average Queue (ft)	188	207	197	16	41	217	241	50	18	207	169
95th Queue (ft)	285	306	377	89	115	356	391	96	48	331	303
Link Distance (ft)	539	539	539			362	362	178	178	857	857
Upstream Blk Time (%)						2	6				
Queuing Penalty (veh)						8	25				
Storage Bay Dist (ft)				100	120						
Storage Blk Time (%)			17		0	34					
Queuing Penalty (veh)			7		0	14					

Intersection: 4: Shiloh Road & Business Park Court

Movement	EB	WB	NB	SB
Directions Served	L	TR	R	LTR
Maximum Queue (ft)	45	151	3	66
Average Queue (ft)	21	59	0	40
95th Queue (ft)	52	340	6	116
Link Distance (ft)		1294	161	233
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	140			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Old Redwood Highway & Shiloh Road

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	LT	R	L	T	R	L	T	R
Maximum Queue (ft)	212	269	236	156	64	292	899	50	59	835	191
Average Queue (ft)	126	95	163	90	17	277	694	12	18	701	145
95th Queue (ft)	220	260	261	164	74	335	1145	65	98	994	259
Link Distance (ft)		1294		904			874			799	
Upstream Blk Time (%)							44			37	
Queuing Penalty (veh)							0			0	
Storage Bay Dist (ft)	375		140		50	192		100	126		91
Storage Blk Time (%)		1	13	33	0	77	18			66	1
Queuing Penalty (veh)		6	50	10	0	411	62			159	5

Intersection: 50: Old Redwood Highway & Shiloh Road (improved)

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	249	89	309	77	129	301	301	63	82	549	364
Average Queue (ft)	170	37	196	44	68	209	190	14	23	384	178
95th Queue (ft)	317	90	315	96	133	320	326	65	108	622	431
Link Distance (ft)		1324			902		867			799	
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)	375		300	120		300		100	126		265
Storage Blk Time (%)			1	1	3	3	18			47	
Queuing Penalty (veh)			5	2	2	17	61			113	

Network Summary

Network wide Queuing Penalty: 1159

Appendix D

Collision Rate Calculations

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Intersection Collision Rate Worksheet

Clearwater at Windsor

Intersection # 1: Shiloh Road & Hembree Lane
Date of Count: 2021 adjusted

Number of Collisions: 8
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 33100
Start Date: October 1, 2015
End Date: September 30, 2020
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{8 \times 1{,}000{,}000}{33{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.13 c/mve**	**0.0%**	**25.0%**
Statewide Average*	**0.42 c/mve**	**0.5%**	**37.4%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection # 2: Shiloh Road & US 101 South Ramps
Date of Count: 2021 adjusted

Number of Collisions: 13
Number of Injuries: 5
Number of Fatalities: 0
Average Daily Traffic (ADT): 28800
Start Date: October 1, 2015
End Date: September 30, 2020
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{13 \times 1{,}000{,}000}{28{,}800 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.25 c/mve**	**0.0%**	**38.5%**
Statewide Average*	**0.29 c/mve**	**0.5%**	**37.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Clearwater at Windsor

Intersection # 3: Shiloh Road & US 101 North Ramps
Date of Count: 2021 adjusted

Number of Collisions: 10
Number of Injuries: 3
Number of Fatalities: 0
Average Daily Traffic (ADT): 30600
Start Date: October 1, 2015
End Date: September 30, 2020
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{10 \times 1{,}000{,}000}{30{,}600 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.18 c/mve**	**0.0%**	**30.0%**
Statewide Average*	**0.29 c/mve**	**0.5%**	**37.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection # 4: Shiloh Road & Business Park Court
Date of Count: 2021 adjusted

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 11300
Start Date: October 1, 2015
End Date: September 30, 2020
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{0 \times 1{,}000{,}000}{11{,}300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.00 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.17 c/mve**	**1.2%**	**39.9%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Clearwater at Windsor

Intersection # 5: Shiloh Road & Old Redwood Highway
Date of Count: 2021 adjusted

Number of Collisions: 11
Number of Injuries: 5
Number of Fatalities: 0
Average Daily Traffic (ADT): 19900
Start Date: October 1, 2015
End Date: September 30, 2020
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{11 \times 1{,}000{,}000}{19{,}900 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.30 c/mve**	**0.0%**	**45.5%**
Statewide Average*	**0.42 c/mve**	**0.5%**	**37.4%**

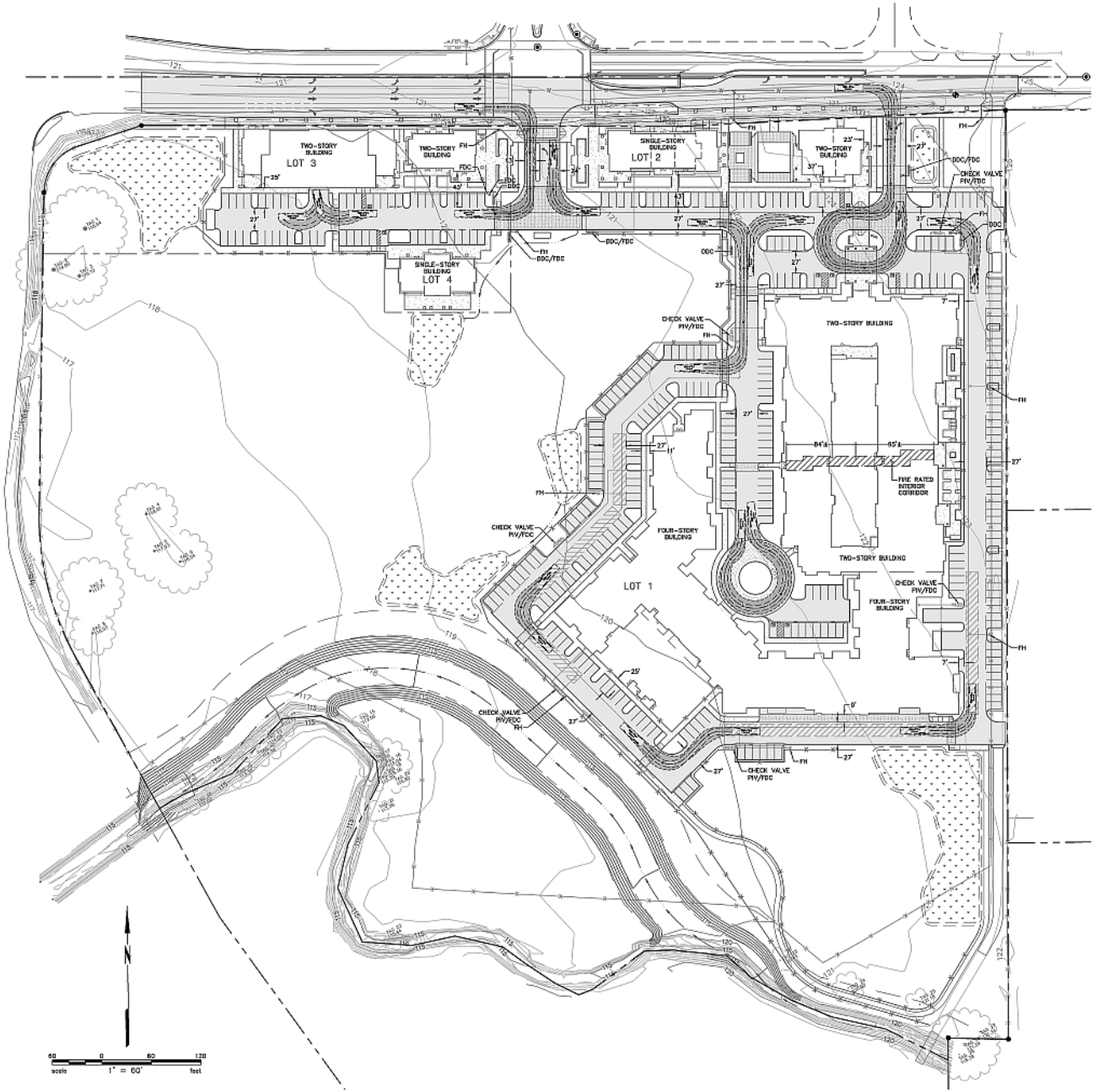
Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2016 Collision Data on California State Highways, Caltrans

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Appendix E

Large Vehicle Maneuverability Diagrams

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SYMBOLS & LEGEND

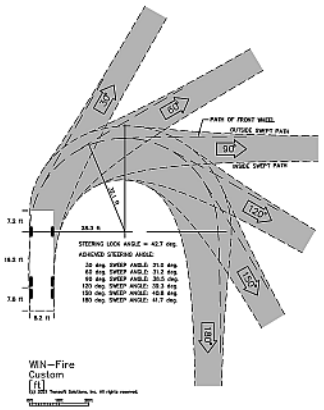
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		VALVE
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		CHECK VALVE
		FIRE HYDRANT
		FIRE DEPARTMENT CONNECTION
		POST INDICATOR VALVE
		WATER LINE
		FIRE APPARATUS STAGING AREA

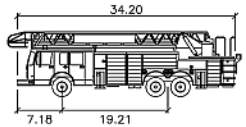


VICINITY MAP
NOT TO SCALE

FIRE APPARATUS TYPICAL TURNING RADIUS

THE RADIUS REQUIREMENTS REFLECTED IN THE GRAPHIC ABOVE WERE OBTAINED FROM THE TOWN OF WINDSOR FIRE DEPARTMENT.





Windsor Fire

	feet
Width	: 8.20
Track	: 8.20
Lock to Lock Time	: 6.0
Steering Angle	: 42.7

FIRE CODE COMPLIANCE EXHIBIT

CLEARWATER AT WINDSOR
TOWN OF WINDSOR, CALIFORNIA

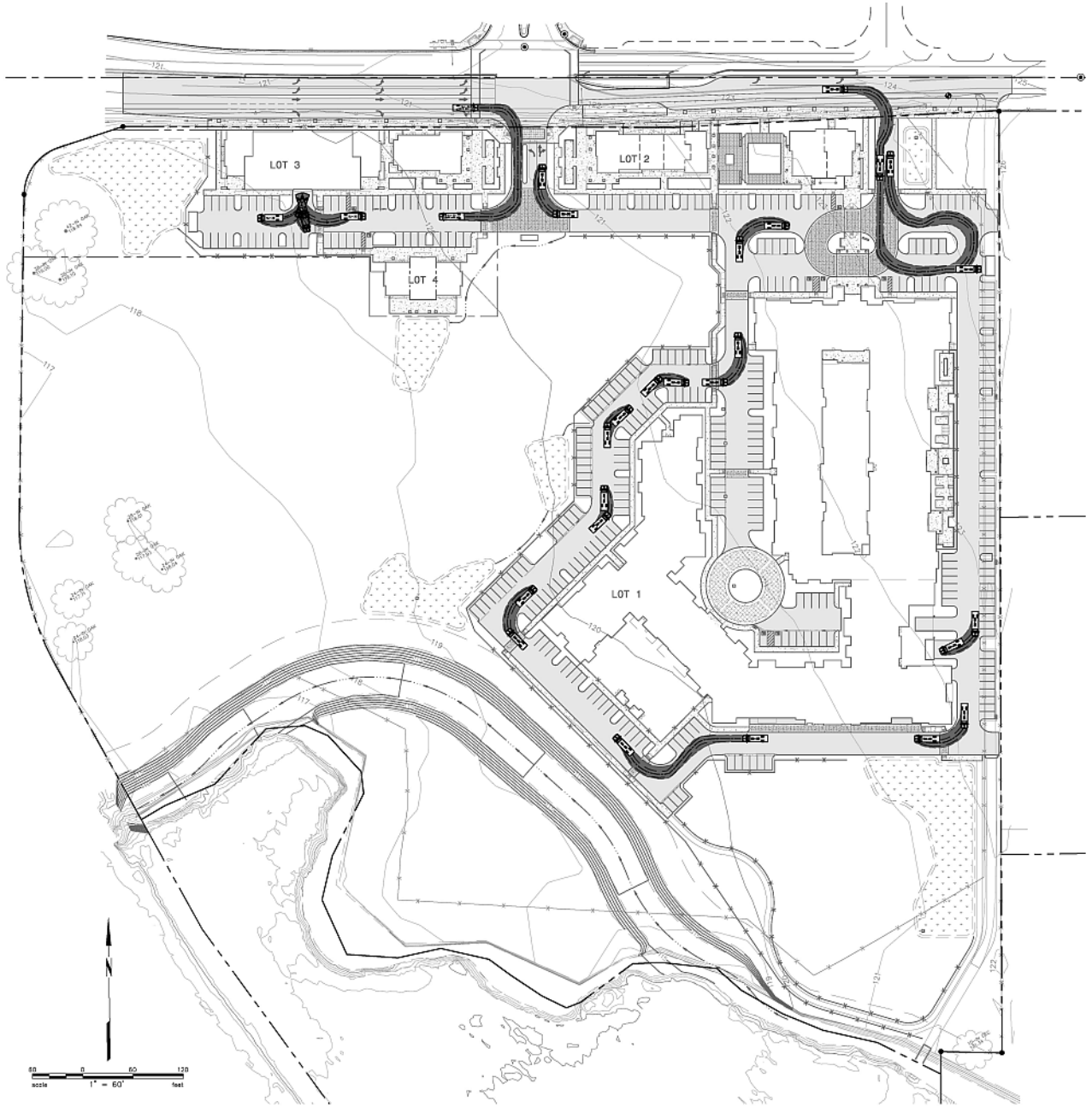
OCTOBER 2021

PREPARED BY
BKF
200 4th STREET
SUITE 300
SANTA ROSA, CA 95401
(707) 583-8500
www.bkf.com

JOB NO. 20169082

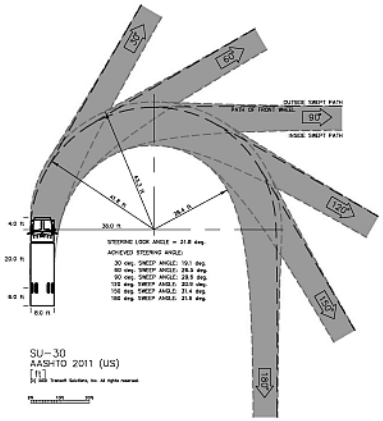
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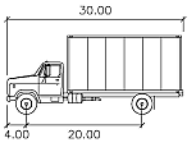
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VICINITY MAP
NOT TO SCALE





SU-30

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

GARBAGE TRUCK TURNING EXHIBIT

CLEARWATER AT WINDSOR
TOWN OF WINDSOR, CALIFORNIA

AUGUST 2021

PREPARED BY
BKF
200 4th STREET
SUITE 300
SANTA ROSA, CA 95401
(707) 583-8500
www.bkf.com

JOB NO. 20159082

SHEET 1 OF 1 SHEETS

Plot: Aug 11, 2021 at 5:24pm
159082_TEXT.dwg
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From: Zack Matley
To: Kimberly Jordan; Carl Euphrat
Subject: Clearwater onsite pedestrian facilities
Date: Friday, September 9, 2022 4:39:43 PM

Good afternoon Kim and Carl,

As requested, I've taken a look at the section of the Clearwater TIS that recommends a pathway along the south side of the main east-west drive aisle, as well as the applicant's suggestion to instead add a crosswalk (and short sidewalk extensions) on the east leg of the internal intersection.

The TIS states that "pedestrian connectivity between the Clearwater residential building and the western portion of the site would generally be adequate," noting that the route would be somewhat circuitous for those walking to the area depicted on the current site plan as Building E. The recommendation to add a sidewalk or path along the south side of the drive aisle is intended to improve walkability within the site, rather than to address an environmental impact to pedestrians. The TIS acknowledges that the abutting area is in an environmentally sensitive zone, and we understand that based on discussions between the Town and applicant along with further evaluations, adding a sidewalk or path in this area has been deemed infeasible. While unfortunate, in our assessment the lack of a sidewalk or pathway in this area would not be considered an adverse environmental impact.

We understand that the applicant team has offered to add a crosswalk on the eastern leg of the interior intersection (i.e., the interior drive aisle intersection just south of the Shiloh Road/Hembree Lane signalized intersection) along with short sidewalk segments connecting the crosswalk to surrounding sidewalks. Adding a crosswalk in this location would help to improve onsite pedestrian circulation and does not present any significant safety concerns, provided that sight triangles on the corners are not obscured by landscaping. The TIS already includes a recommendation that sight triangles be checked once landscaping plans are finalized. Because neither the presence of nor lack of a crosswalk at this location would be considered an impact, we believe the Town has latitude in determining whether to require it as a condition of approval.

Zack

Zack Matley
AICP Principal
he/him/his



Office 707.542.9500 ext. 303 **Mobile** 415.602.5831
490 Mendocino Avenue, Suite 201 Santa Rosa, CA 95401
www.w-trans.com

Appendix I

Water Usage for Sonoma Hills and Riverpark

TOWN OF
WINDSOR
Public Works Department

M E M O R A N D U M

Date: May 11, 2022

From: Carl Euphrat, Senior Civil Engineer Carl L. Euphrat

To: Kim Jordan, Planner III

Subject: Clearwater at Windsor (Proj. No. 19-20)
Water Use Evaluation

This memo is intended to provide an evaluation and justification of the potable water use projected for the Clearwater at Windsor Project and for the information to be reflected in the Initial Study for the project. The purpose of the memo is to provide more accurate information on the projected water demand for the proposed project as opposed to using conceptual projections provided in earlier water studies. Following is some of the background information obtained and used for this evaluation.

The Initial Study (IS) for the project was prepared by Rincon Consultants, Inc. and is dated April 2022. The Wastewater section of the IS estimates the wastewater generated from the project would be approximately 33,360 gallons/day. This number is based on the following chart:

Estimated Wastewater Generation

Use	Unit	Amount	Rate	Total (gallons/day)	Total (gallons/year)
Apartments	Each	258	120 gallons/unit/day	30,960	11,300,400
Commercial	Sq. Ft.	30,000	80 gallons/unit/1,000 sq. ft.	2,400	876,000
Total				**33,360**	**12,176,400**

It should be noted that the IS used Generation Rates from the 2006 L.A. CEQA Thresholds Guide.

The Water section of the IS states that the project's estimated water demand would be approximately 14,611,680 gallons/year or 45 AFY (acre feet/year). Per the IS, this number is based on an industry standard of 120 percent of the wastewater generated by the project.

As a check on the water use for a project of this type, the applicant, Clearwater Living, provided the Town with actual water use from two of their other projects, Sonoma Hills, located in Rohnert Park, and Riverpark, located in Oxnard. The actual water use for those two projects is reported as 13 gal/unit/day and 16 gal/unit/day respectively. Upon receiving these numbers Town staff questioned why the reported water use appeared to be excessively low. Follow-up discussions were held with the applicant and the City of Rohnert Park Utility Department. It was determined by a field investigation that a valve on one of the two water meters serving the Sonoma Hills project was inadvertently left open at some point in the past and the water meter

was not providing an accurate read on the water use. Therefore, the water use provided for Sonoma Hills was determined to be invalid. There were similar concerns for the water use provided for the Riverpark facility. Therefore, the applicant provided the Town with similar information for a third of their facilities, Clearwater at Tustin, located in Santa Ana. The water use for that facility is 41 gal/unit/day. Water use information was also obtained for a similar type of facility, Brookdale, located in the Town of Windsor. The actual water use at Brookdale is approximately 50 gal/unit/day.

Based on this information, the Town of Windsor is comfortable using a value of 50 gal/unit/day for the main Clearwater at Windsor facility.

A generally accepted number in the State of California for water use in an apartment is 64 gal/person/day for indoor/domestic water use. Assuming the apartments on the project site would be occupied by 2 people, this would amount to 128 gal/unit/day, which is slightly higher than the number used in the IS.

There is not sufficient information available on the actual use of the commercial units at this time. Therefore, the value used in the IS will be considered acceptable.

Therefore, estimated potable water use for the entire Clearwater project is reflected in the following chart:

Estimated Water Consumption

Use	Unit	Amount	Rate	Total (gallons/day)	Total (gallons/year)
Memory Care	Each	34	50 gallons/unit/day	1,700	620,500
Assisted Living	Each	71	50 gallons/unit/day	3,550	1,295,750
Independent Living	Each	141	50 gallons/unit/day	7,050	2,573,250
Apartments	Each	12	128 gallons/unit/day	1,536	560,640
Retail/Restaurant	Sq. Ft.	16,423	80 gallons/unit/1,000 sq. ft.	1,314	479,552
Office	Sq. Ft.	5,164	80 gallons/unit/1,000 sq. ft.	413	150,789
Total				**15,563**	**5,680,480**

Notes: 1) The applicant is proposing to construct a new well to provide irrigation water. 2) There are a total of 10 apartments proposed as part of the project. However, there are 2 commercial units which will be used as models for the main facility and it is possible that these two model units could become apartments in the future. Therefore, there are 12 apartments shown in the table.

Therefore, the total estimated annual domestic water consumption for the project of 5,680,480 gallons is approximately 39% of the estimated annual total of 14,611,680 gallons reflected in the IS.

The Town of Windsor 2020 Urban Water Management Plan includes a list of development projects. The Clearwater site is listed as no. 36 on the list with a name of Vicini/Clearwater (it should be noted that the accompanying map in the Plan has the Vicini/Clearwater site labeled as no. 31).

The 2019 Windsor Water Master Plan includes Appendix D – Specific Development Projected Demands. Appendix D lists a water consumption value of 27,137 gal/day for the Vicini/Clearwater site which equates to 9,905,005 gal/yr or 30.4 AFY. The justification for this number is explained in Sec. 3.2.2 of the Water Master Plan. Following are website addresses for the Urban Water Management Plan and the Water Master Plan:

Town of Windsor Urban Water Management Plan - 2020
https://www.townofwindsor.com/DocumentCenter/View/26405/Urban-Water-Management-Plan-Final-2020

Town of Windsor Water Master Plan Update - 2019
https://www.townofwindsor.com/DocumentCenter/View/26406/Windsor-Final-Water-Master-Plan-2019

Per the Estimated Water Consumption table above, the project water demand of the proposed project is 15,563 gal/day which equates to 5,680,495 gal/yr or 17.4 AFY. Therefore, the projected demand of the project as proposed is 57% of the projected demand shown in the Water Master Plan for this property.

It should be noted that none of the facilities researched for this memo are restricted to single occupancy. An unknown number of units do have more than one occupant. There is a sufficient difference between the projected demand of the project and the projected demand per the Water Master Plan to justify any discussion on unit occupancy being single occupant or multiple occupants.

Conclusion

The projected water demand of the Clearwater project as proposed is well within the projected demand per the Urban Water Management Plan.

Appendix J

Firetruck Turning Exhibit and Ground Floor Fire Corridor Plan

LOT 3

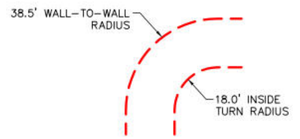
LOT 2

LOT 4

LOT 1



VICINITY MAP
NOT TO SCALE



FIRE APPARATUS TYPICAL TURNING RADIUS

THE RADIUS REQUIREMENTS REFLECTED IN THE GRAPHIC ABOVE WERE OBTAINED FROM THE TOWN OF WINDSOR FIRE DEPARTMENT.

N

60 0 60 120
scale 1" = 60' feet

FIRE TRUCK TURNING EXHIBIT

CLEARWATER ASSISTED LIVING
TOWN OF WINDSOR, CALIFORNIA

APRIL 2021

PREPARED BY

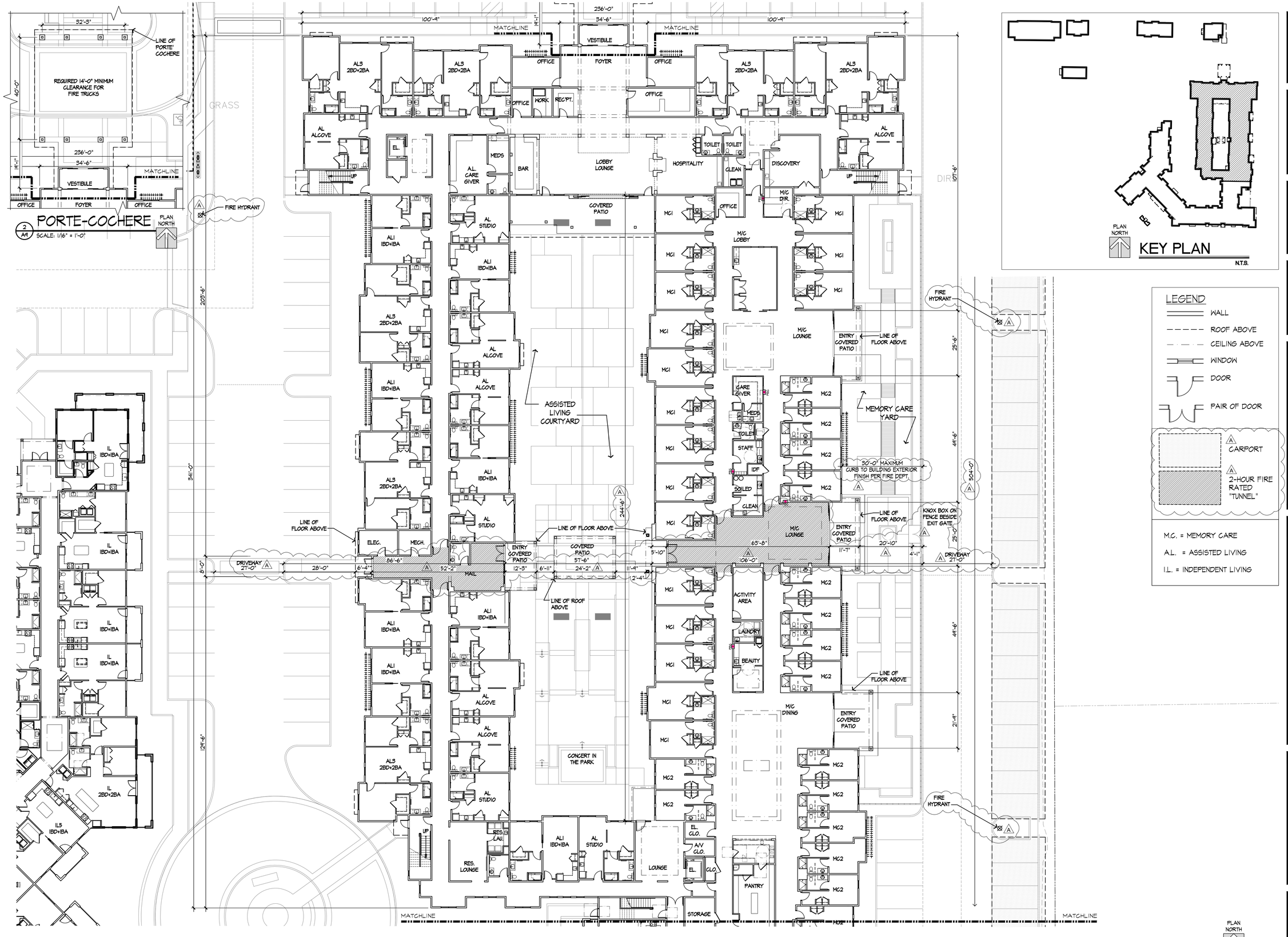
BKF
200 4th STREET
SUITE 300
SANTA ROSA, CA 95401
(707) 583-8500
www.bkf.com

JOB NO. 20169082 SHEET 1 OF 1 SHEETS

Plot Apr 27, 2021 at 10:07am

169082_TENT.dwg

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LEGEND

- WALL
- ROOF ABOVE
- CEILING ABOVE
- WINDOW
- DOOR
- PAIR OF DOOR
- A CARPORT
- A 2-HOUR FIRE RATED "TUNNEL"

M.C. = MEMORY CARE

A.L. = ASSISTED LIVING

I.L. = INDEPENDENT LIVING

MEMORY CARE & ASSISTED LIVING ENLARGED FIRST FLOOR PLAN

1 / A9 SCALE: 1/16" = 1'-0"

PLAN NORTH

ARCHITECTURAL CONCEPTS INC.

SHARON RISSLING
2401 WEST BAY DRIVE, SUITE 503
LARGO, FL 33770

CLEARWATER LIVING

PROPOSED:

CLEARWATER AT WINDSOR

A MIXED USE RETIREMENT COMMUNITY

SHILOH ROAD,
WINDSOR, CA

DO NOT SCALE PRINTS

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PUBLICATION	DATE
A PLANNING RESPONSES	08-11-2021

Draft Print
09/24/2021 12:17:05 PM

PLOT DATE:
9/24/2021 12:15:51 PM

FILE LOCATION:
P:\1750-1799\1792 - Clearwater Senior Living - Windsor CA\Arch\Drawings\24X36 A9 - MC AL North First Floor.dwg

SHEET DESCRIPTION:
SENIOR LIVING BUILDING
MEMORY CARE & ASSISTED LIVING
FIRST FLOOR PLAN

PROJECT NO.	SCALE:
1792	AS NOTED

DRAWING NO.
A9

Appendix K

Windsor Evacuation Zone WI-D and Possible Evacuation Routes

WINDSOR EVACUATION ZONE **WI-D**
POSSIBLE EVACUATION ROUTES

TOWN OF WINDSOR

Possible Exit Routes

Evacuation Zone Area

ARATA LN
HEMBREE LN
CHALK HILL RD
LOS AMIGOS RD
WINDSOR RD
CONDE LN
PLEASANT AVE
OLD REDWOOD HWY
FAUGHT RD
MITCHELL LN
SHILOH RD
E SHILOH RD
101
AIRPORT BLVD
FULTON RD

JENSEN LN
PISTACHIO PL
GINKGO PL
4TH ST
3RD ST
FRANKLIN ST
ALDEN CT
ALDEN LN
PLANETREE DR
LEAFHAVEN LN
SHAGBARK ST
SMOKETREE ST
SHADETREE DR
QUINCE ST
FLAME TREE CIR
SUGAR MAPLE LN
COLLET LN
COCK ROBIN AVE
BLUEBIRD DR
CREEKSIDE DR
BRIANNE CIR
USHER DR
DOVE LN
SHANNON WAY
SHIRA ST
WADE DR
BRIANNE ST
CORNELL ST
DARCY DR
SHAMROCK CIR
BILLINGTON LN
DARTMOUTH WAY
YALE ST
WILSON LN
HASTINGS PL
ETON LN
DEANNA PL
OLD REDWOOD HWY
LOCKWOOD DR
SAVANNAH WAY
AMIE DR
GABRIELLE DR
ANNA DR
TAMARA LN
WRIGHT WAY
BARRIO WAY
MOLL DR
VICTORY LN
TAMARA WAY
MERNER DR
BUSINESS PARK CT
SHILOH RD
LEONA CT
CHRIS ST
GRIDLEY DR
LEA ST
MATHILDE DR

0 0.5 1 Miles

N W E S

Town of Windsor - April 2021

Appendix L

Town of Windsor Applicable General Plan Policies

Land Use and Community Design Element

Policy LU-13.1 **Review Shiloh Village Vision Plan.** The Town shall review and update the Shiloh Village Vision Plan to develop a feasible development plan that can achieve the community's vision for the Shiloh Road area.

Policy LU-13.2 **Shiloh Road Annexation and Development.** The Town shall require that portions of the Shiloh Road East area within the Town's Urban Growth Boundary be annexed prior to or concurrent with development.

Policy LU-13.3 **Shiloh Road Configuration.** Shiloh Road shall be designated a five-lane crosstown street from Old Redwood Highway, west to Skylane Blvd. Shiloh Road shall transition from a five-lane crosstown street to a twolane crosstown street and rural lane from Skylane Blvd, west to Windsor Road.

Policy LU-13.4 **Shiloh Road Transit Stops.** The Town shall require transit stops to be provided at key intersections and activity centers, as appropriate and in consultation with Sonoma County Transit

Policy LU-13.5 **Shiloh Road East Pedestrian-Friendly Design.** The Town shall encourage buildings and sites within the Shiloh Road East area that is designated mixed use to integrate design features that create a pedestrian-friendly environment, including small blocks, siting buildings close to the sidewalks, providing small plazas, providing outdoor eating areas, and including public art.

Policy LU-13.6 **Shiloh Road East Road Design.** The Town shall encourage roads within the Shiloh Road East area to be designed to:

a. minimize street widths to the extent possible;

b. follow a grid pattern;

c. accommodate bicycles;

d. include wide attached sidewalks with street trees and street furniture along the boulevard;

e. provide for bus stops in appropriate locations;

f. include planted parkways between the sidewalk and street whenever possible in residential areas;

g. avoid cul-de-sacs;

h. include bulb-outs at corners;

i. use loop roads; and

j. provide on-street parking.

Policy LU-13.7 **Shiloh Road East Lot Consolidation.** The Town shall develop a strategy for overcoming parcel fragmentation and shall facilitate land assemblage and lot consolidation to encourage the Shiloh Road East area to develop in a comprehensive manner.

Policy LU-13.8 **Neighborhood Compatibility.** The Town shall ensure that development of the mixed-use parcels on the south side of Shiloh Road considers the interface with the lower-density parcels to the south. The mixed-use area shall be connected, and not walled off from, the lower-density residential area, but still designed in a way that reduces conflict and promotes compatibility between uses.

Environmental Resources Element

Policy ER-1.1 **Open Space Preservation.** The Town shall seek to preserve open space resources (i.e., productive farmlands, outdoor recreation areas, biological habitats, visually prominent landforms, Alquist-Priolo Special Study Zones, and flood hazard areas) through avoidance of development in these areas.

Policy ER-1.2 **Sensitive Habitat Preservation.** The Town shall encourage the preservation of sensitive environmental habitat areas, such as oak woodlands, productive farmlands, riparian (creekside) corridors, and important wildlife movement corridors through measures such as clustering development and conservation easements.

Policy ER-5.1 **Community Greenhouse Gas Reduction.** The Town shall strive to reduce emissions by 25 percent below the 1990 community emissions level by 2020, and further reduce community emissions by:

- 40 percent below the 1990 level by 2030;
- 60 percent below the 1990 level by 2040; and
- 80 percent below the 1990 level by 2050 (New Policy, Town Staff and Consultants)

Policy ER-5.2 **Municipal Services Greenhouse Gas Reduction.** The Town shall strive to reduce municipal emissions by 26.2 percent below the 2000 municipal emissions level by 2020, and further reduce municipal emissions by:

- 40 percent below the 1990 level by 2030
- 60 percent below the 1990 level by 2040
- 80 percent below the 1990 level by 2050 (New Policy, Town Staff and Consultants)

Policy ER-5.3 **Greenhouse Gas Efficiency Target.** The Town shall ensure that all new development Projects and Public Works Improvement Projects would result in less than (*) metric tons CO2e per capita (including residents and employees) per year in order to ensure that the emissions targets for the years 2030 and 2050 in ER-5.1 and ER-5.2 would be achieved. *Note: Policy ER-5.3 is a placeholder “emissions threshold” policy that will be used to satisfy 5.1 and 5.2. The actual target will be set once the land use diagram has been confirmed and the associated impacts analyzed.

Policy ER-5.4 **Encourage Development Patterns that Reduce Greenhouse Gas Emissions.** The Town shall strive to reduce greenhouse gas emissions by encouraging compact, mixed-use, pedestrian/bicycle friendly, transit oriented development that reduces vehicle miles traveled (VMT); promoting energy efficient building enhancements, construction

practices, design, and site planning; improving the job-to-housing ratio; and other methods of reducing greenhouse gas emissions while maintaining a balance of housing types.

Policy ER-5.5 **AB 32 and SB 32 Greenhouse Gas Assessment and Monitoring.** The Town shall continue to assess and monitor performance of greenhouse gas emissions (GHG) reduction efforts beyond the AB 32 designated 2020 goal, including progress towards meeting long-term GHG emissions reduction goals for 2030 (consistent with SB 32) and 2050, as well as the effects of climate change and associated levels of risk, in order to plan a community that is resilient and can adapt to changing climate conditions and its negative impacts.

Policy ER-5.6 **Coordinate with BAAQMD and NSCAPCD.** The Town shall coordinate with BAAQMD and NSCAPCD to ensure projects incorporate feasible mitigation measures to reduce GHG emissions and air pollution, if not already provided for through project design.

Policy ER-5.9 **Energy Conservation through Land Use.** The Town shall promote the creation of a land use pattern that reduces operational energy requirements, especially for transportation purposes, by:

a. Avoiding land use configurations and siting decisions that result in single-purpose automobile trips, and instead encouraging patterns that result in multi-purpose trips.
b. Promoting land use patterns that may be easily served by local transit and linked with regional transit.
c. Promoting land use patterns that provide employment opportunities for Windsor residents.

Policy ER-5.10 **Energy Performance Standards.** The Town shall require new construction to meet targeted energy performance standards to advance Town greenhouse gas reduction and other sustainability goals and policies identified in the 2040 General Plan. The Town will allow new development to select from a range of options to achieve a minimum energy performance standard, including but not limited to:

- Solar easements to guarantee access to increased renewable energy generation;
- Installation of EV charging stations in homes and in commercial development to increase the ability for the public to use zero-emission vehicles;
- Passive heating and cooling building design;
- Solar roof and carport panels;
- Cool roofs;
- SMART appliances;
- Wind generation;
- Installation of energy efficient appliances and fixtures; and
- Other emerging technologies as they become available. The Town shall work with affordable housing.

Policy ER-5.11 **Zero Net Energy Goals.** The Town shall strive to implement the State goal of zero net energy (ZNE) in all new residential construction by 2020 and ZNE in all new commercial construction by 2030.

Policy ER-5.14 **Compliance with Energy Regulations.** The Town shall continue to enforce State energy regulations governing energy consumption and use of solar and other renewable energy resources in existing and new development.

Policy ER-5.15 **Title 24 Application.** The Town shall require energy conservation standards for new residential construction, commercial construction, and within Town facilities, as contained in Title 24 of the California Code of Regulations, to be periodically reviewed to identify opportunities for adopting standards that more closely respond to local conditions, especially in the area of passive design, to reduce cooling loads.

Policy ER-5.16 **Address Heat Island Effect in Parking Lots.** The Town shall require the planting of shade trees in parking lots to reduce the heat island effect.

Policy ER-5.17 **Urban Shade Tree Planting.** The Town should expand urban shade tree planting by 500 trees to provide shade in both the public right-of-way and as part of development proposals.

Policy ER-5.18 **Preservation of Trees.** The Town shall require the preservation of trees in parking lots and in the public right-of-way per development standards.

Policy ER-6.1 **Protection of Biological and Ecological Resources.** The Town shall protect significant biological and ecological resources in Windsor, including:

a. Wetlands, in particular, high value wetlands
b. Rare, threatened, or endangered species
c. Vulnerable habitats
d. Vernal pools
e. Oak groves and woodlands
f. Riparian woodlands
g. Heritage trees.

Policy ER-9.2 **Development Guidelines along Scenic Corridors.** The Town shall ensure that development proposals along scenic corridors do not detract from public viewpoints, are protected, and are harmonious and subordinate to the natural features that comprise the scenic viewshed. The Town shall require developers include components of project design that shall be considered in making this assessment include building height, massing, orientation, color, building materials, rooftop appurtenances, storage areas, signage, lighting, and low-water landscaping. The purpose of detailed development review along these corridors is to ensure that development within the viewshed preserves and enhances attractive natural and man-made vistas.

Public Facilities and Services Element

Policy PFS-1.6 **Energy Efficient Buildings and Infrastructure.** The Town shall continue to improve energy efficiency of Town buildings and infrastructure through efficiency improvements, equipment upgrades, and installation of clean, renewable energy systems to achieve climate action goals and reduce operating costs.

Public Health and Safety Element

Goal PHS-8 **Minimize, control, and abate noise interference from indoor and outdoor noise sources and activities that exceed desirable sound levels.**

Policy PHS-4.3 **Fire Suppression Requirements.** The Town shall require additional mitigation for development projects unable to satisfy minimum fire flow requirements.

Policy PHS-4.9 **Priority Undergrounding.** Prioritize undergrounding of utilities along emergency access and evacuation routes to make them more reliable and to minimize hazards from fallen power lines.

Housing Element

Policy H-1.2 The Town shall encourage development of a range of housing types affordable to various income groups, including single family and multifamily dwellings, “move-up” housing, senior housing, secondary and other smaller units, and special needs housing.

Policy H-1.4 The Town shall strive to ensure new housing is provided to meet the needs of the local workforce that work and serve the community (e.g., teachers, police officers, fire fighters, nurses and hospital workers, retail and service workers.

Policy H-6.2 The Town shall encourage the development, rehabilitation, and preservation of senior housing, particularly in areas that are accessible to public transit, commercial services, and health and community facilities.