

To: **Town of Eagle**  
**ATTN: Ryan Johnson, Town Engineer**  
PO Box 609  
1150 Chambers Avenue  
Eagle, CO 81631

From: **McDowell Engineering**  
Kari J. McDowell Schroeder, PE, PTOE

Date: January 26, 2026

Re: **Capitol + Grand**  
**Revised Unit Count Trip Generation Analysis and TIS Updates**  
Eagle, Colorado

## **Purpose**

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The purpose of this memorandum is to present the proposed land use density changes to the previously submitted Transportation Impact Study (Original TIS) dated July 10, 2024, and explain the impacts of the proposed changes.

## **Proposed Changes to Application**

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The TIS submitted in July 2024 was based upon the original development submittal that contained a site layout with a total of 170 dwelling units. The proposed development changes will reduce the number to 101 dwelling units.

## **Trip Generation Revisions**

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### **Original TIS**

In the Original TIS, trip generation rates were taken from Land Use #221 Multifamily Housing (Mid-Rise) of the Institute of Transportation Engineers' (ITE's) *Trip Generation Manual*<sup>1</sup>. Land Use #221 was chosen for the Original TIS due to the size of the proposed buildings having more than three (3) stories. Per the Land Use #221 description:

*"Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways."*

The resulting trip generation for the Original TIS is shown in **Table 1** below.

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<sup>1</sup> *Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers, September 2021.

*Table 1: Original TIS - Trip Generation Calculations from July 2024 TIS*

ITE Code	Units <sup>2</sup>	Eq. Coef	ITE Trip Generation Equation <sup>3</sup>			Avg. Trips (VPD)	Morning Peak Hour		Evening Peak Hour					
			Avg. Weekday	AM Peak Hour	PM Peak Hour		Inbound	Outbound	Inbound	Outbound				
			Rate	A	A		% Trips	Trips (vph)	% Trips	Trips (vph)	% Trips	Trips (vph)		
<b>Proposed Land Use</b>														
#221 - Multifamily Housing (Mid-Rise)	170 DU	Type a= b=	4.54	0.32	0.32	772	26%	16	74%	45	60%	42	40%	28
<i>Multi-Modal Reduction</i>	<i>-10%</i>			5.84	15.57	<i>-77</i>		<i>-2</i>		<i>-5</i>		<i>-4</i>		<i>-3</i>
<b>Proposed New Trips</b>						<b>695</b>		<b>14</b>		<b>40</b>		<b>38</b>		<b>25</b>
								<b>54</b>				<b>63</b>		

**Notes:**

<sup>1</sup> Values obtained from *Trip Generation, 11th Edition*, Institute of Transportation Engineers, September 2021.

<sup>2</sup> DU = Dwelling Units, kSF = 1,000 Square Feet

<sup>3</sup> Fitted curve equations from ITE Land Uses - Equation Type A is  $T = a * X + b$ , Type B is  $\ln(T) = a * \ln(X) + b$ , Rate is  $T = a * X$

Per the Original TIS, the development is anticipated to generate 695 vehicle trips per day (vpd). This includes 54 vehicle trips per hour (vph) during the weekday morning peak hour, and 63vph during the weekday evening peak hour.

**Proposed Changes**

The proposed changes will reduce the number of dwelling units from 170 to 101. Additionally, the buildings will now have a maximum of three (3) stories. As a result, ITE Land Use #220, Multifamily Housing (Low-Rise) was chosen for the proposed changes. Per the Land Use #220 description:

*“Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.”*

**Table 2** shows the proposed trip generation and is anticipated to generate 651 vehicle trips per day (vpd). This includes 56 vehicle trips per hour (vph) during the weekday morning peak hour, and 69vph during the weekday evening peak hour.



**Table 2: Proposed Changes - Trip Generation Calculations**

ITE Code	Units <sup>2</sup>	Eq. Coef	ITE Trip Generation Equation <sup>3</sup>			Avg. Trips (VPD)	Morning Peak Hour		Evening Peak Hour					
			Avg. Weekday	AM Peak Hour	PM Peak Hour		Inbound	Outbound	Inbound	Outbound				
<b>Proposed Land Use</b>														
#220 - Multifamily Housing (Low-Rise)	101 DU	Type a= b=	A 6.41 75.31	A 0.35 28.13	A 0.42 34.78	723	24%	15	76%	48	62%	48	38%	29
Multi-Modal Reduction	-10%					-72		-2		-5		-5		-3
<b>Proposed New Trips</b>						<b>651</b>		<b>13</b>		<b>43</b>		<b>43</b>		<b>26</b>
								<b>56</b>				<b>69</b>		

**Notes:**

<sup>1</sup> Values obtained from *Trip Generation, 11th Edition*, Institute of Transportation Engineers, September 2021.

<sup>2</sup> DU = Dwelling Units, kSF = 1,000 Square Feet

<sup>3</sup> Fitted curve equations from ITE Land Uses - Equation Type A is  $T = a * X + b$ , Type B is  $\ln(T) = a * \ln(X) + b$ , Rate is  $T = a * X$

**Comparison of Original TIS and Proposed Changes**

Per ITE’s historic data, a Low-Rise multifamily building generates more vehicular traffic per unit than a Mid-Rise multifamily building. **Table 3** shows the comparison between anticipated daily and hourly peak trips for the Original TIS and the proposed changes.

**Table 3: Comparison of Original TIS and Proposed Changes for Trip Generation**

Scenario	ITE Land Use Code	Number of Dwelling Units (DU)	Average Weekday Trips (vpd)	Morning Peak Hour Trips (vph)	Evening Peak Hour Trips (vph)
<b>Original TIS</b>	#221 – Multifamily Housing (Mid-Rise)	170	695	54	63
<b>Proposed Changes</b>	#220 – Multifamily Housing (Low-Rise)	101	651	56	69
<b>Difference (Proposed – Original)</b>	N/A	-69 (59% lower)	-44 (6.3% lower)	+2 (3.7% higher)	+6 (9.5% higher)

**Note:** Positive Difference Values (+) indicate that the Proposed Changes are Higher than the Original TIS

From the above table, the change from the Original TIS to the Proposed Changes is anticipated to generate 44 less vehicle trips per day (vpd). This includes two (2) additional vehicle trips per hour (vph) during the weekday morning peak hour, and six (6) additional vph during the weekday evening peak hour.

The Average Weekday, Morning Peak Hour, and Evening Peak Hour trips do not show a proportional drop that would correlate with the 59% decrease in dwelling units. As mentioned earlier, this is due to the change of the ITE Land Use Code to be consistent with the Proposed Changes to the development. The Land Use #220, Multifamily Housing (Low-Rise) uses a calculation that results in a higher rate per unit for

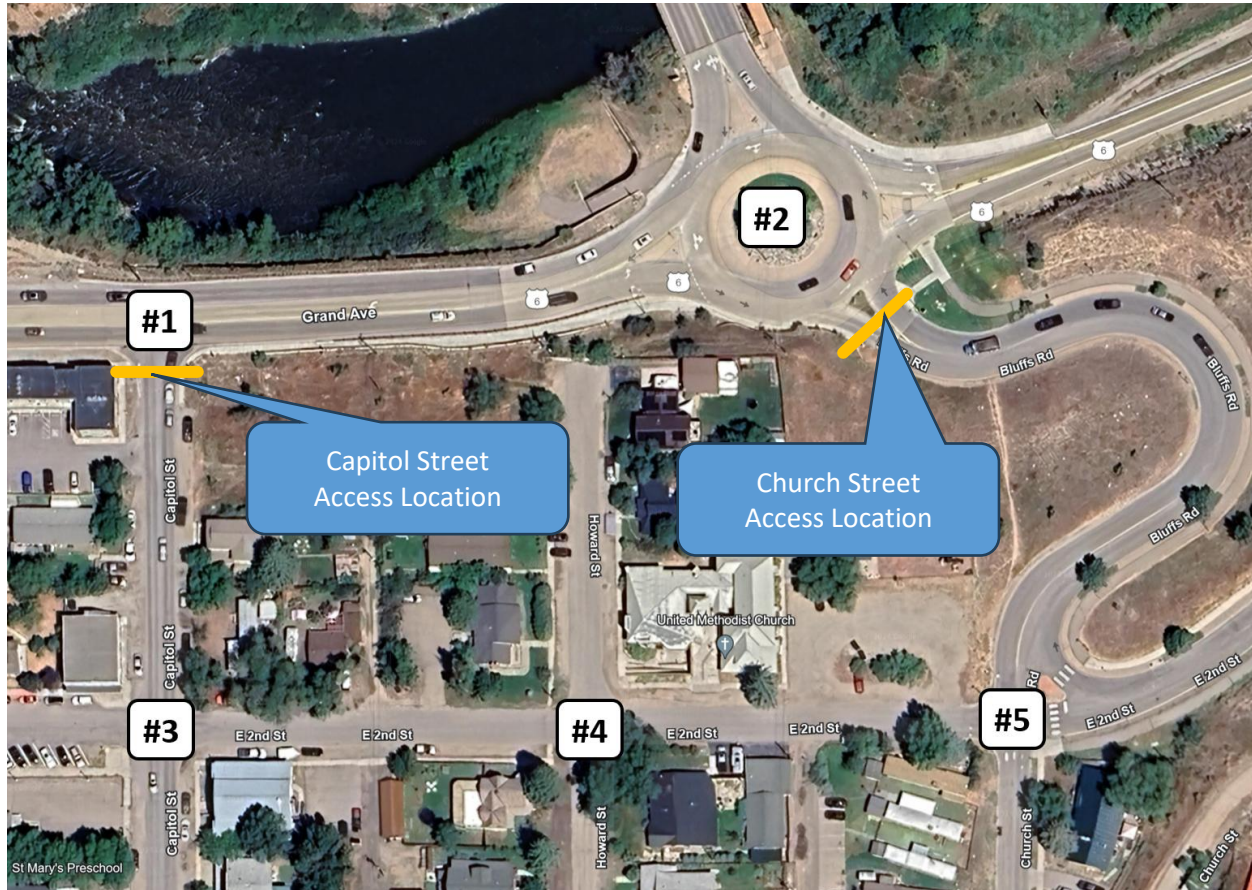


Morning and Evening Peak Hour operations, but results in a slightly lower Average Weekday daily trip traffic volume.

### Impacts of the Proposed Changes to the Original TIS

When the revised trip generation calculations are applied to the overall transportation network, the net changes in impacts are negligible from the perspective of the level of service (LOS) and percentage of impact at the access points to Grand Avenue.

*Figure 1: Access Volume Locations*



The locations of the access points onto Grand Avenue from Capitol Street and Church Street are shown in **Figure 1**. **Table 4** provides a summary of the Original TIS and Proposed Changes access volumes at these two locations. From the table, the net change is less than 1% of the overall volume. This very small change does not result in any net change to the level of service, queuing, or delay from the Original TIS. Therefore, all of the recommendations and conclusions from the Original TIS are still valid, and there are no further recommendations as a result of the change of dwelling units for the proposed changes.

*Table 4: Comparison of Original TIS and Proposed Changes for Trip Generation*

Scenario	Capitol Street Access Volume (AM Peak) (vph)	Capitol Street Access Volume (PM Peak) (vph)	Church Street Access Volume (AM Peak) (vph)	Church Street Access Volume (PM Peak) (vph)
<b>Original TIS</b>	328	356	691	509
<b>Proposed Changes</b>	328	357	693	513
<b>Difference (Proposed – Original)</b>	0 (0% Change)	+1 (0.3% Increase)	+2 (0.3% Increase)	+4 (0.8% Increase)

**Analysis of Build Year 2028**

The Town of Eagle has indicated that it intends to begin construction of the first phase of the Grand Avenue Corridor, which includes improvements at the Grand Avenue and Capitol Street intersection. (Intersection #1). To summarize the operations at this intersection, HCM analysis was performed for the Background AM and PM, as well as Total AM and PM conditions for Year 2028 traffic conditions. This analysis of Year 2028 assumes that the Grand Avenue improvements at Grand Avenue and Capitol Street have been completed, and is the same analysis that is performed in the Year 2045 calculations. **Table 5** and **Table 6** show the Year 2028 Background and Total HCM Analysis, as well as the Year 2025 and Year 2045 analyses from the Original TIS.

*Table 5: Intersection 1 Background Level of Service*

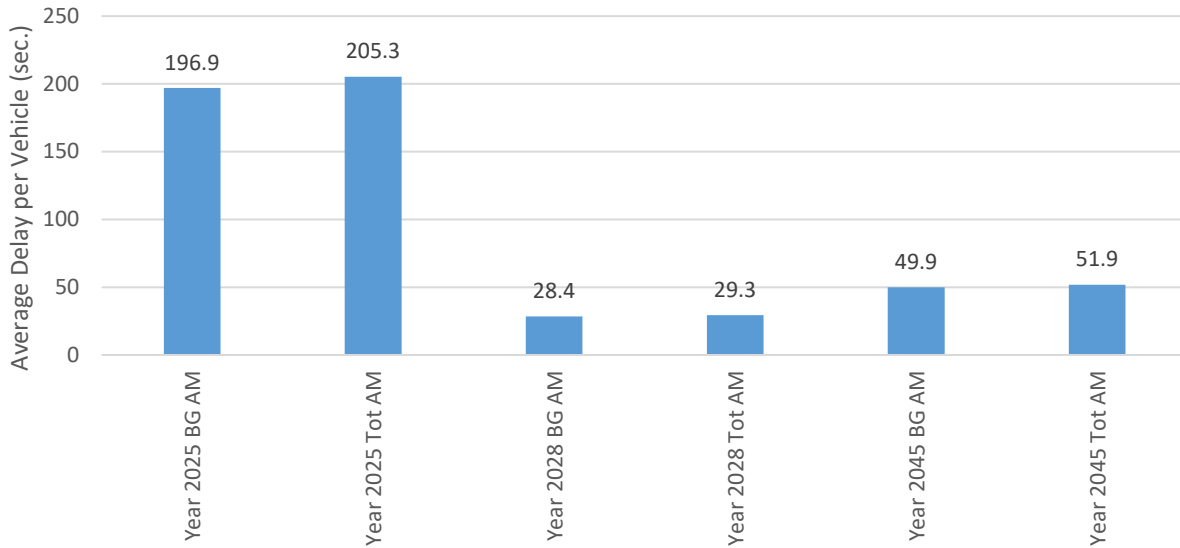
#	Int.	Traffic Control	Approach	Year 2025 Background Level of Service (Delay in Seconds)		Year 2028 Background Level of Service (Delay in Seconds)		Year 2045 Background Level of Service (Delay in Seconds)	
				AM	PM	AM	PM	AM	PM
1	Grand Ave and Capitol St	NB Stop	EB	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
			WB	A (3.3)	A (3.4)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
			NB	F (196.9)	F (57.2)	D (28.4)	C (19.3)	E (49.9)	D (26.3)

*Table 6: Intersection 1 Total Level of Service*

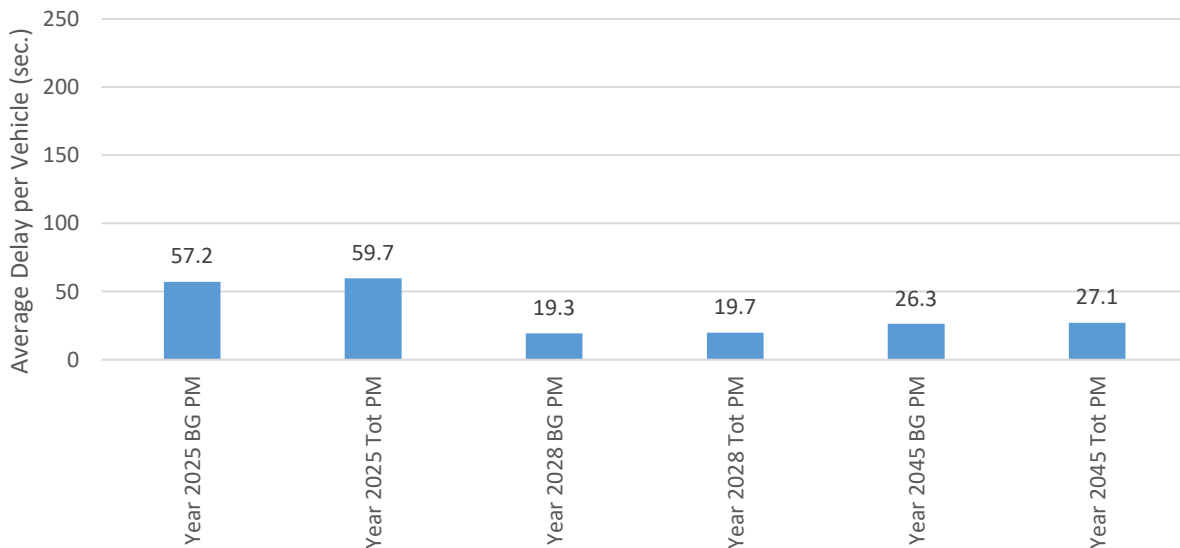
#	Int.	Traffic Control	Approach	Year 2025 Total Level of Service (Delay in Seconds)		Year 2028 Total Level of Service (Delay in Seconds)		Year 2045 Total Level of Service (Delay in Seconds)	
				AM	PM	AM	PM	AM	PM
1	Grand Ave and Capitol St	NB Stop	EB	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
			WB	A (3.3)	A (3.5)	A (0.0)	A (0.0)	A (0.0)	A (0.0)
			NB	F (205.3)	F (59.7)	D (29.3)	C (19.7)	F (51.9)	D (27.1)

**Figure 2** and **Figure 3** show the results of the above tables graphically for the northbound movement, grouped together as AM Peak Hour operations and PM Peak Hour operations respectively.

**Figure 2: Intersection 1 Level of Service for AM Peaks (Northbound Movement Only)**



**Figure 3: Intersection 1 Level of Service for PM Peaks (Northbound Movement Only)**



**Figure 2** shows all of the combined AM Peak northbound movements, and **Figure 3** shows all of the combined PM Peak northbound movements. It also assumes that the Grand Avenue Corridor improvements are made in Year 2028.

As a result, the northbound right turn movement can be expected to see a LOS of 29.3 seconds (LOS D) in the morning peak hour, and a LOS of 19.7 (LOS C) in the evening peak hour with project traffic (Total conditions). It should be noted that the difference between the background and total conditions for Year 2028 traffic are very small. For the AM peak, the difference between background and total is 0.9 seconds

of delay, and for the PM peak, the difference between background and total is 0.4 seconds. These small differences are essentially negligible.

## Summary and Conclusions

The proposed development changes will reduce the number to 101 dwelling units from the Original TIS value of 170 dwelling units. The buildings are being reduced in height. Therefore, a different ITE Land Use was utilized. The calculations of this new land use produced trip generation values that were within 10% of the Original TIS values, despite the number of dwelling units decreasing by 59%. However, when this new trip generation is combined with long-term background traffic to show the total traffic, the net difference is less than a 1% increase.

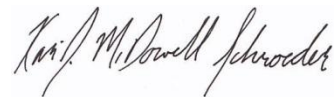
An analysis of Year 2028 conditions examined the Grand Avenue and Capitol Street intersection, as the Town intends to have this intersection reconstructed per the Grand Avenue Corridor Plan by 2028. The AM and PM Peak Level of Service (LOS) is 29.3 seconds of average vehicle delay (LOS D) in the morning, and 19.7 seconds of average vehicle delay (LOS C) during the evening peak hour with project traffic (Total Traffic Conditions)

As a result, there is not a net change to the level of service, queuing, or delay from the Original TIS. Likewise, all recommendations and conclusions from the original TIS remain unchanged.

Please contact me directly with any questions about this information.

Sincerely,

**McDowell Engineering**

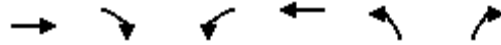


Kari McDowell Schroeder, PE, PTOE  
Traffic/Transportation Engineer

Enc: HCM Analysis – Synchro Modelling Worksheets

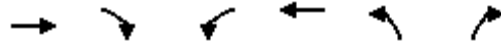


1: Capitol St & Grand Ave  
 Year 2028 Background AM.syn



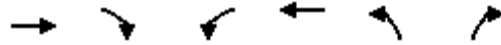
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (veh/h)	1126	3	0	751	0	268
Future Volume (Veh/h)	1126	3	0	751	0	268
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1224	3	0	816	0	291
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1227	1634	614	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1227	1634	614	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	33	
cM capacity (veh/h)			564	92	435	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	
Volume Total	816	411	408	408	291	
Volume Left	0	0	0	0	0	
Volume Right	0	3	0	0	291	
cSH	1700	1700	1700	1700	435	
Volume to Capacity	0.48	0.24	0.24	0.24	0.67	
Queue Length 95th (ft)	0	0	0	0	120	
Control Delay (s)	0.0	0.0	0.0	0.0	28.4	
Lane LOS					D	
Approach Delay (s)	0.0		0.0		28.4	
Approach LOS					D	
<b>Intersection Summary</b>						
Average Delay			3.5			
Intersection Capacity Utilization			54.5%	ICU Level of Service	A	
Analysis Period (min)			15			

1: Capitol St & Grand Ave  
 Year 2028 Background PM.syn



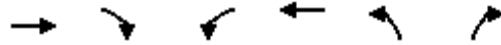
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (veh/h)	824	9	0	1630	0	283
Future Volume (Veh/h)	824	9	0	1630	0	283
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	896	10	0	1772	0	308
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			906	1787	453	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			906	1787	453	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	44	
cM capacity (veh/h)			747	73	554	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	
Volume Total	597	309	886	886	308	
Volume Left	0	0	0	0	0	
Volume Right	0	10	0	0	308	
cSH	1700	1700	1700	1700	554	
Volume to Capacity	0.35	0.18	0.52	0.52	0.56	
Queue Length 95th (ft)	0	0	0	0	85	
Control Delay (s)	0.0	0.0	0.0	0.0	19.3	
Lane LOS						C
Approach Delay (s)	0.0		0.0		19.3	
Approach LOS						C
<b>Intersection Summary</b>						
Average Delay			2.0			
Intersection Capacity Utilization			48.4%	ICU Level of Service	A	
Analysis Period (min)			15			

1: Capitol St & Grand Ave  
 Year 2028 Total AM.syn



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (veh/h)	1126	6	0	760	0	272
Future Volume (Veh/h)	1126	6	0	760	0	272
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1224	7	0	826	0	296
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1231	1640	616	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1231	1640	616	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	32	
cM capacity (veh/h)			562	91	434	
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	
Volume Total	816	415	413	413	296	
Volume Left	0	0	0	0	0	
Volume Right	0	7	0	0	296	
cSH	1700	1700	1700	1700	434	
Volume to Capacity	0.48	0.24	0.24	0.24	0.68	
Queue Length 95th (ft)	0	0	0	0	125	
Control Delay (s)	0.0	0.0	0.0	0.0	29.3	
Lane LOS					D	
Approach Delay (s)	0.0		0.0		29.3	
Approach LOS					D	
<b>Intersection Summary</b>						
Average Delay			3.7			
Intersection Capacity Utilization			54.8%	ICU Level of Service	A	
Analysis Period (min)			15			

1: Capitol St & Grand Ave  
 Year 2028 Total PM.syn



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Traffic Volume (veh/h)	824	18	0	1635	0	286
Future Volume (Veh/h)	824	18	0	1635	0	286
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	896	20	0	1777	0	311
<b>Pedestrians</b>						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			916		1794	458
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			916		1794	458
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	43
cM capacity (veh/h)			740		72	550
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>EB 2</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	
Volume Total	597	319	888	888	311	
Volume Left	0	0	0	0	0	
Volume Right	0	20	0	0	311	
cSH	1700	1700	1700	1700	550	
Volume to Capacity	0.35	0.19	0.52	0.52	0.57	
Queue Length 95th (ft)	0	0	0	0	87	
Control Delay (s)	0.0	0.0	0.0	0.0	19.7	
Lane LOS						C
Approach Delay (s)	0.0		0.0		19.7	
Approach LOS						C
<b>Intersection Summary</b>						
Average Delay			2.0			
Intersection Capacity Utilization			48.5%	ICU Level of Service	A	
Analysis Period (min)			15			