

## 4.0 PROJECTED CONDITIONS

### 4.1 Development Plan Recognition

The improvements of the Access Control Plan Update was influenced by known development that is likely to occur in the immediate future. These plans could include the re-development of a parcel to a different land use or simply making improvements to a property frontage. The City and County are aware of the more immediate development plans and the recommendations of the Access Control Plan Update reflect that knowledge. The updated plan takes into consideration the long-range land use changes along the South College Avenue corridor.

### 4.2 South College Avenue Typical Section

The City of Fort Collins has designated South College Avenue as a Major Arterial in their Master Street Plan (see Appendix C). The cross-section for the typical Major Arterial consists of six through lanes (three in each direction), a raised and landscaped center median and 8-foot bike lanes. A 10-foot parkway and 7-foot sidewalk are also included. This section currently exists between Harmony Road and Swallow Road minus the 8-foot bike lanes. South of Harmony Road, South College Avenue consists of only four through lanes; however, it is planned to be consistent with the City’s standard for a Major Arterial between Carpenter Road (LCR 32) and Harmony Road. The lane and median widths meet or exceed CDOT requirements. The Major Arterial cross-section is represented on Figure 4-1.

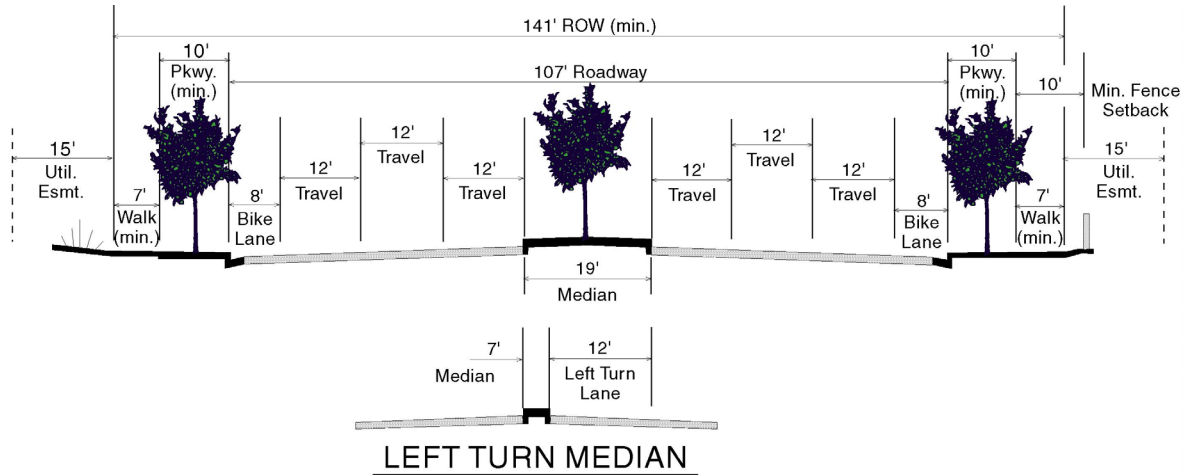


Figure 4-1 Major Arterial Cross-Section

### **4.3 Traffic Control**

One new traffic signal is planned along the study corridor, being at Triangle Drive. In addition, potential new signals could be installed at the Fairway Lane and/or Crestridge Street/Smokey Street intersections. In contrast to the new or potential installations noted above, one traffic signal that was identified in the 1989 Access Control Plan has been removed from the current plan. This location is 600 feet to the north of Trilby Road. This signal has been removed since it does not meet current traffic signal spacing criteria of the Code for a NR-A roadway. Alternative access to other traffic signals at Trilby Road and Skyway Drive is intended to provide access for adjacent properties. Traffic control at unsignalized public intersections will be controlled by stop signs. Restricted access at other locations will be achieved with raised medians.

### **4.4 Parallel Roadways**

Several parallel street connections, with both local and collector street classifications, are proposed along the corridor. Some of these connections are consistent with the 1989 plan; however, some are new. One of the parallel streets proposed in 1989 can no longer be achieved. Land between Crestridge and Cameron Drives on the west side of South College Avenue has been purchased by the City as a natural area, thereby precluding the construction of a new street through this area.

New public parallel streets are planned:

- ▶ Between Trilby Road and Skyway Drive on both the east and west sides of South College Avenue (Collector streets). This street was included in the 1989 Access Control Plan.
- ▶ Between Skyway and Bueno Drives on the east side of South College Avenue (Collector street).
- ▶ Between Fossil Creek Parkway and Fairway Lane on the east side of South College Avenue (Local street standard).

#### 4.5 Traffic Volume Forecasts

Daily and peak hour traffic forecasts, shown on Figures 4-2, 4-3 and 4-4, were developed from the following resources:

- ▶ Existing daily traffic volumes
- ▶ North Front Range traffic model projections
- ▶ Daily traffic volume projections based on CDOT's 20-year growth factors
- ▶ City of Fort Collins estimates at a 3 percent per year compounded growth rate
- ▶ Calculated estimates from adjacent traffic studies with PM peak hour projections being 10% of daily traffic volumes.

This information predicts that the annual growth rate of average daily traffic along South College Avenue and the intersecting cross streets is approximately 2.22%. As can be seen in these figures, daily traffic volume projections range from 44,300 to over 70,000 vehicles per day (vpd). Refer to the [South College Avenue \(US 287\) Access Control Plan Update Traffic Analysis Report](#) for additional information.

At most public road intersections, forecasted peak hour turning movements were estimated using a methodology presented in the National Cooperative Highway Research Program Report 255 (NCHRP 255) titled [Highway Traffic Data for Urbanized Area Project Planning and Design](#), TRB 1982. This methodology uses existing turning movements and forecasted peak hour approach and departure volumes to estimate future turning movements. At minor public roads such as Pavillion Lane, Cregar Drive and Colboard Drive, turning movements were based on the average growth rate for the corridor. At the Carpenter Road and Triangle Drive intersections, turning movements to/from the west approach were based on long range projections presented in traffic studies conducted along the corridor. Figures 4-2, 4-3 and 4-4 also illustrate future peak hour turning movements.

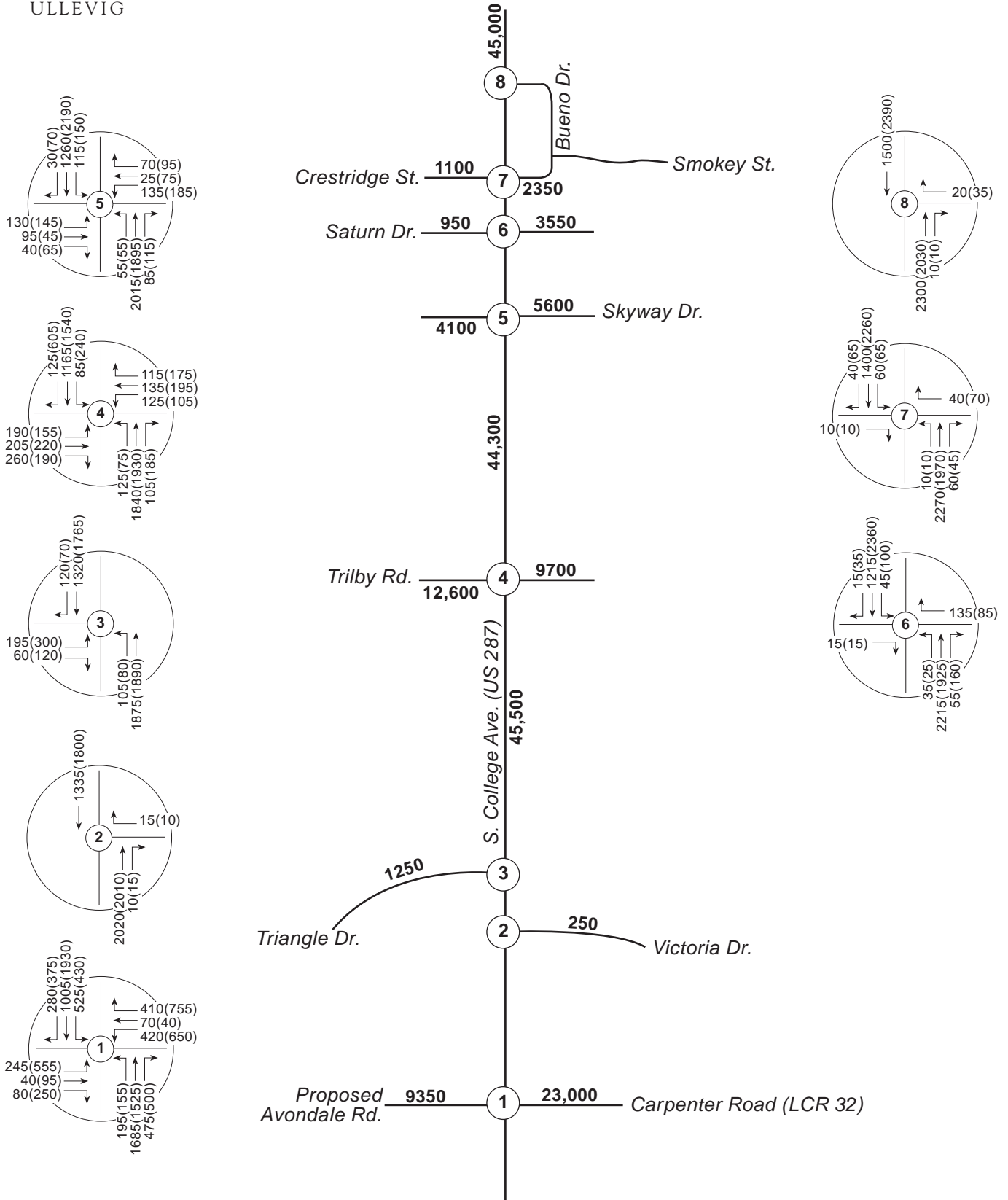
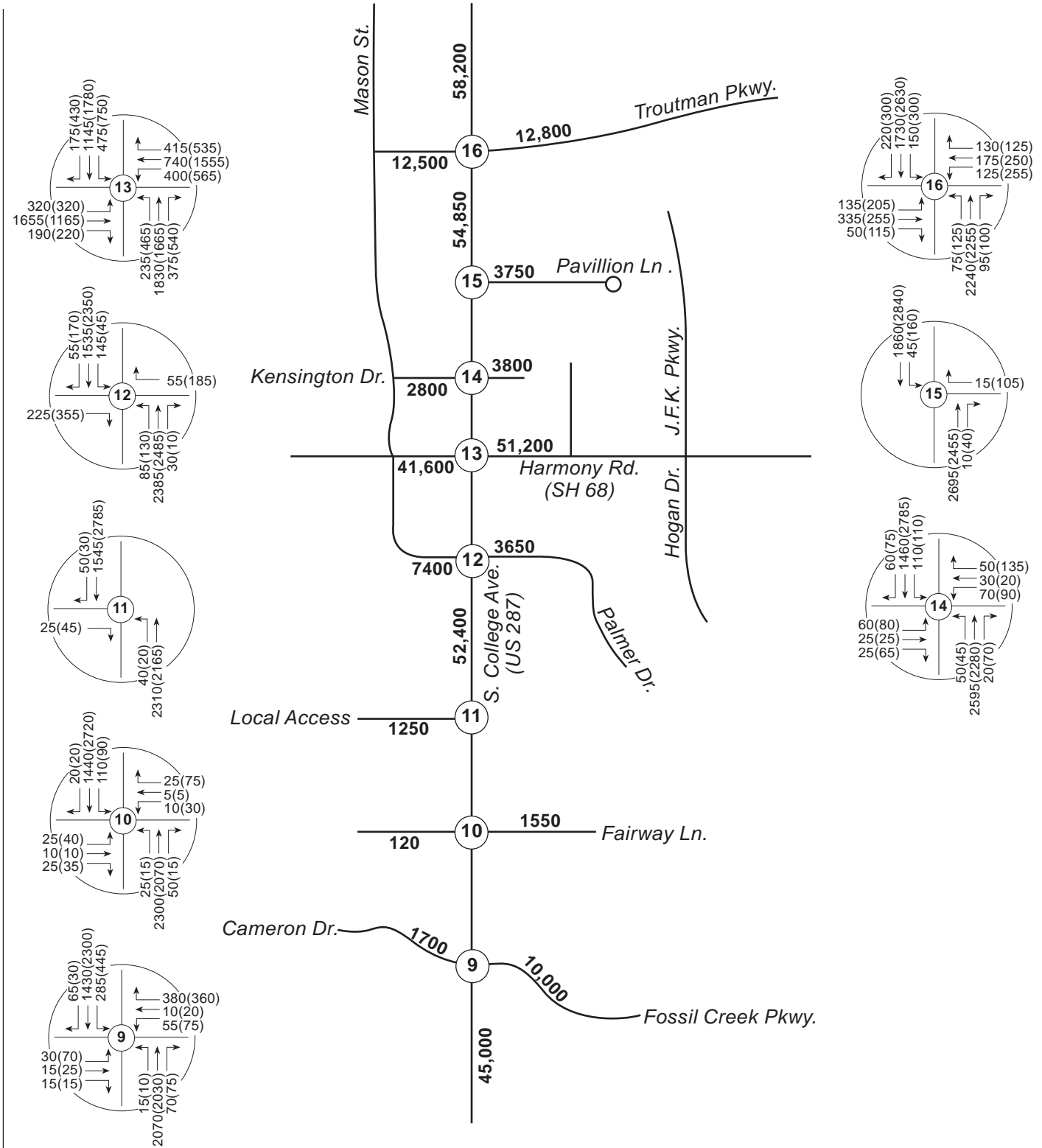


Figure 4-2  
Projected Traffic Volumes -  
Carpenter Road (LCR 32) to Bueno Dr.



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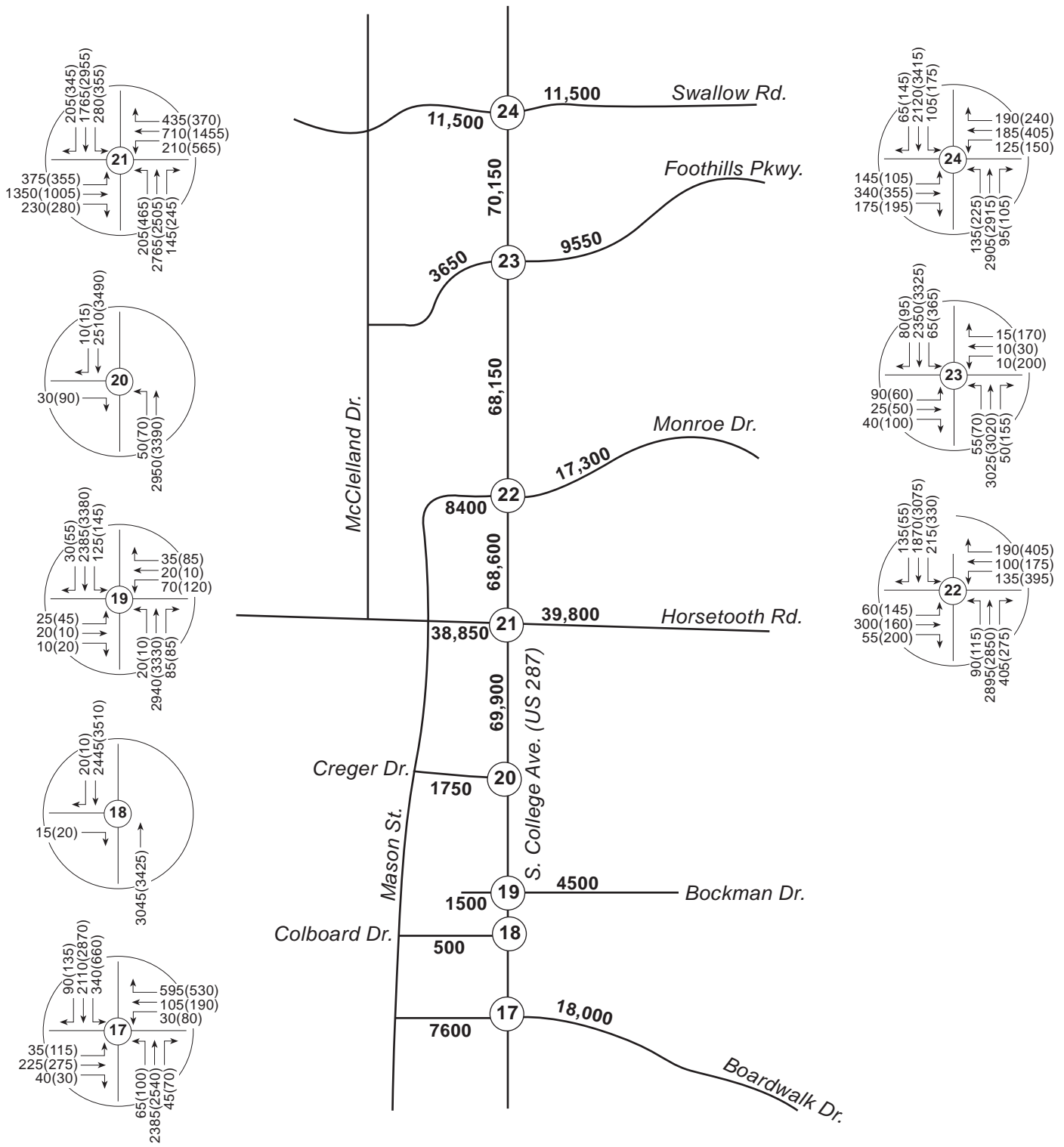
XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes



North

Figure 4-3  
Projected Traffic Volumes -  
Cameron Drive / Fossil Creek Parkway  
to Troutman Parkway



**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

**XXXX** = Average Daily Traffic Volumes



North

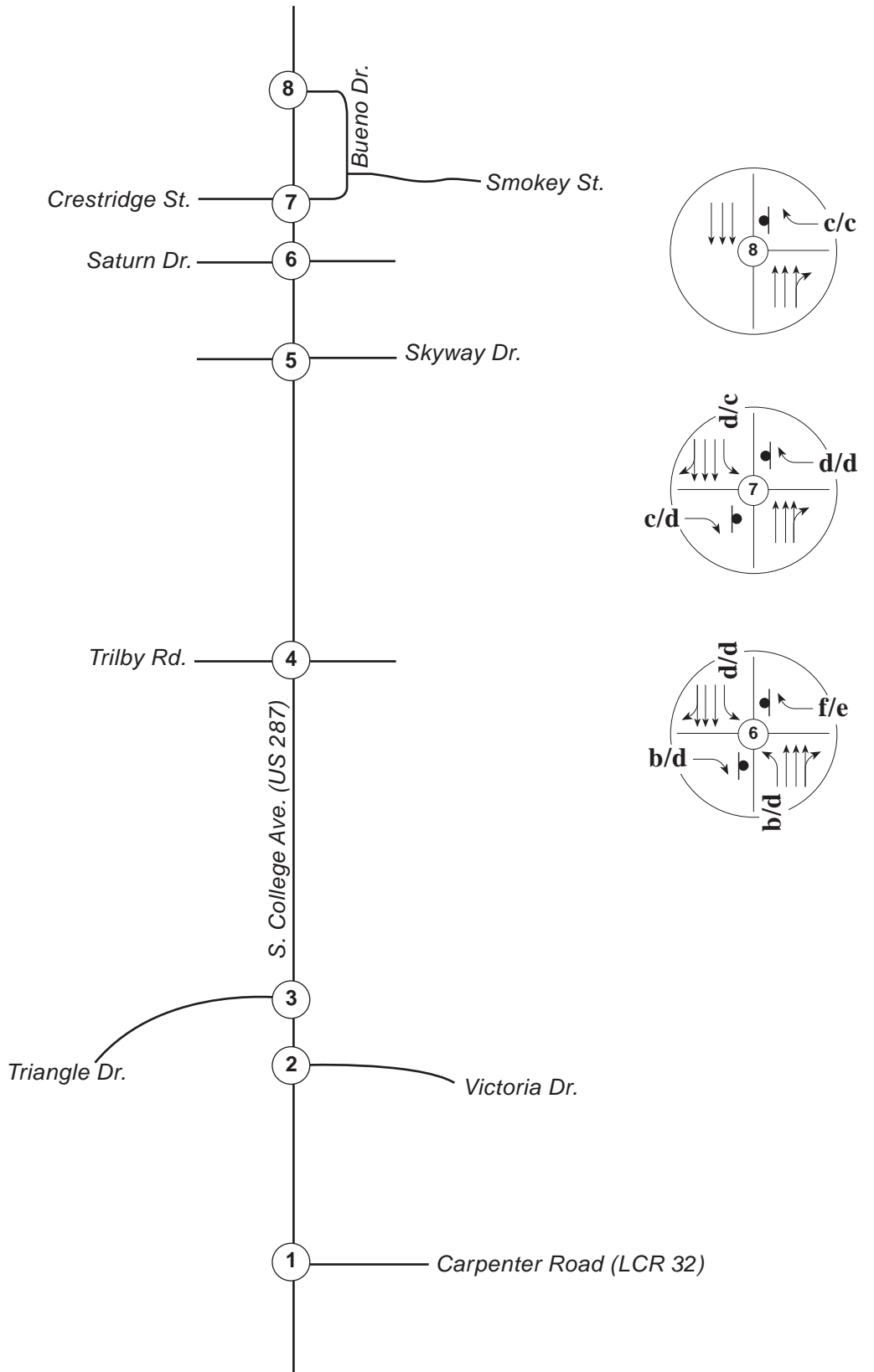
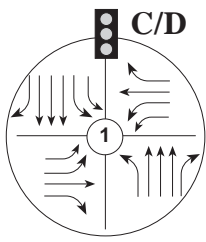
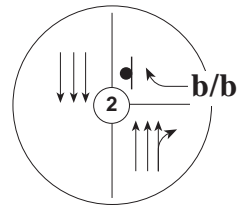
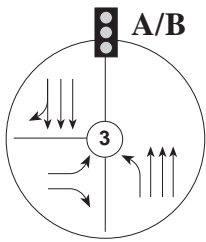
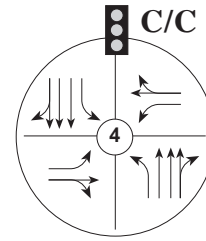
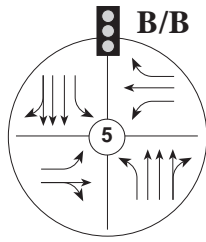
Figure 4-4  
Projected Traffic Volumes -  
Boardwalk Drive to Swallow Road

## 4.6 Traffic Operations

### Intersection Geometry

Figures 4-5, 4-6 and 4-7 depict anticipated future intersection geometry. At each intersection the number of through lanes on each approach is consistent with the number of travel lanes as identified by the City's Master Street Plan. For example, the Master Street Plan identifies South College Avenue as a six-lane facility. Therefore, at each intersection, South College Avenue is assumed to consist of three through lanes in each direction. Auxiliary lanes (i.e., left and right turn lanes) were provided on intersection approaches where there is an anticipated high level of future left and right turns. The locations where projected traffic volumes indicate the need for **additional** auxiliary lanes include:

- ▶ Carpenter Road (LCR 32)/ Avondale Road – Dual left turn lanes on the southbound, eastbound and westbound approaches. Exclusive right turn lanes on the eastbound and westbound approaches. Exclusive northbound and southbound right turn lanes.
- ▶ Skyway Drive – Exclusive left turn lanes on the eastbound and westbound approaches and an exclusive right turn lane on the westbound approach.
- ▶ Fossil Creek Parkway / Cameron Drive – Exclusive right turn lane and a shared through/left lane for the westbound approach.
- ▶ Fairway Lane – Exclusive left turn lane on the westbound approach.
- ▶ Harmony Road (SH 68) – Exclusive right turn lanes on the northbound, southbound and eastbound approaches.
- ▶ Boardwalk Drive – Dual southbound left turn lanes.
- ▶ Horsetooth Road – Dual northbound and southbound left turn lanes and exclusive right turn lane on the eastbound approach.
- ▶ Monroe Drive – Dual southbound and westbound left turn lanes. Exclusive northbound and eastbound right turn lanes.
- ▶ Swallow Road – Exclusive southbound right turn lane.



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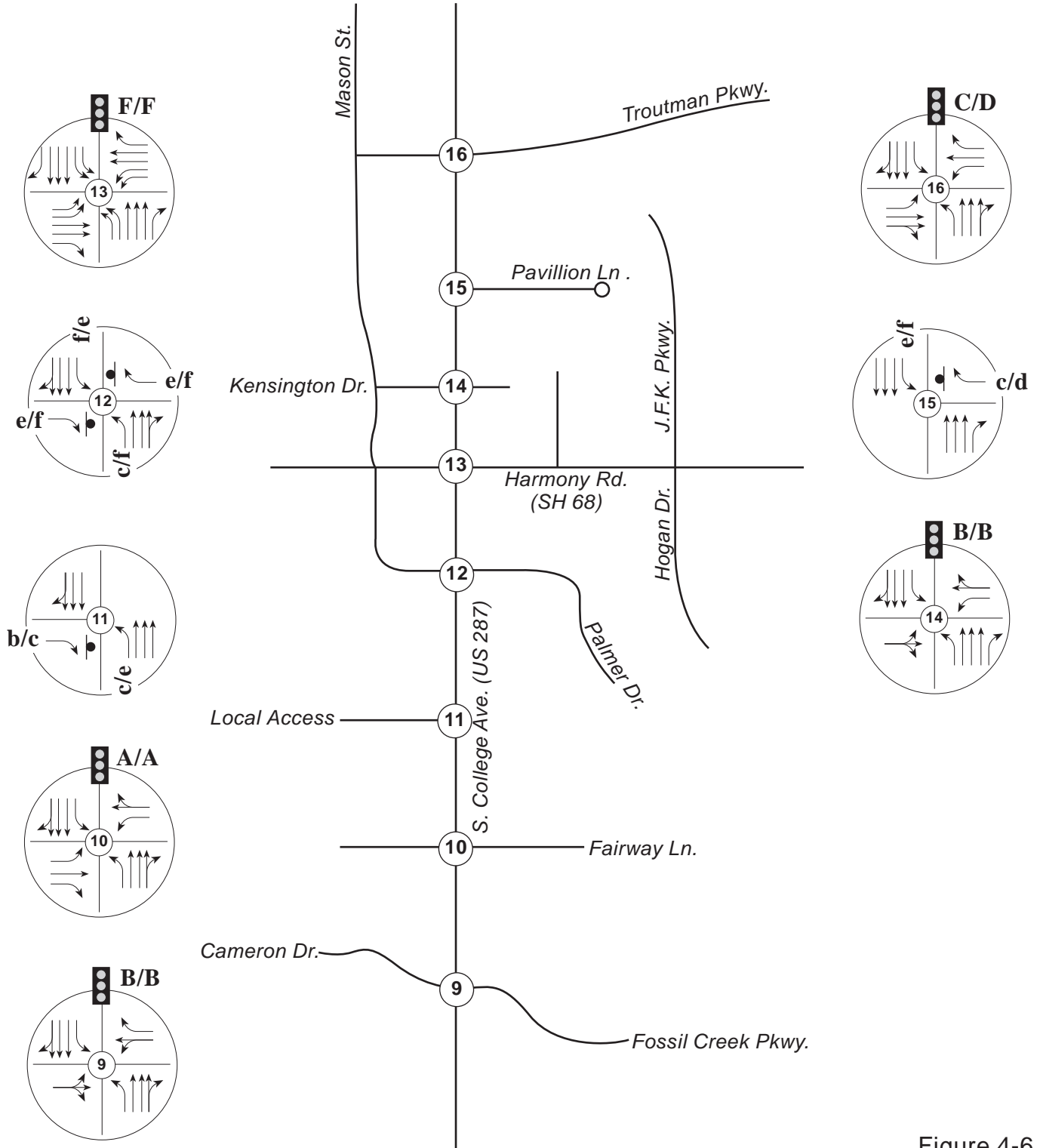
- X/X** = AM/PM Peak Hour Signalized Level of Service
- x/x** = AM/PM Peak Hour Unsignalized Level of Service

- = Stop Sign
- = Traffic Signal



Figure 4-5  
Projected Intersection Geometry  
and Levels of Service -  
Carpenter Road (LCR 32) to Bueno Drive





LEGEND



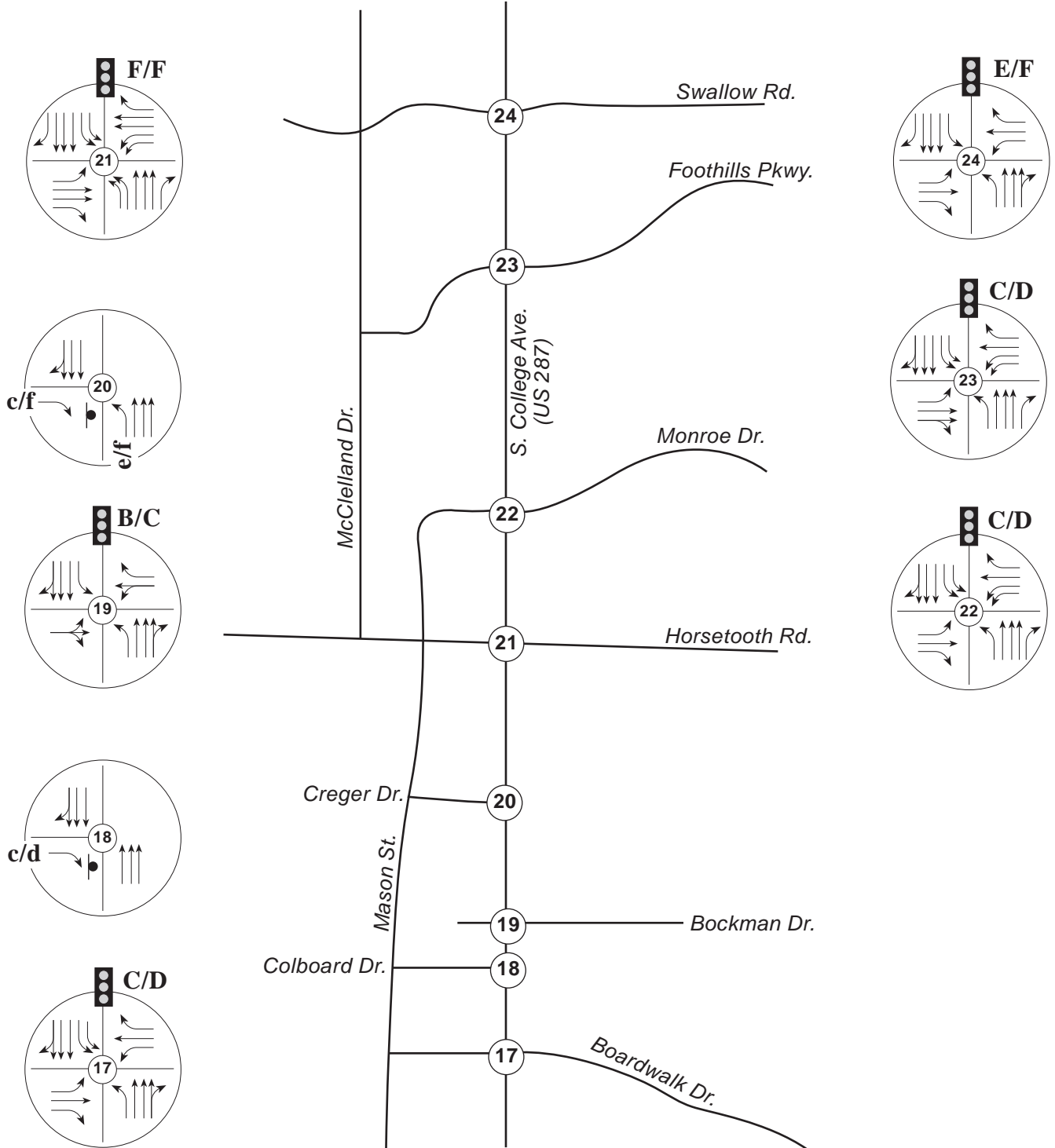
- X/X** = AM/PM Peak Hour Signalized Level of Service
- x/x** = AM/PM Peak Hour Unsignalized Level of Service
-  = Stop Sign
-  = Traffic Signal

Figure 4-6  
Projected Intersection Geometry  
and Levels of Service -  
Cameron Drive / Fossil Creek Parkway  
to Troutman Parkway





LEGEND



- X/X** = AM/PM Peak Hour Signalized Level of Service
- x/x** = AM/PM Peak Hour Unsignalized Level of Service
-  = Stop Sign
-  = Traffic Signal

Figure 4-7  
Projected Intersection Geometry  
and Levels of Service -  
Boardwalk Drive to Swallow Road



### Signalized Intersections

The projected AM and PM peak hour turning movements, along with the intersection geometry discussed in the previous section, were used to evaluate the traffic flow characteristics along the South College Avenue corridor. The software package Synchro was used to optimize signal timing (keeping existing cycle lengths constant) and to evaluate traffic operations at the signalized intersections. The results of these analyses are also depicted on Figures 4-5, 4-6 and 4-7.

According to information provided in the City of Fort Collins Multimodal Level of Service Manual, LOS D is the guideline acceptable for peak period conditions. LOS D is also the accepted standard for Larimer County and CDOT. As can be seen, peak hour traffic operations at the following signalized intersections are projected to be less than LOS D.

- ▶ Harmony Road (SH 68) – LOS F during both the AM and PM peak hours.
- ▶ Horsetooth Road – LOS F during the AM and PM peak hours.
- ▶ Swallow Road – LOS E during the AM peak hour and LOS F during the PM peak hour.

In most cases the primary reason these intersections operate at LOS E or F is due to the high level of through traffic volumes on South College Avenue. The following information describes the geometric improvements needed at the above signalized intersections, in addition to the geometry of Figures 4-5 to 4-7, to improve traffic operations to LOS D or better. These improvements do not take into account right-of-way constraints, construction cost or the functional classification of the roadway as described in the City's Master Street Plan. It is recognized that these improvements may be considered impractical from a community and/or cost-benefit perspective, particularly triple left turn lanes; however, they are listed, nonetheless, to show the potential impacts at these locations.

- ▶ Harmony Road (SH 68) – Three through lanes on the eastbound and westbound approaches. Triple southbound left turn lanes.
- ▶ Horsetooth Road – Triple eastbound and westbound left turn lanes. Four through lanes in each direction on South College Avenue and three through lanes in each direction on Horsetooth Road.
- ▶ Swallow Road – Four southbound through lanes.

### Unsignalized Intersections

The construction of a raised median in the future will prohibit outbound left turns and through movements from stop controlled approaches. Unsignalized public road intersections along the South College Avenue corridor will either be  $\frac{3}{4}$  access or RIRO. Due to the forecasted peak hour traffic volumes on South College Avenue, some minor street movements at the unsignalized intersections are anticipated to operate at LOS E or F:

- ▶ Saturn Drive – Westbound right turns from Saturn Drive during the AM (LOS F) and PM (LOS E) peak hours.
- ▶ Local Access – Northbound left turns during the PM peak hour (LOS E).
- ▶ Mason Street/Palmer Drive – Eastbound and westbound right turns during the AM (LOS E) and PM (LOS F) peak hours. Southbound left turns during the AM (LOS F) and PM (LOS E) peak hours. Northbound left turns during the PM peak hour (LOS F).
- ▶ Pavillion Lane – Southbound left turns from South College Avenue during the AM (LOS E) and PM (LOS F) peak hours.
- ▶ Cregar Drive – Eastbound right turns to South College Avenue during the PM peak hour (LOS F). Northbound left turns during the AM (LOS E) and PM (LOS F) peak hours.

**4.7 Progression Analyses**

In addition to the intersection capacity analyses, vehicle progression was evaluated along the South College Avenue corridor. Progression analyses were conducted for two segments of the corridor with Harmony Road (SH 68) as the dividing point. The following table summarizes the results of the progression analyses.

**Table 4-1 Progression Analyses – Future Conditions (Year 2020)**

Direction	AM Peak Hour			PM Peak Hour		
	Cycle	Bandwidth	Efficiency	Cycle	Bandwidth	Efficiency
<b>Carpenter Road (LCR 32) to Harmony Road (SH 68) NR-A</b>						
Northbound	115 s	33 s	27.4%	130 s	20 s	22.3%
Southbound	115 s	30 s		130 s	38 s	
<b>Harmony Road (SH 68) to Swallow Road NR-B</b>						
Northbound	115 s	24 s	20.9%	130 s	24 s	20.8%
Southbound	115 s	24 s		130 s	30 s	

As can be seen in Table 4-1, the future efficiency for South College Avenue between Carpenter Road and Harmony Road (SH 68) ranges between 22% and 28%. This is less than the desirable bandwidth efficiency (35%) noted in the Code for a highway with a NR-A classification. The efficiency between Harmony Road (SH 68) and Swallow Road is almost 21% in both peak hours, which is less than the desirable bandwidth future efficiency (30%) for a highway with a NR-B classification. This represents an increase in efficiency between Harmony Road (SH 68) and Swallow Road during the AM peak hour from 17.4% to 20.9% and a slight decrease in the PM peak hour from 21.9% to 20.8%.

#### 4.8 Arterial Street Analysis

While the qualitative analyses of signalized intersections offer insight to the operation of specific locations along the corridor, it is important to quantify the effectiveness of an access control plan for the corridor as a whole. The Highway Capacity Manual documents a procedure that evaluates operational conditions of sections of an arterial street, thereby providing indices of relative operational changes if traffic signals are added or removed. The results of the analyses are provided in a level of service assessment based on the average travel speed along a corridor segment. Since the segment of South College Avenue between Harmony Road and Swallow Road is already constructed to the Major Arterial Street cross-section and access changes in this area will be relatively minor, only the segment between Carpenter Road and Harmony Road was evaluated in this analysis.

Without access control measures along South College Avenue, the City's Land Use Code would allow for traffic signal spacing every ¼ mile. The comparison of level of service and average travel speed was conducted between the number of traffic signals proposed with the Access Control Plan Update and what the Land Use Code would allow. The analyses of these two scenarios is contained in Table 4-2.

**Table 4-2 Arterial Street Analysis- Carpenter Road (LCR 32) to Harmony Road (SH 68)**

	Level of Service		Average Travel Speed (mph)	
	AM	PM	AM	PM
Access Control Plan				
- Northbound	D	D	25.5	24.5
- Southbound	C	C	33.4	31.3
Land Use Code				
- Northbound	D	D	18.8	18.8
- Southbound	C	C	24.0	22.3

As can be seen in this table, the level of service is the same under both scenarios; however, there is a reduction in average travel speed of approximately 25-30% if the Access Control Plan Update improvements are not implemented.