

Appendix TR-4

**Roadway and Bicycle Network
Characteristics Assumed in the
Travel Demand Model for the VMT
Analysis**



MEMORANDUM

DATE: September 15, 2022

TO: Cameron Shew | County of Sacramento

FROM: David Tokarski | DKS Associates

SUBJECT: Jackson Township Modeling Assumptions

Project #13049-000

As requested by the Jackson Township applicant group, this memorandum summarizes roadway and bicycle network characteristics assumed in our travel demand model used for the VMT analysis. Per direction from Sacramento County, a modified version of SACOG's SACSIM19 Activity-Based Model was applied for this study. This memorandum summarizes model network assumptions including roadway network, pedestrian/ bicycle network, and access control at project intersection locations. The proposed project includes the following roadways, trails, and transit lines:

- Thoroughfare
 - Jackson Road
- Four Lane Arterials
 - Kiefer Boulevard
 - Excelsior Road
 - Grenville Drive (north and south portions)
 - Street A (south most portion)
- Two Lane Collectors
 - Excelsior Road (town center)
 - Grenville Drive (central portion)
 - Street A (north portion and small length to the south)
 - Streets F and H
 - Township Drive (town center portion)
- Two Lane Residential Streets
 - Street A (central portion)
 - Streets I and J

- Class I Regional Bikeway
 - From southwest corner of project (at intersection of Jackson Road and Excelsior Road) to eastern boundary of project (along Township Drive)
- Class I Bikeway (Off-Street Bike Path)
 - Along portions of Street K, Street I, and Street J
 - In eastern portion of project (from Kiefer Boulevard to Township Drive)
- Class II Bikeway (On-Street Bike Path)
 - Along Street H, Street F, Street A, and Street I
- Class I and Class II Bikeway (On-Street Off-Street Bike Path)
 - Along Kiefer Boulevard, Excelsior Road, Jackson Highway, and Grenville Road
- Class II (One Side Only)
 - Along Street E, Street B, and Street C
- Transit Route (Bus)
 - Along portions of Excelsior Road, Kiefer Boulevard, Grenville Drive, Jackson Road, Street A, and Township Drive (15-minute peak, 30-minute off-peak headways)

TRANSPORTATION NETWORK

The transportation network used in the SACSIM19 travel demand model consists of a “stick figure” network representing the roadways of the six-county SACOG region. For each model scenario, the roadway network includes the following main attributes that define the characteristics of the roadways in the region. Roadway characteristics include CAPCLASS (capacity class, or roadway type), LANES (lanes per direction), and SPEED (estimated “free flow speed”).

The network also includes links coded as pedestrian/ bicycle paths and coded as Class I, Class II, or Class III, as shown on Figure 1. A transit “line” file is also included among the model runs input and is a text file specifying each route based on model network nodes, peak and off-peak headways, speeds relative to free flow traffic, and vehicle type (i.e., bus or light rail). The model takes into consideration the presence of trails, transit, and roadway “friction” when splitting trips by mode (e.g. walk/bike, transit, drive solo, or carpool), assigning traffic volumes, and calculating vehicle miles traveled (VMT).

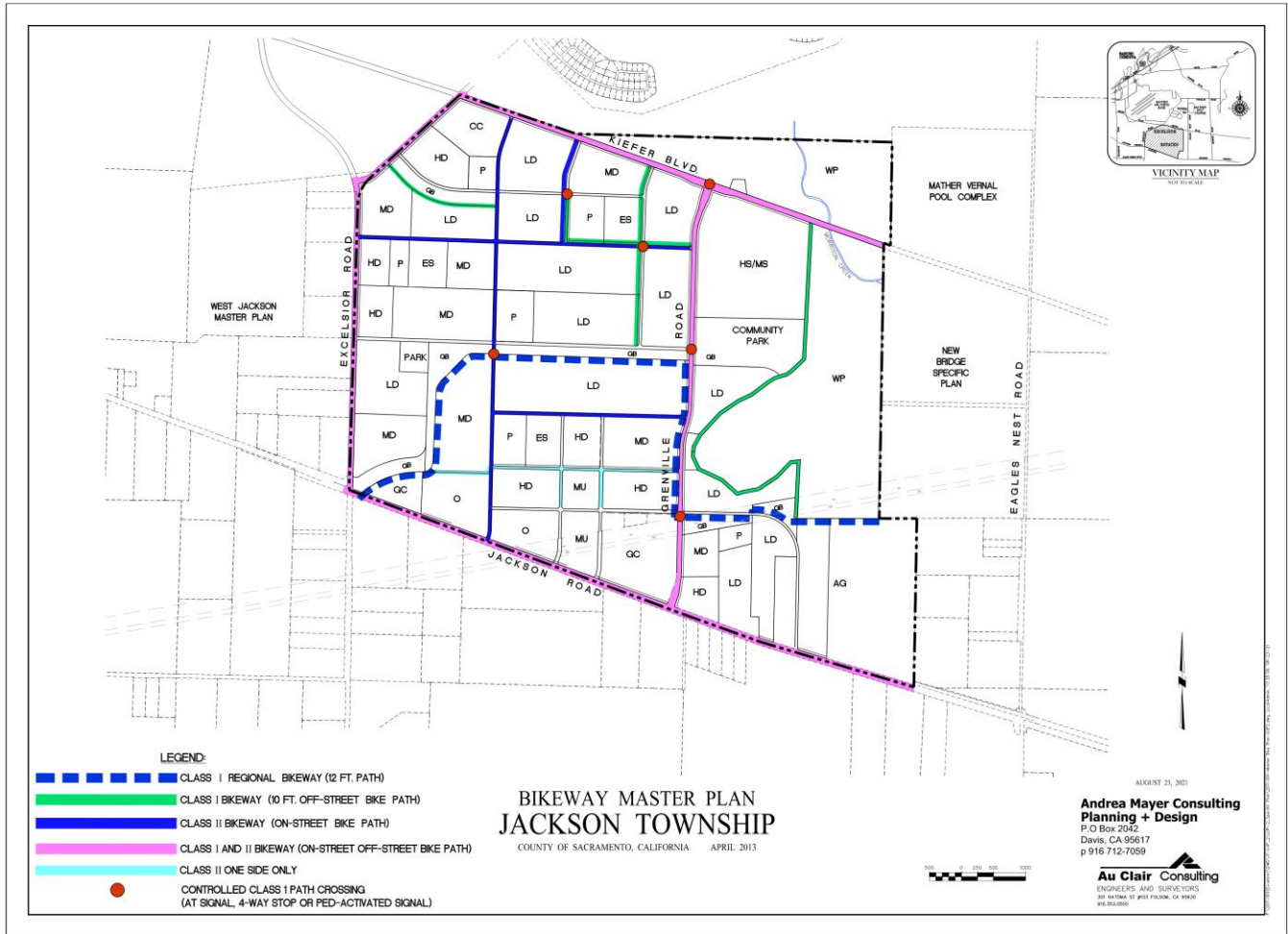


FIGURE 1: JACKSON TOWNSHIP BIKEWAYS

TRANSPORTATION NETWORK ACCESS

In the roadway network, each roadway “link” represents the connection between two “nodes” or points. Nodes can represent multiple aspects of the roadway system, including junctions or intersections between crossing roadway segments, vertices along roadway segments (i.e., to represent roadway curvature), or zone (TAZ) “centroids” representing the estimated center of land use for a given zone. Network access is specified by a number of rules or additional input files. One rule for access is that only vehicles traveling to or from a given zone can access that zone’s centroid connectors. Vehicles cannot use centroid connectors as a “cut-through” between two roadways.

Access between roadways or centroid connectors can be controlled by turn prohibitions. Turn prohibitions are coded into a separate text file as an input to the model. This text file consists of one row of text for each prohibited movement. Thus, if an intersection disallows one movement (i.e., a left turn out at a “T” intersection) there would be one row for that intersection. If an intersection disallows two movements (i.e., both a left turn-out and a left turn-in) there would be two rows for that intersection. Each row consists of a set of three nodes (from, through and to) where the

“through” node represents the intersection itself. **Table 1** shows the node numbers for each controlled intersection (“through”) and each of the “from” and “to” nodes associated with that intersection as it is represented in the turn prohibitions text file (model input file).

TABLE 1: TURN PROHIBITION LIST – JACKSON TOWNSHIP

INTERSECTION	FROM NODE	THROUGH NODE (INTERSECTION)	TO NODE	PROHIBITED MOVEMENT
KIEFER BLVD & STREET J	11843	25564	25619	Westbound Left
	25619	25564	25565	Northbound Left
KIEFER BLVD & STREET A	25565	25566	25626	Westbound Left
	25626	25566	25568	Northbound Left
JACKSON ROAD & STREET A	25573	25572	25717	Southbound Left
JACKSON ROAD & STREET B	25580	25579	25572	Southbound Left
	25586	25579	25580	Eastbound Left
JACKSON ROAD & TAZS 1622,1623	1622	25595	25586	Southbound Left
	1623	25595	25586	
	3620	25595	1622	Eastbound Left
	3620	25595	1623	
JACKSON ROAD & STREET D	6017	25596	25597	Eastbound Left
	25597	25596	25769	Southbound Left
EXCELSIOR ROAD & TAZ 1632	1632	25624	25618	Westbound Left
	3649	25624	1632	Southbound Left
JACKSON ROAD & TAZ 1577	1577	25717	6017	Southbound Left
	25572	25717	1577	Eastbound Left

Source: DKS Associates, 2022.

JACKSON ROAD ASSUMPTIONS

Along the southern border of the Jackson Township Specific Plan, Jackson Road is coded as a Major Arterial with two lanes each direction (the travel demand model does not accommodate center two-way left turn lanes) and a free flow speed of 45 mph. The Sacramento County General Plan ultimately identifies this section of roadway as a six-lane roadway. The southern border of Jackson Township comprises approximately 2.0 miles of Jackson Road.

Within that 2-mile span, three signals are assumed, one at Excelsior Road on the western edge of the project, a second approximately 0.43 miles to the east at Street A, and a third approximately 0.57 miles further east at Grenville Drive. An access controlled centroid connector (right-in right-out) is assumed approximately one-third of the distance between Excelsior Road and Street A. It should be noted that this access is nonspecific and merely represents access from project parcels. No left turns are allowed in or out of this zone connector. Two access-controlled intersections and one access-controlled zone connector are assumed between the signals at Street A and Grenville Drive. Street B is located approximately 1/5 mile east of Street A and disallows left turns into or out of the side street. Street C is located approximately 1/8 mile east of Street A and disallows left turns out of the side street but allows left turns into the side street from Jackson Road. Another access controlled centroid connector (right-in right-out) is assumed halfway between Street C and Grenville Drive. A final access-controlled intersection is located at Street D, approximately 1/3 mile east of Grenville Drive.

The intersection spacing identified in the Specific Plan circulation diagram is represented as closely as possible in the SACSIM19 model network, with spacing reviewed by County staff and consistent with County standards.

THOROUGHFARE AND ARTERIAL ROADWAYS – MODERATE ACCESS CONTROL

The County of Sacramento identifies roadways such as Jackson Road, Kiefer Boulevard, and Excelsior Road as thoroughfare or arterial roadways with moderate access control. The County specifies that these roadways have no more than 2 to 4 stops per mile (signals) with limited driveways (per County code) and design speeds of between 35 and 45 miles per hour. The model network has been coded with the following free flow speeds:

- Jackson Road: 45 mph
- Kiefer Road: 40 mph
- Excelsior Road: 40 mph
- Grenville Drive: 40 mph

The model network is consistent with the project circulation diagram and includes three signals along the roughly two miles of Jackson Road project frontage, including full access intersections at Excelsior Road, Street A, and Grenville Drive, with three additional right-in-right-out intersections at Street B, Street C, and Street D. The three signals within a roughly two mile stretch is consistent with the County standard of 2 to 4 stops (including signals or stop signs) per mile. Additional right-in-right-

out controlled access is assumed at a number of traffic analysis zone (TAZ) "centroids" in the model network. Each of these generally represents any smaller access-controlled driveways that might be constructed between the major intersections.

Similarly, the model network is consistent with the project circulation diagram and includes two signals along the roughly two miles of Kiefer Boulevard project frontage, including full access intersections at Excelsior Road and Grenville Drive, with one full access stop sign at Street I and two additional right-in-right-out intersections at Street A and Street J. The three stops (two signals and one stop sign) within a roughly two-mile stretch is consistent with the County standard of 2 to 4 stops per mile.

Along Excelsior Road, the model represents the project circulation diagram with four full access intersections between Jackson Road and Kiefer Boulevard (Kiefer Boulevard, Street H, one unnamed location south of Street G, and Jackson Road). Again, the four stops (signals) along the roughly two mile stretch of roadway is consistent with County standards of 2 to 4 stops per mile.

Grenville Drive, along the eastern boundary of the project, is identified in the circulation diagram as an arterial for the northern and southern portions of the project and as a collector in the middle. The northern arterial section of Grenville Drive is about one mile long and includes three signals (at Kiefer Boulevard, Street H, and Street G). The southern section of Grenville Drive is about ½ mile long and includes two signals (at Township Drive and Jackson Road). Both of these arterial sections of Grenville Drive are consistent with the County's standard of 2 to 4 stops per mile for moderate access arterial roadways.

In general, while a travel demand model does not represent every possible roadway or driveway access point, the model network for Jackson Township's internal roadways and the existing and planned roadways bordering the project is sufficiently detailed to represent the project and its access to the regional roadway network. Roadway free-flow speeds have been coded to be consistent with County standards and access control (prohibiting disallowed movements) has been coded using turn prohibitions in the model. All model tools available for network characteristics have been utilized to best represent the roadway network defined in the project description and project circulation diagram.