# Response to frequently asked questions about signal coordination

Traffic signal coordination occurs when a group of two or more traffic signals are working together. The goal of the signal coordination is to establish platoons of vehicles that can move easily from one intersection to another without stopping, to improve efficiency and minimizing delay. In traffic signal coordination, the busiest traffic movements are given precedence over the smaller traffic movements. Although arterial streets benefit from signal coordination, some of the benefit is offset by increase in stops and delay to the side street traffic. If the motorist is waiting for a green light to cross the "coordinated" street where there is heavy traffic on the main street and very light traffic on the side street, they will probably feel like they are waiting for a very long time. In the past, coordinated signals have been removed from some of the corridor segments due to complaints about the side street delay.

Traffic signal coordination plans are strongly influenced by dynamic conditions such as corridor speeds, traffic signal spacing, congestion, traffic volumes on major streets, pedestrian volumes, traffic signal cycle lengths and additional phasing. Each factor can significantly complicate good coordination schemes. Below are descriptions of these influencing factors, and the resulting conditions that may be undesirable for the driving public:

CORRIDOR SPEEDS

Signal coordination plans are established by using prevailing travel speeds. Motorists traveling at these speeds will achieve optimal travel times; however, those traveling above or below the prevailing speed may have significantly greater stops and delays as they are traveling outside the progression band.

TRAFFIC SIGNAL SPACING

Well-coordinated timings are established when signals are uniformly spaced along busy streets. For most busy corridors, spacing would be approximately ½ mile. However, while newly developed arterial corridors provide signal spacing in accordance with access management policies, the older developed corridors do not have proper signal spacing which can result in more stops and delays. Traffic signal coordination plans are limited when it comes to signal spacing. Signals are typically spaced no more than ¾ miles apart, as distance can cause the break up of platoons due to access movements, lane changes, truck traffic, varying travel speeds, geometric conditions and other elements. Without regulation, motorists may have more stops and delays than expected.

CONGESTION

Coordination plans are detrimentally impacted when capacities at our busiest intersections are exceeded. Under such conditions, traffic signal operations can not fully serve the demand, resulting in limited progression. In such cases, strategies may include serving only the heaviest directional flows.

TRAFFIC FLOW CHARACTERISTICS

The signal coordination plans are strongly influenced by the volume of total traffic, the directionality of the traffic, and the amount of traffic entering, exiting or crossing from a side street. In most cases, traffic signal coordination is designed to favor the heavier traffic flow. This may cause frustrations for motorists driving in less traveled directions as they may experience more stops and delays than desired.

PEDESTRIAN VOLUMES

In order to serve the pedestrians safely, pedestrian signal phases are included at nearly all crossing locations. Though good for pedestrians, these phases reduce the proportional green time for thru-traffic on major streets. Reducing green "thru" bands affect coordination since it narrows the window when motorists can travel through the intersection without stopping.

TRAFFIC SIGNAL CYCLE LENGTHS

Traffic signals must operate under the same cycle length along a coordinated network to produce consistent results. These cycle lengths are typically set to serve the needs of the busiest intersection as well as provide the optimal coordination along the corridor. As volumes grow on the major streets, cycle lengths increase. This is due primarily to the extended green phase times needed to serve the approach traffic demands. This may cause some delay at minor signalized approaches. In some situations, motorists traveling on side streets may experience longer delays than expected.

ADDITIONAL LEFT TURN SIGNAL PHASES

Addition of left-turn phases along the corridors effects green phase bands. Because cycle lengths are fixed, each additional left-turn phase can reduce "thru" green times by as much as 25% to 40%. As a result, the reduced green "thru" bands can narrow the window allowing motorists to travel through the intersection without stopping.

Other factors affecting signal coordination efficiency include:

- Pre-emption (Fire and Police)
- Bicycle crossing
- Bus traffic
- Equipment malfunction

Existing coordinated corridors in Davis:

- Covell Blvd. from Sycamore Lane to Shasta Drive (5 signals)
- Richards Blvd. from Research Park Drive to First/D Streets (5 signals)
- Fifth Street F and G Streets (2 signals)
- Russell Blvd. from Oak Avenue to A Street (3 signals)
- Russell Blvd. from Arthur Street to Hwy 113 ramps (3 signals)