I. KEY ISSUES AND RECOMMENDATIONS

FARMINGTON AVENUE: A TRANSPORTATION CORRIDOR

Farmington Avenue is truly a street that serves all modes of transportation – although certainly not equally well. Not only is it a major east-west traffic arterial, but it also is the most heavily used transit line in the city. When asked how they usually reached the avenue, 28% of residents said they walked, 3% biked, 42% drove, and 6% took the bus (many sometimes walked, and sometimes drove.) About 40% of residents commute to work on Farmington at least twice a week. Two-thirds of residents said Farmington is a "good" or "excellent" place to get around without a car. A quarter of residents said they use it to walk, jog, or bike for exercise. Although there are currently only a few brave bicyclists, Farmington has been designated as an important future bicycle route for commuters. An overall redesign of the avenue must balance the needs of these varied transportation modes.

Findings

Traffic

Farmington Avenue is one of the major east-west arterial roadways into and out of downtown, carrying 10,000 vehicles per day – a decline from some 17,000 vehicles a day in 1980. This translates into about 12,000 people traveling by car on Farmington daily. An important finding, underlining the avenue's importance as a transit corridor, is the fact that buses represent 2.5% of the total number of vehicles on Farmington Avenue, *yet they carry one third of the people.*

Farmington Avenue has so many pedestrian conflicts because the avenue is currently designed mostly for cars. With its four-lane geometry, drivers often view Farmington as a highway, passing recklessly and driving at high rates of speed, especially in off-peak hours. On both the north and south sides of the avenue are numerous curb cuts and driveways serving the abutting businesses, residences and institutions. This dominance comes at the expense of other users, including pedestrians and bicyclists who avoid the street.

Within the study area, there are 22 intersections, 12 of which are signalized. The width of Farmington Avenue varies between approximately 41 feet and 49 feet. Widths of travel lanes vary between 9 and 11 feet, although they are 12 feet in the East Gateway area, or "no man's land." Eastbound and westbound traffic are separated by a double yellow centerline. Signals at intersections are controlled by the City of Hartford central computer. Along most of the corridor, no parking regulations are in effect from 7 to 9 AM and 3:30 to 6 PM. The posted speed limit on Farmington Avenue is 30 mph.

An analysis of travel volumes and speed revealed the following:

- *Traffic volumes.* Based on limited historical counts provided by the City of Hartford and the Department of Public Works at selected locations along Farmington Avenue, both weekday 24-hour and, Average Daily Traffic (ADT) volumes have decreased. During the AM peak hour, the predominant flow of traffic is in the eastbound direction toward downtown Hartford. Eastbound intersection approach volumes range between 475 vehicles at Asylum Place/Flower Street to 1,075 vehicles at Woodland Street. During the PM peak hour, the predominant flow of traffic is in the westbound direction away from downtown Hartford. Westbound intersection approach volumes range between 395 vehicles at Broad Street to 995 vehicles at Sherman/Sisson Avenue.

- *Travel speeds.* During the AM peak period, the average speed along the corridor, from Prospect to Spruce, was 16 mph in both the eastbound (peak direction) and westbound directions. During the PM peak period, the average speed along the corridor was 14 mph in the westbound (peak direction) and 11 mph in the eastbound direction. It appears that speeds along the corridor are influenced to a large degree by signal coordination and progression, in addition to the volume of traffic (see discussion of off peak speeds, below).

- *Levels of service analysis*. Level of Service (LOS) for each of the study intersections was calculated using procedures presented in the Highway Capacity Manual. LOS criteria, expressed in letters A, B, C, D, E and F, are stated in terms of average delays for vehicle, which includes deceleration delay, stopped delay and acceleration delay. Each succeeding letter indicates more congestion and worse delay conditions at the intersection. Most of the intersections, overall, operate at LOS D or better during both peak periods. The Farmington Avenue/Sisson intersection, however, operates at LOS E during the AM peak hour and the Farmington/Broad Street intersection operates at LOS E during the PM peak hour.

Technical analyses conducted by the PPS team for this study, review of previous studies, discussions with related agencies and information obtained from the community forums, and site tours all pointed out to numerous traffic issues on Farmington Avenue:

- *Lane blockages and congestion.* Even though Farmington Avenue's traffic volumes are moderate, and indeed have decreased over the past decade, drivers still perceive the street as congested. This perception is caused by the excessive and recurring lane blockages along the avenue due to buses picking up and discharging passengers, and illegally parked and stopped vehicles in the curb travel lane, forcing drivers to merge to the middle lane. In the middle lane, drivers are confronted with frequent and heavy left turns, especially in the eastbound direction. The result: drivers are constantly weaving between lanes in order to avoid being blocked by stopped buses or vehicles in the right lane or vehicles waiting to turn from the left lane. Review of videotapes along the corridor indicated that the left lane (in both directions of travel) always carries more traffic than the right lane, sometimes more than twice as many vehicles. In one instance, the right lane was blocked by a stopped bus for 7 minutes during a 10-minute viewing period. In another 10-minute period during the PM rush hour, the right lane on westbound Farmington at Laurel was blocked for 7 minutes by a stopped taxi-cab. During this 10-minute period, the left lane processed 129 vehicles, while the right lane, which was blocked for 70% of the time, carried only 24 vehicles.

- *Left-turn conflicts.* Lack of dedicated left-turn lanes and exclusive left-turn signal phasing at locations with higher left-turn volumes increases backups in the left lane and effectively reduces the vehicular carrying capacity of Farmington Avenue to a single lane at many locations. This "queue spillback" occurs especially at left turns from eastbound Farmington Avenue onto northbound Woodland, and from westbound Farmington onto southbound Sisson (to I-84), which blocks through lanes.

- *Right-turn conflicts.* Buses stopping at near side bus stops were observed to block right-turning vehicles, or as mentioned above, even through vehicles as well.

- *Curb cuts.* The presence of numerous and closely spaced curb cuts on both sides of Farmington Avenue is a very critical issue that not only makes the pedestrian movement hazardous and discontinuous, but also contributes to excessive turning movements, additional conflict points and congestion for vehicles as well.

- *Off-Peak travel speeds.* Although travel speeds higher than 30 mph were not measured along the corridor during peak periods, speeding along the corridor was cited as an issue, especially during the off-peak periods and at nights. This may be attributed, in part, to the signal coordination and progression along the corridor, as it was found that during the AM peak period when volumes are higher in the eastbound direction, speeds were as high or higher in some segments than in the westbound, off-peak direction. Speeding was also cited by residents at two locations on Farmington, between Sisson and Woodland, and between Sigourney and Flower, where "open stretches" of the avenue allow drivers to speed up.

- *Emergency access.* Because of the location of the St. Francis Medical Center just off the avenue, Farmington is used heavily by ambulances and other emergency vehicles. Currently, the 4-lane configuration allows emergency vehicles to pass using the middle lane. Any reconfiguration of the avenue must provide sufficient space for emergency vehicles to pass other vehicles pulled over to the curb.

- *Confusing and complex traffic movements.* This applies mainly to the East Gateway, where Asylum Avenue and Farmington converge at the entrance to downtown, an area that is also an interchange for I-84. This is the highest accident location on Farmington Avenue.

- *Accident analysis.* Accident data summaries for the July 2000 to June 2001 were obtained from the City of Hartford for eleven critical intersections along Farmington Avenue: Prospect Avenue, Whitney Street, Sisson Avenue, Sherman Street, Woodland Street, Marshall Street, Laurel Street, Sigourney Street, Asylum Place, Broad Street and Flower Street. A database was developed to summarize key accident parameters. The following is a brief discussion on the findings related to accident occurrence at the major intersections within the study area. Clearly, however, the design of the street is a contributing factor to the types and locations of accidents on Farmington:

- *Accident frequency*. Over the one-year analysis period, there were 177 accidents at the 11 study intersections. The frequency of accidents is related to locations where heavy turns exist, as well as where movements are overly complex. The highest number of accidents was reported at the Broad Street intersection in the East Gateway or "no man's land" — with 32 accidents occurring during the one year period. Elsewhere along the corridor, accident frequency ranged between 24 accidents each at Sigourney

and Woodland (both intersections where there are heavy turns) to 10 accidents at Asylum Place/Flower Street. Laurel had 22 accidents and Marshall had 18 accidents over the one-year period.

- *Accident severity.* Although there were no fatal accidents, 22% did involve injuries.

- *Accident types.* The majority of accidents (45) were sideswipe accidents followed by left turn accidents (41) and rear end accidents (39). Most of the sideswipe, rear-end and left-turn accidents occurred at Broad Street. Sideswipe accidents were also common at Sigourney and at Marshall Streets. Overtaking accidents were most common at Woodland, probably attributable to excessive lane changing by "through" vehicles to avoid delays caused by turning vehicles. Six accidents involved pedestrians: two of them occurred at Marshall Street; one each occurred at Whitney, Sherman and Sigourney Streets. Two accidents involved fixed objects.

- *Time period of occurrence.* Overall, the majority of accidents (65%) occurred during off-peak periods, when the street is less congested, while 35% occurred during peak traffic periods. However, at the Whitney Street intersection, there were more accidents during the peak (11) than the off-peak periods (6). Accident occurrence at Sigourney was equally split during the peak and off-peak periods with 12 accidents occurring during each period. The majority of accidents (70%) occurred under daylight conditions.

- *Speeding as a contributing factor.* Speeding was cited as a contributing factor in only 10 accidents, mainly at the Whitney, Marshall and Laurel Street intersections.

Transit

The Farmington Avenue corridor, which connects downtown Hartford to the suburban and rural environs located to the west of the city, is the highest ridership route in the CT Transit system – with some 6,000 riders a day.

Transit ridership is high on Farmington Avenue in part because of the density of the Asylum Hill and West End neighborhoods: many residents, especially in Asylum Hill, depend on transit since they cannot afford cars. Indeed, of the total daily passengers, the study area generates 60% of the inbound boardings and 54% of the outbound alightings. A quarter of residents surveyed say that they ride a bus at least twice a week on Farmington.

In addition, Farmington routes are heavily used by commuters. As new transit services are currently in development – including a downtown circulator and the New Britain Busway – more riders are expected to be attracted, especially these riders using public transit by choice rather than necessity.

In spite of such a high use of the public transit system on Farmington Avenue, amenities and infrastructures for passengers are lacking or in very poor condition. Only six bus stops actually have city owned shelters, and these are in need of replacement. Most bus stops have inadequate waiting space, no seating, and add to congestion on the sidewalks. Half of the residents surveyed rated attractiveness of bus shelters and street furniture as "poor." Finally, a very low level of maintenance of bus stops and a lack of signage turn waiting areas into undefined and neglected spots along the avenue.

The primary transit presence within the study area is the CT Transit E-Farmington Route, which connects downtown Hartford with West Hartford Center, with branches serving points located north and south of the corridor. Passengers may also access points located north and south of the corridor by transferring to and from CT Transit Routes A, F and S. Weekday service on Farmington is from 5 AM to midnight; the service frequency is 5 minutes (peak) and 10 minutes (off-peak). In addition to CT Transit regular bus service, the Greater Hartford Transit District (GHTD) provides paratransit services for senior citizens and persons with disabilities through a minibus service and the City of Hartford Dial-A-Ride.

There are currently 27 bus stops in the study area on Farmington: 12 on the westbound side of the street, and 15 on the eastbound side. A typical spacing for bus stops in urban areas is 500 to 1,200 feet with a "typical" space of 750 feet. Farmington's range from 150 feet apart to 700 feet apart. In addition, counts of boarding and alighting passengers on Farmington show that the number of people using stops along the avenue varies greatly. Eastbound highest-used stops are at Sigourney, Gillett, and Laurel; westbound highest-used streets are at South Marshall, Sigourney and Whitney (totals range from 235 to 351 people getting on or off at these stops). Other stops on Farmington have fewer than 100 people. (For example, westbound at North Beacon, Oxford, Tremont, and Lorraine.)

Besides the CT Transit E Route, current and planned alternative public and private transit services within the study area include:

- Union Station provides access to Amtrak and inter-city bus services.

- The Aetna Healthcare Employee Shuttle provides transit service for its employees between the Corporate Headquarters on Farmington Avenue and downtown Hartford.

- A Downtown Circulator, planned to open in 2002 or 2003, will include stops on Farmington Avenue from Sigourney Street to Broad Street. The three-mile circulator route will operate from Church Street, proceeding to Main Street, Sigourney Street, Capitol Avenue, and completing the loop along Farmington Avenue, where there is clearly an opportunity to coordinate planned bus stops. The circulator is planned to operate in two directions at 7-10 minute headways. Another major transfer location would be placed on Sigourney Street.

- Bus Rapid Transit Service that will serve from downtown New Britain to Union Station in Hartford is scheduled to begin in 2005. Unfortunately, the closest station to Farmington is located in the East Gateway at the railroad underpass, where sidewalks are narrow and pedestrian access is very poor. This is a major concern for this area.

Pedestrians

Farmington Avenue is plagued with pedestrian and vehicle conflicts. These conflicts differentiate according to the different zones, with the worst conflicts in the retail areas of Asylum Hill and the West End:

- *Sidewalk continuity.* There is a lack of continuity for people walking along sidewalks, which are interrupted by curb cuts and parking lots, not to mention the cars parked on the sidewalks themselves. Sidewalks are often in poor condition.

- *Separation of sidewalks from storefronts.* Sidewalks are separated from storefronts, which are set back and have their own small sidewalks in front of them. This situation makes comfortable, natural window-shopping nearly impossible. To make matters worse, walls have been erected, preventing shoppers from walking from one store to another. Sidewalk cafes are a high priority of residents, but the lack of an attractive area next to most restaurants makes them difficult to provide.

- *Inadequate sidewalk width and amenities.* Sidewalks are not wide enough to support amenities (such as trees, attractive bus shelters, etc.) Half or more of businesses and residents feel that redesigning the parking and sidewalks in front of stores is a high priority; there is also much interest in planting more trees and flowers and encouraging more sidewalk cafes. Two thirds said that the number of places to sit outside is "poor."

- *Pedestrian crossing difficulties.* The street is very difficult to cross: a third of residents said it is "poor" and another third said it is only "fair." Crosswalks are provided only at signalized intersections, creating long stretches, especially in the West End, where there are no crosswalks at all. Signals require pedestrians to push a button to get a walk signal, which virtually no one bothers to do. Video analysis of the street shows the result: extensive jaywalking in both the West End and Asylum Hill.

Outside the retail areas, conflicts are less severe, but still present:

- The difficulty in crossing the street is exacerbated in locations such as at Clemens Place and in front of St. Joseph's Cathedral, where cars are able to increase their traffic speed and there are no designated crosswalks. Clemens Place reports this as a significant problem for its residents. The Cathedral reported that a pedestrian was killed in front of the church.

- During the placemaking workshop, participants said that some areas between Whitney and Prospect – although more attractive than the retail areas – felt 'desolate' due to the lack of activity.

- Sidewalks, as in the retail area, are often in poor physical condition.

Bicycles

Although designated as a bicycle commuting corridor, and 3% of residents say they usually bike to the street, Farmington Avenue has no official bicycle facilities: no signage, no striped lanes, and few if any bicycle racks. One third of residents said that the ease of riding a bicycle on Farmington is "poor." Moreover, due to the high speed of vehicular circulation and the recurrent pedestrian jaywalking, biking along Farmington can become a very hazardous activity. In spite of this current lack of amenities, several local groups, including the Connecticut Bicycle Coalition expressed interest in the biking potentials on Farmington Avenue.

Parking

Businesses regard parking as a major problem on the avenue: half said the availability is "poor." A majority said that building parking lots behind stores and redesigning parking and sidewalks in front of stores is a high priority. Residents were less negative about parking: about a quarter said that parking is never a problem, and half that it is sometimes a problem. Only a third said that the availability of parking and the location of parking are "poor."

An analysis of turnover of over 650 parking spaces was completed in fifteen front and rear parking lots in the West End and Asylum Hill, as well as on-street parking in locations where use was heaviest. The analysis showed that the need for parking and patterns of parking is not uniform over the entire district.

Off-Street Parking

- Each lot has its own individual parking pattern, depending on the nature of the surrounding use and its overall accessibility. Parking which serves residents or office workers (such as at the Arts Center) is used mainly by one car for an entire day. In certain retail lots (to the front and rear of Arrow Drug for instance), all day parking can be a problem even if it only involves a few spaces: in this case for instance, 7 cars were parked all day, using 24% of the spaces. In general, rear lots are less used than lots facing the avenue. For example, the front parking at the Spiro's /Peking Garden retail strip had a peak occupancy of 82%, compared with 63% in the rear.

- Findings revealed that there is unused capacity in many lots. No lot studied had more than 80% occupancy at any one period during the day; most had an average occupancy over the day of below 40%. The Kinko's lot, because of the vacant retail space, had peak occupancy of only 28%.

- Interestingly, some adjacent lots have complementary patterns of use, demonstrating a possibility for sharing: for example, the Ichiban lot was 90% full at 7pm, while the Burger King lot next door was only 26% occupied. The CVS lot, combined with the adjacent private lot, was never more that 54% occupied, and generally less 40% occupied.

- For most retail locations, occupancy peaked during lunch and in the late afternoon. Again the pattern varied. For example, the lot at the corner of Farmington and Marshall where the coin laundry is located, occupancy was 50% midday and 66% in the late afternoon. In front of Arrow Drug, occupancy was 70% at lunch and 60% during the late afternoon.

On-Street Parking

In addition to this parking analysis of off-street lots, PPS investigated on street parking in specific locations:

- While vehicles are prohibited from parking from 7 to 9AM and from 3 to 5PM, on-street parking is allowed during off peak hours. However, on-street parking is generally used extensively only in three areas: between Laurel and Imlay in Asylum Hill; west of Woodland to Lorraine Street; and in the West Gateway area. About half of the cars parked in these areas appear to be resident parking, as the same cars were parked there at different off-peak hours (weekday early morning, evening, and weekend morning.) In Asylum Hill, cars often even parked in bus stops. In other areas, people tend to not park on the street because of the extensive curb cuts; the general availability of off-street parking; and a sense that if you park on-street you are blocking a moving traffic lane.

- On-street parking also exists on residential side streets. Almost half of business reported that their employees park on side streets, rather than taking up valuable on-site spaces. While this was not studied in detail, side streets offer some potential to provide additional shopper parking close to their intersections with Farmington. However, concerns of residents about traffic speed (there is strong interest in a neighborhood-wide traffic calming program) and intrusion into residential neighborhoods should be a paramount consideration in looking at the possibilities of side streets.

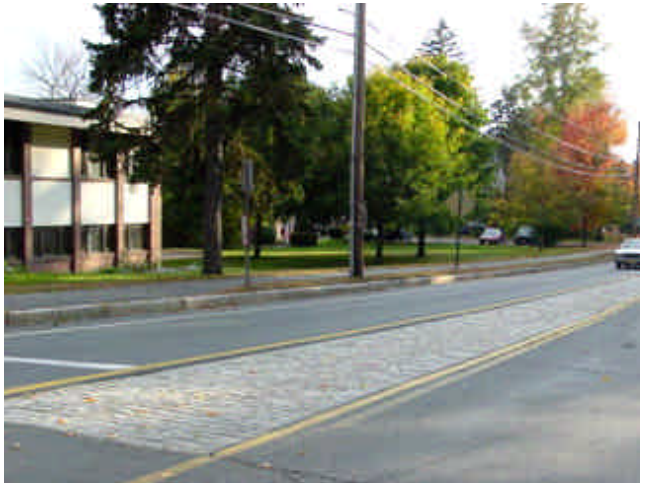
Other Parking Issues

- Many parking lots facing the streets and rear lots are poorly laid out, since owners are providing their own parking, which may or may not connect to the parking of the adjacent property. Rear lots are especially problematic: although Kinko's has a large lot, most rear lots are designed for single property use.

- As new businesses are attracted to Farmington Avenue, parking capacity will have to be increased. For example, a 2,700 square foot restaurant can draw as many as 60 cars on a Saturday night, according to a method of projections by the Institute for Transportation Engineers.

Recommendations

The goal of the street redesign is to improve pedestrian and bicycle access and circulation, while maintaining adequate capacity on the avenue for vehicles and reducing excessive conflicts and speed. To achieve this goal, Farmington Avenue should be changed from a four-lane to a three-lane configuration: one moving lane in each direction with a central planted median which is interrupted at intersections to provide left turn lane "slots". In areas where there are extensive curb cuts which cannot be eliminated today (such as the West End), the central turn lane should be continuous – paved in a special material with intermittent planting areas to prevent it from being used as a passing lane.



Textured median. Amherst, MA.

At the East Gateway, where Farmington and Asylum converge, a simplification of traffic movements is suggested and a reduction in lane widths. Pending further traffic analysis, it appears feasible to make Asylum between Spring/Garden and Cogswell one way westbound at all times, rerouting eastbound traffic south on Broad and then eastbound on Farmington. This allows the Asylum-Farmington Triangle to be widened. Reducing the width of lanes in this area, especially between Spring/Garden and Spruce where the new busway station will be located, will allow sidewalks to be widened.

A three-lane section will have a substantial effect on traffic speeds, as it prevents vehicles from passing. **In addition, other measures to discourage speeding are recommended.** These include the use of lane shifts on the west end of the avenue, which also allows parking and bus stops to be staggered on both sides of the street in this area. Modern roundabouts are proposed for the intersections of Sisson, Sigourney, and Woodland which have heavy turning movements. Modern roundabouts are increasingly being used in the US, as they can accommodate a higher capacity of vehicles than traditional signalized intersections and they force all drivers to reduce their speed. With proper design, they can also be pedestrian friendly. They also create visible urban design focal points that can help give the adjacent district its own special identity.

Green median. Seattle, WA.

Roundabout. Bradenton Beach, FL.

Side access road. Cleveland, OH.

To improve the experience of walking and strolling on the avenue, a continuous and comfortable sidewalk system on Farmington should be created. This can be achieved by reconstructing all concrete sidewalks on the avenue, with special paving in the retail areas, and by reducing curb cuts and intrusions by vehicles parking in pedestrian areas. Moreover, in retail areas where pedestrian conflicts are the worst, special side access or frontage roads – "mini-Main Streets" – should be created in front of businesses. These side access roads should have diagonal parking and comfortably sized sidewalks. The side access roads will eliminate the dual sidewalk system in retail areas, by providing adequately sized sidewalks in front of stores and convenient transitions to curbside crosswalks adjacent to the retail areas. The side access roads also serve to consolidate the excessive curb cuts that create additional conflicts on the street.

Crossing both Farmington Avenue and side streets should be greatly facilitated. This means locating crosswalks at every intersection, even those that are unsignalized, and adding safety islands and signage indicating pedestrian priority. In a few key locations, where pedestrian traffic is high and the crossing "desire lines" do not conform to traditional crosswalks (such as Forest and Farmington, where high school students cross, and at Kenyon and Evergreen Street where streets are offset), raised crosswalks are recommended to slow vehicles. One simple way to improve pedestrian crossings is to providing automatic pedestrian "walk" signals, concurrent with the traffic flow, replacing the push-button signals few bother to use. Finally, providing raised crosswalks on most side residential side streets, a feature that will also act as a traffic calming device, is also recommended.

The efficiency of transit operations and visibility and comfort of transit stops in the redesign should be achieved by consolidating bus stops to roughly spaced to every other block, and locating them on the "far side" of intersections wherever feasible to minimize conflicts with right turning traffic. In addition, designated bus laybys should be provided, out of the flow of vehicle traffic, so that stopping buses do not interfere with regular traffic. An alternative solution tested in other cities is to use the bike lane, widened slightly at the stop, for the bus layby. Because buses come only every 5 minutes during the peak hours, conflicts with bicyclists will be minimized.

Many cities and transit systems are looking at establishing so-called "rapid bus" systems on their main transit arteries. Rapid bus systems include many features typical of light rail lines, and include features that decrease delays and provide a high level of amenity

for riders. Many rapid bus features could be put in place on Farmington, such as: bus shelters with real time arrival information; traffic signals that can be "overridden" by transit vehicles, reducing the number of red lights a bus encounters; custom designed, low floor buses, with special amenities; and express bus stops (every 5 or 6 blocks rather than every one or two). Of course, rapid bus would not totally replace conventional, local buses which would continue to operate at the regular stops.

Bus shelter. St. Louis, MO.

In order to encourage the use of Farmington Avenue as a bicycle route to downtown Hartford, and to accommodate bike riders currently using the avenue, a **continuous at-curb bike lanes running along the avenue both east and west-bound should be provided.** Conflict points with buses at bus stops should be addressed by striping the bike lanes.

To increase the amount of parking, assure a more efficient and aesthetically pleasing solution to parking, and maximize shared parking resources, both front and rear parking lots should be consolidated. The goal should be to make all street facing and rear lots in retail areas "public parking" possibly regulated by the city. On front lots, this is accomplished through the proposed side access roads with diagonal parking. On rear lots, with the cooperation of property owners, fences and other barriers between existing parking lots should be removed, making entrances from side streets (which also reduces curb cuts on Farmington.) Consolidated lots can then be laid out more efficiently to increase capacity. Diagonal parking should be introduced on some side residential streets where appropriate. Employees should be encouraged to park in private lots or on side streets, as many currently do, keeping as many of the most convenient spaces for customers. Management of parking facilities should be discussed as part of the next phase of planning for the project.

"Rapid Bus" and custom bus stop. Los Angeles, CA.

Emergency vehicle access should be maintained with the three-lane configuration. Even though normal traffic cannot pass because the center lane is not continuous, emergency vehicles should be able to easily get around other vehicles. The combined widths of the proposed travel lane plus bike lane in each direction on Farmington is 16 to 17 feet. This allows vehicles to pull over into the bike lane, allowing emergency vehicles to pass.