Evaluation of Springfield Instant Carpooling

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This paper describes and evaluates the phenomenon of "instant carpooling" in the Springfield area of Northern Virginia, wherein about 2,500 strangers form ad hoc carpools each morning in order to use the high-occupancy-vehicle (HOV) express lanes on the Shirley Highway to downtown Washington, D.C. and the Pentagon. It presents the results of field observations on the magnitude and operation of the carpools and of informal interviews with the carpoolers. Safety and parking considerations are discussed, as well as the effect of the carpools on public-transit use. Instant carpooling is found to result in significant savings in travel time for the passengers and drivers and in transit operating cost savings for public agencies. Planners and decision makers are urged to encourage instant carpooling as a means of enhancing the overall effectiveness of park-and-ride and HOV-lane programs. Recommendations are presented for strengthening and protecting the current Springfield instant carpool operations, and the necessary conditions for replicating instant carpools elsewhere are discussed.

To most Americans, the image of the hitchhiker is that of either a scruffy hippie or a down-and-out-bum. A hitchhiker gets a ride out of kindness or pity. Hitchhiking is not an activity in which affluent, middle-class Americans would engage, except in the most desperate of emergencies.

But at two sites in suburban Washington, D.C., well-dressed and proper middle-class people of all races, male and female, line up each morning 5 days a week to ask for rides with strangers. And those drivers who are strangers, also well-dressed, of all races, and male and female, stop their cars and invite the first one, two, or three people into their Ford, Chevy, Plymouth, Cadillac, Mercedes, or BMW. Does this occur on a university campus or as part of a federally funded demonstration project? No, the hitchhikers and drivers initiated it and organized it by themselves, without the influence of any social experimenters and without any outside financial support. It started in 1974 when carpools were first allowed on the express lanes of the Shirley Highway, and it has evolved and grown since then.

This is the Springfield area of Fairfax County, Virginia, one of the nation's most affluent counties. Some have called these middle-class hitchhikers and carpool drivers the "Springfield Underground." The members of this underground are far from being revolutionaries, however. They collectively present a clean-cut and stable image, which is representative of their fellow residents of the county.

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The Springfield Underground commuters have developed their own solution to the problem of commuting (which we call "instant carpooling") in the Shirley Highway corridor (I-95/I-395) of Northern Virginia. They take advantage of a rule that allows carpools with four or more persons to use the two uncongested, peak-direction express lanes in the Shirley Highway corridor. Cars with fewer than four persons must use the three or four congested regular lanes, which require about 20 min more travel time to the Pentagon or to downtown Washington, D.C., during the morning peak period. The arrangements made by the drivers and the passengers allow each group to get to work more quickly. (As of January 1989 the requirement for the express lanes has been dropped to three persons per car.) Buses and standard, preorganized carpools and vanpools are the major users of the special express lanes in terms of both vehicles and persons, but the Underground does make up a significant component of the express lane usage.

TRAVEL IN THE SHIRLEY CORRIDOR

The Shirley Highway express lanes and bus routes were implemented in stages from 1970 to 1974. The express lanes and the new bus services were implemented from 1970 to 1973, and in 1974 carpools of four or more persons were allowed on the express lanes. The two barrier-separated reversible express lanes in the median of the freeway were an immediate and resounding success in terms of providing high-quality and high-capacity peak-hour services in the corridor, and the use of the lanes by buses—and after 1974 by carpools—grew rapidly. By 1977, the express lane buses and carpools were carrying 60 percent of the peak-period inbound person-travel in the Shirley corridor, in two of the five or six inbound travel lanes along the various segments of the highway.

Despite some fluctuations and impacts from the opening of Metrorail services, the express lanes have continued to carry about 60 percent or more of peak-period-corridor person-trips—over 30,000 bus and carpool users during the morning peak and about the same number during the evening peak. The counts of persons on the high-occupancy-vehicle (HOV) lanes in 1986 showed over 18,000 persons using the lanes at the Beltway, with most of those in carpools.

Carpools are used more than buses on the Shirley lanes by Fairfax County commuters from outside the Beltway, whereas inside the Beltway there are more bus passengers than carpoolers, likely because of the greater availability of bus services. Data from a 1977 study show that 75 percent of the express lane users from inside the Beltway were on buses,

whereas over 60 percent of those from outside the Beltway were in carpools. The ramp from Old Keene Mill Road in Springfield onto the Shirley express lanes is one of the principal points for Fairfax County carpools, and it is on the approach to that ramp that the Springfield Underground has developed.

There have been no origin/destination studies in the past 10 years, but the cordon counts of vehicles and passengers on the Shirley Highway at the Beltway indicate that the proportion of carpoolers to total HOV-lane users has been rising. A 1986 study by the Metropolitan Washington Council of Governments indicates that about 79 percent of those crossing the Beltway in HOVs during the peak period in 1986 on the Shirley Highway were in carpools or vanpools as opposed to buses. (This figure includes the regular lanes as well as the express lanes to account for the buses and carpools that had not yet switched over to the express lanes at the point they were counted.) Outside the Beltway can be considered to be carpool and vanpool territory.

Continued adjustments in overall bus and carpool use of the Shirley express lanes can be expected, as the populations of Fairfax and Prince William counties grow, as bus services are adjusted by Fairfax County, the Washington Metropolitan Area Transit Authority (WMATA), Prince William County, and private operators, and as travel times on the regular Shirley lanes change. An additional impact on the express lanes may occur in conjunction with the opening of the Franconia-Springfield line of Metrorail in the 1990s, or in conjunction with the initiation of commuter rail services. The impacts on the Springfield ridesharing are likely to be fairly small, however, since carpool costs to most of the users are likely to remain well below the out-of-pocket costs of the newer transit services.

FORMATION OF INSTANT CARPOOLS

After parking, potential carpool passengers walk to the ride-share pick-up points in the driveway of the Springfield Cinema and in the parking lot of the Long John Silver's Restaurant. According to some commuters, the Marriott Corporation owns the property and has allowed the Long John Silver's parking lot to be used as a match point. Those destined to downtown D.C. (20th and K vicinity) line up at the Springfield Cinema driveway, whereas those destined to the Pentagon, Federal Triangle, Capitol Hill, or other points in D.C. form a line or lines in the Long John Silver lot. (Some destined for 20th and K line up at Long John's also.)

When there are potential passengers waiting, drivers pull up to the head of the line, announce their destination, and ask for a number of persons necessary to achieve four persons to fill out their carpool (which could be one, two, or three depending on how many passengers the driver already has). The carpool passengers next in line and with the appropriate destination get into the vehicle, and the vehicle exits onto Old Keene Mill Road (or possibly out the back entrance of the cinema) and heads for the Shirley ramp. Virtually all vehicles leave the lots with four persons, even if they could carry more. When there are no appropriately destined passengers, the drivers (or passengers already in their cars) solicit riders from those walking up to the lot. The most aggressive of the drivers who need passengers leave their cars parked within the Long John Silver's lot and walk to Old Keene Mill Road in order to meet the new arrivals as soon as they cross Old Keene Mill Road. They do not walk into Old Keene Mill Road or distract the potential passengers crossing Old Keene Mill Road, so this is not a safety hazard.

The Underground's matches usually are made rapidly. The waiting times are usually extremely short, although some drivers or passengers destined to the less likely destinations, such as Southwest D.C., may be there for up to 10 min.

When there are passengers waiting for rides, there are orderly lines at both the Long John's and the cinema match points. Drivers at the cinema also form lines if waiting for passengers to the 20th and K area. At the Long John Silver parking lot, cars are spread all over if many drivers are waiting. When there are cars waiting, persons from each car attempt to intercept arriving passengers as they cross Old Keene Mill Road or enter the Long John's lot from behind (from the cinema lot). The most aggressive of the drivers who are waiting may make matches more quickly, but all eventually make matches. In our observations, no passengers waiting for carpools were left stranded, and no cars left the central business district (CBD) lots without their desired complement of four passengers. Of course, cars could simply bypass the lots if there were no passengers waiting, because potential passengers are clearly visible from Old Keene Mill Road.

MAGNITUDE OF SPRINGFIELD UNDERGROUND INSTANT CARPOOLING

Our investigation of the instant carpooling phenomenon in Springfield indicates that approximately 1,700 persons per morning are involved at the Springfield CBD, filling up carpools and vanpools in the parking lots of Long John Silver's Restaurant and of the Springfield Cinema on Old Keene Mill Road. Table 1 shows the counts made of the number of instant carpools formed in the Springfield CBD by time period from 6:00 a.m. to 9:00 a.m., after which there is no further carpool matching at these locations. The table also shows the number of occupants who were already in the vehicles when they arrived at the Long John Silver or Springfield Cinema pick-up points and the number who boarded carpools there.

We also have counted another 900 persons per morning forming instant carpools at the Rolling Valley park-and-ride lot. The Rolling Valley park-and-ride lot is discussed in detail later. Because there are over 14,000 Shirley carpool and vanpool participants crossing the Beltway on Shirley Highway during the peak period (6:30 to 9:30 a.m.) each morning, it is clear that instant carpooling constitutes a minority, but an important element of the overall Shirley Highway carpool and vanpool activity originating from beyond the Beltway.

Table 2 shows counts of the cars parked at the Springfield CBD lots and at the Rolling Valley park-and-ride lot. Based on observations, almost all of the Springfield CBD lot patrons are engaged in the instant carpooling behavior during the morning. At the Rolling Valley lot, 25 persons were counted boarding buses during the morning peak in July 1987 and 553 boarding carpools. At Rolling Valley, 96 percent of the morning parkers are engaged in casual carpooling and 4 percent are taking the bus.

TABLE 1 PERSONS AND VEHICLES ENGAGED IN INSTANT CARPOOLING IN SPRINGFIELD CBD BY TIME PERIOD, JULY 16, 1987

Time Period	Autos	Arriving Occupants	Boarding Occupants	Cumulative Boarding Occupants	Leaving Occupants	Cumulative Leaving Occupants
6:00–6:15 am	11	18	26	26	44	44
6:15–6:30	45	85	100	126	185	229
6:30–6:45	38	70	82	208	152	381
6:45–7:00	46	88	97	305	185	566
7:00–7:15	43	79	93	398	172	738
7:15–7:30	39	75	81	479	156	894
7:30–7:45	42	74	94	573	168	1,062
7:45–8:00	37	63	85	658	148	1,210
8:00–8:15	44	80	96	754	176	1,386
8:15–8:30	30	55	66	820	121	1,507
8:30–8:45	35	55	85	905	140	1,647
8:45–9:00	6	7	17	922	24	1,671
	416	749	922	922	1,671	1,671

Vehicles Parked at 5:45 a.m.

Springfield Plaza	7
UMC	3

One carpool formed before 6:00 a.m. with 2 arriving and 2 boarding occupants.

No carpools formed after 9:00 a.m.

PARKING CAPACITY AND USE

Within the Springfield CBD, potential carpool passengers can park in one of three official lots: the Springfield Cinema lot, where about 150 out of 235 spaces are used by commuters, the United Methodist Church lot, where 75 spaces reportedly are set aside for commuters, or the Springfield Plaza lot, where 105 spaces reportedly are set aside for commuters. This yields a total of 330 spaces in the CBD that reportedly are set aside as authorized spaces for commuters by the respective property owners. However, more than 330 spaces are used within the designated parking areas, because additional vehicles squeeze into both the Springfield Plaza commuter area (up to 138 were counted parked within the commuter area) and the Methodist Church lot (up to 101 have been counted in the church lot).

Persons who buy monthly passes for the Springfield Cinema are allowed to park in the Springfield Cinema lot "for free." All other offical commuter parking is actually free. The 150 (or more) Springfield Cinema lot users arrive regularly throughout the morning (as only those with passes can park there). Table 2 shows counts of 148 and 155 vehicles in the Springfield Cinema lot on 2 days when counts were made.

At the Springfield Plaza lot, 105 spaces are set aside at no charge for commuter parkers on a first-come, first-served basis. These spaces are filled by 6:45 a.m. Nearly 140 cars can park in the designated commuter area on a typical weekday, by making use of the aisles and cross-hatch areas in addition to the striped commuter parking places. Other instant carpoolers also park at the Springfield Plaza lots outside the spaces set aside for commuters. On a typical weekday there may be 150 to 160 additional commuter vehicles parked in other parts of the Springfield Plaza lots, for a total of 290 to 300 vehicles at Springfield Plaza.

The United Methodist Church provides parking for commuter cars in an area that can hold 75 to 85 cars. The designated commuter parking area is closed off when it is full, which occurs at 6:45 a.m. on weekday mornings. The lot is

TABLE 2 VEHICLES COUNTED AT SPRINGFIELD LOTS

Lot	Vehicles	Date(s) Counted
Springfield Plaza		
commuter area	133	11/12/86
	138	05/21/87
street	22	11/12/86
	18	05/21/87
other	156	05/21/87
Springfield Cinema		
legal	148	11/12/86
	155	05/21/87
Springfield United Methodist Church		
lot	101	11/21/86
	92	05/21/87
Spring Road	31	11/12/86
	28	05/21/87
Rolling Valley P & R		
lot, mall, road	459	10/10/86
	492	11/20/86
lot only	349	10/10/86
	342	02/02/87

reopened at 8:30 a.m. and an additional 10 or more vehicles may use the lot for commuter parking, before about 9:00 a.m., when the carpool formation activity ceases in the Springfield CBD. (As can be seen in Table 1, there is little carpool formation activity from 8:45 to 9:00 a.m. and none after 9:00 a.m.)

About 30 additional commuter vehicles are parked on Spring Road adjacent to the church lot on a typical weekday. Others are parked at nearby lots in the Springfield CBD where it is difficult to differentiate commuter parkers from other parkers. Taking the highest counts from Table 2 and adding them yields 603 parked cars, whereas taking the lowest counts yields 575 cars. Because others may be parked elsewhere near the CBD, we estimate that probably about 700 commuter cars are parked in the Springfield CBD area in total on a weekday morning. As Table 1 indicates, there are about 900 persons who board the casual carpools at the Long John Silver and Springfield Cinema pick-up points. The difference between 700 estimated cars and 922 boarding persons counted in Table 1 is because vehicle occupancy is greater than 1.0 for those parking in the Springfield CBD and some boarding carpool occupants arrive by walking or are dropped off.

SAFETY

The persons parking at Springfield Plaza who want to be passengers walk across six lanes of traffic on Old Keene Mill Road to the Long John Silver parking lot or the Springfield Cinema. There are no lights or other traffic control devices at this crossing point, but pedestrians use gaps in traffic created by the nearest lights to cross each direction of Old Keene Mill Road. Pedestrians wait in the center median of Old Keene Mill Road after crossing the three westbound traffic lanes (which is the lighter direction during the morning peak period). Significant waits are sometimes experienced by pedestrians

in the median before it is safe to cross the eastbound lanes (which are heavily traveled because they are the access to the Shirley Highway). When Old Keene Mill is backed up in front of the Long John Silver's lot, pedestrians cross through the backed-up eastbound traffic lanes. This is clearly undesirable from a safety standpoint. It would definitely be preferable if the parking spaces were on the same side of Old Keene Mill Road as the staging area.

EVOLUTION TO CARPOOL DOMINANCE

It has previously been reported that drivers wanting to pick up persons from carpools in the Springfield CBD did so at bus stops. The Springfield instant carpools have now evolved to the point where the staging points are not at bus stops. The passengers soliciting the rides are not close to bus stops and are not choosing between buses and carpools depending on which opportunity arises first. They are lined up waiting for carpools only. A bus stop within easy walking distance is available as a back-up mode, but during observations several mornings at the Springfield CBD, no one was ever seen leaving the carpool staging area to go to a bus stop.

The operations at these carpool pick-up points resemble several giant carpools, with the advantage that no driver or passenger of the carpool has to wait for stragglers or late carpool members if there are enough persons in line waiting for a ride to his or her destination. Users are mostly regulars and are generally familiar with many of the others in the line and with the drivers as well. Many waiting passengers said they had used the instant carpools for years, some citing numbers between 5 and 15 years.

OBSERVATIONS FROM INTERVIEWS OF CARPOOL PASSENGERS

During May of 1987, informal interviews were conducted among the persons waiting for a ride in the Springfield CBD. Not all users could be interviewed, and most interviews could not be completed because carpool passengers would simply enter autos when a ride was being offered and because many passengers were enticed into waiting carpools at the same moment that they stepped onto the lots.

Because of these factors affecting interview opportunities, no percentage breakdowns of responses are considered to be representative of the entire population of Underground passengers, because we have no way of knowing whether those who had to spend a few moments waiting, and could be interviewed, were distributed across destinations or across any other attribute in the same way as those who were intercepted more rapidly by the drivers. However, the responses are considered to be fairly indicative of the general characteristics of the Springfield Underground.

The following questions were asked:

- What is your destination?
- How many days each week do you carpool like this?
- For how long have you been doing this?
- What other modes do you use in the mornings when you do not rideshare here?
- How do you get back here in the evening when you rideshare in the morning?
- Do you ever pay the driver?
- Why do you rideshare here (cost, time, both, or other)?
- Do you know or recognize the other passengers or drivers?

Responses to these questions are discussed in the following paragraphs.

Destinations may not have been reasonably monitored because only those with longer waiting times could be checked. Two-thirds or more of the passengers were destined to somewhere in the Washington CBD (especially the Federal Triangle employment area between Pennsylvania and Constitution avenues, and the "private office" downtown centered on 20th and K), with the remaining one-third going to the Pentagon. As might be expected, no one was attempting to rideshare to destinations other than these, which are the ones most directly served by the express lanes.

Virtually all respondents used the rideshare area 5 days per week. Some worked only 4 days. The respondents' estimates of how long they used the CBD rideshare operation ranged from 1 week up to 15 years (the express lanes were opened to carpools in 1974). About two-thirds said they would be getting back via carpool (similar carpools form during the afternoon peak at the Pentagon and at 14th Street and Constitution Avenue in D.C.) and one-third via bus or subway and bus. Some of the passengers said that they used to be drivers but had switched to being passengers.

None of the passengers indicated that fares had ever been exchanged, and none are ever expected in this operation. It is interesting to note that in Marin County and San Francisco, an attempt was made to establish such informal carpooling in 1979 and 1980, but that even with a (nominal) fare being suggested by the carpool organizing agency, fares were hardly ever collected because drivers were too embarrassed to ask, or as in Springfield, did not need the fare to be able to afford the trip.

Most of the Springfield CBD passengers indicate some general familiarity with the other passengers or drivers, because they all had been traveling in the same manner at the same time of day for a long period of time. Some waiting drivers indicated that they had regular carpools but that one or two members were absent that morning. The cars entering the lots to pick up passengers had from one to three occupants. Quite a few men or women drivers alone were stopping to pick up three passengers, indicating the high degree of trust that people had in this arrangement.

METROBUS USE

There apparently has been an evolutionary decline in the role of Metrobus compared to carpooling from the Springfield CBD area. In 1974, 330 commuter vehicles parked at Springfield Plaza were counted (*1*), of which 235 were attributed to bus riders and 95 to carpool users. The balance has shifted strongly to carpools since that period, and we estimate that virtually all those who park during the morning in the Springfield CBD are carpooling.

Metrobus operations have been adjusted over time to the differences in the morning versus evening bus commuter

demands related to the relatively greater use of the ridesharing in Springfield during the morning. On the primary lines serving Springfield there are 36 morning-peak-period bus trips arriving at the Pentagon from 6:00 to 9:30 a.m., and 46 evening-peak-period bus trips departing the Pentagon between 3:45 and 7:00 p.m. (There are no direct bus routes along the Shirley corridor into downtown Washington. Commuters working downtown must transfer to or from Metrorail.)

Therefore, there are 10 more peak buses in the evening than in the morning, which at 40 passengers per bus, on average, translates into 400 passenger trips already accounted for in the current Metrobus schedules as the difference between expected morning and expected evening ridership. Because Metrobus and Fairfax County (which pays the Metrobus subsidy) are avoiding substantial costs associated with the morning services, the Springfield instant carpools result in a cost savings to WMATA and the county.

Table 3 shows morning and evening ridership counts on the Metrobus Number 18 lines, as compiled by Fairfax County staff during the winter of 1987. As can be seen, there are probably at least 600 more bus users during the evening peak than during the morning peak on the principal routes serving the Springfield CBD and the Rolling Valley lot. (The morning counts on March 27, a Friday, seem unrepresentatively low when compared to the other counts taken by Fairfax County.) The 10 fewer trips operated during the morning compared to the evening are indicative that the service levels have been reasonably tailored to ridership.

ROLLING VALLEY PARK-AND-RIDE LOT USE

At the Rolling Valley lot, there are 340 spaces in a Virginia Department of Transportation facility that was specifically constructed for commuter parking. Use of the lot and of spaces in the adjacent mall lot and along Shiplett Boulevard totals about 500 cars on a typical weekday.

Counts by Fairfax County in late 1986 and early 1987, shown in Table 3, indicate 42 to 111 persons boarding buses at the Rolling Valley lot in the morning but considerably more persons, 276 to 306, getting off the buses at the Rolling Valley lot in the evening. As shown in Table 4, counts of bus passengers made by project staff in conjunction with counts of carpool passengers on July 22, 1987, indicated 25 morning peak bus passengers boarding at the stop within the Rolling Valley facility. (Total bus passengers were not counted on July 22, 1987.)

Table 4 shows the use of the Rolling Valley lot by casual carpoolers. The carpool behavior at the Springfield CBD is virtually replicated at the Rolling Valley lot, with the exceptions being that the Rolling Valley lot handles about one half as many persons and that it starts and ends somewhat earlier than the Springfield CBD. This early start and end can be expected based on the added distance to the Shirley Express lanes (about 5 mi) for Rolling Valley versus the CBD lots.

EVALUATION

The Springfield Underground is an unusual type of travel behavior for U.S. commuters. (To our knowledge, the only other area where similar activity takes place on a large scale is in the East Bay section of the San Francisco area.) It goes against the general tendency to avoid inviting strangers into one's private home or vehicle. Those who have engaged in this instant carpooling over many years are convinced that in this very particular travel market it is reasonably free of risk.

The operation of the Springfield Underground is a positive phenomenon to which levels of transit services have been adjusted. Users save time, and some users (the passengers) also save money compared to any alternate modes. The public agencies, Fairfax County and WMATA, save bus operating costs and subsidies. Congestion on the regular Shirley Highway lanes and other roads is lower in comparison to what might occur in the absence of the phenomenon. The Springfield instant carpooling should be allowed to continue and should be replicated where possible. It could be replicated, however, only in places where significant travel-time savings are possible and where a sufficient size lot could be located so that matches could be made quickly, as in the Springfield CBD and at the Rolling Valley lot.

Demand for parking spaces at the Springfield CBD and the Rolling Valley park-and-ride has been estimated using approximately the same methodology as has been applied to Metrorail stations to estimate the existing demand for added parking spaces. This methodology is based on a comparison of the accumulation rates of passengers boarding carpools at the two sites and the kiss-and-ride accumulation rates at the Huntington Metrorail station.

The analysis results in an estimate of current use of about 593 spaces in the Springfield CBD and a demand for about 751 if the spaces were clearly marked as authorized. For Rolling Valley, we estimate a total demand of 631 spaces, implying that 290 more authorized spaces could be used there.

Spaces to serve Rolling Valley users could be located in the Springfield CBD, because the Rolling Valley users pass by the Springfield CBD anyway. However, significant amounts of vehicle-miles of travel will be saved by locating spaces at Rolling Valley consistent with the demand for spaces there.

REPLICABILITY OF INSTANT CARPOOLING

Replication of this instant carpooling behavior is unlikely elsewhere unless some specific conditions are met. There are several aspects that will render this difficult.

First, the phenomenon is not reproducible on a small scale. The benefits to both the drivers and the passengers depend on having a sufficient market of users such that waiting times to form each carpool will be short. This will be impossible at usage levels much below what exists in the Springfield CBD or at the Rolling Valley lot today. At least 500 persons wanting to have rides from a general area would appear necessary, although it appears that the service will be more frequent if the demand is similar to that at Rolling Valley—near 1,000 if spaces were unconstrained. (In San Francisco's East Bay area, instant carpools form at many locations, chiefly bus stops, with a small number of commuters at most locations. However, commuters at low-demand sites may be choosing between buses and carpools, depending on which arrives first, and over time there has been a tendency toward concentration at fewer locations, chiefly those most convenient to freeways.)

TABLE 3 METROBUS LINE NUMBER 18 COUNTS

Route	Count Location	Morning Date	Trips	Passengers	Evening Date	Trips	Passengers
18D	a	2/25	5	107	3/24	5	100
18E	a	2/26	8	208	3/25	8	260
18G	b	2/13	9	270	2/10	14	439
18G	b	3/27	11	207	3/31	14	565
18P,R	b	2/13	13	417	2/10	17	682
18P,R	b	3/27	13	289	3/31	17	767
18H,K	b	2/13	12	333	2/10	13	501
18H,K	b	3/27	12	212	3/31	14	674
Subtotals	b						
		2/13	34	1,020	2/10	44	1,622
		3/27	36	708	3/31	45	2,006
18P,R	c	10/10	13	On 42	1/05	18	Off 276
				Leave 209			Leave 37
18P,R	c	12/18	13	On 51	2/02	16	Off 306
				Leave 237			Leave 315
18P,R	c	1/09	13	On 56			
				Leave 270			
	c	2/02	13	On 111			
				Leave 338			

[a] Edsall Road at Shirley Highway

[b] Old Keene Mill Road at Spring

[c] Rolling Valley Park-and-Ride

Note: Dates listed are in the last quarter of 1986 or the first quarter of 1987.

Source: Fairfax County counts.

TABLE 4 PERSONS AND VEHICLES ENGAGED IN INSTANT CARPOOLING AT ROLLING VALLEY PARK-AND-RIDE BY TIME PERIOD, JULY 22, 1987

Time Period	Autos	Arriving Occupants	Boarding Occupants	Cumulative Boarding Occupants	Leaving Occupants	Cumulative Leaving Occupants
6:00-6:15 am	17	25	44	22	69	69
6:15-6:30	31	48	76	120	124	193
6:30-6:45	34	52	84	204	136	329
6:45-7:00	34	44	92	296	136	465
7:00-7:15	33	51	81	377	132	597
7:15-7:30	12	18	30	407	48	645
7:30-7:45	26	42	62	469	104	749
7:45-8:00	19	27	49	518	76	825
8:00-8:15	11	15	29	547	44	869
8:15-8:30	2	2	6	553	8	877
8:30-8:45	0	0	0	553	0	877
8:45-9:00	0	0	0	553	0	877
	219	324	553	553	877	877

Note: 27 cars were parked by 5:50 a.m. Before 6:00 two carpools exited with eight occupants, comprised of four arriving occupants and four boarding occupants.

Bus boardings: 25 from 6:00 a.m. to 8:45 a.m.

Second, travel-time benefits must be available to nearly the same degree as in the Springfield commute to the Pentagon or D.C.—at least 15 to 20 min. This will require creation of similar incentives as are found in the Shirley corridor in terms of relative travel time for carpools versus no carpools.

Third, the afternoon trip back requires high-quality, high-frequency bus services or a location for forming carpools for the outward commute, or both. It may be necessary to concentrate bus routes to pass a particular point where carpool formation could occur.

Fourth, and as important as the rest, the development of this behavior is evolutionary over time. Instant carpools appear to have originated at bus stops (where a back-up mode is readily available if no ride is obtained). As instant carpooling became more popular and more reliable, it has become increasingly separated from bus operations. A further development has been the increasing use of instant carpools for the return trip in the afternoon. This kind of gradual evolution may be necessary to overcome commuters' reluctance to rely on such an unusual mode.

An important reason for this reluctance is the psychological resistance to offering or accepting rides with strangers. Instant carpooling has a number of characteristics that differentiate it sufficiently from hitchhiking to help overcome this resistance. It involves riding with three strangers instead of one, and some of those strangers may be persons that riders have already observed standing in line. Of course, HOV requirements vary from city to city. (In the San Francisco area, only three persons are required to be designated as a carpool.) A requirement of only two persons per vehicle to use the HOV lanes would undoubtedly result in a much higher level of psychological resistance to instant carpooling.

Another characteristic of instant carpooling that decreases the psychological resistance is that no one is forced to accept a ride. In fact, conversations with riders indicate that some occasionally do turn down rides if the driver's appearance makes them uneasy. However, trust in the safety of instant carpooling evolves with time, partly because of the familiarity of the experience and partly because of the recognition of familiar faces and vehicles over time. A final factor in reducing

resistance to riding with strangers is the appearance of the instant carpool users: they are for the most part well dressed and well groomed, reflecting the fact that they are overwhelmingly white-collar professionals and clerical workers.

There has been great interest in the kind of carpooling carried out in Springfield, as exemplified by a major study by Cambridge Systematics for UMTA in 1977, "Feasibility Study of Shared Ride Auto Transit" (*2*). However, that study contemplated an exchange of money for providing rides to passengers. Only the achievement of mutually beneficial time savings has been a substantial incentive for the drivers of shared-ride vehicles in the Springfield area.

As mentioned earlier, Marin County and San Francisco experimented briefly with an organized form of ridesharing in 1979 and 1980. Persons were registered and issued an ID, which showed that they belonged to the "Commuter Connection." Passengers and drivers tried to make matches at many points to combine for rides across the Golden Gate Bridge to San Francisco. The benefit to the driver was the use of an express carpool lane (but of only 3.7 mi) and avoidance of a $1 toll. For at least part of the experiment, fares were suggested but, as mentioned, were rarely collected.

The Marin/San Francisco experiment was dropped after disappointing use. The major flaws, not all of which were noted in an evaluation conducted for UMTA (*3*), were that too many points were identified for matches, travel-time incentives were not great enough for the drivers, and strong efforts to combine the match points with commuter park-and-ride lots and bus services were not made. Instead the project's emphasis was on marketing and promotion efforts. Thus, in the Marin County demonstration, the Springfield Underground's major keys to success (concentration, travel-time advantage, park-and-ride lots, and good bus frequency) were not emulated, and the efforts were placed instead on a marketing aspect, which has never been necessary for the success of the Springfield Underground.

RECOMMENDATIONS FOR SPRINGFIELD

Given the experience of the Springfield Underground, what can Fairfax County or other public or private entities do to protect, enhance, or strengthen the success so far at the Springfield CBD and Rolling Valley lot? Also, what can be done elsewhere in Fairfax County or in other jurisdictions to encourage similar ridesharing choices by commuters?

The first need is to protect the Springfield Underground from the potentiality that private property owners may someday refuse to allow their properties to be used for the staging or parking areas. Consequent impacts on Shirley Highway traffic and on bus subsidy costs would be large. Protection requires some degree of public control of the staging and parking areas—either through outright ownership or through a long-term contractual relationship with the relevant property owners. This could involve both the existing lots in the CBD, or new facilities.

Parking capacity and unauthorized parking are the other two key issues currently at the Springfield CBD and Rolling Valley lot. Half of those who park at Springfield Plaza are outside the designated commuter parking area, and more commuters are parked in other nearby unauthorized lots in the Springfield CBD area. About one-third of the parkers at the Rolling Valley lot are outside the commuter lot, parked along the adjacent streets or in the shopping center lots. Although many have shown themselves to be undeterred from parking if the authorized spaces are full, it is also likely that many others do not park because there are not enough authorized spaces. The expansion of authorized parking would resolve any potential conflicts and serve to attract additional users.

Expansion at the Springfield CBD can be accomplished through either public or private actions. Public actions could include an outlay of public funds either to buy new properties and construct new spaces or to buy or rent existing spaces. Private actions also could be taken to allow more commuter parking in return for better proof that the commuters are patronizing the facilities, such as the Springfield Cinema requirement of a purchase of a monthly pass to allow commuter parking. Other merchants or combinations thereof could sell gift certificates that included stickers allowing commuter parking for a month (or 2 or 3) in additional designated spaces. This would expand the authorized supply of parking and ensure that the merchant was helping mostly his patrons. However, all private solutions may be revocable in the short term as well as the long term. In addition, a new Springfield CBD match point, one actually designed for parking and for persons to line up and wait (as at Rolling Valley), would improve the safety of those using the facility. For these reasons, we recommended to Fairfax County that a new facility close to the Springfield CBD be developed under public ownership.

RECOMMENDATIONS FOR OTHER PLACES IN FAIRFAX COUNTY

The conditions for success of the instant carpools that have evolved at Springfield are stringent, and some would be expensive to satisfy elsewhere. The most restrictive is the existence of incentives for commuters to park and share rides, because those incentives should include travel-time benefits for the drivers. In Fairfax County, the I-66 and related Dulles corridors offer the principal other opportunities for instant carpools. These opportunities would be strengthened if the carpool restrictions on I-66 were extended to the west and if carpools were allowed on the Dulles Toll Road. For I-66, the Fair Oaks Mall area, Greenbriar, or other areas adjacent to or leading directly to an I-66 ramp would be candidate locations for a park-and-ride facility that would be served by high-quality, high-frequency bus service during peak hours and where carpool formation could be built up over time (leading, perhaps to an eventual reduction in bus service as demand falls).

Another candidate location in Fairfax County is in Reston, which has excellent access to the I-66 HOV lanes and where ridesharing has traditionally been extensive. Springfield-type instant carpooling has not yet emerged at the current Reston commuter lot. The lot is too small (240 spaces) and currently is used half for buses and half for organized carpools. It would be reasonable to expect instant carpooling to emerge at a larger facility in Reston. Fairfax County should place high priority on implementing such a facility and on working to allow carpools using this facility onto the Dulles Toll Road.

RECOMMENDATIONS FOR OTHER AREAS OF THE COUNTRY

Bus and regular carpool and vanpool travel can be expected to predominate on any HOV facility, with instant carpooling only one element in overall ridesharing from any area. However, to the extent that the instant carpooling can be encouraged, its expansion can enhance the operation of HOV facilities and bring additional travel-time and cost savings to both users and nonusers of the HOV facility.

For other corridors or urban areas, the construction of an HOV lane or facility is the primary expense in making it possible to build up a ridesharing operation such as occurs in Springfield. Such additional facilities are not planned in Fairfax County outside of the current Shirley and I-66 corridors. In other areas of the country where HOV lanes already exist or are planned, there may be good opportunities for actions to encourage instant carpooling behavior.

Institutional barriers may occur in other urban areas. Replicating the Springfield experience will require enlightened policies on the part of the transit operator or the agency that controls the operator's schedules. The transit service must help to build up ridership that can eventually be taken over by instant carpools. Many transit operators may see this as a threat to their own performance objectives. This institutional problem does not arise in Fairfax County, because the county controls the level of bus services or provides the bus services itself.

Encouraging instant carpooling is potentially cost-effective when HOV facilities exist. It will, however, require close integration with bus service decisions, and it will take time for instant carpools to evolve. Noting these caveats, planners and decision makers should consider encouraging instant carpooling as a means to enhancing the overall effectiveness of a park-and-ride and HOV-lane program.

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