

Evaluating the Accessibility of Commuter Rail Services: Metra Systemwide Parking Inventory/Assessment

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Consumer acceptance and use of the rail mode are clearly influenced by the availability, convenience, and cost of commuter parking around each station. Access conditions represent an opportunity to improve rail service quality and to attract or expand ridership. A thorough understanding of available access to each commuter rail station is essential to a comprehensive transit marketing strategy. To this end, Metra, the commuter rail operator in the northeastern Illinois region, conducted a systemwide inventory and assessment of commuter parking capacity, use, and physical condition at its 208 stations. The study included field surveys, data base design and development, and assessment of the capacity needs at each station. More than 860 parking lots serve these stations. These lots provided more than 54,000 commuter parking spaces, which were used by more than 45,000 cars. The systemwide use rate was over 85 percent, with 90 stations experiencing major capacity deficiencies. The focus of this paper is on the characteristics of the parking facilities serving the Metra system and the strategies proposed to alleviate identified deficiencies. Strategies considered included: overselling of commuter parking permits, redesigning existing lots, construction of new lots, development of shared parking opportunities, pricing adjustments to redistribute parking demand, and expansion of feeder bus and other access alternatives. This study constitutes the initial phase in the development by Metra of a comprehensive parking policy that recognizes the importance of station access to rail service quality.

Metra operates the commuter rail system in northeastern Illinois. This system consists of 11 rail lines plus branch lines generally radially oriented toward the Chicago central business district (CBD), as shown in Figure 1. The system carries an average of 125,000 riders daily. The most frequent mode of travel to Metra commuter rail stations is the drive-and-park mode. Clearly, the availability and condition of parking around stations play an important role in consumers' decisions to use commuter rail. In 1986, Metra began a multiphased study of the role of parking in the definition of the commuter rail travel market. The first phase of the Metra Parking Study is the data collection and analysis activity discussed in this paper: the Metra Systemwide Commuter Rail Parking Inventory/Assessment.

The parking inventory/assessment involved field visits to 208 Metra stations. At the 186 stations where commuter parking was determined to exist, 861 parking locations were identified as having 45,631 cars parked in 54,022 spaces.

The information collected during the inventory/assessment forms the data base for several planned studies of the trip-making behavior of Metra riders. It will be possible to investigate questions such as: Do riders drive to stations, other than the stations closest to their homes, in order to obtain more readily available or less costly parking? Other questions about the effects of parking capacity use on commuter rail ridership levels can also be addressed.

Included among Metra's goals is the enhancement of access to the rail system. To this end, Metra initiated an annual parking capital-improvement program. The inventory/assessment data base constitutes a systemwide analysis of parking, which will be a key element in the formulation of that annual program.

Another intended use of the parking data is the derivation of a set of parking standards and policies for implementation by Metra. The inventory/assessment revealed a great diversity in the practice of parking provision throughout the Metra service area. Unique combinations of factors such as fees, collection methods, and restrictions were found to exist around each station.

The systemwide parking inventory/assessment was managed by the Metra Office of Planning and Analysis and the Metra Parking Committee, which is an interdepartmental task force charged with monitoring all phases of the Metra Parking Study. Virtually all elements of the inventory/assessment were the responsibility of Metra's consultant, Lester B. Knight and Associates, Inc.

OUTLINE OF INVENTORY/ASSESSMENT ACTIVITIES

This project consisted of five major tasks, of which the first three were field survey activities. These are described as follows:

Facilities Inventory

Field crews visited all Metra stations, and all associated parking locations, in the six-county metropolitan area. Crews conducted an inventory of a broad range of facilities and passenger amenities such as public phones, transit maps, bus stops, kiss-and-ride areas, and so forth.

Capacity and Utilization Survey

Crews performed a utilization count by recording the license plate number of every vehicle present at all commuter parking

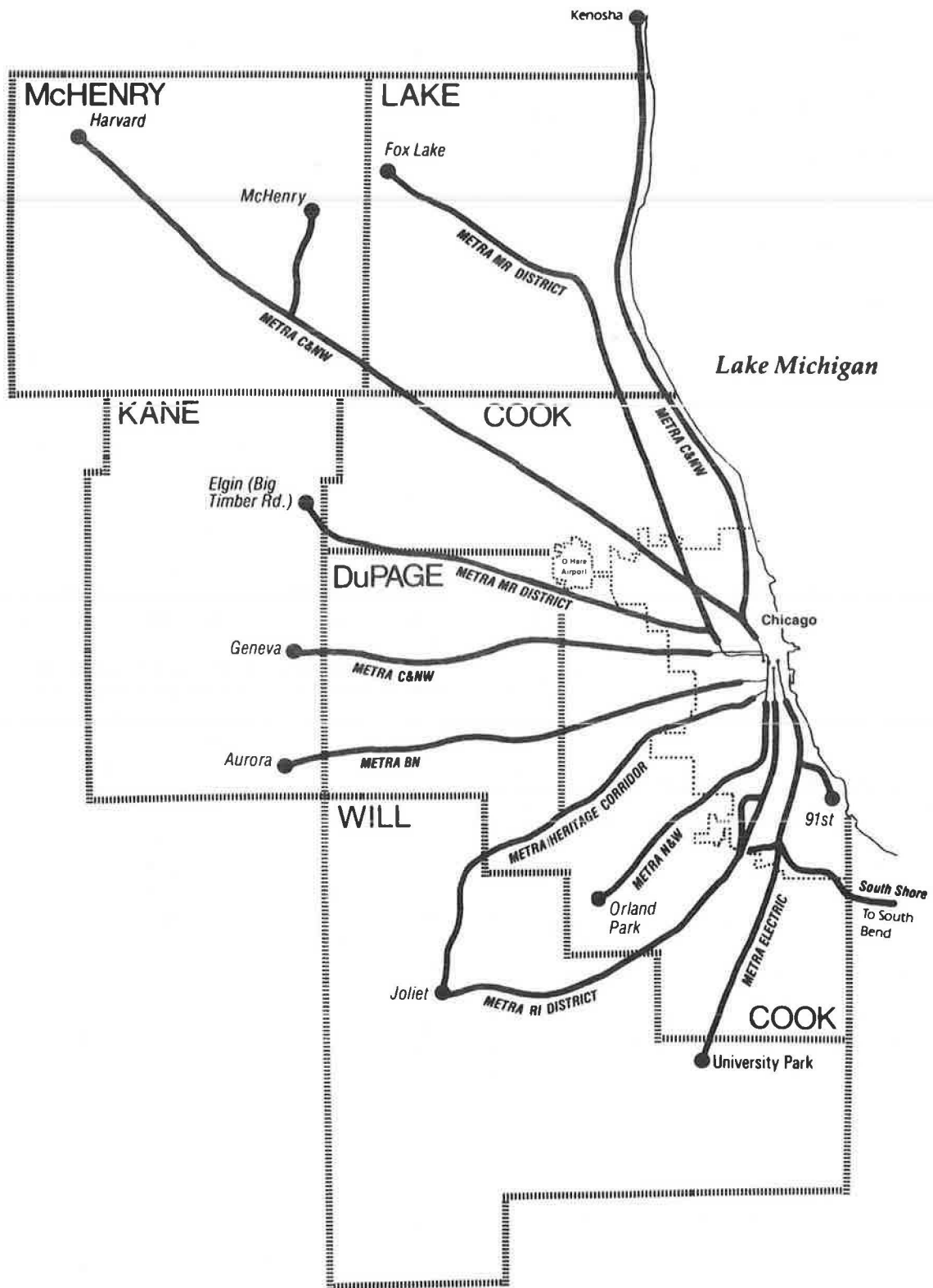


FIGURE 1 Metra commuter rail system.

locations. A count of total capacity was also performed. In unstriped or unpaved locations, crews measured the area to permit capacity to be calculated later.

Physical Conditions Assessment

An assessment of the current physical condition of the parking surface was performed at all publicly owned parking locations outside the public right-of-way. The method selected for rating surfaces was the pavement condition index (PCI).

These field activities provided the base-line data for later phases of the inventory/assessment. These are described as follows:

Data Base Development

Field data were developed in the Metra parking inventory data base. This data base operates on a personal computer and consists of four relatable files. The Village file consists of information on the local government unit in which the station is located. It includes data on the local contact and the commuter parking permit practices of that village. The Station file contains station-specific information gathered during the inventory. This file contains information on passenger amenities available at the station and demographic data for the stations' market areas. The Lot file contains descriptive data associated with each parking location. These include information on the location, capacity, and use of each lot; parking fees; collection methods; lot ownership; and maintenance responsibilities. The Capacity file is derived from the previous files and contains information on the capacity utilization characteristics of each station. The final segment of the data base is a set of consistently formatted maps, one for each station surveyed, which provide geographic information on commuter parking locations for the station concerned.

A user-friendly data management system was developed and implemented in the dBASE language. This software permits

the casual user to extract detailed parking information on a municipality, station, or lot through a menu-driven program. For the experienced user, this data base permits detailed analyses of existing parking-ridership patterns and scenario testing for regional demographic forecasts and proposed parking policies.

Inventory/Assessment Reports

The final report summarizes systemwide statistics and identifies parking problems and needs. It identifies specific locations where parking deficiencies are most serious. In addition, current management practices that contribute to deficiencies are identified and possible improvement strategies are proposed for further study. A procedures manual was developed that describes a preferred method and schedule for updating the inventory/assessment. Finally, a user's manual was prepared describing the development of the computer data base and operation of the user-friendly system.

In a related project, Metra has matched the license plates collected during field work to the names and addresses of the automobile owners. These addresses were geo-coded to the quarter section of origin, yielding a station-specific file of commuter rail users that could be converted to map form. Several studies of station market areas are planned using this data.

CHARACTERISTICS OF COMMUTER PARKING

A wide array of parking conditions exists around the 208 stations included in this inventory. This ranges from no available parking at 22 stations to 6 stations where over 1,000 parking spaces are available for commuters. The stations with no available parking are primarily inner city locations with relatively low boardings and surrounded by higher-density development. The larger suburban stations with heavy ridership generally are served by more parking facilities.

Indicated in Figure 2 is the distribution of the 186 stations with parking by the number of spaces provided. The typical

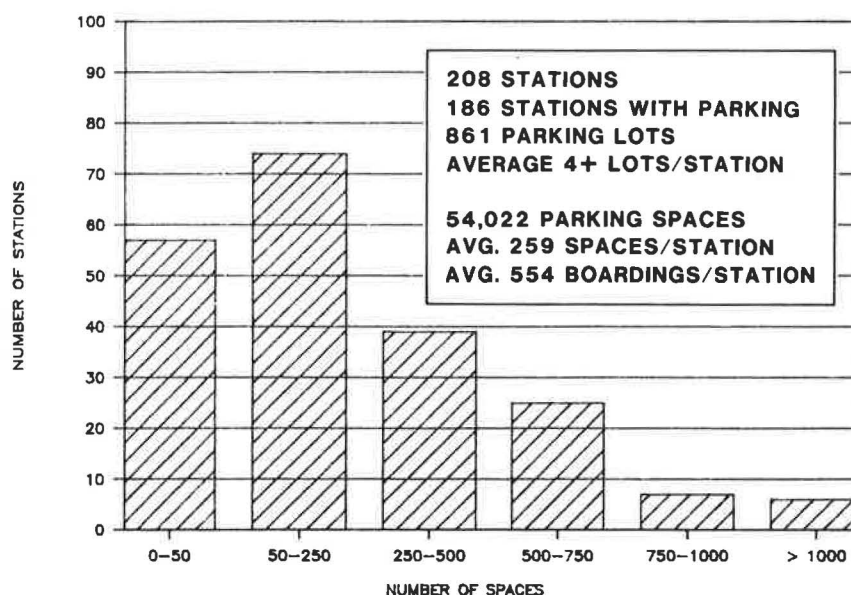


FIGURE 2 Stations by parking availability.

station in the Metra system is served by four parking lots containing a total of 260 spaces. These facilities would serve an average station ridership of 554 boardings. The drive and park mode is clearly the preferred access alternative, with nearly three-fifths of rail commuters arriving at the station by this mode.

As shown in Figure 2, there was a total of 861 parking locations at the 208 stations. These locations provided 54,022 parking spaces. The use of these spaces is summarized in Figure 3. More than 45,631 automobiles were parked in these spaces for a systemwide use rate of 84.5 percent. The average station with parking in the Metra system is used by 245 automobile drivers requiring parking spaces. The distribution of

stations by number of spaces used is also shown in Figure 3. More than 1,000 vehicles were parked at four Metra stations.

The 861 locations inventoried included on-street and off-street lots, designated and nondesignated commuter facilities, paved or unpaved surfaces, and so on. Some systemwide statistics are presented in Figures 4 and 5 that characterize the parking locations available to the rail commuter. As shown in Figure 4, some 366 or nearly 43 percent of all parking locations are off-street designated commuter rail parking lots. These are the typical commuter rail parking lots generally located in close proximity to the station itself. About 213 locations or 24.7 percent are on-street designated lots. On-street nondesignated facilities account for 26.0 percent of the commuter parking lots. Off-street nondesignated and off-street joint-use lots accounted

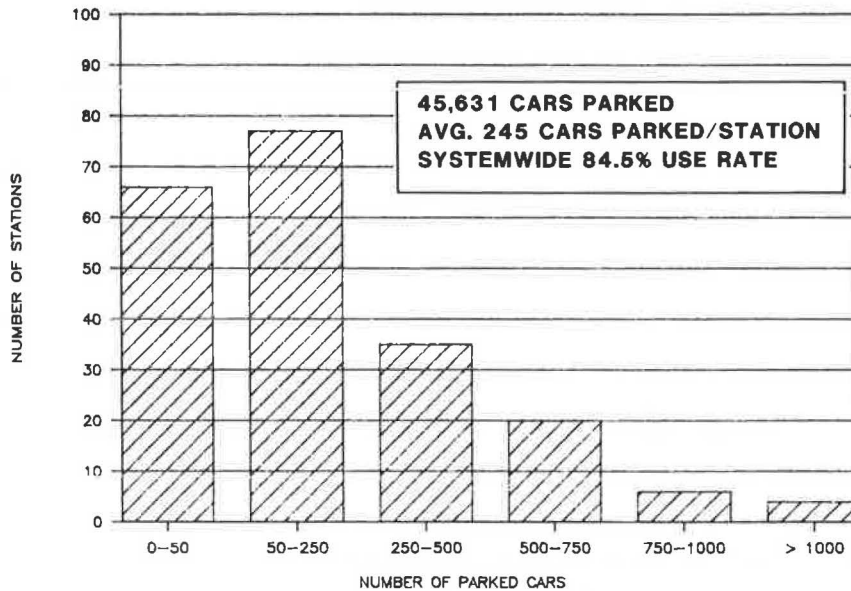


FIGURE 3 Stations by spaces used.

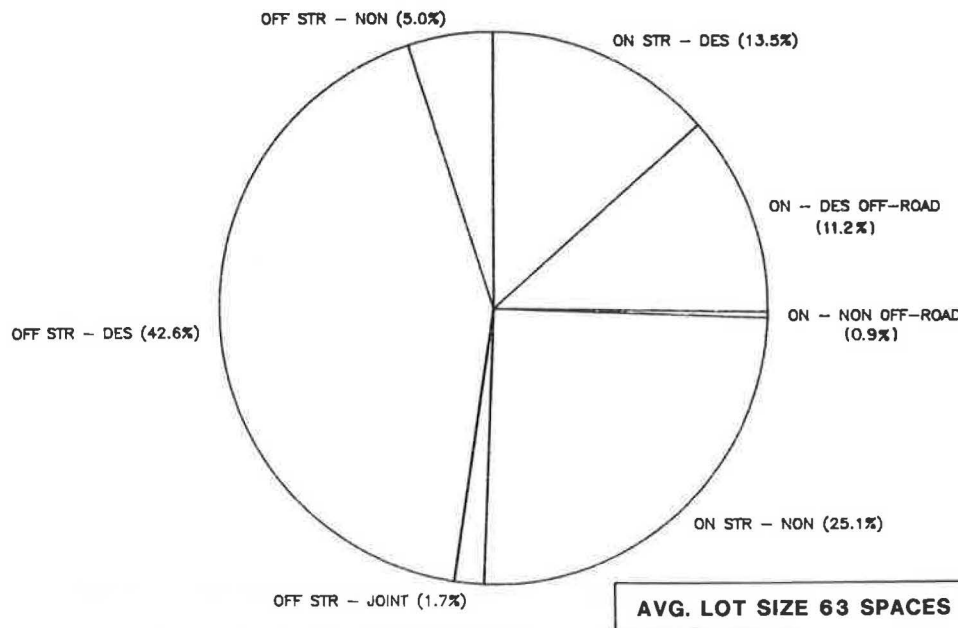


FIGURE 4 Lots by parking category.

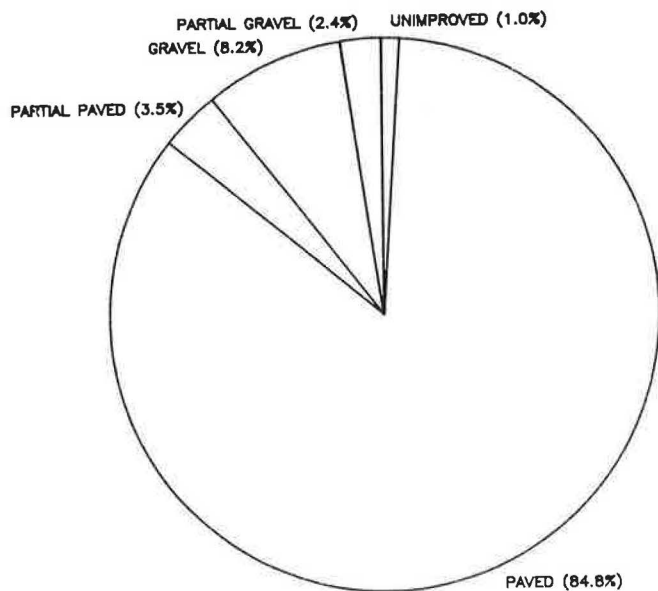


FIGURE 5 Lots by surface type.

for the remaining facilities at 5.0 percent and 1.7 percent, respectively.

More than 84 percent of the locations had paved surfaces, as shown in Figure 5. The rest of the locations ranged from partly paved to unimproved, with 8.2 percent of the locations having gravel or crushed stone surfaces, 3.5 percent having partly paved surfaces, 2.4 percent having partly gravel surfaces, and 1.0 percent having grass or dirt surfaces.

Consumer acceptance and use of the rail mode are clearly influenced by the availability, convenience, and cost of commuter parking around each station. A useful measure of the availability and convenience of parking is the percentage of capacity used. The distribution of stations by percentage of capacity used is shown in Figure 6. More than 95 percent of available parking capacity is used at 58 stations. Between 90 and 95 percent of available spaces are used at another 27

stations. These 85 stations represent potential capacity problems that the improvement strategies discussed later in this paper are intended to solve.

One of the key objectives of the parking inventory was an assessment of the physical condition of all off-street parking locations. The PCI methodology developed by the U.S. Army Corps of Engineers (1) was adapted and applied to rate the surface condition of each publicly owned lot. The distribution of surface conditions for each of the more than 500 rated lots is shown in Figure 7. The majority of lots are in good condition or better. Only 78 lots are categorized as being in poor condition or worse. Improvement of these deteriorated surfaces is required to maintain an acceptable quality of parking facilities.

The distribution of lots by a fee-collection method is shown in Figure 8. No fee is charged at some 33 percent of the lots inventoried. Of the lots charging a fee, 27.7 percent collect by prepayment methods including stickers or permits (22.9 percent) and window cards (4.8 percent). Fees at nearly 36 percent of the lots are collected by daily (or day-of-service) methods including 18 percent by collection boards and 17.4 percent by meters. The average fee charged for commuter parking was \$0.62 per day if all lots are included or \$0.77 per day if only those lots charging fees are included.

PRELIMINARY TOOL FOR COMMUTER PARKING PLANNING

A model of commuter parking demand and capacity requirements was made from the data for the 64 stations with available parking and at which the capacity utilization rate was under the 85 percent taken as the capacity deficiency bench mark. Shown in Figure 9 is parking capacity as a function of weekday rail ridership at each station. The following regression equation was developed for use in estimating the typical parking requirements associated with Metra ridership:

$$\text{Spaces} = 37.3 + 0.49 \text{ Riders} \quad R^2 = 0.66$$

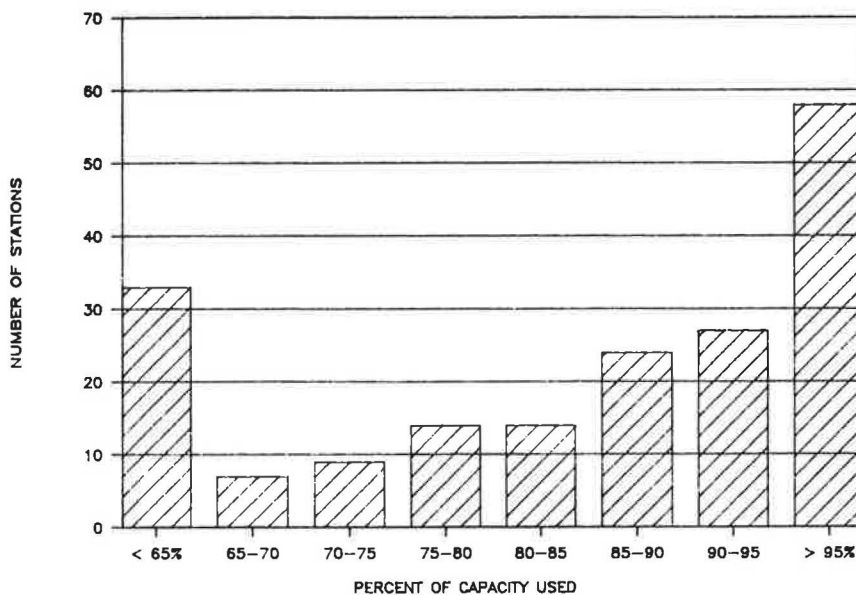


FIGURE 6 Stations by capacity used.

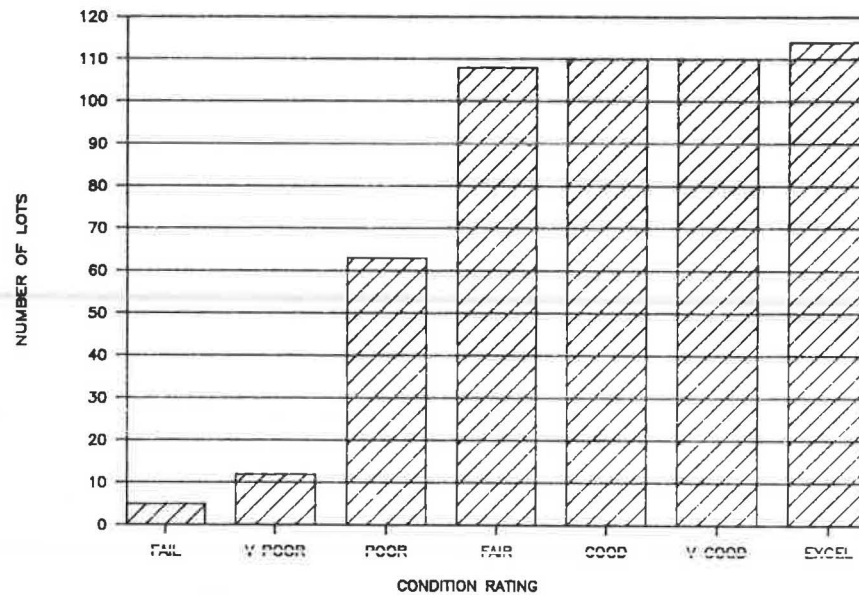
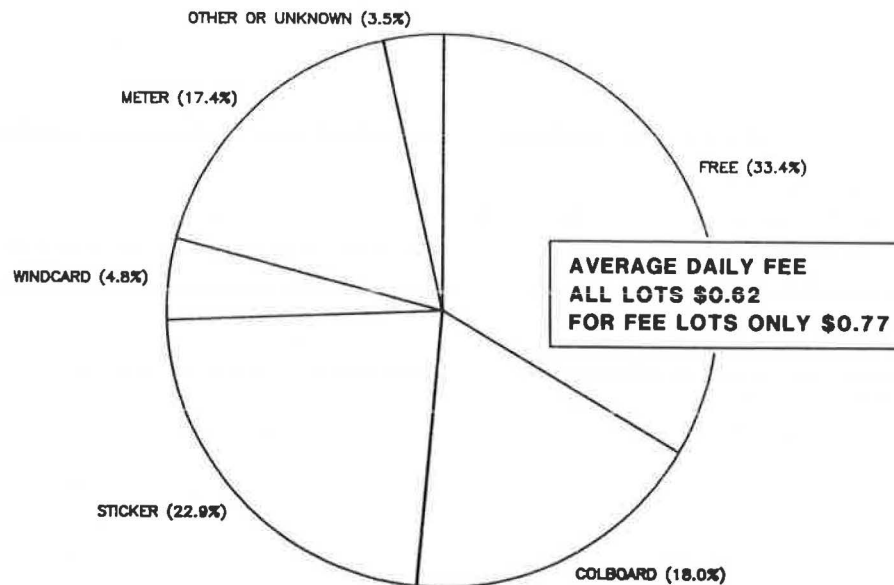


FIGURE 7 Condition of lots.



NOTE: AN INDIVIDUAL LOT MAY HAVE MULTIPLE COLLECTION METHODS.

FIGURE 8 Lots by collection method.

This model indicates that the average Metra station should be served by 38 initial spaces with an additional parking space provided for every two riders boarding at that station. Such a model may be useful in estimating the parking needs of proposed or existing stations. Although development of such a planning tool was beyond the scope of the inventory/assessment, it is clear that the detailed information of the parking data base is well suited to subsequent analysis of this type. The next section offers some parking strategies that may relieve parking problems around particular stations.

COMMUTER PARKING STRATEGIES

Several strategies for increasing the parking available to commuters at specific stations will be considered as a result of the

inventory analysis (2, 3). The first, which has the lowest implementation cost, is a program of overselling monthly or quarterly permits for commuter parking, taking advantage of the fairly constant commuter-absentee rate. This practice already occurs in a small number of municipalities, giving evidence that actual parking capacity can be oversold by 5 to 20 percent without causing inconvenience to the commuter.

Another low-cost strategy for increasing capacity would be a program of restriping parking lots to down-size additional spaces for compact cars. This method is common in shopping malls and increases capacity significantly. The typical commuter parking location has spaces of uniform size, all large enough to readily accommodate full-sized vehicles. Because rail commuters are typically all-day parkers, with minimum recycling of the stalls, it may also be possible to increase

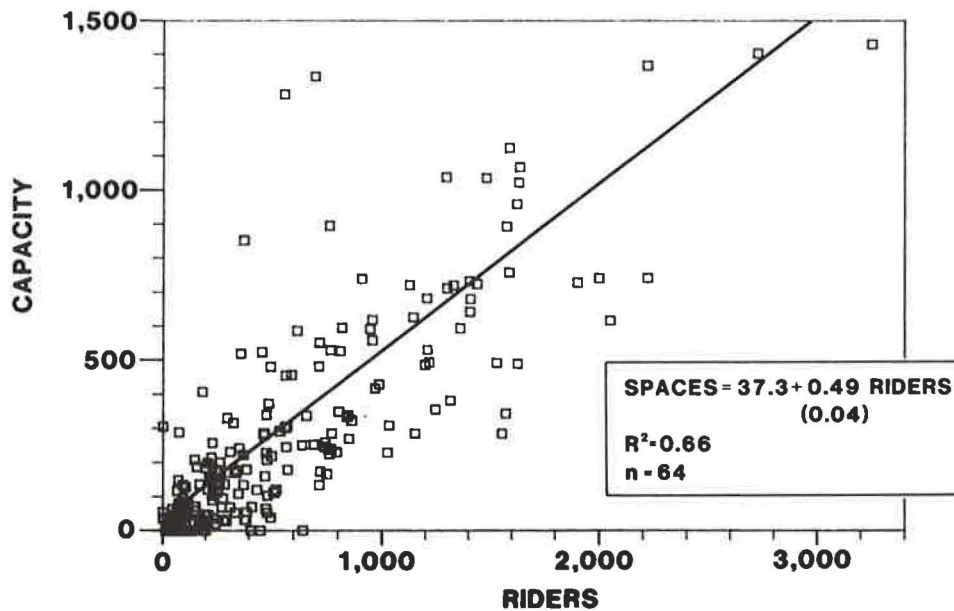


FIGURE 9 Parking capacity versus weekday riders.

capacity by a general down-sizing of stalls to a 9 ft width, for example.

The parking inventory revealed very few instances of commuter parking shared with another activity. Where this exists, it appears to work to the benefit of Metra, the municipality, the sharing establishment, and the commuters. Logically, where shared or jointly developed parking is feasible, the total cost of the parking provision may increase marginally, but the proportional cost for the joint users is lower than if it is not shared. The shared-joint-parking strategy will be the subject of further investigations, and several opportunities for joint parking were identified in the assessment.

The most obvious method of increasing available commuter parking is the construction of new lots. This costly method is also often the most complicated to implement. The areas surrounding Metra's busiest stations, where parking is most frequently in short supply, are the areas most likely to be fully developed. In many cases, the nearest vacant or underused parcel is a great distance from the station. Even where land is available, using it for parking prevents its use for commercial and other high revenue-producing purposes, and is a tax-exempt activity. Not surprisingly, municipalities are not always eager to develop additional parking around their train stations. For these reasons, Metra has vigorously investigated other parking-station-access policy options as alternatives to construction of new parking, though a number of locations for new lot construction were also identified in the assessment.

Metra market studies indicate that many commuters travel to other than the closest rail station to obtain less expensive parking. This behavior exacerbates parking problems when heavily used stations are attractive to commuters from outside a strictly defined market area because of relatively low parking rates. This, of course, means that other stations with excess parking capacity are unattractive to commuters because of

comparatively high parking fees. Metra is also investigating the potential impact and the feasibility of establishing a system-wide, uniform parking fee structure to encourage use of stations with available parking capacity.

Stations with severe parking deficiencies are, in some instances, located within a few miles of other stations with equally priced, excess parking. A study of strategies (e.g., revisions to the timetable) will also be undertaken to assess the ability to attract commuters to underused stations.

At many Metra stations, an alternative to drive-and-park station access exists in the form of feeder bus routes. A cooperative, interagency study of improvements to the feeder bus network is currently under way as a logical consequence of this parking inventory/assessment and the commuter origin geocoding project.

The Metra Systemwide Commuter Rail Parking Inventory/Assessment will be the basis for further study. Many questions regarding the role of parking in shaping the northeastern Illinois region's travel patterns were answered through this effort. This phase of the Metra Parking Study was an unusual undertaking in that, by design, it raised additional questions and provided the foundation on which to construct the answers.

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