INTEGRATING LAND USE AND TRANSPORTATION PLANNING IN REBUILDING CITY CENTERS: AN EXAMINATION OF CEDAR-RIVERSIDE IN MINNEAPOLIS

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Billions of dollars are spent annually rebuilding U.S. cities. Joint planning of land use and transportation systems is essential. Cedar-Riverside, a federally funded "new town in town," is located in Minneapolis, Minnesota, 1 mile (1.6 km) east of the central business district and adjacent to the University of Minnesota. It is 340 acres (136 hm^2) in size and has a planned ultimate development of 34,000 people in 12,500 residential units. Thirteen hundred units have been constructed and are occupied. This paper lists 5 joint planning objectives and comments on how well Cedar-Riverside met them. A thoroughly integrated second-level pedestrian system, an extensive bikeway system, ties to regional transit, and a university community distribution system are discussed. The joint planning objectives include minimizing the need for travel, providing reasonable alternatives to the use of the automobile, providing sizable "environmental" (traffic-free) areas for redevelopment, reducing amount of travel within the district, and reducing the amount of space consumed by automobile parking. The conclusion is that this project is planned to meet these objectives.

•EACH year, billions of dollars are spent on physical improvements in rebuilding U.S. cities. The largest components of these expenditures are directed toward improving the transportation systems and building stocks of city centers. The objectives of these 2 activities are similar: to renovate facilities that are useful and sound, to deal with obsolescence and deterioration through incremental upgrading, and to add new facilities where necessary or desirable. The main purpose of this activity is to create a better urban environment for people.

These physical improvements to transportation facilities and buildings are having a considerable individual effect on the urban environment. However, it must be recognized that the lack of coordination between transportation and land use planning (the latter of which is directly related to buildings) represents a substantial opportunity loss that cannot be rectified easily because of the relatively fixed nature of such long-term capital investments. Although joint land use and transportation planning is accepted now on both a citywide and metropolitanwide basis, in actual practice the principal thrust of this so-called coordination has largely been limited to enhancing accessibility to and among various portions of an urban area. Furthermore, in too many cases, the vague term accessibility has been synonymous with automobile accessibility thus causing inconvenience or hardship for those who, for economic, physical, or personal-preference reasons, find sole dependence on the automobile undesirable. Finally, there should be more in-dpeth examination of the potential adverse impacts of current relationships of land use and transportation from the standpoints of cost (both fiscal and social) and quality of environment (both natural and manufactured).

Professionals concerned with this relationship of land use and transportation recognize that the problem is most acute in city centers where the combination of poor fiscal resources, an aging physical plant, and a significant underprivileged population must be contended with. This paper is principally an examination of the Cedar-Riverside project, which has directly faced some of these critical relationships to develop an improved form of city center. The results so far are by no means a cure-all, nor are

they unique. But much of what has been accomplished so far is promising and deserves continuing examination.

Before detailing the Cedar-Riverside experience, the specific land use and transportation planning objectives that ought to be met in more land development projects should be summarized, and the principal deterrents to meeting these objectives should be detailed

SOME JOINT PLANNING OBJECTIVES

In this paper we will summarize 5 joint planning objectives.

1. Minimize the need to travel. Perhaps the most successful way to reduce urban transportation problems is merely to provide an environment that can reduce the need to travel by means of motor vehicle assistance or at least can reduce the length of trips by motor vehicle.
2. Provide reasonable alternatives to use of the automobile. Although young, old, poor, and infirm people are universally mentioned as needing alternatives to the automobile, many others might soon prefer to travel by some means other than the self-driven gasoline-powered automobile. Energy and environmental cost considerations may force the issue.
3. Provide sizable "environmental" (traffic-free) areas for redevelopment while maintaining high-quality access. The dilemma of providing environmentally pleasant and safe living and working areas while maintaining high-quality access is a major design problem that requires the utmost in joint land use and transportation planning.
4. Reduce amount of travel within an urban district or project area. On a somewhat larger scale than specific development parcels, which is the objective, traffic needs to be minimized into and through various cohesive parts of the city. Even for traffic destined for a particular project area, minimizing the amount of traffic penetration into that area would be desirable.
5. Reduce the amount of space-consuming automobile parking. The tremendous amount of space consumed by parking not only is visually unpleasant, but also is discouraging to other modes of travel such as walking. Furthermore, as land prices rise, continued high parking ratios could have a substantial adverse economic impact. Some way must be found to reduce the impact of parking, especially in densely developed areas

DETERRENTS TO JOINT LAND USE AND TRANSPORTATION PLANNING

Three deterrents to joint land use and transportation are as follows:

1. Planning scale,
2. Project timing, and
3. Differences in an organization's mission.

Transportation planning, because it must be concerned with access to an entire city or metropolitan area, generally has a large planning scale. Land use planning, because it is usually project oriented, typically covers a much more limited geographic area. These differences are not always easily resolved. That which may be good for a particular project may not be good for the city as a whole or at least may not deserve a high priority.

Even if joint land use and transportation planning objectives in a particular portion of a city are in complete concurrence, the programmed timing of specific projects may not satisfactorily mesh and, thus, coordination may not be possible. For example, a project might necessarily be forced to accommodate dominant automobile use simply because extensions of public transit service might not be available at a particular time.

Because much transportation planning is in the public domain and much of land use planning and development is a private function, a fundamental conflict (or at least a

mutual suspicion) is often inherent in joint land use and transportation planning efforts. Even if both the transportation and land development agencies are public, differences in an organization's mission, project timing, and personalities may deter joint planning.

DESCRIPTION OF CEDAR-RIVERSIDE

Before detailing how Cedar-Riverside planners have struggled to obtain some of the primary objectives of joint land use and transportation planning, it is important to understand the unusual size, location, and other physical characteristics of the Cedar-Riverside project. Many promising developments have occurred through this project, but Cedar-Riverside has enjoyed a relatively unique physical location and has been further blessed by an unquestionably high degree of public and private cooperation that does not exist in many development situations.

Project History

The Cedar-Riverside area was settled more than 100 years ago by Scandinavian and Eastern European immigrants. Although most of them were poor, they developed a close-knit and respectable community. But gradually it followed the course set by other inner-city areas and turned into a honky-tonk district. Cedar Avenue became known as Snoose Boulevard after the Swedish word for the tobacco juice that found its way to the sidewalks. As families moved out, the population fell from a peak of 20,000 in 1912 to a low of 4,000 in 1970. Homes and shops stood empty and boarded up. By the late 1950s, however, the area's future began to brighten. The first major step was the expansion of the University of Minnesota campus (which now has more than 40,000 students) across the Mississippi River to establish a new west bank campus. Other educational and medical institutions in the area also prepared expansion plans. In the early 1960s some of the current Cedar-Riverside principals began to purchase property in the area. By 1968 these activities were formalized through the Minneapolis City Council's adoption of an urban renewal plan for the area. Then in December 1971 the Cedar-Riverside area became the nation's first "new town in town" through the signing of a new communities project agreement that insured $24 million in federal land loan guarantees.

Project Size and Location

The Cedar-Riverside project is located between the downtowns of Minneapolis and Saint Paul (Figure 1). More specifically, the project is located approximately 1 mile (1.6 km) east of the Minneapolis central business district (CBD). It is ringed by freeways on the west (I-35W) and south (I-94) and the Mississippi River on the north and east (Figure 2). Most of the main campus of the University of Minnesota lies directly across the Mississippi River from Cedar-Riverside. The project area contains 340 acres (136 hm^2), approximately 100 acres (40 hm^2) of which is slated for private redevelopment. A third of the Cedar-Riverside land area has already been preempted for institutional use by the University of Minnesota, 2 hospitals, and 2 private colleges. Most of the remaining land is designated for open space and transportation use (Table 1).

Development Plan

The development plan calls for an ultimate population of approximately 25,000 persons housed in 12,500 dwelling units and supporting commercial facilities located on 100 acres (40 hm^2) of land (Figure 3). The project is estimated to be completed in 15 to 20 years. The basic nature of the planned community is residential. The community is intended to meet the needs of people working in the Minneapolis downtown and midcity

Figure 1. Location of Cedar-Riverside.

Table 1. Planned land use in Cedar-Riverside.

Use	Acres	Percentages of Project Areas
Residential	88	26
Commercial	11	3
Institutional	113	33
Parks	56	17
Social and cultural	6	2
Circulation	66	19
Total	340	100

Note: 1 acre = 0.4 hm².

Figure 2. Cedar-Riverside area.

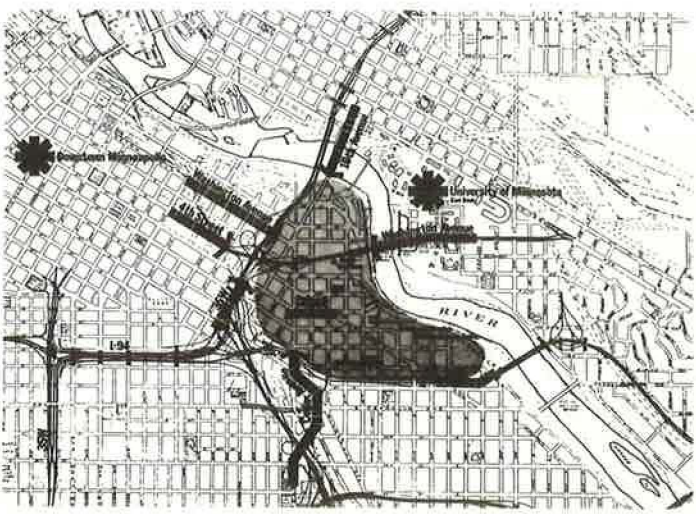
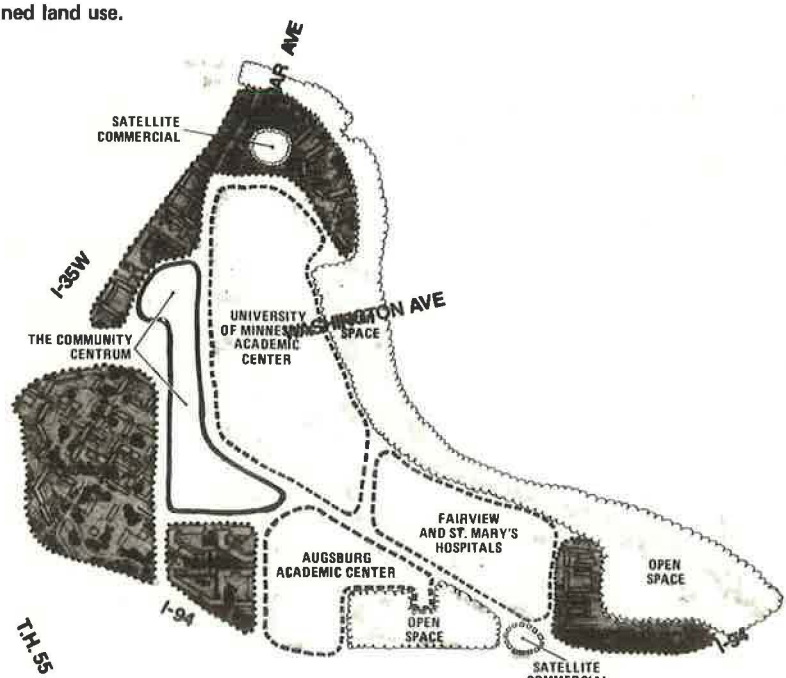


Figure 3. Planned land use.



areas as well as the professional, paraprofessional, and student population of the area's 5 major institutions. Almost half of the housing is designated for low- and moderate-income population.

Existing Project Status

Currently, Cedar-Riverside has developed approximately 1,300 dwelling units housing approximately 2,500 people in its first-stage project called Cedar Square West (Figure 4). More than half of this housing is federally subsidized as can be seen from the data given in the following table:

Type of Dwelling Unit	Number	Percentage
Public housing	117	9
Federally subsidized "236"	552	43
Middle income	408	31
Semiluxury	222	17
Total	1,299	100

The second-stage project, Riverbluff, which is of a similar scale, is being held up by a court-ordered environmental impact statement. Among the arguments against this project are the planned high residential densities. Unfortunately, this environmental impact delay and other setbacks have caused the project to experience financial problems.

Unique Plan Features

Two major plan features sharply distinguish this area from the remainder of the Minneapolis-Saint Paul metropolitan area. First, the projected density of residential development is significantly higher than that which currently exists (beyond a small project scale) anywhere else in the metropolitan area. The proposed density approaches 300 persons/acre (750 persons/hm^2). Average for the city of Minneapolis is 12 persons/acre (30 persons/hm^2). To accomplish these densities much of the housing will be contained in medium- and high-rise structures. This is in sharp contrast to the predominant single-family living style of the metropolitan area. The high concentrations of educational and other institutional uses in the project area permit considerable opportunities to reduce the need to travel, at least by motor vehicle. Furthermore, the nearness of the Minneapolis CBD 1 mile (1.6 km) to the west represents an additional opportunity to minimize length of travel.

Unique Relationship to the Existing Transportation System

Beyond the planned high residential density and the fortuitous location of the Cedar-Riverside residential areas in relation to places of employment and education, the project is extremely well located in relation to the in-place transportation system as shown by Figure 5. Cedar-Riverside is located on the historic principal east-west travel corridor between the city centers of Minneapolis and Saint Paul. (This corridor was first established through the development of the Red River oxen trails that often followed the river bottoms and valleys across Minnesota.) During the formative period of the motor vehicle age, the Washington Avenue-University Avenue corridor passing through Cedar-Riverside provided the principal connection between the 2 cities. In the late 1950s, when the Interstate Highway System was developed, I-94 was constructed in the same

Figure 4. Cedar Square West in 1974.

Figure 5. Corridor location of Cedar-Riverside.

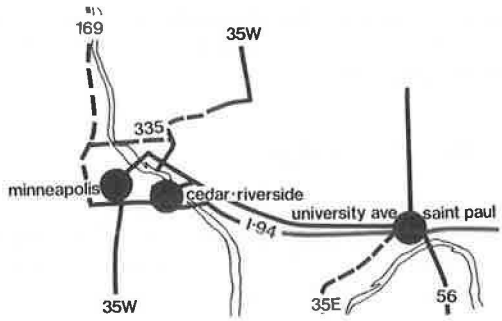


Figure 6. Planned pedestrian system.

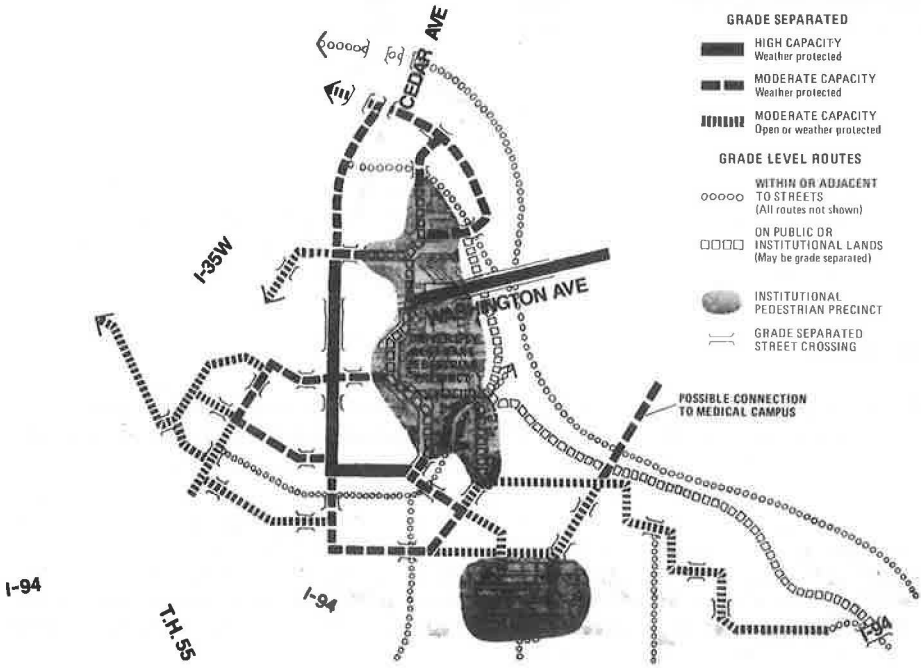


Figure 7. Pedestrian skyway over Cedar Avenue.

Figure 8. Pedestrian treatment along Cedar Avenue.

general corridor. This corridor is again being investigated as part of various regional transit proposals now under consideration. Thus the Cedar-Riverside area has enjoyed and will continue to enjoy good regional access. This is extremely important because the advisability of such concentrated development could be seriously questioned if the project were not properly located in relation to the regional transportation system. This corridor, including the downtowns of Minneapolis and Saint Paul, currently contains approximately 200,000 job opportunities. This represents approximately a fourth of the total job opportunities in the entire metropolitan area.

In summary, the Cedar-Riverside area has 3 major attributes that offer a high potential for joint land use and transportation planning.

1. The project area is well located with regard to existing employment and educational and other institutional activities.
2. Excellent regional access is provided because the project is located next to a major freeway crossroad and proposed major region-serving transit systems.
3. The project is of sufficient size to permit truly joint planning.

The question then becomes, Is Cedar-Riverside achieving its potential for an improved land use and transportation relationship? The remainder of this paper addresses progress to date and prognosis for the future.

PLANNING OBJECTIVES

Minimize the Need to Travel

Cedar-Riverside has an excellent opportunity to meet the objective of reducing vehicle travel because of its nearness to the University of Minnesota, other major institutions within the project area, and the Minneapolis CBD. Beyond primary work and educational destinations, the Cedar-Riverside planning concept calls for a considerable amount of commercial and service land use to be woven into the project in such a manner as to encourage walk-in traffic. Already located within the first project are a grocery store, a day-care center, health services, and meeting rooms. Existing commercial development on Cedar Avenue has been allowed to remain until commercial redevelopment proceeds even though many of these older establishments are not able to pay true economic rent. As the area develops, 50 percent of the residents are expected to both live and either work or attend school in this area. Part of this projection was based on the marketing assumption that a significant proportion of the total number of residents within the area will be students, low-income people, and elderly persons. Although no origin-destination surveys have been taken yet to verify planning targets, a cursory examination of resident activity patterns would seem to indicate that this objective is being maintained. It must be recognized, however, that progress toward reaching the objective of reducing motor vehicle travel cannot be fully weighed until significantly more than the existing 1,300 of the 12,500 planned dwelling units are completed.

Provide Reasonable Alternatives to Use of the Automobile

Based on a series of modal-split calculations, it was estimated that half of all person trips in the project area would be by walking, bicycling, local minibus, or people mover. The remaining half of the person trips (as both driver and passenger) would be by automobile. Approximately 17 percent of all internal-external trips were estimated to be by regional transit. To make this kind of modal split possible, a number of transportation improvements were necessary to encourage forms of transportation other than the automobile.

Pedestrian System

An extensive public pedestrian system is planned for the area shown in Figure 6. Pedestrian treatment along Cedar Avenue is shown in Figures 7 and 8. A significant portion of this system will be weather-protected, which means that at least an overhead cover will be provided. In some cases complete climate control will be provided. Cedar Square West has incorporated these guidelines. A pedestrian area is provided through Cedar Square West on a second-level plaza. This is connected to a pedestrian bridge spanning Cedar Avenue (Figure 7). Current detailed planning for the commercial center, which lies just east of Cedar Avenue, and for the Riverbluff area also incorporates these principles (Figure 3). The routing of pedestrians on a second level eliminates many conflicts with vehicle traffic and increases street capacity. In addition to the second-level pedestrian system, many buildings in the Cedar Square West project have been linked on a third level so that building occupants may travel between buildings without riding the elevator down to the public plaza level. In addition to these existing and projected improvements within Cedar-Riverside, a major climate-controlled pedestrian corridor has been built across the Mississippi River connecting the west and east banks of the University of Minnesota. This was accomplished by constructing a 2-level Washington Avenue bridge and restricting the second level to pedestrians and bicyclists only.

Bicycling System

As seen in Figure 9, an extensive bicycling system has been planned for the Cedar-Riverside area. Because of the proximity of Cedar-Riverside to the University of Minnesota, bicycling has become an important element in the transportation system. Traffic counts taken on the second level of the Washington Avenue bridge have shown that more than 350 bicyclists use this corridor during the 15-min break between class periods. Bicycling corridors generally have been planned jointly with other transportation facilities within the same right-of-way. Wherever possible, however, they will be separated from motor vehicle traffic. The possibility of providing separate pedestrian and bicycle rights-of-way on the Cedar Avenue bridge over the river that is now undergoing reconstruction is currently being investigated. The overriding design principle in the bicycle system plan is that of continuity. That is, access should be provided to all major origins and destinations within the project area.

Regional Transit

Although transit planning has been an ongoing function in the Twin Cities metropolitan area since 1967, the exact hardware and physical configuration of the regional transit system have not been resolved. Currently, all regional transit serving the Cedar-Riverside area is being provided by buses on Washington and Cedar Avenues (Figure 10). Although several regional transit options are still under construction, all foreseen options are expected to be accommodated within the overall Cedar-Riverside plan. One possible option is shown in Figure 10.

Local Transit

Beyond the regional transit system, several potential transit options serving the immediate area also are envisioned. Currently under consideration is a university-community distribution system. It is proposed that this system might be routed north-south directly within the proposed center-commercial area of Cedar-Riverside (Figure 10). The system would connect the Cedar-Riverside residential areas with hospitals, Augsburg College, and both the east and west banks of the University of Minnesota

Figure 9. Planned bicycling system.

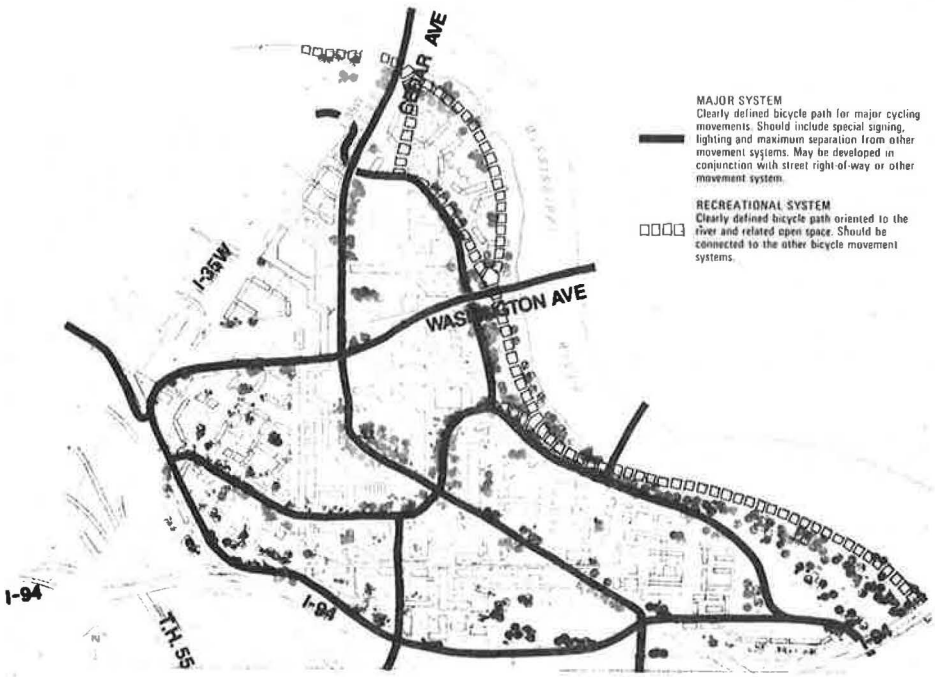
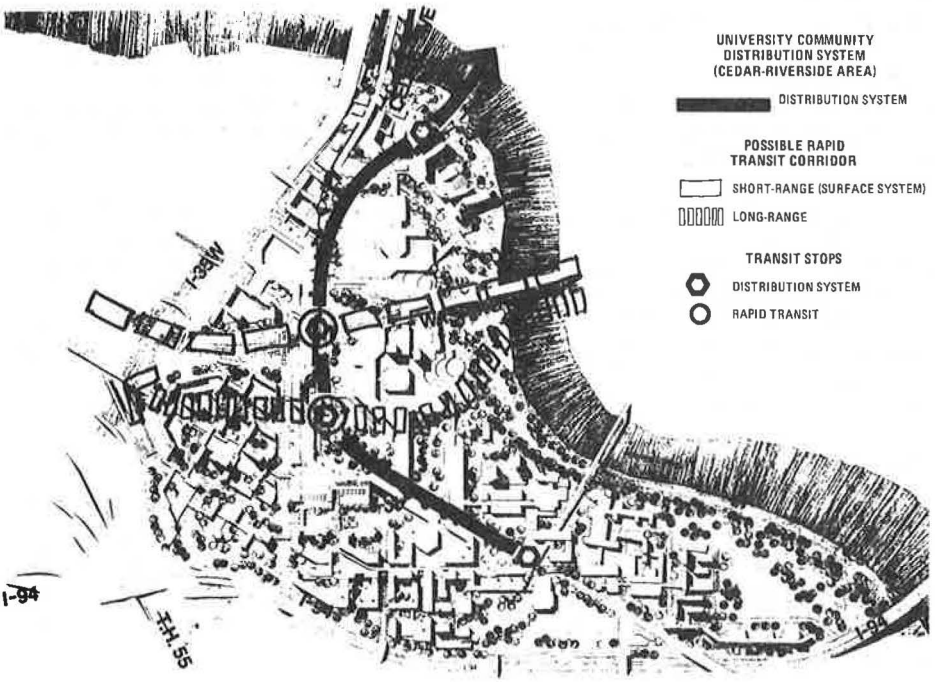


Figure 10. Planned transit system.



campus. This university-community distribution system eventually will be connected to the regional system.

Joint Corridor Improvements

Beyond the planning of individual transportation facilities, the potential for joint transportation corridors has not been overlooked. One particular possibility exists in the proposed arrival plaza area that could be constructed over Washington Avenue (T.H. 12) between Cedar and Nineteenth Avenues. This north-south joint-use area, a northerly extension of the "center," currently is being conceptualized to include facilities for automobile movement and parking, public transit, pedestrians, and bicycles.

In summary, a wide array of transportation facilities is being both planned and constructed within the Cedar-Riverside area. These should permit a diverse array of vehicle modes other than the automobile.

Provide Environmentally Sound Development Parcels While Permitting a High Level of Accessibility

Although modern land development planning calls for the development of "environmental" or automobile-free zones so that high-quality pedestrian-oriented environments can develop, this goal often conflicts with the objective of providing high-quality accessibility (principally by motor vehicle traffic) to and among various land use activities. The inherited street system within the Cedar-Riverside area (Figure 11) was a typical grid street pattern found in most old cities in the middle west. Streets were laid out only 300 ft (914 m) apart. An exception to this grid pattern was the Seven Corners area, which has experienced traffic problems for many years. In spite of this close street spacing, Cedar Avenue already was heavily loaded with traffic even at the existing low development densities.

In response to the need for accommodating higher development densities while providing significant parcels of land for redevelopment, a major change in the vehicle-access configuration was developed as shown in Figure 12. Part of the basis for this major plan was a series of directions-of-approach analyses for various types of trips destined for the Cedar-Riverside area. Subsequent planned modifications to the existing street pattern included 3 items.

1. Traffic conflicts were eliminated in the Seven Corners area. Previously, the Cedar Avenue bridge over the Mississippi River connected directly into Cedar Avenue at the intersection of Washington Avenue, Cedar Avenue, and Fifteenth Avenue South (Figure 11). The approved plan (Figure 12) now provides for reconstructing the southerly end of this structure to allow a direct connection to Nineteenth Avenue South. Additional improvements call for constructing a split-diamond interchange at T.H. 12 between Cedar Avenue and Nineteenth Avenue.
2. Riverside Avenue was connected directly to Nineteenth Avenue at its northern terminus.
3. The River Road collector was bent southerly to assist the planned southerly expansion of the University of Minnesota west bank campus.

These and related traffic improvements will permit the vacation of several streets in providing a series of "pockets" or "environmental areas" for redevelopment (Figure 12). Traffic capacity studies have indicated that this revised system provides a workable motor vehicle transportation network. Many of these streets already are vacated, especially in the Cedar Square West project area.

Figure 11. Inherited street system and proposed street vacations.

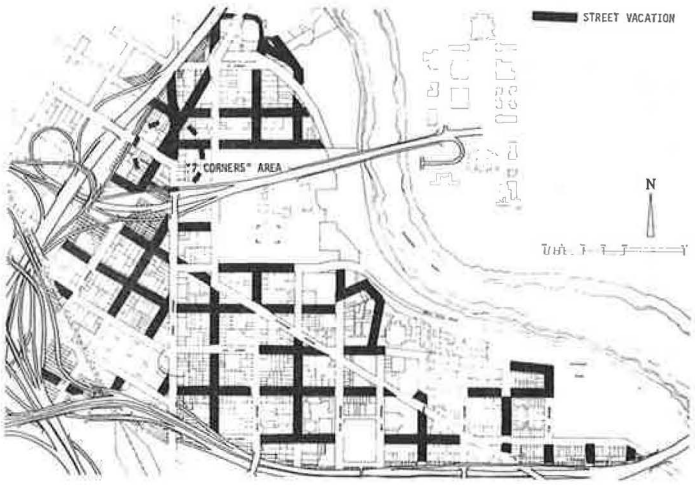
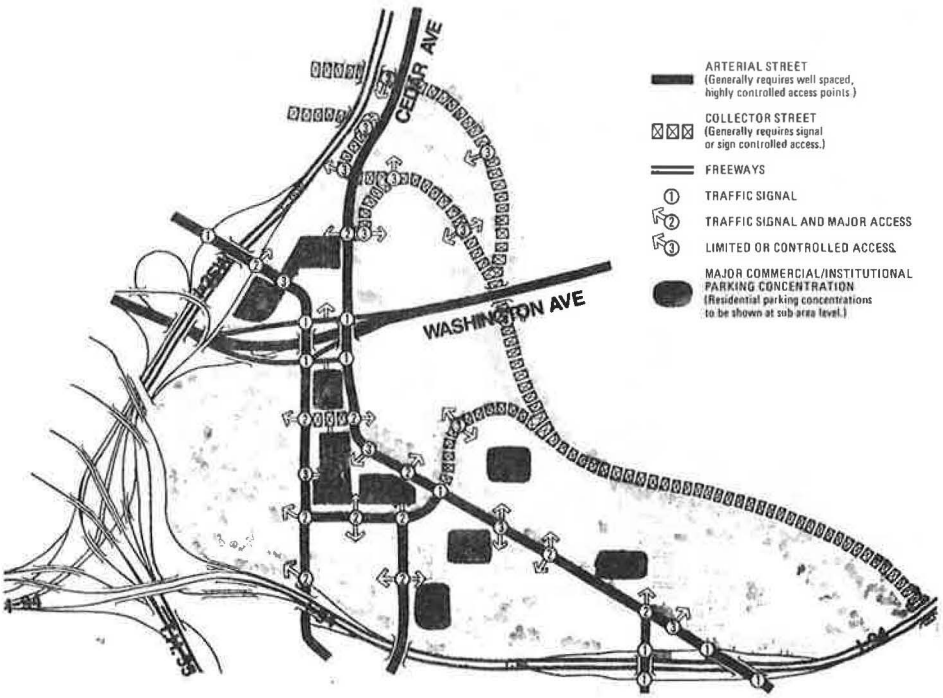


Figure 12. Proposed vehicle circulation and parking.



Reduce Amount of Travel Within the Project Area

Beyond a principal project planning goal of locating Cedar-Riverside residences close to educational, employment, and institutional opportunities, other measures were instituted to reduce the amount of travel within the study area. A principal concept in this vein was to locate major parking concentrations at the periphery of the project area near freeway access points (Figure 12). Emphasis on the location of parking spaces was directed more toward the traffic entrance points than toward proposed travel destinations. As shown in Figure 13, a considerable amount of detail in subarea

Figure 13. Sample of project access and parking plans.

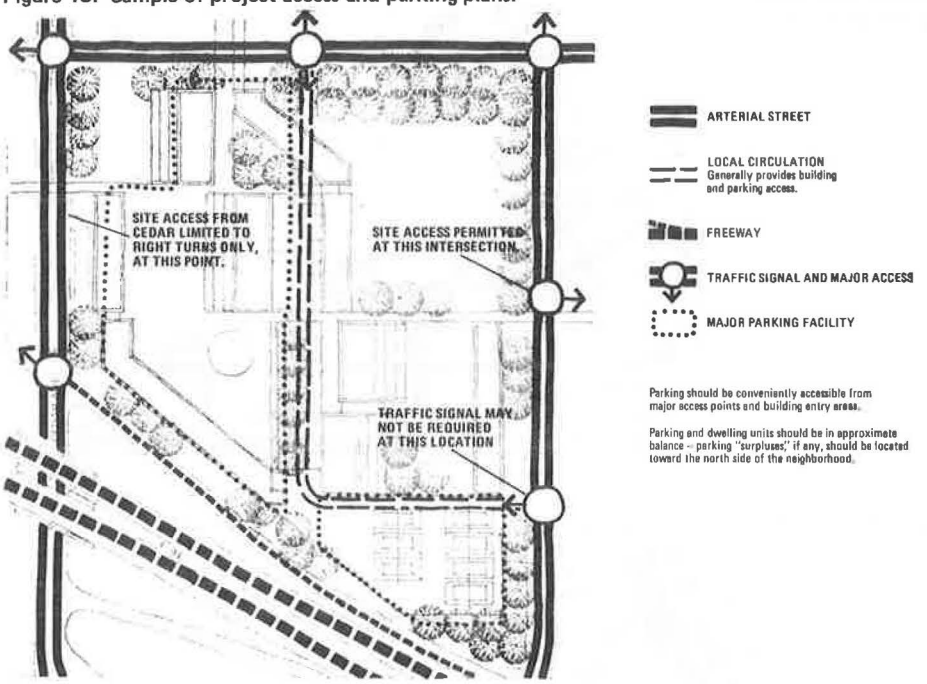
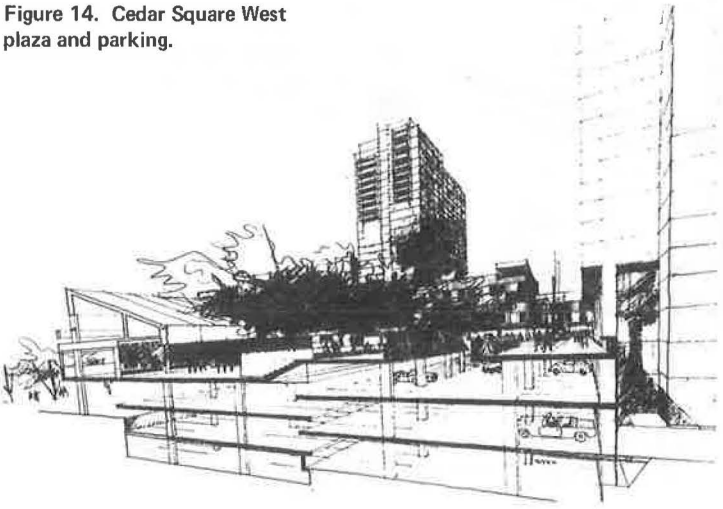


Figure 14. Cedar Square West plaza and parking.



planning was undertaken as it relates to transportation. The hierarchy of streets was carefully outlined as was the location of required traffic signals and major access points to specific land uses. In some cases, all allowable project entrances also were indicated, and special notations were made on whether these entrances would provide for traffic movement in all directions. These planning precepts have been closely followed in the Cedar Square West project.

Reduce Amount of Space-Consuming Automobile Parking

At densities such as those proposed for the Cedar-Riverside area, the amount of land typically required for parking according to typical suburban development design standards would have consumed a large percentage of the space proposed for redevelopment. Therefore, reducing the required ratio of parking per unit of development [expressed as the number of parking spaces per dwelling unit or per 1,000 ft^2 (93 m^2) of gross leasable floor area of commercial-office space] and locating all parking so that it would cause a minimum of disruption became extremely important. Development within Cedar-Riverside to date appears to have met both of these objectives. The Cedar Square West project, for example, has been built with only 0.8 parking space/dwelling unit; a standard of 2.0 spaces/dwelling unit is commonly applied throughout the remainder of the metropolitan area. This low ratio was permitted because of (a) an assumed low percentage of automobile ownership by project residents principally because of their proximity to places of work and schools, (b) a high opportunity to use means of travel other than the automobile, and (c) an assumed amount of shared parking in which nonresidential uses would use parking intended for residents during the day. The shared parking concept will become increasingly important as the commercial center is developed.

Experience with this low parking ratio has proved to be successful to date. Even though parking ratios have been kept very low, the number of cars to be stored became a major design problem with such high residential densities. This however, was successfully met by placing most parking underneath buildings or plazas in an unobtrusive manner. A noteworthy example is the 900-car parking garage in the Cedar Square West area that is located between major buildings (Figure 14). A rather unique feature of this project was the granting of public "air rights" for a public plaza on top of the garage.

SUMMARY AND CONCLUSIONS

Much of this highly integrated transportation and land use planning could not have been accomplished without the splendid coordination of the city of Minneapolis (which did the initial transportation planning in the area), the state highway department, Hennepin County, the University of Minnesota, the Minneapolis Housing and Redevelopment Authority, and the developer (Cedar-Riverside Associates). As the planning proceeded, Cedar-Riverside, the University of Minnesota, and other institutions requested several changes in existing transportation plans to accommodate their proposed development. The city of Minneapolis accommodated most of these requests.

The lessons learned from this examination of the Cedar-Riverside project suggest 5 conclusions.

1. A high degree of cooperation among a complex array of public and private organizations is required if truly coordinated land use transportation planning is to be accomplished. Although the Cedar-Riverside project is a fortunate example, such successful cooperation may not be achieved easily elsewhere.
2. Integrated transportation and land use planning should be viewed as a continuing process. That all such planning must accommodate moving targets should be recognized. Each time a major private development is proposed, it must be reviewed against the public transportation plan. A series of alterations to both plans is likely to become advisable.
3. More public incentives are desirable to encourage public-private development planning. When a developer of a large-scale project decides to do it alone, the public usually loses. Obtaining cooperation is often difficult. Therefore, economic incentives should be developed to enhance the chances that more private redevelopment will occur in the public interest.
4. A high level of joint transportation and land use planning is not easily achievable except in projects of some size. It is estimated that the 340-acre (136-hm^2) size of

Cedar-Riverside may be near the practical minimum for joint land use and transportation planning objectives to be readily accomplished. This is particularly true in project designs that call for reduced dependence on the automobile.

5. Residential densities considerably above those currently in vogue in many metropolitan areas are necessary to change transportation-use patterns. Densities of 4 or 5 dwelling units/acre (10 to 12.5 dwelling units/hm^2) do not permit the wide variety of public transit or pedestrian options that are increasingly being advanced as a means of reducing dependence on the automobile. However, whether the high densities proposed for the Cedar-Riverside project are necessary (not to mention desirable) to achieve reduced dependence on the automobile remains to be seen.

Although the Cedar-Riverside project has made a promising start from a joint land use and transportation planning standpoint, its long-range potential success cannot yet be judged. Only a small portion of the project is completed, and, distressingly, the project currently is in financial trouble—a fate that many large-scale or "new town" projects are facing. It is hoped that projects such as Cedar-Riverside will be strongly encouraged in the future, for, without these experiments in testing alternative ways of redeveloping our central cities, we are bound to continue losing opportunities to improve living conditions in the hearts of metropolitan areas.

ACKNOWLEDGMENT

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