DMC TRANSPORTATION INFRASTRUCTURE PROGRAM MANAGEMENT

October 27, 2016 Transit Technology Workshop Summary

Background

A wide variety of transportation modes are available to support the successful implementation of the transportation principles in the Destination Medical Center (DMC) Plan. The modes vary with respect to speed, reliability, accessibility, visibility, connectivity, flexibility, capital cost, and operating cost.

The City of Rochester sponsored a Transit Technology Workshop on October 27, 2016 to introduce the community to both proven and evolving technologies for potential application in downtown Rochester. The information presented in the workshop will inform the development of initial transit options to be considered in the Transit Circulation Study. The characteristics of the options presented in the workshop are summarized below.

Transit Options Presented

The transit modes range from current technologies with broad operating experience to new and evolving technologies. The options presented at the Transit Technology Workshop are summarized below.

Traditional Bus Circulator Service represents a reliable, relatively low-cost transportation service. This option offers a route or routes tailored for specific downtown markets. The conventional buses (30-40 feet in length) are branded for easier recognition. In many cities, the service is offered for free in downtown to encourage ridership and reduce boarding time. While these tailored circulators offer some improvement over traditional bus service for local travelers, they share travel lanes with regular auto traffic and are subject to the same congestion.

Bus Rapid Transit (BRT) is an all-day, frequent, high-capacity transit mode that uses bus vehicles and incorporates many of the premium characteristics of rail and dedicated busways, but generally operates in mixed-traffic lanes on local streets with stations spaced about a half mile apart. BRT can incorporate transit advantages such as transit signal priority or queue jump lanes, and can be complemented with local bus service that stops more frequently. Typical amenities include improved stations and customer information, unique vehicles and branding, and off-board fare collection that allows for faster boarding.

BRT is operating throughout the United States in both medium and large sized cities. The combination of enhancements varies considerably among cities. The improved service and image offered by BRT typically attracts a significant increase in ridership. In addition, systems that combine a number of the enhancements tend to encourage private development along the route because of the level of service and the long term transportation investment that is associated with the improvements.

Trams include a variety of rail technologies that have been evolving in recent years. While there was once a significant distinction between streetcars and Light Rail (LRT), the differences are becoming blurred as the vehicle sizes are changing and propulsion/power supply options are expanding. The main differences are now related less to the vehicle and more to the operating plan, such as spacing of stops and use of exclusive lanes. All trams have steel

wheels operating on steel tracks. The tracks reinforce the visibility of the route, making the service easy to understand by visitors and new transit users.

Trams function best in urban areas with high transit demand. Tram lines are typically less than four miles long and operate on city streets in mixed-traffic, although they can also operate in exclusive rights-of-way. Trams have a lower passenger capacity than LRT systems, but have higher passenger capacity than a typical bus. Most Tram systems are electrically powered from an overhead source; however, some systems are operating without overhead electrical power on short segments using battery power.

Like BRT, Trams are operating in many U.S. cities. Similarly, their characteristics vary substantially among cities. There are significantly more Trams than BRT focused on downtown operations, however. Cincinnati, Ohio and Kansas City, Missouri both opened new Tram systems in 2016. Each operates about two miles in mixed traffic lanes within the downtown area, extending to neighboring activity centers. Both are experiencing high ridership and have had a significant impact on development along the route. Kansas City runs in two direction on the same street while Cincinnati uses parallel one-way streets to offer two-way service.

Personal Rapid Transit (PRT) is designed around small vehicles traveling along a guideway network connecting many trip origins directly to many trip destinations. The networks operate like an elevated street for exclusive use by the PRT vehicles. Passengers board a 3-4 person vehicle at an elevated station and select a destination station. The vehicle then travels directly to that station bypassing all intermediate stops. The overhead operation on an exclusive guideway provides a high level of service unimpeded by congestion experienced at the street level.

PRT has been discussed as a transportation option for several decades; however, there are no urban PRT systems in operation. The technology was presented in the workshop by representatives from Taxi 2000 and Transit X. Both vendors referenced the full-scale PRT test track that was operated by Raytheon for several years but was never implemented commercially. Each vendor proposes technologies offering direct, grade-separated service as described above, although the details of the service and the nature of the vendors vary somewhat. The two vendors provided some information supporting the viability of their technology and ability to provide an implementation team. Both vendors are seeking their first full-scale application.

Automated Guideway Transit moves airport passengers within and between terminals in many locations throughout the world. There are also several unique applications in resort areas. These systems are grade separated, generally running on an elevated structure. This exclusive, grade separated guideway results in high travel speeds and service reliability.

A representative of Schwager Davis presented a summary of the automated guideway transit system the firm built in 2002 connecting multiple campuses of Clarion Health Partners in Indianapolis. This is the most applicable example with respect to the needs of downtown Rochester. This elevated system has provided highly reliable service since its inception. The elevated nature of the system and size of the structure increases capital cost compared to the at-grade construction. The service quality and significant investment characteristic of this technology could be attractive to development along a downtown route.

Magnetic Levitation uses magnets to suspend and propel a transit vehicle, eliminating contact between the vehicle and the transit guideway. This technology substantially reduces friction,

allowing high operating speeds and reducing wear on the vehicle and the guideway. The grade-separated guideway must be built and maintained to precise specifications in order to maintain a safe, effective operating environment. Similar to PRT and Automated Guideway Transit, the elevated guideway eliminates conflicts with the transit vehicle and street-level vehicles and pedestrians.

Magnetic levitation has had limited application in China and Japan. The high travel speeds characteristic of the technology are particularly attractive for long trips on intercity travel. Potential application for short urban trips is also being considered. Several test tracks are under development.

Autonomous and Connected Vehicles are using existing and evolving technology to allow vehicles to operate independently without driver control. Automobile manufacturers are currently offering limited autonomy, such as automatic breaking when approaching the rear of another car. The transition towards full automation will be incremental; however, this is a competitive and potentially lucrative market that is attracting major participants with significant resources.

Several manufacturers are now producing fully autonomous transit vehicles, which are being tested in a number of pilot applications. These mid-sized vehicles (12-15 passengers) operate independently, selecting a route and recognizing/avoiding potential conflicts, such as pedestrians and other vehicles. Mercedes Benz is currently developing a standard 40-foot transit bus with limited autonomy.

In the short term, autonomous transit vehicles are likely to be used to connect existing, fixed-route transit service to low density areas, providing “first mile/last mile” transit access. The success of the pilot projects currently in place will determine how quickly the autonomous transit vehicles can be introduced for regular service on existing roadways. Like PRT and automated guideway transit, these vehicles could also be operated on an elevated guideway.

Next Steps

The Downtown Transit Circulation Study team is reviewing available rights-of-way and other constraints and opportunities in the downtown area as they develop an initial set of transit modes and alignments to be considered in the study. The initial set of options will be evaluated on a qualitative basis, leading to selection of a limited number of alternatives for more detailed development. Those options will be analyzed using both qualitative and quantitative criteria, leading to a recommended alternative or combination of options. The project team also will develop an implementation strategy for the recommended option(s).