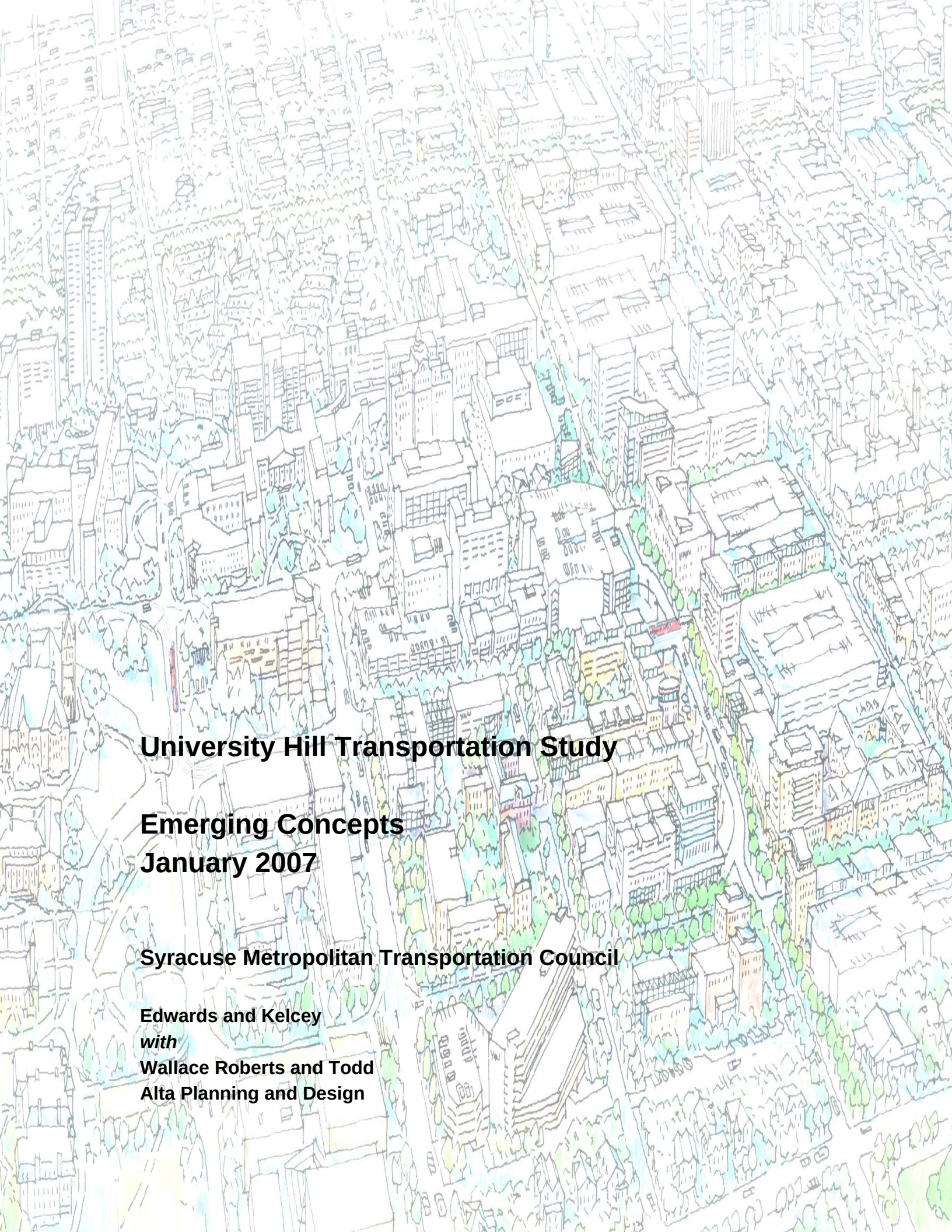

University Hill Transportation Study

Emerging Concepts
January 2007

Syracuse Metropolitan Transportation Council

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with
Wallace Roberts and Todd
Alta Planning and Design

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SECTION ONE - INTRODUCTION

The following is a discussion of the "long list" of alternative concepts to be considered in the University Hill Transportation Study. The University Hill Transportation Study (the Study) is intended to keep institutions and businesses viable on University Hill while reducing growth in auto use and parking in the area. The Study will ultimately result in a plan that supports existing and future land uses while guiding transportation investment decisions. The "long list" includes a broad array of options to achieve this desired result.

The purpose of this report is to assist the Working Group and the public to identify a "short list" of alternatives for further consideration in the Study. The short-listed alternatives will undergo additional analysis and concept refinement to examine their feasibility.

The long list is categorized according to three scenarios for meeting the basic needs of the Study. These scenarios include

- Move Cars
- Move People and
- Move Carbon

The scenarios frame possible issues that could face University Hill. Since we cannot precisely forecast future conditions, the scenarios are helpful in understanding potential future issues.

MOVE CARS SCENARIO

The Move Cars Scenario envisions that fuel will remain relatively inexpensive or that technology will resolve environmental issues such as global warming and allow cars to remain our preferred travel mode. The scenario emphasizes improvements to the interstate system, arterial roadways and parking facilities in the study area, focusing investments on moving cars. The following emerging concepts work toward fulfilling the Move Cars Scenario:

- Widen and Extend I-81 Ramps
- New I-81 Access
- New I-690 Access
- New I-481 Access
- Continuous Flow Lanes – Almond Street

MOVE PEOPLE SCENARIO

The Move People Scenario envisions that the community will not be able to afford all the necessary capital and operating costs required to accommodate the current planned vision for development on University Hill. It also accepts that the capacity created by the additional infrastructure would be eroded due to the induced growth in traffic by the free-flowing conditions. The scenario shifts the transportation emphasis to moving people by non-automobile modes. This scenario looks to enhance transit, biking and walking capacity and features to provide a greater variety of transportation choices to commuters, visitors and residents. It also seeks to improve connectivity between modes, enhance security and mix land uses in an urban pattern. The following emerging concepts work toward fulfilling the Move People Scenario:

- Bus Prioritization
- Streetcar
- Transit Hub
- Transit Gate
- Bike Boulevard
- Gateways
- Pedestrian Square
- Pedestrian Promenade
- Mid-Block Alleys
- Traffic Calming
- Mixed Land Use/Joint Development Scenario
- Viaduct Treatment
- Conversion of I-81 to Boulevard
- Grid Connections
- Two-Way Streets – Harrison and Adams Streets

MOVE CARBON SCENARIO

The move carbon scenario identifies a number of measures that can be implemented to help "move carbon dioxide" levels back to the desired threshold on University Hill, as well as in the entire City of Syracuse and the surrounding region. These could have a significant impact on transportation for University Hill and the rest of the region, which are summarized below. The scenario is based on the obvious starting point of reducing vehicle emissions. Vehicle emissions account for over a third of greenhouse gas pollution in the United States. Carbon dioxide is the most common greenhouse gas and a substantial portion of the contribution of carbon dioxide comes from transportation. This scenario relies on the measures recommended in the Move People Scenario to reduce emissions by increasing the viability of walking, biking and transit as an alternative to the car. The scenario also incorporates a number of locally innovative measures such as the following.

- Annual Carbon Cap
- Lower Speed Limits
- Mandatory Idling Stop
- Parking Privilege Tax
- Preferential Parking
- Parking Cash Out
- Guarantee A Ride Home
- Lane and Parking Cap
- Car Sharing

CURRENT PLANNED VISION

The starting point for thinking about transportation systems is the way we develop land. Decisions about land uses directly affect the demand for different modes of travel. As the amount of development increases, the demand for transportation facilities grows accordingly. The Current Planned Vision (CPV) describes the combined planned growth (anticipated future growth) of each institution on University Hill in terms of total square footage of development, location of development and additional parking spaces. This growth is what will generate many of the future transportation needs.

In an effort to better understand the anticipated land use changes in University Hill and ultimately the impacts on the transportation system in the future, the CPV was identified through a series of confidential interviews. Information gathered through these confidential interviews included square footage of development, number of additional beds where appropriate, number of residential units and number of parking spaces. Site specific data is not presented so as to maintain confidentiality.

Table 1 provides proposed development totals. The development of the Syracuse University West Campus is identified as a long-term prospect with an unknown impact. Therefore, the development totals are shown without West Campus. The Center of Excellence in Environmental and Energy Systems and Kennedy Square are not shown because they are outside of the study area. However, it is understood that development at these locations may have a potential impact on the transportation system, and is therefore accounted for in the Travel Demand Model. Further information about the CPV can be found in the *University Hill Transportation Study Needs Assessment* completed in November 2006.

TABLE 1. CURRENT PLANNED VISION

	Parking Spaces	Residential Units	Retail SF	Commercial SF	Medical Related SF	Education Related SF	Total Additional SF
Recently Completed	1,475					85,000	85,000
Short-Term (0-5 years)	120	150	15,000	4,400	258,000	399,000	676,400
Mid-Term (5-10 years)	1,180			5,400	408,000	325,000	738,400
Total	2,775	230	34,000	67,800	801,000	1,194,000	2,096,800

FIGURE 1. BASIC NEEDS LEGEND

BASIC NEEDS

Each long list alternative is examined compared to the four basic needs identified in the Needs Assessment, including:

- Accessibility
- Flexibility
- Economic Viability and
- Sustainability.

Accessibility addresses access to the transportation system and University Hill. Flexibility relates to the ability of the transportation system and surrounding land uses to accommodate all users and modes. Economic viability involves the long-term success of businesses and institutions on University Hill as well at the City of Syracuse and the region. Sustainability relates to costs associated with the systems and overall environmental health.

REPORT ORGANIZATION

The report is organized in a manner that first illustrates the emerging concept and then provides a brief description of the emerging concept. A discussion of benefits that would help to meet the basic needs and potential challenges to implementing the concept are also included.

Benefits addressing a specific need are identified by icons related to accessibility, flexibility, economic viability or sustainability. Figure 1 illustrates the icons associated with the basic needs.

A discussion of concept bundles concludes this report. The bundles of concepts begin to form the short list of alternatives to be examined in further detail. The Study Working Group will ultimately select six alternatives or bundles of alternative as a short list for further study.

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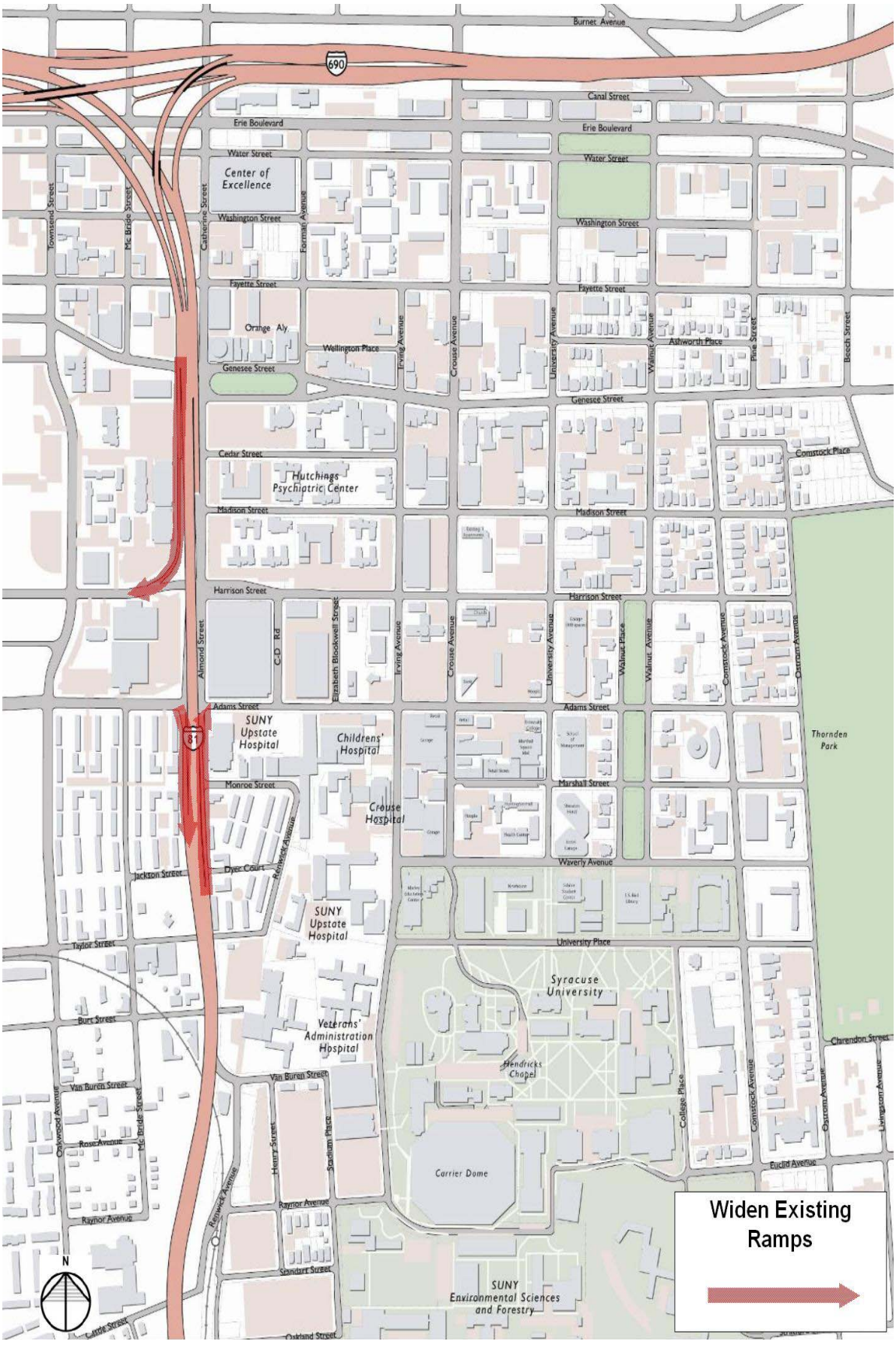
SECTION TWO - MOVE CARS SCENARIO

FIGURE 2. WIDEN EXISTING RAMPS



WIDEN I-81 RAMPS

CONCEPT DESCRIPTION

The transportation modeling of the Current Planned Vision for University Hill shows congestion will result on the Almond Street exit from and entrance ramps to Interstate 81 (I-81) during peak hours. In particular, the volume of traffic on the exit ramps traveling northbound and southbound from I-81 will exceed capacity in the morning peak and the entrance ramps north and southbound will experience similar conditions in the afternoon peak. The ramps provide the primary access to both University Hill and Downtown from I-81.

This alternative would include widening the existing I-81 ramps at Almond Street both southbound and northbound to increase the capacity.

BENEFITS

Ramp widening would allow for easier and faster access to University Hill from I-81 for employees, students, emergency vehicles, residents and visitors. It will also relieve backups onto the mainline of I-81, helping to maintain free-flowing conditions.

This could be especially beneficial for emergency vehicles that need access to one of the medical institutions on University Hill.

More direct and efficient access to University Hill can assist in maintaining economic vibrancy of the area. Employees, for example, would likely see a reduction in their total travel time, making employment on the hill more attractive.

This would allow for increased capacity and possibly more direct access from I-81 without the challenges of a new interchange. The reduction of congestion could help to improve air quality (if the overall growth of vehicles and vehicle miles traveled does not erode the benefits).

CHALLENGES

Widening the ramps have some critical geometric design constraints. One constraint involves the distance needed to safely weave the ramps with the main flow of traffic on the interstate. Generally, a minimum distance of 2,500 feet and a typical distance of 3,500 feet is needed to taper two lane ramps back into an interstate mainline. This would preclude the northbound on-ramp from being widened because of the weave with traffic going northbound from I-81 to I-690 eastbound. The southbound off-ramp to Harrison Street and the southbound on-ramp and north-bound off-ramp look less problematic.

In addition, it would be difficult to obtain additional land to widen the southbound entrance to I-81 given the close proximity of the homes between McBride Street and I-81. Significant environmental justice issues would likely arise due to air quality, noise and vibration concerns from adding additional traffic to the low-income and minority population neighborhood on either side of I-81 south of Adams Street.

Wider ramps might create an even more formidable pedestrian crossing under the viaduct than what currently exists. This is especially a concern at the entrance to the south-bound on-ramp. Pedestrians are currently required to cross Almond Street on the south side of Adams Street and this would add an additional lane.

In addition, consideration would need to be given on how to adequately disperse the increased traffic once it reaches University Hill in the morning or the mainline of I-81 in the afternoon peak periods.

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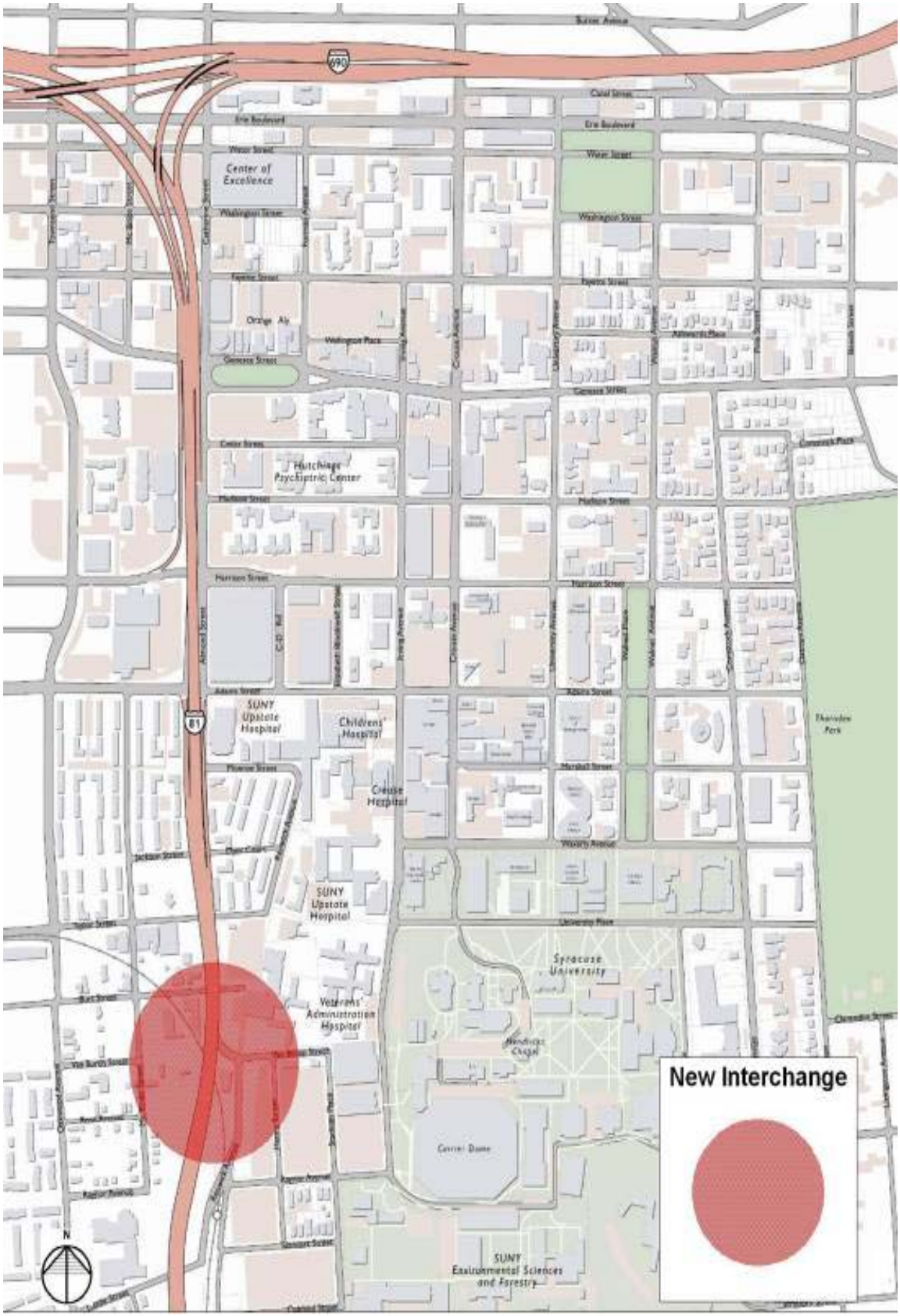
FIGURE 3. NEW I-81 ACCESS



NEW I-81 ACCESS

CONCEPT DESCRIPTION

This concept involves the creation of a new I-81 interchange in the vicinity of Van Buren Street and Raynor Avenue. While new interchanges must meet stringent Federal Highway Administration (FHWA) interchange spacing criteria, there are several potential benefits. In addition, a partial interchange has been identified as desirable in the Syracuse University 2003 Master Plan to serve the West Campus and Dome vicinity.

BENEFITS

A new I-81 interchange would provide a second direct access to and from University Hill and could address the capacity hot spots identified in the Almond Street area. The access would also relieve competition with Downtown traffic for the existing Almond Street interchange

New access provides more options for travelers using I-81. If traffic volumes are reduced sufficiently at the Almond Street interchange vicinity, opportunities to enhance other modes of travel might be created. The second point of access also increases flexibility for emergency vehicles trying to reach the hospitals.

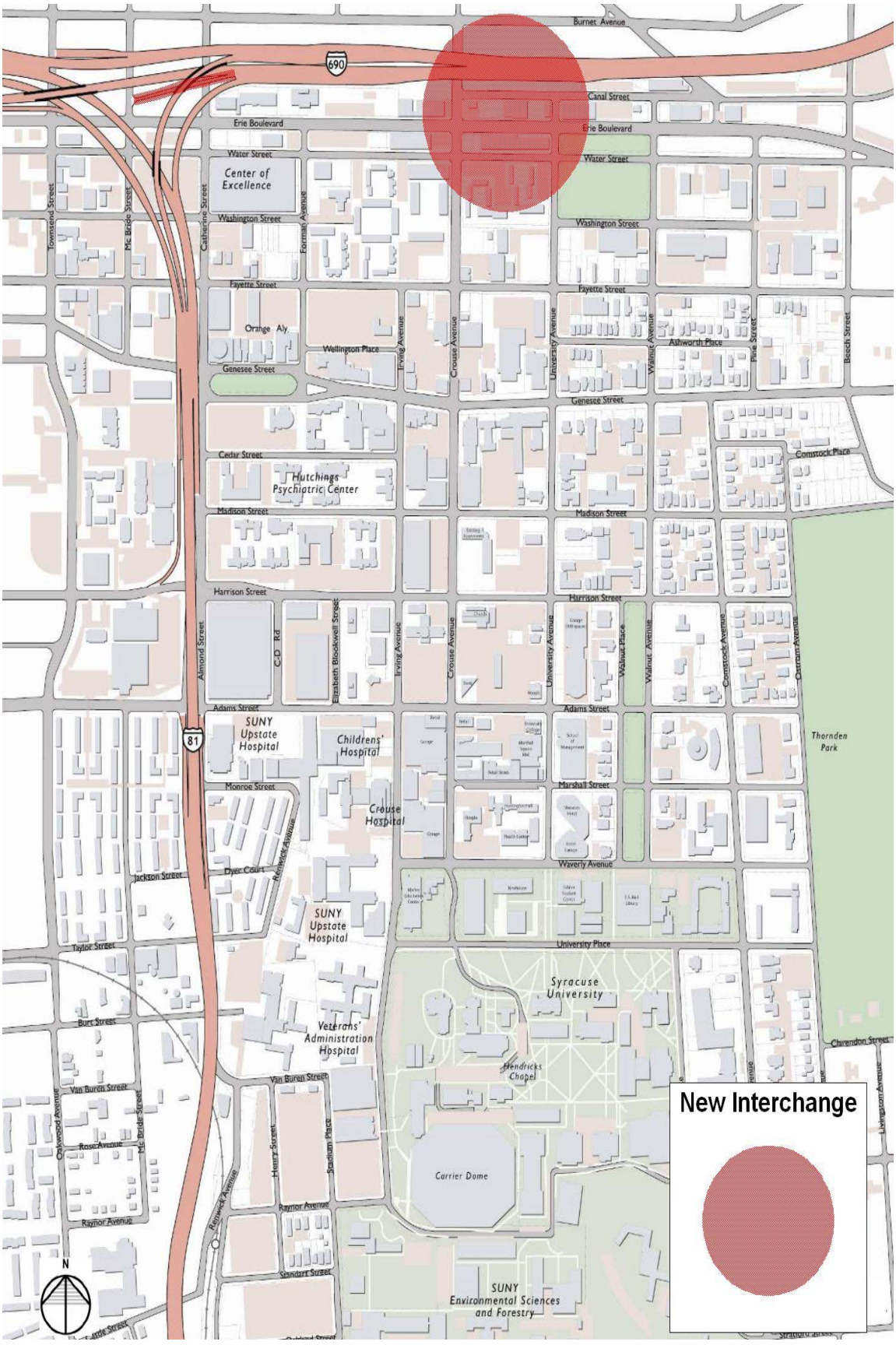
The second point of access and egress could increase the attractiveness of employment on University Hill.

A new ramp would strengthen the connection between University Hill and the interstate and disperse existing and future traffic over a larger geographic area, possibly improving air quality conditions and enhancing the viability of walking or using transit.

CHALLENGES

The FHWA interchange spacing criteria would be a major hurdle in creating a new interchange at this vicinity due to the close proximity of the Almond Street interchange. Other critical concerns include the complexity of the existing street and freight rail line network (and terrain) at this location as well as the proximity of an elementary school. Achieving adequate weaving distances between the ramps and the I-81 mainline would also be an important challenge. It is likely that environmental justice issues would need to be resolved given the proximity of the significant low-income and minority population that reside adjacent to this area. Another issue is the role of interstates in an urban setting such as Syracuse's Downtown and University Hill. Generally, interstates are designed to serve traffic traveling between urban destinations (e.g., through traffic). However, interstates within urban cores take on the conflicting function of providing local access. An additional interchange would likely compound that conflict.

FIGURE 4. NEW I-690 ACCESS



NEW I-690 RAMP

CONCEPT DESCRIPTION

The alternative includes a new partial interchange on I-690 at the vicinity of Crouse Avenue and University Avenue. Currently, traffic traveling westbound on I-690 and wishing to access University Hill typically exits at the Townsend Street exit and travels south on Townsend Street to East Genesee Street or Adams Street. Access to westbound I-690 is more direct via the Harrison Street on-ramp to I-81 and I-690. However, this is already congested at peak hours and the Current Planned Vision will increase this problem.

The new partial interchange would involve reversing the direction of the one-way pair of Crouse Avenue and University Avenue. This would allow the construction of a new westbound exit ramp from I-690 directly to Burnet Avenue (on the north side of I-690) at the intersection of Burnet and Crouse Avenue. An entrance ramp to I-690 eastbound would also be constructed from University Avenue.

BENEFITS

A new I-690 ramp could provide enhanced direct access to University Hill from the east and relieve congestion from the I-81 and I-690 on-ramp at Harrison Street.

This concept would eliminate the need to exit at Townsend Street and ultimately increase the number of driving route choices to access University Hill from I-690. The ramp could also provide a second point of access from the interstate system for emergency vehicles to University Hill hospitals (as well as Saint Josephs Hospital north of I-690).

Enhanced access could encourage investment in the northern portion of University Hill and make University Hill more competitive, related to retaining employees. The ramp could be combined with off-site commuter parking in the northern portion of the study area and transit to reduce the need for more costly structured parking or free up land for more valuable institutional facilities (other than parking).

The alternative could reduce congestion at the Harrison Street on-ramp to I-81 and I-690, thereby improving air quality (if overall total vehicle miles traveled are reduced). The concept might also reduce the total vehicle miles traveled in the Downtown and University Hill due to a shorter access route from I-690 to University Hill.

CHALLENGES

The FHWA interchange spacing criteria would likely require the closure of the eastbound on-ramp to I-690 at McBride Street (north of Erie Boulevard) in creating a new interchange. This would require traffic from Downtown heading toward I-690 eastbound to travel further east on Erie Boulevard.

The exit ramp from I-690 to Burnet Avenue would require the acquisition of businesses along the south side of Burnet Avenue. A related important geometric design consideration would be the need to accommodate two-way traffic on Burnet Avenue between Crouse Avenue and Lodi Street. This might require the acquisition of businesses and residences on the north side of Burnet Avenue.

The interchange raises a larger question about the role of the interstates in the urban setting such as Syracuse's Downtown and University Hill. Generally, interstates are intended and designed to serve traffic traveling between urban destinations (e.g., through traffic). However, interstates within urban cores take on the conflicting function of providing local access. An additional interchange would likely compound that conflict.

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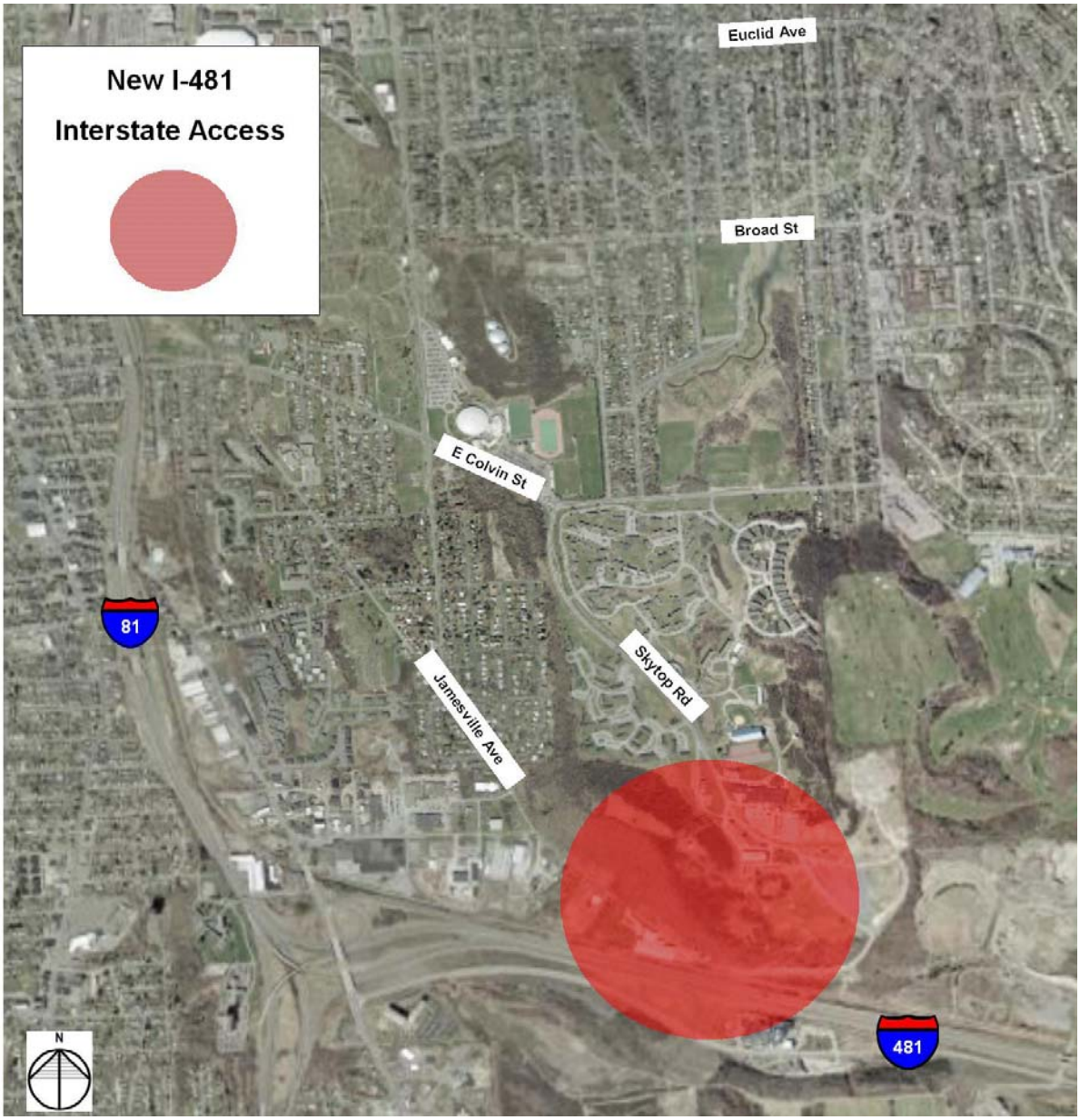
FIGURE 5. NEW I-481 ACCESS



NEW I-481 ACCESS

CONCEPT DESCRIPTION

New I-481 access would involve an interchange that provides access to University Hill in the vicinity of the South Campus. The interchange could align north of I-481 with either Jamesville Road and Comstock Avenue or Skytop Road within the Syracuse University South Campus. Either option would provide access to University Hill via Comstock Avenue from the south. The proposed interchange would be approximately 0.75 to 1.0 mile east of I-81 depending on its design.

BENEFITS

New I-481 access would enhance vehicular access to University Hill for those traveling from the south or east of I-481.

This concept provides an additional point of vehicular access to University Hill.

Enhanced access equates into more willingness to invest in University Hill and also makes University Hill more competitive related to retaining employees. The southern interchange could serve as a catalyst for investment in the South Campus as a tech park or along Jamesville Road. It could also be combined with a park and ride system to avoid costs for more costly parking structures in the core of University Hill.

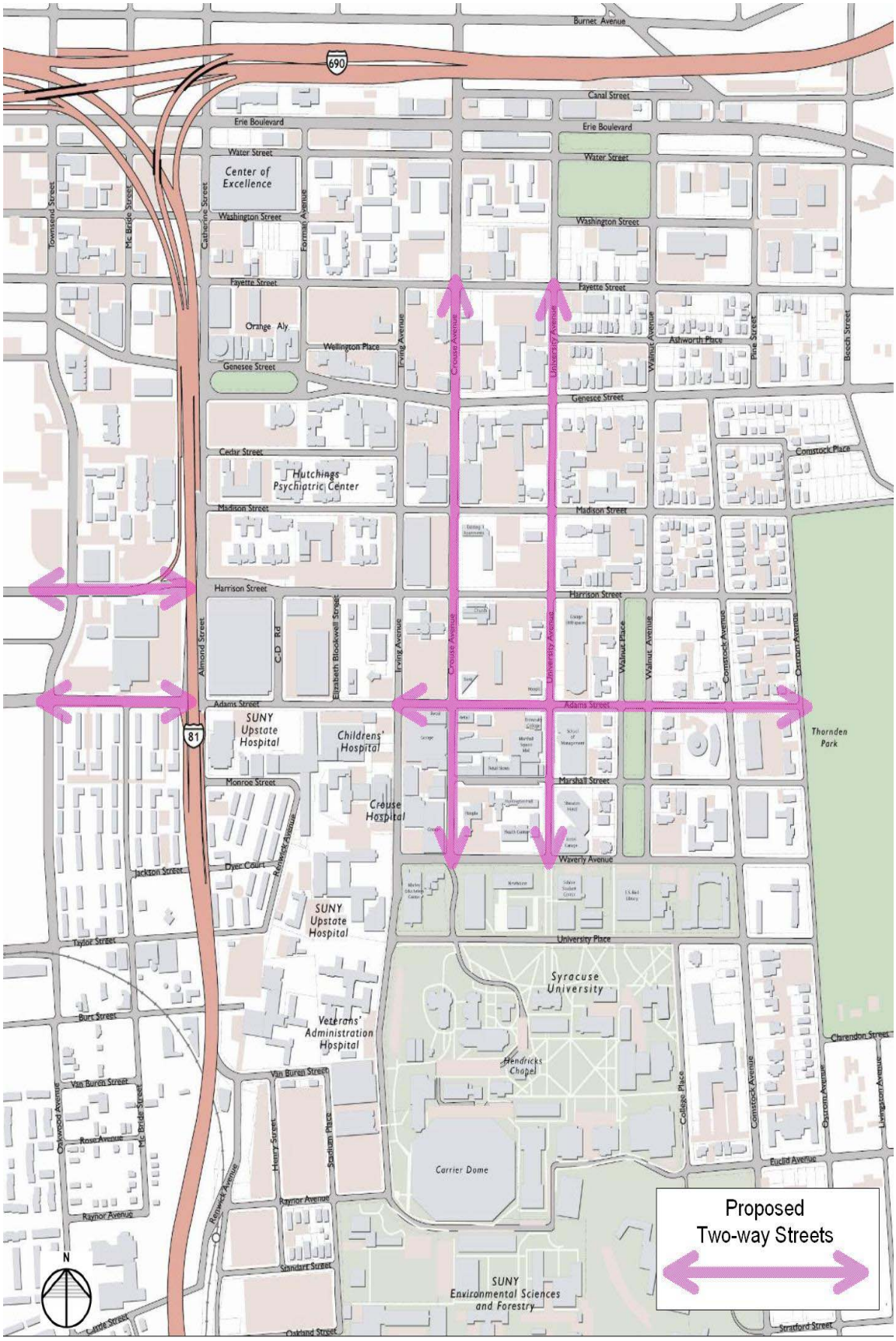
A new ramp would strengthen the connection between University Hill and the interstate system.

CHALLENGES

The number of potential users of the new interchange could be significantly less than other proposed interchanges on I-81 and I-690. In general, the highest proportion of travelers on University Hill have origins or destination in the northwest portion of the SMTC region. These travelers would not be served directly from this investment, unless some additional residual capacity is created by traffic using the new interchange.

In addition, the number of users could also be reduced since the travel distance for many drivers on I-81 south of the I-81 and I-481 merge would be longer via the new interchange. While the potential interchange is approximately the same distance from Adams Street as the interchange of I-481 and I-81, it would add over a mile to a trip from the interchange of the two interstates to the corner of Adams Street and Irving Avenue. Improvements would also be needed along Comstock, Jamesville or Skytop Road to alleviate the drivers' perception of traveling on slower, urban streets to reach University Hill for nearly 3 miles.

FIGURE 6. TWO-WAY STREETS



TWO-WAY STREETS

CONCEPT DESCRIPTION

The conversion of one-way streets to two-way networks is a technique that is associated with downtown revitalization and improving pedestrian mobility. This concept would involve transforming existing one-way streets into two-way streets on three streets within University Hill and two streets in Downtown. The existing conditions are summarized below.

- Adams Street – One-way eastbound between State Street and Ostrom Avenue. Two-way west of State Street.
- Harrison Street – One-way westbound between Salina Street and Almond Street. Two-way east of Almond Street.
- Crouse Avenue – One-way northbound between Waverly Street and Fayette Street.
- University Avenue – One-way southbound between Fayette Street and Waverly Street.

The following are the proposed changes to the street circulation system on University Hill and in Downtown.

- Adams Street – Two-way between Irving Street and Ostrom Avenue. The segment between Almond Street and Irving Street may be viable depending on emergency vehicle access concerns.
- Adams Street – Two-way between State Street and Almond Street.
- Harrison Street – Two-way between Salina Street and Almond Street.
- Crouse Avenue – Two-way between Waverly Street and Fayette Street.
- University Avenue – Two-way between Waverly Street and Fayette Street.

BENEFITS

For years there has been a push to move as many cars as possible, as quickly as possible, without regard for the movement of other modes. While moving traffic is still important, two-way streets are more accommodating to pedestrians. Communities such as Berkeley, CA, Cincinnati, OH and Norfolk, VA are currently converting one-way streets to two-way.

One-way street systems often force motorists, especially visitors to the area, to follow out-of-the-way routes to reach their destination. This recirculation can cause an increase in turning movements, thus conflict points with pedestrians, and travel time. The creation of two-way streets could reduce the amount of travel time.

While those familiar with the University Hill area have likely found the most direct route to their destination, a series of one-way streets can often be confusing to visitors causing frustration and disorientation. Given that University Hill experiences many visitors to its several medical and educational institutions, providing flexibility through two-way streets can be beneficial.

In addition two-way streets can make transit easier by eliminating the confusion of where the stop for an opposite route is located. For example, a transit rider may be dropped off at a stop on a one-way street and may not realize the stop for the return trip is on another street. Currently, the SU-Thurber/Nob Hill and Drumlins buses travel north on Crouse Avenue and return south on Irving Avenue. The Warehouse bus travels north on University Avenue and returns south on Irving Avenue. The lines could be consolidated on a two-way Crouse Avenue, which would align with the entrance to University Place (the access to the Campus Place transit hub) at the SU Campus.

Increased visibility and access for local businesses located along two-way streets can serve to enhance the economic viability of University Hill.

Recirculation of cars looking for parking spaces or building locations caused by one-way streets can lead to a degradation in air quality within the area that is already experiencing increased volumes. Transforming one-ways to two-way streets could have a positive impact on the reduction of air pollutants. In addition, the increase in walking and transit can improve community health while reducing air quality impacts of additional vehicles.

In addition, the ability to turn left on Harrison Street from the I-81 southbound exit ramp or left from the I-81 northbound ramp onto Adams Street could possibly reduce the total vehicle miles traveled in the study area and downtown.

CHALLENGES

The conversion of one-ways to two-way networks is a relatively new technique. While there are communities currently undertaking this conversation, there are several points of view that are still oriented toward the move as many cars as quickly as possible mindset. These include the ability to better synchronize traffic signals on a system of one-way pairs than on two-way streets.

Each street presents some geometric design issues as well. Adams Street is only two-lanes east of Almond Street. The segment between Irving Avenue and University Avenue could be widened as part of future redevelopment under the Mixed-Use Alternative. However, the segment between Almond Street and Irving Avenue would be constrained from widening due to existing and proposed building locations. In addition, it is important to maintain or replace emergency vehicle access to the hospitals on University Hill, which are served primarily by Adams Street and Irving Avenue. In addition, the transformation to two-way streets would trigger the need to conduct an air quality conformity analysis under the Clean Air Act regulations.

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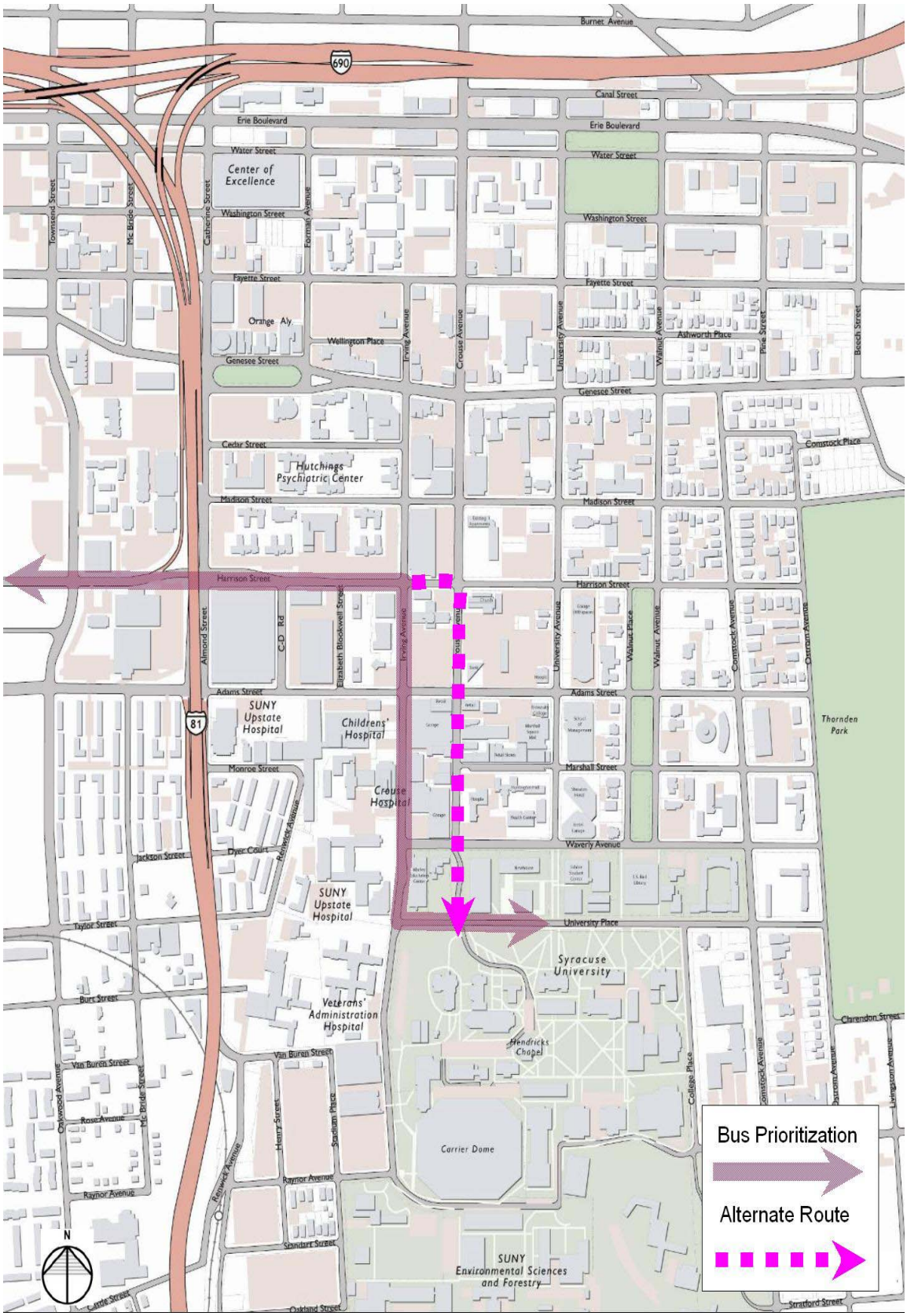
SECTION THREE - MOVE PEOPLE SCENARIO

FIGURE 7. BUS PRIORITIZATION ROUTES



BUS PRIORITIZATION

CONCEPT DESCRIPTION

In order for transit to succeed in any urban area, it must emulate the qualities that are associated with the automobile including frequency, flexibility, reliability, speed, convenience and ease of use. Transit corridors equipped with enhancements like bus-only lanes, bus rapid transit, signal prioritization, queue jumping lanes and other technologies significantly improve transit service by separating buses from the automobile environment so they can successfully compete with vehicles as a viable mode of transportation.

A potential alignment for a transit corridor between West Street (Downtown) and University Hill is West Fayette Street, Clinton Street, Harrison Street, Irving Avenue and University Place (See Figure 7). This corridor could be equipped with signal prioritization and queue-jumping lanes to be a precursor for a full Bus Rapid Transit system. Crouse Avenue could serve as an alternative to Irving Avenue if the Crouse Avenue is converted to a two-way street.

BENEFITS

A transit corridor equipped with prioritization elements would provide employees, residents and visitors of University Hill with a reliable, convenient, speedy, frequent and easy to use transportation choice.

The increase in travel speed and convenience of transit could attract more riders, which would decrease automobile use demand. The transit line would be within 5-minutes walking distance of every major institution on University Hill, as well as adjacent to the Convention Center and CENTRO's proposed downtown bus transfer hub.

By establishing a priority roadway for transit, potential riders would be able to easily recognize the transit facilities. In addition, the system would be designed to make travel by bus as rapid and convenient as by car. The prioritization could also benefit regional traffic by getting express buses to and from the interstate system more quickly than automobiles on University Hill and Downtown.

Prioritized transit could serve as an attractive, less-costly option to the full cost of a car trip, which will reduce the demand for free parking and maximize the amount of

developable space in University Hill. This could be enhanced by the use of a park and ride facility at the terminus of the route along West Street. West Street connects to I-690 and I-81 for travel north and west of downtown.

Prioritized transit could attract new, mixed-use, transit supportive land uses clustered around transit hubs and priority routes. In turn, this could help reduce roadway congestion, improve air quality, reduce auto dependence, and enhance quality of life.

CHALLENGES

A transit system will not succeed if it is not a viable alternative to the automobile. The costs of investing in the necessary infrastructure and providing space for a transit corridor should be balanced against the system's potential to solve University Hill's congestion and parking demand problems. Designating a transit prioritization corridor alone will not automatically increase transit use. Other improvements to transit must take place as well, such as branding, amenity-filled transit stops and supporting land use policies. Non-transit improvements such as raising the price of parking on University Hill would also be necessary. In addition, the introduction of two-way bus prioritization to one-way streets such as Harrison Street requires a broad reconsideration of traffic management in both Downtown and University Hill.

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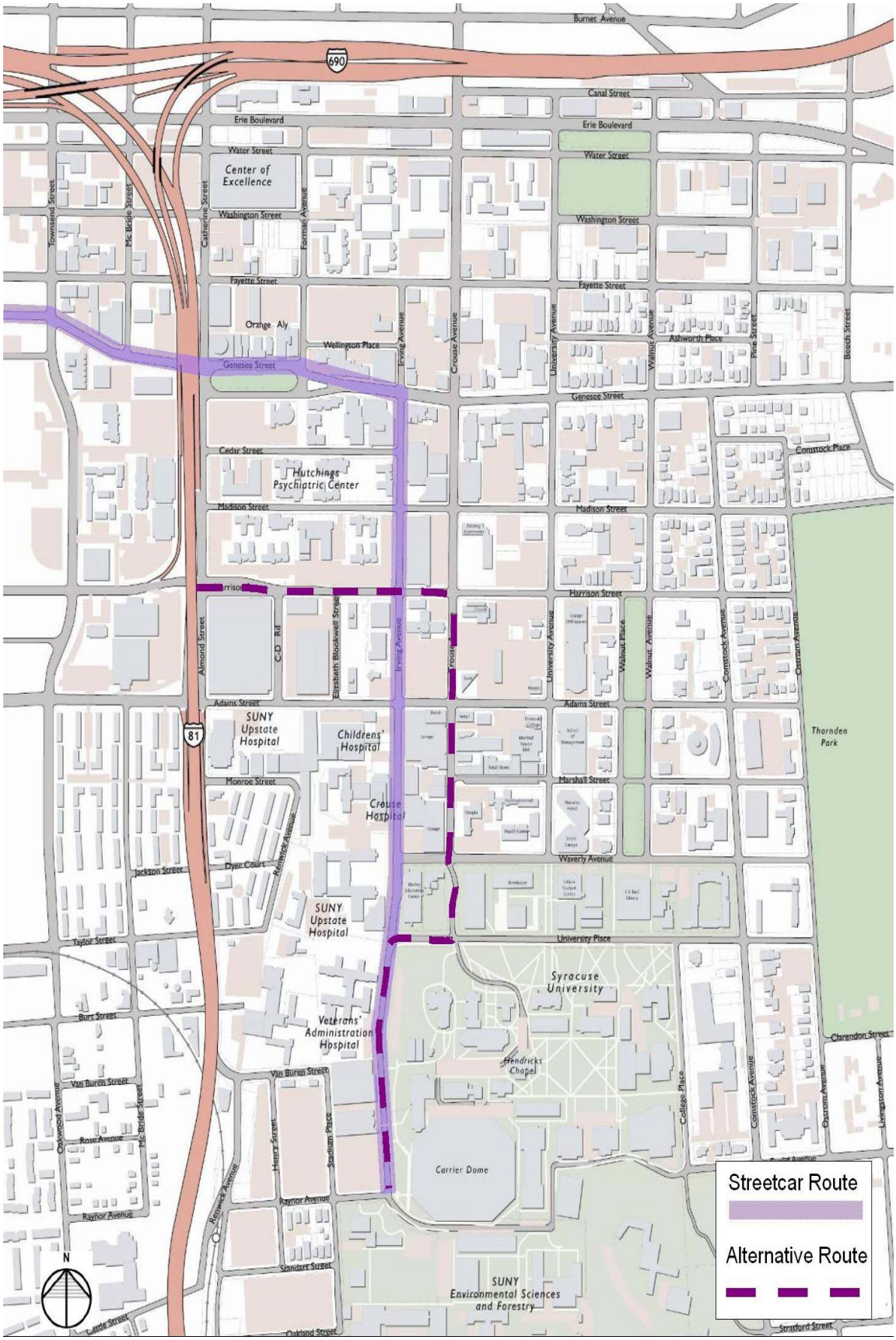
FIGURE 8. STREETCAR ROUTE



STREETCAR

CONCEPT DESCRIPTION

A potential streetcar alignment that would connect downtown to the Syracuse University Campus is along the same alignment proposed for bus prioritization (See Figure 8). This would include Harrison Street and Crouse Avenue on University Hill, the alignment of one of the city's former streetcar lines. The general size and appearance of a streetcar makes them distinguishable from buses. They are different and less costly than a light-rail service because they require few amenities for passengers and can be fully integrated with other forms of transport and pedestrian activity, making simultaneous use of the street.

Another potential streetcar alignment that would also connect downtown to the Syracuse University Campus would be along Genesee Street and along Irving Avenue. This alignment would promote the Arts District and provide an essential connection between University Hill's different districts in addition to downtown.

BENEFITS

A combination of a streetcar, limited parking, and excellent pedestrian amenities can create a new urban living option in University Hill.

It would be an attractive transit option for a variety of users, increasing ridership and providing direct access to employment, education facilities, and health care for residents with a mix of incomes and abilities.

It would be a way of establishing a transit priority corridor, increasing the mode share for transit, and increasing the number of transit options, which can reduce transit travel route times.

Streetcars are appealing to more people and meanwhile offer a less costly trip than the full cost of a car trip. It would preserve the much needed auto capacity in University Hill because it can be seamlessly integrated into the roadway.

A streetcar alignment would work similar to a transit prioritization corridor by attracting high density, transit-oriented and supporting land uses and new residents who would find the streetcar convenient and appealing. It would shape University Hill by attracting investment and keep the area economically and socially viable.

CHALLENGES

Without stakeholder involvement and public support, a streetcar project can get bogged down to the degree that the public investment cannot move in tandem with development. Like all transit projects, a streetcar involves the risk that people will continue to prefer individual automobile travel and the challenge of obtaining public funds. A streetcar should have an appealing design while maintaining low operating costs. Also, public-private partnerships are critical.

FIGURE 9. A STREETCAR CONCEPT IN PORTLAND, OREGON

Portland, Oregon opened the first modern streetcar system in North America in 2001, as pictured above in Figure 9. The Portland Office of Transportation and Portland Streetcar, Inc. worked together, as part of a unique public-private partnership to link investment in high-quality transit service with major new- and re-development.

Since the Portland Streetcar opened, over $2.28 billion has been invested, 7,248 new housing units and 4.6 million square feet of office, institutional, retail, and hotel construction have been constructed within two blocks of the streetcar alignment. The streetcar alignment has enabled developers to build new residential buildings with significantly lower parking ratios than anywhere else in the city

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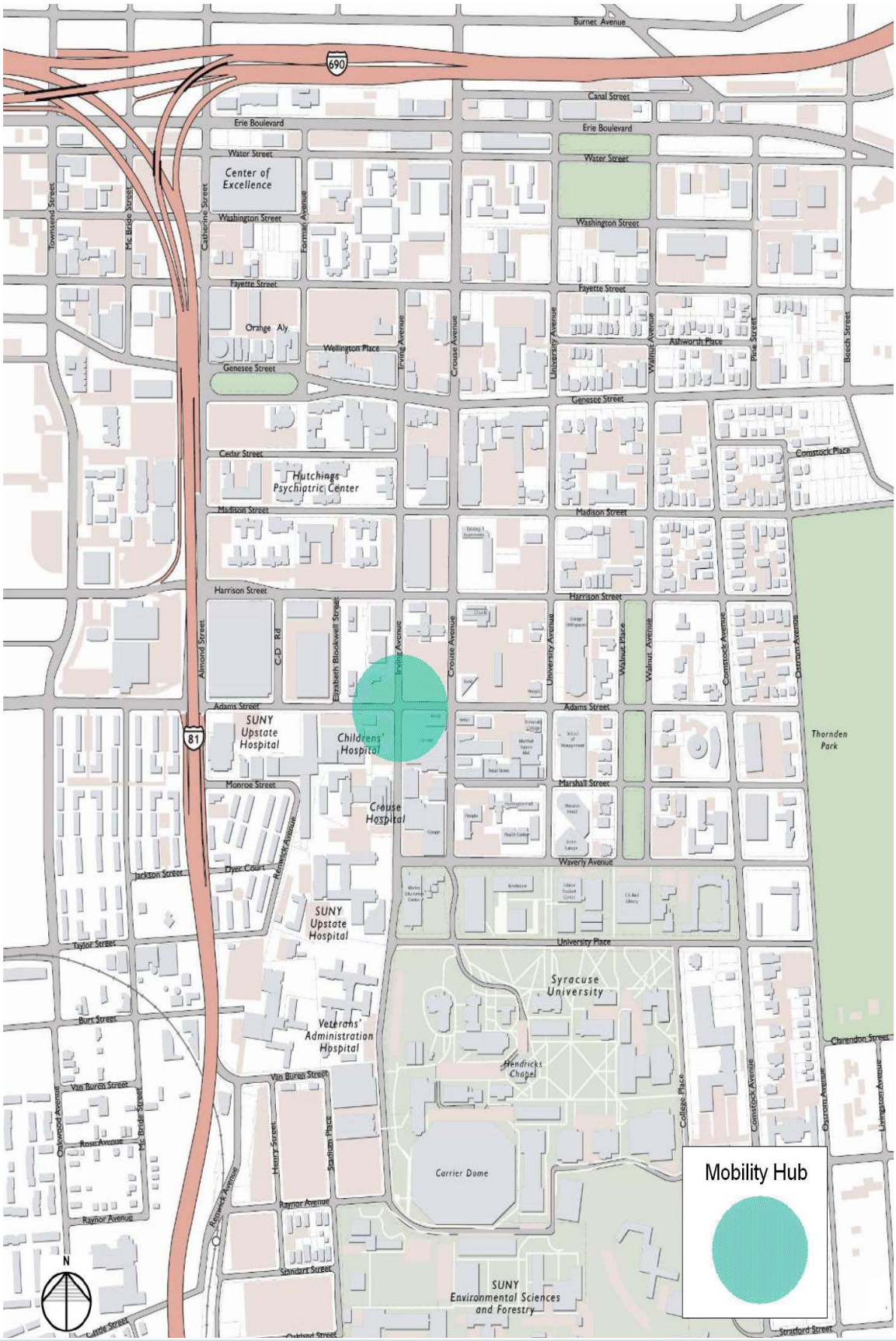
FIGURE 10. MOBILITY HUB



MOBILITY HUB

CONCEPT DESCRIPTION

The proposed hub would stand out from ordinary transit stops since it would be equipped with better weather protection (i.e. heated shelters and rain canopies), bike storage facilities, improved transit service and user information, restrooms, site lighting and vehicle loading and layover bays (or curb extensions). A transit hub can be an attractive, community focal point that is designed to enhance the surrounding area and stimulate redevelopment efforts with economic activity. In this case, the hub could also be a location for offering a shared car service such as Zip Car within walking distance of the major institutions.

BENEFITS

The hub can make transit more user-friendly by providing sufficient information to the rider while also making transit more appealing by providing amenities to transit users.

The hub can create a demand for more transit routes and/or frequency of buses, therefore reducing travel times and appealing as a convenient and reliable transportation option, not just for those that depend on it.

The hub can attract a wide array of users, which will help to reduce the demand for free parking and therefore reduce the acreage of land used for parking and improve the environment.

High-density, mixed-use development can be integrated with the transit hub as long as land use policies are implemented to encourage this type of development where it can best integrate with the transportation system and be both economically and environmentally viable. The reduction of free parking will encourage investments in enhanced bicycle and pedestrian facilities between transit stops and key destinations and activity centers (See Figure 11).

FIGURE 11. UNIVERSITY HILL TRANSIT HUB CONCEPT

CHALLENGES

The major challenge that University Hill may face in developing a transit hub is coordination of policies and land use decisions. Without coordinating local land use polices and transit service improvements, a transit hub alone cannot improve transit services and increase transit ridership. New development and economic activity are very real potential spin-offs of a transit hub, but there needs to be coordination and consensus among the major institutions in University Hill. There should also be a coordinated effort between the institutions, major businesses, developers, city government, and planners.

CASE STUDY- MOBILITY HUB
TORONTO, CANADA

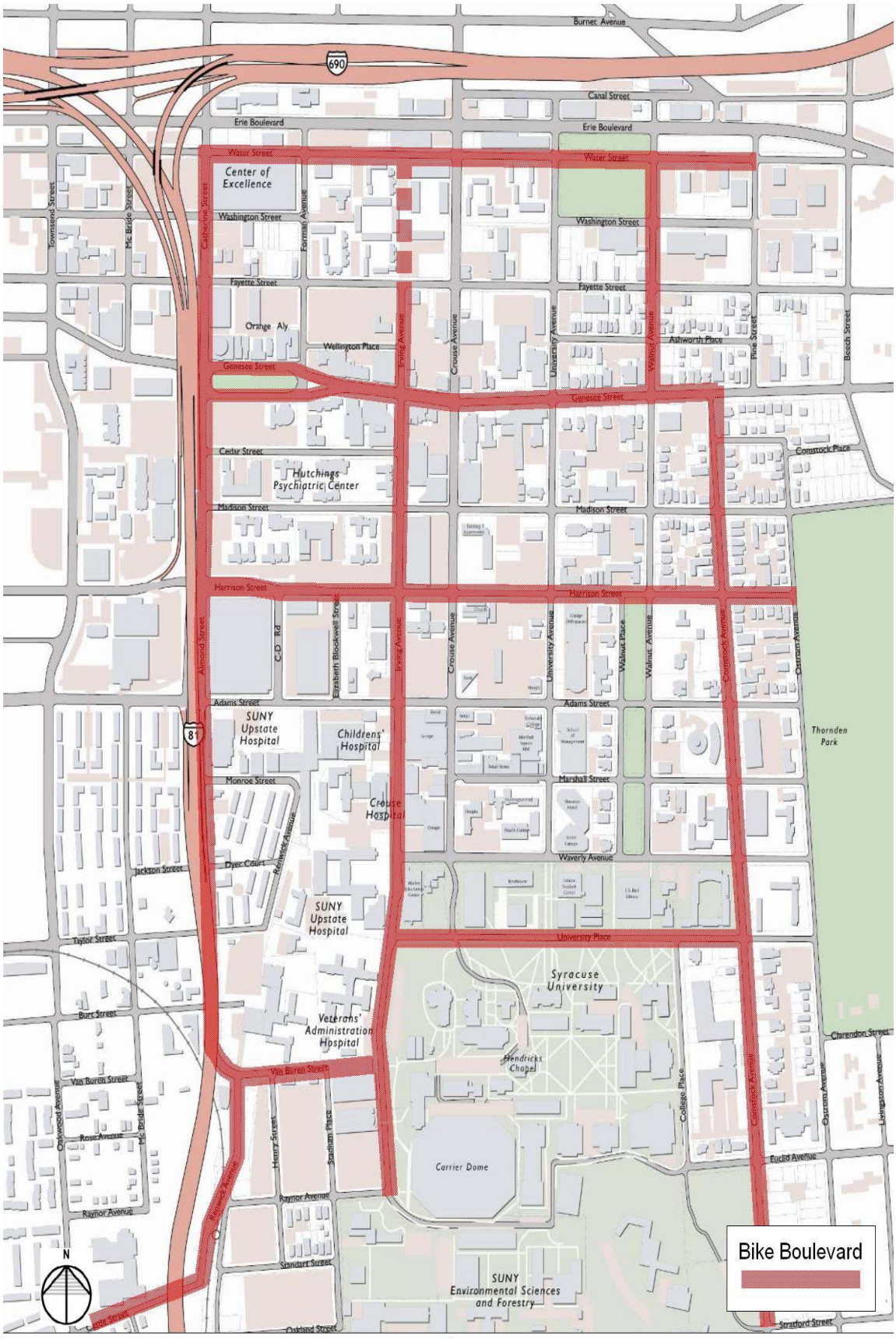
Urban transportation is evolving around the world to become more seamless and integrated. In Toronto, Canada, transportation professionals have created links between the city's transportation services that do just that. Toronto has built "New Mobility Hubs" around the city that connect together various modes of sustainable transportation, including cycling, walking and transit. Residential, commercial and retail developments throughout the city are linked by a network of mobility hubs that provide easy access to buses, trains and streetcars; clean fuel taxis; car-share vehicles and bike-share bicycles; bike parking; a walkable environment; cafés and newsstands with wireless internet access; maps, trail guides and other tourism information; bike and rollerblade rentals and repair; real-time information on when trains, buses, and streetcars will arrive and depart; and payment and discounts integrated on one electronic smart card.

Toronto's New Mobility Hub network is a project of Moving the Economy (MTE), an organization whose mission is to spur the growth of sustainable transportation. The mobility hubs take a global approach to the challenges of getting around cities. It addresses matters of efficiency on par with matters of sustainable development, pollution and environmental impacts such as resource efficiency, energy conservation, public health and quality of life in communities. This agenda addresses the issues of sustainable transportation by emphasizing the supply side. It combines transportation demand management (TDM) strategies and measures for containing, challenging and limiting wasteful and encumbering private car traffic in cities, with coordinated support of a wide range of alternative transportation arrangements, like cycling, walking and transit.

The power of connectivity is driving the explosion of future transportation strategies and advancements. New technology, such as Integrated Mobility Systems (IMS) that use "Smart Card" technology, are enabling tools to access and link the range of urban and inter-city transportation options. The Internet brings the opportunity for web portals, which can provide transportation information and services, regionally and nationally, including door-to-door urban traveler information and the exchange of information by transportation professionals. The system saves time, money and frustration while connecting people to a variety of sustainable transportation choices.

Source: Moving the Economy (www.movingtheeconomy.ca)
SpacingWire (http://spacing.ca)

FIGURE 12. BIKE BOULEVARD



BIKE BOULEVARD

CONCEPT DESCRIPTION

A bicycle boulevard network would increase the visibility of bikeways and acknowledge bicycling as an element of the transportation system. The proposed streets for inclusion in a bike boulevard network are shown in Figure 12. The boulevard is more than simply applying a striped lane and arrow to the pavement. It generally includes a segregated travel lane reserved for cyclists and includes a contra-flow lane to accommodate two-way travel. On-street parking can be provided between the boulevard and the travel lane if street widths allow. The boulevard network also includes traffic calming and bike priority of traffic signals along the network.

BENEFITS

Not all benefits of bicycle boulevard networks are associated with cyclists.

The boulevard system could improve the safety and visibility of biking on a series of streets, create a network of complete streets, and increase the number of people with access to bicycle facilities.

The boulevard system would increase the percentage of street miles designated to bike facilities. It would provide an environment safe and convenient for cycling that would encourage cyclists of all ages and abilities to cycle more, and increase the cycling commute mode share.

It would increase the number of residents within 10-minutes of the bicycle boulevard network, build connections to regional trails, such as the Erie Canalway Trail, and enhance neighborhood appearance and quality of life.

Healthy infrastructure provides opportunities for recreation, ensures safety for all users of the transportation system by providing traffic calming benefits and reducing conflicts, improves the overall environmental quality by lowering carbon emissions, and enhances community health by lowering obesity and asthma rates.

CHALLENGES

Stakeholder involvement is vital in outlining design guidelines that will make the bicycle boulevard easily identifiable and visually unique from surrounding streets, yet maintain the neighborhood character and scale. The design must minimize changes to existing traffic patterns on adjacent streets and not inhibit emergency vehicles. A bicycle boulevard network alone will not encourage more people to bicycle. Features such as Centro bus bike racks, benches, sheltered bicycle storage facilities, and bike racks at activity centers must compliment the network.

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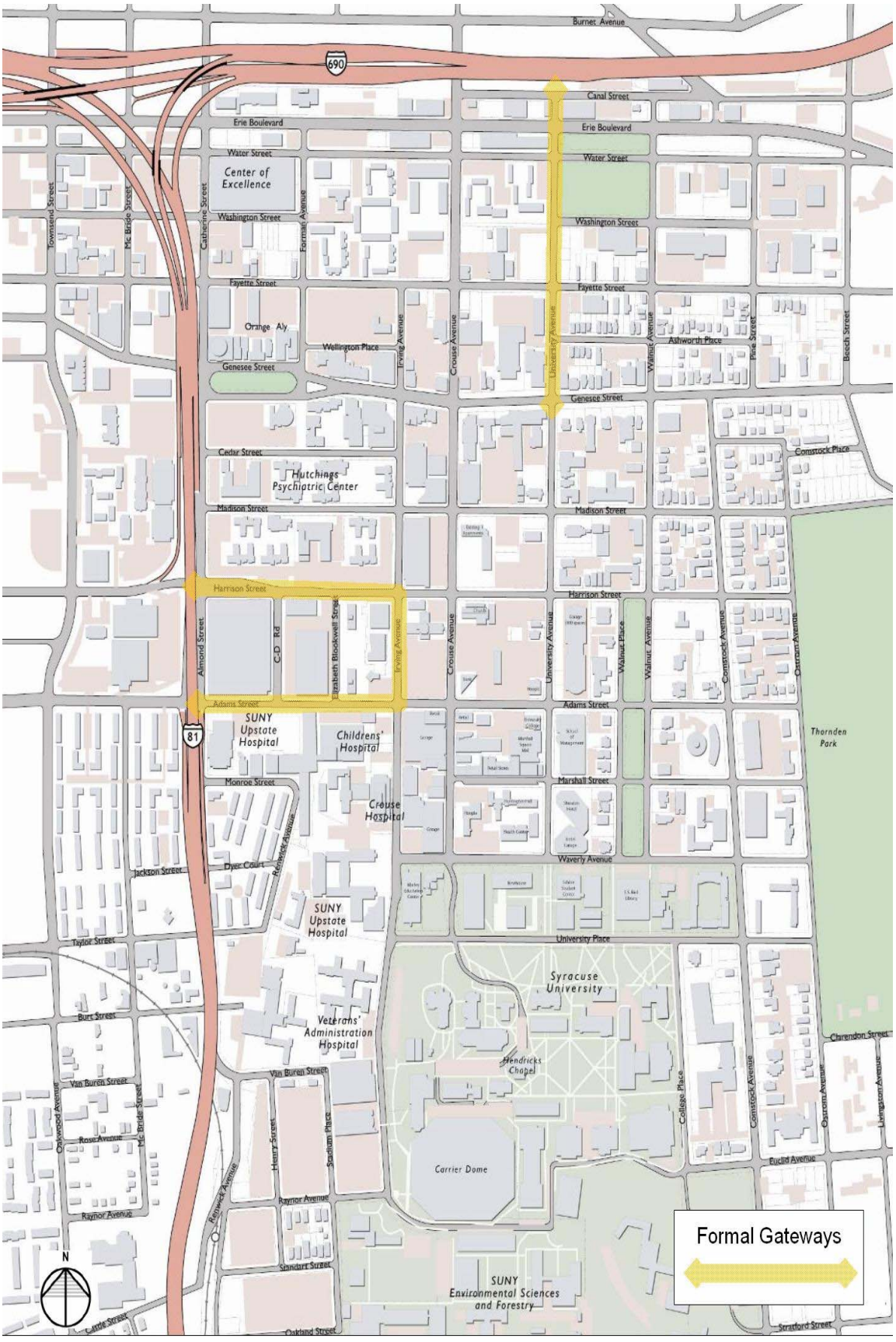
FIGURE 13. FORMAL GATEWAYS



FORMAL GATEWAYS

CONCEPT DESCRIPTION

Gateways create a welcoming entrance into a neighborhood, forming a unique identity for the University Hill area. Formal gateways along University Avenue, Harrison Street and Almond Street can play an important role in calming traffic while creating an enhanced sense of arrival to University Hill.

Gateways would provide a transition for motorists accessing University Hill via I-81 or I-690. They should also be integrated into the Connective Corridor to reinforce the identity of the corridor and to improve its effectiveness.

Gateways can also play a role in effective traffic calming. Traffic-calming involves designing roadways in a manner that improves pedestrian safety. Traffic-calming techniques provide visual cues to motorists to slow down and be alert for pedestrians, bicyclists and other motorists. Typical traffic-calming measures may include narrowing the street, tight turn radii, bulb outs and curb extensions, on-street parking and textured or well-marked crosswalks. The addition of landscaping elements such as street trees could also be utilized.

BENEFITS

Gateways may include elements that enhance pedestrian and bicycle facilities providing improved accessibility.

The inclusion of on-street parking as part of a gateway can increase parking flexibility within University Hill.

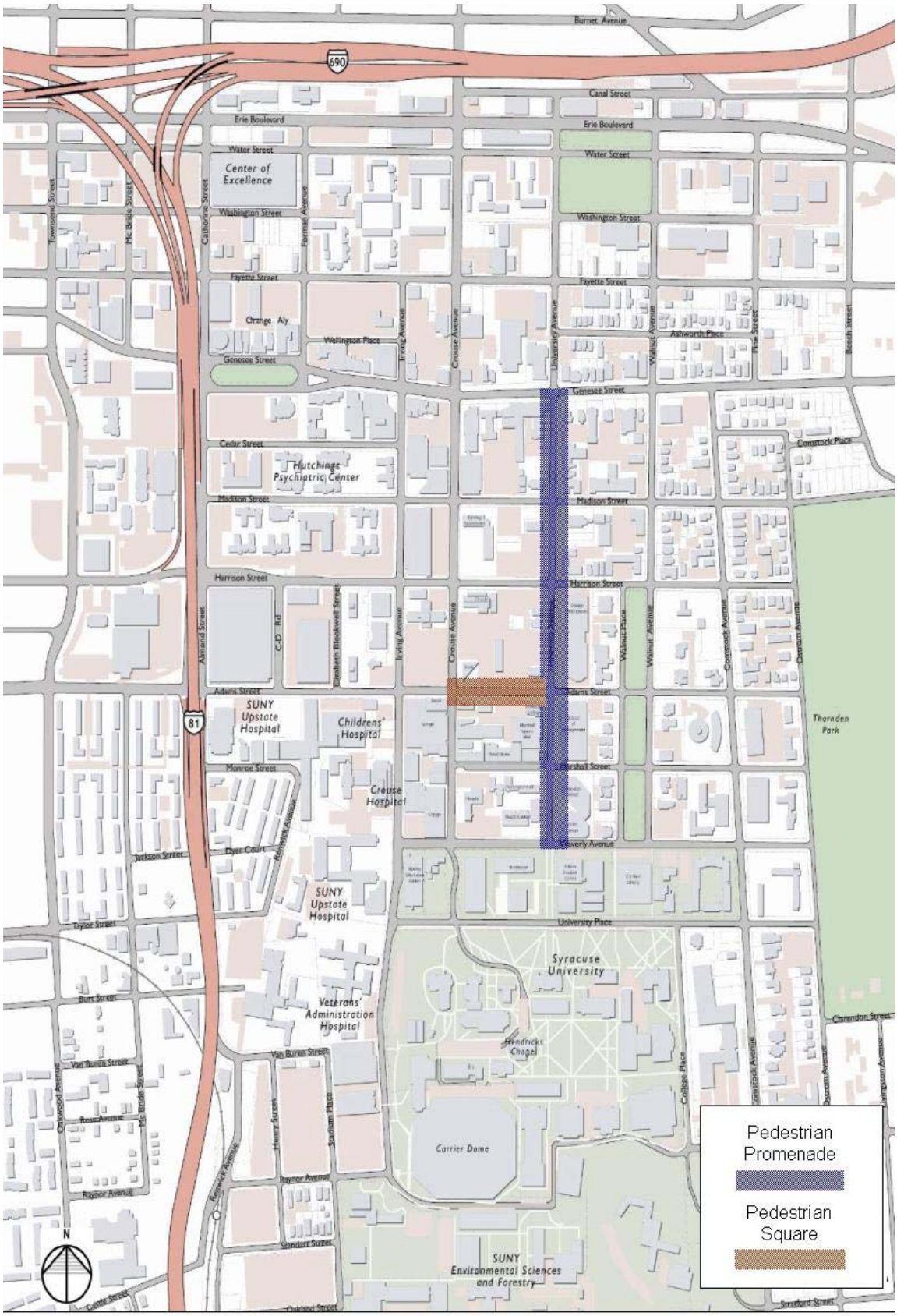
Formal gateways can help create a consistent identity for University Hill, which can boost support for investments in the area from employees, business owners, and others.

Gateways could help to ensure the safety of users including motorists, pedestrians and bicyclists.

CHALLENGES

The principal concern regarding pedestrian-oriented gateways onto University Hill would likely be the impact on auto traffic operations during peak periods. Since the gateways tend to calm traffic, potential congestion impacts should be considered.

FIGURE 14. PEDESTRIAN PROMENADE AND SQUARE



PEDESTRIAN SQUARE/PROMENADE

CONCEPT DESCRIPTION

New development along Adams Street could create a pedestrian square, or "University Square." The square would create a sense of arrival to University Hill and bring opportunities for the development of new prominent academic buildings, while serving as space for new retail, restaurants, and housing on upper floors.

A pedestrian promenade is a pedestrian-oriented street with enhanced pedestrian amenities, such as wider sidewalks, benches for resting, public art, or landscaping with lots of greenery. It can be integrated into a roadway as a traffic-calming element or separated from the roadway and function as a place for rest, social interaction, opportunity for recreation, a safe place to walk, and an attractive and healthy alternative to automobile travel. Civic art, benches for resting, a mini amphitheatre, proper lighting, and a snaking (instead of straight) walkway will make the promenade interesting and attract people.

BENEFITS

Increase percentage of street miles and total length designated to pedestrian facilities.

Extend the average time a pedestrian might walk in University Hill by providing an attractive and interesting pedestrian facility, while also reducing walking/route/travel distance to air line distance ratios between key destinations.

Bring life to the streets, which will attract new economic activity and an improved quality of life in University Hill.

Increase the percent of street with street wall complete, serve as an amenity that attracts new development, residents and businesses, and provide a place for people to safely walk which can improve community health by lowering obesity rates.

CHALLENGES

There are challenges associated with the creation of a pedestrian square or promenade. Installing sidewalks and a little landscaping alone will not attract pedestrians–scheduled events or attractions must be located in or around the promenade to draw people to the space.

FIGURE 15. MID-BLOCK ALLEYS

MID-BLOCK ALLEYS

CONCEPT DESCRIPTION

Traditionally, alleys have been essential as delivery and service conduits in cities. Alleys can also be ideal pedestrian environments, especially when integrated with vibrant, mixed-use spaces. Alleys break up the scale of large blocks and parcels by enabling access to the center of blocks. Alleys can be used as mixed-use, amenity-filled street interiors, pathways and public spaces. A somewhat remote mid-block alley exists at the rear of the Sheraton Hotel and the new SU School of Management building facing University Avenue.

A north-south axis, mid-block alley parallel to Crouse Avenue and University Avenue could be integrated into any future redevelopment of the four blocks between East Genesee Street and Marshall Street. An east-west axis mid-block alley could also be integrated into redevelopment of the two blocks between Adams and Harrison Streets between Irving Avenue and University Avenue (See Figure 15).

BENEFITS

The alleys increase the number of block faces with good/excellent bicycle and pedestrian facilities and provide an alternative pedestrian facility in addition to sidewalks and trails.

The passageways serve as a cut-through for pedestrians, which will reduce travel distances but extend the average time/distance a pedestrian is willing to walk per trip.

The alleys provide accessibility to residences and increase the number of residences within a 10-minute walk of University Hill employers.

As property is redeveloped, the street wall will increasingly become complete because unattractive features of many buildings, such as parking and loading/unloading, can be moved behind buildings, which will create a pedestrian friendly environment that will encourage more people to walk. Alleys also create the ideal space for pedestrian walkways that are too narrow for regular vehicle traffic. Alleys are a part of the transportation system infrastructure that help balance increased density with the characteristics that build livable neighborhoods, like walkability, human scale and a vibrant public realm.

CHALLENGES

Gaining public support for the use of alleys as an element of pedestrian infrastructure may be a challenge because in many places, the functions of alleys have become obsolete, and are often perceived as dark, dangerous spaces for drug activity and illegal behavior. New

development design standards and guidelines should outline appropriate building orientation and heights to maintain ideal sunlight and shadow casts. All new development should be human-scale and the alley's orientation should be based on where the greatest amounts of natural light penetrate. The utilization of street interiors, or alleys, needs to be organic and seamless.

Although design guidelines and principles are vital, they should be careful not to have the effect of creating spaces that are too engineered and constructed around fake nostalgic structures. New development must retain the alley's character and value as a flexible urban space while blending into University Hill's urban fabric and retain some of their fundamental functions like emergency vehicle access and vehicle loading.

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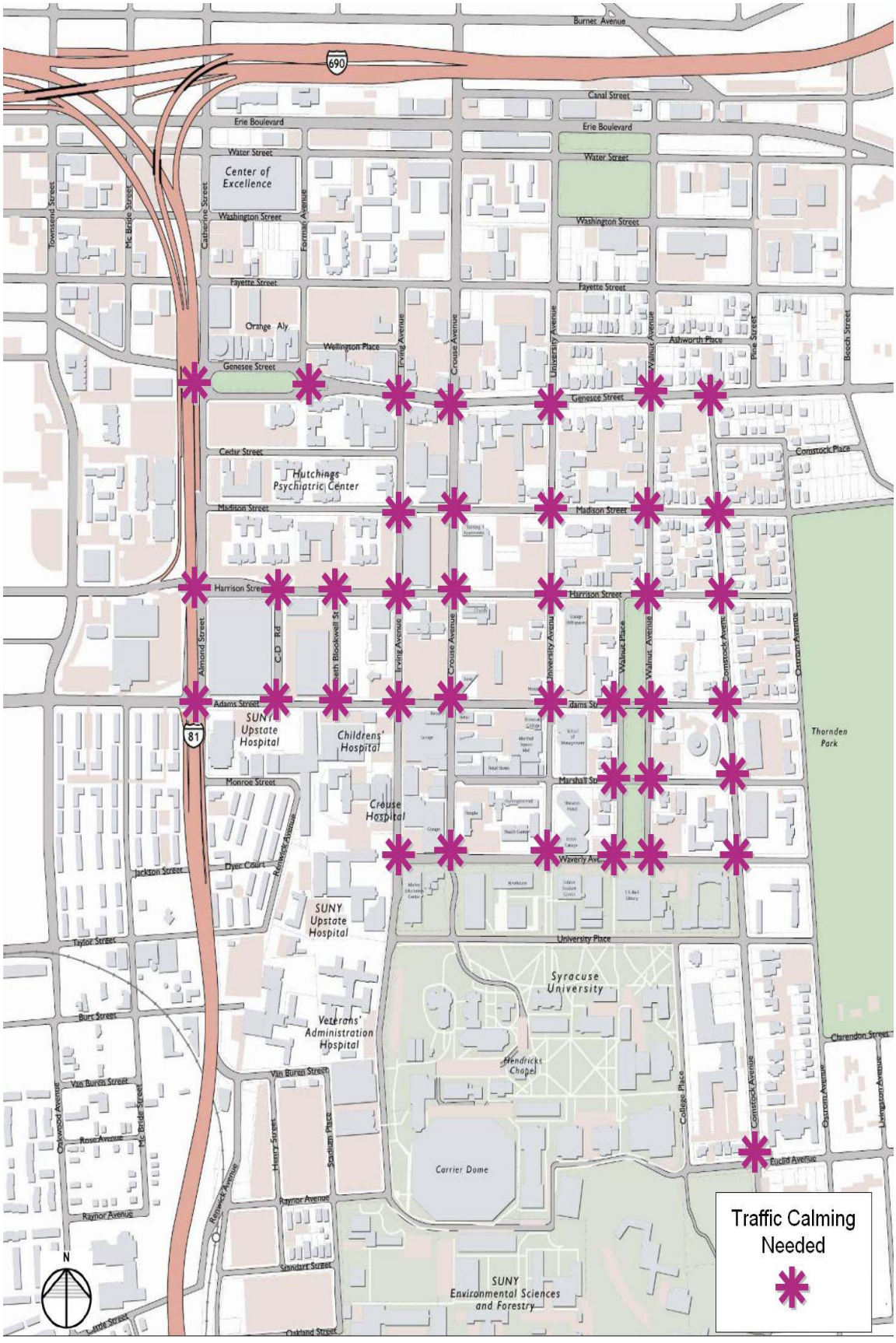
FIGURE 16. TRAFFIC CALMING



TRAFFIC CALMING

CONCEPT DESCRIPTION

A comprehensive traffic-calming program could be introduced onto University Hill. The system would incorporate improvements to nearly every intersection in the core institutional area as well as the Gateway District along Almond Street and the Arts District along East Genesee Street. The intent of the system is to improve pedestrian safety while maintaining acceptable traffic operations.

Traffic calming is based on “the three E’s”: education, enforcement and engineering. It consists of operation measures like enhanced enforcement of traffic laws, as well as physical measures like traffic circles, chokers, speed humps, and marked crosswalks. Such treatments would primarily be installed on University Hill to extend walking times, improve walking safety and reduce traffic speeds. Different types of intersection traffic calming are speed control measures (i.e. speed tables) and horizontal deflection (i.e. traffic circles) horizontal narrowing (i.e. bulb-outs or neckdowns).

BENEFITS

Increase the number of block faces with good/excellent bicycle and pedestrian facilities because it would create a pedestrian-friendly environment, which attracts pedestrian-oriented development and design.

Increase the percent of street miles designated to bicycle and pedestrian facilities, showing that walking and bicycling are integral elements of the transportation system, create a safe environment for walking which will grow the bicycle and pedestrian-commute mode share in University Hill, and extend the average time a pedestrian will walk per trip.

Create an environment that attracts bicycle and pedestrian-friendly development and design, increasing the number of jobs within a 10-minute walk and the number of residences within a 10-minute walk of the major University Hill employers.

Improve community health by improving safety for motorists, pedestrians, and bicyclists in University Hill, while providing a safe environment, which promotes walking and cycling, increases the percent of streets with landscaped street features, and create an overall attractive community.

CHALLENGES

Reducing congestion and improving traffic circulation does not come without a cost. Public support and outreach is vital to a traffic-calming project, just as much as it is to any other transportation planning project. Critics will argue that traffic calming is a waste of resources and simply shifts traffic impacts from one street to another. Many will also reject a plan for traffic calming because of the perceived unfair burdens on drivers. The possibility of offsetting behaviors needs to be considered, such as if drivers, bicyclists, or pedestrians feel safer they may become less cautious and "offset" a portion of crash reduction benefits.

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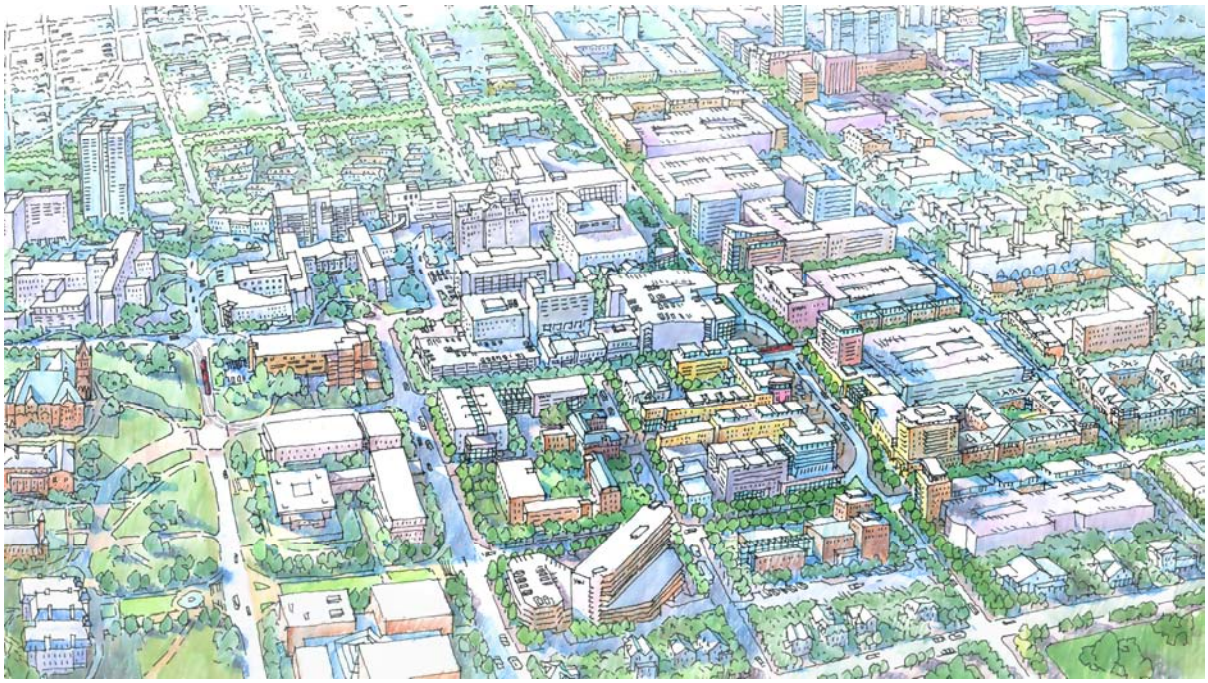
FIGURE 17. ELEMENTS OF A MIXED – USE PLACE

FIGURE 18. UNIVERSITY HILL LAND USE CONCEPT



MIXED LAND USES – CORE AREA

CONCEPT DESCRIPTION

Currently, there is only a limited number of buildings that could be considered "mixed-use" within the study area. A mixed-use concept that relies on joint development of property and shared parking among the various institutional uses was developed as part of the Study. The concept consolidates the proposed development identified within the Current Planned Vision within a 5 minute walking distance centered on Adams Street (between Irving Avenue and University Avenue). The concept and its benefits are more fully explored in the Land Use Concept Report (November 2006) prepared as part of this study. Endorsement of the concept by the participating institutions is pending.

Mixing land uses is a critical component of achieving better places to live. Putting uses close together makes alternatives to driving, such as walking or biking, more viable, and provides a more diverse and sizable population and commercial base for supporting viable public transit. Mixing land uses is a strategy for accommodating increasing travel demand with fewer and fewer resources. It carefully integrates transportation projects with land use planning and community design, which can enhance quality of life, mobility, and economic vitality.

BENEFITS

Increase the frequency of bus stops at activity centers and the number of transit hubs, attract a variety of transit users and increase ridership, reduce demand for free parking within walking distance of institutions, create block faces with excellent bicycle and pedestrian facilities, and increase the number of residents within a 5-minute walk of the Connective Corridor and the major University Hill employers.

Increase the transit, pedestrian and bicycle commute mode share, balance the ratio of parking within the study area with the amount of off-site parking and ride facilities, improve walking and cycling between University Hill and downtown, extend the average time a pedestrian will walk, and grow the bicycle/pedestrian- commute mode share.

Reduce demand for parking, increase the viability and number of off-site public park and ride lots, encourage institutions to jointly manage and share parking spaces and facilities, and increase the number of jobs and residences within a 10-minute walk of University Hill

Reduce energy use, reduce CO_2 emissions and improve air quality, and attract higher-density, transit-oriented development. It could also serve to attract students seeking to live off-campus, thus relieving conflicts with residences in other nearby neighborhoods.

CHALLENGES

Leaders at the local and regional levels must collaborate on how mixed use can be achieved in University Hill. The formation of a mixed use alliance typically includes the development of a common growth vision and bridging differences between public officials, developers, environmental groups and grassroots organization, as well as between urban, suburban and rural interests.

The most dissuading factor is the need for each institution to possibly postpone or eliminate an element of their individual future growth plans to accommodate the collective needs of all the institutions. Given the need to often act quickly when funding is available, this could be a hurdle for institutions to overcome. In addition, an overall coordinating entity would be needed to facilitate the joint development of multiple properties.

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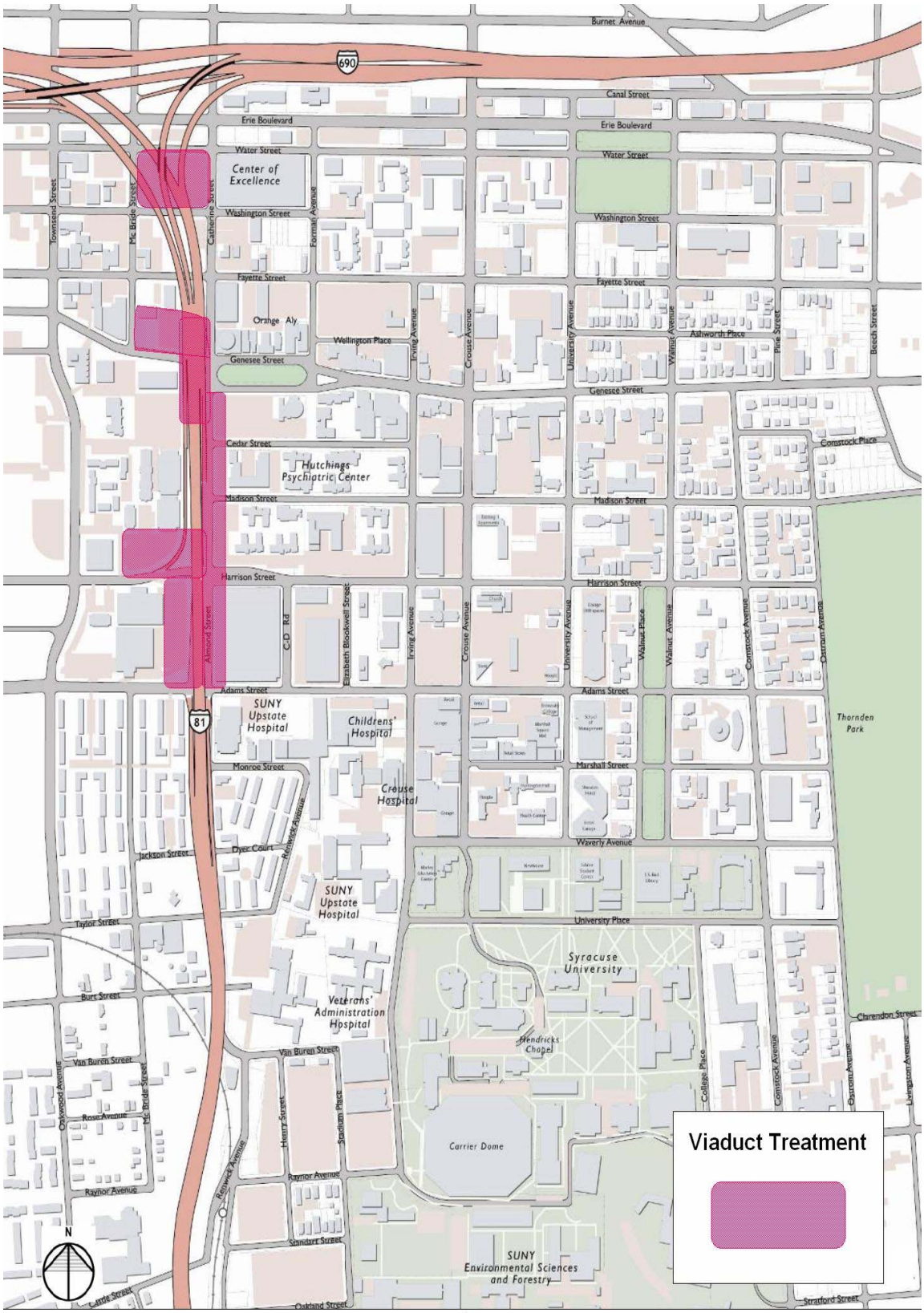
FIGURE 19. VIADUCT TREATMENTS



VIADUCT/ALMOND STREET PEDESTRIAN TREATMENT

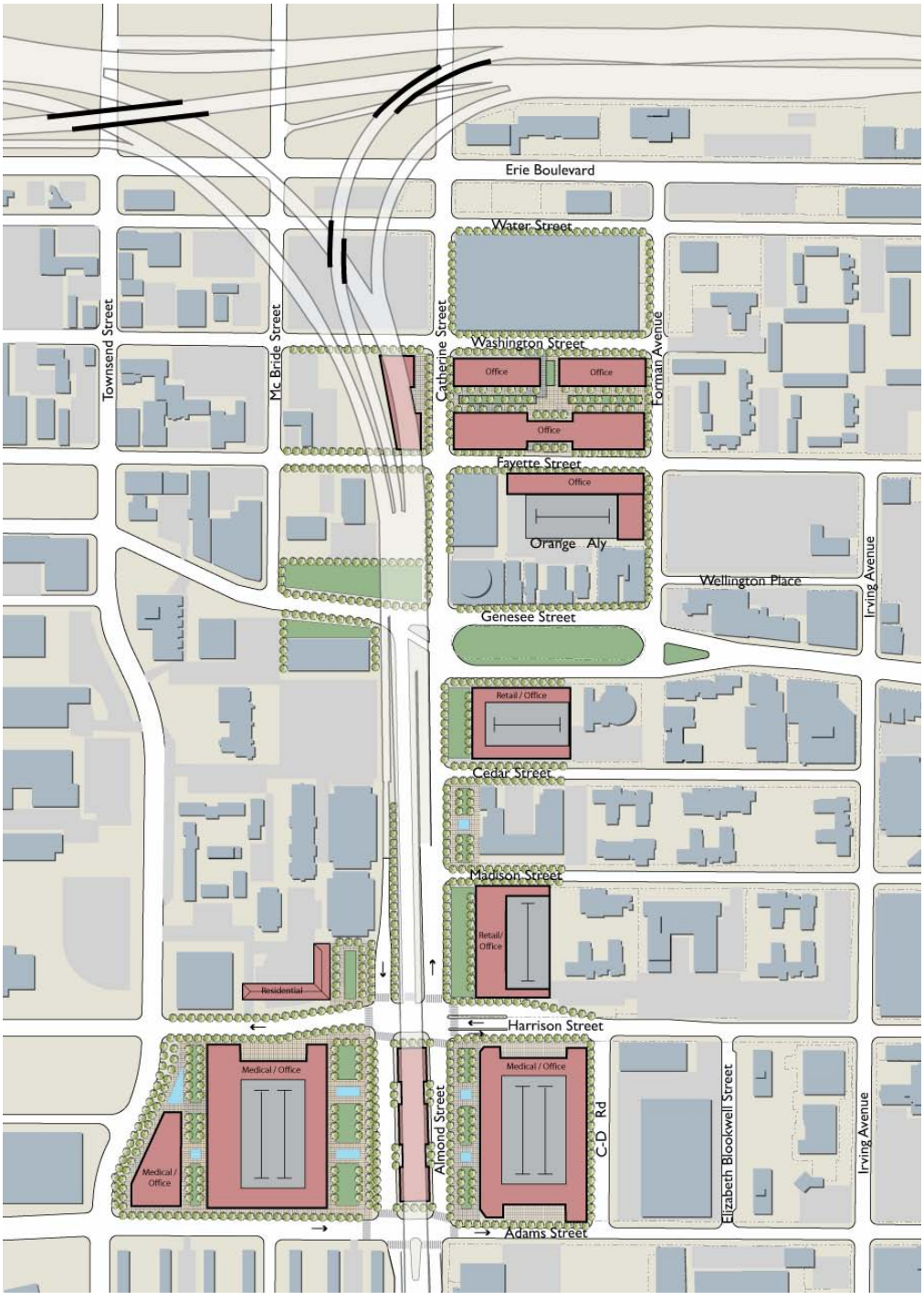
Currently, many pedestrians perceive the combination of the I-81 viaduct and Almond Street as an impediment. Consider the portion of the corridor between Adams and Harrison Streets. Almond Street northbound is four to five lanes in width depending on your location. Almond Street south bound is two lanes wide under the viaduct and has two lanes immediately west of the viaduct. The islands for the viaduct piers vary from a minimum of one to two lanes wide. Generally, the corridor is equivalent to ten travel lanes in width with no landscaping or lighting features.

The problem is compounded by the lack of pedestrian facilities along the northern crossing of the corridor on both the Adams Street and Harrison Street intersections. Thus, as an example, consider a pedestrian seeking to cross Almond Street from the northeast corner to the northwest corner. The pedestrian would need to travel south bound across two lanes of Adams Street, west across more ten lane equivalents, and then north across five more lanes of Adams Street. This totals crossing seventeen lanes including five distinct road sections and passing under the viaduct.

The Viaduct Treatment concept would involve maintaining the viaduct and Almond Street in place. However, it would introduce pedestrian facilities and features on all four legs of each intersection and would aggressively improve the space along the piers and islands. The concept could also be enhanced by making the Harrison Street crossing the primary east-west leg of the Connective Corridor. Consideration could also be given to creating a mid-block crossing between Adams and Harrison to address the frequent pedestrian crossings at this location (this issue may be resolved pending location of the pedestrian access to the proposed ambulatory care building facing Almond Street).

The pedestrian environment in this vicinity could also be enhanced through redevelopment of the block faces along Harrison and Adams Streets between Townsend Street and Almond Street. The buildings are set back quite a distance from the block faces, leaving parking and driveways as the primary visual element for pedestrians. The lack of proximate buildings with doorways, street windows and other architectural features discourages pedestrian activity. Infill development could address this “gap,” thereby extending the distance pedestrians would walk.

FIGURE 20. DEVELOPMENT ALONG A NEW BOULEVARD



BENEFITS

The viaduct treatment would improve accessibility for pedestrians creating more prominent pedestrian crossings and a more inviting environment. .

By providing a more direct route across Almond Street on the north leg of intersections, pedestrians would have more options for crossing the corridor.

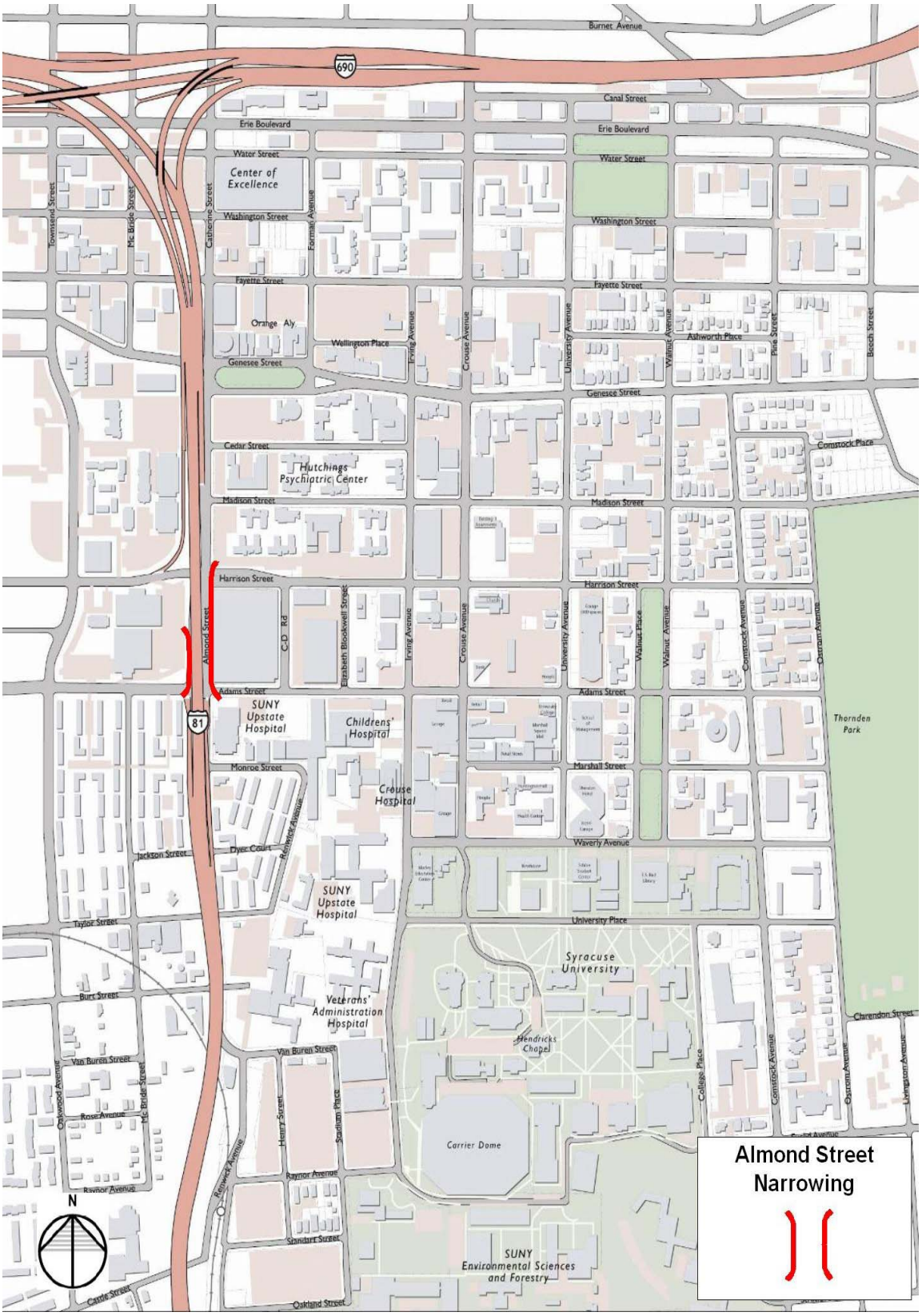
Economic viability would be enhanced by encouraging institutions to maintain facilities on both sides of the corridor without concern for accessibility by employees.

Increased walking would promote health and reduce air quality impacts of automobile travel. It would also improve community health by improving safety for pedestrians, and bicyclists in University Hill, while providing a safe environment, which promotes walking and cycling, increase the percent of streets with landscaped street features, and create an overall attractive community.

CHALLENGES

The viaduct and Almond Street corridor may still be perceived as a physical barrier due to the volume of cars passing through the corridor as well as the width of the corridor.

FIGURE 21. ALMOND STREET NARROWING



ALMOND STREET NARROWING

CONCEPT DESCRIPTION

Pedestrians seeking to cross the Almond Street/I-81 corridor would benefit from a narrowing of the corridor. There are no pedestrian facilities on the north legs of the Adams and Harrison Street intersections. The distance across the north leg of Adams Street is approximately 140 feet in width. Assuming facilities were installed on the north legs, the trip length is still discouraging. At an average walking pace of 4 feet per second, the trip would take 35 seconds if it were non-stop. However, because of signal operations associated with the three bays of travel in the corridor, the trip is more likely to exceed a minute and can exceed two minutes. This dramatically decreases the willingness to walk in this vicinity. The amount of time is even longer if a pedestrian follows the prescribed crosswalks across the three legs of the intersections as described in Viaduct/Corridor pedestrian treatment alternative.

As shown in the facing page, the alternative includes removal of one lane of travel at the far western and eastern edges of the corridor. The narrowing on the west side would only involve the slip lane between Adams and Harrison Streets. However, the narrowing on the eastern side could extend between Adams Street and Erie Boulevard if traffic operations permit. The lanes would be transformed into streetscape feature to make crossing the corridor more inviting. The eastern section of Almond Street could also be used to incorporate a bike boulevard. The alternative would likely be combined with the corridor treatment alternative discussed previously to overhaul the pedestrian experience in this vicinity. In addition, the narrowing of the Almond Street could be an integral part of the Connective Corridor project.

BENEFITS

The narrowing would improve accessibility for pedestrians creating more prominent pedestrian crossings and a more inviting environment.

By providing a more direct route across Almond Street on the north leg of intersections, pedestrians would have more options for crossing the corridor. Create an environment that attracts bicycle and pedestrian-friendly development and design, increasing the number of jobs within a 10-minute walk and the number of residences within a 10-minute walk of the major University Hill employers.

Economic viability would be enhanced by encouraging institutions to maintain facilities on both sides of the corridor without concern for accessibility by employees.

Increased walking would promote health and reduce air quality impacts of automobile travel. It would also improve community health by improving safety for

pedestrians, and bicyclists in University Hill, while providing a safe environment, which promotes walking and cycling, increase the percent of streets with landscaped street features, and create an overall attractive community.

CHALLENGES

The fundamental objection to this alternative would be the loss of capacity for automobiles. The affected road sections carry high volumes of traffic at peak periods so increased congestion may result. The issue is especially sensitive since the south bound lanes of Almond Street serve as an access route for emergency vehicles coming from I-81. However, additional queuing capacity might be possible by extending the remaining western bay back towards Harrison Street (without extending all the way to Harrison Street thereby constraining the pedestrian crossing at that intersection).

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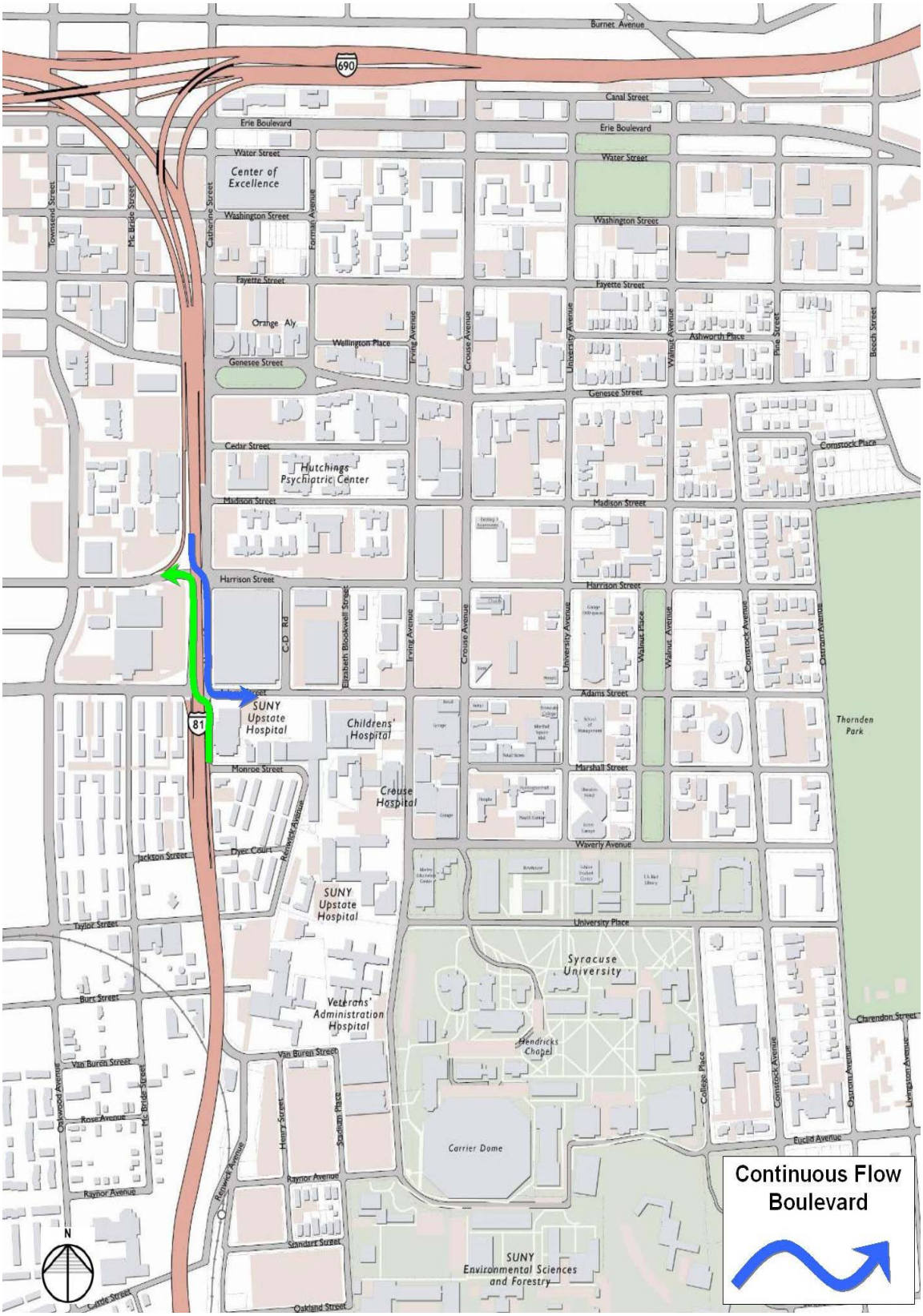
FIGURE 22. CONTINUOUS FLOW BOULEVARD



CONTINUOUS FLOW BOULEVARD

CONCEPT DESCRIPTION

The Continuous Flow Boulevard (CFB) concept involves creating a modified version of two continuous flow intersections (CFI). The effect of the concept is to create a continuous flow boulevard while maintaining the I-81 viaduct and ramp structures. This feature could be combined with the Viaduct/Almond Street Pedestrian Treatment to better accommodate all modes of travel.

A CFI removes the conflict between left-turning vehicles and on-coming through vehicles by introducing a left-turn bay placed to the left of on-coming traffic. In a true CFI, vehicles access the left-turn bay at a mid-block signalized intersection on the approach where continuous flow is desired.

Under the CFB concept, northbound motorists wishing to turn left onto Harrison Street would cross over the opposing travel lanes at the Adams Street intersection to access a dedicated left turn bay. The location of this left turn bay (i.e., to the *left* of the on-coming through lanes) would allow left turns at Harrison Street to occur without conflict, and simultaneously, with multiple other movements at this intersection. Southbound motorists wishing to turn left onto Adams Street would access a similar left turn bay at the Harrison Street intersection, presenting similar signal phasing opportunities at Adams Street.

Pedestrians would cross at times where there are no conflicts with turning vehicles.

BENEFITS

The alternative would remove left turns from intersections as a separate movement. By combining left turns and through movements during the same signal phasing more capacity could be created. In turn, this could reduce congestion in the corridor during peak periods.

Better connections to downtown and the area immediately west of the viaduct would result from a boulevard. In addition, this could create opportunities for increasing transit ridership with improved stops and pedestrian facilities.

No additional right of way would be required. By reducing congestion in the corridor, employment in the University Hill and Downtown would be more attractive. Costs and lost productivity due to congestion-related crashes (e.g., rear end collisions) would be reduced if stop and go conditions were reduced.

Potential benefits could include less congestion and thus improved air quality (as long as total vehicle miles traveled are not increased by induced traffic). The

boulevard islands would enhance pedestrian activity, thereby improving public health and safety.

CHALLENGES

This concept was conceived specifically for the conditions in the Almond Street corridor. Continuous flow intersections have been used in other locations, but this is a variation on the intersection design and would possibly be the first use of a boulevard concept. A public information campaign would be needed to help motorists and pedestrians travel safely on the unfamiliar traffic pattern. Traffic safety could also be an issue since the travel pattern might not be readily apparent to motorists entering the facility.

The layout and operation of the intersections along the boulevard may not be immediately apparent to pedestrians, particularly those with visual disabilities. As a result, pedestrians with visual disabilities may find it difficult to cross the intersection. The unconventional flow of vehicles could disrupt the audible cues that visually impaired pedestrians rely upon. Thus, accessible pedestrian signals would be required for use with the CFB.

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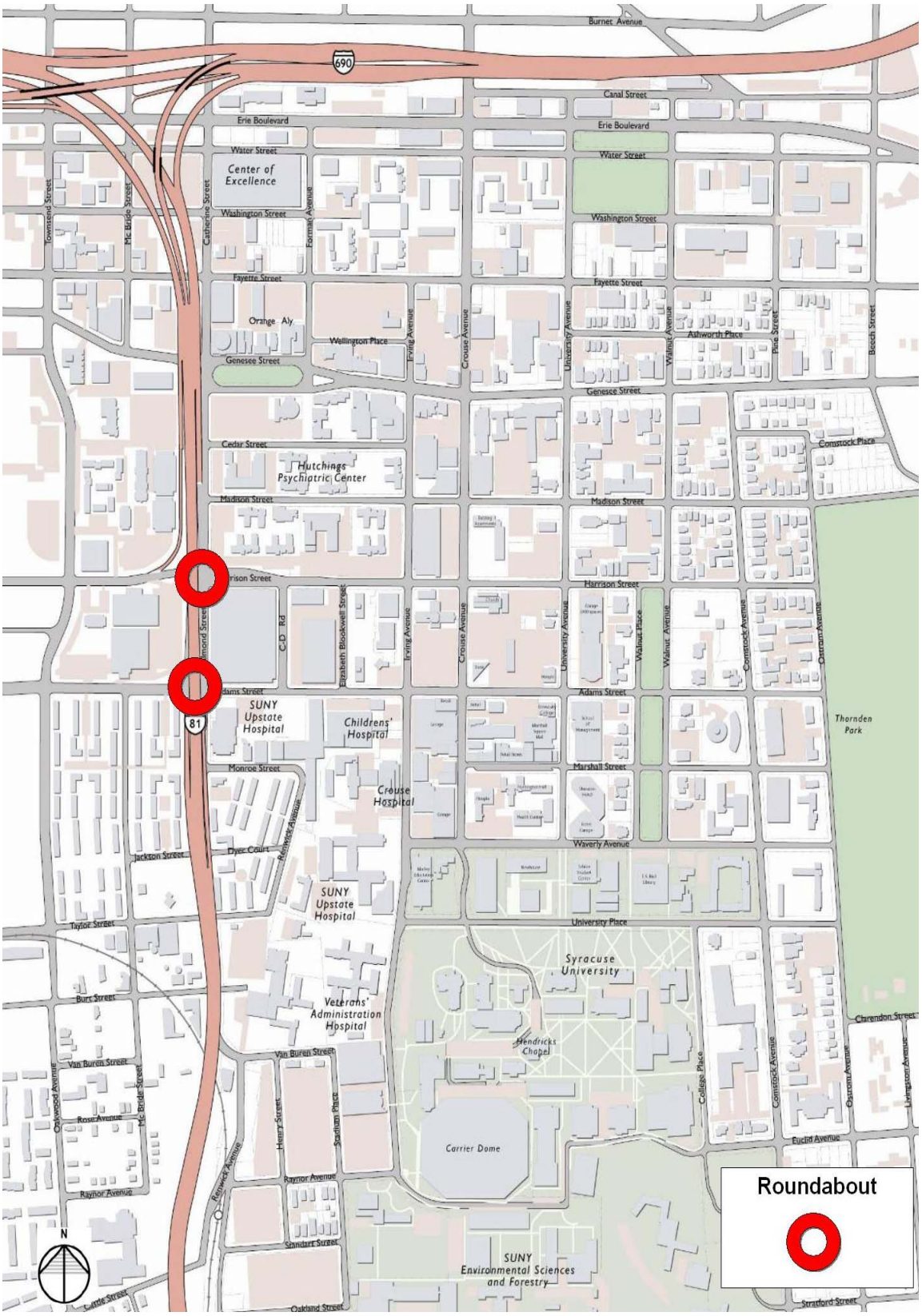
FIGURE 23. DUAL ROUNDABOUTS



DUAL ROUNDABOUTS

CONCEPT DESCRIPTION

The alternative includes the installation of two traffic roundabouts under the viaduct at the intersections of Almond Street with Adams and Harrison Streets. A modern roundabout is an unsignalized circular intersection designed to maximize safety and minimize traffic delay. Although the public is often skeptical of their utility and safety, roundabouts have been accepted enthusiastically once built.

The NYSDOT reports, “Roundabouts have proven to be particularly effective at places with moderate to high entering volumes and at the ends of freeway on and off ramps. In addition, they offer special advantages at intersections with more than four legs.” (NYSDOT, *A Citizen's Guide to Roundabouts*, March 2004) All of these characteristics apply along Almond Street at the Harrison Street and Adams Street intersections.

Safety is enhanced because the number of conflict points, as well as stop and go conditions, are reduced. In addition, the merging lanes that created confusion in old-fashioned traffic circles are eliminated. Since the roundabouts are relatively small, travel speeds are slower, creating more opportunities to enter circulating traffic and giving pedestrians safe crossing opportunities. Pedestrian safety and mobility is also enhanced since pedestrians cross one or two lanes at time, using the splitter islands as refuges before crossing the next lane(s).

BENEFITS

The roundabouts could help reduce travel time between I-81 and University Hill. It could also enhance travel between I-81 and Downtown Syracuse. The design of the roundabouts could improve pedestrian access at these intersections.

This alternative would improve the viability of traveling by modes other than car across the corridor.

The alternatives could improve commuter travel times making employment on University Hill more attractive.

By reducing congestion, air quality could be improved. Public health and safety would also be enhanced by an increase in pedestrian activity.

CHALLENGES

There are two fundamental challenges to this alternative. The first is to determine whether a roundabout reasonably fits within each intersection and can accommodate all the desired travel movements. The second is to determine if the roundabouts can accommodate the current and forecast volume of traffic under the Current Planned Vision.

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FIGURE 24. SMALL-SCALE BOULEVARD

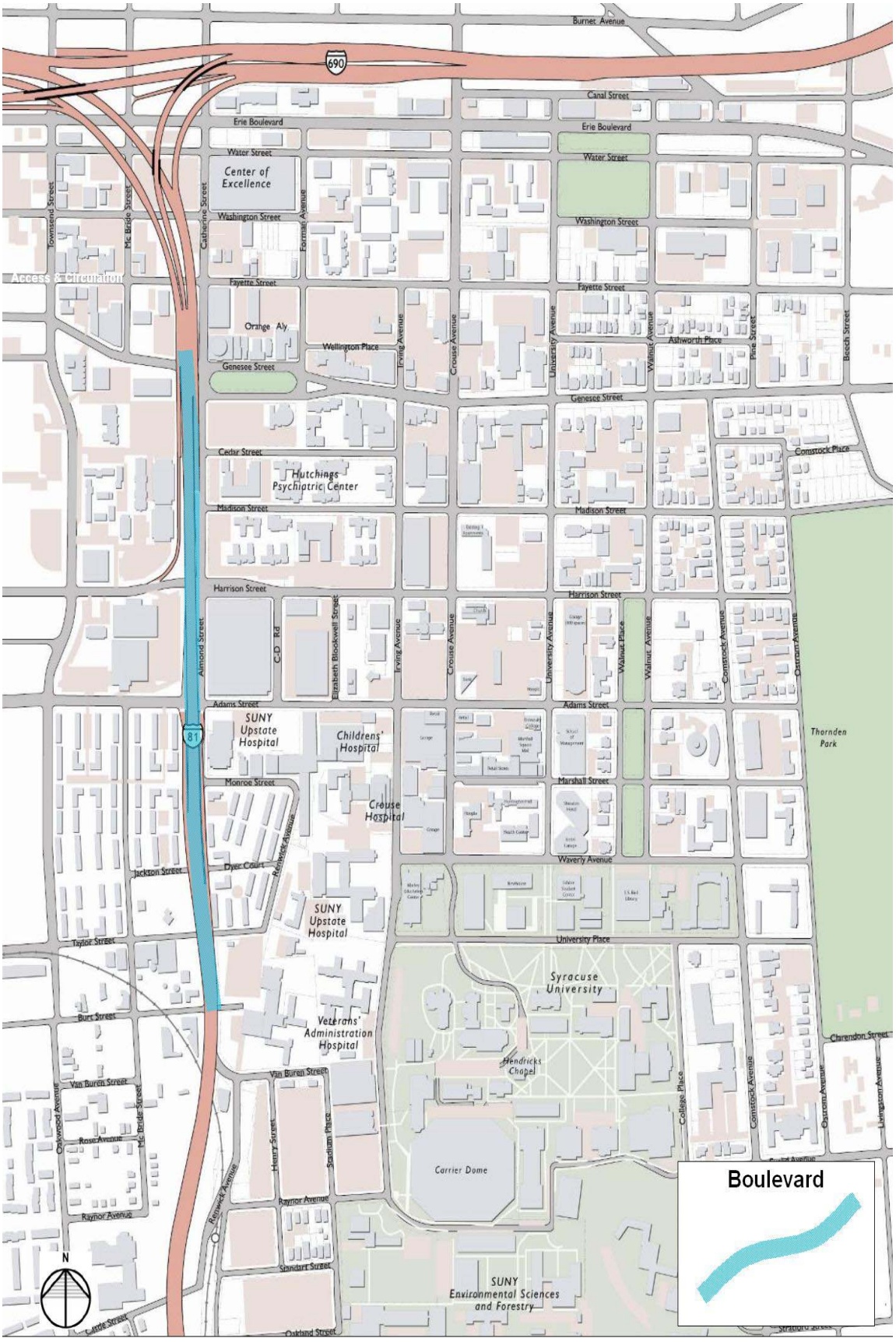


FIGURE 25. MODERATE-SCALED BOULEVARD

FIGURE 26. LARGE-SCALE BOULEVARD

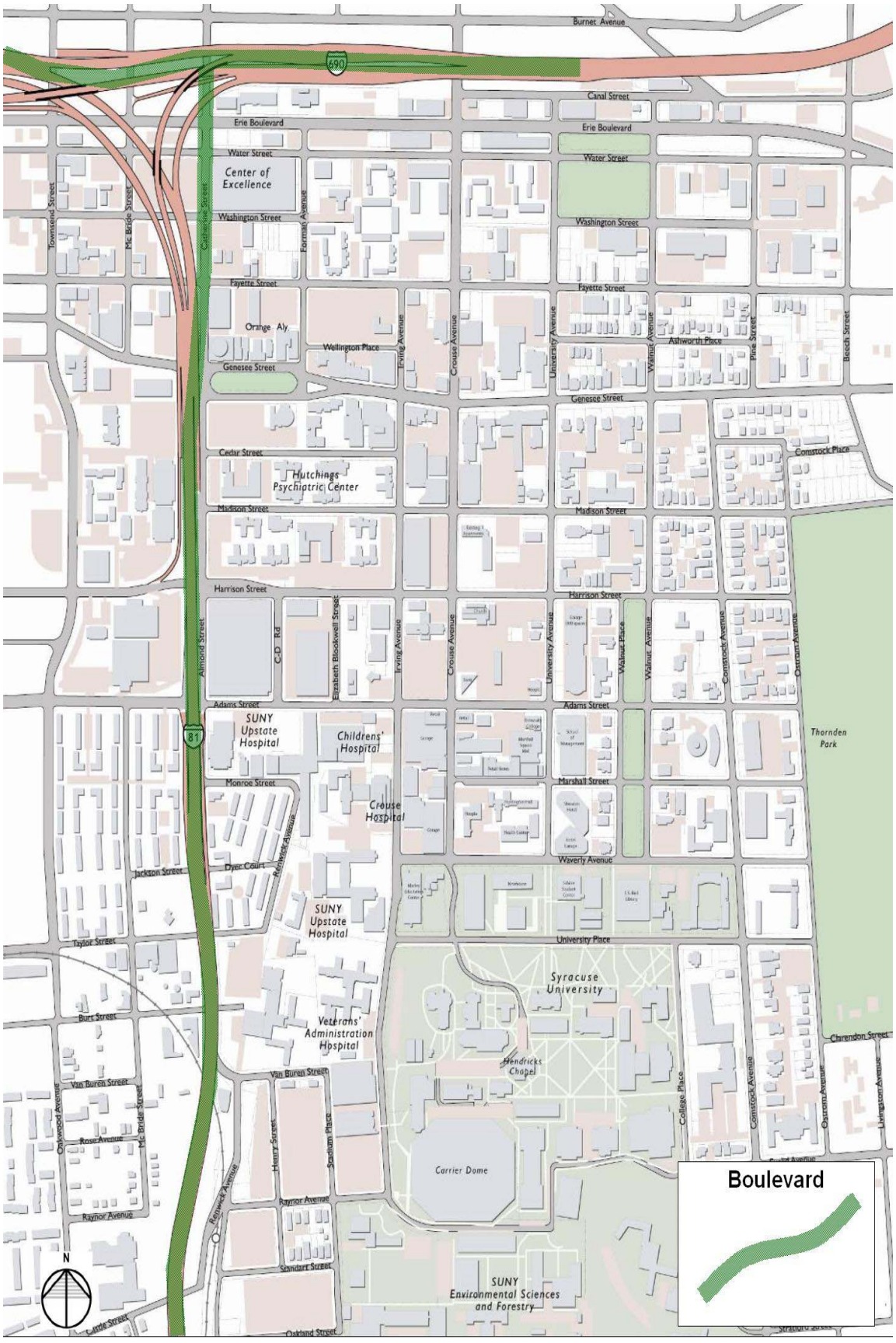
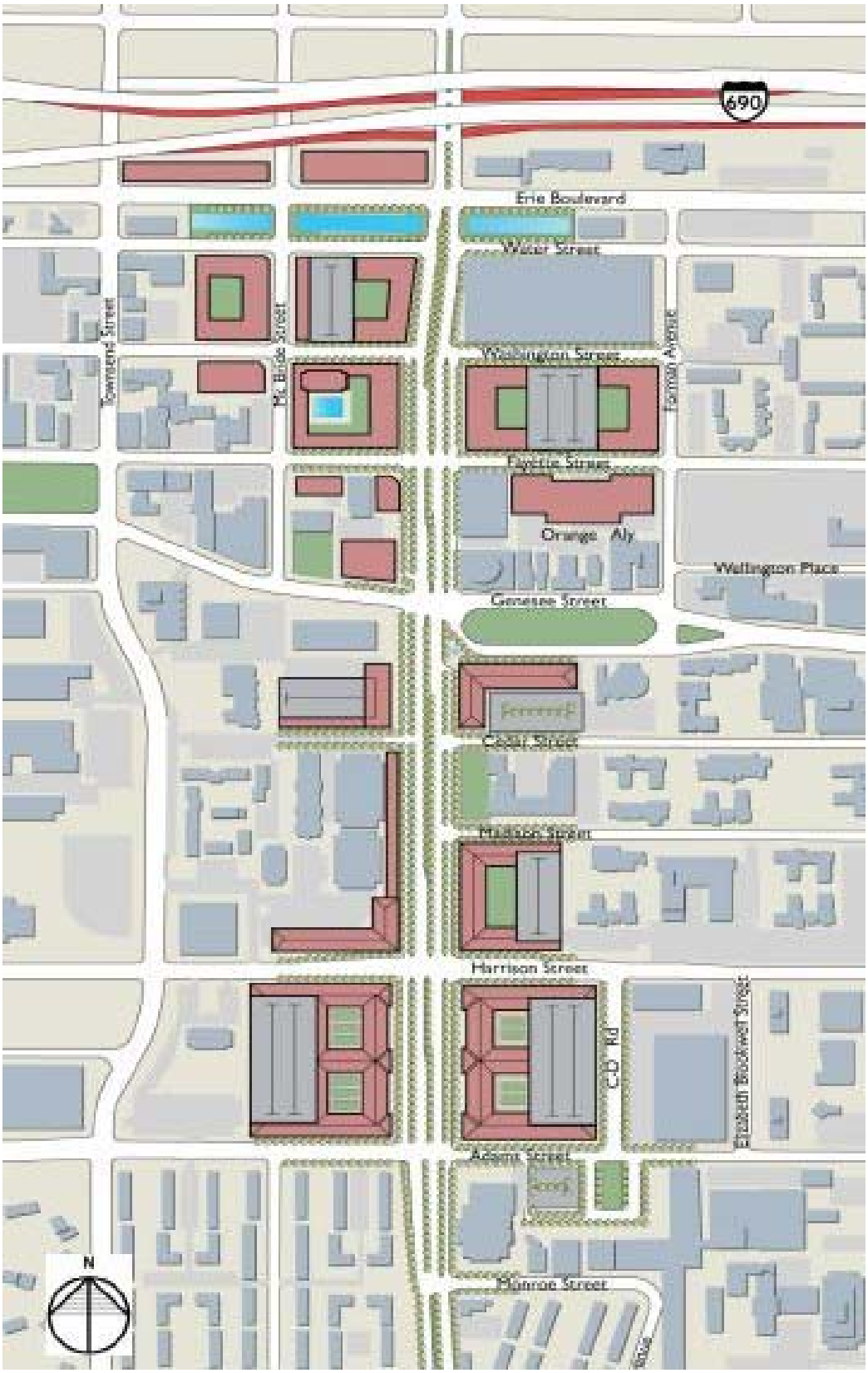


FIGURE 27. ALMOND STREET URBAN BOULEVARD



ALMOND STREET – URBAN BOULEVARD

CONCEPT DESCRIPTION

The Urban Boulevard concept involves creating a surface level boulevard and removing a portion or the entire I-81 viaduct. Boulevards are roadways that typically include medians with landscaping, on-street parking, bicycle and pedestrian facilities and locations for transit stops. Boulevards are often designed to be multi-functional and accommodate multiple users.

The extent of the boulevard could vary significantly. A small-scale boulevard might extend between Burt Street and Harrison, coming back up onto the interstate system at the existing interchange of I-81 and I-690 (See Figure 24). A mid-scale boulevard could extend further south to West Castle Street (See Figure 25). While this would have the advantage of connecting directly to the West Campus and the Dome, it would involve crossing the On-Track line, which is also an active freight line.

A larger scale boulevard concept would involve the reconfiguration of the I-81 and I-690 interchange. This would create additional real estate for mixed-use development while reducing the amount of elevated freeway, as illustrated in Figure 27. It could also reduce the costs associated with elevated roads, which are typically more expensive than surface roads.

The creation of an urban boulevard would require relocation of the I-81 route to I-481. For trips that have origins and designations south and north of the I-481, this may not significantly affect the trip length or travel time.

BENEFITS

Improved accessibility for all modes could be generated. Travelers would have more choices of routes to select to their destinations. In addition, emergency vehicles would be provided more travel route options, which can be critical in cases of congestion or during special events on University Hill.

Better connections to downtown and the area immediately west of I-81 would result from a boulevard. In addition, this could create opportunities for increasing transit ridership with improved stops and pedestrian facilities.

A boulevard treatment could impact the percent of traffic that is local versus regional, thereby creating more opportunities for mixed land uses and increased investment in a portion of University Hill that is not typically a focus for investment.

The creation of a boulevard would add landscaped features to the corridor that would serve as traffic calming measures as well as enhance the aesthetics of the area. By removing the regional through trips, air quality could be improved in the Downtown.

CHALLENGES

Maintaining reasonable traffic flow would be a concern. Currently there are approximately 75,000 vehicles per weekday that use the viaduct. This traffic would be combined with the traffic that uses Almond Street. In addition, a number of grid intersections would be reestablished depending on the length of the boulevard. Traffic operations and pedestrian activity would also have to be considered.

Another concern is likely to be raised about accessibility of travelers from the south to the proposed Destiny NY if the project advances. A travel time analysis would be helpful in evaluating this concern.

The cost associated with creating a boulevard would need to be compared to reconstruction of the viaduct, not only the costs associated with connector streets.

Another challenge would be creating a design that adequately addresses the perception that boulevards are difficult for pedestrians to cross. Mid-boulevard islands can serve as pedestrian refuges and help to organize traffic operations. However, it would be necessary to determine whether the existing right of way would be wide enough.

The designation would require the reconstruction of the southern and northern merges of I-81 and I-481 to accommodate the highway design speed (i.e., 70 mph). A cursory evaluation indicates that this is feasible.

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FIGURE 28. GRID CONNECTIONS

GRID CONNECTIONS

CONCEPT DESCRIPTION

Currently, there are two large “super” blocks in the northern portion of the study area. The largest block encompasses the Kennedy Square residential area. It has been noted during the course of the study that the property may be redeveloped. If such is the case, the proposed development should incorporate smaller blocks to foster increased pedestrian activity and to provide drivers with more travel route options. This would involve connecting the two sections of Washington Street ending at Forman Avenue to the west and University Avenue to the east. The alternative would also extend Irving Avenue to Water Street. The same benefits could be achieved on the larger block to the east by extending Washington Street an additional block to Beech Street.

BENEFITS

Increased accessibility between University Hill and the Erie Boulevard corridor for pedestrians, bicyclists and autos would result from the alternative. The grid would break up blocks creating a more pedestrian friendly environment.

Better connections to the surrounding neighborhoods would result from a grid extension

The redevelopment of the property would provide an opportunity to increase mixed uses in the study area. This would allow shared parking and on-street parking which would decrease costs.

The creation of the grid would enhance the walkability of the area, which would enhance public health.

CHALLENGES

The introduction of the grid would be dependent on redevelopment of these properties.

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SECTION FOUR - MOVE CARBON SCENARIO

MOVE CARBON

CONCEPT DESCRIPTION

As of November 2006, 328 mayors representing over 53 million Americans have signed the U.S. Mayors Climate Protection Agreement (http://www.seattle.gov/mayor/climate). Among those cities signing the agreement was the City of Syracuse, NY. Mayors who signed the Agreement made a commitment to reduce greenhouse emissions in their own cities to 7% below 1990 levels by 2012 (on par with the Kyoto Protocol). In addition, the Mayors called on Congress to pass legislation that sets meaningful timelines and limits on emissions through a flexible, market-based cap and trade program.

The emission reduction target has already been achieved in Syracuse through actions like reducing energy use and promoting use of clean, renewable resources. Examples of the actions taken by the City include the following.

- Replacing the City's entire mercury vapor street lighting with low-pressure sodium fixtures.
- Replacing all the City's incandescent signals with Light Emitting Diodes (LEDs).
- Upgrading lighting in all City parking garages by replacing, adding and upgrading fixtures

A more comprehensive list of the specific measures accomplished by the City are included in Appendix A. In addition, the conversion to a "green fleet" by CENTRO, which uses natural gas as its primary fuel, has contributed to the reduction of greenhouse emissions in Syracuse.

The City's action is commendable since the growth of evidence regarding both the severity and imminence of global warming is alarming. It is reasonable to assume abrupt climate change will occur without dramatic actions on all levels of government. This is unnerving because the severity of global warming has repeatedly exceeded all predictions. It will have significant, almost unfathomable, impacts on economy and transportation. At a minimum, from what we know now, we can expect:

- Exaggerated weather events;
- Increased competition for infrastructure funding due to storm-related damage;
- Altered agriculture production; and
- Challenges to water supply.

The U.N. Intergovernmental Panel on Climate Change recently warned that wide ranging and significant impacts on human health, with significant loss of life, will likely occur if action is not taken globally. Climate stress on agriculture may mean 300 million more victims of malnutrition worldwide each year. Abnormal and extreme weather puts large populations at risk due to infectious diseases spreading north, more frequent and more severe heat waves and diseases associated with flooding (e.g., cryptosporidiosis). In Syracuse, we can consider the proximity of recent first-time occurrences of temperature-controlled diseases such as malaria, dengue fever and West Nile disease in northern states.

By signing the Agreement and meeting its reduction commitment, communities like Syracuse "rose and played a greater part" in the efforts to reduce carbon dioxide and emissions of greenhouse gases that compound its effects.

Scientists are now concerned we are now approaching "Tipping Point" where changes in the atmosphere start feeding on themselves and we undergo significant global warming no matter what actions we undertake. As a result, the UN Panel has warned that we need to reduce our carbon emissions 70% by the year 2030. This will likely lead to the requirement of even more dramatic steps by the City to further reduce greenhouse gas emissions. This effort will also require a number of measures related to transportation since vehicle emissions is one of the major contributors.

TRANSPORTATION STRATEGIES

The following is a scenario which identifies a number of measures that can be implemented to help "move carbon dioxide" levels back to the desired threshold on University Hill as well as in the entire City of Syracuse and the surrounding region. These could have a significant impact on transportation for University Hill and the rest of region, which are summarized below.

The scenario is a combination of sustainable transportation strategies. A sustainable transportation system meets the needs of today's society without compromising the ability of future generations to thrive. It limits waste and emissions, minimizes consumption of non-renewable resources, constrains consumption of renewable resources, reuses and recycles its components, and minimizes the use of land. It is affordable, operates efficiently, offers choice of transport mode and supports a vibrant economy.

The scenario does not accept that we cannot reduce greenhouse gases in politically and economically acceptable ways. Instead, it is founded on the premise that the limits of what is currently politically and economically acceptable are not fixed and immutable. Much like our climate, people's opinion and willingness to act can change.

The scenario also recognizes the transportation-related objectives and strategies outlined in the New York State Energy Plan (2002). These themes include improvements in transportation efficiency, innovation in transportation technology, activities that enhance the use of alternative fuels and measures for meeting federal and State air quality goals.

The scenario is based on the obvious starting point of reducing vehicle emissions. Vehicle emissions account for over a third of greenhouse gas pollution in the United States. Carbon dioxide is the most common greenhouse gas and a substantial portion of the contribution of carbon dioxide comes from transportation.

Thus, this scenario relies on the measures recommended in the Move People Scenario to reduce emissions by increasing the viability of walking, biking and transit as an alternative to the car. The scenario also incorporates a number of locally innovative measures such as the following:

Annual Carbon Cap - An annual carbon cap could be set for the University Hill/Downtown area. The cap would decrease annually until the City's committed level of 7 percent of 1990 levels of carbon dioxide emissions is met. This cap would be combined with an annual ratio of carbon per person. A person could spend it by buying gas and electricity, train and plane tickets. If you run out, you buy it from someone else who has used less than their quota. This approach would provide a powerful incentive for the public to demand low-carbon technology vehicles.

Lower Speed Limits - Travel speed of vehicles significantly impacts fuel efficiency, which in turn, affects the level of carbon dioxide emissions from vehicles. Faster driving causes extra air resistance on vehicles and speeds above 60 miles per hour can especially incur drag that induces higher levels of carbon dioxide emissions. There is increasingly greater consumption of fuel as speed increases (i.e., the relationship is not linear). Lower speed limits for cars would also encourage more use of transit. This measure would be more effective if adopted on a regional scale, rather than within University Hill.

The approach of lowering speed limits to reduce greenhouse gases has been adopted elsewhere in the United States. For example, in 2005, the Tennessee Department of Transportation reduced the speed limits for trucks and cars on interstates and controlled access highways in Hamilton County (which includes Chattanooga). The limit for trucks will drop from 70 mph to 55 mph while the limit for cars will drop to 65 mph. The speed limit drop affected approximately 57 miles of highway.

While measured results of the new limits are not available, the Chattanooga/Hamilton County Air Pollution Control Bureau estimates that reducing truck speeds from 70 mph to 55 mph could have the same impact as eliminating all industrial Nitrogen Oxide by 11% in Hamilton County on a daily basis. The Pollution Control Bureau also estimates that the

decrease in speed will add only approximately three minutes of travel time to a truck's trip through Hamilton County.

Mandatory Idling Stop - A mandatory, manual "idling stop" campaign could be considered in an effort to save fuel and reduce greenhouse gas emissions. The potential idling stop is the low-tech version of a hybrid stop-start system: manually turning off the engine when the vehicle is stopped for more than a very short time in traffic or at an intersection. The program would likely slow traffic flows in the city if implemented, possibly contributing to the appeal of transit as a travel alternative due to the effort required by drivers at each traffic signal stop.

The manual program would be mandatory since impatient drivers do not like to turn off their engines at traffic signal stops as they want a quick start when the lights change. With improved efficiency in starters and batteries, turning off the engine for a short time is feasible, but many drivers find it burdensome to deliberately turn off the engine by using the key.

The idea of drivers shutting off their vehicles to spare the air is not new. The state of Oregon, for example, advises drivers to turn off their engines after more than 10 seconds of idling on Clean Air Action Days.

In the future, the mandatory use of manual idling stop may be replaced by automatic idling stop (or stop-start) systems. Vehicles equipped with automatic idling stop devices are on the increase in the world market.

Parking Privilege Tax - Taxes can be a tool to change the behavior of individuals concerning global warming. Under this approach, a city- or county-wide parking permit program would be created and a parking privilege tax would be charged to the owner of vehicles with low fuel efficiency that wish to park on roadways as well as public lots. High fuel efficiency vehicles would be exempt from the tax. In addition, households with more than two vehicles would be charged an additional surcharge. While the tax would possibly reduce the number of vehicles traveling within the county, its primary benefit would be to encourage the purchase of high-efficiency vehicles.

Parking Cash-Out – This is an alternative to parking charges. It offers an employee a choice – keep your free parking space or give it up for cash. Experience has shown that many employees will choose the subsidy instead of the parking space. The institutions can benefit by using less of their borrowing ability to pay for parking structures and to free up valuable real estate for other institutional uses. Santa Monica, CA requires that employers offer parking cash-out to employees, resulting in a reduction of 500,000 miles of commuter travel per year and annual CO_2 reductions of 200 tons.

Guarantee A Ride Home – Many employees commute by car so they can have quick access to home in case of an emergency. Transit use can be encouraged as an alternative by guaranteeing employees a ride home when needed. The expense is relatively low since few employees need to take advantage of this benefit. Regular users of transit in Chicago, IL can take part in such a program that ensures a ride in a city vehicle during an emergency and provides them with a taxi voucher for missed transit rides.

Preferential Parking – Municipal parking policies could be amended to require new parking structures to reserve free parking and the closest parking spaces for drivers taking part in vanpools and carpools. Preferential parking can also be given to alternative fuel parking. This can be useful since the drive within a parking structure to upper floors can take more time than the amount of delay due to congestion during a typical commute.

Lane and Parking Cap - A cap on the number of travel lanes and parking spaces could be set for the University Hill/Downtown area. Similar to the Carbon Cap described above, the parking cap would decrease annually. Under this approach, the annual decline in available parking spaces, combined with other strategies described above, would encourage use of transit as an alternative mode.

Car Sharing – A major benefit of auto ownership is the convenience of having it when it is needed. Once owned, the car is readily available and often used for trips that could have been made by transit, walking or biking. As an alternative, a share car program, such as Zipcar, can be instituted on University Hill. The cars are available to members, on short notice, whenever they need them. Shared cars are often located at transit hubs to improve convenience. Zipcar estimates that each shared car results in the replacement of 4 to 8 privately owned vehicles.

Additional Strategies - There are some potential wider scale transportation strategies that should be acknowledged in planning for the future of the region. At a minimum these include recommendations for freezing and reducing airport capacity due to the severe impacts of air travel. In addition, pressure may emerge to close large-scale retailers and replace them with a warehouse and delivery system. A warehouse containing the same amount of goods as a large scale retailer use 5 percent of the energy and delivery vehicles use 70 percent less fuel than shoppers' cars collectively. In addition, the scenario envisions the possibility of offsets, or subsidizing businesses that mitigate carbon dioxide emissions that cannot be reduced by individuals or businesses.

There are many other actions that can be taken which are not directly related to transportation. The most common of these is the mandatory use of green building design and materials and net zero-energy buildings.

CHALLENGES

If action isn't taken, we might need a more dramatic series of steps such as fossil-fuel-free communities/neighborhoods. When considering the Move Carbon scenario, it is important to consider the common arguments or assumptions that will challenge the implementation of any of the strategies. These include some of the following.

- Technology will save us.
- A two degree Celsius (3.6 degree F) increase is a small change.
- What I do makes little difference.
- You will never get people out of their cars.
- Cars aren't the main problem
- The problem can be solved with higher fuel efficiency standards.

These assumptions ask us to accept that we have no need to act or no choice but to passively accept the possible future. The strategies set forth in this scenario diverge substantially from these premises by trying to minimize impacts of global warming with action today.

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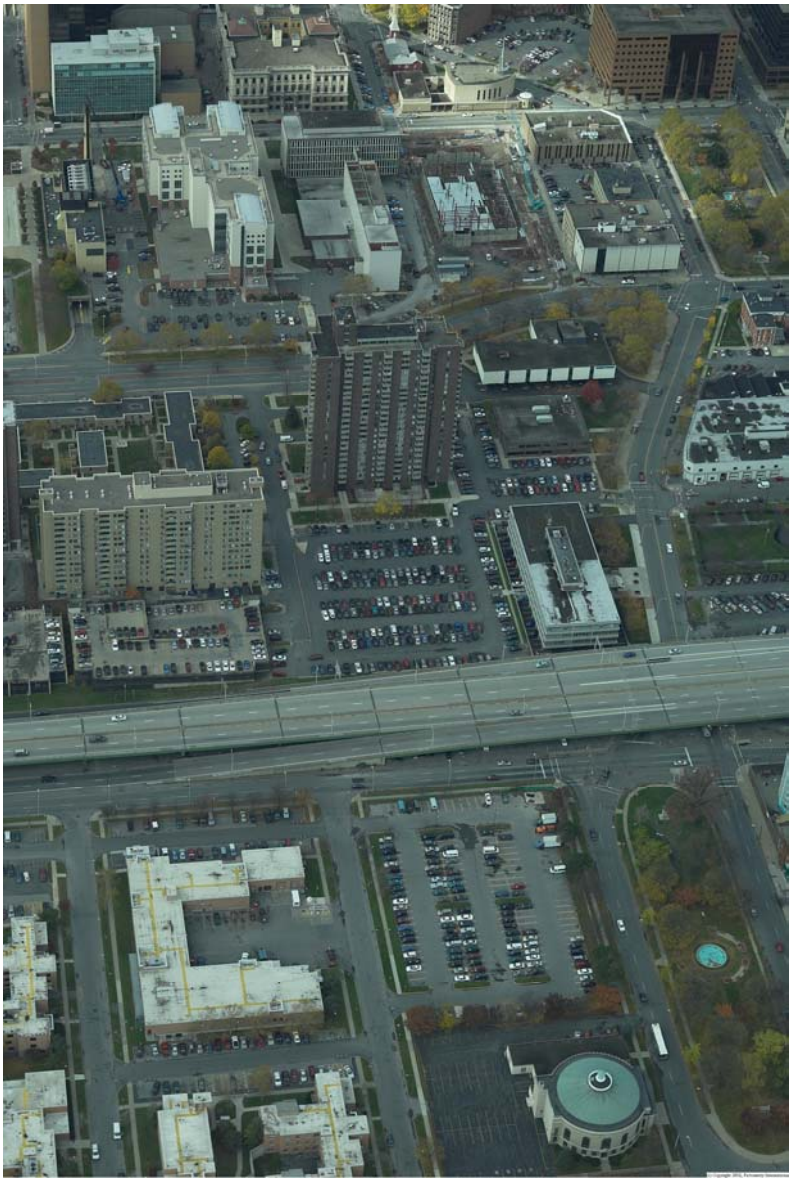
SECTION FIVE - SUGGESTED BUNDLES OF EMERGING CONCEPTS



RECOMMENDATIONS FOR FURTHER STUDY

The following is a summary of six alternatives recommended for further study using the refined SMTC Travel Demand Model for the study area. A brief reason for the recommendation is also provided. It is important to remember the preferred alternative will not be selected solely on the results of modeling, but a broad range of performance measures will be relied upon. The recommended performance measures are listed in the Needs Assessment (Technical Memorandum No. 2).

MOVE CARS

1. **Widen Existing Ramps** – This could relieve congestion on existing ramps without raising concerns about FHWA interchange spacing requirements.

2. **New I-81 Interchange** – This could relieve congestion while providing a close-by, second point of access for the densest portion of University Hill. New interchanges on other nearby interstates would likely not serve as many cars.

MOVE PEOPLE

3. **Viaduct/Almond Street Corridor Treatment with Almond Street Narrowing** – This could be the lower cost option to improve pedestrian and cycling access between Downtown and the Hill. It could be an integral part of the Connective Corridor.

4. **Two-Way Streets and Bus Prioritization** – The concept includes the Transit Hub, Adams Street Square and University Avenue Promenade alternatives as well. It enhances circulation within University Hill and Downtown by giving drivers, emergency vehicles and transit more choice among routes.

5. **Almond Street Roundabouts and Bus Prioritization** – This could improve traffic flow and overall safety as well as enhance access to and from the Interstate. It also gives a full choice of modes for travel between Downtown and University Hill. Alternatively, the busway could be upgraded to a streetcar.

6. **Large Scale Almond Street Boulevard** – This might include roundabouts at Adams, Harrison and East Genesee Streets. The boulevard would remove a perceived barrier and visual eyesore. It might improve overall travel within the region by providing more travel route choices and removing vehicles from Downtown and University Hill.

ADDITIONAL ITEMS

Regardless of the bundles of potential alternatives listed above, the following alternatives are recommended for implementation.

- Mixed Land Uses/Shared Parking and Transportation Management Authority;
- Bike Boulevard Network;
- Gateways (including relocation of Connective Corridor);
- Car Sharing Program;
- Parking Price, Parking Cash-out and Guarantee A Ride Home Programs; and
- Grid Connections

Many of these alternatives cannot be modeled. However, each alternative's benefits, in terms of meeting the four basic needs of University Hill and study goals, are the basis for the recommendation. Collectively, these alternatives can help to reduce total vehicle miles traveled within the study area (and the region) while increasing the use of other modes. This aim is not just about reducing global warming emissions, but it is about improving air quality overall as well as public health. The benefits of the individual alternatives are discussed throughout this report.