

Complete Streets



After an era during which transportation investments often overpowered urban areas, there is movement to rebalance community and mobility needs. Complete Streets is a part of that rebalancing. For the Strip District, Complete Streets is important when the street network is taken as a whole.



National Complete Street Coalition
Logo illustrates mode choice

Features of Complete Streets

The concept of Complete Streets strongly emerged over the last decade, and the National Complete Streets Coalition was created to advance the concept. The Coalition defines Complete Streets' benefits as those that *“are designed and operated to **enable safe access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.**”*

Benefits of Complete Streets

The features of Complete Streets results in multiple benefits for the Strip District:

- **Multi-modal choices** are offered to give businesses, visitors, residents and visitors. Allowing for mobility on a future, coordinated street network actually helps support the current network and accommodate more travel options.
- The solutions are **context sensitive**, which is extremely important because of its historical qualities. This means the very tightly formed District has more flexibility as it continues to transform over time.
- Complete Streets can **yield and support livable communities**. Certainly the energy and vitality of the Strip are renowned – and it is a livable place. A balanced set of streets means even more active street life and walkability.

On-balance, Complete Streets in the Strip District will meet specific needs that safety, independence, connectivity, and healthy interaction. To implement them, there will need to be changes in City design standards and supporting codes.

The Five Cs for Complete Streets

Complete Streets can be a major feature of sustaining the Strip as a livable place. This philosophy is supported by the “Five Cs” to meet mobility needs while strengthening the community and economic attributes of the Strip.



Downtown Orlando Transportation Plan incorporates Complete Street principles

- **Community** – No plan or project can truly be successful without engaging the full range of Strip District stakeholders. Complete Streets are about returning streets to all the Strip’s users and improving the community’s quality of life.
- **Choices** – The Strip is well-aware of the benefits that bicycling, walking and transit riding bring to the Strip’s future health. Properly accommodating them is the challenge, based on the current over-reliance on the automobile.
- **Capacity** – A goal for Complete Streets is to increase the overall person capacity of the Strip when considered as a corridor. A toolbox of analysis techniques and operations strategies is used to manage roadway capacity while balancing mobility needs across modes.
- **Calming** – Planning in the Strip means working with stakeholders to develop appropriate solutions that consider the needs of all potential users, encourage appropriate driving behaviors and speeds, and provide welcoming environments for non-motorized users.
- **Connections** – The Strip’s strategic location emphasizes the need to provide connections to downtown, sites internal to the District, with adjacent neighborhoods, and all transportation modes. Complete Streets can facilitate all of these key connections.



Mid-block pedestrian crossing with overhead signals at a transit station

This approach and philosophy means the plan for the Strip District will offer a “Complete Street Network” that allows the streets to act in concert to achieve the ultimate goals. Not every street will be designed the same – it is the composite network solution.

Success Breeds Success

The good news for Pittsburgh is that “you are not alone” – successful examples abound across the nation. Several are identified and highlighted in the supporting project images. Getting from place to place ought to be convenient and efficient no matter the travel mode - the trip should be safe, comfortable, and welcoming. Streets are not only the means to move people and goods from point A to point B in the Strip. They will be a focus of activity, where people get to know their neighbors, and where the most diverse set of connections can take place. Specific experience from other communities gives the City confidence that the vitality and energy of the Strip will be sustained and enhanced.

The goal in developing a properly functioning transportation network within the Strip District is to provide safe and efficient usage through proper planning and design. When those measures are not effective enough to achieve the desired result, enforcement programs can be introduced to complement the system of improvements.

Features of Enforcement Programs

Contrary to public opinion, the goal of enforcement programs is not revenue generation. A well developed enforcement program should always **educate** users on the intended purpose of the program before providing a disincentive to **deter** future infractions.

Advanced technology helped spur enforcement programs and applications. Programs within the Strip District will need to be balanced within the context of the network such that human interaction is not wholly displaced by computerized methods. The following list offers a few features of both types of enforcement programs:



Modern multi-space parking meter.

- **Off-board electronic fare collection** is accomplished when transit riders pay their fare curbside prior to entering the vehicle. This technique not only **speeds transit service** by allowing riders to exit all doors, but also allows for payment to be made by all riders in peak conditions when movement to the front of the vehicle is time prohibitive. Collection units can **accept a variety of payment forms** that simplify usage.
- **Advanced meter technology** can compliment an overall parking management plan by **improving the flexibility** of pricing and payment. Single space coin operated systems can be replaced with electronic units that can **reduce operation and maintenance costs while improving enforcement**. Motorists can chose to pay through use of smart phones, thus accelerating the time until the next vehicle can utilize the space. Meters can also be adjusted variably along with demand so that peak periods increase in price until it becomes an incentive to use satellite lots in areas of less pedestrian density.
- **Crossing Guards and Traffic Officers** use human interaction to **improve the flow of all modes** through an intersection. They can be implemented at intersections during peak hours such as weekends. Guards help movement in the non-dominant or stop controlled direction when it is difficult to find a gap in traffic.
- **Bicycle Patrol** officers are a more visible and interactive form of law enforcement and can be better suited to **enforce bicycle as well as traffic law**.
- **Red-light cameras** serve as a deterrent against traffic violations at a signalized intersection. Areas where cameras have already been installed have shown a **decrease in deadly “T-bone” type crashes**. Increasing the “yellow” phase of a traffic signal in combination with the installation of red light



Red-light camera with Enforcement Area warning sign.

Enforcement Programs



Traffic officer controlling movement through a busy intersection.

cameras **reduces the likelihood of rear-end crashes**, as well. Providing well placed signage warning drivers that cameras are in use at the beginning of a corridor influences them to pay more attention to all traffic laws.

Benefits of Enforcement Programs

Enforcement programs of various forms have many overall benefits.

- Safety Improvements – closer adherence to laws increases the safety of all users
- Cost Effectiveness – reducing operating costs while improving collection accuracy and efficiency positively alters the bottom line
- Economic Growth – improving the safety and efficiency of the transportation system in an area spurs increased usage and can positively influence behavior patterns

A system of enforcement programs has the advantage of being flexible. The process can be easily adjusted based on results and feedback from the community. Using local knowledge and lessons learned from cities around the country, enforcement programs can be applied to enhance the overall Strip District transportation network.

Parking Strategies



The overall goal of increased multi-modal transportation within the Strip District is highly dependent on the parking management system implemented. Parking strategies can be applied to both on-street parking and satellite parking. Satellite parking areas reduce congestion on local streets, open roadway width to bike/pedestrian movement, and influence the type of stay for each user. While private entities can take on satellite parking operations, this best practice is intended for publicly controlled parking.

Features of Parking Strategies

On-street parking provides easy access to business or residential areas, typically with a quick turnover of vehicles. Traditionally, on-street parking is angle-in or parallel.

- On-street spaces can be managed by implementing restrictions during certain hours, providing priority parking for the disabled or residents, and loading/unloading zones.
- Back-in, angled parking can be implemented where safety concerns with other modes, backing-out crash patterns, or steep terrain exist. The stall is typically angled at 45° with a 30-ft buffer to adjacent stop bars or crosswalks.

Location of **satellite parking** areas within the Strip is critical. The goal of any location should be to catch vehicles before entering the congested parts of the Strip.

- Locate parking areas on major collector streets close to arterials and Interstates, since people are less likely to travel out of their way specifically for parking. The nature of the highway system in the area funnels the majority of out of town users into the Strip from the west. Giving drivers an option before crossing 11th Street is imperative in keeping congestion related to parking off Strip District streets.
- Utilize existing parking facilities, such as the Grant Street transportation hub, to reprioritizing existing infrastructure.
- Transit access is a key to the success of satellite parking areas. Users need quick, reliable, and inexpensive transportation from their cars to destinations to make satellite parking attractive.

Pricing can heavily influence the choice of parking within an area. Traditionally, inexpensive and accessible on-street parking is favored by motorists and businesses, especially in high retail areas. Creative pricing options can satisfy stakeholders while attaining the goal of increased multi-modal transportation and satellite parking usage.

- Surface parking lot prices within the Strip District should be increased to be more expensive than satellite options. Setting a pricing point that alters user behavior without harming business would likely be an iterative process with stakeholders.
- Variable pricing is gaining popularity in major metropolitan areas like San Francisco and could be the key to balancing stakeholder requests. Through the use of modern electronic



Multi-modal, urban corridor in Pottstown, PA with back-in, angled parking.



Grant Street Transportation Center unites parking and transit.

Parking Strategies



parking meters, the cost of a spot can increase or decrease with demand. Prices for street spaces should therefore increase until this utilization is met. Drivers then have the option of using street spaces at normal cost in non-peak times while being given an incentive to use satellite parking areas and transit during heavy congestion.

Zoning policies should be adjusted for future development within the Strip District with parking as driving factor toward the direction of increased multi-modal usage. Privately developed parking options would directly compete with public satellite locations and may undermine the goals of the program in the Strip District.



On-street parking removed for a bicycle lane.

- The introduction of parking maximums in place of parking minimums should be investigated to push developers away from the vast expanses of surface lots that serve as the predominant forms of parking currently available in the Strip.
- Preference should also be given for mixed-use parking structures in order to maintain continuity of the Strip District environment at street level.

Benefits of Parking Strategies

- **Decreased congestion.** Studies by UCLA professor Donald Shoup have shown that drivers circling an area looking for street parking, also known as “cruising”, can account for up to 20% of the vehicles on the road and add half a mile to each user’s trip.
- **Increased ped/bike safety.** The use of back-in parking reduces conflicts between the movement of vehicles, bicyclists, and. By backing in first, drivers are positioned to have eye-to-eye contact with others.
- **Improved ped/bike access.** Removing on-street parking in favor of satellite lots opens up right-of-way for mixed-use paths and bike lanes.
- **Increased transit use.** Satellite parking located on transit lines improves the chances of users using the system rather than driving directly to their destination.
- **Improved communication.** Technology can provide users with real-time pricing and availability.
- **Improved loading/unloading.** Back-in, angled parking allows drivers to load/unload their vehicles from the safety of the sidewalk, not the travel lane.

Models of Parking Strategies

In any future parking management programs, Intelligent Parking Systems should be employed to inform drivers of pricing and vacancy.

- A program such as PARKPGH in the Cultural District uses a website to confirm which locations have vacancy.
- The SFPARK program in San Francisco uses a smart phone application to warn drivers of price and availability. A similar program could also be used for payment.



Smart phone application provides real-time parking availability and pricing.



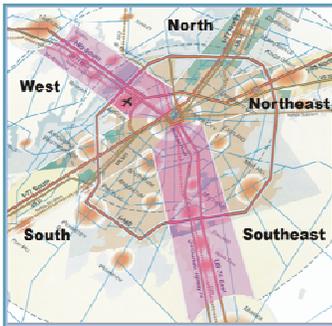
Sustainable Urban Design Standards



The American Public Transportation Association (APTA) represents the transit industry across a wide spectrum of standards, guidelines and best practices. Of special interest and significance to APTA is a recent initiative to develop and recommend a series of sustainable urban design standards (SUDS) best practices. These best practices are geared to assist transit agencies participate in the larger land use and community development planning process. They are available at no charge.

Features of Sustainable Urban Design Standards

The intent of SUDS is to provide a broad spectrum of planning and urban design strategies that have direct applicability to transit-related land use and sustainability issues. In many cases, both the transit and planning agencies are not well-versed in the others realms. Consequently, a series of best practices, couched as urban design standards, sets forth such topics as:



- Defining transit's areas of influence
- Forming transit-oriented development partnerships
- Illustrating why design matters, and
- Promoting quality of life
- Developing climate action plans

These are complementary topics that need to be part of joint planning between planning and transit agencies.

Benefits of Sustainable Urban Design Standards

There are multiple benefits of incorporating SUDS into planning and implementation:



- A common language is shared to foster enhanced communication – the learning curve is shortened
- Standards are shared rather than created separately and possibly being at odds with one another
- Transit is more clearly seen as part of the mobility system and community development process
- Transit can benefit the larger community sustainability discussion and help inform long-term decision making
- Implementation is a natural result of collaboration

Current Sustainable Urban Design Standards

There are a number of SUDS documents approved for distribution, and they are available to the City. Many of the following will be employed during the design charrette and after. They are available at <http://www.aptastandards.com> .

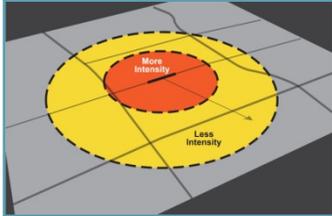
- **Defining Transit Areas of Influence** - This document describes the spatial areas in which transit stops and stations typically have the greatest impact on land use and the ability to



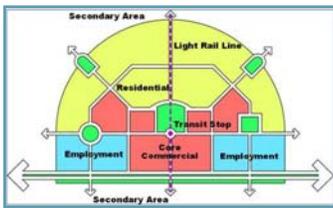
Sustainable Urban Design Standards



generate transit ridership. It guides the delineation of these areas as a means of influencing decisions about private and public investments.



- **Forming Partnerships to Promote TOD and Joint Development** - New projects will emerge in the Strip that require creative development partnerships. Increasingly, businesses and public entities are partnering to implement TOD and joint development. This BP can help Strip developers accelerate the learning curve on helping achieve successful TODs.



- **Why Design Matters for Transit** - Design guidelines establish a vision and sense of purpose to guide project development. They clarify the core functions so the design decisions will support rather than contradict them. Common goals of design guidelines include providing convenience and safety, offering multi-modal balance, generating economic investment, fostering sustainability, and allowing the Strip to retain its unique identity.

- **Transit Sustainability Guidelines** - This document introduces guidelines for designing and operating sustainable transit that reduces a community's environmental footprint from transportation and enhances its quality of life by making travel options more diverse, enjoyable, affordable and timely. The guidelines cover:



- Arts in Transit
- Transit Access Guidelines for Off-Street Transit Facilities
- Parking Management and TOD
- Connectivity & Street Network Guidance

- As a more robust transit network will be developed, this set of guidelines is helpful in considering new modes, new networks and the implications these mean to the long-term livability and vitality of the Strip.

- **Guidelines for Climate Action Planning** - This Best Practice lays out a framework for approaching such planning, and discusses transit's benefits. It can be of help if the City adopts a climate action plan.



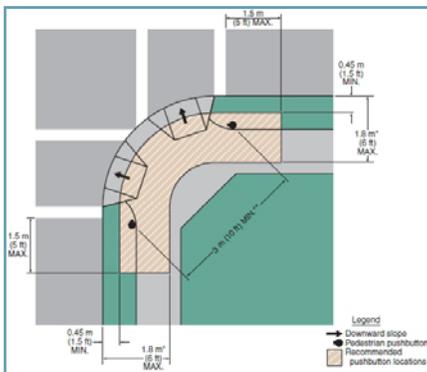
Universal Design at Intersections



Signal Pole is Out of Reach of Intended User



Obstructed Pedestrian Access Route (Notice Clock)



Typical Intersection with Curb Ramps and Signal Pole Locations

Universal design is a broad concept that considers how infrastructure, products, and services can be used by the broadest population possible from the onset, rather than providing add-on elements for specialized populations. The pedestrian facilities at intersections must be designed to safely accommodate pedestrians of all physical and mental abilities. This means intersections must be designed and constructed in accordance with the Americans with Disabilities Act (ADA) guidelines. Particularly in urban areas like the Strip District this can prove to be a challenge for design professionals.

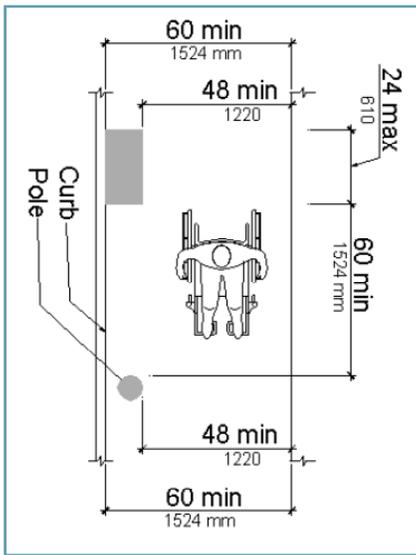
Features of Universal Design at Intersections

For pedestrians with disabilities, intersections can prove to be a challenge. Some of those challenges to better accommodate pedestrians with disabilities include the following:

- The assumption of pedestrian walking speeds of 4 feet per second (fps) is often inadequate. Where pedestrians who travel slower than 3.5 fps routinely use the crosswalk, a slower walking speed should be used in determining the clearance interval.
- Pedestrian signal poles need to be located in an accessible location preferably out of the access route but still reachable from a wheelchair. Pedestrian signal poles should be clearly defined for all users.
- In urban areas where local commerce sprawls onto the sidewalks, adequate width or space needs to be provided.
- Existing roadway features, such as drainage inlets and manholes, can limit design and be a trip hazard.
- At intersections, turning vehicles and the speed at which they travel pose the greatest threat to pedestrians, since often the motorist's attention is focused on other motorists. Intersections should be designed to reduce the speeds at which vehicle/pedestrian conflict occur. Conflicts points should be clearly defined for all users.
- Curb ramps should be designed in accordance with ADA guidelines to accommodate all pedestrian traffic.
- Curb ramps are required at all crossings to provide access for pedestrians who use wheelchairs or who cannot step off a curb. Ideally, a separate curb ramp should be provided for each crosswalk. The ramp should have no more than 8.33% running slope and no more than 2% cross slope. A level landing/turning space is required at the top of a perpendicular ramp. Truncated dome detectable warnings are required at the transition to the street where there is no curb, to alert pedestrians who are visually impaired to the edge of the street. Where possible, the curb ramp should be aligned with the direction of travel on the crosswalk so individuals with disabilities are properly aligned to cross and don't have to turn after entering the street.



Universal Design at Intersections



Plan View of a Typical Wall and Street Fixtures

- Designers are encouraged to provide additional width where possible, especially in high use areas such as in downtown urban areas. Pedestrian access routes should be no less than 72 inches wide in high use areas.
- Placement of street fixtures, such as furniture, benches, poles, and displays should be outside the travel area of the sidewalk to the maximum extent feasible.

The plan view of a wall and street fixtures in relationship to the public sidewalk, shown to the left, illustrates that the width of the pedestrian access route may be reduced to 48 inches and minimum spacing of 60 inches between objects intruding into the full 60-inch pedestrian access route.

Benefits of Universal Design at Intersections

Pedestrian accessibility enhancements benefit all pedestrians, not only people with disabilities. Some of these benefits include the following:

- Curb ramp improvements assist people pushing carts or strollers.
- Placing the WALK push buttons in a place that is accessible for all intersection users encourages intended use and promotes safety.
- Sidewalks and intersections clear of obstructions and with the proper width cut down on crowding allowing smooth flow of pedestrian traffic.
- Use of universal design features at intersections in the Strip District will improve the overall street quality and street commerce by making the transition at intersections safer and less congested for all users.



A camera monitors speed and compliance near an intersection.

Urban areas across America are beginning to benefit from technological innovations and Intelligent Transportation Systems (ITS) for their roadway, parking and transit systems. For the Strip District, ITS solutions can be an integral part of a broader land use plan and provide a more positive experience for its transportation users.

Features of ITS

ITS can be applied across all types of roadways from arterials to interstates. It can also be applied to various modes and transportation infrastructure.

Arterial Management – The following innovative investments could be used to reduce travel delay, driver frustration and improve safety on the Strip District’s arterial corridors:

- **Adaptive Control Strategies (ACS)** work across a network of signalized intersections to optimize signal timings based on real-time conditions of the network. This also includes priority preemption of signals for emergency responder vehicles.
- **Advanced Traveler Information Systems (ATIS)** provide information about arterial speeds, travel times and incidents via media, Internet or personal devices.
- **Automated Enforcement** encourages compliance and increases safety by photographing license plates of violaters, particularly for speeding and running red lights. Though controversial, such programs are being found to be very effective in reducing traffic violations and crashes. Currently in Pennsylvania, Philadelphia is the only jurisdiction permitted to use cameras for red light running, and only with limitations.

Arterial management works best when integrated across jurisdictions and in conjunction with transit and emergency operations. However, legal and operational hurdles still exist in getting the various agencies to introduce and integrate systems.

Transit Management – By expanding certain transit features to the Strip District that are already in place in other limited locations of the Port Authority system, travel times can be reduced and ridership enhanced:

- **Off-Board Fare Collection** – By implementing “barrier controlled” bus stations at critical locations (via gate, turnstile or checkpoint), fares can be collected at the stations instead of on the buses. Automatic fare deductions can also be used.
- **Advanced Public Transportation Systems** – Real time locations of approaching busses can be made available to the public either at the stations, or via media or mobile devices.



A variable message sign provides transit riders a timetable of arriving busses at the station platform.



An APMS sign that provides parking patrons the number of available spaces by floor.

Parking Management – Modern parking management systems provide information to minimize wasted time searching for a parking space. This can be accomplished by providing real time data about lot / garage location and available number of spaces.

- **Advanced Parking Management Systems (APMS)** can also balance and coordinate uneven supply and demand for public and private parking. The City of Pittsburgh has a mobile application related to APMS that could be expanded.
- **Real-Time Variable Message Systems** in garages and lots can direct patrons to by floor, aisle or even individual spaces. The systems are sensor or count-based and typically convey information electronically.
- On-street parking applications, such as **consolidated pay stations**, can eliminate the need for exact change for meters. By being able to pay for longer periods, gone are the days where users must return to “feed the meter.”
- **Parking Reservation Systems** are similar to restaurant reservations – they allow patrons to reserve their space in advance to avoid inconvenience and delay later.



ITS Solutions can help solve mobility and safety issues in the heart of the Strip District.

Benefits of ITS

These technological advances in arterial, transit and parking management provide common benefits and can work well in the Strip District’s urban setting. Benefits include:

- **Operational Performance Improvements** – Transit and arterial networks will perform more efficiently.
- **Ease in Mobility & User Time Savings** – Getting around will be easier, and alternative modes of transportation will benefit as well.
- **Safety Improvements** – More efficiency and better enforcement will result in a safer network for motorists and pedestrians alike.
- **Environmental Benefits** – Less congestion results in better air quality.
- **Economic and Employment Growth** – Ease in transportation results in a sense of vibrancy that helps existing business and attracts new business.

ITS: An Integral Part of the Strip District Land Use Plan

By effectively implementing ITS solutions alongside other Strip District improvements, the main features of the area will be enhanced. ITS and related technological innovations are not an ends in themselves; their role is to improve the overall experience for residents and visitors alike.



An example of a separated bike lane on an urban arterial.



Before and after example of a "Road Diet" in Weirton, WV.

Community Benefits

A well-connected community benefits both directly and indirectly from its transportation ease.

- **Reduced travel time and driver frustration** – By creating a network with many route options, traffic is spread more evenly, reducing delay. Furthermore, a network that allows for multiple modes reduces the number of cars on streets in the Strip.
- **Improved safety** – A consistent network helps to increase the comfort level of all modes of transportation. Vehicular safety is improved by reduced congestion and bicyclists are safer with dedicated bikeways and travel routes.
- **Better response time for emergency vehicles** – Police, fire and ambulance response times are improved with a well-connected network.
- **Environmental and Health Benefits** – Less congestion results in better air quality, and the public's overall health may improve as more people use bicycles or walk to their destinations.
- **Economic Opportunities**– With better regional access and increased activity, the Strip becomes more attractive for economic investment. There is a snowball effect – the more vibrant the area, the more businesses will want to locate there.

Models of Connected Networks

Examples of connected networks that might serve as models for the Strip District include:

- **Monongahela Incline/T Station** – Located at the Carson Street with Smithfield Street intersection, the "Mon" Incline provides a connection between Mount Washington and the South Side of Pittsburgh. Network connectivity to other modes is available, including the "T", bus stop, sidewalks, and Carson Street.
- **Portland, Oregon** – The connected network offers multiple mode options including park-n-rides, bike lanes, and a funicular in addition to the traditional roadway network.

These are examples of creative ideas that have worked in Pittsburgh and other cities, and have potential for the Strip District.



The famous cable cars in San Francisco are a visitor favorite for getting around town.