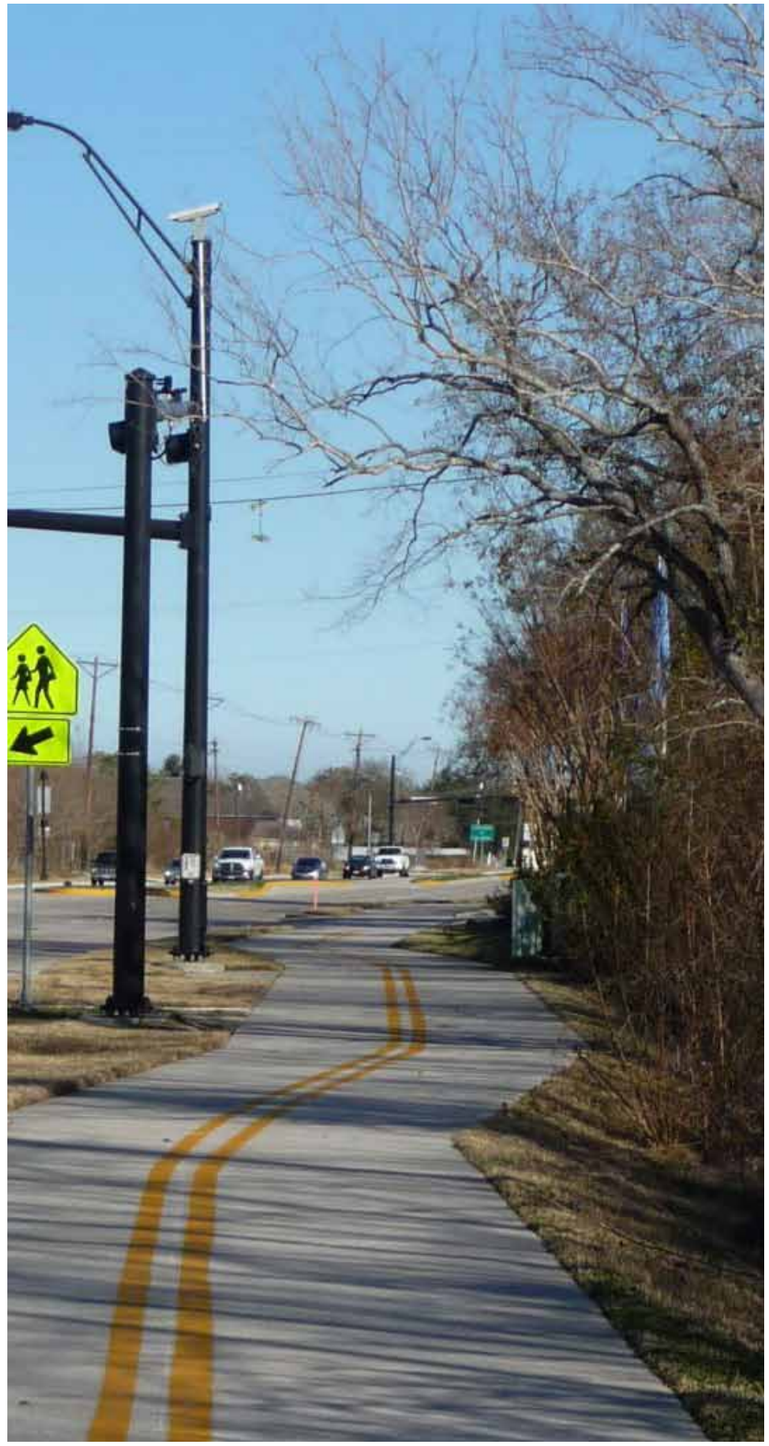


6 - Mobility

The mobility network plays an essential role in virtually all aspects of League City. It is most obviously the means by which people and product flow within and through the community. It also heavily influences the character of an area, economic potential, and the community's marketability. For those reasons, mobility is not simply a focus on the ability to move people and goods, it is also the experience that residents, employees, guests and potential investors have while moving within the community, including convenience, safety, time, cost and entertainment along the way.

The mobility network is focused on roadways with limited alternatives. However, as League City grows it has the potential to offer a variety of ways to move around, including walking, biking, transit, golf cart and other neighborhood electronic vehicles (NEVs), even travel by water. This is not to say that people will give up automobile travel. Simply put, League City is a community of "drivers" and, in the future, it will continue to rely on the automobile for large majority of movement with three distinct differences:

- The destination-based development approach along with substantially increased employment opportunities promoted in the Land Use chapter are expected to result in fewer reasons to leave town and more reasons to work, shop and play in League City.
- Residents, employees and guests that decide to stay local should have options for travel, depending upon their preference. They may choose to ride a bike to dinner or drive the golf cart to the store – or not.
- As a result of the city's effort to create interesting places, more people will be interested in traveling to League City and some of those anticipating driving through on the way to another destination, will want to stop and visit.

The Mobility chapter examines the movement of goods and people in the context of both existing circumstances and the vision for the future. In doing so, it recognizes that the system currently struggles in certain locations and at certain times (particularly peak hours for commuting to and from work) while also recognizing that the population and employment of League City are expected to more than double upon full "build-out". In light of this, the mobility network must evolve into a system that effectively provides a relatively positive experience. Two documents, the Master Mobility Plan that is currently near completion and the recently approved Master Trails Plan provide a number of recommendations for improvement. The Master Mobility Plan is summarized in this chapter while the Master Trails Plan is discussed in the Parks and Open Space chapter. The Mobility chapter utilizes the results of these documents, including the resulting Thoroughfare Plan, and bolsters them with discussion of roadway design, particularly relative to community character. It also provides goals and policies intended to guide decisions made daily about the transportation system.

Master Mobility Plan 2011

The Master Mobility Plan is a multi-modal plan that takes a comprehensive look at all transportation options and modes available to the city. The plan assesses current conditions and makes short and long term recommendations related to roadway improvements, pedestrian and bicycle facilities and transit. The Plan serves as a step-by-step implementation tool for improving traffic flow, connectivity and mode choice in the community.

Existing Conditions and Issues

Roadway Network

- Major roadways in the community include I-45/Gulf Freeway, FM 518/ Main Street, FM 646, SH96/League City Parkway, FM 2094/Marina Way Drive, and Bay Area Boulevard.
- The roadway network is primarily hierarchical meaning that traffic flows onto a relatively small number of arterial streets that are designed to carry high traffic volumes at high speed.
- A general lack of connectivity results in few options for continuous travel other than on the arterials, mobility is vulnerable to disruptions on major streets.
- Future opportunities for connectivity are limited as a result of existing subdivision design.
- Traffic is concentrated onto a few main arteries. FM 518, is considered the primary artery of League City. It connects neighborhoods with the Gulf Freeway and significant retail/commercial development along the corridor. FM 518 currently exhibits:
  - A high density of signalized intersections, some of which operate at Level of Service (LOS) "E" or "F" during peak travel times.
  - Entire roadway sections that operate over capacity.
  - An unacceptably high crash rate
- The roadway network in the Historic District and Shellside area are the only areas in the community configured in the connected grid format that has proven to be more supportive of pedestrian and bicycle activity and more efficient with higher development densities than the areas served by the hierarchical network.
- League City has adopted Level of Service "D" as the minimum standard for acceptable roadway performance.
- The community's desired level of service results in classification of roadways with an existing LOS of "E" or "F" as deficient. Likewise, signalized intersections operating at worse than LOS D are also deficient. Figure 6-1 shows the locations of these deficient roadway segments and signalized intersections.
- Intersection analysis shows the intersections of FM 518 and Hobbs Road, FM 518 and the I-45 frontage road north, and FM 646 and the I-45 southbound ramps regularly operate at a level of service "F".

Accidents

- The number of crashes on League City roadways has been trending upward, with a 32% increase between 2003 and 2008. FM 518 and FM 646 produce the highest number of serious accidents, combining for nearly half of all serious accidents on League City roadways.
- The crash rate along the entire FM 518 corridor (including portions in Pearland, Friendswood, League City, and Kemah) is approximately one-third higher than the statewide average for similar roads. However, the crash rate along FM 518 between I-45 and the "Five Corners" intersection in League City is more than double the statewide average and nearly two-thirds higher than the FM 518 corridor average.

Pedestrian/Bicycle Network

- League City's existing pedestrian network is largely incomplete and discontinuous. Many of the subdivisions in the community have sidewalks, but even there they are not always complete. Outside of neighborhoods, presence of sidewalks is sporadic, including on public property. The resulting "gaps" significantly affect the overall effectiveness of League City's pedestrian network.
- League City currently does not have any on-street bicycle lanes.
- The City of League City does offer a few shared use paths, including a major pathway located along the FM 518 corridor from the CCISD campus south to SH 146.

Transit

- There is existing park & ride commuter bus service available to League City residents, although not within League City's boundaries. METRO's Bay Area Park & Ride is located at the corner of Bay Area Boulevard and Feathercraft Lane, approximately 4.5 miles north of the heart of League City. In addition to this lot, commuter buses serving the Bay Area Park & Ride also stop at a park & pool lot at the corner of Bay Area Boulevard and IH 45, before proceeding northbound via the IH 45 High-Occupancy Vehicle (HOV) lane.
- Plans are underway for southbound park & ride service from League City, located at University of Texas Medical Branch (UTMB) Victory Lakes medical campus. This park & ride facility is currently under development and completion is estimated in mid- to late 2011. For the first time, the facility will provide League City residents with regional transit service that travels southbound to Galveston.
- There is currently no local, fixed route transit service available in League City. However, there is existing service in many of the surrounding communities and additional routes in the planning stages. Dickinson, Texas City, La Marque, Seabrook, Kemah, and the Clear Lake/NASA Parkway areas are some of the places where fixed route transit is or will be operating.
- Demand response transit is currently available to League City residents through Connect Transit. Demand-response service, also known as paratransit or dial-a-ride, is a transit service in which the rider calls the transit provider to request a ride from a specific origin to a specific destination.

Roadway Design Standards

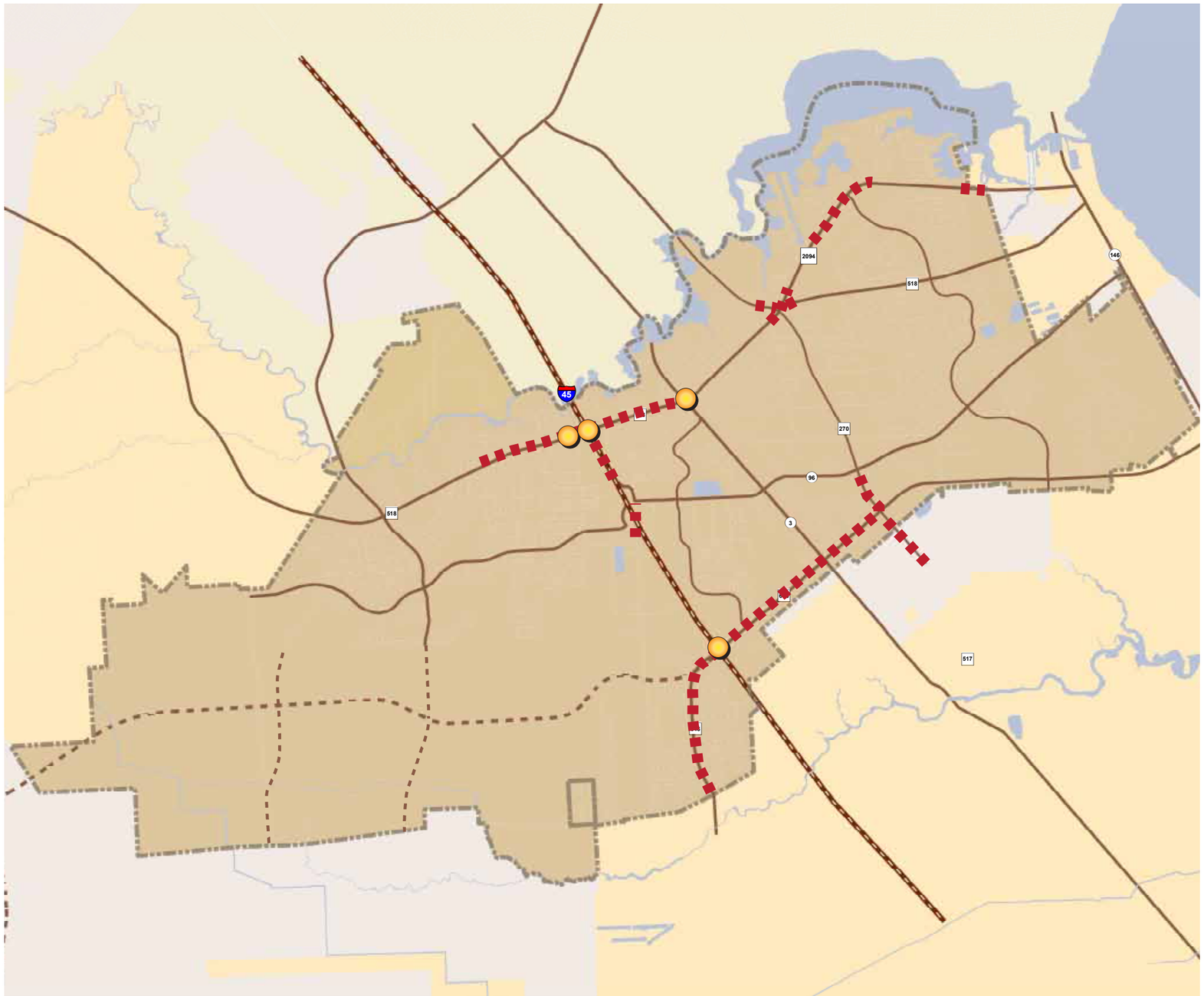
- The criteria represent vehicle-oriented thoroughfare configurations only. For example, in all sections, sidewalk widths are suggested to be four feet rather than the recommended five feet specified by ITE for a vehicle-oriented thoroughfare and well under the nine to twelve feet specified for a walkable thoroughfare.
- The criteria do not provide guidance to reflect the relationship between the roadway and the adjacent community character or development context, nor do they offer consideration for multi-modal improvements.
- The criteria do not provide guidance for decision-making where an element of the thoroughfare has a range of widths. In fact, right-of-way width may be the sole determinant of space allocation.

Level Of Service

Roadway performance is often measured using the Level of Service (LOS) grading system which qualitatively characterizes traffic conditions associated with varying levels of traffic. LOS ranges from LOS A, representing free-flow traffic conditions with little or no delay experienced by motorists, to LOS F, describing congested conditions where traffic flows exceed design capacity, resulting in long queues and delays. LOS A, B, and C are generally considered to be satisfactory service levels, while the influence of congestion becomes more noticeable at LOS D. LOS E is undesirable and is considered by most agencies to be the limit of acceptable delay, and LOS F conditions are considered to be unacceptable to most drivers.

League City has adopted Level of Service "D" as the minimum standard for acceptable roadway performance. This results in classification of roadways with an existing LOS of "E" or "F" as deficient.

Figure 6-1, Deficient Roadways and Intersections



Introduction to Mobility Character

Historically, roadways have been typically designed according to their functional classification which groups roadways according to the service they are intended to provide as part of the overall network. The functional classification system typically divides roadways into Arterial, Collector and Local roads. These functional classifications describe roadways based upon the degree to which the roadway provides mobility, through movement and land access. This system is used for establishing speed limits, design standards, and access controls.

The concept of context sensitive design expands roadway design and configuration beyond the traditional functional classification system to take into account the surrounding character of the area through which a roadway passes. In this way the streetscape becomes an integral part of the built environment that fully complements surrounding activities. A context sensitive thoroughfare in an urban area might include parallel parking, public spaces designed into the roadside and a wide sidewalk for outdoor cafes. As the context changes from urban to suburban or rural the design of the thoroughfare would change as well.

In addition to functional classification, thoroughfares can be classified by character using names that are common such as Expressway, Highway, Boulevard, Avenue, Street, Road and Alley. Today, these titles are used interchangeably, but they historically signified roadways with markedly different traits. Each was appropriate in specific areas. For example, an Avenue may be common in an urban area, but would not be found in a rural area. Likewise, a Road was typically found in rural areas.

The following typology is used to define roadways according to character:

Freeway/Expressway/Parkway represents large volume limited access roadways that allow for a high rate of speed and serve to move cars through an area.

- Freeways are high speed (50 mph or higher), controlled-access thoroughfares with grade-separated interchanges and no pedestrian access.
- Expressways and parkways are high- or medium-speed (45 mph or higher), limited-access thoroughfares with some at-grade intersections.
- Parkways generally allow a rate of speed similar to Expressways and have landscaping (most often naturalized) located on each side of the roadway, as well as a wide landscaped median.

Rural Highway is intended as a high speed (45 mph +) thoroughfare designed to carry traffic and to provide access to abutting property in rural areas. Intersections are generally at grade with occasional deceleration lanes and often include wide shoulders to allow for passing.

High Speed Boulevard serves as a high speed (40 to 45 mph) divided arterial in urban and suburban environments designed to carry primarily higher speed, long distance traffic and serve large tracts of separated single land uses (for example, residential subdivisions, shopping centers, industrial areas and business parks). High speed boulevards may be long corridors, typically 4 to 8 lanes and provide very limited access to land. High speed boulevards may be transit corridors and accommodate pedestrians with sidewalks or separated paths, but some may not provide any pedestrian facilities. Location of a sidewalk is dependent upon surrounding character with separation from the roadway increasing as character becomes less urban. High speed boulevards emphasize traffic movement, and signalized pedestrian crossings and cross-streets may be widely spaced. Bicycles may be accommodated with bike lanes or separate, shared use paths. Buildings or parking lots adjacent to boulevards typically have large landscaped setbacks. They are primary goods movement and emergency response routes and widely use access management techniques to maintain speed with limited interruption.

Low Speed Boulevard represents a walkable, low speed (35 mph to 40 mph) divided arterial in urban environments designed to carry through and local traffic, pedestrians and bicyclists. Sidewalks may be adjacent to the roadway or separated by a landscaped strip. Boulevards may be long corridors, typically consisting of four lanes, but may sometimes be wider, serve longer trips and provide limited access to land. Low Speed Boulevards may be high ridership transit corridors. Boulevards are primary goods movement and emergency response routes and use access management techniques. Curb parking may be allowed on boulevards.

Avenue describes a walkable, low-to-medium speed (25 to 35 mph) urban arterial or collector that offers access to abutting land. Avenues serve as primary pedestrian and bicycle routes and may serve as local transit routes. Avenues are traditionally two to four lanes with access to land as a primary function. Goods movement is typically limited to local routes and deliveries. Some avenues feature a raised landscaped median. Avenues may serve commercial or mixed-use sectors and usually provide curb parking.

Street is intended to be a walkable, low speed (25 to 30 mph) roadway, primarily serving abutting property. A street is typically two lanes and is designed to connect residential neighborhoods with each other, connect neighborhoods with commercial and other districts, and connect local streets to arterials. A street may serve as the main roadway of commercial or mixed-use sectors and emphasize curb parking. Goods movement is restricted to local deliveries only.

Rural Road is a low speed (25-30 mph) thoroughfare in rural areas primarily serving abutting property.

Alley/Rear Lane is described as a very low-speed (5-10 mph) vehicular driveway located to the rear of properties, providing access to parking, service areas and rear uses such as secondary units, as well as an easement for utilities.

Character and functional classifications tend to be complementary. A roadway with a functional classification of “arterial” may be designed as a boulevard or avenue, for example, depending upon the development context that roadway serves. Table 1 shows the relationship between functional classification and thoroughfare types. As shown an arterial roadway could have cross-sections that vary from two to six lanes, depending upon the context through which it operates.

Context Sensitive Solutions (CSS)

CSS is a different and increasingly popular approach to the planning and design of mobility projects that is a direct extension of the discussion of character. However, rather than just defining roadways according to character typologies and general Community Character categories, CSS also builds upon the unique traits and identity of a particular area, such as a trail through wetlands or an area with specific history, such as the Main Street in the Historic District. CSS also plays a major role in functional issues, particularly in instances of conflicts or the need for interaction between modes that can result in intersection improvements, installation of crosswalks at critical locations, or traffic calming. Often, the solution is both functional and intended to enhance character, such as installation of the proposed paddle trail along Clear Creek.

In total, CSS:

- Publicly establishes the goals that a project is intended to accomplish such as improved access, congestion mitigation, enhanced safety, or increased travel options;
- Couples the goals of the project with an understanding of the current and desired physical, social and economic conditions of the areas through which a project passes;
- Involves the public and stakeholders early and continuously throughout the planning and project development process;

Table 6-1, Functional Classification and Thoroughfare Types

Functional Classification	Freeway Expressway Parkway	Rural Highway	Boulevard	Avenue	Street	Rural Road	Alley Rear Lane
Principal Arterial							
Minor Arterial							
Collector							
Local							

Source: Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, ITE, 2006

- Establishes criteria for determining if a project design should be considered "successful";
- Utilizes an interdisciplinary team tailored to addressing both project and area-specific needs;
- Considers all appropriate modes of travel and the relationship between modes;
- Applies creative solutions and applies flexibility to design standards, where appropriate; and
- Incorporates aesthetics as an integral part of good design.

Putting It All Together

The mobility system is a sum of its parts. If all of those parts function together seamlessly and they fit well within the context of the surrounding area, then a traveler's experience will likely be positive. Transit operators have a motto of "first mile to last mile" that neatly summarizes expectations of the mobility network. Every aspect of the travelers experience should be considered from the moment that person exits the door of the home to the moment he or she arrives at the destination. Ironically, Walt Disney applied the same principles in Walt Disney World. If an experience is positive, it will likely be repeated.

In typical communities, simply ensuring that people and goods can move through the city without a problem is enough. However, the destination-based approach to development anticipated in League City is dependent upon creating positive experiences. In this manner, a seamless mobility system that is effective and contributes to the character of the area plays a key role in the city's marketability to residents, employees and guests. For that reason, every detail counts and it counts for every trip from the most mundane to the most unique. A child may choose to ride a bicycle to school on a particular

Case Study - Context Sensitive Solutions
A Avenue, Lake Oswego, OR

A Avenue, is a major arterial located in Lake Oswego's downtown. The downtown area can be characterized as low/medium density commercial mixed use with low/medium density residential located one block from A Avenue. There are several free-standing office buildings and the city's civic center is located at one end of the study corridor. The downtown contains ground floor retail with cafes with street seating. Retail consists of local specialty shops and some national retailers. Upper floors are a mix of professional offices and personal services. Downtown is surrounded by low density single-family homes and medium density multi-family units.

In 1986 The East End Redevelopment Plan was adopted and included a beautification plan for A Avenue. The plan called for landscaped medians to "soften the perceived barrier, which this very wide street creates between two main commercial areas of the East End."
The beautification plan included:

- Modifications to the left turn system (lanes in medians);
- Traffic signal system improvements;
- Overall circulation of commercial and residential streets and alleys;
- Curb extensions to reduce crossing width;
- Special pavement to "improve the visual and psychological connection between the two sides of the street;"
- Undergrounding of utilities;
- Sidewalk extensions/improvements with pedestrian amenities; Street trees, furniture, pedestrian scaled lighting and directory signage.

The A Avenue reconstruction was completed in the 1990s and today it is a functional and highly attractive major urban thoroughfare.

Thoroughfare Elements of the Roadway:

- Functional class: Major arterial
- Through lanes: 4
- Turn lanes: Center left-turn lane
- Median: Raised
- Sidewalks: Both sides
- Planting strip: Tree grates in sidewalk and planting strips
- Speed limit: 25 mph
- Drainage: Urban, curb and gutter
- Parking: Parallel
- Transit: Local/limited routes
- ADT: 24,000

Land Use/Street Integration Features:

- Sidewalks vary from 8 to 15 ft. in width.
- Each block contains several pieces of public art.
- Ample and well-placed street furniture, benches.
- Most building entries at back of sidewalk.
- Good street connectivity on older grid of streets.
- Some cafes with outdoor seating (mostly on side streets).
- Pedestrian scaled lighting/urban design features including monuments, walls and built in plazas.
- Well-maintained street trees and indigenous landscaping in median, planting strips and grated treewells.
- On-street parking, street trees and urban design features buffer sidewalk from travel lanes.
- Attention to detail in streetscape amenities.
- Public and private investment in streetscape, including private provision and maintenance.
- Local bus routes.
- Access management (buildings are rear accessed, median, grid system and some alleys).
- Access to historic Willamette Trolley connecting Lake Oswego to Portland.

Source: Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, ITE, 2006

day. If all needs are considered, upon leaving the house that child can expect to travel along a well marked mix of bike lanes, trails or shared use paths that are designed appropriately to match surrounding context and consider the needs of potential users. The trip will inevitably require interaction with cars that may involve a simple crosswalk at an intersection, but given travel behavior at that location, it may also involve a number of additional improvements including signage, rumble strips, specialized signals, a raised crosswalk, or other amenities intended to provide the rider a sense of safety. Once at school, the child will need a safe place to store the bicycle. If every facet is considered and seamlessly implemented, the child reaches school safe and happy.

On a broader scale, if fully seamless and well planned mobility system can actually become a complementary attraction to the extent that traveling to a destination or within the destination becomes an activity of its own. The paddle trail along Clear Creek, as proposed in the Master Trails Plan, can be an exciting venture on its own. However, that activity could become a much larger engagement if a traveler could stop at Heritage Park and, for a small fee, rent a bicycle or Segway to ride into the Historic District for lunch and an opportunity to enjoy the latest festival held in League Park.

Each travel mode requires a number of ingredients that, together, make up the "sum of its parts". Tables 6-2 and 6-3 note the basic ingredients that go into each mode. By no means should this table be considered more than an initial list, but it is the beginning of understanding the items necessary to establish seamless service in each of the major travel modes.

Table 6-2, Primary Ingredients of Each Travel Mode

Pedestrian	Bike	Golf Cart/LSV	Neighborhood Electric Vehicle	Transit	Car
Appropriate Pathways					
Sidewalks					
Trails	Trails				
Shared Use Paths	Shared Use Paths	Shared Use Paths	Shared Use Paths		
	Bike Lanes				
		Local Streets, 35 mph and below*	Streets, 45 mph and below	Streets	Streets
Additional Network Needs					
Crosswalks (Path Crossing, Intersection and Midpoint)	Crosswalks (Path Crossing, Intersection and Midpoint)	Crosswalks (Path Crossing)	Crosswalks (Path Crossing)		
Trailheads	Trailheads	Trailheads	Trailheads		
				Transit Stop/Station	
Traffic Signs	Traffic Signs	Traffic Signs	Traffic Signs	Traffic Signs	Traffic Signs
		Traffic Signals	Traffic Signals	Traffic Signals	Traffic Signals
Storage					
	Bike Racks	Parking	Parking	Commuter Parking	Parking
General Traffic Management Requirements					
Very Low	Low	Medium	Medium	High	Very High
Signage Design Speed					
3.5 mph	15 mph	25 mph	35 mph	45 mph or more	45 mph or more

* In accordance with State Law and if permitted by League City (currently not permitted beyond areas allowed by State Law)

Table 6-3, Secondary Ingredients of Each Travel Mode

Pedestrian	Bike	Golf Cart/LSV	Neighborhood Electric Vehicle	Transit	Car
Conflict Point Modifications with Cars					
Enhanced Crosswalks	Enhanced Crosswalks	Enhanced Path Crosswalks	Enhanced Path Crosswalks		
Refuge Islands in Medians	Refuge Islands in Medians	Refuge Islands in Medians			
Bulbouts at intersections and midpoints	Bulbouts at midpoints	Bulbouts at midpoints	Bulbouts at midpoints		
				Transit "Pullout"	
					Other Traffic Calming Measures
Household Storage					
None	Bike Rack	Large Shed, Port or Garage with Electrical Outlet	Large Shed, Port or Garage with Electrical Outlet	None	Port or Garage
Amenities/Enhancements					
		Remote Charging Stations	Remote Charging Stations		Remote Charging Stations*
	Rental Stations	Rental Stations	Rental Stations		Rental Stations
Benches, Kiosks and other Street Furniture				Transit Stop Shelters and Enhanced Stations	
Incorporated artwork and landscaping	Incorporated artwork and landscaping	Incorporated artwork and landscaping	Incorporated artwork and landscaping	Incorporated artwork and landscaping	Incorporated artwork and landscaping

* Future need if the city wishes to promote electrical vehicles

Goals and Policies

The following goals and policies provide staff and elected officials direction in maintaining and developing a multi modal transportation system.

Goals:

- ❖ Movement of people and goods in a safe, efficient and convenient manner.
- ❖ A well connected mobility system that considers all aspects of a trip, which begins at the front door and ends at the destination.
- ❖ A multi-modal transportation system that offers choices in traveling to destinations.
- ❖ Transportation facilities designed within the context of the surrounding environment and compatible with adjacent uses and character.
- ❖ Transportation improvements that enhance the traveling experience and marketability of the community.

Policies

Connectivity

- Pedestrian connectivity and circulation supersedes vehicle connectivity and circulation.
- Site design and development plans should emphasize connectivity between places. Adjacent sites should allow for off-road connectivity and account for connectivity in circulation/parking plans.
- Vehicular connectivity should meet a Roadway Connectivity Index of 1.4 (connectivity measured by the number of roadway links divided by the number of roadway nodes).
- Pedestrian and bicycle connectivity should offer a minimum Accessibility Index of 1.5 (determined by dividing direct travel distance to a destination by the actual travel distance).
- Cul-de-sacs and dead-end roadways should be minimized and, if possible, avoided. Horseshoe roadways provide a well-connected alternative.
- Cul-de-sacs and dead-end roadways that are permitted should incorporate pedestrian and bicycle connections to other roadways or trails.
- Gates reduce connectivity and should be avoided.
- New development and redevelopment should connect to any adjacent roadways, trails or other mobility features that were “stubbed” to allow

future connectivity.

- Every effort should be made to ensure that roadways ended for purposes of connection with adjacent future development are marked or otherwise delineated as "future connecting roadways" or similar for purposes of informing the public, particularly impacted property owners.
- Blocks should be appropriately sized to allow for convenient vehicular and nonvehicular connectivity.

Pedestrian and Bicycle Network

- Site plans and master plans should consider pedestrian and bicycle use as a viable alternative to the automobile for distance-appropriate trips.
- Pedestrian and bicycle networks should be designed prior to placement of roadways.
- Pedestrian routes should deviate from vehicle routes if the alternative offers greater convenience, increased safety, a better user experience and/or better meets the Accessibility Index (described above).
- Sidewalks and trails should be designed according to character and anticipated traffic.
- Where appropriate, sidewalks should be separated from the roadway by a minimum of three feet, except in areas of urban character.
- Sidewalk design should account for four zones as appropriate: the curb zone (if the sidewalk abuts the roadway), furnishings zone, pedestrian zone and frontage zone (in areas where the sidewalk abuts structures).
    * Typical sidewalk obstructions such as street lights, fire hydrants, benches, kiosks, landscaping, signage and more should occur in the furnishings zone or adjacent landscaped areas.
    * The pedestrian zone should be sized to be appropriate to anticipated traffic volume.
    * The frontage zone should be sufficient to allow for door openings, but may also be expanded to allow for sidewalk cafe's, benches, tables, sidewalk vendors, sales racks, art features, or other amenities, depending upon character of the area.
- Sidewalks that would not be completed by builders (such as in front of parks or other open spaces) should be completed by the developer prior to acceptance of infrastructure.
- Trails and other off-road mobility improvements should be completed prior to acceptance of infrastructure.
- Sidewalks, trails and shared use paths should be maintained in a manner equal to roadway corridors (or better).
- Crosswalks should be delineated with striping, at minimum, that is regularly maintained and clearly visible. Crosswalks could also include aesthetic treatments. Additional treatments, such as signage, pedestrian crossing signals, walk phases at intersections, street bollards, landscaping, curb extensions/bulbouts, raised intersections, or other innovative additions should be considered based upon need.
- Midblock crosswalks should be added when block length exceeds 600 feet (or in a manner that the distance between crosswalks are no greater than 300 feet in high volume areas) and it is warranted by pedestrian volume.
- Consider additional treatments to ensure awareness of a midblock crosswalk including signage, advanced warning rumble strips (typically low level), signals, lighting and landscaping, or curb extensions/bulbouts (sidewalk extensions that narrow the road width and slow traffic).

Roadway Design

- All new and reconstructed roadways in League City should meet Complete Streets criteria appropriate to surrounding character and context. Exceptions to incorporation of bike lanes, sidewalks or similar paths can be made if improvements for pedestrian and bicycle traffic outside of the right of way are more desirable.
- Right of Way should be sufficient to allow for the anticipated roadway type at buildout to meet Complete Streets criteria appropriate to future surrounding character and context.
- Lane width should match the intended design speed of the roadway for purposes of managing traffic speed and safety. No more or less.
- Consider the impact of corridor width - typically the space between structures that includes the road right-of-way and setbacks - on traffic speed in roadway design and land development.
- Roadways should be named according to character (for example, no street should be called "XX Boulevard" unless it is designed as a boulevard.
- Incorporate alleys into the mobility network, particularly for purposes of utilities, services and garage access.

Intersection Design

- Free flow traffic, even at relatively slow speeds, is generally preferable to stop-and-go traffic.
- Roundabouts and traffic circles should be considered prior to stop signs (and sometimes traffic signals) to improve free flow circulation.
- T-intersections should be appropriately separated to avoid "corner cutting" and other safety and traffic flow concerns.
- Intersections should occur at or near 90 degree angles for full traffic visibility.
- Clear sight distance for traffic safety supersedes aesthetics.
- The curb radius of any intersection should balance desired design speed of the intersection and the need to shorten pedestrian crossing width.
- Pedestrian refuge islands should be incorporated into intersections where necessitated by efforts to allow free flow of vehicular traffic or increased intersection speed.

Street Trees and Vegetation within the ROW

- Consider use of street trees to reduce the perception of corridor width and separate the vehicular and pedestrian realms, but only where appropriate.
- Street trees should be selected from a list of trees specifically recommended for tolerance to roadway conditions, maintenance requirements, and root structure growth, among other criteria. Trees should be addressed according to size at maturity (small, medium and large).
- Street trees should be planted and maintained in a manner that promotes downward growth of roots, including installation of root barriers when appropriate.
- Avoid placing street trees within unacceptable distances to critical streetscape elements such as:
    * Underground Utilities: 5 to 10 feet
    * Sidewalks: 2 to 4 feet
    * Fire Hydrants: 5 to 10 feet
    * Driveways: 5 to 10 feet
    * Water Meters and Utility Boxes: 5 feet
    * Utility Poles (in instances that utilities are not below ground): 5 to 10 feet
    * Stop Lights: 10 to 30 feet
    * Driveways and Intersections: 35 feet or as needed to avoid the Clear Vision Zone
- Rain gardens and low maintenance, native, drought tolerant vegetation are preferable to turf within the right of way, including spaces between

sidewalks and the street.

- When possible, promote swales and native, drought tolerant vegetation rather than raised medians.
- Vegetation should not obstruct the Clear Vision Zone at intersections, crosswalks and other critical locations and potential conflict points. Within the Clear Vision Zone, street trees should be avoided and vegetation should not exceed a height of two feet.
- Street trees should be avoided in medians less than 10 feet in width.
- Street trees should be spaced appropriately to permit mature growth, typically 30 linear feet (range depends upon types of trees)

Access Management

- Medians with managed turn lanes are preferable to continuous turn lanes. Existing continuous turn lanes should be replaced with medians with appropriate access management.
- Medians should be sufficiently wide to serve their intended purpose and meet the intended character for the roadway, as follows:
  * Pedestrian refuge only: 6 feet
  * Simple traffic separation: 10 feet
  * Median with turning lanes: 14 to 16 feet
- Landscaped medians are preferable to barren concrete or painted/striped roadway for purposes of aesthetics and safety. Trees within the median can act as psychoperceptive traffic calming devices that slow traffic, particularly if coupled with street trees.
- New curb cuts, particularly along major roadways, should be minimized to improve traffic movement.
- Efforts to improve roadway efficiency should include an effort to reduce or eliminate the number of sites with multiple or extended curb cuts (i.e. curb cuts wider than needed for simple ingress and egress).

Mobility Planning

- Streets should be spaced appropriately based upon functional classification.
- All development and redevelopment should respect the recommended general location and need for major roadways, trails and other mobility features shown in the Master Mobility Plan, the Master Trails Plan, or required by transportation criteria recognized by city staff.
- Roadways, trails and other mobility features may be moved within a site if the proposed change improves or does not negatively impact the overall mobility network or intended character of the area and continues to provide connectivity.
- The City of League City should make an effort to acquire land needed for absolutely essential improvements in advance of development to the extent possible.
- Advance efforts to acquire land for mobility improvements should include a transparent process that includes public participation, discussion of alternatives and description of impacts.
- All development and redevelopment should recognize and address impacts on the mobility network.
- Development should not occur unless capacity is either in place or constructed concurrent with development.
- Capacity should be measured according to impact upon one or more recognized measures, such as:
  * Vehicle Miles Traveled
  * Vehicle Hours Traveled
  * Level of Service
- Development and redevelopment shall not be allowed to adversely impact the ability of other sites within a "traffic shed" to development or redevelop.
- Private roadways should be avoided.

On-Street Parking

- Promote incorporation of on-street parking into design of collector and local roadways as appropriate. On-street parking along arterial roadways should be avoided unless fitting to the character of the surrounding area and area speed limit.
- Balance the need for on-street parking with traffic needs.
- On-street parking should generally be parallel parking.

Context Sensitive Solutions

- All roadways should be designed to correspond to local community character as well as travel demand.

Traffic Calming

- Traffic calming is most effective if incorporated during the design of the mobility network.
- Stop signs should not be used as traffic calming devices.
- Traffic calming (after a roadway is in place) should be a staged process beginning with the least intrusive techniques, unless implemented as part of a traffic calming plan.
- "After the fact" traffic calming is best performed on a "trial and error" basis using temporary devices to determine if the technique offers the desired impact.
- Consideration should be given to the impact of a traffic calming measure upon the surrounding area as well as the immediate problem area.
- Utilize the entire "toolbox" of traffic calming devices and apply the most appropriate device or set of devices.

Mobility Improvements

- Mobility Improvements should strike a balance between the needs of economic development, community character and mobility.
- When possible, parallel alternate routes are preferable to adding travel lanes beyond two in each direction.
- Prior to making a roadway improvement, the Engineering Department should establish Measures of Effectiveness (MOE) for determination of an improvement to successfully address an issue.
- MOEs should include before and after measures. After measures should be taken after a given time to allow for travel behavior to accurately adjust.