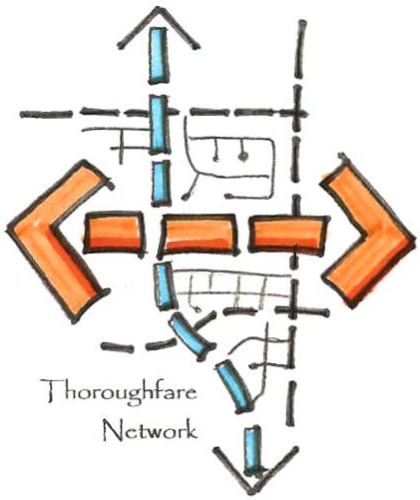
Chapter Five

Transportation

Thoroughfare development requires advanced planning to meet the community's requisite travel demands and to ensure safe and orderly movement of traffic within neighborhoods and throughout the community and region. In addition to meeting mobility needs, transportation system planning is also an essential element in the community's economic development. Access to, through, and within the community, whether by air, rail, bus, or automobile transportation, is vital for movement of both people and goods. A well-planned and regularly maintained transportation system also contributes to community character and appearance, as well as to the quality of life for residents.

The transportation system is made up of a network of corridors that connect neighborhoods with business districts within the community and to other communities. In the case of Del Rio, these corridors provide a connection to the international border, into Ciudad Acuna, and, ultimately, throughout Mexico. Although the automobile is the primary mode of transportation, with increased emphasis placed on the varying needs of residents, thoroughfare planning must look not only at the existing roadway network, but also at each of the other modes of transportation, as well, which together form a complete community transportation system.



The transportation element of the Del Rio Comprehensive Plan establishes a system to accommodate local and regional travel demand through the year 2025 and beyond. It is closely coordinated with each of the other elements of the plan to create a strong and successful area-wide transportation network. As a reflection of today's system of travel, the transportation element will focus largely upon the street system. However, it also places emphasis upon the ability to travel without an automobile via walking, bicycling, bus, and air.

The purpose of this Transportation chapter is to address area-wide mobility needs on all levels, from sidewalks to local streets and neighborhood access to arterial roadways and highways. The principal aim of transportation planning is to ensure safe and efficient movement of people and goods. To achieve this end, this element includes a Thoroughfare Plan, which is the long-term plan for developing an overall system of thoroughfares for the City and its immediate planning area. The plan is to be used as a guide for securing needed rights-of-way and upgrading and extending the network of streets, roads, and highways in an orderly and timely fashion.

While transportation facilities are commonly viewed purely for their function of moving traffic, they also contribute significantly to the form and character of the community. The transportation network frames areas for future development. Therefore, their placement is important to allow development in the areas that are most suitable for it and able to adequately preserve valued natural features and sensitive lands. The design of transportation infrastructure also contributes to the collective appearance of the community, whether it involves the protection of the landscape, preservation of open lands, the use of landscaped medians for traffic management, or the design of bridges, overpasses, and retaining walls.

Many streets in the well-established and outlying area have a pre-coated rock or asphalt surface with a rural street section.

The City has established and is carrying out a multi-year street improvement plan.

KEY TRANSPORTATION ISSUES

In conjunction with the Comprehensive Plan Advisory Committee (CPAC), as well as the input received from the citizens who participated in the stakeholder interviews and community forum, there were a number of key transportation issues identified, including the following:

Maintenance and Safety of Existing Roadways

According to those who participated in the input process, many of the streets throughout the community have not had a level of continued investment, thus leading to streets that are in poor condition and disrepair. They cite not only the street surface conditions, but also, in many instances, a poor condition or lack of curb and gutter, sidewalks, adequate street lighting, and drainage. Recognizing the significant amount of investment necessary to bring the road conditions up to an acceptable standard, the City has established a program of improvements and ongoing maintenance. A two-year program was initiated in 2005 that invested $5 million toward street repair, improvement, and reconstruction. They are now considering continuation of this program with an additional level of funding commitment for 2007-08. Due to the level of need, it is important to acknowledge that collective improvement is ongoing and will require years to accomplish. Nonetheless, the City recognizes the need and is proactively addressing it through the street paving plan.

Similar to the parks-to-standards initiative proposed in Chapter 4, Parks and Recreation, it is advisable for the City to implement a comprehensive streets-to-standards program to concentrate on bringing all roads throughout the community to an equivalent standard. This program is essentially a City-wide initiative to inventory all street conditions and institute a pavement management system. It must be recognized, though, that this requires a substantial investment that will require a significant amount of funding. Without bond funding or another form of contribution on behalf of community residents, the improvement program must be stretched out over an extended period of time. With a focused effort and a commitment of funds over the course of several years, there will be marked improvements in the quality of infrastructure and, hence, neighborhood appearance and integrity. To do so will necessitate a long-term, staged capital improvement program to reconstruct failing streets, seal-coat or overlay those needing surface improvement, install and/or improve underground or ditch drainage systems, construct or reconstruct sidewalks where they do not exist or are in poor condition (particularly adjacent to schools and public buildings, similar to the recent improvements on Wildcat Drive near the schools), install street lights, and replace traffic signs and synchronize traffic signals.

Successful roadway maintenance requires the cooperation of several City departments, including the Department of Transportation, Parks and Recreation Department, and the Department of Public Works and Engineering. The work may be completed either by City employees or, in the case of major roadway reconstruction or improvements, provided by a contractor. Perhaps the most important aspect of a streets-to-standards program is communicating it to the public. This could be accomplished, in part, through postings of the overall and annual programs of street repair and improvement on the City's website. A City liaison or public information officer could also be available to coordinate with civic associations and neighborhood groups or individuals to answer questions and provide information. Quarterly status reports could be made available to the community via the local newspaper, with an annual report published and made available to the public, as well.

GOAL: A safe and well-maintained network of streets and pedestrian ways that are in good physical condition and repair.

Criteria for the Street Paving and Rehabilitation Program include:

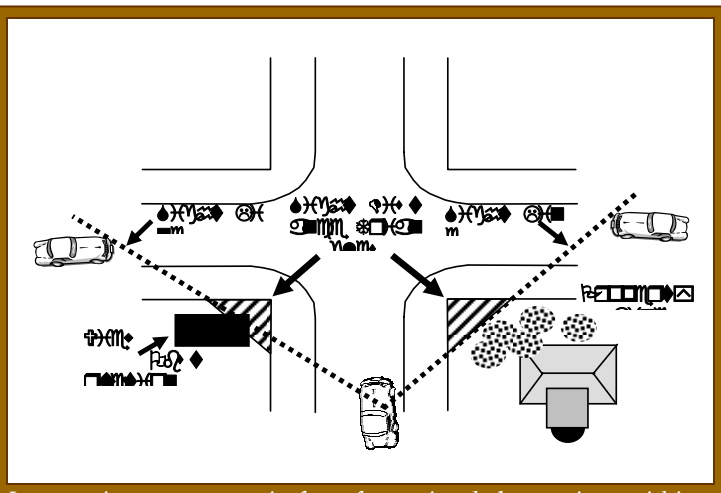
- Street rehabilitation/repair should be coordinated with utility, sewer, and other underground activities to minimize the cost and maximize the effectiveness of rehabilitation/repair.
- Cost effectiveness is an important basis for priority setting.
- In order to benefit the greatest number of residents, visibility of rehabilitation/repair and heavy street use (as indicated by traffic counts) should be given great consideration.
- Rehabilitation/repair of an entire street, rather than one block at a time, should be scheduled often.
- First hand assessment of streets, as well as computer based analysis, should be a basis for street rehabilitation/repair program development.

Program and Policy Updating

- The two-year Street Paving and Rehabilitation Program should be adopted by the City Council, and the 2-year planning process should be adopted as a City policy.
- Each year, the 2-year program should be reviewed and updated by the City Council, with the advice of the City Engineer, City Planner, Economic Development Advisory Committee and City Administration
- The program should be reviewed and updated on an annual basis coinciding with budget preparation.

RECOMMENDATIONS TO CONSIDER:

1. Continue conducting a City-wide pavement condition inventory, which should be integrated into the City's geographic information system (GIS) or another database management program. Subsequently, establish a comprehensive pavement management system, which would include a list of all necessary improvements to meet the established street standard, the level of financial commitment required, and a five-year prioritized implementation plan and funding program.
2. Continue publishing the street paving and improvement plan in the newspaper and on the City's website, with quarterly status updates. Establish a notification program whereby affected homeowners receive notice a sufficient time in advance of ensuing street improvement work. An information desk should be established to accept calls and provide information to the public. This telephone number should be included on all City correspondence, e.g. newsletters, website, etc., and provided regularly in the newspaper.



Intersections must remain free of any visual obstructions within the line of sight of vehicles (site distance triangle) approaching the intersection.

3. Conduct an inventory of street lights and develop a database and corresponding map. Compare the map with the City's street lighting and spacing standards to identify areas where there are deficiencies or nonconformance with existing standards. Subsequently, establish a street light replacement and installation program, coordinated concurrently with street repair and improvement. The above described information desk should also accept calls for lights that are not working properly.
4. Regularly conduct inspections to ensure there are clear views of all traffic control devices, including strict enforcement of visual obstructions within the site distance triangle at street intersections. Conduct an appraisal of all street signs, including their placement, visibility, and condition. Subsequently, replace worn or illegible street signs.
5. Conduct a thorough review and assessment of the City's design criteria and technical specifications regarding street construction standards and all associated infrastructure requirements, e.g. street lights, drainage, and sidewalks. The City may consider a requirement of concrete street construction, pursuant to performance- based street right-of-way and width standards, whereby streets that serve few lots may be narrower due to low traffic volumes. In addition, the allowable densities may be examined to allow increased density, given certain criteria, to offset the expense of requiring concrete streets. In other words, the City may allow a development to have greater density to improve the feasibility of the added expense of concrete streets. The outcome would be a higher standard, a longer useful life of the street paving surface, and reduced maintanance on behalf of the City.

6. Continue periodically conducting signal warrant studies as area travel volumes increase with new development. Such studies may determine additional signals are warranted in certain locations, or that existing signals are no longer needed at the current location. All signals need to be synchronized to maximize the efficiency of the through travel lanes, reducing travel time delay and mitigating congestion.
7. Continue conducting travel speed studies to determine appropriate speed restrictions, particularly in school zones and other high volume pedestrian areas. As areas continue to develop, traffic conditions change and, thus, warrant such studies to make adjustments suited for area travel conditions and the level of street infrastructure.
8. Work with the Texas Department of Transportation (TxDOT) to install pedestrian- and bicycle-actuated traffic signals at intersections, particularly near schools and in other areas with high pedestrian traffic. The installation of medians or esplanades may act as a pedestrian refuge, thereby reducing the distance across a major street section, such as Veteran's Boulevard, Gibbs Street, Dr. Fermin Calderon Boulevard, and Bedell Lane. Improvement and regular maintenance of street pavement markings and signage is also important.
9. Solicit the assistance of civic groups and neighborhood orgnizations to inventory the existence and condition of sidewalks within their areas, which can help in creating an inventory of sidewalks and their conditions City-wide. Parcel level street maps would need to be provided to them as would training on evaluating noteworthy conditions.

Efficient, Adequate and Convenient Local Transportation Network

The local transportation system is made up of a network of roads and streets, each designed with varying capacities and functions to move traffic within and around the community and throughout the region and state. Each street connection contributes to the efficiency and effectiveness of the overall system, making each individual link important. Therefore, dead-end streets, discontinuous roadways, and those yet to be extended or improved cause traffic to be unnecessarily re-routed onto other streets that are not designed to function in this capacity. Of significance to an efficient system is the continuity of the street network.

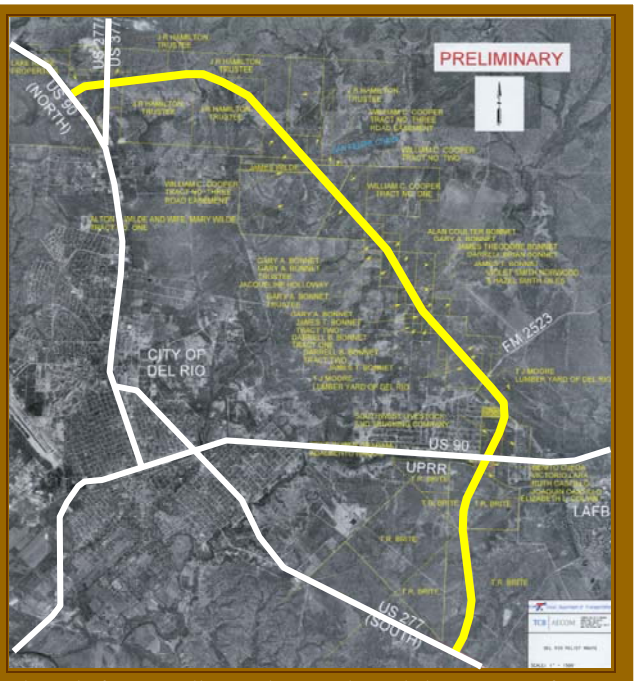
The continuity of the roadway network is well-defined in the area bounded by Bedell Avenue on the east, Airport Boulevard on the west, 17th Street on the north, and Gibbs Street on the south by nature of the grid of arterial, collector, and local residential streets. It is also apparent, albeit to a lesser extent, in the area south of San Felipe Creek. However, elsewhere in the community each of the more recent subdivisions have been and are being designed with a curvilinear street pattern that includes discontinuous and looped roadways. Cul-de-sacs have not been used to a great extent, which improves the efficiency and connectivity of the local street network. While the street pattern includes moderately long segments, their offsetting and discontinuous

An example of a marginal access street is found in front of Del Rio Civic Center, which manages access to U.S. 277.

nature affects the efficiency of traffic flow and lessens connectivity. While development is occurring in small phases, it must occur in a planned manner to ensure adequate roadway continuity and integration with the existing street network. Sidewalk development and public access easements must also occur at the same time as road development during the subdivision planning process to ensure accessibility, convenience, efficiency, and safety.

Congestion is the result of high volumes of traffic due to land development patterns, particularly strip commercial uses along each of the thoroughfares, and an insufficient street network. As is the case in Del Rio, there are relatively few cross-town street connections other than the State highways, leading to high volumes and congested conditions during peak travel times. There are relatively few, if any, convenient alternatives, particularly to move in a north/south direction. There are several improvements necessary to mitigate increasing congestion, which will continue to worsen without network improvements. These improvements include access management strategies, acceleration/deceleration lanes, turn lanes at major intersections (where sufficient right-of-way or a street easement may be acquired), signal warrant studies and synchronization, the use of a reverse frontage road similar to Dodson Avenue, and added restricted access through-ways.

Road design has a significant influence on traffic management. Congestion is increased when traffic flow is impeded and interrupted by multiple points of ingress/egress and local streets accessing major roadways. Since the arterial street network is designed for higher volumes and speeds of traffic, its traffic carrying capacity must be preserved through access management standards and restrictions. An example is found along Veteran's Boulevard between 2nd Street and 17th Street where there is a local street intersection every block. This is less of an issue from that point north, but is, nonetheless, an important planning and design consideration for future thoroughfare construction and development review. Solutions include shared driveways or shared access, cross access easements between properties, marginal access streets, and street closures.



This relief route will provide a much needed connection from U.S. 90 East to U.S. 277/377 and U.S. 90 North.

Del Rio Reliever/Bypass Route – The outer loop that is in the final route alignment determination phase will provide a relief route, extending from U.S. 277 South, crossing U.S. 90, and extending around the northeast quadrant of the community to both U.S. 277/377 North and U.S. 90 North. This route was initially conceived as an entire loop, including the above described segment, but also extending around the southern extents of the community tying into the port of entry and enveloping the western side of the community, as well, eventually connecting to U.S. 90 North. While this is a long-

range vision, the first phase construction is in the near term, possibly as soon as 2008. The relief route will provide a much needed connection from U.S. 90 East near Laughlin Air Force Base to U.S. 277 North without directing traffic through the City, adding to unnecessary congestion.

The location of the reliever route is distant enough from the most densely developed portion of the community that it will not provide in-town residents with an alternative north-south route. Therefore, another thoroughfare is needed that is closer to the developed area to aid in relieving the congested conditions on Gibbs Street and Veteran's Boulevard, among other streets. Upon connection of the relief route to the port of entry, a truck by-pass route will be provided, thereby eliminating heavy truck traffic from their current routing through town on Spur 239 to U.S. 90 or U.S. 277/377. This phase is not expected, though, until 2015 or later.

Second International Bridge – As recent as August 2005, the City commissioned a study to evaluate the feasibility for undertaking the permitting and construction of a second international bridge to Ciudad Acuna, Coahuila. There were three potential sites identified, including one downstream from the existing bridge, which would be for commercial traffic only, thereby eliminating the cue of trucks at the existing bridge and overcoming the constrained conditions in the tourist district of Ciudad Acuna. A second site proposed by the State of Coahuila was located downstream of the existing crossing near the Amistad Dam, which was envisioned as a new crossing with significant adjacent development. A third option was north of the existing industrial park, midway between the existing bridge and the Amistad Dam. The latter alternative was ultimately not included as an alternative. The beneficial and adverse impacts of the remaining two alternatives, in addition to a no-action alternative, were outlined, with no definitive recommendation due to the elections in the State of Coahuila.

While there is no current decision as a result of this recent study, it is important that this plan – with a 20-year horizon – anticipate each of the alternatives and plan accordingly. This issue is relevant to the adopted thoroughfare plan. However, due to the uncertainty and lack of a definitive answer at this time, it will be essential for the City to continue the study following the Coahuila elections to seek resolution to this matter, at a minimum as a means to amend the thoroughfare plan so as not to make any short-sighted transportation investment decisions.

GOAL: An adequate, well-planned, and coordinated thoroughfare network that allows efficient movement of people and goods.

RECOMMENDATIONS TO CONSIDER:

1. Adopt the hierarchical thoroughfare network recommended by this plan and shown on the thoroughfare plan, along with the corresponding policies and regulatory amendments. The recommended street cross-sections and pavement widths must be strictly adhered to in all new development. Where there are existing constrained conditions that are a peculiar to the location and not brought about by artificial reasons, the City may allow exceptions as long as it is the minimum variation needed so as to limit, to the maximum extent practicable, the degree of variation.

2. Amend the subdivision regulations to require, prior to filing a preliminary plat, submittal of a development plan for planned and phased development. The development plan must show the overall street layout and its connection to adjacent properties and developments. The premise of this plan is to ensure connectivity through continuous collector roadways. In-lieu of a development plan, the subdivision regulations should be amended to include a provision for preparation of a local circulation plan by the City. The circulation plan would identify the desired collectors or streets within a superblock, areas for marginal access or reverse frontage roads, and preferred intersection locations, which must then be followed by proposed development. The circulation plan must be based upon the policies of this plan and on the adopted thoroughfare plan.
3. Incorporate traffic calming requirements into the subdivision regulations to slow traffic where continuous and relatively straight streets (for a distance of 500 feet or more) carry higher volumes of traffic in excess of 100 vehicles per hour during peak hours. Refer to the section later in this chapter entitled "Traffic Calming" for more information.
4. Amend the subdivision regulations to include access management requirements to restrict the number, location, and spacing of driveways; street intersections; medians and median openings; marginal access roads; turn lanes; and acceleration/ deceleration lanes at major intersections. The regulations should require marginal access roads and/or cross-access easements along all commercial frontage abutting arterial and collector roads to minimize the number of driveways. The number of residential streets with access to arterial streets should be restricted by requiring marginal access streets or collector roadways located no less than 1,320 feet apart. Plans should be made to manage driveway locations along all arterial streets and where traffic volumes are particularly high.
5. Amend the subdivision regulations to require shared driveways and cross-access easements between adjacent and abutting properties to eliminate the need to use the public street for access between adjoining businesses. Also, require marginal access streets similar to that in front of the Civic Center.

An appropriate termination of minor streets at their intersection with an arterial road must include fencing, landscaping, and a pedestrian connection to the adjacent neighborhood.

6. Conduct a traffic study along with TXDoT to evaluate the feasibility and impacts of minor street closures at their intersections with Veteran's Boulevard, between 2nd Street and 17th Street. Such street closures must be appropriately and attractively terminated with fencing and landscaping treatments.
7. Designate Dodson Avenue as a reverse frontage road, meaning that the properties between Dodson Avenue and Veteran's Boulevard should be designed to take primary access to Dodson Avenue, thereby directing traffic to Veteran's Boulevard at signalized intersections. Doing so will require strict adherence to access management standards along Dodson Avenue to preserve its traffic carrying capacity so it may move traffic efficiently and without impedance.
8. Establish a new thoroughfare generally parallel and to the east of Veteran's Boulevard to provide another north-south through street thereby reducing the volume and congestion on

Veteran's Boulevard. Consider acquisition or accepted dedication of the necessary rights-of-way of Jap Lowe Drive, extending both from Gibbs Street and its continuation of Cantu Road. An extension of this roadway would be necessary north of its intersection with Patuel Lane north and west to tie into Agarita Drive. Steps should be taken in the near term to secure the necessary rights-of-way. Alternatively, the City may consider another alignment immediately to the east of the City limits, which would require annexation. Since this roadway traverses the springs and aquifer areas, it must be designed in the context of its environment, including the use of best management practices for both structural and non-structural improvements to collect and treat storm run-off. The corridor should have an environmentally sensitive "green" design for this purpose. It will also be essential to impose restrictive land use controls along this or another arterial roadway so as to manage access and preserve its traffic carrying design capacity without undue impedance.

9. Coordinate with TxDOT to conduct a traffic engineering and design study along Veteran's Boulevard, Gibbs Street, Dr. Fermin Calderon Boulevard (Bedell Avenue as a City street), and other high volume thoroughfares to identify necessary and feasible improvements such as acceleration/deceleration lanes, turn lanes at major intersections, and the effective use of medians.
10. Continue to plan for, via right-of-way preservation, and secure funding for a continuation of the loop, particularly connecting to the port of entry. Such connection would relieve Spur 239 and the inner-city segments of Veteran's Boulevard and Gibbs Street of heavy truck traffic. Right-of-way should also be preserved for the remaining segments of the loop so as to not result in a short-sighted decision that is denied – or is exponentially more expensive – as development occurs.
11. Monitor development within the influence areas of the identified possible future bridge locations so as to allow land acquisition or required dedication during the land development process.[1] The City may consider annexation of these critical areas to gain the authority to manage and regulate land development.

Multiple Modes of Transportation

A complete transportation system includes more than highways and streets to encompass other modes, such as air transportation, rail and freight transport, public transit, bicycling, and walking. A combination of these modes, which collectively form a complete transportation system, is desirable to adequately support the widely varying needs of the community and its residents and businesses. These transportation needs range from children walking to school and persons using sidewalks or trails for recreational walking and jogging; to those who rely on public transportation or others for their personal mobility; to those traveling longer distances, thereby warranting air travel; to the needs of

Bicycling can be promoted as an alternative mode of transportation through adequate provision of bike lanes along street right-of-way.

[1] Assuming the alternative locations are within the City's extraterritorial jurisdiction, whereby they have the authority to require right-of-way dedication.

businesses who are reliant upon an efficient and affordable transportation system to transport clients into, and products and services out of, the community, region, State and country.

During the public involvement process there were several comments received about the adequacy of the current transit services. Residents cited the increasing population and changes in demographics warranting continuing evaluation and the feasibility of expanding the current transit services. Particularly, there was concern voiced about its timely availability and the regularity of the current fixed route service. This concern is quite common, but confronted with the reality of its financial feasibility, transit systems across the country, and particularly in mid-sized communities, are highly subsidized. With the amount of State and/or Federal funding support shrinking, communities are challenged by their willingness and creativity to find sources of funds to expand and improve their services. While there are inarguably increasing needs and a percentage of the population heavily dependent upon this service, there are significant financial constraints.

The current service in Del Rio is operated on a demand-responsive basis, meaning that calls for service must be 24 hours in advance. It is a door-to-door service operating seven days per week, between the hours of 7:00 a.m. to 6:00 p.m. Monday through Friday; 8:00 a.m. to 6:00 p.m. on Saturday; and 8:00 a.m. to 4:00 p.m. on Sunday. As of the most recent fiscal year, the ridership averaged between 3,300 and 4,300 riders per month, with a total annual ridership of 47,846 persons. The service is available to the general public, although a majority of the riders are the elderly and disabled persons.

The service is operated throughout Val Verde County, and is coordinated with the Community Council of Southwest Texas, which operates service throughout the other eight counties in the Middle Rio Grande Valley Region. The service is managed with a total of 14 vehicles, which range from small passenger vans to 16 to 21 passenger buses. All vehicles are wheelchair accessible. Funding for the services is entirely from contract revenue and state and federal sources, with no local subsidy.

In addition to the demand-response transportation service, the City currently contracts with PAJAR, Incorporated to provide fixed route service within the City and internationally. PAJAR, Inc., is a privately owned transportation company providing local fixed route services and international bus services to the City of Del Rio and Ciudad Acuna, Mexico. The fixed route operates seven days a week and provides local transportation to the citizens of Del Rio. The fixed route destinations include all the major retail centers within the City. International bus services are provided to the citizens of Ciudad Acuna, Mexico, seven days a week. In its first year of operation, PAJAR, Inc., provided transportation for approximately 155 people per day. In 2005, PAJAR, Inc., serviced 55,800 citizens of the City of Del Rio and Ciudad Acuna, Mexico.

Growth of the air service at the Del Rio International Airport is essential to the local economy, and provides a viable mode for longer distance traveling for business or pleasure.

The Del Rio International Airport presently offers three direct flights each day to Houston's Intercontinental Airport, which connects to flights throughout the U.S. and world. As of December 2006, the total number of seats available on inbound flights were at 53% full capacity and 54% full capacity on outbound flights. There are no plans for expansion at this time as added service depends on the number of enplanements and deplanements, which may be accommodated in the future as the population and airport usage increases. Currently, much of the air traffic in and out of the airport is private, general aviation aircraft.

From an economic development perspective, the airport is essential for local and regional business activity. Therefore, it is imperative for the airport usage to continue to grow concurrent with the population growth in the City, region, and Ciudad Acuna. Therefore, there is an incentive for increased advertising and marketing to solicit interest and usage from throughout the larger region.

The railroad presents a challenge in terms of providing an efficient, safe, and convenient street network. Because roads intersect with rail tracks throughout the City, they must be designed to include adequate safety provisions to ensure safe crossings for pedestrians, cyclists, and motorists. Signal crossings, signage, and pavement markings are ways to provide for safe intersection crossings. These safety measures currently need to be enhanced within the City limits and the ETJ. While the railroad presenting a challenge, it also presents an opportunity in terms of transporting goods across the border. While there are homeland security issues associated with such intermodal connection, it would have the benefit of providing a mode of transport other than heavy truck traffic crossing the International Bridge and passing through the heart of the community.

Sidewalks and trails also contribute to the local transportation system by offering safe walking connections within and between neighborhoods. Requiring sidewalks and trail linkages in new developments and expanding the existing system will further enhance the transportation alternatives in the community. In addition to the benefit of additional transportation choices, facilitating physical activity through the construction of sidewalks and trails has health benefits. This is important since 15 percent of children and adolescents aged six to 19 years old are considered overweight, and 60 percent of adults in the U.S. do not get enough physical activity to provide health benefits. Increasingly, it is being recognized that community residents value physical activity opportunities. This data suggests that efforts to install sidewalks and trails will be well received.

GOAL: Development of a true "system" of transportation supporting all modes of local, regional, national, and international transport.

RECOMMENDATIONS TO CONSIDER:

1. Continue to support the bi-national fixed route service currently operated by Pajar Incorporated. Periodically review the service and identify adjustments to include new destinations and stops with a potential high propensity of use. A local area transit study is

advisable to include a survey of current and potential riders, as well as the general public, to identify ways to sustain current ridership and attract additional "choice" riders. The study should also identify adjustments to the route, as well as the necessary street-side improvements, such as bus pull-out bays and improved transit stops.

2. Consider financial support or operation of the fixed route service to allow an expansion of service and increased headways (less time between buses). This will become increasingly important as the community continues to grow and expand its limits.
3. Consider formation of an interagency agreement with the City, County, school district, Sul Ross State University, and other local and regional transportation providers for joint vehicle maintenenace, procurement, and driver training.
4. Coordinate with the demand-response and fixed route service providers to identify locations for construction of bus pull-out bays and improved transit stops, such as Wal-Mart, HEB, Downtown, and others. These improvements will help with the flow of traffic while providing safe, convenient, and comfortable waiting areas with benches, shelters, trash receptacles, public information displays, landscaping, and even public art.
5. Within every street improvement project incorporate design provisions relating to sidewalks; curb cuts and wheelchair accessible ramps; non-slip surfaces; marked, signed and/or signaled pedestrian crossings; prevention of obstructions for wheelchair access; and installation of pedestrian actuated traffic signals.

Sidewalks and trails offer safe walking connections within and between neighborhoods – providing transportation choices and facilitating physical activity.

6. Continue conducting an airport marketing plan to promote the use of the Del Rio International Airport to persons and businesses throughout the Middle Rio Grande Valley. Assistance should be sought from Sul Ross State University and/or other professional sources to develop an airport marketing plan to promote the airport at regional, State-wide, and international levels.
7. Amend the subdivision regulations to require sidewalks on both sides of all arterial and collector roads and on both sides of minor streets where there are more than 45 dwelling units served. Sidewalks should be required on one side of all minor streets with fewer than 45 dwelling units.
8. Amend the subdivision regulations to require public access easements every 800 feet, or portion thereof, where there are continuous rows of homes abutting trails or collector and arterial roads. Such easements must be a minimum width of 15 feet, improved with a five foot wide sidewalk or trail connection.

TRANSPORTATION MODES

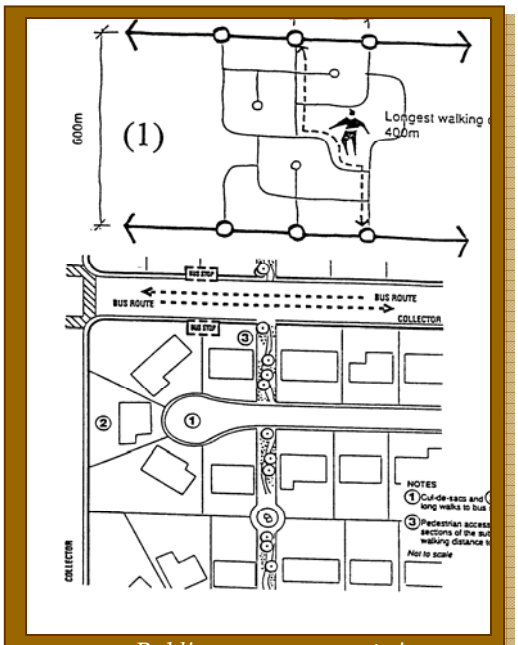
Del Rio currently possesses each of the modes of transportation, which offer increased opportunities for expanding and improving the multi-modal options available to community residents and businesses. The opportunities described in the previous issue discussion, represents improvements to economic development, community recreation, the environment, and local quality of life.

The term "multi-modal" refers to the full range of transportation modes that together form the local and regional transportation system, including single occupant vehicles; multiple occupant vehicles such as ride sharing, van pools and public transit; walking and bicycling; as well as rail and air transportation. The existing improvements and services and the opportunities for enhancement are discussed below.

Pedestrian System Planning

Bikeways, trails, and sidewalks are part of the City's transportation system that serves the needs for pedestrian movement within and between neighborhoods, Downtown and other commercial districts, and to each of the schools, parks and other community facilities. Safe and well-maintained pedestrian facilities are particularly needed in the older neighborhoods that did not have sidewalks installed when they were originally constructed but now, due to the size of the community and location of shopping areas and other destinations, are an essential means of transportation. Consideration must, therefore, be given to conduct an inventory and condition assessment to ensure proper and timely maintenance of sidewalk facilities, implement compliance with the American's with Disabilities Act (ADA), and establish sidewalks and other pedestrian-ways in all neighborhoods. The City's ordinances must also restrict obstacles on sidewalks, such as parked vehicles and trailers, which hinder pedestrian mobility and safety.

Eliminating barriers to pedestrian mobility is an important feature in planning for and developing an effective pedestrian network. U.S. 90 and U.S. 277, in particular, as well as each of the other arterial roadways (Veteran's Boulevard, Gibbs Street, Bedell Avenue, and Cantu Road), and the railroad impose major barriers for pedestrian access and mobility. These barriers must be overcome by access improvements, such as pedestrian tunnels, overhead bridges, or well designed crosswalks and other provisions made during the course of roadway improvements and subdivision design. In addition, integrating schools, parks, and appropriately scaled convenience retail shops within neighborhoods will contribute to lessening reliance on the automobile for short trips and, thus, improve opportunities for walking and bicycling.



Public access easements improve connectivity and enhance pedestrian mobility.

Modern subdivision street patterns, such as the more recent developments north of Mary Lou Drive, are more auto-oriented than the older neighborhoods that have a traditional grid street pattern. A grid pattern is dense and regular, allowing pedestrians several choices of routes to parks and other walking destinations. The well-established neighborhoods south of 17th Street and south of the creek offer examples as to creating walkable neighborhoods.

While curvilinear street patterns are appealing to homeowners, pedestrians have fewer choices of direct routes to destinations within or outside their subdivision. Rather, the pedestrian is left with the alternative of following streets that, at times, meander away from their destination. Similar to automobile traffic, pedestrians rely on a series of connecting paths to make their trips. These paths may include sidewalks, on-street bikeways and lanes, off-street trails and walkways, linear parks and connections, or any other forms of linkage. Most importantly, the system of paths must be both connected and continuous.

Climate has an important influence on the pedestrian system. In southwest Texas, where the heat index frequently reaches 100 degrees during the summer months, walking any significant distance is undesirable. Thus, the nature of the walk becomes a factor. In terms of transportation and thoroughfare planning, the design of the unoccupied public right-of-way becomes quintessential. Policies and recommendations for designing walkable streets include the following:

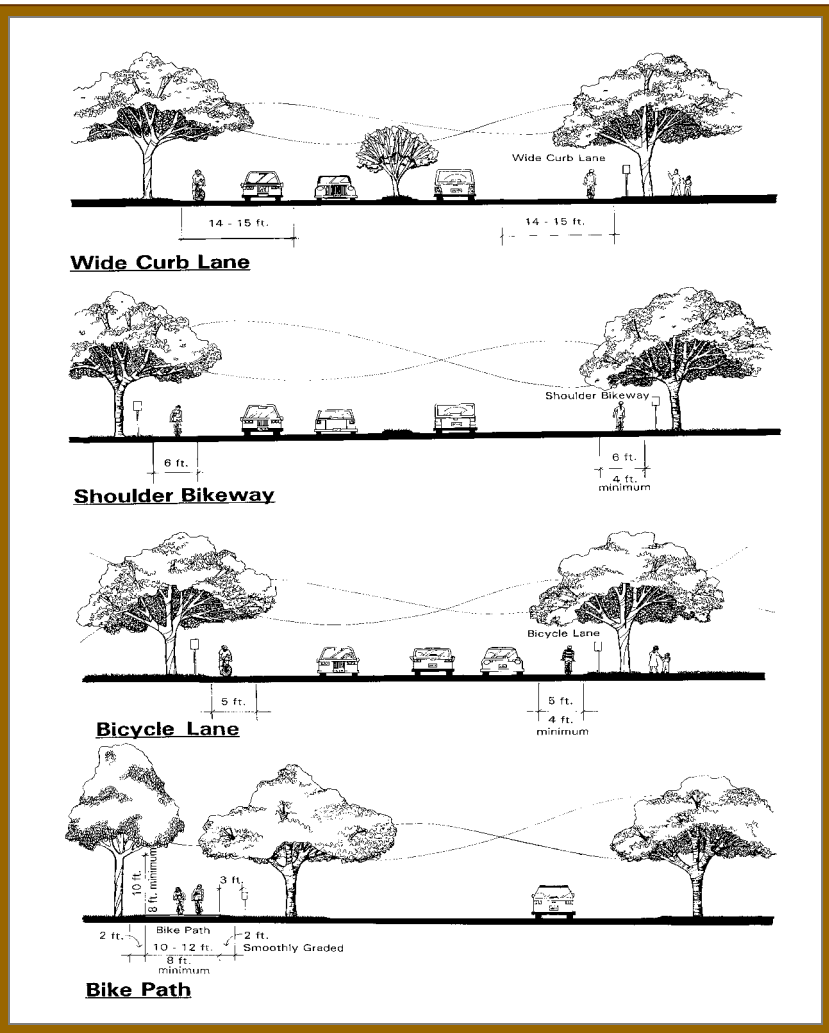
- Cul-de-sac streets should be carefully managed to ensure they are not over utilized. Pedestrian linkages in the form of public access easements and walkways connecting parts of the neighborhood together and providing access to schools and parks must be required.
- Sidewalks and/or trails should be required in all new development, concurrent with street construction and installed in areas where they are not currently available. Sidewalks should be provided on both sides of all arterial streets and collector roadways and on one or both sides of local residential streets depending on the adjacent density. Trade-offs may be permitted in estate and rural developments to allow off-street trails in lieu of sidewalks, thereby meeting the needs of walkers and bicyclers.

Landscaped roadways aid in mitigating the impacts of the climate on pedestrian mobility and enhance the walking environment.

- Mid-block connections in the form of public access easements and walkways should be required to provide linkages between blocks and to common facilities such as parks and open areas. This is particularly important with contemporarily designed developments with curvilinear street patterns.
- Streets, sidewalks, and other pedestrian connections and public gathering areas should be designed to create sheltered areas from heat and inclement weather.
- Tree cover and other landscaping should be required along pedestrian paths for both aesthetic and environmental reasons. Trees provide shade and a sense of enclosure around pedestrian paths. Other vegetation, such as flowers and shrubs, are also encouraged to further compliment the streetscape. To the extent practicable, native plant material that is more tolerant of local conditions should be used.
- The number of driveways and other property access points must be kept to a minimum to reduce the number of pedestrian and vehicular conflict points.

Bicycle Transportation

As new development occurs in the community, signed bicycle routes (shared right-of-way), designated and striped on-street bikeways, and off-street bicycling and jogging trails should be developed to link major attractions and destinations throughout the community, including single-family neighborhoods and apartments, parks, schools, churches, Downtown, Sul Ross State University, San Felipe Creek, and major employment centers and shopping areas. In this way, bicycle routes can provide an alternative mode of transportation, while also serving the recreational needs of area residents.



Bikeways may be accommodated within the right-of-way as wide curb or shoulder lanes, striped lanes or separated paths.

Implementing bicycle improvements may be accomplished by way of highway funds used for the construction and development of bicycle paths wherever a highway, road, or street is being constructed, reconstructed, or relocated. Additionally, drainage corridors, utility corridors, parks and recreation areas, and various other rights-of-way and easements that traverse Del Rio represent potential opportunities for development of future bicycle and pedestrian facilities. There is also a grand opportunity with the construction of new arterial roads, such as that proposed through Jap Lowe Estates or to the west of town between Agarita Drive and Cantu Road. When new rights-of-way are being dedicated or acquired, there should be a sufficient width to accommodate liberal green space and trails. These opportunities can be incorporated as transportation enhancement projects, such as multi-use trails and scenic beautification areas. Refer to the thoroughfare plan as to the proposed locations of the above described arterial roadways.

THOROUGHFARE SYSTEM PLANNING

Thoroughfare system planning is the process to assure development of the most efficient and appropriate street system necessary to meet existing and future travel needs. The primary objective of the Thoroughfare Plan is to ensure that adequate rights-of-way are preserved on appropriate alignments and of sufficient width to allow orderly and efficient improvement of thoroughfares. Proposed alignments are shown for planned new roadways and roadway extensions, but actual alignments will vary depending on the design of development and necessary amendments to the Thoroughfare Plan. Requirements for rights-of-way dedication and construction of street improvements must apply to all subdivision of land within the City and its five-mile extraterritorial jurisdiction.

Preservation of right-of-way is important to:

- Avoid costly acquisition of developed land and structures on planned alignments and, thereby, reduce commercial and residential displacements;
- Prevent the foreclosure of desirable location options;
- Prevent inconsistent development standards of thoroughfares;
- Reduce costs;
- Permit orderly project development; and
- Minimize or avoid environmental, social and economic impacts.

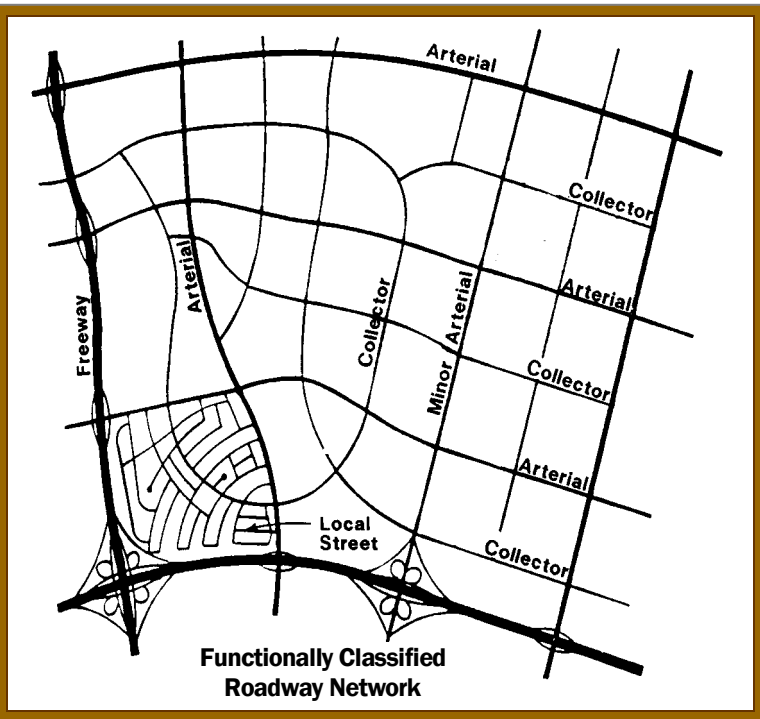
The thoroughfare system of arterial and collector streets is displayed in **Figure 5.1, Thoroughfare Plan**, which shows approximate alignments for planned thoroughfares that will be considered in platting of subdivisions, right-of-way dedication, and construction of major roadways.

Some elements of the thoroughfare system will require additional rights-of-way and may ultimately be developed as two-lane or multi-lane roadways with various cross-sections. Some streets that are identified as collectors on the plan, such as 10th Street and Garza Street, may not ever be widened due to constrained right-of-way conditions. Instead, the collector designation reflected on the Thoroughfare Plan signifies their traffic-handling role in the overall street system and the importance of maintaining them and similar streets in superior condition to maximize their traffic capacity since they most likely cannot be improved to an optimal width and cross-section.

The Thoroughfare Plan does not show local residential streets because their function is to provide access to individual lots and developments and their alignments will vary according to individual development plans. Local residential street alignment should be determined jointly by the City and land owners as part of the subdivision review and approval process, in accordance with the Subdivision Regulations and the policies of this chapter and plan.

Similar to local residential streets, collectors are required with new development, but are not shown in all places on the Thoroughfare Plan - particularly throughout the large extraterritorial jurisdiction - since their alignments will depend on the surrounding street system and particular development plans. They are, nevertheless, essential to an efficient and effective transportation network and must not be overlooked during the subdivision review process. Collectors should be situated on a case-by-case basis to connect arterial streets with other collectors and local residential streets.

The Thoroughfare Plan will affect the growth and development of Del Rio since it guides the preservation of rights-of-way needed for future thoroughfare improvements. As a result, the plan has significant influence on the pattern of traffic movement and the desirability of areas for future development. While other elements of the plan look at foreseeable changes and needs over a 20-year period, thoroughfare planning requires an even broader perspective. Future changes in transportation technology, cost structure, service demand, and long-term shifts in urban growth and development require a far-sighted and visionary approach for thoroughfare decisions.



A typical thoroughfare network includes various classifications of roads, each with a design function within the overall system.

Roadway Cross Sections

Roadway classifications reflect the functions that roadways serve as part of the street network. The cross-section of a roadway is related to traffic volume (vehicles per day and during peak periods), design capacity, and level of service. The City's subdivision regulations specify the right-of-way requirements for arterial, collector, and minor and all other streets, but do not specify the pavement widths of other design requirements pertaining to the number of lanes, lane width, number and width of parking lanes, curb width, width of parkways, or the number and width of sidewalks. It is important that standards are consistently applied throughout the community to achieve consistent, quality results.

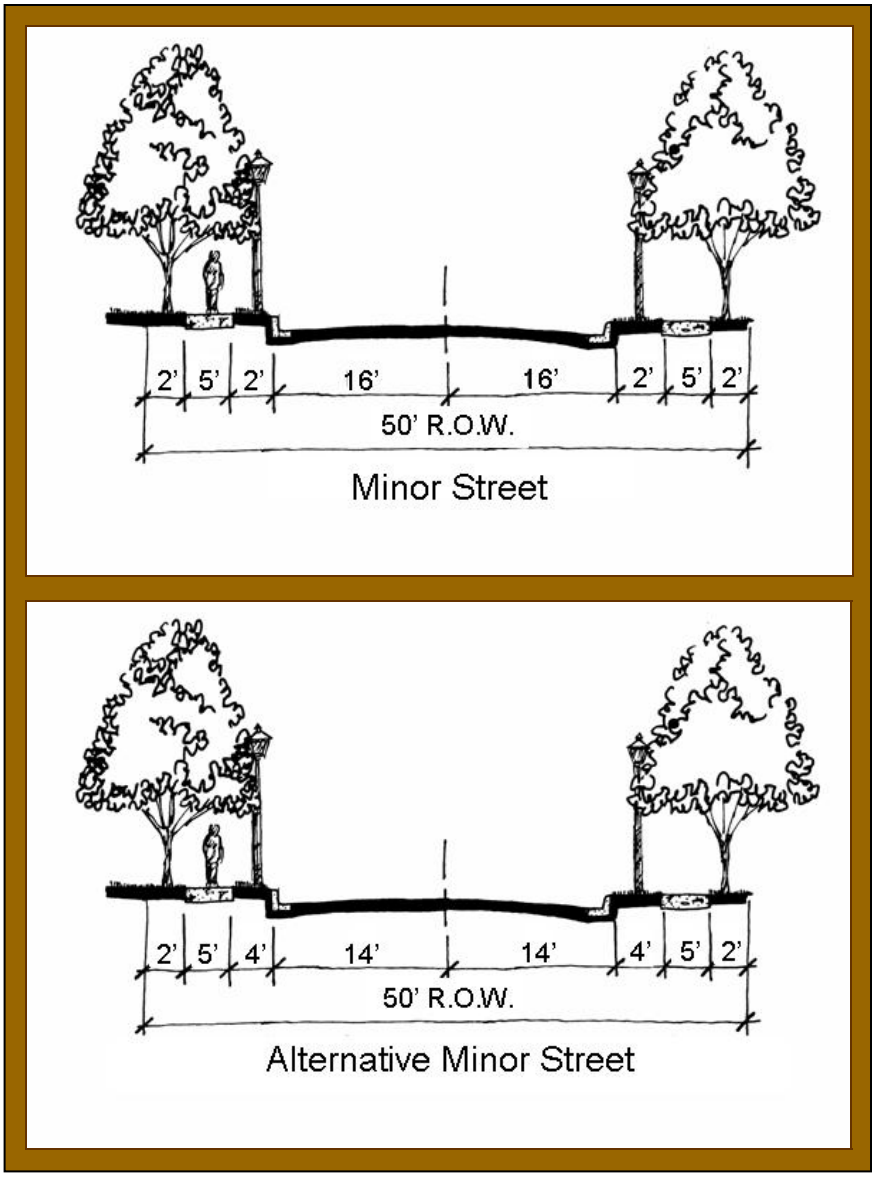
In the administration of the Thoroughfare Plan, unique situations will arise where development conditions and physical constraints conflict with the need for improving designated thoroughfares to the planned right-of-way and pavement widths. Such special circumstances require flexibility in the administration of the plan. Minimum design criteria and special cross-sections may need to be applied in constrained areas where conditions limit the ability to meet typical standards. Special roadway cross-sections should only be determined on a case-by-case basis when a unique design is necessary. Exceptions warranting technical approval must be handled by the City Engineer. Otherwise, the standard cross-sections should be applied in all developing areas and, whenever possible, in existing developed areas.

A single set of standards for development within the City versus that within the outlying planning area may be problematic where the character may be suburban within the City and rural in the County. Standards within the City limits, with rare exception, should reflect its suburban character, with provision for curb and gutter construction, sidewalks, street lighting, signage, and sufficient open space. In the outlying areas where the character of development is large-lot estate or rural, the standards may be varied to mirror the character, yet designed for their environment. Sidewalks are not indicative of estate or rural development, but are certainly appropriate for suburban areas with smaller lot sizes. In the case of the estate or rural development, a wide street section or trail may be more appropriate as an alternative to sidewalks.

Roadway Classifications

The roads and streets in the planning area are grouped into functional classes according to their role for traffic movement and land access. Characteristics of each functional class of roadway differ to meet the corridor's intended purpose.

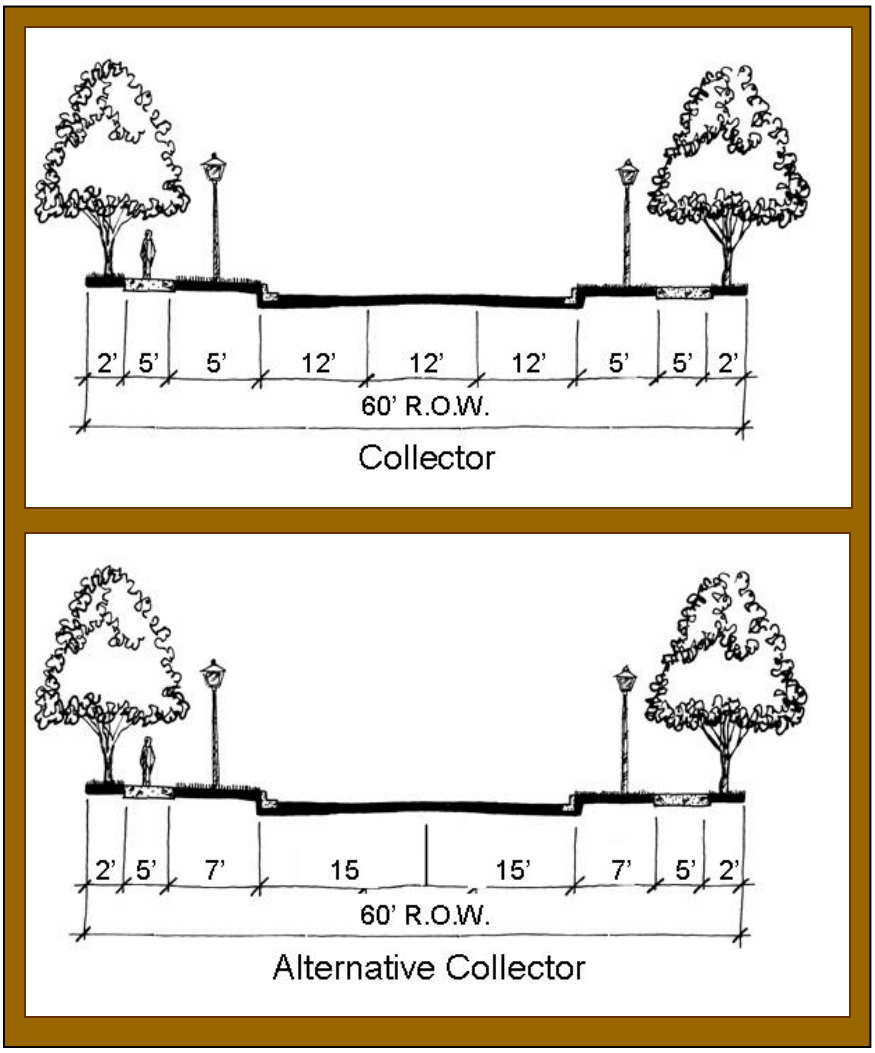
Minor Streets – The Thoroughfare Plan does not differentiate between minor streets by assigning class. Instead, the plan proposes alternative street widths that may change according to such characteristics as on-street parking (one or both sides), building setbacks, choice of trails or sidewalks, and anticipated traffic volumes.



Generally, the current standard for local residential streets is 50 feet of right-of-way with a preferred pavement width of 32 feet. The actual width is currently decided during the subdivision review and approval process, subject to existing conditions and constraints. The Subdivision Regulations do not currently require sidewalks along minor streets.

This plan proposes to require sidewalks on both sides of all streets, with an allowance for sidewalks on a single side of minor streets when the street serves fewer than 45 lots. There are two alternate standard cross-sections for minor streets, each of which maintain 50 feet of right-of-way, as currently required. The first cross-section includes a pavement width of 32 feet with parking allowed on one or both sides. The alternate cross-section allows a reduced pavement width of 28 feet with on-street parking permitted on one side only. The reduced pavement width is designed for a road carrying immediate local traffic and is sufficient to accommodate fire apparatus, but offers the added benefit of neighborhood traffic calming. This approach is designed to create a pedestrian-scaled neighborhood with reduced street widths and building setbacks. The result of narrower streets is reduced travel speeds, an increased distance between the street and sidewalk, and additional green space along the streetscape. In exchange for a reduction in the pavement width to 28 feet, the development must include provisions for upgraded subdivision fencing, street trees, and other open space amenities.

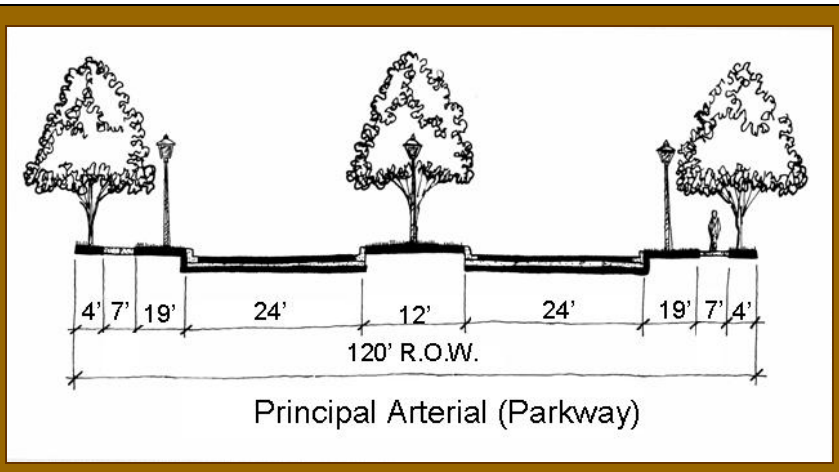
Minor streets may also be adapted to an estate or rural neighborhood to include an open or closed ditch system and trails, as opposed to curbs, gutters, and sidewalks. As with collectors, the advantage continues to be a preservation of rural character, while the disadvantages include a reduced standard for rural development and potentially less effective storm water management.



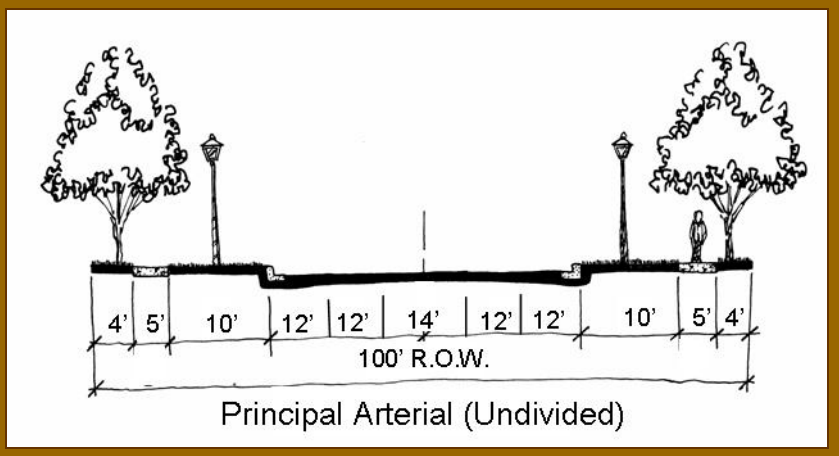
Classifications for alleys and marginal access streets are a function of service and property access and, therefore, are not included in the classification system of the Thoroughfare Plan. This is not to indicate that the plan ignores the possibility of alleys in a development. In fact, it recognizes the valuable contribution of alleys to the urban fabric and proposes that they be used, as appropriate.

Collector Streets – The City's current standards for collector streets is a pavement width ranging from 30 to 32 feet within 60 feet of right-of-way. Sidewalks are required only on one side of collector streets adjacent to the subdivision. The proposed cross-sections maintain 60 feet of right-of-way with pavement widths of 36 and 32 feet. The wider pavement is necessary to achieve the traffic-carrying capacity of a collector roadway, which is to be designed to carry up to 15,000 vehicles per day. The standard collector roadway is proposed to have a 36-foot pavement section with sidewalks on both sides. As an alternative, a developer willing to set aside additional green space and provide enhanced pedestrian pathways and/or street trees may request that the pavement width be reduced to 32 feet. On-street parking should not be allowed on collector roadways due to higher traffic volumes and speeds and their design purpose of distributing traffic to the arterial street network. A street cross-section that is 32 feet wide provides two, 12-foot travel lanes and an eight-foot parking lane, which is sufficient to serve the traffic-carrying capacity of a collector roadway.

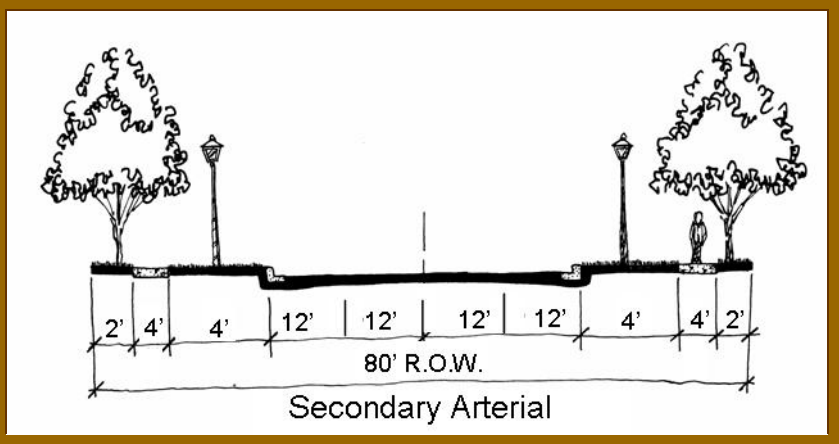
Another option for rural development is collector roads without sidewalks or curb and gutter. This permits development to maintain the look and feel of a rural area, but similarly may not provide the drainage system offered by roads with curb and gutter. In this character of development, significant green space and an interior trail system would be necessary to compensate for the loss of sidewalks. Pavement width would remain at the 36-foot requirement; however, rights-of-way must account for the increased space required for open or covered ditches.



Principal Arterial (Parkway)



Principal Arterial (Undivided)



Secondary Arterial

Arterial Streets – According to the Subdivision Regulations, the right-of-way requirement for an arterial roadway is 100 feet. However, due to constrained conditions, in practice, many of the arterial roads have 80 feet of right-of-way with 62 feet of pavement. This plan proposes three alternatives for arterial streets, including a divided parkway section and two alternative undivided sections. A principal arterial may include either an undivided 62-foot pavement section (with a 14-foot center turn lane) or a 48-foot divided pavement section (two, 24-foot paved sections with a 12-foot median) within 100 feet of right-of-way. Sidewalks must be provided on both sides of all arterial streets. A 12-foot median/esplanade is sufficient in width to provide for decorative street lighting, landscaping, added green space, and to accommodate a turn lane at intersections. The third cross-section is for a secondary arterial street, which is an undivided thoroughfare within 80 feet of right-of-way with a 48-foot pavement section. The 20 feet of right-of-way, excluding the width of pavement, provides space for decorative street lighting, landscaping, and added green space. A secondary arterial would also require sidewalks on both sides of the street.

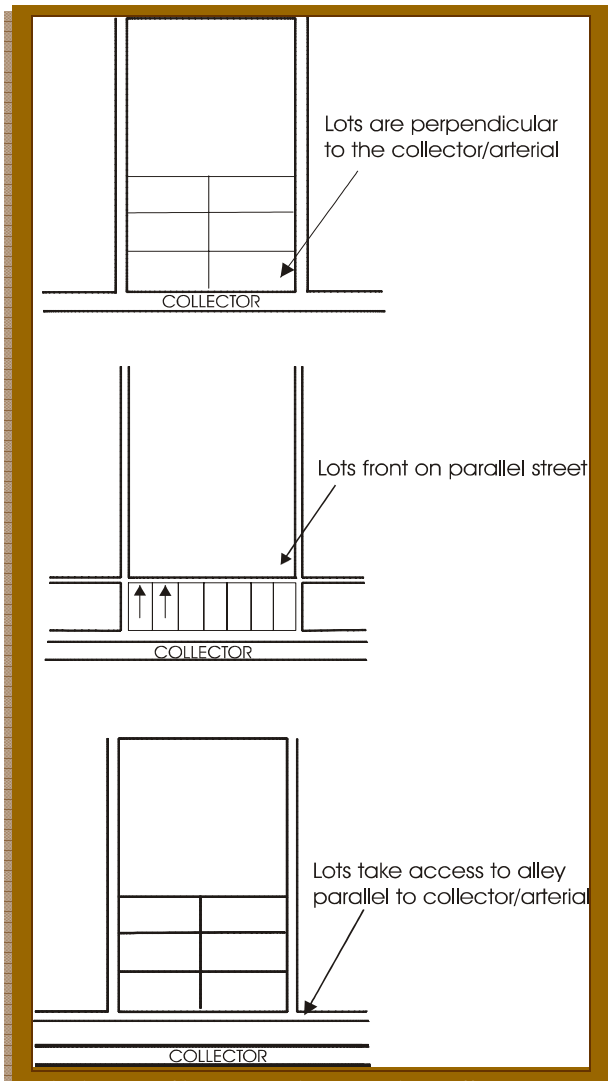
Requirements and Standards

This section outlines criteria for certain characteristics of street and land development. These criteria supplement or expand upon the Subdivision Regulations. These policies should be regulated through ordinance provisions to ensure proper implementation.

- **Location and alignment of thoroughfares** - The general location and alignment of thoroughfares must be in conformance with the Thoroughfare Plan. Subdivision plats must provide for dedication of needed rights-of-way for thoroughfares within or bordering the subdivision, consistent with that required by the Subdivision Regulations. Any major changes in thoroughfare alignment that are inconsistent with the plan require approval by the Planning Commission through a public hearing process. A major change includes any proposal that involves the addition or deletion of a designated thoroughfare or changes in the planned alignment of thoroughfares that would affect parcels of land other than the subject tract.
- **Location and alignment of collectors** - Generally, to adequately serve their role to collect traffic from minor streets and distribute it to the arterial street system, collectors should be spaced approximately one-half mile between arterial streets. The actual alignment of collectors will be determined through the subdivision review and approval process.
- **Roadway continuity** – To maximize mobility, it is essential that collector streets traverse adjacent neighborhoods to provide access and circulation not only within, but also between neighborhoods. Collector streets must connect bounding arterials, rather than allowing development street systems with no points of ingress/egress other than a primary entrance. Collectors should be no less than one-half mile in length and may stretch up to two miles in length.
- **Right-of-way and pavement width** - The pavement and right-of-way widths for thoroughfares must conform to minimum standards unless the City grants a waiver using formalized criteria. Subdivisions that are bordered by an existing thoroughfare with an insufficient right-of-way width must be required to dedicate land to compensate for any deficiency of that thoroughfare. When a new thoroughfare extension is proposed to connect

with an existing thoroughfare that has a narrower right-of-way, a transitional area must be provided to taper the right-of-way and/or pavement width.

- **Continuation and projection of streets** – Existing streets in adjacent areas must be continued and, when adjacent to an undeveloped area, the street layout must provide for a continuation of streets into the undeveloped area. In particular, the arrangement of streets in a new subdivision must make provision for continuation of right-of-way for existing streets in adjoining areas - or where new streets will be necessary for future public requirements on adjacent properties that have not yet been subdivided. Where adjacent land is undeveloped, stub streets must include provisions for temporary turnarounds.



The layout of lots, contributes to the traffic carrying capacity, safety and efficiency of collector streets.

- **Location of street intersections** - New intersections of subdivision streets with existing thoroughfares must be planned to align with existing intersections, where feasible, to avoid creating off-set or "jogged" intersections and to provide for continuity of existing streets, especially collector and arterial streets.
- **Off-set intersections** – Off-set or "jogged" street intersections must have a minimum separation of 225 feet (versus 125 feet as in the current ordinance) between the centerlines of the intersecting streets.
- **Cul-de-sacs** - Through streets and tee-intersections are preferable to cul-de-sacs. Care must be taken so as not to over utilize cul-de-sacs, which limits through access, restricts pedestrian circulation, increases response times, and confuses motorists. However, when cul-de-sacs are used, they may have a maximum length of no more than 400 feet, with a paved turnaround pad of at least 100 feet (versus 80 feet as in the current ordinance) and a right-of-way diameter of 120 feet (versus 100 feet as in the current ordinance) in residential areas. In non-residential areas, the turnaround pad must be 180 feet with 200 feet of right-of-way. A cul-de-sac with an island must have a diameter of not less than 150 feet.
- **Residential lots fronting on arterials** - Subdivision layout must avoid creating residential lots that front on an arterial street. Lots must be accessed from a minor street within or bordering the subdivision or, alternatively, an auxiliary street designed to accommodate driveway traffic.
- **Residential lots fronting on collectors** - Subdivision layout must minimize, and preferably avoid, the arrangement of lots to access collector streets, particularly within 180 feet of an intersection. To the extent practicable, lots must be accessed from minor streets.

- **Private streets** - The City must not approve a plat containing private streets unless adequate precautions are guaranteed to ensure minimum standards of construction, necessary space for utilities and street widening, sufficient room for maneuvering emergency vehicles, and appropriate pedestrian circulation and emergency access.
- **Sidewalks** – Within subdivisions, sidewalks must be installed on at least one side of minor streets (up to 45 lots) and both sides of all minor streets with more than 45 lots, collector streets, and arterials streets unless provisions are made and assurances committed for a trail system or other alternative pedestrian way.

PLAN IMPLEMENTATION

Implementation of thoroughfare system improvements occurs over time as the City grows and builds toward the ultimate thoroughfare system reflected in the Thoroughfare Plan. The fact that a future thoroughfare is shown on the plan does not commit the City to a specific timeframe for construction, or that the City will build the roadway improvement. Individual thoroughfare improvements may be constructed by a variety of implementing agencies, including the City, Texas Department of Transportation (TxDOT), as well as Val Verde County, private developers, intra-governmental agencies, and land owners for sections of roadways located within or adjacent to their property. Road construction can be implemented by individual entities or in partnership, as is the case for construction of roads that are included in the State Transportation Improvement Program.

The City, County, and TxDOT, as well as residents, land owners and developers, can utilize the Thoroughfare Plan in making decisions relating to planning, coordination and programming of future development and transportation improvements. The City should utilize the plan as a means of coordinating with the State to place projects on the Transportation Improvement Program. Review of preliminary and final plats for proposed subdivisions in accordance with the City's Subdivision Regulations must include consideration of compliance with the Thoroughfare Plan in order to ensure consistency and availability of sufficient rights-of-way for the general roadway alignments shown on the plan. It is of particular importance to provide for continuous roadways and through connections between developments to ensure community-wide mobility. By identifying thoroughfare locations where rights-of-way are needed, land owners and developers can consider the roadways in their subdivision planning, dedication of public rights-of-way, and provision of setbacks for new buildings, utility lines, and other improvements located along the right-of-way for existing or planned thoroughfares.

ACCESS MANAGEMENT

Access management is an important component of the thoroughfare management process. Access management is the coordination between land access and traffic flow. Its basic premise is to preserve and improve the operating capacity, performance, and safety of the major street system. It manages congestion on existing transportation facilities and protects the capacity of future transportation systems by controlling access from adjacent development. Properly utilized, it can eliminate the need for street widening or right-of-way acquisition.

Techniques to accomplish access management include limiting and separating vehicle (and pedestrian) conflict points, reducing locations that require vehicle deceleration, removing vehicle turning movements, creating intersection spacing that facilitates signal progression, and providing on-site ingress and egress capacity. In addition, regulation focuses on the spacing and design of driveways, street connections, medians and median openings, auxiliary lanes, on-street parking and parking facilities, on-site storage aisles, traffic signals, turn lanes, freeway interchanges, and pedestrian and bicycle facilities.

The following access management strategies may be used to coordinate the access needs of adjacent land uses with the function of the transportation system:

- **Intergovernmental coordination** - Access management is most effective as a regional strategy that involves members of local, State and Federal organizations involved in the design of area roadways. Through coordinated efforts, access management can even further add to the efficiency of local thoroughfares.
- **Separate conflict points** - Two common conflict points are driveways and adjacent intersections. Spacing driveways so they are not located within a determined distance of intersections or other driveways is a method to achieve access management objectives.
- **Restrict turning movements at un-signalized driveways and intersections** - Full movement intersections can serve multiple developments through the use of joint driveways and cross-access easements. Turning movements can be restricted by designing accesses to limit movements or by the construction of raised medians that can be used to provide turn lanes.
- **Establish design standards** - Design standards within the Subdivision Regulations addressing the spacing of access points, driveway dimensions and radii, sight distance, and the length of turn lanes and tapers are effective mechanisms for managing the balance between the movement of traffic and site access.
- **Locate and design traffic signals to enhance traffic movement** - Interconnecting and spacing traffic signals to enhance the progressive movement of traffic is another strategy for managing mobility. Keeping the number of signal phases to a minimum can improve the capacity of a corridor by increasing green bandwidth.
- **Remove turning vehicles from through travel lanes** - Left and right turn speed change lanes provide for the deceleration of vehicles turning into driveways or other major streets and for the acceleration of vehicles exiting driveways and entering major highways.
- **Encourage shared driveways, unified site plans and cross access easements** - Joint use of driveways reduces the proliferation of driveways and preserves the capacity of major transportation corridors. Such driveway arrangements also encourage sharing of parking and internal circulation among businesses that are in close proximity.

TRAFFIC CALMING

An approach to decrease the amount of "non-local" traffic in residential areas is by adopting traffic calming programs, which are aimed at controlling cut-through traffic, speeding on neighborhood streets, and driving that threatens the safety of other drivers and pedestrians.

Traffic calming measures are instrumental in providing livable neighborhoods where residents feel safe walking, biking and playing. Traffic calming is defined as "the combination of physical features that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users." In addition to addressing motor vehicle issues, traffic calming can also involve objectives such as improving aesthetics, promoting urban renewal, reducing crime, and increasing water filtration into the ground.

The broad goals for traffic calming include increasing quality of life, incorporating the preferences and requirements of nearby residents and others who use the area adjacent to streets and intersections, creating safe and attractive streets, helping to reduce the negative effects of motor vehicles on the environment (pollution, urban sprawl, etc.), and promoting walking and bicycle use. More specific objectives are to:

- Achieve slower speeds for motor vehicles;
- Reduce collision frequency and severity;
- Increase safety and the perception of safety for non-motorized users of the street;
- Reduce the need for police enforcement;
- Enhance the street environment (streetscaping, etc.);
- Increase access for all modes of transportation; and
- Reduce cut-through traffic through neighborhoods.

Traffic calming is accomplished through a combination of measures that control both traffic speed and volume. Volume control measures include street closures, restrictive one-way streets, and turn restrictions. These measures are effective in reducing traffic on streets; however, such measures do not reduce speed and often result in the diversion of unwanted traffic onto other residential streets. Speed control measures are important in reducing injury related accident rates. They also increase walking and bicycling on streets. Speed control measures should be designed into the community through urban design and land use features such as smaller setbacks, street trees, short streets, sharp curves, center islands, traffic circles, textured pavements, and flat-top speed humps.

Flat-top speed hump

Roundabout

Narrowed entrance

Street closure

Choker