State Highway 6 South
Corridor Access Management Plan

Transportation Policy Council Accepted, January 2011

Kimley-Horn and Associates, Inc.
In association with
Klotz Associates Inc.
The Lentz Group
Gateway Planning
CJ Hensch & Associates, Inc.

Project Partners:
Houston-Galveston Area Council (H-GAC)
Texas Department of Transportation
City of Alvin
Brazoria County
Galveston County
City of Manvel
City of Santa Fe

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City of Manvel
City of Santa Fe

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Existing Conditions

Over the past 36 years, the Houston-Galveston Area Council (H-GAC) has continually worked with local governments to improve mobility throughout the region. Many of the projects funded and managed by H-GAC have since been constructed and are examples of successful plan implementation. Furthermore, those projects demonstrate how public involvement and local governmental coordination can generate a long-term plan and achievable vision.

The areas south of Houston are feeling the pressures of development during the past decade. Cities such as Sugar Land, Missouri City, Pearland, and League City have experienced first-hand what increased development can do to access, safety, and mobility. Specifically, each of the aforementioned cities were the focal point for previous access management studies, which were reactive to development pressures. Advanced planning and policy prior to the development pressures could have served these cities well.

As such, H-GAC has initiated the State Highway 6 (SH 6) South Corridor Access Management Plan, a study with goals to improve mobility and safety and a key mission to provide a transparent process for all citizens and stakeholders.

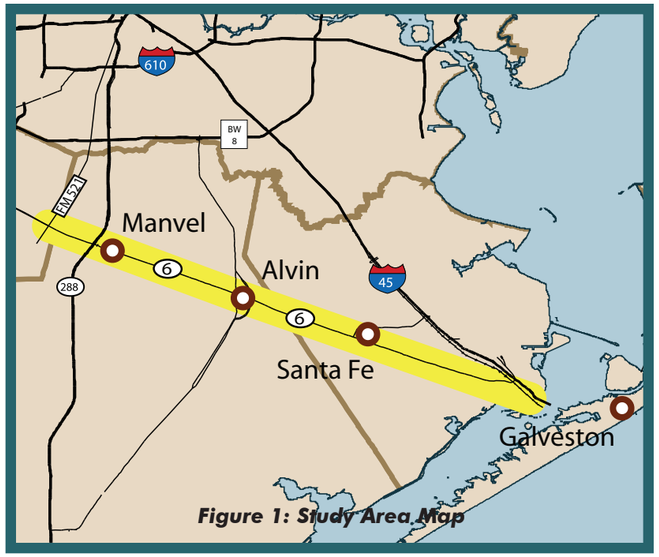


Figure 1: Study Area Map

The SH 6 South corridor spans from FM 521 at Arcola to IH 45 near Galveston and encompasses the communities of Arcola, Alvin, Manvel, Santa Fe, Hitchcock, and Bayou Vista as well as Fort Bend, Brazoria, and Galveston counties. This stretch of highway is the primary study area and is depicted in Figure 1.

Many cities throughout the corridor consider SH 6 the main retail and commercial corridor for their respective city. Furthermore, the corridor is deemed a vital asset to the future economic development opportunities within the region and serves as a primary evacuation route for many residents. Figures 2 and 3 show a snapshot of the growth over a five year period in Pearland, just 5 miles north of the SH 6 study area. The City of Manvel, directly south of Pearland, is currently experiencing development pressure, and the rest of the corridor expects similar conditions in the near future.

Although several developers have begun purchasing property along the SH 6 corridor, many plans have yet to begin construction. The corridor is a mixture of greenfield development, areas of transition, and urbanized towns. The rural characteristics and the opportunity for future development provide a unique opportunity for proactive management of the SH 6 corridor. This study will focus on developing long-term goals and defining a clear vision for the future of the corridor *before* the growth spurt occurs.

Figure 2: FM 518 at FM 288 in 2004

The Houston area has begun to feel the pressures of development during the past decade. As such, H-GAC has initiated the SH 6 South Corridor Access Management plan.

Figure 3: FM 518 at FM 288 in 2009

Previous Data Collection

As part of the SH 6 South Access Management Study, Texas Department of Transportation (TxDOT) Houston District previously commissioned a study to inventory the existing conditions in the area. Jacobs conducted the study and prepared a report entitled "State Highway 6 Existing Conditions Report" in February 2007. The study collected traffic data, performed traffic analysis, and evaluated existing conditions within the SH 6 South corridor. In addition, the study provided a corridor evaluation and a crash data analysis. A substantial amount of detailed data can be found in the report, and a summary of the existing conditions is provided herein.

The existing conditions information from the TxDOT study is the base of information for the SH 6 South Access Management Study. The project team thoroughly reviewed the existing conditions to gain an understanding of the corridor as well as to verify and update existing conditions where necessary. The TxDOT study evaluated crash data from 1999 to 2001. Since the completion of that study, more recent crash data from 2003 to 2007 was obtained (courtesy of TxDOT's Crash Records Information System [CRIS]). The latest crash data was analyzed to determine locations and trends of crashes along SH 6 South. Also, the traffic model developed as part of TxDOT's study was updated to reflect current conditions.

Study Corridor

The SH 6 South Access Management Study corridor stretches from FM 521 to IH 45 and spans Fort Bend, Brazoria, and Galveston Counties. SH 6 also passes through the cities of Arcola, Iowa Colony, Manvel, Alvin, Santa Fe, and Hitchcock. The corridor is 34 miles and includes 26 signalized intersections. There are three diamond interchanges at FM 521, SH 288, and SH 35 Bypass Loop. Land use along the SH 6 South corridor is comprised of residential, commercial, and industrial uses. Two high schools, Manvel and Santa Fe High Schools, are adjacent to SH 6.

Within the study area, SH 6 has six travel lanes, a center turn-lane, and shoulders between FM 521 and SH 35. From SH 35 to IH 45, SH 6 South has four travel lanes, a center-turn lane, and shoulders. Open-ditch drainage exists throughout most of the corridor with some curb-and-gutter drainage in the cities. Primarily a high-speed facility, SH 6's speed limits range from 35 to 60 miles per hour (mph). There is no continuous illumination along the corridor; however, safety lighting exists at signalized intersections and interchanges.

Union Pacific Railroad runs parallel to SH 6 (on the south side) between FM 521 and IH 45. The distance between the railroad and SH 6 varies from 150 to 3,500 feet with the railroad closer to SH 6 on the western side of the SH 35 Bypass Loop. Two sections of the railroad intersect SH 6 — at FM 521 and Business 35. Preemption of traffic signals is provided at several intersections along the corridor.

Pedestrian facilities — i.e., crosswalks and push buttons — within the corridor study area are limited to intersections. Ramps are provided at some intersections, and there are few sidewalks in the corridor. Existing bicycle infrastructure is limited. For carpools and vanpools, there is a park-and-ride lot at the intersection of SH 6 and SH 288.

Access

The study corridor has limited access management currently, resulting in a high number of existing driveways. These driveways provide direct access to residential and commercial properties. Overall, the corridor has nearly 800 driveways with an average density of 12 driveways per mile on the eastbound side and 15 driveways per mile on the westbound side. The areas with the highest density of driveways are in Alvin, Santa Fe, and Hitchcock. Segments with driveway density above 30 driveways per mile include the following:

Alvin
- CR 149 to N 2nd Street, eastbound
- Tovrea Road to SH 35 Bypass Loop, eastbound
- CR 149 to N 2nd Street, westbound
- Bus 35 to Tovrea Road, westbound

Santa Fe
- Santa Fe High School Drive to Tower Road, westbound
- Avenue T to FM 646 N, westbound
- Avenue T to FM 646 S, eastbound

Hitchcock
- FM 2004 to Fairwood Road, eastbound
- FM 2004 to 2nd Street, westbound
- FM 516 to Fairwood Road, westbound

Traffic Characteristics

Annual average daily traffic (AADT) volumes for 2005 in the study corridor ranged from 9,800 vehicles per day (vpd) to 21,800 vpd. The highest daily traffic volumes were concentrated in the segment from SH 288 to SH 35 Business. More recent AADT volumes for 2007 were obtained from TxDOT's 2007 District Highway Traffic Map for the Houston District. The 2007 AADT volumes indicated daily traffic volumes of 11,250 vpd to 23,000 vpd from SH 288 to SH 35 Business.

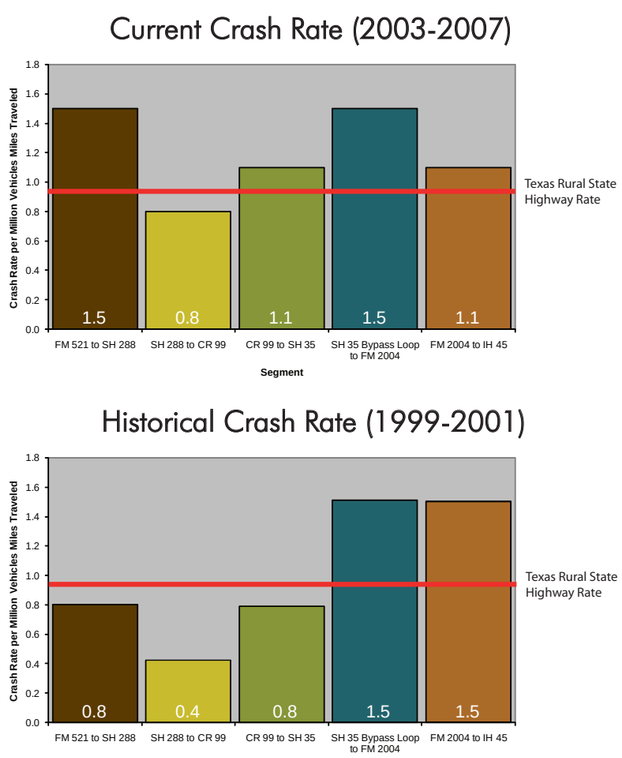
Corridor travel times for the AM peak period, mid-day peak period, and PM peak period for eastbound and westbound along SH 6 South range from 43 to 47 minutes. During the AM peak period, the average travel times were 44 minutes in the eastbound direction and 46 minutes westbound. Mid-day peak period travel times were 43 minutes in both directions, and PM peak period were 45 minutes eastbound and 47 minutes in the westbound direction.

Crash Data

Collision information was obtained from TxDOT and summarized to better analyze "hot spots" within the corridor. A 2007 report from TxDOT included information from 1999 to 2001. This information was supplemented with more recent crash data from 2003 to 2007.

From 1999 to 2001, 599 reported crashes occurred along SH 6 in the corridor. The crash data was analyzed according to severity of crash and type of vehicular movement causing the crash. The crash data was then assigned a severity level in one of five categories: fatal, incapacitation injury, non-incapacitating injury, possible injury, and non-injury. The number of crashes by severity for 1999 to 2001 and 2003 to 2007. Results show that in 1999 to 2001 only 2% of crashes were fatal, and 40% of the crashes had no injuries. Crash data for 2003 to 2007 (which was obtained from TxDOT's CRIS) reported 1,257 crashes with 53% having no injuries.

Figure 4: Area Crash Rates



There were nine categories of vehicular movement causing crashes: rear-end, head-on, side-swipe, left-turn, right-angle, pedestrian, fixed-object, pedal cyclist, and others. From 1999 to 2001, the data indicates that the majority of the crashes were rear-end. This is due to the speed differential between the vehicles traveling along SH 6 and the vehicles turning into driveways. The type of vehicle movement causing crashes was not available in the 2003 to 2007 crash data.

Utilizing the crash data, the project team calculated crash risk by segment by taking the number of crashes in a segment and dividing that number by one million vehicle miles traveled (VMT). The corridor segments were FM 521 to SH 288, SH 288 to CR 99, CR 99 to SH 35, SH 35 to FM 2004, and FM 2004 to IH 45. Note that the 2005 AADT volumes were used for calculating the VMT estimates for the 1999 to 2001 crash data, which resulted in conservative estimates. A comparison of all the rates is shown in Figure 4.

For the 2003 to 2007 crash data, the crash risk was calculated using the AADT from 2007. Crash rates are shown to the left for each segment along SH 6 South. The highest crash rates were between FM 521 and SH 288 and from SH 35 Bypass Loop to FM 2005. These areas referred to as "Hot Spots" are shown in Figure 5. "Hot spots" are any intersection with 50 or more crashes, were identified for the 2003 to 2007 crash data:

- SH 6 at SH 288 (96 crashes)
- SH 6 at Business 35 (69 crashes)
- SH 6 at Tovrea Rd (55 crashes)
- SH 6 at SH 35 Bypass Loop (89 crashes)
- SH 6 at FM 1764 (59 crashes)
- SH 6 at FM 646 North (81 crashes)

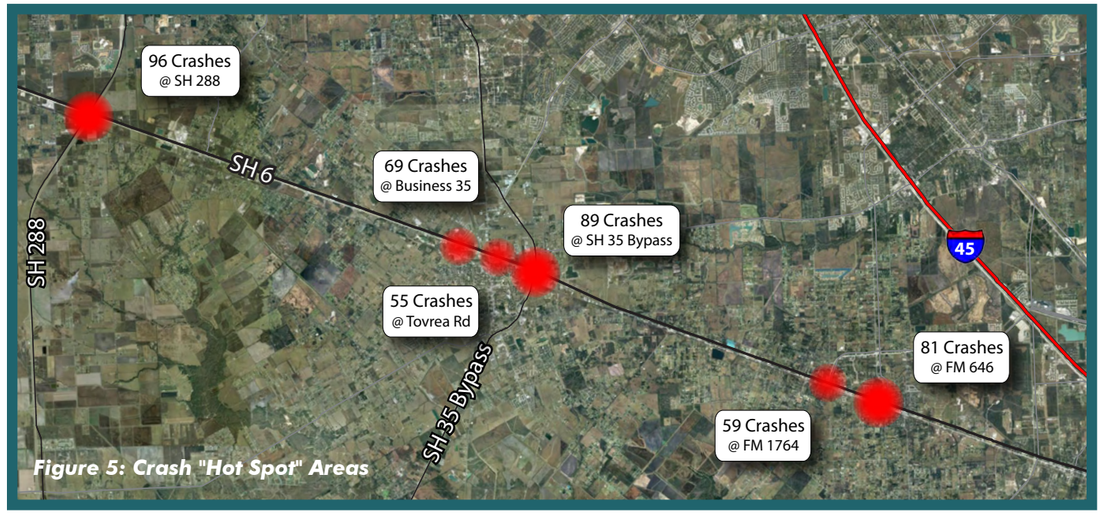


Figure 5: Crash "Hot Spot" Areas

Level of Service Analysis

The 26 signalized intersections along the SH 6 South corridor were analyzed using Synchro Professional 7.0 with SimTraffic software package. Those 26 SH 6 intersections are shown below in Table1:

FM 521	N. 2nd Street	FM 646 North
Savannah Parkway	Business 35	EM 646 South
CR 48	Tovrea Road	FM 2004
SH 288	SH 35 Bypass Loop	Delay Road
McCoy Drive	Santa Fe High School	2nd Street
FM 1128	Tower Road	FM 519
CR 99	Jackson Street	Fairwood Road
CR 146	FM 1764	Tarpon Drive
CR 149	Avenue T	

Table 1: Intersection Summary

The traffic model developed for TxDOT was updated as part of the SH 6 South Access Management Study in order to assess current conditions. Lane configuration, speed limit, and other model criteria were verified and updated. The analysis was conducted for both the AM and PM peak hours. Table 2 is a summary of the levels of service (LOS) for several key signalized intersections along the corridor. To better define LOS, the photos in Figure 6 provide examples of each level. Notice that LOS primarily relates to congestion and travel time.

Most intersections in the AM peak hour operate at an acceptable LOS C or better — except for the SH 6 at SH 35 Bypass Loop intersection. As indicated in Table 2, most of the intersections in the PM peak hour operate at an acceptable LOS except where SH 6 intersects with SH 288, FM 1128, Business 35, and SH 35 Bypass Loop NB and SB. The poor LOS is the result of higher traffic volumes at the intersection of two major thoroughfares.

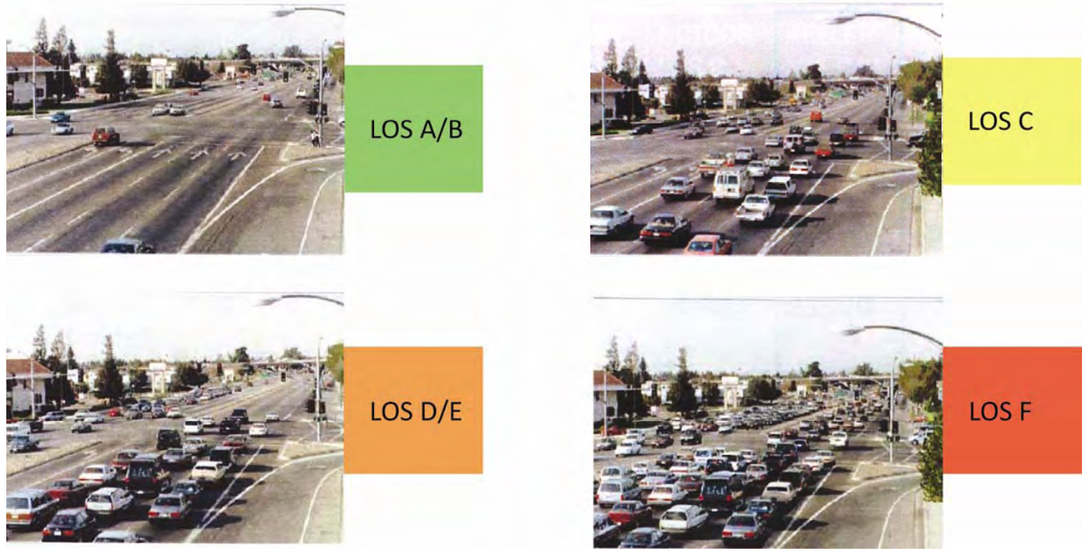


Figure 6: Level of Service Examples

Table 2: Intersection Deficiencies

Intersection	Approach	Deficient Movement	Proposed Improvements	Approach Existing LOS AM	Approach Proposed LOS AM	Approach Existing LOS PM	Approach Proposed LOS PM	Intersection Existing LOS AM	Intersection Proposed LOS AM	Intersection Existing LOS PM	Intersection Proposed LOS PM	Feasibility
SH 6 @ FM 1128	NB	Left, Thru	Right Turn Lane	D	C	C	C	C	C	D	C	NB encroaches on existing property (21' to existing pavement). WB encroaches on existing property (18' to existing pavement)
	EB	Left	Right Turn Lane	C	B	D	C					
	SB	Left		C	C	C	C					
	WB	Left	Right Turn Lane	C	C	C	B					
SH 6 @ Business 35	NB	Left	Extend Acceleration Lane	C	C	C	C	C	C	C	C	The NB right turn lane could impact existing business's driveway. The driveway is approximately 130' from the intersection. The SB right turn lane would encroach on existing property (18' to existing pavement) and 10' to the gas station sign.
	EB	Left	Right Turn Lane	C	B	C	B					
	SB		Add Acceleration Lane	C	B	C	C					
	WB	Left		C	C	D	C					
SH 6 @ SB SH 35 Bypass Loop	NB			-	-	-	-	B	B	D	B	The EB right turn lane could impact an existing business's driveway. The driveway is approximately 220' from the intersection. The SB right turn land would impact an existing business's parking lot.
	EB	Thru, Right	Right Turn Lane	C	C	E	C					
	SB	Left, Thru	Right Turn Lane, Thru Lane	B	B	E	C					
	WB			A	A	A	A					
SH 6 @ NB SH 35 Bypass Loop	NB	Left, Thru	Dual Left Turn Lanes	D	C	D	C	D	C	E	C	
	EB	Left	Dual Left Turn lanes	D	A	F	B					
	SB			-	-	-	-					
	WB			C	C	C	C					
SH 6 @ FM 1764	NB			-	-	-	-	C	C	C	C	The EB widening may impact existing business's parking lot (30' South) or impact existing business's driveway running parallel to SH 6 (15' North).
	EB	Left	Dual Left Turn Lane	D	B	C	B					
	SB			A	A	A	A					
	WB			C	C	C	C					
Avenue T	NB	Left	Left Turn lane	D	C	C	B	C	C	C	B	NB may impact existing business's driveway to the west (20') and RR Tracks are ~175' to the South. SB may impact business's driveway to the east (10' from the intersection) and a business's building (10' from existing pavement) or driveway (140' from the intersection).
	EB	Left		D	C	C	B					
	SB	Left	Left Turn lane	C	C	C	C					
	WB	Left		C	B	C	B					
SH 6 @ FM 646 North	NB	Left, Thru, Right	Left Turn lane	D	C	D	C	C	C	C	C	SB turn lane may impact existing business's parking lots (30' to the west, 0' to the east). The NB approach has RR track ~175' to the south.
	EB	Left		C	B	D	B					
	SB	Left, Thru	Left Turn lane	C	C	C	C					
	WB	Left		C	C	C	C					
SH 6 @ FM 646 South	NB	Left, Thru, Right	Left Turn lane	C	C	D	C	B	B	C	C	The NB approach has RR track ~175' to the south.
	EB			B	B	B	B					
	SB			B	C	C	C					
	WB			B	B	C	C					

Corridor Vision

The focus of the planning process is to develop a Vision that will guide the corridor. Transparency and collaboration were the core principles in establishing ownership between the participants in this planning process. Elected officials, the consultant team, local professionals, and a broad spectrum of citizens, property owners, and developers worked together early and often as the process moved forward. The open planning process cultivated a shared learning environment and timely communication among participants. The first milestone in vision development is to set clear goals and create a schedule for the project. Representatives from each city, county, and agency formed a Steering Committee to help define the following goals:

- **Maintain an open public process** – *Process included three public meetings, 10 steering committee meetings, two business workshops, and numerous one on one land owner meetings*
- **Create mode diversity within the corridor** – *Plan includes pedestrian, bicycle, transit, and land use recommendations to improve mode diversity*
- **Implement a uniform access management policy throughout the corridor** – *Plan allows each city to choose from three policy implementation strategies*
- **Create a growth strategy for the corridor that provides guidance without hindering development** – *Implementation strategy provides recommended standards and design minimums for improved development*
- **Maintain status as evacuation route** – *Improvements increase mobility within the corridor and will improve evacuation times*
- **Improve mobility** – *Several improvements will reduce delay, improve safety, and decrease travel times within the corridor*
- **Improve safety for all modes of transportation** – *Recommendations target unsafe intersections and aim to improve safety performance*

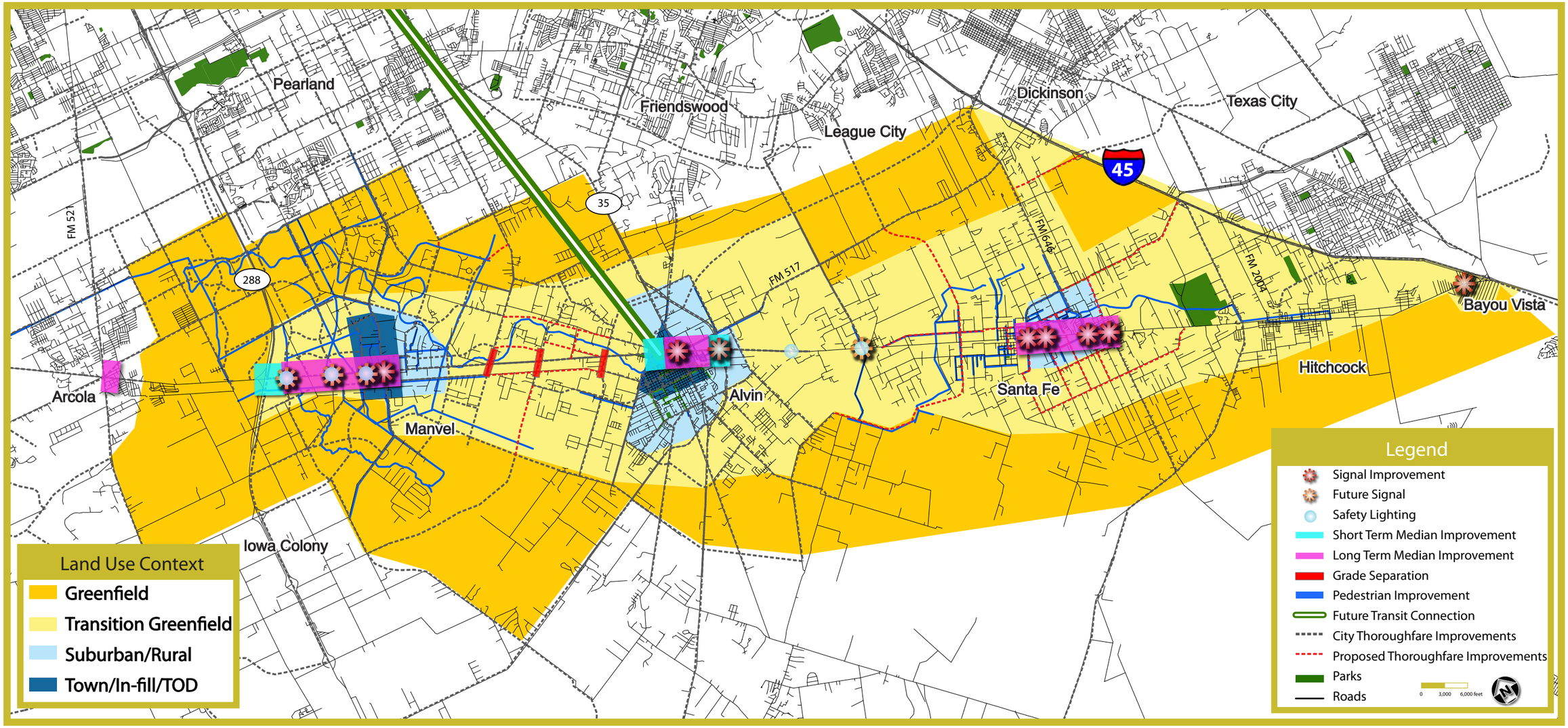
To achieve these goals, the Steering Committee also outlined five key principals that would drive the tools selected and the approach to determining the vision:

- **Access** – *Access management strategies should address both existing and future land use context*
- **Traffic Operations** – *The vision will preserve mobility, safety, and evacuation capabilities for the future*
- **Jurisdictional Coordination** – *The vision will be consistent among jurisdictions and will create a uniform approach to preserving mobility within the SH 6 South corridor*
- **Regulatory Policy** – *A uniform policy will link corridor improvements and development strategies*
- **Fiscal (Economic Vitality)** – *Improvement recommendations will demonstrate fiscal responsibility as well as improve economic vitality within the corridor*

Vision Summary

When establishing the vision, a clear growth strategy was key in determining the proper improvement tool. H-GAC's Livable Centers Program promotes new growth strategies that accommodate growth and redevelopment in a sustainable manner. Its key features are compact mixed-use, walkable design, connectivity, and accessibility to multiple modes of transportation. Although intended for higher intensity urban centers, the same policies can be applied on a smaller scale along SH 6 South. Figure 7 shows this demonstration.

Figure 7: Corridor Vision



Establishing the Vision

The public participation activities for the southern SH 6 Segment Access Management Study provide an ongoing information exchange — from the beginning to the end of the study. Gaining consensus on short- and long-range alternatives during the study process will enable the next phase of programming improvements and design to focus on implementation details rather than big-picture issues.

This section outlines the various public participation activities and techniques used during study development. To ensure a transportation planning process that supports early and continued participation, H-GAC has developed a project-specific public participation plan in accordance with their overall public involvement commitment of providing complete information, timely public notice, and full public access to key decisions (Transportation Public Participation Process adopted by the Transportation Policy Council July 27, 2007).

Public Participation Initiatives

H-GAC actively engaged the public in the decision-making process, staying in line with the Federal Highway Administration's (FHA) five key initiatives for a successful public participation process:

1. Public involvement is more than simply following legislation and regulations. In a democratic society, people have opportunities to debate issues, frame alternative solutions, and effect final decisions. Knowledge is the basis of such participation. The public needs to know details about a plan or action in order to evaluate the relative importance and anticipated costs and benefits. Through continued interaction with the entire community, agencies and project sponsors can build support and, more importantly, assure that the public has the opportunity to help shape the substance of plans and actions. In summary, public agencies must act as public servants.
2. Agency and non-agency partners need to be in continuous contact during transportation decision-making — from early problem identification to definition of purpose and need to alternatives development to implementation of a particular solution.
3. Agencies and project sponsors should use a variety of public involvement techniques to target different groups or individuals in different ways. A single, one-size-fits-all approach usually leaves people out of the process.
4. Agencies and project sponsors should seek out the public and work hard to elicit comments. It is true that resources are limited and agencies cannot make anyone participate. However, transportation agencies have repeatedly found that actively engaging the public and changing unsuccessful approaches bring greater participation.
5. Agencies and project sponsors should focus on increasing public participation in decisions rather than conducting participation activities because they are required. Decision-making should include both the continuous stream of informal decisions made by agency staff and lower-level management as well as the less frequent formal decisions made by higher-level management. Timely agency response to ideas from the public and the integration of those ideas into decisions shows the public that participation is worthwhile. A focus on the wide range of possible decision points gets agencies past simply offering the public passive opportunities to comment on proposals just before formal decision-making.

H-GAC has outlined a public participation process that will achieve these initiatives and provide the team with invaluable guidance for future improvements within the SH 6 South corridor.

Public Participation Objectives

The public participation process for the SH 6 South study was driven by 13 primary objectives:

- Initiate citizen participation at the onset of the study, and continue it throughout the process
- Intensify efforts to solicit community views prior to major project-decision points
- Provide public access to all relevant information
- Distribute regular reports of study findings to the public
- Provide orientation materials to accommodate new participants entering the process
- Maintain two-way communication between the study team and community participants to freely exchange information, ideas, and values
- Present transportation options in an objective manner
- Use a variety of techniques and approaches to reach a diverse group of persons potentially affected by the proposed project
- Give serious consideration of all suggestions from the community
- Respond timely with answers and information to citizen inquiries
- Complete documentation of public participation activities
- Incorporate small discussion groups to encourage a casual environment for discussions during public meetings
- Evaluate the public participation program's effectiveness

Targeted Groups

Three primary groups were targeted as part of this plan. Each group provided unique perspectives — ranging from the highly technical to the extremely concerned — in relation to the project.

Steering Committee
A group of local technical, and policy decision-makers was utilized for the SH 6 South Access Management Study Steering Committee. The committee met at key milestones in the process to receive and assess reports on progress, comment on the schedule, coordinate with their respective agencies, and provide oversight of major activities associated with the study. This group offered details on current and future plans as well as policies and standards to

be used in the process. The committee extended technical guidance related to project goals, measures of effectiveness, and tools to be employed along the corridor. The steering committee was composed of representatives from the Texas Department of Transportation (TxDOT), H-GAC, and local counties, and cities.

Stakeholders
The SH 6 South corridor has many affected stakeholders, including:

- Residents
- Civic and homeowner organizations
- Businesses and chambers of commerce
- Commuters
- Schools, colleges, and churches
- Police and emergency service providers
- Landowners, developers, and real estate agents
- Environmental and historic preservation groups

The team held several meetings to educate stakeholders on access management and the study process in general. The public meetings served as a method to consider individual issues and possibly incorporate those issues into the study's recommendations. The stakeholder meetings focused on the citizenry affected daily by the corridor — that is, the people that live and work in the corridor and possess intimate knowledge of the issues affecting the region.

General Public
The intent of this public participation plan was to promote honest, active, two-way communication with the public by actively listening to their concerns and keeping them informed about the study's progress so that all community factions felt that their concerns were being addressed and they had the opportunity to participate. Public meetings were a major component of this two-way communications effort and were scheduled to be held at three intervals throughout the project. For each round of meetings, there were two identical meetings held at different locations on separate nights, giving the public maximum opportunities to participate.

The first round of meetings relayed the purpose, process, and progress of the study as well as solicited the public's input on the corridor's activities and characteristics. The second round of meetings presented suggested short-, medium- and long-term recommendations and involved the pubic in a hands-on workshop to refine the recommendations. In the final round of meetings, the team will present the final proposed plan.

Outreach Approach

H-GAC employs a variety of methods to reach people of all ethnic and socioeconomic backgrounds. This approach provides education and awareness of the project as well as maximizes public input to direct future implementation.

Communication Tools

Presentation Materials. At each Steering Committee, stakeholder, and public meeting, presentation materials with clear, strong graphics were used to assist the public in understanding technical concepts. These included presentation boards, PowerPoint presentations, handouts, and other communication tools. The materials explained topics such as the study's process and goals, project schedule, overview of the corridor, and funding partners. They also conveyed the technical results at each stage of the study. Team members knowledgeable of the project were available to answer attendees' questions and provide direct input regarding the project.

Project Maps. Another important technique that was employed in engaging the public was using detailed aerial maps to gather specific comments on the public's knowledge of the corridor (i.e., locations of developments, high-crash locations, problem intersections, etc.) and suggested improvements. These maps have been documented as part of the public participation process and have become a formal portion of the project record.

Project Website (www.sh6mobility.com). As part of the effort to educate and inform the public about the study, the project team has kept an up-to-date and informative project website. Presentation materials, summary reports, public meeting notices, and other information has been periodically updated to keep the public attuned to the study's progress. Interested persons should bookmark the site and check it regularly to review new information and links to other pertinent websites.

Comprehensive Meeting Notification. As part of the goal to make diligent efforts to involve the public, the federal government has set forth in the Code of Federal Regulations the National Environmental Protection Act (NEPA) public involvement requirements (40CFR1506.6). This study's outreach approach complies with the NEPA directives for publication and notification of public meetings. It also complies with TxDOT Houston's guidelines for the sequence and types of notices. The specific outreach components include the following:

- Elected officials received a notification letter from Alan Clark, H-GAC's Director of Transportation, to serve as the first publicity item in keeping with TxDOT Houston's preference for notifying elected officials about public meeting opportunities prior to any other advertisements or mailings

- Legal ad in *The Houston Chronicle*, the area's largest distribution daily newspaper, 30 days prior to the public meetings in accordance with TxDOT Houston's preferred time line
- Website postings on the project's website (www.sh6mobility.com) and H-GAC's Transportation Public Information page
- Postcards in English and Spanish were mailed to approximately 6,000 adjacent property owners and stakeholder groups two weeks prior to the meetings. These property owners were collected from Brazoria and Galveston County appraisal districts, as well as owners located within ¼ mile of the study corridor
- E-notice sent to Steering Committee members for them to distribute to their own e-mail distribution lists
- Display ads in three community publications (*Alvin Sun*, *Brazosport Facts,* and *Galveston County News*, placed two weeks prior to the meetings
- Limited English proficiency outreach recognizing that there is a large population of Spanish-speaking households within the corridor. There were spanish display ads placed in *LaVoz*, the weekly spanish newspaper distributed by *The Houston Chronicle*, in addition to the spanish text on postcard mailings
- Posters for the Steering Committee members to post in area businesses and institutions
- Media release to area publications and radio and television stations
- Dynamic messaging signs posted by TranStar on north- and south bound lanes of SH 288 and IH 45 South the days of the meetings

All materials have contained a consistent graphical theme so that the public can readily identify the materials related to the SH 6 South Access Management Study. Also, to assure that the individuals who have expressed interested in the project receive ongoing updates of public involvement activities, the mailing list has been updated according to the sign-in sheets for each round of public meetings.

Schedule of Activities

The public involvement activities of this study have been scheduled to obtain critical input at key stages of the study to keep the project moving forward. Three series of public meetings and multiple Steering Committee and stakeholder meetings have been held throughout the course of the study. As other opportunities arise — such as standing meetings of local business and community organizations — to present findings, the team will schedule additional public outreach activities. Below are summaries of previously-held public meetings for the SH 6 South Access Management Study.

Public Meeting Round One. On September 22 and 24, 2009, H-GAC hosted public meetings regarding potential safety and mobility improvements to SH 6 South. H-GAC sought to collect information to measure and evaluate a range of viable short- and long-term improvement concepts. Two identical meetings were held in order to provide ample opportunity for the public to learn more about the study:

Tuesday, September 22 [6:30p-8:30p]
Santa Fe High School Cafeteria
16000 Highway, Santa Fe, TX 77517

Thursday, September 24 [6:30p-8:30p]
Church of the Harvest
67505 Wilson Dr., Manvel, TX 77578

At each meeting informative boards were staffed by project team members and attendees were able to express concerns, and have questions answered. Throughout the meeting, a short orientation video played on a continuous loop. Large table maps of the study area were displayed, and attendees were invited to review proposed short-, medium-, and long-term improvements. Additionally, smaller maps of proposed pedestrian improvements and thoroughfare plans were available for review. Attendees were given an opportunity to provide input via questionnaires provided by the project team. The project boards, presentation, sign-in sheets, and completed questionnaires are included at the end of this report. The table maps and orientation video are on the enclosed CD.

Seventy-nine people attended the first round of public meetings. The following is a breakdown of attendees by group.

Tuesday, September 22:
General Public: 27
Project Team: 8

Thursday, September 24:
General Public: 37
Project Team: 6
Media: 1

Public Meeting Round Two. H-GAC hosted two additional meetings on March 23 and 25, 2010:

Tuesday, March 23 [6:30p-8:30p]
Santa Fe Junior High School
4132 Warpath Ave., Santa Fe, TX 77510

Thursday, March 25 [6:30p-8:30p]
Cafeteria Church of the Harvest
7505 Wilson Dr., Manvel, TX 77578

These meetings were also equipped with staffed informative boards, large table maps of the study area, smaller maps of proposed pedestrian improvements and thoroughfare plans, an orientation video, and questionnaires. The project boards, presentation, sign-in sheets, and completed questionnaires are included at the end of this report. Table maps and orientation video are on the enclosed CD.

Seventy-seven people attended the second round of public meetings. Below is a breakdown.

Tuesday, March 23:
General Public: 11
Project Team: 9
Elected Officials / Steering Committee: 3

Thursday, March 25:
General Public: 36
Project Team: 10
Elected Officials / Steering Committee: 8

Public Meeting Round Three. H-GAC hosted the final corridor meetings on September 7 and 9, 2010:

Tuesday, September 7 [6:30p-8:30p]
Santa Fe Junior High School
4132 Warpath Ave., Santa Fe, TX 77510

Thursday, September 9 [6:30p-8:30p]
Cafeteria Church of the Harvest
7505 Wilson Dr., Manvel, TX 77578

Sixty-three people attended the second round of public meetings. Below is a breakdown.

Tuesday, September 7:
General Public: 5
Project Team: 9
Elected Officials / Steering Committee: 1

Thursday, September 9:
General Public: 17
Project Team: 8
Elected Officials / Steering Committee: 7

Call to Action

The Introduction section of this document presented the thought that development pressure is beginning to move south toward the SH 6 South corridor. The collected technical information such as crash data and traffic volumes demonstrated the increase in travelers within the corridor. If you review Figure 8, you will notice the limited rural areas along the corridor currently (2009 aerial). By 2035, however, thousands of new residents will call the SH 6 South corridor study area home. These residents will have moved to the area for a variety of reasons, including job opportunities, cost of living, the subtropical climate, and recreation activities.

Today, the region's diverse economy is rooted in agriculture and manufacturing type industries, but it is projected to expand and include more residential, retail, and commercial uses. Continued economic diversification will be fundamental to maintaining growth, development, and a sustainable tax base. To manage growth — so that the economy will remain diverse and become more sustainable — future planning efforts must balance the various demands on public infrastructure with high performance standards. There must be a strong understanding of the possible ripple effects of an investment among competing components of the economy (i.e., environmental preservation versus sprawl development).

The following Toolbox and Implementation chapters of this report seek to illustrate the benefits of advanced planning and implementation of the appropriate tool. In essence, it is recommending a proactive approach to development rather than reactive. These tools will provide an opportunity to manage what the region could look like if growth is anticipated and planned.

Effects of Existing Land Use

Based on our analysis, the current development standards and transportation policies will not attract, enhance, or mange growth as desired by residents and stakeholders within the area. This *Call to Action* affirms that the communities along the SH 6 South corridor have choices when forming their region. Policies and investment strategies can be amended to preserve agricultural and native heritage while accommodating growth in a wise manner. These changes require consideration of new programs, policies, and investment strategies that will require cooperation of multiple governmental entities. (A list of partnerships that must be garnered for the initiative to prosper has also been created.)

The matter is urgent, as the future of the SH 6 South corridor and surrounding jurisdictions depends on it.

Figure 8: Localized Aerial

Toolbox

Because of the large amount of undeveloped land surrounding the SH 6 South corridor, a mobility toolbox was created for the study. The intent of this toolbox is to provide decision-makers with tools to properly plan and manage the corridor. These tools include physical measures — such as street improvements, transit alternatives, technology systems, and corridor management techniques — that are aimed at increasing the capacity of the transportation facility / network.

Policy instruments will increase the efficiency of new infrastructure and private developments by incorporating best practices into their design and construction. However, not all the tools are aimed at moving vehicles. Special effort was made to include tools that mitigate traffic by promoting pedestrian and bicycle activity and creating walkable / bikeable places such as transit-oriented developments (TOD) and livable centers.

Many of the techniques outlined here have been used throughout the region and are currently under construction on other portions of the SH 6 corridor. Furthermore, H-GAC continues to prompt corridor management through their commitment and continuous effort to fund access management corridor plans. Other initiatives, such as the Livable Centers initiative, creates the foundation for the use of these tools. Each municipality within the corridor needs to be poised for implementing transportation improvements to support future and existing development types. To meet the future transportation demands facing the region, a multimodal approach must be adopted.

A multimodal transportation system is defined as "a network of facilities designed for joint use with connections between two or more modes of transportation." This document proposes a policy for developing livable, multimodal facilities to realize the goals of this study. Furthermore, this study's recommendations are developed with the intent of implementation over time as new streets are constructed and existing streets are reconstructed.

This toolbox and its implementation matrix (shown later in this document) provide a road map for creating livable, mobile, and safe corridors.

Intersections

Intersections are one of the most significant factors when evaluating a corridor's mobility. The interaction between the main highway and its cross-streets can reduce speeds, increase accidents, and hinder access to adjacent properties. Properly planning intersections and the type of intersection control will assist in preserving highway improvements. Table 3, Development Policy Matrix in the following section highlights recommendations for increasing spacing at signalized intersections as well as denoting which intersection will be "major" or "minor" in character.

Types of Intersections

Major

Major intersection road junctions accommodate major roads (arterials and collectors). They tend to be four-way and can have a number of different configurations based on the adjoining roads. Major intersections use traffic signals and their timings as the main form of traffic control.

Signal timing is the sequence and duration of each phase of a traffic signal. Advanced traffic signal controllers provide great flexibility in controlling the flow of traffic through an intersection. Having signal timing along a corridor can increase the efficiency of the street by allowing the highest possible number of vehicles to pass in the shortest time span. Signal timing can also positively affect the air quality of a city because travel time and idling is reduced. This technique can be used to increase capacity on corridors and is a less expensive option than adding lanes. These signals should be spaced greater than 1,300 feet apart.

Minor

Minor intersections accommodate minor roads (minor arterials, minor collectors, and local streets can be controlled or uncontrolled depending on traffic volume.

Uncontrolled intersections do not have signs or signals as a form of stop control. Instead, priority rules apply. For example, at a four-way intersection, traffic on the right often has priority (also called the driver's right-of-way). Similarly, at a three-way intersection, either traffic from the right has priority or traffic from the continuing road. For traffic going the same or in opposite directions, those vehicles that go straight have priority over those that turn off the road.

A stop-controlled intersection is a form of controlled intersections. Two-way stops are common; however, four-way stops can be implemented if needed. Yield-controlled intersections may or may not have specific "YIELD" signs. For these intersections, right-of-way rules also apply.

A traffic circle is a type of minor intersection at which traffic streams are directed around a circle. Types of traffic circles include roundabouts, mini-roundabouts, rotaries' "STOP"-controlled circles, and signal-controlled circles. Some people consider roundabouts to be a distinct type of intersection from traffic circles (with the distinction based on certain differences in size and engineering).

Intersection Access

Because connectivity is a key factor in ensuring that people can walk or bike between neighborhoods, cul-de-sacs, and communities, street connectivity requirements are potentially important at the local neighborhood level. An interconnected local street system is necessary to promote orderly and safe development by making certain streets function in an interdependent manner, provide adequate access for emergency and service vehicles, enhance access through connected transportation routes, and provide continuous and comprehensible traffic routes.

Creating connectivity and street network requirements rather than specifying type of streets — a technique typical of thoroughfare plan designations in areas of suburban or rural residential development — can often lessen the burden on designated thoroughfares. Requiring interconnected local streets is gaining ground as a method of ensuring that transportation systems meet the needs of their surrounding communities while allowing credits for trail connectivity that meet local circulation needs.

A network is a structure of streets and highways that serves and connects multiple places and people via multiple modes of travel. Sustainable networks require local streets to be highly connected with the arterial system, and they represent a cost-effective alternative to expensive grade-separations, interchanges, and corridors that require extensive right-of-way purchases. This connectivity of sustainable networks increases the opportunities for and performance of other modes of travel such as walking, bicycling, and riding transit, as well as improves emergency response times. Sustainable networks take a greater level of planning and creative design to build; however, their result is sustainable in terms of capital and maintenance costs. The appendix describes several planning and modeling processes that should be considered as major roadway widening, grade separations, or new functionally classified streets are being planned.

Sustainable networks represent a cost-effective alternative to expensive grade separations, interchanges, and corridors that require extensive right-of-way purchases.

Driveway Access Standards

Consolidating the number of driveways that exist along a street can have positive benefits for both the traveling public and property owners. Fewer driveways reduce the number of conflict points along the street, thereby increasing safety. In many commercial areas, the length of frontage available to each property owner is limited, and limited frontage exposure makes it difficult to provide properly designed driveways. Eliminating driveways and sharing access can improve overall access and increase the available area for parking and deliveries. Reducing access locations is difficult because many property owners assume that the loss of access will result in a loss of customers. However, cross-access — that is, the movement of vehicles between two adjacent sites without having to enter the public street system — can be implemented along the SH 6 South corridor. The purpose of this approach is to limit the number of driveways as well as Vehicle Miles Traveled on the busy roads surrounding commercial centers. With this method, trips between neighboring sites will not have to proceed onto the major road network.

Medians

Raised medians are typically used in urban settings and provide a positive separation between opposing traffic streams and restrict the number of opportunities for left turns between intersections. Therefore, raised medians reduce conflict points. Locations where left turns are permitted can be channelized to include a left-turn bay where turning vehicles are protected and removed from the traffic stream. Including left-turn bays increases the efficiency of the travel lanes. Also, adding raised median treatments to corridors has shown a reduction in crashes and an increase in safety. Raised medians can also be landscaped to enhance the aesthetics of the corridor.

Corridor Lighting

Pedestrian and street lighting can increase visibility and safety for users after dark. Standard light fixtures also help establish a design theme by providing a consistent architectural element that can be repeated throughout the corridor.

Attachments such as seasonal banners or hanging baskets can be added to poles to highlight a special event or area.

Landscaping Elements

Landscaping and street trees can enhance a neighborhood's identity by establishing a consistent aesthetic for the corridor and increasing visibility of significant elements such as monuments, major intersections, or plazas. Street trees can also aid in traffic calming and make for a more pleasant pedestrian experience by providing shade for sidewalks and a physical separation between pedestrians and moving traffic.

Pedestrian Amenities

Pedestrian amenities are valuable in giving any street a "sense of place" while creating aesthetics that are pleasing. They allow for certain areas to become pedestrian-friendly, which in turn, increases social interaction in public spaces. These amenities are can be either visual, textural or both.

There are many amenities to choose from, ranging from informational to practical, and the number of combinations are limitless. Examples include bollards, planters, decorative sidewalk paving, public rest rooms, telephone booths, waste receptacles, clocks, benches, picnic tables, and water fountains.

Studies have shown, when amenities are properly planned and implemented, that people will use their features. This is ideal especially for potential redevelopment and revitalization projects in high traffic areas.

Grid / Thoroughfare Planning

A connected network can handle a large capacity of traffic, as is seen in the center of Manvel. The larger capacity is possible because of proper network spacing, the distance between intersections. Network spacing is important for increasing connectivity in a given area — the more connected a network, the more efficient.

A downtown area, for example, has smaller network spacing than a typical suburban development. The greater the spacing, the more traffic "loads up" on fewer streets, while smaller network spacing diffuses traffic and encourages increased pedestrian travel due to shorter walking distances.

Street Types

Properly planning for the size, alignment, and character of new roads and the retrofit of existing roads to compliment sustainable land development patterns and cultural, historical, and natural resources of the community is essential to realizing SH 6 South's vision.

Currently, most roads are sized based on maximizing capacity for the automobile, and the roads are aligned to meet the desired speed determined by functional classification. This offers little consideration to complementing adjacent land use. Requests for exceptions to current roadway design standards from neighborhoods and developers is handled on a case-by-case basis and are approved at the discretion of the local government's engineering department. Similar to the access management recommendation above, a coordinated and consistent Context Sensitive Solutions (CSS) policy is needed.

A policy framework developed around the concepts of context sensitive streets aims to find the best street solution for a given area. This concept would lead to re-designating existing thoroughfare plans, which are typically focused on a hierarchy of streets to assign traffic patterns. CSS elements proposed in the Recommended Best Practice of the Institute for Traffic Engineers (ITE) and the Congress for the New Urbanism (CNU) alternatively stress the designation of streets based upon their character and the character of the uses and building forms adjacent to them. The new classifications are shown below in Figure 10.

Thoroughfare Types							
Functional Classification	FREEWAY/ EXPRESS-WAY/PARK-WAY	RURAL HIGHWAY	BOULEVARD	AVENUE	STREET	RURAL ROAD	ALLEY/REAR LANE
Principal Arterial	■	■	■	■	■		
Minor Arterial		■	■	■	■		
Collector				■	■	■	
Local					■	■	■

Figure 10: CSS Thoroughfare Types
SOURCE: ITE Context Sensitive Solutions for Major Urban Thoroughfares

A transition from the traditional street classification to the proposed CSS classification system allows communities to focus on all of the modes of transportation needed within a given corridor. Additionally, broad guidelines are not enough to create a livable street environment. Good street design can be accomplished by allowing flexibility while working within a general acceptable design framework.

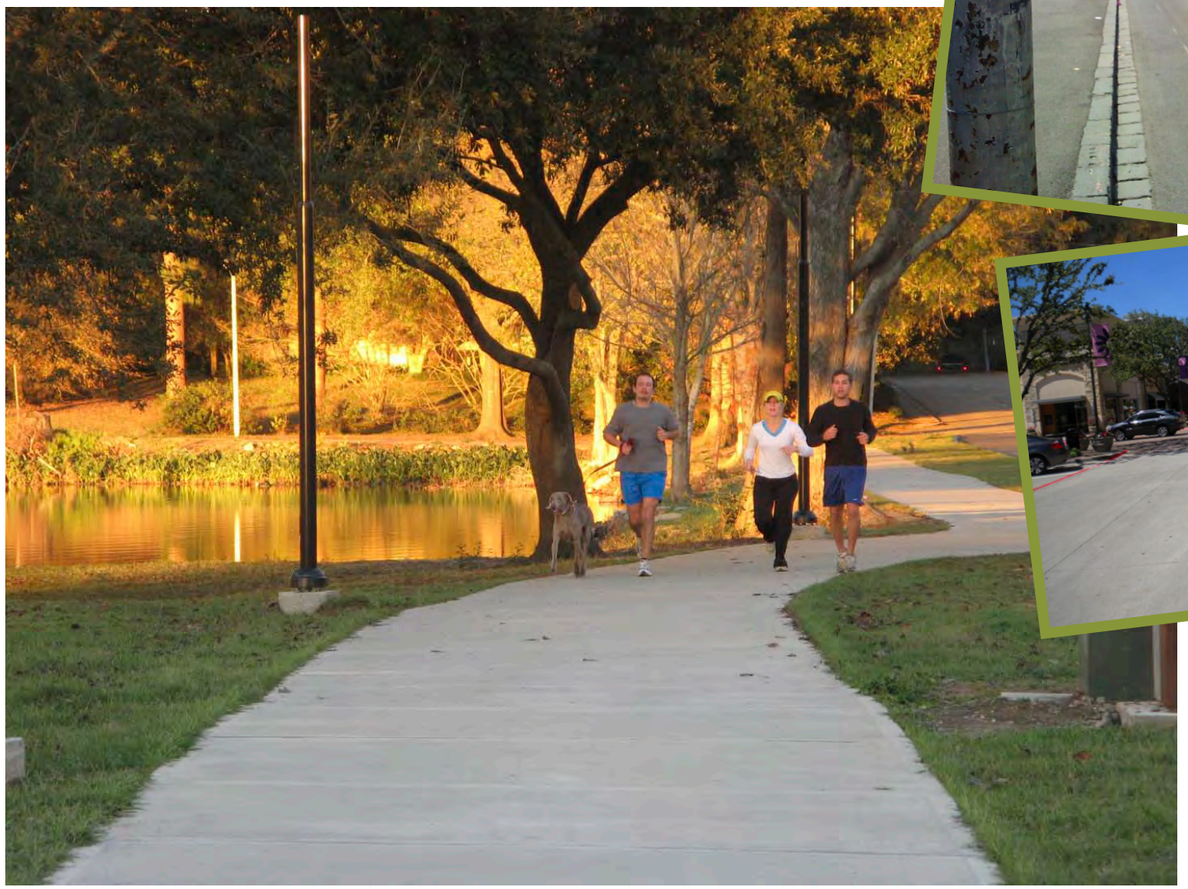
In anticipating the development of roadways within the region, the thoroughfare plan designations are intended to provide the greatest flexibility as traffic patterns dictate when a facility is upgraded to include more travel lanes. Coordinating CSS design principals with a citywide thoroughfare plan can create a properly planned, development-friendly strategy for any city.

Pedestrian / Bicycle Mobility and Linkages

Pedestrian Enhancements

As a tool, pedestrian enhancements become the primary transportation element that connects all travel modes. Increased pedestrian amenities and well-planned pedestrian connections introduce walking as a viable form of transportation, especially when integrated into TODs. A pedestrian-friendly environment is essential to the success of many of the other concepts defined in the Development Matrix, including mixed-use centers, increased transit use, main streets, and park-once districts.

The multimodal and livable streets described in Our Vision for H-GAC must apply to everyone traveling along the road. A sidewalk without curb ramps is useless to someone using a wheelchair. A street with an awkwardly placed public transportation stop without safe crossings is dangerous for transit riders. Conversely, a road with heavy freight traffic must be planned with those vehicles in mind, and pedestrian access should be limited.



The future use of pedestrian enhancements will focus on improving non-vehicular access to new centers and existing destinations. Priority locations for enhancements should be transit stations and stops, routes from neighborhoods to schools, as well as along multimodal corridors and livable and main streets. These enhancements come in the form of better coordination between public works and private development to create a cohesive pedestrian environment, complete sidewalk connections, reduced neighborhood street speeds with traffic calming and slow speed design, and improved location and coordination of transit stops into new developments and public works projects.

Bicycle Enhancements

Bicycle enhancements help provide a viable alternative to driving for the commuter cyclist and facilitate bicycle travel for the recreational cyclist. Successful enhancements emphasize adequate, well-maintained, continuous, and secure facilities. Connecting the bicycle system to other modes of transportation involves linking the travel system to itself and to the end of the trip.

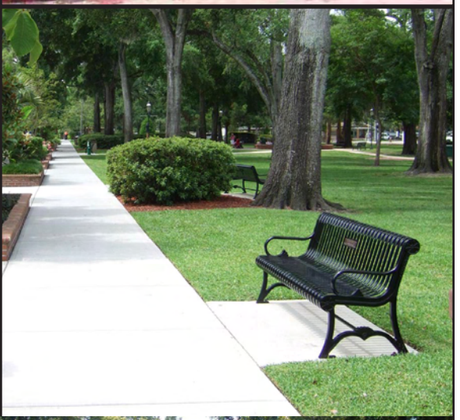
Many bicycle facilities, especially trails, have multiple commuter and recreational users and should be designed for multiple uses. A bicycle-friendly environment consists of significant regional trails linked to a network of major streets with striped bicycle lanes and / or signed bicycle routes. This kind of system maximizes connections to other modes (such as pedestrian routes and transit) and minimizes unsafe interactions with auto traffic at intersections.

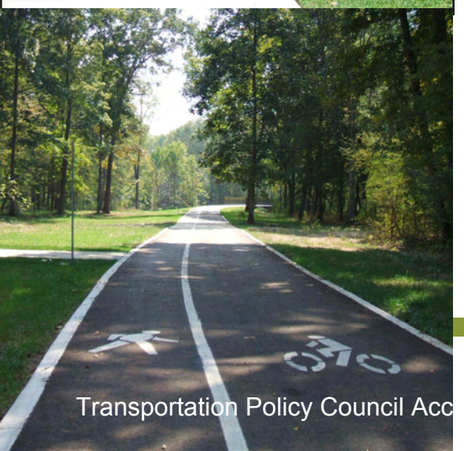
Benefits of bicycling include:

- Fewer vehicle miles traveled and less environmental pollution
- Reduced land and financial resources devoted to vehicle parking and travel lanes
- Improved health through exercise and stress reduction
- Reduced individual travel costs (auto maintenance, parking, fuel)

Parking Types

On-street parking is typically provided in business districts where commercial establishments are constructed on residential streets. On-street parking can provide greater accessibility for patrons using commercial districts and can be designed as angled or parallel parking. Redeveloping areas into walkable communities has re-established the desire for on-street parallel parking as part of the street design. The introduction of on-street parking helps facilitate multimodal mobility by encouraging more pedestrian activity.





General Mix of Uses

A general mix of uses refers to making sure there is a healthy balance between residential, commercial, industrial, office, institutional, or other land uses. Having a balance offers convenience for the public.

Development Orientation

The direction in which a development or project is oriented can affect potential solar gain. It also affects light penetration into the development as well as solar exposure for outdoor areas in the vicinity.

Scale / Intensity (Building Heights)

Scale and intensity seems to always present planning and design issues. These situations arise in a variety of situations such as creating economically feasible development plans; developing zoning for a new district; guiding development in a historic district, evaluating shadow, wind, and other potential impacts; and reviewing proposals for consistency with community goals or compatibility with adjacent building or open space.

Pedestrian Accommodation

A sidewalk is a path for pedestrians that is situated alongside a road or footpath through a park. A sidewalk may accommodate moderate changes in grade. In the United States, most sidewalks are constructed of concrete and are usually 5 feet wide and 4 inches thick. Sidewalks can also be constructed of brick. Sidewalks should be provided near schools, parks, neighborhoods, or in other areas where pedestrian activity is observed. Sidewalks should be constructed according to current standards of the Americans with Disabilities Act of 1990 (ADA).

A bike lane is located on the edge of a street or between travel and parking lanes. Typically, bike lanes are 5 or 6 feet in width and allow for cyclists to have their own space on the street. Bike lanes help connect cyclists with important destinations and transit facilities. Having bicycle infrastructure also improves air quality by reducing the number of vehicular trips.

A multiuse path can be constructed on right-of-way provided for that purpose. Multiuse paths should be constructed a minimum of 10 feet wide, and most are hard surfaced to facilitate their variety of uses. Signed and striped to ensure they operate as designed, multiuse paths are used by walkers, joggers, and bicyclists. Properly designed and maintained paths will provide a safe, efficient place for travel and recreation.

Neighborhood Linkages

These linkages are a good way to bring two or more neighborhoods, which are usually closed off to each other, together, allowing these neighborhoods to interact with one or the other. Popular ways of doing this includes bike trails, sidewalks, and adjoining community parks.

Building Types

A building type refers to the arrangement of individual dwelling units and their placement next to, above, or below each other. “Single-family detached” and “multifamily attached” are examples of residential building types. Others include:

- Multifamily low-rise
- Multifamily mid-rise
- Multifamily high-rise
- Manufactured housing
- Office buildings

Open / Civic Space Types

Open and civic spaces are public spaces meant to be enjoyed by the public. Open space broadly includes woodlands, fields, wetlands, streambanks, floodplains, and unique geologic formations. Alternatively, civic spaces are open areas within an urban setting, such as inner city parks, plazas, and outdoor auditoriums.

Implementation

Does the city create a sense of place? Is the city self-sufficient? Is the city sustainable? Many of these questions are brought up in the vision process to help the city envision what it would like to see itself as in the future. These cities take into account many variables, both tangible and intangible. Place making “tools” are then researched and gathered to remedy any question and problem that may arise. However, tools are only good if they are able to be effectively implemented. Herein lie the roadblock the planning process faces, which is the absent regulatory clout it must have in order to see a development project through.

Development Policy Matrix

In order to best implement the corridor vision, the study team is recommending that a formal corridor policy be adopted. Specifically, there are three ways a city can implement the development policy matrix that will follow: form-based code, overlay zoning, or access management.

Form-Based Code

An alternative to conventional zoning, form-based coding can cultivate built results that can be predicted before any development occurs. Instead of separating uses, form-based coding uses physical form as the organizing standard. Cities and counties alike can adopt these codes and place them into their regulatory laws.

Form-based code can address and regulate the type of façade used in a particular setting, form, mass and scale of buildings, and the types of streets and blocks. In contrast, conventional zoning focuses on the segregation and micro management of land uses, along with controlling the development intensity through parameters that are both uncoordinated and abstract, such as floor-to-area ratio, dwellings per acre, setbacks, parking ratios, and traffic levels of service. A form-based code is a tool that can help to achieve a consensus community vision; however, this tool is only as good as the quality and objectives of the components in it.

Overlay Zoning District

A regulatory tool that creates special zoning districts called overlay zoning can be placed over an existing base zone. This, in turn, identifies special provisions within the created zone. In addition, an overlay-zoned district can share common boundaries with the base zone or cut across several base zone boundaries. Finally, to protect a specific resource or guide the development within a certain area, regulations or incentives can, and usually are, attached to the overlay district.

Access Management Policy

Access management regulations can be an effective enforcement tool for cities. It offers a good systematic control of the location, spacing, design, and operation of driveways, interchanges, median openings, and street connections. This type of management can regulate the design of access connections, location and spacing of connections, spacing of traffic signals, spacing of median openings, joint and cross access requirements, access permitting, and interchange areas.

The implementation phase of any project can be a complex task for any city. Using any or all of these tools can give any city the regulatory authority to employ Table 3: the Development Policy Matrix, and in turn, provide uniformity throughout the planning, development and building process. The following two pages present this matrix and "rules of thumb" the can be employed within the corridor. Three major development contexts were identified for livable center projects along SH 6 South. Those contexts are:

- In-fill / redevelopment opportunities within a traditional downtown context
- In-fill / redevelopment within an under-performing suburban strip commercial context
- Greenfield development

In-fill /Redevelopment Within a Traditional Downtown or Transit Oriented Development Context

Cities such as Alvin and Santa Fe have traditional downtowns that form the historic roots of these farming communities. Although small in scale and area, these downtowns have a physical framework with intact street grids, adjacency to major transportation networks (SH 6 South and rail), and connectivity to existing neighborhoods.

The design team makes the following recommendations for developing a livable centers plan for such traditional downtowns:

- Maintain the existing street grid to the extent possible
- Create gateways into downtown from SH 6
- Identify opportunities for in-fill retail along the "Main Street," keeping with the scale of the existing historic fabric
- Concentrate pedestrian-oriented mixed-use for 4 to 6 blocks near any future transit station or along the community's "Main Street"
- Create opportunities for new building types such as town homes and live-work units as transitions from the downtown core to adjoining neighborhoods
- Create a range of civic and open spaces such as plazas and squares that can become the center of community life
- Allow light industrial and office uses where appropriate as transitions between downtown and other auto-oriented or industrial areas

In-fill /Redevelopment Within a Suburban Context

All communities along the SH 6 South corridor have their main commercial development along both sides of SH 6. Some of these are older commercial developments with aging buildings, under-performing retail, or infrastructure that often does not meet today's codes and ordinances. Redevelopment of these areas should balance the need to keep the limited commercial areas of these communities viable, while maintaining SH 6 South as a major hurricane evacuation corridor.

Below are the study team's recommendations for in-fill / redevelopment areas within aging, suburban contexts:

- Identify key locations of existing, utilized strip commercial that needs significant improvements at key intersections along SH 6 South
- Create an economic development incentive policy that ties reinvestment within these locations to public infrastructure support
- Consolidate driveways and install cross-access easements across adjacent properties to create a de facto slip-lane along the frontage of the commercial properties
- Establish horizontal and vertical building façade articulation standards for strip commercial uses along SH 6 South
- Consider changes to zoning standards that permit (by right) residential uses on upper-level floors of commercial buildings and as transitions to adjoining properties and/or neighborhoods on the rear of the commercial property
- Establish streetscape standards — for example, trees, sidewalks, trails, parkways, and pedestrian amenities — that minimize the impact of private parking along the SH 6 South frontage

Greenfield / New Development in a Suburban Context

Communities also have the opportunity to shape Greenfield development to be more sustainable and support the goals of the Livable Centers Policy. To this end, communities along the SH 6 South corridor should take advantage of this opportunity to attract quality, sustainable growth by applying the following principles:

- Identify locations with significant vacant properties (over 20 contiguous acres) with frontage along SH and / or significant environmentally sensitive areas
- Create policy (comprehensive plan elements) and regulatory zoning framework to implement plans for traditional urban neighborhoods with:
  - A network of walkable streets
  - A range of residential uses and types
  - A commercial / mixed-use center of the development
  - Appropriate transitions to SH 6 South and adjoining properties (both vacant and existing neighborhoods)
  - Development that preserves sensitive environmental areas and orients the development around these features as key elements of the project
  - A range of walking, biking, and other alternative transportation options
  - Economic incentives for public infrastructure to development projects that meet these policy goals

Table 3: Development Policy Matrix

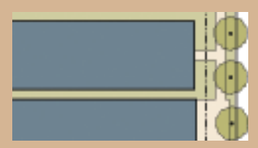
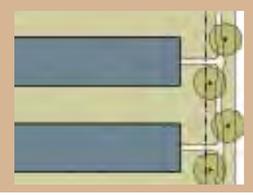
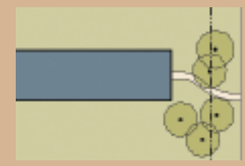
Livable Center Tools/Criteria	Development Context Town/In-fill/TOD	Greenfield	Transition Greenfield	Suburban/Rural
Development Context Descriptions				
State Highway 6 Elements				
Lane Width	11’ to 12'	11’ to 12'	12'	12'
Intersection type (Preferred Thoroughfare Spacing)				
Major arterial	Signalized intersection (1 mile min, 2 mile max)	Signalized intersection (1 mile min, 2 mile max)	Signalized intersection (1 mile min, 2 mile max)	Stop controlled intersection (1mile min, 2 mile max)
Minor arterial	Signalized intersection (1/4 mile min, 1/2 mile max)	Stop controlled intersection (1/4 mile min, 1/2 mile max)	Stop controlled intersection (1/4 mile min, 1 mile max)	Stop controlled intersection (1/4 mile min, 1 mile max)
Collector	Stop controlled intersection (800’ feet min, 1,000’ feet)	Stop controlled intersection (800’ feet min, 1,000’ feet)	Stop controlled intersection (<1,500’ feet min)	Stop controlled intersection (<1,500’ feet min)
Local Street	Stop controlled intersection (400’ feet min, 600’ feet)	Stop controlled intersection (400’ feet min, 800’ feet)	Stop controlled intersection (<1000’ feet min)	Stop controlled intersection (<1000’ feet min)
Intersection access				
Major arterial	Full access	Full access	Full access	Full access
Minor arterial	Reduced (no cross street access)	Reduced (no cross street access)	Full access	Full access
Collector	Right turn only	Right turn only	Reduced (no cross street access)	Full access
Context Speed	30 mph	45 mph	45 mph	55 mph
Driveway Access Standards	Primary access through adjacent thoroughfare, driveway access limited to one (1) shared driveway per block	Primary access through adjacent thoroughfare, driveway access limited to one (1) shared driveway per block	Primary access through adjacent thoroughfare, driveway access limited to two (2) shared driveway per block	Primary access through adjacent thoroughfare, driveway access limited to three (3) shared driveway per block
Medians type	Raised, landscaped medians	Two way left turn lane	Raised concrete median	Two way left turn lane
Corridor Lighting	Continuous lighting through urban areas that conform to context design standards.	Safety lighting at major arterials that exceed 13,000 vehicles per day.	Safety lighting at major arterials that exceed 13,000 vehicles per day.	Safety lighting at major arterials that exceed 13,000 vehicles per day.
Landscaping Elements	Street trees in tree wells or landscape strips and in orderly rows and spaced 40' on center 	Street trees (40' - 60' on center) in landscape strips/ parkways in orderly rows or grouped; shrubs/landscape berms separating roadway from sidewalk 	Street trees in informal rows and groupings 	Natural vegetation 
Pedestrian Amenities	Pedestrian scale lights, sidewalks, street furniture, etc.	Sidewalks, street lights	Sidewalks	None
Drainage Type	Curb and gutter	Curb and gutter	Curb and gutter or swale	Swale

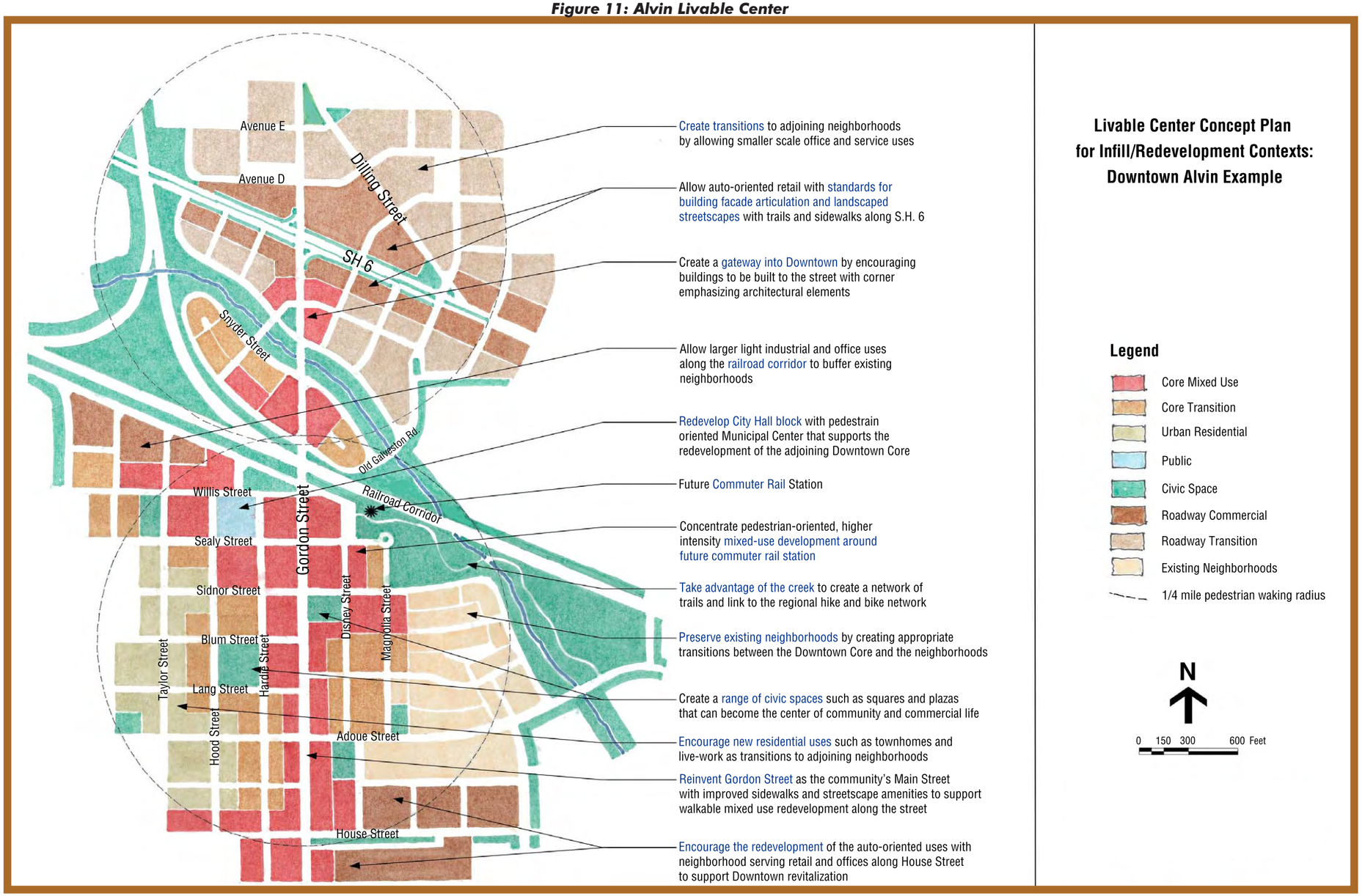
Table 3 Continued

Livable Center Tools/Criteria	Development Context: Town/In-fill/TOD	Greenfield	Transition Greenfield	Suburban/Rural
Number of Intersections per sq. mile	>150	100 - 150	<100	<100
Block width ranges	200' - 500' (max)	600' - 800'	<1000'	>1000'
Street types	Commercial Street, Avenue, Boulevard	Commercial Street, Avenue, Boulevard	Avenue, Boulevard	Road
Pedestrian/Bicycle mobility & linkages	Sidewalks and on-street shared facility	Sidewalks and on-street shared facility	Sidewalks and trails	paths and trails
Integration with Community thoroughfare plans	Design standards for each appropriate thoroughfare type should be included in the community thoroughfare plans. Location of new thoroughfares including critical connectivity goals should be included in community thoroughfare plans.			
Driveway Spacing Standards	200'	200'	200' - 400'	>400'
Landscaping Amenities	Street trees in tree wells or landscape strips and in orderly rows and spaced 40' on center	Street trees (40' - 60' on center) in landscape strips/ parkways in orderly rows or grouped; shrubs/landscape berms separating roadway from sidewalk	Street trees in informal rows and groupings	Natural vegetation
Drainage Type	Curb and gutter	Curb and gutter	Curb and gutter or swale	Swale
Design Speed	See street type document			
Parking Types	On street (parallel and angled)	On street (parallel and angled)	Angled	none
Placemaking Elements				
General Land Use Mix	Mixed use (commercial/retail on the ground floor and office/residential above)	Mixed use, professional offices, general offices and mixed residential	Retail, restaurant, office, auto-oriented uses, auto-service uses	Low intensity residential and commercial, institutional (churches and schools)
Development Orientation	Pedestrian oriented	Pedestrian and auto-oriented	Auto-oriented	Auto-oriented
Scale/Intensity (building heights)	2 - 3 stories (generally 2 stories)	2 stories	1 story (generally)	1 - 2 story
Pedestrian accommodation	High	High	Limited (some sidewalks)	None
Neighborhood linkages	High	High	Limited (some sidewalks)	Trail connections along creeks and other natural features
Building types	Mixed use building, lofts over retail	Mixed use buildings, office buildings, apartment buildings	Single-use retail (big-box), strip retail, retail pad sites, etc	Farms, churches, schools, small residential, other related commercial structures (metal and wood barns, etc)
Open/Civic space types	Plazas, squares, and greens	Plazas, squares, greens, and parks	Parks	Parks and environmental preserves

Application of the Development Matrix

An example of how these tools and matrix can be used was created for Alvin. The proposed livable center strategy shown in Figure 11, demonstrates where the tools can be implemented within the city. The area was selected for its future connection to commuter rail potential as well as the nearby downtown area. This livable center would join these two areas and expand the walkable areas within Alvin. Also notice the elements of access management have been incorporated along State Highway 6 along with a strong network of streets.

Figure 11: Alvin Livable Center



Technical Summary

In order to implement these policies and create a livable corridor some technical design improvements to the SH 6 South corridor are recommended. To more adequately program funding within the corridor, the recommended improvements have been divided into short, medium, and long term projects shown in Table 4. Projects were categorized based on four major variables: existing volumes, crash rates, right of way acquisition, and project cost. The following summary provides the technical information used to determine the proper improvement type and location as well as the time frame in which the implementation of the project is recommended.

Table 4: Improvement Summary

Jurisdiction	Segment	Length (miles)	Existing Number of Lanes	Daily Volume (2005)	Projected Number of Lanes	Projected Daily Volume (2035)	Crashes (2003-2007)	Crash Rate per million VMT	Recommendation		
									Short Term	Medium Term	Long Term
Arcola/Fort Bend County	FM 521 to Old Airline Drive (CR 48)	3	6	14600	6	33000	63	0.79		Raised Median	Continuous lighting
Brazoria County	Old Airline Drive to SH 288	1	6	14600	6	32000	23	0.86			Continuous lighting
Manvel	SH 288 to Proposed Colony Drive	0.5	6	20300	6	41800	98	5.29	Raised Median Add luminaires and signalize proposed Colony Drive intersection		Continuous lighting
Manvel	Proposed Colony Drive to Palmetto Street	2.2	6	20300	6	41800	44	0.54		Add luminaires and signalize proposed Iowa Lane	Continuous lighting
Manvel	Palmetto Street to FM 1128 (Masters Road)	0.25	6	20300	6	41800	40	4.32		Raised Median, signalize Corporate Dr.	Continuous lighting
Manvel	FM 1128(Masters Road) to Cemetery Road	0.5	6	21800	6	35800	29	1.46		Raised Median	Continuous lighting
Manvel/Brazoria County	Cemetery Road to Pearland Sites(CR 99)	2	6	21800	6	35800	55	0.69			Raised Median Continuous lighting
Fort Bend County/Alvin	Pearland Sites(CR 99) to 2nd Street/Brazos Street	3.75	6	21800	6	24000	119	0.80			Grade Separation at Pearland Sites (CR 99) per MTP Grade Separation at Schroeder Lane (CR 146) per MTP Grade Separation at Cardinal Drive (CR 149) per MTP
Alvin	2nd Street/Brazos Street to SH 35 Bus.(Gordon Street)	0.75	6	21800	6	24000	92	3.08		Raised Median	
Alvin	SH 35 Bus.(Gordon Street) to SH 35 Bypass	1	4	17300	6	24000	139	4.40	Raised Median		
Alvin/Galveston County	SH 35 Bypass to Algoa Friendswood	3.5	4	13700	6	20000	49	0.56	Safety lighting at intersection of Faber Drive Add luminaires and signalize Algoa Friendswood Road		
Galveston County/Santa Fe	Algoa Friendswood to FM 1764	4.1	4	13700	4	27400	206	2.01			
Santa Fe	FM 1764 to FM 646 South	1.5	4	14000	4	16500	161	4.20			Raised Median
Santa Fe/Hitchcock	FM 646 South to FM 2004	5.4	4	9800	4	14000	76	0.79			Raised Median
Hitchcock	FM 2004 to FM 519	1.5	4	13700	4	17500	55	1.47			
Hitchcock/Galveston County	FM 519 to IH 45	5.5	4	10000	4	10000	55	0.55			

Continuous lighting warrants meet when volume over 30000 ADT.

Manvel Implementation

The City of Manvel has been the fastest growing community within the study area. This growth has led to many needed safety and congestion improvements. Because of the growth pressures, many of the improvements found in the section are designed to be implemented in a short term. Overtime, longer term solutions improvements will be needed and should be programmed and implemented as funding and development opportunities present themselves.

The improvements detailed in this section include short, medium, and long range summaries for each improvement. Design details and technical summaries are included in Appendix A.

Short Term Improvements

Short-term improvements are characterized as solutions that do not require additional right-of-way and can be built in five years or less. One of the many short-term improvements for this SH 6 South Corridor will include developing raised medians with left-turn bays for safe turning. Others include lighting and intersection improvements such as signalization and additional turn lanes. The following descriptions describe more detail about each of the short term improvements.

Safety Lighting Intersection Improvements

Safety lighting can greatly improve visibility and reduce crash risk during evening hours within the corridor. The criteria used for selecting improvement locations include both: a high number of nighttime crashes, and meeting traffic volume standards established by TxDOT. The following locations are recommended for lighting improvements:

- Colony Drive
- Iowa Lane

Improving the lighting at these intersections will improve visibility and reduce crash risk during evening hours. These improvements although perceived to be minor can have a profound impact on the safety of a corridor.

Signalization Improvements

Improved signal timing and proper planning of future signals can have many positive impacts on crash severity and mobility within the corridor. Although these are listed as short term improvements the plan recognizes that it may take more time for the intersection to meet the proper signal warrant standards. It's important to note that a detailed engineering study at each location will be needed to determine the appropriate date for installation of the signal. It is recommended that the following three intersections be "planned" for as future signalized intersections:

- Colony Drive
- Iowa Lane
- Corporate drive

Intersection Improvements

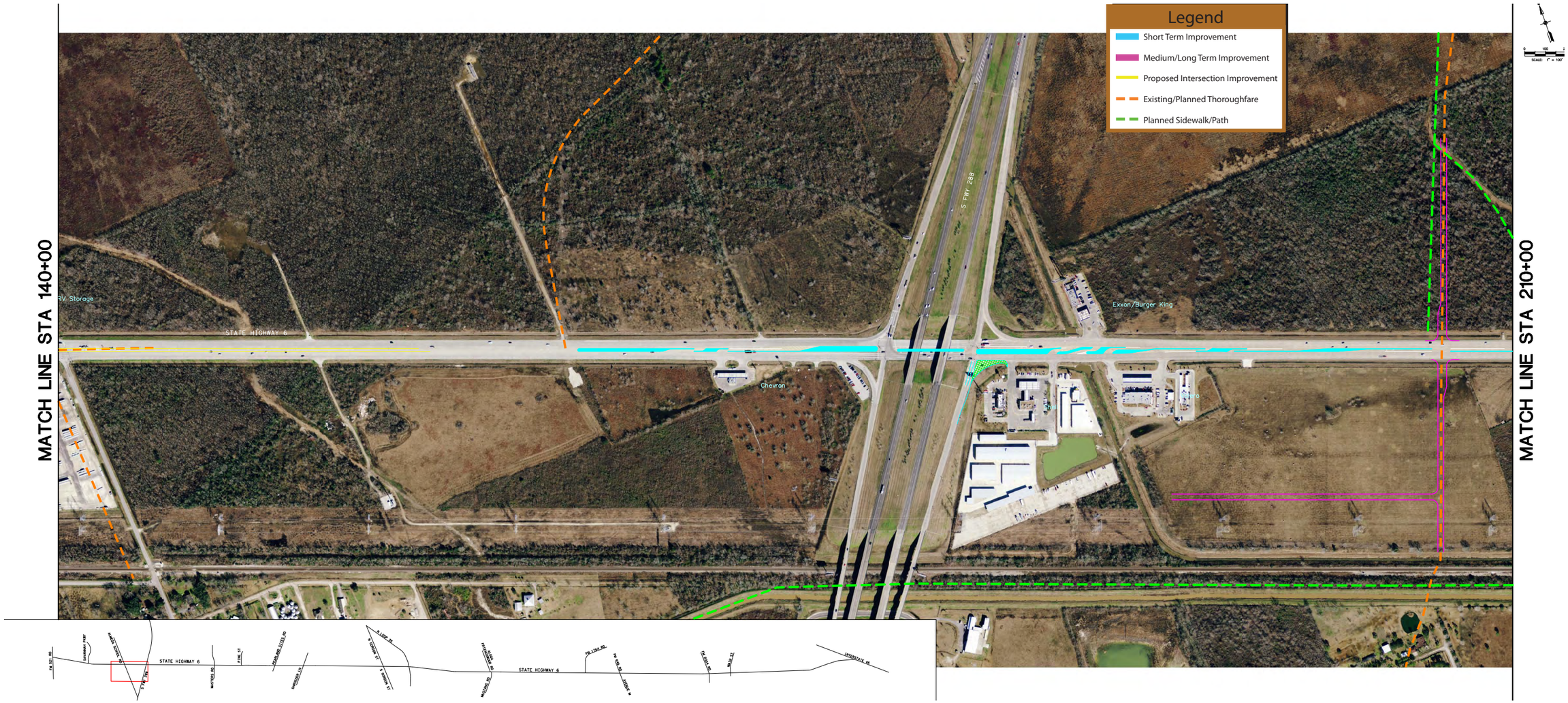
SH 6 /FM 1128

Currently, the SH 6 / FM 1128 intersection operates at a Level of Service (LOS) of C in the AM peak hour and D in the PM peak hour. The current congestion levels limit the ability for travelers to turn left in an efficient manner. Improving the intersection will create greater capacity within the intersection and improve the efficiency for drivers.

Therefore, it is recommended to provide right-turn lanes in the northbound, eastbound, and westbound directions. This change will allow all directions to make right turns on red thereby increasing capacity.

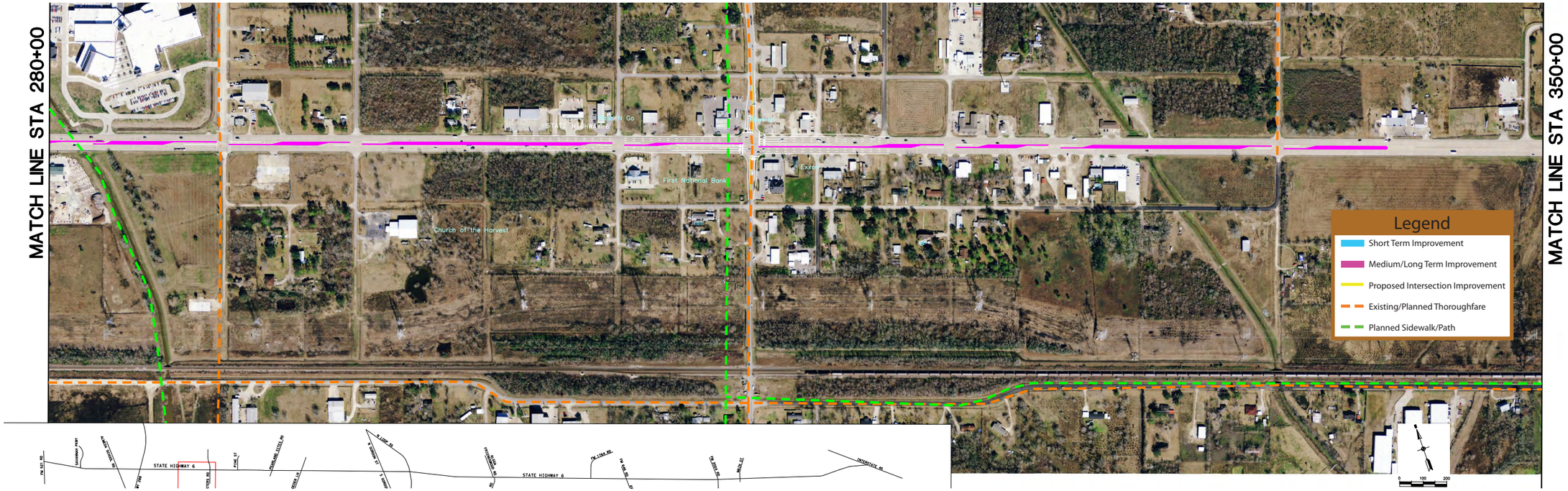
Median Improvements

Within the Manvel region, only one area meets the safety and traffic requirements. The recommendation is a short term median improvement. Specifically, this improvement involves adding a raised median barrier to restrict the movement of traffic, as shown in the graphic illustration below. Notice that the short term raised medians are highlighted in blue. This raised median barrier will restrict the left-out maneuver and can reduce conflict points by over 50%.



Medium Term Improvements

Medium term improvements involve projects that can be implemented in the five to fifteen years. As traffic volumes within the corridor continue to rise, raised medians should be constructed from Palmetto Street to Cemetery Road. The following illustrations show the proposed median location and associated turn lanes.



Long Term Improvements

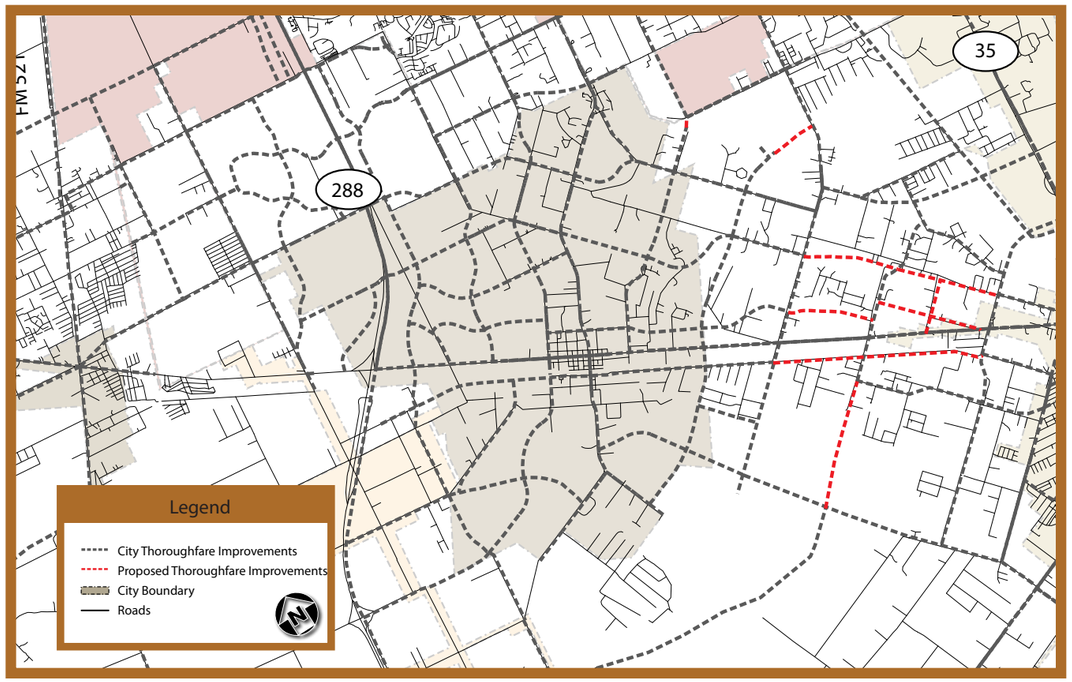
The final sets of improvement within Manvel are long term projects that require property purchases or dedications, and major construction dollars, generally within a fifteen to thirty year time frame. Improvements consist of improving local thoroughfares, bicycle and pedestrian improvements, transit, and various policy considerations.

Thoroughfare Improvements

Based on the current Manvel Thoroughfare plan, two improvements are recommended as shown in the table below. These improvements help to provide alternative routes for both local and regional traffic and will help to relieve congestion and provide evacuation alternatives on SH 6 South. Recommendations are illustrated on the map below as red dashed lines.

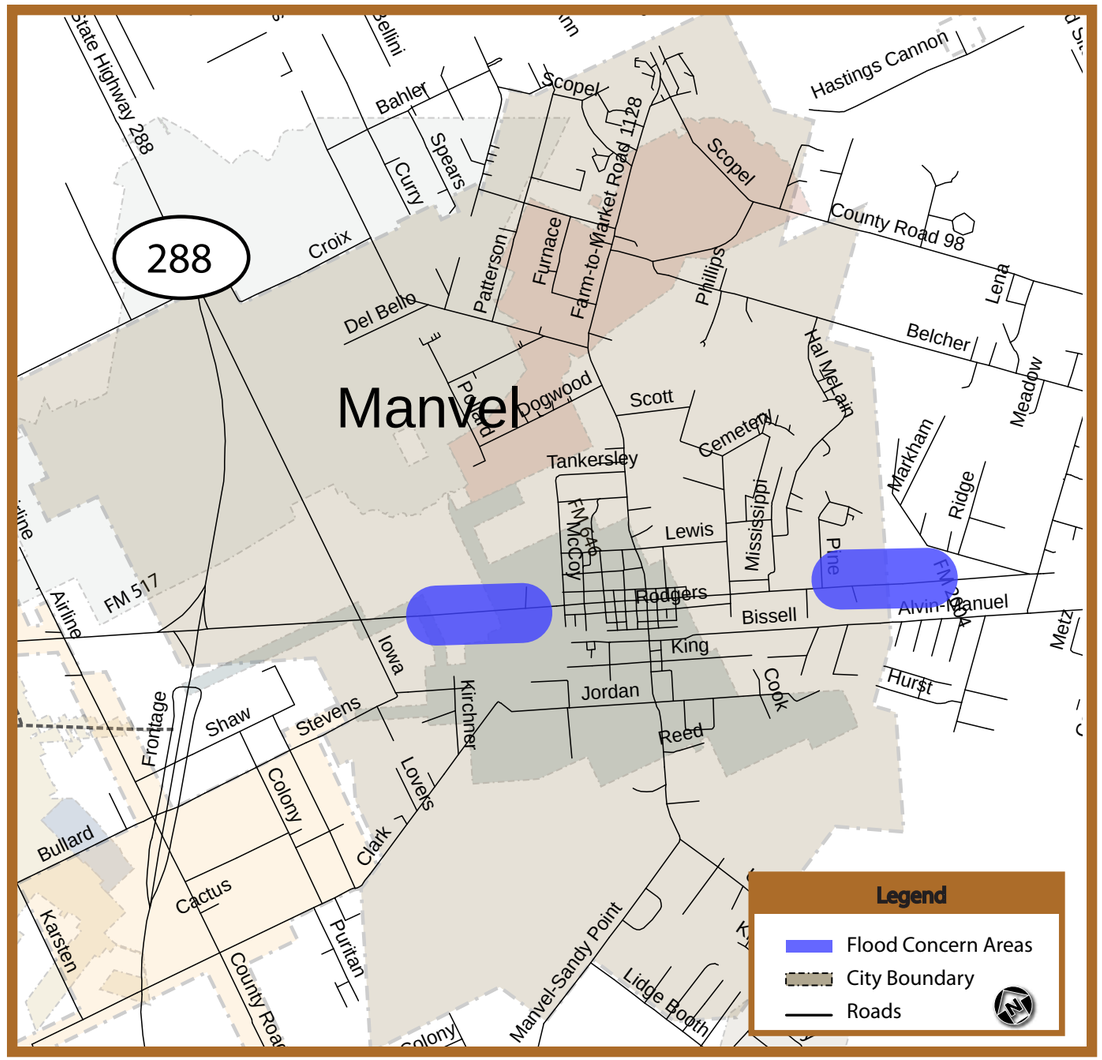
Table 5: Thoroughfare Improvements

Manvel			
Street	From	To	Distance (mi.)
Future Route	Hastings Cannon	CR 206	0.15
Pearland Sites	Future Route	Future Route	0.65
		Total Distance (mi.)	0.80



Roadway Flood Improvement

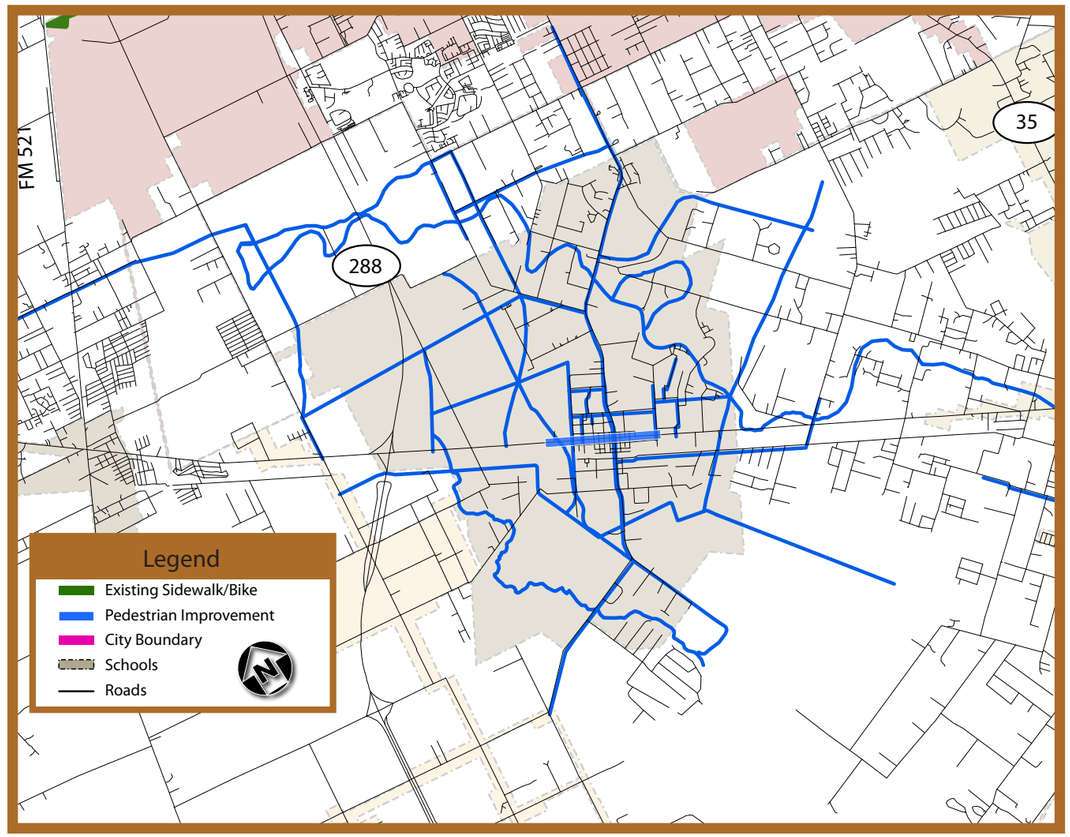
After extensive public involvement several concerns were documented involving localized flooding. The segments of concern fall along the Buffalo Bayou waterways and border the Manvel City boundary. Roadway design standards set clear limits on "acceptable" flooding within the right of way of any state facility. An analysis of this flooding was not completed within the scope of this study; however it is the recommendation that further analysis be completed within the region to ensure safety during large storm events and hurricane evacuation.



Pedestrian Improvements

The bicycle and pedestrian improvements are characterized as pedestrian connectivity options that include hike/bike trails, sidewalks, and smaller multi use paths. In order to create a uniform connection to regional trails several additions to the existing bike and pedestrian plan are recommended. Many of these improvements will be funded by local agencies. Included as a long term improvement, phasing of bicycle and pedestrian improvements is completely dependent on available funding. Local agencies are encouraged to explore whether sidewalk improvements that can built within the existing right-of-way. Plus, during the median construction to plan for pedestrian and landscape improvements where possible.

An extensive trail system can be a valuable tool in decreasing the amount of short trips on SH6 and can be a safe alternative for those unable to drive. The blue trail system below includes the recommended improvements. These will be provided to each city in digital format to more accurately determine future locations of the trail system.



Transit Improvements

Within the Manvel area there are no specific transit recommendations. However, as development continues to expand toward the city providing alternative modes will be vital. This study recommends adopting a Citywide transit vision and goals as part of future planning objectives within the city.

Alvin Implementation

The City of Alvin is currently the largest populated area within the corridor. Alvin currently has several retail and commercial corridors including the SH 6 South section. These developments along the corridor has since led to some of the highest crash rates within the corridor. Therefore, many of the improvements found in the section are designed to be implemented in a short term. In the future extensions of these initial projects will be needed.

The improvements detailed in this section include short, medium, and long range summaries for each improvement. Design details and technical illustrations are included in Appendix A.

Short Term Improvements

As noted, short-term improvements are characterized as solutions that do not require additional right-of-way and can be built in five years or less. The following descriptions describe more detail about each of the short term improvements.

Safety Lighting Intersection Improvements

To improve the safety within the corridor the consultant team is recommending the installation of safety lighting. The criteria used in selecting these intersections included a high number of nighttime crashes and attainment of TxDOT minimum traffic volume standards. The recommended improvement includes the nigh time lighting of two specific intersections in the Alvin area:

- Faber Drive
- Algoa-Friendswood Road

Improving the lighting at these intersections will improve visibility and reduce crash risk during evening hours. These improvements although perceived to be minor can have a profound impact on the safety of a corridor.

Signalization Improvements

Signalization Improvements in Alvin are based on the need to improve current mobility within the area. Improvements are recommended at the following intersections:

- SH6/Business 35
- SH6/SH35 Bypass

It is also recommended that all signalized intersections from Business 35 to the SH35 bypass be coordinated. Currently these intersections have the capability to operate as a coordinated system, but could also use updated software and signal timing plans to perform in a optimal fashion. Signalization plans should be developed for the current and future conditions of these intersections.

Intersection Improvements
SH 6 / Business 35

This intersection currently operates at a LOS of C in the AM and PM peak hours. The deficient movements include the northbound, eastbound and westbound left. Therefore it is recommended to extend the northbound right turn acceleration lane. Provide a right turn lane in the eastbound direction, and provide an acceleration lane for the southbound right turning movement.

3. SH 6 / SB SH 35 Bypass Loop

This intersection currently operates at a LOS of B/D in the AM and PM peak hours respectively. The deficient movements include the eastbound thru and right turn along with the southbound left turn and thru movements. It is recommended to provide a right turn lane in the eastbound direction and to provide a right turn lane and a thru lane in the southbound direction. Both of these improvements with increase capacity and provide additional time for the proper coordination of signals.

4. SH 6 / NB SH 35 Bypass Loop

This intersection currently operates at a LOS of D/E in the AM and PM peak hours respectively. The deficient movements include the northbound left turn and thru along with the eastbound left turn. To improve these deficiencies it is recommended to provide dual left turning lanes in the northbound direction and provide dual left turning lanes in the eastbound direction. This change will increase the capacity of the intersection and allow for improved mobility.

Median Improvements

Within the Alvin region the recommendations include a mixture of short, medium, and long term improvement to address corridor issues as well as circulation and access issues. The graphic below illustrates the mixture of improvements including short term raised medians near Business 35 and the 35 Bypass as well as short term access improvements near Tovrea Rd. Other recommended improvements include medium term medians to connect the short term improvements.

Medium Term Improvements

Medium term improvements involve projects that can be implemented in the five to fifteen years. As traffic volumes within the corridor continue to rise, raised medians should be constructed within Alvin to extend the raised medians throughout SH 6 South Corridor within the City limits. The following illustrations show the proposed median location and associated turn lanes.

Long Term Improvements

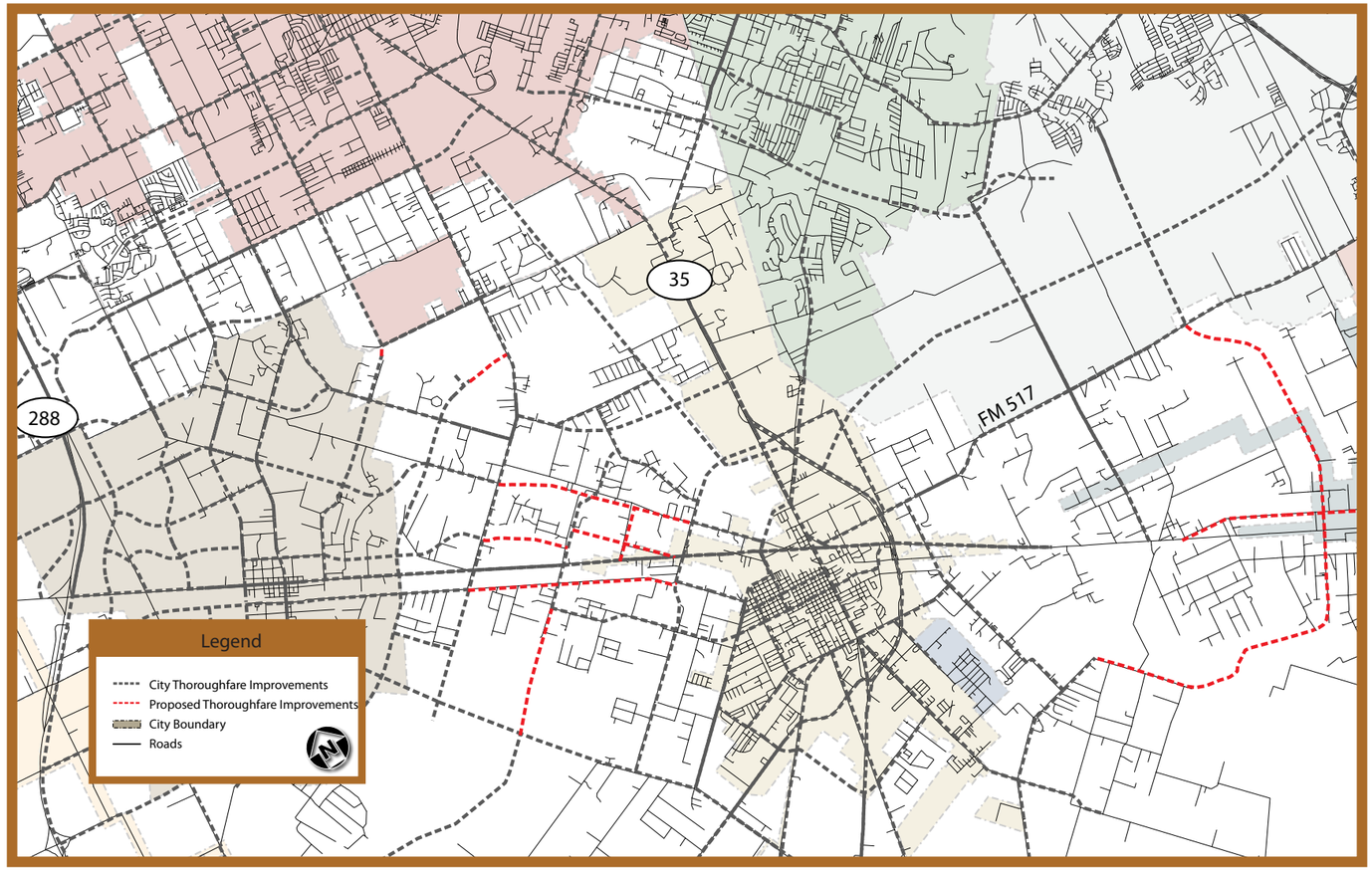
The final set of improvement within the Alvin region are projects that require property purchases or dedications, and major construction dollars. These improvements are typically completed in the ten to thirty year or more time frame. Within the Alvin Region these projects closely relate to sound planning practices including thoroughfare planning, bicycle and pedestrian improvements, transit, various policy considerations and the creation of a Livable Center.

Thoroughfare Improvements

Based on the current Alvin Thoroughfare plan, several improvements are recommended as shown in the Table 6. Furthermore these recommendations are illustrated on the map below as red dashed lines. These improvements help to provide alternative routes for both local and regional traffic. These alternative routes will help to relieve congestion on SH 6 South and also provide evacuation alternatives.

Table 6: Thoroughfare Improvements

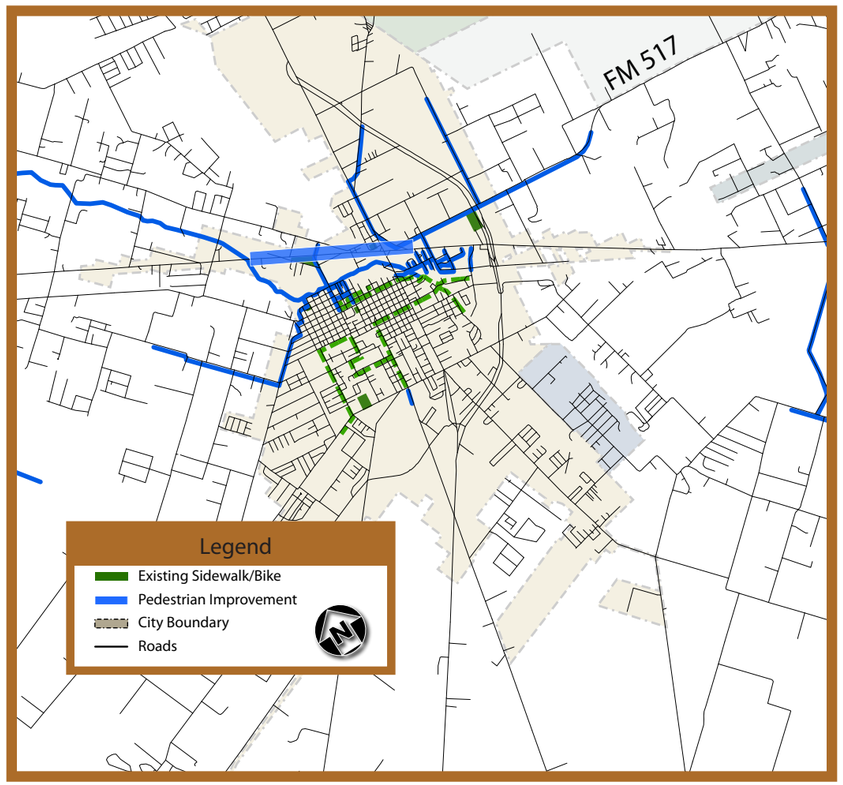
Alvin			
Street	From	To	Distance (mi.)
Heights	Pearland Sites	Cardinal	2.70
Hobbs	Heights	Hwy 6	0.75
Gates	Shroeder	Hwy 6	1.45
Future Route	Pearland Sites	Shroeder	1.20
Alvin-Manuel	Pearland Sites	Cardinal	1.80
Shroeder	Fairview	Future Route	3.00
		Total Distance (mi.)	10.90



Pedestrian Improvements

The bicycle and pedestrian improvements are characterized as pedestrian connectivity options that include hike/bike trails, sidewalks, and smaller multi use paths. In order to create a uniform connection to regional trails several additions to the existing bike and pedestrian plan are recommended. Many of these improvements will be funded by local agencies. Included as a long term improvement, phasing of bicycle and pedestrian improvements is completely dependent on available funding. Local agencies are encouraged to explore whether sidewalk improvements that can built within the existing right-of-way. Plus, during the median construction to plan for pedestrian and landscape improvements where possible.

An extensive trail system can be a valuable tool in decreasing the amount of short trips on SH6 and can be a safe alternative for those unable to drive. The blue trail system below includes the recommended improvements. These will be provided to each city in digital format to more accurately determine future locations of the trail system.



Transit Improvements

Transit recommendations fall into four categories: expansion of park and ride services and express routes, addition of Bus Rapid Transit (BRT) routes, local bus routes, and planning for connections to future livable centers. Within the Regional Commuter Rail Study completed by H-GAC a recommendation to locate a regional rail line within the City of Alvin has potential to be a viable option. The recommendation of this study is to work with regional agencies such as H-GAC to explore that prospect. It is also the recommendation of this study to implement a plan for a Livable Center as presented within the study.

Santa Fe Implementation

The City of Santa Fe has the potential to benefit the most from a proactive approach. Although major development has not pressured this city, several of its neighbors are experiencing growing pains. Many of the recommendations within Santa Fe are medium to long term in hope to attract development while appropriately managing it.

The improvements detailed in this section include short, medium, and long range summaries for each improvement. Design details and technical summaries are included in Appendix A.

Short Term Improvements

The primary short-term improvement for the SH 6 South Corridor will include developing raised medians with left-turn bays, and intersection improvements. Short-term solutions do not require additional right-of-way and should be built in five years or less. Within Santa Fe all of the short term improvements relate specifically to intersections.

Signalization Improvements

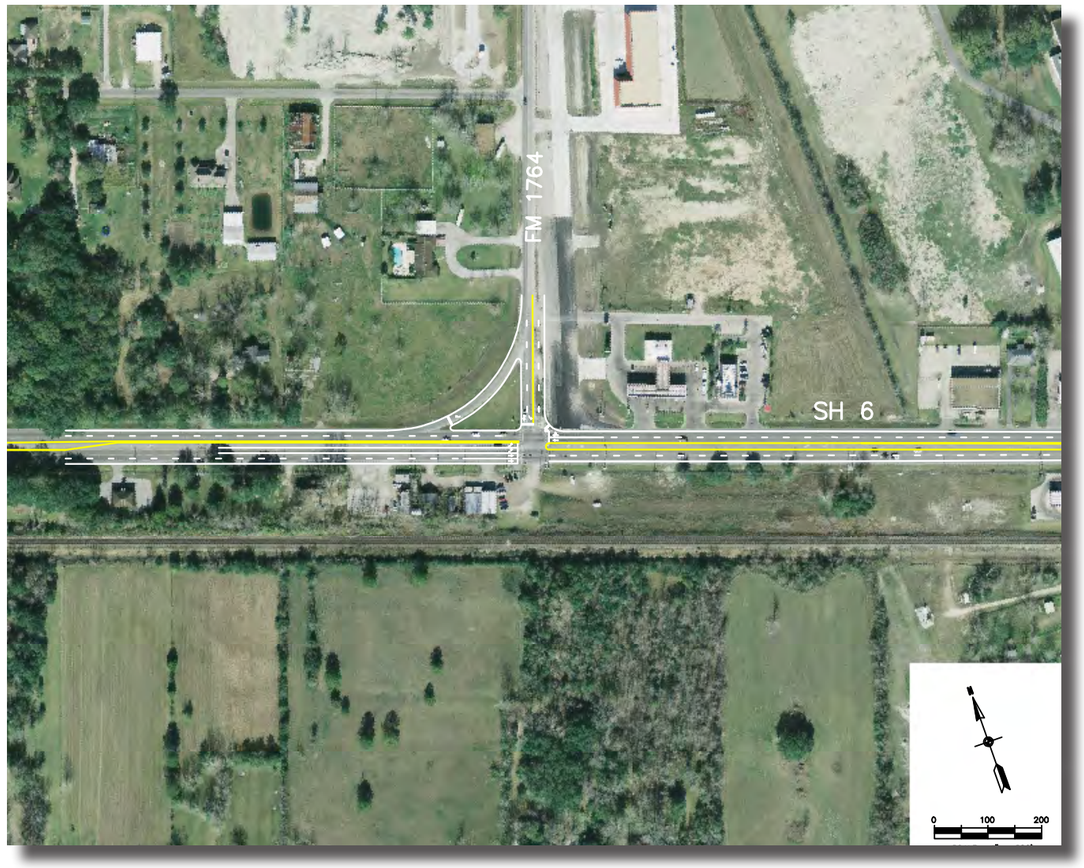
As in Alvin many of the improvement to signalized intersections within the Santa Fe area are related to the improvement of mobility and capacity at existing signalized intersections. The team is recommending four signalized intersections:

- FM 1764
- Avenue T
- FM 646 North
- FM 646 South

Intersection Improvements

SH 6 /FM 1764

Currently, the SH 6 / FM 1128 intersection operates at a LOS of C in the AM and PM peak hours. Currently the intersection design limits the ability for travelers to turn left in an efficient manner. The plan recommends an improvement to provide dual left turn lanes in the eastbound direction.



SH 6 /Avenue T

This intersection currently operates at a LOS of C in the AM and PM peak hours. The deficient movements include all left turning movements. Providing left turn lanes in the northbound and southbound directions will increase the capacity of the left turning movement

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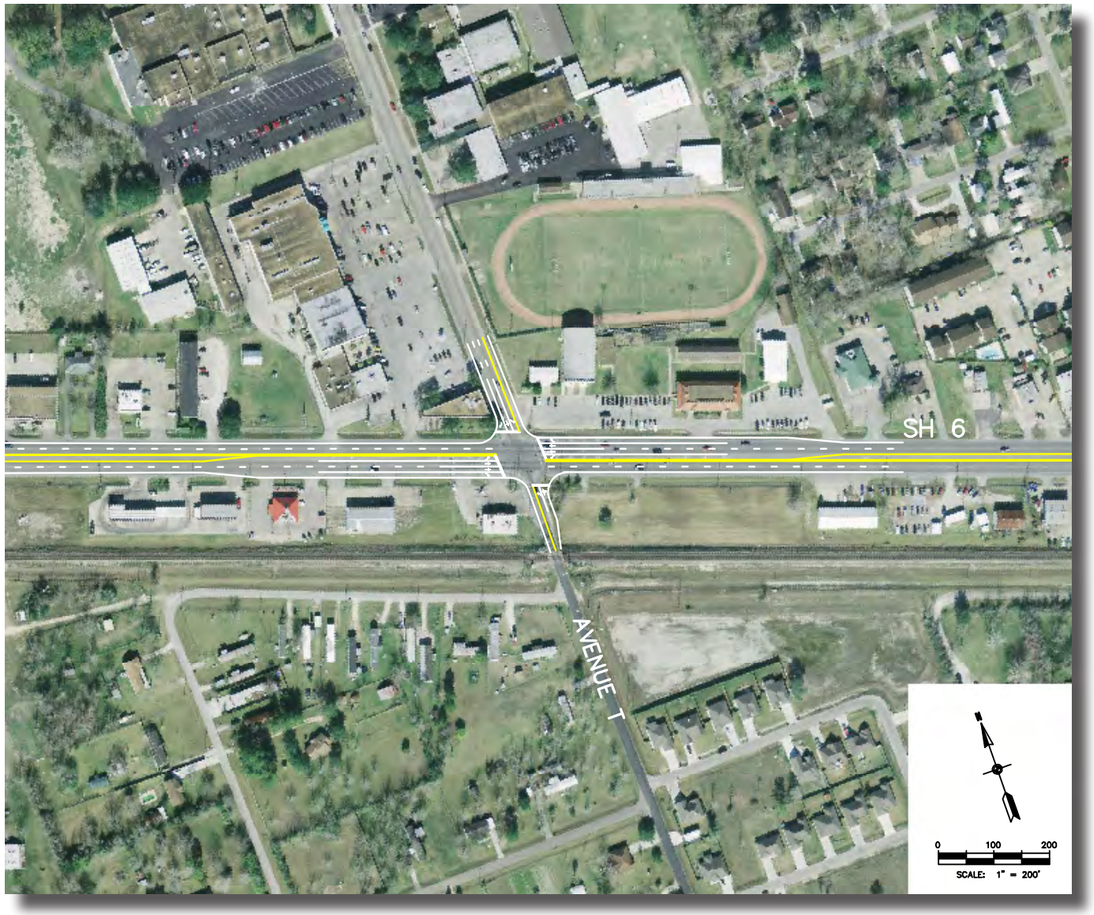


SH 6 /FM 646 North

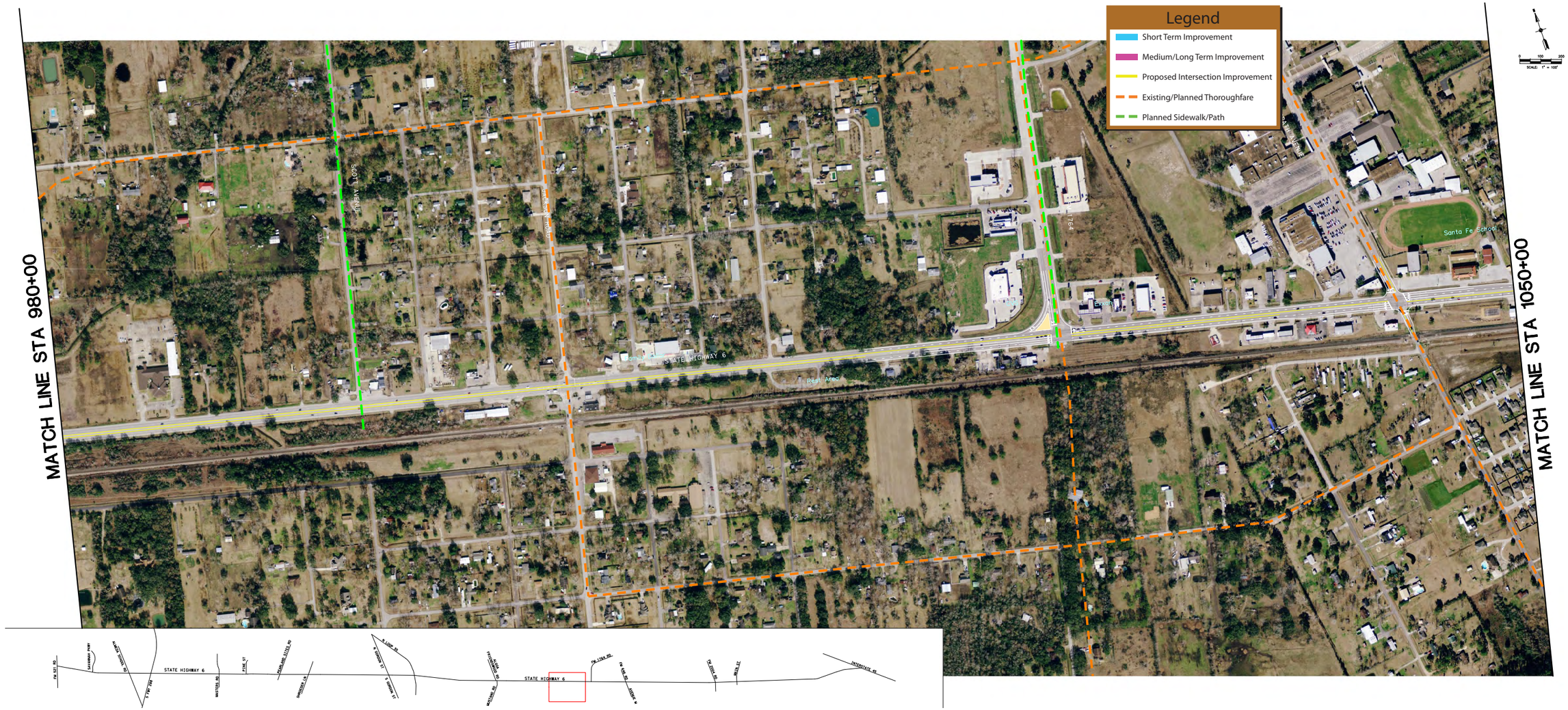
This intersection currently operates at a LOS of C in the AM and PM peak hours. The deficient movements include all left turning movements, the northbound thru and right turn along with the southbound thru. Providing left turn lanes in the northbound and southbound directions will increase the capacity of the left turning movement.

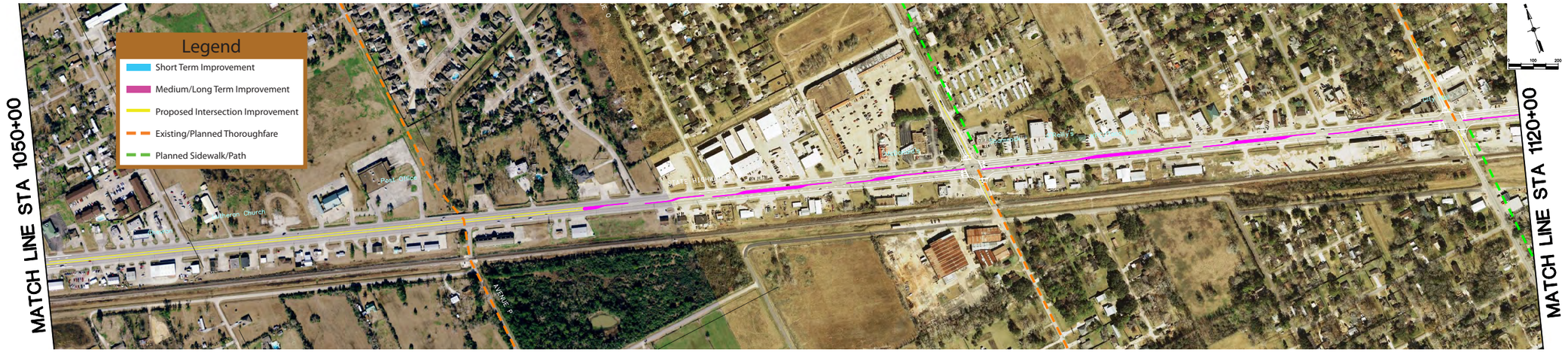
SH 6 / FM 646 South

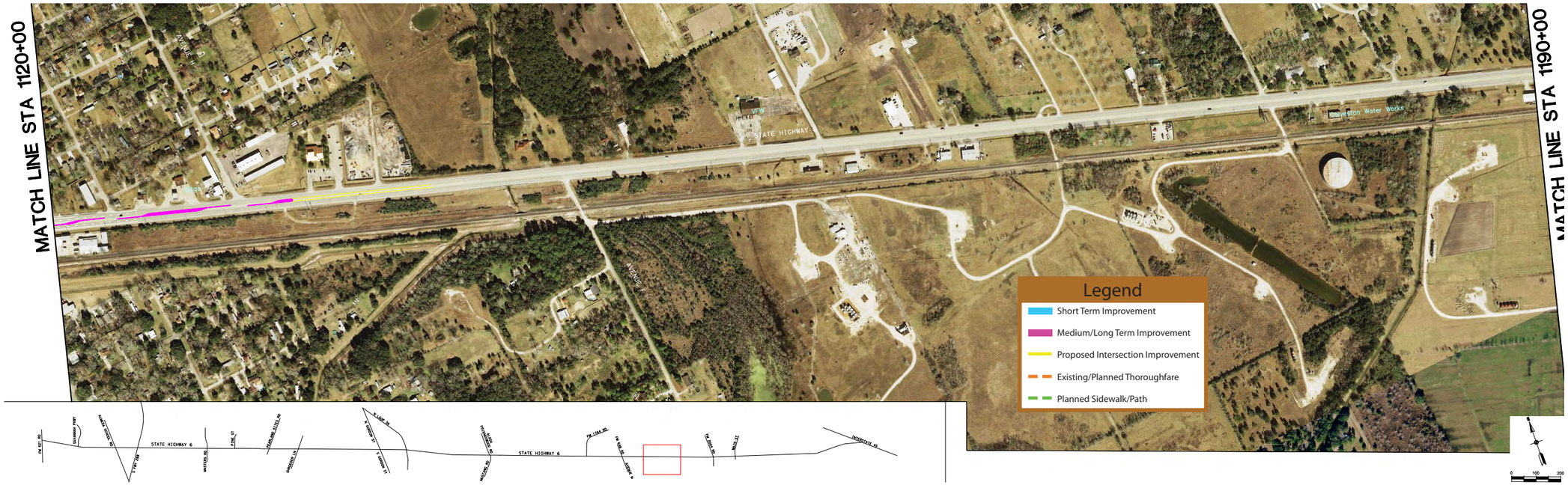
This intersection currently operates at a LOS of B/C in the AM and PM peak hours respectively. The deficient movements include the northbound left, thru and right turn. Recommendations for this intersection include the addition of a left turn lane in the northbound direction.

Medium Term Improvements

Medium term improvements involve projects that can be implemented in the five to fifteen years. As traffic volumes within the corridor continue to rise, raised medians should be constructed within Santa Fe to construct raised medians throughout SH 6 South Corridor within the City limits. The following illustrations show the proposed median location and associated turn lanes.




MATCH LINE STA 1050+00
MATCH LINE STA 1120+00
Legend
Short Term Improvement
Medium/Long Term Improvement
Proposed Intersection Improvement
Existing/Planned Thoroughfare
Planned Sidewalk/Path
Lutheran Church
Post Office
STATE HIGHWAY
AVENUE P
0
100
200


MATCH LINE STA 1120+00
MATCH LINE STA 1190+00
VFW
STATE HIGHWAY
Galveston Water Works
AVENUE P
AVENUE E
Legend
Short Term Improvement
Medium/Long Term Improvement
Proposed Intersection Improvement
Existing/Planned Thoroughfare
Planned Sidewalk/Path
STATE HIGHWAY 6
0
100
200

Long Term Improvements

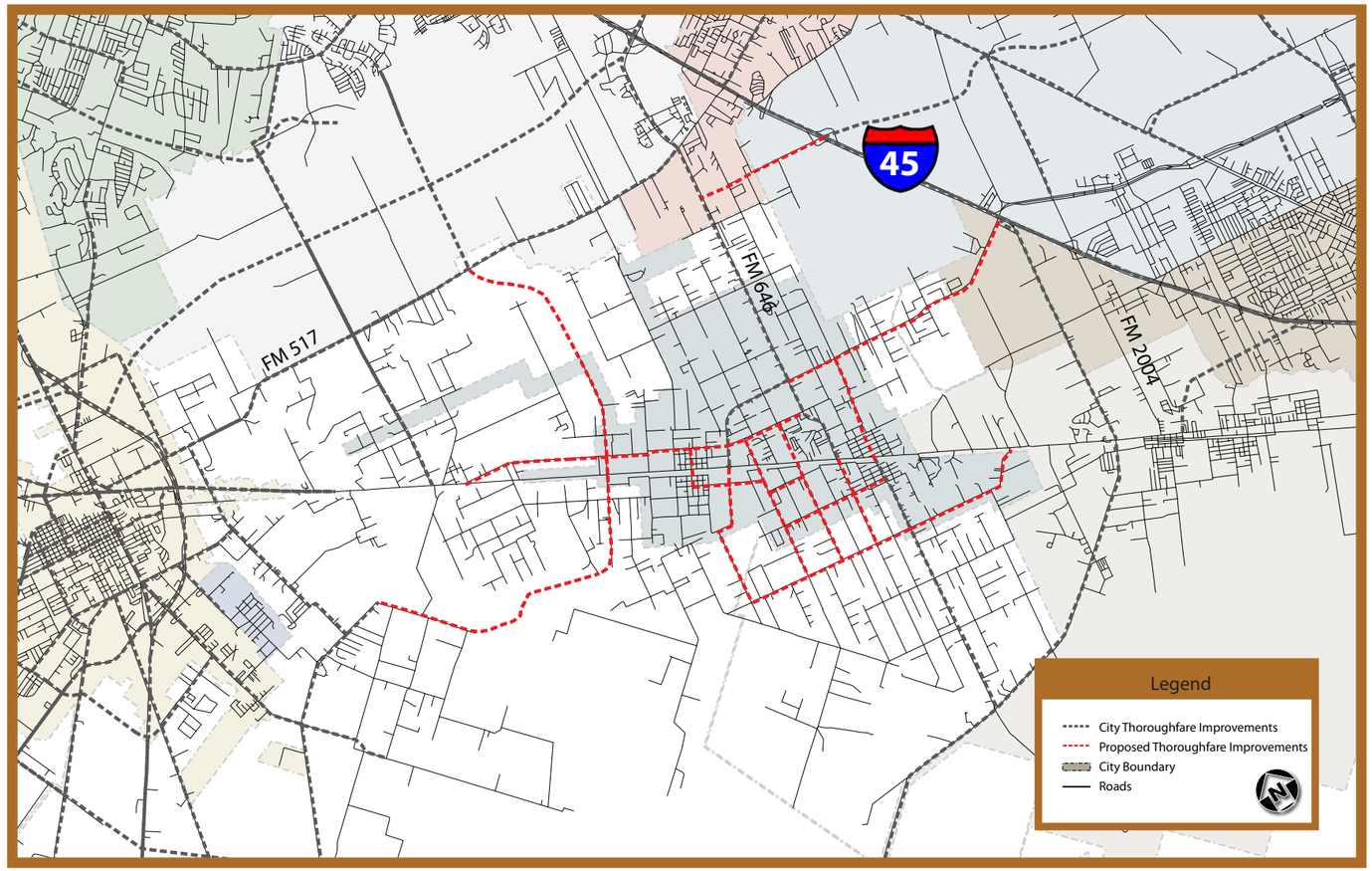
The final sets of improvement within Santa Fe are long term projects that require property purchases or dedications, and major construction dollars, generally within a fifteen to thirty year time frame. Improvements consist of improving local thoroughfares, bicycle and pedestrian improvements, transit, and various policy considerations.

Thoroughfare Improvements

Although Santa Fe does have a capital improvement program and related street improvement plans, a specific thoroughfare plan has yet to be adopted. The following recommendations in Table 7 outline a base for a citywide thoroughfare plan. It is recommended that a specific study and thoroughfare capacity analysis be completed for the city in the near future.

Table 7: Thoroughfare Improvements

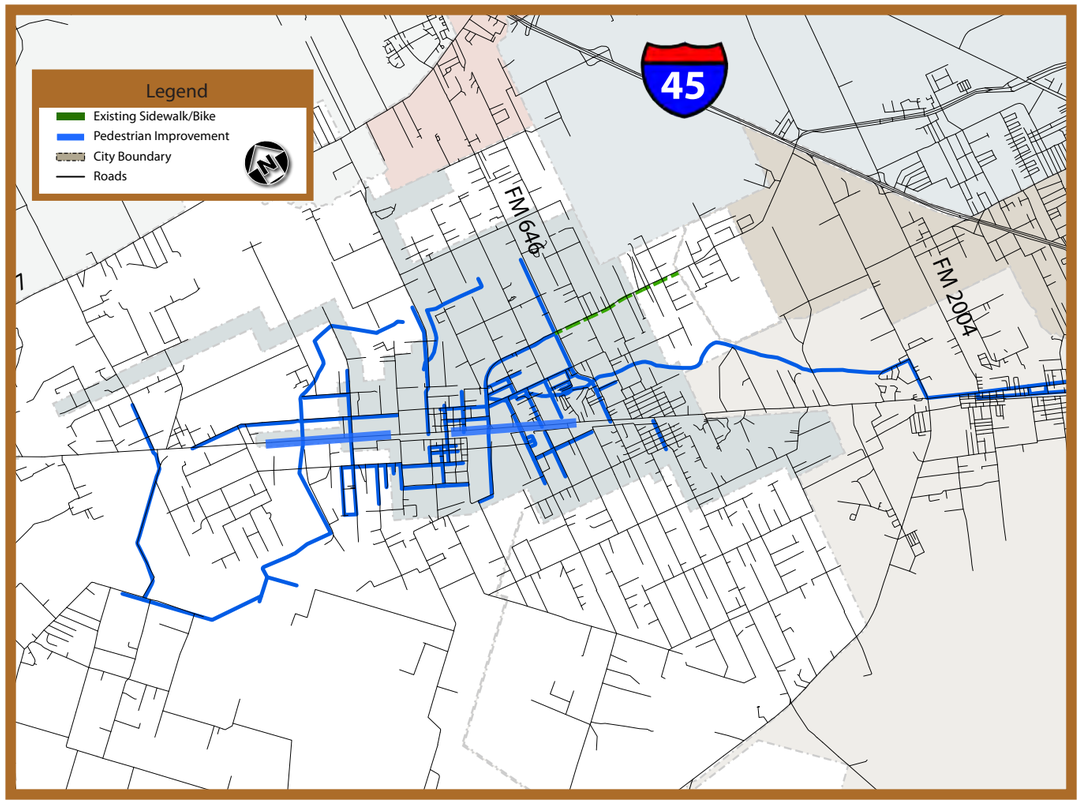
Santa Fe			
Street	From	To	Distance (mi.)
Holand	I-45 (Gulf)	16th	1.90
FM 1764	I-45 (Gulf)	16th	3.80
Ave J	FM 1764	18th	1.50
Tower/CR 164	CR 160	FM 517	8.50
Park	Hwy 6	Maple	1.50
Maple/1st	Park	FM 1764	2.20
6th	FM 1764	16th	1.10
Jackson	1st	6th	0.50
6th	Jackson	Ave T	1.00
Cherry	Hwy 6	Cedar	1.00
Cedar/Beaver	Cherry	28th	1.30
19th	Ave T	Ave P	0.50
24th	Ave T	FM 646	0.50
Ave T	6th	28th	2.00
Ave P	6th	28th	2.00
Ave M	18th	28th	1.30
28th/Ave A	Beaver	Hwy 6	4.30
		Total Distance (mi.)	34.90



Pedestrian Improvements

The bicycle and pedestrian improvements are characterized as pedestrian connectivity options that include hike/bike trails, sidewalks, and smaller multi use paths. In order to create a uniform connection to regional trails several additions to the existing bike and pedestrian plan are recommended. Many of these improvements will be funded by local agencies. Included as a long term improvement, phasing of bicycle and pedestrian improvements is completely dependent on available funding. Local agencies are encouraged to explore whether sidewalk improvements that can built within the existing right-of-way. Plus, during the median construction to plan for pedestrian and landscape improvements where possible.

An extensive trail system can be a valuable tool in decreasing the amount of short trips on SH6 and can be a safe alternative for those unable to drive. The blue trail system below includes the recommended improvements. These will be provided to each city in digital format to more accurately determine future locations of the trail system.



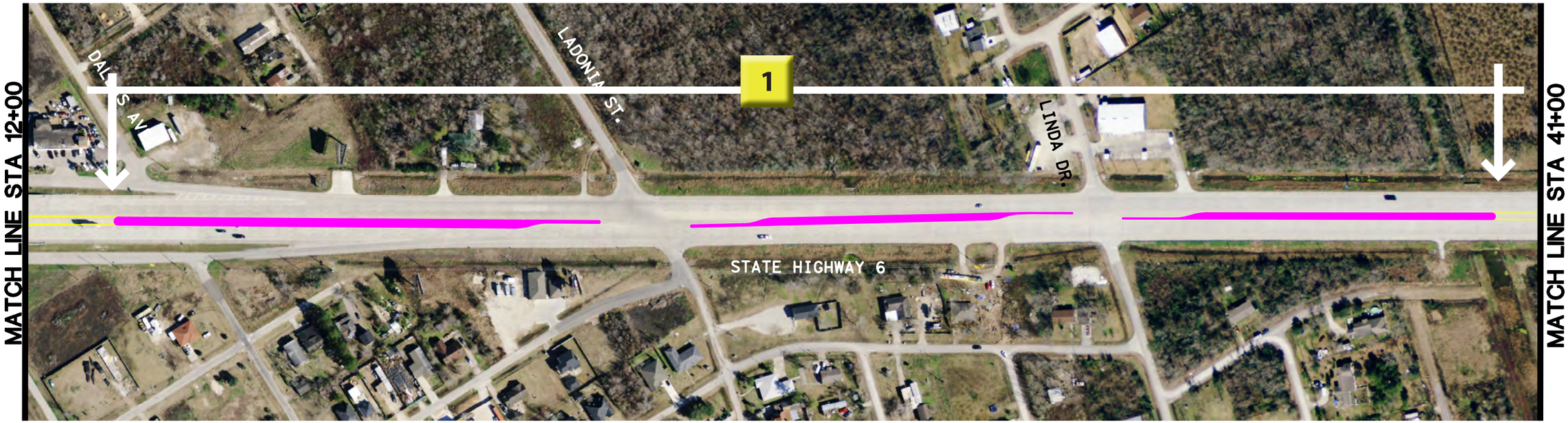
Transit Improvements

Within the Santa Fe area there are no specific transit recommendations. However, as development continues to expand toward the city providing alternative modes will be vital. This study recommends adopting a Citywide transit vision and goals as part of future planning objectives within the city.


HOUSTON 10

Appendix A: Design Detail

The following appendix represents a technical summary for design purposes. The following graphics are expressed with descriptions within the main document and will only be presented in graphic form below.



Legend

Improvement Type
- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

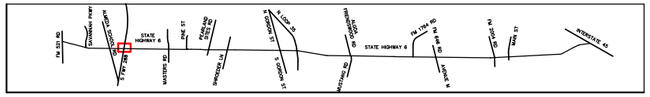
County Improvements
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1 Medium term median on SH6 at FM 521



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

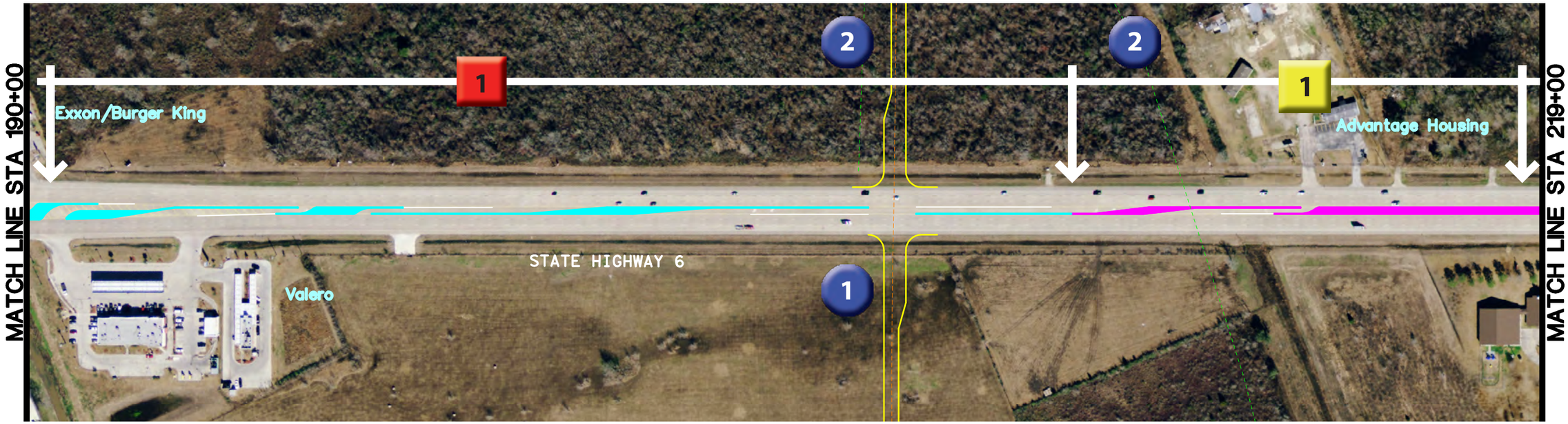
- Short Range
- Medium Range
- Long Range

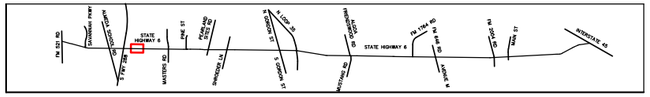
1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Short term median improvement on SH 6 at SH 288
2. Short term Intersection Improvement at NB SH 288





Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

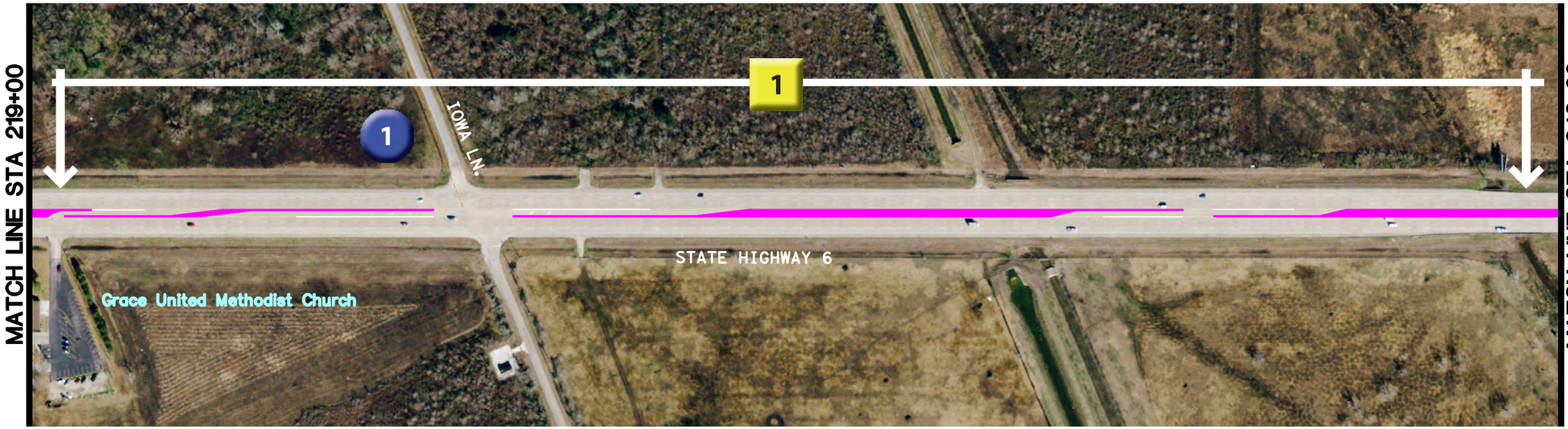
- Short Range
- Medium Range
- Long Range

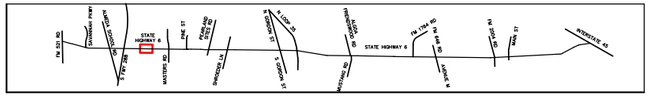
1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Short term median improvement on SH 6 at SH 288
1. Medium term median improvement on SH 6
1. Longterm thoroughfare improvement
2. Long term Pedestrian Improvement





Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

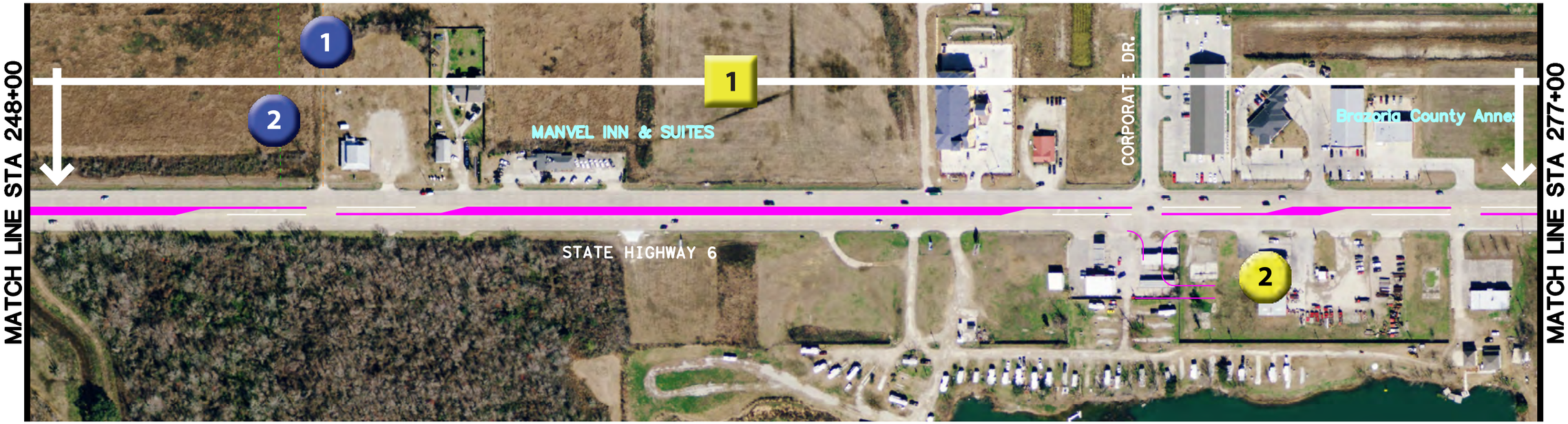
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

- 1 Medium term median improvement on SH 6
- 1 Longterm thoroughfare improvement



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

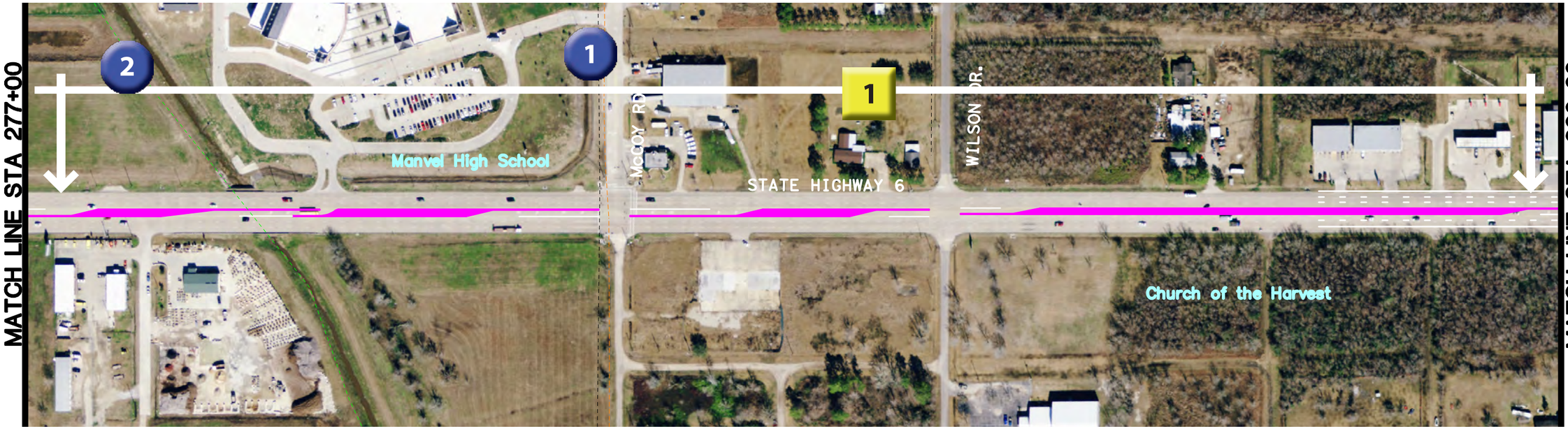
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Medium term median improvement on SH 6
2. Medium Term Intersection Improvement at Corporate Dr.
1. Longterm thoroughfare improvement
2. Long term Pedestrian Improvement



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

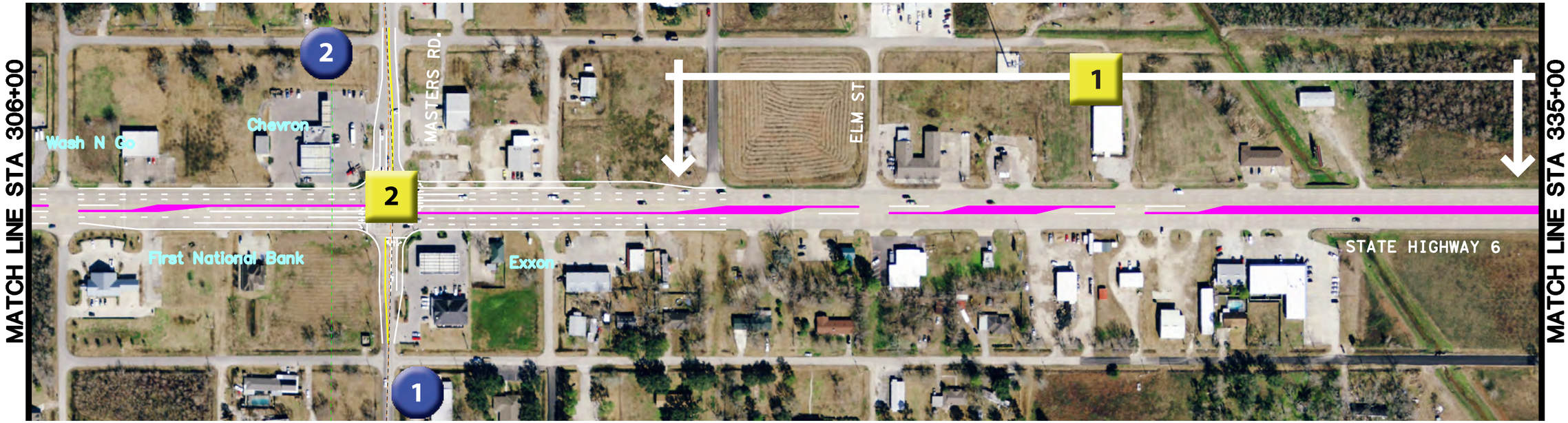
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Medium term median improvement on SH 6 at Corporate Dr.
1. Longterm thoroughfare improvement
2. Long term Pedestrian Improvement



Legend

Improvement Type
- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

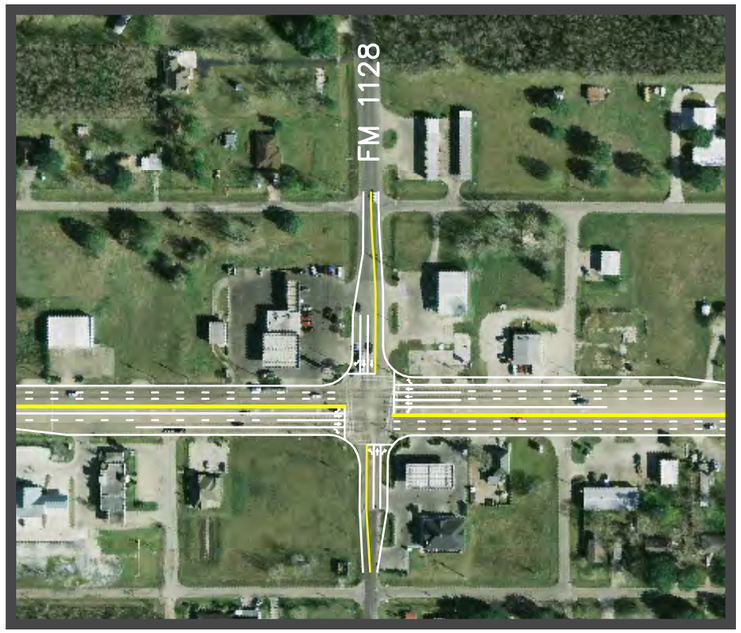
City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010



Improvements Shown:

1. Medium term median improvement on SH 6 at McCoy Dr.
2. Medium term intersection improvement at FM 1128 (Detail left)
1. Longterm thoroughfare improvement
2. Long term Pedestrian Improvement

Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

- Short Range
- Medium Range
- Long Range

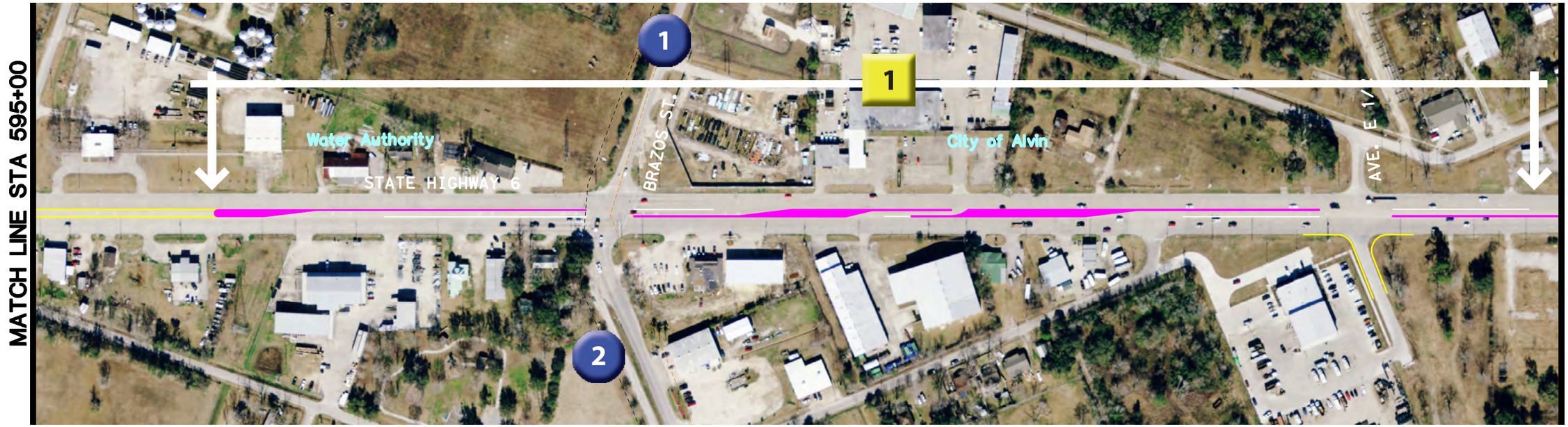
1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1 Medium term median improvement on SH 6 at FM 1128.

1 Longterm thoroughfare improvement at FM 1128



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

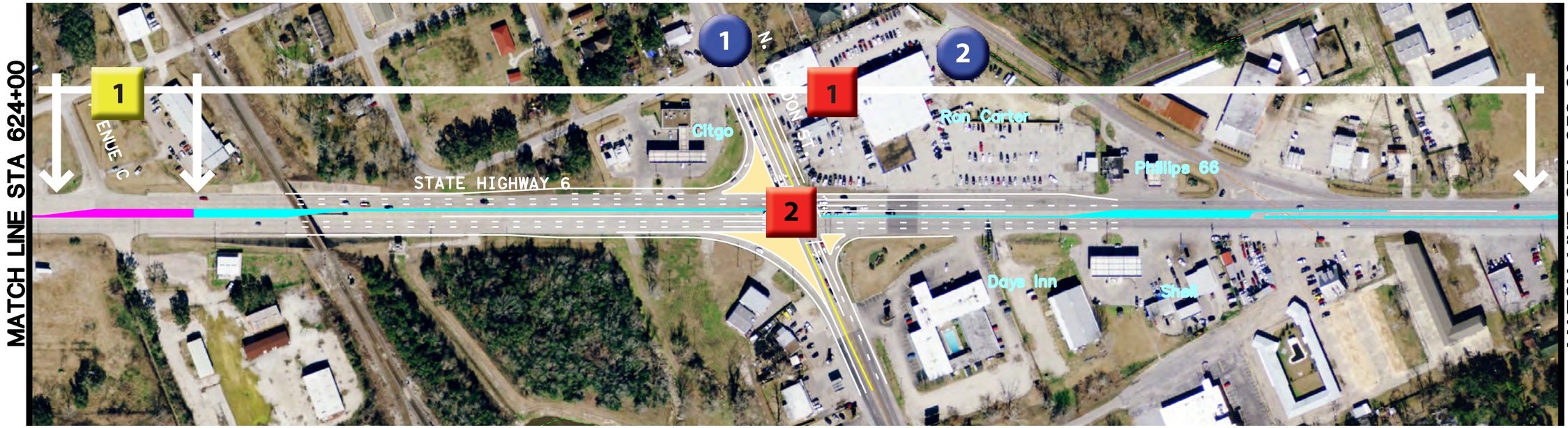
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

- 1 Medium term median improvement on SH 6 at FM 1128.
- 1 Longterm thoroughfare improvement
- 2 Long term Pedestrian Improvement



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

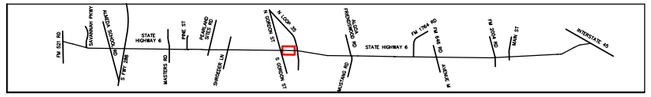
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Short term median improvement on SH 6 at Bus 35.
2. Short term intersection improvement at Bus 35 (Detail left)
1. Medium term median improvement
1. Longterm thoroughfare improvement
2. Long term Pedestrian Improvement



Legend

Improvement Type
- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Short term median improvement on SH 6 at Bus 35.
2. Short term intersection improvement at Tovrea Road to allow for cross access
1. Medium term median improvement
1. Longterm thoroughfare improvement
2. Long term Pedestrian Improvement

Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

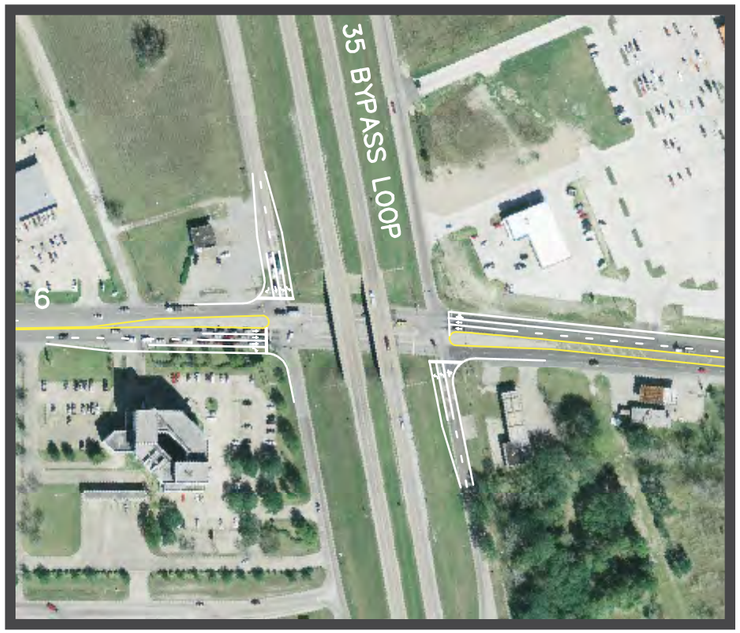
- Short Range
- Medium Range
- Long Range

County Improvements

- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010



Improvements Shown:

1. Short term median improvement on SH 6 at Bus 35.
2. Short term intersection improvement at 35 Bypass (Detail left)
1. Longterm thoroughfare improvement

Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

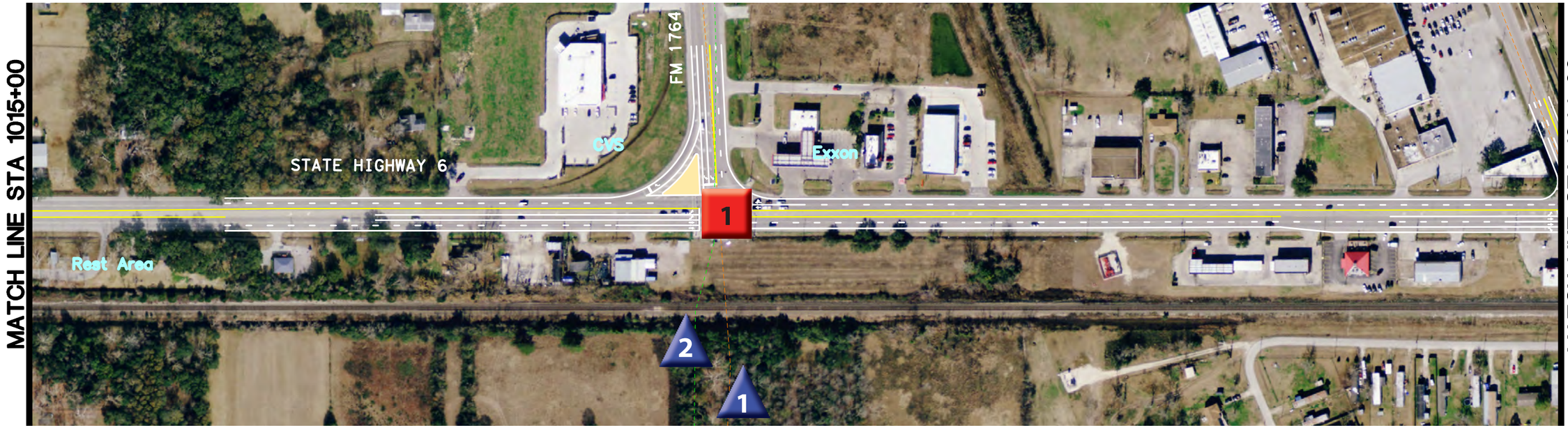
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1 Short term median improvement on SH 6.



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

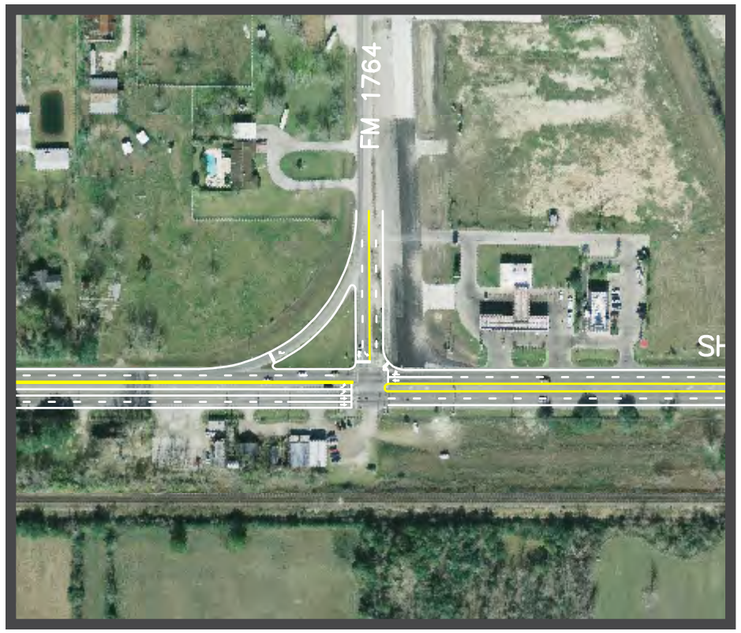
- Short Range
- Medium Range
- Long Range

County Improvements

- Short Range
- Medium Range
- Long Range

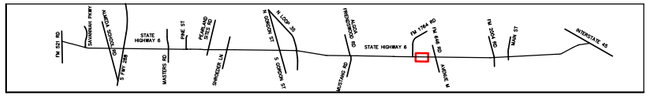
1"=200'

Aerial Date: Feb 2010



Improvements Shown:

1. Short term intersection improvement at FM 1764 (Detail left).
1. Longterm thoroughfare improvement
2. Longterm pedestrian improvement



Legend

Improvement Type
- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements
- Short Range
- Medium Range
- Long Range

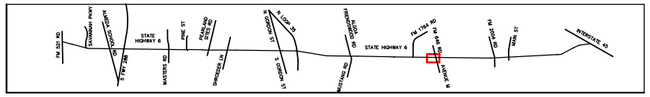
TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:
- 1 Short term intersection improvement at Avenue T (Detail left)
- 1 Longterm thoroughfare improvement
- 2 Longterm pedestrian improvement



Legend

Improvement Type

- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements

- Short Range
- Medium Range
- Long Range

TxDOT Improvements

- Short Range
- Medium Range
- Long Range

County Improvements

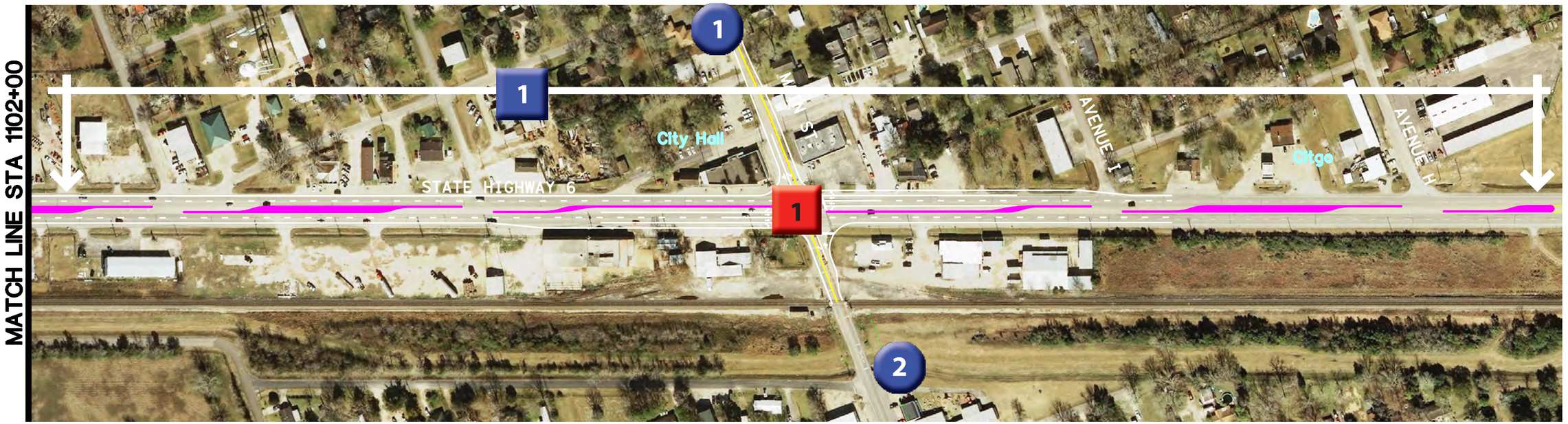
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:

1. Short term intersection improvement at FM 646 N (Detail left)
1. Longterm median improvement
1. Longterm thoroughfare improvement
2. Longterm pedestrian improvement



Legend

Improvement Type
- Short Term Raised Median
- Medium/Long Term Raised Median
- Proposed Intersection Improvement
- Existing/Planned Thoroughfare
- Planned Sidewalk/Path

City Improvements
- Short Range
- Medium Range
- Long Range

TxDOT Improvements
- Short Range
- Medium Range
- Long Range

County Improvements
- Short Range
- Medium Range
- Long Range

1"=200'

Aerial Date: Feb 2010

Improvements Shown:
- 1 Short term intersection improvement at FM 646 S (Detail left)
- 1 Longterm median improvement
- 1 Longterm thoroughfare improvement
- 2 Longterm pedestrian improvement

Appendix B: Opinion of Cost

The following appendix represents an opinion of cost based on current (2010) bid prices and TxDOT bid items. These costs are created only for TxDOT, on system intersection and roadway improvements. All long term thoroughfare and pedestrian improvements have been excluded.

MANVEL AREA SHORT TERM IMPROVEMENTS

SH 6 SOUTH
OPINION OF COST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0100-2002	PREPARING ROW	STA	43	$1,000.00	$43,000.00
0105-2060	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	4500	$6.00	$27,000.00
0110-2001	EXCAVATION (ROADWAY)	CY	751.1111111	$5.00	$3,755.56
0132-2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	1502.222222	$4.00	$6,008.89
0260-2006	LIME TRT (EXST MATL) (6")	SY	13520	$2.00	$27,040.00
0260-2012	LIME (HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	182.52	$120.00	$21,902.40
0276-2224	CEM TRT(PLNT MX) (CL N)(TY E)(GR 4)(6")	SY	13520	$6.00	$81,120.00
0340-2063	D-GR HMA(METH) TY-C SAC-A PG76-22	TON	743.6	$75.00	$55,770.00
0360-2003	CONC PVMT (CONT REINF-CRCP)(10")	SY		$30.00	$0.00
0360-2018	CURB (TYPE II)	LF	9100	$3.50	$31,850.00
0432-2001	RIPRAP (CONC)(4 IN)	CY	500.6906667	$325.00	$162,724.47
0500-2001	MOBILIZATION	LS	10%		$47,247.36
0502-2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.628787879	$5,000.00	$8,143.94
0666-2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0666-2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	2250	$0.70	$1,575.00
0666-2042	REFL PAV MRK TY I (W) 12" (SLD)(100MIL)	LF		$2.00	$0.00
0666-2048	REFL PAV MRK TY I (W) 24" (SLD)(100MIL)	LF	24	$4.00	$96.00
0666-2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	9	$100.00	$900.00
0666-2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	9	$125.00	$1,125.00
0666-2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0672-2012	REFL PAV MRKR TY I-C	EA		$3.00	$0.00
0672-2015	REFL PAV MRKR TY II-A-A	EA		$3.00	$0.00
0677-2001	ELIM EXT PAV MRK & MRKS (4")	LF	9	$0.30	$2.70
0677-2003	ELIM EXT PAV MRK & MRKS (8")	LF		$0.30	$0.00
0677-2005	ELIM EXT PAV MRK & MRKS (12")	LF		$0.75	$0.00
0677-2007	ELIM EXT PAV MRK & MRKS (24")	LF		$1.50	$0.00
0677-2008	ELIM EXT PAV MRK & MRKS (ARROW)	EA		$30.00	$0.00
0677-2018	ELIM EXT PAV MRK & MRKS (WORD)	EA		$30.00	$0.00
0678-2001	PAV SURF PREP FOR MRK (4")	LF		$0.05	$0.00
0678-2003	PAV SURF PREP FOR MRK (8")	LF	2250	$0.10	$225.00
0678-2004	PAV SURF PREP FOR MRK (12")	LF		$0.20	$0.00
0678-2006	PAV SURF PREP FOR MRK (24")	LF	24	$0.40	$9.60
0678-2007	PAV SURF PREP FOR MRK (ARROW)	EA	9	$10.00	$90.00
0678-2018	PAV SURF PREP FOR MRK (WORD)	EA	9	$15.00	$135.00
	SWPPP	LS			$28,503.79
	SIGNING	LS			$24,431.82
	SIGNALIZATION	LS			$30,000.00
SUBTOTAL					$602,656.51
20% CONTINGENECY					$120,531.30
TOTAL					**$723,200.00**

ALVIN AREA SHORT TERM IMPROVEMENTS

SH 6 SOUTH
OPINION OF COST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0100-2002	PREPARING ROW	STA	60	$1,000.00	$60,000.00
0105-2060	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	400	$6.00	$2,400.00
0110-2001	EXCAVATION (ROADWAY)	CY	67	$5.00	$333.33
0132-2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	133	$4.00	$533.33
0260-2006	LIME TRT (EXST MATL) (6")	SY	1200	$2.00	$2,400.00
0260-2012	LIME (HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	16	$120.00	$1,944.00
0276-2224	CEM TRT(PLNT MX) (CL N)(TY E)(GR 4)(6")	SY	1200	$6.00	$7,200.00
0340-2063	D-GR HMA(METH) TY-C SAC-A PG76-22	TON	66	$75.00	$4,950.00
0360-2003	CONC PVMT (CONT REINF-CRCP)(10")	SY		$30.00	$0.00
0360-2018	CURB (TYPE II)	LF	14000	$3.50	$49,000.00
0432-2001	RIPRAP (CONC)(4 IN)	CY	44.44	$325.00	$14,443.00
0500-2001	MOBILIZATION	LS	10%		$16,177.21
0502-2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2	$5,000.00	$11,363.64
0666-2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0666-2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	4000	$0.70	$2,800.00
0666-2042	REFL PAV MRK TY I (W) 12" (SLD)(100MIL)	LF		$2.00	$0.00
0666-2048	REFL PAV MRK TY I (W) 24" (SLD)(100MIL)	LF	0	$4.00	$0.00
0666-2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	16	$100.00	$1,600.00
0666-2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	16	$125.00	$2,000.00
0666-2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0672-2012	REFL PAV MRKR TY I-C	EA		$3.00	$0.00
0672-2015	REFL PAV MRKR TY II-A-A	EA		$3.00	$0.00
0677-2001	ELIM EXT PAV MRK & MRKS (4")	LF	16	$0.30	$4.80
0677-2003	ELIM EXT PAV MRK & MRKS (8")	LF		$0.30	$0.00
0677-2005	ELIM EXT PAV MRK & MRKS (12")	LF		$0.75	$0.00
0677-2007	ELIM EXT PAV MRK & MRKS (24")	LF		$1.50	$0.00
0677-2008	ELIM EXT PAV MRK & MRKS (ARROW)	EA		$30.00	$0.00
0677-2018	ELIM EXT PAV MRK & MRKS (WORD)	EA		$30.00	$0.00
0678-2001	PAV SURF PREP FOR MRK (4")	LF		$0.05	$0.00
0678-2003	PAV SURF PREP FOR MRK (8")	LF	4000	$0.10	$400.00
0678-2004	PAV SURF PREP FOR MRK (12")	LF		$0.20	$0.00
0678-2006	PAV SURF PREP FOR MRK (24")	LF	0	$0.40	$0.00
0678-2007	PAV SURF PREP FOR MRK (ARROW)	EA	16	$10.00	$160.00
0678-2018	PAV SURF PREP FOR MRK (WORD)	EA	16	$15.00	$240.00
	SWPPP	LS			$39,772.73
	SIGNING	LS			$34,090.91
	SIGNALIZATION	LS			$180,000.00
SUBTOTAL					$431,812.95
20% CONTINGENECY					$86,362.59
TOTAL					**$518,200.00**

ARCOLA AREA MEDIUM TERM IMPROVEMENTS

SH 6 SOUTH
OPINION OF COST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0100-2002	PREPARING ROW	STA	30	$1,000.00	$30,000.00
0105-2060	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	3000	$6.00	$18,000.00
0110-2001	EXCAVATION (ROADWAY)	CY	498.1481481	$5.00	$2,490.74
0132-2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	996.2962963	$4.00	$3,985.19
0260-2006	LIME TRT (EXST MATL) (6")	SY	8966.666667	$2.00	$17,933.33
0260-2012	LIME (HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	121.05	$120.00	$14,526.00
0276-2224	CEM TRT(PLNT MX) (CL N)(TY E)(GR 4)(6")	SY	8966.666667	$6.00	$53,800.00
0340-2063	D-GR HMA(METH) TY-C SAC-A PG76-22	TON	493.1666667	$75.00	$36,987.50
0360-2003	CONC PVMT (CONT REINF-CRCP)(10")	SY		$30.00	$0.00
0360-2018	CURB (TYPE II)	LF	15500	$3.50	$54,250.00
0432-2001	RIPRAP (CONC)(4 IN)	CY	332.0655556	$325.00	$107,921.31
0500-2001	MOBILIZATION	LS	10%		$34,748.27
0502-2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.136363636	$5,000.00	$5,681.82
0666-2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0666-2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	1000	$0.70	$700.00
0666-2042	REFL PAV MRK TY I (W) 12" (SLD)(100MIL)	LF		$2.00	$0.00
0666-2048	REFL PAV MRK TY I (W) 24" (SLD)(100MIL)	LF	24	$4.00	$96.00
0666-2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	4	$100.00	$400.00
0666-2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	4	$125.00	$500.00
0666-2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0672-2012	REFL PAV MRKR TY I-C	EA		$3.00	$0.00
0672-2015	REFL PAV MRKR TY II-A-A	EA		$3.00	$0.00
0677-2001	ELIM EXT PAV MRK & MRKS (4")	LF	4	$0.30	$1.20
0677-2003	ELIM EXT PAV MRK & MRKS (8")	LF		$0.30	$0.00
0677-2005	ELIM EXT PAV MRK & MRKS (12")	LF		$0.75	$0.00
0677-2007	ELIM EXT PAV MRK & MRKS (24")	LF		$1.50	$0.00
0677-2008	ELIM EXT PAV MRK & MRKS (ARROW)	EA		$30.00	$0.00
0677-2018	ELIM EXT PAV MRK & MRKS (WORD)	EA		$30.00	$0.00
0678-2001	PAV SURF PREP FOR MRK (4")	LF		$0.05	$0.00
0678-2003	PAV SURF PREP FOR MRK (8")	LF	1000	$0.10	$100.00
0678-2004	PAV SURF PREP FOR MRK (12")	LF		$0.20	$0.00
0678-2006	PAV SURF PREP FOR MRK (24")	LF	24	$0.40	$9.60
0678-2007	PAV SURF PREP FOR MRK (ARROW)	EA	4	$10.00	$40.00
0678-2018	PAV SURF PREP FOR MRK (WORD)	EA	4	$15.00	$60.00
	SWPPP	LS			$19,886.36
	SIGNING	LS			$17,045.45
	SIGNALIZATION	LS			$0.00
SUBTOTAL					$419,162.77
20% CONTINGENECY					$83,832.55
TOTAL					**$503,000.00**

MAVEL AREA MEDIUM TERM IMPROVEMENTS

SH 6 SOUTH
OPINION OF COST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0100-2002	PREPARING ROW	STA	150	$1,000.00	$150,000.00
0105-2060	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	11100	$6.00	$66,600.00
0110-2001	EXCAVATION (ROADWAY)	CY	148	$5.00	$740.74
0132-2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	296	$4.00	$1,185.19
0260-2006	LIME TRT (EXST MATL) (6")	SY	2667	$2.00	$5,333.33
0260-2012	LIME (HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	36	$120.00	$4,320.00
0276-2224	CEM TRT(PLNT MX) (CL N)(TY E)(GR 4)(6")	SY	2667	$6.00	$16,000.00
0340-2063	D-GR HMA(METH) TY-C SAC-A PG76-22	TON	147	$75.00	$11,000.00
0360-2003	CONC PVMT (CONT REINF-CRCP)(10")	SY	11100	$30.00	$333,000.00
0360-2018	CURB (TYPE II)	LF	25400	$3.50	$88,900.00
0432-2001	RIPRAP (CONC)(4 IN)	CY	0	$325.00	$0.00
0500-2001	MOBILIZATION	LS	10%		$71,547.27
0502-2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.68	$5,000.00	$28,409.09
0666-2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0666-2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	5250	$0.70	$3,675.00
0666-2042	REFL PAV MRK TY I (W) 12" (SLD)(100MIL)	LF		$2.00	$0.00
0666-2048	REFL PAV MRK TY I (W) 24" (SLD)(100MIL)	LF	120	$4.00	$480.00
0666-2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	21	$100.00	$2,100.00
0666-2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	21	$125.00	$2,625.00
0666-2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0672-2012	REFL PAV MRKR TY I-C	EA		$3.00	$0.00
0672-2015	REFL PAV MRKR TY II-A-A	EA		$3.00	$0.00
0677-2001	ELIM EXT PAV MRK & MRKS (4")	LF	21	$0.30	$6.30
0677-2003	ELIM EXT PAV MRK & MRKS (8")	LF		$0.30	$0.00
0677-2005	ELIM EXT PAV MRK & MRKS (12")	LF		$0.75	$0.00
0677-2007	ELIM EXT PAV MRK & MRKS (24")	LF		$1.50	$0.00
0677-2008	ELIM EXT PAV MRK & MRKS (ARROW)	EA		$30.00	$0.00
0677-2018	ELIM EXT PAV MRK & MRKS (WORD)	EA		$30.00	$0.00
0678-2001	PAV SURF PREP FOR MRK (4")	LF		$0.05	$0.00
0678-2003	PAV SURF PREP FOR MRK (8")	LF	5250	$0.10	$525.00
0678-2004	PAV SURF PREP FOR MRK (12")	LF		$0.20	$0.00
0678-2006	PAV SURF PREP FOR MRK (24")	LF	120	$0.40	$48.00
0678-2007	PAV SURF PREP FOR MRK (ARROW)	EA	21	$10.00	$210.00
0678-2018	PAV SURF PREP FOR MRK (WORD)	EA	21	$15.00	$315.00
	SWPPP	LS			$99,431.82
	SIGNING	LS			$85,227.27
	SIGNALIZATION	LS			$120,000.00
SUBTOTAL					$1,091,679.01
20% CONTINGENECY					$218,335.80
TOTAL					**$1,310,000.00**

ALVIN AREA MEDIUM TERM IMPROVEMENTS

SH 6 SOUTH
OPINION OF COST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0100-2002	PREPARING ROW	STA	60	$1,000.00	$60,000.00
0105-2060	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	1900	$6.00	$11,400.00
0110-2001	EXCAVATION (ROADWAY)	CY	318.5185185	$5.00	$1,592.59
0132-2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	637.037037	$4.00	$2,548.15
0260-2006	LIME TRT (EXST MATL) (6")	SY	5733.333333	$2.00	$11,466.67
0260-2012	LIME (HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	77.4	$120.00	$9,288.00
0276-2224	CEM TRT(PLNT MX) (CL N)(TY E)(GR 4)(6")	SY	5733.333333	$6.00	$34,400.00
0340-2063	D-GR HMA(METH) TY-C SAC-A PG76-22	TON	315.3333333	$75.00	$23,650.00
0360-2003	CONC PVMT (CONT REINF-CRCP)(10")	SY		$30.00	$0.00
0360-2018	CURB (TYPE II)	LF	16900	$3.50	$59,150.00
0432-2001	RIPRAP (CONC)(4 IN)	CY	212.3244444	$325.00	$69,005.44
0500-2001	MOBILIZATION	LS	10%		$30,135.96
0502-2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.272727273	$5,000.00	$11,363.64
0666-2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0666-2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	4050	$0.70	$2,835.00
0666-2042	REFL PAV MRK TY I (W) 12" (SLD)(100MIL)	LF		$2.00	$0.00
0666-2048	REFL PAV MRK TY I (W) 24" (SLD)(100MIL)	LF	0	$4.00	$0.00
0666-2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	17	$100.00	$1,700.00
0666-2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	17	$125.00	$2,125.00
0666-2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0672-2012	REFL PAV MRKR TY I-C	EA		$3.00	$0.00
0672-2015	REFL PAV MRKR TY II-A-A	EA		$3.00	$0.00
0677-2001	ELIM EXT PAV MRK & MRKS (4")	LF	17	$0.30	$5.10
0677-2003	ELIM EXT PAV MRK & MRKS (8")	LF		$0.30	$0.00
0677-2005	ELIM EXT PAV MRK & MRKS (12")	LF		$0.75	$0.00
0677-2007	ELIM EXT PAV MRK & MRKS (24")	LF		$1.50	$0.00
0677-2008	ELIM EXT PAV MRK & MRKS (ARROW)	EA		$30.00	$0.00
0677-2018	ELIM EXT PAV MRK & MRKS (WORD)	EA		$30.00	$0.00
0678-2001	PAV SURF PREP FOR MRK (4")	LF		$0.05	$0.00
0678-2003	PAV SURF PREP FOR MRK (8")	LF	4050	$0.10	$405.00
0678-2004	PAV SURF PREP FOR MRK (12")	LF		$0.20	$0.00
0678-2006	PAV SURF PREP FOR MRK (24")	LF	0	$0.40	$0.00
0678-2007	PAV SURF PREP FOR MRK (ARROW)	EA	17	$10.00	$170.00
0678-2018	PAV SURF PREP FOR MRK (WORD)	EA	17	$15.00	$255.00
	SWPPP	LS			$39,772.73
	SIGNING	LS			$34,090.91
	SIGNALIZATION	LS			$180,000.00
SUBTOTAL					$585,359.18
20% CONTINGENECY					$117,071.84
TOTAL					**$702,400.00**

SANTA FE AREA LONG TERM IMPROVEMENTS

SH 6 SOUTH
OPINION OF COST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0100-2002	PREPARING ROW	STA	100	$1,000.00	$100,000.00
0105-2060	REMOVING STAB BASE & ASPH PAV(15"-20")	SY	2800	$6.00	$16,800.00
0110-2001	EXCAVATION (ROADWAY)	CY	468.5185185	$5.00	$2,342.59
0132-2006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	CY	937.037037	$4.00	$3,748.15
0260-2006	LIME TRT (EXST MATL) (6")	SY	8433.333333	$2.00	$16,866.67
0260-2012	LIME (HYD,COM OR QK)(SLRY)OR QK(DRY)	TON	113.85	$120.00	$13,662.00
0276-2224	CEM TRT(PLNT MX) (CL N)(TY E)(GR 4)(6")	SY	8433.333333	$6.00	$50,600.00
0340-2063	D-GR HMA(METH) TY-C SAC-A PG76-22	TON	463.8333333	$75.00	$34,787.50
0360-2003	CONC PVMT (CONT REINF-CRCP)(10")	SY		$30.00	$0.00
0360-2018	CURB (TYPE II)	LF	9936	$3.50	$34,776.00
0432-2001	RIPRAP (CONC)(4 IN)	CY	312.3144444	$325.00	$101,502.19
0500-2001	MOBILIZATION	LS	10%		$40,435.35
0502-2001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.787878788	$5,000.00	$18,939.39
0666-2003	REFL PAV MRK TY I (W) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2012	REFL PAV MRK TY I (W) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0666-2036	REFL PAV MRK TY I (W) 8" (SLD)(100MIL)	LF	5500	$0.70	$3,850.00
0666-2042	REFL PAV MRK TY I (W) 12" (SLD)(100MIL)	LF		$2.00	$0.00
0666-2048	REFL PAV MRK TY I (W) 24" (SLD)(100MIL)	LF	96	$4.00	$384.00
0666-2054	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	22	$100.00	$2,200.00
0666-2096	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	22	$125.00	$2,750.00
0666-2105	REFL PAV MRK TY I (Y) 4" (BRK)(100MIL)	LF		$0.30	$0.00
0666-2111	REFL PAV MRK TY I (Y) 4" (SLD)(100MIL)	LF		$0.30	$0.00
0672-2012	REFL PAV MRKR TY I-C	EA		$3.00	$0.00
0672-2015	REFL PAV MRKR TY II-A-A	EA		$3.00	$0.00
0677-2001	ELIM EXT PAV MRK & MRKS (4")	LF	22	$0.30	$6.60
0677-2003	ELIM EXT PAV MRK & MRKS (8")	LF		$0.30	$0.00
0677-2005	ELIM EXT PAV MRK & MRKS (12")	LF		$0.75	$0.00
0677-2007	ELIM EXT PAV MRK & MRKS (24")	LF		$1.50	$0.00
0677-2008	ELIM EXT PAV MRK & MRKS (ARROW)	EA		$30.00	$0.00
0677-2018	ELIM EXT PAV MRK & MRKS (WORD)	EA		$30.00	$0.00
0678-2001	PAV SURF PREP FOR MRK (4")	LF		$0.05	$0.00
0678-2003	PAV SURF PREP FOR MRK (8")	LF	5500	$0.10	$550.00
0678-2004	PAV SURF PREP FOR MRK (12")	LF		$0.20	$0.00
0678-2006	PAV SURF PREP FOR MRK (24")	LF	96	$0.40	$38.40
0678-2007	PAV SURF PREP FOR MRK (ARROW)	EA	22	$10.00	$220.00
0678-2018	PAV SURF PREP FOR MRK (WORD)	EA	22	$15.00	$330.00
	SWPPP	LS			$66,287.88
	SIGNING	LS			$56,818.18
	SIGNALIZATION	LS			$120,000.00
SUBTOTAL					$687,894.91
20% CONTINGENECY					$137,578.98
TOTAL					**$825,500.00**


NORTH
6
TEXAS
SOUTH
2004
ROAD