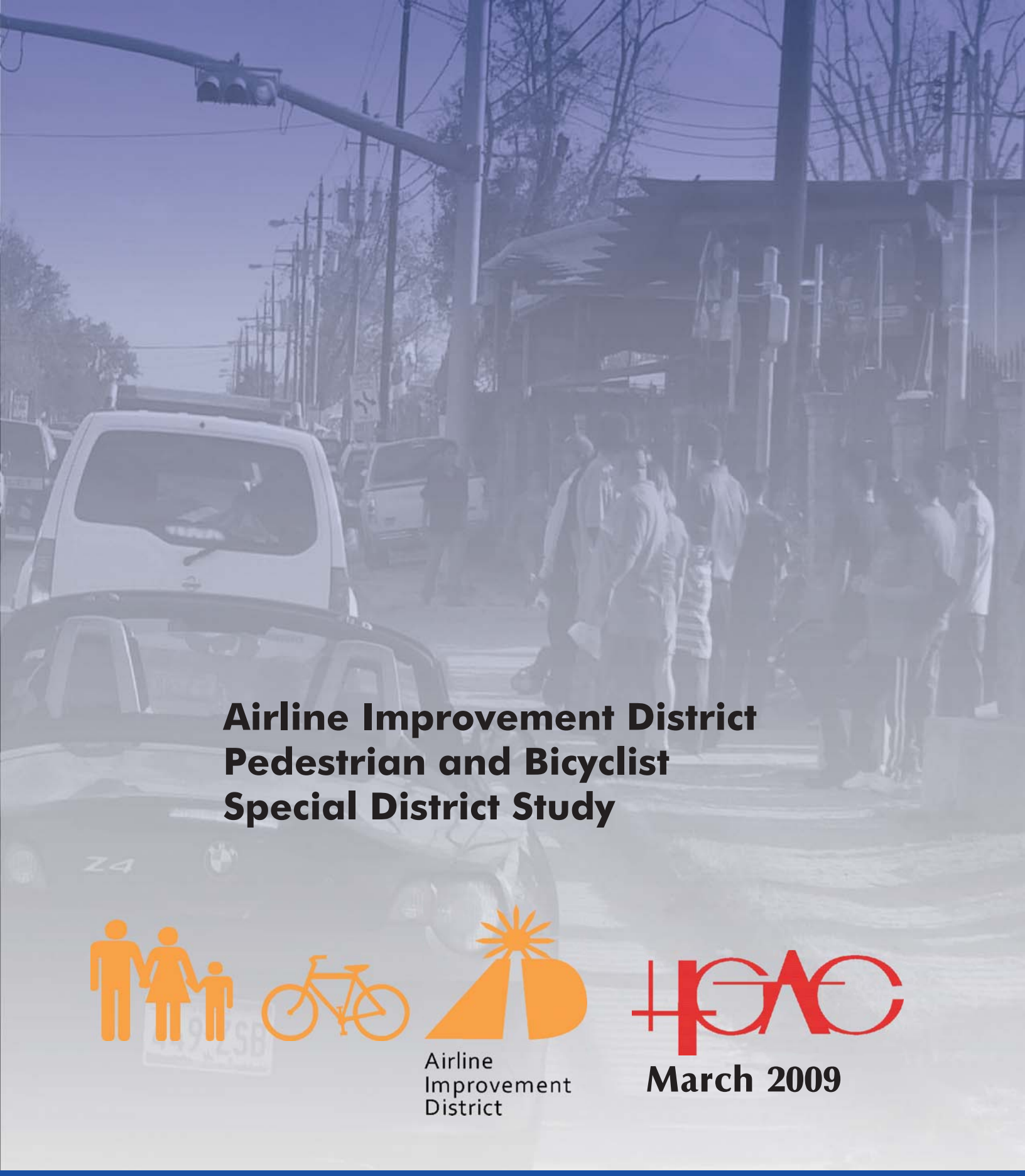


Airline Improvement District Pedestrian and Bicyclist Special District Study

Airline Improvement District

March 2009

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

the CLIFFORD GROUP inc.

Nelson|Nygaard consulting associates

Executive Summary

Introduction

The Houston-Galveston Area Council (H-GAC) is a voluntary association of local governments and local elected officials in the 13-county Gulf Coast Planning Region, an area of 12,500 square miles with almost 5.4 million people. Organized in 1966 by local elected officials after authorization by State enabling legislation, H-GAC now has 132 local government members, including all major general-purpose local governments in the 13-county region: 13 counties, 105 cities, and 14 school districts. H-GAC also serves as the Metropolitan Planning Organization (MPO) for transportation planning in the eight-county Houston-Galveston area. This area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. H-GAC's Transportation Policy Council approves the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP).

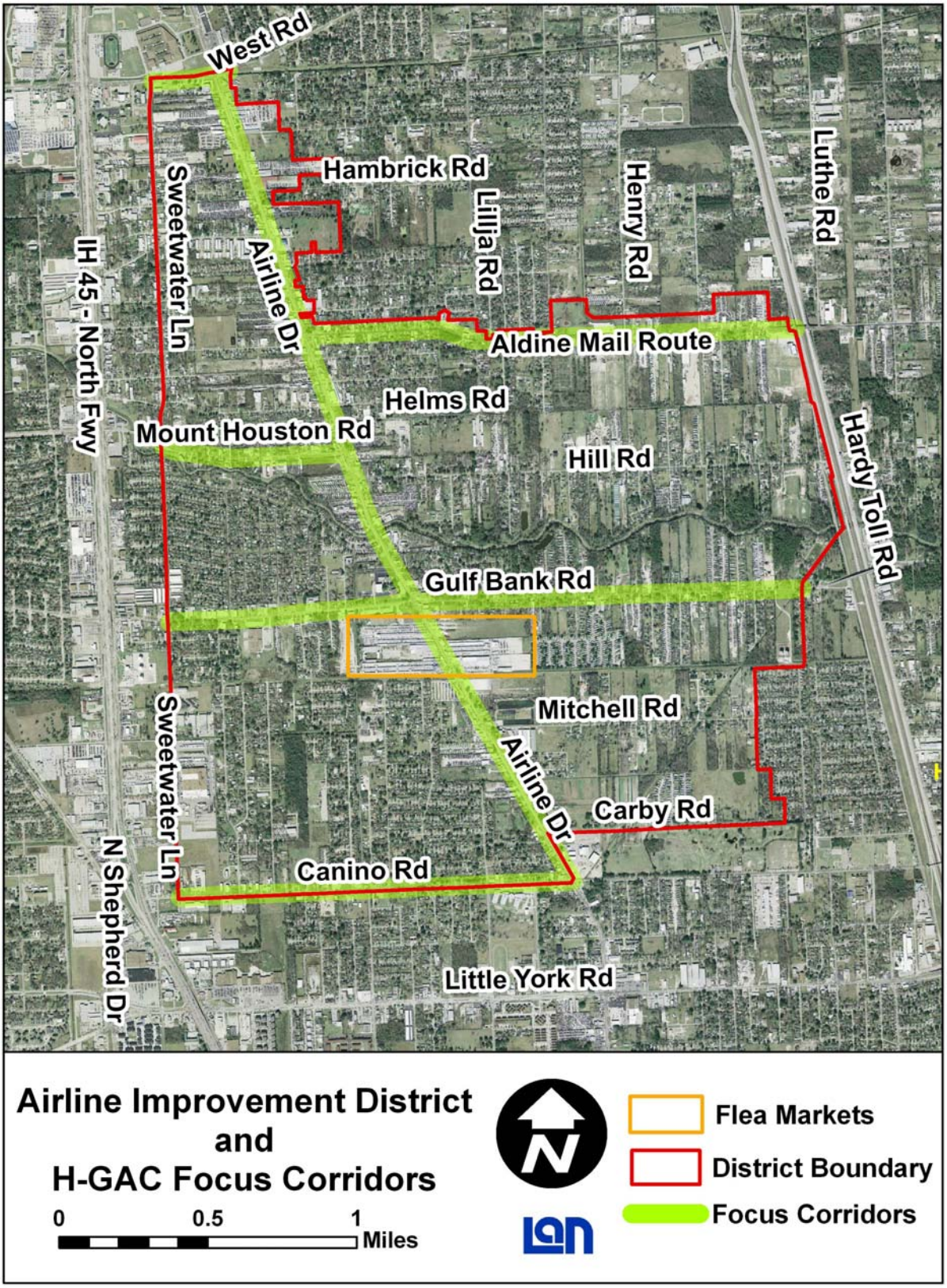
In 2004, H-GAC conducted a study to identify districts where there were high levels of existing or potential pedestrian and bicyclist activity, and where there were significant opportunities to replace vehicle trips with pedestrian or bicycle trips, and to improve pedestrian and bicyclist safety. Fifteen districts were identified throughout the region; one of these was the Airline Improvement District area in Harris County. The map on the following page shows the study area, which is centered on the flea markets along Airline Drive between Mitchell Road and Gulf Bank Road.

The main focus of this study is the flea market area. Although the project team did conduct field inventories of traffic signals and sidewalk conditions on major roads throughout the study area (called "focus corridors" on the map), and made recommendations of infrastructure improvement in those areas, it is the flea market congestion, of both vehicles and pedestrians, that is the major source of concern for the District and the neighborhood residents. This study seeks to improve the safety of pedestrians in a busy commercial zone, as well as to regularize the flow of vehicles, to improve access for transit and emergency vehicles.

Outline of Activities

- Traffic Counts — August 16, 17, and 24, 2008
- Market Owners Meeting — September 5, 2008
- Field Observations — throughout September 2008
- Stakeholder Workshop — November 14, 2008
- Market Patron Survey #1 — November 23, 2008
- Market Patron Survey #2 — December 13, 2008
- H-GAC Pedestrian-Bicycle Subcommittee — January 22, 2009
- Harris County Precinct 1 Presentation — January 27, 2009
- Airline Improvement District Board Meeting — January 29, 2009

Study Area Map



Study Process Description

For initial assessment of existing conditions in the study area, traffic counts were conducted on Airline Drive south of Gulf Bank Road on Saturday and Sunday, August 16-17, 2008. These were counts of traffic volumes, meant to confirm the general perception of Sunday as a busier day, in terms of market patronage, as well as to identify the peak hour(s) during the weekend. Follow-up counts were made, including turning movements at the Airline Drive / Gulf Bank Road intersection, on Sunday, August 24, 2008. Measurements were also made on various dates in early September, of driveway locations, existing fencing, and other physical conditions affecting pedestrian and vehicle movements.

Two public input workshops were held to solicit improvement recommendations from the stakeholders and the community. The first, held Friday, September 5, 2008, involved the District and the market owners, while the second, held Friday, November 14, 2008 also included County and State representatives, area homeowners' associations and civic clubs, and law enforcement personnel (specifically those directing traffic and pedestrian activity on market days). Finally, on Sunday, November 23, 2008, and Saturday, December 13, 2008, tables were set up at the markets to solicit input from market customers.

After these meetings and events, the project team conducted another set of field assessments on Saturday, December 20, 2008. Using the input from the workshops, survey, and field observations, a series of recommendations was developed based on the maps and comments drawn by the market owners and workshop participants, and the responses to the survey received from the public. These projects included sidewalk construction, additional signage and signalization, stop bar and crosswalk striping, long-term driveway consolidation, as well as hike-and-bike trails and bike racks. Twenty-five physical projects and three policy improvements developed from the public input were presented to the H-GAC Pedestrian / Bicyclist Subcommittee on Thursday, January 22, 2009, to representatives of Harris County Precinct 1 on Tuesday, January 27, 2009, and to the Airline Improvement District Board on Thursday, January 29, 2009.

Conceptual Plan

In general, these recommendations are made with an eye not only to improve safety, but also to improve emergency and fire response times, create a more pleasant environment for residents surrounding the market area, and make the population in the area more comfortable with any modifications.

The phasing of these recommendations can be seen in the three maps showing the development of the short, medium and long term potential improvements. The recommendations can be grouped into several broad themes, as listed below:

Pedestrian Improvements

- Close most openings in the fence along the west side of Airline Drive.
- Create a median along the corridor.
- Make the walking area compliant with the Americans with Disabilities Act (ADA) requirements.
- Pave area between market fences and Airline Drive curb as a sidewalk.

Parking / Access Management

- Raise prices for parking.
- Add parking for bicycles.
- Use church parking lot in the off peak hours and direct motorists to lots closest to their origin.
- Create pedestrian bridges over canals.

- Create new access areas from Gulf Bank and Louise Roads.

Traffic Signals and Markings

- Make signals fixed time. (note here that Harris County already plans to do this; the next round of CMAQ-funded road work includes creating signal timings for Airline Drive)
- Add new stop bars at signalized intersections.
- Add two new crosswalks and pedestrian signals.

Transit

- Continue to promote bicycle rack installation on METRO buses.
- Increase bus frequency.
- Consolidate location of bus stops, improve information and comfort of bus stops with route times and direction, benches and shelters.

Signs

- Develop wayfinding signs to locate parking.
- Create gateway treatments to identify the market area.
- Install signage along the two major highways to direct people to parking.

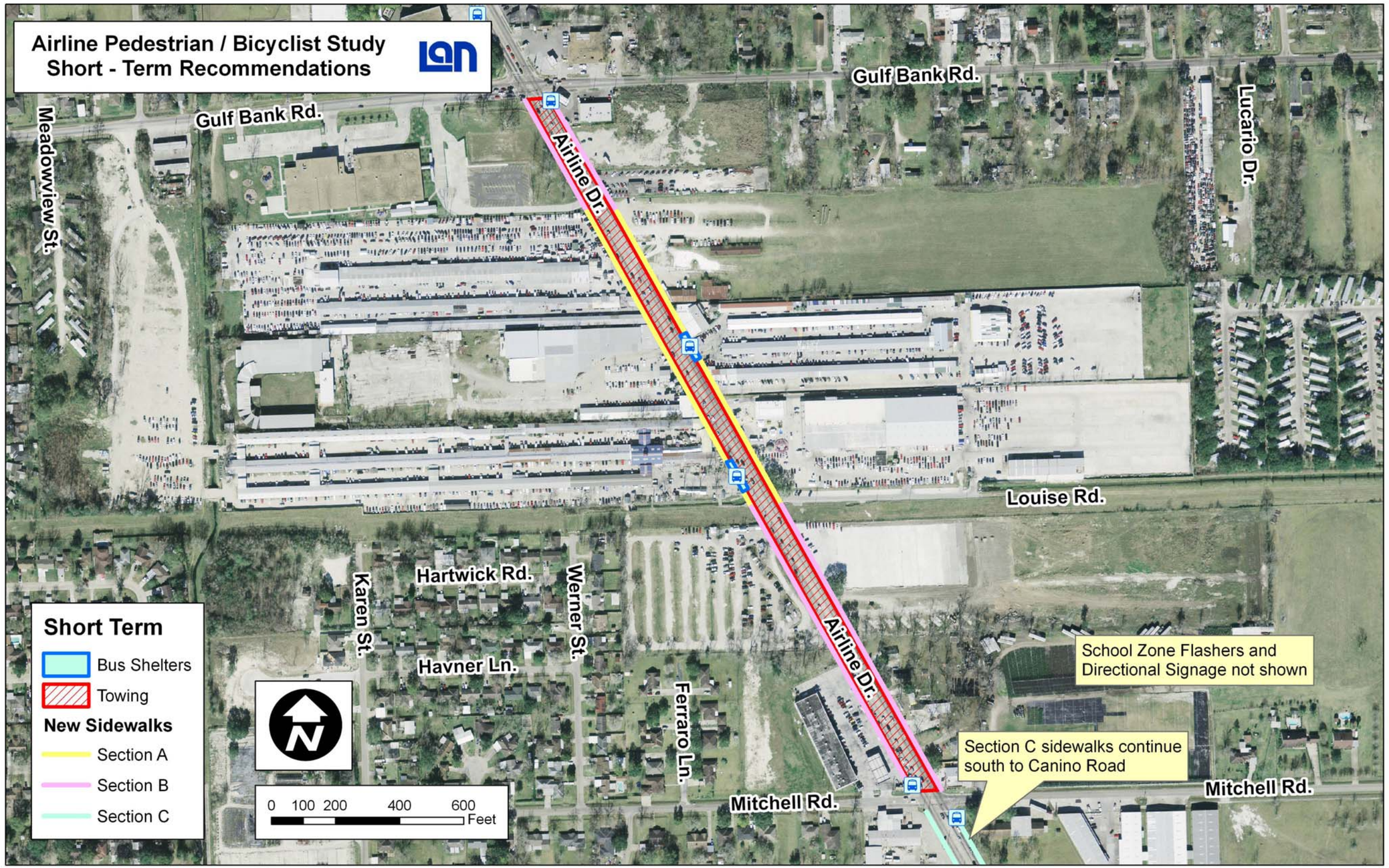
Maps of Recommendations

The project team has taken the conceptual plan detailed above, and created twenty-four proposed physical improvements that reflect the content of the conceptual plan.

The prioritization of short-, medium-, and long-term improvements was done in terms of the relative ease and expense of projects, the necessity in terms of which would have the most beneficial effect on pedestrian conditions, and the required sequencing where one improvement builds on a previously implemented one. The priority order of the projects was determined by the consultant team, in consultation with staff from the Airline Improvement District and Harris County Precinct 1.

The maps on the following pages illustrate the recommended improvements.

Map of Short-Term Recommendations



Map of Medium-Term Recommendations

Map of Long-Term Recommendations

Cost Estimates

The total, shown below, is for all priced projects. By the terms of the federal grant by which HGAC funds the Pedestrian and Bicycle Districts improvements, the sponsoring agency (in this case the Airline Improvement District) must contribute 20% of the cost of improvements. It is also acceptable for the sponsoring agency to secure financial commitment from other government agencies (such as Harris County). In-kind services are not countable towards this total; contributions must be in actual dollars.

Airline Improvement District Pedestrian/Bicyclist Plan
Overall Cost Estimates

Code #	Description	Estimate
1	Airline Drive Sidewalks - Section A (Market Area)	$ 222,200
2	Airline Drive Sidewalks - Section B (Gulf Bank Road to Mitchell Road, excluding Market Area)	$ 177,900
3	Airline Drive Sidewalks - Section C (Mitchell Road to Canino Road)	$ 381,000
4	Bus Shelters at Existing Stops	$ 13,000
5	Tow-Away Zone in Market Area	$ 20,300
6	Enforcement of Tow-Away Zone - not priced	$ -
7	Upgrade School Zone Signage	$ 55,200
8	Canino Road Sidewalks - Fonville Middle School to Airline Drive	$ 121,200
9	Directional Signage to Parking Areas	$ 2,700
10	Airline Drive Crosswalks	$ 187,400
11	Airline Drive Medians	$ 274,600
12	Gulf Bank Road Sidewalks - West of Airline	$ 517,200
13	Gulf Bank Road Sidewalks - East of Airline	$ 840,100
14	Illumination on Gulf Bank Road	$ 264,600
15	Upgrade Signalized Intersections - Group A - Airline Dr. at Gulf Bank Rd. and Mitchell Rd.	$ 105,900
16	Upgrade Signalized Intersections - Group B - Airline Drive at Canino Road	$ 78,900
17	Upgrade Signalized Intersections - Group C - Airline Dr. at Hill Rd. and Mount Houston Rd.	$ 79,200
18	Upgrade Signalized Intersections - Group D - Airline Dr. at Aldine Mail Route and West Rd.	$ 93,400
19	Upgrade Signalized Intersections - Group E - Sweetwater Ln. at Gulf Bank Rd. and Mount Houston Rd.	$ 50,600
20	Modify Intersection - Sweetwater Lane at Gulf Bank Road	$ 21,900
21	Reprogram DMS Boards on IH 45 - not priced	$ -
22	Louise Road Hike / Bike Trail	$ 385,300
23	New Street Connections	$ 962,800
24	Driveway Consolidation / Closure - not priced	$ -
25	Engineering Study - Signal Warrant	$ 8,000
SUB-TOTAL		**$ 4,863,000**
10% Contingency		$ 486,000
GRAND TOTAL		**$ 5,350,000**
FEDERAL SHARE (80%)		$ 4,280,000
LOCAL MATCH (20%)		**$ 1,070,000**

Policy Improvements (non-priced)

P1. Parking Lot Interconnection

P2. Development of Bicycle Parking Areas

P3. Investigate Use of METRO Facilities for Remote Parking

Table of Contents

Chapter 1
Study Overview

Introduction

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In 2004, H-GAC conducted a study to identify districts where there were high levels of existing or potential pedestrian and bicyclist activity, and where there were significant opportunities to replace vehicle trips with pedestrian or bicycle trips, and to improve pedestrian and bicyclist safety. Fifteen districts were identified throughout the region; one of these was the Airline Improvement District area in Harris County.

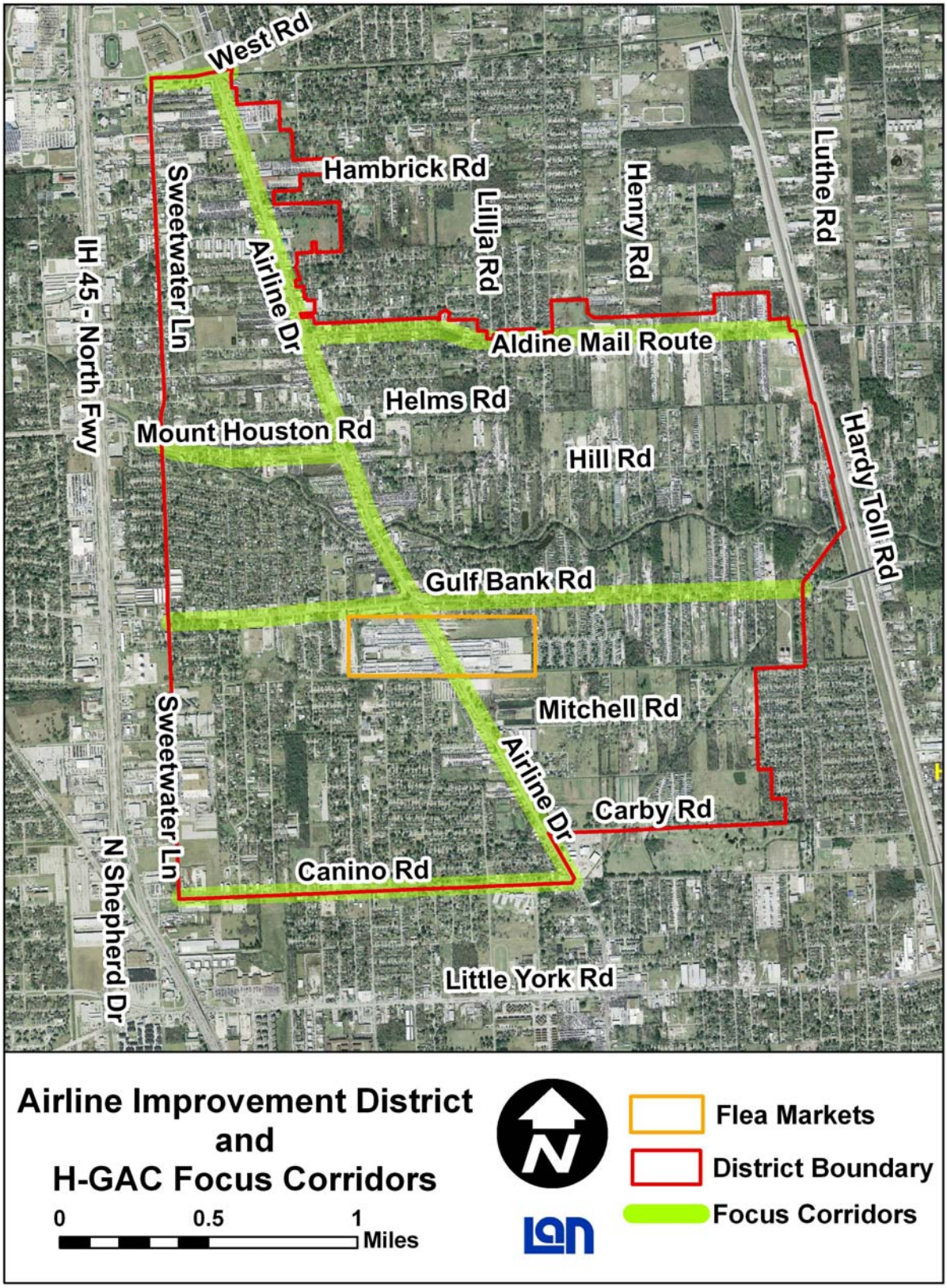
H-GAC selected consultant Lockwood, Andrews & Newnam, Inc. (LAN), in association with sub-consultants Nelson\Nygaard Consulting Associates and The Clifford Group, to develop a conceptual master plan for comprehensive pedestrian and bicyclist improvements in the Airline Improvement District Study Area. The consultant team worked closely with the community to define the best possible overall plan that fits the needs of the residents, businesses and visitors.

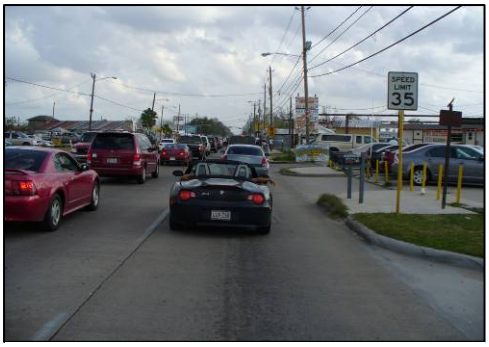
Study Area Characteristics

The Airline / Gulf Bank area developed as a working- to middle-class suburb in the late 1950s and early 1960s, as the conversion of US 75 to Interstate 45 spurred development northward. Subdivisions including Northline Terrace, Sunset Gardens, and Bellmar were built between IH-45 and Airline Drive; further east between Airline and Hardy Road (now the Hardy Toll Road), more rural-style residential on narrow, deep lots predominated. Suburban development continued northward to Greenspoint in the 1970s and 1980s, and beyond to FM 1960. The City of Houston annexed several adjacent neighborhoods in 1978 and 1984, but the Airline / Gulf Bank area remains an unincorporated portion of Harris County, as does Aldine to the north. The map on the following page shows the study area, which is centered on the flea markets along Airline Drive between Mitchell Road and Gulf Bank Road. Additional "focus corridors" were designated, consisting of major east-west roadways in the District, plus only major north-south route, Airline Drive itself. These east-west routes included Canino Road, Gulf Bank Road, Mount Houston Road, Aldine Mail Route, and West Road.

Approximately two-thirds of the District's residents are Hispanic. Most residences are single-family homes. There are a number of mobile home parks in the study area, but relatively few apartments or other multi-family residences. The rate of home ownership in the District is higher than the regional average, although household income is below average. Commercial and light industrial uses are found along Airline Drive and other major roads. The District is in unincorporated Harris County; there is no zoning in place in the County or the adjacent City of Houston. Further demographic and land use information is presented in Appendix A.

Study Area Map





This photo, taken Sunday, November 23, 2008, illustrates the typical weekend traffic.

The Airline Improvement District is a taxing entity created in 2005 by the state legislature. The District's mission is to promote, develop, encourage and maintain employment, commerce, transportation, housing, tourism, recreation, the arts, entertainment, economic development, safety and the public welfare of the District. It is the desire of the District to improve the overall quality of life and create an environment where people want to live, work and raise their families.

The District generates revenue through a 1% retail sales tax, which helps pay for public safety, transportation and drainage projects. Unlike many special districts in the Houston area, the Airline Improvement District is funded solely through an increment of the sales tax and does not levy property taxes. The flea markets along Airline Drive between Mitchell Road and Gulf Bank Road, which are the focus of much of this study, are an important source of revenue for the District. The markets collectively draw 30,000 to 40,000 customers on a typical weekend day. This is equivalent to the patronage at a major shopping mall, and much of the congestion problem arises from the infrastructure of the neighborhood not being able to easily handle such an influx.

The main focus of this study is the flea market area. Although the project team did conduct field inventories of traffic signals and sidewalk conditions on major roads throughout the study area, and made recommendations of infrastructure improvement in those areas, it is the flea market congestion, of both vehicles and pedestrians, that is the major source of concern for the District and the neighborhood residents. This study seeks to improve the safety of pedestrians in a busy commercial zone, as well as to regularize the flow of vehicles, to improve access for transit and emergency vehicles.

This sidewalk on Airline Drive near Mount Houston Road is in good condition, although it is too narrow by current standards, and grass covers the edges.

Pedestrian Conditions

The majority of the study area lacks sidewalks. Sidewalks are provided along West Road, which forms the boundary between the District and the City of Houston, and along Airline Drive from Gulf Bank Road to West Road. A map of existing sidewalks is included in Appendix A. Due to the narrow right-of-way relative to the roadway width, sidewalks are narrow and frequently adjacent to the curb. In some locations, grass growth has encroached on the edges of the sidewalks.

Outside the study area (north of West Road and south of Canino Road), the City of Houston has constructed sidewalks along Airline Drive. The small segment of West Road forming the study area boundary does have sidewalks, as does a short stretch of Canino Road alongside Fonville Middle School. The remaining major east-west roads, as well as virtually all minor roads, do not have sidewalks. Despite the lack of facilities provided, however, pedestrian activity is somewhat evident, though paths worn along roadsides.

Aldine Mail Route at the Lillja Road intersection

Harris County is currently planning to widen Aldine Mail Route from a two-lane undivided roadway to a four-lane boulevard with a median. Although sidewalks have been designed as part of the project, they will not be constructed by the County. The Airline Improvement District hopes to raise money to pay for sidewalk construction.

As part of the needs assessment, the project team inventoried the traffic signals along Airline Drive. Although the signals and their hardware are mostly older, and in only fair condition, pedestrian call buttons and signal heads are present at most intersections. Curb ramps do exist where required, but all those surveyed were of older designs that do not appear to meet current ADA standards. Further detail on signalized intersection conditions is located in Appendix A.

Bicyclist Conditions

The 2000 Census reported that 0.2% of area residents bicycled to work. Although this is double the County average, it is still a small number. Bicycling activity was not in evidence during the field visits made by the project team. Roadway surfaces are generally in fair to good condition, although deep drainage ditches adjacent to the shoulder on most of the east-west roadways may make bicyclists uncomfortable.

Bicycle racks are provided at the various County and City parks in and near the study area, although no signed routes or marked bicycle facilities exist in the vicinity. The nearest facility is a striped bicycle lane in the City of Houston. It extends along Crosstimbers Road, roughly from North Shepherd Drive in the west to US 59 in the east; this is approximately two miles south of the study area.

Benefits to Safety

Development of a comprehensive bicycle and pedestrian plan is essential to increasing bicycling and walking within the Airline Improvement District. Research shows that "where, or when, more people walk or bicycle, the less likely any of them are to be injured by motorists. There is safety in numbers" (Jacobsen: Injury Prevention 2003;9:205–209). Although the traffic crash data indicated that vehicle crashes per person-mile driven are lower in the District than in the region as a whole, the few pedestrian crashes did mostly occur in the flea market area; this is not surprising given the high pedestrian volumes there. Crash severity was generally low, perhaps due to the low speeds typical of a congested area. Crash statistics are only one measure of the "safety" of an area, particularly on a road like Airline Drive, which functions very differently on non-market days. On non-market days vehicle speeds increase, creating an environment that is more difficult for pedestrians and bicyclists to use safely.

Developing policies and programs that increase walking and bicycling mode share are effective ways to improve the safety of those walking and bicycling, and vice versa. Focusing walking and bicycling in specific locations through the development of bicycle and pedestrian amenities is not likely to significantly decrease safety in other locations. This is because addressing the needs of these modes will cause the overall mode share of biking and walking to increase.

In addition, developing safe networks for walking and bicycling should be priorities in the Airline Improvement District as a means of improving the overall public health of local residents. Walking is one of the best ways to maintain health and well being of all populations. Many towns around the country, especially those with high populations of senior citizens, are making an effort to create environments that encourage walking. As the population ages and people give up their driver's licenses, it is crucial to have well established pedestrian amenities to ensure independence in mobility. If there is the general perception that an area is unfriendly for walking and bicycling people will use other means of getting to destinations. In turn, when sidewalks are installed, paths and bridges created, bicycle lanes and parking developed in key areas, people will walk and bicycle more.

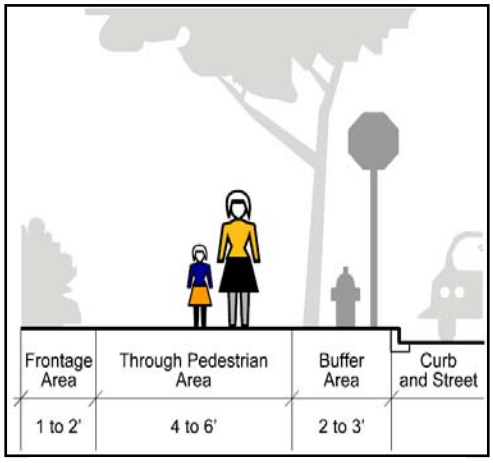
Proposed Facility Types

Vehicle Wayfinding

New signage is planned for directing motorists to parking areas located on the same side of the market area that they arrive from. The City of Houston uses similar permanent signage for wayfinding to farmers' markets which only operate one or two days per week, so there is local precedent for similar treatments. Harris County will have to approve type and location of new signage.

Sidewalks

All new sidewalks planned throughout the study area are standard five-foot wide sidewalks. They are to be constructed of concrete, and must conform to all geometric standards imposed by the Americans with Disabilities Act, as codified in the Texas Accessibility Standards (TAS). Curb ramps in particular, when proposed in Chapter 3, Recommendations, follow the new standard adopted in the TAS in 2006. In addition to the length, width, and slope requirements previously in force, a "detectable warning strip" shall be installed at the street (lower) end of the ramp. These detectable warnings shall be 24" deep and extend the full width of the ramp, with the near edge 6" to 10" from the curb line. They shall comply with TAS 4.29.2, which required a profile of truncated domes. Previous standards required grooves or other tactile patterns.



Typical Sidewalk Section

(Adapted from Pedestrian Master Plan, Portland, Oregon)

The bicycle facility type discussed in Chapter 3 is a shared-use path (called a Class I bikeway). Other facility types include a marked bicycle lane (Class II bikeways), which is present on many streets in the City of Houston. No new marked lanes are proposed as part of this study. Class III bikeways are bicycle routes designated with signage only. None currently exist in the study area, and none are proposed in the study recommendations. Complementary improvements such as bicycle parking and bicycle-oriented signage are discussed below.

Hike-and-Bike Trails

Multi-use paths, often called hike-and-bike trails, are off-street facilities for non-motorized vehicles and pedestrians. They provide the highest level of service for bicyclists because they are completely separate from vehicular traffic. Off-street paths are best located where there is little cross traffic, so as to minimize conflicts. Paths should be seen as complements to the on-street network; not as a substitute, as they are typically found in parkland or other less-developed areas. As such, they may not provide direct connectivity to schools, places of business, or entertainment facilities, and are generally intended as recreational amenities.

Currently, there are no hike-and-bike trails in the study area, although there are some limited paths within nearby parks. These are typically loop systems provided for recreational purposes rather than as transportation connections. The nearest bikeway is a marked lane on Crosstimbers Road, as discussed above.

Bicycle parking

Lack of secure bicycle parking can be an obstacle to bicycling. People will often not bicycle somewhere or commute via bicycle if they think there is a reasonable chance their bicycle will not be there when they return. Finding a bike rack that does not allow one to properly secure the bike, or is inconveniently located, can discourage future bike use. In addition to creating a basic network of bikeways, development of a program to install bicycle racks and other secure bicycle parking facilities throughout the study area is essential.

U-type bicycle racks like these can be installed singly or in arrays of any number. They provide easier and more secure attachment of bicycles than other designs. U-type racks are available from numerous manufacturers throughout the country.

Best practices to accommodate and encourage bicycle commuting include special development or permitting requirements for the provision of bike storage for new developments, including locker shower facilities at large centers of employment. Effective bicycle racks provide direct contact between the bicycle frame and the rack at two points for stability, such as those shown in the photo on the previous page.

Bicycle oriented signage

There are three types of bicycle oriented signage:

- Numbered bicycle route signage should be used on all bikeways for designation and identification. These are essentially the bicycle equivalent of numbered highway systems. Some examples from California are shown in the photo at right.
- Signage directed towards drivers with instructions related to bicycles. These may include signs such as "Share the Road," "Bicycles Allowed Use of Full Lane," or "Yield to Bicycles." These should be used sparingly in key locations. Overuse of warning signs such as these lead motorists to eventually ignore them.

Examples of bicycle route signage with route names and numbers.

- Wayfinding signage provides directions for bicyclists to key destinations such as business districts, schools, parks, and civic buildings, with the option to include distances for improved information. Wayfinding information can be included as part of the numbered bike route signage system.

The Four "E"s of Planning

Education, encouragement, enforcement and good **engineering** are the foundation for pedestrian and bicycle planning. Combined, they take the concept from mere theory to good practice. **Education** provides pedestrians and potential riders with substantial knowledge of network usage. It provides the when, where, and how of the network. **Encouragement** increases the usage of the network by providing incentives and programs that promote safe and well informed usage. **Enforcement**, often thought of as pointing out bad cycling and pedestrian behavior ensures safe riding habits, understanding of the signage, personal responsibility as well as abiding by the rules are taught and maintained. It also includes motorist behavior that disregards cycling and pedestrian activity. This often causes a dangerous potential for conflict.

Most important of all the "four E's" is **engineering**. It supports education, encouragement and enforcement with good design. Good design can educate people to bicycle properly with traffic,

cross streets safely, encourage people to walk in the public right-of-way and provides a physical framework for proper enforcement.

Many engineering and design practices have been tried and tested throughout the country successfully. The most frequently used are pedestrian corridors, pedestrian signals, unsignalized pedestrian crossing treatments, ADA requirements and on-road bicycling.

Pedestrian Corridors

The most common pedestrian corridors are sidewalks. Sidewalks are also the preferred method of choice in an urban environment to accommodate pedestrian activity. However, in many areas of the city, traffic volumes and speeds are so low pedestrians share the street with motor vehicles, especially where discontinuous sidewalks make it simpler to walk in the street. In areas of high traffic volumes, buffers along sidewalks should be used to protect pedestrians from moving traffic. Furniture zones, planter strips, on-street parking, or a bike lane can also act as buffers; this increases pedestrian comfort and some buffers such as, planter strips help meet ADA cross-slope requirements at ramps, around posts and at other designations.

Sidewalks must meet minimum ADA standards, but should also be modified based on traffic conditions. Separated sidewalks should be 5 feet wide or greater, and 6 feet is desirable for curbside sidewalks. Along commercial streets with planters, seating areas, or other furniture within the sidewalk, curbside sidewalks should be at least 10 feet wide. Obstructions should be placed behind the sidewalk (away from the street) if this cannot be achieved. Continuous, connected and well maintained sidewalks are generally needed along both sides of the street to prevent unnecessary crossing.

Pedestrian Signals

Pedestrian signals provide safety and security from motor vehicles in the form of pedestrian signal heads, marked crosswalks, a WALK signal and push buttons. High volume multi-lane thoroughfares may benefit from a signal mid-block or at an existing unsignalized intersection for pedestrian crossing. High pedestrian crossing counts are needed for the MUTCD to warrant a signal installation. Pedestrians are more likely to cross when there is a signal, as they are afforded a protected gap in traffic. Estimating these counts will make it easier to meet MUTCD requirements. Signal operation and safety concerns must also be addressed as well as the distance to adjacent traffic signals.

Pedestrian signal heads and an appropriate signal timing plan give time to cross the street within a signal cycle. Without these signals, pedestrians may have a difficult time determining when to safely cross the street, especially at busy intersections, unusual geometry, or with complex signal phasing like split phasing. Pedestrian signals ensure a timely crossing before conflicting traffic proceeds.

This pedestrian signal in Sugar Land features a timer to indicate how much crossing time remains.

Marked crosswalks on each approach leg of the intersection help warn motorists of possible pedestrian crossing and keep the crossing clear of vehicles. Closing a crosswalk to improve traffic flow can degrade pedestrian safety. Pedestrians crossing without a signal not only increase endangerment but also actually increase exposure and delay. To enhance visibility, crosswalks can be marked with ladder markings; spacing these to avoid the wheel paths of vehicles reduces wear and thus future maintenance needs.

A WALK signal can provide pedestrians with a long enough clearance interval to get pedestrians started and crossed.

Push buttons placed where all pedestrians can access them, including those with disabilities should clearly indicate which crosswalk the button regulates. Mounting push buttons on separate pedestals is often necessary to achieve proper placement, rather than on the signal poles themselves.

In areas of high pedestrian use such as downtowns and central business districts, push buttons are rarely needed except as part of an audible pedestrian signal; the pedestrian phase of the signal should occur every cycle. Traffic delays can be reduced by using a median island or other pedestrian refuge, and a 2-stage pedestrian crossing where the push button stops only one direction of traffic.

Even with the above safety crossing measures, pedestrian crashes can occur at signalized intersections, most often when vehicles turn right on red as pedestrians are crossing the intersection. The following is a list of timing techniques and other treatments to reduce pedestrian-traffic conflict.

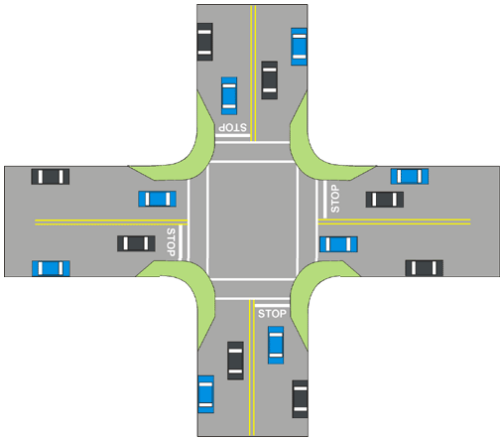
- Protected-only left-turn phasing allows pedestrians to cross without conflicts from left-turning drivers. Red arrows are displayed that prohibit left turns during the pedestrian WALK and clearance intervals.
- 1-2 second all red interval can help prevent crashes caused by red light runners, as they are given a chance to clear the intersection before opposing traffic (and pedestrians) begin to cross.
- Leading pedestrian intervals provide WALK indication 2 to 5 seconds prior to the concurrent green indication; this allows pedestrians to enter the crosswalk before drivers. This increases the visibility of pedestrians and reduces conflicts with turning vehicles.
- Countdown Pedestrian Signals tell pedestrians how much time is left in the pedestrian clearance interval. Studies show that countdown signals reduce the number of pedestrians remaining in the street when conflicting traffic receives a green indication. A study by the City of San Francisco, California, found that replacing older pedestrian signals with countdowns reduced the percentage of pedestrians crossing on "Don't Walk" from 14% to 9%, and reduced vehicle/pedestrian conflicts from 6% of crossings to 4%.

This ladder-style crosswalk leads to a pedestrian refuge in the median.

Unsignalized Pedestrian Crossings

Crossing at unsignalized locations can present difficulties for pedestrians, especially at multi-lane corridors. Pedestrians will cross at locations where there is an opportunity regardless of the location of the nearest signal. It is necessary to provide alternatives to assist pedestrians in safely crossing unsignalized intersections.

- Continuous raised medians or pedestrian crossing islands on two-way streets have been shown to reduce crashes up to 40%. The medians allow pedestrians to "cross and wait then cross again" instead of waiting for a gap in traffic long enough to clear the lanes. At intersections the median or median nose should extend past the crosswalk to provide a refuge for pedestrians as left turning vehicles are approaching.



Curb extensions (shown in green) can reduce pedestrian crossing distance while delineating where on-street parking is allowed.

- Curb extensions can be used where there is on-street parking to reduce the total crossing distance and improve visibility between motorist and pedestrians waiting to cross. These should extend the full width of the parking lane to ensure that sight lines are not obstructed. At intersections, curb extensions can be used to bring the crosswalk closer to the intersection, improve accessibility with additional space, and slow right turning vehicles on tight corners.
- Pedestrian crashes occur predominately at dusk and night. Illumination at crosswalks significantly increases the driver's and pedestrian's visibility.
- An advance yield sign is recommended at unsignalized crosswalks on multi-lane streets to reduce the occurrence of "multiple-threat" crashes. These are the most common and often fatal pedestrian crashes. It occurs when a driver in the outside lane stops to let a pedestrian cross unaware of the blocked sight line he has caused between the pedestrian and the driver in the next lane. The 2nd driver, without adequate time to react, strikes the pedestrian at high speed. The advance yield sign should be placed 20 to 50 feet from the crosswalk; this encourages drivers to stop further back, maintaining better sight lines and giving the 2nd driver and pedestrian time to react if necessary. Advance warning signs should also be installed at mid-block crosswalks.
- At designated unsignalized crossings, high-visibility crosswalk marking is strongly recommended since there is no active control to stop motor vehicles. Longitudinal lines (ladder or continental style crosswalk markings) are preferred and the markings should be spaced to avoid the wheel paths of vehicles, significantly reducing maintenance needs.
- Intersections are safest for pedestrians when they are close to a right angle. Skewed intersections result in longer crosswalks, longer walking distance with more exposure to traffic, poor visibility for both pedestrians and motorists, and allow drivers to turn at high speeds.
- Small corner radii shorten the pedestrian crossing distance, allow for well-placed crosswalks, slow right turning vehicles and increase visibility of pedestrians. The size of the corner radius is determined by the appropriately-chosen design vehicle, and the street designation (residential, collector, or arterial). An appropriate radius for each intersection corner should be designed even if this results in different size radii at the same intersection.
- A channelized island where an exclusive right-turn lane is provided shortens the distance across the through lanes. There is less pedestrian exposure and improved signal timing. The island between the right turn lane and the through lanes allows pedestrians and drivers to negotiate one conflict separate from another. A channelized island is asymmetrical with a longer tail pointing upstream toward the approaching driver turning right.

These sample channelized islands from Georgia Department of Transportation illustrate the system of crosswalks.

- Crosswalk placement can accomplish several pedestrian-related goals: short crosswalks, crosswalks as close as possible to the intersection for better visibility by turning vehicles, and the need to properly locate two sidewalk ramps. Good crosswalk placement can be difficult, especially at intersections with large corner radii. Sidewalk ramps must be contained within the marked crosswalk area. Poorly placed sidewalk ramps and design can make a street crossing difficult since they may require wheelchair users to make long detours while crossing or where drivers do not expect them.

Americans with Disabilities Act (ADA) Requirements

The Americans with Disabilities Act (ADA) was passed in 1990, and "gives civil rights protections to individuals with disabilities similar to those provided to individuals on the basis of race, color, sex, national origin, age, and religion. It guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, State and local government services, and telecommunications," according to www.ada.gov, the U. S. Depart of Justice's ADA website. The ADA's provisions on "public accommodations" include public buildings as well as sidewalks, streets, and other public pedestrian routes. States may establish stricter standards than the Federal requirements; in Texas the standards are enforced and administered by the Texas Department of Licensing and Regulation, and are known as the Texas Accessibility Standards.

ADA requirements ensure the safety and convenience of travel by all pedestrians. The particular requirements that present challenges for this area are smooth surfacing, clear width, maximum cross slope, and proper ramp design and placement. These are absolute requirements of the ADA; they are not suggestions, recommendations, or guidelines.

ADA requires a smooth surface, with vertical changes in the level not exceeding 1/4". New concrete sidewalks are the best way to ensure this. Decorative surfaces such as brick or stamped concrete can be used, but may be difficult to maintain a smooth surface overtime. If decorative surfaces are requested, it is best to place them out of the primary walking area of the sidewalk, in the "furniture zone" near the curb, or in the "frontage zone" at the back of the sidewalk.

ADA standards currently require a minimum clear width of 3 feet but future requirements may add an additional foot. To provide the maximum convenience, a clear width of 5 feet is the recommended dimension. This ensures that all pedestrians, including those with disabilities, can walk side-by-side or pass each other with little interaction. Sidewalks that include a planter strip or furnishing zone make it easier to meet clear width requirements by providing a place where pools, posts, mailboxes, trees, and other obstructions can be placed.

Any cross-slope, such as for drainage, may not exceed 2% (1:50) across the required clear width of the entire accessible route, including all driveways, sidewalk ramps, and intersections. Separated sidewalks that allows sloped driveway apron and sidewalk ramps to be placed in the planter are the easiest way to achieve this requirement. Sidewalks directly adjacent to curbs require special techniques to maintain a level passage across driveways.

Maximum grade in the direction of travel cannot be steeper than 5% (1:20). Sidewalk ramps cannot exceed a maximum slope of 8.3% (1:12) and a 5x5 foot level (2% maximum slope) landing must be provided at the top of every ramp. At the bottom of each ramp truncated domes must be placed at a 2-foot depth, 6-8 inches from the face of the curb, and extending the full width of the ramp. The enables blind pedestrians to determine where the sidewalks ends and the street begins.

Each ramp must be placed completely within the crosswalk at intersections. Two ramps placed at each corner, one for each crosswalk, are generally recommended. This is easiest to achieve when the corner radius is relatively small. On large radius corners of 30 feet and above, placing 2 ramps may be disadvantageous. It will move the crosswalk too far from the intersection itself, forcing disabled pedestrians to make a detour and cross at locations where drivers may not expect them. Designing an intersection with good crosswalk placement is foremost; then decide the necessity of one or two ramps.

An example of an on-street bicycle lane in Palo Alto, California.

On-Road Bicycling

Bicyclists are considered roadway users, and are required to obey motor vehicle laws; this helps motorists anticipate predictable bicyclist behavior. In urban environments with low traffic volumes and speeds, shared bicyclist and motor vehicle roadways are

acceptable. There are no specific dimensions; there is also no special signage or road marking. However, local streets have a significant disadvantage for bicyclists when crossing major arterial streets with no protection or warnings such as islands and traffic signals. Signed shared roadways can be created by adding bike route signs but to be more effective, signage must include destination signing or named and numbered bike route destinations.

Bike lanes are an effective way to travel with faster moving traffic. They also allow bicyclists to move at a constant speed when traffic is congested and moves at a stop and go pace. They are often developed on existing streets by narrowing travel lanes or removing a lane. They should be 5-6 feet wide with a minimum clear width of 5 feet from the center of the lane stripe to the curb or edge of pavement. In areas where bike lane continuity can not be provided, a wide outside lane of 13 to 15 feet will generally suffice. TxDOT standards specify a 14-foot lane; this allows motorists to pass cyclists without changing lanes.

Bicycle boulevards accommodate bicyclists by providing an alternative to arterial streets and turn a local street into a thoroughfare for bicyclists without encouraging motorists to use it as a through route. Bicycle boulevards work best in a system of connected streets such as a grid pattern. Existing bike routes can be converted into bike boulevards, or bike boulevards can be created on other streets as an alternative. Traffic calming techniques can be used to reduce motor vehicle speeds and through traffic. Priority is given to through bicycle movement at intersections with local streets. Special signage is used to increase street usage. Arterial streets are marked with traffic signals for bicyclist, median islands and other measures.

Shoulders are good locations for bicycling, provided they are kept reasonably free of debris. Shoulders provide a continuous pathway further out of the way of motor vehicles, a benefit when bicycling along high-speed or rural roadways.

Chapter 2
Needs Assessment, Public Input, and Project Selection

Needs Assessment

Field Investigations

LAN conducted four separate field visits during this project. The initial field visit was conducted on September 4, 2008. This field visit documented existing intersection geometry and conditions on Airline Drive and Gulf Bank Road within the study area. Conditions and the locations of traffic signals, pavement markings, crosswalks and sidewalks were documented. The second field visit occurred on September 24, 2008 and documented driveways and access points on Airline Drive between Gulf Bank Road and Mitchell Road. The intent of this field visit was to investigate parking and driveway access to local markets and to identify right-of-way for future expansion of pedestrian facilities.

On November 23, 2008 LAN visited markets on Airline Drive during peak hours (Sunday afternoon) to investigate pedestrian and vehicular traffic conditions on Airline Drive and Gulf Bank Road. Furthermore, LAN oversaw the collection of surveys distributed to market patrons. As a result of public input, LAN conducted a fourth field visit on December 4, 2008 to document the location of street lights on Airline Drive and Gulf Bank Road near the markets and to document the location of METRO bus stops within the study area. Finally, the project team conducted another set of field assessments on Saturday, December 20, 2008, focusing on pedestrian counts and movement patterns.

These sidewalks on Airline Drive near Hill Road (above) and Mount Houston Road (below) are in fair to good condition, but pedestrian space is constricted, and the ramp and crosswalk do not meet current standards.

Traffic Counts

Traffic counts were collected on Airline Drive at the flea markets area on Saturday, August 16, 2008, and Sunday, August 17, 2008. Turning movement counts were also collected on Sunday, August 24, 2008, at the intersection of Gulf Bank Road and Airline Drive, the nearest major signalized intersection to the market area.

In general, the peak periods for traffic volume were afternoons. Both days counted showed a sustained peak of activity from approximately 12:00 noon to 8:00 PM, with the highest volumes occurring near 2:00 PM on Saturday and 4:00 PM on Sunday. Traffic volumes in the peak hour in each direction (northbound and southbound) were approximately 1,000 vehicles on both days, measured on Airline Drive south of Gulf Bank Road. It is significant that during those peak hours, the southbound traffic volume on Airline Drive north of Gulf Bank Road was more than double that further south, at over 2,500 vehicles per hour. The majority of these southbound vehicles turned around at Gulf Bank Road and returned northward, perhaps to avoid the market-area congestion.

Further detail on these traffic counts is provided in Appendix A.

Signalized Intersection Survey

On September 4, 2008, the project team conducted a field survey of the signalized intersections in the study area. A number of the locations were found to have curb ramps that did not meet current ADA standards, and stop bars and crosswalks were frequently in poor condition or incomplete. Throughout the study area, it is recommended that these issues be corrected; they are included in the potential improvements list and in the cost estimates. Details of the field survey are shown in Appendix A.

Summary of Public Process

- Market Owners Meeting — September 5, 2008
- Stakeholder Workshop — November 14, 2008
- Market Patron Survey #1 — November 23, 2008
- Market Patron Survey #2 — December 13, 2008
- H-GAC Pedestrian-Bicycle Subcommittee — January 22, 2009
- Harris County Precinct 1 Presentation — January 27, 2009
- Airline Improvement District Board Meeting — January 29, 2009

Public input was solicited throughout the study process, through meetings with the flea market owners and other stakeholders, and through surveys of market patrons conducted in person at the markets.

Two public input workshops were held to solicit improvement recommendations from the stakeholders and the community. The first involved the District and the market owners, while the second also included representatives of the Texas Department of Transportation and Harris County Precinct 1, area homeowners' associations and civic clubs, and law enforcement personnel (specifically those directing traffic and pedestrian activity on market days). Finally, on Sunday, November 23, 2008, and Saturday, December 13, 2008, tables were set up at the markets to solicit input directly from market customers. These efforts are detailed in the following sections.

Market Owners Meeting

As part of the needs assessment, the consultant team conducted a meeting and workshop on September 5, 2008, to provide information about the study and obtain one-on-one input from market owners in a setting with them alone, before hosting a larger workshop for citizens and other community leaders. The meeting was held at the Little York Volunteer Fire Department community room, which is used by the Airline Improvement District for periodic meetings.

Seven owners, representing five of the six major businesses, participated in the meeting. Full detail of the comments from this meeting is located in Appendix B.

Stakeholder Workshop

A second workshop was held on November 14, 2008, to update the owners on the project's status and to solicit input on specific needs and improvements that should be addressed by the new plan. The workshop, like the first meeting, was held at the Little York Volunteer Fire Department community room.

Invitees to the meeting included county officials, congressional representatives, Texas Department of Transportation, METRO, owners of commercial properties in the study area, civic clubs, and institutional representatives such as Aldine ISD.

A total of twenty-one people attended the workshop. The team asked attendees to use the maps and supplies provided at each table to identify problem issues, point out locations/facilities that currently worked well for pedestrians and bicyclists and that would a good example to emulate,

and make suggestions for improvements throughout the project area. Full detail of the comments from this workshop is located in Appendix C.

Market Patron Survey

The patrons of the flea markets come from around the city and region, and a traditional public meeting to obtain their input was deemed unlikely to produce useful results, in terms of low expected attendance and participation. Instead, a survey was developed to be distributed at the markets themselves. The survey was developed by the project team and reviewed by the stakeholders, including the market owners. The survey covered aspects of the patrons' visit to the market, including arrival patterns, visit frequency and duration, and parking opinions. No demographic information was collected.

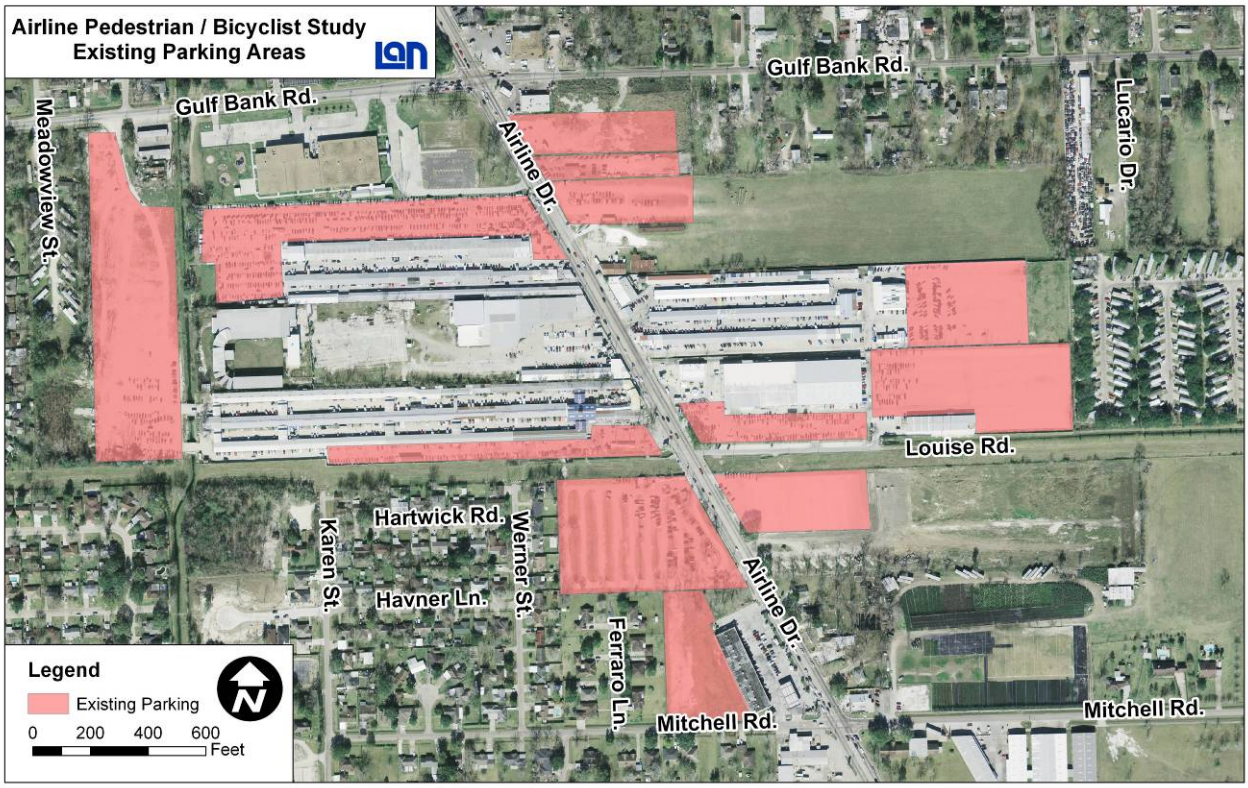
Market owners were given copies of the survey to distribute as they wished. The project team set up tables where surveys were available for customers to fill out. These tables were provided on Sunday, November 23, 2008, at Sunny Flea Market, and Saturday, December 13, 2008, at Mercado Sabadomingo. Counting market-owner-distributed and individually collected surveys, 143 were completed in total. A sample of the survey and the full compilation of results are located in Appendix D. Following is a general discussion of the results.

Board advertising the survey table.

More patrons reported visiting the markets on Sunday rather than Saturday; this is consistent with the District's expectations. A substantial majority (90%) of patrons surveyed said they came to markets at least once a month. This is a benefit for making changes to driveways, parking, or other access points, as repeat visitors will become familiar with the changes more quickly than occasional customers. Approximately 70% of patrons surveyed reported at least "sometimes" visiting other businesses in the area, which shows that the markets do not just generate tax revenue in and of themselves, but contribute to increased retail sales in the District as a whole.

Market patrons fill out the project survey. The market business office is in the background.

Approximately one-half of patrons surveyed reported arriving by means other than driving alone, mainly carpooling and being dropped off. This would seem to indicate the realization that parking is limited. Roughly the same proportion of those surveyed indicated they would park further away if it were cheaper, and some 77% indicated they would take a shuttle from remote parking. The current parking lot locations are shown on the map on the following page. All the facilities charge $2.00 for an unlimited amount of time. Payment is in cash to an attendant upon entering.



Development of Potential Improvements

Using the input from the workshops and survey, a series of recommendations was developed based on the maps and comments drawn by the market owners and workshop participants, and the responses to the survey received from the public. These projects included sidewalk construction, additional signage and signalization, stop bar and crosswalk striping, long-term driveway consolidation, as well as hike-and-bike trails and bike racks. Twenty-five physical projects and three policy improvements developed from the public input were presented to the H-GAC Pedestrian / Bicyclist Subcommittee on Thursday, January 22, 2009, to representatives of Harris County Precinct 1 on Tuesday, January 27, 2009, and to the Airline Improvement District Board on Thursday, January 29, 2009.

This project has generated a list of ideas to improve the environment around the markets on Airline Drive. The project team endeavored to flesh out the ideas and capture them in the conceptual plan. Some of the items are of stand alone nature, such as installing bicycle racks. Others are interdependent and must be implemented in order. The recommendations are listed in the following chapter. The improvements were divided into short-, medium- and long-term groupings, as proposed by the project team in consultation with Harris County. This phasing is proposed to address the most pressing problems first, and then to move on to issues that either are less urgent to resolve, more complicated or more expensive to resolve, or both. The considerations in developing the phasing were feasibility, cost, safety benefit, and user demand.

Chapter 3
Recommendations

Conceptual Plan

Creating a safe and enjoyable pedestrian, bicycling and transit environment along the Airline Drive corridor between Gulf Bank Road and Mitchell Road hinges on developing a new access management plan to reroute market-going motorists to specific parking lots based on their direction of travel to the market.

Access management is critical in achieving the safety and mobility goals of this project for several reasons. First, providing motorists with information regarding how best to get to their destinations creates a level of predictability that improves the road environment for everyone. When motorists are looking for a place to park they are paying less attention to the pedestrian environment and tend to speed up and slow down without notice. The crash statistics along Airline Drive support this observation, as the majority of collisions between motor vehicles were rear end crashes, which occur when drivers make sudden changes in speed.

Second, creating distinct driveways and access points encourages communication between pedestrians and motorists, decreasing the chance of crashes between these two groups. This is especially true where driveways cross sidewalks.

Third, good access management decreases the "conflict points" at which motor vehicles and pedestrians come in contact with each other. Limiting pedestrian exposure to turning motor vehicles greatly enhances safety and mobility.

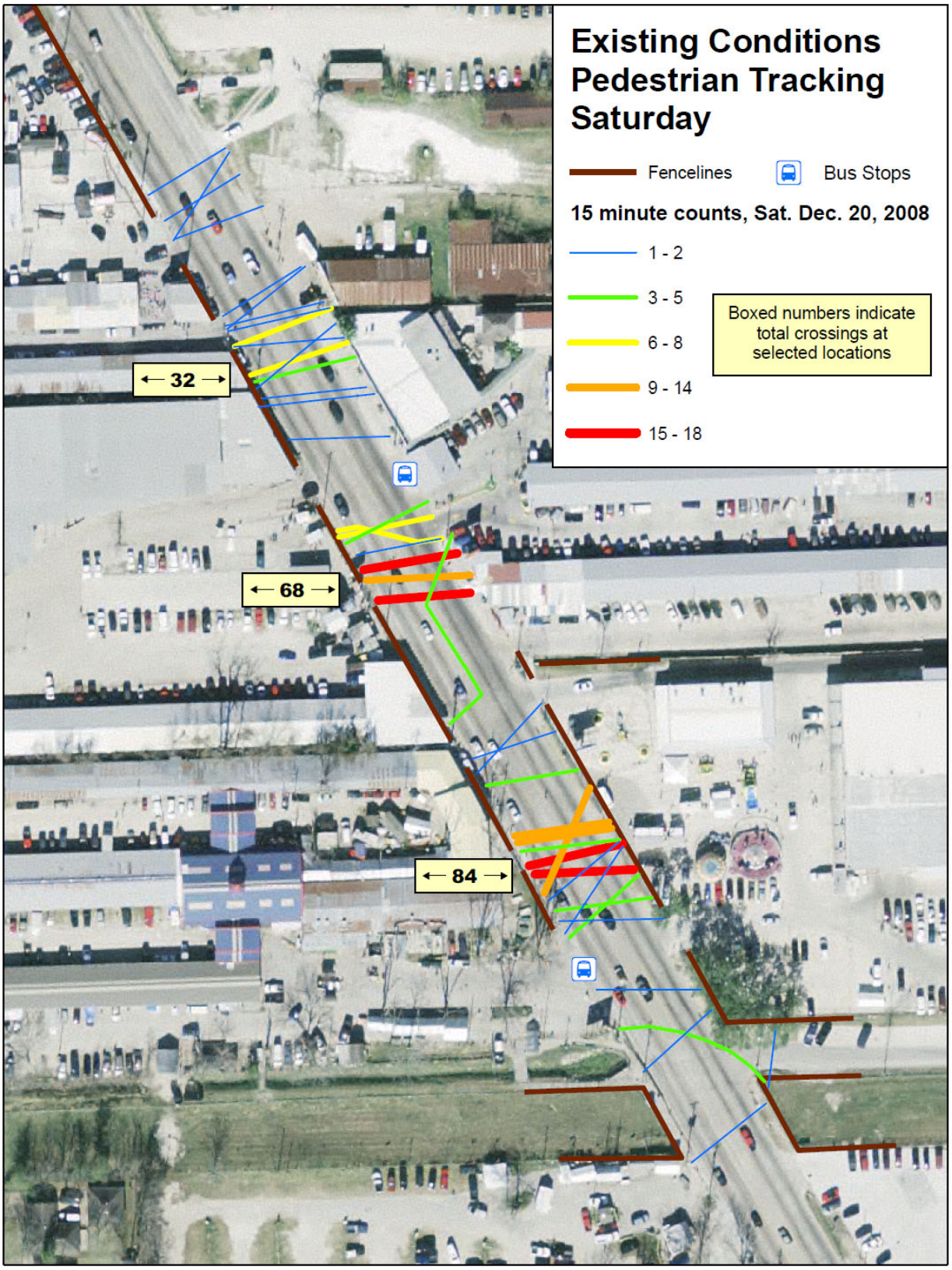
We recommend a new strategy, wherein motorists arriving at the market area from the north would be routed to parking lots in the northern portion of the study area and vehicles traveling from the south would park in lots in the southern section. New signage to the east and the west would inform drivers where they should park in each district.

This would be facilitated in the short term through informational signs directing motorists to certain lots, and in the longer term through the addition of new access roads connecting Louise Road with Gulf Bank Road on the east side of the study area, and potential connections between existing lots on the west side of the study area.

Field observations identified three main locations where the majority of pedestrians were crossing Airline Drive. These are shown on the map on the following page. The heaviest area for crossing was at the current crosswalk, where signals give pedestrians ample time to cross the street. The southern and northern section of the study area also had high volumes of pedestrians. To accommodate these movements, two new vehicle/pedestrian signals would be added at these locations. These new vehicle/pedestrian signals would be set on a "fixed time" cycle, or one in sequence with the current signals.

In addition to these pedestrian safety improvements, we recommend that a pedestrian refuge or median would benefit all users by slowing down motor vehicles and reducing the crossing distance for pedestrians.

Pedestrian Tracking Survey



It was determined that a bicycle element was less of a priority for this study area than various improvements to other existing infrastructure, especially relating to pedestrians. Nevertheless, the project team does recommend additional bicycle parking near the markets, as some patrons did report arriving by bicycle. Also, there exists the long-term potential of developing a multi-use trail along the current Louise Road right-of-way and/or the adjacent Exxon oil pipeline, as well as contributing to non-motorized accessibility, this trail would also provide an additional recreational amenity to the area.

In general, these recommendations are made with an eye not only to improve safety, but also to improve emergency and fire response times, create a more pleasant environment for residents surrounding the market area, and make the population in the area more comfortable with any modifications.

A hike-and-bike trail can be installed in a low-impact manner, such as this gravel trail near Albany, New York. This is the style proposed for the Louise Road corridor.

The phasing of these recommendations can be seen in the three maps showing the development of the short, medium and long term potential improvements. In addition, a flow chart shows how all of the recommendations fit together as a package of changes.

The recommendations can be grouped into several broad themes, as listed below:

Pedestrian Improvements

- Close most openings in the fence along the west side of Airline Drive. Market owners will have to watch for attempts to re-open closed access points.
- Create a median along the corridor.
- Make the walking area compliant with the Americans with Disabilities Act (ADA) requirements.
- Pave area between market fences and Airline Drive curb as a sidewalk.

Parking / Access Management

- Raise prices for parking.
- Add parking for bicycles.
- Use church parking lot in the off peak hours and direct motorists to lots closest to their origin.
- Create pedestrian bridges over canals.
- Provide alternative access to parking areas from Gulf Bank and Louise Roads.

Traffic Signals and Markings

- Make signals fixed time. (note here that Harris County already plans to do this; the next round of CMAQ-funded road work includes creating signal timings for Airline Drive)
- Add new stop bars at signalized intersections.
- Add two new crosswalks and pedestrian signals.

Transit

- Continue to promote bicycle rack installation on METRO buses.

- Increase bus frequency on weekends.
- Consolidate location of bus stops, improve information and comfort of bus stops with route times and direction, benches and shelters.

Signs

- Develop wayfinding signs to locate parking.
- Create gateway treatments to identify the market area.
- Install signage along the two major highways to direct people to parking.

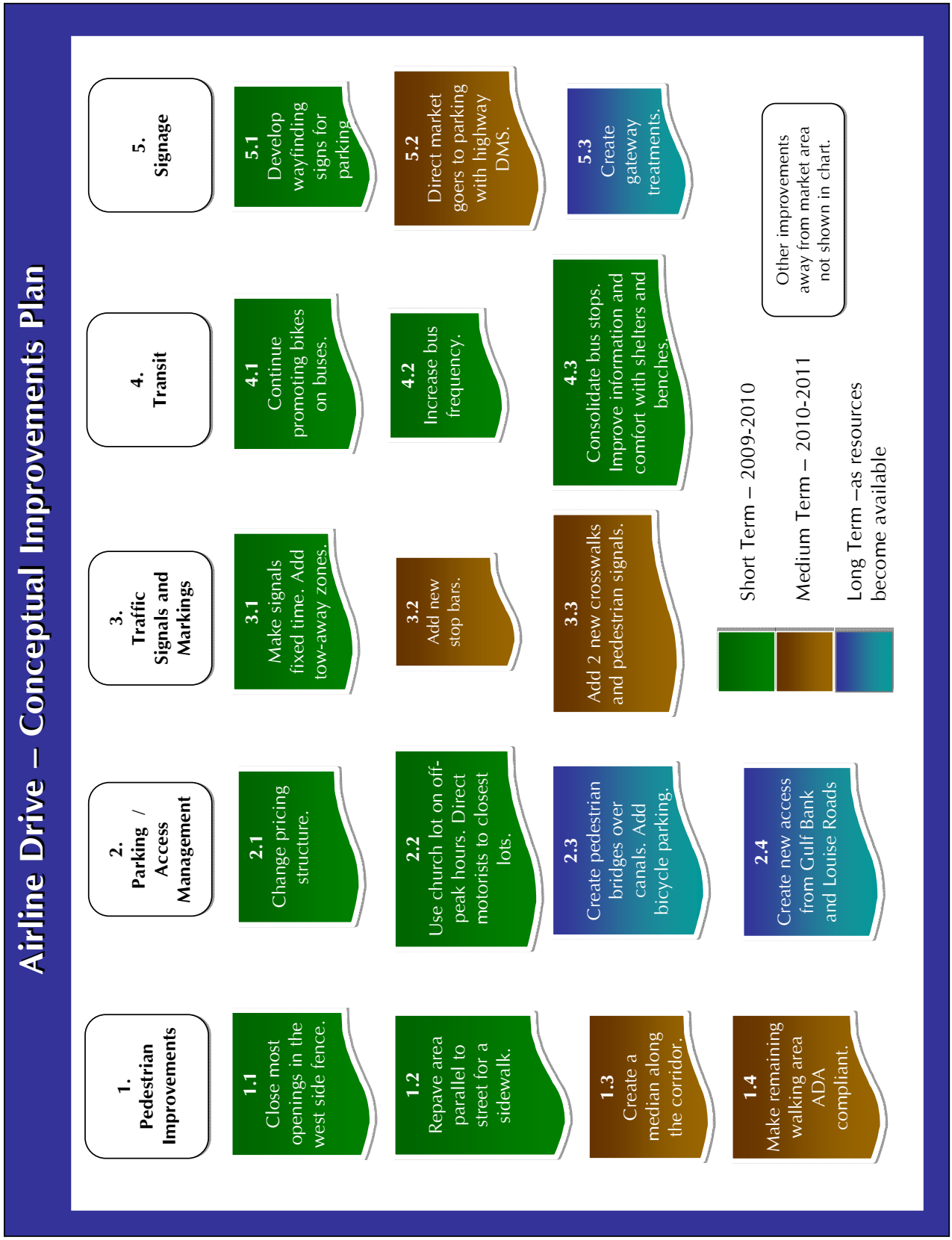
The linchpin of the conceptual plan is closing gaps in the fences along Airline Drive and installing two new pedestrian crossings. The changes will increase the safety of pedestrians and motorists by channeling walkers and slowing down motor vehicles. Providing informational signage about parking options farther away from Airline Drive will allow motorists to make decisions before they reach the congested area around the markets. This will help reduce crashes between motor vehicles as people are less likely to stop and turn erratically when they have advance notice of the destination.

These recommendations were developed to create a more formalized and predictable environment for all road users and to make Airline Drive safer during both market and non-market days. Closing gaps in the fence encourages pedestrians to cross at crosswalks rather than in the middle of the street as they do now. Crosswalks also alert motorists that there is something different happening at that point in the roadway. Crosswalks are especially important for creating a safe crossing environment for younger pedestrians.

From a design perspective, striping crosswalks and installing pedestrian signals are street improvements that dramatically shift the "feeling" of a street from one dominated by cars to one where pedestrians are given priority. This not only creates a safer environment for all users, but it makes walking a more desired choice of travel.

A flowchart showing the phasing of the conceptual plan is located on the following page. The organizing principles shown there were used to develop the improvement recommendations.

Conceptual Plan Flowchart



Summary of Recommendations

The proposed improvements are presented below. The project team has taken the conceptual plan detailed above, and created twenty-five proposed physical improvements that reflect the content of the conceptual plan.

The prioritization of short-, medium-, and long-term improvements was done in terms of the relative ease and expense of projects, the necessity in terms of which would have the most beneficial effect on pedestrian conditions, and the required sequencing where one improvement builds on a previously implemented one. The priority order of the projects was determined by the consultant team, in consultation with Harris County Precinct 1 staff.

SHORT-TERM IMPROVEMENTS

1	**Airline Drive Sidewalks - Section A** Construct sidewalks in market area by paving entire area from fencelines to curb. *up to 20,000 square feet new sidewalks*
2	**Airline Drive Sidewalks - Section B** Construct sidewalks on both sides of Airline Drive from market area north to Gulf Bank Road and south to Mitchell Road. *2 crosswalks, 4 curb ramps, 2 stop bars, 2,950 linear feet of sidewalk* *(Signalized intersections itemized separately.)*
3	**Airline Drive Sidewalks - Section C** Construct sidewalks on both sides of Airline Drive from Mitchell Road south to existing sidewalks at Canino Road. *6 crosswalks, 12 curb ramps, 6 stop bars, 6,100 linear feet of sidewalk* *(Signalized intersections itemized separately.)*
4	**Bus Shelters at Existing Stops** Add shelters to METRO bus stops nearest markets. *2 shelter structures*
5	**Tow-Away Zone in Market Area** Add "No Parking - Tow Away Zone" signs to Airline Drive between Gulf Bank Road and Mitchell Road. Must include enforcement policy authorized by Harris County. *30 individual signs (175-foot spacing for 2,500 feet per side)*
6	**Enforcement of Tow-Away Zone in Market Area** Enforce No Parking rules in market area with towing. *Harris County to authorize towing; private companies to provide service as needed*
7	**Upgrade School Zone Signage** Add flashers to school zone signs at Fonville, Keeble, and Carroll Schools *12 flashing beacons*
8	**Canino Road Sidewalks** Construct new sidewalks to fill in gap from Fonville Middle School to Airline Drive: North side of Canino Road from Nordling Road to Airline Drive; South side of Canino Road from Van Ness Street to Airline Drive. *3 crosswalks, 2 curb ramps, 2,040 linear feet of sidewalk* *(Signalized intersections itemized separately.)*
9	**Directional Signage to Parking Areas** Add signage directing patrons to parking on the same side of markets as their approach. (Supplement later with DMS.) *4 signs with 1-2 arrows each*

MEDIUM-TERM IMPROVEMENTS

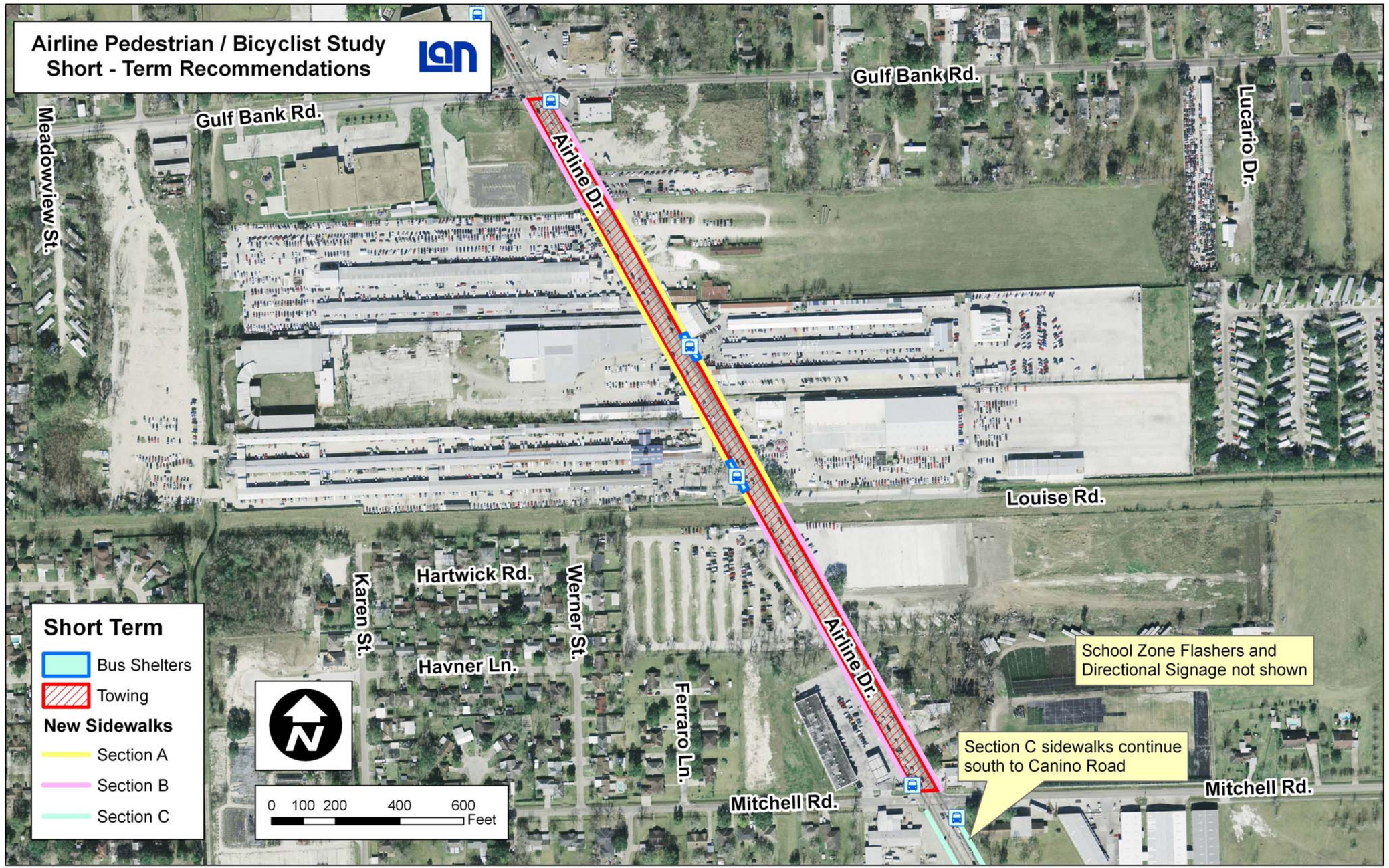
10	**Airline Drive Crosswalks** Construct two new signalized crosswalks, at north and south ends of market area. *2 crosswalks, 4 curb ramps, 4 stop bars, 2 traffic signals*
11	**Airline Drive Medians** Convert existing two-way left turn lane on Airline Drive in market area to raised median (mountable at selected driveways for emergency access). *15,400 square feet 6" concrete, 3,000 linear feet curb*
12	**Gulf Bank Road Sidewalks - West Segment** Construct sidewalks on both sides of Gulf Bank Road from Sweetwater Lane (district boundary) to Airline Drive. *6 crosswalks, 12 curb ramps, 6 stop bars, 8,550 linear feet of sidewalk*
13	**Gulf Bank Road Sidewalks - East Segment** Construct sidewalks on both sides of Gulf Bank Road from Airline Drive to (district boundary) west of Hardy Toll Road. *13 crosswalks, 26 curb ramps, 13 stop bars, 13,475 linear feet of sidewalk*
14	**Illumination on Gulf Bank Road** Add additional streetlights to Gulf Bank Road east and west of Airline Drive. *up to 42 luminaires*
15	**Upgrade Signalized Intersections - Group A - Airline Drive Market Area** Airline Drive at Gulf Bank Road and Mitchell Road - Add new crosswalks, curb ramps and stop bars; add new countdown pedestrian signals. *8 crosswalks, 16 curb ramps, 8 stop bars, 16 pedestrian signals*
16	**Upgrade Signalized Intersections - Group B - Airline Drive South** Airline Drive at Canino Road - Add new crosswalks, curb ramps and stop bars; add new countdown pedestrian signals. *4 crosswalks, 8 curb ramps, 4 stop bars, 8 pedestrian signals*
17	**Upgrade Signalized Intersections - Group C - Airline Drive Near North** Airline Drive at Hill Road and Mount Houston Road - Add new crosswalks, curb ramps and stop bars; add new countdown pedestrian signals. *6 crosswalks, 12 curb ramps, 6 stop bars, 12 pedestrian signals*
18	**Upgrade Signalized Intersections - Group D - Airline Drive Far North** Airline Drive at Aldine Mail Route and West Road - Add new crosswalks, curb ramps and stop bars; add new countdown pedestrian signals. *7 crosswalks, 14 curb ramps, 7 stop bars, 14 pedestrian signals*
19	**Upgrade Signalized Intersections - Group E - Western Area** Sweetwater Lane at Gulf Bank Road and Mount Houston Road - Add new crosswalks, curb ramps and stop bars; add new countdown pedestrian signals. *8 crosswalks, 8 stop bars, 16 pedestrian signals*
20	**Modify Intersection at Gulf Bank and Sweetwater** Add eastbound left-turn lane to Gulf Bank Road at Sweetwater Lane to reduce queue spillover into IH 45 intersection. *3,000 square feet new asphalt pavement, 500 linear feet striping, 2 lane arrows, 2 lane use signs*

LONG-TERM IMPROVEMENTS

22	**Louise Road Hike / Bike Trail** Construct hike and bike trail along Louise Road right-of-way and / or parallel pipeline easement, from Sweetwater Lane to West Hardy Road. *61,500 square feet decomposed granite surface*
23	**New Street Connections** Construct "back entrances" to selected parking areas, to facilitate access from Mitchell Road and/or Gulf Bank Road. *116,000 square feet of new right-of-way, 2,900 linear feet of 2-lane concrete curb-and-gutter pavement.*
24	**Driveway Consolidation / Closure** As parking lots achieve alternate access (sides and back), reduce driveway cuts on Airline Drive *Eventual count of 11 permanent closures, 8 market-day closures*
25	**Signal Warrant Study** Conduct traffic signal warrant study at Gulf Bank Road and Rockcliff Drive in response to neighborhood congestion concerns. *1 engineering study*
P1	**Parking Lot Access / Interconnection** Coordinate with market owners to add / modify parking lot access for better circulation and non-Airline Drive access *Openings in fences, gates, bridges over drainage canals - various locations to be defined by property owners*
P2	**Bicycle Parking Areas** Develop secure bicycle parking areas near entrances to vehicle parking lots. *100 bicycle racks (20 each in 5 locations to be determined by property owners)*
P3	**Investigate use of METRO facilities for remote parking** Promote METRO park-and-ride lots at IH 45 / North Shepherd Drive and IH 45 / West Road as places to park and then ride METRO to flea market area *Coordination with METRO; flyers or signage at markets and on buses*

Note that "P" improvements are on private property or are not physical improvements, and thus not eligible for H-GAC matching funds. Coordination will be needed with landowners, especially for parking interconnection.

Map of Short-Term Recommendations



Map of Medium-Term Recommendations

Map of Long-Term Recommendations

Development of Estimated Costs for Proposed Improvements

Planning-level cost estimates were developed for the potential improvements, based on the TxDOT Construction Average Unit Prices, compiled August 2008. The project team evaluated sidewalks, crosswalks, stop bars and curb ramps at intersections and other locations identified during the study. Those cost estimates are based on installing curb ramps where they are missing, refreshing striping of crosswalks at signalized intersections, and constructing new sections of sidewalks where they are missing. All improvements are priced based on construction to current ADA / TAS standards.

Airline Improvement District Pedestrian/Bicyclist Plan
Cost Estimates--Unit Prices in 2008 Dollars

All item descriptions are taken from the TxDOT Construction 12-Month Average Unit Price, August 2008
http://www.dot.state.tx.us/business/avgd.htm

	TxDOT Description	QTY	Unit	Unit Price	Total Price
Signage:					
Metal pole for sign mounting	INSTALL SMALL RDSD SIGN SUPPORT		EA	$ 600.00	$ 600.00 /EA
"No Parking - Tow Away Zone" sign	ALUM SIGNS (TY A)	3	SF	$ 26.00	$ 78.00 /EA
"Yield to Pedestrians in Crosswalks" sign	ALUM SIGNS (TY A)	3	SF	$ 26.00	$ 78.00 /EA
Directional Signs	ALUM SIGNS (TY A)	3	SF	$ 26.00	$ 78.00 /EA
Bike Route sign	ALUM SIGNS (TY A)	3	SF	$ 26.00	$ 78.00 /EA
High-Visibility Crosswalk					
For a ladder-style crosswalk, assume 24" striping 6' wide:		6	LF	$ 5.55	$ 33.30 /EA
24" stripe followed by a 24" space means each 24" stripe serves 4' of crossing distance.					
For 1' of linear crossing distance, divide the stripe price by 4:		4	LF/EA		$ 8.33 /LF
This is the price for the "ladder rungs." The sides are standard 12" stripes (2 sides)		2	LF/EA	$ 3.28	$ 6.56 /LF
Price per linear foot of crosswalk is the sum of the "rungs" and sides:					$ 14.89 /LF
Other Striping:					
Stop Bars	REFL PAV MRK (WHT) 24" (SLD 100 MIL)		LF	$ 5.55	$ 5.55 /LF
Lane Markings - Directional Arrows	REFL PAV MRK TY I (W) (ARROW) (100MIL)		EA	$ 175.00	$ 175.00 /EA
Concrete Demolition:					
Sidewalks	REMOVING CONC (SIDEWALKS)		SY	$ 11.65	$ 11.65 /SY
Concrete Installation:					
Sidewalks:	CONC SIDEWALKS (6")		SY	$ 100.00	$ 100.00 /SY
6" curb	CONC CURB (TYPE 2)		LF	$ 34.50	$ 34.50 /LF
6" curb with gutter pan	CONC CURB & GUTTER (TY II)		LF	$ 50.00	$ 50.00 /LF
Curb Ramp: 6" curb	CURB RAMP (TYPE 1)		EA	$ 3,300.00	$ 3,300.00 /EA
	DETECTABLE WARNING PAVERS				
Other:					
Ped Pole Installation	PED POLE ASSEMBLY		EA	$ 1,700.00	$ 1,700.00 /EA
Push Button Installation	PED DETECT (2 INCH PUSH BTN)		EA	$ 125.00	$ 125.00 /EA
Ped Signal Heads Installation	PED SIG SEC (12 IN) LED	2	EA	$ 500.00	$ 1,000.00 /EA
	PED XING PACKAGE TOTAL		EA		$ 2,825.00 /EA
Push Button Removal	REMOVAL OF PED PUSH BTNS		EA	$ 100.00	$ 100.00 /EA
Decomposed Granite Trail	Per square foot (see note below)		SF	$ 6.00	$ 6.00 /SF
	Per linear foot if trail 5' wide		LF		$ 30.00 /LF
Flashing School Zone Beacon	INSTALL RDSD FLASH BEACON ASSEMBLY		EA		$ 4,600.00 /EA

Decomposed granite trail price estimated at $6.00/SF
City of San Antonio Park Plan estimated cost at $4.00/SF in 2005
Similar trails in California (state average per City of West Covina) cost $3.00/SF in 2003.

Potential Improvement #10, Airline Crosswalks, includes the installation of pedestrian signals, which are treated as a lump-sum pay item. The itemization of its components is shown below.

Signalized Pedestrian Crossing (used in Improvement #10)

Item #	Series	Description		Total		Unit Cost		Total	
416	2004	DRILL SHAFT (36 IN)	LF	30	$	183.00	$	5,490.00	
618	2013	CONDT (PVC) (SCHD 40) (3") (BORE)	LF	150	$	20.00	$	3,000.00	
620	2009	ELEC CONDR (NO. 8) BARE	LF	150	$	0.98	$	147.00	
620	2010	ELEC CONDR (NO. 6) INSULATED	LF	50	$	1.60	$	80.00	
624	2002	GROUND BOX TY 1 (122422) W/APRON	EA	3	$	1,050.00	$	3,150.00	
628	2125	ELC SRV TY D 120/240 100 (NS)SS(N)SP(O)	EA	1	$	3,100.00	$	3,100.00	
636	2001	ALUMINUM SIGNS (TY A)	SF	90	$	26.00	$	2,340.00	
666	2048	REFL PAV MRK TY I (W) 24"(SLD)(100MIL)	LF	300	$	3.80	$	1,140.00	
666	2157	REFL PAV MRK TY II (W) 24"(SLD)(100MIL)	LF	300	$	1.50	$	450.00	
680	2002	INSTALL HWY TRF SIG (ISOLATED)	EA	1	$	30,000.00	$	30,000.00	*
682	2001	BACK PLATE (12 IN) (3 SEC)	EA	4	$	68.00	$	272.00	
682	2014	PED SIG SEC (12 IN) LED (2 INDICATIONS	EA	2	$	435.00	$	870.00	
682	2023	VEH SIG SEC (12 IN) LED (GRN)	EA	4	$	187.00	$	748.00	
682	2025	VEH SIG SEC (12 IN) LED (YEL)	EA	4	$	187.00	$	748.00	
682	2027	VEH SIG SEC (12 IN) LED (RED)	EA	4	$	187.00	$	748.00	
684	2009	TRF SIG CBL (TY A) (12 AWG) (4 CONDR)	LF	300	$	1.40	$	420.00	
684	2012	TRF SIG CBL (TY A) (12 AWG) (7 CONDR)	LF	300	$	1.90	$	570.00	
685	2003	INSTL RDSD FLSH BEACON ASSM(SOLAR PWRD)	EA	2	$	4,600.00	$	9,200.00	
686	2015	INS TRF SIG PL AM(S) 1 ARM (36')	EA	2	$	4,400.00	$	8,800.00	
688	2001	PED DETECT (2 INCH PUSH BTN)	EA	2	$	116.00	$	232.00	
Sub-Total							**$**	**71,505.00**	
Contingency (20%)							$	14,301.00	
TOTAL							**$**	**85,806.00**	
						Rounded Total	**$**	**85,800.00**	

**Includes signal controller with its cabinet, mounting pad, and installation of all items.*

The total, shown below, is for all priced projects. By the terms of the federal grant by which H-GAC funds the Pedestrian and Bicycle Districts improvements, the agency receiving the funds (such as the Airline Improvement District) must pay for 20% of the cost of improvements. In-kind services are not countable towards this total; it must be in actual dollars.

Airline Improvement District Pedestrian/Bicyclist Plan
Overall Cost Estimates

Code #	Description	Estimate
1	Airline Drive Sidewalks - Section A (Market Area)	$ 222,200
2	Airline Drive Sidewalks - Section B (Gulf Bank Road to Mitchell Road, excluding Market Area)	$ 177,900
3	Airline Drive Sidewalks - Section C (Mitchell Road to Canino Road)	$ 381,000
4	Bus Shelters at Existing Stops	$ 13,000
5	Tow-Away Zone in Market Area	$ 20,300
6	Enforcement of Tow-Away Zone - not priced	$ -
7	Upgrade School Zone Signage	$ 55,200
8	Canino Road Sidewalks - Fonville Middle School to Airline Drive	$ 121,200
9	Directional Signage to Parking Areas	$ 2,700
10	Airline Drive Crosswalks	$ 187,400
11	Airline Drive Medians	$ 274,600
12	Gulf Bank Road Sidewalks - West of Airline	$ 517,200
13	Gulf Bank Road Sidewalks - East of Airline	$ 840,100
14	Illumination on Gulf Bank Road	$ 264,600
15	Upgrade Signalized Intersections - Group A - Airline Dr. at Gulf Bank Rd. and Mitchell Rd.	$ 105,900
16	Upgrade Signalized Intersections - Group B - Airline Drive at Canino Road	$ 78,900
17	Upgrade Signalized Intersections - Group C - Airline Dr. at Hill Rd. and Mount Houston Rd.	$ 79,200
18	Upgrade Signalized Intersections - Group D - Airline Dr. at Aldine Mail Route and West Rd.	$ 93,400
19	Upgrade Signalized Intersections - Group E - Sweetwater Ln. at Gulf Bank Rd. and Mount Houston Rd.	$ 50,600
20	Modify Intersection - Sweetwater Lane at Gulf Bank Road	$ 21,900
21	Reprogram DMS Boards on IH 45 - not priced	$ -
22	Louise Road Hike / Bike Trail	$ 385,300
23	New Street Connections	$ 962,800
24	Driveway Consolidation / Closure - not priced	$ -
25	Engineering Study - Signal Warrant	$ 8,000
SUB-TOTAL		**$ 4,863,000**
10% Contingency		$ 486,000
GRAND TOTAL		**$ 5,350,000**
FEDERAL SHARE (80%)		$ 4,280,000
LOCAL MATCH (20%)		**$ 1,070,000**

These cost estimates are intended for planning purposes only. If the District moves forward on the implementation of these improvements, construction drawings and engineering plans would be required. Further detail on the cost estimates for each improvement is provided on the following pages. The funding of the potential improvements identified in this report, is up to the Airline Improvement District board, with the potential involvement of other public entities such as Harris County. Further information on the disposition of the funding is available from the Airline Improvement District.

SHORT TERM IMPROVEMENTS

New signage, crosswalks, curb ramps, stop bars, and pedestrian signals

Project 1
Airline Drive Sidewalks - Section A (Market Area)

Item	Number	Ft. Each	Total	$ Each	$ Total
New Sidewalk (square feet)			20,000		
New Sidewalk (square yards)			2,222	$ 100.00	$ 222,222.22
TOTAL					**$ 222,222.22**
				Rounded Total	**$ 222,200.00**

Project 2
Airline Drive Sidewalks - Section B (Gulf Bank Road to Mitchell Road, excluding Market Area)

Item	Number	Ft. Each	Total	$ Each	$ Total	
New Sidewalk (linear ft)			2,950	$ 55.56	$ 163,888.89	*
New Curb Ramp (count)			4	$ 3,300.00	$ 13,200.00	
New Crosswalks across side street	2	24	48	$ 14.89	$ 714.48	
Stop Bars across side street	2	12	24	$ 5.55	$ 133.20	
TOTAL					**$ 177,936.57**	
				Rounded Total	**$ 177,900.00**	

Project 3
Airline Drive Sidewalks - Section C (Mitchell Road to Canino Road)

Item	Number	Ft. Each	Total	$ Each	$ Total	
New Sidewalk (linear ft)			6,100	$ 55.56	$ 338,888.89	*
New Curb Ramp (count)			12	$ 3,300.00	$ 39,600.00	
New Crosswalks across side street	6	24	144	$ 14.89	$ 2,143.44	
Stop Bars across side street	6	12	72	$ 5.55	$ 399.60	
TOTAL					**$ 381,031.93**	
				Rounded Total	**$ 381,000.00**	

Project 4
Bus Shelters at Existing Stops

Item	Number	Ft. Each	Total	$ Each	$ Total
New Bus Shelters - 5' x 10', 3 walls, with installation			2	$ 6,500.00	$ 13,000.00
TOTAL					**$ 13,000.00**
				Rounded Total	**$ 13,000.00**

**$100/sy for new sidewalks = $11.11/sf*
*sidewalks 5' wide, so 5 SF = 1 linear foot = $11.11 * 5 = $55.56/ft*

SHORT TERM IMPROVEMENTS (continued)

New signage, crosswalks, curb ramps, stop bars, and pedestrian signals

Project 5
Tow-Away Zone in Market Area

Item	Number	Ft. Each	Total	$ Each	$ Total
"No Parking - Tow Away Zone" Sign			30	$ 78.00	$ 2,340.00
Metal Sign Poles			30	$ 600.00	$ 18,000.00
TOTAL					**$ 20,340.00**
				Rounded Total	**$ 20,300.00**

Project 6
Enforcement of Tow-Away Zone - not priced

Project 7
Upgrade School Zone Signage

Item	Number	Ft. Each	Total	$ Each	$ Total
New Sign Assembly with Flashing Beacon			12	$ 4,600.00	$ 55,200.00
TOTAL					**$ 55,200.00**
				Rounded Total	**$ 55,200.00**

Project 8
Canino Road Sidewalks - Fonville Middle School to Airline Drive

Item	Number	Ft. Each	Total	$ Each	$ Total	
New Sidewalk (linear ft)			2,040	$ 55.56	$ 113,333.33	*
New Curb Ramp (count)			2	$ 3,300.00	$ 6,600.00	
New Crosswalks across side street	3	24	72	$ 14.89	$ 1,071.72	
Stop Bars across side street	3	12	36	$ 5.55	$ 199.80	
TOTAL					**$ 121,204.85**	
				Rounded Total	**$ 121,200.00**	

Project 9
Directional Signage to Parking Areas

Item	Number	Ft. Each	Total	$ Each	$ Total
"Market Parking" signs			4	$ 78.00	$ 312.00
Metal Sign Poles			4	$ 600.00	$ 2,400.00
TOTAL					**$ 2,712.00**
				Rounded Total	**$ 2,700.00**

**$100/sy for new sidewalks = $11.11/sf*
*sidewalks 5' wide, so 5 SF = 1 linear foot = $11.11 * 5 = $55.56/ft*

MEDIUM TERM IMPROVEMENTS

New signage, crosswalks, curb ramps, stop bars, and pedestrian signals

Project 10
Airline Drive Crosswalks

Item	Number	Ft. Each	Total	$ Each	$ Total
New Crosswalks	2	60	120	$ 14.89	$ 1,786.20
New Curb Ramp (count)			4	$ 3,300.00	$ 13,200.00
Stop Bars across Airline	4	36	144	$ 5.55	$ 799.20
New Pedestrian Signal			2	$ 85,800.00	$ 171,600.00
TOTAL					**$ 187,385.40**
				Rounded Total	**$ 187,400.00**

Project 11
Airline Drive Medians **

Item	Number	Ft. Each	Total	$ Each	$ Total
New 6" Curb (linear ft)			3,000	$ 34.50	$ 103,500.00
New Concrete Median (square ft)			15,400		
New Concrete Median (square yards)			1,711	$ 100.00	$ 171,111.11
TOTAL					**$ 274,611.11**
				Rounded Total	**$ 274,600.00**

Project 12
Gulf Bank Road Sidewalks - West of Airline

Item	Number	Ft. Each	Total	$ Each	$ Total
New Sidewalk (linear ft)			8,550	$ 55.56	$ 475,000.00 *
New Curb Ramp (count)			12	$ 3,300.00	$ 39,600.00
New Crosswalks across side street	6	25	150	$ 14.89	$ 2,232.75
Stop Bars across side street	6	12	72	$ 5.55	$ 399.60
TOTAL					**$ 517,232.35**
				Rounded Total	**$ 517,200.00**

Project 13
Gulf Bank Road Sidewalks - East of Airline

Item	Number	Ft. Each	Total	$ Each	$ Total
New Sidewalk (linear ft)			13,475	$ 55.56	$ 748,611.11 *
New Curb Ramp (count)			26	$ 3,300.00	$ 85,800.00
New Crosswalks across side street	13	25	325	$ 14.89	$ 4,837.63
Stop Bars across side street	13	12	156	$ 5.55	$ 865.80
TOTAL					**$ 840,114.54**
				Rounded Total	**$ 840,100.00**

**$100/sy for new sidewalks = $11.11/sf*
*sidewalks 5' wide, so 5 SF = 1 linear foot = $11.11 * 5 = $55.56/ft*

***Raised median priced with perimeter length of curb, and area of 6 " concrete (equivalent to sidewalk) to fill*

MEDIUM TERM IMPROVEMENTS (continued)

New signage, crosswalks, curb ramps, stop bars, and pedestrian signals

Project 14
Illumination on Gulf Bank Road

Item	Number	Ft. Each	Total	$ Each	$ Total
Metal-pole luminaires			42	$ 6,300.00	$ 264,600.00
(ongoing electricity cost not included)					
TOTAL					**$ 264,600.00**
				Rounded Total	**$ 264,600.00**

Project 15
Upgrade Signalized Intersections - Group A - Airline Dr. at Gulf Bank Rd. and Mitchell Rd.

Item	Number	Ft. Each	Total	$ Each	$ Total
New Curb Ramp (count)			16	$ 3,300.00	$ 52,800.00
New Crosswalks - 5-Lane crossing	6	60	360	$ 14.89	$ 5,358.60
New Crosswalks - 3-Lane crossing	2	36	72	$ 14.89	$ 1,071.72
Stop Bars - multi-lane approach	6	36	216	$ 5.55	$ 1,198.80
Stop Bars - single lane approach	2	24	48	$ 5.55	$ 266.40
Pedestrian Signal Heads, poles and buttons			16	$ 2,825.00	$ 45,200.00
TOTAL					**$ 105,895.52**
				Rounded Total	**$ 105,900.00**

Project 16
Upgrade Signalized Intersections - Group B - Airline Drive at Canino Road

Item	Number	Ft. Each	Total	$ Each	$ Total
New Curb Ramp (count)			16	$ 3,300.00	$ 52,800.00
New Crosswalks - 5-Lane crossing	2	60	120	$ 14.89	$ 1,786.20
New Crosswalks - 3-Lane crossing	2	36	72	$ 14.89	$ 1,071.72
Stop Bars - multi-lane approach	2	36	72	$ 5.55	$ 399.60
Stop Bars - single lane approach	2	24	48	$ 5.55	$ 266.40
Pedestrian Signal Heads, poles and buttons			8	$ 2,825.00	$ 22,600.00
TOTAL					**$ 78,923.92**
				Rounded Total	**$ 78,900.00**

Project 17
Upgrade Signalized Intersections - Group C - Airline Dr. at Hill Rd. and Mount Houston Rd.

Item	Number	Ft. Each	Total	$ Each	$ Total
New Curb Ramp (count)			12	$ 3,300.00	$ 39,600.00
New Crosswalks - 5-Lane crossing	4	60	240	$ 14.89	$ 3,572.40
New Crosswalks - 3-Lane crossing	2	36	72	$ 14.89	$ 1,071.72
Stop Bars - multi-lane approach	4	36	144	$ 5.55	$ 799.20
Stop Bars - single lane approach	2	24	48	$ 5.55	$ 266.40
Pedestrian Signal Heads, poles and buttons			12	$ 2,825.00	$ 33,900.00
TOTAL					**$ 79,209.72**
				Rounded Total	**$ 79,200.00**

**$100/sy for new sidewalks = $11.11/sf*
*sidewalks 5' wide, so 5 SF = 1 linear foot = $11.11 * 5 = $55.56/ft*

MEDIUM TERM IMPROVEMENTS (continued)

New signage, crosswalks, curb ramps, stop bars, and pedestrian signals

Project 18
Upgrade Signalized Intersections - Group D - Airline Dr. at Aldine Mail Route and West Rd.

Item	Number	Ft. Each	Total	$ Each	$ Total	
New Curb Ramp (count)			14	$ 3,300.00	$ 46,200.00	
New Crosswalks - 4-Lane crossing	7	60	420	$ 14.89	$ 6,251.70	**
Stop Bars - multi-lane approach	7	36	252	$ 5.55	$ 1,398.60	
Pedestrian Signal Heads, poles and buttons			14	$ 2,825.00	$ 39,550.00	
TOTAL					**$ 93,400.30**	
				Rounded Total	**$ 93,400.00**	

Project 19
Upgrade Signalized Intersections - Group E - Sweetwater Ln. at Gulf Bank Rd. and Mount Houston Rd.

Item	Number	Ft. Each	Total	$ Each	$ Total	
New Crosswalks - 2-Lane crossing	8	36	288	$ 14.89	$ 4,286.88	**
Stop Bars - single lane approach	8	24	192	$ 5.55	$ 1,065.60	
Pedestrian Signal Heads, poles and buttons			16	$ 2,825.00	$ 45,200.00	
TOTAL					**$ 50,552.48**	
				Rounded Total	**$ 50,600.00**	

Project 20
Modify Intersection - Sweetwater Lane at Gulf Bank Road

Item	Number	Ft. Each	Total	$ Each	$ Total
New Asphalt Pavement (square ft)			3,000	$ 6.50	$ 19,500.00
8" lane edge striping (linear ft)			500	$ 1.33	$ 665.00
Directional arrow lane markings			2	$ 175.00	$ 350.00
Lane use signs			2	$ 78.00	$ 156.00
Metal Sign Poles			2	$ 600.00	$ 1,200.00
TOTAL					**$ 21,871.00**
				Rounded Total	**$ 21,900.00**

Project 21
Reprogram DMS Boards - not priced

**$100/sy for new sidewalks = $11.11/sf*
*sidewalks 5' wide, so 5 SF = 1 linear foot = $11.11 * 5 = $55.56/ft*

***24" striping, 6' wide = $5.55 * 6 = $33.30/stripe*
24" stripe followed by a 24" space means each 24" stripe serves 4' of crossing distance.
For 1' of linear crossing distance, divide the stripe price by 4. $33.30 / 4 = $8.33/ft
$8.33/ft for the "ladder rungs."
The "ladder sides" are standard 12" stripes at $3.28/ft, so $6.56/ft for both sides.
$8.33 (rungs) + $6.56 (sides) = $14.89/linear ft

LONG-TERM IMPROVEMENTS

New signage, crosswalks, curb ramps, stop bars, and pedestrian signals

Project 22
Louise Road Hike / Bike Trail

Item	Number	Ft. Each	Total	$ Each	$ Total
Decomposed Granite Trail (linear ft)			12,300		
Decomposed Granite Trail (square ft)			61,500	$ 6.00	$ 369,000.00
Directional Signs (4 per intersecting street)			24	$ 78.00	$ 1,872.00
Metal Sign Poles			24	$ 600.00	$ 14,400.00
TOTAL					**$ 385,272.00**
				Rounded Total	**$ 385,300.00**

Project 23
New Street Connections

Item	Number	Ft. Each	Total	$ Each	$ Total
New Right-of-Way (square ft)			116,000	$ 1.60	$ 185,600.00
New 24'-wide Concrete Street (linear ft)			2,900		
New Concrete Street (square ft)			69,600	$ 7.00	$ 487,200.00
New 6" Concrete Curb & Gutter (linear ft)			5,800	$ 50.00	$ 290,000.00
TOTAL					**$ 962,800.00**
				Rounded Total	**$ 962,800.00**

Project 24
Driveway Consolidation / Closure - not priced

Note that bicycle racks at the markets would be installed on private property and are thus not eligible for H-GAC matching funds. Their cost estimates are included here for information only.

Bicycle Racks (Improvement #P2)

U-Type Racks
Also referred to as "hoops" or "arches."
www.dero.com Nick Mason 888-337-6729
25% off 100 or more
Shipping costs $1,200 per lot of 100
(calculated Minneapolis to zip 77035)

	U-type	with discount
standard galvanized	$ 99.00	$ 74.25
heavy-gauge steel	$ 179.00	$ 134.25
For 100 Racks:	Racks:	$ 7,425.00
	Shipping	$ 1,200.00
	TOTAL	**$ 8,625.00**

Policy and Planning Recommendations—Pedestrians

Following are general suggestions to improve the pedestrian experience:

- The Americans with Disabilities Act requires sidewalks to be at least five feet wide to allow two people in wheelchairs to pass each other. This also allows two people pushing strollers to walk together.
- Make sidewalks continuous across driveways; the driveway should ramp up. Cross slope of the sidewalk is limited to 2% (1:50).
- Do not block continuous paths of travel with hedges, fences or other obstacles which block walkways. Formal links should be created where people already walk.
- Install crosswalks on all legs of all intersections; they must be straight (no bends at medians) and aligned with the sidewalk. Sidewalks should not bend to meet the crosswalks or pedestrian ramp.
- All medians should extend through crosswalks to protect waiting pedestrians. Narrow medians should be cut at the crosswalk. Some examples are shown at right.
- Where significant sustained pedestrian flows exist, the County should consider having signal timing plans include a pedestrian phase each cycle. Priority then could be given to pedestrians via leading pedestrian intervals.
- Provide crossings for pedestrians according to their desire lines, not the vehicle network. Mid-block crossings should be provided if necessary to facilitate pedestrian travel. The design of the crossing (marked crosswalk, signal, refuge island) is dependent on vehicle speed and volume and roadway width.
- Sidewalks should take priority over driveways as drivers are legally required to yield to pedestrians on sidewalks. The driveway should ramp up to sidewalk level at the curb; the sidewalk should not ramp down to meet the driveway.

If traffic or signal timing requires pedestrians to cross the roadway one side at a time, median refuges provide a sense of safety. Cut-throughs can be at grade, or have a ramp at either end.

- Research has shown that drivers turn into driveways at about the same speed, regardless of driveway configuration.[1] Driveways should be as small as possible and never wider than the entrance.

1 Committee on Access Management (2003). Access Management Manual. Washington, DC: Transportation Research Board, 2003, p. 169.

Bicycle parking facilities inside a parking garage, Arlington VA. Note the additional security offered by the lockable chain link fence, located near the attendant's booth.

This sheltered bicycle parking area in Schenectady, NY, shows a simple structure in a surface parking lot.

Bicycle parking

Parking for cyclists should be included in all garages and lots. This is an inexpensive way to increase use, as one can fit about 10 bikes in the space normally used by one car. Bike parking should be located near the entrance in a visible location. Cyclists would ride through the vehicle entrance and then walk out as pedestrians, similar to other parking lot users.

Appendix A
Background Statistics and Demographics

Demographics and Employment

The study area consists of the boundaries of the Airline Improvement District, in north central Harris County. It is an unincorporated area partially surrounded by the City of Houston, and includes the southern portion of the area know as Aldine. It is predominately residential, with commercial and light industrial uses along major thoroughfares. Demographics have been compiled for three Census tracts roughly corresponding to the District boundary. Harris County Census tracts 2216, 2217, and 2224 cover an area north of Little York Road, south of West Road, east of IH 45, and west of the Hardy Toll Road. Table 1 on the following page shows comparisons between the Study Area, H-GAC's eight-county transportation management area, Harris County, and the state of Texas as a whole, for various 2000 Census statistics.

The 8-county region consists of the following counties:

Harris	Fort Bend	Liberty
Galveston	Waller	Chambers
Brazoria	Montgomery	

The District's median household income in 2000 was slightly lower than the State average, and more than 15% lower than the average for the County and region. Unemployment is slightly higher and poverty status slightly more prevalent in the District than the larger areas. Approximately one in six study area residents has income below the poverty level.

Despite the lower incomes, homeownership is more common in the study area than in the County, region, or State. More than 75% of housing units are owner-occupied. The majority of housing units in the study area also are single-family homes. Approximately 76% of Airline District housing units are single-family detached, compared to roughly 56% in the County, 60% in the region and 64% in the whole state. Apartments and condominiums of all size complexes are correspondingly less common, making up only about 8% of the total, while regionally apartments and condominiums are nearly one-third of all housing units. The study area does have a very high percentage of "other" housing units, which in this case are mostly mobile homes. These account for one out of six housing units in the study area, whereas the corresponding figure for Harris County as a whole is less than one in thirty.

The study area is predominately Hispanic, at over 62% of the population. The next largest group is non-Hispanic Whites, who make up about 30% of the population. Compared to the larger geographies, the study area has a much greater proportion of Hispanic residents (roughly twice the regional average).

The age breakdown of the study area population is roughly similar to Harris County and the region as a whole, although there are more children and correspondingly fewer middle-age (35-64) adults.

Educational attainment in the study area is considerably lower than in the County, region, or State, which are all fairly close in educational breakdown. In particular, more than half of study area adults have not completed high school, compared to 23-25% for the larger geographies; and only 7% of study area adults have completed college, compared to 30% for the larger geographies.

Finally, on their journey to work, study area residents use alternative modes of transportation (transit, bicycling, walking, other) at roughly the same rates as the County, region, and State. Although the same 90% of trips occur via automobile, carpooling is significantly more common in the study area. In the study area, 25% of work trips occur by carpool, compared to 14-15% elsewhere. "Drove alone" is correspondingly lower, accounting for 65% of work trips, compared to 75-77% elsewhere.

Table 1: Airline Study Area vs. Other Areas
Comparative Demographics - 2000 Census

STATISTIC	Airline Study Area	Harris County	H-GAC 8 Counties	State of Texas
Population	23,756	3,400,578	4,669,571	20,851,820
Households	7,168	1,205,516	1,639,401	7,393,354
Persons per Household	3.31	2.82	2.85	2.82
Income-Related				
Median Household Income	$ 35,457	$ 42,598	$ 44,788	$ 39,927
Unemployment	8%	6%	6%	7%
Below Poverty Level	16%	15%	14%	15%
Housing Units by Occupancy				
Owner-Occupied	77.5%	55.3%	60.9%	63.8%
Renter-Occupied	22.5%	44.7%	39.1%	36.2%
Housing Vacancy Rate	5.7%	7.1%	7.8%	9.4%
Housing Units by Type				
Single-Family Detached	75.7%	55.7%	59.9%	63.4%
Single-Family Attached	2.1%	4.2%	3.5%	3.1%
Apartments/Condos 2-9 units	2.9%	10.0%	8.7%	9.8%
Apartments/Condos 10+ units	2.9%	27.0%	21.5%	14.4%
Other	16.4%	3.1%	6.4%	9.4%
Race/Ethnicity				
Non-Hispanic White	30.2%	42.0%	47.9%	52.4%
Non-Hispanic Black	4.2%	18.2%	16.6%	11.3%
Non-Hispanic Asian/Other*	3.2%	6.8%	6.6%	4.3%
Hispanics of any race	62.4%	33.0%	28.9%	32.0%
Age				
Children/Adolescents (0-17)	32.7%	28.9%	28.8%	28.2%
Young Adults (18-34)	27.4%	27.0%	25.6%	25.5%
Adults (35-64)	32.1%	36.8%	37.8%	36.4%
Seniors (65+)	7.8%	7.3%	7.8%	9.9%
Education				
No High School	52.4%	25.4%	23.8%	24.3%
High School Only	40.8%	42.9%	45.1%	47.2%
Finished College	5.5%	22.7%	22.5%	20.8%
Graduate Degree	1.3%	9.0%	8.6%	7.6%
Journey to Work				
Drove Alone	65.4%	75.8%	77.1%	77.7%
Drove in Carpool	25.9%	14.6%	14.2%	14.5%
Transit	3.1%	4.1%	3.2%	1.9%
Bicycle	0.2%	0.1%	0.3%	0.2%
Walked	1.9%	1.8%	1.6%	1.9%
Other/Work at Home	3.5%	3.6%	3.5%	3.8%

Airline Study Area includes the following Harris County Census Tracts:
2216, 2217, and 2224 (collectively Little York Rd. to West Rd., IH 45 to Hardy Toll Road)

Source: U.S. Census Bureau, Census 2000
*includes "some other race" and "two or more races"

Transit

The Airline Improvement District is part of the METRO service area. The following local bus routes serve the study area:

- Route 9 – North Main / Gulfton
  - Travels on Canino, Berwyn, and Sweetwater at the southwest edge of the study area
  - North terminus at Mount Houston / IH 45
  - South terminus Fondren / US 59
- Route 56 – Airline Limited
  - Travels the length of Airline in the study area
  - North terminus at Greenspoint Mall
  - South terminus Downtown
- Route 59 – Aldine-Mail Crosstown
  - Travels on Aldine-Mail and Airline north of Aldine-Mail
  - West terminus at West Road / Airline
  - East terminus at Aldine-Mail / US 59

Routes 56 and 59 travel on Airline Drive itself; Route 9 does not. Route 56 has the shortest headways, of up to five buses per hour at peak weekday times, and three per hour on weekends. This is the route which stops directly in front of the flea markets. The table below depicts the service headways; the map on the following page depicts the locations of the bus stops for the three routes.

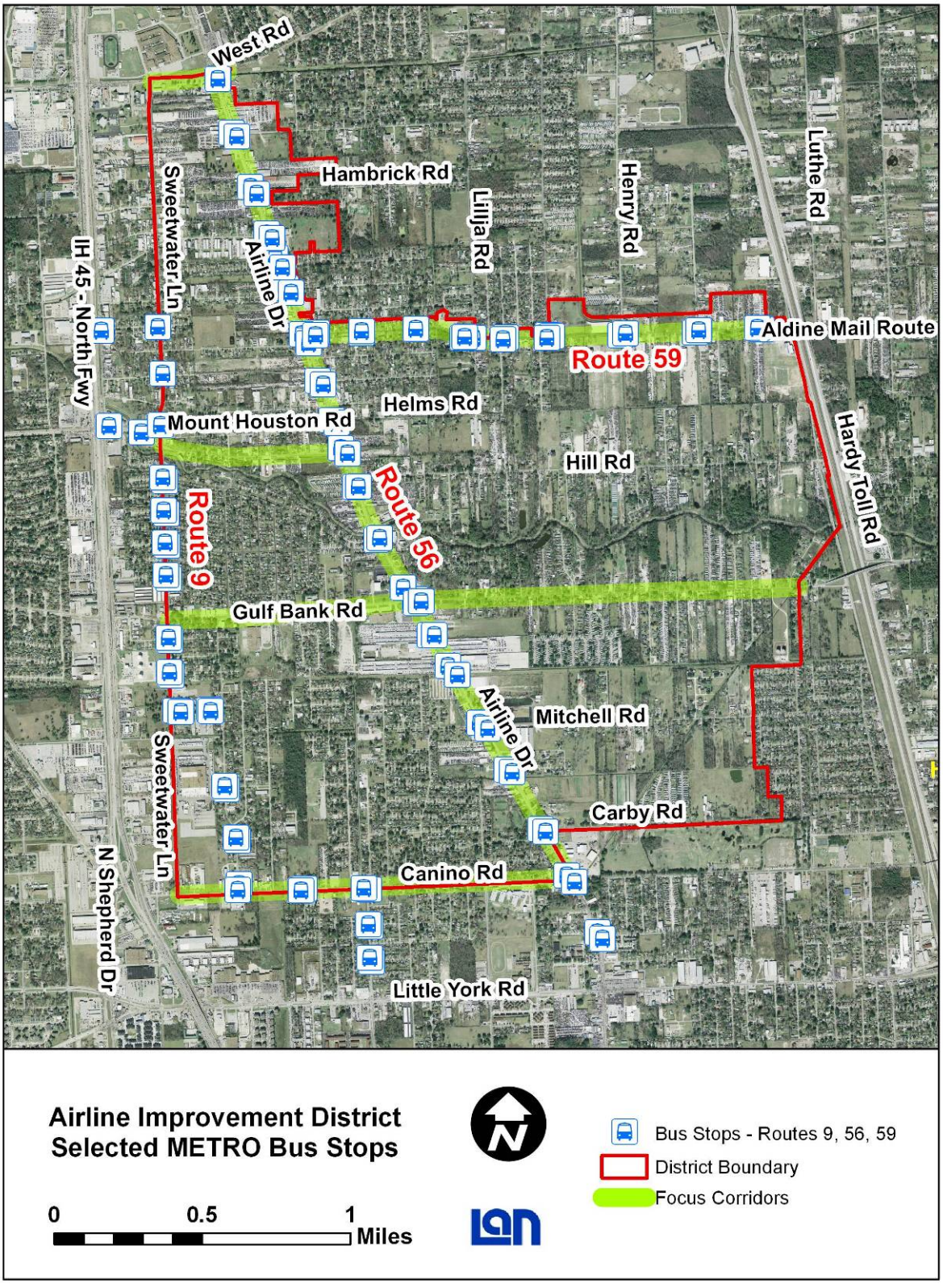
Table 2

Bus Headways (minutes) - Airline Study Area					
Route	**AM Peak**	**PM Peak**	**Off Peak**	**Saturday**	**Sunday**
9 - North Main	15	15	40	30	30
56 - Airline	12	12	15	18*	18
59 - Aldine-Mail	30	30	60	0	0

* plus 1 extra trip at 1pm, 3pm, and 5pm

Route 9 does not travel south of Downtown on Sundays.
Route 56 drops to 30-minute headways after 7pm, all days.
Route 59 does not operate on weekends.

METRO Bus Stops



Land Use

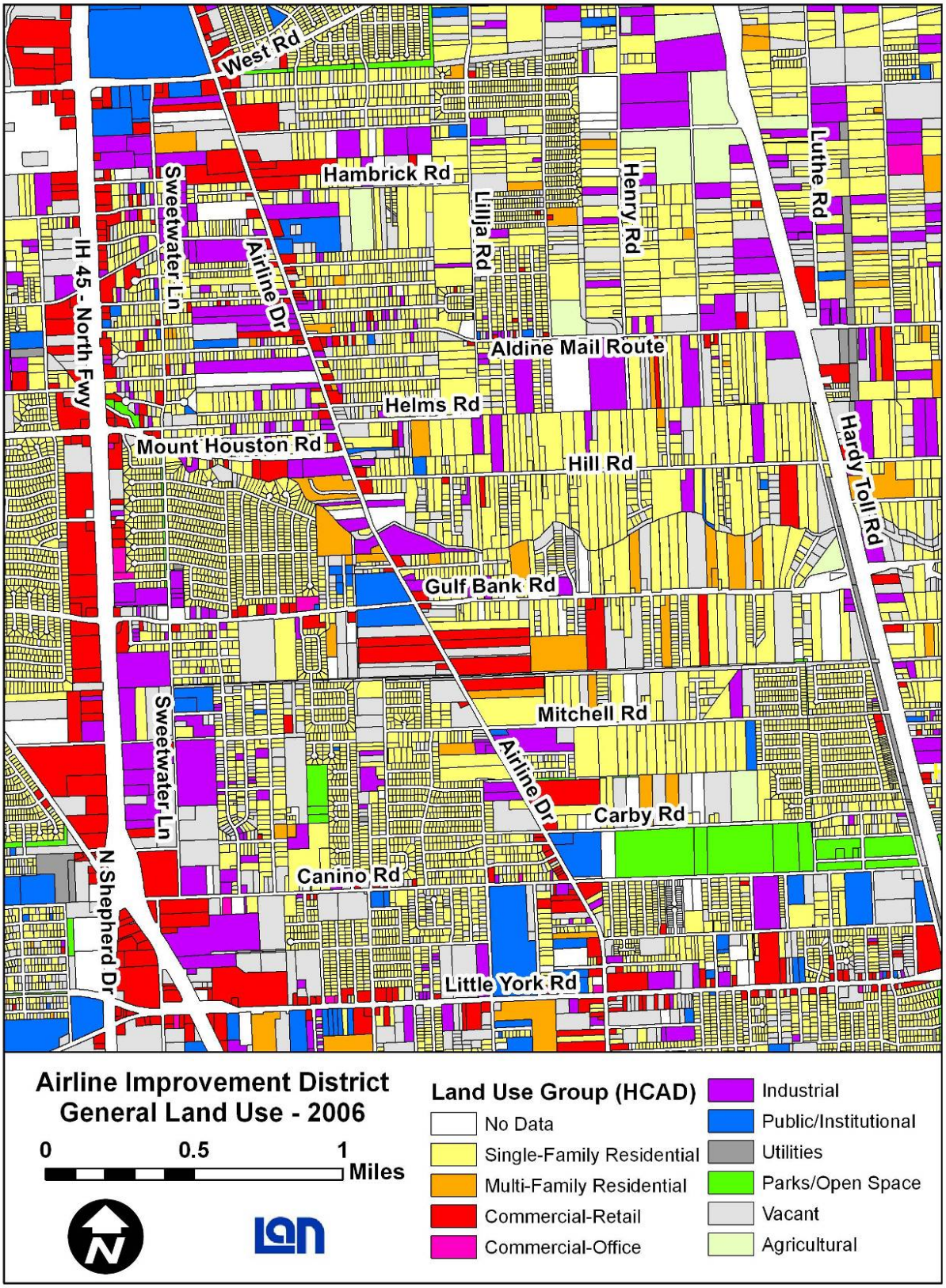
The predominant land use in the study area is single-family residential; small-lot suburban developments are typical of the western side of the study area, while the eastern side is mostly larger-lot rural residential. Commercial and light industrial uses line Airline Drive, and exist at scattered locations throughout the study area. The Airline Improvement District is located in unincorporated Harris County, which does not have zoning. The map on the following page illustrates the land uses in and around the study area. The flea markets are visible as the horizontal red properties roughly in the center of the map.

Traffic Signals and Existing Sidewalks

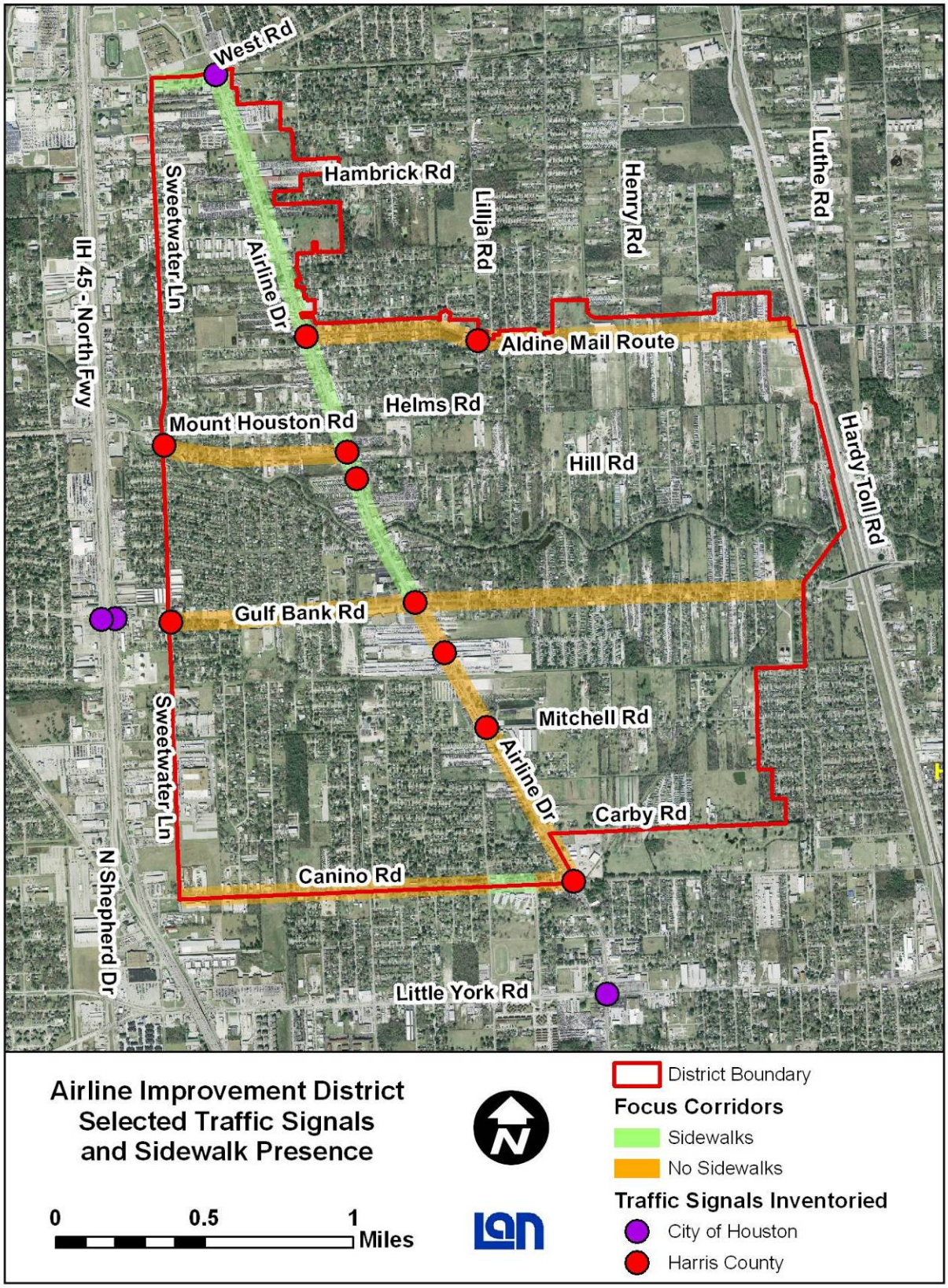
The traffic signals in the Airline District study area are mostly owned and operated by Harris County, although neighboring signals just outside the district are owned and operated by the City of Houston. Harris County has indicated that their traffic signals along Airline Drive are free-running (not pre-timed), with the exception of the Airline / Aldine Mail signal. That one is part of the timing pattern on Aldine Mail Route. Harris County plans to time the remainder of the Airline Drive signals as part of the next round of Congestion Mitigation and Air Quality Funding (CMAQ), currently scheduled for 2009-2010. The map following the land use map illustrates the location and jurisdiction of traffic signals in the study area.

Also shown on the map of traffic signals are the existing sidewalks along major arterials in the study area. Note that only Airline Drive has sidewalks along the majority of its length.

Land Use Map


West Rd
Hambrick Rd
Lillja Rd
Henry Rd
Luthe Rd
Sweetwater Ln
Airline Dr
IH 45 - North Fwy
Aldine Mail Route
Helms Rd
Mount Houston Rd
Hill Rd
Hardy Toll Rd
Gulf Bank Rd
Mitchell Rd
Carby Rd
Canino Rd
N Shepherd Dr
Little York Rd
Airline Improvement District
General Land Use - 2006
0
0.5
1
Miles
N
Land Use Group (HCAD)
No Data
Single-Family Residential
Multi-Family Residential
Commercial-Retail
Commercial-Office
Industrial
Public/Institutional
Utilities
Parks/Open Space
Vacant
Agricultural

Traffic Signals and Sidewalks Map



Traffic Signal Inventory

The project team conducted a field inventory of the condition of traffic signals in the study area. The information is compiled below.

Intersection	Condition of Poles	Condition of Signal Heads	Condition of Luminaires	Condition of Pavement Markings	Condition of Stop Bar	Condition of Crosswalks	Type of Layout
Airline @ Little York	Fair	Fair	Fair	Fair/Poor	Fair/Poor	Fair/Poor	Span Wire
Airline @ Canino	Fair	Fair	Fair	Fair/Poor	Fair/Poor	Poor	Span Wire
Airline @ Mitchell	Fair	Fair	Fair	Fair/Poor	Fair	Fair/Poor	Span Wire
Airline @ Gulf Bank	Fair	Fair	Fair	Fair	Fair/Poor	Fair/Poor	Span Wire
Airline @ Hill	Fair	Fair	Fair	Fair	Fair	None	Span Wire
Airline @ Mount Houston	Fair	Fair	Fair	Fair/Poor	Fair/Poor	Fair/Poor	Span Wire
Airline @ Aldine-Mail Route	Fair	Fair	Fair	Fair	Fair	Fair	Span Wire
Airline @ West	Fair	Fair	Fair	Fair	Fair	Fair	Span Wire
Gulf Bank @ IH 45 Northbound	Fair	Fair	Fair	Fair	Fair	Fair	Mast Arms
Gulf Bank @ IH 45 Southbound	Fair	Fair	Fair	Fair	Fair	Fair	Mast Arms
Gulf Bank @ Sweetwater	Fair	Fair	Fair	Poor	Poor	Poor	Span Wire
Mount Houston @ Sweetwater	Fair	Fair	Fair	Fair/Poor	Fair/Poor	None	Mast Arms

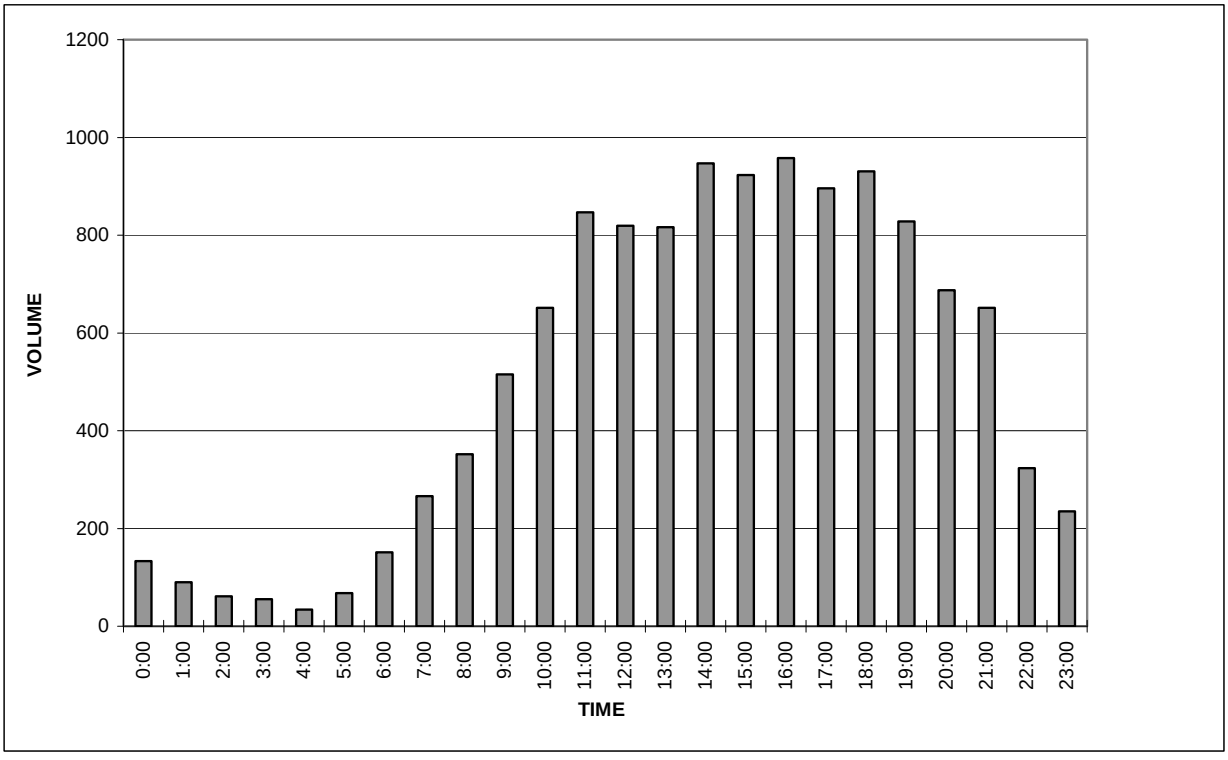
Intersection	Compliance of Wheelchair Ramps (ADA?)	Condition of Ped Heads and Push Buttons	Condition of Signs	Power Lines	Driveways	Condition of Service	Detection Type	Site Distance Problems
Airline @ Little York	No	Fair	Fair	Yes	Yes	Good	Loops	No
Airline @ Canino	No	Fair	Fair	Yes	Yes	Good	Loops	No
Airline @ Mitchell	No	None	Fair/Poor	Yes	Yes	Fair	Loops	No
Airline @ Gulf Bank	No	Fair/Poor	Fair	Yes	Yes	Fair	Loops	No
Airline @ Hill	No	None	Fair	Yes	Yes	Fair	Loops	No
Airline @ Mount Houston	No	None	Fair	Yes	Yes	Fair	Loops	No
Airline @ Aldine-Mail Route	No	Fair	Fair	Yes	Yes	Fair	Loops	No
Airline @ West	No	Fair	Fair	Yes	Yes	Good	Loops	No
Gulf Bank @ IH 45 Northbound	No	Fair	Fair	Yes	Yes	Unknown	Loops	No
Gulf Bank @ IH 45 Southbound	No	Fair	Fair	Yes	No	Unknown	Loops	No
Gulf Bank @ Sweetwater	No	None	Fair	Yes	Yes	Good	Loops	No
Mount Houston @ Sweetwater	No	None	Fair	Yes	Yes	Fair	Loops	No

Traffic Counts—Airline Drive Northbound (Saturday)

Date Began:
8/16/2008

NB Airline South of Gulf Bank (Sat)

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	54	33	20	26	133
1:00	25	22	25	18	90
2:00	18	14	18	11	61
3:00	10	11	15	19	55
4:00	9	8	10	7	34
5:00	13	11	20	24	68
6:00	27	40	34	50	151
7:00	47	60	71	88	266
8:00	76	72	90	114	352
9:00	97	120	134	164	515
10:00	170	131	162	188	651
11:00	194	214	217	222	847
12:00	191	196	216	216	819
13:00	193	213	218	192	816
14:00	238	251	228	230	947
15:00	226	250	223	224	923
16:00	238	242	238	240	958
17:00	216	222	199	259	896
18:00	236	236	250	209	931
19:00	210	206	224	188	828
20:00	152	174	177	184	687
21:00	240	161	140	110	651
22:00	80	87	96	60	323
23:00	70	57	54	54	235
				TOTAL:	12,237

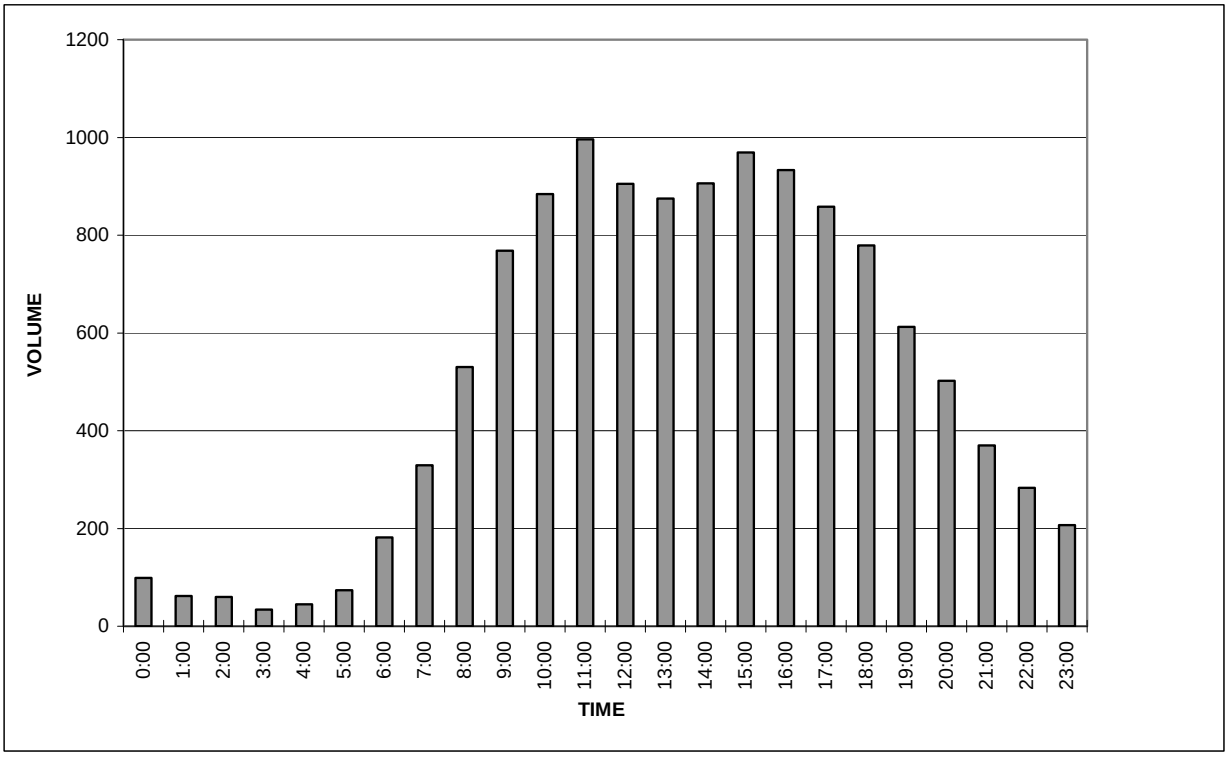


Traffic Counts—Airline Drive Southbound (Saturday)

Date Began:
8/16/2008

SB Airline South of Gulf Bank (Sat)

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	35	20	23	21	99
1:00	11	24	10	17	62
2:00	10	8	22	20	60
3:00	13	10	4	7	34
4:00	12	14	9	10	45
5:00	14	10	22	28	74
6:00	36	40	39	67	182
7:00	63	76	77	113	329
8:00	102	120	146	162	530
9:00	196	180	174	218	768
10:00	224	202	204	254	884
11:00	234	264	250	248	996
12:00	203	239	224	239	905
13:00	218	240	198	219	875
14:00	208	238	216	244	906
15:00	240	254	236	239	969
16:00	222	234	250	227	933
17:00	236	197	202	223	858
18:00	219	200	171	189	779
19:00	180	166	134	132	612
20:00	140	130	120	112	502
21:00	104	94	96	76	370
22:00	83	72	64	64	283
23:00	61	50	50	46	207
				TOTAL:	12,262

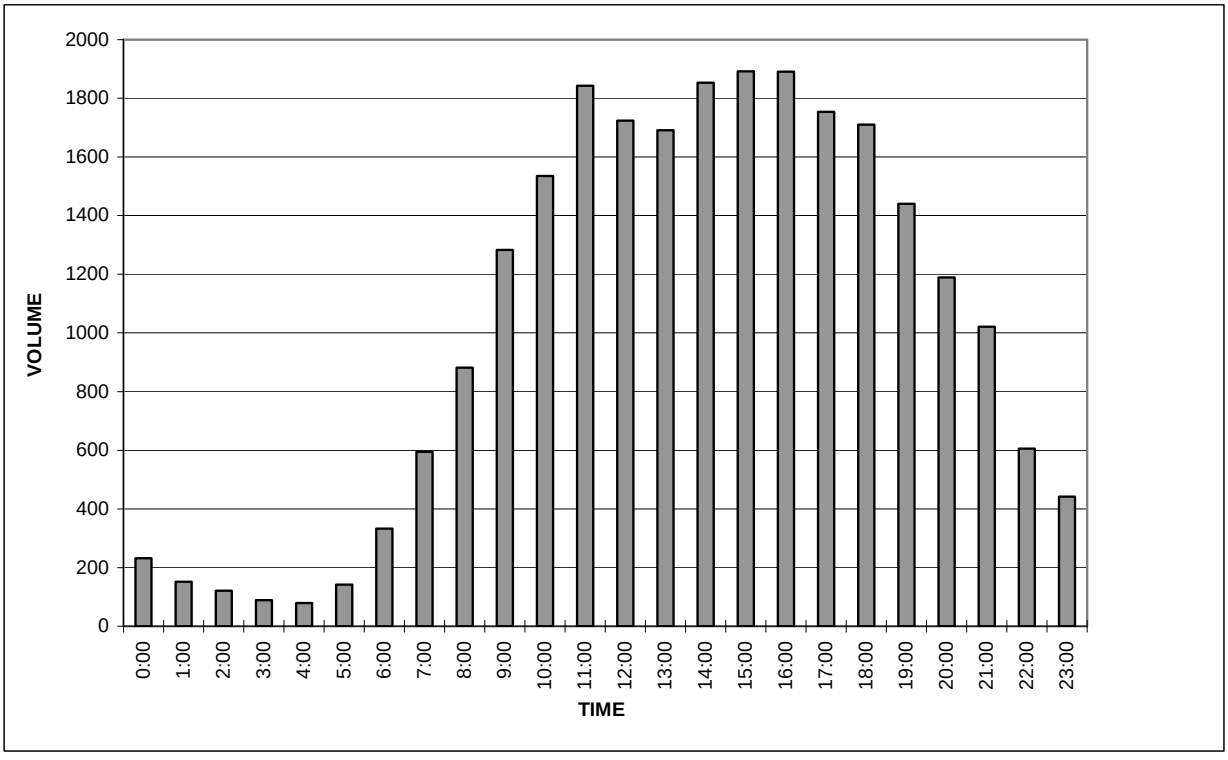


Traffic Counts—Airline Drive Total Volume (Saturday)

Date Began:
8/16/2008

Bi-Directional Airline South of Gulf Bank (Sat)

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	89	53	43	47	232
1:00	36	46	35	35	152
2:00	28	22	40	31	121
3:00	23	21	19	26	89
4:00	21	22	19	17	79
5:00	27	21	42	52	142
6:00	63	80	73	117	333
7:00	110	136	148	201	595
8:00	178	192	236	276	882
9:00	293	300	308	382	1,283
10:00	394	333	366	442	1,535
11:00	428	478	467	470	1,843
12:00	394	435	440	455	1,724
13:00	411	453	416	411	1,691
14:00	446	489	444	474	1,853
15:00	466	504	459	463	1,892
16:00	460	476	488	467	1,891
17:00	452	419	401	482	1,754
18:00	455	436	421	398	1,710
19:00	390	372	358	320	1,440
20:00	292	304	297	296	1,189
21:00	344	255	236	186	1,021
22:00	163	159	160	124	606
23:00	131	107	104	100	442
				TOTAL:	24,499

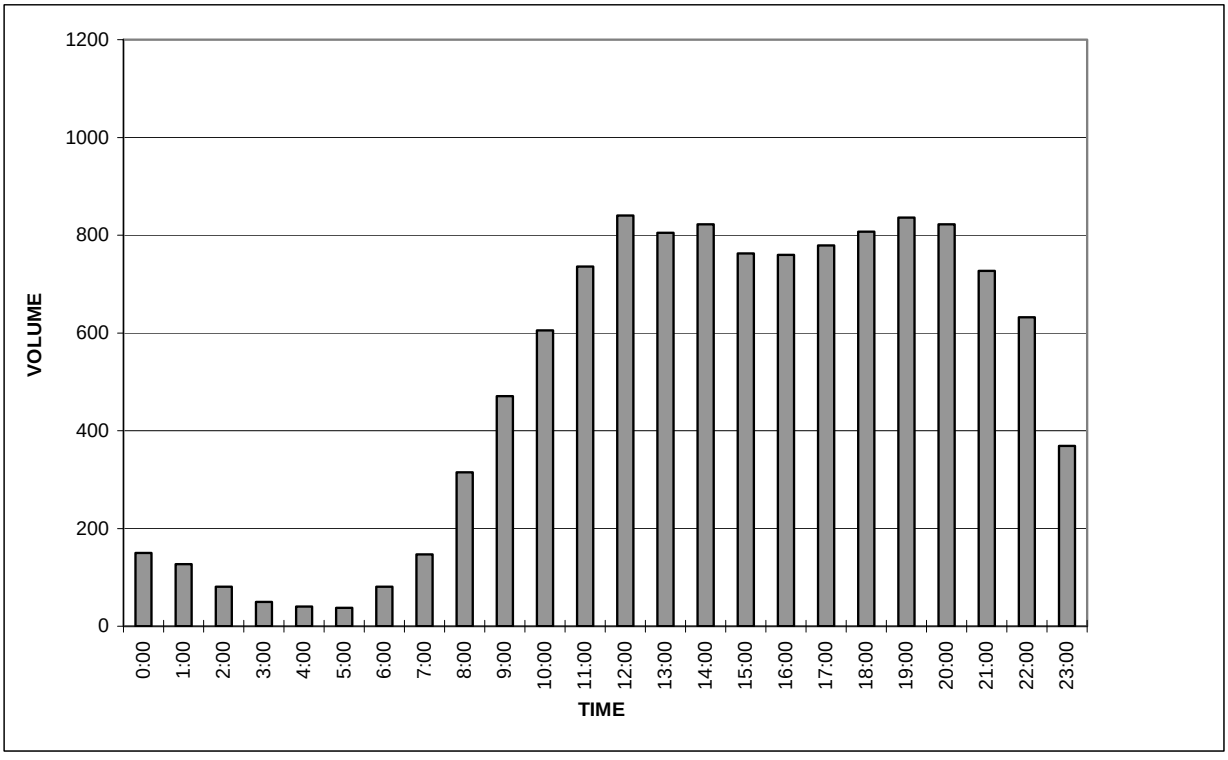


Traffic Counts—Airline Drive Northbound (Sunday)

Date Began:
8/17/2008

NB Airline South of Gulf Bank (Sun)

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	30	46	35	39	150
1:00	39	32	34	22	127
2:00	23	20	18	20	81
3:00	11	12	16	11	50
4:00	14	9	10	7	40
5:00	10	8	6	14	38
6:00	20	22	13	26	81
7:00	29	27	40	51	147
8:00	60	66	101	88	315
9:00	106	108	114	143	471
10:00	146	156	160	143	605
11:00	182	189	192	173	736
12:00	210	199	230	201	840
13:00	207	205	206	187	805
14:00	214	210	194	204	822
15:00	176	160	189	238	763
16:00	198	186	198	178	760
17:00	228	182	194	175	779
18:00	212	197	214	184	807
19:00	216	192	226	202	836
20:00	205	208	206	203	822
21:00	210	220	145	152	727
22:00	140	168	167	157	632
23:00	168	84	77	40	369
				TOTAL:	11,803

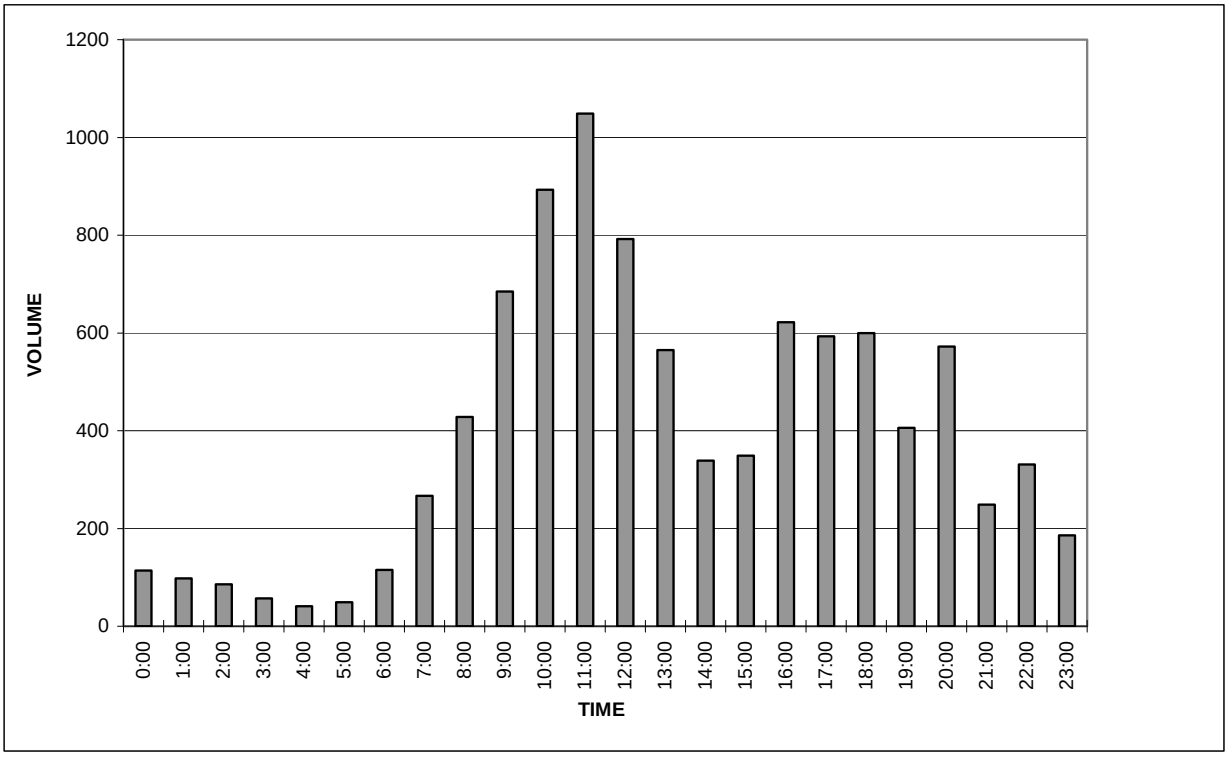


Traffic Counts—Airline Drive Southbound (Sunday)

Date Began:
8/17/2008

SB Airline South of Gulf Bank (Sun)

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	40	26	24	24	114
1:00	24	26	25	23	98
2:00	24	14	30	18	86
3:00	19	12	14	12	57
4:00	9	13	10	9	41
5:00	7	12	8	22	49
6:00	21	24	20	50	115
7:00	54	67	64	82	267
8:00	80	103	112	133	428
9:00	148	168	178	191	685
10:00	214	220	219	240	893
11:00	252	266	263	268	1,049
12:00	225	163	150	254	792
13:00	197	126	108	134	565
14:00	138	79	66	56	339
15:00	60	91	101	97	349
16:00	206	116	164	136	622
17:00	106	230	127	130	593
18:00	127	152	182	139	600
19:00	104	71	96	135	406
20:00	160	146	126	140	572
21:00	50	35	64	100	249
22:00	78	81	94	78	331
23:00	66	51	33	36	186
				TOTAL:	9,486

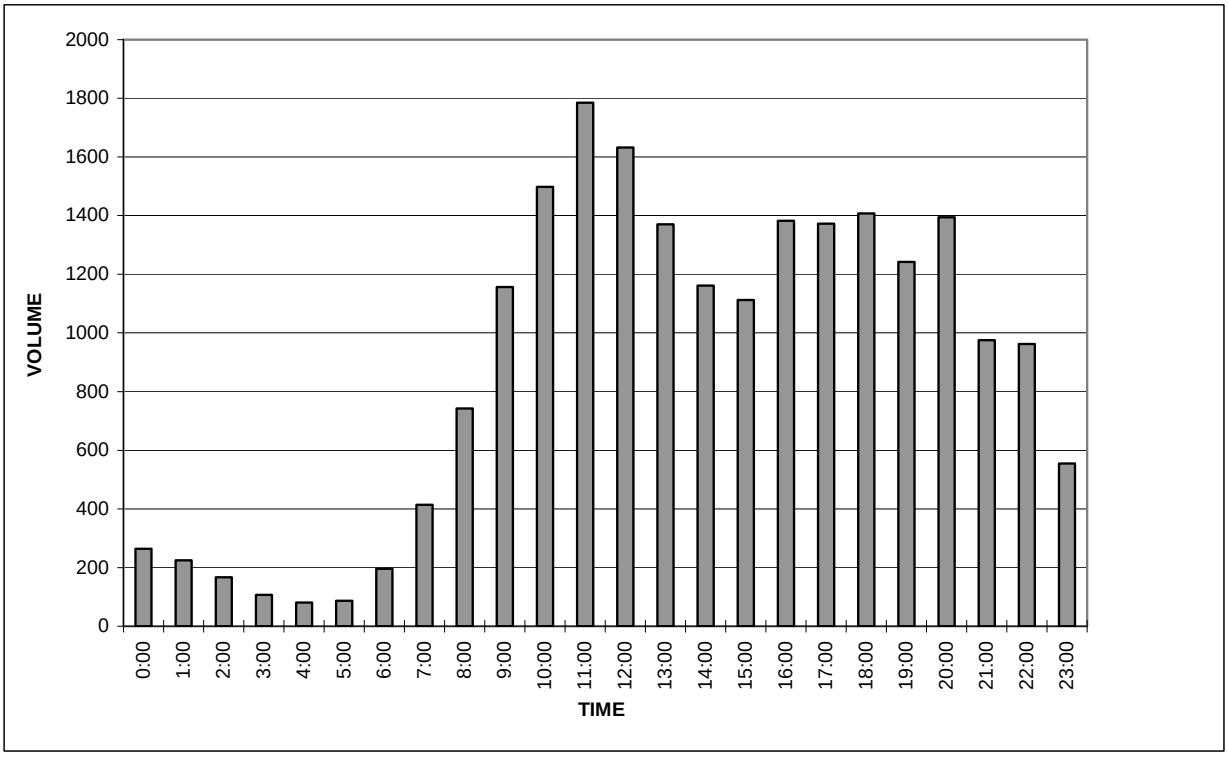


Traffic Counts—Airline Drive Total Volume (Sunday)

Date Began:
8/17/2008

Bi-Directional Airline South of Gulf Bank (Sun)

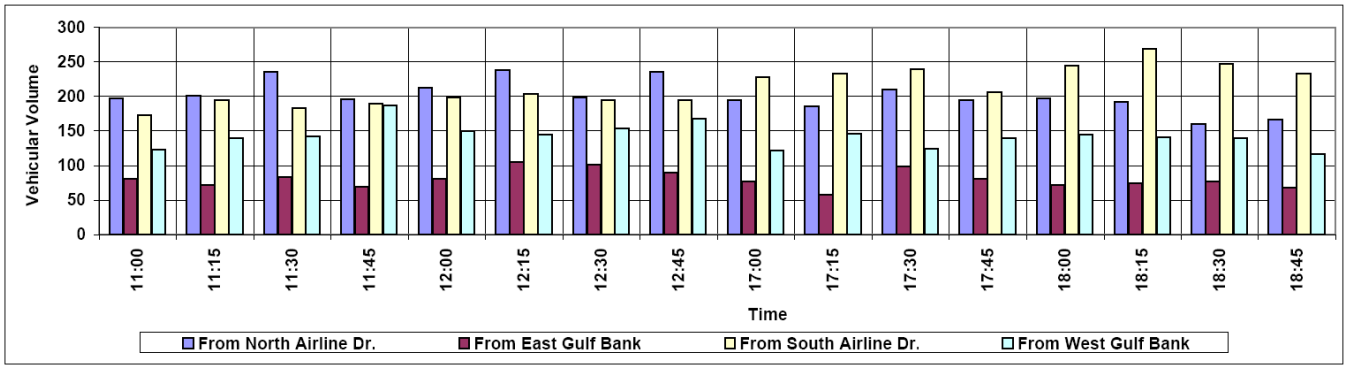
TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	70	72	59	63	264
1:00	63	58	59	45	225
2:00	47	34	48	38	167
3:00	30	24	30	23	107
4:00	23	22	20	16	81
5:00	17	20	14	36	87
6:00	41	46	33	76	196
7:00	83	94	104	133	414
8:00	140	169	213	221	743
9:00	254	276	292	334	1,156
10:00	360	376	379	383	1,498
11:00	434	455	455	441	1,785
12:00	435	362	380	455	1,632
13:00	404	331	314	321	1,370
14:00	352	289	260	260	1,161
15:00	236	251	290	335	1,112
16:00	404	302	362	314	1,382
17:00	334	412	321	305	1,372
18:00	339	349	396	323	1,407
19:00	320	263	322	337	1,242
20:00	365	354	332	343	1,394
21:00	260	255	209	252	976
22:00	218	249	261	235	963
23:00	234	135	110	76	555
				TOTAL:	21,289



Turning Movement Counts—Gulf Bank Road at Airline Drive (Sunday)

Airline Dr. at Gulf Bank Rd.
August 24, 2008
Turning Movement Count

	From North					From East					From South					From West				
	Airline Dr.					Gulf Bank					Airline Dr.					Gulf Bank				
Time	Left	Thru	Right	U	Peds	Left	Thru	Right	U	Peds	Left	Thru	Right	U	Peds	Left	Thru	Right	U	Peds
11:00	24	148	25	0	0	34	24	23	0	5	39	107	27	0	0	24	21	78	0	2
11:15	25	154	22	0	0	21	23	27	0	9	43	124	27	0	0	26	27	87	0	0
11:30	21	197	18	0	0	28	21	34	0	1	35	129	19	0	1	22	22	99	0	2
11:45	20	150	26	0	1	31	21	18	0	7	42	132	15	0	0	48	44	95	0	4
Hr. Total:	**90**	**649**	**91**	**0**	**1**	**114**	**89**	**102**	**0**	**22**	**159**	**492**	**88**	**0**	**1**	**120**	**114**	**359**	**0**	**8**
12:00	24	156	32	0	1	25	19	36	0	5	46	124	28	0	0	33	24	93	0	1
12:15	18	186	34	0	0	31	48	26	0	9	54	126	24	0	0	19	40	86	0	5
12:30	23	148	27	0	0	30	47	24	0	2	54	115	26	0	0	23	32	98	0	6
12:45	34	182	20	0	0	23	44	23	0	3	51	119	25	0	1	37	34	97	0	8
Hr. Total:	**99**	**672**	**113**	**0**	**1**	**109**	**158**	**109**	**0**	**19**	**205**	**484**	**103**	**0**	**1**	**112**	**130**	**374**	**0**	**20**
17:00	24	139	31	0	1	23	22	32	0	1	53	147	28	0	0	18	24	80	0	4
17:15	32	128	25	0	0	15	26	16	0	3	56	140	37	0	0	20	34	92	0	4
17:30	38	146	27	0	0	31	38	29	0	8	53	160	26	0	1	13	36	75	0	4
17:45	28	144	23	0	0	22	34	24	0	2	58	119	29	0	0	19	37	83	0	7
Hr. Total:	**122**	**557**	**106**	**0**	**1**	**91**	**120**	**101**	**0**	**14**	**220**	**566**	**120**	**0**	**1**	**70**	**131**	**330**	**0**	**19**
18:00	26	133	38	0	0	24	25	23	0	0	55	157	32	0	0	18	37	89	0	3
18:15	26	132	34	0	0	27	30	18	0	3	77	156	37	0	0	23	36	82	0	1
18:30	18	122	21	0	0	30	33	14	0	0	68	153	26	0	0	19	35	86	0	2
18:45	28	125	14	0	0	20	30	18	0	0	59	136	38	0	0	13	33	70	0	0
Hr. Total:	**98**	**512**	**107**	**0**	**0**	**101**	**118**	**73**	**0**	**3**	**259**	**602**	**133**	**0**	**0**	**73**	**141**	**327**	**0**	**6**
Gr. Total	409	2390	417	0	3	415	485	385	0	58	843	2144	444	0	3	375	516	1390	0	53
% of Tot.	4%	23%	4%	0%	0%	4%	5%	4%	0%	1%	8%	21%	4%	0%	0%	4%	5%	13%	0%	1%
Apprch%			31%					13%					33%					23%		
% of Apprch	13%	74%	13%	0%	0%	31%	36%	29%	0%	4%	25%	62%	13%	0%	0%	16%	22%	60%	0%	2%
	Left	Thru	Right	U	Peds	Left	Thru	Right	U	Peds	Left	Thru	Right	U	Peds	Left	Thru	Right	U	Peds
	Airline Dr.					Gulf Bank					Airline Dr.					Gulf Bank				
	From North					From East					From South					From West				

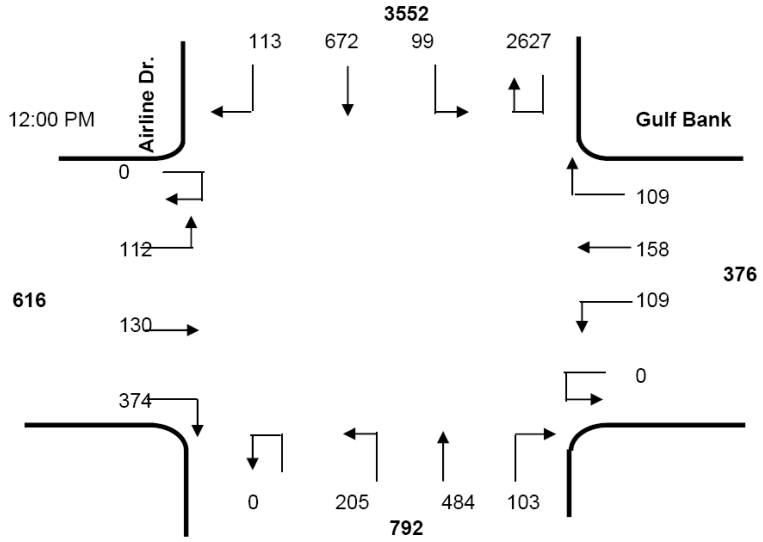


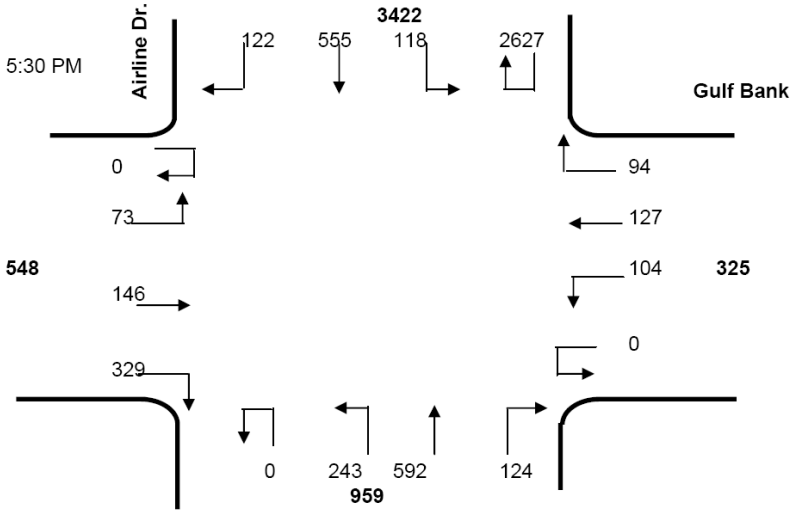
Peak Hour Turning Movement Counts—Gulf Bank Road at Airline Drive (Sunday)

	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
12:00	0	112	130	374	0	109	158	109	0	205	484	103	2668	99	672	113
17:30	0	73	146	329	0	104	127	94	0	243	592	124	2627	118	555	122

a.m. phf 0.96

p.m. phf 0.97





Crash Data

Traffic crash data was obtained from H-GAC, who compiles data from the Texas Department of Public Safety. The data requested was for Airline Drive throughout the study area (West Road to Canino Road), for the most recent three years available (2005-2007). Data covers only *reported* crashes which involved injury and/or property damage.

For all items, a maximum of one answer is permitted per crash record.

Day of Week	Count	Percent
Monday	52	11.4%
Tuesday	43	9.5%
Wednesday	35	7.7%
Thursday	41	9.0%
Friday	34	7.5%
Saturday	106	23.3%
Sunday	144	31.6%
Total	**455**	**100.0%**

Time of Day	Count	Percent
Midnight-3AM	13	4.6%
3AM-6AM	4	1.4%
6AM-9AM	26	9.1%
9AM-Noon	34	11.9%
Noon-3PM	55	19.3%
3PM-6PM	70	24.6%
6PM-9PM	47	16.5%
9PM-Midnight	36	12.6%
Total	**285**	**100.0%**

Light Condition	Count	Percent
Unknown	10	2.2%
Daylight	307	67.5%
Dawn	3	0.7%
Dusk	5	1.1%
Dark	130	28.6%
Total	**455**	**100.0%**

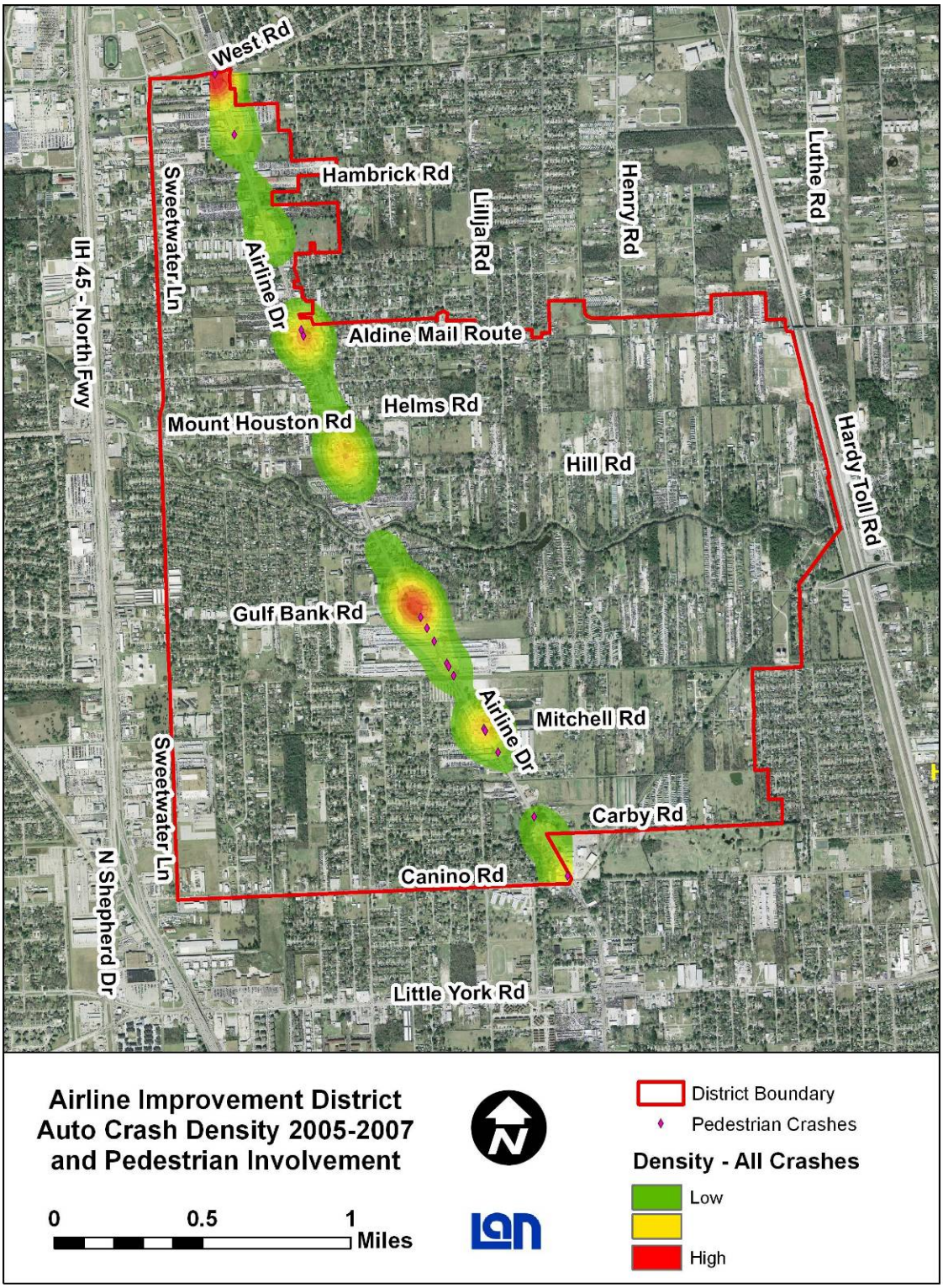
Severity	Count	Percent
Unknown	15	5.0%
Not Injured	202	67.3%
Possible Injury	50	16.7%
Non-Incapacitating Injury	23	7.7%
Incapacitating Injury	5	1.7%
Killed	5	1.7%
Total	**300**	**100.0%**

Traffic Control	Count	Percent
Center Stripe/Divider	158	34.7%
No Control or Inoperative	134	29.5%
Signal Light	107	23.5%
Stop Sign	35	7.7%
Other	17	3.7%
Yield Sign	2	0.4%
Crosswalk	1	0.2%
Officer Or Flagman	1	0.2%
Total	**455**	**100.0%**

Other Contributing Factors	Count	Percent
Leaving Driveway	67	14.7%
For Officer	31	6.8%
Avoiding Another Vehicle Stopped Or Moving Slowly In Traffic Lane	24	5.3%
Entering Driveway	18	3.9%
Changing Lanes	16	3.5%
Backward From Parking	10	2.2%
Reason Not Specified	3	0.7%
Attention Diverted From Driving	2	0.4%
Foot Slipped Off Clutch Or Brake	2	0.4%
To Make Left Turn	2	0.4%
School Bus Involved	2	0.4%
Lost Control Or Skidded	1	0.2%
Passing Or Attempting To Pass On Left	1	0.2%
Standing Or Parked Vehicle	1	0.2%
Avoiding Vehicle Stopped Or Moving Slowly In Traffic Lane	1	0.2%
To Avoid Vehicle Entering Road	1	0.2%
Not Applicable	274	60.1%
TOTAL	**456**	**100.0%**

Type of Crash	Count	Percent
Additional Motor Vehicle	382	84.0%
Fixed Object	33	7.3%
Parked Car	20	4.4%
Pedestrian	19	4.2%
Pedalcyclist	1	0.2%
TOTAL	**455**	**100.0%**

Data from Texas Department of Transportation's (TxDOT) Crash Record Information System through H-GAC. Not to be distributed to other entities or used for other purposes/projects. Includes only crashes with injuries and/or property damage.



Note: "Low" crash density is below regional average; "high" crash density is up to twice the regional average. Crash rates in the study area in general are roughly half the regional average.

Appendix B
Market Owners Meeting—September 2008

Purpose and Location

As part of the needs assessment, the consultant team conducted a meeting and workshop to provide information about the study and obtain one-on-one input from market owners in a setting with them alone, before hosting a larger workshop for citizens and other community leaders. The meeting was held at the following location, used by the Airline Improvement District for periodic meetings:

- September 5, 2008, from 10:00 a.m. – 12:00 p.m. at Little York Volunteer Fire Department

Notifications

As this meeting was intended solely for the market owners, notifications were by individual letter. Addresses were obtained from the District; the letter was drafted by the project team but sent on the District's letterhead. It was decided the market owners' existing familiarity with the District and its purpose would lend credibility and encourage attendance.

Attendees

Randy Sim, Mercado Sabadomingo

Vicente Saldana, Tia Pancha

Denis Saldana, Tia Pancha

Roveen Abante, Sunny Flea Market

Jan Abante, Sunny Flea Market

Jaime Garcia, Buey Y Vaca

Alex Garcia, Buey Y Vaca

Teri Koerth, Airline Improvement District

David Manuel, LAN

Michael Feeney, LAN

Margaret Menger, The Clifford Group

Ellen Feely, The Clifford Group

Meeting Format

For the meeting, David Manuel, AICP, of Lockwood, Andrews, & Newnam, Inc. (LAN), and Teri Koerth of the Airline Improvement District, welcomed attendees and explained the purpose of the plan and why input is crucial to developing a successful plan that addresses the community's pedestrian and bicyclist needs. The purpose of the meeting was to convey the study purpose to market owners, identify trouble spots, identify what has changed over time, document issues of customer access, and document who the customers are. Three other project team members joined Mr. Manuel and Ms. Koerth in facilitating the group's ideas and suggestions. Maps of the area were used to record comments regarding specific areas of concern. General comments concerning safety, parking, access, and goals were recorded on a flipchart.

Project Overview

The following explanation was given of the project's goals and progress:

- Mobility study chosen because of the many vehicles and pedestrians in the District, especially on the weekends
- H-GAC grant is funding 50% of study
- Airline District identified in a list of 50 areas in the H-GAC region that could benefit from a pedestrian/bicyclist study
    - Listed in the top 5
- Situation in the district is unique and requires unique/specific solutions

- Flea market businesses are key, which is why market owner meeting is first
    - Customer taxes are funding the District
    - "How does our tax rate support the Airline District?"
    - 1% of the sales tax paid by the customers
- Next step will be a meeting with other key stakeholders such as METRO, Little York Volunteer Fire Department, etc.
- Goal is to move your customers and the customers of other businesses in and out in the safest way possible
- All suggestions & ideas are welcomed
    - They will be ranked
    - Those ideas not used in the course of this study could be used in the future

Comment Summary

The following is a summary of the ideas and suggestions received from meeting attendees:

General Comments

- Tia Pancha is an entertainment venue, not flea market
    - Most customers arrive around 6 or 7 PM, some after shopping in markets.
    - Most Tia Pancha patrons come from north.
    - Alcohol is sometimes an issue.
    - Food becoming more popular.
    - Dancing is an attraction.
- Status of nearby road improvements?
    - Gulf Bank Road widening has been put on hold by TxDOT.
    - Aldine Mail Route widening is funded by the County and is on track.
- What are METRO's plans for LRT up Airline?

Safety

- Pedestrians with children are crossing everywhere
- The signal installed for the market made things safer for peds, but caused more traffic congestion.
- Many people don't wait for the signal and jaywalk and/or cross up or downstream of the signal. Many of these people are children and children in strollers.
- No real defined walkways
- Illegal left turns
- Potential for a sky bridge?
    - Seems expensive
    - Would need to be fenced off so that it is actually used.

  - e.g. bridge at Reliant Stadium
- Problem of emergency vehicle access

Traffic

- Heaviest on Sundays and Saturday afternoons. Sunday congestion much worse.
- Excepting Tia Pancha, the busiest Sunday time is 2 to 4 PM.
- Need more people to utilize METRO.
- METRO bus stop is always crowded, needs to be bigger to provide more shade also. Currently not a good waiting area.
- There is some carpooling.
- During the week there is the issue of school traffic.
- Vendor / supplier access on weekdays is not an issue.
- Many illegal left turns at intersection of Airline with Mitchell
- People wait 5 minutes to make left turns and back up traffic.

Parking

- Parking lots always full.
- Parking cost: $2 at all markets
- Patrons are very cost-sensitive, and will not pay more than $1 or $2 for parking.
- Owners have noticed an increase in vehicle occupancy/carpooling amongst customers. Probably more driven by parking than gas prices.
- People are "creative" in finding parking spots and will park on sidewalks, etc.

Blocked Sidewalks / Towing

- Cars now park on the right of way
- Parked cars for sale along Airline require patrons to walk in the street. One person in particular sells multiple cars each weekend.
- Pedestrians forced to walk in the road
- Cars will continue to park on walkways unless they are concrete
- Space for sidewalks is limited
- Towing often problematic since it's public ROW
- Could Commissioner Lee issue an ordinance? Post "No Parking" signs?

Existing Officers

- Could there be more?
  - What District currently provides is the max
  - 3 full-time officers employed by District
- Coordinated effort needed

- Market owners have an agreement to each provide officers
- Cinta does not always assist in this effort to the extent most market owners do.
- Tia Pancha: 4 officers on duty on Sunday afternoons/evenings

Market-Goers

- Two phases of patronage: flea market: day, bands/music: night
- Markets have about 80% repeat customers; entertainment like Tia Pancha 50%
- Many complaints about access and traffic
- Some customers are from the neighborhood, but
- Customers do come from as far as Conroe, Rosenberg, San Antonio, El Campo
- Some in neighborhood don't leave the house during the weekends due to congestion

Neighborhood Complaints

- Haven't had many issues regarding parking in neighborhoods
- Most common complaint is loud music
  - There is no County Noise Ordinance
  - Noise issues fall under "Disturbing the Peace"
  - Three strike system used for problems at Sunny Flea Market

Formation of a "Traffic Patrol"

- Markets shouldn't compete for parking, but should instead join together to control traffic
  - How could that be done?
  - Is there a precedent?
  - Should an agreement be established through the district?
  - Impose a penalty if you are not a part of it?

Suggestions for Improvements

- Can improvements be made outside of the market area proper?
- Pedestrian Bridge with aesthetic improvements (expensive)
- Ped Tunnel under Airline
- Satellite parking/Free Shuttle or Tram
- Concrete walkways
- Coordination of traffic lights
- Portable or temporary speed bumps
  - Set widely to easily allow passage of emergency vehicles
  - Bigger buttons in road would be more effective.
- Ban left turns from "chicken lane"
  - Turn lane designated for emergency vehicles only

- Additional/ Revised Signage
    - Signs need to be in English and Spanish
    - Noted that regulatory signs (Stop, etc.) can only be in English
- Directional Signs
- Parking Signs
- A sign on I-45 reading "Flea Market"
- Ped bridge over drainage canal behind markets on west side of Airline
- Need wider sidewalks along Airline. Currently there are inside walkways at some markets. Is ROW or street utilities/furniture in the way?
- Coordinate traffic signals.
- Better police enforcement (i.e. tickets) for illegal turns and parking violations.

PUBLIC INVOLVEMENT

General Concerns

- District population is 62% Hispanic
- Market patrons estimated 98% Hispanic
- Patrons are estimated >= 60% illegal aliens; affects style of survey / interaction
    - Don't wear dark green (color associated with immigration enforcement)
- No personal data requested (name, address)
- Surveys will be transportation related
    - Must explain the purpose
    - Keep it less than 5 or 6 questions and under a minute or two
    - Must be in Spanish
    - How often do you visit?
    - Which days do you visit?
    - How did you arrive here today?
    - How many others did you come with?
- Market owners seemed willing to help distribute & collect surveys.
- One central location where it can be turned in?
- Vendor survey could also be useful
    - Put in monthly newsletter

Survey Incentives

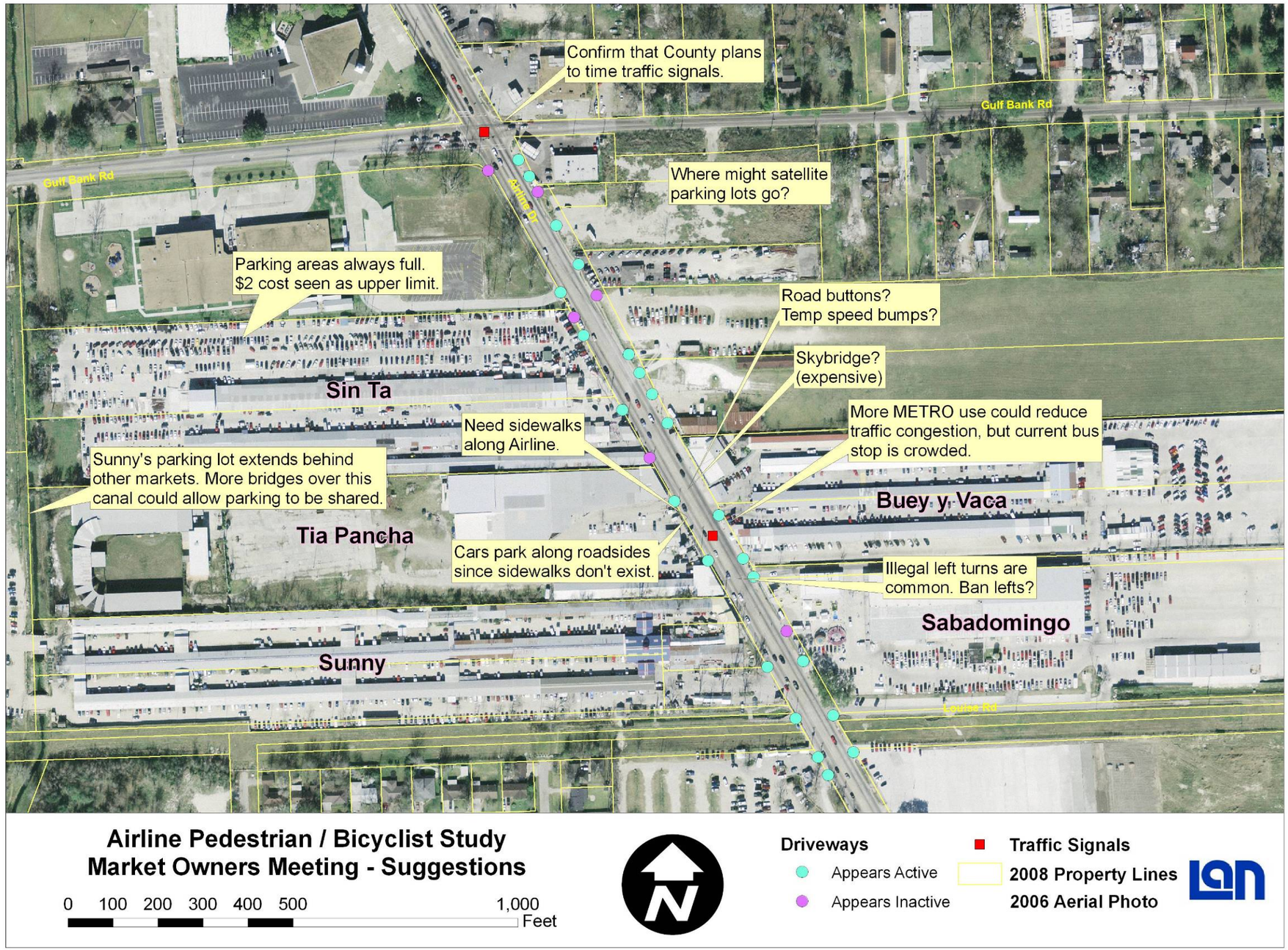
- Best time to conduct: Sunday afternoons, between 2pm and 3pm
    - also on a Saturday afternoon to learn more about that crowd?
- Goods could be donated by vendors

  - ex- food from Sunny's food court
  - Balloons for children
  - Raffle/Give-aways
  - T-shirts
- Use creativity
- Focus on safety and "fun"
- Use something visual appealing like a "Wheel"
- Conduct in one central location
- Involve a radio station. Have a live remote—La Raza or Estereo Latino
- Could be tied in with the promotion of a popular band performing at Tia Pancha

NEXT STEPS

- LAN to create exhibits from traffic signal and sidewalk field work
- LAN to further investigate dimensions of ROW, fencing, curb lines, in market area.
- LAN/District to plan for stakeholder workshop
- LAN to attend next Airline Improvement District Board Meeting: September 25th, 11:30am at Little York Fire Dept.
- Lack of participation from all owners should be discussed further.
- Need existing market security detail info from District

Map of Issues Discussed



Appendix C
Stakeholder Workshop—November 2008

Purpose and Location

H-GAC and the consultant team conducted an initial meeting in September 2008 to provide information about the study and obtain one-on-one input from market owners. A second workshop was held to update the owners on the project's status and to solicit input on specific needs and improvements that should be addressed by the new plan. The workshop was held at the following location:

November 14, 2008, from 10:00 a.m. – 12:00 p.m. at Little York Volunteer Fire Department

Invitees to the meeting included county officials, congressional representatives, Texas Department of Transportation, METRO, owners of commercial properties in the study area, civic clubs, and institutional representatives such as Aldine ISD.

Notifications

Meeting notice letters and e-mails were sent to all identified stakeholders, and follow-up phone calls were made to all invitees.

Attendees

L. R. Alexander, Harris County Sheriff's Office

Jesse Inocencio, Harris County Sheriff's Office

Brian Rego, Harris County Precinct 1

Anthony Simmons, METRO

Larry Badon, METRO

Ruben Landa, Office of State Senator Mario Gallegos

Arlene Nichols, Office of State Representative Kevin Bailey

Joan Brauer, NTC Club

Roveen Abante, Sunny Flea Market

Jan Abante, Sunny Flea Market

Jaime Garcia, Buey Y Vaca

Paul Weisser, Airline Improvement District

John Martin, Airline Improvement District

Randy Sim, Airline Improvement District

Teri Koerth, Airline Improvement District

Teri Kaplan, TxDOT

David Manuel, LAN

Michael Feeney, LAN

Cheryl Mergo, Houston-Galveston Area Council

Ellen Feely, The Clifford Group

Margaret Menger, The Clifford Group

Meeting Format

Teri Koerth, Director of the Airline Improvement District, welcomed attendees and explained the purpose of the plan and why input from stakeholders is crucial to developing a successful plan that addresses the community's pedestrian and bicyclist needs. LAN team members David Manuel, EIT, AICP and Michael Feeney, PE continued the presentation with a recap of input collected at the market owners' meeting in September 2008 and by explaining some of the data the team has collected thus far in the project. The team asked attendees to use the maps and supplies provided at each table to identify problem issues, point out locations/facilities that currently worked well for pedestrians and bicyclists and that would a good example to emulate, and make suggestions for improvements throughout the project area.

After attendees recorded their comments, each group was asked to present their suggestions. Following the group presentations, Mr. Manuel explained the input given at this round of meetings

will be used to prepare a list of proposed improvements. He closed the meetings by thanking everyone for attending, and encouraging the market owners in particular to help distribute the customer survey in addition to the days project team members would be on site.

Comment Summary

Following is a summary of the ideas and suggestions received from meeting attendees. The notations such as A2 refer to one of the three tables (A, B, or C), and to which of two maps they were given, 1 for the overall district, and 2 for the flea market area in close-up:

Traffic Congestion and Mitigation

- Weekday traffic heavy due to schools (Gulf Bank, west of Airline) (A1)
- Gulf Bank needs widening (A2)
- Issue of the community, as well as EMS, getting in and out of area on weekends (B1)
- Cameras installed @ lights (C2)
    - issue tickets
    - enforcement of pedestrian crossing laws
- Traffic on Airline backs up as vehicles turn into lots (C2)
- Pedestrian signs (i.e.- "Do Not Cross") at strategic locations (C2)
- Flashing yellow lights over 8712-8800 block of Airline (C2)
- Lower speed limit from 35mph to 25mph (C2)
- On weekends, open the center lane (Airline, between Gulf Bank & Little York) to traffic going north (B1)

Schools

- Weekday traffic heavy due to schools (Gulf Bank, west of Airline) (A1)
- Two schools in the area (A2)
    - one a preschool (Gulf Bank & Airline)
- Schools need: (A2)
    - flashing lights (multiple start & end times)
    - crossing guards
    - street lights (at Gulf Bank- west of schools)

Pedestrian Infrastructure Needs

- A center esplanade on Airline as a safe haven for pedestrians (B1)
- Wider sidewalks (Airline Dr.- specifically by markets) (C1)
- Pedestrian medians (Airline Drive) (C2)
- Three pedestrian bridges recommended: (C2)
    - One west of Tia Pancha
    - One west of Sin Ta
    - One over Airline Drive, between Sunny & Sabadomingo

- Limit pedestrian access from parking area next to Sunny (C2)
- Cameras installed @ lights (C2)
    - issue tickets
    - enforcement of pedestrian crossing laws
- Prominent pedestrian sidewalks needed on both sides of Airline (C2)
- An enclosed pedestrian bridge at 8712-8800 block of Airline: (C2)
- Pedestrian signs (i.e.- "Do Not Cross") at strategic locations (C2)

Improved Access

- Recommendation to allow only employee parking between Tia Pancha & Sin Ta. Put patron parking at a remote location (C2)
- No vehicle access to Sin Ta (C2)
- Widen public vehicle access driveways (C2)

Transit Issues

- Shuttle service from the METRO 56 Airline stop @ West Rd & Airline Dr. (C1)
- The area south of Canino and north of Little York, circled and labeled "56 Airline" (C1)
- Shuttle (C2)
    - brings safety issues; should not get on shuttle from street
    - Future parking site off of Mitchell; location currently not being developed because of walking distance to markets

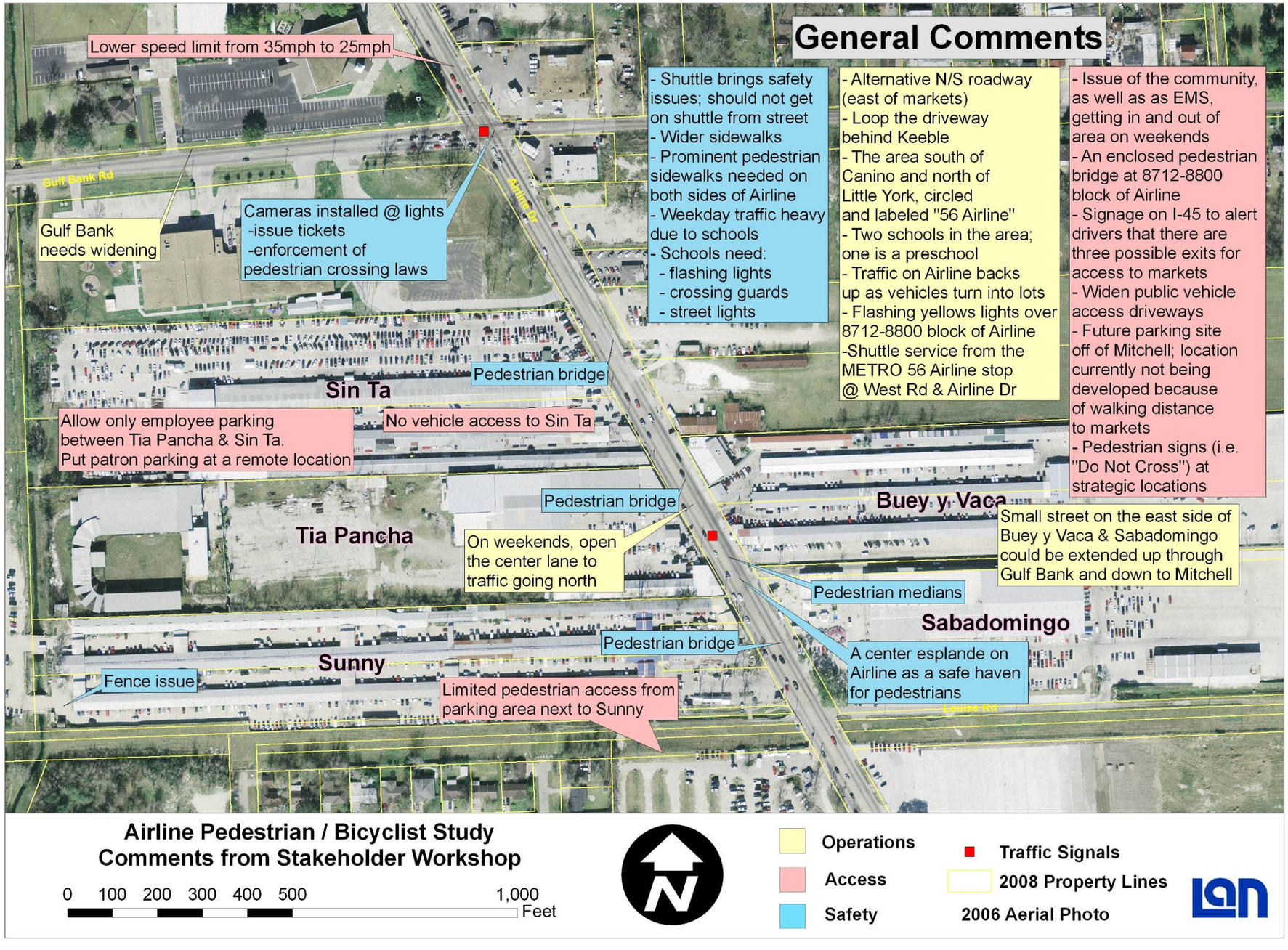
Improving Roadway Network

- Alternative N/S roadway (east of the markets) (B1)
- Loop the driveway behind Keeble (B1)
- Small street on the east side of Buey y Vaca & Sabadomingo could be extended up through Gulf Bank and down to Mitchell (B2)

Other

- Signage on I-45 to alert drivers that there are three (3) possible exits for access to markets (B1)
- "Fence issue" at southwestern corner of Sunny (C2)

Map of Issues Discussed



Appendix D
Market Patron Survey (conducted 11/23/2009 and 12/13/2009) Document and Results

Survey (English)

SURVEY ABOUT THE FLEA MARKETS

Which days do you visit the markets?
- ☐ Saturday only
- ☐ Sunday only
- ☐ Both days

How often do you visit the markets?
- ☐ This is my first visit
- ☐ Every week
- ☐ Once a month
- ☐ Less than once a month

How long do you usually stay?
- ☐ >4 hours
- ☐ 2-4 hours
- ☐ <2 hours

Besides the markets, do you visit other businesses in the area?
- ☐ Always
- ☐ Sometimes
- ☐ Never

From what direction do you arrive?
- ☐ North
- ☐ South
- ☐ East
- ☐ West

How do you usually arrive?
- ☐ Drive myself
- ☐ Drive with others
- ☐ Someone drops me off
- ☐ Ride the Bus
- ☐ Walk
- ☐ Bicycle

Would you park further away if it were cheaper?
- ☐ Yes
- ☐ No

Would you take a shuttle/tram from remote parking?
- ☐ Yes
- ☐ Only if free
- ☐ No

Return survey here and win a prize, or mail it:

stamp

Airline Improvement District

Airline Improvement District Survey
c/o David Manuel

Lockwood, Andrews & Newnam, Inc.
2925 Briarpark Drive, 4th Floor
Houston, Texas 77042

Note that the survey was provided double-sided, with English and Spanish printed on opposite sides. Approximately 95% of surveys were completed in Spanish.

Survey (Spanish)

ENCUESTA SOBRE "LAS PULGAS"

¿ Qué días visita Ud. los mercados?
- ☐ Sólo los sábados
- ☐ Sólo los domingos
- ☐ Los dos días

¿ Con qué frecuencia visita Ud. los mercados?
- ☐ Ésta es mi primera visita
- ☐ Cada semana
- ☐ Una vez por mes
- ☐ Menos de una vez por mes

¿ Cuántas horas dura su visita?
- ☐ >4 horas
- ☐ 2-4 horas
- ☐ <2 horas

¿ A parte de los mercados, visita Ud. otras tiendas en la vecindad?
- ☐ Siempre
- ☐ A veces
- ☐ Nunca

¿ De cuál dirección llega Ud.?
- ☐ Norte
- ☐ Sur
- ☐ Este
- ☐ Oeste

¿ Usualmente, cómo llega Ud.?
- ☐ Conduzco sólo
- ☐ Conduzco con otras personas
- ☐ Alguien me trae
- ☐ Por autobús
- ☐ Caminando
- ☐ En bicicleta

¿ Se estacionaría más lejos si costaría menos?
- ☐ Sí
- ☐ No

¿ Si se estacionaria más lejos, tomaría Ud. una lanzadera?
- ☐ Sí
- ☐ Sólo si es gratis
- ☐ No

¡Deja la encuesta aquí, y gana un premio! O envíela:

stamp

Airline Improvement District

Airline Improvement District Survey
c/o David Manuel

Lockwood, Andrews & Newnam, Inc.
2925 Briarpark Drive, 4th Floor
Houston, Texas 77042

Survey Results compiled January 19, 2009

Which days do you visit the markets?	Number	Percent
Saturdays only	48	34%
Sundays only	52	36%
Both days	43	30%
TOTAL	**143**	**100%**

How often do you visit the markets?	Number	Percent
This is my first visit	19	13%
Every week	74	52%
Once a month	35	25%
Less than once a month	14	10%
TOTAL	**142**	**100%**

How long do you usually stay?	Number	Percent
More than 4 hours	48	34%
2 to 4 hours	65	46%
Less than 2 hours	29	20%
TOTAL	**142**	**100%**

Do you visit other businesses in the area?	Number	Percent
Always	42	29%
Sometimes	58	41%
Never	43	30%
TOTAL	**143**	**100%**

Note that not all respondents answered every question.

From what direction do you arrive?	Number	Percent
North	70	49%
South	43	30%
East	18	13%
West	11	8%
TOTAL	**142**	**100%**

How do you arrive?	Number	Percent
Drive myself	74	52%
Drive with others (how many?)	34	24%
Someone drops me off	23	16%
Ride the Bus	10	7%
Walk	1	1%
Bicycle	1	1%
TOTAL	**143**	**100%**

Would you park further away if it were cheaper?	Number	Percent
Yes	75	54%
No	63	46%
TOTAL	**138**	**100%**

Would you take a shuttle/tram from remote parking?	Number	Percent
Yes	43	30%
Only if free	66	47%
No	32	23%
TOTAL	**141**	**100%**

Appendix E
Air Quality Benefits

Premise of Benefits

The objective of the overall Pedestrian/Bicyclist Special Districts Program is to fund strategic investments in walk/bike facilities to improve safety and mobility. Several of the project recommendations are to provide attractive and functional sidewalks in the areas in which they are most needed, namely where sidewalks do not exist, or where existing sidewalks have deteriorated and are in poor condition. Other improvements enhance pedestrian safety, through illumination, signalization, signage and striping. These improvements in the pedestrian environment will make this travel mode more attractive. It will also increase the attractiveness of transit as a travel mode, as transit patrons typically access the transit on foot. Additionally, the recognition of bicycle travel through bicycle rack installation at visible locations near destinations, will make this travel mode more visible and more attractive. The net result anticipated is a modest decrease in automobile trips, vehicle miles traveled, and associated vehicle emissions.

Table 1: TAZs encompassing Airline study area

TAZ	North boundary	South boundary	West Boundary	East Boundary
1624	Halls Bayou	Gulf Bank Road	IH 45	Airline Drive
1625	Gulf Bank Road	Little York Road	IH 45	Airline Drive
1626	Halls Bayou	Little York Road	Airline Drive	Hardy Toll Road
1635	West Road	Halls Bayou	IH 45	Airline Drive
1636	West Road	Aldine Mail Route	Airline Drive	Hardy Toll Road
1637	Aldine Mail Route	Halls Bayou	Airline Drive	Hardy Toll Road

Table 2: Total Person-Trips by TAZ for Year 2009

Traffic Analysis Zone	Home-Based Work	Home-Based Non-Work	Not Home-Based	TOTAL
1624	3,035	8,253	4,501	15,789
1625	8,918	26,095	19,536	54,549
1626	7,563	19,155	9,795	36,513
1635	3,942	8,573	7,990	20,505
1636	4,491	12,903	5,393	22,787
1637	1,774	4,354	2,111	8,239
TOTAL	**29,723**	**79,333**	**49,326**	**158,382**

Key Data and Assumptions

- 158,382 person-trips in Traffic Analysis Zones (see right)
- 1.36 average vehicle occupancy

(person trips per vehicle trip)

- 0.9% reduction in vehicle trips due to projects
- 13.66 miles per vehicle trip
- local intrazonal vehicle type mix

Results

- VOC reduced: 7.159 kg/day
- NOx reduced: 14.747 kg/day

Calculations

There are very few studies on the effect of microscale pedestrian improvements on travel patterns. The "Making the Land Use, Transportation, Air Quality Connection" (LUTRAQ) demonstration project is one such study (1,000 Friends of Oregon (1993). Making the Land Use Transportation Air Quality Connection—The Pedestrian Environment—Volume 4A. Available at: http://ntl.bts.gov/DOCS/tped.html) Special attention was given to the quality of the pedestrian environment as gauged by the Pedestrian Environment Factor (PEF), a composite measure of "pedestrian friendliness". The four variables included in the PEF are: ease of street crossings, sidewalk continuity, local street characteristics (grid vs. cul-de-sac) and topography. Each of these is given a score of 1-3, resulting in a maximum PEF score of 12. Most significant to this project was the finding that a higher PEF score for a zone was accompanied by a lower automobile mode share for that zone. A one-point increase in PEF was accompanied by a decrease in automobile mode share of 1.8 percent.

The sidewalk improvements proposed here will increase sidewalk continuity along approximately 35,000 linear feet of neighborhood streets in the study area. Although PEF was not field-verified, this improvement is expected to increase the PEF score by 1 based on sidewalk continuity benefits. While the Portland study would suggest a 1.8 percent decrease in automobile mode share, H-GAC estimates a more conservative 0.9 percent decrease.

The number of automobile trips generated by these zones is estimated at 116,457 per day based on 158,382 person trips/day divided by the Houston regional average vehicle occupancy of 1.36. The average vehicle trip distance of 12.0 miles is calculated using 2009 regional trip characteristics by trip type (e.g. home-based work), weighted by the distribution of work, non work and non-home trips modeled for the TAZs in the study area (See Tables 2 and 3 below). According to the 2000 Census, work trip travel times for the region averaged 28.0 minutes, while in the Aldine Census-Designated-Place (of which the study area is a part), the average was 29.9 minutes, or 106.8% of the regional average. In order to calculate an average trip distance for the study area, the regional trip distances were pro-rated by that same 106.8% figure, which assumes similar travel speeds. For example, the regional average trip distance for home-based work trips was 20.3 miles. Multiplying this figure by 106.8% yields 21.7 miles, shown below in Table 2.

Table 3: Data for Estimate to Trip Distance

Trip Purpose	Regional Avg Trip Distance (mi)	Number of Trips in TAZs
Home-Based Work	21.70	29,723
Home-Based Non-Work	10.48	79,333
Non-Home-Based	13.94	49,326
TOTAL		**158,382**
Weighted Average	**13.66**	

Table 4: Data for Estimate to Vehicle Occupancy

Trip Purpose	Regional Avg Occupancy	Number of Trips in TAZs
Home-Based Work	1.10	29,723
Home-Based Non-Work	1.53	79,333
Non-Home-Based	1.24	49,326
TOTAL		**158,382**
Weighted Average	**1.36**	

Sources: 2000 Census, U. S. Census Bureau; Technical Memo RE: Houston-Galveston 1995 Household Travel Survey from David Pearson, Texas Transportation Institute to Jerry Bobo, H-GAC, December 20, 1996; and 2009 Person Trip Tables provided by H-GAC February 2009. Home-based non-work trips include school, shopping, entertainment, airport and other.

VMT reduced are calculated to be 14,317 per day based on multiplication of the average trip distance (13.66), number of vehicle trips in the zone (116,471) and the percentage of trips reduced by the project (0.9%).

13.66 x 116,471 = 1,590,803

1,590,803 * 0.009 = 14,317 mi/day

Vehicle emissions are calculated by multiplying VMT by the weighted average emission rates by vehicle type (average emission rates by vehicle type multiplied by the fraction of such vehicles measured regionally on the Local (intrazonal) road type as shown in Table 4 below).

Table 4. Vehicle Mix and Average Emission Rates by EPA Vehicle Type

	LDGV	LDGT1	LDGT2	HDGV	LDDV	LDDT	HDDV	MC	All Vehicles
Vehicle Type									
Local Roads	59.0%	24.2%	7.2%	3.2%	0.2%	0.3%	5.9%	0.1%	**100.0%**
Emissions									
VOC (g/mile)	0.40	0.47	0.45	1.36	0.06	0.10	1.12	4.65	**0.50**
NOx (g/mile)	0.62	0.66	0.77	3.87	0.50	0.54	5.58	0.97	**1.03**

VOC = 14,317 mi/day * 0.5 g/mi = 7,159 g/day = 7.159 kg/day

NOx = 14,317mi/day * 1.03 g/mi = 14,747 g/day = 14.747 kg/day

Appendix F
Photos of Area Sidewalks

Airline Drive between Little York Road and Canino Road, looking North

Airline Drive between Little York Road and Canino Road, looking North

Airline Drive between Little York Road and Canino Road, looking North

Airline Drive between Little York Road and Canino Road, looking South

Airline Drive between Little York Road and Canino Road, looking South

Canino Road, North side, looking East

Canino Road, North side, looking West

Canino Road, South side, looking East

Canino Road, South side, looking East

Canino Road, South side, looking West

Canino Road, South side, looking West

Airline Drive, between Carby Road and Mitchell Road, looking North

Airline Drive, between Carby Road and Mitchell Road, looking North

Airline Drive, between Carby Road and Mitchell Road, looking South

Airline Drive, between Carby Road and Mitchell Road, looking South

Airline Drive, between Mitchell Road and Gulf Bank Road, looking North

Airline Drive, between Mitchell Road and Gulf Bank Road, looking North

Airline Drive, between Mitchell Road and Gulf Bank Road, looking South

Airline Drive, between Mitchell Road and Gulf Bank Road, looking South

Gulf Bank Road East of Airline Drive, looking East

Gulf Bank Road East of Airline Drive, looking East

Gulf Bank Road East of Airline Drive, looking East

Gulf Bank Road West of Airline Drive, looking East

Gulf Bank Road West of Airline Drive, looking East

Gulf Bank Road West of Airline Drive, looking West

Gulf Bank Road West of Airline Drive, looking West

Mount Houston Road looking East

Mount Houston Road looking West

Airline Drive at Aldine Mail Route, East side, looking North

Airline Drive at Aldine Mail Route, West side, looking North

Aldine Mail Road, North side, looking West

Aldine Mail Route, South side, looking East

West Road, North side, looking East

West Road, North side, looking East

West Road, South side, looking East

Glossary

Acronyms

ADA	Americans with Disabilities Act
AID	Airline Improvement District
AISD	Aldine Independent School District
CMAQ	Congestion Mitigation and Air Quality
COH	City of Houston
HCTRA	Harris County Toll Road Authority (owns and maintains Hardy Toll Road)
H-GAC	Houston-Galveston Area Council
METRO	Metropolitan Transit Authority of Harris County, Texas (transit agency providing service throughout the Houston metro area)
TAS	Texas Accessibility Standards (local interpretation of ADA)
TDLR	Texas Department of Licensing and Regulation (administers ADA/TAS in Texas)
TxDOT	Texas Department of Transportation (owns and maintains all numbered state highways, including US 59 and IH 45)
USDOJ	United States Department of Justice (administers ADA nationwide)

Terms/Names

Decomposed Granite	A type of gravel surface frequently used for hike-and-bike trails. It is durable, stable, and drains well.
Median	A landscaped area between two sets of travel lanes on a roadway
Mountable Curb	A curb whose face is angled to allow emergency vehicles to easily drive over it
Ped	Abbreviation for pedestrian
Ped Button	A push button on a pole or other surface near a traffic signal; pushing it indicates to the traffic signal the presence of pedestrians desiring to cross the roadway.
Road Buttons	A glass, plastic, metal or hard rubber reflector mounted on the roadway surface; generally larger, taller, or more prominent than standard lane markings; some models contain lights. They are used to provide visual delineation and tactile feedback about lane edges or crosswalks.
Speed Bump	A device affixed to or part of the roadway; generally 3-4 inches in height and width; intended to slow traffic almost to a halt.
Speed Hump	A larger and more gentle version of a speed bump, a hump is typically 4-5 feet or more in width and less abrupt than a bump; intended to slow but not stop traffic.
Stop Bar	A wide stripe across the travel lanes of a roadway to indicate where traffic should stop while the traffic signal is red. It is placed behind any crosswalks.

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MEMORANDUM

PLANNING

ENGINEERING

PROGRAM MANAGEMENT

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SAN MARCOS
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DATE: April 21, 2009 **Data Code:** n/a

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FROM: David Manuel, AICP, Project Manager
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2925 Briarpark Drive, Suite 400
Houston, TX 77042

PROJECT NO.: 130-10056-000

PROJECT: H-GAC Airline Pedestrian / Bicyclist Special District

SUBJECT: Cost Estimate: Aldine Mail Route sidewalk construction

MESSAGE:

The purpose of this memorandum is to provide details on a proposed sidewalk improvement to be undertaken by the Airline Improvement District (AID). In March 2009, Lockwood, Andrews, & Newnam, Inc. produced the Airline Improvement District Pedestrian and Bicyclist Special District Study, for the Houston-Galveston Area Council and the AID. This document proposed a series of pedestrian and bicyclist improvements along and in the vicinity of Airline Drive, between Canino Road and West Road, in unincorporated Harris County, Texas.

At the time of the report, Harris County was preparing plans for the widening of Aldine Mail Route, a major east-west arterial in the study area. The roadway is currently a two-lane asphalt roadway with shoulders; it will be widened to a four-lane concrete boulevard section with curbs, gutters, and a median. Improvements to Aldine Mail Route were not considered in the Special District Study as the design was already underway. Since then, Harris County has offered to design sidewalks along Aldine Mail Route as part of its improvement project, but it will be left up to AID to fund the construction of these sidewalks.

LAN has provided a cost estimate for sidewalk construction, in accordance with the estimates for similar improvements in the March 2009 study. Unit costs are listed in the first table on the following page, as provided by TxDOT's Construction 12-Month Averages, August 2008. Following in the second table is the estimate to construct sidewalks along Aldine Mail Route within the Airline Improvement District. The linear distance is approximately 8,180 feet from Airline Drive, the western terminus of Aldine Mail Route, to the Hardy Toll Road, the eastern boundary of AID. This is multiplied by two sides of the roadway, for 16,360 linear feet of sidewalk. There are twelve side road crossings (eight to the north and four to the south), each of which will require a crosswalk, a stop bar, and two curb ramps.

Not included in this estimate are any examination or costs associated with right-of-way, drainage, utility relocation, or sign / pole conflicts.

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Airline Improvement District Pedestrian/Bicyclist Plan
Cost Estimates–Unit Prices in 2008 Dollars

All item descriptions are taken from the TxDOT Construction 12-Month Average Unit Price, August 2008
http://www.dot.state.tx.us/business/avgd.htm
This table is an excerpt from the project report dated March 2009.

	TxDOT Description	QTY	Unit	Unit Price	Total Price
Striping:					
Stop Bars	REFL PAV MRK (WHT) 24" (SLD 100 MIL)		LF	$ 5.55	$ 5.55 /LF
Standard Crosswalk Edges	REFL PAV MRK (WHT) 12" (SLD 100 MIL)		LF	$ 3.28	$ 2.16 /LF
High-Visibility Crosswalk					
For a ladder-style crosswalk, assume 24" striping 6' wide:		6	LF	$ 5.55	$ 33.30 /EA
24" stripe followed by a 24" space means each 24" stripe serves 4' of crossing distance.					
For 1' of linear crossing distance, divide the stripe price by 4:		4	LF/EA		$ 8.33 /LF
This is the price for the "ladder rungs." The sides are standard 12" stripes (2 sides)		2	LF/EA	$ 3.28	$ 6.56 /LF
Price per linear foot of crosswalk is the sum of the "rungs" and sides:					$ 14.89 /LF
Concrete Installation:					
Sidewalks:	CONC SIDEWALKS (6")		SY	$ 100.00	$ 100.00 /SY
Curb Ramp: 6" curb	CURB RAMP (TYPE 1)		EA	$ 3,300.00	$ 3,300.00 /EA
	DETECTABLE WARNING PAVERS				

Project 26
Aldine Mail Route sidewalks - Airline Drive to Hardy Toll Road

Item	Number	Ft. Each	Total	$ Each	$ Total	
New Sidewalk (linear ft)			16,360	$ 55.56	$ 908,888.89	*
New Curb Ramp (count)			24	$ 3,300.00	$ 79,200.00	
New Crosswalks across side street	12	24	288	$ 14.89	$ 4,286.88	
Stop Bars across side street	12	12	144	$ 5.55	$ 799.20	
TOTAL					**$ 993,174.97**	
				Rounded Total	**$ 993,000.00**	

**$100/sy for new sidewalks = $11.11/sf*
*sidewalks 5' wide, so 5 SF = 1 linear foot = $11.11 * 5 = $55.56/ft*

As Aldine Mail Route serves as an important east-west connection in the study area, it is important to take this opportunity to improve the pedestrian conditions along the roadway. LAN recommends the inclusion of Aldine Mail Route sidewalks as a priority project for the Airline Improvement District. The planning-level cost estimate is approximately one million dollars. This would become Project #26, following the numbering of the March 2009 study.

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