State Highway 6
Corridor Access Management Plan

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City of Houston
City of Missouri City
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Fort Bend County
Harris County
Houston-Galveston Area Council (H-GAC)
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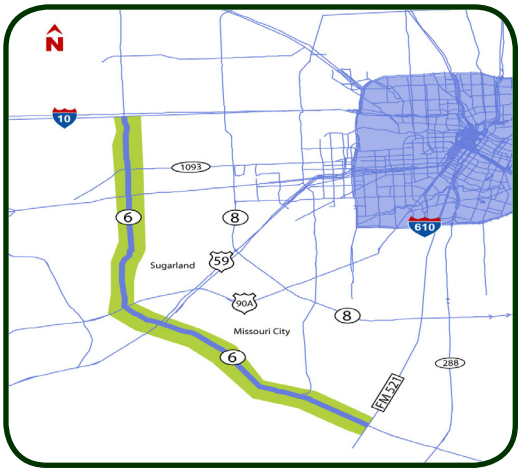
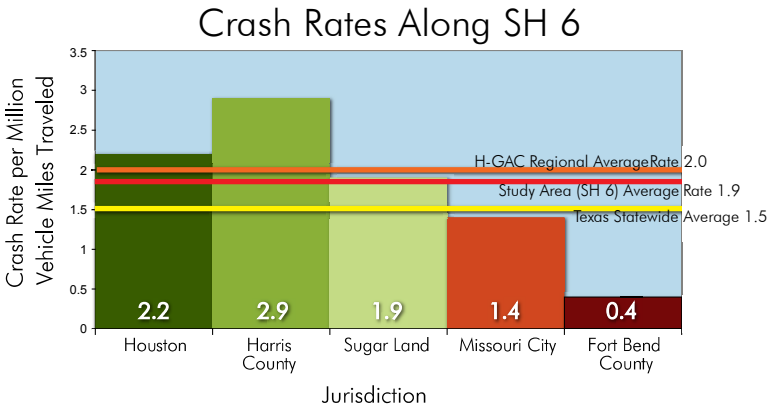
SH 6 Executive Summary

The Houston-Galveston region is experiencing growth in jobs, housing, and number of vehicles. Over the next 27 years this growth will continue and our population will increase by more than three million. In an effort to manage the growing transportation demand, the Metropolitan Planning Organization for the Houston-Galveston Transportation Management Area, H-GAC, has commissioned access management studies that take into account the operation of major corridors in the region. Studies completed to date include Westheimer, FM 1960, and FM 518 all four- to six-lane major east-west corridors. H-GAC, in partnership with TxDOT; the cities of Houston, Missouri City and Sugar Land and Fort Bend and Harris Counties, has commissioned an access management study on SH 6, a six-plus-lane major north-south corridor, from FM 521 in Fort Bend County to IH 10 in the Houston.



The following document summarizes the existing conditions, goals and process, and finally outlines the short, medium, and long-term recommendations. This Executive Summary is intended to provide the reader with a brief summary of all the recommended improvements.

Existing Conditions



Like the Westheimer, FM 1960, and FM 518 corridors, this 23-mile stretch of roadway is increasingly congested with 30,000 to 60,000 vehicles traveling in this corridor each day. In addition to heavy congestion, the crash rate is on the rise. Strip retail development in parts of the corridor, excess driveways, and continuous left-turn lanes have all contributed to a high crash rate. The crash rate has steadily increased to 2,096 crashes over a three year period (1999-2001). The congestion and high crash rate has severely diminished the level of service and contributed to long commute times, loss of business, and most unfortunate – serious injuries and loss of life.

Study Goals

At the outset of this study, representatives from each City, County, and Agency formed a Steering Committee to help define the goals listed to the right. To achieve these goals, cost-effective access management techniques were utilized. Access management is a set of tools that can be used by TxDOT, cities, counties, developers, and businesses to increase the capacity, manage the congestion, and improve safety. In addition to access management techniques, the study also used alternative mode improvements such as pedestrian, bike, and transit to address the goals. While the goals were developed early in the process they were revised throughout the study.

Goals

Improve Safety - The American Association of State Highway and Transportation Officials (AASHTO) indicates that 50% to 70% of all accidents are access related and could be relieved with proper access management strategies.

Identify Short-Term Transportation Solutions - A list and graphic of specific short-term improvements will be identified for each agency.

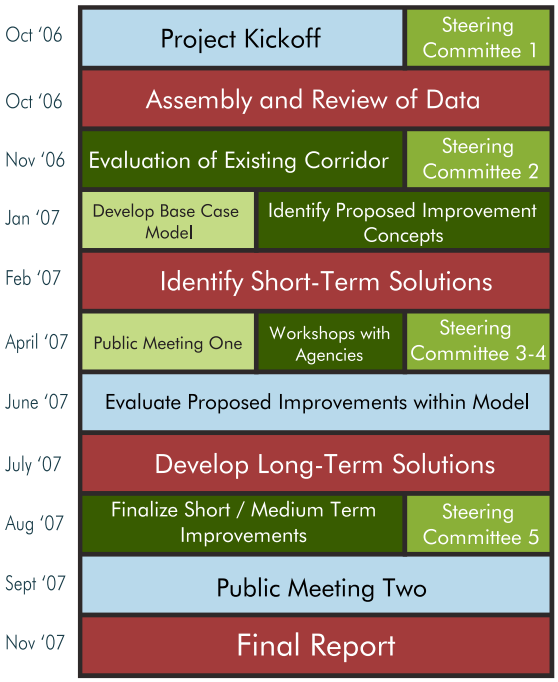
Improve Traffic Flow - This measure will establish the improved traffic flow and the subsequent level-of-service benefits from each of the improvements.

Reduce Motorist Delay - The reduction in delay will be a result of the intersection improvements and the resulting travel time savings.

Assess Long-Term Corridor Needs - These projects will focus on items that will take time and increased funds to occur (e.g., land use changes).

Study Process

The study process, as shown adjacent, is a combination of technical data collection, analysis, and input from our steering committee and the general public. There are many opportunities and venues for citizens and policy makers to comment and guide the process. Providing policy makers with solid technical recommendations and a transparent process is our greatest responsibility. Technical data and public input led to a series of recommendations.

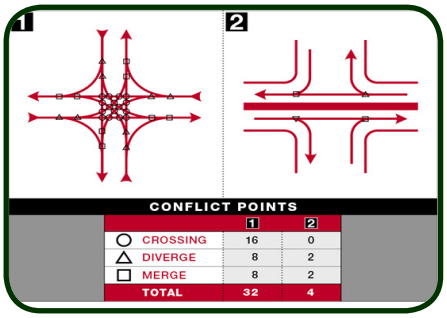


Short-term Improvements

The primary short-term improvement for the SH 6 Corridor Access Plan will include developing raised medians with left-turn bays, intersection improvements (including pedestrian elements), and re-striping shoulders to create right-turn pockets. Short-term solutions do not require additional right-of-way and should be built in five years or less. The following improvements are described in general terms with cost summaries for each involved agency.

Raised Medians

This improvement type involves adding a raised median barrier to restrict the movement of traffic, thereby reducing the number of conflicts in the corridor. The figure to the right illustrates that any of the 32 full-access locations create potential conflict points. With the introduction of a raised median barrier to restrict the left-out maneuver, the conflict points are reduced by over 50%. Reduced conflicts equals improved safety.



Cost Summary	
Houston	$2,311,700
Harris County	$3,104,100
Sugar Land	$1,719,500
Missouri City	$5,464,400
Fort Bend County	$880,000
Total	**$13,479,700**

While TxDOT will be the agency building the medians, providing a cost breakdown by agency is important in terms of cost sharing and proper land planning. These costs include the cost of the median and intersection improvements along SH 6.

Right-turn Lanes

The addition of acceleration and deceleration lanes can provide operational benefits throughout the corridor. These lanes allow turning vehicles to exit the roadway without affecting the through movement of traffic. This allows for a more efficient flow of traffic in the corridor and for vehicles to form "platoons" at the signalized intersections, thereby maximizing the flows each signal can handle. The graphic to the right shows a right-turn lane in Sugar Land. It is anticipated that no right-of-way or utility work will be need to re-stripe these lanes.

Cost Summary	
Houston	$45,300
Harris County	$24,700
Sugar Land	$0
Missouri City	$20,500
Fort Bend County	$0
Total	**$90,500**

Additional Improvements

As mentioned earlier, the short-term median costs include the re-building of many of the signalized intersections. The cost for adding pedestrian ameneties is also included in the short-term. In several cases, dual turn lanes are being added within the existing right-of-way. The preliminary schematic drawings that are in the final report graphically depict each improvement. Another short-term improvement is the re-timing of signals and coordination of signals after these improvements are implemented. While landscaping is listed as a long-term improvement, if a local agency chooses to develop, plan, and coordinate during TxDOT's construction of the medians, landscaping could be done in the short-term. This would also lessen the construction burden on the citizens and lower construction costs for landscaping. Finally, sidewalks are also listed as a long-term solution. If right-of-way is not needed and the local agency can share the funding burden, these projects can become short-term.

Medium-term Improvements

These improvements can generally be implemented within a five to ten year period. The types of improvements for the SH 6 corridor that are considered medium-term are cross-access improvements and driveway consolidations. Below is a general description followed by a cost summary.

Cross-access Improvements

Access management is much more than spacing of driveways and providing raised medians. In order to fully realize the benefits of access management, land use provisions such as requiring cross-access and the sharing of driveways should be provided in the subdivision ordinance of the respective local agencies.

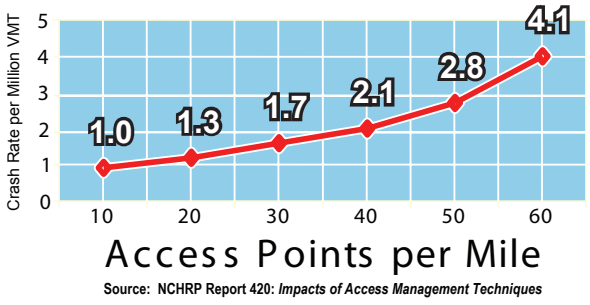
Subdivision ordinances can require property owners to dedicate land on their common property lines or develop joint access easements. A parking lot cross-access provision ensures that a single driveway can serve two or more properties. The result is greater internal circulation between neighboring properties and allowing vehicles to circulate between businesses without having to re-enter the roadway. The table to the right shows the cost breakdown to implement cross-access for select locations in the corridor.

Cost Summary	
Houston	$37,700
Harris County	$122,600
Sugar Land	$35,200
Missouri City	$0
Fort Bend County	$15,600
Total	**$211,100**

Driveway Consolidation

Research shows that driveways that are closely spaced have a direct impact on safety along a roadway. Moreover, research has found that a nexus exists between access connection density and crash rates, as indicated in the graphic below. Simply put, as the density of access connections increase, crash rates increase as indicated in the graphic on the right.

Cost Summary	
Houston	$148,800
Harris County	$217,700
Sugar Land	$21,100
Missouri City	$0
Fort Bend County	$0
Total	**$387,200**



Source: NCHRP Report 420: *Impacts of Access Management Techniques*

Long-term Improvements

Long-term improvements are projects that require property purchases or dedications, and major construction dollars. These improvements are typically completed in the ten to thirty year or more time frame. For SH 6, long-term projects are intersection improvements, bicycle and pedestrian improvements, transit, and various policy considerations.

Intersection Improvements

The intersection improvements for SH 6 are quite extensive. Of the 58 intersections in this corridor, 39 have major recommended improvements. Most of the improvements noted in the costs below occur on the bisecting streets. The intersection improvements to SH 6 itself can, for the most part, be done within the existing right-of-way, and therefore will be built as part of the median construction. For specific details, refer to the full State Highway 6 Access Management Plan. Below are the intersection improvement costs:

Cost Summary	
Houston	$4,661,700
Harris County	$1,799,200
Sugar Land	$1,265,800
Missouri City	$4,194,500
Fort Bend County	$20,700
Total	**$11,941,900**

Bicycle and Pedestrian Improvements

The bicycle and pedestrian improvements can be characterized by three different types of improvements: hike and bike trial additions; sidewalk and pedestrian connections; and intersection pedestrian elements such as curb ramps, decorative cross walks, and lighting and signal pole additions. Many of these improvements can be funded by local agencies and TxDOT, while others would be completely funded by the local agency.

Phasing of bicycle and pedestrian improvements is completely dependent on available funding. Short-term improvements might include sidewalk improvements that can built within the existing right-of-way and as the medians are built, pedestrain cross walks and curb ramps will be included. Local agencies are encouraged to work with TxDOT during the median construction to plan for pedestrian improvements and also landscape additions.

Cost Summary	
Houston	$528,500
Harris County	$39,000
Sugar Land	$259,000
Missouri City	$535,250
Fort Bend County	$0
Total	**$1,361,750**

Long-term Improvements, Cont.

Transit Improvements

Transit recommendations fall into four categories: expansion of park and ride services and express routes, addition of Bus Rapid Transit (BRT) routes, local bus routes, and planning for connections to future livable centers. Local bus service in this corridor might have as many as 40 to 50 stops. Candidate locations of BRT stops were selected based on areas having a high demand for transit service. Because of the long-range nature of these improvements costs are not provided. Local agencies are encouraged to plan for these transit facilities and blend these improvements into their long-range plans.

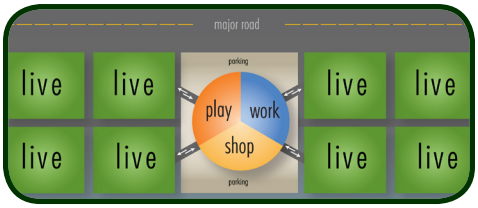
Landscape Improvements

TxDOT offers an optional program that will assist municipalities in improving intersections and median landscape treatments. The Landscape Partnership Program and Landscape Cost Sharing Program target projects like those proposed in this report. Cities or residents are responsible for the maintenance of the areas; however, funding is available for construction.

The local agencies are encouraged to coordinate with TxDOT to develop their own landscape plan for the SH 6 corridor. If this is done, landscaping could be completed in the short-term time frame.

Policy Improvements

Many policy improvements are recommended including, transportation planning, subdivision ordinance changes, driveway design, driveway spacing, turn lanes, and livable centers policies. The full report details the needed steps to implement a livable centers strategy in a given area. For the local agencies, promoting a livable centers strategy begins with identifying candidate areas and ends with partnering with developers to re-develop an area. Several specific areas were suggested as livable center candidate locations (Energy Corridor area, Westheimer / SH 6 Intersection quadrants, and the Austin Parkway area in Sugar Land). Many other locations may also be candidates.



Corridor Summary

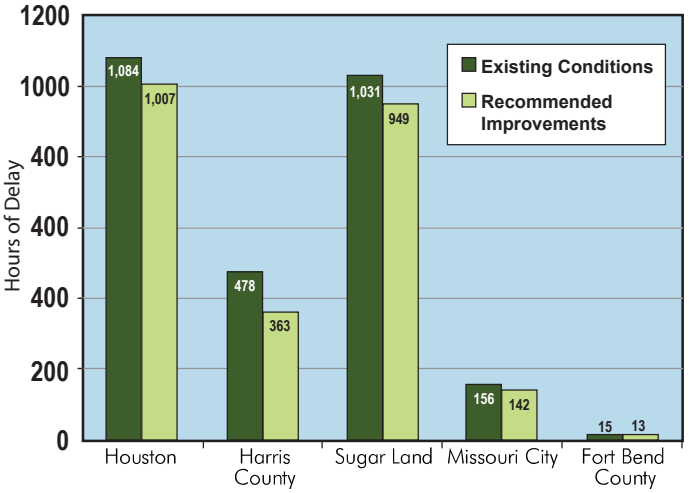
Ultimately, the question becomes how well does this study stack up against the goals?

Improve safety: With more than 2,000 crashes in a three-year period costing approximately $51 million in societal cost, adding the raised medians can potentially mitigate more than 25% of the $51 million resulting in a $13 million savings.

Identify short-term solutions: The short-term solutions identified in this study add up to more than $13,500,000 worth of improvements. Coincidently the cost of the short-term solutions are equal to the potential safety savings (See above).

Improve traffic flow and delay:
Without these improvements, the costs of congestion and mobility are extremely high. It is anticipated that based on the P.M. period operations model, the cost of delay is approximately $5,100 per day, or $150,000 per month, or $1,800,000 per year.

Assess long-term corridor needs:
With more than $13,300,000 in identified improvements many improvements can be planned and programmed.



This plan was designed to be implemented. Every improvement that has been recommended had implementation as the primary goal. While TxDOT is the lead implementation agency in terms of the short-term medians and medium-term driveway consolidation, the local agencies play a critical role in permitting developments, timing and coordinating signals, and much more. With all the planned improvements in place, the aforementioned mobility and safety improvements can be realized. The following table is a summary of all of the planned improvements and their associated cost.

Jurisdiction	Short		Medium		Long		TOTAL
	Medians	RT Turn Lanes	Driveway Consolidations	Cross-Access	Intersection Improvement	Bike and Pedestrian Improvement	
Houston	$2,311,700	$45,300	$148,400	$47,700	$4,661,700	$528,500	$7,743,300
Harris County	$3,104,100	$24,700	$217,700	$112,600	$1,799,200	$39,000	$5,297,300
Sugar Land	$1,719,500	$0	$21,100	$35,200	$1,265,800	$259,000	$3,300,600
Missouri City	$5,464,400	$20,500	$0	$0	$4,194,500	$535,250	$10,214,650
Fort Bend County	$880,400	$0	$0	$15,600	$20,700	$0	$916,700
TOTAL	**$13,480,100**	**$90,500**	**$387,200**	**$211,100**	**$11,941,900**	**$1,361,750**	**$27,472,550**

SH 6 Executive Summary

The steering committee and consultant team would like to thank the citizens, staffs, and elected officials along the SH 6 corridor for their assistance with the development of this plan.

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Funding Partners:
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- City of Missouri City
- City of Sugar Land
- City of Houston
- Fort Bend County
- Harris County

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