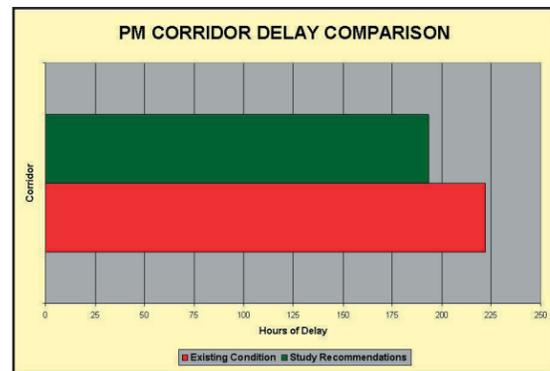
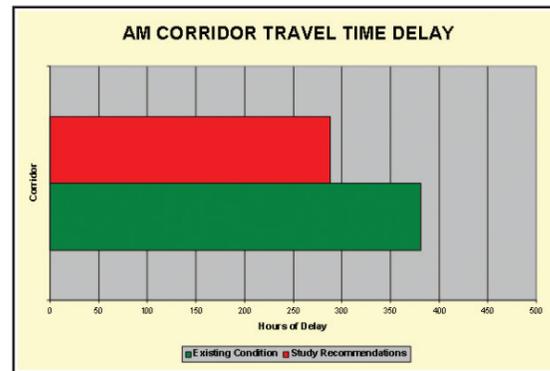


by the U.S. Congress to document and estimate the cost of motor vehicle crashes. Based on these figures, an estimated total of \$37,760,000 worth of economic loss was experienced in these communities over three years (1998, 1999, and 2000).

### Congestion

The intersection and operational improvements recommended in this plan will greatly reduce traffic delay. The graphic below shows that by making intersection and signal timing improvements the overall corridor delay can be reduced significantly. Over 100 hours in the AM period will be reduced, and over 30 hours in the PM. The resulting cost saved by these improvements in the AM and PM periods alone equate to approximately \$430,000 per year.



### Air Quality

Once implemented, the recommendations outlined in this plan will contribute to the region meeting clean air goals and improving quality of life. Overall, air quality pollutant levels can be reduced by more than 30%, which equates to more than 19,500 gallons of fuel saved.

#### Air Quality Benefits

| Pollutant | % Reduced |
|-----------|-----------|
| NOx       | = 37%     |
| VOC       | = 34%     |
| CO        | = 36%     |

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## CONCLUSION

The success of the FM 518 Corridor Access Management Plan is dependent on the formation or strengthening of partnerships among the variety of involved entities. This section seeks to clearly identify the roles and responsibilities of each agency in meeting the goals of this study.

### Steps

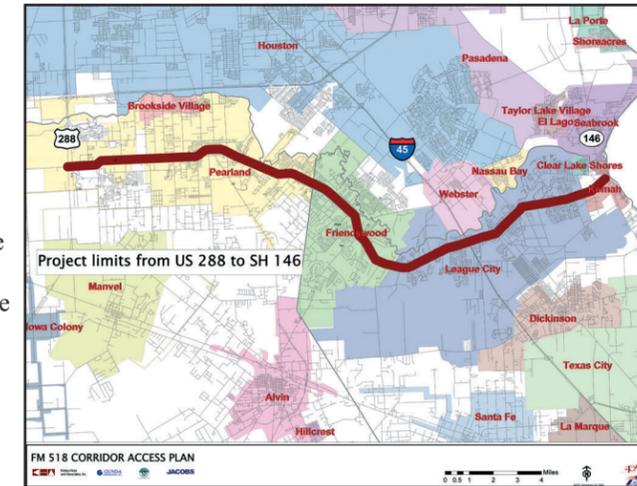
| Step   | Agency                   |
|--|--------------------------|
| 1. Policy board approval of study                              | H-GAC                    |
| 2. Secure funding for short-term intersection improvements     | H-GAC and TxDOT          |
| 3. Implement intersection improvements                         | TxDOT                    |
| 4. Implement system-wide signal retiming                       | TxDOT and Cities         |
| 5. Secure funding for median improvements                      | H-GAC and TxDOT          |
| 6. Implement median improvements                               | TxDOT                    |
| 7. Coordinate with TxDOT for median aesthetics                 | Cities                   |
| 8. Identify funding and implement bike pedestrian improvements | H-GAC, TxDOT, and Cities |
| 9. Adopt FM 518 Corridor Access Plan by ordinance              | Cities                   |
| 10. Program long-range thoroughfare improvements               | Cities                   |
| 11. Update comprehensive plans and subdivision standards       | Cities                   |

This corridor plan attempted to gain the input and concurrence of local business leaders, stakeholders, city officials, regional leaders, and the general public. It is clear from the technical analysis and public process that implementing the short-term intersection improvements and system-wide signal retiming will provide the greatest relief in terms of operations. Additionally, installing raised medians at high crash locations in the short-term will provide safety benefits to the traveling public. The medium and long-range improvements that are contained herein can be implemented as funding and need arises. To develop the remainder of the corridor it is critical that the long-term policy recommendations are incorporated into each city's suite of development regulations.

This will allow for the corridor to develop in a more sustained manor. Incremental improvements will provide relief, but long lasting sustainable corridor success will only be achieved if some level of discipline is exercised to control access to developments.

## Executive Summary

This study was commissioned by the Houston-Galveston Area Council (H-GAC), a voluntary association of local governments, and local elected officials in the 13-county Gulf Coast State Planning Region. H-GAC and the Texas Department of Transportation (TxDOT) recognize developing a viable transportation system not only includes building new roadways and adding transit, but managing the access and demand for travel on these systems.



Study Area Map

The FM 518 roadway from US 288 to SH 146 was identified as a corridor that is experiencing rapid growth, safety concerns, and traffic congestion. This major east-west roadway is 25.5 miles long. The majority of these miles consist of a five-lane cross-section with four mainlanes and one two-way left-turn lane.

The purpose of this corridor study is to identify transportation measures that will improve public safety and traffic flow, reduce motorist delay, enhance air quality, and improve pedestrian and bicycle access. The FM 518 corridor defines the term "intergovernmental coordination," bisecting four cities, two counties, being a TxDOT facility, and under the H-GAC umbrella. The cities involved in this study are Pearland, Friendswood, League City, and Kemah. Also, Brazoria and Galveston Counties and multiple land developers have played a major role in providing guidance to the study team.

This information is valuable in determining mitigation strategies for intersection improvements, median separations, and driveway consolidations.

*Congestion:* Level-of-service (LOS) was determined for FM 518 using Synchro™ software, which simulates actual traffic conditions by inputting roadway geometrics, daily traffic volumes, and signal timing and cycle length. The simulation indicated significant congestion levels during both the PM and AM peak travel times. These conditions were verified during field observations.

Generally, each person traveling along FM 518 is experiencing 15 minutes of delay in the AM peak and 10 minutes in the PM peak. Essentially, commuters using the FM 518 corridor waste an average of one week stuck in traffic over a one year period. This lost time contributes to lost productivity at work, depleted family times, and road rage.

## PUBLIC INVOLVEMENT

The public meeting component of the outreach effort comprised two series of meetings, each made up of three meetings (one in each city of Pearland, Friendswood, and League City/Kemah). These meetings intended to relay the purpose, process, and progress of the study, and were held in the evenings at venues within each city. This maximized public convenience and allowed discussions to focus in on sub-areas as well as whole-corridor issues.

In addition to the various public meetings, local community and business groups were encouraged to invite project team members to make presentations about the study to their respective groups.

## STUDY GOALS

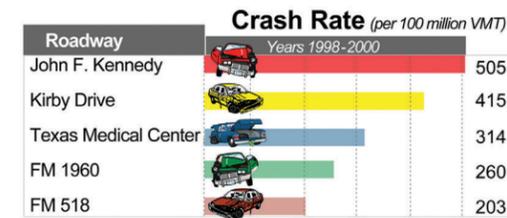
Through an extensive public involvement program and the recognition of the current and projected deficiencies in the FM 518 corridor, the study team established five corridor goals:

- Improve Safety
- Identify Short-Term Transportation Solutions
- Improve Traffic Flow
- Reduce Motorist Delay
- Assess Long-Term Corridor Needs

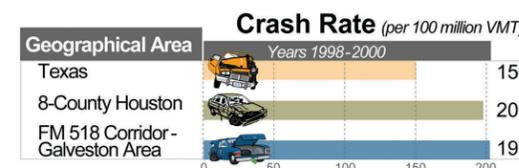
## CURRENT CORRIDOR CONDITIONS

*Safety:* FM 518 has one of the most hazardous crash rates when compared to other roads in the region and the state as a whole.

The graphics below illustrate this point. By geographically analyzing the crash date, the study team documented crash hot spots.



H-GAC Crash Rates



Comparison of Crash Rates

## RECOMMENDATIONS

The study team utilized traffic modeling software, crash analysis techniques, and field verifications to examine the current situation along FM 518. The FM 518 Corridor Stakeholder Committee approved a menu of access management treatments based upon their ability to reduce traffic delay and improve traffic flow and safety for motorists, pedestrians, and bicyclists. The study team then applied these access management techniques to the roadway's most hazardous and congested sections.

The improvements were then presented to the public for review. Based upon these comments, the study team made modifications to the plan, estimated costs, and generated an action plan. The following study recommendations and action plan is the product of a comprehensive public involvement process, coordinated effort amongst all interested parties, and continuation of the partnerships needed for success.

### Short-Term Recommendations

The short-term recommendations concentrate on improvements that do not require major purchases of right-of-way (ROW), have a short construction period, and need only minor coordination with property owners. **Tables 1 and 2** detail the short-term intersection and median improvements for the corridor. Also, recommended pedestrian and bicycle improvements can be found in **Table 3**.

Operational improvements include:

- Right-Turn Lane
- Left-Turn Lane
- Signal Timing

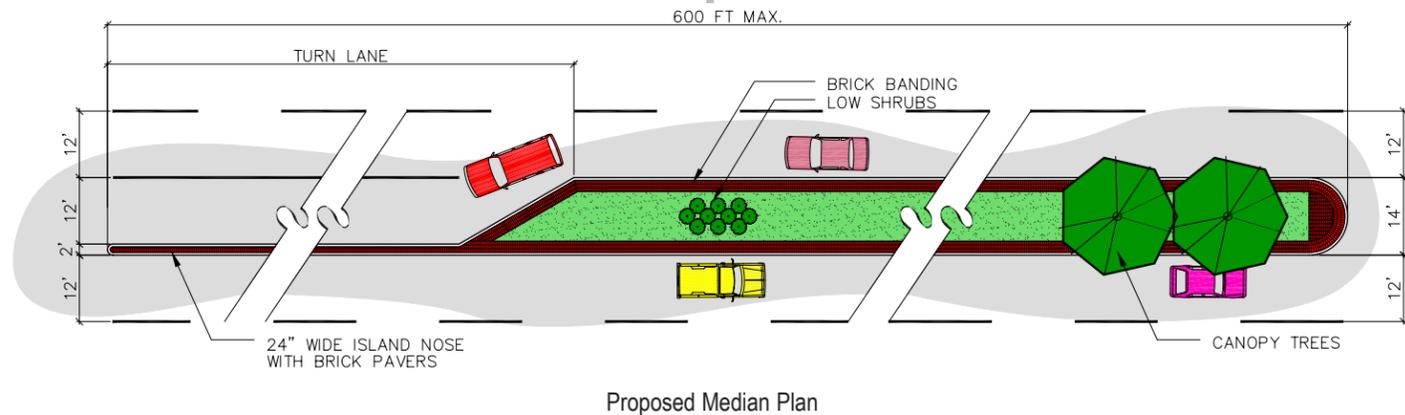
These types of improvements are detailed in **Table 1**.

The study team identified areas where turning traffic, both at the street intersection and at commercial driveways located within the functional area of the intersection, was the major reason for high crash rates. By analyzing the incidents of crashes surrounding each signalized and unsignalized intersection in the corridor, the study team was able to prioritize the application of raised medians. Below illustrates this intersection median concept.

### Characteristics of a potential short-term raised median recommendation include:

- Intersection with a high crash rate (>10)
- Adjacent land use has good alternative access ways (driveway on cross street)
- Adjacent land use has adequate internal circulation
- The addition of the raised median has limited safety benefits, but does contribute aesthetically to a gateway feature

The short-term raised medians will be implemented in the next one-to-two years. **Table 2**



Traffic conditions modeling is one of the primary tools that transportation planners and engineers use to evaluate current and future corridor conditions. Using current intersection traffic counts and Synchro™ software, the study team evaluated every signalized intersection. As mentioned in the Current Corridor Conditions, many intersections are operating at an unacceptable LOS. Based on current traffic counts, field observation, and public involvement, the study team tested various intersection improvement options in an attempt to optimize both the intersections and the overall corridor mobility. This process involved not only modeling recommended physical improvements such as left-turn and right-turn lanes, but also included optimizing the intersection phasing, timing, and offsets.

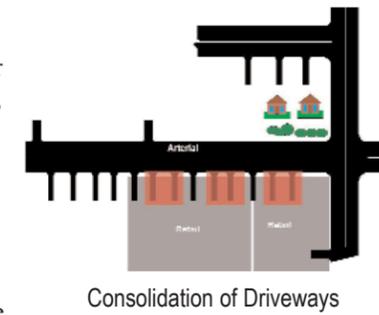
indicates the extents of the short-term raised median improvements. Safety improvements include raised medians at hazardous intersections.

The study team also identified corridor-wide improvements:

- Incorporating isolated traffic signals into a closed-loop system and optimizing all signals for current traffic
- Early warning signage of approaching major intersections
- Continuous street lighting of similar strength and spacing
- Identifying agencies or groups to landscape new medians and ROW
- Adding back panels to signal heads to reduce glare
- Addition of block numbers to overhead street signs

### Medium-Term Recommendations

The medium-term recommendations were prioritized based upon their ability to improve mobility, reduce hazardous roadway conditions, and reduce traffic delay. These improvements attract a greater level of funding, typically are beyond the ROW line, and may require extensive coordination with property owners. The improvements listed in **Tables 4 and 5** represent the major modifications called for to make FM 518 a safer and more accessible roadway. The medium-term recommendations call for driveway consolidations, increased cross and shared access between developments, raised medians, new traffic signals, pedestrian /bicycle accommodations (**Table 6**), and programs to increase transit potential.



### Long-Term Recommendations

The long-term recommendations focus on changes to land use and transportation policy, future thoroughfare plans, transit opportunities, and future pedestrian /bicycle accommodations. These improvements require ample funding, planning, coordination, and persistence. Nevertheless, they are very important to reaching the community vision of what the corridor will look like in the future.

One of the most important long-term recommendations is the creation of a corridor overlay district. The overlay would dictate the spacing of access connections to FM 518, as illustrated in the adjacent table, and set guidelines for land use decisions and transportation enhancements.

| Posted Speed (mph) | Distance (ft) |
|--------------------|---------------|
| ≤30                | 200           |
| 35                 | 250           |
| 40                 | 305           |
| 45                 | 360           |
| ≥50                | 425           |

The result of the corridor overlay district will be a roadway and land development pattern that is more sustainable, aesthetically pleasing, and economically vibrant. Getting from the adjacent picture to the rendering below depends on implementing the long-term recommendations of this study, which include:



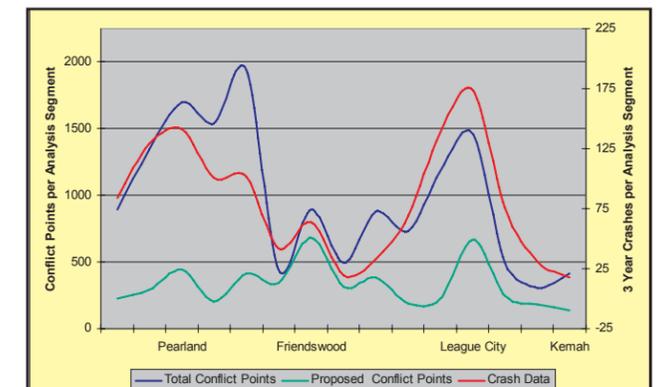
- Coordination with TxDOT
- Shared- and Cross-Access Provisions
- Thoroughfare Planning
- Design Guidelines



## RESULTS

### Safety

The application of a raised median in the FM 518 corridor has the potential to reduce crashes. The graphic shown below illustrates the relationship between crash rates and conflict points. As you can see, there is a direct correlation between the corridor crash rates and conflict points. Also, as shown by the green line, as a median barrier is added the conflict points can be dramatically reduced. The National Safety Council was recently commissioned



## FM 518 CORRIDOR ACCESS PLAN COST ESTIMATES

| Intersection                                     |                           | Add Capacity  | Timing Change      | Cost Estimate    |
|--|---------------------------|---|--------------------|------------------|
| ID   | Name                      |   |                    |                  |
| <b>Pearland</b>                                  |                           |   |                    |                  |
| 2  | SH 288 East Side          | WB (Right)  | RT Overlap         | \$28,000         |
| 3  | Silverlake Village        | NB (Right, Through, Left), SB (Left, Shared Right-Through)            | Split-phased       | \$8,500          |
| 4  | Wal-Mart                  | NB (Left, Shared Right-Through), SB (Left, Shared Right-Through)      | Split-phased       | \$8,000          |
| 5  | CR 94 / Home Depot        | NB (Dual Left, Shared Right-Through), SB (Left, Shared Right-Through) | Split-phased       | \$8,500          |
| 8  | FM 865 / Cullen           | SB (Left, Through, Right)   | Split-phased       | \$8,000          |
| 9  | CR 89 / Kroger            |   | Split-phased       | \$5,000          |
| 10   | FM 1128                   | NB (Dual Left, Shared Right-Through), SB (Left, Through Right)        | Split-phased       | \$19,000         |
| 11   | Harkey / Oday             | NB (Left, Through, Right), SB (Left, Shared Right-Through)            |                    | \$20,500         |
| 13   | Halbert / McLean          | Halbert one-way   | Single phase       | \$8,000          |
| 15   | SH 35 / Main              | WB (Right)  | Add logic plan     | \$20,000         |
| 17   | Old Alvin                 | WB (Right)  |                    | \$11,000         |
| 18   | Walnut / Berry Rose       |   | Right-turn overlap | \$8,000          |
| 20   | Westminster               |   | Single phase       | \$5,000          |
| 21   | Pearland Parkway          | EB&WB (Right), NB (Dual Left, Through, Right-Through)                 |                    | \$55,000         |
| 22   | Liberty                   | EB (Right), NB and SB (Left, Shared Right-Through)                    | Add quad-left      | \$32,000         |
| <b>Friendswood</b>                               |                           |   |                    |                  |
| 28   | FM 2351 / Edgewood        | SEB(Right)  |                    | \$24,000         |
| 33   | Whispering Pines          | NWB (Left)  |                    | \$8,000          |
| 35   | FM 528 / Parkwood         | SWB (Dual left)   |                    | \$14,000         |
| <b>League City</b>                               |                           |   |                    |                  |
| 36   | Bay Area Boulevard        | WB (Right)  |                    | \$23,000         |
| 37   | Spring Landing / Palomino | NB&SB (Left) Restripe Lanes   | Add quad-left      | \$18,500         |
| 51b  | FM 2094                   | WB (Extend inside left lane to accommodate queue)                     |                    | \$5,000          |
| <b>Kemah</b>                                     |                           |   |                    |                  |
| 57a  | Wal-Mart                  | Recommend TxDOT signal warrant be conducted                           | New signal         | \$0              |
| <b>Short-Term Intersection Improvement Total</b> |                           |   |                    | <b>\$337,000</b> |

Table 1: Short-Term Intersection Recommendations

| Intersection #                             | Map # | Location                                    | Feet of Median | Cost Estimate    |
|--|-------|---|----------------|------------------|
| <b>Pearland</b>                            |       |   |                |                  |
| 2  | 1     | West of SH 288 Intersection to Silver Lake  | 700            | \$30,000         |
| 3,4  | 1,2   | Silver Lake Village Drive / Wal-Mart        | 700            | \$30,000         |
| 6  | 2     | Miller Ranch CR 93                          | 1,200          | \$51,600         |
| 7  | 3     | Southwick Road                              | 1,500          | \$64,500         |
| 8, 9                                       | 5     | Cullen (FM 865) & Old Chocolate Bayou CR 89 | 2,000          | \$86,000         |
| 10   | 6     | Manvel Road (FM 1128)                       | 1,050          | \$45,150         |
| 11   | 8     | Harkey / Oday                               | 900            | \$38,700         |
| 11a  | 9     | Hatfield                                    | 650            | \$27,950         |
| 12   | 9     | Woody / Corrigan                            | 1,200          | \$51,600         |
| 13   | 9     | McLean / Halbert                            | 700            | \$30,100         |
| 14   | 10    | Mykawa                                      | 450            | \$19,350         |
| 26   | 16    | Dixie Farm                                  | 1,400          | \$60,200         |
| <b>Friendswood</b>                         |       |   |                |                  |
| 35   | 23    | FM 528 Parkwood                             | 1,200          | \$51,600         |
| <b>League City</b>                         |       |   |                |                  |
| 36   | 28    | Brookdale/ Bay Area Boulevard               | 2,400          | \$103,200        |
| 41 and 42                                  | 32    | Royal — Hobbs / Lafayette to west of IH-45  | 1,000          | \$43,000         |
| 43 and 43a                                 | 32    | East of IH-45 to 40-feet east of Wesley     | 1,300          | \$59,900         |
| 43a  | 33    | Highland Drive                              | 600            | \$25,800         |
| 44   | 33    | Devereux / Calder to Englewood              | 1,300          | \$55,900         |
| 45   | 33    | Interurban                                  | 1,200          | \$51,600         |
| <b>Short-Term Median Improvement Total</b> |       |   |                | <b>\$922,150</b> |

Table 2: Short-Term Raised Median Recommendations

| Intersection             | Mitigation Measure   | Cost Estimate  |
|--------------------------|--|--|
| <b>Pearland</b>          |  |  |
| 3 – Silver Lake Drive    | Re-Stripe lanes will allow concurrent north-south pedestrian movement                                      | The cost of these improvements are reflected within the short term intersection improvements |
| 4 – Wal-Mart Driveway    | Re-Stripe lanes will allow concurrent north-south pedestrian movement                                      |  |
| 5 – CR 94A / Home Depot  | New lanes and re-striping of lanes will eliminate split-phasing and decrease pedestrian wait time          |  |
| 18 – Walnut / Barry Rose | Prohibit pedestrian movement on east side of intersection and associate new crossing with Barry Rose phase |  |
| 19 – Sherwood            | Prohibit pedestrian crossings on west side of intersection and instruct to cross on east side              |  |
| <b>League City</b>       |  |  |
| 41–Hobbs / Lafayette     | Retain split-phasing, but restrict pedestrian crossings on the east side                                   |  |
| 45 – Interurban          | Associate pedestrian signal interval with higher volume northbound movement                                |  |

Table 3: Short-Term Pedestrian and Bicycle Improvements

| Intersection  |                    | Add Capacity   | Cost Estimate       |
|---|--------------------|--|---------------------|
| ID  | Name               |  |                     |
| <b>Pearland</b>   |                    |  |                     |
| 3   | Silverlake Village | *EB (Right) SB (Left, Through, Right)                                  | \$30,000            |
| 7   | Southwick          | EB (Right)   | \$15,000            |
| 8   | FM 865 / Cullen    | SB (Dual Left, Through, Right)   | \$20,000            |
| 13  | Halbert / McLean   | Halbert Cul-de-sac   | \$7,000             |
| 15  | SH 35 / Main       | EB (Dual Left, Right), NB and SB (Dual Left, Right)                    | \$60,000            |
| 22  | Liberty            | NB and SB (Left, Through, Right)                                       | \$40,000            |
| 26  | Dixie Farm         | WB and EB (Dual Left, Right)   | \$50,000            |
| <b>Friendswood</b>  |                    |  |                     |
| 28  | FM 2351 / Edgewood | NEB and SWB (Left), SEB (Right)  | \$55,000            |
| 35  | FM 528 / Parkwood  | SWB (Right), NEB (Dual left)   | \$45,000            |
| <b>League City</b>  |                    |  |                     |
| 38  | Landing Boulevard  | WB (Dual Left)   | \$25,000            |
| 41  | Hobbs / Lafayette  | WB (Dual Left), NB (Dual Right) Widen Hobbs 2 SB lanes                 | \$55,000            |
| 42  | IH-45 West Side    | EB (Dual Right) Begin new right as additional auxiliary lane           | \$140,000           |
| 43  | IH-45 East Side    | EB (Dual Left)   |                     |
| 45  | Interurban         | NB (Left)  | \$25,000            |
| 46  | SH 3               | SB (Right) NB, SB, EB, and WB (Left)                                   | \$95,000            |
| 50  | Texas              | NB (Dual left, shared Right)   | \$20,000            |
| 51b   | FM 2094            | Develop new NB roadway (create a partial continuous flow intersection) | \$680,000           |
| <b>Medium-Term Intersection Improvement Total</b>                                   |                    |  | <b>\$1,342,000*</b> |
| * Estimate does not include ROW cost, which could total 20% to 40% of project cost. |                    |  |                     |

Table 4: Medium-Term Intersection Recommendations

| Intersection #                       | Map #     | Location                                      | Feet of Median | Cost Estimate    |
|--------------------------------------|-----------|---|----------------|------------------|
| <b>Pearland</b>                      |           |   |                |                  |
| 10a                                  | 7         | Roy Street                                    | 550            | \$23,650         |
| 10b                                  | 7         | Garden Road                                   | 750            | \$32,250         |
| 14a                                  | 10        | East of Pearland Drive to west of Texas Drive | 1,000          | \$43,000         |
| 15                                   | 11        | SH 35   | 750            | \$32,250         |
| 16                                   | 11        | Galveston Road                                | 700            | \$30,100         |
| 17                                   | 11        | Old Alvin                                     | 1500           | \$64,500         |
| 18                                   | 12        | Barry Rose                                    | 1,200          | \$51,600         |
| 20                                   | 12        | Westminster                                   | 900            | \$38,700         |
| 21                                   | 13        | Pearland Parkway                              | 1,500          | \$64,500         |
| 22                                   | 13 and 14 | Liberty Drive                                 | 1,250          | \$53,750         |
| 23                                   | 14        | Yost / Shadycrest                             | 740            | \$31,820         |
| 24                                   | 15        | Woodcreek                                     | 1,000          | \$43,000         |
| <b>Friendswood</b>                   |           |   |                |                  |
| 43a                                  | 24 - 27   | Lakeview to Eastern City Limit                | 6,600          | \$283,800        |
| <b>League City</b>                   |           |   |                |                  |
| -                                    | 27        | Western City Limit                            | 2,100          | \$90,300         |
| 38                                   | 31        | Landing Boulevard                             | 600            | \$25,800         |
| <b>Medium-Term Improvement Total</b> |           |   |                | <b>\$909,020</b> |

Table 5: Medium-Term Raised Median Recommendations

| Location   | Map #      | Improvement Type           | Sq. Feet of Concrete | Cost Estimate       |
|--|------------|----------------------------|----------------------|---------------------|
| <b>Pearland</b>  |            |                            |                      |                     |
| Hatfield to McLean south side of FM 518 with a crosswalk at Anthony (midblock) | 9          | 8-foot Multi-use trail     | 2,900                | \$255,200           |
| Anthony to Woody north side of FM 518  | 9          | 5-foot Sidewalk            | 1,000                | \$55,000            |
| <b>League City – Kemah</b>   |            |                            |                      |                     |
| Spring Landing Boulevard to Landing  | 29, 30, 31 | 8-foot Multi-use trail     | 9,200                | \$809,600           |
| FM 2920 to SH 146  |            | 12-14-foot Multi-use trail | 232,800              | \$2,560,800*        |
| <b>Medium-Term Improvement Total</b>   |            |                            |                      | <b>\$3,680,600*</b> |
| * Facility is being proposed is currently a part of a TxDOT widening project   |            |                            |                      |                     |

Table 6: Medium-Term Pedestrian and Bicycle Recommendations

| City                             | Phase       | Improvement Type     | Cost Estimate      |
|----------------------------------|-------------|----------------------|--------------------|
| Pearland                         | Short-Term  | Intersections        | \$244,500          |
| Pearland                         | Short-Term  | Medians              | \$535,150          |
| Pearland                         | Medium-Term | Intersections        | \$222,000          |
| Pearland                         | Medium-Term | Medians              | \$509,120          |
| Pearland                         | Medium-Term | Pedestrian / Bicycle | \$310,200          |
| <b>Pearland Total</b>            |             |                      | <b>\$1,805,970</b> |
| Friendswood                      | Short-Term  | Intersections        | \$46,000           |
| Friendswood                      | Short-Term  | Medians              | \$51,600           |
| Friendswood                      | Medium-Term | Intersections        | \$100,000          |
| Friendswood                      | Medium-Term | Medians              | \$283,800          |
| <b>Friendswood Total</b>         |             |                      | <b>\$481,400</b>   |
| League City / Kemah              | Short-Term  | Intersections        | \$46,500           |
| League City / Kemah              | Short-Term  | Medians              | \$335,400          |
| League City / Kemah              | Medium-Term | Intersections        | \$1,020,000        |
| League City / Kemah              | Medium-Term | Medians              | \$215,000          |
| League City / Kemah              | Medium-Term | Pedestrian / Bicycle | \$3,370,400        |
| <b>League City / Kemah Total</b> |             |                      | <b>\$4,987,300</b> |
| Total Short-Term                 |             |                      | \$1,259,150        |
| Total Medium-Term                |             |                      | \$6,015,520        |
| <b>Grand Total</b>               |             |                      | <b>\$7,289,670</b> |

Table 7: Cost Summary of All Short- and Medium-Term Recommendations