As in Dallas, Fort Worth, and Austin, many of Houston’s most congested sections are on freeways around downtown (Exhibit H-1). Several congested sections have been improved recently and are unlikely to see major capacity additions over the next decade or so. These include IH 10 West (Katy Freeway), US 59 (Eastex Freeway), and US 59 (Southwest Freeway) (Exhibit H-2). Although these sections remain in the 50 most congested sections, there are other freeways that require improvements for congestion, safety, roadway quality and other reasons.

An Environmental Impact Study being conducted on IH 45 is analyzing alternative improvements that will affect all of the five most congested roadways. In addition to the IH 45 roadway sections, the study also includes the section of SH 288 and US 59 southwest of downtown.

One big project that is close to beginning is the extension of the Hardy Toll Road from its terminus at IH 610 into downtown, which will address congestion on IH 45 and possibly on US 59 on the east side of downtown. This project has been cleared for construction and is being considered by the Harris County Toll Road Authority. Another large construction project that has accomplished all of the necessary environmental reviews would involve widening US 290 northwest of IH 610.

In addition to those corridor projects, there are also several project ideas that are termed “bottleneck removal” ideas. Several of the freeway-to-freeway interchanges have ramps that are too narrow for the traffic demand. In essence some of the traffic congestion on the mainlanes is caused by traffic waiting to use the connector ramps. In these situations, notably the IH 610/IH 45 South, IH 610/IH 10 West and IH 610/US 59 South interchanges, congestion on four or five mainlanes would be reduced for the relatively low cost of adding a lane to some connector ramps.

A summary and map of the recommended actions that will affect each congested corridor is included in Exhibits H-3 and H-4 after the individual corridor summaries. Information regarding large projects with significant congestion reduction potential, their estimated implementation cost, and implementation timeframe is included in Exhibit H-5.
Exhibit H-2: Houston Under Construction or Recently Constructed

#13, #18: Expanded freeway

#22, #35: Completed Katy Freeway mainlanes and managed lanes

#2, #20: Expanded freeway

#xx: Congested Section Addressed by Project

Completed Projects

Expanded freeway

Converting HOV Lanes to Managed Lanes
- US 290 (Northwest Fwy)
- IH 45 S. (Gulf Fwy)
- IH 45 N. (North Fwy)
- US 59 S. (Southwest Fwy)
- US 59 N. (Eastex Fwy)
Current Conditions
From IH 610 North to Beltway 8 (Sam Houston Tollway), IH 45 is a 9-lane section with four general purpose lanes in each direction and a one-lane reversible High Occupancy Vehicle (HOV) lane in the middle. Traffic on IH 45 loosely follows a traditional inbound/morning and outbound/evening congestion pattern, though both directions experience significant slowdowns during the evening peak period.

- Segment Length: 10 miles.
- Road Type: 9-lane divided freeway.
- Annual Hours of Delay: 3,600,000.
- Texas Congestion Index: 1.33.
- Commuter Stress Index: 1.44.

Intelligent Transportation Systems (ITS) improve freeway operations and increase motorist awareness; ITS infrastructure along this corridor includes:

- Travel time monitoring system covering the entire segment.
- 17 CCTV cameras to aid incident management.
- Two radar-based vehicle volume and speed detection locations.
- Four dynamic message signs.
- 17 flow signals.

Possible Congestion Causes
The IH 45 corridor was originally built in 1963. The first HOV lane was a temporary experiment opened in 1979; the success of that lane led to a barrier-separated HOV lane in 1982. This segment of IH 45N serves as a through route for major activity centers including downtown Houston, the Texas Medical Center, University of Houston, Texas Southern University, and the Port of Houston to the south, and, the George Bush Intercontinental Airport, the Woodlands, and the Greenspoint area to the north of the corridor. This freeway segment also serves pass-through traffic for motorists traveling north to/from South Houston and Galveston to/from Dallas. Some causes for congestion in this segment include:

- High travel demand (traffic volumes), which extends beyond typical peak hours.
- Narrow lanes and no inside shoulder reduce the road capacity.
- Older ramp design and absence of frontage roads at and near the interchange of IH 610 North and IH 45.
- Short (¼ to ½ mile) ramp spacing.
- Major interchanges at both ends of the segment.
- Northbound left-hand entry of Shepherd on-ramp and HOV exit ramp to mainlanes combined with right hand exit to Gulf Bank Drive in a short distance causes weaving across all lanes and traffic slowdowns.

**Projects in Progress or Completed**

**Incident Clearance**

SAFEclear, the City of Houston’s rapid clearance program, provides quick response and towing of crashed and disabled vehicles reducing secondary crashes and congestion. More than 60 private contractor tow trucks rapidly respond to all incidents (approximately two-thirds of incidents were detected by the roving tow trucks and 90 percent were detected and cleared within 20 minutes by SAFEclear). However, effectiveness of this program was reduced in summer 2010 when City budget cuts caused a $50 fee to be instituted for the previously free tows.

TxDOT, METRO, and Harris County operate fewer than a dozen Motorist Assistance Program (MAP) pick-up trucks as a free assistance program to provide minor aid to stranded motorists. It also reduces traffic congestion and improves highway safety.

A heavy tow truck contract allows quick removal of large trucks. There is a policy that does not hold TxDOT liable for damage to products that are removed from the roadway in such an event.

Houston TranStar traffic and emergency management center is the coordination hub for all incidents. Traffic incidents are detected, verified, and the public is notified through its ITS system. Dispatch and response is sent via coordination of the various agencies.

**Travel Options**

The Houston-Galveston Area Council’s (H-GAC) Commute Solutions program funds, promotes, and provides administrative support to various commute alternative projects. The program provides public education to commuters and employers about available commuting options in the region and on the benefits of using alternative transportation modes. The Commute Solutions program also provides literature and public outreach on carpooling, vanpools, transit, guaranteed ride home, teleworking, alternate work schedules, and parking management.

**Shared Commuting**

NuRide is an online rideshare marketing program that provides ride matches and rewards users for recording their alternative commute trips (i.e., ridesharing, bus, rail, telecommute, walk, bike, and compressed work week). The H-GAC NuRide program is the nation’s largest Ridematching rewards program, with over 17,100 registered riders. Since its inception in June 2005, the program has resulted in 3.32 million fewer car trips, 79.42 million fewer miles driven, and the saving of 3.86 million gallons of gas.

Biking and walking trips account for 4.2 percent of alternative commute trips recorded on NuRide during 2011.

METRO operates the STAR Vanpool program serving more than 700 routes and is ranked as the second largest vanpool program nationally by passenger trips and the third largest vanpool program nationally by passenger miles in the 2011 APTA Fact Book.

**Flextime**

Many employers offer flexible work schedules, with around 350 employers participating annually in the Flex in the City Program.
Incentive Driven TDM Programs
Many large companies in the Texas Medical Center, the Energy Corridor, and the Central Business District subsidize all or part of their employees vanpool or transit commuting costs. Twenty-five companies are voluntarily participating in the Commute Champion Program enabling H-GAC to document emission reductions related to their Commuter Benefits. Additionally 38 companies and 17 local governments are participating in the Clean Air Champion Program in which they voluntarily provide information enabling H-GAC to document their proactive efforts to decrease emissions.

Teleworking
Approximately 2.9 percent of the trips recorded by the NuRide program are telecommutes.

Guaranteed Ride Home Programs
The GRH program provides emergency rides home to transit and rideshare users to address one of the main concerns of those who leave their car at home. All registered users of METRO bus and STAR vanpool riders, registered TREK Express users, and Fort Bend County Transit users have access to three free rides home per calendar year.

Houston Area Transit Service
METRO provides local and express bus service via 97 routes, serving approximately 208,200 average daily boardings (weekday – FY 2012). METRO also operates 32 park & rides routes serving approximately 29,200 average daily boardings (weekday – FY2012). METRO also has light rail transit along a 7.5-mile section serving Downtown, Texas Medical Center, and Reliant Center with 38,100 average daily boardings (weekday – FY2012).

There are also six transit services that have received funding through the Commuter and Transit Services Pilot Program, with a seventh service set to begin in February 2012.

Corridor Transit Service
Along the IH 45 North Corridor, METRO has 12 routes to downtown and one route to Greenway Plaza/Uptown. Combined these routes carry approximately 25,583 average daily boarding (weekday – FY2012). Woodlands Express operates four park and ride lots, serving passengers from 5:30 a.m. to 9:00 p.m.
The North Red Line light rail project is under construction and scheduled to open in 2014. The project will extend 5.1 miles parallel to North Freeway from downtown to Northline Transit Center north of Crosstimbers. The rail line is ultimately planned to extend to Bush Intercontinental Airport.

**HOV/HOT Lanes**
The North Freeway HOV lane is being converted to a High Occupancy Toll (HOT) lane by METRO; opening is planned for summer 2012. In addition to carpools and vanpools, 11 bus routes use this portion of the HOV lane and carry approximately 22,817 average daily boardings.

**Planning Efforts to Date**

**Bottleneck Removal**
Preliminary engineering is being conducted for transportation management improvements in various locations along IH 45. This includes restriping shoulders to add auxiliary lanes and two direct connectors at North Shepherd Drive, bottleneck removal and traffic flow improvement projects between West Road and North Shepherd Drive, and exit ramp relocation at northbound Gulf Bank.

**IH 45 Expansion**
TxDOT is holding public scoping meetings to conduct the IH 45 North Environmental Impact Statement (EIS) Study for the North Houston Highway Improvement Project (http://www.ih45northandmore.com/news.aspx) that involves evaluation of:

- IH 45 North from the US 59/SH 288 interchange to Beltway 8 North.
- Hardy Toll Road from IH 610 North to Beltway 8 North.
- Portions of the IH 10, US 59, and SH 288 Freeways around downtown.

This project is a result of a comprehensive planning study conducted for the North Hardy Corridor that evaluated various transit strategies prior to evaluating the highway component. Transit options that were identified for this corridor include:

- Light rail transit service from Downtown to Crosstimbers (phase I – under construction).
- Light rail transit service from Crosstimbers to George Bush Intercontinental Airport (planned).
- Two-way express bus service along IH 45 in the reconstructed two-way managed lanes (being studied).

The highway component of the IH 45 North improvement project is proposing the reconstruction and capacity increases to the IH 45/IH 610 North Loop interchange. The project also includes the construction of four managed lanes from downtown to north of Belway 8.

The Hardy Toll Road is being considered for extension southward by the Harris County Toll Road Authority (HCTRA) from its current terminus at IH 610 to downtown. This project will also construct direct connectors to US 59.

Smart Street Improvements are planned, but unfunded, along North Shepherd Drive from Veterans Memorial to IH 610.

**Next Steps**

**Downtown Redesign Planning Study**
In addition to several short and long term planned projects described above, three separate multimodal transportation corridor feasibility studies that have the potential to impact operations on IH 45 are planned to be conducted in 2019. These study limits are:

- IH 45 North from US 59 to Beltway 8 North.
- SH 288 from US 59 to CR 60 in Angleton.
- US 59 South from Spur 527 to IH 45 including the interchange of SH 288.

It is recommended that these three studies be combined into one comprehensive study. The scope of the study should include all freeway routes within Loop IH 610. This comprehensive study should be started as soon as possible.
Support for Aggressive Incident Management
The Motorist Assistance Program has operated a few vehicles to assist with minor repairs and stalled vehicles for 20 years. SAFEClear, the City of Houston’s rapid clearance program that implemented performance driven tow services (tow trucks have to reach incident site in 6 minutes), has been very successful since 2005 in reducing incident clearance times and improving safety. Crash reductions of between 10 percent and 15 percent were reported for the first four years of the program. Recent funding cuts have mandated that motorists have to pay for the tow, and the tows have been made optional. The number of tows has, therefore, been reduced by 60 percent to 70 percent. Dedicated funding resources or a different operating strategy should be found for programs such as SAFEClear to advance incident management strategies.

Extension of the Hardy Toll Road
The Hardy Toll Road extension will reduce congestion on IH 45; the Harris County Toll Road Authority decision and implementation schedule should be monitored. If HCTRA decides to not extend the Hardy Toll Road, there may be a need for additional actions.

Feasibility Study for Implementation of Active Traffic Management Strategies
Improving the operation of the existing freeway allows the greatest return on the roadway investment. A study should be conducted to identify freeway locations that can benefit from operational treatments such as dynamic rerouting, dynamic traveler information, and variable speed limits.

Evaluation of Travel Option Strategies
A feasibility study to examine potential benefits and implementation strategies for travel options in the corridor should be conducted. These strategies include, but are not limited to flex-time, carpooling, and employer sponsored vanpooling, transit, and parking incentives.

Mobility Improvements to Significant Parallel Streets
This early action feasibility study would identify mobility improvements along major streets in the IH 45 corridor in order to create viable alternate routes. These mobility improvements would include capacity increases (where possible) and operational treatments including active traffic management strategies such as signal re-timing, dynamic rerouting using improved surface streets, and traveler information.
US 59 (SOUTHWEST FWY)
IH 610 (West Loop) to SH 288 (South Fwy)

Current Conditions
From IH 610 West to SH 288, US 59 operates with four or five lanes in each direction and a reversible high-occupancy vehicle (HOV) lane in the middle. The Southwest Freeway experiences slowdowns during both the morning and evening rush hour periods in the northbound direction. Southbound traffic experiences the heaviest congestion and slowdowns during the evening peak period.
- Segment Length: 7.2 miles.
- Road Type: 8- to 10-lane freeway.
- Annual Hours of Delay: 2,105,000.
- Texas Congestion Index: 1.41.
- Commuter Stress Index: 1.59.

Possible Congestion Causes
The Southwest Freeway between IH 610 West and SH 288 is an 8- to 11-lane facility with four or five lanes in each direction and a reversible HOV lane in the middle from Spur 527 to IH 610. This segment of US 59 serves major travel destinations including Downtown, Uptown/Galleria, Texas Medical Center, Museum District, Greenway Plaza, and Rice University. The segment also serves as a connecting link to traffic headed to/from University of Houston via IH 45. Some reasons for congestion in this segment include:
- High travel demand.
- High traffic volumes merging and diverging near the interchange of IH 610 West and US 59.
- Limited capacity on IH 610 West to accept traffic.
- Vertical and horizontal curves with limited sight distances and design speeds of less than 60 mph.
- Congestion at the interchange of US 59 with IH 45 to the north of this segment causes backup.

Rank: 2
Annual Hrs of Delay/Mile: 291,000
Congestion Time: 4 Hours
Annual Cost of Delay: $51.6 million
Average Daily Traffic: 203,000 Vehicles

Limited acceleration length on the elevated road from the Main Street entrance ramp; traffic cannot merge smoothly with the freeway.
- Left hand exit to Spur 527.
- Start/terminus of Westpark Tollway just west of this segment results in Westpark traffic using this segment of US 59 as a link to all downtown destinations, thereby increasing travel demand on this segment.
Bottleneck north of direct connector from US 59 to West IH 610 northbound.

**Projects in Progress or Completed**

**Incident Clearance**

SAFE Clear, the City of Houston's rapid clearance program, provides quick response and towing of crashed and disabled vehicles reducing secondary crashes and congestion. More than 60 private contractor tow trucks rapidly respond to all incidents (approximately two-thirds of incidents were detected by the roving tow trucks and 90 percent were detected and cleared within 20 minutes by SAFE Clear). However, effectiveness of this program was reduced in summer 2010 when City budget cuts caused a $50 fee to be instituted for the previously free tows.

TexDOT, METRO, and Harris County operate fewer than a dozen Motorist Assistance Program (MAP) pick-up trucks as a free assistance program to provide minor aid to stranded motorists. It also reduces traffic congestion and improves highway safety.

A heavy tow truck contract allows quick removal of large trucks. There is a policy that does not hold TexDOT liable for damage to products that are removed from the roadway in such an event.

Houston TranStar traffic and emergency management center is the coordination hub for all incidents. Traffic incidents are detected, verified, and the public is notified through its ITS system. Dispatch and response is sent via coordination of the various agencies.

**Travel Options**

The Houston-Galveston Area Council’s (H-GAC) Commute Solutions program funds, promotes, and provides administrative support to various commute alternative projects. The program provides public education to commuters and employers about available commuting options in the region and on the benefits of using alternative transportation modes. The Commute Solutions program also provides literature and public outreach on carpooling, vanpools, transit, guaranteed ride home, teleworking, alternate work schedules, and parking management.

**Shared Commuting**

NuRide is an online rideshare marketing program that provides ride matches and rewards users for recording their alternative commute trips (i.e., ridesharing, bus, rail, telecommute, walk, bike, and compressed work week). The H-GAC NuRide program is the nation’s largest Ridematching rewards program, with over 17,100 registered riders. Since its inception in June 2005, the program has resulted in 3.32 million fewer car trips, 79.42 million fewer miles driven, and the saving of 3.86 million gallons of gas.

Biking and walking trips account for 4.2 percent of alternative commute trips recorded on NuRide during 2011.

METRO operates the STAR Vanpool program serving more than 700 routes and is ranked as the second largest vanpool program nationally by passenger trips and the third largest vanpool program nationally by passenger miles in the 2011 APTA Fact Book.

**Flextime**

Many employers offer flexible work schedules, with around 350 employers participating annually in the Flex in the City Program.

**Incentive Driven TDM Programs**

Many large companies in the Texas Medical Center, the Energy Corridor, and the Central Business District subsidize all or part of their employees vanpool or transit commuting costs.

Twenty-five companies are voluntarily participating in the Commute Champion Program enabling H-GAC to document emission reductions related to their Commuter Benefits. Additionally 38 companies and 17 local governments are participating in the Clean Air Champion Program in which they voluntarily provide information enabling H-GAC to
document their proactive efforts to decrease emissions.

**Teleworking**
Approximately 2.9 percent of the trips recorded by the NuRide program are telecommutes.

**Guaranteed Ride Home Programs**
The GRH program provides emergency rides home to transit and rideshare users to address one of the main concerns of those who leave their car at home. All registered users of METRO bus and STAR vanpool riders, registered TREK Express users, and Fort Bend County Transit users have access to three free rides home per calendar year.

**Houston Area Transit Service**
METRO provides local and express bus service via 97 routes, serving approximately 208,200 average daily boardings (weekday – FY 2012). METRO also operates 32 park & rides routes serving approximately 29,200 average daily boardings (weekday – FY 2012). METRO also has light rail transit along a 7.5-mile section serving Downtown, Texas Medical Center, and Reliant Center with 38,100 average daily boardings (weekday – FY 2012).

There are also six transit services that have received funding through the Commuter and Transit Services Pilot Program, with a seventh service set to begin in February 2012.

**Corridor Transit Service**
Eight bus routes serve the Downtown and one route to Texas Medical Center. These routes carry 12,200 average daily weekday boardings (FY 2012). Fort Bend County Transit serves the Greenway Plaza/Uptown area along this segment.

**HOV/HOT Lanes**
The Southwest Freeway HOV lane is being converted to a High Occupancy Toll (HOT) lane by METRO; opening is planned for spring 2012.

**Street Improvements**
Signalization, intersection, and transit access improvements are being installed to reduce intersection delay at intersections in the Upper...
Kirby Management District along with associated pedestrian accessibility projects. Minor improvements will be made to 16 other area intersections by Upper Kirby Management District. Various traffic flow improvements, pedestrian and bicycle improvement projects are also being funded by Uptown Houston District.

**Planning Efforts to Date**

**Preliminary Engineering and Other Studies**

Preliminary engineering is being conducted for:
- Reconstruction of US 59 NB to IH 610 SB direct connector.
- Construction of direct connector from IH 610 NB to US 59 SB.
- Construction of direct connector from IH 610 SB to US 59 NB.
- Reconstruction of frontage roads and intersections from Lancashire St to Shepherd Dr.

Other studies affecting the corridor include:
- Texas Medical Center multimodal transportation study.
- METRO Solutions – University Corridor Light Rail Transit from Hillcroft Transit Center to Eastwood Transit Center (10.6 miles) and ultimately extended to Fort Bend County.
- METRO Solutions – Uptown Corridor Light Rail Transit from Hillcroft Transit Center to Northwest Transit Center (6.3 miles).

**IH 45 Expansion**

TxDOT is holding public scoping meetings to conduct the IH 45 North Environmental Impact Statement (EIS) Study for the North Houston Highway Improvement Project (http://www.ih45northandmore.com/news.asp) that involves evaluation of:
- IH 45 North from the US 59/SH 288 interchange to Beltway 8 North.
- Hardy Toll Road from IH 610 North to Beltway 8 North.
- Portions of the IH 10, US 59, and SH 288 Freeways around downtown.

**Other Planned Projects**

- Improvements to interchange at SH 288 to accommodate managed lanes at SH 288 planned for 2015 (unfunded).
- Reconstruct to six mainlanes with auxiliary lanes and four managed lanes from SH 288 to Spur 527 (unfunded).
- Study to develop a Transit System to meet the needs of the Texas Medical Center area.
- Signature Bus Express Service Routes for uptown area by METRO.

**Next Steps**

**Downtown Redesign Planning Study**

In addition to several short and long term planned projects described above, three separate multimodal transportation corridor feasibility studies that have the potential to impact operations on IH 45 are planned to be conducted in 2019. The study limits are:
- IH 45 North from US 59 to Beltway 8 North.
- SH 288 from US 59 to CR 60 in Angleton.
- US 59 South from Spur 527 to IH 45 including the interchange of SH 288.

It is recommended that these three studies be combined into one comprehensive study and accelerated. The scope of the study should include all freeway routes within Loop IH 610. This comprehensive study should be started as soon as possible.

**Support for Aggressive Incident Management**

The Motorist Assistance Program has operated a few vehicles to assist with minor repairs and stalled vehicles for 20 years. SAFEClear, the City of Houston’s rapid clearance program that implemented performance driven tow services (tow trucks have to reach incident site in 6 minutes), has been very successful since 2005 in reducing incident clearance times and improving safety. Crash reductions of between 10 percent and 15 percent were reported for the first four years of the program. Recent funding cuts have mandated that motorists have to pay for the tow, and the tows have been made optional. The
number of tows has, therefore, been reduced by 60 percent to 70 percent. Dedicated funding resources or a different operating strategy should be found for programs such as SAFEClear to advance incident management strategies.

**Extension of the Hardy Toll Road**
The Hardy Toll Road extension will reduce congestion on US 59; the Harris County Toll Road Authority decision and implementation schedule should be monitored. If HCTRA decides to not extend the Hardy Toll Road, there may be a need for additional actions.

**Feasibility Study for Implementation of Active Traffic Management Strategies**
Improving the operation of the existing freeway allows the greatest return on the roadway investment. A study should be conducted to identify freeway locations that can benefit from operational treatments such as dynamic rerouting, dynamic traveler information, and variable speed limits.

**Evaluation of Travel Option Strategies**
A feasibility study to examine potential benefits and implementation strategies for travel options in the corridor should be conducted. These strategies include, but are not limited to flex-time, carpooling, and employer sponsored vanpooling, transit, and parking incentives.

**Mobility Improvements to Significant Parallel Streets**
This early action feasibility study would identify mobility improvements along major streets parallel to US 59 in order to create viable alternate routes. These mobility improvements would include capacity increases (where possible) and operational treatments including active traffic management strategies such as signal re-timing, dynamic rerouting using improved surface streets, and traveler information.
IH 45 (GULF FWY)
IH 10 (Katy Fwy) to IH 610 S (South Loop)

Current Conditions
From IH 10 to IH 610 south, IH 45 is a 6- to 9-lane facility with three or four general purpose lanes in each direction and a reversible High Occupancy Vehicle (HOV) lane in the median south of US 59. The Gulf Freeway has a traditional commute pattern with heavier traffic and more slowdowns inbound during the morning rush and outbound during the evening rush hours, although both directions experience some congestion in the evening.

- Segment Length: 9.3 miles.
- Road Type: 6- to 9-lane freeway.
- Annual Hours of Delay: 3,515,400.
- Texas Congestion Index: 1.42.
- Commuter Stress Index: 1.58.

Intelligent Transportation Systems (ITS) improve freeway operations and increase motorist awareness; ITS infrastructure along this corridor includes:

- Travel time monitoring system covering the entire segment.
- 15 CCTV cameras to aid incident management.
- 1 radar based vehicle volume and speed detection location.
- 3 dynamic message signs.
- 12 flow signals.

Possible Congestion Causes
This segment of the Gulf Freeway connects to downtown destinations and University of Houston and serves as a through route for major activity centers including the Texas Medical Center, Port of Houston, and Texas Southern University to the south, and the Dallas-Fort Worth area, the Woodlands and the Greenspoint area to the north of the corridor. The interchange of IH 45, US 59, and SH 288 is a major choke point for several downtown

Rank: 6
Annual Hrs of Delay/Mile: 378,000
Congestion Time: 6 Hours
Annual Cost of Delay: $86.1 million
Average Daily Traffic: 254,000 Vehicles

Possible Congestion Causes
This segment of the Gulf Freeway connects to downtown destinations and University of Houston and serves as a through route for major activity centers including the Texas Medical Center, Port of Houston, and Texas Southern University to the south, and the Dallas-Fort Worth area, the Woodlands and the Greenspoint area to the north of the corridor. The interchange of IH 45, US 59, and SH 288 is a major choke point for several downtown

Some other causes for congestion on this segment include:

- Older ramp design and lack of auxiliary lanes cause weaving near on- and off-ramp locations.
- Vertical and horizontal curves with design speeds less than 60 mph.
- Absence of frontage roads between IH 10 and US 59 results in many short trips using the freeway mainlanes.
- Left entry of southbound Allen Parkway ramp combined with southbound Houston Avenue on-ramp (right hand entry) in the same general area causes major weaving problems and violation of driver expectations.
- High travel demand due to the presence of major activity centers and other trip generators within and at either end of this corridor.

**Projects in Progress or Completed**

*Incident Clearance*

SAFEClear, the City of Houston's rapid clearance program, provides quick response and towing of crashed and disabled vehicles reducing secondary crashes and congestion. More than 60 private contractor tow trucks rapidly respond to all incidents (approximately two-thirds of incidents were detected by the roving tow trucks and 90 percent were detected and cleared within 20 minutes by SAFEClear). However, effectiveness of this program was reduced in summer 2010 when City budget cuts caused a $50 fee to be instituted for the previously free tows.

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*Shared Commuting*

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**Houston Area Transit Service**
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There are also six transit services that have received funding through the Commuter and Transit Services Pilot Program, with a seventh service set to begin in February 2012.

**Corridor Transit Service**
Along this segment of IH 45, METRO operates 9 routes serving downtown and one route serving the Texas Medical Center. These 10 routes serve approximately 18,700 average daily weekday boardings (FY2012).

METRO operates 2 transit centers in this corridor (Eastwood and Gulfgate), serving 11 local and park and ride routes.

METRO’s Southeast Light Rail Transit (LRT) line is scheduled to open in 2014.

**HOV/HOT Lanes**
The Gulf Freeway HOV lane is being converted to a High Occupancy Toll (HOT) lane by METRO; opening is planned for winter 2012.
Planning Efforts to Date
IH 45 Expansion

TxDOT is holding public scoping meetings to conduct the IH 45 North Environmental Impact Statement (EIS) Study for the North Houston Highway Improvement Project (http://www.ih45northandmore.com/news.asp) that involves evaluation of:

- IH 45 North from the US 59/SH 288 interchange to Beltway 8 North.
- Hardy Toll Road from IH 610 North to Beltway 8 North.
- Portions of the IH 10, US 59, and SH 288 Freeways around downtown.

Many projects are in the preliminary engineering stage including:

- Construction of direct connector IH 610 EB to IH 45 NB.
- Construction of direct connector IH 45 SB to IH 610 WB.
- Restriping northbound Pierce elevated to four lanes from IH 10 to US 59; remove southbound left hand Allen Pkwy entrance.
- Use of elevated facility for US 59 connector (Transportation Management System improvements) from Spur 5 to US 59.

The Galveston-Houston Mobility Corridor Alternatives Analysis is reviewing commuter rail and bus rapid transit options from Galveston Island to downtown Houston (www.galvestonrailstudy.com).

Next Steps
Downtown Redesign Planning Study
In addition to several short and long term planned projects described above, three separate multimodal transportation corridor feasibility studies that have the potential to impact operations on IH 45 are planned to be conducted in 2019. The limits for these studies are:

- IH 45 North from US 59 to Beltway 8 North.
- SH 288 from US 59 to CR 60 in Angleton.
- US 59 South from Spur 527 to IH 45 including the interchange of SH 288.

It is recommended that these three studies be combined into one comprehensive study. The scope of the study should include all freeway routes within Loop IH 610. This comprehensive study should be started as soon as possible.

Support for Aggressive Incident Management
The Motorist Assistance Program has operated a few vehicles to assist with minor repairs and stalled vehicles for 20 years. SAFEClear, the City of Houston’s rapid clearance program that implemented performance driven tow services (tow trucks have to reach incident site in 6 minutes), has been very successful since 2005 in reducing incident clearance times and improving safety. Crash reductions of between 10 percent and 15 percent were reported for the first four years of the program. Recent funding cuts have mandated that motorists have to pay for the tow, and the tows have been made optional. The number of tows has, therefore, been reduced by 60 percent to 70 percent. Dedicated funding resources or a different operating strategy should be found for programs such as SAFEClear to advance incident management strategies.

Feasibility Study for Implementation of Active Traffic Management Strategies
Improving the operation of the existing freeway allows the greatest return on the roadway investment. A study should be conducted to identify freeway locations that can benefit from operational treatments such as dynamic rerouting, dynamic traveler information, and variable speed limits.

Evaluation of Travel Option Strategies
A feasibility study to examine potential benefits and implementation strategies for travel options in the corridor should be conducted. These strategies include, but are not limited to flex-time, carpooling, and employer sponsored vanpooling, transit, and parking incentives.
Mobility Improvements to Significant Parallel Streets

This early action feasibility study would identify mobility improvements along major streets in the IH 45 corridor in order to create viable alternate routes. These mobility improvements would include capacity increases (where possible) and operational treatments including active traffic management strategies such as signal re-timing, dynamic rerouting using improved surface streets, and traveler information.
**Current Conditions**

From IH 610 North to IH 10, IH 45 operates as a 9-lane facility with four general purpose lanes in each direction and a reversible High Occupancy Vehicle (HOV) lane in the middle. Like other congested corridors in the region, this portion of IH 45 experiences a traditional commute and congestion pattern: slowdowns inbound in the morning and outbound in the evening.

- Segment Length: 3.31 miles
- Road Type: 9-lane freeway
- Annual Hours of Delay: 1,096,000
- Texas Congestion Index: 1.31
- Commuter Stress Index: 1.48

**Possible Congestion Causes**

This segment of IH 45 North serves as a link for traffic from north of the segment as well as for traffic from Loop IH 610 headed to IH 10, downtown, and University of Houston. In addition, the segment serves as a through route for major activity centers including the Texas Medical Center, Port of Houston, and Texas Southern University to the south, and the Woodlands and the Greenspoint area to the north of the corridor. Some causes for congestion on this segment include:

- High travel demand due to major activity centers on each end of the corridor.
- Narrow lanes and no inside shoulder reduce capacity; a reversible HOV lane was retrofitted into the center of IH 45 North from IH 10 to FM 1960 in 1982.
- Absence of frontage roads at both ends of the segment forces short distance trips to use the freeway, causing additional traffic and weaving.
- Older ramp design and limited right-of-way.
- Bottlenecks caused by major interchanges at both ends of this short segment.
Projects in Progress or Completed

Incident Clearance
SAFEClear, the City of Houston's rapid clearance program, provides quick response and towing of crashed and disabled vehicles reducing secondary crashes and congestion. More than 60 private contractor tow trucks rapidly respond to all incidents (approximately two-thirds of incidents were detected by the roving tow trucks and 90 percent were detected and cleared within 20 minutes by SAFEClear). However, effectiveness of this program was reduced in summer 2010 when City budget cuts caused a $50 fee to be instituted for the previously free tows.

TxDOT, METRO, and Harris County operate fewer than a dozen Motorist Assistance Program (MAP) pick-up trucks as a free assistance program to provide minor aid to stranded motorists. It also reduces traffic congestion and improves highway safety.

A heavy tow truck contract allows quick removal of large trucks. There is a policy that does not hold TxDOT liable for damage to products that are removed from the roadway in such an event.

Houston TranStar traffic and emergency management center is the coordination hub for all incidents. Traffic incidents are detected, verified, and the public is notified through its ITS system. Dispatch and response is sent via coordination of the various agencies.

Travel Options
The Houston-Galveston Area Council's (H-GAC) Commute Solutions program funds, promotes, and provides administrative support to various commute alternative projects. The program provides public education to commuters and employers about available commuting options in the region and on the benefits of using alternative transportation modes. The Commute Solutions program also provides literature and public outreach on carpooling, vanpools, transit, guaranteed ride home, teleworking, alternate work schedules, and parking management.

Shared Commuting
NuRide is an online rideshare marketing program that provides ride matches and rewards users for recording their alternative commute trips (i.e., ridesharing, bus, rail, telecommute, walk, bike, and compressed work week). The H-GAC NuRide program is the nation's largest Ridematching rewards program, with over 17,100 registered riders. Since its inception in June 2005, the program has resulted in 3.32 million fewer car trips, 79.42 million fewer miles driven, and the saving of 3.86 million gallons of gas.

Biking and walking trips account for 4.2 percent of alternative commute trips recorded on NuRide during 2011.

METRO operates the STAR Vanpool program serving more than 700 routes and is ranked as the second largest vanpool program nationally by passenger trips and the third largest vanpool program nationally by passenger miles in the 2011 APTA Fact Book.

Flextime
Many employers offer flexible work schedules, with around 350 employers participating annually in the Flex in the City Program.

Incentive Driven TDM Programs
Many large companies in the Texas Medical Center, the Energy Corridor, and the Central Business District subsidize all or part of their employees vanpool or transit commuting costs. Twenty-five companies are voluntarily participating in the Commute Champion Program enabling H-GAC to document emission reductions related to their Commuter Benefits. Additionally 38 companies and 17 local governments are participating in the Clean Air Champion Program in which they voluntarily provide information enabling H-GAC to document their proactive efforts to decrease emissions.
Teleworking
Approximately 2.9 percent of the trips recorded by the NuRide program are telecommutes.

Guaranteed Ride Home Programs
The GRH program provides emergency rides home to transit and rideshare users to address one of the main concerns of those who leave their car at home. All registered users of METRO bus and STAR vanpool riders, registered TERC Express users, and Fort Bend County Transit users have access to three free rides home per calendar year.

Houston Area Transit Service
METRO provides local and express bus service via 97 routes, serving approximately 208,200 average daily boardings (weekday – FY 2012). METRO also operates 32 park & rides routes serving approximately 29,200 average daily boardings (weekday – FY2012). METRO also has light rail transit along a 7.5-mile section serving Downtown, Texas Medical Center, and Reliant Center with 38,100 average daily boardings (weekday – FY2012).

There are also six transit services that have received funding through the Commuter and Transit Services Pilot Program, with a seventh service set to begin in February 2012.

Corridor Transit Service
Along this segment of IH 45, METRO has three routes serving the downtown area and one route to Greenway Plaza/Uptown District.

The North Red Line light rail project is under construction and scheduled to open in 2014. The project will extend 5.1 miles parallel to North Freeway from downtown to Northline Transit Center north of Crosstimbers. The rail line is ultimately planned to extend to Bush Intercontinental Airport.

HOV/HOT Lanes
The North Freeway HOV lane is being converted to a High Occupancy Toll (HOT) lane by METRO; opening is planned for summer 2012.

Planning Efforts to Date
Realignment
Engineering and right-of-way acquisition is being pursued for a new alignment and the redesign of connections to major downtown streets (from the IH 10 interchange to the Pierce/Brazos intersection).
IH 45 Expansion

TxDOT is holding public scoping meetings to conduct the IH 45 North Environmental Impact Statement (EIS) Study for the North Houston Highway Improvement Project (http://www.ih45northandmore.com/news.asp) that involves evaluation of:

- IH 45 North from the US 59/SH 288 interchange to Beltway 8 North.
- Hardy Toll Road from IH 610 North to Beltway 8 North.
- Portions of the IH 10, US 59, and SH 288 Freeways around downtown.

This project is a result of a comprehensive planning study conducted for the North Hardy Corridor that evaluated various transit strategies prior to evaluating the highway component.

Transit options that were identified for this corridor include:

- Light rail transit service from Downtown to Crosstimbers (phase I – under construction).
- Light rail transit service from Crosstimbers to George Bush Intercontinental Airport (planned).
- Two-way express bus service along IH 45 in the reconstructed two-way managed lanes (being studied).

The highway component of the IH 45 North improvement project is proposing the reconstruction and capacity increases to the IH 45/IH 610 North Loop interchange. The project also includes the construction of four managed lanes from downtown to north of Beltway 8.

The Hardy Toll Road is being considered for extension southward by the Harris County Toll Road Authority (HCTRA) from its current terminus at IH 610 to downtown. This project will also construct direct connectors to US 59.

Next Steps

Downtown Redesign Planning Study

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- IH 45 North from US 59 to BW 8 North.
- SH 288 from US 59 to CR 60 in Angleton.
- US 59 South from Spur 527 to IH 45 including the interchange of SH 288.

It is recommended that these three studies be combined into one comprehensive study. The scope of the study should include all freeway routes within Loop IH 610. This comprehensive study should be started as soon as possible.

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The Hardy Toll Road extension will reduce congestion on IH 45; the Harris County Toll Road Authority decision and implementation schedule should be monitored. If HCTRA decides to not extend the Hardy Toll Road, there may be a need for additional actions.
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This early action feasibility study would identify mobility improvements along major streets in the IH 45 corridor in order to create viable alternate routes. These mobility improvements would include capacity increases (where possible) and operational treatments including active traffic management strategies such as signal re-timing, dynamic rerouting using improved surface streets, and traveler information.
US 59 (EASTEX FWY)

IH 10 (East Fwy) to SH 288 (South Fwy)

Current Conditions
From IH 10 to SH 288, US 59 operates as a 6- to 8-lane section with three or four lanes in each direction. The section south of IH 45 is also parallel to SH 288. Southbound traffic on this segment of US 59 experiences severe slowdowns and congestion in the morning period, with speeds dropping to near 20 mph during the peak period. Evening congestion is less severe owing to the effect of bottlenecks elsewhere on the freeway system. Northbound traffic experiences moderate but consistent slowdowns throughout the entire day and into the evening.

- Segment Length: 6.3 miles.
- Road Type: 6- to 8-lane freeway.
- Annual Hours of Delay: 2,734,000.
- Texas Congestion Index: 1.62.
- Commuter Stress Index: 1.76.

Possible Congestion Causes
US 59 between IH 45 and SH 288 is a mix of two freeways, with mainlanes of both US 59 and SH 288. These freeways serve major travel destinations including downtown, Texas Medical Center, Museum District, Greenway Plaza, and Rice University. The segment also provides connections to George Bush Intercontinental Airport. Some reasons for congestion in this segment include:

- Interchange of US 59 and SH 288 at the south end of this segment causes a major choke point in the area.
- In the middle of the section there is the interchange with the IH 45 Gulf Freeway.
- Conjoined US 59 and SH 288 generates several weaving movements.
- Several horizontal and vertical designs add to driver uncertainty at the south end of the segment.

Projects in Progress or Completed
Incident Clearance
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Many large companies in the Texas Medical Center, the Energy Corridor, and the Central Business District subsidize all or part of their employees vanpool or transit commuting costs.

Twenty-five companies are voluntarily participating in the Commute Champion Program enabling H-GAC to document emission reductions related to their Commuter Benefits. Another 38 companies and 17 local governments are participating in the Clean Air Champion Program in which they voluntarily provide information enabling H-GAC to document their proactive efforts to decrease emissions.

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Approximately 2.9 percent of the trips recorded by the NuRide program are telecommutes.

**Guaranteed Ride Home Programs**

The GRH program provides emergency rides home to transit and rideshare users to address one of the main concerns of those who leave their car at home. All registered users of METRO bus and STAR vanpool riders, registered TREK Express users, and Fort Bend County Transit users have access to three free rides home per calendar year.
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There are also six transit services that have received funding through the Commuter and Transit Services Pilot Program, with a seventh service set to begin in February 2012.

Corridor Transit Service
METRO operates eight routes that serve downtown, two routes that serve the Texas Medical Center, and two routes that serve Uptown/Greenway areas. Combined, these routes carry approximately 19,800 average daily weekday boardings (FY 2012). METRO operates one transit center (Wheeler Station) in the corridor. The 7.5-mile Red Line light rail transit line serves Downtown, Texas Medical Center, and Reliant Center with 38,100 average daily boardings (weekday – FY2012).

Planning Efforts to Date
IH 45 Expansion
TxDOT is holding public scoping meetings to conduct the IH 45 North Environmental Impact Statement (EIS) Study for the North Houston Highway Improvement Project (http://www.ih45northandmore.com/news.asp) that involves evaluation of:

- IH 45 North from the US 59/SH 288 interchange to Beltway 8 North.
- Hardy Toll Road from IH 610 North to Beltway 8 North.
- Portions of the IH 10, US 59, and SH 288 Freeways around downtown.

This project has the potential to address bottleneck issues near the interchange of IH 45 and US 59/SH 288.

Rail Transit
METRO is constructing the Southeast Light Rail Transit from IH 45 at Capitol to Palm Center and planning the University Light Rail Transit from Hillcroft Transit Center to Eastwood Transit Center.
Other Planned Projects

- Improvements to interchange at SH 288 with managed lanes on SH 288 planned for 2015 (unfunded).
- Widen from 10 to 12 lanes from IH 45 South to IH 10 East, planned for 2017.
- Widen to eight and 10 mainlanes with managed lanes and improvements to the US 59/IH 45 interchange from IH 45 to SH 288 (unfunded).
- Reconstruct to six mainlanes with auxiliary lanes and four managed lanes from SH 288 to Spur 527 (unfunded).

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The Hardy Toll Road extension will reduce congestion on US 59; the Harris County Toll Road Authority decision and implementation schedule should be monitored. If HCTRA decides to not extend the Hardy Toll Road, there may be a need for additional actions.

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Mobility Improvements to Significant Parallel Streets

This early action feasibility study would identify mobility improvements along major streets parallel to US 59 in order to create viable alternate routes. These mobility improvements would include capacity increases (where possible) and operational treatments including active traffic management strategies such as signal re-timing, dynamic rerouting using improved surface streets, and traveler information.
US 290 (NORTHWEST FWY)
FM 529 (Spencer Rd.) to IH 610 (North Loop)

Current Conditions
From FM 529 to IH 610, US 290 has three or four general purpose lanes in each direction and a one-way reversible High Occupancy Vehicle (HOV) lane in the middle. US 290 experiences heavy slowdowns inbound during the morning hours and outbound during the evening hours—following a traditional commute pattern.

- Segment Length: 9.1 miles.
- Road Type: 6- to 8-Lane Freeway.
- Annual Hours of Delay: 2,284,000.
- Texas Congestion Index: 1.37.
- Commuter Stress Index: 1.58.

Possible Congestion Causes
IH 610 is the eastern terminus of US 290; thus all traffic to/from Northwest Houston headed for destinations south/east of this terminus point travel along this segment of US 290. Major residential and commercial development is causing this 6-lane facility to be over capacity for the peak periods. Possible causes of congestion in this segment include:

- High traffic volumes exceeding capacity.
- Major bottleneck at the interchange of Beltway 8 with US 290 due to limited number of lanes available to accommodate the weaving traffic.
- Large business centers and commercial activity, heavy truck centers/yards between Pinemont Drive and Fairbanks North Houston Road result in high traffic volumes entering and exiting the freeway causing additional weaving and slowdowns.
- Interchange of US 290 with IH 610 South/IH 10 causes backups and slowdowns due to traffic from IH 610 North Loop weaving left to go south on IH 610 West Loop and traffic from US 290 weaving right to get to IH 10 East and IH 10 West.
- Until recently there were limited auxiliary lanes and narrow or no inside shoulders causing slowdowns near on/off ramps since the HOV lane was retrofitted.
- No inside or outside shoulder in certain sections of the segment.
Projects in Progress or Completed

Interchanges
Reconstruction of the inbound portion of the US 290/IH 610 interchange is underway using Proposition 12 funds.

Traffic Management
Traffic management improvements that added auxiliary lanes extended deceleration and acceleration lanes for Beltway 8 interchange traffic have been completed.

Frontage road improvements at various intersections have also been completed.

Incident Clearance
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There are also six transit services that have received funding through the Commuter and Transit Services Pilot Program, with a seventh service set to begin in February 2012.

Corridor Transit Service
METRO operates two Park & Ride Lots (Pinemont & West Little York) along this section of US 290. METRO also operates five park and ride routes and two local bus routes along this section of US 290. Combined, they carry approximately 10,000 average daily boardings.

HOV/HOT Lanes
The Northwest Freeway HOV lane is being converted to a High Occupancy Toll (HOT) lane by METRO; opening is planned for fall 2012.
Planning Efforts to Date
US 290 Program

The US 290 Program is an improvement project for the US 290 corridor that includes the reconstruction of US 290 and construction of Hempstead Tollway. The vision of the program includes:

- Freeway capacity reconstruction and widening from IH 610 to FM 2920 to create five/six general-purpose lanes in each direction from IH 610 to just west of SH 6, plus auxiliary lanes where appropriate and two- or three-lane frontage roads in each direction throughout the corridor.
- Hempstead Tollway - Two managed toll lanes each way from IH 610 to the proposed SH 99/Grand Parkway.
- Two non-tolled frontage road lanes in each direction to be reconstructed along Hempstead Tollway from IH 610 to Beltway 8.
- US 290 METRO HOV operations moved to the Hempstead Tollway managed toll lanes.
- Proposed high-capacity transit corridor located along Hempstead Tollway.
- H-GAC Commuter Rail study and Gulf Coast Rail District Hempstead Corridor commuter rail feasibility analysis.
- Bicycle and pedestrian improvements.

However, funding issues have forced a phased implementation of the program. To date, construction funding has been secured for the following projects:

- Partial reconstruction of the IH 610/US 290 interchange including the US 290/IH 610 North Loop direct connector to IH 10 and the direct connector from IH 10 to outbound US 290 and the IH 610 North Loop eastbound.
- Construct 10 main lanes with auxiliary lanes, two 2-lane frontage roads, and grade separations near Beltway 8.

Other phases along US 290 will progress as funding becomes available. Some of the phases that have been identified for tentative funding sources beyond 2016 are:

- Reconstruct and widen to 12 mainlanes, two 2-lane frontage roads & grade separation (Segment 4) from west of Pinemont Dr. to west of 34th Street.
- Reconstruct and widen to 10 mainlanes with auxiliary lanes, two 2-lane frontage roads and grade separation and bridge replacement (Segment 5) from east of West Little York to west of Fairbanks North Houston.
- Reconstruct 2-lane westbound frontage road and Pinemont bridge (Segment 4) from west of Pinemont Dr. to east of West 43rd Street.
- Construct commuter rail along Hempstead ROW (high capacity transit - six stations) from SH 99 to IH 610.
- Northwest Corridor Hempstead Intermodal Terminal at North Post Oak Road.

HCTRA is assessing its long-term regional mobility goals and financial projections to determine applicable construction phasing for the Hempstead Tollway.
Next Steps

**Purchase Right-of-Way near the US 290/Beltway 8 Interchange**

Providing $78 million in funds for right-of-way purchase as an early action would allow the planned construction to move forward at a faster pace. Construction funding from Proposition 12 bonds for this segment has been authorized by the Texas Transportation Commission and H-GAC. This funding will allow construction of mainlanes with auxiliary lanes, two 2-lane frontage roads and grade separations from west of FM 529 to east of West Little York and construction of two three-lane frontage roads along Beltway 8 over Union Pacific Railroad and Hempstead Road. This project will alleviate congestion due to this bottleneck but is only one component of the corridor plan.

**Support for Aggressive Incident Management**

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This early action feasibility study would identify mobility improvements along major streets in the US 290 corridor in order to create viable alternate routes. These mobility improvements would include capacity increases (where possible) and operational treatments including active traffic management strategies such as signal re-timing, dynamic rerouting using improved surface streets, and traveler information.
The most congested corridors in Houston were examined to identify the most appropriate actions that will have the greatest impact on relieving traffic congestion. Many of these actions can be funded by Proposition 12 funds and are consistent with the goals of Rider 42, while other actions are being funded or performed by other agencies. Exhibit H-3 summarizes the recommended actions to address traffic congestion in each Houston corridor.

**Exhibit H-3: Houston Summary of Congested Corridor Recommendations**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Congested Corridor</th>
<th>Actions Funded by Others</th>
<th>Recommended Early Actions Affecting Congested Corridor</th>
</tr>
</thead>
</table>
| 1    | IH 45 (North Freeway)  
  *(IH 610 North to Beltway 8)* | ▪ Monitor METRO’s high occupancy vehicle (HOV) to high occupancy toll (HOT) conversion.  
  ▪ **Hardy Toll Road**—Monitor, support, and take action if needed. | ▪ Feasibility and downtown freeway redesign study (inside Loop 610); origin-destination evaluation.  
  ▪ Supplement IH 45 environmental study with operations and parallel route study.  
  ▪ Active Traffic Management—Study strategies and funding options.  
  ▪ Travel Options—Feasibility study. |
| 2    | US 59 (Southwest Freeway)  
  *(IH 610 West to SH 288)* | ▪ Study alternative routes.  
  ▪ Monitor METRO’s HOV to HOT conversion | ▪ Feasibility and downtown freeway redesign study (inside Loop 610); origin-destination evaluation.  
  ▪ Active Traffic Management—Study strategies and funding options.  
  ▪ Travel Options—Feasibility study. |
| 6    | IH 45 (Gulf Freeway)  
  *(IH 10 to IH 610 South)* | ▪ Study alternative routes.  
  ▪ Monitor METRO’s HOV to HOT conversion. | ▪ Feasibility and downtown freeway redesign study (inside Loop 610); origin-destination evaluation.  
  ▪ Active Traffic Management—Study strategies and funding options.  
  ▪ Travel Options—Feasibility study. |
| 7    | IH 45 (North Freeway)  
  *(IH 610 North to IH 10)* | ▪ **Hardy Toll Road**—Monitor, support, and take action if needed.  
  ▪ Monitor METRO’s HOV to HOT conversion. | ▪ Feasibility and downtown freeway redesign study (inside Loop 610); origin-destination evaluation.  
  ▪ Supplement IH 45 environmental study with operations and parallel route study.  
  ▪ Active Traffic Management—Study strategies and funding options.  
  ▪ Travel Options—Feasibility study. |
| 10   | US 59 (Eastex Freeway)  
  *(IH 10 to SH 288)* | ▪ Monitor METRO’s HOV to HOT conversion. | ▪ Feasibility and downtown freeway redesign study (inside Loop 610); origin-destination evaluation.  
  ▪ Active Traffic Management—Study strategies and funding options.  
  ▪ Travel Options—Feasibility study. |
<table>
<thead>
<tr>
<th></th>
<th>US 290 (Northwest Freeway)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(IH 610 North to FM 529)</td>
</tr>
</tbody>
</table>

- Monitor METRO’s HOV to HOT conversion.
- Purchase right-of-way and adjust utilities to reconstruct the mainlanes between W. Little York and FM 529 and the interchange of US 290 with Sam Houston Tollway.
- Active Traffic Management—Study strategies and funding options.
- Travel Options—Feasibility study.
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Exhibit H-4: Houston Early Recommendations—February 2012

All Congested Corridors

- Active traffic management
- Travel options
- Monitor METRO's HOV to HOT conversion

#1, #7: Supplement IH 45 EIS: add operations & parallel route study
#2, #6, #7, #10, #27, #31, #35: Downtown redesign study
#1, #7: Monitor Hardy Toll Road extension
#11, #25: Purchase ROW to widen freeway & interchange

#xx: Congested Section Addressed by Project:
- Study Funded by Others: Proposition 12 Funds
- Study Funded by Others
The early recommendations described above represent the first step in the process of reducing congestion on the worst corridors in the state. A larger project involving construction, operation, management, and travel option strategies will follow the early recommended actions. The following table identifies possible projects in the Houston metropolitan area and the amount of funds and timeframe for project implementation. Large construction projects have recently been completed on many congested Houston corridors; those will likely not see any major projects until other corridors are addressed.

**Exhibit H-5: Summary of Possible Large Projects for Houston Congested Corridors**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Corridor</th>
<th>Large Projects</th>
<th>Rider 42 Funding Estimate</th>
<th>Estimated Implementation Funds Needed*</th>
<th>Implementation Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>11, 25</td>
<td>US 290</td>
<td>Construction and Design of US 290 at the BW8 Interchange</td>
<td>$78M for ROW at BW8 Interchange</td>
<td>$140M (Prop 12)</td>
<td>2012 to 2013 (Environmental clearance has been obtained)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reconstruct US 290 and add mainlanes and managed lanes</td>
<td>—</td>
<td>Total Cost: $2.7B (Available funding from Prop 12, Prop 14 &amp; MPO: $1.24B) Needed Funding: $1.46B</td>
<td>2014 to 2019</td>
</tr>
<tr>
<td>1, 7</td>
<td>IH 45 North</td>
<td>Reconstruct mainlanes and add managed lanes</td>
<td>—</td>
<td>$2.0B</td>
<td>In environmental impact study phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feasibility study for mobility improvements along parallel surface routes</td>
<td>$2.0M</td>
<td>TBD**</td>
<td>2014 to 2015</td>
</tr>
<tr>
<td>1, 7</td>
<td>Hardy Toll Road</td>
<td>Extend into downtown</td>
<td>—</td>
<td>$400M (HCTRA)</td>
<td>In design phase</td>
</tr>
<tr>
<td>2, 10</td>
<td>US 59</td>
<td>Reconstruct to 6 mainlanes and 4 managed lanes from SH 288 to Spur 527</td>
<td>—</td>
<td>$233M (HGAC RTP/TIP)</td>
<td>TBD (as a result of IH 45 North EIS and Downtown Redesign study)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Widen to 8 and 10 lanes with managed lanes from IH 45 to SH 288</td>
<td>—</td>
<td>$622M (HGAC RTP/TIP)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Widen to 12 lanes from IH 45 South to IH 10 East</td>
<td>—</td>
<td>$190M (HGAC RTP/TIP)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct connectors from IH 610 West (both NB and SB) to US 59 SB</td>
<td>—</td>
<td>$81.5M (TxDOT Houston District)</td>
<td>—</td>
</tr>
<tr>
<td>2, 6, 7, 10, 27, 31, 35</td>
<td>Downtown Corridors Inside Loop 610</td>
<td>Downtown redesign study that will identify strategies to reduce congestion on sections of IH 45, US 59, SH 288, and IH 10.</td>
<td>$5.0M</td>
<td>TBD**</td>
<td>—</td>
</tr>
</tbody>
</table>
### All Congested Corridors

<table>
<thead>
<tr>
<th>Operational Improvements</th>
<th>Engineering study to identify operational treatments and incident management strategies</th>
<th>$0.85M</th>
<th>TBD**</th>
<th>2014 to 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel Options</td>
<td>Engineering study to examine regional travel options along the corridors.</td>
<td>$0.5M</td>
<td>TBD**</td>
<td>2013 to 2014</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>$86.35M</td>
<td>~6.367B</td>
<td></td>
</tr>
</tbody>
</table>

Remaining Houston Rider 42 allocation: $29.874M.
*Source of implementation funds noted if known.
**To be determined by additional study or design.