Clear Lake

Pedestrian and Bicyclist Study

September 2011

Houston-Galveston Area Council

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HoustonBikewayProgram

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Sakura Rubinson

Clear Lake Pedestrian and Bicyclist Study

Project Sponsors

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Executive Summary

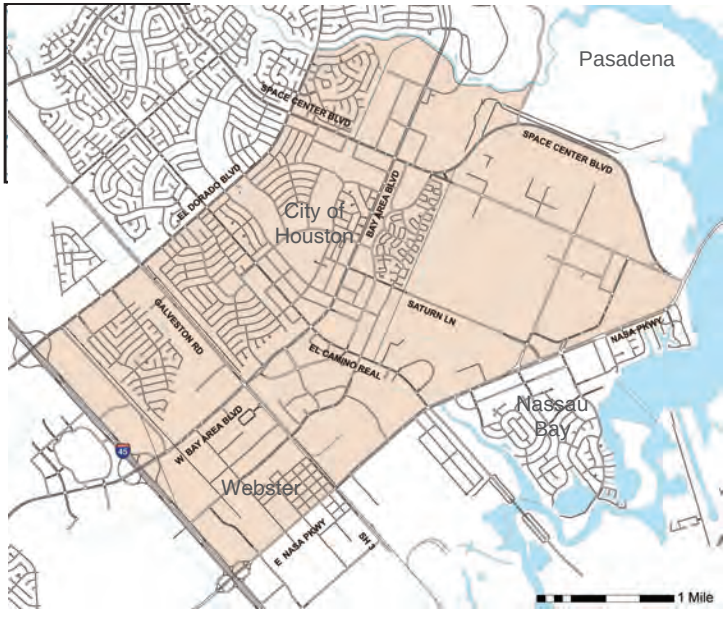
The Clear Lake Pedestrian & Bicyclist Study, and the recommendations made within this report, represents a significant opportunity for the City of Houston to improve walking and biking for its citizens. This opportunity includes expanding the network of bicycle facilities and connecting to regional corridors and planned projects for both recreational and utility trips. The recommendations also represent an approach to improve safety and pedestrian connectivity in the community while providing options for healthy, active trips. Analysis and observation within the study area identified many active users and an unmet demand for more opportunities to make walking and biking trips.

H-GAC Special District Program

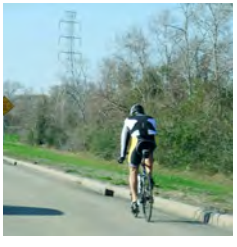
The Houston-Galveston Area Council (H-GAC) coordinates special district studies in areas of the region where there are significant opportunities to replace vehicle trips with pedestrian or bicycle trips based on factors such as destinations, land use mix, density, and demographics. These studies are key elements of the Pedestrian and Bicyclist program as they identify specific infrastructure improvements to improve pedestrian and bicyclist safety and mobility in high-priority districts. The results of the studies have been used to help guide regional investments in pedestrian and bicycle infrastructure.

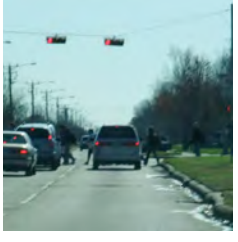
The City of Houston and other communities within the region have developed a growing network of on and off street bike facilities and sidewalk networks that form the basis of non-motorized mobility options. The City of Houston identified the Clear Lake area as a gap in the overall bicycle master plan and understood that the area was recognized as a regional priority. Based on this, the City applied for and received a 50-50 matching grant from H-GAC to develop this study to expand the network as funding opportunities become available.

Clear Lake **Pedestrian and Bicyclist** Study



Study Area





About the Study Area

The study area is an approximately 10 square mile region in the southeast portion of the City of Houston. The limits of the project study area include El Dorado and Space Center Boulevards to the northwest and northeast, respectively, IH-45 to the west, and NASA Parkway in the south. Major corridors within the study area include Bay Area Boulevard, El Camino Real, SH 3 and the Union Pacific railroad corridor that runs parallel to SH 3. The area largely coincides to the Clear Lake City master-planned community that was annexed into the City of Houston in 1977.

The study area is primarily within the City of Houston but also includes a portion of the City of Webster in the southern quadrant of the study area. In addition, the study area is adjacent to the cities of Nassau Bay to the east and Pasadena to the north and close to other communities including League City, Friendswood and Taylor Lake Village. Harris County, Precinct 2 also maintains several of the roadways within the study area.

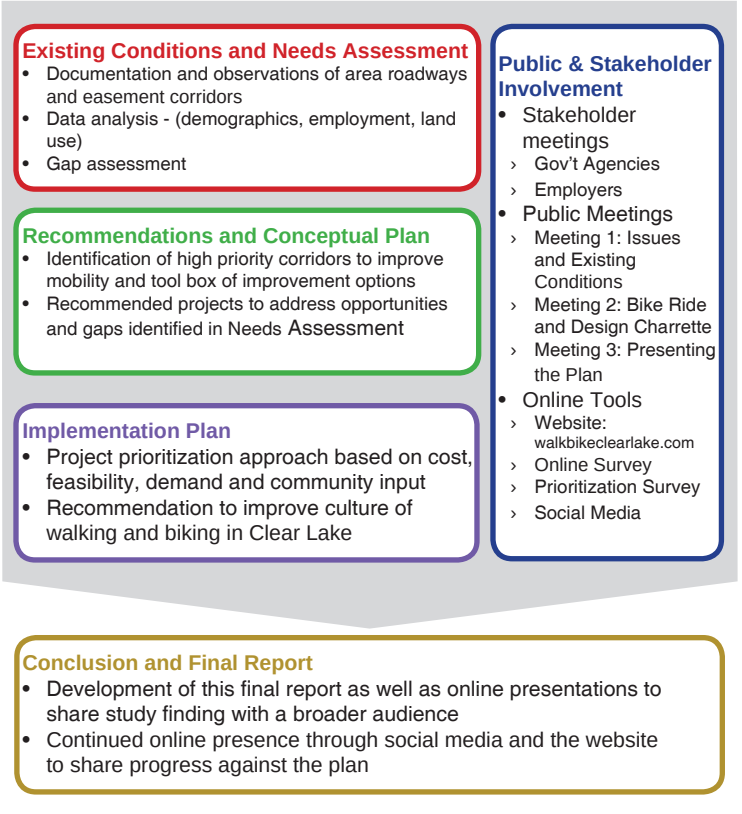
Our **Approach**

The approach to developing the Clear Lake Pedestrian and Bicyclist Study combined in depth assessment and observations of the conditions and needs in the study area with a multi-faceted engagement with key stakeholders including government agencies, major employers, running and cycling clubs, social service agencies and the general public. Stakeholders provided input on success factors for the study that led to the development of overall study goals. Community input was gathered though stakeholder interviews, public meetings and online tools and surveys.

The field assessments and stakeholder input was combined to determine major trip origins and destinations as well as existing barriers to increasing walking and biking trips. The recommendations and a conceptual plan were developed to identify high priority projects to address the goals for the study.

To achieve the recommendations identified in this study, an implementation plan was developed. The implementation plan identifies top project priorities based on cost, feasibility and community input and identifies opportunities to fund potential projects. It also identifies other non-engineering approaches to improving the walking and biking culture in the Clear Lake area such as education and encouragement.

Workplan Approach



Where people **live, work and play** in Clear Lake

The study area contains a very diverse set of land uses and activity centers, as shown in the adjacent figure. Residents want to be able to walk or bike to and from these destinations.

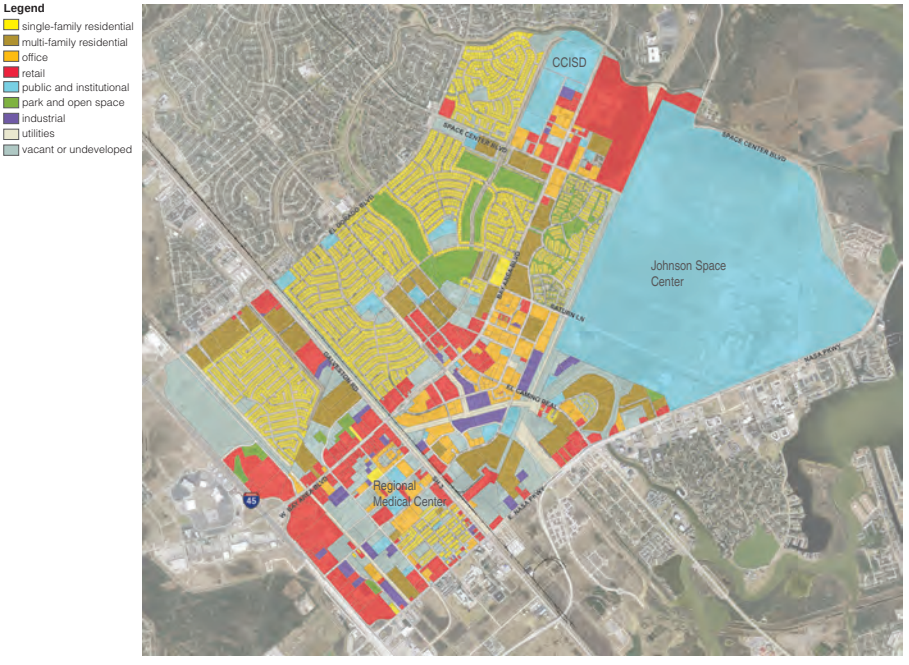
Residential - primarily single-family in the western portion of the study area with pockets of multi-family spread throughout focused along major corridors.

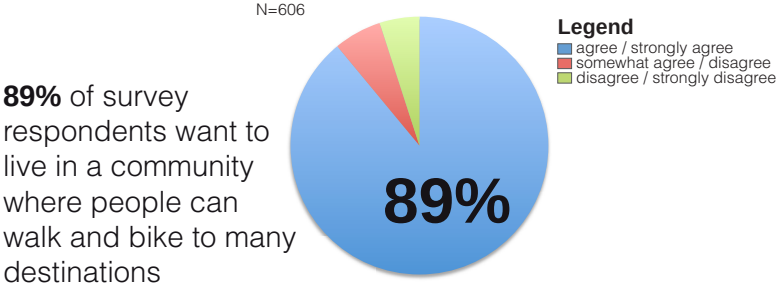
Major job centers - two of the largest job centers in the Houston Region in Johnson Space Center and the Clear Lake Medical Center with additional focus of retail and education related jobs. The METRO Park & Ride facility also provides connections to other job centers in central Houston.

Commercial - primarily strip center retail focused on Bay Area Boulevard, NASA Parkway, SH 3 and IH-45 corridors.

Educational facilities - there are seven CCISD schools within or adjacent to the study area, UH-Clear Lake along the norther border of the study area.

Green Space and Parks - Bay Area Park, Challenger Park, Armand Bayou, the former Clear Lake Golf course, and Clear Lake are all very near the study area.





89% of survey respondents want to live in a community where people can walk and bike to many destinations

Study **Goals**

The team developed the following primary goals for the study based on stakeholder input and an understanding of potential benefits from pedestrian and bicyclist improvements:

Safety

To provide **safe facilities** for walking and biking and **improve** current areas that have a history of crashes or feel unsafe.

Choice

To ensure walking and cycling is a convenient **transportation option** for a broad set of users and trips.

Connectivity

To **eliminate barriers** to walking and cycling by **creating better connections** between where people are and where they want to go.

Opportunities for all

To **provide** walking and biking opportunities with **all users** in mind including bicyclists and pedestrians of all ages and abilities.

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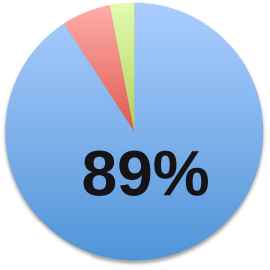
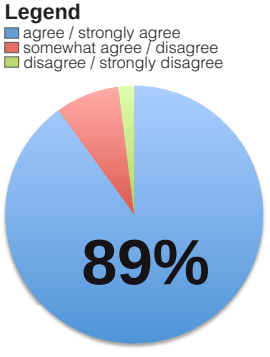


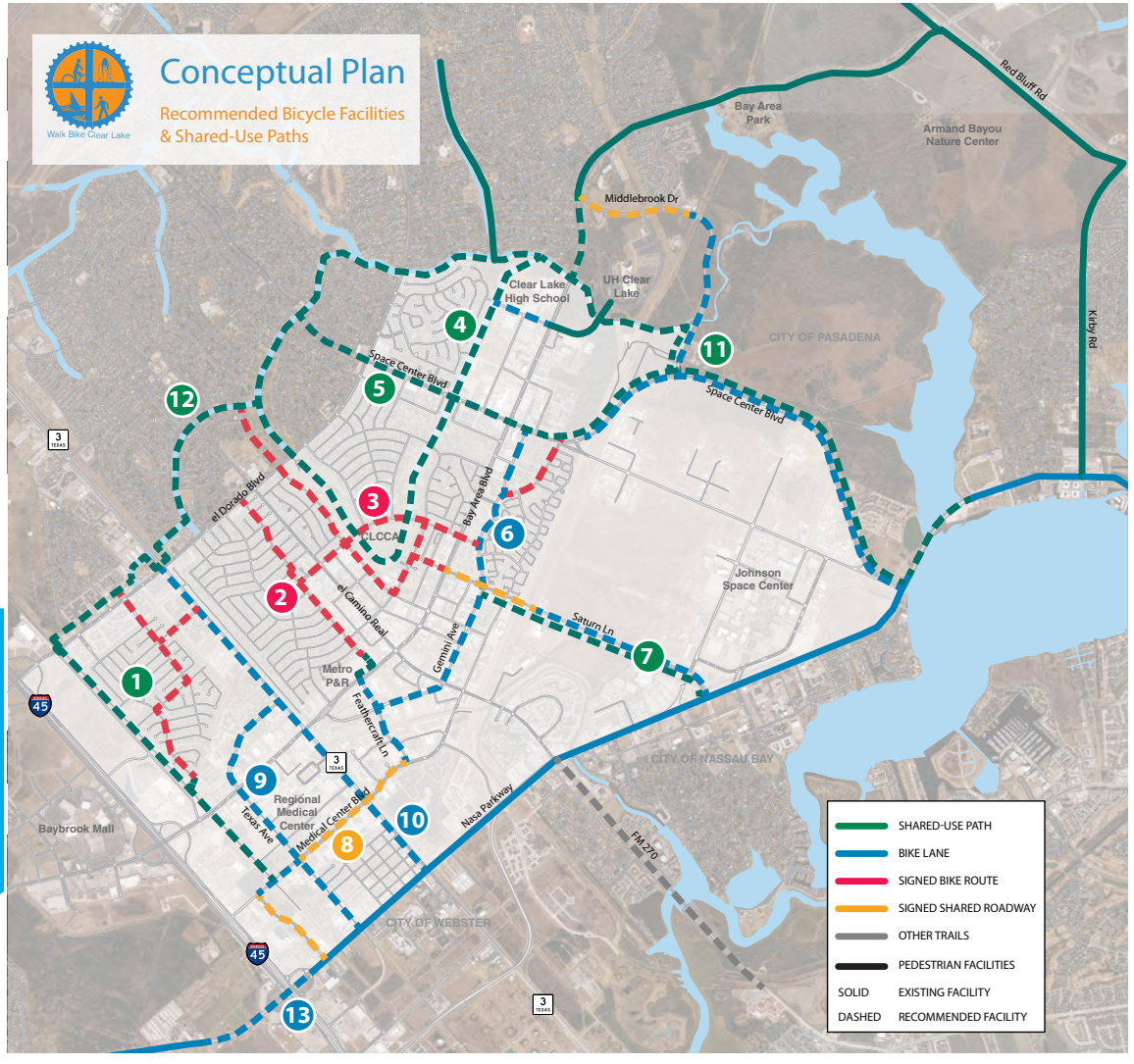
89% of survey respondents would bike 10 minutes to a destination if they felt they could do it safely.



89% of survey respondents would walk 10 minutes to a destination if they felt they could do it safely.

In the online survey of over 600 participants, only 35% of walkers and 11% of cyclist agreed or strongly agreed they felt comfortable walking or riding in Clear Lake

Conceptual **Plan**



Based upon the needs assessment, stakeholder input and opportunity analysis, a conceptual plan was developed to identify potential projects. Projects were developed to connect major destinations, address safety issues and fill existing gaps.

The recommended projects that focus on bicycle and shared use path connections include:

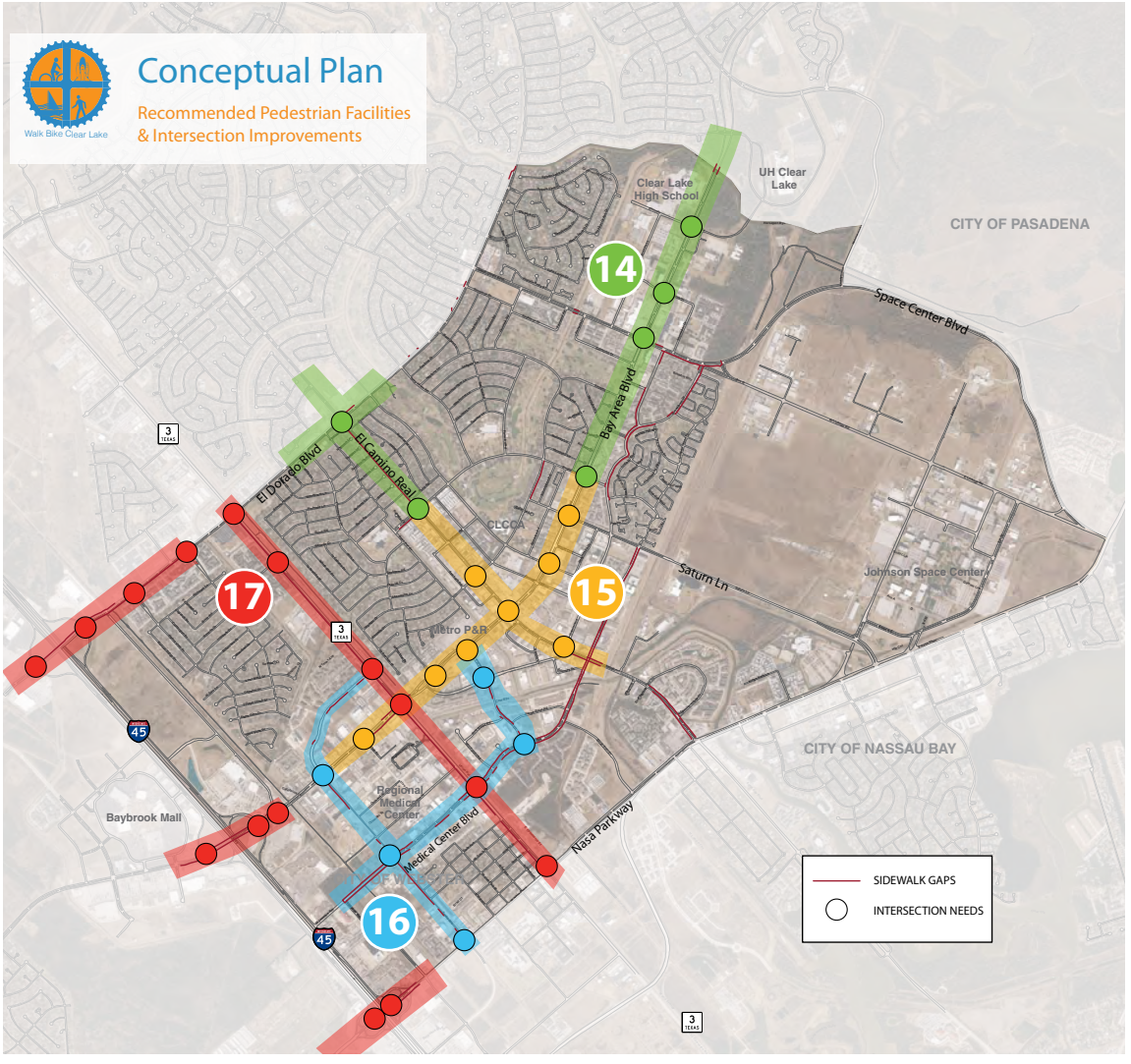
1. El Camino South Connections and Shared-Use Path
2. METRO Park & Ride and Neighborhood Connections
3. CLCCA / Golf Course Shared-Use Paths and Bike Routes
4. CCISD Drainage Easement Shared-Use Path
5. Space Center Blvd Shared-Use Path and Intersection Improvements
6. Gemini Ave. Bike Lanes / Route
7. Saturn Ln. Improvements
8. Medical Center Bike Lanes / Signed Shared Use
9. Texas Ave. Bike Lanes
10. SH 3 Improvements
11. Completing the Bay Area Blvd - Red Bluff - Kirby Trail Loop
12. Shared-use path along drainage ditch & utility easement
13. NASA Parkway Bike Lane Improvements

Sidewalk and intersection improvement projects include:

14. CCISD School Access Sidewalks
15. Commercial Access Sidewalks
16. Clear Lake Regional Medical Center Access Sidewalks
17. Barrier Crossing Sidewalks (IH-45, SH 3, UP Railroad)

Detailed descriptions of each project including the components, the cost and major benefits of implementation can be found in the **Recommendations (Chapter 4) and Implementation (Chapter 5) Chapters** of the full report.

A profile of each of the roadway corridors where recommendations have been made can be found in the **Appendix** of the full report.



Implementation Plan - Making the **Plan Reality**

Project implementation can go a long way towards improving walking and cycling in the study area, but that alone is not sufficient to improve the culture around walking and biking in the region. Recommendations have been made to focus on the other components of a successful pedestrian and bicyclist system including Education, Encouragement, Evaluation and Enforcement (4 of the 5 E's of a holistic plan) with the 5th E - Engineering relating to the projects identified in the Conceptual Plan.

Example of some of these recommendations include:

- Partnering with local bicycle shops and cycling clubs on programs to share bicycle education.
- Creating awareness programs to alert others to the benefits of walking and bicycling and how they foster healthier, more livable communities.
- Expanding Bike to Work Days to cover Clear Lake and adjacent cities to encourage more participation.

While the conceptual plan lays the ground work for what the desired end state for improving walking and biking will look like, the development of an implementation plan provides the critical elements to make the conceptual plan a reality.

The 17 projects identified through the Conceptual Plan were prioritized to support the City of Houston and other stakeholders in focusing resources where they will have the most positive impact for the community. Projects identified all have potential benefits for the region; assigned priorities are relative to that of other Clear Lake projects. The projects were broken into four priority categories.

Priority 1 - Highest priority represented by stronger community support, lower costs, and higher ease of implementation.

Priority 2 - Medium-high priority represented by solid community support, low-medium costs, and/or medium ease of implementation (some challenges).

Priority 3 - Medium priority represented by some community support, Moderate costs and barriers costs, and/or lower ease of implementation.

Priority 4 - Lower priority represented by limited community support, higher costs and barriers, and/or lower ease of implementation.

With a prioritized list of projects, the City of Houston and other local agencies such as Harris County and adjacent cities can target their efforts to deliver those projects that will have the greatest benefit to the community. The following table shows the prioritization of the projects identified through this plan.

Clear Lake **Project Prioritization** Table

Priority Tier	Project #	Project # - Name	Project Description	Cost Estimate
1	13	NASA Parkway Bike Lane Improvements	Improved bike lane markings (e.g., green paint) and completion of the connections on the north and south end of the study area	$298,000
1	3	CLCCA / Golf Course Shared-Use Paths and Bike Routes	Shared-use path along former Clear Lake Golf Course with adjacent bike routes to provide connectivity and wayfinding	$683,000
1	11	Completing the Bay Area Boulevard - Red Bluff Road - Kirby Road Trail Loop	Shared-use paths and on street improvements to complete 10-mile loop connecting major destinations including U of H Clear Lake and Bay Area Park	$1,432,000
1	10	State Highway 3 Improvements	Shoulder and intersection improvements to create a more bike friendly corridor	$67,700
2	4	CCISD Drainage Easement Shared-Use Path	Shared-use path along drainage easement connecting residential neighborhoods to CCISD schools from Bay Area Boulevard to Space Center Boulevard	$368,500
2	15	Commercial Access Sidewalks	Improved sidewalks and intersection crossings along Bay Area Boulevard and El Camino Real to provide better access to commercial retail corridors	Phase 1: $232,000
3	5	Space Center Blvd Shared-Use Path and Intersection Improvements	Shared use path and intersection improvements on Space Center Boulevard west of Middlebrook to improve pedestrian and bicycle access along the corridor	$841,000
3	12	Shared-use path along drainage ditch & utility easement	Shared-use path providing north-south connectivity along the western edge of the study area	$1,433,000
3	7	Saturn Lane Improvements	Improvements to existing shoulder and shared used path along corridor connecting residential areas with Space Center Intermediate School and Johnson Space Center	$429,000
3	2	METRO Park & Ride and Neighborhood Connections	Improved connectivity to the Metro Park and Ride for bicyclist and pedestrian including wayfinding, a shared used path and intersection improvements	$57,500
3	17	Barrier Crossing Sidewalks (IH 45, SH 3, UP Railroad)	Pedestrian improvements targeted at addressing major barriers in the study area including IH-45, SH 3, and the UP Railroad line	Phase 1: $289,000
3	14	CCISD School Access Sidewalks	Sidewalk improvements to fill gaps and create a better pedestrian realm around CCISD schools in and adjacent to the study area	Phase 1: $84,000
4	1	El Camino South Connections and Shared-Use Path	Improved connectivity for the El Camino South subdivision and connections between Bay Area Boulevard and El Dorado Boulevard	$685,500
4	6	Gemini Avenue Bike Lanes / Route	Improved bicycle facility for north-south corridor parallel to Bay Area Boulevard	$633,000
4	16	Clear Lake Regional Medical Center Access Sidewalks	Improved pedestrian connections in and around the Clear Lake Regional Medical Center	Phase 1: $635,000
4	9	Texas Avenue Bike Lanes	Improved east-west connectivity through the City of Webster linking Nasa Parkway to Bay Area Boulevard	$592,000
4	8	Medical Center Bike Lanes / Signed Shared Use	Improved bicycle connections in and around the Clear Lake Regional Medical Center	$316.700

Needs Assessment

To develop a successful pedestrian and bicyclist plan, it is important to understand the existing conditions, needs of the community and the opportunities to address those needs. With its diversity of land uses, Clear Lake represents a major activity center for the greater Houston region with a variety of housing options, economic drivers, entertainment and green space opportunities. West of Bay Area Boulevard, development is primarily single family residential; pockets of multifamily residential are mixed throughout the study area. The area includes two of the Houston region's largest job centers - NASA's Johnson Space Center and the Clear Lake Regional Medical Center, the second largest medical center in the Houston region. Within the study area, commercial development is largely concentrated along the major corridors of Bay Area Boulevard, SH 3, IH-45 and NASA Parkway.

There are seven Clear Creek Independent School District (CCISD) schools within or directly adjacent to the study area. There are other education facilities within or near the study area including church affiliated schools and the University of Houston – Clear Lake. Park and green space destinations near the study area include Bay Area Park, Challenger Park, Texas Avenue Park and the former Clear Lake Country Club (now owned by the Clear Lake Water Authority).

Although significant development exists that generates pedestrian and bicycling activity, there are barriers to mobility, including major roadways, drainage and utility easements, railroad tracks, and missing or poor quality infrastructure that make walking and biking a challenge. These barriers and gaps have been identified along with opportunity areas where investments could significantly improve the pedestrian and bicycling environment. This chapter summarizes the needs assessment for the area including gaps and opportunity areas to improve walking and bicycling in Clear Lake.

Study Area Demographics

Statistic	Study Area	Harris County, Texas	Texas
Total population: Total	31,741	3,400,578	20,851,820
Households: Total	14,201	1,205,516	7,393,354
Households: Avg. household size	2.23	2.79	2.74
Median Household Income	$50,374	$42,598	$39,927
Unemployed	4.5%	6.4%	6.0%
Below Poverty Level	7.7%	15.0%	15.4%
% Own	42.4%	55.3%	63.8%
% Rent	57.6%	44.7%	36.2%
Vacancy	7.8%	7.1%	9.4%
Single Family Detached	34.3%	55.7%	63.4%
Single Family Attached	8.0%	4.2%	3.1%
Apt 2-9	18.5%	10.0%	9.8%
Apt 10-49	21.4%	10.7%	7.0%
Apt 50+	17.7%	16.3%	7.3%
Other	0.1%	3.1%	9.4%
% Hispanic	32.0%	32.9%	15.2%
% White (non hispanic)	52.4%	42.1%	66.7%
% Black (non hispanic)	11.3%	18.2%	6.2%
% other (non hispanic)	4.2%	6.7%	11.9%
% 16 or Under	22.7%	29.0%	28.2%
% 18-34	32.1%	27.2%	25.7%
% 35-64	38.7%	36.4%	36.1%
% 65+	6.6%	7.4%	9.9%
% No High School	9.9%	25.4%	24.3%
% High School	42.0%	43.0%	47.2%
% Assoc. Degree	6.8%	4.7%	5.2%
% College Degree	26.6%	17.9%	15.6%
% Grad School	14.7%	9.0%	7.6%
% Drive Alone	77.7%	75.7%	82.4%
% Carpool	14.5%	14.6%	10.9%
% Transit	1.9%	4.1%	1.7%
% Bike	0.2%	0.3%	0.9%
% Walk	1.9%	1.8%	1.7%
% Other	3.8%	3.4%	2.5%

Source: US Census Data (2000)

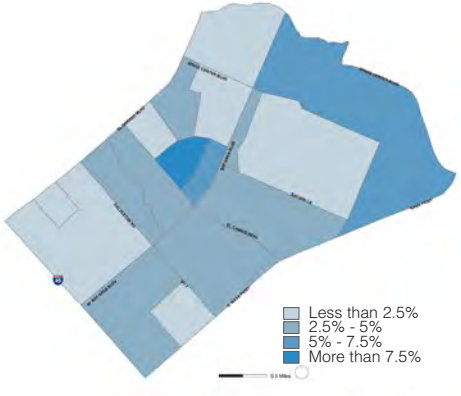
Demographic information for the Clear Lake study area is shown in the table to the left as well as comparative data for Harris County and the State of Texas to understand differences in the study area.

Key takeaways for the study area from this analysis include:

- Smaller than average household size
- Larger than average median income and below average poverty rates
- High share of apartments particularly in small to medium complexes linked to high rental rates
- Larger than average population share in 18-34 year bracket than Harris County; less than average in under 17 years old bracket
- Higher than average educational attainment, many with advanced degrees
- Low transit share with more single occupancy commuters

Drivers of Increased **Walking and Biking**

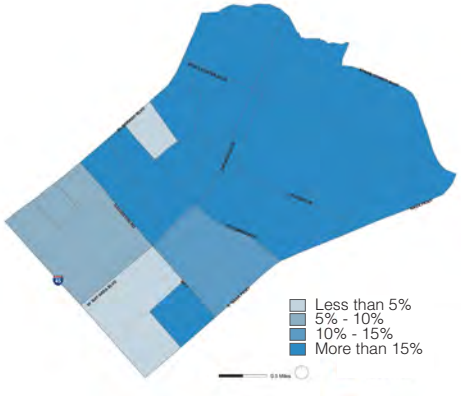
Existing Users



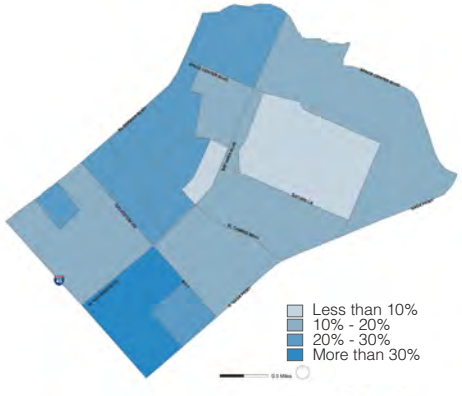
% Bike Commuters

% Zero Car Households

Potential Users



% Under 10 Minute Commute



% Under 16 Years of Age

Certain demographic factors can be indicators of increased walking and biking in a community. The factors include propensity to bicycle commute, car ownership, short commute distances, and high percentages of young people per household.

Relative to regional averages, residents in the study area are slightly less likely to currently bike commute than residents of the wider Houston region, indicating opportunity to improve. There is also a number of younger residents (22% 16 or under) who are unable to drive a car.

These indicators for higher walking and biking are supported by the significant number of pedestrians and bicyclists observed in the study area even in areas where poor infrastructure exists.

Where people **live, work and play** in Clear Lake

The study area contains a very diverse set of land uses and activity centers, as shown in the adjacent figure. Residents want to be able to walk or bike to and from these destinations.

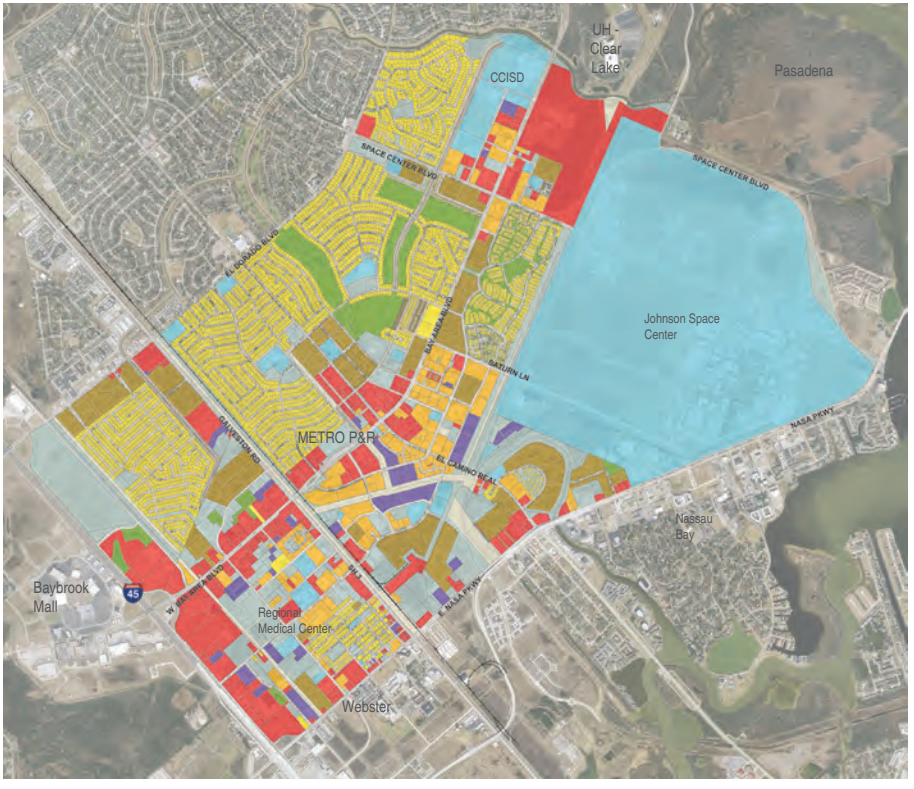
Residential - primarily single-family in the western portion of the study area with pockets of multi-family concentrated along major corridors.

Major job centers - two of the largest job centers in the Houston region in Johnson Space Center and the Clear Lake Medical Center with additional retail and education related jobs. The METRO Park & Ride facility provides connections to other job centers in central Houston.

Commercial - primarily strip center retail concentrated on Bay Area Boulevard, NASA Parkway, SH 3 and IH-45 corridors.

Educational facilities - there are seven CCISD schools within or adjacent to the study area; UH-Clear Lake is located on the northern border of the study area.

Green Space and Parks - Bay Area Park, Challenger Park, Armand Bayou, the former Clear Lake Golf Course, and Clear Lake are all near the study area.

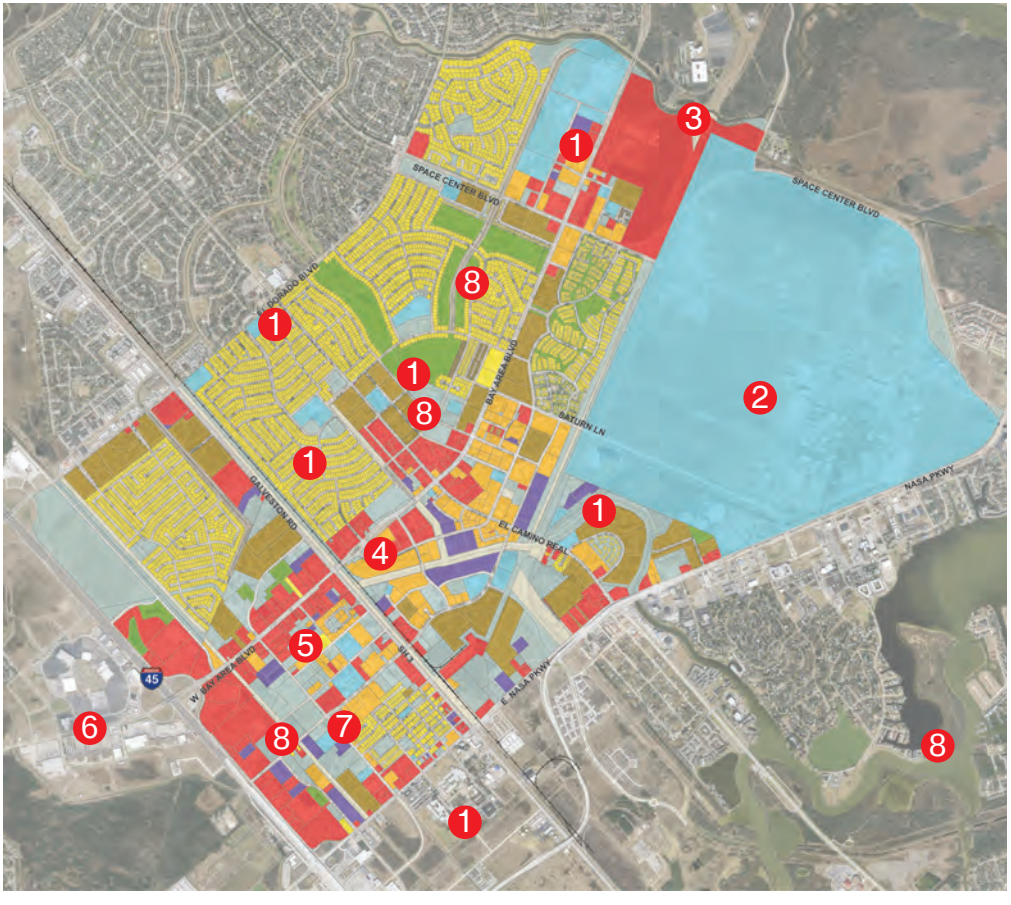


Land Use

legend

- single-family residential
- multi-family residential
- office
- retail
- public and institutional
- park and open space
- industrial
- utilities
- vacant or undeveloped

Major **Destinations**



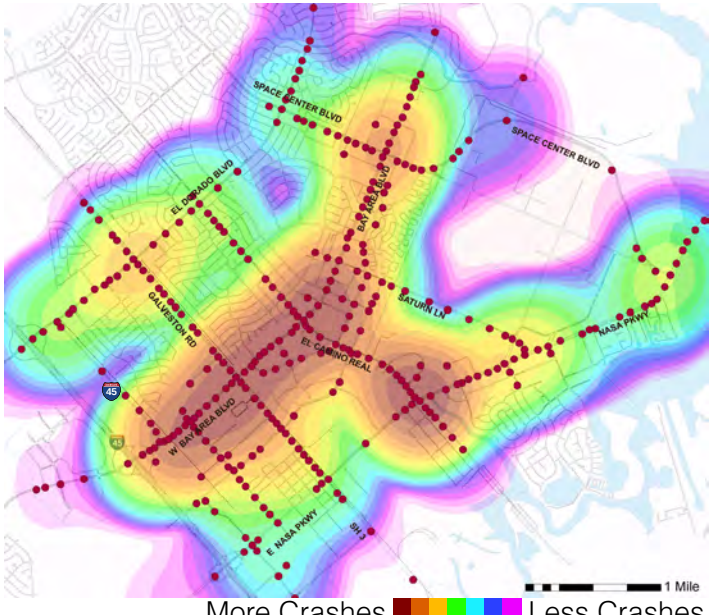
Stakeholders identified the following desirable destinations to improve access for walking and biking. Over 90% of survey respondents agreed pedestrian and bicycle access to the following destinations should be provided or improved.

1. Clear Lake Schools
2. Johnson Space Center
3. UH - Clear Lake
4. METRO Park and Ride
5. Bay Area Boulevard Retail and Employment
6. Baybrook Mall
7. Clear Lake Regional Medical Center
8. Parks and Open Spaces

Safety **Assessment**

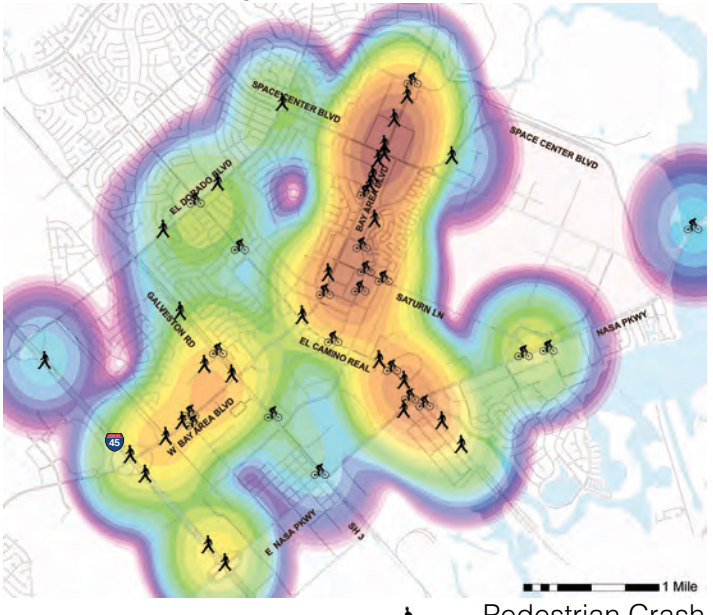
Historical crash data was analyzed within the study area to identify safety "hotspots" where recommendations may be needed to address safety issues. The crash hotspots area shown in the figures below.

Vehicle Crashes 2003-2009



More Crashes Less Crashes

Pedestrian and Bicycle Crashes 2003-2009

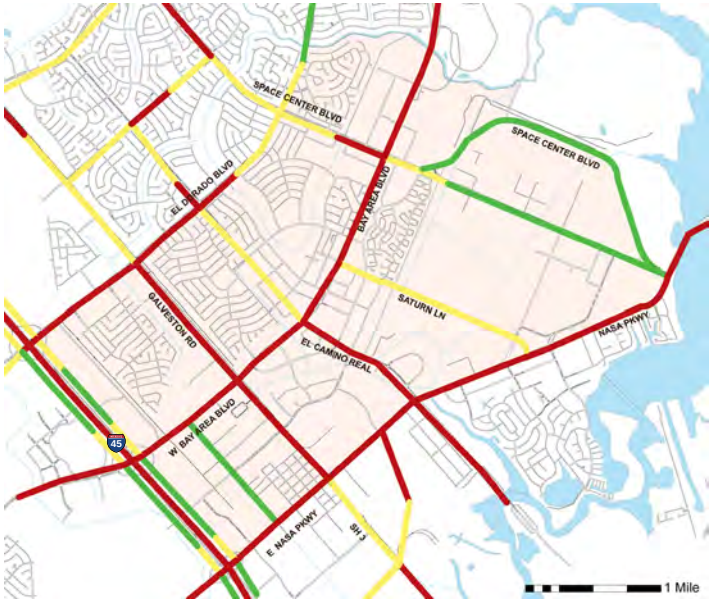


Pedestrian Crash
Bicycle Crash

Areas with higher concentrations of vehicle crashes can be perceived as unsafe for pedestrians and cyclists. Between 2003 and 2009, automobile crashes were concentrated along Bay Area Boulevard where high traffic volumes and frequent driveway openings increase potential conflicts. Pedestrian and bicycle crashes are concentrated near the CCISD schools on Bay Area Boulevard and near the intersection of El Camino Real and NASA Parkway, likely due to the higher percentage of walking and biking usage in that area.

Sources: 2003-2009 Crash Record Information System, TxDOT

Traffic **Assessment**



Source: H-GAC Travel Demand Model 2009-2010

0-10k vehicles
10-20k vehicles
>20k vehicles

Source: Field Observation

All Way Stop
Traffic Signals
Pedestrian Crossing

Within the study area traffic volumes increase closer to IH-45, with Bay Area Boulevard and NASA Parkway carrying the most traffic. These high volume thoroughfares provide access to many activity centers but can also serve as barriers to walking and biking. Lower volume streets such as Space Center Boulevard can provide opportunities for creating attractive cycling facilities. Traffic signals can provide safe places to cross major roadways but are not always located near destinations. Many intersections in the study area require improvements to improve safe crossing for pedestrians, meet ADA requirements, or properly detect bicycles and allow them to safely cross the intersection.

Major **Barriers**

Stakeholders identified the following barriers to pedestrian and bicycle mobility in the study area.

- Wide roadways with high volume, fast moving traffic
- Wide intersections that are difficult to cross
- Railroad track crossings
- Narrow bridges
- Drainage & Utility Easements
- Missing infrastructure and infrastructure in poor conditions (shoulders, sidewalks, trails, bridges)

Major Barriers

What Makes A **Good Pedestrian Experience?**

Qualities of a good pedestrian experience were analyzed to find potential gaps between existing conditions and a good pedestrian realm. In the study area, poor or missing sidewalks were identified as the primary issue.

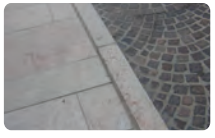
lighting
pedestrian lighting improves safety and business visibility


shade
providing shade allows activity and provides a buffer from cars, even on the hottest days.


crossings
great sidewalks don't end when you step off the curb.

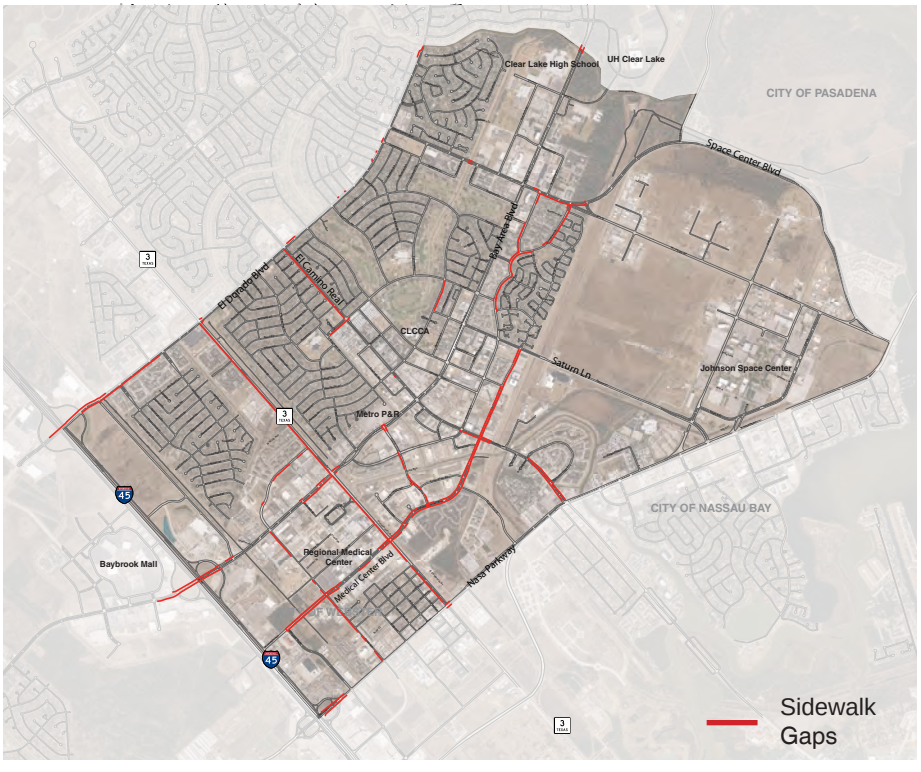

engagement
ground level activity promotes walking.


quality
good pavement encourages use; poor quality reduces use and limits access.




lack of obstruction
good sidewalks are wide enough for conversation and not blocked by obstacles.


Sidewalk **Assessment**



The primary focus of the sidewalk assessment was to identify locations where gaps exist in the existing sidewalk network along major thoroughfares and near activity centers within the study area. As shown in the adjacent figure, nearly all the major roadway corridors have significant sidewalk gaps (shown in red), likely driven by shifts in the development and design regulations as the community has grown.

Major corridors like Bay Area Boulevard, El Camino Real, SH 3, El Dorado Boulevard and Medical Center Boulevard have significant gaps that show wear as pedestrians have walked through grass to reach their destination. A particularly challenging area is crossing the UP railroad at any of the major roadway crossings north of SH 3, as sidewalks typically terminate prior to crossing.

Currently, the majority of existing sidewalks are 4’ wide which is the ADA minimum standard and previous City of Houston standard. This width is below the current standard minimum width of 5’ maintained by the City of Houston. This makes side-by-side walking difficult and should be addressed as projects are developed.

Pedestrian treatments at intersections vary in quality with most pavement markings in worn conditions and in need of maintenance. Most intersections have pedestrian activated push buttons and countdown timers, though some, such as Feathercraft at Gemini and Feathercraft at Bay Area Boulevard do not.

Locations where sidewalk gaps exist and intersection improvements are needed were a primary factor in developing the recommended pedestrian improvement projects for this study.

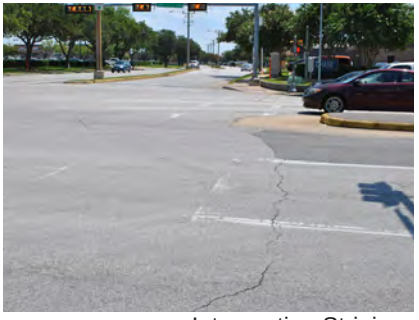
Bay Area Blvd.

UP Railroad near SH 3

Bay Area Blvd.

Reseda Rd.

El Dorado Blvd.



Intersection Striping

What Makes A **Good Biking District?**

To answer this question, the project team examined a mixture of safe, attractive facilities that are appropriate to different corridors in Clear Lake. The included recommended practices from the City of Houston Design Manual, the AASHTO Recommended Practice for Design of Bicycle Facilities and other best practice approaches.

off-road trails

Bayous, drainage and utility easements and other green spaces can provide wonderful opportunities for recreation and transportation. In Clear Lake, these opportunities are numerous.

Buffalo Bayou **Master Plan**

Boulder, CO

Houston, TX

residential streets

This type of road makes up much of Clear Lake. They are typically low volume, low speed and feel comfortable for many types of users.

City of Houston **Design Manual**

Portland, OR

Charlotte, NC

main streets

This type of road makes up the main commercial backbones of Clear Lake. Speeds are higher and volumes greater. Without designated facilities, some experienced cyclists will use them, but few beginners.

City of Houston **Design Manual**

Tempe, AZ

Los Angeles, CA

state highways

State Highway 3 carries a high volume of traffic at very high speed, but it also has wide shoulders. Cyclists may feel comfortable biking next to the road, but crossing is more difficult.

City of Houston **Design Manual**

Dallas, TX

Bastrop, TX

Existing **Bicycle Facilities** and Opportunity Corridors

Existing Conditions and Opportunities

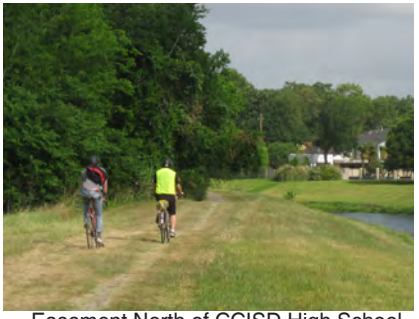
Currently, there are many opportunities to improve the bicycle friendliness of the study area. As shown in the adjacent Existing Conditions and Opportunities figure, the only existing bicycle facility within the study area is the striped bike lane on NASA Parkway. This 4' bike lane is below the recommended 5' width, though widening would be difficult as it would require widening the roadway or reducing vehicle travel lanes. The bike lane is also discontinuous on both the northern and southern edges of the study area.

Near the study area, several shared-use paths exist that would make attractive regional connections. These include the Bay Area Boulevard / Red Bluff Road / Kirby Drive loop that is only missing the Space Center Boulevard section and some improvements on Middlebrook to be complete.

There are several attractive corridors that have potential to connect major destinations with bicycle facilities. These include drainage easements such as the former Clear Lake Golf Club and the easement behind the CCISD schools on Bay Area Boulevard.

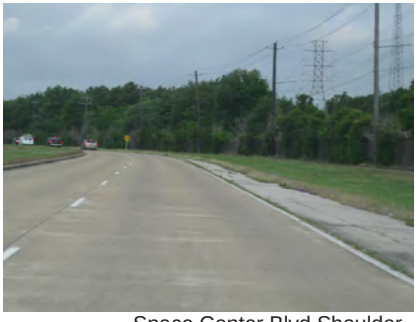
Roads such as SH 3 and Space Center Boulevard (east of Middlebrook) have wide shoulders that could be used by more cyclists if they were adequately improved and maintained.

There are also residential streets and low volume collector streets that have potential to serve as bicycle corridors, with improved signing and striping or pavement widening to allow bike lanes or shared roadways. This opportunity could be better communicated to potential cyclists through the use of a bicycle suitability maps to show where opportunities to ride exist even without dedicated facilities.



Easement North of CCISD High School

Gemini Road



Space Center Blvd Shoulder

Former Clear Lake Golf Course

Higher Suitability
Medium Suitability
Lower Suitability

Illustrative Bicycle Suitability Assessment

Public Engagement

Public Engagement **Timeline**

To better understand the needs of the community, the study team developed and executed a stakeholder and community engagement approach that targeted input through a variety of approaches. This was done in parallel with the other activities of the plan development and provided critical feedback on various phases of the plan. The public engagement approach included:

- **Stakeholder Meetings**
  - Government Agencies - interviews with City of Houston, Harris County, City of Webster, TxDOT
  - Employers - input from major employers including Johnson Space Center, Clear Creek ISD and the Clear Lake Medical Center
- **Public Meetings**
  - Meeting 1: Issues and Existing Conditions
  - Meeting 2: Bike Ride and Design Charrette
  - Meeting 3: Presenting the Plan and Prioritizing Recommendations
- **Online Tools**
  - Website: www.walkbikeclearlake.com, an interactive website to share information and receive questions and feedback
  - Online Survey - completed by more than 600 people and provided key input on issues and themes heard through the course of the study
  - Prioritization Survey - web based survey to complement the prioritization exercise completed during Public Meeting #3
  - Social Media - Houston Bikeway Program Facebook Page
    Twitter: @WalkBikeCLTX

The outcomes from the public involvement efforts were combined with the needs assessment information to define and refine the recommendations made in this study.

Stake**holders**

The study team worked with community and business leaders to understand their perspectives and goals for improving walking and biking in and around the study area. This input helped refine the overall study approach and steer the recommendations to ensure that the goals of a broad set of constituencies were met.

Examples of questions that the stakeholders were asked to provide input on include:

- What would the outcomes of a successful bicycle and pedestrian plan for Clear Lake look like?
- What do you think are the greatest barriers to walking and biking in Clear Lake?
- What destinations and activity centers in or near the study area are most important?
- What do you think are the most effective ways to promote walking and biking?
- Do you feel it is important to encourage walking and biking as transportation? Why?

Stakeholders provided positive views and support for walking and biking in general and specifically in the study area. They identified health, environmental, economic and equity benefits to investing in infrastructure like sidewalks and bicycle facilities.

Stakeholders involved in the project include:

- City of Houston
  - › Department of Public Works and Engineering
  - › Department of Planning
  - › Houston Bikeway Program
- Houston-Galveston Area Council
- City of Webster
- Texas Department of Transportation
- Harris County Public Infrastructure Department
- Harris County Precinct 2
- City of Pasadena
- Clear Creek Independent School District
- Johnson Space Center
- Space City Cycling Club
- Clear Lake City Community Association
- University of Houston - Clear Lake
- The residents of the Clear Lake region

The team would also like to thank the following organizations for supporting and publicizing the project:

- Bay Area News
- Change Magazine
- Local Bicycle and Running Shops
- BayTrans

Study **Goals**

The team developed the following primary goals for the study based on stakeholder input and an understanding of potential benefits from pedestrian and bicyclist improvements:

Safety

To provide **safe facilities** for walking and biking and **improve** current areas that have a history of crashes or feel unsafe.

Choice

To ensure walking and cycling is a convenient **transportation option** for a broad set of users and trips.

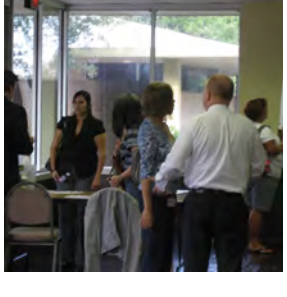
Connectivity

To **eliminate barriers** to walking and cycling by **creating better connections** between where people are and where they want to go.

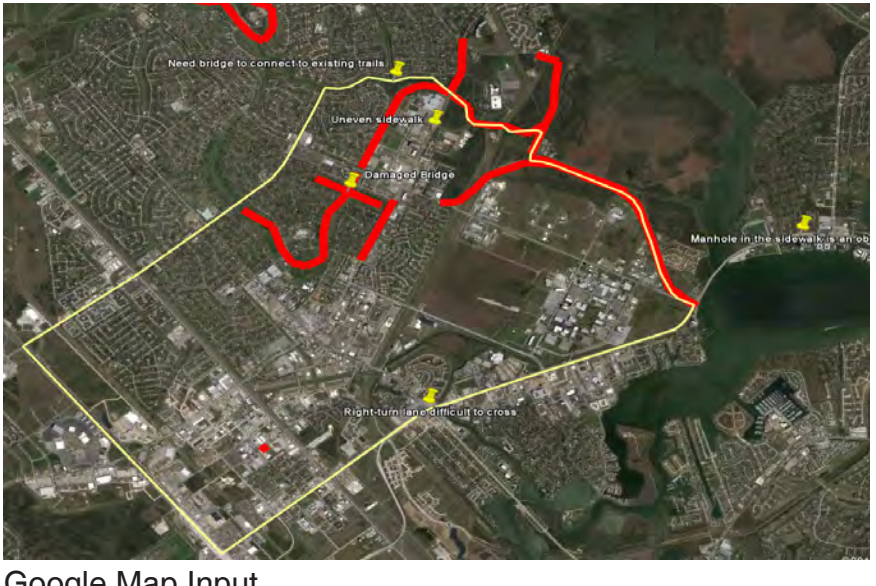
Opportunities for all

To **provide** walking and biking opportunities with **all users** in mind including bicyclists and pedestrians of all ages and abilities.

Public Meeting #1 **Existing Conditions**



The first of the three public meetings was well attended by area residents, employees, and other individuals enthusiastic about making Clear Lake a better place to walk and bike. The goal of the meeting was to share information about the study, educate attendees about how to improve walking and biking and to get feedback from the people who know Clear Lake best. These attendees provided great feedback on the study goals and insights into where to focus the attention of the study. Participants were given the opportunity to examine data collected by the team, identify important local destinations, share barriers to biking and walking, speak with team members and give input on additional goals. Using a Google Earth map, feedback from participants identifying particularly challenging problem spots were collected and are shown below.



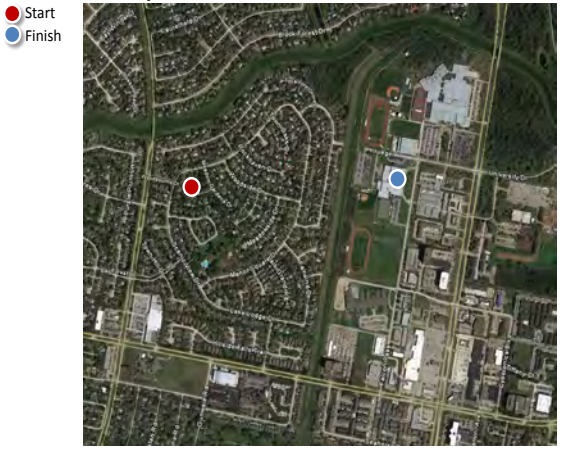
Google Map Input

Representative **Users**

During the public engagement process, four profiles were developed that represent community demographic groups, each with different skill levels and reasons for biking. Scenarios developed for these characters were used to allow participants to plan for a multitude of people with different needs within the study area.

During the workshops, we asked participants to plan trip routes for each profile to help understand the opportunities and challenges in the study area.

Sample Route Plan



Sophia, 8 years old, kid

Sophie learned to bike 4 years ago and loves to bike for recreation with her parents and her friends. Her parents let her bike on the streets in her neighborhood and in the park. Sometimes she bikes to school with other children and a parent.

James, 16 years old, high school student

Although James just got his drivers license, his parents only have two cars, and they don't let him use one often. He uses his bike to get to and from his part-time job at the mall, to spend time with his friends and to get to school. He likes the amount of freedom riding his bike gives him.

Jennifer, 28 years old, nurse

Jennifer works at a local hospital. As a nurse, she's concerned about both her health and her pocketbook. At the same time, she also knows what it looks like when a car hits a cyclist. She'd like to ride her bike to work for exercise, but she's a little nervous to try it out for the first time.

Ron, 42 years old, accountant

Ron took up biking in his 30s as a good low impact workout. He spends money on the best equipment and regularly rides 30 miles a day during the week and even longer on weekends. He enjoys taking part in group rides and is a member of the local cycling club.

Public Meeting #2 **Bike Ride**

Photos Courtesy of Steve Pedigo

Route Map

Participents began the second public meeting with a group bike ride with about 15 riders around the study area. The group had a chance to explore the possibilities and challenges of providing walking and biking connections to transit, jobs, and schools. Participents also braved some rather harrowing moments — such as crossing a bridge along Space Center Boulevard by using a very narrow sidewalk or getting across Bay Area Boulevard at an unsignalized intersection — as well as positives, such as receiving instruction on using bike racks on METRO buses.

Topics of Discussion

Public Meeting Bike Ride

1. Crossing Major Streets
2. Connections to Transit
3. Connections to Jobs
4. On-Street Facility Types
5. Connections to Schools
6. Off-Street Facility Types

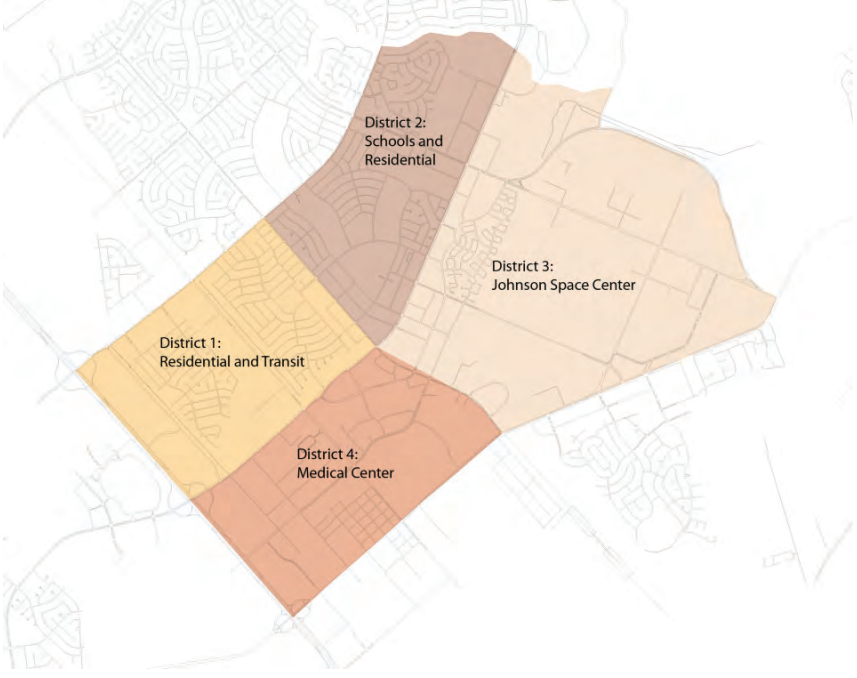
Clear Lake
Bicyclist and Pedestrian Study
July 20, 2011

Public Meeting #2 **Ideas and Recommendations**

After the group bicycle ride, meeting participants back at the CLCCA Pavilion to review the study findings and the results of the Clear Lake survey. A toolbox of walking and biking improvements was presented and the larger group then broke into several smaller groups to discuss barriers and opportunities within and between particular districts of the study area. This design charrette allowed participants to provide direct ideas for how to improve walking and biking in the study area by using the toolbox to provide solutions on the maps that were provided. These ideas played a major factor in developing the recommended projects in this plan.

The results of the design charrette exercise are shown on the following pages.

Development of **Districts**



In order to better collect data at a more localized level the team divided the study area into four districts with some distinctive characteristics. These four districts were used to collect public input in the charrette exercise and to develop recommendations for the conceptual plan.

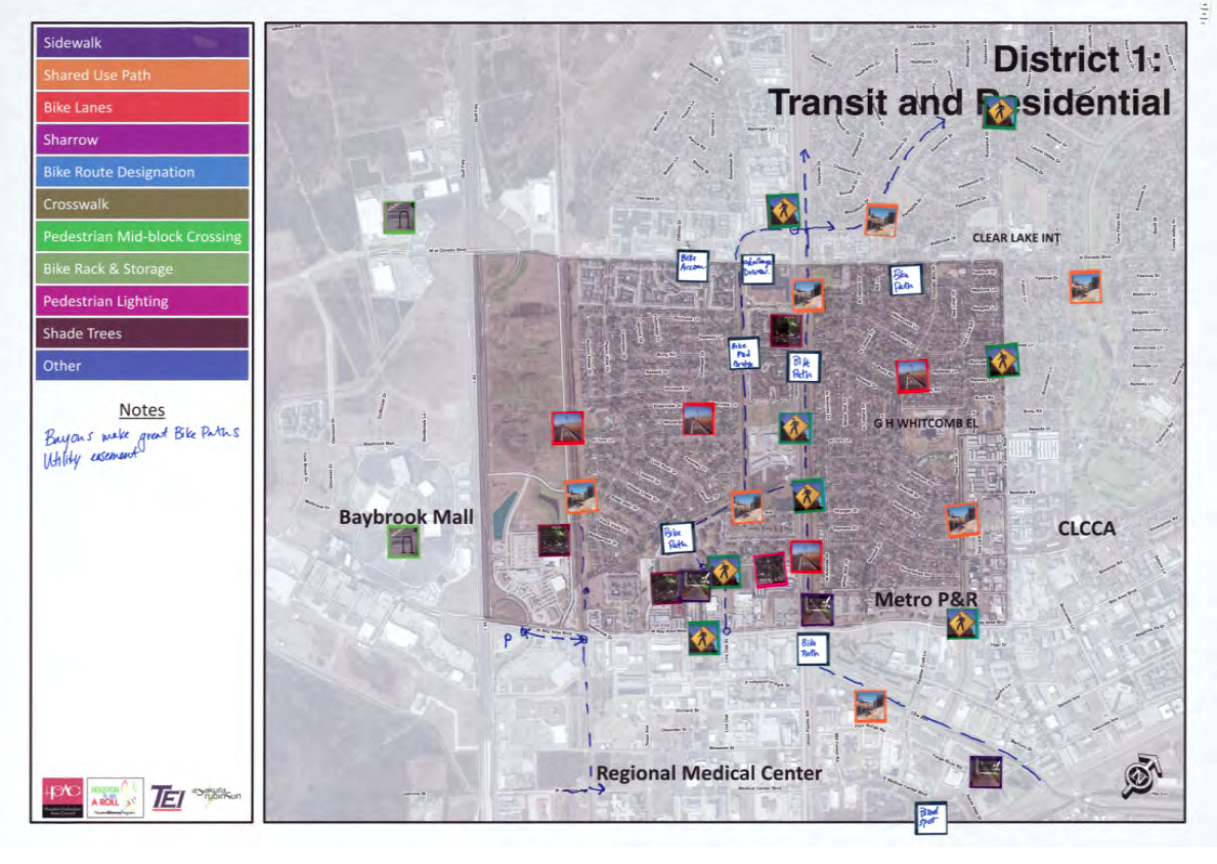
- **District 1** is heavily residential and also contains the METRO Park and Ride facility.
- **District 2** contains residential uses and many of CCISD's schools, as well as the former golf course site.
- **District 3** contains the Johnson Space Center.
- **District 4** is largely within the City of Webster and contains significant medical and commercial uses.

The **major divisions** between the districts were Bay Area Boulevard on the north-south axis and el Camino Real on the east-west axis. Analyzing the study area through districts enables a focus on access to destinations within a district and connectivity between the districts.

Connections between the districts typically mean crossing a major barrier such as an arterial roadway. Regional connection to areas outside the study area were also considered.

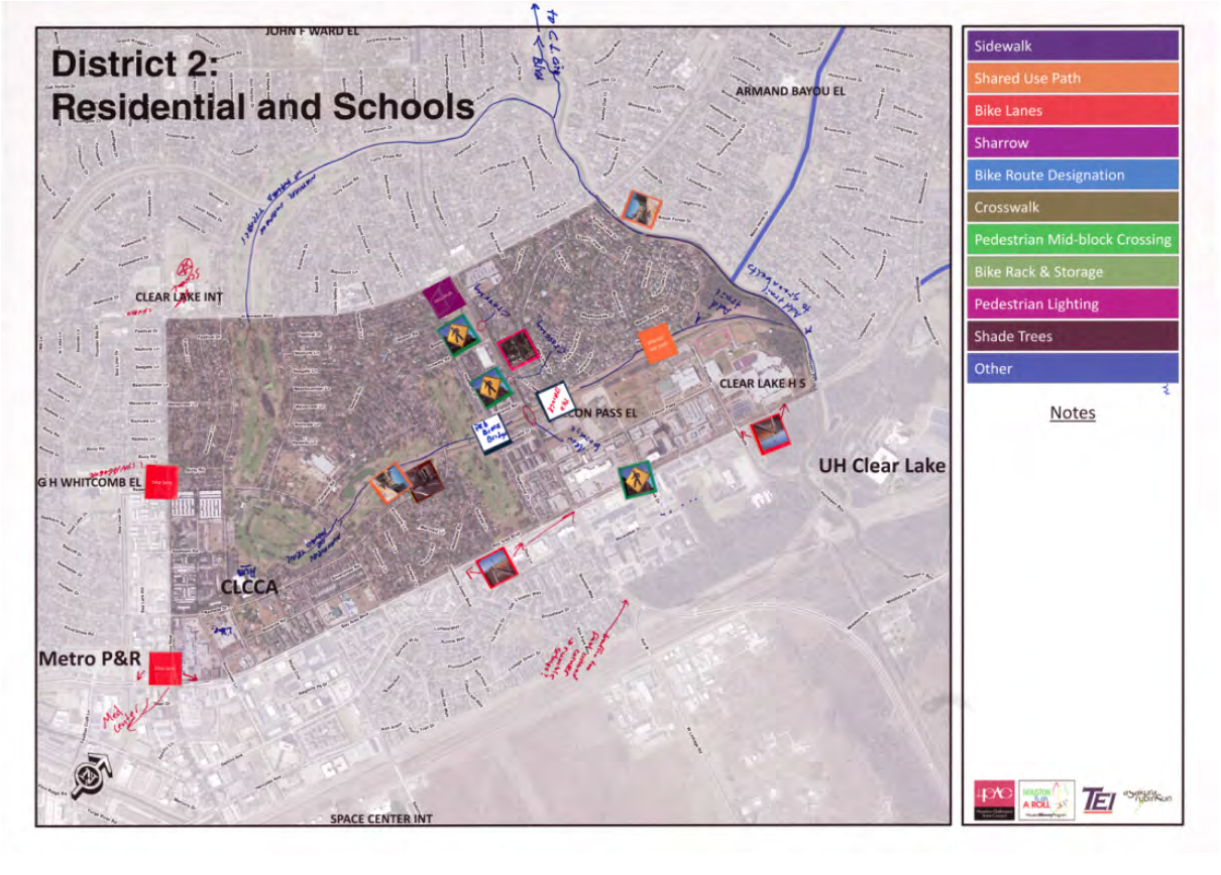
Public Meeting #2 **Charrette Results**

District 1 includes primarily single family residential with some commercial along Bay Area Boulevard and an active METRO Park and Ride Facility with bicycle parking facilities that are frequently used. Charrette recommendations included improvements to corridors such as SH 3, Texas Avenue and several drainage easements. Other opportunities for improvements including crossings along Bay Area Boulevard and those providing access to the METRO Park and Ride were also identified.



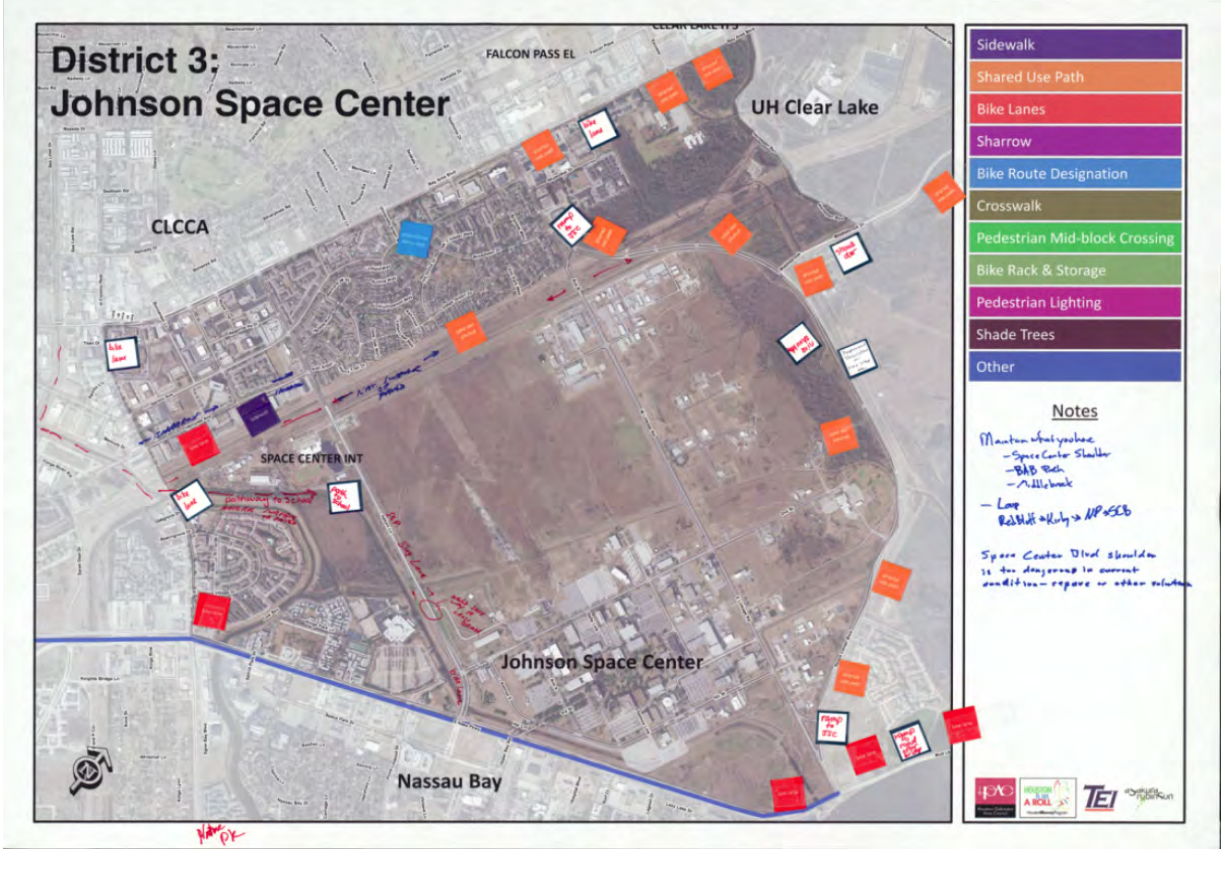
Public Meeting #2 **Charrette Results**

District 2 includes the Clear Lake City Community Association, the former Clear Lake Golf Course, several CCISD schools in addition to single-family residential. Improvement ideas focused on the golf course and drainage easements to access the residential neighborhoods and schools that are primary trip origins and destinations in this district. Participants also identified extensions of recommendations to connect to destinations and existing bicycle facilities outside the study area.



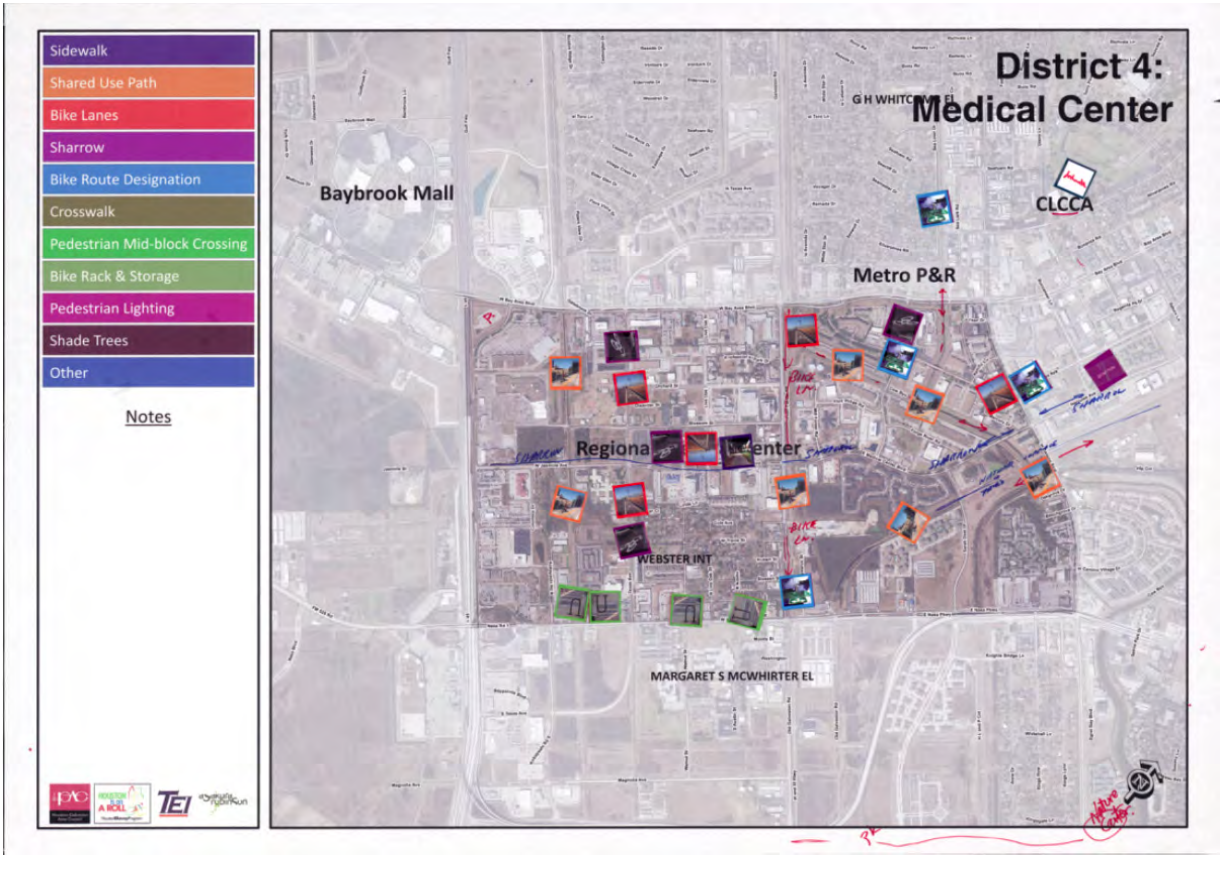
Public Meeting #2 **Charrette Results**

District 3 encompasses Johnson Space Center and a mix of single-family and multi-family residential. Improvements to Space Center Boulevard were a high priority to access the regional trail system and destinations such as Bay Area Park and Armand Bayou. Access to Johnson Space Center and Space Center Intermediate School were important with a focus being improvements along Saturn Boulevard. The bridge on NASA Parkway north of the study area was also identified as an important area to connect the bike lanes on either side of the bridge.



Public Meeting #2 **Charrette Results**

District 4 is primarily in the City of Webster and includes the growing Clear Lake Regional Medical Center as well as commercial uses on Bay Area Boulevard and NASA Parkway. Suggested major improvements included improved pedestrian and bicycle access along Texas Avenue and Medical Center Boulevard. as well as the installation of bike racks at commercial destinations along NASA Parkway.

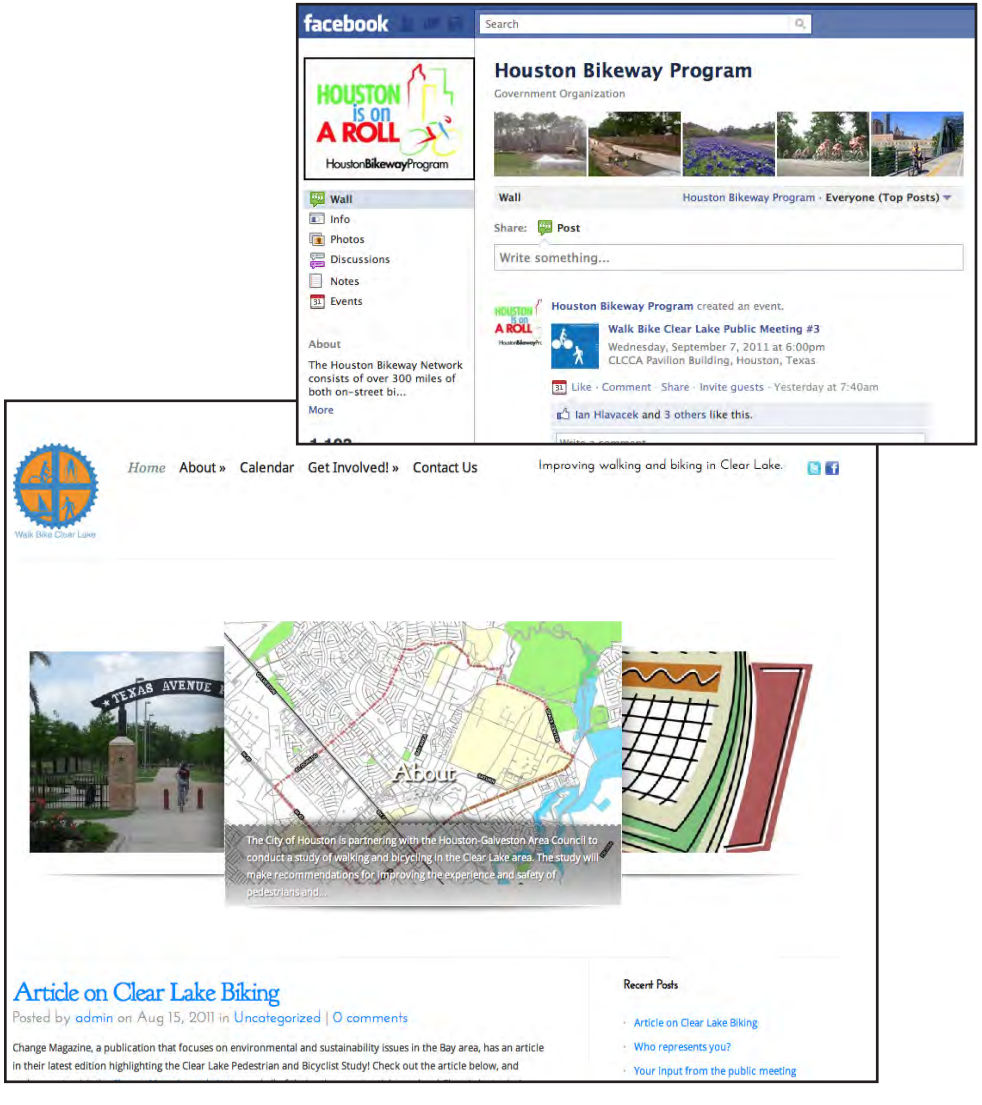


Public Meeting #3 **Implementation**

Public Meeting #3 provided an opportunity to present the findings of the Clear Lake Pedestrian and Bicyclist Study and an overview of the draft Conceptual Plan. Each project was presented to the audience in detail, describing the type of facilities that were recommended to address barriers and strengthen connections to major destinations.

Attendees were given an opportunity to provide input on project priorities through a voting exercise. A prioritization voting survey was also made available on the project website so that those unable to attend could provide input on implementation priorities.

Online **Engagement**



Online tools proved to be an effective way to engage and communicate with the Clear Lake community. These tools were used to share information, build interest and collect feedback through a variety of approaches.

A website was created at **www.walkbikeclearlake.com** that allowed the public to send emails, provide online comments,and answer two online surveys. In all, over 600 people took the Clear Lake Walking and Biking Survey and the results are summarized on the following pages.

Social media including Twitter and the Houston Bikeway Program's Facebook page,with over 1000+ followers, were used to spread the word about the project, meetings and recommendations.

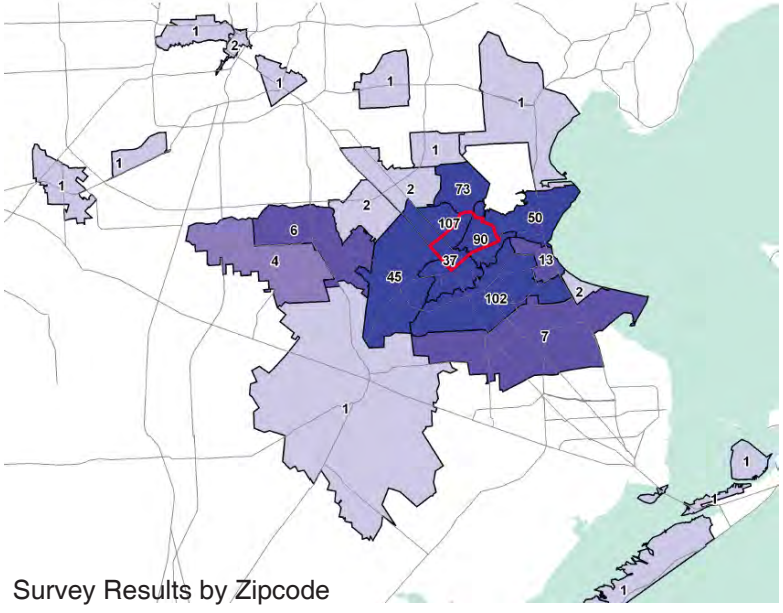
www.walkbikeclearlake.com
www.facebook.com/HoustonBikeways
www.twitter.com/walkbikecltx

Survey Results - **Demographics**

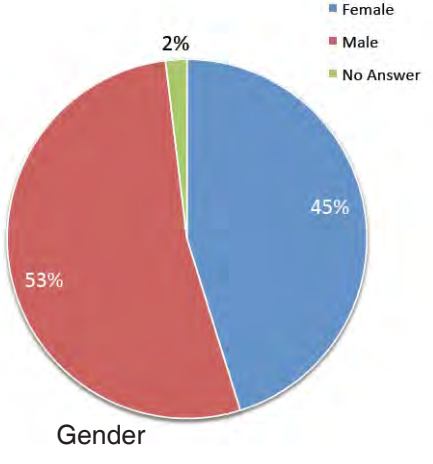
The online survey provided valuable feedback from the community, on goals, facility preference types and priority destinations. The goals of the survey were to:

- Gather input from the community about current walking and biking conditions in Clear Lake
- Identify major destinations for increased connectivity
- Define major barriers to increased walking and biking
- Understand facility preference types (e.g., bike lanes, shared use paths)
- Educate the community about the issues and some of the tools and opportunities to improve walking and biking

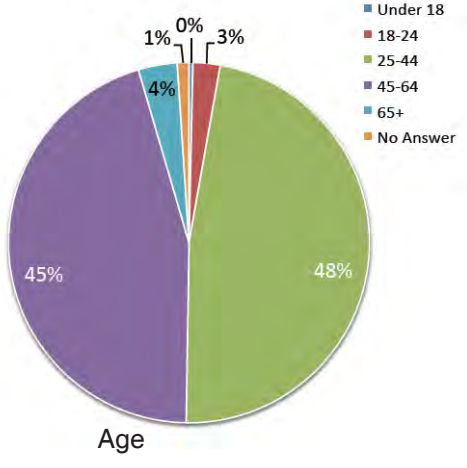
In all, 647 people took the survey. They represented a useful cross-section of the community with a distribution across region, gender and age. A summarized review of the survey results follows. Additional results from the survey are available in the appendix.



Survey Results by Zipcode



Gender

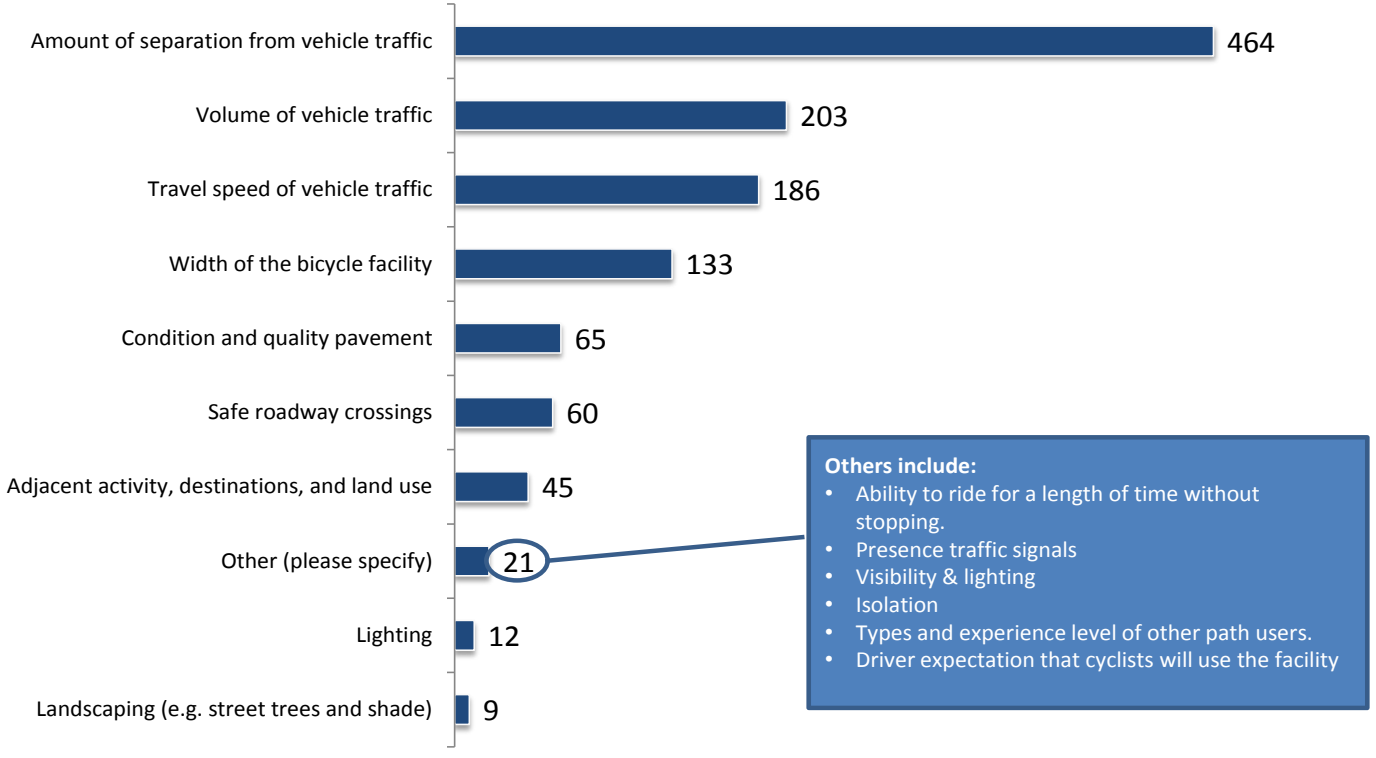


Age

Safety a **Priority for Cyclists...**

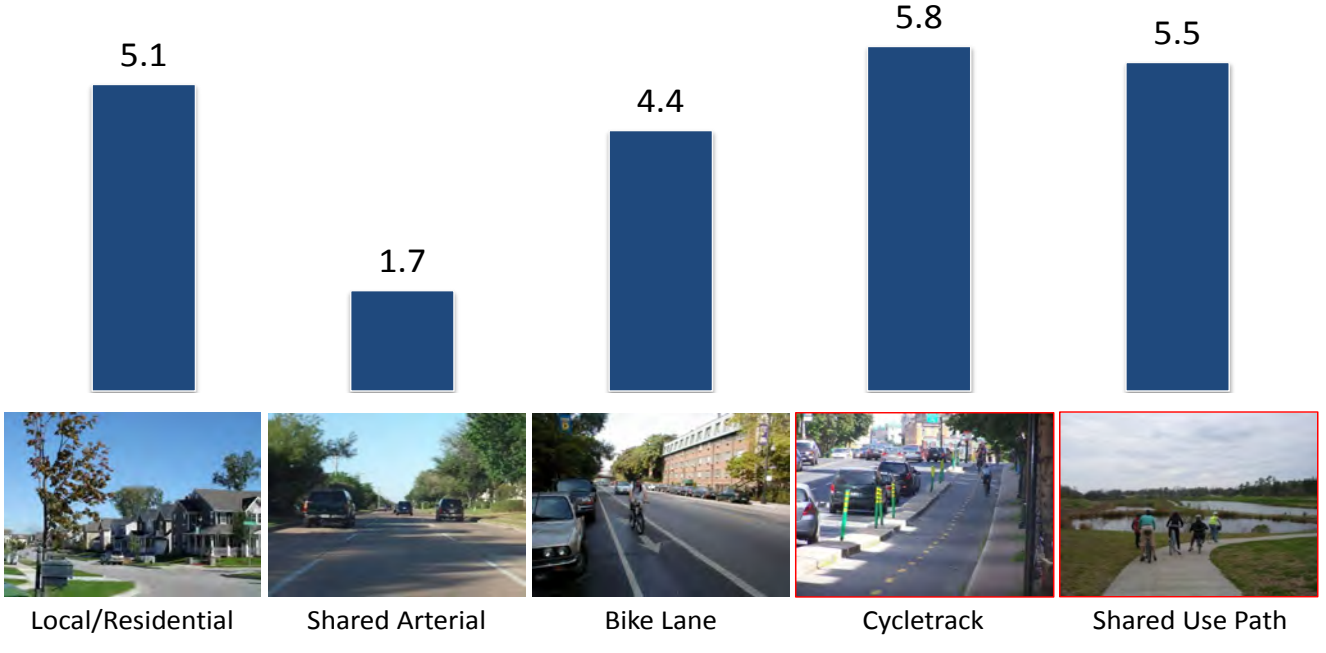
When selecting facility type preferences (shown on the opposite page) and providing the rationale for their selection, respondents to the survey preferred greater amounts of separation from vehicle traffic, and identified the volume of traffic and the speed of traffic as the most important factors in determining their comfort level with a particular facility.

Reason for selecting a facility type preference (Total number of times selected)



Biking Facility Type **Preference**

Interestingly, respondents indicated a preference for a separated cycletrack to all other facility types. Discussion at the first public meeting indicated this preference may be driven by both the separation from traffic and the potential to be near activity centers and desirable destinations. Users also expressed a high level of comfort with riding on local streets and shared used paths and a moderate level of comfort with on street bike lanes. Shared arterials were not viewed as facilities most would be comfortable riding.

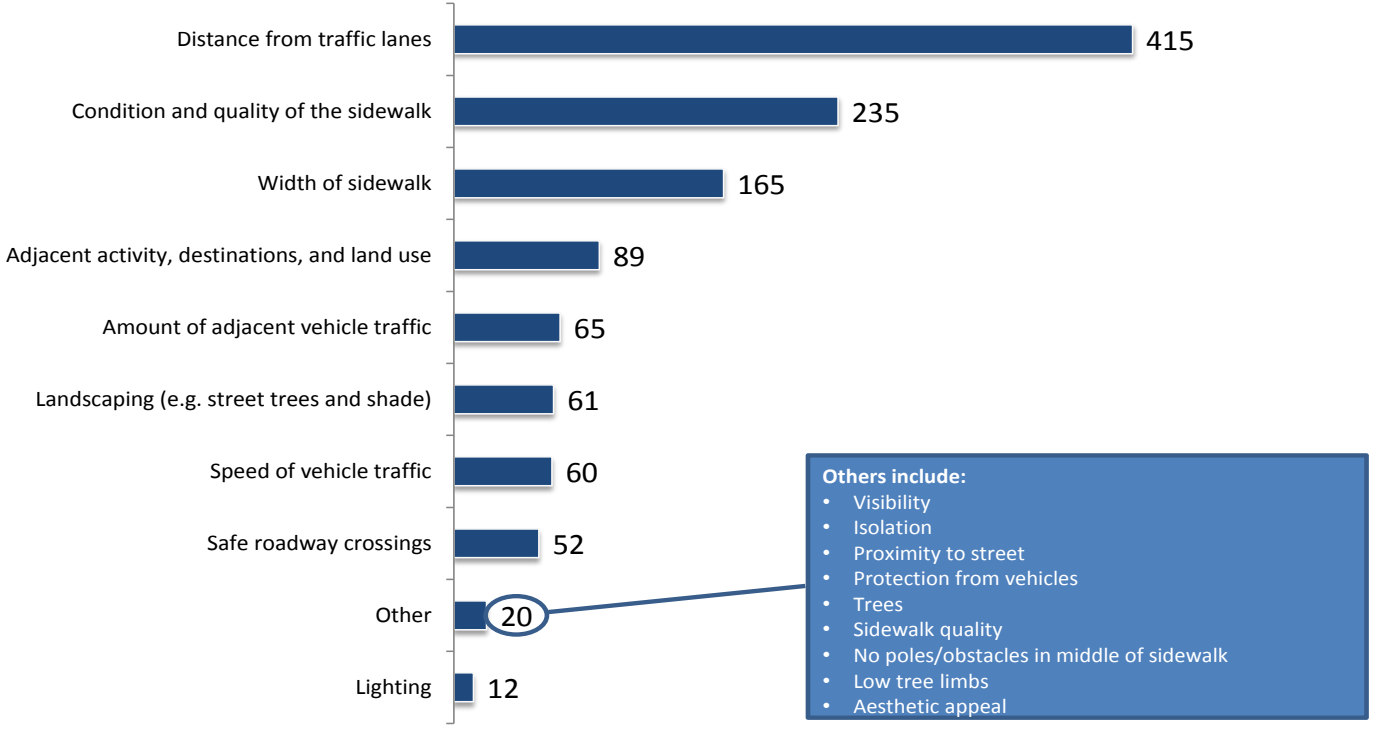


Scale of 1 to 6 (6 = Strongly Agree the type would be comfortable, 1 = Strongly Disagree)

...and for **Pedestrians**

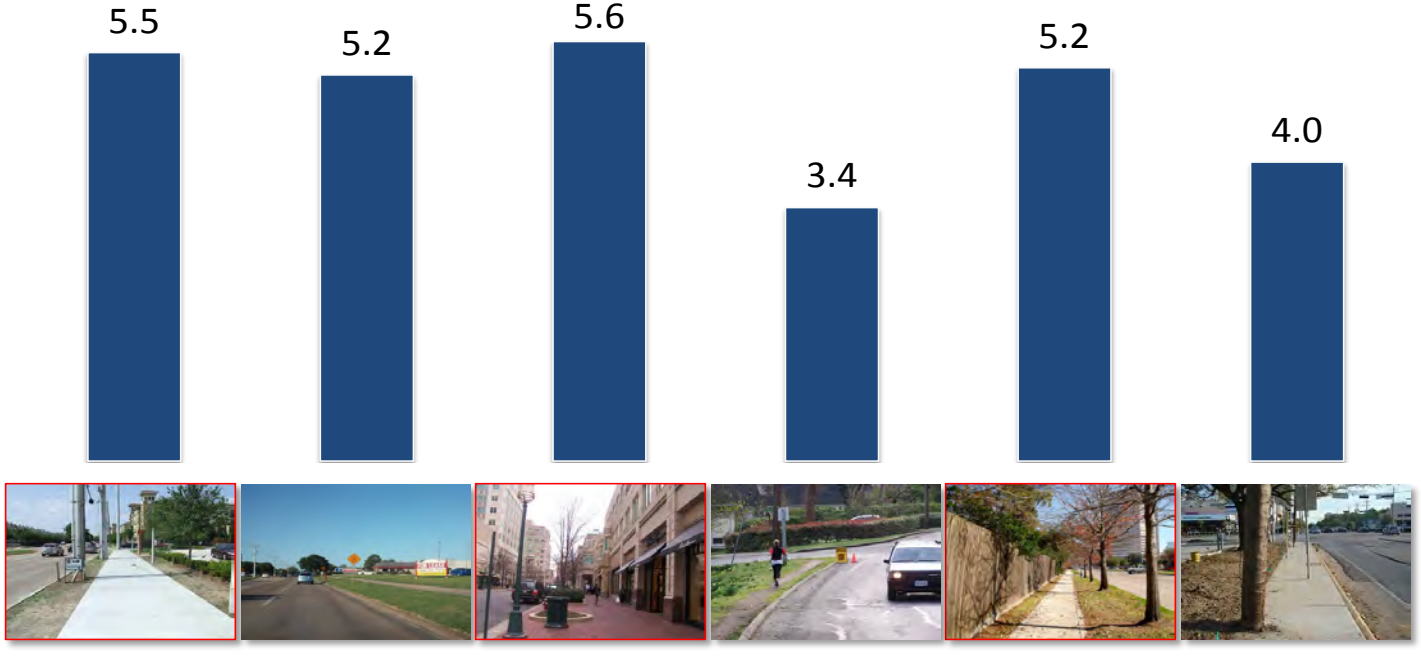
Respondents to the survey ranked the amount of separation from vehicle traffic as critical for pedestrians trips and identified the condition and quality of the sidewalk as important factors for deciding to walk. In general, pedestrians felt more comfortable than bicyclists in moving around Clear Lake.

Reason for selecting a facility type preference (Total number of times selected)



Pedestrian Facility Type **Preference**

Based on the survey, respondents prefered wider sidewalk facilities, ground level activity, and tree shade with a greater buffer from street traffic. Respondents seem to be more comfortable in a range of scenarios for walking than biking but recognize the challenge that impediments and sidewalk gaps represent in the study area.



Scale of 1 to 6 (6 = Strongly Agree the type would be comfortable, 1 = Strongly Disagree)

Barriers to **Increased Walking and Biking**

The respondents to the survey identified the major barriers to walking and biking in Clear Lake as primarily infrastructure related. Issues such as a lack of sidewalks or trails and the quality of the trails were top priorities. Crossing major roadway intersections, traffic volumes and speeds were also frequently identified as major barriers. Issues consistently not seen as major barriers include air quality and crime.

Several of the factors viewed as intermediate barriers are issues that will likely become more important as more walking and biking infrastructure gets built or upgraded. These include needs such as bicycle storage, shade trees, showers and lighting.

for pedestrians....

- Difficult to cross roadways/intersections
- Not enough sidewalks or trails

- Existing sidewalks are in poor condition
- Too much/Too fast traffic
- Lack of shade
- Destinations are too far
- Heat and humidity
- Lack of adequate lighting

- Lack of accessible curb ramps
- Poor air quality
- Fear of crime

for bicyclists....

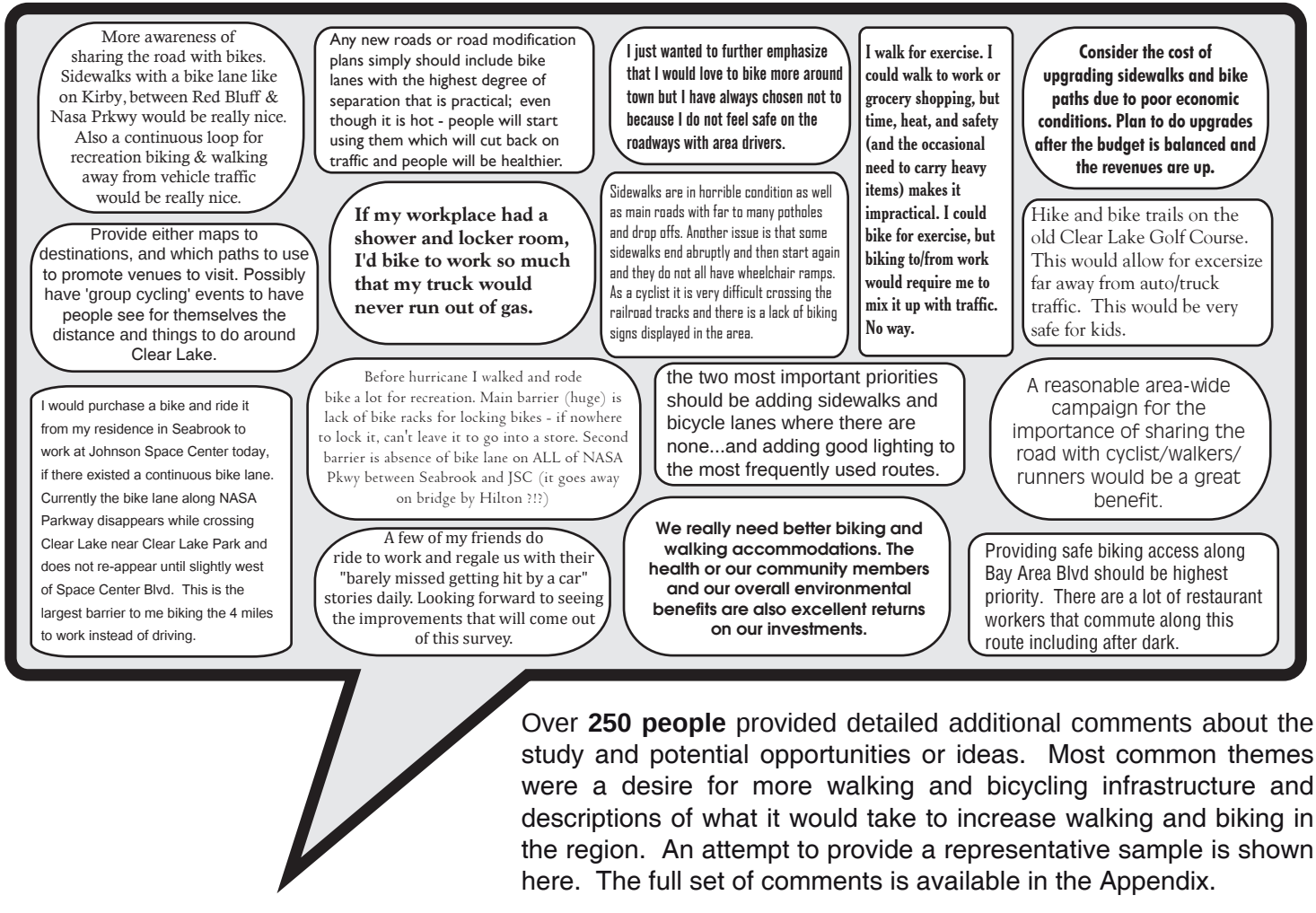
- Lack of facilities
- Too much/Too fast traffic
- Difficult to cross roadways/intersections

- Condition and quality of facilities
- Need for shower after ride
- Condition of roadway
- Heat and humidity
- No place to park / lock up bike
- Lack of shade

- Lack of adequate lighting
- Fear of crime
- Poor air quality

Seen as a major barrier | Seen as an intermediate barrier | Limited / not seen as a barrier

Survey **Quotes**



Over **250 people** provided detailed additional comments about the study and potential opportunities or ideas. Most common themes were a desire for more walking and bicycling infrastructure and descriptions of what it would take to increase walking and biking in the region. An attempt to provide a representative sample is shown here. The full set of comments is available in the Appendix.

Recommendations

The Conceptual Plan for pedestrian and bicycle improvements for the Clear Lake study area is discussed in this chapter. The recommendations within this plan are based on an analysis of the existing conditions and needs assessment, land use origins and destinations, safety analysis and the input received from stakeholders and the community combined with the study team's expertise in developing pedestrian and bicycle networks. Improvement ideas were developed to address gaps and opportunity areas that have been identified through the course of the study.

There are an array of improvement tools and represent opportunities to improve walking and bicycling in the study area within the medium term (5-10 years) that would be eligible for implementation both through local and federal funding sources. Where possible, recommendations outline near term improvements that have higher likelihood to be implemented, but in some corridors, phased improvements have been defined where further engineering study, policy changes or revisions to the roadway cross-sections or right of way would need to be considered for the long term recommendations to be implemented.

Recommendations were developed using the four districts introduced in the public engagement chapter. The recommendations identified opportunities for users that would significantly enhance connectivity in the study area by focusing on major arterials and regional connections.. A detailed approach for prioritizing and moving the projects to implementation is included in the **Implementation Plan** chapter of this report.

Recommendation **Toolbox**

To develop the Conceptual Plan, various tools for improving walking and biking were applied to address the gaps and opportunities identified through the needs assessment and public involvement. An overview of toolbox of approaches used to address these issues is shown here, and detailed descriptions are provided on the following pages.

Shared-use Path

A Shared-use Path is physically separated from traffic and may be used for both pedestrian and bicyclist traffic.

recommended: high volume streets
streets with high speed limits
natural areas & easements


Sharrow

Sharrows are road markings used to indicate a shared lane environment for bicycles and automobiles.

recommended: on streets with low volume
on streets with low speeds
along angled parking
to fill gaps in bike lanes or paths


Bike Racks and Storage

Bike Racks or covered storage improve accessibility and usefulness of bicycles for transportation.

recommended: within 65 feet of commercial business entrances
within 65 feet of office buildings entrances
at transit stops and public destinations


Bike Lane

A Bike Lane is defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists.

recommended: medium volume streets
streets with limits ≥ 35 mph


Bike Route Designation

Bike Route Designation is given to streets that are preferred for cyclists.

recommended: streets with bicycle facilities
low volume, low speed streets
streets that provide connectivity between neighborhoods


Crosswalk

Provide visibility for pedestrians crossing at intersections.

recommended: intersections
bus stops


Sidewalk

Sidewalks widths may vary based on land uses and traffic volume.

recommended: all streets


Pedestrian Midblock Crossing

Pedestrian Midblock Crossings provide connectivity where there are not intersections or there are long spacings. Markings or signal indications may be provided.

recommended: places with destinations on opposite sides of a street
where off street paths cross streets


Pedestrian Lighting

Lights that illuminate roadways are often too tall to properly illuminate sidewalks.

recommended: commerical streets
streets with high pedestrian volumes
shared use paths


The following approaches build on the description in the 1999 AASHTO Guide for the Development of Bicycle Facilities, City of Houston Standards, the 2009 Manual on Uniform Traffic Control Devices, and other best practices.

Facility Types


Sidewalk

Sidewalks - Effective sidewalks provide distinct separation of pedestrians and vehicles, serving to increase pedestrian safety as well as to enhance vehicular capacity. Sidewalks are typically an integral part of the transportation system in developed residential and commercial activity centers and central business districts. Sidewalks are typically a minimum of 5-feet in width (though wider is frequently preferred) and offset from the road to provide a level of comfort for pedestrians.


Residential Street

Shared Roadway (No Bikeway Designation) - Most bicycle travel in the United States now occurs on streets and highways without any bikeway designations. In some instances, the existing street system may be adequate for efficient bicycle travel and signing and striping for bicycle use may be unnecessary. This is true of many of the residential streets with low volume, low speed traffic in the study area.

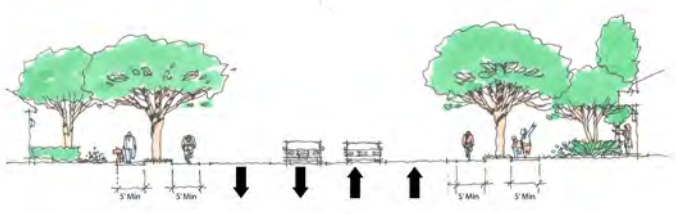

"Sharrow"

Signed Shared Roadway - Signed shared roadways are designated by bike route signs, and serve to provide continuity to other bicycle facilities (usually bike lanes or shared use paths) or designate preferred routes through high-demand corridors. They may also be supplemented with on-street shared routes markings (e.g., "Sharrows") They can include a wider outside line to accommodate cyclists (typically 14-feet or more). Signing and Sharrows also serve to advise vehicle drivers that bicycles are present.

Bike Lane

Bike Lanes - Bike lanes are established with appropriate pavement markings and signing along streets in corridors where there is significant bicycle demand and where there are distinct needs that can be served. Bicycle lanes should ideally be 5' minimum in width and may be implemented through a variety of approaches including, roadway widening, narrowing or reducing the number of existing lanes to create space or by improving existing shoulders and providing signing and pavement markings. Bike lanes maybe painted in color (primarily green) to improve visibility. Wider striping or raised curbs may also be used to supplement bike lanes to create a buffer and increase the amount of separation from vehicular traffic.

Other measures should be taken to ensure that bicycle lanes are effective facilities. In particular, bicycle-safe drainage inlet grates should be used, pavement surfaces should be smooth, and traffic signals should be responsive to bicyclists. Regular maintenance of bicycle lanes should be a top priority, since bicyclists are unable to use a lane with potholes, debris or broken glass.



Typical 4-lane Cross-Section with Bike Lanes

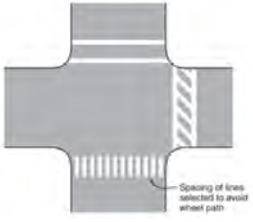
MKT Trail in Houston

Shared Use Path - Generally, shared use paths are facilities physically separated from vehicular traffic and are shared by pedestrians and bicycles. These paths should be used to serve corridors not served by roadways, particularly where open space or wide utility, drainage or former railroad right-of-way exists. Shared use paths should offer opportunities not provided by the road system. Theses facilities can appeal to less experienced riders and can provide a recreational opportunity or, in some instances, can serve as direct corridors to access destinations. Shared use paths are recommended to be at least 10-feet in width (12-feet preferred) for two way operation.

Intersection Improvements

While sidewalks and bicycle facilities are critical to creating an interconnected network, intersections improvements need to be considered to connect that network together. This study has identified a number of intersection improvements tools that can be applied to increase connectivity and safety at intersections for both bicyclists and pedestrians.

Intersection Crosswalks



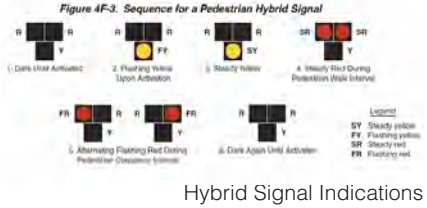
Examples of Crosswalk Markings

Crosswalk markings provide guidance for pedestrians who are crossing roadways by delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops. In conjunction with signs and other measures, crosswalk markings also help to alert road users of a designated pedestrian crossing point across roadways at locations that are not controlled by traffic control signals or signs. Pedestrian ramps and pedestrian push buttons should be placed appropriately at intersections in compliance with regulations such as the Americans with Disabilities Act.

Countdown Pedestrian Signal

Pedestrian Signal Indications

Pedestrian signal heads provide guidance on when it is appropriate to cross the street. They assist pedestrians in deciding when to begin crossing the roadway in the chosen direction of travel. For new installations, signal head with countdown indications for the flashing pedestrian clearance interval are typically required.



Hybrid Signal Indications

Mid-Block Crossing Tools

Hybrid Pedestrian Beacon - A pedestrian hybrid beacon (sometime referred to as a HAWK) is a special type of beacon used to warn and control traffic at an unsignalized location and assist pedestrians in crossing a street at a marked crosswalk. As shown in the adjacent MUTCD figure, they allow pedestrians to activate the beacon to stop conflicting traffic; the beacon remains dark during other times to maximize vehicle capacity.

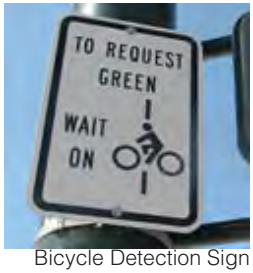
RRFB

Rapid Rectangular Flash Beacon - Studies (FHWA-SA-09-009) have shown that Rectangular Rapid Flash Beacons (RRFB) can enhance safety by reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings by increasing driver awareness of potential pedestrian conflicts. RRFBs can be lower cost alternatives to traffic signals and hybrid signals and increase driver yielding behavior at crosswalks significantly when supplementing standard pedestrian crossing warning signs and markings. They are allowed by FHWA as an experimental treatment in approved locations.

Green Painted Bike Lane at Merge Point - Seattle

Intersection Improvements for Bicycles

Pavement Markings - Colored pavement (typically green) within a bicycle lane increases the visibility of the facility and can identify potential areas of conflict between vehicles and bicycles. Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection, and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.



Bicycle Detection Sign

Signal Detection and Actuation - Bicycle detection at traffic signals is used at actuated signals to alert the signal controller of bicycle crossing demand on a particular approach. It is important to both accurately detect bicyclists and provide clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand). They are especially important in left turn lanes where bicyclist are turning left and in situations where extension of the green interval is necessary to allow bicycles to safely cross the intersection.

Bicyclist will also typically benefit from the installation of Hybrid Pedestrian Signals and RRFBs as they provide improved crossing opportunities at high volume crossing locations.

Other Amenities

Wayfinding - A bicycle wayfinding system consists of signing and/or pavement markings to guide bicyclists to destinations along preferred bicycle routes. Signs are typically placed at decision points along bicycle routes such as at intersections of two or more bikeways. Signage may provide confirmation that cyclists are on a particular route or alert riders to decision points to reach their destinations.

MUTCD Sign D1-2c

Bicycle Storage - Bicycle storage should provide appropriate facilities for both short and long term use. Bicycle racks such as the inverted U provide a safe place for cyclists as they make shorter stops such as retail trips. Long term storage should be provided through bike lockers for shelter protection or by locating the racks under existing covered facilities. This will support storage at facilities like the METRO Park and Ride where several lockers do exist.

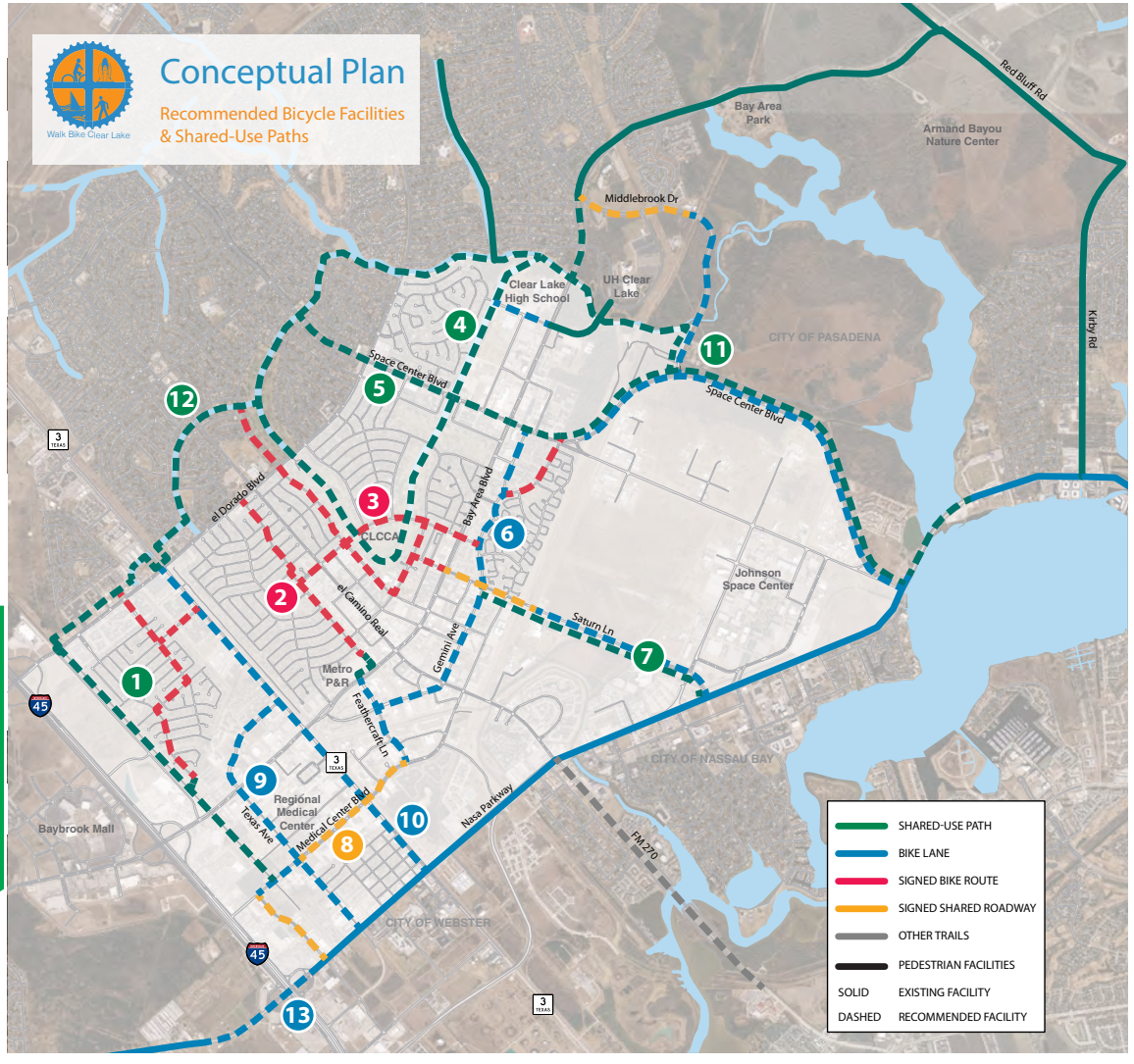
Recommended Projects

By applying the improvement tools from the toolbox to the gaps and opportunities identified through the Needs Assessment and the Public Involvement phases of the project, a set of recommended projects has been developed. Projects are defined based on a set of related improvements that could potentially be implemented together to create attractive connections to major origins and destinations. These projects are shown on the conceptual plan maps on the following pages.

The first two conceptual plan maps show study area level views of the recommended projects for bicycle/shared-use and pedestrian improvements, respectively. They are followed by a District level breakdown of projects using the same districts defined in the needs assessment and public involvement phases of the project.

Detailed project overviews with benefits, costs and prioritization have been developed in the Implementation Plan chapter of this report. Detailed profiles of area roadways are available in the Appendix.

Conceptual **Plan**



Based upon the needs assessment, stakeholder input and opportunity analysis, the conceptual plan was developed to identify potential projects. Projects were developed to connect major destinations, address safety issues and fill existing gaps.

The recommended projects focused on bicycle and shared use path connections include:

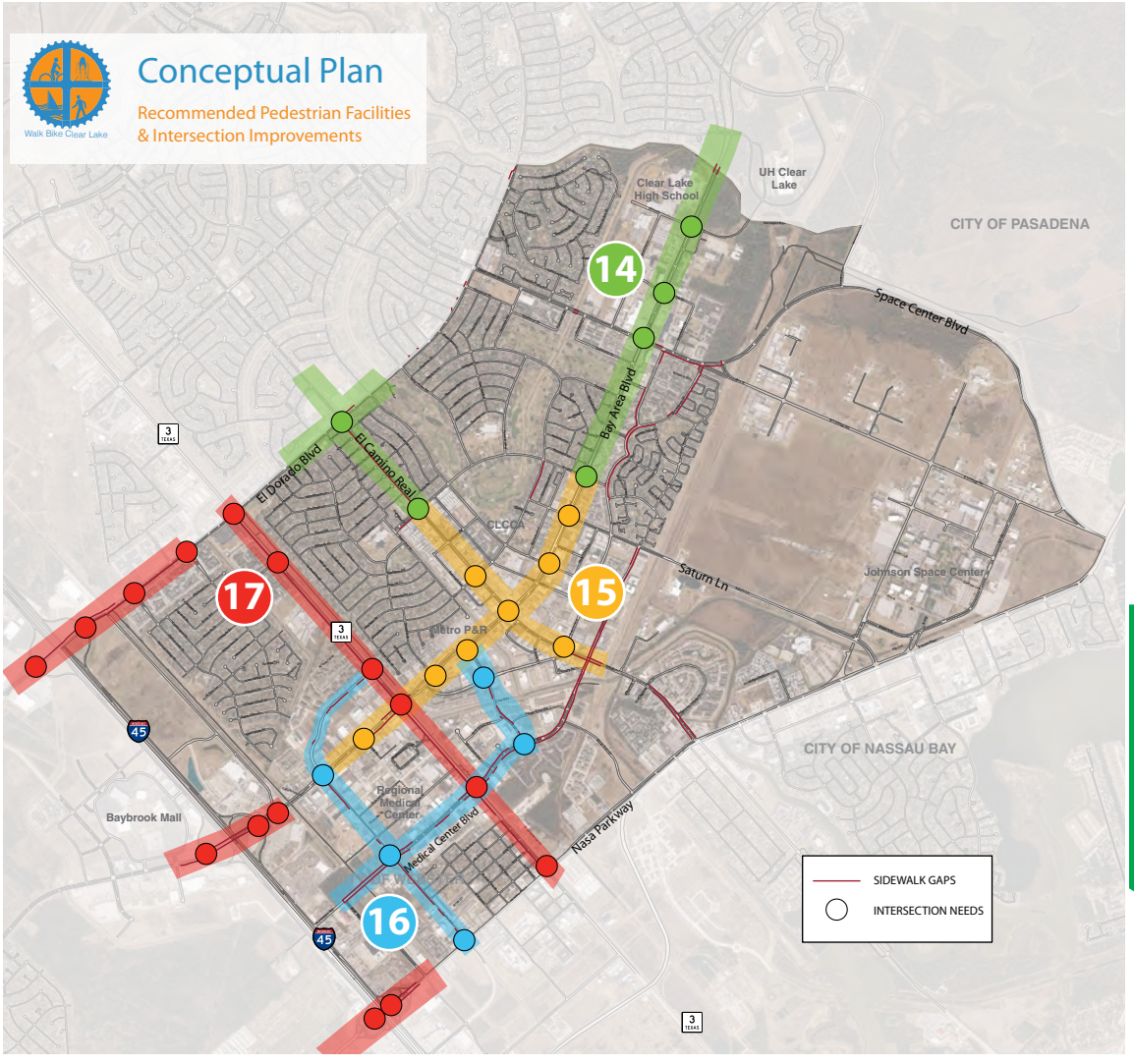
1. El Camino South Connections and Shared-Use Path
2. METRO Park & Ride and Neighborhood Connections
3. CLCCA / Golf Course Shared-Use Paths and Bike Routes
4. CCISD Drainage Easement Shared-Use Path
5. Space Center Blvd Shared-Use Path and Intersection Improvements
6. Gemini Ave. Bike Lanes / Route
7. Saturn Ln. Improvements
8. Medical Center Bike Lanes / Signed Shared Use
9. Texas Ave. Bike Lanes
10. SH 3 Improvements
11. Completing the Bay Area Blvd - Red Bluff - Kirby Trail Loop
12. Shared-use path along drainage ditch & utility easement
13. NASA Parkway Bike Lane Improvements

Sidewalk and intersection improvement projects include:

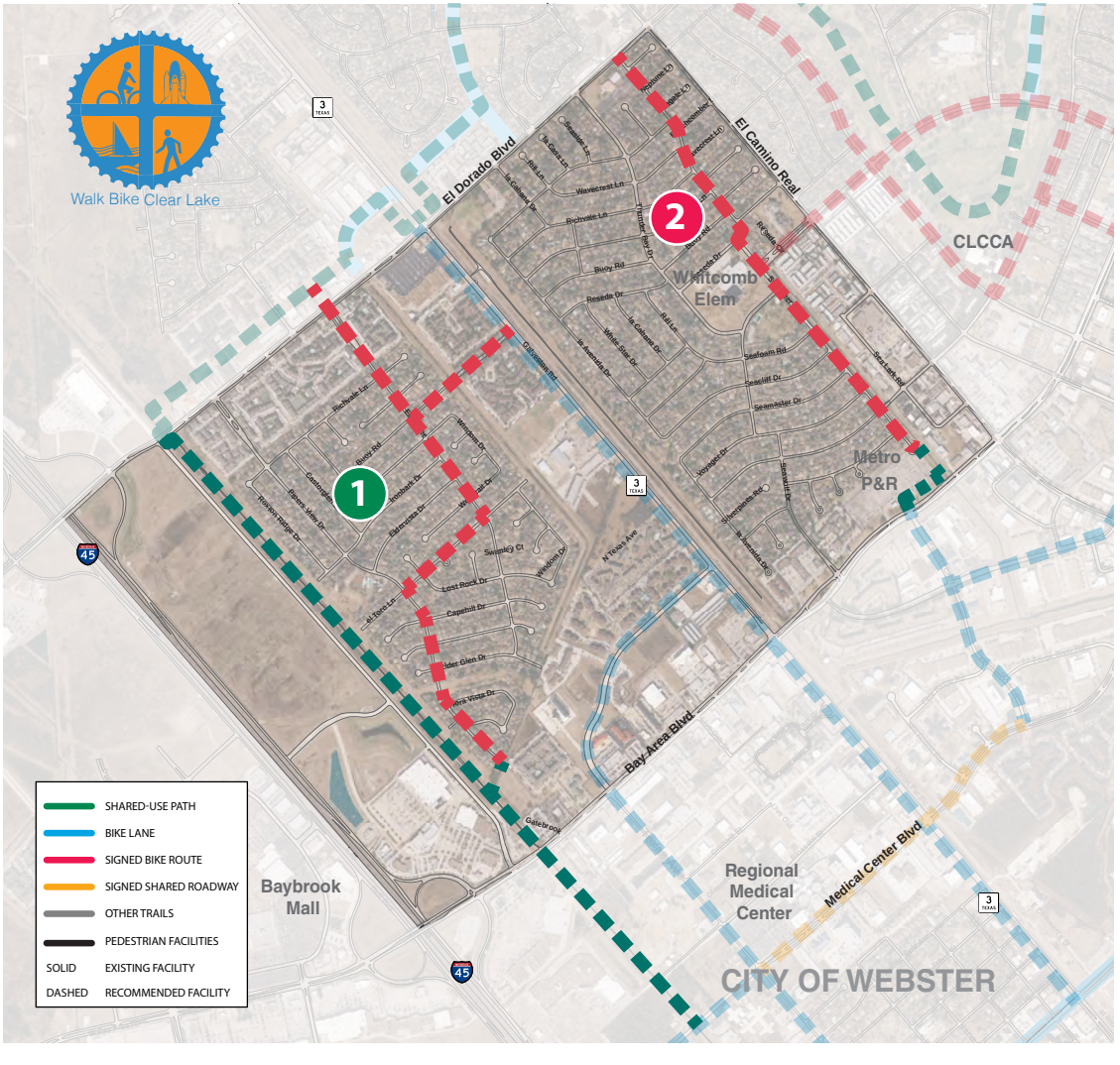
14. CCISD School Access Sidewalks
15. Commercial Access Sidewalks
16. Clear Lake Regional Medical Center Access Sidewalks
17. Barrier Crossing Sidewalks (IH-45, SH 3, UP Railroad)

Detailed descriptions of each project including the components, the cost and major benefits of implementation can be found in the **Implementation Chapter** of this report.

A profile of each of the roadway corridors where recommendations have been made can be found in the **Appendix** of this report.



District One **Conceptual Plan**



District 1: Residential & Transit

Recommended Projects

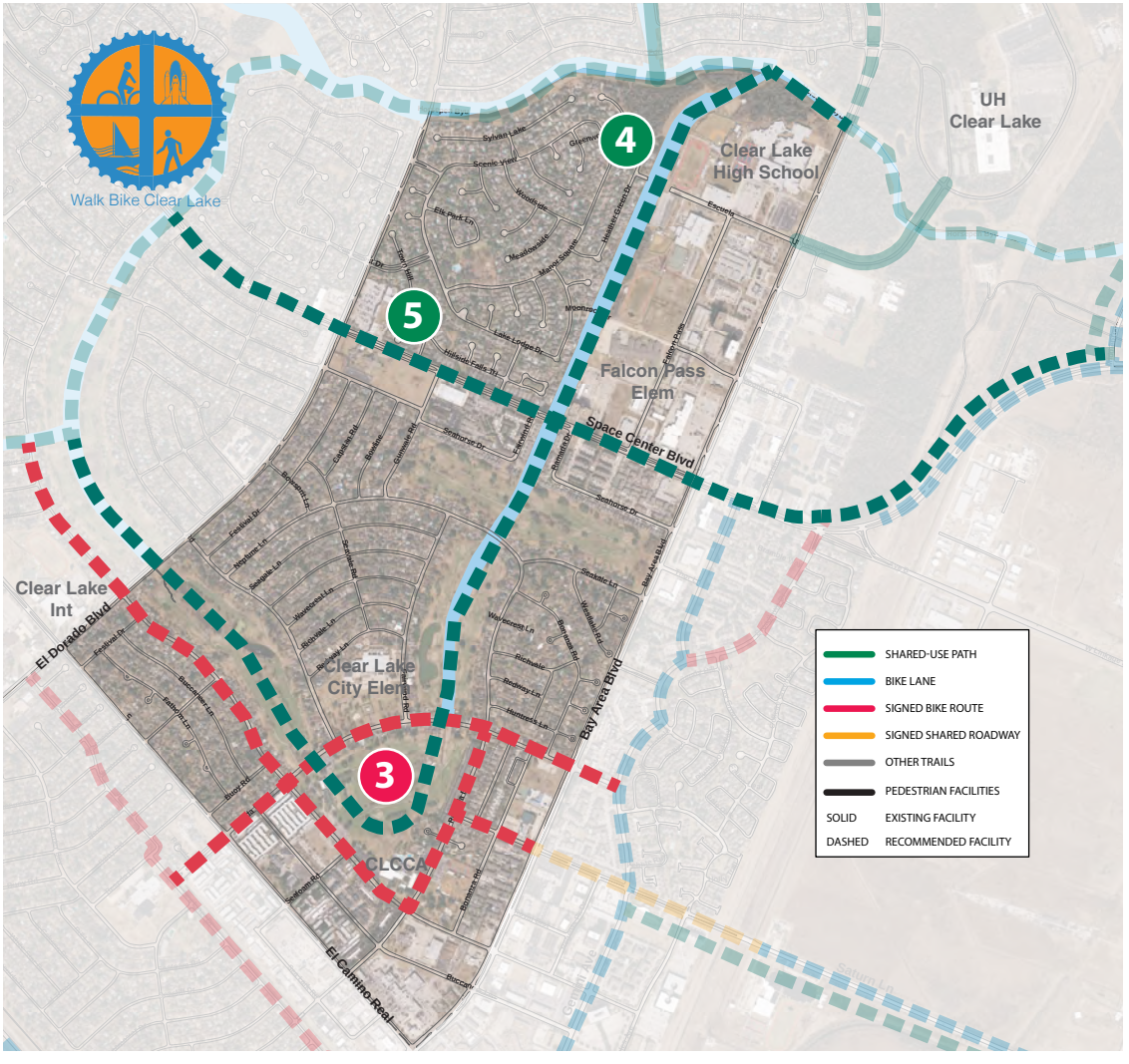
1 ***El Camino South* Connections and Shared-Use Path**

- *Shared-use path between El Dorado & Medical Center Blvd.*
- *Path connection into El Camino South subdivision*
- *Signed route along Piper's View Dr., El Toro Ln., and Eastcape Dr.*
- *Signed route along Buoy Rd.*
- *Bridge on Buoy Rd. across drainage ditch.*

2 **METRO Park & Ride and Neighborhood Connections**

- *Signed route along Sea Liner Dr. and Sea Lark Rd.*
- *Shared-use path along drainage ditch and Bay Area Blvd. between Sea Liner Rd. and Feathercraft Ln.*

District Two **Conceptual Plan**



District 2: Schools & Residential

Recommended Projects

3 **CLCCA / Golf Course**

- *Signed route along Reseda Dr. between Gemini Ave. and Sea Liner Dr.*
- *Signed route along Ramada Dr. between Reseda Dr. and Diana Ln.*
- *Signed route along Diana Ln. between Ramada Dr. and drainage ditch.*
- *Shared-use path on one side of drainage ditch from Space Center Blvd. to west of El Dorado Blvd.*

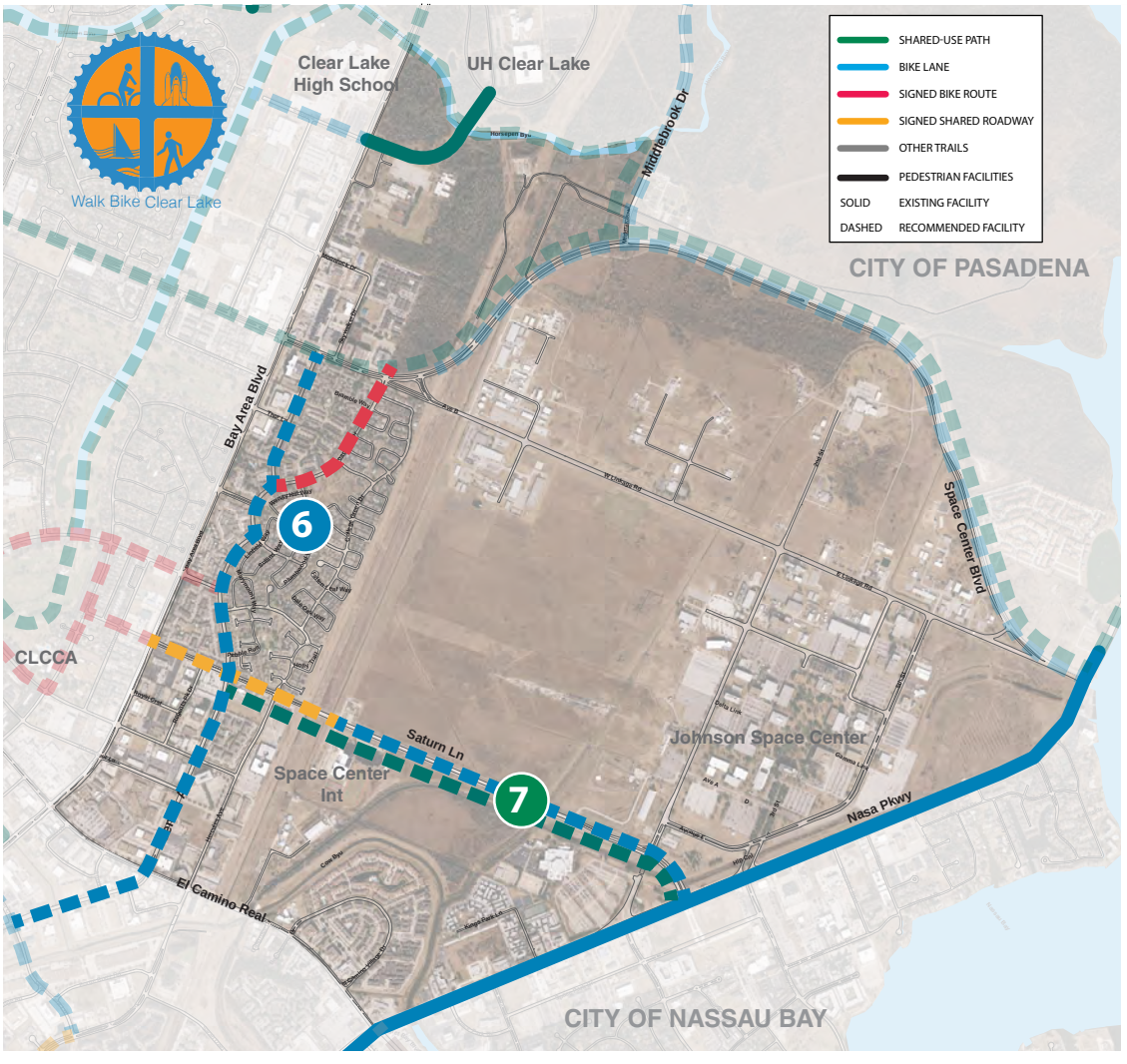
4 **CCISD Drainage Easement Shared-Use Path**

- *Shared-use path between Space Center Blvd. & Bay Area Blvd. behind Clear Lake High School*

5 **Space Center Blvd Shared-Use Path and Intersection Improvements**

- *Shared-use path on north side of the road between El Dorado Blvd. and Middlebrook Dr.*
- *Improvements at intersections to increase ease and safety of crossings.*

District Three **Conceptual Plan**



District 3: Johnson Space Center

Recommended Projects

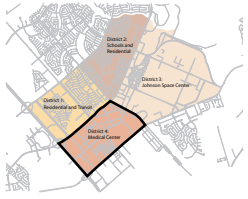
6 **Gemini Ave. Bike Lanes / Route**

- *Bike lanes and signage along Gemini Ave. between el Camino Real and Space Center Blvd.*
- *Signed route along Broadlawn Dr. between Gemini Ave. and Space Center Blvd.*

7 **Saturn Ln. Improvements**

- *Bike lanes on shoulder between Nasa Parkway and Space Center Intermediate.*
- *Shared lane markings and signage between Space Center Intermediate and Bay Area Blvd.*
- *Off road trail along south side of Saturn Lane between Nasa Parkway and Gemini Ave.*

District Four **Conceptual Plan**



District 4: Medical Center

Recommended Projects

8 Medical Center Bike Lanes / Signed Shared Use

- *Bike Lanes along Feathercraft Ln. between Bay Area Blvd. and Medical Center Blvd.*
- *Shared lane markings on Medical Center Blvd. between Feathercraft Ln. and Texas Ave.*
- *Bike lanes on Medical Center Blvd. between Texas Ave. and*
- *Shared lane markings on Kobayashi Rd. between Medical Center Blvd. and NASA Parkway.*

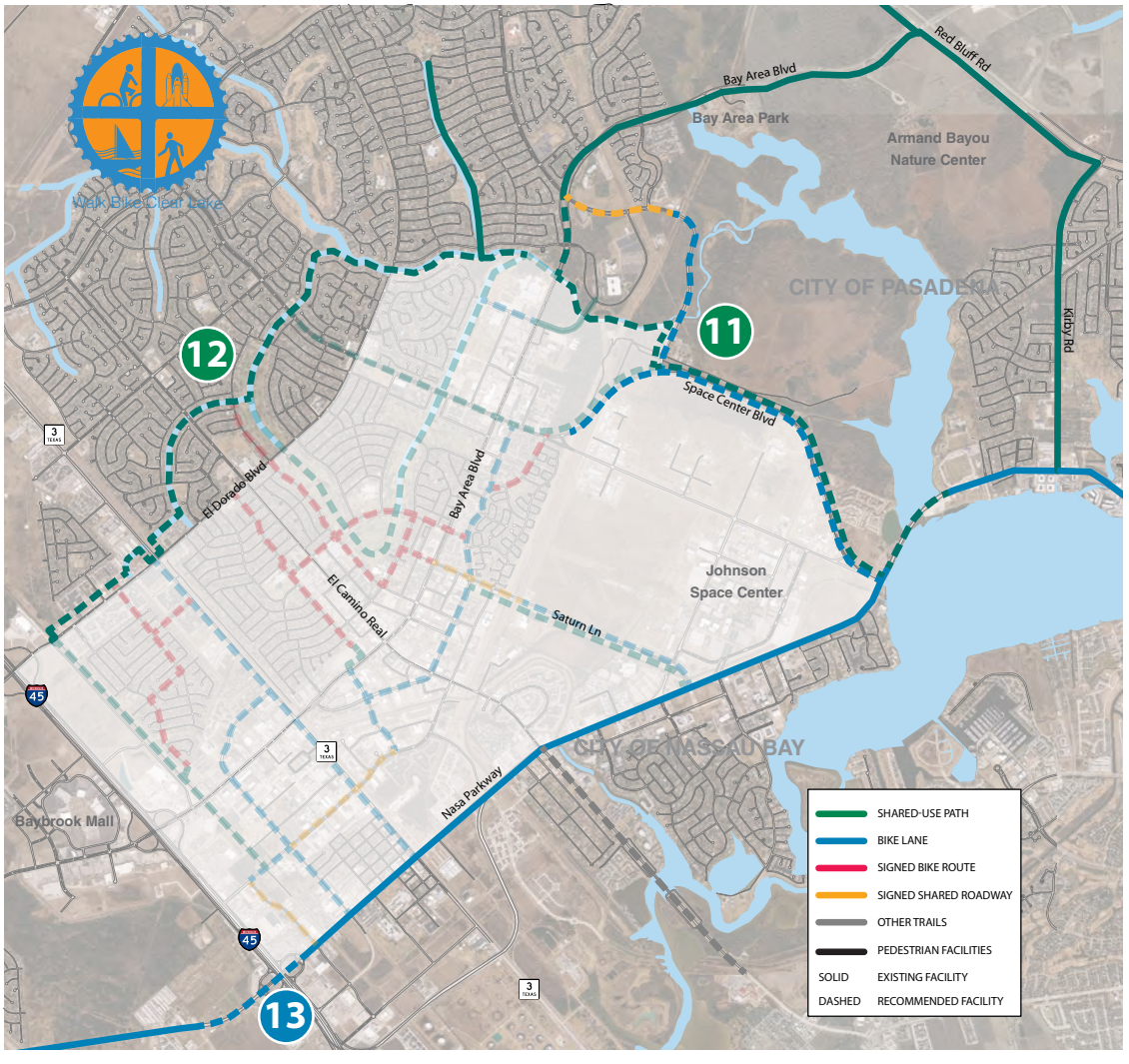
9 Texas Ave. Bike Lanes

- *Bike lanes along Texas Ave. between SH 3 and NASA Parkway*

10 SH 3 Improvements

- *Improve existing shoulders along roadway between SH 3 and NASA Parkway and add bicycle markings.*

Regional Connections **Conceptual Plan**



Regional Connections Recommended Projects

11 **Completing the Bay Area Blvd - Red Bluff Rd - Kirby Rd Trail Loop**

- *Shared-use path along Space Center Blvd. from NASA Pkwy. to Middlebrook Dr.*
- *Improve existing shoulders along Space Center Blvd. and add bike lane markings.*
- *Bike lanes and shared-lane markings along Middlebrook Dr.*
- *Shared-use path along Bay Area Blvd. between Horsepen Bayou and Middlebrook Dr.*
- *Ramps onto bridge sidewalk from bike lanes on NASA Pkwy.*

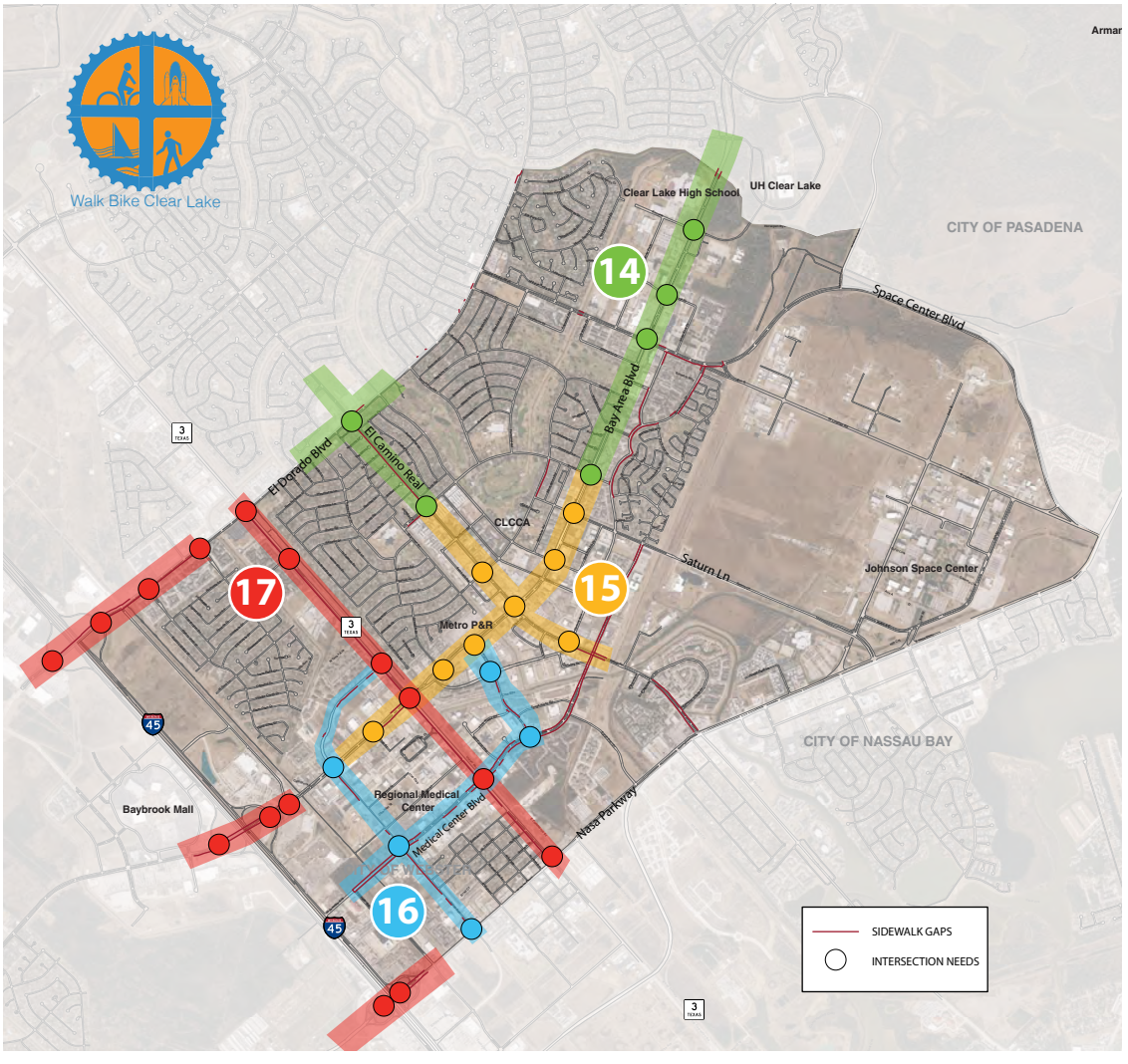
12 **Shared-use path along drainage ditch & utility easement**

- *From SH 3 to bayou junction just west of Bay Area Blvd.*
- *Shared-use path between SH 3 and Gatebrook Dr. along utility easement.*

13 **NASA Parkway Bike Lane Improvements**

- *Bike lanes on NASA Parkway from just south of Kobayashi Rd. to Challenger Blvd.*
- *Green bike lane markings at select intersections.*

Pedestrian **Conceptual Plan**



Pedestrian & Intersection Improvements

Recommended Projects

14 CCISD School Access Sidewalks

- *Phase 1: Intersection improvements and fill existing sidewalk gaps*
- *Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min, 6' preferred on Bay Area Blvd.)*

15 Commercial Access Sidewalks

- *Phase 1: Intersection improvements and fill existing sidewalk gaps*
- *Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min)*

16 Clear Lake Regional Medical Center Access Sidewalks

- *Phase 1: Intersection improvements and fill existing sidewalk gaps*
- *Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min)*

17 Barrier Crossing Sidewalks (I-45, SH 3, and UP Railroad)

- *Phase 1: Intersection improvements and fill existing sidewalk gaps*
- *Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min)*

Implementation Plan

Project implementation can go a long way towards improving walking and cycling in the study area, but that alone is not sufficient to improve the culture around walking and biking in the region and maximizing the potential usage of those facilities. Recommendations have been made to focus on the other components of a successfully implemented pedestrian and bicyclist system including Education, Encouragement, Evaluation and Enforcement (4 of the 5 E's of a holistic plan) with the 5th E - Engineering addressed through the projects identified in the Conceptual Plan.

The 17 recommended improvement projects identified in the Conceptual Plan for the Clear Lake Pedestrian and Bicyclist Study were developed to address existing barriers and gaps to increase walking and bicycling and create safe, high quality connections to major destinations and activity centers in the study area and the region. While the conceptual plan lays the ground work for what the desired end state for improving walking and biking will look like, the development of an implementation plan, as described in this chapter, provides the critical elements to make the conceptual plan a reality. These elements include greater detail on project specifics, benefits and connections. They also include a prioritization approach based on critical implementation elements including:

- **Cost estimates and funding options** - Potential sources of funding and partnerships to implement each project. Estimated costs for various design options to implement each of the projects
- **Projected Demand** - the likely usage for each of the recommended corridors based on currently demographic or the area, land use and activity centers
- **Feasibility/Ease of implementation** - the ease or challenge of projects due to factors such as right-of-way, policies and regulations, and construction challenges.
- **Community input** - the feedback received through the public meetings and the website on which identified projects the community would like to see happen first

With a prioritized list of projects, the City of Houston and other local agencies such as Harris County and adjacent cities can target their efforts to deliver the projects that will have the greatest benefit to the community. This Chapter also discusses potential air quality benefits that may be realized by the implementation of recommended projects.

Developing a Pedestrian and Bicyclist Plan

While the majority of the recommendations identified through the course of this study are related to infrastructure improvements, other factors are important to creating an atmosphere where an increasing share of overall trips utilize non-vehicular modes including biking and walking. A substantial mode shift would require a cultural change for users, motorists, employers, government officials and staff and others. Cultural change would be supported by activities that go beyond the implementation of more pedestrian and bicyclist infrastructure.

A framework for creating a holistic approach is the 5E Framework. The first E is Engineering, which is developed through the planning and design of bicycle and pedestrian facilities. The other four E's are:

- Education
- Encouragement
- Enforcement
- Evaluation

Developing programs to address these is a critical component to a successful and reinforcing pedestrian and bicycle program.

Education

Education can be a powerful tool for enhancing the focus of a community toward increased walking and biking. Education can inform related behavior while improving skills and safety. Pedestrians, bicyclists and motorists can all benefit from educational approaches that teach them the rules, rights, and responsibilities of various modes of travel.

It is also important to recognize that there is wide differences in skills and abilities among bicyclist, pedestrians and motorists. Programs should be targeted across this range of target audiences. Potential opportunities include:

- Partner with local bicycle shops and cycling clubs on programs to share bicycle education.
- Develop a bicycle suitability map to show the breadth of options available for increased riding at various skill levels.
- Develop Safe Routes to School programs with Clear Creek ISD schools to better understand walking and driving patterns for local schools and educate students and parents on benefits of increased walking and biking.
- Work with driver education programs to increase driver knowledge of pedestrian and bicycle regulations.

Encouragement

By promoting and encouraging walking and bicycling, organizations can create incentives to consider broader transportation choices. Potential strategies for promoting walking and bicycling in the community include:

- Work with local businesses to provide incentives for increased walking (or transit) and bicycling commuting including benefit programs, cash out parking programs, bike storage and on-site showers.
- Create awareness programs to alert others to the benefits of walking and bicycling and how they foster healthier, more livable communities.
- Expand Bike to Work Days to cover Clear Lake job centers like NASA and the Regional Medical Center to encourage more participation.
- Expand the City of Houston Bicycle Map and online tools to include the Clear Lake area as improvements are approved and implemented.

Enforcement

Enforcement covers several factors to support improved pedestrian and bicycling programs. They include both enforcing traffic laws and regulating bicyclists, motorists, and other roadway users, as well as developing and enforcing policies for the operations and maintenance of pedestrian and bicycling facilities. Enforcement programs can be used to educate roadway users about the traffic laws that govern them; serve as periodic reminders to obey traffic rules; encourage safer behaviors; and monitor and protect public spaces. They can also help reinforce and support educational programs and messages. Potential improvement ideas include:

- Develop and distribute summaries of bicycle related policies and laws to local law enforcement.
- Ensure enforcement is focused and all modes of travel (e.g., bicyclist and vehicles).

Evaluation

The ongoing assessment and management of the bicycle and pedestrian networks is critical to maintain high quality facilities and a culture that support more walking and biking. Potential evaluation opportunities include:

- Define and measure performance management criteria for operations and maintenance of sidewalk and bicycle facilities (e.g., riderships, percent swept per month, percent lane pavement and sidewalks in good condition).
- Update bicycle master plan on a regular basis based on completion of projects and changes in demand as well as feedback from community.

Detailed Project Descriptions

To support the implementation of the projects defined in the Conceptual Plan, detailed descriptions of the projects were developed and projects were prioritized. Theproject descriptions were envisioned to be inputs into approval conversations and funding requests such as Transportation Enhancement projects and Transportation Improvement Plan (TIP) applications related to pedestrian and bicycle improvements. The methodology for the development of this table is described in the following pages.

A detailed breakdown of the cost estimates can be found in the Appendix. These planning level estimates are based on most recent 12-month unit price bids obtained from the Texas Department of Transportation. Projects were also given a relative priority ranking of 1-4. Priority 1 being the highest priority projects based on community input, cost, demand and feasibility and Priority 4 being the lowest priority. It is important to note while Priority 4 projects are considered the lowest priority among the identified projects, they are still considered important to mobility in Clear Lake and should be re-prioritized as other projects are completed.

District 1 Projects

P# : Project #

Project #	Project Name	District	Detailed Components	Cost Estimate	Priority	Major Project Benefits
①	El Camino South Connections and Shared-Use Path	1	• Shared-use path between El Dorado & Medical Center Blvd. • Path connection into El Camino South subdivision • Signed route along Piper's View Dr., el Toro Ln., and Eastcape Dr. • Signed route along Buoy Rd. • Bridge on Buoy Rd. across drainage ditch	$685,500	4	• Provides access to Regional Medical Center for large residential neighborhood (El Camino South) • Signed route within neighborhood guides cyclists to shared-use path • Drainage ditch bridge provides direct connection for pedestrian and cyclists to SH 3; also allows apartment dwellers on SH 3 to access shared-use path • Connects to proposed SH 3 bike lanes (P10), Medical Center Blvd bike lanes (P8), and El Dorado shared-use path (P12)
②	METRO Park & Ride and Neighborhood Connections	1	• Signed route along Sea Liner Dr. and Sea Lark Rd. • Shared-use path along drainage ditch and Bay Area Blvd. between Sea Liner Rd. and Feathercraft Ln.	$57,500	3	• Signed route guides cyclists from adjacent neighborhood and larger bike network to Metro Park and Ride and Whitcomb Elementary School • Path connects signed route around Park and Ride into Webster via proposed Feathercraft Lane bike lane; essential connection because Park and Ride is gated at night • Connects to proposed bike lanes on Feathercraft (P8) and signed bike route on Reseda (P3)

District 2 Projects

Project #	Project Name	District	Detailed Components	Cost Estimate	Priority	Major Project Benefits
③	CLCCA / Golf Course Shared-Use Paths and Bike Routes	2	• Signed route along Reseda Dr. between Gemini Ave. and Sea Liner Dr. • Signed route along Ramada Dr. between Reseda Dr. and Diana Ln. • Signed route along Diana Ln. between Ramada Dr. and drainage ditch. • Shared-use path on one side of drainage ditch from Space Center Blvd. to west of El Dorado Blvd.	$683,000	1	• Signed route connects wider network (eg proposed Gemini bike lanes and P2 facilities) through neighborhood. • Signed route also provides parallel route to Golf Course shared-use path between path access points. • Golf Course shared-use path connects neighborhood to Clear Lake High School, Clear Lake City Community Association facilities, and proposed regional trail network of P12. • Connects to proposed shared-use path on northwest edge of study area (P12), Space Center Blvd shared-use path (P5), and Clear Lake HS shared- use path (P4)
④	CCISD Drainage Easement Shared-Use Path	2	• Shared-use path between Space Center Blvd. & Bay Area Blvd. behind Clear Lake High School	$368,500	2	• Path runs adjacent to Clear Lake High School and near University of Houston - Clear Lake. • Path would connect to proposed Golf Course path and together form an essential north-south backbone. • Existing pedestrian bridge already provides connection to adjacent residential community.
⑤	Space Center Blvd Shared-Use Path and Intersection Improvements	2	• Shared-use path on north side of the road between drainage ditch and Middlebrook Dr. • Improvements at intersections to increase ease and safety of crossings.	$841,000	3	• Path would provide essential east-west backbone to network. • Serves Clear Lake High School via proposed drainage ditch path (P4). • Connects to major commercial destinations at intersection of Bay Area Boulevard and Space Center Boulevard. • Connects to proposed Bay Area - Red Bluff - Kirby - Space Center bike loop. • Provides primary route for cyclists in the far north of the study area to access Regional Medical Center via proposed Gemini bike lanes.

District 3 Projects

Project #	Project Name	District	Detailed Components	Cost Estimate	Priority	Major Project Benefits
⑥	Gemini Ave. Bike Lanes / Route	3	• Bike lanes and signage along Gemini Ave. between Feathercraft and Space Center Blvd. • Signed route along Broadlawn Dr. between Gemini Ave. and Space Center Blvd.	$633,000	4	• Bay Area Boulevard destinations are easily accessible from any point along Gemini • Traffic volumes and speeds are relatively low along Gemini, making it an ideal bike route • This facility would provide the primary north-south backbone of the proposed bicycle network • Connects to proposed Bay Area - Red Bluff - Kirby - Space Center bike loop (P11), Space Center Blvd shared use path (P5), Saturn Ln facilities (P7), and Medical Center facilities (P8)
⑦	Saturn Ln. Improvements	3	• Bike lanes on shoulder between NASA Parkway and Space Center Intermediate. • Shared lane markings and signage between Space Center Intermediate and Bay Area Blvd. • Off road trail along south side of Saturn Lane between NASA Parkway and Gemini Ave.	$429,000	3	• Facilities on Saturn would provide essential east-west connectivity. Provides access to Johnson Space Center, Nassau Bay, and NASA Parkway bike lanes • Parallel trail would offer access to these important destinations for less experienced cyclists. • Bike lanes and shared lanes would connect directly into signed routes of P3 • Provides access to Space Center Intermediate School
⑧	Medical Center Bike Lanes / Signed Shared Use	3	• Bike Lanes along Feathercraft Ln. between Bay Area Blvd. and Medical Center Blvd. • Shared lane markings on Medical Center Blvd. between Feathercraft Ln. and Texas Ave. • Bike lanes on Medical Center Blvd. between Texas Ave. and Kobayashi Rd. • Shared lane markings on Kobayashi Rd. between Medical Center Blvd. and NASA Parkway.	$316,694	4	• Provides access to Metro Park and Ride, Regional Medical Center, and businesses along IH-45 Frontage Road and in Webster • Connects existing NASA Parkway bike lanes, proposed Texas Ave bike lanes, Gemini bike lanes, and shared-use path of P1 • Medical Center Blvd south of Texas Ave has wide ROW and could potentially be restriped to provide buffered bike lanes

District 4 Projects

Project #	Project Name	District	Detailed Components	Cost Estimate	Priority	Major Project Benefits
⑨	Texas Ave. Bike Lanes	4	Bike lanes along Texas Ave. between SH 3 and NASA Parkway	$592,000	4	• Provides access to Regional Medical Center and business along Bay Area Blvd and NASA Pkwy in Webster. • Provides access to Texas Ave Park. • Provides principal east-west bike route through Webster.
⑩	SH 3 Improvements	4	Improve existing shoulders along roadway between El Dorado and NASA Parkway and add bicycle markings.	$67,670	1	• Provides access to businesses fronting SH 3. • Connects to existing NASA Pkwy bike lanes. • Connects to proposed Medical Center shared lanes (P8), Texas Ave bike lanes (P9), Buoy St signed route (P1), and El Dorado shared use path (P12)

Regional Connectivity Projects

Project #	Project Name	District	Detailed Components	Cost Estimate	Priority	Major Project Benefits
⑪	Completing the Bay Area Blvd - Red Bluff Rd - Kirby Rd Trail Loop	Regional	• Shared-use path along Space Center Blvd. from NASA Pkwy. to Middlebrook Dr. • Improve existing shoulders along Space Center Blvd. and add bike lane markings. • Bike lanes and shared-lane markings along Middlebrook Dr. • Shared-use path along Bay Area Blvd. between Horsepen Bayou and Middlebrook Dr. • Ramps onto bridge sidewalk from bike lanes on NASA Pkwy. • Shared-use path along bayou between Space Center and Bay Area Blvd.	$1,432,000	1	• Provides access to Johnson Space Center, Nassau Bay, Seabrook, UH-Clear Lake, and Clear Lake High School. • Provides access to Armand Bayou Nature Center and Bay Area Park. • Connects to existing facilities on NASA Pkwy, Kirby Rd, Red Bluff Rd, and Bay Area Blvd. • Connects to proposed shared-use path behind Clear Lake HS (P4) and bike facilities along Gemini and Broadlawn (P6)
⑫	North-South shared-use path along drainage ditch & utility easement	Regional	• From SH 3 to bayou junction just west of Bay Area Blvd. • Shared-use path between SH 3 and Gatebrook Dr. along utility easement.	$1,433,000	3	• Provides primary north-south bike backbone for northwest side of study area • Connects to existing Middlebrook Subdivision trails • Connects to proposed utility easement shared-use path (P1), SH 3 bike lane (P10), Golf Course shared-use path (Project 3), Space Center Blvd shared-use path (P5), and Clear Lake High School shared-use path (P4)
⑬	NASA Parkway Bike Lane Improvements	Regional	• Bike lanes on NASA Parkway from just south of Kobayashi Rd. to Challenger Blvd. • Green bike lane markings at select intersections.	$298,000	1	• Fills gap in existing bike lanes along NASA Pkwy. • Improves safety of existing bike lanes at difficult intersections.

Sidewalk Projects

Project #	Project Name	District	Detailed Components	Cost Estimate	Priority	Major Project Benefits
⑭	CCISD School Access Sidewalks	Sidewalk	• Phase 1: Intersection improvements and fill existing sidewalk gaps • Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min, 6' preferred on Bay Area Blvd.)	Phase 1: $84,000 Phase 2: $1,812,000	3	• Provides access to Clear Lake High School, UH-Clear Lake, and Clear Lake Intermediate School. • Provides access to commercial businesses along Bay Area Blvd. • 6' sidewalks on Bay Area Blvd accommodate bicyclists on last leg of trip to Bay Area Blvd destinations from rest of proposed bike network.
⑮	Commercial Access Sidewalks	Sidewalk	• Phase 1: Intersection improvements and fill existing sidewalk gaps • Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min)	Phase 1: $232,000 Phase 2: $1,210,000	2	• Provides access to commercial businesses along Bay Area Blvd and el Camino Real. • Cyclists have indicated that they use Bay Are Blvd sidewalks as a north-south corridor but gaps in sidewalk south of SH 3 disrupt connectivity. • 6' sidewalks on Bay Area Blvd accommodate bicyclists on last leg of trip to Bay Area Blvd destinations from rest of proposed bike network.
⑯	Clear Lake Regional Medical Center Access Sidewalks	Sidewalk	• Phase 1: Intersection improvements and fill existing sidewalk gaps • Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min)	Phase 1: $635,000 Phase 2: $657,000	4	• Provides access across IH-45 to Baybrook Mall and other commercial districts where Clear Lake residents work and shop. • Provides access across SH 3. • Many pedestrians and cyclists already cross these barriers without safe facilities - high demand.
⑰	Barrier Crossing Sidewalks (IH 45, SH 3, UP RR)	Sidewalk	• Phase 1: Intersection improvements and fill existing sidewalk gaps • Phase 2: Upgrade sidewalk to current standards (e.g. 5' width min)	Phase 1: $289,000 Phase 2: $761,000	3	• Provides pedestrian access to Regional Medical Center and within Webster. • Provides access to commercial businesses along Bay Area Blvd. • Provides access to Texas Ave Park.

Project Prioritization Approach

The 17 projects identified through the Conceptual Plan were prioritized to support the City of Houston and other stakeholders in focusing resources where they will have the most positive impact for the community. Projects identified all have potential benefits for the region; assigned priorities are relative to that of other Clear Lake projects. The projects were broken into four priority categories.

Priority 1 - Highest priority represented by stronger community support, lower costs, and higher ease of implementation.

Priority 2 - Medium-high priority represented by solid community support, low-medium costs, and/or medium ease of implementation (some challenges).

Priority 3 - Medium priority represented by some community support, Moderate costs and barriers costs, and/or lower ease of implementation.

Priority 4 - Lower priority represented by limited community support, higher costs and barriers, and/or lower ease of implementation.

It is important to note that projects should be re-prioritized as high priority projects are implemented and that even lower priority projects are viewed as important to creating a complete system for improving walking and biking in Clear Lake.

To determine relative prioritization, the projects were each ranked in 4 categories and a cumulative score was determined for each project. The categories and scores are as follows:

Cost Estimates (1-3) - See Appendix for details

- 3 points - Less than $100,000
- 2 points - $100,000-250,000
- 1 Point - Greater Than $250,000

Ease of Implementation (1-3)

- 3 points - High (Limited challenges; Can implement quickly)
- 2 points - Medium (Moderate challenges)
- 1 Point - Low (Significant challenges such as Right of Way Acquisition)

Projected Demand (1-3) - See Appendix for details

- 3 Points - High
- 2 Points - Medium
- 1 Point - Low

Community Input (1-5) - based on the number of votes received in the online Project Prioritization Survey and Third Public Meeting.

- 5 Points - Top 20% of Projects
- 4 Points - 2nd 20% of Projects
- 3 Points - 3rd 20% of Projects
- 2 Points - 4th 20% of Projects
- 1 Point - Bottom 20% of Projects

The relative prioritization of the 17 projects is shown in the following Table.

Clear Lake **Project Prioritization** Table

Tier	Project #	Project # - Name	Cost Score (1)	Ease of Implementation (2)	Projected Demand (3)	Community Input (4)	Total Prioritization Score (1+2+3+4)
1	13	NASA Parkway Bike Lane Improvements	3	2	2	5	12
1	3	CLCCA / Golf Course Shared-Use Paths and Bike Routes	1	2	3	5	11
1	11	Completing the Bay Area Blvd - Red Bluff Rd - Kirby Rd Trail Loop	1	2	3	5	11
1	10	SH 3 Improvements	3	3	1	4	11
2	4	CCISD Drainage Easement Shared-Use Path	2	3	2	3	10
2	15	Commercial Access Sidewalks	3	3	2	2	10
3	5	Space Center Blvd Shared-Use Path and Intersection Improvements	1	2	2	4	9
3	12	Shared-use path along drainage ditch & utility easement	1	1	3	4	9
3	7	Saturn Ln. Improvements	2	3	1	3	9
3	2	METRO Park & Ride and Neighborhood Connections	3	3	1	2	9
3	17	Barrier Crossing Sidewalks (IH 45, SH 3, UP RR)	3	1	3	2	9
3	14	CCISD School Access Sidewalks	3	3	2	1	9
4	1	El Camino South Connections and Shared-Use Path	1	1	3	3	8
4	6	Gemini Ave. Bike Lanes / Route	2	2	1	3	8
4	16	Clear Lake Regional Medical Center Access Sidewalks	2	3	2	1	8
4	9	Texas Ave. Bike Lanes	2	2	1	2	7
4	8	Medical Center Bike Lanes / Signed Shared Use	2	2	1	1	6

The project prioritization developed for the Clear Lake Pedestrian and Bicyclist Study is based on a number of assumptions in terms of cost, implementability and demand drivers. These can be understood better through the detailed approach descriptions in the Appendix of this report. It is also important to understand that circumstances may change that allow certain projects to be accelerated or prioritized. For example, the costs presented are the full estimated costs for the project based on current Texas Department of Transportation (TxDOT) statewide, contracted average prices as of August 31, 2011. They may exceed the cost that would be carried by a local city of county because funding programs may provide significant matching funds (up to 80% in some cases) for items such as shared use paths or sidewalks around schools.

Implementing agencies may also select to use different design standards than those assumed in this report which may increase or decrease the estimated cost of a particular project, affecting the project's attractiveness. For example, the shared-use paths recommended in this study were assumed to be 12'-wide concrete paths based on TxDOT standards and implemented with a design-bid-build process. Many paths have been constructed in the region using other materials such as asphalt with varying widths and construction techniques that result in lower implementation costs. As part of this study Harris County - Precinct 2 indicated a potential desire to construct off-road paths with their in-house construction crews, where materials were available, also potentially limiting cost and making projects a higher priority.

Based on conversations with City of Houston officials, this report does not specifically recommend a reduction in travel lanes for any roadway where bicycle facilities are proposed. These projects were estimated based on the cost of moving the curbs and widening the roadway to allow the implementation of facilities like bike lanes. Should further engineering studies and City of Houston officials determine that a reduction in travel lanes that allows the implementation of on street facilities be warranted, the estimated cost of re-striping to allow for bicycle lanes has be included as an alternate cost on the Cost Estimate section of the Appendix.

One other factor influencing prioritization regards the implementation of shared-use trails along drainage and utility easements. Drainage easements can have complex ownership structures that make implementation a challenge because it requires reaching consensus across a number of different people. While utility easements may not have the same complexity of ownership, the utilities in the Houston region, primarily Centerpoint, have not been supportive of trails on their easements until legislation limiting their liability be passed in the State of Texas legislature. Attempts to address this have been made in the last two legislative sessions but no bill has been passed. Support for this measure will be required for several of the recommendations in the study to be full realized, but if passed these utility corridors will make very attractive corridors to enhance walking and biking in Clear Lake.

Funding Strategy

Funding is a major challenge for the implementation of pedestrian and bicyclist projects. There are a wide variety of funding sources for pedestrian and bicycle improvements though changes in the priorities and policies at federal, state, and local levels will influence the availability of funding for future projects. The City of Houston may be able to improve pedestrian and bicycle facilities through the implementation of the Rebuild Houston Program, a drainage fee that will support the reconstruction of roadways as drainage is improved. There is also local sidewalk improvement funding that may help fill gaps in the system. External funding programs will also be an opportunity to implement some of the recommended projects. While these may change as policies evolve at all levels of government, current programs include:

- **Transportation Enhancements (TE) Grants** – The TE program offers funding opportunities to help expand transportation choices for 12 eligible TE activities related to surface transportation, including pedestrian and bicycle infrastructure and safety programs.
- **Safe Routes to School** – Safe Routes to School programs create practical projects to make school routes safer for children to walk and bicycle, such as sidewalks, crosswalks and bicycle facilities. TxDOT typically issues a call for projects every two years.
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)** – The funds are used to help communities in air quality non-attainment areas (historically including the Houston-Galveston-Brazoria region) and maintenance areas to reduce emissions. Pedestrian and bicycle programs are among the programs that can be funded using CMAQ funds.
- **FHWA Recreational Trails Program** - The Recreational Trails Program (RTP) provides funds to the states to develop and maintain recreational trails and trail-related facilities for recreational uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA) is overseen by the Texas Parks and Wildlife Department.

Selection for many of these programs is based on a competitive application and selection process. Having an approved, existing plan in place such as this study will be a benefit to selection. These programs also require a local financial match to implementation that can range from a 20-50 percent depending on the program and the type of facility being pursued. As a result, identifying potential matching funds from the City and other partners is beneficial to selection and receipt of funding.

Air Quality

Improving air quality is an important outcome for any transportation study or project. In addition to health and safety benefits of recommended projects, a shift in travel modes to increased levels of biking and walking in the study area will likely reduce the level of emissions from vehicle trips.

While it is difficult to estimate the total impact from these improvements due to the number of factors that affect the total trips and the share of diverted trips in the study area, an estimation of the potential benefits has been made. This estimate is based on assumptions of the total trips generated from the region for both home and employment based trips as well as trip lengths, mode shift factors and emission rates.

Total trips within the area influenced by a new pedestrian or bicycle facility (the catchment area) were estimated for two scenarios:

- H-GAC Baseline Area: 1/4 mile for pedestrian projects; 1 mile for bicycle projects
- Federal Transit Authority Recommended Project Boundary Area: 1/2 mile for pedestrian projects; 3 miles for bicycle projects

Trip reductions from the recommendations in this study are estimated based on comparing current walking and biking use with regional averages and estimated mode shift based on studies of other projects. Three mode shift scenarios were analyzed to give a range of potential outcomes. These assumptions are used to calculate total emission improvements as shown in the following tables.

H-GAC Baseline Project Boundary Area

Emissions Reduction (kg/Year)	Mode	Low Mode Shift Scenario	Medium Mode Shift Scenario	High Mode Shift Scenario
NOx	Pedestrian	29.0	65.2	94.2
	Bicyclist	65.3	130.5	195.8
	Total	94.3	195.8	290.0
VOC	Pedestrian	38.1	85.8	124.0
	Bicyclist	85.9	171.8	257.7
	Total	124.0	257.6	381.6
CO	Pedestrian	451.9	1,016.8	1,468.7
	Bicyclist	1,017.6	2,035.2	3,052.8
	Total	1,469.5	3,052.0	4,521.6

FTA Project Boundary Area

Emissions Reduction (kg/Year)	Mode	Low Mode Shift Scenario	Medium Mode Shift Scenario	High Mode Shift Scenario
NOx	Pedestrian	40.3	90.6	130.9
	Bicyclist	134.6	269.2	403.7
	Total	174.8	359.8	534.6
VOC	Pedestrian	53.0	119.2	172.2
	Bicyclist	177.1	354.2	531.3
	Total	230.1	473.4	703.5
CO	Pedestrian	627.8	1,412.5	2,040.3
	Bicyclist	2,098.2	4,196.3	6,294.5
	Total	2,726.0	5,608.9	8,334.8

A detailed description of the process for estimating air quality reductions is shown in the **Appendix**.

Conclusion

The Clear Lake Pedestrian & Bicyclist Study, and the recommendations made within this report, represent a significant opportunity for the City of Houston to improve walking and biking for its citizens. This opportunity includes expanding the network of bicycle facilities and connecting to regional corridors for both recreational and utility trips.

Clear Lake is a dynamic region with a variety of residential, commercial and educational destinations. It has a large economic base supported by two of the region's largest job centers in the Johnson Space Center and the Clear Lake Regional Medical Center. The Needs Assessment and Public Engagement show a significant demand for increased walking and biking trips and define gaps and opportunities to make Clear Lake an excellent pedestrian and bicycle friendly community.

The 17 projects that have been identified and prioritized within this study represent a network of improvements that will address the needs of the community as well as the goals expressed by key stakeholders, community leaders and the public. These goals, which have been defined through the development of this study, include:

Safety

To provide safe facilities for walking and biking and improve current areas that have a history of crashes or feel unsafe.

Choice

To ensure walking and cycling is a convenient transportation option for a broad set of users and trips.

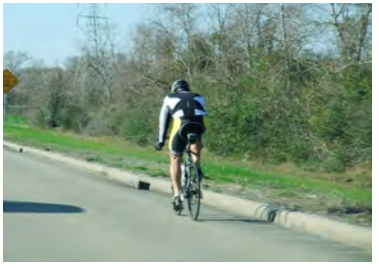
Connectivity

To eliminate barriers to walking and cycling by creating better connections between where people are and where they want to go.

Opportunities for all

To provide walking and biking opportunities with all users in mind including bicyclists and pedestrians of all ages and abilities.

This plan addresses the goals with a set of projects that address safety on critical area corridors, provide alternate routes and a range of facilities to increase transportation choices for all users, and connect major destinations within the community. Implementing the projects identified in this plan represents a significant financial investment from local agencies; this plan can serve as a tool to attract potential funding partners for achieving a holistic vision for walking and biking in the Clear Lake region. Implementation of this plan will result in a healthier, more active transportation system that has significant environmental, economic and quality of life benefits for the Clear Lake region.



Appendix

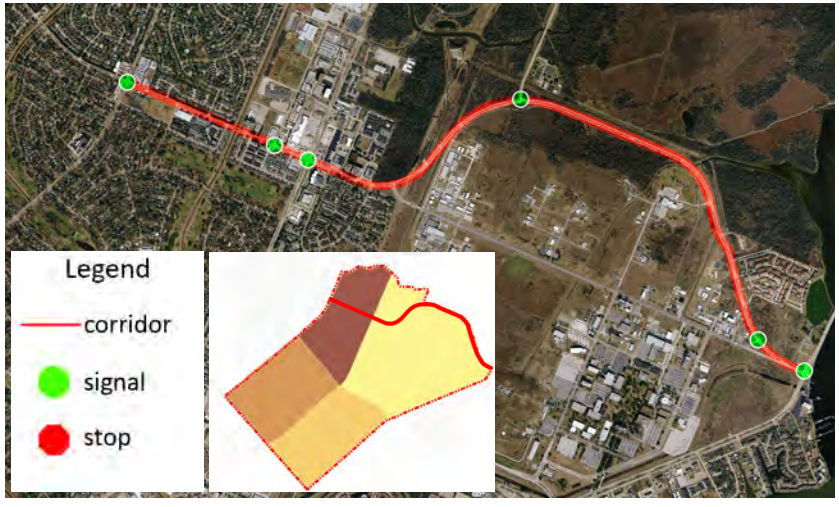
Corridor **Profiles**

The projects identified by this study to improve walking and biking in the Clear Lake area are a mix of off-street facilities such as shared-use paths and on-street facilities such as bike lanes and shared bike routes and "sharrows". Where possible, the on-street recommendations apply to low-speed, low-volume roads; however, there is an implicit assumption that many walking and biking trips will begin at, end at, or use for at least a segment, some of the busier thoroughfares in the area.

A thorough understanding of walking and biking in the area, as well as of the full range of on-street facilities that are possible for implementation, requires familiarity with the major roadway corridors. The following corridor profiles are presented to summarize those characteristics of the roadways that are most likely to impact a corridor's current and potential walkability and bikability.

Definitions of Roadway Characteristics	
Classification	Roadway designation in the City of Houston or City of Webster Major Thoroughfare Plan
ROW	The width of the roadway right-of-way
Travel Lanes	Number of total traffic lanes carrying vehicles in both travel directions
Traffic Counts	Daily Traffic Volumes from City of Houston Traffic Counts
Posted Speed Limit	The mandated speed limit for a roadway
Roadway Width	Distance from curb face to curb face of the paved roadway
Shoulder	Where existing, the paved area on the edge of a roadway; potential travel path for bicyclist
Sidewalks	Paved walking area alongside most roadways
Land Usage	The types of development that exist adjacent to the roadway
Notes	Any other comments regarding the roadway Characteristics not covered above

Space Center Boulevard



Cross Section

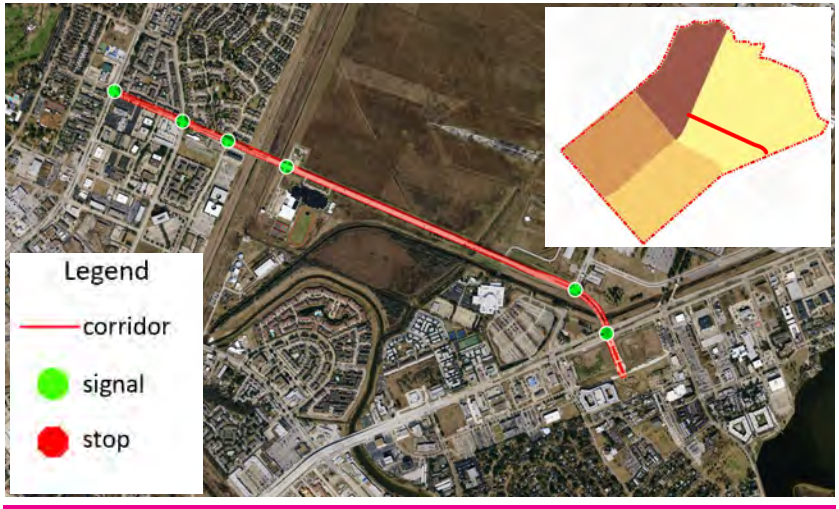
Potential Improvements:

- ☒ Sidewalks
- ☒ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☒ Shared Use Path

Corridor Information

Classification	Major Thoroughfare
ROW	110
Travel Lanes	4
Traffic Counts (ADT)	El Dorado to Bay Area Blvd - 29,041 Bay Area Blvd. to W. Linkage Rd - 20,066 W. Linkage Rd. to Houston City Limit - 13,842 Houston City Limit to NASA Rd. One - 20,662
Posted Speed Limit	40 MPH
Roadway Width	El Dorado to Bay Area Blvd - 24' Bay Area Blvd. to W. Linkage Rd - 22' W. Linkage Rd. to Houston City Limit - 24' Houston City Limit to NASA Rd. One - 24'
Shoulder	"El Dorado to Bay Area Blvd - None Bay Area Blvd. to W. Linkage Rd - None W. Linkage Rd. to Houston City Limit - None Houston City Limit to NASA Rd. One - Yes, 7', Poor Condition
Sidewalks	"El Dorado to Bay Area Blvd - Yes Bay Area Blvd. to W. Linkage Rd - Yes W. Linkage Rd. to Houston City Limit - Yes Houston City Limit to NASA Rd. One - Yes"
Land Usage	Single-family Residential Retail Public and institutional
Notes	

Saturn Lane



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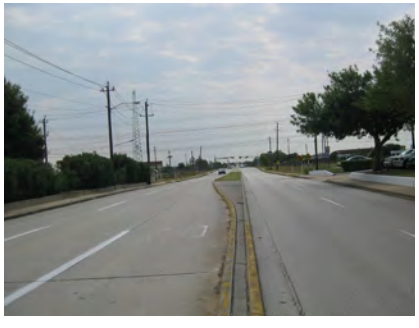


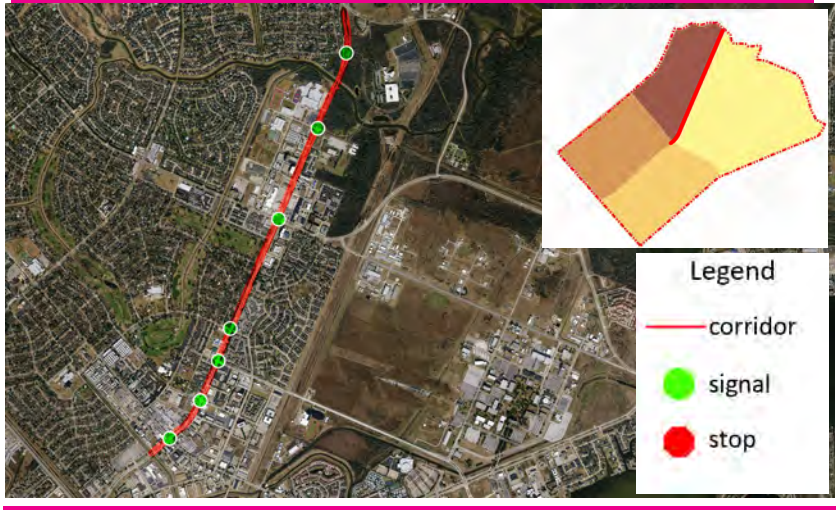
Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☒ Shared Bike Route
- ☒ Bike Lanes
- ☒ Shared Use Path

Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	80
Travel Lanes	4
Traffic Counts (ADT)	N/A
Posted Speed Limit	35 MPH
Roadway Width	63’
Shoulder	Yes, 7’
Sidewalks	Yes, Both Sides, Continuous
Land Usage	Office Public and Institutional
Notes	

Bay Area Boulevard (North of El Camino)



Cross Section

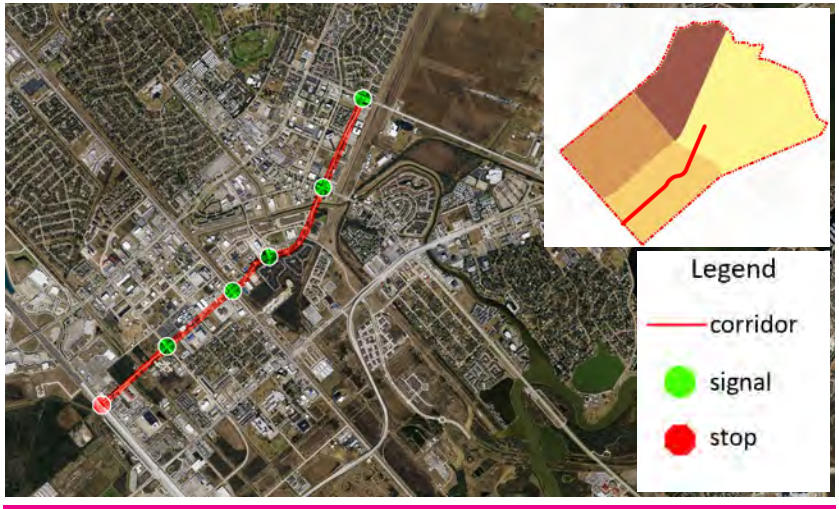
Potential Improvements:

- [x] Sidewalks
- [x] Intersection Improvements
- [ ] Signed Bike Route
- [ ] Shared Bike Route
- [ ] Bike Lanes
- [ ] Shared Use Path

Corridor Information

Classification	Principal Thoroughfare
ROW	W. City Limit to Gulf Fwy. - 100 Galveston Rd. to El Camino Real - 140 El Camino Real to Space Center - 120 Space Center to Horsepen Bayou - 120 Horsepen Bayou to Middlebrook - 300
Travel Lanes	6
Traffic Counts (ADT)	W. City Limit to Gulf Fwy. - 24,219 Galveston Rd. to El Camino Real - 41,788 El Camino Real to Space Center - 36,758 Space Center to Horsepen Bayou - 29,973 Horsepen Bayou to Middlebrook - 23,595
Posted Speed Limit	35 MPH
Roadway Width	2 - 35’ with 27’ median
Shoulder	No
Sidewalks	Yes, Both sides, Continuous
Land Usage	Single-family residential Multi-family residential Office Retail
Notes	

Medical Center Boulevard



Cross Section

Potential Improvements:

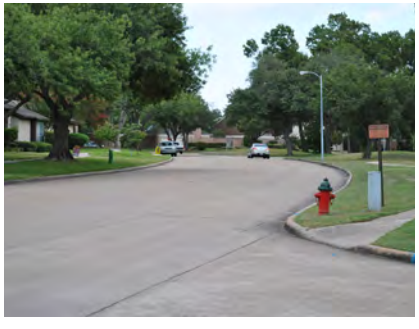
- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☒ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

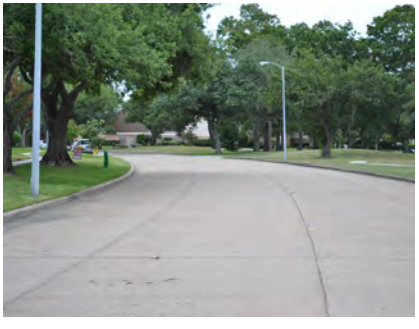
Corridor Information

Classification	Minor Arterial
ROW	100
Travel Lanes	4
Traffic Counts (ADT)	Just south of SH 3 - 22,200 (2006) Just north of SH 3 - 16,800 (2006)
Posted Speed Limit	40 MPH
Roadway Width	Between I-45 and Texas Avenue - 58' Between Texas Avenue and Feathercraft - 2-22' with 30' median
Shoulder	No
Sidewalks	Scattered, unconnected sidewalks
Land Usage	Multi-family residential Public and institutional Office Retail
Notes	City of Webster Roadway

Broadlawn

Cross Section





Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☒ Signed Bike Route
- ☐ Shared Bike Route
- ☐ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	60
Travel Lanes	4
Traffic Counts (ADT)	N/A
Posted Speed Limit	30 MPH
Roadway Width	40’
Shoulder	No
Sidewalks	Yes, noncontinuous
Land Usage	Single-family residential Park and open space
Notes	

University Drive

Cross Section

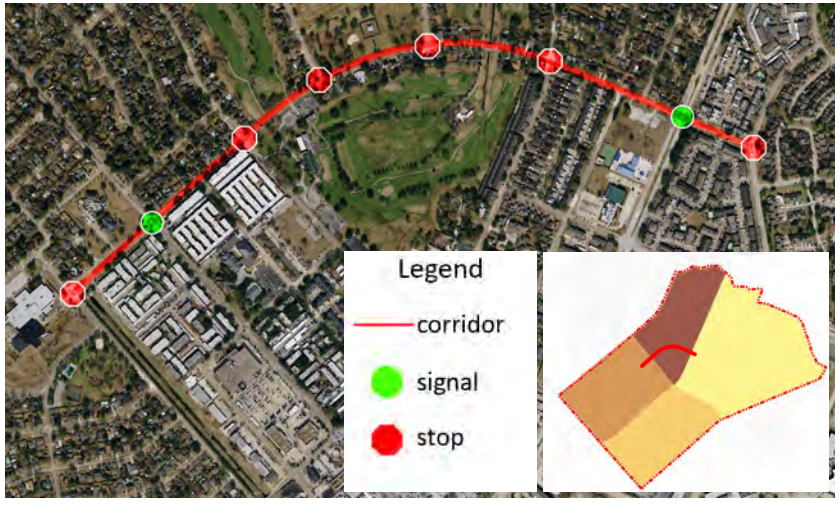
Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	N/A
Travel Lanes	2
Traffic Counts (ADT)	N/A
Posted Speed Limit	N/A
Roadway Width	26’
Shoulder	No
Sidewalks	Continuous sidewalk on South side of road, No sidewalk on North side of road
Land Usage	Public and institutional
Notes	

Reseda Drive



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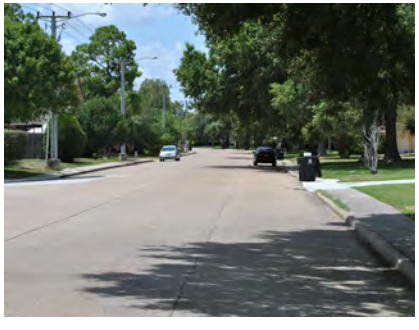


Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☒ Signed Bike Route
- ☐ Shared Bike Route
- ☐ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	Sea Liner to El Camino - 130 El Camino to Bay Area BLVD - 60
Travel Lanes	4
Traffic Counts (ADT)	N/A
Posted Speed Limit	30 MPH
Roadway Width	Sea Liner to El Camino - 2-24' with 31' median El Camino to Bay Area Blvd - 38'
Shoulder	No
Sidewalks	Yes, Continuous on the North side between Sea Liner and Bay Area BLVD, Continuous on the South side between El Camino and Bay Area BLVD
Land Usage	Single-family residential Multi-family residential Park and open space
Notes	

Bay Area Boulevard (South of El Camino)

Cross Section

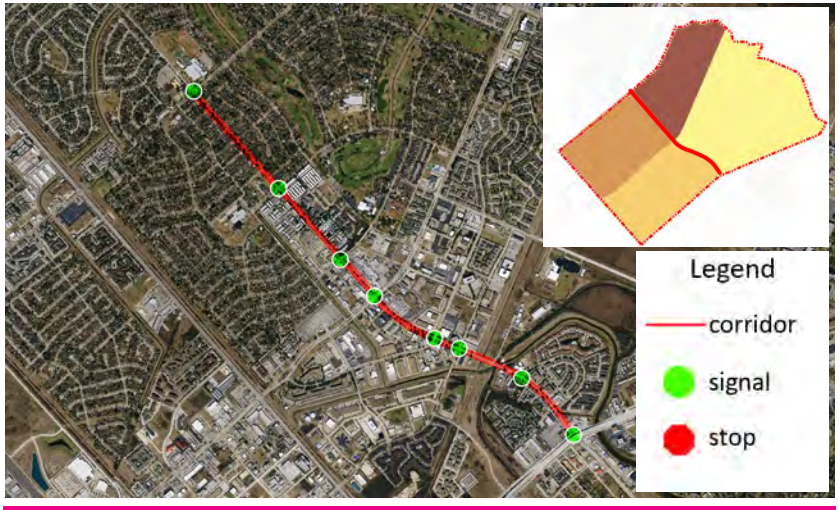
Potential Improvements:

- [x] Sidewalks
- [x] Intersection Improvements
- [ ] Signed Bike Route
- [ ] Shared Bike Route
- [ ] Bike Lanes
- [ ] Shared Use Path

Corridor Information

Classification	Principal Thoroughfare
ROW	W. City Limit to Gulf Fwy. - 100 Galveston Rd. to El Camino Real - 140 El Camino Real to Space Center - 120 Space Center to Horsepen Bayou - 120 Horsepen Bayou to Middlebrook - 300
Travel Lanes	6
Traffic Counts (ADT)	W. City Limit to Gulf Fwy. - 24,219 Galveston Rd. to El Camino Real - 41,788 El Camino Real to Space Center - 36,758 Space CEnter to Horsepen Bayou - 29,973 Horsepen Bayou to Middlebrook - 23,595
Posted Speed Limit	35 MPH
Roadway Width	2-34' with 27' median
Shoulder	No
Sidewalks	Yes, continuous
Land Usage	Retail Vacant or undeveloped Office
Notes	

El Camino



Cross Section

Potential Improvements:

- ☒ Sidewalks
- ☒ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☐ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	Major Thoroughfare
ROW	80
Travel Lanes	4
Traffic Counts (ADT)	Houston City Limit to Bay Area Blvd - 22,731 Bay Area Blvd to El Dorado - 20,097 El Dorado to Pebbleshire - 16,482 Pebbleshire to Pineloch - 10,359 Pineloch to Clear Lake City Blvd - 10,512
Posted Speed Limit	35 MPH (School Zone - From a point 145 FT north of Festival to a point 435 FT north of Pebbleshire, Northbound) (School Zone - From a point 400 FT west of Thunderbay to a point 100 FT east of Diana, Southbound)
Roadway Width	2-30’ with 10’ median
Shoulder	No
Sidewalks	Yes, noncontinuous
Land Usage	Single-family residential Multi-family residential Retail Office
Notes	

El Dorado

Cross Section

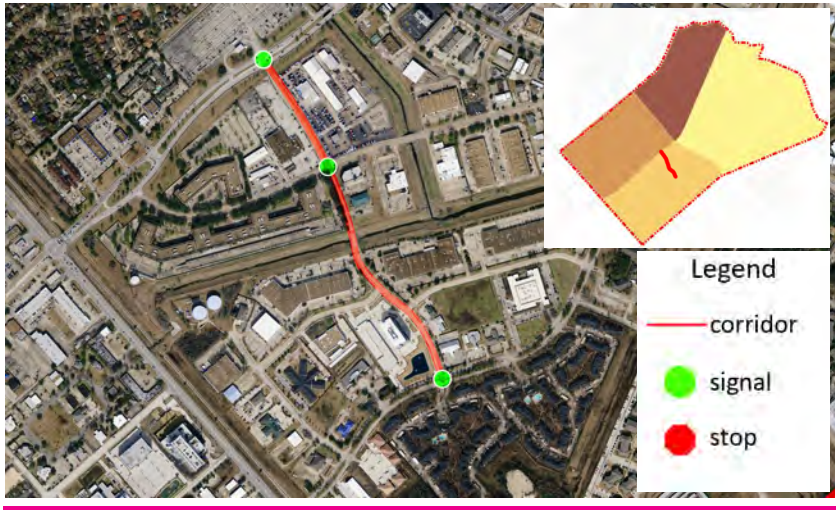
Potential Improvements:

- [x] Sidewalks
- [x] Intersection Improvements
- [ ] Signed Bike Route
- [ ] Shared Bike Route
- [ ] Bike Lanes
- [ ] Shared Use Path

Corridor Information

Classification	Major Thoroughfare
ROW	100
Travel Lanes	4
Traffic Counts (ADT)	W Houston City Limit to Gulf Fwy. - 14,798 Houston City Limit to Galveston Rd. - 28,797 Galveston Rd. to El Camino Real - 11,231 El Camino Real to Space Center - 10,368 Space Center to Horsepen Bayou - 14,639 Horsepen Bayou to Clear Lake City Blvd - 7,388 Clear Lake City Blvd to Genoa (segment does not connect 2008)
Posted Speed Limit	40 MPH (School Zone - From a point 400 FT west of Thunderbay to a point 100 FT east of Diana, Eastbound) (School Zone - From a point 325 FT east of Diana to a point 150 FT west of Thunderbay, Westbound) (School Zone - From a point 163 FT south of Parkwood to a point 50 FT south of Hickory Knoll, North and Southbound) (School Zone - From a point 840 FT west of Glenwest to a point 75 FT east of Starboard View, East and Westbound)
Roadway Width	2-24' with 31' median
Shoulder	No
Sidewalks	Yes, noncontinuous
Land Usage	Single-family residential Multi-family residential
Notes	

Feathercraft Lane



Cross Section

Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	Major Collector
ROW	85
Travel Lanes	4
Traffic Counts (ADT)	N/A
Posted Speed Limit	N/A
Roadway Width	38’
Shoulder	No
Sidewalks	Yes, noncontinuous
Land Usage	Retail Office Industrial Vacant or undeveloped
Notes	Primarily City of Webster Roadway

Gemini Drive

Cross Section

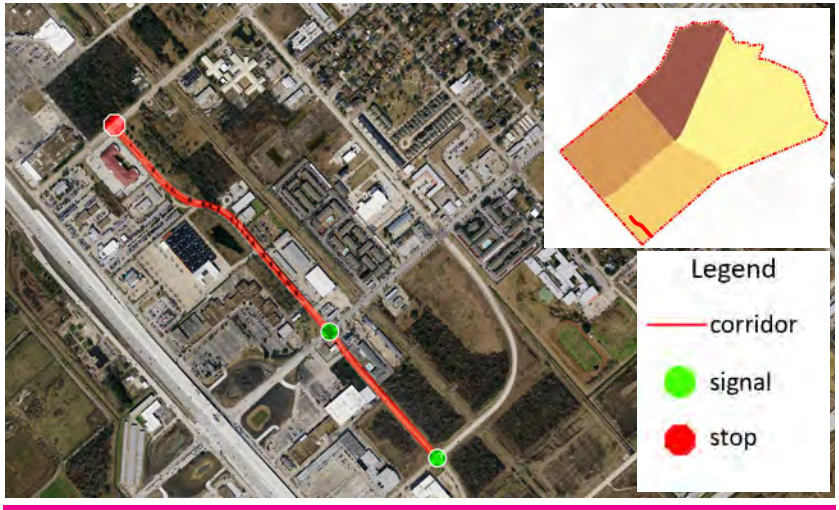
Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

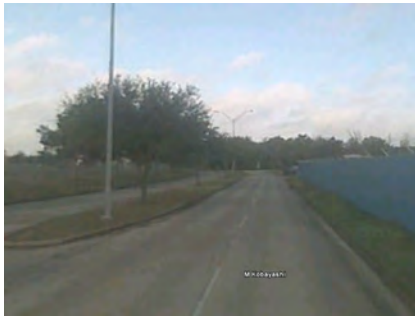
Corridor Information

Classification	N/A
ROW	80
Travel Lanes	4
Traffic Counts (ADT)	N/A
Posted Speed Limit	30 MPH
Roadway Width	46’
Shoulder	No
Sidewalks	Yes, continuous on West side of street
Land Usage	Office Residential Industrial Multi-family residential Single-family residential
Notes	

Kobayashi



Cross Section



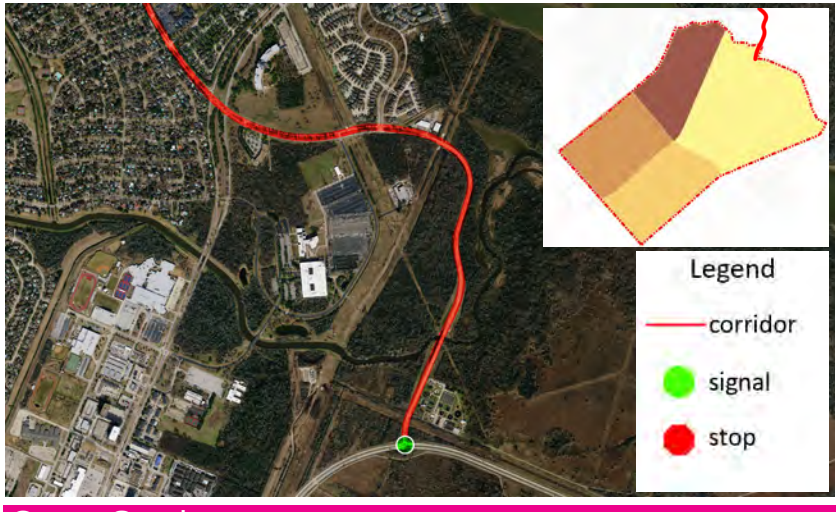
Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☒ Shared Bike Route
- ☐ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	Major Collector
ROW	80
Travel Lanes	4
Traffic Counts (ADT)	100 Kobayashi - 10,153
Posted Speed Limit	30 MPH
Roadway Width	2-25' with 13' median
Shoulder	No
Sidewalks	Scattered, noncontinuous
Land Usage	Industrial Vacant or undeveloped Office Retail
Notes	City of Webster roadway

Middlebrook



Cross Section

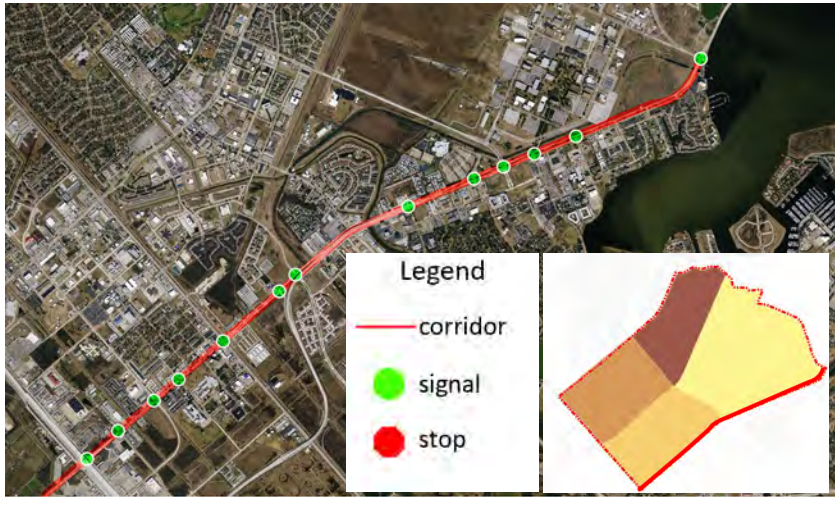
Potential Improvements:

- ☐ Sidewalks
- ☐ Intersection Improvements
- ☐ Signed Bike Route
- ☒ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

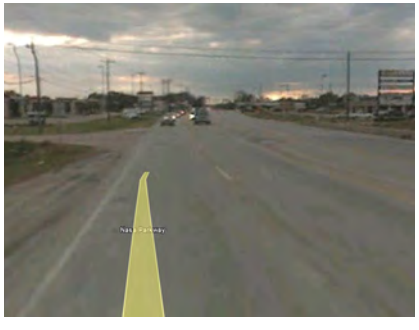
Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	100
Travel Lanes	4
Traffic Counts (ADT)	Bay Area to Walnut Pond - 11,510 Walnut Pond to Clear Lake City - 7,705
Posted Speed Limit	(School Zone - From a point 900 FT south of Walnut Pond to a point 75 FT north of Cedar Ridge Trail, Northbound) (School Zone - From a point 255 FT north of Cedar Ridge Trail to a point 900 FT south of Walnut Pond, Southbound)
Roadway Width	44’
Shoulder	Yes, 7’, Poor condition
Sidewalks	Yes, scattered, noncontinuous
Land Usage	Public and institutional
Notes	

NASA Parkway



Cross Section



Potential Improvements:

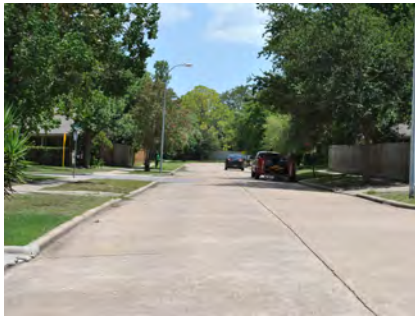
- ☐ Sidewalks
- ☒ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	Major Arterial
ROW	Between Texas Avenue and SH 3 - 100 Between Saturn and Space Center BLVD - 225
Travel Lanes	Between Texas Avenue and SH 3 - 5 Between SH 3 and Avenue B - 8
Traffic Counts (ADT)	Between El Camino and Sarah Deel - 54,800 Just north of El Camino - 56,600
Posted Speed Limit	45 MPH
Roadway Width	Between I-45 and SH 3 - 61' Between SH 3 and El Camino - 2-30' with 7' median Between El Camino and Space Center BLVD - 2-50' with 14' concrete median
Shoulder	No
Sidewalks	Yes, mostly continuous
Land Usage	Public and institutional Multi-family residential Vacant or undeveloped Retail
Notes	City of Webster Kobayashi to Space Center- Bicycle Lanes

Sea Lark

Cross Section



Potential Improvements:

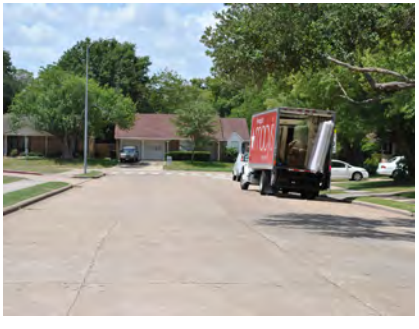
- ☐ Sidewalks
- ☐ Intersection Improvements
- ☒ Signed Bike Route
- ☐ Shared Bike Route
- ☐ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	65
Travel Lanes	2
Traffic Counts (ADT)	N/A
Posted Speed Limit	30 MPH
Roadway Width	28’
Shoulder	No
Sidewalks	Yes, Continuous on North side of road
Land Usage	Single-family residential Park and open space
Notes	

Sea Liner

Cross Section



Potential Improvements:

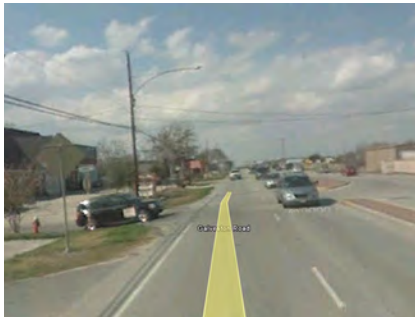
- ☐ Sidewalks
- ☐ Intersection Improvements
- ☒ Signed Bike Route
- ☐ Shared Bike Route
- ☐ Bike Lanes
- ☐ Shared Use Path

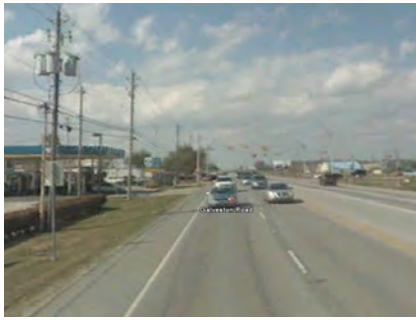
Corridor Information

Classification	N/A (not in Major Thoroughfare Plan)
ROW	70
Travel Lanes	2
Traffic Counts (ADT)	N/A
Posted Speed Limit	30 MPH
Roadway Width	40”
Shoulder	No
Sidewalks	Yes, Continuous on South side of road
Land Usage	Single-family residential Public and institutional
Notes	

SH 3 (Old Galveston Road)

Cross Section





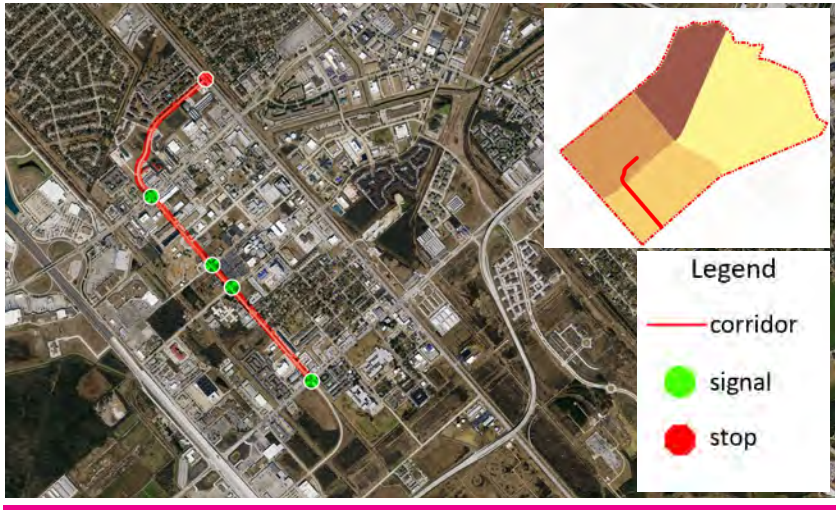
Potential Improvements:

- ☒ Sidewalks
- ☒ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	Principal Thoroughfare
ROW	100
Travel Lanes	5
Traffic Counts (ADT)	El Dorado to Webster N. CL - 27,128
Posted Speed Limit	50 MPH
Roadway Width	65’
Shoulder	Yes, 8’, Good Condition
Sidewalks	No
Land Usage	Single-family residential Multi-family residential Retail Vacant or undeveloped
Notes	

Texas Avenue



Cross Section

Potential Improvements:

- ☒ Sidewalks
- ☒ Intersection Improvements
- ☐ Signed Bike Route
- ☐ Shared Bike Route
- ☒ Bike Lanes
- ☐ Shared Use Path

Corridor Information

Classification	Minor Arterial
ROW	75
Travel Lanes	4
Traffic Counts (ADT)	Just west of Medical Center - 11,800 (2006)
Posted Speed Limit	30 MPH
Roadway Width	44’
Shoulder	No
Sidewalks	From Bay Area to NASA Rd 1 - Sidewalk is continuous on north side of street. Sidewalk is unconnected on south side of street
Land Usage	Multi-family residential Vacant or undeveloped Retail
Notes	City of Webster Roadway

Prioritization **Backup**

As discussed in the Implementation Plan section of the report, all recommended projects were prioritized to enable a simple comparison of the many factors affecting implementation: cost, community input, potential demand, and ease of implementability.

This section includes the data upon which these implementation factors were based.

Community Prioritization Input

As discussed in the Public Engagement section of the report, the community was given two methods for providing input into the project prioritization. The third Public Meeting provided the first opportunity. Attendees at the meeting were given five stickers to distribute among the 17 identified projects on large maps, with each sticker representing one vote. Nineteen participants voted on projects at the public meeting.

A survey was also provided on the project website that allowed participants to distribute 5 votes among the projects. Thirty people participated in the online prioritization survey.

The chart at right shows the voting distribution for the 17 projects, the rank of each project based on votes, and the quintile based on votes into which each project fell which determined the 1-5 for prioritization.

Project	PM3 Votes	Online Votes	Total Votes	Rank	Quintile
1	5	3	8	7.5	3
2	2	2	4	11.5	2
3	13	6	19	3	5
4	5	3	8	7.5	3
5	10	4	14	4.5	4
6	5	0	5	9.5	3
7	4	1	5	9.5	3
8	2	0	2	15.5	1
9	2	1	3	13.5	2
10	6	5	11	6	4
11	63	43	106	1	5
12	8	6	14	4.5	4
13	20	17	37	2	5
14	1	1	2	15.5	1
15	2	2	4	11.5	2
16	0	0	0	17	1
17	2	1	3	13.5	2

Potential Demand Analysis Methodology

The potential demands for each recommended project were estimated using a methodology developed by H-GAC in 2011 to assess and prioritize bicycle and pedestrian projects submitted for the 2011-2014 TIP Call For Projects. The methodology is summarized below:

Define catchment areas. Using GIS software, a buffer was drawn around each project to define a "catchment area" to identify trip generators that could access the project. Bicycle projects and pedestrian projects were assumed to have different catchment areas, and two buffer sizes were defined for each.

- Bicycle projects: 1 mile and 3 miles
- Pedestrian projects: ¼ mile and ½ mile

The lower values are conservative estimates developed by H-GAC for TIP project evaluations; the higher values were proposed by the FTA in 2011 for assessing funding for bicycle and pedestrian projects. A weighted average was used to combine the two buffers for each project type: trips generated in the larger buffer area were weighted 1/3 and those in the closer buffer were weighted 2/3. This approach recognizes that trips generated closer to a facility are more likely to use it. This approach allows relative demand between projects in the study to be assessed.

Generate trips. Regional trip generation rates were used to estimate total trips produced in the catchment area around each project. The rates used were based on assumptions from HGAC:

- 6.54 trips per household
- 2.53 trips per job

Assume mode split. Three mode split rates were defined for bicycle projects and pedestrian projects. These represent and an absolute percentage increase in total mode split and not a percent shift in mode. The rates used were:

- Bicycle projects: 0.1, 0.2, and 0.3 percent increases in mode split
- Pedestrian projects: 0.4, 0.9, and 1.3 percent increases in mode split

Mode split estimates were based on a comparison of existing travel modes in Clear Lake with regional averages as well as previous research such as LUTRAQ study in Portland, Oregon. Shared use paths are expected to have both bicycle and pedestrian users; this dual-demand was estimated by summing both biking and walking trips generated by the project.

Project	Calculated Demand	Rank	Tercile
1	100,165	3	3
2	49,422	17	1
3	105,958	1	3
4	57,033	10	2
5	72,076	6	2
6	53,382	14	1
7	51,400	15	1
8	54,284	13	1
9	50,607	16	1
10	55,832	12	1
11	75,063	5	3
12	100,423	2	3
13	56,300	11	2
14	58,518	8	2
15	65,963	7	2
16	58,062	9	2
17	79,504	4	3

Compute demand. The number of bicycle and pedestrians trips generated by a project was computed by multiplying the assumed increase in mode split by the total number of trips computed for the weighted average catchment area of the project. The resulting relative demand for the 17 projects is shown in the table to the left. For this table, demand for each project was estimated using the medium mode shift estimate and a prioritization score was estimated by tercile.

Cost Estimates

Cost estimates were computed for each recommended project. The estimates were based on TxDOT Statewide 12-month moving average low bids as of August 31, 2011. The table to the right summarizes major assumptions and unit costs for the various facility types used for each project. The following pages provide detailed cost estimates for all the components of each project.

Facility Type	Unit Price	Assumptions
Shared-Use Path	$60.41	Price is per LF of trail; assumes price is same as a 12' concrete sidewalk.
Signed route	$0.56	Price is per LF of road, both sides included; assumes 2 signs per sign assembly, spaced every 0.25 miles.
Bike lanes	$5.99	Price is per LF of road, both sides included; includes provisions bike lane pavement markings, signage, and restriping vehicular lanes.
Buffered bike lanes	$8.14	Price is per LF of road, both sides included; includes providing for bike lane pavement markings, signage, and restriping vehicular lanes.
Roadway addition	$64.45	Price is per LF of road for 6' additional concrete pavement on both sides of road.
Shared lanes	$2.06	Price is per LF of road, both sides included; assumes sharrow spacing of 250 feet
Shoulder repair	$20.40	Price is per LF of road, both sides included; includes cost of asphalt overlay and restriping.
New 6' Sidewalk	$30.21	Price is per LF of sidewalk.
Retrofit 6' Sidewalk	$33.67	Price is per LF of sidewalk; assumes removal of existing 4' sidewalk.
New 5' Sidewalk	$25.17	Price is per LF of sidewalk.
Retrofit 5' Sidewalk	$28.64	Price is per LF of sidewalk; assumes removal of existing 4' sidewalk.
Pedestrian Signals	$328.91	Price is per signal.
ADA ramps	$1,725	Price is per corner identified for improvement; assumes 1.5 ramps needed per corner.
Crosswalks	$9.68	Price is per LF of road to cross; assumes continental striping with stripes that are 8' long and 2' wide and that are spaced 3'.
Colored bike lanes	$33.91	Price is per LF of lane; assumes colored thermoplastic material.
Pedestrian bridge	$110,000	Assumes prefabricated steel truss bridge with span of 110 feet.

Overall **Cost Estimates**

Project #	Description	Cost Estimate
1	El Camino South Connections and Shared-Use Path	$685,386
2	METRO Park & Ride and Neighborhood Connections	$57,504
3.	CLCCA / Golf Course	$683,123
4.	CCISD Drainage Easement Shared-Use Path	$368,526
5.	Space Center Blvd Shared-Use Path and Intersection Improvements	$841,010
6.	Gemini Ave. Bike Lanes / Route	$60,029
7.	Saturn Ln. Improvements	$467,447
8.	Medical Center Bike Lanes / Signed Shared Use	$39,574
9.	Texas Ave. Bike Lanes	$50,303
10.	SH 3 Improvements	$67,670
11.	Completing the Bay Area Blvd - Red Bluff Rd - Kirby Rd Trail Loop	$1,432,224
12.	Shared-use path along drainage ditch & utility easement	$1,433,067
13.	NASA Parkway Bike Lane Improvements	$58,466
14.	CCISD School Access Sidewalks	$1,895,924
15.	Commercial Access Sidewalks	$1,209,632
16.	Clear Lake Barrier Crossing Sidewalks	$1,292,121
17.	Clear Lake Regional Medical Center Access Sidewalks	$1,050,037
Sub-total		**$11,692,041**
5.	Additional Roadway	$631,575
8.	Additional Roadway	$302,870
9.	Additional Roadway	$541,350
13.	Additional Roadway	$264,230
Sub-total		**$1,740,025**
TOTALS		**$13,432,066**

Cost estimates are for planning purposes only and does not include roadway additions. Additional planning, engineering and construction documents would be required for most improvements. Further information is available on the following pages.

1. El Camino South **Connections and Shared-Use Path**

Item	Type	Length (ft)	Total
Shared-use path between El Dorado & Medical Center Blvd.	Shared Use	9,000	$543,726
Path connection into El Camino South subdivision	Shared Use	450	$27,186
Signed route along Piper's View Dr., El Toro Ln., & Eastcape Dr.	Signed Bike Route	6,500	$3,634
Signed route along Buoy Rd.	Signed Bike Route	1,500	$839
Bridge on Buoy Rd. across drainage ditch	Bridge		$110,000
Total			**$685,386**

2. METRO **Park & Ride and Neighborhood Connections**

Item	Type	Length (ft)	Total
Signed route along Sea Liner Dr. and Sea Lark Rd.	Signed Bike Route	5,600	$3,131
Path along drainage & Bay Area from Sea Liner to Feathercraft	Shared Use Path	900	$54,373
Total			**$57,504**

3. CLCCA / Golf Course **Shared-Use Path**

Item	Type	Length (ft)	Total
Signed route along Reseda between Gemini & Sea Liner	Signed Bike Route	2,400	$1,342
Signed route along Ramada between Reseda & Diana	Signed Bike Route	2,200	$1,230
Signed route along Diana between Ramada & ditch	Signed Bike Route	7,000	$3,914
Path on one side of ditch from Space Center to El Dorado	Shared Use Path	11,200	$676,637
Total			**$683,123**

4. CCISD Drainage Easement **Shared-Use Path**

Item	Type	Length (ft)	Total
Path between Space Center & Bay Area behind Clear Lake HS	Shared Use Path	6,100	$368,526
Total			**$368,526**

5. Space Center Blvd **Path and Intersection Improvements**

Item	Type	Length (ft)	Total
Path on north side of the road between ditch and Middlebrook	Shared Use	12,100	$731,010
Bridge across drainage ditch adjacent to vehicle bridge	Bridge		$110,000
Total			**$841,010**

6. Gemini Ave. **Bike Lanes / Route**

Item	Type	Length (ft)	Total
Lanes & signage along between Feathercraft & Space Center	Bike Lanes	9,800	$58,687
Signed route along Broadlawn between Gemini & Space Center	Signed Bike Route	2,400	$1,342
Sub-total			**$60,029**
Additional pavement for bike lanes along Gemini	Roadway Addition	9,800	$631,575
Total			**$632,917***

7. Saturn Lane **Improvements**

Item	Type	Length (ft)	Total
Bike lanes on shoulder between NASA & Space Center Interm.	Bike Lanes	5,500	$32,937
Lane marking between Space Center Interm. & Bay Area	Sharrows	2,700	$5,571
Off-road trail along south of Saturn between NASA & Gemini	Signed Use	7,100	$3,914
Sub-total			**$428,940**

*** Includes Roadway Addition**

8. Medical Center **Bike Lanes / Signed Shared Use**

Item	Type	Length (ft)	Total
Lanes along Feathercraft between Bay Area & Medical Center	Bike Lanes	2,800	$16,768
Lane markings on Medical Center between Feathercraft & Texas	Sharrows	4,000	$8,253
Bike lanes on Medical Center between Texas & Kobayashi	Bike Lanes	1,500	$8,983
Lane markings on Kobayashi between Medical Center & NASA	Sharrows	2,700	$5,571
Sub-total			**$39,574**
Pavement on Feathercraft from Bay Area to Med Center	Roadway Addition	2,800	$197,218
Pavement on Medical Center between Texas & Kobayashi	Roadway Addition	1,500	$105,652
Total			**$316,694***

9. Texas Avenue **Bike Lanes**

Item	Type	Length (ft)	Total
Bike lanes on Texas Ave. between SH 3 & NASA Parkway	Bike Lanes	8,400	$50,303
Sub-total			**$50,303**
Pavement on Texas Ave. between SH 3 & NASA Parkway	Roadway Addition	8,400	$541,350
Total			**$591,653***

10. SH 3 **Improvements**

Item	Type	Length (ft)	Total
Improve existing shoulders along between El Dorado & NASA	Bike Lanes	11,300	$67,670
Total			**$67,670**

*** Includes Roadway Addition**

11. Completing the Bay Area Blvd - Red Bluff Rd - Kirby Rd **Trail** Loop

Item	Type	Length (ft)	Total
Path along Space Center from NASA to Middlebrook	Shared Use	9,800	$592,057
Improve existing shoulders along Space Center & add markings	Bike Lanes	13,000	$342,995
Bike lanes and shared-lane markings along Middlebrook	Bike Lanes	8,500	$37,164
Path along Bay Area between Horsepen Bayou & Middlebrook	Shared Use	2,300	$138,952
Ramps onto bridge sidewalk from bike lanes on NASA	Ramps	NA	$6,902
Path along bayou between Space Center & Bay Area	Signed Use	5,200	$314,153
Total			**$1,432,224**

12. Drainage Ditch & Utility Easement **Shared-use Path**

Item	Type	Length (ft)	Total
From SH 3 to bayou junction just west of Bay Area	Signed Use Path	17,800	$1,075,370
Path between SH 3 & Gatebrook Dr. along utility easement.	Shared Use Path	4,700	$247,698
Bridge across Horspen Bayou to connect to Middlebrook trails	Bridge	NA	$110,000
Total			**$1,433,067**

13. NASA Parkway **Bike Lane** Improvements

Item	Type	Length (ft)	Total
Bike lanes on NASA from south of Kobayashi to Challenger	Bike Lanes	4,100	$24,553
Intersection markings on NASA Parkway and Bypass, Sarah Deel, El Camino Real, and Nassau Bay	Bike Lane Markings	NA	$33,914
Sub-total			**$58,466**
Pavement on NASA from south of Kobayashi to Challenger.	Roadway Addition	4,100	$264,230
Total			**$298,144***

*** Includes Roadway Addition**

14. CCISD **School Access Sidewalks**

Item	Total
Intersection improvements and fill existing sidewalk gaps	$83,348
Upgrade sidewalk to current standards (e.g. 5’ width min, 6’ preferred on Bay Area Blvd.)	$1,812,575
Total	**$1,895,924**

15. Commercial **Access Sidewalks**

Item	Total
Intersection improvements and fill existing sidewalk gaps	$232,342
Upgrade sidewalk to current standards (e.g. 5’ width min, 6’ preferred on Bay Area Blvd.)	$1,209,632
Total	**$1,209,632**

16. Clear Lake **Barrier Crossing Sidewalks**

Item	Total
Intersection improvements and fill existing sidewalk gaps	$634,838
Upgrade sidewalk to current standards (e.g. 5’ width min, 6’ preferred on Bay Area Blvd.)	$657,283
Total	**$1,292,121**

17. Clear Lake Regional Medical Center **Access Sidewalks**

Item	Total
Intersection improvements and fill existing sidewalk gaps	$288,934
Upgrade sidewalk to current standards (e.g. 5’ width min, 6’ preferred on Bay Area Blvd.)	$761,103
Total	**$1,050,037**

Survey **Details**

An online survey was conducted as part of the study to assess perceptions of walking and biking in Clear Lake. The online survey provided valuable feedback from the community, on goals, facility preference types and priority destinations. The goals of the survey were to:

- Get input from the community about current walking and biking conditions in Clear Lake
- Identify major destination for increased connectivity
- Understand major barriers to increased walking and biking
- Understand facility preference types (e.g., bike lanes, shared use paths)
- Educate the community about the issues and some of the tools and opportunities to improve walking and biking

The survey was conducted on the internet and was open from May 31, 2011 to July 19, 2011. 647 participants began the survey; 585 completed.

The following pages present the 34 questions asked on the survey. For a full discussion of the survey results, please see the Public Engagement section of the report.

Clear Lake Pedestrian & Bicyclist Survey

1. Current Walking and Biking Activities

The City of Houston is partnering with the Houston-Galveston Area Council to conduct a study of walking and bicycling in the Clear Lake area. Recommendations of the report will support the implementation of improvements for the experience and safety of pedestrians and bicyclists. Your input into this survey will help the study team better understand the Clear Lake community and will directly impact where and what kinds of bicycle and pedestrian projects will ultimately be recommended.

The entire survey should take you less than 10 minutes to complete. We appreciate your participation in helping make Clear Lake a better, safer place to walk and bike!

1. How many times per month do you typically walk or bike for transportation (to get to a destination)?

- ◯ 0
- ◯ 1-2
- ◯ 3-5
- ◯ 5-10
- ◯ 10+

2. How many times per month do you typically walk, bike, or run for recreation or exercise?

- ◯ 0
- ◯ 1-2
- ◯ 3-5
- ◯ 5-10
- ◯ 10+

Clear Lake Pedestrian & Bicyclist Survey

3. Have you walked or biked to any of the following destinations within the last month? (Select all that apply.)

- ☐ Job
- ☐ Restaurants
- ☐ Retail Stores
- ☐ Grocery Stores
- ☐ Other (please specify)
- ☐ Church
- ☐ School
- ☐ Parks/Entertainment
- ☐ Transit

Clear Lake Pedestrian & Bicyclist Survey

2. Perceptions of Walking and Biking

4. Please indicate your level of agreement with the following statements:

	1 - Strongly Disagree	2 - Disagree	3 - Somewhat Disagree	4 - Somewhat Agree	5 - Agree	6 - Strongly Agree
I feel very comfortable walking in Clear Lake.	◯	◯	◯	◯	◯	◯
I feel very comfortable biking in Clear Lake.	◯	◯	◯	◯	◯	◯
I want to live in a community where people can walk and bike to many destinations.	◯	◯	◯	◯	◯	◯
I would walk 10 minutes to a destination if I felt I could do it safely.	◯	◯	◯	◯	◯	◯
I would bike 10 minutes to a destination if I felt I could do it safely.	◯	◯	◯	◯	◯	◯
There are many destinations within a 10 minute walk from my house.	◯	◯	◯	◯	◯	◯

5. Do you agree that it is important to provide for pedestrians and bicycles at the following destinations?

	1 - Strongly Disagree	2 - Disagree	3 - Somewhat Disagree	4 - Somewhat Agree	5 - Agree	6 - Strongly Agree
Clear Lake schools	◯	◯	◯	◯	◯	◯
University of Houston - Clear Lake	◯	◯	◯	◯	◯	◯
Johnson Space Center (NASA)	◯	◯	◯	◯	◯	◯
Clear Lake Regional Medical Center	◯	◯	◯	◯	◯	◯
METRO Park & Ride	◯	◯	◯	◯	◯	◯
Harris County Transit bus stops	◯	◯	◯	◯	◯	◯
Retail and employment along Bay Area Boulevard	◯	◯	◯	◯	◯	◯
Baybrook Mall	◯	◯	◯	◯	◯	◯

Clear Lake Pedestrian & Bicyclist Survey

3. Bicycle Facilities

Consider the image and indicate your level of agreement with the following statement:

6. I would feel comfortable riding a bicycle on a local road with low traffic volumes, such as the one in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

Consider the image and indicate your level of agreement with the following statement:

7. I would feel comfortable riding a bicycle in a regular traffic lane on a road similar to Bay Area Boulevard, as shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

4. Bicycle Facilities

Consider the image and indicate your level of agreement with the following statement:

8. I would feel comfortable riding a bicycle in a bike lane on a road with moderate traffic volumes, such as the one in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

Consider the image and indicate your level of agreement with the following statement:

9. I would feel comfortable riding a bicycle on a cycle track that is physically separated from a busy road, such as the one shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

5. Bicycle Facilities

Consider the image and indicate your level of agreement with the following statement:

10. I would feel comfortable riding a bicycle on a shared use path or hike and bike trail, such as the one in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

6. Bicycle Facilities

11. Which TWO of the sample bike facilities would you be most comfortable using?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

12. Which of the sample bicycle facilities would you consider safe for a child to use? Please select as many as apply.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

13. Which TWO of the following factors were most important in determining your choices for the previous two questions?

- ☐ Volume of vehicle traffic
- ☐ Travel speed of vehicle traffic
- ☐ Amount of separation from vehicle traffic
- ☐ Condition and quality pavement
- ☐ Safe roadway crossings
- ☐ Other (please specify)
- ☐ Width of the bicycle facility
- ☐ Adjacent activity, destinations, and land use
- ☐ Landscaping (e.g. street trees and shade)
- ☐ Lighting

Clear Lake Pedestrian & Bicyclist Survey

7. Bicycle Facilities

14. Please indicate your level agreement that the following are barriers to biking in Clear Lake:

	1 - Strongly Disagree	2 - Disagree	3 - Somewhat Disagree	4 - Somewhat Agree	5 - Agree	6 - Strongly Agree
Lack of facilities (e.g. bike paths, trails)	◯	◯	◯	◯	◯	◯
Difficult to cross intersections / roadways	◯	◯	◯	◯	◯	◯
Condition and quality of bicycle facilities	◯	◯	◯	◯	◯	◯
Condition and quality of roadway pavement	◯	◯	◯	◯	◯	◯
Safety / fear of crime	◯	◯	◯	◯	◯	◯
Lack of adequate lighting	◯	◯	◯	◯	◯	◯
Heat and humidity	◯	◯	◯	◯	◯	◯
Lack of shade / trees	◯	◯	◯	◯	◯	◯
High traffic volumes / speed	◯	◯	◯	◯	◯	◯
Destinations such as work, school, and stores are too far to bike	◯	◯	◯	◯	◯	◯
Poor air quality	◯	◯	◯	◯	◯	◯
No place to lock up / park bikes	◯	◯	◯	◯	◯	◯
Need for a shower after ride	◯	◯	◯	◯	◯	◯

Clear Lake Pedestrian & Bicyclist Survey

15. From the previous list, which do you feel are the TWO most important barriers to biking in Clear Lake?

- ☐ Lack of facilities (e.g. bike paths, trails)
- ☐ Difficult to cross intersections / roadways
- ☐ Condition and quality of bicycle facilities
- ☐ Condition and quality of roadway pavement
- ☐ Safety / fear of crime
- ☐ Lack of adequate lighting
- ☐ Heat and humidity
- ☐ Other (please specify)
- ☐ Lack of shade / trees
- ☐ High traffic volumes / speed
- ☐ Destinations such as work, school, and stores are too far to bike
- ☐ Poor air quality
- ☐ No place to lock up / park bikes
- ☐ Need for a shower after ride

Clear Lake Pedestrian & Bicyclist Survey

8. Sidewalks

Consider the image and indicate your level of agreement with the following statement:

16. I would feel comfortable walking along the sidewalk shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

Consider the image and indicate your level of agreement with the following statement:

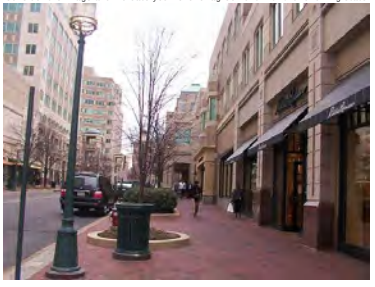
17. I would feel comfortable walking along the sidewalk shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

9. Sidewalks

Consider the image and indicate your level of agreement with the following statement:



18. I would feel comfortable walking along the sidewalk shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

Consider the image and indicate your level of agreement with the following statement:

19. I would feel comfortable walking along the path shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

10. Sidewalks

Consider the image and indicate your level of agreement with the following statement:

20. I would feel comfortable walking along the sidewalk shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

Consider the image and indicate your level of agreement with the following statement:

21. I would feel comfortable walking along the sidewalk shown in the picture.

◯ 1 - Strongly Disagree ◯ 2 - Disagree ◯ 3 - Somewhat Disagree ◯ 4 - Somewhat Agree ◯ 5 - Agree ◯ 6 - Strongly Agree

Clear Lake Pedestrian & Bicyclist Survey

11. Sidewalks

22. Which TWO of the sample sidewalks would you be most comfortable using?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

23. Which of the sample sidewalks would you consider safe for a child to use? Please select as many as apply.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

24. Which TWO of the following factors were most important in determining your choices for the previous two questions?

- ☐ Condition and quality of the sidewalk
- ☐ Width of sidewalk
- ☐ Distance from traffic lanes
- ☐ Amount of adjacent vehicle traffic
- ☐ Speed of vehicle traffic
- ☐ Adjacent activity, destinations, and land use
- ☐ Landscaping (e.g. street trees and shade)
- ☐ Safe roadway crossings
- ☐ Lighting
- ☐ Other (please specify)

Clear Lake Pedestrian & Bicyclist Survey

12. Sidewalks

25. Please indicate your level agreement that the following are barriers to walking in Clear Lake:

	1 - Strongly Disagree	2 - Disagree	3 - Somewhat Disagree	4 - Somewhat Agree	5 - Agree	6 - Strongly Agree
Not enough sidewalks or trails	◯	◯	◯	◯	◯	◯
Difficult to cross intersections / roadways	◯	◯	◯	◯	◯	◯
Existing sidewalks are in poor condition	◯	◯	◯	◯	◯	◯
Safety / fear of crime	◯	◯	◯	◯	◯	◯
Lack of adequate lighting	◯	◯	◯	◯	◯	◯
Heat and humidity	◯	◯	◯	◯	◯	◯
Lack of shade / trees	◯	◯	◯	◯	◯	◯
Traffic volumes / speeds are too high	◯	◯	◯	◯	◯	◯
Destinations are too far	◯	◯	◯	◯	◯	◯
Poor air quality	◯	◯	◯	◯	◯	◯
Lack of accessible curb ramps	◯	◯	◯	◯	◯	◯

26. From the previous list, which do you feel are the TWO most important barriers to walking in Clear Lake?

- ☐ Not enough sidewalks or trails
- ☐ Difficult to cross intersections / roadways
- ☐ Existing sidewalks are in poor condition
- ☐ Safety / fear of crime
- ☐ Lack of adequate lighting
- ☐ Heat and humidity
- ☐ Lack of shade / trees
- ☐ Traffic volumes / speeds are too high
- ☐ Destinations are too far
- ☐ Poor air quality
- ☐ Lack of accessible curb ramps

Clear Lake Pedestrian & Bicyclist Survey

13. Demographics

This page asks for some background information on you as the respondent. If you do not wish to provide this information please select the "Prefer not to answer" option for each question.. Please remember that all responses are anonymous.

27. What is your age?

28. Sex:

29. How many children under 16 do you have that currently live with you?

30. What is your home zip code?

31. Do you own or have access to a family car?

32. Do you own a bicycle?

33. Do you require the assistance of a wheelchair or other mobility device when traveling?

34. Are there any additional issues that you would like to comment on or that the Clear Lake Pedestrian and Bicyclist Plan should address?

Open Response Answers

The final question of the survey, question #34, was an open-response question that asked:

> *Are there any additional issues that you would like to comment on or that the Clear Lake Pedestrian and Bicyclist Plan should address?*

256 responses were provided by the survey participants, may of which were extremely detailed in their feedback. The following pages present the unedited open response answers.

Response	Comment
1	I think the two most important priorities should be adding sidewalks and bicycle lanes where there are none (such as Egret Bay road going south from NASA Parkway) and adding good lighting to the most frequently used routes.
2	Existing sidewalk along Saturn Ln. (route used to get to work) is always in need of maintenance (i.e. mowing). It is sometimes difficult to walk or bike along a weed-choked pathway.
3	Drivers need to be better educated on sharing the road with cyclists.
4	Majority of major roads in Clear Lake have NO shoulder at all and force bicycles to use the traffic lanes. Sidewalks are for walking/running and not riding bicycles.
5	I work in Pasadena on Highway 225 but would ride to work if there were enough paths to get me there. The traffic speed is too high and there are no paths for bicycles to get there. I also like to bike a loop from Clear Lake Forest on the nice path, down to NASA Rd 1 which has a path that stops right before the park (so you use the sidewalk), up Space Center (which has no path and terrible shoulders so you are forced to use the sidewalk), up Middlebrook through U of H, then out to Bay Area Blvd, which has a TERRIBLE path west of Middlebrook. The rest of the path along Bay Area and Red Bluff are wonderful. We need more paths like that one and the one going up Red Bluff on the west side!
6	I bicycle along space center Boulevard and it is not safe. The road has eroded on the easement. The byclcle trail is in poor condition. There is no trail to get from space center to bay area I think it is middlecreek. We need better biking trails in the Clear Lake area Also NASA Road 1 is not safe on the bike lane.
7	"I have a special needs child that has NO safe routes to bicycle. No ramps, the roads are full of obsticles such as pot holes and loose gravel. My child has fallen many times over something we would not be too concerned with but if it were improved, good sidewalks and trails we could ride as a family without the worry. I would ride my bike to work if there were a trail from League City to NASA/JSC its only 3 and a half miles one way. I have visited many city's and they seem to consider this very important to the area. Please put the trails and sidewalks in."
8	Include League City and other surrounding communities in your plans.
9	Thank you
10	would love a dedicated bike/walk lane along 270 between 518 & NASA Road 1
11	Hike and bike trails on the old Clear Lake Golf Course. This would allow for excersie far away from auto/truck traffic. This would be very safe for kids.
12	aggressive bicyclists in traffic
13	More connecting trails between neighborhoods that aren't directly tied to roads. In suburbia, getting from point A to B via roads is often very, very long due to cul-dd-sacs, and generally poor planning. Using paths to bridge these areas and taking advantage of power line right or ways, drainage, etc will greatly help mobility.
14	(none)

Response	Comment
15	I travel by bike frequently in Clear Lake. NASA Road 1 is very accessible, as is Bay Area Boulevard (though the traffic closer to I-45 makes riding on the sidewalks feel more perilous and the condition of the sidewalks is somewhat rough). El Camino Real should be a priority site for laying walk/bike routes.
16	no
17	More awareness of sharing the road with bikes. Sidewalks with a bike lane like on Kirby, between Red Bluff & NASA Prkwy would be really nice. Also a continuous loop for recreation biking & walking away from vehicle traffic would be really nice.
18	Need to look into Montreal Canada bicycle system....it's amazing!!
19	Also need to be careful about designing the sidewalks/walkways so that they can be safely shared by both pedestrians and bicyclists.
20	Thanks for looking into this subject!!
21	Master-planned homogenized subdivisions like all those found in Clear Lake (minus old Webster) have businesses excessively segregated from residences. If I had a small mom-and-pop store three blocks away, I'd walk to it, or a restaurant in Camino South rather than a 15-minute walk with no sidewalk the last 100 yards, I'd walk to it. I'd walk to work at 600 Gemini if I could cross Bay Area Blvd without risking my life.
22	Make the sidewalks accessibile/safe for blind to walk on. Many sidewalks are badly cracked and this is a danger for blind folks.
23	Providing safe biking access along Bay Area Blvd should be highest priority. There are a lot of restaraunt workers that commute along this route including after dark.
24	The Clear Lake metropolitian area is so large I don't think this plan would work. For instance, I would never consider walking or riding a bike to Bay Brook Mall from my home in Seabrook. It's just not feasible.
25	Please build awesome sidewalks and bike lanes. Landscaping wouldn't hurt.
26	The Clearlake area is too spread out and climate too hot in summer for use of walking and biking as transportation. The focus should be on recreation and connecting residential areas to parks and schools. If available, work on connecting residential areas to local dining.
27	Unless there is a strongly residential area within ~0.5 miles of a strongly commercial area, the addition of sidewalks & bike locks within those areas is probably not going to create a sudden surge of walkers & bikers. Please keep it simple. I know many of my generation, including myself, would absolutely love having a more pedestrian/bike friendly area to live, but the climate in Houston does not allow that for 6 months out of the year.
28	Sometimes is required/or wanted to walk/bike but there are few quality places to walk/bike to destinations even within 10 minutes of home/work. We need to become more mobile in Houston/surrounding areas.
29	More paths for foot traffic and bikes would be great. However, if bicycles are going share a path with walkers and runners, bicyclists need to be educated to be respectful of others on the path. Granted, that respect goes both ways, but I've run in parks where I felt unsafe because of the bicyclists that were on the path.

Response	Comment
30	"-A safe bike trail for kids to use away from heavy traffic would be really nice for the Clear Lake area.
31	Would definitely use trails if available.
32	no
33	please add more bike paths to the area and make bike paths so one can bike to JSC
34	Road design is too hazardous to safely allow bikes to intermingle iwth traffic. maintenance is horrible, for instance space center north of the space center
35	Walking and biking should be encouraged, and not looked upon as unusual. The League City police have stopped several people because they were walking from one destination to another after dark - older than 21, minding their own business, not causing any harm much less acting/looking suspicious outside of just walking. In fact, one officer said 'We don't walk in Houston!'. I find this unacceptable. I live close enough to places to walk/ride, but Bay Area is a scary place for a bicycle and I do not feel comfortable. The bike/run 'path' on Space Center is atrocious.
36	The main problem I see is too few sidewalks and bike trails. It is very dangerous to bike or walk in the road.
37	It would be nice to incorporate the trails in the old CL city golf course + pathways in near drainage ditches in neighborhoods similar to brookforest & middlebrook.
38	Repair of existing sidewalks is a big problem. I blew out a tire the other day when I hit a bad spot on a sidewalk. Walking or biking over the railroad tracks at highway 3 is the most dangerous place.
39	More paths along the bayous would be benefical and keep bicyclist/walkers away from the majority of traffic.
40	I would bike to work (NASA) if there was a safe way to get there from residential neighborhoods in Clear Lake, and if NASA provided shower facilities in main buildings (e.g., 45, 1, 4South), as opposed to just at Gilruth
41	Ask again this winter and heat/humidity will be less of a barrier.
42	More Safety Signs
43	Existing bike trails are a joke. An example of a very poor bike path is NASA Road 1 between Bay Area Boulevard and I-45. That path is not safe at all, and uses a poorly maintained shoulder on a high-speed roadway.
44	"Really would like to see the bike trail around CL finished and refresh (a bench, water, air, restroom) stations added. There is no SAFE way to get across NASA 1. The lights are not long enough."
45	I would love to see this community develop into something that facilitates commerce while being less dependent on automobiles.
46	I would purchase a bike and ride it from my residence in Seabrook to work at Johnson Space Center today, if there existed a continuous bike lane. Currently the bike lane along NASA Parkway disappears while crossing Clear Lake near Clear Lake Park and does not re-appear until slightly west of Space Center Blvd. This is the largest barrier to me biking the 4 miles to work instead of driving.

Response	Comment
47	Bike paths that link to other cities or other bike routes, and well marked bike lanes would go a long way to increasing cycling instead of driving. Thanks for looking into this!
48	Please feel free to contact me for further information. I ride my bike from League City to UHCL five days a week. - Jeff Lash (lash@uhcl.edu)
49	"The biggest obstacle - by far - that cyclists must overcome is the anti-cycling culture. Cyclists do themselves no favors by using an entire lane, especially when there is a small group riding, during peak traffic hours. Cyclists might have the right to the road, but they need to remember that taking an entire lane when it is unnecessary (for example) inflames your typical driver, and does nothing to promote cycling in the Bay Area. -Working water fountains would be needed for walkers and bikers in parks." On the other hand, drivers need to be tolerant of cyclists and recognize the cyclist's right to safely ride on roadways. Perhaps there should be a mandatory section of the driver's education curriculum that focuses on sharing the road with bicycles."
50	despite high number of bicyclists, NASA area is not really bike friendly
51	Better control of distractions by drivers, such as iphones, ipads, cell phones, eating, fixing hair, dressing, loud music, reading, tv, radio, yelling, cussing, smoking, chewing tobacco, cutting people off, DRINKING, USING DRUGS, MAKING OUT, PLAYING VIDEO GAMES. BEING A SMART ASS DRIVER, NO COURTESY
52	This shouldn't just be about walking and biking, think about the drivers also to ensure a shared responsibility.
53	Plant trees and shrubs to enhance shade and beauty; people need to feel safe walking/biking alone; barriers of some type between traffic and pedestrians and bikers - don't lower speed limits (lower speed limits is not a solution to increasing use of hike & bike sidewalks/trails)
54	Needs to include League City - a lot of us commute to Clear Lake for work.
55	No additional issues that I would like to address but I just wanted to further emphasize that I would love to bike more around town but I have always chosen not to because I do not feel safe on the roadways with area drivers.
56	Seabrook wants bike trails and the City has formal plans. It needs funding.
57	One of my concerns is for the safety of those who do not or can not afford a car and the only choice is to commute by bicycle. For me it's a matter of health and enjoyment to commute by bicycle or on foot but for many of Clear Lake's economically disadvantaged, it is the only option and the conditions for them are deplorable. Just try riding your bike from Bay Area to NASA 1 on El Camino. It is a very tricky task. Many people do it but it is not safe or easy to do. Sidewalks randomly start and stop and there are no bike lanes. I don't know how people manage.
58	I'm excited that there is an effort going on to remedy the poor walking and biking conditions! I've been trying to bike around the area more and have been discouraged by the poor bike/walking trails/sidewalks.
59	If bicyclists are in the street they need to obey all trafic laws (stop signs, etc.) and police need to ticket them when they don't. Although it may be "legal" to ride a bike down busy streets like Bay Area Boulevard - it is extremely unsafe to do so - there are sidewalks on either side that should be used by bikes.

Response	Comment
60	no
61	I think people would be inclined to use additional bike and walking trails for recreation and exercise. I don't think people will be inclined to use them to get to work, shop, or go to Church due to the heat and humidity in the Spring/ Summer months.
62	Egret Bay has a lot of bicyclers and pedestrians every day, and they walk in the middle of the road because there is no where else. This road should really be addressed soon.
63	I saw a cyclist get hit on NASA Pkwy in frt of Texaco (Kirby int.) by truck turning left into Texaco. It was like the cyclist wasn't even there. Driver on phone, pulling trailer, cyclist was in bike lane. Cars veer into bike lane all the time too. Separate bike paths are the way to go for so many reasons. Putting in dbl-wide sidewalks on all streets would go far enough, then give employers incentives to install shower/locker facilities.
64	Would like to see more trees sporatically along walkways for shade, but not rows of bushes where someone could be lurking or hiding and make it feel unsafe. My husband and I frequently drive to the Woodlands on weekends and take our bikes to ride, where there are lots of sidewalks, parks and riding trails. I wish Clear Lake was a community where we could walk to places to get out and exercise. I would choose to walk or ride my bicycle to work and to the grocery store instead of driving if it was safe. I have tried walking to work, but I don't feel safe crossing busy at busy intersections, such as Bay Area Blvd, Space Center or El Camino and NASA Rd. 1.
65	I'm a mountain biker. I have to go to Jack Brooks, Terry Hershy Park, Memorial, or out of town to get any decent riding in. So I would love to see some more hike and bike nature trails around. Clear Lake has a great landscape for that with all the trees and parks. I speak for a lot of mtn. bikers. I know that road bikers wish they had better, safer, wider, smoother, and longer stretches where they could ride as well. Those are the primary complaints of riders in the Clear Lake area. Thanks for the survey and I hope to see some new additions and upgrades.
66	A few years ago friends of mine would bike in the Clear Lake area and people would drive by and shout obscenities at them and throw things at them. This has deterred me from riding a bike in the Clear Lake area.
67	If my workplace had a shower and locker room, I'd bike to work so much that my truck would never run out of gas.
68	safe bicycle access between Clear Lake, League City and Friendswood, e.g., from Hwy 3 west across I-45.
69	Consider training local drivers on the laws regarding bicyclists and the rights of cyclists using the road. Personal cycling experience: I've come to a stop in the right lane (at a stop sign) at the same time as a car has stopped in the left lane, and then, the car has turned right (from the left lane) and cut me off just to save a few seconds of time. This has happened three times in the past month.
70	need seperated bike lanes over both bridges to League City
71	no
72	There are many road that have good sidewalks for walking or bicycle use; however, some of the connecting roads have no sidewalks or bicycle lanes. For example, there's a pretty good section of NASA Rd 1 with good sidelwalks and bicycle lanes, but I can't get to it because Egret Bay (from League City) doesn't have any protection.
73	More bike lanes and/or connecting greenbelt trails networks for bikes.
74	Egret Bay Rd and the Egret Bay bridge south of NASA Parkway lack adequate lighting and sidewalks for pedestrian traffic.
75	have a bike lane added on FM270. That would enable a nice bike ride loop around clear lake (NASA rd 1 to FM 146 to FM 518 to FM 270. That's about an 18 mile ride. Currently, people walking and riding bikes on FM 270 are at extreme risk. What morron designed the bridge and road with out a place for "people" to walk or ride a bike.
76	When designing a bike lane, it would be nice if there were motion sensors placed at intersections that would warn drivers not to go until biker (s), walker (s) have passed. I commute to work, and use a bike lane when I can, but so far, I have been hit by cars on two different occaisons because I was crossing an intersection, and they pulled out in front of me right when I was crossing.
77	I walk for exercise. I could walk to work or grocery shopping, but time, heat, and safety (and the occasional need to carry heavy items) makes it impractical. I could bike for exercise, but biking to/from work would require me to mix it up with traffic. No way.
78	"I am a fan of using bikes as the main transportation method, but feel safe using them only at parks. Me and my wife used one time the bicycle lanes in Clear Lake, but freaked out after having cars passing 1-2 ft from you at speeds of 45mph or higher. Wind from cars make it easy to loose control, plus you don't know how concentrated the drivers are on the road. Exhaust gases and air quality makes it even harder. I prefer to be in a car with my family for short drives, so there is more chance on returning back home in one piece. We live in League City and the problem there is that the pedestrian walk stops in the middle of our way between point A and B. This requires to run on the grass, or move to the road and take one lane with all the other cars. Also intersections are difficult to use, specially when there is an ""only"" and cars don't let you cross independently the crossing symbol is white in your favor. People just hit the gas. Some of the pictures in this survey showed perfect conditions for me to decide use a bike 80% of the time as transportation (distance as the limiting factor for the other 20%). Please share the results of this survey with the JSC community. Very interesting."
79	The heat and humidity limit walking and bicycling to distant areas most of the year. Please concentrate on improving the roads and sidewalks in the area.
80	"Driver education re: bicycle rights; Cyclist education re: responsibilites"
81	"Get us more paved trails, particularly along drainage ditches where there are no cars, and strongly encourage employers to offer shower facilities since nothing can be done about the heat and humidity. $ spent on facilities will be more than made up for on reduced medical expenses."
82	Personally, I do not ride bikes because of knee cap issues.
83	Develop a plan for Seabrook too.
84	I would bike to work from Friendswood if there were bike lanes and a shower.

Response	Comment
85	Biking to commute is good, but it would also be nice to be able to bike long distances for exercise. Meaning, good separation or shoulders on long stretches of road. Urban biking is good, but having the ability to bike long distances without having to stop often is also beneficial. This would occur is less urban places, or being able to get from urban to something like Red Bluff easily.
86	Mainly use bike paths if they are available, but there is not an easy way to remove the barriers of distance between locations and heat and humidity once you get where you are going, you need a shower, esp at work
87	Mandatory education for bike riders on proper and safe biking.
88	Before hurricane I had bike and lived in Kemah/Clear Lake Shores and walked and rode bike a lot for recreation. Main barrier (huge) is lack of bike racks for locking bikes - if nowhere to lock it, can't leave it to go into a store. Second barrier is absence of bike lane on ALL of NASA Pkwy between Seabrook and JSC (it goes away on bridge by Hilton - a more danger-ous place than the rest of the road??? and you aren't supposed to ride on sidewalk - should make an exception there) and on Hwy 146 between Kemah bridge and NASA Pkwy. JSC has added showers in new building, but previ-ously with showers only at Gilruth Rec center and no taxi to office buildings, it is difficult to ride to work - get hot and sweaty unless I go early and it is VERY INCONVENIENT to have to shower at work. So I guess the real barriers are the HEAT and not wanting to ride so early or take stuff to shower at work i.e. inconvenience. Also high volume of traffice on NASA Pkwy is a deterrant, even with a nice bike lane on most of the road.
89	Cycling in the main lanes of traffic is not only dangerous for the rider, but also for the drivers. Drivers are not accustomed to slowing down and accomodat-ing cyclists; so in doing so this creates a hazardous situation all-round. We need to have separate lanes for the cyclists.
90	recommend using easements and right-of-ways to create paths
91	Would love to see better bicycle access to the new convention center up to Bay Area and all. Rental bikes for out of town visitors, etc. My biggest con-cern with what I see today are the folks who ride in the street on busy streets like Bay Area or El Camino when there are sidewalks. Need to understand why they do that- curbs? Uneven surfaces? It;s scary for the drivers some-times because they are hard to see. Also, any separate bike path would need to be well lit and have safety phones (at least eventually) of folks would not feel safe at night.
92	I moved to Clear Lake 2 years ago from another state. I bike to work every day. Your bike paths in some areas are very good, better than many other cities'. Extending the network of bike lanes to include more areas would be great. Getting retailers to include bike paths in their parking lots and bike racks would permit me to do more shopping by bike. I find shopping center parking lots to be the most dangerous places for me to ride. And of course, educating vehicle drivers to share the road would also be helpful.
93	I've had a bike for 3 years and never used it here. I live 3 miles from work. I don't ride because there is no safe place for me to ride.
94	Many athletes use the sidewalks/bike paths for practice rides. More of those (10, 20, 30, 40, 50 mile distances) would be great!
95	Safe bicycling lanes throughout the area!

Response	Comment
96	Any new roads or road modification plans simply should include bike lanes with the highest degree of separation that is practical; even though it is hot - people will start using them which will cut back on traffic and people will be healthier.
97	Crazy drivers and speed of traffic makes it dangerous for anyone to walk and ride a bike in clear lake. In general the houston area.
98	There were no questions about it, but I think that the public transportation/ Bike facilities from the inner city to clear lake should be modified. Coworkers from the city would like to be able to ride the bus out to clear lake and home and bike to work, but the bus times are minimally available both here and on return and pathways are not readily accessible to bike the remaining distance to work.
99	They should coordinate with areas outside of the Clear Lake area to ensure that bike/walk paths connect to allow traffic in and out of the Clear Lake area.
100	Connect all the side walks and bike trails so you can go everywhere. It was stupid not to extend 518 bikepath below the newly constructed I-45 intersec-tion to the other side of the bike path in Webster.
101	Sidewalks along 270/Egret Bay Blvd between NASA Parkway and 518. People are always walking in the middle of the road, which seems extremely dangerous! More local transportation stops to ride between Webster, Clear Lake City, League City, and east Friendswood. Trees for shade would be great!
102	Please consider working with the CL Water Authority to turn the old CL Golf Course into safe, useable hike and bike trails.
103	I would bicycle the seven miles from home to work onsite JSC if there were shower facilities near my work area.
104	It would be nice to have trails to take the kids on.
105	Bike lanes along FM270 and South Shore Blvd would be a big help in commuting to JSC. Plans to put in sidewalks along Louisiana and Austin in League City are going to be great.
106	We have inadequate bike parking at destinations.
107	Drivers' lack of knowledge of non-drivers' rights to the road, unwillingness to share or yield, and inconsiderateness in failing to stay within speed limits or lanes, and to use signals; these all force bicyclists/pedestrians to be constantly on high alert.

Response	Comment
108	I think the biggest problems with walking/cycling in Clear Lake are the heat/ humidity, distance between places, and mindset of drivers. I go to school in Boulder, Colorado, where cycling paths are the norm and pedestrians are considered untouchable, and destinations are closer to each other because the city is located in a valley between mountains (which also keeps the heat and humidity down). In Boulder I rarely ever drive - I usually either walk, bike, or take the bus (for slightly farther destinations). It's hard to do that in the Clear Lake area (and most of Texas, really) because cyclists and pedestrians aren't considered important enough. Drivers are more selfish, and pedestrians and cyclists are seen as an annoyance instead of being accepted as the norm. I don't know how to fix the heat and humidity (except with maybe a bit more shade?), or the distance between destinations being long, but I think the importance of pedestrian/cyclist safety should be more prominent to drivers. In Boulder, that awareness is achieved through the presence of an abundance of crosswalks that give pedestrians/cyclists plenty of time to cross (and in some places, signs where pedestrians only have to press a button and flashers on the signs come on that alert drivers to the presence of a pedestrian in the road and force them to stop so that the pedestrian can instantly cross without waiting for traffic to diminish), separate right turn lanes on many streets with YIELD TO PEDESTRIANS signs (so pedestrians don't have to worry about drivers turning right when they cross the main portion of the street), and a state law requiring all vehicles to yield to pedestrians, skateboards, and bikes (and signs everywhere that remind drivers of this law).
109	I live at El Dorado and Space Center and would try biking to JSC if there was a safe bike lane to do so, when the weather isn't 100 degrees. Answering the survey during this incredibly hot summer is bound to impact responses.
110	"Working with surrounding areas such as Webster and League City to support joint plans to incorporate bike paths and sidewalks to Clear Lake. Adding water stations along paths."
111	JSC gate closures can double or triple the length of a walk/bike commute. Card reader turnstiles would give walkers/bikers 24 hour access to the security gates that make to most sense.
112	When I have biked to work before, I have felt it necessary for safety to walk my bike across the Bay Area to my work building, I have had traffic coming from Pasedena purposely rev up their engine in an attempt to threaten my crossing the street or scare me. I don't think we can fix stupid, rude people.
113	The main problem I have biking here is the quality of road surface, both on sidewalks and in the road. Most neighborhoods in my area are low traffic and easy to bike in the street, but traffic doesn't know what to do with the bikes so they drive really close. For this reason off street bike lanes would be fantastic.
114	Bike lanes such as the one along parts of NASA Road 1 are not adequate: drivers disregard them regularly. Once, I saw a bicyclist coming up behind me at an intersection so I got over as far as I could to the left side of my lane, the right-most lane, so he could have as much room as possible. (I have friends who do ride around here and complain about drivers crowding the bike lane, clipping their elbows with mirrors.) An SUV saw me do this and took it as his opportunity to get over behind me in MY LANE AND THE BIKE LANE, narrowly missing my car, and make a right turn beside me. I think he may have even had his right front wheel on the curb! Had the cyclist been closer, the SUV would have hit him instead of just completely blocking his passage.

Response	Comment
115	Vehicle Driver Education of Bike Laws and sharing of the road. Many drivers believe bikes should ride on the sidewalks and not impede traffic flow even though this is illegal. Laws should reconsider the greater hazard - Car vs Bike or Bike vs Jogger
116	Consider the cost of upgrading sidewalks and bike paths due to poor economic conditions. Plan to do upgrades after the budget is balanced and the revenues are up.
117	none
118	"Would definitely like to see bike lanes added when new roads are built or existing roads are resurfaced. The entire length of Bay Area Blvd, El Doradao and NASA Road 1 Parkway needs a bike lane."
119	Lack of commercial businesses in or near subdivisions makes it very unlikely that biking or walking for non-recreational acitivities will ever be popular in this region. The zoning and deed restrictions would have to dramatically change to improve this situation - which I'm not necessarily against. However, because of the complexity of changing deed restrictions, it's hard to imagine that this would happen in my lifetime. The only remote possibility of improving access to commercial destinations in my lifetime by means of bicycling would be setting up bicycle and walking paths along utilitiy easements, which would also encounter a lot of opposition, most likely, from the utility companies. Nuff Said.
120	Clear lake has horrible bike lanes / bike paths compared to other Texas cities. The bike lanes on NASA Road 1 / FM 528 is a joke, putting cyclists right next to 55mph+ traffic in a poorly maintained shoulder lane.
121	Provide either maps to destinations, and which paths to use to promote venues to visit. Possibly have 'group cycling' events to have people see for themselves the distance and things to do around clear lake.
122	I think another factor for walking/bicycle safety that should be addressed is the education of motorists on how to "share the road".
123	I would love to see more people out walking and biking around Clear Lake, but it will take a complete overhaul of attitudes that people have about their cars. There also needs to be a change in attitudes that people in their cars have about people on foot or on bicycles. I will not ride in the bike lane on NASA Rd. 1 because of the crazy drivers who do not pay attention while driving. I feel safer on the sidewalk.
124	I would enjoy using my bike more often but I don't feel safe on most roadways in the Clear Lake area due to the traffic. Bike lanes would be great.
125	Consistent, clear requirements for design, installation and maintenance of walkways and bicycle paths, including significant consideration to connecting the trails and paths to facilitate movement around the surrounding area without a gap in trails.
126	no
127	I would bike ride to work if there was a shower there. As a Mom, biking to the grocery store is not practical just due to needing to get cold stuff home quickly, and volume of groceries needed most of the time. I would love to walk to restaurants with the family.

Response	Comment
128	It would be very easy to connect the greenways together to make safe walking and biking paths. It is very frustrating that the few bike paths that do exist are not connected to anything.
129	Clear Lake area could easily benefit greatly by creating hike/bike trails along drainage ditches and Horsepen Bayou. They would be an excellent added ammenity to the area and enable people to walk, jog and bike away from exhaust fumes!
130	I would love for the NASA Rd 1 and Bay Area to have good sidewalks. I wish I could ride a bike around the area, but I wouldn't dare go on the roads because of the enormous trucks. I would definitely rank Clear Lake as "Low" on "Bicycle-Friendliness," but I'm glad that you are working to understand the desire.
131	"1) Include bike lanes on moderately busy side streets (the traffic volume and speed make the bike lanes on NASA Parkway unusable). 2) Install a mixed use trail along Highway 3 (parallel to the railway) 3) Install pedestrian crossings across the railway at all major intersections (Bay Area Blvd., NASA Parkway, etc.) 4) Implement a commuter light rail on the railway along Highway 3 connecting the Clear Lake area with downtown Houston. 5) Ensure that as the intersections between I-45 and major crossing streets are rebuilt that they include a way for bicycles to cross the interstate. 6) Just FYI, the biggest psychological barrier to biking in Clear Lake is the fact that biking is not part of the community mindset and thus motorists are not as aware of the need to look for bicycles."
132	Awesome initiative, and I look forward to the day when there are more bikes on the road than cars!!
133	We have bike lanes and sidewalks, but no coherent plan whatsoever. Sidewalks just end and so do bike lanes. NASA Rd 1 right in front of JSC and to the east the bike lane just stops, then starts up again 1 mile later. You need to consider the big picture and connect destinations, not just make developers pour enough concrete to cover the frontage of their land. And, please, let's drop the wavy sidewalk patterns, it's not a nature park, it's a sidewalk. Take a lesson from Seabrook, their walking/running trails are excellent, well maintained and highly used for exercise. We are driving from all over Clear Lake to use those trails.
134	living close to parks that can be desserted so I would like a little security during school session (in/out) so the kids can walk / bike safely from home to school and viceversa. Also, some people don't seem to pay attention to stop signs or speed signs.
135	Attitude of motorists toward bicyclists is very negative and ignorant.
136	Highway 3 needs serious work. I lived along Highway 3 for 5 years, and never felt safe walking there. It's 50 mph speed limit, no sidewalks. Your choice is to either walk/bike along a narrow shoulder next to high-speed traffic, or walk/bike in the drainage ditches. Deplorable pedestrian conditions.
137	We really need safe bike trails to get to JSC from all directions. Ought to be albe to bike into JSC from 10 miles out, cartainly 5 miles.
138	No
139	no

Response	Comment
140	These walking and biking trails could promote local small businesses as destinations. Please look at redeveloping some under used areas for such a purpose (and give us more places to bike to and to walk to).
141	Many places that have suitable sidewalks don't have frequent enough mowing/pruning, so they're often too overgrown to safely use (thinking of along Space Center and Middlebrook and Bay Area near UHCL). Also, there's moderately OK bike access to a NASA entrance at the main gate, but no safe crossings from the sidewalk at either Space Center gate, and riding between Cyberonics Rd. and the back NASA gate on Space Center itself is dangerous and scary (curbs, 40 mph speed limit).
142	This may be out of scope for this committee, but my biggest request is to have a dedicated, safe bike lane on Egret Bay - between 518 and NASA Parkway. A nice, wide path already exists along 518 all the way to Kemah. An Egret Bay bike lane would dramatically open up commuting opportunities for a large number of people.
143	Cycling in Clear Lake is dangerous. The few bike lanes we have don't go anywhere useful. Need more bike lanes that allow commuting to work or to shopping.
144	"I believe that if bike lanes were installed or sidewalks were in better condition and were existent in all of Clear Lake, more people would use them. I have tried riding my bike to work once and found that the sidewalk would end and put me into morning traffice which is not worth the risk in my opinion. I'm only about 4 miles from work and would enjoy riding but am not willing to risk my life to do so. I truly hope this project comes to fruitation. It would be wonderful to see more people using human powered transportation."
145	need bike lanes
146	I would like to walk/bike or take a shuttle since it is close. Yet not enough bike/walking lanes. I would even like a shuttle service to get me closer to my destination (work/shop/restaurants) and then I walk the remainder of the way.
147	"Consider a ""spoke and hub"" approach. Have feeders coming from the various neighborhoods that feed into a central lane. Has consideration been given to using the old Clear Lake Golf Course as a central line from the communities North of Bay Area Blvd heading toward NASA and Clear Lake Hospital. Also there is a lot of ""green"" space along the bayou's and the areas where gas pipelines run."
148	Driver education - enforce the message that bicycles have a right to the road.
149	Excellent survey. One thing missing: The fact that bicycles are fun!
150	"There is no safe route from League City to Clear Lake. The existing routes are much too dangerous. There are no showers at work, so biking to work would be difficult."
151	I would like to see some of the speeds on the major roads lowered especially on Clear Lake City Blvd, El Camino, Space Center and Pineloch. I would also like red light traffic cameras installed at the traffic lights. The City of Houston could make a small fortune issuing tickets for speeding and running red lights by people commuting through Clear Lake.
152	Please don't spend any more money on this project.
153	no

Response	Comment
154	I run, walk, and occasionaly ride a bicycle (for excercise and enjoyment, not for transportation). I see no pressing need for increased bike lanes and only a mild need for improved walking paths. I do not see significant foot or bike traffic and I do not believe this is a case of "build it and they will come."
155	no
156	We live in Clear Lake, High School is in Freindswood, there is absolutely no way to travel down FM2351 on foot or bike between I-45 and Beamer. None. Traveling north-south, there is Bay Area Blvd. is the great divide - it is not crossable on foot, not advisable on bicycle. NASA 1 is not crossable either. There is plenty of foot and bike traffic wihin the area bordered by HWY 3, Bay Area, MiddleBrook, and FM2351.
157	"1. The sidewalks along Saturn Lane (between the fire station, junior high school, & JSC) would be used more if there was adequate lighting. There are no street lights between Hercules Blvd. & NASA Rd. Otherwise, I believe more folks would consider walking from the nearby townhomes & apts. 2. More police patrol along pedestrian routes. Many areas of Clear Lake seem safe, but are somewhat isolated feeling. 3. A NASA employee shuttle bus system would be ideal to have."
158	Another factor preventing me from biking in Clear Lake is that drivers are inconsiderate. They speed, run red lights, and change lanes without looking -- and in some cases, they "hit and run." A cyclist will be critically injured if hit by any car. I fear for my safety with every bike ride.
159	Seabrook paths and the paths along RedBluff are good models
160	Cyclo-commuting requires education of cyclists and motorists, not just cyclists.
161	no
162	There needs to be more strict enforcement of the automobile traffic on all roads before walking and biking in the Clear Lake area will be able to become routine for my family. I do not feel safe letting any of us walk or bike anywhere if we have to share the road with drivers in the area. The blatant disregard for the rules of the road by civilians and police officers alike is terrifying.
163	More trails please!
164	restrooms
165	the possibility of utilizing land on the east side of Hwy 3 between the subdivisions & the railroad tracks as hiking/biking trails.
166	The study omits the populated sections of Meadowgreen, Oakbrook West, Pineloch, Clear Lake City Blvd, and their associated parks and green belts. Neighborhood layouts discourage walking to the corner store.
167	"I live in El Lago and can;t even get to Arlan's Market in a safe way. If I could bike safely to a grocery store with a bike trailer, i.e. wide bike lane, not in the street, distanced from trafiic, I would do so. Perhaps a Walk/Bike-n-Ride for the local public transit in which every resident would be able to safely walk/bike to an area with secure bike parking less than a quarter mile from their house and then get on a shuttle to NASA, the Mall, Bay Area Park and Ride, and other major destinations in the area."

Response	Comment
168	I have two young boys with autism and would like to be able to take them out more. They don,t understand danger or traffic, so we need more places safe from cars. Thank you for the work you are doing!!!
169	I wish more people knew about this survey and your activities. I happened to encounter a postcard regarding this survey while at a bike store today. However, I interact with others very interested in this topic often and no one in the community mentioned this opportunity to have an impact on biking and walking resources in our community. Bravo for your efforts!
170	Please consider connecting/extending the already existing bike facilities in Clear Lake (bike lanes and shared-use trails) with those in Friendswood and South Houston.
171	Integration with parks and greenbelts as well as stores would be helpful and enjoyable.
172	I'm an avid cyclist and runner along with many associates and friends that are productive members of our local community. We all agree that in order to safely cycle, run or trail run we have to commute out of Clear Lake to Alvin, League City or Bay Port in order to have rides and runs where dangerous traffic and fear of fatal crashes aren't as big a concern. I literally know at least a hundred local athletes who would love to spend more time in Clear Lake training and spending their hard earned money, if only Clear Lake was a more bike/pedestrian friendly place.
173	I mostly answered regarding interest in riding a bicycle in my work area - the Webster Medical Center area. I would love to see workers in the Webster Medical Center area using bicycles to commute from one medical facility to another, post office, convenience store, restaurants, etc.
174	Egret Bay/ 270 needs bike a bike/ running path.
175	I ride a road bike with others. We would greatly appreciate bike lanes, especially those that have distinct separation from traffic flow as pictured in one of your examples.
176	It's really annoying when roads are re-paved and there is NO concern for putting in bike lanes. Really? That's one reason why Houston was the Fattest City in America. Good job.
177	Driver education, driver education, driver education. The average Clear Lake drive is much more concerned with their cell-phone, make-up or iPod than they are of maintaining awareness of their situation and surroundings.
178	do we need a bike prmit?
179	A bicycle lane on the highways would suffice.
180	Even an addition of bike lanes for some of the major thoroughfares in Clear Lake would be highly beneficial for increasing both bike and pedestrian traffic. It would provide dedicated areas for bikes to travel with lower risk of car hazards, and would provide a buffer between high speed traffic and pedestrians.
181	I think it is great that you are addressing these issues. I am a triathlete and drive down to highway 96 to ride because of the wide shoulder. I would love to be able to do my rides in Clear Lake and I would also ride my bike to work (Johnson Space Center) if it was safer to do so. A few of my friends do ride to work and regale us with their "barely missed getting hit by a car" stories daily. Looking forward to seeing the improvements that will come out of this survey.

Response	Comment
182	First, thank you for conducting this survey. I bike frequently in Clear Lake for exercise and transportation and appreciate that you are working hard on this issue. I frequently cycle on roads where the speed limit is 45 mph and traffic is frequently driving in excess of that. Drivers frequently pass too close, at high speed, and often harass cyclists, either honking the horn, or offering disparaging comments. I think public awareness of cyclists and consideration for their safety is negligible in Clear Lake. A public awareness campaign would do wonders for repairing the relationship between cyclists and drivers.
183	My interest is more in biking. There are some useable bike lanes in the Clear Lake area but my concern is that there are quite a few breaks between them which make it difficult to access all current bike lanes.
184	Although I live in Dickinson, I run/bikeride in Clear lake area.
185	Please pay attention to connectivity to other communities to support long distance road cycling (30-80-mile routes). Please avoid big square curbs on roads without a bike lane or shoulder. Please continue to post "share the road - bikes are vehicles too" type signs.
186	prevent crime
187	Clean up existing sidewalks and shoulders while inadequate bike paths and trails are considered or implemented.
188	We really need better biking and walking accommodations. The health or our community members and our overall environmental benefits are also excellent returns on our investments.
189	no i think you've covered the basics
190	What a lot of this comes down to is that drivers in Houston do not want to share a road with bikers, runners, walkers. I have lost count as to the number of times I've been honked at or had a car drive way too close to me out of spite on busy roads like space center, NASA, or 146. 146 is the worse. Let alone the derogatory comments yelled at by drivers/passengers. Would LOVE to see policeman on 146 pulling over jacka$$es for trying to cause bikers to crash by doing inappropriate things. or fill the side of the road with mattresses, so when a pickup truck forces one off the road, it'll be a soft landing.
191	Not only are there few destinations within most people's homes, but Clear Lake does not have a transit option other than the park and ride for commuters. Additionally, car culture is established in high school, where the majority of students own and drive cars to school, even those living just 1 mile away. The public school system should be involved in this process and students should be given incentive to walk to bike to school.
192	not at this time
193	We want bike lanes.
194	Drivers & cyclists need to learn to share the road.

Response	Comment
195	I regularly bike along NASA Road One to JSC NASA. The bike lane stops around clear Lake park to past Space Center blvd which is very dangerous for me. I prefer to stay in the streets for a smoother ride, particularly on my road bike. The streets/bike lanes could be swept more often. Also who should I call to report problems? The fancy red bricks on the sidewalks are in poor condition. There should be trails/shoulder along Space Center Blvd for road biking. The sidewalk is horrible and too narrow for bikes. the new sidewalk along Kirby was a nice idea but the concrete gaps are too bumpy for my road bike. It would be nice if the NASA Road/Space Center/Bay Area/Red Bluff/Kirby loop was in consistent condition for a reasonably safe jogging/riding route and it was better connected to the Armand Bayou trails (problems such as no crossing lights, no sidewalk ramps). I would also like a better connection to the Seabrook trails. I don't dare let me kids bike there so I have to put the bikes on the rack. It would just be nice to ride for 10 miles without risking my life. It would also be nice to have better biking access for the Kemah boardwalk, Kemah bridge, and Todville road (one of my favorites if it was safer). I regulary bike in the area and I am always ready to talk.
196	"Well, the survey was amateurish in that many valid options were not available...you did not focus on some valid constructs of interest...etc... I'm not sure how much you will learn. You also assume that we want more accessibility for bikers. I find bikers to be uniformly rude and rarely do I see a biker stop at stop signs or obey any traffic laws. I would, therefore, be resistant to any expenditure on bike related paths/trails/etc."
197	We are so happy someone is trying to improve this. We talk about it often as we drive around saying our city does not encourage walking or biking with lack of sidewalks etc. Thank you!
198	education/signage (e.g. Please Don't Run Over Our Cyclists and Pedestrians) Please have the city correct misspellings on street signs to easier identify location.
199	Signs to notify motorists of cyclists and pedestrians.
200	There are a lot of athletes, both runners and cyclists, in the Clear Lake area that would put any available paths to good use.
201	The community would love to have more hike and bike trails. Thanks for putting together the survey!
202	More trails please!
203	I recognize that you can't do anything about the weather and the fact that often destinations aren't close to neighborhoods. But the lack of sidewalk and the lack of bike trails is awful. I don't walk to destinations because they are too far, but I run and bike for exercise 5-6 days per week and would love love LOVE better trails and bike lanes for that purpose. I know hundreds of others who would like that too.
204	Focus on making sure we have adequate options for mobility. Also, I am an avid runner, but there is a serious lack of places to run here away from traffic. I usually end up have to drive to places like Memorial or Hermann Park because there are no safe places away from auto traffic to run, and insufficient lighting for the evenings.

Response	Comment
205	The current bike lanes (such as on NASA Rd 1) are not sufficient. Houston drivers have no respect for bicycles. For safety reasons I feel it is important to have separation between the bikes and cars. Also, it is frustrating as a biker when the lane magically disappears for 100 yards or so at various places.
206	improving awareness to car drivers of the right of way for bkikers, or simply awareness of them on the road. Moved here from colorado and have not felt safe biking here unless in a residential neighborhood. Would love to see bike bridges over busy roads such as bay area blvd.or hwy 3
207	I was hit by a car while riding my bike in a quiet residential area like in one of the photos. I was just banged up, but my bike was totaled. Every time I go out to get exercise on my bike, I am nervous. In order to get in enough distance for a good workout, I have to ride in traffic on Space Center and Pineloch blvds. I really wish there was a long stretch of bike lanes somewhere so that I could get a good workout without having to ride in traffic. Most people ride early in the mornings due to traffic and not as much because of the heat.
208	I would use bicycle trails alot more if available in the area. We have to drive far to use recreational bicycle trails.
209	The sidewalks stink in this area. They are eighther to skinny, slanted, or just end without anywhere to go. When biking there is always a seam right where you want to bike...even some places on the NASA road 1 bike lane...which always has TONS OF DEBRIS.
210	Many cyclists ride in excess of 15 mph, which is not safe on sidewalks - bike lanes are needed for safe cycling transportation, and sidewalks for walking and roller blading (and for cycling with kids). Because the large (and often, unfortunately, serpentine-shaped) sidewalks exist in some places, motorists expect cyclists to use them - and it's just not safe. Also consider motorist awareness issues at business entrances - we've almost been hit by motorists not paying attention to the bike lane when coming out of driveways. Need to limit landscaping that is a barrier to sight lines. Thanks for your work on this issue!
211	I am particularly concerned about not having isolated areas. We did not move to the woodlands bcse i have three girls and i would never have let them ride on trails behind houses and hidden by woods. I am also a long distance rider and am cocerned about the condition of current bike paths which are not swept and cause flats or even in some cases, the need to still ride in the main lane.
212	I commute to work (JSC) on a bicycle, traveling about 5 miles one way. I would like to see the shoulders maintained on Middlebrook Drive south of Bay Area and on Space Center north of NASA Parkway, as it is not safe for me to drive in traffic lanes on these roads, and the shoulders are often unusable, with stones, glass, weeds, cracks and broken surfaces.
213	Clear Lake Bridge design along Bay Area Blvd, Space Center, and El Camino has inadequate pedistrian or bicycle width on each side. Very poor design and very bad maintence are another factor.
214	There are places where a utility pole is in the middle of the sidewalk/trail area. That doesn't make any sense.

Response	Comment
215	"Making new sidewalks level - in many cases they are slanted or uneven Making new sidewalks straight instead of making them curvy for no reason - i.e. along South Shore Blvd they are unnecessarily curvy"
216	Bicyclists in the street are a danger to themselves and others; they know it, the drivers know it, anyone who has witnessed an entire lane of cars slowly moving to the other lane to go around a cyclist knows it. I would bike more often if Clear Lake had smooth, separate bike lanes.
217	I think for me the concern is that there are not enough bike paths or walking paths in the area. The walking paths that are near my house are not wide enough to pass on without endangering the other person on the path. The only bike trail I have is along Bay Area till I reach Red Bluff and just getting to the Bay Area trail can be difficult sometimes due to no crossing lanes or bike lanes from the neighborhood. I would like to see focus on hike/bike trails that are actually in the wooded area around our community instead of on busy streets such as Bay Area. A good example would be the Memorial area trails or Terry Hersey park out in Katy. I shouldn't have to load my bike into my car to go use it in another area.
218	Please consider a master plan that integrates walking and bike paths with parks, greenspaces, recreational facilities, and retail spaces (such as coffee shops, restaurants, and other storefronts).
219	Sidewalks should not be used by bikers. Bikers shouldn't monopolize traffic lanes in high traffic areas. In the neighborhoods it is fairly safe to walk on existing sidewalks or ride a bike, even in traffic lanes. Once you reach thoroughfares such as Bay Area, NASA 1, El Dorado, El Camino, Clear Lake City Blvd., and the like, it just isn't safe to ride a bike on the thoroughfares (and sidewalks are not intended for use as bike lanes). From a crime and personal safety perspective, it is not safe to be biking or walking alone on these thoroughfares in my opinion.
220	I hate the fact that some of our sidewalks are right next to the road. I hate this because if a driver gets distracted he/she could easily just veer into the pedestrian area. Also, some of our desinated bike lanes are not well maintained - all the trash from the road goes there so it is hard to ride in the bike lane without flatting out on a road bike. Check out the NASA Parkway bike lane - it should be swept regularly. Also, the pedestrian bridges on Space Center North of Clear Lake City BLVD are not separated from the road - except they are elevated. When my kids were younger, I was worried that one of them would fall off of their bike right into the road. I would make them ride right next to the railing. With more and more driver distraction issues, separation from cars is essential for biking safety! Cars do not like to be held up by bikers - some people are outright aggressive to the bikers, even though the bikers are following the traffic laws.
221	Some riders are down right hostile and veer towards me in a threatening manner when I bicycle. The attitudes of the drivers are the most problematic. They need to share the road
222	The more we add safe facilities for biking and walking, the more we increase activity and health levels, and possibly increase people using more business that they can walk and bike to, as well as decreasing traffic issues and pollution.
223	Bike routes to High Schools especially Northfork to Clear Brook High School

Response	Comment
224	Roads should be more bicycle friendly ... either bike lanes or dedicated bike paths. Also, it should be easier to park and lock a bicycle at area businesses.
225	Keep the bike lanes clean and free of debris. They constantly have trash/ hazards in them. They are not wide enough to feel safe.
226	I would like to see these efforts extended south along the I-45 corridor. It would be nice to be able to ride a bike to Galveston Isalnd and cross the causeway or ride to Kemah/Seabrook. I would like to be able to ride from Dickinson to the Bay Area P&R without getting run over. I have yet to find a way to get there without using major roads. It would be nice to be able to bike into downtown Houston if desired.
227	We need more trails for bike and pedestrians to use. Not aesthetic side-walks, but functional wide paths, and not just concrete.
228	I feel like building constraints that make new places of business more walking friendly would be benificial, for example placing parking on the side or in the rear, bike locking stations and the creation of bike lanes that are maintained as clean areas, as opposed to the areas where trash from the road is swept, as is often the case on NASA Rd 1.
229	This area need a more integrated network of trails (not sidewalks) for running and walking and bike commuting. The inclusion of some single track type mountain biking trails would be awesome. Sidewalks around business and retail areas here are a bizzare in the way that they start and stop and dip and dive and narrow and move left and right in some sort of strict application of municiple code that ends up looking about like the most stupid result that could be imagined from a use standpoint. In neighborhoods with low traffic volume and lower speeds, I prefer no sidewalks and simply shared us of the street for biking and walking. The pointlessly twisty subdivision walks just want to make me cry for our collective stupidity.
230	A reasonable area-wide campaign for the importance of sharing the road with cyclist/walkers/runners would be a great benefit. Some people will not change their mind and feel that the roadways are meant only for cars ---and there's always that factor---but many may be perceptive to change to increase safety & awareness of others using these transportation resources.
231	Recreational trails for families and citizens. Separate bike lanes; painted or physically separated.
232	The light @ Reseda and Bay Area is difficult (to impossible) to trigger on a bicycle. If there are no cars going in the same direction, the bicyclist must either run the red light (when the left turn lane light is green for traffic on Reseda) or get off their bicycle and push the pedestrian button.
233	Sidewalk for runners need to be asphalt or trails. Not concrete.
234	Cleaning the streets (bike lane) of major roads (NASA Parkway, 146 Kemah Bridge). The cub side of street are full of sand, debris, glass, etc
235	If you could find a way to get rid of the Houston humidity, that would be awe-some. :) (just kidding)
236	The bike paths that are in clear lake are to narrow and end to quickly, there are not side walks where there should be !!!

Response	Comment
237	I hope action will be taken and bike trails established for cyclists to navigate for recreation as well as for transportation access to workplaces in Clear Lake.
238	just adding biking trails/ lanes or safer ways to bike so more people can bike to work and school like Denver, CO. maybe make kemah bridge safer with a physical wall to block sholder for runners...? also more access to metro bus, maybe even more bus stops and expand the route. thank you!
239	Park&Ride near pearland (example San Jac to get to a route bus that go around the SpaceCenter).
240	Basic bicycle roadway safety classes would be nice as well as informational sessions for motorists on sharing the road safely. I have almost been run over by a car making a right turn who didn't have his turn signal on and didn't see me continuing in straight. Luckily I was paying attention and was able to stop myself in time, but in any type of collision, the bicyclist is at a disadvan-tage to the motorist.
241	I would like to be able to bicycle for exercise after work, but the central clear lake area has too much traffic and very few bike lanes - even the kind that are right in the roadway, and I do not feel safe. There needs to be education as well (both for drivers and cyclists) to encourage mutual respect, and proper road rules. I would also bike to work if there was a safer path (although lack of shower facilities is an additional barrier there). I recently travelled to my hometown of Madison, WI and found that they have an incredible network of bicycle and multi-use trails, both on and off-road, such that you can bike almost anywhere. It was amazing and I am completely envious! I would love to see anything even starting to approach that here.
242	Jurisdictional issues. For example, the shoulders of roadway around the inter-section of NASA Road 1 and Kirby Road is always strewn with debris. Some of these pieces can be large (branches, car parts etc). It's tough to tell who is in charge, but none of the municipalities that bound that area (Houston, Pasadena, El Lago, Taylor Lake Village) seem to want to take responsibility for keeping the roadway free of hazards.
243	Short segments of a commmute such as the last 1/4 mile before getting to JSC from Clear Lake make bicycling to work dangerous.
244	education of motor vehicle drivers to be cautious of cyclists not angry at them.
245	From my part of town, 2 of the best biking locations are not accessible due to lack of sidewalk and difficult/dangerous interesections. I live in Pine Brook and cannot safely and easily get to Bay Area Park and the new bike trail on Red Bluff without taking a circuitous route or going thru dangerous intersec-tions. I suggest a sidewalk along Bay Area (on the Brookwood neighborhood side) between Middlebrook Drive and Red Bluff.
246	I think there should be a bicycle lane on every street with a reasonably safe seperation from the traffic. By simply having the facilities available, more people will be encouraged to ride their bikes. Also, the few lanes that exist now do not feel safe. They are thin, very close to traffic and there is a lot of debris along side the road that ends up in the bike lane. It would be nice to clean these as well. Once or twice a month would be great!
247	NO TAX INCREASE WITH THE QUALITY ENHANCEMENT OF PUBLIC LIFE.

Response	Comment
248	Need more Bike Lanes and Trails asap. People are getting killed or seriously injured trying to ride bikes to work or for exercise.
249	cycling is a very popular sport in the Clear Lake area. It would be nice if it offered more biking trails to provide for more recreation and safety for clcylers.
250	We have bike lanes but they are right next to traffic. Most drivers are unaware of where they drive and constantly drive inside the bike lane, or close enough to the bike lanes so that their mirrors, trailers, and door handles are INSIDE the bike lane and can potentially hit cyclists. Some drivers go as far as curse and offend cyclists because they are 'too slow' i.e. slower than (or at) the speed limit instead of faster than the speed limit. As an adult, I can take the risk and ride on those lanes, but I would not be comfortable if a child was to use them. Bike lanes need to be PHYSICALLY SEPARATED from motorized vehicular traffic. The separation would create safety and make the lanes usable by both adults and children.
251	I used to ride on Space Center between Bay Area and NASA 1 as part of a 25-mile workout 2 to 3 times per week for years, but the condition has deteriorated so much that i no longer do so. I'd like to see the berm of the road repaired, grass removed, cracks filled, etc. so I could resume using it. This is a great route to get to NASA 1 and the bike lanes there that can take me to Kemah and 146, which I used to love to ride to.
252	n/a
253	"Cooperation with adjacent towns to have continuous paths between towns that actually go some place. When commuting on a bike you actually go 5-15 miles and that spans across town boarder. I live on the west side of 45 and even though I commuted over 95% in college over 5 miles each way, I feel very unsafe here because of the lack of bicycle paths that cross I-45 and that actually are continuous and actually go somewhere. A good example is bay area and hwy 3, no sidewalks crossing the track and intersection. No sidewalk in front of black eyed pea. And at hwy 3 and bay area there is a sidewalk on the east side of bay area but then when crossing hwy 3 there is no sidewalk on the west side of hwy 3 until Live oak street. Sidewalks are great when they exist, but sadly they do not exist or have sign polls, light polls, stop light signal poles right in the corner, water hydrants or other obstructions in the sidewalk. This itself that makes it very unsafe to walk or ride a bike on them because there are no bike lanes at all. Just token lanes that start in arbitrary places and end in arbitrary places while actually going no where. Please make the paths/sidewalk dual use, thus cost effective to construct and practical to use.
254	It would be nice to work with League City and connect their future bike ways to some in the Clear Lake area. If bike lanes are approved it would be nice to have them seperate from traffic, not a wide side wlak either, but an actual bike lane.
255	Side walks are in horrible condition as well as main roads with far to many potholes and drop offs. Another issue is that some sidewalks end abrubtly and then start again and they do not all have wheelchair ramps. As a cyclist it is very difficult crossing the railroad tracks and there is a lack of biking signs displayed in the area.
256	handicapped availability. There will be much more need in the future.
257	Cycle paths will get people out of their cars for sure!!!!
258	Vehicles not respecting cyclists, and cyclists not respecting laws

Air Quality **Analysis Methodology**

The air quality benefits of each recommended project were estimated based on a methodology devised by H-GAC and expanded here to provide a range of estimates for various conditions. The methodology is based on that used to compute potential demand but with some modifications and additional steps.

Define catchment areas. Using GIS software, two buffers, one for pedestrian projects and one for bicyclist projects were drawn around each set of projects within the study area to define a "catchment area" for the Year 2015 to identify trip generators that would potentially be influenced by the improvements identified. Bicycle projects and pedestrian projects were assumed to have different catchment areas:

- Bicycle projects: 1 mile and 3 miles
- Pedestrian projects: ¼ mile and ½ mile

The lower values are standard H-GAC assumptions; the higher values were proposed by the FTA in 2011 for assessing bicycle and pedestrian projects.

Generate trips. Regional trip generation rates were used to estimate total trips produced in the catchment area around each project based on H-GAC estimates. The rates used were:

- 6.54 trips per household
- 2.53 trips per job

Assume mode split. Three mode split shifts were defined for bicycle projects and pedestrian projects.
Mode splits estimates were based on a comparison of existing travel modes in Clear Lake with regional averages as well as previous research such as LUTRAQ study in Portland, Oregon which saw a 1.8% mode shift from improvements, which was used as a baseline and adjusted down for the Houston Region. The rates used were:

	Non-Motorized Mode Split (%)				
	Existing		Incremental Growth		
	Study Area	Harris County	Low	Medium	High
Pedestrian	1.9	1.8	0.4	0.9	1.3
Bicyclist	0.2	0.3	0.1	0.2	0.3
Total	2.1	2.1	0.5	1.1	1.6

Compute demand. The number of bicycle and pedestrians trips generated was computed by multiplying the assumed increase in mode split by the total number of trips computed for the catchment area. This resulted in six trip estimates for each project: high, medium, and low estimates for each of the two buffer definitions.

Compute VMT reduction. Total vehicle miles traveled (VMTs) were calculated by multiplying 2009 National Household Travel Survey estimates of trip length (2.26 miles for bike; 0.7 miles for walking) by the computed demand.

Compute air quality benefits. The methodology of MOSERS 11.1 was used to estimate emissions reductions using the six combinations of mode splits and buffer sizes. Estimates for the emissions per mile were used for the

following air quality factors. The total emission were then annualized to determine the annual kilograms (kg) per year that could be averted by implementation of the Clear Lake Pedestrian and Bicyclist Plan.

	Emissions (gram per mile)
NOx	0.239
VOC	0.315
CO	3.732

Several scenarios were developed to understand the potential range of the Air Quality benefits. Many other factors are likely to influence to results as well including the level and pace of plan implementation, overall and local economic conditions, fuel prices, land use development practices and ongoing operations and maintenance of facilities.

An example walkthrough of the air quality calculations for one mode and scenario is shown on this page.

Sample Scenario: H-GAC Buffer
Medium Mode Shift
Bicycle Projects

Calculation Step	Equation		Quantity	Units
Catchment Area Trip Generators	a	Households	37790	homes
	b	Employment	61725	jobs
Trip Rates	c	Households	6.54	trips/day/home
	d	Employment	2.53	trips/day/job
Total Trips	e=(a*c)+(b*d)		403311	trips/day
Mode Shift Rate	f		0.2%	percent trips
Trips Replaced	g=e*f		807	Trips
Miles per Trip Replaced	h		2.6	miles/trip
Vehicle Miles Travel Replaced	j=g*h		2097	miles
Emissions Factors	k	NOx	0.239	gm/mile
	l	VOC	0.315	gm/mile
	m	CO	3.732	gm/mile
Total Emissions Reduced	n=j*k	NOx	502.1	gm/day
	o=j*l	VOC	660.7	gm/day
	p=j*m	CO	7827.8	gm/day
Assumed Annual Days	q		260	days/year
Metric Conversion Factor	r		1000	gm/kg
Annual Emissions Reduction	s=n*q*r	NOx	130.5	kg/year
	t=o*q*r	VOC	171.8	kg/year
	u=p*q*r	CO	2035.2	kg/year

The estimated air quality benefits for all the projects, using H-GAC and FTA buffers as well as high, medium, and low mode split estimates, are shown in the adjacent two tables.

While this analysis represents an updated approach from the analysis from previous H-GAC Special Districts studies, this approach represents an attempt to better define the service area of proposed pedestrian and bicycle facilities and consider the land use and development context of projects. This approach will likely produce slightly lower total air quality improvements as it provided more precise estimate of catchment area and more granularity between pedestrian and bicycle mode shifts and catchment areas.

bold Results from example walkthrough

Most similar to previous H-GAC Special Districts Studies

H-GAC Baseline Project Boundary Area

Emissions Reduction (kg/Year)	Mode	Low Mode Shift Scenario	Medium Mode Shift Scenario	High Mode Shift Scenario
NOx	Pedestrian	29.0	65.2	94.2
	Bicyclist	65.3	**130.5**	195.8
	Total	94.3	195.8	290.0
VOC	Pedestrian	38.1	85.8	124.0
	Bicyclist	85.9	**171.8**	257.7
	Total	124.0	257.6	381.6
CO	Pedestrian	451.9	1,016.8	1,468.7
	Bicyclist	1,017.6	**2,035.2**	3,052.8
	Total	1,469.5	3,052.0	4,521.6

FTA Project Boundary Area

Emissions Reduction (kg/Year)	Mode	Low Mode Shift Scenario	Medium Mode Shift Scenario	High Mode Shift Scenario
NOx	Pedestrian	40.3	90.6	130.9
	Bicyclist	134.6	269.2	403.7
	Total	174.8	359.8	534.6
VOC	Pedestrian	53.0	119.2	172.2
	Bicyclist	177.1	354.2	531.3
	Total	230.1	473.4	703.5
CO	Pedestrian	627.8	1,412.5	2,040.3
	Bicyclist	2,098.2	4,196.3	6,294.5
	Total	2,726.0	5,608.9	8,334.8