4.0 ENVIRONMENTAL CONSEQUENCES

4.1 LAND USE IMPACTS

4.1.1 Land Use Impacts Related to Right of Way Acquisition

The proposed project is in an urban setting, with the Corpus Christi Central Business District (CBD), the Port of Corpus Christi and Port industries, and the Northside neighborhoods as the predominant land uses along the corridor (see **Land Use Plates** in **Appendix E**). Churches, businesses, and public parklands are also important land uses in the project area and all are potentially affected by one or more of the alternatives proposed for the project. The following sections describe the particular land use types that would be converted to transportation use by the proposed build alternatives as well as how compatible and consistent each alternative would be with local land use plans and policies. The No Build Alternative is also discussed in each case for comparison.

4.1.1.1 Impacts of the Build Alternatives

Additional right of way would need to be acquired to implement the proposed project. Depending on the alternative selected, the total new right of way required for construction would range from 30.47 acres to 68.92 acres (see **Table 4.1-1**). This additional right of way would directly affect residential areas, businesses, public parks, churches, a wildlife refuge, Corpus Christi's Broadway Wastewater Treatment Plant, as well as land owned and operated by the Port of Corpus Christi. Displacements, residential, commercial or otherwise, are discussed in **Section 4.4**. Effects to community resources are discussed in **Section 4.6**, and effects to public parkland and other Section 4(f) properties are evaluated in **Section 5.0**.

Table 4.1-1 Proposed Land Use Conversions by Build Alternative (in acres)

Land Use Types	Green	Red	Orange	West
Church	0.19	0.06	0.12	0.03
Commercial / Industrial	14.63	17.39	19.91	15.64
Community / Government	0.72	0.00	0.96	0.05
Public Park/ Refuge	0.64	5.45	3.32	2.83
Residential	1.89	2.76	5.87	1.86
Utility	0.11	0.00	1.35	0.00
Upland Confined Placement Area*	0.00	0.00	0.00	23.73
Undeveloped Land	12.28	24.74	18.24	24.78
Total	**30.47**	**50.40**	**49.78**	**68.92**

Source: US 181 Harbor Bridge Team 2013

*The Upland Confined Placement Area is described in **Section 3.8.1.4**. The Port of Corpus Christi Authority is obligated under a permit with the U.S. Army Corps of Engineers to operate and maintain this area for the placement of spoils material dredged from the bottom of the Corpus Christi ship channel.

4.1.1.2 Green Alternative

An estimated 30.47 acres of additional right of way would be required to implement the Green Alternative. Approximately 14.63 acres of this additional right of way is currently in commercial or industrial use, 1.89 acres is currently in residential use, and 12.28 acres is undeveloped land. The remaining additional right of way would include less than one acre each of land used for church, public parkland, utilities, and community/government facilities. In the community/government land use category, 0.72 acre of the Solomon P. Ortiz International Center (Ortiz Center) and 0.04 acre between the Corpus Christi Fire Station on Belden Street and N. Broadway Street would be converted to transportation use. No impacts to the services provided by the fire station would result from the minor right of way acquisition. Impacts to the Ortiz Center from the Green Alternative are described in **Section 4.4.3**.

The acquisition of additional right of way would include displacement of Templo Trinidad church as well as a strip of land between I-37 and the Corpus Christi Baptist Church and a strip of land between Buffalo Street and Hillcrest Church of Christ. No impacts to the services provided by Corpus Christi Baptist Church or Hillcrest Church of Christ would result from the minor right of way acquisition. See **Section 4.6.2.4** for a discussion of the effects of the displacement of Templo Trinidad church.

The additional right of way required for the Green Alternative would also include 0.64 acres (approximately 92 percent) of Lovenskiold Park and 0.076 acre of the parking lot of the San Antonio, Uvalde, and Gulf (SAU&G) Depot. The effects of these proposed acquisitions are evaluated fully as part of the Draft Section 4(f) Evaluation in **Section 5.0**.

4.1.1.3 Red Alternative (Preferred)

The Red Alternative (the Preferred Alternative) would require 50.40 acres of additional right of way. Approximately 17.39 acres of this additional right of way is currently in commercial or industrial use, 5.45 acres is currently used as public parkland, 2.76 acres is residential land, and 24.74 acres is undeveloped land. The remaining additional right of way would include less than one acre each of church and community/government land uses. The acquisition of additional right of way would impact 0.03 acre adjacent to the parking area owned and used by the Kelsey Memorial United Methodist Church as well as 0.02 acre adjacent to Buffalo Street at the Hillcrest Church of Christ. These effects would not restrict or otherwise impair services provided by the individual churches. A small strip of land between Buffalo Street and the city-owned building formerly housing the Brooks Chapel Day Care Center (now closed) would also be converted to transportation use.

The additional right of way required for the Red Alternative would include 5.14 acres (approximately 59 percent) of T.C. Ayers Park and 0.32 acres (approximately 45 percent) of Lovenskiold Park. The effects of these proposed acquisitions are evaluated fully as part of the Draft Section 4(f) Evaluation in **Section 5.0**.

4.1.1.4 Orange Alternative

The Orange Alternative would require 49.78 acres of additional right of way. Approximately 19.91 acres of this additional right of way is in commercial or industrial use, 5.87 acres is currently in residential use, 3.32 acres is used for public parks, 1.35 acres is used for public utilities (the Broadway Wastewater Treatment Plant), and 18.24 acres of undeveloped land. The Orange Alternative would impact the plant's pump station and the structure housing the controls and generators for the pump station. The pump station is critical to the operation of the plant, as it distributes sewage collected via underground pipes to the treatment plant. The remaining additional right of way would include less than one acre of industrial use, community/government land use, and less than one acre of church use. This would include the Kelsey Memorial United Methodist Church land between N. Brownlee Boulevard and the church parking lot (0.03 acre), the land between I-37 and the Corpus Christi Baptist Church building (0.0003 acre) and the land between Buffalo Street and the Hillcrest Church of Christ (0.03 acre). These effects would not restrict or otherwise impair services provided by the individual churches. The 0.96 acre of community/government use includes the Ortiz Center, the impacts to which are described in **Section 4.4.3**.

The additional right of way required for the Orange Alternative would include 3.01 acres (approximately 34 percent) of T.C. Ayers Park and 0.30 acre (approximately 43 percent) of Lovenskiold Park. The effects of these proposed acquisitions are evaluated fully as part of the Draft Section 4(f) Evaluation in **Section 5.0**.

4.1.1.5 West Alternative

An additional 68.92 acres of right of way would be required to implement the West Alternative. Approximately 23.73 acres of this additional right of way would be within the Port of Corpus Christi's Upland Confined Placement Area (UPCA) (containing spoils material dredged from the Corpus Christi Ship Channel). This acreage represents approximately 0.07 percent of the 350-acre UPCA. This area has been set aside by the Port for use under a U.S. Army Corps of Engineers (USACE) permit for the maintenance dredging of the ship channel and is the primary location for this critical activity. Approximately 15.64 acres of the additional right of way required for the West Alternative is currently in commercial or industrial use, and 1.86 acres is currently in residential use. The remaining additional right of way would include less than one acre of industrial use and less than one acre of church use. This would include the land between I-37 and the Corpus Christi Baptist Church (0.0003 acre) and the land between the Buffalo Street and the Hillcrest Church of Christ (0.028 acre). These effects would not restrict or otherwise impair services provided by the individual churches.

The additional right of way required for the West Alternative would include 2.83 acres of the Rincon Channel Wetlands Interpretive Overlook. These effects are evaluated fully as part of the Draft Section 4(f) Evaluation in **Section 5.0**.

4.1.1.6 Impacts of the No Build Alternative

The No Build Alternative would not result in the acquisition of additional right of way and no existing land uses would be converted to transportation uses.

4.1.2 Consistency and Compatibility with Local Land Uses

The land use plans and policies adopted by the City of Corpus Christi, the City of Portland and the Corpus Christi Metropolitan Planning Organization (MPO) are summarized in **Section 3.1.3.1**. The following section evaluates the consistency and compatibility of each of the proposed alternatives with these identified plans and policies.

4.1.2.1 City of Corpus Christi Integrated Community Sustainability Plan

The *City of Corpus Christi Integrated Community Sustainability Plan* establishes "destination nodes" as community focal points for "smart growth development" (HDR, Inc. 2011). The Plan identifies specific sites that pose opportunities to guide future land use planning and development. Node 1 addresses the proposed US 181 Harbor Bridge project as an opportunity to establish a "new green gateway into the City that builds upon the vision of the *Downtown Vision Plan* [2008], the *Bayfront Master Plan* [2007], and the Destination Bayfront Proposal [2010], to yield a cohesive, vibrant, 24-hour, mixed-use urban center that is both defined by and inextricably connected to the waterfront" (HDR, Inc. 2011).

Node 1 presumes a corridor for the proposed replacement of the Harbor Bridge that closely resembles the alignment of the Red Alternative (the Preferred Alternative), and states that the "realignment would streamline highway traffic, reconnect historic neighborhoods that are currently isolated to the west of the highway corridor, and allow for a more cohesive connection between the active portions of the downtown district" (HDR, Inc. 2011). Without mentioning the proposed build alternatives specifically, the Sustainability Plan implies that the relocation of US 181 roughly along an alignment that resembles the Red Alternative would remove the barrier of I-37 and US 181 between the Washington-Coles neighborhood and the mixed-use development in the SEA (Sports, Entertainment, and Arts) District and the downtown area. It should be noted that the West Alternative, which was introduced after the development of the Sustainability Plan, and the Orange Alternative to some extent, would also remove the existing barrier between the Washington-Coles neighborhood and the SEA District. The Green Alternative would leave US 181 in place, but at a higher elevation such that existing downtown streets that currently stop at the embankment on the east side of US 181 (Power, Palo Alto, Fitzgerald and Hughes Streets) would carry under US 181, allowing for greater mobility and accessibility relative to the existing condition.

The No Build Alternative would also leave US 181 in place and leave downtown connectivity to the SEA District and the Northside neighborhoods, which is impeded by the existing alignment, unaddressed. While many elements of the Sustainability Plan would be largely unaffected by the No Build Alternative, overall implementation of the plan assumes the removal of the physical barrier represented by US 181. In this way the No Build Alternative is not consistent with the City's Sustainability Plan.

4.1.2.2 City of Corpus Christi Urban Transportation Plan

The *Corpus Christi Urban Transportation Plan* specifies goals for streets as well as bicycle and pedestrian facilities within the transportation network. The goals of the plan are discussed in **Section 3.1.3.1**, the main goal being to provide an efficient and safe street network (City of Corpus Christi 2010a). The Plan does not specifically address future improvements to US 181, and the improvements it does propose to city streets in the project area would not be directly affected by any of the proposed build alternatives. The Plan identifies proposed improvements to Staples Street as a two-lane collector extending from its current northern terminus at W. Broadway Street through the (decommissioned) Broadway Wastewater Treatment Plant location and across US 181 to connect to Fitzgerald Street. All of the build alternatives would accommodate this proposal. The No Build Alternative would not allow Staples Street to connect to Fitzgerald Street as there is no underpass at US 181 in this location.

Among the build alternatives, the West Alternative does not meet the goals of the City's Transportation Plan, primarily due to the fact that access to the West Alternative from the Northside neighborhoods would be much more difficult than the access to US 181 that exists currently—residents would access I-37 from downtown Corpus Christi in order to access the northbound ramp to US 181. In the southbound direction, Hillcrest neighborhood residents would not access their neighborhood directly from US 181. Residents would enter I-37 and then exit at Staples Street to turn left into the Washington-Coles neighborhood and travel further west to reach Hillcrest. In addition, Hillcrest neighborhood residents would no longer be able to access the eastbound I-37 mainlanes headed toward City Hall or the bayfront and downtown area, although the eastbound frontage road could be used for these purposes. These proposed changes do not conform to the Plan goals to improve access and mobility, to provide efficient and convenient travel choices, or to provide equitable transportation options that do not adversely affect a particular community disproportionately. The other proposed build alternatives, and to a lesser extent the No Build Alternative, would be better able to meet the goals of the Urban Transportation Plan, in that they accommodate access to US 181 in a manner more closely resembling the existing condition.

4.1.2.3 City of Corpus Christi Future Land Use Plan

The *City of Corpus Christi Future Land Use Plan* specifies goals consistent with the City's *Comprehensive Plan* in terms of updating zoning ordinances and rezoning land within the city. The Plan is intended to assist area development planners in making decisions based on land use and future improvements (City of Corpus Christi 2010b). The Future Land Use Plan emphasizes the use of the transportation network to "serve existing and future land uses" (City of Corpus Christi 2010b). The Plan, as adopted in 2010, does not specifically identify a future corridor for the proposed replacement of the Harbor Bridge, and therefore assumptions regarding the consistency and compatibility of the proposed alternatives, including the No Build, are made on the basis of coordination with local stakeholders, the City of Corpus Christi and the Technical and Citizens Advisory Committees.

From an overarching standpoint, local stakeholders, residents, business owners and elected officials are in support of the proposed project, with support for some alternatives being greater than for others. Individual viewpoints regarding the consistency and compatibility of each of the build alternatives with future land use plans does vary, particularly between business interests and local resident interests.

Green Alternative

The Green Alternative, although it does follow the existing alignment of US 181 and represents minimal change from the existing land use conditions, is viewed by local business interests as well as by representatives of the City, as not being consistent with the City's long-term planning goals emphasizing further development in the SEA District and improving transportation access into and out of the SEA District and downtown Corpus Christi. From the standpoint of residents[1] potentially affected by the proposed project, the Green Alternative largely avoids direct impacts to neighborhoods, particularly the Northside neighborhoods of Washington-Coles and Hillcrest. Based strictly on a comparison of the City's *Existing Land Use Plan* (City of Corpus Christi 2010b) with its *Future Land Use Plan*, the Green Alternative is partially consistent in that it would allow for the gradual reclassification of land use in the Washington-Coles neighborhood from low-density residential to medium-density residential, but could potentially impede or delay land use downtown (along Shoreline Boulevard) from converting to higher density commercial and tourist oriented development.

Through the North Beach area the Green Alternative is largely compatible with existing and planned land uses. Because this alternative follows the existing alignment, it would not conflict with the *North Beach Development Plan*, adopted by the Corpus Christi City Council in 2011. This plan envisions improvements to the beachfront area, as well as the primarily vacant land further inland. The plan highlights the area between the existing US 181 and W. Causeway Boulevard to be prime land for "high impact tourist use" (City of Corpus Christi2011b). The Green Alternative would support the future development of the North Beach area, although a portion of existing land adjacent to US 181 south of Burleson Street would be converted to transportation use and therefore not available to be developed for high impact tourism, as the 2011 Plan envisions. Existing and planned land uses in the other neighborhoods along the Green Alternative would be largely unaffected as the alignment follows the existing US 181 and I-37, and construction would be accomplished primarily within the existing right of way.

Red Alternative (Preferred)

The Red Alternative (the Preferred Alternative), in contrast to the Green Alternative, is viewed by local business stakeholders and representatives of the City as providing the opportunity for the further expansion of commercial and tourist-related development in the SEA District and downtown area, by virtue of the fact that the Red Alternative would remove the existing US 181 embankment and elevated highway facility from that area and realign US 181 to extend north from the Crosstown Expressway at its interchange with I-37. Neighborhood interests are mixed in their views of the compatibility of this

[1] Views of residents of Washington-Coles and Hillcrest neighborhoods were gathered at the Northside Neighborhood meeting at St. Paul United Methodist Church held on October 15, 2012, as well as meetings of the Citizens Advisory Committee on October 18, 2012, and July 11, 2013.

alternative with the future of the Northside neighborhoods in particular. Because this alternative would be realigned more or less parallel with N. Port Avenue north of I-37, the new facility would lie between the residential portions of the Washington-Coles and Hillcrest neighborhoods. (See **Section 4.6** for further discussion of the community effects related to the proposed placement of the Red Alternative). This would be seen by some Northside residents[2] as incompatible with the residential nature of the area, whereas other community representatives on the Technical Advisory Committee voiced support[3] for this alternative in light of the opportunity presented by the removal of the existing US 181 alignment from the SEA District and downtown area.

In comparing the *Existing Land Use Plan* to the *Future Land Use Plan*, the Red Alternative is mostly consistent in that it would not conflict with the gradual redevelopment of the Washington-Coles neighborhood from low-density residential to medium-density residential while also being consistent with the expansion of the SEA District and the conversion of existing downtown land uses to higher-density commercial and tourist-related uses. The Red Alternative would, however, involve introducing a major highway transportation facility into a residential area. Future land use planning in the Hillcrest neighborhood represents fairly minimal change from the existing, primarily low-density residential use and would remain largely unaffected by the Red Alternative.

Through the North Beach area, the Red Alternative is compatible with existing and planned land uses. This alternative diverges from the existing US 181 at Burleson Street and briefly follows the existing transportation right of way for the Joe Fulton Corridor, mostly avoiding the previously developed areas of North Beach west of US 181. The Red Alternative also follows an alignment labeled "Potential New Harbor Bridge Location" on the *North Beach Development Plan Map* (City of Corpus Christi 2011b). As a result, future, primarily tourism-related land use, as approved by the City, would likely develop with and around the Red Alternative. Existing and planned land uses in the other neighborhoods along the Red Alternative would be largely unaffected as the alignment follows existing I-37 and the Crosstown Expressway, and construction would be accomplished primarily within the existing right of way.

Orange Alternative

The Orange Alternative is viewed by local business stakeholders, representatives of the City and neighborhood interests as being largely incompatible with future land use planning because it would pass through both the SEA District and the Washington-Coles neighborhood between the Inner Harbor and I-37. Both existing SEA District attractions and areas available for future expansion would be affected by the alignment of the Orange Alternative. This would include the Hurricane Alley Waterpark, surface parking for the Whataburger Field baseball park, and numerous vacant lots suitable for development or redevelopment within the SEA District. Within the Washington-Coles neighborhood, numerous residences, including the North Side Manor Apartment complexes on Lake Street and Alameda Street would be displaced, and several businesses would be displaced as well. The Orange Alternative also affects Corpus Christi's Broadway Wastewater Treatment Plant, currently undergoing

[2] Northside neighborhood meeting and Citizens Advisory Committee meeting (see previous footnote).
[3] Technical Advisory Committee meetings held on October 18, 2012, and July 11, 2013, at the Oveal Williams Senior Center.

redesign and reconstruction along Resaca Street. The alignment of the Orange Alternative would displace the pump station and a building housing its controls; the pump station is essential to the plant, and relocating these facilities would be extremely costly.

In comparing the *Existing Land Use Plan* with the *Future Land Use Plan*, the Orange Alternative is mostly inconsistent. From a transportation viewpoint, the Orange Alternative would not conflict with the conversion of downtown land uses to higher-density commercial and tourist-related development, but because the alignment would be incompatible with the existing and future expansion of the SEA District, downtown redevelopment could be hindered as well. Similarly, because of the alignment of the Orange Alternative through the residential areas of the Washington-Coles neighborhood, the likelihood of future land use reflecting the City's plans is considerably lower. In similarity with the Red Alternative, future land use planning in the Hillcrest neighborhood represents fairly minimal change from the existing, primarily low-density residential use and would remain largely unaffected by the Orange Alternative.

Through the North Beach area, the Orange Alternative is largely compatible with existing and planned land uses. Because this alternative roughly follows the existing alignment, it would support the future development of the North Beach area, although a portion of existing land adjacent to the west side of US 181 south of Burleson Street would be converted to transportation use and therefore not available to be developed for high impact tourism, as the 2011 Plan envisions. Existing and planned land uses in the other neighborhoods along the Orange Alternative would be largely unaffected as the alignment follows existing I-37 and the Crosstown Expressway, and construction would be accomplished primarily within the existing right of way.

West Alternative

The West Alternative is viewed by local business stakeholders and representatives of the City as being largely inconsistent with future land use planning because the alignment for this alternative would essentially divert vehicular traffic away from the SEA District and the downtown area. From a practical standpoint, the alignment of the West Alternative would not prohibit the future expansion of the SEA District, nor would it prevent the gradual redevelopment of downtown to higher-density commercial and tourist-related uses. These types of land uses, though, depend largely on vehicular traffic, and, although access would not be prohibited, the length and circuity of the route is viewed by many locally as being incompatible with the City's future land use plans, particularly from a transportation standpoint.

Neighborhood stakeholders view the West Alternative as being largely compatible with the residential nature of the Northside neighborhoods. Although the alignment of the West Alternative would be within the Hillcrest neighborhood, it would be within an area of the neighborhood where homes are largely absent; residential lots in the area have mostly been sold to the adjacent refinery to provide more of a separation between the neighborhood and the refinery activities. The placement of the West Alternative in this portion of the neighborhood could provide even more of a physical separation from

the adjacent refinery. Opinions differ in this respect, and representatives of the Hillcrest Neighborhood Association on the Citizens Advisory Committee expressed concern[4] at the July 11, 2013, committee meeting regarding the proximity of this alternative to the neighborhood. In addition, members of the Citizens Advisory Committee and Technical Advisory Committee expressed objections regarding the proximity of the alignment to the refineries west of Nueces Bay Boulevard at the June 21, 2012 meeting. These worries stemmed from concern for the safety of travelers on the proposed facility, should there be an accident at the refineries. The Department of Housing and Urban Development (HUD) has established Acceptable Separation Distances (ASD) from stationary hazards (based on volume and material stored) to be used in establishing safety zones for housing that could also be applied to other places of human occupation, like roadways. For the above ground storage tanks to the west and north of the Northside neighborhoods, ASDs were calculated in the 2008 existing conditions report prepared as part of the *Northside Redevelopment Plan* (see **Section 3.5.3.3**). The ASDs extend approximately to Van Loan Avenue on the east and Summers Street on the north, fully encompassing the proposed West Alternative route (Civic Design Associates 2008, 12). Members of the Citizens Advisory Committee and Technical Advisory Committee also expressed concerns about the security of the refineries, given their proximity to the West Alternative. TxDOT considered these concerns in its evaluation of the potential impacts of the West Alternative (see **Table 4.6.3**).

With respect to the North Beach area, the West Alternative is seen by local stakeholders[5] as bypassing the main commercial and tourist destinations in the area, including the Texas State Aquarium and the USS *Lexington* museum. Because the alignment of the West Alternative diverges from the existing US 181 alignment north of Burleson Street, traffic would cross the North Beach area farther from these primary attractions, as compared to the current condition and the other build alternatives. The *North Beach Development Plan* shows future commercial and tourist-oriented development along the alignment of the West Alternative, and the placement of the highway through this area would not be compatible with these uses. Existing and future land uses in the other neighborhoods along the West Alternative would be largely unaffected as the majority of the alternative follows I-37 and the Crosstown Expressway and would be constructed primarily within the existing right of way.

No Build Alternative

Under the No Build Alternative, no new right of way would be acquired, no existing land uses would be converted to transportation use, and future land use plans as adopted by the City would remain largely unaltered. As noted previously, the City's *Future Land Use Plan* did not identify a new corridor for the proposed replacement of the Harbor Bridge and therefore assumes US 181 would stay within its existing alignment and right of way. From a long-range planning standpoint, however, the No Build Alternative is mostly inconsistent and incompatible with the City's goals for improving transportation access, including bicycle and pedestrian access, into and out of the SEA District and the downtown area.

[4] At the July 11, 2013, meeting of the Citizens Advisory Committee Brother Henry Williams of the Hillcrest Neighborhood Association stated opposition to the West Alternative, favoring instead the Green Alternative as a way to reduce potential impacts to the neighborhood.

[5] Local stakeholders include North Beach community residents, North Beach business owners, and managers of the USS *Lexington* and the Texas State Aquarium. A stakeholder meeting was held on November 13, 2012, at the Texas State Aquarium; representatives included three business owners and representatives of the Aquarium and the *Lexington*.

Related planning efforts, including the *Integrated Community Sustainability Plan* and the *North Beach Development Plan*, have actually represented a future corridor for US 181 that would relocate the existing facility further west, following a path closely resembling the alignment of the Red Alternative.

It is not entirely clear how much of an effect the No Build Alternative would have on the future expansion of the SEA District and the redevelopment of downtown. Public and private investment in this area began with the expansion and renovation of the American Bank Convention Center in 2004, the development of the American Bank Center concert arena also in 2004, and the opening of Whataburger Field and the debut of the Corpus Christi Hooks (minor league baseball club) in April 2005. Development continued with the Ortiz Center in 2006 and the Hurricane Alley Waterpark in May 2012. In many respects, development and investment is likely to continue in this area. Transportation is a major factor in delivering patrons to and from these venues, however, and as noted in **Section 1.5.2**, existing access is not direct and results in congestion on US 181 and local downtown roadways during major events. Bicycle and pedestrian access is also a major consideration for the future development of the SEA District and downtown, and the No Build Alternative would leave the existing US 181 infrastructure in place meaning that access for both drivers and non-drivers would continue to be poorly accommodated in this area.

4.1.2.4 City of Corpus Christi Strategic Parks and Recreation Master Plan

The *2012 Strategic Parks and Recreation Master Plan* (Parks Master Plan) presents the priorities and recommendations for park, recreation, and open spaces in Corpus Christi (see **Section 3.1.3.1** for more detailed discussion). The plan focuses on the City's existing park resources and future plans for those resources and does not necessarily incorporate regional transportation decisions into its decision making process. Nevertheless, the proposed US 181 Harbor Bridge project would affect existing park resources owned by the City and could also affect future plans for those resources depending on the alternative. The Green, Red and Orange Alternatives would all affect Lovenskiold Park on the southeast corner of I-37 and the Crosstown Expressway. This is a minor park—it's less than one acre—with few amenities and does not factor largely into the Parks Master Plan from the standpoint of budget priorities and recommendations for future improvements. The Red and Orange Alternatives would also affect T.C. Ayers Park on Winnebago Street north of I-37. The Corpus Christi Parks & Recreation Department has in their Parks Master Plan recommended that T.C. Ayers Park be repurposed, and this designation carries with it several possible outcomes. As the City has decided not to continue to allocate budget to the maintenance and operation of the park, outcomes could include the decision to remove the park improvements (children's playscape, covered pavilion, recreation center, baseball diamond, basketball courts) and operate the park property as open space. The City would also accept funds from outside sources to continue the upkeep of the park or sell the property to a private purchaser. The effects of the Red and Orange Alternatives on T.C. Ayers Park in this way are not necessarily inconsistent with the City's future plans for the park and would in some ways facilitate the implementation of this element of Parks Master Plan.

The West Alternative would not affect Lovenskiold Park or T.C. Ayers Park and is otherwise consistent and compatible with the Parks Master Plan. The No Build Alternative is likewise consistent with the Parks Master Plan. For a listing of the impacts to public parkland by alternative see **Section 4.18**, and for a full evaluation of the effects of the proposed project on public parkland see **Section 5.0**.

4.1.2.5 City of Portland Comprehensive Plan

The 2006 *City of Portland Comprehensive Plan* establishes the goals for future development and a framework for the physical environment and socio-economic factors related to growth in the City of Portland and serves as the official policy guide of the City (see **Section 3.1.3.2**). The build alternatives and the No Build Alternative would be consistent with the goals and policies of the Comprehensive Plan and would not have a direct impact on the City of Portland. Improvements to the Harbor Bridge would provide efficient and safe travel which would be compatible with the Comprehensive Plan.

4.1.2.6 Corpus Christi MPO – 2010-2035 MTP

The proposed project is listed in the Corpus Christi MPO's Metropolitan Transportation Plan (MTP) 2010-2035 as construction of a new bridge over the Corpus Christi Ship Channel. The MTP does not identify a particular route for the project; however, the members of the MPO's Technical Advisory Committee voted unanimously on October 18, 2012, to recommend the Red Alternative to the Transportation Policy Committee. On August 1, 2013, the Transportation Policy Committee considered the recommendation and voted unanimously to recommend the Red Alternative.

The No Build Alternative is not consistent with the MPO's long-range transportation planning goals or the MTP and therefore was not included in the vote under consideration.

4.1.2.7 Corpus Christi MPO – Bicycle and Pedestrian Plan

The Corpus Christi MPO's *2005 Bicycle and Pedestrian Plan* provides a framework for the development of bicycle and pedestrian facilities in three primary categories: neighborhood connectivity; long-distance or commute cycling; and off-street paths designed for bicycling or for multi-use. The Plan covers the entire MPO boundary, and as a result the planned facilities are largely outside the project area for the proposed US 181 Harbor Bridge project. Nevertheless, there are existing and proposed facilities that would cross one or more of the proposed build alternatives and coordination with the MPO is ongoing with respect to the accommodation of bicycle and pedestrian facilities into the design of the proposed project, including the proposed bicycle and pedestrian shared-use path that would allow bicyclists and pedestrians the ability to safely cross the proposed bridge. (See **Section 2.4.2.2** for a discussion of the proposed shared-use path to be incorporated into the design for each of the build alternatives).

In the category of neighborhood connectivity, the 2005 Plan identifies the combination of Brownlee Boulevard, 19th Street, Alameda Street and Lipan Street (Corpus Christi MPO 2005, 5-2) as providing an opportunity for access through the near downtown neighborhoods on lightly traveled, two-lane roads. None of the proposed build alternatives would prohibit this conceptual route from being developed,

although the Green Alternative would accommodate the facilities proposed in this plan more readily than the Red, Orange or West Alternatives. Under the Green Alternative, Lipan Street would remain open and would allow for bicycle and pedestrian movement from one side of the Crosstown Expressway to the other, whereas with the Red, Orange and West Alternatives, Lipan Street would be closed, with Comanche Street providing bicycle and pedestrian access across the expressway with minimal overall effect to the connectivity envisioned by the MPO.

With respect to commuters and long-distance bicyclists, the 2005 Plan identifies several major facilities that could be restriped or improved with a wide curb lane to accommodate those cyclists that are advanced as well as those less experienced. Several of these proposed routes intersect the proposed US 181 Harbor Bridge project.

Lipan Street from Upper Broadway Street to Port Avenue is identified as a potential route by either designating it as a bike route as is or with restriping to provide bike lanes. As mentioned previously, Lipan Street would remain open with the implementation of the Green Alternative, while the Red, Orange and West Alternatives would all result in Lipan Street being closed at the Crosstown Expressway. Comanche Street could provide an alternative to the MPO's proposed Lipan Street bike route—Comanche Street does parallel Lipan Street to the south—though Comanche does not provide the same "uninterrupted" route as it does not intersect Upper Broadway Street.

Leopard Street is identified by the MPO as the primary east-west corridor providing a long-distance bicycling opportunity and this proposed route intersects the proposed project at the Crosstown Expressway south of I-37. All of the proposed build alternatives would accommodate this proposed route. Other long-distance routes identified in the 2005 Plan include the I-37 frontage roads from Alameda Street to Rand Morgan and from Leopard Street to South Padre Island Drive along the Crosstown Expressway. All of the alternatives would accommodate these proposed bike routes as well.

The MPO identifies multiple opportunities for off-street bike paths and multi-use paths in the 2005 Plan as well, and as proposed none of these potential facilities would intersect the proposed project.

The No Build Alternative would be consistent with the MPO's *2005 Bicycle and Pedestrian Plan*, as the Plan does not incorporate the proposed replacement of the Harbor Bridge into its planning of future bicycle and pedestrian facilities. The Plan does, however, list US 181 in its present condition as a barrier to "safe and convenient bicycle and pedestrian travel," and the No Build Alternative would leave this barrier in place. In this way, the No Build Alternative would not be compatible with the MPO's goals of promoting the use and safety of bicycle and pedestrian travel or of providing continuity in the bikeway network across physical barriers to promote neighborhood and regional accessibility (Corpus Christi MPO 2005, 2-1–2-3).

4.1.3 Summary of Land Use Impacts

In review of the existing land use and various local plans for future land use, it is apparent that each alternative is at least partially consistent with the City's long-term planning goals. While some of the

plans that have been adopted, or soon to be, by the City Council, including the *North Beach Development Plan* and the *Integrated Community Sustainability Plan*, actually address the relocation of US 181, the *Future Land Use Plan* and the *Urban Transportation Plan* do not. Those that do address US 181 identify a path resembling the alignment of the Red Alternative (the Preferred Alternative). Similarly, the MPO's Transportation Policy Committee has recommended the Red Alternative be pursued from a transportation planning standpoint. The Red Alternative would not necessarily conflict with the City's *Future Land Use Plan* or *Urban Transportation Plan*, and local views are mixed as to whether that should be seen as a determination of consistency and compatibility in light of the priorities of the neighborhoods that stand to be most affected by this alignment.

The Green Alternative is also partially consistent with local land use plans and policies. As stated, the adopted plans indicate an expected relocation of US 181 out of the downtown area, and, in particular, the Sustainability Plan considers that the "the proposed realignment of this corridor as part of the planned replacement of the Harbor Bridge would create an opportunity to establish a new green gateway into the City" (HDR 2011). The basis for these expectations to some extent is the presumption that the existing I-37/US 181 facility "bisects adjacent neighborhoods and creates a barrier between the northern and southern sectors of the Downtown" (HDR 2011), and that removing US 181 from its current alignment would alleviate that situation. While the construction of I-37 in the early 1960s had the effect of making access to uptown and downtown Corpus Christi from the Northside neighborhoods more lengthy and less direct, relocating US 181 to within the community (with the Red or Orange Alternatives) would have a similar effect. (See **Section 4.6** for discussion of the community effects of each alternative). It is primarily for this reason that members of the Citizens Advisory Committee representing the Northside community view the Green Alternative as being consistent with long-term land use planning goals, in essence by preserving the neighborhoods that exist today. By contrast, local planning and transportation officials view the Green Alternative as being inconsistent with long-term planning goals as it would potentially impede or delay land use downtown from converting to higher density commercial and tourist oriented development.

The Orange Alternative, although it is similar to the Red Alternative in many respects, passes through developed and developable portions of the SEA District and converts a substantial amount of the residential area of the Washington-Coles neighborhood to an urban highway corridor—in contrast to the Red Alternative. The Orange Alternative is not considered consistent or compatible with local land use planning.

The West Alternative is largely incompatible with local land use planning. Although, the relocation of US 181 to the west of the Northside community would potentially allow for the realization of the City's goals to reconnect these historic neighborhoods with downtown, the bypassing of downtown and the SEA District, as well as the primary North Beach tourist attractions—the Aquarium and the *Lexington*—would potentially negate the opportunity presented by that relocation.

The MPO's Technical Advisory Committee voted, as reported by the *Corpus Christi Caller Times* on October 19, 2012, to recommend the Red Alternative to the Transportation Policy Committee on the

basis that it "offer[s] the best connectivity, especially when considering the access provided by new ramps and connectors" and is "the least detrimental to getting out of downtown." Based on these criteria, the Orange Alternative would rate similarly, as it is virtually identical in both regards. The Green Alternative would provide a more circuitous route out of downtown relative to the existing facility (although with ramps designed to current standards) and the Red and Orange Alternatives. The West Alternative theoretically would provide the same access out of downtown as the Red and Orange Alternatives. For reasons stated by representatives of the MPO on the US 181 Harbor Bridge Technical Advisory Committee, the access to the West Alternative from other points within the network is difficult.

The MPO's Transportation Policy Committee considered the October 19, 2012 recommendation by the Advisory Committee on August 1, 2013, and voted unanimously to recommend the Red Alternative.

4.2 IMPACTS RELATING TO MODES OF TRANSPORTATION

4.2.1 Highways and Streets

Vehicular transportation is by far the predominant mode in the project area and the proposed improvements to US 181 and the Harbor Bridge would have a negligible effect on the relationship between vehicle travel and travel by other means, including bicycle and pedestrian travel, transit, and waterway travel via the Port of Corpus Christi.

There are three major highways in the project area, I-37, US 181 and the Crosstown Expressway (SH 286), all of which would be modified by the proposed build alternatives. The local roadway network would also be modified by the build alternatives resulting in changes in the way vehicles would access these major highway corridors. Access changes and changes in travel patterns are presented in **Table 4.2-1** below and on **Figures 4.2-1** through **4.2-5** in **Appendix A**. These changes are described in detail in **Section 4.5.3** and by community in **Section 4.6.**

Table 4.2-1 Changes in Entrance and Exit Ramps by Alternative

	Existing (No Build)	Red	Orange	Green	West
NB SH 286 / US 181	**EXIT RAMPS**				
	Beach Ave	Beach Ave	Beach Ave	Beach Ave	Beach Ave
	Burleson St	NA	NA	NA	NA
	Leopard St, Antelope St & Buffalo St	Leopard St & Frontage Rd Box	Leopard St & Frontage Rd Box	NA	Leopard St & Frontage Rd Box
	Comanche St & Lipan St	NA	NA	NA	NA
	ENTRANCE RAMPS				
	W Causeway Blvd	NA	NA	NA	NA
	Belden St & Power St	NA	NA	NA	NA
	I-37	NA	NA	NA	NA

Table 4.2-1 Changes in Entrance and Exit Ramps by Alternative					
	Existing (No Build)	**Red**	**Orange**	**Green**	**West**
	Agnes St & Laredo St	Agnes St, Laredo St, Comanche St, Lipan St, Leopard St & Frontage Rd Box	Agnes St, Laredo St, Comanche St, Lipan St, Leopard St & Frontage Rd Box	Agnes St & Laredo St	NA
SB SH 286 / US 181	**EXIT RAMPS**				
	Burleson St	Burleson St	Burleson St	Burleson St	Burleson St
	Power St & Tancahua St	NA	NA	NA	NA
	Padre St	NA	NA	NA	NA
	Laredo St & Agnes St	Frontage Rd Box, Leopard St, Lipan St, Comanche St, Laredo St & Agnes St	Frontage Rd Box, Leopard St, Lipan St, Comanche St, Laredo St & Agnes St	Laredo St & Agnes St	NA
	ENTRANCE RAMPS				
	Burleson St	Beach Ave	Beach Ave	Beach Ave	Beach Ave
	Antelope St & Leopard St	NA	NA	NA	Frontage Rd Box & Leopard St
	Lipan St & Comanche St	Lipan St & Comanche St	Lipan St & Comanche St	Lipan St & Comanche St	NA
EB I- 37	**EXIT RAMPS**				
		Staples St	Staples St	Broadway St & Shoreline Blvd	Staples St
	Port Ave	Port Ave & Frontage Rd Box	Port Ave & Frontage Rd Box	Port Ave & Frontage Rd Box	NA
	Buddy Lawrence	NA	NA	NA	Buddy Lawrence Blvd, Nueces Bay Blvd, Port Ave & Frontage Rd Box
	ENTRANCE RAMPS				
	Brownlee Blvd	Frontage Rd Box	Frontage Rd Box	Frontage Rd Box & Staples St	Frontage Rd Box
	NA	NA	NA	NA	SB SH 286 / US 181 & EB I-37
	Nueces Bay Blvd & Buddy Laurence	Nueces Bay Blvd, Buffalo St & Antelope St	Nueces Bay Blvd, Buffalo St & Antelope St	Nueces Bay Blvd, Buffalo St & Antelope St	Buddy Laurence Blvd, Nueces Bay Blvd & Buffalo St
	Up River Rd	NA	NA	NA	Up River Rd
WB I-37	**EXIT RAMPS**				
	Brownlee Blvd	Staples St, Frontage Rd Box & Port Ave	Staples St, Frontage Rd Box & Port Ave	Staples St & Frontage Rd Box	Staples St & Frontage Rd Box

Table 4.2-1 Changes in Entrance and Exit Ramps by Alternative					
	Existing (No Build)	**Red**	**Orange**	**Green**	**West**
	Nueces Bay Blvd & Buddy Lawrence	Stillman Ave & Nueces Bay Blvd	Stillman Ave & Nueces Bay Blvd	Stillman Ave & Nueces Bay Blvd	Port Ave, Stillman Ave & Nueces Bay Blvd, Buddy Lawrence Blvd
		Nueces Bay Blvd	Nueces Bay Blvd	NA	NA
	Up River Rd	NA	NA	NA	Up River Rd
	ENTRANCE RAMPS				
	Broadway St	NA	NA	NA	NA
	Brownlee Blvd & Staples St	Staples St	Staples St	Staples St	NB SH 286 / US 181 & WB I-37
	Port Ave & Brownlee Blvd	Frontage Rd Box & Port Ave	Frontage Rd Box & Port Ave	Frontage Rd Box & Port Ave	Staples St, Frontage Rd Box, Port Ave, Nueces Bay Blvd & Buddy Lawrence Blvd
	Buddy Lawrence & Nueces Bay Blvd	NA	NA	NA	NA

Source: US 181 Harbor Bridge Team 2013

4.2.1.1 Impacts of the Build Alternatives

The Green Alternative follows the existing alignment while the Red, Orange and West Alternatives would realign US 181 from roughly Burleson Street to I-37. The Red, Orange and West Alternatives would all follow the existing alignments of I-37 and the Crosstown Expressway within the project limits. The proposed build alternatives would have minimal effect on vehicular transportation in the project area relative to the existing conditions. Accessibility and travel patterns would be affected and these effects are considered in detail by community in **Section 4.6.** Vehicular transportation, including freight movement via trucking, would continue to be the dominant mode of transportation in the project with any of the build alternatives or the No Build Alternative.

4.2.1.2 Impacts of the No Build Alternative

The No Build Alternative would not result in improvements to I-37, US 181 or the Crosstown Expressway in the project area, and the existing condition of these facilities would remain the same. The No Build Alternative would also leave the local roadway network unchanged. Vehicular transportation as the dominant mode of travel would not be affected by the No Build Alternative.

4.2.2 Bicycle and Pedestrian Facilities

The consistency of the proposed project with the Corpus Christi MPO's *2005 Bicycle and Pedestrian Plan* is described in **Section 4.1.2.7**. The proposed project would intersect existing and proposed bicycle and

pedestrian routes identified in the 2005 Plan and each build alternative would have an effect on these routes depending on the location along the alignment.

4.2.2.1 Impacts of the Build Alternatives

The MPO's 2005 Plan identifies bike routes for neighborhood connectivity as well as routes for commuter and long-distance bicyclists, and several proposed routes would be affected by one or more of the proposed build alternatives. (See **Section 4.1.2.7** for a detailed discussion of the effects of each of the proposed build alternatives on the MPO's proposed routes). For example, the proposed closure of Lipan Street with the Red, Orange and West Alternatives would require rerouting of this proposed bicycle route along Comanche Street which would remain open with all of the proposed alternatives. Leopard Street would also be available as an east-west bike route. The MPO's proposed routes along I-37 and the Crosstown Expressway would be accommodated by the proposed alternatives, including the No Build Alternative, and coordination between TxDOT and the MPO and the City of Corpus Christi regarding any necessary signage and designations to incorporate into the project would continue to occur during the detailed design phase.

The proposed project would comply with the March 2011 The Texas Department of Transportation (TxDOT) "Guidelines Emphasizing Bicycle and Pedestrian Accommodations" and the March 11, 2010, U.S. Department of Transportation (DOT) Policy Statement on Bicycle and Pedestrian Accommodations, Regulations and Recommendations. The build alternatives each propose to include a new 10-foot shared-use path for bicyclists and pedestrians to cross back and forth over the Inner Harbor. The proposed bicycle and pedestrian shared-use path would be separated from the main lanes by a two-foot concrete barrier. For more detail on the design of the bicycle and pedestrian shared-use path, see **Section 2.4.2.2**. With the inclusion of the bicycle and pedestrian shared-use path, the proposed project would encourage pedestrian and bicycle travel, particularly along US 181 and, combined with the implementation of additional network improvements by the MPO and the City, would expand the overall availability of bicycle and pedestrian facilities in the project area, providing connections between communities and entertainment destinations.

4.2.2.2 Impacts of the No Build Alternative

The No Build Alternative would not affect the MPO's proposals for existing and planned bicycle and pedestrian facilities and would not provide additional facilities such as the bicycle and pedestrian shared-use path proposed with the build alternatives. The MPO would be able to implement the improvements listed in their 2005 Plan even without improvements to US 181.

4.2.3 Transit

4.2.3.1 Impacts of the Build Alternatives

Public transportation facilities in the project area provided by the Corpus Christi Regional Transportation Authority (RTA) include park and ride lots, the Staples Street Station, fixed bus routes, commuter services, and the Corpus Christi Harbor Ferry, (See **Section 3.2.3** for further details on the services

provided by the RTA). The build alternatives would not impact designated park and ride lots, the Staples Street Station or the ferry route; fixed bus routes and (curb-to-curb) commuter services would be affected temporarily during the construction phase and, depending on the alternative, fixed bus routes could be affected by rerouting due to road closures and bus stop closures. Coordination with the RTA is ongoing, and measures to restore bus routes or bus stops would be incorporated into the final design of the proposed project as necessary and summarized in the Final EIS.

Fixed bus routes crossing the proposed project area were identified using the RTA's published route maps, and the relative importance of the routes was determined from the RTA's Evaluation Route Study (CCRTA 2012), which ranked heavily used bus stops and routes throughout the network. The two primary routes affected by one or more of the proposed build alternatives are Route 12 Hillcrest/Saxet/Oak Park and Route 78 CC Beach Connector; Route 76 Harbor Bridge Shuttle is a seasonal route that would also be affected by all of the proposed build alternatives.

Route 12 Hillcrest/Saxet/Oak Park connects the Hillcrest and Washington-Coles neighborhoods with the Oak Park area and city hall. Route 12 runs between Staples Street Station and Leopard Street at Omaha Drive every 30 minutes. The route serves several schools, including Miller High School and Driscoll Middle School, as well as several low-income housing complexes. The route operates Monday through Friday from 5:14 am to 10:40 pm and on Saturdays from 6:00 am to 10:36 pm. Route 12 is categorized by the RTA as a top third route by total weekday ridership, with approximately 1,154 passengers on an average weekday and approximately 706 passengers on Saturdays. The Route 12 Bus Stop 2 is located at Winnebago Street and Brownlee Boulevard. Both the Red and Orange Alternatives would result in Winnebago Street being closed between roughly Josephine Street and Coke Street disrupting the bus route and displacing Bus Stop 2. The Red and Orange Alternatives would replace the east-west access through the Northside community provided by Winnebago Street by improving Lake Street to create a through connection. Bus Stop 2 could be replaced along Winnebago Street near Josephine Street or Coke Street, or along the improved Lake Street, to allow pedestrians to access a bus stop within close proximity to the existing Bus Stop 2. The Green and West Alternatives would not affect Route 12 or Bus Stop 2. John Alexander, RTA Program Manager, indicated that should the Red (the Preferred Alternative) or Orange Alternatives be selected (the two build alternatives that would require changes to bus stops), bus routes and stop locations would be expediently modified in order to maintain service to the riders served by Bus Stop 2 (John Alexander, personal communication 2013).

Route 78 CC Beach Connector is a local route that runs Monday through Saturday every half hour from 6:30 am to 8:25 pm. The route connects Staples Street Station to the Bayfront area, the SEA District and North Beach. Daily ridership averages 453 boardings Monday through Friday and approximately 401 on Saturdays. The route exits US 181 north-bound at Beach Avenue, and each of the proposed build alternatives would maintain this exit. South of the Inner Harbor, the route exits US 181 at Staples Street, and with the Green Alternative, this exit would remain. With the Red and Orange Alternatives, Route 78 would exit US 181 at I-37 and access Leopard Street via the southbound service road. With the West Alternative, Route 78 would access I-37 directly from US 181 and then exit I-37 to Staples Street via the eastbound frontage road. Although Route 78 would be maintained with the West Alternative, it

would be a much longer route (five miles) relative to the existing route (three miles) between Beach Avenue and Staples Street. Bus stops on Route 78 would not be affected by any of the build alternatives.

The seasonal Route 76 Harbor Bridge Shuttle runs from Memorial Day to Labor Day, connecting the Texas State Aquarium area and the Staples Street Station on an hourly basis. The route follows Chaparral Street, Shoreline Boulevard, US 181 across the Harbor Bridge, Timon Boulevard, and Surfside Boulevard and can be viewed at http://ccrta.org/assets/76-harbor-bridge-shuttle-6-2013.pdf. The route is categorized by the RTA as the lowest weekday ridership with an average of 20 riders per day, with slightly higher numbers on Saturdays—approximately 48 riders. The route has a Sunday service, Route 76S, which runs year round with an average of 199 riders. The route exits US 181 north-bound at Beach Avenue, and each of the proposed build alternatives would maintain this exit. The Green Alternative would provide a route most similar to the existing 76 route, while the Red and Orange Alternatives would offer a slightly longer path. The West Alternative would substantially alter Route 76, particularly for tourists looking to travel quickly back and forth from North Beach to downtown, and would no longer be characterized as a relatively short "shuttle" service.

4.2.3.2 Impacts of the No Build Alternative

The No Build Alternative would not affect existing RTA routes or bus stops within the proposed project area. Routes 12, 78 and 76 would continue along their existing paths, pending any alteration the RTA might decide to make as it implements its Long Range Plan, adopted in October 2012.

4.2.4 Ports and Waterways

The Port of Corpus Christi is the seventh largest in the United States in total tonnage handled (USACE 2012a) and the primary economic engine for the Coastal Bend. Based on statistics maintained by the Port summarizing ship and barge activity as well as inbound and outbound shipments, a total of 581 vessels (121 ships and 460 barges) visited the Port of Corpus Christi in May 2013, translating to roughly 7.8 million tons of cargo, approximately 85 percent of which is petroleum and petroleum-related products. The average number of vessels per month calling the Port in 2012 was 506, with an average monthly tonnage of 6.5 million; of this roughly 84 percent came under the Harbor Bridge and into the Inner Harbor.

The existing Harbor Bridge provides 138 feet of vertical clearance, which means the maximum air-draft—the distance between the top of the water surface and the vessel's highest point—for vessels calling at the Inner Harbor is 138 feet. (Refer to **Section 2.4.2.3** for further information). The depth of the channel is maintained at 45 feet. In 2010, the Port commissioned a *Harbor Bridge Clearance Study* based on an analysis of the various types of vessels in the world fleet that currently call the Port as well as projections of vessels that might be available in the future, including cargo ships, tankers, cruise ships, and military ships. The study also included a survey of current Port customers seeking data pertaining to vessel size and type, both for current conditions and future projections (Harrington &

Cortelyou, Inc. 2010). Of the vessels in the worldwide database[6] for which air draft dimensions are provided, an estimated 56 percent have an air draft of 138 feet or less. Furthermore, of this 56 percent, 75 percent are tankers which are commonly used for transporting petroleum and petroleum products, the most common commodity shipped into and out of the Port of Corpus Christi. If implemented, the proposed project would increase the vertical restriction of the Harbor Bridge to between 206-216 feet above the ship channel, and an estimated 99 percent of vessels, the 2010 study concludes, have a light air draft of 205 feet or less.

According to the 2003 *U.S. 181 (Harbor Bridge) Feasibility Study*, the vessels with the greatest air draft are aircraft carriers (215-foot air draft), Ultra Large Crude Carriers (ULCC) (200-foot air draft) and cruise ships (226-foot air draft). Vessels with an air draft in this range (greater than 200 feet) also tend to have a higher draft (distance from the top of the water surface to the bottom of the vessel). For example, a ULCC with an air draft of 200 feet could have a draft of 80 feet. The existing channel depth of the Corpus Christi Ship Channel, as mentioned previously, is 45 feet—with an authorization by the U.S. Army Corps of Engineers to dredge to a depth of 52 feet—and therefore a ULCC of this size would not be able to call the Port even with an increase in the current 138-foot vertical clearance at the Harbor Bridge combined with the seven-foot channel deepening.

4.2.4.1 Impacts of the Build Alternatives

The current distribution of commodities shipped into and out of the Port is determined by a number of variables, including global market conditions, regional export-import demands, the dockside and landside infrastructure offered by the Port, and the requirements of the refineries and other industrial shipping customers located along the Inner Harbor. As these market variables change over time, a potential effect of raising the vertical restriction could be a change in the number and size of vessels calling the Port facilities on the Inner Harbor. The current distribution of commodity tonnage at the Port, however, is roughly 85 percent petroleum, and about 80 percent of vessel types calling the Port are barges, which typically have air draft dimensions less than 138 feet (Harrington & Cortelyou, Inc. 2010). Thus, if the current distribution remains stable in the future, an increase in the vertical restriction is not likely to have a substantial effect on the types of commodities or vessels calling the Port.

As part of their Participating Agency and project stakeholder role on the proposed project and in meetings with project planners[7] the Port of Corpus Christi Authority stated their expectation that global shippers would actually see an economic benefit to their own operations from utilizing fewer vessels with greater capacity to ship their products into and out of the Port, and that an increased air-draft would not by itself result in more vessels calling the Port. A related and beneficial effect potentially

[6] The 2010 *Harbor Bridge Clearance Study* utilizes world fleet register data from Clarksons Research Services Limited, a global shipping support firm that prepares research and compiles statistics on the world's shipping fleet.

[7] On November 13, 2012, TxDOT staff met with the Managing Director and the Director of Engineering Services for the Port of Corpus Christi Authority. Topics of discussion included existing Port infrastructure and planned improvements by Port tenants relative to the locations of the proposed alternatives under consideration and expectations regarding the future navigation considerations of vessels utilizing the Inner Harbor if the 138-foot vertical restriction were to be raised, potentially to 205 feet.

would be that vessels with a light air draft greater than 138 feet that currently are required to take on ballast water to leave the Port, a costly and time-consuming exercise, would be able leave without taking on that ballast. As these potential effects are uncertain and, if they were to occur, would occur later in time and be caused by others, they are considered in more detail in **Section 6.0 Indirect Effects** and **Section 7.0 Cumulative Effects**.

Although each of the proposed build alternatives would provide a vertical clearance of between 206 and 216 feet above the ship channel, the alignments vary; hence, the accessibility to the docks along the Inner Harbor would vary as well. The new bridge location proposed for the Green and Orange Alternatives would be only slightly offset relative to the existing bridge location, and therefore access to the Inner Harbor would still be limited to vessels with less than 205 feet of air draft and 45 feet of draft. The bridge location on the Red Alternative (the Preferred Alternative) is approximately 1,500 feet west of the existing Harbor Bridge and therefore the easternmost stretch of the Inner Harbor would be accessible regardless of a vessel's air draft. Facilities in this stretch of the Inner Harbor include Warehouse #9 and its associated dock, Warehouse #10 and its associated dock and the Congressman Solomon P. Ortiz International Center. Warehouse #9 serves general cargo as well as the U.S. military. Warehouse #10 is the Port's cold storage facility. The West Alternative would leave a larger portion of the Inner Harbor (approximately 2,500 feet) unrestricted by air draft limitations relative to the other build alternatives. Facilities in this stretch of the Inner Harbor, in addition to those listed above, include Warehouse #8 and its associated public cargo docks and multiple public and private oil docks.

As recreational vessels are prohibited from entering the Inner Harbor, the proposed project would have no effect on this type of navigation.

4.2.4.2 Impacts of the No Build Alternative

As stated previously, the Port of Corpus Christi is currently the seventh largest port in the U.S. in total tonnage, handling nearly 71 million tons in 2011 (USACE 2012a). The Port contracted with Martin Associates to prepare an Economic Impact Study which was finalized in September 2012. According to the Martin study, in 2011, marine cargo activity at the public and private terminals generated a total of $13.1 billion of total economic activity in the State of Texas and created over 66,000 jobs (Martin Associates 2012). The No Build Alternative would not affect this ability of the Port's to support the economy of the Coastal Bend region.

4.2.5 Railroads

4.2.5.1 Impacts of the Build Alternatives

The proposed project would not affect rail transportation from a regional perspective. **Section 3.2.5** describes the rail infrastructure in the project area as well as the conceptual plans for rail infrastructure improvements proposed by the Port of Corpus Christi Authority.

The proposed project would intersect the Union Pacific Rail Line south of the Inner Harbor and the Corpus Christi Terminal Rail line both north and south of the Inner Harbor. The Red, Orange and West Alternatives would bridge over the Union Pacific Line and no direct effects are anticipated; the Green Alternative would not cross the Union Pacific line. An agreement with Union Pacific would be pursued as part of the detailed design phase of the project, if necessary.

The Corpus Christi Terminal rail line owned by the Port of Corpus Christi Authority crosses the project area both north and south of the Inner Harbor and generally parallels the Inner Harbor on both sides. Each build alternative would bridge over the rail line and direct effects to this line are not anticipated. South of the Inner Harbor, the existing rail line crosses under the existing Harbor Bridge near Harbor Drive and turns south on the east side of US 181 and then crosses back to the west across US 181 at Port Avenue. This portion of the rail line would be within the limits of construction for all of the build alternatives; the improvements to the existing US 181 facility through this area would replace the at-grade crossings in the same manner as the existing crossings. Coordination with the Port would be necessary for these proposed improvements within the Port's rail right of way.

The effects of the build alternatives would vary with respect to the Port's conceptual plans for infrastructure improvements. The Port's 2012 *Rail Master Plan* identifies several expansion projects in areas that would be crossed by one or more of the proposed build alternatives, including the Al Speight Yard, the Northside Permian Rail Extension and Yard and the Missouri Pacific Rail Yard (Port of Corpus Christi 2012b).

The Green Alternative would pass to the east of the Al Speight yard, although cross-street improvements to Hughes Street associated with this alternative would be in the location proposed by the Port for two new tracks to add storage capacity to the yard. The placement of Hughes Street in this location would make it difficult for the new tracks to be installed as planned, although a minor realignment of Hughes Street to the south would likely accommodate both elements.

The Red Alternative would be constructed over the eastern portion of the planned Northside Permian Rail Extension and Yard. The Red Alternative would cross the 'New East End Turnaround Loop', which would be an extension of the existing Corpus Christi Terminal Rail line, and at a proposed elevation of 170 feet, the Red Alternative would span the rail line without affecting it directly.

The Orange Alternative would cross the Port's Al Speight Yard west of US 181 along Resaca Street. This alternative would bridge over the area at an elevation of 115 feet, and no direct effects to the yard are anticipated. The Port plans to add two new tracks along the existing track which would provide additional staging area for rail cars, and in particular for rolling military cargoes.

The West Alternative would be constructed over the inactive Missouri Pacific Rail Yard near Nueces Bay Boulevard. The Port proposes to rehabilitate this yard, although reconstruction of the tracks would be required and an existing at-grade road crossing of the yard limits the utility of the site for rail car

storage. The West Alternative would cross the yard at an elevation of 170 feet, and no direct effects to the yard are anticipated.

4.2.5.2 Impacts of the No Build Alternative

Under the No Build Alternative, no new right of way would be acquired, and no impacts to railroads or rail traffic would result.

4.3 IMPACTS TO PUBLIC SERVICES AND UTILITIES

Section 3.3 of this Draft Environmental Impact Statement (EIS) describes the various public services provided by the cities and counties in the project area, including emergency services and public housing services. **Section 3.3** also describes the public and private utilities (telephone, electric, gas, cable) in the project area with the potential to be affected by one or more of the alternatives.

4.3.1 Impacts of the Build Alternatives

4.3.1.1 Impacts to City and County Services

City of Corpus Christi Services

Corpus Christi Fire Department and Emergency Medical Services. **Section 3.3.1.1** identified three fire stations within the limits of the proposed project, and while there would be no direct effect to the stations themselves, changes in access associated with the proposed build alternatives would affect certain routes from the stations to areas of the city during an emergency. Fire Station 1 on Belden Street, for example, responds to emergencies in the North Beach area, which does not have a fire station. Access to existing US 181 from Belden Street is straight forward, with an entrance just a short distance away off of Mesquite Street. With the proposed build alternatives, the ramp from Mesquite Street to US 181 would be removed and emergency response vehicles would access US 181 northbound differently depending on the alternative. With the Green Alternative access to US 181 northbound would be via a turnaround at Staples Street that leads to a northbound entrance ramp. With the Red and Orange Alternatives, access to US 181 northbound from Belden Street would be via the I-37 westbound frontage road, with a northbound access ramp provided just north of I-37 at the interchange with the Crosstown Expressway. With the West Alternative access to US 181 northbound would be via the I-37 main lane entrance to US 181 just east of the Crosstown Expressway interchange. With any of the build alternatives the route from Fire Station 1 to the North Beach area in an emergency would be longer than the existing route. The West Alternative route would be two miles longer for emergency response, and community members have expressed concern regarding access for emergency vehicles under this alternative. Travel-time modeling for the project, however, indicates that the time it would take to travel between North Beach and CHRISTUS Spohn Memorial Hospital would be very similar under all of the build alternatives (ranging from 34 seconds faster under the Red Alternative and 42 seconds slower under the Green and West Alternatives) when compared to the No Build Alternative (see **Table 4.5-5**).

The emergency response time that may be influenced to some extent by the length of a particular route would be improved with any of the build alternatives in cases where an accident has occurred on the bridge or the approaches. The addition of shoulders to the bridge and approaches as part of the proposed design would allow emergency vehicles to utilize this additional space, or the shoulder could be used to store the vehicles involved in an accident such that traffic on the through travel-lanes would not be as congested as with the No Build Alternative in the same circumstance.

Emergency response routes from Fire Stations 3 and 5 would not be as affected by the proposed project, although there could be certain response scenarios where the route could be shorter or longer depending on the destination.

Corpus Christi Police Department. The Corpus Christi Police Department (CCPD) is headquartered at 321 John Sartain Street, southeast of the I-37/US 181 interchange. Routes from the police station to destinations within the project area would be affected by changes in access, particularly any routes to the North Beach area. Police response times, however, would typically be dependent more on where a particular patrol car is at the time the response is needed rather than the location of police headquarters. In some scenarios, response times could be shorter with the build alternatives than with the No Build Alternative, and in other cases it could be longer; differentiation among the build alternatives, therefore, would be speculative. In cases where an accident has occurred on the bridge or approaches, police response times would improve dramatically in comparison to the No Build Alternative. As described in the previous section addressing fire and emergency response, the addition of shoulders to the bridge and the approaches with the proposed design would prevent routine accidents from causing prolonged congestion, thereby allowing police vehicles to pass in times of emergency.

Corpus Christi Housing Services. Housing services provided by the Corpus Christi Housing Authority and the Neighborhood Services Department would not be directly affected by the proposed project. Effects to recipients of these services would be in the context of displacement, traffic noise, access, or other category of effect discussed elsewhere in this Draft EIS. Displacements are covered in **Section 4.4**, traffic noise is covered in **Section 4.10**, and access changes are discussed by neighborhood in **Section 4.6**.

Corpus Christi Stormwater Management. Any of the proposed build alternatives would include drainage infrastructure that would be required to integrate with Corpus Christi's municipal separate storm sewer system (MS4). Specific drainage design details would be developed and coordination with the City's Stormwater Management Department would occur during the detailed design phase of the project. All of the alternatives would affect the existing storm drainage system at the I-37/Crosstown Expressway interchange, and the Red Alternative would additionally affect a nearby major drainage structure that collects stormwater from the interchange and conveys it to the Inner Harbor. Coordination with the City is ongoing. In addition, other minor storm sewer infrastructure would need to be addressed for any of the proposed build alternatives, and design details would be finalized following the selection of an alternative. Additional discussion of the Corpus Christi MS4 in the context of stormwater discharges from the construction site is included in **Section 4.11.3**.

Nueces County Services

Construction of the proposed project would occur within the Corpus Christi city limits, with the exception of a small portion of the Red Alternative and a somewhat larger portion of the West Alternative occurring on property owned and operated by the Port of Corpus Christi Authority. Services provided by Nueces County, therefore, would not be affected by the proposed project.

City of Portland Services

City of Portland Fire Department. The proposed project would not affect services provided by the City of Portland within its city limits. The chief of the Portland Fire Department indicated at the November 12, 2012, Portland Community Meeting that there are occasions when the Portland Fire Department is called to provide support and backup to the City of Corpus Christi Fire Department. Depending on the location of an emergency in Corpus Christi requiring the support of the Portland Fire Department, response times could be affected relative to those with the No Build Alternative; differentiation among the alternatives, including the No Build, would be speculative.

City of Portland Police Department. The proposed project would not affect services provided by the Portland Police Department.

City of Portland Stormwater Management. The proposed project would not affect stormwater management in the city of Portland.

San Patricio County Services

The proposed project would not affect services provided by San Patricio County.

4.3.1.2 Impacts to Public and Private Utilities

A description of the public utilities provided by the City of Corpus Christi is included in **Section 3.3.1.1.** The proposed project, regardless of the build alternative, would require the relocation of public utilities, including water, gas and electric. Private utilities such as telecommunications and cable would also be subject to relocation. At this stage of the project, the locations of utilities potentially requiring adjustment or relocation have not been identified. Once an alternative is selected, subsurface and overhead utility locating would be an element of the detailed design, and coordination with the utility owners on possible relocation options would take place. Utility relocations and adjustment would be accomplished with the minimum practicable disruption in service to customers.

4.3.2 Impacts of the No Build Alternative

Under the No Build Alternative, no new right of way would be acquired, and no utilities would be impacted. The No Build Alternative would not address the operational and safety deficiencies on the existing bridge and the US 181 facility, including the lack of shoulders which contributes to periods of prolonged congestion when even minor accidents occur. In this respect, despite the shorter route, the

No Build Alternative does not provide the reliable emergency response that the build alternatives would. The No Build Alternative would not affect stormwater management services or public housing services.

4.4 DISPLACEMENTS

4.4.1 Residential Displacements

The proposed build alternatives would displace several residences within four communities identified in **Section 3.5.3**: North Beach, Northside, South Central and Westside. Displacements would include single-family homes on small lots, multi-family duplex units, and apartment complexes. Both owner-occupied and tenant-occupied residences would be affected.

To ensure that decent, safe, and sanitary dwellings would be available to all displaced persons, the state's Relocation Assistance Program (RAP) would be available to all eligible individuals and families displaced as a result of construction of the proposed project. The acquisition of property and relocation assistance would be conducted in accordance with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (P.L. 91-646) (HUD 2005). Relocation resources would be made available to all eligible displaced residents, including tenants, without discrimination, consistent with the requirements of the Civil Rights Act of 1964 and the Housing and Urban Development Act of 1974.

Tenants renting an apartment or duplex unit for a minimum of 90 days are entitled to rental assistance payments for monthly rent and the estimated average monthly cost to utilities (HUD 2005). Rental assistance for low-income tenants is provided for those who qualify for the U.S. Department of Housing and Urban Development's Annual Survey of Income Limits for the Public Housing and Section 8 Programs (HUD 2005). Considerations for renters receiving a HUD Section 8 Existing Housing Certificate or a Housing Voucher are offered through the Texas Department of Transportation (TxDOT) Rental Assistance program. Displaced tenants would have the opportunity to discuss program eligibility options with a TxDOT relocation counselor.

Based on field observations of the residences likely to be displaced by each of the proposed alternatives, there are no obvious external indications that relocation considerations for disabled persons would be necessary. For example, wheelchair ramps are not evident at residences presumed to be displaced by one or more of the proposed build alternatives. TxDOT right of way staff would conduct individual interviews with residents to be displaced by the project during the right of way acquisition phase to determine if any special accommodations would need to be made to facilitate relocation.

The Nueces County Appraisal District shows assessed 2012 values for the potentially displaced homes within a wide range, from $5,498 to $66,771. Zillow.com (accessed June 2013) shows approximately 260 single-family homes for sale in Corpus Christi ranging in price from $8,500 to $80,000. There are also multiple open lots and land available for purchase in the affected neighborhoods. The majority of available homes for sale are located in the Westside community. As of June 2013, no homes are listed

for sale under $17,000, and it could therefore be difficult to find available homes in that price range; twelve homes with assessed values less than $17,000 would be displaced by one or more of the build alternatives. If comparable housing is not available at the time of right of way acquisition, TxDOT would provide the required housing or, if necessary, provide housing supplement payments in excess of the standard payment limits to ensure that decent, safe and sanitary dwellings are made available to all eligible persons displaced by the proposed project. For those residents located in low-income subsidized housing apartments, special relocation assistance would be provided by TxDOT to ensure decent, safe and sanitary replacement housing.

4.4.1.1 Impacts of the Build Alternatives

The following sections summarize the number and type of residences that would be displaced by each proposed build alternative. The availability of replacement housing is also discussed by neighborhood.

Green Alternative

An estimated 15 residences would be displaced by the Green Alternative (see **Table 4.4-1** and **Displacement Plates G-1** through **G-6** in **Appendix H**; **Figure 3.5-4** depicts project area community boundaries). Assessed values range from $14,128 to $66,771. It appears that sufficient replacement housing would be available in the price range comparable to the single-family homes that would be displaced in three of the affected neighborhoods: South Central, Northside, and Westside. The Green Alternative would displace nine single-family homes in the North Beach area, and the only residences currently for sale in North Beach below $80,000 are one-bedroom condominiums. There would not likely be a sufficient number of residences for sale in North Beach to replace the nine displaced homes. Further coordination between TxDOT right of way agents and displaced residents in the North Beach neighborhood would be required to identify suitable replacement housing.

Table 4.4-1 Residential Displacements - Green Alternative

			2012 Appraised Value		Sq Ft	
	Neighborhood	**Number**	**Low**	**High**	**Low**	**High**
Single Family/Duplex	North Beach	9	$14,168	$65,170	513	2,780
15	South Central	2	$14,128	$53,415	594	2,070
	Northside	3	$21,154	$66,771	1,280	66,771
	Westside	1	$29,479	$29,479	1,220	1,220
Apartment(s)						
0	--	0	--		--	
Total		**15**				

Source: Nueces County Appraisal District, 2012

Red Alternative (Preferred)

An estimated 19 single-family or duplex residences and three apartment complexes would be displaced by the Red Alternative (the Preferred Alternative); totaling 39 residential displacements (see **Table 4.4-2** and **Displacement Plates R-1** through **R-5** in **Appendix H**; **Figure 3.5-4** depicts project area community boundaries). Assessed values range from $9,546 to $66,771 for the 13 single-family homes displaced.

Three duplexes would also be displaced, totaling six displaced residences. Although there are no comparable houses for sale below $35,000 in the South Central or Northside communities, three houses in the South Central community and one home in the Northside community having an assessed value less than $35,000 would be displaced. In the North Beach area, there are currently no single-family homes for sale under $159,000; all of the displaced homes in this neighborhood are assessed below this value. Additional coordination with TxDOT right of way agents would be necessary to identify relocation options in these neighborhoods. As of June 2013, there are approximately 19 single-family homes for sale under $35,000 located in the Westside community.

The North Side Manor Apartments have two locations; the Lake Street location has 20 units and the N. Alameda Street location has 100 units. The Red Alternative would displace two of the buildings in the North Side Manor Apartments Lake Street complex, affecting 10 units. On October 23, 2012, Housing and Community Services Inc. from San Antonio, Texas received approval from the Corpus Christi City Council for Low-Income Housing Tax Credit (LIHTC) funding to build an apartment complex being referred to as The Palms on Leopard Street. The proposed complex would consist of 120 units, sufficient to accommodate all of the residents of North Side Manor Apartments displaced by the proposed project. Upon completion of The Palms, and independent of the proposed project, the North Side Manor Apartments on N. Alameda Street and Lake Street are planned for demolition (KIII News 2011b). The Palms could serve as replacement housing for the current residents of North Side Manor; according to the City of Corpus Christi's Neighborhood Services Director speaking at the July 2013 Technical Advisory Committee meeting, North Side Manor tenants would be given priority during the application process for The Palms. The Red Alternative would also displace a residence located at 1202 Van Loan Avenue that includes four individual housing units. The Red Alternative would also displace all six units in the Hillcrest Manor Apartments at 2830 Martin Luther King Drive; these units serve low-income residents in the Northside community. In a phone conversation with project planners, the owner reported that the apartments provide temporary housing for individuals who have not yet been approved for subsidized housing.

Table 4.4-2 Residential Displacements - Red Alternative

	Neighborhood	Number	2012 Appraised Value		Sq Ft	
			Low	High	Low	High
Single Family/Duplex	North Beach	2	$21,471	$65,170	737	1,651
19	South Central	4	$9,546	$49,207	616	2,914
	Northside	11	$21,154	$66,771	960	2,550
	Westside	2	$29,479	$30,433	1,168	1,220
Apartment(s)						
North Side Manor Lake St	Northside	10	$269,109*		17,436	
1202 Van Loan Ave	Northside	4	$64,216		2,233	
Hillcrest Manor	Northside	6	$77,345*		3,848	
Total		**39**				

Source: Nueces County Appraisal District 2012

* Appraised value of the apartment complex.

Orange Alternative

An estimated 30 residences and five apartment complexes would be displaced by the Orange Alternative; totaling 102 residential displacements (see **Table 4.4-3** and **Displacement Plates O-1** through **O-5** in **Appendix H**; **Figure 3.5-4** depicts project area community boundaries). Assessed values range from $5,498 to $49,207 for the single-family homes. Four duplexes would also be displaced, totaling eight displaced residences. It appears that sufficient replacement housing would be available in the price range comparable to the single-family homes that would be displaced in the South Central and Westside communities. As of June 2013, the North Beach and Northside communities do not have an adequate number of single-family homes for sale to serve as replacement housing for those displaced by the proposed project. There would be eight Northside homes displaced by the Orange Alternative that have an assessed value less than $35,000; two homes under $35,000 would also be displaced in the South Central community. The Westside community has a sufficient number of homes for sale to accommodate displaced Northside and South Central residents, including homes listed under $35,000.

The Orange Alternative would displace 20 units in the North Side Manor Apartments on Lake Street and 30 units in the North Side Manor Apartments on N. Alameda Street. As previously noted under the discussion of the Red Alternative, the Palms on Leopard Street apartments would have 120 units, and residents of the North Side Manor Apartments would be given priority during the application process at The Palms. It should be noted that residents would be able to choose whether they wished to relocate to the Palms. The state's RAP would be available to these residents, and this service would consider location preference for replacement housing. The Orange Alternative would also displace the six units at the Hillcrest Manor Apartments and four units at the property at 1202 Van Loan Avenue. The Orange Alternative would also affect one unit in the 12-unit Gulfview Suites, a rental and extended-stay property in the North Beach area with several current occupants.

Table 4.4-3 Residential Displacements - Orange Alternative

	Neighborhood	Number	2012 Appraised Value		Sq Ft	
			Low	High	Low	High
Single Family/Duplex	North Beach	5	$14,168	$29,408	513	798
30	South Central	5	$9,546	$49,207	616	2,914
	Northside	18	$5,498	$44,214	501	2,550
	Westside	2	$19,212	$30,433	875	1,220
Apartment(s)						
Gulfview Suites	North Beach	12	$272,640*		5,840	
Hillcrest Manor	Northside	6	$77,345*		3,848	
North Side Manor Lake St	Northside	20	$269,109*		17,436	
North Side Manor N. Alameda St	Northside	30	$747,933*		78,196	
1202 Van Loan Ave	Northside	4	$64,216		2,233	
Total		**102**				

Source: Nueces County Appraisal District 2012

* Appraised value of the apartment complex.

West Alternative

An estimated seven residences and one apartment complex would be displaced by the West Alternative totaling 13 residential displacements (see **Table 4.4-4** and **Displacement Plates W-1** through **W-7** in **Appendix H**; **Figure 3.5-4** depicts project area community boundaries). Home values range from $29,135 to $66,771 for single-family homes. Based on a search of available houses for sale in the Northside and Westside communities, it appears that sufficient replacement housing would be available in the price range comparable to the single-family homes that would be displaced. The West Alternative would also displace all six units of the Hillcrest Manor Apartments, previously noted as providing housing for low-income residents.

Table 4.4-4 Residential Displacements - West Alternative

	Neighborhood	Number	2012 Appraised Value		Sq Ft	
			Low	High	Low	High
Single Family/Duplex	North Beach	0	--	--	--	--
9	South Central	0	--	--	--	--
	Northside	5	$29,135	$66,771	1015	2550
	Westside	2	$29,479	$30,433	1168	1220
Apartment(s)						
Hillcrest Manor	Northside	6	$77,345*		3,848	
Total		**13**				

Source: Nueces County Appraisal District 2012

* Appraised value of the apartment complex.

4.4.1.2 Impacts of the No Build Alternative

Under the No Build Alterative, no new right of way would be acquired, and no residential displacements would occur.

4.4.2 Business Displacements

4.4.2.1 Impacts of the Build Alternatives

The proposed build alternatives would displace a number of businesses, including among others small, family-owned shops, larger chain or franchise businesses, gas stations, an office high-rise building and industrial sites. A database search of commercial properties (industrial, office, retail, and land) for both sale and lease was conducted to assess the availability of commercial properties to serve as replacement for those displaced by the proposed project. Results of the search are listed below in the discussions by alternative.

The TxDOT RAP would assist displaced business owners and tenants by reimbursing reasonable moving costs, personal property losses, expenses in finding a replacement, and expenses in reestablishing the business (TxDOT 2010c). It is likely that many of the potentially displaced businesses would choose to relocate to take advantage of highway frontage locations. Factors influencing a business owner's decision to relocate include site conditions affecting the possibility of on-site relocation and status as part of a chain or national organization. Employees of displaced businesses could experience short-term

effects, such as lost income, during the period of relocation. It is assumed that most employees of successfully relocated businesses would continue to be employed at the new locations.

Employees of businesses that choose not to reestablish could experience effects such as temporary unemployment. While TxDOT's RAP does not offer assistance directly to employees of relocated businesses, right of way agents would offer relocation counseling to minimize economic harm and provide information as to possible sources of funding and assistance from other local, state, and federal agencies. Further discussion of effects to employees is included in **Section 4.5**. The following summarizes the analysis of the number and type of businesses that would be displaced by each proposed build alternative.

Green Alternative

An estimated 57 businesses in the North Beach and South Central communities would be displaced by the Green Alternative (see **Table 4.4-5**). The businesses include restaurants, financial services, automobile shops, retail shops, gas stations, an engineering service, warehouses, a large office tower, a water park, and a small office building housing two attorneys and a real estate professional. The majority of affected businesses are small, single-owner or family-owned shops, typically employing a small number of employees. Larger businesses include the water park and a bus charter and shuttle service.

Table 4.4-5 Business Displacements - Green Alternative

Business	Type	Employees	Similar Businesses in the Community[3]	Community
Valero/Stripes Gas Station – E. Causeway Boulevard	Gas Station	3-5[2]	2	North Beach
Brewster Street Ice House	Food Services	10-20[2]	67	South Central
Daisy Charters and Shuttles	Services	3	0	South Central
CC Southern Pacific Credit Union	Financial	4[1]	8	South Central
Howards Bar B Cue	Food Services	5-9	67	South Central
Hurricane Alley Waterpark	Entertainment	15-30[2]	0	South Central
International Forum Systems (IFS)	Point of Sale Services	6	0	South Central
LR Global LLC, Strategic Solutions	Consulting Services	2	5	South Central
Olszewski Stained Glass Studio Inc	Services	1-5	1	South Central
Park Tower	Business Park	41-207*	Varies	South Central
Red Rover Imaging and Frames	Printing Services	1-4	1	South Central
Shell Gas Station - Leopard Street	Gas Station	3-5[2]	5	South Central
V Twin Motorcycle Parts	Auto Services	1-4	1	South Central
Your Sign Company LLC	Services	8	11	South Central
Rve Inc. Engineering	Services	17[1]	5	South Central
902 Buffalo Street	Law Services/ Real Estate Services	5-6[1]	78	South Central
Cliffs Uptown Detail	Auto Services	1-4	4	South Central
Total	**57**	**126-339**		

Source: 1. Phone interview with the business owner or manager; 2. Estimate; 3. YellowPages.com (accessed June 2013); all others, Manta.com.
*The number of employees potentially affected is based on a range of one employee per office up to a ratio of 250 square feet per employee.

Based on the June 2013 Loopnet.com search for commercial properties, there appear to be a sufficient number of properties zoned for commercial use available for sale or lease—approximately 80—to accommodate businesses in the North Beach and South Central communities displaced by the Green Alternative.

The structure proposed to be displaced by the Green Alternative with the largest number of employees is the Park Tower office building at 710 Buffalo Street, which includes many different tenants in small office suites. According to email correspondence with the building manager in June 2013, Park Tower has approximately 41 tenants, with office sizes ranging from 300 to 3,000 square feet. Current tenants within the building include financial institutions, counseling offices, law firms, a sports radio station, photography studios, surveying and sales firms, an office for the Port of Corpus Christi, and others. According to loopnet.com, as of June 2013, Park Tower is approximately 34 percent vacant and currently offers annual lease rates of $9-11 per square foot; there are several comparable properties currently advertising space for lease in this price range in the downtown area. Finding compatible office space for these small groups would be less challenging than attempting to relocate businesses with large square footage requirements.

Businesses that would be displaced under the Green alternative with unique site requirements include the two gas stations and the Hurricane Alley Waterpark. The Valero/Stripes Gas Station on E. Causeway Boulevard and the Shell Gas Station on Leopard Street would likely seek a highly accessible relocation site, preferably adjacent to a service road. As of June 2013, there are multiple vacant lots for sale and zoned for commercial use in the North Beach area that could serve as a replacement site for the Valero/Stripes Gas Station on E. Causeway Boulevard. As of June 2013, one commercially-zoned lot with frontage on Leopard Street is for sale and could serve as a sufficient replacement property for the displaced Shell station. Finding a suitable location in the SEA District for the Hurricane Alley Waterpark to relocate is likely to be difficult, although several large, open lots do exist in close proximity to the existing site.

Red Alternative (Preferred)

An estimated three businesses would be displaced by the Red Alternative (Preferred) in the North Beach and South Central communities (see **Table 4.4-6**). The list of businesses includes a stained glass studio and the two gas stations that would be displaced by all of the build alternatives.

Table 4.4-6 Business Displacements - Red Alternative

Business	Type	Employees	Similar Businesses in the Community[2]	Community
Valero/Stripes Gas Station – E. Causeway Boulevard	Gas Station	3-5[1]	2	North Beach
Shell Gas Station - Leopard Street	Gas Station	3-5[1]	5	South Central
Olszewski Stained Glass Studio Inc	Services	1-5	1	South Central
Total	**3**	**7-15**		

Source: 1. Estimate; 2. YellowPages.com (accessed June 2013); all others, Manta.com.

All three of these businesses would be displaced by the Green Alternative as well as the Red Alternative; as discussed previously, there would be adequate replacement properties for sale or lease for the displaced gas stations in the North Beach and South Central communities. The Olszewski Glass Studio currently occupies a space of approximately 3,000 square feet. As of June 2013, there are several listings for similarly sized commercial structures for sale in the downtown Corpus Christi area.

Orange Alternative

An estimated 10 businesses would be displaced by the Orange Alternative in the North Beach, South Central, and Northside communities (see **Table 4.4-7**). Three gas stations, a moving and storage business, an automobile shop, a restaurant, an athletic training facility, a funeral home, a retail shop, and a water park would be among the displacements.

Table 4.4-7 Business Displacements - Orange Alternative

Business	Type	Employees	Similar Businesses in the Community[3]	Community
Texaco Gas Station - Seagull Boulevard	Gas Station	3-5[2]	1	North Beach
Valero/Stripes Gas Station – E. Causeway Boulevard	Gas Station	3-5[2]	1	North Beach
Keystone Automotive	Auto Services	11[1]	4	South Central
Batter's Box Training	Baseball Training	1-5	0	South Central
Shell Gas Station - Leopard Street	Gas Station	3-5[2]	5	South Central
Crocker Moving & Storage	Services	10-19	3	South Central
Hurricane Alley Waterpark	Entertainment	15-30[2]	0	South Central
Olszewski Stained Glass Studio Inc	Services	1-5	1	South Central
Unity Chapel Funeral Home	Services	5-9	0	Northside
Blue Monday	Food Services	5-9	0	Northside
Total	**10**	**57-103**		

Source: 1. Phone interview with the business owner or manager; 2. Estimate; 3. YellowPages.com (accessed June 2013); all others, Manta.com.

As noted previously in the discussion of displaced properties with special location requirements under the Green Alternative, there is available land suitable for the relocation of the two gas stations that would be displaced under all of the alternatives (the Valero/Stripes in the North Beach area and the Shell Gas Station on Leopard Street). The Texaco gas station displaced by the Orange Alternative could also be accommodated in the North Beach area. As noted previously under the Green Alternative, finding a suitable replacement property in the SEA District for the Hurricane Alley Waterpark could be difficult although several empty lots do exist nearby.

There are no properties zoned for commercial use for sale or lease in the Northside neighborhoods and, therefore, the relocation of the Unity Chapel Funeral Home and Blue Monday could be difficult. It should be noted, however, that there are several vacant lots in the community, which may be available for the

relocation of these businesses, even if the land is not currently for sale. Unity Chapel is located across the street from Saint Paul United Methodist Church and is the only funeral home serving the Northside neighborhoods. See **Section 4.6.3** for a discussion of the potential community impacts of the displacement of these businesses.

West Alternative

An estimated two businesses would be displaced by the proposed West Alternative in the North Beach, and Northside communities (see **Table 4.4-8**). Businesses to be displaced include a gas station and the CITGO Corpus Christi Refinery office building complex. One building in the three-building complex is divided into two parts connected by a walkway; the West Alternative would take the portion of this building on the east side of the walkway as well as the two buildings north of Dempsey Street.

Table 4.4-8 Business Displacements - West Alternative

Business	Type	Employees	Similar Businesses in the Community[2]	Community
Valero/Stripes Gas Station – E. Causeway Boulevard	Gas Station	3-5[1]	2	North Beach
CITGO Corpus Christi Refinery Office Buildings	Industrial	100	----	Northside
Total	**2**	**103-105**		

Source: 1. Estimate; 2. YellowPages.com (accessed June 2013); all others, Manta.com.

CITGO has established a strong presence in Corpus Christi, including the operation of two large plants covering 565 acres that would not be affected by the proposed project. It is therefore not anticipated that the company would choose not to rebuild or relocate any offices displaced from this complex. CITGO would very likely rebuild their facility on nearby vacant land or lease space elsewhere. There are an adequate number of replacement properties for sale or lease in the North Beach and South Central communities.

As noted previously, there is available land suitable for the relocation of the displaced gas station. The Flint Hills Resources above ground petroleum storage tanks would be displaced by the West Alternative and may require special consideration and further discussion with Flint Hills and the Port of Corpus Christi to determine the availability of commercial or industrial land suitable for the replacement of the tanks.

4.4.2.2 Impacts of the No Build Alternative

Under the No Build Alterative, no new right of way would be acquired, no businesses or industrial structures would be impacted, and no commercial land uses would be converted to transportation use.

4.4.3 Other Displacements

In addition to residential and commercial displacements, the proposed build alternatives would displace a number of other prominent properties in the North Beach, South Central, and Northside communities (see **Table 4.4-9**).

The Green and Orange Alternative would affect a portion of the Congressman Solomon P. Ortiz International Center, located west of the existing Harbor Bridge. The Green Alternative would impact the covered plaza area between the main building and the Harbor Bridge. The plaza is used for outdoor functions as well as a break area for conferences and events held at the Ortiz Center. The Orange Alternative would impact the covered plaza as well as several interior rooms.

The Green Alternative would displace Templo Trinidad Church, located on 719 Waco Street south of I-37. Further discussion regarding services provided by Templo Trinidad is included in **Section 3.5.3.2**. The Texas RAP would assist displaced church owners by reimbursing reasonable moving costs, property losses, expenses in finding a replacement property, and expenses in reestablishing the church.

The Orange Alternative and Green Alternatives would displace Port Warehouse #9/public dock currently being leased for general cargo. According to a phone interview with the Port's Director of Engineering Services in July 2013, this is an important covered transfer facility that is the primary link to rail on the north side of the Inner Harbor. This facility also handles military cargo, in support of the Port's designation and use as a Strategic Military Port and displacement of this facility could affect this critical designation for the Port. The Red Alternative would displace the Port of Corpus Christi's warehouses #10 (Refrigerated Distribution Center), #26 and #27. This alternative would also displace the H&S Fabricators warehouse located on Port property. Warehouse #10 is the Port's cold storage facility, which is currently unoccupied; the associated dock is being leased by Martin Oil Company.

There appears to be sufficient replacement properties available for the warehouses which are not necessarily located on a dock or rail line. As of July 2013, a warehouse comparable in size to the displaced H&S Fabricators warehouse is for sale in the next block of N. Port Avenue. Port Warehouses #26 and #27 are each over 100,000 square feet; there is one warehouse of similar size currently for lease about three miles away in the Westside neighborhood. Port facilities #9 and #10 are critical to Port operations; there are no existing replacement facilities with the same amenities (refrigeration, access to rail, and access to docks).

The Orange Alternative would affect a portion of the Broadway Wastewater Treatment Plant undergoing reconstruction along Broadway and Resaca Streets just west of US 181. The affected portion of the plant includes the pump station, which is needed to control the flow of water into the treatment facility. The pump station was designed for the new treatment plant and includes underground tanks and pipes; this facility is considered an integral part of the operation of the Broadway Wastewater Treatment Plant.

Table 4.4-9 Other Displacements			
Business	**Type**	**Community**	**Alternative**
Solomon P. Ortiz International Center	Public	South Central	Green, Orange
Templo Trinidad	Church	South Central	Green
Port of Corpus Christi Warehouse #10 (Cold Storage)	Industrial	North Beach	Red
H&S Fabricators Warehouse	Industrial	South Central	Red
Port of Corpus Christi Warehouse #26 and #27	Industrial	South Central	Red
Port of Corpus Christi Warehouse #9/Cargo Dock (Military)	Industrial	North Beach	Green, Orange
Broadway Wastewater Treatment Plant	Industrial	South Central	Orange
Flint Hills Resources Refinery Storage Tanks	Industrial	Northside	West
Total	**8**		

Source: US 181 Harbor Bridge EIS Team 2013

4.5 ECONOMIC AND EMPLOYMENT IMPACTS

In accordance with the guidelines established in Federal Highway Administration (FHWA) Technical Advisory 6640.8A, this section considers the foreseeable economic impacts of the proposed build alternatives as well as the no build scenario. For each alternative, the following types of economic impacts were considered:

- Impacts related to proposed roadway improvements and the relationship of the alignment locations to established business districts;
- Impacts related to business displacements and employment opportunities;
- Impacts related to changes in access;
- Impacts to major employers;
- Impacts related to tax revenues and public expenditures; and
- Regional economic effects from construction of the project.

4.5.1 Economic Impacts Related to Roadway Improvements and Alignment Location

4.5.1.1 Impacts of the Build Alternatives

This section will describe the economic impacts that could result from the proposed roadway improvements (for example, the expected improvements in Level of Service [LOS]) as well as the impacts related to changing the location of US 181 in relationship to established business districts. Many impacts to businesses in the project area are common to all of the build alternatives. Each of the build alternatives would serve to improve safety, congestion, and travel time reliability, which are all benefits to local business activity. The proposed safety improvements, including adding shoulders to the bridge and approaches, reducing the vertical grade and horizontal curvature, providing longer ramps and adequate spacing between ramps, would provide a more safe and efficient facility that would benefit those taking vehicle trips along the portions of US 181 and I-37 in the project area. These improvements would reduce the likelihood of traffic accidents, and the addition of shoulders on the bridge would provide a break-down lane outside of the flow of traffic, contributing to more reliable travel time expectations, even when accidents occur. Reduced congestion represents increased efficiency and revenue for transportation-dependent industries like trucking. While the primary truck route in the area

is the Joe Fulton Corridor, trucks and tractor-trailers do utilize the Harbor Bridge. Additionally, the potential for reduction in traffic accidents would also minimize business losses associated with these accidents. In May 2013, at least two trucks overturned along US 181 and I-37 in the project area, causing damage to the trucks and their cargo and causing delays for other travelers.

With regards to the alignment location, several studies (CalTrans 2006; WDOT 1998) have analyzed the impact of highway bypasses, or projects which divert traffic away from the main streets of a town. Important findings of the 2006 CalTrans study include the following:

- "Highway-oriented towns have a much harder time transitioning their economies after bypasses are constructed than those that cater to local residents or offer tourist attractions.
- Towns that serve regional markets by providing services, such as big box retail, automobile dealers, department stores, or hospitals, may experience little or no economic impacts. If a bypass provides better access to regional services, the local economy may actually improve as the town expands its regional draw.
- Towns with other economic bases, such as government employment, mining, agriculture, manufacture, etc. are not likely to be economically impacted by bypasses.
- Other visitor-serving businesses, such as motels, art galleries, antique stores, and curio shops, cater more to visitors attracted to the community as a destination rather than those simply passing through. These businesses are less likely to be negatively impacted by bypasses and may find that business improves if the downtown is turned into a destination.
- Businesses that serve local residents, such as drug stores, banks, and grocery stores are generally not impacted by bypasses.
- Bypasses located close to existing downtowns are less likely to hurt local economies. Travelers may be able to see businesses and access times are shorter." (CalTrans 2006: 3-4)

Green, Red (Preferred), and Orange Alternatives

As discussed above, a safer and more efficient route for the crossing of the Inner Harbor would benefit those taking vehicle trips along US 181 and I-37. Under the Green, Red, and Orange Alternatives, routing drivers through the central business district and over the Inner Harbor near its confluence with Corpus Christi Bay could bring increased traffic visibility and access for downtown area businesses and attractions, including the Texas State Aquarium and the USS *Lexington* museum. The anticipated achievement of LOS A and B (depending on roadway segment) in 2043 for the build alternatives represents a substantial improvement from the No Build Alternative, which would operate between LOS D and E in 2043 (URS Corporation 2013b). No bypass effects are anticipated to occur under the Green, Red, or Orange Alternatives, as the locations of the US 181 main lanes and the crossings of the Inner Harbor are very close to its current location.

West Alternative

As with the Green, Orange, and Red Alternatives, the West Alternative would also provide a safer and more efficient route for the crossing of the Inner Harbor. Traffic along the West Alternative is also

expected to operate at LOS A and B in 2043, which also represents an improvement from the No Build Alternative (URS Corporation 2013b).

While the other alternatives would include a crossing of the Inner Harbor close to the existing bridge, the West Alternative proposes a crossing approximately 1.3 miles to the west. This location would route travelers of US 181 away from downtown and the established central business district, reducing non-local traffic along I-37 east of Nueces Bay Boulevard and along the existing alignment of US 181. Potential effects related this route include comparatively less visibility and drive-by traffic for downtown businesses and attractions. There are many factors, however, which would temper the severity of this impact.

The relatively proximate distance of the West Alternative from downtown (even though it would not pass through) makes the potential economic effects of this route less likely to be detrimental. The downtown area would generally remain visible to travelers of the West Alternative, even if the distance prevents the recognition of certain attractions and limits the reach of specific signage. Although the potential exists for a decline in customers for businesses serving drive-by traffic such as gas stations along the existing I-37 route and in the downtown area, drivers seeking these services could be immediately accommodated in the North Beach area or along I-37 west of Nueces Bay Boulevard, thus retaining the economic benefits of these transactions within the city of Corpus Christi.

Corpus Christi is not a highway-oriented town. The city is located on the coast, approximately 15 miles east of the I-37/US 77 corridor that provides a connection to many other destinations in the state, and the city developed independently of the highway system. Corpus Christi also has a relatively diversified economy serving a regional market that is not dependent on pass-through traffic (see **Section 3.4**). As supported by the CalTrans study, neither the patronage of visitors to Corpus Christi planning to go to certain attractions nor local residents with established shopping habits would be anticipated to be substantially influenced by a route "bypassing" the downtown area, particularly since the West Alternative would be located relatively close to downtown. Nevertheless, in comparison to the Green, Red and Orange Alternatives, the West Alternative is seen by members of both the Technical and Citizens Advisory Committees as being the route most likely to discourage travel downtown or to the attractions along North Beach. (See **Section 8.0** for further discussion of the results of the Advisory Committee meetings.)

4.5.1.2 Impacts of the No Build Alternative

Under the No Build Alternative, the proposed improvements to the roadway would not be made. The LOS on the existing facility would continue to worsen and has been modeled by project engineers operate between LOS D and E in 2043 (URS Corporation 2013b). Traffic conditions would also continue to be affected by breakdowns occurring on the Harbor Bridge due to a lack of emergency shoulders, a condition that is not captured in the LOS modeling, but would further exacerbate traffic congestion and travel time reliability. The lack of safety improvements and increasing congestion under the No Build

Alternative represent a comparatively less efficient roadway for transportation-related industries than the conditions that could be achieved under the build alternatives.

The location of the crossing of US 181 over the Inner Harbor would not change. This location, near the downtown area, the SEA District, and North Beach, would continue to provide travelers with a view of Corpus Christi attractions and would continue to route traffic through the central business district.

4.5.2 Economic Impacts Related to Business Displacements and Employment Opportunities

4.5.2.1 Impacts of the Build Alternatives

As described in **Section 4.4**, the proposed build alternatives would displace between two and 57 businesses, affecting between seven and 339 employees. It is likely that many of the potentially displaced businesses would choose to relocate and that most employees of successfully relocated businesses would continue to be employed at the new locations. A comparison of the potential jobs lost to potential replacement employment opportunities is analyzed below for each alternative. Generally, most of the displaced jobs are not specialized positions, and these employees are likely to be able to find work within the same industry. The Corpus Christi area also has very strong employment conditions. According to the Bureau of Labor Statistics, unemployment in the city of Corpus Christi has been at or below 6 percent since August of 2012. In June 2013 (the most recently released data), the Corpus Christi Metropolitan Statistical Area (MSA) ranked 92nd (top 25 percent) for lowest unemployment rate of the 372 metropolitan areas in the United States tracked by the Bureau of Labor Statistics (BLS) (BLS 2013).

If a build alternative is selected, the construction of a new bridge and associated improvements is estimated to bring upwards of 4,300 jobs to the region. As these positions would be related to the investment in the construction sector, employment effects are expected to last about as long as the construction period for the project (see **Section 4.5.6.1**). TxDOT would also work with the Workforce Solutions of the Coastal Bend (a recipient of grants from the Texas Workforce Commission) to ensure that displaced employees are aware of offerings including career development information, job search resources, and training programs. See **Section 4.7.5** for more discussion of this mitigation opportunity.

<u>Green Alternative</u>

An estimated 57 businesses would be displaced by the Green Alternative. Port Warehouse #9, the covered transfer facility, is an important Port asset that would be displaced by the Green Alternative. This warehouse is located next to warehouse #10, a similarly important facility. In conversation with project planners, the Port has expressed that the loss of both of these facilities would have a substantial impact on operations. Although the Green Alternative would not affect warehouse #10, the loss of warehouse #9, which serves as the primary location for direct ship-to-rail transfers on the north side of the Inner Harbor, including military cargo, would represent a disruption for the Port. As the proposed right of way for the Green Alternative only clips a corner of the covered transfer facility building, it may be possible to maintain the dock and access to the rail line with a smaller building on the site. If the

Hurricane Alley Waterpark, also displaced by the Green Alternative, were unable to find a proximate relocation site, visitor traffic to the downtown area could decrease, although there are several other attractions in the SEA District and in North Beach that would continue to draw visitors to the area. The impact to the Solomon P. Ortiz International Center under the Green Alternative would be limited to the covered plaza. The main meeting and event center building could continue to operate and bring people downtown.

The business displacements of the Green Alternative would affect an estimated 126 to 339 employees (see **Table 4.5-1**). Given the availability of suitable replacement properties (discussed in **Section 4.4.2.1**), it is estimated that most businesses would be able to reestablish nearby, and most unemployment effects would likely be temporary. Should a business elect not to relocate, employees would have to seek employment elsewhere. **Table 4.5-1** shows summary information regarding the number of similar businesses in the city that may be able to provide employment opportunities for displaced workers, as well as the number of advertised jobs in positions associated with the businesses likely to be displaced by the Green Alternative.

Table 4.5-1 Employment Effects Related to Business Displacements - Green Alternative

Business	Type	Community	Employees	Similar Businesses within Community[3]	Similar Businesses within City[3]	Advertised Job Openings[4]
Valero/Stripes Gas Station-E Causeway Boulevard	Gas Station	North Beach	3-5[2]	2	80	81
Brewster Street Ice House	Food Services	South Central	10-20[2]	67	439	57
Daisy Charters and Shuttles	Services	South Central	3	0	3	5
CC Southern Pacific Credit Union	Financial	South Central	4[1]	8	58	23
Howards Bar B Cue	Food Services	South Central	5-9	67	439	57
Hurricane Alley Waterpark	Entertainment	South Central	15-30[2]	0	0	2
International Forum Systems (IFS)	Point of Sale Services	South Central	6	0	3	78
LR Global LLC, Strategic Solutions	Consulting Services	South Central	2	5	36	85
Olszewski Stained Glass Studio Inc	Services	South Central	1-5	1	4	0
Park Tower	Business Park	South Central	40-207*	Varies	Varies	Varies
Red Rover Imaging and Frames	Printing Services	South Central	1-4	1	3	81
Shell Gas Station - Leopard Street	Gas Station	South Central	3-5[2]	5	80	81
V Twin Motorcycle Parts	Auto Services	South	1-4	1	7	22

Table 4.5-1 Employment Effects Related to Business Displacements - Green Alternative						
Business	**Type**	**Community**	**Employees**	**Similar Businesses within Community[3]**	**Similar Businesses within City[3]**	**Advertised Job Openings[4]**
		Central				
Your Sign Company LLC	Services	South Central	8	11	26	81
Rve Inc. Engineering	Services	South Central	17[1]	5	53	13
902 Buffalo Street	Law Services/ Real Estate Services	South Central	5-6[1]	78	411	8
Cliffs Uptown Detail	Auto Services	South Central	1-4	4	14	8
Total	**57**		**126-339**			

Source: 1. Phone interview with the business owner or manager; 2. Estimate; 3. YellowPages.com (accessed June 2013); 4. Indeed.com (accessed July 2013); all others, Manta.com.
*The number of employees potentially affected is based on a range of one employee per office up to a ratio of 250 square feet per employee.

For this evaluation, each of the businesses that are similar to potentially displaced businesses was considered available as a potential employment location for the employees of displaced businesses identified in this study. As illustrated in **Table 4.5-1**, it appears that most potentially displaced employees would be able to find new employment in the area within a reasonable time, based on the number of similar businesses that could be available for employment and the number of advertised job openings in the categories of jobs potentially displaced, which are predominantly service sector jobs associated with retail, recreation, and tourism. Detailed information is not provided for each of the 41 tenants in the Park Tower office building; as analyzed in **Section 4.4.2.1**, it is anticipated that these tenants would be able to be accommodated in other spaces for lease in the Corpus Christi office market. While employment opportunities for lifeguards appear to be limited based on advertised openings, employees of the Hurricane Alley Waterpark include positions aside from lifeguard, including sales positions and cashiers, which have many more advertised openings. These jobs are also likely to be seasonal.

Red Alternative (Preferred)

Approximately three businesses would be displaced by the Red Alternative (the Preferred Alternative), and substantial economic effects would not be expected if they chose not to relocate. The Red Alternative would also displace three structures owned by the Port of Corpus Christi, including Port Warehouses #10 (cold storage facility), #26 and #27. The cold storage facility is currently vacant, and warehouses #26 and #27 are being utilized for sand storage. While warehouse #10 is an important Port asset with unique amenities, the other facility described as an integral property by the Port, warehouse #9, would remain under the Red Alternative. Substantial impacts to Port operations or the area economy due to the displacement of warehouse #10, #26, and #27 would not be anticipated.

The business displacements of the Red Alternative would affect an estimated seven to 15 employees (see **Table 4.5-2**). Given the availability of suitable replacement properties (discussed in **Section 4.4.2.1**), it is estimated that most businesses would be able to reestablish nearby, and most unemployment effects would likely be temporary. Should a business elect not to relocate, employees would have to seek employment elsewhere. **Table 4.5-2** also provides summary information regarding the number of similar businesses in the city that may be able to provide employment opportunities for displaced workers, as well as the number of advertised jobs in positions associated with the businesses likely to be displaced by the Red Alternative.

Table 4.5-2 Employment Effects Related to Business Displacements - Red Alternative

Business	Type	Community	Employees	Similar Businesses in Community[2]	Similar Businesses within City[2]	Advertised Job Openings[3]
Valero/Stripes Gas Station-E Causeway Boulevard	Gas Station	North Beach	3-5[1]	2	80	81
Shell Gas Station - Leopard Street	Gas Station	South Central	3-5[1]	5	80	81
Olszewski Stained Glass Studio Inc	Services	South Central	1-5	1	4	0
Total	**3**		**7-15**			

Source: 1. Estimate; 2. YellowPages.com (accessed June 2013); 3. Indeed.com (accessed July 2013); all others, Manta.com.

Based on a comparison of the potential jobs lost to the number of similar establishments in the city and advertised job openings, it is anticipated that employees of businesses displaced by the Red Alternative would be able to find alternate employment. Regarding the glass studio, it could be assumed that some of these employees perform administrative tasks not specific to the stained glass industry, and it would likely not be difficult to find employment elsewhere, should Olszewski Glass Studio choose not to relocate. According to yellowpages.com, there are four other businesses in Corpus Christi categorized as "Glass-Stained & Leaded." These other businesses could potentially provide employment opportunities for the small number of potentially displaced employees seeking to remain in that industry.

Orange Alternative

Ten businesses are estimated to be displaced by the Orange Alternative. With the potential exception of the Hurricane Alley Waterpark, and Port Warehouse #9, none of the displacements under the Orange Alternative would have particularly substantial economic effects for the community if they chose not to relocate. As noted in the discussion of the Green Alternative above, the loss of Port Warehouse #9 would represent an economic difficulty for the Port, including a potential effect to the Strategic Military Port designation. The Orange Alternative would affect slightly more of the warehouse building than would the Green Alternative; it may still be possible to maintain access to the dock and rail with a smaller building on this site. If the water park is unable to find a proximate relocation site, visitor traffic to the downtown area could decrease, although there are several other attractions in the SEA District

and in North Beach that would continue to bring visitors to the area. The right of way to be acquired for the Orange Alternative would include the Jim Wells Room, the audio visual booth, and potentially part of the Nueces Room of the Solomon P. Ortiz International Center. The bridge would be much higher than the building at this location, but even if the portion of the Ortiz Center inside the right of way must be removed, the majority of the building would remain. It is assumed that this meeting and event center could continue to operate and draw people downtown.

The displacements required by the Orange Alternative would affect between 57 and 103 employees (see **Table 4.5-3**). Given the availability of suitable replacement properties (discussed in **Section 4.4.2.1**), it is estimated that most businesses would be able to reestablish nearby, and most unemployment effects would be temporary. Should a business elect not to relocate, employees would have to seek employment elsewhere. **Table 4.5-3** shows summary information regarding the number of similar businesses in the city that may be able to provide employment opportunities for displaced workers, as well as the number of advertised jobs in positions associated with the businesses likely to be displaced by the Orange Alternative.

Table 4.5-3 Employment Effects Related to Business Displacements - Orange Alternative

Business	Type	Community	Employees	Similar Businesses in Community[3]	Similar Businesses within City[3]	Advertised Job Openings[4]
Texaco Gas Station - Seagull Boulevard	Gas Station	North Beach	3-5[2]	1	80	81
Valero/Stripes Gas Station-E Causeway Boulevard	Gas Station	North Beach	3-5[2]	1	80	81
Keystone Automotive	Auto Services	South Central	11[1]	4	7	22
Batter's Box Training Camp	Baseball Training	South Central	1-5	0	2	5
Shell Gas Station - Leopard Street	Gas Station	South Central	3-5[2]	5	80	81
Crocker Moving & Storage	Services	South Central	10-19	3	7	197
Hurricane Alley Waterpark	Entertainment	South Central	15-30[2]	0	0	2
Olszewski Stained Glass Studio Inc	Services	South Central	1-5	1	4	0
Unity Chapel Funeral Home	Services	Northside	5-9	0	22	1
Blue Monday	Food Services	Northside	5-9	0	439	57
Total	**10**		**57-103**			

Source: 1. Phone interview with the business owner or manager; 2. Estimate; 3. YellowPages.com (accessed June 2013); 4. Indeed.com (accessed July 2013); all others, Manta.com.

Based on a comparison of the potential jobs lost to the number of similar establishments in the city and advertised job openings, it is anticipated that employees of businesses displaced by the Orange

Alternative would be able to find alternate employment (see discussion of potential effects to employees of the Hurricane Alley Waterpark and the Olszewksi Stained Glass Studio under the Green and Red Alternatives, respectively).

West Alternative

Two businesses are estimated to be displaced by the West Alternative, including a gas station and an office complex owned by the CITGO refinery. The displacement of the gas station by the West Alternative would not cause measurable economic effects if it chose not to relocate. As discussed in **Section 4.4.2.1**, it is expected that CITGO would relocate their business office, and refinery operations would not be substantially affected.

The displacements required by the West Alternative would affect between 103 and 105 employees (see **Table 4.5-4**). Given the availability of suitable replacement properties (discussed in **Section 4.4.2.1**), it is estimated that the businesses would be able to reestablish nearby, and most unemployment effects would likely be temporary. Should a business elect not to relocate, employees would have to seek employment elsewhere. **Table 4.5-4** shows summary information regarding the number of similar businesses in the city that may be able to provide employment opportunities for displaced workers, as well as the number of advertised jobs in positions associated with the businesses likely to be displaced by the West Alternative.

Table 4.5-4 Employment Effects Related to Business Displacements - West Alternative

Business	Type	Community	Employees	Similar Businesses in Community[2]	Similar Businesses within City[2]	Advertised Job Openings[3]
Valero/Stripes Gas Station-E Causeway Boulevard	Gas Station	North Beach	3-5[1]	2	80	81
CITGO Corpus Christi Refinery Office Complex	Industrial	Northside	100	0	7	87
Total	**2**		**103-105**			

Source: 1. Estimate; 2. YellowPages.com (accessed June 2013); 3. Indeed.com (accessed July 2013); all others, Manta.com.

Based on a comparison of the potential jobs lost to the number of similar establishments in the city and advertised job openings, it is anticipated that employees of businesses displaced by the West Alternative would be able to find alternate employment.

4.5.2.2 Impacts of the No Build Alternative

Under the No Build Alternative, no new right of way would be acquired, no businesses or industrial structures would be displaced, and there would be no economic effects to businesses or employees.

4.5.3 Economic Impacts Related to Changes in Access

4.5.3.1 Impacts of the Build Alternatives

Each of the build alternatives would include a crossing of the Inner Harbor in a new location and the reconstruction of the interchanges at I-37/Crosstown Expressway and US 181/I-37. See **Section 2.4.1** for a detailed description of the build alternatives and a narrative description of changes in access. The build alternatives would generally result in changes in access which in many cases would result in increased exposure and improved access for businesses along frontage roads.

The build alternatives have several common changes in access. In the North Beach area, the existing US 181 allows northbound drivers to exit at Burleson Street and Gulfspray Avenue; southbound drivers may exit at Beach Avenue and Burleson Street. Under all of the build alternatives, the only northbound exit would be at Beach Avenue (north of both current northbound exits); southbound exits would remain at Beach Avenue and Burleson Street. For businesses located on the southern end of North Beach, including the Texas State Aquarium and the USS *Lexington* museum, this change in access would mean a longer and more circuitous route for patrons coming from Corpus Christi. Businesses sited along Timon Boulevard, however, could benefit from increased traffic visibility and access.

The build alternatives also each propose the closure of the northbound entrance ramp to US 181 at Elm Street and the southbound entrance ramp to US 181 at Burleson Street in North Beach. These closures mean that northbound travelers, including trucks, along US 181 wishing to access the Joe Fulton Corridor would exit at Beach Avenue and make a U-turn, instead of exiting at Burleson Street to make the connection. Similarly, drivers wishing to access US 181 from the Joe Fulton Corridor would travel north to Beach Avenue to make a U-turn to access the southbound entrance ramp or travel further north to access the northbound entrance ramp near Enchanted Harbor Drive. While the reduction in the number of entrances and exits would result in less direct travel patterns for some drivers, including trucks utilizing the Joe Fulton Corridor, these changes are not expected to have substantial economic impacts.

On the west side of the Crosstown Expressway, Antelope Street east of Peabody Avenue would be replaced by an eastbound I-37 frontage road under all of the build alternatives. The portion of Antelope Street curving southeast would be removed; businesses along Leopard Street east of Doss Street would lose roadway frontage and access on one side of their properties. Access to the businesses would be preserved, however, along Leopard, Doss, and Cleveland Streets under all of the build alternatives.

Travel-time modeling was conducted by URS (201b3) for the proposed project that compared the No Build Alternative to each of the proposed build alternatives in 2040. The travel time assumptions include the use of the current Corpus Christi MPO model (base year 1996) with demographic data provided by TxDOT Transportation Planning and Programming Division (TPP) in June 2012 and developed by CDM Smith. Travel time estimations are based on loaded networks of each scenario and do not account for peak-hour travel. The results of this modeling are presented below in **Table 4.5-5**.

Positive numbers represent a longer travel time when compared to the No Build Alternative in 2040, while negative numbers represent a time savings.

Additionally, all of the build alternatives would involve the re-designation of several city streets as highway service roads. Affected streets include Antelope Street, Brownlee Boulevard, Buffalo Street/Martin Luther King Drive, Causeway Boulevard, and Culberson Street. Businesses along these streets may experience minor inconveniences related to changes in address. The TxDOT RAP would provide assistance in covering expenses related to address changes.

Green Alternative

Primary changes in access in the North Beach area for the Green Alternative are common to all of the build alternatives and are discussed above. Moving south of the Inner Harbor, Hughes, Fitzgerald, Palo Alto, Power, and Belden Streets would all be extended under US 181 to connect with Tancahua Street to the west. As the current eastern terminus of these streets is the one-way northbound N. Broadway Street, the connection to two-way Tancahua Street would provide a new southbound route. These additional connections represent increased accessibility for the businesses in this area.

Along I-37, the eastbound exit for N. Port Avenue would be moved west approximately 0.3 miles and the next exit for local traffic would be at Broadway Street instead of Artesian Street, routing local travelers along the frontage road rather than through the I-37 main lanes for some distance. This change in access would result in increased drive-by exposure for the businesses located along the eastbound frontage road.

On the Crosstown Expressway northbound, the exits to Leopard and Comanche Streets would be closed under the Green Alternative, making the Agnes/Laredo Street exit the last northbound exit. This earlier exit would allow for increased drive-by exposure for the businesses located along the northbound Crosstown Expressway frontage between Morris and Leopard Streets.

Red Alternative (Preferred)

General changes in access in the North Beach area for the Red Alternative (the Preferred Alternative) are the same as the other build alternatives and are discussed at the beginning of this section. South of the Inner Harbor, under the Red Alternative, the current alignment of US 181 parallel to Broadway Street would be removed and replaced with an at-grade, two-way boulevard section (Broadway Boulevard), extending from approximately Belden Street to Hirsch Street. Hirsch, Brewster, Power, and Belden Streets would all connect to Tancahua Street across the boulevard. As the current western terminus of these streets is the one-way northbound N. Broadway Street, the proposed boulevard section would provide additional east-west connectivity in this area along with a new southbound route. Additionally, the Red Alternative would allow both Carancahua and Tancahua Streets to extend across the I-37 main lanes, providing a new north-south connection to Broadway Boulevard. These routes

Table 4.5-5 Modeled Differences in Travel Time by Alternative

From/Origin	To/Destination	Travel Time (minutes)									
		Existing (2010)	No Build (2040)	Green (2040)		Red (2040)		Orange (2040)		West (2040)	
		Time (minutes)		Time	Difference	Time	Difference	Time	Difference	Time	Difference
I-37 @ Up River Rd	I-37 @ Shoreline Blvd	4.5	4.6	4.5	0.0	4.5	0.0	4.6	0.0	4.5	0.0
I-37 @ Up River Rd	Morgan Avenue and Prescott/17th	5.1	5.2	5.4	+0.1	5.2	-0.1	5.2	-0.1	5.2	0.0
I-37 @ Up River Rd	Beach Avenue and Causeway Blvd	8.1	8.1	6.4	-1.7	7.3	-0.7	7.4	-0.7	6.4	-1.7
Beach Avenue and Causeway Blvd	Morgan Avenue and Prescott/17th	7.2	7.2	7.9	+0.7	6.6	-0.6	6.8	-0.4	7.9	+0.7
Beach Avenue and Causeway Blvd	I-37 @ Shoreline Blvd	4.8	4.7	7.6	+2.9	7.4	+2.7	8.2	+3.5	7.6	+2.9
I-37 @ Up River Rd	Texas State Aquarium parking lot	8.6	8.0	8.9	+0.8	8.9	+0.8	9.7	+1.6	8.9	+0.8
Morgan Avenue at SHE 286	Texas State Aquarium parking lot	7.8	7.3	10.4	+3.1	9.4	+2.1	6.6	-0.7	10.4	+3.1
I-37 @ Shoreline Blvd	Texas State Aquarium parking lot	5.1	4.5	10.1	+5.6	9.8	+5.3	8.9	+4.4	10.1	+5.6
Portland (Daniel Moore Ave and Center Dr)	I-37 @ Shoreline Blvd	12.1	12.1	15.3	+3.2	14.8	+2.8	14.7	+2.6	15.3	+3.2
Portland (Daniel Moore Ave and Center Dr)	CHRISTUS Spohn Hospital Memorial	14.9	14.6	15.6	+1.1	14.5	-0.1	14.6	0.0	15.2	+0.6

Source: US 181 Harbor Bridge EIS Team 2013

would facilitate accessibility and would be beneficial for businesses and tourism activity in the downtown area and the SEA District.

Like the Green Alternative, the movement of the exit for N. Port Avenue along eastbound I-37 further west under the Red Alternative would route travelers along the frontage road and result in increased drive-by visibility for businesses. The removal of the direct ramp from the Crosstown Expressway northbound and eastbound I-37 under the Red Alternative would require traffic heading downtown from the Crosstown Expressway to exit at Leopard Street and take the eastbound frontage road or Leopard Street east. This change, along with the closure of the Lipan/Comanche Street exit from the Crosstown Expressway northbound would route more traffic along frontage roads, providing opportunities for exposure to area businesses.

Orange Alternative

Primary changes in access in the North Beach area for the Orange Alternative are common to all of the build alternatives and are discussed above. The Orange Alternative proposes the same at-grade, two-way Broadway Boulevard concept with connections to Carancahua and Tancahua Streets across I-37 as described in the Red Alternative. The improved access and additional north-south route would be beneficial for area businesses. Like the Red Alternative, the Orange Alternative would also remove the direct ramp between the Crosstown Expressway northbound and eastbound I-37 and close the northbound Lipan/Comanche Street exit from the Crosstown Expressway, resulting in potential increased traffic visibility and access benefits for nearby businesses along the frontage road.

West Alternative

The West Alternative proposes a crossing of the Inner Harbor approximately 1.3 miles to the west of the current bridge, while the other build alternatives would propose a new bridge within 1,000 feet of the existing bridge. See **Section 4.5.3.1** above for a discussion of potential "bypass" effects associated with the West Alternative.

General changes in access in the North Beach area for the West Alternative are the same as the other build alternatives and are discussed at the beginning of this section. Like the Red and Orange Alternatives, the West Alternative proposes the same at-grade, two-way Broadway Boulevard concept with connections to Tancahua Street across the boulevard at Hirsch, Brewster, Power and Belden Streets and connections to Carancahua and Tancahua Streets across I-37. The improved access and additional north-south route would be beneficial for area businesses.

Along I-37, the West Alternative would close the current eastbound exit to N. Port Avenue. Drivers would instead exit west of Buddy Lawrence Boulevard. This change would result in traffic being directed to the frontage road for an additional mile and represents increased exposure for businesses located along or visible from the frontage road. Like the Red and Orange Alternatives, the West Alternative would remove the direct ramp between the Crosstown Expressway northbound and eastbound I-37 and

close the northbound Lipan/Comanche Street exit from the Crosstown Expressway, resulting in potential increased traffic visibility and access benefits for nearby businesses along the frontage road.

4.5.3.2 Impacts of the No Build Alternative

Under the No Build Alternative, a new bridge would not be constructed and no roadway improvements would be made. There would be no changes in access from the current condition.

4.5.4 Economic Impacts Related to Major Employers

4.5.4.1 Impacts of the Build Alternatives

The build alternatives are not anticipated to affect any of the major employers identified in **Section 3.4.4**. None of these businesses would experience property acquisitions or displacements under any of the alternatives, and the proposed designs would not cause substantial changes in access or travel patterns that could have an adverse effect on these businesses. Although the Green Alternative could make accessing City Hall more circuitous, the changes in access are not anticipated to affect business conducted there. The City of Corpus Christi is a major employer, and the City's primary office space is located in City Hall, at the intersection of Leopard Street and Alameda Street in the project area. Under the Green Alternative, employees traveling to City Hall from eastbound I-37 would either exit I-37 at Peabody Street or Mesquite Street. Travelers from the Crosstown Expressway northbound would exit at Agnes/Laredo Street, instead of Leopard Street. Under the Green Alternative, drivers accessing City Hall may spend more time on frontage roads and local streets than highways as compared to the current condition and the other alternatives, which provide an exit from eastbound I-37 at Alameda Street as well as an exit to Leopard Street from the Crosstown Expressway.

Although the Port of Corpus Christi Authority itself is not a major employer, effects on Port properties are discussed in **Section 4.5.4.1**. Effects to Port operations and Port tenants would primarily be related to navigation impacts, which are discussed in **Section 4.2.4**. Effects related to emergency vehicle access to CHRISTUS Spohn Memorial Hospital near Morgan Avenue are discussed in **Section 4.6.4.5.**

4.5.4.2 Impacts of the No Build Alternative

Under the No Build Alternative, no land would be acquired, no businesses would be displaced, and no changes in access would occur. Therefore, impacts to major employers are not anticipated under the No Build Alternative.

4.5.5 Economic Impacts to Related to Tax Revenues and Public Expenditures

4.5.5.1 Impacts of the Build Alternatives

The build alternatives would require acquisitions of between approximately 20.6 to 30.1 acres of land that are not tax-exempt properties. The build alternatives would remove the remaining acreage of land from the tax rolls, representing an estimated $72,478 to $153,398 in annual taxes paid to various jurisdictions, including the City of Corpus Christi, Nueces County, and Corpus Christi Independent School

District (see **Table 4.5-6**). This value was estimated by multiplying the total 2013 taxes by the percentage of land to be acquired for each affected parcel, according to data published by Nueces County Central Appraisal District (CAD).

Table 4.5-6 Estimated Annual Loss of Tax Revenue by Alternative

	Non-Tax-Exempt Acres to be Converted to Transportation Use	Estimated Loss in Tax Revenue
Green Alternative	23.7	$101,087
Red Alternative	20.6	$72,478
Orange Alternative	25.7	$153,398
West Alternative	30.1	$119,477

Source: US 181 Harbor Bridge Team 2013; Nueces CAD 2013

It is anticipated that most businesses would choose to relocate and would also choose to relocate within Corpus Christi; the table above does not reflect the effects of likely taxable reinvestment elsewhere in the city. Additionally, the build alternatives could contribute to making other parcels that would not be affected by displacements or acquisitions more attractive for development or redevelopment; such activities could potentially increase assessed values and tax revenues.

Preliminary construction and maintenance cost estimates for the build alternatives are presented below in **Table 4.5-7**. These figures are exclusive of the costs of right of way acquisition and the adjustment of utilities.

Table 4.5-7 Preliminary Cost Estimates by Alternative (2013$)

	Construction Cost	Maintenance Cost*
Green Alternative	$557,530,443	$19,247,228
Red Alternative	$636,527,734	$27,903,876
Orange Alternative	$629,819,315	$22,249,427
West Alternative	$679,131,890	$27,627,600

Source: URS Corporation 2013c
* Based on 75-year design life

The Green Alternative would require the least expenditure of public funds, while the West Alternative would require the most.

4.5.5.2 Impacts of the No Build Alternative

The No Build Alternative would not convert any currently taxable land to transportation use. The No Build Alternative would not require the expenditure of public funds to construct a new bridge and related improvements. Continued maintenance of the existing structure would still be required, however. A cost analysis, completed in 2012 for TxDOT's Bridge Division, found that extending the service life of the current Harbor Bridge to 2086 would cost an estimated $279,471,206 in 2012 dollars (or $401,430,000 using probable 2012 net present value).

4.5.6 Regional Economic Impacts from Construction

4.5.6.1 Impacts of the Build Alternatives

All of the build alternatives would affect the local and regional economies due to employment, both construction-related and long-term, and income benefits. Generalizations about the proposed project's economic effects can be made using the U.S. Department of Commerce Bureau of Economic Analysis RIMS II Multipliers. Industry-specific final-demand multipliers (in this case, Construction) are provided in order to estimate the total change in output (sales), household earnings, and employment (full- and part-time jobs) per dollar of final-demand change (cost of the project). When multiplied by the proposed project's estimated construction cost ranging from approximately $558M to $679M, the RIMS II multipliers produce an estimated direct household earnings effect ranging from $208M to $254M and an estimated 4,303 to 5,242 new jobs. As these positions would be related to the investment in the construction sector, employment effects are expected to last about as long as the construction period for the project. **Table 4.5-8** provides a comparison of these effects resulting from the various proposed build alternatives. **Section 6.5.1.1** provides further information on the indirect and induced effects on output, earnings, and employment.

Table 4.5-8 Direct Economic Effects of the Proposed Alternatives

	Green	Red	Orange	West
Construction Cost ($)	557,530,443	636,527,734	629,819,315	679,131,890
Earnings ($)	208,119,688	237,608,467	235,104,291	253,512,107
Employment (jobs)	4,303	4,913	4,861	5,242

Source: U.S. Bureau of Economic Analysis, RIMS II Multiplier System, Table 2.5, 2010 Total Multipliers for Output, Earnings, and Employment, by Industry Aggregation for Nueces and San Patricio County, Texas (Types I and II).

4.5.6.2 Impacts of the No Build Alternative

Under the No Build Alternative, the proposed project would not be constructed, and the region would not recognize the economic benefits from the investment in construction industry.

4.6 COMMUNITY IMPACTS

This analysis focuses on the communities with potential to be directly or indirectly affected by the project. FHWA guidance (1996) identifies a variety of impact types that may apply to communities, either singly or as interrelated effects. These impact types include: displacements; mobility and access; social and psychological; physical; provision of public services; visual; land use; economics; and safety. An analysis of land use impacts, economic impacts, and visual and aesthetic impacts are provided in **Section 4.1**, **Section 4.5**, and **Section 4.20**, respectively, and are summarized in the tables following the discussion of each individual community below (see **Figure 3.5-4** for a map depicting community boundaries). General population and demographic characteristics, such as ethnicity and race, income and poverty rate, and employment status are described for each community in **Section 3.5.3**. Environmental Justice is addressed in **Section 4.7** and Children's Health is addressed in **Section 4.8**.

Social and psychological impacts include changes to: population, isolation, social values, community cohesion, and quality of life (FHWA 1996). Physical impacts may include intrusions in the landscape, noise impacts, and the "barrier effect," which refers to conditions that discourage connectivity in ways which may be tangible or perceived. Scholarly studies of the barrier effect in relationship to transportation projects have drawn a distinction between the "barrier effect" and "severance" (Handy 2002). While a barrier effect may be associated with improvements to an existing transportation facility that already divides a community, the term "severance" refers to cutting off existing connections (Handy 2002).

The potential community impacts related to the Harbor Bridge project have played a strong role in defining the project in the early phases of project development. Stakeholder and public involvement has been an integral part of the planning and engineering studies undertaken for the proposed project and has identified community concerns and resources that have been taken into account by project planners and engineers. See **Section 3.5.3** and **Section 8.0** for further detail regarding community meetings held for the proposed project and public involvement, respectively.

This analysis is organized by individual community, corresponding with the communities described in **Section 3.5.3**. The potential for each type of impact to occur for each community is then evaluated by alternative. Impacts to a community which may be common to all of the alternatives are presented first, followed by an evaluation of each alternative's unique impacts. Some categories of impacts would also be the same for all build alternatives in all communities. For example, all of the build alternatives would improve safety for the traveling public in the project area, as the design for each of the proposed alternatives would bring the roadway up to current FHWA and TxDOT design standards. Improvements to pedestrian and bicycle accommodations along US 181 are also proposed for all build alternatives, thus improving safety for those users as well.

4.6.1 North Beach

4.6.1.1 Displacement Impacts

For the North Beach neighborhood, the residential displacements required by each build alternative would range from one to nine homes, while commercial displacements would range from two to four businesses. Displacement impacts are discussed in detail by alternative in **Section 4.4**. Under the Green, Red, and Orange Alternatives, finding replacement housing for displaced North Beach residents may be difficult. If no replacement housing is available within the financial means of displaced residents, TxDOT would provide supplemental housing payments to ensure all displaced residents are relocated to decent, safe and sanitary housing. All of the build alternatives would displace the Valero/Stripes gas station at Surfboard Avenue and E. Causeway Boulevard. Based on available commercial real estate, it is assumed that these displaced businesses would be able to relocate within the community. As there are two other gas stations and three other convenience stores in North Beach, these displacements would not adversely affect the community, even if these businesses chose not to relocate.

Green Alternative

The Green Alternative would displace nine single-family homes in North Beach (see **Displacements Plate G-1** in **Appendix H**). Six homes are located between Burleson Street and Elm Street, and three homes are located on Bridgeport Avenue at Surfside Boulevard. The homes are situated in small groups of two to three structures located within an approximately 0.3 mile stretch of proposed right of way. The homes are not part of an identified neighborhood; there are few single-family homes in the North Beach area outside of the Harbors community. All of the homes to be displaced have an assessed value of less than $66,000. Based on real estate market data gathered in June 2013, the housing available for sale in this price range in North Beach is limited to one-bedroom condominiums. Finding existing replacement housing within the community may therefore be difficult.

Commercial displacements would be limited to the Valero/Stripes gas station (see **Displacements Plate G-1** in **Appendix H**). The proposed right of way of the Green Alternative also clips the eastern corner of the Port of Corpus Christi's Warehouse #9. Whether or not this site is able to be maintained as a cargo dock/rail transfer facility is not anticipated to have an effect on the North Beach community.

Red Alternative (Preferred)

The Red Alternative (the Preferred Alternative) would displace two single-family homes in North Beach, both on E. Causeway Boulevard (see **Displacements Plate R-1** in **Appendix H**). The homes are not within a neighborhood setting and are located in the same, relatively undeveloped area as three of the homes to be displaced under the Green Alternative. A comparison of the assessed value of the homes to be displaced with current market availability indicates that finding replacement housing in North Beach may be difficult.

Although the Red Alternative would displace the Valero/Stripes canopy and gas pumps, it would not affect the Stripes convenience store on the eastern side of the parcel (see **Displacements Plate R-1** in **Appendix H**). The Red Alternative would displace the Port's Warehouse #10 (Refrigerated Distribution Center). Although this is an important facility for the Port, the loss of this warehouse would not adversely impact the North Beach community.

Orange Alternative

The Orange Alternative would displace five of the same single-family homes as the Green Alternative (see **Displacements Plate O-1** in **Appendix H**). The Gulfview Suites, a rental property located on the corner of Seagull Boulevard and Churchdale Avenue, would also be displaced by the Orange Alternative. The property has 12 units, offering extended-stay and seasonal rentals. There are many rental units available throughout the North Beach community that could serve as replacement options for tenants; therefore, no substantive community impacts would be associated with the loss of the Gulfview Suites.

Similar to the Red Alternative, the Orange Alternative would displace the canopy and gas pumps on the Valero/Stripes parcel but would not affect the Stripes convenience store on the eastern side of the lot

(see **Displacements Plate O-1** in **Appendix H**). In addition, the Orange Alternative would also displace the Texaco gas station on Seagull Boulevard. The Valero station and convenience store at Beach Avenue would remain to serve the North Beach community. If the affected gas stations were not to relocate within the North Beach community, no substantive adverse impact to the community would be anticipated. Like the Green Alternative, the Orange Alternative would potentially displace the Port of Corpus Christi's Warehouse #9. As discussed above, the displacement would not affect the North Beach community.

West Alternative

The West Alternative would not require any residential displacements in the North Beach community. Like all the build alternatives, the West Alternative would displace the Valero/Stripes gas station (see **Displacements Plate W-1** in **Appendix I**). As noted above, because there are multiple gas stations in the area, the loss of this business would not represent an adverse impact to the community.

No Build Alternative

The No Build Alternative would not require any residential or business displacements.

4.6.1.2 Mobility and Access Impacts

All of the build alternatives have very similar designs in terms of access in the North Beach area. The existing northbound exit to Burleson Street would be removed, and the exit from northbound US 181 would be to Beach Avenue. The two existing southbound exits would remain, providing access to Beach Avenue and Burleson Street. The build alternatives also each propose the closure of the northbound entrance ramp to US 181 at Elm Street and the southbound entrance ramp to US 181 at Burleson Street. North Beach residents and business leaders expressed concern at the North Beach Community Meeting (held September 20, 2012) about the potential mix of residential, tourism, and industrial traffic and the congestion that would result at Beach Avenue from the elimination of the Burleson Street exit. Project engineers took these concerns into account and have ensured that the southbound exit to Burleson Street from US 181 remains, allowing truck traffic to exit US 181 there instead of at Beach Avenue. All northbound traffic exiting to North Beach would utilize the single Beach Avenue exit.

Access for residents living north of Beach Avenue, including the Harbors subdivision and Puerto del Sol RV Park, would remain relatively unchanged. Residents living south of Beach Avenue would travel farther north to exit northbound US 181 and to enter southbound US 181, rather than utilizing Burleson Street, as is the case with the existing facility.

Travel-time modeling was conducted for the proposed project that compared the No Build Alternative to each of the proposed build alternatives in 2040 (see **Table 4.5-5**). Based on this modeling, the time it would take to travel from I-37 at Up River Road to the intersection of Beach Avenue and Causeway Boulevard using any of the proposed build alternatives would be faster than with the No Build Alternative. Traveling from Beach Avenue and Causeway Boulevard south to Morgan Avenue using the

Red and Orange Alternatives would be between 24 and 36 seconds faster than using the existing route under the No Build Alternative, while the Green and West Alternatives would take approximately 42 seconds longer. Traveling from Beach Avenue and Causeway Boulevard to the intersection of I-37 and Shoreline Boulevard downtown would take between 2.9 and 3.5 minutes longer with the build alternatives. The trip from I-37 at Shoreline Boulevard to the Texas State Aquarium would take between 4.4 and 5.6 minutes longer with the build alternatives; this route represents the largest difference in travel times between the build alternatives and the No Build Alternative for the 2040 modeled routes. In this case, the travel time for each of the build alternatives would be very similar, with the Orange Alternative representing the fastest build alternative route.

Green, Red (Preferred), and Orange Alternatives

Although the Green, Red (Preferred), and Orange Alternatives would close all or parts of W. Causeway Boulevard, Walnut Street, Plum Street, or Elm Street, much of the land in this area would be acquired for right of way and local traffic patterns in North Beach not related to travel on US 181 would not be affected. On average, all of the build alternatives would require slightly longer travel times to and from destinations in North Beach as compared to the No Build Alternative, based on the 2040 routes modeled. The Orange Alternative route is slightly faster than the Red Alternative, and the Green and West Alternatives are almost equal.

West Alternative

Under the West alternative, US 181 would be routed away from downtown and to the west, requiring traffic to connect to I-37 to gain access to the downtown area. Aside from the removal of ramps associated with the existing US 181, the West Alternative would leave North Beach streets intact; closures of parts of W. Causeway Boulevard, Walnut Street, Plum Street, or Elm Street would not be required. Like all of the build alternatives, the West Alternative would slightly increase travel time for residents of the North Beach community accessing downtown Corpus Christi and the SEA District relative to the No Build Alternative. As noted above, modeling indicates that travel times to and from destinations in North Beach would be relatively similar under all of the build alternatives.

No Build Alternative

Under the No Build Alternative, a new bridge would not be constructed and no roadway improvements would be made. There would be no changes in access from the current condition. According to the modeling, travel times to and from North Beach would actually decrease slightly over time from 2010 to 2040 under the No Build Alternative. This improvement is attributed to other transportation projects assumed to be undertaken elsewhere in the transportation network by 2040.

4.6.1.3 Physical Impacts

The Inner Harbor has physically divided North Beach from the rest of Corpus Christi from its earliest development, and US 181 has physically divided North Beach itself since 1959, when the Harbor Bridge was constructed. All of the build alternatives would maintain this separation from the rest of the city,

and the bridge structure would be more prominent on the landscape. The proposed new structure would be higher and the portion that is elevated would extend further north than the existing facility. Each of the build alternatives would add a dedicated bicycle and pedestrian shared use path to the bridge, which would serve to increase connectivity for pedestrians and bicyclists between North Beach and the downtown area south of the Inner Harbor.

Regarding traffic noise (discussed in detail in **Section 4.10**), modeling indicates that all of the build alternatives would result in a traffic noise impact over the FHWA Noise Abatement Criteria (NAC) at the Rincon Channel Wetlands Interpretive Overlook. Noise abatement measures were considered as part of the analysis and determined not to be reasonable and feasible for the North Beach community. (See **Section 4.10** for detailed discussion of the traffic noise analysis).

Green and Orange Alternatives

Under the Green and Orange Alternatives, the separation south of Burleson Street would largely remain due to the presence of the US 181 facility close to its existing alignment. Over time, development west of the existing US 181 and south of Burleson Street has waned. The Green and Orange Alternatives would require the displacement of most of the few remaining structures in this area. In addition to the removal of these structures, the reinforcement of this barrier could discourage future development in this area.

The Green Alternative would result in a traffic noise impact to one residential receiver in the North Beach neighborhood (see **Noise Plate G-1** in **Appendix I**). The Orange Alternative would impact 16 residential receivers (see **Noise Plate O-1** in **Appendix I**).

Red (Preferred) and West Alternatives

Under the Red (Preferred) and West Alternatives, the shifting of US 181's path to the west would remove the existing barrier of US 181 in the southern portion of North Beach. Because of the dearth of existing development west of US 181 in this area, the Red and West Alternatives represent a future opportunity for development that could be more closely linked with the more established part of North Beach to the east rather than a reconnection of two separated communities. Compatibility of the alternatives with future land use planning in North Beach is addressed in **Section 4.1.2**.

The Red Alternative would result in noise impacts to nine residential receivers in North Beach (see **Noise Plate R-1 in Appendix I**). The Red Alternative would also result in a greater than 10 dBA impact to the Our Lady Star of the Sea Catholic Church. The West Alternative would impact one residential receiver in North Beach (see **Noise Plate W-1** and **9 in Appendix I**).

No Build Alternative

The No Build Alternative would perpetuate the separation stemming from the presence of US 181, and the separation from the areas south of the Inner Harbor would remain. The connectivity between these

two areas would not be improved with pedestrian and bicycle facilities on the bridge. Noise levels would not increase.

4.6.1.4 Social and Psychological Impacts

Important characteristics of North Beach as identified in the community survey (see **Section 3.5.3.1**) primarily relate to proximity to the beach, water views, and accessibility to downtown. North Beach is a cohesive community. Approximately 20 percent of residents moved to the area before 1969, and many people are actively engaged in the Corpus Christi Beach Association. With regards to the proposed project, North Beach respondents to the survey rated increased traffic noise as the potential negative effect of the most concern, followed by changes in vehicular access, and displacements. Of lesser concern were the possibility of some residents moving away and pedestrian improvements. Potential benefits that rated as most important to North Beach residents were a sense of safety when using the bridge and improved efficiency for hurricane evacuations. All of the build alternatives would address equally the project benefits considered most important by the North Beach community, while the alternatives differ with respect to the potential for perceived negative outcomes to occur.

Build Alternatives

The historic vulnerability of the North Beach area to natural disaster has influenced development patterns (see **Section 3.5.3.1**). Once an area with many single-family homes and a substantial residential presence, fewer and fewer homes have been rebuilt following hurricane and flood events. Most residents live in condominiums or RVs; outside of the Harbors subdivision, there are few single-family houses in North Beach. While the build alternatives are not expected to cause substantial changes in population distribution (residential relocations range from zero to nine homes), the displacements would nonetheless contribute to the reduction of single-family homes in North Beach. The Green Alternative would require the most residential displacements (nine) and the West Alternative would require no residential displacements.

In stakeholder and community meetings held in North Beach, both local business owners and residents expressed feeling some degree of isolation due to the geographic separation of the area from the rest of Corpus Christi. Many who live and work in North Beach feel that the current bridge can be a barrier over which some people are reluctant to travel. All of the build alternatives would offer a new bridge and approach roadway that would conform to current design standards, thus potentially easing concerns about traveling over the bridge. The West Alternative would cross the Inner Harbor approximately 1.3 miles west of the current bridge. This alternative would not offer travelers a proximate view of North Beach amenities from the bridge like the other alternatives would. The West Alternative could increase the feeling of isolation in North Beach, and business owners and community members have voiced concerns about the impact of this route on area attractions. The potential economic "bypass" effect is discussed in **Section 4.5.3.1**.

As noted above and in **Section 3.5.3.1**, proximity to the beach and an identity as a "beach community" were among the most strongly expressed community values by residents of North Beach in responses to

the community survey. The build alternatives would not affect this important aspect of community identity. As the build alternatives would be constructed west of most of the residences, it is not anticipated that any of the alternatives would obstruct existing water views, an important characteristic of life in North Beach. Access to and from downtown would be most different under the West Alternative, although modeling indicates that travel time differences between the alternatives would not be substantial. Additionally, based on feedback received at community and stakeholder meetings as well as the survey, residents and business owners in North Beach are generally in favor of the project. None of the build alternatives would require the displacement of any community gathering places, and the changes in access would not affect social relationships. The build alternatives are not anticipated to affect social values or community cohesion in North Beach.

Quality of life could be perceived as generally improving because of the increased mobility and safety, with possible short-term declines in some places due to construction phase traffic disruption, increased noise levels, dust, and similar inconveniences.

No Build Alternative

Under the No Build Alternative, the current patterns in population changes and development trends would continue, and the perception of the barrier between North Beach and the rest of Corpus Christi would remain. No improvements would be made to the bridge and approaches, which would not improve safety, identified as the most important benefit of the project for North Beach residents. The No Build Alternative would continue to offer views of the North Beach attractions from the Harbor Bridge, a positive factor identified by the community. The No Build Alternative would not affect the community's beach-oriented identity and would not change community cohesion.

4.6.1.5 Impacts to Public Services

Build Alternatives

None of the proposed build alternatives would displace any public facilities in the North Beach community; there are no schools, hospitals, fire, or police stations in North Beach. Community members have expressed concern regarding access for emergency vehicles under the West Alternative. The fire station serving North Beach (Fire Station #1) is located south of the Inner Harbor, at 514 Belden Street (see **Figure 3.5-6**). North Beach residents as well as members of the Technical and Citizens Advisory Committees have expressed concerns that fire and EMS vehicles would not be able to respond quickly to North Beach emergencies using the West Alternative route. There are also no hospitals in North Beach, and residents have expressed the same concern regarding response times for emergency vehicles to hospitals south of the Inner Harbor. Travel-time modeling for the project indicates that the time it would take to travel between North Beach and CHRISTUS Spohn Memorial Hospital would be very similar under all of the build alternatives (ranging from 34 seconds faster under the Red Alternative and 42 seconds slower under the Green and West Alternatives) when compared to the No Build Alternative.

The Rincon Channel Wetlands Interpretive Overlook is the only recreation facility in North Beach that would be directly affected by any of the build alternatives. The West Alternative would require the acquisition of approximately three acres of land from this refuge area that is also utilized as a public recreation and wildlife observation area. The West Alternative would not affect the existing associated boardwalk and parking area at Beach Avenue. Access to the land would be maintained, and fishing or other activities could also continue in aquatic areas adjacent to bridge piers. While the other build alternatives would avoid this recreational resource entirely, the West Alternative's impact to the Rincon Channel Wetlands Interpretive Overlook would not adversely affect the North Beach community. See **Section 5.3.2.2** for a discussion of the impacts to this property in the context of Section 4(f).

No Build Alternative

Under the No Build Alternative, there would be no impacts to public services. Travel time between North Beach and CHRISTUS Spohn Memorial Hospital would decrease slightly over time, when comparing the 2010 condition to the 2040 No Build Alternative.

Summary: North Beach

Table 4.6-1 summarizes the community impacts to North Beach by alternative.

Table 4.6-1 Summary of Community Impacts: North Beach

	Green	Red	Orange	West	No Build
Displacements	9 residential displacements	2 residential displacements	5 residential displacements	0 residential displacements	
Mobility & Access	Reduction to single northbound US 181 exit to North Beach (Beach Avenue); addition of shared use path on bridge for bicyclists and pedestrians			Reduction to single northbound US 181 exit to North Beach (Beach Avenue); addition of shared use path on bridge for bicyclists and pedestrians; more circuitous access to downtown	No impact
Physical	Perpetuation of barrier; noise impacts at 1 residential receiver	Potential for areas south of Burleson Street to become connected; noise impacts at 9 residential receivers	Perpetuation of barrier; noise impacts at 16 residential receivers	Potential for areas south of Burleson Street to become connected; noise impacts at 1 residential receiver	Perpetuation of barrier; no noise impacts
Social & Psychological	No impact to community values or cohesion			No impact to community values or cohesion; potential for increased feeling of isolation	No impact to community values or cohesion; concern for safety of current bridge
Public Services	Minor difference in emergency response times; No parks impacted			Minor difference in emergency	No impact

Table 4.6-1 Summary of Community Impacts: North Beach					
	Green	**Red**	**Orange**	**West**	**No Build**
				response times; Negligible impact on recreational use of Rincon Channel Wetlands Interpretive Overlook	
Safety	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared use lanes				No improvement
Visual & Aesthetic	Change in Harbor Bridge elevation would not substantially alter community viewshed	Removal of existing Harbor Bridge from line-of-sight view in southern part of community	Harbor Bridge would remain highly visible from the southern parts of North Beach	Removal of Harbor Bridge from the existing viewsheds in North Beach	No impact
Land Use	Compatible with existing and planned uses, but would allow less "high impact tourism" because of land converted to transportation use	Compatible with existing and planned uses; follows an alignment labeled "Potential New Harbor Bridge Location" on the North Beach Development Plan map	Compatible with existing and planned uses, but would allow less "high impact tourism" because of land converted to transportation use	Not compatible with planned uses; commercial and tourist-oriented development planned where West alignment would be	No impact
Economic	No business displacements that would cause impacts to community				

Source: US 181 Harbor Bridge EIS Study Team 2013

4.6.2 South Central

4.6.2.1 Displacement Impacts

Displacement impacts are discussed in detail by alternative in **Section 4.4**. For the South Central community, the residential displacements required by each build alternative would range from zero to five single-family homes, while commercial displacements would range from zero to 56 businesses (including 41 tenants in the Park Tower office Building). The South Central community is divided into three sub neighborhoods: Evans Elementary (Evans), the Central Business District (CBD), and Crosstown East. See **Section 3.5.3.2** for a description of the demographics and community characteristics of these neighborhoods.

Green Alternative

The Green Alternative would displace two single-family homes in the South Central community: one in the Evans neighborhood and one in the CBD neighborhood (see **Displacements Plate G-3** in **Appendix I**). The home in the Evans neighborhood is within a small cluster of three homes adjacent to I-37. The home located on Artesian Street in the CBD is adjacent to I-37 and is not located in a neighborhood setting. Based on a June 2013 search of similar properties in the community, there appear to be a sufficient number of comparable replacement homes for sale within the South Central community.

The Green Alternative would displace a total of 56 businesses in the South Central neighborhood, including the Hurricane Alley Waterpark, the Brewster Street Ice House, Howard's Bar-B-Que, the Shell gas station on Leopard Street, and 41 tenants of Park Tower office building (see **Table 4.4-5**). There are also a number of abandoned structures, both commercial and residential, within the proposed right of way that would be displaced. Based on available commercial real estate, it is assumed that with the potential exception of the waterpark, all of the displaced businesses would be able to relocate within the community. Even if the businesses chose not to relocate, the loss of these businesses would not represent a substantial adverse effect for the community; none of the potentially displaced businesses are the sole provider of a category of service or offer services vital to the community. The economic impact of the potential displacements is discussed in **Section 4.4.2.1**.

The Solomon P. Ortiz International Center and Templo Trinidad, a church located on 716 Waco Street, would also be affected by the Green Alternative. The impact to the Ortiz Center under the Green Alternative would be limited to the covered plaza adjacent to the primary building. The conference and event center would continue to operate. Templo Trinidad is a Pentecostal church established in 1979 and offers bilingual worship services, classes, counseling, home study, and support groups to the local community. The social impacts of the potential displacement of this church are discussed below in the Social and Psychological impacts section.

Red Alternative (Preferred)

The Red Alternative (Preferred) would displace four homes in the Evans neighborhood (see **Displacements Plate R-3** in **Appendix I**). These houses are along four blocks facing N. Brownlee Boulevard and are at the western edge of the Evans neighborhood. Sufficient comparable replacement housing appears to be available within the community for all but one of the homes, based on a market search conducted in June 2013. One home has an appraised value of less than $10,000, and there are no homes for sale in this range. If comparable housing is not available at the time of right of way acquisition, TxDOT would provide the required housing or, if necessary, provide housing supplement payments in excess of the standard payment limits to ensure that decent, safe and sanitary dwellings are made available.

Two of the businesses in the Evans neighborhood displaced by the Green Alternative, Olszewski Stained Glass Studio and the Shell gas station on Leopard Street, would also be displaced under the Red Alternative. Additional displacements include the H&S Fabricators warehouse, and Port Warehouses #26 and #27, located on N. Port Avenue. None of these displacements would cause adverse effects to the community should the businesses not remain in operation or relocate in close proximity.

Orange Alternative

The Orange Alternative would displace the same four homes in the Evans neighborhood as the Red Alternative, in addition to one house on the corner of Lipan Street and N. Brownlee Boulevard (see

Displacements Plate O-3 in **Appendix I**). As noted above, sufficient replacement housing appears to be available to accommodate relocation of these households within the community.

Six businesses in the South Central community would be displaced under the Orange Alternative, including the stained glass studio and the Shell gas station that would also be displaced by the Green and Red Alternatives. Additional business displacements include the Hurricane Alley Waterpark, Batter's Box Training, Keystone Automotive, and Crocker Moving and Storage. Based on available commercial real estate, it is assumed that with the potential exception of the waterpark, all of the displaced businesses would be able to relocate within the community. Even if the businesses chose not to relocate, the loss of these businesses would not represent an adverse effect for the community; none of the potentially displaced businesses are the sole provider of a category of service or offer services vital to the community. The economic impact of the potential displacements is discussed in **Section 4.4.2.1**.

The right of way to be acquired for the Orange Alternative would include a small portion of the Solomon P. Ortiz International Center. The bridge would be much higher than the building at this location, but if the portion of the Ortiz Center inside the right of way were to be removed, the majority of the building would be unaffected, and it is assumed that it would remain operational.

West Alternative

The West Alternative would not require any residential or commercial displacements in the South Central community.

No Build Alternative

The No Build Alternative would not require any residential or business displacements.

4.6.2.2 Mobility and Access Impacts

Changes in access would be relatively limited inside the South Central community under all of the build alternatives and are primarily related to access to the Crosstown Expressway and the downtown area north of I-37.

Green Alternative

On the Crosstown Expressway, the northbound exits to Leopard and Lipan/Comanche Streets would be closed under the Green Alternative, making the Agnes/Laredo Street exit the last northbound exit before I-37. This earlier exit would require drivers accessing the Evans and CBD neighborhoods from the northbound direction to travel for a longer distance along the frontage road. Access to the southbound Crosstown Expressway would remain similar to the current condition; drivers would cross the highway on Leopard, Comanche, or Lipan Street and enter via the entrance ramp at Howard Street, slightly south of the existing entrance ramp at Leopard Street which would be closed. Both Lipan and Comanche

Streets would remain open, maintaining connections to the Ben Garza neighborhood west of the Crosstown Expressway.

To access westbound I-37, drivers from the Evans neighborhood could take the northbound frontage road to Winnebago Street and enter the ramp at Alameda Street, while drivers from Crosstown East could connect to the westbound main lanes via the direct ramp from the Crosstown Expressway northbound. From the CBD, drivers would take the westbound I-37 frontage road and enter the ramp at Alameda Street.

In the part of the CBD neighborhood north of I-37, residents would see additional connections under the US 181 facility between N. Broadway and Tancahua Streets. Access to US 181 would be provided via the ramp just east of Artesian Street; drivers from downtown would take the westbound frontage road and utilize the turnaround at Staples Street. The Evans neighborhood would have direct access to the eastbound frontage road. Drivers from the Crosstown East neighborhood would likely utilize the direct ramp from the Crosstown Expressway to US 181.

The Ramirez Street and Buffalo Street one-way pair of bridges currently spanning I-37, which also have sidewalks for pedestrian use, would be closed under the Green Alternative. A new one-way northbound connection across I-37 would be provided via N. Lower Broadway Street, although it would not connect directly to the Washington-Coles neighborhood. Connectivity between the neighborhoods would be maintained via preserved connections at Staples Street, the northbound frontage road on the Crosstown Expressway (formerly Brownlee Boulevard) and the Alameda Street pedestrian bridge.

Red (Preferred) and Orange Alternatives

Under the Red (Preferred) and Orange Alternatives, the exit to Lipan/Comanche Streets from the Crosstown Expressway northbound would be closed; drivers could instead utilize the Leopard Street exit and backtrack south or exit at Agnes/Laredo Street and travel for a longer distance along the frontage road. Access to the Crosstown Expressway southbound would be relatively similar to but more circuitous than the current condition; drivers could cross the highway on Leopard or Comanche Streets and travel down the southbound frontage road to enter the Crosstown Expressway via the entrance ramp at Coleman Street. The entrance northbound at Laredo Street would be closed, making the ramp at Morgan Avenue the northernmost opportunity to enter the Crosstown Expressway northbound. Lipan Street would be closed under the Red and Orange Alternatives, although Comanche Street would remain open to maintain a connection (along with Leopard Street) to the Ben Garza neighborhood to the west.

To access westbound I-37, drivers from the Evans neighborhood could take Staples Street north and enter the ramp at Alameda Street, while drivers from Crosstown East entering the Crosstown Expressway at Morgan Avenue could connect to the westbound I-37 main lanes via the direct northbound ramp. From the CBD, drivers would have direct access to the I-37 main lanes from Mesquite Street. The direct ramp from the Crosstown Expressway northbound to eastbound I-37 would

be removed with the Red and Orange Alternatives; drivers would exit at Leopard Street and use the eastbound frontage road entrance to I-37 to connect to downtown.

Under the Red and Orange Alternatives, the current alignment of US 181 parallel to Broadway Street would be removed and replaced with an at-grade, two-way boulevard section. Palo Alto, Fitzgerald, Resaca, Hughes, and Hirsch Streets would all connect to the new boulevard. As the current eastern terminus of these streets is the one-way, northbound N. Broadway Street, the proposed boulevard section would provide a new southbound route to access areas south of I-37. Northbound US 181 would be accessible directly from the Evans and Crosstown East neighborhoods via a ramp from the northbound frontage road. From the CBD, drivers would take the westbound I-37 frontage road to the intersection with the northbound US 181 frontage road and enter the ramp near Winnebago Street.

The Red and Orange Alternatives would preserve the Ramirez Street and Buffalo Street bridges, and access between the Northside and South Central communities would also be provided via Staples Street and the northbound frontage road along the Crosstown Expressway.

West Alternative

The West Alternative would preserve the exit to Leopard Street from the Crosstown Expressway northbound, although the exit to Lipan/Comanche Streets would be closed as with the other alternatives. Access to the Crosstown Expressway southbound would remain the same as the current condition; drivers would cross the highway on Leopard Street and enter the ramp to the Crosstown Expressway at that location. As with the Red and Orange Alternatives, the entrance to the Crosstown Expressway northbound at Laredo Street would be closed, making the ramp at Morgan Avenue the northernmost opportunity to enter heading northbound. Lipan Street would also be closed, although Comanche Street would remain open to maintain a connection (along with Leopard Street) to the Ben Garza neighborhood to the west.

To access westbound I-37, drivers from the Evans and Crosstown East neighborhoods would either enter the Crosstown Expressway at Morgan and connect to the westbound I-37 main lanes via the direct northbound ramp or enter downtown at Mesquite Street. From the CBD, drivers would have direct access to the I-37 main lanes at Mesquite, Chaparral, and Water Streets. The direct ramp from the Crosstown Expressway northbound to eastbound I-37 would be removed under the West Alternative; drivers would exit at Leopard Street and take the eastbound frontage road, or Leopard Street, to connect to downtown instead of using I-37.

The West Alternative proposes the same at-grade, two-way Broadway Boulevard concept as the Red and Orange Alternatives. Access to US 181 from the South Central community would be provided via westbound I-37.

No Build Alternative

Under the No Build Alternative, a new bridge would not be constructed and no roadway improvements would be made. There would be no changes in access from the current condition.

4.6.2.3 Physical Impacts

The Evans and Crosstown East neighborhoods within the South Central community are bounded by the Crosstown Expressway to the west, which contributes to the separation between the South Central and Westside neighborhoods. The construction of the expressway and I-37 in the 1960s required the removal or demolition of hundreds of homes and severed connections within neighborhoods both to the north and west. The proposed improvements to both facilities would not change their alignment and the barriers they each represent would remain unchanged under all of the build alternatives.

Regarding traffic noise (discussed in detail in **Section 4.10**), modeling indicates that all of the build alternatives would result in a traffic noise impact over the FHWA NAC for residential receivers in the South Central community; no noise abatement measures are proposed for the community. None of the residential impacts would result in noise levels more than 10 dBA above existing conditions.

Green Alternative

Under the Green Alternative, US 181 would be reconstructed along the existing alignment. The bridge would be constructed at a higher elevation and could therefore be considered more imposing visually. Existing downtown cross streets that currently end at the embankment on the east side of US 181 would be constructed under US 181, alleviating to some extent the physical barrier within the CBD. The Green Alternative would result in traffic noise impacts to 116 residential receivers, occurring in all three of the community neighborhoods (see **Noise Plates G-2-4** and **G-7 in Appendix I**).

Red (Preferred), Orange, and West Alternatives

The Red (Preferred), Orange and West Alternatives would remove US 181 from the CBD and provide an extension of downtown streets to the new boulevard section, representing improvements to connectivity.

The Red Alternative would result in traffic noise impacts to 80 residential receivers, occurring in the Evans Elementary and Crosstown East neighborhoods (see **Noise Plates R-2-4** and **7 in Appendix I**). The Orange Alternative would result in traffic noise impacts to 79 residential receivers, occurring in all three of the community neighborhoods (see **Noise Plates O-2** through **4** and **O-7 in Appendix I**). The West Alternative would result in traffic noise impacts to 102 residential receivers, occurring in all three of the community neighborhoods (see **Noise Plate W-5** through **8 in Appendix I**).

No Build Alternative

The No Build Alternative would leave the existing US 181 alignment in place and the facility would continue to be a physical barrier within the South Central community. Noise levels would continue to increase as the volume of traffic increases over time.

4.6.2.4 Social and Psychological Impacts

As mentioned above, construction of I-37 and the Crosstown Expressway in the 1960s divided the neighborhoods south of I-37 into separate communities. Fewer members of the South Central community responded to the community survey than other project area communities, but the responses indicate that the Evans neighborhood has a relatively high degree of cohesion, while the CBD neighborhood is not very cohesive (see **Section 3.5.3.2**). Based on the responses received to the survey and discussions held at community meetings, residents of the South Central community indicated that proximity to downtown and the entertainment areas were important aspects of the neighborhoods, and improved access to downtown was the highest rated potential benefit of the project. Potential relocations were rated as the potential negative effect of the project of most concern. At the South Central community meeting held at Kelsey Memorial United Methodist Church in the Evans neighborhood, many attendees were church members and expressed concern about noise impacts and about impacts to the church parking lot, which is adjacent to N. Brownlee Boulevard. These concerns were taken into account by project engineers, and the proposed build alternatives avoid effects to church parking. The West and Green Alternatives would result in a noise impact at the church.

The primary impact to the South Central community relates to changes in access, which are not expected to be substantial or cause changes in social relationships under any of the alternatives. All of the build alternatives would involve the re-designation of Brownlee Boulevard and Antelope Street as highway service roads. Antelope Street appears on Sanborn maps dating from 1900, and Brownlee Boulevard, formerly known as 13th Street, first appears on Sanborn maps in 1945. The only home that fronts on to N. Brownlee Boulevard in the area that would be re-designated would be displaced by the Red and Orange Alternatives; a change of address for this property would only be required under the Green or West Alternatives. There are no residential properties with an Antelope Street address in the area that would be re-designated.

Green Alternative

The displacement of Templo Trinidad Church could represent an adverse effect to members of the church, were it not able to relocate in the community, although, many of the services provided by the church are also provided by other institutions in the community that would not be affected by the proposed project, including Workforce Solutions of the Coastal Bend, two Salvation Army facilities, the Good Samaritan Rescue Mission, and the Mother Teresa Shelter.

The degree of separation of the South Central community from other parts of town would remain very similar to the existing condition. The alignment of the Crosstown Expressway and I-37 would remain

unchanged, and US 181 would be reconstructed at a higher elevation; proposed street improvements would minimally enhance connectivity downtown. The impacts of the Green Alternative are not anticipated to affect social relationships or community cohesion.

Red (Preferred), Orange and West Alternatives

With regard to separation, the alignment of I-37 and the Crosstown Expressway would remain unchanged. The changes in access would not affect community cohesion within the neighborhood, and no important community centers or gathering places would be affected.

No Build Alternative

Under the No Build Alternative, the current patterns in population changes and development trends would continue, and the physical barrier within the CBD would remain. No safety improvements would be made to US 181, including the existing Harbor Bridge and approaches. The No Build Alternative would continue to offer the same accessibility and mobility options for neighborhood residents and would not have an effect on community cohesion.

4.6.2.5 Impacts to Public Services

Build Alternatives

Fire and police response times to the South Central community are not anticipated to be substantially affected by the build alternatives. Corpus Christi Fire Stations 1 and 3 are the closest stations to the South Central Community (refer back to **Figure 3.5-6**). Routes to the CBD area from Fire Station 1 and routes to Crosstown East from Fire Station 3 would remain unchanged. Fire and EMS vehicles that currently utilize Ramirez Street to reach certain locations in the Evans or CBD neighborhoods would cross I-37 via Staples Street instead with the Green Alternative. This change in access would mean a slightly longer route in some cases. Access to CHRISTUS Spohn Memorial Hospital would remain relatively unchanged under all of the build alternatives, and there would be multiple routes to the hospital from the South Central community.

The build alternatives have varying impacts to Lovenskiold Park, the only affected public facility in the South Central community, and these impacts are discussed in detail in **Section 5.3.2.1**. Lovenskiold Park is less than one acre in size and amenities are limited to a single swing set. No substantial community impacts would be associated with the loss of the park; there are several other parks within the South Central community, including Blucher and Artesian Parks, which offer more amenities and are utilized more frequently. Additionally, any impacts to park functions by the proposed project would be replaced at a nearby location. The West Alternative would not impact Lovenskiold Park.

No Build Alternative

Under the No Build Alternative, there would be no impacts to public facilities or the provision of public services.

Summary: South Central

Table 4.6-2 summarizes the impacts to the South Central community by alternative.

Table 4.6-2 Summary of Community Impacts: South Central					
	Green	**Red**	**Orange**	**West**	**No Build**
Displacements	2 residential displacements	4 residential displacements	5 residential displacements	0 residential displacements	
Mobility & Access	Similar access to current condition overall	Similar access to current condition for US 181 and WB I-37; many entrance and exit closures along Crosstown Expressway; closure of Lipan Street, Comanche Street remains open		US 181 and WB I-37 less accessible than current condition; some entrance and exit closures along Crosstown Expressway; closure of Lipan Street, Comanche Street remains open	No impact
Physical	Existing barriers would remain; noise impacts at 116 residential receivers	Physical barrier within CBD would be removed; noise impacts at 80 residential receivers	Physical barrier within CBD would be removed; noise impacts at 79 residential receivers	Physical barrier within CBD would be removed; noise impacts at 102 residential receivers	Perpetuation of existing barrier effect; no noise impacts
Social & Psychological	Potential loss of one church, but no substantial impact to community values or cohesion	No impact to community values or cohesion			No impact to community values or cohesion; safety improvements to US 181 would not occur
Public Services	No effect on provision of public services; loss of Lovenskiold Park-functions to be replaced at existing Ben Garza Park	No effect on provision of public services; impact to Lovenskiold Park-functions to be replaced at existing Ben Garza Park		No effect on provision of services; no parks impacted	No impact
Safety	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared-use path				No improvement
Visual & Aesthetic	Change in elevation of Harbor Bridge would not substantially alter the viewshed from CBD; visual and aesthetic changes for other neighborhoods would not be substantially different	View of bridge from CBD would be more distant; visual and aesthetic changes for other South Central neighborhoods would not be substantially different	View of bridge from CBD would be similar to current condition; visual and aesthetic changes for other South Central neighborhoods would not be substantially different	View of bridge removed from CBD; visual and aesthetic changes for other South Central neighborhoods would not be substantially different	No impact

Table 4.6-2 Summary of Community Impacts: South Central					
	Green	**Red**	**Orange**	**West**	**No Build**
Land Use	Partially consistent: could impede City from implementing Future Land Use Plan and Community Sustainability Plan	Potential for the City to implement Future Land Use Plan and Community Sustainability Plan	Considered largely incompatible with future land use and community sustainability planning in the SEA District/CBD	Considered largely incompatible with future land use and community sustainability planning in the SEA District/CBD because of diversion of traffic away from these areas	No impact
Economic	56 business displacements, none with adverse impacts to community	No business displacements with impacts to community			No impact

Source: US 181 Harbor Bridge EIS Study Team 2013

4.6.3 Northside

The Northside community is generally divided by N. Port Avenue and is comprised of two neighborhoods, Hillcrest and Washington-Coles. See **Section 3.5.3.3** for a complete community profile.

4.6.3.1 Displacement Impacts

Displacement impacts are discussed in detail by alternative in **Section 4.4**. For the Northside community, the residential displacements required by each build alternative would range from three to 18 single-family or duplex houses and apartment displacements would range from 6 to 60 units; commercial displacements would range from zero to three businesses.

Green Alternative

Under the Green Alternative, direct impacts to the Northside community would occur along the I-37 westbound frontage road with residential displacements limited to three single-family homes, all in the Hillcrest neighborhood (see **Displacements Plate G-5** in **Appendix I**). The homes are situated between Floral Street and Peabody Avenue and all have an assessed value of less than $70,000. As of June 2013, there are five homes for sale in Hillcrest within this price range, and therefore sufficient comparable replacement housing appears available to accommodate the displaced residents. There would be no commercial displacements in the Northside neighborhoods with the proposed Green Alternative.

Red Alternative (Preferred)

Residential displacements under the Red Alternative (Preferred) in the Hillcrest neighborhood include the same three single-family homes that would be displaced by the Green Alternative, an additional two single-family homes near Van Loan Avenue and Palm Drive, and two apartment complexes; 1202 Van Loan Avenue with four units, and the Hillcrest Manor Apartments with six units (see **Displacements Plate R-4** in **Appendix I**). Displacements in the Washington-Coles neighborhood would include three duplexes and one apartment complex (see **Displacements Plate R-3** in **Appendix I**). There is a group of

six duplexes on Winnebago Street that house 12 units; the three westernmost duplexes would be displaced by the Red Alternative, affecting six units. Two buildings in the North Side Manor Apartments complex on Lake Street would be displaced, affecting 10 units. Both buildings of Hillcrest Manor Apartments would be displaced, affecting six units. The property at 1202 Van Loan Avenue houses four separate residential units, all of which would be affected. As mentioned above, there appears to be sufficient replacement housing available for the single-family homes displaced. As there are no currently advertised properties available for rent in the Northside community, finding replacement housing for these units may be difficult. As noted in **Section 4.4.1.1**, tenants displaced from the North Side Manor Apartments are to be accommodated at The Palms, a low-income housing development independent of the proposed project. Depending on the timing of right of way acquisition for the proposed project, tenants of the North Side Manor Apartments may no longer be in need of relocation assistance. There would be no commercial displacements in the North Side neighborhoods with the Red Alternative.

Orange Alternative

Residential displacements required by the Orange Alternative in the Northside community include 18 homes or duplex units, and 60 apartment units. In Hillcrest, these displacements include five single-family houses (also displaced by the Green and Red Alternatives), all six units of the Hillcrest Apartments complex (also displaced by the Red and West Alternatives), and all four units of 1202 Van Loan Avenue property (see **Displacements Plate O-4** in **Appendix I**). In the Washington-Coles neighborhood, five single-family homes, four duplex homes and units in two apartment complexes would be displaced (see **Displacements Plates O-2** and **O-3** in **Appendix I**). The five single-family homes in Washington-Coles are located between Lobo Lane and Chipito Street and are surrounded by vacant land and several vacant structures. Four duplexes (eight units) would be displaced in the group of six duplexes on Winnebago Street. The Orange Alternative would displace five of the 17 buildings in the North Side Manor Apartments complex on Alameda Street (30 units) and would displace all of the buildings at the Lake Street location (20 units). The Orange Alternative would displace both buildings in the Hillcrest Manor Apartments with a total of six units, and the four-unit building on Van Loan Avenue. It is anticipated that sufficient comparable replacement housing would be available in the Northside community for the single-family and duplex homes displaced by the Orange Alternative. As currently there are no advertised properties available for rent in the Northside community, finding replacement housing for displaced tenants may be difficult. As mentioned above, depending on the timing of right of way acquisition tenants that would be displaced from the North Side Manor Apartments may already have been relocated to The Palms.

The Orange Alternative would displace a lounge and a funeral home in the Washington-Coles neighborhood, which are each the sole provider of these services. Blue Monday is located on Josephine Street and is an entertainment and club business classified by the North American Industry Classification System (NAICS) as a Civil and Social Organization. Nueces County CAD data indicates that the structure was built in 1965, and taxes have been paid on the personal property listed as “Blue Monday Lounge” since 2003. Based on field visits, Blue Monday seems to be a popular spot for local residents. Unity

Chapel Funeral Home is located on Sam Rankin Street and has been in business for nearly 25 years. The discussion of Social and Psychological Impacts below includes further analysis of the impact the loss of these businesses would represent to the community.

West Alternative

Residential displacements include five single-family houses in the Hillcrest neighborhood. Three of the houses are located on the corner of Martin Luther King Drive and Palm Drive (see **Displacements Plate W-3** in **Appendix I**). The houses are in a small cluster within one block. The house to be displaced on Minton Street is located in the open area between the Hillcrest neighborhood and the refineries to the west. This home is the last remaining in a two-block radius. The surrounding homes have been purchased by the CITGO refinery to create a buffer between residential areas and the surrounding industries in the 1990s (see **Section 3.5.3.3**). The West Alternative would also displace the six-unit Hillcrest Manor Apartments. Sufficient replacement housing would be available for residents displaced from single-family homes. Based on the lack of advertised vacancies in July 2013, finding available apartment units in the neighborhood may be difficult. If no replacement housing is available within the financial means of displacees, TxDOT would provide supplemental housing payments to ensure all displaced residents are relocated to decent, safe and sanitary housing.

The sole business that would be displaced by the West Alternative in the Northside community is the CITGO refinery office building complex located on Nueces Bay Boulevard. The economic impact of this displacement is discussed in **Section 4.4.2.1**; due to their vested interest in the community, CITGO would be expected to relocate on nearby land already owned by the company or lease office space nearby. There would be no anticipated impacts to the Northside community related to the potential relocation of CITGO offices.

No Build Alternative

The No Build Alternative would not require any residential or business displacements.

4.6.3.2 Mobility and Access Impacts

With all of the build alternatives the number of entrance ramps to westbound I-37 would be reduced relative to the current condition for the Northside community, as the Brownlee Boulevard entrance to westbound I-37 would be closed. All of the alternatives would offer increased connectivity between Washington Coles and downtown, as several streets that currently terminate at northbound N. Broadway Street would be extended from downtown to connect to Tancahua Street. There are currently dedicated pedestrian bridges connecting the Northside neighborhoods to the communities to the south at Stillman Avenue and N. Alameda Street. The bridges carrying N. Staples Street, Ramirez Street, and Buffalo Street also have sidewalks for pedestrian use. In conversations with project planners at the October 2012 Citizens Advisory Committee meeting, representatives of the Northside community emphasized the importance of the preservation of pedestrian bridges from the Northside community across I-37. All of the build alternatives would preserve the pedestrian access along N. Staples Street,

and the access across Ramirez and Buffalo Streets would be reconstructed under the Red, Orange and West Alternatives; the Stillman Avenue pedestrian bridge would be removed but would be reconstructed nearby under all of the alternatives. The pedestrian-only bridge at Alameda Street would be removed under the Red, Orange, and West Alternatives and reconstructed along N. Staples Street. The vehicular crossings with sidewalks (Ramirez, Buffalo and Staples Streets) would be reduced from three to one (Staples Street) with the Green Alternative.

Green Alternative

Under the Green Alternative, there would be no changes in access within the Northside neighborhoods, although access to other parts of the city would be modified. Access to and from US 181 would be very similar to the current condition for both Hillcrest and Washington-Coles residents. The three closed entrances to westbound I-37 would be replaced with a single entrance just west of Alameda Street, and the next opportunity to enter the freeway would be west of Buddy Lawrence Drive. Hughes, Fitzgerald, Palo Alto, Power, and Belden Streets would all be extended under US 181 to connect with Tancahua Street to the west. While this change represents some degree of additional connection to the downtown area for the Northside community, the improvement in access is limited by the fact that none of the streets which would be extended connect to the residential portion of the Washington-Coles neighborhood; travelers would still need to utilize Sam Rankin Street to access Resaca Street or Brewster Street, all greatly in need of maintenance, to connect to Tancahua Street. Street closures include the removal of the Buffalo Street and Ramirez Street one-way pair, thus reducing vehicular and pedestrian access to the area south of I-37 and east of the Crosstown Expressway. The pedestrian bridge at Stillman Avenue would be removed and replaced nearby while the Alameda Street bridge would be reconstructed along N. Staples Street. Although these changes in travel patterns may result in some Northside motorists having to travel a greater distance relative to the existing condition, there would be no change in the accessibility of key neighborhood resources like the Oveal Williams Senior Center and the CHRISTUS Spohn Family Health Clinic.

Red Alternative (Preferred)

Under the Red Alternative (the Preferred Alternative), changes in access for the Northside community primarily relate to I-37 and the effects of the proposed path of US 181 through the community. The access points to and from US 181 would be modified, with the convenience of access for the community remaining relatively similar. Washington-Coles residents would enter US 181 via the northbound frontage road at Winnebago Street, and Hillcrest residents could utilize a realigned Lake Street to pass under US 181 and connect to N. Staples Street to access the frontage road entrance. As with the Green Alternative, the three closed entrances to westbound I-37 would be replaced with entrances at N. Staples Street and N. Port Avenue. Under the Red Alternative, the current elevated alignment of US 181 parallel to N. Broadway Street would be removed and replaced with an at-grade, two-way boulevard section (Broadway Boulevard), extending from approximately Belden Street to Hirsch Street. The downtown streets currently terminating at the northbound US 181 frontage road would connect to the proposed boulevard, and these streets could be improved further west by the City of Corpus Christi to provide enhanced connectivity to the Washington-Coles neighborhood.

Road closures under the Red Alternative include a portion of Winnebago Street, spanning from Coke Street to just west of Josephine Street. As Winnebago Street is an important thoroughfare linking Washington-Coles and Hillcrest, the severance of this thoroughfare for both drivers and non-drivers would have an effect on the connectivity between the neighborhoods. Winnebago also provides two-way access to the Oveal Williams Senior Center, the CHRISTUS Spohn Health Clinic, Solomon Coles High School and Education Center, the Alameda Street pedestrian bridge to City Hall, the County Courthouse, and the Staples Street transit center. Although the Red Alternative would require more circuitous travel patterns, Hillcrest residents would still be able to access to these facilities, and their route would be 1,100 feet longer using Lake Street. The changes in design in order to replace access along Winnebago via Lake Street were presented at the July 2013 CAC meeting; no objections or concerns regarding this concept were recorded at the meeting. The pedestrian bridge at N. Alameda Street would be removed and reconstructed along N. Staples Street, and the pedestrian bridge at Stillman Avenue would be reconstructed nearby. Coordination with the neighborhood regarding changes in access is ongoing as part of the public involvement process for the project.

Orange Alternative

Changes in access in the Northside community under the Orange Alternative are similar to those of the Red Alternative, including the entrance and exit points for US 181 and the design of the at-grade Broadway Boulevard section. Similar to the Red Alternative, the current elevated alignment of US 181 parallel to Broadway Street would be removed and replaced with an at-grade, two-way Broadway Boulevard with existing downtown streets extended across the boulevard. As with the Red Alternative, these streets could be improved further west by the City to provide enhanced connectivity to the Washington-Coles neighborhood.

The portion of Winnebago Street to be closed under the Red Alternative would also be closed under the Orange Alternative, with the same change in connectivity between Hillcrest and Washington-Coles and access to the senior center, health clinic, and other resources via Lake Street. The pedestrian bridge at N. Alameda Street would be reconstructed at N. Staples Street, while the bridge at Stillman Avenue would be reconstructed nearby.

West Alternative

The West Alternative would not affect travel patterns within the Northside neighborhoods, although this alternative would reduce access to US 181 and I-37 relative to the current condition. The three existing entrances to the westbound I-37 main lanes (Padre Street, Brownlee Boulevard and N. Port Avenue) from the Northside community would not be replaced due to geometric design constraints. Drivers could use Sam Rankin Street to Brewster Street to Mesquite Street or drive up to two miles along the westbound frontage road to the entrance past Buddy Lawrence Drive. The entrance to the eastbound I-37 main lanes for the Northside community would be via a ramp just east of Nueces Bay Boulevard. Northside residents would either take the aforementioned ramp or enter downtown via northbound Port Avenue. The West Alternative would not be able to accommodate an entrance to US 181 from the

Northside community due to geometric design constraints. To enter northbound US 181, Northside residents would follow the same path to I-37, taking Sam Rankin Street to Brewster Street to Mesquite Street and accessing I-37 from there. From southbound US 181, Northside residents would enter I-37 and exit at N. Staples Street, turning left and tracking back through the Washington-Coles neighborhood to access Hillcrest. The pedestrian bridge at Stillman Avenue would be removed and replaced nearby.

As with the Red and Orange Alternatives, the current elevated alignment of US 181 parallel to Broadway Street would be removed and replaced with an at-grade, two-way Broadway Boulevard with existing downtown streets extended across the boulevard. As with the Red and Orange Alternatives, these streets could be improved further west by the City to provide enhanced connectivity to the Washington-Coles neighborhood.

No Build Alternative

Under the No Build Alternative, a new bridge would not be constructed and no roadway improvements would be made. There would be no changes in access from the current condition.

4.6.3.3 Physical Impacts

The Northside community is currently bounded by industrial uses to the north and west and major highways to the east and south, which all contribute to the separation of the Northside neighborhoods from the downtown area and the city and county offices along Leopard Street. As described in **Section 3.5.3.3,** the construction of I-37 in the early 1960s required the removal or demolition of many homes in both the Hillcrest and Washington-Coles neighborhoods. The interstate was constructed in the block between Antelope and Buffalo Streets, one block north of Leopard Street, removing the neighborhood's direct access to the commercial corridor of the day. The Washington-Coles neighborhood had long been bounded by the rail road, which was built in 1914, and industrial uses related to the Port which began expansion in 1926. The addition of US 181, therefore, served to exacerbate a previously existing physical separation but was not itself the cause of the separation. Although each of the build alternatives would differ with respect to the future alignment of US 181, the physical barrier of I-37 would remain under all of the alternatives.

Regarding traffic noise (discussed in detail in **Section 4.10**), modeling indicates that all of the build alternatives would result in a traffic noise impact over the FHWA NAC at T.C. Ayers Park in 2032. Noise abatement measures are proposed along I-37 in the Hillcrest neighborhood under the Green Alternative.

Green Alternative

Under the Green Alternative, US 181 would be reconstructed on the existing alignment, along the eastern edge of the Washington-Coles neighborhood. As mentioned above, the physical relationship of I-37 to the Northside community would remain relatively unchanged with the proposed improvements. Construction of a new US 181 facility along the existing alignment, including a new bridge, would also

leave the physical relationship between the highway and the neighborhood relatively unchanged; US 181 would be constructed at a higher elevation and could therefore be considered more imposing visually.

Under the Green Alternative, 68 residential receivers located in both Washington-Coles and Hillcrest would experience traffic noise impacts (see **Noise Plates G-3**, **G-5,** and **G-6** in **Appendix I**). None of the noise impacts would result in an increase of 10 dBA or more above existing levels. Noise abatement measures were considered as part of the traffic noise analysis, and none of these measures were reasonable and feasible for the Northside community under the Green Alternative.

Red Alternative (Preferred)

The Red Alternative (the Preferred Alternative) proposes an alignment for US 181 that would extend directly north of the Crosstown Expressway, crossing the Northside community on the western side of the Washington-Coles neighborhood in an area that is largely undeveloped, with the exception of T.C. Ayers Park. Although Lake Street and W. Broadway Street would pass under the structure, the placement of the alignment would require closure of Winnebago Street, the principal connecting roadway between the Washington-Coles and Hillcrest neighborhoods and would introduce a physical barrier between the two neighborhoods. The relocation of the existing US 181 facility out of the downtown area would remove the physical barrier between the Washington-Coles neighborhood and downtown.

Under the Red Alternative, 204 residential receivers in the Washington-Coles and Hillcrest neighborhoods would experience traffic noise impacts (see **Noise Plates R-3**, **R-6**, and **R-7** in **Appendix I**). Noise abatement measures were considered as part of the traffic noise analysis, and none of these measures were reasonable and feasible for the Northside community under the Red Alternative.

Orange Alternative

Under the Orange Alternative, US 181 would follow an alignment similar to that of the Red Alternative in the Northside community, although it would be placed more toward the interior of the Washington-Coles neighborhood and would affect much more of the residential portion of the neighborhood than the Red Alternative. The physical barrier, therefore, would be much more pronounced with the Orange Alternative. Similar to the Red Alternative, the removal of the existing US 181 facility would eliminate the physical barrier between the Washington-Coles neighborhood and the downtown area.

Under the Orange Alternative, 145 residential receivers in the Washington-Coles and Hillcrest neighborhoods would experience traffic noise impacts (see **Noise Plates O-3**, **O-6,** and **O-7** in **Appendix I**). Noise abatement measures were considered as part of the traffic noise analysis, and none of these measures were reasonable and feasible for the Northside community under the Orange Alternative.

West Alternative

The West Alternative would remove the US 181 facility from the downtown area and place it at the western periphery of the Hillcrest neighborhood, between the residential portion of the neighborhood and the adjacent refineries. The West Alternative lies between a portion of a two-block area, between Martin Luther King Drive on the south and W. Broadway Boulevard on the north, that was almost entirely cleared of homes in the 1990s when the refineries engaged in a buyout of land bordering their sites. Some members of the Technical Advisory Committee stated at the October 2012 meeting that the location of the alignment would be beneficial in reinforcing this separation between industrial and residential uses, while some residents of the Hillcrest neighborhood indicated at the July 2013 Citizens Advisory Committee meeting that the West Alternative would be introducing the physical barrier of another major transportation facility (in addition to I-37) into the neighborhood. This alternative does allow for the greatest possibility of connecting both the Hillcrest and Washington-Coles neighborhoods with the downtown area; however, as described in **Section 4.6.3.2**, the West Alternative would not accommodate vehicular access from the Hillcrest neighborhood directly to I-37 and US 181, the area's primary hurricane evacuation routes.

Under the West Alternative, 47 residential receivers in the Washington-Coles and Hillcrest neighborhoods would experience traffic noise impacts (see **Noise Plates W-3**, **W-5** and **W-7** in **Appendix I**). Noise abatement measures were considered as part of the traffic noise analysis, and none of these measures were reasonable and feasible for the Northside community under the West Alternative.

No Build Alternative

The No Build Alternative would leave US 181 in place and the facility would continue to be a physical separation between the Northside neighborhoods and the downtown area. Noise levels would continue to increase as the volume of traffic increases over time.

4.6.3.4 Social and Psychological Impacts

Important neighborhood attributes as identified by Northside residents in their responses to the community survey (see **Section 3.5.3.3**) include proximity to downtown amenities and employers, and ease of accessibility. Northside residents also emphasized the importance of maintaining easy access to Buccaneer Stadium (a football stadium utilized by area high schools; see **Figure 3.5-8** in **Appendix A**) adjacent to Miller High School; this concern was also expressed at the October 2012 Citizens Advisory Committee meeting. Hillcrest is a relatively cohesive community, based on many factors, including density of owner-occupied, single-family homes, and the fact that many families have lived in the neighborhood for several generations and plan to remain for the foreseeable future. The Oveal Williams Senior Center is an important base for community cohesion, as the facility provides space for meetings of HIALCO (an acronym for Hillcrest, Ayers, Leathers and Coles neighborhoods) organization and a gathering place for seniors and other members of the community. Washington-Coles as a neighborhood is less cohesive than Hillcrest, as there are more rental properties, vacant tracts of land, and abandoned

structures. Although fewer responses were recorded, survey results from the Washington-Coles neighborhood were characteristic of a community with low cohesion (see **Section 3.5.3.3**).

With regard to the proposed project, Northside respondents to the survey rated changes in vehicular access as the potential negative effect of the most concern, followed by increased traffic noise, changes in the sense of living in a neighborhood, and displacements. Of lesser concern was the closing of parks and facilities. Potential benefits that rated as most important to Northside residents were the long-term economic opportunity for the region and a sense of safety when using the proposed facility, including the bridge. All of the build alternatives would address in similar fashion the project benefits considered most important by the Northside community, while the alternatives differ with respect to the potential for perceived negative outcomes to occur. The economic benefits of the proposed project are addressed in **Section 4.5.6** and the safety benefits are described in **Section 2.3.1.2**.

While the build alternatives vary in the manner with which accessibility to downtown is addressed, access to N. Port Avenue and Nueces Bay Boulevard would be maintained under all of the alternatives, allowing for a relatively unchanged route to Buccaneer Stadium and the schools south of I-37. While the pedestrian bridges at Alameda Street would be removed under the Red, Orange and West Alternatives, pedestrian access would remain similar to the existing condition. The removed pedestrian access at Alameda Street would be accommodated at Staples Street, and the pedestrian bridge at Stillman Avenue would be removed but replaced nearby under all of the alternatives. Pedestrian access across I-37 would also be accommodated at the interchange with the Crosstown Expressway, at N. Port Avenue, and at Nueces Bay Boulevard. The physical barrier of I-37, which contributes to the community's sense of separation, would remain under all of the alternatives.

Green Alternative

The three homes that would be displaced in the Northside community under the Green Alternative would not result in the redistribution, loss, or influx of population. The availability of replacement housing should allow the displaced residents to remain in the neighborhood if they choose. The degree of separation of the community from downtown would remain relatively unchanged under the Green Alternative, although the addition of four underpasses (Hughes, Fitzgerald, Palo Alto and Power Streets) to the reconstructed US 181 facility would allow for improved mobility to and from the downtown area. Access to downtown was one of the community values identified as important by respondents to the survey and these underpasses would be an improvement relative to the current condition. As the Green Alternative would not impact or affect access to the Oveal Williams Senior Center or other community gathering places, this alternative would not affect community cohesion.

Red Alternative (Preferred)

The proposed Red Alternative (the Preferred Alternative) would require the displacement of 39 residences within the Northside community. Fifteen of the units to be displaced are located at the edge of the Hillcrest neighborhood along the I-37 frontage road; the remaining 24 units are duplexes or apartments clustered in the Washington-Coles neighborhood near Winnebago and Josephine Streets.

Although efforts would be made to locate replacement housing within the neighborhood, if these households decided to relocate outside of the Northside community, the population loss would not be substantial. Census 2010 data show that there are approximately 941 households in the Northside community; 39 households represent approximately 4 percent.

As noted in **Section 3.5.3.3**, the Hillcrest and Washington-Coles neighborhoods are distinct from each other and have differing demographic characteristics. Cross-neighborhood interaction does occur, primarily at community resource centers. These amenities, including the Oveal Williams Senior Center, the health clinic, Solomon Coles High School (the only operating school in the Northside community), and St. Paul United Methodist Church are located in the Washington-Coles neighborhood. Solomon Coles High School is also the location of afterschool programs. While Hillcrest is currently separated from Washington-Coles by N. Port Avenue and bound on other sides by I-37 and the refineries, the degree of separation of the Hillcrest neighborhood would be magnified by the implementation of the Red Alternative, based on changes in access and the presence of an elevated roadway through the Northside community. The alignment would bisect the Northside community and sever Winnebago Street, the primary east-west connection between the two neighborhoods—this connection would be restored with an extension of Lake Street to the north and the eastbound frontage road to the south, as noted in **Section 4.6.3.2**, which helps to minimize the separation to some extent. Broadway Street and Port Avenue would also remain to provide east-west connections within the community.

The ease of accessibility to employers and downtown amenities identified as an important aspect of the Northside community would improve slightly under the Red Alternative with the additional east-west connectivity offered by the new connection of Power, Brewster, and Hirsch Streets to Tancahua Street. Access to eastbound I-37 and US 181 would be about as convenient as the current condition, though access to westbound I-37 would be reduced from three entrances to two: N. Staples Street and N. Port Avenue.

As discussed above, Hillcrest is a more cohesive neighborhood than Washington-Coles and while the Red Alternative would have minimal effects to community cohesion for these neighborhoods individually, it would contribute to further urbanization of the community and separation between the two neighborhoods, affecting cohesion in the Northside community as a whole.

Orange Alternative

The Orange Alternative would result in similar but more pronounced social and psychological impacts as compared to the Red Alternative. In the Hillcrest neighborhood, the same 15 residential units displaced by the Red Alternatives would be displaced by the Orange Alternative. In the Washington-Coles neighborhood, five homes and eight duplex units would be displaced, along with 50 apartment units. These displacements would affect 15 households in the Hillcrest neighborhood and 63 households in Washington-Coles neighborhood, representing 2.6 and 16.8 percent of the current households in these neighborhoods, respectively. While the displacements in the Hillcrest neighborhood would represent a relatively minor effect—few displacements with available single-family replacement housing— the

impacts in the Washington-Coles neighborhood would be more substantial. Fifty of the units to be displaced are low-income rental apartments, and there are no replacement units available in the neighborhood. While these households could be accommodated at the proposed Palms at Leopard complex (see **Section 4.4.1.1**), this development is located across I-37 in the Leopard Street neighborhood. The outflow of approximately 17 percent of the Washington-Coles neighborhood's households would adversely affect community cohesion.

Additionally, businesses to be displaced by the Orange Alternative (Blue Monday Lounge and Unity Chapel Funeral Home) are utilized by residents of both neighborhoods. The Washington-Coles area was home to a bustling Northside business and entertainment district in the 1950s and 1960s, centered along N. Staples Street (Strasburg 1998b), but over time, most of these businesses have closed. The commercial uses along N. Port Avenue are primarily industrial and do not offer services to the residents of the Northside neighborhoods. The two businesses that would be displaced by the Orange Alternative are the only businesses of these types remaining in the Washington-Coles neighborhood. Although none of these businesses provide services essential to the well being of community members (institutions in this category would include food or clothing banks, shelters, adult day care, physical and mental health support) the loss of these establishments would represent an adverse impact to provision of services within the neighborhood, particularly the funeral home. The nearest funeral homes are located on Leopard Street west of the Oak Park neighborhood and on Morgan Avenue in the Crosstown East neighborhood. As these establishments also serve as gathering places, these business displacements would also adversely affect community cohesion.

The proposed route of US 181 through the community under the Orange Alternative would also contribute to increased separation for both the Hillcrest and Washington-Coles neighborhoods. Like the Red Alternative, the proposed route for the Orange Alternative would introduce a new barrier between the two neighborhoods and would sever Winnebago Street, the primary east-west connection. Access would be provided along the new Lake Street extension, which would be about 1,100 feet longer than Winnebago Street in this location. While the Orange Alternative would create a barrier for the Hillcrest neighborhood more or less to the same degree as the Red Alternative, the Orange Alternative would encroach further into the Washington-Coles neighborhood, creating a barrier with the added effect of removing a large portion of the residential area of the neighborhood and replacing it with a major highway.

As with the Red Alternative, the ease of accessibility from the Northside community to employers and downtown amenities would improve slightly under the Orange Alternative, with the additional east-west connectivity offered by the new connection of Power, Brewster, and Hirsch Streets to Tancahua Street. Access to eastbound I-37 and US 181 would be about as convenient as the current condition, though access to westbound I-37 would be reduced from three entrances to two: N. Staples Street and N. Port Avenue. The community's sense of living in a neighborhood could be negatively impacted for residents of Washington-Coles, considering the potential population loss and the introduction of a major transportation facility that would contribute to the further urbanization of the neighborhood.

West Alternative

As discussed in **Section 3.5.3.3**, in the 1990s, refineries purchased land and removed houses along the western edge of the Hillcrest neighborhood to provide separation between their industrial activities and the Northside neighborhoods. The proposed West Alternative is designed to utilize part of this now mostly open space. Although this alternative primarily passes through vacant land in the Hillcrest neighborhood, 11 residential units would be displaced. Five of the residences are single family homes, and replacement housing in the neighborhood is available. The six apartment units would be more difficult to relocate; however, even if these households chose to relocate outside the neighborhood, these displacements would not result in substantive redistribution, influx, or loss of population within the community.

The sense of separation related to the boundary created by I-37 would remain relatively unchanged under any of the alternatives. The West Alternative would avoid placing a new barrier in the middle of the Northside community, as the Red and Orange Alternatives would, and would also substantially reduce the barrier between the neighborhoods and downtown created by the existing US 181 facility. While the location of the West Alternative in the Hillcrest neighborhood may be considered by some in the community as positive reinforcement of the buffer between the residential areas and the refineries, others, including representatives of the Citizens Advisory Committee speaking at the July 11, 2013 meeting, would consider the West Alternative an intrusion into the neighborhood.

Like the Red and Orange Alternatives, the West Alternative would provide additional east-west connectivity to downtown via the new connection of Power, Brewster, and Hirsch Streets to Tancahua Street. The West Alternative, however, would not accommodate direct access to US 181 and I-37 from the Northside community, particularly the Hillcrest neighborhood. Considering that respondents to the community survey identified changes in vehicular access as the potential negative effect of the most concern, and that ease of access to downtown was identified as an important characteristic of the community, the West Alternative would have an adverse effect to Northside community values.

Community cohesion would be minimally affected by the West Alternative as access between the Hillcrest and Washington-Coles neighborhoods would be maintained and the displacement of community resources or gathering places would not be required. The West Alternative would not be expected to adversely affect the existing social relationships or a sense of shared identity among residents.

No Build Alternative

Under the No Build Alternative, the current patterns in population changes and development trends would continue, and the perception of the barrier between the Northside community and downtown would remain. No safety improvements would be made to US 181, including the existing Harbor Bridge and approaches. The No Build Alternative would continue to offer the same accessibility and mobility options for neighborhood residents and would not have an effect on community cohesion.

4.6.3.5 Impacts to Public Services

Corpus Christi Fire Stations 1 and 5 are closest to the Northside community (see **Figure 3.5-7**). The route from Fire Station 1 into the Washington-Coles neighborhood, via Belden or Brewster Street, would remain unchanged under the build alternatives. Similarly, vehicles from Fire Station 5 would still be able to utilize the same route via Port Avenue to access the Hillcrest neighborhood. Reaching the CHRISTUS Spohn Family Health Clinic would be somewhat more circuitous for Hillcrest residents under the Red and Orange Alternatives (as Winnebago Street would be closed and access replaced to the north along an extended Lake Street), but the facility would remain accessible. Travel time modeling indicates that the trip from I-37 at Up River Road to the hospital on Morgan Avenue would only take a few seconds longer for all of the build alternatives as compared to taking the trip under the No Build Alternative (see **Table 4.5-5**).

Green and West Alternatives

The Green and West Alternatives would not affect any parks or other facilities providing public services in the Northside community.

Red (Preferred) and Orange Alternatives

T.C. Ayers Park would be impacted by the Red and Orange Alternatives. The Red Alternative would impact the park's baseball field, the playground, the covered basketball court, the Born Learning Trail, and the (closed) recreation center. The Orange Alternative would impact the baseball field and would leave the remaining amenities intact. T.C. Ayers is the only park in the community with a baseball field, although there are more fields offered at Ben Garza Park, located approximately one mile away. While field observations indicate that the baseball and basketball facilities are not used regularly and the pool is only open for a portion of the summer, these usage patterns can be attributed to some degree to the lack of City funding for operation and maintenance of these facilities. The baseball fields are not mowed regularly, the recreation center is closed, and the pool is operated with the assistance of outside funding that limits the duration of its operating season. **Section 5.3.2.1** includes a discussion of the impacts to T.C. Ayers Park in the context of Section 4(f) and **Section 5.5.2** provides details of the conceptual mitigation that would serve to replace the functions of the park at a property nearby, resulting in a potential overall benefit to the community.

No Build Alternative

Under the No Build Alternative, there would be no impacts to public services. Travel time between Up River Road at I-37 and CHRISTUS Spohn Memorial Hospital would be about eight seconds slower in 2040 under the No Build Alternative, compared to the 2010 existing condition (see **Table 4.5-5**).

Summary: Northside

Impacts to the Northside community are summarized below by alternative in **Table 4.6-3**.

Table 4.6-3 Summary of Community Impacts: Northside					
	Green	**Red**	**Orange**	**West**	**No Build**
Displacements	3 residential displacements	31 residential displacements	78 residential displacements	11 residential displacements	0 residential displacements
Mobility & Access	No changes within neighborhoods; I-37 westbound less accessible; minor improvement in connectivity between Northside and downtown	Closure of portion of Winnebago Street; I-37 westbound less accessible; improvement in connectivity between Northside and downtown	Closure of portion of Winnebago Street; I-37 westbound less accessible; improvement in connectivity between Northside and downtown	No changes within neighborhood; poor access to US 181 and I-37; improvement in connectivity between Northside and downtown	No impact; no improvement in connectivity between Northside and downtown
Physical	Existing barrier effect downtown would remain with minor connectivity improvement; noise impacts at 68 residential receivers	Physical barrier between Washington-Coles and downtown would be removed; new barrier between Hillcrest and Washington-Coles would be introduced; noise impacts at 204 residential receivers	Physical barrier between Washington-Coles and downtown would be removed; new barrier between Hillcrest and Washington-Coles would be introduced; noise impacts at 145 residential receivers	Physical barrier between Northside and downtown would be removed; physically separates Hillcrest from refineries while introducing a new highway facility into the neighborhood; noise impacts at 47 residential receivers	Perpetuation of existing barrier effect; no noise impacts
Social & Psychological	Loss of less than 1% of Hillcrest neighborhood households; No impact to community values or cohesion; existing barrier effect would remain with minor mobility improvement	Loss of 3% of neighborhood households in Hillcrest and 4% in Washington-Coles; Potential for increased separation; loss of cohesion between the Hillcrest and Washington-Coles neighborhoods	Loss of 3% of neighborhood households in Hillcrest, and 17% in Washington-Coles; potential for increased separation; adverse impact to community cohesion for Washington-Coles	Loss of 2% of neighborhood households in Hillcrest; No impact to community cohesion; loss of accessibility to major transportation facilities (adverse effect to community values)	No impact to community values or cohesion; safety improvements to US 181 would not occur
Public Services	No effect on provision of services; no parks impacted	No effect on provision of public services; impacts to recreation at T.C. Ayers Park to be replaced nearby; Oveal Williams Senior Center less accessible	No effect on provision of public services; impacts to recreation at T.C. Ayers Park to be replaced nearby; Oveal Williams Senior Center less accessible	No effect on provision of services; no parks impacted	No impact

Table 4.6-3 Summary of Community Impacts: Northside					
	Green	**Red**	**Orange**	**West**	**No Build**
Safety	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared-use path	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared-use path	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared-use path	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared-use path; Perception of US 181 proximity to refineries as unsafe (see **Section 4.1.2** and **Section 4.7.3**); reduced access to I-37 and US 181 from Hillcrest affecting hurricane evacuation	No improvement
Visual & Aesthetic	Change in Harbor Bridge elevation would not substantially alter the viewshed from Washington-Coles	Removal of existing view of Harbor Bridge from Washington-Coles; view of new bridge would be more pronounced than current condition; new bridge would add to the urbanized aesthetic of the neighborhood	Removal of existing view of Harbor Bridge from Washington-Coles; view of new bridge would be more pronounced than current condition; new bridge would add to the urbanized aesthetic of the Washington-Coles neighborhood and change visual character substantially	Removal of existing view of Harbor Bridge from Washington-Coles; view of new bridge would be more pronounced than current condition; could act as visual screen for refineries but would change visual character of this part of Hillcrest	No impact
Land Use	Partially consistent: could impede City from implementing Future Land Use Plan and Community Sustainability Plan	Potential for the City to implement Future Land Use Plan and Community Sustainability Plan	Considered largely incompatible with future land use and community sustainability planning in the SEA District/CBD; impact to Broadway Wastewater Treatment Plant	Considered largely incompatible with future land use and community sustainability planning in the SEA District/CBD because of diversion of traffic away from these areas	No impact
Economic	No business displacements with impacts to community	No business displacements with impacts to community	Loss of businesses which are sole providers of services within community	No business displacements with impacts to community	No impact

1 Source: US 181 Harbor Bridge EIS Study Team 2013

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4.6.4 Westside

4.6.4.1 Displacement Impacts

Displacement impacts are discussed in detail by alternative in **Section 4.4**. The Westside community is comprised of four neighborhoods: Oak Park, Leopard Street, Ben Garza, and Crosstown West (see **Section 3.5.3.4**). Residential displacements required by the build alternatives range from one to two homes, both in the Ben Garza neighborhood. There would be no commercial displacements in the Westside community under any of the build alternatives.

Green Alternative

The Green Alternative would require one residential displacement in the Ben Garza neighborhood (see **Displacements Plate G-3** in **Appendix I**). Based on a real estate market search conducted in June 2013, there are no properties for sale in the Ben Garza neighborhood. Several comparable homes are available, however, in the Crosstown West neighborhood south of Laredo Street.

Red (Preferred), Orange, and West Alternatives

The Red (Preferred), Orange and West Alternatives would each displace the same residence as the Green Alternative, in addition to a home on Culberson Street just south of Lipan Street in the Ben Garza neighborhood (see **Displacements Plates R-3**, **O-3**, and **W-6** in **Appendix I**). As discussed above, it is anticipated that sufficient comparable replacement housing would be available in the adjacent Crosstown West neighborhood to accommodate these displaced households.

No Build Alternative

The No Build Alternative would not require any residential or business displacements.

4.6.4.2 Mobility and Access Impacts

Green Alternative

Along the Crosstown Expressway, the southbound entrance at Leopard Street would be closed; drivers would travel a short distance further south to enter the ramp at Howard Street instead. From the Crosstown Expressway northbound, the exits to Leopard and Lipan/Comanche Streets would be closed under the Green Alternative, requiring drivers to exit at Laredo Street to access streets further north. Similar to the current condition, drivers from the Westside community could access the Crosstown Expressway northbound via a ramp just south of Musset Street. Both Lipan and Comanche Streets would remain open, maintaining connections to the Evans Elementary neighborhood to the east.

Under the Green Alternative, the main lanes of eastbound I-37 would transition to US 181 near Staples Street. Access to downtown formerly provided by eastbound I-37 would be provided by eastbound frontage roads along a very similar alignment. This frontage road extends to the northern boundary of the Westside community and would be directly accessible from the Ben Garza, Leopard Street, and Oak Park neighborhoods. To access westbound I-37, drivers from the Ben Garza and Crosstown West

neighborhoods could utilize the direct ramp northbound from the Crosstown Expressway. They could also cross at Lipan Street or Comanche Street and take the northbound frontage road to Winnebago Street to enter the ramp a short distance away at Alameda Street. Drivers from the Leopard Street or Oak Park neighborhoods would cross I-37 at Port Avenue or Nueces Bay Boulevard and enter the ramp to westbound I-37 west of Buddy Lawrence Drive. Access to US 181 would be provided via eastbound I-37, the northbound frontage road, or the direct ramp from the Crosstown Expressway northbound.

Red (Preferred) and Orange Alternative

Under the Red (Preferred) and Orange Alternatives, the exit to Lipan/Comanche Streets from the Crosstown Expressway northbound would be closed; drivers could instead utilize the Leopard Street exit and backtrack south or exit at Agnes/Laredo Street and travel north on N. 19th Street. Access to the Crosstown Expressway southbound would be relatively similar to the current condition; drivers from the Westside would enter via the ramp at Coleman Street instead of the existing Leopard Street entrance which would be closed. The entrance to the Crosstown Expressway northbound at Laredo Street would be closed, making the ramp at Morgan Avenue the northernmost opportunity to enter heading north. Lipan Street would be closed as well under the Red and Orange Alternatives, although Comanche Street would remain open to maintain a connection (along with Leopard Street) to the Evans Elementary neighborhood to the east.

Drivers from the Ben Garza and Crosstown West neighborhoods could access westbound I-37 via the direct ramp from the Crosstown Expressway northbound. They could also cross at Comanche Street and take the northbound frontage road to Winnebago Street, entering the ramp a short distance away at N. Staples Street. Drivers from the Leopard Street or Ben Garza neighborhoods would cross I-37 at Port Avenue and enter the ramp to westbound I-37 at that location. Eastbound I-37 would be accessible via the ramp from the eastbound frontage road near Kennedy Avenue in the Leopard Street neighborhood.

Access to US 181 for the Crosstown West, Ben Garza and Leopard Street neighborhoods would be provided via the northbound US 181 frontage road (accessed via Leopard Street, Comanche Street, or the eastbound I-37 frontage road), or directly from the Crosstown Expressway northbound.

West Alternative

The West Alternative would preserve the existing exit to Leopard Street from the Crosstown Expressway northbound, while the exit to Comanche Street would be closed. Access to the southbound Crosstown Expressway would remain the same as the current condition. As with the Red and Orange Alternatives, the entrance to the Crosstown Expressway northbound at Laredo Street would be closed, making the ramp at Morgan Avenue the northernmost opportunity to enter northbound. Lipan Street would also be closed, while Comanche Street would remain open to maintain a connection (along with Leopard Street) to the Evans Elementary neighborhood to the west.

Access to westbound I-37 for the Crosstown West and Ben Garza neighborhoods would be provided via the direct ramp from the Crosstown Expressway northbound. Alternately, drivers could cross I-37 at Port Avenue or Nueces Bay Boulevard and take the entrance ramp past Buddy Lawrence Drive.

Access to US 181 for the Crosstown West, Ben Garza and Leopard Street neighborhoods would be provided directly from the Crosstown Expressway northbound. Drivers from the Oak Park neighborhood would enter the eastbound I-37 main lanes at Up River Road and access US 181 via a direct ramp.

No Build Alternative

Under the No Build Alternative, a new bridge would not be constructed and no roadway improvements would be made. There would be no changes in access from the current condition.

4.6.4.3 Physical Impacts

The only physical impact to the Westside community would be traffic noise (discussed in detail in **Section 4.10**). Modeling indicates that all of the build alternatives would result in a traffic noise impact over the FHWA NAC at residential receivers in the community. Noise barriers are proposed in various locations along the Crosstown Expressway in the Westside community under all of the proposed alternatives.

Green Alternative

The Green Alternative would result in traffic noise impacts at 235 residential receivers in all four of the Westside neighborhoods (see **Noise Plates G-3-5** in **Appendix I**). Noise barriers are proposed along the Crosstown Expressway between Howard Street and Laredo Street in the Ben Garza and Crosstown West neighborhoods, resulting in benefits to 36 residential receivers as well as Ben Garza Park. A barrier is also proposed in the Oak Park neighborhood, benefitting seven residential receivers.

Red Alternative (Preferred)

Under the Red Alternative, 223 residential receivers in all of the Westside neighborhoods would experience traffic noise impacts (see **Noise Plates R-3** through **6** in **Appendix I**). The same noise barriers as proposed under the Green Alternative for the Westside community are proposed under the Red Alternative, resulting in benefits to 27 residential receivers.

Orange Alternative

The Orange Alternative would result in traffic noise impacts at 210 residential receivers in all four of the Westside neighborhoods (see **Noise Plates O-3, O-4,** and **O-6** in **Appendix I**). The same noise barriers as proposed under the Green Alternative for the Westside community are proposed under the Orange Alternative, resulting in benefits to 42 residential receivers.

West Alternative

The West Alternative would result in traffic noise impacts at 172 residential receivers in the Westside community (see **Noise Plates W-4** through **7** in **Appendix I**). Noise barriers are proposed along the Crosstown Expressway between Howard Street and Laredo Street, resulting in benefits to 14 residential receivers.

No Build Alternative

As with the build alternatives, the No Build Alternative would not affect the alignment of the Crosstown Expressway or I-37, which acts as physical boundaries for the Westside neighborhoods. Noise levels would continue to increase as the volume of traffic increases over time.

4.6.4.4 Social and Psychological Impacts

As with the South Central community, the Westside neighborhoods were affected by the construction of the Crosstown Expressway and I-37 in the 1960s. The path of the expressway severed existing communities to the east and west. When I-37 was constructed, the Oak Park neighborhood was divided in half and many homes were demolished. Refineries later began acquiring property in the portion of the neighborhood north of I-37; all that remains of the neighborhood today is the area south of I-37 between Nueces Bay Boulevard and Up River Road. As noted in **Section 3.5.3.4**, input from attendees at meetings in the Westside community suggested that residents of the areas along either side of the Crosstown Expressway may not share a strong sense of community cohesion in geographically defined neighborhoods, although cohesion in the Oak Park and Leopard Street neighborhoods is relatively strong. Concerns expressed by the Westside community included avoiding impacts to Corpus Christi Metro Ministries—all of the alternatives avoid this property—and changes in access to downtown and the entertainment district. Respondents to the community survey listed a sense of safety when using the bridge and long-term economic opportunities as the highest ranked potential benefits. Changes in vehicular access and changes to pedestrian routes were listed as the potential negative effects of most concern.

Build Alternatives

The primary impact to the Westside community relates to changes in access, which are not expected to be substantial or cause changes in social relationships under any of the alternatives. All of the build alternatives would involve the re-designation of Culberson Street as a Crosstown Expressway service road. Depending on the alternative, two to three structures appear to face on to Culberson Street and would have a change in address.

The small number of residential displacements required by the build alternatives would not affect population trends in the Ben Garza neighborhood. There would be no business displacements in the Westside community under any of the alternatives, and there would be no impact to Corpus Christi Metro Ministries, an important community resource. The degree of separation of the neighborhoods would remain very similar to the existing condition; the boundary imposed by the Crosstown

Expressway and I-37 would remain unchanged. Downtown entertainment areas would remain essentially as accessible as the current condition. No community facilities or gathering places would be impacted. The proposed build alternatives are not anticipated to affect social relationships or community cohesion in the Westside community.

No Build Alternative

Under the No Build Alternative, the current patterns in population changes and development trends would continue, and the division of neighborhoods by the Crosstown Expressway would remain. No safety improvements would be made to US 181, including the existing Harbor Bridge and approaches. The No Build Alternative would continue to offer the same accessibility and mobility options for neighborhood residents and would not have an effect on community cohesion.

4.6.4.5 Impacts to Public Services

Build Alternatives

Fire Station 5, located at 3312 Leopard Street, is the closest station to the Westside community (see **Figure 3.5-8**). As noted in **Section 4.3.1.1**, emergency response routes from this station would not be affected by the proposed project, although there could be certain response scenarios where the route could be shorter or longer depending on the destination. The fastest route for ambulances from CHRISTUS Spohn Memorial Hospital to reach the Westside neighborhoods would not utilize the Leopard or Lipan/Comanche Street exits from the Crosstown Expressway; neither these exit closures nor any other changes in access would measurably affect emergency vehicle response time.

Ben Garza Park and the Navarro Place public housing complex in the Westside community would not be affected by the build alternatives.

No Build Alternative

Under the No Build Alternative, there would be no impacts to public facilities or the provision of public services.

Summary: Westside

Table 4.6-4 provides a summary of impacts to the Westside community by alternative.

Table 4.6-4 Summary of Community Impacts: Westside

	Green	Red	Orange	West	No Build
Displacements	1 residential displacement	2 residential displacements	2 residential displacements	2 residential displacements	0 residential displacements
Mobility & Access	Similar access to current condition	Similar access to current condition for US 181 and I-37; many entrance and exit closures along Crosstown Expressway; closure of Lipan Street		Similar access to current condition for US 181 and I-37; some entrance and exit closures along Crosstown	No impact

Table 4.6-4 Summary of Community Impacts: Westside					
	Green	**Red**	**Orange**	**West**	**No Build**
				Expressway; closure of Lipan Street	
Physical	Existing barriers of Crosstown Expressway and I-37 would remain; traffic noise impacts at 235 residential receivers; noise barriers proposed	Existing barriers of Crosstown Expressway and I-37 would remain; traffic noise impacts at 223 residential receivers; noise barriers proposed	Existing barriers of Crosstown Expressway and I-37 would remain; traffic noise impacts at 210 residential receivers; noise barriers proposed	Existing barriers of Crosstown Expressway and I-37 would remain; traffic noise impacts at 172 residential receivers; noise barriers proposed	Existing barriers of Crosstown Expressway and I-37 would remain; no noise impacts
Social & Psychological	No impact to community values or cohesion; existing barrier effect of the Crosstown Expressway and I-37 would remain				No impact to community values or cohesion; safety improvements to US 181 would not occur
Public Services	No effect on provision of services; no parks impacted				
Safety	Improved safety along US 181 and I-37 and improved safety for bicyclists and pedestrians with shared-use path				No improvement
Visual & Aesthetic	No substantial changes in visual and aesthetic qualities of community			Introduction of bridge and approaches to view of some areas of Oak Park	No impact
Land Use	No effect on land use in Westside community				
Economic	No business displacements				

Source: US 181 Harbor Bridge EIS Study Team 2013

4.6.5 Refinery Row

The populated portion of the Refinery Row community is located west of the project limits and would not be directly impacted by the proposed project. These neighborhoods are included in the community impact analysis because of their potential to be indirectly affected by the project, a concern raised by Citizens for Environmental Justice (CFEJ) and community residents who are members of the Citizens Advisory Committee. The Dona Park and Academy Heights neighborhoods are highly cohesive, with many multi-generational residents (see **Section 3.5.3.5** for a complete profile).

At the community meeting, held at St. Teresa's Catholic Church on November 13, 2012, some attendees expressed support for the project as well as concerns about the environmental health of the community. Respondents to the community survey listed the quiet and secluded nature of the neighborhoods as the most special aspect of their community. Regarding the proposed project, the potential for increased long-term economic opportunity and a sense of safety when using the bridge were listed as the potential project benefits of greatest importance. Potential negative effects of the

proposed project of the greatest importance were displacements and increases in traffic noise. All of the build alternatives would address the most important benefits in a similar fashion, and none of the build alternatives would result in displacements or noise impacts to the community.

There would be no effects to the street network in the Refinery Row neighborhoods; the community would not experience changes in population or changes in access due to the project. The neighborhoods have clearly defined boundaries, including I-37 to the south and refineries to the north, and the community could be described as somewhat isolated. This quality, however, appears to be a valued aspect of the neighborhoods. Under all of the build alternatives, the alignment of I-37 would be unchanged, and the degree of isolation would also remain unchanged. The proposed project would not impact community cohesion or cause a change in social values. There would be no impact to any public facilities or the provision of public services, including emergency response time. Access to the Refinery Row community from Corpus Christi Fire Station 9 would be unchanged. Modeled travel times indicate that the trip from I-37 at Up River Road (inside the project limits) to CHRISTUS Spohn Memorial Hospital on Morgan Avenue under the build alternatives would be less than 10 seconds different than the No Build Alternative (see **Table 4.5-5**). There would be no changes in the visual and aesthetic character of the neighborhoods or changes in land use, and there would be no direct economic impacts. Potential indirect effects of the project on the Refinery Row community are discussed in **Section 6.6.1.2**.

4.6.6 Portland

Portland is located north of the Nueces Bay Causeway in San Patricio County and would not be directly impacted by the proposed project. The community is included in the community impact analysis because residents of Portland use the Harbor Bridge to travel to Corpus Christi and may be indirectly affected by the project. According to Census 2010 origin-destination employment statistics, approximately 47 percent of employed persons who live in Portland work in Corpus Christi.

Based on community input gathered through public meetings and the community survey, residents and public officials in Portland and San Patricio County are generally in favor of the project. Concerns focused on changes in access to downtown, particularly for business commuters and emergency services. According to responses to the community survey, the most important beneficial aspects of the project to Portland residents are a sense of safety when using the bridge and the potential for increased long-term economic opportunity for the region. All of the build alternatives would address these benefits in a similar fashion. The most important potential negative effects are changes in distance to a major highway and displacements. As it has been clear during all phases of project development that the proposed project's construction limits would not extend to Portland, and that there would be no displacements there, respondents to the survey are likely referring to displacements elsewhere in the project area. As access to US 181 and to the portion of I-37 that would be used for long-distance travel for Portland residents would remain unchanged, the build alternatives would not cause changes in distance to a major highway.

There would be no effects to the local street network in Portland, and the proposed project would not isolate or cause physical impacts to the community, including noise impacts. The proposed project would not impact community cohesion in Portland or cause a change in social values. There would be no impact to any public facilities or the provision of public services, including emergency response time. Access from Portland fire and police stations would not be changed. Modeled travel times indicate that the trip to CHRISTUS Spohn Memorial Hospital on Morgan Avenue from a central point in Portland (Daniel Moore Avenue and Center Drive) under the Red and Orange Alternatives would be less than five seconds different than with the No Build Alternative, while the trip along the West and Green Alternatives would take 38 seconds and one minute longer, respectively (see **Table 4.5-5**). There would be no changes in the visual and aesthetic character of the neighborhoods or changes in land use, and there would be no direct economic impacts. The potential for indirect effects of the project to occur in Portland are discussed in **Section 6.6.1.2**.

4.7 ENVIRONMENTAL JUSTICE

In compliance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and in accordance with agency implementation guidelines, this section summarizes: the identification of low-income and minority populations; the efforts undertaken to ensure meaningful opportunities for public participation; potential beneficial and adverse effects of the proposed project; consideration of mitigation and offsetting benefits; and an evaluation of whether any of the proposed alternatives would cause disproportionately high and adverse effects. Per FHWA Order 6640.23A, a disproportionately high and adverse effect on a minority or low income population means the adverse effect is predominantly borne by such population or is appreciably more severe or greater in magnitude on the minority or low-income population than the adverse effect suffered by the non-minority or non-low-income population.

4.7.1 Minority Populations and Low Income Populations

Section 3.5.1.3 outlines the definitions and methodology for identifying environmental justice populations. According to data from the 2007-2011 American Community Survey, seven block groups adjacent to or intersected by the proposed alternatives have been identified as low-income populations. (Refer back to **Table 3.5-9** and **Figure 3.5-2** for further information on the demographic and spatial distribution of low-income groups in the project area). Further, according to data from the 2010 Census, of the 82 populated blocks adjacent to or intersected by one or more of the proposed build alternatives, 70 are identified as minority populations. (Refer back to **Table 3.5-10** and **Figure 3.5-3** for further information on the demographic and spatial distribution of minority groups in the project area). In addition to the Census geographies identified above, analysis of the various communities identified in the community impact assessment indicates that of the six communities (North Beach, Northside, Westside, South Central, Refinery Row, and Portland), all but North Beach and Portland have an overall minority population over 50 percent. Four of the communities (Northside, Westside, South Central, and Portland) include block groups with median household incomes below the 2013 DHHS poverty guideline for a family of four ($23,550). The population within the combined community boundaries, including Portland (see **Figure 3.5-4**) is approximately 62 percent minority. Excluding Portland, the area has a

minority population of approximately 84 percent. The following analysis is based on this identification of minority and low-income populations as well as the assessment of impacts presented throughout **Section 4.0, Environmental Consequences**.

4.7.2 Coordination, Access to Information and Participation

Proactive efforts to ensure meaningful opportunities for public participation in the decision-making process for the proposed project have been pursued from the outset of the scoping phase initiated on August 9, 2011. Invitations to the two public scoping meetings held for the project were sent to numerous church, business and school leaders representing the various minority communities in the project area as well as residents from these communities. Project planners engaged with scoping participants to ascertain their views on the project as well as their ideas regarding effective ways to reach other members of the minority and low-income community who were not able to attend the public scoping meetings.

From these initial discussions, project planners developed an approach specific to this environmental justice analysis to identify potential barriers to community participation (including limited English proficiency and cultural differences, for example) and measures to counteract those barriers. In particular, a series of eight neighborhood meetings were held in the fall of 2012 to present the project to each individual community identified in the community impact assessment as being potentially affected by the proposed project. These neighborhood meetings are described in **Section 8.2.4** of this Draft EIS, including information on the outreach and advertisement of each meeting according to the preferences of the individual communities. Design issues arising out of these neighborhood meetings informed the engineering and environmental considerations for the project, a process described in **Section 4.7.5**.

As a companion to the individual neighborhood meetings, and in an effort to reach a wider demographic, a community survey was administered throughout the fall of 2012 and winter of 2013; details are provided in **Section 3.5.3** and a copy of the survey is included in **Appendix F**. The survey was provided at each of the neighborhood meetings, in both English and Spanish, and was also available on the project website in English and Spanish. Attendees at the neighborhood meetings were also offered the opportunity to provide answers to the survey verbally for project staff to record. Summaries of the responses to the survey are included in **Section 3.5.3** under the headings for each individual community. In an effort to expand the reach of the survey to minority and low-income areas that had to that point been less responsive to the survey, graduate students in the Public Administration program at Texas A&M University-Corpus Christi, developed and administered an abbreviated survey specifically designed to elicit feedback from the Hillcrest, Washington-Coles, Ben Garza, Leopard Street, and Evans Elementary neighborhoods.

In addition to the neighborhood meetings, special meetings were held during the lunch hour—the period of highest attendance—at the Oveal Williams Senior Center on November 8, 2012 and July 11, 2013. In both cases, patrons of the Senior Center were provided detailed information on the proposed

project, including the potential effects, and an opportunity to have their questions answered regarding the proposed alternatives, the analysis of project impacts and possible mitigation options. Members provided valuable feedback, and their concerns have been incorporated into the proposed project—including, most importantly, the avoidance of the Senior Center. (See **Section 4.7.5** for further discussion of avoidance and minimization efforts.) A separate meeting was held with the Environmental Summit Environmental Justice Working Group on October 16, 2012, and meeting participants and project staff in attendance engaged in a similar back and forth discussion regarding the proposed project (see **Section 8.2.5**).

Another major opportunity for meaningful project input by minority and low-income communities was provided to members of or public participants in the project's Citizens Advisory Committee. This committee (described more fully in **Section 8.2.3.1**), which met four times throughout the development of the Draft EIS, provided valuable feedback to the community and to project planners. Many of the issues raised in the committee meetings have been incorporated into the project design, resulting in either avoidance or minimization of impacts to minority and low-income populations. (See **Section 4.7.5** for a description of avoidance and minimization measures.)

The public meeting, held for the proposed project on December 4, 2012, was another opportunity for participation by minority and low-income communities; the specifics of this meeting are described in **Section 8.2.6**. Additional opportunities are on the horizon, including a public hearing to be held for the project following review of this Draft EIS by the public and Participating and Cooperating agencies. A public design guideline workshop is also planned to be held following the public hearing, which will give members of minority and low-income communities an opportunity to participate in the process regarding the aesthetic design of the project, including the bridge.

4.7.3 Impacts of the Build Alternatives

The direct effects of the proposed project are described throughout **Section 4.0** this Draft EIS; indirect effects and cumulative effects are described in **Sections 6.0** and **7.0**, respectively. This section does not attempt to reevaluate all of the impacts presented elsewhere in this Draft EIS, but instead focuses on those effects that could be beneficial or potentially adverse and evaluates those on the basis of whether they would be predominantly borne by minority or low-income populations in comparison to those effects on the overall population within the project area.

4.7.3.1 Displacements and Relocation Impacts

As shown below in **Table 4.7-1**, the Orange Alternative would require the largest number of residential displacements, and all of the alternatives would require displacements within minority blocks and low-income block groups. The displacements are also depicted by alternative in the context of Census geographies on the **Displacements Plates** in **Appendix I**.

Table 4.7-1 Residential Displacements in Minority or Low-Income Areas by Alternative				
	Green	**Red**	**Orange**	**West**
Total Residential Displacements	15	39	102	13
Residential Displacements within Minority Block and/or Low-Income Block Group	9	37	87	13
Percent of Total Residential Displacements	60%	95%	85%	100%

Source: US 181 Harbor Bridge EIS Team 2013

TxDOT would ensure that decent, safe and sanitary housing is available to all eligible displaced persons (home owners and rental tenants who have occupied the structure for at least 90 days) prior to their being displaced, although replacement housing within the same neighborhood would be difficult to find in some cases. Under the Orange Alternative, it is likely that many of the Northside residents displaced would not be able to relocate within the same neighborhood, particularly given the lack of multi-family housing available and the number of existing multifamily units that would be displaced (68). As discussed in **Section 4.4.1**, a new 120-unit apartment complex is planned on Leopard Street near Palm Drive, and it is expected that residents in the North Side Manor apartments in the Washington-Coles neighborhood would be offered preference in the application process for this new housing. Although this independent action is not associated with the proposed project, if residents of North Side Manor were accommodated at the Palms, this would provide housing for approximately 10 to 50 of the affected households in the Northside Manor Apartments under the Red and Orange Alternatives, respectively.

The Green, Red (Preferred), Orange, and West Alternatives would require 57, 3, 11, and 2 business displacements, respectively (see **Section 4.4.2.1**). While the Green Alternative would require the most business displacements, the displacements required by the Orange Alternative would primarily affect minority populations. This alternative would displace two businesses (a lounge and a funeral home) that are the sole provider of these services in the minority and low-income Washington-Coles neighborhood. The impacts to the community from these displacements are discussed in **Section 4.6.3.4** and these effects would be predominantly borne by minority and low-income groups.

4.7.3.2 Economic and Employment Impacts

Section 4.5 considers economic impacts related to business displacements, changes in access, major employers, tax revenues, and regional productivity. The proposed project would not directly affect major employers, and the regional economic effects associated with any of the proposed build alternatives would be beneficial for the overall community.

The Green Alternative would displace 57 businesses, primarily in the CBD area (see **Table 4.4-5**). Forty-one of these businesses are located in a single office tower, and based on Corpus Christi office market availability, it is anticipated that these businesses would be able to relocate without long-term effects to employees. Only two of the businesses to be displaced are registered Historically Underutilized Businesses (HUBs), which would both be displaced by the Green Alternative: Frontier Surveying in the

Park Tower, and Your Sign Company. It should be noted that HUBs are not necessarily minority-owned businesses. Effects from business displacements overall would be distributed throughout the city and would not be predominantly borne by minority or low-income groups. Other business displacements, in particular the important community businesses in the Washington-Coles neighborhood displaced by the Orange Alternative, could affect minority and low-income groups in ways other than economically, and these effects are described below in **Section 4.7.3.3**.

Changes in access could largely be beneficial for roadway-oriented businesses, as the somewhat more circuitous routes sometimes required and the reduction in the number of exits could mean that some businesses along the frontage roads would see increased exposure. These benefits would be shared by minority and non-minority, low-income and non-low-income business owners and employees alike. Conversely, depending on location and other circumstances, more circuitous routes could discourage customers of some roadway-oriented businesses.

Tax revenue impacts are calculated in **Section 4.5.5**, based on the loss in annual taxes associated with the conversion of taxable property to transportation use. The build alternatives would cause an estimated loss of $72,478 to $153,398 in annual taxes paid to various jurisdictions, including the City of Corpus Christi, Nueces County, and Corpus Christi Independent School District. In comparison to the size of the operating budgets of these jurisdictions, the lost tax revenue would be relatively insubstantial. In addition, construction of the proposed project would potentially involve some areas of existing State-owned right of way becoming available for sale as surplus property at some point, and these areas could eventually be added back to the local tax roles, minimizing the initial loss described above. These effects would be distributed throughout the community and would not be borne predominantly by minority or low-income groups.

The regional economic effects of the proposed project represent benefits that would be distributed throughout the project area and beyond. As noted in **Section 4.5.6**, the proposed project would provide an increase of $208M to $254M in household earnings, and an estimated 4,303 to 5,242 new jobs. These benefits would be available to minority and non-minority, low-income and non-low-income groups alike. The proposed project would include goals for disadvantaged and historically underutilized businesses to participate in the construction, and TxDOT would require the contractor to comply with these goals as part of its administration of the construction contract. The extent to which employment and income benefits would accrue to minority and low-income communities would be a function of the eligibility and qualifications of job applicants. TxDOT would work with the minority and low-income community, potentially through the Workforce Solutions of the Coastal Bend, on raising the level of awareness of the opportunity as well as the skills needed to participate. Additional information on this outreach effort is included below in **Section 4.7.5**.

4.7.3.3 Community Cohesion and Accessibility

Based on the analysis in **Section 4.6**, the primary social and psychological impacts of the proposed build alternatives relate to community cohesion and community values.

The introduction of a major transportation facility into the residential portions of the Northside neighborhoods under the Red (Preferred) and Orange Alternatives would contribute to a physical and visual barrier between the Hillcrest and Washington-Coles neighborhoods, potentially affecting the community cohesion of both neighborhoods. The Red and Orange Alternatives would require the closure of Winnebago Street, which Hillcrest residents use to access shared community resources, including the Oveal Williams Senior Center, the CHRISTUS Spohn Family Health Clinic, Solomon Coles High School and Education Center, and St. Paul United Methodist Church, all located in the Washington-Coles neighborhood. The closure of Winnebago Street within the proposed right of way would alter the way in which Hillcrest residents access these important community resources, although the effects would be minimized through the replacement of access along Lake Street to the north, including an accommodation for bicycle and pedestrian facilities; access would also be available along the I-37 frontage road to the south. While not a substantial difference relative to the existing condition—the route along Lake Street would be approximately 1,100 feet longer—the change in access could potentially discourage some users of these facilities, particularly non-drivers, from making these trips. The Senior Center, the Health Clinic and the church are several of the most important service providers in the community, however, and the likelihood is low that large numbers of residents would forego these public services because of a slightly longer route. The changes in design in order to replace access along Winnebago via Lake Street were presented at the July 2013 CAC meeting; no objections or concerns regarding this concept were recorded at the meeting.

Comparatively, the removal of the existing barrier of US 181 between Washington-Coles and downtown under the Red, Orange, and West Alternatives would be beneficial to overall community connectivity, which is important to neighborhood residents, based on responses to the community survey. The removal of the physical barrier could be combined with city improvements to residential streets within the neighborhood to provide more transportation options and a safer environment for residents. The improvements could include bicycle and pedestrian improvements, street lights and other aesthetic treatments designed in a context sensitive manner and with the input of the community. **Section 4.7.5** includes further discussion of this potential opportunity.

The Orange Alternative would also displace Blue Monday Lounge and the Unity Chapel Funeral Home, the sole providers of these services and important community gathering places in the Washington-Coles neighborhood. Along with these business displacements, up to 78 households would be displaced in the Northside community under the Orange Alternative and, as previously stated, would most likely not be able to find comparable replacement housing in the neighborhood. These effects to community cohesion would be borne predominantly by the minority and low-income community.

In the North Beach community, the Red and West Alternatives would remove the existing US 181 barrier separating the east and west sides of the southern portion of the community, a beneficial effect overall. Members of the North Beach community, which does include some minority blocks, expressed that the West Alternative could result in the bypassing of the community and therefore contribute to feelings of isolation.

Impacts to recreational resources with potential to adversely affect the community include those to T.C. Ayers Park under the Orange and Red Alternatives. (See **Section 5.3.2** for a full evaluation of the use of park properties by alternative.) Conceptual mitigation plans to address these impacts are being developed, which when implemented would be a beneficial effect of the project. The current state of the park is declining, the recreational amenities are in disrepair, and the City of Corpus Christi has approved the "repurposing" of the park in its 2012 *Parks Master Plan*. **Section 4.1.2** includes a discussion of the potential options the city would consider for the property in the context of repurposing, one of which would be to sell the property. With the Red or Orange Alternatives, a portion of T.C. Ayers Park would be acquired for the right of way, and the functions of the park could be replaced at an alternate location in the Washington-Coles neighborhood to then be designated as a public park. Amenities to the existing Hillcrest Park (also known as Dr. H.J. Williams Memorial Park) could also be added to more directly serve the Hillcrest neighborhood. Coordination with the City of Corpus Christi Parks and Recreation Department is ongoing, and further discussion can be found in **Section 5.5.2**.

All of the build alternatives would require minor changes in access for the community overall, primarily relating to access to the Crosstown Expressway, I-37, and US 181. Although the changes in access may make certain routes slightly longer or less direct, based on the analysis presented in **Section 4.6**, most of these changes would be minimal and would not adversely affect the community overall. Under the West Alternative, the three existing entrance ramps to westbound I-37 in the Northside community (Padre Street, Brownlee Boulevard and N. Port Avenue) would be closed and not replaced due to geometric design constraints. As mentioned above, changes in access are of particular concern to community members; respondents to the survey from the Northside neighborhoods rated changes in vehicular access as the potential negative effect of the most concern. In addition, due to geometric design constraints, the West Alternative cannot accommodate an entrance to US 181 from the minority and low-income Northside community. This alternative, therefore, would limit access to the two primary hurricane evacuation routes for the area, an effect that would be predominantly borne by minority and low-income groups.

Beneficial changes would also occur with the build alternatives in the downtown area along Broadway Street north of I-37. Under the Green Alternative, several existing downtown streets (Hughes, Fitzgerald, Palo Alto and Power Streets) would be extended under US 181, while the other build alternatives would provide an at-grade boulevard with these same street connections. As a result, there would be improved mobility between the minority and low-income Washington-Coles neighborhood and the downtown area. This beneficial effect would occur with all of the build alternatives, with the Red, Orange and West Alternatives providing the biggest improvement in terms of downtown mobility by virtue of the fact that US 181 would be on a new alignment west of downtown. The minority and low-income Northside and CBD neighborhoods would stand to benefit the most from these changes, with the benefits of improved connectivity downtown extending to the overall community as well.

4.7.3.4 Air Quality Impacts

Section 4.9 describes the air quality impacts of the proposed project and concludes that the overall effects are minor. Computer modeling indicates that the level of Carbon Monoxide (CO) contributions from the proposed project combined with background concentrations for the area would not exceed national standards. Similarly, a qualitative study of Mobile Source Air Toxics (MSAT) indicates that over time, MSAT levels would decline region-wide. Construction-phase air quality effects would affect the overall project area population and would be minimized through the use of appropriate dust suppression techniques.

4.7.3.5 Traffic Noise Impacts

Traffic noise impacts would result from the implementation of all of the proposed build alternatives in the North Beach, Northside, South Central, and Westside communities. Traffic noise impacts would be concentrated along the roadways where improvements are planned and would be borne predominately by low-income and minority populations. Noise abatement has been considered and noise walls are proposed in several locations, including along the west side of the Crosstown Expressway under all of the build alternatives. More specific information regarding traffic noise impacts and noise abatement is included in **Section 4.10**.

4.7.3.6 Water Quality Impacts

Section 4.11 discusses the potential water quality effects of the proposed project and concludes that with any of the proposed build alternatives, surface and ground water quality would not be adversely affected. Effects to water quality, furthermore, would be distributed throughout the overall project area and would not be borne predominantly by minority or low-income groups.

4.7.3.7 Hazardous Materials Impacts

Communities in the project area are not anticipated to experience impacts from the proposed project related to hazardous materials. While some sites are categorized as having a high risk for encountering hazardous materials during construction activities for the build alternatives, if such sites were encountered, TxDOT would perform any necessary assessment and remediation actions in order to ensure that hazardous materials are handled appropriately. As no hazardous materials impacts are anticipated, this type of impact would not be borne predominantly by minority or low-income groups. See **Section 4.19** for a detailed discussion of hazardous materials.

4.7.3.8 Visual and Aesthetic Impacts

The visual and aesthetic impacts of the proposed alternatives are discussed in **Section 4.20**, and in **Section 4.6** in relation to communities. The analysis indicates that relative to existing visual and aesthetic qualities, the minority and low-income Northside community stands to be affected most by the Red (Preferred) and Orange Alternatives. The Orange Alternative would convert a large portion of the residential area in the Washington-Coles neighborhood to a major highway corridor and would contribute to the urbanizing aesthetic of the neighborhood for those areas that remain. The Red

Alternative would largely avoid converting residential areas to transportation use, although the alignment of the Red Alternative would represent a substantial change in the visual and aesthetic character of the neighborhood. Neighborhood opinion is mixed (see **Section 4.6.3.3**) regarding whether the introduction of the West Alternative at the western edge of the Hillcrest neighborhood would be considered an intrusion in the Northside community or whether it could act as a beneficial barrier between the neighborhood and the industrial uses to the west.

Beneficial effects would also be associated with the proposed build alternatives, in the form of a landmark bridge in close proximity and within the viewshed of several communities, including North Beach, Northside, and South Central. It should be noted that this use of the term "landmark" refers to the quality of being a highly recognizable feature, rather than a "historic landmark." The Green Alternative has the greatest potential to maintain and enhance the landmark status of the bridge and contribute to an iconic skyline for the city, while the West Alternative has the least potential to contribute to an iconic city skyline. These effects, both positive and negative, would be predominantly borne by minority and low-income groups living in close proximity to the proposed build alternatives.

4.7.3.9 Safety

By correcting geometric deficiencies and upgrading the facility to current FHWA and TxDOT highway standards, safety for both drivers and non-drivers would be improved, including on the bridge, under any of the proposed build alternatives. These safety improvements would substantially benefit all members of the community, including minority and low-income groups.

The proposed changes in access under the West Alternative would alter the route from Fire Station 1 downtown to the North Beach community. The increased travel-time would be relatively minor, and access would not be denied. The small change in response time would affect the North Beach community overall, including non-minority and non-low income residents.

Members of the Citizens Advisory Committee and the Technical Advisory Committee expressed objections regarding the proximity of the West Alternative to the refineries west of Nueces Bay Boulevard at the June 21, 2012 meeting. These worries stemmed from concern for the safety of travelers on the proposed facility, should there be an accident at the refineries, as well as concerns about the security of the refineries, given their proximity to the proposed alternative. As mentioned in **Section 4.1.2.3**, the West Alternative lies within the area needed for an Acceptable Separation Distance (as calculated by HUD guidelines) from the above ground storage tanks to the west and north of the Northside neighborhoods.

4.7.3.10 Construction Impacts

Temporary effects to ground transportation during the construction phase would include traffic delays and work-zone congestion that could disrupt travel patterns for local residents and businesses for the duration of construction. These effects would be distributed along the corridor of any of the proposed build alternatives and would not be predominantly borne by minority or low-income groups. Other

effects would include construction air emissions and noise, and these would similarly affect the overall community and not be predominantly borne by minority or low-income groups.

4.7.3.11 Summary of Impacts

In comparing the effects of the four build alternatives, the Orange and West Alternatives would have the greatest impact on minority and low-income populations. The Orange Alternative would result in 87 residential displacements in minority and low-income areas and would convert a large portion of the residential area in the Washington-Coles neighborhood to highway use resulting in a substantial loss of community cohesion. Effects from business displacements overall would be distributed throughout the city and would not be predominantly borne by minority or low-income groups, although the loss of important businesses in the Northside community under the Orange Alternative could affect community cohesion.

Due to geometric constraints, the West Alternative cannot accommodate access to US 181 from the Northside neighborhood, and the three existing entrance ramps to westbound I-37 in the Northside community would be closed and not replaced. Therefore, the West Alternative would not adequately provide for the safe evacuation of the minority and low-income Hillcrest neighborhood in the event of a hurricane or other emergency due to the lack of access to I-37 and US 181 from the neighborhood. The Green Alternative has less of a direct impact on the community, although following the existing alignment would leave the physical barrier between the Washington-Coles neighborhood and downtown in place and do little to improve accessibility, a high-priority goal of the Northside community as indicated by respondents to the community survey.

The Red Alternative (Preferred) would include the beneficial effect of removing the physical barrier between the Washington-Coles neighborhood and the downtown area (a benefit of the Orange and West Alternatives as well). This alternative would introduce a new physical barrier into the Northside community that would contribute to the separation between the Washington-Coles and Hillcrest neighborhoods and change the aesthetic character of the community. The Red Alternative would also result in 37 residential displacements in minority or low-income areas.

Traffic noise effects would result from any of the proposed build alternatives and these would be mitigated to the extent practicable through the use of feasible and reasonable noise walls.

Other beneficial effects that would apply to all build alternatives would be the economic and employment effects resulting from construction of the proposed project and the substantial safety improvements resulting from the redesign to current standards.

Efforts to avoid, minimize, and mitigate adverse effects in the minority and low-income neighborhoods are discussed in **Section 4.7.5**.

4.7.4 Impacts of the No Build Alternative

The No Build Alternative would not have direct effects on minority and low-income populations. The existing facility would remain in operation, with safety and operational deficiencies for drivers and non-drivers. Under the No Build Alternative, traffic congestion would continue to worsen, and is expected to operate between LOS D and E in 2043 (URS Corporation 2013b). In addition, the physical barrier of US 181 would remain in place as well, which does not provide for connectivity between the minority and low-income Northside community and the downtown area.

4.7.5 Measures to Avoid, Minimize and Mitigate Adverse Effects

The proposed project would result in potentially adverse effects to minority and low-income populations, regardless of the alternative, and considerable effort has been made to avoid and minimize those effects to the extent practicable. In cases where the effects would be potentially adverse even after avoidance and minimization have been applied, mitigation measures and offsetting benefits have been proposed.

4.7.5.1 Avoidance and Minimization Measures

Design Refinements

Due to the concentration of minority populations and low-income populations in the project area, each of the four build alternatives would have some effect on these groups. From the outset of the project design and the impact evaluation phase, project engineers and planners have taken these potential effects into account and applied reasonable measures to avoid and minimize adverse effects. The most impactful of these measures was the redesign of the interchange at US 181, I-37 and the Crosstown Expressway. In conceptual stages of the design, including those designs presented at the December 4, 2012 public meeting, this interchange was designed to be fully-directional, meaning that each highway had a direct connection to the other two. This fully-directional interchange had a much broader footprint than the one presented and evaluated in this Draft EIS, and it would have resulted in substantially greater effects to minority populations and low-income populations. Under the Red and Orange Alternatives, the fully-directional interchange would have required the displacement of the Oveal Williams Senior Center and the CHRISTUS Spohn Health Clinic, two critically important community resources to the predominantly minority and low-income Northside neighborhoods. In addition, the fully-directional interchange would have required the displacement of the historic Galvan Ballroom on the northbound frontage road of the Crosstown Expressway near Agnes Street, and the Salvation Army church sanctuary building, also on the northbound service road near Buford Street. Both of these resources are important to the Crosstown East neighborhood as well as the larger community.

In an effort to avoid and minimize these adverse effects, project engineers reevaluated the traffic movement to and from downtown Corpus Christi and determined that the volumes did not warrant construction of direct ramps in four of the eight directions at the interchange. Ramps connecting I-37 from downtown to the Crosstown Expressway southbound would also not carry a volume of traffic sufficient to warrant the expense of constructing that bridge. Two other bridges, from US 181

southbound to I-37 eastbound and I-37 westbound to US 181 northbound, were also eliminated in this redesign. Overall, the redesign represents a substantial reduction in the magnitude of adverse effects to minority populations and low-income populations.

Maintenance of Local Access

Other efforts to avoid and minimize impacts to minority populations and low-income populations include the replacement of Comanche Street as a means of crossing from one side of the Crosstown Expressway to the other. This street, along with Lipan Street to the north, were both planned to be removed in the conceptual designs shown at the December 4, 2012 public meeting under the Green and West Alternatives. These cross streets are important to the minority congregation at Kelsey Memorial United Methodist Church as well as to minority and low-income school children attending school at Evans Elementary and walking to and from home using either Lipan Street or Comanche Street. In the proposed redesign of the Green and West Alternatives evaluated in this Draft EIS, both the Lipan Street and Comanche Street overpasses of the Crosstown Expressway would remain open, avoiding a potentially adverse effect to minority churchgoers and school children. Under the Red and Orange Alternatives, although Lipan Street would be closed, Comanche Street would remain open to preserve this connection.

Another potentially adverse effect that has been avoided through refinement of the design is the closure of Winnebago Street between the Hillcrest and Washington-Coles neighborhoods. Without this access through the community, residents from Hillcrest would have had a difficult time accessing important community resources in the Washington-Coles neighborhood. Project engineers modified the design in this area to replace the access along Lake Street across US 181 just north of Winnebago Street, reducing the impact to less than a quarter of a mile of distance added to the existing route.

4.7.5.2 Mitigation Measures

The following measures for mitigation are conceptual and the Joint Lead Agencies will continue to solicit input from Cooperating and Participating Agencies and the public with regard to the potential for implementation of some or all of these measures. Feedback from agencies and the community will be incorporated prior to finalizing these mitigation commitments for the proposed project.

Workforce Support

The proposed project would include goals for disadvantaged and historically underutilized businesses to participate in the construction, and TxDOT would require the contractor to comply with these goals as part of its administration of the construction contract. Additionally, TxDOT would establish a partnership with the non-profit Workforce Solutions of the Coastal Bend that would provide a range of services for both employers and employees affected by the displacement of businesses resulting from the proposed project. Workforce Solutions of the Coastal Bend would provide information packets for TxDOT to distribute to potentially affected employers and employees at the Public Hearing and be available to provide the services described below to displaced employees during the right of way

acquisition phase of project development. Contact information for the Workforce Solutions of the Coastal Bend would also be distributed to displaced business owners during the right of way acquisition process.

Workforce Solutions of the Coastal Bend receives funding from the Texas Workforce Commission, which is the state-government agency charged with overseeing and providing workforce development services to employers and job seekers for the state of Texas. For employers, the Texas Workforce Commission offers recruiting, retention, training and retraining, and outplacement services as well as valuable information on labor law and labor market statistics. For job seekers, the Texas Workforce Commission offers career development information, job search resources, training programs, and, as appropriate, unemployment benefits.

Services provided to employers include:

- Recruitment, screening and referral of qualified motivated job applicants;
- Customized and on-the-job training;
- Job fairs;
- Interviewing facilities with fax, phone, and technology;
- Unlimited job postings with WorkinTexas.com;
- Consulting on Equal Opportunity, Americans With Disabilities Act, job skills analysis, and customized labor market information; and
- Professional outplacement services for companies restructuring, downsizing or closing operations.

Services provided by the Workforce Solutions of the Coastal Bend to all job seekers include:

- Current job listings and referrals to companies that are hiring
- Access to WorkinTexas.com, a comprehensive online job matching system
- Access to computerized job banks and invitations to hiring events
- Professional workshops on resume writing, interviewing techniques and strategies for conducting a successful job search
- Interest and aptitude testing
- Information on available education and training programs and providers
- Information on financial aid opportunities
- Career and labor market information
- Self-service resource libraries providing computers with Internet access, resume writing software, job search and career materials, telephones, copiers, printers, fax machines and more
- Information and referral to community resource partners for services such as child care, transportation, housing assistance, etc.
- Job placement assistance for those applying for cash assistance under Temporary Assistance for Needy Families and those receiving food stamps

- Specialized employment services for veterans; and
- Specialized services for customers with disabilities, including information and referrals, and assistive technology.

Recreational Enhancement

The Red (Preferred) and Orange Alternatives would affect T.C. Ayers Park, a recreational resource that serves the minority and low-income Northside community. As detailed in the Draft Section 4(f) Evaluation in **Section 5.5.1**, project engineers and planners have sought ways to avoid and minimize effects to T.C. Ayers Park. Because of the critical community resources that surround the park (Oveal Williams Senior Center, Leathers public housing complex), alignment shifts to completely avoid the park to the east or west would not be feasible and prudent. The major redesign of the Crosstown Expressway interchange, however, has resulted in minimization of the impacts for both the Red and the Orange Alternatives. Conceptual plans to offset the remaining impacts to T.C. Ayers Park after minimization include replacement of park functions on property near the existing park and enhancement of the swimming pool, which would not be affected by any of the alternatives. (See **Section 5.5.2** for further discussion.)

As part of the proposed Section 4(f) mitigation under the Red and Orange Alternatives, the extension of Lake Street to replace access lost via Winnebago Street would also serve to connect neighborhood parks and other important community resources. This route would provide an accommodation for bicycle and pedestrian facilities and would offer a connection between Dr. H.J. Williams Memorial Park, T.C. Ayers Park, the Oveal Williams Senior Center, the community swimming pool, the proposed new park on the site of the former Washington Elementary school, and Solomon Coles High School. (See **Section 5.5.2** for further discussion.)

The Red, Orange and Green Alternatives would also affect Lovenskiold Park, located in the predominantly minority and low-income South Central community. **Section 5.5.1** describes the efforts to avoid impacts to the park and concludes that, with the exception of the West Alternative, alignment shifts to completely avoid the park are not feasible and prudent. The redesign of the Crosstown Expressway interchange has resulted in minimization of impacts for both the Red and the Orange Alternatives; the Green Alternative was not modified in the same way due to the fact that it follows the existing alignment of US 181, and therefore the redesign of the interchange did not have the same effect. Conceptual plans to offset the remaining impacts to Lovenskiold Park after minimization include monetary compensation for the development of park amenities at nearby Ben Garza Park. (See **Section 5.5.2** for further discussion).

Aesthetic Enhancements

In an effort to minimize the visual and aesthetic impacts of the proposed build alternatives on minority and low-income neighborhoods, particularly for the Red (Preferred), Orange and West Alternatives, future public involvement efforts would allow the public, including neighborhood residents, the

opportunity to participate in the process regarding the aesthetics of the proposed project. Elements to be discussed could include aesthetic treatments, landscaping and lighting.

Livability Enhancements

As a way of continuing to support the improvement of the quality of life in the Northside community and provide fair distribution of the beneficial effects of the proposed project, TxDOT and FHWA would provide financial support to grant funding programs already available through local non-profit community organizations and possibly the City of Corpus Christi. Given the agencies' transportation focus, the funding could be allocated for initiatives that improve infrastructure in the community and provide more transportation options for residents. This could include bicycle and pedestrian improvements, ride sharing and similar goals. In this way, TxDOT and FHWA would proactively make certain that the Northside community would benefit from the safety, mobility and connectivity improvements associated with the construction of the proposed project as well as the long-term livability in the community.

Along with this proposed funding, TxDOT and FHWA would continue to work within the Partnership for Sustainable Communities with two of its Cooperating agencies, the Environmental Protection Agency (EPA) and HUD, as well as the City of Corpus Christi, the Port of Corpus Christi Authority and the Regional Transportation Authority to advance other livability initiatives in the community. The Partnership agencies offer grant funding opportunities and technical assistance to support communities in creating healthy neighborhoods that provide more housing options, economic opportunities, and efficient transportation options. These funding and technical assistance programs, such as the Surface Transportation Program (STP) and the Community Development Block Grant (CDBG) program can provide another means of federal resources for the state, the Coastal Bend region and the city of Corpus Christi.

Consistent with continuing outreach to the Northside neighborhoods eliciting the viewpoints of the community, initiatives to pursue would include but not be limited to:

- Improving Northside residential streets connecting to the SEA District and the downtown area;
- Addition of street lights and other practicable aesthetic treatments within the Northside neighborhoods;
- Improvements to provide more transportation choices, including bicycle and pedestrian routes and transit;
- Providing preferential consideration for applicants to the proposed Palms at Leopard affordable housing development for persons displaced from the North Side Manor apartments as well as other displaced persons from the Northside community;
- Coordinating with HUD to identify opportunities to increase the availability of affordable housing in the community; and
- Promoting the use of disadvantaged and historically underutilized businesses in the construction of the project.

TxDOT and FHWA would also pursue a relationship with Team-EJ, a working group created by the Partnership focused on the connections between environmental justice and sustainable communities. The *Environmental Justice and Sustainability Deskbook* (available at www.epa.gov/smartgrowth) was produced by Team-EJ to provide information on the resources available to communities through the Partnership agencies.

Coordination with Local Transportation Planning

TxDOT would work closely with the MPO regarding the application of available federal transportation funding for local projects to maximize the use of those funds for infrastructure improvements in minority and low-income communities affected by the proposed project.

4.7.6 Summary and Conclusion

Based on the above discussion and analysis, including the proposed measures to avoid, minimize, and mitigate effects, the accessibility effects of the West Alternative and the displacement and community cohesion effects of the Orange Alternative would be disproportionately high and adverse with respect to minority and low-income groups, and the harm of these effects would not reasonably be offset by the economic and safety benefits of the proposed project. By contrast, the measures to mitigate the effects of the Red Alternative (the Preferred Alternative) combined with the beneficial economic, safety and connectivity effects overall would substantially offset the adverse effects to minority and low income populations. Therefore, the Red Alternative would not cause disproportionately high and adverse effects to minority or low-income groups. Similarly, the effects of the Green Alternative on minority and low-income populations would not be disproportionately high and adverse.

The proposed commitments made in this section are conceptual and the Joint Lead Agencies will continue to solicit input from Cooperating and Participating Agencies and the public with regard to the potential for implementation. These proposed commitments are also included in **Section 9.0** of this Draft EIS and finalization of the mitigation will be documented in the Final EIS.

4.8 CHILDREN'S HEALTH

The physiological and behavioral traits of children make this element of the population more vulnerable to environmental health and safety risks. This analysis considers the proposed project's potential effects to children's health and is included at the request of the EPA.

Section 3.5.1.5 provides baseline information on the health of children in the Corpus Christi area, including the results of health studies (not related to the proposed project and conducted by others) in the project area. These studies concluded that children could be at a higher risk of exposure to metals through contaminated soil because of hand-to-mouth activities, but that there is no clear evidence of age-related differences in susceptibility to benzene toxicity. Regarding potential exposures in the project area, five of the 478 yards assessed in the Dona Park neighborhood had concentrations above

the action levels for lead and/or cadmium in the soil (Daniel B. Stephens & Associates 2011, 5); all five properties have since been remediated by the Texas Commission on Environmental Quality (TCEQ). Additionally, the studies on the concentrations of benzene and other petroleum-related VOCs in personal air samples from residents from the Hillcrest and Dona Park neighborhoods were not higher than those detected in residents of the United States as a whole.

4.8.1 Impacts of the Build Alternatives

Children's health may be influenced by a number of environmental factors that could stem from roadway construction, including traffic noise, changes in access, exposure to poor air quality or hazardous materials, and dangerous construction sites, which could be safety concerns. Indirectly, children's health could be impacted by project elements like pedestrian and bicycle paths and improvements to parks, which provide an opportunity for healthy activities.

4.8.1.1 Traffic Noise

Traffic noise impacts may affect the learning environment of schools and daycare facilities. These types of facilities in the proposed project area have been identified and mapped, and are depicted by community on **Figures 3.5-5** through **3.5-10** in **Appendix A**. The only school adjacent to any of the proposed alternatives is Solomon Coles High School in the Northside community. There are no daycare centers along the alignments of the proposed build alternatives, and the only Head Start facilities are also located away from the proposed roadway improvements in the interior of the Washington-Coles and Ben Garza neighborhoods. None of the build alternatives would result in traffic noise impacts to Solomon Coles High School (see **R35** on **Noise Plate R-7** in **Appendix I**).

4.8.1.2 Air Quality

Children's health may also be affected by exposure to air pollutants, which may stem from mobile and non-mobile sources. The EPA has developed health-based National Ambient Air Quality Standards (NAAQS), which factor in children's health, for the criteria pollutants. This project is located in an area that is in attainment for all NAAQS; therefore, the EPA has verified that this area does not currently exceed their health-based NAAQS. A carbon monoxide (CO) Traffic Air Quality Analysis (TAQA) was also performed for this project (see **Section 4.9.2**). The results of this analysis indicate that future concentrations of CO associated with the proposed project would not exceed EPA's applicable health-based NAAQS in the future years modeled. The EPA has not established NAAQS or health-based standards for the compounds that they identify as MSAT. There is also no established, standardized way to perform localized modeling of on-road mobile emissions of all of these MSAT compounds in a way that would provide accurate and reliable results for health risk assessment. The uncertainty involved in such an analysis is expected to exceed any perceived accuracy of the results. However, FHWA modeled MSAT on a national scale and predicted that even with an increase in vehicle-miles travelled (VMT) of 102 percent between 2010 and 2050, overall MSAT emissions are expected to decrease by 83 percent over this same period. Even though a localized MSAT health risk analysis is not considered reliable, regional MSAT emissions analyses are sometimes performed for large transportation projects in heavily

travelled corridors in order to show that regional MSAT modeling results are generally consistent with FHWA's national MSAT modeling results. Although the proposed project does not rise to the level requiring it, provided that necessary data are available from the MPO, a quantitative MSAT analysis will be developed for the Preferred Alternative in the Final EIS due to expressed public concern over air quality.

During the construction phase of this project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation. These emissions are temporary in nature (only occurring during actual construction). However, the potential impacts of particulate matter emissions will be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate.

The construction activity phase of this project may also generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary construction-related MSAT emissions are diesel particulate matter from diesel powered construction equipment and vehicles. The MSAT emissions will be minimized through the use of low emission diesel fuel for non-road diesel construction equipment operated in Nueces County, and by provisions included in project plans and specifications requiring contractors to make every reasonable effort to minimize construction air quality impacts through abatement measures such as limiting construction equipment idling and other emission limitation techniques, as appropriate.

In conclusion, since: 1) the area is in attainment of EPA's health-based standards; 2) modeled CO emissions associated with the proposed project would not exceed EPA's NAAQS for CO; and 3) because overall MSAT emissions are expected to decline region-wide in the future, the long-term effects of the project are not expected to adversely affect children's health. The dust suppression and other air quality measures that are required by TxDOT's construction specifications would minimize potential air quality impacts associated with construction of the project; therefore, the short-term effects of the proposed project are similarly not expected to adversely affect children's health.

4.8.1.3 Physical or Chemical Exposures

Children may also be vulnerable to impacts from physical or chemical exposures related to roadway construction. During the construction phase for any of the build alternatives, there could be short-term conditions that would be dangerous to the public, including children. The contractor would follow TxDOT's Standard Specifications, which would include provisions to protect the health and safety of persons in the proximity of construction and staging sites. All of the proposed build alternatives would include demolition activities for the existing bridge and approaches. As described in **Section 4.19,** lead and asbestos testing would be conducted prior to demolition to ensure that these materials are handled appropriately. Hazardous materials sites classified as high or medium risk (see **Section 4.19**) would be present within or adjacent to the proposed rights of way of all of the build alternatives. TxDOT would ensure that these sites are avoided where practicable or sufficiently remediated so that the public

would not be exposed to health risk. Given TxDOT's Standard Specifications and commitments to protecting the health and safety of the public, none of the build alternatives would have an adverse effect to children's health relating to construction activities.

4.8.1.4 Water Quality

As noted in **Section 4.11.3**, the proposed build alternatives would not contribute to contamination of groundwater within the project area. Furthermore, there are no water wells registered in the Texas Water Development Board (TWDB) database within the project area. Drinking water for the project area is distributed by the City of Corpus Christi Water Department and is produced at the O. N. Stevens Water Treatment Plant. This water is obtained from Lake Corpus Christi, which is located in Live Oak County. Therefore, the proposed project would not contribute to environmental exposures via groundwater pathways.

4.8.1.5 Changes in Access

Changes in access, including the provision of bicycle and pedestrian paths, can affect children's health indirectly because the availability of these facilities might encourage healthy habits that can reduce the risk of obesity and improve overall health. All of the proposed alternatives would maintain access to routes to schools. Based on information gathered from the community, some students at Evans Elementary School utilize the Lipan and Comanche Street bridges across the Crosstown Expressway to walk to school from the Ben Garza and Crosstown West neighborhoods. All of the alternatives would leave at least one of these bridges (which are currently in very close proximity to each other) in place. The Green and West Alternatives would preserve both bridges, while the Red and Orange Alternatives would remove the Lipan Street bridge. As the bridges are approximately 300 feet apart, changes in pedestrian routes to utilize Comanche Street instead of Lipan Street would not be substantial and safety impacts are not expected as no busy street crossings separate Lipan Street from Comanche Street. Each of the build alternatives also includes the addition of a shared-use bicycle and pedestrian path along US 181, which would connect North Beach to various areas south of the Inner Harbor, depending on the alternative. The West Alternative would provide access to this path from the Northside community, the Green Alternative would provide access from the South Central community, and the Orange and Red Alternatives would provide opportunities to enter this path from both of these communities.

4.8.1.6 Parks and Recreational Facilities

Similarly, impacts to parks and recreational facilities or providing enhancements to these properties can benefit children's health. The Rincon Channel Wetlands Interpretive Overlook would be impacted by the West Alternative, which would require the acquisition of approximately 2.83 acres of land. Because the West Alternative would not affect the parking area or boardwalk, access to this recreational property would be maintained, and fishing or other activities could also continue in aquatic areas adjacent to bridge piers. The Green, Red (Preferred) and Orange Alternatives would impact part or all of Lovenskiold Park in the Evans Elementary neighborhood. Proposed mitigation for this impact, depending on the alternative, includes enhancement of existing Ben Garza Park nearby. (See **Section**

5.0 for a detailed discussion of the impacts to public parks and the proposed measures to minimize harm.) The Red and Orange Alternatives would also impact T.C. Ayers Park in the Washington-Coles neighborhood. A nearby replacement park is proposed as mitigation for the impacts to the existing park under both alternatives. New facilities could encourage higher usage numbers, including by children.

4.8.2 Impacts of the No Build Alternative

The No Build Alternative would not substantially change the current status of the health of children in the project area. Regular maintenance of the existing roadways would continue to occur, and TxDOT maintenance of traffic plans would serve to protect the health and safety of the public, including children, from the potential dangers of construction activities. The No Build Alternative would not provide new park facilities to replace T.C. Ayers Park or Lovenskiold park, thus perpetuating the current low-usage patterns due to lack of well-maintained amenities. The No Build Alternative would also not provide a shared-use path for pedestrian and bicycle access to and from North Beach, which could encourage exercise.

4.9 AIR QUALITY IMPACTS

This section provides a summary of the proposed project's conformity status, provides results of the traffic air quality analysis, provides a qualitative assessment of potential mobile source air toxics emissions as a result of the proposed project, and discusses construction-related air emissions and potential mitigation activities.

4.9.1 Conformity

This project is located in Nueces County, which is in an area in attainment of all NAAQS; therefore, the transportation conformity rules do not apply. A summary of project planning activities is included in **Section 1.2.**

4.9.2 Impacts of the Build Alternatives

4.9.2.1 Carbon Monoxide (CO) Traffic Air Quality Analysis

The maximum traffic data for any analyzed project alternative for the estimated time of completion year (2023) and horizon year (2035) is estimated to be 87,100 vehicles per day, and 101,600 vehicles per day, respectively. A prior TxDOT modeling study and previous analyses of similar projects demonstrated that it is unlikely that a carbon monoxide (CO) standard would ever be exceeded as a result of any project with an average annual daily traffic (AADT) below 140,000. However, through agreement with FHWA and local entities, the project sponsor has completed a CO analysis of project-related emissions for each alternative analyzed in this Draft EIS. The traffic data used in the analysis was obtained from URS Corporation and approved for use by TxDOT.

Topography and meteorology of the area in which the project is located would not seriously restrict dispersion of the air pollutants.

Carbon monoxide concentrations for the proposed action were modeled using MOBILE6.2 emission factors and the CALINE3 dispersion model and factoring in adverse meteorological conditions and sensitive receptors at the right of way line in accordance with TxDOT Air Quality Guidelines. The use of MOBILE6.2 emission factors applicable to Corpus Christi for the Draft EIS air quality analysis was approved by FHWA during an April 9, 2013 meeting. This approval was based on a project air quality analysis start date prior to the EPA's required use of the Motor Vehicle Emission Simulator (MOVES) model on December 20, 2012. Local concentrations of carbon monoxide are not expected to exceed national standards at any time. **Table 4.9-1** summarizes the results of the air quality analysis for each build alternative and primary roadway segment.

Table 4.9-1 Project Carbon Monoxide Concentrations

Year	1-hr CO Standard 35 ppm	1 HR % NAAQS	8-hour CO Standard 9 ppm	8-HR % NAAQS
2023	2.0	5.7%	1.2	13.8%
2035	2.1	6.0%	1.3	14.4%

Source: US 181 Harbor Bridge EIS Team 2013

* The NAAQS for CO is 35 ppm for one-hour and 9 ppm for eight hours. Analysis includes a one-hour background concentration of 0.6 ppm and an 8-hour background concentration of 0.4 ppm.

4.9.2.2 Mobile Source Air Toxics (MSAT)

Project Specific MSAT Information

The proposed project does not add capacity and design-year traffic projections indicate an annual average daily traffic (AADT) of less than 140,000 vehicles; therefore, a qualitative MSAT analysis has been performed for each project alternative. A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from various alternatives of a project. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at:
http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf.

For each alternative in this document, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Build Alternative is higher than for any of the build alternatives, higher levels of MSAT are not expected from any of the build alternatives compared to the No Build. In addition, because the estimated VMT under each of the alternatives are nearly the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Under each alternative there may be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along roadway sections constructed closer to adjacent residential areas. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, under all build alternatives in the design-year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental

concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an “acceptable” level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA’s approach to addressing risk in its two step decision framework.

Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable. Because of the limitations in the methodologies

for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities, plus improved access for emergency response, that are better suited for quantitative analysis.

Conclusion

A qualitative MSAT assessment has been provided relative to the various alternatives of MSAT emissions and has acknowledged that all of the project alternatives may result in increased exposure to MSAT emissions in certain locations. However, since concentrations and duration of exposures are uncertain, the health effects from these emissions will not be estimated. Provided that the necessary data are available from the MPO, a quantitative assessment of MSAT emissions for the preferred alternative will be included in the Final EIS for the proposed project.

4.9.2.3 Construction-Related Air Emissions

During the construction phase of this project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation which is temporary in nature (only occurring during actual construction). The potential impacts of particulate matter emissions would be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling of water in dust prone areas, covering loaded trucks, and other dust abatement controls, as appropriate.

The construction activity phase of this project may also generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary construction-related MSAT emissions are particulate matter from site preparation and diesel particulate matter from diesel powered construction equipment and vehicles.

Considering the temporary and transient nature of construction-related emissions, as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this project would have any significant impact on air quality in the area.

4.9.3 Impacts of the No Build Alternative

The No Build Alternative would result in gradually increasing VMT as traffic volumes increase and traffic congestion worsens within the existing roadway system over time. However, MSAT emissions will likely be lower than present levels in future years as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050.

4.10 TRAFFIC NOISE IMPACTS

This section describes the effects of the four proposed build alternatives, provides an overview of current FHWA and TxDOT traffic noise regulations, describes FHWA NAC for various land use activity areas adjacent to the proposed project, and presents reasonable and feasible noise abatement for impacted receivers.

4.10.1 Impacts of the Build Alternatives

The FHWA traffic noise modeling software (TNM 2.5) was used to calculate existing (2013) and predicted (design year 2032) traffic noise levels for the four build alternatives. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; and the locations of activity areas likely to be impacted by the associated traffic noise. Sensitive receiver locations were selected to represent the land use activity areas adjacent to the proposed build alternatives and were incorporated into the TNM 2.5 alternative models to estimate the potential future traffic noise levels. The predicted noise levels for each of the four build alternatives for the representative receivers incorporated into the TNM model are presented in **Table 4.10-1**. The predicted noise impacts at the representative sensitive receivers, along with the estimated noise contours (see **Section 4.10.2**), were utilized to estimate noise impacts for each alternative.

Note that structures located the same distance from the highway may have different estimated noise levels due to differences in ground cover, terrain, and the presence of buildings located between the highway and the structures. Noise attenuation by structures, berms, hills, and dense woods were not evaluated as part of this study. Therefore, if any potentially noise-sensitive receivers in the study area are shielded by structures, berms, hills or dense vegetation, the noise analysis may over-estimate the noise levels at these sites.

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Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)																	
					Green Alternative			Red Alternative			Orange Alternative			West Alternative		
Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
1	Rincon Wetland Observation	C	66	65	69	4	Y	68	3	Y	68	3	Y	67	2	Y
4	Residential	B	66	65	70	5	Y	70	5	Y	69	4	Y	67	2	Y
5	Hotel	E	71	64	69	5	N	68	4	N	N/A			64	0	N
6	Hotel	E	71	59	65	6	N	64	5	N	66	7	N	59	0	N
7	Residential	B	66	63	N/A			69	6	Y	68	5	Y	59	-4	N
8	Residential	B	66	61	N/A			N/A			68	7	Y	60	-1	N
9	Residential	B	66	60	N/A			69	9	Y	67	7	Y	56	-4	N
10	Residential	B	66	58	63	5	N	N/A			66	8	Y	54	-4	N
11	Residential	B	66	54	64	10	N	68	14	Y	63	9	N	62	8	N
12	Hotel	E	71	61	64	3	N	60	-1	N	66	5	N	48	-13	N
13	Residential	B	66	58	62	4	N	67	9	Y	66	8	Y	51	-7	N
14	Church	C	66	56	62	6	N	68	12	Y	65	9	N	50	-6	N
15	Hotel	E	71	62	65	3	N	61	-1	N	67	5	N	46	-16	N
16	Residential	B	66	57	64	7	N	65	8	N	66	9	Y	45	-12	N
17	Residential	B	66	60	N/A			63	3	N	N/A			45	-15	N
19	Aquarium	C	66	55	64	9	N	56	1	N	63	8	N	40	-15	N
20	Residential	B	66	65	N/A			63	-2	N	N/A			49	-16	N
21	Residential	B	66	62	N/A			65	3	N	N/A			51	-11	N
22	Recreational Area	C	66	53	65	12	Y	61	8	N	67	14	Y	41	-12	N

Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)																
					Green Alternative			Red Alternative			Orange Alternative			West Alternative		
Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
23	Corpus Christi Museum of Science and History	C	66	53	63	10	N	56	3	N	61	8	N	41	-12	N
24	Park	C	66	60	66	6	Y	56	-4	N	60	0	N	46	-14	N
25	Park	C	66	57	65	8	N	56	-1	N	60	3	N	45	-12	N
26	Residential	B	66	60	66	6	Y	55	-5	N	59	-1	N	47	-13	N
27[1]	Medical Facility	D	51	37	48	11	Y	33	-4	N	44	7	N	24	-13	N
28	Old Courthouse	E	71	60	66	6	N	58	-2	N	59	-1	N	59	-1	N
29	Park	C	66	57	64	7	N	59	2	N	60	3	N	59	2	N
30	Courthouse	E	71	49	58	9	N	53	4	N	54	5	N	51	2	N
31	Residential	B	66	61	65	4	N	60	-1	N	63	2	N	58	-3	N
32	Residential	B	66	65	N/A			65	0	N	67	2	Y	66	1	Y
33	Cemetery	C	66	54	64	10	N	56	2	N	58	4	N	55	1	N
34	School	C	66	60	62	2	N	61	1	N	62	2	N	60	0	N
35	Residential	B	66	64	65	1	N	61	-3	N	62	-2	N	59	-5	N
36	Residential	B	66	63	66	3	Y	65	2	N	65	2	N	64	1	N
37	Residential	B	66	64	68	4	Y	65	1	N	65	1	N	66	2	Y
38[1]	Oveal Williams Senior Center	D	51	40	45	5	N	45	5	N	46	6	N	42	2	N
39	Day Care	C	66	59	63	4	N	N/A			N/A			61	2	N
40	Residential	B	66	65	71	6	Y	68	3	Y	69	4	Y	67	2	Y
41	Residential	B	66	63	68	5	Y	66	3	Y	67	4	Y	65	2	N

Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)

Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	Green Alternative			Red Alternative			Orange Alternative			West Alternative		
					2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
42	Residential	B	66	64	69	5	Y	64	0	N	64	0	N	66	2	Y
43[1]	Radio Studio	D	51	44	N/A			44	0	N	43	-1	N	47	3	N
44	Local Business	E	71	62	69	7	N	61	-1	N	61	-1	N	65	3	N
45	Recreation Area	C	66	62	66	4	Y	67	5	Y	67	5	Y	67	5	Y
46	Residential	B	66	64	68	4	Y	68	4	Y	67	3	Y	69	5	Y
47	Residential	B	66	63	68	5	Y	68	5	Y	68	5	Y	N/A		
48	Residential	B	66	63	64	1	N	67	4	Y	68	5	Y	70	7	Y
49	Residential	B	66	63	64	1	N	66	3	Y	66	3	Y	67	4	Y
50	Church	C	66	64	66	2	Y	67	3	Y	67	3	Y	68	4	Y
51	Residential	B	66	67	69	2	Y	70	3	Y	69	2	Y	70	3	Y
52	Residential	B	66	67	70	3	Y	70	3	Y	N/A			70	3	Y
53	Residential	B	66	66	69	3	Y	N/A			N/A			N/A		
54	Church	C	66	63	65	2	N	65	2	N	65	2	N	N/A		
55	Residential	B	66	58	59	1	N	60	2	N	60	2	N	66	8	Y
56[2]	Residential	B	66	57	55	-2	N	55	-2	N	55	-2	N	65	8	N
57[2]	Residential	B	66	57	53	-4	N	54	-3	N	54	-3	N	63	6	N
58[2]	Residential	B	66	57	53	-4	N	54	-3	N	54	-3	N	62	5	N
59[2]	Residential	B	66	57	53	-4	N	54	-3	N	54	-3	N	60	3	N
60[2]	Residential	B	66	57	52	-5	N	52	-5	N	52	-5	N	65	8	N
61[2]	Residential	B	66	54	45	-9	N	46	-8	N	46	-8	N	64	10	N
62[2]	Residential	B	66	54	45	-9	N	46	-8	N	46	-8	N	62	8	N
63	Fire Station	E	71	62	65	3	N	65	3	N	65	3	N	66	4	N

Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)																
					Green Alternative			Red Alternative			Orange Alternative			West Alternative		
Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
64	Residential	B	66	65	68	3	Y	68	3	Y	67	2	Y	68	3	Y
65	Residential	B	66	69	71	2	Y	71	2	Y	71	2	Y	71	2	Y
66	Residential	B	66	70	73	3	Y	72	2	Y	72	2	Y	73	3	Y
67	Residential	B	66	69	71	2	Y	71	2	Y	71	2	Y	71	2	Y
68	Residential	B	66	66	69	3	Y	68	2	Y	68	2	Y	69	3	Y
69	Residential	B	66	65	67	2	Y	67	2	Y	67	2	Y	67	2	Y
70	Residential	B	66	66	68	2	Y	68	2	Y	68	2	Y	64	-2	N
71	Residential	B	66	67	70	3	Y	69	2	Y	69	2	Y	63	-4	N
72	Residential	B	66	66	68	2	Y	68	2	Y	68	2	Y	64	-2	N
74	Church	C	66	63	63	0	N	63	0	N	63	0	N	61	-2	N
75	Residential	B	66	67	67	0	Y	67	0	Y	67	0	Y	64	-3	N
76	Residential	B	66	69	67	-2	Y	67	-2	Y	67	-2	Y	68	-1	Y
77	Hotel	E	71	62	66	4	N	65	3	N	62	0	N	67	5	N
78	Residential	B	66	62	67	5	Y	65	3	N	65	3	N	67	5	Y
79	Residential	B	66	64	68	4	Y	65	1	N	66	2	Y	68	4	Y
80	Residential	B	66	65	70	5	Y	69	4	Y	70	5	Y	67	2	Y
81	Residential	B	66	63	67	4	Y	N/A			N/A			66	3	Y
82	Residential	B	66	64	66	2	Y	N/A			N/A			67	3	Y
83	Church	C	66	64	66	2	Y	64	0	N	64	0	N	66	2	Y
84	Residential	B	66	67	69	2	Y	N/A			N/A			70	3	Y
85	Residential	B	66	65	68	3	Y	65	0	N	64	-1	N	69	4	Y
86	Residential	B	66	65	69	4	Y	68	3	Y	69	4	Y	68	3	Y

Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)																
					Green Alternative			Red Alternative			Orange Alternative			West Alternative		
Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
87	Residential	B	66	65	69	4	Y	67	2	Y	68	3	Y	69	4	Y
88	Park	C	66	64	67	3	Y	65	1	N	64	0	N	67	3	Y
89	Residential	B	66	64	66	2	Y	66	2	Y	65	1	N	67	3	Y
90	Residential	B	66	66	67	1	Y	69	3	Y	67	1	Y	70	4	Y
91	Residential	B	66	66	68	2	Y	71	5	Y	68	2	Y	71	5	Y
92	Residential	B	66	69	72	3	Y	74	5	Y	72	3	Y	74	5	Y
93	Residential	B	66	70	72	2	Y	73	3	Y	73	3	Y	73	3	Y
94	Residential	B	66	66	67	1	Y	70	4	Y	68	2	Y	70	4	Y
95	Residential	B	66	69	72	3	Y	72	3	Y	73	4	Y	72	3	Y
96	Residential	B	66	70	71	1	Y	72	2	Y	73	3	Y	72	2	Y
97	Residential	B	66	67	69	2	Y	69	2	Y	70	3	Y	70	3	Y
98	Residential	B	66	66	68	2	Y	69	3	Y	69	3	Y	69	3	Y
99	Residential	B	66	68	71	3	Y	71	3	Y	71	3	Y	71	3	Y
100	Residential	B	66	69	71	2	Y	71	2	Y	72	3	Y	72	3	Y
101	Residential	B	66	68	70	2	Y	71	3	Y	71	3	Y	71	3	Y
102	Residential	B	66	68	70	2	Y	71	3	Y	71	3	Y	71	3	Y
103	Residential	B	66	69	71	2	Y	71	2	Y	72	3	Y	72	3	Y
104	Residential	B	66	69	71	2	Y	71	2	Y	71	2	Y	71	2	Y
105	Day Care	C	66	67	69	2	Y	69	2	Y	70	3	Y	70	3	Y
106	Church	C	66	68	70	2	Y	70	2	Y	71	3	Y	70	2	Y
107	Residential	B	66	69	71	2	Y	71	2	Y	71	2	Y	71	2	Y
108	Residential	B	66	67	69	2	Y	70	3	Y	70	3	Y	70	3	Y

Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)																
					Green Alternative			Red Alternative			Orange Alternative			West Alternative		
Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
109	Residential	B	66	65	67	2	Y	67	2	Y	68	3	Y	68	3	Y
110	Residential	B	66	68	70	2	Y	70	2	Y	70	2	Y	70	2	Y
111	Residential	B	66	60	64	4	N	68	8	Y	68	8	Y	63	3	N
112	Residential	B	66	62	65	3	N	66	4	Y	67	5	Y	64	2	N
113	Residential	B	66	64	66	2	Y	66	2	Y	67	3	Y	66	2	Y
114	Residential	B	66	67	69	2	Y	69	2	Y	70	3	Y	70	3	Y
115	Residential	B	66	67	68	1	Y	69	2	Y	70	3	Y	69	2	Y
116	Cemetery	C	66	65	66	1	Y	68	3	Y	67	2	Y	68	3	Y
117	Residential	B	66	65	67	2	Y	64	-1	N	63	-2	N	68	3	Y
118	Residential	B	66	64	66	2	Y	64	0	N	64	0	N	67	3	Y
119	Residential	B	66	59	64	5	N	62	3	N	63	4	N	60	1	N
120[2]	Residential	B	66	51	55	4	N	62	11	Y	65	14	Y	53	2	N
121	Residential	B	66	55	61	6	N	65	10	N	64	9	N	61	6	N
122[2]	Residential	B	66	51	56	5	N	63	12	Y	67	16	Y	54	3	N
123[2]	Residential	B	66	49	52	3	N	61	12	Y	69	20	Y	46	-3	N
124[2]	Church	C	66	50	52	2	N	62	12	Y	67	17	Y	49	-1	N
125[2]	Residential	B	66	50	53	3	N	63	13	Y	68	18	Y	51	1	N
126[2]	Residential	B	66	50	52	2	N	65	15	Y	N/A			49	-1	N
163	Hillcrest Park	C	66	48	51	3	N	53	5	N	52	4	N	53	5	N
164	Lovenskiold Park	C	66	60	N/A			N/A			N/A			62	2	N
165	Kiwanis Park	C	66	57	64	7	N	65	8	N	63	6	N	64	7	N
166	Oak Park	C	66	61	64	3	N	63	2	N	63	2	N	65	4	N

Table 4.10-1 Existing and Predicted Traffic Noise Levels (dBA Leq)

Receiver ID	NAC Representation	NAC Cat.	NAC Level (dBA)	Existing Noise Level (dBA)	Green Alternative			Red Alternative			Orange Alternative			West Alternative		
					2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)	2032 Noise Level (dBA)	Noise Level Increase (+/- dBA)	Noise Impact (Y/N)
167	Artesian Park	C	66	56	60	4	N	53	-3	N	55	-1	N	51	-5	N
168	Residential	B	66	58	64	6	N	65	7	N	63	5	N	64	6	N

Source: US 181 Harbor Bridge EIS Team 2013

Notes: Predicted noise levels for receivers that are potential displacements were not calculated and are denoted as N/A.
(1) Interior noise level was used to assess potential impacts.
(2) Existing noise level is from 2012 field measurements presented in **Table 3.7-2**.

Table 4.10-2 presents a summary of the number of anticipated traffic noise impacts in 2032 for each build alternative. Impacted receivers are also depicted on the plates in **Appendix I**. To assess the number of potential impacts per alternative the following methodology was utilized: for single family residences, each residence was counted as one receiver; for multi-family residences, each unit was counted as one receiver; for pools at hotels and parks, the capacity of the pool determined the number of receivers; for parks the number of receivers was determined by the land area of the park divided by the single family parcel area of the surrounding receivers, as per 2011 TxDOT guidelines. At the time of the noise evaluation, there were no outdoor seating areas at restaurants within the study area to consider. In some instances the interior noise levels were considered as the NAC in areas where there is little to no human activity in the exterior areas adjacent to the roadway. Receivers where interior noise levels were evaluated are denoted in the following tables. To calculate the interior noise levels, the TNM noise levels were reduced by 20 dBA as identified by light frame, ordinary sash construction method in the TxDOT 2011 guidelines.

Table 4.10-2 Summary of Future (2032) Traffic Noise Impacts

Alternative	Sensitive Receivers Impacted ≥ NAC	Sensitive Receivers > 10 dBA Over Existing Noise Levels	Total Number of Impacted Receivers*
Green Alternative	573	2	574
Red Alternative	489	167	654
Orange Alternative	585	109	587
West Alternative	473	0	473

Source: US 181 Harbor Bridge Team 2013

* Represents the number of receivers experiencing traffic noise impacts under the absolute or relative criterion in 2032; some receivers may experience both types of impacts.

For the Green Alternative, approximately 573 receivers would be expected to experience traffic noise impacts over the NAC in 2032 and approximately two receivers would be expected to have future noise levels exceed existing noise levels by more than 10 dBA. Impacts would be located throughout the study area, although impacts would be heavily concentrated along the Crosstown Expressway, between I-37 and Morgan Avenue, and along I-37 between Up River Road and the Crosstown Expressway

For the Red Alternative (the Preferred Alternative), approximately 489 receivers would be expected to experience traffic noise impacts over the NAC in 2032 and approximately 167 receivers would be expected to have future noise levels exceed existing noise levels by more than 10 dBA. Impacts would be located throughout the study area, although noise impacts would be heavily concentrated along US 181, between the Inner Harbor and I-37; along the Crosstown Expressway, between I-37 and Morgan Avenue; and along I-37 between Up River Road and the Crosstown Expressway.

For the Orange Alternative, approximately 585 receivers would be expected to experience traffic noise impacts over the NAC in 2032 and approximately 109 receivers would be expected to have future noise levels exceed existing noise levels by more than 10 dBA. Impacts would be located throughout the study

area, although noise impacts would be heavily concentrated along US 181, between the Inner Harbor and I-37; along the Crosstown Expressway, between I-37 and Morgan Avenue; and along I-37 between Up River Road and the Crosstown Expressway.

For the West Alternative, approximately 473 receivers would be expected to experience traffic noise impacts over the NAC in 2032 and no receivers would be expected to have future noise levels exceed existing noise levels by more than 10 dBA. Impacts would be located throughout the study area, although impacts would be heavily concentrated along the Crosstown Expressway, between I-37 and Morgan Avenue and along I-37 between Up River Road and the Crosstown Expressway.

If the No-Build Alternative were implemented, noise levels would be expected to increase with an associated increase in future traffic volumes.

4.10.2 Predicted Noise Impact Contours

To avoid noise impacts that may result from future development of properties adjacent to the proposed project alternatives, local officials responsible for land use control programs must ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the predicted (2032) noise impact contours identified in **Table 4.10-3**. Distances from the right of way to the noise level impact contours identified in the table are from the roadway within the study area with the highest forecasted traffic volumes. The distances from right of way to the noise level impact contours should not be assumed to be consistent throughout the study area, as the noise contours are specific to traffic volumes and roadway geometry.

Table 4.10-3 Year 2032 Predicted Noise Impact Contours

Alternative	71 dBA Impact Contour [1] Description	66 dBA Impact Contour [2] Description
Green Alternative		
US 181 from Beach Avenue to I-37	40 feet from right of way, between proposed northbound frontage road and Seagull Blvd	240 feet from right of way, between proposed northbound frontage road and N. Mesquite St
I-37 from Shoreline Avenue to Nueces Bay Blvd.	30 feet from right of way, between eastbound frontage road and Leopard St	110 feet from right of way, between westbound frontage road and Noakes St
SH 286 from I-37 to Morgan Avenue	80 feet from right of way, between 16th St and 15th St	220 feet from right of way, between 17th St and 18th St
Red Alternative		
US 181 from Beach Avenue to I-37	40 feet from right of way, between proposed northbound frontage road and Seagull Blvd	130 feet from right of way, between proposed northbound frontage road and Seagull Blvd
I-37 from Shoreline Avenue to Nueces Bay Blvd.	30 feet from right of way, between westbound frontage road and Noakes St	125 feet from right of way, between westbound frontage road and Noakes St

Table 4.10-3 Year 2032 Predicted Noise Impact Contours		
Alternative	**71 dBA Impact Contour [1] Description**	**66 dBA Impact Contour [2] Description**
SH 286 from I-37 to Morgan Avenue	90 feet from right of way, between 16th St and 15th St	220 feet from right of way, between 17th St and 18th St
Orange Alternative		
US 181 from Beach Avenue to I-37	30 feet from right of way, between proposed northbound frontage road and Seagull Blvd	220 feet from right of way, between Seagull Blvd and E Causeway Blvd
I-37 from Shoreline Avenue to Nueces Bay Blvd.	15 feet from right of way, between westbound frontage road and Noakes St	140 feet from right of way, between westbound frontage road and Noakes St
SH 286 from I-37 to Morgan Avenue	90 feet from right of way, between 16th St and 15th St	220 feet from right of way, between 17th St and 18th St
West Alternative		
US 181 from Beach Avenue to I-37	30 feet from right of way, between westbound frontage road and Noakes St	160 feet from right of way, along Floral St
I-37 from Shoreline Avenue to Nueces Bay Blvd.	50 feet from right of way, between westbound frontage road and Noakes St	170 feet from right of way, between westbound frontage road and Noakes St
SH 286 from I-37 to Morgan Avenue	80 feet from right of way, between 16th St and 15th St	255 feet from right of way, between 16th St and 15th St

Source: US 181 Harbor Bridge EIS Team 2013

Notes: 1. NAC Category E

2. NAC Category B and Category C

4.10.3 Evaluation of Noise Abatement Measures

Since potential noise impacts have been identified for this project, the feasibility and reasonableness of potential noise abatement measures must be evaluated per the 2011 TxDOT guidelines. Specific abatement measures including traffic management measures, alteration of horizontal and vertical alignments, acquisition of undeveloped property to provide noise buffers, and the construction of noise barriers were evaluated for feasibility and reasonableness. Abatement measures determined to be feasible and reasonable per TxDOT criteria can be recommended as effective measures to reduce adverse noise impacts associated with the proposed project.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable under TxDOT guidelines. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50 percent of impacted, first row receivers by at least 5 dBA. TxDOT considers noise abatement to be "reasonable," if the following criteria are met:

1. The noise reduction design goal is met – a minimum of one first row benefited receiver must receive a noise reduction of at least 7 dBA;

2. The cost-effectiveness goal is met – the cost of the abatement measure should be equal to or less than $25,000 per benefited receiver (noise impact reduced by at least 5 dBA); and
3. Concurrence from the public on the noise abatement measure – at least 50 percent plus one of the affected property owners supports the proposed abatement.

The specific, potential noise abatement measures that were evaluated for this project to reduce or eliminate adverse noise impacts are discussed by build alternative below along with a determination of feasibility and reasonableness. Barriers that meet criteria 1 and 2 above are considered acoustically feasible and reasonable under TxDOT guidelines.

Traffic Management Measures: Control devices could be used to reduce the speed of the traffic; however, the minor benefit of 1 dBA per 5 mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways. Based on these considerations, traffic management measures were determined to be infeasible as a noise abatement measure.

Alteration of Horizontal and/or Vertical Alignments: Any alteration of the existing alignment would displace existing businesses and residences, require additional right of way and not be cost effective or reasonable. Typical engineering estimates indicate that changes in alignment must at least eight times the distance between the roadway and the receiver to produce a benefit (considered a reduction of at least 5 dBA). Because of increased cost and the potential for increasing the number of noise level impacts, altering the horizontal or vertical alignment of any of the proposed alternatives was determined to be infeasible.

Buffer Zone: The acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise Walls: Noise walls are the most commonly used noise abatement measure. Noise walls were evaluated for reasonableness and feasibleness at each of the impacted receiver locations for each alternative as described in the following section.

4.10.3.1 Green Alternative Barrier Analysis

As indicated in **Table 4.10-1**, the proposed project would result in potential traffic noise impacts at modeled commercial, residential, and community receivers located in the immediate vicinity of the proposed Green Alternative along I-37, US 181, and the Crosstown Expressway. Noise barriers were evaluated by the impacted receiver locations and the results are described below.

Noise barriers would not be feasible and reasonable for any of the following impacted receivers and, therefore, are not proposed for incorporation into the project:

R1: This location is representative of the Rincon Channel Wetlands Interpretive Overlook located on the west side of US 181. Because of the configuration of the parking area, a noise barrier could not continuously be installed at this location. Additionally, this is an isolated area with no other receivers in the immediate vicinity; noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R4: R4 is a separate, individual residence located east of US 181. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R22: This receiver is representative of a separate, isolated recreational field. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R24: This receiver is representative of Heritage Park, which is equivalent to six representative receivers. Various barrier scenarios within the proposed right of way were evaluated to determine if effective noise reduction at this location could be provided. Noise barriers were evaluated in TNM in several locations, including: along the US 181 elevated northbound mainlanes and along the northbound frontage road, between Fitzgerald Street and Hughes Street. None of the preliminary scenarios, individual or combined, were able to provide a noise reduction of at least 5 dBA for any noise receiver in the vicinity. Because there would be no receivers with a 5 dBA or 7 dBA noise reduction, a noise barrier at this location would not be acoustically feasible under TxDOT noise policy.

R26: This receiver is representative of 10 residences near N. Broadway Street, east of US 181. The residences' backyards are along the back of commercial parcels that front N. Broadway Street. Extending the noise barrier in front of the commercial area would have a detrimental effect on business by restricting views and access by potential customers. Additionally, access to the business is currently provided via N. Broadway Street. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R27: This receiver is representative of a rehabilitation clinic, Reality Ranch. Predicted interior noise levels would be anticipated to substantially exceed the existing interior noise level. Since this area has no other impacted receivers in the immediate vicinity, a noise barrier that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R36: This receiver is representative of four residences located north of I-37, just east of the Crosstown Expressway. In this location, noise barriers could not be continuously installed along

Martin Luther King Drive because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers in this location are not proposed for incorporation into the proposed project.

R37: This location is representative of an apartment complex; 20 units would be expected to be impacted by this alternative. In this location, noise barriers could not be continuously installed along the westbound frontage road because of the existing driveway into the apartment complex. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers in this location are not proposed for incorporation into the proposed project.

R40 through R42: These receivers are representative of 10 residences located south of I-37, just east of the Crosstown Expressway. In this location, noise barriers could not be continuously installed along Antelope Street, which serves as the frontage road, because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option. Additionally, this area is sparsely populated within the traffic noise impact area. Constructing a noise barrier in this location that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R45–R47: These receivers represent a total of 12 residences and T.C. Ayers Park, which includes a pool representing a total of 121 receivers. The park and residences fronting I-37 all have driveway access from Martin Luther King Drive, which serves as a frontage road. In this location, noise barriers could not be continuously installed along Martin Luther King Drive because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R50 – R51: These receivers represent seven residences and a church. To provide effective noise reduction at this location, a noise barrier could be installed along the westbound Frontage although there would be a break in the barrier for the existing intersection with Stillman Avenue. The noise barrier would be located north of the Frontage Road along the edge of right of way and would span between Van Loan Avenue and Peabody Avenue. The length of this proposed barrier is limited by residential driveway access provided along the frontage road west of Van Loan Avenue, which would not allow for construction of a continuous noise barrier. Based on preliminary calculations, a noise barrier 502 feet in length and 14 feet in height would be expected to reduce noise levels by at least 5 dBA for 4 receivers. Although at least one receiver would be expected to have a noise reduction of at least 7 dBA, the cost of constructing

this noise barrier would be greater than $25,000 per benefitted receiver; therefore, a noise barrier at this location would not be considered acoustically feasible under TxDOT noise policy.

R52 – R53: These receivers represent 25 residences. In this location, noise barriers could not be continuously installed along the westbound Frontage Road because of the existing driveways for the residences fronting I-37. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers in this location are not proposed for incorporation into the proposed project.

R64–R71: These receivers are representative of 81 residences. Residences fronting I-37 have driveway access from the frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers in this location are not proposed for incorporation into the proposed project.

R75: This receiver represents an apartment complex with approximately 20 impacted units along eastbound I-37. In this location, a noise barrier could be constructed between the Frontage Road and the edge of right of way. The noise barrier would be located south of the eastbound Frontage Road along the edge of right of way and would span between Nueces Bay Boulevard and Buffalo Street, with two breaks for driveway access. Based on preliminary calculations, a noise barrier 508 feet in length and 19 feet in height would be expected to reduce noise levels by at least 5 dBA for 12 receivers. Because of the numerous breaks in the barrier for driveway access, no receivers would have a 7 dBA noise reduction; therefore, a noise barrier at this location would not be acoustically feasible.

R76: This receiver is representative of three residences with driveway access from the I-37 frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R78, R79: These receivers represent five residences. To provide effective noise reduction at this location, a noise barrier could be installed along Antelope Street, which serves as the frontage road. The noise barrier would be located south of Antelope Street along the edge of right of way and would span between Lester Street and Cleveland Street, with a break for Doss Street. Based on preliminary calculations, a noise barrier 374 feet in length and 14 feet in height would be expected to reduce noise levels by at least 5 dBA for two receivers. No receivers would be expected to have a noise reduction of at least 7 dBA. Because the cost of constructing this noise barrier would be greater than $25,000 per benefitted receiver and no receivers would incur a 7

dBA noise reduction, a noise barrier at this location would not be acoustically feasible under TxDOT noise policy.

R80, R86, and R87: These receivers are representative of eight residences located west of the Crosstown Expressway. At these locations, noise barriers could not be continuously installed along Culberson Street, which serves as the frontage road, because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers in this location are not proposed for incorporation into the proposed project.

R81–R85, R94–R98, R105–R109, R113–R118: These receivers are representative of 96 residences, a cemetery, church, day care and playground associated with the Salvation Army. There are multiple cross streets and driveway access is provided to these representative receivers from the northbound frontage road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers in this location are not proposed for incorporation into the proposed project.

R92: This receiver is representative of four residences in a generally commercial area. At these locations, noise barriers could not be continuously installed along the southbound frontage road because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers in this location are not proposed for incorporation into the proposed project.

R93, R99–R104, and R110: These receivers are representative of 60 residences. Driveway access is provided to these representative receivers from the frontage road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers in this location are not proposed for incorporation into the proposed project.

Noise barriers would be acoustically feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project.

R72: This receiver represents a total of 10 residences along eastbound I-37 near Nueces Bay Boulevard. In this location, a noise barrier could be constructed between the frontage road and the edge of the right of way and would span between Huisache Street and Nueces Bay Boulevard. There would be a break in the barrier for an existing residential driveway near Huisache Street. Based on preliminary calculations, a noise barrier 524 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for seven receivers at a total cost of $122,616 or $17,517 per benefitted receiver. At least one receiver would be

expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is also summarized in **Table 4.10-4** as Barrier C.

R88–R91: These receivers represent 45 residences and Ben Garza Park, equivalent to 15 receivers, for a total of 60 representative receivers. To provide effective noise reduction at this location, a noise barrier could be installed along Culberson Street, which serves as the frontage road, and the edge of the right of way. The noise barrier would be located between Howard Street and just north of Laredo Street where there is a business. There would be a break in the barrier at Mussett Street to maintain the existing intersection with Culberson Street. Based on preliminary calculations, a noise barrier 1,368 feet in length and 17 feet in height would be expected to reduce noise levels by at least 5 dBA for 36 receivers at a total cost of $391,748 or $10,882 per benefitted receiver. Of the 36 benefitted receivers, approximately 6 receivers would be expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is also summarized in **Table 4.10-4** as Barrier F.

Table 4.10-4 Green Alternative Noise Barrier Proposal

Barrier	Representative Receivers	Total No. Benefited	Length (feet)	Height (feet)	Total Cost	$/Benefited Receiver	Reasonable & Feasible
C	R72	7	537	13	$125,318	$17,903	Yes
F	R88 – R91	36	1,368	17	$391,748	$10,882	Yes

Source: US 181 Harbor Bridge EIS Team 2013

4.10.3.2 Red Alternative Barrier Analysis

As indicated in **Table 4.10-1**, the proposed project would result in potential traffic noise impacts at modeled commercial, residential, and community receivers located in the immediate vicinity of the proposed Red Alternative (the Preferred Alternative) along I-37, US 181, and the Crosstown Expressway. Noise barriers were evaluated by the impacted receiver locations and the results are described below.

Noise barriers would not be feasible or reasonable for any of the following impacted receivers and, therefore, are not proposed for incorporation into the project:

R1: This location is representative of the Rincon Channel Wetlands Interpretive Overlook located on the west side of US 181. Because of the configuration of the parking area, a noise barrier could not continuously be installed at this location. Additionally, this is an isolated area with no other receivers in the immediate vicinity; noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R3, R4, R7, R9, and R11: Receiver 3 is an isolated gas station and R4, R7, R9, and R11 are representative of separate, individual impacted residences, located east of US 181. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction

goal of 7 dBA at these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000.

R13: This receiver represents two isolated residences along US 181 near E. Causeway Boulevard. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R14: This receiver is representative of a church east of US 181 and three residences. Because of the existing access provided to the parking area from E. Causeway Boulevard, a noise barrier could not continuously be installed at this location. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R40–R41: These receivers are representative of seven residences located south of I-37, just east of the Crosstown Expressway. In this location, noise barriers could not be continuously installed along Antelope Street, which serves as the frontage road, because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option. Additionally, this area is sparsely populated within the traffic noise impact area. Constructing a noise barrier in this location that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R45–R48: These receivers represent a total of 20 residences and T.C. Ayers Park, which includes a pool representing 121 receivers. The park and residences fronting I-37 all have driveway access from Martin Luther King Drive, which serves as a frontage road. In this location, noise barriers could not be continuously installed along Martin Luther King Drive because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R49-R51: These receivers represent 21 residences and a church. To provide effective noise reduction at this location, a noise barrier could be installed along the westbound Frontage Road although there would be a break in the barrier for the existing intersection with Stillman Avenue. The noise barrier would be located north of the Frontage Road along the edge of right of way and would span between Van Loan Avenue and Peabody Avenue. The length of this proposed barrier is limited by residential driveway access provided along the frontage road west of Van Loan Avenue, which would not allow for construction of a continuous noise barrier. Based on preliminary calculations, a noise barrier 515 feet in length and 10 feet in height would

be expected to reduce noise levels by at least 5 dBA for two receivers. Although at least one receiver would be expected to have a noise reduction of at least 7 dBA, the cost of constructing this noise barrier would be greater than $25,000 per benefitted receiver; therefore, a noise barrier at this location would not be considered acoustically feasible under TxDOT noise policy.

R64–R71: These receivers are representative of 81 residences. Residences fronting I-37 have driveway access from the frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R76: This receiver is representative of three residences with driveway access from the I-37 frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R80, R86, and R87: These receivers are representative of eight residences located west of the Crosstown Expressway. At these locations, noise barriers could not be continuously installed along Culberson Street, which serves as the frontage road, because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R75: This receiver represents an apartment complex with approximately 20 impacted units along eastbound I-37. In this location, a noise barrier could be constructed between the Frontage Road and the edge of right of way. The noise barrier would be located south of the eastbound Frontage Road along the edge of right of way and would span between Nueces Bay Boulevard and Buffalo Street, with two breaks for existing driveway access. Based on preliminary calculations, a noise barrier 508 feet in length and 19 feet in height would be expected to reduce noise levels by at least 5 dBA for 12 receivers. Because of the numerous breaks in the barrier for driveway access, no receivers would have a 7 dBA noise reduction; therefore, a noise barrier at this location would not be acoustically feasible.

R92: This receiver is representative of four residences in a generally commercial area. At these locations, noise barriers could not be continuously installed along 17th Street, which serves as the frontage road, because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option, and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R93, R99–R104, and R110: These receivers are representative of 60 residences. Driveway access is provided to these representative receivers from the frontage road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option, and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R94–R98, R105–R109, R111–R116: These receivers are representative of 71 residences, a cemetery, day care and a playground associated with the Salvation Army. There are multiple cross streets and driveway access is provided to these representative receivers from the northbound Crosstown Access road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option, and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R120, R122 – R126: These receivers represent 163 residences, one church, and one business, located east of the proposed US 181 alignment. Various barrier scenarios within the proposed right of way were evaluated to determine if effective noise reduction at this location could be provided. Noise barriers were evaluated in several locations, including: along the US 181 elevated northbound mainlanes, along the US 181 elevated northbound entrance ramp, and along the direct connector from eastbound I-37 to northbound US 181. None of the preliminary scenarios, individual or combined, were able to provide a noise reduction of at least 5 dBA for any noise receiver in the vicinity. Because there would be no receivers with a 5 dBA or 7 dBA noise reduction, a noise barrier at this location would not be acoustically feasible under TxDOT noise policy.

Noise barriers would be acoustically feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project.

R72: This receiver represents a total of nine residences along eastbound I-37 near Nueces Bay Boulevard. In this location, a noise barrier could be constructed between the frontage road and the edge of the right of way and would span between Huisache Street and Nueces Bay Boulevard. There would be a break in the barrier for an existing residential driveway near Huisache Street. Based on preliminary calculations, a noise barrier 537 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for nine receivers at a total cost of $125,286 or $13,921 per benefitted receiver. At least one receiver would be expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is summarized in **Table 4.10-5** as Barrier B.

R89–R91: These receivers represent 45 residences. A noise barrier extension was also evaluated in the area near R88. To provide effective noise reduction at this location, a noise barrier could be installed along Culberson Street/Crosstown Avenue, which serves as the frontage road, and

the edge of the right of way. The noise barrier would be located between Mussett Street and just north of Laredo Street where there is an established business. Based on preliminary calculations, a noise barrier 1,368 feet in length and 15 feet in height would be expected to reduce noise levels by at least 5 dBA for 18 receivers at a total cost of $367,516 or $20,418 per benefitted receiver. Of the 18 benefitted receivers, six receivers would be expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is summarized in **Table 4.10-4** as Barrier D.

Table 4.10-5 Red Alternative Noise Barrier Proposal

Barrier	Representative Receivers	Total No. Benefited	Length (feet)	Height (feet)	Total Cost	$/Benefited Receiver	Reasonable & Feasible
B	R72	9	537	13	125,286	$13,921	Yes
D	R89-R91	18	1,368	15	$367,516	$20,418	Yes

Source: US 181 Harbor Bridge EIS Team 2013

4.10.3.3 Orange Alternative Barrier Analysis

As indicated in **Table 4.10-1**, the proposed project would result in potential traffic noise impacts at modeled commercial, residential, and community receivers located in the immediate vicinity of the proposed Orange Alternative along I-37, US 181, and the Crosstown Expressway. Noise barriers were evaluated for the impacted receiver locations and the results are described below.

Noise barriers would not be feasible or reasonable for any of the following impacted receivers and, therefore, are not proposed for incorporation into the project:

R1: This location is representative the Rincon Channel Wetlands Interpretive Overlook located on the west side of US 181. Because of the configuration of the parking area, a noise barrier could not continuously be installed at this location. Additionally, this is an isolated area with no other receivers in the immediate vicinity; noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R4: This receiver is representative of a separate, individual impacted residence, located east of US 181. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R7 – R10, R13, and R16: These receivers represent a total of 15 residences located west of the proposed US 181. To provide effective noise reduction at this location, a noise barrier could be installed along the elevated southbound mainlanes of US 181. Based on preliminary calculations and various height scenarios, a noise barrier would not be expected to reduce noise levels by at least 5 dBA for receivers in the area. Because there would be no receivers with a 5 dBA or 7 dBA

noise reduction, a noise barrier at this location would not be acoustically feasible under TxDOT noise policy.

R22: This location is representative of a separate, isolated recreational field. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R32: This location is representative of a separate, individual impacted residence, located south of I-37. Noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R40–R41: These receivers are representative of seven residences located south of I-37, just east of the Crosstown Expressway. In this location, noise barriers could not be continuously installed along Antelope Street, which serves as the frontage road, because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option. Additionally, this area is sparsely populated within the traffic noise impact area. Constructing a noise barrier in this location that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000.

R45–R48: These receivers represent a total of 17 residences and T.C. Ayers Park, including a pool representing 121 receivers. The park and residences fronting I-37 all have driveway access from Martin Luther King Drive, which serves as a frontage road. In this location, noise barriers could not be continuously installed along Martin Luther King Drive because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R49–R51: These receivers represent 21 residences and a church. To provide effective noise reduction at this location, a noise barrier could be installed along the westbound Frontage Road although there would be a break in the barrier for the existing intersection with Stillman Avenue. The noise barrier would be located north of the Frontage Road along the edge of right of way and would span between Van Loan Avenue and Peabody Avenue. The length of this proposed barrier is limited by residential driveway access provided along the frontage road west of Van Loan Avenue. Based on preliminary calculations, a noise barrier 502 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for three receivers. Although at least one receiver would be expected to have a noise reduction of at least 7 dBA, the cost of constructing this noise barrier would be greater than $25,000 per benefitted

receiver; therefore, a noise barrier at this location would not be considered acoustically feasible under TxDOT noise policy.

R64–R71: These receivers are representative of 81 residences. Residences fronting I-37 have driveway access from the frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R75: This receiver represents an apartment complex with approximately 20 impacted units along eastbound I-37. In this location, a noise barrier could be constructed between the Frontage Road and the edge of right of way. The noise barrier would be located south of the eastbound Frontage Road along the edge of right of way and would span between Nueces Bay Boulevard and Buffalo Street, with two breaks for existing driveway access. Based on preliminary calculations, a noise barrier 508 feet in length and 19 feet in height would be expected to reduce noise levels by at least 5 dBA for 12 receivers. Because of the numerous breaks in the barrier for driveway access, no receivers would have a 7 dBA noise reduction; therefore, a noise barrier at this location would not be acoustically feasible.

R76: This receiver is representative of three residences with driveway access from the I-37 frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R79: This receiver represents a total of two separate, isolated residences located south of I-37 near the Crosstown Expressway. Constructing a noise barrier in this location that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R80, R86, and R87: These receivers are representative of seven residences located west of the Crosstown Expressway. At these locations, noise barriers could not be continuously installed along Culberson Street, which serves as the frontage road, because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R92: This receiver is representative of three residences in a generally commercial area. At these locations, noise barriers could not be continuously installed along 17th Street, which serves as the frontage road, because of the numerous driveway access points and cross streets.

Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R93, R99–R104, and R110: These receivers are representative of 59 residences. Driveway access is provided to these representative receivers from the frontage road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R94–R98, R105–R109, R111–R116: These receivers are representative of 71 residences, a cemetery, day care and a playground associated with the Salvation Army. There are multiple cross streets and driveway access is provided to these representative receivers from the northbound Crosstown Access road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

Noise barriers would be acoustically feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project.

R72: This receiver represents a total of nine residences along eastbound I-37 near Nueces Bay Boulevard. In this location, a noise barrier could be constructed between the frontage road and the edge of the right of way and would span between Huisache Street and Nueces Bay Boulevard. There would be a break in the barrier for an existing residential driveway near Huisache Street. Based on preliminary calculations, a noise barrier 524 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for nine receivers at a total cost of $122,338 or $13,593 per benefitted receiver. At least one receiver would be expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is summarized in **Table 4.10-6** as Barrier C.

R90–R91: These receivers represent 26 residences. A noise barrier extension was also evaluated in the vicinity of R88. To provide effective noise reduction at this location, a noise barrier could be installed along Culberson Street/Crosstown Avenue, which serves as the frontage road, and the edge of the right of way. The noise barrier would be located between Mussett Street and just north of Laredo Street where there is an established business. Based on preliminary calculations, a noise barrier 1,367 feet in length and 17 feet in height would be expected to reduce noise levels by at least 5 dBA for 33 receivers at a total cost of $415,674 or $12,596 per benefitted receiver. Of the 33 benefitted receivers, 12 receivers would be expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is summarized in **Table 4.10-6** as Barrier E.

Table 4.10-6 Orange Alternative Noise Barrier Proposal							
Barrier	Representative Receivers	Total No. Benefited	Length (feet)	Height (feet)	Total Cost	$/Benefited Receiver	Reasonable & Feasible
C	R72	9	524	13	$122,338	$13,593	Yes
E	R90 – R91	33	1,368	17	$415,674	$12,596	Yes

Source: US 181 Harbor Bridge EIS Team 2013

4.10.3.4 West Alternative Barrier Analysis

As indicated in **Table 4.10-1**, the proposed project would result in potential traffic noise impacts at modeled commercial, residential, and community receivers located in the immediate vicinity of the proposed West Alternative along I-37, US 181, and the Crosstown Expressway. Noise barriers were evaluated for the impacted receiver locations and the results are described below.

Noise barriers would not be feasible or reasonable for any of the following impacted receivers and, therefore, are not proposed for incorporation into the project:

R1: This location is representative the Rincon Channel Wetlands Interpretive Overlook located on the west side of US 181. Because of the configuration of the parking area, a noise barrier could not continuously be installed at this location. Additionally, since this is an isolated area with no other receivers in the immediate vicinity, noise barriers that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

R4, R32, and R55: These receivers are separate, individual residences. Since this area has no other impacted receivers in the immediate vicinity, a noise barrier that would achieve the minimum feasible reduction of 5 dBA and the noise reduction goal of 7 dBA at these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000.

R37: This location is representative of an apartment complex; eight units would be expected to be impacted by this alternative. In this location, noise barriers could not be continuously installed along the westbound frontage road because of the existing driveway into the apartment complex. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R40, R42: These receivers are representative of five residences located south of I-37, just east of the Crosstown Expressway. In this location, noise barriers could not be continuously installed along Antelope Street, which serves as the frontage road, because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option. Additionally, this area is sparsely populated within the traffic noise impact area. Constructing a noise barrier in this location that would achieve the minimum feasible reduction of 5 dBA and

the noise reduction goal of 7 dBA at these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000.

R45, R46, and R48: These receivers represent a total of 16 residences and T.C. Ayers Park, including a pool representing 121 receivers. The park and residences fronting I-37 all have driveway access from Martin Luther King Drive, which serves as a frontage road. In this location, noise barriers could not be continuously installed along Martin Luther King Drive because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R49–R52: These receivers represent 21 residences and a church. To provide effective noise reduction at this location, a noise barrier could be installed along the westbound Frontage Road although there would be a break in the barrier for the existing intersection with Stillman Avenue. The noise barrier would be located north of the Frontage Road along the edge of right of way and would span between Van Loan Avenue and Kennedy Avenue. The length of this proposed barrier is limited by residential driveway access provided along the frontage road west of Van Loan Avenue. Based on preliminary calculations, a noise barrier 524 feet in length and 17 feet in height would be expected to reduce noise levels by at least 5 dBA for three receivers. Because the cost of constructing this noise barrier would be greater than $25,000 per benefitted receiver and no receivers would be expected to have a noise reduction of at least 7 dBA, a noise barrier at this location would not be acoustically feasible under TxDOT noise policy.

R64–R69: These receivers are representative of 48 residences. Residences fronting I-37 have driveway access from the frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R76: This receiver is representative of three residences with driveway access from the I-37 frontage road. In this location, noise barriers could not be continuously installed along the frontage road because of the existing driveway access points. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option and, therefore, barriers at this location are not proposed for incorporation into the proposed project.

R78, R79: These receivers represent five residences. To provide effective noise reduction at this location, a noise barrier could be installed along Antelope Street, which serves as the frontage road. The noise barrier would be located south of Antelope Street along the edge of right of way and would span between Lester Street and Cleveland Street, with a break for Doss Street.

Based on preliminary calculations, a noise barrier 374 feet in length and 16 feet in height would be expected to reduce noise levels by at least 5 dBA for two receivers. No receivers would be expected to have a noise reduction of at least 7 dBA. Because the cost of constructing this noise barrier would be greater than $25,000 per benefitted receiver, a noise barrier at this location would not be acoustically feasible under TxDOT noise policy.

R80, R81, R86, and R87: These receivers are representative of seven residences located west of the Crosstown Expressway. At these locations, noise barriers could not be continuously installed along Culberson Street, which serves as the frontage road, because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R82–R85, R94–R98, R105–R109, R113–R118: These receivers are representative of 94 residences, a cemetery, church, day care and a playground associated with the Salvation Army. There are multiple cross streets and driveway access is provided to these representative receivers from the northbound Crosstown Access road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R92: This receiver is representative of three residences in a generally commercial area. At these locations, noise barriers could not be continuously installed along 17th Street, which serves as the frontage road, because of the numerous driveway access points and cross streets. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

R93, R99–R104, and R110: These receivers are representative of 59 residences. Driveway access is provided to these representative receivers from the frontage road. Maintaining access at the existing points would result in breaks in the noise barriers that would negate the potential effectiveness of this abatement option; therefore, barriers at this location are not proposed for incorporation into the proposed project.

Noise barriers would be acoustically feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project.

R88–R91: These receivers represent 47 residences and Ben Garza Park, equivalent to 15 receivers, for a total of 62 representative receivers. To provide effective noise reduction at this location, a noise barrier could be installed along the between Culberson Street/Crosstown Avenue and the edge of the right of way. The noise barrier would be located between Howard

Street and just north of Laredo Street where there is a business. There would be a break in the barrier at Mussett Street to maintain the existing intersection with Culberson Street. Based on preliminary calculations, a noise barrier 1,368 feet in length and 14 feet in height would be expected to reduce noise levels by at least 5 dBA for 33 receivers at a total cost of $343,285 or $10,403 per benefitted receiver. Of the 33 benefitted receivers, 6 receivers would be expected to have a noise reduction of at least 7 dBA. This barrier was determined to be acoustically feasible and is summarized in **Table 4.10-7** as Barrier C.

Table 4.10-7 West Alternative Noise Barrier Proposal

Barrier	Representative Receivers	Total # Benefited	Length (feet)	Height (feet)	Total Cost	$/Benefited Receiver	Reasonable & Feasible
C	R88 – R91	33	1,368	14	$343,285	$10,403	Yes

Source: US 181 Harbor Bridge EIS Team 2013

4.10.3.5 Barrier Summary for Build Alternatives

Several barrier scenarios for each build alternative were determined to be acoustically feasible and reasonable, as summarized in **Table 4.10-8**. Two barriers are proposed for the Green, Red (Preferred), and Orange Alternatives and are located in the same areas, although these barriers provide various degrees of noise level reduction because of the unique geometry for each alternative. These barriers are located along eastbound I-37 and along southbound Crosstown Expressway. One barrier is proposed for the West Alternative and is located along southbound Crosstown Expressway.

Table 4.10-8 Barrier Proposal Summary for Build Alternatives

Barrier	Representative Receivers	Total No. Benefited	Length (feet)	Height (feet)	Total Cost	$/Benefited Receiver	Reasonable & Feasible
Green							
C	R72	7	524	13	$122,616	$17,517	Yes
F	R88 – R91	36	1,368	17	$391,748	$10,882	Yes
Red							
B	R72	9	524	13	$122,616	$13,624	Yes
D	R89-R91	18	1,368	15	$367,516	$20,418	Yes
Orange							
C	R72	9	524	13	$122,616	$13,624	Yes
E	R90 – R91	33	1,368	17	$415,674	$12,596	Yes
West							
C	R88 – R91	33	1,368	14	$343,285	$10,403	Yes

Source: US 181 Harbor Bridge EIS Team 2013

Any subsequent project design changes may require a reevaluation of this preliminary noise barrier proposal. The final decision to construct the proposed noise barrier will not be made until completion of the project design, utility evaluation and polling of adjacent property owners.

4.10.4 Construction Noise Impacts

During the construction phase of this project, temporary increases in noise may result from construction activities. Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers are expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions would be included in the construction plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

4.10.5 Summary

Based on the results of this analysis, increased vehicular traffic associated with the proposed project would increase noise levels at existing noise-sensitive sites adjacent to each alternative. Residential noise receivers located throughout the study area are anticipated to experience noise levels that approach or exceed the NAC by 2032 for all of the proposed build alternatives. Additionally, parks, churches, and schools would be expected to have noise impacts. Abatement measures that would be both feasible and reasonable for impacted locations are proposed for each alternative and are summarized below.

- Green Alternative
  - Barrier C - A noise barrier 524 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for seven receivers at a total cost of $122,616 or $17,517 per benefitted receiver.
  - Barrier F - A noise barrier 1,368 feet in length and 17 feet in height would be expected to reduce noise levels by at least 5 dBA for 36 receivers at a total cost of $391,748 or $10,882 per benefitted receiver.
- Red Alternative (the Preferred Alternative)
  - Barrier B – A noise barrier 524 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for nine receivers at a total cost of $122,616 or $13,624 per benefitted receiver.
  - Barrier D – A noise barrier 1,368 feet in length and 15 feet in height would be expected to reduce noise levels by at least 5 dBA for 18 receivers at a total cost of $367,516 or $20,418 per benefitted receiver.
- Orange Alternative
  - Barrier C – A noise barrier 524 feet in length and 13 feet in height would be expected to reduce noise levels by at least 5 dBA for nine receivers at a total cost of $122,616 or $13,624 per benefitted receiver.

- Barrier E – A noise barrier 1,368 feet in length and 17 feet in height would be expected to reduce noise levels by at least 5 dBA for 33 receivers at a total cost of $415,674 or $12,596 per benefitted receiver.

- West Alternative
  - Barrier C - A noise barrier 1,368 feet in length and 14 feet in height would be expected to reduce noise levels by at least 5 dBA for 33 receivers at a total cost of $343,285 or $10,403 per benefitted receiver.

Construction noise would be minimized by the implementation of Best Management Practices (BMP) including, but not limited to, the requirement of the construction contractor to maintain adequate muffler systems for equipment and to limit operations of selected equipment to certain times of the day, as necessary.

A copy of this traffic noise analysis will be made available to local officials. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

4.11 WATER RESOURCES IMPACTS

This section focuses on the potential direct impacts of the proposed project on water supply and availability, surface water quality (focusing on impaired waters and stormwater), and groundwater. Under the Clean Water Act, water quality is primarily regulated under Section 303(d) (impaired waters) and Section 402 (stormwater discharge permitting). Other regulatory programs protecting water quality include the General Bridge Act and the Rivers and Harbors Act (covered in **Section 4.11.6**) and the Texas Coastal Management Program (covered in **Section 4.11.5**). Section 401 of the Clean Water Act, which requires state certification of permitted discharges potentially affecting water quality, is discussed in **Section 4.13.1.2**.

Effects to surface water quality would be primarily to those water bodies receiving stormwater runoff from the construction and operation of proposed project. These receiving waters include Nueces Bay, Corpus Christi Bay, and the Port of Corpus Christi Inner Harbor (Inner Harbor), as well as stormwater ditches conveying runoff to these receiving waters. The Nueces River and Delta, discussed in **Section 3.8.1.2** for its contribution to project area water resources from a regional perspective, would not be directly affected by the proposed project.

4.11.1 Potential Impacts to Water Supply and Availability

The Coastal Bend Region Water Planning Group (CBRWPG) (Region N) identified 18 cities and water user groups that would have unmet needs during drought of record supply conditions during the 60-year planning horizon from 2000–2060. In service areas of the Corpus Christi and San Patricio Municipal Water Districts, which supplies a large majority of Region N's water demands, the combined shortage in 2060 is projected to be 61,255 acre feet per year.

The proposed project would require relatively minor amounts of water for construction and long-term maintenance, and is not expected to directly contribute to projected drought conditions in the future. The No Build Alternative, likewise, would not have an effect on water supply or contribute to future projected drought conditions.

4.11.2 Potential Impacts on Impaired Surface Waters - Compliance with Clean Water Act Section 303(d)

Stormwater from construction and operation of the proposed project would drain to Nueces Bay, Corpus Christi Bay and the Inner Harbor.

As discussed in **Section 3.8.1.2**, Nueces Bay has been identified as impaired for oyster waters, but is not listed on the 303(d) list because it has an EPA/TCEQ-approved Total Maximum Daily Load (TMDL) and TMDL Implementation Plan (TCEQ 2006 and TCEQ 2007).[8] The Inner Harbor is not listed as impaired on the 2012 Texas 303(d) list (approved by the EPA on May 9, 2013) or the 2012 Texas Integrated Report of Surface Water Quality (TCEQ 2013c). Nitrogen nutrients have been identified by TCEQ, however, as parameters of concern for the Inner Harbor since 2002 (see **Table 3.8-1**).

Corpus Christi Bay has been identified in the 2012 Texas 303(d) List as impaired, and the 2012 Texas Integrated Report identifies the parameters of water quality concern as pathogen indicator bacteria at recreational beaches on the Bay. In October 2010, TCEQ initiated a TMDL program for Corpus Christi Bay recreational beaches at Ropes Park and Cole Park. Corpus Christi Bay remains on the 303(d) list because the TMDL has not been completed or approved by EPA and TCEQ. TCEQ's 2012 Clean Water Act Integrated Report also includes a third Corpus Christi Bay recreational beach at Poenisch Park as of Concern for near-nonattainment of the recreational beach use standard.

4.11.2.1 Impacts of the Build Alternatives

All of the proposed build alternatives would be located within five miles of and drain to all three of the receiving waters. **Figure 4.11-1** shows the proposed build alternatives on a map of drainage areas for these tidally influenced receiving water bodies (Nueces Bay, Corpus Christi Bay, and the Inner Harbor). The drainage areas depicted are primarily based on the City of Corpus Christi's 2010 map of *Major Stormwater Drainage Basins* (City of Corpus Christi 2010d). Areas identified by cross-hatching show where the City's drainage basin map was modified based on field observations conducted for the proposed project in February 2013. The potential for project-related surface water quality impacts is related to roadway and bridge construction activities for the build alternatives, and with highway stormwater runoff associated with roadway and bridge operation and use for all of the alternatives, including the No-Build Alternative.

[8] TCEQ's Texas Surface Water Quality Standards identify classified water body segments as impaired when they have pollutants or water quality conditions which do not support their designated uses (e.g., contact recreation, oyster waters). Impaired water bodies are further categorized as Category 4, which includes those having an approved TMDL, and Category 5, which includes those without a TMDL or a TMDL underway but not yet approved. Only Category 5 water bodies are included on the 303(d) list.

The relative extent to which the different receiving waters may potentially be affected by the proposed build alternatives largely depends on where the alignments fall within their watersheds. As previously stated, each of the proposed build alternatives would result in discharges of highway stormwater runoff, in varying amounts, to all three of the receiving water bodies in the project area. The minor differences among the build alternatives relate to the acreage of required right of way through each of the three drainage areas and the comparative effects of typical roadway runoff constituents on the parameters of concern identified for each of the water bodies. The extent of the proposed right of way footprint within the different drainage areas is summarized in **Table 4.11-1**.

Table 4.11-1 Right of Way Draining to Receiving Waters by Alternative

Alternative	Right of Way (acres)			Right of Way Drainage to Receiving Water (acres) (Percent of Alternative's Total Drainage to all Waters)		
	Existing Right of Way[1]	Additional Right of Way[2]	Total	Corpus Christi Bay	Nueces Bay	Inner Harbor
Green	228.3	30.5	258.8	76.5 (29.6%)	69.0 (26.7%)	108.6 (42.0%)
Red	240.1	50.4	290.5	61.1 (21.0%)	72.8 (25.1%)	148.1 (51.0%)
Orange	237.4	49.8	287.2	67.0 (23.3%)	70.2 (24.4%)	145.0 (50.5%)
West	251.7	68.9	320.6	61.8 (19.3%)	55.9 (17.4%)	195.7 (61.0%)
No Build	228.3	0.0	228.3	62.8 (24.3%)	55.0 (21.3%)	

Source: City of Corpus Christi 2010d and US 181 Harbor Bridge EIS Study Team 2013

1. Existing right of way includes the segments of US 181, I-37, and SH 286 that each proposed build alternative would follow. It includes the portions of US 181 not used by the Red, Orange and West Alternatives, as these segments would continue to be used for transportation purposes.

2. Additional right of way includes new location alignments as well as expanded right of way along existing facilities (US 181, I-37, SH 286). Additional right of way is equivalent to each alternative's increase over the No Build Alternative.

The Green Alternative would have a total stormwater drainage area of 258.8 acres, the least total drainage area of any build alternative. Drainage would potentially discharge to all receiving waters via the Corpus Christi municipal separate storm sewer system (MS4). This represents a net increase of 30.5 acres of drainage area over the No Build Alternative, the least amount of increase of any build alternative. The Red Alternative (the Preferred Alternative) would have a total stormwater drainage area of 290.5 acres and a net increase of 50.4 acres of drainage area over the No Build Alternative. The Orange Alternative would have a total stormwater drainage area of 287.2 acres and a net increase of 49.8 acres of drainage area over the No Build Alternative. The West Alternative would have a total storm water drainage area of 320.6 acres, the most of any alternative. This is a net increase of 68.9 acres over the No Build Alternative. The West Alternative would also require construction of an elevated roadway over the Port's Upland Confined Placement Area (UCPA), which could affect water quality conditions in storm water runoff to the Inner Harbor or Nueces Bay (see **Appendix G**).

Nueces Bay

The impairment of Nueces Bay Oyster waters for zinc in edible tissue is addressed by an approved TMDL and TMDL Implementation Plan (see **Table 3.8-1**). Total loadings of zinc to Nueces Bay are dominated

by atmospheric deposition (42 percent); other sources contributing zinc loading to the bay include nonpoint sources from watersheds draining to the bay (about 18 percent) (TCEQ 2006).

All of the proposed build alternatives would have stormwater discharges within five miles of and within the watershed of the impaired Nueces Bay Oyster Waters, Segment 2482OW, Assessment Unit 2482OW_01 (entire segment) (see **Table 3.8-1**).

Table 4.11-2 illustrates the amount of project right of way that would have stormwater discharges within the drainage basin of Nueces Bay by alternative, including the No Build Alternative.

Table 4.11-2 Right of Way Draining to Nueces Bay by Alternative

Alternative	Existing Right of Way	Additional Right of Way	Total (%)
Green	55.0	14.0	69.0 (26.7%)
Red	60.9	11.9	72.8 (25.0%)
Orange	57.0	13.2	70.2 (24.4%)
West	44.4	11.5	55.9 (17.3%)
No Build	55.0	0.0	55.0 (21.3%)

Source: City of Corpus Christi 2010d and US 181 Harbor Bridge EIS Study Team 2013

For any of the build alternatives, stormwater runoff is expected to contain zinc (from tire wear, motor oil, and grease; see **Appendix G**), which is addressed in the Load Allocation of the TMDL as a part of the total zinc loading from nonpoint sources in the Nueces Bay watershed. The proposed project and associated activities would be implemented, operated, and maintained in a manner that is consistent with the approved TMDL and TMDL Implementation Plan for Nueces Bay. Therefore, the effects of the proposed project on water quality in Nueces Bay would not be substantial.

Corpus Christi Bay

For any of the build alternatives, stormwater runoff from the proposed project would be conveyed via the City's MS4 to stormwater discharge points that are within five miles of and within the watershed of the recreational beaches at Cole Park (Assessment Unit 2481CB_03) and Ropes Park (Assessment Unit 2481CB_04), which are on the 2012 Texas 303(d) List for the parameter bacteria. There is no approved TMDL addressing the listed Assessment Units, which are within Segment 2481CB, Corpus Christi Bay Recreational Beaches.

Table 4.11-3 illustrates the amount of project right of way that would have stormwater discharges within the drainage basin of Corpus Christi Bay by alternative, including the No Build Alternative.

Table 4.11-3 Right of Way Draining to Corpus Christi Bay by Alternative

Alternative	Existing Right of Way	Additional Right of Way	Total
Green	62.8	13.7	76.5 (29.6%)
Red	61.0	0.1	61.1 (21.0%)

Table 4.11-3 Right of Way Draining to Corpus Christi Bay by Alternative			
Alternative	**Existing Right of Way**	**Additional Right of Way**	**Total**
Orange	61.7	5.3	67.0 (23.3%)
West	61.8	0.0	61.8 (19.3%)
No Build	62.8	0.0	62.8 (24.3%)

Source: City of Corpus Christi 2010d and US 181 Harbor Bridge EIS Study Team 2013

The 303(d) listing for the Cole Park and Ropes Park beaches is based on levels of *Enterococci*, the pathogen indicator bacteria used for assessing marine waters. The 2012 Texas Integrated Report also identifies an additional Corpus Christi Bay recreational beach, Poenisch Park, as having a level of concern for near-nonattainment of bacteria standards. Although pathogen indicator bacteria such as fecal coliforms and *E. coli* have been found in national assessments of highway runoff, as well as in runoff from all types of urban land uses, it is important to note that not all pollutants found in highway runoff can be attributed to transportation activities (Hyman and Vary 1999). Pitt et al. (2004) found statistically significant differences in fecal coliform levels in storm water from different land uses, with median levels in freeway storm water being significantly lower than residential, commercial, industrial and open space land uses. The primary sources of pathogen indicator bacteria in highway runoff have been identified as soil, litter, bird droppings, and trucks hauling livestock and stockyard waste (Dupuis et al. 2002). Vegetated areas of medians and adjacent land uses within the drainage areas of roadway storm drains may be source areas for bacteria contributed by soils and animal waste. Roadway operation for transportation use is considered to be a minor source of bacteria and is not expected to contribute to water body impairment at recreational beaches in Corpus Christi Bay. Construction, operation, and maintenance of the proposed project would be implemented using BMPs to control the discharge of pollutants from the project site. Therefore, the proposed project's effects to water quality in Corpus Christi Bay would not be substantial.

Inner Harbor

The Inner Harbor is not identified as impaired on the 2012 Texas 303(d) List or the 2012 Texas Integrated Report. Nitrogen nutrients have been identified by TCEQ, however, as parameters of concern for the Inner Harbor since 2002 (see **Table 3.8-1**). The 2012 Texas Integrated Report identifies a concern level based on nutrient screening levels in the Inner Harbor for the parameters ammonia, nitrate, and chlorophyll-A. The 2012 Texas 303(d) List does not identify any of the project area receiving waters as impaired for nutrients. National data on nitrogen nutrients in stormwater shows that highway runoff has median ammonia levels that are about twice those of other urban land uses, and median nitrite + nitrate levels that are about half of the levels found in other urban land uses (Pitt et al. 2004). The relative contribution of roadway runoff from the proposed project to total nutrient loading in the Inner Harbor is related to the impervious surface area of the roadway facility in the context of other land uses. Nonpoint and point sources of nutrients reflect the substantial contribution from atmospheric deposition, which strongly influences the nutrient loading from most land uses. For example, Barrett et al. (1995b) reported an estimated nitrate load from a high traffic section of highway in Austin, Texas at 1.42 kg/HA/year; however, Irish et al. (1995) concluded from the same study that rainfall concentrations

of nutrients as determined for a series of storm events accounted for between 50 percent and 100 percent of the nitrate load and 22 percent of the total phosphorus load from highway runoff. This conclusion is consistent with the findings of the Coastal Bend Bays and Estuary Program that 46 percent of nitrogen entering the bays is from atmospheric deposition (Wade and Sweet 2008).

Table 4.11-4 illustrates the amount of project right of way that would have stormwater discharges within the drainage basin of the Inner Harbor by alternative, including the No Build Alternative.

Table 4.11-4 Right of Way Draining to the Inner Harbor by Alternative

Alternative	Existing Right of Way	Additional Right of Way	Total
Green	105.8	2.8	108.6 (42.0%)
Red	109.7	38.4	148.1 (51.0%)
Orange	113.7	31.3	145.0 (50.5%)
West	138.6	57.1	195.7 (61.0%)
No Build	105.9	0.0	105.9 (40.9%)

Source: City of Corpus Christi 2010d and US 181 Harbor Bridge EIS Study Team 2013

All of the proposed build alternatives would discharge stormwater into the Inner Harbor, Segment 2484, where TCEQ has identified nutrients as a water quality parameter of concern. Across all the build alternatives, stormwater runoff from the roadway would be expected to contain nutrients, both ammonia and nitrate. The net contribution of nutrients from roadway runoff, however, in consideration of the atmospheric deposition of nitrogen and other nonpoint sources that affect levels of nutrients in runoff from the watershed, would not substantially contribute to nutrient enrichment in the Inner Harbor. Therefore, effects of the proposed project on water quality in the Inner Harbor would not be substantial.

4.11.2.2 Impacts of the No Build Alternative

The existing Harbor Bridge and associated roadway segments in the project study area generate stormwater runoff that discharges directly into the Inner Harbor and indirectly via stormwater conveyances to the Inner Harbor, Nueces Bay and Corpus Christi Bay. This includes discharges that are within five miles of Segment 2481CB of Corpus Christi Bay Recreational Beaches at Cole Park and Ropes Parks, which are listed for the parameter bacteria on the 2012 Texas 303(d) List. Continued operation of the existing roadway under the No Build Alternative would not change existing conditions with respect to the presence of bacteria or other constituents of concern in stormwater runoff to Corpus Christi Bay.

Nueces Bay (Oyster Waters), Segment 1282OW, is assessed as impaired for elevated levels of zinc in edible tissue, and an approved TMDL and TMDL Implementation Plan have been established for zinc loading to Nueces Bay. Stormwater runoff from the northern portion of the existing roadway and bridge approach drains to Nueces Bay and is expected to contain zinc, as discussed earlier. Continued operation of the existing roadway under the No Build Alternative is consistent with the approved TMDL and TMDL Implementation Plan and would not change existing conditions with respect to the presence of zinc or other constituents of concern in stormwater runoff to Nueces Bay.

As discussed for the build alternatives, other water quality parameters of concern in receiving waters include nutrients in the Inner Harbor. Stormwater runoff from the existing roadway would be expected to contain both ammonia and nitrate, as discussed earlier. Given the predominant role of atmospheric deposition of nitrogen and other nonpoint sources that affect nutrient levels in runoff from the watershed, the net contribution of nutrients from the existing roadway is relatively minor. The No Build Alternative would not change existing conditions with respect to the presence of nutrients or other constituents in stormwater runoff to the Corpus Christi Inner Harbor.

All of the stormwater discharges that would occur during the operation of the No Build Alternative would continue to be authorized by a MS4 permit issued to the City of Corpus Christi, with co-permittees that include TxDOT and the Port of Corpus Christi Authority (TPDES Permit No. WQ0004200000). This includes stormwater discharges that enter the system's stormwater conveyances from operation of the roadway. No new BMPs or stormwater management measures would be implemented under the No Build Alternative other than those developed and implemented as a part of the ongoing stormwater management program of the MS4. Authorization for discharge of stormwater from construction activities, and development and implementation of a SW3P, are not applicable to the No Build Alternative.

If the proposed project were not implemented, the long-term maintenance program for the existing steel structure would require periodic washing, blasting with abrasives and painting. Analysis of paint chips and associated wash water from maintenance activities conducted in August 1994 indicates the presence of lead (i.e., 1,600 mg/kg and 3,100 mg/kg of lead in the paint chip samples and 0.92 mg/L and 1.15 mg/L of lead in the associated wash water). However, a December 3, 1998, TxDOT Memorandum stated that "the contractor will encapsulate all operations to prevent any materials from falling into the water body below the bridge." Therefore, it was determined that the water quality risk of this potential source is low. However, given the future maintenance requirements of the aging steel structure, some water quality effects may occur associated with releases of wash-off, paint, paint residues, and blasting residues, which could contain priority pollutant metals.

4.11.2.3 Summary of Impacts to Impaired Surface Waters

The preceding information supports a finding that stormwater discharges from construction and operation of any of the build alternatives would not contribute to impairment of the Section 303(d)-listed Corpus Christi Bay beaches (listed for bacteria). Construction and operation of all the build alternatives would be consistent with the Nueces Bay TMDL non-point source load allocations, including zinc. Lastly, stormwater discharges from any of the build alternatives would not substantially contribute to nutrient enrichment in the Inner Harbor.

The No Build Alternative, likewise, would not result in substantial water quality effects and would be consistent with the Nueces Bay TMDL and TMDL Implementation Plan.

Information on highway runoff constituents and the effectiveness of BMPs is provided in **Appendix G.**

4.11.3 Potential Impacts of Stormwater Runoff - Compliance with Clean Water Act Section 402

Construction of any of the build alternatives would require authorization under the TCEQ Construction General Permit (CGP), TXR150000 as a Large Construction Activity. All of the considerations and requirements discussed below would apply to all of the proposed build alternatives. The No Build Alternative would not require authorization under the TCEQ CGP, and the requirements of this section therefore would not apply.

The proposed project would be eligible for authorization under the CGP for discharges to impaired surface waters, if applicable at the time of construction, because, as stated previously, the project would be consistent with the approved TMDL and TMDL Implementation Plan and would not cause or contribute to water quality impairment of any 303(d)-listed surface water.

A Notice of Intent (NOI) to discharge stormwater from a Large Construction Activity would be submitted to the TCEQ in order to obtain authorization to discharge under the CGP, and the NOI as well as a Construction Site Notice would be posted on the project site per CGP requirements. Operators of MS4s that would receive the stormwater discharges would be notified and provided a copy of the NOI prior to commencement of construction. During the construction phase, there would be stormwater discharges of sediment from the construction site, which would be authorized by the CGP.

TxDOT would prepare and implement a Stormwater Pollution Prevention Plan (SW3P) describing the measures to be used to minimize pollutants in construction stormwater discharges. Temporary erosion and sediment control BMPs would be designed, put in place and maintained throughout the construction phase, as required by the CGP and by TxDOT Construction Specifications. In addition to the use of temporary BMPs, such as silt fences, sediment traps, rock filter dams and temporary revegetation, the required final stabilization measures would also be implemented.

BMPs would also be implemented for post-construction stormwater. For any of the build alternatives, roadway runoff that is not discharged directly from bridges would be treated by permanent BMPs such as vegetated swales and vegetated filter strips within portions of the right of way. Such permanent BMPs would be implemented to the extent practicable, in consideration of the design constraints presented by the right of way and by safety considerations, for control of total suspended solids and other constituents of highway runoff.

4.11.4 Potential Impacts to Ground Water

The coastal counties of the Texas Water Development Board Coastal Bend Regional Planning Area (Region N) are primarily underlain by the Gulf Coast Aquifer. The aquifer does not extend into the areas of Nueces and San Patricio Counties around Corpus Christi Bay, including the proposed project area (see **Figure 3.8-2**). The available groundwater is brackish and is little used in this area; water table levels are shallow, estimated at between four and 12 feet below surface. No appreciable freshwater sources or

water supply wells are known to exist within the vicinity of the proposed project, although numerous ground water monitoring wells and several oil and gas wells have been drilled. **Section 3.16** describes ground water and soil conditions in the project area related to prior contamination events, as well as current TCEQ investigations and remediation projects.

Under any of the build alternatives, the substructure would be constructed such that it would not impact on existing groundwater conditions. Procedures that represent best practices to construct piles and drill shafts without allowing intrusion into the local water table would be utilized, such as lined casings or slurry displaced drill shafts. Where the potential for interaction between surface and subsurface construction activities and shallow ground water resources exists, temporary storm water control BMPs would also be employed as needed to prevent impacts to ground water from drilling and other subsurface activities, or to treat any groundwater that is released. If the proposed project is constructed, full compliance with these protective measures would minimize the risk of adverse impacts related to the water table.

Therefore, the implementation of any of the proposed build alternatives is not expected to contribute to contamination of the water table or other adverse impacts to groundwater within the project area. Continued operation of the existing facility under the No Build Alternative would also not contribute to contamination of the water table or other adverse impacts to ground water.

4.11.5 Texas Coastal Management Program

All four build alternatives would impact Coastal Natural Resource Areas (CNRAs) including coastal shore areas, coastal wetlands, special hazard areas, and water under tidal influence. Additionally, the West Alternative would impact submerged land and submerged aquatic vegetation.

In order to maintain compliance with the Coastal Management Program (CMP), any of the four build alternatives would require a consistency determination from the Texas General Land Office (GLO). This determination would be obtained and coordination would occur during the Section 404 and Coast Guard bridge permitting processes. A compliance statement would be submitted with the applicable Section 404 and Bridge Permit applications described in **Sections 4.13.1.1** and **4.11.6**, respectively.

To ensure consistency with the CMP, construction and maintenance of the proposed project would comply with the following policies:

1. Pollution prevention procedures would be incorporated into the construction and maintenance of the proposed project to minimize pollutant loading to coastal waters from stormwater runoff, erosion and sedimentation, and use of pesticides and herbicides for maintenance of the right of way.
2. The proposed project would, to the greatest extent practicable, avoid and otherwise minimize the potential for adverse effects from construction and maintenance of the bridge, additional roads, and other development associated with the project.

3. The proposed project would, to the greatest extent practicable, avoid and otherwise minimize the potential for adverse effects from direct release of pollutants from oil or hazardous substance spills, contaminated sediments or stormwater runoff to CNRAs through the implementation of permanent BMPs to be determined during the final design phase.
4. Where practicable, the proposed project would be located in existing rights of way or previously disturbed areas to avoid or minimize adverse effects.
5. The proposed project would be located in an area where, to the greatest extent practicable, future expansion would not require development in coastal wetlands except where such construction is determined to be essential for evacuation in the case of a natural disaster.
6. Construction and maintenance of the proposed project would, to the greatest extent practicable, avoid the impoundment and draining of coastal wetlands. Where impoundment or draining cannot be avoided, compensatory mitigation would be implemented to mitigate adverse effects to the impounded or drained wetlands.
7. Construction of the proposed project would, to the greatest extent practicable, occur in areas and times selected to have the least adverse effects on recreational uses of CNRAs and on spawning or nesting seasons or seasonal migrations of terrestrial or aquatic species.

The No Build Alternative would not impact CNRAs and a consistency determination and coordination under the CMP would not be required.

4.11.6 General Bridge Act and Rivers and Harbors Act

All four build alternatives would include the construction of a bridge over the Inner Harbor, a navigable waterway as determined by FHWA and the USCG. Consultation with the USCG is ongoing, and following the issuance of the Record of Decision for this project, a bridge permit application packet would be prepared and submitted to the USCG.

None of the build alternatives would include the construction of wharfs, piers, jetties, a weir, dolphins, bank protection, or other structures that could be considered obstructions to a navigable water (the Inner Harbor). Therefore, a permit under Section 10 of the Rivers and Harbors Act from the USACE would not be required for the construction of the proposed project.

During the construction and demolition phases of the proposed project, a regulated navigation area (RNA) would be established within the Inner Harbor to protect individuals and vessels from potential safety hazards and allow for safe and orderly movements through the area. Vessels would not be allowed to enter this area during certain times throughout these phases. Additionally, vessels would be required to proceed at a minimum safe speed in the RNA and would not be allowed to meet or pass.

The No Build Alternative would not involve work in or over a navigable water and therefore a Bridge Permit or authorization under Section 10 would not be required.

4.12 FLOODPLAIN IMPACTS

4.12.1 Impacts of the Build Alternatives

As described in **Section 3.9**, Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) were analyzed in order to map the 100-year floodplain in the project area; all of the proposed alternatives as well as the existing alignment encroach or would encroach upon the 100-year floodplain. **Table 4.12-1** summarizes the floodplain encroachments within the proposed right of way footprint for each build alternative.

Table 4.12-1 Floodplain Encroachments by Alternative

	Green	Red	Orange	West
Acres of proposed right of way within the 100-year floodplain	14.61	32.66	21.65	46.08
Linear Feet of Improvements with the 100-year floodplain	8,508	11,593	9,293	14,078

Source: FEMA 1985

The West Alternative's right of way footprint would cross the largest acreage of land within the floodplain, while the Green Alternative would cross the least amount of land within the floodplain. It should be noted, however, that the quantified impacts reflect the proposed right of way footprint, rather than specific placement of structures or fill within the floodplain, which have not been designed at this stage of the project.

Executive Order 11988 "Floodplain Management" requires federal agencies to "identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain." Due to the extent of the floodplain in the project area (see **Figure 3.9-1**), there are no practicable routes that would avoid floodplain encroachments and still allow a crossing of the Inner Harbor.

Although detailed hydraulic design has not been completed at this time, all of the proposed alternatives would be designed in accordance with the policies and procedures for FHWA projects set forth in 23 CFR 650 Part A. These regulations require the following to be evaluated for alternatives with encroachments:

- Any consequences associated with the probability of flooding attributable to an encroachment resulting from the action
- The impacts on natural and beneficial floodplain values;
- The degree to which the action provides support for probable incompatible floodplain development; and
- Measures to minimize floodplain impacts and measures to restore and preserve the natural and beneficial floodplain values affected.

Each of these four factors is evaluated in order in the discussion below.

Because the hydraulic design for this project would be in accordance with current FHWA and TxDOT design policies, any flooding attributable to an encroachment resulting from the action would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. Bridges in regulatory floodplains would be designed to accommodate a 100-year flood in accordance with FEMA and local floodplain ordinance criteria.

Natural and beneficial floodplain values are defined by 23 CFR 650.105(i) as including, but not limited to, "fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge." The design of existing culverts and proposed elevated structures in accordance with TxDOT and FHWA requirements would maintain floodplain connectivity and would minimize impacts to natural and beneficial floodplain values, specifically the natural moderation of floods and water quality maintenance. The minor impacts to the floodplain under any of the alternatives would not have any significant effect on natural and beneficial floodplain values.

The proposed project would not provide support for incompatible floodplain development. Any build alternative selected would be designed for consistency with local National Flood Insurance Program (NFIP) standards, per 23 CFR 650.115. None of the proposed alternatives would provide new access to floodplain areas, and any proposed development actions by others would be subject to the permitting and coordination requirements of local floodplain ordinances.

Much of the proposed roadway for each build alternative would be elevated in areas within the 100-year floodplain. Additionally, because the fill for bridge piers would be primarily located in tidal water bodies, an increase in the base flood elevation would not be anticipated for these areas. Efforts would be made to minimize the permanent impact to the floodplain to the extent practicable during detailed design. As natural and beneficial floodplain values are not anticipated to be affected, no specific measures to restore and preserve these values are proposed.

None of the proposed alternatives would result in a "significant encroachment," as the term is defined in 23 CFR 650.105(q). There is not a significant potential for construction or flood related impacts to cause an interruption or termination of a transportation facility that serves emergency vehicles or provides a community's only transportation route. The floodplain encroachments of the alternatives also do not represent significant risks, including property loss and hazard to life, or significant adverse impacts on natural and beneficial floodplain values.

As the City of Corpus Christi and Nueces County are participants in the NFIP, coordination with the local Floodplain Administrators would be required.

4.12.2 Effects of the No Build Alternative

The current roadway alignment includes right of way within the 100-year floodplain. Under the No Build Alternative, there would be no new impacts to floodplains. Actions within the floodplain would continue to be managed by the local floodplain administrator.

4.13 IMPACTS TO WETLANDS AND WATERS OF THE U.S.

Coordination with the Galveston District of the USACE was initiated during the formal scoping process for this Draft EIS and has continued throughout the development of the proposed project. As the project progresses, coordination with the Galveston District will continue including any necessary Section 404 permit coordination.

4.13.1 Impacts of the Build Alternatives

For the build alternatives, impacts to waters of the U.S. and wetlands would be both permanent and temporary. Direct impacts would include the alteration of the vegetation, soils, and hydrology. The vegetation would be mowed or removed in preparation for construction. Additionally, impacts to vegetation could occur as a result of shading by the proposed bridge structure with effects varying by build alternative. The soils would be graded; fill, concrete, and road or bridge structures, would be added, depending on construction needs. Heavy equipment would compact the soils, which often alters their drainage capability. The hydrology would be temporarily altered by changes in topography and vegetation if runoff, drainage, and tidal flow were to be diverted directly or indirectly during construction. Minor water temperature effects would also be expected in shaded areas beneath and adjacent to bridged areas.

The impacts of the proposed project on the flood control function of wetlands would be temporary. The proposed project would be a bridge or elevated structure for the majority of its span across the wetland sites and water of the U.S. crossings. Careful design and spacing of bridge supports and any necessary culverts would allow for unimpeded flow of flood waters under the spanned areas. Thus, the existing hydrology and flood storage potential would not be substantially altered once construction has ceased and the remaining area has been returned to natural contours.

During construction of the proposed roadway, the majority of fish and wildlife species that utilize project area waters of the U.S. and wetlands would be able to temporarily relocate to adjacent marsh and open water areas. It is expected that after construction has ceased and the waters of the U.S. and wetland areas have been returned to natural contours, these wildlife species would return to their prior utilization of the remaining areas. Disturbed areas are expected to revegetate except where the soils have been severely or permanently affected (sterile fill or paving), provided that sufficient light and water are available after construction is completed. TxDOT specifications for revegetation, erosion/sedimentation control, and other restoration would be employed during and after the construction phase.

4.13.1.1 Clean Water Act Section 404

Three types of waters of the U.S., including wetlands, were identified within the proposed project area and are discussed in detail in **Section 3.10.2**. These include tidal waters of the U.S., tidal fringe wetlands, and tidally-influenced drainage features. Impacts to these areas would be covered by either a Section 404 Nationwide Permit (NWP) 14 for Linear Transportation Projects or an Individual Permit (IP), depending on the alternative. A NWP 14 authorizes linear transportation projects in tidal waters where discharges do not result in the loss of greater than 1/3 acre of waters of the U.S. A pre-construction notification (PCN) for NWP 14 is required for the following scenarios:

1. The loss of waters of the U.S. exceeds 0.10 acre
2. There is a discharge in a special aquatic site
3. There is a discharge or work proposed in tidal waters (in the USACE Galveston District)

Sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs and riffle and pool complexes are considered special aquatic sites which are defined as "geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values."

In addition to the criteria established within the individual NWPs, there are 31 general conditions and 11 regional conditions to which the proposed project would be required to adhere under the NWP program. It should be noted that regional conditions applicable to projects within the USACE Galveston District in the State of Texas state "all NWPs, except NWP 3, shall not be used to authorize discharges into mangrove marshes." Approximately 3.88 acres of mangrove vegetation occur within the low marsh vegetative community in the vicinity of the proposed project. Temporary and/or permanent discharges into these areas would require authorization under a Section 404 IP. Sensitive environmental features in the vicinity of the proposed project, including mangroves, special aquatic sites and waters of the U.S. are illustrated on **Figure 4.13-1**. **Table 4.13-1** depicts the potential impacts in acres that each build alternative would have on water of the U.S. features within the proposed right of way. These amounts are estimates only, as detailed drainage and bridge designs have yet to be developed. Reassessment of these estimates would need to be completed during detailed design. An accounting of any additional construction phase impacts from contractor access routes or temporary work pads would also need to be made for permitting purposes. The potential impacts to waters of the U.S. and wetlands and permitting scenarios by build alternative are discussed in greater detail.

<u>Green Alternative</u>

Construction of the Green Alternative would result in an estimated 0.13 acre of permanent impacts and 0.19 acre of temporary impacts to waters of the U.S. and wetlands, all tidal fringe wetlands. These wetland areas are located north of the Inner Harbor along the east and west sides of US 181 and are described in detail in **Section 3.10.2**. There would be no impacts to tidal waters of the U.S. or tidally-influenced drainage features with the Green Alternative and no impacts to mangrove vegetation.

Permanent impacts to tidal waters of the U.S. would be less than 1/3 acre; therefore the construction of the Green Alternative would be authorized under NWP 14. Temporary impacts including temporary structures, fills, and work necessary to complete the project would also be authorized under NWP 14. A PCN would be required for this alternative since the loss of waters of the U.S. would be greater than 0.10 acre and there would be discharge into tidal fringe wetlands. Compensatory mitigation would also be required since the loss of wetlands would exceed 0.10 acre.

Red Alternative (Preferred)

Construction of the Red Alternative (the Preferred Alternative) would result in an estimated 0.25 acre of permanent impacts and 2.18 acres of temporary impacts to waters of the U.S., including wetlands. Approximately 0.73 acre of tidal fringe wetlands would be impacted. Of this, approximately 0.6 acre would be temporarily impacted and approximately 0.13 acre would include permanent fill. The Red Alternative would also impact 1.7 acres of tidally-influenced drainage features. Of this, approximately 1.58 acres would be temporarily impacted and approximately 0.12 acre would include permanent fill. These waters of the U.S. and wetland areas are located north of the Inner Harbor along the east and west sides of US 181 and are described in detail in **Section 3.10.2**. There would be no impacts to tidal waters of the U.S. with the Red Alternative and no impacts to mangrove vegetation.

Permanent impacts to tidal waters of the U.S. and wetlands would be less than 1/3 acre; therefore the construction of the Red Alternative would be authorized under NWP 14. Temporary impacts including temporary structures, fills, and work necessary to complete the project would also be authorized under NWP 14. Temporary impacts related to the Red Alternative would also include the realignment of portions of tidally-influenced drainage feature (DF) 2 (see **Section 3.10.2**). A PCN would be required for this alternative since the loss of waters of the U.S. would be greater than 0.10 acre and there would be discharge into tidal fringe wetlands. Compensatory mitigation would also be required since the loss of wetlands would exceed 0.10 acre.

Orange Alternative

Construction of the Orange Alternative would result in an estimated 0.14 acre of permanent impacts and 0.30 acre of temporary impacts to waters of the U.S., including wetlands. Approximately 0.34 acre of tidal fringe wetlands would be impacted. Of this, approximately 0.23 acre would be temporarily impacted and approximately 0.11 acre would include permanent fill. The Orange Alternative would also impact 0.10 acre of tidally-influenced drainage features. Of this, approximately 0.07 acre would be temporarily impacted and approximately 0.03 acre would include permanent fill. These waters of the U.S. and wetland areas are located north of the Inner Harbor along the east and west sides of US 181 and are described in detail in **Section 3.10.2**. There would be no impacts to tidal waters of the U.S. with the Orange Alternative and no impacts to mangrove vegetation.

Table 4.13-1 Temporary and Permanent Impacts to Waters of the U.S. by Build Alternative								
Water of the U.S. Type	Green		Red		Orange		West	
	Temporary Fill (acres)	Permanent Fill (acres)	Temporary Fill (acres)	Permanent Fill (acres)	Temporary Fill (acres)	Permanent Fill (acres)	Temporary Fill (acres)	Permanent Fill (acres)
Tidal Waters of the U.S.	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.01
Tidal Fringe Wetlands	0.19	0.13	0.60	0.13	0.23	0.11	4.81	0.42
Tidally-Influenced Drainage Features	0.00	0.00	1.58	0.12	0.07	0.03	0.70	0.03
Totals	**0.19**	**0.13**	**2.18**	**0.25**	**0.30**	**0.14**	**5.75**	**0.46**

Source: US 181 Harbor Bridge EIS Team 2013

Permanent impacts to tidal waters of the U.S. and wetlands would be less than 1/3 acre; therefore the construction of the Orange Alternative would be authorized under NWP 14. Temporary impacts including temporary structures, fills, and work necessary to complete the project would also be authorized under NWP 14. A PCN would be required for this alternative since the loss of waters of the U.S. would be greater than 0.10 acre and there would be discharge into tidal fringe wetlands. Compensatory mitigation would also be required since the loss of wetlands would exceed 0.10 acre.

West Alternative

Construction of the West Alternative would result in an estimated 0.46 acre of permanent impacts and 5.75 acres of temporary impacts to waters of the U.S., including wetlands. Approximately 5.23 acres of tidal fringe wetlands would be impacted. Of this, approximately 4.81 acres would be impacted temporarily and approximately 0.42 acre would include permanent fill. The West Alternative would also impact 0.73 acre of tidally-influenced drainage features. Of this, approximately 0.7 acre would be temporarily impacted and approximately 0.03 acre would include permanent fill. Impacts to tidal waters of the U.S. would total approximately 0.25 acre. Of this, approximately 0.24 acre would be temporarily impacted and approximately 0.01 acre would include permanent fill. These waters of the U.S. and wetland areas are located north of the Inner Harbor along the east and west sides of US 181 and are described in detail in **Section 3.10.2**.

Construction of the West Alternative would also impact mangrove vegetation. Approximately 0.71 acre of mangrove-dominated low marsh would be directly impacted by the construction of this alternative. Additionally, impacts to mangroves and other marsh vegetation may occur as a result of shading by the proposed bridge. Young black mangroves are intolerant to sunlight, but as they mature they become shade intolerant (USFWS 1999). A study conducted by Broome et. al. (2005) suggests that bridges with a height/width ratio less than 0.5 had a measurable effect on the productivity of tidal marshes due to shading. The proposed bridge structure for this alternative has a height/width ratio of approximately 0.3 where it would span the tidal wetlands. Therefore, permanent impacts to marsh vegetation, especially mangroves, would result from the construction of this alternative. Because permanent impacts to tidal waters of the U.S. and wetlands would exceed 1/3 acre and discharges into mangrove marshes would occur, a Section 404 IP would be required. Mitigation would be implemented for permanent impacts to wetlands and to mangrove vegetation.

4.13.1.2 Clean Water Act Section 401

Construction activities would require compliance with the State of Texas Water Quality Certification Program. Coordination with the TCEQ was initiated during the formal scoping process for this Draft EIS and has continued throughout the development of the proposed project. Coordination will continue as the project progresses. The Green, Red, and Orange Alternatives would be authorized under a Section 404 Nationwide Permit (see **Section 4.13.1.1**), and as a result compliance with Section 401 of the Clean Water Act would require the use of BMPs to manage water quality on the site. The SW3P required for the proposed project would include at least one BMP from the 401 Water Quality Certification Conditions for Nationwide Permits (TCEQ 2012a). These BMPs would address each of the following

categories: 1) erosion control, 2) sedimentation control, and 3) post construction TSS control. It is likely that temporary vegetation, soil retention blankets and/or sodding would be utilized for erosion control; silt fences, rock filter dams, sand bag berms and/or filter socks would be used for sedimentation control; and vegetated filter strips and/or vegetated swales would be used for post-construction TSS control.

The West Alternative would be authorized under a Section 404 Individual Permit and would impact less than three acres of waters of the U.S. (see **Section 4.13.1.1**); however, this alternative would impact mangrove marshes, which are described in the NWP regional conditions for Texas as rare or ecologically sensitive wetlands and are therefore a trigger for Tier II Certification. The Tier II 401 Certification Questionnaire and Alternatives Analysis Checklist would be completed and submitted to the TCEQ and USACE in the event the West Alternative was selected.

4.13.1.3 Executive Order 11990 Protection of Wetlands

Executive Order 11990 (Protection of Wetlands, 1977) mandates that a project should avoid wetlands or, if no practicable alternative exists that avoids wetlands, impacts to wetland areas should be minimized as much as possible. All four proposed build alternatives would involve unavoidable impacts to wetlands, and impacts were minimized to the extent practicable as required by Executive Order 11990 on wetlands. The Final EIS will include a determination under Executive Order 11990.

4.13.2 Impacts of the No Build Alternative

The No Build Alternative would not affect waters of the U.S. or wetlands. There are tidal-fringe wetlands within the existing right of way and these areas would be subject to temporary impacts from maintenance of the existing US 181 facility. Care would be taken during maintenance activities to avoid or minimize adverse effects to wetland areas inside the existing right of way.

4.14 FARMLAND IMPACTS

4.14.1 Impacts of the Build Alternatives

The Farmland Protection Policy Act (FPPA) provides protection to prime and unique farmlands, as well as farmlands of statewide or local importance. Statewide and locally important farmland, as well as unique farmland, is defined by the State Conservationist. The Texas State Conservationist has determined that soils rated Class IV (4) or lower are considered to be of statewide and local importance. The state of Texas has not identified any unique farmland within the state. The FPPA does not apply to urban built-up land, including land designated by the U.S. Census Bureau as Urban Areas.

The majority of the proposed project area falls within the Census 2010 Urbanized Area (UA) for Corpus Christi and is therefore exempt from the protections of the FPPA. Portions of the proposed right of way footprint for the Red, Orange, and West Alternatives, however, fall outside of the UA in the North Beach area. The soil characteristics of this area were examined in order to determine if protected soils are present, including prime farmland soils and soils of state and local importance.

An overview of soil types in the project vicinity is presented in **Section 3.11.3** and depicted in **Figure 3.11-2.** Soil types within the project area but outside of the UA are limited to Urban land (Ua) soils, the Victoria clay formation (VcA), Ijam clay loam (Ma), and Tidal flat soils (Ta). Based on data obtained in August 2013 from the United States Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS) via a Web Soil Survey Report for the project area, none of these soil units are considered prime farmland. The soil survey report also provides information on the Land Capability Classification of soils in the project area. The classification levels for intersected soil units ranged from Class 7 to 8; these soil units are therefore not considered soils of statewide or local importance. Based on the above analysis, the FPPA does not apply to the proposed project. No coordination with the NRCS is necessary.

4.14.2 Impacts of the No Build Alternative

The No Build Alternative would not require any right of way acquisition and would not impact any soils protected under the FPPA.

4.15 VEGETATION IMPACTS

4.15.1 Impacts of the Build Alternative

Effects to vegetation within the proposed right of way would involve the removal of trees and other vegetation as required to accommodate the proposed project's main lanes, shoulders, overpasses, drainage ditches, and safety clear zones. As discussed in **Section 4.13.1.1**, bridge structures can also have a measurable effect on vegetation due to shading. Existing native vegetation (i.e. marsh, brush and grasslands) provides erosion-inhibiting ground cover as well as habitat for many resident and migratory animal species; therefore, its loss through clearing or shading can have negative effects to wildlife and water quality. Disturbed areas would be restored and reseeded according to the TxDOT specifications.
Six vegetative communities were identified within the proposed project and are discussed in detail in **Section 3.12.1.2**. These communities include low marsh, high marsh, maintained landscape, mixed brush, grassland, and sparsely vegetated. **Table 4.15-1** depicts the potential impact in acres that each build alternative would have on vegetative communities. The potential impacts by build alternative are discussed in greater detail below.

<u>Green Alternative</u>

Construction of the Green Alternative would impact four of the six vegetation types within the right of way. These include low marsh, maintained landscape, mixed brush, and sparsely vegetated. Approximately 0.23 acre of low marsh vegetation would be impacted by the construction of this alternative, all within the existing right of way. Impacts to maintained landscape vegetation would total approximately 79.72 acres. Of this, approximately 71.79 acres occur within the existing right of way and approximately 7.93 acres occur within the proposed right of way. Impacts to mixed brush vegetation would total approximately 0.22 acre. Of this, approximately 0.04 acre occurs within the existing right of way and approximately 0.18 acre occurs within the proposed right of way. Lastly, approximately 5.73 acres of sparsely vegetated areas would be impacted by the construction of the Green Alternative. Of

this, approximately 0.08 acre occurs within the existing right of way and approximately 5.65 acres occurs within the proposed right of way.

Red Alternative (Preferred)

Construction of the Red Alternative (the Preferred Alternative) would impact five of the six vegetation types within the right of way. These include low marsh, maintained landscape, mixed brush, grassland, and sparsely vegetated. Approximately 0.59 acre of low marsh vegetation would be impacted by the construction of this alternative, all within the proposed right of way. Impacts to maintained landscape vegetation would total approximately 86.35 acres. Of this, approximately 72.97 acres occur within the existing right of way and approximately 13.38 acres occur within the proposed right of way. Potential impacts to mixed brush vegetation total approximately 4.75 acres. Of this, approximately 0.04 acre occurs within the existing right of way and approximately 4.71 acres occurs within the proposed right of way. Impacts to grassland vegetation would total approximately 4.09 acres, all within the proposed right of way. Lastly, approximately 10.01 acres of sparsely vegetated areas would be impacted by the construction of the Red Alternative. Of this, approximately 0.08 acre occurs within the existing right of way and approximately 9.93 acres occurs within the proposed right of way.

Orange Alternative

Construction of the Orange Alternative would impact five of the six vegetation types within the right of way. These include low marsh, maintained landscape, mixed brush, grassland, and sparsely vegetated. Approximately 0.23 acre of low marsh vegetation would be impacted by the construction of this alternative, all within the proposed right of way. Impacts to maintained landscape vegetation would total approximately 94.75 acres. Of this, approximately 72.77 acres occur within the existing right of way and approximately 21.98 acres occur within the proposed right of way. Impacts to mixed brush vegetation total approximately 0.09 acre. Of this, approximately 0.04 acre occurs within the existing right of way and approximately 0.05 acre occurs within the proposed right of way. Impacts to grassland vegetation would total approximately 0.02 acre, all within the proposed right of way. Lastly, approximately 6.23 acres of sparsely vegetated areas would be impacted by the construction of the Orange Alternative. Of this, approximately 0.08 acre occurs within the existing right of way and approximately 6.15 acres occurs within the proposed right of way.

West Alternative

Construction of the West Alternative would impact all six of the vegetation types within the proposed project. These include low marsh, high marsh, maintained landscape, mixed brush, grassland, and sparsely vegetated. Approximately 5.43 acre of low marsh vegetation and approximately 0.62 acre of high marsh vegetation would be impacted by the construction of this alternative, all within the proposed right of way. Impacts to maintained landscape vegetation would total approximately 92.51 acres. Of this, approximately 73.46 acres occur within the existing right of way and approximately 19.05 acres occur within the proposed right of way. Impacts to mixed brush vegetation would total approximately 1.14 acres. Of this, approximately 0.04 acre occurs within the existing right of way and approximately

1.10 acres occur within the proposed right of way. Impacts to grassland vegetation total approximately 2.58 acres, all within the proposed right of way. Lastly, approximately 33.28 acres of sparsely vegetated areas would be impacted by the construction of the West Alternative. Of this, approximately 0.16 acre occurs within the existing right of way and approximately 33.12 acres occur within the proposed right of way.

4.15.1.1 TxDOT/TPWD MOU/MOA Documentation

In accordance with the 2013 TxDOT-TPWD MOU, unusual vegetation features or special habitat features occurring within the proposed project area were identified and described during field investigations. Unusual vegetation features are described in the MOU as including:

- Unmaintained vegetation;
- Trees or shrubs along a fenceline adjacent to a field (fencerow vegetation);
- Riparian vegetation (particularly where fields/cropland extends up to or abuts the vegetation associated with the riparian corridor);
- Trees that are considered historically significant, ecologically significant, or locally important (such as champion trees located on the Texas A&M Forest Service Big Tree Registry http://txforestservice.tamu.edu/main/article.aspx?id=1336); and
- Unusual stands or islands (isolated) of vegetation.

Of these five types of unusual vegetation features, two occur within the vicinity of the proposed project: unmaintained vegetation, and isolated areas of vegetation. Unmaintained vegetation and isolated stands of vegetation are associated with the high and low marsh vegetative communities and mixed brush and grassland communities. All four build alternatives would impact these communities to varying extents; the West Alternative would have the most impacts to marsh vegetation (6.05) and the Red Alternative would impact the most mixed brush and grassland (8.84 acres).

Special habitat features are described in the MOU as including:

- Bottomland hardwoods;
- Caves;
- Cliffs and bluffs;
- Native prairies (particularly those with climax species of native grasses and forbs);
- Ponds (temporary and permanent, natural, and man-made);
- Seeps or springs;
- Snags (dead trees) or groups of snags;
- Water bodies (creeks, streams, rivers, lakes, etc.);
- Existing bridges with known or easily observed bird or bat colonies;

Table 4.15-1 Vegetation Impacts by Build Alternative												
Vegetation Type	Green			Red			Orange			West		
	Existing Right of Way (acres)	Proposed Right of Way (acres)	Total (acres)	Existing Right of Way (acres)	Proposed Right of Way (acres)	Total (acres)	Existing Right of Way (acres)	Proposed Right of Way (acres)	Total (acres)	Existing Right of Way (acres)	Proposed Right of Way (acres)	Total (acres)
Low Marsh	0.00	0.23	**0.23**	0.00	0.59	**0.59**	0.00	0.23	**0.23**	0.00	5.43	**5.43**
High Marsh	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.00	0.62	**0.62**
Maintained Landscape	71.79	7.93	**79.72**	72.97	13.38	**86.35**	72.77	21.98	**94.75**	73.46	19.05	**92.51**
Mixed Brush	0.04	0.18	**0.22**	0.04	4.71	**4.75**	0.04	0.05	**0.09**	0.04	1.10	**1.14**
Grassland	0.00	0.00	**0.00**	0.00	4.09	**4.09**	0.00	0.02	**0.02**	0.00	2.58	**2.58**
Sparsely Vegetated	0.08	5.65	**5.73**	0.08	9.93	**10.01**	0.08	6.15	**6.23**	0.16	33.12	**33.28**

1 Source: US 181 Harbor Bridge EIS Team 2013

- Rookeries; and
- Prairie dog towns

Special habitat features within the proposed project area include snags and water bodies, and all four build alternatives would impact these habitat types. Snags are found throughout the mixed brush vegetative community; particularly along the manmade berm where trees have died and have not been removed. Water bodies consist of the tidal waters and tidal fringe wetland areas associated with Nueces Bay, the Inner Harbor, one unlined, tidally-influenced man-made drainage feature associated with the Nueces Bay wetland areas, and two lined, tidally-influenced man-made drainage features south of the Inner Harbor that drain in a northerly direction towards the Inner Harbor. The West Alternative would have the most impacts to water bodies (6.21 acres; see **Table 4.13-1**). Additionally, a review of the Texas Conservation Action Plan for the Gulf Coast Prairies and Marshes Ecoregion (TPWD 2012a) identified saltwater wetlands and estuaries as priority habitat types for species of greatest conservation need (SGCN) including various birds and fish. The mangrove dominated margins of the tidal fringe wetlands and the tidal waters associated with Nueces Bay are considered priority habitat types. These areas would be impacted by the construction of the West Alternative and are discussed in detail above in **Section 4.13.1.1**.

As detailed in §2.206 of the 2013 MOU, coordination with the TPWD is required for projects that trigger one or more of the following:

1) The project is within range of a state threatened or endangered species or SGCN as identified by the TPWD County list of Rare and Protected Species, and there is suitable habitat, unless BMPs as defined in this MOU are implemented as part of a programmatic agreement.
2) The project may adversely impact important remnant vegetation based on the judgment of a qualified biologist or as mapped in the Texas Natural Diversity Database (TXNDD).
3) The project requires a nationwide permit with pre-construction notification or an individual permit, issued by the USACE.
4) The project includes in the TxDOT right of way or conservation, construction, or drainage easement more than 200 linear feet of stream channel for each single and complete crossing of one or more of the following that is not already channelized or otherwise maintained:
    a) Channel realignment; or
    b) Stream bed or stream bank excavation, scraping, clearing, or other permanent disturbance.
5) The project contains known isolated wetlands outside existing TxDOT right of way that would be directly impacted by the project.
6) The project may impact 0.10 acre of riparian vegetation based on the judgement of a qualified biologist or as mapped in the EMST.
7) The project disturbs habitat in an area equal to or greater than the area of disturbance indicated in the Threshold Table Programmatic Agreement

All four build alternatives trigger the need for coordination with the TPWD. The proposed project, including the area abutting the rights of way of the four proposed build alternatives, is within the range and habitat of state listed and rare species as identified by the TPWD County list of Rare and Protected Species. Additionally, black mangrove shrubland (S2S3) and windmill grass (S2) were either noted during field investigations or documented by the Texas Natural Diversity Database (TXNDD) to occur in the vicinity of the proposed project. These species and BMPs that would be implemented to avoid or minimize impacts are discussed below in **Section 4.16.1.2.**

The Threshold Table Programmatic Agreement groups vegetation types into broader MOU types and sets a disturbance threshold for each type by ecoregion that, if met or exceeded, triggers coordination with the TPWD. A review of the Threshold Table Programmatic Agreement determined that vegetation within the proposed project falls into three MOU types: Tidal and Salt Marsh, Disturbed Prairie, and Mowed and Maintained Right of Way. Tidal and Salt Marsh consists of the low and high marsh vegetation types; Disturbed Prairie consists of the mixed brush and grassland vegetation types; and Mowed and Maintained Right of Way consists of the maintained landscape vegetation type. There is no MOU type for the sparsely vegetated category. The Threshold Table Programmatic Agreement sets a disturbance threshold of 0.01 acre for Tidal and Salt Marsh, 3.0 acres for Disturbed Prairie and 10.0 acres for Mowed and Maintained Right of Way. Vegetation impacts quantified on **Table 4.15-1** show that all four proposed alternatives would exceed the threshold for Tidal and Salt Marsh and Mowed and Maintained Right of Way MOU types. Additionally, the Red (Preferred) and West Alternatives exceed the threshold for the Disturbed Prairie MOU type.

As discussed in **Section 4.13.1.1,** the Green, Red and Orange Alternatives would also require a nationwide permit with pre-construction notification while the West Alternative would require an Individual Section 404 Permit. None of the proposed alternatives would impact important remnant vegetation, stream channels, isolated wetlands outside of the TxDOT right of way, or riparian vegetation. Coordination with TPWD was initiated during the formal scoping process and has continued through the development phase of the proposed project. Coordination with TPWD will continue and include a review of this Draft EIS. Mitigation for vegetation and wildlife habitat impacts will be negotiated between TxDOT and TPWD and any commitments agreed to by both agencies will be included in the Final EIS.

4.15.1.2 Executive Order 13112 on Invasive Species

Care would be taken to prevent the introduction of invasive species during construction, and all actions would comply with Executive Order 13112 on Invasive Species.

4.15.1.3 Executive Memorandum on Beneficial Landscaping

Upon completion of earthwork operations, disturbed areas would be restored and reseeded in accordance with TxDOT's Vegetation Management Guidelines and in compliance with the intent of the FHWA Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices.

4.15.2 Impacts of the No Build Alternative

The No Build Alternative would not adversely impact vegetation resources. The maintained landscape within the existing right of way would continue to be maintained throughout the operation of the existing US 181 facility. Unmaintained vegetation within the existing right of way would be subject to temporary impacts from maintenance of the existing US 181 facility. Care would be taken during maintenance activities to avoid or minimize adverse effects to these areas.

4.16 WILDLIFE IMPACTS INCLUDING THREATENED AND ENDANGERED SPECIES

4.16.1 Impacts of the Build Alternatives

4.16.1.1 Impacts to Wildlife Habitat

Trombulak and Frissell (2000) categorize roadway impacts to terrestrial and aquatic ecosystems into seven general areas: 1) increased mortality from road construction; 2) increased mortality from collision with vehicles; 3) modification of animal behavior; 4) alteration of the physical environment; 5) alteration of the chemical environment; 6) spread of exotic species; and 7) increased alteration and use of habitats by humans.

Construction phase activities for the proposed project could directly or indirectly affect wildlife species present within the proposed right of way. Some sessile and/or slow moving species could be killed by heavy machinery during right of way clearing. Impacts to wildlife within the proposed project area would also occur in conjunction with the removal of vegetation and disturbance in and around water features. Wooded areas provide cover, food, and habitat for many resident and migratory species. Trees within maintained landscape areas provide nesting habitat for birds as well as roosting habitat for the state-listed southern yellow bat (*Lasiurus ega*) as discussed in **Section 3.13.2**. Additionally, certain species of birds utilize sparsely vegetated areas for ground nesting, and these areas would be disturbed during construction. An increase in runoff related to the operation of the proposed project could cause minor, incremental changes in the physical and chemical characteristics of tidal waters and coastal salt marsh areas. Direct mortality of wildlife species from vehicle collisions (road kill) is well documented and would likely be an effect with any of the proposed build alternatives, especially to invertebrates such as insects and avian species that are attracted to bridge structures for roosting and nesting.

The use of BMPs, careful vegetation clearing techniques, and replanting would minimize impacts to wildlife habitat within the proposed project area, including tidal waters and coastal salt marsh areas. Monitoring before and during construction activities would protect wildlife species, including nesting birds, from direct harm. Adjacent wildlife habitat would be protected from stormwater runoff by implementing BMPs that would control erosion and sedimentation. Native vegetation would be re-established where practicable and in accordance with Executive Order 13112 to replace important forage and cover for wildlife.

Depending upon the alternative, five habitat types would be directly affected by construction of the proposed project. The impacts to these habitat types by alternative are depicted below in **Table 4.16-1** and include marsh, maintained landscape, mixed brush, grassland, and sparsely vegetated habitats.

Table 4.16-1 Wildlife Habitat Impacts by Build Alternative (acres)

Habitat Type	Green	Red	Orange	West
Marsh	0.23	0.59	0.23	6.05
Maintained Landscape	79.72	86.35	94.75	92.51
Mixed Brush	0.22	4.75	0.09	1.14
Grassland	0.00	4.09	0.02	2.58
Sparsely Vegetated	5.73	10.01	6.23	32.28

Source: US 181 Harbor Bridge EIS Team 2013.

The majority of the impacts for the Green, Red and Orange Alternatives would be permanent and result in the direct conversion of habitat areas to transportation use. The West Alternative would not have the same ground-level impacts that the other alternatives would, and, therefore, the majority of the impacts to the marsh, mixed brush, grassland, and sparsely vegetated habitat areas would be temporary; wildlife species would be expected to move back into these areas once construction was completed and preconstruction conditions restored. The majority of impacts to maintained landscape habitat with the West Alternative would be permanent and would result in the direct conversion of this habitat to transportation use. For marsh habitats consisting primarily of black mangroves, onsite mitigation would be implemented, allowing displaced wildlife to move into newly-created habitat areas.

4.16.1.2 Threatened and Endangered Species

According to county lists maintained by USFWS and TPWD, several threatened or endangered plant and wildlife species are known to occur in Nueces and San Patricio Counties. **Table 4.16-2** presents the impacts to federally and state-listed threatened and endangered species and rare species that could occur within Nueces and San Patricio Counties. The habitat requirements for each of the species are described in **Table 3.13-1**. The terms effect and impact are used in the table below. Effect is used in relation to federally listed species only to conform to USFWS regulations, while the term impact is used for all other species. Evaluations are made on the basis of presence of suitable habitat, recorded occurrences, and the likelihood of presence based on field investigations.

Table 4.16-2 Impacts to Rare, Threatened and Endangered Species of Potential Occurrence in Nueces and San Patricio Counties, Texas

Species	Federal Status	State Status	Evaluation	Effects/Impact
Plants				
Buckley's spiderwort *Tradescantia buckleyi*	—	—	Vegetation and potentially suitable soil types within and adjacent to the proposed project have been disturbed due to land conversion for urban and industrial uses.	The project *would have* ***no impact on*** this species.
Texas windmill-grass *Chloris texensis*	—	—	Potentially suitable habitat occurs on roadsides within the vicinity of the proposed project.	The project ***may impact*** this species.

Table 4.16-2 Impacts to Rare, Threatened and Endangered Species of Potential Occurrence in Nueces and San Patricio Counties, Texas

Species	Federal Status	State Status	Evaluation	Effects/Impact
Elmendorf's onion *Allium elmendorfii*	—	—	Live oak woodlands do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Lila de los llanos *Echeandia chandleri*	—	—	Subtropical thorn shrublands and coastal prairie do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Refugio rain-lily *Zephyranthes refugiensis*	—	—	The proposed project is not underlain by the Lissie Formation and suitable soil types do not occur.	The project would have ***no impact*** on this species.
Mexican mud-plantain *Heteranthera mexicana*	—	—	Resacas and ephemeral wetlands do not exist within the proposed project area.	The project would have ***no impact*** on this species.
South Texas ambrosia *Ambrosia cheiranthifolia*	LE	E	A rare plant survey for this species was conducted in potentially suitable habitat areas and no individuals were detected. The nearest known occurrence of this species to the proposed project area is approximately 9.4 miles and recorded in the TXNDD as EO ID 1470.	The project would have ***no effect*** on this species.
Plains gumweed *Grindelia oolepis*	—	—	Suitable soil types for this species do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Coastal gay-feather *Liatris bracteata*	—	—	The proposed project is outside of the known range of this species. Additionally, vegetation within and adjacent to the proposed project has been disturbed due to land conversion for urban and industrial uses.	The project would have ***no impact*** on this species.
Welder machaeranthera *Psilactis heterocarpa*	—	—	Suitable soil types for this species do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Threeflower broomweed *Thurovia triflora*	—	—	The proposed project is outside of the known range of this species. Additionally, vegetation within and adjacent to the proposed project has been disturbed due to land conversion for urban and industrial uses.	The project would have ***no impact*** on this species.
Slender rushpea *Hoffmannseggia tenella*	LE	E	Coastal prairie grasslands do not occur in the vicinity of the proposed project.	The project would have ***no effect*** on this species.
Mollusks				
Golden orb *Quadrula aurea*	C	T	Freshwater river systems do not occur in the vicinity of the proposed project.	The project would have ***no effect*** on this species.
Insects				
Manfreda giant-skipper *Stallingsia maculosus*	—	—	Potential habitat for the larval host plant, *Manfreda maculosa*, does not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Fishes				
Smalltooth sawfish *Pristis pectinata*	LE	E	Habitat for this species does not occur in the vicinity of the proposed project as this species prefers open bay systems. Additionally, this species has only been documented to occur along the Texas coast four times since 1998 with the nearest occurrence documented in 2003 and located approximately 46 miles to the south of the proposed project in Baffin Bay.	The project would have ***no effect*** this species.
American eel *Anguilla rostrata*	—	—	Aquatic habitats with access to the ocean occur in the vicinity of the proposed project.	The project ***may impact*** this species.
Opossum pipefish *Microphis brachyurus*	—	T	Estuarine areas associated with Rincon Channel provide potential suitable habitat for this species.	The project ***may impact*** this species.

Table 4.16-2 Impacts to Rare, Threatened and Endangered Species of Potential Occurrence in Nueces and San Patricio Counties, Texas

Species	Federal Status	State Status	Evaluation	Effects/Impact
Texas pipefish *Syngnathus affinis*	—	—	Estuarine areas associated with Nueces Bay provide potential suitable habitat for this species.	The project ***may impact*** this species.
Amphibians				
South Texas Siren (large form) *Siren sp 1*	—	T	Wet habitats (i.e. canals and ditches) within the project area are primarily marine and too saline to support this species.	The project would have ***no impact*** on this species.
Black-spotted newt *Notophthalmus meridionalis*	—	T	Wet habitats (i.e. canals and ditches) within the project area are primarily marine and too saline to support this species.	The project would have ***no impact*** on this species.
Sheep frog *Hypopachus variolosus*	—	T	Suitable habitat for this species does not occur in the vicinity of the proposed project. Additionally, wet habitats (i.e. canals and ditches) within the project area are primarily marine and too saline to support this species.	The project would have ***no impact*** on this species.
Reptiles				
Texas diamondbacked terrapin *Malaclemys terrapin littoralis*	—	—	Coastal marshes and estuaries occur in the vicinity of the proposed project.	The project ***may impact*** this species.
Texas tortoise *Gopherus berlandieri*	—	T	Areas of open brush with a grass understory do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Loggerhead sea turtle *Caretta caretta*	LT	T	The Corpus Christi Inner Harbor, the Rincon Channel, and adjacent areas of open water potentially provide suitable habitat for this species.	The project ***may affect*** but is not likely to ***adversely affect*** this species.
Green sea turtle *Chelonia mydas*	LE	T	The Corpus Christi Inner Harbor, the Rincon Channel, and adjacent areas of open water potentially provide suitable habitat for this species.	The project ***may affect*** but is not likely to ***adversely affect*** this species.
Atlantic hawksbill sea turtle *Eretmochelys imbricata*	LE	E	The Corpus Christi Inner Harbor, the Rincon Channel, and adjacent areas of open water potentially provide suitable habitat for this species.	The project ***may affect*** but is not likely to ***adversely affect*** this species.
Kemp's Ridley sea turtle *Lepidochelys kempii*	LE	E	The Corpus Christi Inner Harbor, the Rincon Channel, and adjacent areas of open water potentially provide suitable habitat for this species.	The project ***may affect*** but is not likely to ***adversely affect*** this species.
Leatherback sea turtle *Dermochelys coriacea*	LE	E	The Corpus Christi Inner Harbor, the Rincon Channel, and adjacent areas of open water potentially provide suitable habitat for this species.	The project ***may affect*** but is not likely to ***adversely affect*** this species.
Spot-tailed earless lizard *Holbrookia lacerata*	—	—	Suitable habitat for this species does not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Keeled earless lizard *Holbrookia propinqua*	—	—	Proposed project soil types consist primarily of clay loam and urban land. Additionally, coastal dunes and barrier islands do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Texas horned lizard *Phrynosoma cornutum*	—	T	Open, arid areas with sparse vegetation exist in the vicinity of the proposed project; however, these areas were created due to development and are not considered habitat for this species. Additionally, no harvester ants (a primary food source) were observed during field visits.	The project would have ***no impact*** on this species.
Texas scarlet snake *Cemophora coccinea lineri*	—	T	Mixed hardwood scrub and sandy soils do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.

Table 4.16-2 Impacts to Rare, Threatened and Endangered Species of Potential Occurrence in Nueces and San Patricio Counties, Texas

Species	Federal Status	State Status	Evaluation	Effects/Impact
Texas indigo snake *Drymarchon melanurus erebennus*	—	T	Dense riparian corridors, suburban, or irrigated croplands do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Timber/Canebrake rattlesnake *Crotalus horridus*	—	T	Suitable habitat does not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Birds				
Wood Stork *Mycteria Americana*	—	T	Could utilize the wetland areas associated with Nueces Bay for foraging and roosting.	The project ***may impact*** this species.
Brown Pelican *Pelecanus occidentalis*	DL	—	Occurs within the wetland areas associated with Nueces Bay and the dredge spoil placement area.	The project ***may impact*** this species.
Reddish Egret *Egretta rufescens*	—	T	This species was observed utilizing the wetland areas associated with Nueces Bay for foraging during the March 5-7, 2013, field investigations.	The project ***may impact*** this species.
White-faced Ibis *Plegadis chihi*	—	T	Could utilize the wetland areas associated with Nueces Bay for foraging and roosting.	The project ***may impact*** this species.
White-tailed Hawk *Buteo albicaudatus*	—	T	Could potentially utilize mixed brush and the wetland areas associated with Nueces Bay and the upland confined placement area for foraging, although it typically inhabits areas further inland. Use of the project area would be temporary in nature and no impacts are expected to occur.	The project would have ***no impact*** to this species.
Northern Aplomado Falcon *Falco femoralis septentrionalis*	LE	E	Very little suitable habitat occurs in the vicinity of the proposed project.	The project would have ***no effect*** on this species.
Peregrine Falcon *Falco peregrinus*	DL	T	Wintering Peregrine Falcons have been observed in the project vicinity and could occur within the wetland areas associated with Nueces Bay for winter foraging; however, any use of the project area would be temporary and no impacts are expected to occur.	The project would have ***no impact*** on this species.
American Peregrine Falcon *Falco peregrinus anatum*	DL	T	Wintering Peregrine Falcons have been observed in the project vicinity and could occur within the wetland areas associated with Nueces Bay as a wintering migrant; however, any use would be temporary and no impacts are expected to occur.	The project would have ***no impact*** on this species.
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	—	Wintering Peregrine Falcons have been observed in the project vicinity. Could occur within the wetland areas associated with Nueces Bay as a wintering migrant; however, any use would be temporary and no impacts are expected to occur.	The project would have ***no impact*** on this species.
Whooping Crane *Grus americana*	LE	E	Potential foraging habitat exists within the wetland areas associated with Nueces Bay. However, this species has not been known to utilize the project vicinity and would not be expected to occur there, as they prefer larger, more remote open water habitats.	The project would have ***no effect*** on this species.
Snowy Plover *Charadrius alexandrinus*	—	—	Could occur within the wetland areas associated with Nueces Bay as a wintering migrant; however, any use would be transitory and no impacts are expected to occur.	The project would have ***no impact*** on this species.
Western Snowy Plover *Charadrius alexandrines nivosus*	—	—	Could occur within the wetland areas associated with Nueces Bay as a wintering migrant; however, any use would be transitory and no impacts are expected to occur.	The project would have ***no impact*** on this species.

Table 4.16-2 Impacts to Rare, Threatened and Endangered Species of Potential Occurrence in Nueces and San Patricio Counties, Texas

Species	Federal Status	State Status	Evaluation	Effects/Impact
Southeastern Snowy Plover *Charadrius alexandrines tenuirostris*	—	—	Could occur within the wetland areas associated with Nueces Bay as a wintering migrant; however, any use would be transitory and no impacts are expected to occur.	The project would have ***no impact*** on this species.
Piping Plover *Charadrius melodus*	LT	T	Could occur within the wetland areas associated with Nueces Bay; however, this species tends to utilize beaches, eastern bay shorelines and spoil islands more so than western bay shores and tidal flat areas. Monitoring for this species would take place prior to and during construction activities to ensure no impacts to this species would occur.	The project would have ***no effect*** on this species.
Mountain Plover *Charadrius montanus*	—	—	Shortgrass prairie does not occur in the vicinity of the proposed project area.	The project would have ***no impact*** on this species.
Eskimo Curlew *Numenius borealis*	LE	E	Virtually extirpated and any potential to occur would be as a transient through the project area; however, any use would be considered incidental and no impacts are expected to occur.	The project would have ***no effect*** on this species.
Red Knot *Calidris canutus rufa*	C	—	Could utilize the wetland areas associated with Nueces Bay for foraging and roosting during winter migration; however, any use would be temporary and no impacts are expected to occur. Monitoring for this species would take place prior to and during construction activities to ensure no impacts to this species would occur.	The project would have ***no effect*** on this species.
Sooty Tern *Sterna fuscata*	—	T	Feeds offshore and breeds on offshore islands. This species would not be expected to use the project area.	The project would have ***no impact*** on this species.
Western Burrowing Owl *Athene cunicularia hypugaea*	—	—	Suitable nesting and roosting sites do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Sprague's Pipit *Anthus spragueii*	C	—	Native upland prairie or native coastal grassland does not occur in the vicinity of the proposed project.	The project would have ***no effect*** on this species.
Texas Botteri's Sparrow *Aimophila botterii texana*	—	T	Grassland or short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca do not occur in the vicinity of the project area.	The project would have ***no impact*** on this species.
Henslow's Sparrow *Ammodramus henslowii*	—	—	Weedy fields or cut-over areas consisting of bunch grasses and vines and brambles interspersed with bare ground do not exist in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Sennett's Hooded Oriole *Icterus cucullatus sennetti*	—	—	Suitable nesting habitat does not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.
Mammals				
Southern yellow bat *Lasiurus ega*	—	T	Suitable roosting habitat occurs in the vicinity of the proposed project.	The project ***may impact*** this species.
Maritime pocket gopher *Geomys personatus maritimus*	—	—	Soils in the proposed project area consist primarily of clay loam and urban areas and not deep sandy soils as is a requirement for this species.	The project would have ***no impact*** on this species.
White-nosed coati *Nasua narica*	—	T	Woodlands, riparian corridors and canyons do not occur in the vicinity of the proposed project.	The project would have ***no impact*** on this species.

Table 4.16-2 Impacts to Rare, Threatened and Endangered Species of Potential Occurrence in Nueces and San Patricio Counties, Texas

Species	Federal Status	State Status	Evaluation	Effects/Impact
Plains spotted skunk *Spilogale putorius interrupta*	—	—	Wooded, brushy areas and open fields occur in the vicinity of the proposed project.	The project ***may impact*** this species.
Ocelot *Leopardus pardalis*	LE	E	Undisturbed, contiguous areas of dense brush do not occur in the vicinity of the proposed project due to urbanization.	The project would have ***no effect*** on this species.
Jaguarundi *Herpailurus yaguarondi*	LE	E	Undisturbed, contiguous areas of dense brush do not occur in the vicinity of the proposed project due to urbanization.	The project would have ***no effect*** on this species.
West Indian manatee *Trichechus manatus*	LE	E	The Inner Harbor and the shallow waters adjacent to Nueces Bay potentially provide suitable habitat for this species. This species has been documented by the TXNDD (EO ID 6570) to occur in the proposed project area. Additionally, recent sightings of this species have occurred in the vicinity of the proposed project as detailed in **Section 3.13.2.1**. Monitoring for this species would take place prior to and during construction activities, and construction would be halted temporarily and as necessary, to ensure no impacts to this species would occur.	The project ***may affect but is not likely to adversely affect*** this species.

C – Federally Listed Candidate
LE, LT - Federally Listed Endangered/Threatened
DL- Federally Delisted
E, T - State Listed Endangered/Threatened
— - Rare or Species of Concern, but no regulatory listing status

Effects to Federally-listed Threatened, Endangered, or Candidate Species

Potential habitat for eight federally-listed threatened or endangered species and one candidate species occurs within the project area for all of the alternatives; these species include:

- Atlantic hawksbill sea turtle (LE)
- Green sea turtle (LE)
- Kemp's Ridley sea turtle (LE)
- Leatherback sea turtle (LE)
- Loggerhead sea turtle (LT)
- West Indian manatee (LE)
- Whooping Crane (LE)
- Red Knot (C)
- Piping Plover (LT)

No designated critical habitat for any of the federally-listed threatened or endangered species occurs within the immediate vicinity of the proposed project. A meeting with the Corpus Christi Ecological Services Office of the USFWS on March 7, 2013, concluded that the principal concerns for these species are related to construction activities and the demolition of the existing bridge.

All five sea turtles and the manatee could potentially utilize the Inner Harbor and Nueces Bay. To avoid and minimize impacts to the sea turtles and manatees and ensure the proposed project would not be likely to adversely affect these species, the following approach (provided by the Corpus Christi Ecological Services Office of the USFWS) would be implemented during construction and demolition activities:

1. Training would be provided on avoiding potential impacts on the sea turtles and manatee for all personnel involved in construction or demolition of the bridge.
2. The training information would advise contractors and staff that sea turtles and manatees may be found in the Corpus Christi Ship Channel and Inner Harbor.
3. The training materials would include a poster and/or photographs in a book to be carried onsite to assist in identifying these species.
4. The training materials would instruct personnel not to feed or water the manatee.
5. The training materials would include instructions to call the Corpus Christi Ecological Services Field Office (CCESFO) in the event a manatee is sighted in or near the project area
6. Qualified biologists would monitor the presence of sea turtles and manatees during all phases of construction and demolition within open waters of the project area.
7. Before construction or demolition commences, a preliminary impact zone would be established, delineated by a 50-foot radius from the work area if that impact zone would extend into the water. If any sea turtle or manatee were to be observed within the appropriate impact zone, the biological monitor would instruct that construction or demolition activities cease until it could be determined that the animal had moved beyond the impact zone radius, either through sighting or by waiting until enough time has elapsed (approximately 15 minutes) to assume that the animal has moved beyond the impact zone.

In addition to these protective measures listed above, the contractor would be required to avoid and minimize impacts to open water areas to the extent practicable, including the Inner Harbor, during construction and demolition of the proposed project. Regardless of the methods chosen to demolish the existing bridge, the contractor would not be authorized to intentionally discharge pieces of the existing bridge, however small, into the Inner Harbor. Incidental discharges would be minimized to the extent practicable and measures to control these types of discharges would be developed and implemented during all phases of construction and demolition with the potential to impact aquatic habitats.

There is a remote chance that the Whooping Crane could potentially utilize Nueces Bay wetland areas temporarily; however, this species has not been documented in the project vicinity and would not be expected to occur there, as they prefer larger, more remote open water habitats. Therefore, the proposed project would have no effect on this species. The Red Knot could utilize the tidal flats and wetland areas associated with Nueces Bay for foraging and roosting during winter migration; however, any use would be temporary and no impacts are expected to occur. Additionally, the Piping Plover could also utilize the tidal flats associated with Nueces Bay for foraging and roosting. To prevent impacts to these species and to ensure the proposed project would have no effect to the Piping Plover, the following would be implemented:

1. Pre-construction surveys for the Piping Plover and Red Knot would be conducted prior to construction of the proposed project within the Nueces Bay tidal flats area.
2. If one of the bird species is detected during pre-construction surveys, USFWS-approved biologists would monitor for the presence of the birds during all phases of construction and construction activities that could potentially affect the species would be avoided.

Effects to State-listed Threatened or Rare Species

Potential habitat for seven state-listed threatened species occurs within the project area for all of the alternatives; these species include:

- Opossum pipefish
- Peregrine Falcon
- Reddish Egret
- White-faced Ibis
- White-tailed Hawk
- Wood Stork
- Southern yellow bat

Additionally, potential habitat for 10 species considered rare by the state of Texas, but not provided any regulatory protection, occurs within the proposed project for all of the alternatives; these species include:

- Texas windmill-grass
- A crayfish
- American eel
- Texas pipefish
- Texas diamondback terrapin
- Brown Pelican
- Snowy Plover
- Southeastern Snowy Plover
- Western Snowy Plover
- Plains spotted skunk

During construction, efforts would be made to avoid direct harm to individuals of state-listed or rare species; particularly those most vulnerable to earth moving and de-watering activities. Specific notes would be inserted into the construction plans that indicate the potential presence of these species and instruct the contractor to avoid impacting them. The contractor would be briefed on the species' appearance and habitat preferences prior to construction and instructed to cease activities in the vicinity of the protected species, if encountered, for a sufficient amount of time to enable escape or relocation. To avoid and minimize impacts to aquatic species, waterways would be spanned whenever

practicable and appropriate BMPs put in place. When areas must be de-watered, the work site would be isolated to prevent fish and other aquatic species from moving into the construction zone and work activities conducted as quickly as possible to minimize the length of time that flow is modified or interrupted. Prompt and effective erosion control and re-vegetation and restoration of flow lines and grades would be employed to further minimize impacts. The contractor would return temporary work areas to pre-project conditions as soon as practicable. Coordination with TPWD was initiated during the formal scoping process and has continued through the development phase of the proposed project. Coordination with TPWD will continue and include a review of this Draft EIS.

4.16.1.3 Essential Fish Habitat

Five Fishery Management Unit (FMU) Essential Fish Habitat (EFH) designations exist in the vicinity of the proposed project, including the Inner Harbor and the wetland area associated with Nueces Bay. These include Red Drum, Reef Fish, Coastal Migratory Pelagic Fish, Shrimp, and Stone Crab. No impacts to EFH within the Inner Harbor would occur as the proposed bridge would span this area and construction would be accomplished primarily from the banks. Therefore, potential impacts to EFH would be to the low marsh areas associated with Nueces Bay and the tidally-influenced drainage feature running from the low marsh areas to Nueces Bay. **Table 4.16-3** includes the acreage of EFH potentially impacted by each of the build alternatives.

Table 4.16-3 Potential Impacts to Essential Fish Habitat (EFH)

Alternative	Impacts to EFH		
	Existing Right of Way (acres)	Proposed Right of Way (acres)	Total (acres)
Green	0.00	0.00	0.00
Red	0.14	0.13	0.27
Orange	0.10	0.00	0.10
West	0.05	4.41	4.46

Source: US 181 Harbor Bridge EIS Team 2013

The West Alternative would impact the most acreage of EFH (4.46 acres) followed by the Red Alternative (0.27 acre), then Orange Alternative (0.10 acre). The Green Alternative would not impact EFH; therefore coordination with NMFS would not be required for this alternative. Impacts to EFH would include permanent displacement of habitat areas with roadway fill or other structures, including bridge piers and footings, and temporary construction phase disturbance. It should be noted that the majority of impacts to EFH by the construction of the West Alternative would be temporary and related to the construction of the bridge structure within this area. Coordination with NMFS was initiated during the formal scoping process and has continued through the development phase of the proposed project. Coordination with NMFS will continue and include a review of this Draft EIS. Once a preferred alternative has been identified, an Essential Fish Habitat Assessment will be prepared and submitted to NMFS through the Section 404 permitting process (see **Section 4.13.1.1**). Recommendations by NMFS to avoid or minimize adverse impacts to EFH would be implemented where practicable.

4.16.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance with the Act's policies and regulations. Migratory birds were observed during field investigations and may arrive in the project area to breed during construction of the proposed project. All four build alternatives have the potential to impact migratory birds. Appropriate measures would be taken to avoid adverse impacts on migratory birds and include the following:

- Removing or destroying active migratory bird nests (nests containing eggs and/or young) at any time of the year would be prohibited until the nests become inactive.
- If colonial nesting (for example, swallows) occurs on or in structures, nests would not be removed until all nests in the colony become inactive. A qualified wildlife biologist would be consulted to determine what constitutes a colony in the context of birds nesting on a bridge, culvert or other structure and to examine nests for eggs or young as needed.
- Measures would be utilized, to the extent practicable, to prevent or discourage migratory birds from building nests within portions of the project area scheduled for immediate construction or demolition.
- Inactive nests would be removed from the project area to minimize the potential for reuse by migratory birds.

When practicable, construction or demolition activities would be scheduled outside the typical nesting season (February to October), noting that the prohibitive provisions of the MBTA apply year-round.

4.16.1.5 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) was enacted to protect wildlife when federal actions result in the control or modification of a natural stream or body of water. All four build alternatives would result in the control or modification of a body of water. The Green, Red, and Orange Alternatives would be authorized under a Section 404 NWP, which would satisfy FWCA coordination requirements. The West Alternative would require authorization under an individual Section 404 permit, and therefore coordination with the USFWS and TPWD would be required under the Act; comments and recommendations from the agencies would be given full consideration by TxDOT.

4.16.1.6 Marine Mammal Protection Act

Impacts to marine mammals could potentially occur during construction or construction staging activities that extend into the open water. All four build alternatives have the potential to impact marine mammals during construction and demolition of the existing bridge. Coordination with NMFS was initiated during the formal scoping process and has continued through the development phase of the proposed project. Coordination with NMFS will continue and include a review of this Draft EIS. To avoid and minimize potential incidental harassment of marine mammals, the following mitigation measures would be implemented:

1. Qualified biologists would monitor the presence of marine mammals during all phases of construction and demolition within open waters of the project area, including the Inner Harbor.
2. Before construction or demolition commences, a preliminary marine mammal impact zone would be established, delineated by a 50-foot radius from the work area if that impact zone would extend into the water. If any marine mammal were to be observed within the appropriate impact zone, the biological monitor would instruct that construction activities cease until it could be determined that the animal had moved beyond the impact zone radius, either through sighting or by waiting until enough time has elapsed (approximately 15 minutes) to assume that the animal has moved beyond the impact zone.

4.16.2 Impacts of the No Build Alternative

The No Build Alternative would not adversely impact existing wildlife habitat. Habitat types within the existing right of way include marsh, maintained landscape, and mixed brush. These areas provide suitable habitat for various wildlife species including nesting birds and the state-listed southern yellow bat. The habitat types within the existing right of way would be subject to temporary impacts from maintenance of the existing US 181 facility; therefore, minor impacts to wildlife could result and would include temporary behavior modification resulting from disturbance. Additionally, mortality via vehicle collisions would continue to impact area wildlife. Care would be taken during maintenance activities to avoid or minimize adverse effects to habitat areas and wildlife inside and adjacent to the existing right of way.

4.17 CULTURAL RESOURCES

FHWA, the State Historic Preservation Office (SHPO)/Texas Historical Commission (THC), the Advisory Council on Historic Preservation (ACHP), and TxDOT have entered into a programmatic agreement to establish procedures for compliance with Section 106 of the National Historic Preservation Act (NHPA). Under the First Amended Programmatic Agreement Regarding the Implementation of Transportation Undertakings (PA-TU) among FHWA, SHPO, the AHCP, and TxDOT, consultation under 36 CFR 800 has been streamlined. Various types of transportation undertakings have been categorized under numbered stipulations based on the likelihood to cause adverse effects, with accompanying procedures for coordination with the SHPO. Compliance with Section 106 and coordination with the SHPO is discussed below for both archeological and historic resources, with reference to the PA-TU.

4.17.1 Archeological Resources

4.17.1.1 Impacts of the Build Alternatives

Selection of the Green, Red (Preferred), Orange, or West Alternative would result in impacts only to previously disturbed areas that lack the potential to contain archeological historic properties or cemeteries. Prior disturbances include former and extant industrial, petroleum, natural gas, and manufacturing facilities, former and extant commercial and residential buildings, construction, dredge spoil mantling, ship channel modifications, contamination, and highway construction.

The SHPO/ THC concurred with TxDOT's findings that the development of any of the proposed build alternatives would have no effect on archeological historic properties or cemeteries, and that consultation with SHPO/THC under Section 106 of the NHPA was concluded. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area would cease and TxDOT archeological staff would be contacted to initiate post-review discovery procedures under the provisions of PA-TU among FHWA, SHPO, the Advisory Council on Historic Preservation, and TxDOT; and the MOU between TxDOT and the THC. TxDOT would also continue consultation with interested parties in the event that unanticipated archeological deposits are encountered during construction.

4.17.1.2 Impacts of the No Build Alternative

The No Build Alternative would have no foreseeable impacts to archeological cultural resources in the study area.

4.17.1.3 Section 106 Consultation: Archeological Resources

TxDOT initiated consultation with SHPO/THC in a letter dated June 27, 2013, which included submission of the *Archeological Background Studies Technical Memorandum* (URS 2013d) in support of the Draft EIS. This report identified several areas for potential field investigations. TxDOT sought concurrence from SHPO/THC that the report adequately evaluated the alternative alignments for potential effects to archeological historic properties, that further field investigations such as geotechnical coring may be conducted following selection of the preferred alternative. SHPO/THC concurred on July 1, 2013 (see **Appendix B**).

TxDOT, on behalf of FHWA, also initiated Section 106 consultation on June 18, 2013, with federally-recognized Tribes consulting in the TxDOT Corpus Christi District, including the Apache Tribe of Oklahoma, the Kiowa Indian Tribe of Oklahoma, the Tonkawa Tribe of Indians of Oklahoma, the Comanche Nation of Oklahoma, and the Mescalero Apache Tribe in New Mexico (see **Appendix B**). These tribes have a Programmatic Agreement with FHWA and TxDOT. No responses were received within the 30-day project review period. In the event that any additional archeological investigations revealed archeological deposits that could be adversely impacted by the undertaking, TxDOT would continue consultation.

Other interested parties with whom TxDOT initiated Section 106 consultation include the City of Corpus Christi, the Corpus Christi Area Heritage Society, the Coastal Bend Archaeological Society, the Texas Archaeological Society Region 7, and the Nueces County Historical Commission. The City of Corpus Christi responded via email (see **Appendix B**). No other responses were received within the 30-day project review period. In the event that additional archeological investigations revealed archeological deposits that could be adversely impacted by the undertaking, TxDOT would continue consultation.

In a letter to SHPO/THC dated August 15, 2013, TxDOT provided additional information regarding past right of way disturbances and sought the following concurrence from SHPO/THC: "1) that no further

archeological investigations are warranted, 2) a finding of No Effect on archeological historic properties and cemeteries, and 3) Section 106 consultation with SHPO/THC regarding archeological historic properties is concluded." SHPO/THC concurred with these recommendations on August 16, 2013 (see **Appendix B**).

4.17.2 Historic Resources

4.17.2.1 Impacts of the Build Alternatives

In accordance with Section 106 of the NHPA, the effects the proposed project may have on properties eligible for the National Register of Historic Places (NRHP) have been analyzed and documented in the Historic Resources Survey Report (HRSR) entitled *Corpus Christi Harbor Bridge Reconnaissance Survey*, completed in December 2012 (Mead and Hunt 2012). A summary of the properties recommended eligible for the NRHP is included in **Section 3.14.2** of this Draft EIS. Subsequent to the completion of the HRSR, there were changes in eligibility determinations made in consultation with SHPO/THC, as well as refinements to the project design that resulted in avoidance and minimization of impacts. These changes are briefly summarized below.

During an intensive survey of the Leopard Street Commercial Historic District, recommended as eligible for the NRHP in the 2012 HRSR, it was discovered that several resources previously considered as contributing to the eligibility of the district had been demolished in connection with activities unrelated to the project. These demolitions resulted in a noncontiguous district boundary. The Melba Theater (1016 Leopard Street) and 1001 Leopard Street were recommended in the 2012 HRSR as properties contributing to the eligibility of the district but not individually eligible for the NRHP. Subsequent to coordination with SHPO/THC, however, these properties were determined to be individually eligible. Additionally, refinements to the project design occurring after the completion of the 2012 HRSR resulted in several NRHP-eligible resources being avoided, including the Galvan Ballroom and the Navarro Place Housing Complex. Further detail about measures undertaken to avoid and minimize harm to historic resources is provided in the Draft Section 4(f) Evaluation in **Section 5.5.1.3**. **Table 4.17-1** summarizes the NRHP-eligible resources in the APE and the final determination of effect. These resources are also depicted on the **Land Use Plates** in **Appendix E**.

Table 4.17-1 Determination of Effect for NRHP-Eligible Historic Resources in the APE

Resource Number (see Land Use Plates)	NRHP-Eligible Resource in APE	Determination of Effect
B1-7	Harbor Bridge system (comprised of the Harbor Bridge and six concrete bridges that carry US 181 in the project area)	Adverse Effect
1	SAU&G Railroad Depot	No Adverse Effect (*de minimis impact*)
2	Navarro Place Housing Complex	No Adverse Effect
3	Galvan Ballroom (1632 Agnes Street)	No Adverse Effect
4	Melba Theater (1016 Leopard Street)	No Adverse Effect

Table 4.17-1 Determination of Effect for NRHP-Eligible Historic Resources in the APE		
Resource Number (see Land Use Plates)	**NRHP-Eligible Resource in APE**	**Determination of Effect**
5	1001 Leopard Street	No Adverse Effect
6	Nueces County Centennial Marker	No Adverse Effect
7	Old Bayview Cemetery	No Adverse Effect
8	Solomon Coles High School	No Adverse Effect
9	Nueces County Courthouse	No Adverse Effect
10	DN Leathers Housing Complex	No Adverse Effect
11	1414 Leopard Street	No Adverse Effect
12	1110 Leopard Street	No Adverse Effect
13	Broadway Bluff Improvement	No Adverse Effect
14	Somico Building (807 Broadway)	No Adverse Effect
15	Hebrew Rest Cemetery	No Adverse Effect
16	1124 16th Street	No Adverse Effect

Source: Mead & Hunt 2012

The only NRHP-eligible historic resources affected by the proposed project are the Harbor Bridge system and the SAU&G Railroad Depot. As all of the proposed build alternatives would require the removal of the Harbor Bridge system, TxDOT historians determined that the proposed project would have an adverse effect on this NRHP-eligible resource. As the proposed Green Alternative would only require a small amount of right of way from the parking lot area of the SAU&G Railroad Depot, TxDOT historians determined that this alternative would have no adverse effect to the historic resource; TxDOT and FHWA intend to pursue a *de minimis* impact determination for this property (see **Section 5.3.2.3**). The Red, Orange and West Alternatives would have no effect to the SAU&G Railroad Depot. The proposed undertaking would have no other reasonably foreseeable adverse effects that may occur later in time, be farther removed in distance, or be cumulative.

4.17.2.2 Impacts of the No Build Alternative

The No Build Alternative would not affect historic properties listed on or eligible for listing on the NRHP.

4.17.2.3 Section 106 Consultation: Historic Resources

The above findings were reviewed by the Section 106 consulting parties, including the Corpus Christi Landmarks Commission, the Nueces County Historical Commission, and the Historic Bridge Foundation. Pursuant to Stipulation VI, "Undertakings with the Potential to Cause Effects," of the PA-TU and the MOU, these findings were individually coordinated with SHPO/THC. SHPO/THC concurred with TxDOT determinations in a letter dated June 6, 2013; therefore, Section 106 has been satisfied. (See the Section 106 coordination letters in **Appendix B**).

4.17.2.4 Mitigation for Historic Resources

In accordance with 36 CFR 800.6, TxDOT proposes to mitigate the above mentioned adverse effects. TxDOT would develop educational materials in tandem with programmatic mitigation efforts for post-World War II bridges currently under development among TxDOT, the THC, FHWA and the Historic Bridge Foundation. Specifically, a public education campaign could be employed focused on the significance of the Harbor Bridge and the six adjacent concrete bridges (see discussion in **Section 5.5.3.3**).

4.18 SECTION 4(F)

4.18.1 Impacts of the Build Alternatives

Section 3.15 identified Section 4(f) properties in the vicinity of one or more of the proposed build alternatives. Use of 4(f) property would occur under all of the proposed build alternatives, as each build alternative would require the use of the Harbor Bridge system. **Table 4.18-1** presents the anticipated use of Section 4(f) property by alternative. Refer to **Section 5.0** of this document for the Draft Section 4(f) Evaluation.

Table 4.18-1 Use of Section 4(f) Property by Alternative

	Green	Red	Orange	West
4(f) Properties Used	Harbor Bridge system, Lovenskiold Park, SAU&G Depot (*de minimis*)	Harbor Bridge system, Lovenskiold Park, T.C. Ayers Park	Harbor Bridge system, Lovenskiold Park, T.C. Ayers Park, Oveal Williams Senior Center (*de minimis*)	Harbor Bridge system, Rincon Channel Wetlands Interpretive Overlook

Source: US 181 Harbor Bridge EIS Team 2013

4.18.2 Impacts of the No Build Alternative

The No Build Alternative would not result in the use of any Section 4(f) property.

4.19 HAZARDOUS MATERIALS

Environmental impacts generated from hazardous materials in the project area would be associated with current or historical facilities that have impacted or have the potential to impact the environment. **Section 3.16** identified facilities and other regulated sites with the potential to impact the environment due to hazardous materials. Facilities or regulated sites within the right of way of the selected alternative would need to be acquired. Prior to acquisition, a Phase I Environmental Site Assessment would be conducted at sites or facilities with known or potential hazardous materials impacts. The potential for encountering hazardous materials during construction would be identified during this assessment as well as any required sampling, analysis, remediation and soil/groundwater management.

Storage and use of hazardous materials may be necessary during the construction of the selected alternative. For example, temporary aboveground storage tanks (ASTs) containing oil and diesel for on-site equipment and vehicles would be regulated and require control measures for spills and leaks. In addition, potential impacts from spills and leaks from fueling and maintenance of equipment and vehicles could occur on-site. These impacts would to be minimal and best management practices would be implemented to reduce these types of impacts during construction. In addition, activities associated with the use and storage of hazardous materials would be required to conform to TxDOT standards for spill containment and control strategies.

The relocation of existing pipelines and the removal of underground PSTs and LPSTs as well as ASTs containing over 200,000 gallons of petroleum may be required. Arrangements with pipeline operators and tank owners would be addressed during the right of way acquisition and negotiation process. Required removal of PSTs during construction would be in accordance with 30 TAC §334, Subchapter C, Technical Standards.

None of the build alternatives are anticipated to impact active oil/gas wells. However, if oil/gas well-related contamination was encountered during construction, remediation would be conducted, as needed, prior to the continuation of construction activities. The proposed project may also require the demolition of building structures and the demolition or renovation of existing bridge structures containing asbestos. Asbestos issues would be addressed during right of way acquisition prior to construction and applicable asbestos inspections, specification, notification, license, accreditation, abatement, and disposal, would be in compliance with federal, state, and local regulations. As a result, further investigation would need to be conducted prior to the acquisition of the properties identified in this document.

4.19.1 Impacts of the Build Alternatives

The build alternatives may have risks for hazardous materials impacts on or near existing hazardous materials sites. Thirty-five regulated sites were identified within or adjacent to one or more of the build alternatives. These sites create a higher potential for encountering hazardous contamination during construction. **Table 4.19-1** lists the 35 sites and provides a summary of the facilities that are considered high, medium or low risk based on available information; map ID numbers correlate with features shown in **Figures 3.16-1** through **3.16-4**.

In addition to the regulated sites listed in **Table 4.19-1**, construction of the Red and Orange Alternatives would impact the eastern most portion of the former Southwestern/Kerr-McGee tank farm, Terminal 1, and the Leathers II site, which contains known lead and total petroleum hydrocarbon (TPH) compounds in soil and substantial quantities of TPH in groundwater on site. The Red, Orange and Green Alternatives would be in close proximity to 200,000+ gallon petroleum product ASTs along the right of way (see **Section 3.16.5**).

Construction of the West Alternative would potentially impact the western-most portion of the Hillcrest Community Environmental Investigation (HCEI) study area along Nueces Bay Boulevard; it would require disturbing potentially contaminated soils in the Inner Harbor dredge material placement area 1 (IH-PA 1); and it may require the removal of one or more 200,000+ gallon petroleum product ASTs along the right of way (see **Section 3.16.5**).

These issues and those identified in **Table 4.19-1** would require additional investigation, depending on the alternative selected.

4.19.1.1 Oil/Gas Well and Pipeline Sites

Review of RRC documentation indicates that there are four dry wells and four plugged gas wells within the proposed rights of way. None of the alternatives would impact permitted locations or active oil/gas wells (see **Figure 3.16-5**). However, if oil/gas well-related contamination was encountered during construction, remediation would be conducted prior to continuation of construction activities. If a well is encountered and damaged during construction, the responsible party would be required to correct the damage and remediate contamination resulting from the damage.

In addition, there are approximately 24 petroleum pipelines that cross one or more of the proposed build alternatives. Therefore, relocation of existing pipelines may be necessary. The Green and Orange Alternatives would have the least amount of pipeline impacts while the West Alternative would have the greatest (see **Figure 3.16-5**). Arrangements with pipeline operators would be addressed during the right of way acquisition and negotiation process. In addition, pipeline depths and locations would be clearly marked prior to construction to prevent accidental ruptures.

4.19.1.2 Construction

Storage and use of hazardous materials may be necessary during the construction of the proposed project. For example, temporary ASTs containing oil and diesel for on-site equipment and vehicles would be regulated and require control measures for spills and leaks. In addition, potential impacts from spills and leaks from fueling and maintenance of equipment and vehicles could occur on-site. These impacts are expected to be minimal and best management practices would be implemented to reduce these types of impacts during construction. In addition, activities associated with the use and storage of hazardous materials would be required to conform to TxDOT standards for spill containment and control strategies.

Table 4.19-1 Regulated Hazardous Materials Sites									
Map ID No.	**Company**	**Address**	**Database**	**Green Alternative**	**Orange Alternative**	**Red Alternative**	**West Alternative**	**Category**	**Further Investigation Required?**
1	Pope Estate (Port of Corpus Christi Authority sign was present during site visit)	Off Burleson Rd	CALF	Within ROW				High	Yes
2	CITGO Ref. & Chem. – East Plant	1800 Nueces Bay Blvd	SPILLS, CERCLIS, ERNSTX, FRSTX, ICIS, ICIS/NPDES, NOV				Within ROW	Low	No
3	K Marketing, Inc.	Northbound lanes of I-37 under the Tancahua St Bridge	SPILLS	Within ROW				Low	No
4	Ray West Warehouse; Koch Refining Co.	US 181 NB at Burleson St	SPILLS	Within ROW				Low	No
5	Gulf Stream (Currently identified as Rawson, Inc.)	701 East Navigation Blvd	ERNSTX, FRSTX			Adjacent to ROW		Low	No
6	Al Speight Military Rail Yard	Laydown yard between Sam Rankin St & Brewster St	FRSTX		Adjacent to ROW			Medium	Yes
7	Medina Texaco; Merchants Fast Motor Lines (Identified as abandoned during site visit)	3030 Martin Luther King Blvd	LPST, PST, GWCC	Within ROW				Medium	Yes
8	Port Of Corpus Christi Authority recyclable transfer container yard	1925 N Sam Rankin St	FRSTX, IHW			Within ROW		Medium	Yes
9	Texas Department Of Transportation	US 181 Corpus Christi Harbor at north side of Harbor Bridge	SPILLS, RCRAGR06, IHW	Within ROW				Low	No
10	Flint Hills Resources East Refinery; Southwestern	1700 Nueces Bay Blvd	IHW, NOV, PST, SPILLS, TIERI,				Within ROW	Low	No

Table 4.19-1 Regulated Hazardous Materials Sites									
Map ID No.	**Company**	**Address**	**Database**	**Green Alternative**	**Orange Alternative**	**Red Alternative**	**West Alternative**	**Category**	**Further Investigation Required?**
	Refining; Koch Petroleum Group		AIRAFS, BRS, CERCLIS, DOCKETS, ERNSTX, FRSTX, ICIS, NFRAP, PADS, RCRA, RCRAGR06, TRI, APAR						
12	E Z Stop (Identified as Shell Food Mart during site visit)	1621 Leopard St	NOV, PST, FRSTX,LPST	Within ROW				High	Yes
13	Crocker Transfer & Storage	817 Brewster St	PST		Adjacent to ROW			Medium	Yes
14	Beachside Market	503 Burleson St	FRSTX, PST	Within ROW				Medium	Yes
15	Southwestern Refining (Identified as Koch during site visit)	Nueces Bay Blvd @ RR Tracks	SPILLS				Within ROW	Low	No
16	Enterprise; Trout Trucking Co; Suntide Materials & Trucking	I-37 & US 181 NB	HMIRSR06, SPILLS	Within ROW				Low	No
17	SAIA Motor Freight; IRECO, Inc. Could not identify company name during site visit)	1922 Sam Rankin St	HMIRSR06, SPILLS			Within ROW		Low	No
19	Former Riviera Wholesale Food (Could not locate during site visit; facility was vacant)	1502 Tancahua St	PST	Adjacent to ROW				Low	No
21	Paradise Cushions; Paradise Designer	711 Belden St	PST, LPST	Adjacent to ROW				Low	No
22	Corpus Christi Transfer	900 N Staples St	PST, LPST	Adjacent to ROW				Low	No
23	7 11 Store 52118; Stripes 2118	4010 E Causeway Blvd	PST, LPST	Adjacent to ROW				Medium	Yes
24	Police Headquarters	1616 Martin Luther King Dr	PST	Within ROW				Low	No
25	Gilman Insulation Co.;	1217 N. Tancahua	PST, LPST, IHW	Adjacent to ROW				Low	No

Table 4.19-1 Regulated Hazardous Materials Sites

Map ID No.	Company	Address	Database	Green Alternative	Orange Alternative	Red Alternative	West Alternative	Category	Further Investigation Required?
	Les Feldser, Inc. (building appears vacant)								
26	Daniel Brodhag (Identified as an abandoned gas station during site visit)	920 Antelope St	PST	Within ROW				Low	No
27	Exxon Station 6 3676; Stripes 2160	1233 17th St; 2021 Morgan Ave; 2002 Morgan Ave	PST, LPST, IHW		Adjacent to ROW			Medium	Yes
30	Texas Star 101	1633 Agnes St	PST, LPST		Adjacent to ROW			Medium	Yes
31	Stripes 9432; Circle K 9432	3238 Buddy Lawrence Dr	PST, LPST	Adjacent to ROW			Adjacent to ROW	Medium	Yes
34	Valero Corner Store 0135; Diamond Shamrock 00135	4502 E Causeway Blvd; 4502 W US 181	PST, LPST	Adjacent to ROW				Medium	Yes
38	Beachcomber	2901 E Surfside Blvd	PST, LPST			Adjacent to ROW		Medium	Yes
39	Ryder Pie Nationwide (Goodman, Amana Air Conditioning and Heating on building)	1621 Mussett St	IHW		Adjacent to ROW			Low	No
40	American Bottling Co., Truck Service	1519 & 1601 Leopard	PST, LPST		Adjacent to ROW			Medium	Yes
42	Police	1517 Winnebago St	PST		Within ROW			Low	No
60	Stripes 9831	1050 Nueces Bay Blvd	PST, LPST				Adjacent to ROW	Medium	Yes
65	Cooper Outdoor Adv	1821 Leopard	PST	Adjacent to ROW				Low	No
104	Malek, Inc. (air conditioning and heating)	2521 Antelope St	PST, LPST	Adjacent to ROW				Medium	Yes
118	Circle K 2179	301 I-37 Access Road	PST, LPST	Adjacent to ROW				Medium	Yes

Source: US 181 Harbor Bridge EIS Team 2013

If hazardous materials are unexpectedly encountered within the soil or groundwater during construction, appropriate assessment, remediation and management would be conducted in accordance with federal and state regulations.

4.19.1.3 Asbestos-Containing Materials

The proposed project may require the demolition of building structures which may contain asbestos. Asbestos issues would be addressed during right of way acquisition prior to construction and applicable asbestos inspections, specification, notification, license, accreditation, abatement, and disposal, would be in compliance with federal and state regulations.

Asbestos may also be encountered during demolition and/or renovation of existing bridge structures. The *Texas Department of State Health Services* (DSHS) *Notification Rules* (25 TAC 295.61) state that bridge structures must be inspected by a licensed asbestos inspector prior to demolition or renovation. If asbestos-containing materials above EPA thresholds would be disturbed during construction or renovation, DSHS must be notified at least ten days prior to these activities using the *DSHS Asbestos Demolition/Renovation Notification Form*.

4.19.1.4 Petroleum Storage Tanks

LPSTs would be addressed during right of way negotiation and acquisition. Required removal of PSTs during construction would be in accordance with 30 TAC §334, Subchapter C, Technical Standards. All tanks would be removed and proper closure activities would be conducted prior to construction. Excavation, pumping, and dewatering activities associated with impacted soil or groundwater would require treatment and disposal.

4.19.2 Impacts of the No Build Alternative

The No-Build Alternative would provide no immediate changes within the project area and therefore, would not result in hazardous materials impacts associated with the construction or operation of the proposed project. Existing contamination and contamination sources would remain in place under their current course of action, if any. In addition, based on prior events, the potential for the overturn of trucks potentially carrying hazardous materials on the existing roadway is expected to be greater than on any of the new alternatives.

4.20 IMPACTS TO VISUAL AND AESTHETIC RESOURCES

This section summarizes the potential visual and aesthetic effects from implementation of the proposed project, by alternative, and discusses further opportunities for local input into the design of the bridge and other project aspects. The existing visual character and quality, and existing viewer exposures and sensitivity are described in **Section 3.17**. FHWA guidance (1988) includes three types of potential observer viewpoints that may be analyzed to determine changes in visual character: sensitive points in the landscape, typical viewpoints in the area, and random points spaced throughout the project area. This visual impact assessment analyzed existing and future views from both sensitive viewpoints

(including critical visual resources like the existing Harbor Bridge and the marina) as well as typical viewpoints that are representative of the character of the landscape and type of viewer. Visualizations to represent some of these viewpoints were created by developing a model of the proposed bridge and roadway and rendering the model in Autodesk 3D Studio Max. The rendered images were then overlaid onto photographs taken from the viewpoints and edited in Adobe Photoshop. These visualizations are presented as illustrations in this section.

4.20.1 Impacts of the Build Alternatives

Along I-37 and south of I-37 along the Crosstown Expressway, the proposed build alternatives follow the existing alignment; the configuration of these highways, including the interchange between them, would remain largely the same as the existing condition. The relationship between the transportation facility and the surrounding environment in these areas, therefore, would not be substantially different visually or aesthetically. As the existing facility currently does not provide suitable accommodations for bicyclists and pedestrians, the shared-use path proposed under each of the build alternatives would offer new viewpoints of Corpus Christi Bay and the bayfront, North Beach, including the Texas State Aquarium and the USS *Lexington* museum, the downtown area and the marina.

All of the build alternatives would remove the existing Harbor Bridge, an important component of the existing landscape and a sensitive visual resource. The value of the view of this resource is derived primarily from its contribution to the vividness of the landscape (see **Section 3.17**). It can be assumed that the design of a new bridge under any of the build alternatives would also be visually striking, although the ability of a new bridge to function as an iconic feature of the skyline would vary by location and therefore by alternative.

Many of the elements of the proposed project having aesthetic implications, such as signage, vegetation treatments, noise barriers, and most significantly—the bridge design—have yet to be developed at the current stage of the project. The public would be afforded the opportunity to have input into the decision-making process for the development of many of these aspects at a later stage of project development. For example, the communities for which noise walls are proposed would have an opportunity to receive further information about the design and materials for the proposed walls and to decide if the walls should be constructed. A design guideline workshop is planned for the project and this would also allow for input from the public regarding the design of the bridge and other elements such as landscaping and aesthetic treatments. These opportunities would be available under all of the build alternatives; the following analysis considers the general characteristics of the roadway improvements and the location of the proposed bridge for each build alternative.

<u>Green Alternative</u>

The Green Alternative would cross the Inner Harbor immediately adjacent to the existing bridge and at an elevation approximately at the top of the existing bridge; the elevation would taper to the north and south, matching the elevation of the existing US 181 facility roughly one and a half miles north and one mile south of the center of the Inner Harbor. While the location of the bridge would remain relatively

unchanged, the change in elevation represents a slight change in the viewshed for both travelers on the facility and viewers of the facility from the water, the downtown area, the SEA District, North Beach, and from the Northside community, particularly the Washington-Coles neighborhood (see **Figure 3.17-2**). The taller bridge (approximately 50 percent higher) would also increase the viewshed. Because the Harbor Bridge has been a major part of the landscape in its current location for over five decades, the change in elevation would not substantially alter the viewshed from these vantages. Similarly, the viewshed from the highway itself would remain largely unchanged relative to the existing condition.

Residents of the Washington-Coles and CBD neighborhoods would experience changes in views in the foreground to middle-ground that would be permanent. Although visual quality in these areas is considered low (see **Section 3.17**), the taller structure could block some views of downtown, and the existing visual character of the bridge would be different. As noted in **Table 3.17-1**, residents of adjacent neighborhoods are expected to have high sensitivity to changes in the landscape in close proximity to their homes. Because the existing bridge would be located very close to its existing alignment and the alignment of the bridge approaches would remain where they are today in relationship to the neighborhoods, the visual impact of the Green Alternative on this viewer group is considered to be low.

Office and industrial workers are expected to have only a moderate degree of sensitivity to changes in the landscape. Under all of the build alternatives, the number of viewers in this category is likely to increase, due to the height of the bridge. Due to the extremely close proximity of the Green Alternative's crossing of the Inner Harbor to the existing condition, the change in the visual landscape for this viewer group is expected to be low.

Tourists would have high exposure to changes in the visual landscape of the downtown area, as the SEA District and North Beach are the primary locations of tourist attractions. Visitors to the city may not be as sensitive to changes as residents, however, especially considering that a tourist's first visit to the city may be after a new bridge is constructed. Changes in the visual environment for this viewer group are expected to be low.

Boaters on the water would also have views of the bridge with the Green Alternative varying from foreground to background. The view for boaters would be relatively similar to the existing condition, considering the proximity of the Green Alternative's alignment to the existing bridge. The increased height of the bridge would increase its visibility from the water, as the only obstructions between viewers on the boat and the bridge would be other boats.

Finally, most commuters and travelers along the facility would have low sensitivity and moderate exposure. Under the Green Alternative, views from the roadway would be very similar to the existing condition; the height of the proposed structure would allow for farther reaching views from the bridge.

Overall, the Green Alternative would result in relatively minor changes to the visual quality of the project area. The bridge would remain visible from visually sensitive areas like the marina, and changes

to neighborhood areas where viewer response is expected to be moderate, would be relatively minor. The view of the city from the facility could be considered to be improved, considering the vantage allowed by the height of the proposed bridge. With respect to the importance of the existing Harbor Bridge as a local landmark, members of both the Technical and Citizens Advisory Committees were largely in agreement that the Green Alternative represents the best opportunity to maintain and enhance the landmark quality of the bridge, mainly due to the location of the alternative along the existing US 181 alignment, the alignment closest to the bayfront. It should be noted that this use of the term "landmark" refers to the quality of being a highly recognizable feature, rather than a "historic landmark."

Red Alternative (Preferred)

Located roughly a quarter of a mile west of the existing facility, the Red Alternative (the Preferred Alternative) would remove the existing Harbor Bridge and the US 181 approaches. These features would be removed from the line-of-sight view from Shoreline Boulevard, the Washington-Coles neighborhood (looking east toward the bay) and the southern parts of North Beach where the Texas State Aquarium and the *Lexington* are located. At a planned low-chord elevation of 217 feet above the Inner Harbor, however, the Red Alternative would not be completely removed from view. The taller bridge would also increase the viewshed (see **Figure 3.17-3**).

The view of the Red Alternative from the Hillcrest neighborhood would be more pronounced than that of the Green or Orange Alternatives, though the line of sight in many parts of the neighborhood would be below existing utility lines and the tree line. Views of the proposed facility from the Washington-Coles neighborhood would also be more pronounced, and the introduction of the facility into the Northside area would add to the urbanized aesthetic of the neighborhood already characterized by proximity to I-37, the Port, the Broadway Wastewater Treatment Plant and the downtown area. The visual character of portions of the Washington-Coles neighborhood would be changed substantially, particularly in the area of T.C. Ayers Park and the residential areas surrounding the park.

Illustration 4.20-1. Rendering of the direct connector ramps, frontage road ramps and main lanes for US 181 for proposed Red Alternative, looking southwest from Nueces Street toward T.C. Ayers Park in the Northside community.

Office and industrial workers are expected to have a moderate degree of sensitivity to visual changes. The proposed Red Alternative would move the location of the bridge farther west from the downtown core and concentration of office workers. The increased height of the bridge, however, would preserve a view of the bridge for those viewers who are currently able to see it in the CBD area (see **Figure 3.17-3**). The westward shift in alignment would also bring the bridge closer to industrial workers at the refineries and other facilities on Port property. The change in the visual landscape for this viewer group is expected to be low to moderate.

Although tourists would have high exposure to changes in the visual landscape of the downtown area, these viewers are expected to have only moderate sensitivity to changes in the landscape. Tourists would view the bridge from the downtown area; under the Red Alternative, views of the bridge would shift from foreground under the existing condition to middle-ground. The Red Alternative's bridge would remain visible from the visually sensitive marina area. A depiction of the view of the Red Alternative from this location is shown below in **Illustration 4.20-2**. Changes in the visual environment for this viewer group are expected to be moderate.

Illustration 4.20-2. Rendering of proposed Red Alternative from the L-Head, with existing Harbor Bridge visible in the background.

Views of the bridge for recreational boaters on the Corpus Christi Bay would similarly shift from foreground to middle-ground/background under the Red Alternative. The location of the crossing further west would not provide for the same close proximity to the structure allowed by the current bridge; access to the Inner Harbor would be restricted for recreational boaters. Despite the westward shift, the increased height of the bridge would still increase its visibility from the water (see **Figure 3.17-3**).

Users of the facility, including motorists and bicyclists and pedestrians on the proposed shared-use path, would continue to have a view of the North Beach area, including the Aquarium and the *Lexington*. South of the Inner Harbor, the viewshed from the bridge would include Whataburger Field, the SEA District, the bayfront and the marina to the east. The viewshed south of the Inner Harbor facing west would include mainly Port industrial uses, including the refineries west of Nueces Bay Boulevard, and at the elevation proposed (approximately 130 feet above the existing ground) the line of sight would largely pass over the top of the Hillcrest neighborhood immediately adjacent to the west.

In summary, the proposed Red Alternative would cause changes that could be considered visually incompatible with the residential areas of the Northside neighborhoods, where viewers are sensitive to changes in the landscape. Existing visual quality in this area, however, is low (see **Illustration 3.17-7**). Views from downtown would represent a moderately substantial change, as the bridge and its

approaches are shifted further west. Views from the visually sensitive marina area would remain relatively similar, and the bridge would remain visible. The view of the city from the facility could be considered to be improved, considering the vantage allowed by the height of the proposed bridge. Due to the placement of the Red Alternative further inland from the existing bridge, members of the Technical and Citizens Advisory Committees were less optimistic that the new bridge associated with this alternative would have the same landmark feel as the existing bridge, or of the bridges proposed with the Green or Orange Alternatives.

Orange Alternative

The Orange Alternative would cross the Inner Harbor adjacent to and to the west of the existing bridge and therefore shares with the Green Alternative many of the viewsheds in the downtown and North Beach Areas. The Orange Alternative connects to I-37 at the same location as the Red Alternative, and shares viewsheds with that alternative as well.

The bridge and approach section would be removed from the view from the Washington-Coles neighborhood (looking east toward the bay) and would remain highly visible from the southern parts of North Beach where the Texas State Aquarium and the *Lexington* are located (see **Figure 3.17-4**). The view of the Orange Alternative from the Hillcrest neighborhood area would be more pronounced than that of the Green Alternative and very similar to that of the Red Alternative, with the line of sight in many parts of the neighborhood being below existing utility lines and the tree line. Views of the proposed facility from the Washington-Coles neighborhood would also be more pronounced, and the placement of the Orange Alternative through the neighborhood would replace much of the residential area with a major transportation facility, changing the aesthetic of the neighborhood from mostly residential to mostly urban, with I-37, the Port, the Broadway Wastewater Treatment Plant and the downtown area contributing to the more urban feel. The visual character of the Washington-Coles neighborhood would be changed substantially as well, with residential areas and the areas in and around T.C. Ayers Park becoming part of the transportation right of way.

Illustration 4.20-3. Rendering of proposed Orange Alternative in the distance, from the intersection of Waco Street and Ramirez Street in the Northside community.

Office and industrial workers are expected to have a moderate degree of sensitivity to changes in the landscape. Due to the close proximity of the Orange Alternative's crossing of the Inner Harbor to the existing condition, the change in the visual landscape for this viewer group is considered to be low.

Although tourists would have high exposure to changes in the visual landscape of the downtown area, these viewers are expected to have only moderate sensitivity to changes in the landscape. Tourists would view the bridge from the downtown area; under the Orange Alternative, views of the bridge would shift only slightly from the current landscape. As the bridge would be located at the western edge of most tourist-centric areas in the downtown area, views would be primarily in the middle-ground to background. The Orange Alternative's bridge would remain visible from the marina area; a depiction of the view from the L-Head is shown in **Illustration 4.20-4**. Changes in the visual environment for this viewer group are expected to be low.

Illustration 4.20-4. Rendering of proposed Orange Alternative from the L-Head, with existing Harbor Bridge in the background.

The Orange Alternative's bridge would be highly visible to recreational boaters in the Corpus Christi Bay. Although the bridge alignment would be shifted slightly to the west from the existing bridge, the increased height of the new bridge would extend the viewshed from the water (see **Figure 3.17-4**).

The proposed bicycle and pedestrian shared-use path would offer a new view for bicyclists and pedestrians of Corpus Christi Bay and the bay front, North Beach, including the Texas State Aquarium and the *Lexington*, the downtown area and the marina. South of the Inner Harbor, the viewshed from the bridge would include Whataburger Field to the west and the bay front and the marina to the east. Further south and facing west the viewshed would include the refineries west of Nueces Bay Boulevard with the Hillcrest neighborhood in the foreground.

Overall, the Orange Alternative would be visually incompatible with the landscape in the Northside neighborhoods where there are sensitive viewers (although existing views are low in quality), while changes in the visual landscape from other viewpoints would be relatively similar to the existing condition. The view from the visually sensitive marina area would remain relatively unchanged, and the bridge would be visible from this vantage point. The view of the city from the facility could be considered to be improved, considering the vantage allowed by the height of the proposed bridge. Regarding the landmark potential of the Orange Alternative, members of both the Technical and Citizens

Advisory Committees likened this alternative to the Green Alternative in that it provides an opportunity to maintain and enhance the iconic status of the Harbor Bridge.

West Alternative

The West Alternative would cross the Inner Harbor approximately one mile west of the existing Harbor Bridge and would remove US 181 and the bridge from the existing viewsheds downtown, in North Beach and in the Washington-Coles neighborhood.

The West Alternative would introduce a major highway interchange into the Hillcrest neighborhood as well as the Oak Park neighborhood on the south side of I-37. Effects to the Oak Park neighborhood would be largely to the areas adjacent to I-37 in the vicinity of Nueces Bay Boulevard. From viewpoints within the Hillcrest neighborhood, the West Alternative would potentially act as visual screen of the adjoining refinery operations, although in many respects the refineries adjacent to Nueces Bay Boulevard would still be visible beyond the West Alternative (see **Illustration 4.20-5**). The West Alternative would replace the strip of open land between the west side of the neighborhood and Nueces Bay Boulevard with a major transportation facility, altering the aesthetic character of that portion of the neighborhood.

Illustration 4.20-5. Rendering of proposed West Alternative from the intersection of W. Broadway Street and Palm Drive, looking west towards the refineries, in the Hillcrest neighborhood.

The alignment of the West Alternative would remove the view of the bridge from office workers in the majority of the downtown area (see **Figure 3.17-5**). Moving the alignment to the west, however, would make the bridge and elevated approaches more highly visible for industrial workers in the refinery operations and areas of the Port. These viewers are expected to have a low to moderate degree of sensitivity to changes in the landscape.

The view of the bridge would likely be removed or relegated to a far background view from the viewshed of tourists in the downtown area. These viewers would utilize the bridge, however, to access tourist attractions in the North Beach area. Although tourists would have high exposure to changes in the visual landscape of the downtown area, these viewers are expected to have only moderate sensitivity to changes in the landscape. Under the West Alternative, the bridge would not be visible from the marina area. Changes in the visual environment for this viewer group are expected to be moderate to high.

Similarly, the existing bridge would no longer be visible to viewers in boats on the Corpus Christi Bay. These viewers would have a reduced view of the new bridge, which may only be visible intermittently in the background. The restricted access to the Inner Harbor would not allow for recreational boating activities in close proximity to the bridge, as is the case under the existing condition.

Viewsheds *from* the roadway of the West Alternative would not include downtown, the bay front and marina area, and the North Beach area, including the Aquarium and *Lexington*. Instead the viewsheds to the east would include the Northside neighborhoods with the downtown area, the SEA District and Corpus Christi Bay in the background. Viewsheds to the west would include the Port's Upland Confined Placement Areas north of the Inner Harbor, the refineries west of Nueces Bay Boulevard and the industrial areas along the Inner Harbor.

In summary, the West Alternative would have a moderate effect on the visual environment of sensitive neighborhood viewers, considering the relatively low existing visual quality of the Hillcrest area. The West Alternative, however, would remove a landmark view from visually sensitive areas like the marina and the bridge would no longer be visible from many other areas downtown. Members of the Technical and Citizens Advisory Committees agreed in large measure that the alignment of the West Alternative would be too far west to be a landmark in the manner of the existing bridge and that it would not be able to contribute to the skyline, an important factor in the identity of Corpus Christi.

4.20.2 Impacts of the No Build Alternative

The No Build Alternative would not change the existing visual and aesthetic qualities in the project area. The Harbor Bridge would continue to be a local landmark and an icon in the Corpus Christi skyline. The lights on the bridge are an important feature of the night skyline for Corpus Christi and they would remain on the bridge if the No Build Alternative were selected.

4.20.3 Summary of Visual and Aesthetic Impacts

Relative to the existing visual and aesthetic qualities of the project area, the Green Alternative would have the least effect while the Orange Alternative would have the greatest effect. In similar fashion, the Green Alternative has the greatest potential to maintain and enhance the landmark status of the bridge and contribute to an iconic skyline for the city. The West Alternative has the least potential to be recognized as a landmark bridge and to contribute to an iconic city skyline. The Red Alternative (the Preferred Alternative) would affect the visual quality of the residential areas in the Northside community and would be shifted away from the downtown area and the marina and bayfront areas. These effects are generally considered moderate. The Red Alternative would still be able to convey a landmark feel for the city, although to a lesser degree relative to the Green or Orange Alternatives which remain at or near the bayfront.

4.21 ENERGY REQUIREMENTS

4.21.1 Impacts of the Build Alternatives

Energy requirements associated with the build alternatives would include activities associated with the construction, operation, and maintenance of US 181 and the Harbor Bridge and are primarily related to the amount of petroleum required to conduct these activities. Consumption of energy would occur during the construction phase of the proposed project (short-term) and after the completion of the proposed project by users of the new facility (long-term). These short-term and long-term energy requirements are considered in the sections that follow along with potential conservation measures to consider to offset these energy requirements.

4.21.1.1 Short-Term Requirements

Short-term energy requirements would include the consumption of energy during petroleum-dependent activities such as operation and maintenance of equipment used to construct any of the proposed build alternatives, resource extraction for the production of concrete and fabrication of materials to build the highway and the bridge. Short-term requirements would also include energy-consuming travel to work by individuals employed for the construction of the proposed facility as well as temporary increases in travel time due to any rerouting of vehicular traffic during the construction phase. With construction limit distances of 5.67 miles, 6.48 miles, and 6.35 miles, construction of the Green, Red, and Orange alternatives, respectively, would have similar energy requirements during construction. With a limit of construction distance of 8.2 miles and an expected longer duration of construction, the West Alternative is expected to have greater short-term energy requirements relative to the other build alternatives.

4.21.1.2 Long-Term Requirements

Long-term energy requirements associated with the proposed project would be primarily related to vehicle operation during use and maintenance of the facility. Energy consumption related to use of the proposed facility would be dependent on travel efficiency, which includes variables such as roadway geometry, surface conditions, weather conditions, and traffic flows. With the reduction in future projected levels of traffic congestion and improved mobility on US 181, the energy-consuming activities

of the build alternatives would be less than those for the No Build Alternative. In addition to a long-term decrease in energy consumption, any of the proposed build alternatives would be expected to result in a net savings of operational energy when compared to the No Build Alternative due to the correction of geometric and design deficiencies of the existing facility (a reduction in vertical grade, elimination of sharp horizontal curves, and the addition of shoulders) and by maximizing the long-term operability of the structure through the use of non-corrodible materials that would limit the extent, frequency, and cost of energy-consuming maintenance. Additional energy requirements over the long-term for the proposed alternatives, including the No Build, would include lighting.

Traffic studies conducted for the proposed project (URS Corporation 2013a) suggest that for the build alternatives, US 181 is projected to operate at LOS B for either a.m. or p.m. commutes in the year 2043.

4.21.2 Impacts of the No Build Alternative

The No Build Alternative would require less energy consumption in the short-term, although the facility would continue to operate at increasing levels of congestion and inefficiency over the long-term as traffic volumes increase. According to the modeling conducted for the proposed project, the No Build Alternative would operate between LOS D and E in 2043 (URS 2013b).

Bridge and roadway maintenance would still apply to this alternative, and energy consumption would be required for these activities.

4.21.3 Potential Conservation Measures

4.21.3.1 Short-Term Conservation Measures

A number of measures would reduce short-term energy consumption during the construction phase of the proposed project for any of the build alternatives. Consideration of the following would be given during construction of the proposed project:

- Reusing and recycling of construction materials;
- Maximizing the use of local materials to reduce hauling;
- Carpooling of workers to and from the jobsite;
- Regular maintenance of equipment to ensure proper working order;
- Reducing energy consumption by turning off equipment and vehicles when not in use;
- Minimizing stops and delays by efficient routing of trucks to and from the jobsite and utilizing off-peak travel times to maximize fuel efficiency;
- Minimizing the need for artificial lighting by scheduling construction during daytime hours to the extent practicable; and
- Implementing maintenance of traffic plan in a manner that minimizes lengthy detours or delays for motorists.

4.21.3.2 Long-Term Conservation Measures

In addition to the short-term strategies outlined above, implementation of any of the build alternatives would:

- Encourage bicycle and pedestrian travel through the incorporation into the design of safe, shared-use facilities;
- Improve highway operations by updating the facility to current design standards effectively reducing congestion and improving fuel efficiency; and
- Address identified transportation deficiencies with the existing Harbor Bridge and US 181 facilities by maintaining the long-term operation of a US 181 crossing of the Corpus Christi Ship Channel.

4.22 CONSTRUCTION IMPACTS

This section discusses the temporary effects associated with the construction of the proposed build alternatives and demolition of the existing facility, including the Harbor Bridge and the paved roadways and other bridges that constitute the proposed improvements. Since the No Build Alternative would not involve any project-related construction or demolition, discussions here are focused on the build alternatives. Typically, construction effects of a disruptive nature are dependent on the type and location of proposed construction activities and the duration of the construction process from initiation to completion. The contractor will be required to prepare a demolition plan acknowledging the commitment to avoidance and minimization of impacts noted in this section and **Section 9.0** of the Draft EIS.

4.22.1 Transportation Impacts—Construction Phase

Construction activities necessary for the implementation of any of the build alternatives would temporarily affect existing transportation facilities within the project area, as described below. To allow for vehicles to continue utilizing the Harbor Bridge to cross the Inner Harbor during construction, the new bridge would be built first and opened to traffic before the old bridge was removed. The highway elements of the proposed project would likewise be constructed while traffic continued to use the existing facilities. In this way, traffic disruptions and other user impacts would be minimized.

All of the proposed build alternatives would similarly and temporarily affect ground transportation during the construction phase. Temporary effects would include traffic delays and work-zone congestion that could disrupt travel patterns for local residents and businesses for the duration of construction—estimated to be approximately three years. Mitigation measures, such as maintenance of traffic plans, would be implemented to address user impacts including work-zone safety and traffic delays. Access for police, fire, and emergency vehicles would be maintained during construction; details would be developed in a maintenance of traffic plan to be implemented for the proposed project.

4.22.1.1 Green Alternative

Construction of the Green Alternative would affect traffic along US 181 from approximately Beach Avenue to Surfside Boulevard in the North Beach area and from Port Avenue to I-37 south of the Inner Harbor. Traffic disruption would also be expected along I-37 from Buddy Lawrence Drive to North Shoreline Boulevard and along the Crosstown Expressway from I-37 to Laredo Street. Due to their proximity to the construction zone for the Green Alternative access to and from North Beach residences and businesses, the SEA District and downtown, and the city and county offices along Leopard Street would all likely be affected temporarily during construction.

4.22.1.2 Red Alternative (Preferred)

Construction of the Red Alternative (the Preferred Alternative) would affect traffic along US 181 from Beach Avenue to East Navigation Boulevard in the North Beach area. Traffic disruption would also be expected south of the Inner Harbor from Port Avenue to I-37, from Baymoor Boulevard to North Carrizo Street along I-37, and along the Crosstown Expressway from I-37 to Laredo Street. North of I-37, traffic delays and disruption of travel patterns would be expected along Winnebago and Lake Streets. Due to their proximity to the construction zone of the Red Alternative, access to and from North Beach residences and businesses, the SEA District and downtown, city and county offices along Leopard Street, and neighborhoods in the Northside community would all likely be affected temporarily during construction.

4.22.1.3 Orange Alternative

Construction of the Orange Alternative would affect traffic along US 181 from Beach Avenue to Surfside Boulevard and along West Causeway Boulevard from Elm Street to Beach Avenue in the North Beach area. South of the Inner Harbor traffic disruption would be expected along US 181 from Port Avenue to I-37, along I-37 from Baymoor Boulevard to North Carrizo Street, and along the Crosstown Expressway from I-37 to Laredo Street. Due to their proximity to the construction zone for the Orange Alternative access to and from North Beach residences and businesses, the SEA District and downtown, city and county offices along Leopard Street, and neighborhoods in the Northside community would all likely be affected temporarily during construction.

4.22.1.4 West Alternative

Construction of the West Alternative would affect traffic along US 181 from Beach Avenue to Burleson Street and along West Causeway Boulevard from Beach Avenue to Walnut Street in the North Beach area. Traffic disruption would also be expected south of the Inner Harbor along I-37 from Buddy Lawrence Drive to Shoreline Boulevard, and along the Crosstown Expressway from I-37 to Comanche Street. Additional disruption would occur along North Broadway Street from Taylor Street to Harbor Drive. Due to their proximity to construction zone for the West Alternative, access to and from North Beach residences and business, the SEA District and downtown, city and county offices along Leopard Street and residences and businesses along the Crosstown Expressway from I-37 to Comanche Street would all likely be affected temporarily during construction.

4.22.2 Navigation Impacts—Construction Phase

During construction of the West Alternative, access to the UCPA would likely be restricted at times, potentially affecting maintenance dredging of the ship channel by the USACE. During Participating Agency coordination with TxDOT, the Corpus Christi Resident Office of the USACE Galveston District indicated that there is a reach of the ship channel not far from the Harbor Bridge that cannot be restricted for navigation. The reach is prone to shoaling and the USACE needs to have access to the UCPA to dispose of dredge material at all times in the event of an emergency shoal. If this need to dispose of dredged material occurred while construction was underway on the UCPA, both the USACE's maintenance operation and TxDOT's construction operation would be jeopardized. Further coordination with the USACE would be required to minimize the likelihood that an emergency situation would arise during construction of the West Alternative.

Navigation impacts during construction of any of the build alternatives, including the West Alternative, would need to be avoided or minimized to the maximum extent practicable. Any temporary restriction of the Inner Harbor due to construction operations would need to be coordinated with the Port of Corpus Christi Authority in advance and would be subject to the navigational requirements of the Port and vessels calling the Port.

4.22.3 Air Quality Impacts—Construction Phase

During the construction phase of this project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation, which is temporary in nature (only occurring during actual construction). However, the potential impacts of particulate matter emissions will be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate.

The construction activity phase of this project may generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary MSAT construction related emissions are particulate matter from site preparation and diesel particulate matter from diesel powered construction equipment and vehicles.

4.22.4 Noise Impacts—Construction Phase

TxDOT (2011c) notes that predicting levels of construction noise for specific or representative location of a noise sensitive area is difficult because of heavy machinery, the major source of noise during construction, is constantly moving in unpredictable patterns. However, construction would occur mainly during daylight hours when people tolerate intermittent loud noise and the duration of exposure to noise for any single location would be short; therefore there are no anticipated disruptions of normal activities due to construction period noise for the build alternatives.

4.22.5 Water Quality Impacts—Construction Phase

The construction phase for any of the build alternatives could potentially affect water quality. These effects include erosion and sedimentation of receiving waters due to soil exposure, stormwater discharges including concrete washout residue, petroleum products, paints and other chemicals used during construction, and accidental spills from construction equipment and material storage. These effects would be minimized by implementing erosion and sediment controls and other pollution prevention measures as part of the required SW3P for the proposed project (refer to **Section 4.11.3** for further information regarding stormwater management requirements for the proposed project). These measures would minimize sediment releases in stormwater runoff, control and clean up petroleum hydrocarbon spills to minimize contamination and control other pollutants from being washed into surface waters during a storm event.

4.22.5.1 Potential Impacts of Construction Over the Upland Confined Placement Area

Construction of a portion of the West Alternative through the Port of Corpus Christi's UCPA raises potential water quality issues. The UCPA covers approximately 350 acres north of the Inner Harbor and west of the existing US 181 alignment.

As noted in **Section 3.8.1.4**, the sediment and water quality in the UCPA and the Inner Harbor were addressed in the Final EIS for the Port's proposed channel improvement project (USACE 2003). Water and sediment quality data collected at regular intervals by the USACE in all reaches of the proposed channel were reviewed and compared with Texas Water Quality Standards. Although the sampling data did not indicate impairment under State standards, it did indicate the presence of constituents, including metals and organic compounds, above detection limits in samples of water and elutriates (constituents that are dissolved into the water column). Due to concerns about contaminants, maintenance materials dredged from the Inner Harbor are recommended by the USACE to be placed in the existing UCPA.

The USACE also noted that, for most metals in most of the system, including the Inner Harbor, concentrations are declining; the elutriate analysis performed for the USACE's Final EIS showed no indications of concerns (USACE 2003). The Final EIS stated that sampling of any future project maintenance material will be routinely conducted to determine sediment quality prior to actual dredging (USACE 2003).

Roadway construction activities associated with the West Alternative within the UCPA could result in surface disturbances that increase the concentration of sediments in stormwater runoff, particularly Total Suspended Solids (TSS). TCEQ's Section 401 certification of such discharges limits TSS

concentrations to 300 mg/L.[9] Compliance with this requirement could require additional BMPs during the construction phase and oversight of stormwater discharges from the UCPA during the construction and operational phases.

4.22.6 Natural Resources Impacts—Construction Phase

Temporary impacts to natural resources due to construction could result from the implementation of any of the proposed build alternatives and include disturbances, including hydrologic disturbances, to wildlife and vegetative communities. Implementation of any of the build alternatives would involve the removal of grasses, trees and shrubs during the construction phase, affecting the natural, erosion-inhibiting ground cover and resulting in the loss of habitat for both resident and migratory species. Disturbed areas would be restored, reseeded, and recontoured as necessary according to TxDOT specifications, making these effects largely temporary.

While impacts to other project-area vegetation types would be similar for all the build alternatives, construction of the West Alternative would directly impact approximately 0.71 acres of black mangrove habitat and would necessitate onsite mitigation in accordance with Provision (4)(A)(ii) of the TxDOT-TPWD MOA (see **Section 4.15.1.1**). Further, during construction of any of the build alternatives, the hydrology of wetland areas would be temporarily altered due to compaction of soils, changes in topography, and divergence of drainage and tidal flow, potentially affecting flood control functions temporarily. Following construction, hydrology would return to pre-construction conditions with minor adjustments due the necessary relocation of existing stormwater drainage ditches along the US 181 frontage roads.

The proposed construction and demolition activities may affect a number of threatened and endangered species as described in **Section 4.16.1.2**. These include the Atlantic hawksbill sea turtle, Green sea turtle, Kemp's Ridley sea turtle, Leatherback sea turtle, Loggerhead sea turtle, and the West Indian manatee. Protections for these species are proposed (in **Section 4.16.1.2**) and the proposed project is not likely to adversely affect any of these species.

[9] The USACE Galveston District has established a Regional General Permit which specifically addresses the Port of Corpus Christi dredged material disposal areas. The permit states: "The material must be placed in a Corps disposal area, including No. 1, Number 6, Rincon, South Shore Cells A, B, C, and Suntide, or in an upland disposal area, as determined by the Corps." Special condition (k) of the permit states: "Prior to the performance of hydraulic dredging, the permittee will obtain a Section 401-water quality certification from the Texas Commission on Environmental Quality for the effluent or return water" (Regional General Permit SWG-2002-02405 (12/3/08) "To maintenance dredge existing authorized facilities in the Corpus Christi Ship Channel, and the Rincon Channel, from the Corpus Christi Ship Channel, to and including Canals A and B."). Another condition of the Regional General Permit is that return water flows are to be discharged to the waterbody from which the material was dredged.

TCEQ's Section 401 water quality certification clarifies the application of NWP 16 in Texas:
"NWP 16 should be limited to the return water from upland contained dredged material disposal areas…**.** TCEQ understands dredged material to be associated with navigational dredging activities, not commercial [industrial and construction sand and gravel] mining activities." TCEQ conditionally certifies NWP 16 "…for return water from confined upland disposal not to exceed a 300 mg/L Total Suspended Solids (TSS) concentration…" (TCEQ letter to USACE, April 5, 2012). the return water from upland contained dredged material disposal areas…. TCEQ understands dredged material to be associated with navigational dredging activities, not commercial [industrial and construction sand and gravel] mining activities." TCEQ conditionally certifies NWP 16 "…for return water from confined upland disposal not to exceed a 300 mg/L Total Suspended Solids (TSS) concentration…" (TCEQ letter to USACE, April 5, 2012).

4.23 RELATIONSHIP OF LOCAL SHORT-TERM USES VS. LONG-TERM PRODUCTIVITY

Implementation of the proposed project would result in a number of short-term and long-term effects to surrounding populations and the environment. Short-term refers to the temporary phase of construction, while long-term refers to the operational life of the proposed project. The temporary operation of construction equipment would have short-term effects including increases in noise levels, traffic delays and work-zone congestion, elevated dust and hydrocarbon emissions and potential sedimentation of surface waters due to erosion from the exposed construction site. These effects would be localized and minimized through erosion and sedimentation controls, noise abatement controls and construction emission abatement measures.

Other short-term effects include residential and business displacements resulting from right of way acquisition; the number of displacements would vary depending on the alternative as described in **Section 4.4**. Effects to displaced residents would be minimized by TxDOT's RAP designed to ensure that decent, safe, and sanitary dwellings are made available to all eligible individuals and families displaced as a result of the proposed project. Additionally, the RAP would assist owners of displaced businesses through the reimbursement of various moving expenses.

Any of the build alternatives, if implemented, would support long-term productivity in the area by improving safety and providing a long-term solution to the crossing of the Corpus Christi Inner Harbor. Additionally, providing transportation infrastructure to support economic development and improve connectivity to the local roadway network would benefit long-term productivity in the area

The No Build Alternative would not involve the short-term uses described for the build alternatives but would also not support the long-term productivity in the area as well as the build alternatives would. The No Build Alternative would involve more frequent and costly maintenance of the existing Harbor Bridge and the eventual reconstruction or replacement of the fracture-critical structure at a higher cost in terms of future dollar value. The No Build Alternative would also involve increased traffic delays due to increasing traffic volumes and operational deficiencies of the existing facility, including the lack of shoulders on the existing bridge.

4.24 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section describes the irreversible and irretrievable commitments of resources associated with implementing the proposed project. As defined by the CEQ, irreversible and irretrievable resource commitments are nonrenewable resources whose use during a project may be irreversible if their use or removal occurs and cannot be replaced within a reasonable time frame. An "irreversible commitment of resources" occurs when once committed, either directly or indirectly, to a proposed project and/or its components, the resource continues to be committed to that project throughout the life of the project and/or its resulting components. An "irretrievable commitment of resources" refers to those resources that, once used, consumed, destroyed, or degraded during construction, operation, or decommissioning of a project and/or its components would cause the resource to be unavailable for future utilization.

4.24.1 Impacts of the Build Alternatives

Implementation of any of the build alternatives would involve the commitment of natural, human, physical, and fiscal resources.

4.24.1.1 Land Use

Land to be acquired in the implementation of the proposed project would irreversibly commit these resources for the foreseeable future while the land is in use for the proposed project. This would include land in various uses outside the existing state-owned right of way that would be converted to transportation use over the long-term. It is anticipated that portions of this land could, if the need arises or if the proposed facility is no longer needed, be converted to other uses. The amount of land to be used by each proposed build alternative is summarized in **Table 4.1-1** (refer back to **Section 4.1.1**).

4.24.1.2 Waters of the U.S., including Wetlands

All the proposed build alternatives would permanently impact waters of the U.S., including tidal fringe wetlands within the footprint of the proposed project, resulting in the irreversible commitment of these valuable resources. **Table 4.13-1** (refer back to **Section 4.13.1.1**) summarizes the amount of waters of the U.S., including wetlands, that would be permanently impacted by the proposed project. It should be noted that these losses would be subject to compensatory mitigation through the Clean Water Act Section 404 permit process, and the long-term effect would therefore be offset.

4.24.1.3 Wildlife Habitat

All the proposed build alternatives would permanently impact wildlife habitat within the footprint of the proposed project. **Table 4.15-1** (refer back to **Section 4.15.1**) summarizes the amount of wildlife habitat that would be permanently impacted by the proposed project. In addition, the Red and West Alternatives would also permanently impact Essential Fish Habitat (see **Section 4.16.1.3** for a description of these impacts). These impacts would represent an irretrievable commitment of these valuable resources over the life of the proposed facility.

4.24.1.4 Cultural Resources

Cultural resources (both prehistoric and historic-age) are nonrenewable. An archeological background study conducted for the proposed project noted that there are no documented archeological sites within the proposed footprint of any of the build alternatives (see **Section 3.14.1**). Archeological sites, cultural materials, and/or their context could be lost through accidental discoveries during the construction of any of the build alternatives. Any impacts to these resources would be considered an irreversible and irretrievable commitment.

Additionally, the existing Harbor Bridge facility is eligible for listing in the NRHP as an important Texas metal truss bridge. The Harbor Bridge is considered the most important design work of Texas Highway Department bridge engineer Vigo Miller (Mead & Hunt 2012: 51). The dismantling of the bridge during

the implementation of any of the build alternatives would be an irreversible and irretrievable loss of this important cultural resource.

4.24.1.5 Other Considerations

Large amounts of labor, steel, cement, and rock aggregate are expected to be expended during the construction of any of the proposed build alternatives. While these materials are not retrievable, they currently are not in short supply and their use is not expected to have an adverse effect on their continued availability. Fossil fuels, including gasoline and diesel fuel, would be required for construction of the proposed, although over the long-term, projected decreases in routine and structural maintenance and traffic congestion would offset the short-term energy requirements of the project. (See **Section 4.21.1** for further discussion of project energy requirements). Any of the proposed build alternatives would require a substantial expenditure of state and federal funds for project planning and construction that are not retrievable.

These commitments of resources are based upon the position, supported by state and local plans and policies, that citizens in Corpus Christi and the southwest Texas region would benefit for an extended time period from an improved transportation system. These benefits include improved safety, mobility access, economic opportunity and improved connectivity to the local roadway network. These benefits outweigh the costs required to implement any of the proposed build alternatives.

4.24.2 Impacts of the No Build Alternative

The No Build Alternative would require the irreversible or irretrievable commitment of resources during the routine maintenance of the Harbor Bridge and the US 181 facility. These commitments would be relatively minor compared to the commitments that would need to be made for the build alternatives. Although the expenditure of public funds to maintain the existing fracture-critical bridge would be substantial over the long-term, the No Build Alternative would not involve the irreversible and irretrievable commitment of natural and cultural resources, or other resources required to construct the project.