

Broadway Corridor Development Plan

Corridor Connections: Analysis of Walnut One-Way Pair and Mykawa to Veterans Connections

PEARLAND, TEXAS

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Prepared for: City of Pearland
and Pearland Economic Development Corporation

Prepared by:

Kimley»Horn

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WALNUT STREET ANALYSIS

INTRODUCTION

TxDOT's plan to widen Broadway terminates approximately 0.75 miles west of SH 35 between Johnston Street and McLean Road/Halbert Drive. Although SH 35 is a logical end point for the project, widening Broadway to six lanes east of McLean Road (through Old Town) was not further evaluated by TxDOT after initial considerations of social and environmental impacts. As traditional widening between McLean Road and SH 35 is considered environmentally costly, other potential corridor connections were developed to improve mobility near Broadway at SH 35. The purpose of the Walnut Street Analysis is to develop and evaluate roadway alternatives aimed at improving mobility along Broadway.

ROADWAY CONFIGURATION ALTERNATIVES

An evaluation of schematic and alternative roadway configurations along Broadway Street and Walnut Street from McLean Road to Barry Rose Road was prepared. An aerial of the Walnut Analysis study area is provided as **Figure 1**. In addition to schematic roadway configurations (per TxDOT Environmental Assessment), three alternative configurations were developed based on discussions with City of Pearland staff. For purposes of this analysis, roadway configuration refers primarily to number of through lanes, direction of traffic flow, and roadway grade (elevation) along Broadway Street and Walnut Street. Roadway configurations evaluated as part of this analysis are provided as **Figures 2 – 5** and are described briefly as follows:

TxDOT Schematic Widening

- West of McLean Road, Broadway Street is six-lane roadway with two-way operation
- East of McLean Road Broadway Street is four-lane roadway with two-way operation
- Walnut Street is two lane-lane roadway with two-way operation

Extend Widening to SH 35

- West of SH 35, Broadway Street is six-lane roadway with two-way operation
- East of SH 35, Broadway Street is four-lane roadway with two-way operation
- Walnut Street is two lane-lane roadway with two-way operation

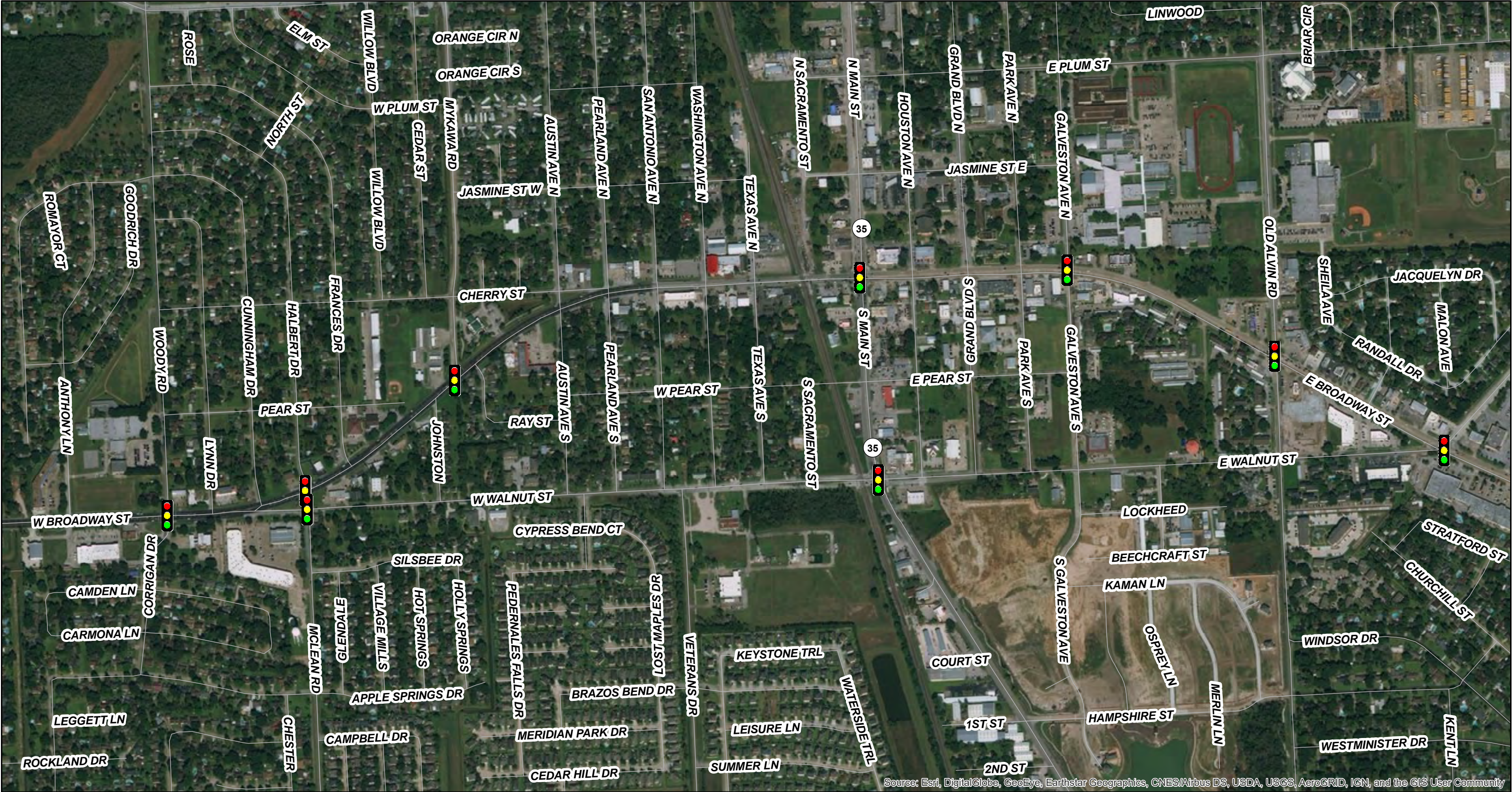
One-Way Couplet

- West of McLean Road, Broadway Street is six-lane roadway with two-way operation
- East of McLean Road Broadway Street is three-lane roadway with one-way operation
- Walnut Street is three-lane roadway with one-way operation (to Barry Rose Road)

Two-Lane Elevated Bypass

- West of McLean Road, Broadway Street is six-lane (at-grade) roadway with two-way operation
- Between McLean Road and Old Alvin Road, Broadway Street has two-way operation and is four-lane roadway (at-grade) and two-lane roadway (above grade)
- East of Old Alvin Road, Broadway Street is four-lane (at-grade) roadway with two-way operation
- Walnut Street is two lane-lane roadway with two-way operation

FIGURE 1 - AERIAL



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

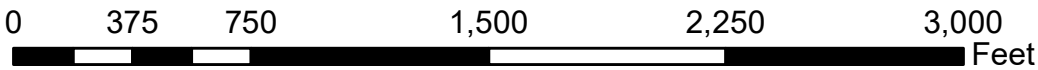
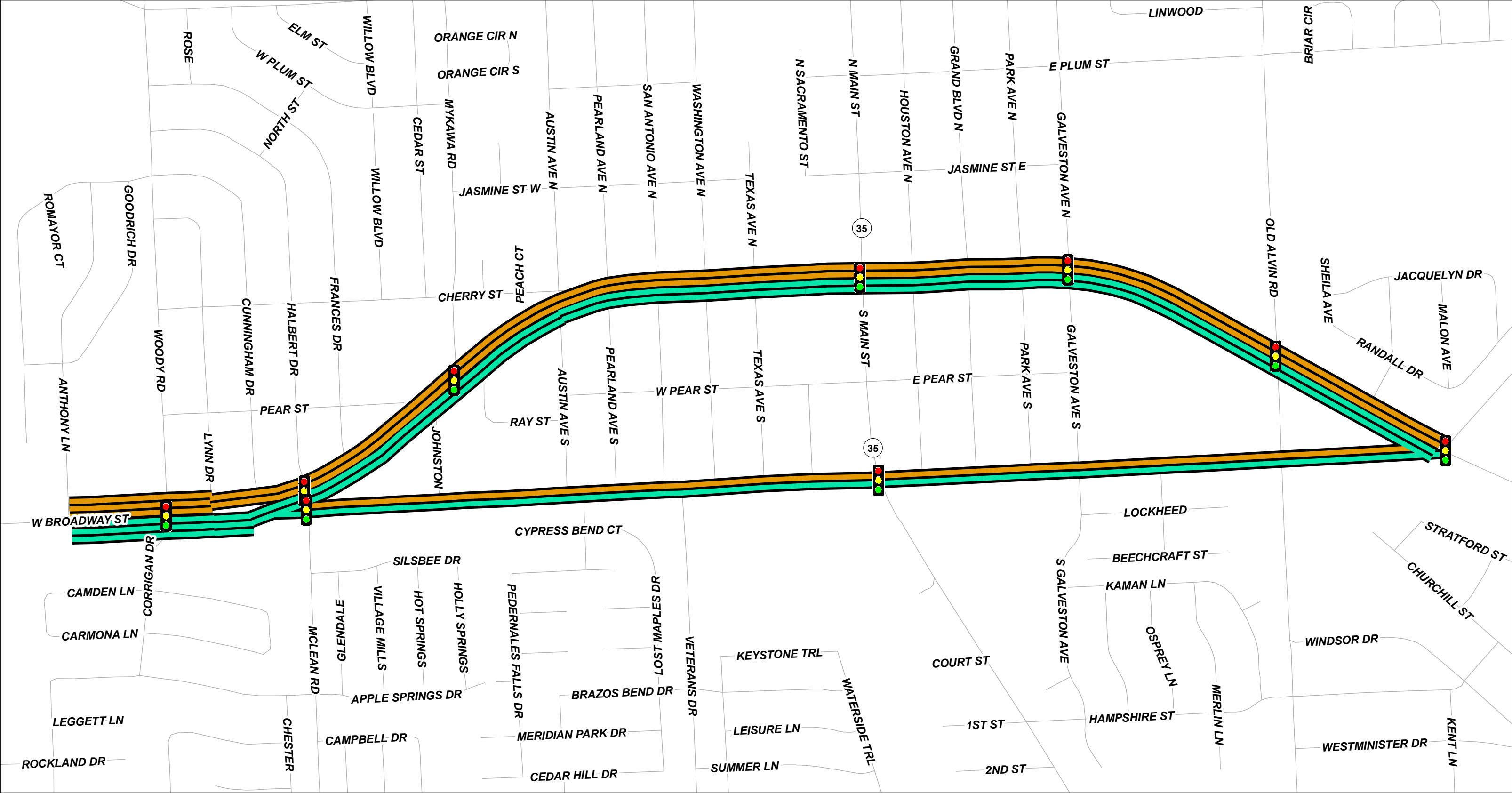








FIGURE 2 - TXDOT SCHEMATIC



- | | | | |
|--|--------------------------------|---|--------------------------------|
|  | Westbound travel |  | One lane (single direction) |
|  | Eastbound travel |  | Two lanes (single direction) |
|  | Elevated lane (bi-directional) |  | Three lanes (single direction) |

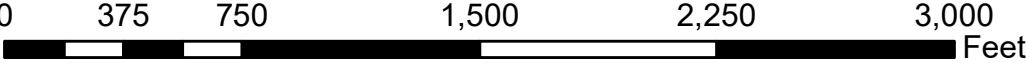


FIGURE 3 - EXTEND WIDENING TO SH 35

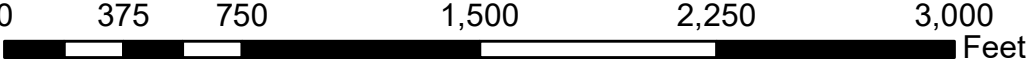
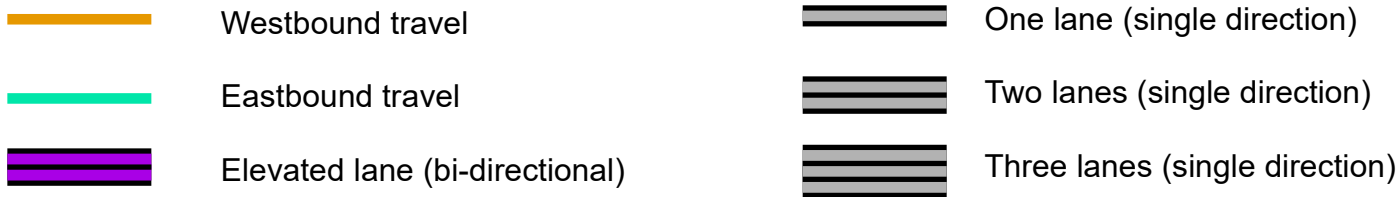
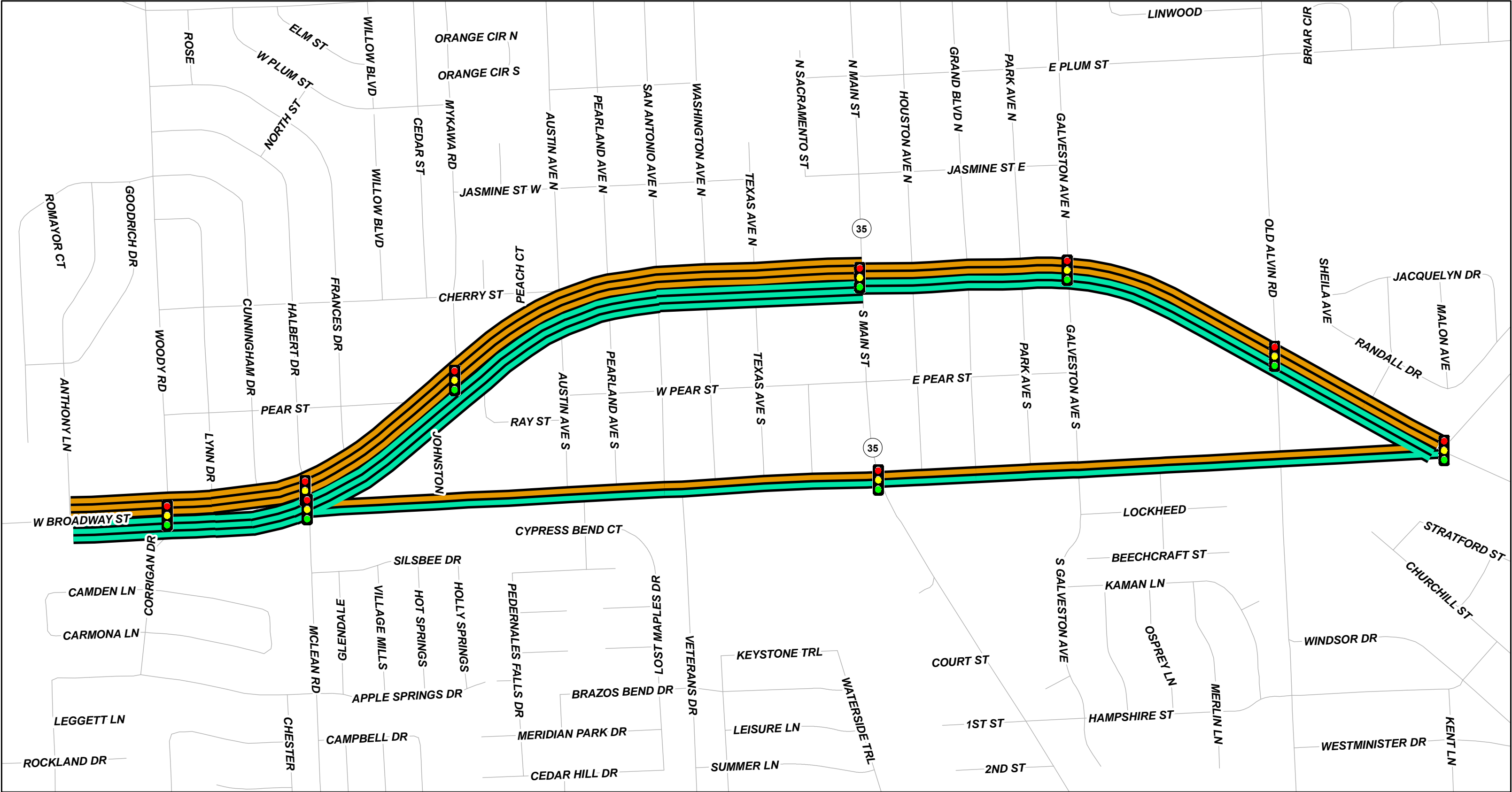


FIGURE 4 - ONE-WAY COUPLET

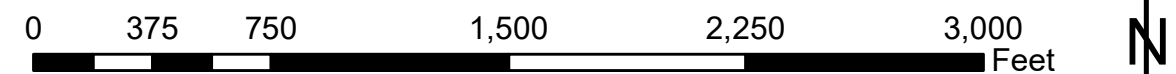
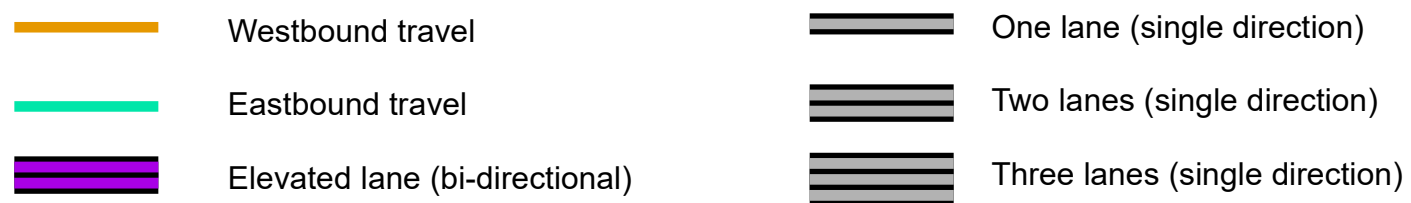
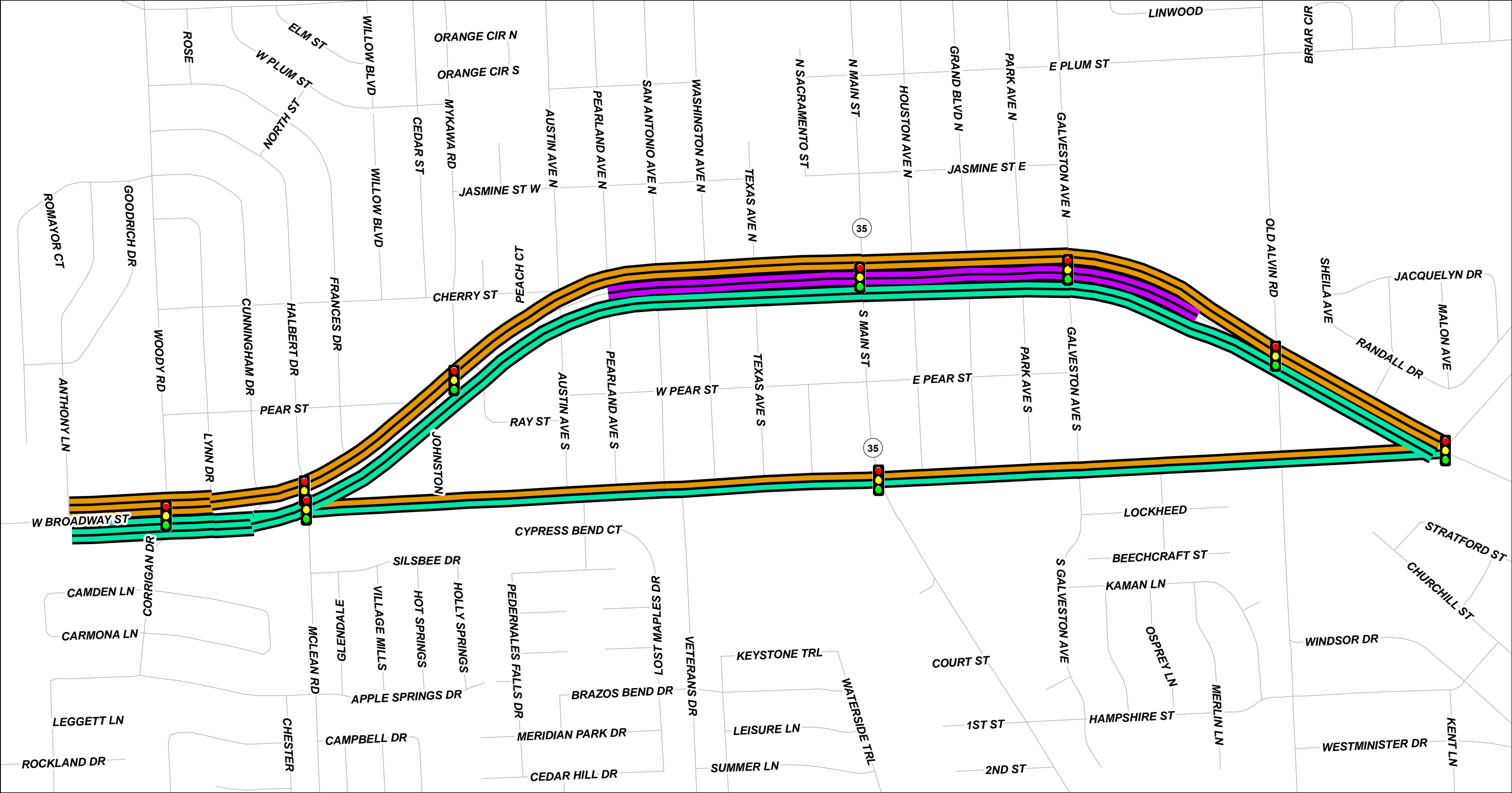


FIGURE 5 - TWO-LANE ELEVATED BYPASS



ALTERNATIVE EVALUATION

Schematic and alternative roadway configurations were qualitatively evaluated based on criteria defined below. Evaluation results describing the anticipated benefits and costs of each alternative are provided as **Table 1**.

- Safety, in terms of, roadway geometry and driver expectancy
- Mobility, in terms of, travel speed, roadway capacity, and intersection capacity
- Access, in terms of, adjacent property entry/exit points, local trip distance, and local circulation
- Property Impacts, in terms of, social, environmental and historic property impacts
- ROW cost, in terms of, price and intensity of ROW expected to be purchased
- Construction cost, in terms of, price of materials to construct improvements
- Development potential, in terms of, associated economic benefits

Table 1 – Roadway Configuration Evaluation

Alternative	TxDOT Schematic	1) Extend Widening	2) One-Way Couplet	3) Elevated Bypass
Description	Discontinue Broadway widening at Halbert, Walnut to remain as-is	Continue Broadway widening to SH 35, Walnut to remain as-is	Widen Broadway west of Halbert, between Halbert and Barry Rose Broadway is three lanes westbound and Walnut is three lanes eastbound	Between Halbert Drive and Old Alvin Road, Broadway Street has two-way operation and is four-lane roadway (at-grade) and two-lane roadway (above grade)
Safety	Merge, no access management	No merge, installed access management	Two-to-one-way conversion, introducing uncommon operation,	High speeds, introducing uncommon operation
Mobility	No increased capacity	Increased capacity	Increased capacity, fewer phases at traffic signals	Increased capacity
Access	No access management	Restricted access (raised median)	Limits access, increases trip distance	Access controlled
Property Impacts	No ROW required	50' ROW required	No ROW required	100' ROW required
ROW Cost	No ROW required	50' ROW required	No ROW required	100' ROW required
Construction Cost	No improvement	Widening Broadway	Reconstructing Broadway, widening Walnut	Elevated structure, widening Broadway
Development Potential	None	Increased volume	ROW made available for social/aesthetic improvements	None

Based on this limited analysis, the Broadway-Walnut one-way couplet (Walnut Street as three-lanes eastbound and Broadway as three-lanes westbound) is the preferred alternative due to anticipated benefits to traffic operations and minimal impacts to ROW.

Legend	
Icon	Description
	Very Poor
	Poor
	Adequate
	Good
	Very Good

VETERANS TO MYKAWA CONNECTION ANALYSIS

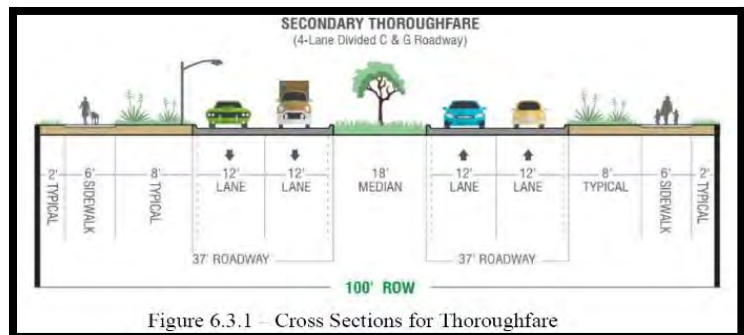
INTRODUCTION

City of Pearland's Thoroughfare Plan, excerpt provided as **Figure 6**, includes a north-south connection between Veterans and Mykawa. Currently, Veterans terminates at Walnut Street approximately 0.25 miles west of SH 35 between San Antonio and Washington Avenue. Similarly, Mykawa Road terminates at Broadway Street approximately 0.50 miles west of SH 35 between Johnston Street and Ray Street. Connecting Veterans to Mykawa would provide a continuous north-south route throughout Pearland and provide congestion relief to SH 35 and other adjacent north-south thoroughfares. The purpose of the Veterans to Mykawa Connection Analysis is to develop and evaluate roadway connections between Veterans and Mykawa.

Figure 7 - City of Pearland's Thoroughfare Plan Excerpts



Figure 6 - City of Pearland's Secondary Thoroughfare Cross Section

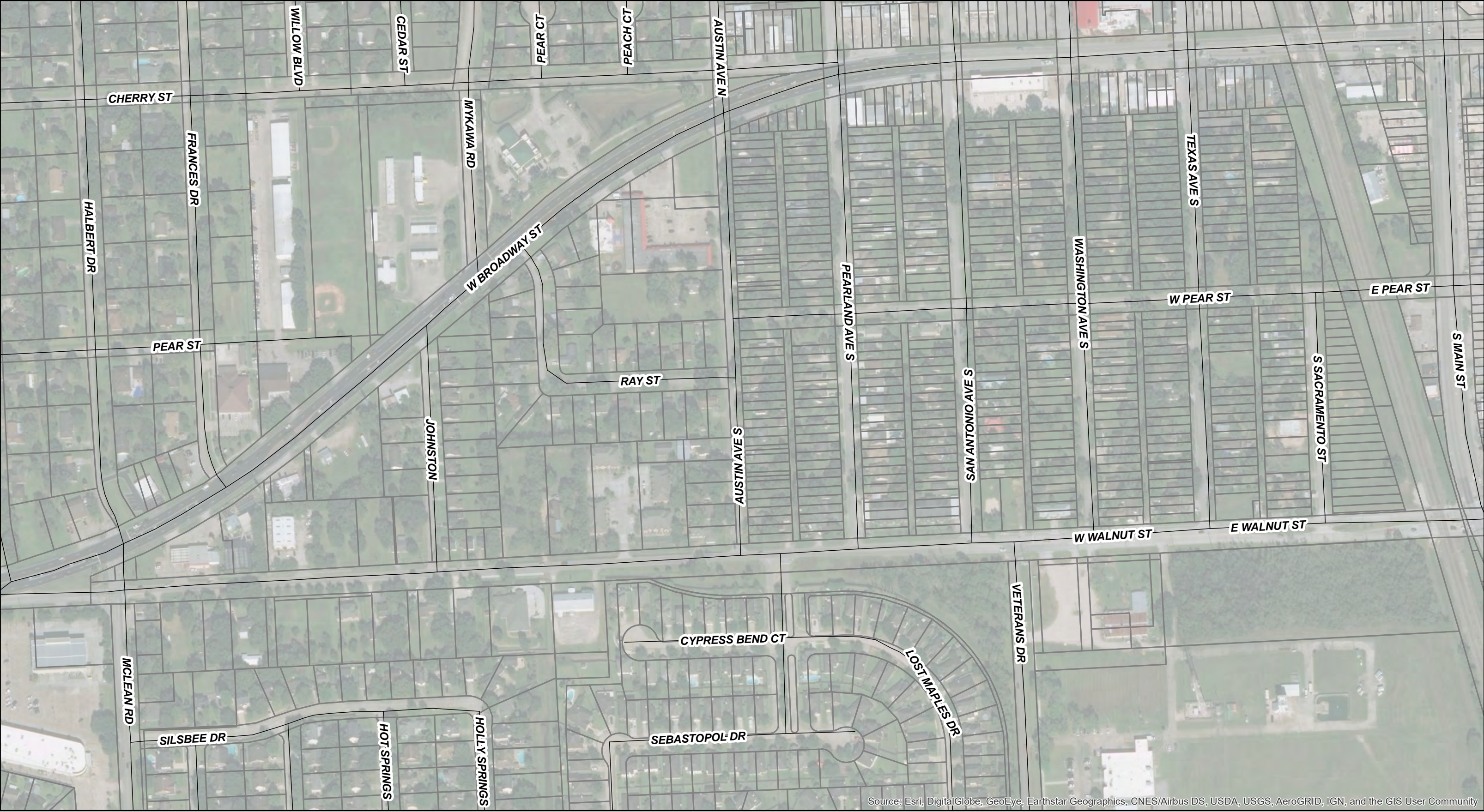


ROADWAY ALIGNMENT ALTERNATIVES

Three roadway alignments were developed based on discussions with City of Pearland staff which connect Veterans to Mykawa. For planning purposes, a 100-foot ROW was assumed for all alignments to allow for a 5-lane cross-section such as Pearland's Secondary Thoroughfare (**Figure 6**). An aerial of the evaluation study area is provided as **Figure 8** and roadway alignment concepts are provided in subsequent figures. The following is a brief description of each alternative:

- **S-Curve:** Reverse (back-to-back) right angle curves connecting Veterans to Mykawa (**Figure 9**)
- **Dual Roundabout:** Extend Mykawa to Walnut and construct roundabout, construct another roundabout at intersection of Veterans at Walnut (**Figure 10**)
- **North-South Extensions:** Extend Mykawa to Walnut, widen San Antonio between Walnut and Broadway to extend Veterans (**Figure 11**)

FIGURE 8 - AERIAL



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

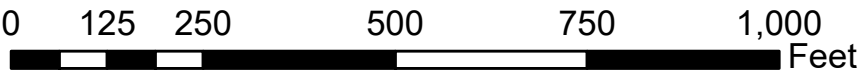


FIGURE 9 - S-CURVE

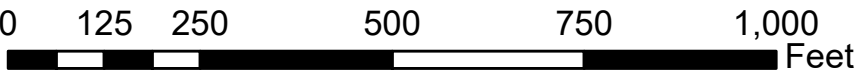


FIGURE 10 - DUAL ROUNDABOUT

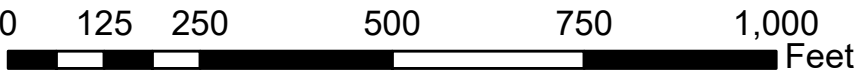
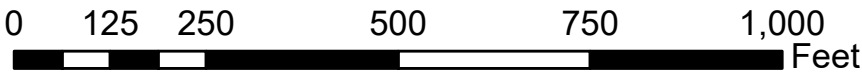


FIGURE 11 - NORTH-SOUTH EXTENSIONS








ALTERNATIVE EVALUATION

Roadway alignments were quantitatively evaluated based on ROW impacts. ROW impact evaluation results are provided as **Table 2**. Additionally, alignments were qualitatively evaluated based on safety, mobility, and access. Qualitative evaluation results describing the anticipated benefits and shortcomings of each alternative are provided as **Table 3**.

Table 2 – Roadway Alignment Evaluation (ROW Impacts)

Metric	Unit	S-Curve	Dual Roundabout	North-South Extensions
ROW Width	Feet	100	100	100
Centerline Length	Feet	2,794	2,866	2,591
Roadway ROW	Square Feet	279,385	286,569	259,115
Proposed ROW Acquisition (Actual)	Square Feet	105,037	91,016	121,489
Parcels Impacted (Takings)	Square Feet	112,389	120,716	156,622
Residential Parcels Impacted (Takings)	Square Feet	84,621	83,914	118,958
Commercial Parcels Impacted (Takings)	Square Feet		2,497	-
Gov/Med/Edu Parcels Impacted (Takings)	Square Feet	17,372	17,421	17,421
Other Parcels Impacted (Takings)	Square Feet	10,397	16,885	20,243
Parcels Impacted	Number	26	31	112
Residential Parcels Impacted	Number	19	25	104
Commercial Parcels Impacted	Number		1	-
Gov/Med/Edu Parcels Impacted	Number	3	2	2
Other Parcels Impacted	Number	4	3	6
Area of Roadway ROW in Floodplain	Square Feet	69,472	51,027	37,891
Percent of Roadway ROW in Floodplain	%	25%	18%	15%

Table 3 – Roadway Alignment Evaluation (Qualitative Criteria)

Alternative	1) S-Curve	2) Dual Roundabout	3) North-South	Legend	
Safety	Unsignalized, stopping sight distance concerns	Fewest conflict points, slower speeds	Signalized	Icon	Description
					Very Poor
					Poor
					Adequate
					Good
					Very Good
Mobility	Delay for vehicles continuing along Walnut	Slower Speeds	Indirect connection		
Access	Limited access on curves	Improves circulation	Improves circulation		

Based on the Veterans to Mykawa Connection Analysis, the dual roundabout roadway alignment is the preferred roadway alignment considering ROW impacts and traffic operations.

CONCLUSIONS AND RECOMMENDATIONS

Walnut Street Analysis and Veterans to Mykawa Analysis were performed to evaluate various roadway alternatives aimed at improving mobility near Broadway at SH 35. Roadway alternatives were evaluated prior to the design-phase of TxDOT's Broadway Street widening project such that, if alternatives merited significant design changes, analysis recommendations could be incorporated into TxDOT's design.

Based on the Walnut Street Analysis, the Broadway-Walnut one-way couplet (Walnut Street as three-lanes eastbound and Broadway as three-lanes westbound) is the preferred alternative due to anticipated benefits to traffic operations and minimal impacts to ROW. Based on the Veterans to Mykawa Connection Analysis, the dual roundabout roadway alignment is the preferred roadway alignment considering ROW impacts and traffic operations.

However, the Broadway-Walnut one-way pair and the dual roundabout alignment are not compatible. As these preferred alternatives are mutually exclusive, **further study is recommended to better understand costs/benefits of each improvement prior to influencing TxDOT's design process.** A possible outcome of further study may include steps toward roadway improvements such as:

Short-Term

- COP to begin public engagement efforts regarding roadway improvements east of McLean Road
- City of Pearland (COP) to conduct detailed capacity analysis to determine future roadway improvements
- COP to acquire ROW between Broadway and Walnut street for future Mykawa extension
- TxDOT to widen Broadway from 4 to 6 lanes west of McLean Road
- East of McLean Road, TxDOT to reconstruct Broadway as a five-lane curb and gutter section with access management improvements

Near-Term

- COP to widen Walnut Street to five-lane, divided roadway
- COP to extend Mykawa to Walnut Street
- COP to construct roundabout at intersection of Walnut at Mykawa
- COP to construct roundabout at intersection of Walnut at Veterans

Long-Term

- COP to monitor congestion along Broadway near SH 35 to determine if 6-lanes of capacity is needed (>50,000 vehicles per day)
- COP to install one-way couplet: Walnut Street as three-lanes eastbound and Broadway as three-lanes westbound