



BROADWAYST

Corridor Development Plan SH 288 to SH 35

Prepared for



Prepared by

Kimley»Horn

HAWES HILL & ASSOCIATES
LLP



EXECUTIVE SUMMARY

In October 2012, the Pearland Economic Development Corporation (PEDC), along with local partners in government, education, healthcare, and business embarked upon a long-term strategic community and economic development planning process to create a shared vision of the community's future growth and an action plan to achieve it. One of the main strategies outlined in the Pearland 20/20 Strategic Plan is to optimize the development potential of Pearland's principal commercial corridors. As one of the three major corridors addressed in the recently completed Pearland Prosperity Community Strategic Plan, and its predecessor, the Pearland 20/20 Strategic Plan, the Broadway corridor, the Broadway corridor has the capacity to support additional businesses and the potential to be a vibrant and visually appealing space that stimulates investment from private business. Building upon objectives of the Strategic Plan, this corridor development plan (CDP) aims to:

- ▶ Facilitate and plan for the impact of the road's reconstruction and widening
- ▶ Improve corridor aesthetics to create image and sense of place
- ▶ Assess current and future market potential
- ▶ Identify development opportunities within targeted areas
- ▶ Evaluate the Veterans to Mykawa connection and Walnut one-way pair

Pearland is growing rapidly and transportation infrastructure improvements are needed throughout Pearland to provide access and mobility for residents. Broadway is the highest traveled non-freeway corridor in the City of Pearland and serves the City's highest density retail areas. East of SH 288, Broadway carries nearly 50,000 vehicle per day and is severely

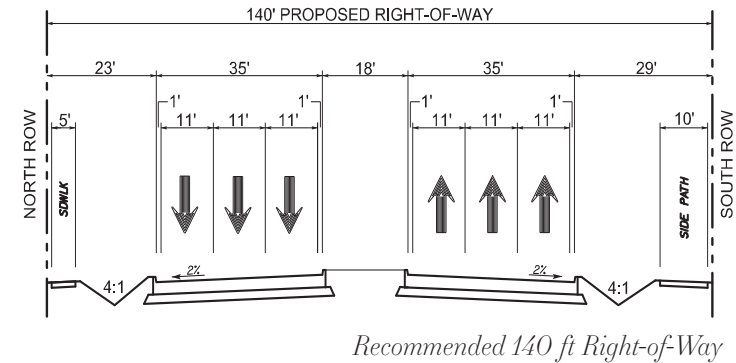
congested during peak hours and weekends. To address mobility and safety concerns, plans to widen Broadway between SH 288 and SH 35 have been ongoing for many years. The H-GAC Northern Brazoria County/Pearland Subregional Planning Initiative (2013) identified Broadway (from SH 288 to Cullen Parkway) as the highest scoring project based on scoring criteria such as level-of-service, crash occurrences, connectivity, and environmental impact. Widening Broadway from four to six lanes, including additional turn lanes at major intersections, was recommended in Pearland's Traffic Management Plan dated July 2015. Texas Department of Transportation (TxDOT) started schematic design with an initial public meeting on May 14, 2015 and began the environmental assessment in 2016. City of Pearland worked with TxDOT and H-GAC to include the Broadway widening project in the Regional Transportation Plan in 2017.

The objectives of the Broadway CDP were expanded to address TxDOT's plan to widen Broadway from four to six lanes. Widening will require acquisition of private property that will be disruptive to existing development along the corridor. The Broadway CDP identifies impacts of widening on properties along the Broadway corridor and recommends policies and infrastructure improvements to mitigate these impacts. The Broadway CDP recommendations were developed through a collaborative process between Pearland residents, project stakeholders, PEDC, the City of Pearland, and TxDOT. Community input was primarily provided at the Community Open House or via MetroQuest survey. Planning efforts and detailed plan recommendations are documented in the body of this report. Key recommendations from this study are presented below and can generally be grouped into **Infrastructure Recommendations** and **Development Recommendations**:



Infrastructure Recommendations

TxDOT FM 518 widening project provides the City of Pearland an opportunity to work with TxDOT to improve mobility along Broadway. As TxDOT moves into their Plans, Specifications and Estimate (PS&E) phase (Design Phase) an opportunity exists to meet with TxDOT regarding final ROW determination as well as the location of median openings and access management changes (driveways). The FM 518 widening project also is an appropriate time to consider utility and aesthetic improvements along the corridor. The TxDOT PS&E Phase has submittals at the 30%, 60%, 90% and 100% design stages and TxDOT will generally consider making adjustments to their design up to the 60% point in the project.



Summary of Infrastructure Recommendations

Mobility

Schedule recurring meetings with TxDOT during design-phase to collaborate regarding pedestrian, streetscape, drainage, and roadway elements

- ▶ TxDOT Schematic Changes
 - Reconstruct roadway as an urban cross section with no open ditches
 - Reduce ROW from the currently proposed 150 to 140 feet to reduce total right-of-way needed by 27%, or 6.6 acres
 - Extend Phase I (SH 288 to Cullen) widening east of Freedom Lane before transitioning back to four lanes
 - At minimum, reconstruct Broadway east of McLean in Old Town to SH 35 in current ROW width with curb, storm sewers and access management improvements as part of the Phase II Broadway Widening
 - Incorporate intersection capacity improvements per the City of Pearland's Mobility Study
 - Consider providing 11' travel lanes (in lieu of 12') to reduce right-of-way width
 - Remove the 15' shared-lane (on-street) shown on the schematic and replace with a 10' shared use path (off-street) on the south side of Broadway and a 5' sidewalk on the north side
- ▶ TxDOT to provide incentives for contractors delivering the project on time or to insert a "Time is of the Essence Clause" to minimize delays for completion

Drainage

- ▶ Maintain roadside ditches only to the extent needed to capture and convey offsite areas lower than the road that currently drain towards the corridor. Where ditches are needed, the depth should be minimized
- ▶ Construct underground storm sewer to replace existing roadside ditches or construct off-site detention ponds
- ▶ Utilize underground storm sewer for inline detention to mitigate the impact of removing ditch volume and adding impervious area or include offsite detention in the project

- ▶ City should continue to require future development along the corridor to capture onsite runoff in an underground storm sewer system to eliminate the need for roadside ditches
- ▶ Consider lowering the road profile where feasible

Utilities

- ▶ Consider contracting a third-party project manager and/or utility coordinator on behalf of the City to ensure the granularity of attention desired for the project
- ▶ Consider advantages and disadvantages of moving the overhead utilities underground throughout the corridor
- ▶ Consider undergrounding utilities near commercial centers to improve aesthetics if capital costs for corridor-wide underground are too high

Bicycle and Pedestrian

- ▶ Coordinate with TxDOT regarding sidewalks and a multi-use path
- ▶ Coordinate with the currently underway City of Pearland Multi-Modal project regarding off-Broadway facilities described in Chapter 3 of this report.

Streetscape

- ▶ Create a design standard that is flexible and able to incorporate varying sizes of ROW
- ▶ Include elements such as trees, enhanced landscape beds, benches, and pavers in medians to compensate for lost landscape buffer on private property

Connectivity

- ▶ Begin public engagement efforts regarding roadway improvements east of McLean Road
- ▶ Conduct detailed capacity analysis to determine future roadway improvements east of McLean Road
- ▶ At minimum, reconstruct in existing configuration with medians from McLean to SH 35

Development Recommendations

Methods for Addressing Property Impacts

Update development regulations to identify all properties impacted by right-of-way expansion to be legally nonconforming, or more commonly known as “grandfathered”. In doing so, consideration will need to be given to businesses that must relocate or recreate business signage or make other minor adjustments to remain viable.

- ▶ Where possible, relocate water and wastewater easements previously placed along the front edge of private property so that those easements are located within the expanded public right-of-way. Doing so potentially expands the developable area of a property.
- ▶ Similarly, a number of properties along the Broadway Corridor include sidewalks that may or may not be consumed by the expanded right-of-way. For those where sidewalks remain on private property, the City of Pearland should assist property owners in removal of the sidewalk since it will duplicate the walkway offered within the public right-of-way.
- ▶ Coordinate with TxDOT to add landscaping improvements into the public right-of-way, where possible, in a manner similar to improvements along other major corridors of the community, including SH-35.
- ▶ Consider changes to front yard setback and landscaping requirements within the study area to potentially reduce the setback in return for alternatives elsewhere on the site, including landscaping, art or architectural improvements.
- ▶ Allow reconfiguration of parking areas in which aisles or a limited number of parking spaces will be lost. Additionally, adjust parking requirements, including methods for reducing overall requirements when appropriate or allowing adjacent businesses and/or properties to share parking.
- ▶ Finally, encourage redevelopment of properties where impacts are substantial enough that they may be difficult to overcome under existing circumstances; however, insufficient to warrant property acquisition by TxDOT. For example, if enough parking is eliminated by right-of-way expansion to impact business viability, redevelopment to allow for more parking may be in order.

Regulatory Framework Recommendations

Following right-of-way acquisition for the expansion of Broadway, amend Chapter 2, Article 7 - Nonconforming Uses & Structures to allow those properties impacted by the expansion of the right-of-way to be classified as legally nonconforming if they can no longer meet the requirements of the Unified Development Code:

- ▶ Amend site planning requirements to allow previously required elements to be placed in the public right-of-way and coordinate with TxDOT to make aesthetic improvements.

- ▶ Conduct a study to determine if parking requirements of the Unified Development Code should be reduced and amended, particularly given the rise of alternatives that impact parking such as online services that allow for pick-up or delivery (such as Instacart and Uber Eats), personal transportation (Lyft and Uber) and other changes in travel behavior.
- ▶ Amend the current version of the Corridor Overlay District to allow for Broadway Street (and perhaps other applicable roadways) to have its own unique character and set of solutions. Along Broadway, the Corridor Overlay District can be adapted to accommodate right-of-way expansion and better promote redevelopment in a manner appropriate to this specific corridor.

Target Area Recommendations

- ▶ Build Strategic Partnerships and a Common Vision
- ▶ Acquire and/or Rezone Property
- ▶ Establish a Tax Increment Reinvestment Zone
- ▶ Phase Development as Appropriate
- ▶ Prepare Site
- ▶ Consider a Developer Request for Interest

Implementation

The Broadway Corridor Development Plan (CDP), extending from SH 288 to SH 35, includes a number of recommendations involving a variety of partners, most important of which is TxDOT. Even before completion of the document, the process has shown results as the City of Pearland and TxDOT coordinate to determine the most appropriate expansion of right-of-way (ROW) and alignment of the improved corridor. The implementation program for the Broadway CDP is intended to gather and galvanize the various recommendations of the plan and place them in an order of implementation. Each task has also been crafted to accommodate changes in the ROW and corridor alignment as the concept and design details are refined.

Tasks for implementation have been divided into those specific to the corridor and others specific to the three proposed targeted areas of development. Each of the tasks has generally been arranged by anticipated order of completion. Additionally, each recommendation includes implementation guidance in terms of potential organizations that may have a role in each task.

The Implementation Program is intended to be highly flexible. Changes occur. Opportunities arise. A task may be amended to be appropriate or the order may change. The Implementation Plan should be viewed as the proposed roadmap to success, but not the exclusive route to get there.

COMMUNITY INPUT PROCESS

Broadway Corridor Plan Stakeholder and Committee Interviews

Input was provided by community members, project stakeholders, and participating agencies throughout the creation of the Broadway CDP. Community input was primarily provided at the Community Open House or via MetroQuest survey, in addition to interviews of identified citizens and groups with close ties to and history with the corridor. A stakeholder committee also met twice to provide input.

Kimley-Horn conducted several interviews with project stakeholders at PEDC's office, Kimley-Horn's office, and via Skype. At each interview, the purpose and scope of the study was reviewed with the stakeholders and they were shown the materials presented at the Community Open House. All stakeholders were generally supportive of the Corridor Development Plan and offered their thoughts on ways to improve Broadway in the future.

It was also mentioned that the City should investigate "Super Street" improvements for major thoroughfares, which means coordinating and upgrading an arterial street system to enhance Broadway mobility. Potential improvements are under consideration to reduce drive times, relieve traffic congestion, and eliminate the bottleneck that would occur at the east side terminus once the TxDOT widening project is constructed. More details on alternative road concepts are provided in the [Appendix](#).

<i>Stakeholder Committee Members</i>		
Brazoria County	Matt Hanks	Brazoria County Engineer
Chamber	Carol Artz-Bucek	President
Business/Prop. Owner	JoBeth Prochaska	Weitzman
Business/Prop. Owner	Craig Slater	Slater Insurance
Business/Prop. Owner	Sandy Cavazos	A-Better Plumbing
Business/ Prop. Owner	Jeff Barry	Barry Insurance Group
City	Trent Epperson	Assistant City Manager
City	Robert Upton	Director of Projects and Engineering, City Engineer
City	John McDonald	Director of Community Development
PEDC	Matt Buchanan	President
PISD	Keith Ordeneaux	Energy and Risk Manager
TxDOT	Michelle Milliard	Brazoria Area Engineer

Table 1 — Stakeholder Committee Members



Those interviewed felt that the corridor needed a variety of new development, including more restaurants, park space throughout the corridor, and multi-family housing or townhomes. There was also a sense among interviewed stakeholders that the City could add some flexibility to its land use codes and specifications, including setbacks. Specific suggestions included:

- ▶ Adding a range of setbacks along Broadway, developing a type of “Setback Bell Curve” to arrive at an “optimum setback”
- ▶ Form-based codes that push parking to the back and or sides of properties, which could promote a more “active” and aesthetically pleasing corridor
- ▶ Creating more flexible specifications based on market demand for certain types of properties

In relation to aesthetics and diversity of business, it was noted that aesthetics and adequate, well designed parking can help businesses and the “feel” of the corridor. Some barriers discussed include:

- ▶ Broadway between Cullen and SH 35 generally moves well; Broadway between Cullen and SH 288 does not work well, and many people try to avoid this section
- ▶ There is no natural “hub” or “center” along the corridor, and it is not generally walkable or bike-friendly
- ▶ Older commercial centers are not maintained well, detracting from the corridor
- ▶ Recent new businesses are similar (i.e. nail salons, pizza places) and there are still “restaurant deserts” in spots along Broadway, namely along Cullen

Some solutions to identified barriers that were expressed included:

- ▶ Signage that is more “visible” and “attractive” would improve the corridor and the business climate in general
- ▶ Nonperforming commercial centers could be incentivized to be repurposed as varying types of housing or additional parking deemed critical to business success
- ▶ Taller CenterPoint power poles may improve aesthetics if undergrounding utilities proves too expensive, and span-wire type traffic signals could be replaced with aesthetically pleasing poles and mast-arm designs
- ▶ Portions of acquired TxDOT properties outside of the road and new right-of-way could be used as open green park space or for additional drainage infrastructure

MOBILITY IS PRIORITY

Traffic Safety and Mobility was ranked the top priority by participants of the MetroQuest survey. Additionally, participants were asked to describe the Broadway corridor as it exists today as well as their vision for Broadway. This exercise compared existing attitudes and future expectations for the corridor and was intended to reveal response patterns and cohesion among participants. Single-word descriptions of the corridor (current and future vision) are provided as **Table 2**. “Congested” was the most frequent word participants used to describe Broadway today. Accordingly, “Uncongested” was the most frequent word participants used to describe their vision for Broadway.

Participants were prompted to identify a traffic-related improvement and evaluate congestion when dropping a traffic map marker. Of the 510 markers dropped, 202 improvements were identified, and congestion was evaluated at 250 locations. Remaining markers contained narrative comments (or were left blank). Of the traffic improvements identified, addition travel lanes (38%), additional turn lanes (24%), and median modifications (16%) were reported most frequently. Of the congested locations evaluated, 69% reported “very bad” traffic and 31% reported “somewhat bad” traffic.

COMMUNITY INPUT

<i>Rank</i>	<i>Today</i>	<i>Vision</i>
1	Congested (49)	Uncongested (11)
2	Busy (11)	Smooth (7)
3	Nightmare	Beautiful
4	Mess	Widened
5	Traffic	Flow
6	Ugly	Improved
7	Avoided	Safe

Table 2 — Most Common Single-Word Descriptions

MOBILITY AND ACCESS

Pearland is growing rapidly and transportation infrastructure improvements are needed throughout Pearland to provide access and mobility for residents. Broadway is the highest traveled non-freeway corridor in the City of Pearland and serves the City’s highest density retail areas. East of SH 288, Broadway carries nearly 50,000 vehicles per day and is severely congested during peak hours and weekends.

To address mobility and safety concerns, plans to widen Broadway between SH 288 and SH 35 have been ongoing for several years. The H-GAC Northern Brazoria County/ Pearland Subregional Planning Initiative (2013) identified Broadway (from SH 288 to Cullen Parkway) as the highest scoring project based on scoring criteria such as level-of-service, crash occurrences, connectivity, and environmental impact. Widening Broadway from four to six lanes, including additional turn lanes at major intersections, was recommended in Pearland’s Traffic Management Plan dated July 2015. TxDOT started schematic design with an initial public meeting on May 14, 2015 and began the environmental assessment in 2016. The City of Pearland worked with TxDOT and H-GAC to include the Broadway widening project in the Regional Transportation Plan in 2017.

Widening Broadway from four to six lanes from SH 288 to Cullen is funded, and design for the entire segment from SH 288 to SH 35 is expected to begin in early 2020. Funding to widen Broadway east of Cullen has not been secured, but efforts are being made to move the project forward. Widening Broadway will provide additional capacity to improve mobility and reduce congestion, which is the top priority for residents based on the MetroQuest survey results.

Raised median improvements will also be constructed concurrently with widening Broadway. Raised median improvements along Broadway were recommended to improve safety in the FM 518 Corridor Access Management Plan published by H-GAC in 2004. Transportation research indicates roadways with raised medians have a lower crash rate than those with two-way left-turn lanes (the dominant median type along the corridor). Therefore, the installation of raised medians is expected to reduce crashes along Broadway. A crash density heat map depicting current injury crash hot spots along Broadway is provided as **Exhibit 1**.

TxDOT’s schematic includes raised medians, which will result in changes to Approximately 68 driveways along the corridor. The raised median locations and specific changes are provided as an [Appendix](#).

The City of Pearland provided comments (24 total) to TxDOT’s schematic in coordination with the 2015 TMP prior to publishing the EA. City of Pearland comments and TxDOT responses are provided an [Appendix](#).

In addition to raised medians, another common access management technique includes driveway consolidation. Driveway consolidation is a technique that involves the removal or relocation of existing access points (driveways). Closely spaced driveways negatively impact safety, as transportation research indicates crash rates are correlated with driveway density.

However, the typical relationship between crash density and driveway density is not apparent along Broadway. Instead, crash density is highest near SH 288 and at the intersection of Broadway at Cullen due to the high traffic volumes in these areas.



Exhibit 1 — Crash Density Heat Map
Source: TxDOT CRIS Crash Data from 1/1/2016 – 12/31/2018

EXISTING AND PROPOSED ROADWAY

TxDOT published a preliminary draft Environmental Assessment (EA) in October 2018, describing the anticipated impacts of widening the Broadway corridor (FM 518) from SH 288 to SH 35. The construction cost for widening Broadway is approximately \$55 million, per TxDOT's EA.

In addition to preparing a roadway schematic (provided as an [Appendix](#)), social and environmental impacts are also evaluated as part of the EA. Key excerpts from TxDOT's EA are provided in this section of the report. The draft EA and supplemental technical reports are available on TxDOT's webpage, while additional information on TxDOT's project development procedure is available on the National Environmental Policy Act (NEPA) webpage. Existing and proposed typical roadway cross sections are provided as **Figure 2.1, 2.2** with the recommended 140' cross section at **Figure 2.3**. Additional roadway characteristics per TxDOT's EA are as follows:

"The proposed improvements to FM 518 include the reconstruction and widening of the existing roadway from four lanes to six lanes. The improvements include the addition of one 15-foot-wide shared-use lane in each direction, 12-foot-wide left turn lanes in various locations, and construction of a typical 18-foot-wide raised median (the proposed median width varies). The lane configurations (e.g. number of lanes) vary along the project limits to accommodate turning movements at various intersections and driveways. The proposed improvements also include 5-foot-wide sidewalks on both sides of the roadway. The roadway would be converted to a curb and gutter system. Improvements to cross streets (Walnut Street, Halbert Drive, and McLean Road) at the eastern project terminus are also proposed and were assessed in the technical reports that support this EA. The proposed project would require approximately 24.5 acres of new right-of-way; no easements are proposed. The proposed right-of-way would vary in width from 150 feet to 250 feet."

Mobility Recommendations

- ▶ TxDOT Schematic Changes
 - Reconstruct roadway as an urban cross section with no open ditches
 - Reduce ROW from the currently proposed 150 to 140 feet to reduce total right-of-way needed by 27%, or 6.6 acres
 - Extend Phase I (SH 288 to Cullen) widening east of Freedom Lane before transitioning back to four lanes
 - At minimum, reconstruct Broadway east of McLean in Old Town to SH 35 in current ROW width with curb, storm sewers and access management improvements as part of the Phase II Broadway Widening
 - Incorporate intersection capacity improvements per the City of Pearland's Mobility Study
 - Consider providing 11' travel lanes (in lieu of 12') to reduce right-of-way width
 - Remove the 15' shared-lane (on-street) shown on the schematic and replace with a 10' shared use path (off-street) on the south side of Broadway and a 5' sidewalk on the north side
- ▶ TxDOT to provide incentives for contractors delivering the project on time or to insert a "Time is of the Essence Clause" to minimize delays for completion

As Pearland's principal commercial corridor, any modifications to Broadway should be guided by the City's priorities. Benefits and shortcoming of winding Broadway (per TxDOT's schematic) are enumerated as follows:

Benefits:

- ▶ Improves mobility by increasing capacity in the most congested corridor in the City
- ▶ Improves safety by adding raised medians
- ▶ Improves mobility and access for pedestrians/bicyclists
- ▶ Improves access and commerce to the City's major commercial area

Shortcomings:

- ▶ 24.5 acres of ROW acquired
- ▶ 4 residential displacements
- ▶ 10 business displacements
- ▶ 1 other property displacement
- ▶ 1 recreational facility impacted

TxDOT's schematic cross-section includes 150' ROW and open ditch drainage which is typically used in rural environments. However, Broadway's ultimate cross-section is not yet finalized, and changes will occur throughout the project's design-phase which, as of February 2020, has not started. **Since the draft EA was published in October 2018, Federal Highway Administration guidance has been issued regarding pedestrian facilities which prohibits shared lanes on roadways such as Broadway.** As an alternative to 15-foot shared-use lane shown in the EA schematic, FHWA guidance encourages 10' off-street sidewalks (termed shared-use paths).

Kimley-Horn recommends an urban cross-section with storm sewer drainage which, due to reduced ditch width, creates opportunity for reduced ROW width. Other opportunities to reduce ROW include reducing travel lane widths to 11' and 18' medians (east of Cullen). Narrowing TxDOT's proposed project ROW from 150' to 140' could reduce acreage needs from approximately 24.5 acres to 17.9 acres, reducing the road's proposed footprint by 6.6 acres, a ROW savings of 27%. Furthermore, a 10' shared-use path is recommended on the south side (eastbound) and a 5' sidewalk on the north (westbound).

Existing

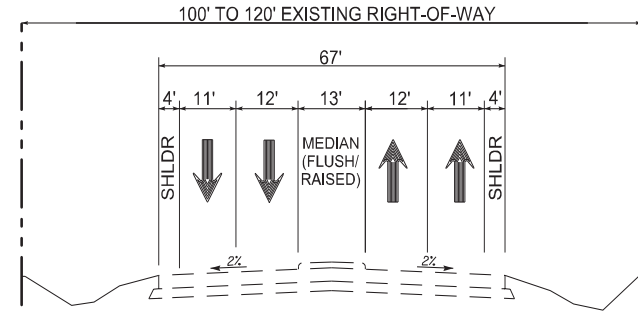


Figure 2.1 — Existing Typical Roadway Cross Section

Schematic

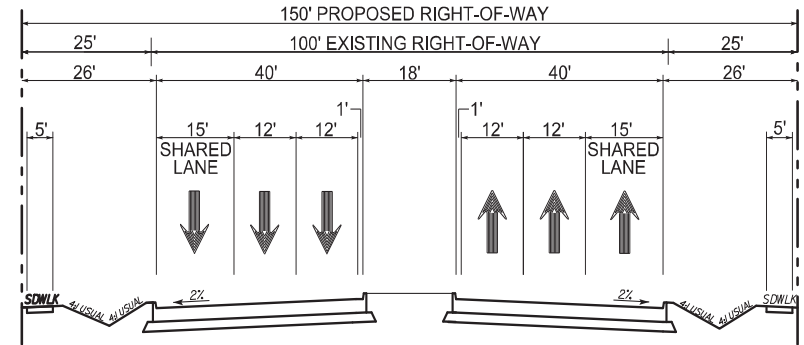


Figure 2.2 — TxDOT Schematic Typical Roadway Cross Section

Recommended

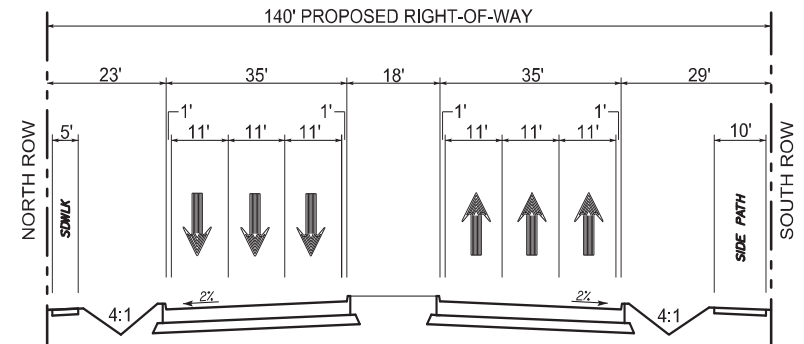


Figure 2.3 — Right-of-Way Typical Cross Section

DRAINAGE

Existing storm sewer infrastructure along the Broadway corridor consists of a roadside ditch with limited storm sewer improvements. Developed areas west of Cullen Parkway generally drain away from the corridor. In these areas, the existing roadside ditch captures roadway runoff and conveys it to several Brazoria Drainage District No. 4 ditches.

Developed and undeveloped areas east of Cullen Parkway generally drain towards the corridor. The existing roadside ditch not only captures roadway runoff in these areas, but also captures and conveys offsite runoff, ultimately conveying it to Brazoria Drainage District No. 4 ditches. The current top of road elevation is typically higher than the adjacent ground throughout the corridor, which requires a roadside ditch to capture offsite areas.

Widening Broadway can be accomplished without negatively impacting drainage patterns along the corridor by providing adequate ditch capacity. However, additional right-of-way (ROW) will be required to widen the road and maintain existing ditches.

To minimize ROW impacts associated with roadway widening, the following measures are recommended throughout the corridor:

- ▶ Reduce travel lane width
- ▶ Maintain roadside ditches only to the extent needed to capture and convey offsite areas lower than the road that currently drain towards the corridor. Where ditches are needed, the ditch depth should be minimized.
- ▶ Construct underground storm sewer to replace existing roadside ditches.
- ▶ Utilize underground storm sewer for inline detention to mitigate the impact of removing ditch volume and adding impervious area or construct offsite detention ponds.
- ▶ City should continue to require future development along the corridor to capture onsite runoff in an underground storm sewer to eliminate the need for roadside ditches.
- ▶ Lower the road profile west of Cullen Parkway where there is adequate freeboard above the Brazoria Drainage District No. 4 receiving channels and the 500-year FEMA floodplain elevation.

The City held meetings with TxDOT to discuss the above recommendations in an effort to minimize the impact of roadway widening by reducing the width of the right-of-way. Cost/benefit analysis summarized in **Exhibit 3.1** showed that increasing stormwater pipe size is less expensive than acquiring parcels for ROW.

The Drainage Study for FM 518 from East of SH 288 to Halbert Drive (AECOM, January 2017) is a schematic-level drainage report which analyzed the hydrologic and hydraulic implications of the proposed roadway widening project. This study provided preliminary design of the proposed roadway drainage system. Generally, the proposed system includes required detention storage within roadside ditches. Considering the total storage volume available and the total storage volume required as reported in AECOM drainage study, 12.7 acre-feet of surplus volume storage is available. The surplus volume reported includes a 20% factor of safety in addition to the “surplus volume” provided by the current design.

The “surplus volume” was included in the design with the expectation that final design will utilize Atlas 14 rainfall data. The actual required volume will change slightly upon final design, but it is unlikely the entire “surplus volume” can be removed due to changing drainage criteria. Drainage area maps (extracted from the AECOM drainage report) are annotated with proposed pipe sizes and potential total top width/ROW reduction which is provided as an [Appendix](#).

MetroQuest survey participants were asked to identify drainage-related improvements. Drainage map marker results are provided as an [Appendix](#). Of the drainage locations evaluated, 37% reported “not too bad” drainage, 31.5% reported “very bad” drainage, and 31.5% reported “bad” drainage. Despite the perception of poor drainage conditions, the existing drainage facilities along the corridor performed well with little to no significant flooding issues during past storm events.

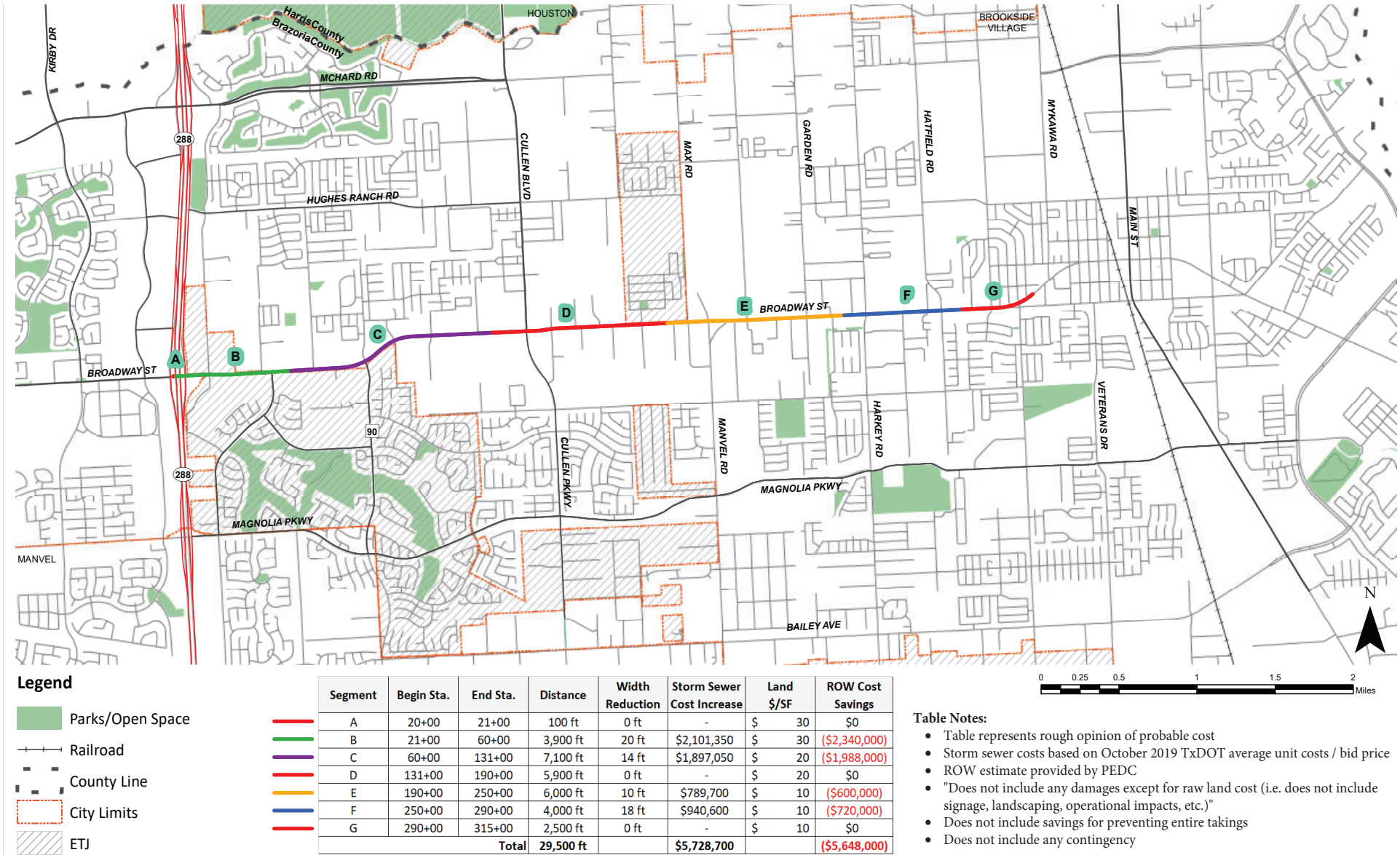


Exhibit 3.1 — Drainage Information Overview

UTILITIES

Overview

This utilities analysis section reviews existing and proposed utilities in the Broadway corridor and examines the potential roadway conflicts related to the proposed FM 518 widening. The following section summarizes the information gathered and planning-level opinions of probable construction costs (OPCC) of the impact the roadway project will have on the facilities. As a densely developed corridor, the Broadway widening project will require significant utility relocations through the TxDOT utility accommodation process. Relocations will require detailed coordination with City and franchise operators. The project provides a meaningful opportunity to improve the corridor aesthetics by moving overhead electric and communication lines into underground duct banks.

The following utilities, and possibly other utilities, currently operate within the corridor:

- ▶ City of Pearland water, wastewater, storm sewer, and fiber-optic cable
- ▶ AT&T / Southwestern Bell Telephone
- ▶ Comcast telecommunications
- ▶ CenterPoint Electric
- ▶ CenterPoint Gas
- ▶ Lightwave telecommunications, and
- ▶ Phonoscope telecommunications

City Utilities: The City of Pearland owns and maintains water, wastewater, and storm sewer pipelines within the Broadway corridor. The City also owns and maintains fiber-optic cables within the corridor. The study compared GIS data of utility locations provided by the City GIS department to the proposed TxDOT widening plan to characterize the types of utility conflicts. GIS maps and detailed commentary regarding the review of water, wastewater, and storm water pipelines within the Broadway corridor are provided as an [Appendix](#).

Electrical Utility Relocation

Underground Broadway Segment from Cullen to SH 35/Main Street (East Side)	Approximate Length	OPCC (Planning level estimate)
Cullen to Reid/Manvel	1.2 miles	\$16,710,000
Reid/Manvel to O'Day/Harkey	1.0 miles	\$20,900,000
O'Day/Harkey to McLean	1.0 miles	\$10,410,000
McLean to SH 35/Main Street	0.8 miles	\$17,000,000
East Side Total		\$65,020,000

Underground Broadway Segment from SH 288 to Cullen (West Side)	Approximate Length	OPCC (Planning level estimate)
SH 288 to Silverlake Parkway	1.2 miles	\$8,050,000
Silverlake Parkway to Cullen	1.1 miles	\$9,000,000
West Side Total		\$17,050,000
Grand Total		\$82,070,000

The study identifies opportunities for consolidation, relocation, redesign, or the introduction of new technology. The following options are considered:

1. Leaving overhead utilities in place
2. Moving utilities past the widening extent
3. Relocating overhead utilities to easements behind the existing structures, and
4. Moving overhead utilities to underground duct banks

Option 1 is not feasible due to direct conflicts with existing poles and the proposed widening. Option 2 is the default TxDOT approach, which does not meet the City's desire for resiliency, aesthetics, and use of easement described below. Option 3 would require acquisition of easements behind the existing structures and relocation of electric meters and services. There are several advantages to moving the existing overhead electric and communications systems into underground duct banks, including the following:

- ▶ **Resiliency:** Lessons learned from major storm events such as Hurricane Harvey and Hurricane Ike have shown engineers that overhead power and communication systems can be fragile during extreme wind, rain, lightning, and flooding events. Moving the utilities underground will improve the resiliency of the power and communication systems in future extreme weather events. Underground features are also less likely to be damaged by traffic accidents. Moving these conductors underground will reduce the risk of power interruptions.
- ▶ **Aesthetics:** Broadway is a signature commercial corridor for Pearland. The retail shops and businesses contribute significantly to the City economy. Businesses depend on signs and curb appeal to attract customers and maintain their desired brand. Overhead power and communication wires and poles block the line of sight from the travelling public to the commercial interests. Moving these utilities underground would provide improved aesthetics for the properties.

- ▶ **Easement:** Land values in the Broadway corridor are high, and each square foot of easement area is valuable. Typically, the easement footprint of an overhead power line and pole is larger than the same service in an underground duct bank.

Some disadvantages to moving the overhead utilities underground include:

- ▶ **Increased Capital Cost:** Typical costs for constructing duct banks can be 2 to 4 times more than simple relocation of the same utilities.
- ▶ **Operation and Maintenance:** operation and maintenance of underground duct banks can be more expensive for the franchise utility operator due to the need to excavate or pull cables through duct banks instead of working in the clear on pole mounted equipment and conductors
- ▶ **Landscaping conflicts:** the utility easement may not allow landscape improvements directly above the duct banks

Cost ranges in this report are based on experience with recent projects in Pearland including undergrounding similar overhead electric utilities for the Upper Kirby Redevelopment Authority in 2014. The Upper Kirby project documented the following costs for an approximately 3,700 linear feet (0.7 mile) project along Bissonnet (from Buffalo Speedway to Kirby):

- ▶ CenterPoint remove overhead: \$226,102
- ▶ CenterPoint construct underground primary: \$663,140
- ▶ AT&T relocation to underground: \$3,475
- ▶ Comcast relocation to underground: \$40,970
- ▶ Owner construction of underground conduit: estimated at \$555,000
- ▶ Total 2014 project: \$1,488,686
- ▶ Total project, escalated to 2019 CPI inflation: \$1,634,063

Based on Upper Kirby and two other similar projects, this study assumes that undergrounding of overhead electric and communication utilities should be approximately \$2.3 million per mile per circuit. The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

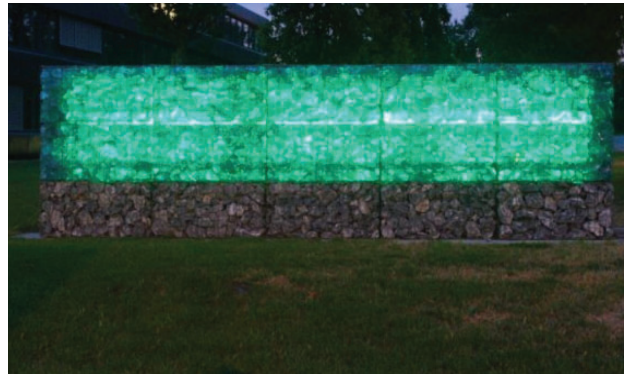
Utilities Recommendations

- ▶ Consider contracting a third-party project manager and/or utility coordinator on behalf of the City to ensure the granularity of attention desired for the project
- ▶ Consider advantages and disadvantages of moving the overhead utilities underground throughout the corridor
- ▶ Consider undergrounding utilities near commercial centers to improve aesthetics if capital costs for corridor-wide underground are too high



Landscape Buffer Alternatives

As discussed, the following offer examples of methods of enhancing on site architecture, art and landscape architecture as a means of reducing the required 30' landscape buffer.



Architectural Enhancements

Recommendation: Replace a portion of the visual interest created by the current landscaping requirement by adding visual appeal to the architecture of structures along Broadway.

A program in Columbus, Indiana promoted use of leading architects to design unique buildings that now serve as a tourist attraction in their own right.

Examples of methods for doing so include architectural design, roofline, materials (made somewhat more difficult by recent state legislation), articulation/differentiation, transparency/glazing, and entry. The program also allows for reincorporation of building materials as a consideration since it serves as an alternative to an extensive landscape buffer.

Landscape Enhancements

Recommendation One: Offer a "landscape alternative" to options that replace a portion of the current landscape buffer requirement.

Recommendation Two: Allow landscaping alternatives to become one of a suite of alternatives alongside architectural enhancements and art as a landscape alternative.

Examples of alternatives include a living wall or garden wall; "Green Screen" hedges, columns, or sculptures; a concrete, gabion, or other partial wall; or intensified screening landscaping in a narrower yard.

Art Installations

Recommendation: Allow artwork as a replacement of a portion of the current landscaping requirement to add a level of vibrancy and culture to Broadway, including the possibility of interactive and/or "Instagrammable" art.

The City of Edmond, Oklahoma established a percentage of fees that was set aside for design and implementation of onsite art.

Examples of art include freestanding monuments, murals, interactive art, fountains, and kinetic art.

In areas with a large loss of buffer and little remaining ROW, there are a few design options that can occur. At important intersections, a low blue glass gabion wall can be used to not only provide screening, but act as a striking sculptural piece of art (see images directly to right). Glass color and lighting styles can be incorporated within other streetscape elements like benches and pedestrian light fixtures to create a consistent streetscape aesthetic. In areas that abut a sidewalk and building, a vine screen can be used to provide greenery and screening to break up large swaths of hardscape (see bottom left).

Lastly, berms can be used in areas that are broken up by numerous driveways. Organically shaped berms allow for screening of businesses along Broadway while working with the limited landscape area (see top right). Street trees and shrubs can be incorporated into the berm to allow for continuity. This option works best with the driveways because it can naturally taper off to provide adequate sight distances for the approaching cars.

Landscaping Recommendations

- ▶ Create a design standard that is flexible and able to incorporate varying sizes of ROW
- ▶ Include the following streetscape elements:
 - Street trees
 - Ornamental Trees at intersections
 - Enhanced landscape beds
 - Benches
 - Pavers in medians
 - 10' hike and bike path (south side)
 - 5' sidewalk (north side)
 - Pedestrian Refuges
 - New crosswalk striping



In urban areas with high pedestrian traffic and little ROW, low planters can create barriers to pedestrians to safely navigate the street. These planters not only provide separation from vehicular traffic, but also consistent landscape along the road.



Fencing using vines



Retaining walls using rock wire and gabions



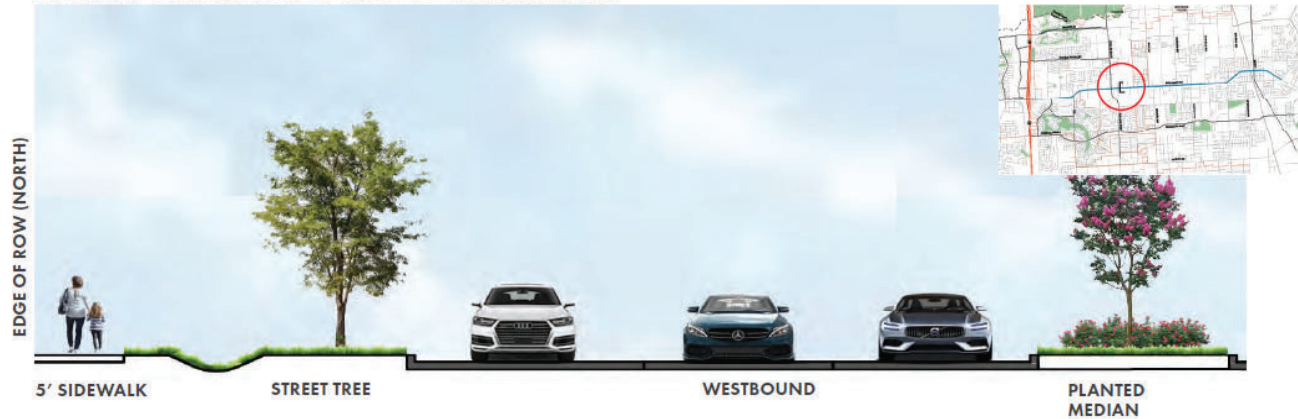
Neighborhood berms



BROADWAY SECTIONS

The sections below show recommended ROW improvements in contrast to the existing conditions. These improvements will help provide a uniform design along Broadway / FM 518, and create continuous pedestrian routes along the corridor. Street trees will provide shade as well as acting as a buffer from vehicles and creating a safer environment. In areas with a large loss of buffer and little remaining ROW, a decorative fence with screening shrubs or a wall can be placed like the images below, as suggested in the landscape alternatives section on the next page.

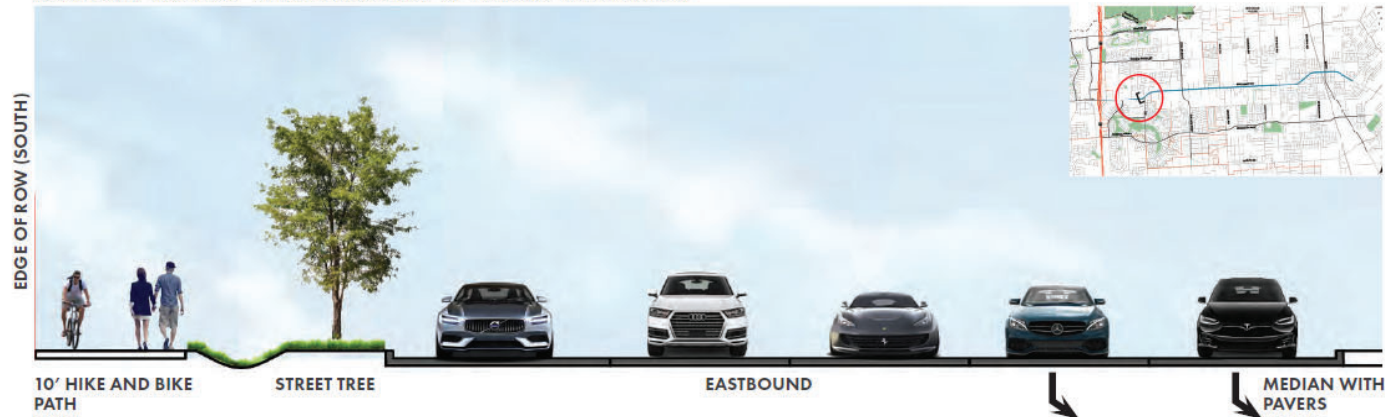
BROADWAY TYPICAL SECTION- EAST OF CULLEN PARKWAY



EXISTING CONDITIONS



BROADWAY SECTION- AT INTERSECTION OF MILLER RANCH ROAD



EXISTING CONDITIONS



Prepared for



Prepared by

Kimley»»Horn

HAWES HILL & ASSOCIATES
LLP

