Houston Urban Core Revival

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Background

Texas Department of Transportation (TxDOT) is planning a series of road widening projects in the Houston area.[1] The most notable of these widening projects is the North Houston Highway Improvement Project (NHHIP). The purpose of the NHHIP is to ease congestion and to improve mobility and safety.[2]

Objective

Houston Urban Core Revival is an alternative plan to ease congestion and to improve mobility and safety. This plan will also improve air quality, increase equity, and reduce financial cost.

This plan aims to better manage our existing freeways while reducing our dependence on cars.

Plan Overview

1. The boundary of downtown Houston is defined by the "downtown loop" of freeways: short segments of I-10, I-45, and I-69, totaling about 6 miles in length. We should close this downtown loop to cars, then re-open it as an elevated **green belt** for pedestrians and cyclists. Add **ramps** every block to create local access. Lease out new **commercial real estate** beneath the green belt to create vibrant, safe connections between downtown and its surrounding neighborhoods.

2. Designate a region around downtown, about 5 miles wide, as a **Congestion Control Zone** (CCZ), with tolls to enter during peak hours. Convert the remaining freeways inside the CCZ into surface-grade **boulevards** to increase local access.

3. Add **congestion tolls** during peak hours to all freeways inside of Beltway 8, including the 610 loop. Also build safe **pedestrian crossings** every ½ mile along the freeways, about a 10-minute walk.

4. Quickly fund and complete METRONext and the Houston Bike Plan. **Invest** congestion toll revenues to build more sidewalks, bike lanes, and mass transit.

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1   See Appendix A for a complete list of TxDOT's planned widening projects inside Beltway 8.
2   North Houston Highway Improvement Project: Draft Environmental Impact Statement, April 2017, Main Report, page 1-1, http://www.ih45northandmore.com/draft_eis.aspx
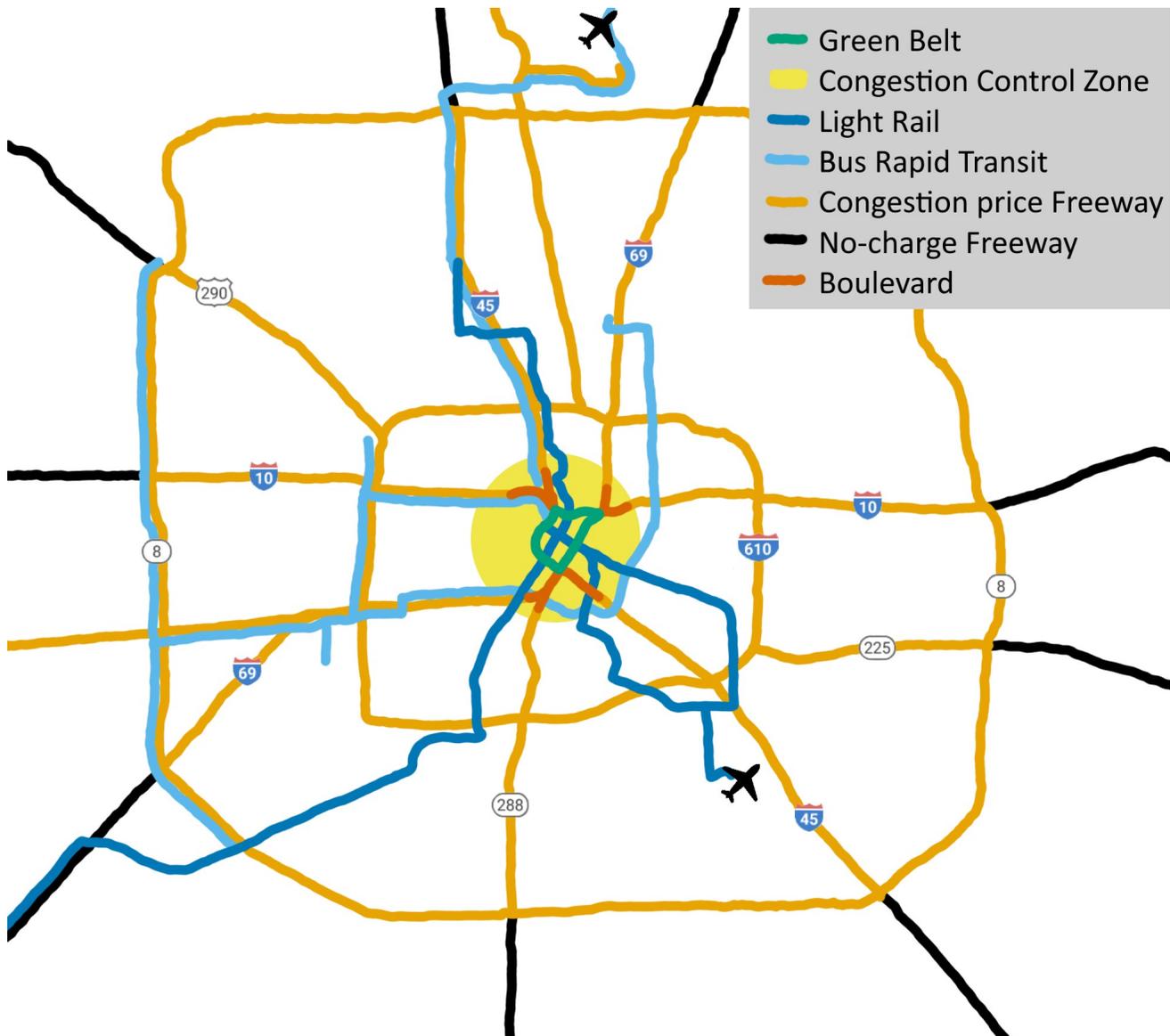
Plan Map

Figure 1: Map of Houston showing green belt, CCZ, congestion-price freeways, and converted boulevards, overlaid with METRONext

Safety

640 people a year die on Houston-area roads, and 2,850 more are seriously injured. Houston is the most deadly major metro area in the nation for drivers, passengers, and people in their path. Factors that make the Houston area more dangerous than other metros include roads designed for maximum speed and the absence of bike lanes and sidewalks.[3]

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3   Houston Chronicle: Out of Control: Houston's roads, drivers are country's most deadly, https://www.houstonchronicle.com/local/article/Houston-s-roads-drivers-are-nation-s-most-12865072.php

Narrower streets help promote slower driving speeds which, in turn, reduce the severity of crashes. Narrower streets are also safer because they have shorter crossing distances and shorter signal cycle times.[4]

Air Quality

Exposure to freeway-generated pollutants is linked to cancer, asthma, heart disease, and other illnesses. Experts advise that people shouldn't live or exercise within 1000 feet of freeways and busy roads.[5] With Houston's existing freeway configuration, it is difficult to go far without exposing yourself to these pollutants.

Quality of Life

Around the world, there are very few examples of thriving urban environments that are co-located with freeways. Cities like Seoul and San Francisco have torn down urban freeways and replaced them with green spaces, bringing prosperity to blighted neighborhoods.[6]

Mobility

As Houston's population grows, we should expect that more people will live and work near downtown. We could widen the roads to accommodate their travel by car, but land at the center of the city is scarce and valuable. Widening roads will destroy the very businesses and homes that the roads are meant to serve.[7]

Instead of widening, we can move more people along the existing roads by re-configuring them for pedestrians, bicycles, and mass transit.[8] See Figure 3 for a comparison of lane capacity by transport mode.

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4   National Association of City Transportation Officials: Urban Street Design Guide: Lane Width, https://nacto.org/publication/urban-street-design-guide/street-design-elements/lane-width/
5   Los Angeles Times: Freeway pollution travels farther than we thought. Here's how to protect yourself, https://www.latimes.com/local/california/la-me-freeway-pollution-what-you-can-do-20171230-htmlstory.html
6   Gizmodo: Six Freeway Removals That Changed Their Cities Forever, https://gizmodo.com/6-freeway-removals-that-changed-their-cities-forever-1548314937
7   Houston Chronicle: Widening I-45 will be a disaster for Houston, https://www.houstonchronicle.com/opinion/outlook/article/Widening-I-45-will-be-a-disaster-for-Houston-14417614.php
8   National Association of City Transportation Officials: Transit Street Design Guide: Designing to Move People, https://nacto.org/publication/transit-street-design-guide/introduction/why/designing-move-people/
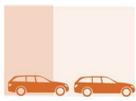
PRIVATE MOTOR VEHICLES
600–1,600/HR

MIXED TRAFFIC WITH FREQUENT BUSES
1,000–2,800/HR

TWO-WAY PROTECTED BIKEWAY
7,500/HR

DEDICATED TRANSIT LANES
4,000–8,000/HR

SIDEWALK
9,000/HR

ON-STREET TRANSITWAY, BUS OR RAIL
10,000–25,000/HR

Figure 2: The capacity of a single 10-foot lane (or equivalent width) by mode at peak conditions with normal operations. Source: National Association of City Transportation Officials.

Financial Costs of Road Widening

Wide roads are expensive to build. Construction costs for the NHHIP are estimated at $5.5 billion, a figure which doesn't include engineering, land acquisition, or relocation assistance for displaced residents and businesses.[9]

Wide roads are expensive to maintain. Each new lane-mile of road costs approximately $24,000 per year to maintain in a state of good repair, which means that road widening creates significant financial liabilities now and for years into the future.[10] It doesn't make sense to widen roads when so many of the roads we already have are in need of repairs.

When TxDOT uses eminent domain to widen roads, the property tax revenue from that land is lost forever. With the NHHIP, the City of Houston will lose $13.6 million per year in property tax revenue. That is a loss of 0.26% of the city's total property tax revenue.[11]

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9   See Appendix A for a complete list of TxDOT's planned widening projects inside Beltway 8.
10   Transportation for America: The Congestion Con, page 5, http://t4america.org/maps-tools/congestion-con/
11   TxDOT: Community Impacts Assessment Technical Report, December 2019, page 5-133,
      http://www.ih45northandmore.com/final_eis.aspx

Congestion Policy

Space on the road for cars is a finite resource. When too many cars use a road at the same time, they get stuck in traffic. If we begin charging a toll during rush hour, fewer cars will enter the road, traffic will be reduced, and travel times will improve.[12]

The proposed 5-mile-diameter CCZ for Houston is similar to the CCZ projects in other cities, as shown in Table 1.

City	Distance across CCZ	Year Introduced
Singapore	6 miles	1998
London	3 miles	2003
Stockholm	5 miles	2007

Table 1: Major operational Congestion Control Zones, their approximate size, and the year they were introduced.

Based on those programs, here are some rules for Houston's congestion program:

- Congestion charges should be collected only during peak hours on weekdays. Weekends and holidays are free.
- Residents of the CCZ get a 90% discount when they enter the CCZ.
- Cars with disabled parking placards and plates get a 100% discount on all congestion tolls.

Houston will need a study to determine what prices to charge and when to charge. For example, Table 2 shows the latest pricing index to enter downtown Stockholm.[13]

Morning Time Intervals	Charge (USD)		Evening Time Intervals	Charge (USD)
00:00–05:59	$0.00		12:00–14:59	$1.10
06:00–06:29	$1.50		15:00–15:29	$2.00
06:30–06:59	$3.00		15:30–15:59	$3.00
07:00–08:29	$4.50		16:00–17:29	$4.50
08:30–08:59	$3.00		17:30–17:59	$3.00
09:00–09:29	$2.00		18:00–18:29	$2.00
09:30–11:59	$1.10		18:30–23:59	$0.00

Table 2: Stockholm's congestion charge rate table that took effect January 1, 2020, converted at a rate of $0.10 USD per SEK.

Where will all the cars go?

Where does the traffic go when we close freeways and add congestion tolls? Some people will change their route or switch to public transit. Some people will carpool to distribute the cost of the toll. Some people will re-schedule their trips outside of rush hour, when the tolls are free or reduced. Some trips will simply not be taken, as people find other ways to meet their goals.[14]

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12 Oregon Department of Transportation: Tolling: Frequently Asked Questions, https://www.oregon.gov/ODOT/tolling/Pages/FAQ.aspx
13 Swedish Transport Agency: Hours and amounts in Stockholm, https://transportstyrelsen.se/en/road/Congestion-taxes-in-Stockholm-and-Goteborg/congestion-tax-in-stockholm/hours-and-amounts-in-stockholm/

Equity

> "One of the criticisms of congestion pricing is that the poorest may be hit the hardest. But the poorest are probably being hit the hardest now: In many cities poorer households tend to live in areas that suffer from higher congestion, more road accidents and poor air quality caused by road traffic.

> "The evidence from the Stockholm and London charging examples is that all of society can be better off with the introduction of congestion charging, particularly if the revenues are spent for the advantage of the public, for example, through improved public transport services. Ultimately, it does not have to be that the poor are hit the hardest — it is a political decision on how equitable the congestion charging system will be."[15]

Federal Aid

With regard to federal aid, the Value Pricing Pilot Program (VPPP) allows states to toll on existing toll-free highways, as long as value pricing (or "congestion pricing") is used to manage traffic congestion.[16]

> "Value Pricing projects continue to demonstrate the technical feasibility of pricing and have changed travel behavior. Priced lanes have also proven that many travelers are happy to have the option of paying for a guaranteed reliable trip. Furthermore, the VPPP's support of innovative congestion reduction strategies through the deployment of priced facilities has created more efficient use of the transportation network which offers citizens the opportunity to reach services and jobs."[17]

Pedestrian Crossings

Houston's freeways are a barrier to mobility for pedestrians and cyclists. Counting Americans who walk every day, the median walking trip distance is 0.5 miles.[18] But most segments of freeway in Houston have pedestrian crossings spaced 1 mile apart. If we build more pedestrian bridges across Houston's freeways, we can shorten the travel times between homes and businesses. Trips that now require a car will become walkable and bikable.

For an example of a great pedestrian crossing, consider the Fifth Street bridge in Atlanta, Georgia pictured in Figure 3. The bridge provides safe, comfortable passage for pedestrians, cyclists, and cars across 16 lanes of I-75/I-85 freeway traffic. The bridge uses elevated planter boxes and live trees to mitigate the noise and air pollution from the freeway below. In 2006, the Georgia Department of

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14 Arkansas Times: The carmageddons that didn't happen: Atlanta, LA, Minneapolis, Little Rock,
    https://arktimes.com/arkansas-blog/2017/04/05/the-carmageddons-that-didnt-happen-atlanta-la-minneapolis-little-rock
15 Seattle Times: Congestion tolls work in London and Stockholm, why not Seattle?,
    https://www.seattletimes.com/opinion/congestion-tolls-work-in-london-and-stockholm-why-not-seattle/
16 Connecticuit General Assembly's Office of Legislative Research: Tolls and Federal Highway Funding Consequences,
    https://cga.ct.gov/2018/rpt/pdf/2018-R-0244.pdf
17 Federal Highway Administration: Value Pricing Pilot Program,
    https://ops.fhwa.dot.gov/congestionpricing/value_pricing/index.htm
18 National Institutes of Health: Walking Distance by Trip Purpose and Population Subgroups,
    https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3377942/

Transportation completed the project at a cost of $10 million.[19] For the same price as the NHHIP, TxDOT could build hundreds of similar bridges.

Figure 3: 5th Street Ave bridge in Midtown Atlanta provides safe, comfortable passage for pedestrians, cyclists, and cars. The bridge crosses 16 lanes of I-75/I-85 freeway traffic. Image © 2020 Google.

Public Support

Congestion pricing is more popular in polls when people believe that congestion is a serious problem. The popularity of congestion pricing increases significantly when government agencies host public meetings to explain the plan and solicit feedback.[20]

Evacuation Route

Southeast Texas' regional planner, the Houston-Galveston Area Council (H-GAC), has designated I-45 through downtown Houston as a hurricane evacuation corridor.[21] H-GAC can re-designate the evacuation corridor to bypass downtown using 610, the East Loop. Evacuation traffic can also use the surface streets of downtown and take Elysian north – this route is outside of the 500-year flood plain.[22]

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19 ASPIRE: Fifth Street Pedestrian Plaza Bridge, http://aspirebridge.com/magazine/2008Winter/5th_street_win08.pdf
20 Federal Highway Administration: Lessons Learned From International Experience in Congestion Pricing, https://ops.fhwa.dot.gov/publications/fhwahop08047/02summ.htm
21 H-GAC: Hurricane Evacuation Planning, https://www.h-gac.com/hurricane-evacuation-planning/default.aspx
22 Harris County: Flood Education Mapping Tool, https://www.harriscountyfemt.org/

Conclusion

Houston Urban Core Revival will allow Houston to grow sensibly, creating safe and clean mobility options for everyone. More work is needed from many disciplines. Engineering work is needed to determine the boundaries of the CCZ, to design the downtown green belt and boulevards, and to nominate locations for pedestrian bridges. A study is needed to set initial congestion prices. Public meetings are needed to increase public support and to improve the plan through feedback. Legal research is needed to find funding sources. Harris County and the City of Houston may adopt this plan, then collaborate with state and federal agencies to implement it.

Appendix A – Upcoming Road Widening Projects inside Beltway 8

Road to Be Widened	From Limit	To Limit	Construction Cost Estimate*	Length (miles)	Bid Date (Earliest if multiple)	Notes	TxDOT Project IDs
I-45 and I-69	Spur 527	I-10	$3,631,178,000	4.5	2021-Sep	NHHIP Segment 3	002713200 002713201 050003599 050003601 050008001
I-45 (North Fwy)	I-10	Beltway 8 North	$1,956,700,000	10.1	2024-Feb	NHHIP Segments 1&2	011006132 011006139 050003446 050003560 050003596
Hempstead Rd	610 West Loop	Jones Rd	$900,000,000	10.1	2028-Jan		091272598 091272599 091272601 091272603
610 (West Loop)	I-69 (Southwest Fwy)	I-10 (Katy Fwy)	$350,000,000	4.8	2025-Sep		027117162
I-10 (Katy Fwy)	Studemont St	Houston Ave	$211,600,000	1.2	2026-Jan		027107326
SH 249	Beltway 8 North	I-45 (North Fwy)	$95,000,000	7.2	2025-Aug		072003131
Gessner Rd	N of Briar Forest	Richmond Ave	$40,816,000	2.0	2023-Oct		091272382 091272383
Fondren Rd	Braeswood Blvd S	Airport Blvd W	$29,900,000	2.2	2021-Jun		091272381

*Construction cost estimate does not include costs for engineering, land acquisition, or relocation assistance for displaced residents and businesses.

Source: TxDOT Project Tracker, https://www.txdot.gov/inside-txdot/projects/project-tracker.html