Dallas to Houston Intercity Rail: Roadmap for Implementation

May 2, 2024

The University of Texas at Austin
Community and Regional Planning
School of Architecture
About Us

- Graduate students at UT Austin’s School of Architecture - City and Regional Planning Program
- This course is a Practicum - aimed at studying a real problem and offering real solutions

(L and top) Recent field trip viewing possible rail corridors from Houston to Dallas;
(R) Meeting with Judge Brown and Texas Rail Advocates conference
The Mission

- Should Dallas-Houston be connected by passenger rail?
  - If so, which mode produces the most benefit (high speed rail, high performing rail, conventional rail) to TEXANS?
- Forget the actors for a moment
  - Sketch the ideal traits of developers and operators to serve the needs of Texans
- Build a policy roadmap with a nod to realistic politics
Special Thanks - Advisors

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Senior Program Manager
AECOM

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Principal
Nelson/Nygaard

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Transportation Executive & Consultant

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Federal Railroad Administration

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AECOM

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Northern California Regional Director
California High-Speed Rail Authority

Andy Brown
Judge
Travis County

Emma Hilbert
Policy Council
Travis County

Ming Zhang
Director CRP
UT Austin
Special Thanks - Interviewees

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Independent
BNSF Consultant

Dr. Theresa Daniel
County Commissioner
Dallas County

Desi Porter
Exec. Director
Texans Against
High Speed Rail

Brendon Wheeler
Program Manager
North Central
Texas Council of
Governments

David Brewer
County Commissioner
Navarro County

Kyle Workman
County Commissioner
Leon County

Adam Krom
Director of
Planning
Amtrak
Agenda

- Approach
- Benefits & Costs
- Funding
- Governance
- Recommendations
Approach
Reasoning for Studying BCA and Governance

**Introduction**

- Monetization of benefits and costs of each presented option
- BCA provides a benchmark for evaluation and comparison for investment decisions

**Approach**

- Conceptualization of a system based approach
- Establishment of a single point of accountability

**Benefits & Costs**

**Funding**

**Governance**

**Recommendations**
Topics Outside of Scope

No precise alignments; only general corridors + existing proposals

No operating details, for both freight and passenger

Not prescriptive of station locations, unless in existing proposal
Problem Statement: The Houston to Dallas metro areas are experiencing increasing population and people need more options for transportation between the two regions.
What type of infrastructure is most appropriate to provide mode shift options in the corridor between?

- High speed rail;
- High performance passenger rail; or
- Conventional passenger rail?
Guiding Questions: When?

For whichever strategy is chosen, when should the process begin and over what time scale?
Which corridors are most well suited to house each type of infrastructure?
Who should own the infrastructure?
Who should operate the rail?
Who should develop the stations?
Why Texas?
American Commerce Depends on Texas

States with a smaller population than DFW and Houston MSA
Rapid Population Growth

- Harris County is expected to grow by 1.5 M by 2060
- Dallas County is expected to grow by nearly a half a million by 2060

Source: Texas Demographic Center
Texas is at the geographic intersection of USMCA trade routes

48% of USMCA trade products are transported through Texas using the I-35 corridor
People Need the Option

- No better city pairings for passenger rail
- Topography is perfect
- Similarly large metro areas
- High-Speed rail is competitive for distances under four hours driving
Why Now?
America’s Cargo Capacity is Maxed Out

**The New York Times**

**FLIGHT RISKS**

**Airline Close Calls Happen Far More Often Than Previously Known**

*Near-miss cargo/passenger collision at Austin airport, 2023*

*Baltimore Bridge Collapse from Cargo Ship safety errors*

*Palestine, OH Derailment of hazardous materials*
Passengers Are an Afterthought

- Texas’ population is exploding and our infrastructure is bursting at the seams
- Demand for cargo capacity is only growing with more eCommerce and USMCA trade from nearshoring
Growing freight demand strains highways:

eCommerce → increased freight transportation

### Freight is at Max Capacity

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>Freight by Value - All Modes ($2022 millions)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Texas</td>
<td>3,132,697</td>
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<td>2</td>
<td>California</td>
<td>2,845,127</td>
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<td>3</td>
<td>Illinois</td>
<td>1,571,888</td>
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<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>Freight by Value - Trucks ($2022 millions)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Texas</td>
<td>2,053,701</td>
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<tr>
<td>2</td>
<td>California</td>
<td>1,896,400</td>
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<tr>
<td>3</td>
<td>Illinois</td>
<td>1,123,656</td>
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</tbody>
</table>
Growing freight demand strains highways:

92% increase in truck freight value expected by 2050
Freight Rail is at Max Capacity

Intercity rail for passengers is equally important:

- Reliability and safety increase
- Reduces SOV traffic
- Efficiency of movement
- Economic growth

Source: Litman and Fizzroy 2012, based on FHWA and APTA data

Litman & Fizzroy, 2012
HSR is 8x more energy efficient than planes & 4x more than cars
- 14-16x reduction in Greenhouse Gas (GHG) emissions
- Less dependence on foreign oil
- Improvement in air quality

Must Move Toward Environmental Sustainability
Induced & Needed Indirect Benefits

There are a variety of benefits that Texas could miss out on…

- Increases in tax revenue (Japan)
- Benefits to per-capita GDP (China)
- Increased opportunity along HSR corridors
- Increased quality of life
If we continue to do nothing:

- Travel time on IH 45 to increase to 6.5 hours by 2035
- Freight trucks will suffer
- ~22% of these vehicles are freight trucks
Why Not Now?

- Not a priority in Republican-led state
- Previous attempts failed
- Private property ownership culture at odds with eminent domain needs
- Infrastructure costs are high
- Lack of organization
Benefits & Costs
Why not the IH-45 Corridor?

- Meanders too much for high-speed rail co-alignment
- Not enough ROW in median
- Other, non-greenfield options in conventional rail
Why not the IH-45 Corridor?

- Meanders too much for high-speed rail co-alignment
- Not enough ROW in median
- Other, non-greenfield options in conventional rail

Median: ~13’
Why not the IH-45 Corridor?

- Meanders too much for high-speed rail co-alignment
- Not enough ROW in median
- Other, non-greenfield options in conventional rail

284A (Dallas)
Median: ~22.5'
### Options Overview

<table>
<thead>
<tr>
<th>Mode</th>
<th>Most Like…</th>
<th>Maximum Speeds</th>
<th>Greenfield?</th>
<th>Build</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Speed Rail</td>
<td>Japanese Shinkansen</td>
<td>160–200 mph (260–320 km/h)</td>
<td>Yes</td>
<td>On Texas Central’s proposed utility corridor</td>
</tr>
<tr>
<td>High Performance Passenger Rail</td>
<td>Amtrak Northeast Corridor (Acela)</td>
<td>90–125 mph (145–200 km/h)</td>
<td>Yes</td>
<td>Alongside existing UP/BNSF track</td>
</tr>
<tr>
<td>Conventional Passenger Rail</td>
<td>Amtrak Long Distance Routes</td>
<td>55–80 mph (88–127 km/h)</td>
<td>No</td>
<td>Use existing UP/BNSF track</td>
</tr>
</tbody>
</table>
## Proposals

<table>
<thead>
<tr>
<th>#</th>
<th>Projects Evaluated</th>
<th>Proposed by…</th>
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<tbody>
<tr>
<td>1</td>
<td>High Speed Rail</td>
<td>Texas Central</td>
</tr>
<tr>
<td>2</td>
<td>High Performance Passenger Rail - UP</td>
<td>Hypothetical</td>
</tr>
<tr>
<td>3</td>
<td>High Performance Passenger Rail - BNSF</td>
<td>Hypothetical</td>
</tr>
<tr>
<td>4</td>
<td>High Performance Passenger Rail - Collaborative</td>
<td>Hypothetical</td>
</tr>
<tr>
<td>5</td>
<td>Conventional Rail - UP</td>
<td>TxDOT/Amtrak</td>
</tr>
<tr>
<td>6</td>
<td>Conventional Rail - BNSF</td>
<td>Hypothetical</td>
</tr>
<tr>
<td>7</td>
<td>Conventional Rail - Collaborative</td>
<td>Hypothetical</td>
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</tbody>
</table>
Proposal Alignments

<table>
<thead>
<tr>
<th>High Speed Rail</th>
<th>UP (HPPR &amp; Conventional)</th>
<th>BNSF (HPPR &amp; Conventional)</th>
<th>Collab (HPPR &amp; Conventional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas</td>
<td>Dallas</td>
<td>Dallas</td>
<td>Dallas</td>
</tr>
<tr>
<td>Brazos Valley</td>
<td>Corsicana</td>
<td>Waxahachie</td>
<td>Corsicana</td>
</tr>
<tr>
<td></td>
<td>Hearne</td>
<td>College Station</td>
<td>College Station</td>
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<td>Navasota</td>
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</tbody>
</table>
Calculate **direct** monetary benefits for each proposal

- Travel Time Savings
- Reduction in Crashes
- Residual Value
- Operating Cost Savings
- Reduced Emissions Damage
## Comparative Table

<table>
<thead>
<tr>
<th></th>
<th>Ridership (2035 est. millions)</th>
<th>Benefits ($2022 millions)</th>
<th>Costs ($2022 millions)</th>
<th>Benefit-Cost Ratio</th>
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<tbody>
<tr>
<td>High Speed Rail</td>
<td>2.41</td>
<td>$26,250</td>
<td>$37,500</td>
<td>0.70</td>
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<tr>
<td>HPPR - UP</td>
<td>0.46</td>
<td>$7,104</td>
<td>$19,200</td>
<td>0.37</td>
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<tr>
<td>HPPR - BNSF</td>
<td>0.50</td>
<td>$7,544</td>
<td>$18,400</td>
<td>0.41</td>
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<tr>
<td>HPPR - Collaborative</td>
<td>0.53</td>
<td>$8,010</td>
<td>$17,800</td>
<td>0.45</td>
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<tr>
<td>Conventional - UP</td>
<td>0.09</td>
<td>$1,065</td>
<td>$1,500</td>
<td>0.71</td>
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<tr>
<td>Conventional - BNSF</td>
<td>0.10</td>
<td>$1,320</td>
<td>$1,500</td>
<td>0.88</td>
</tr>
<tr>
<td>Conventional - Collaborative</td>
<td>0.10</td>
<td>$1,526</td>
<td>$1,400</td>
<td>1.09</td>
</tr>
</tbody>
</table>
Comparison

Benefits

- Conventional - Collab
- Conventional - UP
- Conventional - BNSF
- HPPR - Collab
- HPPR - UP
- HPPR - BNSF

Costs

- Conventional - Collab
- Conventional - UP
- Conventional - BNSF
- HPPR - Collab
- HPPR - UP
- HPPR - BNSF

$26.5B

$37.5B
High Speed Rail

Alignment chosen by Texas Central after EIS completion

70% of alignment runs alongside an existing utility corridor

Highest benefits in terms of raw numbers, but also very high capital cost

At a Glance

- 2.41M riders (2035)
- 90 minutes
- 240 miles
- 0.70 B/C ratio

Introduction
Approach
Benefits & Costs
Funding
Governance
Recommendations
High Performance Passenger Rail (UP Alignment)

At a Glance

- 463K riders
- 207 minutes
- 311 miles
- 0.37 B/C ratio

New tracks would run parallel to the existing UP tracks.

Alignment is the longest distance of all of the options.

Introduction

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High Performance Passenger Rail (BNSF Alignment)

At a Glance

- 496K riders
- 198 minutes
- 297 miles
- 0.41 B/C ratio

New tracks would run parallel to the existing BNSF tracks

Slightly shorter route than the UP corridor alternative
High Performance Passenger Rail (Collaborative Alignment)

**At a Glance**

- **530K riders**
- **191 minutes**
- **286 miles**
- **0.45 B/C ratio**

Would run parallel to BNSF tracks for about 80%, and parallel to UP for about 20%

Would stop in fewer towns but be a faster trip time between Dallas-Houston

**Introduction**

Would run parallel to BNSF tracks for about 80%, and parallel to UP for about 20%

Would stop in fewer towns but be a faster trip time between Dallas-Houston
Conventional Rail (UP Alignment)

Train stops in Corsicana, Hearne, and Navasota, per TxDOT Corridor ID grant application

Parts of this UP track can run up to 15 trains per day

At a Glance

- 89K riders
- 270 minutes
- 311 miles
- 0.71 B/C ratio
Conventional Rail (BNSF Alignment)

At a Glance

- 95K riders
- 258 minutes
- 297 miles
- 0.88 B/C ratio

Would run on existing BNSF right-of-way where they currently operate up to 10 trains per day

Slightly shorter route than the UP corridor alternative

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Recommendations

Would run on existing BNSF right-of-way where they currently operate up to 10 trains per day

Slightly shorter route than the UP corridor alternative
**Conventional Rail (Collaborative Alignment)**

- **At a Glance**
  - **100K riders**
  - **249 minutes**
  - **286 miles**
  - **1.09 B/C ratio**

Shortest possible route between Houston and Dallas using existing freight corridors. Would run on both UP and BNSF tracks, switching in Corsicana.
Across all options, savings from crashes and travel time were by far the highest.

Operating cost savings and residual value were about equal across the board.

Emissions savings were lowest for all options, but still positive.
BCA Takeaways

HPPR performs the worst—can spend proportionately more for much better HSR

Conventional with best B/C ratios—low raw benefits, but also low capital cost

HSR has the largest raw benefits, but the capital cost is extremely high
Indirect Benefits

- BCA only outlines **direct** benefits
- But, there are many **indirect** benefits
  - Economic agglomeration
  - Labor market integration
  - Future-proofing for growth
  - Ease of travel and comfort
  - Evacuation use
  - And more…
Indirect Benefits

- HSR would contribute most indirect benefits
  - HSR has the highest ridership numbers
  - In long-term, HSR can handle growth best
  - More cars off of road means less need for road expansion
Funding
Funding Considerations

Who will manage the funds?

- What’s needed:
  - A bank account
  - A financial manager
  - Capacity to receive public and private funding
Federal Grants
- Funds from Bipartisan Infrastructure Law: $66 billion

Future legislation
- Federal government interested in further in high speed rail investment nationwide
- Clean energy & green jobs legislation

Source: FRA
### Possible Funding Sources

**Federal financing programs**

- Transportation Infrastructure Finance and Innovation Act (TIFIA)
- Railroad Rehabilitation and Improvement Financing (RRIF)
- State Infrastructure Banks (SIB)
- Section 129 Loans
- Grant Anticipation Revenue Vehicles (GARVEEs)
Possible Funding Sources

State and Local funds

- Statewide and Citywide Bonds
  - General Obligation bonds
  - Revenue bonds

- Taxes and Fees
  - Carbon cap & trade
  - Gasoline tax
Possible Funding Sources

Private Financing:

- Public-Private Partnerships
  - Lower capital costs
  - Private sector flexibility
  - Risk-sharing benefit

- Private Activity Bonds (PABs)

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<td>Traditional Design-Bid-Build</td>
<td></td>
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<tr>
<td>Design-Build (DB)</td>
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<td>X</td>
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<tr>
<td>Design-Build-Finance (DBF)</td>
<td>X</td>
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<tr>
<td>Design, Build, Finance, Operate and Maintain (DBFOM)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes, if toll or traffic-based payment</td>
<td>Yes, if performance-based payment</td>
</tr>
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</table>

Source: Federal Highway Administration
High Speed Rail

- Estimated cost = $37.5 Billion
- Cost/mile = $156.25 Million
- “Blended approach”
  - Federal grants (BIL)
  - Federal direct loans
  - Tax-exempt bonds
  - Private activity bonds
  - Developer equity
Conventional Rail - UP Alignment

- Estimated Cost = $1.5B
- Cost per mile = $4.82M
- Mostly government funding
  - BIL
  - DOT/FRA
  - State subsidies
  - Future legislation
Governance
Existing Rail Governance Models

**Integration Model**
- Unified Operations & Development
- Consolidated/nationalized rail infrastructure and development
- Ex: France, Switzerland, California

**Separation Model**
- Separate Operations & Development
- An entity receives funding and manages subsidiaries in charge of operations and development
- Ex: Spain, Japan, UK
Recommending Governance Model

We Recommend

Separation Model

The Managing Body:

- Plans and funds programs
- Adapts to changing demands and conditions
- Contracts development and operations to subsidiaries
- Manages growth and public relations
- Is State supported, regionally led
Spain’s Separation Model

Oversight
Spanish Government

Managing Body
ADIF

Acting Divisions
Development
Renfe

Sub-divisions
Railway Development
Station Development
Maintenance
Rolling Stock Management
Passenger Transport Operators
Ticketing Operations

Ouigo España
Iryo

Renfe used to be sole state operator until competition recently arose
**Japan’s Separation Model**

**Oversight**
- Japanese Government

**Managing Body**
- Japan Railway Construction, Transport and Technology Agency (JRTT)

**Acting Divisions**
- Japanese Freight Railway Company

**Sub-divisions**
- Railway Development
- Station Development
- Maintenance
- Rolling Stock Management
- Passenger Transport Operators
- Ticketing Operations

**State-Owned Enterprises (SOEs)**
- Japan’s Railways Group (JR Group)
  - JR Shikoku
  - JR West
  - JR Hokkaido
  - JR Central
  - JR East
  - JR Kyushu

**Introduction**
- Approach
- Benefits & Costs
- Funding
- Governance
- Recommendations

**Development**
- JRTT owns these because of underperformance

**Operations**
- JR Shikoku
- JR Hokkaido
- JR West
- JR Central
- JR East
- JR Kyushu
Proposed Separation Model for Texas

Oversight
- Funding Bodies: USDOT, FRA, FTA, Investors, etc.
- Regulatory Bodies: TxDOT, Localities, EPA, FRA, etc.

Managing Body
- New Development Division

Acting Divisions
- Development
- Operations
- Freight Partners
- Potential for new competition (like in Spain)

Sub-divisions
- Railway Development
- Station Development
- Maintenance
- Rolling Stock Management
- Passenger Transport Operators
- Ticketing Operations

Introduction
- Approach
- Governance
- Recommendations
  - Benefits & Costs
  - Funding
  - Recommendations
Simplified Model for Texas

Texas Railroad Authority

Development Division

Operations Division

Introduction | Approach | Benefits & Costs | Funding | Governance | Recommendations
Proposed Authority Structure

Board of Directors

Legal Counsel

Chief Executive Officer

Audit Services

Finance & ITS

Legislative Affairs

Strategic Communications

Program Delivery

Regional Leads

Dallas, Houston, Brazos Valley, etc.

Texas Railroad Authority
Managing Body Job Description

✓ History of forming relationships with local and governmental entities
✓ Ability to navigate financing mechanisms
✓ Understanding of rail operations and development
✓ Local, Texan knowledge
Demonstrated ability in:

- Route planning
- Service planning
- Ticketing services

Holds a clean safety record
Experience with regulatory processes (e.g. NEPA)
Holistic view of impacts: equity, environmental, and economic
Adaptive to change
Proficient in partnerships
Managing Body Board Membership

- TxDOT
- Amtrak
- Investors
- Relevant Counties
- Freight Companies
- Relevant Cities
- COGs/MPOs
- etc.
Recommendations for Organizing

- Partner & cooperate with freight companies
- Gain allies at the state legislature
- Engage locals and other partners
Making the Argument at a State Level

- Proven business model
- Strong ROI for economic growth
- Strong job creation
- Tourism promotion
- Expanding job opportunities
- Freeing room for 18-wheelers (freight)
- Shared use is not ideal for freight rail
- Vastly enhanced highway safety
Recommendations
Build Capacity Now

- Purchase land for future alignments
- Build trust through partnerships with freight companies and shown commitment to work
- Prove ridership is viable
- Coordinate federally allocated funding to be co-beneficial
Incremental Approach

- Prioritize conventional rail now
- Target collaborative alignment (UP+BNSF) option between Dallas & Houston
- Conduct preliminary studies with freight cooperation
- Create shared-use agreements with UP & BNSF
Develop incrementally, build capacity along the way

- Develop conventional rail now
- Work towards establishing the Texas Rail Authority; High Speed rail will take more sophisticated governance, funding, and will need bipartisan political momentum
In the meantime…
- Establish the TRA now
- Begin forming stronger partnerships with freight entities, focusing on co-benefits
- Improve rail capacity
- Lay the groundwork for future HSR, begin ROW acquisition
Texas Railroad Authority

Pursuing Conventional Rail

Planning for HSR

Recommendations
Summary Roadmap

**Introduction**

- Texas Railroad Authority

**Approach**

- Establish the TRA
- Pursue Conventional Rail on Collaborative Alignment

**Benefits & Costs**

- Build relationships with freight
- Seek political allies
- Right-of-way acquisition

**Funding**

**Governance**

**Recommendations**

- Build High Speed Rail on Utility Corridor
Questions?
Discussion
Appendix
<table>
<thead>
<tr>
<th>Proposal</th>
<th>Time Travel Savings</th>
<th>Reduced Crash Costs</th>
<th>Reduced Emissions</th>
<th>Operating Cost Savings</th>
<th>Residual Value</th>
<th>Estimated Capital + O&amp;M Cost</th>
<th>B/C Ratio</th>
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<tbody>
<tr>
<td>High Speed Rail</td>
<td>$7.9B</td>
<td>$8.2B</td>
<td>$591M</td>
<td>$4.0B</td>
<td>$6.4B</td>
<td>$37.5B</td>
<td>0.70</td>
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<tr>
<td>HPPR - UP</td>
<td>$1.6B</td>
<td>$2.1B</td>
<td>$166M</td>
<td>$1.0B</td>
<td>$3.2B</td>
<td>$19.2B</td>
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<tr>
<td>HPPR - BNSF</td>
<td>$1.9B</td>
<td>$2.3B</td>
<td>$168M</td>
<td>$1.1B</td>
<td>$3.1B</td>
<td>$18.4B</td>
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<td>$2.4B</td>
<td>$168M</td>
<td>$1.1B</td>
<td>$3.0B</td>
<td>$17.8B</td>
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<tr>
<td>Conventional - UP</td>
<td>$288M</td>
<td>$423M</td>
<td>$34M</td>
<td>$195M</td>
<td>$231M</td>
<td>$1.5B</td>
<td>0.71</td>
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<tr>
<td>Conventional - BNSF</td>
<td>$430M</td>
<td>$450M</td>
<td>$28M</td>
<td>$209M</td>
<td>$220M</td>
<td>$1.5B</td>
<td>0.88</td>
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<tr>
<td>Conventional - Collaborative</td>
<td>$602M</td>
<td>$477M</td>
<td>$30M</td>
<td>$221M</td>
<td>$213M</td>
<td>$1.4B</td>
<td>1.09</td>
</tr>
</tbody>
</table>

*All figures in 2022 dollars; benefits and costs discounted 3.1%, 2.0% for CO2, per 2024 USDOT BCA Guidance*
Did you consider the cost of doing nothing?
- In many of the benefits, the no build scenario was estimated.
- The build scenario values were subtracted from the no build scenario to get a final benefit value.
- Therefore, the cost of doing nothing is implied in the benefits (i.e. we are missing out on benefits by not building option X)
How did you estimate ridership?

- Weighted average of 3 sources estimating daily trips/people traveling between Dallas and Houston
  - Amtrak est. (2022), TxDOT est. (2011), and Texas Central est. (2029)
  - Weights - Amtrak (.6), TxDOT (.3), TX Central (.1)

- Each sources’ date of estimation was scaled up to 2035 and 2065 using future population growth rate estimates
  - Used Texas Demographic Center 2060 - 0.5 migration scenario, intended for long-range planning
Did you consider a bump in ridership for options that would pass through College Station?

- This study only looked at trips between Dallas and Houston using existing sources.
- We would have to be more speculative about ridership to and from College Station using more extrapolative methods (e.g. looking at AADT on roads between IH 45 and College Station, then assuming a % shift to rail).
- Football gameday surges are difficult to account for in our ridership analysis without a more complex model.
What was the period of analysis for the BCA?

- 30 year analysis period, assuming that the opening dates for all of the options is 2035
- Therefore, the analysis period was from 2035 to 2065
Did you consider inflation?

- All calculations for benefits and costs were done in 2022 dollars, per 2024 USDOT BCA Guidance.
  - This means that future anticipated inflation does not affect the dollar outputs in the analysis because everything is expressed in raw 2022 dollars.
What is discounting and why was it applied to the BCA?

- Discounting is the principle that benefits and costs that occur sooner in time are more highly valued than those that occur in the future.
- 2024 USDOT BCA Guidance requires that benefits and costs be discounted at a rate of 3.1%, except for carbon dioxide emissions, which are discounted at a rate of 2.0%.
What is discounting and why was it applied to the BCA? (continued)

○ An illustration of a 3.1% discount rate is shown below
What is residual value?

- Residual value is the estimated worth of an asset following full depreciation.
- The useful life of all the projects here were assumed to be 100 years.
  - Major infrastructure projects like rail are expected to have very long useful lives—100 years is reasonable for a BCA on rail assets (assuming proper maintenance).
● Why weren’t ticket sales counted as a benefit?
  ○ Per the most recent 2016 FRA BCA Guidance (most relevant to passenger rail), you should not calculate passenger ticket sales as a benefit
  ○ Fares and fees considered “transfers of the value of real benefits” between users and the rail entity, and would therefore represent double counting benefits
<table>
<thead>
<tr>
<th>Corridor</th>
<th>Intersections Based on AADT Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AADT =&gt;30000</td>
</tr>
<tr>
<td>Utility</td>
<td>19</td>
</tr>
<tr>
<td>BNSF</td>
<td>33</td>
</tr>
<tr>
<td>UP</td>
<td>31</td>
</tr>
<tr>
<td>Collaborative</td>
<td>36</td>
</tr>
</tbody>
</table>
Summary Roadmap

Short-Term
- Establish the TRA
- Pursue Conventional Rail on Collaborative Alignment

Mid-Term
- Build relationships with freight
- Seek political allies
- Right-of-way acquisition

Long-Term
- Build High Speed Rail on Utility Corridor

Introduction | Approach | Benefits & Costs | Funding | Governance | Recommendations
# Options Overview

<table>
<thead>
<tr>
<th>Mode</th>
<th>Most Like…</th>
<th>Maximum Speeds</th>
<th>Greenfield?</th>
<th>Build</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Speed Rail</td>
<td>Japanese Shinkansen</td>
<td>160–200 mph (260–320 km/h)</td>
<td>Yes</td>
<td>On Texas Central’s proposed utility corridor</td>
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<tr>
<td>High Performance Passenger Rail</td>
<td>Amtrak Northeast Corridor (Acela)</td>
<td>90–125 mph (145–200 km/h)</td>
<td>Yes</td>
<td>Alongside existing UP/BNSF track</td>
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<tr>
<td>Conventional Passenger Rail</td>
<td>Amtrak Long Distance Routes</td>
<td>55–80 mph (88–127 km/h)</td>
<td>No</td>
<td>Use existing UP/BNSF track</td>
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</tbody>
</table>
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Dallas to Houston Intercity Rail: 
Roadmap for Implementation

May 2, 2024