Go West! Getting Commuter Rail on Track

Rail~Volution 2016 | San Francisco, CA
October 12, 2016

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More Than Commuting

What Commuter Rail Has Been and Can Be

Loren Herrigstad

Transportation Development

Note: Switch to Notes Page view for this page only to see additional speaker bio information.

We will explore . . .

What Commuter Trains are

How they developed

What they can do

And why they perhaps shouldn’t really be called Commuter Trains anymore

Commuter Trains . . .

- **Are operated mostly on existing rail infrastructures, often being legacies from the past**
- **Tend to have longer routes than other forms of rail transit:**
  - **– Commuter Rail: 20 – 80 miles**
  - – Heavy Rail: 15 – 40 miles
  - – Light Rail: 5 – 20 miles
  - – Streetcars: ≤ 5 miles
- **Their stations are spaced farther apart:**
  - **– Commuter Rail: 2 – 10 miles**
  - – Heavy Rail: 0.5 – 5 miles
  - – Light Rail: 0.5 – 2 miles
  - – Streetcars: 0.25 – 0.5 miles
- **Tend to have lower Capital Costs:**
  - **– Commuter Rail: $1.3 – $26 million/mile**
  - – Heavy Rail: $60 – $2,100 million/mi
  - – Light Rail: $25 – $204 million/mi
  - – Streetcars: $2 – $50 million/mi

US DOT FHA & FTA 2001 & PublicTransport.about.com 2016 data

Commuter Trains . . .

- **Can operate on at-grade / un-segregated corridors**
- **Tend to be operated at rush hours**
- **At frequencies of:**
  - **– Commuter Rail: 10 – 60 minutes**
  - – Heavy Rail: 2 – 20 min
  - – Light Rail: 5 – 20 min
  - – Streetcars: 5 – 60 min
- **At higher speeds:**
  - **– Commuter Rail: 30 mph (avg) / 90 mph (max)**
  - – Heavy Rail: 30 mph (avg) / 70 mph (max)
  - – Light Rail: 15 mph (avg) / 65 mph (max)
  - – Streetcars: 8 – 15 mph (avg) / 45 mph (max)
- **Offering flexible capacities:**
  - **– Commuter Rail: 2,000 – 78,000 pphpd**
  - – Heavy Rail: 50,000 pphpd
  - – Light Rail: 16,000 pphpd
  - – Streetcars: 2,000 pphpd

US DOT FHA & FTA 2001 & PublicTransport.about.com 2016 data

First Passenger Trains

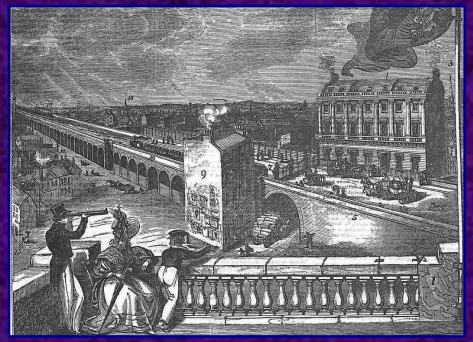
Oystermouth Railway (1807)
Swansey, Wales, UK
- World's first passenger railway
- Served 7 stations along 5.5 mile route

Baltimore & Ohio Rail Road (1830)
Baltimore – Ellicott Mills, Maryland
- America's first passenger railway
- Served 4 stations along 13 mile route

Chemin de Fer Saint Étienne a Lyon (1830)
Saint Étienne – Givors, France
- Continetal Europe's first passenger railway
- Served 5 stations along 22.2 mile route

Liverpool and Manchester Railway (1830)
Liverpool – Manchester, UK
- First "modern" railway
- Served 25 stations along 35 mile (flat) route

First Commuter Lines



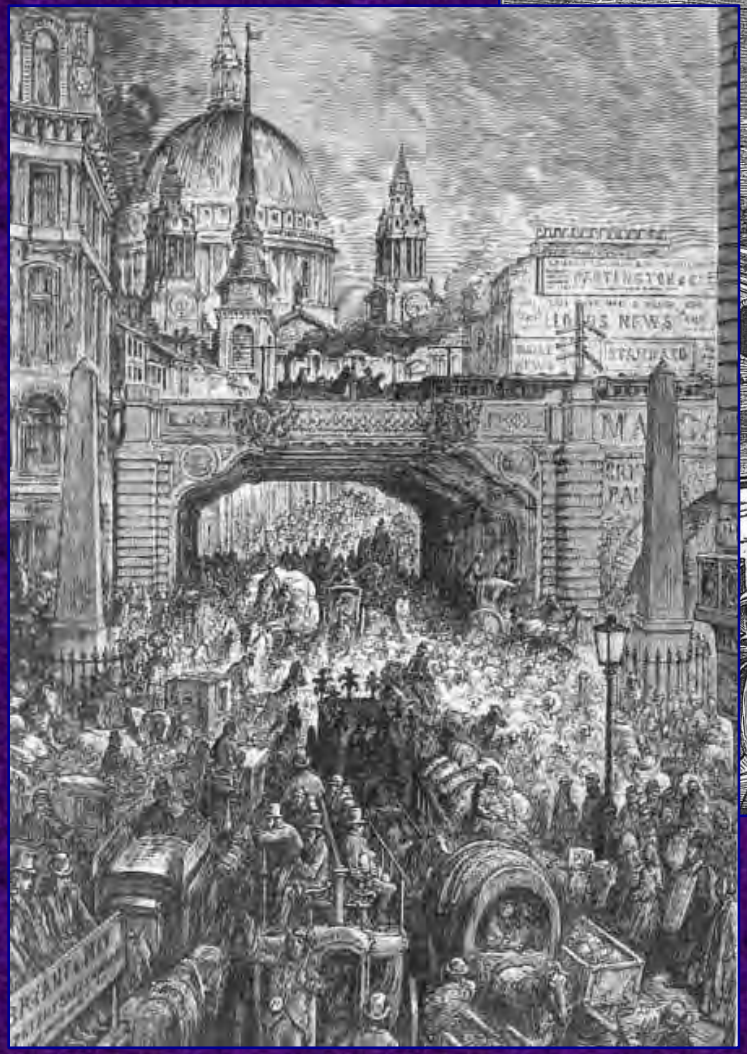
London & Greenwich Railway (1836)
London Spa Road – Deptford, UK
- London's first passenger railway & terminus
- Served 3 stations along 4 mile route

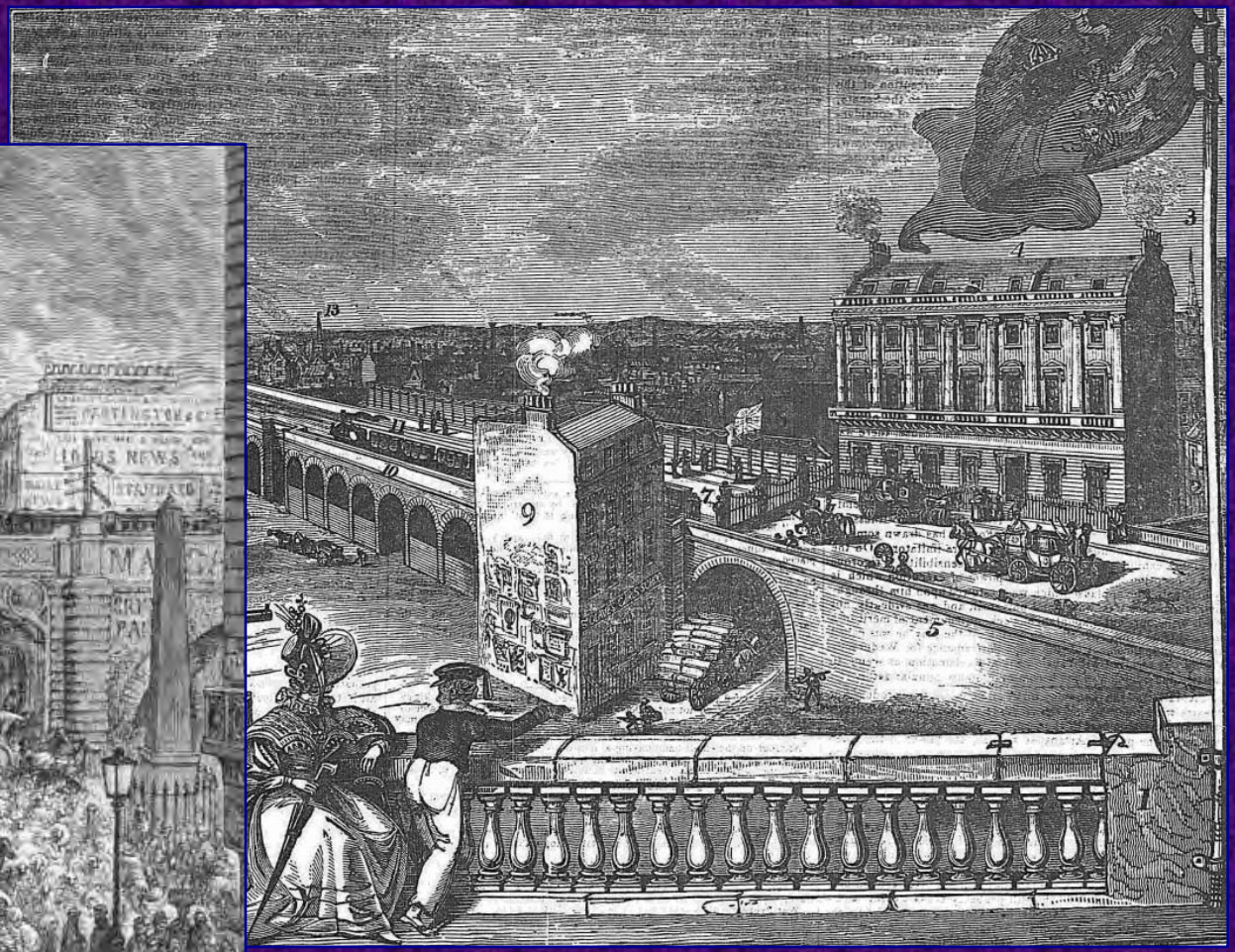
Long Island Rail Road (1836)
Brooklyn – Jamaica, NY
- New York's first passenger railway
- Served 5 stations along 10 mile route

Chemin de Fer Paris a St Germain (1837)
Paris – St Germain, France
- Paris' first passenger railway & terminus
- Served 8 stations along 12 mile route

Railways coined term “Commuter” as well . . .

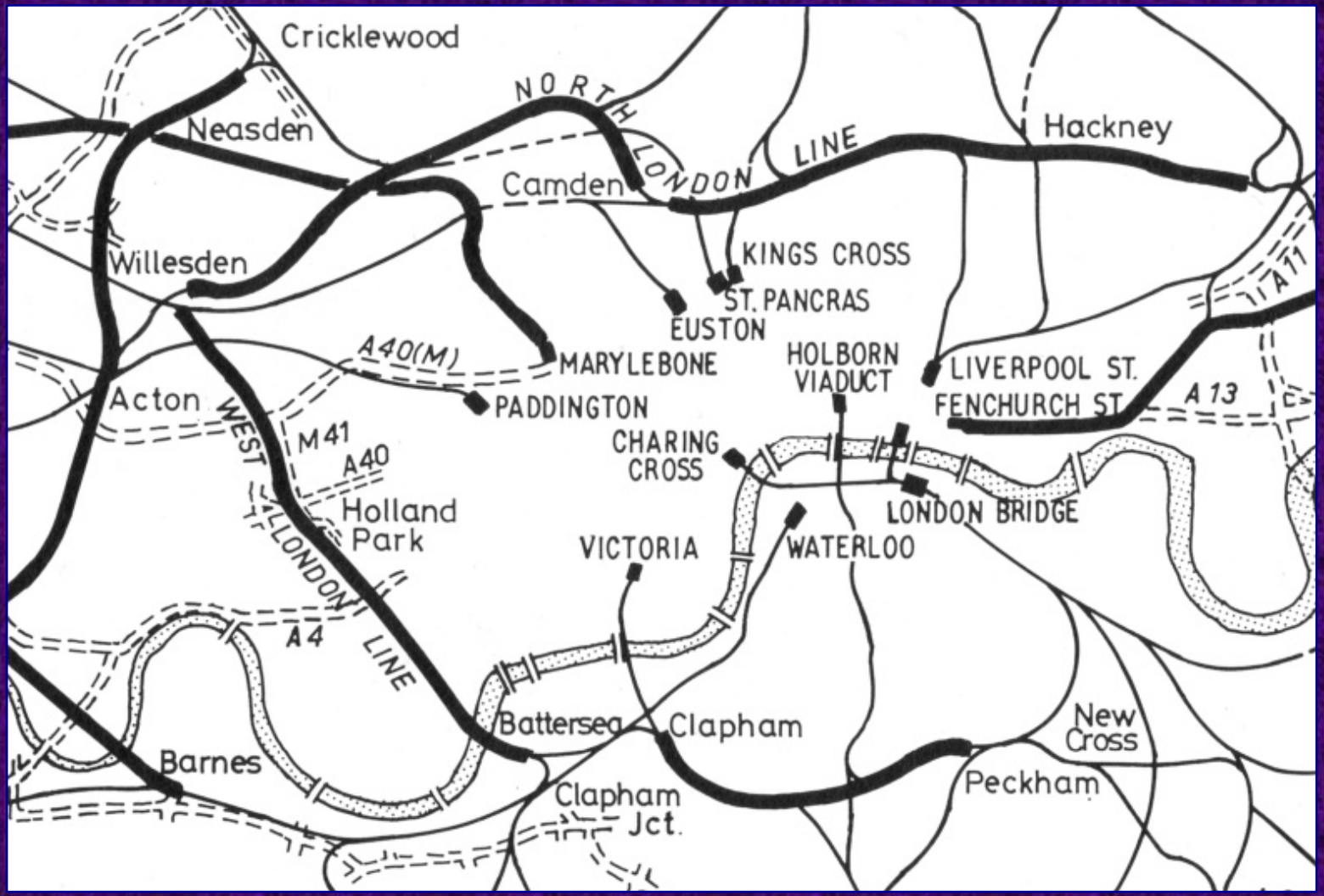
The railways' original "Last Mile" problem . . .



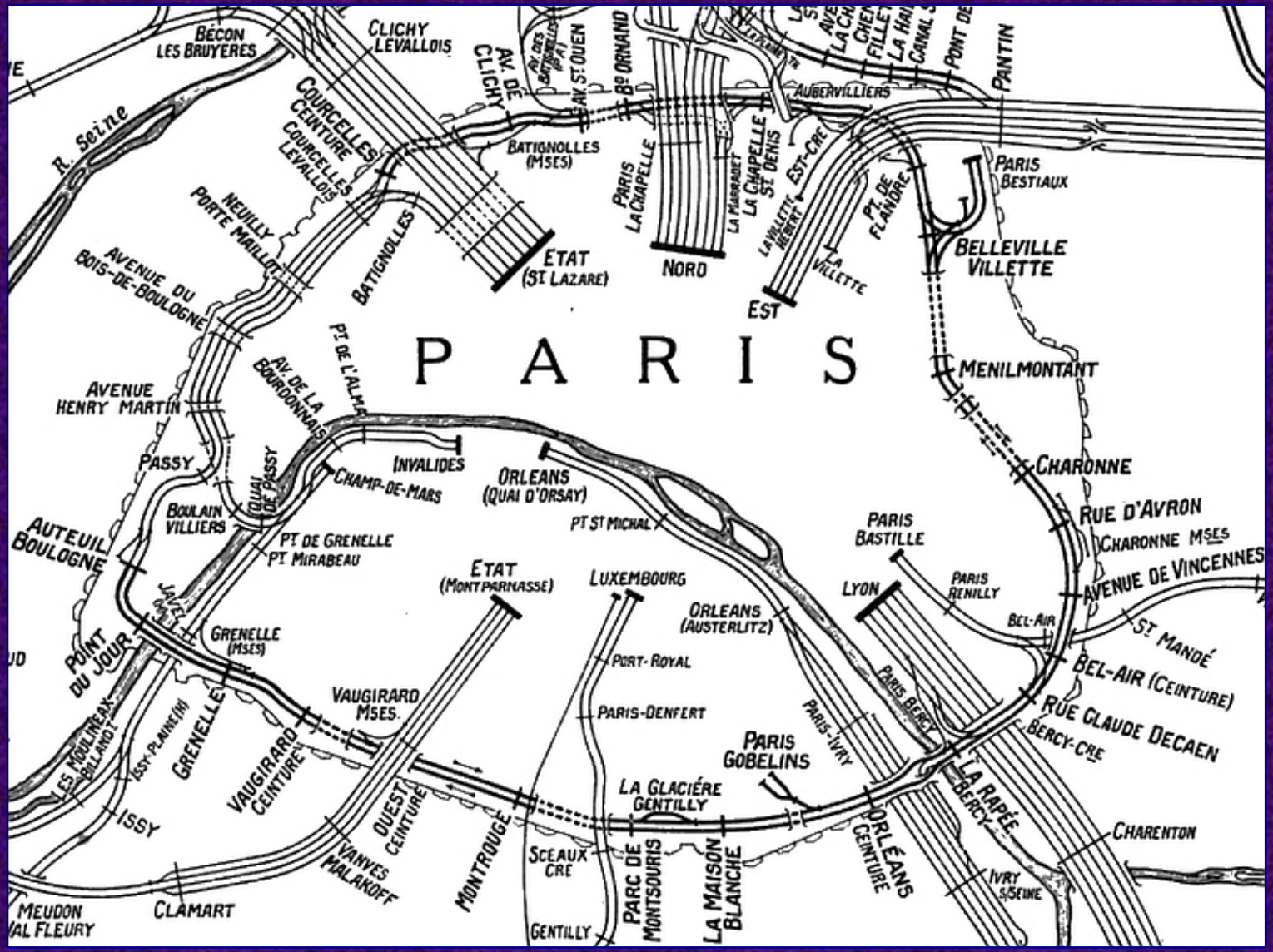


. . . It was expensive to get into town

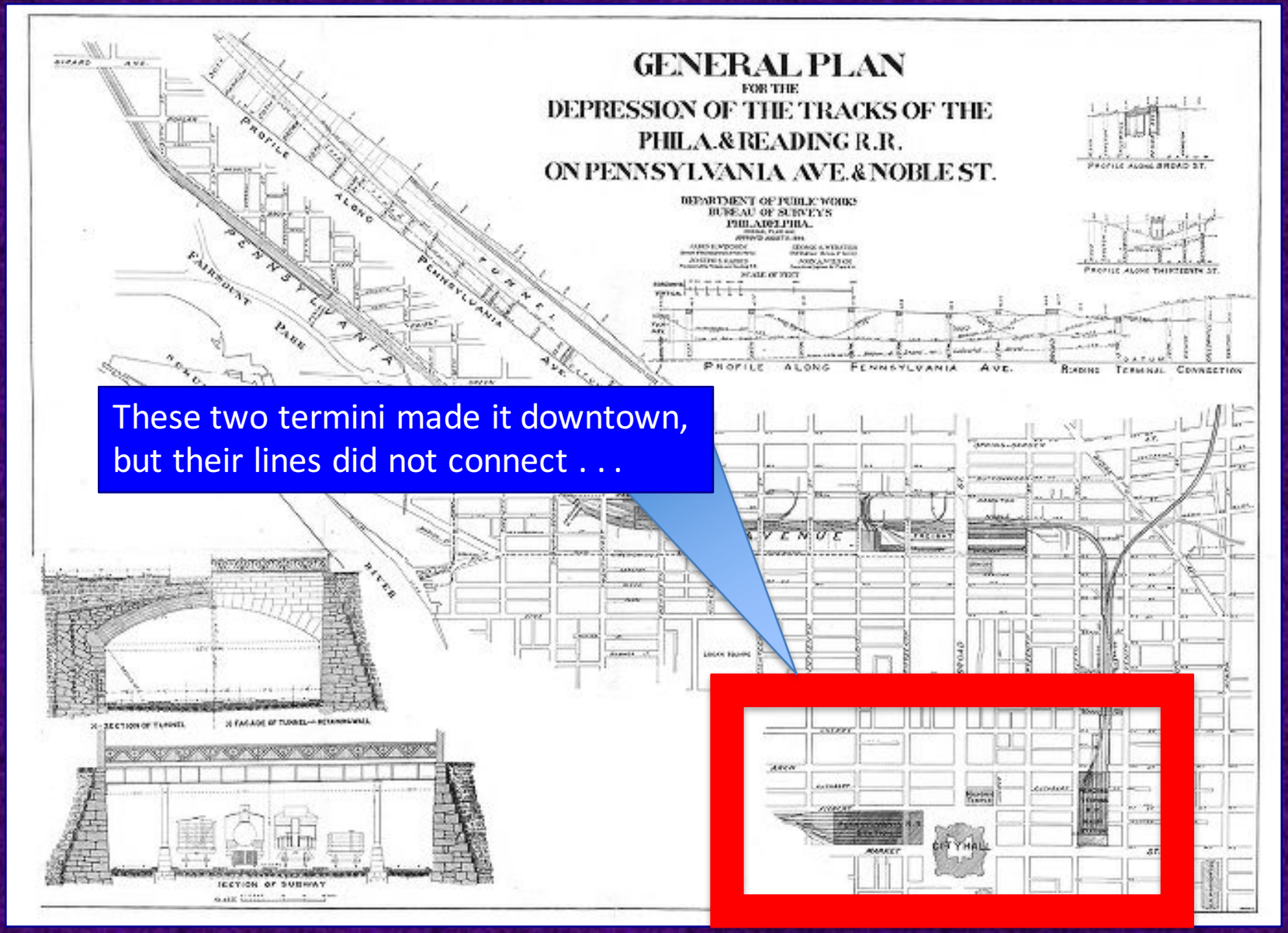
So railways terminated around city centers . . .



London Rail Termini

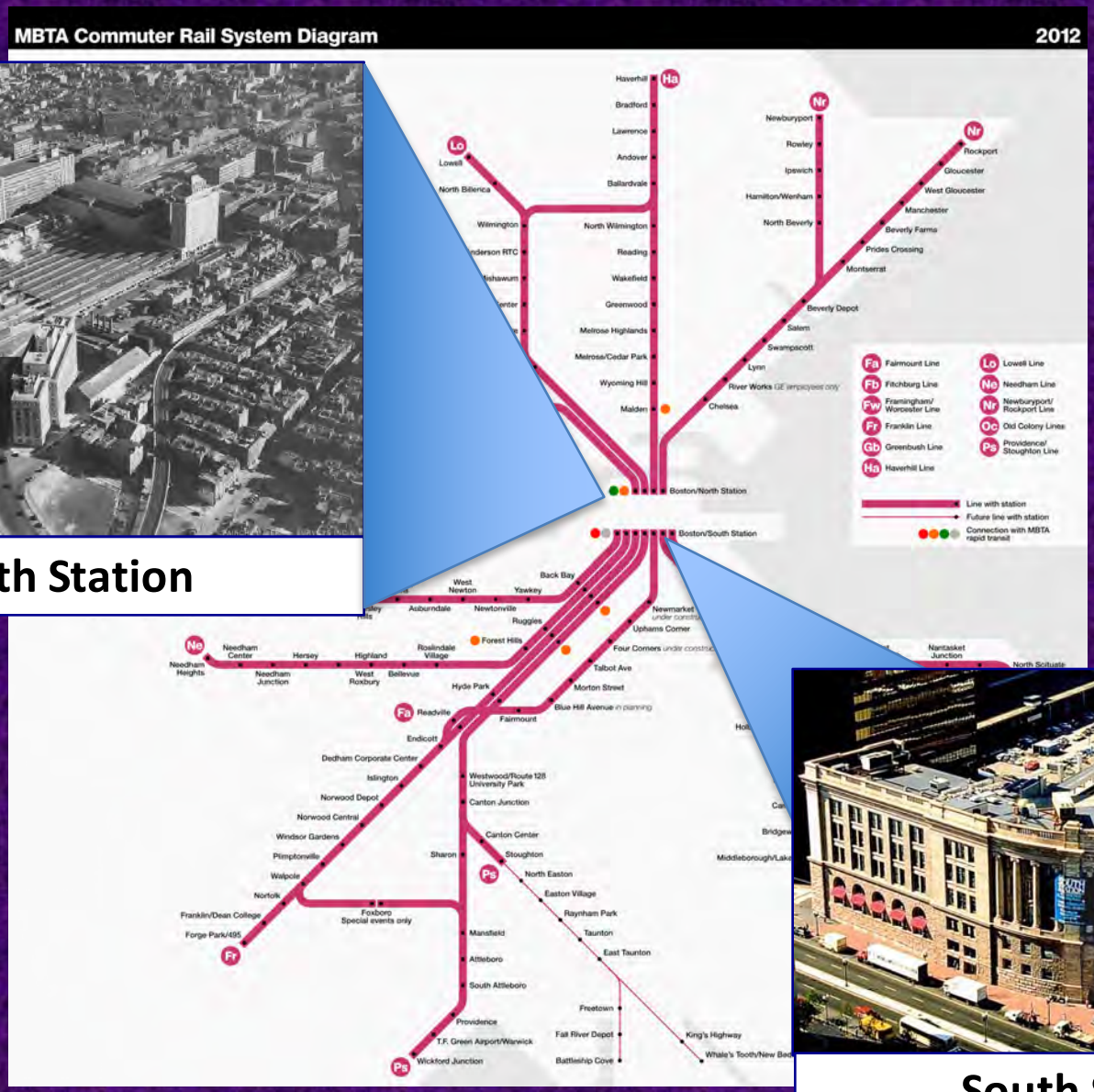


Paris Rail Termini



Philadelphia Rail Termini

North Station



South Station

Boston Rail Termini

First Underground Railway

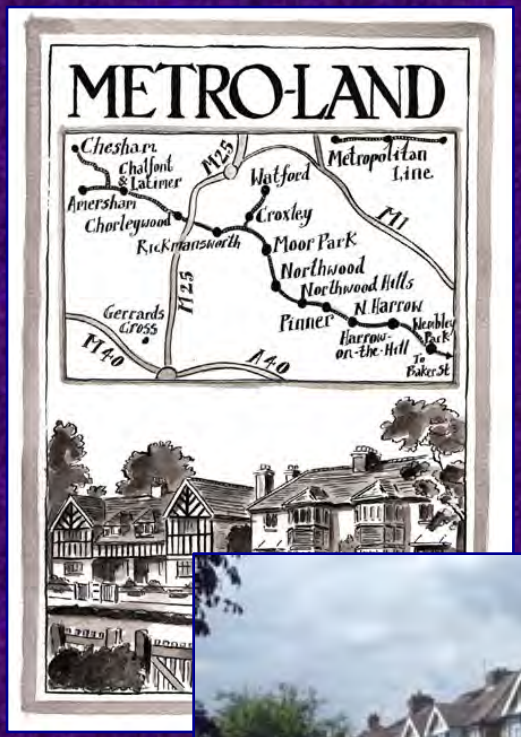
London's Metropolitan Railway (1863)

Built to mainline clearances to connect London's rail termini with steam trains.

It was Parisians who adapted "Metropolitan" into today's "Metro"

First Planned Suburbs

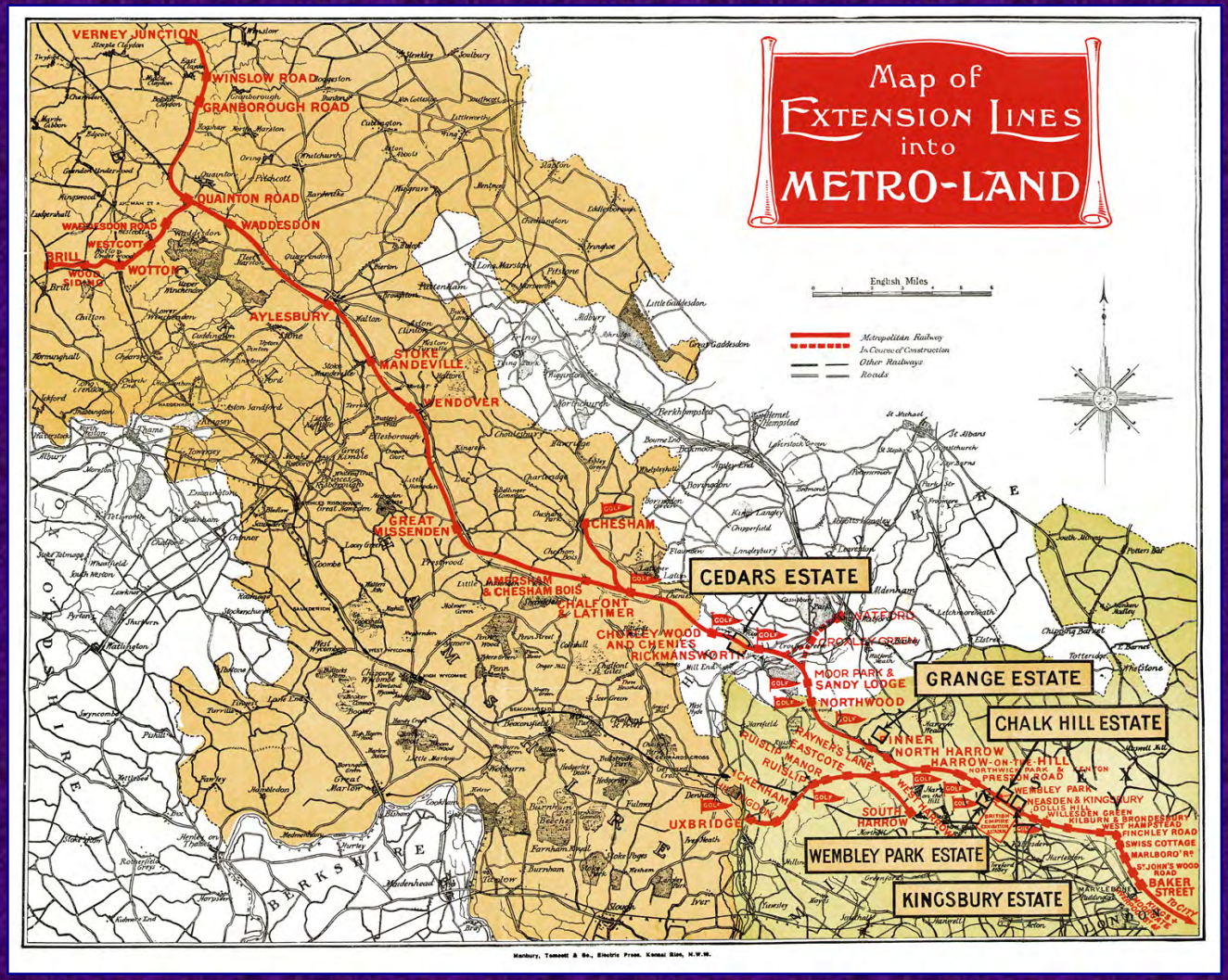
(1890 | 1912 | 1920s)



London's Metropolitan Railway

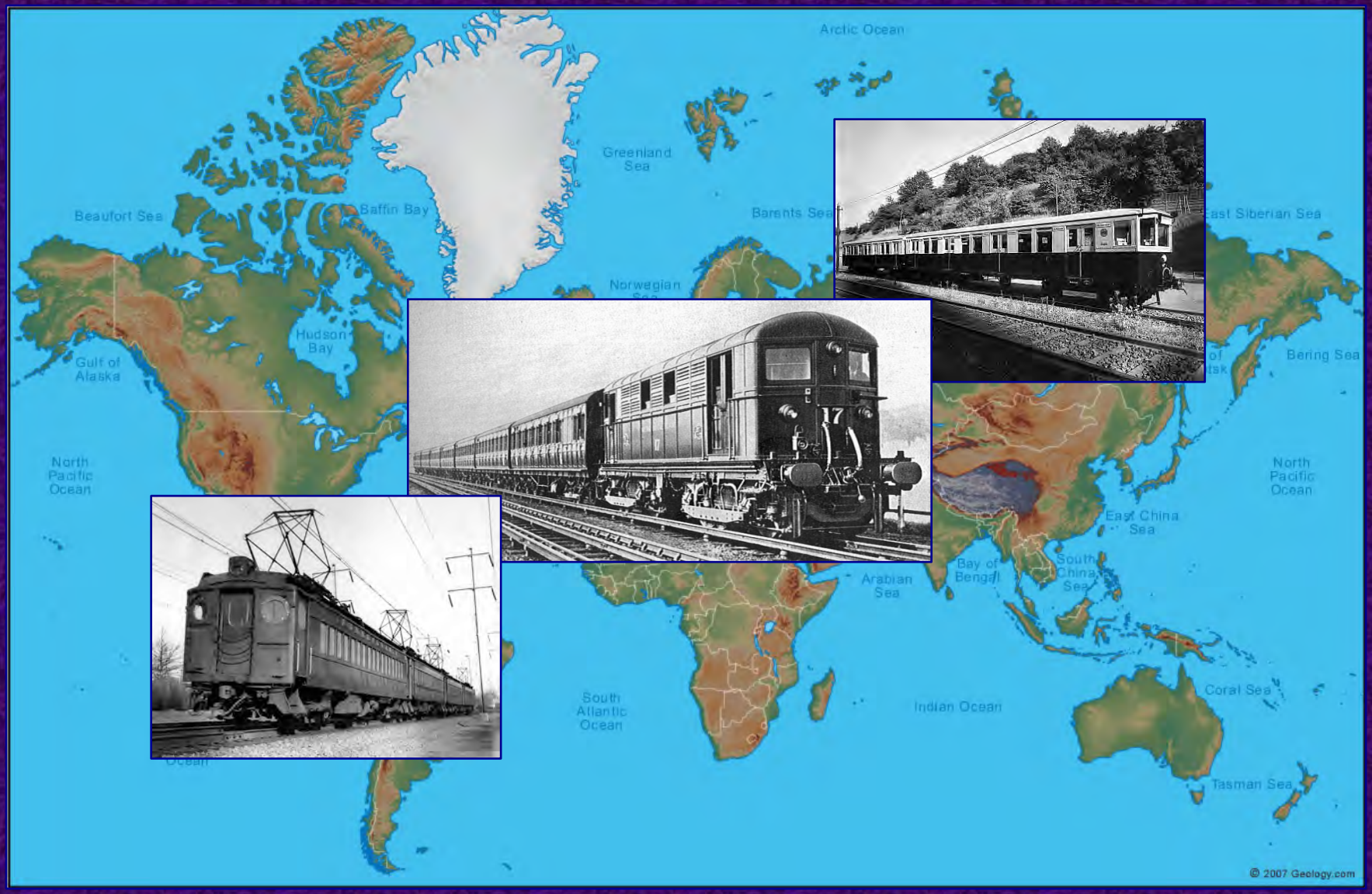
Metro-Land – A perfect union of country living and railways

First Planned Suburbs



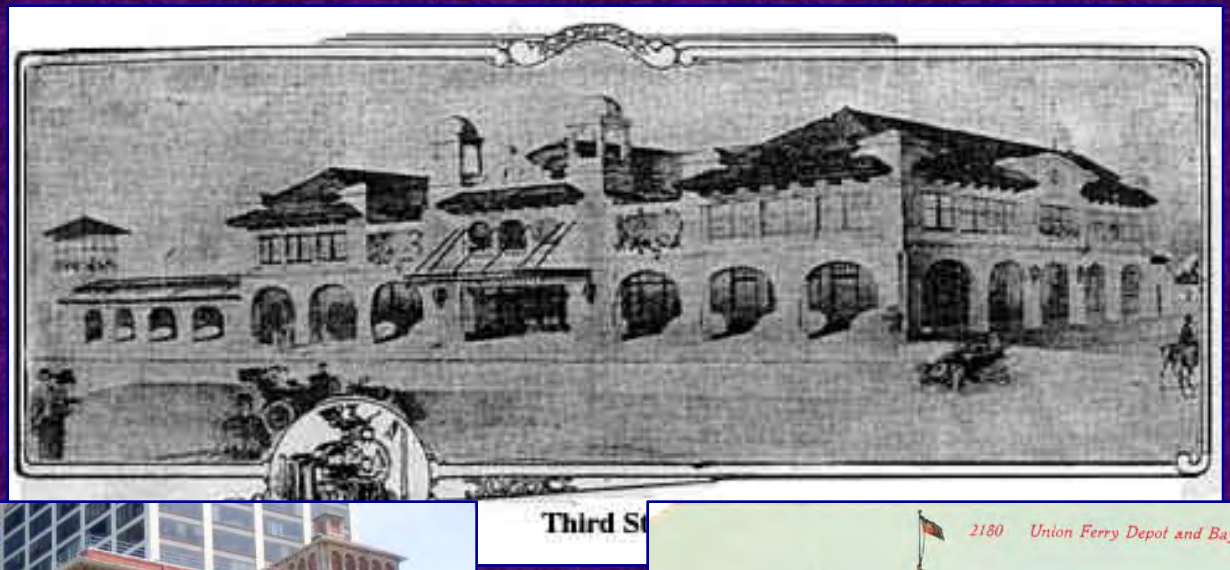
Spanning dozens of square miles, Metro-Land was the largest real estate development of it's day . . . perhaps ever.

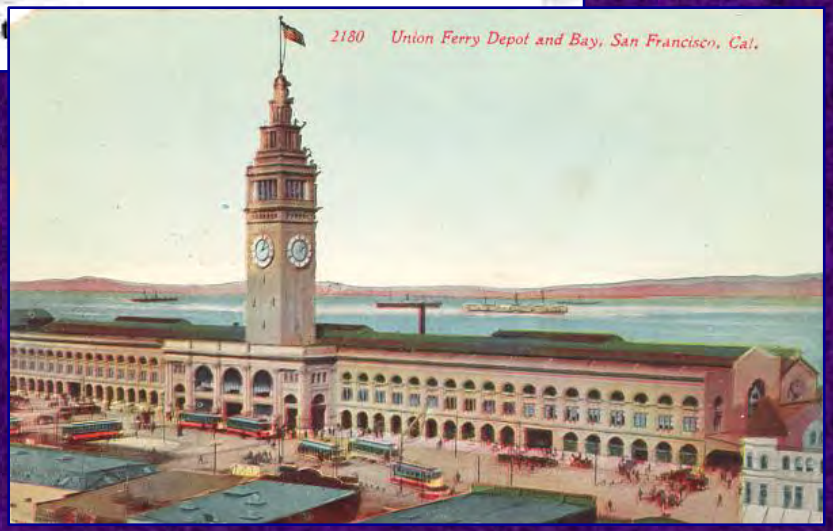
Then came World War I



By 1920, railways in both Europe and America were realizing that commuters were a marginal proposition

Even in San Francisco, the Southern Pacific decided to cancel its "Grand Central" of the West; settling for a more modest commuter terminal at Third & Townsend, completing its prime 1 Market Street property as an office building, and relying on the publicly-owned Ferry Building as its civic gateway instead . . .





The Stock Market Crash, World War II, and the Post-War Auto Boom further weakened Commuter Rail . . .

By the late 1960s, the German Siemens-Duewag U2 Light Rail Vehicle was catching the attention of American transit planners, who thought it might become a total answer for rail transit in metro areas . . .

. . . while overlooking European Suburban Rail systems that were continuing to carry many more passengers daily without fanfare.

While modern rail transit development in North American cities tends to focus on single systems or technologies; European cities typically employ a mix of Light, Heavy, and Suburban Rail . . .

Paris is now even adding trams to its already dense network of Metro and RER lines, and they're already carrying 900,000 riders daily.

But if Americans still want one form of rail transit that could do it all . . .

I'd nominate the

Commuter Train

Commuter Trains can . . .

Combine the best aspects of Subway and Light Rail:

- High Capacity
- Lower Capital Costs outside city centers
- Lower Per Passenger Costs

While providing the equivalent capacity of a new freeway using a fraction of the space

The Paris RER – A truly Super Train

New York Subway vs. Paris RER

NYCTA 10-car R160 Train
Length 602.1 ft | Max Speed 55 mph
2,556 total passengers
552 seated

26 – 30 trains per hour per direction
76,680 passengers per hour per direction (pphpd)

PARIS RER 10-car M109 Train
Length 735 ft | Max Speed 74 mph
2,600 total passengers
948 seated

30 trains per hour per direction
78,000 passengers per hour per direction (pphpd)

Paris RER

78,000 passengers per hour per direction

=

39 freeway lanes At 2,000 pphpd (LOS E)

. . . and that's just on one track!

Paris RER System

It makes for a web of super-capacity criss-crossing Paris, each line capable of carrying 10 times more passengers than a typical 8-lane motorway.

But other cities are discovering what RERs and S-Bahns can do . . .

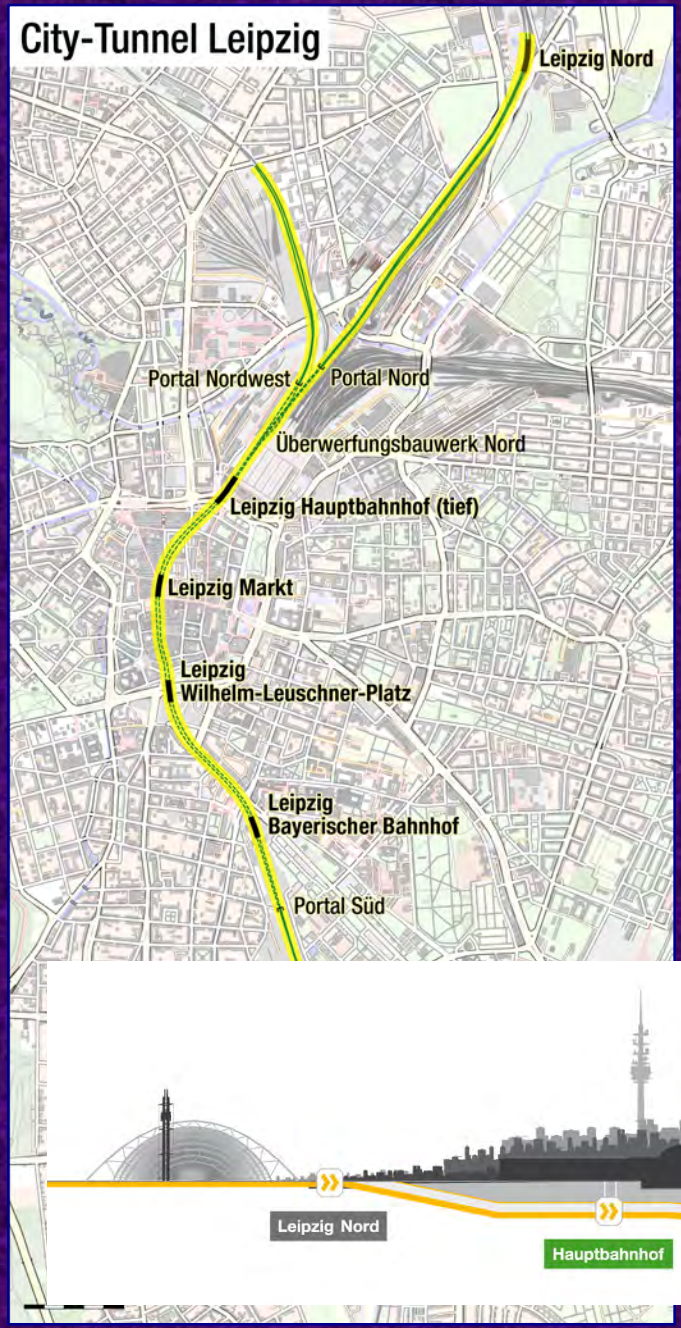
Leipzig, Germany

City Population: 560,000

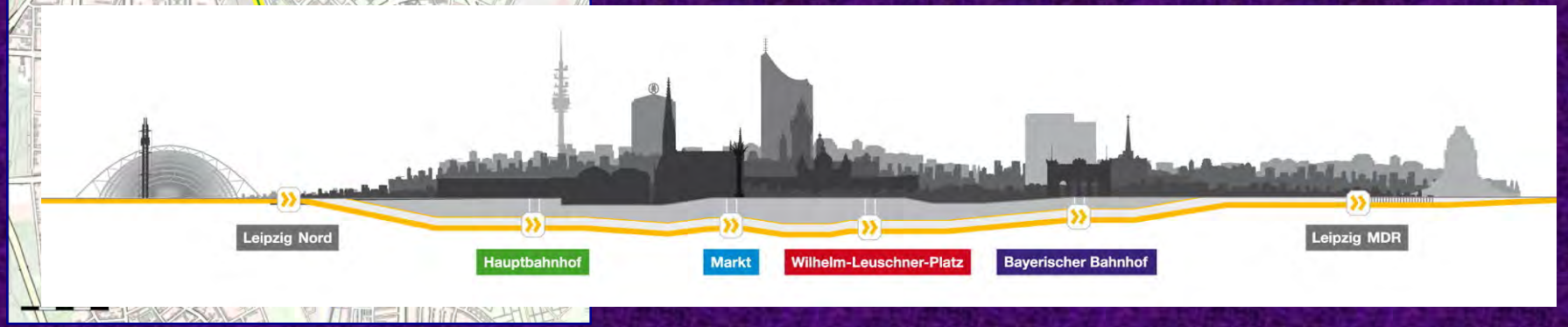
Metro Population: 1 million

Area: 115 square miles

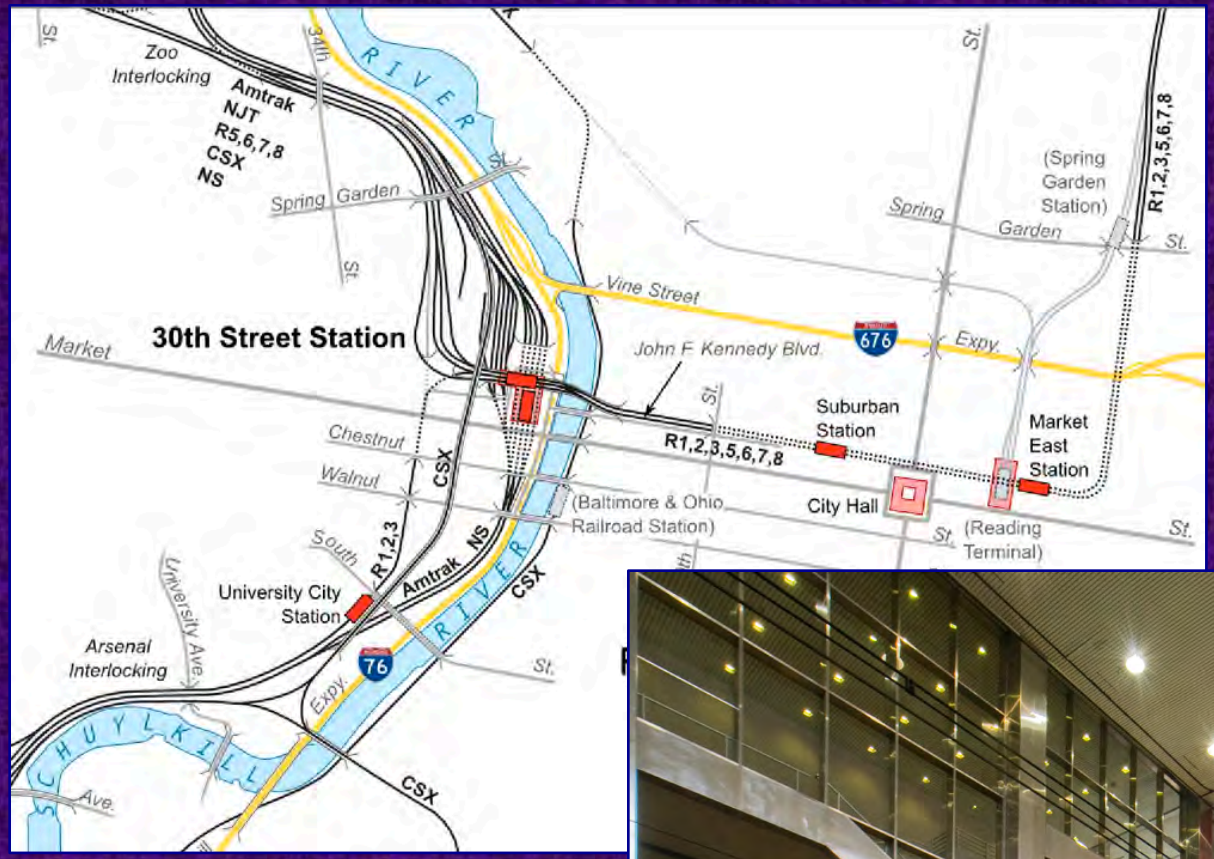
A small city with a huge rail terminus

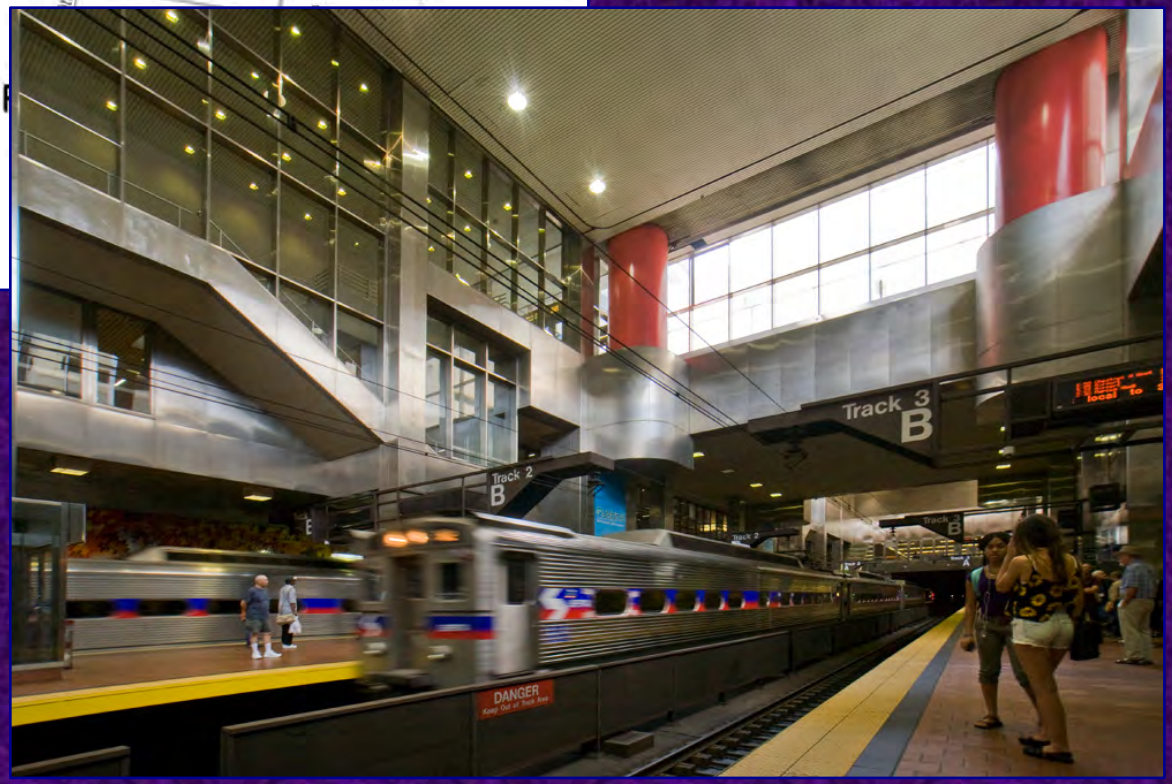


Despite its large terminus, Leipzig built the subway-like City-Tunnel under its down-town from 2003-13. It now provides more direct routes for both S-Bahn and Regio-Bahn trains, and handles double-deck trains.



Philadelphia Center City Commuter Connection (built 1978-84)





- **4 Tracks**
- **650 Trains per Day**
  (some just 2 cars though)
- **107,000 daily riders**

Philadelphia Center City Commuter Connection

13 Regional Rail lines feeding into 4 tunnel tracks

But across Europe, RERs and S-Bahns are for more than just commuters, as this crowd for a weekend marathon in Paris demonstrates . . .
Paris Austerlitz
Pont de Rungis Aéroport d'Orly
Orly Airport • Aeropuerto Orly
Massy Palaiseau
Versailles Chantiers via Juvisy
Saint-Martin d'Étampes – Dourdan
noostromo
running blog

So just as we've imported Sushi, Karaoke and Espresso into American English . . .

. . . as well as increasingly adopting international symbols for Metros and Light Rail . . .

. . . how about we restyle Commuter Trains as . . .

S-Bahns

Simple to say • World-class terminology

So in summary . . .

Commuter trains are flexible, lower cost, and can be run on existing rail infrastructures

They created suburbs and commuting, even the word “commuter”

They can burrow under downtowns like Light and Heavy Rail, and carry as many people daily as 39 freeway lanes

And like Light and Heavy Rail, they can attract and be used by a lot more people than just commuters

Finally . . .

Think big . . . enough.

A number of European cities have built “Pre-Metros” — tram lines running in larger tunnels and stations built for eventual upgrading to Heavy Rail Metros, even mainline RERs or S-Bahn Suburban trains, as here in Brussels, Belgium.

So consider the difference in capacities between Light Rail and RER . . .

Seattle LINK Light Rail
16,000 pphpd
Tunnel Diameter 6.4 m (21 ft)

Paris RER
79,000 pphpd
Tunnel Diameter 8.7 m (28.5 ft)

While rail transit planners don't tend to get estimates on differing tunnel diameters, fortunately physicists building colliders have . . .

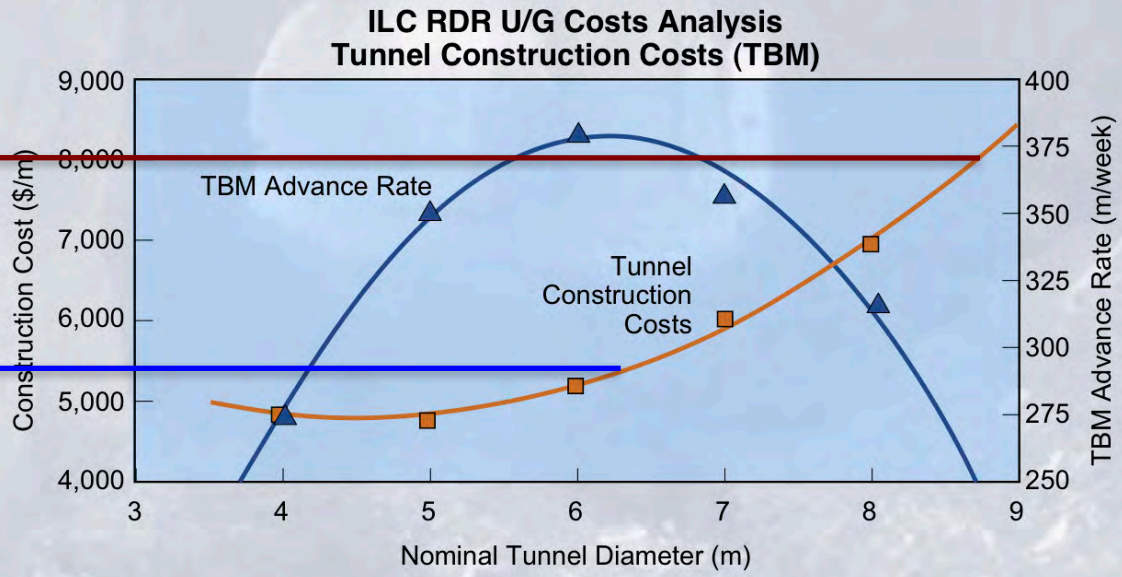
Paris RER
8.7 m (28.5 ft)

Seattle LINK
6.4 m (21 ft)

ilc international linear collider

U/G Unit Cost Analysis

- Results
  - Tunnels



Fermilab 7 PARSONS

While there is a 50% increase in tunneling cost between Light Rail and RER or S-Bahn, there is a 394% increase in pphpd.

So let's think big enough for the future as we plan and build rail transit!

Thank You

Loren Herrigstad

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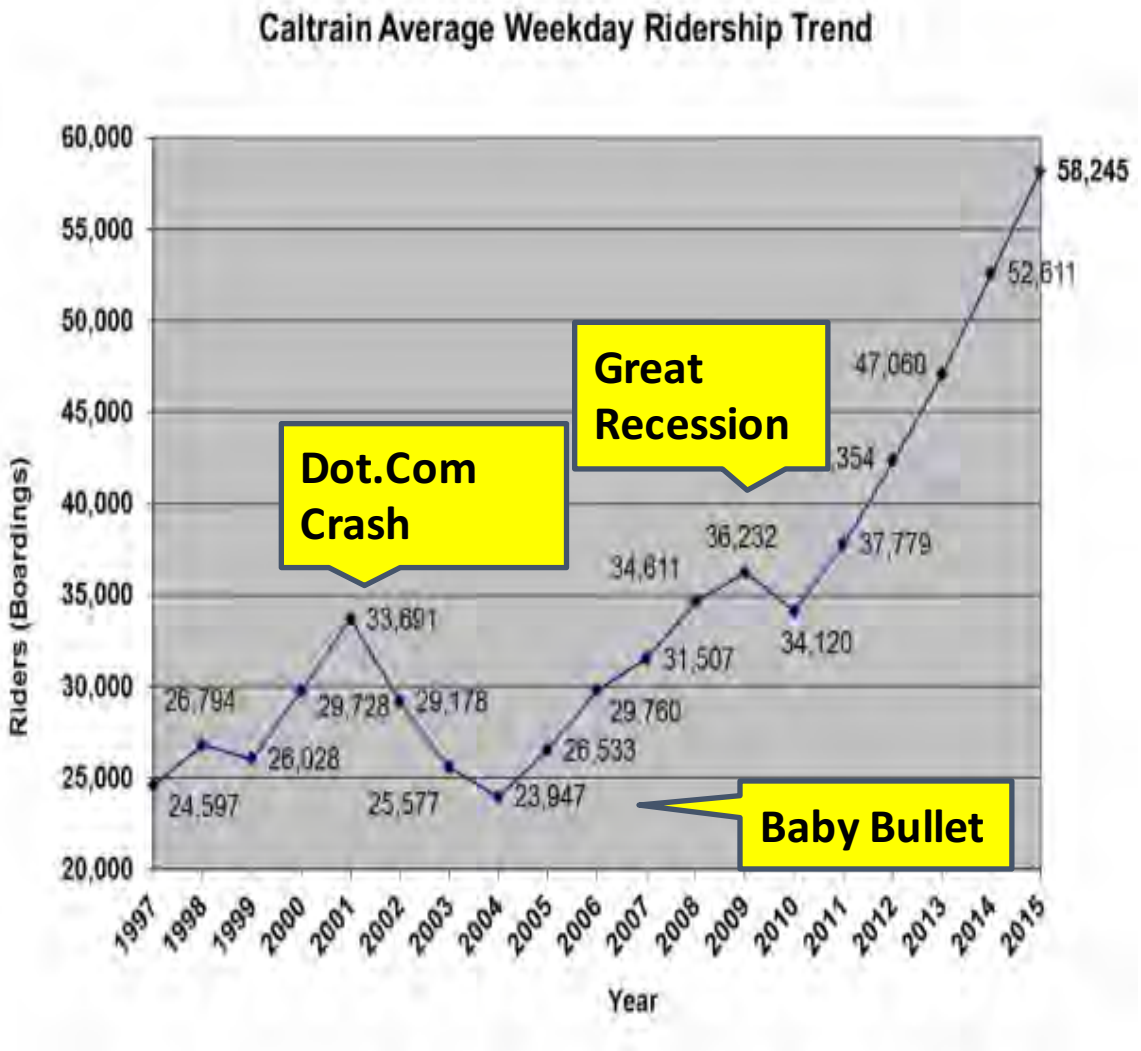
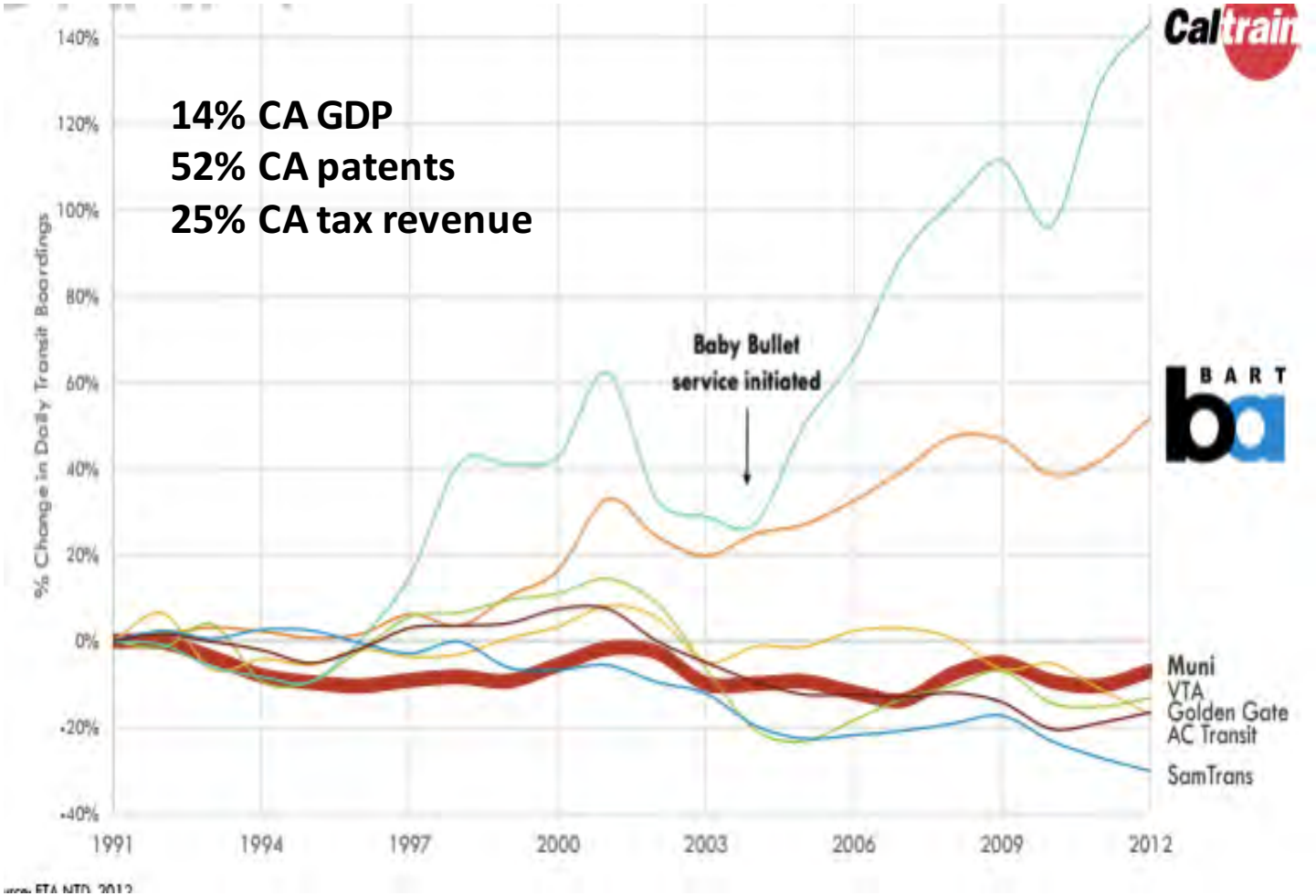
Caltrain: Commuter Rail on the Verge of Change

Adina Levin - Friends of Caltrain
Rail~Volution, October 2016

Ridership up 2.5x in last decade…

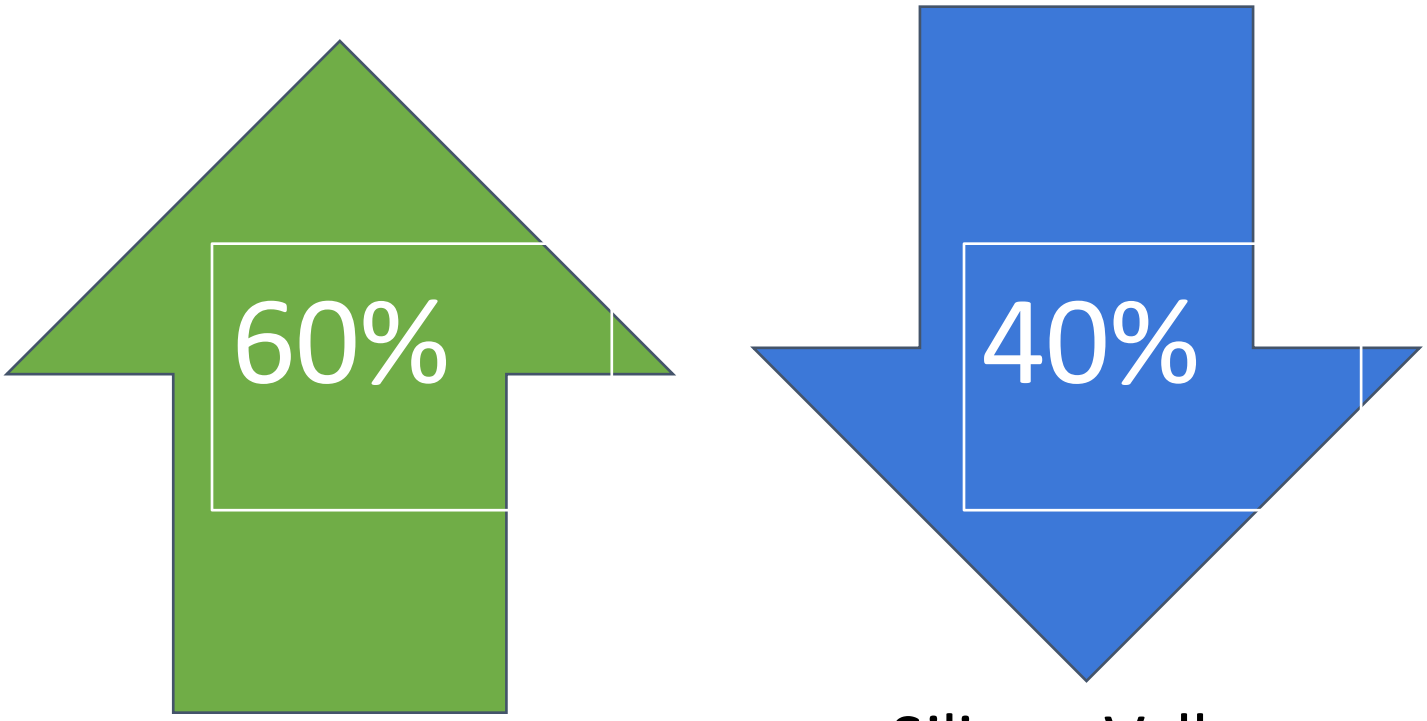


Driven by fast-growing economy



Bi-directional commute pattern

San Francisco



Silicon Valley

TOD along the corridor

State policy to reduce greenhouse gas emissions, coordinate transportation & land use

Accommodate 80% of housing, 60% of job growth in < 5% of land with transit access

Back to the Future

Caltrain corridor is original transit-oriented development

Cities grew around train

RWC, PA, MV 1938

Cities invest to reduce trips

Transportation Demand Management

- Accommodate more people with less cars, traffic, parking demand
- Transit passes, shuttles, carpool, carshare, education/marketing
- Transportation Management Association
- Funded by employers, developments, parking
- Data, reporting, accountability

Established Developing

Crowding and challenge to keep up

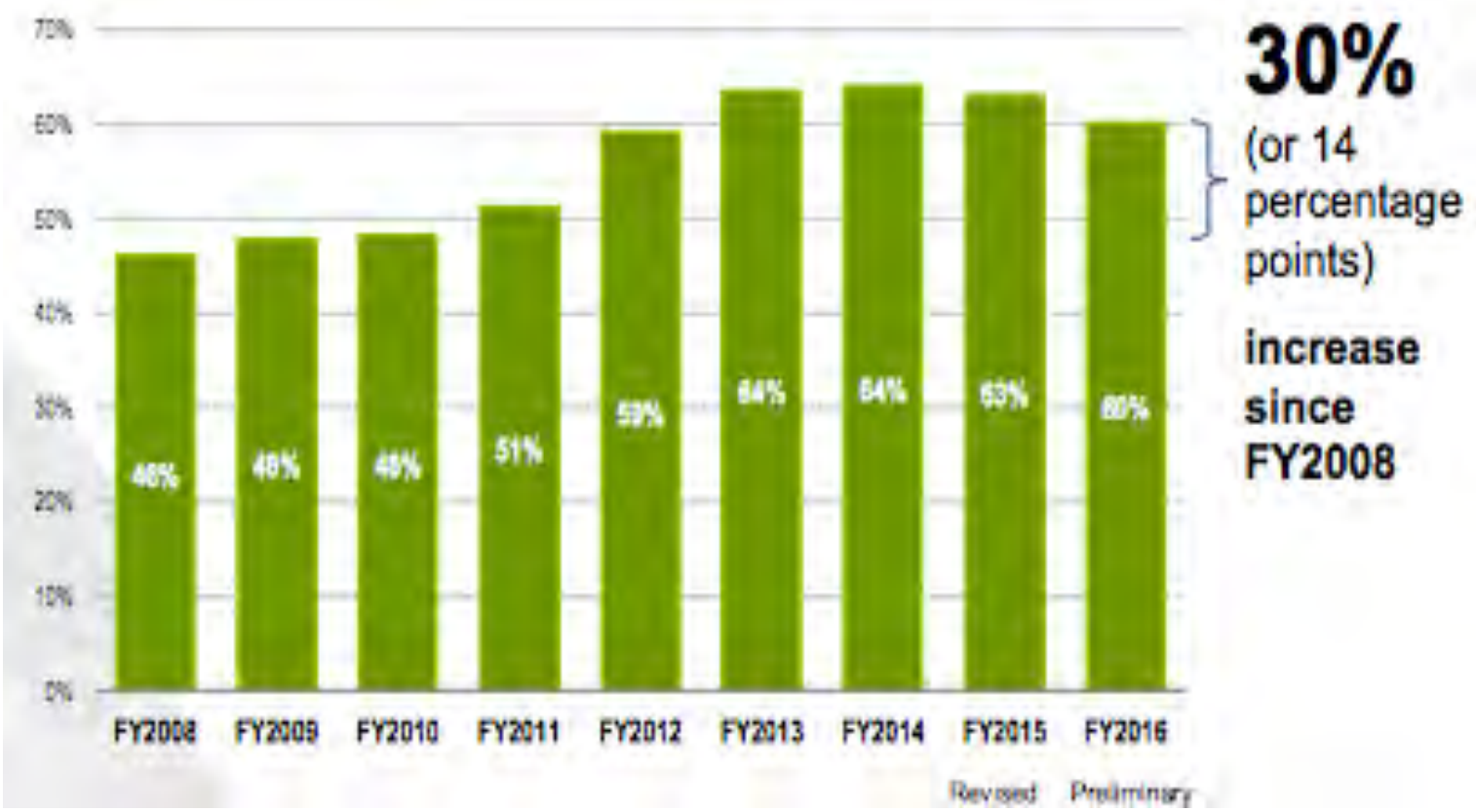
Keeping up with ridership growth

- Extra cars from LA
- Electrification
- Longer trains, level boarding

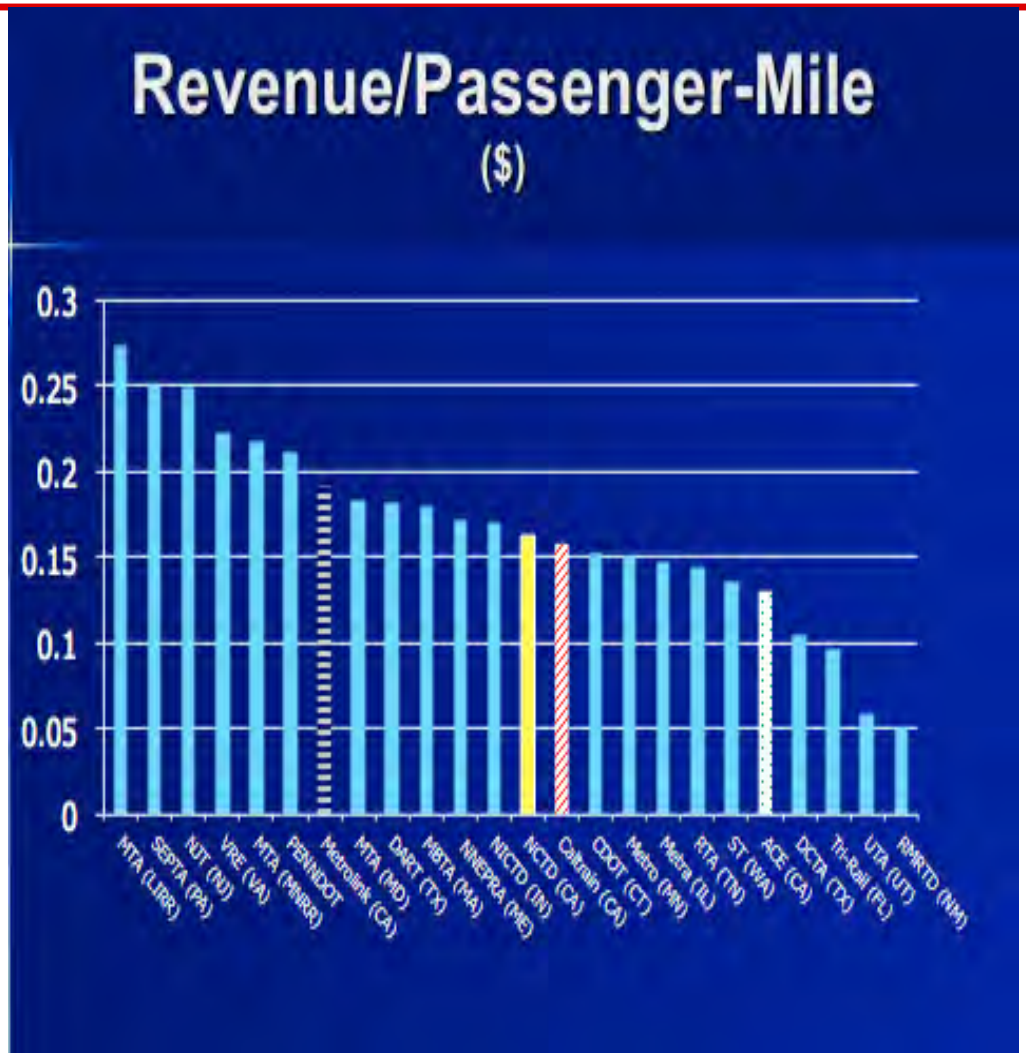
Verge of Transformation…

- Clockface schedule
- All-day service
- Supporting TOD and car-light lifestyle

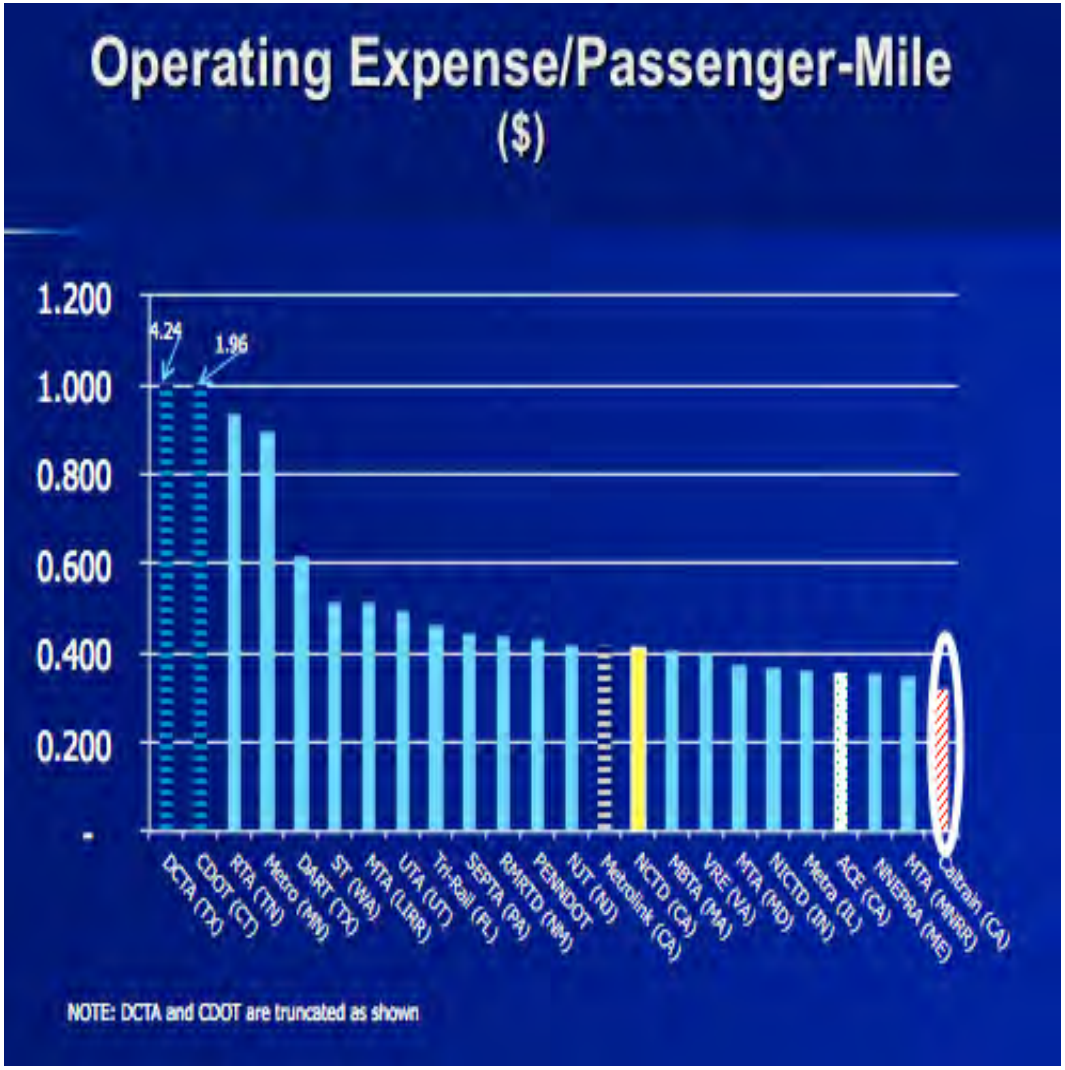
60% Farebox Recovery



Middle-of-pack in revenue vs. peers

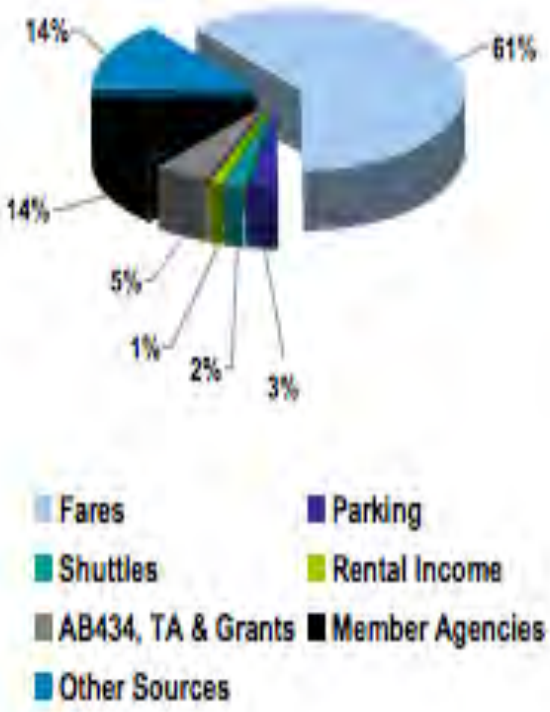


Lower expenses than peers



Unstable operating funding

Fares	$83.7
Parking	4.4
Shuttles	2.6
Rental Income	1.8
Other Income	0.6
AB434, TA & Grants	7.5
Member Agencies	19.7
Other Sources	18.8
Total Revenue	**$139.1**

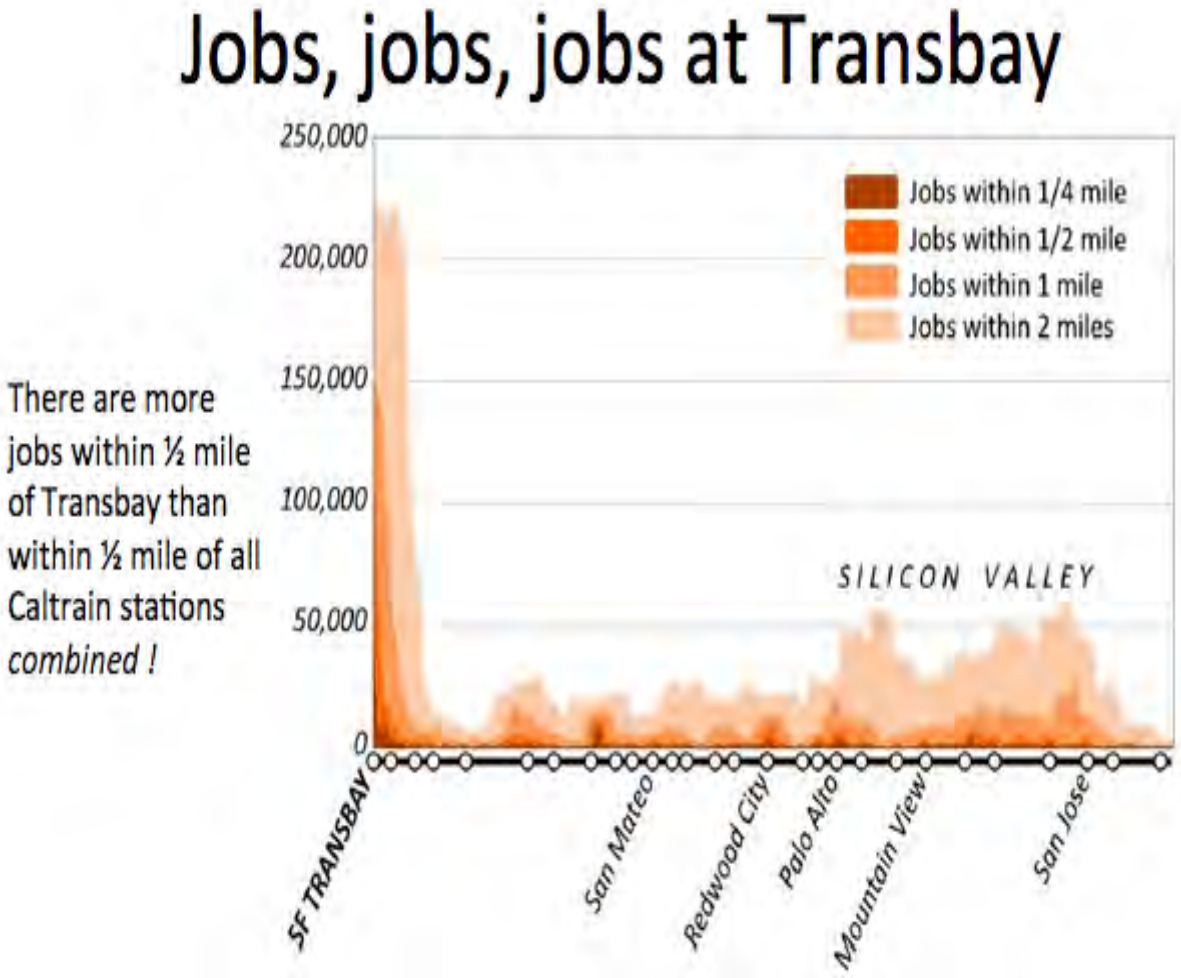


County agency partners:
San Francisco
San Mateo
Santa Clara

~30%

No funding to connect downtown

More jobs near Transbay than entire rest of line



m TIllier

Connections to BART

Backbone rail around the bay

- Integrated fares?
- Integrated schedules?

Regional fragmentation

- 26 transit agencies
- 30,000 fare rules and combinations

On the verge of change…

- Transformation
- Fragmentation

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http://greencaltrain.com

Connecticut's Travel Corridors Improving Connectivity with Rail and Transit Options

Presented by

Anna Bergeron,
Connecticut Department of Transportation

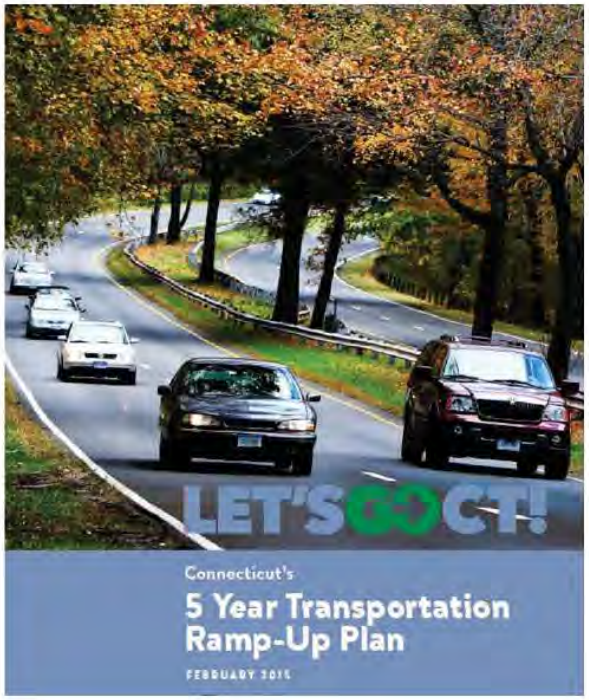
Stephen Gazillo
AECOM

LET'S GO CT!

- Result of statewide planning initiative
- Reduce congestion
- Improve environment
- Increase rail and transit
- Improve connectivity

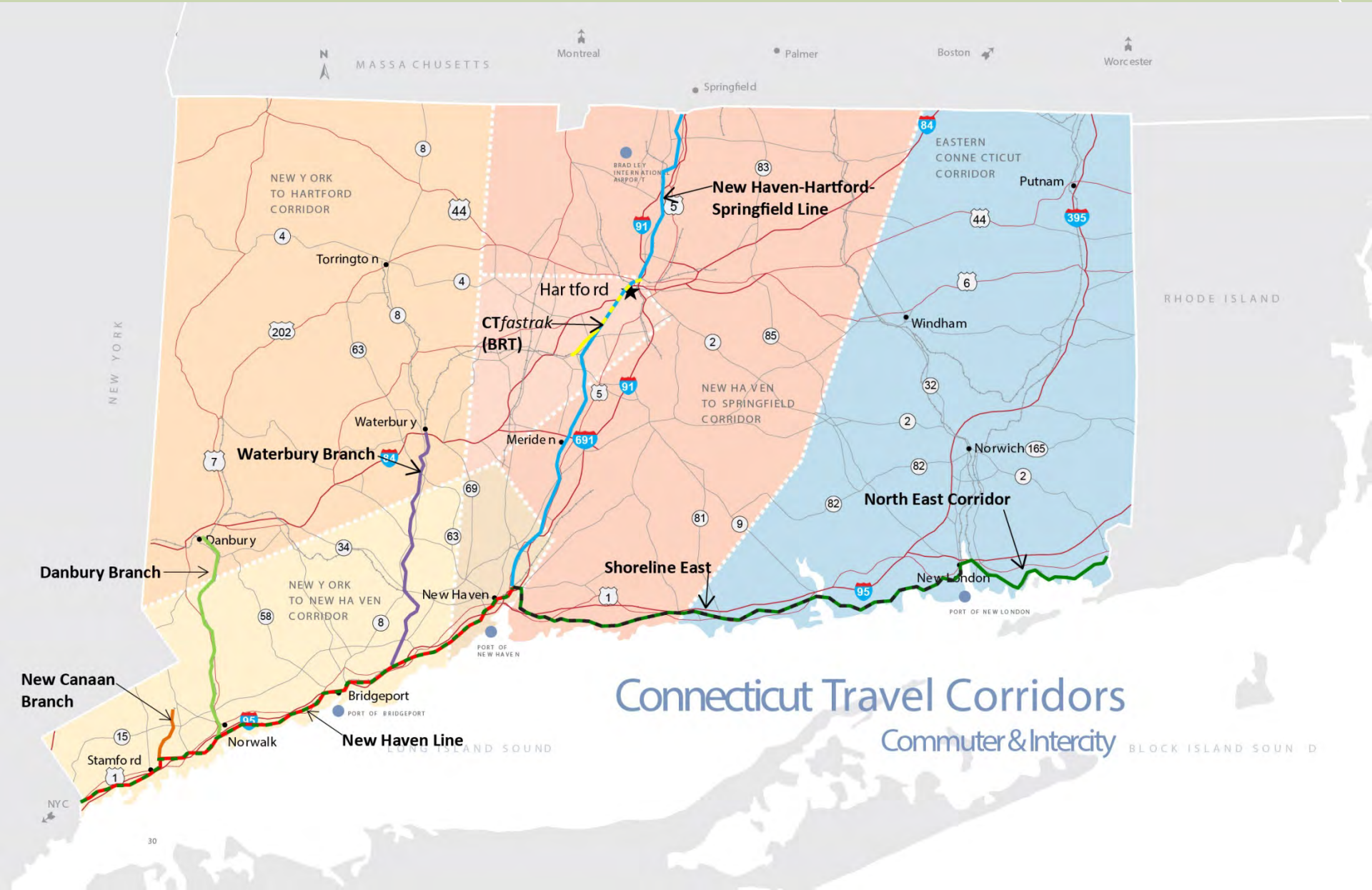
LET'S GO CT!

Best in Class Vision

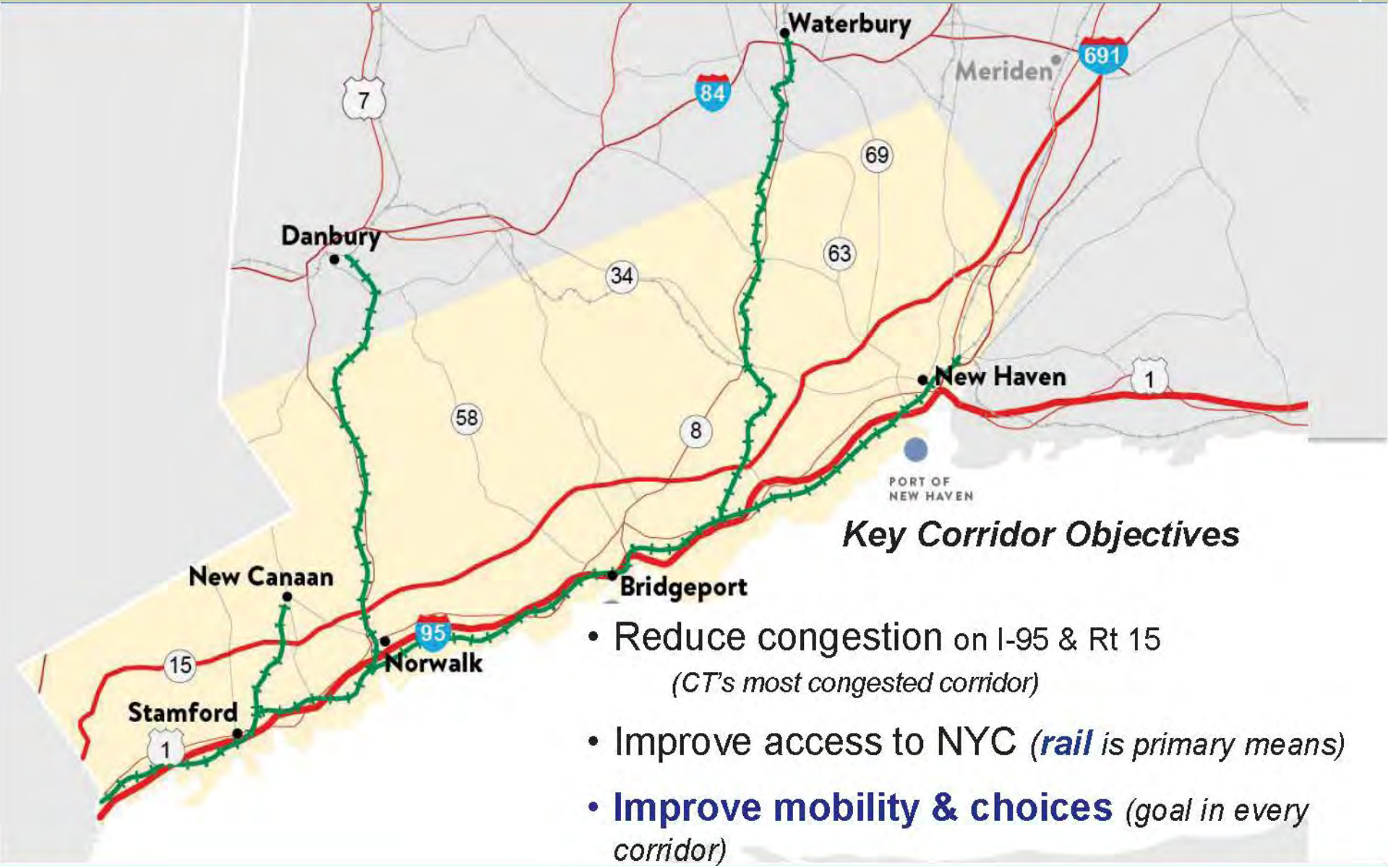


- **30-year plan**: all critical preservation & enhancement needs
- **5-year ramp-up:** projects within the 5-year budget cycle to jump start investment
- **Lock Box**
- **Cost:**
  - 30-year ***Vision***: **$100 Billion** investment
  - 5-year ramp up: **$10 Billion** investment
    - **Base Capital Program** is **$7.2** Billion (fed + state)
    - **Ramp-Up** funds **$2.8 Billion** (additional state)

Connecticut's Travel Corridors - Overview

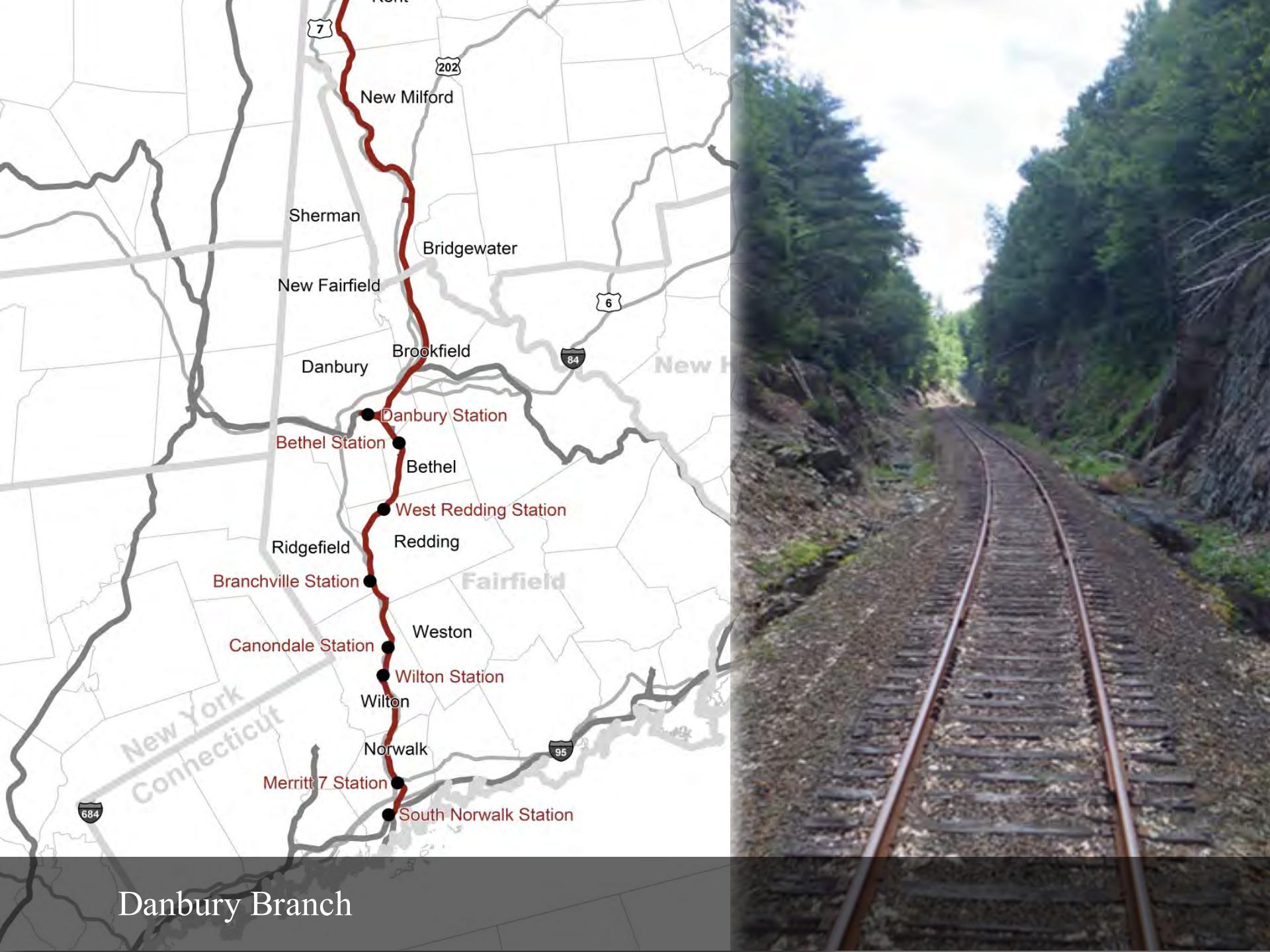


Connecticut's Commuter Rail Branch Lines



Key Corridor Objectives

- Reduce congestion on I-95 & Rt 15
  (CT's most congested corridor)
- Improve access to NYC *(**rail** is primary means)*
- **Improve mobility & choices** *(goal in every corridor)*



Danbury Branch

Danbury Branch Operations

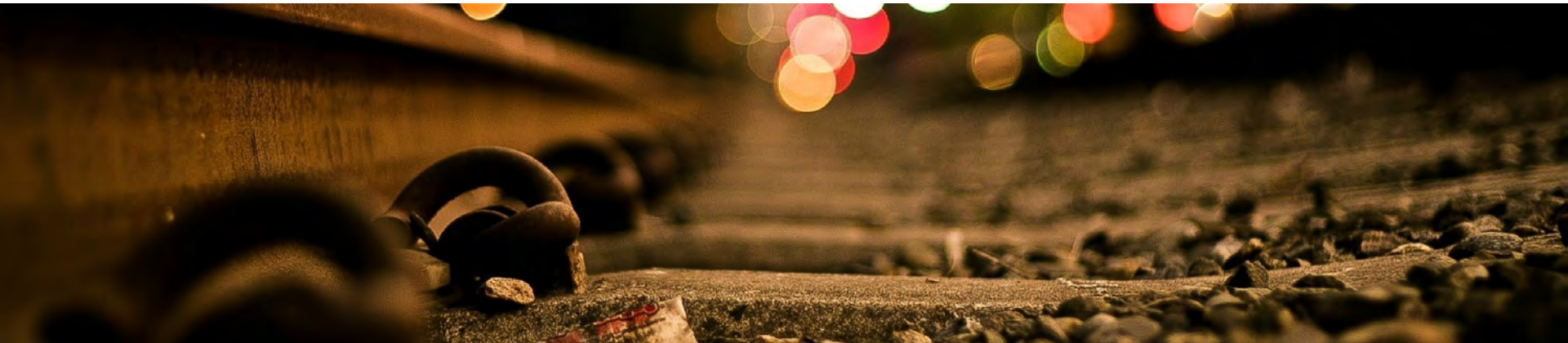
» **Danbury Branch – recent past**

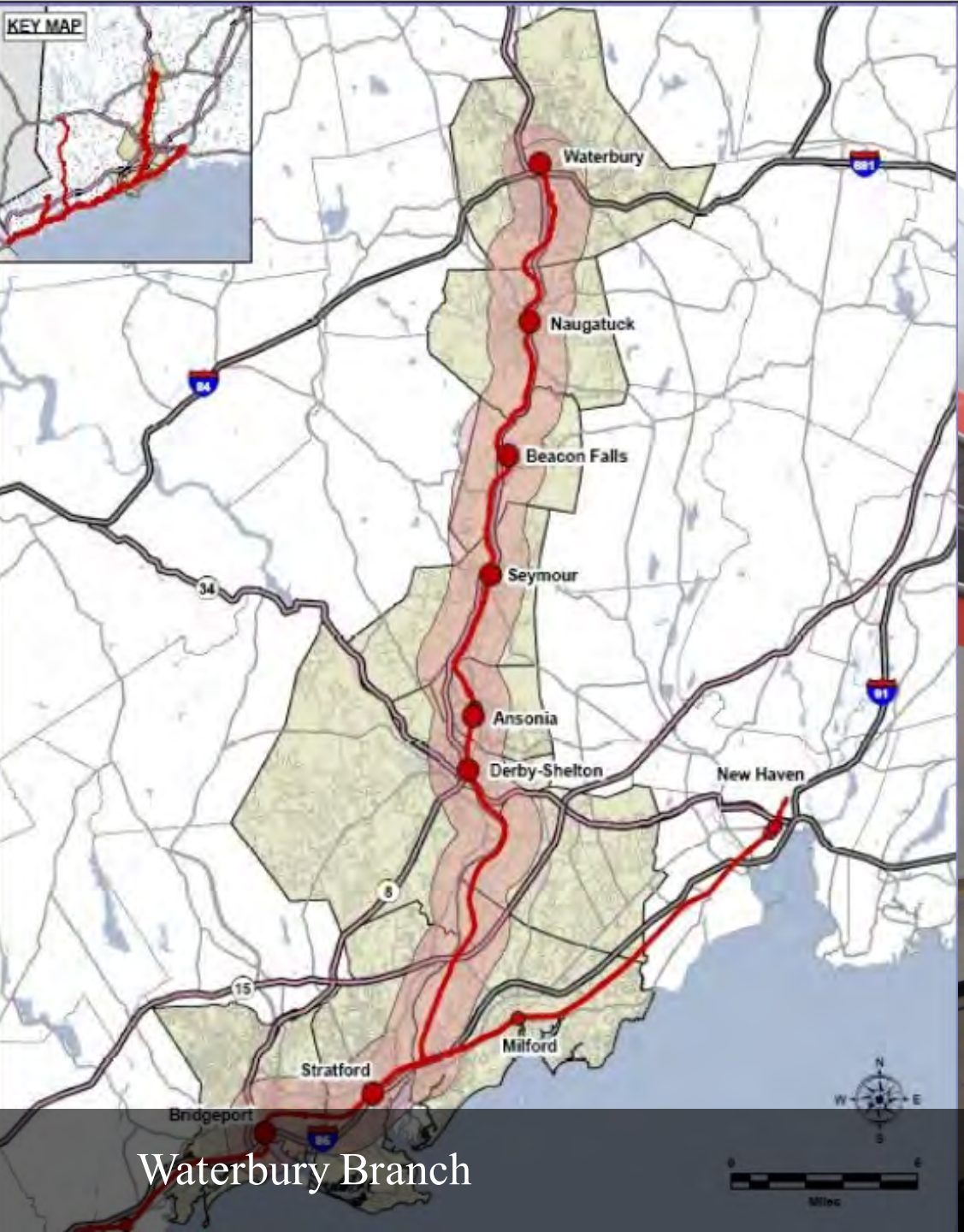
- Began service 1852
- Originally electrified - removed in 1960
- Diesel service today
- 23 miles long
- Single track
- 8 Station Stops
- 22 trains per day
- No signal system
- Annual Ridership - 734,000

Danbury Branch Improvements

» **Danbury Branch - Today**

- New signal system
- New passing sidings
- Station and Parking upgrades
- Additional service – 28 trains a day (20% increase)
- Annual ridership – 802,000 (9% increase)





Waterbury Branch

Waterbury Branch Operations

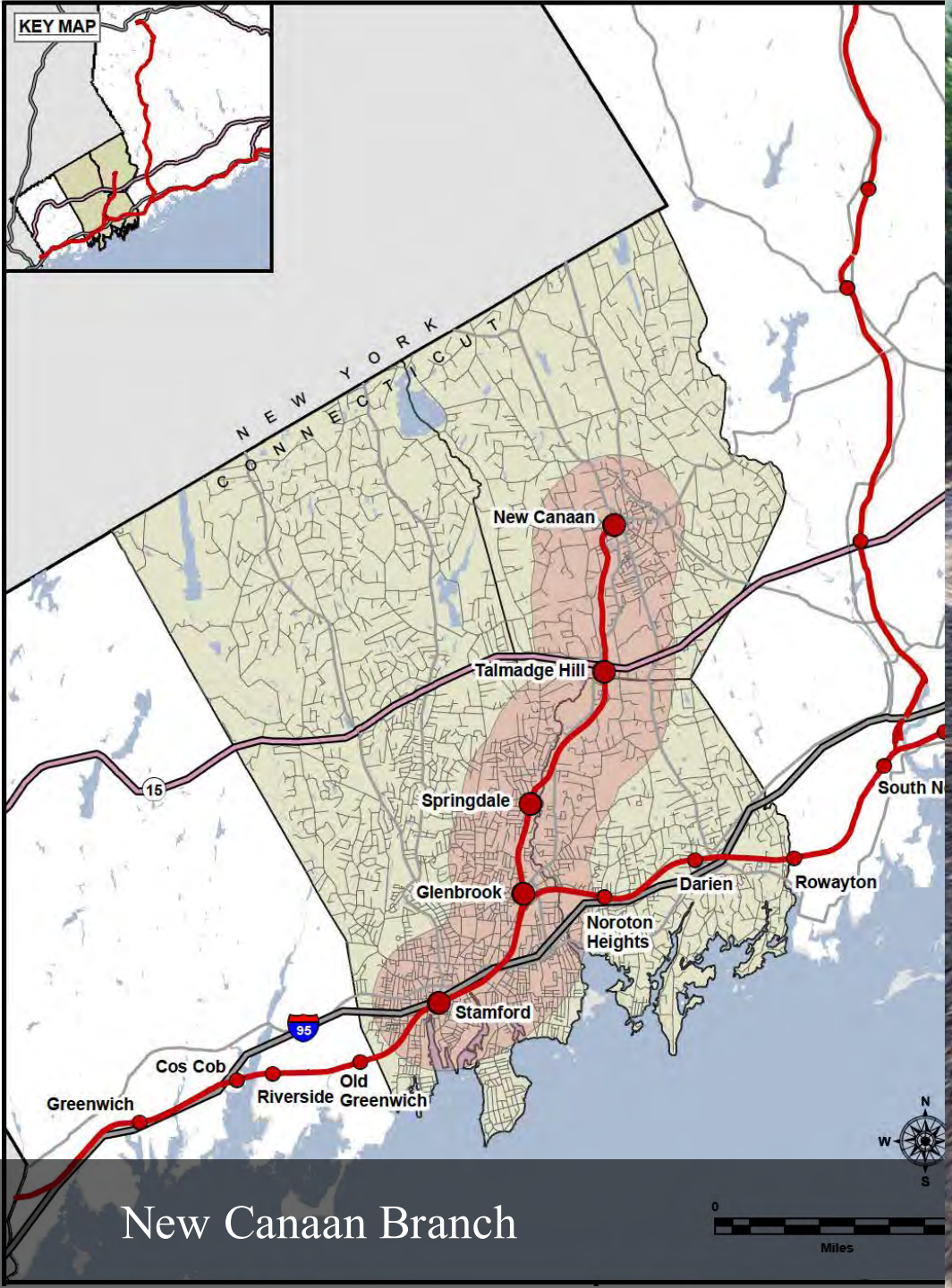
» **Waterbury Branch – today**

- Began service 1849
- 28.5 miles
- Diesel service,
- No signal system
- Single track
- 8 stations
- Annual ridership – 198,000

Waterbury Branch Improvements

» Waterbury Branch Upgrades

- New Signal System in Design
- Infrastructure Improvements
- Devon Bridge replacement
- Future Passing Sidings
- Minor Parking Expansion
- Potential Devon Station



New Canaan Branch

New Canaan Branch Operations

» **New Canaan Branch**

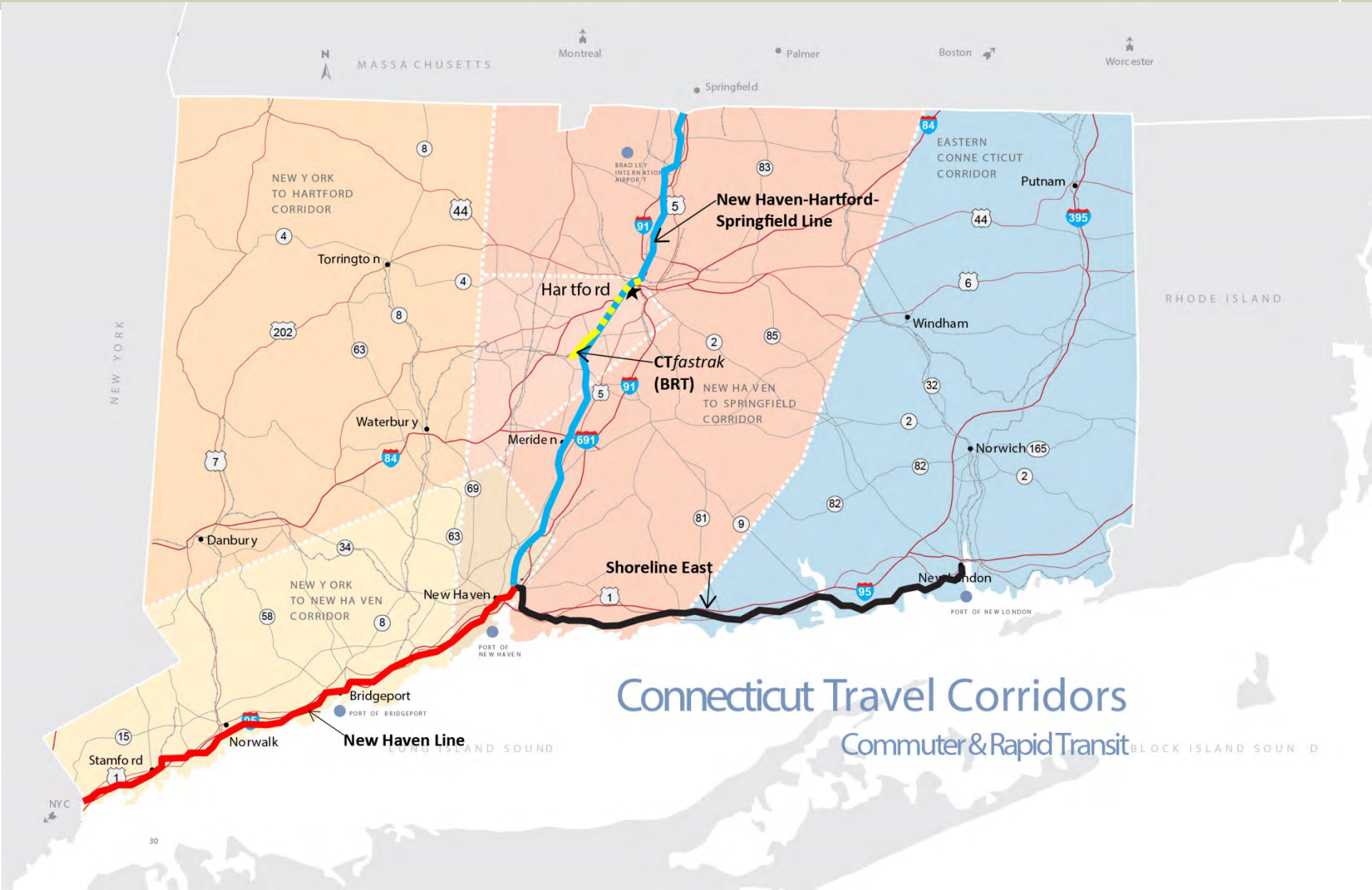
- Began service 1866
- 8 miles long
- Single track
- 5 station stops
- Electrified service
- Annual ridership
  1.5 million

New Canaan Branch Improvements

» **New Canaan Branch**

- Electrified
- Frequent service
- TOD Efforts

The Hartford Line



LET'S GO CT! New Haven – Hartford – Springfield Corridor

RAIL highlights

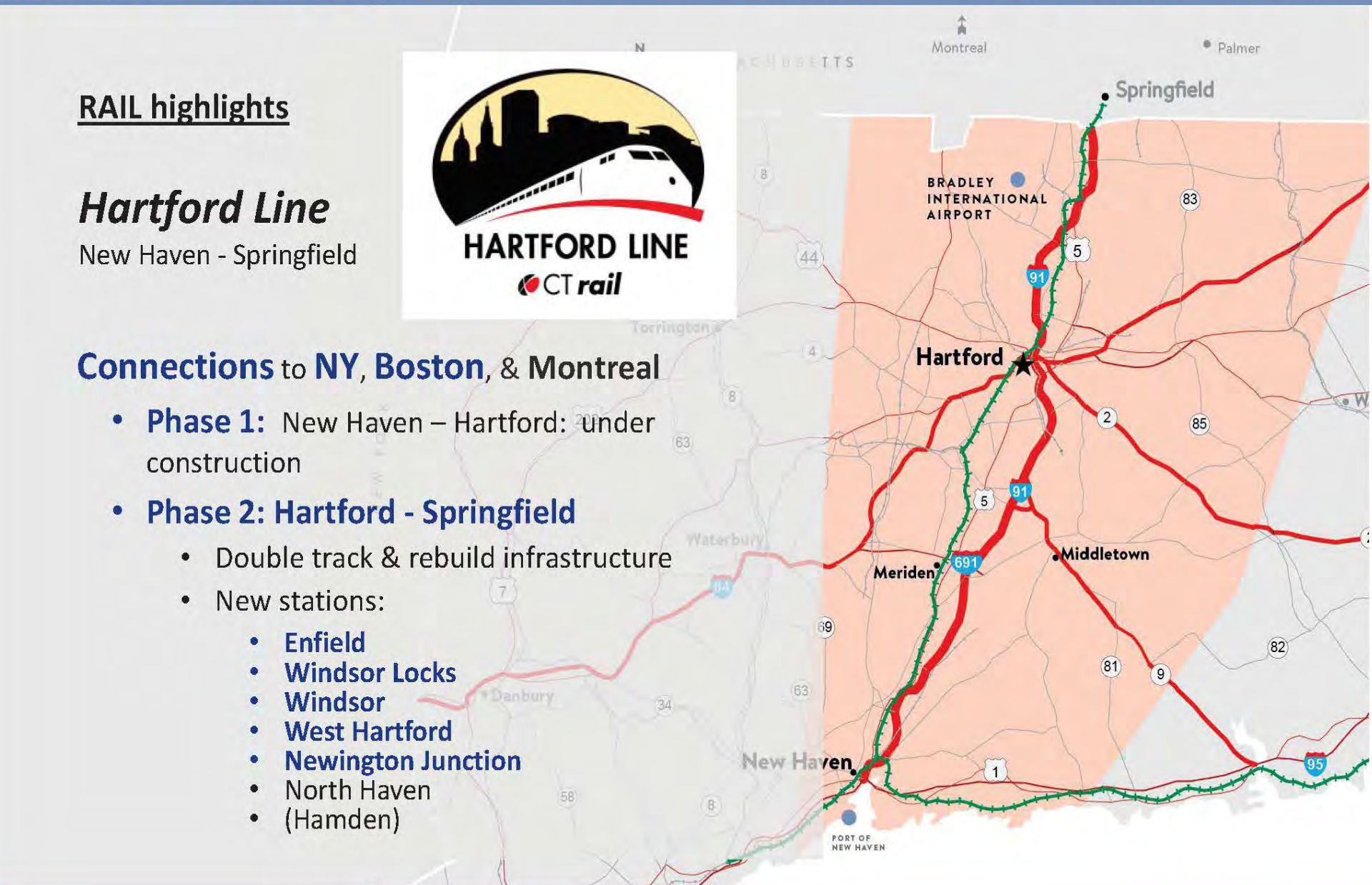
Hartford Line

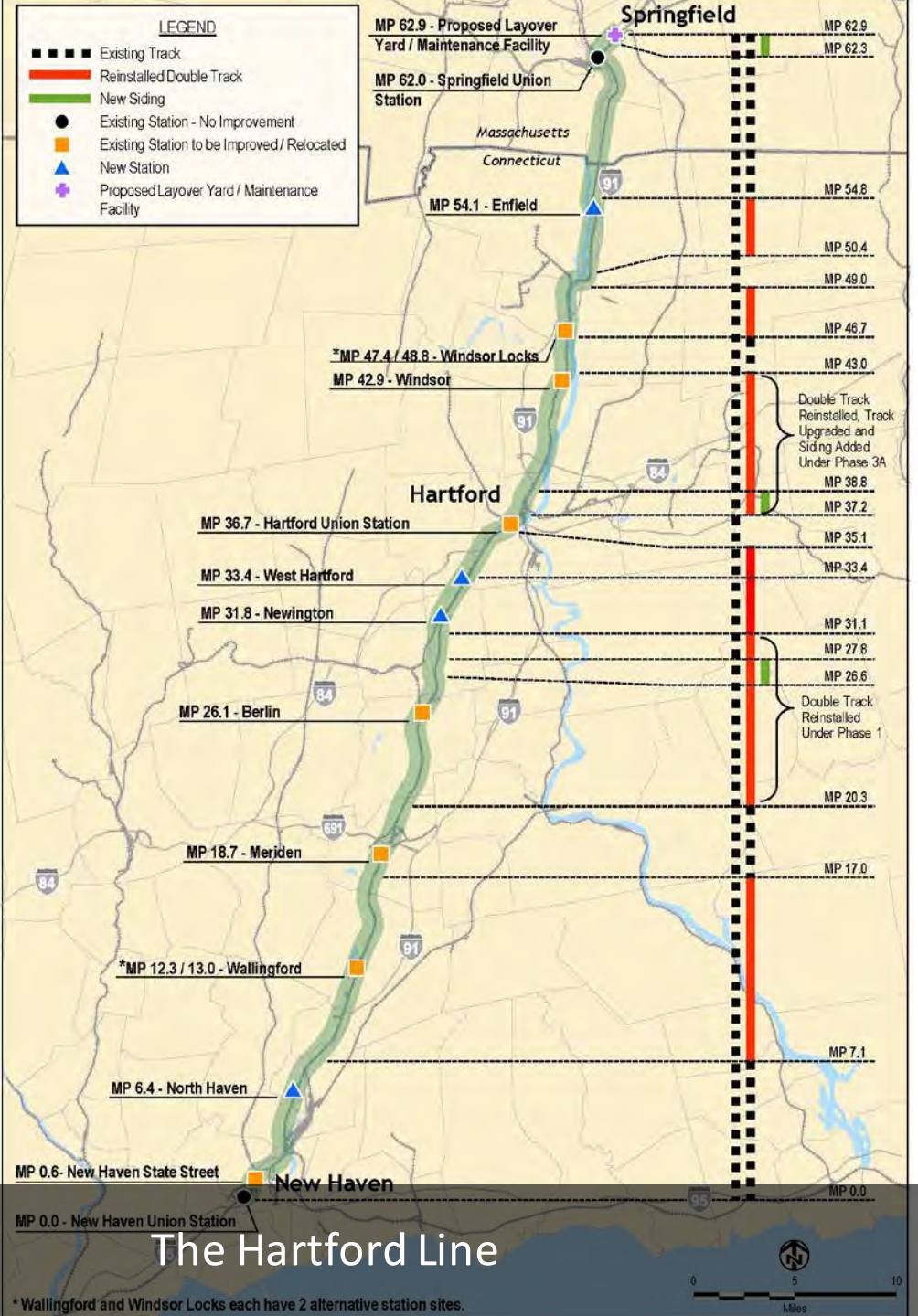
New Haven - Springfield

HARTFORD LINE
CT rail

Connections to **NY**, **Boston**, & **Montreal**

- **Phase 1:** New Haven – Hartford: under construction
- **Phase 2: Hartford - Springfield**
  - Double track & rebuild infrastructure
  - New stations:
    - **Enfield**
    - **Windsor Locks**
    - **Windsor**
    - **West Hartford**
    - **Newington Junction**
    - North Haven
    - (Hamden)





The Hartford Line

The Hartford Line

» The Hartford Line – commuter service to start 2018
Increase from 6 round trips to 17 round trips per day

- 62 miles
- 8 stations
- Track upgrades
- Add 2nd track in sections
- 60 new rail cars

Ongoing Commuter Rail TOD

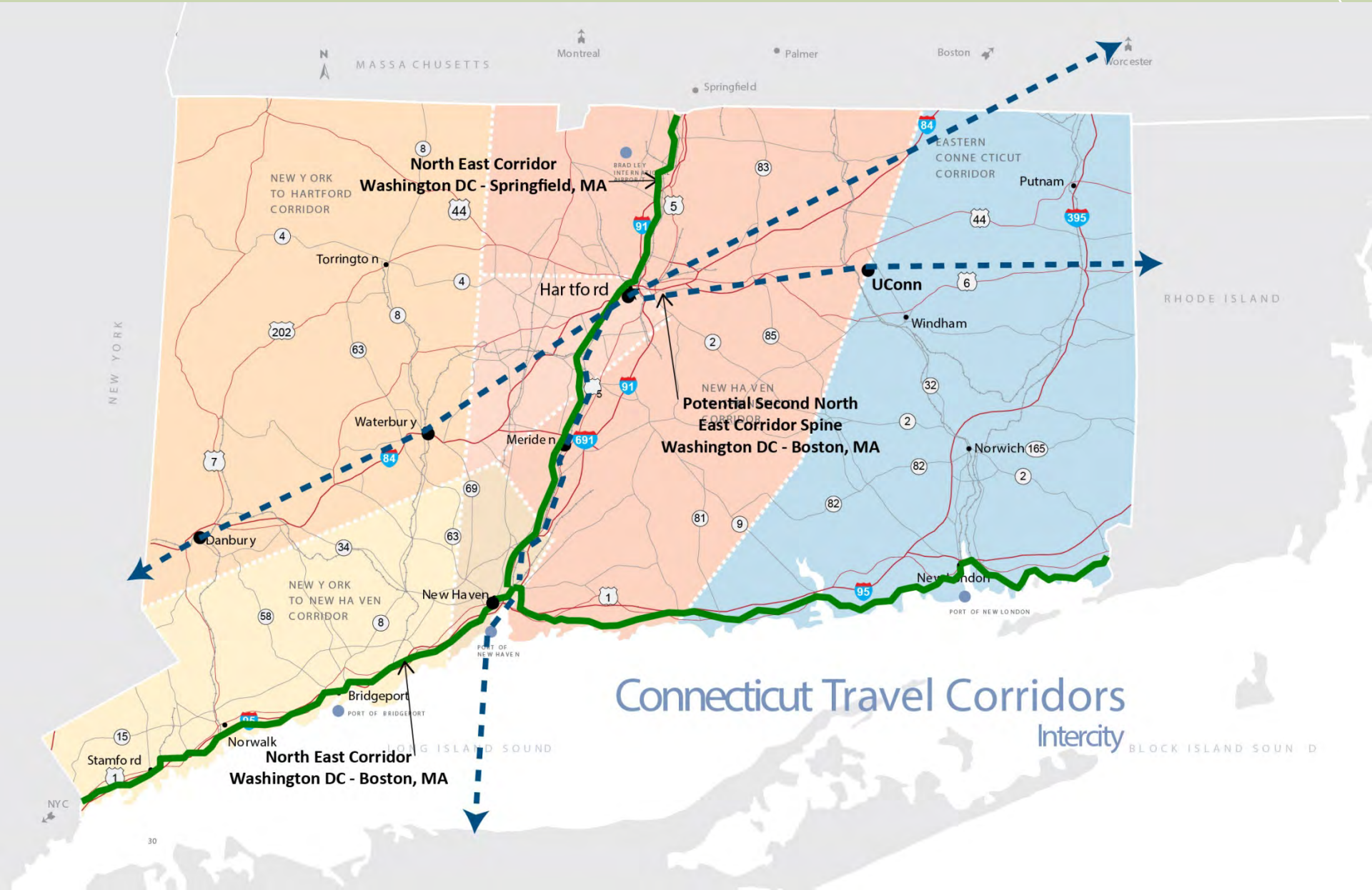
» **Danbury Branch**
- Bethel
- Branchville
- Danbury

» **Waterbury Branch**
- Derby/Shelton
- Waterbury
- Ansonia
- Naugatuck

» **New Canaan Branch**
- Glenbrook
- Springdale

» **Hartford Line (NHHS)**
- Berlin
- Meriden
- Wallingford
- New Haven

Intercity Service – Amtrak



Thank You!

Getting Commuter Rail on Track

Adapting to Changing Conditions

Barbara Gilliland, AICP
Planning Manager

WSP | Parsons Brinckerhoff

Note: Switch to Notes Page view to see additional speaker comments throughout this presentation.

The Future Story

- Lessons Learned
- All About Access
- Building Communities
- Looking for Opportunities

In the Beginning . . .

There were the Railroads

We needed to connect growing suburban cities with the central city of the region

Maximizing Existing Infrastructure

Lessons Learned Along the Way

- Costs
- Capacity
- Connection
- Culture

Sometimes its just about Access

Trains, Transit and Automobiles

» Expanding site planning from storage . . .

It’s About Curb Space

- Walking
- Biking
- Shared Rides
- Pick-up/Drop-off
- Shuttles

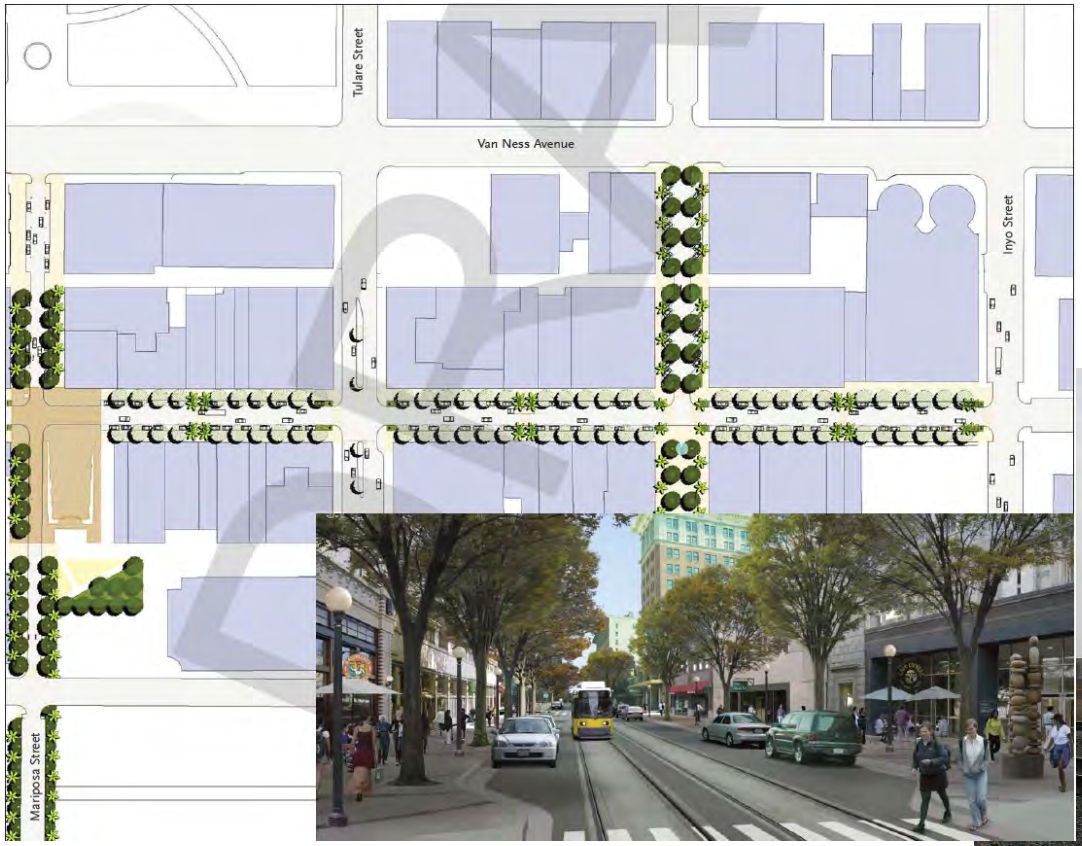
UBER

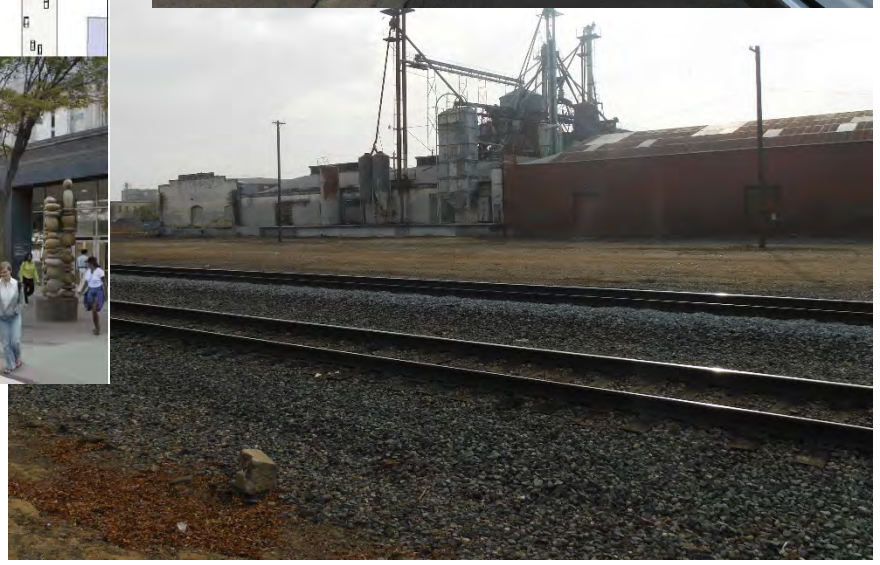
Vision meets Reality

How do we take this and . . .

Make it this . . .

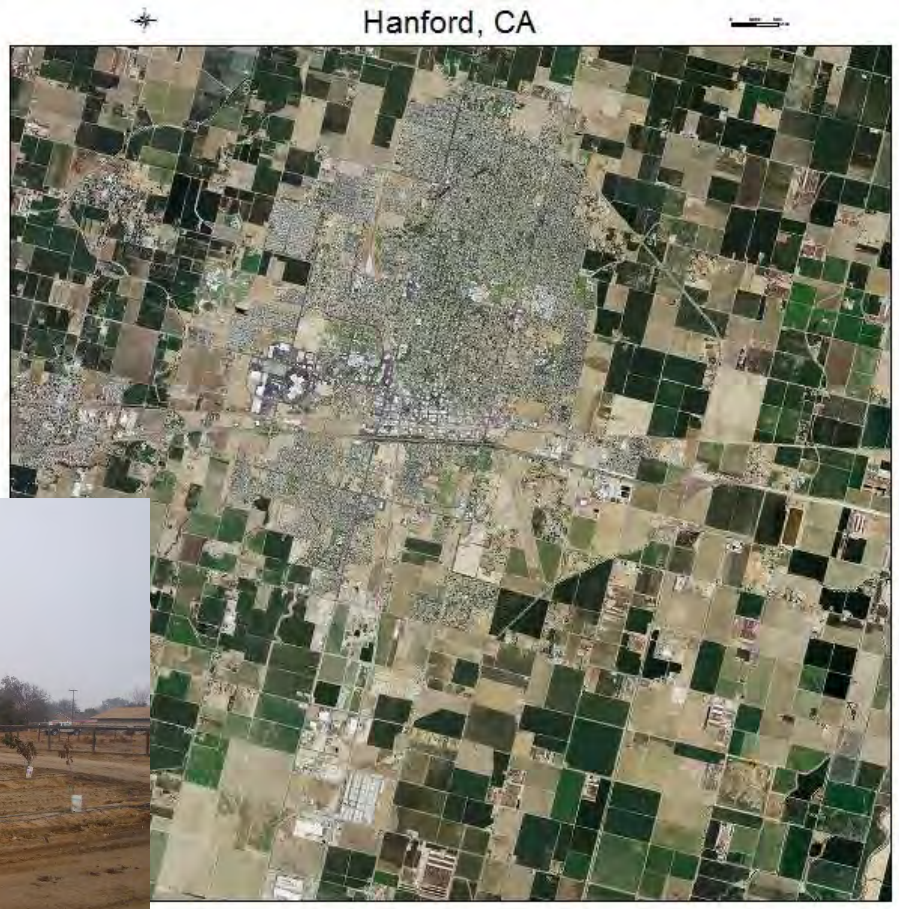
Creating a Front Door in Fresno





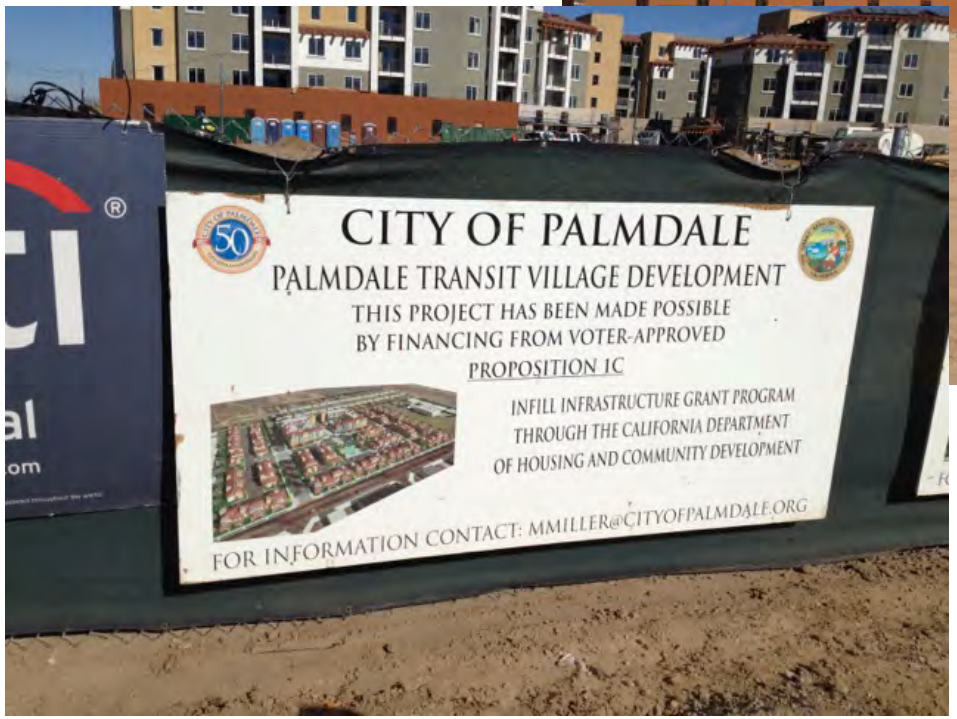
Green Field Challenges

Integrating Communities without Sprawl



Looking for Win/Win Scenarios

Early Partnerships and Planning



Creating System Value

Build a train

Create New Community Connections

Catalyze Development

Attract Public and Private Support and Capital

Attract a private operator??

California High-Speed Rail – It's Happening

Questions and Discussion

First Mile/Last Mile Challenges

- What are some solutions you have seen to the “first mile” – “last mile” challenge of commuting?

- *Increased parking at commuter rail stops*
- *Improved bicycle and pedestrian connectivity*
- *CT Rides*
- *Transit connections*
- *Potential TMA solutions*

Challenges to Implementing TOD on Commuter Rail Lines

- What are the challenges to implementing TOD on commuter rail lines?

- *Service frequency*
- *Location*
- *Density*
- *Parking*
- *Mindset*