

# Next Stop *Tren Urbano*:

## Adding Transit Stations Along Partially Defined Alignments

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Technology Transfer  
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# Background



Subsequent to submission of the FEIS (November, 1995), two Stations were added to *Tren Urbano's* proposed route:

- UPR (December, 1996)
- Domenech (June, 1997)

# Why is Station Location & Spacing so Important?

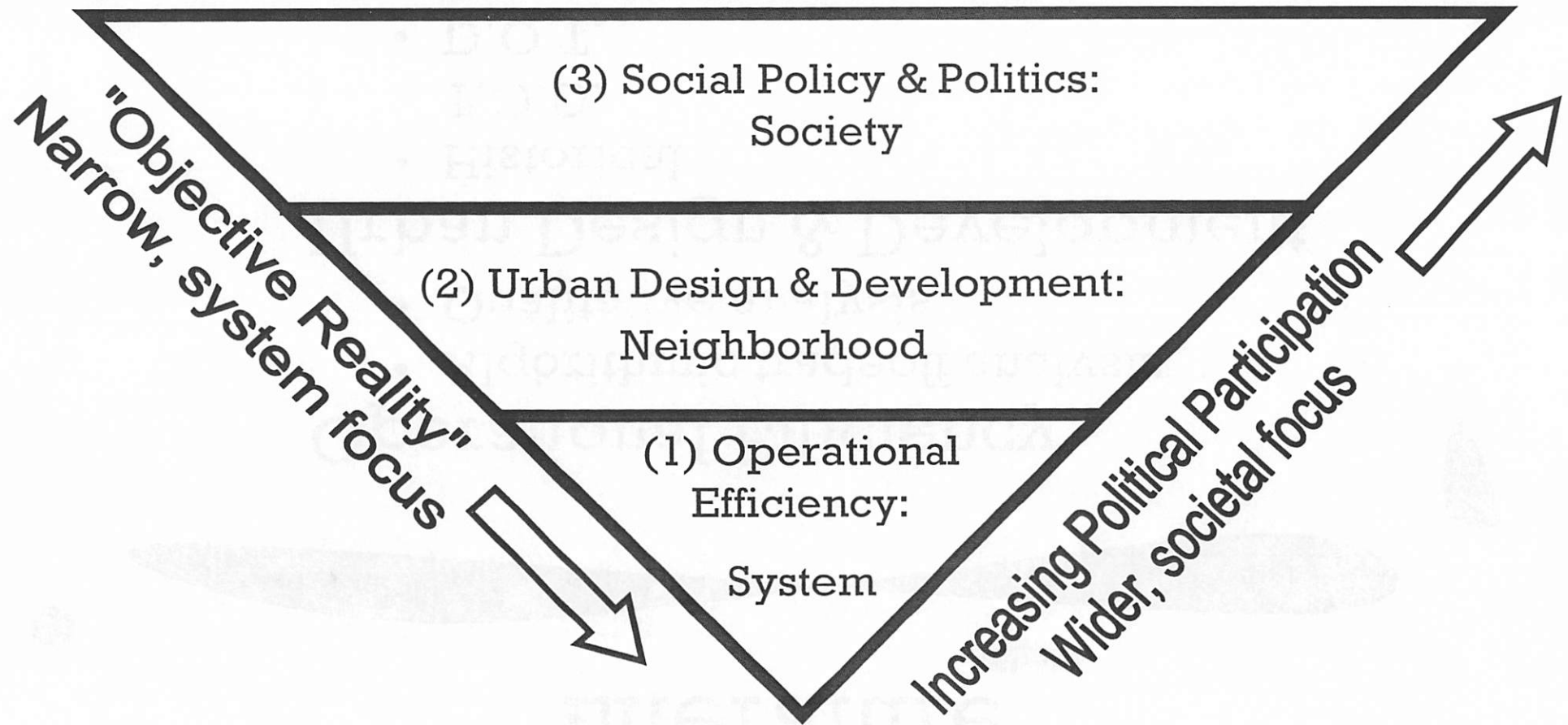
- Stations are interface points between the system & the community
- Station location determines future access to the system: ridership, viability
- Stations anchor neighborhoods: quality of life, physical & economic development
- Station location determines who uses system: equity, coverage, quality, LOS
- Number of stations impacts travel times

# Uniqueness of Station Additions



- Added stations must be transplanted into existing network of stations
- Added stations are more likely to have pedestrian focus
- Added stations are more likely to be the result of advocacy from interest groups
- Must consider construction impacts: It is easier to build during initial construction than to add later.

# Families of Literature on Station Spacing & Location



# Literature




## Operational Efficiency

- Algorithmic tradeoff analysis
- Qualitative analysis

## Urban Design & Development

- Historical
- T.O.D.
- D.O.T.
- Economic Development

## Social Policy & Politics

- Transportation equity
  - Political entrepreneurship
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# *Tren Urbano* Station & Alignment Changes Following DEIS

Station	Change	Time Frame
Luchetti	Eliminated	Between DEIS and FEIS
Bayamon Centro	Relocated	Between DEIS and FEIS
Complejo Deportivo	Relocated	Between DEIS and FEIS
Los Lomas (Martinez Nadal)	Relocated	Between DEIS and FEIS
Estacion Experimental	Eliminated	Between DEIS and FEIS
Villa Nevarez (Cupey)	Relocated	Subsequent to FEIS
Rio Piedras	Relocated	Between DEIS and FEIS
UPR (Universidad)	Added	Subsequent to FEIS
Centro Judico (Pintero)	Relocated	Between DEIS and FEIS
Domenech	Added	Subsequent to FEIS
Hato Rey Centro (Roosevelt)	Relocated	Between DEIS and FEIS
Nuevo Centro (Hato Rey)	Relocated	Between DEIS and FEIS
Segrado Corozon	Relocated	Between DEIS and FEIS

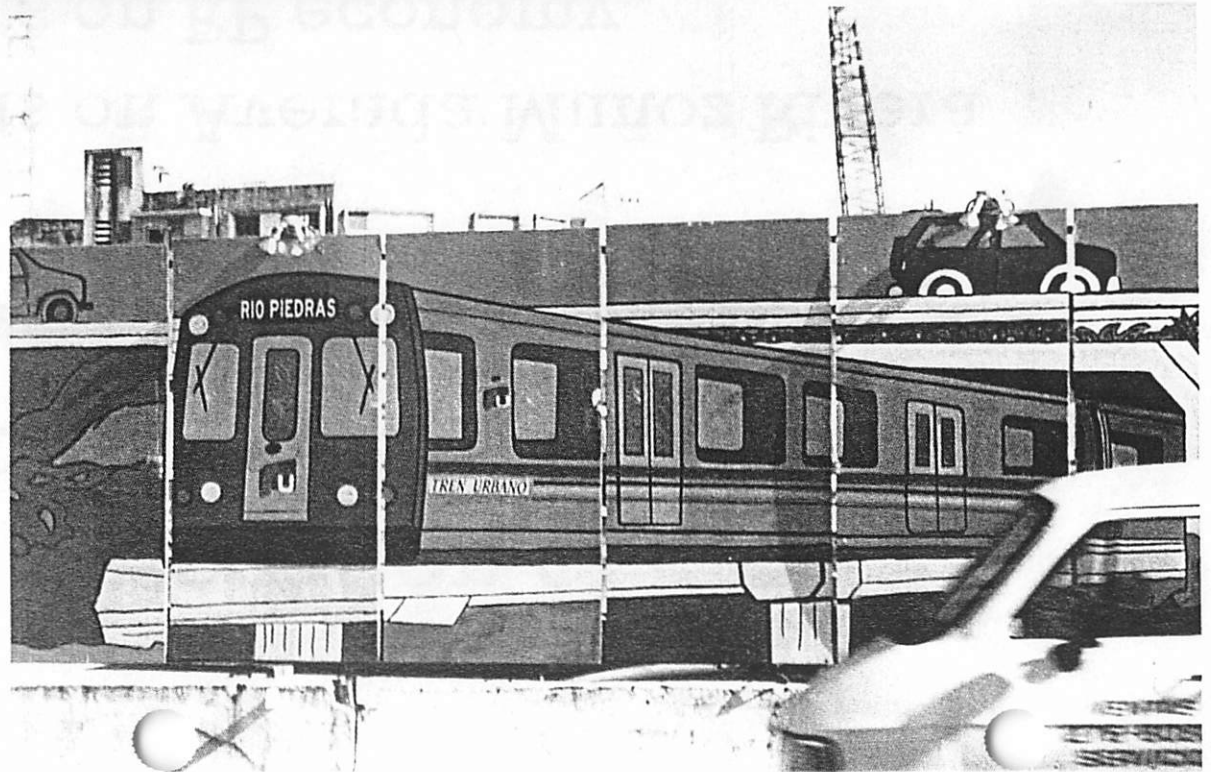
# Río Piedras: Background

- Historic transportation center
- Economic & physical decline
- Conflicting interests:
  - Residents, Merchants, Students, Large Immigrant Population (15-20% Dominican)
- Strong culture of community involvement
- Initial station proposed 1km west of historic center, .5km west of UPR

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# Arguments for Relocation of Río Piedras Station to Commercial Center

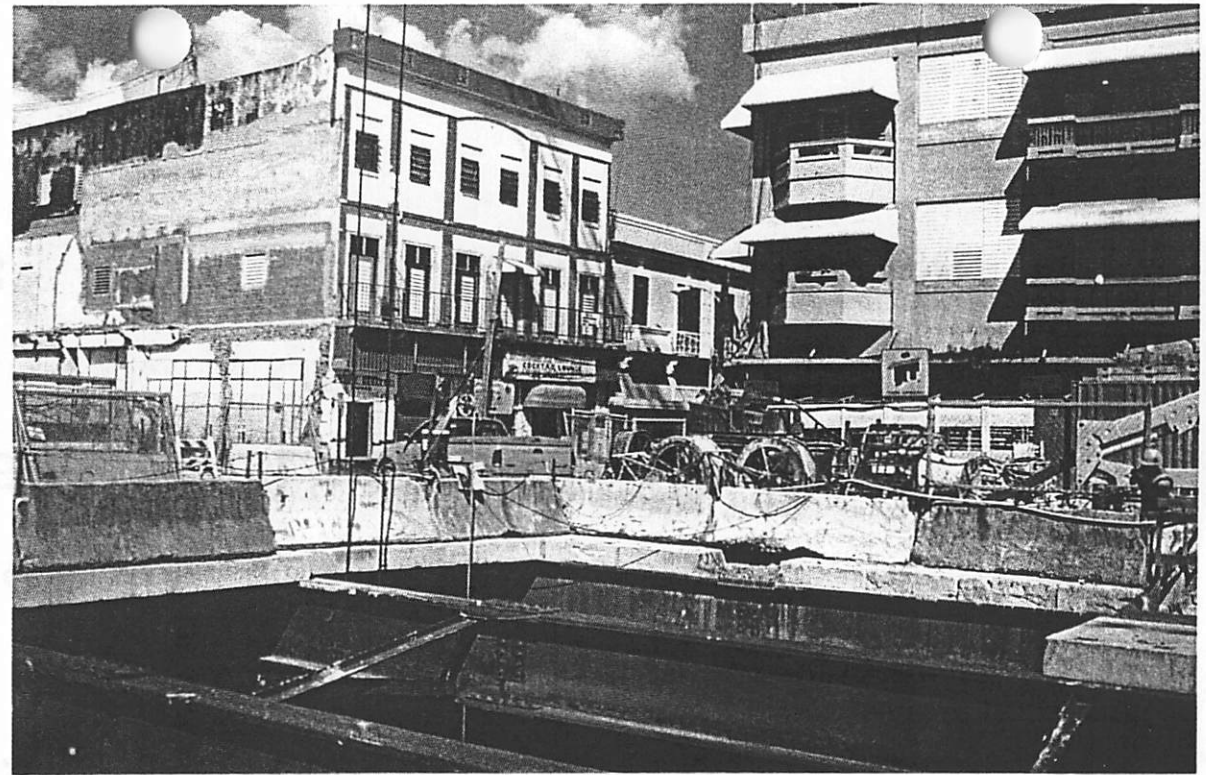
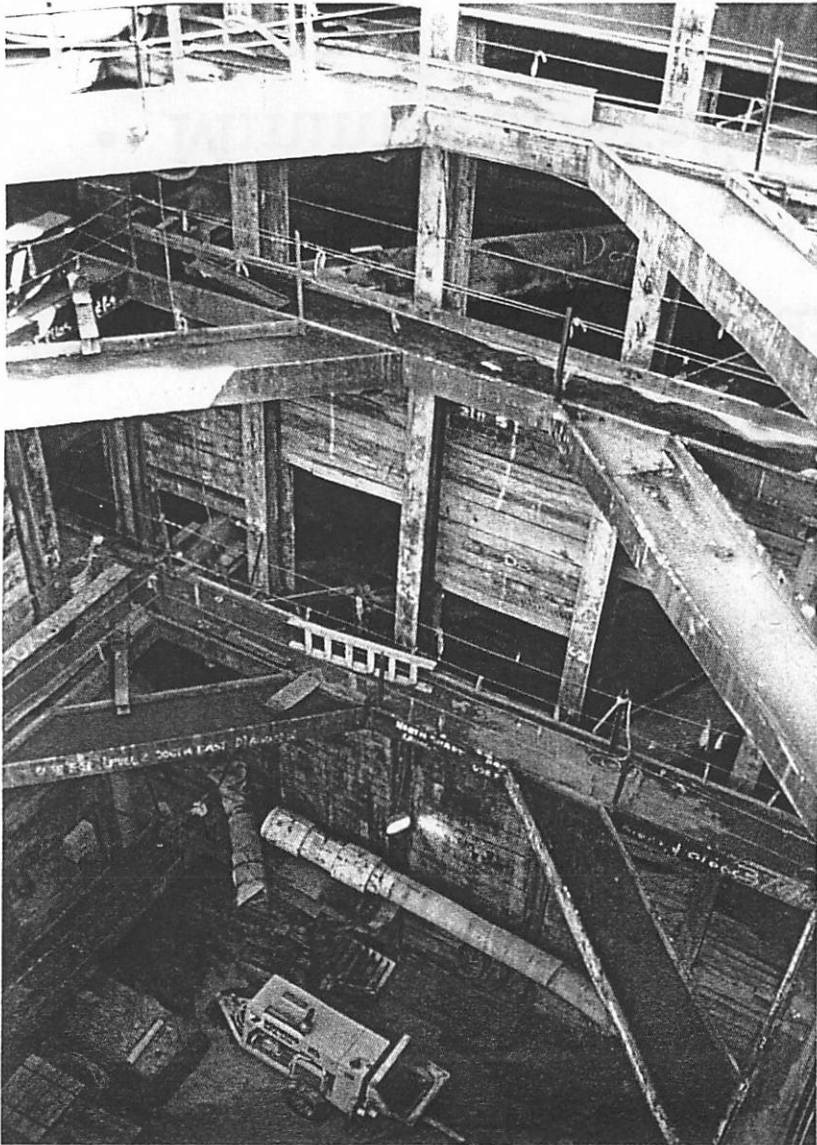
- Negative impacts on Avenida Muñoz Rivera
- Negative impacts on RP economy
- Quality of life:
  - pedestrian-friendly, community oriented, attractive architecture, historically connected
- RP density, street layout, connection to other modes will mean increased ridership
- Ethical desire to support uniquely Puerto Rican historic spatial patterns



**Top:** Alijita Firpi, community leader and president of the *Association de Residentes de Río Piedras*.

**Top Right:** Río Piedras Construction.

**Bottom Right:** *Tren Urbano* mural, painted by Río Piedras school children.



**Top:** Construction of Río Piedras tunnel.  
**Top Right:** Construction impacts along Avenida Ponce de León.  
**Bottom Right:** Río Piedras' central plaza (*Plaza de Recreo*).

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# Arguments for/against UPR Station

## For

- Cultivating students as riders
- Congestion/parking
- Development: Plaza Universitaria
- Minimal operations impact

## Against

- Redundancy
- Reinforcing cultural divide
- Economically detrimental to RP
- Non-continuous use



Building demolition in preparation for construction of midblock elevated alignment and Domenech Station.

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# Arguments for Addition of Domenech Station

- Technical argument
- “Build it and they will come”
- Serving existing activity center, residential areas
- Current stop spacing in Hato Rey too long
- Minimizing future construction impacts

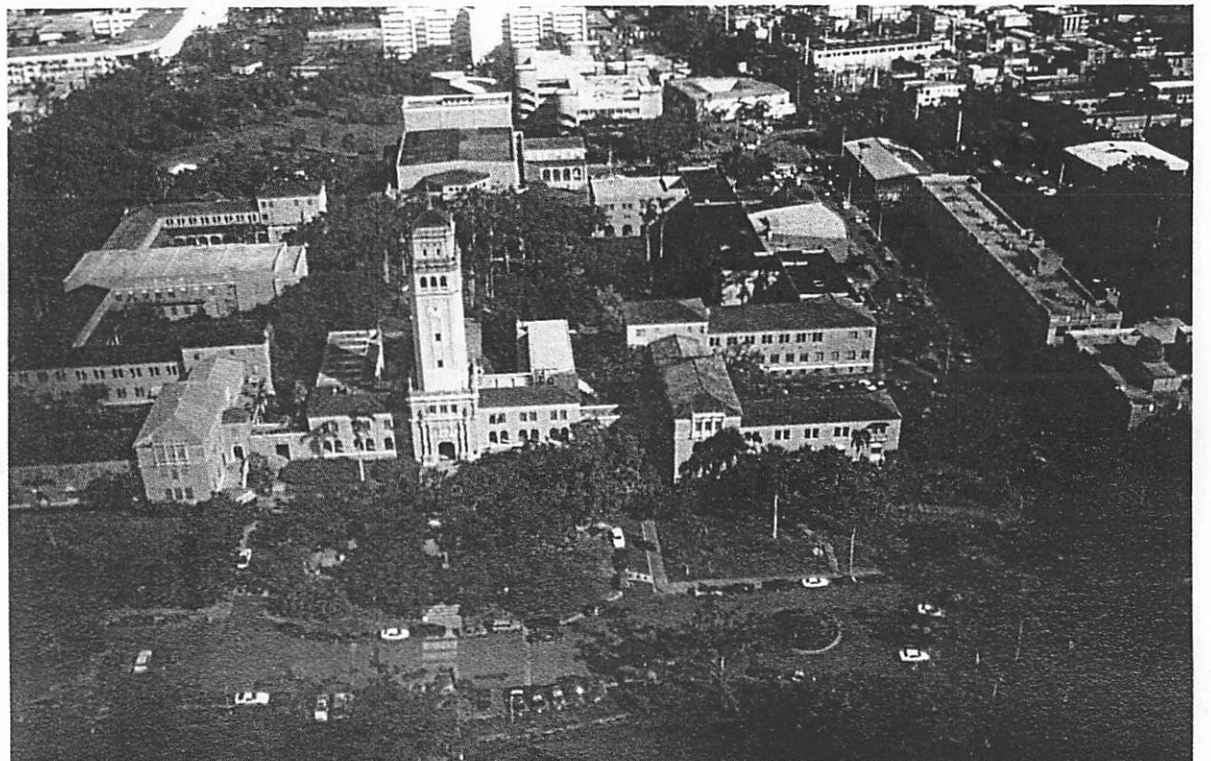
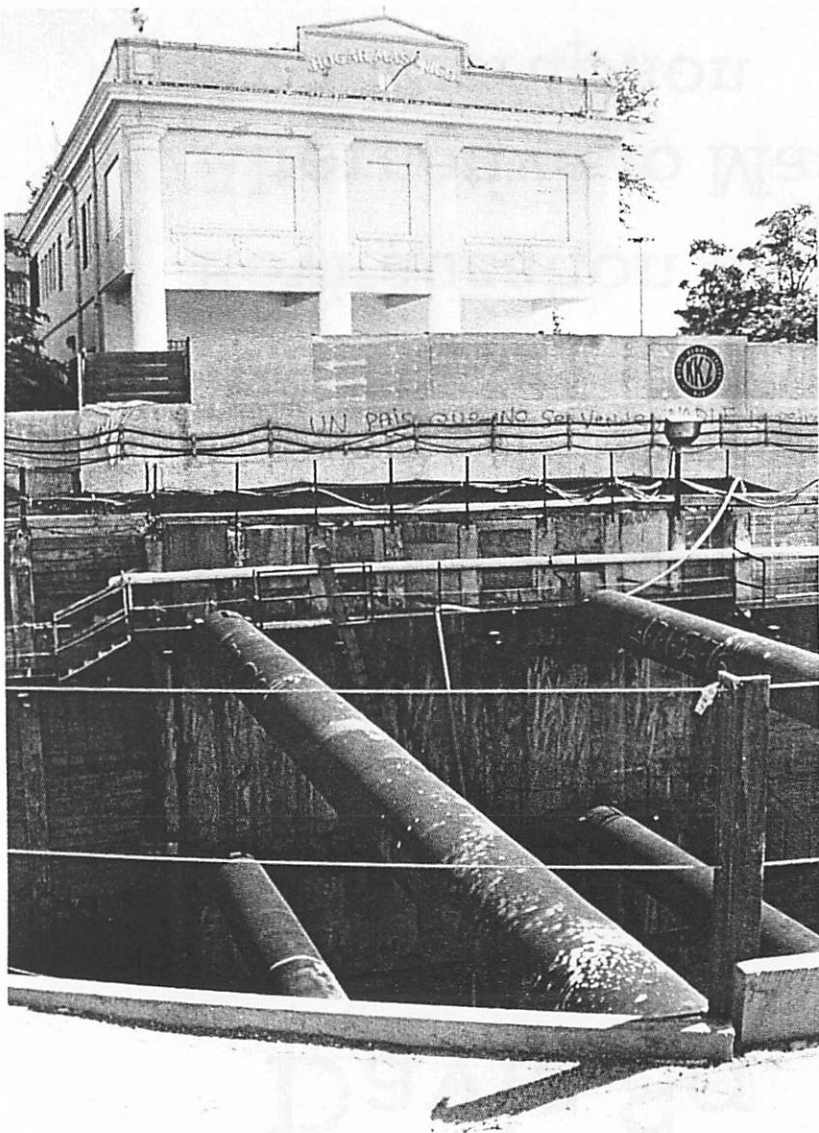


**Top:** Aerial view of future site of Domenech Station.  
**Bottom:** Looking east along Calle Domenech toward Avenida Muñoz Rivera.



**Top:** View from lower income residential neighborhood (*Quintana*) immediately east of future Domenech Station.

**Bottom:** View from more affluent residential neighborhood (*Baldrich*) immediately west of Domenech Station.



**Top:** Construction in front of UPR's *Hogar Masonica*.  
**Top Right:** Cut and cover construction opposite future site of *Plaza Universitaria*.  
**Bottom Right:** Aerial view of UPR.

Boston

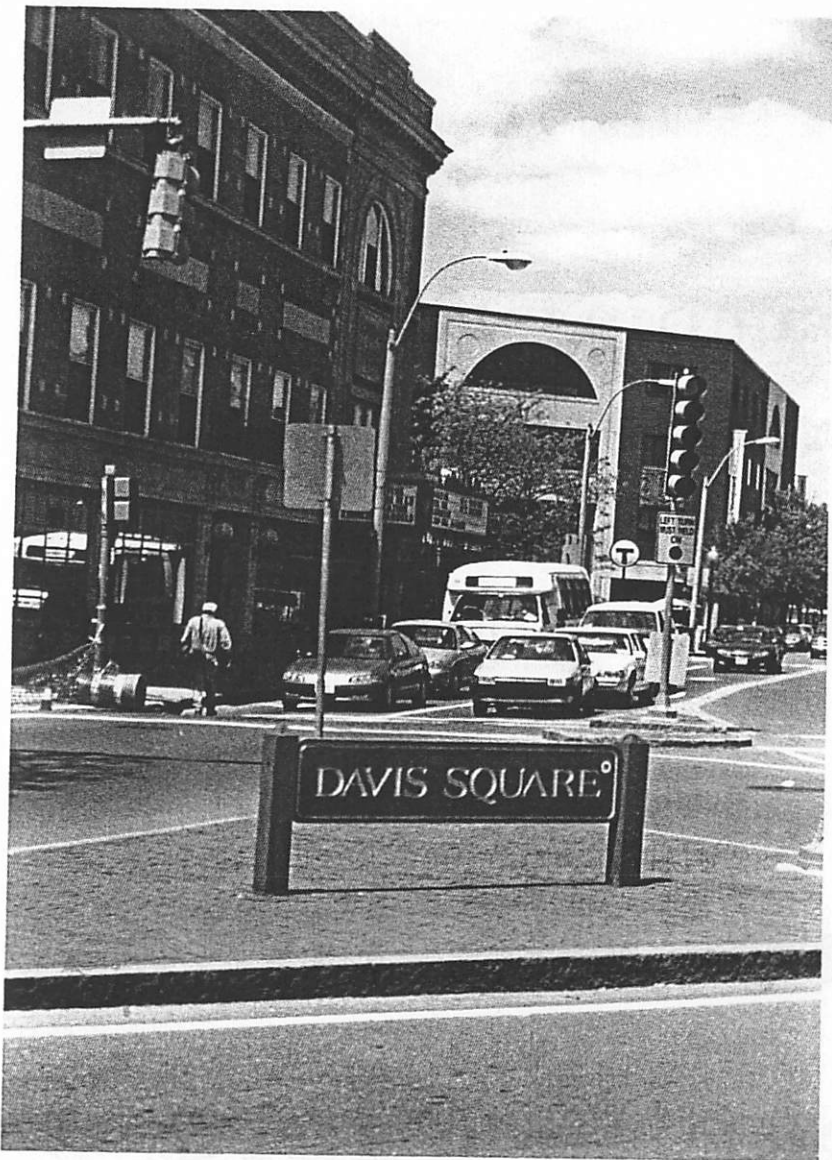
# Davis Sq. Station Addition

## Arguments

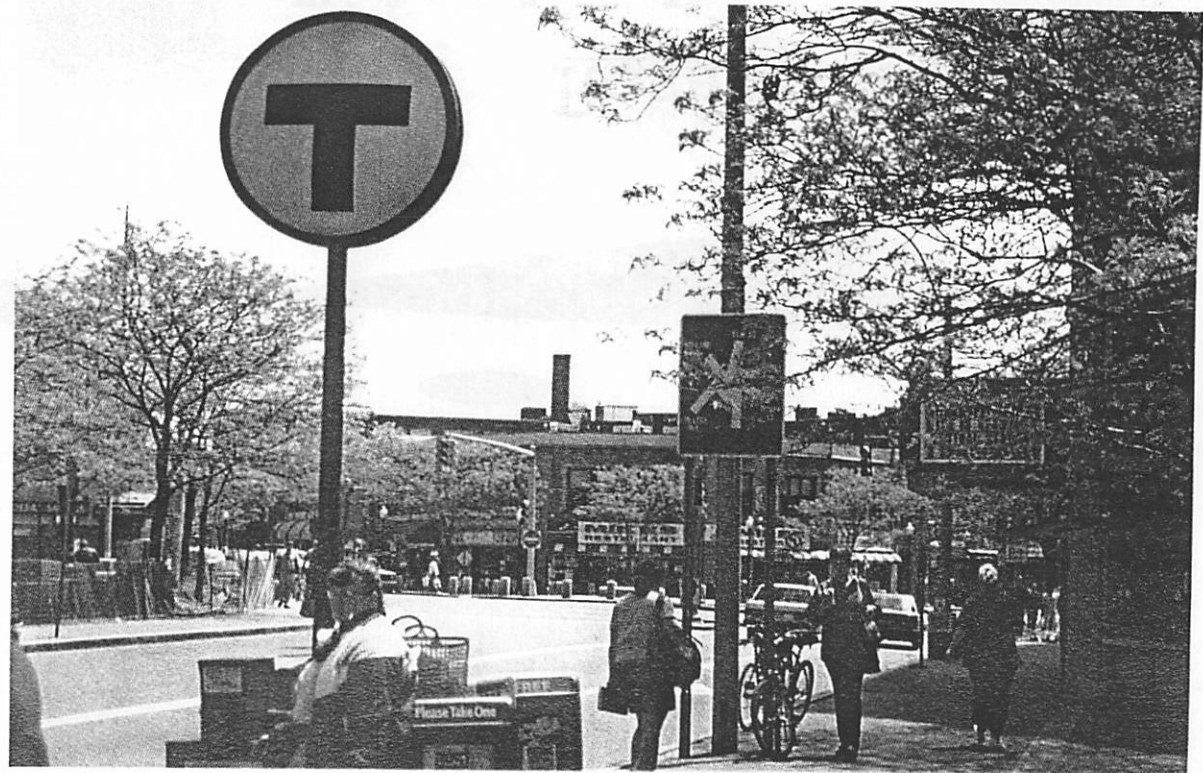
- Funding Equity
- Transit Orientation
- Economic Revitalization
- Alternative to Mass. Ave. disruption

## Results

- Ridership: High performing station
  - 9,544 pax/day
- Economic revitalization of Davis Square
- Institutional Revitalization



**Top:** Looking north from Davis Sq. along Holland Ave., past Somerville Theater and MBTA Red Line Station.  
**Top Right:** Reconstruction of Davis Sq. Plaza, over former freight railway cutoff.  
**Bottom Right:** Looking south along Holland Ave. from Davis Sq. Station Headhouse.



Boston

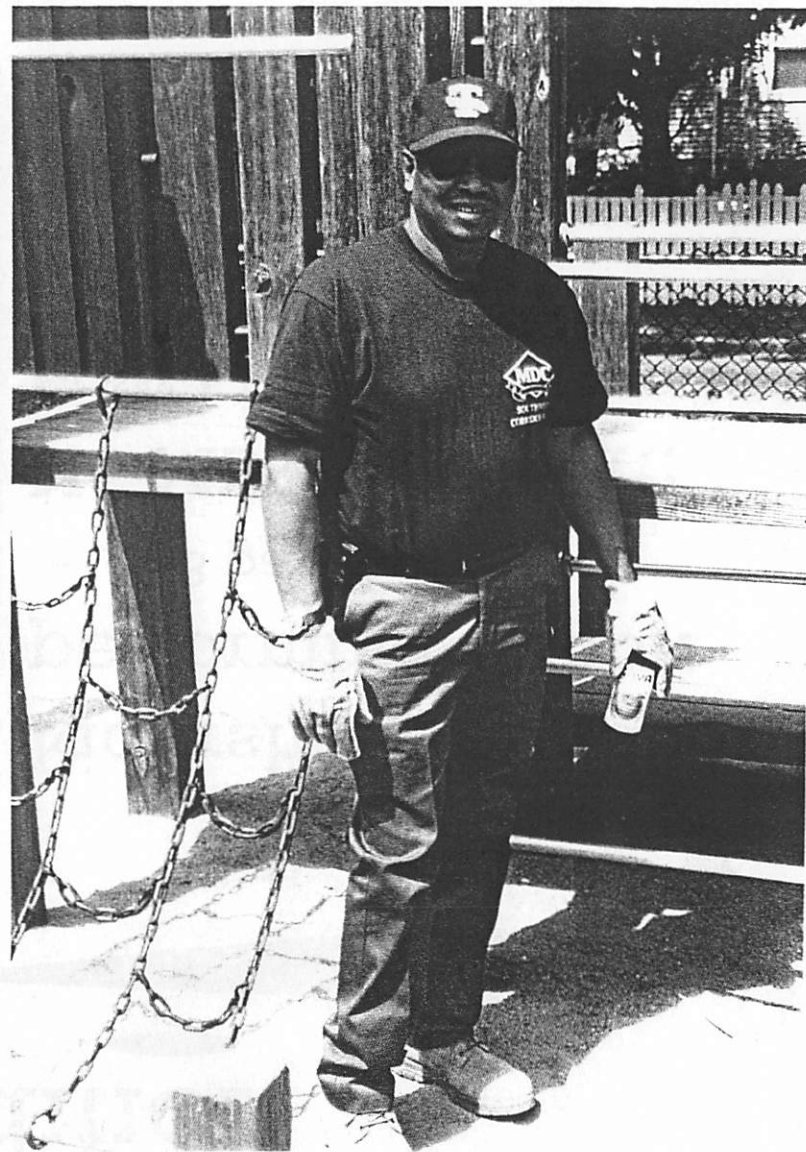
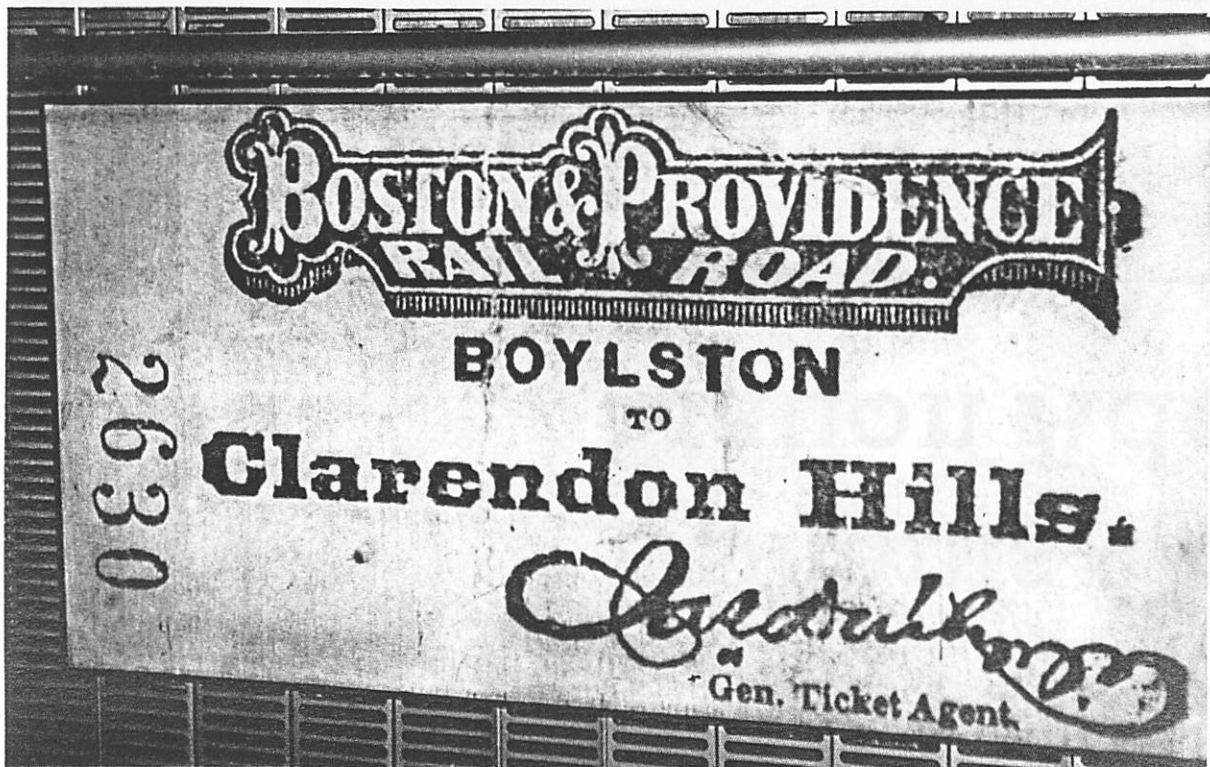
# Stony Brook Station Addition

## Arguments

- Neighborhood investment
- Reconnecting divide
- Historical argument

## Results

- Ridership: Poor performing station
  - 1,886 pax/day
- Institutional revitalization
- Neighborhood integration



Top Left: View of Stony Brook Orange Line Station, looking north along Southwest Corridor Park.

Bottom Left: Poster of historic railroad ticket from old Boylston Station adorning present Stony Brook Station, outbound track.

Top: Employee of Metropolitan District Commission (MDC) maintaining Southwest Corridor Park.

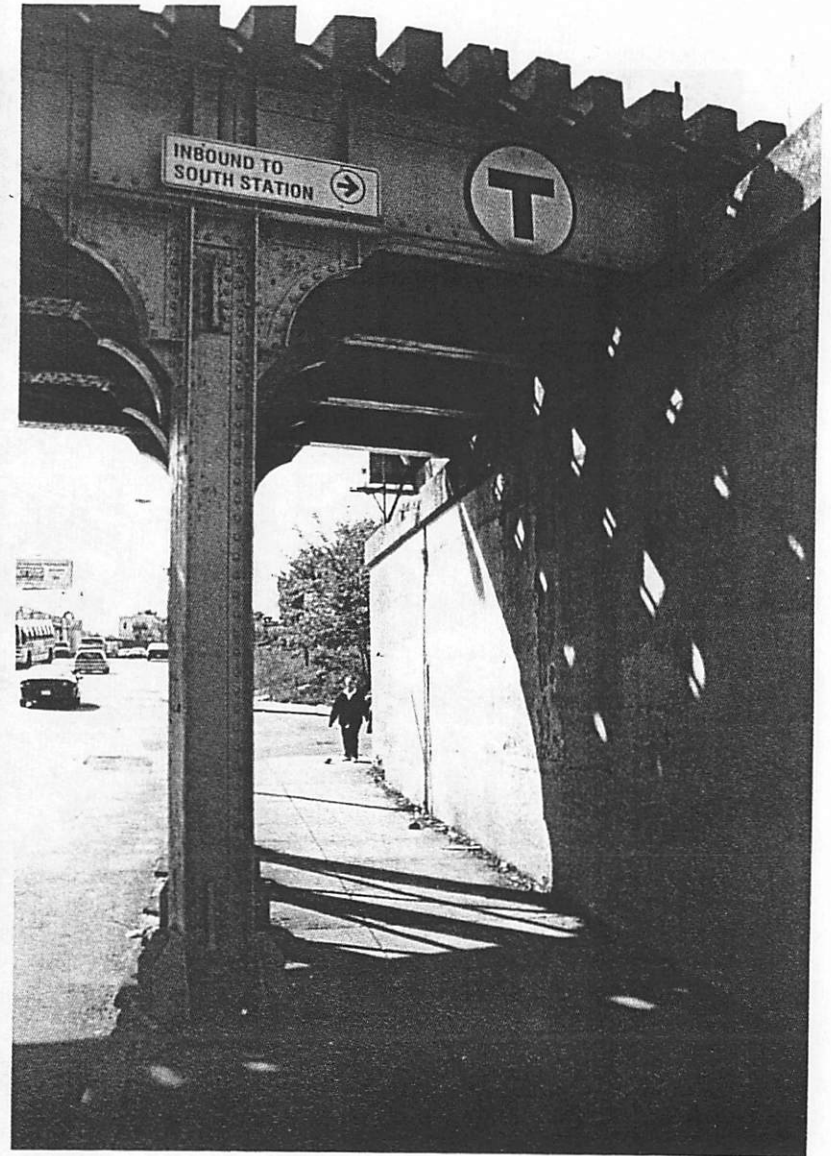
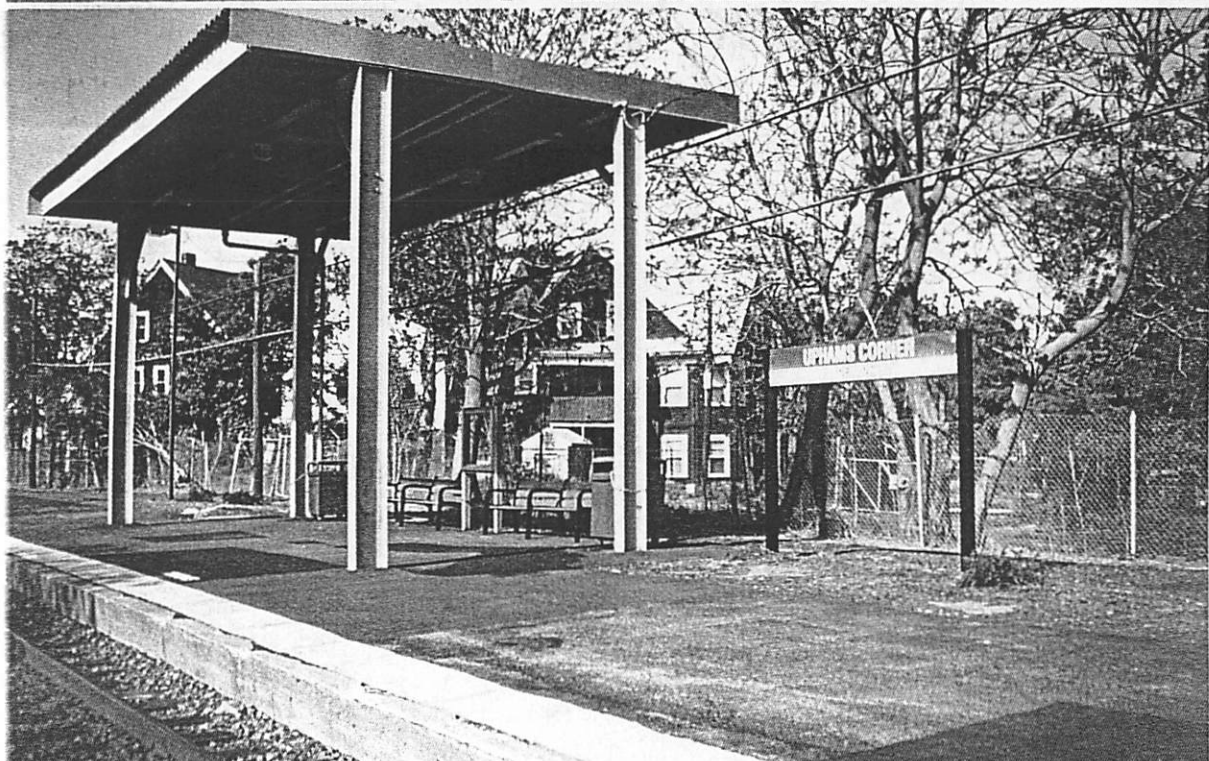
# Uphams Corner Station Addition

## Arguments

- Compensation for lost Orange Line service
- Compensation for bearing negative externalities of RR ROW
- Need: high poverty, low auto ownership

## Results

- Ridership: Very poor performing station
  - 153 pax/day
- No MBTA support: Low LOS
- No significant neighborhood impact



**Top Left:** Commuter train leaving Uphams Corner Station heading towards South Station.

**Bottom Left:** Minimal amenities at Uphams Corner Station.

**Top:** View of Uphams Corner Station signage from Dudley St.



**Top:** Looking east along Dudley St. to Uphams Corner business district from elevated track at Uphams Corner Station.

**Bottom:** Looking west from Uphams Corner business district along Dudley St. Note elevated train stopped at Uphams Corner Station in background.

Analysis

# Station Spacing & Location

## Distance-based or Node-based?

### Tren Urbano

- TU argues spacings are node driven
- Prior to additions, relatively uniform spacings: 1,224m avg.
- Little difference in spacings between suburban & urban sections: 1,224m v. 1,278m
- Trains will only reach max. velocity (100m/hr) at 2 points along line.

### MBTA

- Extensions studied more urban than lines designed in 1960s
- Red Line:
  - Nodally focused
  - Davis creates anomalous spacing
- Orange Line:
  - Not nodal
  - short spacings
  - Priority of alignment

## Analysis

# Relationship of Stations to Neighborhoods

- Institutional support
  - Davis: Strong, station specific
  - Stony Brook: Strong, corridor specific
  - Uphams Corner
  - UPR, Río Piedras: Potential
- Focus on historic centers/historic corridors
  - Río Piedras relocation consistent w/ previously realized goal of supporting urban centers
- Ridership de-emphasized

# Process: Who Participates?

- Public participation process dominated by professional elite, large institutions
- Community-based organizations not representative
  - No Dominican participation in Río Piedras
  - RP Merchants Association dominated by bigger stores
- Process depends on strong community leader
  - Ruth Hernandez
- Community representation, not participation
  - TU Community Relations Office located in implementation team, not planning team
- Party Politics
  - *Centros Urbanos* not utilized

# Guideposts for Adding Transit Stations

- (1) Where does the public enter the process?
- (2) What has changed? Why was the station not added at the onset?
- (3) Who is represented in the process?
- (4) Is there a history of supporting transit in the area?
- (5) Does the station help to right an historical injustice?
- (6) Who is in favor of adding the station? Who is opposed?
- (7) Would the area around the proposed station be well-served by transit if the station were not built?
- (8) Would the station be appropriate to the technology?

## Recommendations

# Guideposts (cont.)

- (9) Does the proposed station serve populations more dependent on public transit?
- (10) Will the proposed station benefit multiple types of riders making multiple types of trips?
- (11) Does the proposed station increase accessibility to dense residential & employment areas?
- (12) Does the station rely on auto or pedestrian access?
- (13) Will there be institutional support for the station?
- (14) Does the station support sustainable growth?
- (15) Is there likely to be a need for a station in the proposed area at a later date?
- (16) What is the cost/investment?

# Challenges - The future

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- risk taking
- technological development (Agenda 2030) (cost bridging)
- social change
- lessons learned ...
- [ Limitations ... We can do it ] Positive aspects
- learn approach
- innovative approach T2