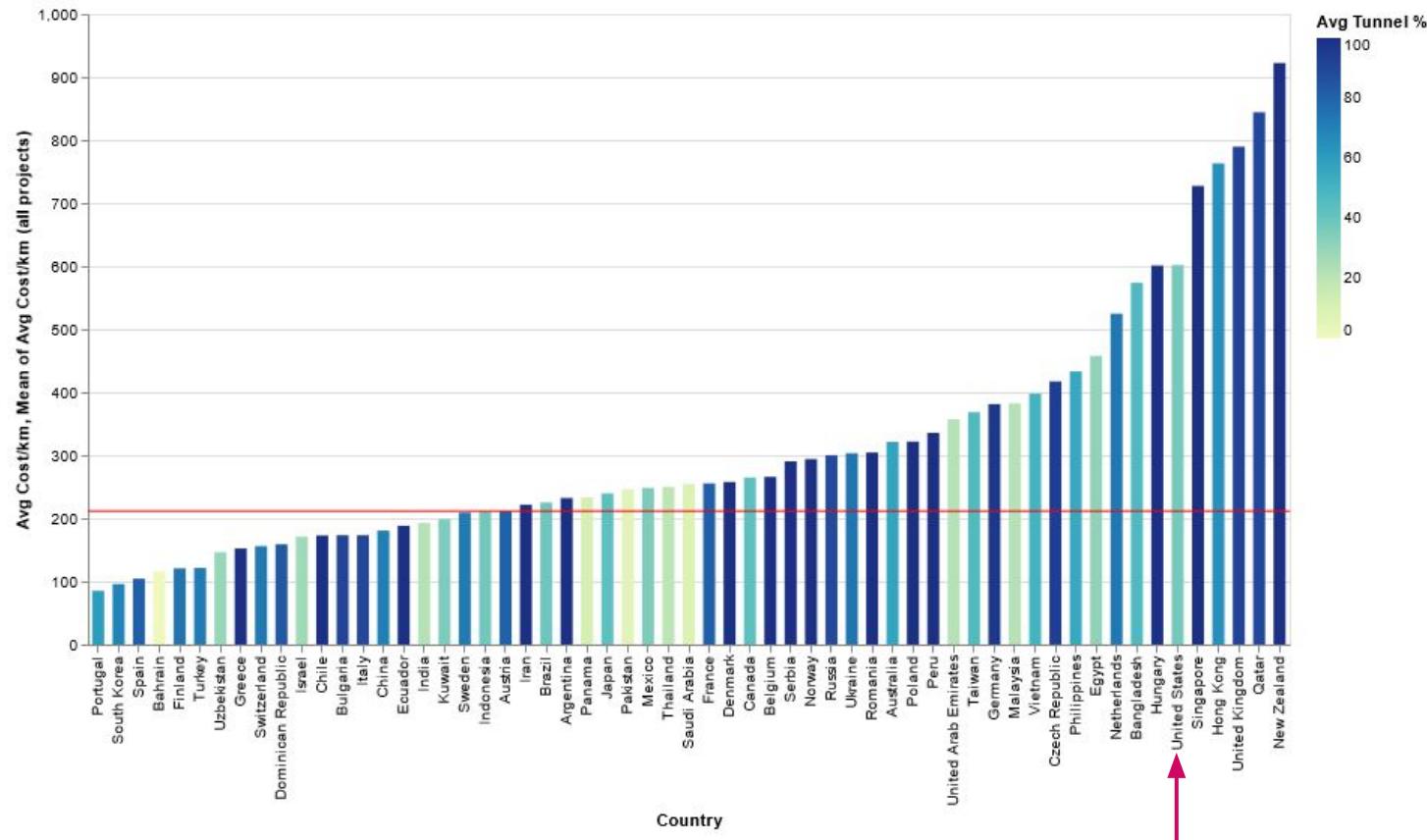


Transit Costs Project

Understanding Transit Infrastructure Costs
in American Cities

Eric Goldwyn, Alon Levy, Elif Ensari, & Marco Chitti



Case Studies

- Boston: Green Line Extension
- Istanbul: M4, Marmaray and M9
- Italy: Milan, Rome, Turin and Naples
- Sweden: Citybanan and Nya Tunnelbanan
- New York: Second Avenue Subway, Phase 1

Phase 1 of the Second Avenue Subway



The Contracts

		CONTRACT	PROPOSED	ACTUAL	INCREASE	
		Date Contractor Work	Bids	Duration Cost	Completion Duration Cost	Duration Cost
TUNNELS	3/20/2007	S3 Tunnel Constructors JV	②	40 months \$ 337 million	- 3/30/2012 - 60 months - \$ 378 million	50% 12%
	5/28/2009	E.E. Cruz/Tully Construction	④	43 months \$ 325 million	- 11/5/2013 - 53 months - \$ 372 million	23% 15%
96 th STREET STATION	6/22/2012	E.E. Cruz/Tully Construction	⑦	42 months Station Finishes, MEP Systems, Ancillary Buildings, and Entrances	- 8/7/2017 - 61.5 months - \$ 411 million	46% 27%
	7/8/2009	J.D'Annunzio & Sons, Inc.	⑤	19 months Excavation, Utility Relocation, and Road Decking	- 11/16/2011 - 28 months - \$ 41 million	47% 19%
86 th STREET STATION	8/4/2011	Skanska/Taylor JV	⑤	37 months Heavy Civil/Structural	- 12/16/2014 - 52 months - \$ 326 million	41% 8%
	6/12/2013	86th Street Constructors	⑤	35.5 months Station Finishes, MEP Systems, Ancillary Buildings, and Entrances	- 9/29/2017 - 51.5 months - \$ 266 million	45% 27%
72 nd STREET STATION	10/1/2010	Schiavone/Shea/Kiewit	③	39 months Cavern Mining, G3/G4 Tunnels, and Heavy Civil/Structural	- 1/14/2014 - 39.5 months - \$ 448 million	1% 0%
	2/14/2013	Judlau Contracting	⑤	33 months Station Finishes, MEP Systems, Ancillary Buildings, and Entrances	- 8/3/2017 - 56.5 months - \$ 347 million	71% 34%
SYSTEMS	1/13/2011	Judlau Contracting	⑥	40 months Reconstruction	- 12/29/2017 - 83 months - \$ 229 million	108% 30%
	1/18/2012	Comstock Skanska JV	④	55 months Track, Power, Signals, and Communications	- 7/31/2018 - 78 months - \$ 336 million	42% 28%
DESIGN & CM	5/31/2007	PB Americas		91 months Consultant Construction Management	- 8/31/2021 - 173.5 months - \$ 204 million	91% 152%
	12/20/2001	Aecom-Arup JV		183 months Design and Engineering Services	- 3/31/2021 - 210 months - \$ 451 million	15% 142%

Primary Factors

- Intergovernmental Coordination and Utilities
- Labor Wages and Staffing
- Procurement and Risk
- Station Design

Intergovernmental Coordination and Utilities



86th Street and Second Avenue Before and After Construction

A Story About Pipes



Photo Credit: Ben Heckscher

Permitting/3rd Parties Add Uncertainty, Delay, & Costs

News

Project delays may cost taxpayers \$150K daily as DART officials and Dallas council members squabble

KERA | By Nathan Collins
Published February 28, 2023 at 3:19 PM CST



Disagreements between DART and city officials over excess tax revenue, project additions and a lack of communication has delayed DART projects in Dallas.

Delays in a Dallas area light rail project could cost taxpayers \$150,000 a day. That's a rough estimate by a Dallas Area Rapid Transit (DART) official at Tuesday's joint committee meeting with the Transportation and Infrastructure committee.

DURHAM COUNTY NEWS

Duke opts to not back Triangle light-rail project

by: CBS 17 staff
Posted: Feb 27, 2019 / 05:34 PM EST
Updated: Mar 1, 2019 / 06:40 AM EST



Mercer Island Abandons Long Legal Fight Against Sound Transit

By Ryan Packer - December 14, 2022



After a series of years-long legal fights with Sound Transit, Mercer Island has signed a settlement and given up. (Rendering of future Mercer Island Station courtesy of Sound Transit)

Municipality will pay transit agency \$2.1 million and drop claims surrounding East Link extension.

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April 26, 2023

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April 26, 2023

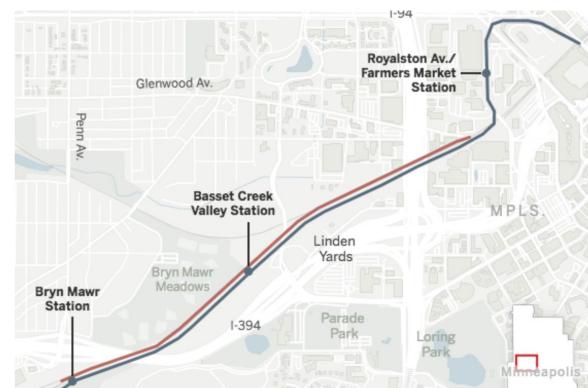
Sunday Video: What Traffic Shows Of The Bahama's Racial History
April 23, 2023

The Urbanist Podcast: What We're Reading

March 24, 2021 | Track Construction

How much more? Cost of crash wall on Southwest line in Minnesota spikes 356%

Written by RT&S Staff



A 1-mile-long barrier wall required by BNSF will cost more than originally expected.

The Metropolitan Council knows who is going to pay for this wall, but the new price is staggering.

Labor and Wages

Second Avenue Subway Phase 1 Tunnel Boring Machine Staffing

Actual and Proposed Staffing

Team	Number of Staff/Shift	Fully-Laden Employment Cost	Proposed Number of Staff/Shift	Fully-Laden Employment Cost of Proposed Scenario
TBM Crew	20	\$73,720	13	\$47,457
Support Crews	26	\$89,964	17	\$57,882
Total per Shift	46	\$163,684	30	\$116,529
Total	138	\$491,052	90	\$349,586

Labor Productivity



Second Avenue Subway TBM Launch Box

Agency Capacity



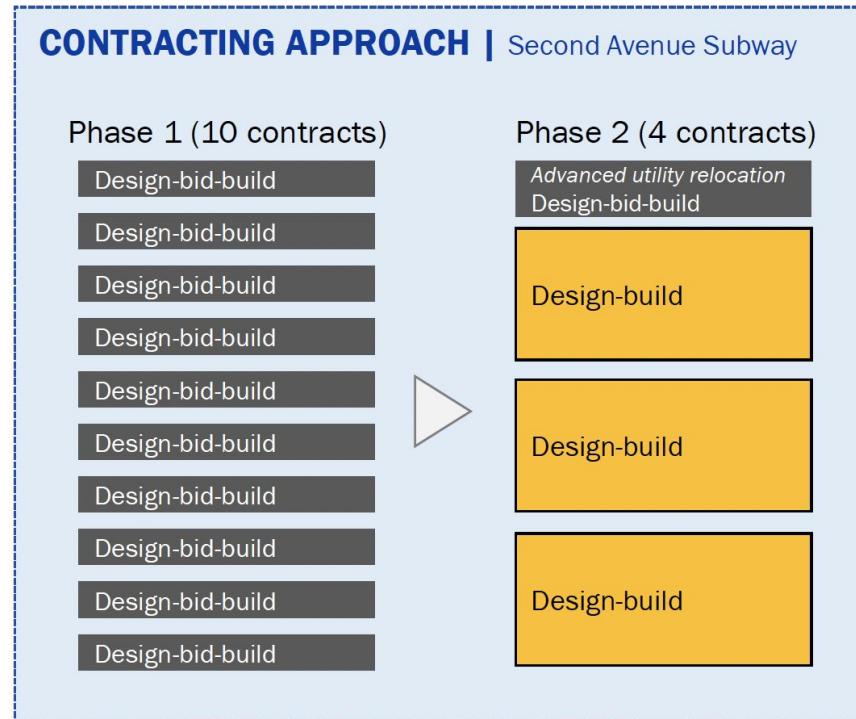
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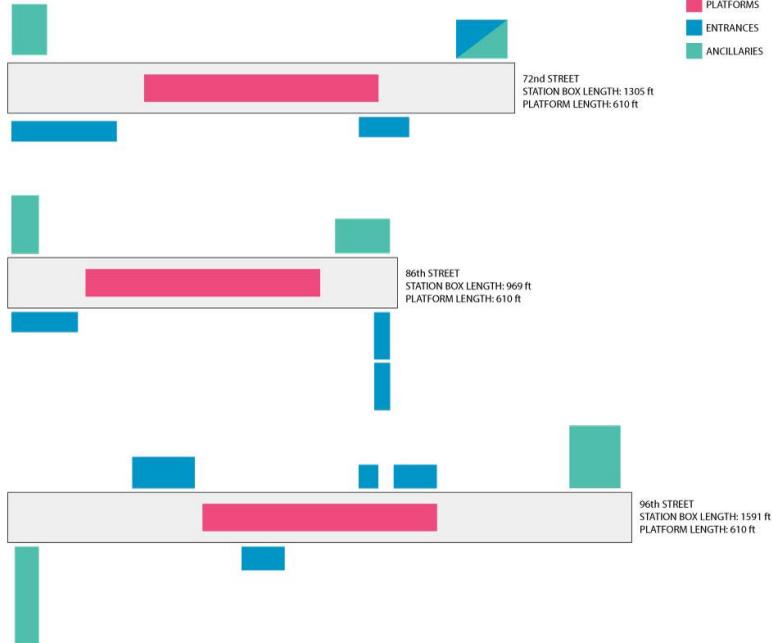


Procurement and Risk



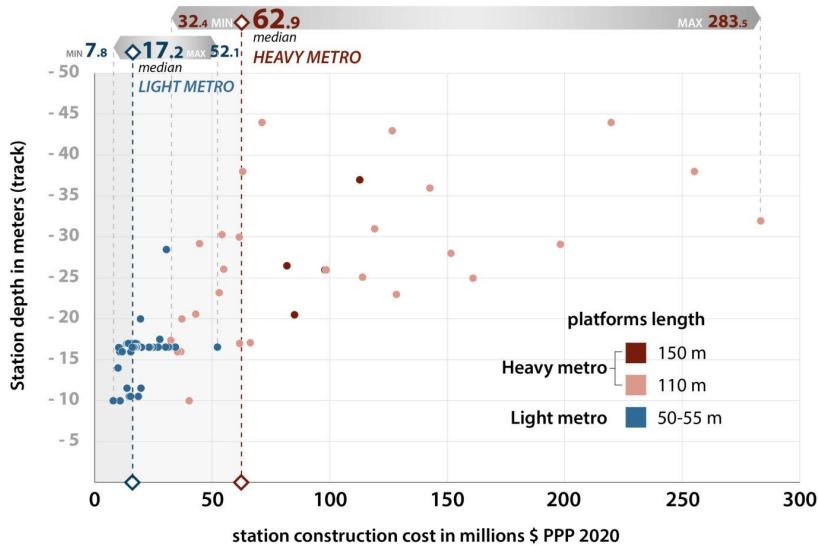
Moving from DBB to DB

Station Design

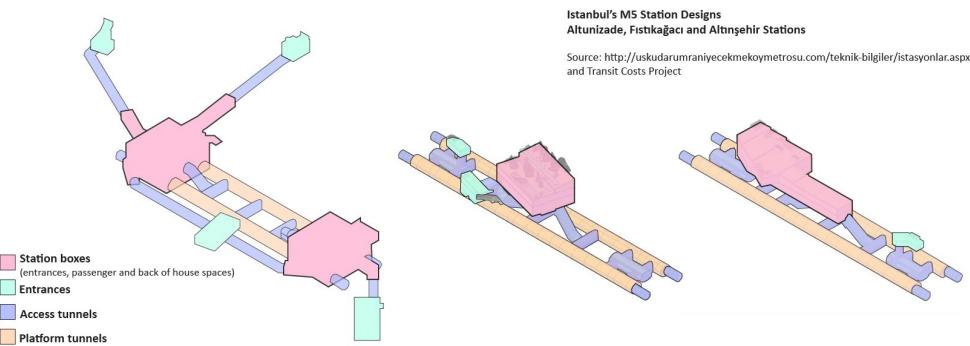


72nd st. North: Laverick, K., <https://www.vanshnookenraggen.com>; 72nd st. South: Goldwyn, E.; 86th st. North: Henderson, J., <https://www.wikiwand.com>; 86th st. South and 96th st. South: Walsh, K., *Forgotten New York*; 96th st. North: Google Street View.

Another World is Possible

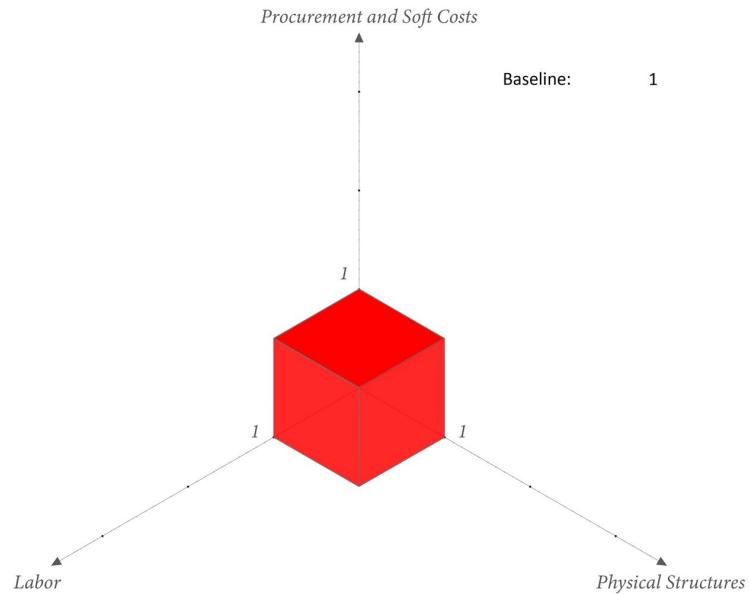


Italian Station Costs

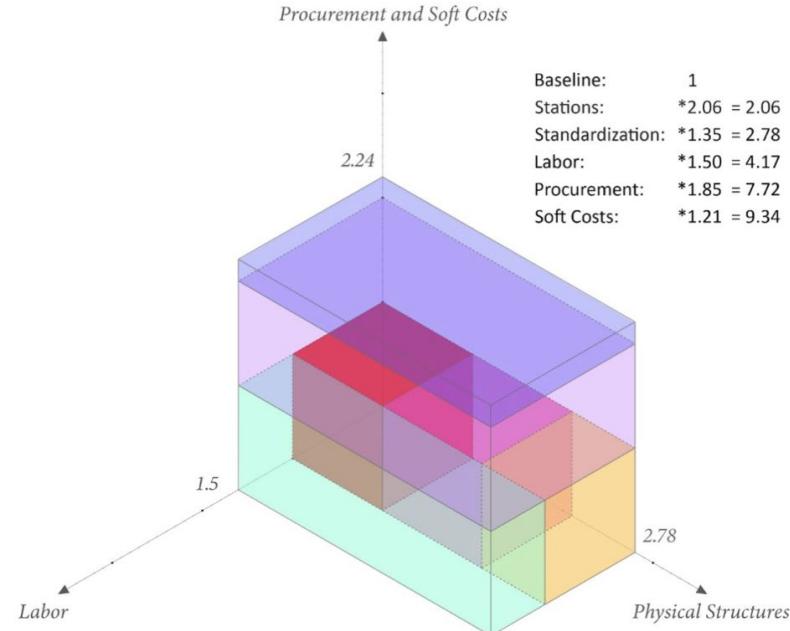


Turkish station boxes are shorter than platforms!

Factor of 8-12



Factor of 8-12: Static



Recommendations - Management

- Find champions
- Import experts, adopt proven standards, cultivate in-house expertise
- Collaborate with other agencies, particularly utilities
- Foster transparency
- Staff-up. Plan to avoid politicization and early commitment.

Recommendations - Procurement

- Use DBB or DB. Supervise contractors well. Be good clients.
- Itemize contracts
- Ease, speed-up and standardize change order processes
- Keep the risk in the public sector
- Award contracts based on technical merit
- Standardize regulations
- Limit contingencies

Recommendations - Stations

- Standardize designs
- Use cut and cover, build shallowly
- Build small

Thank you

More at transitcosts.com

Contact: egoldwyn@nyu.edu