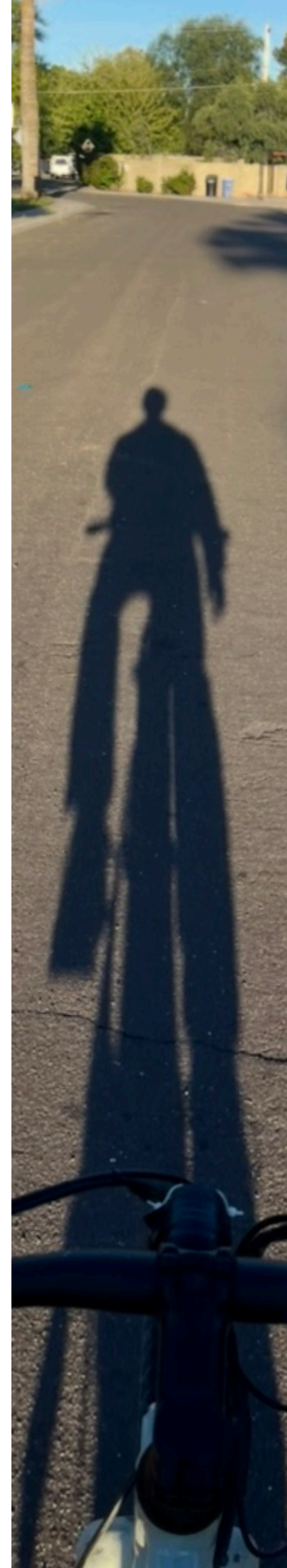




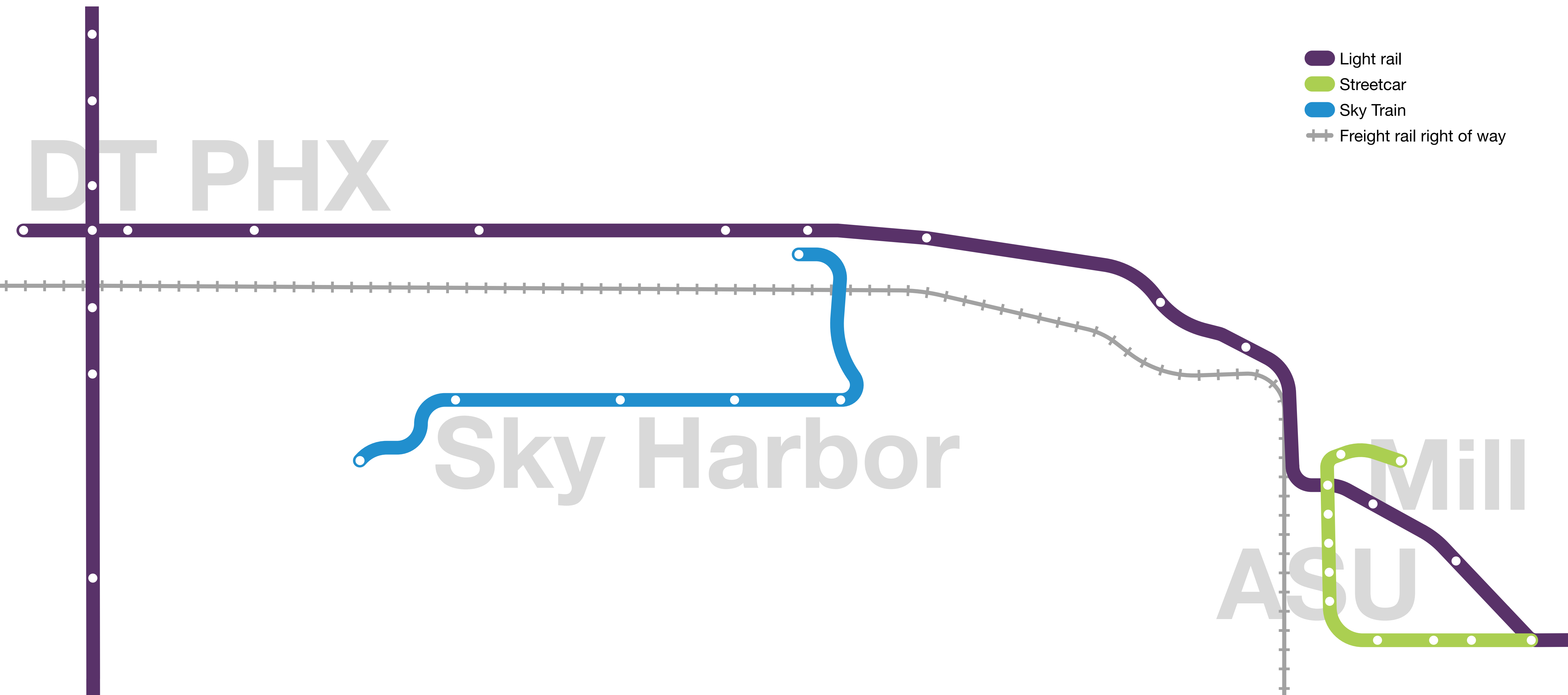
Phoenix — Tempe Express Rail

Created by James Graef

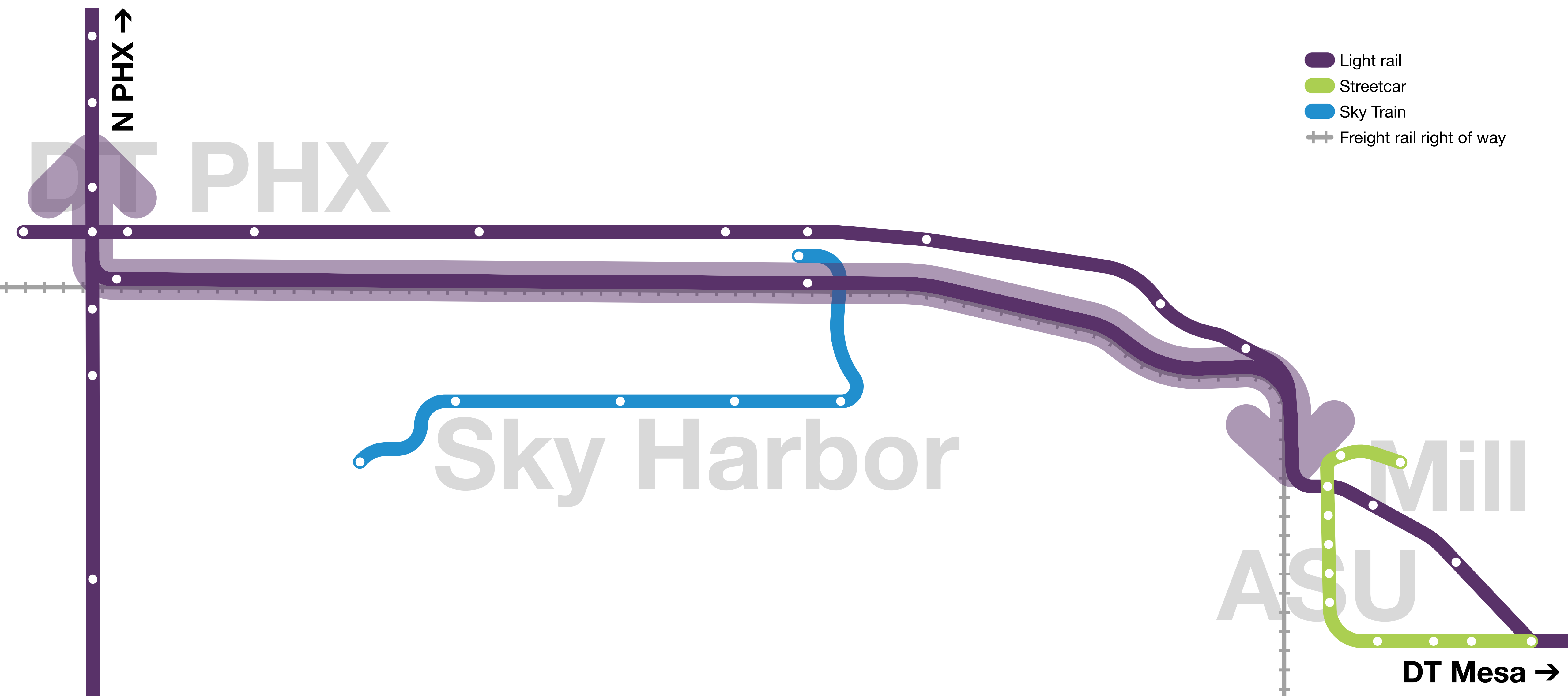
traveling Phoenix car-free
leaves 🕒 ***plenty of time*** to
contemplate better transport



Existing rail system: slow between downtowns



New express tracks connect N PHX to Mesa



first time light rail will be

 f a s t e r t h a n d r i v i n g

between any two points,

anywhere in the valley

This project's iterative design development

Groundwork ↻



Case-building ↻



Refinement ↻

- 1.** Survey existing conditions
- 2.** Test assumptions
- 3.** Acknowledge & approximate unknowns

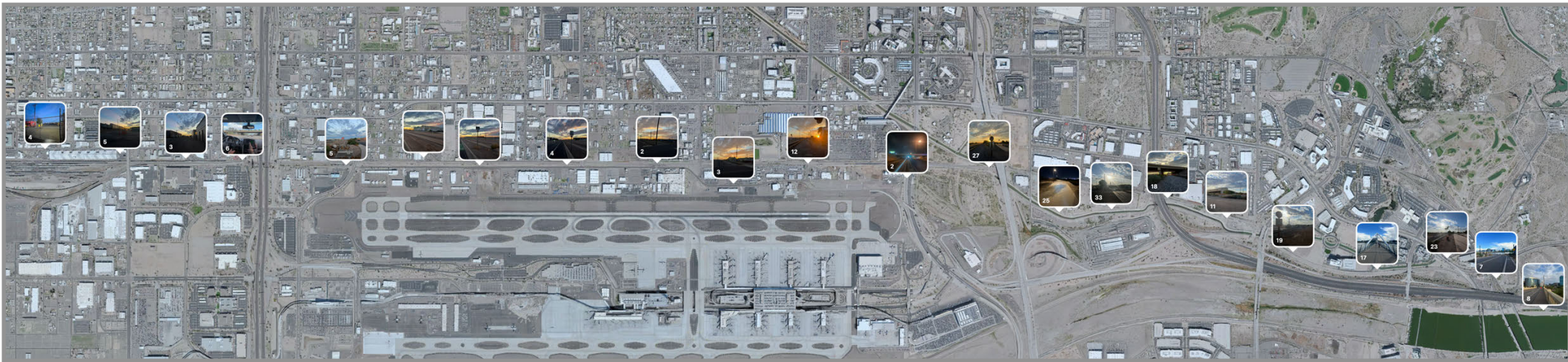
- 4.** Craft a compelling narrative
- 5.** Address stakeholders' visions & concerns
- 6.** Get initial feedback from trusted allies

- 7.** Look to precedents
- 8.** Translate precedents to local context
- 9.** Learn from sharing & iterate

1. Survey existing conditions

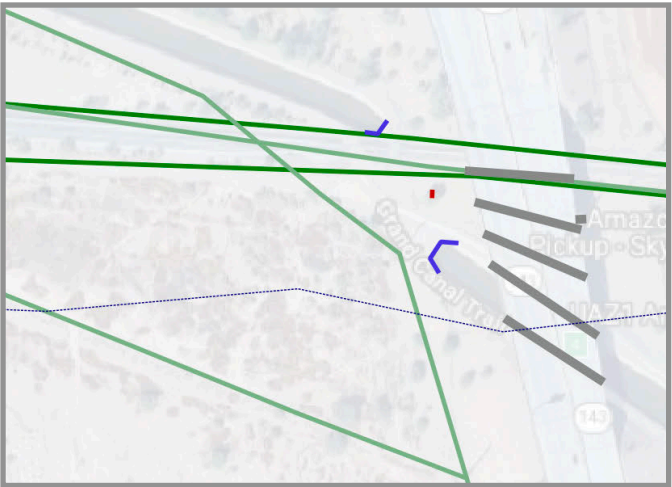
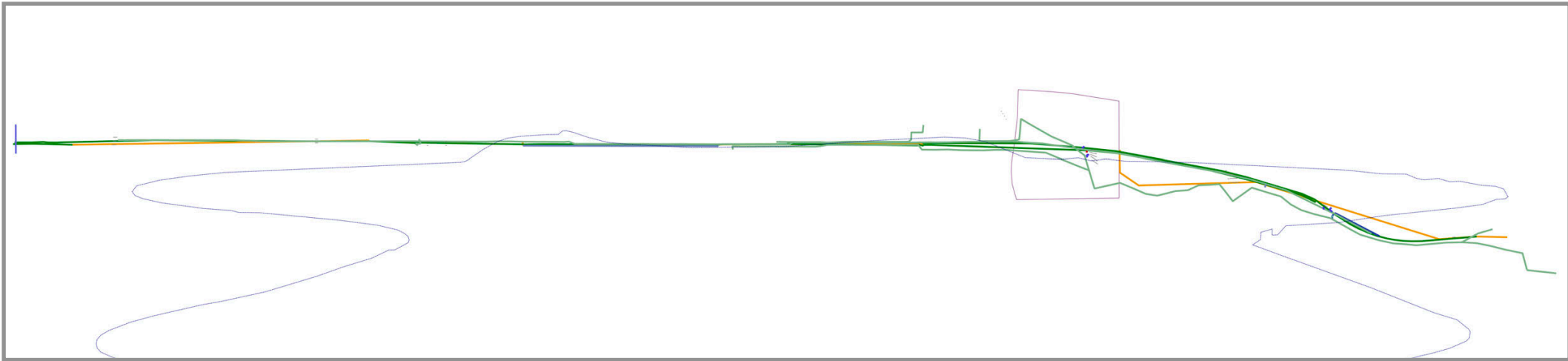
a.

On-the-ground survey via bike collecting utility locations, grade changes, and up-to-date statuses



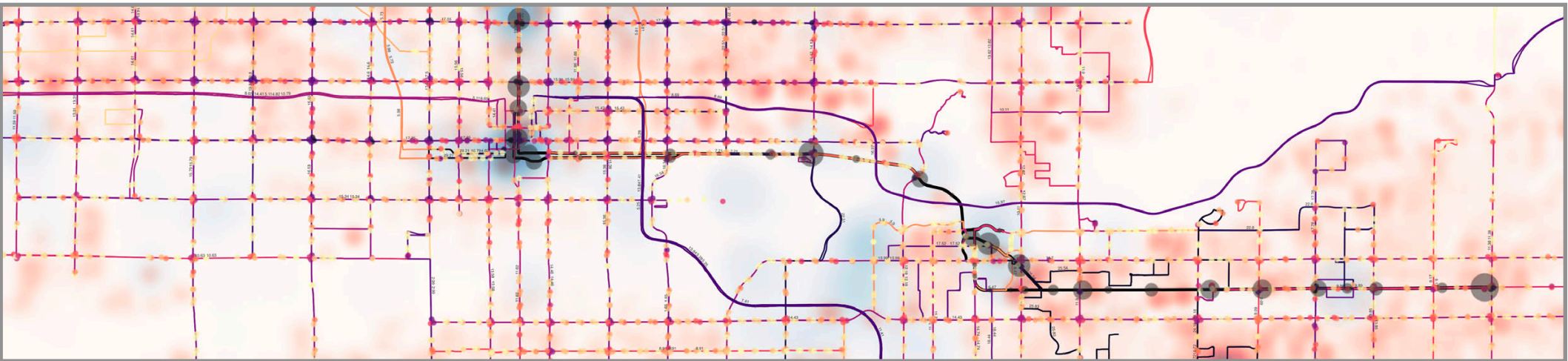
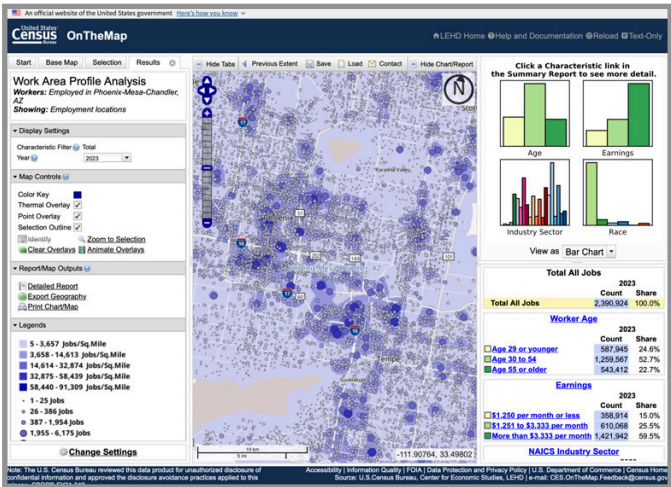
b.

Utilities survey (without city data layers) via photos, maps, and GIS data, incl. airport 65dba boundary



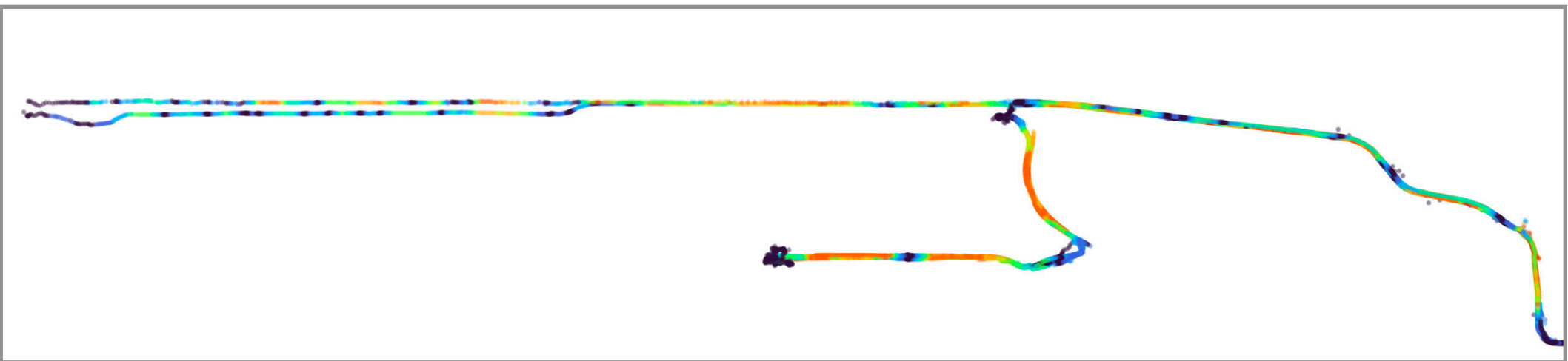
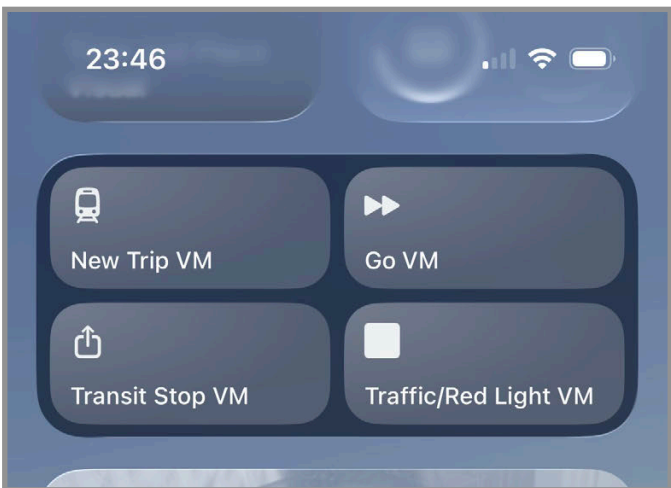
c.

Ridership survey from Census work and home data and existing transit ridership GIS layers



d.

Speed survey via opportunistic speedometer recording and manual Shortcuts data collection



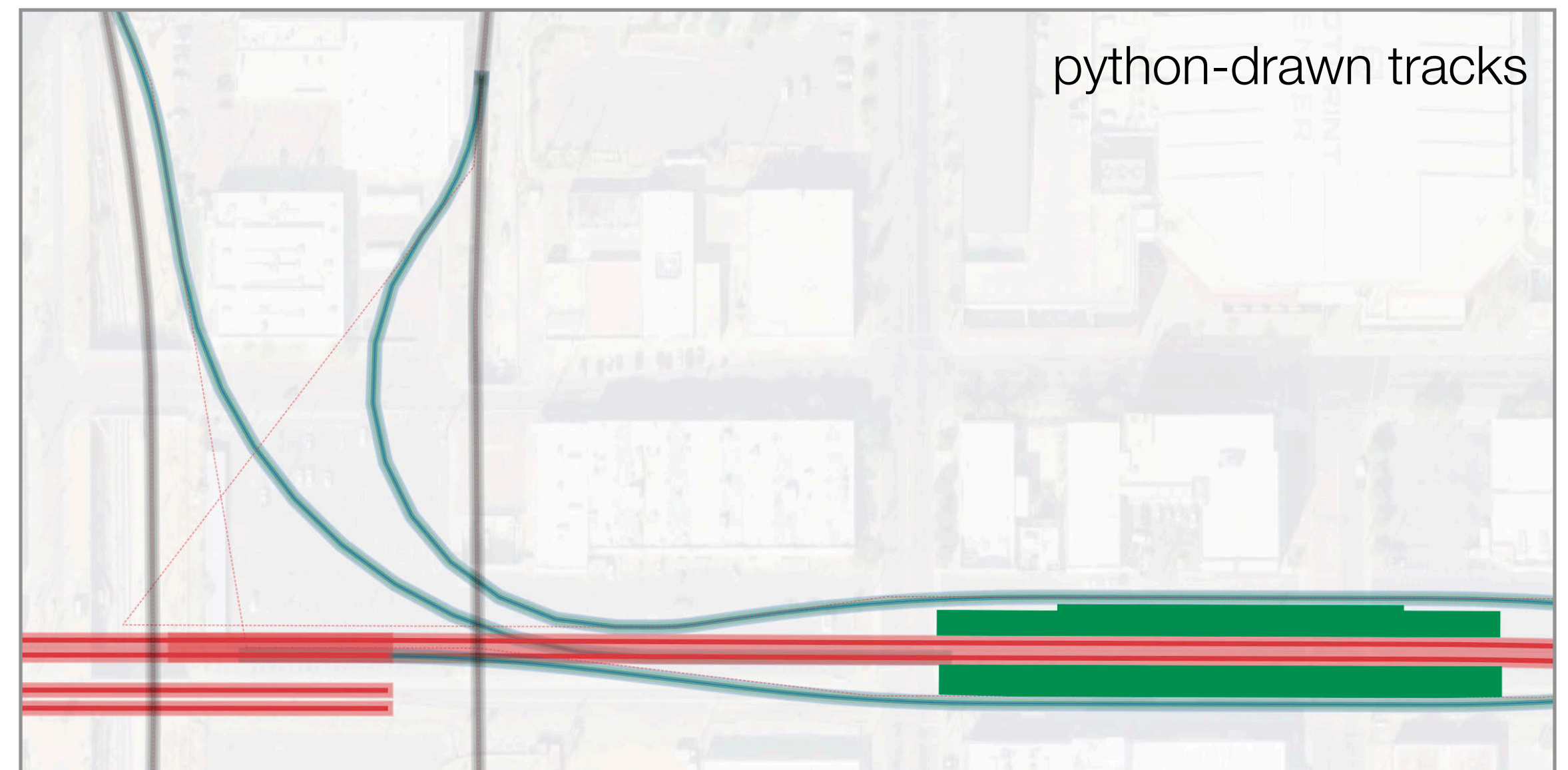
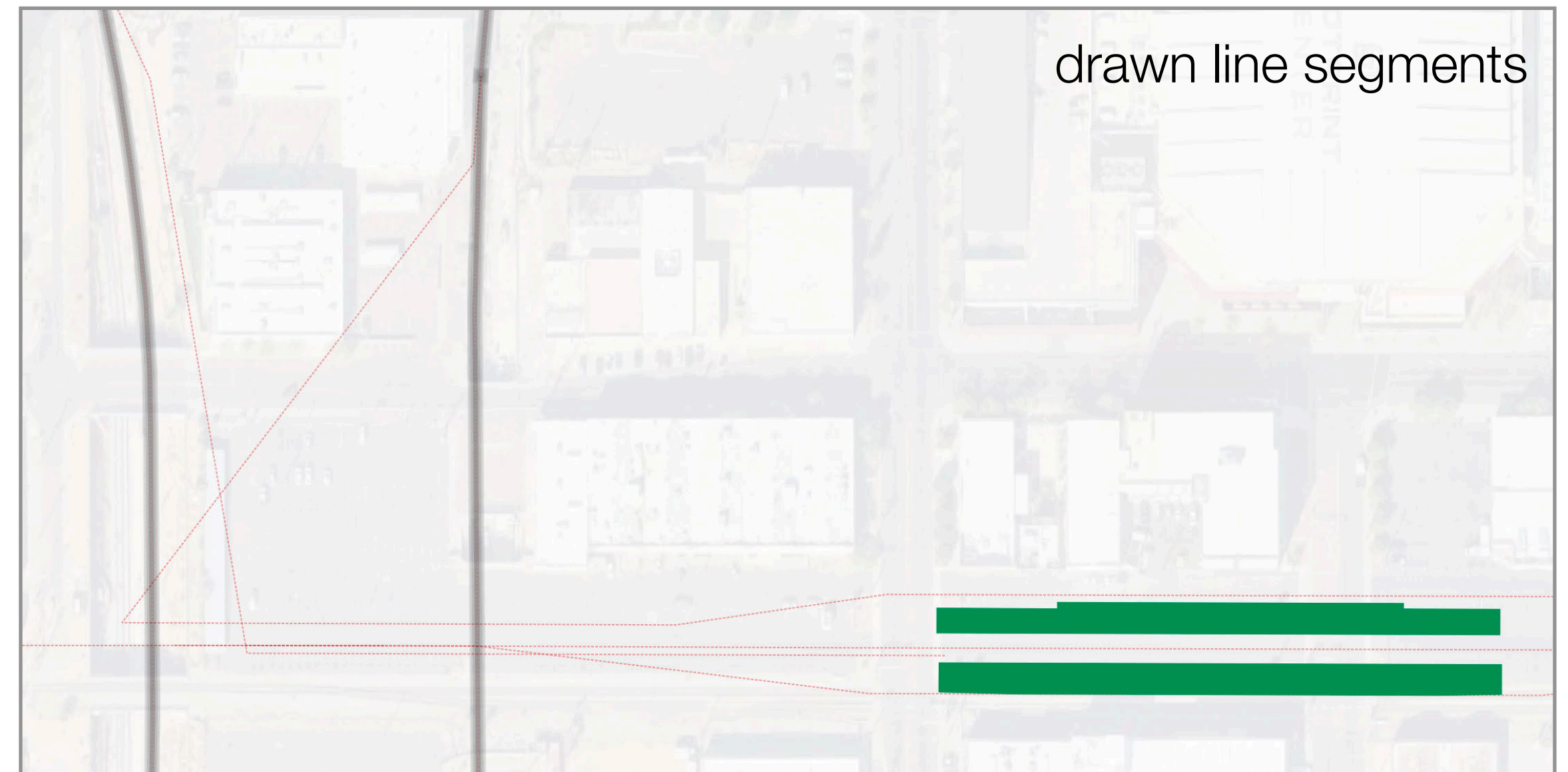
2. Test assumptions

To create the alignment,

I created a python script* in GIS to build tracks from line segments with:

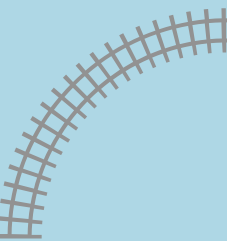
- Curves dynamically updated based on radii attributes
- Track center offsets for double tracking and more
- Track gauge, loading gauge, and clearance envelope

*created beginning 2022 before LLMs made vibecoding easy

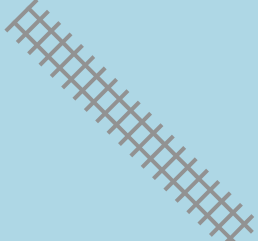


2. Test assumptions

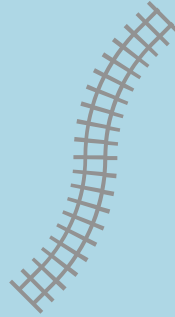
A table of track segments... ...used as model inputs... ...create time estimates and diagrams



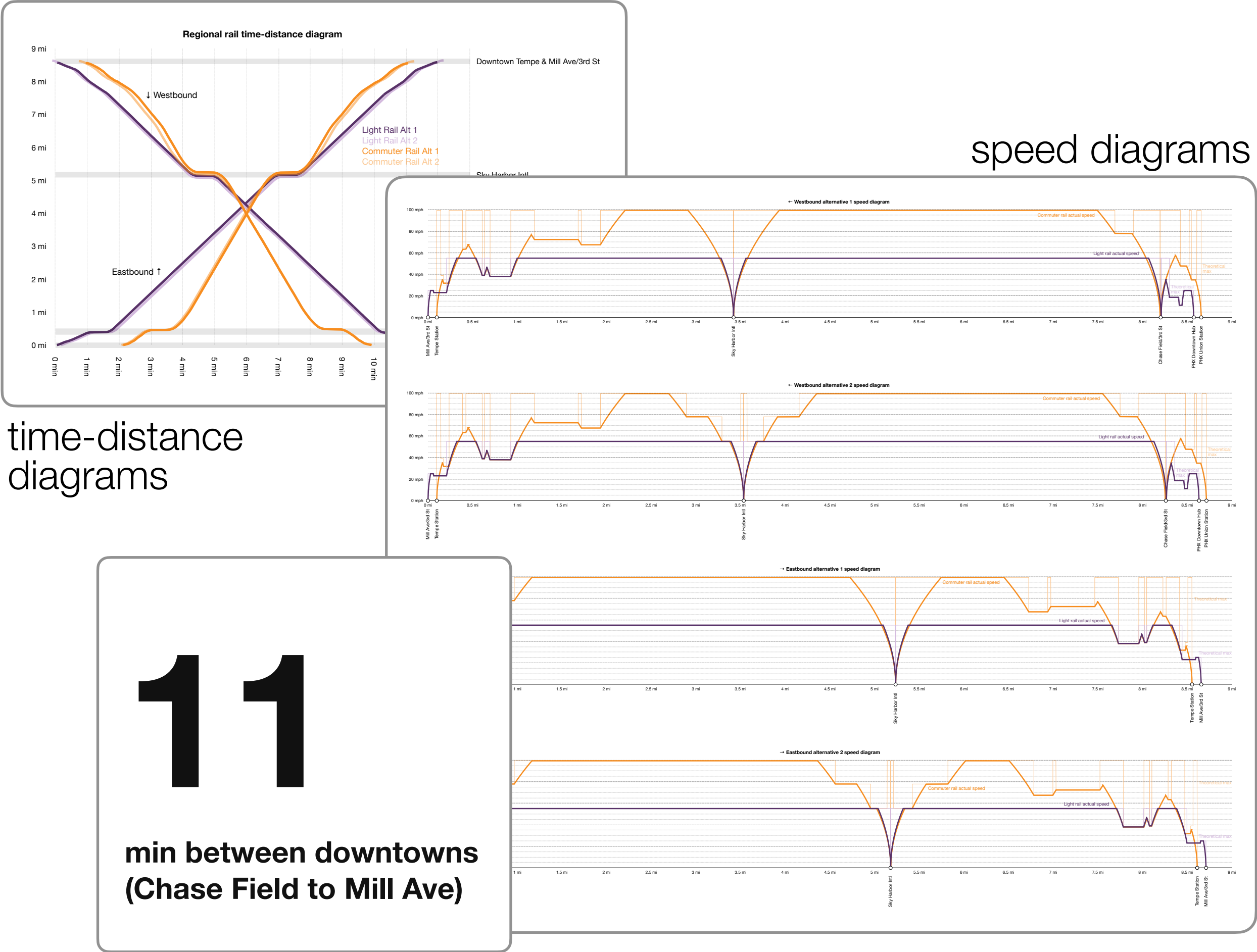
Segment 012
WB light rail
785ft length
500ft radius



Segment 329
EB light rail
2,300ft length
na radius



Segment 155
WB mainline
450ft length
300ft radius



3. Acknowledge and approximate unknowns



This project's iterative design development

Groundwork ↻



Case-building ↻



Refinement ↻

- 1.** Survey existing conditions
- 2.** Test assumptions
- 3.** Acknowledge & approximate unknowns

- 4.** Craft a compelling narrative
- 5.** Address stakeholders' visions & concerns
- 6.** Get feedback from friendly audiences

- 7.** Look to precedents
- 8.** Translate precedents to local context
- 9.** Learn from sharing & iterate

4. Craft a compelling narrative



5. Address stakeholders' visions & concerns

64%

more jobs within 30 min
of downtown Tempe

38%

more jobs within 30 min
of downtown Phoenix

2x

more people within 30
min of Chase Field

80%

more people within 30 min
of 44th St/Sky Harbor

6. Get initial feedback from trusted allies



This project's iterative design development

Groundwork ↻



Case-building ↻



Refinement ↻

- 1.** Survey existing conditions
- 2.** Test assumptions
- 3.** Acknowledge & approximate unknowns

- 4.** Craft a compelling narrative
- 5.** Address stakeholders' visions & concerns
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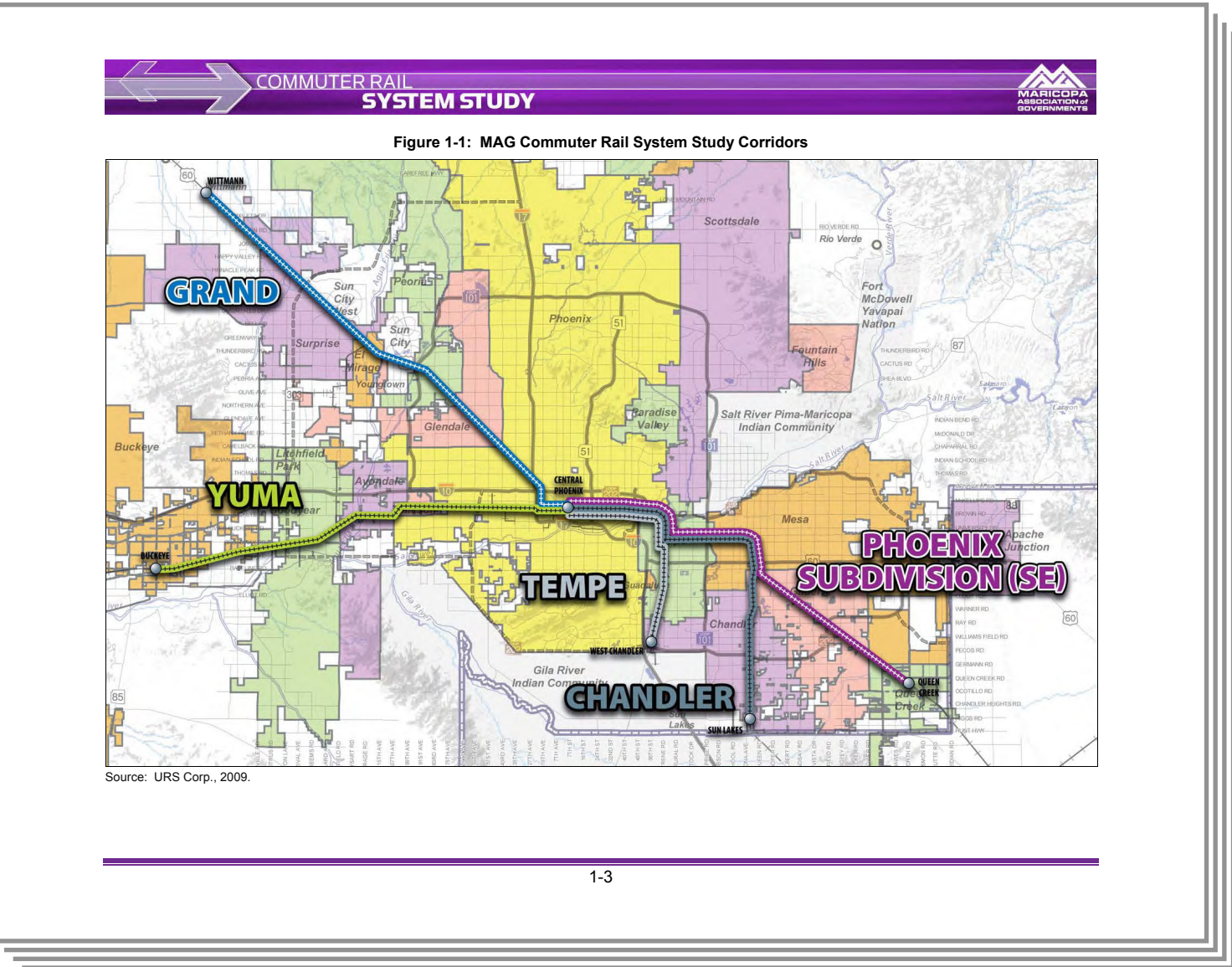
- 7.** Look to precedents
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Decades of commuter and intercity rail studies

All plan the Phoenix to Tempe corridor as a network trunk

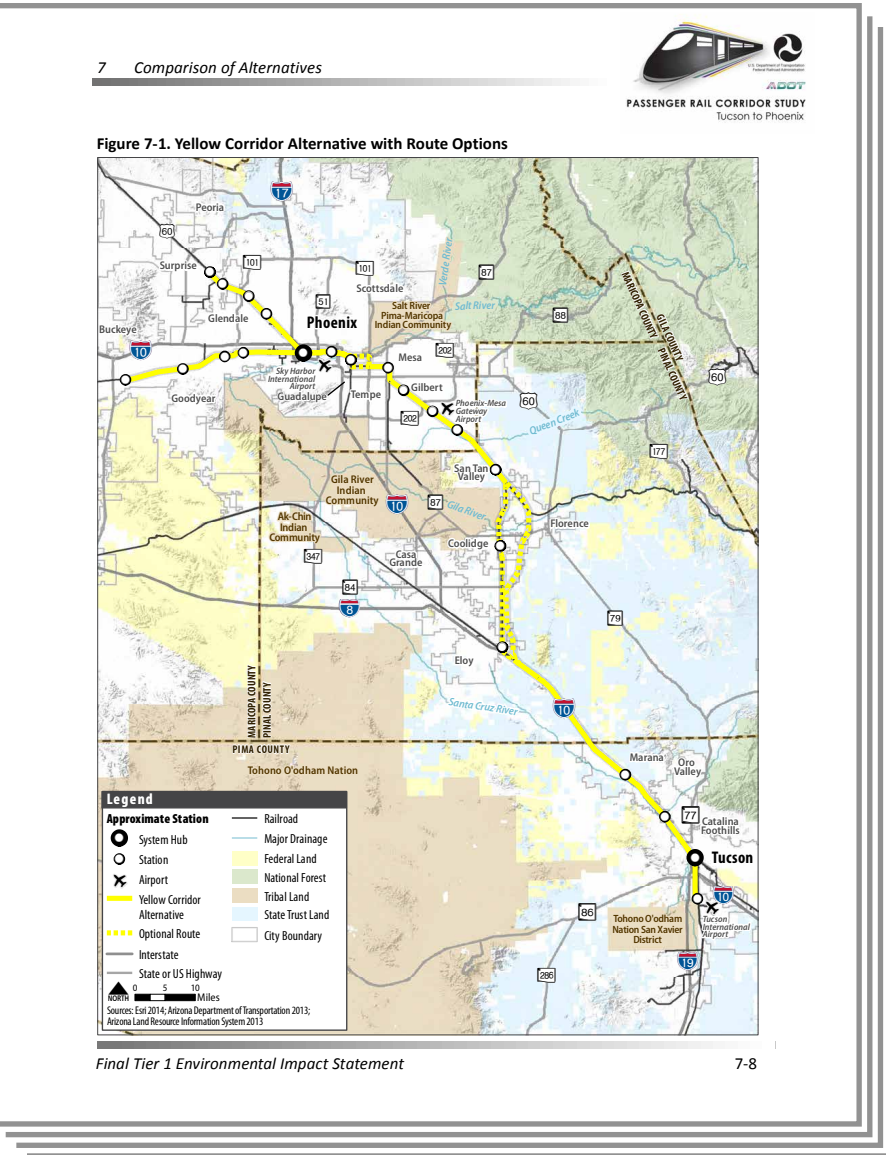
2010

Commuter Rail System Study
Maricopa Assoc. of Governments



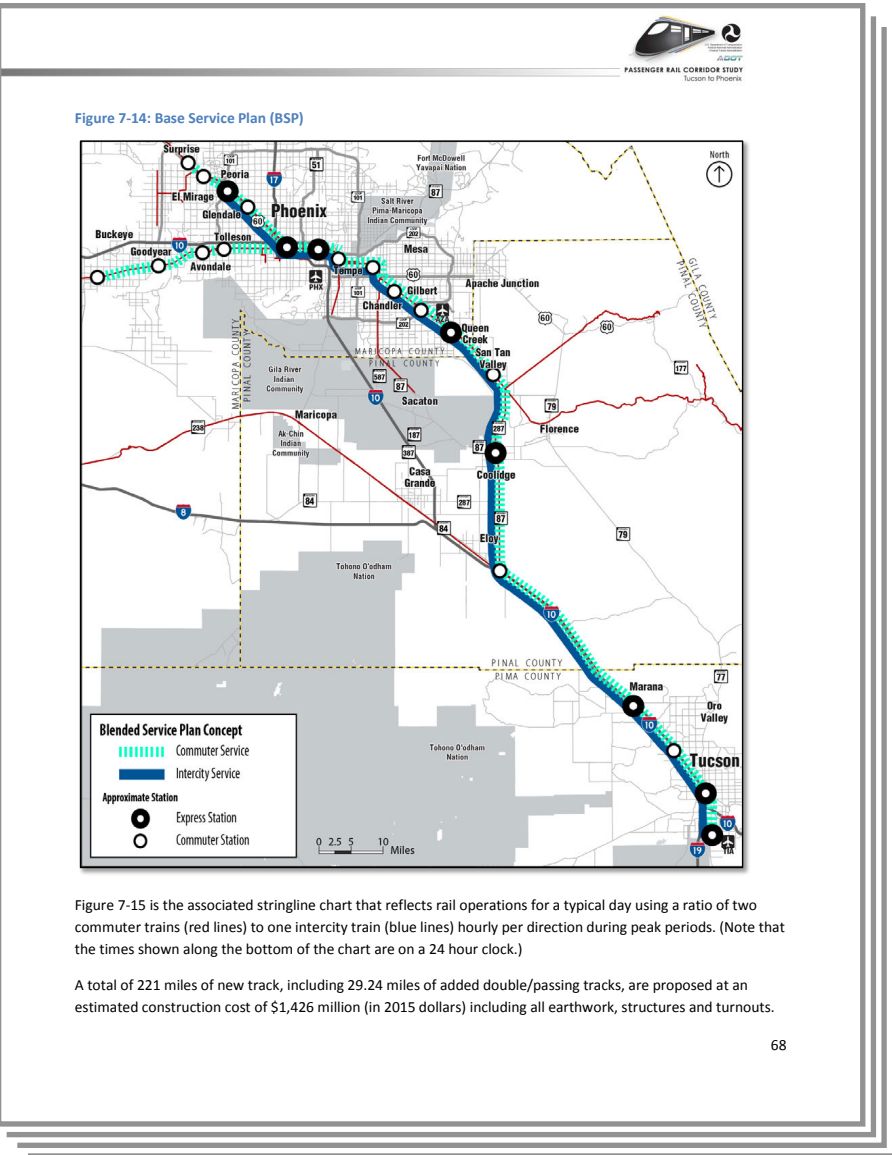
2016

Tier 1 EIS Passenger Rail
Study: Tucson to Phoenix



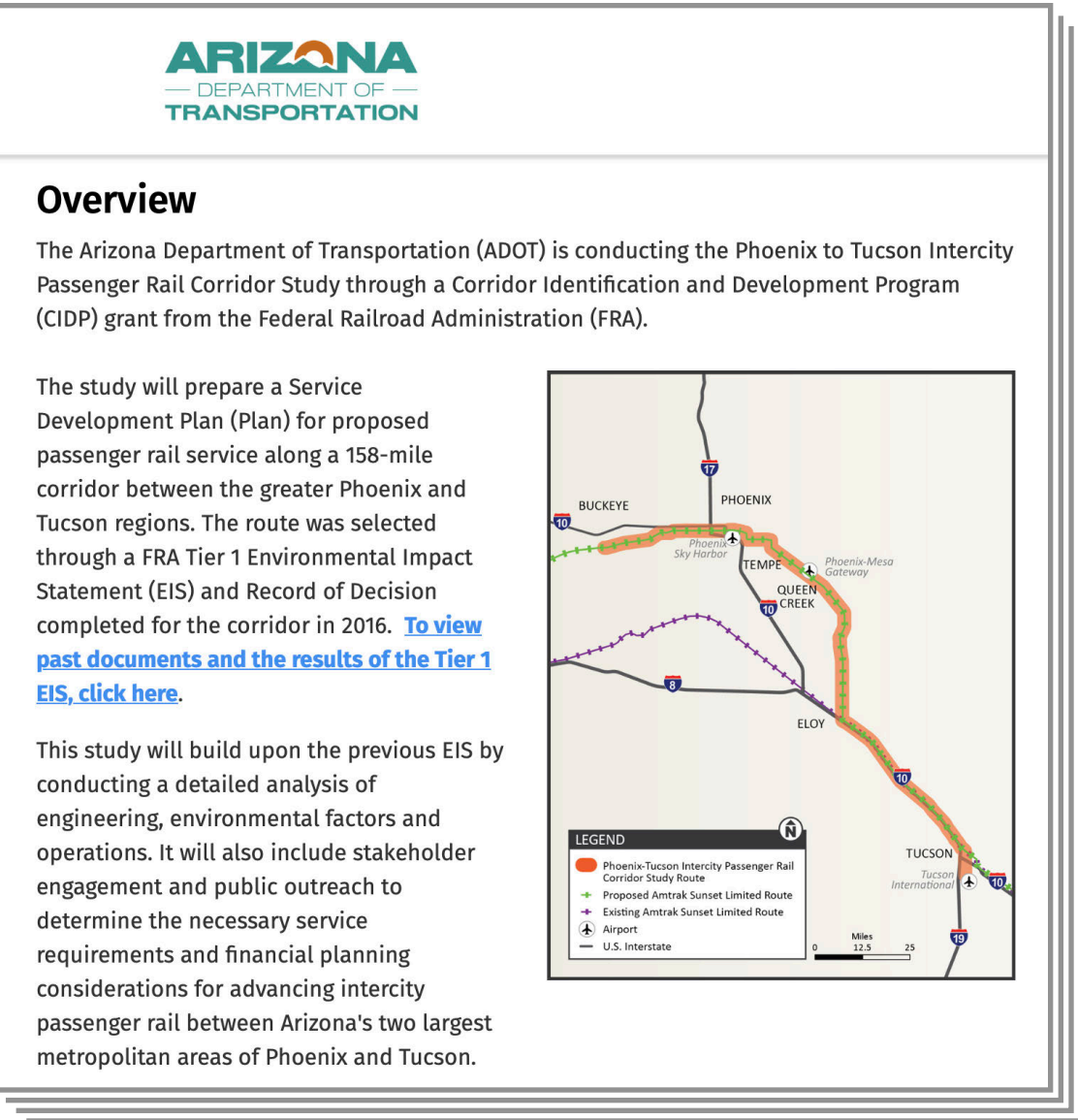
2017

AZ Passenger Rail Corridor:
Service Development Plan

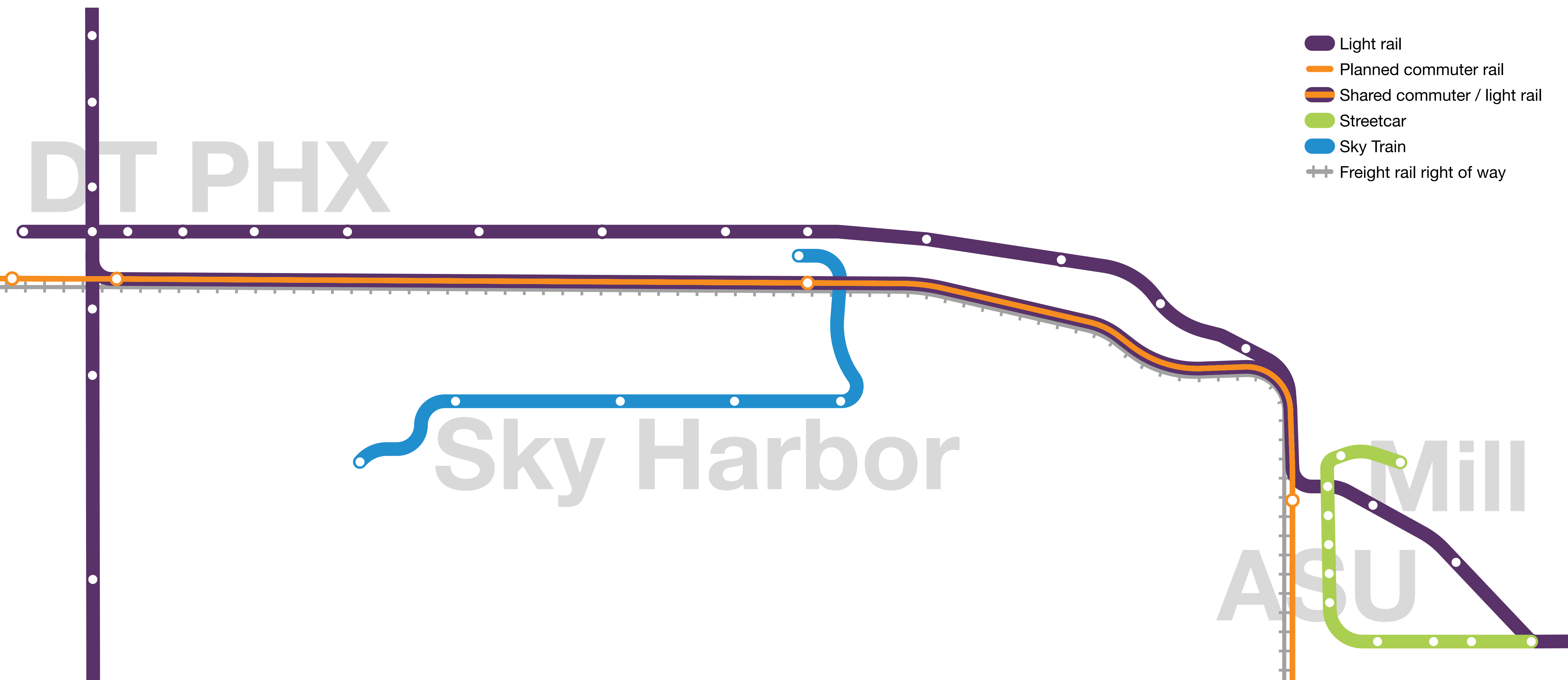


Ongoing

Phoenix-Tucson Intercity Rail
Passenger Corridor Study



Commuter/intercity rail could share light rail tracks



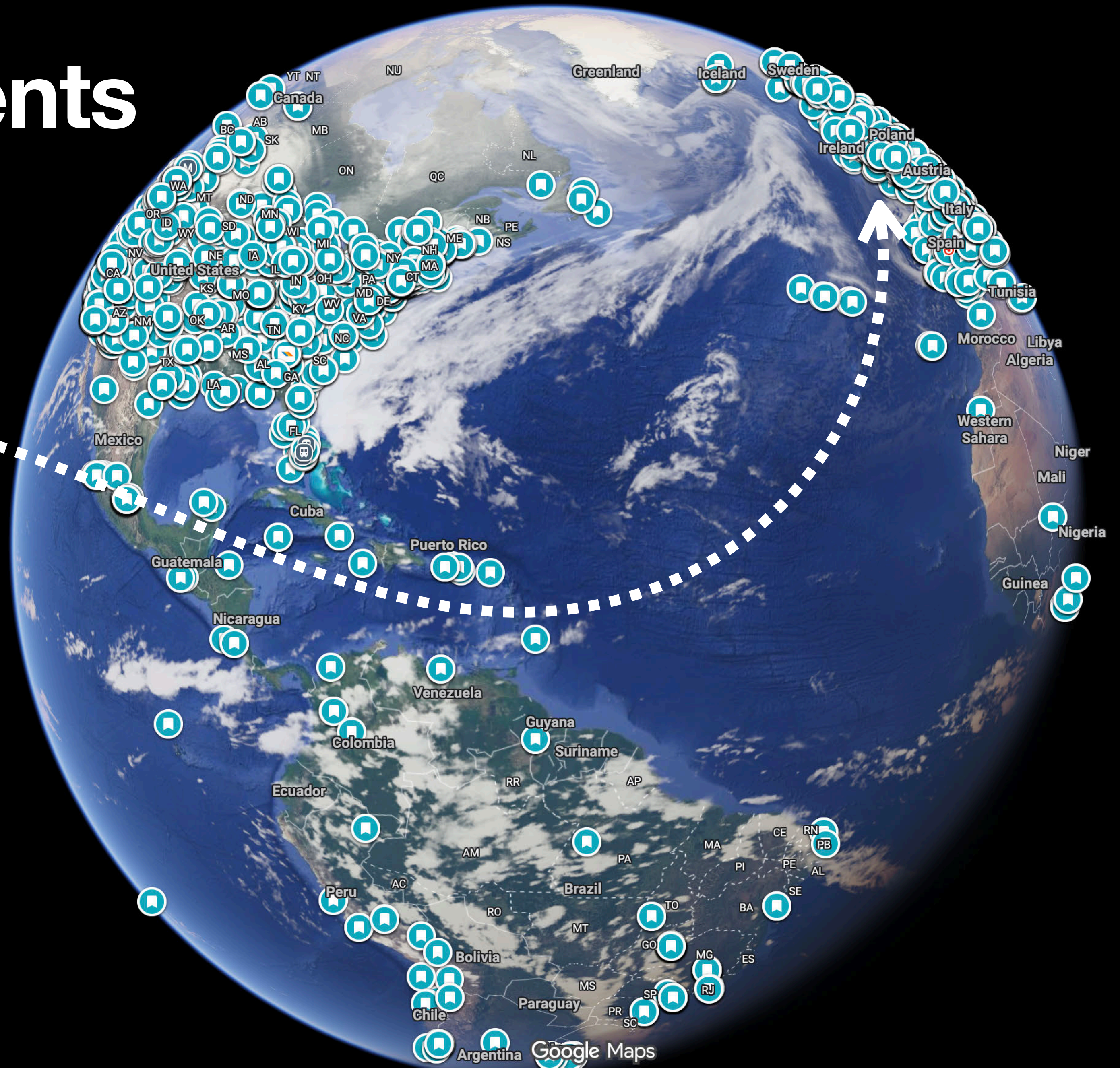
7. Look to precedents

Karlsruhe, Germany

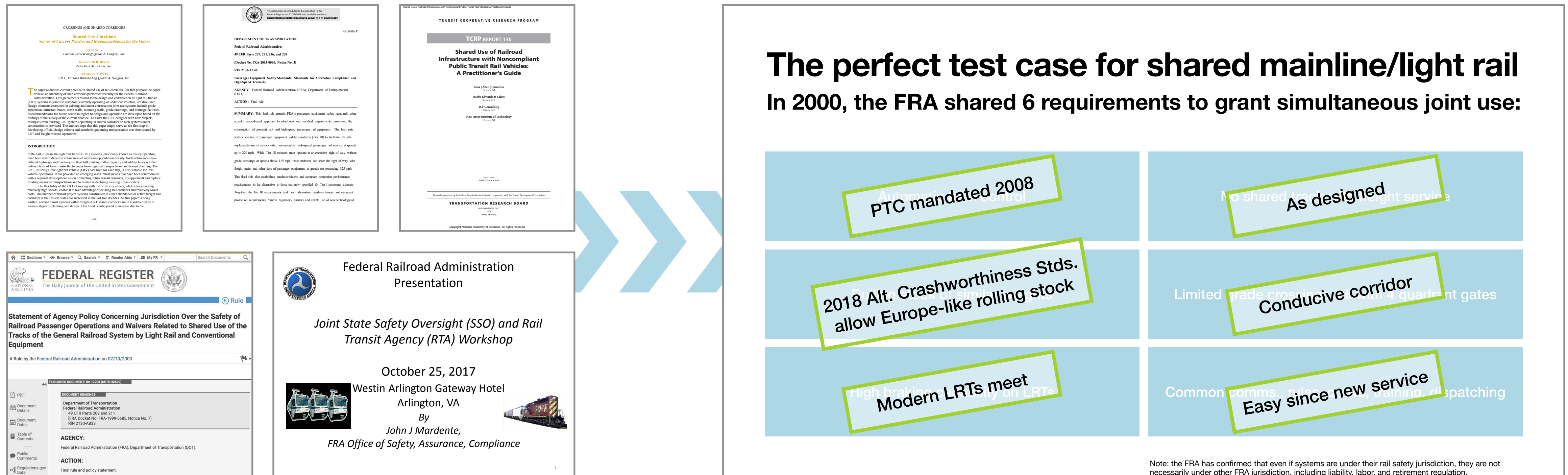
Light rail vehicles operate on track simultaneously with mainline passenger rail.

Rhine-Gouwe Line, Netherlands

Saarbrücken, Germany & France

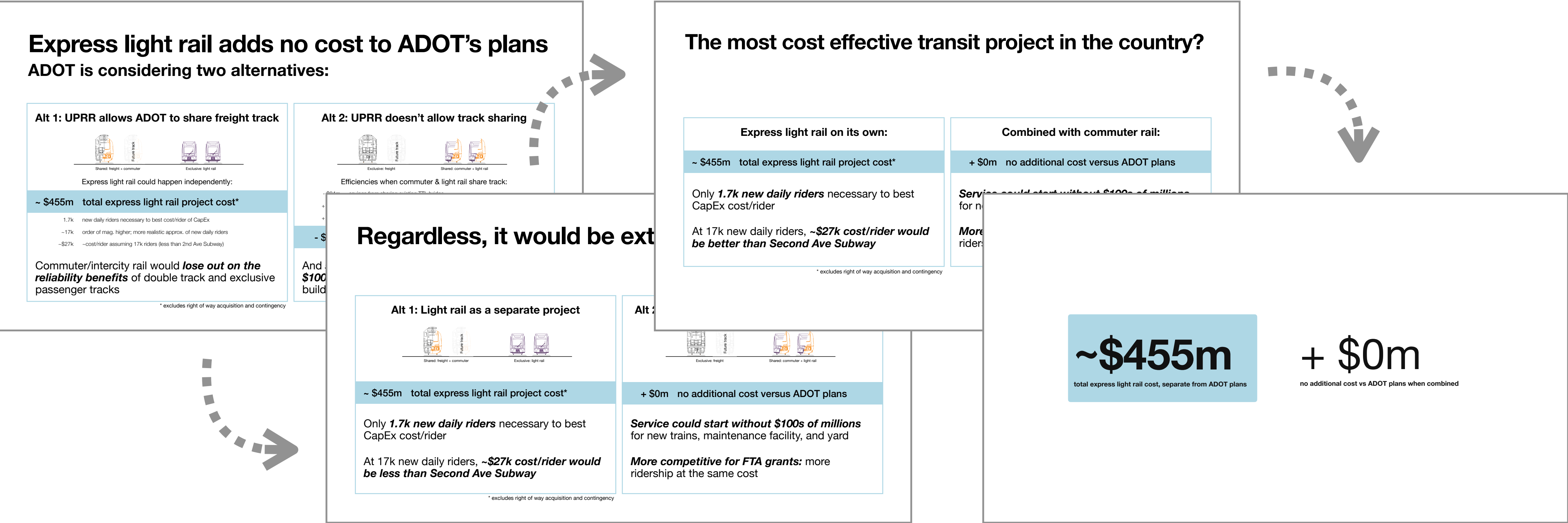


8. Translate precedents to local context



9. Learn from sharing and iterate

Technical detail clutter...



... evolves to key outcome highlights

100+

person contact list

50+

stakeholders consulted

AECOM

Arizona Department of Transportation

Arizona State University

Arnold Ventures Foundation

City of Mesa, AZ

City of Phoenix, AZ

City of Tempe, AZ

Friends of Transit

Jacobs

Maricopa Association of Governments

Public Interest Research Group

RUMBO Community Group

Rio Grande Plan

Shared Use Mobility Center

TYLin

TYPSA

Union Pacific Railroad

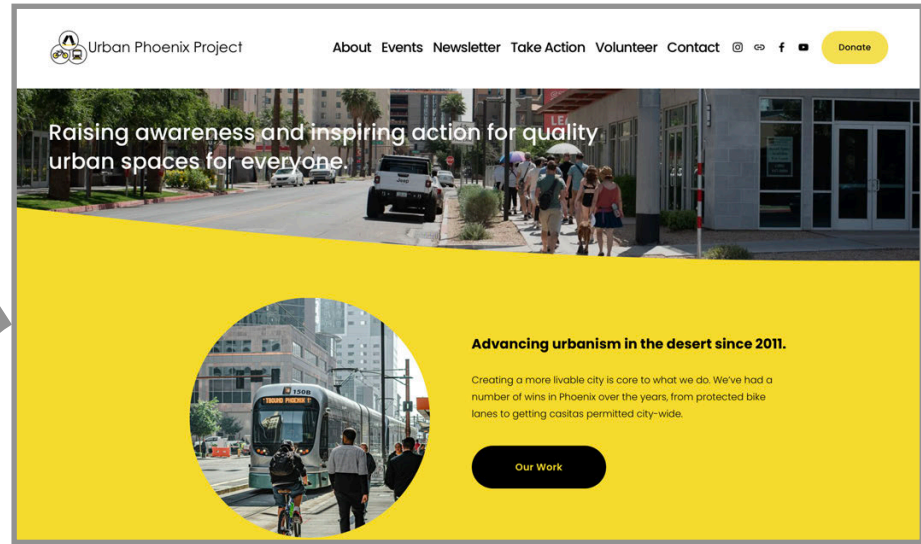
Urban Phoenix Project

Valley Metro

WSP

Here's how we start

- 1.** ■ **Include this plan as a studied alternative** in the ongoing ADOT intercity rail study
- 2.** ■ **Safeguard rights-of-way**, most urgently the parking lots adjacent to the UPRR right of way in DTPHX



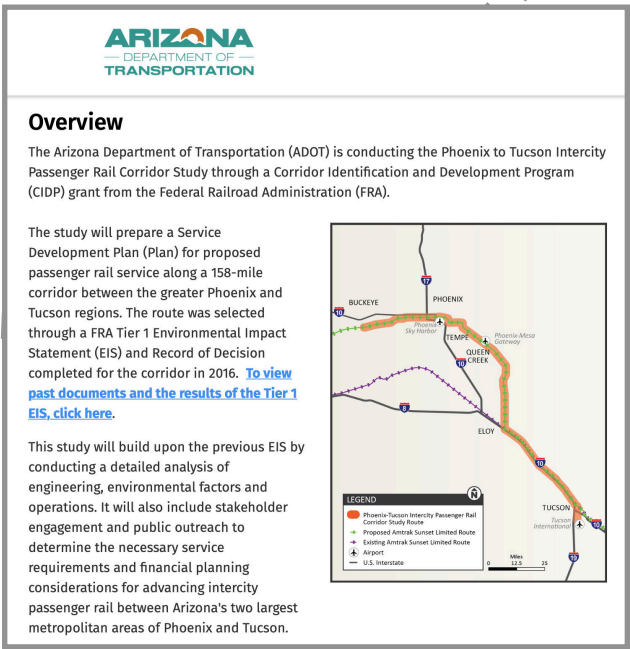
Advocates



Electeds



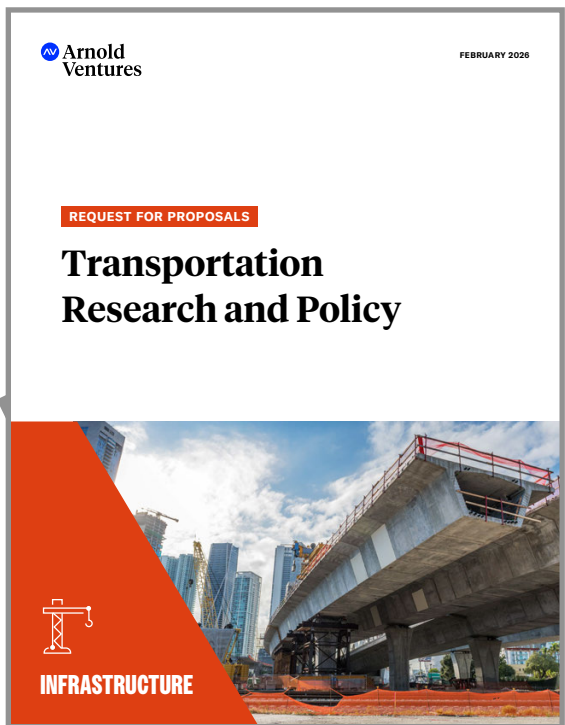
City & agency staff



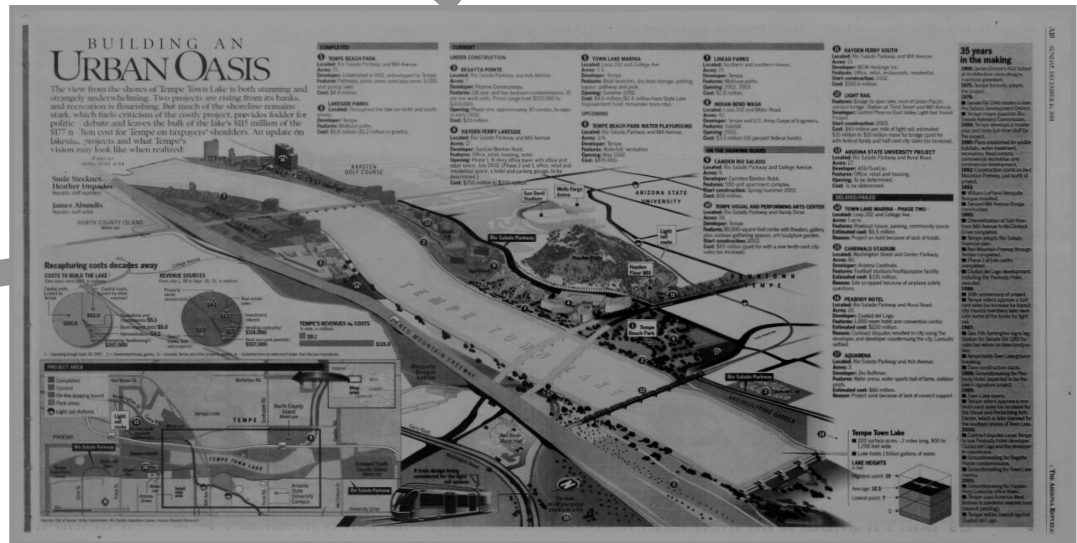
ADOT alternative



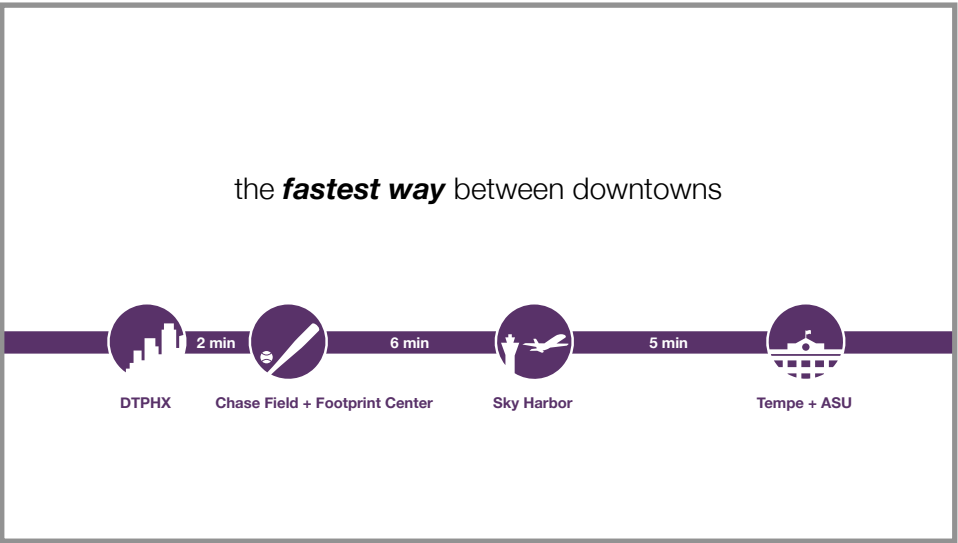
Planned project



Funded study



ASU studio project



My proposal