

1 Minimum design radius (180m vs 200m)

2 Minimum platform length (200m vs 350+m)

3 Minimum platform curvature (∞ vs 500m)

4 7th/Townsend realignment vs Catellus/C&CSF

5 Mission Bay station issues (location, elevation, width)

6 Threats to ROW (eg 201 Second, 3736-97)

7 Oblique rail terminal

8 Station throats, through roads, pathing

9 !?

Minimum design radius 180m(590', 9.7°) vs 200m(655', 8.7°)

Bigger is always better, of course.

Extremely constrained site, getting more constrained every month. Unpalatable tradeoffs are a given.

Tradeoffs: radius versus platform length, radius versus platform count, radius versus easements/takings.

UIC recommendation and UIC High Speed requirement is minimum 180m

Used by DB (ICE), RFF (TGV), etc.

To ignore this (eg design around current US commuter equipment or one particular existing high speed train) would be very unwise: dangers of obsolescence, unique vendor, custom designs.

PTG 200m minimum appears to be coming from CHSRA, but what justification?

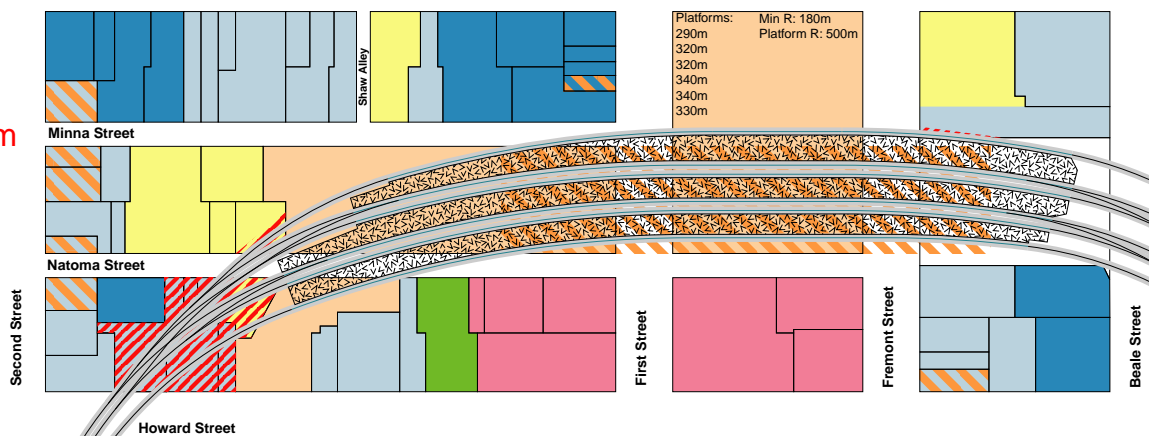
TGV, ICE, AGV (next generation), AVE, etc can negotiate <180m

Design speeds up to 380kmh.

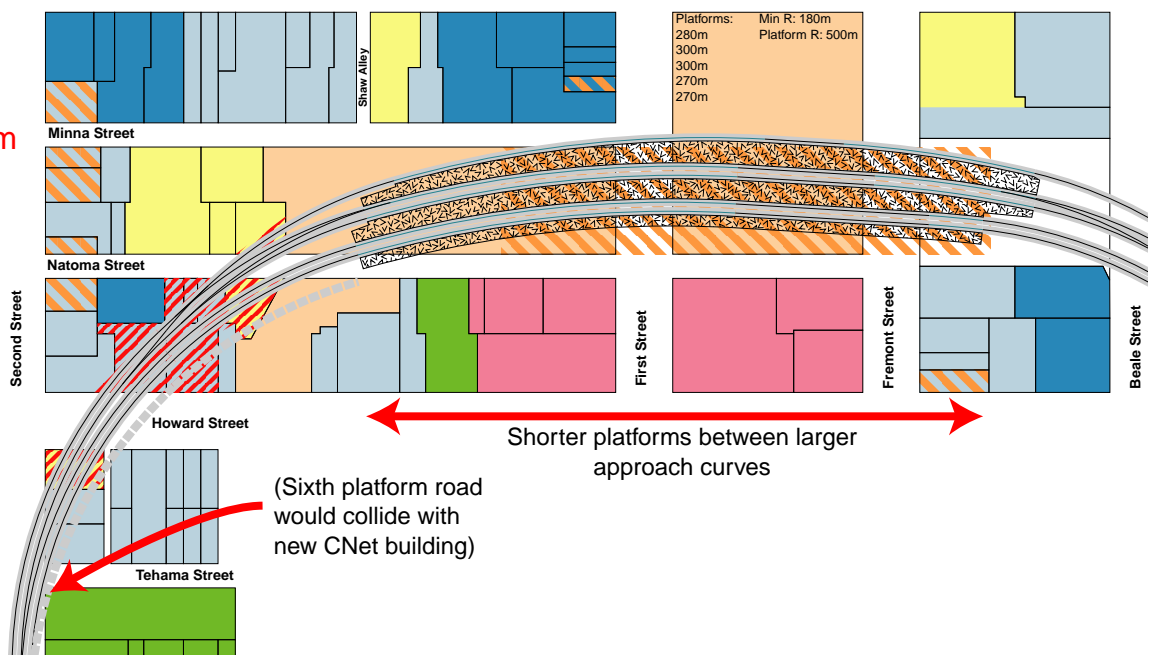
Real costs (station capacity, land takes) at TTT site to requiring larger radii.

Tradeoff example:

180m min radius
6 platforms
Lengths 300m - 340m
(975' - 1100')



200m min radius
5 platforms
Lengths 270m - 300m
(875' - 975')



Platform curvature (none vs 500+m radius)

Zero curvature is best, of course.

Extremely constrained site, getting more constrained every month. Unpalatable tradeoffs are a given.

Tradeoffs: curved platforms versus platform length, curved platforms versus safety.

Nearly all rail operators in the world serve stations with curved platforms, particularly at constrained urban stations.

Platform gap (ADA, etc) is manageable.

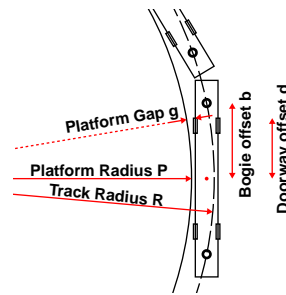


Fertagus. Lisboa, Portugal. New 1999

Typical suburban bilevel
 R 600m, b 9.5m, d 6m, gap = 3.0cm = 1.2 inch

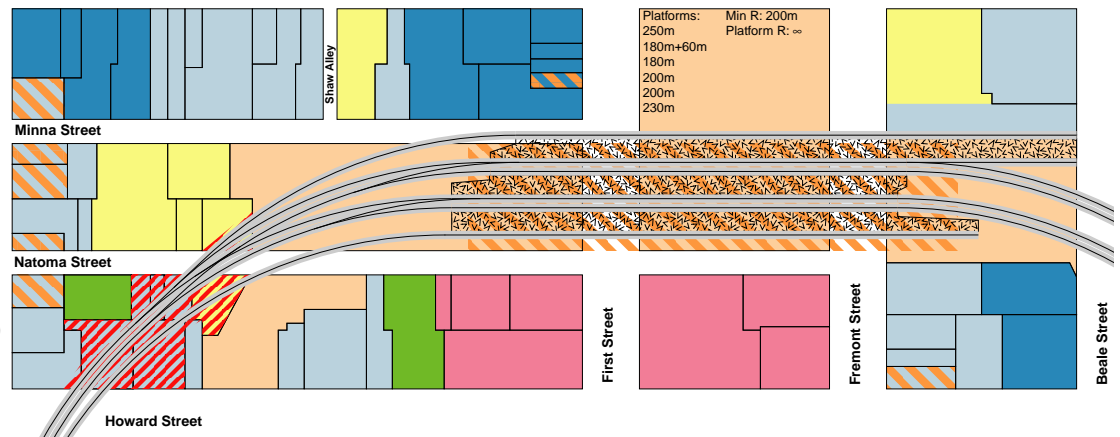
TGV
 R 600m, b 10m, d 8m, gap = 5.3cm = 2.1 inch

Cars with doors at extremities are problematic...

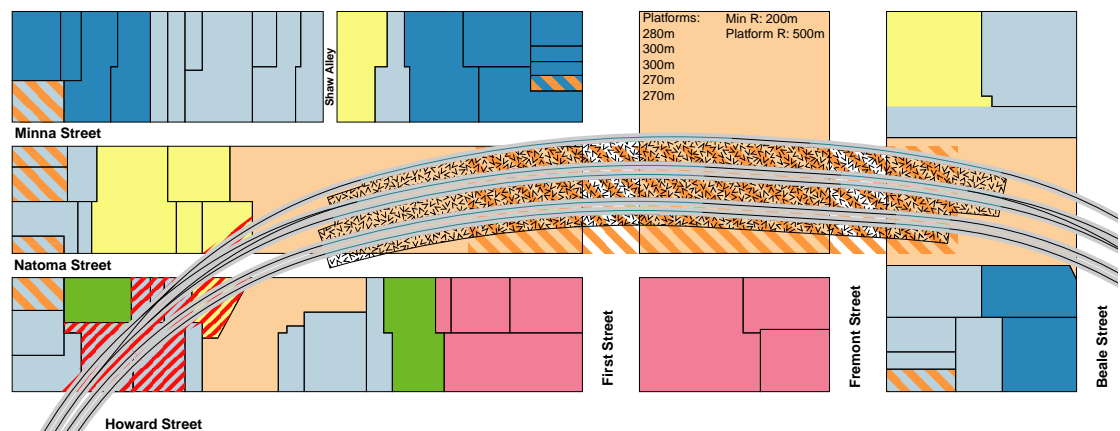


Crew sighting along train length is addressed by platform-mounted or in-cab CCTV. Standard equipment on many new suburban trains.

Straight platforms
 4 through platforms
 Through length 180m (600')
 Terminating length 230 - 250m (750' - 825')



Curve-o-rama
 5 platforms
 Lengths 270m - 300m (875' - 975')

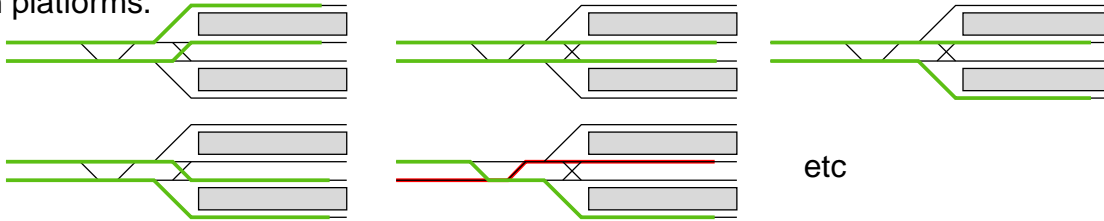


Paths and Throats

Restrictions and limits at TTT (both geometrical and operational) are likely to be the system-wide constraints for both all Caltrain corridor and all regional and long distance (including HSR) service. Maximal effort should be expended to "do no harm" and not to preclude future operations.

Insufficient provision for station approach special work can cause permanent capacity limits.

Ideally a pair of simultaneous departures and arrivals should be possible from any two station platforms.



Even if traffic levels will not justify complex special work in the medium future, attempt to allow future reconfiguration through careful planning of excavation, column placement, etc.

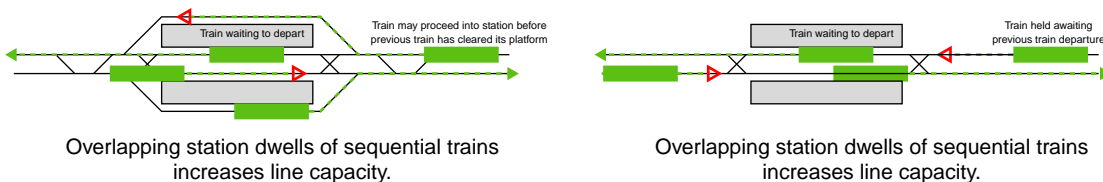
Insufficient provision for long trains can cause permanent passenger capacity limits as line capacity saturates.

All successful High Speed services operate double-length ($2 \times 200\text{m} = 2 \times 650' = 1300'$) trains. ICE, TGV, Shinkansen.

TTT site can't accommodate 400m, but can come very close (370m in oblique orientation.)



Insufficient provision for future through-running roads can cause permanent transbay capacity problems. (Compare 2-road BART headways with 4-road Key System at TTT.)



Anticipating future (long term!) new transbay connection to relieve at-capacity BART Transbay/San Francisco "M Line", TTT must be allow at least four platform roads poised for extension through to the East Bay.

Mission Bay Station

Alternatives in DEIR/DEIS completely inadequate

Multi-track, multi-platform station required?

Scheduling bottleneck from Bayshore to TTT. Limits express/local headways to > 10 minutes.

Lengthy dwells for event (baseball) service? (Not if base service frequency is adequate!)

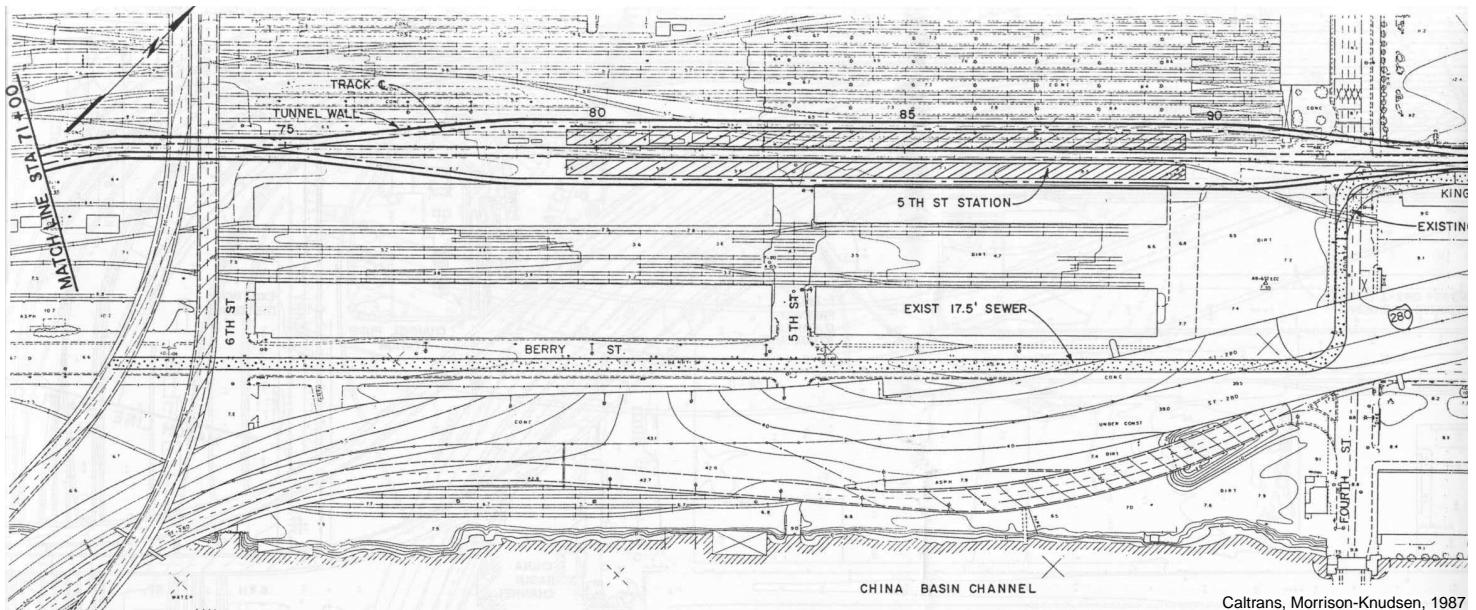
Diesel power terminus

Surface open-air level for terminating trains? \$\$\$

Massive ventilation in subterranean station?

Southern end in open cut, diesels idle outside? (eg Boston South Station)

Storage yard? Leads?



Seventh/Townsend curve must be realigned.

300m (6°) seems doable...

Catellus/C&SF roadblocks

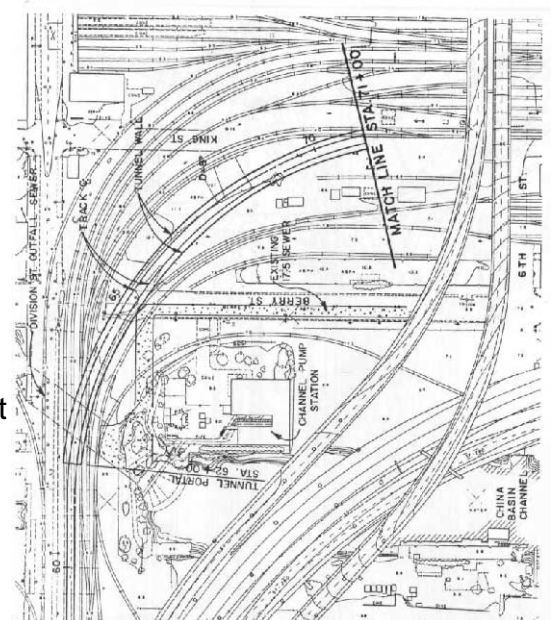
Berry Street (trolley buses at grade?!?)

Sixteenth Street (ditto?!?)

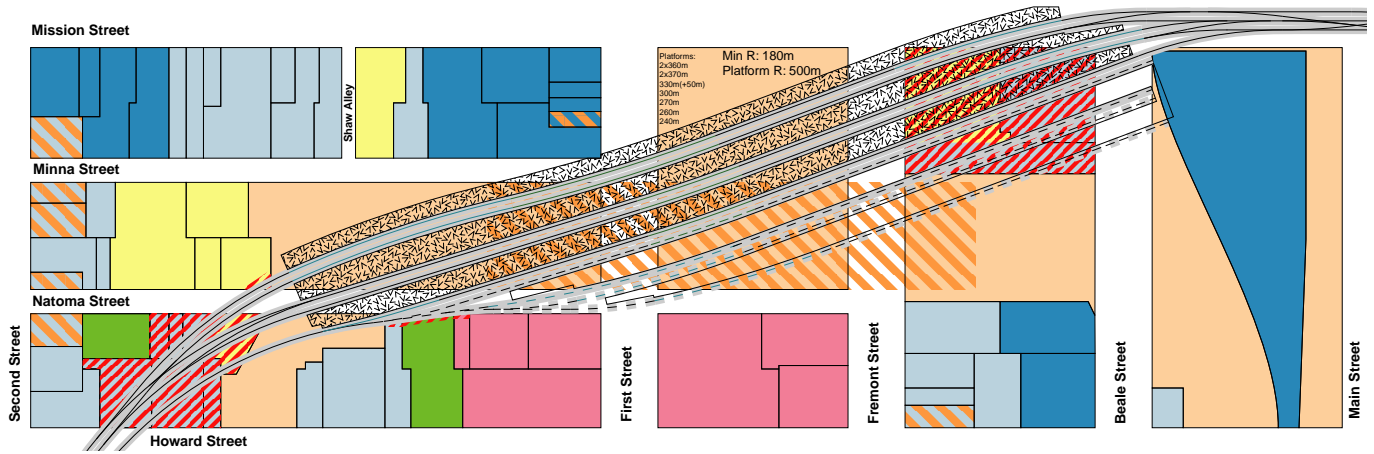
Parcels zoned retail in inside of Caltrain curve adjacent to pumping station. Swap possible?

Easement under 3rd/4th/King/Townsend block will be needed.

Ideally station would be at least partially under joint development on that block...



Obliquity



Real alternative to Second/Main loop route (Essex stub-end not a serious alternative)

Huge platform length advantages (5 x 360+m through roads possible.)

Phaseable.

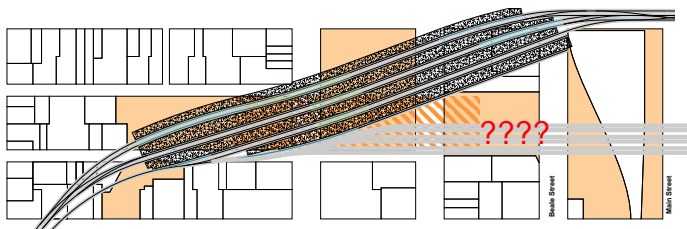
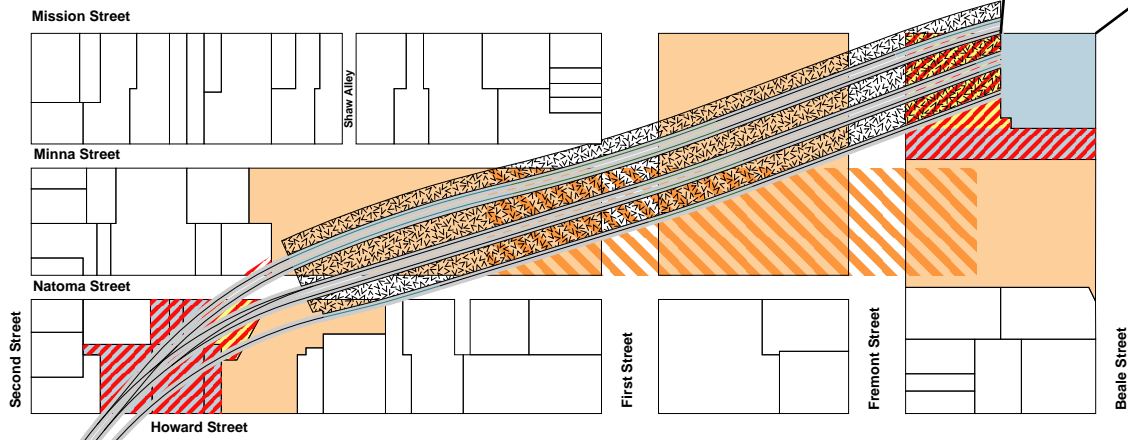
Constructability questions.

Mission Street utilities?

Dive under Muni MMT under Embarcadero? Station depth.

301 Mission Street (corner Beale, block 3719-1) will cost.

But can be purchased/underpinned in a subsequent phase.



Perverse storage location under and aligned with TTT?

Missing the Point

Poor connections with other terminal transit services

Poor connections with Market Street transit services

Poor passenger circulation: all lengthwise, little lateral

Station-length rail mezzanine *required*. \$\$\$

Top of Rail ~ -30 feet.

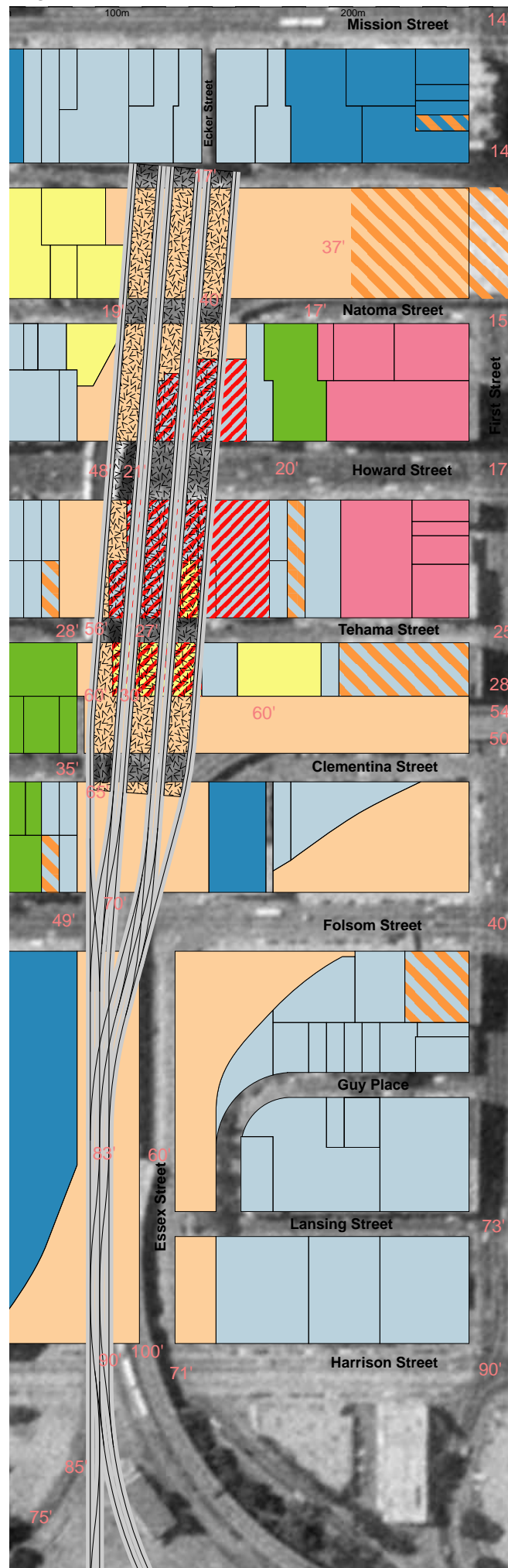
Large number of paths conflicts: inherent low throughput of stub terminals.

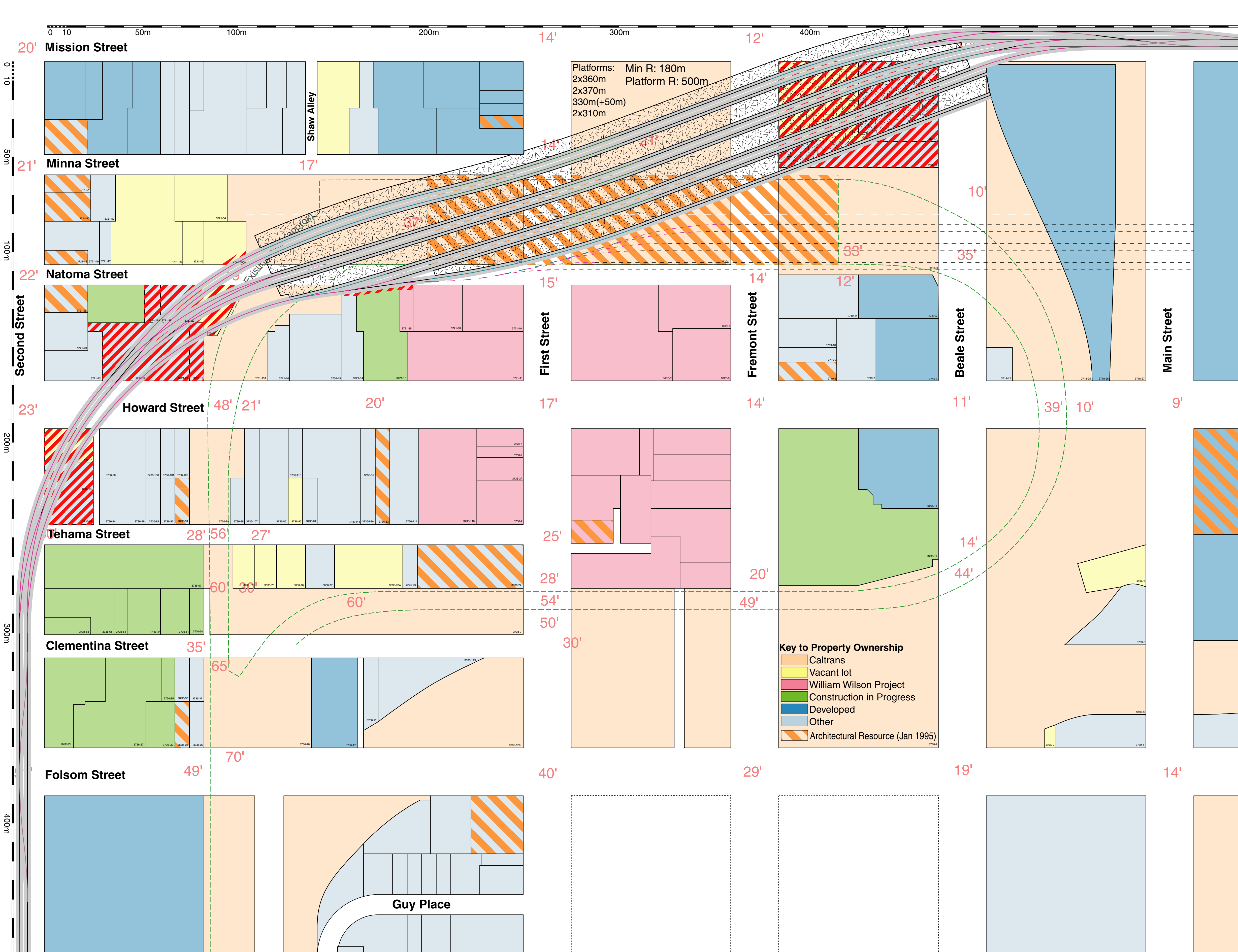
Future transbay throughput very poor.

Constructible? Rock line at Folsom.

Station throat and junction 80 feet down in weak rock under Fremont Street off-ramp and bus ramps.

Doesn't meet the program, can't be built, why is this on the table?





0 10 50m 100m 200m 300m 400m

20' Mission Street

14'

12'

Platforms: Min R: 180m
 2x360m Platform R: 500m
 2x370m
 330m(+50m)
 2x310m

0 10 50m 100m

21' Minna Street

17'

22' Natoma Street

15'

14'

Second Street

First Street

Fremont Street

Beale Street

Main Street

23'

Howard Street

48' 21'

20'

17'

14'

11'

39' 10'

9'

200m

Tehama Street

28' 56'

27'

25'

20'

14'

44'

Clementina Street

35'

65'

28'

54'

50'

20'

49'

Folsom Street

49'

70'

40'

29'

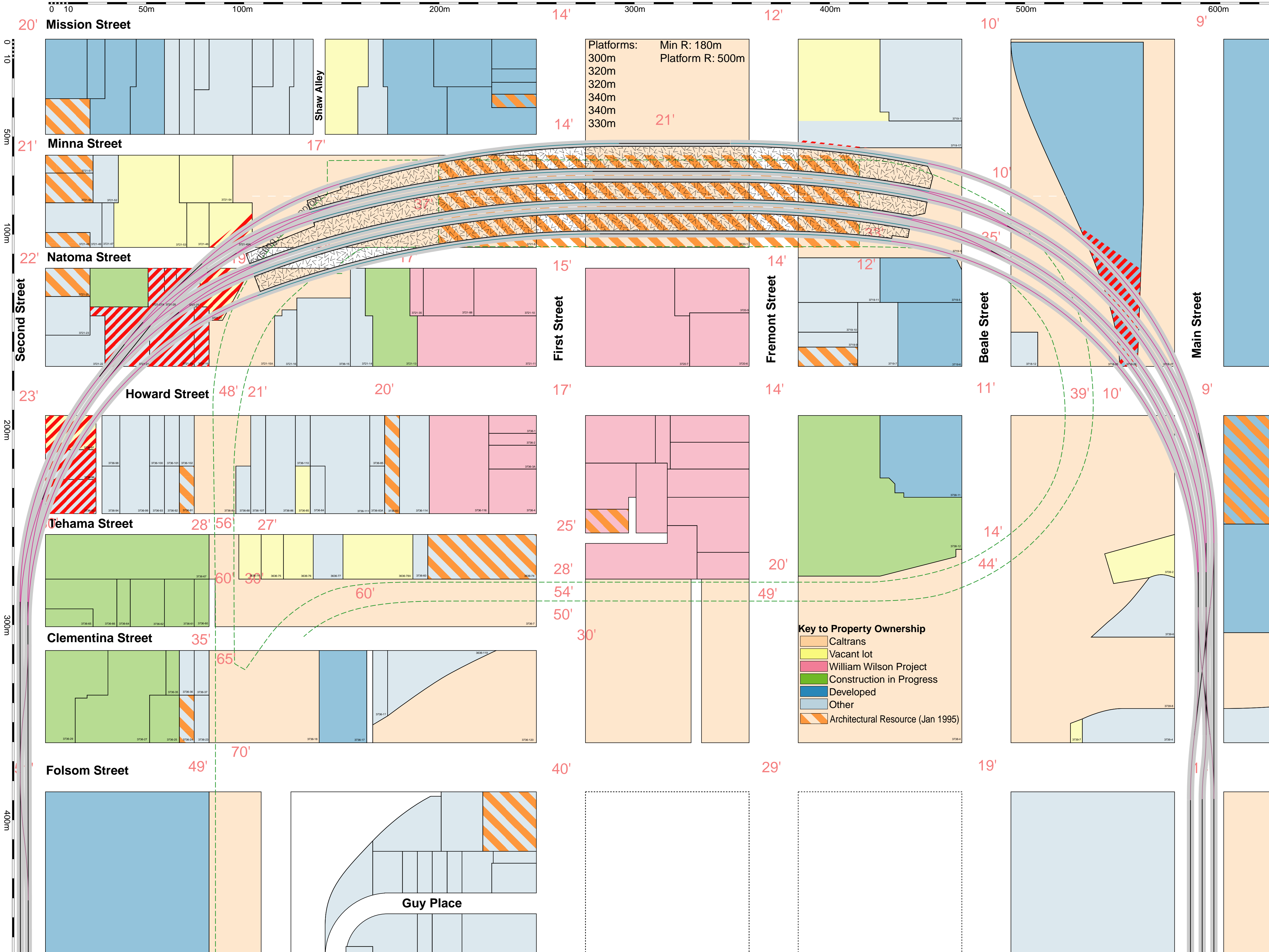
19'

14'

400m

Guy Place

- Key to Property Ownership**
- Caltrans
 - Vacant lot
 - William Wilson Project
 - Construction in Progress
 - Developed
 - Other
 - Architectural Resource (Jan 1995)



0 10 50m 100m 200m 300m 400m 500m 600m

20' Mission Street 14' 12' 10' 9'

Platforms: Min R: 180m
 300m Platform R: 500m
 320m
 320m
 340m
 340m
 330m

21' Minna Street 17' 14' 10' 35' 10'

22' Natoma Street 19' 17' 15' 14' 12' 10' 35' 10'

23' Howard Street 48' 21' 20' 17' 14' 11' 39' 10' 9'

Tehama Street 28' 56' 27' 25' 20' 14' 14' 10'

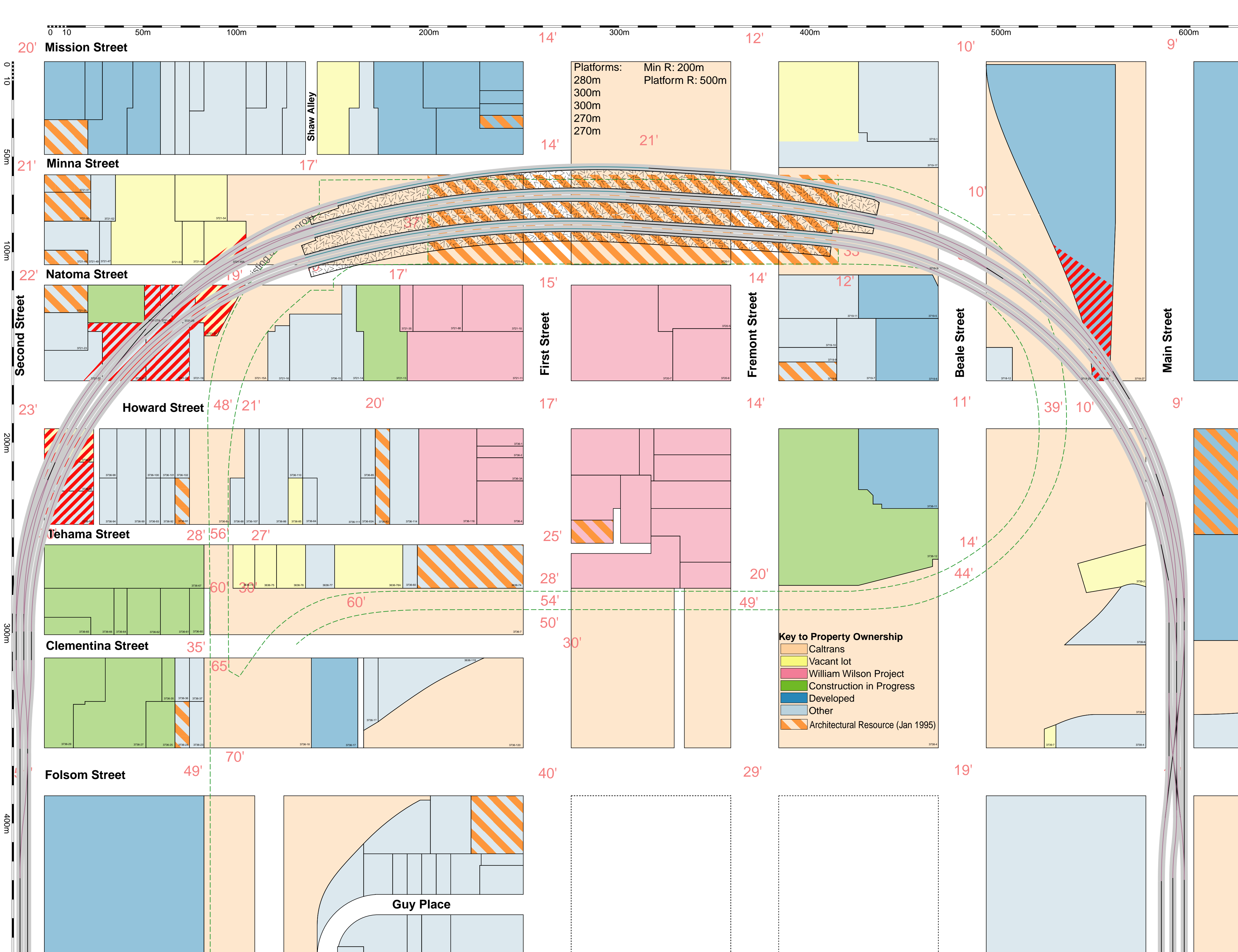
Clementina Street 35' 60' 30' 60' 28' 20' 49' 14' 44' 30'

Folsom Street 49' 70' 40' 29' 19' 1'

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Guy Place



0 10 50m 100m 200m 300m 400m 500m 600m

20' Mission Street 14' 12' 10' 9'

Platforms: Min R: 200m
 280m Platform R: 500m
 300m
 300m
 270m
 270m

21' Minna Street 17' 14' 21' 10' 10'

22' Natoma Street 19' 17' 15' 14' 12' 10' 11' 9'

23' Howard Street 48' 21' 20' 17' 14' 11' 39' 10' 9'

Tehama Street 28' 56' 27' 25' 20' 14' 14' 14'

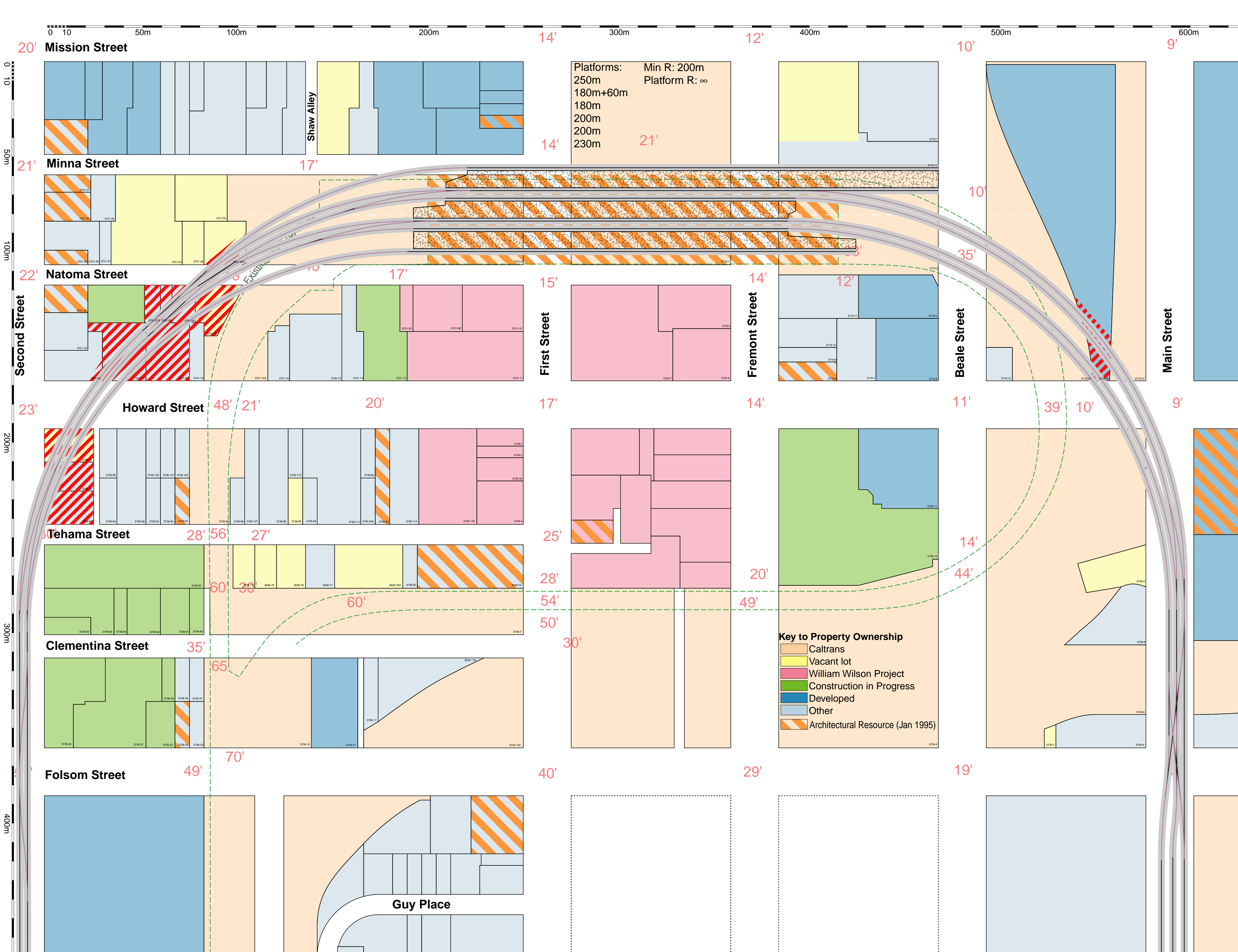
Clementina Street 35' 60' 30' 28' 20' 49' 44' 30' 14' 44'

Folsom Street 49' 70' 40' 29' 19' 19'

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Guy Place



0 10 50m 100m 200m 300m 400m 500m 600m

20' Mission Street

14'

12'

10'

9'

Platforms:

250m	Min R: 200m
180m+60m	Platform R: ∞
180m	
200m	
200m	
230m	

21' Minna Street

17'

14'

21'

10'

22' Natoma Street

17'

15'

14'

12'

35'

Second Street

First Street

Fremont Street

Beale Street

Main Street

23'

Howard Street

48' 21'

20'

17'

14'

11'

39' 10'

9'

Tehama Street

28' 56'

27'

25'

20'

14'

44'

Clementina Street

35'

65'

54'

50'

30'

49'

- Key to Property Ownership**
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Folsom Street

49'

70'

40'

29'

19'

Guy Place