Commuter Rail Studies

Transit Committee

April 8, 2010

MARICOPA ASSOCIATION of GOVERNMENTS

ON THE MOVE
PARTNERS IN PROGRESS

ON THE MOVE
PARTNERS IN PROGRESS

Introduction

- **Item on the agenda for action**
- **Request to accept three studies:**
  - Commuter Rail System Study
  - Grand Avenue Commuter Rail Corridor Development Plan
  - Yuma West Commuter Rail Corridor Development Plan

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

What is Commuter Rail?

- Larger, heavier, roomier than light rail
- Higher maximum speed, slower acceleration and deceleration than light rail, but still has good travel time and reliability
- Uses the latest in clean diesel technology
- Typically longer station spacing (every 3-5 miles on average) than light rail (1-2 miles) with emphasis on park-and-rides

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

What is Commuter Rail ? (cont.)

- Meets federally mandated structural requirements for rolling stock
- Can share ROW, track with freight (does not need exclusive right-of-way like light rail)
- Lower cost per mile ($10-$20M) than light rail ($60-$80M)

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Commuter Rail Systems

- "Heritage" Systems (Pre-1985)
- "New" Systems (Since 1985)
- Open by 2010
- In design or planning

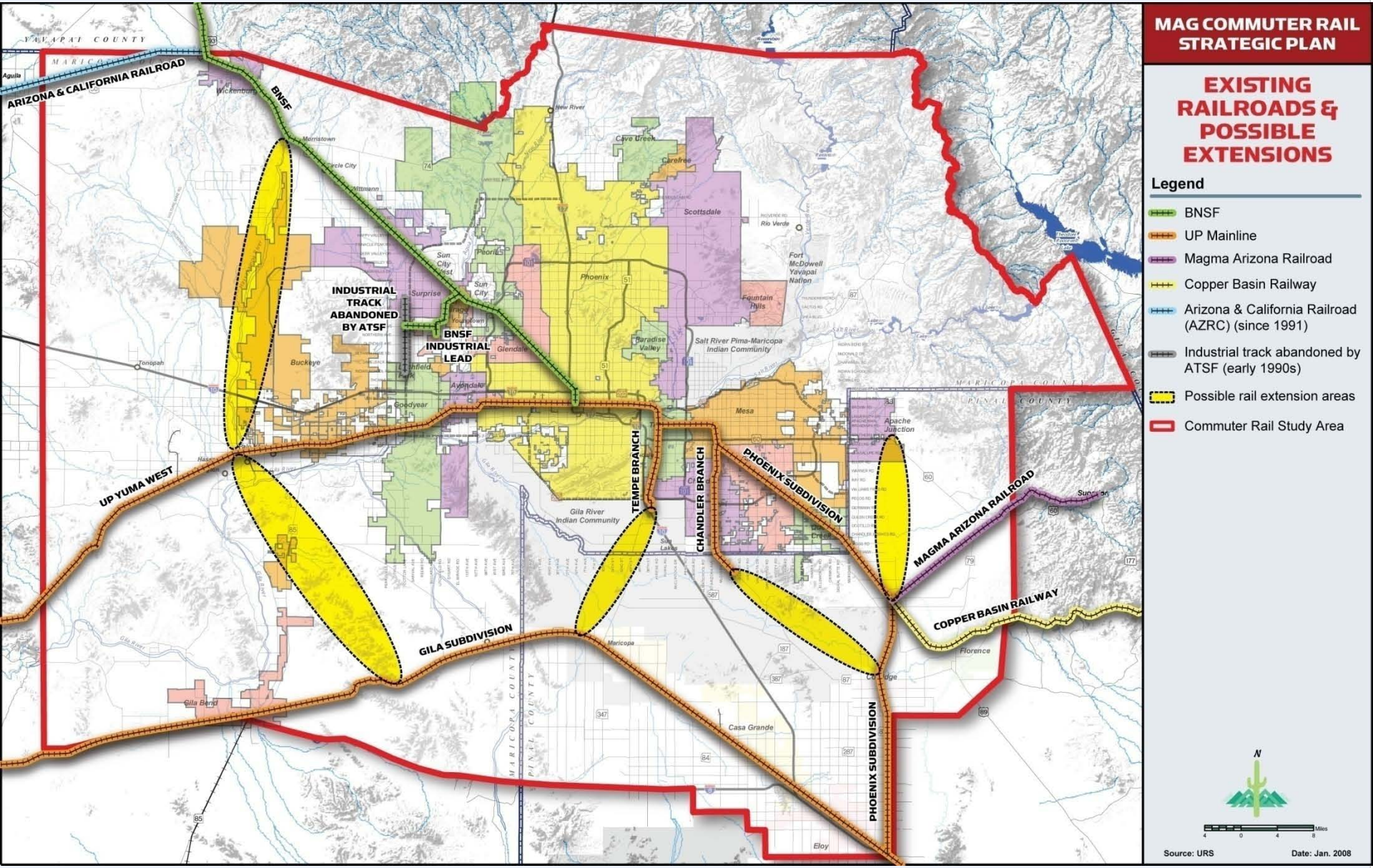
Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Study Process and Background

- Funding included in the RTP to study commuter rail
- Commuter Rail Strategic Plan accepted by MAG Regional Council in April 2008
- Grand Avenue study initiated in November 2008
- Yuma West and System Study initiated in April 2009
- Phoenix-Tucson Intercity Rail AA currently out for bid (ADOT)
- Extensive stakeholder involvement

Copyright © 2010


MAG COMMUTER RAIL STRATEGIC PLAN
EXISTING RAILROADS & POSSIBLE EXTENSIONS
Legend
BNSF
UP Mainline
Magma Arizona Railroad
Copper Basin Railway
Arizona & California Railroad (AZRC) (since 1991)
Industrial track abandoned by ATSF (early 1990s)
Possible rail extension areas
Commuter Rail Study Area
ARIZONA & CALIFORNIA RAILROAD
BNSF
INDUSTRIAL TRACK ABANDONED BY ATSF
BNSF INDUSTRIAL LEAD
UP YUMA WEST
GILA SUBDIVISION
TEMPE BRANCH
CHANDLER BRANCH
PHOENIX SUBDIVISION
MAGMA ARIZONA RAILROAD
COPPER BASIN RAILWAY
PHOENIX SUBDIVISION
Wickenburg
Morristown
Circle City
Mittmann
New River
Cave Creek
Carefree
Scottsdale
Rio Verde
Fort McDowell Yavapai Nation
Sun City West
Sun City
Peoria
Phoenix
Surprise
Youngtown
Glendale
Fountain Hills
Paradise Valley
Salt River Pima-Maricopa Indian Community
Buckeye
Tonopah
Litchfield Park
Avondale
Goodyear
Mesa
Apache Junction
Gila River Indian Community
Sun Lakes
Maricopa
Florence
Coolidge
Casa Grande
Gila Bend
Eloy
Superstition Mountains
YAVAPAI COUNTY
MARICOPA COUNTY
PINAL COUNTY
N
Miles
Source: URS
Date: Jan. 2008

ON THE MOVE
PARTNERS IN PROGRESS

Stations

Many are fairly generic

But they can be quite elaborate

Or not

Copyright © 2010

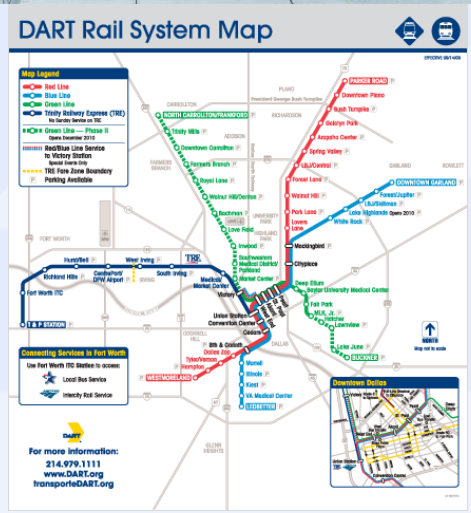
ON THE MOVE
PARTNERS IN PROGRESS

Access to Stations

Auto

Bike and walk

Transit



ON THE MOVE
PARTNERS IN PROGRESS

Transit Oriented Development

Is possible

But it's not a given

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Commuter Rail Implementation

1. Continued coordination with ADOT and railroads
2. Determine liability and indemnification statutes
3. Regional Sustainable Transportation and Land Use Integration Study

---

4. Identify local funding
5. Develop and implement governance plan
6. Railroad agreements
7. Design and construction
8. Operation

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Study Results

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Objectives-Commuter Rail System Study

- Evaluate commuter rail options for the MAG region and the potential connecting routes immediately adjacent to the MAG region.
- Establish priorities for implementing commuter rail service through the evaluation of ridership potential, operating strategies, and associated capital and operating costs.
- Evaluate existing freight corridors and possible rail extension areas identified in the Commuter Rail Strategic Plan.

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

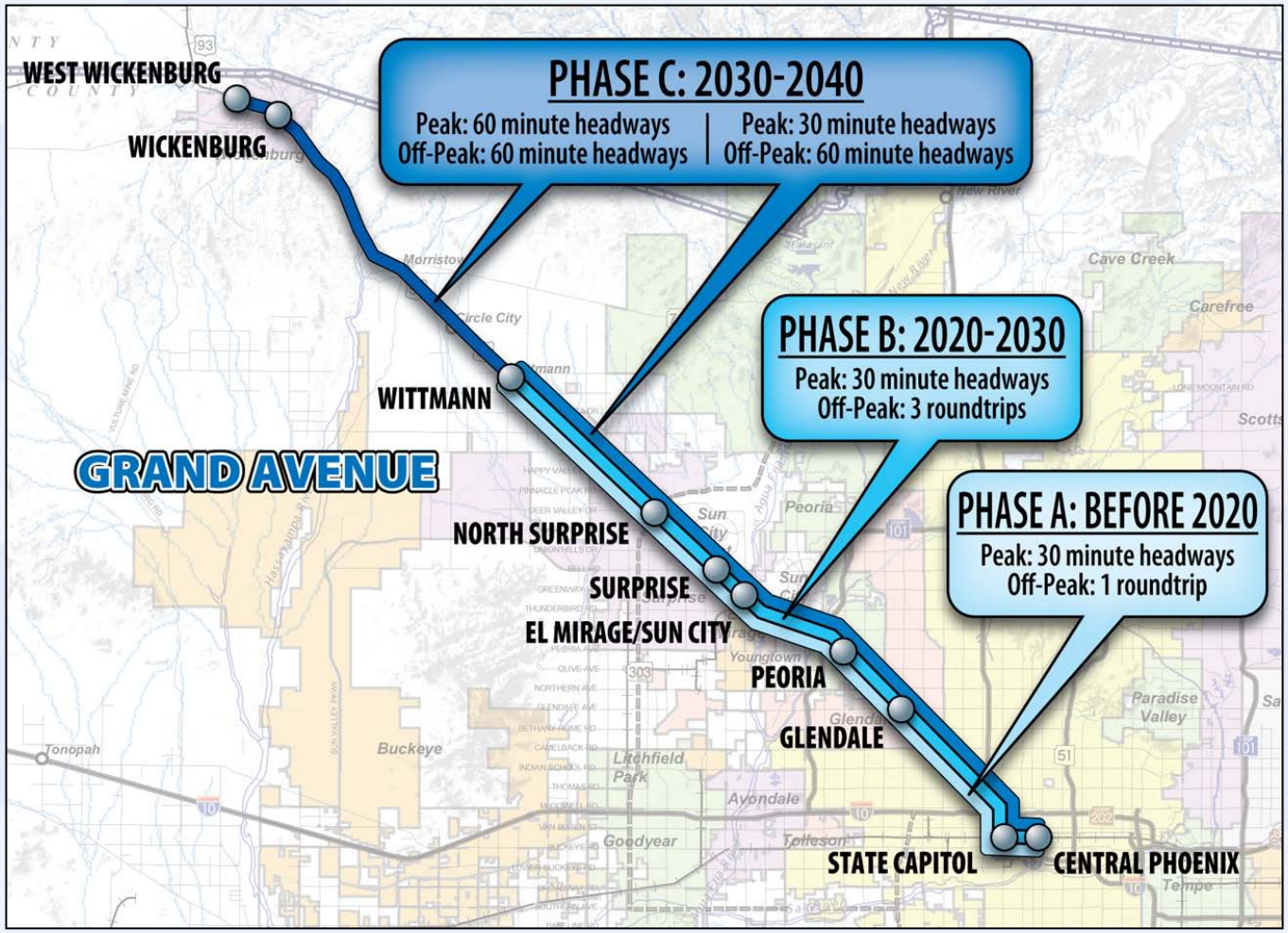
Objectives-Grand Avenue and Yuma West Studies

- Review and document existing and forecast demographics, land use, and travel characteristics
- Identify barriers and opportunities for implementation of commuter rail service
- Assess alternative implementation or operating scenarios and associated costs and ridership
- Recommend a conceptual path forward for funding and implementation

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

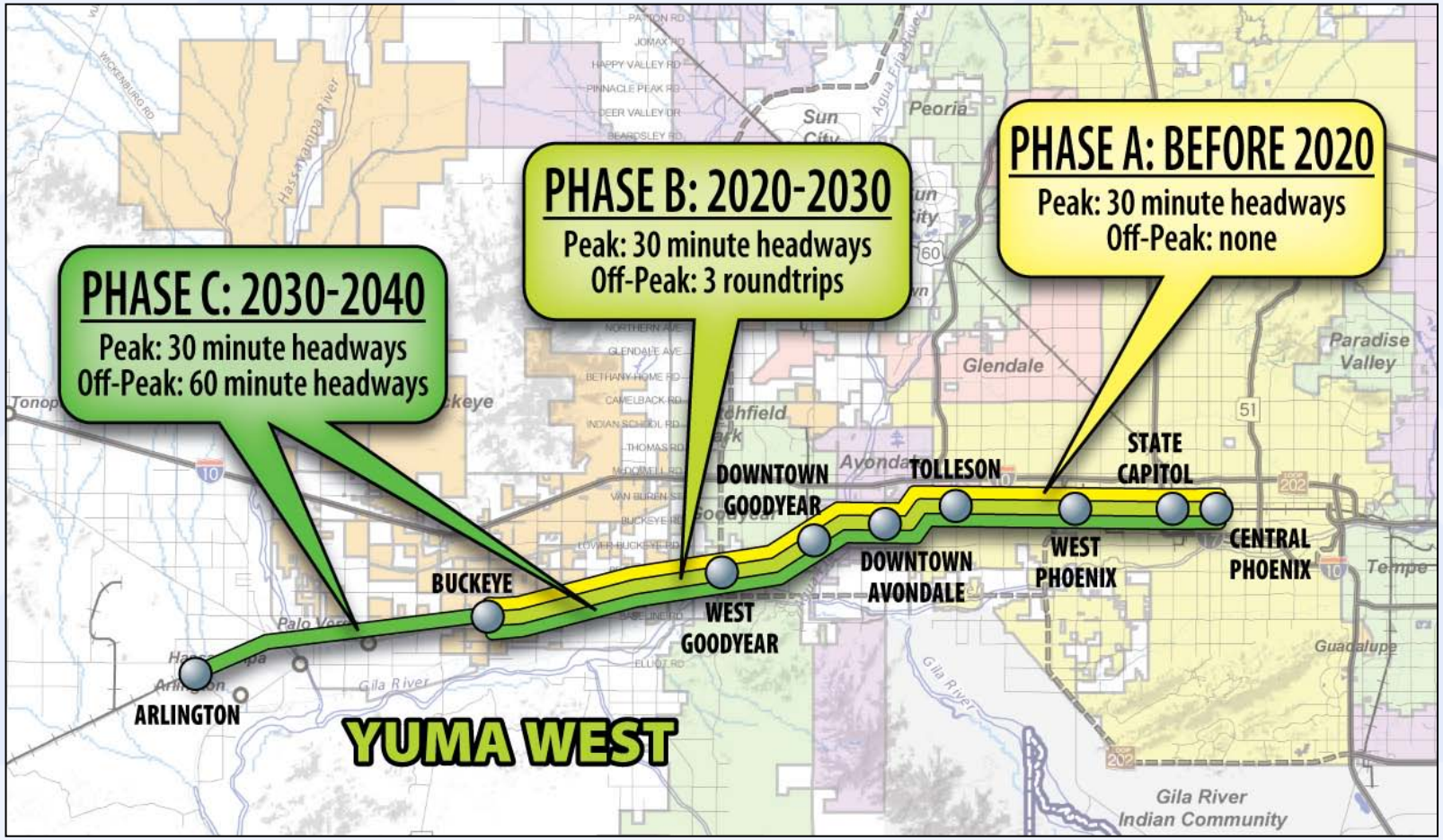
Grand Avenue Corridor Development Plan



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

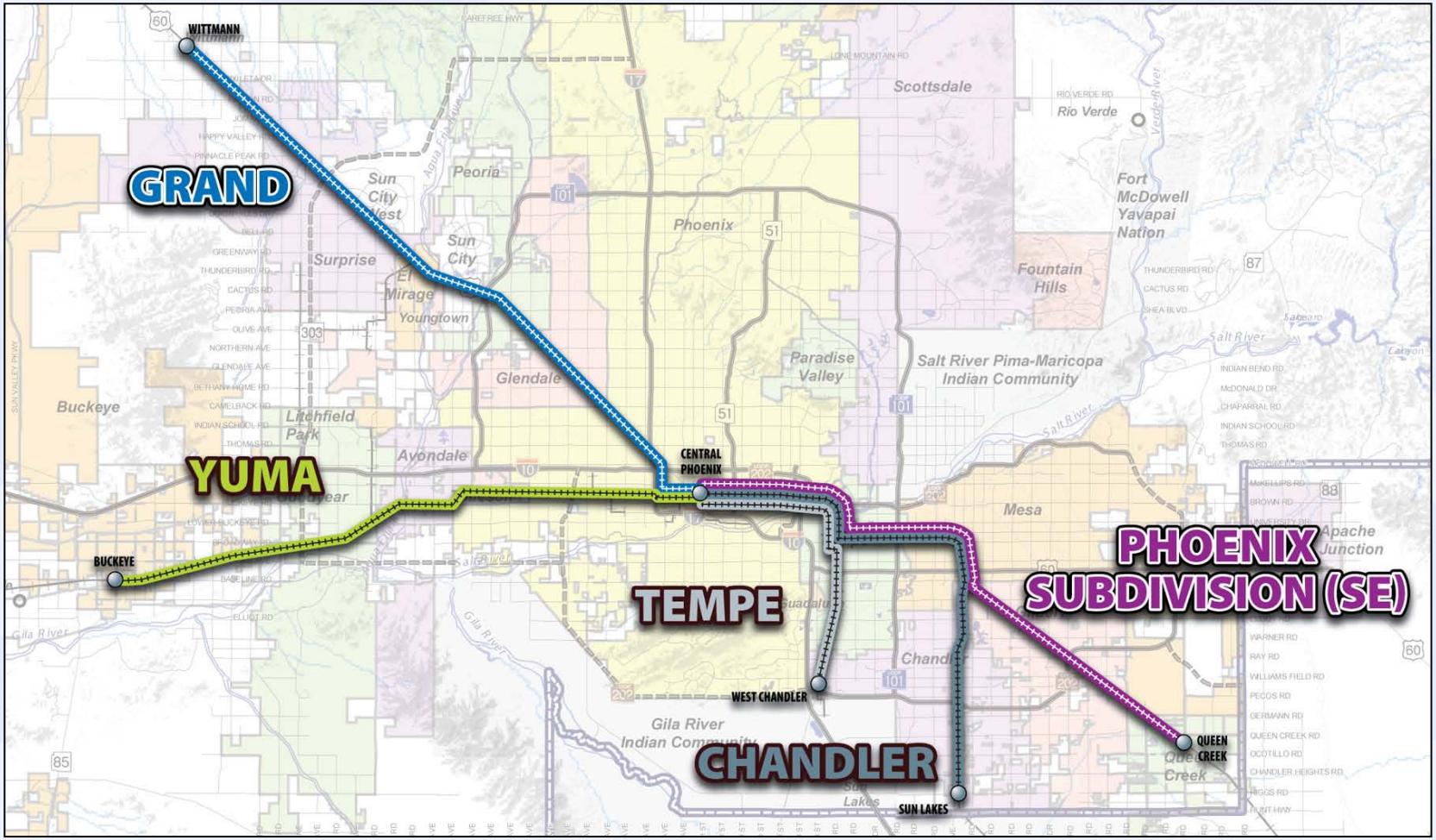
Yuma West Corridor Development Plan



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

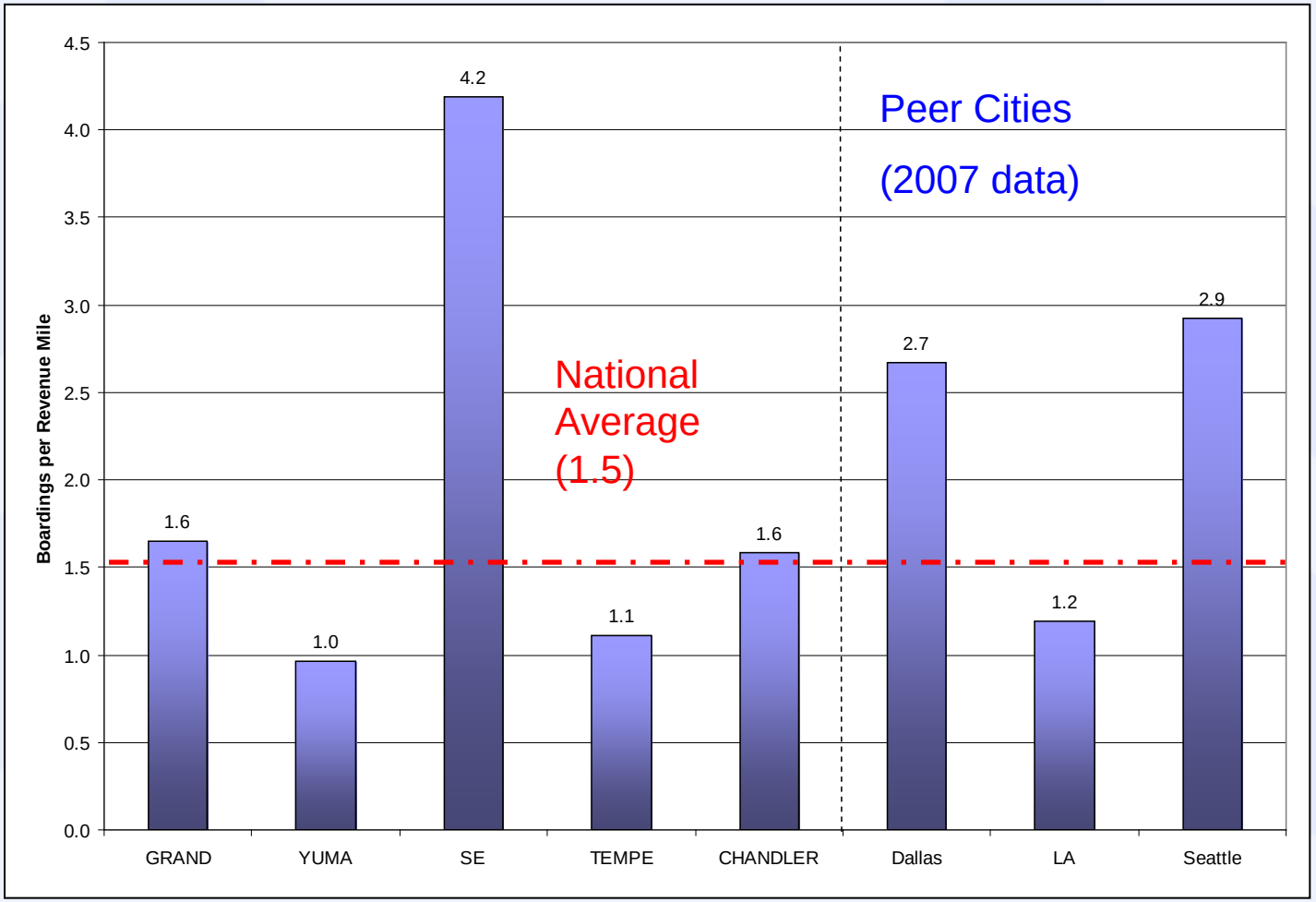
System Study Corridors



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

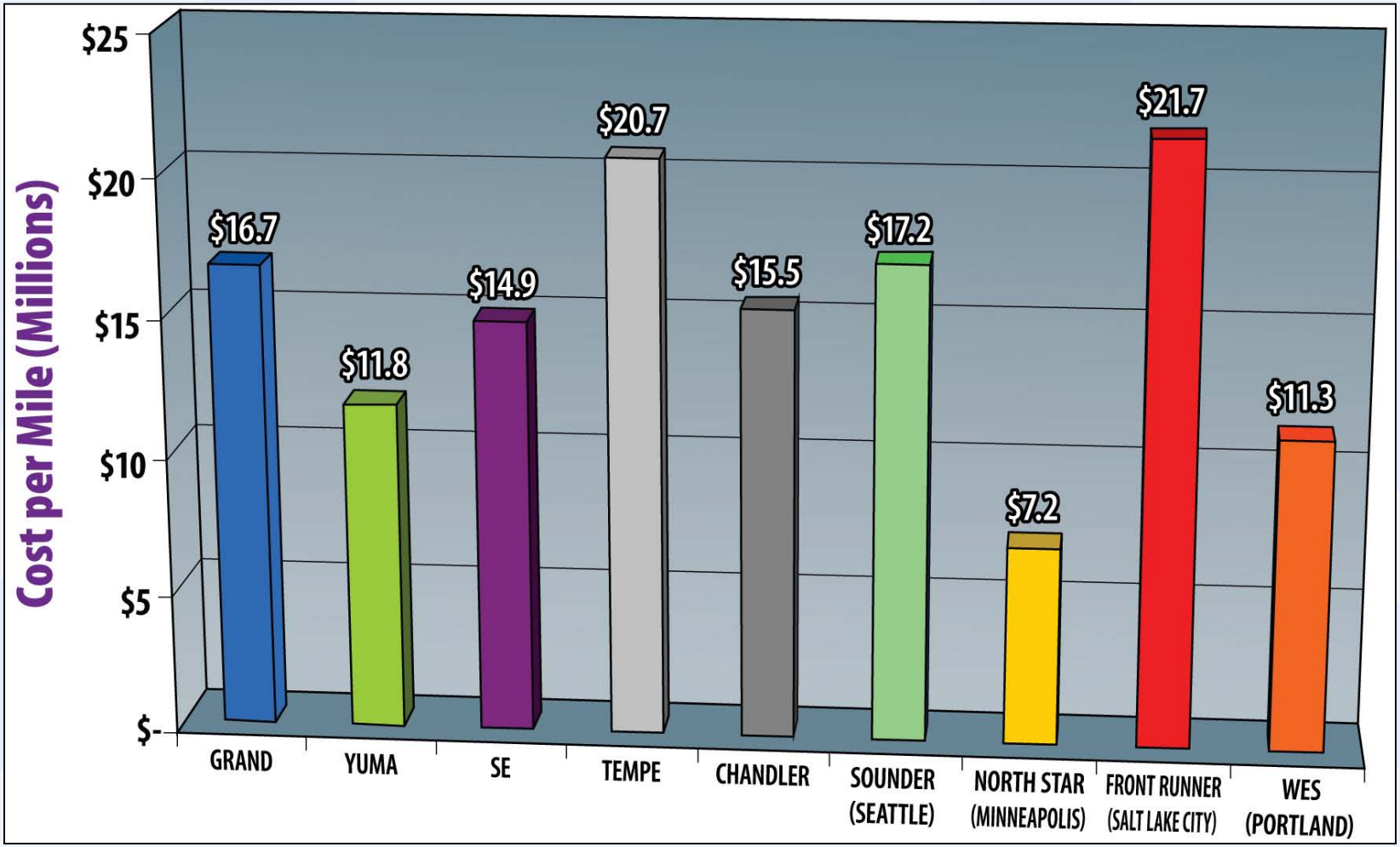
Daily Boardings per Revenue Mile – Stand Alone Corridors



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

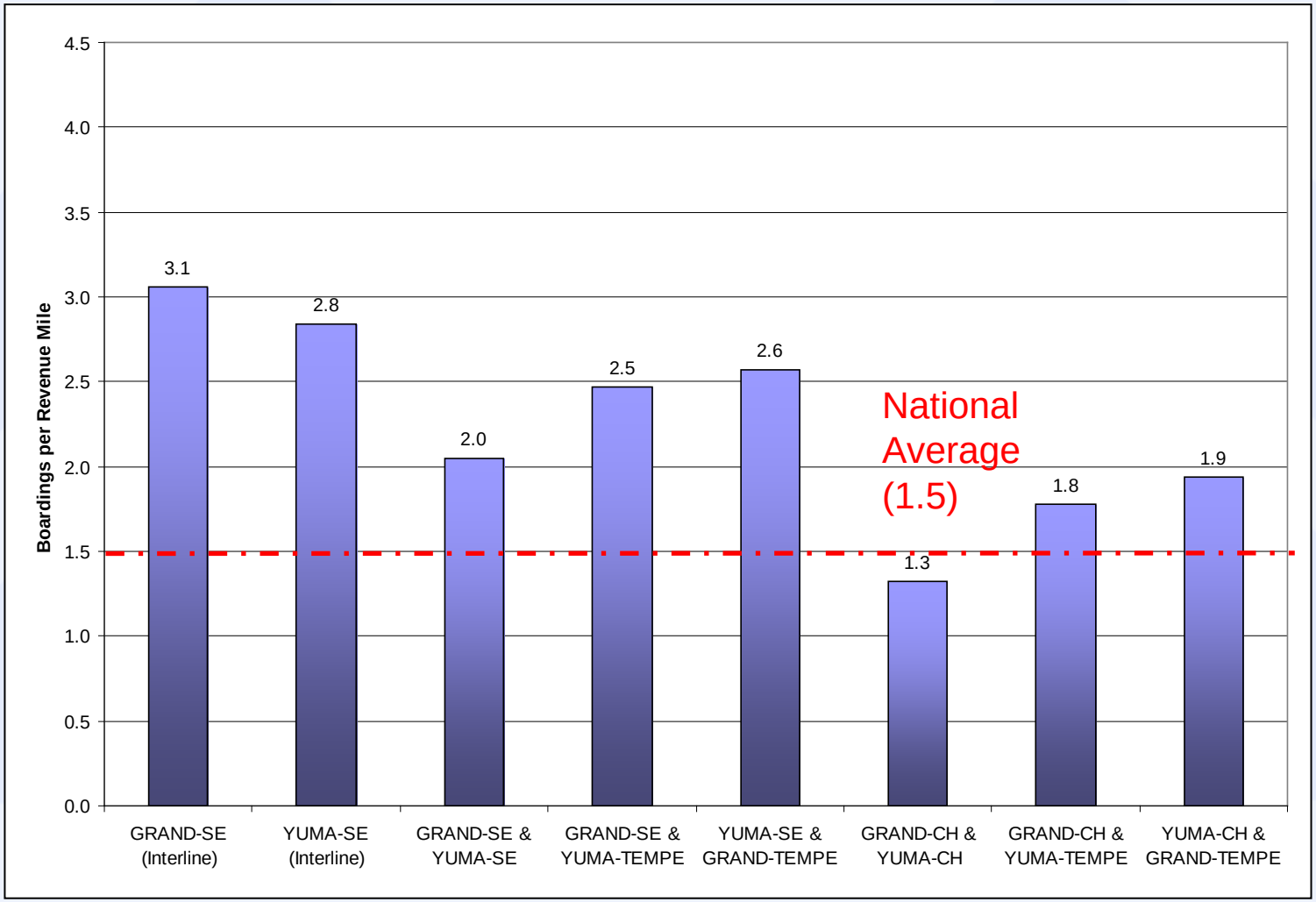
Stand Alone Corridors Capital Cost per Mile



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

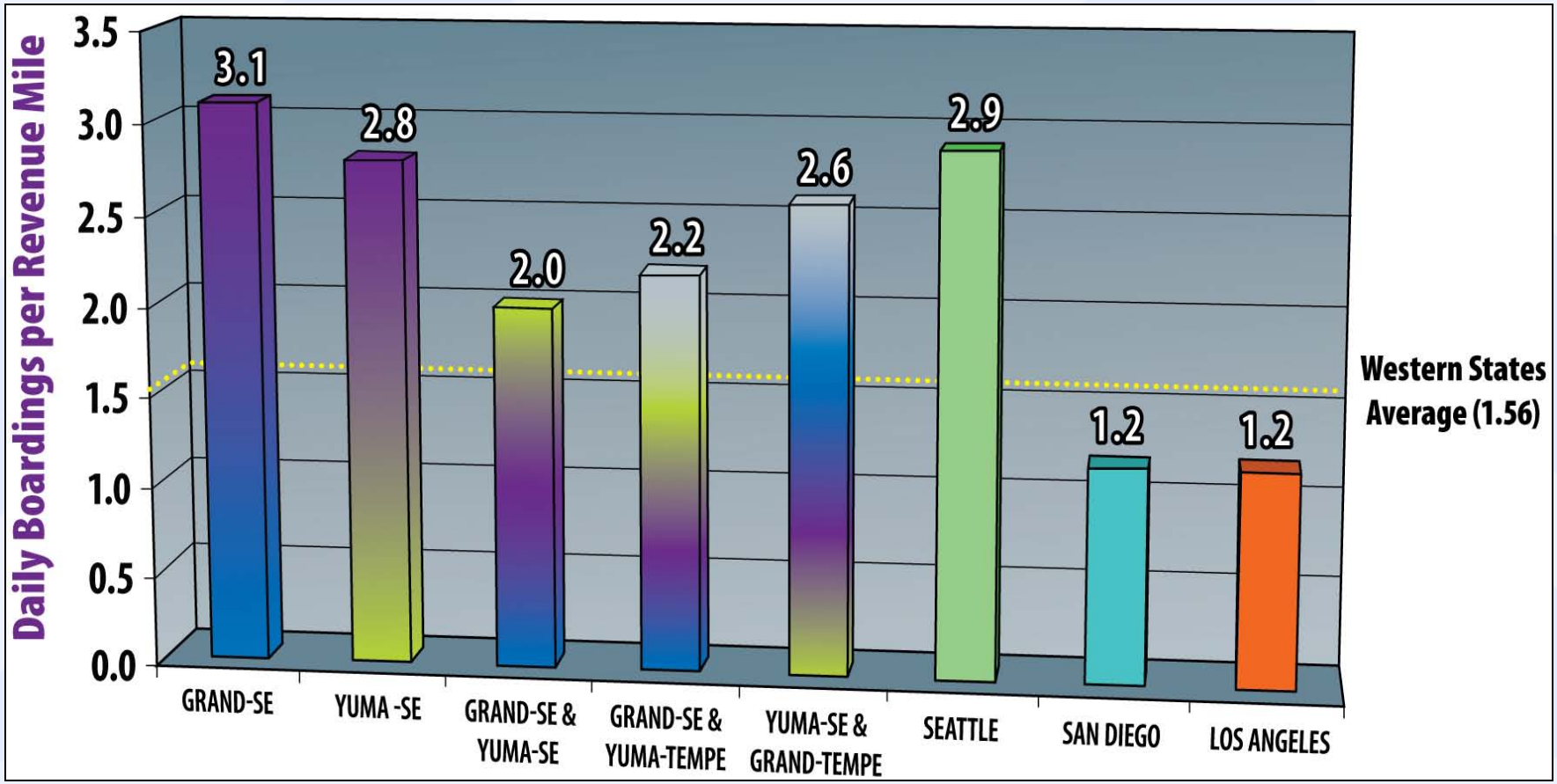
Daily Boardings per Revenue Mile – Interlined Corridors



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

2030 Daily Boardings per Revenue Mile – Interlined Corridors



Copyright © 2010

ON THE MOVE PARTNE

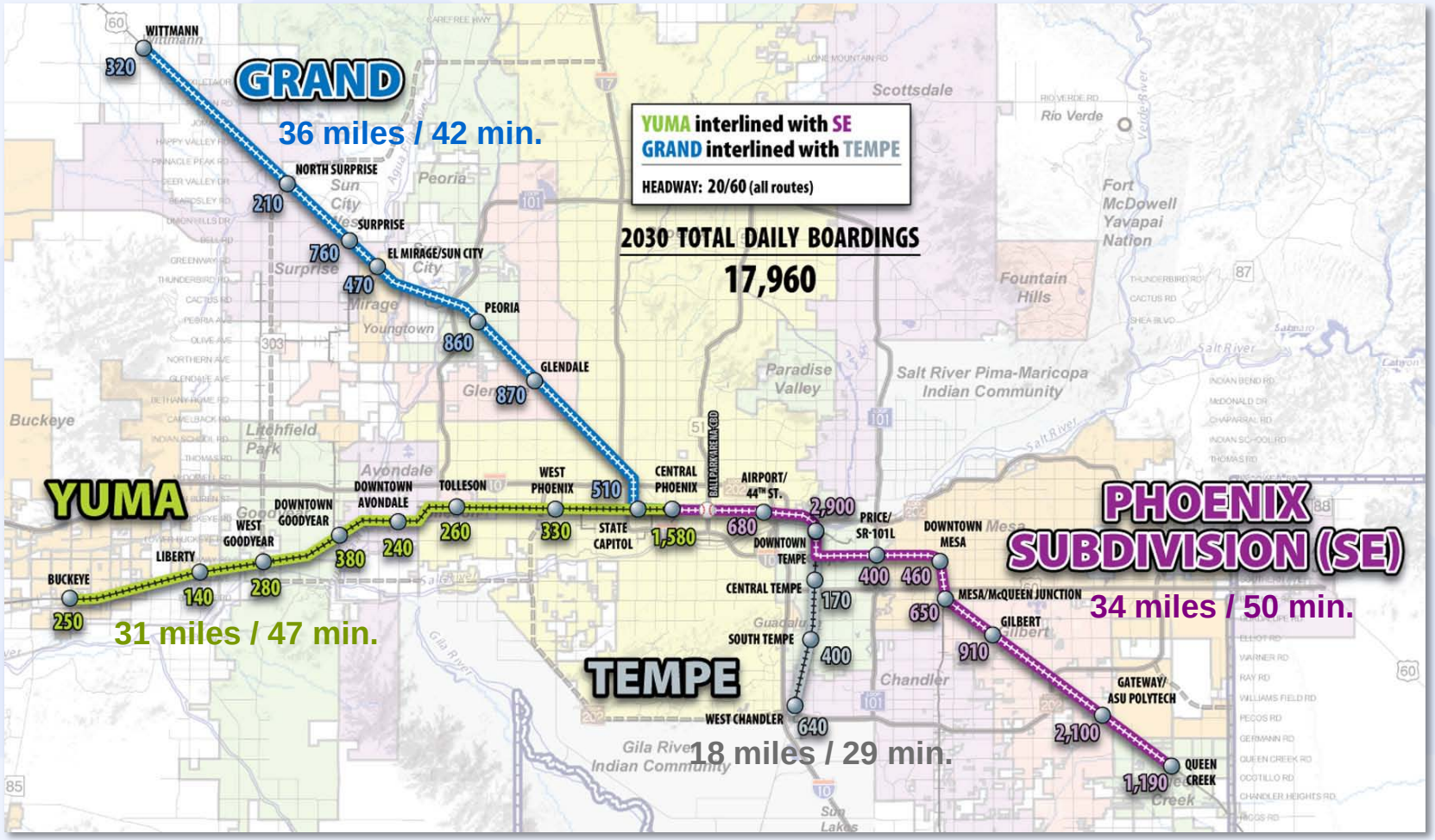
Comparisons to Other Commuter Rail Systems

System	Start Year	Length (in route miles)	Trains Per Day (Weekday)	Daily Ridership (Weekday)
Altamont Commuter Express (ACE) (San Jose-Stockton, CA)	1998	86	6-8	3,700
Coaster (San Diego-Oceanside, CA)	1995	41	22	6,000
Front Runner (Salt Lake City-Ogden, UT)	2008	44	70	4,800
Metrolink, San Bernardino Line (Los Angeles-San Bernardino, CA)	1992	56	39	11,950
Metrolink, Ventura County Line (Los Angeles-Oxnard/Montalvo, CA)	1992	71	22	4,000
Music City Star (Nashville-Lebanon, TN)	2006	32	11	1,000
New Mexico Rail Runner Express (Santa Fe-Albuquerque-Belen, NM)	2006	93	24	4,500
Sounder, North Line (Seattle-Everett, WA.)	2003	35	8	1,500
Sounder, South Line (Seattle-Tacoma, WA.)	2000	47	18	11,000
Trinity Railway Express (TRE) (Dallas-Ft. Worth, TX)	1996	34	49	9,800

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Overall Most Productive System



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Key Sensitivity Tests Results: What might happen…

1. … if selected highway projects are not built?

2. … between 2030 and 2035?

→ ***Looking for differences of 10% or greater. Changes of less than 10% are considered nominal and generally within normal model variation.***

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

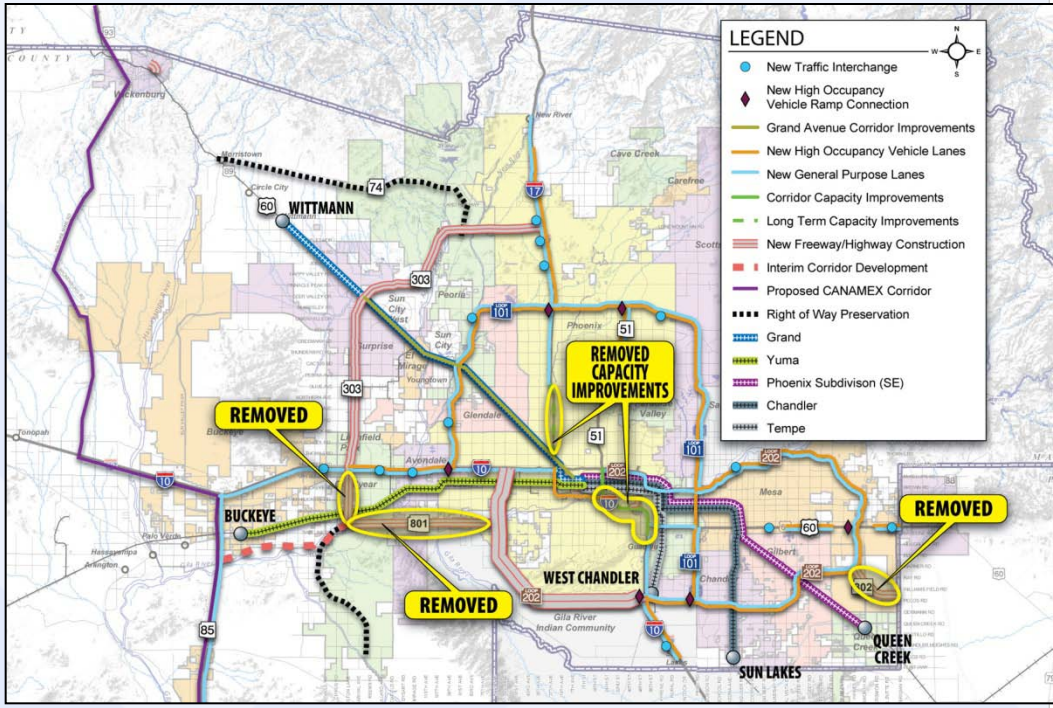
What might happen to ridership … if selected highway projects aren't built?

What We Did:

- Removed projects from network and reran model
- Compared results with and without projects

Results (% change without projects):

- SE: +10% (Removed SR-802)



Conclusions:

- In general, the planned highway projects do not substantially compete with commuter rail service.
- SE might see slightly higher ridership if the SR-802 project is not constructed.

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

What might happen to ridership … between 2030 and 2035?

What We Did:

- Ran base model of all five base corridors with 2030 socioeconomic data
- Ran same model with 2035 socioeconomic data
- Compared results for 2035 vs. 2030

Results (% change with 2035 socioeconomic data):

- Grand: +17%
- Yuma: +19%

Conclusion:

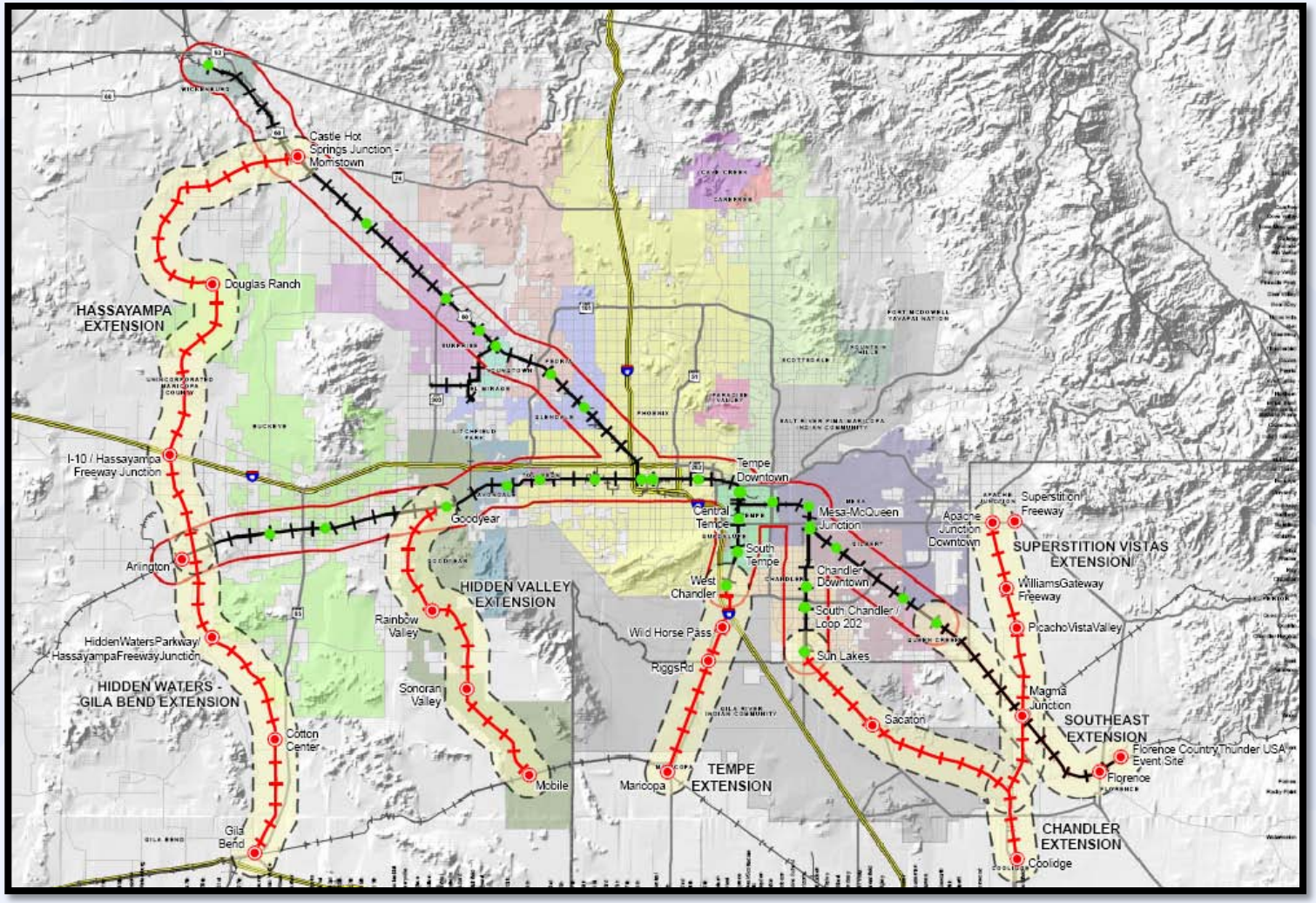
- Grand and Yuma are likely to see a noticeable increase in ridership between 2030 and 2035 if development occurs as predicted.

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Potential Corridor Extensions

(Existing railroad lines, historic railroad corridors and new rights of way)



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Considering Potential Extensions

Forecasting for a Post-2035 Scenario

- Another method for analyzing extension viability
- Based on latest available MAG Future Land Use data (2007)
- For each corridor, total projected households with 8 miles and employment within .5 mile of target stations areas were correlated with ridership potential
- Normalized values for comparison across corridors by calculating households per mile and employment per station target area

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Extensions –Conclusions

- Higher ridership potential exists for future extensions in eastern Maricopa County and northern Pinal County.
- Superstition Vistas extension is the most productive.
- Ridership potential in the far West Valley is more viable in the longer-term, based on available projections and plans.
- Low ridership potential is observed along the Hidden Waters extension to Gila Bend.

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Evaluation Criteria

Key discriminators in blue

- Travel time savings
- Boardings per revenue mile
- Connections to activity centers
- Land use compatibility
- Impact on regional travel and air quality
- Capital cost per mile
- Annual O&M cost per rider
- Ease of implementation
- Compatibility with freight railroads

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Stand Alone Corridors: Evaluation Results

Alternative	Results
SE Corridor	Top Tier
Grand Corridor	Middle Tier
Tempe Corridor	Middle Tier
Chandler Corridor	Middle Tier
Yuma Corridor	Lower Tier

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Stand Alone Corridors: Major Discriminators

Top Tier:

SE Corridor

- 2 - 4 times the number of boardings per revenue mile as all other corridors
- 18 minute end-to-end travel time savings
- Second lowest capital cost per mile
- Lowest O&M cost per rider

Middle Tier:

Grand Ave.

- Boardings per revenue mile are close to Western States average
- 24 minute end-to-end travel time savings
- Moderate capital cost per mile
- Second lowest O&M cost per rider

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Stand Alone Corridors: Major Discriminators

Tempe and Chandler corridors (borderline middle tier)

- Low to moderate boardings per mile
- High O&M cost per user
- Moderate to high capital cost per mile

<u>Lower Tier:</u>

Yuma Corridor

- Lowest capital cost per mile w/relatively few infrastructure improvements
- But has lowest boardings per revenue mile
- Minimal travel time savings
- Highest O&M cost per rider

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Interlined Corridors: Evaluation Results

Alternative	Ranking
Yuma-SE	Top Tier
Grand-SE	Top Tier
Yuma-SE & Grand-Tempe	Middle Tier
Grand-SE & Yuma-Tempe	Middle Tier
Grand/Yuma/SE	Lower Tier

Copyright © 2010

Interlined Corridors: Major Discriminators

FINDING:

Each Interlined Alternative increases overall ridership over Stand-Alone Alternatives.

Top Tier:

Yuma-SE

- Moderate boardings per mile
- Lowest capital cost per mile
- Moderate O&M cost per rider

Grand-SE

- Highest boardings per mile
- High capital cost per mile
- Lowest O&M cost per rider

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Interlined Corridors: Major Discriminators

Middle Tier:

Grand/SE/Yuma/Tempe combinations

- Low to moderate boardings per mile
- Moderate capital cost per mile
- Moderate O&M cost per rider

Lower Tier:

Grand/Yuma/SE

- Lowest boardings per mile
- Moderate capital cost per mile
- Highest O&M cost per rider

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Interlined Corridors: Major Discriminators

Middle Tier:

Grand/SE/Yuma/Tempe combinations

- Low to moderate boardings per mile
- Moderate capital cost per mile
- Moderate O&M cost per rider

Lower Tier:

Grand/Yuma/SE

- Lowest boardings per mile
- Moderate capital cost per mile
- Highest O&M cost per rider

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Corridor Prioritization: Segment #1

Q: Which corridor is recommended for start-up commuter rail service?

A: SE Corridor: Significantly highest ridership, offers substantial travel time savings, and is cost-effective.

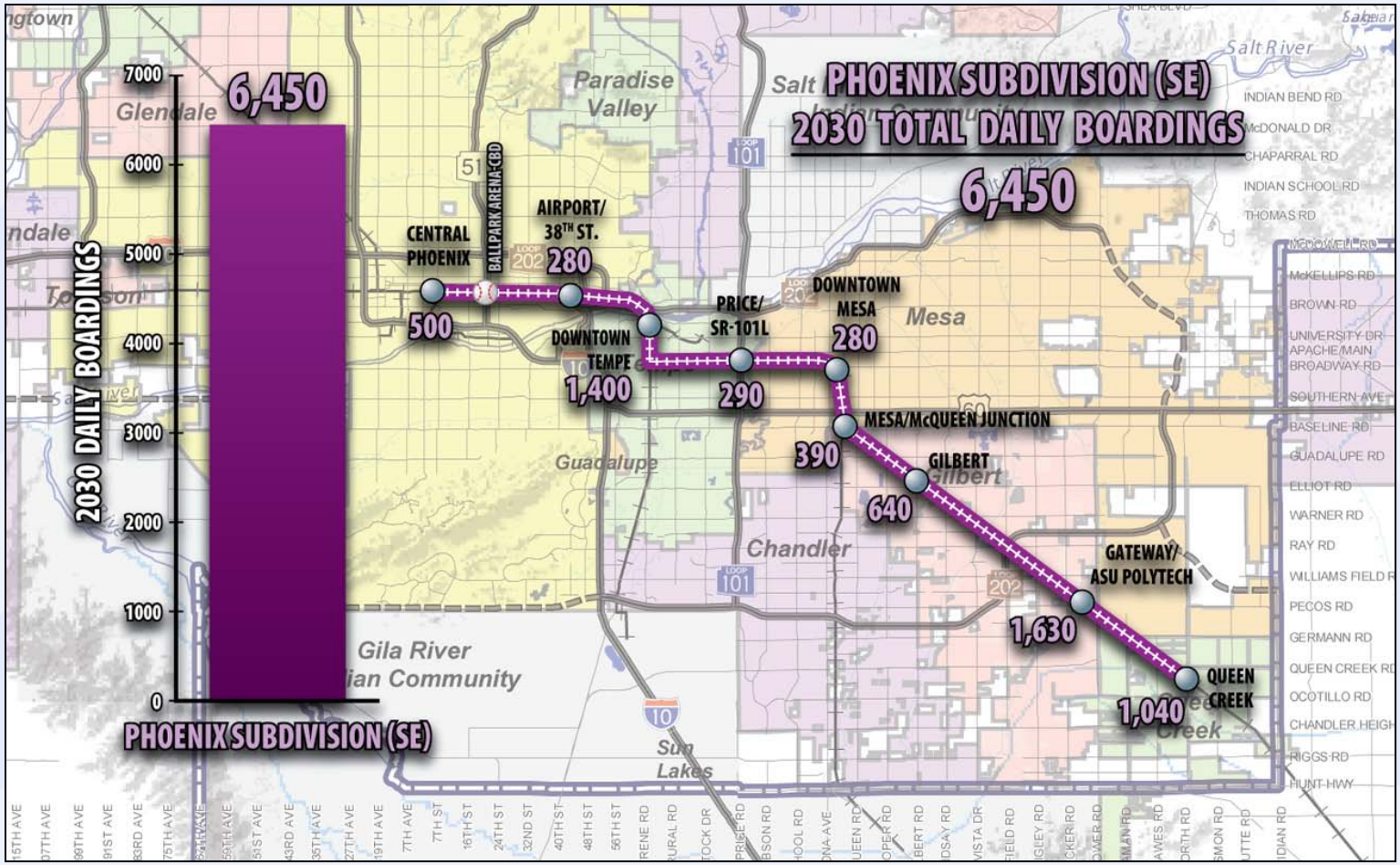
However, if use of railroad right-of-way is a fatal flaw, due to costs and agreements to get through rail yards in Central Phoenix, than options include:

- Build Grand Corridor first; or
- Build SE segment between Tempe and Queen Creek and transfer to LRT in downtown Tempe or at the airport.
- Build Tempe or Chandler segment in lieu of SE.

Copyright © 2010

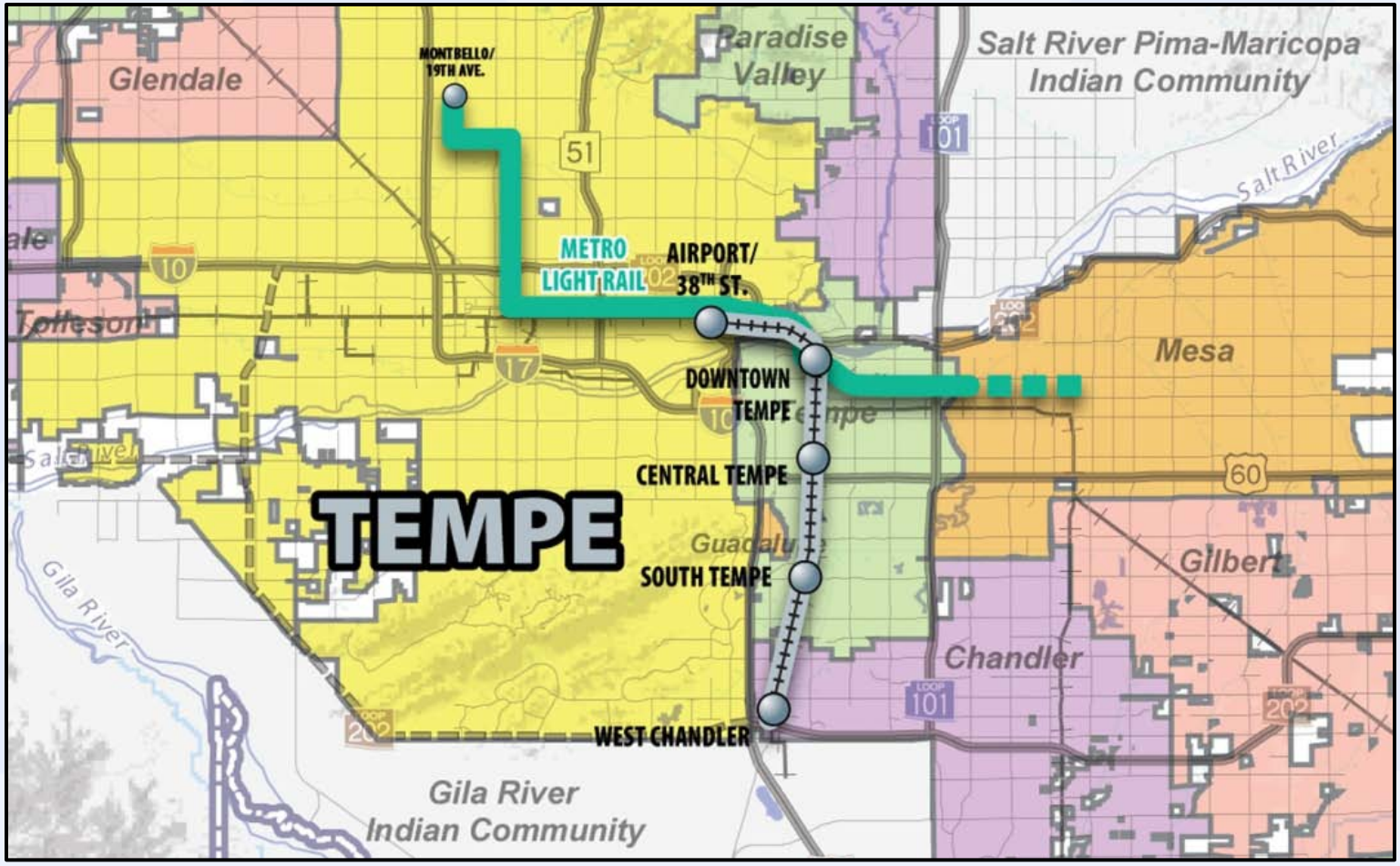
ON THE MOVE
PARTNERS IN PROGRESS

Corridor Prioritization: Segment #1



ON THE MOVE
PARTNERS IN PROGRESS

Alternative Route Connections



Copyright © 2010

Corridor Prioritization: Segment #2

Q: Which corridor is recommended to interline with SE, if it's built as Segment #1?

A: While Yuma-SE may be more *cost-effective* (low capital cost for Yuma coupled with high ridership on SE), Grand-SE is more *effective* because it carries more riders.

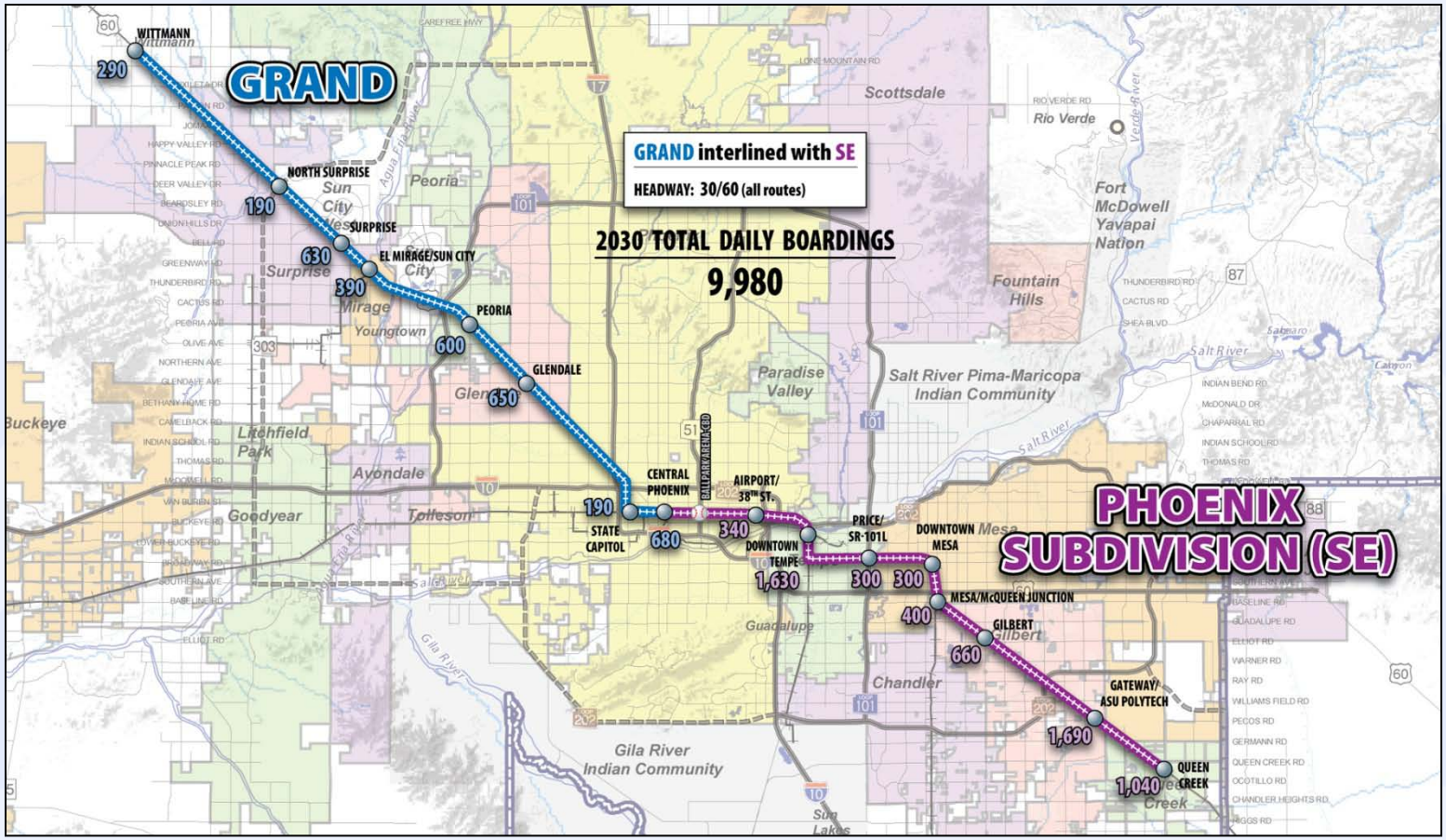
- Ridership is greatest when most productive East Valley and West Valley Corridors – Grand Avenue and SE – are combined.

Therefore, Grand-SE is recommended as first system interline.

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Corridor Prioritization: Segment #2



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Corridor Prioritization: System Build-Out

Q: How should the remainder of the corridors be phased?

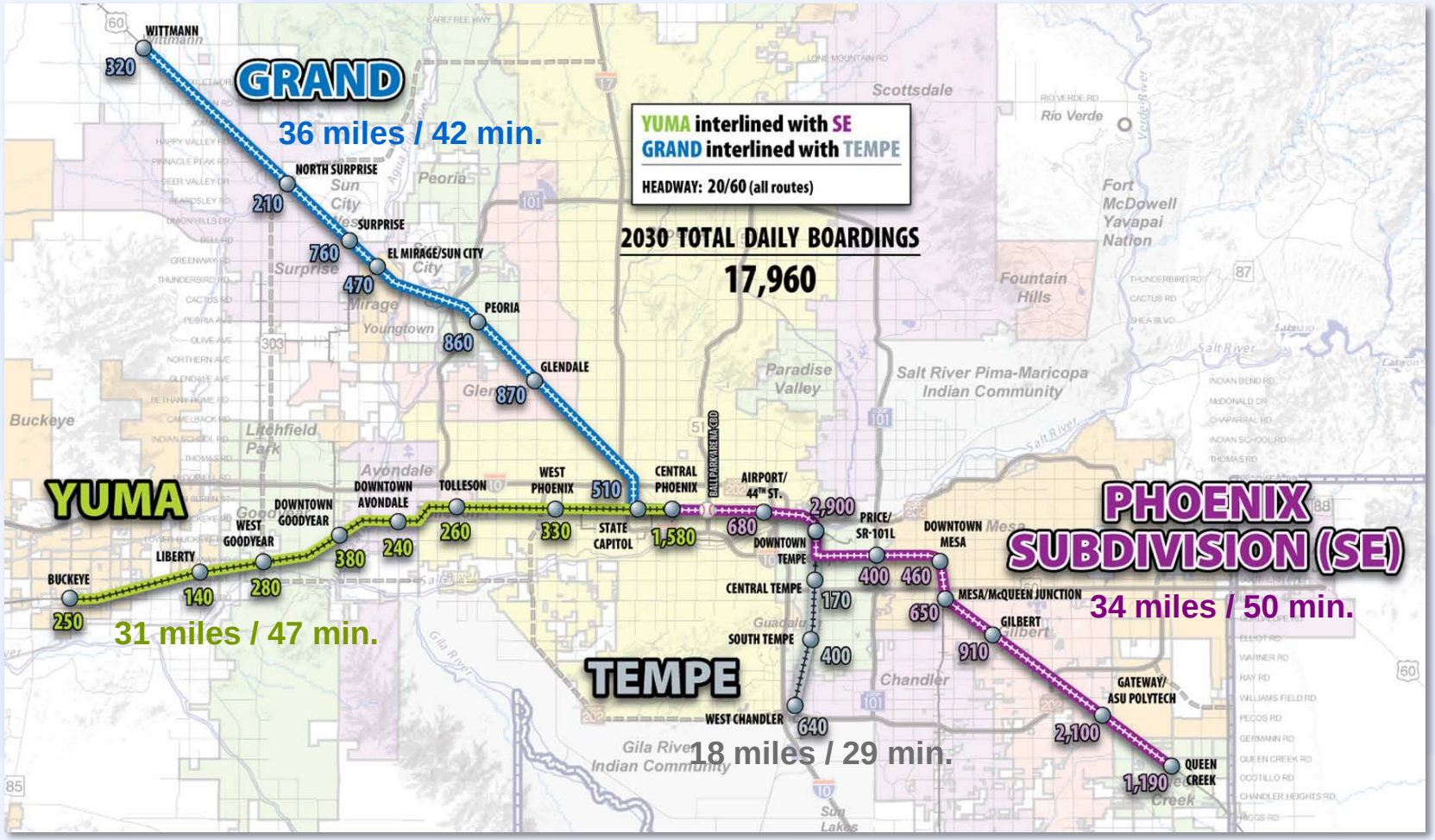
A: No one outstanding performer in other three corridors – Tempe, Chandler, Yuma. Considerations for future phasing and system build-out will include:

- Development patterns
- Changes in travel demand
- Community support
- Potential integration with intercity rail, etc.
- Railroad support

Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Overall Most Productive System



ON THE MOVE
PARTNERS IN PROGRESS

Requested Action

1. Accept the findings of the Grand Avenue Commuter Rail Corridor Development Plan, Yuma West Commuter Rail Corridor Development Plan, and Commuter Rail System Study

2. Revise the corridor ranking included in the Commuter Rail System Study upon the completion of update regional socioeconomic forecasts

Copyright © 2010

Commuter Rail Studies

Transit Committee

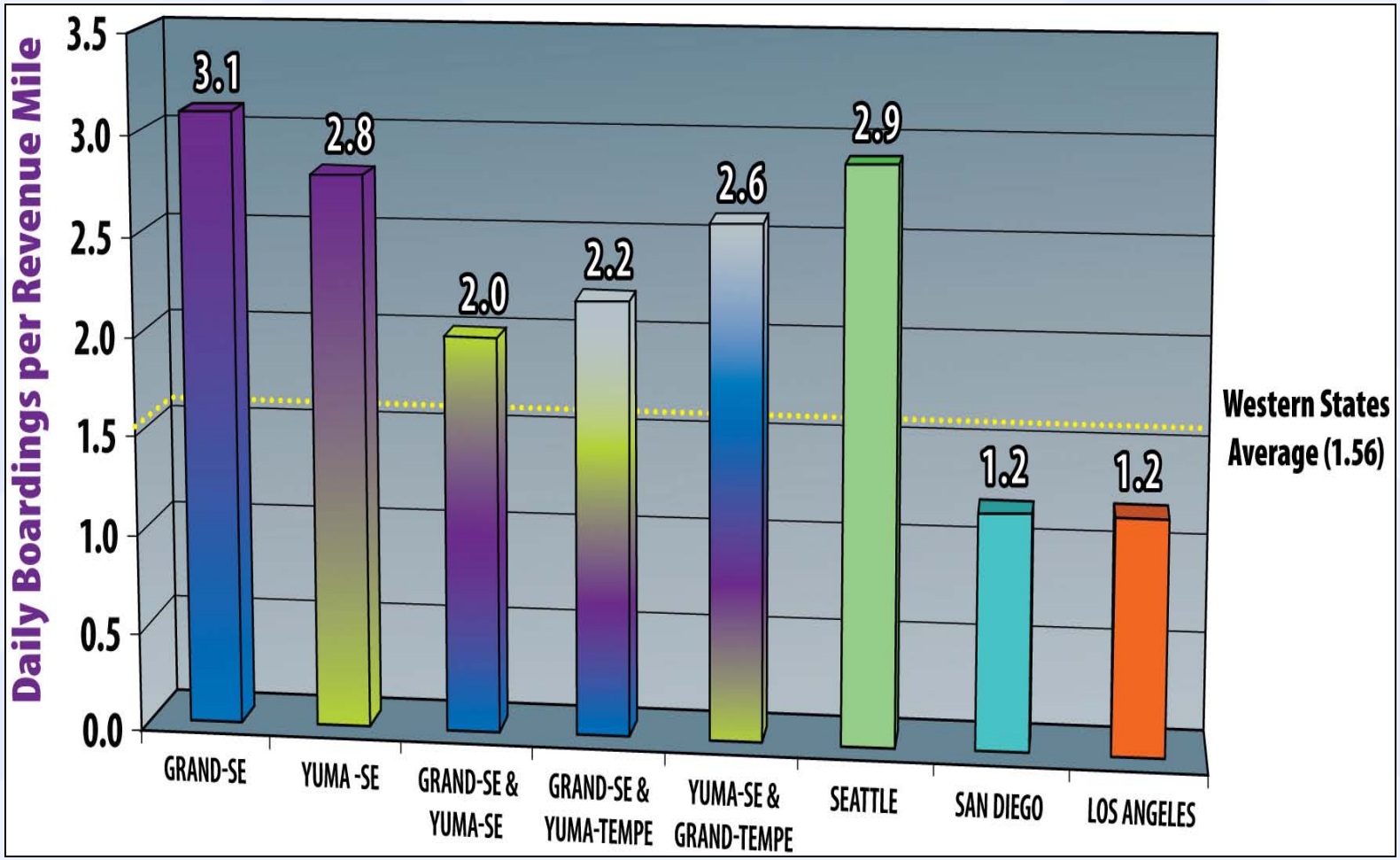
April 8, 2010

MARICOPA ASSOCIATION of GOVERNMENTS

ON THE MOVE
PARTNERS IN PROGRESS

ON THE MOVE
PARTNERS IN PROGRESS

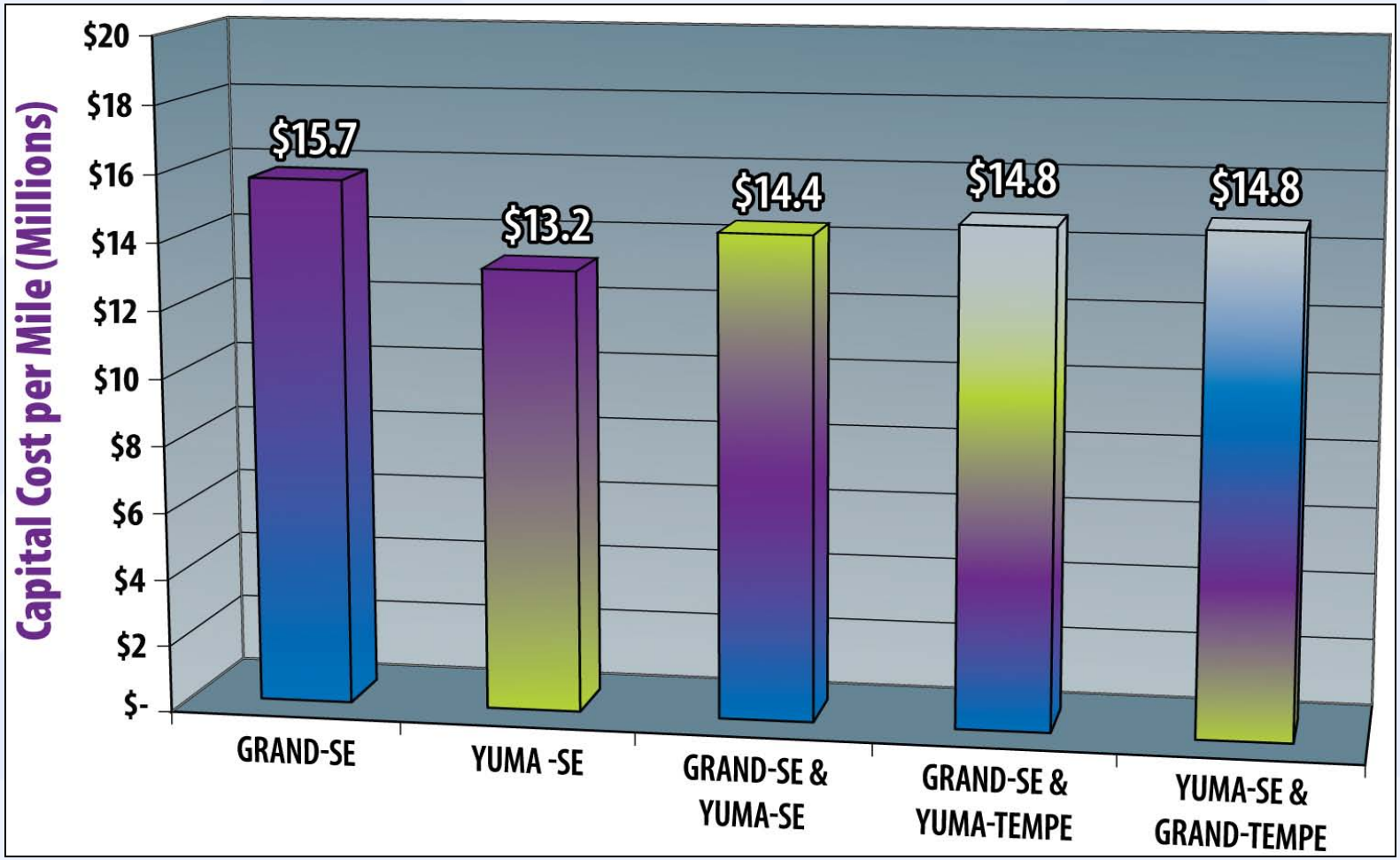
Interlined Corridors: Boardings per Mile



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

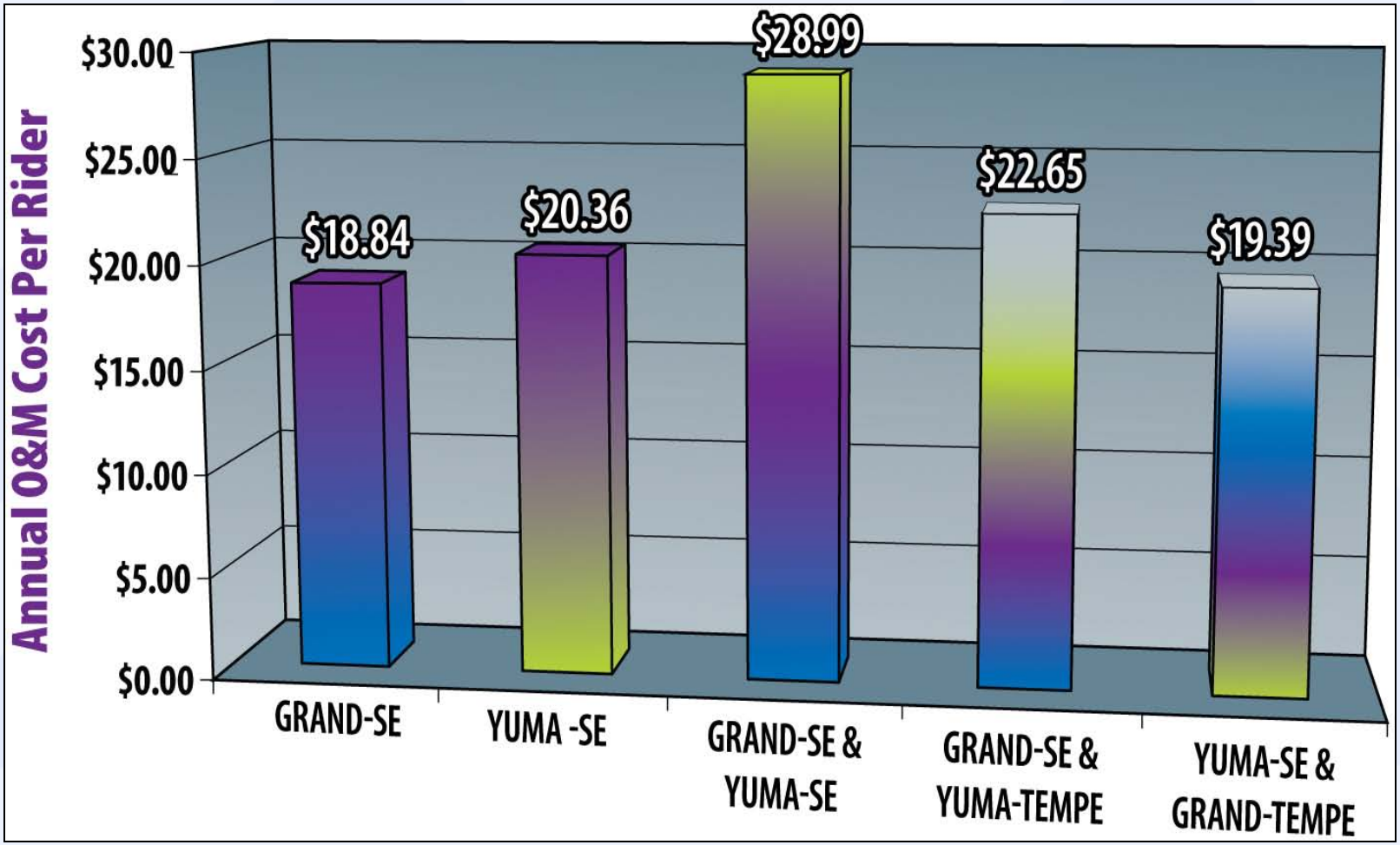
Interlined Corridors: Capital Cost per Mile



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

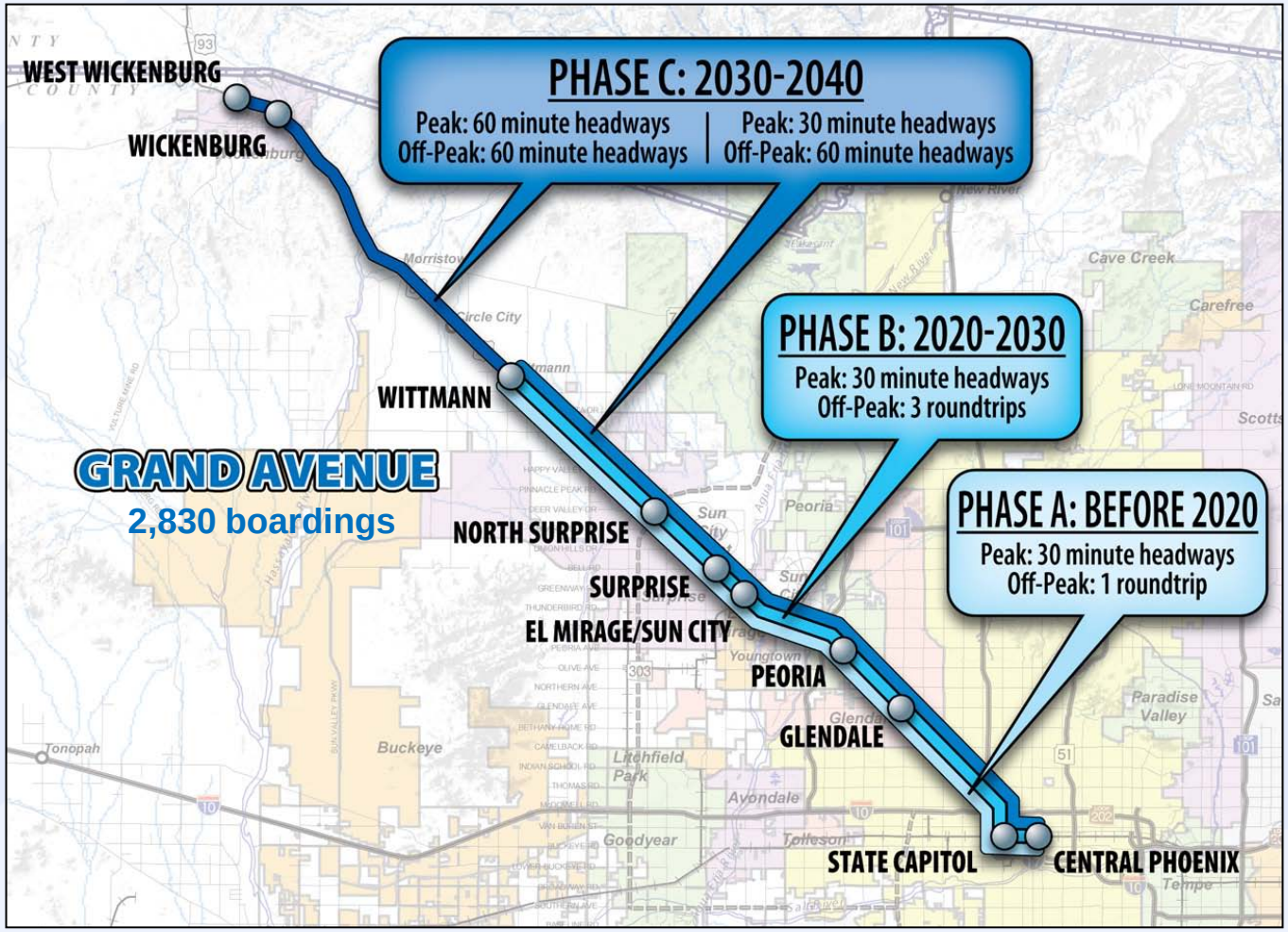
Interlined Corridors: Capital Cost per Mile



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

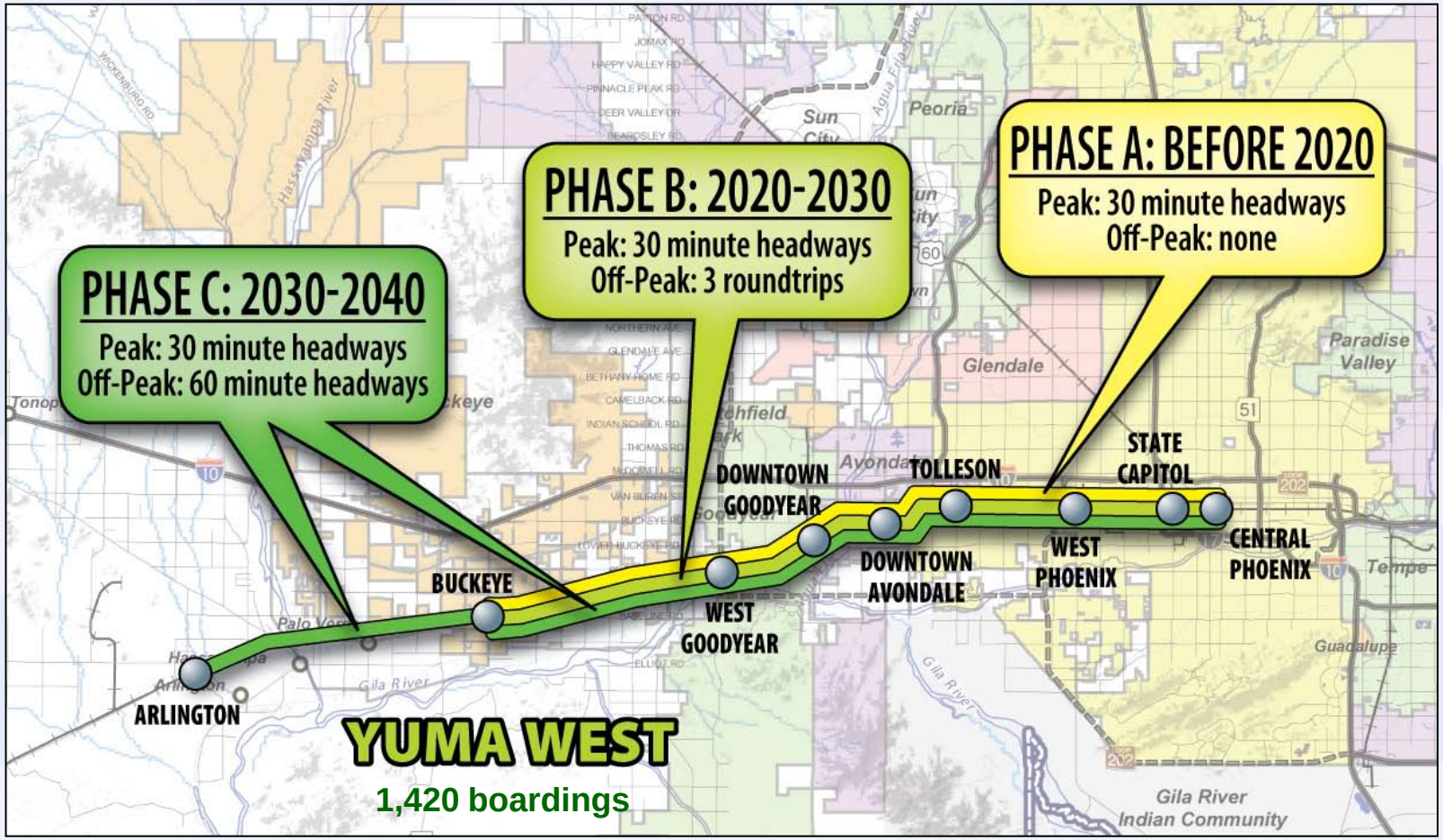
Grand Avenue Corridor Development Plan



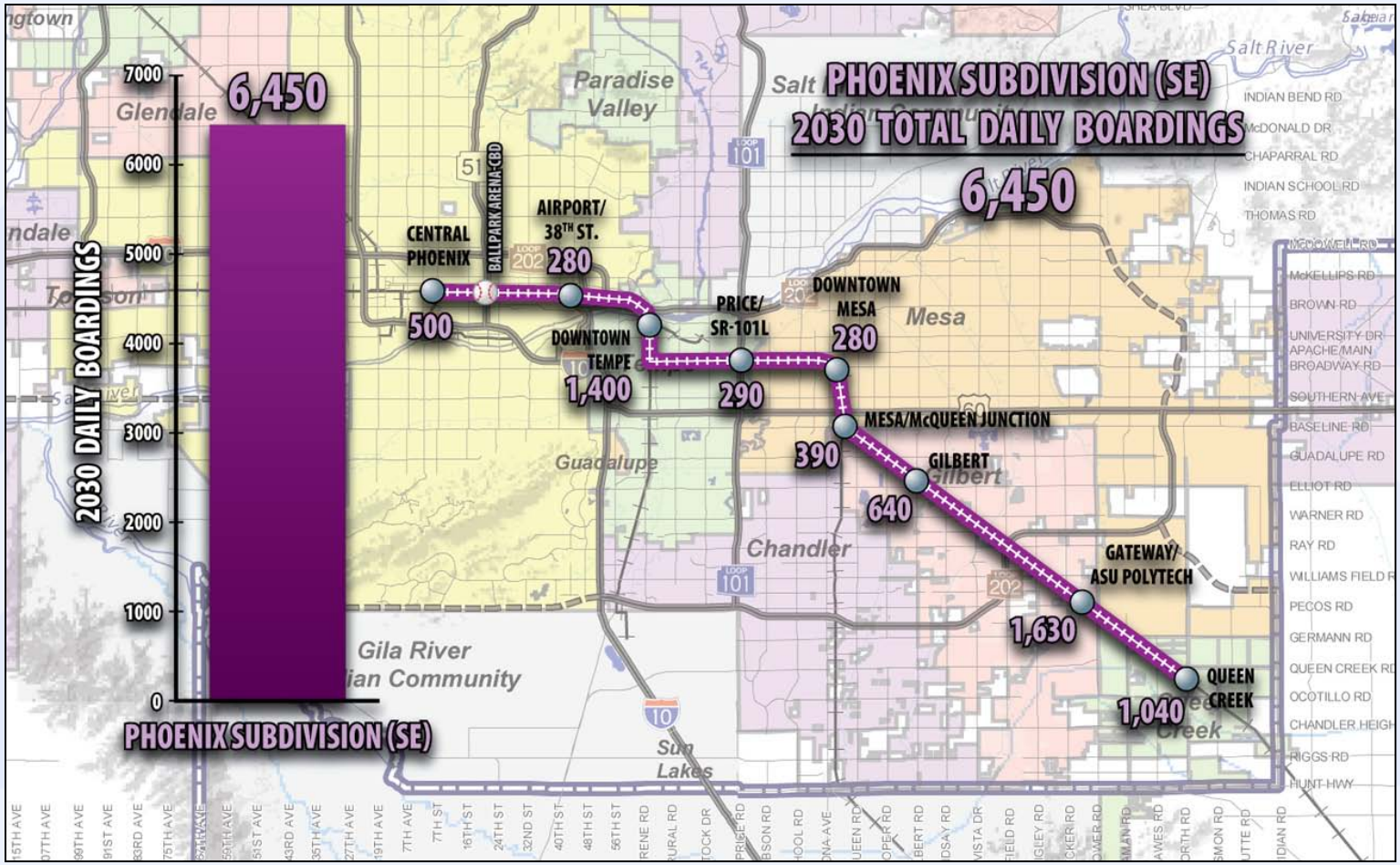
Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Yuma West Corridor Development Plan



Copyright © 2010

ON THE MOVE
PARTNERS IN PROGRESS

Corridor Prioritization: Segment #1