mpo TRANSIT STUDY

ALTERNATIVE TRANSIT CONCEPTS

CORPLAN LAND USE ANALYSIS
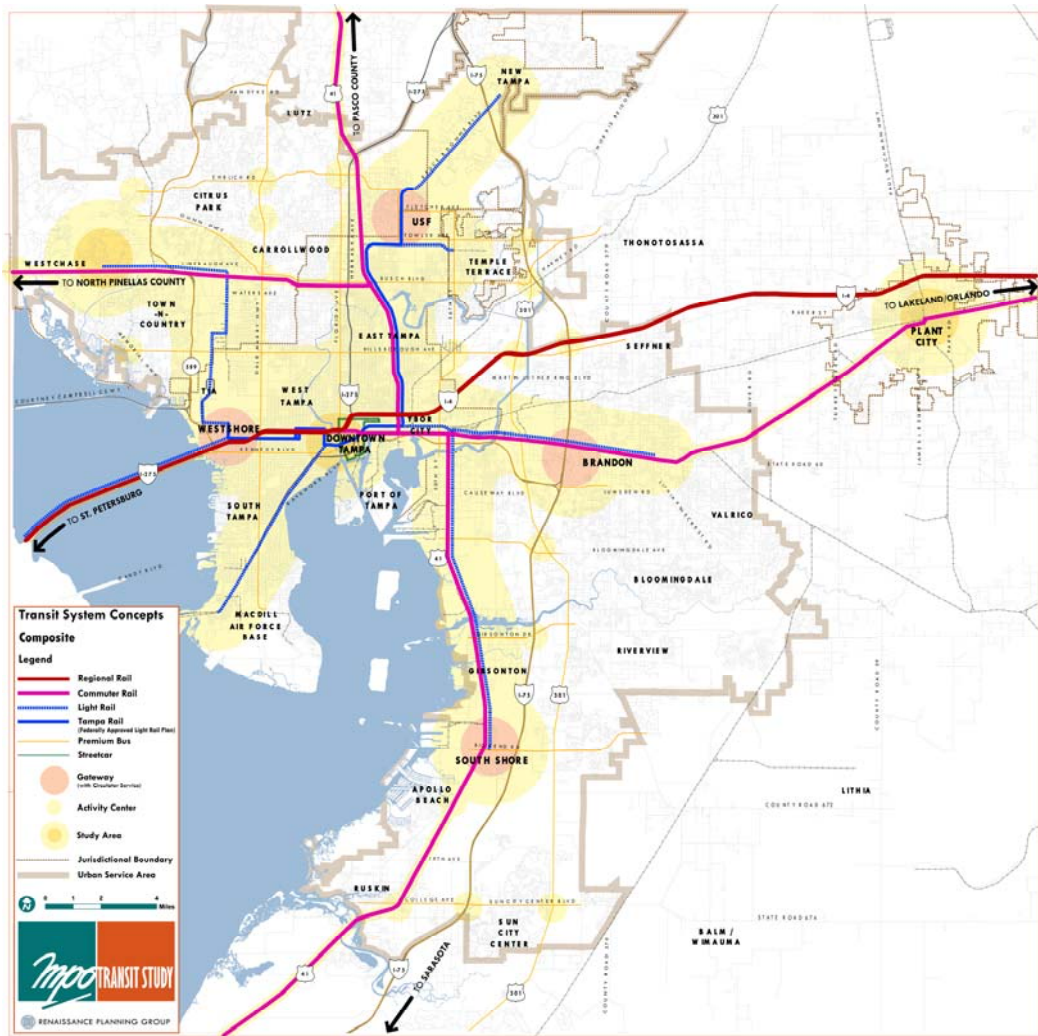
TECHNICAL MEMORANDUM

JUNE 2007

RENAISSANCE
PLANNING
GROUP

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ALTERNATIVE TRANSIT CONCEPTS

PLANNING APPROACH AND KEY ASSUMPTIONS

INTRODUCTION

The Hillsborough Transit Study aims to explore the benefits, tradeoffs and feasibility of creating a more robust transit concept to serve the mobility needs of residents in Hillsborough County. Based on previous studies, preliminary analyses and public comment, a Transit Needs and Opportunities map has been developed. The map identifies the major corridors and subareas to be considered for premium transit, and includes a range of technologies such as commuter rail, light rail and bus rapid transit. From this framework, a set of Alternative Transit System Concepts were developed and evaluated to facilitate the creation of a preferred transit scenario that best addresses the land use, economic, mobility and environmental goals of the community.

Each concept was focused on a primary transit and supporting land use theme, and comprised of prototypical station areas that respond to the context of the particular corridor and the transit technologies being considered. These concepts are designed to illustrate the cause and effect and tradeoffs of more transit oriented land use development patterns, transit technologies and transit concept configurations. Each Alternative Transit Concept was described in both graphic and narrative formats and included a set of quantifiable measures that were used to evaluate system performance, quality of life indicators, development and redevelopment potential, etc. Upon review and analysis of the Alternative Transit Concepts, a preferred transit scenario will be created for consideration and adoption by the MPO Board.

The following Alternative Transit Concepts were considered: **Urban Core (Concept A), Urban Corridors (Concept B), and Urban Centers (Concept C)**. In addition, a **Trend** concept and a **Composite (Concept ABC)** concept were considered for analytical purposes. The following provides a brief summary of each concept as illustrated in the accompanying map series.

TREND

- Status quo land development policies (based on existing comprehensive plans)

- Transit limited to increased fixed route and express bus service

- Advances a primarily auto-dominated mobility strategy

URBAN CORE (CONCEPT A)

- Focuses on transit oriented land development policies concentrating growth and redevelopment in City of Tampa

- Transit focuses on Tampa Light Rail, including Light Rail to Airport, and supportive Premium Bus network

- Advances Premium Transit Mobility Strategy

Figure 1: Urban Core (Concept A)
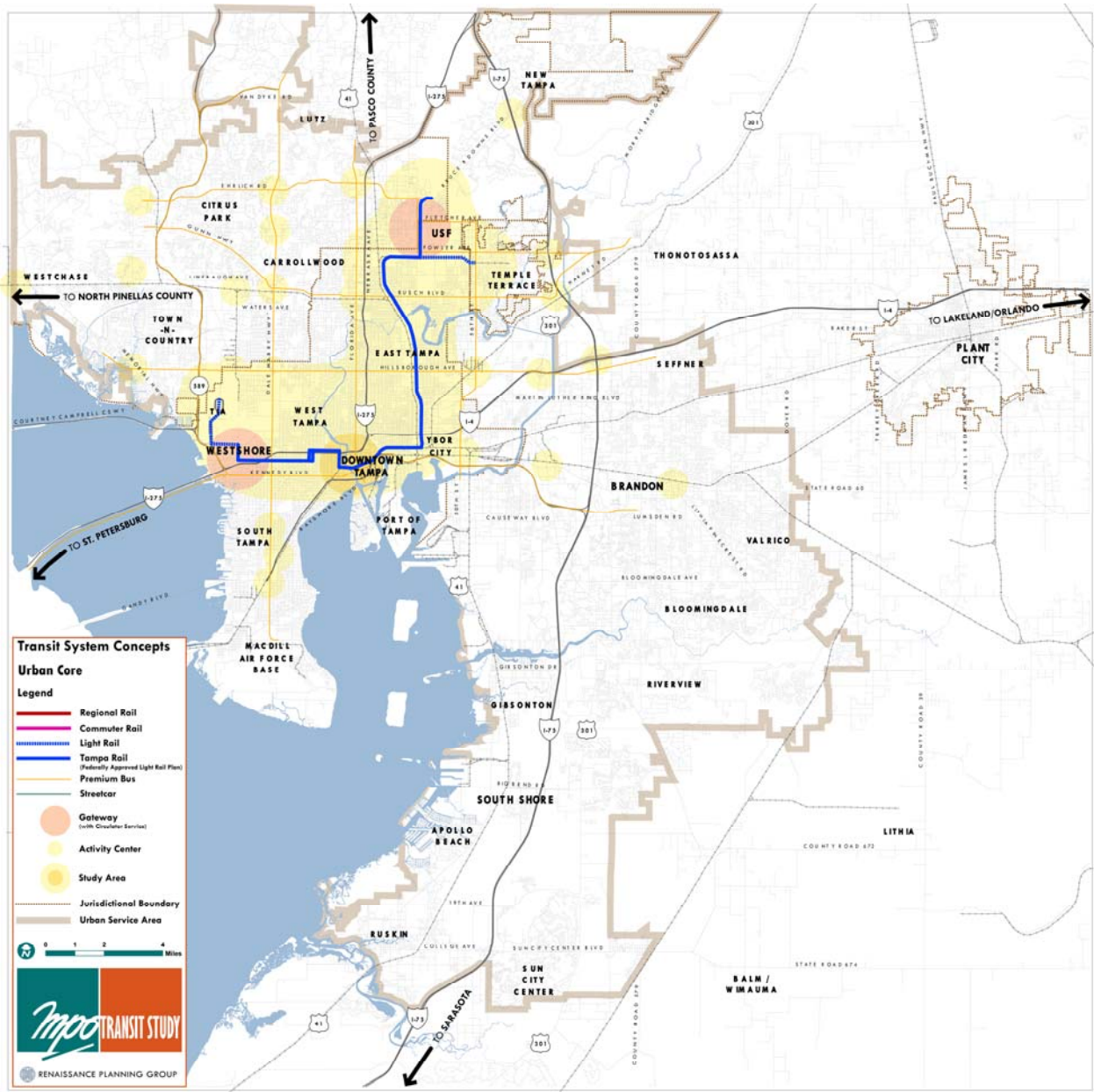
URBAN CORRIDORS (CONCEPT B)

- Focuses on Transit Oriented Land Development Policies concentrating growth along major "spokes" or corridors

- Transit focuses on Light Rail along major corridors and supportive Premium Bus network

- Advances premium transit mobility strategy

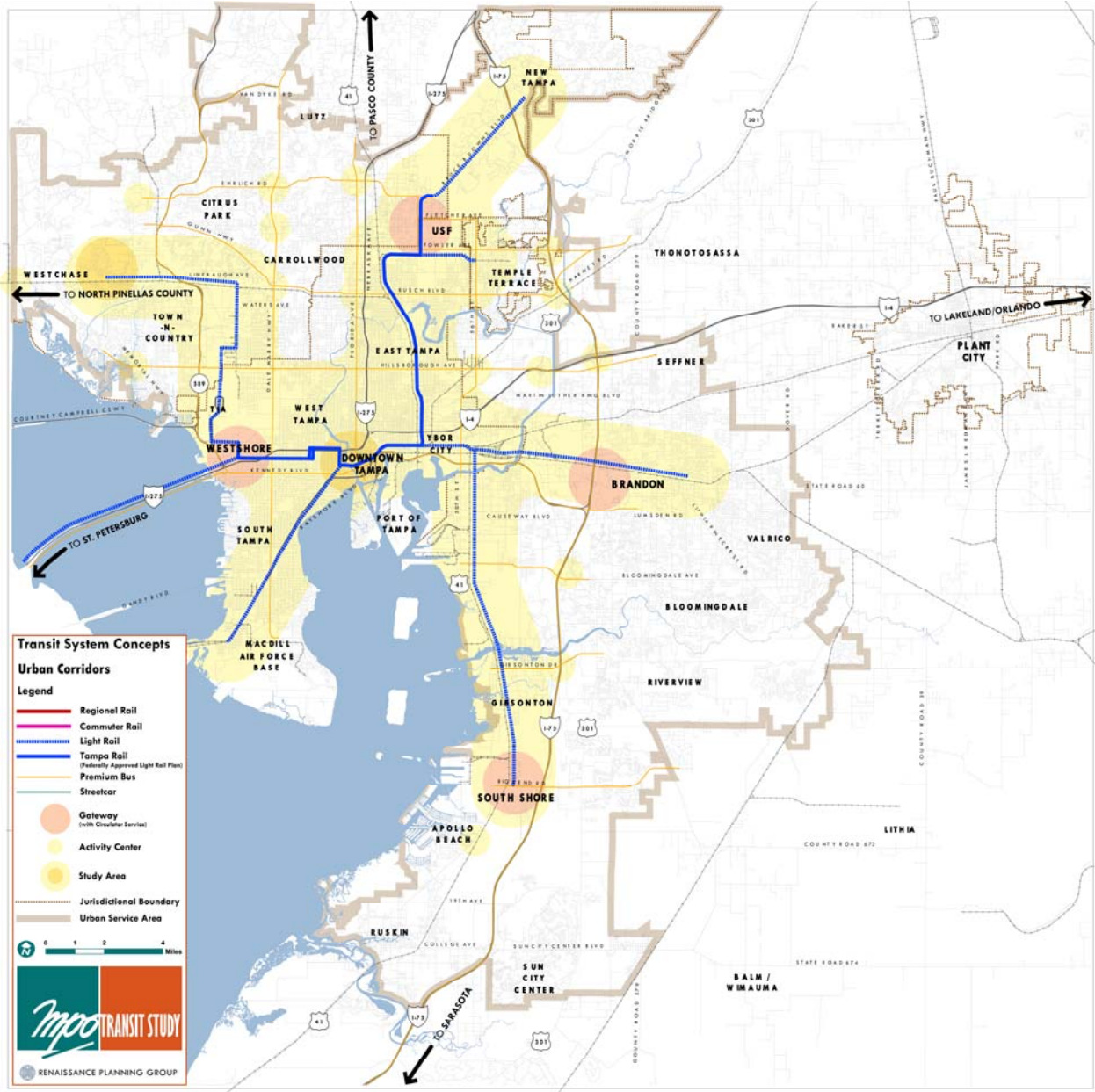**Figure 2: Urban Corridors (Concept B)**

URBAN CENTERS (CONCEPT C)

- Focuses on Transit Oriented Land Development Policies concentrating in major centers throughout the County

- Transit focuses on Commuter Rail connecting major centers to Downtown and supportive Premium Bus network

- Advances premium transit mobility strategy

Figure 3: Urban Centers (Concept C)
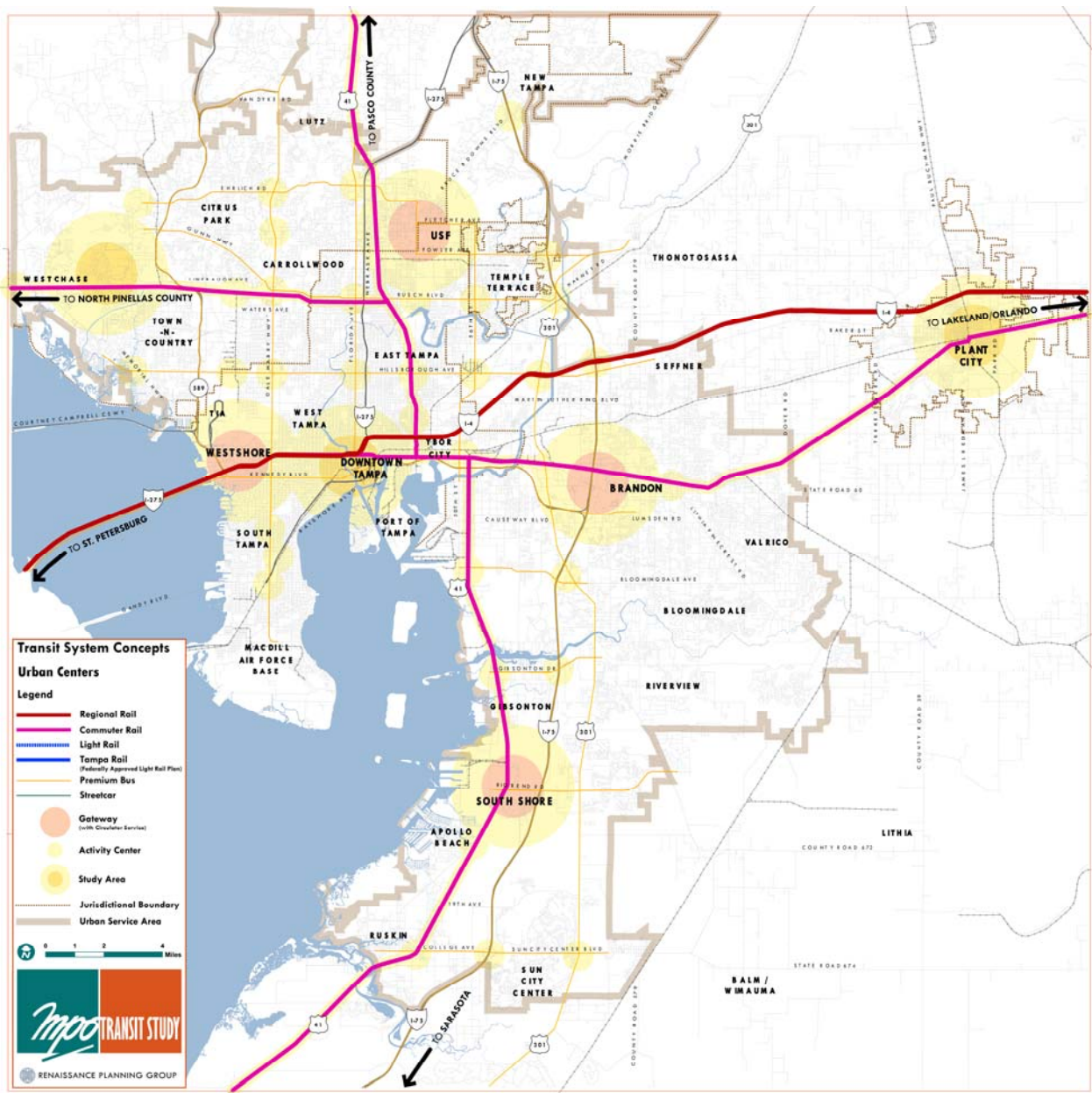
COMPOSITE (CONCEPT ABC)

- Consolidates all Transit Oriented Land Development Policies including growth and redevelopment in the City of Tampa, along extended corridors within the urbanized areas of the county, and in major centers throughout the county

- Transit considers both Light Rail and Commuter Rail as well as supportive Premium Bus network

- Advances premium transit mobility strategy
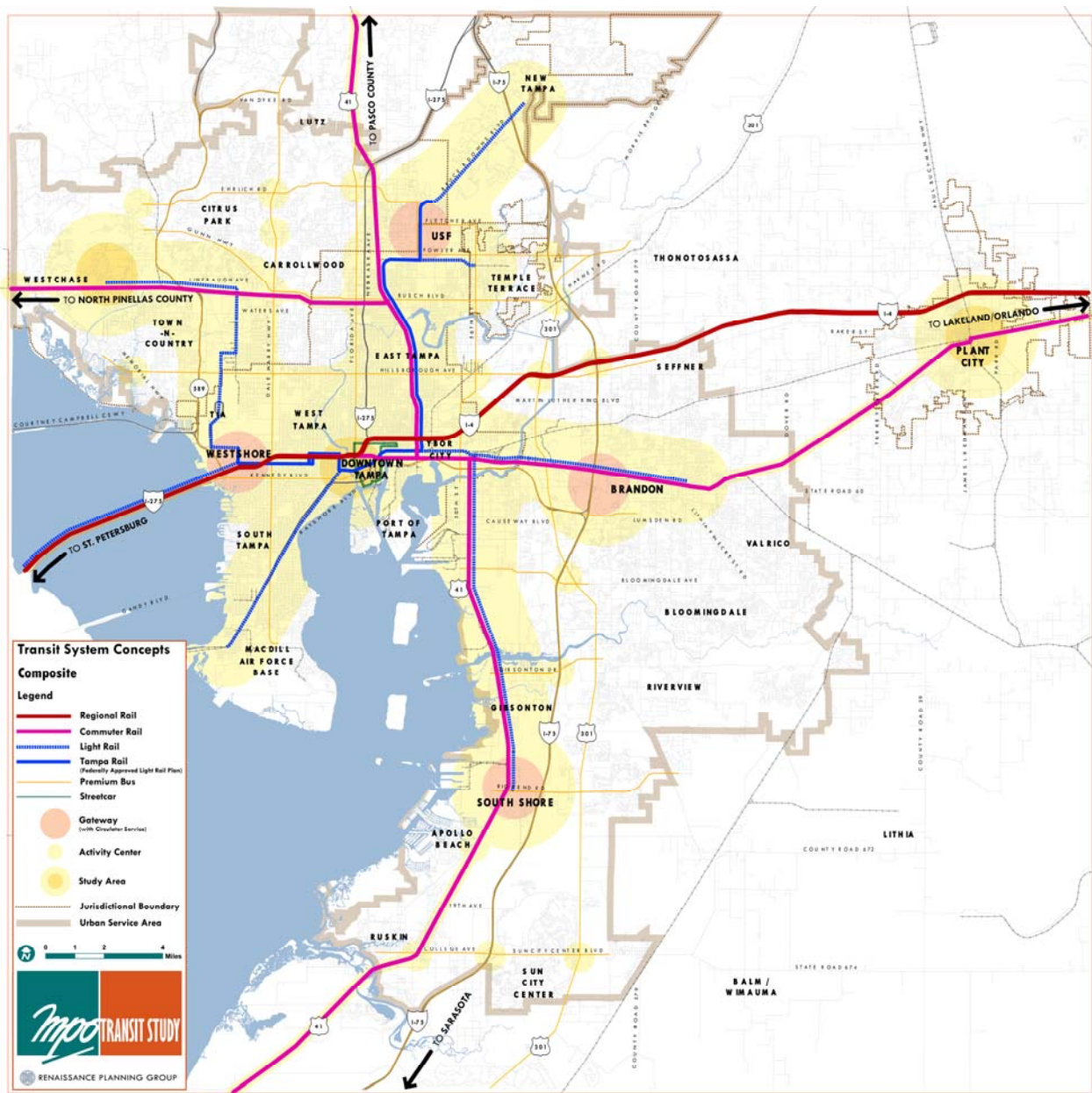
Figure 4: Composite (Concept ABC)

Figure 5: Transit Needs and Opportunities

ALTERNATIVE TRANSIT CONCEPTS ANALYSIS

The transit concepts were analyzed using the CorPlan Land Use Allocation Model. As the transit concepts were developed in CorPlan, corresponding 2050 TAZ/Socioeconomic data sets were produced for use with the region's travel demand model (WCFRPM). To create the transit concepts, a series of transit station area prototypes were developed with varying assumptions concerning land use, percent redevelopment, site design characteristics, population and employment, and densities. Land use variations from the existing adopted comprehensive plans were limited primarily to station areas along a given corridor. Depending on the existing and future land use designation and available vacant land within the station areas, a certain level of redevelopment was assumed within the mile, half and quarter mile station area footprints. The following paragraphs describe key assumptions used in the CorPlan analysis for the concepts:

POPULATION PROJECTION AND CONTROL TOTALS

Each concept was developed with the same 2050 county population control total of 2,034,180 and employment control total of 1,430,199 based on FDOT Strategic Regional Transit Needs Assessment (SRNTA) Study from February 2007. This population projection assumes sustained growth within the county resulting in almost a doubling in population by 2050 from the 2005 population estimate of 1,131,546. Beyond the countywide population control totals, the 2050 Alternative Transit Concepts were not restricted by subregional or TAZ level control totals. In the case of the Trend concept, the 2025 increment of growth is consistent with the adopted 2025 TBRPM Socioeconomic Data and TAZs per FDOT.

LAND USE ASSUMPTIONS

In order to model the concepts, Hillsborough County was subdivided into 0.15 acre grid cells by overlaying an 80 feet grid on the entire county. Each grid cell was allocated values as a proportion of the FDOT TAZ/Socioeconomic data for 2025. Land uses associated with each cell were generalized and designated as vacant (agricultural, vacant), redevelopment (commercial, industrial) or 'neither' (residential, institutional). Certain uses are traditionally not considered for future redevelopment, especially single family residential. This designation of cells as vacant, redevelopment, or 'neither' is intended to manage land availability and capacity by assuming the full potential development of vacant cells, partial capacity for redevelopment cells and no allocation on cells that are assigned 'neither' designation.

STATION AREA PROTOTYPES

A series of six primary and three special station area prototypes were used to explore each Alternative Transit Concept. The sphere of influence for each station area was allocated in ¼ mile, ½ mile and 1 mile increments. The level of redevelopment, intensity and use within each sphere would vary based on location along the transit corridor, the neighborhood context, and transit technology being considered. The station prototypes are a combination of scale (regional, community and neighborhood) and place (urban and suburban) and are as follows: **Urban Regional**, **Urban Community**, **Urban Neighborhood**, **Suburban Regional**, **Suburban Community**, and **Suburban Neighborhood**. **Central Business District** is a special designation for Downtown Tampa. **Special Categories A** and **B** are assigned to the area north of the airport (with residential restrictions due to flight path) and the airport respectively. The following table describes the unique intensity, density and mix of use characteristics associated with each station prototype:

Figure 6: Station Area Characteristics

Station Areas	Characteristics	
CENTRAL BUSINESS DISTRICT	Regional Employment High Density Residential High Intensity Retail	DENSITY - 40 to 60 DUs/Acre, 360 to 400 Jobs/Acre INTENSITY - 8.0 Floor Area Ratio MIX - Residential: 20%, Retail: 20%, Office: 60%
URBAN REGIONAL	Office Center High Density Residential High Density Retail	DENSITY - 60 to 80 DUs/Acre, 240 to 260 Jobs/Acre INTENSITY - 4.0 Floor Area Ratio MIX - Residential: 40%, Retail: 10%, Office: 40%
URBAN COMMUNITY	Employment Centers Retail High Density Residential	DENSITY - 80 to 100 DUs/Acre, 50 to 70 Jobs/Acre INTENSITY - 2.0 to 4.0 Floor Area Ratio MIX - Residential: 90% , Retail: 5%, Office: 5%
URBAN NEIGHBORHOOD	Residential Neighborhood Retail Light Office/Service	DENSITY - 20 to 40 DUs/Acre, 15 to 60 Jobs/Acre INTENSITY - 1.0 to 2.0 Floor Area Ratio MIX - Residential: 90%, Retail: 5%, Office: 5%
SUBURBAN REGIONAL	Sub-regional Employment Multi-family Housing Retail	DENSITY - 20 to 40 DUs/Acre, 60 to 80 Jobs/Acre INTENSITY - 2.5 Floor Area Ratio MIX - Residential: 70%, Retail: 10%, Office: 20%,
SUBURBAN COMMUNITY	Mix of Residential Sub-regional Employment Retail Commercial	DENSITY - 15 to 25 DUs/Acre, 5 to 15 Jobs/Acre INTENSITY – 1.0 to 2.5 Floor Area Ratio MIX - Residential: 95%, Retail: 2 %, Office: 3%

Station Areas	Characteristics	
SUBURBAN NEIGHBORHOOD	Mixed Residential Neighborhood Retail Light Office/Service	DENSITY - 6 to 12 DUs/Acre, 10-20 Jobs/Acre INTENSITY - 0.5 to 1.0 Floor Area Ratio MIX - Residential: 98%, Retail: 1%, Office: 1%
SPECIAL A	Light Industrial Office/Service Commercial Retail	DENSITY - 0 DUs/Acre, 20-40 Jobs/Acre INTENSITY - 1.0 Floor Area Ratio MIX - Residential: 0%, Retail: 10%, Office: 90%
SPECIAL B	Airport	DENSITY - 0 DUs/Acre, 0 Jobs/Acre INTENSITY - 0 Floor Area Ratio MIX - Residential: 0%, Retail: 0%, Office: 0%

Note: The intensities and densities included in the table are net values for development on vacant sites.

ANALYSIS

In order to generate household and employment estimates, CorPlan translates the intensities, densities and mix of uses associated the station prototypes into household density (dwelling units/acre) and employment density (jobs/acre) and superimposes it on the generalized land use designations. As a result, the grid cells are assigned incremental household and employment values based on the vacant/redevelopment designation of each cell included in the allocation. Sites designated as redevelopment are allocated a percentage of the net development, ranging from 5% to 40% based on the station prototype.

The household and employment estimates are aggregated at various scales (TAZ, station area, subzones, and county) to quantify the land use impact of the suggested transit investment in each concept. Since the allocation of station prototypes was limited to ¼ mile and ½ mile radius for all transit stations and up to 1 mile radius for some select stations of regional impact, the household and employment increment for other parts of the county was assumed to at least represent the Trend projection for that area conditional to a minimum level of transit support such as fixed route or premium bus service. TAZs without any transit support were assumed to be 'borrow' areas required to maintain overall county control totals.

In order to compare the household and employment estimates for the Alternative Transit Concepts to the Trend, Hillsborough County was subdivided into six sub-zones (Tampa, Temple Terrace, Plant City, NW County, NE County, and SE County).The aggregation and comparison of household and employment estimates at county and sub-zone level is an indicator of future growth distribution in the county and provide the basis for the preferred growth scenario in the county.

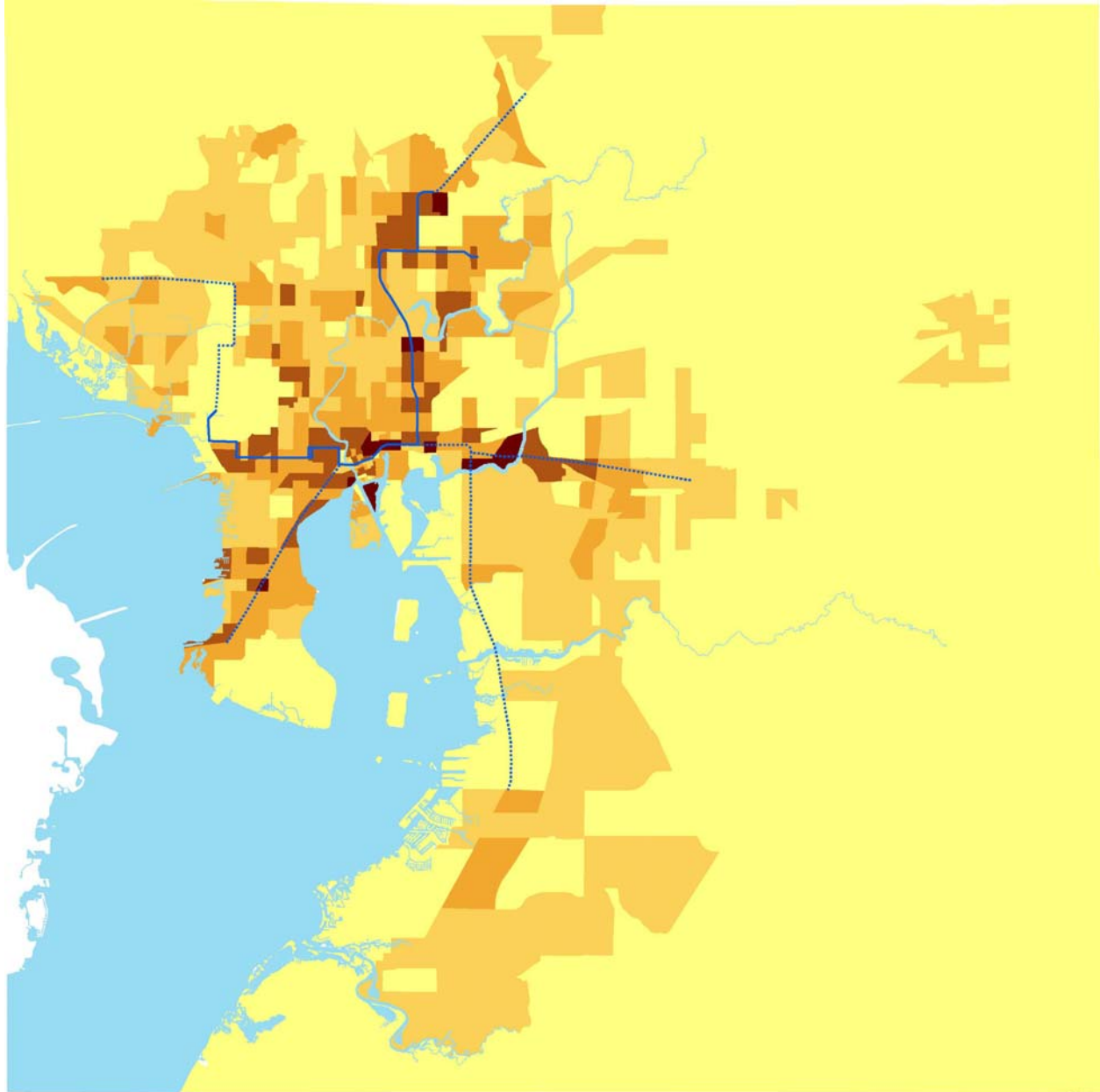*Figure 7: Concept A Total Household Density*
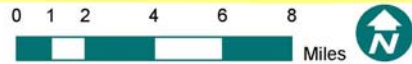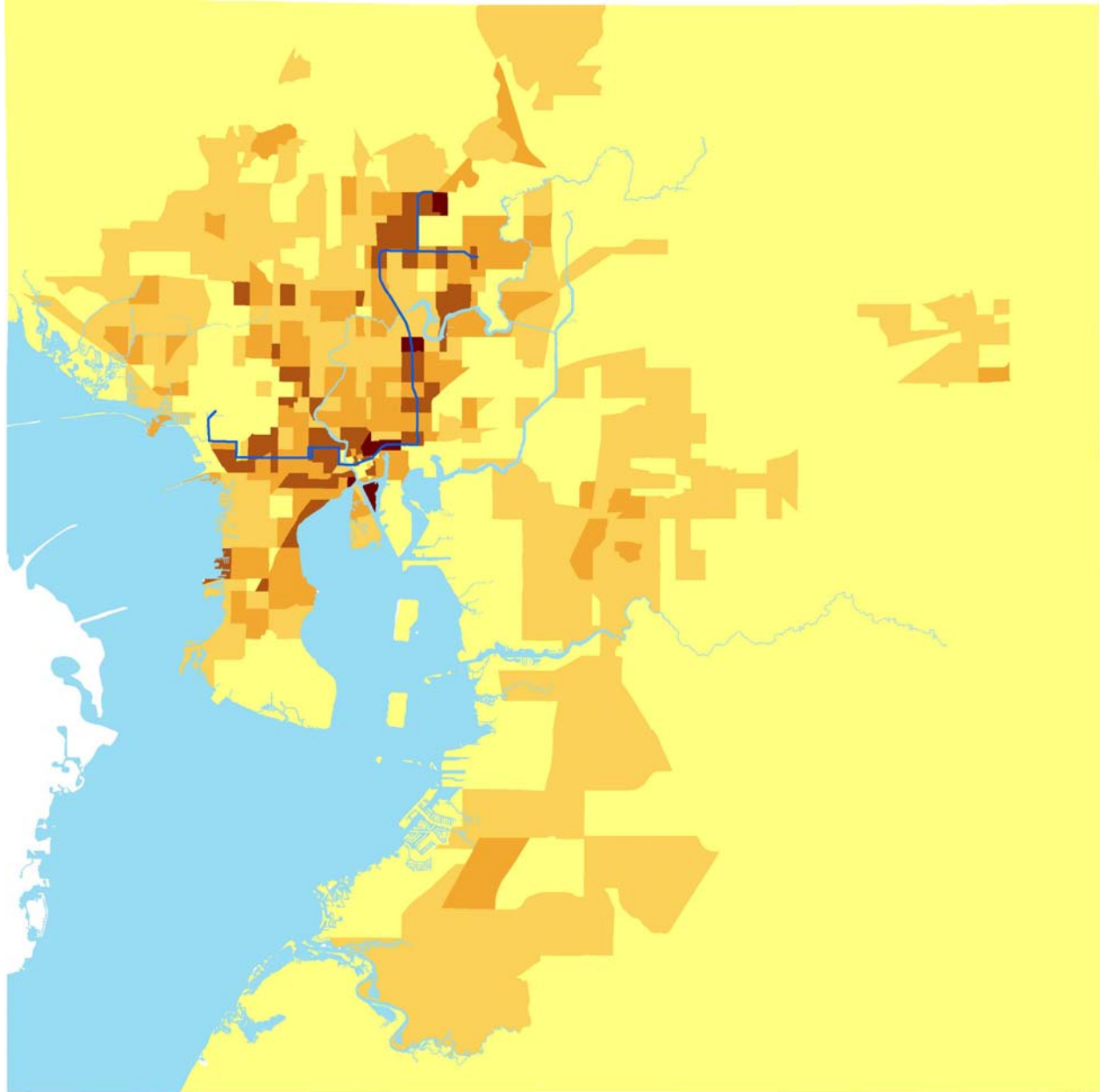
Legend

—— Tampa Rail

Households per Acre

< 2

2 - 4

4 - 8

8 - 16

> 16

Figure 8: Concept B Total Household Density

Legend

·········· Light Rail

———— Tampa Rail
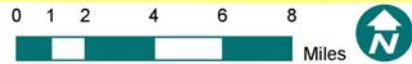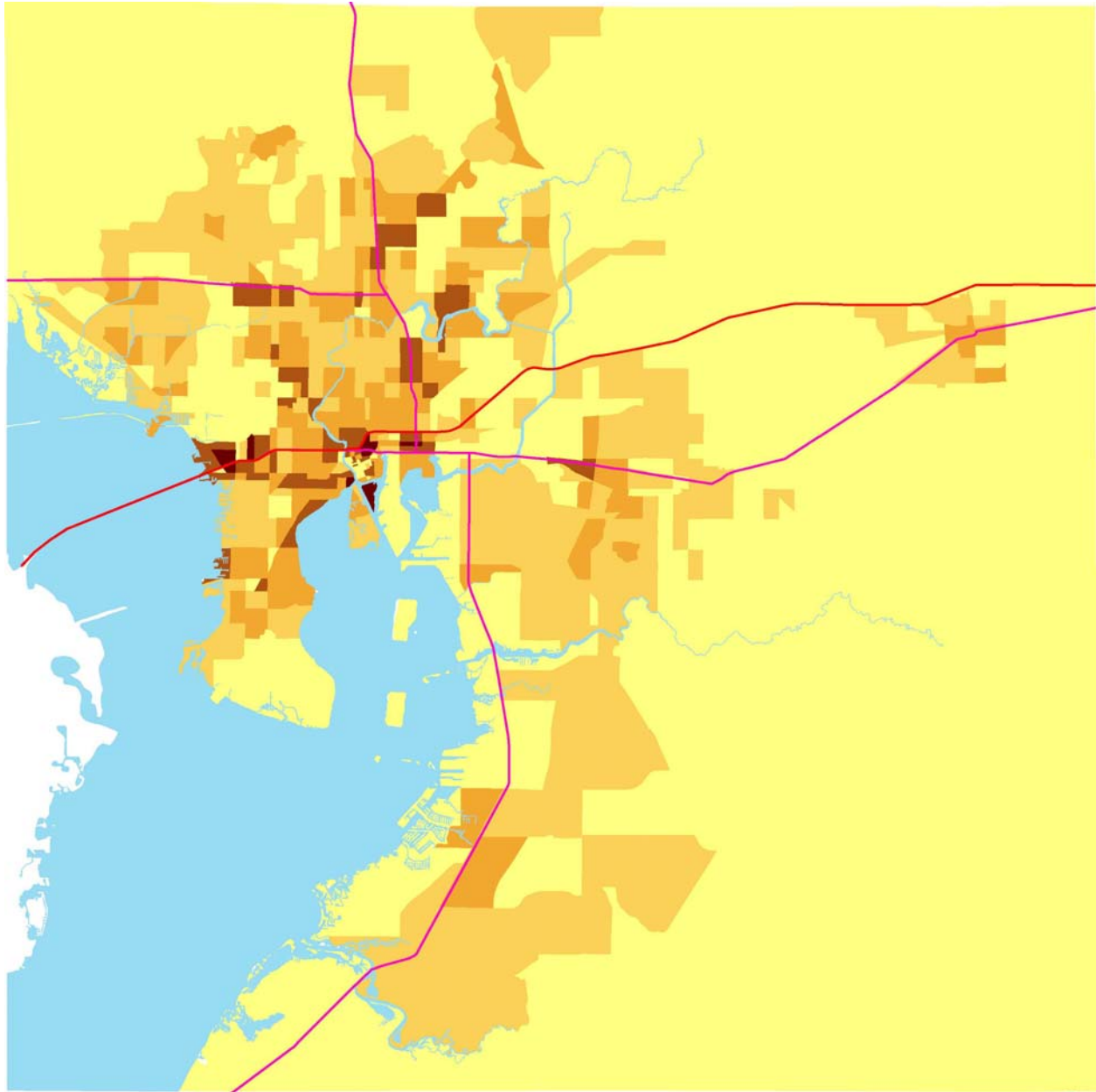
Households per Acre

< 2

2 - 4

4 - 8

8 - 16

> 16

Figure 9: Concept C Total Household Density

Legend

— Regional Rail

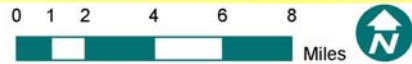— Commuter Rail

Households per Acre

< 2

2 - 4

4 - 8

8 - 16

> 16

0 1 2 4 6 8 Miles

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Figure 10: Concept ABC Household Density

Legend

...... Light Rail
──── Regional Rail
──── Tampa Rail
──── Commuter Rail

Households per Acre

< 2
2 - 4
4 - 8
8 - 16
> 16

0 1 2   4   6   8
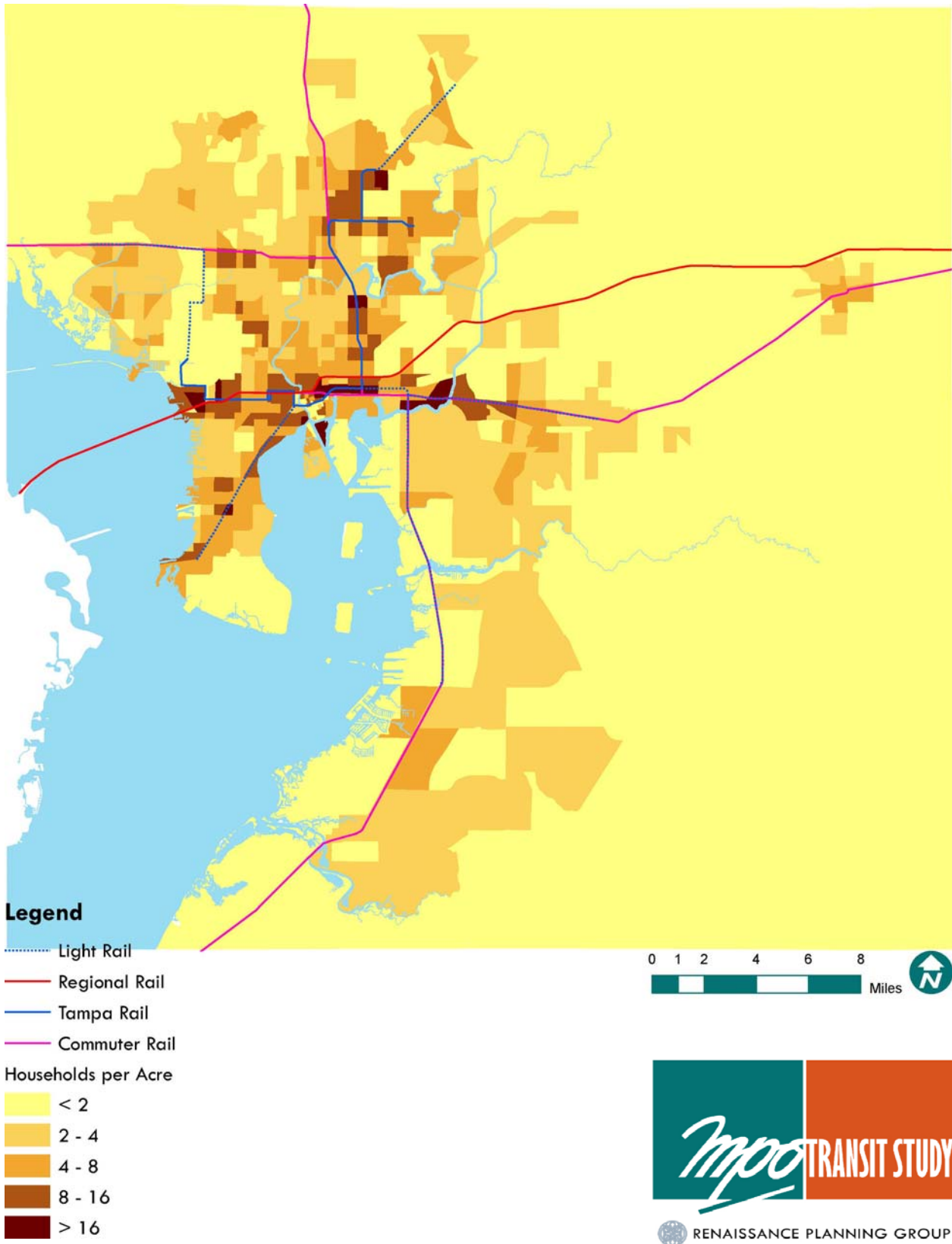Miles

MPO TRANSIT STUDY
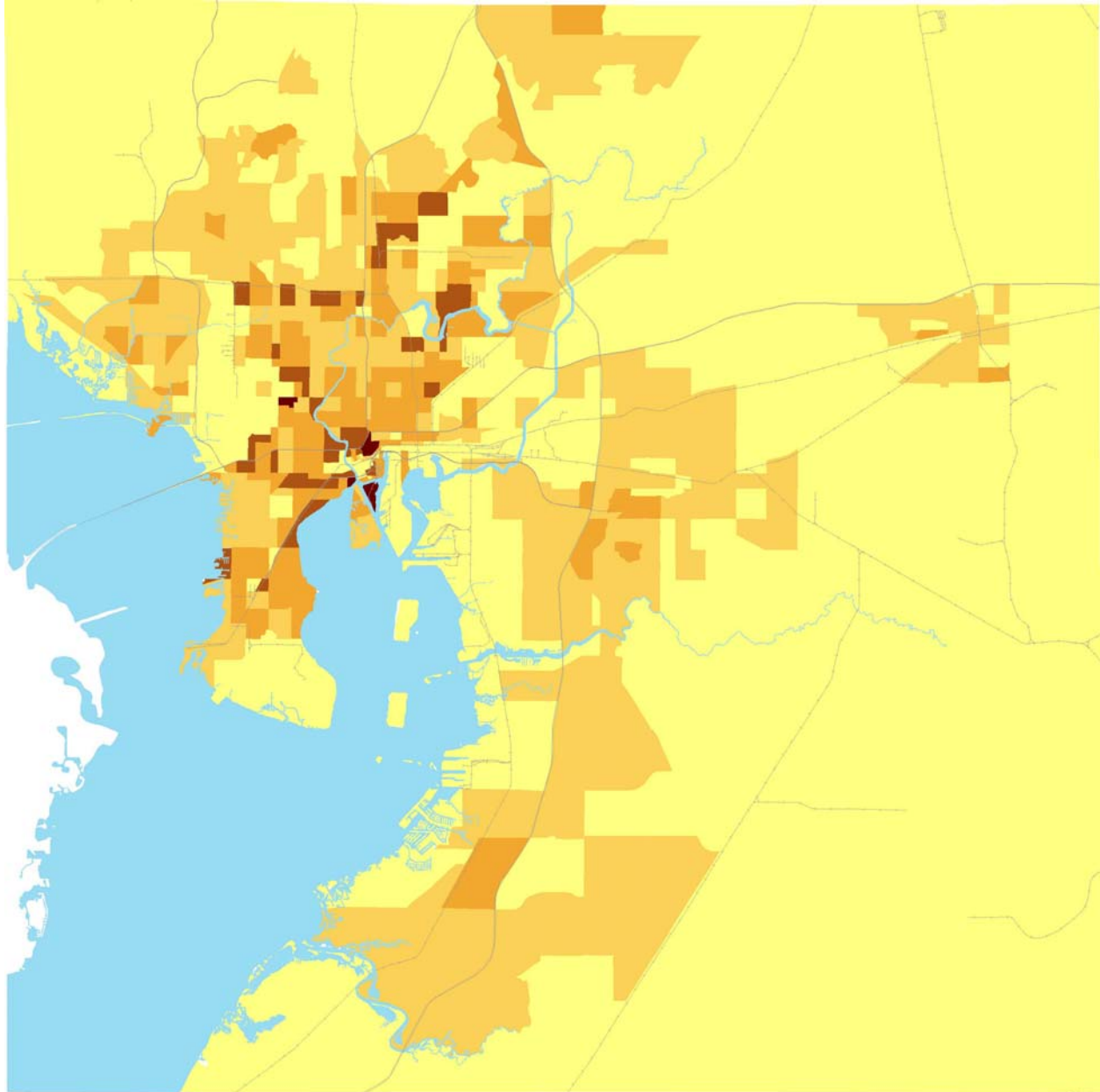RENAISSANCE PLANNING GROUP

Figure 11: Trend 2050 Total Household Density

Legend

—— Rail

—— Roads

Households per Acre

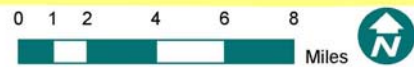- < 2
- 2 - 4
- 4 - 8
- 8 - 16
- > 16

Figure 12: Concept A Total Employment Density
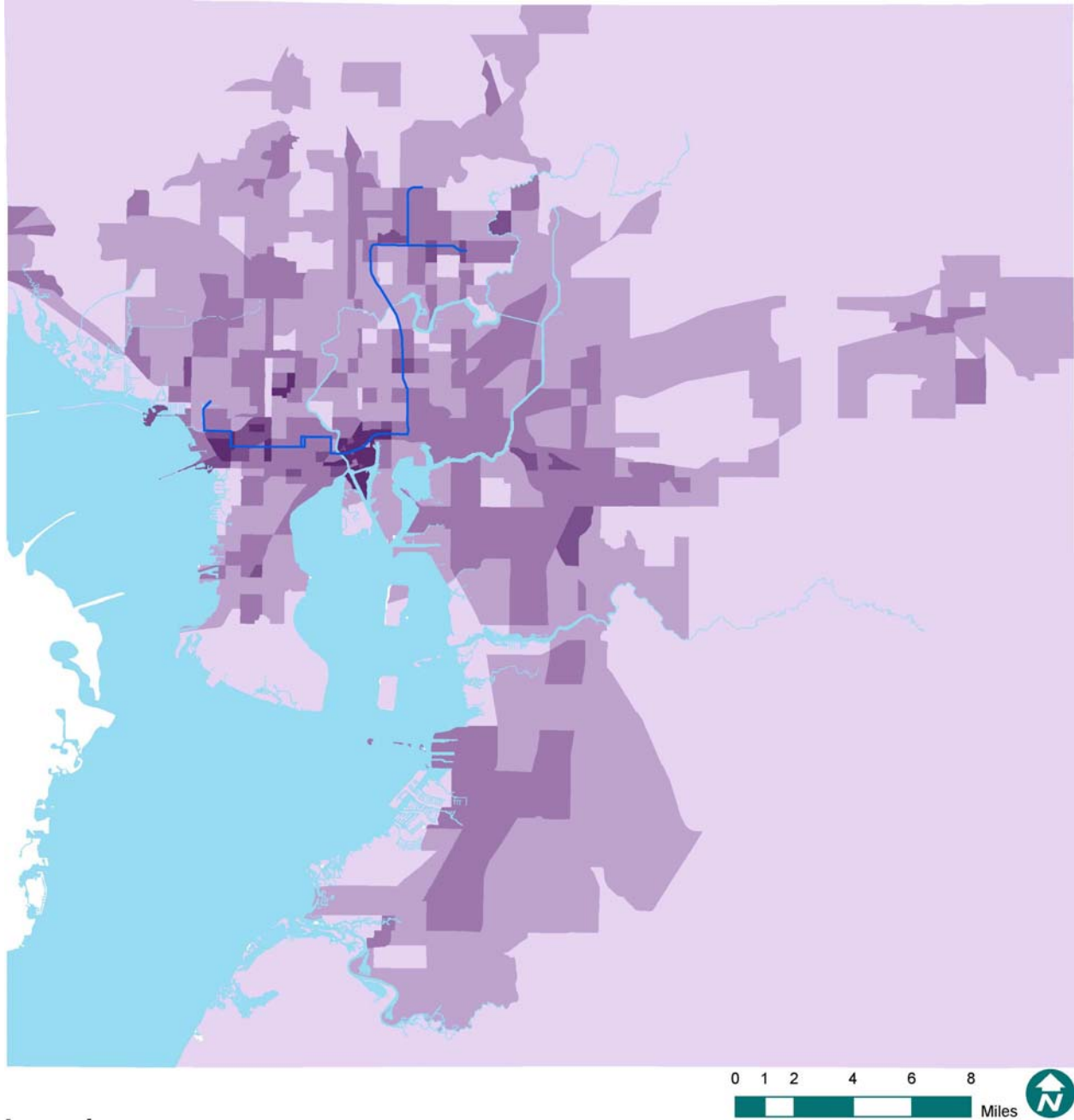
Legend

— Tampa Rail

Employees per Acre

< 1
1 - 5
5 - 25
25 - 50
> 50

Figure 13: Concept B Total Employment Density
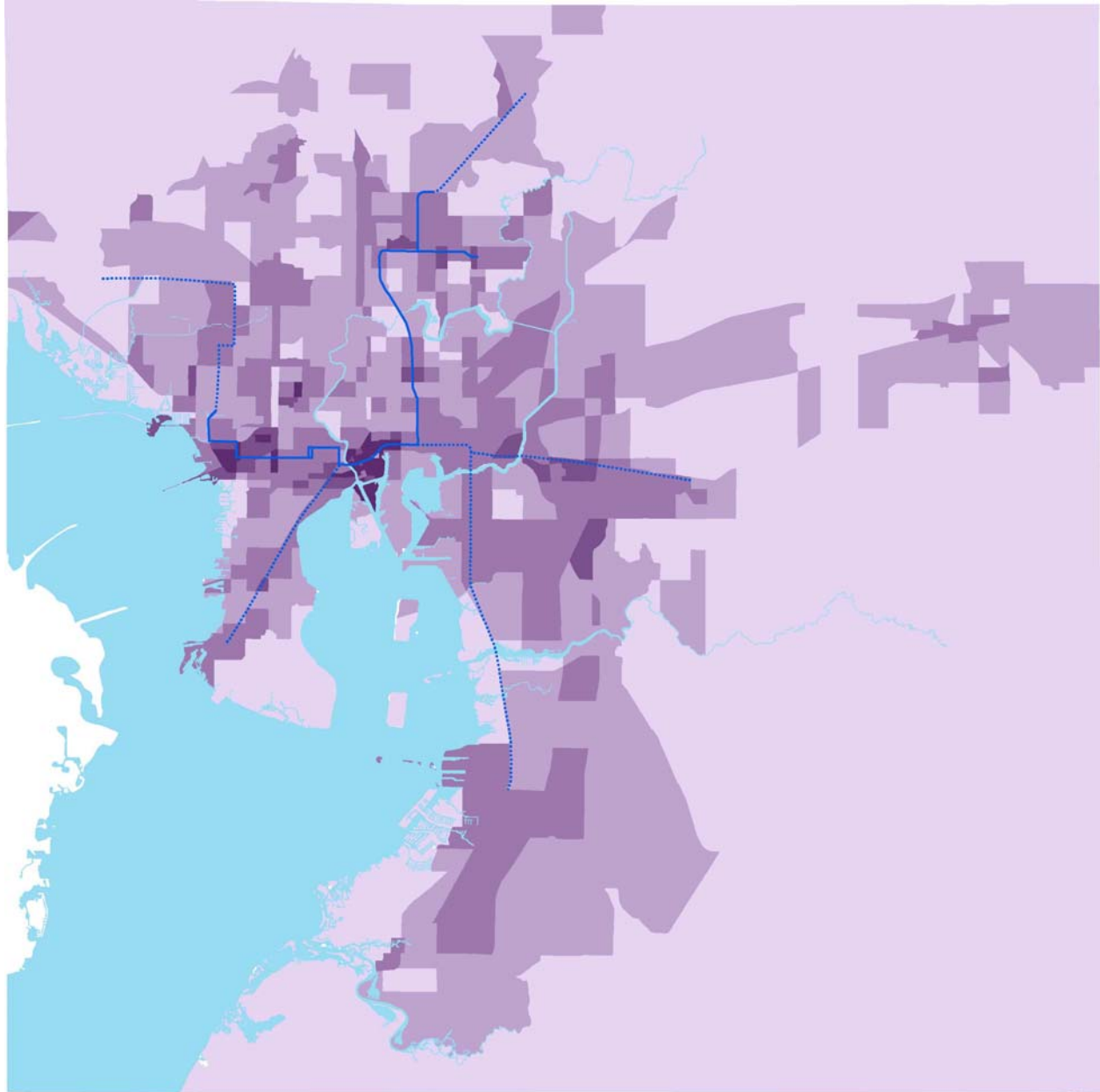
Legend

.... Light Rail

——— Tampa Rail

Employees per Acre

- < 1
- 1 - 5
- 5 - 25
- 25 - 50
- > 50
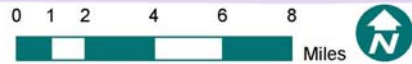
Figure 14: Concept C Total Employment Density
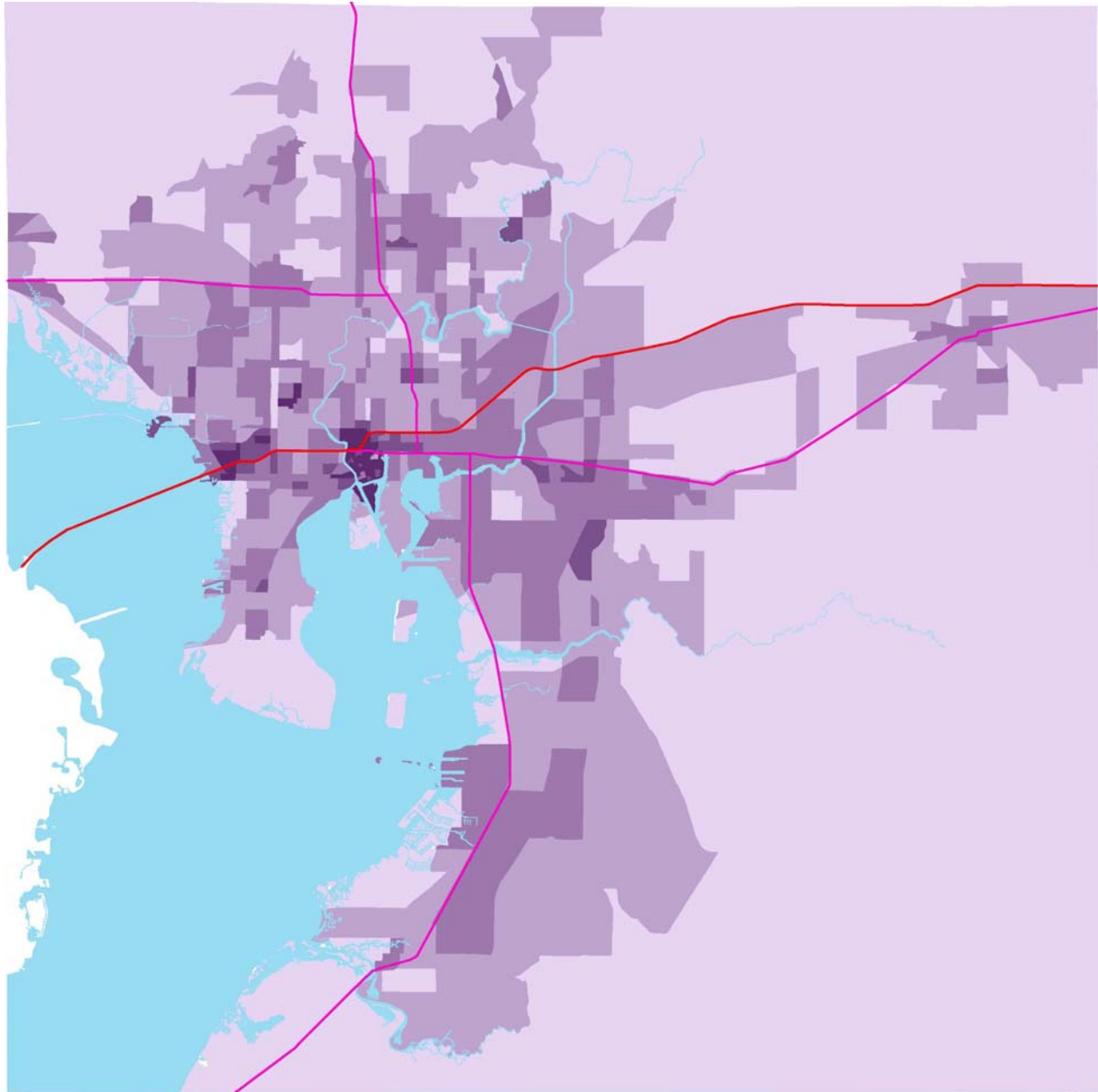
Legend

── Regional Rail
── Commuter Rail

Employees per Acre

0 - 1
1 - 5
5 - 25
25 - 50
> 50
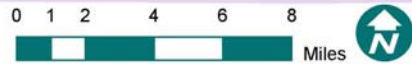
Figure 15: Concept ABC Total Employment Density

Legend

.... Light Rail

───── Regional Rail

───── Tampa Rail

───── Commuter Rail

Employees per Acre

    < 1

    1 - 5

    5 - 25

    25 - 50

    > 50

0 1 2   4   6   8
Miles

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Figure 16: Trend for 2050 Employment Density

Legend

—— Rail

—— Roads
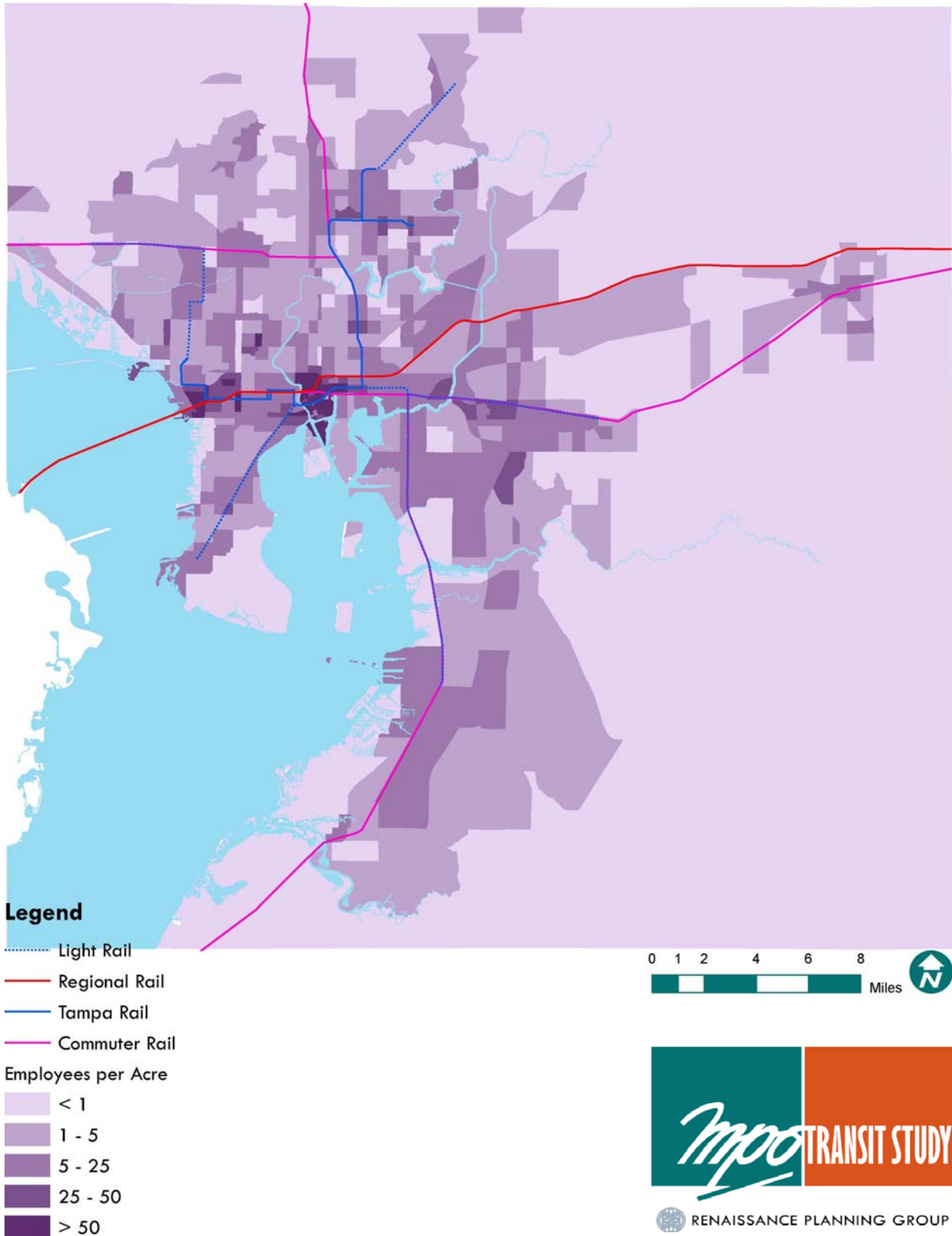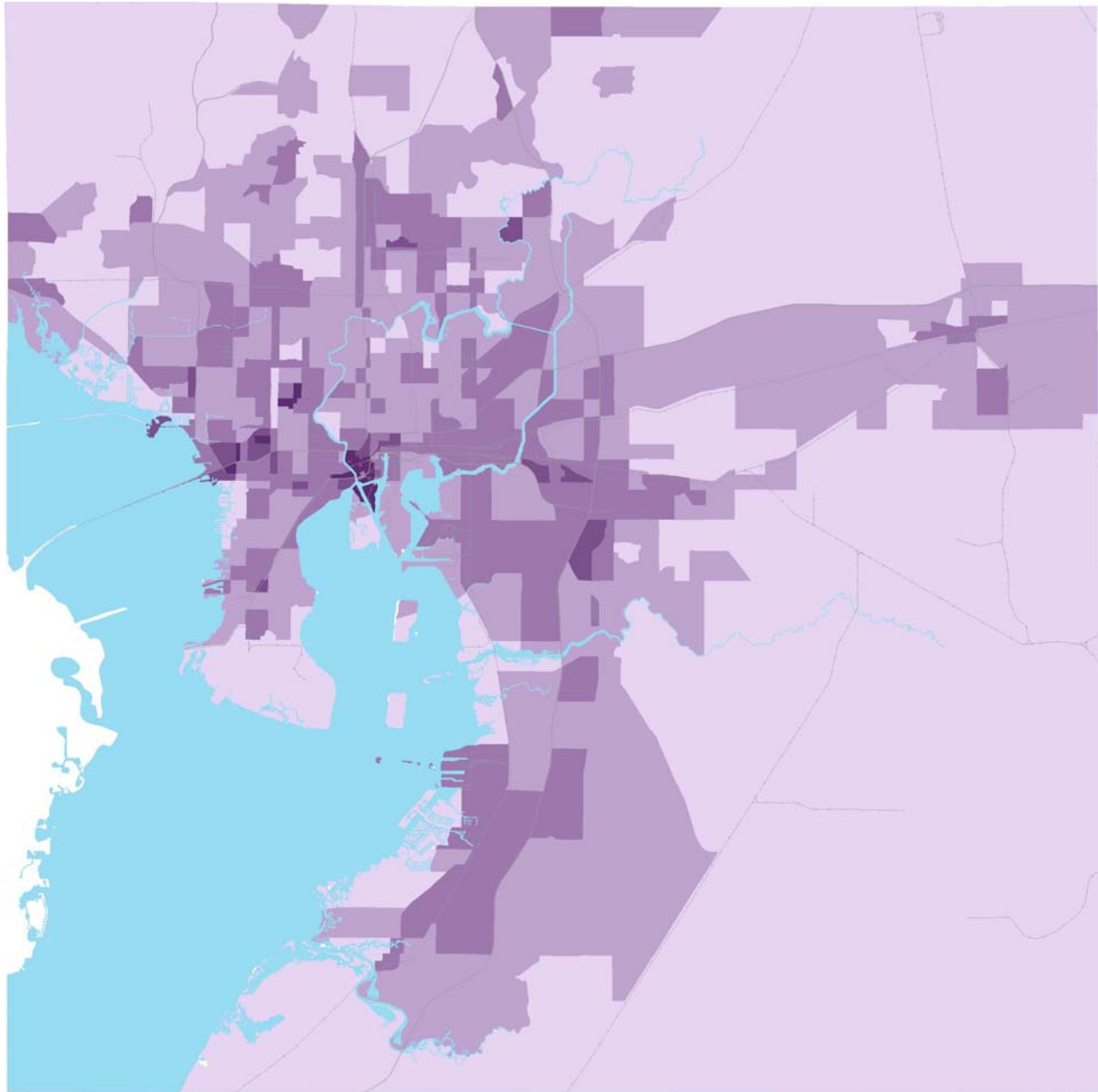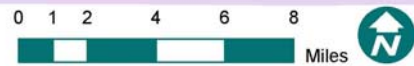
Employees per Acre

▢ < 1

▢ 1 - 5

▢ 5 - 25

▢ 25 - 50

▢ > 50

ALTERNATIVE TRANSIT CONCEPTS SUMMARY

The objective of modeling the Alternative Transit Concepts in CorPlan was to generate household and employment estimates, and predict the growth pattern that would accompany each concept. An important component of the land use analysis is to illustrate potential future land consumption patterns in correlation to transportation or transit investments as well as growth management policies in the county.

While the City of Tampa currently represents the largest urbanized area in Hillsborough County with significant redevelopment capacity, the county continues to see new growth and development in NW County along the Veterans Expressway and in SE County along the I-75 corridor. This pattern of growth is predicted to continue through the year 2025 and 2050 based on trend projections and transportation investments, especially in SE County along the I-75 corridor. Trend projections for the year 2050 indicate that development in SE County will account for more than half of the projected regional growth for the county through the year 2050.

The Alternative Transit Concepts, especially Urban Core (Concept A) and Urban Corridors (Concept B), indicate that transit investments focused on the urbanized core and corridors will tap into the substantial redevelopment potential of these areas and allow the City of Tampa to accommodate a larger share of future growth in the County. The Urban Centers (Concept C) concept allows the regional centers and sub-centers (Downtown Tampa, Brandon, Westshore, USF, Westchase, Central Tampa, SouthShore/Apollo Beach and Plant City) to accommodate a larger share of regional growth as an offset from future transit investments.

The Composite Transit Concept illustrates a synergistic combination of continued growth within the urban core and corridors and new growth in regional centers and sub-centers with the mobility benefits and sustainability advantages of transit oriented growth patterns. This balanced growth scenario for the County demonstrates the value of a diversified transit concept that responds to existing and future land use and the mobility needs to support the wide cross section of growth patterns in the County. Variety in transit technologies and station area prototypes are key components in creating the framework for the Transit Concept for 2050.

Besides land use, the Alternative Transit Concepts represent differing benefits and trade-offs in terms of mobility, cost, environment, and system capacity and coverage. The maps and figures illustrating the Alternative Transit Concepts, including Trend, are included in the following pages:

Figure 17:

Alternative Transit Concepts Development

The following illustrations are primarily for land use analysis and household/employment projection comparison of the Alternative Transit Concepts. The land use analysis uses **CorPlan Land Use Allocation Model** to generate Household and Employment estimates. All estimates for 2050 and the 2000 and 2025 socioeconomic data are based on TAZ (Transportation Analysis Zone) level data analysis and represent differing sizes based on existing development patterns.

Households 2000
Existing Population by TAZ

Households 2025

TAZ Forecast
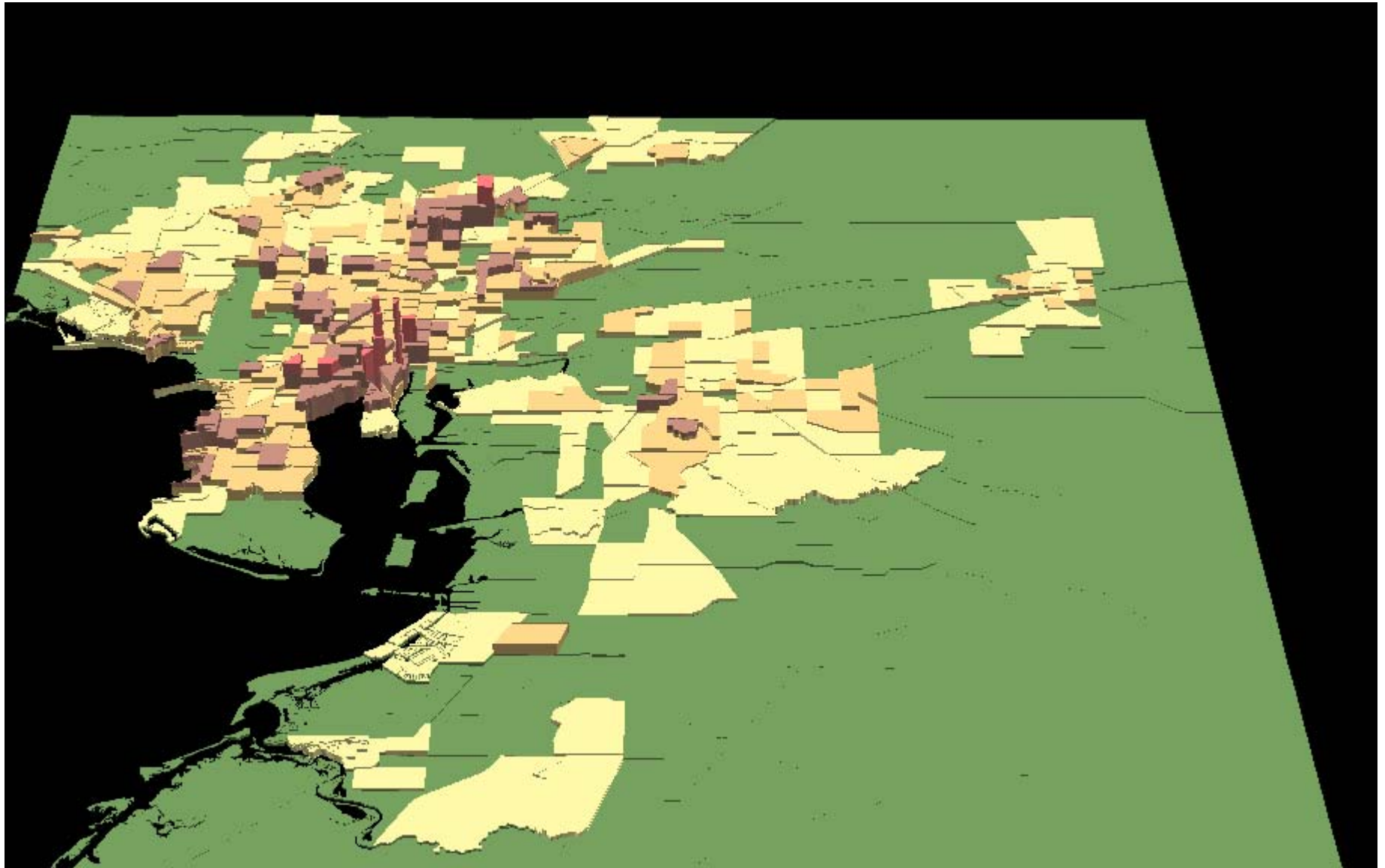
Households 2050

Trend Scenario

Incremental Growth 2000-2025

TAZ Forecast

Incremental Growth 2000-2050

Trend Scenario

Sub Regional Shares

Percent of Regional Growth

	2025 TAZ	2050 Trend
Northwest	30%	10%
Southeast	20%	56%
Tampa	33%	15%
Northeast	10%	12%
Plant Cit	5%	5%
Temple Te	3%	3%
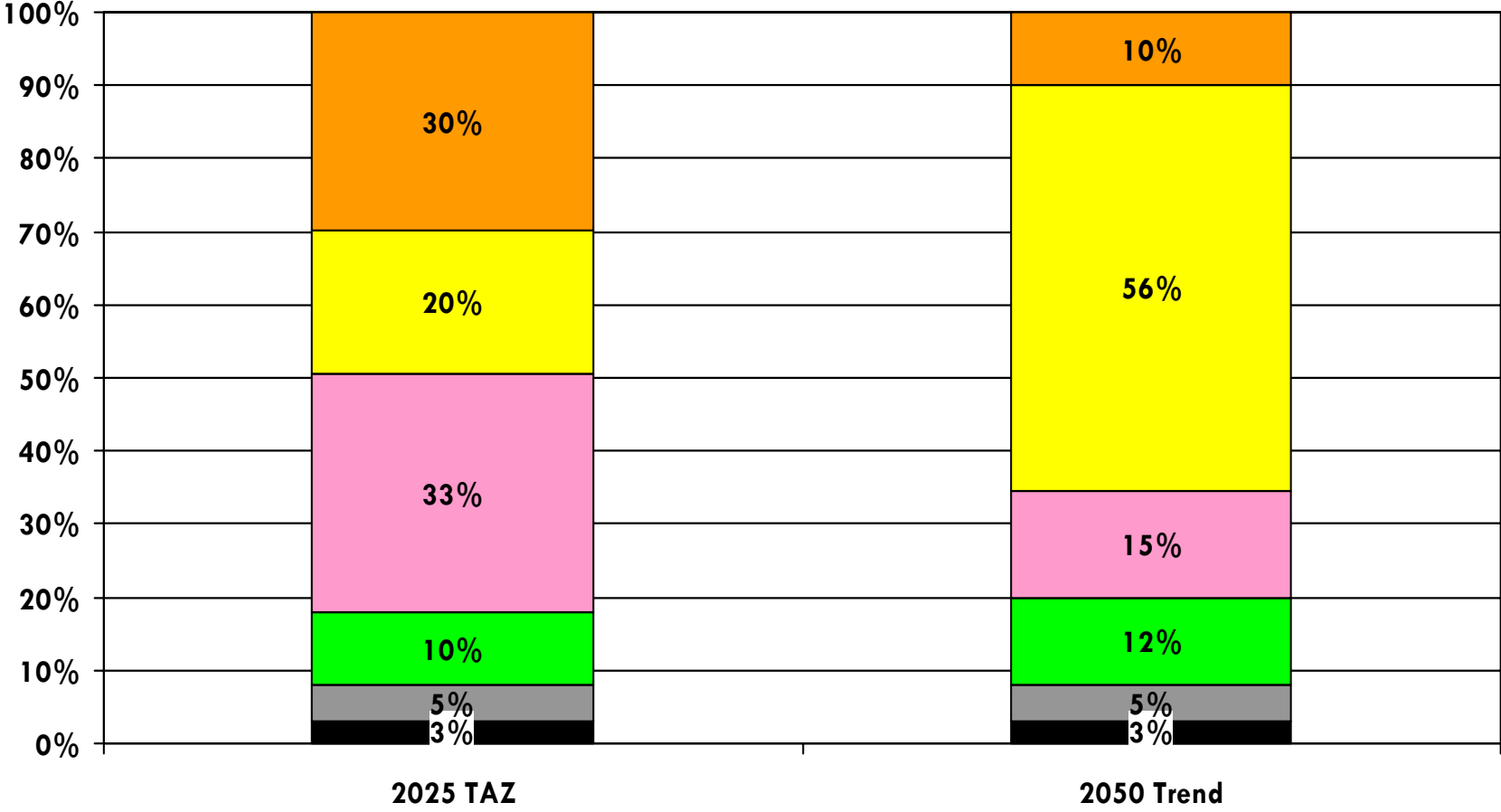
■ Temple Te ■ Plant Cit ■ Northeast ■ Tampa ■ Southeast ■ Northwest

Concept A: Stations
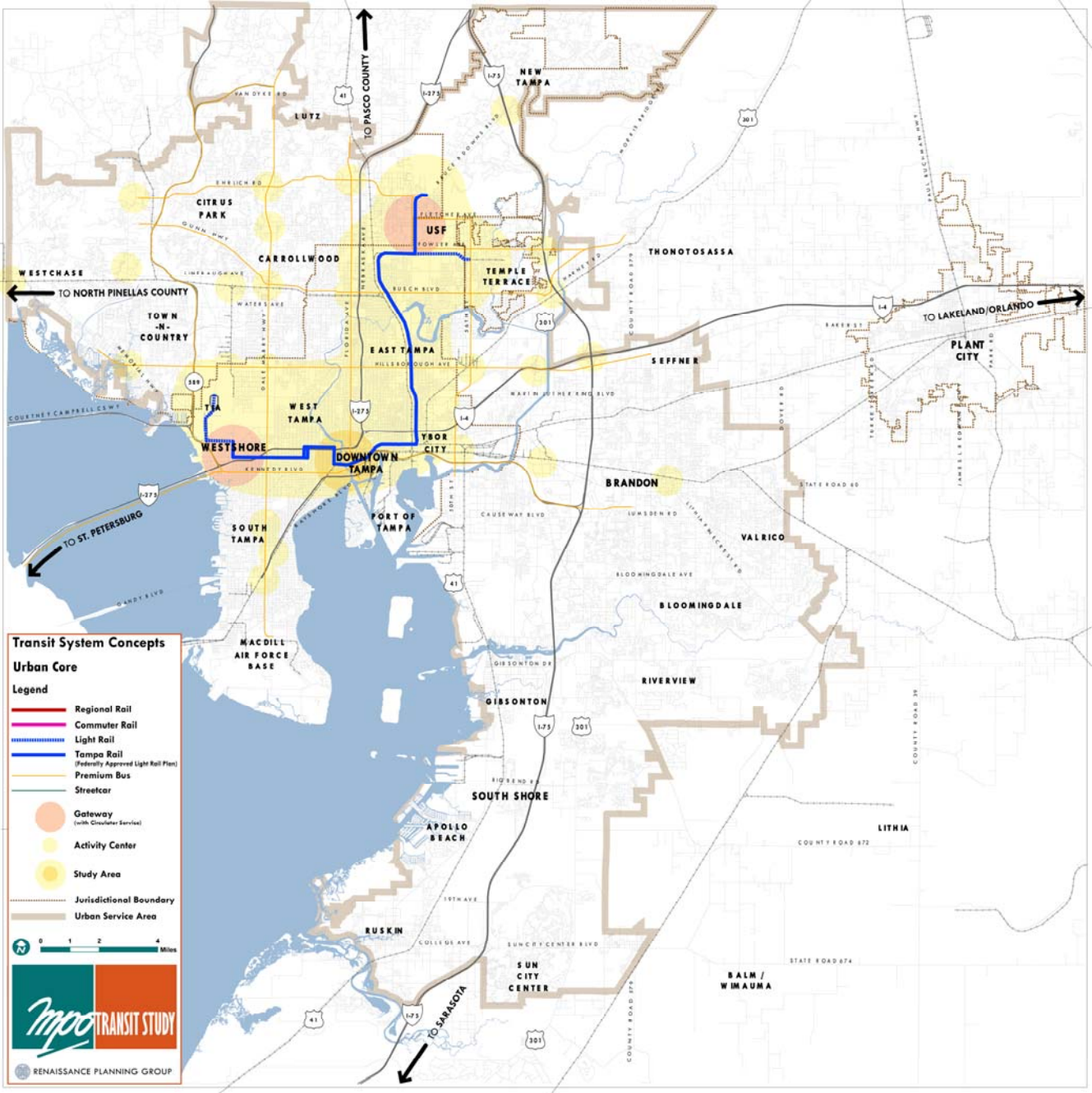
Legend
— Tampa Rail
● concepta_stations
Concept A Station Areas
- Urban Regional
- Urban Neighborhood
- Urban Community
- Suburban Regional
- Suburban Neighborhood
- Suburban Community
- Special B
- Special A
- Central Business District

N

Miles
0 0.5 1   2   3   4
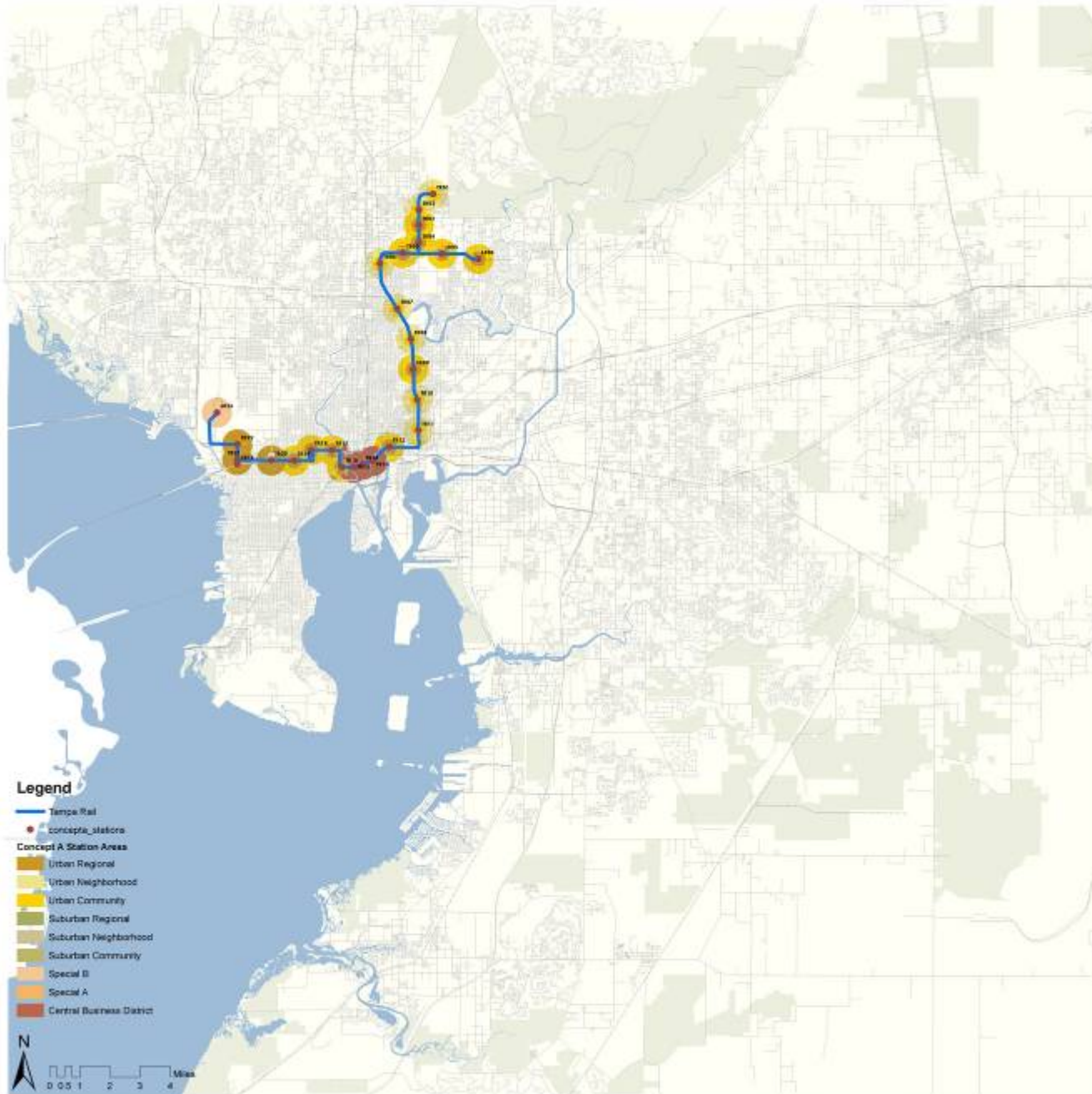
Concept A: HH Increment/Acre by TAZ

Legend

— Tampa Rail

TAZ_ConA.ConA_HHinc / TAZ_ConA.ACRES

- 0 - 2
- 3 - 4
- 5 - 8
- 9 - 16
- 17 - 32

Legend

Tampa Rail

TAZ_ConA.ConA_EMPin / TAZ_ConA.ACRES

0 - 10

11 - 20

21 - 40

41 - 70

71 - 110
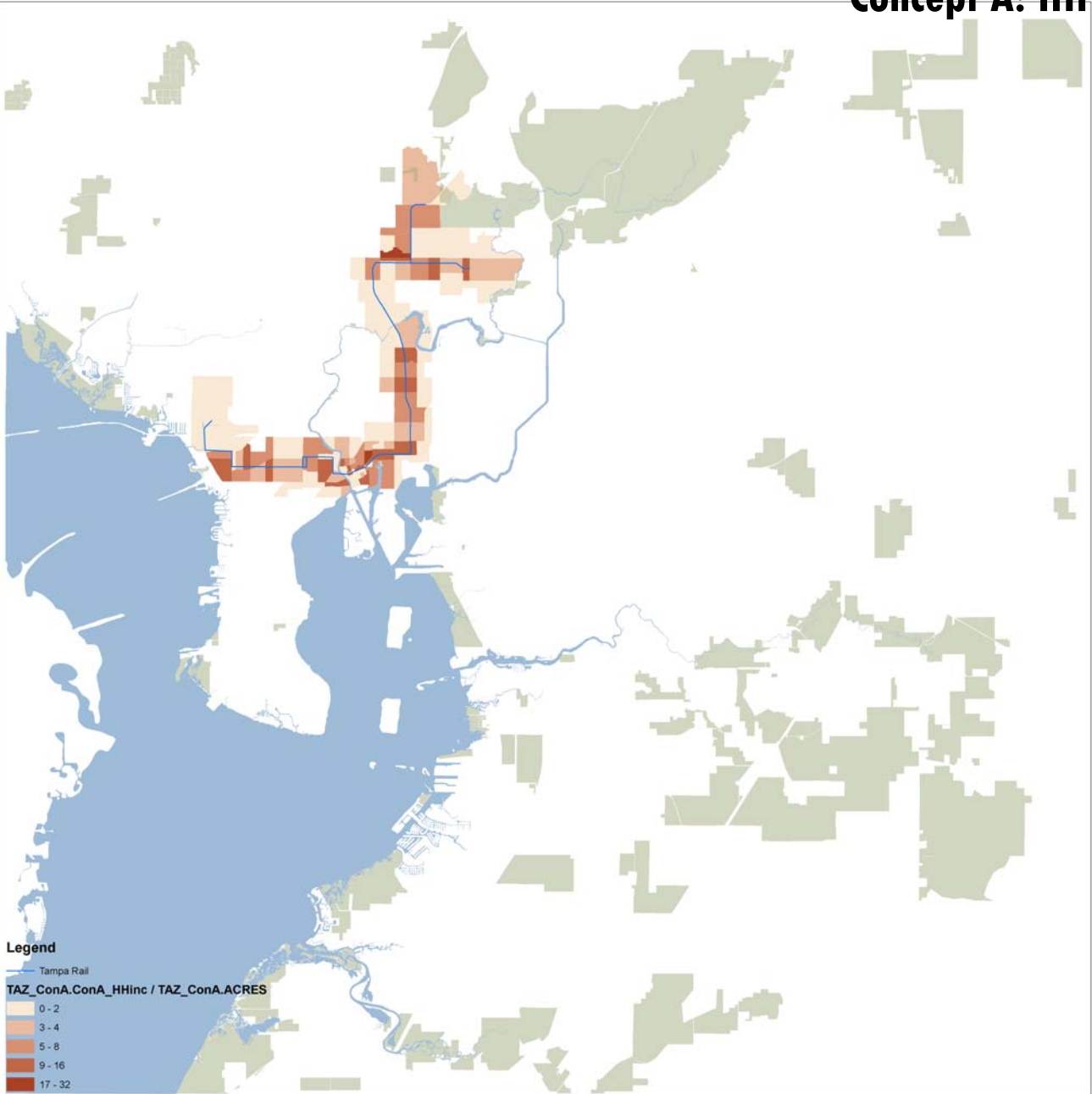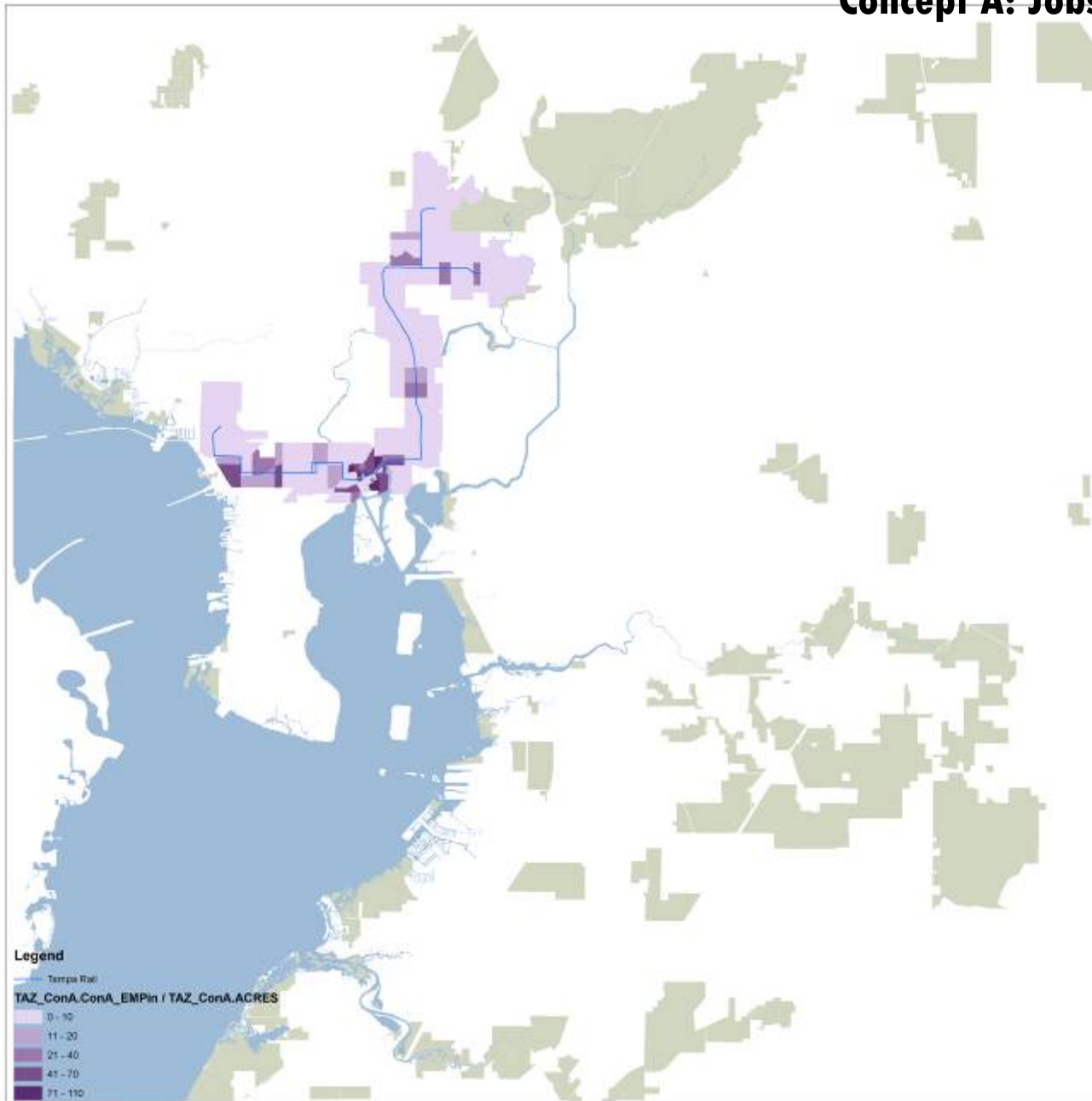
Concept A + Trend 2050: Incremental Growth
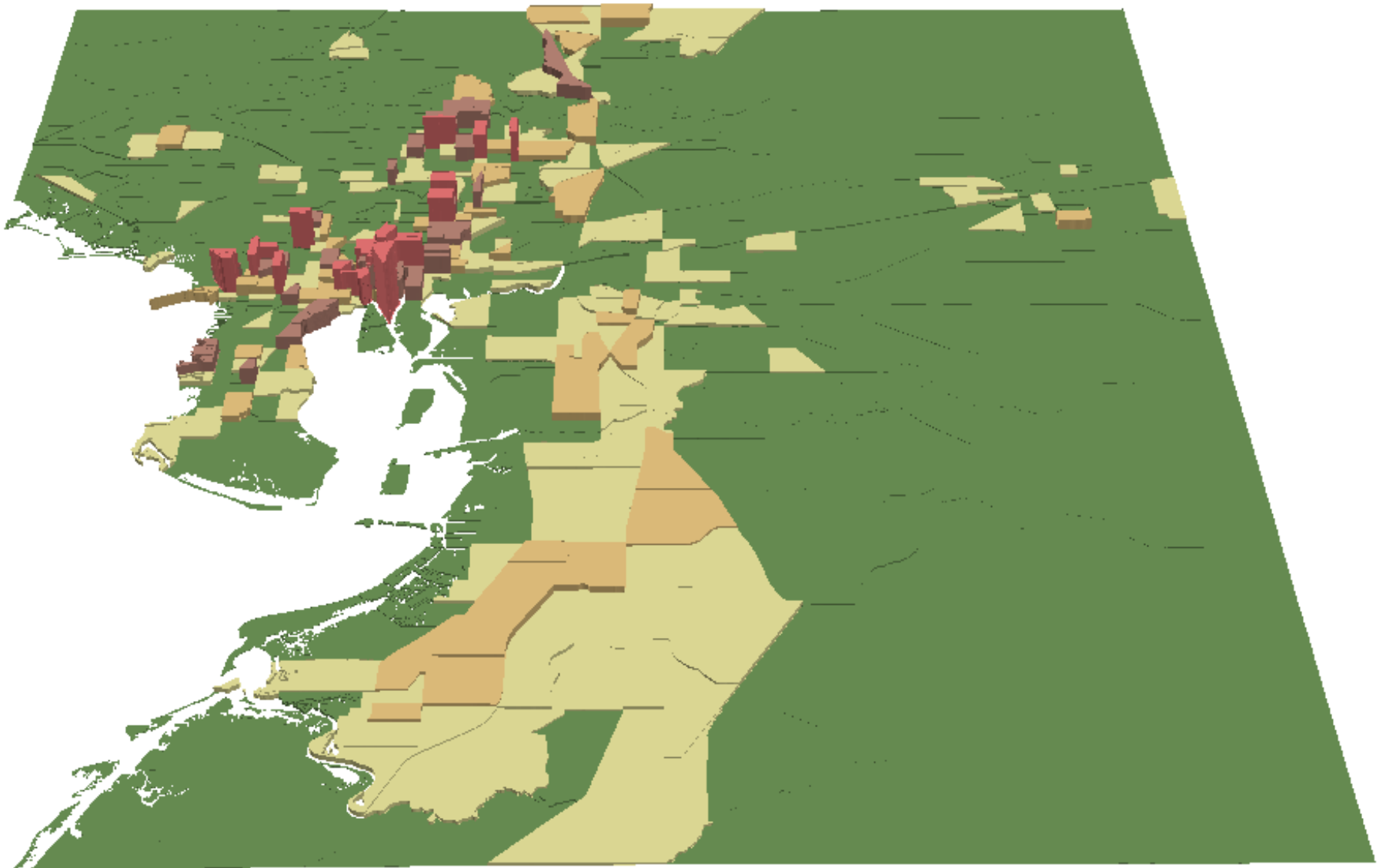
Concept A + Trend 2050: TAZ Totals
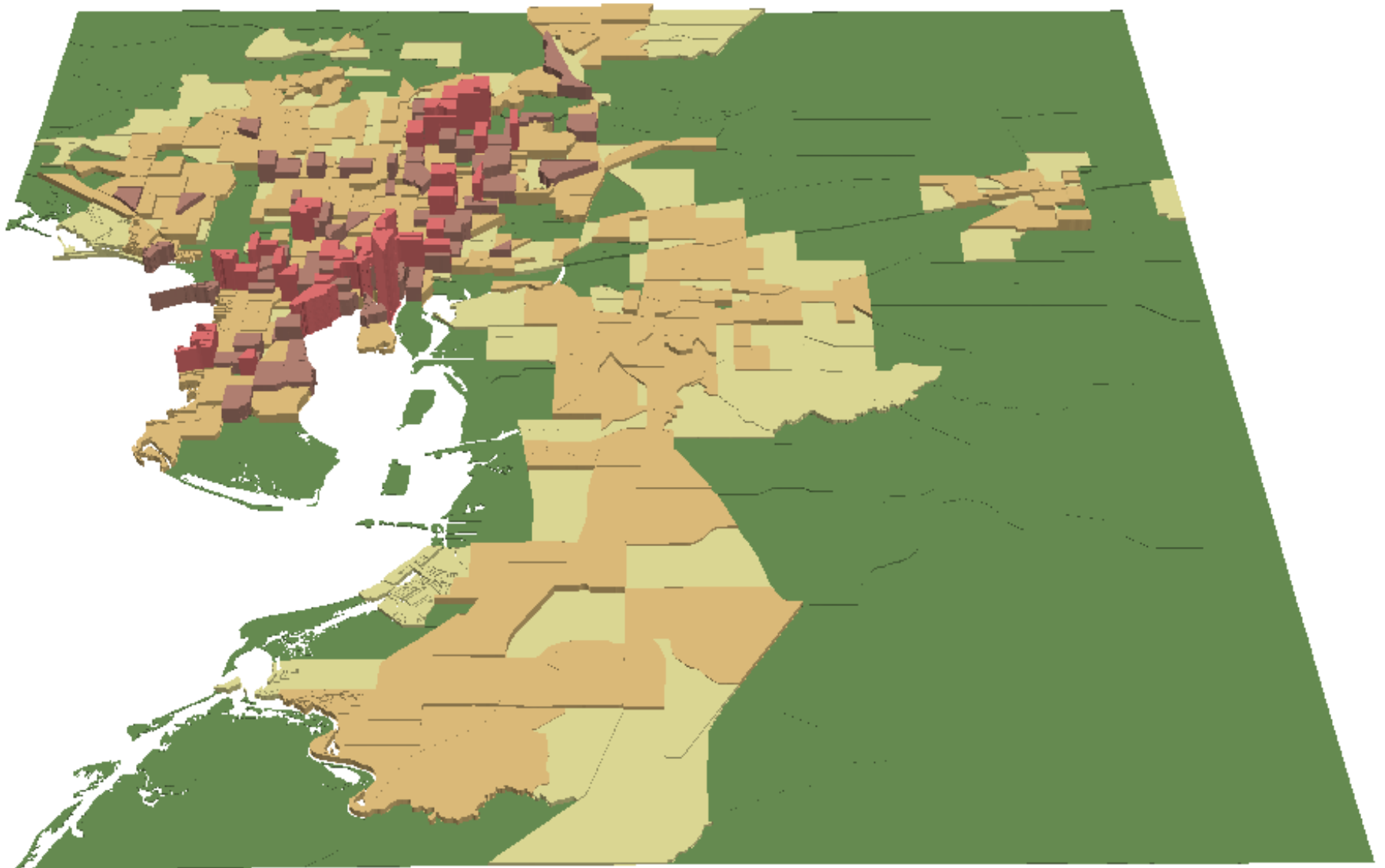
Concept B: Diagram

Transit System Concepts
Urban Corridors
Legend

Regional Rail
Commuter Rail
Light Rail
Tampa Rail
(Federally Approved Light Rail Plan)
Premium Bus
Streetcar

Gateway
(with Circulator Service)

Activity Center

Study Area

Jurisdictional Boundary
Urban Service Area

0 1 2 4 Miles

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Concept B: Stations

Legend

Light Rail

Tampa Rail

TAZ_ConB1

TAZ_ConB1.B1_HHinc / TAZ_ConB1.ACRES

0 - 2

3 - 4

5 - 8

9 - 16

17 - 32

Legend

— Light Rail
— Tampa Rail

TAZ_ConB1
TAZ_ConB1.B1_EMPinc / TAZ_ConB1.ACRES

- 0 - 10
- 11 - 20
- 21 - 40
- 41 - 70
- 71 - 110
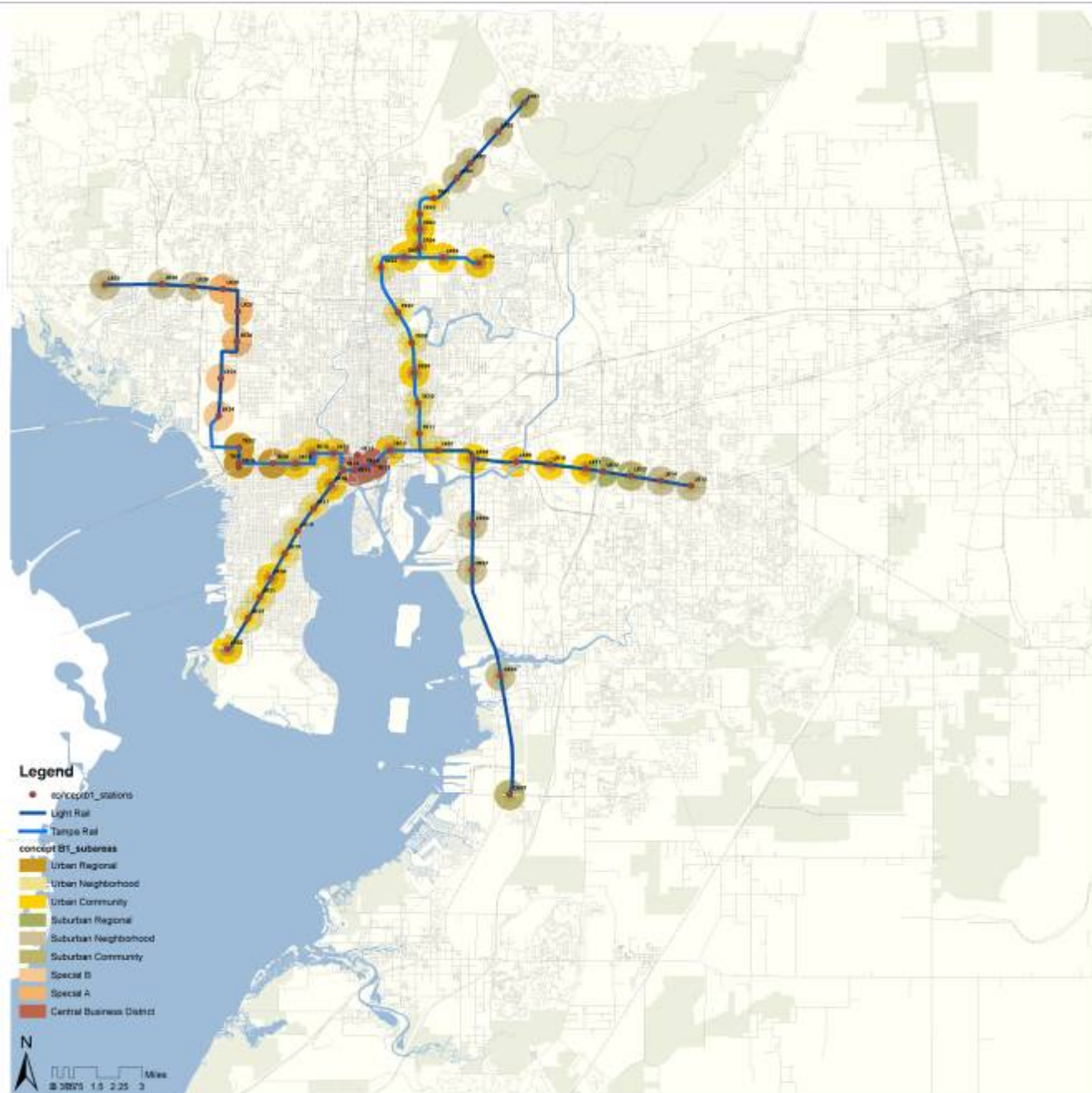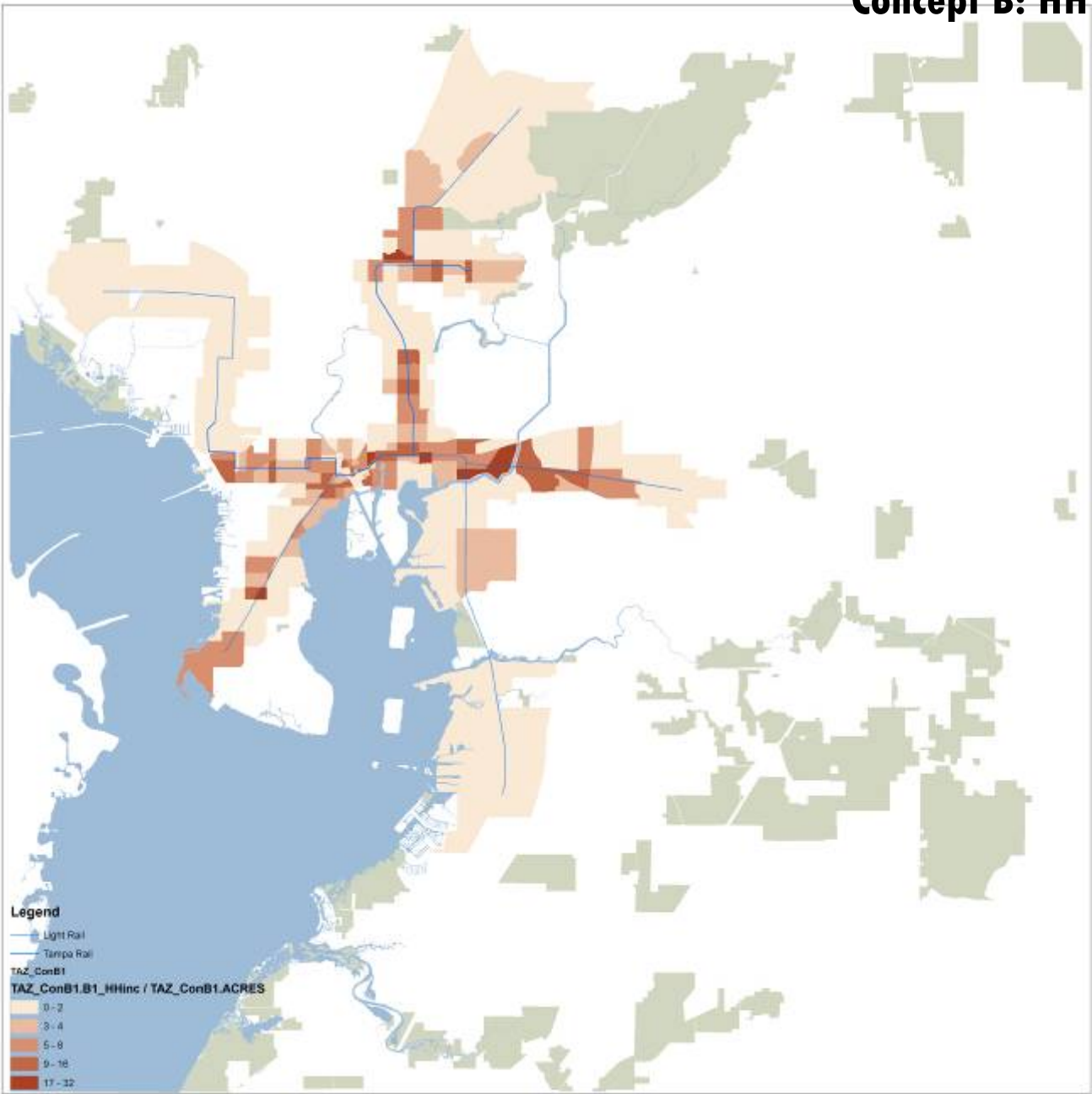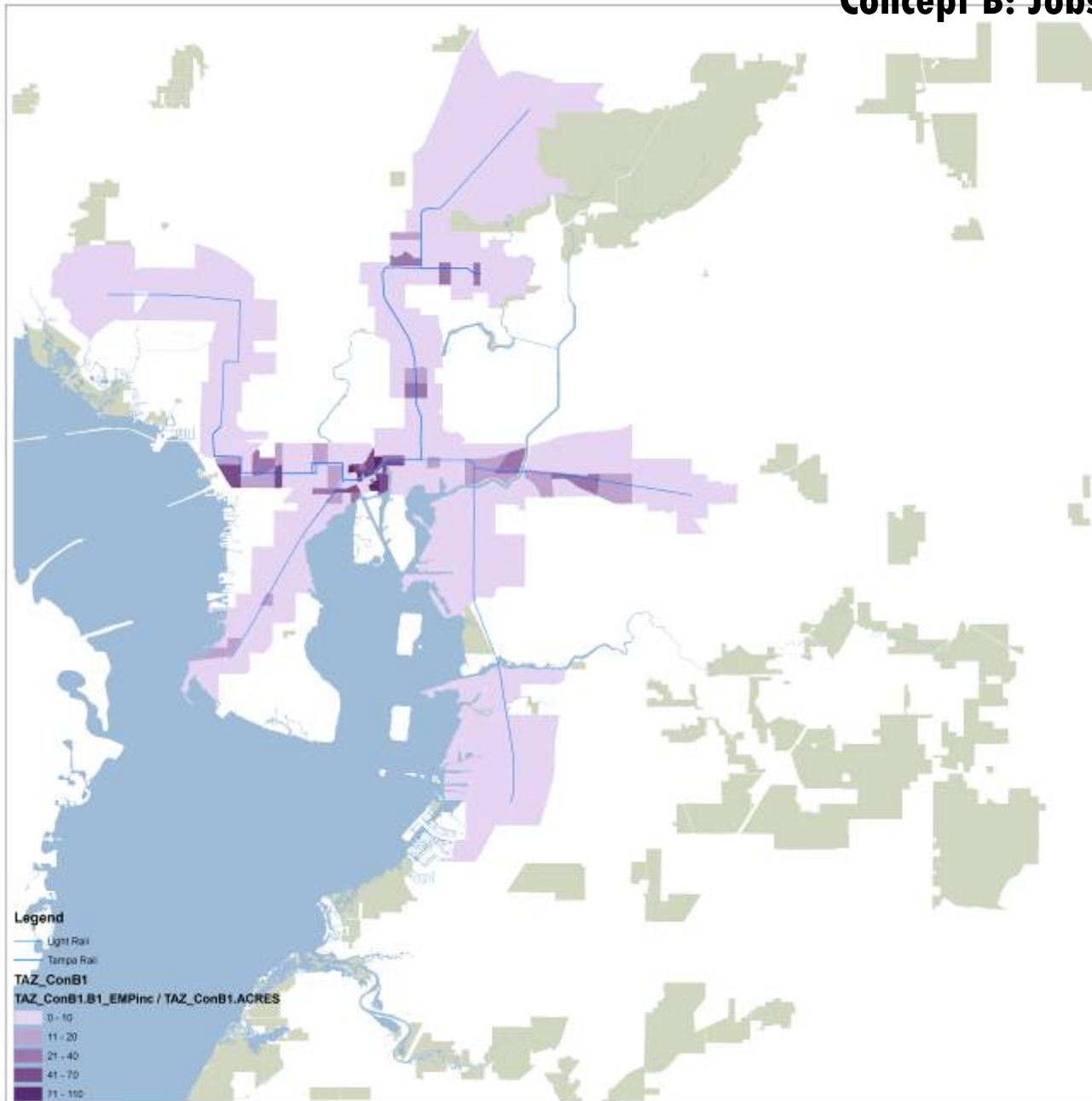
Concept B + Trend 2050: Incremental Growth
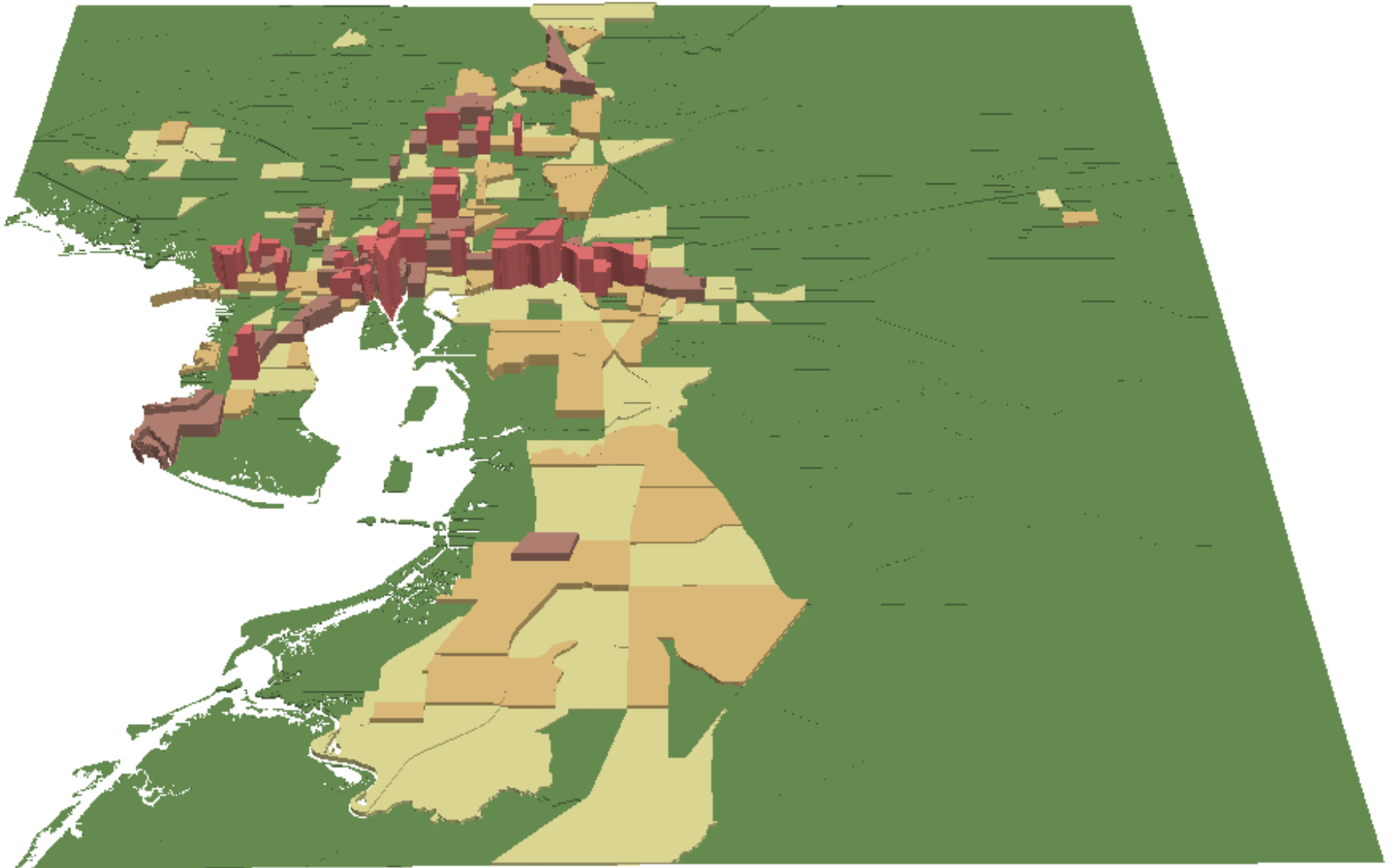
Concept B + Trend 2050: TAZ Totals
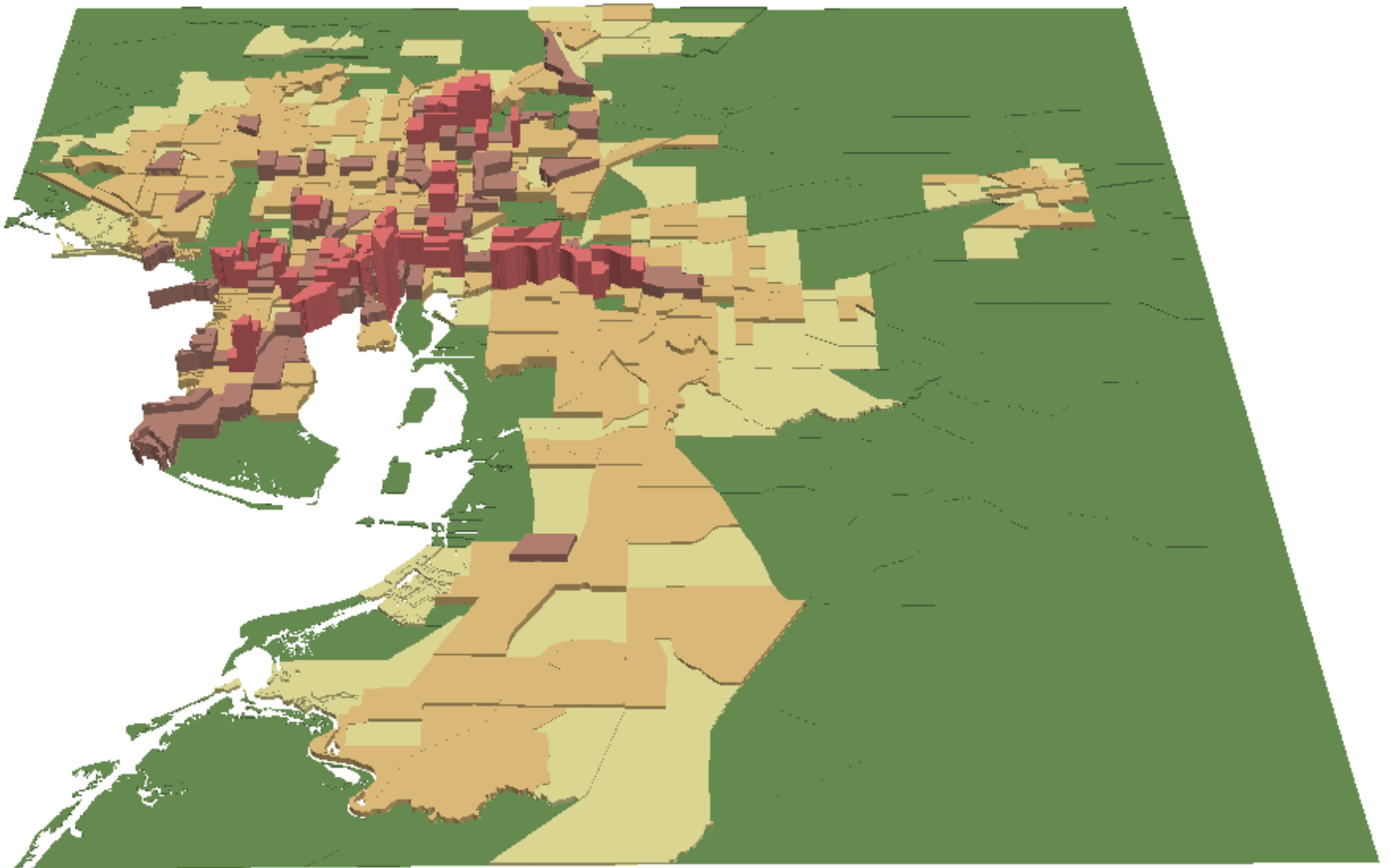
Concept C: Diagram

Concept C: Stations

Legend
- Regional Rail
- conceptc_stations
Concept C Station Areas
- Urban Regional
- Urban Neighborhood
- Urban Community
- Suburban Regional
- Suburban Neighborhood
- Suburban Community
- Special B
- Special A
- Central Business District

N

Miles
0 0.5 1   2   3   4
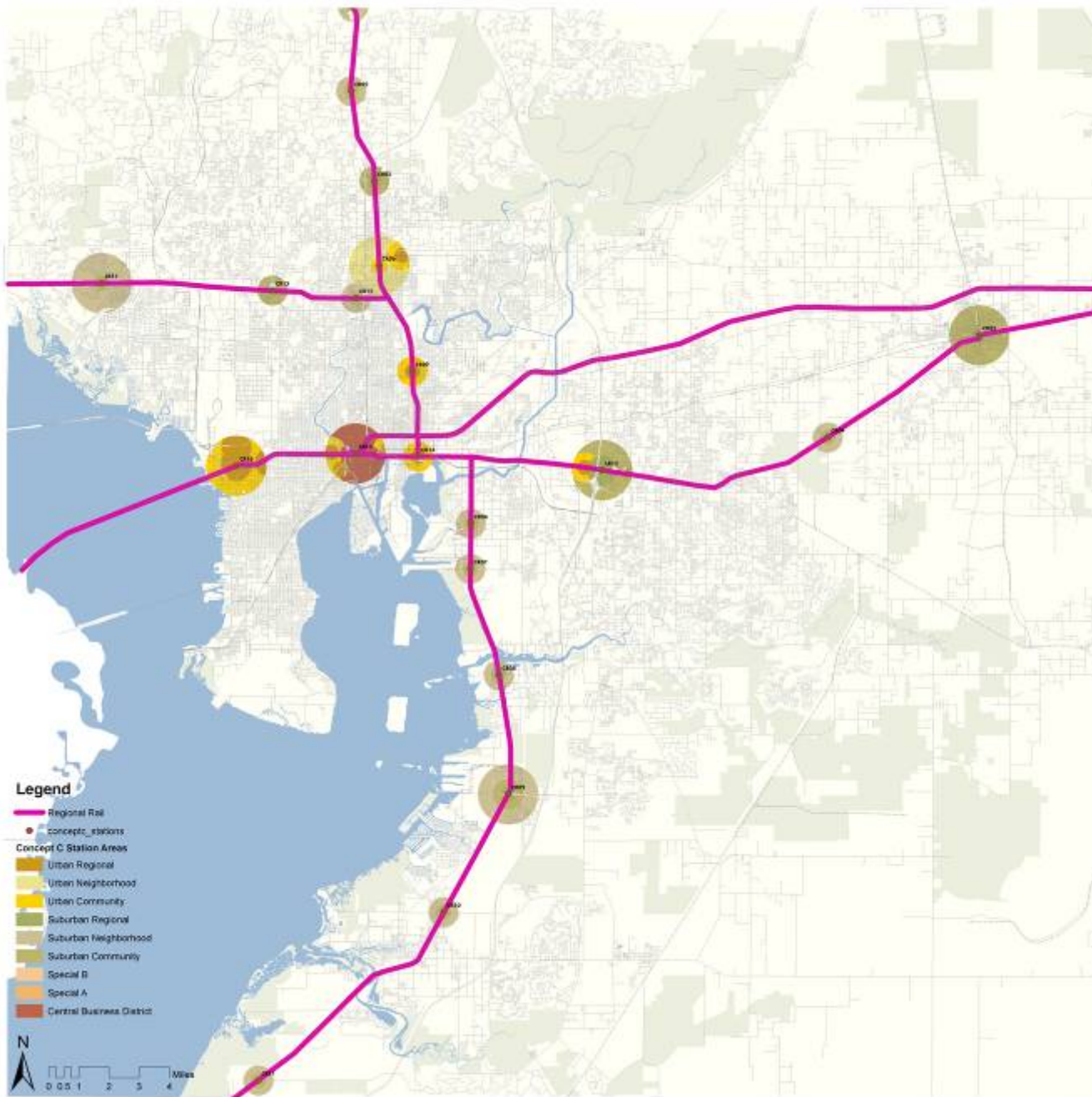
Concept C: HH Increment/Acre by TAZ

Legend
— Commuter Rail
— Regional Rail
TAZ_ConC.ConC_HHinc / TAZ_ConC.ACRES
0 - 2
3 - 4
5 - 8
9 - 16
17 - 32
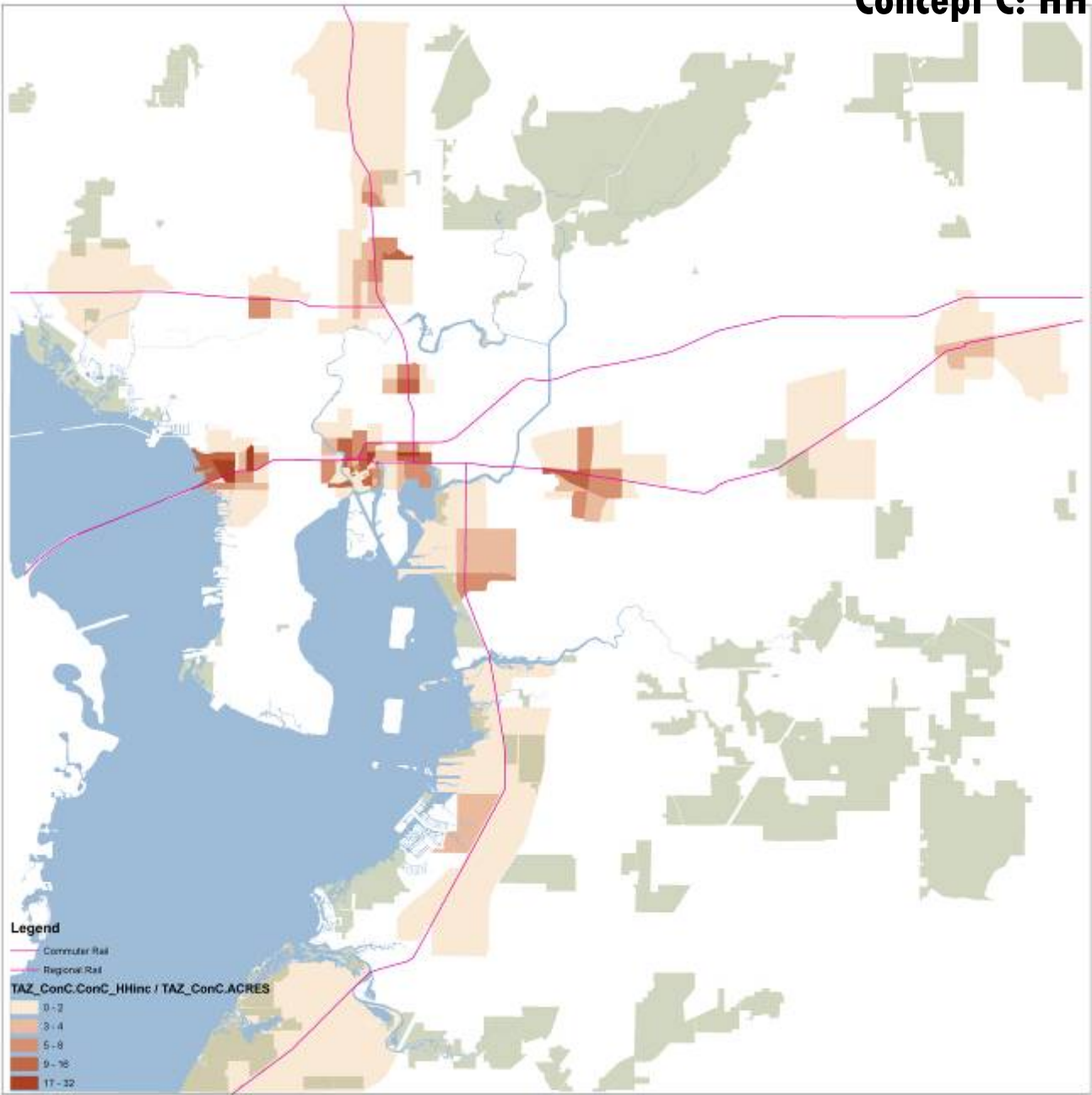
Concept C: Jobs Increment/Acre by TAZ

Legend

Commuter Rail

Regional Rail

TAZ_ConC.ConC_EMPin / TAZ_ConC.ACRES

- 0 - 10
- 11 - 20
- 21 - 40
- 41 - 70
- 71 - 110
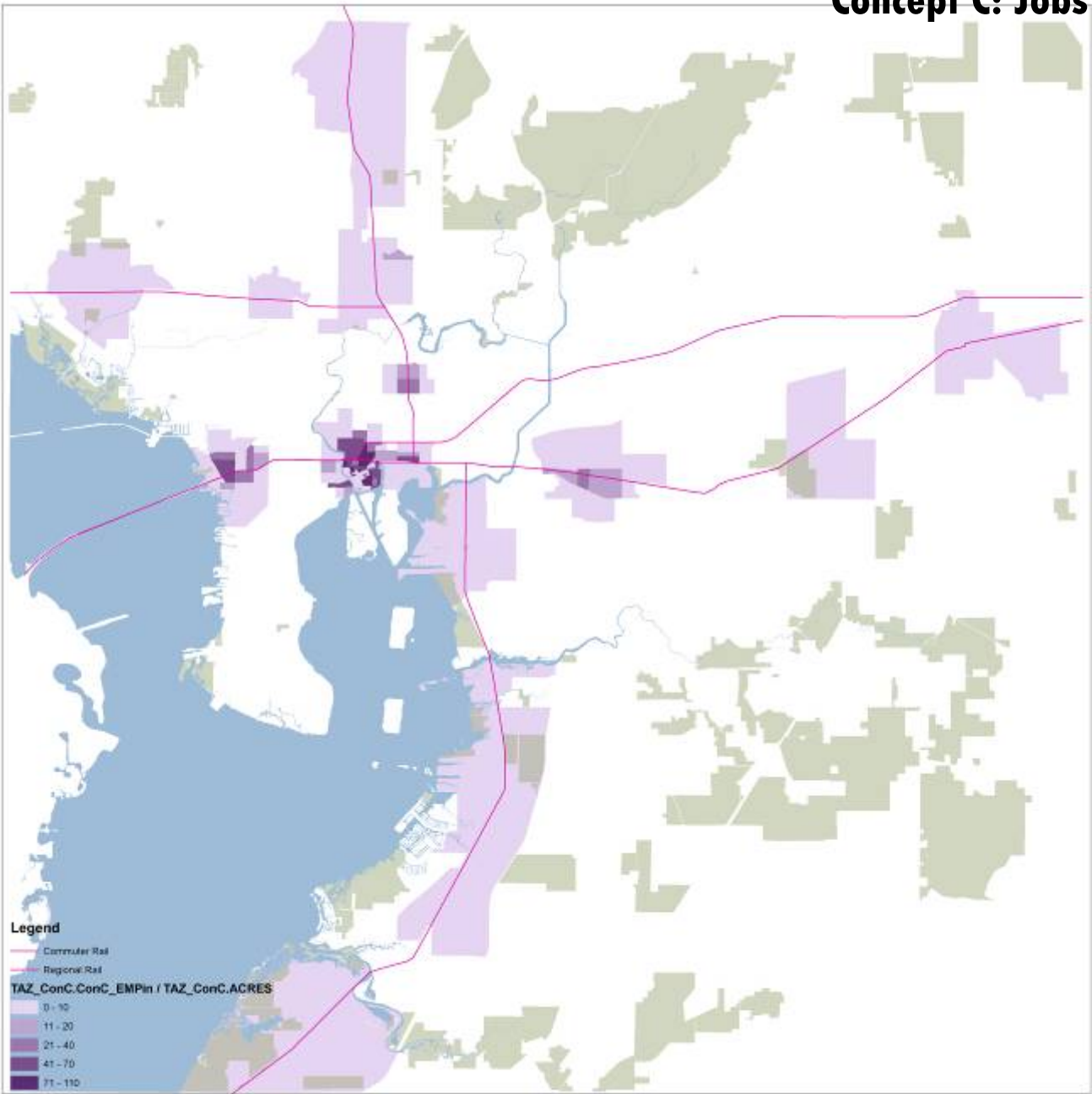
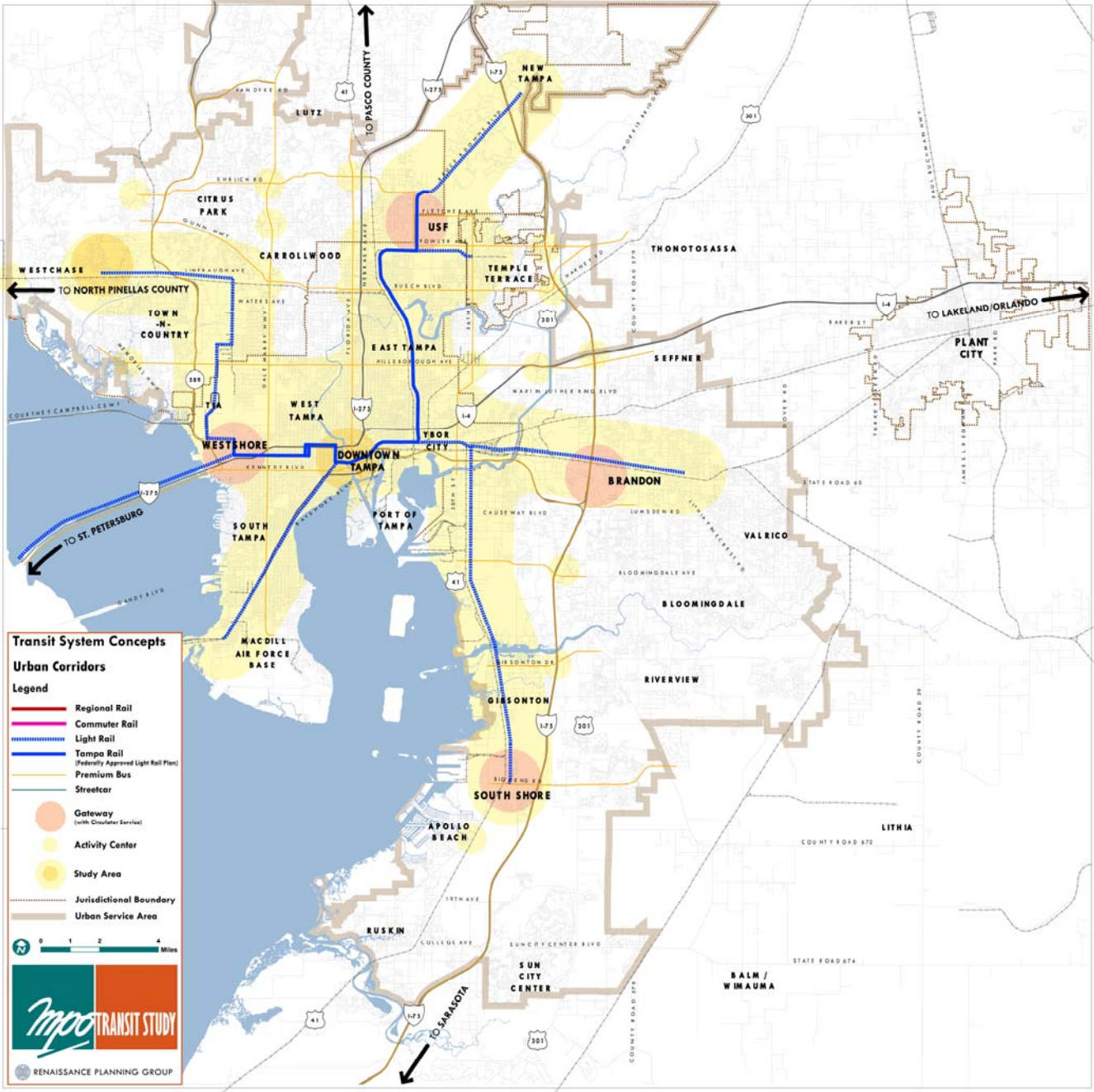**Concept C + Trend 2050: Incremental Growth**

Concept C + Trend 2050: TAZ Totals

Concept ABC: Diagram

Transit System Concepts
Composite
Legend
- Regional Rail
- Commuter Rail
- Light Rail
- Tampa Rail (Federally Approved Light Rail Plan)
- Premium Bus
- Streetcar
- Gateway (with Circulator Service)
- Activity Center
- Study Area
- Jurisdictional Boundary
- Urban Service Area

Concept ABC: Stations

Legend
- Premium Bus
- Light Rail
- Tampa Rail
- Regional Rail

N

Miles
0 0.4 0.8 1.6 2.4 3.2
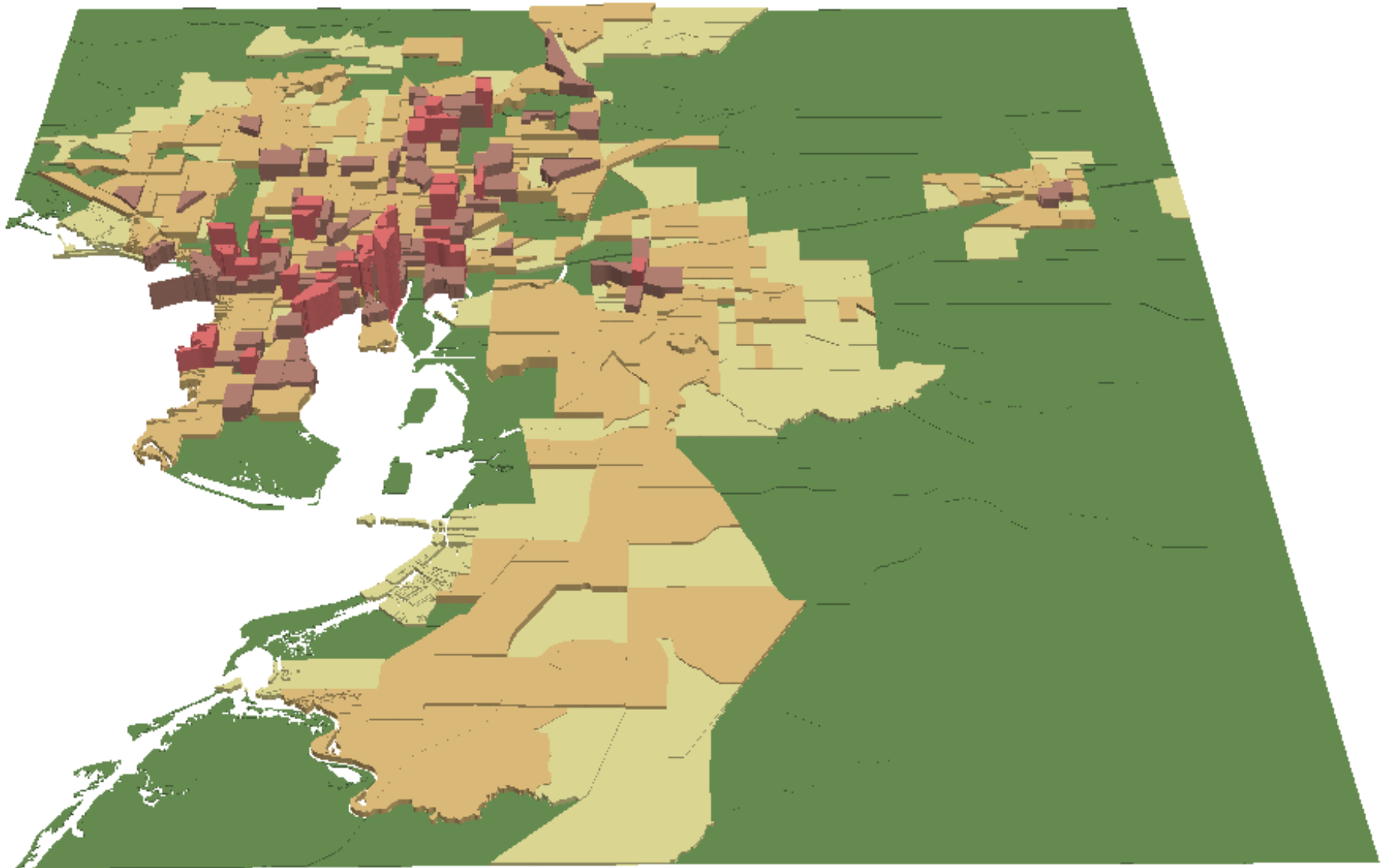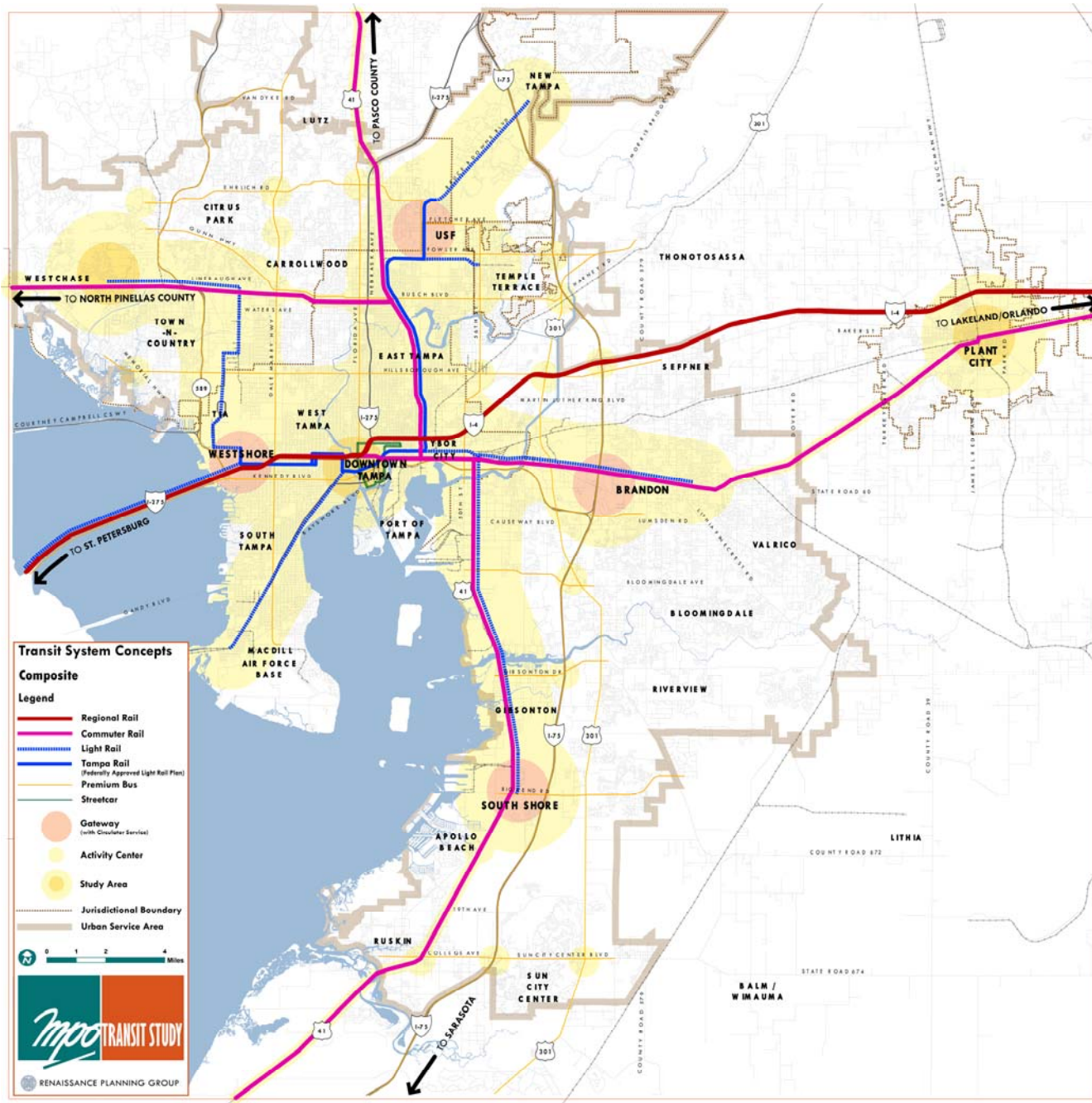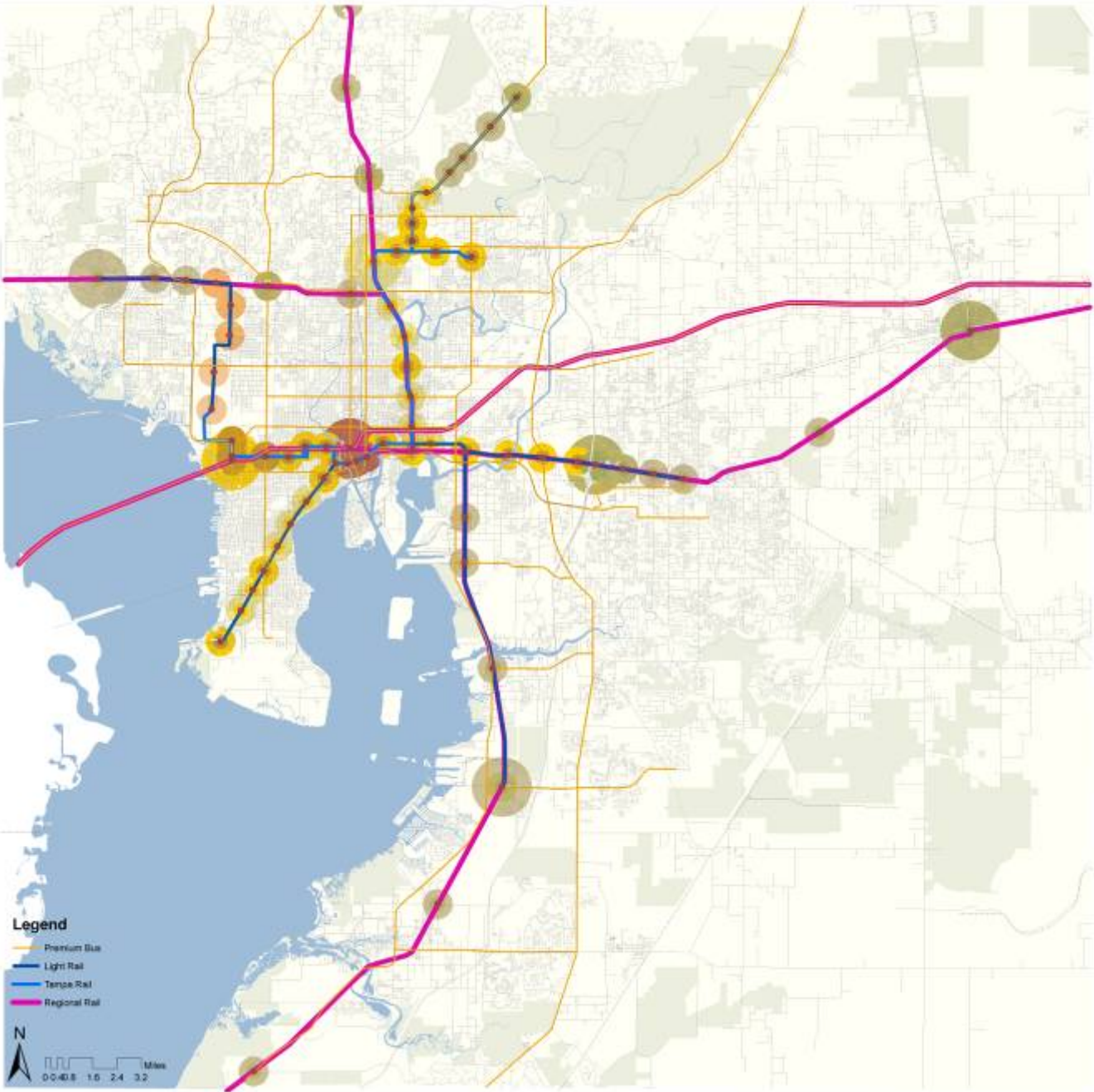
Concept ABC: HH Increment/Acre by TAZ

Legend

— Commuter Rail

— Regional Rail

TAZ_ConABC.ABC_HHinc / TAZ_ConABC.ACRES

- 0 - 2
- 3 - 4
- 5 - 8
- 9 - 16
- 17 - 32
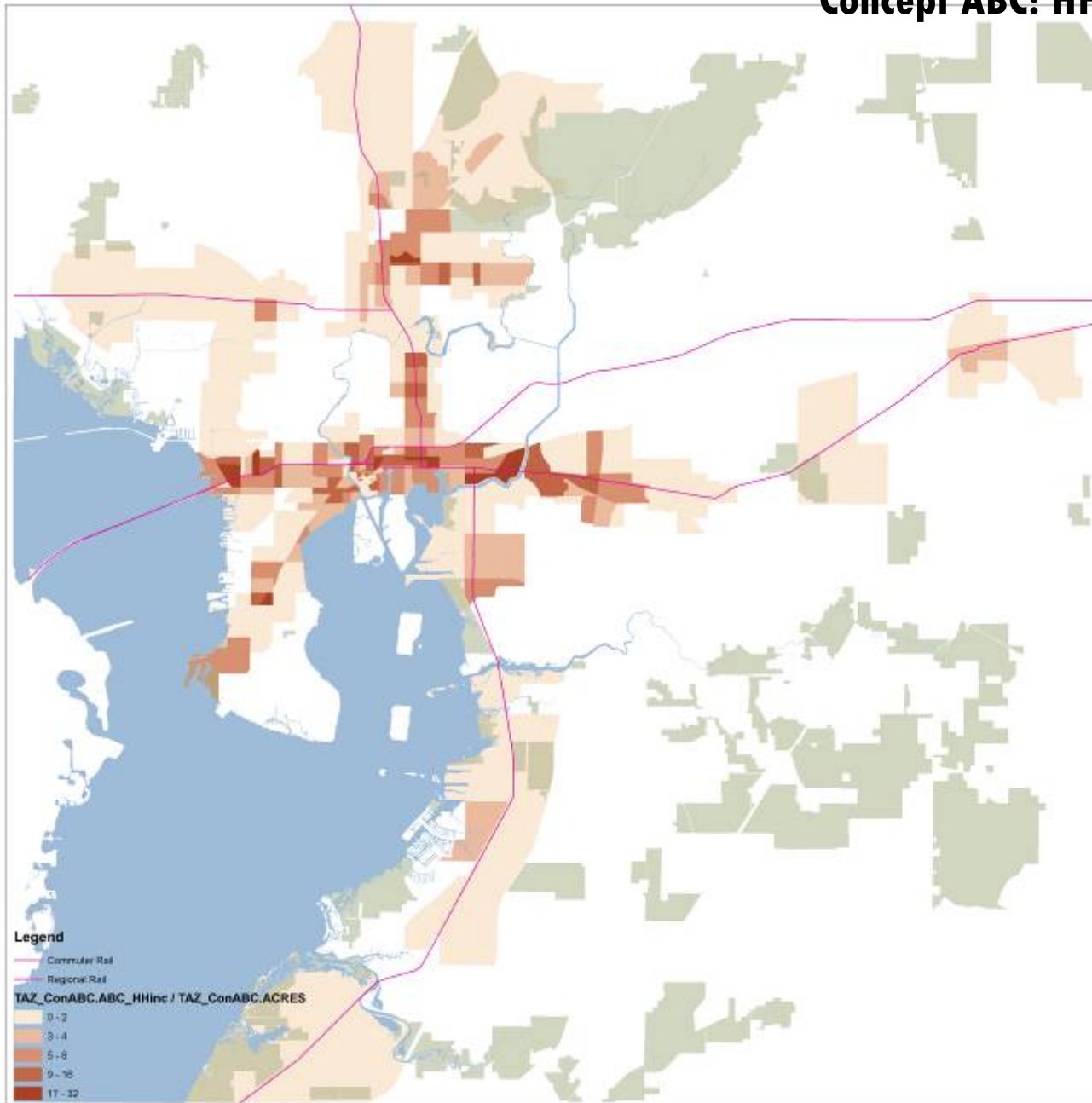
Concept ABC: Jobs Increment/Acre by TAZ

Legend

Commuter Rail

Regional Rail

TAZ_ConABC.ABC_EMPinc / TAZ_ConABC.ACRES

0 - 10

11 - 20

21 - 40

41 - 70

71 - 110

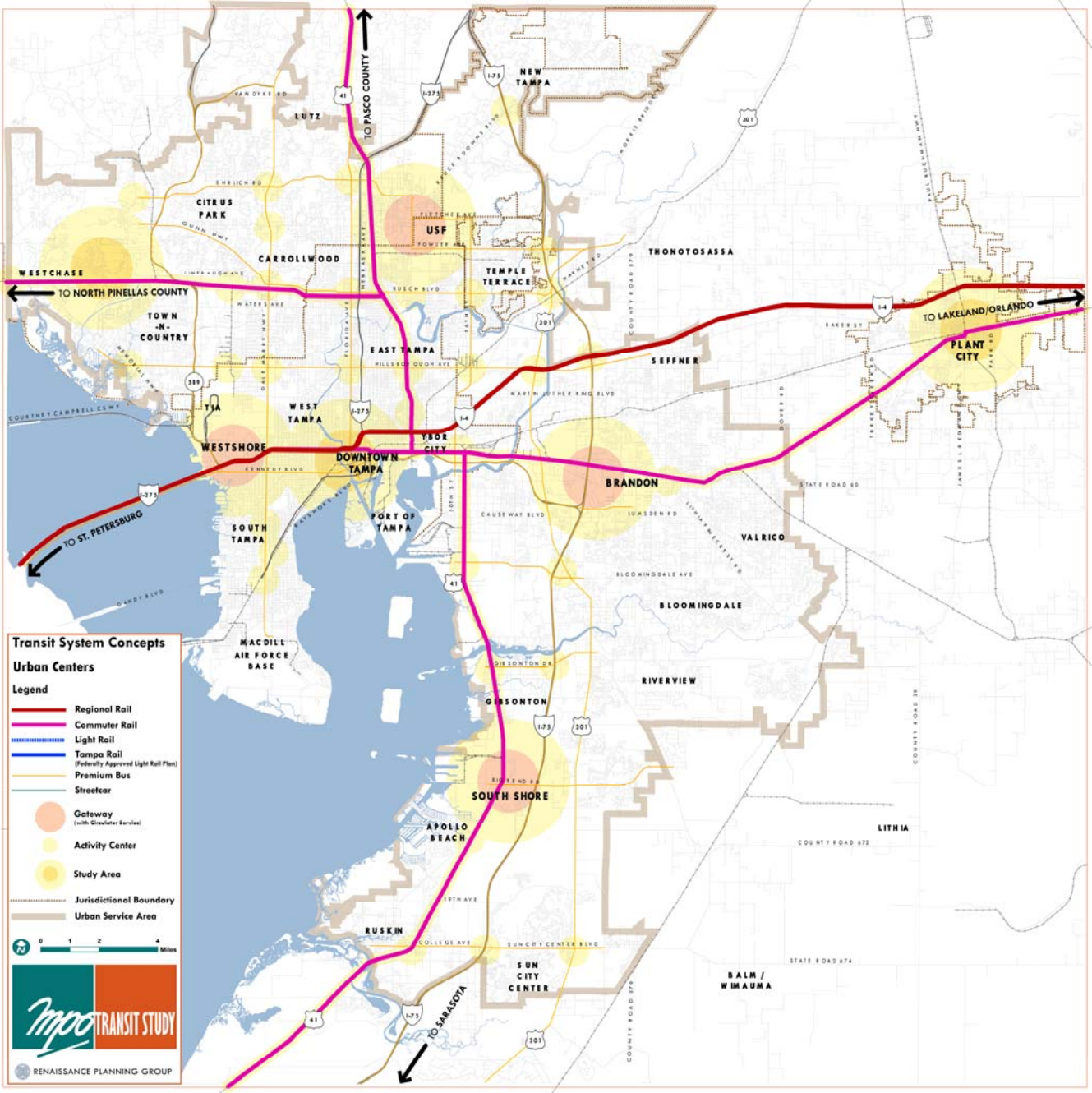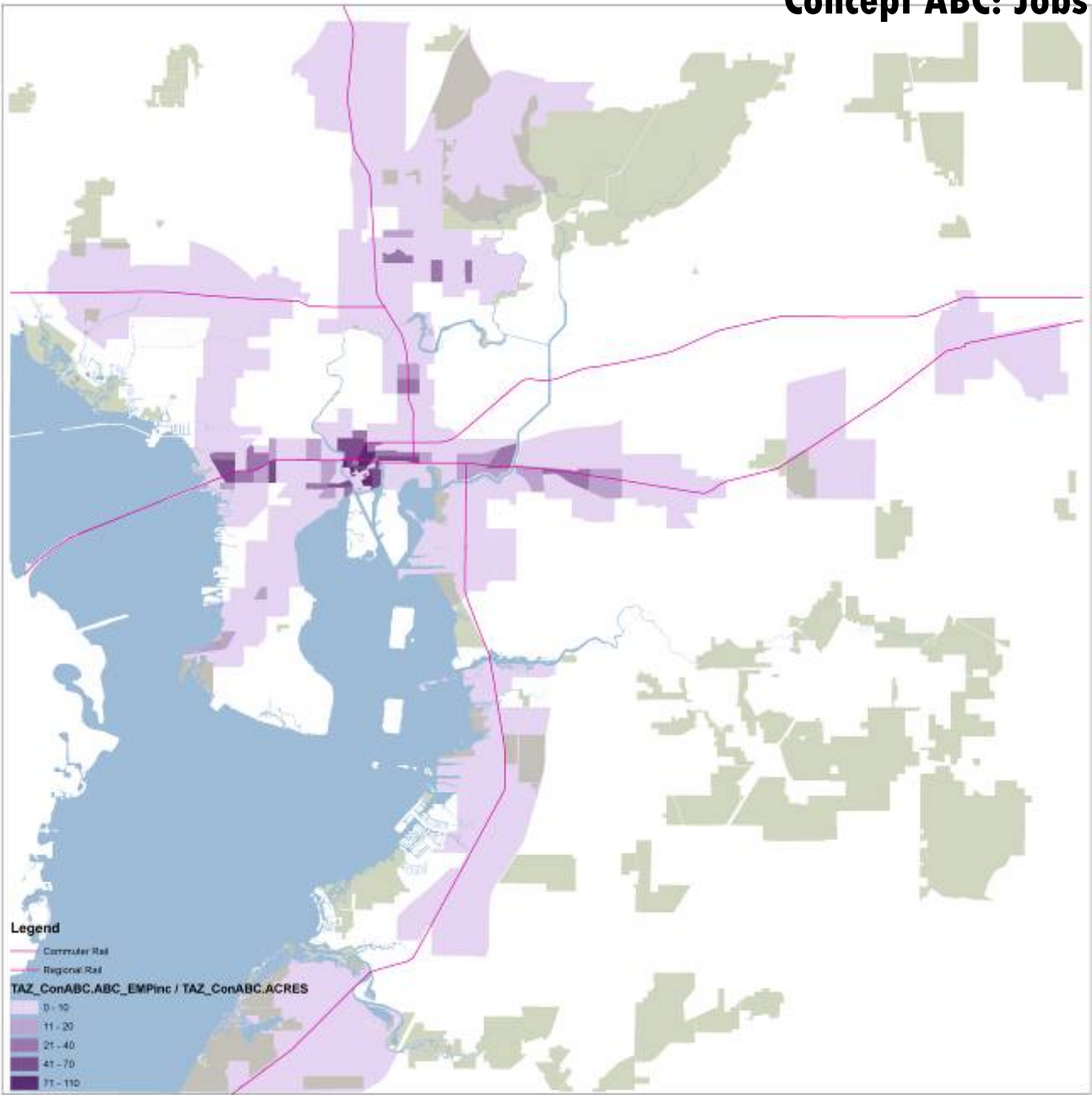Concept ABC + Trend 2050: Incremental Growth

Concept ABC + Trend 2050: TAZ Totals

Summary: Land Allocation

	Vacant Acres	Redevelopment Acres	Allocated Acres
10,025 Acres — Concept A	8.05%	16.79%	24.84%
24,479 Acres — Concept B	14.49%	19.15%	33.65%
19,294 Acres — Concept C	23.94%	17.62%	41.56%
36,683 Acres — Concept ABC	18.28%	18.01%	36.29%
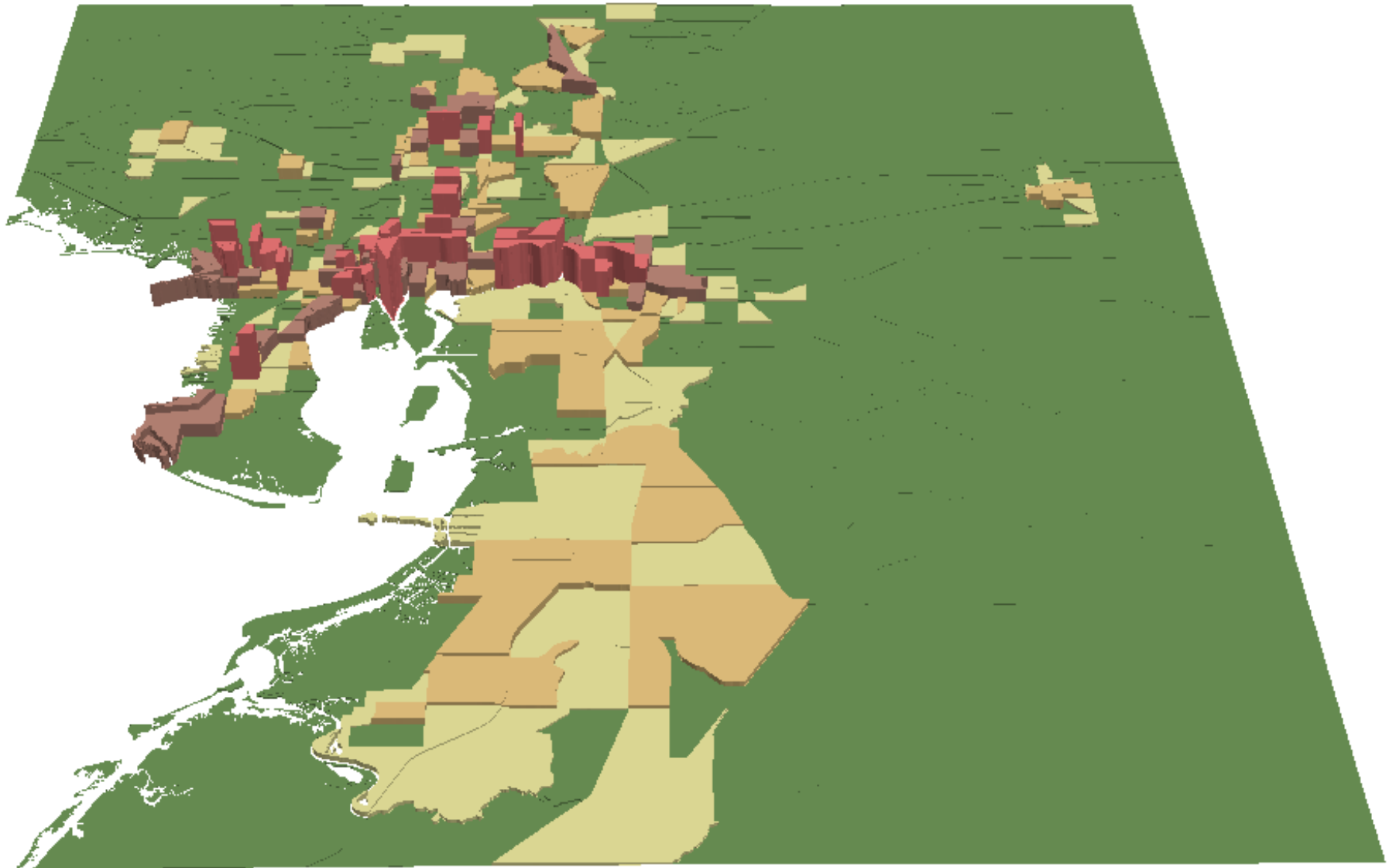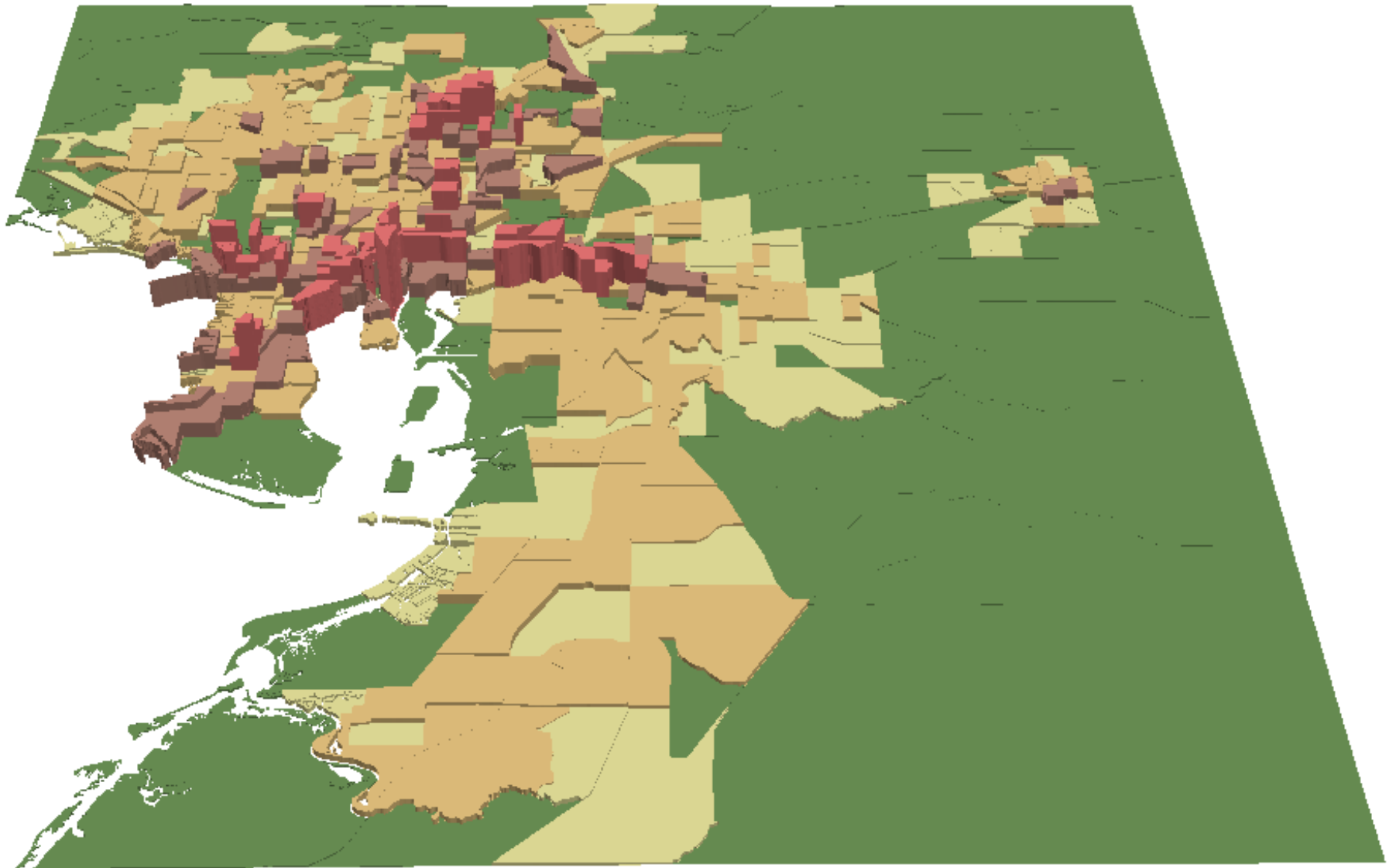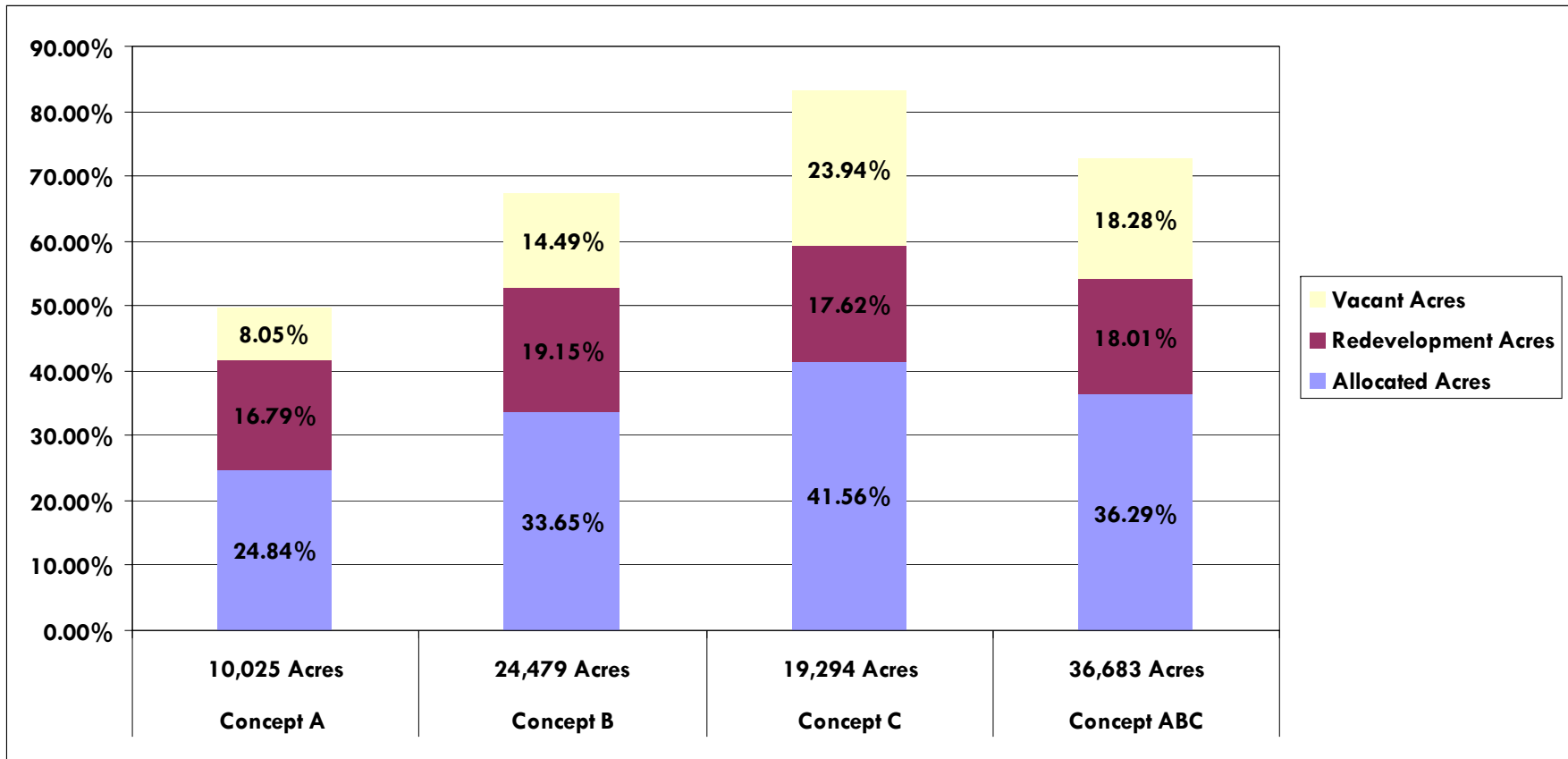
Summary: HH, Jobs and Potential Riders Increment

	Households Increment	Jobs Increment	Potential Riders Increment
Concept ABC	28.75%	25.71%	27.81%
Concept C	15.21%	15.11%	15.34%
Concept B	20.29%	20.30%	20.52%
Concept A	8.46%	11.94%	9.99%
	901,120	1,430,199	3,464,379
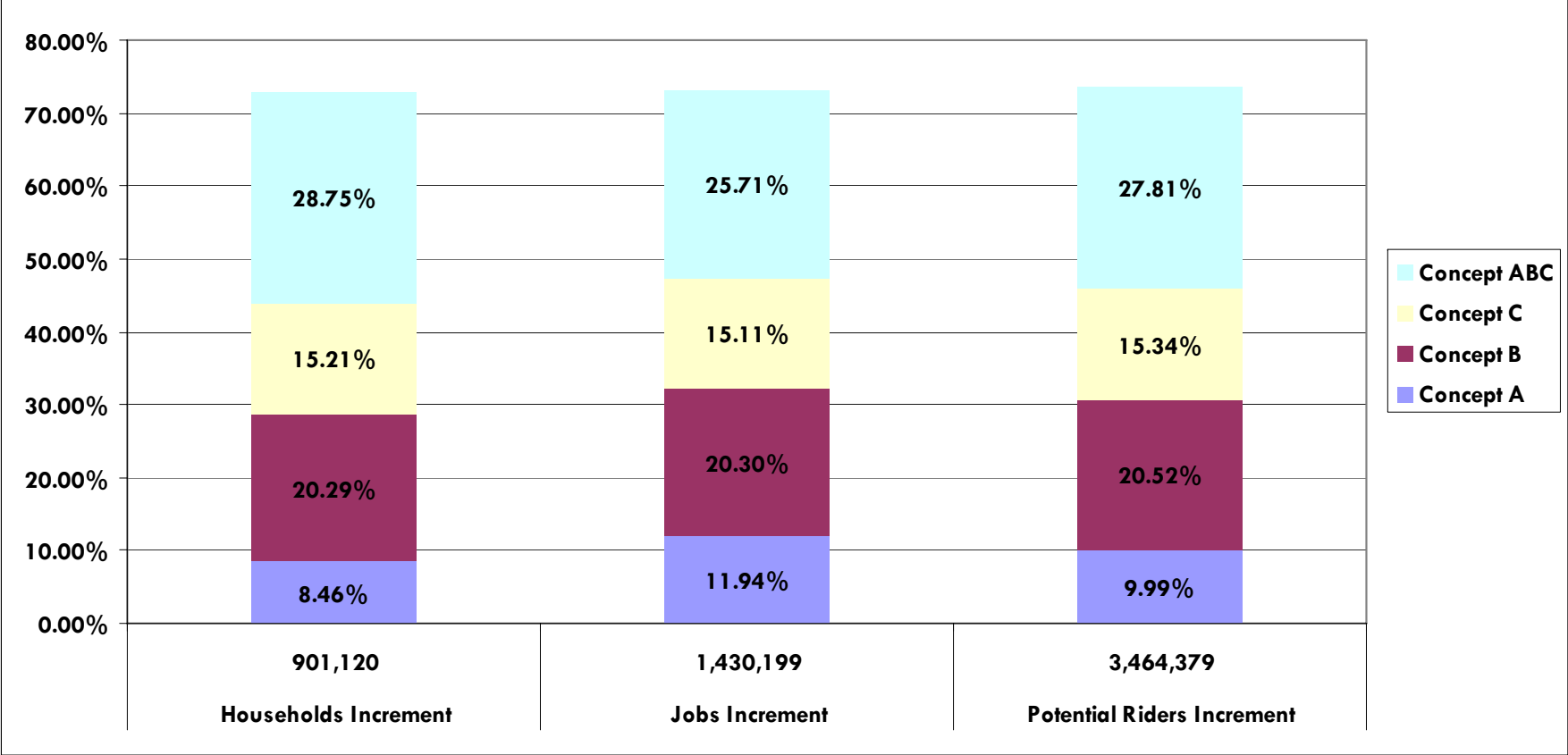
HH Increment Distribution by Community Element

Legend:
- Suburban Neighborhood
- Suburban Community
- Suburban Regional
- Urban Neighborhood
- Urban Community
- Urban Regional
- Central Business District

Concept A
- 14% Urban Neighborhood
- 49% Urban Community
- 29% Urban Regional
- 8% Central Business District

Concept B
- 5% Suburban Neighborhood
- 4% Suburban Community
- 4% Suburban Regional
- 10% Urban Neighborhood
- 54% Urban Community
- 20% Urban Regional
- 4% Central Business District

Concept C
- 17% Suburban Neighborhood
- 14% Suburban Community
- 4% Suburban Regional
- 7% Urban Neighborhood
- 40% Urban Community
- 13% Urban Regional
- 4% Central Business District

Concept C1
- 27% Suburban Neighborhood
- 23% Suburban Community
- 7% Suburban Regional
- 3% Urban Neighborhood
- 21% Urban Community
- 12% Urban Regional
- 8% Central Business District

Summaries: HH Increment by Subzones

	Concept A	Concept B	Concept C	Concept ABC
SE County		5.42%	23.12%	4.70%
Plant City			3.93%	1.46%
NE County		20.37%	22.36%	13.79%
Temple Terrace	5.50%	2.29%		2.31%
Tampa	73.90%	60.38%	37.40%	66.91%
NW County	20.60%	11.54%	13.19%	10.82%

Sub Regional Shares

Total Households

	1990 Census	2000 TAZ	2025 TAZ	2050 Trend
Temple Terrace	4%	3%	3%	3%
Tampa	34%	31%	29%	30%
Southeast	18%	23%	28%	33%
Plant City	4%	4%	4%	5%
Northwest	29%	29%	27%	19%
Northeast	11%	9%	9%	10%

Legend: ■ Northeast ■ Northwest ■ Plant City ■ Southeast ■ Tampa ■ Temple Terrace
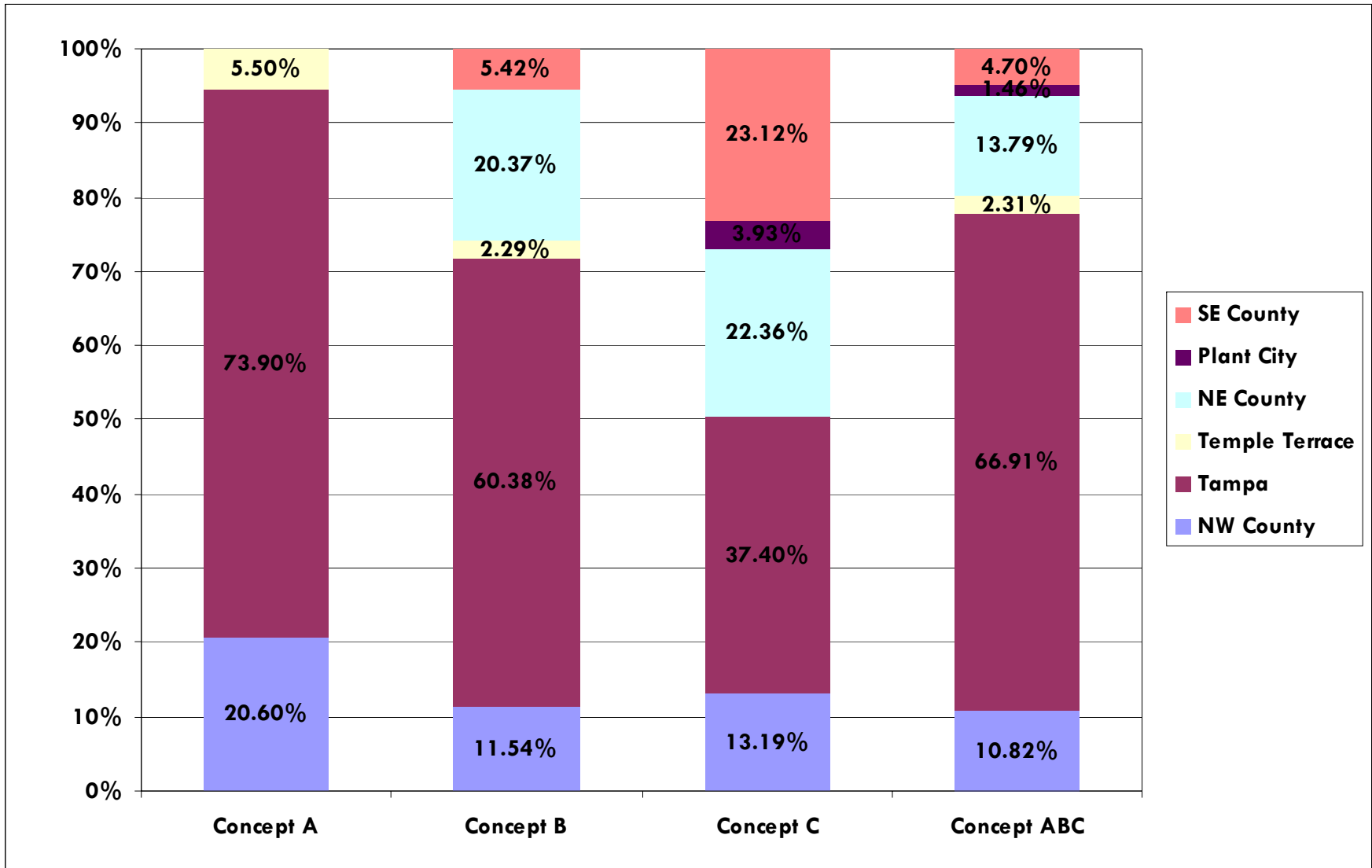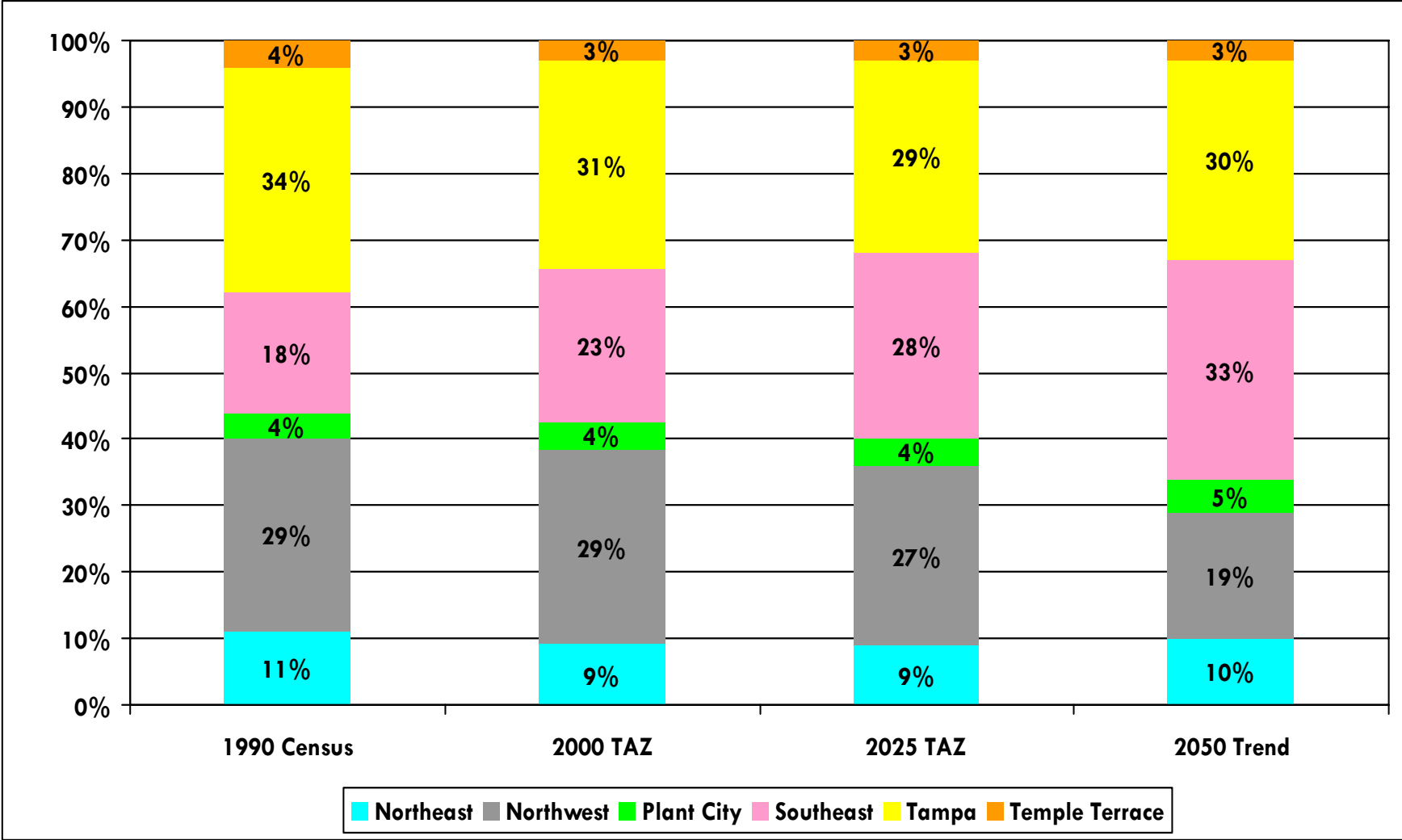
Sub Regional Shares

Total Households by Concept

	HH50-Trend	HH50_A	HH50_B	HH50_C	HH50_ABC
Temple Terrace	3%	3%	3%	3%	3%
Tampa	30%	32%	35%	31%	35%
Southeast	33%	32%	30%	32%	30%
Plant City	5%	4%	3%	4%	3%
Northwest	19%	19%	19%	19%	19%
Northeast	10%	9%	10%	10%	10%

Legend: Northeast, Northwest, Plant City, Southeast, Tampa, Temple Terrace
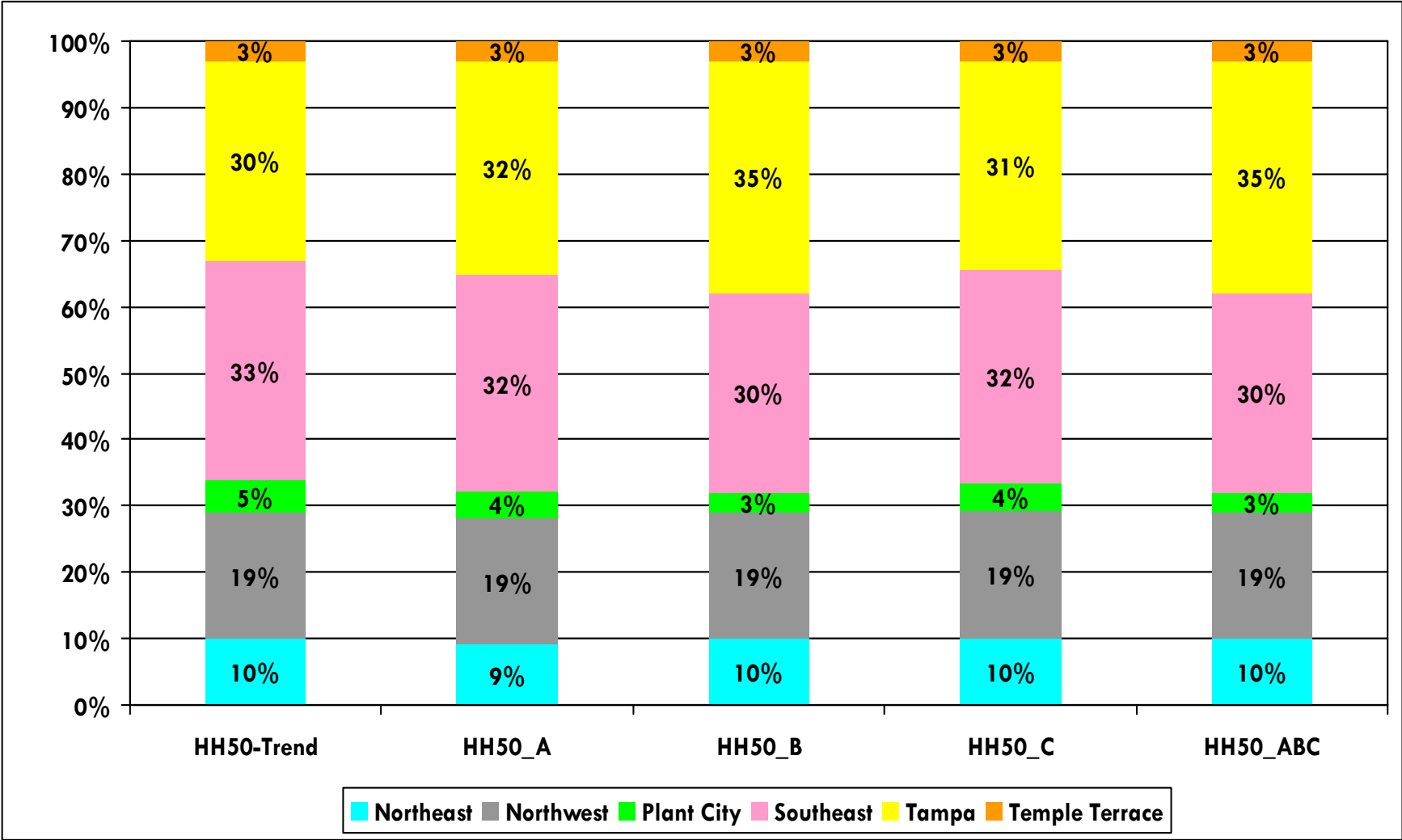
Summaries: Jobs Increment by Subzones
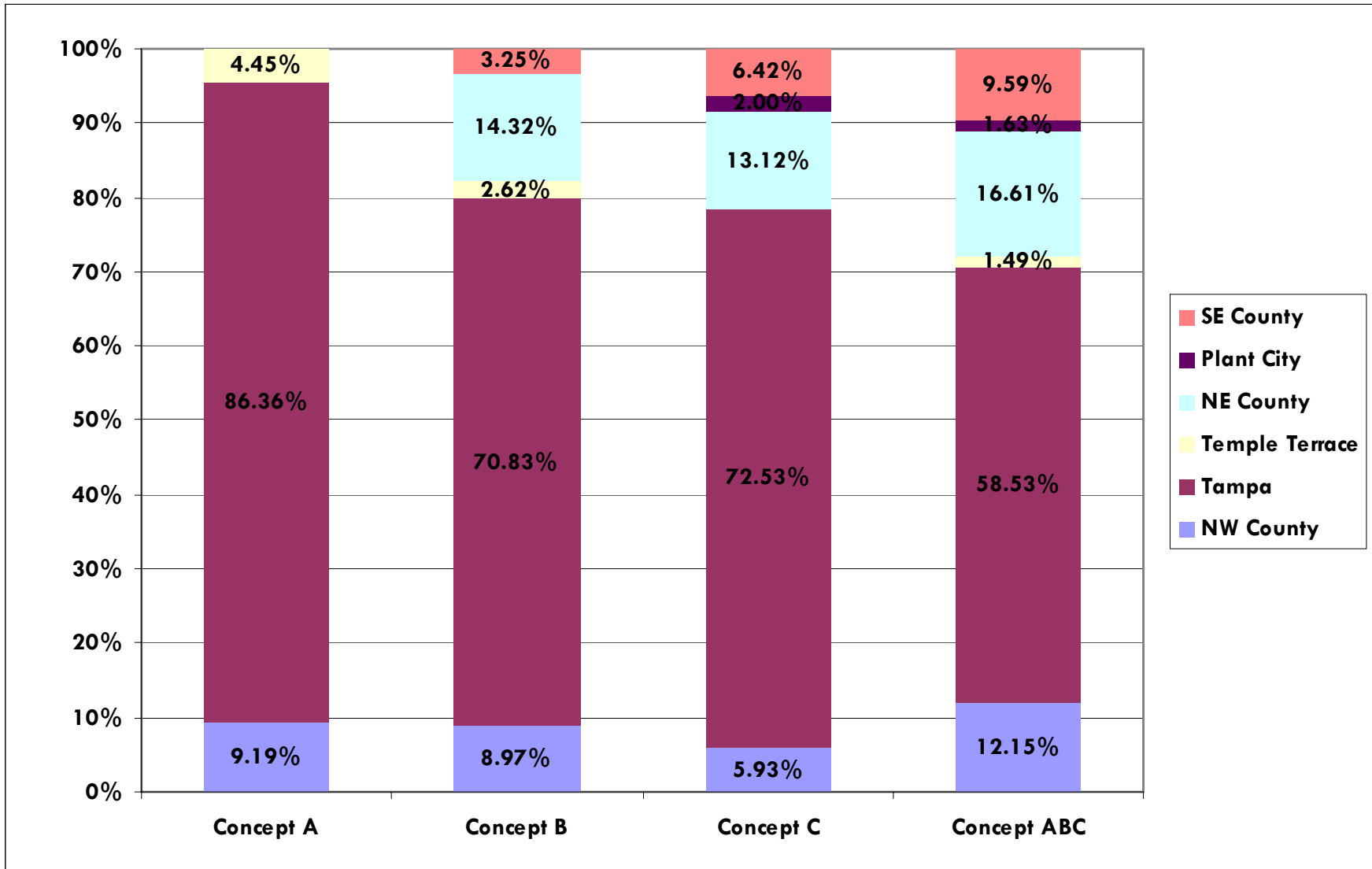
Sub Regional Shares
Total Employment

Legend: Northeast ■ Northwest ■ Plant City ■ Southeast ■ Tampa ■ Temple Terrace ■

2000 TAZ
- Temple Terrace: 3%
- Tampa: 49%
- Southeast: 13%
- Plant City: 4%
- Northwest: 20%
- Northeast: 10%

2025 TAZ
- Temple Terrace: 3%
- Tampa: 44%
- Southeast: 18%
- Plant City: 4%
- Northwest: 21%
- Northeast: 10%

2050 Trend
- Temple Terrace: 3%
- Tampa: 34%
- Southeast: 30%
- Plant City: 6%
- Northwest: 15%
- Northeast: 12%

Sub Regional Shares

Percent Employment by Concept

	Emp50-Trend	EMP50_A	EMP50_B	EMP50_C	EMP50_ABC
Temple Terrace	3%	3%	3%	2%	3%
Tampa	34%	40%	42%	40%	44%
Southeast	30%	28%	27%	28%	26%
Plant City	6%	4%	4%	4%	3%
Northwest	15%	15%	14%	14%	14%
Northeast	12%	10%	11%	11%	10%

Legend: Northeast, Northwest, Plant City, Southeast, Tampa, Temple Terrace