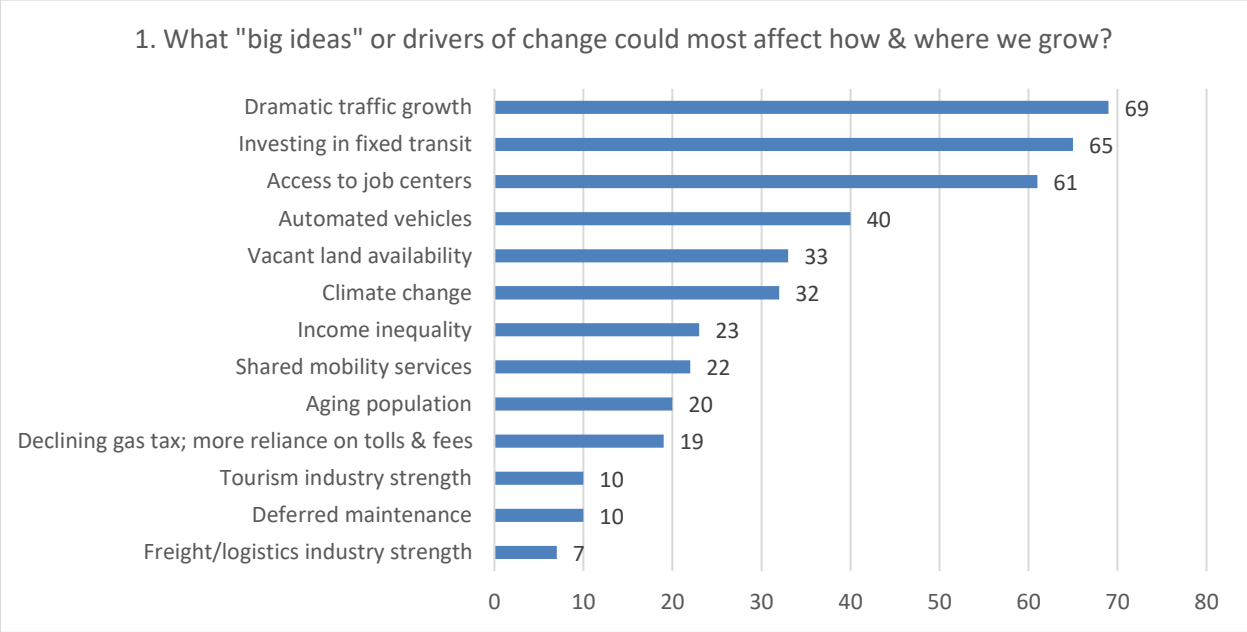
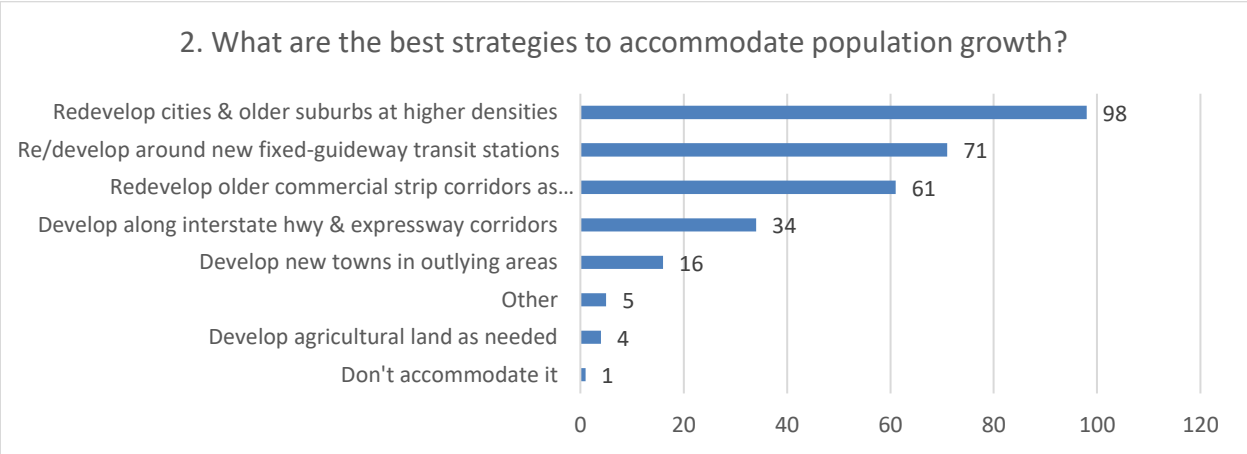
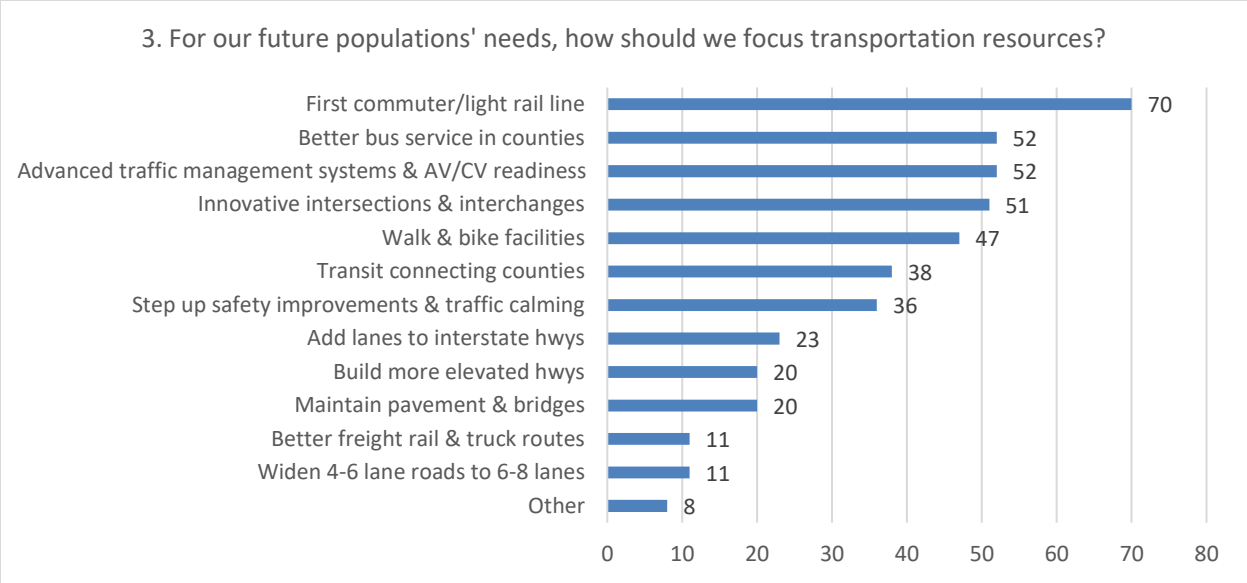
Scenario Performance Data Technical Memo

The following priorities were adapted from the Hillsborough County City-County Planning Commission's (2014) long range plan, *Imagine 2040*. Between September and December 2017, advisory committees to the Hillsborough, Pasco and Pinellas Metropolitan Planning Organizations, public meeting attendees, and working groups comprised of transportation and land use professionals, were asked to participate in a polling exercise to answer three questions. The first question was *what 'big ideas' or drivers of change could most affect how & where we grow?* The second question was *what are the best strategies to accommodate population growth?* The third question was *for our future populations' needs, how should we focus transportation resources?* The polling exercise was not designed as a statistically significant survey but was created to solicit general input regarding values, and to inform the future direction of regional transportation planning. The results of that polling exercise are shown below:







Using data collected from this exercise, eight priorities were identified to be included in the 2045 Long Range Transportation Plan Update survey. The eight resulting priorities were then evaluated during survey working group meetings and several rounds of pilot testing by members of the public. One of the eight priorities, *Impact on Clean Air & Water*, was eventually omitted from the list due to the supporting data being heavily influenced by traffic congestion, which is already captured under other priorities.

Performance data supporting each priority was produced by the Tampa Bay Regional Planning Model for transportation (TBRPM) and/or a proprietary land-use modeling software, Community Viz. The TBRPM and Community Viz report modeling results in the form of a baseline raw score based on historical data from either 2010 or 2015, and a projected score based on future conditions in 2045. Comparing current and future data points allows for a percent change to be calculated with respect to each performance indicator: a positive percent change thus translates into a net improvement, while a negative percent change translates into a net diminishment.

Six of the final seven priorities are supported by multiple performance data points, the two exceptions being *Shorter Commutes* and *Storm Vulnerability.* Most data indicators are equally-weighted except where noted, e.g. *Alternatives to Driving* is supported by (3) data indicators weighted at 33.3% each, while *Open/Green Spaces* is supported by (2) data indicators weighted at 50% each. The percent change between current and future performance was calculated for each data indicator and was then normalized to fall within a range of ±50. A priority with a score of -50 represents an extreme negative performance whereas a priority with a score of +50 represents an extreme positive performance.

The seven priorities and supporting performance data are provided in the MetroQuest survey to demonstrate how each of three scenarios (A, B, and C) influence the priorities in the year 2045. For illustrative purposes, Scenario A represents a future in which New Technologies and a few roadway projects are deployed to manage traffic flow. Scenario B represents a future in which Expressway Lanes form an outer loop so that traffic does not have to travel through the

congested center of the region. Scenario C represents a future in which Bus and Rail Services connect, revitalize and infill the communities that exist today.

1. Impact on *Alternatives to Driving*

Providing more mobility options ensures that people who cannot or opt not to drive are able to reach their destinations. To satisfy the growing population of non-drivers, it is important to promote alternatives to single-occupancy vehicle travel, including trips on bus or rail, walking, bicycling, carpooling, and waterborne transportation. This priority is supported by performance indicators related to destination-accessibility by modes other than single-occupancy vehicles.

What was measured? A forecast of future population living within 1/4mi of bus routes which have ≤30min headways, as a percentage of total population; forecast of future job opportunities within 1/4mi of bus routes which have ≤30min headways, as a percentage of total jobs; forecast of future population living within 1/4mi of trails and protected bike lanes, as a percentage of total population.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
Pop within 1/4mi transit per capita:	0.185		
Jobs within 1/4mi transit per capita:	0.155		
Pop within 1/4mi trails per capita:	0.477		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Pop within 1/4mi transit per capita:	0.174	(5.52)	
Jobs within 1/4mi transit per capita:	0.152	1.97	
Pop within 1/4mi trails per capita:	0.477	(9.60)	
Weighted Score		(4.38)	(9.05)

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Pop within 1/4mi transit per capita:	0.180	(2.34)	
Jobs within 1/4mi transit per capita:	0.172	12.59	
Pop within 1/4mi trails per capita:	0.493	(6.63)	
Weighted Score		1.21	2.49

Scenario C	Raw Score	Pct Change	-50 to +50 Score
Pop within 1/4mi transit per capita:	0.246	33.19	
Jobs within 1/4mi transit per capita:	0.214	40.26	
Pop within 1/4mi trails per capita:	0.524	(0.81)	
Weighted Score		24.21	50.00

2. Impact on *Shorter Commutes*

One part of growing businesses and attracting new ones is having great places for business growth. To help sustain economic growth, employers need access to a large pool of qualified workers and workers need access to jobs. Reducing commuting times and delivery times facilitates economic growth by reducing costs associated with travel time to market.

What was measured? A forecast of future average trip length from home-to-work, measured in minutes of travel time.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (HBW)	16.90		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (HBW)	18.00	6.51	
Weighted Score		6.51	(49.99)[1]

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (HBW)	17.70	4.73	
Weighted Score		4.73	(36.36)

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (HBW)	17.10	1.18	
Weighted Score		1.18	(9.09)

[1] The sign of the normalized ±50 score was multiplied by (1) to convey that increases in *Avg trip length (HBW)* is not a desirable characteristic of the roadway network.

3. Impact on *Equal Opportunity*

Providing opportunities for everyone to participate in the job market is critical to the long-term stability of the economy. Access to healthcare facilities is also an important indicator of quality-of-life. At the same time, many living in historically underserved communities lack the ability to participate in the economy and receive health services, in part due to limited or inadequate transportation facilities.

What was measured? A forecast of 'future average trip length for all purposes for Environmental Justice population' as a proportion of 'future average trip length for all purposes for the total population'. Explained in another way, the raw score of 'Avg trip length (EJ/Total)' tells us how average trip length changes for Environmental Justice populations when compared to how average trip length changes for the total population. A percent change of 0 for this indicator would represent absolutely equal performance between Environmental Justice populations and the total population of the region, whereas a positive value would represent an improvement in equity and a negative value would represent a decrease in equity.

A second indicator was used to evaluate equal opportunity: a proportion of two ratios among ('future Environmental Justice population living within 1/4mi of bus routes which have ≤30min headways' / 'total Environmental Justice population') / ('future population living within 1/4mi of bus routes which have ≤30min headways' / 'total population'). Explained in another way, the raw score of 'Pct of pop with with ≤30min transit headways (EJ/Total)' tells us the percentage of people living in an Environmental Justice community who have convenient access to transit and compares this number to the percentage of people living across the entire region who have convenient access to transit. A percent change of 0 for this indicator would represent absolutely equal performance between Environmental Justice populations and the total population of the region, whereas a positive value would represent an improvement in equity and a negative value would represent a decrease in equity.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (EJ/Total):	0.8211		
Pct of pop with ≤30min transit headways (EJ/Total):	2.7167		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (EJ/Total):	0.8162	0.60	

Pct of pop with ≤30min transit headways (EJ/Total):	3.0096	10.78	
Weighted Score		5.69	40.37

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (EJ/Total):	0.7985	2.76	
Pct of pop with ≤30min transit headways (EJ/Total):	3.0096	10.04	
Weighted Score		6.40	45.39

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
Avg trip length (EJ/Total):	0.7939	3.32	
Pct of pop with ≤30min transit headways (EJ/Total):	2.7538	1.36	
Weighted Score		2.34	16.60

4. Impact on *Open/Green Spaces*

Productive agricultural spaces provide food, jobs and economic benefits to the local economy and the region. Protecting other rural and environmentally-significant lands provides safe spaces for wildlife habitat and aquifer recharge areas.

What was measured? A forecast of future acres of critical wildlife habitat[2] impacted by new development, taken as a proportion of total critical wildlife habitat; forecast of future acres of new development in locations designated for agricultural use, taken as a proportion of total agricultural land.

Baseline 2010:	Raw Score	Pct Change	-50 to +50 Score
Acres critical habitat:	339312		
Acres Ag land:	277349		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Acres critical habitat:	22314	.007	
Acres Ag land:	33667	0.12	
Weighted Score		0.09	(50)

[2] *Critical habitat* is defined as rangeland and upland forest land, which are local hotspots for biodiversity.

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Acres critical habitat:	22219	0.07	
Acres Ag land:	33522	0.12	
Weighted Score		0.09	(49.79)

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
Acres critical habitat:	18108	0.05	
Acres Ag land:	29102	0.10	
Weighted Score		0.08	(42.29)

5. Impact on *Public Service Costs*

Households and businesses typically share in the use of public infrastructure, which may include services like water and sewer. As new residential/commercial/industrial structures are built, there are costs associated with providing infrastructure to new developments. Relative costs of providing infrastructure is largely influenced by the dispersion and distance of developments from existing centers.

What was measured? A forecast of future new demand for water and sewer services[3], measured in gallons per day per new resident; forecast of future local roads, measured in lane-miles per new resident.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
New water/sewer demand per capita:	186		
New lane-miles per capita:	0.008		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
New water/sewer demand per capita:	181.16	2.6	
New lane-miles per capita:	0.009	(15.1)	
Weighted Score		(6.25)	(0.79)

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
New water/sewer demand per capita:	180.02	3.2	

[3] Assumes that new demand for water and wastewater are equivalent. Therefore, freshwater demand was multiplied by 2 in order to arrive at the raw scores for water and wastewater (sewer).

New lane-miles per capita:	0.009	(15.2)	
Weighted Score		(5.99)	(0.75)

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
New water/sewer demand per capita:	147.33	20.8	
New lane-miles per capita:	0.007	11.5	
Weighted Score		16.15	2.03

6. Impact on *Storm Vulnerability*

In a hurricane-prone area like Tampa Bay, it can be hazardous for households to locate near the coastline or within a floodplain. When facing an extreme weather event, it is logistically difficult to facilitate evacuations of a large population from these zones.

What was measured? A forecast of future population within 100yr floodplain or locations designated as coastal hazards areas as a percentage of total population.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
Homes/pop/jobs within flood prone areas per capita:	1.191		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Homes/pop/jobs within flood prone areas per capita:	1.168	(1.88)	
Weighted Score		(1.88)	(50.00)

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Homes/pop/jobs within flood prone areas per capita:	1.169	(1.80)	
Weighted Score		(1.80)	(48.04)

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
Homes/pop/jobs within flood prone areas per capita:	1.190	(0.02)	
Weighted Score		(0.02)	(0.50)

7. Impact on *Traffic Jams*

The location of homes and jobs, and the transportation facilities that connect them, affects the amount of time the average person must spend on the road (or the bus) each day.

What was measured? A forecast of future total vehicles hours of delay on a typical weekday as a percentage of total population; forecast of the future average trip length for all purposes, measured in minutes.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
Vehicle delay hrs per capita:	0.118		
Avg trip length:	12.3		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Vehicle delay hrs per capita:	0.304	157.83	
Avg trip length:	13.6	10.57	
Weighted Score		84.20	(28.59)

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Vehicle delay hrs per capita:	0.410	247.39	
Avg trip length:	13.4	8.94	
Weighted Score		128.16	(43.52)

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
Vehicle delay hrs per capita:	0.453	283.91	
Avg trip length:	13.1	6.50	
Weighted Score		145.21	(49.31)

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8. Impact on *Clean Air & Water*

Motor vehicles account for approximately 40% of the ground-level ozone, an ingredient of smog. More energy efficient vehicles and fuel-switching can help to reduce air pollution.

Preserving the health of our rivers, streams and beaches is critical for Tampa Bay. Water bodies offer a number of important services, including erosion control, recreational opportunities and marine habitat, among others. Unfortunately, rain water picks up pollutants as it runs off roofs and parking lots then drains into rivers, lakes and drinking water reservoirs, thus threatening the health of these assets.

What was measured? A forecast of total kilograms of mobile source emissions originating from automotive traffic, including carbon monoxide, hydrocarbons and nitrogen oxides, all represented as a percentage of total population; forecast of total gallons of fuel use as a percentage of total population; forecast of new acreage of impervious surface as a percentage of total population, based on development rates.[4] This priority was omitted from the final list of priorities due to the supporting data being captured under other priorities, chiefly *Traffic Jams*.

Baseline:	Raw Score	Pct Change	-50 to +50 Score
Emissions CO per capita:	0.3812		
Emissions HC_x per capita:	0.0278		
Emissions NO_x per capita:	7.3067		
Fuel consumption per capita:	0.5329		
Impervious surface per capita:	0.0243		

Scenario A:	Raw Score	Pct Change	-50 to +50 Score
Emissions CO per capita:	0.5456	43.14	
Emissions HC_x per capita:	0.0386	38.86	
Emissions NO_x per capita:	11.0301	50.96	
Fuel consumption per capita:	0.7804	46.45	
New impervious surface per capita:	0.0183	(24.46)	
Weighted Score		10.19	(11.62)

Scenario B:	Raw Score	Pct Change	-50 to +50 Score
Emissions CO per capita:	0.5860	53.74	
Emissions HC_x per capita:	0.0405	45.74	
Emissions NO_x per capita:	11.7106	60.27	
Fuel consumption per capita:	0.8096	51.93	
New impervious surface per capita:	0.0169	(30.44)	
Weighted Score		11.24	(12.81)

[4] *Impervious surface rates* are derived from estimates for building and parking footprints, driveways, sidewalks, and streets associated with development. Assumes that redevelopment accounts for a 25% net increase in impervious surface.

Scenario C:	Raw Score	Pct Change	-50 to +50 Score
Emissions CO per capita:	0.5974	56.74	
Emissions HC_x per capita:	0.0405	45.76	
Emissions NO_x per capita:	12.3694	69.29	
Fuel consumption per capita:	0.8390	57.44	
New impervious surface per capita:	0.0182	(24.93)	
Weighted Score		16.19	(18.45)