November 2, 2018

Memorandum #2018-131

TO: Regional Connectors Study Working Group

BY: Robert A. Crum, Jr., Executive Director

RE: Regional Connectors Study

Attached is the agenda for the **Regional Connectors Study Working Group meeting** scheduled for **Thursday, November 8, 2018 at 10:00 am** at The Regional Building, Conference Room D, located at 723 Woodlake Drive, Chesapeake 23320.

MK/sc

Voting Members:
Earl Sorey (CH)
VACANT (HA)
Bryan Stilley (NN)
Brian Fowler (NO)
VACANT (SU)
James Wright (PO)
Phil Pullen (VB)

Nonvoting Members:
Patrick Kinsman (Army Corps)
George Janek (Army Corps)
Robert Pruhs (Army Corps)
Ivan Rucker (FHWA)
Kevin Page (HRTAC)
Rhonda Murray (US NAVY)
Tim Dolan (US Coast Guard)
Gene Leonard (US Coast Guard)
Tony Gibson (VDOT)
Scott Smizik (VDOT)
Kit Chope (VPA)

Staff:
Bob Crum (HRTPO)
Mike Kimbrel (HRTPO)
Rob Case (HRTPO)
Keith Nichols (HRTPO)
Dale Stith (HRTPO)

Project Coordinator:
Camelia Ravanbakht

Agenda
Regional Connectors Study
Working Group Meeting
November 8, 2018
10:00 AM

The Regional Building, Conference Room D, 723 Woodlake Drive, Chesapeake, Virginia

1. Call to Order

2. Welcome and Introductions

3. Public Comment Period (Limit 3 minutes per individual)

4. Minutes

   Recommended Action: Approval

5. Phase 1 Study Tasks Progress: Craig, Eddy, MBI

   List of Stakeholders – Attachment 5

   Recommended Action: For Information and Discussion

6. RCS Regional Scenario Planning

   - Background – Dale Stith, HRTPO

   - Draft Scope of Work – Lorna Parkins, MBI

   Scope of Work RCS Scenario Analysis Draft Document – Attachment 6

   Recommended Action: For Review and Discussion

7. Schedule and Next Meetings:

   December 6, 2018 – 10 AM

   January 31, 2019 – 10 AM

8. Adjournment

8-22-18 RCS Meeting at Regional Building- Minutes

<u>Attendance (alphabetically)</u>

Keith Cannady	HRPDC
Rob Case	HRTPO
Kit Chope	VPA
Bob Crum	HRTPO
Tim Dolan	USCG
Craig Eddy	Michael Baker
Walter Ezell	Norfolk
Jason Flowers	USACE
Brian Fowler	Norfolk
Amy Inman	Norfolk
Carl Jackson	Portsmouth
Mike Kimbrel	HRTPO
Gene Leonard	USCG
Keith Nichols	HRTPO
Kevin Page	HRTAC
Phil Pullen	Va. Beach
Camelia Ravanbakht	Retired HRTPO
Scott Smizik	VDOT
Earl Sorey	Chesapeake
Bryan Stilley	Newport News
Dale Stith	HRTPO
Mark Velasquez	Suffolk
James Wright	Portsmouth

Meeting Actions, by Item Number from the Agenda

1. Call to Order- 11am Bob Crum (HRTPO) called meeting to order.
2. Welcome and Introductions- Bob welcomed the working group who introduced themselves.
3. Public Comment Period- no comments
4. Minutes- The group approved the minutes from 6-4-18 meeting.
5. Phase 1 (establishing goals and objectives for subsequent phases) Study Progress-
   Craig Eddy (MBI) relayed progress to the group via task-by-task slides:
   - Task 1- Develop and Initiate Engagement Program
     o After discussion, MBI agreed to invite both CAOs and technical representatives for one-on-one interviews.
     o Craig asked for comments by early next week on draft public survey (handout).
   - Task 2- Evaluate Regional Travel Demand Model
     o To keep the study on schedule, Craig plans to use the model after key (but not all) updates have been made by VDOT.
   - Task 3- Determine Scenario Planning Effort
     o Craig met July 16 with HRTPO staff.
   - Task 4- Update Existing Conditions Information
     o Craig asked for feedback on two formats (handout).
   - Task 5- Present Findings at Working Group Meeting
     o Next meeting is scheduled for late September but may be pushed back to account for one-on-one interviews.
6. Progress of Tasks- see above
7. Schedule- Dale Stith (HRTPO) needs input from RCS for 2045 Long-Range Transportation Plan in spring 2020.
8. Next Steps-
   - Complete Phase 1.
   - Collaborate with group to determine scope and costs of Phase 2.

Initial Stakeholders

- City of Chesapeake;
- City of Franklin;
- City of Hampton;
- Isle of Wight County;
- James City County;
- City of Newport News;
- City of Norfolk;
- City of Poquoson;
- City of Portsmouth;
- Gloucester County;
- Southampton County;
- City of Suffolk;
- City of Virginia Beach;
- City of Williamsburg;
- York County;
- Coastal Virginia Tourism Alliance;
- Elizabeth River Crossings;
- Federal Highway Administration;
- Hampton Roads Chamber;
- Hampton Roads Economic Development Alliance;
- Hampton Roads Military and Federal Facilities Alliance (HRMFFA);
- Hampton Roads Transit;
- Suffolk Transit;
- US Air Force - Langley/Fort Eustis Joint Operation;
- US Army Corps of Engineers;
- US Coast Guard;
- US Navy - NAS Oceana/Dam Neck Annex;
- US Navy – Little Creek/Ft Story Joint Operation;
- US Navy - Naval Station Norfolk;
- US Navy - Yorktown Naval Weapons Station;
- Virginia Department of Rail and Public Transportation;
- Virginia Department of Transportation;
- Virginia Peninsula Chamber of Commerce;
- Virginia Port Authority; and
- Williamsburg Area Transit Authority (WATA).

Suggested Additional Stakeholders

- Busch Gardens
- HRT
- Colonial Williamsburg
- Riverside (5 hospitals on Northside of Hampton Roads)
- NASA
- Newport News Shipyard
- Joint CAO meetings (17 folks) SE group
- Walmart
- Chesapeake Bay Bridge Tunnel Authority
- Office of Innovation, Chief of Technology
- TMTA - Tidewater Motor Trucking Association
- VA Maritime Association (David White)
- Hampton University
- William & Mary
- Christopher Newport University
- Norfolk State University
- Thomas Nelson Community College
- Coliseum Business Improvement District
- Phoebus business team
- Downtown Hampton business team
- Hampton neighborhood groups
- Hampton Roads Public Transportation Alliance (advocacy group that focuses on transit issues)
- NS
- CSX
- CVTA – also includes the airport
- VRLTA VA Restaurant Lodging and Travel Association
  - o WMBG hotel and motel
  - o Norfolk hotel and motel
- Florence Kingston - Newport News
- Amy Jordan - James City County
- Chris Morello –Smithfield
- LEAD Peninsula civic immersion class
- CBDA – Central Business District Association
- Resort Advisory Commission
- Virginia Beach civic leagues
- People outside of the region to understand Richmond, Northern VA, Raleigh (fresh perspectives on HR region)
- The Greater Norfolk Incorporation
- Barry Bishop Business Groups
- Hampton Boulevard Task Force
- Michelle Woodhouse – provost Portsmouth TCC
- Jim Cooke, president emeritus of ODU involved with state of the region for over 15 years

Attachment 5

- Citywide Civic League Summit - invite all leagues to TCC for a charrette
- Ashton Lewis – long-time car dealership owner

DRAFT SCOPE OF WORK
Regional Scenario Planning

<u>Introduction</u>

The future is always uncertain, but long-range planning requires forecasting in the face of uncertainty. Our forecasts typically rely on assumptions about how economic, demographic, and technological trends will play out over an extended timeframe. To do long-range planning in the context of risk and uncertainty, a proven technique is scenario planning – testing potential impacts of future trends by analyzing alternative future scenarios. Scenario planning provides an opportunity to bracket assumptions about plausible futures and test the impacts of alternative trends on regional goals and objectives such as quality of life, mobility, accessibility and environmental resiliency.

The Regional Connectors Study (RCS) Regional Scenario Planning process will provide insight to decisionmakers regarding the need for and the benefits of alternative transportation investments in light of potential alternative future trends. The Scenario Planning process will consider a baseline 2045 scenario and three alternative 2045 scenarios that present plausible futures with respect to economic, demographic and technology drivers. The scenario analysis will link alternative future economic and demographic trends with land use, and the resulting socioeconomic forecasts will be tested with the regional travel demand model to understand the impacts to transportation and other performance measures. The scenario outcomes will provide a series of benchmarks against which to test the resilience of different transportation investments. A potential benefit of this process will be to identify those transportation investments and projects that fare best in the analysis - that provide the most cumulative benefit to the region regardless of which alternative future scenario is tested. This will be done by testing each of the RCS alternatives against each scenario to gauge how robust each investment is with respect to the range of possible futures.

Throughout the RCS Regional Scenario Planning process, the RCS Working Group will work closely with HRTPO staff and the Consultant team to provide guidance, affirm scenarios, select drivers and performance measures, and evaluate interim and final results. The RCS Steering Committee that is overseeing the overall RCS process will also be updated on the progress on the Regional Scenario Planning effort and will receive the results of the scenario testing of RCS alternatives for evaluation and consideration in the overall RCS process. The results will also be shared with the public to provide input as part of the final assessment of investment and policy insights in the study.

Task 1: Building the Base Data, Models, and Scenarios

Overview

The purpose of this task is to build a series of datasets and maps that will be used as the basis for the Scenario Planning effort. It will require close coordination with technical staff from the HRTPO and good communication with the Working Group to ensure that each step is documented and vetted, particularly because the data gathered in this task will be the foundation for all the scenario and modeling work in the following months.

The conversion of large amounts of data into useful information is a significant challenge that requires clear and concise data analysis and synthesis. The Consultant Team's planning process will be built upon developing an accurate, living library through assembling the compiled data into an organized structure and accessible formats, and by analyzing the data in a coordinated, comprehensive manner. The data collected and used in this study will be updated to provide regional leaders and analysts with accurate information from which to make strong, technically-supported decisions.

Task 1a. Kick Off and Data Collection

The focus of this task will be to review and analyze available data (much of it collected in Phase 1), with the goal of establishing a unified dataset for analysis of future scenarios, as well as to enable a foundational "benchmarking" of the core indicators of success in the Region. In addition, in this task we will hold a kick off meeting with the Working Group to guide the start of the technical and analytic process.

Task 1b: Build GIS Base for Scenario Planning

In this task, the Consultant Team will build a layered base, using GIS data, of the entire region to be used as the platform for spatial allocations in the Scenario Planning model. The initial data we anticipate assembling (some of which has been collected in Phase 1) includes information on demographics, housing, transportation, environment, infrastructure, governance, employment, education, finance and a host of other measures. In addition, we will organize this data in spatial terms, as layers on the regional GIS base map for future analysis.

A key step in building this base will be the determination of the scale of the "grid" to be used as the surface for the analysis of the region. There are a number of options for this grid, based on how the region is broken down into modules for different analytic purposes. These include:

- The TAZs used in the Regional Model
- Census Block Groups
- Existing parcel data
- An overlay grid of equal squares sometimes used for analysis purposes – usually ranging from 30x30 meter squares to 40-acre squares.

The type of grid used for the land use allocations will be determined once all the data is assembled to see which scale of grid is most conducive to data collection and analysis. In all cases, however, regardless of the primary grid chosen for analysis purposes, all data will of necessity be translated to the TAZ geography ultimately for use in the Travel Demand Model.

Task 1c: Build Place types

The land use allocation aspect of the Scenario Planning process will be conducted through a "Place type" approach. This involves converting the existing and future land use data categories in the region into a series of typical community or "place" types, with names such as residential suburban community, agricultural community or high-density mixed-use community with a commercial or residential focus. These Place types will be used both to profile the existing land use pattern in the region and to construct each of the future land use scenarios.

The process of building a set of Place types will involve several steps, including:

- Profiling existing and future land use types in the region to develop a unified set of Place types that describe regional development patterns
- Developing quantitative summaries of each Place type that summarize land uses, developed areas, and environmental data for each
- Developing summary 3-D visualizations of each Place type, to clearly explain them to stakeholders and the public

Available HRTPO datasets of existing and future land uses will be used as the basis for the Place types, and they will be checked against air photos and parcel data from sample locations in the Region to calibrate the Place types to existing conditions.

Task 1d: Build "Virtual Present" Map of the Region

The Virtual Present map is a picture of where development is currently located in the Region. Building the Virtual Present involves allocating the Place types onto the GIS base map of the region to match the existing pattern of development and land uses on the ground today. The existing parcel-based land use data from HRTPO will be used for this, but where there are any potential gaps in the parcel dataset, we have the ability to use National Land Cover data to fill in the missing areas. The output will be a GIS map of the Region that converts the existing land uses to Place types, with resulting data derived from the Place types about land use, environmental features, accessibility and transportation characteristics.

Task 1e: Land Suitability Analysis

The Land Suitability Analysis is a necessary step in order to build future scenarios and land use allocations. In order to be able to allocate new development based on growth scenarios, it is necessary to understand which lands are suitable for development from a regulatory, environmental and existing conditions standpoint. In this task, a series of new data layers will be added to the Regional GIS base that describe the suitability of the land for development or redevelopment based on:

- Federal, state or local government-owned lands
- Environmental constraints
- Utilities, infrastructure and easements
- Zoning and other regulatory constraints
- Flood and inundation zones
- Value of land and improvements (if parcel level data is available in GIS)
- Other constraints or factors influencing development potential

Together, the Virtual Present map and the Land Suitability Analysis overlays will define where new growth is both feasible and (to some extent) likely to occur. This information will form the basis for allocating future growth for the land use portion of the scenario development process.

Task 1f: Calibrate "Virtual Present" to TAZ control totals

An important aspect of this process will be to calibrate the allocations of land use to the control totals for socioeconomic data in the Travel Demand Model for each TAZ. This task will involve modifying the Place type allocation in the Virtual Present so that the population and industry employment totals match the controls in each TAZ according to the Travel Demand Model. This will ensure that the Virtual Present map exactly matches the spatial distribution of population and employment data that is used in the Travel Demand Model so that the Scenario Planning model and the Travel Demand Model are in synch. This will also highlight any significant differences between the 2015 land use data and the socioeconomic data in the Travel Demand Model.

Task 1g: Review Data on Economic Conditions and Trends

In order to support later development of economic "drivers" for use in scenario planning, the Consultant Team must first develop a baseline understanding of current economic conditions as well as key trends and drivers of future economic conditions. To this end, the Consultant Team will review HRTPO's 2015 profile of socioeconomic data and its 2045 regional socioeconomic forecasts, developed with the use of the Regional Economic Models Inc. (REMI). HRTPO will provide the Consultant Team with methodological documentation.

The Consultant Team will review and document trends and forecasts of several critical socio-economic and demographic variables, including employment by sector, population, population by age, households, household size, labor force participation, and migration by county. The Consultant Team will discuss the forecast process and results with Greg Grootendorst, Chief Economist of HRPDC, as needed. To support interpretation of these forecasts, they will be benchmarked against other sources of information, such as Federal and State data, as well as proprietary sources such as Moody's Economy.com. The Consultant Team will further outline and discuss the transportation implications of the socio-economic and demographic changes identified, as well as the key underlying assumptions within the REMI model or other parts of the forecasting process that drive outcomes. In particular, the Consultant Team will review embedded assumptions related to the types of economic drivers that will subsequently define alternative scenarios, to ensure divergent futures can be correctly "pivoted" from the baseline forecast, and to identify any key sources of uncertainty.

In addition to the broad regional review, the Consultant Team will conduct a specific review of expected trends at Port of Virginia facilities. This will include a review of port demand forecasts contained in the travel model and documented in PoV's 2065 master plan and a meeting with PoV staff. This review will ensure alignment between the travel model and the port's expectation and will support the option for integrating shifts in port activity (including mode shifts) as potential scenario drivers later in the process.

Task 1h: Identification of Economic Opportunities

In this task, the Consultant Team will review available information on identified economic development opportunities within the region that may affect spatial and industry patterns of long term regional growth. This is expected to include a review of information collected by HRTPO regarding potential large

parcel economic development sites, as well as discussions with staff concerning the way in which these sites are treated in the TPO's future forecasting process. In addition, the Consultant Team will review the Hampton Roads Economic Development Alliance report that identified competitive industries that could drive additional regional growth including advanced manufacturing & logistics, shared services (e.g. ADP), and IT. The Consultant Team will also review HRPDC's most recent Regional Economic Development Strategy (REDS) and Regional Benchmarking Study and will hold 1-2 stakeholder meetings with regional economic development experts. This information together will provide a basis for defining potential scenario economic drivers that are specific to the Hampton Roads Region, with particular attention given to different potential economic diversification futures.

Task 1i: Economic and Financial Implications of Alternative Development/Industry Mix

The Consultant Team will conduct an initial review of data and tools available to connect alternative development (by Place type or industry) and transportation scenarios to likely economic and financial outcomes. This preliminary research will help parameterize the range of economic performance measure options available, to be further refined in Task 3. At a minimum, this will involve coordinating with TPO staff regarding options to use the TREDIS economic modeling system with or without REMI. TREDIS's modular framework enables economic impact evaluation either with the built-in Regional Dynamics economic model, or through integration with REMI. As part of this TREDIS review, the Consultant Team will coordinate with TPO staff regarding freight data options that enable the connection of commodity movements to economic activity and impacts. The vFreight county-to-county trade flow database will be the default option. However, should the TPO have access to new Transearch data via VDOT, this option can be considered as well.

The Consultant Team will also review data on average square feet per employee and development value per square foot by different development types. This can support definition of scenarios in both development and employment terms. In addition, the economic Consultant Team will conduct a scan of available research on the relationship between public sector infrastructure costs and development typologies, as a potential variable of interest.

Task 1j: Review Data Describing Regional Travel Behavior

The Consultant Team will assess the data underlying the updated (2015/2045) HRTPO travel model for its adequacy in sustaining the performance of the model and for use in developing the identified potential model enhancements and extensions. The Consultant Team's data assessment will [a] identify shortcomings, if any, of existing data, [b] prioritize needed data collection, and [c] describe alternative data collection methods for cost-efficiently updating the underlying model data. The Consultant Team will prepare a preliminary cost estimate and schedule for acquiring any needed data. The assessment will include a review of any available information including previous studies, surveys, and reports characterizing personal and commercial travel behavior in the region.

As a result of the model evaluation completed in Phase I of this Study, there were several recommended actions based on acquiring GPS origin-destination data:

- Evaluate travel patterns associated with major facilities and harbor crossings. With respect to this study, it will be particularly important to understand and have the model represent well the travel markets that use the Harbor crossings.

- Evaluate and update external travel (XX, XI, IX) with respect to the region.
- Assess need for special generator representation. Determine travel patterns associated with the ports and any other major freight traffic generators in the region.

Task 1k: Evaluate Updated Regional Travel Demand Model

HRTPO model modifications are currently underway by VDOT and its consultants, including a base year update to Year 2015 - accommodating HRTPO's long range planning process. The Consultant Team is actively coordinating with VDOT and their consultants to incorporate recommendations deemed critical to this study for this model update. Once the model update is complete, the Consultant Team will conduct an evaluation of the updated model similar to the evaluation conducted in Phase I of this study for the previous version of the Regional Model.

The Consultant Team will review available documentation describing the updated HRTPO model and associated performance. The review will include an examination of currently available base and future year model sets reflecting the updates, and the Consultant Team will execute the model set(s), mechanically verifying results and the implementation of updates as described in the documentation, as well as model performance.

The Consultant Team will review and summarize the current model structure, modeling procedures, software, hardware, run scripts, and data flows. The Consultant Team will also review various model parameters, including vehicle and truck trip generation rates. Based on its review, the Consultant Team will describe the types of analysis that the model process is currently capable of supporting.   If necessary, in concert with feedback from HRTPO staff, the Consultant Team will identify potential enhancements and extensions to the modeling process that will broaden and/or integrate the model's analysis capabilities to address study needs. The list of potential model enhancements will be prioritized by the Consultant Team. The Consultant Team will outline the steps and actions needed to implement each enhancement.

This review may recommend further modification and testing of the model sets and will produce a list of recommended enhancements for implementation. The Consultant Team will summarize review findings and recommendations in a technical memorandum. After allowing HRTPO sufficient time to review the draft recommendations, two Consultant Team members will meet with HRTPO staff at the HRTPO office to discuss and finalize any necessary model modifications.

Timing:
- 3+ months (note that the 2045 regional travel demand model will need to be available for some parts of Task 1)

Meetings:
- Meetings with HRTPO staff: 3
- Working Group Meetings: 3
- Steering Committee Meetings: 0
- Other/Stakeholder Meetings: 3-4

Deliverables:
- Scenario Planning Methodology White Paper
- Memo Summarizing Economic Trends and Opportunities

- Memo Summarizing Travel Behavior Data Review
- Memo Summarizing Travel Demand Model Evaluation
- GIS Base for Scenario Planning Model
- Place type Dataset
- 3-D Visualizations of Place types
- Virtual Present GIS Mapping
- Land Suitability GIS Mapping
- TAZ Calibration of Place types
- Presentation materials, posters and slide decks of Deliverables for public outreach process

Task 2. Defining Alternative Future Scenarios

Overview

This task is a crucial one in the overall process as it defines the set of alternative future scenarios that will be the basis for all the subsequent analysis and modeling in the project. There are two broad aspects to defining alternative scenarios. One is the engagement aspect and the other is the technical aspect. Each one is outlined below separately but in reality, these two aspects will need to work together, with each major technical milestone having full input and vetting from the HRTPO staff, the Working Group and the Steering Committee.

It is assumed that there will be up to three Alternative Future Scenarios, in addition to the 2045 Baseline Scenario described in Task 5 below. As discussed in Phase 1 of this project, the 2045 Baseline Scenario is assumed to be HRTPO's 2045 forecast that is being finalized for the Travel Demand Model. The Alternative Future Scenarios will assume a level of growth that is in addition to the 2045 baseline growth in the model.

Task 2a: Identify Framework Scenarios

In this task, the Consultant Team will collaborate with the Working Group to define and affirm up to three draft "framework" scenarios. The Framework Scenarios will be simplified narrative descriptions of each scenario in plain language that describe the storyline for each alternative future. Through a series of work sessions with HRTPO staff and the Working Group, a set of draft frameworks will be developed, each of which profiles a different economic and growth future for the region. Some work has been done on this already in the region and the Consultant Team will be mindful not to reinvent the wheel but start with whatever has already been vetted with stakeholders to date.

Task 2b: Affirm Framework Scenarios

In this task, the Consultant Team will involve the Working Group and Steering Committee in a process of vetting and affirming the Framework Scenarios. Various techniques may be used to build consensus and affirmation in this task, including:

- Website questionnaires and interactive surveys (if broader exposure/input is desired)
- Focus group sessions with stakeholder groups
- Work sessions with the Working Group and Steering Committee

The result will be consensus on the part of the Working Group and Steering Committee on the three Alternative Future Scenarios that will go forward in this project, described in basic framework terms, without any quantitative analysis at this stage in the process.

Task 2c: Define Draft Drivers

Once the Framework Scenarios have been defined and vetted, the Consultant Team will use its research and technical expertise to propose a set of draft Drivers that will be used to develop the future scenarios. These drivers will be major change parameters in basic categories such as:

1. Demographics and location choice
2. Economy
3. Technology

Each category will have a set of quantitative drivers associated with it that will be used to construct the alternative future scenarios. Examples of the quantitative aspects of the drivers include things like:

- Population change by age cohort
- Place type location preference by age cohort
- Employment change by industry
- Adoption rate of transportation technology by Place type and/or age cohort

Drivers can sometimes be paired or interrelated to identify a potential outcome of interest. As an example, an increase in the number of workers with a college degree could be a driver of growth in knowledge-intensive industry sectors. Similarly, trends towards e-commerce can yield changes in the composition of truck trips and mileage on the transportation system.

The result of this task will be a set of Draft Drivers that can each be quantified and serve as model inputs for constructing the quantitative aspect of each of the future scenarios.

Task 2d: Define Scenario Socioeconomic Control Totals and Aggregate Spatial Assumptions

The Consultant Team will use the Drivers and the Framework Scenarios to create a set of socioeconomic control totals and aggregate spatial assumptions for each future scenario. The control totals will set the future levels of population and employment by industry for each scenario. Aggregate spatial assumptions will describe the decision-rules for spatial allocation of employment and population and will be developed by relating economic drivers to some combination of (a) Place types, (b) Specific major development sites, and (c) Existing clustering dynamics of industries within the region.

Once we identify drivers for each scenario, we will scan the academic literature and regional information collected in Task 1 to understand how each is related to changes in employment, population, and the spatial distribution of activity. This means that if the selected driver is, for example, level of educational attainment, we will use existing research to estimate the expected increase in regional employment associated with a certain change in the number of workers with a college degree. Similarly, a driver of reduced military spending would result in targeted decreases in the defense sector at military sites in the region. A successful diversification scenario might then also add employment to identified competitive industries, with spatial assumptions derived from the literature or based on existing

clustering dynamics. Adjustments like these are what will differentiate the baseline scenario from a set of alternative scenarios.

This task will involve close coordination with technical staff to ensure that each scenario's control totals are realistic, plausible and fit within the storyline of each Framework Scenario defined in task 2a above. We will also fine-tune the scenario drivers if we find that the anticipated effects of different drivers within the same scenario may have opposite effects, thereby diluting the overall impact of the scenario.

For the purpose of having apples-to-apples comparisons among scenarios, our starting assumption is that all three Alternative Future Scenarios will have the same overall regional control total for population and employment, although the spatial distribution and type of employment will vary for each scenario. However, this will need to be affirmed with staff and we are flexible if the staff's desire is to use different control totals for the scenarios, as long as the implications of this for the scenario analysis are clear for all.

Task 2e: Define Scenario Changes in Travel Behavior/System Performance

Changes in travel behavior are dictated by the nature and spatial allocation of activity, changes in perceived and actual costs of travel, availability of personal transportation modes, freight modal preferences associated with industry mix, and the efficiency of the transportation infrastructure in accommodating demand. Once we identify drivers for each scenario, we will scan the academic literature and regional information collected in Task 1 to understand how each is related to changes in all independent variables affecting travel behavior. The Regional Travel Demand Model, in conjunction with appropriate input data and parameter adjustments, will account for these behavior changes. With respect to drivers such as demographics and the economy, socio-economic data inputs to the travel model will reflect changes to travel behavior. Advances in technology such as ITS and connected/autonomous vehicles (C-AVs) will also impact the spatial allocation of land use. Technology will induce travel behavior changes that will depend on scenario assumptions regarding:

- market penetration of these technologies
- level of auto ownership (affects number of privately owned vs. shared C-AVs and zero occupant vehicle (ZOV) trips) and other factors/behaviors related to mode share
- parking location
- traveler values-of-time
- trip rates (reflecting induced demand and mobility by seniors, children, and disabled)
- trip lengths
- effective capacity of roadway infrastructure (due to platooning, higher density traffic flows)

Some of these variables will vary by Place type or other driver such as age cohort, facilitating assessment of the relationships between land use allocation and transportation performance. This task will involve close coordination with technical staff to ensure that each scenario's assumptions are realistic, plausible and fit within the storyline of each Framework Scenario defined in Task 2a. above.

Task 2f: Affirm Drivers and Scenario Parameters

In this task, the Consultant Team will use a similar process as in task 2b, above, to reconnect with the advisory groups to affirm each Scenario again in a quantified format with control totals, aggregate spatial assumptions, and changes in travel behavior for each. The result will be a general consensus on

the total amount and types of growth that each scenario will analyze in the subsequent tasks, as well as high-level parameters governing spatial distribution across the region and changes in travel behavior that will subsequently be reflected in the travel model.

Timing:
- 2-3 months

Meetings:
- Meetings with HRTPO staff: 2
- Working Group Meetings: 2
- Steering Committee Meetings: 1-2
- Other/Stakeholder Meetings: 2

Deliverables:
- Tech Memo on Framework Scenarios
- Infographics and Visualizations of Framework Scenarios
- Tech Memo on Drivers
- Tech Memo on Control Totals, Aggregate Spatial Assumptions, and Travel Parameters

Task 3: Defining Measures of Success

Overview

This task will establish a series of economic, land use and transportation factors that will be used to measure how each scenario contributes to a successful future for the Hampton Roads region. The factors will serve as the measures of effectiveness against which to test the overall regional impact of each scenario. It is anticipated that there will be numerous measures, but they will be grouped according to broad goals and objectives derived from the LRTP and RCS planning processes. Alignment with the Prioritization Tool measures is also a priority. A matrix will be developed that aligns each metric according to an established objective for the region. The example below is purely for illustration and the objectives and metrics will be developed in coordination with staff and Working Group and relate to the overall vision for the region:

OBJECTIVE	MEASURE	METRIC	DATA SOURCE
Improve Regional Accessibility	Labor market access	Population within a 40-minute travel time of employment centers	Travel demand model (population and travel time skims)
	Job accessibility of low income residents	Jobs accessible within a 40-minute travel time	Travel demand model (population and travel time skims) and/or network-based accessibility measure
Preserve the environment and enhance resiliency	Resilient development patterns	Square feet of development in non-flood-prone areas	Land use allocation model and GIS data on flood-resilient areas
	Impact on unprotected natural areas or green infrastructure	Location of sensitive but unprotected natural areas; developed, or development near (1/4 mile).	A composite of natural features, development footprints
Enhance economic	Cost of congestion	Monetized reliability costs	TREDIS and travel demand

OBJECTIVE	MEASURE	METRIC	DATA SOURCE
vitality		borne by travelers	model to analyze VMT/ VHT subject to congestion
	Economic impacts of congestion	Forfeited jobs, wages, income, or GRP	TREDIS and travel demand model
	Good jobs	Average wages per worker	REMI and Adjusted Scenario Industry Composition

Task 3a: Develop Draft Performance Measures

In this task, a set of performance measures will be developed in four categories – land use, environmental, transportation, and economic. They will each relate to the specific modeling methodology used – the land use model and related GIS data, the Travel Demand Model, and the economic models (including TREDIS, REMI, and spreadsheet "models"). Many of these measures will be of aggregate regional performance. However, the Consultant Team also expects some subset of targeted measures related to cross-harbor connections, in support of understanding the need for improved regional connectors.

Task 3b: Correlation with HRTPO Project Prioritization Methodology

A key aspect of the performance measures that will be explored in this task will be integration with HRTPO's Project Prioritization Tool. Coordination between the Scenario Planning process and the HRTPO's project prioritization process will be a priority, and the Consultant Team will work with the staff to ensure compatibility between measures that are used in this project with measures used by the HRTPO in their transportation planning and programming efforts.

Task 3c: Affirm Final Performance Measures and Develop Performance Dashboard

The final performance measures will be vetted with the Working Group and HRTPO staff and, as needed, will be reviewed with the Steering Committee. The result will be a general consensus on the methods and metrics that will be used to gauge success in the evaluation of each of the scenarios in subsequent tasks.

Once the final performance measures have been affirmed, the Consultant Team will develop a user-friendly interface to display the performance measures in a graphic dashboard format for use in public presentations and on the project website. The performance dashboard will allow a consistent way of comparing the scenarios and will show quantitatively how well each scenario helps the Region achieve its overall vision and goals for the future. It will be delivered in a format that allows HRTPO staff to use and update it later.

Timing:
- 2 months (measures)
- 1 month (dashboard)

Meetings:
- Meetings with HRTPO staff: 3
- Working Group Meetings: 1
- Steering Committee Meetings: 1 (optional)

- Other/Stakeholder Meetings: 0

Deliverables:
- Tech Memo on Performance Measures
- Performance Dashboard
- Infographics for Performance Measures

Task 4: Evaluate 2015 Regional Conditions

Overview

At this point in the process, all the elements will have been assembled to allow the scenario modeling process to begin. The first step in this process is to model and evaluate current (2015) conditions as a benchmark for future comparisons. The purpose of this initial model run is threefold:

1. To verify the modeling approach and outputs of the three modeling efforts – land use, economic and travel demand models – and make sure they are working in concert
2. To establish a picture of the region today using the approved Performance Measures to profile current conditions in the region for comparison against future scenarios
3. To calibrate the scenario model inputs and perform a "reality check" so that the model outputs plausibly profile current conditions from the standpoint of stakeholders

Task 4a: Evaluate 2015 land use, economics and travel conditions

Under this task, the Consultant Team will evaluate current regional conditions using information from the land use, economic and travel demand models and organize the outputs based on the approved performance measures and the Performance Dashboard as described above. In the case of the land use model, this involves calibrating and running the model to reproduce current conditions. The Travel Demand Model will be calibrated in Task 1k. above, so this task will just organize the outputs into the Performance Dashboard. Economic evaluation/modeling will involve a hybrid approach of spreadsheet-based evaluations and TREDIS-based modeling of the economic implications of avoidable transportation costs experienced by transportation system users and non-users as a result of system performance. The latter analysis will be supported by standard transportation data available from the regional travel demand model (e.g. network skims, O-D matrices, and V/C ratios).

While the exact nature of this analysis will be determined collaboratively within task 3, this analysis can potentially quantify the forfeiture of travel time and operating costs driven by congestion, lack of reliability, and other network constraints, as well as additional societal costs associated with degradation of environmental or safety conditions. It may also visualize and quantify forfeited labor and freight markets, as well as identify which facilities within the regional network contribute the most to the loss of regional accessibility and associated business productivity.

Task 4b: Validate Model Outputs and Data for 2015 Performance

Once an initial set of 2015 performance outputs has been generated from the models, this task will involve a validation of the data to ensure that it is a plausible portrayal of conditions in the Region for 2015. The Consultant Team will compare the 2015 model outputs against available data on regional economic and demographic conditions as well as other documented areas of performance to ensure that they generally match. This task may involve some adjustment of the model inputs and additional

model runs to ensure that the 2015 model accurately outputs known measurable conditions in the Region.

Timing:
- 5 weeks

Meetings:
- Meetings with HRTPO staff: 2
- Working Group Meetings: 1
- Steering Committee Meetings: 0
- Other/Stakeholder Meetings: 0

Deliverables:
- Land Use, Economic and Travel Demand model runs/evaluations for 2015 Current Conditions
- Dashboard Outputs for Model Runs
- 2015 Land Use Allocation and Transportation Model sets for HRTPO use

Task 5: Modeling the 2045 Baseline Alternative

Overview

At this point in the process, based on work from the previous tasks, we will have a working set of models that portray an accurate picture of conditions in the Hampton Roads region for 2015. The next series of tasks will create the "baseline" alternative for 2045 that matches HRTPO's Travel Demand Model assumptions and outputs. This first scenario will be called the 2045 Baseline Scenario because it will be the standard of comparison for all the other future scenarios. It establishes a baseline pattern and level of growth in the Region that has already been vetted with the Region's public and stakeholders through the HRTPO's transportation planning process. [FOR DISCUSSION:] All the other future scenarios will use this Baseline as a starting point in adding further growth based on enhanced future conditions in the "storyline" of each scenario. In order to correlate to HRTPO's long-range transportation planning process, we will ensure the following assumptions for the 2045 Baseline Alternative:

- Use the 2045 future socioeconomic forecasts by TAZ from the Travel Demand Model
- Use the 2045 Existing + Committed network from the Travel Demand Model

Task 5a: Developing the 2045 "Virtual Future" map of the Region

In the same process as creating the Virtual Present, above, this task will assign the Place types according to the 2045 land uses from the Travel Demand Model. We will use the 2045 control totals from the Travel Demand Model to ensure correlation of the socioeconomic data with the Travel Demand Model. This task will involve iterations and cross checking so that the Place types assigned within each of the Region's 1,500 TAZs each contains the same total population and employment numbers as the Travel Demand Model.

Task 5b: Conduct 2045 Baseline model runs for land use, economics and travel demand models

Under this task, the Consultant Team will conduct model runs of the land use, economic and travel demand models for the 2045 Baseline future and organize the outputs based on the approved performance measures outputted into the Performance Dashboard as described above.

Once the model outputs have been organized into the Performance Dashboard, a clear picture of the 2045 state of the Region based on current trends and policies should emerge.

In addition, this task will involve running the outputs from the Travel Demand Model through the TREDIS model (as in all subsequent scenario tests from this point on). This task will also involve affirming the assumptions and outputs to-date with the Working Group as an important check in before proceeding to the next steps of testing alternative future scenarios. Note that the performance output of this model run, should it take place before similar model runs for the overall RCS study, will provide useful information regarding future deficiencies.

Timing:
- 6 weeks

Meetings:
- Meetings with HRTPO staff: 2
- Working Group Meetings: 1
- Steering Committee Meetings: 0
- Other/Stakeholder Meetings: 0

Deliverables:
- Land Use Allocation for 2045 Baseline Conditions
- Land Use, Economic and Travel Demand model runs/evaluations for 2045 Baseline Conditions
- Dashboard Outputs for Model Runs
- Presentation materials, posters and slide decks of Deliverables for public outreach process
- 2045 Land Use Allocation and Transportation Model sets for HRTPO use

Task 6: Building the Alternative Scenarios
Overview

Up to this point, the workflow has concentrated on developing quantifiable models and profiles of conditions in the Region for 2015 and for the adopted 2045 vision from the Travel Demand Model. The next series of tasks will focus on developing and testing alternative future Scenarios for the year 2045 based on the scenario "storylines" developed in earlier tasks of this process. These next tasks will involve operationalizing the Scenarios with the assumptions (i.e., future economic and land use forecasts, future land use allocation for each scenario, technology assumptions in the Travel Demand Model, etc.) that have been developed to define each Scenario.

It is important to note that each of the alternative Future Scenarios will allocate growth that is in addition to the growth inherent in the 2045 Baseline model from the Travel Demand Model. This means that each Scenario is dealing with an additional increment of growth above and beyond the assumed growth for 2045 in the Travel Demand Model. In addition, it is important to note that each Scenario will use the same Existing + Committed transportation network as in the 2045 Baseline Scenario. These two considerations should help in maintaining consistency and provide an 'apples-to-apples' comparison among scenarios.

Task 6a: Develop Land Use Allocations for 3 Alternative Future Scenarios

The first step in building each of the alternative future Scenarios from a land use standpoint is to "paint" the appropriate scenario-based pattern of land uses (using Place types) onto the regional Base Map. This pattern will be based on the future assumptions about land uses and growth, including demographic drivers, described in each Scenario. Each Scenario will have assumptions about how and where future growth will happen in relation to the economic future that each Scenario envisions. These assumptions are likely to incorporate both specific assumptions about growth opportunities derived from identification of industry clusters or large development sites, as well associations between economic growth patterns and Place types. Based on that economic future, we will allocate to Place types by TAZ to match the overall control totals under each Scenario.

The product of this task will be a series of land use allocations, one for each future Scenario, that are derived from the growth and economic profiles of each Scenario. These land use allocations will then be used as the basis for the model runs in Task 7 to determine the impacts of each scenario.

Task 6b: Convert Land Use Allocations to TAZ Spatial Datasets for 3 Scenarios

Once the land use allocations for each Scenario have been completed, it will be necessary to translate them to the socioeconomic data required by the Travel Demand Model. For each Scenario, this involves converting the grid-based Place type map into the TAZ map with associated socioeconomic data used for the Travel Demand Model. The population and employment data built into each Place type will be converted to a TAZ geography for the Travel Demand Model.

This is an important step as it will allow both the Travel Demand Model and the TREDIS economic model to use the same assumptions for growth and land use for each Scenario.

Timing:
- 2-3 months

Meetings:
- Meetings with HRTPO staff: 2
- Working Group Meetings: 1
- Steering Committee Meetings: 0
- Other/Stakeholder Meetings: 0

Deliverables:
- Land Use Allocations for 3 Future Scenarios
- TAZ Calibration for 3 Future Scenarios

Task 7: Evaluating the Scenarios
Overview

The next step in the scenario modeling process is to run the various models for each Scenario and evaluate the results. The goal of this task is to assemble and evaluate the performance measures for each Scenario based on economic, transportation and land use/environmental metrics. As noted above, each Scenario will use the same transportation network (Existing + Committed) but will have different growth assumptions, land use patterns, and transportation behavior or technology assumptions. The Consultant Team will compare the scenario results to the 2045 Baseline to infer differences in performance attributed to the scenario drivers. This is a key step in understanding the potential range of

future outcomes without regard to transportation investment choices. The analysis of performance from transportation investments will be conducted in Task 8.

Task 7a. Travel Demand Modeling of 3 Scenarios

In this task the Travel Demand Model will be run for all 3 Alternative Scenarios. Socio-economic datasets developed in Task 6b and parameters associated with the technological assumptions for the scenarios vetted in Task 2e will serve as inputs to the TDM, distinguishing each scenario. The outputs from each model run will be summarized on the Performance Dashboard and will be used for the economic modeling.

Task 7b. Economic Modeling of 3 Scenarios

In this task, each of the Travel Demand Model outputs for the 3 Scenarios will be run through TREDIS modeling and potentially other spreadsheet economic models to analyze the potential economic benefits and impacts to the Region for each Scenario. The outputs from each model run will be summarized on the Performance Dashboard and will be used for the overall evaluation of Scenarios.

Task 7c. Land Use modeling of 3 Scenarios

In this task, each of the land use allocations for the 3 Scenarios will be analyzed through land use modeling in the same way as for the 2015 Current Year and the 2045 Baseline Scenarios. The outputs will allow comparisons of indicators such as land use efficiency, accessibility to destinations, environmental impacts, etc. The outputs from each model run will be summarized on the Performance Dashboard and will be used for the overall evaluation of Scenarios.

Task 7d. Public and Stakeholder Vetting of the Scenario Evaluations

Once all the model runs for the 3 Scenarios have been completed and the outputs summarized, the Consultant Team will use outreach approaches to bring the public and key stakeholders into a process of understanding and vetting the results of the Scenario Evaluation. We will work with the Working Group to confirm the involvement approach which may include website interactive surveys, focus group sessions, public workshops and work sessions with the Working Group.

The result will be a public awareness of the conclusions of the Scenario Evaluation and support for proceeding with the next task, which will involve testing each of the Candidate Regional Connector projects (screened for permitability) against the Scenarios.

Timing:
- 3 months (possible extension overlapping Task 8 for ongoing outreach)

Meetings:
- Meetings with HRTPO staff: 3
- Working Group Meetings: 1
- Steering Committee Meetings: 1
- Other/Stakeholder Meetings: 0

Deliverables:
- Land Use, Economic and Travel Demand model runs for 3 Future Scenarios

- Dashboard Outputs for Model Runs
- Tech Memo on Scenario Evaluation
- Presentation materials, posters and slide decks of Deliverables for public outreach process

Task 8: Evaluating the Candidate RCS Projects

Overview

The final step in the scenario analysis is the assessment of transportation investment impacts by scenario. In this task, the Consultant Team will run each RCS project for each scenario. The Consultant Team will scope up to 20 model runs per scenario that will be a combination of runs used to develop demand estimates associated with each RCS project and additional runs to check for cause and effect relationships (such as particular pairings of RCS projects). The schedule assumes the component RCS projects will have already been coded into the travel demand model network in the main RCS study process prior to the beginning of this task.

Task 8a: Confirmation/Coding of Candidate RCS projects for testing

Transportation improvements defined by the RCS projects will be "coded" into the Existing + Committed network using planning data available from HRTPO. Coding will include information such as facility description, alignment, and capacity information associated with improvements. Network coding will also specify locations of toll assessment and toll values, if applicable. The Consultant Team will review and confirm project coding assumptions with HRTPO. There will be one project network for each RCS project. Note, the schedule assumes the component RCS projects will have already been coded into the travel demand model network by Michael Baker some time prior to the beginning of this task.

Task 8b: Travel Demand Modeling for 3 Scenarios (each Candidate project)

Using the networks developed in Task 7a and scenario specific socio-economic data and parameters, run the TDM for each project over each of the 3 scenarios. Provide quality control checks on associated output. The modeling results for the newly coded projects will be compared against results of similar projects or benchmarks (if available) to determine appropriateness of the results. Ad-hoc sensitivity testing may be performed under certain circumstances if the results of the projects are not intuitive. The results for each project will be compared against all project scenarios and the Existing + Committed network demand estimates to uncover and flag any potential issues in the results.

Task 8c: Performance Evaluation of 3 Scenarios (each individual project)

In this task, the Consultant team will complete the performance dashboard for each RCS project, though not necessarily each model run due to the large volume of information. The Consultant Team will work with HRTPO staff to identify the most meaningful comparisons to share with the Working Group and will then determine any further iterations to run to explore cause-and-effect in performance in Task 8c. Also, the Consultant Team will provide all necessary input data for HRTPO staff to run the HRTPO prioritization tool for each set of projects under each scenario to provide a ranking of each project by scenario, as illustrated in the table below. This information will provide an important basis for assessing how robust the RCS alternatives are for potential future conditions.

Project Rank	2045 Baseline E+C	Scenario 1 E + C	Scenario 2 E + C	Scenario 3 E + C

E+C + RCS 1	5	8	15	8
E+C + RCS 2	4	6	4	2
E+C + RCS 3	5	3	20	15
...E+C + RCS 20	8	9	3	9

HRTPO seeks to evaluate the transportation benefits of RCS candidate projects and the extent to which they achieve the goal of enhancing economic vitality and improving the quality of life in the region. To do so, the Consultant Team will use TREDIS to translate travel model results describing travel time, distance, reliability, and market access, into regional economic impacts expressed in terms of jobs, labor income, business sales, and GDP, with detail available by industry sector, and over time. The TREDIS FREIGHT module will allow targeted analysis of the implications of transportation performance for freight-reliant industries. Given the number of RCS projects, and the desire to test performance of every project under the baseline as well as all alternative scenarios, the Consultant Team will make use of TREDIS's batch mode to support easy import of project details and export of key economic performance results.

Task 8d: Additional iterations to check for cause and effect relationships and preparation of final results

After the initial testing of individual candidate projects, the Consultant Team will hold a workshop with the Working Group and HRTPO staff to identify any final questions to be addressed with final model runs and/or extraction of data (such as select link analysis) from the model set. After this meeting, the Consultant Team will conduct any final iterations and will prepare the final results for presentation to the Working Group and Steering Committee. In these meetings, these groups will provide input on the most relevant data, insights, and 'story lines' to be carried forward in final reporting.

Timing:
- 4 months

Meetings:
- Meetings with HRTPO staff: 3
- Working Group Meetings: 2
- Steering Committee Meetings: 1
- Other/Stakeholder Meetings: 0

Deliverables:
- Travel Demand model, economic model, and prioritization tool runs
- Dashboard Outputs for Model Runs
- Tech Memo on RCS project evaluation
- Final scenario planning land use and travel demand model files

Task 9: Reporting Results
Overview

In this final task, the Consultant Team will work with HRTPO Staff, the Working Group, and the Steering Committee to distill the insights from the scenario process and package them for sharing with the public. The schedule assumes the HRTPO staff will carry the results forward into further outreach, but this effort can be undertaken with Consultant Team support if desired.

Task 9a Scenario Results Workshops

In this task, the Consultant Team will take the materials and input generated in Task 8 and prepare a work session to be held individually or jointly with the Working Group and Steering Committee to discuss the scenario analysis results and to provide input on investment, policy, and other recommendations to carry forward from the analysis.

Task 9b Packaging Scenario Results

The Consultant Team will document the results of the Task 9a workshop in the form of a presentation, website content, and a draft report that capture the full scenario planning steps and findings. This information will be used by HRTPO staff for ongoing outreach. After a period of initial outreach and input, the Consultant Team will present final findings to the Working Group and Steering Committee at the conclusion of Task 9.

Timing:
- 3 months (possibly extended for public outreach)

Meetings:
- Meetings with HRTPO staff: 3
- Working Group Meetings: 2
- Steering Committee Meetings: 2
- Other/Stakeholder Meetings: TBD

Deliverables:
- Draft and final presentation of scenario planning results
- Draft and final website content of scenario planning results
- Draft and final scenario planning report

HRTPO

REGIONAL CONNECTORS STUDY

STATUS REPORT

November 8, 2018

Phase 1 Tasks

- **Task 1 – Develop and Initiate Engagement Program**
  - Subtask 1.1A – Conduct One-on-One Interviews with Local Governments
  - Subtask 1.1B – Conduct One-on-One Interviews with other Local Agencies
  - Subtask 1.2 – Prepare Study Engagement /Outreach Plan
  - Subtask 1.3 – Develop and Maintain Study Website
  - Subtask 1.4 – Develop and Conduct Regional Survey

- **Task 2 – Evaluate Regional Travel Demand Model**

- **Task 3 – Determine Scenario Planning Effort**

- **Task 4 – Update Existing Conditions Information**

- **Task 5 – Present Findings to Working Group**

Task 1 – Develop and Initiate Engagement Program

- Task 1.1.A and Task 1.1.B – majority of stakeholder interviews have been conducted, additional stakeholders may be added

- Task 1.2 – Draft Engagement/Outreach Plan nearing completion

- Task 1.3 – Website content still under development

- Task 1.4 – 20,000 surveys were mailed out. 7.3% return rate. 2.6% margin of error.

DELIVERABLES

Engagement/Outreach Plan, establish website with usage statistics, summary of interview and survey results – website still under development, interview and survey results compilation has been initiated.

Task 2 – Evaluate Regional Travel Demand Model

- Reviewed model sets

- Assessed support capability

- Assessed data

- Coordinated with TPO and VDOT regarding planned model updates

- Identified model enhancements required

DELIVERABLES
Recommendations memorandum – technical memorandum nearing completion.

Task 3 – Determine Scenario Planning Effort

- Consultant team and HRTPO staff collaboration completed

- Draft scope of work for Phase 2 developed

DELIVERABLES

Memorandum of understanding defining roles and outcomes – draft memorandum completed

Regional Scenario Planning

- **What is the purpose of Scenario Planning?**
  - Testing potential impacts of future trends—economic, demographic, and technological—by analyzing alternative future scenarios
  - Considers a **Baseline Scenario** and **Alternative Scenarios** that differ based on plausible futures with respect to economic, demographic, and technology drivers

- **What are the benefits?**
  - Identifying the transportation investments and projects that fare best in the analysis (using the region's own prioritization methodology)
  - Responsive to travel behavior, job accessibility, environmental factors

Regional Scenario Planning – Exploratory Scenarios

EXPLORATORY scenarios ask what COULD happen?

What if we grow much faster or slower?

What COULD Happen?

How might new technologies change the game?
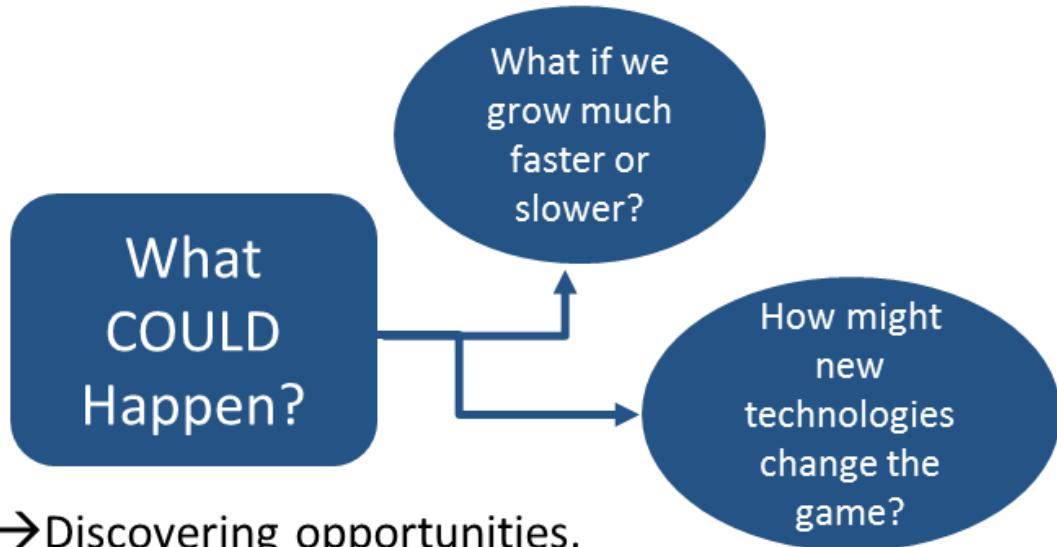
→ Discovering opportunities, identifying risks, shaping tactics, optimizing chances of success

Technology Advances

Changing Values

Globalization

UNCERTAINTY

Regional Scenario Modeling

OUTPUTS

SPATIAL MODEL (Land Use, Place types)

Modify Outputs directly

Modify AMOUNT & LOCATION of S/E data by TAZ

TRAVEL DEMAND MODEL

Modify Outputs

QUANTITATIVE MODELS (e.g. REMI)

Modify global CONTROL TOTALS for whole REGION

Modify Outputs directly

Scenario Planning - Project Workflow

TASK 1:
Build the Base Data, Models and Scenarios

TASK 2:
Define Alternative Future Scenarios

TASK 3:
Define Measures of Success

TASK 4:
Evaluate 2015 Regional Conditions

TASK 5:
Model 2045 Baseline Alternative

The foundation for all the scenario and modeling work in the following tasks

Requires engagement and technical work

The economic, land use, and transportation factors that will measure how successful each scenario is for Hampton Roads

Model and evaluate the current conditions

Establish the baseline to compare other scenarios against

Scenario Planning - Project Workflow

TASK 6:
Build Alternative 2045 Scenarios

Test the future scenario "storylines" developed earlier in process

TASK 7:
Evaluate the Scenarios

Assemble and evaluate the performance measures for each scenario based on established metrics

TASK 8:
Evaluate the Candidate RCS Projects

Assessment of each Candidate RCS project for each scenario after screening for permitability, feasibility, and constructability.

TASK 9:
Report Results

Distillation of results, insights, and how to move forward

REGIONAL CONNECTORS STUDY

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TRANSPORTATION PLANNING ORGANIZATION

Scenario Planning - Task 1: Base Data, Models, and Scenarios

- **Kick Off & Data Collection** WG

- **Build the GIS Base**

- **Build Place types**
  - *Profiling existing and future land use*
  - *Quantitative summaries of each Place type*
  - *3D visualizations of each Place type*

- **"Virtual Present" Map of Region**
  - *Where development is <u>currently</u> located; allocation of Place types*

| V1 – Rural | V2 – Low-Density Suburban | V3 – Small Town/ Suburban | V4 – Multimodal Suburban | V5 – High Density Suburban | V6 – Multimodal Urban |

Scenario Planning - Task 1: Base Data, Models, and Scenarios

- **Land Suitability Analysis**
  - *Suitability of land for future development based on:*
    - *Government ownership; environmental constraints; utilities, infrastructure, and easements; zoning and other regulatory constraints; flood and inundation zones; land and improvements values*

- **Calibrate Virtual Present**

- **Review Economic Conditions & Trends** (WG)
  - *Review HRTPO's 2015 socioeconomic data profile, 2045 socioeconomic forecasts*
  - *Review of expected trends at Port of Virginia*

- **Identification of Economic Opportunities**
  - *Review of HRPDC's Regional Economic Development Strategy*
 - *Stakeholder meetings with regional economic developer experts*

Scenario Planning - Task 1: Base Data, Models, and Scenarios

- Alternative Development/Industry Mix Implications

- Review Data Describing Regional Travel Behavior

- Evaluate the Updated Regional Travel Demand Model
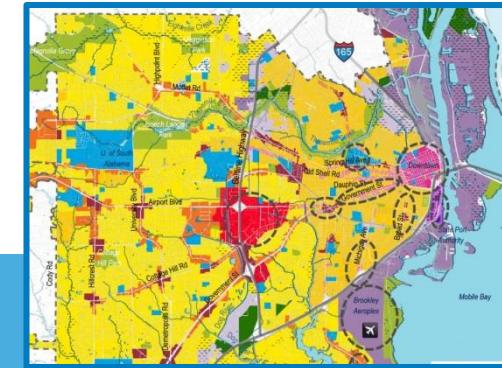
DELIVERABLES
- Scenario Planning Methodology White Paper
- Memos summarizing Economic Trends, Travel Behavior Data, TDM Evaluation
- GIS Base Data and Mapping, Place type Dataset, 3-D Visualizations

Scenario Planning - Task 2: Define Alternative Future Scenarios

- ## Identify Framework Scenarios (WG)

  - *Anticipate 3 Alternative Futures + Baseline*

- ## Affirm Framework Scenarios (WG)

  - *Work sessions with the Working Group and Steering Committee*

SCENARIOS

- **Alternative future states**
- **Describe potential changes to paint a picture of the future.**

Industrial Renaissance
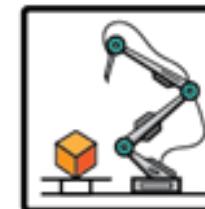
Techtopia
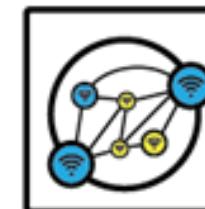
Silver Age

The Scenarios tell us how to move the input variables

INPUTS
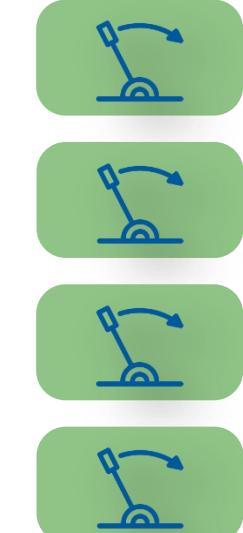
Scenario Planning - Task 2: Define Alternative Future Scenarios

- ▪ **Define Draft Drivers**
  - • *Demographics and location choice (e.g., Population change or Place type preference by cohort)*
  - • *Economy (e.g., Employment change by industry)*
  - • *Technology (e.g., adoption rate of transportation technology by age cohort)*
- ▪ **Define Future Socioeconomic and Spatial Assumptions**

Change in retail and food services jobs in DC:
April 2015 to April 2017
(change in number of jobs from the same period of the prior year, calculated from 3-month moving averages)
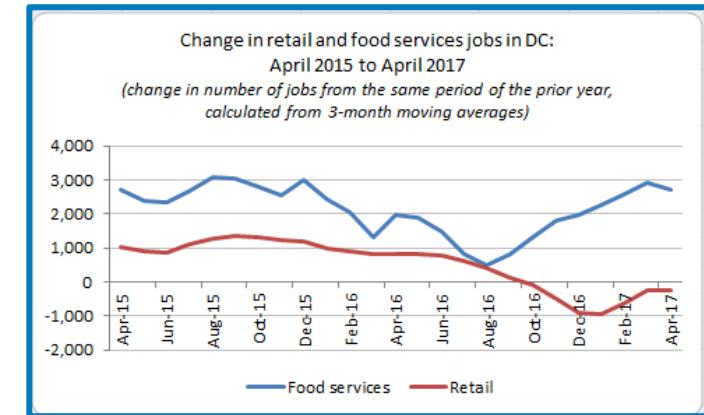
Scenario Planning - Task 2: Define Alternative Future Scenarios

- **Define Scenario Changes in Travel Behavior**
  - *Changes in activity allocation, costs of travel, mode availability, industry mode preference, efficiency*
  - *Technology adoption: market penetration, auto ownership, parking location, traveler values-of-time, trip rates, effective capacity of roadway infrastructure*

- **Affirm Drivers and Scenario Parameters**

DELIVERABLES
- Tech Memos on Framework Scenarios, Drivers, and Control Totals/Spatial Assumptions/Travel Parameters
- Infographics and Visualizations of Framework Scenarios

Scenario Planning - Task 3: Define Measures of Success

- *Measures of effectiveness against which to test impact of each scenario*

- Develop Draft Performance Measurements
  - *Four categories: land use, environmental, transportation, economic*
  - *Link to LRTP and RCS Goals and Objectives*

- Integration with HRTPO Project Prioritization Methodology

- Affirm Final Performance Measures and Develop Performance Dashboard

WG

DELIVERABLES
- Tech Memo on Performance Measures
- Performance Dashboard
- Infographics for Performance Measures

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Scenario Planning - Task 4: Evaluate 2015 Regional Conditions

- **Evaluate 2015 Conditions** WG
  - *Evaluation of 2015 land use, economics, and travel conditions*
  - *Establish picture of region today using Performance Measures*

- **Validate Model Outputs and Data for 2015 Performance**
  - *Compare model output against other available data to ensure plausible results*

DELIVERABLES
- Land Use, Economic, and Travel Demand model runs/evaluations for 2015 Conditions
- Dashboard Outputs for Model Runs

Scenario Planning - Task 5: Model 2045 Baseline Alternative

- Develop 2045 **Virtual Future** Map of Region

- Run Model for 2045 Baseline Alternative
  - *Land use, economics, and travel demand models*

- *Check in with Working Group before proceeding* **WG**

Discussion

Consultants recommend higher growth for the 3 alternative scenarios

DELIVERABLES

- Land Use Allocation for 2045 Baseline Conditions
- Model set for HRTPO use in LRTP
- Land Use, Economic, & Travel Demand model runs/evaluations for 2045 Baseline Conditions
- Dashboard Outputs for Model Runs
- Presentation, Outreach Materials

REGIONAL CONNECTORS STUDY

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Scenario Planning - Task 6: Build 2045 Alternative Scenarios

- *Each uses **same** Existing + Committed transportation network*

- *Each scenario deals with **additional** growth beyond baseline 2045 (recommended)*

- Develop Land Use Allocations for 3 Scenarios **WG**
  - *Where growth will happen in relation to the different economic futures*
  - *Specific assumptions about opportunities from industry clusters, development sites, growth patterns, and Place types*

DELIVERABLES
- Land Use Allocations for 3 Future Scenarios
- TAZ Calibration for 3 Future Scenarios

Scenario Planning - Task 7: Evaluate Alternative Scenarios

- Travel Demand Modeling of 3 Scenarios

- Economic Modeling of 3 Scenarios
  - *Determine the potential economic benefits and impacts of each scenario for Hampton Roads*

- Land Use Modeling of 3 Scenarios
  - *Allows for comparisons of indicators like land use efficiency, accessibility, environmental impacts, etc.*

WG

- Public and Stakeholder Vetting of Scenario Evaluations

DELIVERABLES

- Land Use, Economic, & Travel Demand model runs for 3 Future Scenarios
- Dashboard Outputs for Model Runs
- Tech Memo on Scenario Evaluation
- Presentation, Outreach Materials

REGIONAL CONNECTORS STUDY

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

Scenario Planning - Task 8: Evaluate the RCS Projects

- **Confirmation and Coding of the Candidate RCS Projects**
  - *Facility descriptions, alignments, capacity information, toll information*

- **Travel Demand Modeling of 3 Scenarios**
  - *For each candidate project*
  - *Compared to all other project scenarios and E+C network demand estimates*
  - *Some iterations to understand cause and effect*
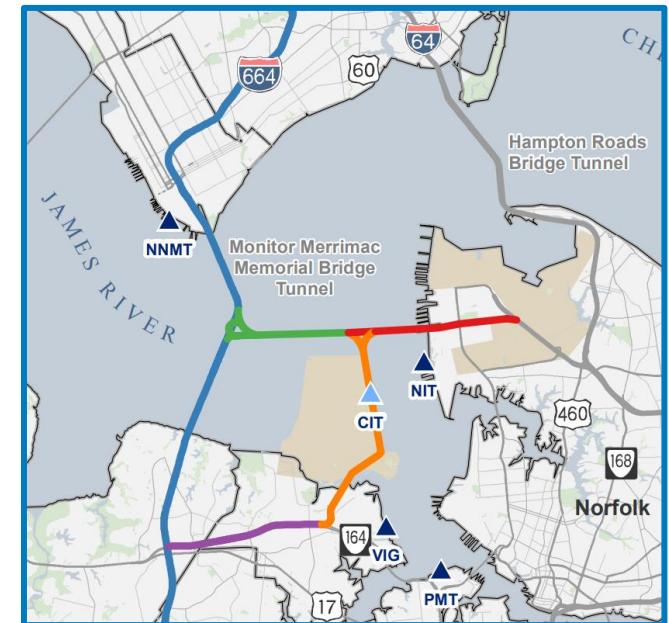
Scenario Planning - Task 8: Evaluate the RCS Projects

- Performance Evaluation of 3 Scenarios **WG**
  - *For each project*
  - *Identify significant comparisons, potential further iterations*

DELIVERABLES
- Travel Demand Model, Economic Model, and Prioritization tool runs
- Dashboard Outputs for Model Runs
- Tech Memo on RCS Project Evaluation

Scenario Planning - Task 9: Report the Results

- **Scenario Results Workshops** (WG)
  - *Discussions on scenario analysis results and investment, policy, and other recommendations*

- **Packaging the Scenario Results** (WG)
  - *Information for ongoing outreach by HRTPO staff*

DELIVERABLES
- Draft and Final Presentation of Scenario Planning Results
- Draft and Final Website Content of Scenario Planning Results
- Draft and Final Scenario Planning Report

Task 4 – Update Existing Conditions Information

- Summary pages completed and submitted for HRTPO staff comments

DELIVERABLES

One-page summaries of limited-access roadway segments – draft summary pages under review.

Task 5 – Present Findings at Working Group Meeting

- November 8 - status update

DELIVERABLES
Today's Phase 1 status update presentation, Phase 2 draft scope – partially initiated, awaiting analytical results before completing draft.

Schedule

Task No.	Task Name		June		July					August				September				October					November				December					January			
			18	25	2	9	16	23	30	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28
1.1	Prepare Study Engagement/Outreach Plan									█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█										
1.2	Develop and Maintain Study Website						█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█		█	█						
1.3	Conduct One-On-One Interviews			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█										
1.4	Develop and Conduct Regional Survey		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█								█	█									
2.0	Evaluate Regional Travel Demand Model			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█										
3.0	Determine Scenario Planning Effort			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█										
4.0	Update Existing Conditions Information			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█										
5.0	Present Findings at Working Group Meeting											█											█					█								█
	Prepare Phase 2 Scope of Work																											█	█	█	█	█				

PHASE 1 — Week of

Next Steps

- Complete Phase 1 tasks

- Collaborate with Working Group to determine scope of Phase 2

- Develop costs associated with Phase 2 scope

- Submit Phase 2 scope and costs for HRTPO Board approval

Coordination: LRTP and RCS

- **Key Elements that need to be consistent:**
  - **Visioning**
  - **Scenario Planning**
  - **Prioritization**

2045 LRTP: SCENARIO PLANNING

- LRTPs are updated to reflect changing conditions in:
  - Regional Priorities
  - Population and Employment
  - Economy
  - Anticipated Travel Demand
  - Transportation Technology
  - Etc.

What could happen?

What should we prepare for?

Where will growth occur and what will it look like?

What are employment and industry trends?

How advanced will transportation technology be?

What are the environmental considerations?

Labor Force Participation · Driving Age Population · Vehicle Ownership · Licensing Regulations · Gasoline Prices · Congestion & Time Use · Non-Auto Mode Options · GDP, Real Income Growth · Suburban Migration · Household Formation · Goods & Services Delivery · Tele-Commuting · Social Networking · Internet Shopping · Autonomous Cars · Driverless Vehicles

2045 LRTP: PLANNING TIMELINE

Year 1 (2016-2017)	Year 2 (2017-2018)	Year 3 (2018-2019)	Year 4 (2019-2020)	Year 5 (2020-2021)
Develop 2045 SE Control Totals	Project Prioritization 2.0 (modifications)	Allocate 2045 TAZ Data	Revenue Forecast	Constrained Project List
Update Regional Land Use Data	Update TAZ Data and Boundaries	Finalize modifications to Project Prioritization Tool	Project Evaluation/ Scenario Planning	Air Quality Conformity (6-month process)
TAZ Review/Delineation	Visioning/Regional Priorities Survey (statistically valid)	Refine Candidate Projects and collect Project Cost Estimates	Environmental Justice Analysis (may be incorporated in Tool)	Complete Documentation
Scenario Planning (research)	Goals, Objectives, Performance Measures/Targets	Project Evaluation/ Scenario Planning	Fiscal-Constraint Guidelines	
Project Prioritization 2.0 (research)	Needs Analysis (identify/collect candidate projects)	Environmental Coordination	Identification of Regional Priority Projects	
Develop Regional Priorities Surveys (scientific and public)	Scenario Planning (refine)			

Year 1 (2016-2017)	Year 2 (2017-2018)	Year 3 (2018-2019)	Year 4 (2019-2020)	Year 5 (2020-2021)
Marketing 2040	Public Outreach: (visioning/transportation needs)	Public Outreach: Candidate Projects (collect and review)	Public Outreach: Review of Prioritization Scores	Public Outreach: Review of Constrained Project List
Marketing 2045 Kick-Off	Public Outreach: Scenario Planning	Information Campaign: Prioritization 2.0 (changes, importance)	Public Outreach: online/web tools fiscal-constraint	

School Outreach – Year 2/3 and Year 4

**Public Review/Comment on Planning Documents throughout process

Hampton Roads 2045 Long-Range Transportation Plan

COORDINATION WITH STAKEHOLDERS

- Multiple meetings, presentations, workshops on Scenario Planning
  - TTAC
  - LRTP Subcommittee
  - Scenario Planning Peer Workshop (Nov 2016)
    - Forum to share noteworthy practices and key recommendations
    - Set the stage for the 2045 LRTP

- MPO Peers
- Virginia Peers
- Technical Experts
- Regional Stakeholders to participate

RESEARCH AND DIALOGUE
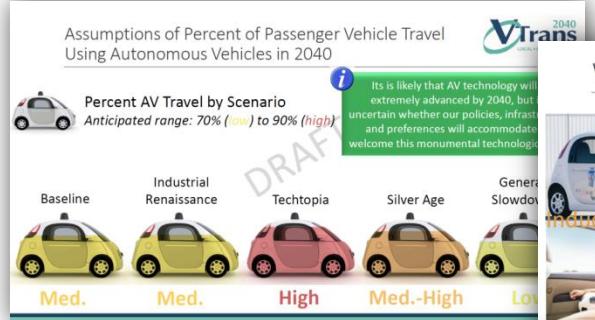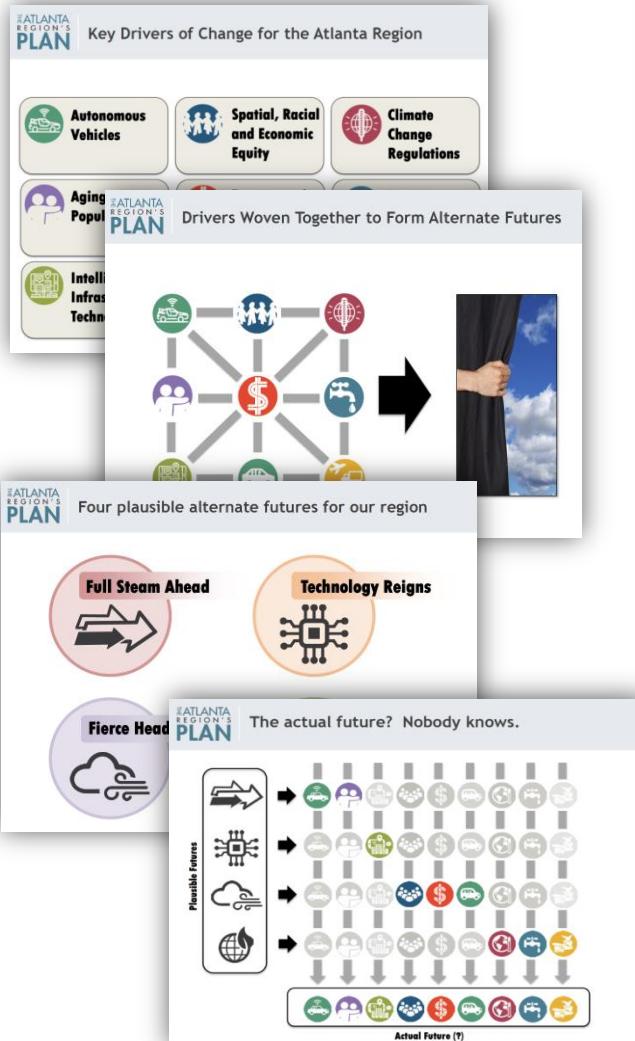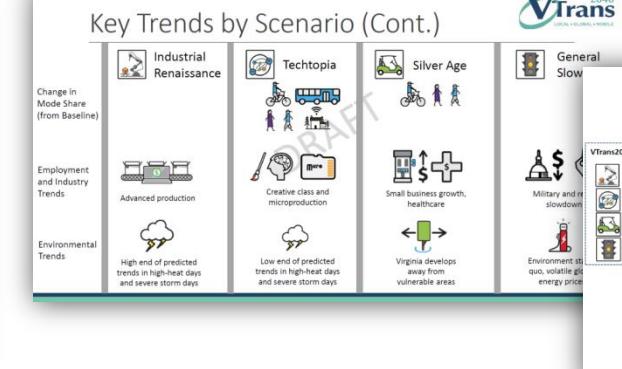
POTENTIAL SCENARIOS FOR 2045 LRTP
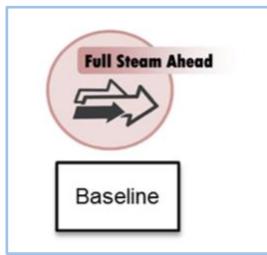
Full Steam Ahead/ Business As Usual

High Growth Industry
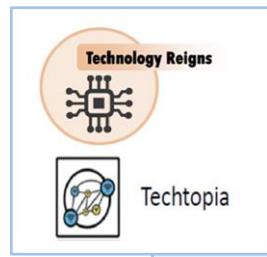
Technology Reigns/High Growth Technology
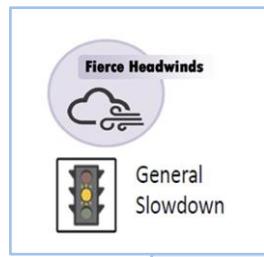
Fierce Headwinds/Low Growth

Silver Age/Aging Population

Ectopia/Sustainability

- ## Combine into 3 scenarios

Thank You!