Supplemental Information

Hampton Roads Transportation Planning Organization – Board Meeting
February 21, 2019

This packet includes supplemental information for Agenda Item 12:

- Scaled-down Scope, Schedule, and Budget for Phase 2 of the ***Regional Connectors Study***

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

PHASE 2 – TECHNICAL ANALYSIS

SCOPE OF WORK

<u>Introduction</u>
Phase 2 of the study will entail the technical analysis required to identify, assess, and prioritize potential transportation improvements to enhance connectivity between the Peninsula and the Southside of Hampton Roads. Phase 2 tasks are described in the following paragraphs.

TASK 1 – Execute Engagement Plan

This task outlines the process for the implementation of a Public Engagement Plan developed in Phase 1 of the Hampton Roads Regional Connectors Study (RCS). The subtasks associated with implementation of the Public Engagement Plan seek to inform, educate and engage stakeholders, residents, businesses, and travelers in the Hampton Roads Region. Phase 2 covers the period from January 2019 through January 2020, a 13-month period. As such, the Public Engagement Plan will be reviewed on a quarterly basis to ensure alignment with the goals and objectives of the study and to address any additional information obtained through the engagement process. The Consultant Team will adhere to all applicable policies and procedures as directed by HRTPO and applicable federal guidelines covering MPOs and recipients of federal funds for planning purposes.

Task 1.1: Task Management
The engagement task lead will provide a task-based progress report, participate in monthly team meetings and bi-weekly calls as appropriate with HRTPO staff and the project management team. Progress reports will summarize and report the percentage complete of each task and provide the basis for the monthly invoice. Progress reports will be provided to the project management team in acceptable format. The engagement task leader will attend Consultant Team meetings as needed, including but not limited to bi-weekly engagement team meetings, internal team meetings, and meetings with HRPTO staff as required. The engagement task leader will provide schedule updates to inform the master project schedule.

Task 1.2: Engagement Plan Review
The study engagement team will perform a quarterly review of the RCS Engagement Plan. This review will include evaluation of the demographic profile, tools and tactics, metrics, stakeholder groups and key

messages. Any revisions will be provided to HRTPO staff in track changes for review and acceptance. An electronic copy of each plan revision will be submitted.

Task 1.3 Implementation of Engagement Program

The study engagement team will conduct stakeholder outreach tasks to engage regional stakeholders as directed and approved by HRTPO and the Working Group. This will consist of outreach to the targeted stakeholders representing or living in the jurisdictions covered by HRTPO agreements. Activities to be implemented by the engagement team include:

Task 1.3a Study Mailing list and Comment Database

The study engagement team will create, organize, and maintain a project database and mailing list to house contact details for agency representatives, elected officials, civic groups, businesses, and other important stakeholders. The engagement team will work closely with HRTPO to develop the agency and locality mailing list. The list will be used to disseminate project status information such as a study brochure and to notify people of upcoming in-person and online engagement opportunities.

Throughout the course of the study, the engagement team will expand and update the list by encouraging interested parties to refer others to the list or through mailing list signups via the study website. The engagement team will utilize database software such as MailChimp to maintain the database.

This database can also be used to house public meeting comments for extraction and future response development. The engagement team will accept all public comments submitted during public outreach efforts and at public meetings. This effort will include: developing a public comment section of the database; collecting and cataloging all correspondence sent to the study team; categorizing all comments for inclusion in comment analysis or reports and creating the public outreach comment table summary for inclusion in the Engagement Summary Report.

Task 1.4 Website Upgrades and Maintenance

The study engagement team will develop content for use and subsequent uploading to the study website by the study team. This effort includes initial content development to be reviewed and approved by the Working Group and HRPTO along with the development of content updates by the study team at project milestones and other pertinent events.

Task 1.4 Prepare Website Content

The study team will develop a creative brief for Phase 2 to orient readers to the Regional Connectors Study and its phases.

As a part of Phase 2, the study website will be populated with fresh information as it becomes available, including analysis results, meeting dates, reports, and meeting/briefing dates. Updates and reporting documents such as one-pagers will be shared as they become available. Templates for these updates will be designed and developed as a part of this task. New content, including microsimulation of alternatives' traffic operating conditions, will be integrated into the site, and new components will be added to the site as needed to accommodate this content. Original copywriting will be delivered as a part of these updates, and publication will be managed by the study team. Regular hosting and maintenance of the study website will also be covered under this scope.

A key feature of Phase 2 will be the development of an Interactive Map, which will require coordination to establish visual goals, data sources, and other content needs. Once designed, this map will be integrated into the existing study website.

Phase 2 will also feature a new Scenario Planning Page Template which will appear at the top-level navigation on the site. New copy will be developed, and technical analysis elements performed by team members will be uploaded. This page will be designed to feature animations and other graphical elements.

As the Study gathers momentum, a plan will be created to report events on a regular schedule, and a post template for these events posts will be created.

Finally, survey results will be shared in the form of a final report. Survey-generated publications will be added, and categories for these publication types will be created and added to the website backend.

Timing:

- 13 months

Meetings:

- Meetings with HRTPO staff: 1
- Working Group Meetings: 0
- Steering Committee Meetings: 0

Deliverables:

- Study mailing list (electronic format)
- Comment database (electronic format)
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- Public Engagement Summary Website deliverables

TASK 4 – Conduct Scenario Planning

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 considering 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 scenarios will be developed in Phase 2, but not analyzed until Phase 3.

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.

The economic modeling tasks require model access and data license charges that are detailed in Appendix A.

Task 4.1: 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 effective 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 Consultant team will obtain all readily available data that localities have provided to HRPDC and will also coordinate any additional land use data collection efforts with local government planning and economic development staff.

The conversion of substantial 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 4.1a. 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 4.1b: 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 several 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 4.1c: 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 4.1d: Build “Virtual Present” Map of the Region

The Virtual Present map is a picture of where development is <u>currently</u> 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 can 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 4.1e: Land Suitability Analysis

The Land Suitability Analysis is a necessary step to build future scenarios and land use allocations. 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 4.1f: 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 4.1g: Review Data on Economic Conditions and Trends

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 the 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. 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 4.1h: 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 will provide a basis for defining potential scenario economic drivers that are specific to the Hampton Roads Region, with attention given to different potential economic diversification futures.

Task 4.1i: 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.

Task 4.1j: 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.

This review will include any data collection and analysis documented because of the ongoing HRTPO model modifications by VDOT to not duplicate efforts.

Task 4.1k: 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 targeted to the application of the model for use in the RCS.

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, as needed to conduct a study-focused validation to ensure the model well represents the travel markets that use the Harbor crossings.

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 4.1)

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 4.2. 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, 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 <u>in addition to</u> the 2045 baseline growth in the model.

Task 4.2a: 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 the Working Group and HRTPO staff, 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 4.2b: 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 4.2c: 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

Given the importance of resiliency (sea level rise/storm surge/recurrent flooding) to the Hampton Roads region, the study team will incorporate assumptions regarding resiliency in the scenarios, the specifics of which will be determined through stakeholder engagement.

Note, the scope and budget does not currently include any environmental drivers in the alternative scenarios beyond the incorporation of one sea level rise assumption consistent with HRPDC policy, to be applied across all scenarios. If the engagement process leads to the incorporation of additional variables and data in the model set, the cost of those additions will need to be added.

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 4.2d: 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 4.2e: 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, zero occupant vehicle (ZOV) trips and other factors/behaviors related to mode share)
- parking location
- traveler values-of-time (and their effect on average trip lengths)
- trip rates (reflecting induced demand and mobility by seniors, children, and disabled)
- 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 4.2f: Affirm Drivers and Scenario Parameters

In this task, the Consultant Team will use a similar process as in Task 4.2b, 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 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 4.3: 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 HRTPO Project Prioritization Tool measures is also a priority. In addition to measures for evaluating the scenarios, this task will include the development of all measures used to evaluate the RCS alternatives, including permitability and constructability.

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

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 vitality	Cost of congestion	Monetized reliability costs borne by travelers	TREDIS and travel demand 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 4.3a: Establish Goals and Objectives for the RCS Evaluations

In this task, the Consultant Team will coordinate with the Working Group to establish goals and objectives for the RCS evaluations, upon which the performance measures will be based. The goals and objectives will be derived from the study Vision statement and input from stakeholders and the public in Phase I. The Consultant Team will ensure that the objectives are measurable and will provide a basis for meaningful performance measures. The goals and objectives will be reviewed and refined with the Working Group and presented for approval to the Steering Committee.

Task 4.3b: Develop Draft Scenario Performance Measures

In this task, a set of scenario 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. The Consultant Team will take great care to consider new data sources and the available modeling tools to derive insightful and credible performance measures.

Timing:

- 3 months (measures and data collection)
- 1 month (dashboard)

Meetings:

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

Deliverables:

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

Task 4.4: 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 4.4a: 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 4.1k. 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 because 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 4.3, 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 4.4b: Validate Model Outputs and Data for 2015 Performance

Once an initial set of 2015 performance outputs have 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 land use 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– Prepare for and Attend Meetings (Working Group and Steering Committee)

Task 5.1: Working Group Meetings

The Consultant team will be represented by the Project Manager at all meetings (barring unforeseen conflicts) and supplemental team members depending upon the type of expertise being presented/discussed at each meeting. Discipline experts have estimated the number of Working Group meetings they will attend in each of the task/subtask summaries in this scope of services.

Task 5.2 Steering Committee Meetings

The Consultant team will be represented by the Project Manager at all meetings (barring unforeseen conflicts) and supplemental team members depending upon the type of expertise being presented/discussed at each meeting. Discipline experts have estimated the number of Working Group meetings they will attend in each of the task/subtask summaries in this scope of services.

Timing:

- 13 months

Meetings:

- Meetings with HRTPO staff: 0
- Working Group Meetings: 10
- Steering Committee Meetings: 5
- Other/Stakeholder Meetings: 0

Deliverables:

- Power Point slides and meeting handouts

TASK 6 – Manage the Project

Task 6.1: Weekly Coordination Conference Calls

Consultant Project Manager will participate in weekly coordination calls with RCS Project Coordinator, other interested parties, and HRTPO staff (assume 56 conference calls).

Task 6.2: Schedule and Budget Oversight

Consultant Project Manager will monitor schedule and budget on monthly basis and make changes to schedule, as needed. Budget monitoring will occur monthly during preparation of monthly progress reports so that any budget issues can be included in those reports. A Critical Path Method (CPM) schedule will be developed and maintained throughout Phase 2.

Task 6.3: Quality Assurance of Deliverables

Consultant PM will review all documentation and deliverables before they are forwarded to the RCS Project Coordinator for distribution to the Working Group and HRTPO staff.

Timing:

- 13 months

Meetings:

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

Deliverables:

- Coordination meeting minutes

APPENDIX A: ECONOMIC MODELS & DATA

Cost Assumptions

12-month TREDIS subscription for HRTPO region (13-counties)

= $19,800 for 12-months up to 8 counties + $500 x 5 additional counties = $22,300

Either vFreight add-on OR Transearch connection (if Transearch data available through VDOT)

= $10,000

Task 1i includes a decision point to select among these:

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.

Given duration of project effort, assume 2-year subscriptions:

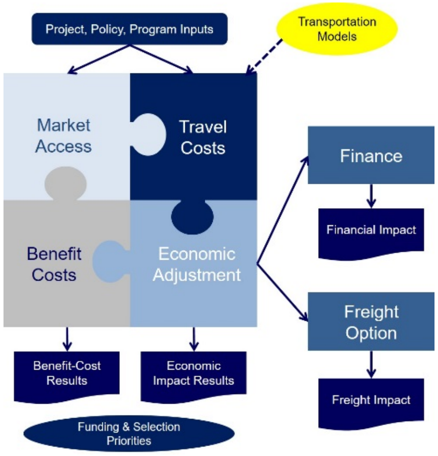
= 2 x ($22,300 + $10,000) = $64,600

Note: If HRTPO would prefer, the subscription can be billed in 1-year increments. These costs are currently included in Task 4.1.

TREDIS PACKAGE	Term	Study Areas	Users	Training & Support	Subscription Cost $US
US Regional MPO Subscription	12 months	Up to 8 counties	Up to 3	10 hours	$19,800
Optional Add-ons					
vFreight county level freight data	12 months	1 state	--	--	$10,000
Transearch connection	12 months	1 state	--	--	$10,000
Additional county	12 months	1 county	--	--	$500

HRTPO Independent Use: Note that the TREDIS subscription comes with 3 independent log-ins. HRTPO could independently use TREDIS as well as take advantage of the designated training and project/program support via phone, email, and web meeting. All subscriptions include unlimited technical support.

Model Background



TREDIS Model:

TREDIS® is the ***transportation economics suite*** – a unique decision support system for transportation planners that spans economic impact analysis, benefit-cost analysis, and financial analysis, as well as freight and trade impact analysis. It is the only system applicable for all modes – covering passenger and freight transport via aviation, marine and rail modes, as well as truck, car, bus, bicycle, and pedestrian travel. It is widely recognized for its high level of documentation, which is backed by published research, and its transparency, allowing users to trace the calculation of results. TREDIS is the most widely used system for economic impact analysis of transportation projects in the US and Canada.

Fact sheet on using TREDIS for economic impact analysis: http://tredis.com/images/pdf-docs/datasheets/TREDIS-Economic%20Impact%20Analysis%202014.pdf

TREDIS Freight:

The TREDIS FREIGHT module provides State DOTs, MPOs and transportation organizations with unsurpassed analysis capabilities that support freight planning, strategy development, project prioritization, economic impact assessment, and benefit-cost evaluation as well as meeting several other Federal requirements. These capabilities are enabled by a clearly laid-out framework that (a) brings together available transportation, economic and trade data, and (b) integrates industry, commodity and modal perspectives.

TREDIS Freight can be set up with one of two data options:

TREDIS vFreight provides data on county-to-county freight flows by 2 or 3-digit SCTG commodity level and both domestic and international mode. This data is integrated within the TREDIS economic impact module to enable more accurate and detailed industry impact evaluations based on the specific composition of commodity flows at the county level. It can also be used to identify existing freight dependence within a region.

TREDIS Fueled by Transearch® integrates IHS Global Insight Transearch data (purchased separately) into the TREDIS model. This enables corridor-level analysis of freight flows and economic reliance on/impacts of freight.

DRAFT

Regional Connectors Study - Phase 2
Schedule

Task No.	Task	2019 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	2020 JAN
TASK 1	EXECUTE ENGAGEMENT PLAN													
1.1	Task Management													
1.2	Engagement Plan Review													
1.3	Implementation of Engagement Plan													
1.3a	Study Mailing List and Comment Database													
~~1.3b~~	~~Stakeholder Briefings and Presentations~~													
~~1.3c~~	~~Brochures, Factsheets, and Handouts~~													
~~1.3d~~	~~Community Events and Outreach~~													
1.4	Website Upgrades and Maintenance													
~~TASK 2~~	~~DEVELOPMENT OF PRELIMINARY ALTERNATIVES~~													
~~2.1~~	~~Develop Geometry of Preliminary Alternatives~~													
~~2.2~~	~~Hydraulics and Hydrology~~													
~~2.3~~	~~Structures~~													
~~2.4~~	~~Utilities and Railroad Crossings~~													
~~2.5~~	~~Planning Cost Estimates~~													
~~TASK 3~~	~~CONGESTION RELIEF ASSESSMENT~~													
~~3.1~~	~~Conduct Congestion Relief Assessments~~													
~~3.2~~	~~Conduct Permitability Assessments~~													
~~3.3~~	~~Conduct Constructability Assessments~~													
TASK 4	CONDUCT SCENARIO PLANNING													
4.1	Building the Base Data, Models, and Scenarios													
4.2	Defining Alternative Future Scenarios													
4.3	Defining Measures of Success													
4.4	Evaluate 2015 Current Regional Conditions													
~~4.5~~	~~Modeling the 2045 Baseline Alternative~~													
~~4.6~~	~~Building the Alternative Scenarios~~													
TASK 5	PREPARE FOR AND ATTEND MEETINGS (WORKING GROUP AND STEERING COMMITTEE)													
5.1	Working Group Meetings													
5.2	Steering Committee Meetings													
TASK 6	MANAGE THE PROJECT													
6.1	Weekly Coordination with Study Leadership													
6.2	Schedule and Budget Oversight													
6.3	Quality Assurance of Deliverables													

Draft Deliverables
Final Deliverables
Steering Committee Meetings and Presentations
Working Group Coordination Meeting

Continuous Task
Draft Task Schedule

HRTPO to approve updated Prioritization Tool
2015 Regional Travel Demand Model available
2045 Regional Travel Demand Model available

PHASE 2 - TASK SUMMARY

Task No.	Task	Hours	Labor Costs	ODC's	TOTAL COST
1	**EXECUTE ENGAGEMENT PLAN**				
1.1	Task Management	139	$18,656	$0	$18,656
1.2	Engagement Plan Review	38	$5,341	$0	$5,341
1.3	Implementation of Engagement Plan	92	$13,479	$500	$13,979
1.3a	Study Mailing List and Comment Database	44	$5,231	$0	$5,231
~~1.3b~~	~~Stakeholder Briefings and Presentations~~				
~~1.3c~~	~~Brochures, Factsheets, Handouts~~				
~~1.3d~~	~~Community Events and Outreach~~				
1.4	Website Upgrades and Maintenance	548	$76,356	$2,500	$78,856
	Total Task 1	**862**	**$119,062**	**$3,000**	**$122,062**
~~2~~	~~DEVELOPMENT OF PRELIMINARY ALTERNATIVES~~				
~~2.1~~	~~Develop Geometry of Preliminary Alternatives~~	0	$0	$0	$0
~~2.2~~	~~Hydraulics and Hydrology~~				
~~2.3~~	~~Structures~~				
~~2.4~~	~~Utilities and Railroad Crossings~~				
~~2.5~~	~~Planning Cost Estimates~~				
	Total Task 2	**0**	**$0**	**$0**	**$0**
~~3~~	~~CONGESTION RELIEF ASSESSMENT~~				
~~3.1~~	~~Conduct Congestion Relief Assessments~~	0	$0	$0	$0
~~3.2~~	~~Conduct Permitability Assessments~~				
~~3.3~~	~~Conduct Constructability Assessments~~				
	Total Task 3	**0**	**$0**	**$0**	**$0**
4	**CONDUCT SCENARIO PLANNING**				
4.1	Building the Base Data, Models, and Scenarios	1313	$195,782	$42,302	$238,084
4.2	Defining Alternative Future Scenarios	823	$130,586	$5,729	$136,315
4.3	Defining Measures of Success	244	$37,148	$1,423	$38,571
4.4	Evaluate 2015 Current Regional Conditions	431	$63,287	$2,327	$65,614
~~4.5~~	~~Modeling the 2045 Baseline Alternative~~	0	$0	$0	$0
~~4.6~~	~~Building the Alternative Scenarios~~				
~~4.7~~	~~Evaluating the Scenarios~~				
	Total Task 4	**2811**	**$426,803**	**$51,781**	**$478,584**
5	**PREPARE FOR AND ATTEND MEETINGS (WORKING GROUP AND STEERING COMMITTEE**				
5.1	Working Group Meetings	172	$31,600	$8,954	$40,554
5.2	Steering Committee Meetings	80	$15,064	$3,685	$18,749
	Total Task 5	**252**	**$46,664**	**$12,639**	**$59,303**
6	**MANAGE THE PROJECT**				
6.1	Weekly Coordination with Study Leadership	312	$68,920	$8,218	$77,138
6.2	Schedule and Budget Oversight	82	$16,685	$0	$16,685
6.3	Quality Assurance of Deliverables	95	$24,928	$500	$25,428
	Total Task 6	**489**	**$110,533**	**$8,718**	**$119,251**
	SUBTOTALS	**4,413**	**$703,061**	**$76,138**	**$779,199**
	10% Contingency				**$77,920**
	TOTAL				**$857,119**