Technical Documents Companion Guide

GREATER HARTFORD MOBILITY STUDY

CONNECTICUT DEPARTMENT OF TRANSPORTATION

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Introduction

This Greater Hartford Mobility Study (GHMS) is a "PEL Study". The term "PEL Study" represents a Planning and Environment Linkages (PEL) analysis that follows Federal Highway Administration guidance. The study transitions from long-range planning to the upcoming environmental review process by assessing local conditions and developing alternatives. The Connecticut Department of Transportation may adopt or incorporate Planning Products from this PEL Study into a federal or state environmental review process, pursuant to Title 23 U.S.C to Title 23 U.S.C. § 168(d)(4).

This "Technical Documents Companion Guide" outlines the various steps of the PEL process and summarizes planning methods, assessments, findings, and next steps. Several technical documents were prepared as a part of the GHMS PEL. These documents are included as appendices with this technical report, which serves as a tool to direct readers to the appropriate technical appendices supporting the final report.

GHMS Overview

Why this study?

The Connecticut Department of Transportation (CTDOT) has expanded its transportation vision for the Greater Hartford area by taking a comprehensive approach to improve mobility for all modes of travel spanning the Connecticut River from Hartford to East Hartford and throughout the region. The Greater Hartford Mobility Study (GHMS) is built upon the extensive planning and engineering work performed to date on multiple initiatives in the region, including the I-84 Hartford Project, CT*fastrak* East Expansion Study, Hartford Rail Alternatives Analysis, the I-84/I-91 Interchange Study, Bradley International Airport Master Plan, the East Coast Greenway and regional pedestrian and bicycle connectivity. These initiatives are illustrated in Figure 1.

Figure 1: Regional Planning Initiatives

GHMS is a comprehensive planning initiative that is focused on assessing the primary transportation deficiencies in the region and provide a mechanism to prioritize projects for further study and implementation. The study has considered all modes of transportation, including transit (rail and bus), freight (rail and truck), bicycles and pedestrians, and automobiles.

What are the study vision and goals?

The GHMS focuses on identifying opportunities for successful implementation of a future transportation system that supports regional growth. A Vision Statement was developed for the purpose of creating a lens through which future transportation decision-making can be viewed.

The Greater Hartford Mobility Study's Vision is to improve mobility by planning an integrated, resilient, multi-modal transportation system in the Greater Hartford Region thereby enhancing the quality of life, economic vitality, and opportunity in the region.

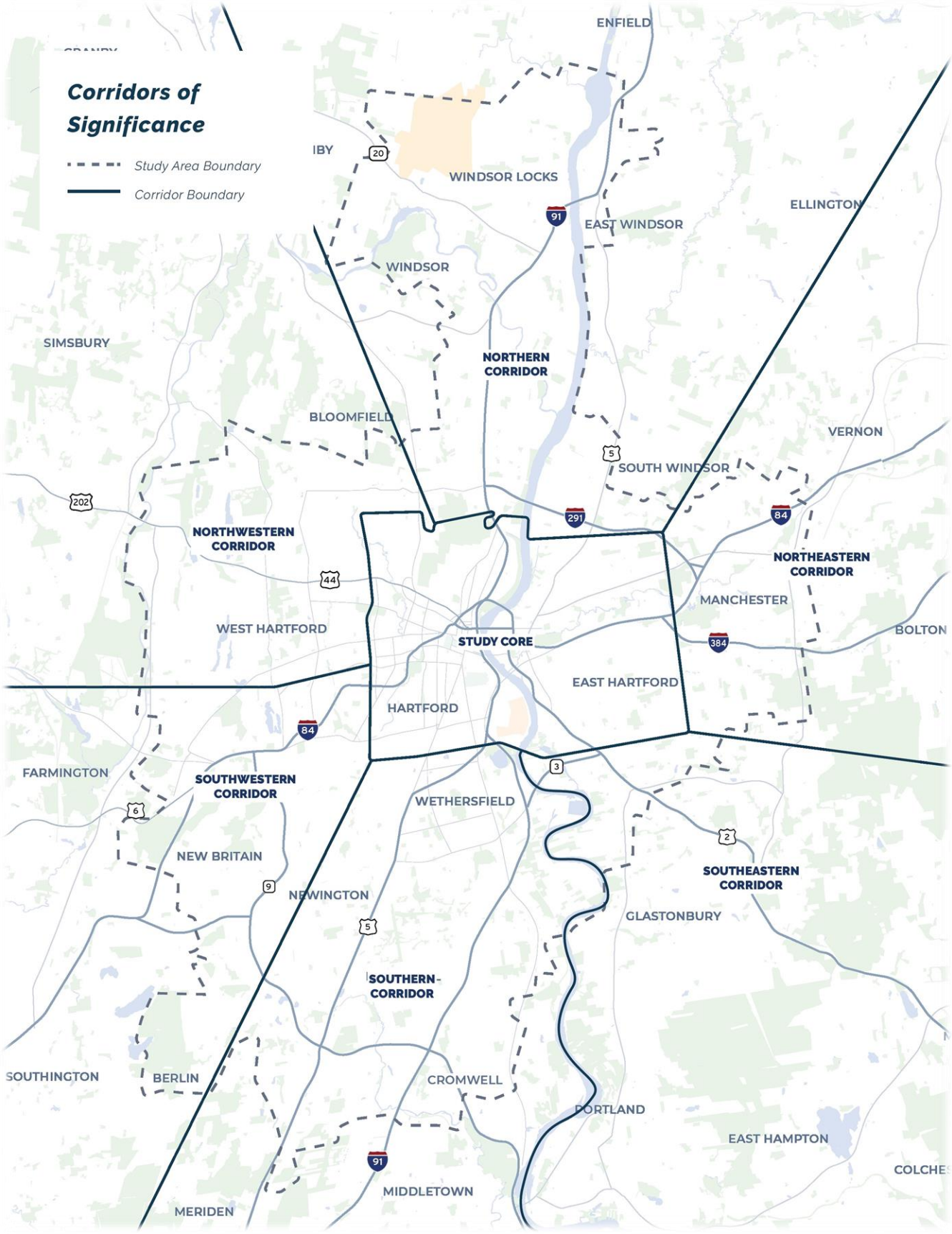
The Vision is a high-level expression that is further defined by a set of the following Study Goals:

1. Improve the movement of people and goods. This is a core study goal. Efficiently moving people and goods is essential for a healthy economy.
2. Increase transportation options, accessibility, reliability, and safety. Transportation cannot rely only on a system of roads and highways to serve people's mobility needs. Sustainable transportation requires system redundancy and multimodal options for choosing how and when to make a trip. This includes making travel choices safe and reliable, as well as accessible to all people.
3. Accommodate future needs and emerging technologies. Transportation improvements must consider the needs of future generations of users and upcoming innovative transportation technologies. Travel preferences are constantly in a state of change, as are decisions where people choose to live, work and play. Additionally, technology is an ever-evolving aspect continually impacting the status quo and the GHMS needs to consider the potential impacts of connected and automated vehicles, technology enabled transit, on-demand ride sharing, and alternative freight delivery technologies, among others.
4. Prioritize social equity. Transportation must satisfy the needs of all users, regardless of race, color, gender, national origin, or economic status. Public agencies are adapting to create a more inclusive and equitable future.
5. Minimize environmental impacts. CTDOT and partnering state agencies are committed to addressing the deterioration of the natural and built environments. Transportation projects should avoid or minimize any further environmental impact and should ideally improve conditions into the future.

What is the study area?

The study area encompasses a broad geographic area that extends beyond the urban core of Hartford and East Hartford. It was established to include major transportation facilities carrying people and goods within, through and around Hartford, as well as other regional travel hubs, such as Bradley International Airport, Hartford Line, and Hartford's Union Station. The Study Core of Hartford and East Hartford is the focus of several ongoing transportation initiatives with broader regional implications. However, it is important to think beyond the core when defining project needs over the next several decades. Transportation to and from the core is as important as transportation within. Therefore, six radial corridors have been defined based on the approximate travel sheds that feed into the Study Core. The overall study area, with the study core and six radial corridors of significance, is shown in Figure 2.

Figure 2: GHMS Study Area and Corridors of Significance

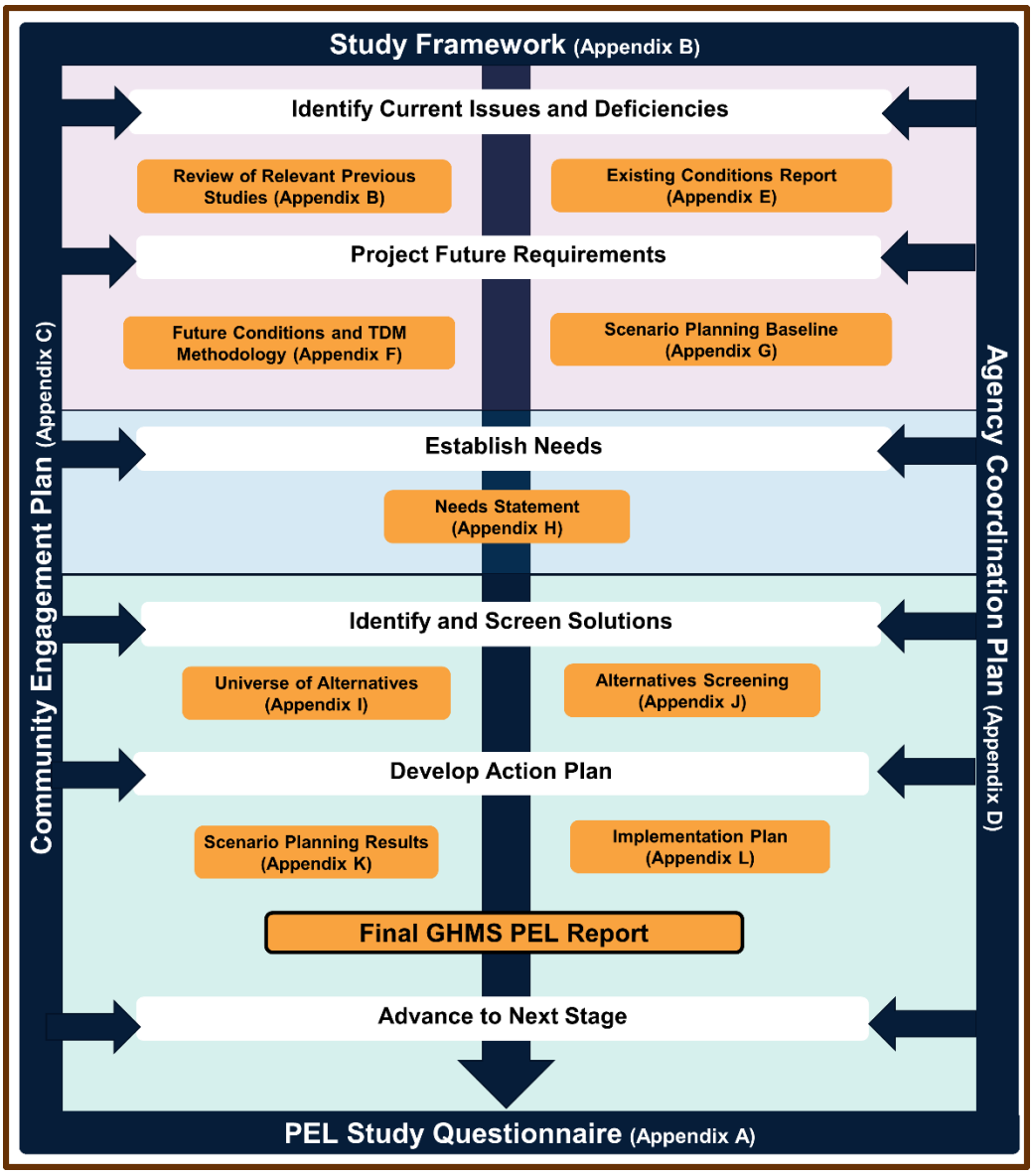


What's the overall study process?

GHMS is a Planning and Environmental Linkage (PEL) study that has facilitated simultaneous consideration of planning vision, economic goals, community goals and environmental goals. With multiple transportation initiatives currently in various phases of analysis and/or implementation in the greater Hartford region, the GHMS PEL has provided a comprehensive approach to assess these initiatives and other potential multimodal mobility improvements with an integrated and overarching regional planning study that leads to development of an implementation plan for the region.

The GHMS followed the PEL process illustrated in Figure 3.

Figure 3: GHMS PEL Study Process



At the beginning of the study, an overall technical study framework was established including the study area, vision, and goals, as well as planning methods, tools, and parameters. The Study Framework Technical Memorandum also focused on reviewing nearly 50 recent multimodal studies in the region to understand mobility related recommendations from these studies. A Community Engagement Plan (CEP) and Agency Coordination Plan (ACP) were also developed to establish guidelines for an early and ongoing coordination with the public, local agencies/stakeholders, and appropriate resource

agencies. The CEP and ACP were living documents and updated throughout the duration of the study. These three technical documents served as the overall framework for the GHMS PEL study, guiding technical assessments and development of technical documents which have been included as appendices here and summarized in the next section. The overall PEL process ultimately led to the development of the Final PEL Report along with an Implementation Plan for the recommended multimodal improvements within the region.

Technical Appendices Summary

The following twelve (12) technical appendices support the final report and document the execution of the PEL process that was utilized for decision-making and led to the recommendations presented in the final report.

Technical Document Appendices:

Appendix A: PEL Questionnaire

Appendix B: Study Framework

Appendix C: Community Engagement Plan

Appendix D: Agency Coordination Plan

Appendix E: Existing Conditions Report

Appendix F: Future Conditions and TDM Methodology

Appendix G: Scenario Planning Baseline

Appendix H: Needs Statement

Appendix I: Universe of Alternatives

Appendix J: Alternatives Screening

Appendix K: Study Findings

Appendix L: Implementation Plan

The following provides a high-level summary of the purpose and key components of each of the technical appendices.

Appendix A: PEL Questionnaire

Purpose

The PEL Questionnaire is a required Federal Highway Administration document to demonstrate how the given PEL process meets Administration requirements pursuant to Title 23 U.S.C. to Title 23 U. S. C. § 168(d)(4). The GHMS PEL Questionnaire was completed at the end of the study with an intention to act as a summary of planning process and study outcomes that will ease the transition from planning to a National Environmental Policy Act (NEPA) analysis for the projects recommended for advancement.

Key Components

The PEL questionnaire provides comprehensive responses to the standard questions focused on the following topics:

1. Study Background
2. Methodology Used
3. Agency Coordination
4. Public Coordination
5. Purpose and Need for the PEL Study
6. Range of Alternatives
7. Planning Assumptions and Analytical Methods
8. Environmental Assessments

Appendix B: Study Framework

Purpose

The Study Framework Tech Memo outlines the GHMS process and context. GHMS is a PEL study and is built upon the extensive planning and engineering work performed to date on multiple initiatives in the region. The PEL expanded on these initiatives and identified additional potential improvements by taking a holistic approach to improve mobility for all modes of travel spanning the Connecticut River from Hartford to East Hartford and throughout the region.

Key Components

The tech memo focuses on the following topics:

1. PEL Study Process and Milestones
2. Review and Summary of Relevant Previous Studies
3. Study Vision and Goals
4. Planning Tools, Methods, and Performance Measures

Appendix C: Community Engagement Plan

Purpose

The Community Engagement Plan (CEP), outlines the Study Team's approach to inform, engage, and seek input from the communities, stakeholders (e.g., neighborhood groups, non-profit organizations, etc.), and the traveling public during the study process. It included numerous opportunities for discussion and comment. Methods of outreach employed throughout the study included stakeholder and public listening sessions, stakeholder interviews, pop up events, participation in neighborhood meetings, public meetings, the CTDOT and GHMS websites including an interactive study specific web portal for active public input, social media, fact sheets, e-bulletins, and other forms of outreach as appropriate. They are described within this CEP. Public opinion and comments have been documented and considered in the development of study recommendations. This CEP is a living document. It has been regularly revisited and refined throughout the study as outreach needs evolved.

Key Components

The CEP focuses on the following topics:

1. Community Engagement Guiding Principles
2. Community Engagement Methods
3. Summary of GHMS Public Outreach (Types of Events, Dates, Key Discussion Topics/Themes etc.)

Appendix D: Agency Coordination Plan

Purpose

The Agency Coordination Plan (ACP) communicates CTDOT coordination milestones for regional, state, and federal agency participation and to identify opportunities for interactive dialogue in the Planning and Environmental Linkages (PEL) process. The PEL process is designed to improve information sharing and early consultation among state and federal transportation and resource agencies, thereby reducing, or even eliminating, duplication of work in future planning and National Environmental Policy Act (NEPA) and Connecticut Environmental Policy Act (CEPA) processes. The ACP guided the agency coordination activities at various milestones of the GHMS PEL study and will support the agency coordination process to be followed on any future NEPA actions that may be required based on outcomes of the PEL study.

Key Components

The ACP focuses on the following topics:

1. Identification of Resource Agency Partners
2. Summary of Anticipated Agency Roles and Coordination Outcomes
3. Summary of GHMS Agency Coordination Meetings (Meeting Types, Dates, Focus of Discussion etc.)

Appendix E: Existing Conditions Report

Purpose

The Existing Conditions Report summarizes the baseline transportation system performance findings under the current conditions. The existing conditions assessment, coupled with active public and stakeholder input, helped identify multimodal transportation system's current deficiencies. A detailed Strength-Weakness-Opportunities-Threats (SWOT) analysis was performed as a part of the existing conditions assessment for each travel mode and supporting focus topic listed in the key components below.

Key Components

The existing conditions performance assessment of the study area was conducted for the following modes and/or focus areas:

1. Traffic Performance
2. Highway and Safety
3. Transit Bus Mode
4. Rail Mode
5. Bicycle and Pedestrian Facilities
6. Environmental Resources and Conditions
7. Land Use
8. Multimodal Connectivity Considerations

Types of Technical Analyses

The following types of analyses were conducted as a part of the existing conditions assessment:

1. Traffic volumes, speeds, travel patterns
2. Roadway interchange design criteria and geometry assessment - roadway geometrics vs. posted speed limit, horizontal sight distance restrictions and interchange spacing etc.
3. Transit bus travel times, transit travel time competitiveness compared to use of personal vehicle, mode share, frequency and span of service, on-time performance and reliability, safety, and the average age of vehicles in the fleet.
4. Rail system performance - level of service, condition of infrastructure and recent work, role of Hartford Union Station in multimodal connectivity and existing transit-oriented development (TOD) efforts.
5. First- and last-mile bicycle and pedestrian connectivity with key transit nodes/hubs, "heat maps" of land-use based bicycle and pedestrian demand/potential and available facilities.
6. Identification and mapping of presence of natural resources, man-made resources and socioeconomic conditions within the study area required for environmental impact review.
7. Land use considerations for economic development and quality of life.
8. Intermodal interactions and modal connectivity assessment.

The Existing Conditions Report was compiled and subsequently reviewed in 2021 and was used for the remainder of the study process.

Appendix F: Future Conditions and TDM Methodology

Purpose

The Travel Demand Model (TDM) Methodology Memo has been prepared as background information to describe the industry standard planning-level technical assessment methodology used as a basis for the Greater Hartford Mobility Study (GHMS). It describes the Capitol Region Council of Governments (CRCOG) travel demand model used to project multimodal travel behavior within the study area for the 2050 design year. A brief overview of the model structure is presented along with comparisons between 2020 base year and 2050 design year model inputs and outputs.

Key Components

The TDM Methodology Memo focuses on the following topics:

1. Modifications made to the model specific to GHMS
2. TDM Inputs
3. TDM Steps and Outputs
4. 2020 Base Year Assessment
5. Future Volume Projection Methodology
6. 2050 No-Build Future Year Assessment

Appendix G: Scenario Planning Baseline

Purpose

The Scenario Planning Baseline Memo outlines the purpose and the methodology of the GHMS Scenario Planning Tool. The Scenario Planning Tool is an exploratory modelling tool developed using the CRCOG regional travel demand model as the base. The tool is based on data-driven, performance-based, and scenario planning methodologies to study and evaluate future uncertainties in land use, travel behavior, mobility policy, and emerging technologies at a regional or sub-regional scale. The tool uses an easy-to-understand graphical user interface (GUI) for users to:

- Quickly build scenarios using various network, technology, land use, demographics, growth, and policy inputs;
- Evaluate scenario impacts with quantitative performance measures; and
- Assess potential risks and opportunities associated with each scenario.

Key Components

The Scenario Planning Baseline Memo focuses on the following topics:

1. Scenario Input Variables
2. Land Use Allocation and Travel Demand Modules
3. Model Configuration, Calibration and Validation
4. Key Performance Indicator Outputs
5. 2020 Existing and 2050 Future No-Build Baseline Scenario Results

Appendix H: Needs Statement

Purpose

The Needs Statement discusses the needs identified for the overall Study Area and for each Corridor of Significance and identified their alignment with the established study goals. These needs were identified based on the existing conditions assessment completed for the GHMS, feedback received from stakeholders and the general public, and recommendations from relevant previous studies.

Key Components

The Needs Statement focuses on the following topics:

1. Needs Identification Process
2. Summary of Identified Needs from Previous Studies
3. Summary of Public and Stakeholder Input on Transportation System Needs
4. Summary of Needs Identified from Existing Conditions Analysis
5. Overall Study Area Need Statement
6. Individual Corridor of Significance Need Statements

Appendix I: Universe of Alternatives

Purpose

The Universe of Alternatives Tech Memo provides a summary of all the alternatives, ideas, and improvement concepts either developed by the GHMS study team or received from stakeholders/general public or advanced from the relevant previous studies in the region to be considered in the GHMS, to help address the identified transportation system needs and eliminate transportation system deficiencies to enhance regional mobility. These alternatives were grouped into three categories for each travel mode: capital alternatives, operations alternatives, and policy alternatives. High-level fatal flaw screening criteria were established to determine which of these alternatives warrant a detailed analysis in the subsequent steps of the study. The tech memo lists alternatives that were identified during Phase 1 of the GHMS, additional alternatives were added during Phase 2.

Key Components

The Universe of Alternatives Tech Memo focuses on the following topics:

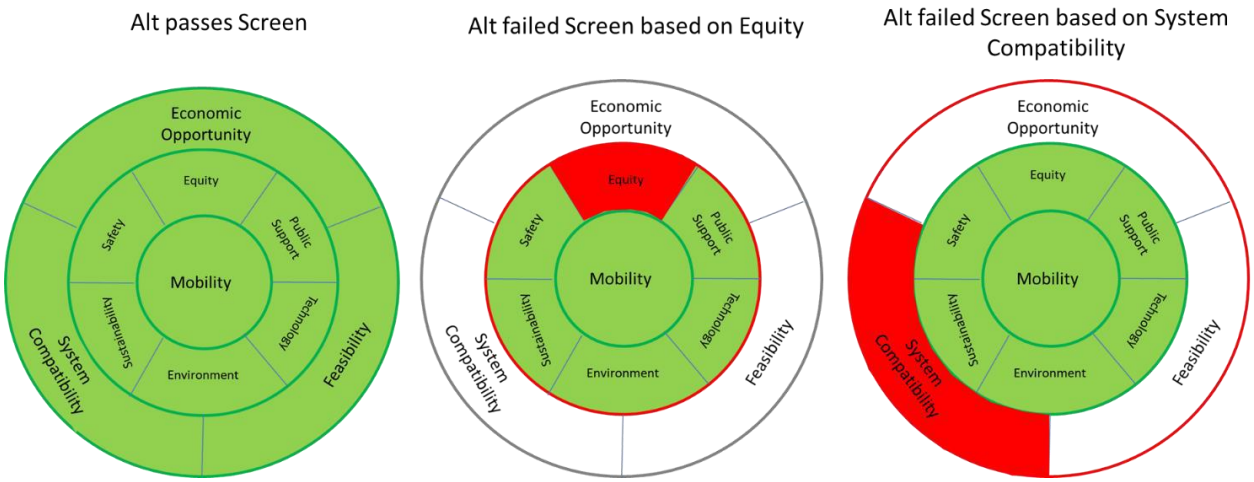
1. Alternatives Identification Process
2. Classification of Alternatives
3. Alternatives Summary by Mode
4. High-Level Fatal Flaw Screening Process

Appendix J: Alternatives Screening

Purpose

The Alternatives Screening Tech Memo explains the detailed alternatives evaluation process and screening outcomes based on the established screening criteria. Multi-layered screening criteria were developed for conducting a detailed planning-level analysis for the identified alternatives that passed the high-level fatal flaws screening assessment in Phase 1 of the study. Considering that mobility has been the focus of this PEL study, core screening criteria related to multimodal mobility were established at the "bull's eye" of the screening process. Then a second layer of supporting screening criteria were established that were aligned with established study goals and finally a third layer of pragmatic and overarching screening criteria were established that aligned with the overall vision for the study
core mobility and supporting criteria. The screening assessment has been done at a planning level and it focused on assessing benefits or impacts related to each screening criteria. Critical flaw considerations were identified for most of the screening criteria that would support elimination of some alternatives from further consideration with appropriate documentation of the associated reasoning.

The following graphics illustrates examples of alternatives screening outcomes.



Key Components

The Alternatives Screening Tech Memo focuses on the following topics:

1. Screening Criteria Development
2. Screening Criteria Definitions
3. Summary of Overall Screening Outcomes
4. Detailed Screening Outcome Assessment for Each Alternative
5. Documentation of Eliminated Alternatives

Appendix K: Study Findings

Purpose

The Study Findings Tech Memo outlines the Key Performance Indicators (KPI) results and regional transportation system performance findings from the GHMS Scenario Planning exercise for both baseline and build scenarios.

Baseline Scenarios

Scenario 1: 2020 Existing Conditions

Scenario 2: Future Year (2050) No-Build Condition – only considers future transportation improvements that are already programmed for implementation and will be completed prior to 2050.

Build Scenarios

Build scenarios were developed based anticipated implementation timeframe for various alternatives as follows:

Scenario 3: 2050 Long-Term Framework – acts as a "big-picture" guide to establish a future transportation vision with major infrastructure initiatives that will be implemented over a longer period (10+ years).

Scenario 4: Early Action Plus Mid-term Improvements – to determine incremental benefits of projects that can either be implemented quickly (0-4 years implementation timeframe) or within the next 10 years (mid-term).

Scenario 5: Full Build Scenario – an overarching scenario established to include all the identified projects in the GHMS Implementation Plan.

Key Components

The Study Findings Tech Memo focuses on the following topics:

1. Establishment of Baseline Scenarios
2. Build Scenario Development Process and Definitions
3. Transportation System Benefits (Quantitative KPIs) by Scenario
4. Highlights of Transportation System Performance Improvements
5. Options for Customized Scenario Variations

Appendix L: Implementation Plan

Purpose

The GHMS Implementation Plan is a planning-level summary of the identified multimodal transportation improvement recommendations that are being advanced to the next steps of project development. They were categorized as follows:

- Capital Projects
- Policy Recommendations
- Operations Improvement Recommendations

City Link East, City Link West, River Gateway, and Founders Gateway have been identified as the four (4) primary long-term components of the Implementation Plan. In addition, approximately forty-four (44) early action, fifteen (15) mid-term and three (3) long-term recommendations have been incorporated in the Implementation Plan. The following factors influence actions related to the implementation plan: Environmental Review Requirements, Anticipated Implementation Timeframe, Funding Availability, Project Priority, and Fluctuation in Socioeconomic Considerations.