
9.0 Before and After Study Plan

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A Before and After Study Plan has been prepared, describing how the City of Madison and the RTA will collect and report information about the Transport 2020 project. As described in the plan that follows, information will be assembled on:

1. Project scope;
2. Transit service levels;
3. Capital costs;
4. Operating and maintenance costs; and
5. Ridership patterns and revenues.

This information will be provided throughout project planning, development, and design, and continues until two years after revenue operation begins. The Before and After Study Plan will be updated as the project moves through engineering and design, and finalized during the final design phase.

Transport 2020

Before and After Data Preservation and Collection Plan

Introduction

The Federal Transit Administration's (FTA) December 2000 Final Rule on Major Capital Investment Projects requires that New Start project proponents collect data on key project characteristics generated 1) during planning and project development, 2) immediately before implementation of the project, and 3) two years after the project opens for service. SAFETEA-LU amended Section 5309(g)(2)(c) to codify this regulatory requirement. Project sponsors, as a condition of receiving a Full Funding Grant Agreement (FFGA), must assemble information on:

1. Project scope;
2. Transit service levels;
3. Capital costs;
4. Operating and maintenance (O&M) costs; and
5. Ridership patterns and revenues.

As directed by SAFETEA-LU, this information is now provided throughout project planning, development, and design, and continues until two years after revenue operation begins.

SAFETEA-LU additionally requires FTA to summarize the information provided by project sponsors on these key project characteristics in a Report to Congress on the results of any before and after studies completed during that year.

This memorandum provides the proposed Before and After Data Preservation and Collection Plan for the Transport 2020 project. This plan will be finalized during the final design phase of project development.

Project Description

The proposed Transport 2020 project consists of diesel multiple unit (DMU) or hybrid technology commuter rail vehicles operating in the existing rail corridor running from the Highway 12/14 interchange in Middleton, through the Isthmus, to Reiner Road in Sun Prairie. This alternative is designed to serve many of metropolitan Madison's major employment, entertainment and shopping destinations, and complements the existing bus system. The project includes 17 stations along a 16-mile, two-track alignment from Stonefield Road on the west to Route 30 on the east. In order to provide cost effective and frequent service in Madison's core, trains will operate on two overlapping routes, identified as the east branch and the west branch. The east

branch operates from Reiner Road near Sun Prairie, through downtown Madison, to Whitney Way/Hill Farms; the west branch runs from Middleton to Fair Oaks east of the Isthmus.

The proposed service will be operated with DMUs or hybrid technology commuter rail vehicles sharing track with Wisconsin and Southern freight trains (temporal separation of freight and passenger rail service is assumed). The tracks that are currently in place will be rehabilitated to accommodate the passenger service. Eight train sets are required for the weekday peak service. Assuming single-car trains, 10 vehicles inclusive of two spares would provide adequate coverage for the service and any maintenance that would be required during operating hours, from 6:00 a.m. to 11:30 p.m. on weekdays, and from 8:00 a.m. to 10:00 p.m. on Saturdays. The service design would provide 70 daily trips on weekdays and 40 trips on Saturdays on both the Western and Eastern Branches. Initially, Sunday service and other special event service will be offered as demand warrants.

The project is estimated to cost \$337.1 million in year of expenditure dollars.

Responsibilities

Internal

The project sponsor for the Transport 2020 project is the City of Madison, which is one of the entities with Dane County and the Wisconsin Department of Transportation (WisDOT) that comprise the Intergovernmental Partnership (IGP) established to manage project planning and development activities. The City has provided the Program Manager leading the planning/alternatives analysis/environmental phases of the study. The design phase for the Transport 2020 project will be the responsibility of this Program Manager with specialized engineering technical support to be provided by the WisDOT Design Project Manager. The Program Manager reports directly to the IGP. The Before and After Study also will be the responsibility of the Program Manager, who has extensive history with the Transport 2020 planning effort and as noted previously will direct the next stage of project development.

Primary IGP responsibilities related to the project include the following:

- Manage the planning, scope, design and engineering, construction administration, and construction inspection;
- Provide oversight for project technical issues;
- Develop recommendations for resolution of unique problems arising out of unforeseen conditions brought to light during project planning, development, and implementation; and
- Serve as liaison to the Project Management Oversight Contractor (PMOC) assigned by the FTA, and provide responses to the PMOC requests for information.

Transport 2020 service will ultimately be operated under the auspices of a Regional Transit Authority (RTA). As plans are advanced for formation of the RTA, this internal responsibilities summary will be updated.

Madison Area Transportation Planning Board

The Madison Area Transportation Planning Board is the federally designated Metropolitan Planning Organization (MPO) for the Madison Urban Area. As the MPO, it is the policy body responsible for cooperative, continuous, and comprehensive regional transportation planning and decision making for the Madison Metropolitan Planning Area.

Federal Transit Administration

The FTA will review and approve the Before and After Study work program. The FTA also will review any before and after data developed during the project planning and development phase, as well as draft and final reports.

PMO Contractors

The PMO contractors designated by the FTA will assist in reviewing project data.

Scope of Work/Data Collection and Preservation Plan

Task 1 - Organization

- Assembly and review of project planning documents to date;
- Meeting of project participants;
- Preparation of draft work plan; and
- Preparation of final work plan.

Task 2 - Documentation of Forecasts During Project Development

Ridership forecasts for Transport 2020 and project capital and operating and maintenance cost estimates will be reported to the FTA at each decision stage throughout project development - initiation of preliminary engineering, final design, full funding grant agreement - or in any years in which there may be a significant change to the project. More detail about reporting of specific forecasts is provided below.

A. Project Scope and Capital Costs

1) Alternatives Analysis

- a) Collect project planning documents - All relevant documents related to the project scope and estimation of capital costs during the alternatives analysis process will be identified and assembled. These documents currently are maintained and organized in a project network drive, and include technical memoranda, drawings, meeting minutes, and other relevant materials.

- b) Document project scope - A detailed project description will be developed documenting the physical scope of the project. Major items, such as the new track, stations, and yards, will be recorded. Other major cost items, such as signals, rolling stock and parking, will be described and documented. The expected timing and duration of construction will be documented. Costs are assembled in the Standard Cost Categories (SCC) worksheet developed for this PE request.

2) Preliminary Engineering

- a) Collect project planning documents - All relevant documents related to the project scope and estimation of capital costs during the PE phase will be identified and assembled in a project document management system. This will include not only the PE reports but all supporting technical memoranda, drawings, and similar materials, and other relevant materials (e.g., electronic spreadsheets used in cost estimation).
- b) Document project scope - A detailed project description will be developed documenting the physical scope of the project as planned in PE. Major items such as new track, stations, and yards will be recorded. Other major cost items, such as signals, rolling stock, and parking, will be described and documented. The expected timing and duration of construction will be documented. Costs are assembled in the SCC worksheet developed for this PE request and subsequent New Starts submittals.

3) Full Funding Grant Agreement

- a) Document project as specified in FFGA - A detailed project description will be developed documenting the physical scope of the project as specified for the FFGA. Major items such as new track, stations, and yards will be recorded. Other major cost items, such as signals, rolling stock, and parking, will be described and documented. The expected timing and duration of construction will be documented. Costs are assembled in the SCC worksheet developed for this PE request and subsequent New Starts submittals
- b) Document any changes in scope, capital costs, or schedule from PE.

B. Operating and Maintenance Costs

1) Alternatives Analysis

- a) Operating plan. Documentation will include the following measures for Transport 2020:
 - i) Routes
 - ii) Headways (peak, off-peak, night, weekend)
 - iii) Run time by route

- iv) Vehicle miles traveled
 - v) Revenue hours
 - b) Systemwide operating statistics (“system” is anticipated to include service operated under the auspices of the proposed RTA, which will include Transport 2020 service and potentially bus services now operated by Madison Metro):
 - i) Vehicle hours
 - ii) Vehicle miles
 - iii) Peak fleet
 - iv) Number of transfer centers
 - c) Operating and maintenance costs
 - i) Transport 2020
 - ii) Systemwide
- 2) Preliminary Engineering
- a) Operating plan. Documentation will include the following measures for Transport 2020, and any changes from AA will be explained:
 - i) Routes
 - ii) Headways (peak, off-peak, night, weekend)
 - iii) Run time by route
 - iv) Vehicle miles traveled
 - v) Revenue hours
 - b) Systemwide operating statistics:
 - i) Vehicle hours
 - ii) Vehicle miles
 - iii) Peak fleet
 - iv) Number of transfer centers
 - c) Operating and maintenance costs
 - i) Transport 2020

- ii) Systemwide
- 3) Full Funding Grant Agreement
 - a) Operating plan. Documentation will include the following measures for Transport 2020 service, with any changes from PE explained:
 - i) Routes
 - ii) Headways (peak, off-peak, night, weekend)
 - iii) Run time by route
 - iv) Vehicle miles traveled
 - v) Revenue hours
 - b) Systemwide operating statistics:
 - i) Vehicle hours
 - ii) Vehicle miles
 - iii) Peak fleet
 - iv) Number of transfer centers
 - c) Operating and maintenance costs
 - i) Transport 2020
 - ii) Systemwide

C. Ridership

- 1) Alternatives Analysis
 - a) Document Methods - The methods and procedures used in the Transport 2020 alternatives analysis to develop forecasts of project ridership will be documented. This includes not just the description of the procedures or the functional relationships, but also all of the underlying data that were used in developing the forecasts.
 - i) Obtain and document geographic analysis system (traffic analysis zones)
 - ii) Obtain and document transportation networks
 - iii) Obtain and document travel forecasting functional relationships

- iv) Obtain and document demographic and economic forecast data (e.g., population, employment, parking costs, fares, etc.)
- b) Document Results
 - i) Document trip tables by mode and purpose
 - ii) Document travel assignments
- 2) Preliminary Engineering
 - a) Document Methods - The methods and procedures used in the PE phase of the project to develop forecasts of project ridership will be documented. This includes not just the description of the procedures or the functional relationships but also of the underlying data that were used in developing the forecasts.
 - i) Obtain and document geographic analysis system (traffic analysis zones)
 - ii) Obtain and document transportation networks
 - iii) Obtain and document travel forecasting functional relationships
 - iv) Obtain and document demographic and economic forecast data (e.g., population, employment, parking costs, fares, etc.)
 - v) Document changes from AA phase
 - vi) Changes in the projected system ridership as reported in the AA will be documented. This will include not only changes in total ridership but also changes in ridership by route, by station, by market segment, or by other meaningful grouping. Changes in the design of the project, in forecasts of population, economic activity, transportation systems, or in other factors that would have affected the ridership forecasts will be identified and documented.
 - b) Document Results
 - i) Document trip tables by mode and purpose
 - ii) Document travel assignments, including boardings and mode of access by station
 - c) Document Changes From the AA Phase

Task 3 - Documentation of Conditions Before Project Implementation

A. Project Scope

- 1) Document any refinements from FFGA

- 2) Document the timing and duration of construction (from the FFGA)

B. Transit Service Levels

- 1) Area covered - The service area for which data will be gathered will be described.
- 2) Measures to be documented are those shown in Task 2, B.
- 3) Data sources - RTA, Madison Metro.
- 4) How reported - The sources of data on transit operations will be the same as those used for NTD reporting.

C. Capital Costs

- 1) Document costs from construction documents, using FTA activity line items (ALI) codes, noting and explaining any changes from the FFGA.

D. Operating and Maintenance Costs

- 1) Document revised operating and maintenance cost estimates, noting and explaining any changes from the FFGA.

E. Ridership and Revenue

- 1) A plan for conducting surveys pre-implementation of the Transport 2020 project will be finalized prior to final design.

F. Other Factors Affecting Costs and/or Ridership

- 1) Construction cost index (CCI) values - The Engineering News Record CCI for the region will be researched and recorded for the cost years used in estimation of project costs.
- 2) Consumer Price Index (CPI) - The CPI for the region will be documented for each year in which O&M cost estimates were prepared and will be monitored and recorded during the construction period.
- 3) Cost of gasoline - The average price of gasoline in the Chicago region will be obtained from the local AAA office. This information will be documented and compared against operating cost per mile values used in the CMAP travel forecasting model.
- 4) Parking costs - Data on downtown parking costs will be obtained from the City of Madison. These costs will be documented and compared against parking costs during the planning and design phases of the project.
- 5) Planned development - Updated information on planned development will be obtained from the Cities of Madison and Middleton and the University of Wisconsin, as well as other smaller municipalities served by Transport 2020.

- 6) Other operating variables – These may include fuel, motive power, and security costs; impacts related to weather and highway construction; labor wage rates and benefits; and public financing assumptions.

Task 4: Documentation of Conditions After Project Opening

Data will be collected consistent with NTD reporting practices during the first full fiscal year after project opening, anticipated in 2014.

A. Physical Scope (as built)

- 1) A detailed project description will be developed documenting the physical scope of the project as actually constructed. Major items such as new track, stations, and yards will be recorded. Other major cost items, such as signals, rolling stock, and parking, will be described and documented. Any changes from the AA phase and/or FFGA will be documented and explained. Finally, the actual length of the construction period will be documented.

B. Transit Service Levels (as operated)

- 1) Area covered – The service area for which data will be gathered will be described.
- 2) Measures to be documented are those shown in Task 2, B.
- 3) Data sources – As operated from RTA and Madison Metro.
- 4) How reported – The sources of data on transit operations will be the same as those used for NTD reporting.

C. Capital Costs

- 1) Sources of information – Project expenditures will be reported and summarized using FTA ALI codes. These reports will be available monthly during the project construction period. While there may be some work continuing and some claims unresolved on opening day, the vast majority of capital costs should have been incurred and claims resolved by the end of the first full year of operation. Project records and PMO reports will provide needed capital cost information.
- 2) Adjustments
 - a) For changes in physical scope – Differences between the project as built and the project as planned and described in the FFGA will be documented. Estimates of the impacts of these changes on actual construction as compared to estimated costs will be prepared.
 - b) As built costs will be expressed in year of expenditure dollars and compared to anticipated expenditures as detailed in the FFGA. All changes will be noted and explained.

D. Operating and Maintenance Costs

- 1) Information sources – RTA
- 2) As operated costs will be reported in year of expenditure dollars, consistent with an approach developed for Transport 2020 , noting and explaining any changes from the FFGA.

E. Ridership

- 1) A methodology for collecting ridership data to evaluate ridership impacts will be proposed during final design.

Task 5: Proposed Analyses

A. Project Scope

- 1) Planned versus As Built
 - a) Analyze and explain changes in project scope from AA through FFGA.
 - b) Analyze and explain changes in project scope from FFGA to After Implementation, as described in Task 4.
 - c) Analyze and explain changes in project scope from Before Implementation (Task 3) to After Implementation (Task 4)

B. Transit Service Levels

- 1) Planned versus After Implementation
 - a) Maps will be prepared illustrating the service plan in the project corridor as envisioned in the AA phase of the study and as actually operated.
 - b) Charts will be prepared comparing the service measures as documented in Tasks 2 and 4.
 - c) Explanation of any changes will be provided.
- 2) Before versus After Implementation
 - a) Maps will be prepared illustrating the service plan in the project corridor as envisioned in the AA phase of the study and as actually operated.
 - b) Charts will be prepared comparing the service measures as documented in Tasks 3 and 4.
 - c) Explanation of any changes will be provided

C. Capital Costs

1) Estimated versus After Implementation

- a) A chart will be prepared that compares costs as documented in Task 2 (AA, PE, and FFGA) with Task 4, after implementation costs.
- b) Analysis of projected versus achieved costs will be conducted in year of expenditure dollars. The CCI and CPI for the region will be analyzed in relation to actual costs. The analysis of capital costs will seek to identify not only the differences between costs as estimated and as achieved, but also the project components that contributed to these differences. This will include assessment of differences between estimated and achieved costs by component (e.g., track work, stations, right-of-way acquisition, railcars, design, environmental mitigation, etc.) with special attention given to any changes in project scope. Other documented changes that may have had a significant impact on achieved project costs but which cannot be specifically identified by a cost category will be discussed.

2) Before and After Implementation

- a) A chart will be prepared that compares costs as documented in Task 3 with final costs as documented in Task 4.
- b) Any changes from Task 3 to Task 4 will be analyzed and explained.

D. Operating and Maintenance Costs

1) Estimated versus After Implementation

- a) A chart will be prepared that compares costs as documented in Task 2 (AA, PE, and FFGA) with Task 4, after implementation costs.
- b) Analysis of any changes from the FFGA to after implementation costs will be conducted and documented. The analysis will focus on differences due to changes in the number of units (e.g., vehicle hours of service, route lengths, etc.) and changes in the cost per unit. To the extent possible, the analysis will address costs by component including vehicle operations, maintenance, etc. Changes in the CPI for the region will be analyzed in relation to actual costs.

2) Before and After Implementation

- a) A chart will be prepared that compares costs as documented in Task 3 with final costs as documented in Task 4.
- b) Any changes from Task 3 to Task 4 will be analyzed and explained.

E. Ridership

1) Ridership Estimates versus After Implementation

- a) A chart will be developed that shows the changes in ridership between the AA phase (Task 2) and after implementation (Task 4). This will include not only changes in total system ridership, but also changes by route, station or station group, market segment, and other meaningful measures.
 - b) An analysis will explain how changes in the design of the project, forecasts of population, economic activity, transportation systems, or other factors affected the ridership forecasts and actual outcomes.
- 2) Before versus After Implementation
 - a) A chart will be prepared to show changes in ridership projections and ridership characteristics as documented in Tasks 3 and 4.
 - b) An analysis will explain the impacts the project had on overall ridership and ridership characteristics for the Transport 2020 corridor and system as a whole (i.e., services operating under the auspices of the RTA).

Task 6: Findings and Recommendations

- 1) Summarize Findings - A summary will be prepared highlighting the major findings of the analysis. The relationship between forecast and achieved values of capital cost, operating cost, and ridership will be documented. Major factors influencing the differences will be presented.
- 2) Summarize Recommendations - Based on the comparisons of forecast and achieved values, recommendations will be developed for improving the methods for developing forecasts, for presenting forecasts, or for other actions that would foster better use of data in making transit investment decisions.
- 3) Prepare Draft Report - The Before and After draft report and the associated findings and recommendations will be prepared and submitted to the FTA.
- 4) Discuss Draft Report - The Before and After draft report will be reviewed with the FTA.
- 5) Revise Report - Based on discussions with the FTA, the draft report will be revised.
- 6) Prepare Final Report - The final version of the Before and After Report will be prepared and submitted to the FTA.