

10. Preparing for Before-and-After Studies

On May 16, 2006, FTA issued final policy guidance that requires the preservation and analysis of forecasts prepared during the planning and development of New Starts projects so that these forecasts will be available for Before-and-After Studies of completed projects. This section provides detail on the information, analysis, and preservation of forecasts for agencies developing candidate New Starts, Small Starts, and Very Small Starts projects.

10.1 The Requirement

SAFETEA-LU requires that FTA obtain a Before-and-After Study for each project receiving New Starts or Small Starts funds. The study has two purposes. First, it documents the project and its impacts to provide an understanding of the actual costs and impacts on transit service and transit ridership. The study accomplishes this purpose through collection of appropriate transit data both before and after the opening of the project, analysis of these data to identify changes in transit service levels and ridership caused by the project, and careful documentation of the actual project costs after its completion. Guidance on tasks related to this purpose is available elsewhere.

Second, the Before-and-After Study examines the accuracy of the forecasts prepared to support decisionmaking during project planning and development. Other provisions of SAFETEA-LU rely on the results of Before-and-After Studies, including FTA's annual report to Congress summarizing the findings of completed studies, a second annual report to Congress evaluating the performance of contractors who prepared the forecasts, and the possible award of additional funding to projects with accurate forecasts. Further, in the report on contractor performance, FTA is required to take into account the extent to which any errors in the forecasts are attributable to information provided by others to the contractors. Clearly then, crucial information and insights are expected of Before-and-After Studies and, consequently, care must be taken by FTA and by project sponsors to ensure that the studies are done with sufficient access to the forecasts prepared for the projects.

SAFETEA-LU identifies five characteristics of New Starts projects that are of interest: (1) physical scope; (2) capital costs; (3) transit service levels; (4) operating and maintenance (O&M) costs; and (5) ridership patterns and revenues. The law also identifies the time-points from which forecasts of these characteristics are needed – (1) entry into preliminary engineering; (2) entry into final design; and (3) immediately prior to the FFGA – and specifies that these forecasts be compared with actual outcomes measured two years after project opening.

For Small Starts, the information requirements are the same but the time-points are reduced to: (1) entry into project development and (2) immediately prior to the PCGA. For Very Small Starts projects (for which ridership forecasts are not necessary), the required information consists only of: (1) physical scope, (2) capital costs; (3) current ridership; and (4) predicted transit service levels at entry into project development.

The May 16, 2006, FTA guidance ensures that the forecasts necessary to prepare meaningful Before-and-After Studies will continue to be available two years after completion of the project. The guidance requires that project sponsors preserve the forecasts in their own archives of materials from project planning and development and, as a back-up, provide a

copy (on DVDs) to FTA. Further, to capture the causes of any changes in the forecasts at each time-point – while memories are still fresh and participating staff members are still around – the guidance also requires the analysis and documentation of those changes. The analysis must illuminate the specific causes of the revisions and their individual impacts on the forecasts and be documented in detail sufficient to convey these insights to the eventual preparers of the Before-and-After Study for the project.

FTA learned first-hand the critical importance of the careful preservation of the forecasts when in 2005 the agency initiated case studies of the predicted-versus-actual characteristics of eight recently completed New Starts projects. None of the case studies made much progress because, over the years, most of the early forecasts for the projects had been lost, tossed, or otherwise abandoned. Even where some documentation was still available, attempts to determine the causes of changes were made difficult because documentation of the forecasts was generally very aggregate and specifics on what changed were generally absent. The important insight from the effort was that specific provisions must be made for the preservation and timely analysis.

10.2 Elements of Forecasts to Be Preserved

The specific elements of the forecasts that need to be preserved are those that will be useful in the comparison of forecasts with the actual outcome of a project. Consequently, each project sponsor will need to identify the appropriate materials for preservation for an individual project. Early provisions should be made for archiving memoranda, drawings, spreadsheets, documentation, and other technical elements of the forecasts. Scopes of work should identify the appropriate tasks, responsible parties, budgets, and any other items necessary to the orderly archiving of materials. Completion of these tasks should be a necessary condition of contract close-outs. Overall responsibility for the archiving of forecasts should be assigned to an individual position within the sponsoring agency.

As a starting point for these provisions, FTA has identified a generic list of the forecast elements that will be preserved for a typical project. Elements may be added for individual projects, depending on the technical work undertaken to prepare forecasts during planning and project development. For New Starts and Small Starts, the generic list includes:

- ◆ Project scope
 - narrative description of the project and its alignment
 - plan and profile drawings
 - design standards
 - environmental documents
 - engineering documentation
- ◆ Capital costs
 - documentation of the costing methodology
 - spreadsheet file(s) of the Standard Cost Category (SCC) worksheets presenting:
 - the capital cost estimates in constant dollars and in year-of-expenditure dollars
 - the project schedule
 - supporting documentation of assumptions for each SCC element
 - engineering studies

- ◆ Service levels
 - a table of all routes, headways, vehicle-miles, and vehicle-hours (by time of day) for today, opening year, and the horizon year (currently 2030 for New Starts projects)
 - route map(s) for transit routes serving the project, plus associated bus routes
 - fare policies and fare levels
- ◆ O&M costs
 - documentation of the costing methodology and supporting assumptions
 - the cost model(s) applied in an electronic spreadsheet to estimate the O&M costs for the project plus the entire transit system for opening year and the horizon year
- ◆ Ridership
 - forecasts for the project in its opening year and the horizon year
 - forecasts for the No-Build and Baseline alternatives in the horizon year
 - forecasts for validation year used to test the travel models
 - the electronic files needed to replicate the above forecasts
 - the full travel model, as necessary to replicate the above forecasts
 - supporting documentation on model application
 - (note that the DVDs must not include proprietary software)

The SCC spreadsheets, O&M model spreadsheets, and full travel model are needed to respond to the requirement for an understanding of the sources of any (significant) errors in the forecasts. Without the ability to revise the forecasts with the actual conditions two years after opening, the specific impacts of incorrect information used to prepare the forecasts (actual unit costs, project service levels, fare policies and levels, etc.) would be largely a matter of guesswork. The ability to replicate the forecasts enables the staff preparing the Before-and-After Study to observe the specific implications of input errors by applying the same forecasting methodology with corrected inputs. The travel forecasts for the validation year, No-build, and Baseline are needed to isolate the various possible sources of ridership errors – the forecasting model itself, demographic changes, and/or transit service levels. An FTA oversight contractor may help FTA verify that the DVDs provided by project sponsors support the replication of forecasts and preparation of revised forecasts with corrected inputs.

For Very Small Starts projects, the starting-point list of forecast items excludes the O&M cost items. The list also excludes all items associated with ridership forecasting, substituting in their place the count data and documentation used to qualify the project for Very Small Starts eligibility.

10.3 Interim Analyses of Revised Forecasts

The appropriate analysis of any significant changes in forecasts is defined by the circumstances. Again, the purpose is to provide to the analysts who will be preparing the Before-and-After Study sufficient information and insights to inform their work. Three features of the analysis are essential: (1) it must present the former and revised forecasts in identical format; (2) it must highlight the elements of the forecasts that have changed and explain those changes in sufficient detail for later use by others; and (3) it must demonstrate that the highlighted changes account for all – or nearly all – of the revision to the forecasts.

In most instances, interim analyses will be needed only: (1) at the conclusion of preliminary engineering (to examine any changes in forecasts since the conclusion of alternatives analysis); and (2) immediately prior to execution of the grant agreement (to examine any changes since the conclusion of preliminary engineering). However, an earlier instance may occur during requests to advance a project into preliminary engineering. In cases where project forecasts provided to FTA in support of a request to enter preliminary engineering are substantially different from those developed during alternatives analysis, FTA will ask for sufficient documentation and analysis of those changes as a condition for entry into preliminary engineering. This provision ensures that the Before-and-After Study can consider the reliability of forecasts made in support of the key decision to select a major transit improvement as the locally preferred alternative.

10.4 Coordination

Early coordination by project sponsors is crucial to the useful response to this requirement. Provisions must be included in the scope of work, schedule, and budget for alternatives analysis, preliminary engineering, and final design so that materials can be archived as the work proceeds – rather than as an after-thought.

Timely coordination with FTA will allow for identification of the level of effort required to preserve forecasts and the necessary analysis, the scope of information to be preserved, and the timing of these activities. Early FTA reviews of scopes of work will ensure that they provide for an appropriate response to this requirement. As the work proceeds, ongoing communication with FTA will confirm the specific information to be preserved and the nature of analysis to be performed given the individual circumstances of each project. For further information, contact Ken Cervenka in the FTA Office of Planning and Environment (Ken.Cervenka@dot.gov or 202 493-0512).