

*Before-and-After Studies  
of New Starts Projects*

Report to Congress

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## **FOREWORD**

This fifth annual report to Congress on Before-and-After Studies summarizes the Before and After Study for the Greater Cleveland Regional Transit Authority (GCRTA) Euclid Corridor Project, also known as the HealthLine.

Before-and-After Studies are intended to assess the impact of New and Small Start projects, compare the actual and forecasted costs of the projects and ridership two years after opening, and identify the sources of differences between predicted and actual outcomes. Before-and-After Studies also assist the Federal Transit Administration (FTA) and project sponsors in determining how to improve the reliability of the cost and ridership forecasts of major public transportation projects.

As with the projects considered in the four previous Before-and-After Study reports, planning and development of these projects was well underway before FTA introduced requirements for: (1) a Before-and-After Study (2001), (2) documentation of capital costs in FTA-defined standard cost categories (2005), and (3) preservation of the forecasts needed to support the study (May 2006). Consequently, some details are limited on the transit service plans, cost estimates, and ridership forecasts prepared for the early milestones. This report reflects the full extent of information that FTA has obtained from GCRTA.

## **Euclid Corridor Transportation Project; Cleveland, Ohio**

The Euclid Corridor project comprises a 7.1-mile Bus Rapid Transit (BRT) facility and 2.3 miles of bus-oriented street improvements in a “transit zone” within downtown Cleveland. The project was developed and is now operated by GCRTA. The BRT component operates as “The HealthLine” after the purchase of naming rights by a consortium of the Cleveland Clinic and University Hospitals, two major health care institutions in the Euclid corridor.

The project was initially identified as an element of the Transportation System Management (TSM) alternative evaluated in corridor-planning studies of major rail alternatives for the “Dual Hub Corridor” between downtown Cleveland and University Circle. In 1995, at the conclusion of those studies, GCRTA chose the TSM option as the locally preferred alternative for the corridor. Since then, GCRTA has focused on the BRT and transit-zone components as a New Starts project while pursuing the other elements of the locally preferred alternative (LPA) (new transit centers, relocation and upgrading of existing rail stations) as separate projects.

The project entered preliminary engineering (PE) in 1997, entered final design (FD) in 2002, received a Full Funding Grant Agreement (FFGA) in 2004, and opened to service in 2008.

### **Physical Scope of the Project**

The BRT component of the project extends from Public Square in downtown Cleveland eastward on Euclid Avenue through the University Circle area to its terminus at the Stokes rapid transit station in East Cleveland.

For the first 4.4-miles on Euclid Avenue, the BRT facility provides exclusive mid-street lanes for BRT vehicles and other transit buses. This segment includes 35 BRT stations at 21 locations (28 stations are directional pairs at 14 cross-street locations). Stations have substantial structures with a distinctive design, off-board fare equipment, static schedule information, dedicated lighting, planters, and other amenities. BRT vehicles have signal priority at traffic intersections. Construction in this segment entailed the complete building-face-to-building-face rebuild of the street and sidewalks.

For the remaining 2.7-miles, BRT vehicles operate in mixed-traffic curb-lanes serving 21 stops located on the sidewalks. Construction in the eastern 1.2 miles of this section involved only the placement of passenger facilities on sidewalks at stop locations. Each stop has a smaller shelter consistent with the BRT architectural design, off-board fare equipment, schedule information, and dedicated lighting. HealthLine service is provided by 20 BRT vehicles: 64 foot, with five doors on both sides to accommodate left- and right-side boarding, distinctive design and color scheme, and upgraded interior amenities.

The transit project defined in the FFGA was coordinated with a separately funded streetscaping project in the 4.4-mile segment where the entire public right-of-way was rebuilt.

The anticipated project evolved during project development in several ways. First, the 1995 LPA specified a 5.5-mile Euclid Avenue BRT project that was lengthened before entry to PE with the addition of 1.2-miles of curb-lane running in East Cleveland. During PE, the scope

expanded with the addition of more ambitious streetscaping elements and the rebuilding of Euclid Avenue for the entire length of the BRT project. In early FD, financial realities and cost-effectiveness targets led to the elimination of the more ambitious streetscaping and lengthened rebuild of Euclid Avenue that had been added during PE.

## **Capital Cost**

The actual cost of the Euclid Corridor project was \$197.2 million in year-of-expenditure (YOE) dollars, including an FFGA baseline cost estimate of \$168.4 million and \$28.8 million in streetscaping elements funded separately as a non-transit project. Aggregate unit cost of the transit project was \$17.9 million per mile (\$14.9 million per mile without the cost of BRT vehicles). Within this average, unit costs vary from \$24 to \$27 million per mile for intensive street reconstruction to \$2 to \$3 million per mile for station-only upgrades.

Predictions of project costs were reasonably accurate throughout project development. Differences from the actual cost were caused largely by changes in project scope, plus a very optimistic construction schedule assumed for the entry-to-PE cost prediction. Predicted costs at entry to PE were high by 10 percent in constant dollars (no YOE was prepared). Costs at entry to FD were high by 15 percent in YOE dollars and high by 28 percent in constant dollars, reflecting the ambitious design standards applied to the entire project during PE, but later eliminated in FD. The FFGA cost prediction was 0.2 percent lower than the actual outcome in YOE dollars, but 1.8 percent higher than the outcome in constant 2008 dollars, reflecting both the scope reductions made during early FD and GCRTA's management of project costs in procurement and construction.

## **Transit Service**

With the opening of the project in 2008, the HealthLine BRT service replaced the #6 local bus route and four other local bus routes were able to use the BRT lanes for parts of their itineraries. The HealthLine provided 5-minute headways in the peak periods compared to 6-minute headways on Route #6 and the same 10-minute headway in off-peak periods. Headways on the other corridor routes were unchanged. In aggregate terms, Route #6 previously had provided 75 percent of the service on Euclid Avenue; the more frequent peak-period service on the HealthLine increased this share to 82 percent from when the HealthLine began service.

End-to-end run-time for the BRT bus service averages 36 minutes compared to 46 minutes for the #6 buses. Run-time savings occur throughout the BRT facility because of longer stop-spacing and off-board fare collection. However, 80 percent of the run-time savings occurs within the 4.5-mile segment where the BRT also has exclusive lanes and traffic-signal priority. Overall, changes associated with the opening of the HealthLine increased service in the corridor by 22 percent and reduced run-times by 21 percent.

In April 2010, in response to a drop in operating revenues caused by contraction of the national and regional economies, GCRTA's system-wide reductions in service included significant changes in the Euclid Corridor. Service on the HealthLine remained unchanged. Local bus service on the BRT facility was effectively eliminated as these routes were truncated at rail and

BRT stations in the corridor. As a result, the HealthLine provided 98 percent of all service on Euclid Avenue.

The net effect of the 2008 HealthLine opening and the 2010 service adjustments has been a 2 percent increase in aggregate service levels and a 21 percent reduction in bus run-times on Euclid Avenue.

Throughout project development, service plans for the Euclid Corridor accurately anticipated the levels of service provided after the project opened. Early plans did not fully anticipate the significant improvements in run-times because of the reserved lanes and other elements of the project. None of the service plans anticipated the 2010 reductions in local bus services in the Euclid corridor caused by contraction of the national and regional economies.

### **Operating and Maintenance Costs**

Operation and maintenance (O&M) costs for the HealthLine service itself are \$8.2 million annually compared to \$7 million for the Route #6 service that it replaced, an increase of 17 percent. This net increase in cost reflects the maintenance of the physical facilities added by the project. However, the 37 percent increase in the number of bus trips provided by the HealthLine compared to Route #6 results in a reduction in cost per bus-trip caused by the 21 percent faster bus run-time.

During project development, GCRTA accurately anticipated an increase in HealthLine O&M costs of approximately \$1 million annually.

### **Ridership**

The HealthLine carries 14,300 trips on the average weekday compared to 8,900 weekday trips on the Route 6 that it replaced. This increase reflects (1) faster travel times and moderately more-frequent peak-period service, (2) increased customer satisfaction with the HealthLine service, and (3) the elimination of local bus routes on Euclid Avenue.

Total ridership in the Euclid Corridor increased from 16,200 to 21,200 trips per average weekday, a gain of 31 percent. This ridership gain in Euclid Corridor occurred over a 3-year period in which the metro-area bus system lost 30 percent of its ridership because of the economic contraction and consequent declines in travel needs and reductions in bus service. Total transit ridership in the metro area (including rail and para-transit services) dropped by 22 percent over this interval.

Given that overall service in the corridor returned to pre-HealthLine levels because of the service reductions in 2010, ridership gains in the Euclid Corridor are a response to faster travel times and the “fixed-guideway” effects of the BRT facility. Surveys of riders before and after project opening indicate substantial increases in rider satisfaction with passenger facilities at stations, on-time performance, comfort on the BRT vehicles, and the overall transit-riding experience.

Early ridership forecasts anticipated HealthLine volumes of 21,100 trips per average weekday. Later refinements to local travel-forecasting procedures produced a revised forecast of 13,500 weekday trips documented in the FFGA. Neither of these forecasts anticipated the substantial contraction of the regional economy in the late 2000s or the consequent drop in area-wide transit ridership.

### **Economic development**

The Euclid Corridor project has both contributed to and benefited from ongoing development and redevelopment in the corridor. A 2009 article by *The Plain Dealer* of Cleveland cataloged some \$3.3 billion in investments that were recently completed, underway, or planned proximate to the HealthLine. These investments have included residential transit-oriented-development, the continued growth of many major institutions (particularly universities and hospitals), and greater business expansion. This record comes at a time of significant contraction in the regional economy and stands in significant contrast to conditions elsewhere in the metropolitan area.

As with most major transit investments, efforts to determine causality are confounded by changing market conditions, subsidies and other governmental incentives for investment, and the varying situations faced by individual developers, institutions, and businesses.

Nevertheless, the stated goals of the Euclid Corridor Transportation Project included the support of reinvestment in a corridor that has both major assets and major liabilities. The project has improved transit accessibility within the corridor with visible and permanent transit facilities. It has further upgraded the physical appeal of streets, sidewalks, and other public spaces. And it has attracted the sponsorship of two major institutions in the corridor. The contribution of the project to economic development in the corridor is evident from the examples cited, however, the precise impact of the project is difficult to quantify.