Cleveland HealthLine
Bus Rapid Transit
Greater Cleveland Regional Transit Authority

Kenneth G. Sislak, Associate Vice President; Manager of Transit/Rail Planning
Agenda

- What is the Euclid Corridor HealthLine project?
- How much did it cost to build?
- How is it configured?
- How does it operate?
- What are the benefits?
What is the HealthLine BRT?
Euclid Corridor HealthLine Bus Rapid Transit

- 9.38 miles long
- 36 stations
- Complete Street
  - Building face to building face
  - Transit priority
  - Pedestrian and bicycle friendly
  - Landscape/hardscape treatment
  - Public Art - Integrated/stand-alone
HealthLine BRT Design Features
Bus Rapid Transit Vehicles (RTV)

- Twenty-one RTV
- Left and right-side doors
- 46 seats, 120 standing
- Diesel-electric hybrid
- $900,000 each
- New Flyer
Precision Docking
Level Boarding
Fare Payment

- Ticket vending installed at every HealthLine station.
  - Dispenses single-fare tickets and day-passes only.
  - Validates multi-ride tickets by subtracting a ride.
Automated Vehicle Location (AVL) System

- Buses equipped with Siemens GPS/AVL tracking devices monitored by Cleveland RTA
- Bus operators monitor Mobile Data Terminal in vehicle for schedule tracking

Wireless LAN at Garages

2 Minute Updates
Passenger Information Systems

- Electronic message signs
  - Connected to GPS-controlled Automatic Vehicle Locator.
  - Satellite-directed signs provide real-time messages about bus arrivals and departures.
## Peak Hour Bus Service

<table>
<thead>
<tr>
<th>Route</th>
<th>Peak Hour Headway</th>
<th>Buses/hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthLine</td>
<td>5 minute</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>20 minute</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>12 minute</td>
<td>5</td>
</tr>
<tr>
<td>32</td>
<td>15 minute</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>A bus every 2.5 minutes</td>
<td>24</td>
</tr>
</tbody>
</table>
### Funding Partners and Allocations

<table>
<thead>
<tr>
<th>Source of Funds</th>
<th>HealthLine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Funding Grant Agreement</strong></td>
<td><strong>($ millions)</strong></td>
</tr>
<tr>
<td>Federal Transit Administration “New Starts”</td>
<td>$82.2</td>
</tr>
<tr>
<td>Other federal</td>
<td>$0.6</td>
</tr>
<tr>
<td>Ohio Department of Transportation</td>
<td>$50.0</td>
</tr>
<tr>
<td>Greater Cleveland Regional Transit Authority</td>
<td>$17.6</td>
</tr>
<tr>
<td>City of Cleveland*</td>
<td>$8.0</td>
</tr>
<tr>
<td>Northeast Ohio Areawide Coordinating Agency</td>
<td>$10.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$168.4</strong></td>
</tr>
</tbody>
</table>

* $31.6 million in additional local funding for project enhancements. Total cost of project was $200 million
How is it configured?
Euclid Corridor HealthLine BRT Project Map

Downtown Transit Zone
Typical Section - Downtown

DOWNTOWN/CSU DISTRICT
SECTION WITH ONE-SIDE PARKING

Scale: 1/8"=1'-0"
Public Square Station
Median Center Platform Station
Typical Section - Midtown
Typical Section Midtown with Station
Median Side-Platform Station
Typical Section – University Circle
Curbside Stations
How does it operate?
Exclusive Bus Lane Example

- One mixed-flow auto lane in each direction
- Reduced on-street parking and revised access
- Center median busway and station locations
Left Turn Patterns with Median Flow-Right-Side Boarding

Conflicting turning movement

20 foot inner radius
30 foot outer radius
Operational Considerations

- Accommodate…
  - Left turns and U-turns
  - Cross street traffic
  - Pedestrians
  - Bicyclists
  - Exclusive bus lane operations
  - Transit priority treatment

- Support…
  - Emergency access
Downtown Closed-Loop Traffic Signals Affected by HealthLine
(Map not to scale)

- **Existing Signal Location (to be impacted by HealthLine improvements)**
- **Euclid Avenue / Busway**
- **Superior / St. Clair Transit Zone**
How do we make it work?
Traffic Signal Prioritization
Which Services Should Have Priority?

- Express vs. local service
- Corridor services
- Local emphasis on operational improvements
- Intersection, crossing corridor traffic volumes
Operational Needs

- Desire to monitor and manage traffic control from central locations (GCRTA & City Hall)
- Desire to visually monitor / verify conditions at intersections
- Preference to base signal operations on time-of-day plans based on prevailing flows
- Desire to link control centers and traffic signal system
Traffic Management System (TMS)

- Integration of bus location / speed information
- Provide for future integration with other systems
- Provide signal timings supporting transit priority
- Control for left turns and U-turns
- Minimize delays to north-south flows
- Minimize queuing
Communications and Traffic Control System

Travelers
- RTA Dynamic Message Signs
- Wide-Area Wireless Communication
- Emergency Vehicle
- RTA Vehicle

Operations Centers
- Police / 911 Services
- City of East Cleveland Traffic Management Center
- City of Cleveland Traffic Management Center
- RTA Dispatch and Management Center
- City Maintenance and Construction Divisions

Vehicles

Roadside
- Dedicated Short Range Communications
- East Cleveland Traffic Controllers
- Cleveland Traffic Controllers
- Cleveland CCTV Cameras
Planned and Designed

City of Cleveland CCTV Cameras
City of Cleveland TMC
City of East Cleveland Traffic Signal Controllers
Regional Emergency Response Vehicles
City of Cleveland TMC
RTA Dispatch and Management Center
RTA Electronic Payment Instrument
RTA Buses
Personal Traveler Information Devices
RTA Station Dynamic Message Signs

Center to Center Interface
Center to Field / Vehicle Interface
Traffic Signals for Bus Rapid Transit Vehicles

- Replacement of traffic signal system for the length of the project limits within Cleveland
- Replacement of controllers in East Cleveland
Traffic Control Centers

- Information instantly conveyed to RTA Integrated Communications and Operations Center
- Traffic Signal changes can be made based on data flow
- Optimize transit & non-transit operations along Euclid Avenue
- City of Cleveland turned off traffic control center
Existing Conditions
Current Systems – Cleveland RTA

- Siemens Automatic Vehicle Location (AVL) and Ericsson 900 MHz Radio System
- HASTUS Scheduling Software Integration
- Siemens Electronic Information Signs
Current Systems – City of Cleveland

- Closed-Loop signal systems
- Siemens, Peek, Eagle and Econolite
- 1,000 intersections have NEMA controllers
- 100 intersections have electromechanical controllers
- Newer systems have twisted-pair communications to control center
Vehicle Priority System

- Electronic camera in the system to monitor signals from approaching BRT vehicles or emergency vehicles.
- Cameras are very high maintenance, moving toward radar.
Transit Vehicle Priority Plan

- Protocols provide green-time extension for buses
  - Running behind: receive extension or phase jump
  - Running ahead: sit through full traffic cycle
- Emergency vehicles override the signal operations
Transit Signal Priority

- Pedestrian calls always get “Walk” + clear
- Sequential phasing in bus lane
  - Early green
  - Green extension
  - Jump phase
- All three can occur in one cycle
Benefits

- Higher operating costs
- Higher ridership
- Lower cost per rider

- Reduction in auto VMT
- Travel time savings

- Land use changed
- Urban fabric changed

- Real estate market appeal
- Significant redevelopment
# Before and After Study

<table>
<thead>
<tr>
<th>Features</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running time</td>
<td>46 minutes</td>
<td>36 minutes</td>
</tr>
<tr>
<td>Weekday ridership</td>
<td>8,900</td>
<td>14,300</td>
</tr>
<tr>
<td>Annual ridership</td>
<td>3,056,289</td>
<td>4,800,000</td>
</tr>
<tr>
<td>Operating costs</td>
<td>$7,000,000</td>
<td>$8,200,000</td>
</tr>
<tr>
<td>Cost per trip</td>
<td>$2.29</td>
<td>$1.71</td>
</tr>
</tbody>
</table>

Before-and-After Studies of New Starts Projects
Report to Congress
June 2012

Prepared by:
Office of Planning and Environment
Federal Transit Administration
U.S. Department of Transportation
http://www.dot.gov
The Power of Permanence

Euclid Corridor project has already brought $4.3 billion in new investment to the city

Inside

Ah! All the bad news about Cleveland's economy, one big, positive number is sure to impress all but the most hardened critics: $4.3 billion. That's how much fresh investment—conservatively speaking—is being poured into the four-mile-long strip of Cleveland's Euclid Avenue between Public Square and University Circle. The spending, which is encompassing everything from museums and hospitals to housing and educational institutions, includes projects that started before 2000 as well as new ones scheduled for completion within the next six years. Cleveland police are looking to arm up

The rebirth

The Euclid Avenue project's signature development, University City, seen right, is just one of the many ways the city is evolving on the heels of the recession. The street has long embraced its urban character, but in recent years it has undergone a transformation that is now attracting new residents and businesses. The renovations and improvements to businesses and public spaces have made Euclid Avenue a vibrant and dynamic destination. Cleveland.com | News

See graphics, maps and aerial photos and take a walk along Euclid Avenue in a video by The Plain Dealer's Lennie Thomas

AECOM

For more information about AECOM, visit aecom.com
Thank you!
Acknowledgements

- Michael J. Schipper, PE
  - Deputy General Manager, Engineering and Project Management; Greater Cleveland Regional Transit Authority

- Rob Mavec, PE, PTOE;
  - Commissioner of Traffic; City of Cleveland

- Glenn N. Havinoviski, PE, PTOE
  - Iteris

- William Crowley, PE
  - AECOM