

Wilcox Tunnel

What was requested:

Stated Goals for this Hearing:

1. To inform the community of our work on the tunnel;
2. To build trust between the community and city government by explaining our approach to the issues concerning the tunnel; and
3. To provide the public with a better understanding of the efforts the City has put forth to improve the situation.

Presentation will cover:

Introduction – Blythe Bailey – Administrator, Department of Transportation (CDOT)

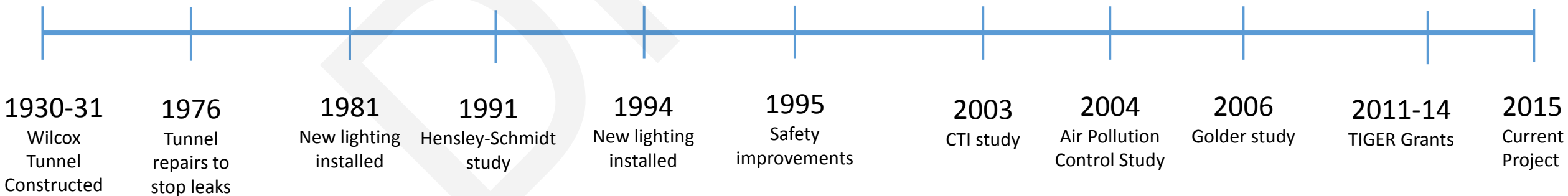
History of the Tunnel (up to ca 2011/12) – Bill Payne – City Engineer, Department of Public Works

Transportation Growth Models - Yuen Lee, Director of Research and Analysis, RPA

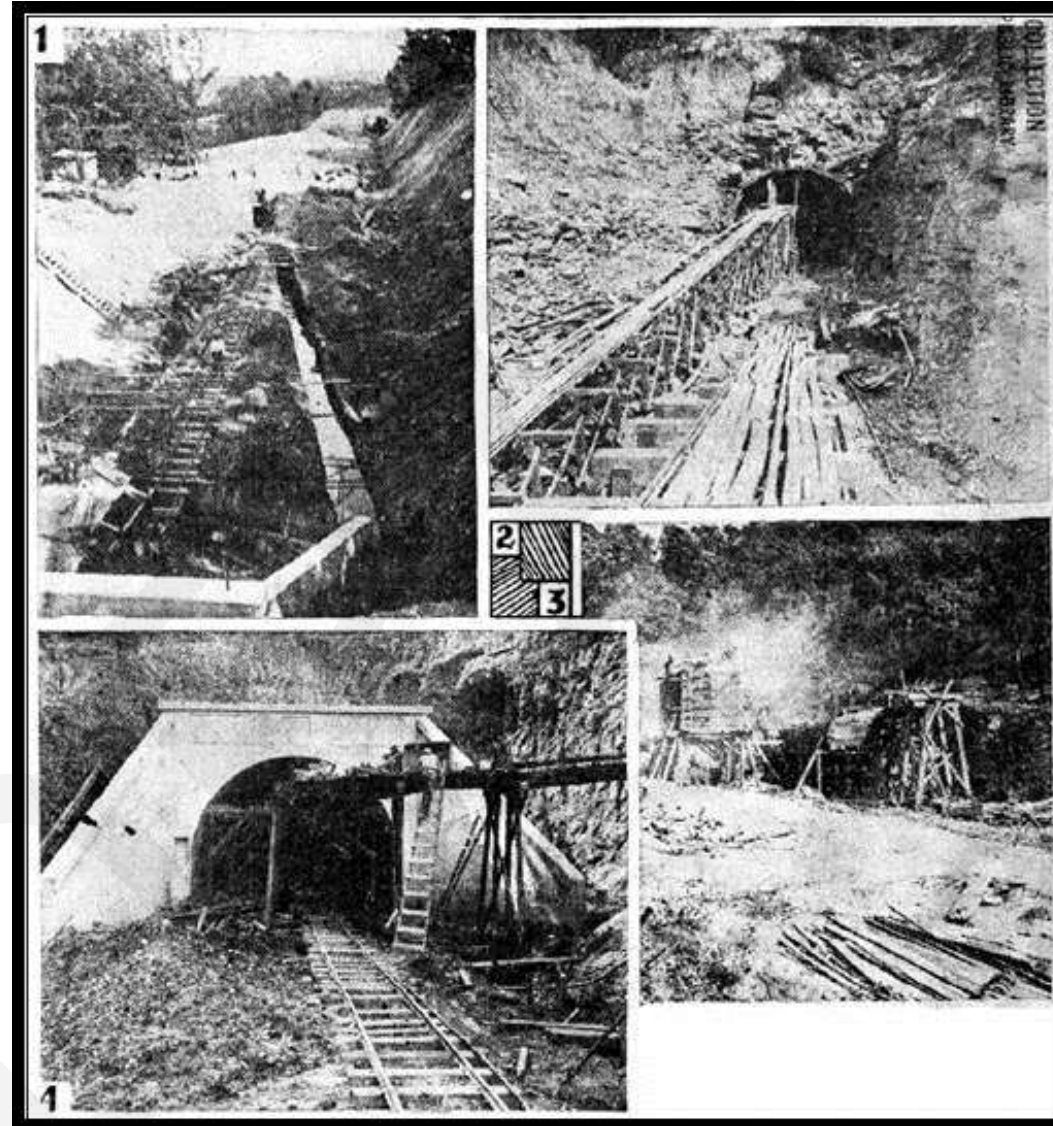
Transportation Planning Process – Melissa Taylor, Director of Strategic Long Range Planning

Recent History of the Tunnel, (2011/12 to the present)
- Blythe Bailey, Administrator, Department of Transportation (CDOT)

Wilcox Tunnel



History of Wilcox Tunnel



Wilcox Tunnel
construction 1930

Original Construction

- 1923 Missionary Ridge west of Crest road annexed into City
- 1927 State Legislature authorized construction
- 1928 County bond referendum
- 1929 Chattanooga Manufacturer's Association opposition
- 1930-31 Construction of tunnel and approaches
- 1957 Missionary Ridge east of Crest Road annexed into City



Tunnel cleaning 1978

Littlefield Urges Work To Widen Wilcox Tunnel

Possible federal
funding 1993

In Addition To Cosmetic, Safety Changes *City Eyes Expanding Wilcox Tunnel*

Tunnel Expansion Study
1990

East Chattanooga **Wilcox Tunnel may get wider**

The Public Works Department says they could make the Wilcox Tunnel a little less narrow and dangerous, but it would cost area residents the sidewalk in the tunnel.

Removal of walkway
proposed 1995

Improvements to Wilcox Tunnel

Wilcox Tunnel Will Have Injections Of Silicone

NFP11-13-76 p. A5
By J.B. COLLINS
N-PP Urban Affairs Editor

The city of Chattanooga is using injections of silicone to repair and beautify the deteriorating Wilcox Tunnel.

And, yes, it is the same material used in some types of female cosmetic surgery, according to Public Works Commissioner Paul Clark, who has authorized the project.

Quantities of silicon are forced under pressure into crevasses and holes drilled into the tunnel lining, filling cavities that have eroded through the years and stopping leaks

that are causing even more deterioration.

The material is mixed on the spot from machines designed for the purpose. This is the same material being used to repair breaks and faulty joints in the city's sewer system.

With the special equipment purchased a few months ago by the commissioner, sewer repairs are made by remote control by operators viewing the breaks through a television camera directed through the piping.

Repairing the tunnel is a bonus benefit, the commissioner said.

The new unit is also being used, Commissioner Clark said, to locate and remove root obstructions in the city's underground drainage system.

A substance that dissolves roots is pumped into the target area—also by remote control—and the treated fibers are then simply washed away.

After the Wilcox Tunnel is repaired and the leaks stopped, the city plans to apply a lining of dirt-resistant material. The glazed finish can then be hosed off and cleaning will be a comparatively minor problem, the commissioner said.

1976

Wilcox Tunnel Getting New Lights

T 2-16-82 p. B6

The "cave-like atmosphere" of the Wilcox Tunnel is about to change, but it means the tunnel will be closed to traffic from 9 a.m. to 3 p.m. weekdays for the next four weeks.

Jack Marcellis, assistant city traffic engineer, said the tunnel will be closed at 9 a.m. today as Electric Power Board crews begin installing new light fixtures expected to provide almost three times the light of those presently in use.

While there will be some inconvenience to motorists for the next four weeks, Marcellis said, when the job is finished, "You'll be able to see as you drive through there rather than having a cave-like atmosphere."

And, Commissioner Jim Eberle said, the improvements will cost the city

nothing. In fact, he said, it will save money since the new fixtures use less electricity than the antiquated ones now in place.

Eberle explained that the EPB will replace the fixtures at its cost as part of a contract with the city to light the tunnel. While that sounds good, he noted, the EPB has had the benefit of the contract for many years without major maintenance or replacement work.

The tunnel, Marcellis said, will be open for rush-hour traffic in both the morning and afternoon during the four-week period. It will also be open all day Saturday and Sunday.

1982

Eastdale

More lights OK'd for Wilcox Tunnel

Soon, light won't be something just found at the end of the Wilcox Tunnel. T 3-2-94 p. B1

The City Council on Tuesday gave its initial approval to a \$150,000 deal with the Electric Power Board to double the illumination in the notoriously dark and narrow tunnel.

"I consider it a Band-Aid," Councilman Ron Swafford said Tuesday night. "There's still much to be done with the tunnel, but this is a step in the right direction."

After the council gives final

approval to the move next week, contracts will be let to do the work.

1994

1987

- Budgetary estimate for repairing leaks & cracks - \$247,000

1988

- CWS estimate
 - Painting - \$32,298
 - Handrail repair (material only) - \$24,519

1989

- EPB lighting estimate
 - \$89,000

DRAFT

1991

- March

- Hensley-Schmidt, Inc.
- Engineering Report and Evaluation
- \$18,500
- Approved by Council Resolution 18947

- August

- Recommendations
 - Clean & Paint
 - Install New lighting
 - Remove sidewalk
 - Install modified Jersey barrier along tunnel walls
 - Mill 1.5" and overlay remaining concrete with 1.5" asphalt overlay
- Estimated cost \$564,295

1994 & 1995

1994

- Lighting
 - EPB estimate \$150,000
 - Approved by Council resolution 20169
 - Completed Aug. 1 – Sept. 6
- Pedestrian Study
 - One-day study
 - Four recreational users observed
 - Three used tunnel less than once per week
 - All had other means of transportation
 - Trial sidewalk closure implemented

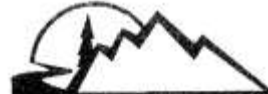
1995

- Accident Review
 - Nine accidents in the six months preceding the lighting upgrade
 - Zero Accidents in six months after lighting upgrade
- Sidewalk reopened
- Lane Widening deferred

Bill will insert some slides here

- 2003 cti slides
- 2004 resolution
- 2004 air quality
- 2005 – 2nd report from CTI
- 2006 – golder
- 2007/08 and 2010-2011
- 2012 – city council

Chattanooga- Hamilton County Air Pollution Control Bureau Study



Chattanooga-Hamilton County Air Pollution Control Bureau

May 3, 2004

Mr. Joe A. Rowe
North Brainerd Community Council
1204 Talley Road
Chattanooga, Tennessee 37411

Dear Mr. Rowe:

Thank you for your letter concerning the Wilcox Tunnel as it relates to air quality. Following receipt of your letter, I asked our Engineering Manager, Mr. Errol Reksten, to review air quality issues in the Wilcox Tunnel.

A copy of his report to me is attached. To summarize, Mr. Reksten finds that the tunnel as it is presently configured and as called for in the City's plan does not cause any violation of Clean Air Act requirements.

If you should have any questions, please let me know.

Sincerely,

Robert H. Colby
Director

CR

Enclosure

1995

- **RW-4-95 Safety Improvements**
 - Concrete Pavement repairs
 - Install New guardrail at portals
 - Install new pedestrian Handrail system
- **Council Resolutions 20726 & 20832**
 - Riverbend Construction Corp
 - \$160,183.90

Consolidated Technologies, Inc. Studies

Council Resolutions 23804 and 24613 – May 2003 and August 2004

- Consolidated Technologies, Inc.
- Two studies:
 - Engineering Investigation of Wilcox Boulevard Tunnel
 - Wilcox Boulevard – Future Tunnel Study
- \$150,000
- Summary

Golder Study

Council Resolution 24760 – May 16, 2006

- Golder Associates, Inc.
- Two-part study:
 - Investigation and Recommendation on Water Control and Structural Issues for Wilcox Tunnel
- \$139,000
- Summary

2005

Council Resolution 24327 – February 08, 2005

- Recommendation that up to \$2.7 million be set aside in the next capital and/or operating budget for the repair of Wilcox Tunnel

2008-2011

E-03-007-104 Wilcox Tunnel Improvements

- Remove pedestrian walkway to widen traffic lanes
- Rehabilitate roadway
- Install improved drainage system

Council Resolution 25457 - March 18,2008

- \$205,000
- Volkert and Associates, Inc.

Funding from Public Works

Design work for project was completed 12/2010

Resolution for the repairs designed for a contract amount of slightly less than half a million dollars was added to the Feb 15, 2011 agenda only to be removed before a vote so that the city could go back and study the possibility of building a new tunnel and applying for more substantial federal grants to make the funding possible.

Transition to bb

DRAFT

Improvements to Area Surrounding Wilcox Tunnel

CC-1-66 Widen Wilcox Boulevard at N. Chamberlin Avenue

- 1966

File No. 3240 Resurfacing of 1.6 miles of Wilcox Boulevard

- 1983
- Resurfacing of Wilcox Boulevard from bridge west of Holtzclaw Ave. to Wilcox Tunnel and from Wilcox Tunnel to Moss Street

File No. 4219 Intersection improvements at Wilcox Boulevard and N. Chamberlin Avenue

- 1997
- Widen Wilcox Boulevard
- Sidewalks
- Curbs and gutters
- Light poles
- Storm drains

Improvements to Area Surrounding Wilcox Tunnel

CD-5-84 Rehabilitation of North Chamberlain Avenue

- 1985
- Sidewalks
- Curbs and gutters
- Storm drains

SS-5-00-02 Streetscape improvements on Wilcox Boulevard from Greenwood Ave. to Moss Dr.

- 2000
- Sidewalks
- Curbs and gutters
- Light poles
- Street trees
- Storm drains

Recent Work Orders around Wilcox Tunnel

2012

76623 and 102007

- Roadway repaired at 3230 Wilcox Boulevard
- Roadway milled and repaved at 3770 Wilcox Boulevard

2014

85754 and 125381

- Roadway milled and repaved at Wilcox Boulevard and Tunnel Boulevard because of initial suggestion of Councilman Gilbert

2011-2014

E-10-013-101

- Designs for improvements to existing tunnel and construction of second tunnel

Council Resolutions 26630 and 26928 – March 22 and December 20, 2011

- Halcrow Inc.
- \$2,048,646
- 35% design completed

Council Resolution 26804 – August 2, 2011

- Five-year Capital Improvement Plan for FY 2012-2016
- Includes Wilcox Tunnel recommended allocation of \$37 million

Council Resolution 27625 – August 27, 2013

- Five-year Capital Improvement Plan for FY 2014-2018
- Includes Wilcox Tunnel recommended allocation of \$51.7 million

NDT Corporation – August 2013/October 2014

Voids exist behind the lining in a number of locations along the tunnel, and there has been expressed some concern particularly where these voids coincide with areas of lower strength concrete or thinner tunnel liner.

CH2MHill's opinion is these voids present a low-risk. October 2014

“The lining is clearly stable at the moment, and to change that situation it would require either a significant change in the lining properties (very unlikely in the short term) or a significant change in the loading condition.”

The voids do allow for a potential mechanism for changing the loading condition, i.e. if a block of rock behind the void becomes loose and slides into contact with the tunnel lining. However, we consider the possibility of this happening in the short-term to be very low as the rock behind these voids has clearly been stable for several decades. It also requires that the block have a smaller overall footprint than the extent of the void.

Summary of Wilcox Tunnel Actions

Year	Project	Cost	Completed	
1987	Budgetary estimate for repairing leaks and cracks	\$ 247,000	Not completed	
1988	CWS Estimate for painting and handrail repair	\$ 56,817	Painting was not completed	
1989	EPB lighting estimate	\$ 89,000	Completed in 1994	
1991	Hensley-Schmidt, Inc. Engineering Report and Evaluation	\$ 18,500	Work completed in 1991	
1991	Coating and Painting; Mill and Overlay; Removal of Sidewalk - Hensley Schmidt Recommendation	\$ 250,000	Not completed	
1994	EPB Replaced lighting - Hensley Schmidt Recommendation	\$ 150,000	Completed	
1995	RW-4-95 Safety Improvements - Hensley Schmidt Recommendation	\$ 160,184	Completed	
2003	Consolidated Technologies, Inc. Report	\$ 25,000		
2003	CTI Report Improvements - Lighting Upgrade, Ceiling Joints, Remove Sidewalk, Concrete Pavement Repair, Coat and Paint interior, New drainage system and lighting system	\$ 2,700,000	Not completed	
2004	CTI Report - Improvements - New Replacement Tunnel(s)	\$ 25,000,000	Not completed	
2005	CTI Report	\$ 125,000	Repair technique evaluation	
2006	Golder Report	\$ 139,000	Geotechnical and geophysical studies	

Regional Planning and Growth Projections

Transportation Growth Models - Yuen Lee, Director of Research and Analysis, RPA

Transportation Planning Process – Melissa Taylor, Director of Strategic Long Range Planning

Population Projection

Hamilton County

	Projection				
	2000	2010	Low	Mid	High
Population	307,896	336,463	399,769	411,494	448,842

- Woods & Poole
- Tennessee State Data Center

Population Projection

Hamilton County

Advisory Committee

- The Center of Business & Economic Research, UTK
- Chattanooga Area Chamber of Commerce
- Hamilton County Health Department
- Northwest Georgia Regional Commission
- Ochs Center

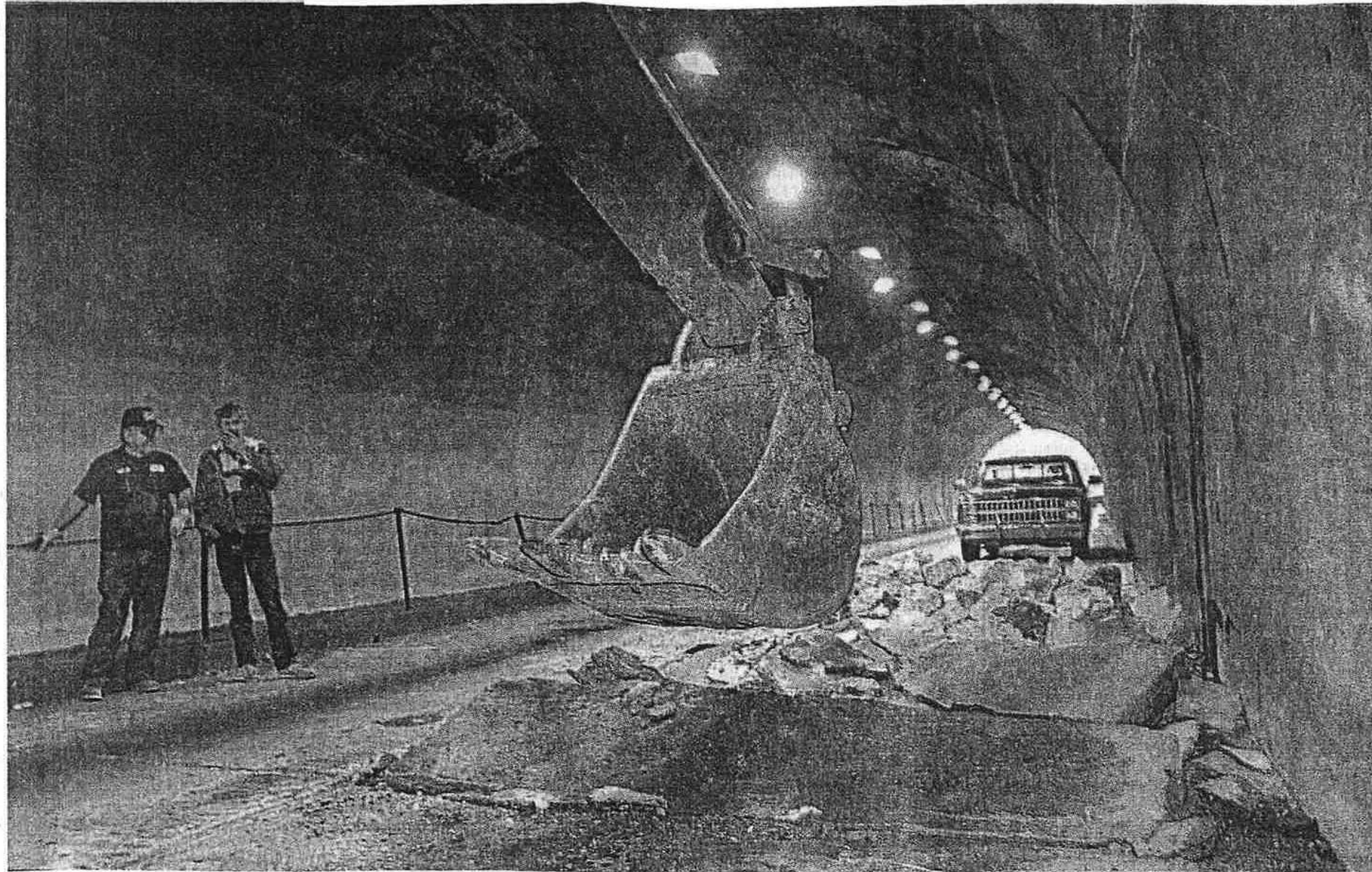
Traffic Volumes

Travel Demand Model

	2010*	2020	2030	2040
Wilcox Tunnel	13,187	12,439	17,158	16,939
Brainerd Tunnel	34,167	32,640	34,676	32,758
Ringgold Tunnel	18,847	15,559	16,862	16,319

* actual count from TDOT

Tunnel vision

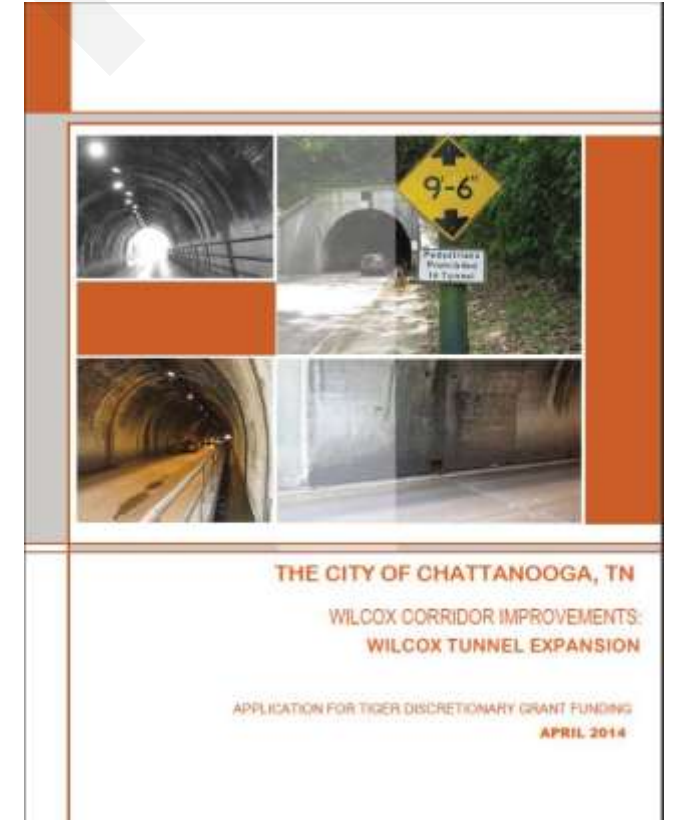
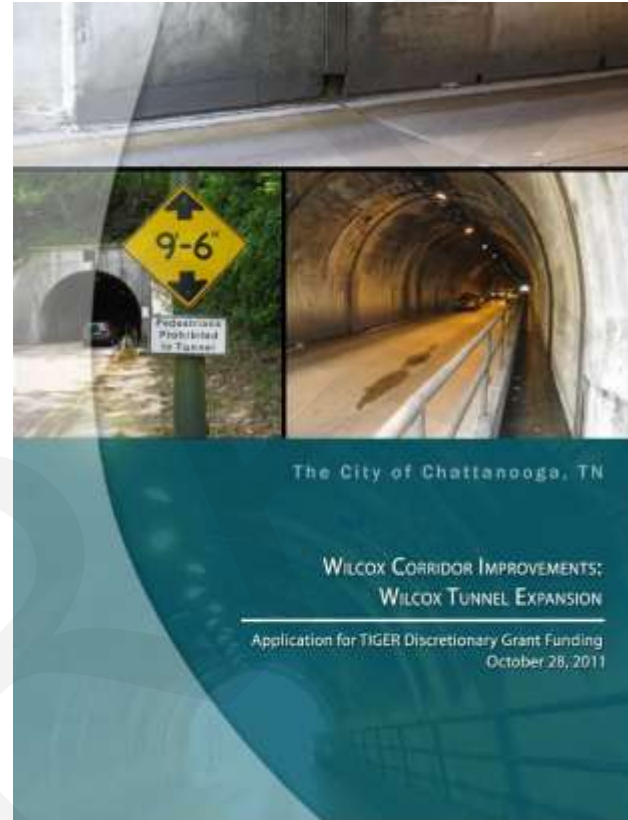


T10-24-95 p. B1

Refurbishment of the Wilcox Boulevard Tunnel began Monday and will close the tubes for about two months. Russell Lev-
ing and Larry Harp, from left, watch as sections of the old paving are broken up. Along with about 13 of these areas, repairs will also be made to a pedestrian handrail.

October
1995

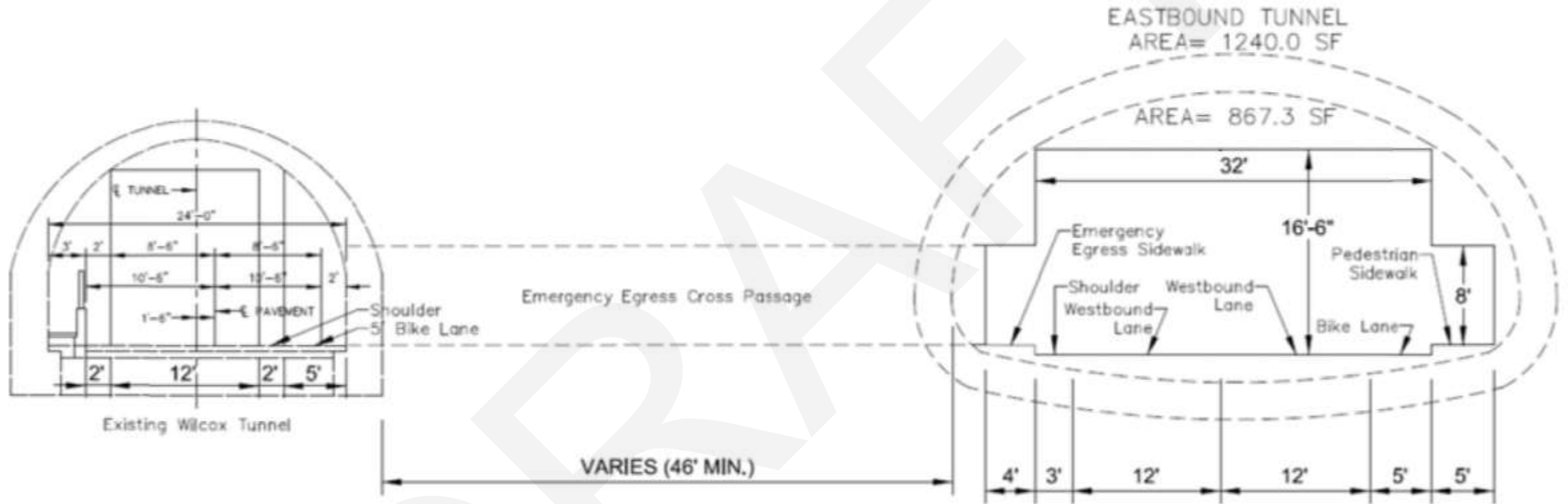
TIGER III (2011)
TIGER IV (2012)
TIGER V (2013)
TIGER VI (2014)



TIGER FEDERAL GRANT PLAN



TIGER FEDERAL GRANT PLAN



Cross section of existing and proposed tunnels

TIGER I 2009

- 1,457 Applicants sought over \$59 billion in TIGER funding
- 51 projects were selected totaling \$1,498,126,016
- 2.5% of projects by dollar were awarded
- Average project cost - \$29,375,020
- % over \$10 million - 75%
- % over \$15 million - 71%
- **% over \$20 million - 57%**

TIGER II 2010

- 1,696 Applicants sought over \$29 billion in TIGER funding
- 74 projects were selected totaling \$574,132,988
- 2% of projects by dollar were awarded
- Average project cost - \$7,805,751
- % over \$10 million - 35%
- % over \$15 million - 24%
- **% over \$20 million - 10%**

TIGER III 2011

- 848 Applicants sought over \$27 billion in TIGER funding
- 46 projects were selected totaling \$511,423,147
- 2% of projects by dollar were awarded
- Average project cost - \$11,117,895
- % over \$10 million - 52%
- % over \$15 million - 20%
- **% over \$20 million - 0%**
- City of Chattanooga asked for \$23,100,000
- Consultant fees for application \$28,511

TIGER IV 2012

- 710 Applicants sought over \$13 billion in TIGER funding
- 47 projects were selected totaling \$485,382,248
- 4% of projects by dollar were awarded
- Average project cost - \$10,117,005
- % over \$10 million - 43%
- % over \$15 million - 9%
- % over \$20 million - 4%
- **% over \$25 million - 0%**
- City of Chattanooga asked for \$25,000,000
- Consultant fees for application \$23,235

TIGER V 2013

- 585 Applicants sought over \$9 billion in TIGER funding
- 52 projects were selected totaling \$457,847,000
- 5% of projects by dollar were awarded
- Average project cost - \$8,804,750
- % over \$10 million - 31%
- % over \$15 million - 12%
- **% over \$20 million - 0%**
- City of Chattanooga asked for \$26,751,354
- Consultant fees for application \$25,000

TIGER VI 2014

- 798 Applicants sought over \$8.7 billion in TIGER funding
- 72 projects were selected totaling \$584,062,021
- 6.6% of projects by dollar were awarded
- Average project cost - \$5,208,523
- % over \$10 million - 22%
- % over \$15 million - 13%
- % over \$20 million - 4%
- **% over \$25 million - 0%**
- City of Chattanooga asked for \$27,300,000
- Consultant fees for application \$30,000

TIGER I-VI 2009-2014

- 6,094 Applicants sought over \$146.5 billion in TIGER funding
- 342 projects were selected totaling \$4,110,973,420
- 2.8% of projects by dollar were awarded
- Average project cost - \$12,020,390
- % over \$10 million - 44%
- % over \$15 million - 23%
- % over \$20 million - 12%
- % over \$25 million - 7%

TIGER Recipient – Tunnel/bridge

Memorial Bridge Replacement – New Hampshire Department of Transportation

TIGER Funding \$20 million

Total Project Cost \$100 million

This joint Maine-New Hampshire project will replace a crucial, but deteriorating, highway bridge that currently has a bridge sufficiency rating of 6 out of 100. Safety concerns resulted in both states' restricting bridge traffic to no more than three tons, thereby causing all truck traffic to detour. The TIGER II grant provided by the U.S. Department of Transportation will enable this bridge to resume normal operations and allow material transport between the Portsmouth Naval Shipyard and the regional transportation network.



TIGER Recipient – Tunnel/bridge

I-20 Mississippi River Bridge Rehabilitation – Mississippi and Louisiana
Departments of Transportation

TIGER Funding \$4.25million

Total Project Cost \$4.25million

TIGER funds will support the rehabilitation of the I-20/Vicksburg Mississippi River Bridge, which has experienced unanticipated stresses due to movement of the pier foundations. The funds will be used to improve the bridge truss and deck to withstand minor side-to-side movements (e.g. downstream movement of piers/foundation soils, minor barge strikes).



TIGER Recipient – Complete Streets

Goldsboro Main Street Revitalization – Goldsboro, NC

TIGER Funding \$10 million

Total Project Cost \$21.9 million

TIGER funds will be used to complete a package of transportation projects in the Goldsboro downtown area, including the Gateway Transit Authority Transfer Facility, a Walnut Street Connector Block, and streetscaping improvements around Union Station and Center Street. The project will reduce a large six-lane highway to a more traditional and appropriately scaled small town boulevard with wide sidewalks and bike lanes, in order to improve safety and livability.



TIGER Recipient – Multi-modal/Rail

Atlanta Streetcar

TIGER Funding \$47.7 million

Total Project Cost \$72.2 million

The Atlanta Streetcar project, a product of the relationship between the city of Atlanta, the Atlanta business community and the Metropolitan Atlanta Rapid Transit Authority (MARTA), will provide new and enhanced transit options in the city's core. The project, which connects to the existing MARTA light-rail system at Peachtree Center, will be 2.7 miles of track and four streetcars that operate between 12 stations. The streetcars will travel counter clockwise along a loop that converges at Woodruff Park.



Regular Quarterly Maintenance



Scrub brush cleaning 2014



Pressure washing after 45 minutes of scrubbing one panel

Tunnel Cleaning



- October 2014
- \$7500.00



Other Improvements:

Lighting improvements



The original tunnel lighting was replaced on January 7, 1942 with a mercury vapor lamp system. The improvements consisted of forty two 150w White Way Luminaires (fixtures) and associated wiring, installed by the Electric Power Board. The total cost of the new lighting was \$2985.00.

Between 1942 and 1982 the lighting system was upgraded to 104 mercury vapor luminaires.

On September 10, 1981 the existing mercury vapor lighting system was removed and replaced by a new system, consisting of 92 150w high pressure sodium luminaires. EPB performed the work at a cost of \$46,199.00.

Lighting in the tunnel currently consists of 92, 400w, high pressure sodium fixtures and exposed conduit. It was installed in June of 1994. The lighting system was inspected on April 2, 2013, by EPB contractor AP&L, and was found to be in good condition, with no loose fixtures or conduit.

Aluminum flashing to seal leaks



Aluminum flashing installed
June-July 2008

What does it take to make Wilcox Tunnel a state route?

State Route Map

DRAFT

CARTA

Route through Wilcox Tunnel discontinued in August 2009

Route #19 Cromwell Road travels an additional 5.25 miles each round trip

Annual Ridership

Year	East Chattanooga	Eastdale	Cromwell	Total
FY 2011	260,783	34,541	22,053	317,377
FY2010	262,822	32,469	15,299	310,590
FY2009	280,048	32,562	16,823	329,433

Bus Bike Rack Usage

Year	East Chattanooga	Eastdale	Cromwell	Total
FY2011	1,814	123	211	2,148
FY 2010	1,996	87	151	2,234
FY2009	2,014	153	146	2,313

Comparisons of Other Tunnels and Streets

<u>Tunnel</u>		<u>No.-Width of Lanes</u>	<u>Length (ft)</u>	<u>Daily Traffic Volume (vpd)</u>	<u>Total Crashes</u>	<u>Injury Crashes</u>	<u>Crash Rate</u>	<u>Critical Crash Rate</u>	<u>R/Rc</u>
Wilcox		2-10.5'	1,315	12,694	21	1	12.96	5.7	2.28
Wilcox	*1992-1995	2-10.5'	1,315	20,255	23	5	6.08	4.80	1.27
Bachmann		2-15'	1,025	17,566	9	0	3.73	5.24	0.71
Stringer's Ridge		2-11'	299	13,082	4	3	4.24	6.44	0.66
Missionary Ridge		4-11'	995	31,542	9	0	2.26	3.82	0.59
<u>Road Section</u>	<u>From</u>	<u>No.-Width of Lanes</u>	<u>Length (ft)</u>	<u>Daily Traffic Volume (vpd)</u>	<u>Total Crashes</u>	<u>Injury Crashes</u>	<u>Crash Rate</u>	<u>Critical Crash Rate</u>	<u>R/Rc</u>
Igou Gap Rd	Franks to Gunbarrel	2-9'	2,150	7,145	17	1	6.76	5.19	1.3
Dodson Ave	Gilbert to Infantry	2-10'	1,300	7,181	5	2	6.59	6.78	0.97
N Chamberlain Ave	Latta to Emma	2-15'	1,300	7,042	4	1	3.04	5.97	0.51
Bonny Oaks Dr	Parkway to Talatha	2-11'	1,300	11,433	2	0	0.84	5.25	0.16

Major work on other tunnels in Chattanooga

There are currently 3 tunnels in the areas that are State maintained:

- McCallie tunnels (2 tubes)
- Bachman Tubes (2 tubes)
- Stringers Ridge Tunnel

Annual maintenance consists of a monthly cleaning for each tunnel and as needed maintenance to address drainage issues, lighting, etc.

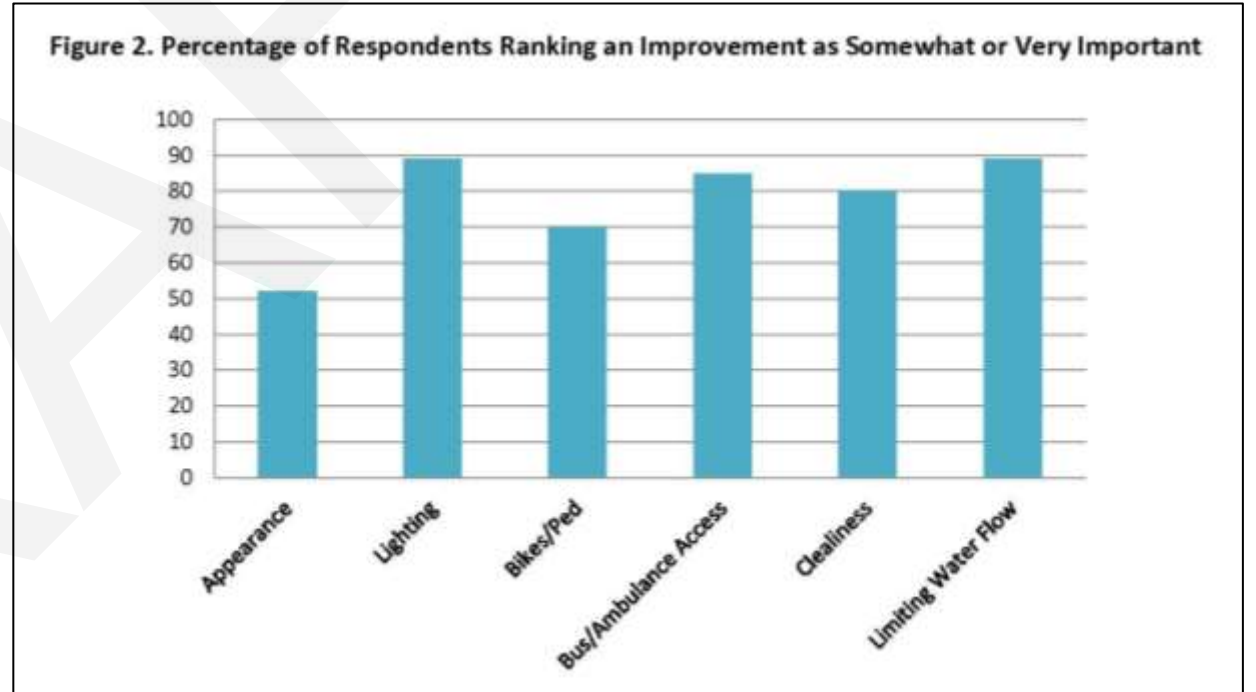
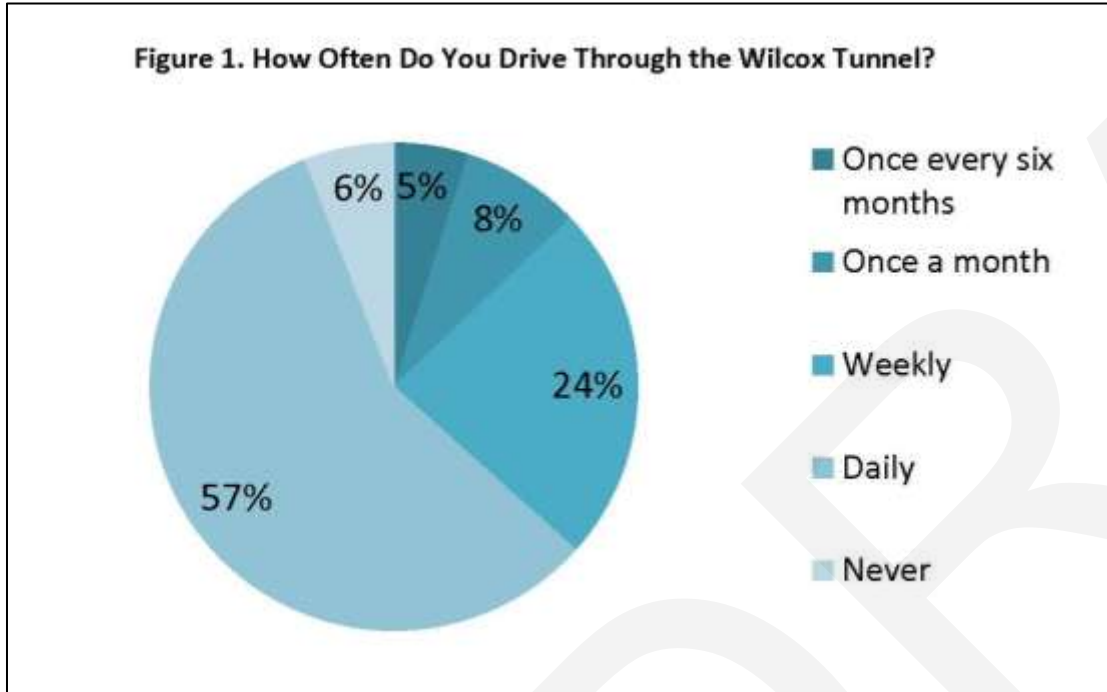
Annual cost is approximately \$187,000 or \$44 per linear foot

The tunnels were renovated 1990-1993 for \$7.6 million

- Pumped grout into the crevices
- Tile
- Lights



To determine priorities for Wilcox Tunnel modifications, the Mayor, City Council members, City staff, and volunteers canvassed the neighborhoods on either side of the Tunnel in 2014 to solicit citizen comments. In addition, the City posted the questionnaire on the City website for several weeks.



Citizen comment statistics 2014

Wilcox Tunnel West Entrance Before

Tunnel is dimly lit with yellow high-pressure sodium lights

Existing walls are dirty, both inside and outside the tunnel



Moisture and ponding occur along the travel lane

Road surface is old and in need of repair

Existing railing is in poor condition

Wilcox Tunnel West Entrance After

New energy efficient white LED lighting system

New tunnel surface coating for moisture resistance and brightness



New drainage gutter for improved water conveyance

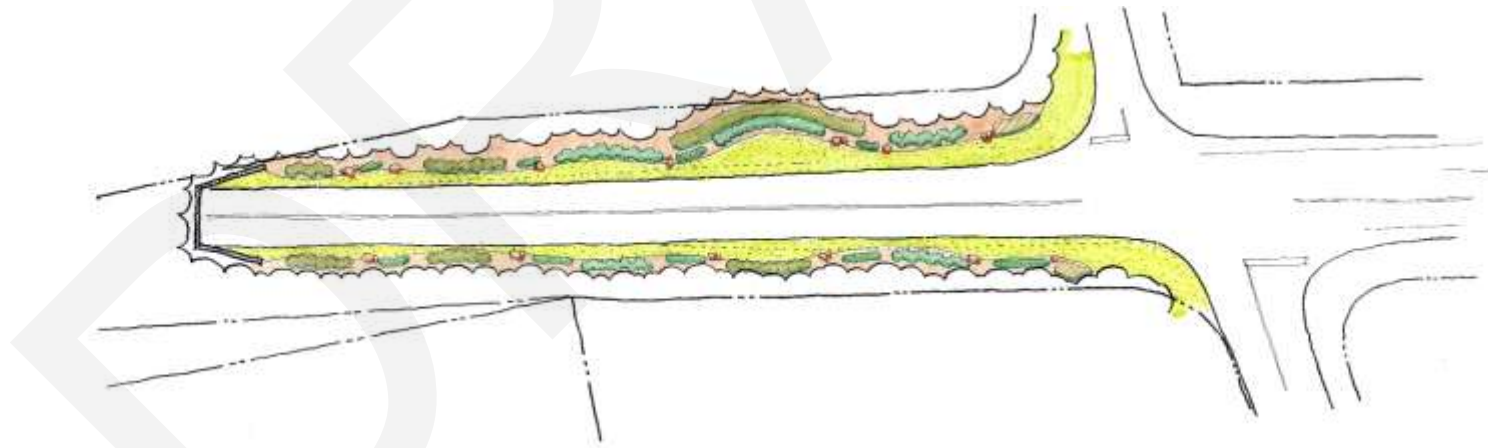
Refurbished road surface for enhanced travel and skid resistance

Enhanced pedestrian railing with increased height for pedestrian protection

Proposed Wilcox Tunnel Entrance Landscaping

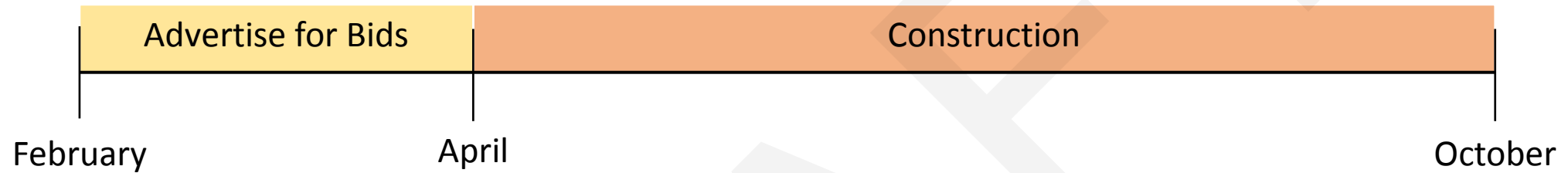


West Entrance



East Entrance

Current Wilcox Tunnel Schedule



Scope of work:

- Clean tunnel panels and joints
- Install:
 - New lighting system
 - New tunnel coating
 - Improved drainage system
 - Enhanced pedestrian railing
- Rehabilitate roadway