ALAN M. VOORHEES
Shaping Cities

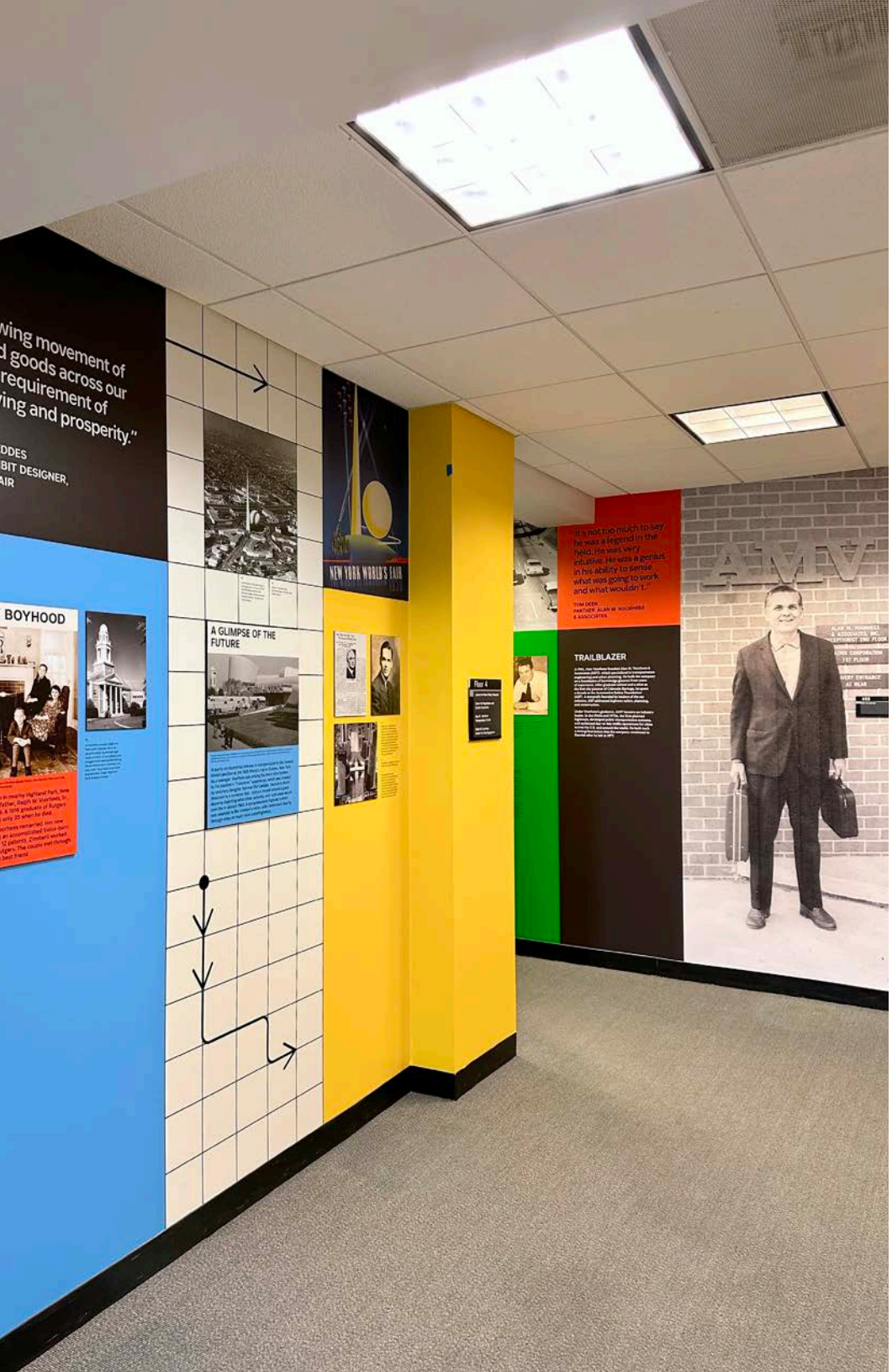
COVER IMAGE: The center's namesake, Alan M. Voorhees, was a trailblazing transportation planner. His consultancy firm shaped the development of cities around the world in the 1960s, 70s, and 80s. *Image:* Engineering News-Record

NEXT PAGE: Alan M. Voorhees & Associates provided insights and recommendations for projects ranging from traffic light coordination and highway networks to subway routes and bus operations. This image is from a 1972 report on the Boston-area transportation network. *Image: Alan M. Voorhees & Associates in association with Jason M. Cortell & Associates; Real Estate Research Corp.; David A. Crane & Partners; Skidmore, Owings & Merrill; Frederic R. Harris, Inc.; Wallace, Floyd, Ellenzweig, Inc.; Economics Research Associates; Environmental Research Technology; Environmental Systems Laboratories*

An exhibition at the

ALAN M. VOORHEES TRANSPORTATION CENTER

Leading transportation research and education regionally and nationally.



Alan M. Voorhees: Shaping Cities opened on May 5, 2023 at the Voorhees Transportation Center at Rutgers, the State University of New Jersey, in New Brunswick, New Jersey. The exhibit celebrates the life of Alan M. Voorhees and the impact of the company he founded, Alan M. Voorhees & Associates (AMV). Two years in the making, the exhibit was the result of a collaboration between the Transportation Center, the Voorhees family, and the AMV Legacy Committee.

FOR MORE ABOUT AMV, VISIT ITS ONLINE ARCHIVE:

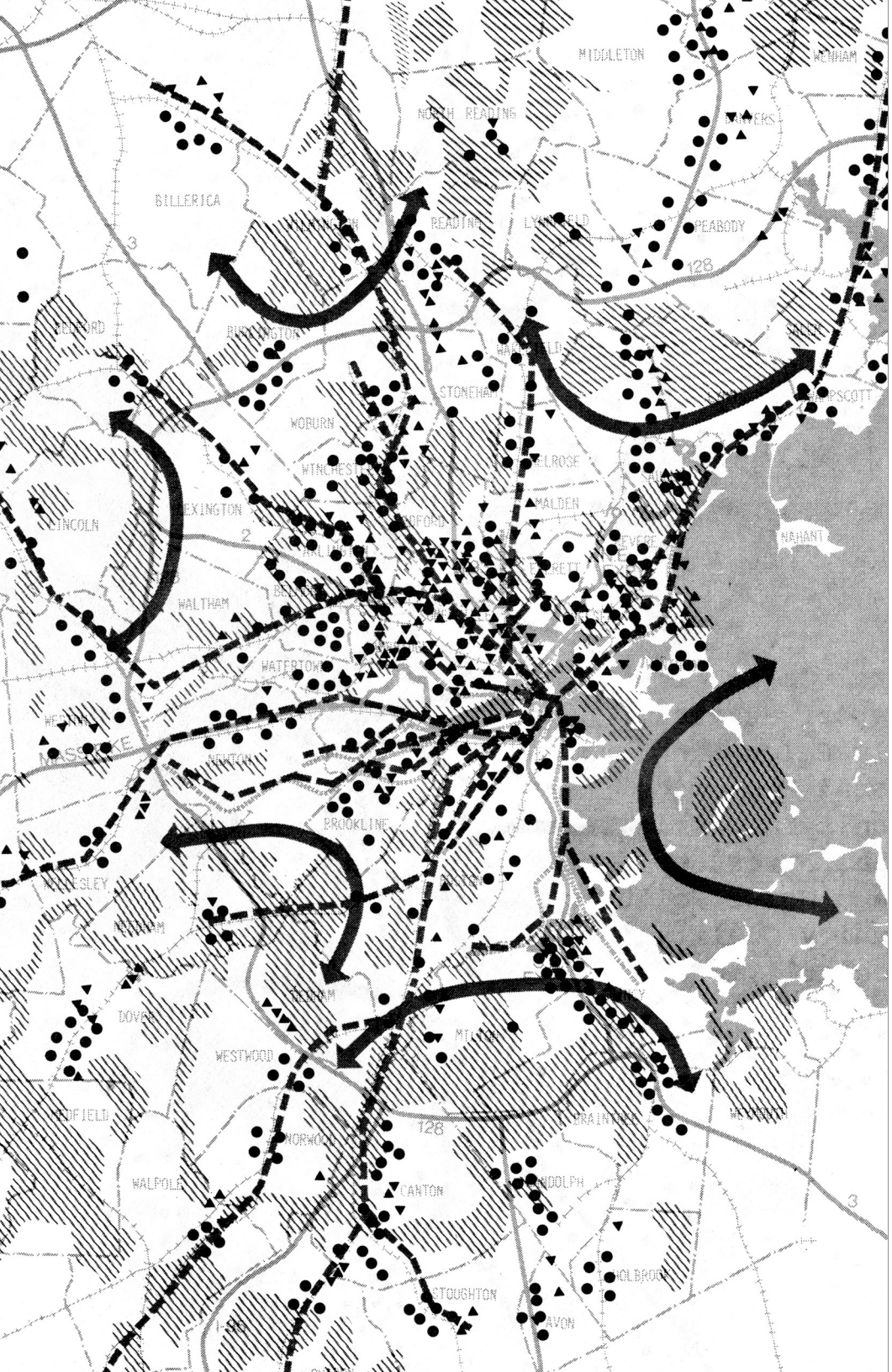
vtc.rutgers.edu/about voorhees


We R
Strike
Ready
ALAN M. VOORHEES
Shaping Cities


ALAN M. VOORHEES
& ASSOCIATES
Reshaping Cities,
Transportation
ARAPAHOE
DOUGLAS
ELBERT
LINCOLN
TELLER
EL PASO
CROWLEY
PUEBLO
OTERO
CUSTER
HUERFANO
LAS ANIMAS
COSTILLA


URBAN RAIL TRANSIT
REVITALIZATION


EXIT
to the huge impact of building the Interstate highway system into cities."
TOM DEEN
PARTNER AT ALAN M. VOORHEES & ASSOCIATES
The Big Picture: Environmental Impact
RETHINKING URBAN FREEWAYS
TRAFFIC SIGNAL LIGHTS
FIRE EXTINGUISHER
LEXINGTON
WALTHAM
WATERTOWN
NEWTON
BROOKLINE
DEDHAM
NORWOOD
WALPOLE
CANTON
WEYMOUTH



ALAN M. VOORHEES
Shaping Cities

As a visionary transportation planner, Alan M. Voorhees (1922–2005) had an enormous impact on American cities. He began his career in the 1950s, when the federal government began funding the Interstate highway system so that states could address growing automobile use and better connect cities. Like many other planners, he hoped that the system would also ease congestion and bring "peace and quiet" to urban neighborhoods.

By 1961, when Voorhees founded a traffic and planning consultancy, it was already clear that the new highways could not answer all urban transportation needs. Over the next 20 years, his company, Alan M. Voorhees & Associates (AMV), helped cities build or expand public transit, fine-tune traffic control, analyze existing and projected road use, and much more.

Voorhees, known as Al to colleagues and family alike, was a gifted problem solver. He pioneered the use of computer-aided analysis, accommodated the needs of multiple stakeholders, and had an eye for talent—members of his firm became transportation leaders in their own right. Voorhees's many honors included recognition by the National Academy of Engineering, American Society of Civil Engineers, and Institute of Transportation Engineers.

BROTHERLY BONDS

Ralph W. Voorhees honored his brother by helping to found this center. A 1948 graduate of Rutgers and lifetime resident of the New Brunswick area, Ralph had his own distinguished career as a stockbroker and philanthropist. A firm believer in civic action, he served on the boards of many organizations, including the Rutgers University Foundation. In 2011, Rutgers established the Ralph W. Voorhees Center for Civic Engagement, located here at the Edward J. Bloustein School of Planning and Public Policy.

Al (*left*) and his younger brother, Ralph, grew up in Highland Park, New Jersey, very close to this campus.
Image: Voorhees family

Ralph (left) and Al at the Transportation Center's naming ceremony in 1998. *Image: Alan M. Voorhees Transportation Center*

THE VOORHEES-RUTGERS CONNECTION

The Voorhees name (of Dutch origin) is a familiar one at Rutgers, reflecting the family's long-standing philanthropic support. Ralph Garret Voorhees (1835–1907) and Elizabeth Rodman Voorhees (1842–1924)—Alan Voorhees's great uncle and aunt—were the first to donate, reflecting their strong belief in higher education. Later generations of the Voorhees family, including Al's father and brother, attended Rutgers or served as university trustees and governors. Even members of the family who did not go to Rutgers contributed to the school, including Al.

Elizabeth Rodman Voorhees donated funds for a "religious building" at what would become Douglass College, a women's college within Rutgers. The chapel, built in 1925, was named for her. *Image: Nick Romanenko for Rutgers, the State University of New Jersey*

You are standing in the Edward J. Bloustein School of Planning and Public Policy, which houses both the Ralph W. Voorhees Center for Civic Engagement (founded in 2011) and the Alan M. Voorhees Transportation Center (1998). *Image: Nick Romanenko for Rutgers, the State University of New Jersey*

Alan and Ralph Voorhees were major benefactors of the university's art museum, which is named for their mother, Jane Voorhees Zimmerli.
Image: Nick Romanenko for Rutgers, the State University of New Jersey

Al and Nathalie Voorhees with Edward Bloustein, then president of Rutgers, at the opening of the Zimmerli Art Museum in 1983.
Image: The Central New Jersey Home News, *14 February 1983*

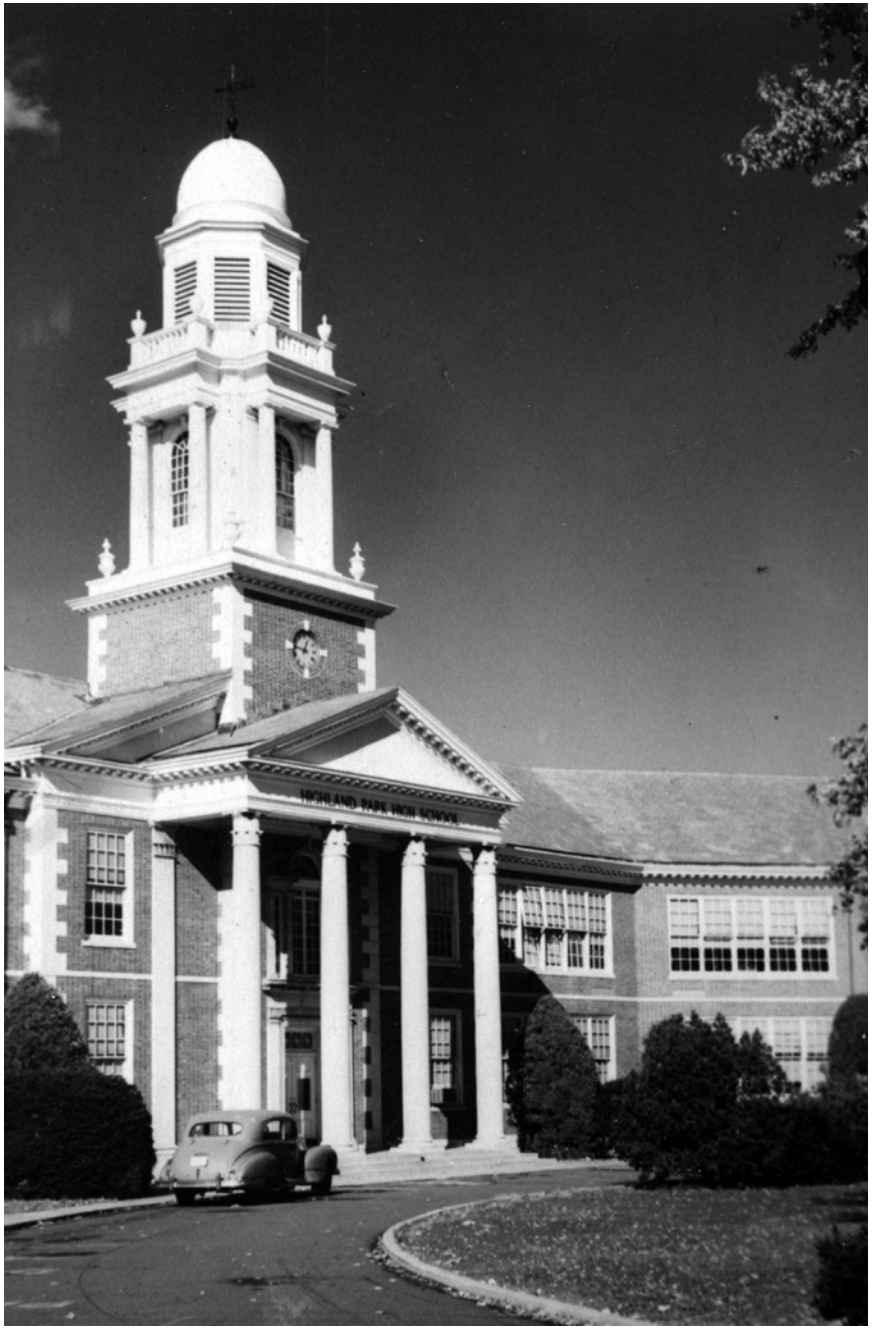
Built in 1903, Voorhees Hall was originally Rutgers's main library. Its construction was financed by Ralph and Elizabeth Rodman Voorhees in the late 1800s.
Image: Nick Romanenko for Rutgers, the State University of New Jersey

NEW JERSEY BOYHOOD

Born in 1922, Al Voorhees grew up in nearby Highland Park, New Jersey. Tragedy struck when his father, Ralph W. Voorhees, Sr., succumbed to pneumonia in 1929. A 1916 graduate of Rutgers and an investment banker, he was only 35 when he died.

Five years later, Jane Manners Voorhees remarried. Her new husband, Dr. Adolf Zimmerli, was an accomplished Swiss-born chemical engineer. The holder of 12 patents, Zimmerli worked in industry and also lectured at Rutgers. The couple met through their sons: Fred Zimmerli was Al's best friend.

Jane Voorhees Zimmerli (far right) and Dr. Adolf Zimmerli (standing) pose with their blended family: Alice (far left), Fred (next to his father), Al (next to his mother), and Ralph (seated in front).
Image: Voorhees family



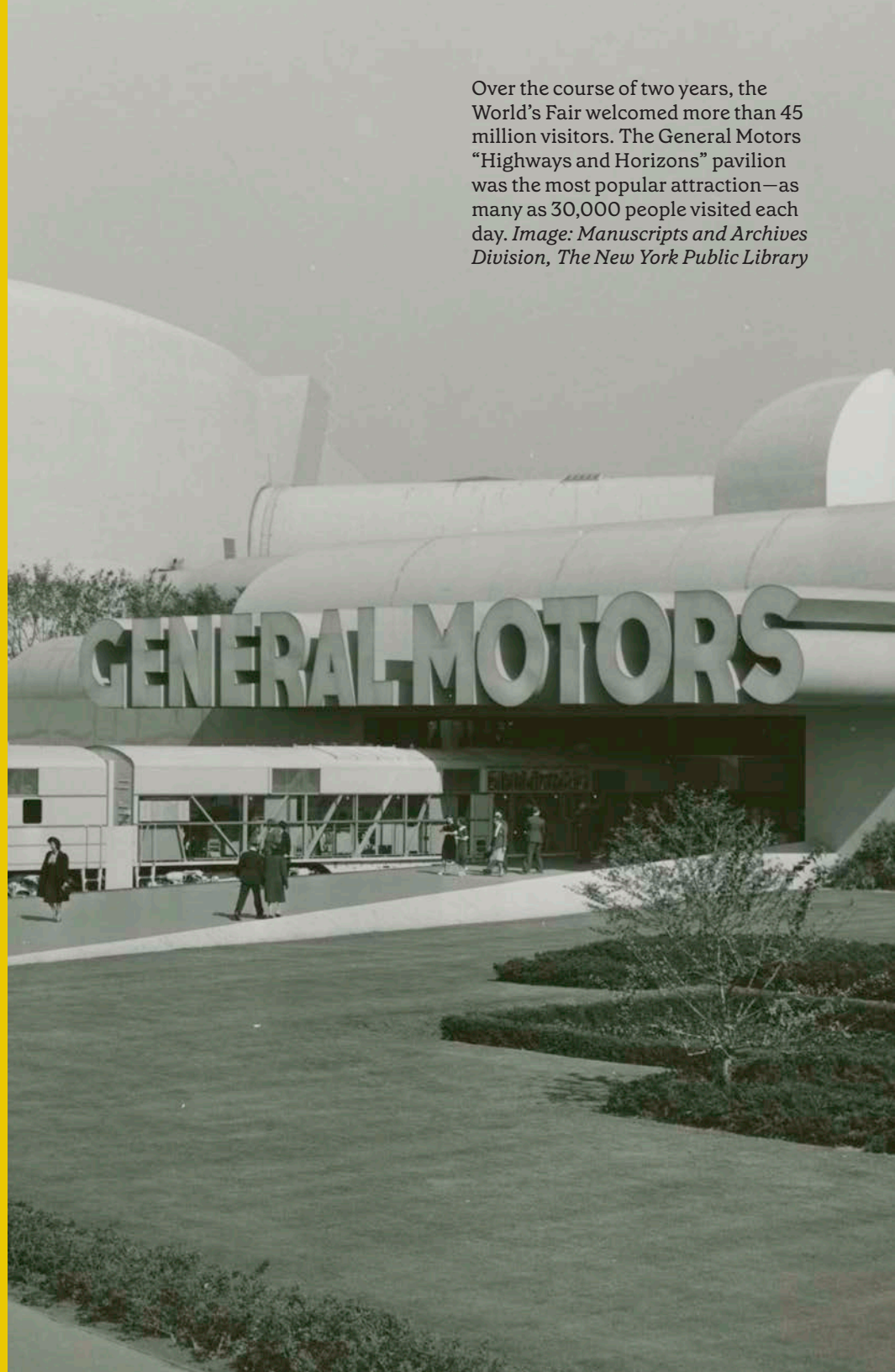
"A free-flowing movement of people and goods across our nation is a requirement of modern living and prosperity."

NORMAN BEL GEDDES
FUTURAMA EXHIBIT DESIGNER,
1939 WORLD'S FAIR

LEFT: Al Voorhees attended Highland Park public schools, where he played football, basketball, and track and field. Al had dyslexia and struggled with reading and writing. He excelled at math, however, and was voted "most likely to succeed" at graduation. Image: Highland Park Historical Society

A GLIMPSE OF THE FUTURE

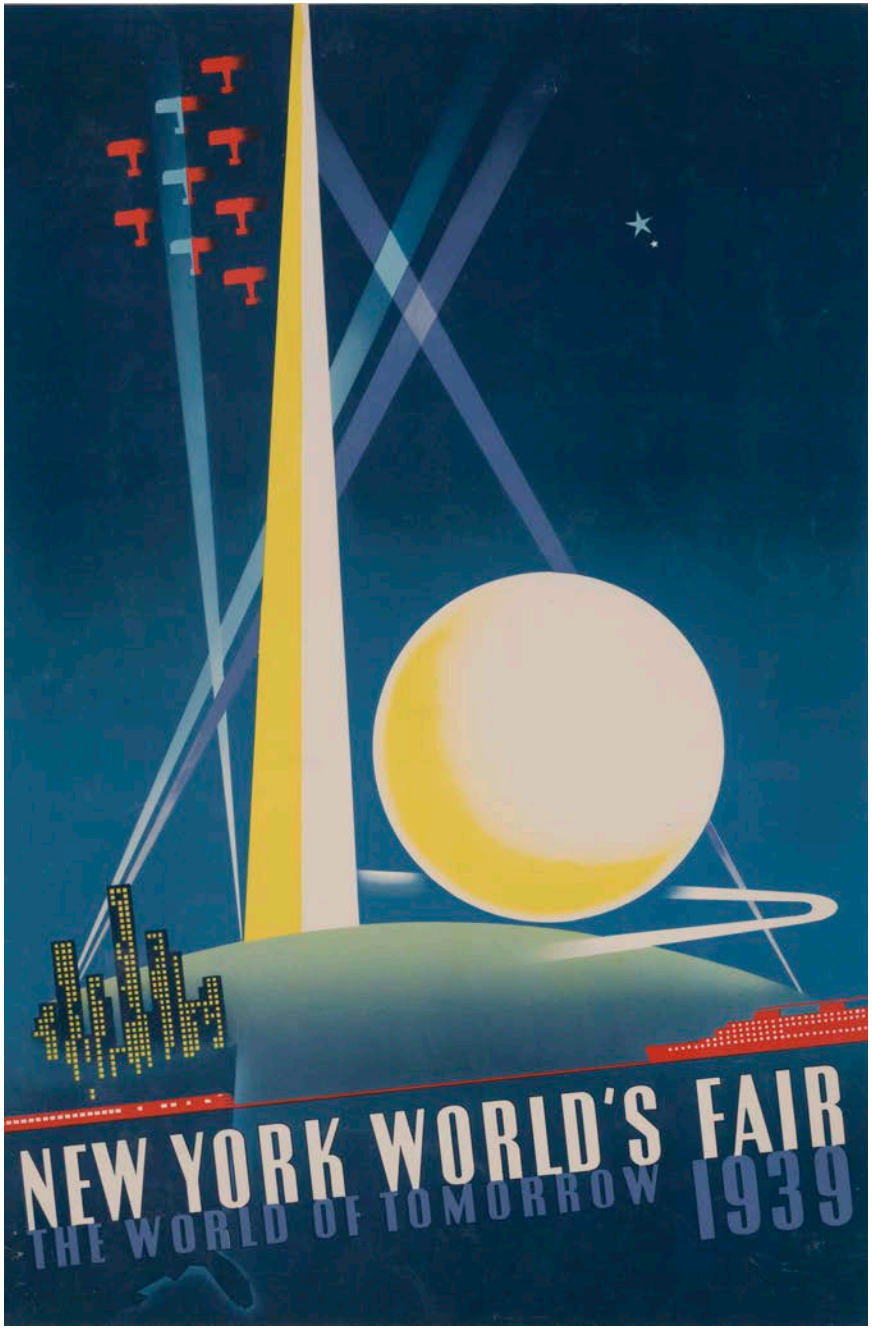
Al partly attributed his interest in transportation to the General Motors pavilion at the 1939 World's Fair in Queens, New York. As a teenager, Voorhees was among the many who flockedto the pavilion's "Futurama" experience, which was created by visionary designer Norman Bel Geddes. Seated in chairs mounted to a conveyor belt, visitors moved around a giant diorama depicting what cities, suburbs, and rural areas would look like in distant 1960. A comprehensive highway system was essential to Bel Geddes's vision, with commuters zipping through cities on multi-level superhighways.



Over the course of two years, the World's Fair welcomed more than 45 million visitors. The General Motors "Highways and Horizons" pavilion was the most popular attraction—as many as 30,000 people visited each day. *Image: Manuscripts and Archives Division, The New York Public Library*

ABOVE: Look closely at this aerial view of the fairgrounds, and you will see the Manhattan skyline in the distance. *Image: Manuscripts and Archives Division, The New York Public Library*

RIGHT: *Image: Manuscripts and Archives Division, The New York Public Library*



Local Man Describes Visit To Grounds of World's Fair

Oscar M. Voorhees, Who Saw Centennial of Washington's Inauguration in 1889, Marvels at Progress Made

By OSCAR M. VOORHEES

One who had part in the celebration in 1889 of the centennial of the beginning of the United States Government under the Constitution is naturally interested in the plans now being carried forward to mark the passage of another half century. Hence I have followed with interest the announcements respecting the Worlds Fair in New York in 1939, and recently went with two school boys, Alan Voorhees and Edgar Van Nuis, to Flushing Meadows, to see what may be seen now when the opening of the Fair is only a year away. It added much to our satisfaction that a kinsman, Stephen F. Voorhees, a native of Rocky Hill and a graduate of Princeton, as chairman of the Board of Design, gave us a letter of introduction to C. L. Lee, an architectural associate, who has charge of one department in the Administration Building on the fair grounds. Mr. Lee had given assistance some months ago when I visited the office, then on the 80th floor of the Empire State Building, and showed like curtesy on our recent visit.

The Flushing Meadow, which I had known as an unsightly and unattractive swampy section, has been transformed into a beautiful park. The heaps of ashes which increased the former ugliness have been spread over the area, and then covered with rich alluvial deposits taken from the section now made into two beautiful lakes, and the whole area is now traversed by permanent roads and paths that will remain in the park after the fair is a thing of the past.

Buildings Going Up

On all parts of the area buildings are being constructed; some well on toward completion, others just beginning. For the foundations thousands of poles have been driven to firm ground or rock, and work will progress until all is in readiness for the opening on April 30, 1939, the 150th anniversary of the inauguration of George Washington as first President of the United States.

Diagrams of the grounds issued two years ago gave approximate sites of prospective buildings. Since then the designs of many buildings have been completed. Upon a large platform, on which the general plan is outlined, a small wooden model of each building made to scale has been placed. This was approaching completion at the time of our visit.

DR. O. M. VOORHEES

For unusual architectural features a Teme Center — a Trylon and Perisphere are being constructed. The Trylon, a slender graceful obelisk, will be higher than the Perisphere adjoining, a giant globe, will be about 17 stories high, and within will be an auditorium larger than Roxy's or that at Rockefeller Center. From a ramp leading to the entrance to the Perisphere a fine view of the grounds will be had.

The bigness of the project is indicated by some figures. The Flushing Meadow Park is three miles long and 1½ miles wide, with 1,216 acres—more than 200 city blocks. We are surprised to be told that it is near the geographical and population centers of New York City.

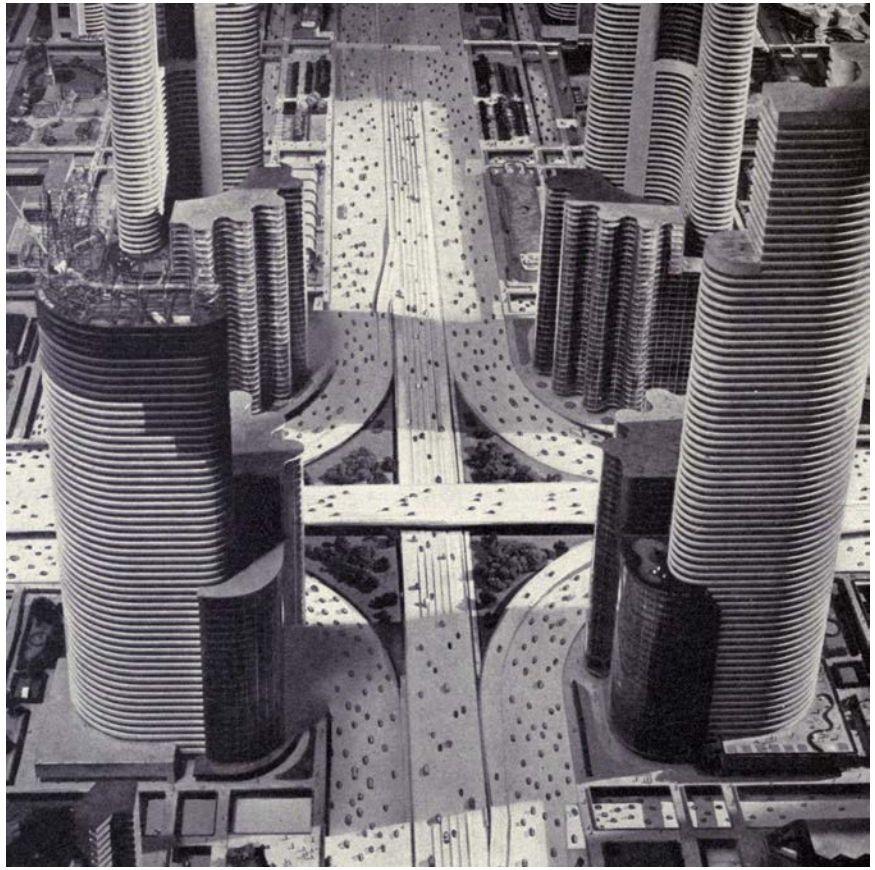
More than 200 buildings are being constructed, some by foreign governments, others by the United States, the city, the State of New York, whose building will be permanent, and others by great industries. The buildings for the states will be grouped. That for New Jersey will be a replica of the Revolutionary barracks at Trenton. An extended area along the lakes will be devoted to amusements—"two miles of fun" is the official expression.

"Building the World of Tomorrow" is given as the purpose of the fair, and that it will be on a large and commanding scale is already evident. It is in marked contrast with the more simple exercises that marked the centennial of the inauguration of General Washington.

Then President Benjamin Harrison came from Washington by train, and was taken from Elizabethport by launch, following the route over which Washington had passed, though in hours instead of days. He and Chauncey M. Depew made addresses before the building that then covered the site of Federal Hall, where Washington had taken the oath of office.

The President and his party then attended divine service in St. Paul's Church, and in the afternoon reviewed a parade that filed down Fifth avenue. I had found a place of vantage above the reviewing stand from which, toward the end of the procession, I stepped out and joined a passing group that was not in uniform, and so had the privilege of saluting a President of the United States for the first time in my career. It was indeed a thrilling moment.

A little later I slipped out of the procession, took a train for New Brunswick, and the following day was back at my studies in the Theological Seminary.



LEFT: Sixteen-year-old Al got a sneak peek of the fair in 1938, when he visited the Flushing Meadows site with his grandfather the Rev. Oscar Voorhees. Although the fair was still under construction, Rev. Voorhees marveled that the area had been "transformed into a beautiful park," as he wrote in *The Central New Jersey Home News*. *Image: The CentralNew Jersey Home News.*

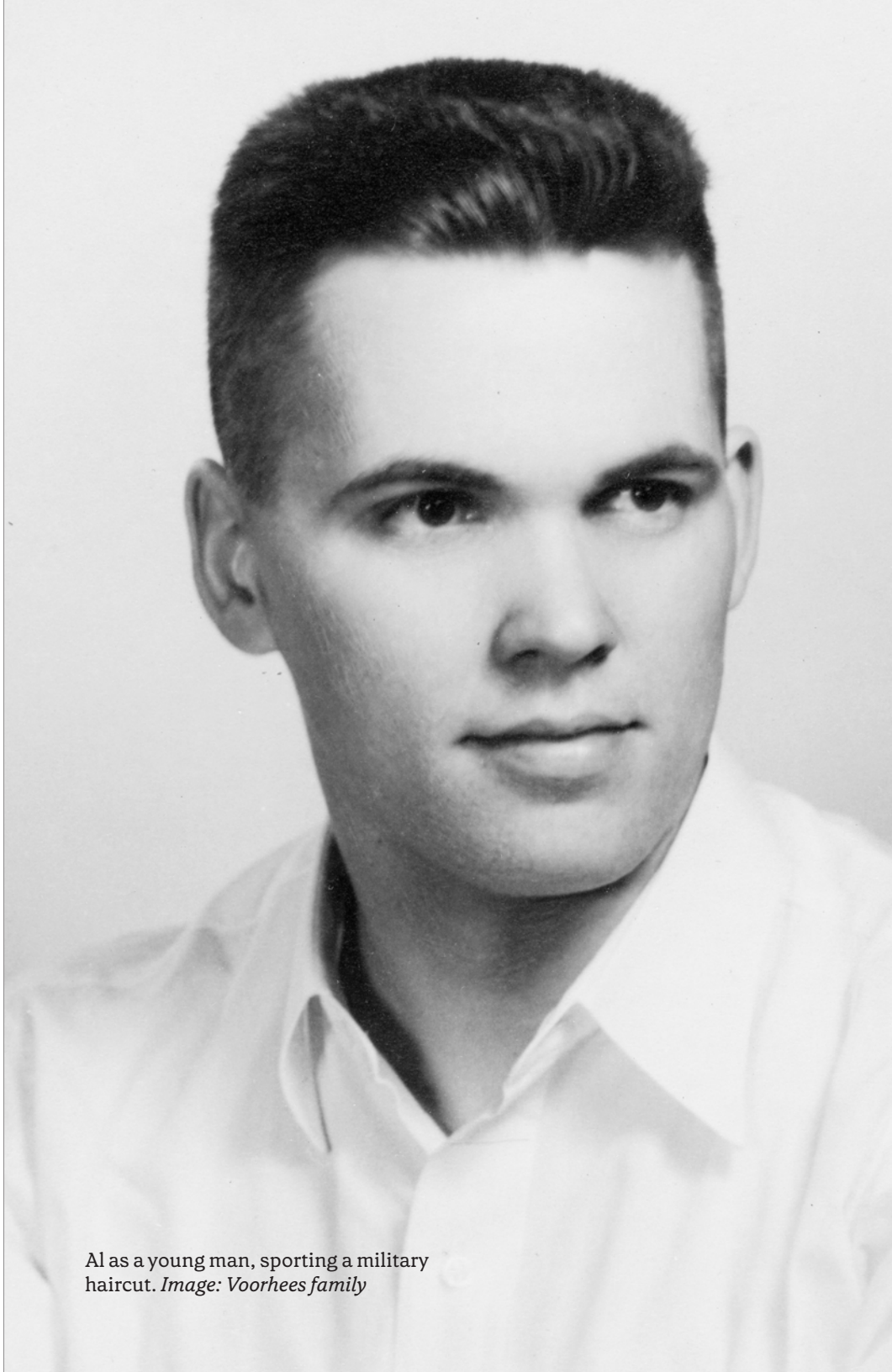
ABOVE: Futurama featured massive freeways that connected sprawling suburbs with workplaces in the city. Bel Geddes hoped to show "the four basic principles of highway design: safety, comfort, speed, and economy." *Image: Detail from Magic Motorways by Norman Bel Geddes, Random House, New York, 1940*

Al in 1940, not long after he visited the World's Fair. *Image: Voorhees family*

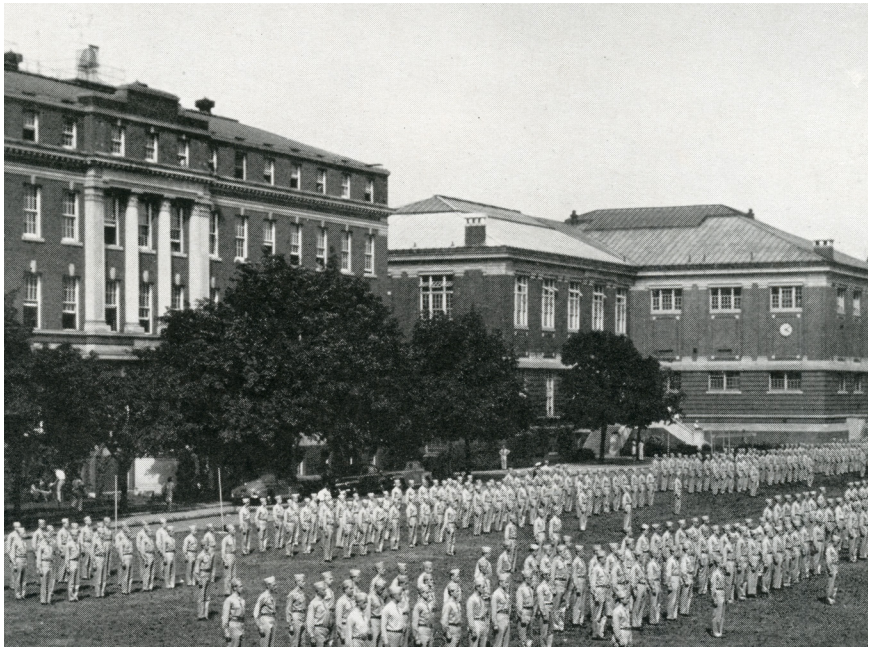
LAUNCHED INTO THE WORLD

In the fall of 1941, Al Voorhees and his stepbrother, Fred, left Highland Park for Rensselaer Polytechnic Institute (RPI) in Troy, New York. Influenced by their stepfather and father, Al majored in civil engineering, while Fred pursued his talent in electrical engineering. That winter, the U.S. officially entered World War II. The brothers joined officer training programs on campus and then served in critical missions in the Pacific Theater. Al and Fred returned to RPI after the war, receiving degrees in 1947.

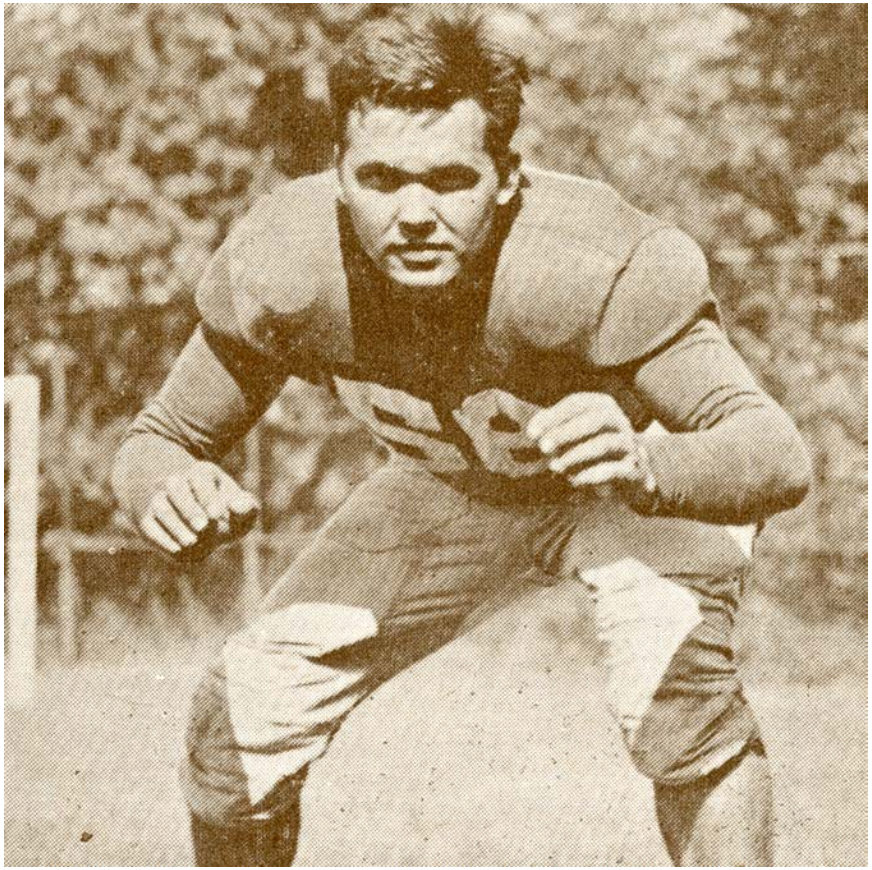
For Alan, the next five years were action-packed. In 1949, he received a master's degree in city planning from MIT. He then served as the first city-planning engineer for Colorado Springs, Colorado. By 1952, he was back on the East Coast, where he completed a one-year program at the Yale Bureau of Highway Traffic before taking a job at the Automobile Safety Foundation in Washington, DC.



Al as a young man, sporting a military haircut. *Image: Voorhees family*



Reserve Officers' Training Corps conduct drills on the RPI campus, around 1945. *Image: Rensselaer Polytechnic Institute Department of Institute Archives and Special Collections*



Al played football at RPI both before and after his military service. A newspaper article from 1946 highlighted guards on the team, including Voorhees, a "205-pounder from New Brunswick, New Jersey." *Image: Rensselaer Polytechnic Institute Department of Institute Archives and Special Collections*

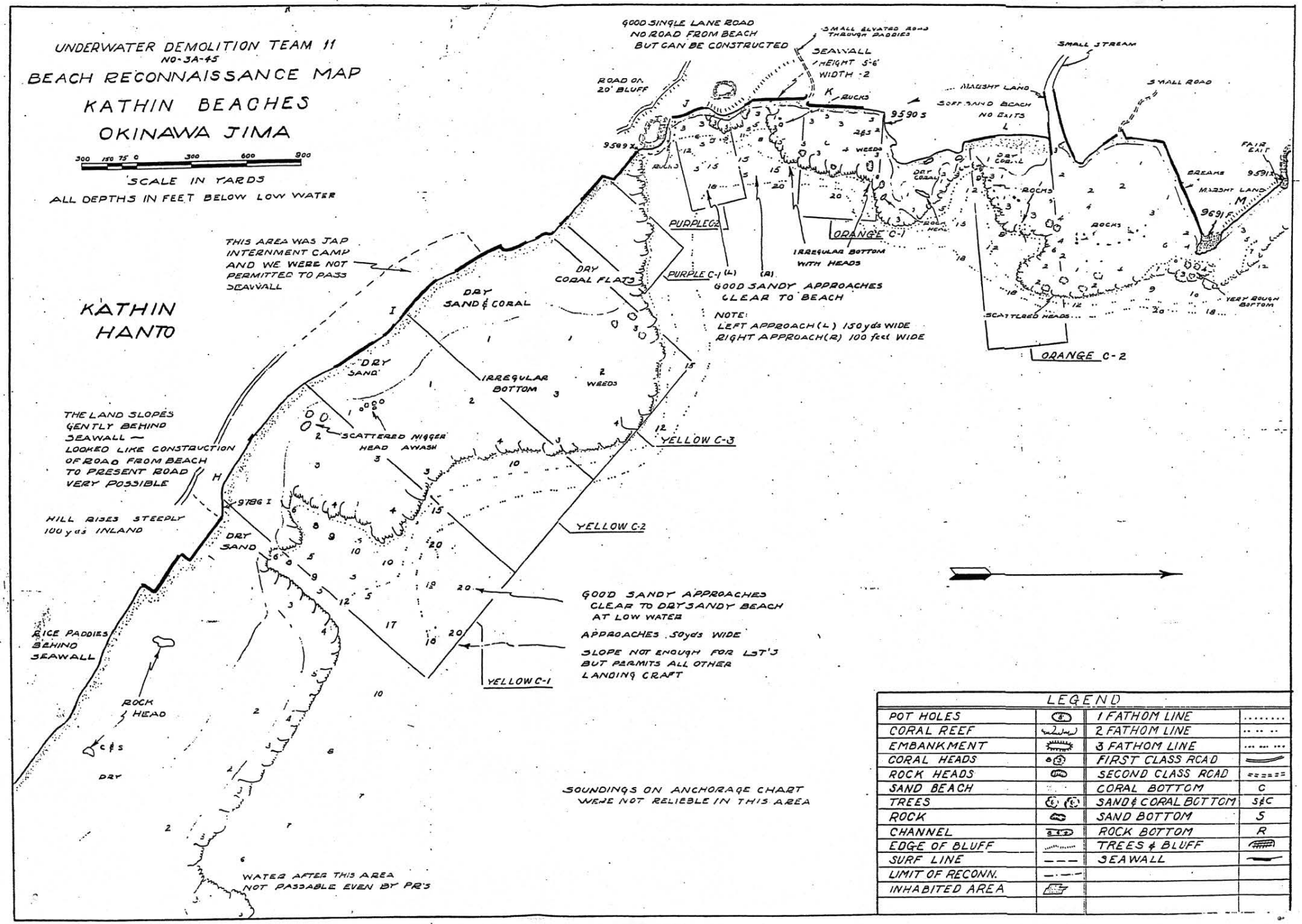
DISTINGUISHED SERVICE

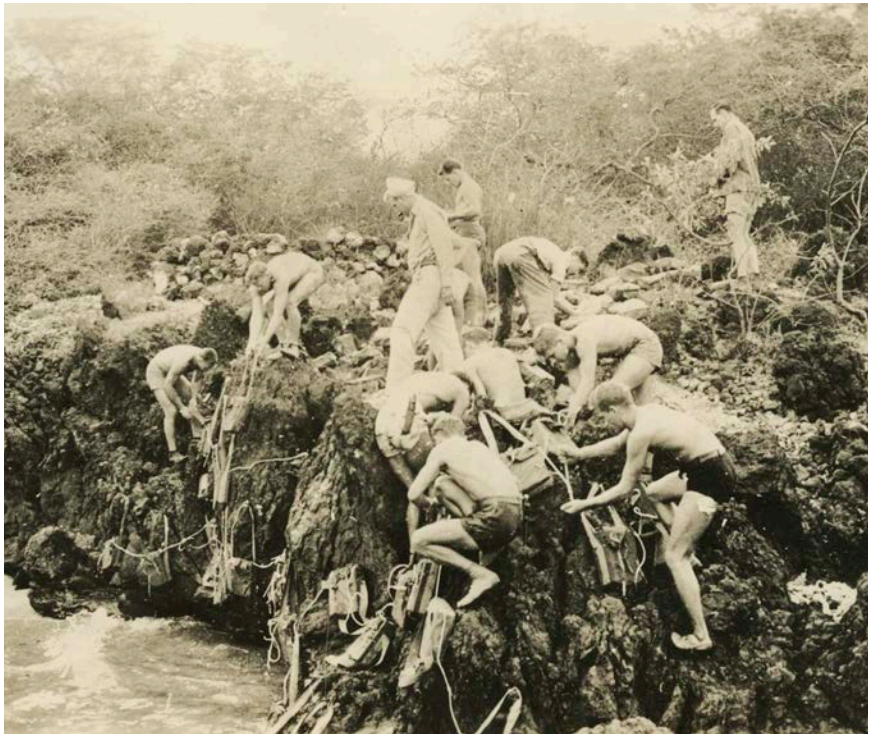
Alan Voorhees served in the U.S. Navy from 1942 to 1945 as a "frogman," a member of an elite underwater demolition unit that eventually evolved into the United States Navy Sea, Air, and Land Teams, commonly known as Navy SEALs. His team, UDT11, swam ashore, often under heavy fire, to clear mines and obstacles, map the coastal topography, and scout enemy positions in advance of landings by the Marines.

In 1945, just six weeks after the second atomic bomb was dropped, Voorhees went to Nagasaki, Japan, where he surveyed damage to the harbor to secure and clear its accessibility.

It was only after the war that Voorhees (shown in uniform) learned that his stepbrother and college classmate, Fred Zimmerli, had helped design the atomic bomb dropped on Nagasaki (where Voorhees, with UDT11, would be just six weeks later). Zimmerli had served in a special, classified branch of the U.S. Army where he applied his knowledge of electrical engineering to develop the bomb's altimeter fuse. *Image: Voorhees family*

Al (front row, 2nd from right) served in this unit of the Navy: Underwater Demolition Team 11 (UDT11). *Image: Voorhees family*


UNDERWATER DEMOLITION TEAM 11
NO-3A-45
BEACH RECONNAISSANCE MAP
KATHIN BEACHES
OKINAWA JIMA
300 150 75 0 300 600 900
SCALE IN YARDS
ALL DEPTHS IN FEET BELOW LOW WATER
KATHIN HANTO
GOOD SINGLE LANE ROAD
NO ROAD FROM BEACH
BUT CAN BE CONSTRUCTED
ROAD ON 20' BLUFF
SMALL ELEVATED ROAD THROUGH PADDIES
SEAWALL
HEIGHT 5'-6"
WIDTH -2
SMALL STREAM
SMALL ROAD
MARSH LAND
SOFT SAND BEACH
NO EXITS
9590 S
9589 X
FAIR EXIT
STREAMS
9591
MARSH LAND
M
9691 F
THIS AREA WAS JAP INTERNMENT CAMP AND WE WERE NOT PERMITTED TO PASS SEAWALL
DRY CORAL FLATS
PURPLE C-2
PURPLE C-1 (L)
(R)
GOOD SANDY APPROACHES CLEAR TO BEACH
NOTE:
LEFT APPROACH (L) 150 yds WIDE
RIGHT APPROACH (R) 100 feet WIDE
ORANGE C-1
IRREGULAR BOTTOM WITH HEADS
ORANGE C-2
SCATTERED HEADS
VERY ROUGH BOTTOM
DRY SAND & CORAL
DRY SAND
IRREGULAR BOTTOM
WEEDS
SCATTERED NIGGER HEAD AWASH
YELLOW C-3
THE LAND SLOPES GENTLY BEHIND SEAWALL — LOOKED LIKE CONSTRUCTION OF ROAD FROM BEACH TO PRESENT ROAD VERY POSSIBLE
HILL RISES STEEPLY 100 yds INLAND
9786 I
YELLOW C-2
GOOD SANDY APPROACHES CLEAR TO DRY SANDY BEACH AT LOW WATER
APPROACHES 50yds WIDE
SLOPE NOT ENOUGH FOR LST'S BUT PERMITS ALL OTHER LANDING CRAFT
YELLOW C-1
RICE PADDIES BEHIND SEAWALL
ROCK HEAD
DRY
SOUNDINGS ON ANCHORAGE CHART WERE NOT RELIEBLE IN THIS AREA
WATER AFTER THIS AREA NOT PASSABLE EVEN BY PR'S
LEGEND
POT HOLES
CORAL REEF
EMBANKMENT
CORAL HEADS
ROCK HEADS
SAND BEACH
TREES
ROCK
CHANNEL
EDGE OF BLUFF
SURF LINE
LIMIT OF RECONN.
INHABITED AREA
1 FATHOM LINE
2 FATHOM LINE
3 FATHOM LINE
FIRST CLASS ROAD
SECOND CLASS ROAD
CORAL BOTTOM C
SAND & CORAL BOTTOM S&C
SAND BOTTOM S
ROCK BOTTOM R
TREES & BLUFF
SEAWALL



PREVIOUS: Voorhees was called into active service a couple of years into college. Luckily, he had acquired enough technical drawing skills to become a mapmaker for his naval unit. This is just one of the maps that he created for UDT landings on the islands of Okinawa and Borneo.
Image: Voorhees family

ABOVE: Al trains with his UDT unit (he is top center, in swim trunks).
Image: Voorhees family

Voorhees was honored for his services with the Silver Star, Bronze Star, and a Presidential Unit Citation.

LEFT: In 1949, Voorhees married Nathalie Potter, whom he met on a blind date while at RPI. A graduate of nearby Skidmore College, she had worked abroad in Bern just after the war and then for U.S. Senator Styles Bridges of New Hampshire, her home state. A skilled writer and communicator, she would help Al build a career and launch his company. *Image: Voorhees family*

ABOVE: Alan and Nathalie Voorhees raised their three children in Bethesda, Maryland. Al designed and helped build the family home. *Image: Voorhees family*

In the late 1940s, Voorhees enrolled in the master's program in city planning at MIT. The program had recently expanded its focus to include regional planning, a topic of keen interest to Voorhees. *Image: Arthur Griffin Museum of Photography*

The postgraduate program that Voorhees attended at Yale, the Bureau of Highway Traffic, focused on making streets, highways, and parking areas safe and efficient. Voorhees's colleague, Tom Deen, also completed the program, and remembered that "It was centered on traffic operations, but also introduced us to transportation planning." *Image: Chronicle / Alamy*

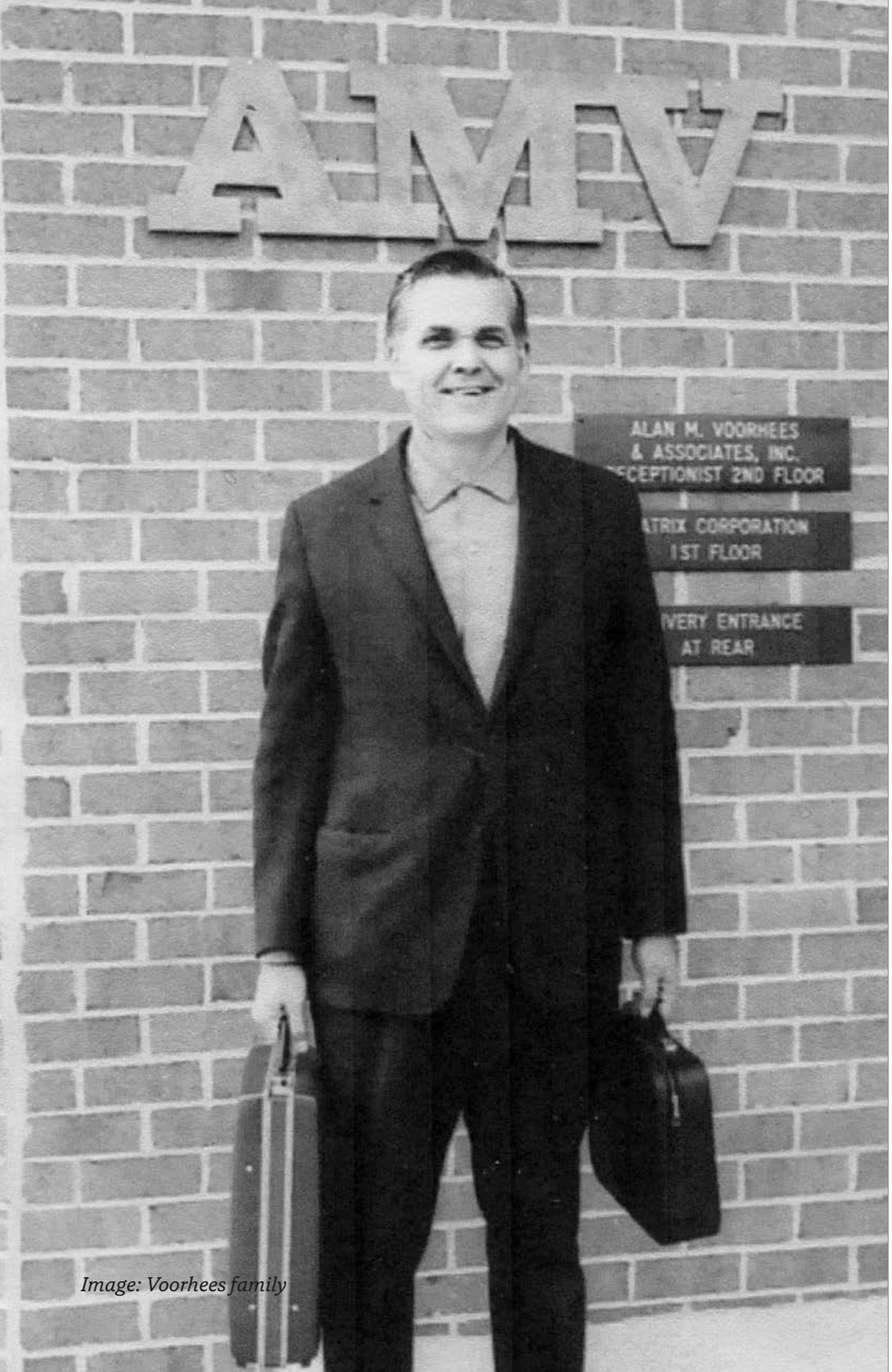


Image: Voorhees family

TRAILBLAZER

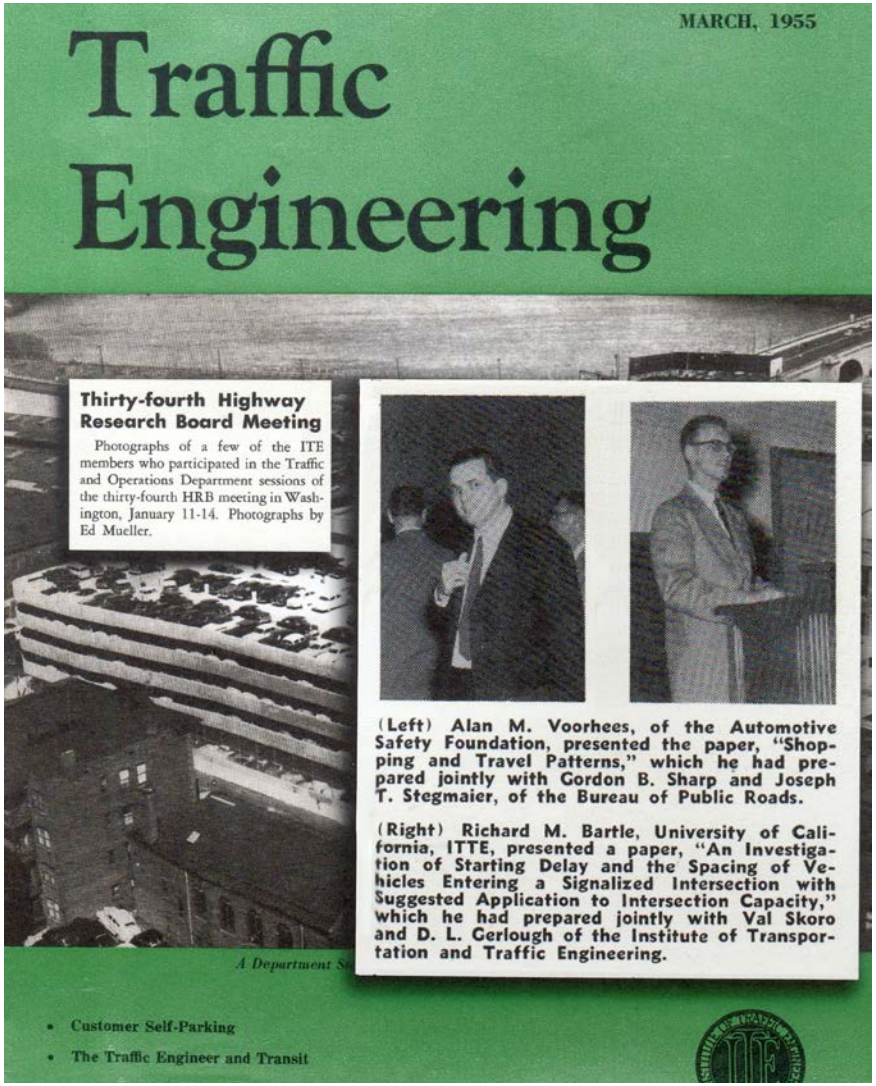
In 1961, Alan Voorhees founded Alan M. Voorhees & Associates (AMV), which specialized in transportation engineering and urban planning. He built the company on a foundation of knowledge gleaned from years of experience. After graduate school and a stint as the first city planner of Colorado Springs, he spent a decade at the Automotive Safety Foundation (ASF). A nonprofit founded by leaders of the car industry, ASF addressed highway safety, planning, and construction.

Under Voorhees's guidance, AMV became an industry leader. In the 1960s and 1970s, the firm planned highways, developed public transportation systems, and optimized day-to-day traffic operations for cities across the U.S. and around the world. He built such a strong foundation that the company continued to flourish after he left in 1977.

"It's not too much to say he was a legend in the field. He was very intuitive. He was a genius in his ability to sense what was going to work and what wouldn't."

TOM DEEN
PARTNER, ALAN M. VOORHEES & ASSOCIATES

At the Automobile Safety Foundation, Voorhees researched urban infrastructure and travel patterns, as well as the relationship between land use and transportation. While at the Foundation, he began using computer technology to develop traffic plans and to advance the art of traffic forecasting. *Image: Voorhees family*



MARCH, 1955

Traffic Engineering

Thirty-fourth Highway Research Board Meeting

Photographs of a few of the ITE members who participated in the Traffic and Operations Department sessions of the thirty-fourth HRB meeting in Washington, January 11-14. Photographs by Ed Mueller.

(Left) Alan M. Voorhees, of the Automotive Safety Foundation, presented the paper, "Shopping and Travel Patterns," which he had prepared jointly with Gordon B. Sharp and Joseph T. Stegmaier, of the Bureau of Public Roads.

(Right) Richard M. Bartle, University of California, ITTE, presented a paper, "An Investigation of Starting Delay and the Spacing of Vehicles Entering a Signalized Intersection with Suggested Application to Intersection Capacity," which he had prepared jointly with Val Skoro and D. L. Gerlough of the Institute of Transportation and Traffic Engineering.

- Customer Self-Parking
- The Traffic Engineer and Transit

A small article in *Traffic Engineering* noted Al Voorhees's presentation of a paper, co-authored with Gordon Sharp and Joseph Stegmaier, at the 1955 Annual Meeting of the Highway Research Board. *Image: Institute of Traffic Engineers*

Image: ClassicStock / Alamy

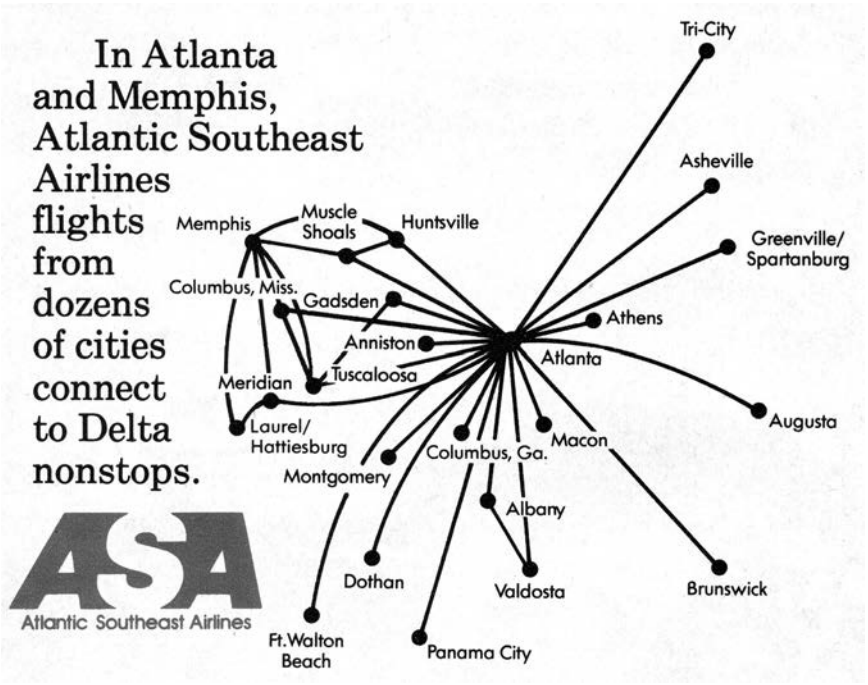
The Big Picture: The Interstate Highway System

The National Interstate and Defense Highways Act of 1956 authorized and financed the beginning of what would become a 47,000-mile Interstate system. It was originally intended as a mostly intercity system serving trips between cities. However, many cities lobbied to have Interstate segments within their boundaries to serve local trips, creating high demand for the emerging field of urban transportation planning.

Freeways proved to be a mixed blessing. They led to unprecedented mobility and access to goods and services, which in turn bolstered the national economy. At the same time, their construction divided or even destroyed urban neighborhoods, often ones that comprised of low-income, minority, or immigrant groups.

SECOND ACT

After Voorhees left AMV, he spent two years as the dean of the College of Architecture, Art, and Urban Science at the University of Illinois Chicago Circle. In 1978, he returned to Washington, DC, where he had established a small office to manage investments. From then until his death in 2005, he helped found and guide a wide range of companies and real estate projects, many of which involved transportation and technology.



An ad from the 1980s promotes the routes flown by Atlantic Southeast Airlines. *Image: David Henderson, SunshineSkies.com*

Following the Airline Deregulation Act in 1978, Voorhees's brother, Ralph, introduced him to George Pickett, Jr., Robert Priddy, and John Beiser (Ralph's brother-in-law), who were former Southern Airways executives developing a commuter airline to serve the southern East Coast. Al backed them, securing their first plane and helping to found Atlantic Southeast Airlines in 1979. Al remained its chairman until Delta Airlines purchased it in 1999. *Image: David Henderson, SunshineSkies.com.*

Named U. of I. dean

Planner takes teaching job

By Susan Feyder

YEARS OF PRACTICAL experience have prepared Alan Voorhees, transportation expert and urban planner, for almost any job.

The new dean of the College of Architecture, Art and Urban Sciences at the University of Illinois' Chicago Circle Campus was until recently president of his own planning firm. He has set up planning studies for several cities and created plans for new towns in the United States and overseas. He has developed environmental guidelines for the federal Department of Housing and Urban Development.

But ask Voorhees how he'll fill his new role of teaching urban planning at Circle and the response is one, long sigh.

"I'M AFRAID that's one thing I'm not so sure of," he says.

Voorhees, 54, was named dean in July and officially took over the post last month. He also will be a professor of urban studies. He'll have plenty of time to figure out what to do because he won't teach any classes until the next academic year.

Voorhees expects to draw heavily on his practical experience.

"Since I've worked with the private sector and city officials, I think I can appreciate their problems and needs," he says. In fact, he'd like to work closely with city officials in transportation and housing plans.

THIS DEPARTURE from the traditional classroom approach of urban studies is a relatively new phenomenon, Voorhees says.

Voorhees has taken the first step toward establishing a closer relationship with public officials. Earlier this summer he held a two-day workshop with city planners to discuss Chicago's development problems.

More ideas than actual programs came out of the session, he says, but he hopes to schedule another meeting soon.

FUTURE DEVELOPMENT will be restricted, Voorhees says, because of the tightening supply of land, and more modest growth in population and real income. The restrictions imposed by highways and public transportation systems also will limit urban planners.

"That network — and the structure of the city — isn't going to change much," he says. "We could put millions into mass transit and still not have a drastic impact on the highway system."

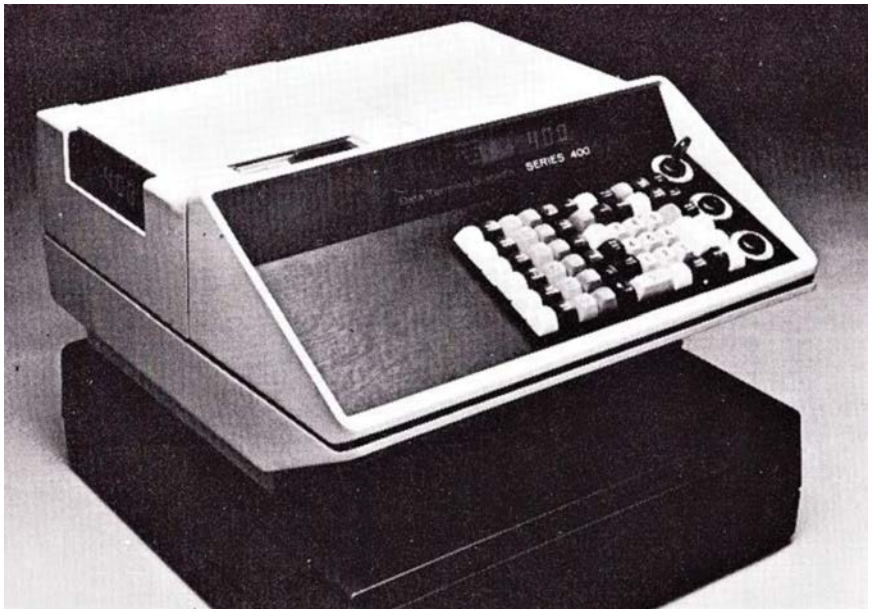
He contends there is room for change in zoning policies, however. Voorhees says exclusionary zoning practices have resulted in a separation of residential and commercial development which makes U.S. cities sterile. He prefers the approach used in Europe, in which the design as well as the type of building is considered.

Alan M. Voorhees

"IT MAKES THEIR cities fit together far better than ours," he says. "We've let a legal tool do our thinking for us."

"But building a city is one thing," he says. "What we're not sure of is whether we're organized to operate it. We hope to have the ability as planners to forecast the impact of our recommendations. We haven't always been as successful as we should have been."

As a dean at University of Illinois Chicago Circle, Voorhees expressed concern that "exclusionary zoning practices" had rendered city neighborhoods "sterile," disconnected, and isolated. He and his wife, Nathalie, founded the university's Nathalie P. Voorhees Center for Neighborhood and Community Improvement to foster productive dialogue between planners and local stakeholders. *Image: Chicago Tribune*



In the early 1970s, a neighbor showed Voorhees the prototype for a microprocessor-equipped cash register developed by Data Terminal Systems. Recognizing the potential for computer-based sales, he became a principal investor. He then backed two other technology companies, both helmed by Lou Brown, an ex-Hewlett Packard engineer. Micros—now owned by Oracle—makes point-of-sale terminals that are a mainstay in the hospitality industry. Autometric, a satellite mapping and reconnaissance firm, is now part of Boeing. *Image: chipsetc.com*

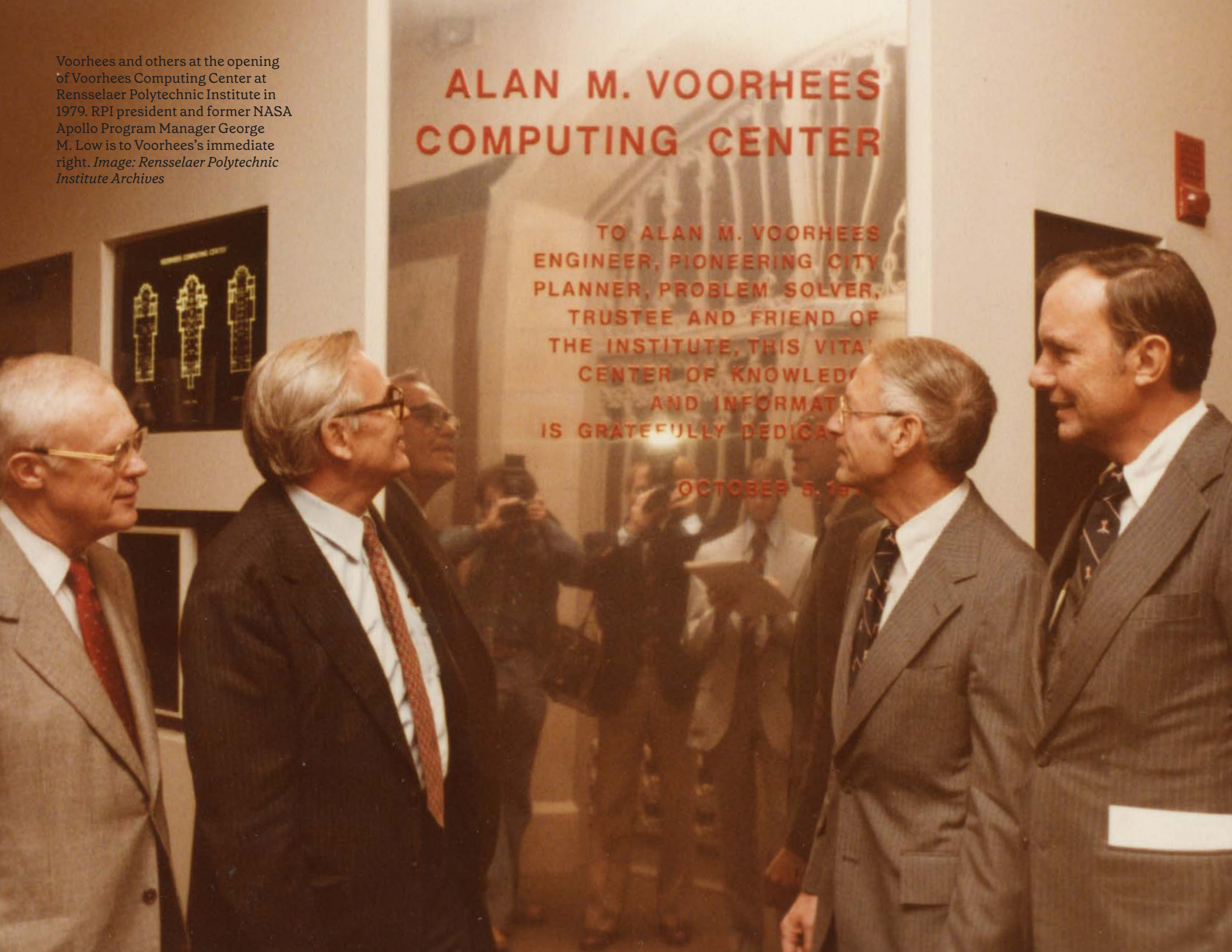
Voorhees and architect Richard Stauffer created Hamilton Court, a mixed-use development in the Georgetown neighborhood of Washington, DC. The design integrated two new buildings with five historic properties. *Image: Blackburn Architects, P.C.*

In the 1980s, Voorhees converted a commercial property in Richmond, Virginia into the Berkeley Hotel. In 2005, he died in one of the guest rooms, having celebrated his 83rd birthday at the hotel earlier in the evening. *Image: The Costar Group*

Voorhees was the majority shareholder of American Rocket Company, a pioneer in hybrid rocket propulsion. Combining solid fuel and liquid oxidant in the engine design prevented explosions that had plagued other rockets. The company ceased operations in 1995, but Virgin Galactic continues to use this signature technology.
Image: Voorhees family

GIVING BACK

Alan Voorhees was a generous philanthropist, with particular interests in the environment, technology, education, cities, and effective government. The examples shown here represent only a fraction of the organizations that Voorhees supported.



Voorhees and others at the opening of Voorhees Computing Center at Rensselaer Polytechnic Institute in 1979. RPI president and former NASA Apollo Program Manager George M. Low is to Voorhees's immediate right. *Image: Rensselaer Polytechnic Institute Archives*

In the late 1970s, Alan Voorhees's generosity made it possible for his alma mater, Rensselaer Polytechnic Institute, to convert a Gothic chapel into a cutting-edge computer center for students and faculty alike.
Image: Steve Rosenthal Collection, Historic New England

"He liked ideas, progress, productivity. He never really retired."

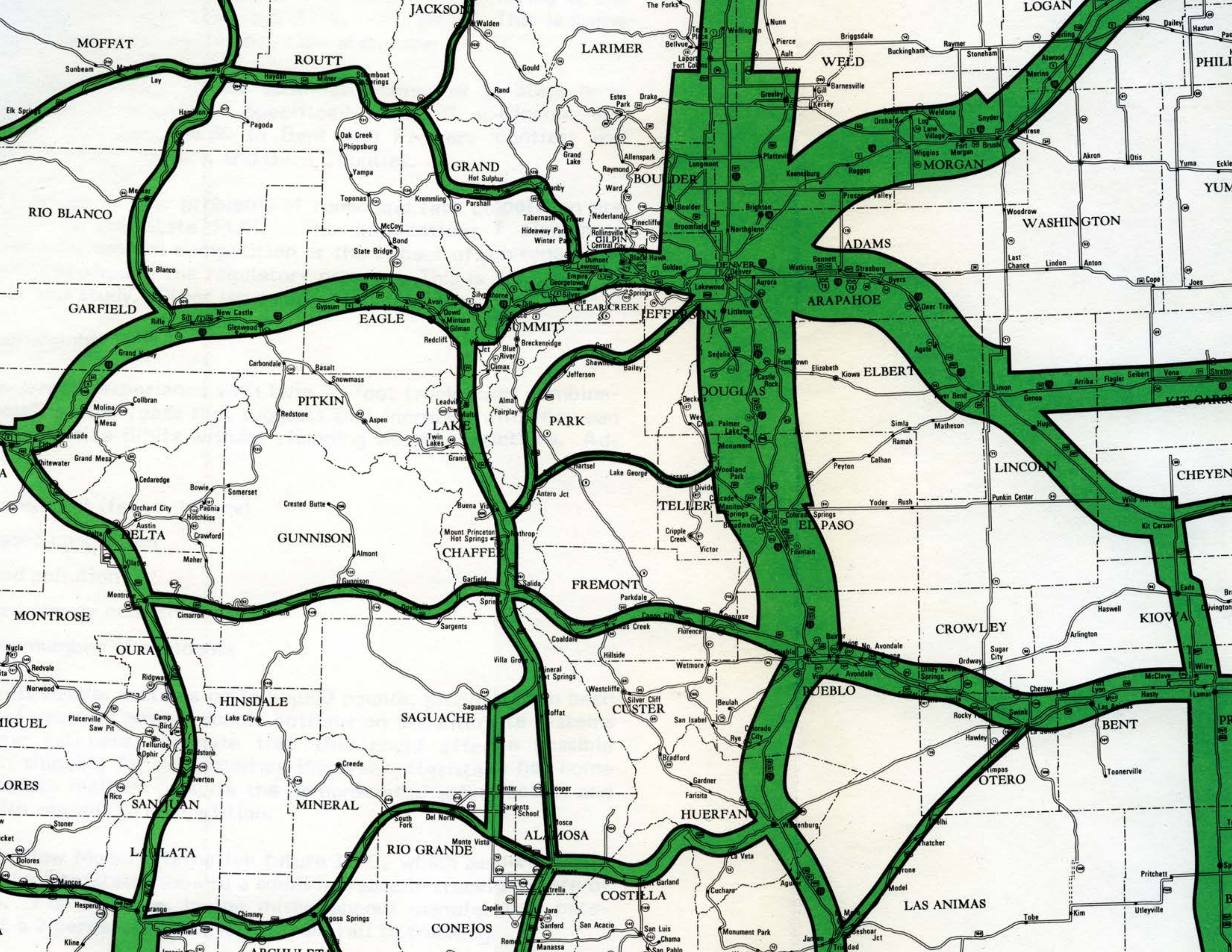
NANCY VOORHEES
DAUGHTER

In 1983, Voorhees established a popular pick-your-own berry farm in Virginia's Northern Neck (shown here). In 1994, he donated 729 acres along the Rappahannock River to the Nature Conservancy. *Image: Voorhees family*

In the late 1800s, Alan Voorhees's great uncle and aunt provided educator Elizabeth Evelyn Wright with the necessary funds to create a college for African American students in Denmark, South Carolina. She named the school Voorhees College after them. The Voorhees family, including Al, has continued to support the college ever since. *Image: Benton Henry, bentonhenry.com*

Keenly interested in Virginia history, Voorhees provided a generous donation to what would become the Alan M. and Nathalie P. Voorhees Archaearium at Historic Jamestowne. The award-winning museum showcases 2,000 artifacts excavated from the site of Virginia's earliest colonial settlement.
Image: Charles Durfor for Jamestown Rediscovery (Preservation Virginia)

Voorhees assembled one of the finest private collections of antique maps in the world, ultimately donating more than 300 to the Library of Congress, the Library of Virginia, and the Virginia Historical Society. "Even greater than his support for acquiring maps and documents was his zeal for providing intellectual access to them," remembered Charles F. Bryan, former president of the Virginia Historical Society. *Abraham Ortelius*. Americae sive novi orbis, nova descriptio. 1608 or 1612.
Image: G3290 1587 .O69 Voorhees collection. Map Collection. The Library of Virginia, Richmond, Virginia


MOFFAT
ROUTT
JACKSON
LARIMER
LOGAN
WELD
PHILLIPS
RIO BLANCO
GRAND
BOULDER
MORGAN
WASHINGTON
YUMA
ADAMS
GARFIELD
EAGLE
GILPIN
CLEAR CREEK
JEFFERSON
ARAPAHOE
SUMMIT
PITKIN
LAKE
PARK
DOUGLAS
ELBERT
KIT CARSON
LINCOLN
CHEYENNE
DELTA
GUNNISON
CHAFFEE
TELLER
EL PASO
MONTROSE
FREMONT
CROWLEY
KIOWA
OURAY
HINSDALE
SAGUACHE
CUSTER
PUEBLO
BENT
SAN JUAN
MINERAL
HUERFANO
OTERO
LA PLATA
RIO GRANDE
ALAMOSA
COSTILLA
LAS ANIMAS
CONEJOS
Denver
Colorado Springs
Pueblo
Grand Junction
Glenwood Springs
Fort Collins
Greeley
Boulder
Longmont
Aurora
Lakewood
Golden
Limon
Lamar
La Junta
Walsenburg
Trinidad
Alamosa
Durango
Montrose
Gunnison
Salida
Leadville
Aspen
Steamboat Springs
Craig
Sterling
Brush
Fort Morgan
Cañon City
Trinidad

THE DAILY HOME NEWS
NEW BRUNSWICK, N. J., SATURDAY, DECEMBER 4, 1965 5

TRANSPORTATION VISIONS— Somerset County Planning Board leaders discuss transportation plan designed to provide traffic needs for the next two decades. They are, left to right: William E. Roach, planning director; Robert Clarkson, board chairman; John H. Senesy, vice chairman, and Alan M. Voorhees, transportation and planning consultant.

Highway Visions in Somerset

PREVIOUS: In 1977, AMV published a report evaluating "highway-related transportation needs" for the State of Colorado. *Image: Alan M. Voorhees & Associates in association with THK Associates, Inc.*

ABOVE: Then as now, transportation projects generated intense interest. Voorhees (far right) and his company made frequent appearances in local newspapers throughout the 1960s and 1970s. *Image: Daily Home News, New Brunswick, NJ*

ALAN M. VOORHEES & ASSOCIATES
Reshaping Cities, Transportation

In the first decade of Alan M. Voorhees & Associates (AMV)—1961 to 1971—the field of urban transportation evolved dramatically. New computer-driven tools enabled increasingly complex traffic forecasting. Demand for a multimodal approach to urban transportation required a deep understanding of both road systems and public transit systems. Federal legislation established new requirements for transportation agencies and their consultants, including consideration of environmental impact and community input.

AMV was perfectly positioned for success. Voorhees and his partners already had national reputations in the field. Staff members had experience working with local, state, and national transportation agencies and fully understood the sensitivities and legalities involved in any transportation project. The firm also embraced technology, using computer systems and mathematical models to predict traffic patterns, user demands, and more.

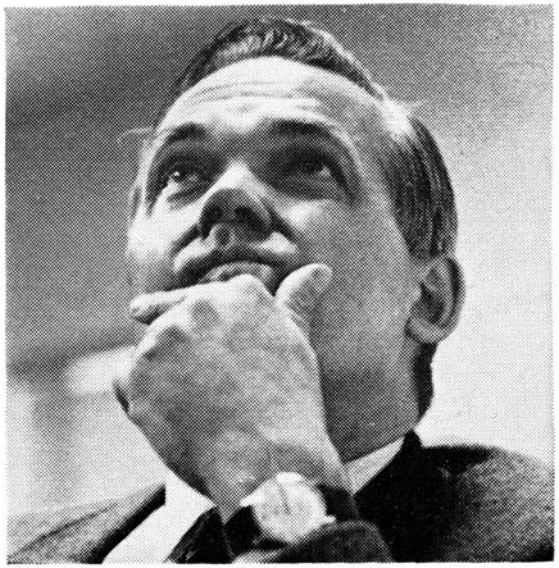
The Big Picture: Balancing Act

In the early 1960s, the construction of the Interstate highway system was well underway. Champions applauded such advantages as full-access control without signals or stop signs. Critics felt that the roads negatively impacted poor and minority urban neighborhoods. In many cases, residents had no say in the construction plans.

The federal government decided to augment the planning process—to make transportation investments that better balanced the needs of travelers and urban dwellers. The Federal-Aid Highway Act of 1962 required all metropolitan areas with a population of more than 50,000 to have a "continuing, comprehensive, and cooperative" planning process as a prerequisite for federal project funding. The Urban Mass Transportation Acts of 1964 and 1965 provided funding for local transit.

Voorhees on the profession

AIP has concentrated on getting city planning recognized.



I'm concerned with the planner himself as a professional.

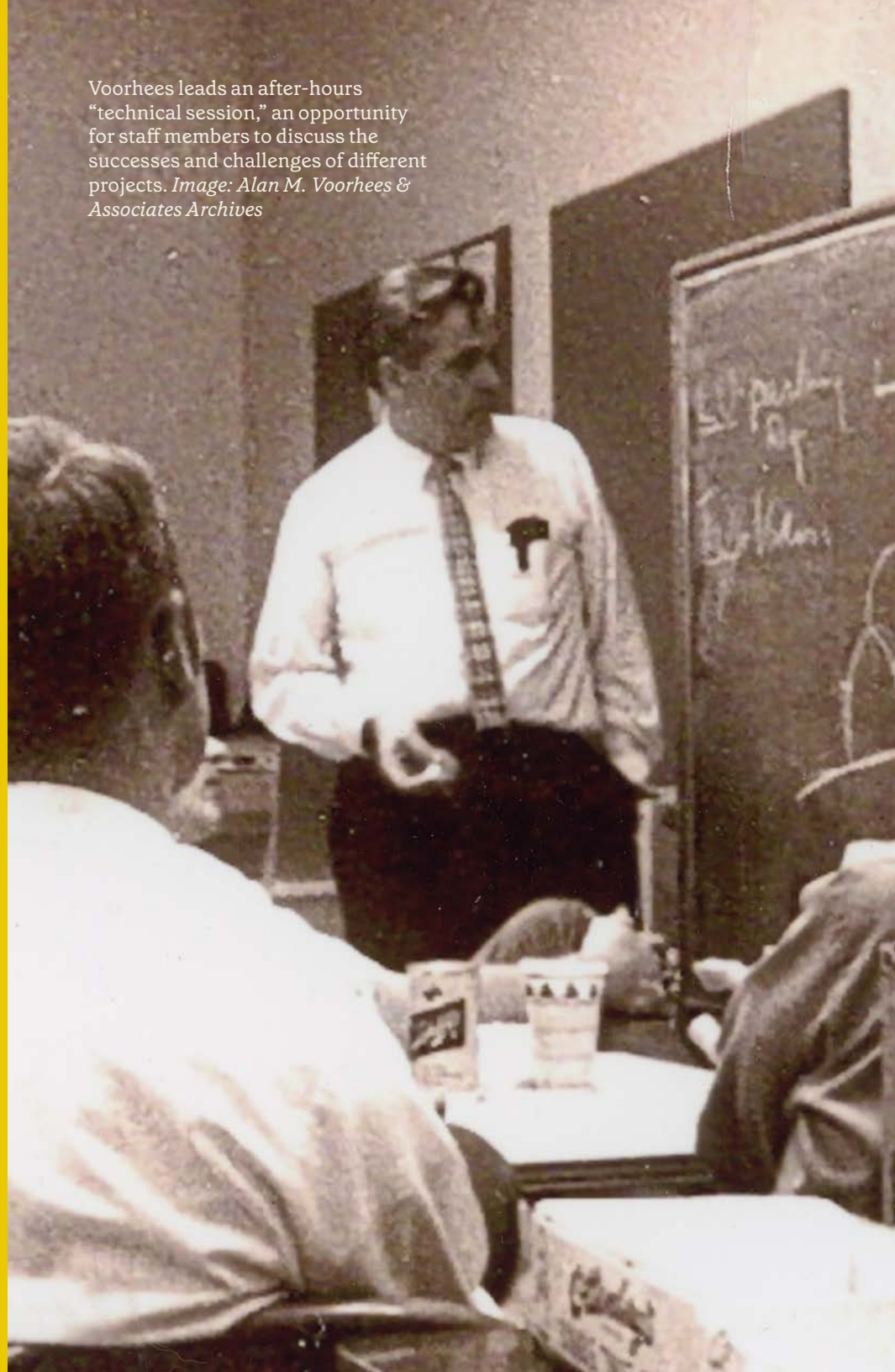
We're a young profession with the needs of the young.

Image: Engineering News-Record

TALENT, CULTIVATED

Alan Voorhees had an innate ability to understand the particular skills and abilities each person could bring to the firm. He took pride in putting together the right team for each project. By 1968, the company had a staff of around 80, which included engineers, computer specialists, economists, social scientists, and geographers.

A key tenet of corporate philosophy was investing in employees. In 1968, Voorhees estimated that he devoted 2% of the firm's gross income toward professional development, "to broaden our men to make them more creative." (The staff also included several women planners.)



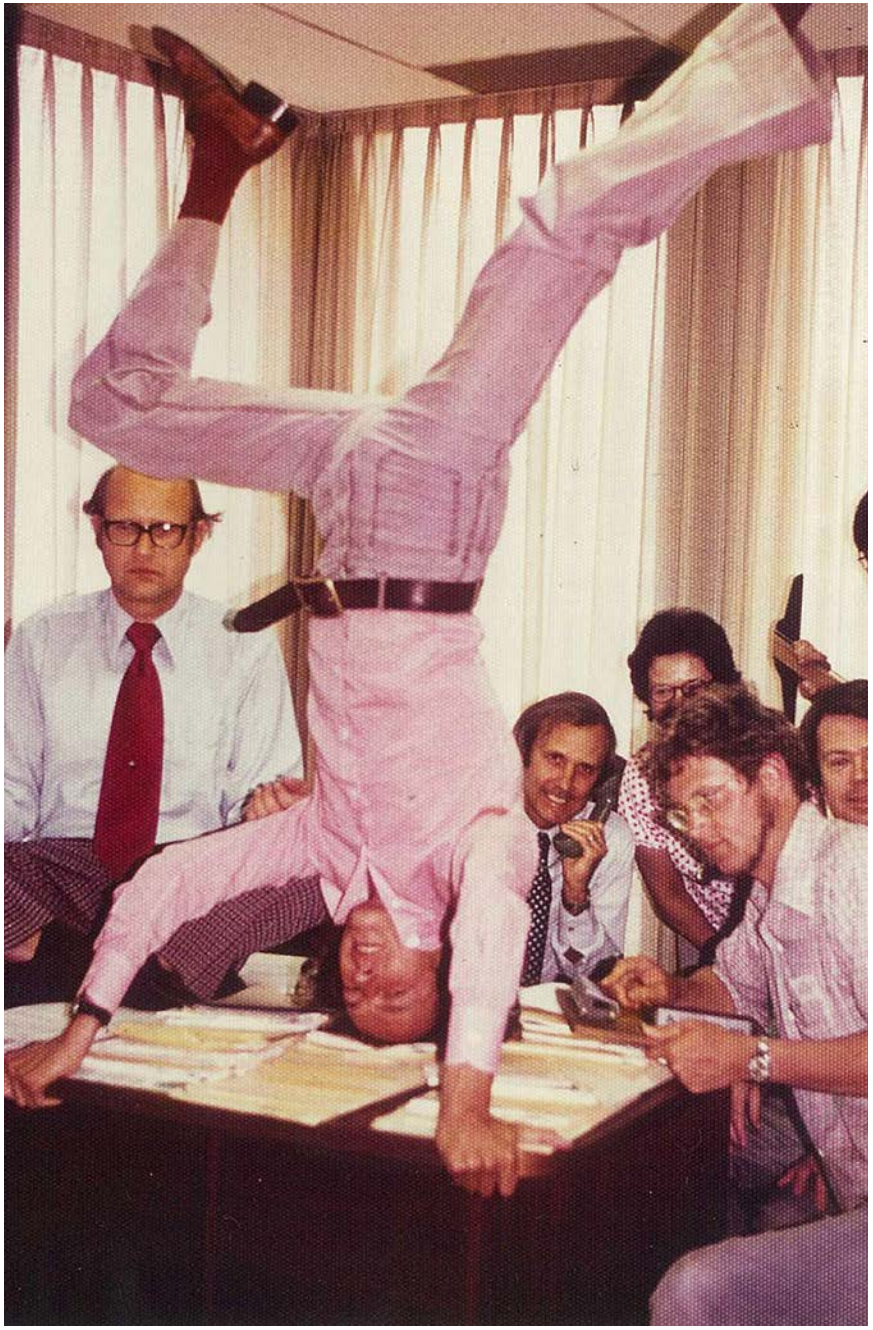
Voorhees leads an after-hours "technical session," an opportunity for staff members to discuss the successes and challenges of different projects. *Image: Alan M. Voorhees & Associates Archives*

TOM DEEN

When Tom Deen came to AMV as a partner, he had been the chief planner of the Washington, D.C. rail transit system. He remained at AMV after Voorhees left, becoming company CEO. *Image: Alan M. Voorhees & Associates Archives*

WALT HANSEN

Another company leader was Walt Hansen, who had a deep understanding of computers and had previously worked for the U.S. Bureau of Public Roads. He was a pioneer in applying mainframe computing power to forecast urban travel. After Voorhees left AMV, Hansen and Tom Deen shared leadership of the company. *Image: Alan M. Voorhees & Associates Archives*



LEFT: Voorhees encouraged informal gatherings for AMV staff and their families, as well as weekend retreats that brought together employees from far-flung AMV branch offices. As seen in this photo, the workday also had its spontaneous moments of levity. *Image: Alan M. Voorhees & Associates Archives*

ABOVE: AMV marketed its mastery of computer technology. In the 1960s, the firm used an IBM 7090—the same model used by NASA mission control, as shown in this 1962 photo. AMV created a suite of traffic forecasting programs that it licensed to local and state governments and also designed computer-managed systems for traffic lights. *Image: National Archives and Records Administration*

AMV offices in Tysons Corner, Virginia, in the spring of 1969.
Image: Alan M. Voorhees & Associates Archives

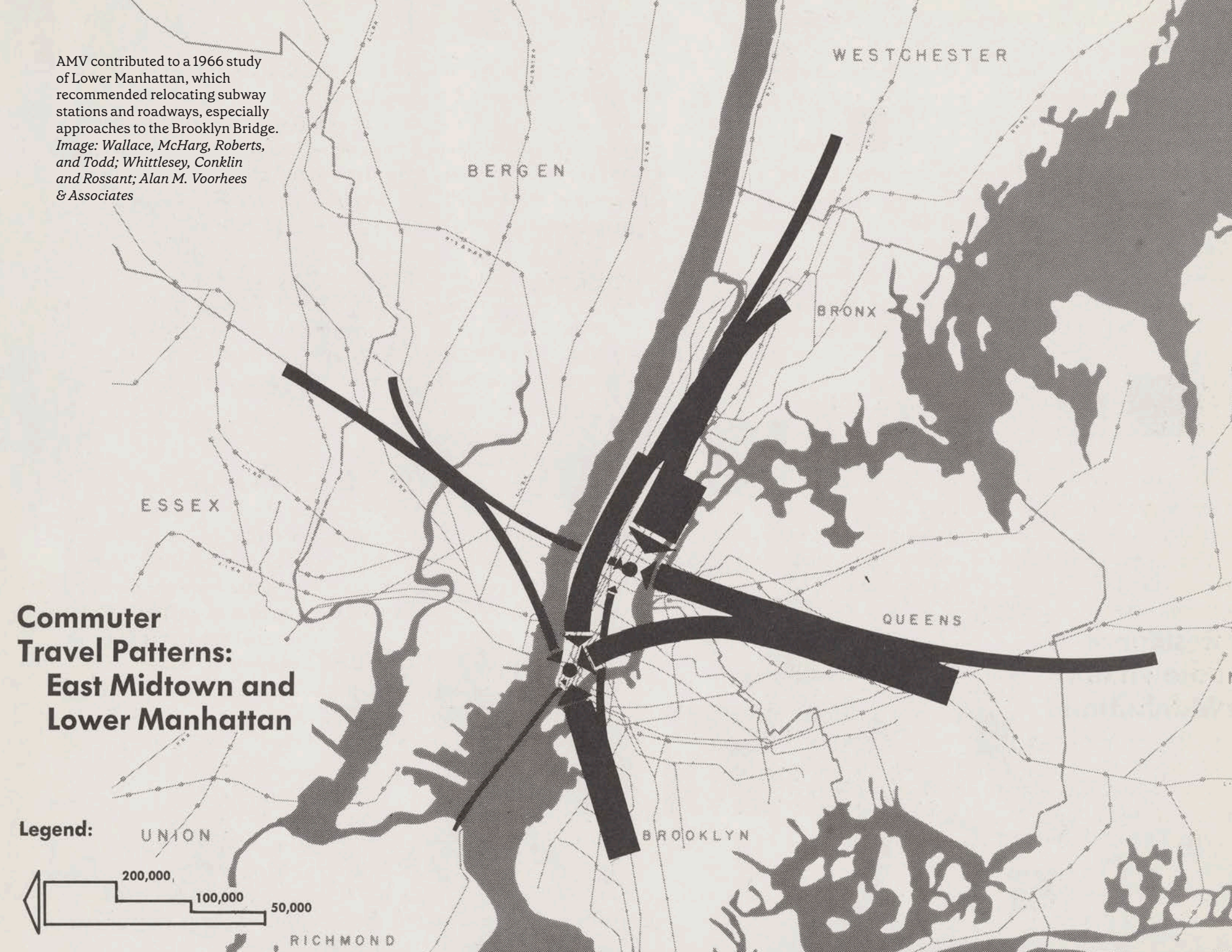
MANAGING TRAFFIC

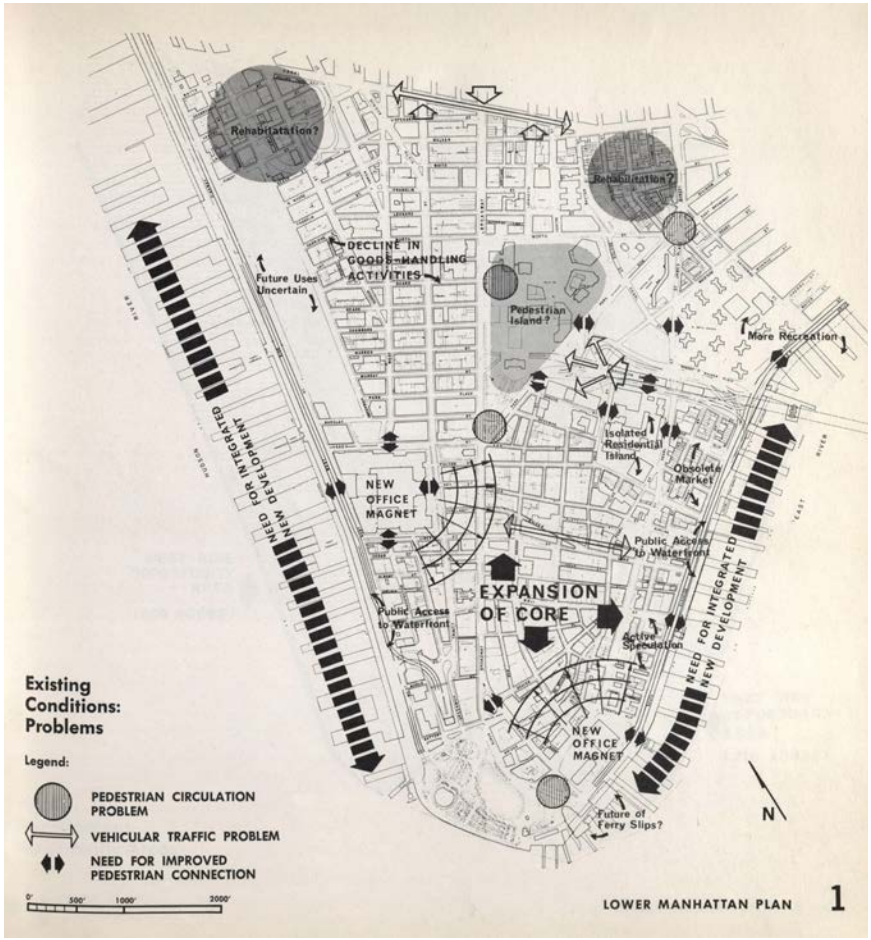
Alan M. Voorhees & Associates (AMV) helped major cities develop and manage projects that affected vehicular, transit, and pedestrian traffic. For example, in the mid 1960s, AMV developed a transportation plan for Lower Manhattan. This area of New York City was newly made land, created by filling in gaps between piers. City planners anticipated a huge influx of buildings and people to the site, which eventually included the World Trade Center.

AMV also helped cities rethink traffic signals, analyzing existing systems and designing new ones. The firm was an advocate for computer-based automated traffic control. In fact, AMV led Federal Highway Administration-funded training courses across the country to educate local governments about computerizing traffic signals.

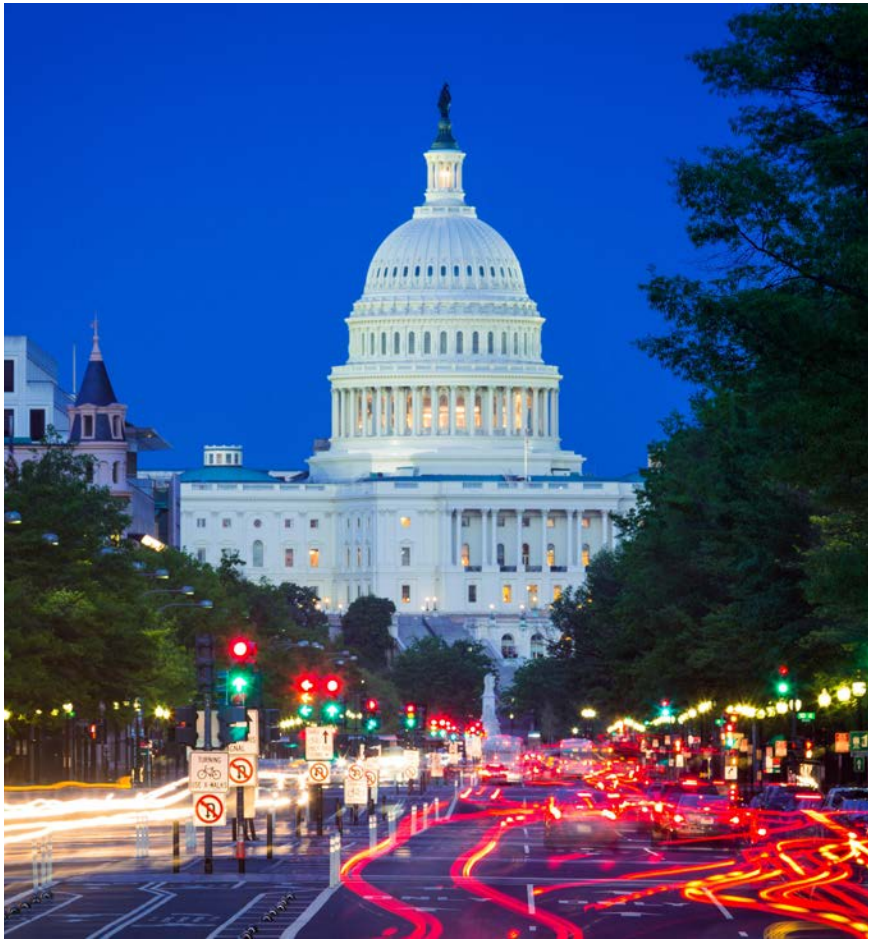
AMV frequently studied dense urban areas and their competing streams of traffic. In this 1953 image of New York City's Times Square, pedestrians jostle with city buses, cabs, and cars. *Image: Library of Congress, Prints and Photographs Division*

AMV contributed to a 1966 study of Lower Manhattan, which recommended relocating subway stations and roadways, especially approaches to the Brooklyn Bridge. *Image: Wallace, McHarg, Roberts, and Todd; Whittlesey, Conklin and Rossant; Alan M. Voorhees & Associates*





The 1966 Lower Manhattan report sought to address key mobility problems. "The complex of narrow canyon-streets (a natural pedestrian precinct) must also handle the servicing of a gigantic business activity, generating a serious conflict between the pedestrian and the vehicle." *Image: Wallace, McHarg, Roberts, and Todd; Whittlesey, Conklin and Rossant; Alan M. Voorhees & Associates*



In the 1970s, AMV's Operations team developed a coordinated "demand-response" system for 1,200 traffic signals in Washington, D.C.—an early implementation of computer-driven traffic signaling. *Image: incamerastock / Alamy*

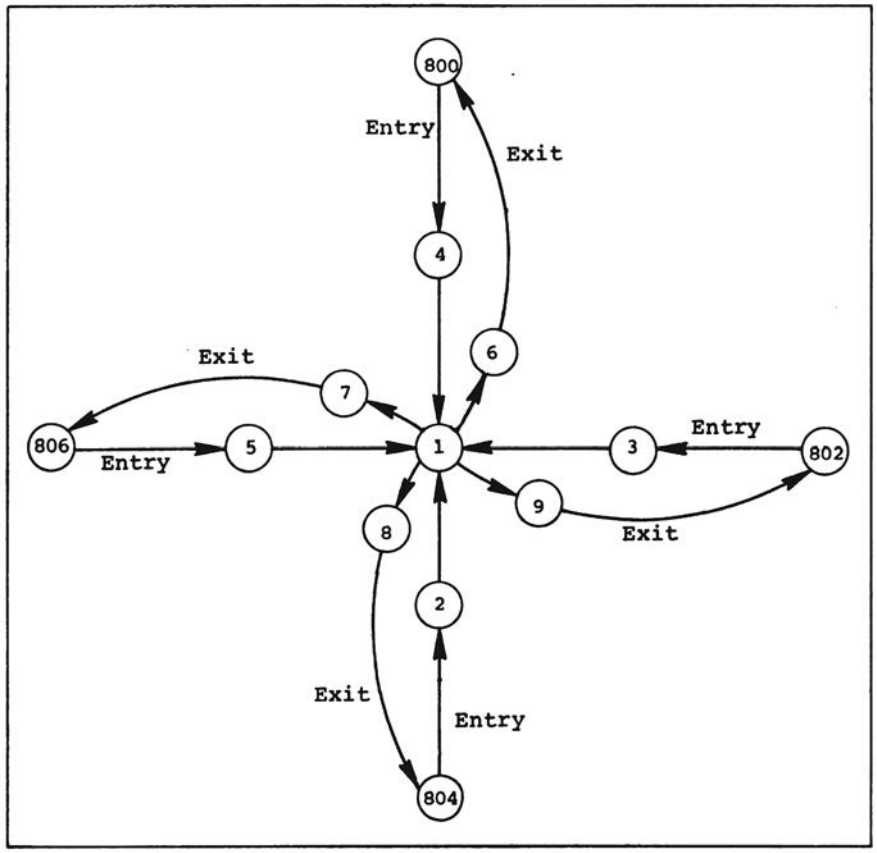


Figure 7. Simulation network schematic.

AMV studied every aspect of traffic regulations. These images are from a 1976 report on "right turn on red" for the Federal Highway Administration, conducted at the height of the energy crisis of the 1970s. Turning right on red meant less gas-consuming idling at intersections. *Image: Alan M. Voorhees & Associates; KLD Associates, Inc.*

RIGHT TURN AGAINST RED LIGHT:

Make a full stop for a red traffic light. After you have made sure that traffic permits, you may turn right against the red signal, IF no sign has been posted to prohibit such a turn. You must give the right-of-way to pedestrians and vehicles obeying the signals. (V.C. Sec. 21453.)

LEFT TURN AGAINST RED LIGHT (one-way street only):

Make a full stop for a red traffic light. After you have made sure that traffic permits, you may turn left from a one-way street into an intersecting one-way street on which traffic moves to the left, IF no signs have been posted to prohibit it. You must give the right-of-way to pedestrians and vehicles obeying the signals. (V.C. Sec. 21453.)

TRAFFIC SIGNAL LIGHTS

This is what the colors of traffic lights mean (V.C. Secs. 21451 to 21457; and 21802):

a. A RED light means "STOP" until the green appears.
(See pages 8 and 9 on how to make turns permitted after "STOP" facing a red light.)

A flashing RED traffic light means exactly the same as a stop sign, namely STOP! After stopping, proceed when safe, observing the right-of-way rules.

b. A GREEN light means "GO", but you must let any vehicles or pedestrians remaining in the intersection when the light changes to green, get through before you move ahead. Quickly look to be sure that all cross traffic has stopped before you enter the intersection.

c. A YELLOW light warns you that the red signal is about to appear. When you see the yellow light, you should stop your car if you can do so safely. If you can't stop, look out for cars that may enter the intersection when the light changes.

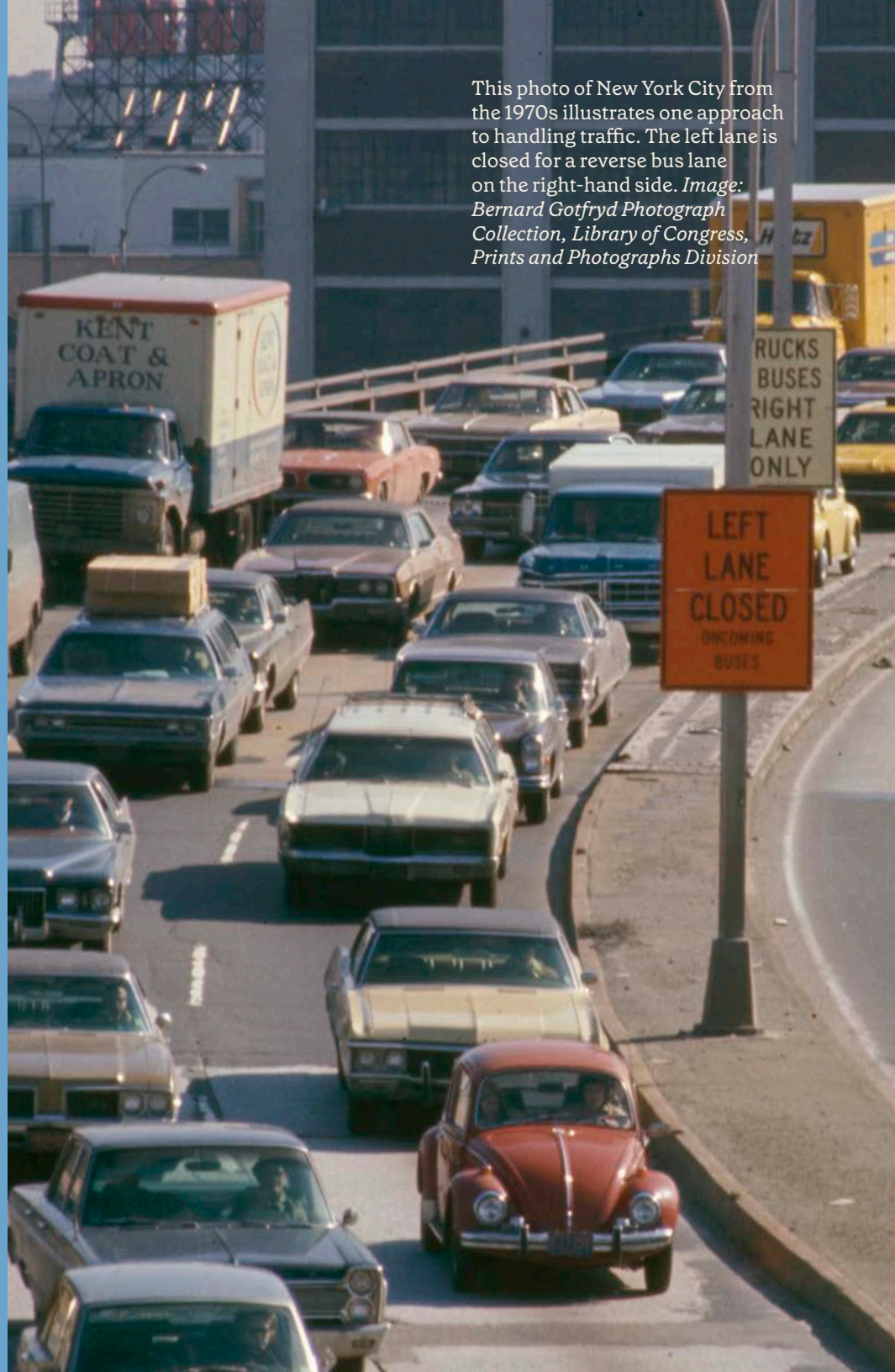
A flashing YELLOW light is a warning of a hazard. Slow down and be especially alert.

Figure 38. Excerpts from state driver's manual noting RTOR (LTOR) rules (continued).

RETHINKING URBAN FREEWAYS

By the 1960s, cities no longer automatically addressed traffic congestion solely with the construction of a new highway. Potential projects were considered from multiple angles, with input gathered from experts and the community alike. As a result, cities scrapped plans for some proposed freeways and considered ways to offset the negative impacts of existing highways, including their removal.

When the cities of Philadelphia and Boston contemplated new freeways, they hired AMV to lend its expertise. In both cases, AMV's recommendations prevented construction of roads that would have destroyed neighborhoods. AMV offered alternative solutions for handling traffic demands.



This photo of New York City from the 1970s illustrates one approach to handling traffic. The left lane is closed for a reverse bus lane on the right-hand side. *Image: Bernard Gotfryd Photograph Collection, Library of Congress, Prints and Photographs Division*

"[Voorhees] understood how urban areas work and had a vision of how to harness the various institutional systems into a planning system that could be responsive to the huge impact of building the Interstate highway system into cities."

TOM DEEN
PARTNER AT ALAN M. VOORHEES & ASSOCIATES

ABOVE: In 1972, AMV led a landmark study for the Boston area that recommended against building a controversial "innerbelt" freeway, proposed alternative transit and highway investments, and conceived a plan to replace an aging elevated highway with an underground tunnel. The study led the way to what became the most expensive highway project in history: the Central Artery/Tunnel Project ("the Big Dig"), which was completed in 2007. *Image: Avalon/ Construction Photography / Alamy*

NEXT: This map of the greater Boston metropolitan area appeared in a 1972 report created by the Boston Transportation Planning Review (BTPR). AMV helmed the review, working with a consortium of consultants. *Image: Alan M. Voorhees & Associates in association with Jason M. Cortell & Associates; Real Estate Research Corp.; David A. Crane & Partners; Skidmore, Owings & Merrill; Frederic R. Harris, Inc.; Wallace, Floyd, Ellenzweig, Inc.; Economics Research Associates; Environmental Research Technology; Environmental Systems Laboratories*


WOBURN
WINCHESTER
LEXINGTON
LINCOLN
ARLINGTON
BELMONT
WALTHAM
WATERTOWN
NEWTON
BROOKLINE
BOSTON
NEEDHAM
DEDHAM
MELROSE
MALDEN
EVERETT
SAUGUS
LYNN
SWAMPSCOTT
NAHANT
PUNTHROP
93
28

The Big Picture: Environmental Impact

The late 1960s saw the birth of the modern environmental movement, and with it came concern about automobile emissions, air pollution, and disruption of natural areas. The National Environmental Policy Act of 1968 made environmental impact statements a requirement for transportation projects. In 1970 the Clean Air Act required states to address poor air quality.

In the 1970s, federal law instituted Transportation Systems Management (TSM) plans as an outgrowth of the Federal-Aid Highway Act of 1968. To secure federal funding, cities needed to create TSM plans that improved efficiency, air quality, and energy conservation through a mix of roadway, transit, and carpooling changes, as well as "demand management" techniques such as restrictions for parking.

CONSIDERING THE WHOLE PICTURE

In the 1940s, Philadelphia leaders began discussing a new freeway on the southern edge of Center City. Discussions evolved into actual plans for the Crosstown Expressway by the 1950s: the road would cut through certain neighborhoods and separate South Philadelphia from Center City. Residents of the affected neighborhoods began to mobilize against the plan.

Officials hired Alan M. Voorhees & Associates (AMV) to study the potential impacts of the Crosstown Expressway. As detailed in its 1971 report, AMV found that the freeway would force the relocation of many low-income households and harm the environment. The city abandoned the expressway, opting instead for modest traffic engineering improvements.

Alt. 4a

Housing Caseloads

Total Occupied Units:	2050
Total Population:	5360
White Households:	367
Nonwhite Households:	1683
Tenant Households:	1584
Owner Households:	466
Families:	1304
Individuals:	745

Alt. 4e

Total Occupied Units:	856
Total Population:	2900
White Households:	430
Nonwhite Households:	426
Tenant Households:	378
Owner Households:	478
Families:	732
Individuals:	124

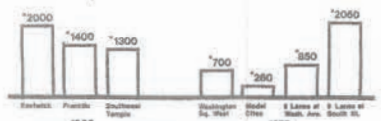
Alt. 6

Total Occupied Units:	443
Total Population:	1518
White Households:	191
Nonwhite Households:	252
Tenant Households:	209
Owner Households:	234
Families:	380
Individuals:	62

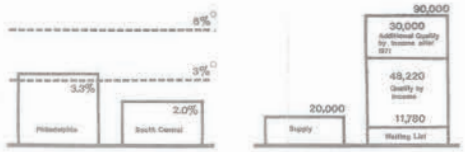
Housing Constraints

Average Annual Relocation Caseload — Effect on Caseload by Crosstown

*Dwelling Units

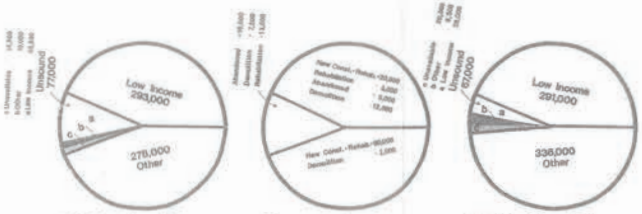


Comparison of Relocation Project Caseloads

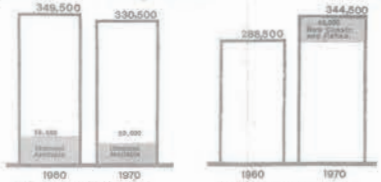


Private Market Vacancy Rate — Public Housing Supply and Demand

°HUD has established that a vacancy rate of less than 3% for the city as a whole is too low to turn to the private market as a relocation resource. A rate of 6% indicates a fluid market.



1960 Dwelling Units — Change Factors — 1970 Dwelling Units



No. of Dwelling Units Renting Less Than $80/mo. Selling Less Than $7,500 — No. of Dwelling Units Renting More Than $80/mo. Selling More Than $7,500

TITLE: Impact and Evaluation, Housing

FIGURE 28

SOURCE:

SCALE: 0 1200 2400

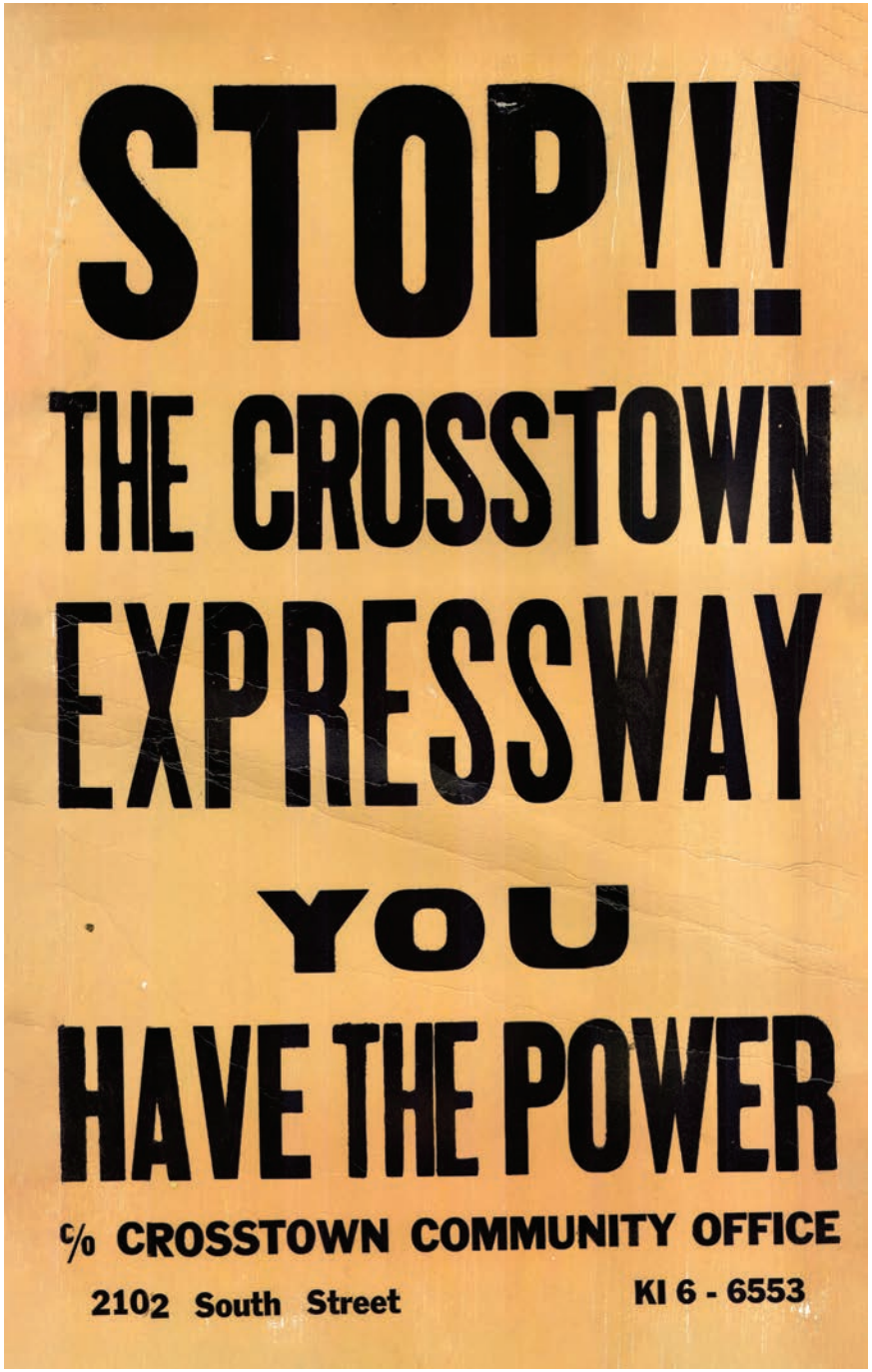
DATE: Nov. 28 1970

SOUTH CENTRAL TRANSPORTATION STUDY · PHILADELPHIA, PA.

PREVIOUS: AMV's report on the South Central Philadelphia Crosstown Expressway included analysis on the households that would require relocation for the freeway's construction. *Image: Alan M. Voorhees & Associates Archives*

ABOVE: African American communities along South Street were among those slated for redevelopment. Residents formed the Crosstown Community to organize protests and other forms of resistance. In this 1968 photograph, women and children carry posters made by the Crosstown Community Office as they march in front of City Hall. *Image: Special Collections Research Center, Temple University Libraries*

RIGHT: *Image: Alan M. Voorhees & Associates Archives*



"Recognition of the wider range of freeway impacts and increased levels of community involvement in the early 1970s required AMV to develop an entirely new participatory approach to facility planning."

STEVE LOCKWOOD
ALAN M. VOORHEES & ASSOCIATES, PROJECT DIRECTOR, SOUTH CENTRAL TRANSPORTATION STUDY

$$T_{ij} = \frac{A_j F_{ij} K_{ij}}{\sum_{\text{all zones}} A_x F_{ij} K_{ix}} x P_i$$

FORECASTING TOOL

In its 1963 publication on the gravity model, the U.S. Bureau of Public Roads (now named the Federal Highway Administration) cites Voorhees as the person "...who perhaps more than anyone else has been responsible for the rapid development of the traffic model field."

The gravity model is based upon Newton's law of universal gravitation and has been widely used throughout the world to forecast trips between areas or zones within an urban area. Voorhees was not the first person to consider using a gravity-type formulation for urban trips, but he was the first to integrate it into a general theory of traffic movement that relates trip making and land use. He used data from around the U.S. to demonstrate how the model could be adapted for urban travel forecasting, turning it into a practical tool for transportation planners.

URBAN RAIL TRANSIT REVITALIZATION

In the early 1960s, major cities began to take a fresh look at an old idea—rail transit—as an answer to mobility needs. AMV conducted early feasibility studies and developed transit plans for ambitious, new underground rail systems in large cities like Washington, DC; Baltimore; Atlanta; Caracas; São Paulo; Hong Kong; Calgary; and Newcastle, England. The firm also helped smaller cities like Buffalo, New York, develop light-rail systems, which were more flexible and less costly to build.

"Let's not kid ourselves. The freedom of the car is so great that we must concentrate on improving mass transit to offset it."

ALAN M. VOORHEES

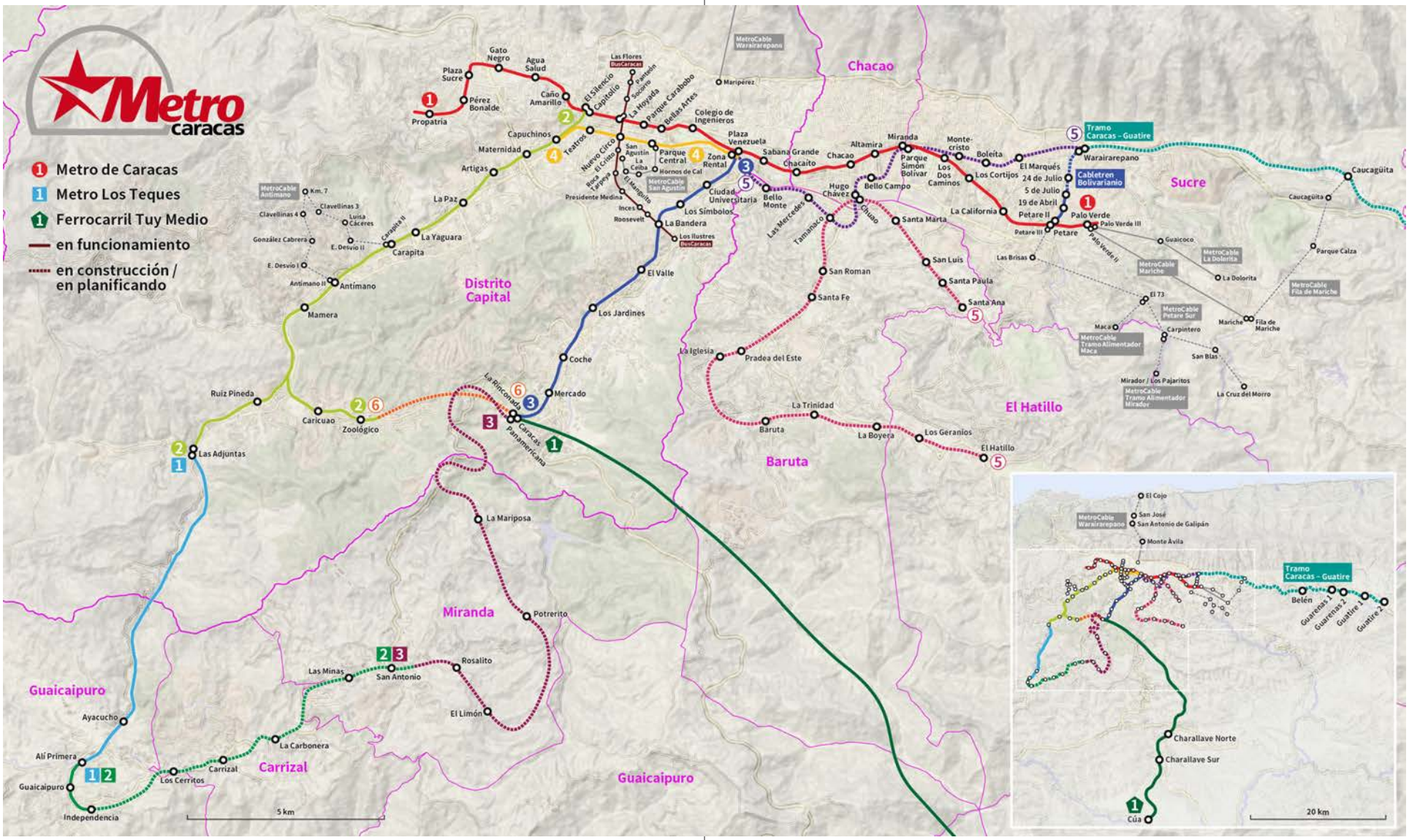
Passengers disembark from a Loop-bound Ravenswood B train in Chicago on a winter afternoon in 1962.
Image: Chicago Transit Authority

The Washington, DC Metro first began operating in 1976. As of 2023, the network spanned six lines and 129 miles of track. *Image: Simon Leigh / Alamy*

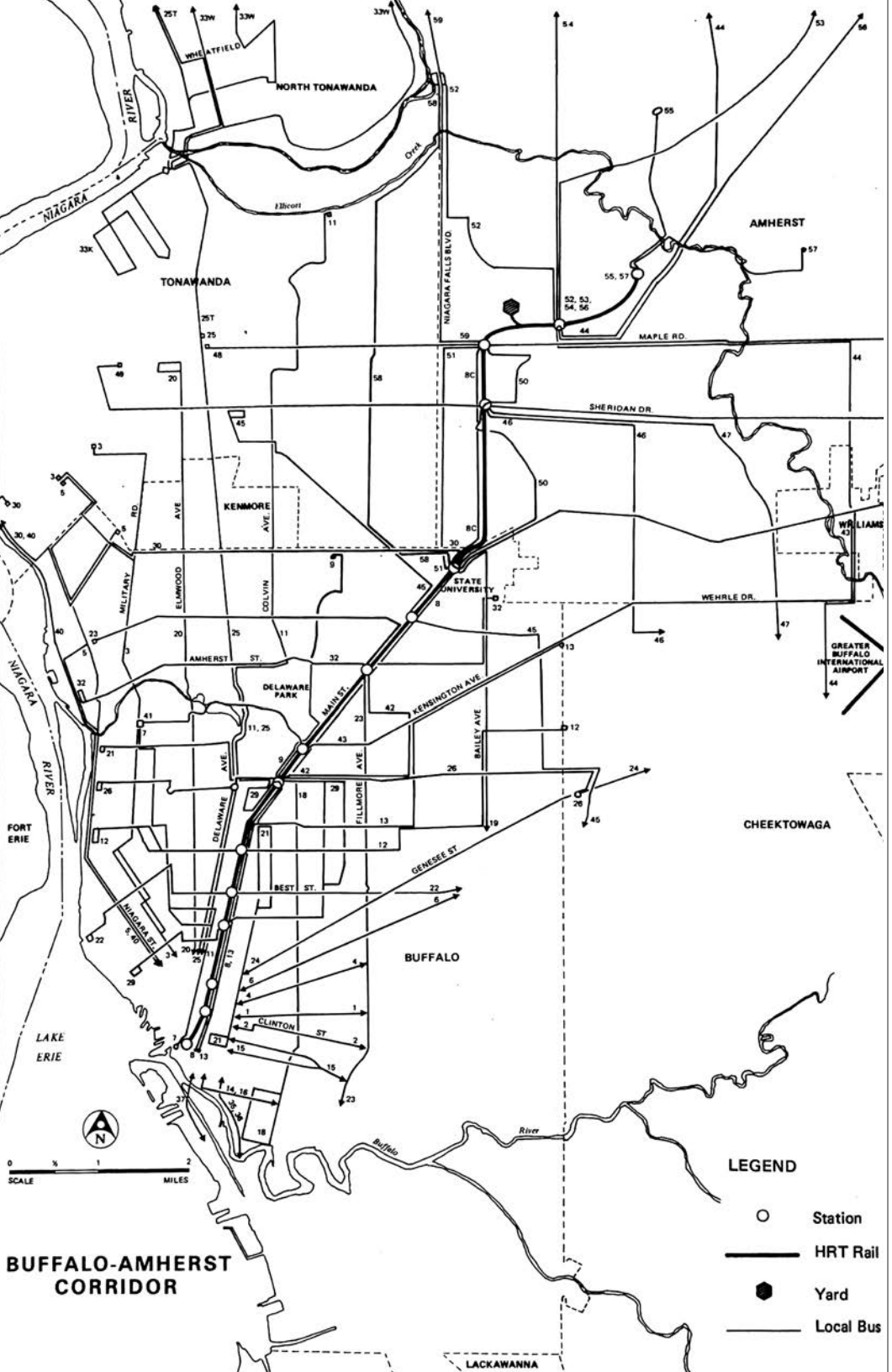
In the 1960s, AMV assisted the Washington Metropolitan Area Transit Authority in the early planning stages of a new rail system by forecasting ridership and revenue. AMV also explored how to coordinate the proposed system with existing bus services. *Image: Martin Shields / Alamy*

AMV's estimate of peak demand helped determine the necessary length of trains and operating frequency for the Caracas system.
Image: Rob Crandall / Alamy

In the 1960s and 70s, AMV collaborated with the engineering firm Parsons, Brinckerhoff, Quade, and Douglas to develop plans and forecast potential ridership for the rail transit system in Caracas, Venezuela.
Image: Luis Molina / Alamy



The Caracas Metro began operations in 1983. The system includes six lines. *Image: Wikimedia Commons*



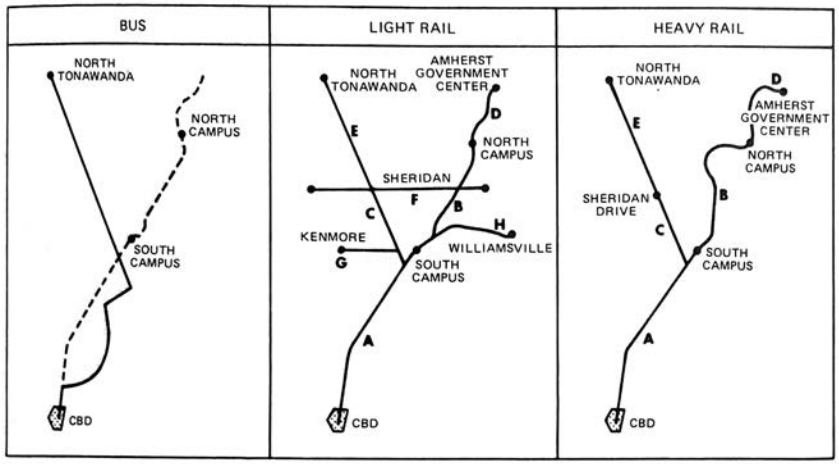


Figure VIII-1. Schematic System Layouts

Image: Alan M. Voorhees & Associates Archives

The Niagara Frontier Transportation Authority (NFTA) originally envisioned an 11-mile "heavy rail" system for Buffalo, akin to the Washington, DC Metro. AMV helped NFTA convert the plan into a light rail that runs 6.4 miles along Main Street. It began operating in 1984. *Image: David Wilson, Wikimedia Commons*

SAVING BUS TRANSIT

In the 1960s and 1970s, privately owned bus systems throughout the U.S. were failing financially, especially in small- and medium-sized cities. To help, the federal government offered financial incentives for cities to acquire and operate these systems.

Transferring ownership was complicated. AMV put together recommendations for infrastructure, management systems, and more efficient bus routes. Clients included Manchester, New Hampshire; Bakersfield, California; Albany, Georgia; High Point, North Carolina; and Lynchburg and Richmond, both in Virginia.

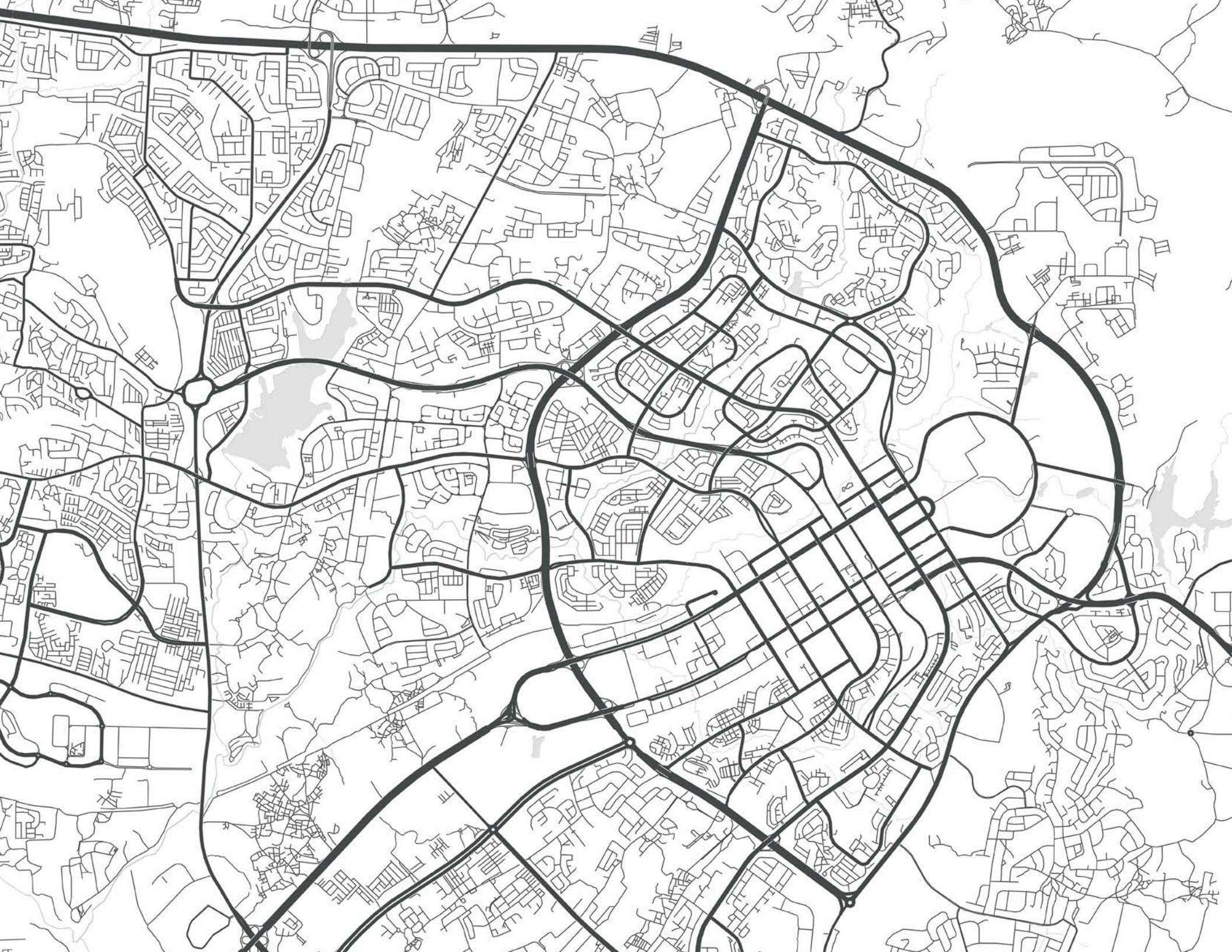
In 1974, AMV produced a report to help facilitate transfer of Lynchburg, Virginia, buses to city ownership. The report included an appraisal of assets, a survey of riders to determine demographics and travel patterns, and a five-year projection of farebox revenues, operating costs, and subsidy requirements. *Image: Greater Lynchburg Transit Company*

ENVISIONING NEW TOWNS

AMV lent its talents and expertise to the planning and development of brand-new municipalities. Two were in the greater Washington, DC, area: Reston, Virginia and Columbia, Maryland. Both were "New Towns": suburban communities built as a series of self-contained villages that combined housing with shopping centers, schools, commercial offices, and recreation areas.

Designing a national capital from scratch was an even more ambitious undertaking. AMV helped plan two: Canberra, Australia and Abuja, Nigeria.

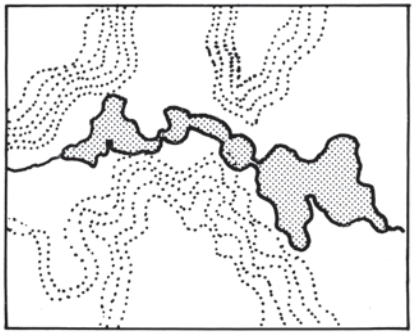
Construction on the city of Abuja began in the 1980s. It was officially named the capital of Nigeria in 1991. In 2023, the population was more than 1.2 million. *Image: Tayvay / Shutterstock*

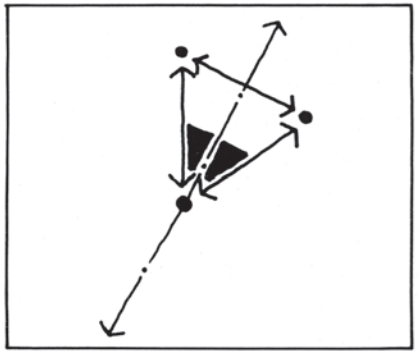


PREVIOUS: In the 1970s, the Nigerian government decided to create a new capital in the central region of the country. AMV was part of an American consortium that planned and designed the city, providing logistics and transportation recommendations. *Image: Federal Capital Development Authority*

ABOVE: This view of Canberra showcases Parliament House, the seat of the Australian government. At the top of the photo is Lake Burley Griffin, a human-made body of water. Image: Arcaid Images / Alamy

The site for Australia's capital was selected in 1913 but construction was slow until 1958, when the country authorized a commission to plan the city. AMV's transportation study, published in 1967, led to the "Y" layout linking residential areas with the city center. *Image: Alan M. Voorhees & Associates Archives*

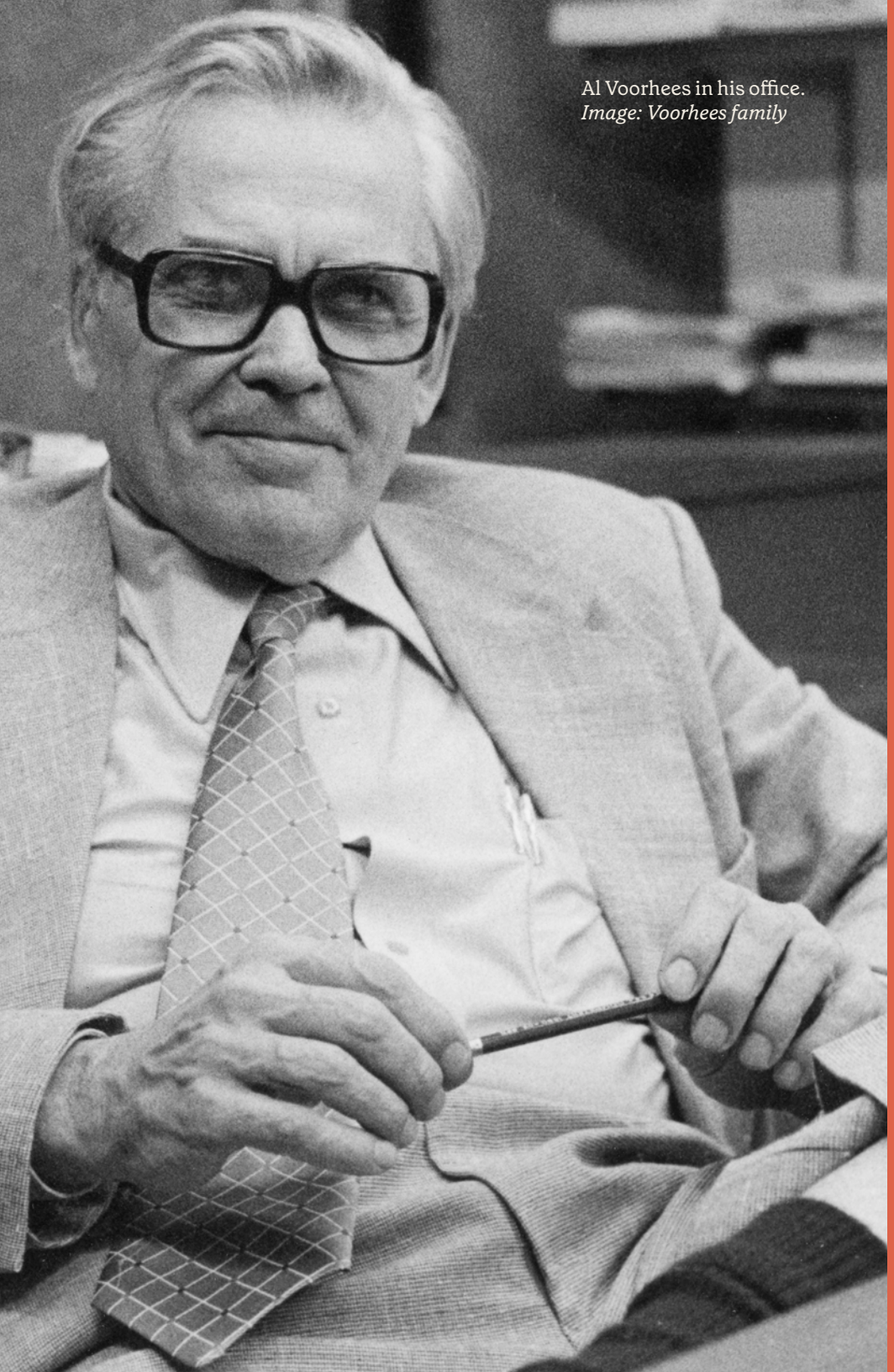




"Recognition of the wider range of freeway impacts and increased levels of community involvement in the early 1970s required AMV to develop an entirely new participatory approach to facility planning."

STEVE LOCKWOOD
ALAN M. VOORHEES & ASSOCIATES, PROJECT DIRECTOR, SOUTH CENTRAL TRANSPORTATION STUDY

AMV engineer Wayne Kittleson annotates a drawing, 1976.
Image: AMV Archives



Al Voorhees in his office.
Image: Voorhees family

END OF AN ERA

In 1967 in need of capital to expand, Voorhees sold AMV to Planning Research Corporation (PRC), but stayed at the helm for the next decade. When he left in 1977, he left AMV in good hands with Walt Hansen and Tom Deen as co-directors. By the mid 1980s, AMV was fully absorbed by PRC and ceased to exist as its own entity.

AMV influenced the field long after it dissolved, with alums holding leadership positions in transportation-related organizations around the world. For example, Tom Deen became the executive director of the Transportation Research Board. Others started their own firms, providing opportunities for a new generation of planners.

These exhibits are dedicated to the memory of Keith J. Bull (1958–2022). He helped shape their creation with thoughtfulness, insight, humor, and grace.

EXHIBITION CREDITS

This exhibit was guided and funded by the Voorhees family and former leaders of Alan M. Voorhees & Associates, with additional input from the Voorhees Transportation Center.

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