SCANNER

NEWSLETTER OF THE AMERICAN SOCIETY OF HIGHWAY ENGINEERS

Winter 2003-1

Public-Private Partnership Success

Ship Road and Swedesford Road Intersection Improvement Project

Robert G. Prophet, P.E., Project Manager, Highway Design, Traffic Planning and Design, Inc. (TPD)

Success

In October 1998, Traffic Planning and Design, Inc. (TPD) began design work on the Ship Road and Swedesford Road Intersection Improvement Project in West Whiteland Township, Chester County, PA. After construction was completed in April 2001, TPD and West Whiteland Township won "2nd Runner Up" in the Pennsylvania State Association of Township Supervisors (PSATS) 20th Annual Road and Bridge Safety Improvement Award program, judged by a panel comprised of representatives from PHIA, PENNDOT, and PSATS. The "job well done" included structural design, traffic signal design, intersection improvements, and highway widening and realignments which "resulted in well-documented safety improvements." This project also received Honorable Mention from the Delaware Valley Section of the American Society of Highway Engineers (ASHE) for 2001 Project of the Year Award.

The project involved close coordination with multiple stakeholders and regulatory agencies, and required quick turnaround due to other construction projects scheduled in the surrounding area. Pennoni Associates, Inc. completed the original traffic study which included alignment alternatives, and Eastern States Engineering completed survey and site work for the adjacent Swedesford Chase development being constructed by Toll Brothers, Inc.

Project Description

Ship Road (State Road 1001) and Swedesford Road (Township Road 413) intersect in West Whiteland Township, Chester County, PA approximately 1/2 mile northeast of the Exton Square Mall. Both Ship Road and Swedesford Road are used as bypass routes for motorists trying to avoid traffic delays and traffic signals on PA Route 100 (1/2 mile west of the intersection) and Business Route 30 (1/2 mile south of the intersection) both of which are classified as Principal Arterial roadways. The junction was originally designed as two "T" intersections, offset by approximately 275 feet, with a tributary to Valley Creek located between the two intersections. This type of design was commonly used in the early part of the 20th century to avoid multiple stream crossings by both intersecting roadways. This offset required vehicles traveling along Ship Road to make two turning movements, increasing commuter delay and the possibility of crashes. Concerns with the existing intersection were magnified due to the large volume of vehicles performing this movement and the consistent flow of traffic on Swedesford Road, which did not allow for proper gaps in traffic.

A traffic study, developed in late 1997 by Pennoni, analyzed various design alternatives for the intersection. The focus of the study was to increase safety and mobility at the intersection of Ship

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Construction of new intersection at Ship Road and Swedesford Road.

National Board News

National board members met for a regular board meeting on February 1, 2003, at the Sawgrass Marriott Resort & Beach Club at Ponte Vedra Beach, Florida. National President Sandra K. Ivory presided over the meeting. The following are highlights of the committee reports and board actions:

Membership:

There was a decrease of 57 members since the October board meeting, Secretary Conner reported. Total ASHE membership stands at 5,502, representing 34 local sections.

President's Report:

President Ivory reported on the many engagements that she attended on behalf of ASHE, including a speaking engagement for the 2002 Exploring Engineering and Technology Academy in Westmoreland County, Pennsylvania; 56th Annual Ohio Transportation Engineering Conference in Columbus, Ohio; ASHE Region 6 Seminar at Stanton, Delaware; ASHE Pittsburgh Section Past President's Dinner in Coraopolis, Pennsylvania; ASHE Southwest Penn Past President's Dinner; Delaware Valley Section meeting; ASHE/PENNDOT, District 9-0 Seminar; ASHE Franklin Section meeting; and speaker at the Georgia Section meeting.

New Sections:

Director Ronald Purvis reported that a PowerPoint Presentation – "ASHE: What Are We?" was recently added to the ASHE Web Page. This is a promotional for ASHE that can be used as a recruiting tool when meeting with potential new section groups. Also, it represents ASHE well for visitors to the web page. Purvis also noted that his committee is in the process of updating the New Sections Manual for clarity and cost responsibility.

Membership Committee:

Second Vice President Rodney Pello reported on the results of thirteen section surveys that were returned regarding techniques that sections are using to grow membership. ASHE only experienced 26% growth since 1996 of which half was contributed by new sections. There were limited success stories for membership expansion. One approach that was discussed was a stronger focus on promoting ASHE in various trade magazines. Arrangements will be made to prepare a promotional ad for ASHE.

Conference Committee:

Directors Robert Hochevar and Shirley Stuttler reviewed and accepted comments on the latest revision to the "National Conference Guidelines." This document is reviewed annually in order to provide the new hosting section direction and opportunities for success.

National Conference Committee representatives together with 2004 National Conference Chair William Warden, Jr. toured the Sawgrass Marriott Resort on December 6 and 7, 2002. The Conference Committee concluded that the facility is more than adequate to host an ASHE Conference. The Region 9 National Conference Committee hosted the February National Board Meeting at the Marriott Sawgrass and presented an excellent plan for a successful conference in Ponte Vedra, Florida.

The Conference Committee along with 2005 Conference Chair Gerald Pitzer toured the Sheraton Hotel at Station Square – Pittsburgh, Pennsylvania on October 24, 2002. Approval of the facility was given by the Conference Committee to host the 2005 ASHE National Conference.

Director Hochevar reported on details of the Region 1 National Conference to be held at the Hilton-Akron/FAIRLAWN, Fairlawn, Ohio on May 29 through June 1, 2003. All arrangements are well underway. The registration brochures are being designed and will be mailed approximately eight weeks prior to the Conference. The forms will be linked to the conference website and can be reached at www.ashe2003.org.

Web Site Committee:

Director Hochevar reported that updates to the Section Operating Manual and the 2002/03 National Officers and Directors listing have been made on the website. The PowerPoint –"ASHE: What Are We?" was added to the home page of the website as a tool to encourage new sections.

So far there have been no company requests to link to the website at a cost of $200.00 per year. The committee will look into providing some incentives for those dedicated advertisers that place four ads per year in the SCANNER.

Nominating Committee:

Secretary Terence D. Conner announced the following slate of officers and directors for the 2003-04 ASHE year:

President	David W. Jones, P.E.
1st Vice President	Rodney P. Pello, P.E.
2nd Vice President	Ronald L. Purvis, P.E.
Secretary	Terence D. Conner, P.E.
Treasurer	Robert E. Yeager, P.L.S.
Past President	Sandra K. Ivory
Director - 1 Year	
Region 4	Robert M. Peda, P.E.
Region 5	Marl L. Welker
Region 6	Richard S. Prentice, P.E.
Director – 2 Year	
Region 7	
Region 8	Thomas P. Zigler, P.E.
Region 9	Steven J. Tidwell, P.E.
Director – 3 Year	
Region 1	Robert H. Hochevar, P.E.
Region 2	Jean Zarger
Region 3	Perry M. Schweiss, P.E.

Student Section Committee:

Director Mark Welker provided a status report on the commitment that ASHE is making toward student development and outreach to potential civil engineering students. Of the 31 ASHE sections that responded to a survey, 23 or 74% reported that they offer one or more student scholarships. The current ASHE

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Road and Swedesford Road. Based on the study, the selected intersection improvement alternative included signalizing the intersection, realigning the western and southern legs of the intersection to create a single skewed four-way intersection, and the addition of left turn lanes on each approach. In October 1998, Toll Brothers, Inc. and West Whiteland Township employed Traffic Planning and Design, the Township Traffic Engineer, to develop plans for the intersection redesign. Plans were required to be prepared and submitted to PENNDOT as a Highway Occupancy Permit (HOP) application with West Whiteland Township as the permit applicant.

Design of the intersection was complicated by several factors within the project limits including the Tributary to the Valley Creek, the proximity of a Township and County Park on the northeast and southeast corners of the intersection, historic structures on the northeast and northwest corners, and the presence of wetlands on the northeast corner. An existing 3'x 6½' reinforced box culvert carried the Valley Creek tributary beneath the offset leg between the two T-intersections. Originally, it was expected that this existing box culvert would be able to be extended as required or replaced with an elliptical pipe. However, preliminary coordination with DEP eliminated this possibility. Following this coordination, further research of the flood history within the area indicated that the existing culvert had potential flooding concerns. These concerns, along with the anticipated extensive intersection improvements, dictated that the existing box culvert be replaced. During the design process and flood history research, concerns also arose about flooding which was occurring in a residential area located downstream of the intersection. This flooding occurred along the tributary to the Valley Creek during higher intensity storm events. Therefore, any design of a replacement box culvert carrying the creek through the redesigned intersection needed to be developed in such a manner as to minimize impact on downstream property owners.

Based on TPD's in-depth hydraulic analyses, the replacement structure required for this project was 5½' x 14' reinforced box culvert with a total required length of 206 feet. The extensive culvert length was required because the Valley Creek tributary flowed directly through the center of the proposed intersection. Any attempts to relocate the intersection were prohibited by the adjacent park and the adjacent historic structures, while any attempt to minimize the culvert length required significant stream relocation. Therefore, the location of the creek was not altered as part of this project and the culvert was designed and constructed at the 206' length. Since the total length of the box culvert exceeded 100 feet, it was sized to handle a 100-year design storm. TPD coordinated with the Army Corp of Engineers, Department of Environmental Protection, Chester County Conservation District, and Trout Unlimited throughout the development of the design of the box culvert.

Due to a scheduled structure replacement on PA Route 100, approximately ½ mile west of the intersection, West Whiteland Township imposed extensive construction deadlines, since this intersection would provide alternative traffic routes for commuters affected by the elimination of one lane in each direction on PA Route 100. Due to this intense schedule, TPD, West Whiteland Township, and PENNDOT coordinated closely to achieve the required deadlines. As a result of the tight schedule and late addition of structural design tasks, a final structural plan package included a combination of geometry, plans, and details developed by TPD, along with specific precast culvert and precast wingwall shop drawings provided by Rotondo Precast. This modified submission format, which required extensive coordination between TPD, the Township, PENNDOT, Rotondo, and the contractor, resulted in the successful fabrication and installation of the replacement culvert within the required time constraints. A typical PENNDOT submission procedure would have extended the fabrication and construction schedule by a minimum of three months.

Another element which increased the complexity of the design and coordination of the intersection realignment, was the presence of eight (8) utility companies. There were five (5) existing above-ground and underground utility lines, which were going to be affected and, therefore, required relocation as part of this project. An additional three (3) utility companies requested that their lines be relocated/extended through the intersection while it was under construction. Of particular concern was a high-pressure Sun Oil pipeline running parallel to Swedesford Road immediately south of the intersection. As part of this project, the proposed box culvert was to be extended to the south of the existing intersection immediately above the pipeline. Therefore, a decision was made to relocate the high-pressure line approximately 50 feet to the south to avoid any conflict with the box culvert. Closure of the gas line required extensive coordination with Sun Oil, West Whiteland Township and an adjacent construction site located one mile east of the intersection of Ship Road and Swedesford Road.

One final design element requiring special attention from utility companies and contractors, was the proximity of two 100-year old trees on the northeast corner of the intersection. West Whiteland Township officials requested that the trees remain undisturbed during construction. Therefore, special measures were taken when designing the curb line and utility relocations as to not disturb the trees. To ensure that the trees would survive construction, an arborist was hired by the Township to trim certain portions of the trees where root damage could have occurred.

Contract and Scheduling

Construction of intersection improvements was performed by Allan Myers, Inc. and managed by Toll Brothers, Inc., who funded the improvements as part of their adjacent Swedesford Chase land development. Construction was performed under a full detour condition to accelerate completion and to allow for improved safety during installation of the box culvert. Both the Township and PENNDOT deemed completion of the intersection improvements critical due to the upcoming reconstruction of PA Route 100 through the Exton Mall area. PA Route 100 was scheduled to be reduced from four lanes to two lanes in order to complete the widening of a major structure. Traffic from PA Route 100 was to be partially diverted onto Ship Road during that period. Due to the efforts of West Whiteland Township, PENNDOT, Toll Brothers, Allan Myers, Rotondo, and TPD, intersection improvements were completed and

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North-East Penn Section

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The Reconstruction of Military Highway

Regis Schuler, Project Manager, Michael Baker Corporation, Virginia Beach

With the country now preparing to go to war, the same thing was occurring over sixty years ago with the advent of World War II. The military build up meant more people locating in the area, and with people come cars, plenty of them. So many the City of Norfolk could not keep up with the growth. The military needed to move men and material fast and could not be bogged down in traffic. So, Federal, state and city officials put their heads together and came up with a plan to build a more efficient highway to alleviate traffic problems. All parties agreed on a 15-mile long section, from Chesapeake to Taussig Boulevard in Norfolk.

The proposed "super" highway, named Military Highway, was designed and built in 1943 for approximately $2.5 million. Military Highway can lay claim to a lot of "firsts." It was one of the first multi-lane (4-lanes, two in each direction) constructed in the area. The new roadway included several overpasses, bridges, interchanges and a traffic circle. The cloverleaf interchange constructed at Military Highway and Virginia Beach Boulevard was the first ever built in the state

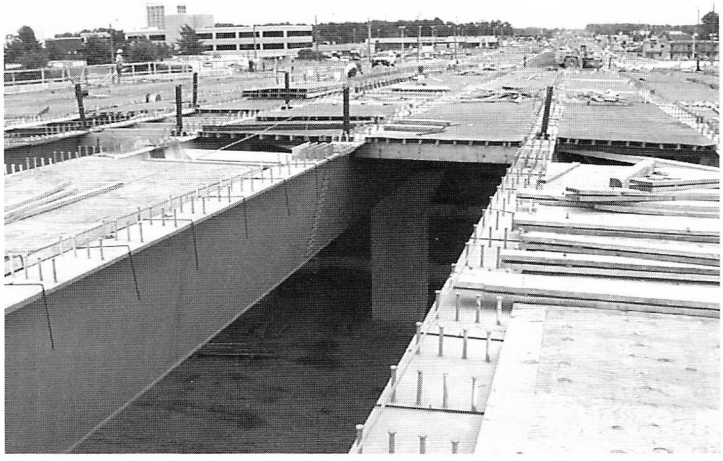
After the war, businesses and residential development soared. With the development of Janaf Shopping Center, Military Circle Mall, Best Square Shopping Center and other large developments brought thousands of additional people into the area to live, work and shop. With the influx of people came even more cars. More than 50,000 vehicles traveled along Military Highway daily with 67,000 vehicles expected by the year 2010. The old "super" highway could no longer support the increased traffic volumes. Existing lanes were insufficient to handle the traffic and the bridges, especially the one at the Military Highway/Virginia Beach Boulevard cloverleaf, which had physically deteriorated to a point where restricting commercial vehicles, due to their weight, and reduction of speed was necessary.

Once again a call to arms was sounded, this time to rebuild Military Highway. The City and the Virginia Department of Transportation both agreed that a major road and bridge rebuild was necessary. VDOT hired Michael Baker Jr., Inc. (formerly C.E. Maguire and Maguire Associates, Inc.) of Virginia Beach, Virginia to prepare conceptual design study and perform final roadway and bridge design. Project limits were from I-264 to I-64 at Robin Hood Road. Work commenced on the project in 1985 beginning with preparation of the Conceptual Studies Report. The report included analysis of all traffic movements and lane configurations necessary to provide adequate level of service for design year 2005.

Results of the analysis were used in developing alternate roadway designs and layouts. At-grade intersections, flyovers, urban, cloverleaf and diamond interchange were all considered. Plans were completed, public meetings held, and a decision made on the final design. There would be 10 lanes from I-264 to Military Circle Shopping Center, eight lanes to Princess Anne Road/ Northampton Boulevard and six lanes to I-64 and Robin Hood Road. The bridges over I-264 and Curlew Drive were to be new construction, building one side, then the other. The cloverleaf interchange and bridge at the Virginia Beach Boulevard interchange was removed and replaced with a Single Point Urban Interchange or SPUI. This was another first for the area. The SPUI was the first of its kind to be built in the area. The new structure replacing the original bridge is 478 feet long and 121 feet wide. It is a three span structure with the center span measuring 218 feet. Minimum clearance of 16'-6" was met. Approximately 1000' of reinforced cantilevered retaining wall was constructed.

Major utility relocations were considered and designed, including replacing two 48" raw water mains. Maintenance and protection of traffic during construction presented major design challenges. Plans were developed to ensure a safe transition from one stage to the next. Feedback from citizens and business were considered while developing the plans. Regular meetings with civic leagues and area businesses were conducted to solicit feedback concerning design issues, construction concerns and project scheduling.

Road and bridge plans were completed in December 1995. Construction began the following year with the contract awarded to E.V. Williams of Virginia Beach, Virginia. Construction costs were within budget and time allotted. In fact, the contractor completed the project earlier than planned. The official completion date was June 1999. To quote the Honorable Paul D. Fraim, Mayor of Norfolk, "The Military Highway corridor renovation is perhaps one of the most challenging and yet rewarding projects that the City of Norfolk has ever faced. By communicating and building partnerships with the Virginia Department of Transportation, contractors, area businesses and residents, the project was a success." ■

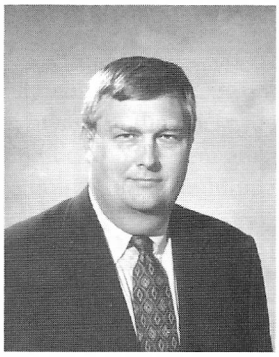


Placement of forms over box girders (bridge over Virginia Beach Boulevard)

Military Highway over Virginia Beach Boulevard, Single Point Urban Interchange, looking North.

The Tampa Bay SunGuide Freeway Management System

Peter J. Yauch, P.E., Technical Director of Traffic Engineering and ITS, TEI Engineers & Planners, Tampa, Florida



The Tampa Bay area, located on the west coast of Florida, is well known for its beautiful beaches and pleasant year-round temperatures. It includes the cities of Tampa, St. Petersburg, Clearwater, and a multitude of smaller cities, towns, and communities. Home of the World Champion Tampa Bay Buccaneers, it is also home to 2.3 million people, many of whom drive on the area's freeway system on a regular basis.

As the name implies, the area is centered around Tampa Bay, a large body of water connected to the Gulf of Mexico. St. Petersburg and Clearwater are located in Pinellas County, on a peninsula between the Gulf and the Bay; Tampa is located on the east side of the Bay, in Hillsborough County. Interstate 275 connects the two counties, and crosses the Bay twice – on the Howard Frankland Bridge and on the Sunshine Skyway Bridge, which extends down into Manatee County toward the Bradenton / Sarasota areas. Interstate 4 extends from its terminus at Interstate 275 in downtown Tampa eastward to the Orlando and Daytona Beach areas, and Interstate 75 runs north-south along the east side of Tampa Bay.

The Florida Department of Transportation's District Seven, which serves the Tampa Bay area, embarked on a program to implement a Freeway Management System on the area's Interstate Highway System. Nationally, Freeway Management Systems have long provided a tool to help keep traffic flowing smoothly along our expressways and freeways. By providing timely identification and verification of a congestion-causing incident, the system can assist in the dispatching of appropriate emergency personnel and equipment to the scene. In addition, the system can provide information about the incident to motorists, to prepare them for congestion or hazards, or to divert them to alternative facilities. In short, the system can save lives, time, and money.

The Freeway Management System will be invaluable during hurricane and other inclement weather evacuations. As the Tampa Bay area population and density increases, moving residents from low-lying coastal communities inland to safety is a critical concern. Allowing emergency management personnel to determine traffic and weather conditions from a centralized location, and provide information to motorists concerning shelters and lodging opportunities, the coordination of the evacuation process will be made easier.

The system will also be a major tool in traffic management for tourism and special events. Raymond James Stadium, the St. Petersburg Times Forum, and Tropicana Field are all served by the Interstate system. Buccaneers, Lightning hockey, and Devil Rays baseball games place a significant demand on the area roadways. In addition, annual tourism attractions such as the Gasparilla Pirate Invasion, the Florida State Fair, the Plant City Strawberry Festival, Spring Break, and Spring Baseball training, all impact the area travel patterns.

The Tampa Bay SunGuide program will provide for full incident management capabilities on the Interstate Highway system within Pinellas and Hillsborough Counties, with ultimate expansion to include Interstate 75 in Pasco and Hernando Counties. Inclusion of non-Interstate facilities, including the Gandy Bridge, Courtney Campbell Causeway, Veterans Expressway, Suncoast Parkway, and Lee Roy Selmon Expressway, is anticipated for the future.

Within the areas of full incident management, the freeway infrastructure will include vehicle detection stations spaced at approximately one-half mile intervals. Using video detection technology and a variety of incident detection algorithms, the system will be able to automatically sense the presence of most congestion-causing incidents. Cellular callers to 9-1-1 or *FHP (the Florida Highway Patrol's motorist assistance line) services will supplement the system's capabilities to determine the presence of an incident.

As a means of confirming the presence of an incident, as well as monitoring traffic flow, video cameras will be located at approximately one mile intervals. These color video cameras will have full pan, tilt, and zoom capabilities, allowing system operators to observe areas of interest along the roadway system.

Motorists along these corridors will be provided timely information by means of regularly spaced dynamic message signs. These signs, which use light emitting diodes (LEDs) for forming alphanumeric characters and graphic symbols, will provide advance information about incidents and traffic conditions. These will be particularly critical at major diversion points, allowing for the rerouting of heavy traffic flows to alternate facilities.

Tying these field devices together, and back to the system's control facility, will be an extensive communications network. To support the bandwidth necessary for video imaging, and to provide a reliable, noise-resistant media, fiber optic communications will be used. Gigabit Ethernet technology, with Internet Protocol addressable devices, will be implemented to secure an off-the-shelf solution to the communications requirements.

The system's traffic management facility, known as Tampa Bay SunGuide Center, will also serve as the District's Emergency Operations Center and will also serve as the regional law enforcement dispatch center of the Florida Highway Patrol and other state law enforcement agencies. The center will be a hardened facility, allowing operations to continue before, during, and after a hurricane or other severe storms. Combining the three functions will allow a multiple agency approach to traffic management all in one centralized facility.

Operations staff at the Center will be responsible for utilizing the system as an effective tool for traffic management. A typical scenario for an incident starts with the system identifying the location of a possible incident, based on the detector data being received. The operator will view that section of the roadway to confirm the presence of the incident, and to determine the needed response, which may include dispatching police, fire rescue, a Road Ranger service patrol vehicle, or DOT maintenance forces. The operator will also activate appropriate messages on nearby dynamic message signs, updating the information as the incident evolves. The media may be notified, based on the extent of the incident. In case of a need for the diversion of traffic to alternative surface streets, the operator will contact the appropriate traffic management center to implement special signal timings.

The first phase of the Tampa Bay SunGuide system will come on line in 2006, with additional phases, covering all of Pinellas and Hillsborough Counties, over the following six years. ■

Ohio Roads Okay But Could Use Extra Credit

Patrick M. Welsh, Highway Rubber Products, Corp., North Canton, Ohio

Roads in Ohio's cities are similar to the "C" that showed up on your grade card—good enough to get by, but with some extra effort they could be exceptional. For the most part, the streets and highways in the Buckeye State's major cities are in relatively good condition. Yet, there are areas to improve, as lots of lanes remain potholed and crumbling, costing Ohioans annually hundreds of dollars in vehicle repairs.

A recent analysis by The Road Information Project (TRIP) found nearly 1,000 out of the 2,326 miles of roads in Ohio's major metropolitan areas were rated good. That includes interstates, state and national highways, and local streets. The Lorain-Elyria area had the state's highest percentage of roads rated in good condition with 58 percent. Columbus was second with 51 percent, which was 13th best in the nation for areas with populations more than 1 million. That was followed by Akron (48 percent), the Youngstown-Warren vicinity (45 percent), and Dayton (44 percent). Cleveland had the lowest percentage of good roads at 33 percent, which ranked 21st nationally.

However, 868 miles of roads in the Buckeye State's most populated cities are rated mediocre to poor. Cleveland had the worst roads, as 19 percent of its highways and streets were given a poor rating. Toledo was second with 17 percent, followed by Cincinnati (14 percent), Canton (13 percent), and Dayton (11 percent). Only 5 percent of the roads in Columbus were rated poor.

TRIP also found that Ohio's urban drivers spend an average $242 per motorist in additional costs, such as new tires, suspension work and other repairs, to drive on roads that need fixed. The national average is $358. Cleveland motorists have to spend the most in the state as, on average, drivers pay $326 each year for automobile repairs. Columbus is the cheapest at $169.

TRIP revealed that nearly one-fourth of the major roads in the nation's largest urban areas have significant deterioration and are in need of immediate repair. Boston had the worst roads in the country (57 percent rated poor) for cities with populations more than 1 million, closely followed by New Orleans and Los Angeles (56 percent).

Of the remaining nation's major road mileage, 19 percent was rated in fair condition and 29 percent was rated in good condition. Los Angeles also had the highest extra operating costs with $641 per driver, while Atlanta was the cheapest at $50. Cities in Georgia appear to have the best roads in the nation, as Atlanta, Augusta, Columbus and Savannah all had less than two percent of their highways classified as poor.

Increased highway spending would not only improve the roads on which Ohioans drive but also provide numerous economic benefits. According to a United States Department of transportation study, every dollar invested in the highway system yields $5.70 in paybacks, such as reduced delays, improved safety, and lower vehicle operating costs. ■

Road Conditions in Ohio's Major Cities

(Figures represent number of miles)

Information provided by Ohio Construction Information Association

	Poor	Mediocre	Fair	Good	Extra Vehicle Operating Cost/Driver
Akron	24	53	47	114	$223
Canton	14	29	27	42	$266
Cincinnati	56	97	77	176	$261
Cleveland	105	162	107	180	$326
Columbus	14	64	73	160	$169
Dayton	29	71	52	119	$241
Lorain-Elyria	8	21	18	64	$179
Toledo	33	44	32	78	$291
Youngstown-Warren	14	30	32	63	$224
OHIO TOTALS	**297**	**571**	**465**	**996**	**$242.22 (Average)**

Route 29 Tunnel Project

Larry McKinney, P. E., Resident Engineer

A distant view of the Route 29 tunnel project from the Route 1 bridge gives the fleeting impression of a River Boat gliding north along the Delaware River in all the grandeur and opulence these magnificent ships represented from the historic days of the Trenton waterfront. In a sense, this is the vision that the New Jersey Department of Transportation, The City of Trenton, Mercer County and Community representatives had to recreate the vitality and economic resource that the Trenton Waterfront once represented. Towards this vision, the Route 29 tunnel and approach roadways represent a prominent jewel in the overall plans for accomplishing the numerous projects that include Waterfront Park home of the Trenton Thunder, a Marina, an amphitheater, a linear Park, professional offices, parking facilities, shopping areas, and restaurants. Construction of Route 29 on a new alignment along the Delaware River would complete a vital transportation beltway around the City of Trenton while providing the improved access essential to movement of patrons.

Project development for the Route 29 Tunnel and approaches is led by NJDOT Capital Program Management Division under the direction of Assistant Commissioner, Dennis Keck, P. E. and Director Art Silber. Richard Gramlich, P.E. serves as the Program Manager for the Department and Robert Davies is the Project Manager.

In summer 1997, many years of planning for the project with community involvement culminated when the Department advertised for the construction of the Route 29 project utilizing a modified design build Contract delivery process based on preliminary plans and specifications developed by the Department's consultant, Gannett Fleming, (Hammonton, NJ office). The successful Contractor was a Joint Venture of PKF-Mark III and Neshaminy Constructors. The Joint Venture retained Frederic R. Harris, Inc. as their design consultant for the planning, engineering, and design services for the project and construction phase services. Harris and the Joint Venture employed numerous other sub-consultants including, K S Engineers, Hatch Mott MacDonald, Phoenix Environmental Management, and Haley & Aldridge. Cconstruction designs for the project developed by the JV and Harris were submitted to Gannet Fleming which provided engineering review for the DOT under the direction of Greg Milakovic, P.E., and Ed McMahon, P.E. Gannett review comments were provided to the Department for consideration and final approval. Likewise, shop drawings developed for construction were reviewed by the JV and Harris before submission to Gannett for checking, and final sign-off was made by the Department.

Michael Baker Jr. Inc.'s Princeton, New Jersey office was chosen by NJDOT to provide Construction Management/Construction Inspection Services for the project in June 2000. Project services encompassed construction documentation, correspondence and document management, community interaction, monitoring and reporting work progress based on the approved CPM Schedules, claims avoidance and resolution, construction orders, progress payments, and project acceptance recommendations. NJDOT Materials Department conducted materials tests for the project. Michael Brescia, P. E., Construction Manager, leads these services for Baker. Baker's team included: ACT Engineers provided Public Relations Support and inspection assistance, Baker Environmental guided contaminant issues and solutions, Sverdrup Parcel provided expertise on Electrical/Mechanical/ITS Systems and Tunnel Operations, and Hunt Engineers assisted with dispute resolution.

Project limits encompass about 2.5 miles in length starting at the Route 29 Expressway/Route 129 interchange at the south end and ending at the Amtrak Bridge at the northern limit. Two 12-foot roadway lanes, a 12-foot right shoulder, and 3 foot left shoulder are maintained in each travel direction including through the tunnel section. Roadways are separated by concrete barrier curb along the south roadway approach to the tunnel structure. North of the tunnel, roadways are separated by concrete barrier curb to a point where the median widens near Waterfront Park. From this point, the roadways are on independent alignments to the northern limit.

The Joint Venture exercised available strategies under the bid concept to provide economy of construction and long-term value in the completed project. Innovations used by the design and construction team included high strength concrete pre-cast sheet piles, post tensioned tunnel structure, and deep dynamic compaction of weak existing rivers edge fill materials. The final design concept adopted for construction facilitates traffic demand design objectives for the urban roadway.

Construction designs and drawings were developed on a continuing basis after construction commenced in fall 1997 and progressed toward completion over the past four years, albeit not without overcoming some remainders of the once thriving industrial use of the Delaware River front traversed by the project. Industry uses of the river's edge left numerous contaminants in the soils that were properly identified and suitable dispositions through treatment or off site disposal in controlled landfills were made. The scope and extent of the soil contaminants both known and discovered during construction led to considerable escalation of Contract costs and corresponding adjustments to Contract time associated with the clean-up and disposal activities.

Major utility relocation work was required to fit the proposed roadway between Lamberton St. and the Delaware River. Approximately 2,800 feet of 72" and 600 feet of 96" reinforced concrete sewer line and associated structures owned by the Trenton Sewer Utility were constructed adjacent to the tunnel alignment. New lines enabled an equal length of 72" sewer line to be abandoned and removed from within the tunnel alignment. Some segments of the old brick sewer were abandoned in place and backfilled with flowable grout. Numerous pole relocations, electrical services, gas line relocations along the alignment required close coordination with PSE&G over the duration of the project as the construction phases unfolded. Trenton Water Department facilities were adjusted as they were affected.

The Joint Venture chose to employ pre-cast sheet piles to serve the multi-function purpose for tunnel structure bearing support, roadway embankment support, and scour protection along the Delaware River. Piles were jetted in, down to a predetermined elevation and driven to specified bearing based on designated blow counts. Piles were keyed together to maintain wall alignment and continuity. A cast-in-place pile cap was used where the tunnel base slab does not bear on the sheet pile wall. River cobbles were placed along the rivers edge to restore pre-construction condition along the rivers edge and enhance appearance.

"Route 29" continued p. 15

"Route 29" continued from p. 13

To produce the depressed roadway profile alignment the JV used a variety of wall types. Pre-cast T-Wall was used along the East Side at each tunnel approach to provide original ground support. A unique soldier pile wall design was used for top down construction due to site restrictions adjacent to a Utility access road parallel to the Riverview Cemetery adjacent to the south tunnel approach. An architectural Wall facing was connected to the soldier piles by welded studs and was cast-in-place. Conventional reinforced concrete retaining walls were used along the ramp leading from Lamberton road to northbound Route 29 and at other locations.

The 2,300 foot cut and cover below grade roadway structure was conceived by the JV as a tunnel in the northbound direction and a section open to the river in the south bound direction. Column bents support the southbound tunnel deck. A solid center wall and east wall are utilized to create the northbound tunnel. This approach provides a roadway section consisting of two twelve foot width roadway lanes, a 12 foot right shoulder, and a 3 foot left shoulder in each direction of travel. The tunnel grade is 0%. Travel lanes are constructed with 0.02 ft./ft. cross slope and shoulder slope is 0.04 ft./ft. Drainage is collected in a slot drain along the right edge of shoulder and is discharged to a detention basin west of the north portal via a 24" cast iron collector pipe. The tunnel base slab, solid center and east walls, and the roof deck are post tensioned in the longitudinal direction. The roof deck is also post tensioned in the transverse direction. The tunnel was constructed in 23 segments. Fifteen segments approximately 103' in length are constant section width as described above. Eight segments at the north end of the tunnel vary in width and length to accommodate an exit ramp southbound leading to Lalor St. and for U-turn to northbound travel via a ramp entering the northbound roadway from Lamberton St. The Contractor used a hydraulically operated traveling form system fabricated specifically for the project use to support the roof deck. The form systems utilized, and sequencing employed, enabled tunnel production of one segment at about two-week intervals during peak progress. Post-tensioning of the structure reduced the required amount of reinforcement steel in the structure and produced corresponding savings in labor to place the reinforcement. Concrete placements ranged from 650 CY for a roof segment to over 1100 cubic yards when both base slab and roof deck were placed on the same day.

Life safety systems are provided within the tunnel in accordance with 1998 NFPA 502 Fire Code. Three banks of three jet fans are located along the northbound side of the roadway. No fans are required along the southbound roadway since it is open to the river. Call boxes, fire alarm pull boxes, fire extinguishers and dry standpipes are spaced at approximately 300-foot intervals for use in the event of an accident, breakdown, or fire incident. Air quality monitors detect carbon monoxide levels and opacity, and activate the jet fans to maintain preset reading levels. A linear heat detection system is an additional fire detection system installed in the tunnel that will report the location of fires detected to Trenton Communications Division.

Traffic signals were installed at the Cass St. and Warren St. intersections with Route 29 and at the intersection of Lamberton St. and Lalor St. Epoxy and latex pavement striping, and thermoplastic pavement markings were applied for roadway delineation and guidance. Regulatory and guide signing was installed. Signs excluding hazardous material loads from the tunnel are in place at each tunnel approach. Temporary detour signs are installed on designated detour routes for motorists and trucks to follow when the tunnel is closed due to emergency or for tunnel maintenance.

Stationary, fixed focus, CCTV cameras are installed within the tunnel to monitor traffic flow conditions. Pan, tilt, zoom cameras are installed at each approach to view the tunnel entrances and roadway intersections with Route 29. NJDOT Traffic Operations South will monitor the CCTV. Fiber optic cable connects the tunnel CCTV system into the NJDOT backbone located on I-295. The video is also fed to the Tunnel Controls Building, and NTOC. Tunnel ventilation equipment and life safety systems are monitored and controlled via a PLC system located in the Tunnel Controls Building at the intersection of Lalor St. and Centre St. Fire. Smoke control panels, ventilation fan motor controls, un-interruptible power supply, and call box controls, are located within the TCB. Transformers and standby emergency generator equipment are located within the fenced building site.

Dual PSE&G power supplies are provided to the tunnel from the PSE&G's Liberty substation for redundancy required under code. Either PSE&G feed will carry the full power demand for the tunnel. The standby generator has capacity to provide full operation of the tunnel systems for an extended duration. Tunnel lighting is designed to provide four levels of illumination at the portals through the transition zones from approach to within the tunnel depending on the ambient light conditions. Light levels are controlled by photoelectric cells located outside the tunnel. Approximately 1500 high-pressure 150 and 400 watt high pressure sodium light fixtures are used for tunnel lighting. Dual quartz lamp fixtures are employed at the tunnel entrances to provide partial roadway illumination levels during restart of the sodium vapor lamps when power supply transitions are experienced. Nighttime roadway lighting levels are maintained by operation of approximately one quarter of the lights.

A linear park, designed by Vollmer Associates of New York City, will be built on top of the tunnel under a separate construction Contract planned to begin in 2002. The park will be complete with playground, paths for walking, interpretive areas, and manicured lawn areas, a pleasing sight for residents living along Lamberton St., which parallels the Route 29 alignment.

An Open Water Mitigation Site is presently under construction adjacent to Lamberton Road and along the Delaware River south of the tunnel project. Upon completion, the site will meet permit requirements for replacement of wetland areas required for construction of the Route 29 project.

The Route 29 tunnel and approach roadway and the linear park construction represent a significant investment in the future of the City of Trenton area by the New Jersey Department of Transportation. Facilities constructed will serve the immediate and long-term transportation needs of the area and improve the quality of life for the residential areas along the corridor and the citizens of Trenton. The facility is a remarkable accomplishment for the New Jersey Department of Transportation and the citizens of the State of New Jersey. The Department opened the tunnel and roadway on March 2, 2002 and the facilities have been well received by commuters and through traffic. ■

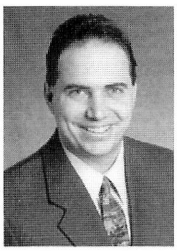
As the Wheel Turns

Sandra K. Basehore has been promoted to Vice President of Environmental Services for the firm's Harrisburg office. Ms. Basehore has been with Skelly and Loy since 1990 and has 19 years of experience associated with assessment of environmental impacts and development of mitigation actions for transportation and infrastructure improvement projects. She has successfully completed all levels of environmental documentation associated with such projects including environmental assessments and impact statements and is a skilled communicator who has polled public opinion and promoted public understanding through the implementation of comprehensive public involvement programs. In her new role, she will be responsible for all environmental services performed from Skelly and Loy's Harrisburg office. Ms. Basehore holds a Bachelor of Science degree in Environmental Resource Management from The Pennsylvania State University.

McMahon Associates, Inc., a transportation engineering and planning firm with over 26 years of service in Florida, proudly recognizes **Carolyn Gish, P.E.**, as the newly elected President of Gold Coast ASHE (American Society of Highway Engineers). The Gold Coast Chapter serves the South Florida area to promote the planning, design, construction, maintenance and operation of safe and efficient highways.

Ms. Gish, Senior Project Manager at McMahon Associates, is a graduate of the Florida Institute of Technology with a Bachelor of Science degree in civil engineering, has 10 years of highway design experience. She is also an active member of the American Society of Civil Engineers (ASCE) and the Florida Engineering Society.

McMahon Associates currently has regional offices in Palm Beach Gardens, Fort Lauderdale, and Cape Coral, Florida, with over 100 full-time employees firm wide. Other markets served are New England and the Mid-Atlantic states.



The engineering firm of Finkbeiner, Pettis & Strout, Inc. (FPS) has named Project Manager **James S. Bowling, P.E.**, as an associate in the firm. Since joining FPS as part of a cooperative education program in 1992, Jim Bowling has become a pivotal member of the transportation engineering team in the FPS Akron office. Jim has worked as a project engineer and resident project construction representative and is now designing and managing numerous transportation and hydraulic projects. Jim served as president of the Akron-Canton Chapter of the American Society of Civil Engineers from 2000-2001 and is also a member of the American Society of Highway Engineers, the Association of State Floodplain Engineers, and the Water Management Association of Ohio. He received his bachelor's degree in civil engineering from the University of Akron.

Ranked as one of the top 300 engineering firms nationwide according to billings, FPS designs water, wastewater, storm water, and transportation systems for hundreds of communities throughout the Midwest and Mid-Atlantic states. The firm has nine offices in Michigan, Ohio, North Carolina, and Virginia.

Thomas W. Brady, PE, joined Vollmer Associates LLP as a Senior Highway Project Manager in the Kennett Square, Pennsylvania office. Mr. Brady has experience in all aspects of highway design, including preparation of construction plans, cost estimates, utility coordination, and traffic analysis. His recent projects include design of sections of Route 202 in Pennsylvania and the Germantown Avenue Bridge in Philadelphia. Mr. Brady holds a bachelor degree from Drexel University and a Master's degree from Villanova University, both in civil engineering. ■

"Board" continued from p.3

scholarship total is reported at $51,700 which amounts to nearly $12 for each ASHE member in those reporting sections.

Two of the sections sponsor an active transportation or civil engineering student section. However, 15 sections have some level of student outreach primarily in the form of High School career day presentations.

Continuing Education Units (CEU's):

Director Richard Prentice provided a synopsis of the history of ASHE's involvement in providing accreditation in the form of CEU's through the International Association for Continuing Education and Training (IACET). Richard Prentice and Pat Dougherty have been developing a process in order to meet IACET's requirements for ASHE to become reauthorized as a CEU Sponsor.

The Technical Committee will be responsible to review and approve any training program for content to meet CEU criteria. Programs are prepared based on technical content and learning outcomes. Measurement of learning outcomes is done through evaluation forms. The learning environment is most often in the classroom setting, but can be in field settings. The instructors must be qualified in course content to conduct the program. Finally the recordation of the CEU credits will be maintained by the Technical Committee and a process must be in place to produce records within a specified timeframes. Final details of the process will be presented at the next ASHE National Board meeting. ■

EPA and DOE Announce Fuel Economy Leaders for 2003 Model Year Cars

OCTOBER 29, 2002 - Environmental Protection Agency Administrator Christie Whitman and Secretary of Energy Spencer Abraham today announced the 28th annual mpg estimates for 2003 passenger vehicles. For the third year in a row, the Honda Insight and Toyota Prius hybrid electric vehicles continue to be the fuel economy leaders. In addition to being fuel-efficient, these vehicles are also among the cleanest vehicles available.

"The fuel economy guide allows consumers to make informed purchasing decisions about what kind of gas mileage a new vehicle gets during normal usage," said Whitman. "By choosing more efficient models, people will not only save themselves money at the pump, they will help improve the quality of our environment. I believe that when people are provided the information this guide contains, they will make smart decisions that benefit both their checkbook and the air we all breathe."

"The DOE and EPA have joined forces to provide clear, unbiased information to help car-buyers choose the most fuel-efficient vehicle that meets their needs," Secretary Abraham said. By driving a more fuel-efficient vehicle, a vehicle powered by alternative fuels, or even by driving our current vehicles more efficiently, we can all do our part to reduce our nation's reliance on imported oil and strengthen our energy security."

A joint EPA and Department of Energy web site, www.fueleconomy.gov, provides detailed information on vehicle fuel economy, including a complete version of the Fuel Economy Guide. The site includes fuel economy information going back to 1985, which can be helpful for buying used cars. The website also includes emissions and safety data for model year 2003 vehicles as well as fuel-saving tips for drivers. The printed version of the "2003 Fuel Economy Guide" will be available at car dealerships, public libraries and credit unions later this fall.

Fuel economy estimates are determined by averaging numbers gathered through tests conducted by manufacturers and verified by EPA. Vehicles are tested in a controlled setting and the results are adjusted to reflect actual driving conditions. All vehicles are tested in the same way so consumers can compare the results when choosing a vehicle type or class. The miles-per-gallon ratings appear on window stickers on all new cars and light trucks prior to sale. Consumers can use this information to identify the most fuel-efficient vehicles to purchase.

EPA has also posted the 2003 models on the Green Vehicle Guide website to give consumers a full picture of fuel economy and automobile emissions. Consumers can use this guide to locate the cleanest and most fuel-efficient vehicle that meets their needs. To access this guide, visit: www.epa.gov/greenvehicles. ■

"Success" continued from p. 5

the road was open in time for the PA Route 100 lane closures. Following is a summary of the key events:

Commence Intersection Design	November 1999
Commence Structural Design	March 2000
Intersection Design Approved	April 2000
TS&L Submission	April 2000
TS&L Approval	May 2000
Construction Started	May 2000
Final Structure Plan Submission	July 2000
Fabrication of Box Culvert Started	July 2000
Final Structure Plan Approval	August 2000
Utility Poles Relocated	August 2000
Construction Substantially Completed	September 2000
Roadway Open to Traffic	September 2000
Final Paving and Pavement Marking (Construction completed)	April 2001

Significant Techniques or Innovations

The design and construction of the improvements at Ship Road and Swedesford Road involved extensive public-private partnership. Through this partnership, the design and construction of the intersection improvements were completed within a seventeen (17) month time period. This time period is significantly less than the typical four-year time period for design and construction of a similar size publicly funded project.

Coordination was critical to the successful completion of design and construction of the intersection improvements. This involved multiple meetings with utility companies, Township officials, PENNDOT, Toll Brothers, Inc. and TPD. In addition, engineers from TPD met with Rotondo Precast, the box culvert fabricator, to discuss and coordinate design issues, shop drawings, and final structure approval. This intensive coordination culminated in a final structure submission to PENNDOT, which included drawings and details provided by TPD and shop drawings prepared by Rotondo Precast. This process expedited the approval and construction schedule by approximately three months.

An additional method used by the designers and contractors to accelerate the project was employing a full detour in which all four approaches to the intersection were closed to traffic. This method allowed for the reconstruction of Ship Road and Swedesford Road and the continuous installation of the 26 segments of the box culvert. The detour allowed for extended work hours and provided staging areas for vehicles and equipment necessary for the installation of the box culvert. ■

Classifieds

Transportation Engineers

Yoh Engineering is in need of Full Time transportation Engineers to fill 40 positions immediately in Austin, TX. We are seeking qualified engineering candidates with 3 or more years experience in Roadway Design, Bridge Design and Drainage Design. Ideal candidates will have both Microstation and Geopak experience. These positions will be working on a new toll road being built in the area, a very high profile project. There is also tech/production positions available or the same skill set. Candidates will be required to move to the Austin, TX area and relocation assistance can be provided. Please send resume and salary history to Austin@yoh.com or call 1-888-294-7489.

Civil Engineering - Highway

Robson Lapina is a multi-discipline forensic engineering firm practicing throughout the eastern and central US. We seek mature professionals, experienced in design, construction, and maintenance phases of roadways, for interesting and challenging assignments. Must be degreed and registered, with excellent analytical and communication skills. Full-time positions in Lancaster, PA and Cedar Knolls, NJ. More information on www.RobsonLapina.com. Send resume to nchillas@robsonlapina.com.

Senior Highway Engineer

C.C.Johnson & Malhotra, P.C. is seeking an individual with BS in Civil Engineering, with an emphasis in Hwy. Design. PE and minimum of 4+ yrs. experience with PENNDOT related projects required. Highway design, review/preparation of PS&E packages, plus managing design group and interaction with clients. Forward resume to CCJM, 4660 Trindle Road, Suite 301, Camp Hill, PA 17011. Fax: (717) 730-4170; phone (717) 730-4160.

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- Ads are printed black and white; spot color (determined by issue press run color) can be added for an additional 15% fee
- Send electronic files in .pdf, .jpg, .tif, or .eps format to jennifer@wannerassoc.com. Camera ready art can be accepted as well.

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***SCANNER* Correspondence**

Robert M. Peda, P.E. Managing Editor
c/o Wanner Associates
908 N. Second Street
Harrisburg, PA 17102
717.236.2050; Fax: 717.236.2046
E-mail: jennifer@wannerassoc.com

THE ASHE SCANNER
Robert M. Peda, P.E. Managing Editor
c/o Wanner Associates, Inc.
908 North Second Street
Harrisburg, PA 17102

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Gold Coast	74
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