Lake George Association

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NEWS RELEASE
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For IMMEDIATE RELEASE

Lake George's Beach Road to Get Porous Asphalt

- **First Roadway of its Kind in New York State**
- **One of the most important lake-saving projects ever on Lake George**

Lake George, NY – February 10, 2012 **–** Beach Road at the south end of Lake George will be re-built this spring with an unconventional pavement: porous asphalt. Upon completion, Beach Road will become the first heavily traveled roadway in New York State (and one of the only roads in the Northeast) to be paved with porous asphalt.

First Project of its Kind in New York State

"This is one of the most important lake saving projects ever for Lake George," said Walt Lender, LGA executive director, "and a first of its kind for New York State," he said. "The LGA recognizes both Warren County Superintendent of Public Works Jeff Tennyson, the state Department of Transportation, and the Federal Highway Administration for taking the bold steps to move forward on this revolutionary project, one we believe will get national recognition, and will set a precedent for many like it to follow in other lakeside communities," said Lender.

The engineering firm of Barton & Loguidice (B&L) is designing the project, which has been funded with state, federal and county monies. Construction will begin in May of this year with completion in the fall of 2013. The porous pavement will be installed between Canada Street and Fort George Road.

Benefits and Effectiveness

Superintendent of Public Works for Warren County Jeff Tennyson said "Porous asphalt pavement is an innovative approach to storm water management. Where typical drainage systems collect storm water runoff from the road, send it to treatment structures and then outlet it, porous pavement instead allows the water to infiltrate through the road and into the subgrade where it will be filtered and then dissipate." Tennyson went on to say, "Porous pavement is being used throughout the country under light traffic conditions, such as parking lots and small residential roads. However, this will be the first use of a full depth porous asphalt pavement system on a heavily traveled roadway in New York State. Many roads throughout the County are excellent candidates for porous asphalt, but the setting and character of Beach Road sets it apart as the ideal location for such an experimental pavement. The environmental benefits we anticipate achieving with porous pavement will help preserve the natural beauty of Lake George."

"Porous asphalt is very effective in draining rainwater after a storm, as well as melting snow. This project will greatly benefit the water quality of the lake," said Randy Rath, LGA's lake saving projects manager. "Stormwater is the number one source of contaminants entering Lake George. With a large amount of high intensity

development in the south end of Lake George, the volume and rate of flow of stormwater is greatly increased. Many groups, including the LGA, have worked hard to capture and treat stormwater, keeping many contaminants, such as silt, salt and harmful nutrients, from entering the Lake. In contrast, the porous asphalt won't generate runoff and the sediment below it will naturally filter out any contaminants as the precipitation enters the ground," he said.

The amount of salt detected in the south end of the lake has doubled in just over 20 years, threatening the Lake's ability to serve as a source of drinking water.

"In addition to its drainage abilities, porous asphalt offers other advantages over conventional pavement," explained Thomas Baird, project manager and chief engineer with B&L. "Compared to conventional pavement, porous asphalt reduces road spray, reduces road traffic noise, improves tire-to-road contact, reduces skidding from hydroplaning, and reduces headlight glare during and after rainstorms. During winter months, ice and snow on the road that melt during a sunny afternoon will drain down to the lower layers and not re-freeze on the surface as temperatures drop again," Baird continued.

With the proper design and foundation, the durability and strength of porous asphalt is comparable to conventional pavement, and in some applications it actually can cost less to install.

"The porous surface actually becomes more effective, rather than less effective in the winter. For de-icing, it requires much less salt than conventional pavement, and is less susceptible to breaking down as a result of repeated freezing and thawing," said Baird.

How did this project come about?

Beach Road has been in need of reconstruction for several years and plans to reconstruct the road were under development. In the fall of 2010, at the North County Stormwater Conference & Trade Show at Roaring Brook Ranch, several engineers and researchers made presentations about porous asphalt applications. They explained how there had been many significant improvements in the strength, durability, and production cost of porous asphalt, and how it is now being used very successfully in northern climates, where many traditional thinkers in the engineering community thought it would fail.

Attending that conference were LGA Project Manager Randy Rath and Dave Wick, the director of Warren County Soil and Water Conservation District. After hearing the presentations, Rath and Wick thought porous asphalt would be a perfect fit for Beach Road. "We quickly pulled together a presentation to the county, and encouraged the county to consider this exciting, alternative solution," said Wick. "To provide further support for the idea, the LGA invested $8,000 for a feasibility study with the Beach Road project engineer Thomas Baird of Barton & Loguidice. This study provided the information the county and state needed to move forward," Rath said. At the same time, Dave Wick prepared a successful Green Innovation Grant Program (GIGP) application through the NYS Environmental Facilities Corporation (EFC) for additional monies to offset additional costs associated with using porous asphalt.

Beach Road: A Demonstration for Future Projects Across the State and Nation

"The Beach Road project will certainly serve as an important demonstration for what porous asphalt can accomplish, especially in a waterfront setting," said Rath of the LGA. "Many people around the state and the nation will be watching to see how it works," he said.

"To determine the new road's effectiveness, testing and water quality sampling will need to be conducted along the way, so we can quantify the results," said Baird. "We are looking for funding, and an agency or university research team to help set up and conduct testing," he continued.

Project design

"Porous asphalt has typically been used for parking lots, multi-use paths, driveways, and some low-volume local and private roadways," said engineer Baird. "With an average of more than 5,800 vehicles per day traveling along Beach Road, the porous pavement structure must be more robust than what is typically needed for a parking lot and the asphalt mix design needs to be specifically designed for heavier duty applications. Other engineering elements such as a high water table, the flat grades along the corridor, the severe weather storm events of recent years, and varying underlying soils, were also addressed during the design process for the project," Baird continued.

In addition, the Beach Road design addresses varying infiltration rates in the underlying soil. Unlike some porous asphalt projects, this site will use catch basins, stormwater separators, and a traditional storm drain system. This traditional drainage system will play a key role during the road's construction. After completion, the drainage system will serve as an important backup during heavy rain storms, and will accommodate the variable infiltration rates in the soil below by evenly distributing water through the reservoir layer. *(Please see the diagram on page one of the Backgrounder.)* In addition, in the unlikely event that the porous asphalt does not work on the site, the underlying drainage system needed for conventional pavement will already be in place.

"The asphalt mix for the design for Beach Road is similar to a mix used on a test section of a high traffic road – the Maine Mall Road -- in Portland Maine. Constructed by the Maine Dept. of Transportation in 2009, the mix has been successfully tested and shows no signs of failure," said Tom Baird.

Current plans for the timing of the project

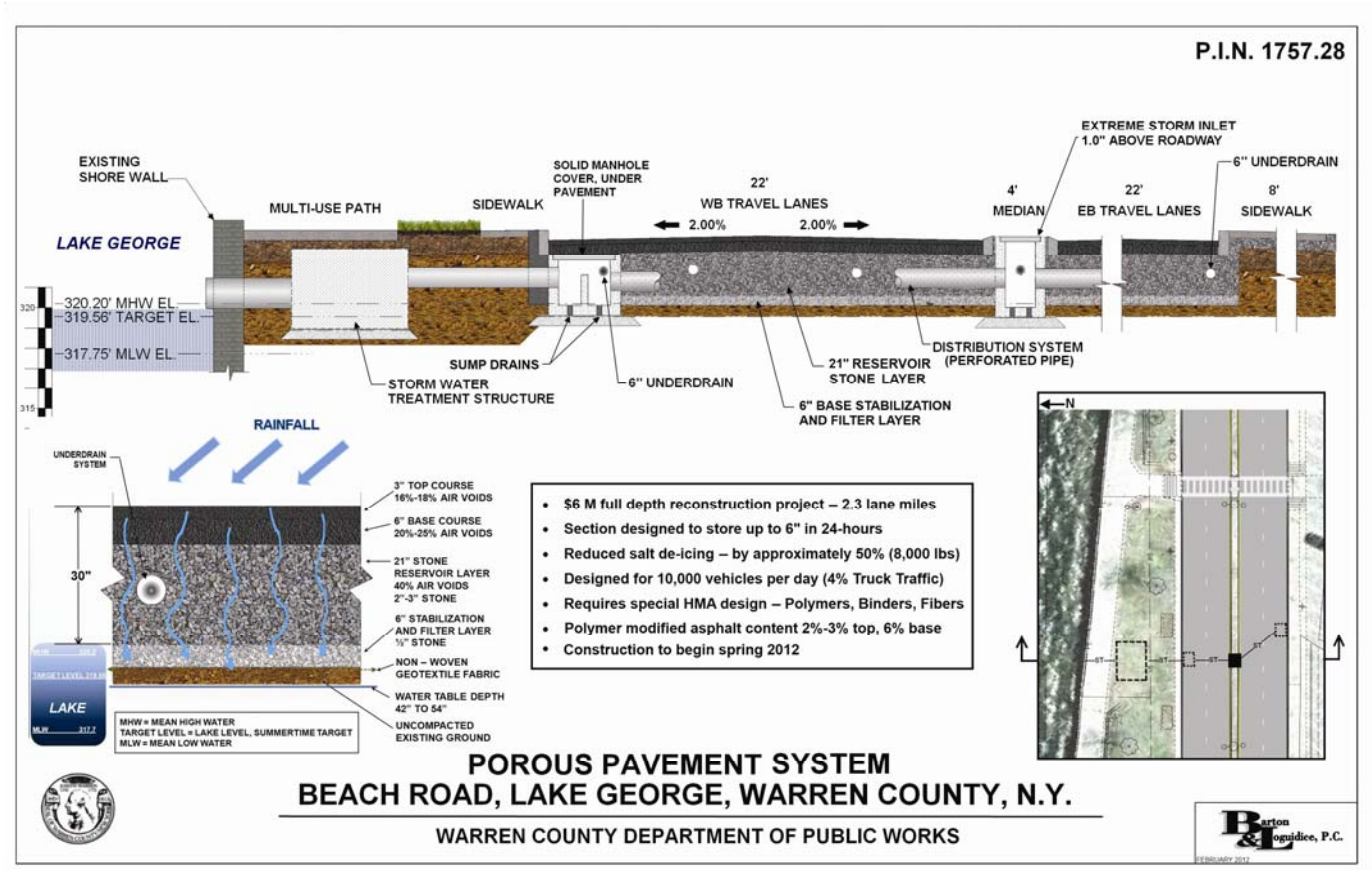
- Late Feb 2012: Warren County releasing bid packages to contractors (notification in local newspapers)
- Late March 2012: Bids will be opened
- Early May 2012: Contract awarded
- June 2012: Groundbreaking for the project – press conference on site – exact date and time TBA
- July 2012 - Nov. 2013: Construction (with ongoing coordination of work block-out dates to accommodate village events)

Images: All images below can be sent as separate 300dpi jpeg files. Please contact Lynne Rosenthal at the LGA if you need one or more of them.

Caption: A portion of Beach Road in the town of Lake George, between Canada Street and east of Fort George Road, will become the first heavily traveled road in New York State to be paved with porous asphalt.

Caption: A parking lot in Albany shows the effectiveness of porous asphalt (front) over conventional pavement (rear). Porous asphalt is very effective in draining rainwater after a storm, as well as melting snow. Photo courtesy of John Dzailo, town of Colonie.

Caption: The road splash and large puddles that currently form on Beach Road in front of Fort William Henry in Lake George will become things of the past upon completion of a new $6-million road construction project that will feature porous asphalt.



The engineering design for the Beach Road Project.

Caption: University of New Hampshire Stormwater Center photos show the results of a test on porous asphalt. A porous asphalt parking lot (left) and a conventional pavement parking lot (right foreground) are shown one hour after plowing.

Caption: A demonstration section of porous pavement in front of the LGA offices in Lake George show the effective performance of the material during the winter months; ice and snow does not build up on the surface of the material to the degree that it does on the traditional gravel surface surround the porous section.

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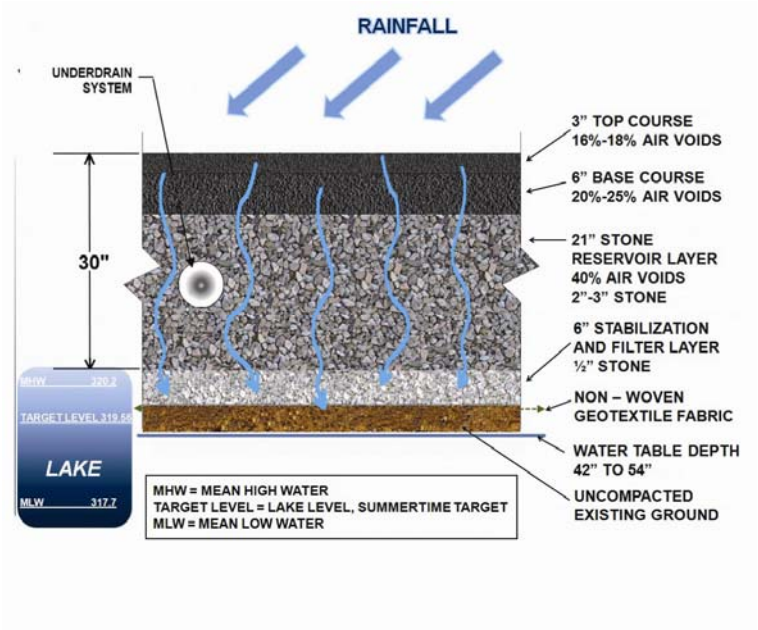
Beach Road, Lake George, NY - Porous Asphalt Backgrounder

What is Porous Asphalt?

Porous asphalt is mixed with stone that is coarser than that used in conventional pavement. Without sand and finer particles in the mix, air takes up the spaces in the porous asphalt once occupied by the smaller particles. These air, or void, spaces account for approximately 15-20% of the volume in porous asphalt pavements compared to approximately 2% for conventional non-porous pavement mixes. During a storm event, water passes through the air voids in the asphalt down to an underlying stone reservoir layer comprised of clean, washed, angular shaped stone, uniformly sized in the 2" to 3" range. Stormwater is temporarily stored in this 12-to-30-inch-thick reservoir layer as it is absorbed into the underlying soils below. It is in the asphalt, stone, and underlying soil layers that trap and break down the contaminants carried by the water.



What will be in the porous asphalt mixture used on Beach Road?

The asphalt section will be nine inches thick and comprised of a 3-inch top layer and a 6-inch base layer. The mixture will consist of clean and dry stone aggregate, asphalt cement, structural fibers, and chemical polymers that help keep the asphalt material and fibers bound to each other and the stone. *(It is these polymers and additive fibers that have improved the durability of permeable asphalt in recent years.)*

The top 3 inches will contain approximately 18 to 20% air voids and the 6-inch thick base asphalt course will contain approximately 20 to 25% air voids. It is through these voids the water will travel.

The mix design is a variation of a mix developed by the Maine Department of Transportation (DOT) and used successfully along an 800-foot long test section in Portland, Maine. Barton and Loguidice worked with the New York State Dept. of Transportation to modify the mix design and the handling and paving procedures to meet the needs of the Beach Road project. The Maine DOT provided invaluable information and experiences from their project.

What layers will be under the asphalt?

Beneath the two top levels of porous asphalt there will be:

- A 21-inch thick reservoir course layer using clean, washed, angular, and uniformly graded (2" to 3") crushed stone with 40% air voids.
- A 6-inch thick base stabilization and filter layer using clean, washed, angular, and uniformly graded (1/2" to ¾") crushed stone.
- A non-woven geotextile separation layer. This is a very porous fabric that will let water flow through, but not let the fine particles below make their way into the base and reservoir layers to clog up the void spaces. It is also very strong and will serve to help distribute the traffic loading to the underlying soil without overly compacting the native material.
- Directly under these layers there will be un-compacted existing ground and the water table.

How was the thickness of the asphalt determined? Will the asphalt be able to withstand the high volume of traffic on the road?

The asphalt thickness is based on an ESAL-based pavement design as per the recommendations the American Association of State Highway and Transportation Officials (AASHTO) *1993 Guide for the Design of Pavement Structures*. This type of design protocol is accepted practice in the industry.

Yes, the asphalt thickness and underlying foundation system is designed based on the anticipated traffic loading that would occur over more than a 20 year period.

Won't ice and frost decrease the porous asphalt's ability to absorb water?

The University of New Hampshire Stormwater Center has conducted extensive research on the effectiveness of porous asphalt in cold climate conditions. The UNHSC findings showed that infiltration rates for porous asphalt were not negatively impacted by frost penetration at all; in fact, infiltration was better in the winter than the summer. The strong winter performance of the porous asphalt was the opposite of what was expected. The well-drained layers of stone beneath the asphalt ensure that the void spaces in the asphalt remain open, even during periods of prolonged freezing. While the layers may freeze, they do not freeze solid, and infiltration capabilities are maintained. Freezing rain and rain on snow can freeze the material at the surface, but minor salting and plowing will return the surface to high infiltration, based on the study results.

What about freezing and thawing action – does that destroy porous asphalt?

Again, because the porous asphalt does not freeze as an impervious solid block, it maintains its porosity, and the freeze-thaw stress is less than that of conventional pavement. Consequently, porous asphalt breaks down less than conventional pavement; it has a longer lifespan, and does not pothole and crack as easily.

To combat frost heave, the high ratio of voids in the stone reservoir course will significantly reduce or eliminate the upward migration of water known as capillary action. Capillary action is typical in conventional asphalt stone base courses that do not drain well and is one of the primary causes of frost heave. In porous asphalt the water is not there to freeze, therefore, frost heaving and the damage it causes (potholes, cracks, etc.) are dramatically reduced and add to the longevity of the pavement system.

Did the high water table present a unique challenge for the Beach Road porous asphalt project?

Yes, some adjustments to the design were made to account for the high water table under the road.

Nearly all guidelines for porous asphalt specify that the water table be four to six feet below the reservoir course layer. When the water table is far enough down, typical porous asphalt applications do not require under-drain systems to accommodate heavy rainfall events or reduced infiltration rates.

The water table under Beach Road varies in depth. It is just 3 feet below the surface near Canada Street on the west end. On other parts of Beach Road the water table is 4 to 5 feet below the surface.

Near Canada Street porous asphalt will not be installed. In this area, conventional pavement and an extensive under-drain system will be used.

Just east of that area, where the porous asphalt will be installed, the asphalt layer, the various stone layers underneath, and the native soil beneath that, will all contribute to the filtering, biodegradation and removal of contaminants in the water on the road. If the water table rises high enough to reduce or eliminate infiltration,

the porous asphalt will be better for the Lake than the impervious system in place now, in which water runs off the road surface, into a storm drain, untreated, and then directly into the Lake.

How long has this technology been around? Why hasn't it been used a lot before?

Porous asphalt has been used since the mid-1970s, primarily in parking lot applications. Recent changes in storm water regulations have prompted many consulting engineers and public works officials to seek information about them. Government agencies have also increased their support for green infrastructure and permeable pavement applications.

Within the past 10 years new polymers and additive fibers have been developed that are much more effective in binding the larger stone in the asphalt mix. These polymers and additive fibers have improved the durability of permeable asphalt in recent years.

How durable is it?

With proper design and installation, porous asphalt can last more than twenty years with few cracking or pothole problems. The surface wears well. One of the best-known porous parking lots, located at the Walden Pond State Reservation in Massachusetts, was constructed in 1977. While it has never been repaved, it is in good shape and still drains effectively.

What does it cost?

The underlying stone bed is more extensive and expensive than that used for conventional pavement, but these costs can be offset because many elements of standard stormwater management systems – such as under-drainage, catch basins and detention basins, are no longer needed.

The cost of the permeable asphalt top and base courses is approximately 5% higher than a conventional pavement mix.

Is it true that porous asphalt requires less salt to remove ice and snow? How does porous asphalt work to remove pollutants before they enter a waterbody?

Reductions in salt usage on porous pavement have shown to be 50% or greater in many communities with the greatest reductions in use coming between storms since the need for salt to control black ice is significantly reduced. Salts (or chlorides) are a soluble (dissolved in water) contaminant and cannot be removed by the porous pavement structure, ponds, wetlands, or vegetated swales. It is by reduction of their use that will be the benefit to the lake. Other pollutants such as zinc, lead, copper, chemical oxygen demand, cadmium, and total phosphorus have shown removal rates of 40% to 95% in porous asphalt applications (source: NYSDEC) and we expect similar results for Beach Road.

Porous pavements break down oil pollutants with the help of naturally occurring fungi and bacteria that develop in the mass network of surface area within the asphalt section. Testing has shown that between 97 and 99% of motor oil is retained in the asphalt microbial community and used as food by the fungi and bacteria. With the oils consumed and biodegraded to the simple byproducts of carbon dioxide and water, oil and petroleum products dropped by vehicles along Beach Road will be reduced to near zero.

Do these pavements look "different?" Are they smooth?

Most people walking on a porous asphalt surface will not notice that it is porous. The surface is smooth enough to meet requirements of the Americans with Disabilities Act (ADA). The surface has been described as looking like a Rice Krispy treat.

Are special construction techniques needed?

Mixing porous asphalt does not require a contractor to have special ingredients, paving equipment or skills. With the proper information, most asphalt plants can easily prepare the mix and general paving contractors can install it. Requirements include:

- Track-mounted paving equipment;
- A clean working environment free of mud and loose soil;
- Specific working temperatures for handling pavement and rolling operations;
- Vehicles must wait between 23 – 48 hours before they can ride on top of the pavement.

About the LGA

The LGA is a non-profit membership organization of people interested in working together to protect, conserve, and improve the beauty and quality of the Lake George Basin. It is the nation's oldest lake association. For more information, contact the LGA at (518) 668-3558 or visit the LGA website at www.lakegeorgeassociation.org.

About Barton & Loguidice

Established in 1961, Barton & Loguidice has offices in Syracuse, Albany, Rochester, Ellenville, and Newburgh, New York, and Camp Hill, Pennsylvania. The multi-disciplined professionals on staff offer expertise in engineering, planning, environmental science, landscape architecture and more. For more information, contact B&L at (518) 218-1801 or visit the B&L website at www.bartonandloguidice.com.

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