

# Concrete Pipe **News**

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#### On the Cover:

Specially designed 36-inch diameter RCP under 80 feet of fill. Story on page 4.



American Concrete Pipe Association

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# Editorial

## Staying Competitive Is All About Quality



**Matt Childs, P.E., President**  
**American Concrete Pipe Association**

Products are third-party certified, and people who produce the products are thoroughly educated and skilled in producing the engineered products that roll off the line.

ACPA offers an on-going quality assurance program to member and non-member companies. The "[Quality Cast](#)" ([QCast Plant Certification Program](#))<sup>2</sup> is an inspection program that covers materials, finished products, handling/storage procedures, performance testing, and quality control documentation. Plants can be certified in the production of storm sewer and culvert pipe, sanitary sewer pipe, precast boxes, three-sided structures, manholes, and other precast structures. ACPA's [QCast Plant Certification Manual \(Version 6.0\)](#)<sup>3</sup> was released January 1, 2012. Plants may elect to complete any single product-specific certification or full plant certification to meet local or state requirements. If plant certification is chosen, then all products covered by the manual will be audited. [Wiss, Janney, Elstner Associates, Inc.](#)<sup>4</sup>, experts in materials science engineering, is the third party auditing firm that conducts the QCast Plant Certification annual inspections.

The QCast program sets standards to achieve certification which cannot be attained by completing minimum expectations. QCast is recognized by many state DOTs, the U.S. Army Corp. of Engineers, and AASHTO as a valid third party certification program. QCast-certified production facilities are pre-approved to supply products to government projects.

To strengthen the QCast program, ACPA holds an annual pipe school with a three-day track focused on production. Courses include cementitious materials, aggregates, reinforcement, admixtures, concrete technology, self consolidating concrete, mix design, concrete production (mixing, batching, and transport), consolidation, curing, pre/post pour inspection, testing, repairs and finishing, and QCast certification. [The Quality Pipe School](#)<sup>5</sup> is recognized in industry as a comprehensive education program, because it engages the key people that produce the Nation's supply of concrete pipe, boxes and manholes, and the industry's best teachers. Regulators and specifiers are welcome to audit the courses. Graduates of the program have passed written examinations.

High quality is more than a phrase used by the concrete pipe industry. It is a value proposition for the users of concrete pipe, precast boxes, and manholes that is backed by continuous research and development, continuing education, time-tested Standards, and third party certification of plants and products through the ACPA's QCast quality assurance program. The concrete pipe industry's Standards are based on applied science and validated research – the foundation of the concrete pipe industry's success spanning three centuries. When you see the term high quality associated with the concrete pipe industry's products, you know you are dealing with products that are truly...high quality.

#### LINKS

1. [www.concrete-pipe.org/pages/locate-usa.html](http://www.concrete-pipe.org/pages/locate-usa.html)
2. [www.concrete-pipe.org/pages/qcast.html](http://www.concrete-pipe.org/pages/qcast.html)
3. [www.concrete-pipe.org/pdf/Qcast\\_Ver6.0\\_Red.pdf](http://www.concrete-pipe.org/pdf/Qcast_Ver6.0_Red.pdf)
4. [www.wje.com](http://www.wje.com)
5. [www.concrete-pipe.org/images/pipeschool/Quality\\_Track.pdf](http://www.concrete-pipe.org/images/pipeschool/Quality_Track.pdf)

High quality is a meaningless term because it does not say anything about a product or service. The term by itself does not provide any factors to measure quality. Unless the term is immediately backed with detail on what it means, it is a useless statement.

Decades ago, producer members of the American Concrete Pipe Association (ACPA) charged the ACPA to take the lead in creating and delivering programs to members that increase the knowledge of producing high quality precast concrete pipe, boxes and manholes, and implementing a quality assurance program. The ACPA and its members frame quality in the context of Standards, education, personalized teaching, research, engagement with people involved in a company's quality assurance program, and focus on pipe, boxes and manholes, the core products of the concrete pipe industry. When ACPA's [producer \(Active\) members](#)<sup>1</sup> talk about their high quality products, there is no doubt about the meaning of the term.

# Bridging The Technology Gap

## Horizontal Elliptical Pipe Offers Advantages under Certain Conditions

By Frank Sisk, Southern Virginia Sales Manager  
Hanson Pipe & Precast  
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The hydraulic and structural characteristics of [precast reinforced concrete elliptical pipe](#)<sup>1</sup> offer advantages under certain conditions over circular concrete pipe used for culverts and sewers. For minimum cover conditions, or where vertical clearance is limited by existing structures, horizontal elliptical pipe is particularly suitable, since the vertical heights are less than the height of hydraulically equivalent circular sizes. Horizontal elliptical pipelines have greater flow capacity for the same depth of flow than most other structures of equivalent full capacity. Considering the [durability of alternate flexible pipe products](#)<sup>2</sup> compared to concrete, there are situations where the specification of elliptical concrete pipe makes most sense.

A failed corrugated metal pipe (CMP) storm sewer closed the westbound lane of Berkmar Drive (Route 1403) in Albemarle County, Virginia on March 22, 2011 after a weekend of heavy rainfall. It was replaced by the Virginia Department of Transportation with horizontal elliptical reinforced concrete pipe (HERCP). The severely corroded 42-inch diameter CMP sewer contributed to the undermining and collapse of the pavement. The emergency repair required approximately 80 feet of 60-inch x 38-inch Class III HERCP between two existing catch basins on either side of the road. The standard HERCP concrete pipe was required instead of round concrete pipe because of the shallow bury under Berkmar Drive. Although the available space to install the pipeline was limited, and located in front of the entrance to the only mall in Charlottesville, there were no issues in delivering, storing, and installing the concrete pipe.

The contractor, [Fielders Choice Enterprises](#)<sup>3</sup>, Inc. installed the HERCP storm sewer and a cast-in-place concrete junction box that was required to accommodate the junction of existing pipelines at varying elevations. One of the existing pipelines was a 36-inch diameter reinforced concrete pipe structure installed over 40 years ago. The pipe was made by Paracrete; a company that was supplying precast products in the '70s. Paracrete supplied the pipe used for the storm sewer installed under a mall parking lot with 10 to 15 feet of backfill. Because of the excellent condition of the pipe, the storm sewer was left undisturbed to continue service for decades to come.

Construction of the sewer and junction box was completed between June 1 and mid August. Berkmar Drive was closed for about a week to remove the failed CMP and install the concrete storm sewer. Although the precast products were installed quickly, other construction activity required to complete the contract took more time. [Hanson Pipe & Precast](#)<sup>4</sup> supplied the pipe from its Richmond facility.

### LINKS

1. [www.concrete-pipe.org/pdfdd/DD\\_6.pdf](http://www.concrete-pipe.org/pdfdd/DD_6.pdf)
2. [www.concrete-pipe.org/pdf/InstallationComparisonInspectorsContractors.pdf](http://www.concrete-pipe.org/pdf/InstallationComparisonInspectorsContractors.pdf)
3. [www.meadhunt.com](http://www.meadhunt.com)
4. [www.hansonpipeandprecast.com](http://www.hansonpipeandprecast.com)

### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website** (elliptical, storm, sewer, culvert, shallow, fail, CMP, metal)  
[www.concrete-pipe.org](http://www.concrete-pipe.org)
- **Concrete Pipe Design Manual**  
[www.concrete-pipe.org/pages/design-manual.html](http://www.concrete-pipe.org/pages/design-manual.html)
- **Concrete Pipe News**  
[www.concrete-pipe.org/pdfcpn/CP-News-Summer-2008.pdf](http://www.concrete-pipe.org/pdfcpn/CP-News-Summer-2008.pdf) (Page 6)  
[www.concrete-pipe.org/pdfcpn/CP-News-Spring-2000.pdf](http://www.concrete-pipe.org/pdfcpn/CP-News-Spring-2000.pdf) (Page 9)



Old 36-inch diameter reinforced concrete pipe connects with 60-inch x 38-inch Class III HERCP.

Hydraulic and structural characteristics of precast reinforced concrete elliptical pipe have advantages.



Cast-in-place junction box required to accommodate existing pipelines at varying elevations.

Photos: Frank Sisk,  
Hanson Pipe & Precast



136-inch diameter pipe designed with an 8.25-inch wall.



Heavy-wall 36-inch diameter reinforced concrete pipe culvert under 80 feet of fill.



Assembly of precast outfall at base of 80-foot bury.

Photos: Charles Black Construction Company, Inc.

## Built To Last Under 80 Feet

By Ted V. Price, General Manager – Georgia  
Rinker Materials Concrete Pipe Division – CEMEX  
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A culvert constructed to perform as a bridge structure and conduit, at least 80 feet below the surface of a road, must be comprised of specially designed products and a material that will perform over very long period. Such a culvert exists in the northeast corner of Georgia in the Blue Ridge Mountains of Rabun County, Georgia.

Wesley Taylor, Facilities Manager for Rabun County School System, reported that the purchase of 137 acres of National Forest land on Boggs Mountain Road in 2010 enabled the connection of the high/middle school site and elementary site into one contiguous 263 acre campus to house all Rabun County Schools. Development of the campus required the extension of Wildcat Hill Drive to allow buses to access US 441, a four lane divided highway at Boggs Mountain Road, via an overpass located at the high school. With the extension, buses would not have to make at-grade crossings on US 441, thereby increasing the level of safety for the students and bus drivers.

Construction of the Wildcat Hill Drive extension required a considerable amount of fill, because of the mountainous topography of the region characterized by open valleys, swift streams, the Chattooga River, the Little Tennessee River, waterfalls and lakes.

David Spivey, Landscape Architect with [Southern A&E in Austell<sup>1</sup>](#), Georgia specified [reinforced concrete pipe \(RCP\)<sup>2</sup>](#) to provide the drainage under the road extension. RCP was the only option because it would be produced with a concrete mix and reinforcement that would provide the strength and long-term performance to handle an eighty foot backfill in the valley of Boggs Mountain near Tiger, Georgia. Concrete was considered to be the safest, most reliable and proven material. This, combined with the cost effectiveness of precast concrete pipe, made a RCP culvert the right choice on behalf of the client, Rabun County School System.

[Rinker Materials Concrete Pipe Division – CEMEX \(Stockbridge, GA\)<sup>3</sup>](#) was awarded a contract in the spring 2011 by [Simpson Grading and Trucking<sup>4</sup>](#) to provide concrete pipe for a storm drain structure that would meet the challenge posed by 80 feet of fill. Rinker's design team in Houston delivered the [design of a reinforced concrete pipe<sup>5</sup>](#) that would meet the special design parameters. It was submitted and approved in June 2011. The 36-inch diameter pipe design included double circular cages, an 8.25-inch wall dry cast pipe, flush bell gaskets, and 8 foot lengths with a minimum concrete design strength of 6,000 psi. Rinker began producing the pipe at its Stockbridge GA plant in late July and finished in early August.

Before delivery of the pipe, Simpson was moving 15,000 to 18,000 cubic yards of material at the primary school site per day to prepared the site for delivery and installation. Some cuts were greater than 100 feet to achieve the initial elevation where the specially designed RCP would be installed. In less than 2 days after the pipe was installed, there was 30 feet of soil compacted over the concrete pipe. The 36-inch diameter heavy wall double reinforced concrete pipe was performing as designed. The pipe installation began in early October and was completed by the end of the same month.

The new Rabun County Primary School with a finished floor elevation is 2,268 feet above sea level was under construction in the spring, 2012. [Charles Black Construction Company, Inc.<sup>6</sup>](#) from Cleveland, GA is the Construction Manager-At-Risk for the project. The school is scheduled for occupancy in August, 2013.

### LINKS

1. [www.southernae.com](http://www.southernae.com)
2. [www.concrete-pipe.org/pages/why.html](http://www.concrete-pipe.org/pages/why.html)
3. [www.rinkerpipe.com](http://www.rinkerpipe.com)
4. <http://simpsontrucking.com>
5. [www.concrete-pipe.org/pages/design-manual.html](http://www.concrete-pipe.org/pages/design-manual.html)
6. [www.charlesblackconstruction.com](http://www.charlesblackconstruction.com)

### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**  
(installation, deep, bury, fill, culvert, wall)  
[www.concrete-pipe.org](http://www.concrete-pipe.org)
- **Concrete Pipe Design Manual**  
[www.concrete-pipe.org/pages/design-manual.html](http://www.concrete-pipe.org/pages/design-manual.html)
- **Concrete Pipe News**  
[www.concrete-pipe.org/pages/cpnews.html](http://www.concrete-pipe.org/pages/cpnews.html)

## Good Specification – The Right Choice

### RCP Selected for Stormwater Detention

By David L. McClintock, P.E., Ohio Area Manager / Engineer

Rinker Materials Concrete Pipe Division – CEMEX

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A 10-year, \$110 million Capital Improvement Plan at the Akron-Canton Airport (Akron, Ohio) includes parking lots to accommodate passenger traffic that doubled between 2000 and 2006. Reinforced concrete pipe (RCP) was supplied by [Rinker Materials Concrete Pipe Division – CEMEX](#)<sup>1</sup> from its Diamond, Ohio facility, for the construction of an underground storm detention system under one of the lots. Concrete pipe was selected by the contractor because there was a choice of materials in a well-considered specification. The project was originally designed and bid as 60-inch diameter high density polyethylene (HDPE) conduit with HDPE pipe fittings or 72-inch diameter RCP with fittings as an alternate.

The contractor, Wenger Excavation (Dalton, Ohio) chose [RCP](#)<sup>2</sup> to reduce the structure's footprint, footage of pipe to be installed, and the amount of work required to complete the load requirements of the installation. In addition, a RCP structure provided security and strength below the 10 to 15 feet of fill and live load of the parking area. The original design had a layout of five different runs, connected by a series of bends and tees (13 fabricated fittings plus multiple short joints).

Through value engineering, Rinker re-designed the detention system to accommodate 4 equal runs of pipe, 8 fabricated fittings, and no short joints. The re-design reduced the spacing of the pipes from 5 feet to 32 inches, resulting in a significant saving in structural backfill material. Designed by the [Floyd Browne Group \(Akron, Ohio\)](#)<sup>3</sup> the [underground detention system](#)<sup>4</sup> required approximately 230,000 gallons to be stored and control-released to a sand filter system. The structure is comprised of approximately 1,100 feet of 72-inch diameter Class III RCP, O-ring gasket joint, with an 8-inch wall. Rinker supplied 101 – 10-foot long pipe units with standard joints, three 72-inch x 72-inch x 72-inch bell tees, two 72-inch x 72-inch x 72-inch spigot tees, and three 72-inch x 72-inch 90-degree bends. The 10-foot long pipe units were produced to accommodate the tee fabrication and to reduce the number of joints to be installed.

The contractor excavated the entire footprint and installed up to 20 units per day on all four lines to ensure that the system would close as designed. The project began in the fall of 2011 and was commissioned in 2012.

RCP has [many advantages](#)<sup>5</sup> over HDPE conduit when it comes to the construction of stormwater detention systems under parking lots. While HDPE conduit manufacturers claim a service life of over 50 years, experience shows otherwise. The Corps of Engineers assigns a service life of up to 100 years for concrete pipe. Experienced contractors know that manufacturers of RCP supply quality-certified products. Designers of concrete pipe stormwater management systems can choose from five different pipe classes and special designs, and four installation types. HDPE conduit offers limited choice and an installation method that does not meet the needs of all projects, such as deep fills or live loads with shallow cover. Concrete pipe structures make sense at airports because they are durable and non-flammable.

## LINKS

1. [www.rinkerpipe.com](http://www.rinkerpipe.com)
2. [www.concrete-pipe.org/pages/why.html](http://www.concrete-pipe.org/pages/why.html)
3. [www.floydbrowne.com](http://www.floydbrowne.com)
4. [www.concrete-pipe.org/brochures/underground\\_storm\\_water.pdf](http://www.concrete-pipe.org/brochures/underground_storm_water.pdf)
5. [www.concrete-pipe.org/pdf/InstallationComparisonInspectorsContractors.pdf](http://www.concrete-pipe.org/pdf/InstallationComparisonInspectorsContractors.pdf)

Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**  
(detention, retention, pipe, storage, underground stormwater)  
[www.concrete-pipe.org](http://www.concrete-pipe.org)
- **Concrete Pipe Design Manual**  
[www.concrete-pipe.org/pages/design-manual.html](http://www.concrete-pipe.org/pages/design-manual.html)
- **Concrete Pipe News**  
[www.concrete-pipe.org/pages/cpnews.html](http://www.concrete-pipe.org/pages/cpnews.html)

Photos: Rinker Materials-Concrete Pipe Division CEMEX

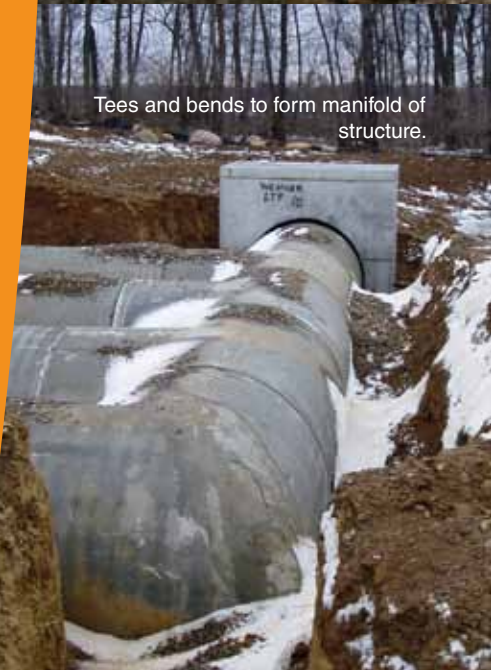


72-inch diameter bends and tees.

Detention system to accommodate 4 equal runs of pipe, 8 fabricated fittings, and no short joints.



Tees and bends to form manifold of structure.



## Utility Tunnels for Heating and Cooling Constructed with Concrete Boxes

By Ryan McDaniel, P.E., Senior Engineer  
Hanson Pipe & Precast, Portland, Oregon  
Ryan.McDaniel@hanson.com

With several active sustainability committees, a robust facilities-led energy management program, award-winning research capabilities, 500 plus sustainability-focused courses, over 50 sustainability-related research centers and institutes, 30 sustainability-focused student groups, 50 faculty and staff Green Teams, and several state and national environmental awards, Portland State University (PSU) is a global sustainability leader. The university has driven down electricity usage and demand (in spite of adding millions of square feet of new buildings), enjoys an impressive 58% recycling rate, and has earned top global honors in alternative energy research. Included in Portland State's sustainability strategy and success in reducing electricity usage is the application of precast concrete boxes for utility tunnels for a heating and cooling system that provide energy to several campus buildings. The tunnels are accessible by maintenance personnel. [Hanson Pipe & Precast](#)<sup>1</sup> supplied boxes from its Portland facility in a variety of sizes to complete the tunnel system.

The concrete steam and chilled water improvements project is an underground heating and cooling system that provides energy to several campus buildings including Shattuck Hall and Millar Library. The \$17 million campus-wide loop transports either piped chilled water (for cooling) or steam (for heating) through underground tunnels that connect most of the university's buildings. The loop is an efficient way to heat buildings by consolidating the amount of equipment needed. PSU will save considerable money on maintenance and energy costs.

The precast boxes supplied to construct the utilities shaft were 14 feet x 14 feet providing access to maintenance personnel. These sections were used only as junction boxes. Water tightness was a big factor to consider in the design of the joint interface with the reinforced concrete boxes to protect against intrusion of groundwater. The cooling and heating elements are routed via piping within the tunnels.

Boxes for other components of the system ranged in size from 8-foot x 9-foot to 10-foot x 10-foot. All were produced according to ASTM C1433 - 10 Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers. This specification covers single-cell precast reinforced concrete box sections cast monolithically and intended to be used for the construction of culverts and for the conveyance of storm water industrial wastes and sewage.

There were no special tests associated with the quality control of the box production. Standard concrete cylinder testing was required, and the manufacturing process inspected according to National Precast Concrete Association guidelines.


### LINKS

1. [www.hansonpipeandprecast.com](http://www.hansonpipeandprecast.com)
2. [www.concrete-pipe.org/pages/why.html](http://www.concrete-pipe.org/pages/why.html)


### Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**  
(box, energy, steam, heat, LEED)  
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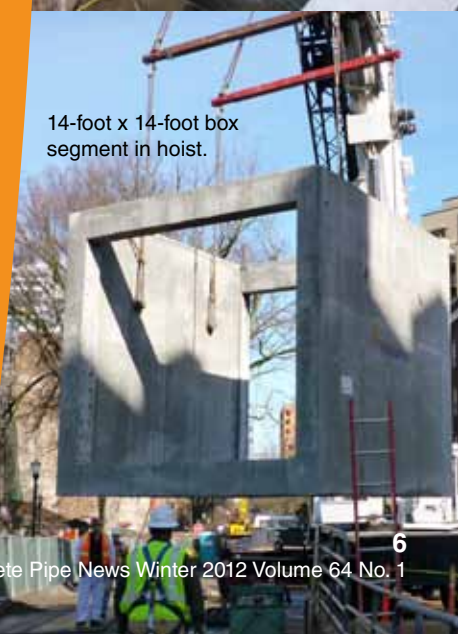
Photos: Ryan McDaniel



14-foot x 14-foot box segment for utilities shaft in transit.



Precast box junction for utilities tunnels.



14-foot x 14-foot box segment in hoist.

Precast concrete boxes supplied for the construction of box culverts.



Reinforced concrete pipe supplied for stormwater management.



Hanson Pipe & Precast supplied precast concrete pipe and boxes for stormwater management.



## Texas Highway Widening With Concrete Pipe and Boxes

By Matt Daniel, Director of Strategic Sales and Sales Manager  
Hanson Pipe & Precast, Austin Facility  
matt.daniel@hanson.com

[Hanson Pipe & Precast](#)<sup>1</sup> was selected to provide more than 130,000 feet of [precast concrete pipe, precast boxes](#)<sup>2</sup>, and inlets for the McLennan County IH-35 widening located near Waco, Texas. Hanson's products will be used to move and manage stormwater runoff in a project designed to ease traffic congestion over nearly 20 miles of highway. IH-35 is being widened from four lanes to six, including the widening of frontage roads. Construction began in October 2010 with completion scheduled for late 2014.

Hanson was selected by Base Construction to supply project materials because of the economic benefits of precast concrete products, and the proximity to Hanson's facilities. Precast concrete provides the city with quality, pre-engineered products that are reliable, cost-efficient and sustainable for stormwater management. In addition, Hanson's Waco and Austin facilities allowed the use of local labor and materials, with all materials delivered from within 90 miles of the project construction sites.

IH 35 is an interstate route that connects Gainesville and Laredo. In addition to serving as a long distance corridor, IH-35 is a commuter route through Waco, Bellmead, Lacy-Lakeview, and Elm Mott. The average daily traffic (ADT) along the corridor is approximately 83,000. This section has experienced rapid development in recent years due to NAFTA, population growth, and other reasons. Subsequently, traffic volumes along this section are projected to increase to approximately 144,000 by the year 2025.

Although there were many challenges during the course of the project, such as difficult installation due to multiple intersections, existing utilities, and bridge work, the reduced project site labor allowed the project to continue on-schedule. The supply of precast concrete pipe and boxes contributed to reducing on site construction labor. There was less need for poured-in-place construction of structures like culverts and pipelines.

IH-35 was originally designed and constructed in the 1960s based on the highway design standards at that time. Vertical clearances and vertical alignments no longer met modern highway design standards. These substandard designs, along with the increasing traffic volumes, caused operational deficiencies. In addition, existing frontage roads are discontinuous in several locations. The proposed improvements will provide additional main lanes, continuous frontage roads, and improved ramps and grade separations. Some of the structures in the corridor are approaching the end of their life cycle design, and will not allow for the expansion of the main lanes to accommodate the projected traffic. Therefore, the replacement of structures is necessary for safety and projected traffic growth.

The total cost of this state funded project is approximately \$167 million, with a portion of that designated for precast concrete products provided by Hanson. By January 2012, Hanson had shipped more than 65,000 of 130,000 feet of round and square precast concrete products.

### LINKS

1. [www.hansonpipeandprecast.com](http://www.hansonpipeandprecast.com)
2. [www.concrete-pipe.org/pages/why.html](http://www.concrete-pipe.org/pages/why.html)

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Photos: Matt Daniel, Hanson Pipe & Precast



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## Richard Langguth Receives Longfellow Award



The 2011 recipient of the Richard C. Longfellow Award was Richard Langguth, with Cretex Concrete Products Midwest, Inc. His article, [“The Versatility of Concrete Pipe and Boxes Spotlighthed on Minnesota Highway Project”](#)<sup>1</sup> was published in the Summer 2011 issue of Concrete Pipe News, Page 3. The project described in the article won the ACPA’s Project Achievement Award in 2011.

Each year, a Concrete Pipe News author is honored with the award for an article that most effectively demonstrates innovative and effective use of concrete pipe. The award is presented in memory of Richard Longfellow who had an outstanding career with Cretex Companies, Inc. based in Elk River, Minnesota.

### LINK TO ARTICLE

1. [www.concrete-pipe.org/pdfcpn/CP-News-Summer-2011.pdf](http://www.concrete-pipe.org/pdfcpn/CP-News-Summer-2011.pdf)

Save this link [www.concrete-pipe.org/pages/cpnews.html](http://www.concrete-pipe.org/pages/cpnews.html) to your favorites list to increase your knowledge about drainage applications and innovative ways to use precast reinforced concrete pipe and boxes to build structures that will last.