

**"Our mission is to maintain
and improve the county's
800-plus mile road network"**

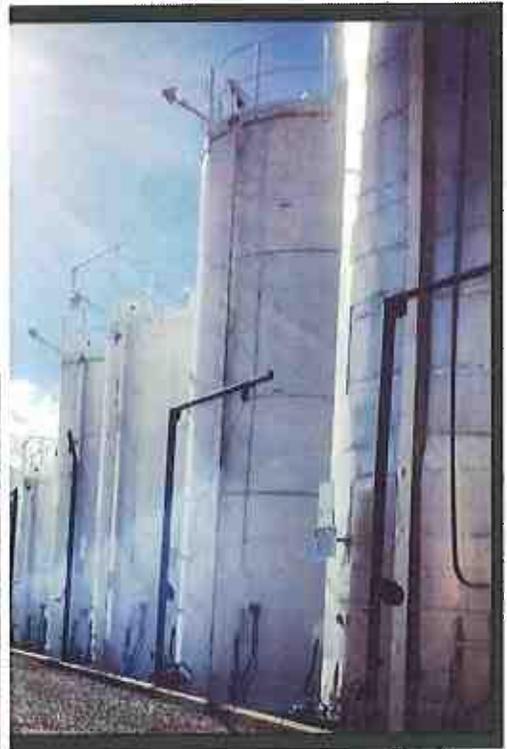
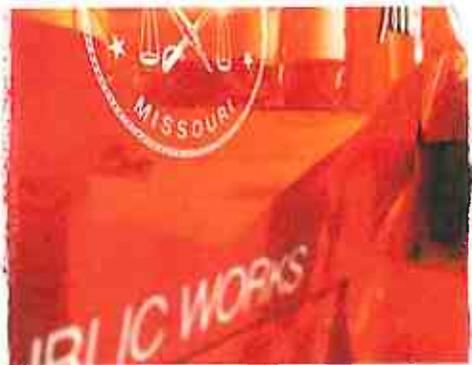
BOONE COUNTY PUBLIC WORKS MAINTENANCE OPERATIONS 2013 YEAR IN REVIEW

Presented to the

Boone County Commission

On

February 20, 2014





Maintenance Operations 2013 HIGHLIGHTS

January 30, 2014

RURAL ROAD STABILIZATION

IMPROVEMENT—ROAD

Presiding Commissioner: Dan Atwill
District I Commissioner: Karen Miller
District II Commissioner: Janet Thompson

The Boone County Public Works Department is pleased to present our Annual Report which highlights major activities and accomplishments for fiscal year 2013. Our mission is to maintain and improve the County's network of 800+ miles of roads.. The success of the Public Works Department depends, in large part, on our ability to earn the confidence and support of the public and of our County Commissioners. We are grateful for the tremendous support we have experienced this past year and want to give special thanks to our liaison Commissioner, Dan Atwill.

Predictably, weather plays a pivotal role in Public Works. To start the year, we had lots of snow followed by some significant rains, and then drought-like conditions for part of summer. Finally, it seemed like winter returned around Thanksgiving, and as I write this letter, I can say we have had a busy winter. Taking all of the weather related events into consideration, I'm proud to say that, with perseverance, our Maintenance staff adapted to the weather conditions and managed to achieve our goals in 2013.

Drainage remains a top priority in the department. Maintenance staff achievements during 2013 include the replacement of several large diameter culverts and replacement of over 500 concrete panels. Most of the prep work associated with the pavement preservation program was completed by Maintenance Operations, and that's around 70 miles of base issues, drainage improvements, cracksealing, and tree trimming. In addition, we prepped 4 miles of road to receive magnesium chloride

($MgCl_2$, a chemical compound of salts.) The dual purpose of $MgCl_2$ is to first provide good base stabilization, but it also has the benefit of dust suppression. The roads selected for this treatment were high maintenance roads. Systematically fixing the root cause of recurring maintenance problems (such as inadequate drainage or base failure) allows us to accomplish more with the resources available.

Other completed items from our work plan include:

- Preparation of 10 miles of limestone chip seal roads for re-application.
- Completion of 3 low water crossing projects and repair or extension of two others to prevent future maintenance issues.

Public Works continues to develop proactive work plans that aim to prevent "surprise emergencies" on our roadways. This approach, coupled with a solid pavement preservation program has allowed our department to maintain a firm focus on scheduled maintenance. It is far more desirable and efficient to prevent problems than it is to spend time and resources fixing them.

We had an opportunity to host a gravel road academy this year, which was very informative for those who attended. About half of the 30 participants were from Boone County and half from surrounding counties. The "field" portion of this training allowed us to showcase the skill level of our motorgrader operators. The instructors were impressed with the ability of our operators.

In this report, I'd like to recognize all of the auxiliary services that are key to the overall operation of the department. I want to

acknowledge our staff of skilled mechanics. I think it's difficult to fully appreciate the volume and complexity of their role in keeping all of the varied types of equipment and vehicles in good mechanical repair. Their ability to keep the equipment in good shape has a direct impact on our productivity in the field. I would also like to recognize the great work done by our sign crew. They make, install, replace, and maintain all of the signs marking Boone County roadways. And last but not least, I want to thank our office staff. They do a great job communicating with the public and handling the administrative functions of the department.

In closing, I would like to say that I'm truly proud to represent the Boone County Public Works Department. We have a great bunch of employees that take pride in their jobs and are proud to serve the citizens of Boone County. We are lucky to have employees who take ownership of their respective territories and are dedicated to making the roads safe for the traveling public. Thanks again for your support.

Respectfully,
Chet Dunn, Manager

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MAGNESIUM CHLORIDE for DUST CONTROL and ROAD STABILIZATION



All gravel roads will give off dust with traffic. Boone County has over 450 miles of gravel roads, so when weather conditions turn very dry, we can anticipate problems with dust. As traffic volume has increased on many rural roads, so have concerns about dust.



Tank is distributing Magnesium Chloride to Edwards Rd, located in southern Boone County during the 2013 Gravel Road Academy session.

Magnesium chloride is a hygroscopic product meaning it draws moisture from the air and keeps the road surface constantly damp.

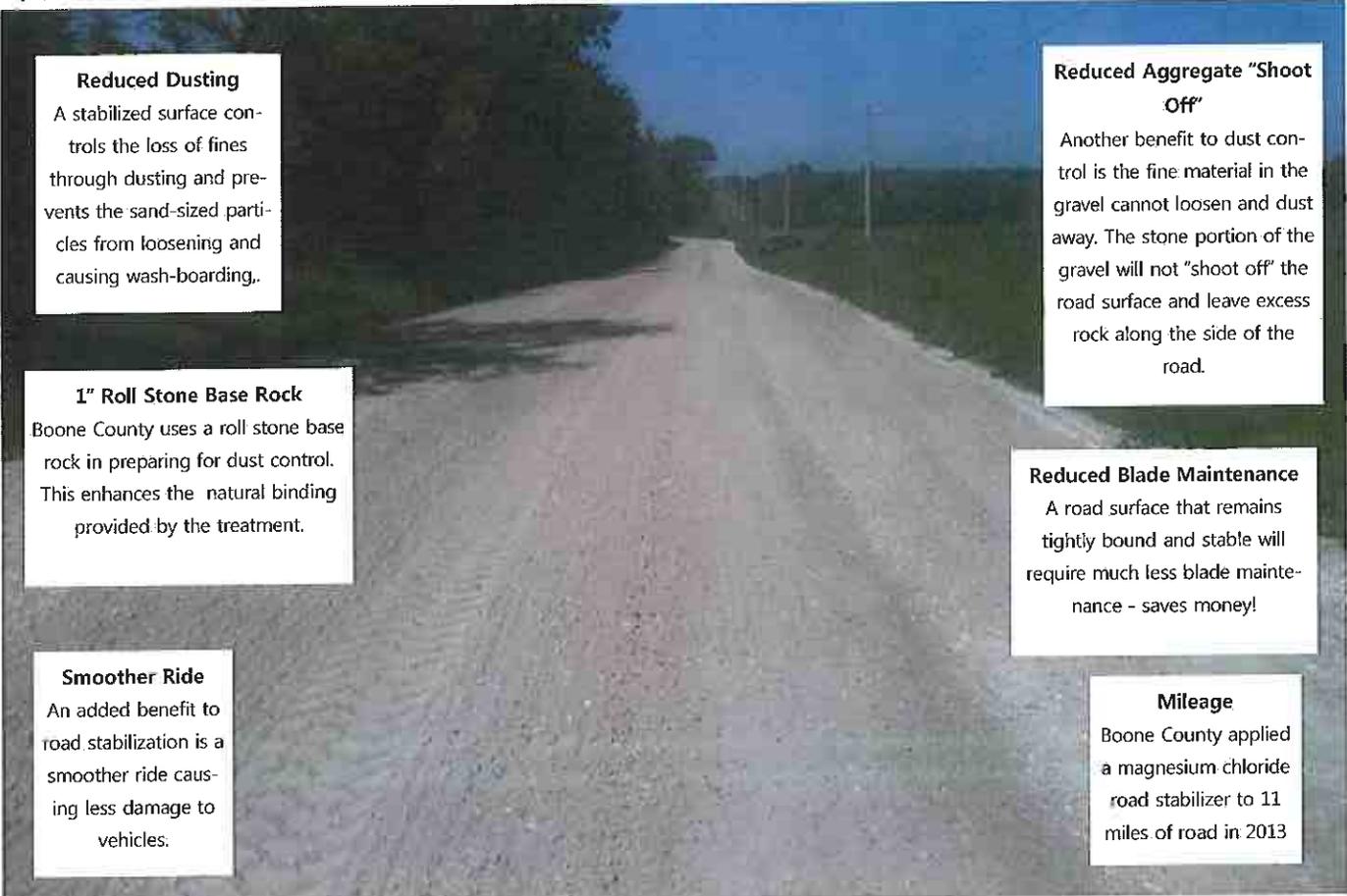
Application of magnesium chloride has proven to be a very effective treatment for dust control on appropriately selected gravel roads. It also offers the additional benefit of stabilizing the road bed. Magnesium Chloride ($MgCl_2$) is a hygroscopic product applied in a liquid form. In simple terms, the $MgCl_2$ draws moisture from the air and keeps the road surface constantly damp.

As we gain more experience with $MgCl_2$, we are optimistic about its potential value as a cost effective surface treatment that can reduce maintenance and alleviate dust. WIN WIN

BOONE COUNTY CITIZENS CAN ORDER PRIVATE DUST CONTROL

- If you live in Boone County, you can order dust control from a private vendor to apply treatment to at least 300 ft of gravel surface
- BCPW suggests early spring and/or during rainy season is the best time to apply dust control
- Check out www.showmeboone.com/PublicWorks for more info!

QUICK FACTS AND BENEFITS OF DUST CONTROL IN BOONE COUNTY



Reduced Dusting

A stabilized surface controls the loss of fines through dusting and prevents the sand-sized particles from loosening and causing wash-boarding.

1" Roll Stone Base Rock

Boone County uses a roll stone base rock in preparing for dust control. This enhances the natural binding provided by the treatment.

Smoother Ride

An added benefit to road stabilization is a smoother ride causing less damage to vehicles.

Reduced Aggregate "Shoot Off"

Another benefit to dust control is the fine material in the gravel cannot loosen and dust away. The stone portion of the gravel will not "shoot off" the road surface and leave excess rock along the side of the road.

Reduced Blade Maintenance

A road surface that remains tightly bound and stable will require much less blade maintenance - saves money!

Mileage

Boone County applied a magnesium chloride road stabilizer to 11 miles of road in 2013

GRAY RD - GO BIG OR GO HOME

Improving a rural road requires completing multiple tasks such as ditching, replacing culverts and hauling rock to improve the overall condition of the road. All of these tasks were completed for the Gray Rd Rural Road project. To improve the drainage and safety of this road, maintenance crews replaced two, smaller crossroad culvert pipes with one large poly-coated pipe and ditched along the side of the road.



Above: A view of the two, smaller culverts that were replaced along Gray Rd. The pipes had not been replaced in some time, and doing so improved the drainage for this road.



Above: The new crossroad poly-coated galvanized culvert pipe that was installed along Gray Rd.

“ THANK YOU FOR ALL YOUR HARDWORK AND DEDICATION ON O’NEAL RD! KEEP UP THE GREAT WORK!”
 -Happy Boone County Citizen on O’Neal Rd”

Right: O’Neal Rd completed after spending around 400 labor hours over a total of 23 days replacing culverts, hauling rock and grading.

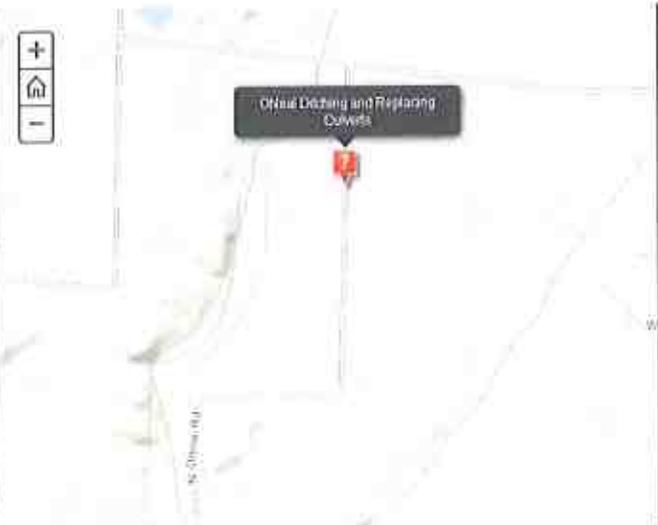


O’NEAL RD—DITCHING

According to gravel road experts, the most important and common drainage structure needed is the roadside ditch. Maintaining ditches along rural roads will improve the drainage and performance of the road. On O’Neal Rd, maintenance crews required loaders, excavators, trucks and other equipment to complete shoulder work, erosion control tasks and ditching to keep this road in great condition and easy to maintain.



Above: Skid loader works on piling excess dirt along O’Neal Rd.

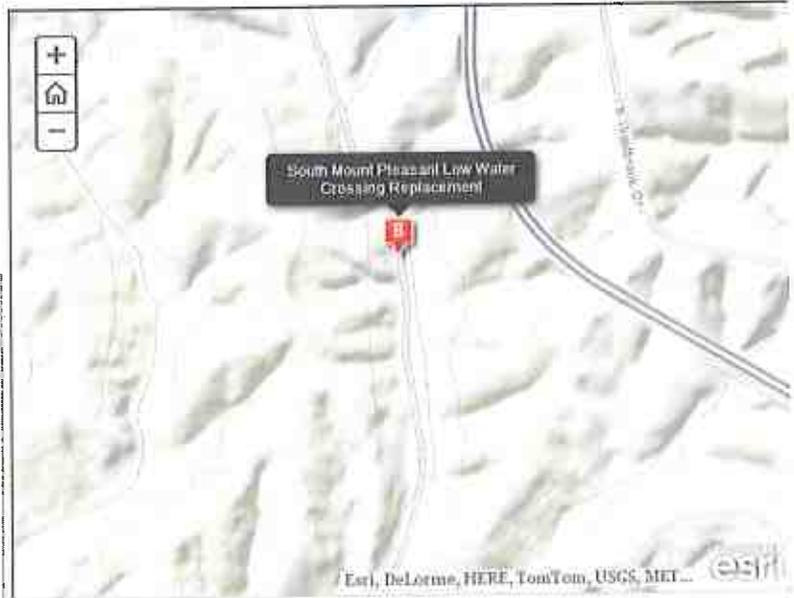


SOUTH MOUNT PLEASANT RD—REPLACING LWCs

In October 2013, the low water crossings (LWC) along South Mount Pleasant Rd were replaced or extended due to collapsed culverts and uneven concrete over the culverts. These LWCs are constructed with a metal culvert underneath a concrete surface. For this particular location, a LWC provides an efficient and cost-effective solution to getting across these low water level areas easily and safely.



Right: Previously, this low water crossing consisted of two concrete slabs, where it connected over the culvert pipe. As seen here, the concrete had started to divide in the center due to freezing and thawing conditions, and vehicular wear away.



Below: The area to the right of the LWC consisted of old concrete, broken rocks, etc. This new design will improve drainage for the area because there are no ledges, keeping the crossing dry during low-level water flows.

Right: Maintenance crews border off the crossing area and continue to pour fresh concrete over the culvert pipe.



The congruent concrete area will provide a smooth ride over the creek bed.



Boone County Public Works maintenance division works closely with the Design and Construction department to implement a long-term strategy for preserving and improving our paved surface roads. In preparation for an asphalt overlay project, maintenance crews have to complete several activities before a road is qualified for any surface treatment.

PREP WORK: CRACK POURING

Maintenance crews will focus on crack sealing roads so water cannot seep in and cause sub grade failures. In 2013, 73 roads were crack sealed to improve and preserve paved surfaces.



Left: Maintenance crew use a crack seal wand to fill transverse and reflective cracks in the road surface with liquid asphalt.

PREP WORK: DIG-OUT REPAIRS FOR SUBGRADE FAILURES



1. Saw and excavate 17 inches deep



2. Filter fabric is installed in the sub grade to keep failures from occurring in the future



3. 6 inches of surface rock is distributed on top of fabric



4. 2 3" lifts of asphalt are installed and compacted between lifts



PREP WORK: TREE PRUNING

Pruning trees is a major task for preparing a road for an overlay. In 2013 alone, crews pruned 81 streets in 17 subdivisions.

Pruning trees throughout subdivisions improves site distance for the neighborhood, and helps large vehicles such as snow plow trucks, school buses, and trash trucks, navigate the streets better.

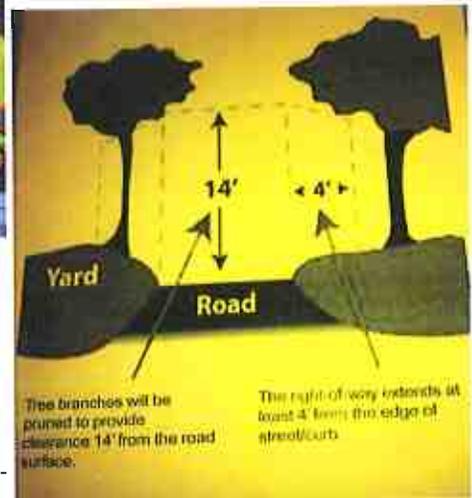


Brush crew working hard throughout the county removing tree limbs, cutting down dead trees and cleaning up roads, preparing for overlay.



Chain saw used for tree pruning

In certain cases where tree limbs are above the height of 14 feet and need to be removed, property owners are given fliers letting them know the tree requires pruning. The flier explains that trees and shrubs that grow too close to the roadway may cause a safety hazard or impede the work of road maintenance activities.



Drainage easements are usually on a curb and gutter street and they consist of a drop inlet and culvert pipes leading to a drainage area. The county does maintain some drainage easements in subdivisions throughout the county. Typically, easements exist on a private residence. Before construction can begin, the superintendent speaks with the property owner and has them complete a Maintenance Operations Agreement based on the construction details. For 2013, three drainage projects were completed.

Brookhaven Dr—Drainage Easement Repair

This project, similar to Hilltop Dr., called for an excavation and removal of an old drop inlet and pipe. Crews uncovered the drop inlet and plugged the existing 8" pipe. They then backfilled and replaced the inlet with a concrete flume and ditched the drainage area. Crews were able to complete this project in 180 hours and spent only \$731.13 on materials.

Lake of the Woods—Drop Inlet Installation

A new drop inlet was installed on Lake of the Woods Rd near Water's Edge Dr. The existing pipe had begun to show signs of deterioration. Crews excavated the area and installed a precast 4x4x8 foot junction box. Final yard grading and concrete driveway apron replacement will take place in 2014

Hilltop Dr—Drainage Easement Repair

After 240 labor hours and use of an estimated \$4,667.27 worth of materials, maintenance crews excavated and removed 287 feet of 18" culvert (labeled S20528) that was tied into a drop inlet. Crews then repaired the sub grade and 287 foot area, and reinstalled a new 18" culvert that tied to the drop inlet. To improve the drainage in this location, crews also distributed a 40 ton rock blanket of 6"x12" graded rip rap at the discharge area. Next, the crews backfilled and graded the yard, seeded and strawed.



Right: View of the deteriorated culvert pipe that was replaced with a new drop inlet



A "Flagger Ahead" sign sits up against the precast junction box before the new culvert pipe is inserted



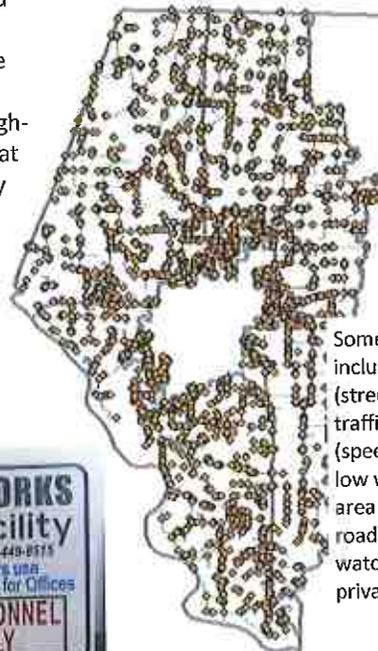
Left: Maintenance crew works on connecting the new culvert pipe to the usable, existing pipe with a band that will keep the pipes conjoined, and in place for storm water to flow through successfully



Above: New drop inlet will improve the drainage for this area.

The Sign Division continues to stretch their wings with additional initiatives to improve safety and reduce expenses. They provide a shining example of the advantage of in-house sign production by offering a rapid turnaround on street sign replacements. This team uses advanced mobile mapping technology to precisely track inventory data and sign location. Collaborating with the Planning Department and Emergency Management Services, EMS coordinate address verification of county street name signs has advanced to 88.9% from 64% in 2012.

This is a quick view of Boone County and every sign that is maintained by the county. There are 9,370 signs throughout the county that are maintained by the sign division



Some of the signs include : ID Signs (street name signs), traffic control (speed limit signs), low water (flood area ahead signs), road marker (night watch signs) and private streets.



ID signs are made in -house



Right: Special signs can be designed and produced in-house.



Close up view of high resolution reflectivity. 88.2% of all county signs requiring the more visible high-intensity prismatic sheeting have now been installed. Less than 1,000 remain to be replaced.

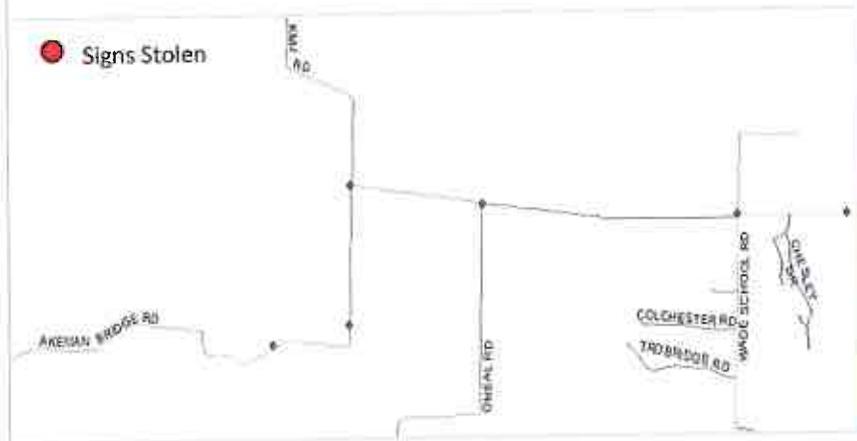
SPECIAL PROJECTS FOR SIGNS DIVISION

Currently the Sign Division is exploring measures with law enforcement to capture and collect crash data in an effort to:

- Identify potentially hazardous areas on county roads and implement plans to improve safety
- Recover funds used to repair/replace county property damaged by crashes
- Inter-agency work effort reconciling legal and posted limits on county roads providing law enforcement with current and accurate information

IMPLEMENTING MEASURES TO REDUCE COUNTY COSTS—STOLEN SIGNS

New this year, the Sign Division has started capturing data on sign theft and vandalism throughout Boone County. Tracking these locations using their GIS mobile application and identifying these high theft areas, the sign division has been able to implement measures to reduce county costs.



ARCGIS MOBILE

A mobile application that allows supervisors to track all operations including road activities, track culverts and other assets, signs and create field maps based on current data..



Urban superintendent Bryan Boyce using the mobile application to capture road operations data

CARTEGRAPH

An asset management system that assists in tracking specific activities, and costs in terms of labor expended, equipment use and material costs.

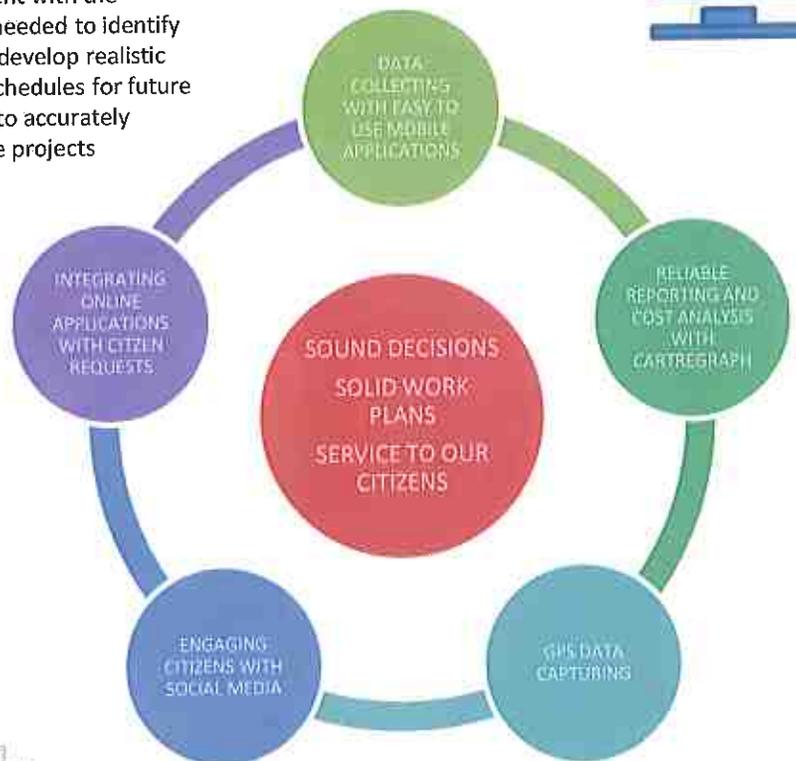
Cartegraph effectively creates reports that are designed to calculate costs and provide the department with the information needed to identify cost savings, develop realistic work plans/schedules for future projects and to accurately budget future projects



Helpful Reporting

WEBTECH – GPS

An automated vehicle location (AVL) system that allows Public Works to track all fleet for snow removal, grading rural roads, mowing and brush cutting, and other maintenance activities.



WEB-REPORTING APPLICATION

Available on the Public Works website, an easy to use application that allows citizens to view an interactive web map of Boone county and locate the problem area geographically. Whether that problem area is a pothole, a gravel road that needs rock, or a culvert that requires maintenance, this web-reporting app is extremely informative for Public Works staff to systematically plan future work projects.

Boone County Public Works Road Problem Reporting Application

You may report a problem with Boone County roads using this application and either of the methods listed below.

Use the Map and Form

1. Use the + and - map tools to zoom in on the map location of the problem
2. Select the 'Report a Problem' map tool
3. Click the map at the location of the problem
4. Fill out the form with the requested information and submit

Use Only the Form

1. Open the Form
2. Fill out the form with the requested information and submit



SOCIAL MEDIA – FACEBOOK

Started in December 2013, Boone County Public Works joined the Facebook social network to communicate to citizens current road conditions, projects and snow removal efforts.

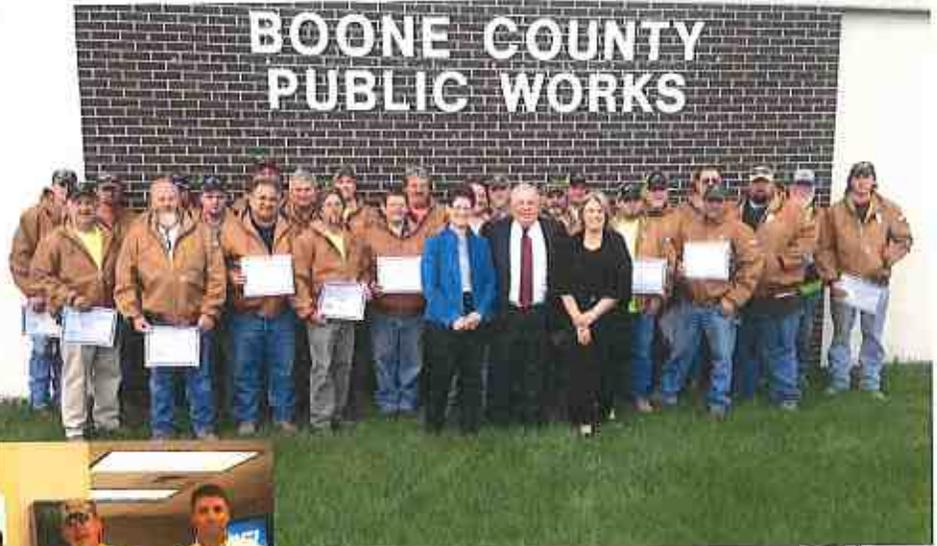


View of Boone County Public Works Road Problems Reporting Application – From here, citizens can put in a road request which is then immediately sent to the Public Works office.



Road Scholars

With great pride, we can boast that Boone County Public Works has the largest group of “Road Scholar” graduates in the state of Missouri. This program, sponsored by Missouri Local Technical Assistance Program(MO LTAP) through the Federal Highway Administration and MODOT aims to enhance the skills of all personnel involved in local transportation in the state of Missouri. The program includes 3 core courses and 5 elective courses to be completed over a four year period.



A SCHOLARLY CREW.

Forty-one graduates and continuing to add to that number.

Gravel Road Academy

The Gravel Road Academy, presented by Ken Skorseth, provided Boone County staff an opportunity to learn from and consult with one of the most experienced and knowledgeable people in the field of gravel road maintenance. Ken Skorseth is author of “Gravel Roads – Maintenance and Design Manual,” widely considered to be the premier reference on gravel road maintenance. The course included a review of design, maintenance, stabilization, efficiency, and field training on Boone County’s own roads. Of the 30 class participants, about half were from Boone County and half from surrounding entities. We hosted the event in our new training room and moved out to a Boone County gravel road for the field portion of the course. This was the perfect venue for our motorgrader operators to demonstrate their skills to the instructors and other guests.



OSHA 10 HOUR

For the third consecutive year, Boone County has participated in the highly regarded Damage Prevention & Excavation Safety Summit hosted by the Missouri Common Ground Alliance. In addition to many other valuable courses, this summit has provided all of our recent hires with the OSHA 10 Hour safety course.

WHO'S WHO IN BOONE COUNTY PUBLIC WORKS



Bart Barner
Brandon Bennett
Ryan Bennett
Corey Bolles



Bryan Boyce
Tod Chandlee
Charly Clendenning
Greg Coleman



Bobby Craig
David Critchfield
Tony Crocker
Lee Crump



J C Csolak
Don DeMeyer
Mark Donoho
Chet Dunn



Allan Eberwein
Greg Edington
Darren Evans
Nick Fairley



Dustin Friedli
Randy Garrett
Mike Glascock
Margaret Green



Raymond Hackmann
Isaiah Harmon
Scott Harmon
Rickey Harvey



Robert Hostetter
Brandon Irwin
Chris Jennings
Darren Kimbrel



Dwayne Kimbrel
Terry Knight
Adam Lewis
Raenell Mackey



Mike Mattingly
Gordon McCune
Billy Montgomery
J.C. Nichols



Price Nichols
Ben Nieman
David Noble
Caleb Okeefe



Adam Reddick
Joe Reddick
Neal Roberts
Mark Rowland



Teresa Shaw
Robbie Sapp
Bobby Smith
Lincoln Smith



Jane Telander
Marijane Williams
Joey Winn
Jeff Wren



We know Boone County Public Works has a great bunch of employees, but its always nice to hear it from the public, so we couldn't resist including this recent email from a Boone County resident.

Roland Wren

I have lived in Cole, Miller, Callaway and Osage county in the 40+ years I have lived in this state and have never seen a county works dept do as GOOD of a job as Boone. (been living here for last two years) THANK YOU for the hard work. Just so you know I am not the type of person that normally would say good job but you got to give credit to those that have earned it. Thank you keep up the good work.