45-1 Summer 2018

HOOSIER SURVEYOR

Quarterly publication of the Indiana Society of Professional Land Surveyors, Inc.

FEATURED ARTICLE

Easier digging? Plan on it. Indiana 811 and Kentucky 811 have announced two ways to assist in the effective and safe implementation of large-scale excavation projects, or any job that requires extensive or complex design and engineering.

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Office: 317-293-3542
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Past President
Bryan Catlin
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Cell: 317-327-4110
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David Myers
Terre Haute, IN
Office: 812-238-9731
Email: jdm@myersengineering.com

Vice President
Ed Sweetland
Indianapolis, IN
Office: 317-849-5832
Email: esweetland@b-l-n.com

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Ryan Swingley
Indianapolis, IN
Cell: 317-370-0400
Email: rswingley@espassociates.com

Director
Kurt Vonderheide
Indianapolis, IN
Office: 317-636-4682
Email: kvonderheide@hntb.com

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President-Elect
Todd Bauer
Fort Wayne, IN
Phone: 260-484-9900
Email: todd@4site.biz

Director
Rich Hudson
Valparaiso, IN
Office: 219-462-2946
Email: rickandcal@comcast.net

Director
Eric Meeks
Scipio, IN
Phone: 812-592-4145
Email: eric.meeks@meekscompany.com

Director
Don Williams
Crown Point, IN
Cell: 219-734-7215
Email: drwilliams@dlz.com

L to R: Dave Myers, Terre Haute; Todd Bauer, Fort Wayne; Ed Sweetland, Indianapolis; Don Williams, Crown Point; Bryan Catlin, Clayton; Rich Hudson, Valparaiso; Eric Meeks, Scipio; Alexander Fabian, Munster; Vincent Barr, Franklin; Ryan Swingley, Indianapolis; Kurt Vonderheide, Indianapolis; Norman Hiselman, Avon.

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FROM THE EDITOR

Deadlines for copy for various planned issues of the Hoosier Surveyor are as follows:

- Winter - February 1
- Spring - May 1
- Summer - September 1
- Fall - November 1

The Hoosier Surveyor is published quarterly by the Indiana Society of Professional Land Surveyors to inform land surveyors and related professions, government officials, educational institutions, libraries, contractors, suppliers and associated businesses and industries about land surveying affairs.

Articles and columns appearing in this publication do not necessarily reflect the viewpoints of ISPLS or the Hoosier Surveyor staff, but are published as a service to its members, the general public and for the betterment of the surveying profession. No responsibility is assumed for errors, misquotes or deletions as to its contents.

Mike Davis, Editor
4310 Broadway Street
Indianapolis, IN 46205
Phone: (317) 283-4630
Email: mijdavis@iupui.edu

CONTACT

9100 Purdue Road, Suite 200
Indianapolis, IN 46268

Phone: (317) 454-8309

Email: editor@ispls.org

PRESIDENT'S MESSAGE – TROUBLE! RIGHT HERE IN RIVER CITY...

By 2018 ISPLS President Ryan C. Swingley, PS

That's right, I say trouble. I am not talking about the fabricated trouble of a pool table in River City but the real trouble that faces our profession today. We all know the woes to trying to find quality help in this very busy market. There simply is little understanding of what we do — and I think less desire for the next generation to take on the hard work needed to complete survey tasks.

A few months ago, ISPLS formed an ad hoc committee to discuss the future of the current university programs in our state. Many of our educators have retired or will be retiring in the next year, leaving some of our programs with an uncertain future. Many programs across the country have seen dwindling numbers and many notable programs have folded, which makes the entire industry wonder where the next generation of surveyors will come from.

Couple that with the large percentage of one-man field crews, and we are not keeping up with the pace of retirement of our elder statesmen. To make matters worse, there are a lot of lay people waiting in the wings to offer services that traditionally and legally fall under the purview of an Indiana Professional Surveyor.

I challenge you to do a cursory internet search of "drone" companies offering 3D mapping services in your area and I think you will be shocked at the claims and statements of accuracy you will find. Our Indiana Administrative Code is fairly clear that this 3D mapping of fixed works must be completed by a PS, PE, CP or an Architect. (See 865 IAC 1-12-3, IC 25-21.5-1-2.5, IC 25-21.5-1-7 and IC 25-21.5-1-8, just to name a few).

So, what is ISPLS going to do about it you say? Too often we think that when we pay our annual dues, that precludes us from getting our hands dirty. Well folks, it is time for us all to get our hands dirty.

The ISPLS Board of Directors is currently seeking legal advice on how the society can help combat these lay people that invest in technology and start infringing on our practice area. There are legal hurdles that a society like ours could face in such endeavors.

We have a choice ahead of us: do nothing and let 3D mapping slip through our fingers, or roll up our sleeves and get our hands dirty. The famed Bill Pullman, in his role in the 1996 film "Independence Day" as American President Thomas Whitmore, said, "*We will not go quietly into the night! We will not vanish without a fight! We're going to live on! We're going to survive!*"

We will not go quietly — and I believe that it is all of our personal responsibilities as professionals to report non-registrants advertising and preforming land surveying tasks as described by Indiana Administrative Code. The complaint process is simple, and if you need advice or assistance feel free to give me a call anytime.

Let's get back to workforce development. There is a two-fold plan of attack that we need to combat this issue. One, we need to address our immediate needs for staff; and two, we need a long-term marketing effort.

Currently the State of Indiana is offering grants for training reimbursement through Governor Holcomb's Next Level Jobs initiative. I met September 20 with Vincennes University's Director of Distance Education, the Business and Industry Director and the Assistant Vice President of Division of Outreach and Engagement to discuss how our profession can take advantage of this program.

I am very excited about the opportunities presented in this meeting. ISPLS will be sending a letter of recommendation to the Indiana Commission for Higher Education to have land surveying added in to the preapproved list of programs defined in the Next Level Jobs initiative. Things are very much still in the air but I hope that at a minimum we get the green light to start offering classes in the spring semester — and that we will find some opportunities to help students find grants and other funding sources to offset the cost of tuition.

There are also many great online and in-person educational opportunities right now from Purdue Northwest, Purdue University, Purdue Fort Wayne and Cincinnati State. With ISPLS partnering with our wonderful surveying programs in the state, I hope we can start providing more convenient education opportunities to develop our next party chief, Professional Surveyors and leaders. More on this to come.

The long-term plan is always outreach to young people to spark an interest in pursuing a career in land surveying. I would like to see us double down on longstanding programs like the Boy Scout Surveying Merit Badge and Trig-Star. These two programs target middle- and high-school-aged kids and offer a great avenue to pursue. If you have interest in either of these two programs, please feel free to give me a call.

ISPLS also recently got involved with a program called "Get Kids into Survey," which was started by Elaine Ball in the United Kingdom. I have gotten to know Elaine over the last couple of years through her involvement with Certainty 3D, which makes TopoDOT, a key software in my day-to-day operations at ESP. If we could bottle up Elaine's enthusiasm and pass it out during the convention we would have no marketing issues whatsoever.

Get Kids into Survey is a series of "Where's Waldo" style posters that are oriented to characters performing surveying tasks. There is instructional information for presenters to use in discussing a poster with the class. In July, ISPLS commissioned a character named "Bengal Cat the Boundary Survey" in honor of our fallen, long-standing ISPLS Board Member and NSPS Governor, Don Bengel.

I think this campaign has some great potential and we have posters ready to hand out now. If you would like more information please visit https://www.elaineball.co.uk/campaigns/ or contact me directly.

So, I ask you, will you stand with ISPLS, roll up your sleeves and get your hands dirty? We need your help and we need to stand together as a society. To finish with our movie theme, I leave you with this paraphrased quote from Princess Leia in one of my favorite movies, "Star Wars": "Help me, ISPLS members, you're my only hope."

LEGAL SURVEYS

By Bryan F. Catlin, PS, ISPLS Past President

The goal of this column is to provide brief summaries of recent Indiana Court of Appeals and Supreme Court cases involving topics related to surveying practice, certainly not to provide legal advice. Information is gathered from the courts website at www.in.gov/judiciary. Comments or suggestions for future columns are welcome by email to: Bryan.Catlin@indy.gov.

Central States Tower III, LLC, a/k/a Central States Tower v. Plan Commission of the City of Portage, Indiana Court of Appeals Case No. 64A04-1710-CC-2400, April 4, 2018

This appeal from the Porter Superior Court involves Central States, which signed a lease for a communications tower on a site owned by the local school corporation. Central States filed a site plan which included a required access and utility easement from a local street that had previously been designated for closure. This fact was pointed out and a later plan was submitted which showed an alternative easement location. However, this easement was not recorded or in a form to be recorded. It was clear that the lease agreement contemplated relocating easements if needed in the future but the school preferred to wait to see what the effects of closing the street were before revising the easement. The plan commission felt they were being put in a position between Central States and their landlord and unanimously denied the site plan.

Central States filed a petition for judicial review of the plan commission's denial of the site plan. The trial court found for the plan commission.

On appeal, the court found that by not including the required easement, Central States was asking the plan commission to step into a potential breach of conflict dispute between Central States and the school corporation by deciding the meaning of the lease document language. Because of this, the trial court did not err by finding the denial was not arbitrary, capricious, contrary to law, or unsupported by evidence and the judgment of the trial court was affirmed.

Town of Brownsburg, Indiana, Town Council of Brownsburg, Indiana, and Jeanette M. Brickler v. Fight Against Brownsburg Annexation, et al., Indiana Court of Appeals Case No. 32A01-1702-PL-215, April 5, 2018

This case was decided on whether 60% of the annexation area had been subdivided as well as whether the area was needed and can be used in the reasonably near future as required by Indiana Code. Brownsburg presented six scenarios from one of their planners to the Hendricks Superior Court arguing that the Indiana Code did not specify that only actual acreage be considered in the required percentage. Each of the six scenarios considered the percentage of tracts subdivided as well as the percentage of acreage they included in the 4,462 acres Brownsburg sought to annex. Briefly, the first method considered only recorded traditional subdivision plats and found that 66.74% of the tracts, but only 17.5% of the acreage, was subdivided. The Hendricks County cartographer also calculated that only 17.54% was subdivided. The other methods used included agricultural land to arrive at different percentages (including any "subdivision" of the original patented land into smaller aliquot parts). The court also looked at the definition of subdivided in both the Brownsburg and Hendricks County Subdivision Control Ordinances and found Brownsburg was short of the needed percentage.

When it came to the needed and can be used in the reasonably near future question, Brownsburg argued that since the expansion of the Ronald Reagan Parkway was going to create a new interstate crossing in the proposed annexation and extend beyond Brownsburg's current limits, Brownsburg needed to be able to manage future growth in the area. But there is no firm timetable for much of this development, and Brownsburg currently has enough undeveloped land that the argument that the annexation area was needed was questioned. The trial court found that Brownsburg had not met its burden under Indiana Code, and the annexation could not proceed.

On appeal, the trial court's findings were not found to be clearly erroneous and were therefore affirmed.

Patricia M. Jones v. Von Hollow Association, Inc., Indiana Court of Appeals Case No. 08A02-1709-PL-2175, May 25, 2018

Jones owns property near, but not on, Lake Freeman. Von Hollow owns property along the shorefront as does the Shafer and Freeman Lakes Environmental Conservation Corporation (SFLECC). Jones's property is separated from the SFLECC property by a "tail" of the Von Hollow property that at a corner of Jones's property is less than a quarter inch wide. Both Von Hollow and Jones have separate licenses from SFLECC to access the shorefront and lake. Von Hollow has a gated lane running to the SFLECC property that, until they changed the lock in August 2015, they had provided Jones with keys to so she could use the lane. Jones has a walkway across the tail but Von Hollow had requested at different times that a deck and retaining wall under construction be moved as they were on the tail or the SFLECC property, and Jones complied.

Jones filed a complaint in the Carroll Circuit Court on March 11, 2016 requesting a declaratory judgment for a prescriptive easement, an injunction against Von Hollow to prevent obstruction or interference with the claimed easement, and a judgment against Von Hollow for trespass. Von Hollow counterclaimed for trespass against Jones on its property. At trial, Jones dropped the easement claim for the lane. The court eventually denied Jones's claim for a prescriptive easement finding the use of the tail was with Von Hollow's permission. The court also found against Jones's trespass claim and in favor of Von Hollow on its trespass claim against Jones. Jones filed an appeal.

The court of appeals found that the trial court properly found Jones's use of the walkway was permissive and thus there was no prescriptive easement. While properly finding Von Hollow did not commit trespass against Jones in the SFLECC property, the trial court erred in determining Jones trespassed there, as she had a license to use the property and did not require Von Hollow's permission to do so. The trial court had also ordered SFLECC to jointly license use of its property to Jones and Von Hollow. Here the appeal court found that regardless of its good intentions, the trial court could not order a party not a party to the action to issue joint licenses.

Interestingly, the Carroll Circuit Court stated: *"Jones can access and use her boat lift, improvements and the Shore Front License Area by water via Lake Freeman without using the lane or crossing the tail"* (my italics) in its findings of fact. The opinion did not expand on this as the appeals court found the element of intent dispositive. But by including this in the opinion, they may have been indicating that Jones's access to her licensed use of the SFLECC property was not limited to overland access only. This is a situation that could occur along other lakes and navigable rivers.

Wayne and Donna Kirchgessner v. Betty Kirchgessner, Albert Kirchgessner, Norbert Kirchgessner, Marcella Kirchgessner, Stephen Kirchgessner, Mary Ann Lee, Fred Kirchgessner, Mary Ann Emil Kirchgessner Junior, Mary Kirchgessner, Edward Kirchgessner, Ted Graf, Marcella Graf, James Fessel, Mildred Fessel, Martha Rhodes, Everett Rhodes, Mary Kirchgessner, Clifford Kirchgessner, Julia Bowe, Norbert Renn, Adelaide Renn, Board of Commissioners, Clark County, Indiana, and the Commissioners Paul Garrett, Larry Coates, Larry Dean in their official capacities, Indiana Court of Appeals Case No. 10A01-1710-CP-2309, May 29, 2018

Here is a case from the Clark Circuit Court where Wayne and Donna Kirchgessner filed suit in 1985 against nearby landowners, including many family members, and government officials to have Kruer Road declared a county road as it was their only means of access. The road was maintained by the county but was not an official county road. In 1990, the trial court declared Kruer Road was a "public highway by use". In 2012, the county paved a new Kruer Road adjacent to the original road. In December 2015, Richard and Theresa Williams filed a Motion to Vacate Summary Judgment Entry of October 1, 1990. They argued that the need for the old road had gone away and that this would remove a burden or cloud on their title as well as remove any risk of liability in the old roadway. Wayne and Donna filed an opposition to the motion apparently based on a desire to keep using the road his grandpa built and he had been using for forty-three years. The trial court granted the motion to vacate the summary judgment as no longer equitable under Trial Rule 60(B)(7), and Wayne and Donna appealed.

The appeal included several lines of attack, but the only one the appeals court felt required detailed discussion was whether the Rule 60(B) motion was untimely. Since the trial court granted relief under Rule 60(B)(7), the issue is whether the motion was filed "within a reasonable time". Wayne and Donna argued that 25 years after the judgment was entered was not within a reasonable period of time. But the court noted that the change in road location did not happen until 2012, and the Williamses conducted title searches to determine affected properties and then obtained consent forms from those owners as well as Clark County and filed their motion for relief less than six weeks later. The appeals court noted that twenty-five years is a long time, but that does not mean it is an unreasonable time and affirmed the decision of the trial court.

Terrance E. Chmiel v. US Bank National Association, Indiana Court of Appeals Case No. 75A05-1708-PL-1979, June 29, 2018

Here is a case where his mother and stepfather conveyed property to Chmiel in 1991 while retaining life estates. In 2005, a quitclaim deed was filed conveying the property back to his mother who then obtained a mortgage. Eventually the mother defaulted on the mortgage and the current owner of the mortgage began foreclosure proceedings which ended when the mother filed a petition for bankruptcy and made agreed payments until her death. Chmiel had since 2007 written letters to various mortgage companies stating he had not executed the 2005 deed and his signature was a forgery, but he had not filed suit against his mother. A year after his mother's death Chmiel filed a complaint to quiet title asking that he be determined to be

the fee simple owner, that the mortgage had expired upon his mother's death because it only applied to her life estate, and to quiet his fee simple title to the property against US Bank. Eventually, the trial court granted summary judgment to US Bank and this appeal followed.

The Appeals Court now finds that the statute of limitations did not bar Chmiel's claim, that there remain genuine issues of material fact regarding whether the doctrine of laches (unreasonable delay in presenting a claim) bars Chmiel's claim, whether the 2005 deed is valid, and if US Bank was a bona fide mortgagee. Therefore, the judgment of the trial court was reversed and remanded for further proceedings.

Speedway Corp. v. Wilson Real Estate II, LLC, Indiana Court of Appeals Case No. 67A01-1709-SC-2089, April 18, 2018 MEMORANDUM DECISION

Speedway and Wilson are commercial neighbors in Greencastle. After a 2013 dispute about the use of an area covered by a 1962 easement agreement, Speedway agreed to pay Wilson $25,000 and repave, once, an area depicted on an exhibit, and Wilson agreed to grant Speedway a permanent easement. The easement included a section on maintenance which stated: "Speedway shall be responsible for the periodic repair of damages to said Easement area caused by vehicular traffic (i.e., potholes). In 2017, Wilson filed a small claims action against Speedway in the Putnam Superior Court for maintenance of the parking lot. At a hearing Wilson argued that all the parking lines in the easement area needed to be painted and Speedway was obligated to repaint the lines under the terms of the easement agreement. Speedway argued that the plain and ordinary meaning of "i.e." meant the only damages they were required to repair were potholes. The trial court concluded that the damages in the easement agreement were not limited to potholes, and that if the parking lines were worn down by vehicular traffic, Speedway was obligated to repaint them. However, the trial court concluded only one line needed to be repainted, ordered the parties to split the cost equally, and issued a judgment awarding no damages.

On appeal, Speedway again argued the meaning of "i.e." was misinterpreted and the court agreed. The court explained "i.e." is an abbreviation for the Latin "id est", which means "that is", but is often confused with "e.g.", an abbreviation for the Latin "exempli gratia", meaning "for example". The trial court order was reversed.

This illustrates why exact language in an easement matters and why we need to be sure of the meaning of terms, even abbreviations of foreign terms.

John Reno v. Dennis O. Hamilton, Cathy A. Hamilton, Stephen Wayne Bell II, Stephanie L. Bell, Stacie L. Bell, Sonia K. Bell-Brenizer, Indiana Court of Appeals Case No. 33A01-1711-PL-2669, May 24, 2018 MEMORANDUM DECISION

A reminder to not put off recording documents or paying taxes.

Reno owned three tracts totaling about 3.06 acres in New Castle (the property). One tract was adjacent to and contained the driveway used by Reno's business. In 2000, Reno conveyed the property to his friend Stephen Bell as a favor so that Bell would have collateral for a bank loan. Bell died in 2005 without a will survived by four children. The loan fell into default and the bank initiated a foreclosure action naming the Bell Heirs as defendants. The bank obtained a judgment in the amount of $29,753.28 and the property went to a sheriff's sale in 2006. Michael McKown, a real estate broker and friend of Reno's, noticed the sale listing, and knowing it was next to Reno's business and that Reno had owned it, contacted Reno to notify him about the upcoming sale. Reno attended the auction and bought the property for $500. Reno received a Sheriff's Deed but never recorded it. Reno began receiving tax bills addressed to Stephen Bell in care of John Reno but did not pay the taxes in a timely manner. Cathy Hamilton, whose mother lived next to the property, saw the property was going to be sold at a tax sale in 2009 listing Bell as the owner. Dennis Hamilton purchased the property at the tax sale and received a tax sale certificate. McKown saw the tax sale notice and notified Reno. Reno did not attend the tax sale but McKown did and told Hamilton someone else owned or had an interest in the property. The Hamiltons had a title search done which revealed Bell owned the property. Reno paid the property taxes a few days before the one year redemption period ended.

In 2012, the Hamiltons received a telephone call from one of the Bell heirs asking if they wanted to purchase the property. The Hamiltons had a second property records search done which indicated title to the property was in the name of the "Heirs at Law of Stephen Wayne Bell, deceased."

The Hamiltons closed on the property on February 3, 2012 paying $4000, or $1000 to each of the four Bell heirs. The Hamiltons also paid the delinquent taxes at that time. The warranty deed was recorded on February 8, 2012.

About two months later, Cathy saw Reno and informed him the Hamiltons owned the property and Reno informed her about his possession of a 2006 Sheriff's Deed to the same property. The Hamiltons consulted their attorney and a third property search was done which found a copy of the unrecorded sheriff's deed in a file in the Henry County Clerk's Office. Reno attempted to record his 2006 deed but the Recorder did not allow Reno to record his deed because of the 2012 Hamilton deed.

On January 7, 2013, Reno filed a complaint in the Henry Circuit Court against the Hamiltons and the Bell heirs. The first count was a quiet title claim and adverse possession claim based on the 2006 sheriff's deed. The second count was a claim for conversion, claiming the Bell Heir's warranty deed was fraudulent and represented conversion as to Reno's ownership rights to the property. The Hamiltons answered and counterclaimed quiet title in their favor. Reno filed a motion for summary judgment, asserting his deed was first in time and the Hamiltons were not bona fide purchasers for value while admitting the unrecorded Sheriff's Deed may have created a gap in the chain of title. The trial court denied Reno's motion finding that genuine issue of material fact existed.

At trial, one of the heirs, Sonia K. Bell-Brenizer, testified that she was aware that her father had a home on the property, but that she had never been to it, having moved to Indiana after his death. She was also not aware of the previous foreclosure action where she and her siblings were named as defendants. Reno testified he knew it was his responsibility to record the Sheriff's Deed. Cathy Hamilton testified that they would be willing to convey a strip of land to Reno for ingress and egress and that they would pay to have it surveyed and a deed prepared. Dennis Hamilton testified that he had gone to the courthouse in 2010 to learn who had redeemed the tax certificate and was told Reno had. The trial court awarded fee simple ownership and possession of the property to the Hamiltons as bona fide purchasers in good faith for valuable consideration without notice of any outstanding legal right of Reno. The order also reflected that the Hamiltons agreed to execute a warranty deed to Reno to convey in fee simple a strip of land sixteen feet wide across one parcel of the property surveyed at the Hamiltons' expense. Reno filed a motion to correct error, alleging newly discovered evidence which was denied and this appeal followed.

The appeals court affirmed the decision of the trial court while also mentioning that Indiana is a race-notice state, so timely filing of instruments matter and that a record outside the chain of title does not provide notice to bona fide purchasers for value.

Heather M. (Varner) France v. Mary Sparling, Indiana Court of Appeals Case No. 85A02-1710-PL-2472, June 26, 2018 MEMORANDUM DECISION

This case from the Wabash Circuit Court began after a survey showed that France's fence, permanent wooden shed, part of a house addition, and most of a pool sit on neighbors' land. Sparling filed a complaint of trespass against France and France filed an answer admitting Sparling "holds legal title of the property" while claiming adverse possession. At trial Sparling presented evidence on her case and rested. Her attorney moved to dismiss France's counterclaim. The trial court granted the motion and entered judgment for Sparling. France was not allowed to offer any evidence and this appeal followed.

The trial court dismissed France's adverse possession claim based on France's "conclusive and binding judicial admission" in her answer. The appeal court does not condone "gotcha" litigation. Also, this admission was paired with an adverse possession claim. In total, it is clear that France intended to admit that Sparling is the title holder of record while maintaining herself as the legal owner based on adverse possession. The judgment was reversed and remanded for further proceedings.

Bryan F. Catlin, PS has been registered as a Land Surveyor in Indiana since 1991. He holds B.S. Land Surveying Engineering and M.S. Engineering (Geodesy) degrees from Purdue University.

Free Resource: Land Surveying Career Brochure

ISPLS has produced an educational brochure that raises awareness to the profession and encourages students to join the field. Help us spread the word by requesting print copies or sharing the digital version of the brochure in your office, at events and seminars and with any student who may be interested in joining the field.

To request physical copies of the brochure, send an email with the quantity to Kayla Jenkins. Want to share it online? Download a digital copy here.

EASIER DIGGING? PLAN ON IT

Submitted by Indiana811

Indiana 811 and Kentucky 811 have announced two ways to assist in the effective and safe implementation of large-scale excavation projects, or any job that requires extensive or complex design and engineering.

The Design Tool, or Design Tool Inquiry, is an early step and starting point. It may only be completed online, and there are no restrictions on the amount of linear feet on the project. This is a way to informally exchange planning information between you and member facility operators in the area in which you are planning a large project. It is then up to you if and when you contact each of these operators, and how you then exchange information with them.

To start this process, register as a Web Ticket Entry user by filling out a Web Ticket Entry Application at https://www.usa811.org/in811_wetf. Detailed information on how to complete a Design Tool Inquiry after registration is completed can be found in the Design Inquiry Manual by selecting this link or by going to the Indiana Web Ticket Entry Program page at https://indiana811.org/inweb_ticket_entry and scrolling down to select the Design Inquiry Manual link.

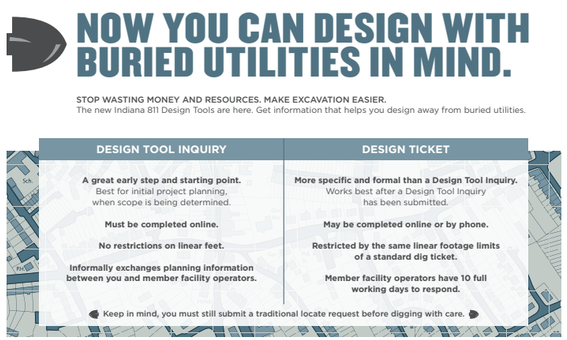
The Design Ticket, on the other hand, is a more specific and formal process, and works best after a Design Tool Inquiry has been submitted. Like other formal locate requests, it may be completed online or by calling 811 or 800-382-5544. It is restricted by the same linear footage limits as a standard dig ticket, and member facility operators have 10 full working days to respond.

The online process to complete a Design ticket also begins by completing an application at https://www.usa811.org/in811_wetf. Your user name and password will be different than for the Design Tool Inquiry.

With either a Design Tool Inquiry or Design Ticket, a traditional locate request must still be submitted before digging with care. That may be accomplished by calling 811 or 800-382-5544; going online to Indiana811.org/excavators and selecting the Web Ticket Entry link; or by selecting this link.

These two initiatives are meant to ease the complexity of the pre-dig design process, broaden communication channels, avoid potential conflicts with existing underground facilities in the planning stage, and, most importantly, keep everyone digging safely.

More information about the Web Ticket Entry Program, including a short training video, may be viewed at the Web Ticket Entry Program page.



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For questions or trouble assessing the app, send an email to Kayla Jenkins.

IN CASE YOU MISSED IT:

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- 3 Benefits of Orbital Forged Survey Markers
  July 9 Newsletter | Berntsen International
- The Traveling Surveyor
  August 20 Newsletter | ISPLS Blog
- Technology Behind the Thailand Cave Rescue
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Have an article you want to see in the ISPLS Newsletter? Email Kayla Jenkins

THE TRAVELING SURVEYOR

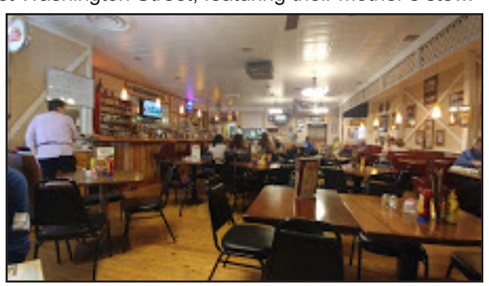
By Ryan C. Swingley, PS, ISPLS President

The old traveling surveyor doesn't get to travel quite like he used to. These days I am stuck behind a computer looking at point clouds all day—and by the time lunch rolls around I need a break and see the sun, even if it is just during the drive to get a quick bite.

In September I found myself stuck in Indy and going a little stir-crazy, so when presented a chance to deliver some data on a hard drive to my client and friend Andrew McClelland, I was quick to suggest it be a lunch meeting. Given the location of our two offices, downtown Indianapolis was an obvious choice, but what was not obvious was where to go (toughest decision of the day).

After several email exchanges of "I don't care, where do you want to go?" I stepped up and suggested a little off-the-beaten-path place…John's Famous Stew (1146 Kentucky Ave., Indianapolis). Now, John's Famous Stew is no hipster place down on Mass Ave—it is quite the opposite. This place doesn't even have a website, and you can bet they don't have Wi-Fi. No, John's is very much a throwback to a simpler time when a man needed a hearty stew and a cold PBR after a hard day's work in the factory.

The official story of John's Famous Stew goes like this (per the menu): "During the late 1800s in Macedonia, an old woman by the name of Mother Dapa Strangeff cooked a stew for her nine children and field hands on her family farm. She cooked the stew in iron kettles on wood-burning stoves. She lived to be 99 years old. Her two sons settled in Indianapolis in 1911. They started a restaurant at 535 West Washington Street, featuring their mother's stew."



Tables and booths flank a bar at John's Famous Stew, located at 1146 Kentucky Ave. It's been an Indianapolis institution for more than 100 years. (Photos by Ryan Swingley)

So, John's has been a local institution for more than 100 years. I am sorry that I am just now discovering this place—but if eating this fine stew helps me live to 99 like Mother Dapa, then I have a lot of stew eatin' years ahead of me.

Walking into John's is kind of like stepping into a time machine and going back to the 1950s. The outside of John's has no windows, so you are not sure what you are getting into, but you walk on in and seat yourself. I hear that the place can be quite busy, but I typically eat around 11:30 a.m. so it has never been bad when I have been around that time.

The décor is kind of typical dive bar with the neon signs and mirrors advertising a brand of beer, but I particularly like the very large racehorse mural covering the entire wall by the front door. There is a small "ticket window" that led us to speculate that maybe the place had been some kind of theater at one point, but after a quick question to one of the wait staff we found out that check cashing was done there at one point. That kind of sets the tone for the type of place this is.

The waitresses have mostly all been working at John's Famous Stew for more than 20 years. As with most who have worked at their jobs for that long, these ladies are quick-witted and have a little Seinfeld Soup Nazi attitude. This was off-putting to me at first but after a couple of visits this attitude has come to have its own charm.

After some light hearty chat with Andrew about workload—and with the waitress standing there tapping her foot with an "order already" look on her face—we figured we had better make a snap decision. Andrew went with the Cabbage Roll Stew and since I had already had the "Famous" stew on previous visits I decided to go with John's Famous Tenderloin.

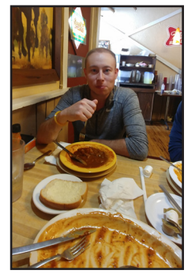
Fresh from the kitchen at John's Famous Stew are bowls of (clockwise, from top left) Cabbage Roll Stew for Andrew McClelland; a mild version of John's Famous Stew for Nick Jamieson; and a mix of mild and hot stew on John's Famous Tenderloin for Ryan Swingley.

The famous tenderloin is a breaded pork tenderloin covered in the famous stew but with no bun. You are given the choice of mild, medium or hot version of the stew. Typically, I like hot stuff but the hot here is a bit too much for me to enjoy the flavors of the stew. I was given the option of a mix of mild and hot that is a bit hotter than medium, so I went with that.

My new employee Nick Jamieson went with the Mild Famous Stew. The menu is not limited to stew, and there is a large selection of your typical bar fare, but "stew" is in the name of the place, so you got to get a stew. Our food came out pretty quickly and as you could imagine the table chatter went silent. Time to dig in!

The stew atop my tenderloin consisted of large chunks of beef, peppers, onions, carrots and celery, all swimming in a thick broth with a rich beef favor and light undertones of paprika and just the slightest hint of sweetness. The stew was spot on.

The tenderloin was a bit flatter than I prefer, which is kind of a nod to my childhood when tenderloins were the size of hubcaps. While it was good, next time I will forego the tenderloin to make more room for this outstanding stew. Andrew is a bit of a little fellow so the fact that he cleaned his plate should be a testament to how good the Cabbage Roll Stew was. Nick is a bacon cheeseburger guy just like his dad, Todd Jamieson, but he was glad he did not steer away from the stew this time.



Andrew McClelland opted for the Cabbage Roll Stew at John's Famous Stew. The well-scrubbed plate in the foreground belonged to Ryan Swingley and once was filled with an ample serving of John's Famous Tenderloin.

So, the next time you are in the area I suggest you give John's a whirl. I mean, 107 years of loyal customers can't be wrong.

Time for the ratings:

Rating Criteria

A place to take clients: out of 5 plumb bobs (just a bit of back story and they will be fine here)

Field Crew Friendly: out of 5 plumb bobs

Would I want to eat there on a hot day: out of 5 plumb bobs (stew is more of a fall/winter kind of thing)

Would I want to eat there on a cold day: out of 5 plumb bobs

Portions: out of 5 plumb bobs

Quality: out of 5 plumb bobs

Cleanliness: out of 5 plumb bobs

Quality of the restroom: Did not use the restroom (I know, I know, I promise I will make this a priority)

Service: out of 5 plumb bobs

Overall Score: out of 5 plumb bobs

WHICH DRONE SENSOR IS RIGHT FOR YOUR SURVEY BUSINESS?

By Logan Campbell and Daniel Katz, Aerotas

Our goal at Aerotas is to provide the best drone solutions for land surveyors. To achieve this goal, we constantly stay up to date on the latest developments in survey drone technology. We are not attached to any specific providers of drone-related technology; remaining independent so that when better tools are available, we can provide them to our customers. When analyzing technology, we focus on cost-benefit analysis: what delivers the most benefit to the average surveyor for the lowest cost.

An effective drone program involves dozens of components, and we regularly test the options available for each. The three specific technology components we get the most questions about are drone airframes, sensors, and georeferencing options.

This article begins a three-part series covering those three technologies. These articles summarize our current analysis of the options for each of these components based on our continual R&D and our work with hundreds of surveyors nationwide.

It is important to understand that the drone is only one part of a successful drone program. Even the best drone will not deliver the survey or business results needed unless it is paired with the right field Standard Operating Procedures (SOPs) and data processing workflow to get final linework.

Types of Drone Sensors for Surveyors

There is an incredible variety of sensors made for drones, for the incredible variety of applications drones are used for. The drone sensors most surveyors are likely to consider fall into four general categories: built-in cameras, small independent cameras, high-end independent cameras, and LiDAR. The first three options are different types of standard cameras, used as photogrammetry tools, while a LiDAR sensor is effectively a laser scanner mounted to a drone. Each of these sensors has it merits and drawbacks. All four are viable to be used in an effective drone survey program with the right SOPs and processing workflow, though they differ in their real-world applications.

	Built-in camera	Small independent camera	High-end independent camera	LiDAR
Airframe requirement	Small multi-rotor, which camera is built into	Fixed wing, or custom small or medium multi-rotor	Large multi-rotor	Large multi-rotor
Common price, with likely airframe	$1,500	$2,000-$40,000	$20,000+	$150,000+
Real-world accuracy	0.1’	0.1’-0.3’	0.1’	0.2’-0.3’

Built-In Camera

Built-in cameras are designed and built specifically for use in the drone they are attached to. They are completely integrated into the drone airframe and cannot be removed nor replaced without significant manual modification. While only a small number of drone manufacturers build first-party cameras, they have proven to be so dominant as to deserve their own category. DJI is the largest manufacturer of these drones, with the Phantom series being the one most commonly used in survey applications (note: the DJI X4S camera carried by the DJI Inspire and M200 series is functionally identical to the Phantom 4 Professional or Advanced camera). Built-in cameras often have as large as 20 megapixel sensors with global shutters (as opposed to rolling shutters, which can cause image distortion), and are most often carried on small multirotor airframes.

The primary benefit of this type of sensor is its high accuracy capability relative to its low cost and high reliability. With the right field SOPs and data processing, built-in cameras can reliably produce survey data at better than 0.1’ accuracy. They are also extremely inexpensive, with the DJI Phantom series costing $1,500, including the sensor. Given that they are built specifically for use in these aircrafts, these sensors are extremely simple and reliable. This means minimal maintenance, calibration, and downtime, and maximum return on investment.

Since they are built into the aircraft, however, these sensors are less flexible, since they can’t be easily swapped out for alternate sensors. Because the image sensors are smaller than some alternatives, they need to be flown fairly low (~100’) to attain the 0.1’ accuracy, meaning their range is somewhat limited, to approximately 25 acres/hour.

With their low cost, high reliability, and high accuracy, built-in sensors are usually the best bet for most surveyors focused on topographic and planimetric mapping on projects less than 250 acres.

Small Independent Camera

These are third-party sensors mounted onto airframes either by the drone manufacturer or aftermarket modification. They are often ~20 megapixel image sensors with global shutters. These are the most common option for fixed-wing aircraft, which have more weight limitations, as well as some custom-built small multi-rotors. Due to the mechanics of fixed-wings and the complexity of custom integration on small multi-rotors, these cameras are often not mounted on a gimbal — a device that allows the camera to move independently of the airframe.

A main benefit of these cameras is their ability to be used on fixed-wing airframes, which have longer ranges than multi-rotors. If used on a multi-rotor with a gimbal, they can produce equivalent accuracy to a built-in sensor. Since they are not integrated into the airframe, they can be swapped easier than a built-in sensor.

Because they are not built into the airframe, however, they often require more complex work, calibration, and maintenance than a built-in sensor. Specifically, in our experience, the camera shutter-trigger mechanism can be particularly challenging, resulting in unpredictable data-collection failures. Whenever a camera is used without a gimbal, as on nearly all fixed-wings, there are additional data quality issues. Without a gimbal, whenever the drone vibrates, turns, or banks to fight wind gusts, images will be blurred, resulting in lower-accuracy data.

The best use-case for a small independent camera is on a fixed-wing drone, when large acreages need to be covered at lower accuracy. If a large project only requires spot elevations sufficient for one-foot contours, this type of sensor is an excellent choice.

High-End Independent Cameras

These sensors are larger cameras developed for uses other than drone mapping (e.g., digital SLR cameras), which must be carried on large multi-rotor airframes that are designed to carry large sensors. These cameras can often have up to 40-megapixel sensors.

The primary benefit of these sensors is the very high image resolution they can produce, which translates to lower (better) ground sampling distance in aerial imagery. This allows them to consistently produce survey data accurate to 0.1’ when used with appropriate field SOPs and data processing. Because of their higher resolution, they can achieve this accuracy at higher flight altitudes than built-in cameras, meaning they can cover slightly more ground and clear tall obstacles without sacrificing accuracy.

The main drawback of these sensors on a drone is complexity. They almost always require custom integration, thus being more prone to faults and requiring regular significant maintenance and calibration. The shutter-trigger integration is often particularly fault-prone, and managing autopilot settings to ensure consistently optimal overlap is challenging. Despite the higher resolution of the camera, there is no benefit to accuracy since they must be flown higher to avoid warping and artifacting in data-processing. Despite the larger image sensor, range benefits are minimal due to the heavier camera and airframe. Finally, high-end cameras and the airframes they require are quite expensive, making it harder for a business to get a return on the investment.

Our analysis is that a built-in camera is usually preferable to a high-end independent camera, due to getting equivalent accuracy cheaper and more reliably. The best use-case for a high-end camera is if very high-resolution orthophotos are required as base-maps on special projects, or if an airframe with swappable payloads is required (e.g., to swap for a thermal sensor for roof inspections) – though often it will be cheaper and more reliable to just have separate dedicated drones for other sensors. Regardless, high-end cameras are only recommended for very experienced custom drone technicians.

LiDAR Sensor

Several companies are starting to make drone-specific LiDAR sensors. These sensors produce point-cloud data, which require laser scanner software to manage and reduce into usable survey deliverables.

The primary benefit of LiDAR sensors over cameras is that they can penetrate some ground cover. On projects which have some sparse tree, bush, or grass cover, LiDAR can return some true ground elevations beneath the cover, reducing the amount of supplemental ground data collection needed.

The primary drawbacks of LiDAR come down to complexity and cost. LiDAR integrations are highly technical and complex, so very prone to faults, and requiring a great deal of time-consuming calibration and maintenance. LiDAR data management is also very complicated. Whereas drafting linework from photogrammetric orthophotos and 3D mesh surface models is somewhat straightforward, LiDAR requires working in point clouds. This requires very high-powered computers and a time-consuming process of selectively reducing point clouds down to only the points needed to create the surface. Despite this added complexity, LiDAR sensors are substantially less accurate than cameras – though LiDAR lasers are very precise, their ground-tested accuracy is usually around 0.3’. Finally, LiDAR is very expensive, making for a challenging business investment.

Our current analysis shows that LiDAR is still maturing. With its high cost to accuracy ratio, it is not a good investment for many survey firms today. However, for firms that frequently work on sites with moderate to sparse ground cover and have a great deal of experience with custom drone technology, LiDAR sensors, and point cloud management, these sensors could make a profitable option.

DRONES

Choosing the right tool for the job

	Built-in camera	Small independent camera	High-end independent camera	LiDAR
Benefits	• Simple & reliable • Best-in class accuracy: 0.1' • Inexpensive	• Capable of greater range on fixed-wing • Capable of 0.1' accuracy on multi-rotor • Can be interchangeable	• Very high resolution • Best-in class accuracy: 0.1' • Can achieve 0.1' accuracy at higher flight altitude • Slight range benefit over built-in camera • Interchangeable	• Can penetrate some sparse ground cover
Drawbacks	• Inflexible: can't interchange sensor • Limited range (~25acres/hr at 0.1' accuracy)	• Integration complexity can lead to unreliability • Data quality issues when used without gimbal	• Integration complexity often leads to aircraft and data unreliability • Substantial maintenance needs • Expensive	• Integration complexity often leads to unreliability • Substantial maintenance needs • Data management is very time-intensive • Low accuracy • Very expensive
Best for	○Most standard survey work <250 acres	• Use on fixed-wings for regular very large projects with low accuracy needs	• Very high-resolution imagery • Very drone-experienced team	• Frequent work in sparsely-vegetated areas • Very drone-experienced team

There is no one right choice that applies to every company. For most firms focused on small to medium sized topographic, ALTA, or similar projects, a drone carrying a built-in camera is usually the best option. For firms focused on large projects with lower accuracy requirements, a small independent camera mounted on a fixed-wing aircraft can be a great choice. For firms with substantial drone experience that want to differentiate themselves via very high-resolution imagery, a high-end independent camera can work well. And for firms that regularly work on sites with some ground cover, have large budgets, and have ample experience with point cloud management, a LiDAR sensor will work well.

Logan Campbell and Daniel Katz are Co-Founders of Aerotas, where they enable land surveyors to use drones to get survey linework and contours with industry-best accuracy. Learn more at www.aerotas.com.

We want to hear from you: Share your surveying stories

In an effort to represent the diversity, scope and challenges experienced by Professional Surveyors, the Indiana Society of Professional Land Surveyors is requesting stories and examples of experiences our members have had during careers.

If you have had a unique experience on a high profile project, the use of new and developing technology, or simply a survey gone bad, we would love to hear from you! Our hope is to gather your stories and experiences and share them with your colleagues and prospective future surveyors to show that we are more than “just a surveyor.” Send your stories to kjenkins@ispls.org today.

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mew@lochgroup.com
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Vice President
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