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SPECIAL POINTS OF INTEREST:

AUTUMN 2015

Save The Date!

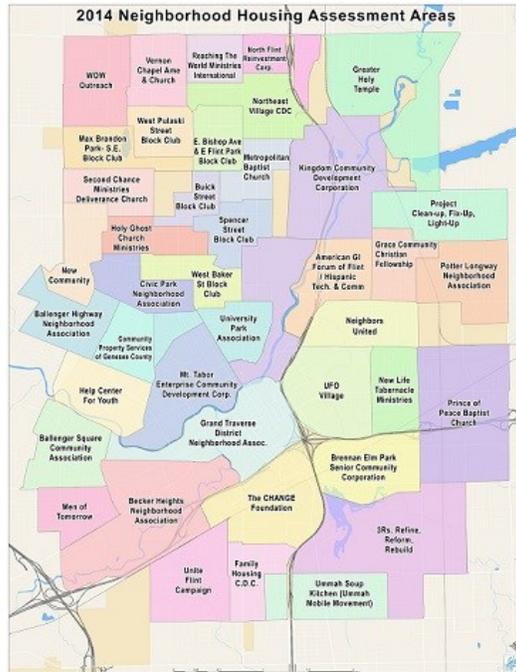
The 2016 IMAGIN Annual Conference is returning the Great Wolf Lodge in Traverse City, MI May 15-17, 2016

IMAGIN is hosting a LiDAR Workshop Wednesday, November 4, 2015 at the Lansing Community College. Visit our Website for more details: www.imagin.org

INSIDE THIS ISSUE:

Feature Article	1-4
Technical Article	5-6
LiDAR Workshop	7
Upcoming Events	7
Vendor Info	7

Flint's Your Neighborhood Inventory



Map of 2014 Your Neighborhood Inventory Groups and Inventory Areas in Flint, MI

On October 28th, 2013, the City of Flint adopted the Imagine Flint Master Plan for a Sustainable Flint, its first official comprehensive master plan in over 50 years. The Master Plan provides a 20-year vision for Flint and an organizing catalyst for responding to its changing circumstances. Strong community engagement guided the planning process and created a community vision that represents the desires and decisions of the Flint community.

The City of Flint's planning accomplishments over the last three years are noteworthy in their own right. However, when one learns that prior to the master planning process, Flint City Hall had been absent of a planning presence for more than 20 years. One must ask; how was Flint able to establish its first planning office in more than two decades, lead an award-winning community engagement process, and ultimately produce a progressive and award-winning comprehensive master plan that

was unanimously adopted by its city council? One of the keys to Flint's recent planning success is its new Neighborhood Inventory initiative.

Data collection was one of the first necessary steps in developing the Master Plan. Accordingly, newly hired planning staff began surveying the condition of properties in Flint in the spring and summer of 2012, as the master planning process was launched. Simultaneously, planning staff sought strategies to build relationships with the community that would provide a foundation for participatory planning. As the City's planning staff developed its community engagement plan, it connected with the Community Foundation of Greater Flint's Neighborhoods Small Grants Program. From these conversations emerged action and the launch of the Your Neighborhood Inventory initiative in the fall of 2012.

By November of 2012, the condition of each and every one of Flint's residential properties (51,607) was assessed. While City of Flint Planning staff assessed 60% of the properties in the spring and summer, the remaining 40% was assessed in the fall through the Your Neighborhood Inventory initiative.

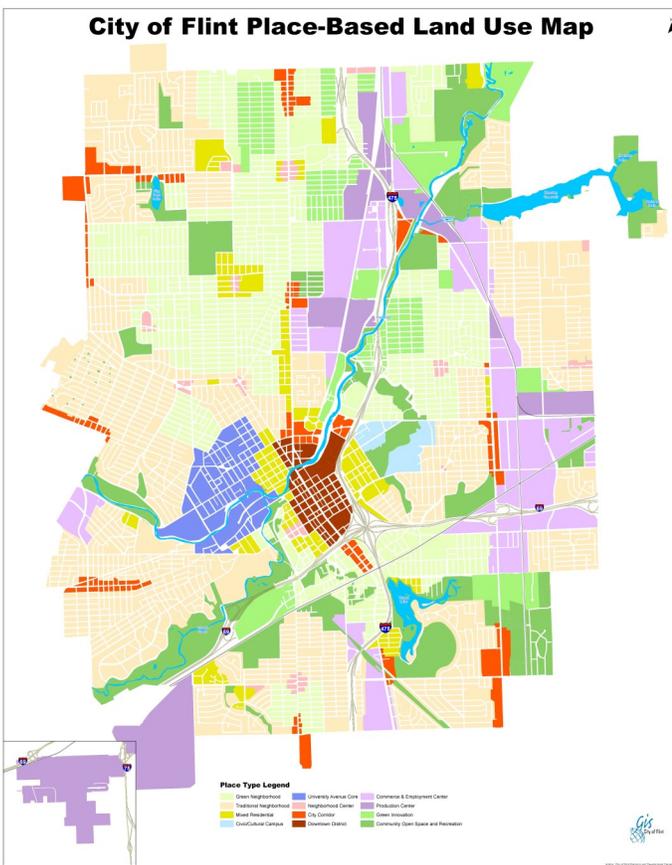
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West Pulaski Street Block Club attending the commercial property condition assessment training in 2013.



Flint's Your Neighborhood Inventory

City of Flint Place-Based Land Use Map



*Imagine Flint Master Plan
for a Sustainable Flint
Land Use Map, 2013*

Twenty-seven neighborhood groups volunteered to assess properties in and around their respective neighborhoods. In exchange, each group received a \$500 mini-grant from the Community Foundation of Greater Flint's Neighborhoods Small Grants Program, which granted \$13,500 in total.

City of Flint planners organized the Your Neighborhood Inventory assessment process. The City developed a five-point housing condition assessment scale by drawing from best practices. The City supplied each participating group with customized materials necessary for completing the inventory, including the assessment tool,

information on the purpose of the inventory, and a map of the group's neighborhood that was used to complete the inventory. The City also hosted one-hour trainings that were mandatory for participating groups. During these trainings, City planners not only taught participants how to use their maps and the assessment scale to complete the inventory, but also engaged with community groups about their neighborhood conditions and the role of data and planning.

The 27 groups that participated in the Your Neighborhood Inventory initiative in 2012 included: block clubs, neighborhood associations, schools, churches, and local non-profits. Each group was required to select a team of two or three people to complete the inventory, participate in the one-hour training, and assess the condition of all residential parcels within the group's neighborhood according to the City's five-point scale.

Residential structures were categorized as "good," "fair," "poor," or "sub-standard." Vacant lots were classified accordingly.

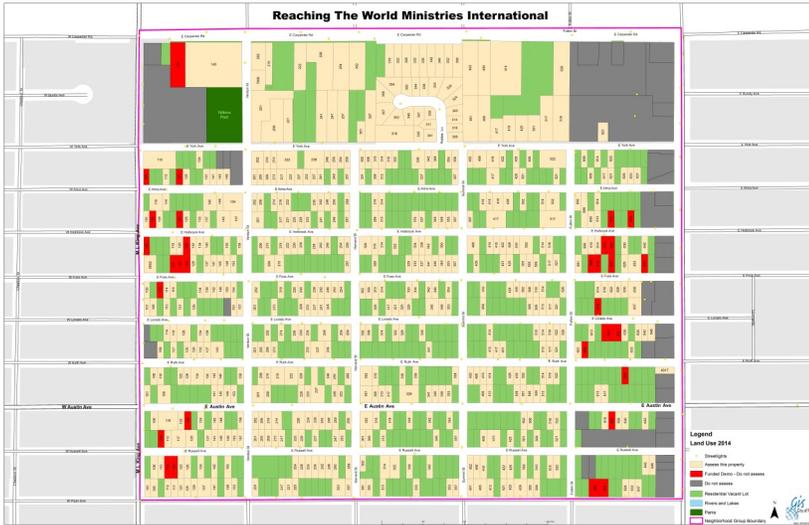
After the Inventory was completed in 2012, the City of Flint and Community Foundation of Greater Flint convened the participating groups to discuss the initiative, including its successes, challenges, and potential continuation. During the convening, each neighborhood group received a new property condition map of its area that presented its collected data and participated in an Imagine Flint Master Plan engagement session. The 2012 Your Neighborhood Inventory initiative was so successful and well received that the participants advocated for its continuation.

The Your Neighborhood Inventory initiative continues today. During the fall of 2013, the condition of every commercial property in Flint was assessed through the initiative. Thirty-eight neighborhood groups participated in 2013 and again received \$500 mini-grants

WOW conducting the housing condition assessment in 2012



Flint's Your Neighborhood Inventory



Housing condition assessment map for a neighborhood group conducting the 2014 Inventory. Maps were developed for data recording. The maps were simplified and symbolized to show residential structures, funded demolitions, vacant lots, and commercial lots. Participants were only asked to survey residential lots.

from the Community Foundation of Greater Flint, which granted \$19,000 in total. In 2014, neighborhood groups asked to add a new component to the inventory; streetlights. Thus, during the 2014 Your Neighborhood Inventory, 41 community groups assessed the condition of all residential parcels in Flint and completed an audit of the 11,470 streetlights in the city. This meant that each group had to sweep its area twice – once in the daytime to assess the condition of residential parcels and once in the evening to audit the functioning of streetlights. Again, each group received a \$500 mini-grant from the Community Foundation of Greater Flint, which granted \$20,500 in total.

The data collected through the Your Neighborhood Inventory initiative has inspired and informed countless plans and projects to date. In 2013 the Genesee County Land Bank Authority was awarded nearly \$24 million in demolition

grant funding to demolish more than 1,800 dangerous and abandon structures, with all of this inventory data being used in the proposals. In 2014 the City released Beyond Blight: City of Flint Comprehensive Blight Elimination Framework, a five-year blight elimination plan that has received national recognition because of its use and analysis of this data. Whether it is used to identify houses for demolition,

vacant lot reuse candidates, or commercial infrastructure investment opportunities, this data guides daily data-driven decision-making in Flint.

To support the Blight Elimination Framework, a list of potential structures for demolition inspection was created from the housing condition data along with vacancy and land use. 3,526 Sub-standard, vacant structures were targeted and prioritized based on where they fell in the Imagine Flint's future land use with neighborhood centers and residential neighborhoods being a high priority.

In tangent to the inspections lists the city also created Beyond Blight Maps that translate the Beyond Blight: City of Flint Comprehensive Blight Elimination Framework to a place-based, parcel level for City stake holders. The maps were created by analyzing three property attributes. The attributes were property condition, occupancy status, and place type and future land use. The light intensity interventions developed from the analyses were Re-Occupy and Residential Structures Vulnerable to Blight (RSVB). 4,026 Re-Occupy and 1,343 RSVB properties were identified and recorded as properties in a good or fair condition.

(Continued on page 4)

Inventory groups, City of Flint planners, and Community Foundation of Greater Flint staff gather at Flint City Hall for the 2014 Your Neighborhood Inventory debrief



Flint's Your Neighborhood Inventory



Parcel-level Blight Elimination Intervention Intervention profile map for a neighborhood in Flint, MI. The data is being used to implement the Beyond Blight Framework through the development of a Blight Elimination Intervention profile that identifies intervention type by analysis of property condition, occupancy, and Master Plan place type. The data is also being used for targeted code enforcement of 3,526 properties

The difference between the two are that Re-Occupy properties are vacant and fall within a Neighborhood place type and the RSVB properties were in commercial and heavier use place types. The medium intensity interventions developed were Owner-Occupied Rehabilitation Candidates (OOR) and Rental Program Candidates (RP). 3,624 OOR and 2,685 RP candidates were identified as properties in fair condition. The difference between them being whether they are owner occupied or renter occupied. The last most intense intervention is the Residential Demolition Candidates, 5,872 of these were found to be in a poor or substandard condition. The areas targeted

for the maps included the cities Northwestern corner, the Smith Village and Potter Longway Neighborhoods, properties along South Saginaw, and the Innovation District. The maps provided a

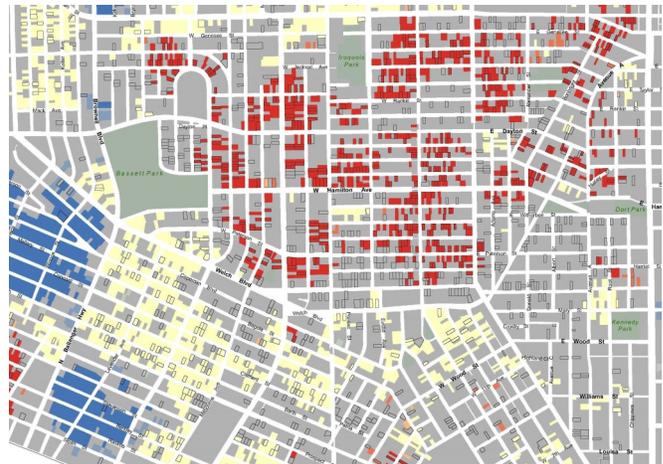
starting point for planning and implementation for approaching parcel-specific blight elimination interventions for Flint's stakeholders.

Flint planners will tell you that partnering with community groups was not the only or easiest way to collect property condition data. The Your Neighborhood Inventory initiative is a success for Flint not only because it provides priceless data, but also because it engages the community in the planning processes within Flint and by doing so continues to build bridges between Flint residents and City planners.

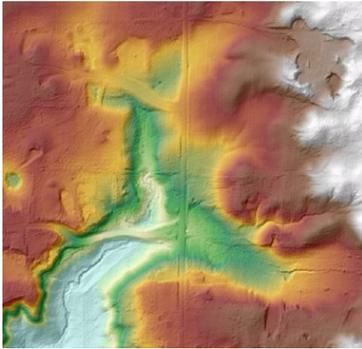
~ Article submitted by: Calix Martinez, GIS Technician, City of Flint. cmartinez@cityofflint.com 810-766-7426 ext. 3027

If you are interested in submitting an article for a future issue of the IMAGINews please contact the IMAGIN Communications Team via email at communication@imagin.org.

The Your Neighborhood Inventory has provided data for analyzing the spatial relationships of housing conditions.



Contours from Lidar Data — Achieving a Balance



Hydro-flattened Digital Elevation Model derived from QL2 Lidar data. Data courtesy of Kent County Information Technology.

Airborne Lidar (Light Detection and Ranging) data has become a common data source available to geospatial professionals interested in topographic modeling, hydrological analysis, planning and other activities. Lidar data is essentially composed of millions to billions of individual points containing X, Y and Z coordinates. Its precision far exceeds other elevation data typically used in the past, such as 10- and 30-meter digital elevation model (DEM) data available from the United States Geological Survey (USGS) National Elevation Dataset (NED). Other topographic data include Digital Raster Graphics (DRGs), otherwise known as digital quadrangle maps. While these may be sufficient for broad analyses, greater precision is

needed for detailed investigations.

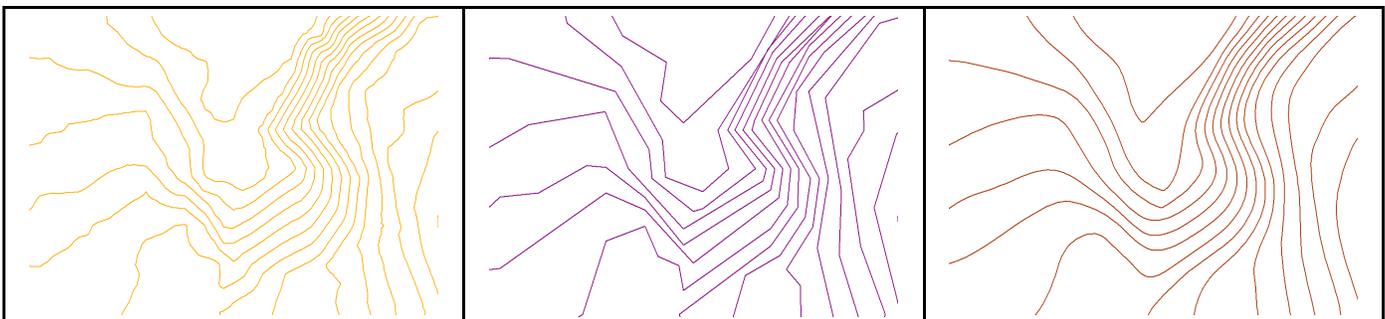
Lidar data acquired by qualified vendors comes in many “flavors” and can vary by point density (e.g., sampling distance, also known as precision) and spatial accuracy. The USGS sets parameters for different quality levels, which are detailed in their Lidar Base Specification document (<http://pubs.usgs.gov/tm/11/b4/pdf/tm11-B4.pdf>). In addition to Lidar point cloud data, vendors usually deliver bare-earth DEMs, which are generated from classified point cloud data. These DEMs, which are delivered in raster or ASCII format, are often hydro-flattened and/or hydro-enforced. Hydro-flattening mirrors reality by setting consistent elevation values across water features such as rivers, ponds and lakes. Hydro-enforcement removes barriers to water flow and is useful if the data is to be used for catchment delineation and other hydrologic analyses. Although there is an extra cost, RS&GIS always urges communities to acquire data that is both hydro-flattened and hydro-enforced so it meets the needs of all departments. This is not to say that quality contours cannot be created from data that has not been hydro-enforced or hydro-flattened. It simply limits the types of applications for which the data can be used.

One of the main Lidar-derived products clients covet most is topographic contours. Elevation contours help both geospatial and non-geospatial professionals visualize the landscape without dealing with cumbersome point cloud data or raster DEM data. Contours are used in map-making, planning, and other activities.

Important: It goes without saying that the overall quality of contours is highly dependent upon the quality of the Lidar data. This is where the USGS standards help.

Contours can be created at the touch of a button if users have ArcGIS for Desktop (Standard or Advanced) or a similar product. However, contours created using ArcGIS and other geospatial programs are not usually aesthetically pleasing, particularly when the interval is very small, such as 1 or 2 feet. Raw contours appear jagged and unappealing. Additionally, many small spurious contours are created that result in large file sizes and an overall “crowded” appearance. Luckily, there are many software tools available that allow geospatial professionals to generalize elevation contours to make them more useful and of cartographic quality. Typical approaches used to generalize contour data include simplification and smoothing. Simplifying involves removing a number of vertices along a line segment, while smoothing changes straight line segments into arcs. These two processes can be used iteratively to achieve the desired level of generalization. Of course, if the dataset is very large, there is the added necessity of tiling or otherwise sub-setting the data to shorten processing time. Finally, small spurious contour segments can be queried and removed based upon size. For example, based on application, it may be determined that removing all contours less than 100 feet do not impact the final product negatively. This process alone can remove a significant amount of data, thereby improving processing time during generalization. For example, one contour subset feature class processed by RS&GIS included over 40,000 contours.

(Continued on page 6)



2-foot contour data at a scale of 1:250. From left to right, Draft Contours, Simplified Contours, Smoothed Contours.

Contours from Lidar Data — Achieving a Balance

“As organizations across Michigan acquire Lidar data and develop contours, it is important to understand the connection between creating visually-pleasing data and the inevitable reduction in precision and accuracy.”

When contours smaller than the size threshold were removed, only 9,000 contours remained. Removal of the roughly 31,000 small contours had little to no effect on the precision and accuracy of the final product. As the saying goes... “There is no free lunch.” Smoothing, simplifying, and removing contours results in permanently reduced precision and accuracy. The question must be asked, “Does this level of generalization work for my intended uses?” That being said, the process of making cartographic-quality contours can be controlled to achieve a balance between appearance, precision & accuracy. Overly smoothed contour data may be too generalized and slightly smoothed contours may not satisfy aesthetic needs. Achieving a balance is also important for controlling topological inconsistencies. Overly smoothed data will create numerous errors, such as overlaps. Correcting these errors is a time-consuming, and often manual, process. So, where is the balance? That is the million dollar question. What works well for one person, department, or application may not work for another. As a rule, it is always better to err on the side of preserving accuracy and

precision. It is always possible to increase generalization but once precision is lost, it cannot be recaptured. It should be understood that if contours are being generalized for a large area, it will be very time-consuming. In this scenario, getting it right the first time is very important. Recently RS&GIS created 2-foot contours for Kent County from 2014 QL2 Lidar data that was hydro-flattened. Based on previous experience, RS&GIS sent samples to the County staff that represented different levels of generalization yet still preserved the majority of the accuracy and precision of the original data. These samples were shared with various Kent County staff to establish a consensus. The chosen level of generalization was then applied to the entire county. The level chosen represented a good balance between aesthetics & precision/accuracy while the number of errors that needed to be corrected was manageable (~530 errors for over 100,000 individual contours divided among several subsets). To test the quality of Kent County contours, RS&GIS created DEM data from generalized contours and compared elevation values of the resulting DEMs to original

DEM data. Subtracting values of the original DEMs from the derived DEMs indicated a small change in overall accuracy and precision. As organizations across Michigan acquire Lidar data and develop contours, it is important to understand the connection between creating visually-pleasing data and the inevitable reduction in precision and accuracy. In an effort to reduce time and cost, it is best to develop a consensus on the level of generalization, as well as the contour interval, before proceeding with large contour projects. Given the right tools, data and perspective, organizations across Michigan can reap the benefits of quality contour data.

~ Article submitted by:
Robert Goodwin

Robert Goodwin is a Project Manager and the Senior Geospatial Analyst in the Department of Geography, RS&GIS, Michigan State University. He graduated from MSU with a degree in Fisheries and Wildlife and a minor in Spatial Information Processing and received his GIS certification in 2004. He has worked at RS&GIS since 1998 and specializes in GIS, GNSS and Remote Sensing projects. He is the lead trainer at RS&GIS and regularly teaches professional courses in applied GIS. If you are interested in submitting an article for a future issue of the IMAGINews please contact the IMAGIN Communications Team via email at communication@imagin.org.

<p>Properly-smoothed contours (moderate smoothing threshold)</p>	<p>Overly-smoothed contours (excessive smoothing threshold)</p>	<p>Topology errors - overlaps</p>

IMAGIN's 2015 LiDAR Workshop

IMAGIN is proud to announce our upcoming hands-on LiDAR workshop. The workshop is scheduled for Wednesday November 4, 2015 at Lansing Community College. The workshop is open to both members and non-members.

Oftentimes organizations obtain LiDAR data but don't know what they can do with it. Come and join your colleagues for a workshop that will show you how to use ESRI tools to work with LiDAR and for a hands-on session with real data. Bring your laptop, as software and data will be provided.

Cost of Attendance: Members—\$20.00, Non-Members—\$30.00, Students—Free (students must show valid student ID)

Schedule of Events:

- Doors Open & Networking – 8:30 AM—9:00 AM
- Introduction to LiDAR – 9:00 AM to 10:00 AM
- Using ESRI Tools to Create Base Datasets from LiDAR – 10:00 AM to 11:00 AM
- Using LiDAR Derived Data to Answer Questions – 11:00 AM to 12:00 PM
- Lunch 12:00 PM—1:30 PM (lunch on your own)
- Hands-On LiDAR Workshop – 1:30 PM – 3:30 PM (bring own laptop—software and data will be provided)

Location of Events:

Lansing Community College - 610 N. Capitol Ave Lansing, MI 48933 Room S147

Light refreshments will be provided courtesy of IMAGIN.

Visit www.imagin.org for more information and to register.

Upcoming Events

- October 16, 2015—IMAGIN Board meeting in Mt. Pleasant, MI
- October 29, 2015—West Michigan GIS Users Group Meeting in Grand Rapids, MI at the Grand Valley Metropolitan Council
- November 4, 2015—IMAGIN's LiDAR Workshop in Lansing, MI at Lansing Community College
- November 13, 2015—IMAGIN Board Meeting via teleconference
- November 18, 2015—GIS Day, Events are being held at various locations throughout MI including: MSU, EMU, UM Dearborn, & Albion College (visit www.gisday.com for more details)
- December 3, 2015—Statewide GIS Users Group Meeting in Lansing, MI
- December 11, 2015—IMAGIN Board Meeting via teleconference
- January 8, 2016—IMAGIN Board Meeting via teleconference

- February 12, 2016—IMAGIN Board Meeting via teleconference
- May 15-17, IMAGIN's Annual Conference in Traverse City, MI

For Complete Details on all these events go to www.imagin.org

Have an upcoming GIS related event you want to advertise? Send the date, time, and place to communication@imagin.org



Vendor Advertising Opportunity

Would you like to advertise your business or agency in our newsletter? IMAGIN will once again be publishing their printed newsletter (IMAGINews) on a quarterly basis. Take advantage of the opportunity to reach all of its members for a minimal fee. Right now you can get a business card-sized ad for \$75 per issue or \$200 for 4 issues. If you purchase 4

issues worth of ads at one time you will also be eligible for a half page Vendor Spotlight article (on a first-come, first-served rotation), where you can highlight anything related to your business.

To purchase an ad or for more information please contact the IMAGIN Communication Team at communication@imagin.org



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AUTUMN 2015

IMAGIN is a non-profit professional development organization committed to providing opportunities for its members to network with professionals who are using, creating, or maintaining spatial resources within Michigan. IMAGIN serves as a crossroads for spatial information users/developers at all levels of government, business, and non-profit organizations by providing its members partnership opportunities to recognize, share, and create spatial data resources for both traditional and new applications.

IMAGINews publishes original, timely, and innovative articles and news items that advance knowledge regarding GIS, related technologies, and their use within Michigan. IMAGINews welcomes submissions from IMAGIN members and others. Please send article submissions in Microsoft Word format to communication@imagin.org.

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