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December 16, 2020

GIS Excellence Awards 2020

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GIS Excellence Awards 2020

Michael Liddle

Director, Geospatial
Services Division

Department of
Information Technology

GIS Excellence Awards 2020

Agenda

Introduction

Michael Liddle, Director

Geospatial Services Division

Department of Information Technology

Featured Speakers

Gregory Scott, Chief Technology Officer

Department of Information Technology

Jeffrey C McKay, Chairman

Fairfax County Board of Supervisors

Presentation of Awards

Michael Liddle

Sandra Woiak

Closing Statements

Michael Liddle

GIS Excellence Awards 2020

Gregory Scott

Director / Chief
Technology Officer

Department of
Information Technology

GIS Excellence Awards 2020

Jeffrey McKay

Chairman

Fairfax County
Board of Supervisors

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Entries (alphabetically by title)

2019 - 2020 South County Site-Specific Plan Amendment Process – Department of Planning & Development; Marshall Keeney, Graham Owen

COVID-19 Vulnerability Index – Office of the County Executive; Katherine Miga, Robin Wilson

Development of a Point Layer of Stream Roadway Crossings to Support Floodplain Mapping – Stormwater Management; Dipmani Kumar, Elfatih Salim, Chip Galloway

Election Day 2020 – Polling Location Awareness – Office of Emergency Management; Paul Lupe, Avery Church, Matthew Miller (DIT), Judy Lamey-Doldorf (DIT), Mei Wang (DPSC)

Eviction Prevention Dashboard – Office of Strategy Management; Terry Reardon, Alexandra Krafchek, Stephanie Calderon (DIT), Daniel Cabrera (DIT)

Fairfax County Animal Shelter – Expanding Community Outreach – Department of Animal Sheltering; Melanie Leopold, Sandra Woiak (DIT)

Fairfax County Congressional Districts and Supervisor Districts – Department of Information Technology; Daniel Cabrera

Fairfax County Food Resources Map – Department of Neighborhood and Community Services; Caroline Rankin, Matthew Miller (DIT), Judy Lamey-Doldorf (DIT), Franz Arend (DIT), Melanna Forsys (DIT), Diane Bentley (DIT), Kathy Ryan (Fairfax County Public Schools)

Fairfax County Houses of Worship – Department of Neighborhood and Community Services; Caroline Rankin, Ramona Carroll, Gregory Bacon (DIT)

Fairfax County Park Authority Data Contribution – Park Authority; Andrew DeLuca, Justin Roberson, Fariss Agatone, Lynne Johnson

Fairfax County Senate Districts and Supervisor Districts – Department of Information Technology; Daniel Cabrera

Fairfax County ZIP Codes and Post Offices – Department of Information Technology; Daniel Cabrera

Fairfax County's Department of Public Safety Communications NextGen 9-1-1 Efforts – Department of Public Safety Communications; Raleigh Maier

FCDOT – Existing Bicycle & Pedestrian Network Dataset – Department of Transportation; Thomas Wampler, Zachary Krohmal, Lindsay Marfurt, Nicole Wynands

Fire Box Web Swipe App – Fire and Rescue Department; Katherine Good, Eric Fisher

Fire Data Changes in 2020 – Fire and Rescue Department; Katherine Good

Fires from Improperly Disposed of Smoking Materials – Fire and Rescue Department; Eric Fisher

FY2019 RECenter Scholarships with Vulnerability Index – Park Authority; Farris Agatone, Joshua Colman

Health and Human Services Needs Assessment (2019) – Office of Strategy Management; Susan Shaw, Alexandra Krafchek, Michelle Gregory (DMB), Sophia Dutton (DMB)

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Entries (continued)

Historical Gypsy Moth Egg Mass Distribution and Abundance in Fairfax County – Urban Forest Management; Patrick O'Brien, Joan Allen, Daniel Bluntzer, Rachel Griesmer, Rachel Habig-Myers, Katherine Layton

Know the Score: Restaurant Inspection Reporting – Health Department; Lauren Lochstampfor, Adrian Joye, Srijana Tuladhar (DIT), Gregory Thomas (DIT), James Callahan (DIT)

Laurel Hill – Detangling the Knot – Capital Facilities; Yilia Vega-Claudio, Vickie McEntire Anglin, Leanna O'Donnell, Alan Weiss, Christopher Jensen, Luis Benitez Ayala

Mapping Laurel Hill's Lorton Prison Complex/GSA Transfer Proffers – Support for Highest Use Negotiations – Capital Facilities; Yilia Vega-Claudio, Vickie McEntire Anglin, Leanna O'Donnell (DPD), Christopher Jensen, Luis Benitez Ayala, Alan Weiss (OCA)

Mosaic District Cyberpunk Map – Department of Information Technology; Daniel Cabrera

Police Data Transparency Initiative – Police Department; Jeffrey Gallagher, Carolyn Kinney, Kathy Pham, Amy Milliman, James Krause

Potomac River 1945 USGS Map with 2018 Digital Elevation Model Overlay – Stormwater Management; Chip Galloway

Reston Data Visualization Implementation Hub Site – Department of Planning & Development; Daniel White, Beth Elliott, Arpita Chatterjee (DOT), Michael Garcia (FRD)

RISE Grant Program Awards – Department of Economic Initiatives; Scott Sizer, Ingrid Abernathy, Wendy Lemieux, Chase Suddith, Theresa Benincasa, Tanya Burrell (DOF), Stephanie Calderon (DIT), Elliott Stroud (DIT), Patricia McCay (OCA), Andrew Janos (DPMM), Donna Hurwitt (EDA), Dana Mariano (Community Business Partnership)

Site Records Viewer – Utilizing GIS and OpenText to Map Site Records – Land Development Services; Brett Martin, Bill Edwards, Bushra Khan, Jose Baez, Pragnaya Katiki, Matthew Logie, Julia Ward, Radha Avala (DIT), Harish Reddy (DIT)

Supporting Return to School – Department of Neighborhood and Community Services; Muhammad Jahangir, Philethea Duckett

The Fairfax County LiDAR Resources Hub Site – Department of Information Technology; Gregory Bacon

Tree Canopy and Impervious Surface Estimator Application – Department of Information Technology; Gregory Bacon

Web Based Drainage Area Delineation Using LiDAR – Land Development Services; Brett Martin, Gregory Bacon (DIT)

Where Can I Picnic in Fairfax County, You Ask? Let Us Show You! – Park Authority; Fariss Agatone, Morgan Chapin

Where Should We Plant Trees? – Department of Public Works and Environmental Services Director's Office; Yeoanny Venetsanos, Juan Reyes, Brian Keightley (UFM)

Ye Olde Map(e) of Fairfax(e) – Department of Information Technology; Daniel Cabrera

GIS Excellence Awards 2020

Categories

- Best GIS Cartographic Product/Presentation
- Best Use of GIS for Analysis
- Best Web Application
- Best Use of GIS for Public Outreach
- Most Significant Data Contributor
- Best GIS Integration

GIS Excellence Awards 2020

Best GIS Cartographic Product/Presentation

This award is intended to showcase the power of GIS tools in creating accurate, instructive, and visually pleasing printed maps. The map must have been or planned to be used for Fairfax County business, and an original design is required (i.e. the map must not be based on any commonly used templates). Criteria used to evaluate the entries include:

- clarity of purpose and intent
- the use of GIS tools, methods, and operations to go beyond basic cartography
- visual balance and appeal
- inclusion of necessary map elements and conventions
- quality control for typos or other errors



GIS Excellence Awards 2020



Best GIS Cartographic Product/Presentation

FY2019 RECenter Scholarships with Vulnerability Index

Park Authority

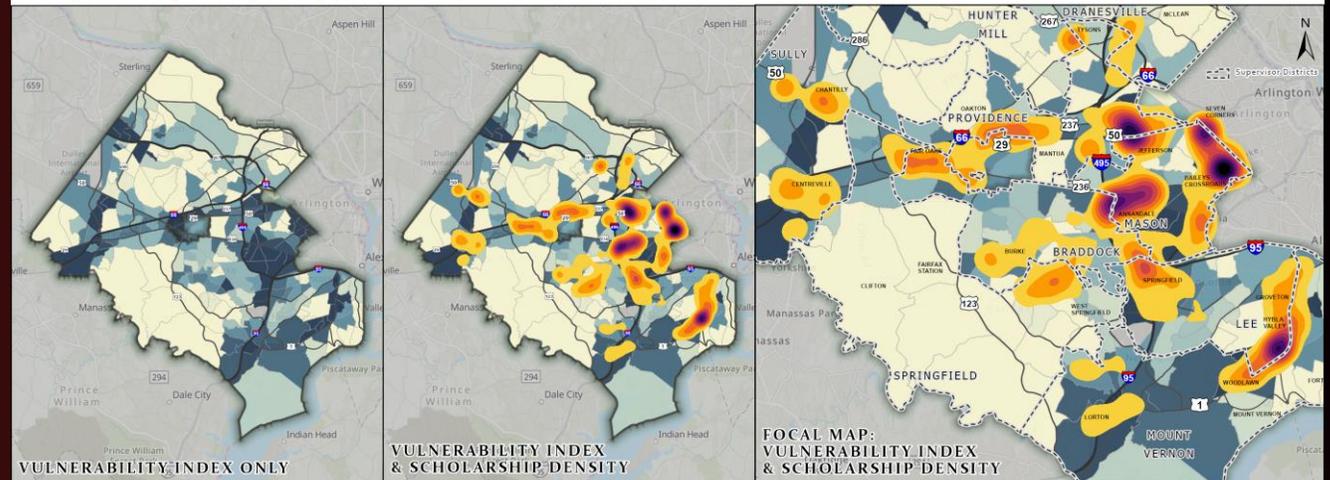
Fariss Agatone, Joshua Colman

FY 2019 RECENTER SCHOLARSHIPS WITH VULNERABILITY INDEX

Fairfax County Park Authority, Park Services: Fiscal Year 2019 Class Scholarships (2019)
Fairfax County Department of Information Technology, One Fairfax
and the Office of Strategy Management: Vulnerability Index (2019)



Published by the Fairfax County Park Authority on February 6, 2020.



THE FAIRFAX COUNTY VULNERABILITY INDEX

The Vulnerability Index was created in 2019 for use by One Fairfax, as well as in the Human Services Needs Assessment produced by Office of Strategy Management. Eight different datasets from the 2007-2013 American Community Survey were used to create the Index. These datasets include: People of Color, Low English-Speaking Ability, Low Educational Attainment, Household Income, Households without a Vehicle, Population without Health Insurance, Housing cost-burdened households, and Severely cost-burdened renters. A score of 1 - 5 was given to each census tract for each indicator, with 5 representing the most vulnerable. The index was calculated by adding all scores together and dividing by 8 - no weighting was applied. For visualization purposes, the data was then classified into 5 classes using natural breaks.

FY 2019 RECENTER CLASS SCHOLARSHIPS

In 2019, the Fairfax County Park Authority awarded thousands of scholarships. Of the 8,134 records shared from Park Services, 8,082 of these matched addresses in Fairfax County and City. This means that 99% of data is displayed in this visualization.

Vulnerability Index

0.75 (Low Vulnerability)
4.875 (High Vulnerability)

Class Scholarship Density Per Sq. Mile

≤66 ≤100 ≤133 ≤167 ≤200 ≤233 ≤267 ≤300 ≤334

GIS Excellence Awards 2020



Best GIS Cartographic
Product/Presentation

Mosaic District
Cyberpunk Map

Department of Information Technology

Daniel Cabrera



GIS Excellence Awards 2020

Best Use of GIS for Analysis

This award is intended to showcase the power of GIS tools in undertaking sophisticated spatial analyses that aid County operations and answer significant questions. Criteria used to evaluate the entries include:

- complexity of analysis; use of tools, scripting, model builder, etc.
- ingenuity/creativity/originality of GIS methods used
- project benefits to a team or department
- effective demonstration of the information and insight gained (e.g., diagrams, maps, presentations, report, text)



GIS Excellence Awards 2020



Best Use of GIS for Analysis

Development of a Point Layer of Stream Roadway Crossings to Support Floodplain Mapping

Stormwater Management

Dipmani Kumar, Elfatih Salim, Chip Galloway

Development of a Point Layer of Stream Crossings in Fairfax County to Support Floodplain Modeling

The Stormwater Planning Division has initiated a project to map regulated floodplains in the County, backed by limited-detail hydraulic models utilizing estimated ultimate development flows. In order to (i) establish the level of effort and cost of developing hydraulic models, and (ii) locate points where bridge or culvert geometric data would be needed for the hydraulic models, it was first necessary to create a countywide point layer of stream crossings.

It was determined that a simple intersect of existing stream hydrography and the roadway centerline would result in identifying additional crossings that were not needed for the hydraulic modeling because the stream hydrography extends well upstream of the 70 acre threshold of regulated floodplains. An additional complication is that many major divided roadways are represented with two lines in the roadway centerline feature.

In order to obtain the desired point layer of stream crossings, the following analytical procedure was adopted:

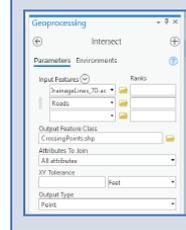
1. A 70-acre stream network was first identified utilizing Spatial Analyst functions within ArcGIS Pro, which consisted of the following steps:
 - a) Using the CON function and an existing Flow Accumulation Grid derived from the most recent County Digital Elevation Model, a raster linear network grid that started at a 70-acre drainage point was created.
 - b) The raster linear network was vectorized using the Stream to Feature tool within the Hydrology toolset available with ArcGIS Pro.
2. The 70-ac stream network created in the previous step was intersected with the roadway centerline, and a series of geoprocessing functions (buffer, multipart to singlepart, and featurto point) utilized to eliminate multiple intersection points on divided highways and major roadways as shown in the attached document.

The final crossings point layer contains 2,455 points representing the intersection of regulated floodplain streams and roadways. This layer will be used to develop initial cost estimates for hydraulic modeling to support the mapping of regulated floodplains in the County. Additionally, this point layer will be utilized to locate available sources of geometric data needed for the hydraulic modeling of crossings such as VDOT, existing FEMA models, or models previously created to support management plans for the County's designated watersheds.

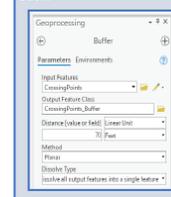
Steps in ArcGIS Pro

1. Add Data and add
DrainageLines_70-ac and Roads
centerlines feature classes.

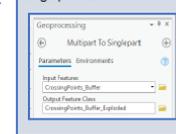
2. Intersect the
DrainageLines_70-ac and
Roads feature



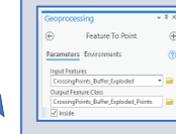
3. Buffer the
CrossingPoints feature as
such:



4. Explode the
CrossingPoints Multipart to
Singlepart as such:



5. Convert the exploded
Buffers to points as such:



6. The result is a single point at each road
crossing:



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Best Use of GIS
for Analysis

COVID-19 Vulnerability Index

Office of the County Executive
Katherine Miga, Robin Wilson



COVID-19 Vulnerability Index



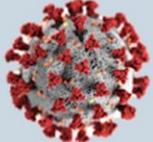

Background

While COVID-19 is a health crisis, we know that health is tied to the conditions that people live in and the opportunities they have for housing, jobs, health insurance, education, and more. The One Fairfax Policy was passed with the recognition that opportunity and vulnerability vary across Fairfax County. Before Coronavirus, some communities in Fairfax were already in a state where poverty, unemployment, lack of access to healthcare and transportation, and other factors made people vulnerable. The pandemic exacerbates those vulnerabilities.

Anyone can get COVID-19, but individual characteristics, and social and economic conditions in the community make some people are more vulnerable than others. Some people are more exposed to the virus because they work in a public-facing essential job, such as healthcare workers, grocery store workers, and other frontline positions. Others live in crowded housing, making it difficult to self-isolate. Some live in areas without medical facilities and lack transportation or health insurance, limiting access to testing and treatment. There are many in the county who do not have the savings to support their families and meet basic needs if they lose their job. Others have underlying health conditions, like heart disease or diabetes, that make Coronavirus more severe.

This COVID-19 Vulnerability Index, based on the CDC's Social Vulnerability Index, shows which areas of the county may be at higher risk for COVID-19 and its effects, and which areas need a continued focus as we move into recovery. The Index complements the data that the Health Department's dashboard, which shows current health data on the epidemic. Combining information about vulnerability, the health status of our community, our response efforts, and community need, an equity-centered approach requires us to identify and mitigate burdens rather than using a one-size-fits-all approach. These maps can help us provide resources according to need in our response and recovery, keeping in mind that the spaces where people live define their opportunities.

As we move toward recovery, we need to ensure that opportunities for jobs, transportation, and affordable housing are available in all communities in Fairfax County so that people are better prepared to contribute to the economy, and when needed, to weather the financial losses that disaster brings. We must remember that economic security is fundamental to public health, and we must do all we can to keep people healthy and secure enough to take care of themselves and their families.



Methodology

The COVID-19 Vulnerability Index helps us understand which areas of the county are vulnerable to COVID-19, and where to target interventions and resources by geography/population for response and recovery efforts. The COVID Vulnerability Index shows five domains individually and as a composite index: Socioeconomic Status, Household Composition and Disability, Race/Ethnicity and Language, Housing and Transportation, and Health. Individual indicators were ranked into 5 classes using natural breaks and given a score of 1-5, with 5 being the most vulnerable (shown in dark blue). The individual indicators were combined, using equal weighting, to create the five sub-indices. The overall COVID Vulnerability Index was created using the five sub-indices and applying equal weighting. The variables in Socioeconomic Status, Household Composition and Disability, Race/Ethnicity and Language, and Housing and Transportation, is from the American Community Survey (ACS) 2014-2018, with the exception of the Free and Reduced-Price Lunch data. The sources of the Health variables are the ACS 2014-2018 and the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS).

Individual Characteristics

- Age
- Gender
- Marital Status
- Health Insurance
- Diabetes
- Obesity
- Smoking
- Chronic Disease
- Disability
- Language
- Transportation
- Housing

Social and Economic Conditions in the Community

- Population Density
- Population Change
- Population Growth
- Population Decline
- Population Stability
- Population Increase
- Population Decrease
- Population Growth
- Population Decline
- Population Stability
- Population Increase
- Population Decrease

Impact

The Fairfax County COVID-19 Vulnerability Index is being used in targeted planning and programming throughout the County. Below are a few examples:

- Neighborhood and Community Services - Community Engagement activities, as well as Food Access and Food Insecurity mitigation efforts
- Department of Public Works and Environmental Services - targeted tree planting activities
- Health Department - locating new community immunization clinics
- Department of Tax Administration - locating tax payment kiosks

Additionally, the COVID-19 Vulnerability Index is being used by non-profit partners. One example is Fairfax Future's study 'Strengthening an Equitable School Readiness Framework for Early Childhood Education.' The COVID-19 Vulnerability Index allowed for a more robust view of the community conditions in the study area than the single results-oriented measure.

The COVID-19 Vulnerability Index will be updated with every annual release of five-year ACS data so that targeted interventions and programs can be tracked for the effectiveness. The goal being that the communities that are currently shown to be vulnerable will be afforded the opportunity to thrive.

Indicator	Description
Below Poverty	Persons below poverty estimate, ACS 2014-2018, B17001
Under 18 Below Poverty	Persons Under 18 below poverty estimate, ACS 2014-2018, B17001
No high school diploma	Persons (age 25+) with no high school diploma estimate, ACS 2014-2018, B06009
Median Household Income	Median Household Income, ACS 2014-2018, B19013
Vulnerable "non-essential" jobs	Food Preparation and serving related occupations, Personal care and service occupations, Installation, maintenance, and repair occupations, Construction and extraction occupations, ACS 2014-2018, S2401
Free and Reduced-Price Meals	Elementary school students who are eligible for free and reduced-price meals, Virginia Department of Education, School Year 2019-2020
65+ years old	Persons aged 65 and older estimate, ACS 5-year DP02
People with a disability	Civilian noninstitutionalized population with a disability estimate, ACS 5-year DP02
Population that speaks English less than well	Persons (age 5+) who speak English "less than well" estimate, ACS 5-year B16005
Population of Color (Race/Ethnicity)	Minority (all persons except white, non-Hispanic) estimate, ACS 5-year B0100H
Severely Burdened Renter	% of renter households paying more than 50% of income on housing, ACS 2014-2018, B25070
Multi-unit structures	Housing in structures with 10 or more units estimate, ACS 2014-2018, DP04
Mobile homes	Mobile home estimate, ACS 2014-2018, DP04
No vehicle	Households with no vehicle available estimate, ACS 2014-2018, B25044
Crowding/overcrowding	At household level (occupied housing units), more people than rooms estimate, ACS 2014-2018, B25014
Population without health insurance	Civilian noninstitutionalized population without health insurance, ACS 2014-2018, S2701
Adults diagnosed with Hypertension	Estimated percent of adults ever diagnosed with high blood pressure (hypertension) in 2017, CDC BRFSS and PolicyMap
Adults diagnosed with COPD	Estimated percent of adults ever diagnosed with chronic obstructive pulmonary disease, emphysema, or chronic bronchitis in 2017, CDC BRFSS and PolicyMap
Adults diagnosed with Asthma	Estimated percent of adults reporting to have asthma in 2017, CDC BRFSS and PolicyMap
Adults diagnosed with Diabetes	Estimated percent of adults ever diagnosed with diabetes in 2017, CDC BRFSS and PolicyMap
Adults reported being Obese	Estimated percent of adults reporting to be obese (a body mass index of 30 or greater) in 2017, CDC BRFSS and PolicyMap

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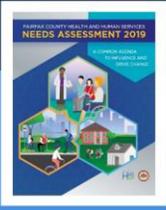


Best Use of GIS
for Analysis

Health and Human Services Needs Assessment (2019)

Office of Strategy Management

Susan Shaw, Alexandra Krafchek,
Michelle Gregory (DMB), Sophia Dutton (DMB)



**Health & Human Services
Needs Assessment (2019)**

The Health and Human Services, Office of Strategy Management (OSM), Data Analytics division, published the Health and Human Services Needs Assessment (Assessment) in October 2019. This Assessment builds upon the previous 2016 Needs Assessment, and uses data and trends to develop a deeper understanding of crosscutting issues impacting the financial stability and social well-being of residents in our community. Three areas emerged that depict the pervasive challenges and needs across the community: Economic Inequities, Transportation Inequities, and Health Inequities. The narrative emphasizes the vital need to effectively plan and coordinate efforts and efficiently align programs and services that help maintain a thriving community for all residents.

To further illustrate these impacts in our community, the 2019 Assessment was expanded to include GIS mapping applications and analysis to visually see and geographically identify where inequities remain.

1 Vulnerability Index

The Vulnerability Index was created combining demographic, housing, income, education, and uninsured indicators by zip code in Fairfax County; these components create the foundation of the Assessment. This spatial mapping tool integrates these indicators into a composite index highlighting those communities within the county who are the most vulnerable.

- Eight indicators were chosen for the index, including: Uninsured Population, Households without a Vehicle, Population of Color, Median Household Income, Burdened Renter Households, Severely Burdened Renter Households, Population who speak English less than well, and Population with Low Educational Attainment.
- Each indicator was assigned a weight that was aggregated to create a composite; this approach, once mapped, shows the variation by colors in vulnerability across the county. The darker the shading of color, the greater vulnerability. Creating these visual cues, allows the readers to see where the needs and challenges remain our community.
- The interactive nature of the index allows stakeholders to click on the map or enter a specific zip code and can begin to understand inequities in their own neighborhoods.
- Layers within the application allows the user to turn on and off data to visually see where the gaps and challenges remain in our community. Additional layers were included for context within the layers including, School Facilities, Elementary, Middle and High School Attendance Areas, and Age.
- The attribute table allows the user to see the data in a table at the bottom of the screen. There is also a feature to export the selected data set in the attribute table to a CSV file.

The index can be found here:
<https://bit.ly/2qYe2vf>

A series of static maps were created for the hard copy of the assessment that depicts the data used within the assessment, including: Population Growth Rate 2010-2019 & 2019-2029; Black/African American Occupied Households Who Are Severely Rent Burdened, Severely Rent Burdened Along with Housing Pipeline in Fairfax County, Services for Older Adults and Persons with Disabilities, Uninsured Population, Percent of Uninsured Population with Household Income Less than \$75,000, and Severely Rent Burdened with Uninsured Population. Results are displayed geographically, showing component values, using a color-coded key for each of the data sets and shaded with the corresponding color to show the variations of inequities by zip code.

Static maps county be found embedded within the Assessment:
<https://bit.ly/37T91hb>

2 Static Maps

3 Needs Assessment Mapping Application

Additionally, the online version brought these static maps into one mapping application that allows readers to functionally and interactively see the data, including additional layers and pop up windows.

- Layers within the mapping application include: Housing Unit Pipeline, IPLS, Population Growth Rate: 2010 - 2019, Population Growth Rate: 2019 - 2029, Uninsured Population, Black/African American Renter Households, Severely Burdened Renter Households, and Uninsured Population with Household Income under \$75,000. Having multiple layers allows the users to visually turn on and off data, filtering one or multiple data points at a time based on chosen criteria.
- The pop-up window displays additional information specific to the selected geography or point, such as the total number of uninsured population by zip code.
- Again, an attribute table is included, allowing the user to see the complete data in a table at the bottom of the screen. There is also a feature to export the selected data in the attribute table to a CSV file.
- The query tool creates a new layer on top of the map based on the variable selections made by the user, for example, percent uninsured greater than 5 percent.
- The print function allows the user to create a PDF, JPG or PNG and print the map they create, including a legend and customizable map title.

The mapping application can be found here:
<https://bit.ly/2jz5N1u>

Understanding how these trends impact the community empowers leaders with knowledge to initiate difficult dialogues to influence and drive change by helping to assess and track vulnerability, analysis in particular geographic areas or socioeconomic sectors, and helping to guide policy decisions, set priorities, and manage progress. The overall framework and utility of the original vulnerability index, became the framework for the recently published COVID-19 Index, that also identified disparities in our community.

GIS Excellence Awards 2020

Best GIS Web Application

This award is intended to showcase the ever-increasing presence of GIS web applications. These applications are a significant foundation for bringing maps, geospatial data, and analysis/data collection tools to a varied audience of county staff and residents. Criteria used to evaluate the entries include:

- effectiveness of the web application in meeting stated purpose
- benefit to the public and/or agency
- incorporation of application into business practices
- aesthetics and ease of use
- use of well-thought-out cartography
- inclusion of innovative and unique tools



GIS Excellence Awards 2020



Best GIS Web Application

RISE Grant Program Awards

Department of Economic Initiatives

Scott Sizer, Ingrid Abernathy, Wendy Lemieux, Chase Suddith, Theresa Benincasa, Tanya Burrell (DOF), Stephanie Calderon (DIT), Elliott Stroud (DIT), Patricia McCay (OCA), Andrew Janos (DPMM), Donna Hurwitt (EDA), Dana Mariano (Community Business Partnership)

RISE Grant Program Awards

2020 GIS Award Submission: Web Application
Scott Sizer, Department of Economic Initiatives

RISE Grant Program Awards

Website for Transparency and Sharing:

The Fairfax RISE Grant website was established to provide updates on RISE Grants awarded. These were done in two major formats, a GIS Dashboard displaying the location of grant awardees along with critical program metrics and a searchable data table.



The award information was updated weekly and will be through December 4, 2020.

Dashboard:

<https://fairfaxcountygis.maps.arcgis.com/apps/opsdashboard/index.html#/1352f53eeea421fa3125b04ef05342f>

Award Table:

<https://www.fairfaxcounty.gov/economic-success/ris-grantes>

Business Name	Supervisor District	City	Amount
...

RISE Grant Program Awards

Website for Program Monitoring and Reporting:

Due to the urgent need, size, and scale of the program the public and elected officials required frequent updates on key program measures, as well as specific geographic distribution of applications, such as by Supervisor District and our municipal partners in the Towns of Vienna, Herndon, and Clifton.

The GIS Dashboard allowed for us to update the data online to display key program metrics.



RISE Grant Program Awards

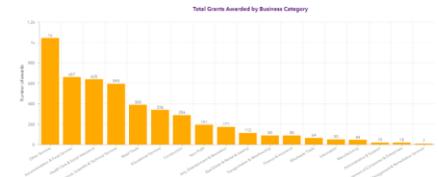
Website for Program Monitoring and Reporting:

The Dashboard provided a single point of information distribution and allowed for standard queries to be performed by staff and residents.

This not only improved program transparency but cut down on reports needed for each Supervisor District, as they were easily searchable and reviewed.

Example of a Query for Providence District:

Providence
Total Grants Awarded: 723
Total Amount Awarded: \$5,020,000
70% of the businesses and/or non-profits awarded are minority, women, and/or veteran-owned.
49% are minority-owned
42% are women-owned
3% are veteran-owned



GIS Excellence Awards 2020



Best GIS Web Application

The Fairfax County LiDAR Resources Hub Site

Department of Information Technology

Gregory Bacon

The Fairfax County LiDAR Resources Hub Site

Landing Page

Fairfax County LiDAR Resources

"What is LiDAR?"

LiDAR (Light Detection and Ranging) is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable returns) to the Earth. These range measurements are used to create a 3D representation of the surface of the Earth and to generate high-resolution digital elevation models (DEMs) and digital surface models (DSMs). The data can be used to create surface maps, terrain models, and other applications.

LiDAR Data Layers and Applications

Fairfax County's latest LiDAR data was captured in December 2018 and meets the US Geological Survey criteria for Quality Level 1 (QL1). At a density of eight points per square meter, it is four times more dense than our 2012/2014 collection. The data is provided for all basins, selected project basins, and more.

The LiDAR Resources Hub site was created and released by the county's GIS & Mapping Services Division in June 2020 to present multiple years of county topographic data. The site shows the available years of data in both raster (image service) and 3D point cloud formats as well as contours derived from the data. Prior to the site's release, both county GIS users and resident data consumers frequently had questions about what data the county had, what the different surfaces represented, and how they could use the data. By providing a gallery of applications and data layers, the hub site aggregates the information in an intuitive and accessible user experience for county GIS users and the public. It also provides project metadata for each flight year, so accuracy information is readily available. The hub site can be accessed at <https://lidar.fairfaxcounty.gov/opendata/arcgis.com/> or from the county's GIS Data page under "Topography Data." The success of the site in meeting its objective resulted in a presentation invitation at the ESRI Imagery Summit in October 2020.

Gallery of Data and Applications

A Little Help

Click on the images below for metadata and additional information on the LiDAR data. These are not intended to be used for any other purpose than to provide information on the data. To get already to our LiDAR image services, please visit our server.

Using LiDAR Image Services in ArcGIS Pro

Using LiDAR Image Services in ArcMap

Instructions for accessing the data from the county's image server are provided to ease the transition to online services over having to download large datasets. Users can follow steps for both ArcMap and ArcGIS Pro access through ArcGIS Online or through direct server connections to use the LiDAR data.

Project submitted by Greg Bacon, Fairfax County GIS & Mapping Services Division

Page 2: Analyses Using LiDAR

Answering Questions with Analysis

LiDAR data has enabled new analysis and visualization capabilities, making it a valuable asset in answering questions about the county. We use the data in a range of GIS analyses, taking advantage of both the ground elevation as well as tree and building heights. This page provides some examples of these analyses.

Line of Sight Analysis

Assessing visibility from one location to another is critical for assessing the visibility of proposed infrastructure projects. In the past, line of sight analysis was often done using a 2D map. LiDAR data provides a more accurate representation of the terrain, allowing for a more realistic assessment of visibility. This analysis can be used to evaluate the impact of proposed projects on visibility and to identify areas where visibility may be affected.

Looking at Change

LiDAR data can be used to identify changes in the landscape over time. By comparing LiDAR data from different years, we can identify areas where the ground surface has changed. This can be useful for identifying areas of erosion, sedimentation, or other changes in the landscape. This analysis can be used to monitor changes in the landscape and to identify areas where further action may be needed.

Drainage Area Delineation

A high accuracy surface enables delineation of drainage areas, both large and small, for a specific point on a stream. Knowing where water goes is essential in evaluating proposed developments and effects on water quality and quantity.

Differential LiDAR Analysis of Stream Erosion and Restoration Areas

Page 3: Legacy Topographic Data

For the foreseeable future, the county will still provide the 2009 bare earth digital elevation model (DEM) through a web map interface. Though users are encouraged to use the more recent, higher accuracy LiDAR image services, they can still download historical topographic data. Consolidating all topographic data under the umbrella of the hub site helped to draw a comparison between the data of the past and the new direction the county is moving in.

GIS Excellence Awards 2020



Best GIS Web Application

Web Based Drainage Area Delineation Using LiDAR

Land Development Services

Brett Martin, Gregory Bacon (DIT)

Web Based Drainage Area Delineation Using LiDAR

BACKGROUND

Fairfax County, Land Development Services has developed an innovative Web GIS solution to streamline the process for delineating drainage areas using LiDAR data. The workflow involves hydro conditioning the LiDAR derived Digital Elevation Model (DEM), creating a flow accumulation grid with drainage area values, and developing a drainage area delineation geoprocessing service. The new tool gives county staff across multiple agencies the ability to easily delineate watersheds using the most accurate elevation surface available.

The new tool replaced an existing Desktop Tool that was slow, cumbersome, and required a Spatial Analyst Extension. The new tool is hosted on an ArcGIS Server with a Spatial Analyst Extension. The run time decreased exponentially, and it is accessed through an easy-to-use ArcGIS Online Web App.

HYDRO CONDITIONING PROCESS

The Drainage Area Delineation Tool is only as good as the data the tool consumes. Hydro conditioning the DEM was the most time-consuming part of this project. We started with a LiDAR derived Bare Earth DEM. The LiDAR meets the USGS criteria for Quality Level 1 (QL1). The other integral GIS data needed was the Stormwater Infrastructure (Storm Net) and Stream Centerlines (FWD). This dataset containing all Pipes interconnected with the Stream Centerlines was burned into the DEM. The following methodology were used the Hydro Conditioning Methodology.

1. Fill Sinks
2. DEM Reconditioning (Burning Storm Net and FWD)
3. Fill Sinks (to get rid of the sinks potentially introduced by the DEM Reconditioning)
4. Flow Direction
5. Flow Accumulation

Once we had the Hydro Conditioned DEM, the Flow Accumulation and Flow Direction grids, a rigorous quality control process was performed by subject matter experts from multiple county agencies.

BARE EARTH DEM

BARE EARTH DEM WITH STORM NET

BARE EARTH DEM RECONDITIONED

FLOW ACCUMULATION AND DIRECTION

The Flow Direction layer and Flow Accumulation Layer are both raster derivatives of the Hydro Conditioning Process. These layers are the input parameters for the Drainage Area Delineation Tool. The Flow Direction Layer determines which way the water will flow in each cell in the raster. This is based on the steepest descent into the next cell, or maximum drop from each cell.

The values in the Flow Accumulation Layer represent the accumulated flow into each cell based off the Flow Direction Layer.

This layer is not only used as an input to the tool, but also a visual reference when using the tool. When the user drops their Pour Point (lowest point of elevation) where they would like to delineate their drainage area the point snaps to the Flow Accumulation Layer. This makes it essential to have this layer published as a service and added as a visual aid for pour point creation in any app that uses the tool. To make the layer even more beneficial the values in the layer were converted from accumulated flow (count of cells that flow into a given cell) to the actual drainage area in acres for that cell. This was done by using the raster calculator to multiply each cell value by the area (acres) of the cell. This gives you the drainage area in acres to every cell in the county. This new layer was published as an image service and added to the app. The service can be seen below and in the Tool in Action section.

GEOPROCESSING SERVICE

The next step was publishing the geoprocessing service. The existing desktop tool was built using Model Builder. There were several modifications needed to successfully publish the model as a web tool in ArcGIS Pro. These modifications were primarily related to the format of the output parameters. You can see these modifications in the last couple geoprocessing tools in the model below. Once the model was successfully published it was configured in the Web App Builder Geoprocessing Widget.

THE TOOL IN ACTION

Step 1: Locate study area and select Pour Point

Step 2: Zoom out and click run

BENEFITS

The new tool gives Department of Public Works and Environmental Services Ecologists the ability to perform preliminary steps in evaluating relationships between important factors, such as land use and hydrology, their influence on stream condition, water quality, and aquatic life, as well as changes in these factors over time. Land Development Services Plan Review Engineers rely on the application to obtain the data they need to calculate the flow for a pipe or channel, to confirm that it is still adequately sized for its design year storm, and to check for potential drainage problems in unmapped floodplains. Overall, the tool has contributed to streamlining drainage area delineation in Fairfax County.

NEXT STEPS

The next step with the Drainage Area Delineation Tool is to make it available to the public. LDS will be publishing a public version in the coming months. The Hydro Conditioning process will also be revisited yearly as we receive new LiDAR or updated Stormwater Infrastructure (Storm Net). This will ensure that we are using the most current elevation surface and all new pipe and stream data is considered.

Land Development Services

GIS Excellence Awards 2020

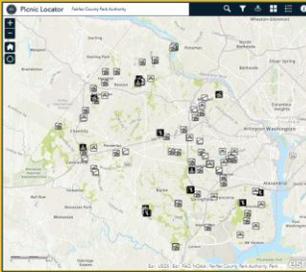


Best GIS Web Application

Where Can I Picnic in Fairfax County, You Ask? Let Us Show You!

Park Authority

Fariss Agatone, Morgan Chapin



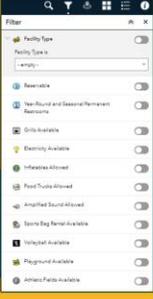
SUMMARY

The Park Authority has been maintaining the Picnic Locator Web Application since 2018. With over 73,000 views since its creation, this application is a critical part of our public presence. In December 2019, we implemented a series of updates in the transition to Version 2.0. Most importantly, we connected our reservation system – RecDynamics – to each record in the dataset. This allows patrons to use the Picnic Locator to search and filter for their preferred site, then make a reservation in just a few clicks.



UPDATES

In order to serve the public, the inventory of sites has been completely reviewed and re-organized to include all first-come-first-served locations. Information on whether a permit for a food truck is allowed at each location and whether a playground is nearby have both been added for Version 2.0. Several usability updates have been implemented. The symbology for the application now shows a unique symbol for each facility type. A splash screen has been added to introduce new users to the purpose of the application, as well as the new symbology. The filters each have a unique icon that is associated with the filter's purpose. For assistance using the application, the Help icon provides a complete description of the functionality contained within the application.



FILTERING CAPABILITIES

Clear filtering options are a must for our patrons. The Picnic Locator allows for filtering on facility type, as well as the reservable status of each location and the amenities that are available. The Filter Widget will display all records that match with each filter selected.

Where Can I Picnic in Fairfax County, You Ask? Let Us Show You!

"THE PICNIC LOCATOR" WEB APPLICATION

The Park Authority's Picnic Locator 2.0 is here! A new version of one of our most popular web applications makes it easier than ever to locate and reserve a picnic spot in a Fairfax County park. With the new application, picnickers can now make reservations online. Visitors to the web application can use the filters to find the rental facility that best meets their needs. Search for amenities such as grills, electricity, volleyball courts and athletic fields, and nearby playgrounds. In addition, there is information on whether a permit for a food truck can be acquired at each location. Access maps of each reservable site, too. To reserve, just open the pop-up window for the desired location, then scroll down and click on "More info" next to "Reservation Link." This will take users away from the Picnic Locator application and into the reservation system. For spontaneous moments, the Picnic Locator also includes all the Park Authority's first-come, first-served picnic locations.

RECDYNAMICS RESERVATIONS

A series of maps was also developed for integration with the RecDynamics software. Each site now has a standard map that matches the cartography of the Picnic Locator. This provides an optimal experience for the patrons, as they can make their selection using the filters in Picnic Locator, and then view this same contextual information in RecDynamics.



2020 WEB APPLICATION AND USE OF GIS FOR PUBLIC OUTREACH CATEGORIES



Author: Fariss Agatone, Fairfax County Park Authority. Questions? Email Fariss.Agatone@fairfaxcounty.gov
Gratitude to Morgan Chapin for her contributions. Picnic Locator: <https://www.fairfaxcounty.gov/parks/picnic>



GIS Excellence Awards 2020

Best Use of GIS for Public Outreach

This award is presented to the agency that best utilizes GIS to serve the public with map documents, customer service operations, press relations, or public events. A totality of an agency's GIS public outreach efforts over the last 12 months will be evaluated rather than just one specific project. Criteria used to evaluate the entries include:

- effectiveness of the GIS work to the outreach effort
- degree to which a difficult message was clearly communicated
- complexity of cartography, data analysis, customization and/or programming
- adaptability to future expansion/modification
- contribution of GIS as a planning tool for the outreach effort



GIS Excellence Awards 2020



Best Use of GIS for Public Outreach

Fairfax County Food Resources Map

Department of Neighborhood and
Community Services

Caroline Rankin, Matthew Miller (DIT),
Judy Lamey-Doldorf (DIT), Franz Arend (DIT),
Melanna Forsys (DIT), Diane Bentley (DIT), Kathy
Ryan (FCPS)

BACKGROUND
This application was designed to help Fairfax County individuals and families find the nearest food resources to their location. The FCPS meals distribution sites have been established to provide meals. Other sites are provided by neighborhood centers, community centers, and other non-profit providers.

OUTREACH
The Food Resources Map was designed to quickly and easily identify where to obtain food and prepared meals. This map is linked prominently on the COVID-19 Geospatial Resources Hub Site.
Residents can use the map on a computer or a smart phone, in Spanish or English, and focus on locations close to home and work. County staff use the map to work with residents experiencing food insecurity, and conditions associated with food insecurity including homelessness and job loss.

ADAPTABILITY
As FCPS and Community Providers have observed patterns of use and need in the community, they have strategically adjusted the times, days, and locations for food distribution to equitably meet community needs. As these updates are made, changes are communicated to the GIS team, and the public facing map is updated.

CLARITY
As the COVID-19 pandemic took hold, the response from FCPS and community food providers to organize and offer food distribution locations throughout the county was monumental. The static lists of food distribution sites can be overwhelming and quickly outdated. The ability to see food distribution sites, search for locations around a specific address, and even get directions to a food distribution site can help ease some of the anxiety felt by those experiencing food insecurity. Users can click on an icon and get detailed information about where food is distributed, a direct link to a food provider's website, any eligibility requirements to receive food, the types of food distributed, how to access the food, and any other relevant details.

Fairfax County Food Resources Map
Fairfax County Public Schools (FCPS) and Fairfax County Government
<https://www.fcps.edu/return-school/food> <https://www.fairfaxcounty.gov/maps/food-resources>

Food Resources Fairfax County, Virginia Fairfax County's Basic Needs Assistance Information

Find address or place

Legend

- Neighborhood & Community Sites
- FCPS Meal Kit Pickup
- FCPS Grab & Go Meals
- FCPS Bus Meal Service Stops
- Nonprofit Food Providers

Find Closest Food Resources

Enter your address or physical location from the map to find the nearest food resource. Clicking on a resource will show further details and provide directions.

Show results within 2 Miles

- FCPS Meal Kit Pickup (1)
- FCPS Grab & Go Meals (8)
- FCPS Bus Meal Service Stops (14)
- Nonprofit Food Providers (3)

Fairfax County's Basic Needs Assistance Information

Find Closest Food Resources

Enter your address or physical location from the map to find the nearest food resource. Clicking on a resource will show further details and provide directions.

Show results within 2 Miles

- FCPS Meal Kit Pickup (1)
- FCPS Grab & Go Meals (8)
- FCPS Bus Meal Service Stops (14)
- Nonprofit Food Providers (3)

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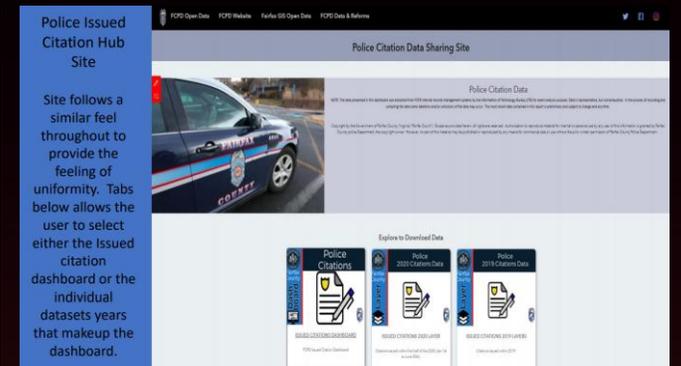
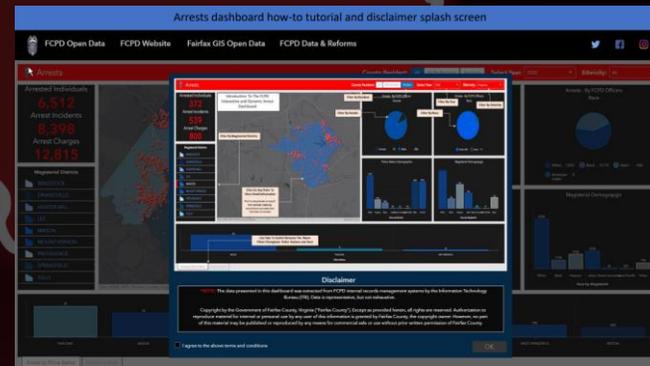
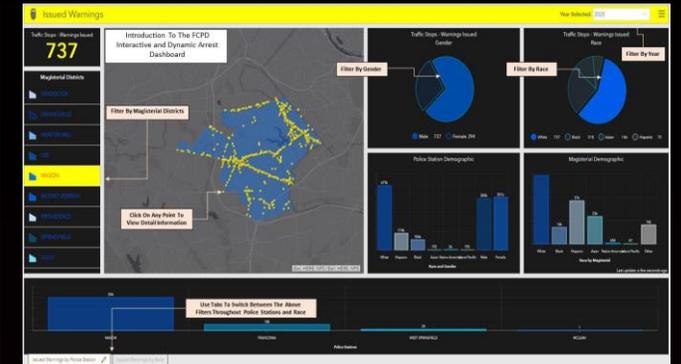


Best Use of GIS
for Public Outreach

Police Data
Transparency Initiative

Police Department

Jeffrey Gallagher, Carolyn Kinney,
Kathy Pham, Amy Milliman, James Krause



GIS Excellence Awards 2020

Most Significant Data Contributor

This award is presented to the agency that has created or refined the most significant spatial data for the County. Criteria used to evaluate the entries include:

- significance of the data for the county and/or agency
- importance to agency's long-term business processes
- level of effort required to create/maintain the data
- sophistication of process to create/maintain the data



GIS Excellence Awards 2020



Most Significant
Data Contributor

Fairfax County Park Authority Data Contribution

Park Authority

Andrew DeLuca, Justin Roberson,
Fariss Agatone, Lynne Johnson

Data Design Process

All data created by the Fairfax County Park Authority goes through a rigorous, iterative process to develop an effective, accurate, and focused GIS layer. This process ensures the data will meet all business needs of the Park Authority while also creating effective data sourcing to ensure it stays temporally accurate.

Fairfax County Park Authority Data Contribution

Authors: Andrew DeLuca, Justin Roberson, Fariss Agatone, Lynne Johnson.
Questions? Email: Justin.Roberson@fairfaxcounty.gov

Introduction

For the past 3 years the Fairfax County Park Authority has moved to within reach of using and maintaining enterprise level GIS data in all major business processes. Creating and maintaining this data requires a standard, repeatable data design process as well as accurate documentation. This poster illustrates the types of enterprise level data the Park Authority has generated over the last three years as well as the process and documentation that goes into each individual dataset.

- Data Sourcing** – Authoritative data sources are compiled to feed into the new dataset. Sources can be from existing Fairfax County data, outside jurisdiction data, or other data sources. The format of the reference data can be location based, tabular, or even word of mouth.
- Schema Design** – After sourcing data, a schema is designed to hold the information deemed critical by the Park Authority GIS team. This is created based on agency business requirements and general informational needs of the public.
- Stakeholder Review** – The data and schema are reviewed by a designated group of stakeholders with subject matter expertise. They determine if the data includes the correct information required to complete agency business processes.
- User Testing** – The data is pushed into a development application where agency staff can view it spatially and review whether it addresses their business needs.

Types of Data

The Fairfax County Park Authority (FCPA) GIS team maintains data for all areas of the organization:

- Facility data for operations and maintenance staff
- Parks, planning, & land records information for planning and real estate acquisition staff
- Natural resources data for our ecologists and resource management staff
- Cultural resources data for our heritage preservation staff and archeologists
- Data for public information which guide the public to all our park system's offerings

Metadata Documentation

During development, all Park Authority data is documented using a standard template. This template includes the recorded metadata, table properties, privileges and fields of a table, view, or layer. This document also includes a data dictionary which provides use and type information of each field as well as a data capture methodology which illustrates how the data is collected for the authoritative dataset.

Data Contributed 2018-2020

Dataset Name	Data Type	Description
Courts	Park Facilities	All outdoor sports courts (Tennis, Basketball, Volleyball, etc.)
Playgrounds	Park Facilities	Playgrounds and play equipment such as swing sets and bouncy animals
Diamond Fields	Park Facilities	Softball and baseball fields
Rectangle Fields	Park Facilities	Natural surface and synthetic rectangle sport fields
Dog Parks	Park Facilities	All off-leash dog parks
Skateparks	Park Facilities	All skateparks in Fairfax County
Garden Plots	Park Facilities	Rentable garden plots for community use
Park Maintenance Areas	Operations	Boundary polygons of the Park Authority's six maintenance areas
Deer Browse Impact Plots	Natural Resources	Plot level data that measures the amount of deer herbivory on woody vegetation
Invasive Management Areas	Natural Resources	Inventory of all county volunteer invasive manage area sites
Restored Ecosystems	Natural Resources	Park Authority's inventory of completed habitat restoration projects
Vegetation Community Classification	Natural Resources	Complete vegetation community inventory of all park natural areas
Rare Species Surveys	Natural Resources	Surveys that document the presence or absence of rare plants and animals
Historic Structures	Cultural Resource	Inventory of historic structures located on Park Authority property
Reservable Facilities	Public Information	Data for use in the Picnic Locator application to aid citizens in finding a park facility to rent
Resident Curator Properties	Public Information	All historic properties that are included in the county's resident curator program

GIS Excellence Awards 2020



Most Significant
Data Contributor

FCDOT – Existing Bicycle & Pedestrian Network Dataset

Department of Transportation

Thomas Wampler, Zachary Krohmal, Lindsay Marfurt, Nicole Wynands

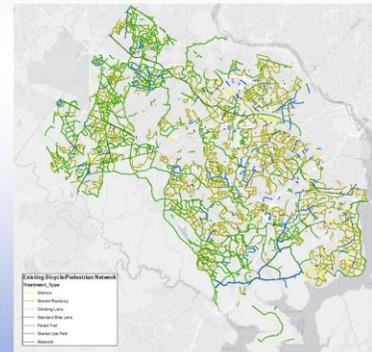
FCDOT—Existing Bicycle & Pedestrian Network Dataset

Fairfax County Department of Transportation Bicycle and Pedestrian Programs aim to enhance the quality of life of our residents, through enhanced safety and access on the road for all, increased awareness of the benefits of their modes of transportation for leisure and commuting, and improved connectivity through infrastructure improvements that accommodate biking and walking within Fairfax County. To help the variety of planning groups within the Department of Transportation coordinate efforts, a Bicycle & Pedestrian Network Dataset was created to help track existing conditions as they relate to bicycle and pedestrian on-road and off-road features.

The dataset is meant to bridge the gap between the planners implementing the Comprehensive Transportation Plan and planners implementing the Bicycle Master Plan by providing information relevant to both so that both sides can coordinate efforts for improvements within the shared right-of-way space. The dataset was also designed with network connectivity in mind so in addition to the dataset being used to review existing features, the dataset can also be used to create routes and service areas using ArcMap Network Analyst to assess the connectivity of the bicycle/pedestrian grid.

This dataset currently does not contain every address in the County as not all addresses are contained like friendly. The initial design of the dataset was to contain only bike features, but due to the large volume of off-road bike features being pedestrian friendly the decision was made to include pedestrian roads for consideration in the dataset. As a result, most of the "Bike/Friend" features when present are denoted as "Substandard" meaning they do not conform to the current standards for bikeable sidewalks.

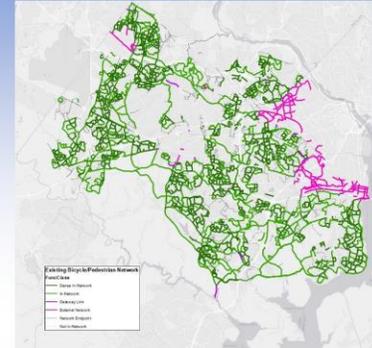
The dataset was initially designed and created in early 2019 and released for use by County employees in April 2019, however a major effort was made to create network functionality in January 2020 with additional updates to fully populate attributes relevant to the Comprehensive Plan & Bike Master Plans in the following months. This year, 1554 features were added to the existing 2019 in the initial dataset (30% increase) in quarterly updates with a goal of obtaining 90% coverage of existing "bike friendly" features by year end. Feasibility of maintaining equal coverage of pedestrian center features is being evaluated but the expected goal is to maintain biannual updates going forward.



Map showing features symbolized by "Treatment Type". The Existing Bicycle/Pedestrian Network dataset can be used as an "inventory" of features used to bicyclists and pedestrians to traverse the County. The dataset was initially built to be useful for planners to be able to track features in existence and to be able to plan improvements where gaps are present in the system. To facilitate this a number of "Standard Crossing" (not shown in legend) are included in the dataset to allow simple network datasets to be created and the network analysis extension in ArcMap allows for route and service areas to be created from this dataset.



Map of features added between initial dataset creation in April 2019, the final dataset consisted of 2042 features. 1554 features were added over the course of the year and nearly every feature was added with complete relating to the quality of the feature and its suitability for biking.



Map showing features symbolized by "Functional Classification". The Existing Bicycle/Pedestrian Network dataset can be used to identify areas of the County where there is no bicycle/pedestrian access is available. To help planners identify these areas a functional classification was created to define segments as part of a "Sense in Network" grid consisting of 3 or more segments enclosing a 1/2 square mile area. A "Sidewalk Gap" is a feature as part of an "External Network" such as a trail leading into an adjacent County or the City of Alexandria. A "Network Endpoint" where the feature does not connect to any other feature. Or some features are disconnected from the network at large and cannot be accessed from outside.

Line ID	Line Name	Treatment Type	Functional Classification	One Way	Bike Lane	Comprehensive Plan	Planning District	Subdivision District	Special Planning Area	Amenity	Substance	Comments
1000000001	1000000001	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000002	1000000002	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000003	1000000003	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000004	1000000004	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000005	1000000005	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000006	1000000006	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000007	1000000007	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000008	1000000008	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000009	1000000009	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000010	1000000010	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000011	1000000011	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000012	1000000012	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000013	1000000013	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000014	1000000014	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000015	1000000015	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000016	1000000016	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000017	1000000017	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000018	1000000018	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000019	1000000019	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000020	1000000020	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
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1000000033	1000000033	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000034	1000000034	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000035	1000000035	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
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1000000045	1000000045	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000046	1000000046	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000047	1000000047	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
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1000000049	1000000049	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None
1000000050	1000000050	Shared Pathway	Shared Pathway	No	No	Yes	North Virginia	North Virginia	None	None	None	None

Table of attributes. Each feature is recorded with an official "Feature Name" for identification purposes. A "Treatment Type" defines what type of feature is present while the "Functional Classification" defines the segment as part of a Sense in Network grid, endpoint, or a link not connected to the overall network. "Bike Plan" and "Transportation Plan" denote whether an improvement is proposed on either the Bicycle Master Plan or Comprehensive Transportation Plan maps. This notifies planners to check other documents to find existing policies can be received before moving forward. "Standard" tracks whether an improvement has affected features since their creation, as this time the field has been unused. "Comments" have largely been populated by planner's notes as to the suitability of the segment for biking. Notable comments include the speed limit and average daily traffic (ADT) for shared roadways, bike lanes, and other on-road features. WASH and whether the feature meets current standards for network/route design.



GIS Excellence Awards 2020



Most Significant
Data Contributor

Fire Data Changes in 2020

Fire and Rescue Department

Katherine Good

Fire Data Changes in 2020

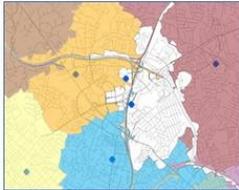
Fairfax County Fire and Rescue Department

New Fire Station 444, 1775 Old Meadow Ln, McLean, VA 22102

The opening of a new fire station requires a team effort. The station must be built and furnished, emergency vehicles must be purchased or transferred, personnel must be hired or transferred, computer systems installed, and new GIS based data added to the Computer Aided Dispatch System (CAD) for 911 calls.

Many departments are involved with new GIS data: DIT GIS* enters the station driveway and commonplace name, LDS creates the address point, DPSC & FRD staff at DPSC enter the station definition and assign emergency units to the station. FRD GIS staff create the GIS data for the fire station, fire facility, fire box areas, and other data, as required.

The first due area is based on the streets and addresses assigned to the closest (by time) fire station. This is determined using Esri's Network Analyst Service Area Solver.



Service area determination of new fire station area.

The service area output data is adjusted such that the property, address point, buildings and corresponding street fall into the same polygon. This creates the First_Due data layer.



Service area before cleanup:
After cleanup:

The fire box area is based on the 3 closest fire stations by time. This is determined over the new first due area by eliminating the first due fire station and rerunning the Service Area Solver. This process is repeated after eliminating the second and first due fire station. Further refinements are made for the break points (of the 3 closest stations) using the Closest Facility Solver, also a part of Network analyst.

***Department Abbreviations:**
 DIT GIS: main GIS Office in the Department of Information Technology
 DTA: Department of Tax Administration
 LDS: Land Development Services
 DPSC: Department of Public Safety Communications
 FRD: Fire and Rescue Department



Using all this information, the fire box boundary is drawn using editing tools in ArcMap. Common tasks involve splits, merges, and reshapes in the original fire box data. At the same time, various attributes are changed so a record of the old values are kept and records needing mass updates are flagged for future updates.

A centroid is generated for each fire box. Each centroid location is reviewed in relation to fairness to all responding fire stations.

A complete run order (order in which every fire station would arrive to the center of each box) is created using Esri's Network Analyst OD Cost Matrix Solver.

Times are calculated from every fire station to the centroid of each fire box area. The times are ordered from shortest to longest.



Box	1	2	3	4	
40141	401	444	108	429	103
40142	108	103	401	106	102
40143	401	106	108	444	103
40144	108	103	106	102	103

These become the backup run order in CAD if the Automatic Vehicle Location (AVL) dispatch fails. In addition, a human readable list is generated using Power Tools then reformatted in Excel. Finally, an opposite fire box list and run order is created for areas over the interstates. The lists and fire box GIS data are major components of CAD.

GIS Excellence Awards 2020

Best GIS Integration

This award is presented to the agency that has integrated GIS into their operations to the greatest degree. Agencies that have a long history of GIS, as well as agencies that are in the beginning stages of GIS integration, will be evaluated separately. Criteria used to evaluate the entries include:

- effectiveness of the integration in meeting its stated goal
- increased use of GIS in the agency, either directly or through agency-generated GIS products
- increased agency efficiency as a result of GIS
- demonstration of significant effort to train staff in GIS
- ingenuity/creativity/originality of GIS methods utilized
- ability to gain insights into data/project/issue as a result of the integration
- potential for further GIS-related growth



GIS Excellence Awards 2020



Best GIS
Integration

Fairfax County Animal Shelter - Expanding Community Reach

Department of Animal Sheltering

Melanie Leopold, Sandra Woiak (DIT)

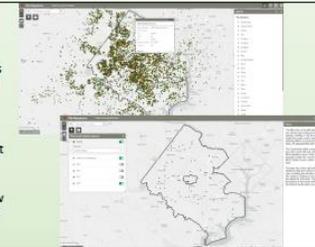
Fairfax County Animal Shelter – Expanding Community Reach

Late in 2019 the Department of Animal Services reached out to the GIS Division to assist in visualizing the services we provide to the community. The result was three interactive mapping applications focused on the location of residents utilizing our services. These apps have been hugely helpful in understanding the distribution of our customers as well as in planning to better serve our community.



This mapping has been instrumental in helping us understand our reach into the community – both areas we are serving well and other areas where there is great potential. We are looking at surgeries and vaccinations since 2016 and we update the information quarterly. Analyzing this data in a visual format has been very helpful in easily seeing where we are strong and where we have room to grow. The clustering functionality allows us to easily identify areas where we have a strong presence and, conversely, where we do not.

Understanding our reach in the community and where our animals are going when adopted is incredibly helpful. With this information we are targeting our Outreach and Community programs to areas where adopted animals are living. It has also helped us identify areas where potential adopters may not know about us and the resources we provide. In the two examples you can easily see the benefits of filtering the data – it makes the data so much clearer and actionable. In the first screenshot all adoptions for all years are shown. The second screenshot filters the view to just Domestic Rabbits that have been adopted within the county in 2018.



Low Cost Rabies Clinics are held several times a year at different county locations. Mapping of the addresses of participants over the last three years contributed to a change in clinic locations for our 2020 program. The ability to filter by clinic location and animal type allowed us to design a schedule more aligned with residents using the clinic, adding locations in underserved areas. Not all of our plans were put into place due to COVID-19 but we are ready to proceed once it is safe.

GIS Excellence Awards 2020



Best GIS
Integration

Site Records Viewer – Utilizing GIS and OpenText to Map Site Records

Land Development Services

Brett Martin, Bill Edwards, Bushra Khan, Jose Baez, Pragnaya Katiki, Matthew Logie, Julia Ward, Radha Avala (DIT), Harish Reddy (DIT)

Site Records Viewer Utilizing GIS and OpenText to Map Site Records



BACKGROUND

The Site Records Viewer (SRV) provides public access to thousands of approved site records. The SRV gives users the ability to download or view PDFs of approved site-related plan records, such as infill lot grading plans, resource protection area studies, and site plans. The SRV was a collaborative effort by Land Development Services (LDS) and the Department of Information Technology (DIT). Prior to the SRV, these records were only available to the public by submitting a request to Records and Information Management (RIM). The new workflow integrates GIS with the county's document management system called OpenText, integrating OpenText with GIS adds spatial reference to the documents making them searchable by address, parcel number or document name in an easy-to-use ArcGIS Online Web Application.

SPLASH SCREEN

The SRV is a public facing ArcGIS Online Web Application. LDS GIS held several training sessions for County staff and the app was part of the Joint Training Academy (JTA) Deep Dive into Land Development GIS class. A five-minute video tutorial was also created and linked from the SRV's splash screen for the public. The splash screen includes a brief description of the app and a link to submit a request to RIM for any site records that cannot be located.

THE WORKFLOW

The process starts with RIM staff scanning in the site records. This was a time-consuming process with the first upload of 60k site records consisting of hundreds of thousands of pages. However, all site records are now scanned in upon approval and saved to a network file storage location.

LDS Information Technology Services (ITS) then runs a query against the network filed storage for a list of the file names with the location of the file. They then run multiple formulas to parse the filename data into a CSV. ITS then runs the parsed CSV against the Plans and Waivers System (PAWS) for additional data mapping. This includes the parcel numbers, addresses and the records type associated with each site record.

The CSV is then sent to DIT to import into OpenText along with the appropriate metadata. Once the records are loaded into OpenText, DIT runs a custom service to map a public URL to the OpenText file location. DIT then provides LDS GIS with a CSV containing the parcel number, document name, record type, address and URL for each record.

LDS GIS runs the Make Query Table Geoprocessing Tool using the Archived Parcels layer and the CSV as the input. There is a many to many relationship between site records and parcels. A parcel can have multiple site records and a site record can contain multiple parcels. This tool duplicates the geometry of the parcel for each unique record in the CSV, ensuring that every parcel associated with a particular site record is linked back to the site record pdf. Once the tool is run, the results are appended to the Site Records feature class in the Enterprise Geodatabase.

SEARCHING RECORDS

The user can search by address, parcel number or document name. Once they have navigated to the location of interest the site records can be accessed by clicking the hyperlink in the popup.

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The user can search by address, parcel number or document name. Once they have navigated to the location of interest the site records can be accessed by clicking the hyperlink in the popup.

SITE RECORDS FILTER

The Site Records Filter lets the user filter the site records by the record type. The widget will allow you to filter on multiple record types at once if needed. The filter also works with the Site Records Near Me widget.

SITE RECORDS NEAR ME

The Site Records Near Me widget enables the user to generate a list of Site Records within a certain geographic distance from an address or point on the map. A point can be dropped on the map or the user can search by address.

BENEFITS

The SRV has given the public open access to 60,000 plus site records in an easily searchable ArcGIS Online Web Application. This convenience also reduces the number of records request that RIM staff must process freeing up valuable staff time. The public can simply search by address and have site records history of Fairfax County at their fingertips.

NEXT STEPS

The next step for the SRV is to automate the update process. We are currently on a monthly updating cycle. The goal is to have the SRV updated with approved site records on a nightly basis.

Site Records Viewer

Land Development Services



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December 16, 2020

GIS Excellence Awards 2020

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GIS Excellence Awards 2020

Judges (alphabetically by last name)

Sue Carlson - GIS Web Administrator, Loudoun County GIS – Sue has been with Loudoun County for 13 years. She has a master's degree in GIS from the University of Redlands and is a GISP.

Tom Conry - GIS Manager, Fairfax County (retired) – Over the course of Tom's 20-year career with Fairfax County, the GIS Department evolved into one of the most respected local government GIS offices in the country. He has a B.A. in Chemistry from LaSalle University, an M.S. in Chemistry from the University of Maryland, and an M.S. in Computer Science from John Hopkins University. Tom retired to the Palmetto state in 2019 and spends much of his time traveling.

Tim Ernest - GIS System Administrator, Arlington County GIS – Tim has been with Arlington county's GIS program for 29 years in various roles. He started his GIS career in the Army as a military geographer and analyst. In '90 he left the Army to work for Arlington and became the County's first Cartographer in '93 and then their GIS System Admin in 2000.

Kathryn Kearanen - HS Program Coordinator, James Madison University – Kathryn is an instructor at James Madison University and the co-founder of the dual enrollment Geospatial Semester. She taught GIS at Thomas Jefferson High School for 7 years before retiring from Fairfax County Public Schools. She is a Wake Forest University graduate, a certified K-12 Esri trainer, and has co-authored six training manuals for Esri Press.

David Khoeler – IT Program Manager, DC Department of Public Works – David is a certified GIS Professional with 26 years of experience in the field of GIS and information technology. He works with other GIS team members at DPW and throughout District government to develop and maintain applications that capture data and track operations in the field, to provide data analysis opportunities, and system integration capabilities for DPW and coordinating agencies.

Ken Lanfear - USGS (retired)– Mr. Lanfear was a leader in introducing Geographic Information Systems (GIS) within the U.S. Geological Survey (USGS) and built some of the earliest spatial data sets of the U.S. watersheds. He developed USGS's Advanced Arc/INFO training course and trained many of USGS's top GIS scientists, and was the founding chair of the Federal Geographic Data Committee (FGDC) Spatial Water Data Subcommittee. He currently is the Hunter Mill representative on the Environmental Quality Advisory Council.

Billie Leff – Cartography and Information Products Lead, Esri – Billie has been with Esri Professional Services for 10 years. She is a graduate of the University of Wisconsin – Madison, with a master's degree in remote sensing and geospatial information technology. She also holds degrees in environmental science, anthropology, and business administration. Prior to working for Esri, Billie was the GIS manager at National Geographic for 6 years, managing the team which provided all content for Society-created maps.

Greg Licamele - Public Information Officer, Fairfax County Office of Public Affairs – Greg leads digital content strategy for the county website and social media. He has served the county for nearly 15 years in a variety of public affairs roles. He holds a bachelor's degree in journalism from St. Bonaventure University and two master's degrees (media/public affairs and homeland security/emergency management) from The George Washington University.

GIS Excellence Awards 2020

Judges (continued)

Dawn Matasic - Account Manager, Esri – Dawn is a senior account manager with Esri's Local Government Team. She has over 22 years of experience in the GIS industry and over 13 years of experience working with Esri. She has been working with Fairfax County since 2016.

Anthony Myers - Solution Engineer, Esri – Anthony is a team lead on the Local Government Team. He has a Masters of Geospatial Information Science & Technology and has Esri certifications for System Design, Enterprise Geodatabase Management, Enterprise Administration, and Desktop. He has worked in City government and the AEC industry prior to joining Esri. He has been with Esri for eight years where he focuses on web GIS technology to support government operations

Dieter Pfoser - Professor, George Mason University – Dr. Pfoser is Chair of the Department of Geography and Geoinformation Science at George Mason University. He received his Ph.D in computer science from Aalborg University, Denmark. His research interests include data management and data mining for spatial and spatiotemporal data, graph algorithms for dynamic networks, and mining user-generated content.

Michael Smith - Division Chief, IT Services Department, City of Alexandria – Michael has 20+ years of experience, predominantly in local government. During his tenure with Alexandria, he has directed and managed the strategic GIS implementations of the City's asset and work order management system (Cityworks), the 911 CAD system (TriTech), the permitting and land use system (Energov) and the custom developed Stormwater Utility system. He leads a team of GIS Analysts who are responsible for nearly 500 GIS data elements that support more than 20 City departments and the public.

Jason Smolinski - Teacher, Fairfax High School – Jason teaches Geospatial Analysis at Fairfax High School. A former GIS analyst at SAIC, he earned his master's in education in 2012 and his bachelor's degree in information technology in 2005 from George Mason University.

Ian Stack – Chief, GIS Services, Fairfax Water Authority – Ian has been at Fairfax Water since 2007 primarily responsible for GIS Enterprise architecture, managing GIS data collection and dissemination solutions, end user support, and staff management. He graduated from the University of Maryland in 1993 with a degree in Civil Engineering and obtained his Master's Degree in Civil Engineering, Water Resources in 2006 also from the University of Maryland.

Rachel Weeden - Mid Atlantic Regional Manager, Esri – Rachel's role with Esri allows her to combine her interests in geography, applied technology and improving government services. Prior to Esri, she worked for the City of Philadelphia and Chester County PA as a GIS Specialist, a career path introduced to her as a Geography undergraduate at Penn State University.

Daniel Wickens - Solution Engineer, Esri – Daniel has worked for Esri for over four years and is a graduate of the University of Pittsburgh with a degree in environmental studies and GIS. In his role as solution engineer for Esri's Philadelphia regional office, he works extensively with local and state governments to implement Esri's new ArcGIS Hub technology, which helps organizations bring people, data, and engagement tools together to accomplish initiative goals.

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