MSMD Field Application Fairfax County, VA

Fairfax County, Virginia's Maintenance and Stormwater Management Division (MSMD) maintains a countywide stormwater infrastructure geographic information systems (GIS) dataset. This dataset includes all stormwater structures as point (curb inlets, manholes, yard inlets, etc.) and line (pipes, culverts, ditches) features as well as stormwater facilities as polygon features. Additionally, MSMD performs field visits to each stormwater structure in accordance with the National Pollutant Discharge Elimination System (NPDES) MS4 permitting program. All stormwater infrastructure within the 1,500 miles of the county stormwater conveyance system must be inspected during a recurring five-year time period.

In the past, paper maps were marked up during a field inspection, noting changes necessary to the GIS data. These maps were susceptible to the environment (and spilled coffee) and did not serve as a sustainable archiving tool. In addition to marking up the paper maps, the field inspectors would take photographs documenting the condition of the structures. Upon their return from the field to the office, they would link the photos to the appropriate structure identification number which would result in the photo linking to the GIS features. This process was time consuming and could potentially lead to error.

MSMD asked that a field application be built for use on their laptops or tablet PCs that would allow the field crew to collect their information digitally using Esri's ArcGIS/ArcView software along with Fairfax County Enterprise GIS data checked out from the County's centralized GIS data warehouse. Fundamental to this concept was that the application be very easy to use for the field collection staff and that it would be easy to maintain. Perhaps more importantly was that the design of the tool be driven by the field crews existing workflow and not have the workflow driven by the tool.

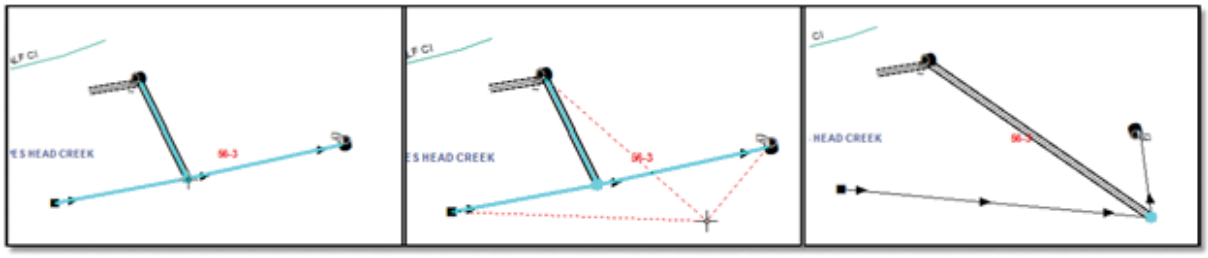
Critical to any change in workflow is to get the users to buy in. SSA was intent on not changing the existing workflow, but replicating it in a digital environment. To accomplish this, SSA worked closely with MSMD through various meetings to gain a high level understanding of how the toolset should work. Important to this was riding along with the field crew to get a true sense of what was being accomplished during the NPDES inspections. Prior to developing and deploying an application, it was important that Fairfax approved the key components of the toolset. To accomplish this, functional requirements were drafted to layout the various aspects of the application and describe their basic functionality. This allowed MSMD to select exactly what components they felt were necessary and important in the field verification process.

The resulting field application is a toolset that includes easy, one-click feature creation tools using large buttons with the feature type displayed. The feature creation workflow simply involves selecting the feature from the toolbar and dropping it in the appropriate location in the map view. The application automatically handles basic editing functions and settings such as:

- starting, saving, and stopping edit sessions
- setting snapping tolerances
- flipping the direction of linear features to follow flow
- auto rotating symbols

Likewise, attribute information is auto populated using computer login credentials, time/date stamps, underlying features such as tax map and watershed. Pick lists have been created allowing the user to auto assign specific codes in their inspection process. An inspection date is assigned to the features recording when the features were last visited.

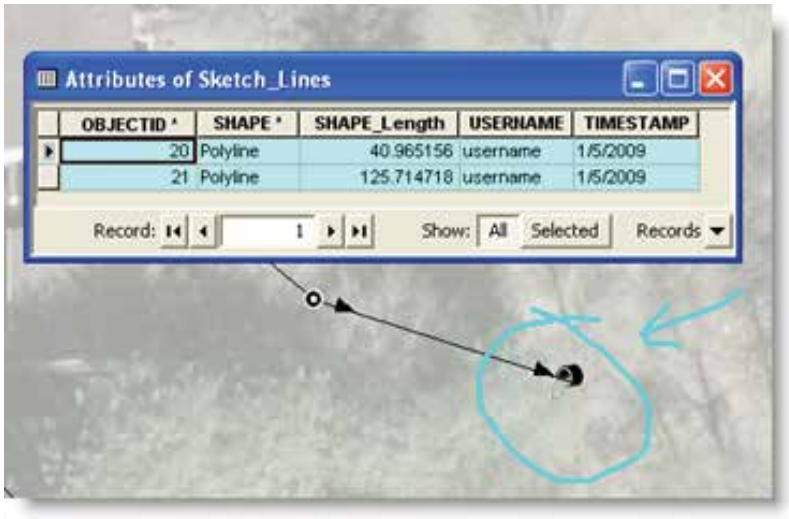
Additional functionality includes GPS being enabled, letting the end user automatically move a feature to the GPS location. Custom editing tools are included that maintain topology allowing the user to move a point and have the associated linear feature move with the point. This makes for easy geometry and placement updates without requiring a geometric network.



The field inspectors can now link the photographs captured in the field to the GIS data as soon as the photo is taken. This reduces the need for in-office work and the potential for erroneous photo–to-features association. A field photo preview window was built allowing the user to peruse the photos prior to associating them to a feature. The transfer of the photo to the laptop or tablet PC can be done wirelessly or via a USB cable.

While using paper maps, the field inspectors would often add notes detailing changes necessary or specific information about the structures they were inspecting. This has been replicated on the tablet PC through the use of a stylus. The inspector can make redline markups which are saved as a feature and checked-in to Fairfax County's Enterprise GIS data. The idea behind this is to allow the user to make the same specific markups about features in the field that an analyst could then use as a reference once the data is back in the Enterprise GIS environment.

The Fairfax stormwater field application gives non-GIS users the ability to easily update and maintain GIS data. Utilizing an application like this during required inspections, such as those under NPDES, allows data to be field verified and improved without taking on additional field collection efforts.



Though built specifically for stormwater collection, the underlying functionality is transferable to all data collection practices.

Spatial Systems Associates provides complete GIS and FMIS implementation and support services. The MSMD field application is but one example of customized applications we have built to meet specific needs of our clients. If you have a need for a customized spatial application, we invite you to call us.