Mobile Data Collection, Distribution, and Collaboration: From Office to Field

City Engineers Association of Minnesota
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Aaron Mielke – Barr Engineering Company
Mobile mapping / Mobile data collection?

- “Mobile” – simply means using a mobile device (cell phone, tablet, iPad etc.) as a tool to view and collect data.

Barr needed a system that was:
- Customizable to any project
- Stored data in a common system so data could easily be handed over to the client
Provide our clients & staff the ability to

- View maps and data
- Know their location
- Collect data
- Share and access data (real time)
Mobile Data Collection, Distribution, and Collaboration – Benefits

- Improves data quality (accuracy and consistency)
- Improves efficiency of data collection
- Limitless layers and attributes (unlike paper maps)
- Real time updates
- Centralized data (reporting)
- Data is transferable
Barr’s first use of mobile mapping tech.

- 5-6 years ago (using iPads)
- Simple base map that we could overlay GIS data on
- Used primarily to replace paper field maps for our wind developers
- Helped with navigation (where am I?)
GIS Field Data Collection

Toughbook

Windows Tablet

Trimble Handheld

Apple iPad

Phones

Android

Apple iPhone

Trimble Tablet
Barr uses the following software

- ArcGIS Desktop – map development
- ArcGIS Server (SQL Server) – publishing map services and storing data
- Windows server with IIS and .NET framework
- Programmed using Classic ASP, JavaScript and JQuery
Barr’s next use of mobile mapping tech.

- 4 years ago (using iPads)
- Needed more than simple mobile map
  - Needed data collection and sharing
  - Real-time updates
  - Reporting
Project Example – CapX2020

- Construction of over 300 miles of new electric transmission line
- Over 1000 poles – each its own “construction site” requiring regular inspections
Project Example – CapX2020

- Dozens of staff (office and in the field)
- State Agencies (MPCA, DNR…)
- Contractors
  - ROW Clearing
  - BMP Installation
  - Construction Crews
Application – CapX2020

- Tablets (iPads) used to ensure environmental compliance
  - SWPPP inspections
  - BMP Installation (location & repair)
  - Coordinate route-of-way clearing
    - Wetland avoidance
    - T&E avoidance
  - Construction crews (access)
ArcGIS Online

- https://maps.barr.com/arc...
**Comment: Patrick Brockamp**

**User Name**
Patrick Brockamp

**Comments**
Wood debris from construction mats need to be removed.

**Date**
12/12/14, 10:46 AM

**Comment Type**
Corrective Action Comment
Comment: Patrick Brockamp

User Name
Patrick Brockamp

Comments
Wood debris from construction mats need to be removed.

Date
12/12/14, 10:46 AM

Comment Type
Corrective Action Comment
Mobile Data Collection, Distribution, and Collaboration – Reporting

Centralized Database Allows for Reporting

- Web based access
- Corrective Action Report
- Inspection History Report
Welcome!

Report Menu

- **Required SWPPP Maintenance**
  All uncompleted actions in order of deadline

- **Corrective Action Report (SWPPP)**
  [Run Report]
  Runs report by structure and shows any corrected actions (completed and incomplete).

- **Inspection History Report**
  [Run Report]
  Shows inspection date and comments.

- **7 Day Inspection Schedule**
  List of all structures needing an inspection in the next 7 days.

- **30 Day Inspection Schedule**
  List of all structures needing an inspection in the next 30 days.
### Required SWPPP Maintenance

<table>
<thead>
<tr>
<th>Structure</th>
<th>Deadline</th>
<th>Corrective Actions</th>
<th>Inspection Date</th>
<th>Inspector</th>
<th>Vetted Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>0955-484</td>
<td>12/15/2014</td>
<td>Wood debris from construction mats near tower. Remove debris.</td>
<td>12/12/2014</td>
<td>PEB</td>
<td></td>
</tr>
<tr>
<td>0955-350</td>
<td>11/24/2014</td>
<td>Remove plowed debris along fence line</td>
<td>11/20/2014</td>
<td>KSJ</td>
<td></td>
</tr>
<tr>
<td>0955-347</td>
<td>11/24/2014</td>
<td>Remove plowed debris along fence line</td>
<td>11/20/2014</td>
<td>KSJ</td>
<td></td>
</tr>
<tr>
<td>0955-324</td>
<td>11/14/2014</td>
<td>Repair wetland rutting before/during mat removal</td>
<td>11/12/2014</td>
<td>KSJ</td>
<td></td>
</tr>
<tr>
<td>Fergus Falls-Laydown</td>
<td>11/10/2014</td>
<td>Repair damaged silt fence near entrance</td>
<td>11/07/2014</td>
<td>KSJ</td>
<td></td>
</tr>
<tr>
<td>0955-757</td>
<td>11/7/2014</td>
<td>Sediment washing out along wall building up behind Silt fence, erosion logs are not functioning.</td>
<td>11/06/2014</td>
<td>PEB</td>
<td></td>
</tr>
</tbody>
</table>
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### Inspection History

**Structure: 0955-625**

<table>
<thead>
<tr>
<th>Inspection Date</th>
<th>Overall Comments/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/28/2014 1:50:42 PM</td>
<td>Tower stringing, no recent activity.</td>
</tr>
<tr>
<td>9/5/2014 1:16:02 PM</td>
<td>Line has not been clipped yet. No other changes.</td>
</tr>
<tr>
<td>9/11/2014 12:35:15 PM</td>
<td>Crews working, stringing lines, helicopter in use, site inaccessible.</td>
</tr>
<tr>
<td>9/18/2014 11:54:17 AM</td>
<td>Crew at the site removing mats on the stretch between towers 722 and 727. Inaccessible.</td>
</tr>
<tr>
<td>10/3/2014 9:48:04 AM</td>
<td>Mechanical project 100% complete. ROW returned to pre-project undisturbed condition.</td>
</tr>
<tr>
<td>10/2/2014 2:50:38 PM</td>
<td>Crews working, site inaccessible.</td>
</tr>
<tr>
<td>9/25/2014 5:56:40 PM</td>
<td>Tower stringing, no recent activity.</td>
</tr>
<tr>
<td>10/9/2014 6:34:13 PM</td>
<td>Change status to Site Stabilized.</td>
</tr>
<tr>
<td>11/6/2014 3:30:55 PM</td>
<td>Site inaccessible due to mud.</td>
</tr>
</tbody>
</table>

**Filter:**

**Structure:** 0955-625
Status of CapX2020 Project

• In use for 4 years.
• Currently has 80+ users who access maps and data using iPads or cell phone.
• 1000s of inspections
• No compliance violations
• Plans are to continue until construction is complete in 2016
Other Projects

This system has been used on dozens of other projects.

- SPCC Inspections
- Permit Inspections
- Geotechnical Investigations
- BMP siting
- General Navigation
- Wild rice surveys
- Phase I environmental site assessment
Mobile Data Collection, Distribution, and Collaboration – Contact Information

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