Chasing The MIRE Unicorn

James K. Graham – DC Dept. of Transportation

Art: Ramona L. Graham
Overview

• Background
• Why Cross-sections?
• Goals 1.0
• <record screeching> GIS-T 2018
• Goals 1.1
GIS in Transportation

- There are a ton of MIRE elements
- No data model
- Automation is difficult
- Two things are needed...

Intersection Model
MIRE Cross-sections

33 Outside Through Lane Width
45 Right Shoulder Total Width
46 Right Paved Shoulder Width
49 Left Shoulder Total Width
50 Left Paved Shoulder Width
65 Right Sideslope Width
67 Left Sideslope Width

MIRE 2.0, pg 36
Cross-section Data in our LRS

• Roadway Section Events:
  • Section 1: parking lane, inbound, 8’
  • Section 2: through lane, inbound, 11’
  • Section 3: centerline (double-yellow), no direction, 1’
  • Section 4: left turn lane, outbound, 10’
  • Section 5: through lane, outbound, 11’
  • Section 6: bike lane, outbound, 5’
  • Section 7: parking lane, outbound, 8’
Send a point to the DDOT LRS SOE...
Custom Server Object Extension (SOE)

- Modified for cross-section events

About DDOT Cross Section Data:
https://wiki.ddot.dc.gov/display/GIS/Cross-section+Data

Access Web Service:
"roadwayAttributes": { 
  "crossSections": { 
    "totalSectionWidth": 43, 
    "section1": { 
      "sectionType": "Lane: Through", 
      "sectionWidth": 11, 
      "sectionDirection": "Outbound (with centerline geometry)",
      "sectionPavementType": "Concrete" 
    },
    "section2": { 
      "sectionType": "Lane: Through", 
      "sectionWidth": 10, 
      "sectionDirection": "Outbound (with centerline geometry)",
      "sectionPavementType": "Concrete" 
    },
    "section3": { 
      "sectionType": "Lane: Through", 
      "sectionWidth": 11, 
      "sectionDirection": "Outbound (with centerline geometry)",
      "sectionPavementType": "Concrete" 
    },
    "section4": { 
      "sectionType": "Lane: Through", 
      "sectionWidth": 11, 
      "sectionDirection": "Outbound (with centerline geometry)",
      "sectionPavementType": "Concrete" 
    } 
  } 
}
When the smoke cleared...

- 29 out 38 FDE
GIS-T 2018

Workshop presentation by Ron Brush (New Century Systems) on NoSQL.

Made us completely rethink how we are approaching MIRE
Traditional LRS

- Routes
- AADT
- FC

Speed Limit → ETL or Collection → MIRE Output

- At-Grade Intersections
- Unique Approach ID
- # Through Lanes

- Median Type

SaA Safety Analyst

AASHTOWare
Question from a DDOT Planner:

“I would like to look at every street in the District to see which ones we could install bike infrastructure on without taking away any parking.”

-- Will Handsfield, February 28, 2019

Query for segments that have all of the following:

1. No Existing Bike Lanes \textbf{AND}
2. One way streets with parking on both sides \textbf{AND}
3. Minimum total width of 29’ \textbf{AND}
4. Maximum width of 34’
### Intersection Checklist:

<table>
<thead>
<tr>
<th>Name of primary street:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of cross street:</td>
</tr>
<tr>
<td>Total number of lanes on primary street:</td>
</tr>
<tr>
<td>Total distance across primary street (measure with rolatape):</td>
</tr>
<tr>
<td>Total number of lanes on cross street:</td>
</tr>
<tr>
<td>Total distance across street (measure with rolatape):</td>
</tr>
<tr>
<td>Are there any left turn only lanes? yes—no</td>
</tr>
<tr>
<td>Are there any right turn only lanes? yes—no</td>
</tr>
<tr>
<td>Is a right turn on red permitted? yes—no</td>
</tr>
<tr>
<td>Is there a right turn island? yes—no</td>
</tr>
<tr>
<td>Is parking permitted on the primary street? yes—no</td>
</tr>
<tr>
<td>Is parking permitted on the cross street? yes—no</td>
</tr>
<tr>
<td>How many corners have curb extensions (bulbouts)?</td>
</tr>
</tbody>
</table>

| Is there a median? yes—no |
| If so, is it designed as a pedestrian refuge? yes—no |
| Is it identifiable to people with vision impairments? yes—no |
| Is it accessible to people with mobility impairments? yes—no |
| Does the intersection have four way stop signs? yes—no |
| Does the intersection have two way stop signs? yes—no |
| Is the intersection signalized? yes—no |
| Is there a pedestrian actuated control signal? yes—no |

| Location of control: |
| Information emitted: audible vibrotactile infrared |
| Is there a high contrast between the button and post color? yes—no |
| Is there a tactile arrow indicating the street crossing direction? yes—no |
| Height of control: |
| Dimension of pedestrian button: |
| Is 5 lbs of force or less required to operate the signal? yes—no |
| Is the crosswalk marked? yes—no |
| If so, what are the conditions of the markings? |

| Duration of WALK interval: |
| Comments: |

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https://www.ada.gov/pcatoolkit/chap6toolkit.htm

Figure 3. FHWA Accessibility Intersection Checklist (18).
LEVEL OF TRAFFIC STRESS

INCREASING LEVEL OF COMFORT, SAFETY, AND INTEREST IN BICYCLING FOR TRANSPORTATION

**LTS 4**
No bike lane on a busy street

**LTS 3**
Narrow bike lane or shoulder on a busy street

**LTS 2**
Buffered bike lane on a calm street

**LTS 1**
Separated bike lane

Modeling Many-to-Many Relationships

- 1 Roundabout has multiple Approaches
- 1 Road approaches 2 Roundabouts
- 1 Roundabout has multiple arcs

“NoSQL Data Modeling” – Ron Brush, New Century Software, GIS-T, 2018
What is NOSQL?

• Graph database (Facebook, LinkedIn, others)
• Ability to model complex nested objects
• Multiple geographic representations of the same thing
• Highly flexible and easy to change
• Just makes more sense
NoSQL Data Model for Traffic Circle
What’s next?

• NHTSA Grant-funded Project: **NoSQL MIRE Data Modeling**
  • Build NoSQL Database
  • Create Web app to visualize and query
• Complete LRS to GIS Routable Network
• **Will present findings at next GIS-T**
Thank You!

James K. Graham
James.graham2@dc.gov
DC Dept. of Transportation

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