School Zone Flashers in Indianapolis, Indiana

March 7, 2018
Today’s Presentation

• Case Study
  • Project Initiation
  • Design
  • Construction
  • Maintenance

• Lessons Learned
Project Initiation

• Outdated & Conflicting Legislation

  • Original 1975 ordinance with minor revision in 2001

  • Reduced speed zone in effect from 7:00AM to 4:30PM School Days

  • Exact dimensions of zones based upon school property lines and posted speed limits
Project Initiation

- Outdated & Conflicting Signs
  - Many school zone signs did not use the fluorescent yellow/green placard
  - How the Department addressed the end of school zones was inconsistent
Project Initiation

• Observed non-compliance of motorists
  • General disregard to school zones
  • Motorists unsure of year round or balanced calendars
  • 9.5 hours per day of reduced speeds many of which there were no children present
Project Initiation

• How did we solve these problems?
  
  • Total revamp of school zone infrastructure
  
  • Applied for Highway Safety Improvement Program (HSIP) funds
  
  • Hired Shrewsberry & Associates to help evaluate need of nearly 400 schools.
School Flashers

- School Zone Speed Reduction Flashers
- Rectangular Rapid Flashing Beacons (RRFB)
Design Phase

- Design Procedure
  - IMAGIS base maps
  - Field measurements
  - Placement of flashers per ordinance
  - Detail and specifications for RRFB
Design Phase

- Design Challenges
  - Schools closing, temporary schools, schools for adults
  - ROW constraints
  - Posted speed is 25 mph
  - ADA
  - Constructability issues
  - Schedule/funding
Contract Documents

- Plans, quantities, estimates
- PCE for phase 1, 2
  - PCE + RFI for phase 3
- Plat maps for phase 1, 2
  - ROW cert for phase 3
- Proprietary materials phase 3
- Unique Special Provisions:
  - Speed flasher specs
  - RRFB specs package
  - “Modification” of speed flasher
  - Spare parts package
## Metrics

<table>
<thead>
<tr>
<th></th>
<th>Speed</th>
<th>RRFB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>166</td>
<td>32</td>
<td>198</td>
</tr>
<tr>
<td>Phase 2</td>
<td>240</td>
<td>20</td>
<td>260</td>
</tr>
<tr>
<td>Phase 3</td>
<td>110</td>
<td>24</td>
<td>134</td>
</tr>
<tr>
<td>Total</td>
<td>516</td>
<td>76</td>
<td>592</td>
</tr>
</tbody>
</table>

**Final Cost:**
- CN: $4,490,000
- PE: 4.2%
- INSP: 12.7%
- Total: $5.25 M
- $8,871/flasher
Construction Phase

• 3 separate projects were bid through INDOT using HSIP funds

• With 1 design firm, 2 contractors, and 2 inspection firms we have installed nearly 600 flashing beacons to date.

• Different methods of construction utilized
  • Traditional on-site foundation pour
  • Off-site foundation construction
Remote Programming & Monitoring

Issues:

• Programming requires site visit x 516 each year
• No way to adjust for weather events
• Rely on reports of malfunctions
Remote Programming & Monitoring

Solutions from RTC:
- AP22 Time Switch
- M2M Cellular Modem
- Guardian
- RTC Connect
Lessons Learned

Project Initiation:
• Calendar research/programming
• Coordination with Council re: ordinance
• Communication with schools
Lessons Learned

Design Phase:
- Cost estimating
- 2nd beacon was optional
- Submittal document changes – ROW, PCE
- RRFB approval revoked
Lessons Learned

Construction Phase:

• Ensure contractors and inspectors have correct equipment
  • Laptops w/ internet access

• Solar Limitations
  • Unobscured view of sky

• Neighborhood complaints
  • NIMFY
Lessons Learned

Maintenance Phase:

- Adequate replacement parts
  - Improvement Rich -vs- Maintenance Poor

- “Manual mode” access switch placement
  - Unintended consequences of standards modification

- Stolen equipment (LED’s, visors, etc…)
  - Location has had 3 separate LED’s “borrowed”

- Knockdowns (intentional and non-intentional)
  - 36 incidents in less than 2 years
QUESTIONS?

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