**Traffic and Safety Improvement at a Busy T-intersection**

**Introduction**
T-intersection of two county roads (Main Street and Side Street) poses safety hazards and traffic delays. Situation is exacerbated by a heavily used trail 150 ft east of Main Street. An adjacent wetland also had to be accommodated in the design. A team of five civil engineering seniors worked under the mentorship of two county engineers (a PE and an EIT) and two faculty members (a PE and a PE-PLS) to improve the intersection.

**Project Goal**
Improve the Level of Service (LOS) of intersection and safety of pedestrians and trail users. Reduce adverse impacts to wetland.

**Development and Evaluated Alternatives**
1. Developed preliminary design for three options:
   - Roundabout
   - Three-way stop
   - Traffic signalization

2. Evaluated the three options and a no-build option based on seven factors & selected preferred alternative.

   - **Level of Service (LOS)**: Analyzed traffic using software, Synchro®, to ensure LOS ≥ C
   - **Cost**:
     - Right of Way (ROW) Acquisition
     - Used state bid tabs and historical bid prices to determine construction and maintenance cost.
   - **Environmental Impact**:
     - Analyzed potential vehicle-vehicle and vehicle-pedestrian conflict points to maximize safety
     - Pedestrian Safety: Analyzed driver-trail user interaction due to trail alignment
   - **Decision Matrix** (score 1 (weak); 5 (strong))
     - **Options**
       - Round About
       - Three-way stop
       - Traffic Signal
       - No Build
     - **Traffic Collision Reduction**
     - Non-motorized improvements
     - Traffic Operations
     - Construction cost
     - Maintenance cost
     - ROW Acquisition
     - Environmental Impact
   - **Total**

**30% Design of Preferred Alternative - Traffic Signalization**
1. Team performed traffic warrant analysis to confirm intersection merits traffic signal. Designed revised lane configurations and stormwater system. Prepared professional quality engineering drawings (some excerpts of drawings are shown below).

**Public Health, Safety, Welfare Awareness**
Improving driver, pedestrian and trail user safety and welfare was primary goal of project.

**Preservation of wetland, and stormwater disposal brought awareness to public safety and welfare.**

**Knowledge and Skills Gained**
- **Engineering & Technical Skills**
  - Developed working knowledge of several Federal, State and County design guidelines, codes, specifications.
  - Used a transportation engineering software and a drafting software.
  - Prepared students to enter the transportation engineering profession.

**Professional Skills**
- Developed Oral presentations to class, professional engineers on department advisory board, county & local professional society meeting.
- Honed technical writing skills through proposal, progress and final reports, and emails.
- Project management and leadership skills: prepared agenda, ran meetings, followed up on action items; managed schedules, budgets; learned to work as a team in-person and in virtual settings.

**Cost**
- **Construction Estimate** $1,426,000
- **Right-of-Way Acquisition** $112,000
- **Preliminary Engineering** $285,000
- **Construction Engineering** $214,000
- **Total Project Cost** $2,037,000

**Team’s Approach**
- Brainstorm design options
- Create optional design concepts
- Evaluate options
- Select preferred alternative and take it to 30% design

**Results compiled into Decision Matrix**

**Two faculty members supervised team (a PE and a PE-PLS)**

**Team presented to Department Advisory Board members (8 PEs & a Scientist)**

**Two engineers from County mentor team (PE and EIT)**

**College-Industry Partners**

**Two engineers from Local engineering contest (5 PEs as judges)**

**County engineers, managers, construction personnel provided feedback on oral presentations: a drafter from the county provided guidance on preparing professional quality drawings.**