



# TRAFFIC ENGINEERING SERVICES, INC.

13545 Watertown Plank Road • Elm Grove, WI 53122 • (262) 797-9097 • Fax (262) 797-9098 • [www.tes.info](http://www.tes.info)

December 23, 2019

City of Mequon  
11333 N. Cedarburg Road 60W  
Mequon, WI 53092-1930  
Submittal Email: [klundeen@ci.mequon.wi.us](mailto:klundeen@ci.mequon.wi.us)

RE: Mequon Road  
Traffic Signals and OIT Crossing Design

The following Project Approach and Contract is hereby submitted by Traffic Engineering Services, Inc. (herein after called TES) staff to the City of Mequon (herein after called Client) for engineering services in Mequon, WI. Wayne R. Higgins, PE, PTOE and support staff under his direction will complete this work.

## **PROJECT APPROACH**

### **PROJECT DESCRIPTION**

As noted in the RFP for:

- Traffic Signal Modification
- Safe Pedestrian/Bicycle Crossing Design
- Lighting System improvements

### **SCOPE OF SERVICES**

- Prepare plans showing existing road design and proposed geometrics improvements. Improvements will emphasize safety and maneuverability for bicycles, pedestrians, drivers, and emergency vehicles while improving connectivity of the surrounding new developments.
- Incorporate recommendations made in the TIAs for adjacent developments. Based on field observation the traffic counts shown in the most recent TIAs for the area are represented. Lane configuration and lengths recommended by Traffic Engineering Services, Inc. are shown in the attached "Proposed Transportation Detail" drawing.
- Update the signal design at the intersection of Mequon Road at Buntrock Avenue and Cedarburg Road to include preemption for emergency vehicles and update pedestrian signals. Consider the option of painting and reusing existing signal poles and arms at this intersection to match the aesthetics of the nearby new developments while minimizing cost.

- Design a traffic signal plan for the intersection of Mequon Road and Weston Drive that will aesthetically match the redesigned signals at the intersection of Mequon Road and Buntrock Avenue. The proposed signalized intersection at Weston Drive will utilize preemption for trains and emergency vehicles. This will be a 7 phase fully actuated/coordinated signal with low volume periods of traffic in free operation. Traffic Engineering Services, Inc. will work with railroad for preemption.
- The signals along Mequon Road at Buntrock Road, Weston Drive, and Cedarburg Road will be coordinated to improve traffic flow along Mequon Road. Signals at all three intersections will be designed to allow for emergency vehicle preemption, while the proposed signal at Weston Drive will also utilize railroad preemption. Pedestrian safety and pedestrian signal timing will be emphasized in the signal coordination design.
- Design traffic signals to utilize traffic cameras for vehicle detection
- Design lighting improvements for the intersection of Mequon Road and Weston Drive with type 3 and 4 poles. Type 9 and 10 are a design option but not recommended.
- Add additional light pole in the median is needed to IES compatibility unless a post top alternative is desired along Mequon Road between Buntrock Avenue and Weston Drive.
- Review existing lighting to be adequate at crosswalk locations and at existing signalized intersections. Conversion to LED at bike path crossing on existing old luminaries.
- Incorporate ADA compliant pedestrian ramps into all proposed crosswalks.
- Improve bicycle/pedestrian safety at the crossing for the Ozaukee Interurban Trail (OIT) by providing additional and/or improved warning devices for drivers approaching the crossing. Potential options include:
  - Improved pavement markings for crossing with ground mount signage. The following images show an example of pavement markings and spacing of ground-mounted signage that could be considered for the traffic control design at the Ozaukee Interurban Trail crossing. The images are from a crosswalk located near a railroad crossing on Moorland Road, 0.45 miles south of Greenfield Avenue in New Berlin, WI.

**Northbound Approach:**



**Northbound Approach:**



**Southbound Approach:**



**Southbound Approach:**



### Southbound Approach:



Other improvement options include:

- Improved pavement marking for crossing with median-mounted overhead signage.
- Installing a bicycle/pedestrian actuated flashing beacon which utilizes either push buttons or video cameras for detection (see attached "OIT Crosswalk Flashing Beacon Conceptual Drawing").

The same safety measures should be considered for the proposed mid-block pedestrian crossing located 275' west of Cedarburg Road. With our vast expert witness work history, we can also add a review the OIT crossing on Pioneer Road if the City feels it is applicable.

- Considering the Ozaukee Interurban Trail's close proximity to the railroad crossing, use of a HAWK signal would not serve as an appropriate form of traffic control at the trail's crosswalk. An actuated flashing beacon at the Ozaukee Interurban Trail crossing would provide adequate warning to drivers. The following images show a HAWK signal near the Milwaukee County Zoo along Bluemound Road. The flashing red lights and required signage for a HAWK signal would likely confuse drivers when placed in close proximity to railroad crossing gate and flashing beacons.

### Eastbound Approach:



### Westbound Approach:



- Prepare plans for signage and pavement markings along Mequon Road between the west approach to Buntrock Avenue and the east approach to Cedarburg Road. Plans will show lane markings by type and width of lanes. Bicycle/Pedestrian crosswalk markings will be included for crosswalks located at the following locations:
  - Ozaukee Interurban Trail
  - A midblock crossing 275' west of Cedarburg Road
  - The proposed signalized intersection of Mequon Road and Weston Drive

- The signalized intersection of Mequon Road and Buntrock Avenue.  
The plans will include existing and proposed signage for parking and traffic control.
- Incorporate the Mequon Town Center Design Standards into the improvement plans. Consider median post top lighting at bicycle and pedestrian crossing.
- Prepare estimate of quantities, bid documents and contracts and assist in the bidding process as requested by the City. The City will receive and compile the bids and negotiate the contracts.
- Traffic Engineering Services, Inc. staff will create project specifications and calculate the required quantities, along with other traffic calming elements as needed.
- Work with City of Mequon on design for traffic signals at the intersection of Mequon Road and Cedarburg Road and three intersection coordination.
- Work with WisDOT on design for Mequon Road traffic signals between Buntrock Avenue and Cedarburg Road.
- Incorporate design elements including, but not limited to, those include in previous TC Streetscape and TIF Project Plans
- Prepare a cost estimate and construction phasing plans for the project that will maintain vehicular and pedestrian access on site throughout construction.
- Consider options for incorporating a bike lane along Mequon Road. Possible options include:
  - Adding an on-street shared bike lane in both directions along Mequon Road.
  - Adding an off-street 2-directional bicycle/multi-use path along the south side of Mequon Road with bicycle/pedestrian detection at signals
- Midblock LED post top lighting to be considered along with alternatives of matching the existing fixtures. To be designed to IES standards.
- Consider aligning northbound and southbound lanes at the intersection of Mequon Road and Buntrock Avenue by shifting southbound approach lanes to the east.
- The proposed mid-block crosswalk located 275' west of Cedarburg Road will connect the newly developed Mequon Town Center to the shopping center to the south of Mequon Road. Therefore, on-site modifications should be made to the sidewalk in front of Chase Bank to improve ADA compliance. Scope of services includes suggestions for on-site modifications.
- Existing conduit and pull boxes to be reused wherever possible.
- Design push button locations for crosswalks according to ADA and MUTCD standards.
- Specify locations of signal heads for vehicles and pedestrians to achieve maximum visibility

- Prepare traffic signal plans, specifications, and estimates for construction with proposed signal timing and system operations.
- System interconnection by hardwire or digital radio communication.
- Meet with City of Mequon, Committee and Common Council, and WisDOT as necessary



PUSH BUTTON MOUNTED ON 3' POST

PUSH BUTTON MOUNTED ON 3' POST

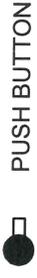
18' ARMS

W11-15

RECTANGULAR RAPID FLASHING BEACON

PUSH BUTTON MOUNTED ON 3' POST

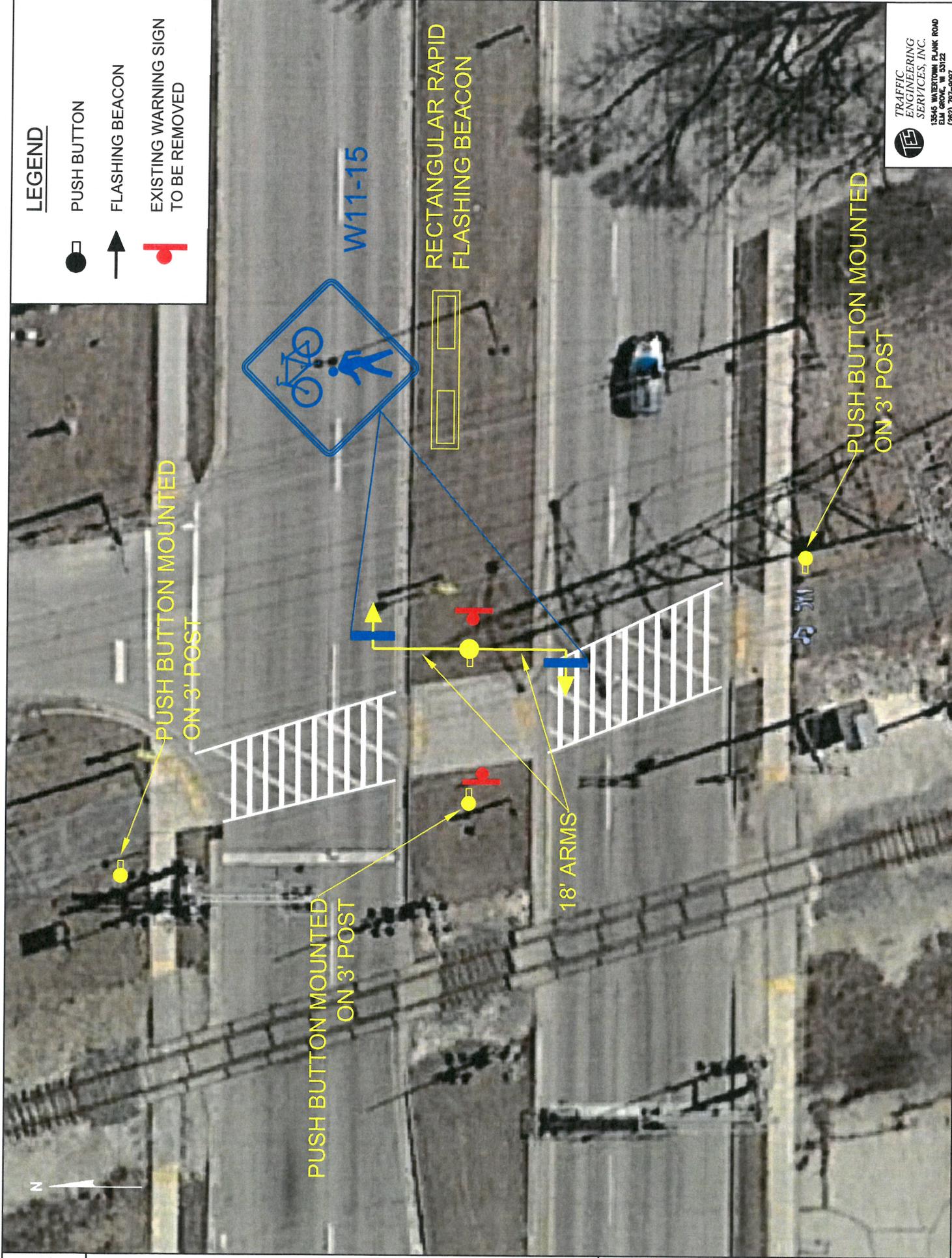
**LEGEND**



PUSH BUTTON

FLASHING BEACON

EXISTING WARNING SIGN TO BE REMOVED



**TES**  
**TRAFFIC ENGINEERING SERVICES, INC.**  
 13545 WATERTOWN PLANK ROAD  
 ELM GROVE, WI 53122  
 (262) 797-9087

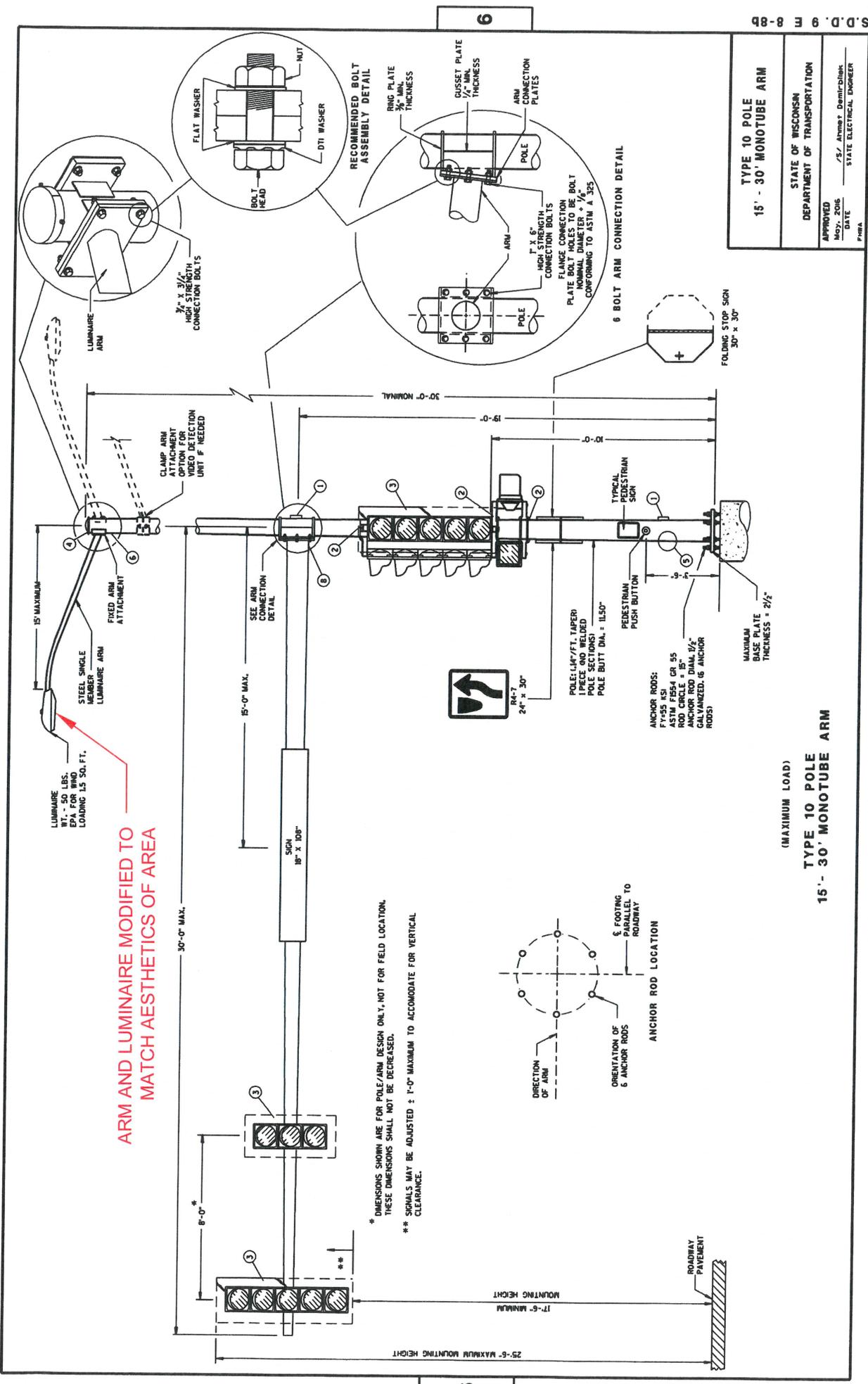
TES PROJECT NUMBER:	HWY: MEQUON ROAD	COUNTY: OZAUKEE	OIT CROSSWALK FLASHING BEACON CONCEPTUAL DRAWING	SCALE:	NTS	SHEET NO: 11	E
PLOT BY: T.E.S.			DATE: 12/23/2019 9:54:01 AM	ORIGINATOR: T.E.S.			
S:\Project\Approach\Pending 2019\Mequon\OIT Conceptual Drawing.dwg, 12/23/2019 9:54:01 AM, 11							
WISDOT/CADDIS SHEET 42							





# ALTERNATE DESIGN

## SDD 9e8-b Type 10 Pole 15'-30' Monotube Arm



S.D.D. 9 E 8-8b

**CLIENT FURNISHED**

The client shall furnish TES the following:

- Map of scope area
- TIAs for Civic Campus Parking Lot, MTC1, Spur 16 and Foxtown Development
- TC Streetscape Plans
- TIF Plan

Any of the digital information listed above can be e-mailed to TES at [wayne@tes.info](mailto:wayne@tes.info).

**TENTATIVE SCHEDULE**

Work will begin upon receipt of a signed contract. Verbal or email authorization will be accepted by TES as authorization of the notice to proceed.

January 14, 2020	Contract Award
March 10, 2020	Committee of the Whole presentation of OIT design options
April 24, 2020	Final Design, phasing and cost estimate

**ESTIMATED FEE**

The work will be completed in accordance with the scope of services for an estimated fee of **\$26,570.00** at time and material billing.

All work will be performed by TES at the time and material rates stipulated on the Schedule of Hourly Rates, shown below, after authorization has been received from client to do so. All rates apply for portal-to-portal time utilized in providing services.

**HOURLY RATE SCHEDULE**

October 1, 2019

<b>CLASSIFICATION</b>	<b>RATE</b>
670 Principal Engineer, PE	\$150.00
645 Senior Traffic Engineer	\$110.00
640 Staff Engineer	\$84.00
635 Senior Technician	\$75.00
630 Technician I	\$50.00
625 Business Administrator/Project Administrator	\$75.00
620 Office Administrator/Word Processing/Clerical	\$60.00
617 Engineering Intern	\$48.00
615 Traffic Data Collector/Engineering Aide	\$40.00

The cost of TES non-owned vehicle travel, lodging, meals, shipping, and outside printing/plotting expenses will be added to the above unit prices when applicable. Telephone (greater than 15-minute calls may be added for reimbursement), FAX and TES owned vehicle automobile mileage, routine photocopies and computer time is included in the above rates. The additions will be considered a part of any lump sum or a not to exceed contract amount.

### **INVOICES**

Compensation for services will be invoiced on a monthly basis, at the completion of the work or a phase of the work. All invoices will be summarized by type of work, employee hours and rate or by percent complete if a lump sum.

#### **Billing Location**

*Client, please review to ensure invoices are processed correctly*

Attn: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Email: \_\_\_\_\_

FAX Number: \_\_\_\_\_

Client Project No: \_\_\_\_\_

#### **Payment Location**

Traffic Engineering Services, Inc.

Attn: Accounting

P.O. Box 423

Elm Grove, WI 53122

Terms: Net 30 days

### **PARTIAL PAYMENT**

Promptly upon receipt, review and approval of properly documented invoices, the Client will pay or cause to be paid all invoices received. Payment will be in the amount of sums earned, less previous partial payments and retainers. Standard payment terms are net 30 days, from invoice date.

### **LATE CHARGES**

If non-disputed payment is not received by TES within 60 calendar days of the invoice date, the Client shall pay as late charges an additional cost of 1.0% of the PAST DUE amount per month or the maximum amount permitted by law. Payment thereafter will first be applied to accrued late charges and then to the unpaid principal.

### **COLLECTION COSTS**

In the event, legal action is necessary to enforce the payment provisions of this contract, TES will be entitled to collect from the Client any judgment or settlement sums due, attorneys' fees, court costs and expenses incurred by TES in connection therewith and, in addition, the value of TES's time and expenses spent in connection with such collection action, computed at TES's prevailing fee schedule and expense policies.

### **SUSPENSION OF SERVICES**

If the Client fails to make payments when due and has not filed a notice to TES for dispute of fees due or otherwise is in breach of this contract, TES may suspend performance of services upon five (5) calendar days' notice to the Client. TES will have no liability whatsoever to the Client for any costs or damages as a result of such suspension caused by any breach of this contract by the Client.

### **FINAL ACCEPTANCE**

Promptly upon acceptance of the final submission of the work, a sum equal to 100 percent 100% of the compensation set forth in the agreement, less the total of all previous partial payments will be processed and paid from TES final invoice.

### **TERMINATION AND ABANDONMENT**

The Client reserves the right to discontinue the project or any phase thereof for any reason. If the Client discontinues the project, the Client will be liable to TES only for service provided to the date TES is notified of the discontinuation of the project.

If TES abandons or discontinues work prior to completion of the project, TES will be entitled to no compensation beyond the date of abandonment and the Client reserves all rights of action it has in law and in equity.

If the Client fails to make a non-disputed payment to TES in accordance with the payment terms herein, this will constitute a material breach of this contract and will be cause for termination by TES.

### **RISK ALLOCATION CLAUSE**

In recognition of the relative risks and benefits of the project to both the Client and TES the risks have been allocated such that the Client agrees, to the fullest extent permitted by law, to limit the liability of TES and his or her subconsultants to the Client and to all construction contractors and subcontractors on the project for any and all claims, losses, costs, damages of any nature whatsoever or claims expenses from any cause or causes, so that the total aggregate liability of the TES and his or her subconsultants to all those named shall not exceed \$100,000, or TES total fee for services rendered on this project, whichever is greater. Such claims and causes include, but are not limited to negligence, professional errors or omissions, strict liability, breach of contractor warranty.

### **MEDIATION**

In an effort to resolve any conflicts that arise during the design or construction of the project or following the completion of the project, TES and Client agree that all disputes between them arising out of or relating to this contract shall be submitted to non-binding mediation unless the parties mutually agree otherwise.

TES and Client further agree to include a similar mediation provision in all agreements with independent contractors and consultants retained for the project and to require all independent contractors and consultants also to include a similar mediation provision in all agreements with subcontractors, subconsultants, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute resolution between the parties to those agreements.

### **INSURANCE**

TES currently maintains insurance coverage in the following amounts:

Worker's Compensation - as required by law

General Liability

General total limit - \$2,000,000

Products and completed work - \$2,000,000

Personal Injury - \$1,000,000

Each event limit - \$1,000,000

Medical Expense limit - \$5,000

Tenants liability limit - \$300,000

Non-owned Autos - \$1,000,000

Valuable Papers - \$100,000

Automobile Liability – Company vehicles - \$1,000,000/1,000,000/1,000,000

Professional Liability \$1,000,000/\$2,000,000 per policy limitations.

**INDEMNITY**

TES agrees, to the fullest extent permitted by law, to indemnify and hold harmless the Client, its officers, directors and employees (collectively, Client) against all damages and liabilities to the extent caused by TES's negligent performance of professional services under this Agreement and that of its subconsultants or anyone for whom TES is legally liable.

The Client agrees, to the fullest extent permitted by law, to indemnify and hold harmless TES, its officers, directors, employees and subconsultants (collectively, Consultant) against all damages and liabilities to the extent caused by the Client's negligent acts in connection with the Project and the acts of its contractors, subcontractors or consultants or anyone for whom the Client is legally liable.

Neither the Client nor TES shall be obligated to indemnify the other party in any manner whatsoever for the other party's own negligence.

**NOTICE**

Notice under this agreement will be accomplished by either FAX or mailing postage prepaid to either party to the addresses set forth on page 1 of this agreement. Mailed notification will be deemed to have been received 2 days after posting. FAX notice will be deemed to be received the next regular business day after such transmission.

## MISCELLANEOUS

**Documents:** All design documents relating to this project shall be considered copyrighted to TES and copies provided to the client upon request. If either party discontinues the project, then all documents relating to the project will be copied and provided to the Client within seven (7) days of the date the project is discontinued, but not until payment is received for services rendered.

**Delivery of Electronic Files:** In accepting and utilizing any drawings, reports and data on any form of electronic media generated and furnished by TES, the Client agrees that all such electronic files are instruments of the service of TES, who shall be deemed the author and shall retain all common law, statutory law and other rights, including copyrights.

The Client agrees not to reuse these electronic files, in whole or in part, for any purpose other than for the Project. The Client agrees not to transfer these electronic files to others without the prior written consent of TES. The Client further agrees to waive all claims against TES resulting in any way from any unauthorized changes to or reuse of the electronic files for any other project by anyone other than TES.

The Client and TES agree that any electronic files furnished by either party shall conform to the specifications listed in Client Furnished. Any changes to the electronic specifications by either the Client or TES are subject to review and acceptance by the other party. Additional services by TES made necessary by changes to the electronic file specifications shall be compensated for as Additional Services.

Electronic files furnished by either party shall be subject to an acceptance period of 5 work days during which the receiving party agrees to perform appropriate acceptance tests. The party furnishing the electronic files shall correct any discrepancies or errors detected and reported within the acceptance period. After the acceptance period, the electronic files shall be deemed to be accepted and neither party shall have any obligation to correct errors or maintain electronic files.

The Client is aware that differences may exist between the electronic files delivered and the printed hard copy construction documents. In the event of a conflict between the signed construction documents prepared by TES and electronic files, the signed or sealed hard copy construction documents shall govern.

Under no circumstances shall delivery of electronic files for use by the Client be deemed a sale by TES, and TES makes no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall TES be liable for indirect or consequential damages as a result of the Client's use or reuse of the electronic files.

**Jurisdiction and Venue:** This agreement shall be construed by the laws of the State of Wisconsin. The parties agree that venue shall be only in the State of Wisconsin.

**We look forward to working with you on this project.**

Traffic Engineering Services, Inc.



Wayne R. Higgins, PE, PTOE  
President

**ENDORSEMENT**

The undersigned hereby accepts this project description, scope of services, and contract for engineering and other services as stipulated herein, and hereby executes this contract and authorizes, Traffic Engineering Services, Inc. to proceed with the services outlined herein.

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
(Type or print name)

BY: \_\_\_\_\_ TITLE \_\_\_\_\_  
Signature (Type or print title)

*Standard terms and service charges for overdue accounts are hereby accepted unless noted otherwise.*

## ***SUMMARY OF SERVICES***

**Traffic Engineering Services, Inc.**, established in 1985, [www.tes.info](http://www.tes.info), for resumes, provides planning, design, operations improvements and analysis for municipal, State, Other Engineers and Architects, Developers, Attorney, Private Sector and Insurance Company clients. The company was founded on the experience of Wayne R. Higgins, PE, PTOE. Mr. Higgins has over fifty years of experience in the field of traffic engineering. He started in traffic engineering in Racine and Kenosha while an undergraduate at UW-Madison. His ten years of experience with the City of Madison (Wisconsin) Department of Transportation in traffic operations engineering and service to numerous Wisconsin Cities as traffic engineer establishes the background required for planning, design, analysis and operation of your traffic improvements. Wayne Higgins and his support staff, Jessica Lee, EIT; Ann-Marie Bergman, VP; and Jennifer Arnold, are available to you on an as needed basis.

Specific engineering work performed includes traffic signal design and operations, traffic impact studies, various types of traffic data collection, safe routes to school, neighborhood safety, downtown pedestrian friendly shopping plazas, parking surveys and design, parking lot/ramp internal traffic flow and access, roadway design, geometric roadway design, roundabout design and analysis, travel time and delay studies, origin-destination surveys, speed & speed limit studies, design study reports, outdoor lighting design, traffic signing and pavement marking design, locating No Passing Zones, intersection and system traffic signal design, operation and analysis, site planning and development, traffic crash analysis, traffic structure base design and other forensic engineering work as expert witness or opinion.

Traffic Engineering Services, Inc is the on-call traffic engineer for The Village of West Milwaukee and City of St Francis since 1985 plus the Village of Greendale, and Racine County for many years. Our workload is such that serving additional communities is in our operations plan. Other communities served in the past include City of Berlin, Village of Germantown and Village of Sussex and Kenosha County.

Professional Engineer (PE) and Corporate Registration in:

WI - PE # 13373

MI - PE # 6201035898

IL - PE # 062.055979

VA – PE # 058237

PTOE # 360 (Profession Traffic Operations Engineer) valid in all states registered as PE

### ***TRAFFIC SIGNAL PROJECTS***

- Signal updates for traffic detour in Jefferson County, Watertown
- Traffic Signals, timing and coordination, 43<sup>rd</sup> Street, W. National Avenue, Westchester Street and Miller Park Way, West Milwaukee
- Traffic Signal timing and improvements, 10 intersections along Church Street and Main Street, Watertown
- Signal upgrade with coordination, Lincoln Avenue, Miller Park Way and 43<sup>rd</sup> Street, West Milwaukee
- Traffic signal review and timing updated, City of Watertown
- CBD Traffic signal system timing Watertown Plank and Pilgrim Road retiming and or for change to 4-adaptive system with WisDOT, Elm Grove
- New traffic signals at CTH K / Northwestern Avenue, Racine Unified School District
- Traffic signals and Railroad preemption Denton, Nicholson and KK, 3 traffic signals Howard and Lake, St. Francis
- Traffic signal system optimization and 1 new signal for 14 intersection closed loop system along Miller Park Way and National Avenue 2012-2013 AM, Average and PM timing plans implemented using our MARC software, West Milwaukee
- New traffic signal CTH E, CTH JR & 39<sup>th</sup> Avenue, Kenosha County
- Temporary traffic signal CTH K/60<sup>th</sup> ST & Indian Trail Schools
- Traffic Signal at Howard Ave and Iowa Ave addition to 8 Intersection closed loop system, St Francis
- Daylight Savings Time update Traffic Signals West Milwaukee, St Francis, Racine County and Germantown
- Village of Germantown – Traffic Signal Modification, River Lane, High School Drive and S. Blackstone Drive, PS&E add east leg to intersection 2006 design and 2007 implementation
- Racine County new traffic signals in closed loop system Burlington: CTH E at Main ST, CTH W & Mc Canna Pkwy
- Racine County closed loop system Old STH 36 at CTH W & Buckley St and CTH W & Lynch Drive
- City of Delavan – Traffic Signal 3 intersection Closed Loop system STH 50, coordination update from new developments, Cycle/Split/Offset for timing plans at different times of day, days of week and seasons of the year, third update since installation current spring 2007

- City of Berlin – Two Traffic Signals on main street coordinated by Time Based Coordination AM & PM peak hours, improve flow and side street gaps for safety improvement 2006
- Sheboygan STH 42 & I 43 Ramps with Wal-Mart development, traffic signal coordination programs
- Kenosha County – CTH “EZ” & CTH “ML” PS&E construction inspection retiming modification to EB left turn on arrow phase only, sight distance problem resolution and change to LED signals, fall 2006 bid and winter 2007 implementation
- Kenosha County CTH “Y” & CTH “E” traffic signal timing from infield observation fall 2006
- Village of West Milwaukee – new Traffic Signals Pick N Save and Menards at Miller Park Way, PS&E construction and addition to make a 13 intersection closed loop signal system timing, construction fall-winter 2006/2007, system implementation with City of Milwaukee intersection at end of 12 Village signals 2007
- Village of West Milwaukee – Traffic Signal Removal evaluation and implementation Beloit Rd, 55<sup>th</sup> St & Mitchell St
- City of Delavan – Retiming of STH 50 and North Shore Drive Spring 2006
- Village of Sussex – Traffic Signal modification Main St & Maple St to add left turn phases, vehicle & pedestrian detector upgrade and LED signals PS&E with construction engineering and retiming of controller fall 2006
- City of St Francis – KK & Crawford Traffic Signal detector operation review 2006
- Racine County – Design review and Construction engineering new traffic signal CTH “W” and Lynch Way
- Kenosha County – New Traffic Signal CTH “S” & CTH “H” geometrics and PS&E 2006/2007
- Waukesha County – CTH L & Bay Lane Road PS&E add north leg to intersection 2005 design and 2006 implementation
- 
- City of Brookfield - Traffic Signal Installation, Calhoun and Civic Drive, PS&E and construction assistance.
- Village of Germantown - Temporary Traffic Signals, CTH Q & River, PS&E and construction.
- Waukesha - Traffic Signals, Fox Run and CTH "X", PS&E, bid and construction.

- Algoma - Traffic Signal Installation and Construction Services for the planned installation of traffic signals at Washburn and Highway 21.
- Dane County - Verona Bypass & CTH "PB", Street Lighting Analysis, PS&E for WisDOT
- City of Plymouth - Mill Road and North Avenue, Traffic Signal Construction Inspection.
- Waupun - STH 49 and STH 26, Traffic Signal, Waupun
- City of St. Francis - Traffic Signal, KK and East Crawford, PS&E and Construction.



## **Traffic Engineering Services, Inc.**

13545 Watertown Plank Road

Elm Grove, WI 53122

Office (262) 797-9097

**Wayne R. Higgins, PE, PTOE**

President

### **Professional Experience**

50+ Years

### **Professional Registration**

PE (Professional Engineer) and

PTOE (Professional Traffic Operations Engineer) in

Wisconsin #13373, Illinois #184.003866, Michigan #35898

Virginia #058237, PTOE #360

WisDOT TIA Provider #SE05-804-032

### **Education**

1969 BS Civil Engineering UW Madison

1977 Professional Development Engineering UW Extension Madison including course work at Northwestern University Traffic Institute

### **Highlights of Experience**

Mr. Higgins began working in Traffic Engineering since 1965 at the City of Racine, WI; followed by City of Kenosha 1966-68 and City of Madison 1969-1979. From 1979 to 1985 he was a traffic signal and relate products distributor and manufacturer as well as electrical contractor for traffic signal installations. He established the consulting firm of Traffic Engineering Services, Inc. in 1985. In 1995, he sold the company to Edwards and Kelcey, Inc. He was an Associate Vice President at Edwards & Kelcey from June 1995 to December 1996 where he was responsible for project management, direction and technical support for a wide variety of planning, highway, traffic, traffic-related, ITS and PCS communications site development projects.

In January 1997 he reestablished Traffic Engineering Services, Inc. at 890 Elm Grove Road and in 2015 relocated the business to 13545 Watertown Plank Road still in Elm Grove, WI.

Mr. Higgins experience and expertise covers a wide range of private, municipal, county and state traffic related engineering services. He is a part-time instructor at UW-Milwaukee for traffic engineering PE refresher course and traffic engineering 1-day seminar. Traffic Engineering Services, Inc. is in the 34th year of business and has completed over 2,500 projects in the following areas:

### **Traffic Design Studies**

- Traffic Projections
- Trip Generations
- Traffic Impact Analysis
- Traffic Accident Analysis
- Traffic Control Warrants
- Vehicle Counts, Classification, Weight and Speed Studies
- Safe Routes to School Maps
- Signing Study and Analysis
- Parking Study and Analysis
- Traffic for Roadway Design
- Bike path facilities
- Traffic Flow Analysis

## **Traffic Engineering Design**

- Roadway, Bike Path and Sidewalk Geometric Design
- Urban mall & municipal streetscape projects
- Traffic signal systems & isolated intersection control
- Pavement marking design materials and applications
- Traffic Safety Improvements
- Traffic Calming
- Parking Lots, sidewalks, circulation of cars, buses, trucks, bikes, motor cycles and pedestrians
- Parking ramps and lots access and traffic flow
- Roundabouts: City of Sheboygan 8<sup>th</sup> Street, Indiana Ave & Water St - APWA Public Works Project of the Year Under \$2,000,000 in 1996, Milwaukee County CTH ZZ/College Ave and Ace Industrial Drive access for trucking and future USPS Distribution Center in 2012, Racine County Concept Alternative Spring St & Airline Rd
- Street and Area Lighting
- Speed Limit Studies
- Preparation of Plans, Specifications & Cost Estimates
- Project Contract Preparation

## **Traffic Engineering Operations and Maintenance**

- Retiming and sequence evaluation for traffic signals
- Pavement markings and signing
- Traffic control in work zones
- Sign inventories and maintenance programs
- Traffic control installation policies and procedures
- Conversion of traffic signal equipment
- Video and radar vehicle detection systems
- "Closed Loop" traffic signal systems: twisted pair, fiber optic, microwave, radio, etc
- Conversion of TBC traffic signal controllers to time of day systems and traffic responsive systems

## **Outdoor Lighting Systems**

- Roadway and parking lot lighting
- Site lighting
- Sports and recreational lighting
- Streetscape lighting, kiosk and bus shelters
- Dimming special circuits HID LED lighting systems

## **Application of Computer Programs to Traffic Engineering**

- HCS-Highway Capacity Software
- TRANSYT 7F-Traffic Signal System Optimization
- PASSER-Traffic Signal Arterial Street Timing Optimization
- TEAPAC-Traffic Signal Intersection Optimization
- CALAVISUAL-Outdoor Area & Roadway Lighting
- Traffic Counter Recorder Software Sets
- Vehicle Classification Studies
- AUTOTURN and AutoCAD
- MICRO STATION (by TES staff)

## **Traffic and Lighting Pole Structure Foundations**

- Traffic sign Structures
- Traffic Signal Structures
- Traffic Signal Poles
- Sports Lighting
- Street Lighting
- Foundation Design Projects since 1969 - Over 100 Record-Base Designs are on File at TES including spread footing, wing, anchor to bed rock, shallow and deep for WisDOT, County, City, Village and Private sector use.

## **Forensic Engineering**

Expert Witness and Analysis: More than 60 jobs have been completed in: Traffic crash/accident analysis involving pedestrian, motorcycle, school bus, semi-truck, dump truck, auto collisions and collisions with trains plus slip and fall cases, roadway signing, pavement marking and geometric design, traffic signal operations and work zone traffic control.

## **Published Papers**

Street Lighting John Nolan Causeway Cutoff Luminaires Madison, WI – IESNA 1977

Modified Traffic Circle Sheboygan WI – APWA & ITE 1996

Vehicle Crash Reconstruction Evidence Documentation I-ENG-A

Motor Cycle Crash Analysis at Traffic Signal – I-ENG-A & Milwaukee Bar Association

## **Equipment Design-Build and Construction**

In addition to the design experience outlined above, Mr. Higgins has designed and built traffic signal and street lighting control cabinet panels, was a contractor to install traffic signalized intersections, and designed and assisted in the installation of interconnected traffic signal systems (including equipment modification, preemption for railroad, fire and transit) and traffic controller cabinets have been furnished to WisDOT and several cities. He also designed lighting for roadways, and sports facilities as well as field reviewed test systems for heavy truck weigh-in-motion systems.

## **Lecturer**

- University of Wisconsin-Milwaukee, PE Refresher Course: Transportation
- University of Wisconsin-Milwaukee, 1-day Traffic Engineering Seminar
- Crowley Construction, Brickline and Mega Rentals training for Locating No Passing Zones
- Milwaukee Bar Association: Motor Vehicle & Motor Cycle Crash Analysis
- Investigative Engineers Conference: Analysis of Motor Cycle and Pickup Truck Crash
- Investigative Engineers Conference: Elements of Data Collection for Crash Analysis
- Institute of Transportation Engineers, Wisconsin Section: PTOE Refresher
- University of Wisconsin-Madison: Traffic Engineering
- University of Wisconsin-Extension: Traffic Engineering One Day Seminar
- Northwestern Traffic Institute: Computer applications to Traffic Engineering

In the area of roadway design and analysis, Mr. Higgins has performed intersection and roadway preliminary and final design for a variety of state, county and local agencies and private developments. He has prepared intersection, roadway and interchange design alternatives at various locations for the Wisconsin Department of Transportation. His design for the intersection of 8th Avenue, Water Street and

Indiana Avenue, "A Modified Traffic Circle," in Sheboygan, WI was awarded the Under \$2 Million, "Public Works Project of the Year" in 1996.

A two-lane roundabout design was completed on CTH ZZ/College Avenue in City of Oak Creek, City of Cudahy at Ace Industrial Drive. Hamiton School District Templeton Middle School Sussex design, bid and construction engineering onsite roundabout.

### **Prior Professional Experience**

1997 to Present:	Traffic Engineering Services, Inc., President
2009 to 2013:	I-ENG-A of Southeast Wisconsin by TES
1995 to 1997:	Edwards and Kelcey, Inc., Associate Vice President
1985 to 1995:	Traffic Engineering Services, Inc., President
1981 to 1985:	Signal and Lighting Engineering Systems, Inc., President
1979 to 1981:	Tucker Co., Inc., Vice President and Sales Engineer
1969 to 1979:	City of Madison, WI, Traffic Operations Engineer
1966 to 1968:	City of Kenosha, WI, Assistant to City Traffic Engineer
1965 (summer):	City of Racine, WI, Temporary Assistant to City Traffic Engineer

### **Awards**

ITE Wisconsin Section 2005 Distinguished Service Award

APWA 1996 Public Works Project of the Year 1996 for Under \$2 Million  
Sheboygan Modified Traffic Circle at South 8th Street, Indiana Avenue and Water Street

Illuminating Engineering Society of North America

Lighting Design Award of Merit 1977

John Nolen Drive "Causeway" Cutoff Street Lighting Project with Modified Flood Lights

American Society of Civil Engineers (ASCE), Life Member 2009

### **Professional Activities**

ASCE, Life Member

IESNA, Member Emeritus

APWA, Member

ITE, Fellow

Numerous continuing education courses as instructor & attendee 16+ PDH per year

Past Transportation Professional Certification Board (TPCB), 7-Years Member

Past Village of Elm Grove, Plan Commission 18-yrs

Vintage Chevrolet Club of Wisconsin (VCCA), Past Director

Christ The King Lutheran Church, Past President, Unity Lutheran Church (Now COL & CTK) Church Festival Committee Member, Back Yard Improvement Committee Member \$800k + project

## References

Melinda Dejewski, PE City Engineer /Director of Public Works  
City of St Francis  
4235 S. Nicholson Avenue, St. Francis, WI 53235  
(414) 481-2300 [melindad@stfranwi.org](mailto:melindad@stfranwi.org)

Jim Stenzel, Superintendant of Public Works  
Village of West Milwaukee  
4755 W. Beloit Road, West Milwaukee, WI 53214  
(414) 645-6238  
[james.stenzel@westmilwaukee.org](mailto:james.stenzel@westmilwaukee.org)

Jim Gatzke, Attorney  
Gatzke Law, LLC  
15710 W. National Avenue, PO Box 510743, New Berlin, WI 53151-0743  
(262) 814-1700 Main [jgatzke@gatzkelaw.com](mailto:jgatzke@gatzkelaw.com)



## **Traffic Engineering Services, Inc.**

13545 Watertown Plank Road  
Elm Grove, WI 53122  
Office (262) 797-9097

**Jessica D. Lee**

Staff Engineer

### **Education**

University of Wisconsin-Milwaukee (2014 – 2018)

- Bachelor of Science, Honors Degree
- Civil Engineering with an emphasis in Transportation
- Summa Cum Laude

### **Experience**

#### **Traffic Engineering Services, Inc., Elm Grove, Wisconsin**

January, 2019 – current: Staff Engineer

- Assist in road, roundabout, and parking lot designs
- Draft plans in AutoCAD
- Traffic Impact Analysis (TIA) preparation
- Analyze traffic count and signal data in Synchro and HCS
- Conduct field measurements and site reviews
- Monitor traffic signals and control cabinets in field and remotely
- Research and review data for expert witness cases
- Utilize survey equipment in field and analyze data
- Check project progress during construction and meet with contractors

#### **Wisconsin Department of Transportation, West Allis, Wisconsin**

May, 2017 – December, 2018: Signing and Marking Student Engineer Trainee

- Worked independently by performing field reviews for signs and pavement markings to determine if they need to be updated or replaced
- Updated signing records in Cartegraph and Excel software based on work orders from regional counties
- Marked proposed locations for future signs in the field
- Job shadowed people in various positions: bridge inspector, lighting engineer, landscape architect
- Completed training course in designing for pedestrian safety

#### **Wacker Neuson Corporation, Menomonee Falls, Wisconsin**

Summer, 2016: Lean Manufacturing Intern

- Improved assembly line efficiency by creating value stream maps and spaghetti diagram and by helping set up Kanban systems
- Designed and created training documents for Kanban and the setup reduction program
- Analyzed and improved the flow of raw material to the generator assembly line
- Directed employees to assist in redesigning the storage bin system in production

Summer, 2015: Maintenance Employee

- Performed various maintenance tasks, including painting, general cleaning, and yard work

### **Computer Skills**

Experience with: Revit, Civil 3D, AutoCAD, Cube, Cartegraph, Microsoft Office, Minitab, Google Earth, GIS, Synchro, HCS, TACTICS

### **Achievements and Certifications**

- 2019: Earned Engineer in Training (EIT) Certification
- 2019: Completed the WisDOT TIA Preparers Training Program
- 2017: Became a member of **Tau Beta Pi Wisconsin Gamma Engineering Honor Society**
  - Served in an officer position as the corresponding secretary
- 2014-2018: Dean's List, University of Wisconsin-Milwaukee