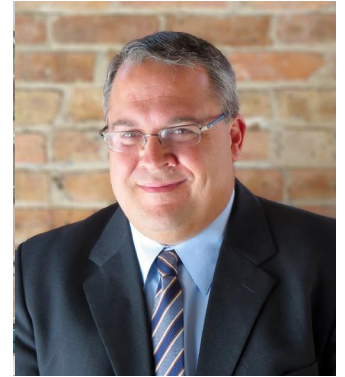


BROCHURE

TERRA Engineering, Ltd. (TERRA), has experience with traffic engineering projects and studies of all sizes, ranging from small local projects to larger projects of regional importance. Highlights include work for federal, state, county, and local governments in both rural and complex urban environments. TERRA provides professional traffic survey and data collection to public and private clients. With an inventory of more than 40 Miovision video collection units, over 250 Hi-Star magnetic Counters and more than 200 road tube counters, in addition to numerous handheld counting devices and GPS equipment, our team of qualified technicians is prepared to collect traffic count data on projects of all sizes.

TERRA conducts a wide array of traffic engineering and safety studies to assist our clients in determining the potential impact of a project on the surrounding roadway network. Our traffic engineering staff is well versed in the procedures, standards and technology required to determine the appropriate solutions for each project. TERRA provides a wide array of traffic signal services from traffic signal warrant studies to signal coordination and timing for existing signal corridors. Our traffic engineers have experience designing a wide array of traffic signals including emergency preemption, railroad coordination and Flashing Yellow Arrow (FYA) treatments.



Point of Contact

Chris Hutchinson, PE, PTOE

chutchinson@terraengineering.com

O: 314.395.9899 | M: 314.614.2410

1804 Borman Circle Drive, Ste 200

St. Louis, MO 63146

EXPERIENCE

- National Geospatial Agency - St. Louis, Missouri
- Great Rivers Greenway Bicycle Master Plan - St. Louis, Missouri
- MoDOT Route 21 Signal Timing Coordination - St. Louis, Missouri
- Riyadh Traffic Monitoring & Analysis - Riyadh, Saudi Arabia
- Various Traffic Counts - Wildwood, Missouri
- MoDOT Traffic Counts & Signal Optimization of Route 141 - St. Louis, Missouri
- On-Call Traffic Services - Champaign, Illinois
- Modified High-Intensity Activated Crosswalk ("HAWK") Signal Installation - Oak Park, Illinois
- Freedom Parkway - Washington, Illinois
- Main & University Intersection Improvements - Peoria, Illinois
- 2017 World Rowing Championship Traffic Management Study - Sarasota & Bradenton, Florida
- Area 6 Neighborhood Traffic Study - Downers Grove, Illinois
- Chicago Park District Headquarters - Chicago, IL
- MPEA Event Center & Hotel Traffic Signals - Chicago, Illinois
- Downtown Traffic & Parking Study - Clarendon Hills, Illinois

SERVICES

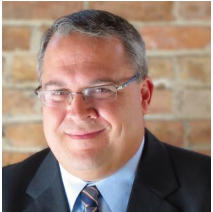
- Traffic Data Collection
- Corridor Studies
- Speed Studies
- Intersection / Roadway Capacity Analysis
- Intersection Design Studies (IDS)
- Parking Lot Analysis / Studies (including Site Circulation)
- Speed Delay Studies
- Traffic Modeling (utilizing VISSIM, Synchro, HCS, Sidra, TruTraffic, etc.)
- Traffic Impact Analysis
- Traffic Signal and Stop Sign Warrant Analysis
- Traffic Signal Design / Interconnect
- Transit Studies
- Vehicle / Pedestrian Inventories
- Highway Safety Manual
- Safety Studies and Economic Analysis

MANAGEMENT

WBE*

Karen Steingraber, PE, President • Jamil Bou-Saab, PE, Executive Vice President
George Ghareeb, PE, F.ASCE, Associate Vice President • Eric Therkildsen, PE, Associate Vice President

MEET THE TEAM



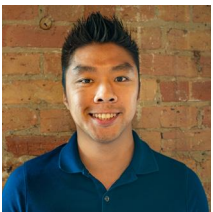
Project Manager | M. Chris Hutchinson, PE, PTOE

Mr. Hutchinson has acquired more than 20 years of experience in providing traffic and transportation engineering services for a variety of projects and clients. Chris specializes in traffic modeling and traffic impact studies for TERRA. Chris has completed multiple large-scale modeling projects throughout the Midwest. Chris also has completed numerous traffic and speed studies for public and private clients, as it pertains to a new roadway design. His experience includes traffic modeling and analysis, traffic signal design, signal optimization, roadway design, and traffic studies. Chris has worked on various roadway design projects including Folkers Avenue Reconstruction and the Washington Street TIGER II Complete Streets project.



Senior Traffic Engineer | Colin Coad, PE, PTOE, VMA

Colin has 15 years of experience in roadway geometrics, traffic analysis, traffic signal design, environmental processes/documentation and preparing Project Development Reports on State, County and Municipal transportation projects with both local and federal funding. He has mastered various software programs including Highway Capacity Software, Synchro/SimTraffic, MicroStation and GeoPAK. Colin has completed TERRA's neighborhood traffic Study for the Village of Downers Grove, signal designs for the MPEA Event Center, and assisted on the Traffic Monitoring and Analysis project in Riyadh, Saudi Arabia. Colin has also assisted Cook County, IL with an on-call project, performing tasks including conducting speed studies, analysis of intersection operations, traffic signal and stop sign warrants.



Design Engineer | Sanders Ong, EIT

Sanders has been working with the St. Louis office for approximately five years. During this time, Sanders has led the Miovision data collection team efforts from the St. Louis office and has personally overseen several hundred traffic count locations. Sanders also performs QA/QC on TERRA's work on the IDOT Traffic Data collection project ensuring the accuracy of the count data, location information and other pertinent information. In addition, Sanders assists with traffic modeling in Synchro and has been instrumental with the preparation of numerous traffic impact studies for various public and private clients throughout Missouri and Illinois.

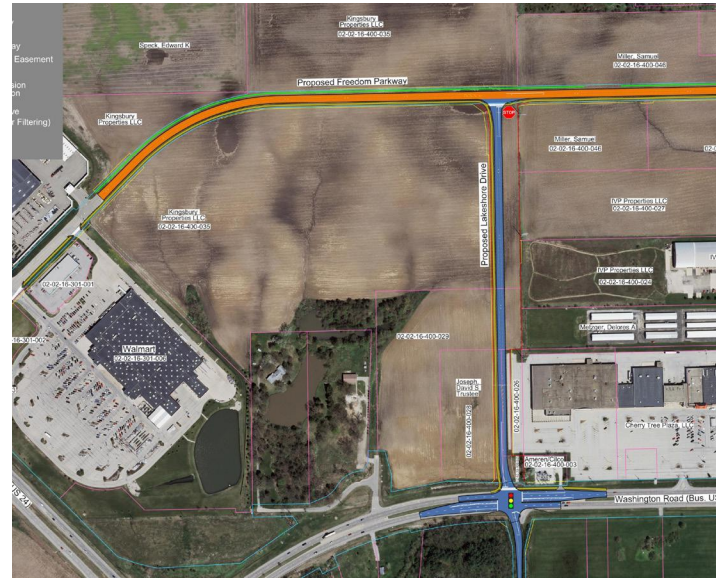


MODOT TRAFFIC COUNTS AND SIGNAL OPTIMIZATION OF MO ROUTE 21

TERRA Engineering was selected as part of a team to provide traffic data collection services and traffic modeling for the signal coordination and timing project to be completed along Missouri Route 21. TERRA's staff performed the video data collection at all of the intersections through the corridor. Chris Hutchinson from TERRA's staff then created and updated a Synchro model to evaluate the existing signal timing and to optimize proposed timing plans.

TERRA's team evaluated multiple timing scenarios which included AM, PM, Weekend and off-peak timings and worked to improve the overall network performance. TERRA also assisted with the before and after travel time runs utilizing Tru-Traffic software which were used to help measure the actual improvements realized by drivers. TERRA used the Tru-traffic data in conjunction with the Synchro model to fine-tune the signal green bands in conjunction with the travel time and speed data and improve the traffic model performance.

- Key Personnel: M. Chris Hutchinson, PE, PTOE
- Reference: Brad Loomis, PE, PTOE, Tepa, LLC, 816.506.9284, Brad.loomis@tepa.com / Chris Hohowski, MoDOT, 314.275.1577, christopher.hohowski@modot.mo.gov



FREEDOM PARKWAY

TERRA provided traffic engineering services in conjunction with transportation, site/civil engineering, landscape architecture, and surveying services for the extension of Freedom Parkway from Menards to Cummings Lane. The traffic study portion of the project was to analyze the change in traffic patterns and project the potential new traffic to be generated by the extension of Freedom Parkway and Lakeshore Drive for the City of Washington IL. The City is looking to develop the adjacent agricultural land into industrial and "urban village" land uses. TERRA developed a traffic study, roadway geometry, traffic signals, and drainage design for the City and IDOT-jurisdiction roadways affected by the project. This effort includes developing and coordinating Intersection Design Studies, a Location Drainage Study, and a Project Development Report, with public involvement. The resulting plan provides the framework for the advancement of the City's roadway network and development.

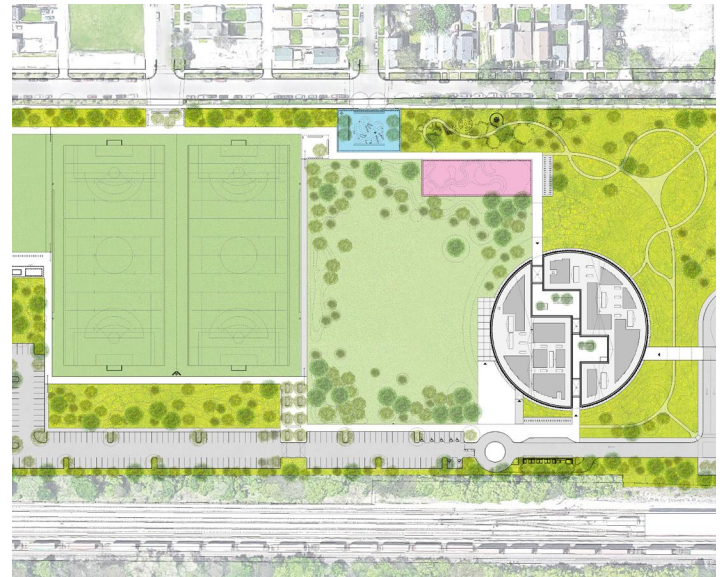
- Key Personnel: M. Chris Hutchinson, PE, PTOE, Sanders Ong, EIT, Colin Coad, PE, PTOE, VMA
- Reference: Dennis Carr, PE, City Engineer, City of Washington, IL, 309.441.1136, dcarr@ci.washington.il.us



TRAFFIC DATA COLLECTION AND STUDY - IDOT DISTRICTS 3,4,5,6,7,8, AND 9

TERRA Engineering, Ltd. (TERRA), provided 24-hour machine traffic counts for on- and off-system routes throughout multiple IDOT Districts, which includes municipalities such as Peoria, Quincy, Carbondale, Effingham, and Springfield and the Illinois portion of the St. Louis Metro Area. Counts were administered using our inventory of over 500 portable traffic data collection devices such as NuMetrics Hi-Star magnetic traffic lane sensors, road tube counters and MioVision Automated Traffic Data collection cameras. Data was compiled into weekly submittal spreadsheets including volume and classification, where applicable. Raw count data from the magnetic counters was submitted to IDOT weekly. Count data was verified against historic trends before submitting to IDOT. Field technicians also used on-board laptop computers to collect and compile GPS data, which was then integrated into ArcGIS and sent to IDOT in the weekly submittals.

- Key Personnel: Colin Coad, PE, PTOE; Sanders Ong, EIT;
- Reference: William Morgan, IDOT, 217.782.0378, William.Morgan@illinois.gov



CHICAGO PARK DISTRICT HEADQUARTERS

TERRA is responsible for the site/civil engineering, traffic engineering and surveying services associated with developing a 17-acre property near 48th Street and Western Avenue will be developed with the new Chicago Park District Headquarters building, new fieldhouse and new park amenities. TERRA was responsible for authoring the traffic study which evaluated the impacts of the new headquarters on Western Avenue and the adjacent CTA Orange Line Station. TERRA used video to collect vehicle and pedestrian data along both Western Avenue and Western Boulevard throughout the study area. During the analysis, TERRA noted numerous pedestrian crossings away from the marked crosswalks, including many two-stage crossings where pedestrians waited in the center of the roadway in unprotected areas for gaps to appear in oncoming traffic to finish crossing the street. TERRA made recommendations to improve pedestrian safety and provide a safe pedestrian crossing from the transit station and an existing senior home to the new park and headquarters building.

- Key Personnel: M. Chris Hutchinson, PE, PTOE
- Reference John Ronan, Principal, John Ronan Architects., 312.951.6600x21, ronan@jarch.com