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MINNESOTA PUBLIC UTILITIES COMMISSION

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DIRECT TESTIMONY OF JOSHUA MAUS

APRIL 6, 2022

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SCHEDULES:
Schedule A: Resume of Joshua Maus
Schedule B: Memorandum of Proposed Solar Development Traffic Analysis, CSAH 11 and Becker Township Business Park, Minnesota.

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Joshua Maus, and my business address is 3701 Wayzata Boulevard, Suite 100, Minneapolis, MN 55416-3791.

Q. With whom are you employed?

A. I am employed by SRF Consulting Group, Inc. ("SRF").

Q. What is your position with SRF?

A. I am a Project Director of Traffic Operations at SRF.

Q. Please describe your educational and professional background.

A. I am a Minnesota certified Professional Engineer ("PE"). I have over 20 years of experience in the field of traffic engineering with much of that experience focused on freeway and arterial analysis, traffic forecasting, concept design, and benefit-cost analysis. I hold a B.S. in Civil Engineering from the University of Minnesota, where I focused on traffic engineering. My resume is attached to this Direct Testimony as **Schedule A**.

Q. Describe your role with respect to the Project.

A. I was retained to evaluate the existing traffic operations at the two study intersections near the Becker Township Business Park to identify any potential transportation impacts associated with the proposed Sherco Solar Facility ("Solar Project"), identify the impacts the proposed Solar Project may have on the accessibility to and from the Becker Township Business Park, and recommend improvements to address any issues, if necessary.

II. OVERVIEW

Q. What is the purpose of your Direct Testimony?

A. In a letter dated April 30, 2021 (filed to Docket No. E002/M-20-9-891 as eDocket ID No. 20214-173722-01), Becker Township expressed concerns about the Solar Project and the impacts it would have on Becker Township's ability to create traffic solutions that would make the Becker Township Business Park more accessible for users. Becker Township is specifically concerned with the intersection of 149th St SE and County State Aid Highway ("CSAH") 11 at the entrance to the Becker Township Business Park and the intersection of CSAH 11 and Highway 10, which are collectively referred to in my Direct Testimony as the "Study Intersections". In response to these concerns, Becker Township presented three road alignment options to create an alternate path out of the Becker Township Business Park as a way to mitigate Becker Township's existing traffic concerns at the entrance to the Becker Township Business Park. The three alternate road alignments would all travel through the East Block of the Solar Project.

The purpose of my Direct Testimony is to report the results of a traffic engineering study we conducted to: 1) evaluate the existing operations at the Study Intersections; 2) identify any transportation impacts associated with the proposed Solar Project; 3) identify impacts the proposed Solar Project will have on access to and from the Becker Township Business Park; 4) evaluate the traffic solutions proposed by Becker Township and others to alleviate existing traffic concerns and recommend improvements to address any issues, if necessary; and 5) provide recommendations on the pursuit of the three alternate road alignments proposed by Becker Township.

Q. What schedules are attached to your Direct Testimony?

A. The following schedules are attached to my Direct Testimony:

- **Schedule A:** Resume of Joshua Maus

- **Schedule B**: Memorandum of Proposed Solar Development Traffic Analysis, CSAH 11 and Becker Township Business Park, Minnesota.

Q. Describe your experience conducting traffic studies in the area surrounding the Solar Project.

A. I led the Trunk Highway 25 Area Study, which included the area studied in the report attached as **Schedule B** to this Direct Testimony. The Trunk Highway 25 Area Study was completed in October 2019 on behalf of Central Mississippi River Regional Planning Partnership, a consortium of local government units, that includes Becker Township. The Central Mississippi River Regional Planning Partnership initiated the study to identify near and long-term improvements that address current and future transportation issues on Trunk Highway 25 between I-94 and Highway 10, and accommodate future community growth in Becker, Becker Township, Big Lake, Big Lake Township, and Monticello.

Sherburne County ("County") also engaged SRF to complete a study of the Highway 10 and CSAH 11 intersection to understand the operational and safety issues currently experienced at the Highway 10 and CSAH 11 intersection. The Highway 10 and CSAH 11 Intersection Study was led by me and completed in March 2020 ("*Highway 10/CSAH 11 Intersection Study*"). The County is currently pursuing funding for future improvements at this location. Traffic data and modeling files from the Highway 10 and CSAH 11 Intersection Study were utilized for the study summarized in the report attached as **Schedule B** to my Direct Testimony.

III. EVALUTION OF EXISTING OPERATIONS AT STUDY INTERSECTIONS

Q. What general methodology did you use to assess the existing traffic patterns at the Study Intersections?

A. Existing conditions were reviewed to establish a baseline to identify any future impacts associated with the Solar Project. The evaluation of existing conditions includes collection and review of traffic volumes entering and exiting the Becker

Township Business Park at the CSAH 11 and 149th Street SE intersection, review of traffic volumes using the Highway 10 and CSAH 11 intersection and an intersection capacity analysis for both Study Intersections. New intersection turning movement count data was collected for the CSAH 11 and 149th Street SE intersection, which is the entrance and exit for the Becker Township Business Park. Traffic data for the Highway 10 and CSAH 11 intersection was available from the *Highway 10/CSAH 11 Intersection Study*. Traffic counts were conducted by setting video cameras and post processing the video files to provide peak hour totals for each turning movement at the Study Intersections.

Q. How are the Intersection Capacities determined?

A. An existing intersection capacity analysis was completed on the Study Intersections using an industry approved microsimulation software (i.e., PTV Vissim) to establish current, baseline conditions of the intersections. Capacity analysis results identify a Level of Service ("LOS") which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 1 of **Schedule B**. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection scores of LOS A through LOS D are generally considered acceptable based on Minnesota Department of Transportation ("MnDOT") guidelines.

Q. What were the results of the Intersection Capacity Analysis for the Study Intersections?

A. Results of the existing capacity analysis, shown in Table 2 of **Schedule B**, indicate the Study Intersections perform at an acceptable LOS, except that during the p.m. peak hour, the intersection of CSAH 11 and 149th Street SE operates at a poor level of service (i.e., LOS F) with average delays for the eastbound approach exceeding 3 minutes.

Q. What do you believe to be the cause of the poor level of service for the CSAH 11 and 149th Street SE intersection during the p.m. peak traffic hour?

A. The poor level of service at this intersection in the p.m. peak traffic hour is mainly caused by the poor operations of the Highway 10 and CSAH 11 intersection when a train event occurs on the BNSF Railroad tracks where northbound traffic queues can spill back over 2,000 feet to the south of the Highway 10 and CSAH 11 intersection, based on the modeling results and site observations. When this queue develops, it spills past 149th Street SE, impacting operations at this location. Based on information from BNSF and our traffic counts, approximately two train events occur during each peak hour. In addition to a train event, the northbound approach of CSAH 11 at Highway 10 only has one approach lane without a left-turn lane and only a short channelization for the right turn movement, which means that all traffic travelling straight or turning right or left at the Highway 10 intersection is stacked in one lane. This confinement of traffic in one lane also contributes to the operations and queuing issues that are present today at the CSAH 11 and 149th Street SE intersection during the p.m. peak traffic hour.

IV. TRANSPORTATION IMPACTS ASSOCIATED WITH THE PROPOSED SOLAR PROJECT

Q. How did you assess the impact the construction of the proposed Solar Project will have on the traffic patterns at the Study Intersections?

A. Based on information provided by Xcel Energy, construction for the West Block and East Block of the Solar Project sites will take approximately 30 months to complete. During the peak months, approximately 400 construction workers per day are expected to be on the East Block from March 2023 to October 2023. The primary staging area for the East Block will be located along Sherburne Avenue near 137th Street. The closest access from the staging area to Highway 10 is via Sherburne Avenue to Liberty Lane or via Sherburne Avenue to 137th Street. Therefore, it would

be anticipated that most of the East Block construction traffic accessing Highway 10 will enter and exit the staging area using either Liberty Lane or 137th Street.

The construction workers are expected to arrive on site during the a.m. peak hour and will depart during the p.m. peak hour. While some traffic may enter the site staging area via CSAH 11 to Sherburne Avenue, the model conservatively routed all traffic via Highway 10 to understand the maximum potential impacts to the Study Intersections. Construction traffic was not expected to pass through the CSAH 11 and 149th Street SE intersection due to available routes around the intersection to the staging area from all directions. The Study Intersection capacity analysis model generated above using PTV Vissim software was updated with this construction traffic information to generate an updated capacity analysis with updated LOS calculations for the Study Intersections.

Q. What were the results of your solar development construction traffic assessment?

A. Results of the peak construction conditions intersection analysis indicate that the traffic generated from the construction workers will not have a significant impact on the operations of the Study Intersections under peak construction conditions. The results from the peak construction conditions analysis reflect the results from the existing conditions analysis closely, only showing a slight increase in delay between the Study Intersections.

Q. How did you assess the impact the operation of the proposed Solar Project will have on the traffic patterns at the Study Intersections?

A. First a capacity analysis was conducted to determine how the Study Intersections would operate under future conditions if no improvements were made to the intersections and if the Solar Project was not constructed. Year 2040 traffic volumes were developed using the Metropolitan Council's Travel Demand Model. The future traffic volumes also reflect planned development for the neighboring communities of Becker, Big Lake and Monticello and are consistent with those future traffic volumes

developed in the *Highway 10/CSAH 11 Intersection Study*. The year 2040 baseline scenario assumed the existing lane geometry at both Study Intersections and assumed a consistent train schedule as the existing conditions. Next, the year 2040 capacity analysis was updated to account for the traffic projected to be generated by the Solar Project during its operation. The additional trips from the employees working on-site at the Solar Project during operations was provided by Xcel Energy. Each person working at the Solar Project was assumed to arrive on-site during the morning peak hour and depart from the site during the afternoon peak hour.

Q. What were the results of your construction traffic assessment during Solar Project operations?

A. Results of the future traffic conditions intersection analysis indicate that the baseline Study Intersection condition in year 2040, without the Solar Project, would worsen significantly from current conditions during the afternoon peak hour. During the p.m. peak hour, the northbound queue approaching the Highway 10 and CSAH 11 intersection would be projected to exceed one mile. This queue is caused by a combination of train events at the railroad crossing and the lack of capacity on the northbound approach at the Highway 10 and /CSAH 11 intersection. This excessive northbound queue would impact the drivers exiting the Becker Township Business Park at CSAH 11 and /149th Street SE, causing the eastbound delay to exceed 10 minutes at that intersection. The results indicate that the operations traffic associated with Solar Project would not have a negative impact on traffic flow through the Study Intersections and would not worsen the accessibility to and from the Business Park.

V. EVALUTION OF POTENTIAL SOLUTIONS TO ADDRESS STUDY INTERSECTION ISSUES

Q. The Solar Project is not expected to impact traffic at the Study Intersections, was that the end of your traffic study?

A. No. Even though the Solar Project will not significantly impact traffic at the Study Intersections, Xcel Energy asked us to review Study Intersection traffic solutions proposed by Becker Township to resolve accessibility concerns for the Becker Township Business Park resulting from traffic back-ups from the Highway 10 and CSAH 11 intersection and train events on the BNSF railroad impacts operations. In its April 30, 2021 letter, Becker Township presented three roadway options that would extend 149th Avenue to the south, west or northwest through the proposed Solar Project to provide an alternate exit to the Becker Township Business Park. The three roadway build options are shown in Figure 6 of **Schedule B** to this Direct Testimony. Xcel Energy asked us to determine if Becker Township's proposed solutions were worthwhile to improve existing traffic issues because the traffic solutions proposed by Becker Township would significantly impact the East Block of the Solar Project as proposed by Xcel Energy.

Q. Did you evaluate Becker Township's proposed alternate road solution to resolve traffic issues at the Becker Township Business Park?

A. Yes. We evaluated Becker Township's proposed alternative road alignment options to determine if they were cost effective solutions to alleviate traffic delays existing at the Becker Township Business Park. Based on the distances of these roadway build options, roadway build option A (i.e., the roadway proposed from 149th Street SE to 137th Street) provides the most direct connection to Highway 10, resulting in the greatest potential to improve the accessibility and reduce travel times to and from the Becker Township Business Park. Accordingly, in the interests of modeling the roadway scenario most likely to reduce travel times, roadway build option A was used as a representative option for the analysis of potential new roadways.

Q. Did you evaluate any other potential solutions to resolve traffic issues at the Becker Township Business Park?

A. Yes. We also evaluated a full-grade separated interchange at the Highway 10 and CSAH 11 intersection to understand the benefit this improvement would provide to the operations at the CSAH 11 and 149th Street SE intersection so that comparisons

could be made to Becker Township's alternate road alignments such that a determination could be made as to which solution, if any, would be most effective at resolving existing traffic issues. The full-grade separated interchange was developed and evaluated as part of the *Highway 10/CSAH 11 Intersection Study*.

Q. Please discuss how you evaluated the potential solutions to resolve traffic issues at the Becker Township Business Park?

A. To evaluate an alternate roadway scenario to the northwest of the Becker Township Business Park and the full-grade separated interchange at the Highway 10 and CSAH 11 intersection, we conducted a travel time analysis to determine the impacts each improvement would have on traffic exiting the Becker Township Business Park using Year 2040 project development conditions. Travel times entering and exiting the Business Park were evaluated for the following three scenarios:

- Year 2040 Development Conditions – With No Intersection Improvements
- Year 2040 Development Conditions – With Potential New Roadway
- Year 2040 Development Conditions – With Potential New Interchange

We also conducted a cost-benefit and return-on-investment analyses for each of the two traffic improvements to determine which improvement would provide the most cost-effective solution to the Becker Township Business Park traffic concerns. Return-on-investment is a measurement that is used to understand how quickly an investment will pay off. This type of evaluation can be used to compare the efficiency of different investment options. A return-on-investment evaluation was performed for the potential new roadway and new interchange to determine an approximate time frame the respective improvements would pay off in terms of motorist travel time. For the purpose of our analyses and based on previous studies, it was assumed that a benefit-cost ratio of 1.0 would provide a return on investment of 20 years.

Q. Please describe the results of your intersection improvement travel time analysis.

A. From this analysis, the Becker Township Business Park accessibility is greatly improved if the Highway 10 and CSAH 11 intersection and associated at-grade railroad crossing are addressed. Under the potential new interchange scenario, the Highway 10 and CSAH 11 intersection and the railroad crossing are both grade separated, resulting in a significant travel time reduction for the Becker Township Business Park traffic. The northbound queue that currently develops from the Highway 10 and CSAH 11 intersection and the railroad crossing would be eliminated and would not spill back to the CSAH 11 and 149th Street SE intersection. Relieving this queue would provide more accessibility to the Becker Township Business Park.

While the travel times with a new alternate roadway also are greatly improved from the development conditions scenario, drivers will still experience significant delay at the railroad and Highway 10 and 137th Street intersection, unlike under the new interchange analysis. Motorists will experience a similar amount of delay at this railroad crossing as they do at the CSAH 11 railroad crossing. The Highway 10 and 137th Street intersection is side-street stop controlled (no traffic signal) and serves high speed traffic on Highway 10 and provides minimal gaps for side-street traffic. The minimal gaps and high speeds result in motorists feeling uncomfortable, creating potential safety issues and excessive side-street delays. If traffic were diverted further west to the CSAH 11 and Liberty Lane intersection they would be able to access CSAH 11 via a traffic light, but would still encounter the railroad crossing and would have additional travel time to drive to the CSAH 11 and Liberty Lane intersection and associated delays at the traffic light.

Q. Please describe the results of your cost-benefit analysis of the two intersection improvements evaluated in your study.

A. The benefit-cost ratio for Becker Township's proposed new roadway is less than 1.0 (i.e., 0.8), indicating that this is not a cost-effective solution. Whereas the benefit-cost ratio for the new full-grade separate interchange is 1.8, indicating it is a cost-

effective solution. Moreover, the benefit-cost ratio for the potential new roadway is likely to be less than 0.8 because the cost used to calculate the return on investment and the benefit-cost ratio only assumed the cost of grading and pavement and not the ancillary improvements that will also be required. The new roadway will only serve traffic accessing the Business Park, whereas the new interchange will serve all traffic traveling through the Highway 10 and CSAH 11 intersection in addition to the traffic accessing the Business Park.

Accordingly, the results from the return-on-investment evaluation indicate that it would be more cost effective to invest in a potential new interchange than a potential new roadway with the return-on-investment for the new interchange at 11.1 years and the new roadway at 24.8 years. The new interchange would also provide a safety benefit with the grade separation of Highway 10 and the railroad crossing in addition to the travel time and reduced car delay benefits. These safety benefits are not applicable to the new roadway since traffic still must cross the railroad and access Highway 10 at-grade on 137th Street. Additionally, the new interchange is eligible for funding sources that would not apply to the new roadway because the new interchange would create grade separation between the railroad crossing and CSAH 11.

VI. CONCLUSIONS

Q. What conclusion do you draw from your analyses of the Study Intersections and potential solutions to address Becker Township's concerns?

A. The proposed Solar Project will not have a significant impact on traffic at the Study Intersections during construction and operation of the Solar Project. Future improvements at the Highway 10 and CSAH 11 intersection will be necessary to improve operations at the CSAH 11 and 149th Street SE intersection regardless of the Solar Project's minimal impacts on the regional traffic system.

337 A new roadway from the Becker Township Business Park to 137th Street is not a
338 cost-effective solution to existing Business Park traffic issues because the Business
339 Park traffic will still experience significant delays due to the railroad crossing and the
340 Highway 10 and 137th Street intersection. The new roadway will likely only serve
341 traffic originating and destined west on Highway 10 from the Becker Township
342 Business Park. This traffic accounts for 50 vehicles or less during each peak hour
343 under existing conditions. Constructing a new roadway that only serves such a low
344 traffic volume is not a cost-effective solution.

345
346 The grade separation of the Highway 10 and CSAH 11 intersection and the BNSF
347 railroad on CSAH 11 greatly improves the Business Park accessibility. This grade
348 separation eliminates the northbound queue and provides motorists a travel time
349 with minimal delay. Constructing a grade separated interchange at Highway 10 and
350 CSAH 11 and at the railroad crossing is more cost-effective than the local roadway
351 option. The grade separation of Highway 10 and CSAH 11 also fits within the long-
352 term vision for the Highway 10 corridor as there is currently another grade separated
353 interchange being designed on the west side of Becker at Highway 10 and Highway
354 25 to address similar accessibility and delay issues at that intersection.

355
356 **Q. Does this conclude your Direct Testimony?**

357 A. Yes.