City of Manitowoc, Department of Infrastructure

Technical Support Services

February 25, 2025

TECHNICAL MEMORANDUM

Subject: STH 42 (Memorial Drive) & E. Reed Avenue

Executive Summary

STH 42 (Memorial Drive) is a four-lane divided urban roadway from I-43 East to Lake Michigan and continues to the North to Two Rivers and then continues onto Kewaunee County. There is no parking on either side of STH 42 anywhere in the project area near this T-Intersection with East Reed Avenue. There is parking allowed on E. Reed some distance back from the intersection. There is a left turn lane off of the Northbound STH 42 turning to the West onto E. Reed Ave. E. Reed Ave. ends at the Signalized intersection with two lanes, one turning Left to the North, and one turning Right to the South. The speed limit is 35 MPH in the area on STH 42 and 25 MPH on the Reed Avenue approach.

Summary of findings

Site Investigation

Traffic Signal Equipment

An evaluation of the traffic signal infrastructure supporting this intersection took place on February 2, 2025.

The signal equipment is very old at this intersection.

Control: The signal controller is an EPAC M4O, an unsupported controller since the early 2000's. The electrical service is old and separated from the cabinet in a socket mounted some 30' from the cabinet. Nighttime flashing operations are used due to lack of adequate vehicle actuation.

Underground: Conduit that is visible is Steel 2-inch and in poor condition.

Pull boxes that do exist are old steel pull boxes that are in fair condition. Grounds are corroded and the rim and cover are ungrounded. The City of Manitowoc also used the pull boxes for all splicing. Current City staff would prefer changing that to above ground.

Concrete bases are old but in decent condition, although Type 1 Bases have rusty ¾ inch anchor bolts and others that have been damaged and repaired.

Above Ground: Vehicle heads are older Durasig style heads. These heads are not approved for use by DOT due to the closure mechanism and a resulting lawsuit in SE Region years ago. Local units were allowed to use them but current staff prefers to eliminate due to closure mechanism.

Pedestrian heads are older LED fill style. There is pedestrian actuation on one of the two crosswalks at the intersection.

Signal Standards are old steel standards in fair condition. They have been maintained but show lots of rusted areas. Others have been replaced with aluminum post.

One older Type 2 Pole with a 15' trombone arm is present in the northeast quadrant, a newer Type 3 Pole with a 25' trombone arm is used in the southwest quadrant

Pavement and Curb Ramps

Pavement at the intersection is older concrete on E. Reed Avenue ending at an asphalt overlay of STH 42. Curb ramps exist on all three ends of sidewalk areas here only the East side of the roadway has a detectable warning field. The Northwest corner has 2 ramps but one heading to the East leads to nothing and should be removed.

A non-intrusive method should be utilized when detection is added. Using non-intrusive detection would eliminate the need to saw into the PCC pavement. Grooves are not used much any longer and slots weaken the pavement too much. Pavement panel replacement would be the only feasible means of providing inductive loops.

Utility Comments

There are overhead power and communications lines on the east side of the intersection. Underground is unknown. This intersection could benefit from better area lighting revised signal poles could provide better lighting and improving safety for vehicles and pedestrians. Lighting controls can be included in a new signal cabinet.

Conclusion

The City may consider requesting funding for signal replacement from the SISP program for FY 2026. This program funds 90% of the cost for the upgrades, the other 10% is a local share. The application deadline for this is April 4, 2025. The work would be completed using the City's Competitive Bid process.

The project scope would be to replace all above and below ground components of the signal to current standards. Upgrade curb ramps to include detectable warning fields. Upgrade the Cabinet to TS2 standards and move it to a safer location. Add non-intrusive detection for advance detection on STH 42 and stop bar detection for the side Street approach to the intersection. Add pedestrian push buttons to both crosswalks. Upgrade underground raceways and install non-conductive pull boxes. Replace all above ground equipment. Install monotube structures on STH 42. Add lighting into signal cabinet on signal structures, where possible. Re-cable entire intersection.

A copy of the field evaluation and Item Summary including estimated cost are attached to this memorandum. The quantities shown are approximate as no plans have formally been developed. Past prices were used as a guide for the preparation of the estimate.

Traffic Signal Condition Review

Location: STH 42 (Memorial Drive) & East Reed Avenue

Municipality: Manitowoc

8/4/2020

Control Cabinet:

Eagle TF-4008 loadbay in small cabinet

Channels 8

Controller Type EPAC Model M4O

Monitor EDI SSM-6LEC

EVP None

Detection Existing Loops and Iteris VersiCam retrofit, due to loop failures

Base T1 with Transformer base

Electrical Service Separate: On Utility pole, No longer allowed by Utility.

Underground: Steel conduit routed from base to base, rusty and does not drain properly.

PB's 1 Steel Pull Box in fair to poor condition, bonding corroded no rim/cover bonding jumper

1 retrofit rectangular box, not to standards

Signal splices in Pull Boxes

Bases Type 2, unknown

Type 1 3/4 anchor bolts corroded and have been repaired

Above Ground:

Vehicle Heads Old Durasig heads - non DOT QPL due to lawsuit over thumbscrew connection

Pedestrian Old 12 inch LED filled style, no countdown

Ped buttons only crossing Mainline

Standards Old steel with some replaced with aluminum as damaged

Poles One older Type 2 with 15 foot Trombone Arm, NB

One newer Type 3 with 25 foot trombone arm and area light

Luminaires and Arms:

One 12 foot truss arm and light with photo-control

Other area lighting by Manitowoc Public Utilities

Pavement: Mainline is asphalt overlay in fair to poor condition

Side Street is Concrete near end of life

Utility Comments:

OH Power and Comm on East Side

UG unknown

Scope: Install TS2 Cabinet and Type 9 Base

Install new underground PVC Raceway around intersection

Install new non-conductive Pull boxes

Replace all above ground signal equipment

Provide area lighting where possible to improve pedestrian safety

Upgrade all ramps to DWF with ADA landing and slope

Install Pedestrian push buttons on both crosswalks, also 16 inch ped head w/countdown

Provide GridSmart video-based vehicle detection for stopline and advance detection

Add area lighting with control via signal cabinet power

Install Monotube Structures for North and Southbound lane signals

Eliminate Island end signal standards and install turn lane FYA signal head on structure arm

City to interconnect signal, via wireless ethernet bridge

PROJECT ID: DATE: 2/4/2025
PROJECT TITLE: STH 42 (Memorial Drive) & East Reed Avenue Intersection
PRIMARY ROUTE: STH 42
COUNTY: Manitowoc County PROJECT LENGTH: Traffic Signal Re-Construction
Note: Prices are only estimates based on past projects

	ITEM NUMBER	ITEM DESCRIPTION	UNITS	QUANTITIES	UNIT PRICE	TOTAL
	204.0100	Removing Concrete Pavement	SY	3	$100.00	$300.00
	204.0155	Removing Concrete Sidewalk	SY	40	$27.00	$1,080.00
	602.0410	Concrete sidewalk, 5-inch	SF	254	$17.50	$4,445.00
	204.0195	Removing Concrete Bases	EACH	9	$200.00	$1,800.00
	637.2215	Signs Type II Reflective H Folding	SF	15.20	$32.00	$486.40
	638.2102	Moving Signs Type II	EACH	0		$0.00
	638.2602	Removing Signs Type II	EACH	0		$0.00
	652.0225	Conduit Rigid Nonmetallic Schedule 40 2-Inch	LF	150	$12.00	$1,800.00
	652.0235	Conduit Rigid Nonmetallic Schedule 40 3-Inch	LF	90	$14.00	$1,260.00
	652.0605	Conduit Special 2-Inch	LF	0	$28.00	$0.00
	652.0615	Conduit Special 3-Inch	LF	366	$30.00	$10,980.00
	653.0164	Pull Boxes Non-Conductive 24x42-Inch	EACH	4	$1,850.00	$7,400.00
	653.0905	Removing Pull Boxes	EACH	2	$75.00	$150.00
	654.0101	Concrete Bases Type 1	EACH	3	$1,125.00	$3,375.00
	654.0102	Concrete Bases Type 2	EACH	3	$1,750.00	$5,250.00
	654.0120	Concrete Bases Type 10-Special	EACH	2	$7,500.00	$15,000.00
	654.0217	Concrete Control Cabinet Bases Type 9 Special	EACH	1	$2,200.00	$2,200.00
	655.0230	Cable Traffic Signal 5-14 AWG	LF	1,185	$1.75	$2,073.75
	655.0240	Cable Traffic Signal 7-14 AWG	LF	495	$1.90	$940.50
	655.0260	Cable Traffic Signal 12-14 AWG	LF	995	$3.75	$3,731.25
	655.0305	Cable Type UF 2-12 AWG Grounded	LF	670	$2.00	$1,340.00
	655.0515	Electrical Wire Traffic Signals 10 AWG	LF	1,170	$0.85	$994.50

	656.0200	Electrical Service Meter Breaker Pedestal (Washington St & 21st St)	LS	1	$1,850.00	$1,850.00
	657.0100	Pedestal Bases	EACH	2	$225.00	$450.00
	657.0255	Transformer Bases Breakaway 11 1/2-Inch Bolt Circle	EACH	2	$585.00	$1,170.00
	657.0305	Poles Type 2	EACH	0	$2,010.00	$0.00
	657.0315	Poles Type 4	EACH	2	$1,885.00	$3,770.00
	657.0405	Traffic Signal Standards Aluminum 3.5-FT	EACH	0	$290.00	$0.00
	657.0420	Traffic Signal Standards Aluminum 13-FT	EACH	2	$555.00	$1,110.00
	657.0425	Traffic Signal Standards Aluminum 15-FT	EACH	0	$600.00	$0.00
	657.0585	Trombone Arms 15-FT	EACH	0	$1,670.00	$0.00
	657.0595	Trombone Arms 25-FT	EACH	0	$2,100.00	$0.00
	657.0714	Luminaire Arms Truss Type 4-Inch Clamp 15-FT	EACH	2	$700.00	$1,400.00
	658.0173	Traffic Signal Face 3S 12-Inch	EACH	9	$650.00	$5,850.00
	658.0174	Traffic Signal Face 4S 12-Inch	EACH	2	$865.00	$1,730.00
	658.0416	Pedestrian Signal Face 16-Inch	EACH	4	$530.00	$2,120.00
	658.0500	Pedestrian Push Buttons	EACH	4	$475.00	$1,900.00
	658.5069	Signal Mounting Hardware (Washington St & 21st St)	LS	1	$6,000.00	$6,000.00
	659.1125	Luminaires Utility LED C	EACH	3	$400.00	$1,200.00
	690.0250	Sawing Concrete	LF	100	$5.00	$500.00
	SPV 3.01	Mobilization	LS	1	$15,000.00	$15,000.00
	SPV 3.02	Traffic Control	LS	1	$2,850.00	$2,850.00
	SVP 3.03	Erosion Control and Restoration	LS	1	$5,500.00	$5,500.00
	SPV 3.06	Install Department Furnished Traffic Signal Control Cabinet	EACH	1	$3,500.00	$3,500.00
	SPV 3.8.2	Install Department Furnished Monotube Pole Type 9/10-Special and Monotube Arm	EACH	2	$1,850.00	$3,700.00
	SPV 3.8.4	Install Department Furnished Monotube Luminaire Arm	EACH	1	$1,850.00	$1,850.00
	SPV 3.12	Removing Traffic Signal (Washington St & 21st St)	LS	1	$5,500.00	$5,500.00
	SPV 3.13	Grounding Existing Pull Box Covers	EACH	0		$0.00
	SPV 3.17	Install City Supplied Gridsmart Video Detection System - Washington St & 21st St	LS	1	$3,750.00	$3,750.00
	SPV 3.18	Temporary Pedestrian Traffic Control	LS	1	$875.00	$875.00
	Add-on	Traffic Signals - Black	LS	1	$9,000.00	$9,000.00
					Sub-Total	**$145,181.40**

				Contingencies (0)		**$0.00**
				TOTAL CONSTRUTION COSTS		**$145,181.40**
City Supplied Labor & Materials						
		Monotube Pole, Type 9 Special	EACH	1	$10,000.00	$10,000.00
		Monotube Pole, Type 10 Special	EACH	1	$12,000.00	$12,000.00
		Monotube Arm, 45-ft Special	EACH	2	$7,000.00	$14,000.00
		Luminaire Arm for Monotube Type 10 Special	EACH	1	$750.00	$750.00
		New Electrical Service Lateral	LS	1	$2,500.00	$2,500.00
		Non-Intrusive Detection System - Gridsmart	LS	1	$22,000.00	$22,000.00
		Signal Cabinet TS2	LS	1	$18,000.00	$18,000.00
		City Engineer	HOUR			$0.00
		City Planner	HOUR			$0.00
		City Electrician	HOUR			$0.00
		City Staff (Other)	HOUR			$0.00
		Other City-Supplied Materials & Expenses				$0.00
			TOTAL CITY SUPPLIED MATERIALS			**$79,250.00**
				PROJECT TOTAL		**$224,431.40**