

Technical Memo

Date: Monday, November 06, 2017

Project: I-29 Exit 77 (41st Street) Interchange and Environmental Study
PL 0100(84), PCN 05MH
IM 0293(106)77P; PCN 03RA

To: Study Advisory Team

From: HDR

Subject: Construction Sequencing, Maintenance of Traffic, and Anticipated Construction Timeframes for I-29/41st Street Reconstruction Project

1. Overview

Throughout the 2011/2012 Corridor Study and 2016/2017 Interchange and Environmental Study phases of the project, business owners, property owners, and the travelling public had stressed that 41st Street remain open to traffic during construction of proposed improvements. The Diverging Diamond Interchange (DDI) alternative was designated as the preferred alternative, in part, because of its simpler construction and ability of that type of interchange to maintain 41st Street traffic during construction.

Therefore, development of the overall conceptual construction sequencing and maintenance of traffic plan for the project was based on the criteria of maintaining some level of 41st Street traffic throughout the project limits during construction.

It is anticipated that this concept plan will be beneficial for SDDOT, City planners and the design team as the project moves forward through final design phase. It is expected that this concept plan will be refined during the final design phase of the project.

2. Maintenance of Traffic and Construction Sequencing

Graphics have been prepared (attached Figures 1, 2a, 2b, 3, and 4) which illustrate the concept plan for maintenance of traffic and construction sequencing. Figure 5 illustrates the finished construction of the project. A summary of the construction and traffic for each area of the project is provided below.

2.1 I-29

- Disruption to I-29 mainline traffic will be minimal during project construction. During ramp construction adjacent to the mainline (ramps A and C), Maintain two lanes of traffic on I-29 during peak traffic periods.
- If feasible, allow only night time closures of either northbound or southbound I-29 for bridge widening, overlay, or reconstruction, mostly for setting of bridge girders. The extent of bridge work will be determined during the final design phase of the project but the disruption to I-29 traffic should be the same for widening or reconstruction of the bridge.

2.2 Interchange ramps

- During construction of the south 41st Street lanes (Phase 1), stagger closures of ramps B and C. Traffic would be detoured to 26th Street and I-229 during closure periods.

- During construction of the north 41st Street lanes (Phase 2), ramp A will be closed. Traffic would be detoured to 26th Street. Because of the high traffic volumes at Ramp D, Phase 2 is broken into sub-phases “a” and “b” to maintain at least one lane of right turn and one lane of left turn traffic.
- During construction of the raised medians and the center DDI barriers (Phase 3), left turns at the ramp intersections likely cannot be allowed. This restriction is inherent with the DDI type of interchange because of the traffic crossover at the ends of the center DDI barrier. This should not be a lengthy timeframe. It may be advantageous to close all ramps during this phase.
- During construction of the 41st Street raised islands at the interchange ramps (Phase 4), the ramps will need to be closed entirely to traffic. Again, this is inherent to the DDI traffic crossover concept and should not be a lengthy timeframe.

2.3 41st Street

- In general, 2 lanes of through traffic in each direction east of I-29 and one lane of through traffic in each direction west of I-29 can be maintained throughout project construction.
- Wherever feasible, a center left turn lane should be provided for access to intersecting roadways and properties.
- Intersection closures at Cathy Avenue, Terry Avenue, Gateway Boulevard/Madelyn Lane, and Meadow Avenue will need to be staggered so only one intersection is closed at a time.
- Intersection closures at W. Empire Place and Shirley Avenue will need to be staggered. Empire Mall traffic will be directed to use Louise Avenue as the main access to the mall during project construction.

2.4 Marion Road

- Closure of Marion Road south of 41st Street is proposed during Phase 1 construction. This closure should not occur when I-29 ramps B or C are closed since Marion Road will be needed for traffic diverted from the ramps.
- Construction of Marion Road north of 41st Street is done in Phases 2a and 2b. Access to the Fire Station will need to be maintained throughout construction.

2.5 Shirley Avenue

- The City of Sioux Falls may accelerate Shirley Avenue improvements to coincide with re-development of the former Sioux Falls Ford site. However, the sequencing plans show the Shirley Avenue improvements at the same time as the rest of the 41st Street and I-29 interchange project.

3. Pedestrian Provisions

In accordance with Americans with Disabilities Act (ADA) requirements, alternate pedestrian routes must be provided when a pedestrian circulation path is impacted by construction.

Maintaining the alternate route on the same side of the street as the impacted route (as recommended by ADA) is not feasible due to right-of-way constraints and construction work.

Therefore, pedestrian routes during construction are generally limited to one side of 41st Street or Marion Road. The construction sequencing figures illustrate the proposed pedestrian routes during construction.

4. Construction Timeframe

With an estimated construction cost of over \$30 million (2017 costs assuming total replacement of the existing bridge as a worst-case scenario) it is likely that the construction timeframe will extend over two construction seasons. Other elements that indicate a two construction season timeframe include:

- Working in a congested and restricted urban environment.
- Widening 41st Street to the south in phase 1 into new right-of-way will entail relocation of multiple private signs and utilities.

Estimated timeframes of the various project phases are listed in Table 1 below and on Figures 1, 2a, 2b, 3, and 4.

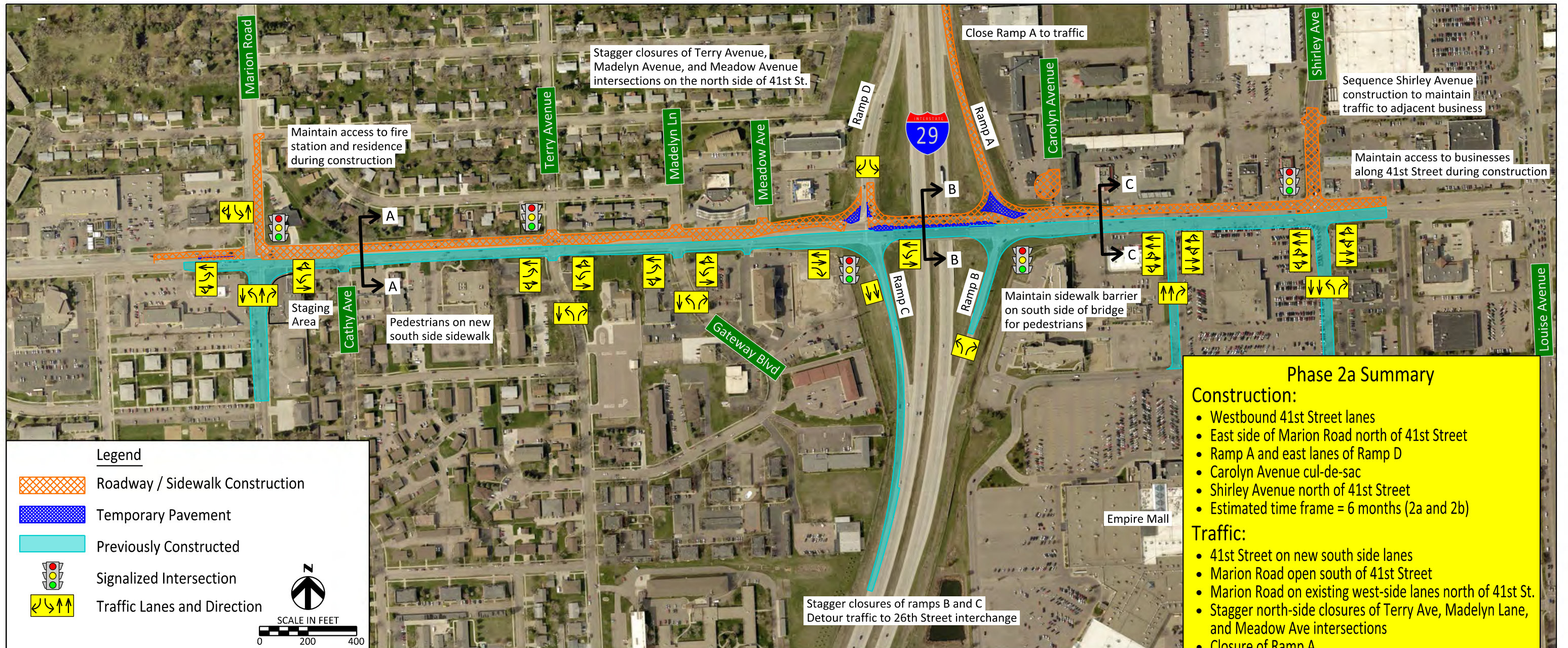
Table 1 – Construction Timeframe Estimation

Phase	Construction Summary	Estimated Duration
1	New south-side 41 st Street lanes Marion Road south of 41 st Street Empire Mall access roads	7 months
2a & 2b	New north-side 41 st Street lanes Marion Road north of 41 st Street Shirley Avenue	6 months
3	Raised medians and center turn lanes	2 months
4	Raised islands	1 month
	Total	16 months

5. Recommendations

During final design, these items should be considered:

- 5.1 Split construction into an east phase (bridge to Shirley Avenue, including interchange and ramps) and a west phase (bridge to Marion Road). This would reduce the timeframe of impacts to specific businesses.
- 5.2 Hold constructability and sequencing review meetings with contractors early in the final design phase to strategize methods of completing the overall project in a one year construction timeframe.
- 5.3 Acquire right-of-way on the south side of 41st Street as early as possible to allow for potential early relocation of private signs and utilities.
- 5.4 Utilize the City's traffic model to estimate distribution of traffic for ramp closures and lane restrictions.
- 5.5 Determine alternative route corridor and intersection route operations with detour traffic
- 5.6 If necessary and feasible, implement improvements at alternative routes prior to I-29/41st Street construction.



Phase 2a Summary

Construction:

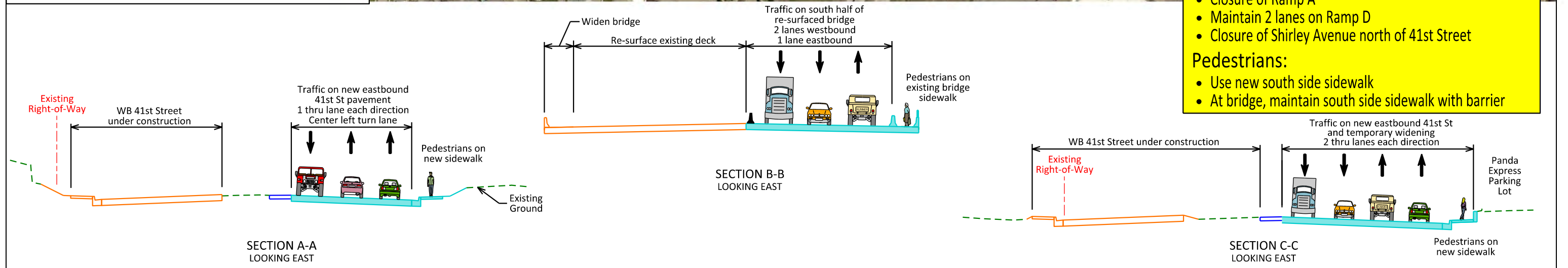
- Westbound 41st Street lanes
- East side of Marion Road north of 41st Street
- Ramp A and east lanes of Ramp D
- Carolyn Avenue cul-de-sac
- Shirley Avenue north of 41st Street
- Estimated time frame = 6 months (2a and 2b)

Traffic:

- 41st Street on new south side lanes
- Marion Road open south of 41st Street
- Marion Road on existing west-side lanes north of 41st St.
- Stagger north-side closures of Terry Ave, Madelyn Lane, and Meadow Ave intersections
- Closure of Ramp A
- Maintain 2 lanes on Ramp D
- Closure of Shirley Avenue north of 41st Street

Pedestrians:

- Use new south side sidewalk
- At bridge, maintain south side sidewalk with barrier



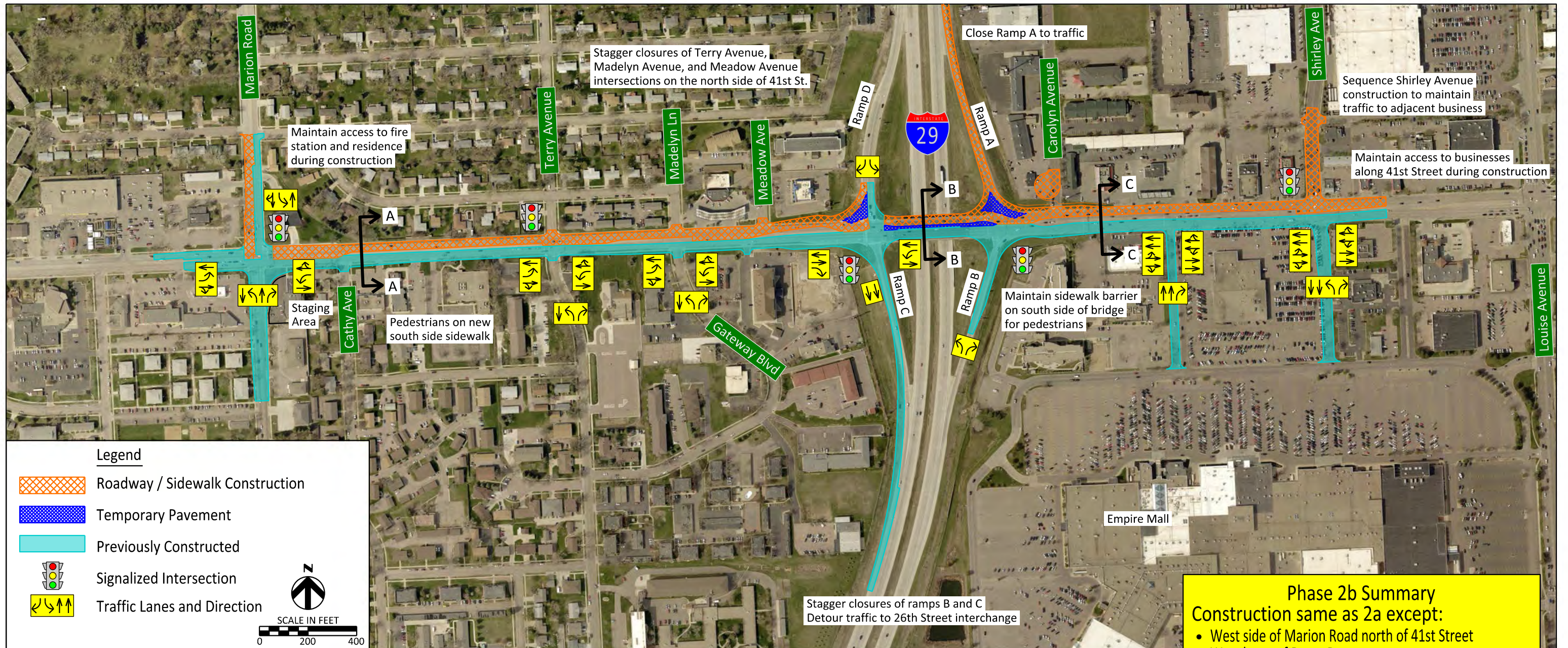
Date of Aerial Photography: 2014

Drawn By: B. Miller
Date: 10/6/2017
Checked By: J. Unruh
Date: 10/6/2017
Revisions:



Construction Sequencing / Maintenance of Traffic
Phase 2a Construction
I-29 Exit 77 (41st Street)
Sioux Falls, SD

Figure
2a



Legend

- Roadway / Sidewalk Construction
- Temporary Pavement
- Previously Constructed
- Signalized Intersection
- Traffic Lanes and Direction

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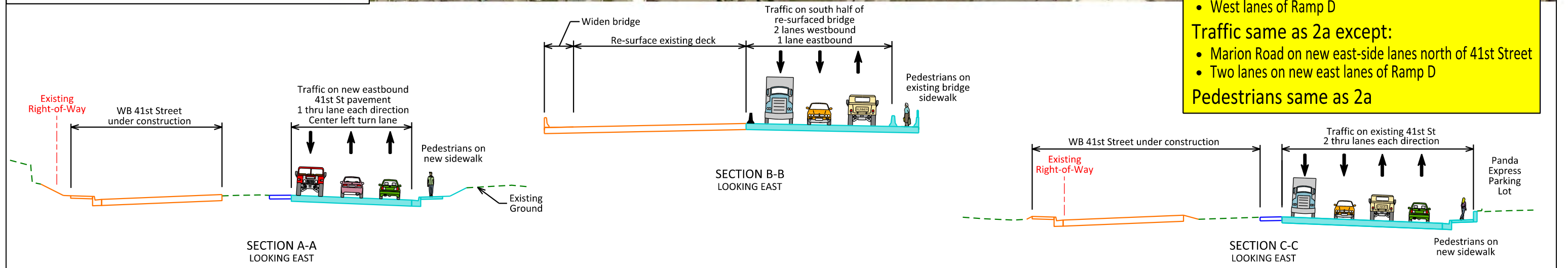
Phase 2b Summary
Construction same as 2a except:

- West side of Marion Road north of 41st Street
- West lanes of Ramp D

Traffic same as 2a except:

- Marion Road on new east-side lanes north of 41st Street
- Two lanes on new east lanes of Ramp D

Pedestrians same as 2a



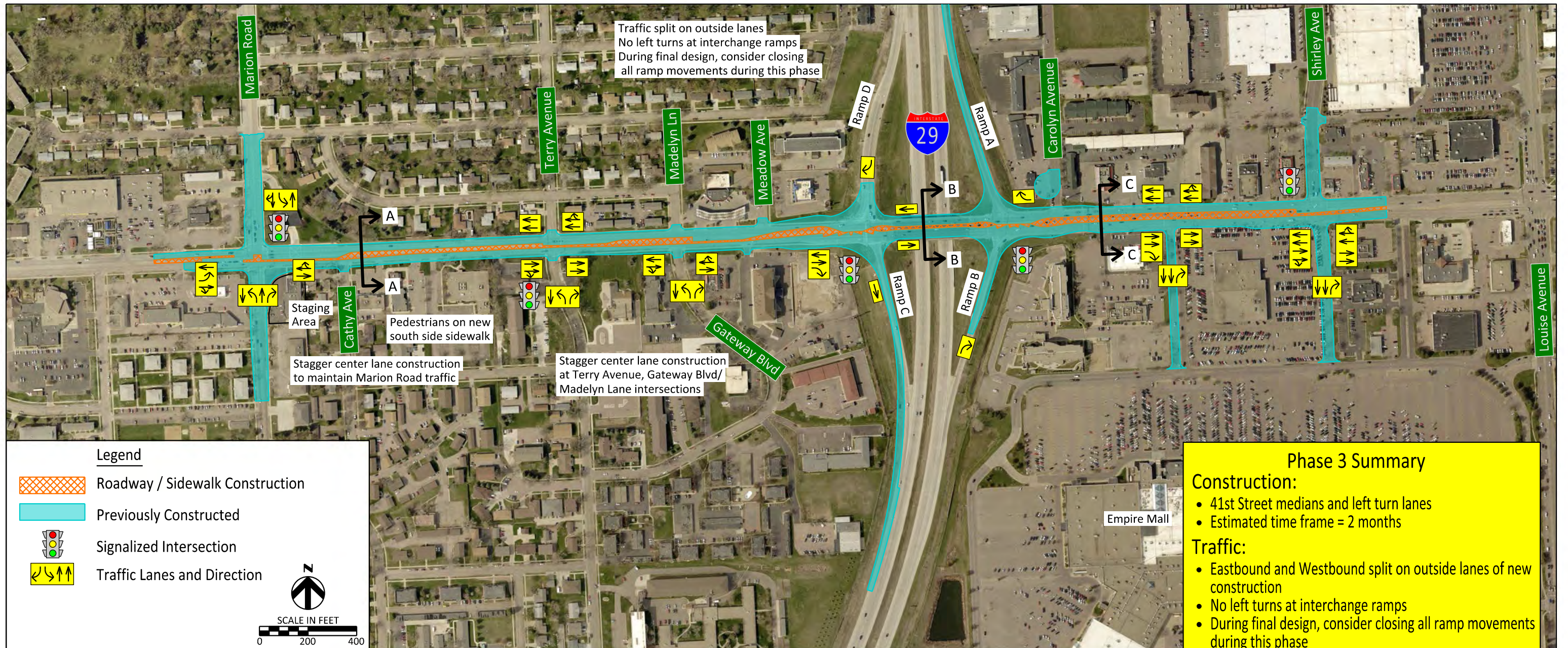
Date of Aerial Photography: 2014

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Revisions:







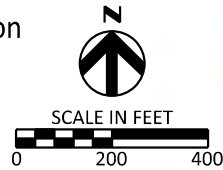
Construction Sequencing / Maintenance of Traffic
Phase 2b Construction
I-29 Exit 77 (41st Street)
Sioux Falls, SD

Figure
2b



Legend

-  Roadway / Sidewalk Construction
-  Previously Constructed
-  Signalized Intersection
-  Traffic Lanes and Direction



Phase 3 Summary

Construction:

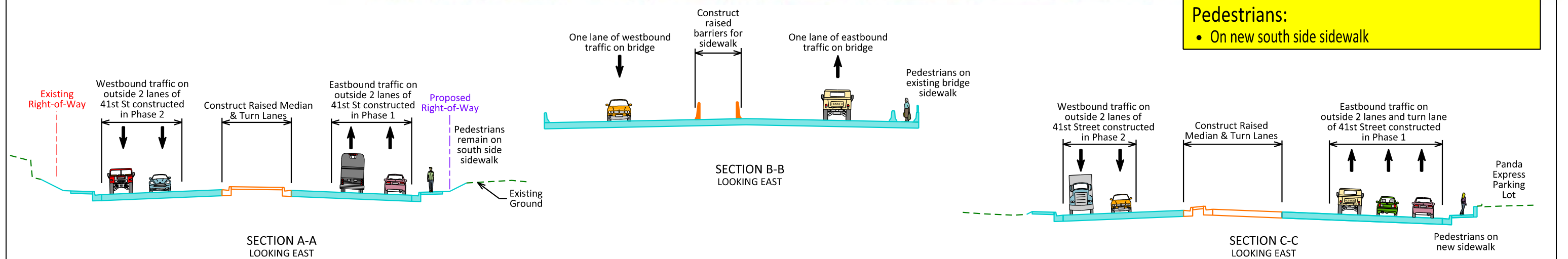
- 41st Street medians and left turn lanes
- Estimated time frame = 2 months

Traffic:

- Eastbound and Westbound split on outside lanes of new construction
- No left turns at interchange ramps
- During final design, consider closing all ramp movements during this phase

Pedestrians:

- On new south side sidewalk



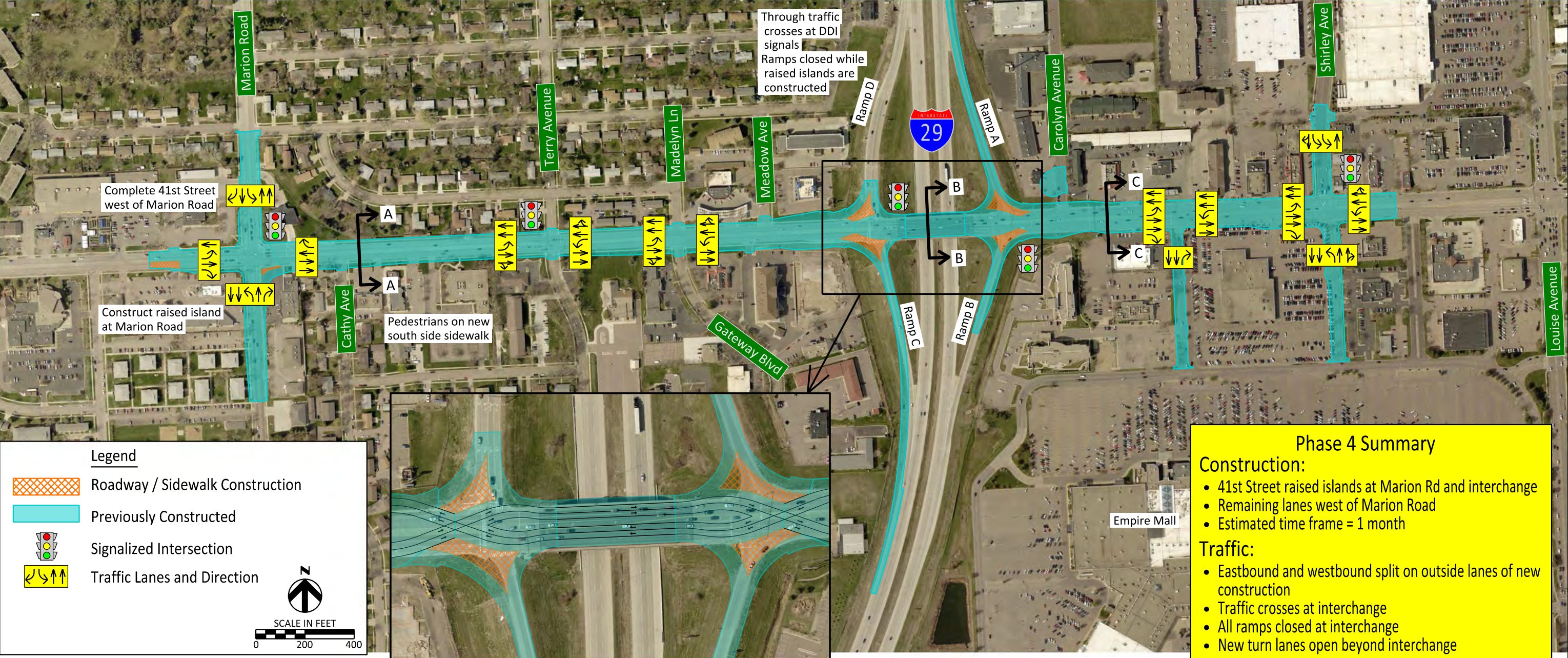
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Construction Sequencing / Maintenance of Traffic
Phase 3 Construction
I-29 Exit 77 (41st Street)
Sioux Falls, SD

Figure
3

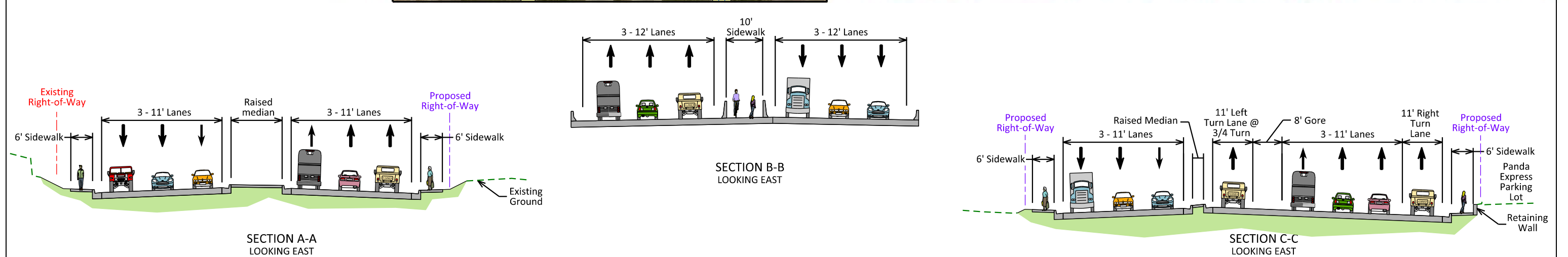
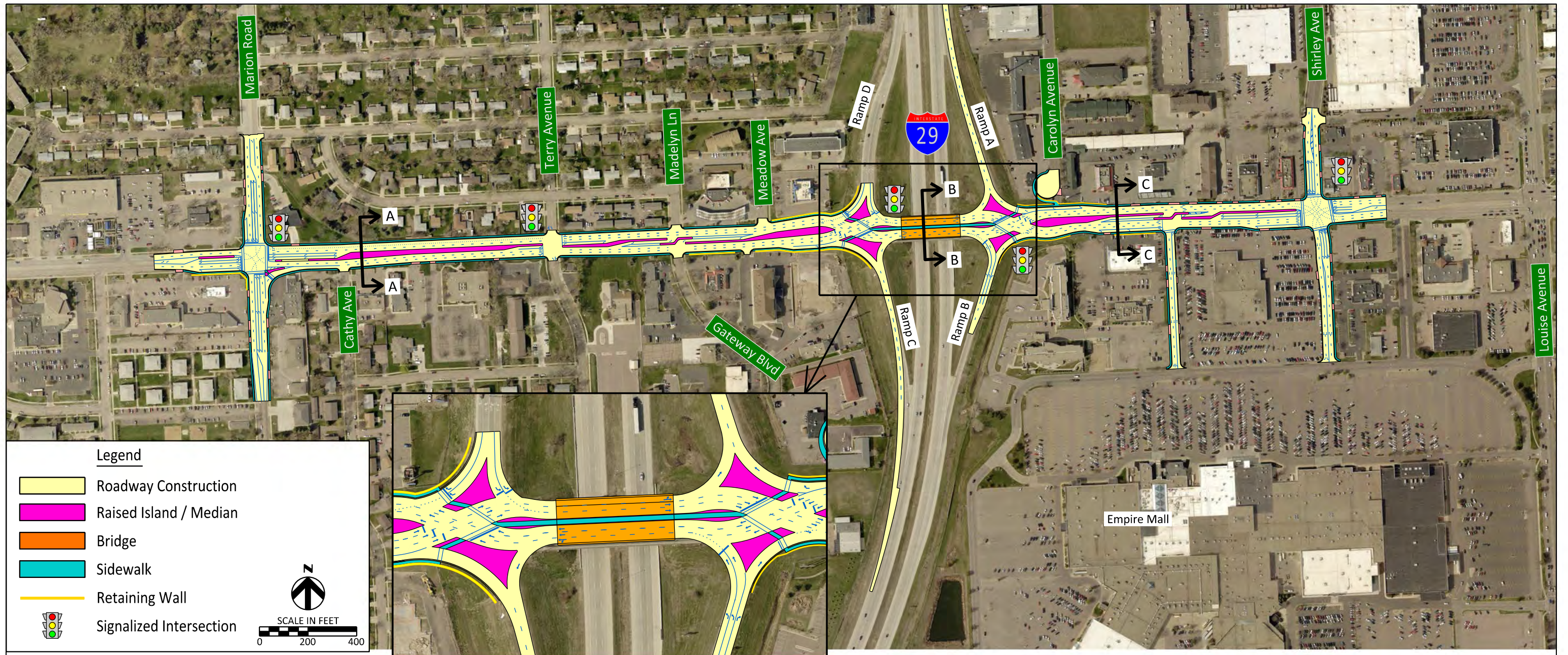


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Drawn By: B. Miller
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 Revisions:



Construction Sequencing / Maintenance of Traffic
 Phase 4 Construction
 I-29 Exit 77 (41st Street)
 Sioux Falls, SD



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Date: 10/10/2017
Revisions:



Construction Sequencing / Maintenance of Traffic
Finished Construction
I-29 Exit 77 (41st Street)
Sioux Falls, SD

Figure
5