4.11 Right of Way

Right of Way will be required between the SB I-75 entrance ramp from 12 Mile Road and Stephenson Highway for the placement of proposed sidewalk and for driveway consolidation, as well as, on the north side of 12 Mile Road between station 105+00 and 110+00 since the existing curb line is outside of the existing ROW. In addition, ROW will be required for the realignment of the SB I-75 entrance ramp at 12 Mile Road. These driveway grading permits, consent to construct sidewalks, construction grading permits and fee right of way areas are consistent with the right of way needs detailed in the FEIS.

4.12 Non-Motorized

The Safety/Side Path/sidewalks located at 12 Mile Road, 13 Mile Road, 14 Mile Road, Rochester Road, Livernois Road, Long Lake Road, and South Boulevard crossing I-75 Freeway will be replaced to match the existing width. These paths/sidewalks which are 5 feet wide are located within the road right-of-way however, are separated from the roadway surface.

The paths located at Wattles Road and Big Beaver Road Interchange are also considered a Safety/Side Path however, they are wider than the sidewalks mentioned above. The 14 foot Wattles Road path runs along the south side of Wattles Road and will be separated from the travel lanes by a barrier on the proposed Wattles Road bridge over I-75 as shown in **Figure 4-53.** The 8 foot wide Big Beaver Road path which runs along the north and south side of the road will be replaced in kind due to the reconstruction of the interchange ramps and bridges. The paths will be located behind the outside piers within the tail spans of the proposed bridges.

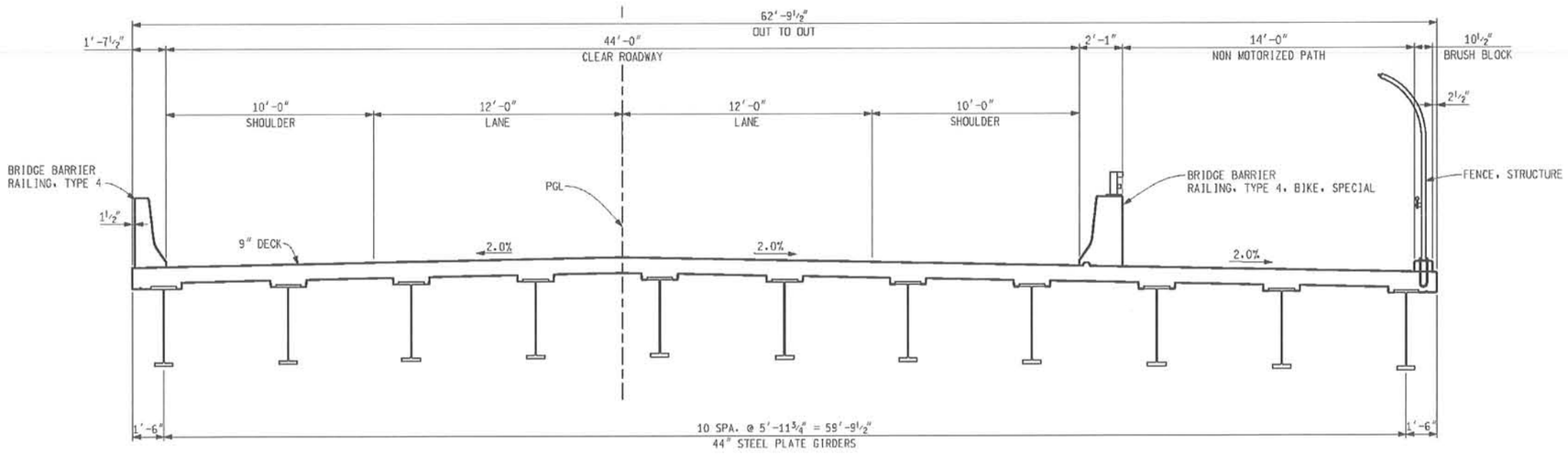
Within the study area is a "trail link" located just north of 12 Mile Road called the "Red Run Drain Trail". This trail is not designated as a primary non-motorized trail. However, there are current discussions by the City of Madison and Oakland County to make this a designated trail in the near future. This trail would extend from Stephenson to Dequindre crossing under I-75 at the Red Run Drain.

In addition to the trail at the Red Run Drain, there are plans to replace the sidewalks at:

- 12 Mile Road
- 13 Mile Road
- 14 Mile Road

The sidewalks would connect with the existing sidewalk that is east and west of the I-75 Freeway.

Figure 4-53 Proposed Wattles Road Bridge Cross Section with Non-Motorized Path



4.13 Corridor Construction Phasing

The 13.64 miles of I-75 were broken into multiple construction segments, based on a combination of design issues, construction dollars and maintenance of traffic.

The I-75 Freeway contains the following construction elements:

- Addition of a lane to I-75 in each direction and to dedicate the median lane in the morning and afternoon peak traffic periods to High Occupancy Vehicle (HOV) traffic.
- Reconstruction of the 12 Mile Road Interchange as detailed in the I-75 EIS.
- Reconstruction of the Square Lake Road Interchange that brings the NB I-75 freeway and HOV lane adjacent to the SB I-75 alignment and upgrades all existing left-hand entrance and exit ramps to right-hand entrance and exit ramps.
- Reconstruction of the 14 Mile Road Interchange, including capacity improvements along 14 Mile Road at the interchange.
- Reconstruction of the ramps and lengthening at all interchanges within the project limits (Rochester Road, Big Beaver Road, Crooks Road, and Adams Road) to accommodate current MDOT and FHWA design standards.
- Upgrade of the drainage system, including cross culverts and installation of an enclosed median drainage system.
- Improvements to the local roadway corridors at 12 Mile and 14 Mile Roads.
- Major utility modifications or relocations required for the interchange and ramp reconstruction.

The following priorities were identified prior to setting the construction staging and project sequencing.

- Minimize the disruption of traffic in the construction area along I-75.
- Two lanes will be maintained in each direction on I-75 except during the placement of the bridge beams which will require I-75 traffic to shift to the other direction of travel.
- Maintain local access across I-75 during construction.
- Provide multiple local access points to and from I-75 along the corridor during construction.

The closure of local crossroads at I-75 while under construction will require traffic to find alternate routes across I-75. Detour routes will be established to direct the traffic to an alternate route.

4.13.1 Corridor Construction Segments

The northern section of the I-75 corridor from south of 12 Mile Road to south of M-59 is a total length of 13.64 miles. Construction phasing of the northern section was broken into five segments as described below and as shown in **Figure 4-54.**

Segment 1:
Roadway Project limits: **From south of 12 Mile Road to north of 13 Mile Road**
Total length: **1.74 miles (Sta 907+00 to Sta 999+00)**
Interchange Construction: Includes **12 Mile Road Interchange**
Bridge Project limits: Includes replacement of **ten bridges**

Segment 2:
Roadway Project limits: **From north of 13 Mile Road to north of Rochester Road**
Total length: **3.33 miles (Sta 999+00 to Sta 1175+00)**
Interchange Construction: Includes **14 Mile Road and Rochester Road Interchanges**
Bridge Project limits: Includes replacement of **six bridges**

Segment 3:
Roadway Project limits: **From north of Rochester Road to north of Wattles Road**
Total length is **2.62 miles (Sta 1175+00 to Sta 1313+50)**
Interchange Construction: Includes **Big Beaver Road Interchange**
Bridge Project limits: Includes replacement of **seven bridges**

Segment 4:
Roadway Project limits: **From north of Wattles Road to north of Adams Road**
Total length is **4.14 miles (Sta 1313+50 to Sta 787+50)**
Interchange Construction: Includes **Crooks Road and Adams Road Interchanges**
Bridge Project limits: Includes replacement of **ten bridges (including Squirrel Road)**

Segment 5:
Roadway Project limits: **From north of Adams Road to south of M-59**
Total length is **1.81 miles (Sta 787+50 to Sta 882+82.61)**
Interchange Construction: Includes **Square Lake Road Interchange (not including Squirrel Road)**
Bridge Project limits: Includes replacement/new construction of **two bridges**

Combination of Segment 1 with a portion of the southern section:
The transition on I-75 from a depressed freeway to a raised freeway occurs south of 12 Mile Road, where the proposed horizontal alignment is in a superelevated section and where the proposed vertical alignment is in a fill section. The proposed drainage system for the southern section from 8 Mile Road to south of 12 Mile Road is located on the NB I-75 service drive and is conveyed through the proposed storm sewer interceptor to the Red Run Drain located north of 12 Mile Road. This system must be in service prior to disconnection from the existing drainage system located on the SB I-75 service drive.

Coordination efforts with Parsons Brinkerhoff (PB) has resulted in Segment 1 being combined with a portion of the southern section of I-75 from I-696 to south of 12 Mile Road **(Sta 820+00 to Sta 907+00)**. This is an additional length of **1.65 miles,** making the combined total length of the Segment 1 project **3.39 miles**. Due to the drainage needs for the southern section, it was determined that the first construction contract for the entire I-75 corridor will be from I-696 to north of 13 Mile Road (**Sta 820+00 to Sta 999+00**).

Once the first construction contract has been completed, construction of the remainder of the northern section may commence starting with Segment 2, 3, 4 and 5.

Combination of Segments 2 through 4
The 5 segments developed for the I-75 corridor are constructible individually as 5 multiple contracts. In addition, Segments 2 through 4 can also be combined into fewer contracts depending on MDOT funding resources and

approved MOT concepts during the design phase. Segments can be combined in order going from south to north to take advantage of the HOV lane being constructed. For example, Segments 2 and 3 or Segments 3 and 4 can be combined.

If segments are to be combined, stage construction of the interchanges must be re-evaluated during the design phase to minimize consecutive ramp closures and to take into account winter staging or shutdown.

Advance Contract

The following advance contracts may be let to shorten the construction duration and cost of each segment and to allow for possible combination of segments into fewer contracts:

- Advance Contract for Temporary Freeway Construction
  The advance contract may include construction of temporary pavement widening, construction of temporary freeway and ramp crossovers, and temporary bridge widening at 12 Mile Road and Red Run Drain.

- Advance Contract for Bridges Carrying Local Roadways Over I-75
  The location of the existing bridge piers for most of the bridges carrying local roadways over I-75 are impacted by the proposed freeway construction. These structures will require removal at the start of construction. It will be beneficial to reconstruct these bridges prior to the mainline I-75 construction to allow these bridges to be open to traffic and available for detoured local traffic local during ramp closures on I-75.

The MOT conceptual alternatives evaluated are applied to each construction segment. During final design as the project limits are further refined, the MOT alternatives may need to be re-evaluated.

CITY OF ROYAL OAK
OAKLAND COUNTY

CITY OF TROY
OAKLAND COUNTY

CITY OF BIRMINGHAM
OAKLAND COUNTY

CITY OF PONTIAC
OAKLAND COUNTY

CITY OF AUBURN HILLS
OAKLAND COUNTY

P01 OF 63174
S03-2 OF 63174
THURBY DRAIN
B02-6 OF 63174
B02-2 OF 63174
13 MILE DRAIN
S04-1 OF 63174
S04-2 OF 63174
UNNAMED DRAIN
S05-1 OF 63174
S05-2 OF 63174
WARNER DRAIN
McDONALD DRAIN
STEPHENSON HWY
GARDENIA AVE
12 MILE RD
13 MILE RD
14 MILE RD
MAPLE RD
S03-5 OF 63174
S03-1 OF 63174
B02-1 OF 63174
B02-5 OF 63174
12 TOWNS DRAIN
RED RUN DRAIN
SPENCER DRAIN
S21-2 OF 63174
S21-1 OF 63174
ROTH DRAIN
STURGIS DRAIN

S09-2 OF 63174
S09-1 OF 63174
MASTIN TRIBUTARY DRAIN
S08-1 OF 63174
S08-2 OF 63174
BIG BEAVER RD
LIVERNOIS RD
ROCHESTER RD
S09-6 OF 63174
HUBER DRAIN
LANE DRAIN
WATTLES DRAIN
S10 OF 63174
UNNAMED DRAIN
S09-5 OF 63174
MASTIN DRAIN
P07 OF 63174
SPENCER DRAIN
SWAN DRAIN
ROTH DRAIN
S06-1 OF 63174
S06-2 OF 63174

WATTLES RD
LONG LAKE RD
CORPORATE DR
CROOKS RD
S11-1 OF 63174
S11-2 OF 63174
S12 OF 63174
S13 OF 63174
S32 OF 63174

SQUARE LAKE RD
OPDYKE RD
S18-5 OF 63174
AMY DRAIN
S17 OF 63174
N01 OF 63174
SOUTH BLVD
SQUIRREL RD
ADAMS RD
S16-1 OF 63174
S16-2 OF 63174
S19 OF 63174
S18 OF 63174
COOLIDGE HWY
S15-1 OF 63174
S15-2 OF 63174
E. SQUARE LAKE RD
S14-1 OF 63174
S14-2 OF 63174

COLOR KEY

P01 OF 63174	PEDESTRIAN BRIDGES
THURBY DRAIN	DRAINAGE CROSSING
B02-6 OF 63174	BRIDGE OVER WATER WAYS
S09-2 OF 63174	GRADE SEPARATED BRIDGES

CITY OF MADISON HEIGHTS
OAKLAND COUNTY

CITY OF TROY
OAKLAND COUNTY

SEGMENT 1
COORDINATION WITH PB PROJECT TO
NORTH OF 13 MILE RD (I-75 STATION 999+00)

SEGMENT 2
NORTH OF 13 MILE RD (I-75 STATION 999+00) TO
NORTH OF ROCHESTER RD (I-75 STATION 1175+00) (3.33 MILES)

SEGMENT 3
NORTH OF ROCHESTER RD (I-75 STATION 1175+00) TO
NORTH OF WATTLES RD (I-75 STATION 1313+50) (2.62 MILES)

SEGMENT 4
NORTH OF WATTLES RD (I-75 STATION 1313+50) TO
NORTH OF ADAMS RD (I-75 STATION 787+50) (4.14 MILES)

SEGMENT 5
NORTH OF ADAMS RD (I-75 STATION 787+50) TO
SOUTH OF M-59 (I-75 STATION 882+82.61) (1.81 MILES)

FIGURE 4-54
CORRIDOR CONSTRUCTION PHASING

SCALE
2000' 1000' 0' 2000'

LEGEND
GAS LINE
ELECTRIC UTILITY LINE
POWER TRANS LINE
FIBER OPTICS
EXISTING R-O-W
SANITARY LINE
WATERMAIN
CABLE
EXISTING WETLAND
EXISTING DRAINAGE FLOW
PROP PAVEMENT EDGE
PROP SHOULDER EDGE
PROP BARRIER
PROP RETAINING WALL
PROPOSED CUL-DE-SAC
PROP WETLAND
EXISTING LA R-O-W
EXISTING R-O-W
PROP R-O-W
PROP LA R-O-W
NOISE WALL
PROP BRIDGE
PROP SIDEWALK
PROP CONSTRUCTION ℄
PROP BRIDGE REPAIR
PROP PARK & RIDE
SIGNALIZED INTERSECTION
CITY LIMITS

URS
Surface Transportation
Grand Rapids . Southfield . Traverse City

MDOT
Michigan Department of Transportation

MDOT JOB NO.
88168

MDOT CONTROL SECTION
63174

MICHIGAN DEPARTMENT OF TRANSPORTATION
I-75 SOUTH OF 12 MILE RD TO SOUTH OF M-59
ENGINEERING REPORT

I-75
CONSTRUCTION
SEGMENTS

4.13.2 Construction Duration for Project Segments

The construction duration for each project segment was developed for MOT Alternatives 1 to 3. The MDOT Critical Path Construction Time Estimates were used for the individual operation rates based individually on quantities calculated by project segment. Use of these estimates provides a conservative approximation for the potential duration of a construction activity. Accelerated schedules may ultimately be used when constructing certain portions of this project. More detailed construction schedules will be developed for each project segment and the selected MOT alternative during the final design phase. The following general assumptions were used in developing these construction schedules:

- The work will proceed from south to north
- November Letting Date
- Award takes one month
- A single crew for a specific work element
- Average six work days per week
- Average 25 work days per month
- Tasks overlap whenever feasible
- No construction work will occur during the Seasonal Suspension, November 14 to April 16 as defined by the Standard Specifications for Construction

See **Figures 4-55** through **4-57** for the projected construction duration for all segments and each MOT Alternatives.

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Figure 4-55
Alternative 1: Full Closure
I-75 From 12 Mile Road to South of M-59

ID	Task Name
1	**SEGMENT 1 - 1.74 Miles**
2	Letting
3	Award
4	Full Closure of I-75 NB & SB - Detour Traffic
5	Pavement Removals
6	Drainage
7	Earthwork and Grading
8	Mainline Paving
9	Ramp Paving
10	**Structures**
11	Shop Dwg & Fab
12	P01 of 63174
13	S03-1 of 63174
14	S03-2 of 63174
15	S03-5 of 63174
16	B02-6 of 63174
17	B02-1, 2 & 5 of 63174
18	S04-1 of 63174
19	S04-2 of 63174
20	**SEGMENT 2 - 3.33 Miles**
21	Letting
22	Award
23	Full Closure of I-75 NB & SB - Detour Traffic
24	Pavement Removals
25	Drainage
26	Earthwork and Grading
27	Mainline Paving
28	Ramp Paving
29	14 Mile Road Demo and Reconstruct
30	**Structures**
31	Shop Dwg & Fab
32	S05-1 of 63174
33	S05-2 of 63174
34	S21-1 of 63174
35	S21-2 of 63174
36	S06-1 of 63174
37	S06-2 of 63174
38	**SEGMENT 3 - 2.62 Miles**
39	Letting
40	Award
41	Full Closure of I-75 NB & SB - Detour Traffic
42	Pavement Removals
43	Drainage
44	Earthwork and Grading
45	Mainline Paving
46	Ramp Paving
47	**Structures**
48	Shop Dwg & Fab
49	S08-1 of 63174
50	S08-2 of 63174
51	S09-1 of 63174
52	S09-2 of 63174
53	S09-5 of 63174
54	S09-6 of 63174
55	S10 of 63174
56	**SEGMENT 4 - 4.14 Miles**
57	Letting
58	Award
59	Full Closure of I-75 NB & SB - Detour Traffic
60	Pavement Removals
61	Drainage
62	Earthwork and Grading
63	Mainline Paving
64	Ramp Paving
65	**Structures**
66	Shop Dwg & Fab
67	S11-1 of 63174
68	S11-2 of 63174
69	S12 of 63174
70	S14-1 of 63174
71	S14-2 of 63174
72	S15-1 of 63174
73	S15-2 of 63174
74	S16-1 of 63174
75	S16-2 of 63174
76	**SEGMENT 5 - 1.81 Miles**
77	Letting
78	Award
79	Full Closure of I-75 NB & SB - Detour Traffic
80	Pavement Removals
81	Drainage
82	Earthwork and Grading
83	Mainline Paving
84	Ramp Paving
85	**Structures**
86	Shop Dwg & Fab
87	S18 Remove
88	S17 of 63174
89	S18 of 63174
90	S18-5 of 63174

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Figure 4-56
Alternative 2: Half Closure
I-75 From 12 Mile Road to South of M-59

ID	Task Name
1	**SEGMENT 1 - 1.74 Miles**
2	Letting
3	Award
4	**Freeway**
5	Full Closure of I-75 NB - Detour Traffic
6	Stage 1 Reconstruct NB
7	Full Closure of I-75 SB - Detour Traffic
8	Stage 2 Reconstruct SB
9	**Structures**
10	Shop Dwg & Fab
11	S03-1 of 63174
12	S03-5 of 63174
13	B02-1of 63174
14	B02- 5 of 63174
15	S04-1 of 63174
16	B02-2 of 63174
17	S03-2 of 63174
18	B02-6 of 63174
19	S04-2 of 63174
20	P01 of 63174
21	**SEGMENT 2 - 3.33 Miles**
22	Letting
23	Award
24	**Freeway**
25	Full Closure of I-75 NB - Detour Traffic
26	Stage 1 Reconstruct NB
27	Full Closure of I-75 SB - Detour Traffic
28	Stage 2 Reconstruct SB
29	**14 Mile Road Demo and Reconstruct**
30	**Structures**
31	Shop Dwg & Fab
32	S05-2 of 63174
33	S21-1 of 63174
34	S06-1 of 63174
35	S05-1 of 63174
36	S21-2 of 63174
37	S06-2 of 63174
38	**SEGMENT 3 - 2.62 Miles**
39	Letting
40	Award
41	**Freeway**
42	Full Closure of I-75 NB - Detour Traffic
43	Stage 1 Reconstruct NB
44	Full Closure of I-75 SB - Detour Traffic
45	Stage 2 Reconstruct SB
46	**Structures**
47	Shop Dwg & Fab
48	S08-1 of 63174
49	S09-1 of 63174
50	S09-5 of 63174
51	S08-2 of 63174
52	S09-2 of 63174
53	S09-6 of 63174
54	S10 of 63174
55	**SEGMENT 4 - 4.14 Miles**
56	Letting
57	Award
58	**Freeway**
59	Full Closure of I-75 NB - Detour Traffic
60	Stage 1 Reconstruct NB
61	Full Closure of I-75 SB - Detour Traffic
62	Stage 2 Reconstruct SB
63	**Structures**
64	Shop Dwg & Fab
65	S11-1 of 63174
66	S14-1 of 63174
67	S15-1 of 63174
68	S16-1 of 63174
69	S11-2 of 63174
70	S14-2 of 63174
71	S15-2 of 63174
72	S16-2 of 63174
73	S12 of 63174
74	**SEGMENT 5 - 1.81 Miles**
75	Letting
76	Award
77	**Freeway**
78	Full Closure of I-75 SB - Detour Traffic
79	Stage 1A Reconstruct POB to Ramp ES - SB Inside Lanes & New NB
80	Stage 1B Reconstruct SB I-75 POB to Ramp ES - Outside Lanes
81	Stage 1A Reconstruct SB I-75 Ramp SW to POE - Full Width
82	Stage 2 Reconstruct NB at POB and POE
83	Ramp Construction
84	**Structures**
85	Shop Dwg & Fab
86	S18 Remove
87	S17 of 63174
88	S18 of 63174
89	S18-5 of 63174

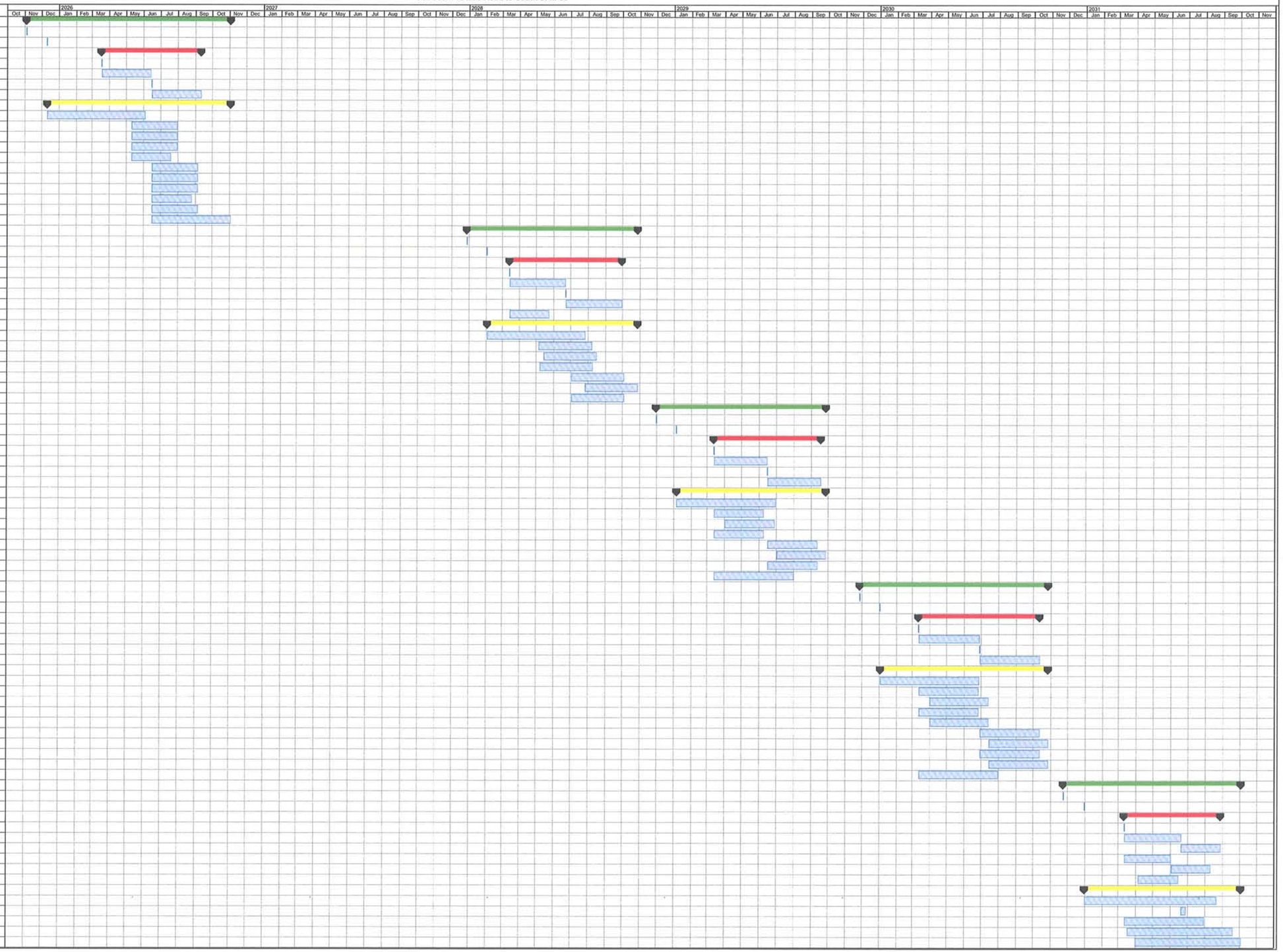

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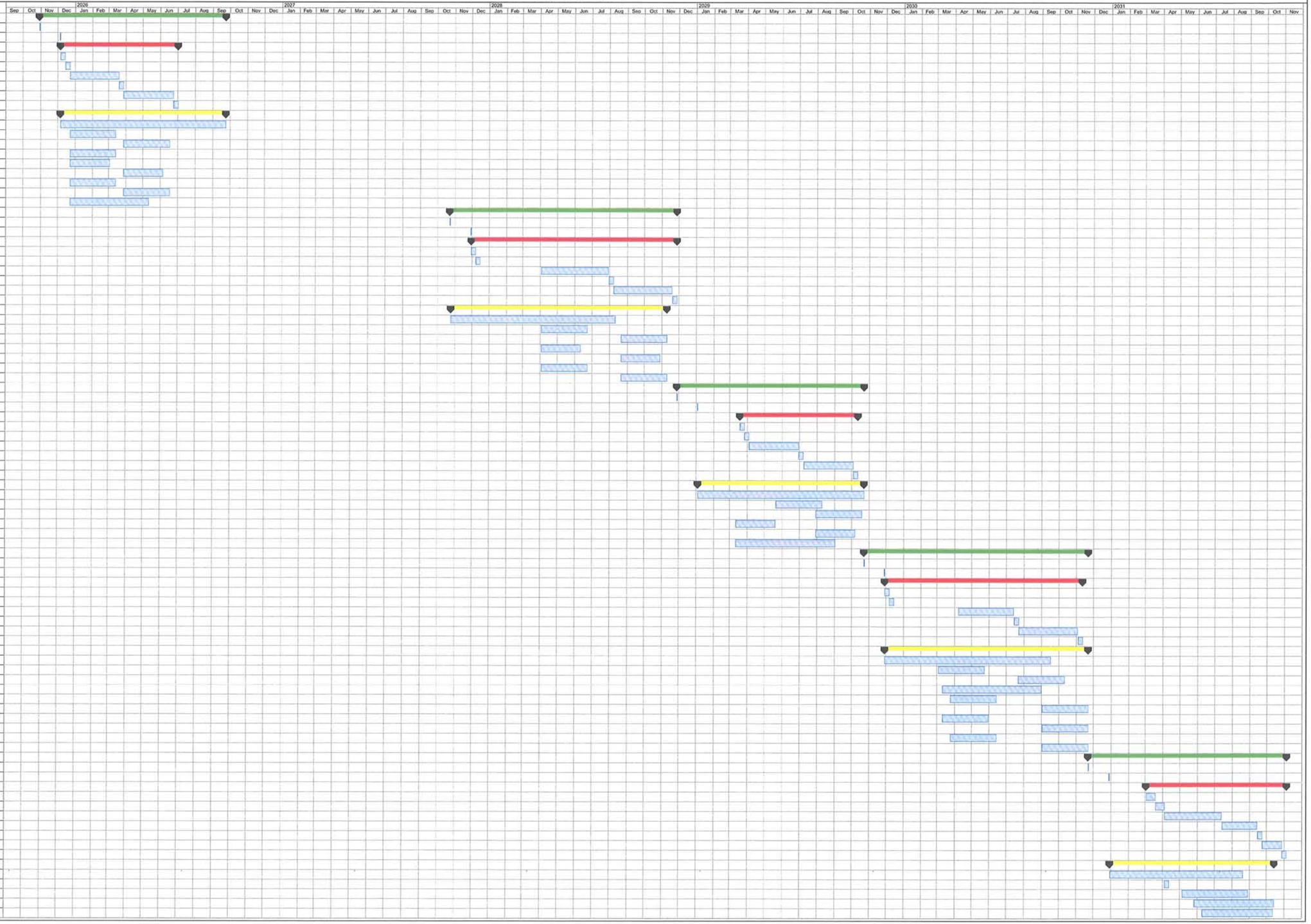
Figure 4-57
Alternative 3: Part Width
I-75 From 12 Mile Road to South of M-59

ID	Task Name
1	**SEGMENT 1 - 1.74 Miles**
2	Letting
3	Award
4	**Freeway**
5	Stage 1: Temp Widening
6	Stage 2: Construct Crossovers
7	Stage 3: NB Construction
8	Stage 4: Construct Crossover
9	Stage 5: SB Construction
10	Stage 6: Restore Crossovers
11	**Structures**
12	Shop Dwg & Fab
13	S03-1 of 63174
14	S03-2 of 63174
15	S03-5 of 63174
16	B02-1 & 5 of 63174
17	B02-2 & 6 of 63174
18	S04-1 of 63174
19	S04-2 of 63174
20	P01 of 63174
21	**SEGMENT 2 - 3.33 Miles**
22	Letting
23	Award
24	**Freeway**
25	Stage 1: Temp Widening
26	Stage 2: Construct Crossovers
27	Stage 3: NB Construction
28	Stage 4: Construct Crossover
29	Stage 5: SB Construction
30	Stage 6: Restore Crossovers
31	**Structures**
32	Shop Dwg & Fab
33	S05-1 of 63174
34	S05-2 of 63174
35	S21-1 of 63174
36	S21-2 of 63174
37	S06-1 of 63174
38	S06-2 of 63174
39	**SEGMENT 3 - 2.62 Miles**
40	Letting
41	Award
42	**Freeway**
43	Stage 1: Temp Widening
44	Stage 2: Construct Crossovers
45	Stage 3: NB Construction
46	Stage 4: Construct Crossover
47	Stage 5: SB Construction
48	Stage 6: Restore Crossovers
49	**Structures**
50	Shop Dwg & Fab
51	S08-1 of 63174
52	S08-2 of 63174
53	S09-1 & 5 of 63174
54	S09-2 & 6 of 63174
55	S10 of 63174
56	**SEGMENT 4 - 4.14 Miles**
57	Letting
58	Award
59	**Freeway**
60	Stage 1: Temp Widening
61	Stage 2: Construct Crossovers
62	Stage 3: NB Construction
63	Stage 4: Construct Crossover
64	Stage 5: SB Construction
65	Stage 6: Restore Crossovers
66	**Structures**
67	Shop Dwgs & Fab
68	S11-1 of 63174
69	S11-2 of 63174
70	S12 of 63174
71	S14-1 of 63174
72	S14-2 of 63174
73	S15-1 of 63174
74	S15-2 of 63174
75	S16-1 of 63174
76	S16-2 of 63174
77	**SEGMENT 5 - 1.81 Miles**
78	Letting
79	Award
80	**Freeway**
81	Stage 1: Temp Widening
82	Stage 2: Construct Crossovers & Temp Widening
83	Stage 3A: SB & NB Construction in New Alignment
84	Stage 3B: Complete SB at each end of project
85	Stage 4: Construct Crossover
86	Stage 5: NB at each end & Rem old NB alignment
87	Stage 6: Remove Crossovers
88	**Structures**
89	Shop Dwgs & Fab
90	S18 Remove
91	S17 of 63174
92	S18 of 63174
93	S18-5 of 63174



4.14 Maintenance of Traffic

This section evaluates the design and constructability issues associated with the widening and reconstruction of the I-75 corridor from 8 Mile Road to south of M-59. The purpose of the widening on I-75 is to accommodate the addition of a High Occupancy Vehicle (HOV) lane in each direction.

The existing southern section of I-75 from 8 Mile Road to south of 12 Mile Road is a total length of 4.02 miles and consists of a six lane urban depressed freeway, with auxiliary lanes in each direction from north of 8 Mile Road to south of I-696, and from north of I-696 to 11 Mile Road. There are 20 bridges within this section, all of which serve local roads that carry vehicular or pedestrian traffic over I-75. Service drives exist along the NB and SB I-75 directions, connecting I-75 to the local roads via ramps at 8 Mile Road, 9 Mile Road, and 11 Mile Road. The most critical access in this section is at the interchange of I-75 and I-696, located between 9 Mile Road and 11 Mile Road. The existing drainage is maintained using an enclosed storm sewer system that outlets to the Red Run Drain north of 12 Mile Road.

The existing northern section of I-75 from south of 12 Mile Road to south of M-59 is a total length of 13.64 miles and consists of a six lane rural raised freeway with seven interchanges. There are 36 bridges within this section, of which 26 structures carry I-75 traffic over local roads. Unlike the southern section of I-75, there are no service drives within this section and existing drainage is maintained using open ditches in the median and outside.

MOT concepts have been developed for both sections, using the criteria set forth in the 2005 EIS for the project and additional recent mobility criteria. The MOT concepts incorporate the proposed I-75 improvements described in the geometric, bridge, drainage and traffic studies, while considering mobility and constructability as outlined in the Michigan Department of Transportation's (MDOT's) policy for Transportation Management Plans (TMP's). The southern section of I-75 is discussed in a separate Engineering Report.

The engineering approach taken for the development of MOT concepts is specific to the characteristics of their respective sections. The southern section is an urban depressed freeway with enclosed drainage while the northern section is a rural raised freeway with an enclosed median and open outside freeway ditch. Coordination of the MOT concepts between the two sections was performed to identify a seamless project that will tie together the two sections.

The various MOT concepts for the northern section were developed and then evaluated. The advantages and disadvantages of each MOT conceptual alternative were outlined and a decision matrix was prepared to aid in the identification of a preferred MOT alternative, based on numerous factors.

4.14.1 Factors Considered During Alternative Development

Factors considered during the evaluation of all MOT conceptual alternatives are summarized herein. Most of these issues have been addressed at this point but may need more detailed analysis during the final design phase.

The following factors were considered when developing the MOT concepts:

- Proposed versus Existing Horizontal Alignment:
  The proposed horizontal alignment followed the existing alignment in tangent sections within the project. In the superelevated sections, the proposed alignment varied from the existing alignment to achieve current MDOT standards. The changes occurred at the 12 Mile Road, Big Beaver Road and Square Lake Road interchanges. The proposed changes impact the amount of existing pavement that can be utilized for maintaining traffic and dictate the need for temporary pavement widening, temporary bridge widening, or full closure of the impacted roadway, ramps or bridges.

- Proposed versus Existing Interchange Geometrics:
  The proposed interchange geometrics were evaluated against existing geometrics to determine the feasibility of maintaining ramps during interchange construction. The location of the proposed ramps impacted the existing ramps, dictating the need for ramp closures.

  The proposed geometrics of the Square Lake Road interchange differed significantly from the existing configuration due to the elimination of the left exit and left entrance ramps in favor of right exit and right entrance ramps. The proposed I-75 roadway will be lowered and the proposed ramp from NB I-75 to WB I-75 BL/Square Lake Road (Ramp NW) will be raised. Lowering I-75 required the closure of the existing SB I-75 roadway and the tri-level ramps in the interchange, Ramp NW and Ramp EN (EB I-75 BL to NB I-75).

- Proposed versus Existing Vertical Alignment:
  The proposed vertical alignment was compared to the existing vertical alignment to determine logical break points when constructing 13.64 miles of roadway. Break points were chosen based on locations where the proposed vertical alignment closely matched the existing alignment, which also occurred in the tangent sections of roadway. Matching the vertical alignments ensures that ending points for each contract will not occur in the middle of a fill or cut section. Each segment constructed may remain in a permanent condition for a few years, especially if unknown factors like funding or overall MDOT planning may cause the remaining projects to be delayed.

  The proposed and existing vertical alignments were reviewed to determine grade differentials during construction to identify the need for temporary sheet piling and to determine the feasibility of maintaining temporary freeway of ramp crossovers once one half of the proposed I-75 roadway is constructed.

- Proposed NB versus Proposed SB Vertical Alignments:
  The grade differentials between the proposed NB and proposed SB vertical alignments were evaluated to determine the locations of temporary freeway and ramp crossovers that were deemed necessary to maintain. Where grade differentials exist, removal of proposed freeway sections, such as shoulders and valley gutters, were identified to remain within the allowable rollover rates for temporary freeway crossovers.

- Proposed versus Existing Drainage System:
  The proposed drainage system was evaluated with respect to the existing drainage system to ensure maintenance of positive drainage during construction. The simplest and easiest way to maintain positive drainage during construction while building the proposed drainage system dictated which side of I-75 should be constructed first.

- Existing Bridge Widths:
  All existing bridge clear widths were reviewed to determine adequacy for maintaining traffic, based on minimum shy distance requirements by MDOT, as shown in Table 4-5. Where existing clear widths are not adequate, temporary bridge widening is proposed.

- Condition of Existing Shoulders:
  Old plans were evaluated and field reviews were conducted to determine the condition of existing shoulders. From initial review, the existing shoulder sections appear adequate for maintaining traffic. Temporary pavement needs were determined based on widening from the existing shoulder section. The shoulders need to be re-examined during the final design phase to determine any necessary upgrades.

- Optimal Use of the Proposed High Occupancy Vehicle (HOV) Lane:
  Phasing of construction projects were identified with the assumption that an adequate length of I-75 will be reconstructed to make the HOV lane usable. Construction of the northern section was planned by building from south of 12 Mile Road going north.

- Constructible Segments and Winter Shutdown:
  Construction of the I-75 corridor was divided into constructible segments that can be let as individual contracts, which can be built in one or two construction seasons, and which can be staged to allow traffic to return to their respective roadways during the winter shutdown if constructed in more than one season.

- Construction of Bridges Over I-75
  Construction phasing was evaluated to ensure that closure of bridges over I-75 while under construction will cause the least impact to the local road system. When a local road bridge is closed, the adjacent local roads are open to traffic. Bridge construction was also phased in order to minimize freeway closure of I-75 for bridge work operations.

- Consecutive Closures of Interchanges:
  There are 7 interchanges on I-75 from south of 12 Mile Road to south of M-59 that provide access between I-75 and the local road system. Construction phasing was chosen to ensure that adjacent interchanges are maintained during construction of impacted interchanges. Break points were identified to ensure that the location of temporary freeway and ramp crossovers cause the least impact to nearby interchanges.

- Major Traffic Generators:
  Major traffic generators, such as Oakland Mall on 14 Mile Road and Somerset Mall on Big Beaver Road, were taken into account when determining interchange reconstruction. Access to the numerous commercial businesses served by the interchanges at 12 Mile Road and Crooks Road Interchange was also considered. A particularly critical interchange in the northern section is the I-75/Square Lake Road (I-75 BL) interchange, which serves as a major detour route for MDOT-owned freeway or non-freeway roads.

- Posted Detour Routes:
  Posted detour routes were chosen based on standard MDOT practice of using only MDOT-owned trunklines when closing MDOT-owned roadways. MDOT-owned trunklines within the I-75 corridor include I-75, I-696, US-24, M-1, and Square Lake Road (I-75BL).

  Detouring traffic using the local roadway system was not evaluated as an alternative since this will require the approval of the local agencies involved. In addition, the cost of upgrading the local road system to carry detoured freeway or MDOT-owned ramp traffic will be difficult to quantify in this report.

- Impact of Lane and Ramp Closures to the Motoring Public:
  Each MOT conceptual alternative was modeled to determine the impact of lane closures to the travel time in comparison to the baseline existing conditions. Ramp closures were also modeled to determine the impact of interchange construction to the local road system. Some measures to minimize ramp closures were identified such as maintaining ramp traffic using temporary traffic signals at adjacent ramps, maintaining temporary ramp crossovers, or part-width ramp construction.

- Maintaining Pedestrian Traffic:
  The location of the proposed pedestrian bridge over I-75 south of 12 Mile Road will be set south of the existing pedestrian bridge to be able to maintain pedestrian traffic at all times. Sidewalk closures on local roads under I-75 will be staged to maintain pedestrian traffic on one side while the other side is under construction. Pedestrian detours will be provided for all other bridge closures over I-75, where existing sidewalk is present on the bridge.

Other factors include contractor access and ease of construction for each MOT Conceptual Alternative, construction duration and cost for each MOT Conceptual Alternative.

The factors considered required coordination between PB and URS. The transition on I-75 from a depressed freeway to a raised freeway occurs south of 12 Mile Road, where the proposed horizontal alignment is in a superelevated section and where the proposed vertical alignment is in a fill section. The proposed drainage system for the southern section from 8 Mile Road to south of 12 Mile Road is located on the NB I-75 service drive and outlets to the Red Run Drain located north of 12 Mile Road. This system must be in service prior to removal of the existing drainage system located on the SB I-75 service drive. These factors resulted in combining the southern portion of I-75 from I-696 to south of 12 Mile Road with Segment 1 (south of 12 Mile Road to north of 13 Mile Road) of the northern section.

4.14.2 Maintenance of Traffic Design Criteria

The proposed maintenance of traffic design criteria, used as guidelines when developing the MOT conceptual alternatives, is shown in **Table 4-6**.

Table 4-6 Proposed Maintenance of Traffic Design Criteria

DESIGN CRITERIA	REFERENCE	I-75 MOT
GENERAL		
Roadway Classification	AASHTO-GDS Chapter 1	Rural Freeway
Terrain	AASHTO-GDS Exhibit 8-1 Page 510	Level
Posted Speed Within Construction Zone	Bureau of Highway Instructional Memo 2005-16	60 mph/45 mph
Posted Speed Prior to Construction Zone	Field Review	70 mph
TYPICAL SECTION		
Inside Shoulder Width/Shy Distance		2' min (1' min on bridges)
Outside Shoulder Width/Shy Distance		2' min (1' min on bridges)
Lane Width	MDOT Work Zone Safety and Mobility Manual	11' min, 12' desirable
Number of Lanes	2005 Final EIS, I-75 from M-102 to M-59	2 lanes in each direction, minimum
Temporary Shoulder Cross Slopes		Varies to 4% max
Temporary Rollover Rates on Crossovers	AASHTO-GDS Exhibit 4-2 Page 307	8% max
HORIZONTAL ALIGNMENT		
Minimum Taper Length (shifting)	MDOT Maintaining Traffic Typical M0020a	1/2 S x W
Minimum Taper Length (merging)	MDOT Maintaining Traffic Typical M0020a	S x W
Temporary Freeway Crossover Lengths	MDOT Standard R-113	60 mph design speed, minimum
Temporary Ramp Taper and Crossover Lengths	MDOT Standard R-113, Geo Design Guides GEO-101 & GEO-131	60 mph freeway design speed, ramp speeds based on ramp radii
VERTICAL ALIGNMENT		
Vertical Clearance	MDOT RDM 3.12G (I-75 North of I-696)	16'-3" (14'-0" with approval)

4.14.3 Conceptual MOT Alternatives

The following I-75 MOT concepts have been evaluated for each segment:

- Alternative 1: Full Freeway Closure
- Alternative 2: Half Freeway Closure in One Stage
- Alternative 3: Two Lane Operation Minimum in Each Direction Using Crossovers

In addition, a fourth alternative (Three Lane Operation in Each Direction – Contra-Flow) was considered and discussed but has not been fully evaluated from a traffic perspective. Due to the large number of I-75 freeway bridges over local roads, the Contra-Flow Alternative became cost prohibitive (all freeway over bridges would have to be built part-width) and would have several constructability issues with the number of freeway cross culverts/drains.

Staging Concepts Applicable to all Alternatives

- Posted Detour
  Posted detour routes were chosen based on standard MDOT practice of using only MDOT-owned freeways and trunklines when closing MDOT-owned roadways. When closing ramps or roadways owned by local agencies, detour routes were posted using the local roadway system.

  US-24 (Telegraph Road) is the preferred north-south route due to existing features of this roadway when compared to M-1 (Woodward Avenue). The timing of the traffic signals on US-24 allows for better progression of traffic when compared to M-1. There is also a more defined separation and fewer driveway access points between US-24 and the businesses along US-24, which results in less conflict between traffic and driveway ingress and egress.

- Which Side of I-75 to Construct First
  Segments 1 through 4
  Drainage studies for the northern section of the I-75 corridor led to the conclusion that the NB I-75 freeway must be constructed first in Segments 1 through 4.

  Segment 5
  The SB I-75 roadway must be constructed first in Segment 5, because the majority of the work in the Square Lake Interchange impacts the SB I-75 roadway. In addition, the existing NB roadway may be used to maintain traffic while building the proposed I-75 roadway and tri-level ramps.

4.14.3.1 Alternative 1: Full Freeway Closure of I-75

Alternative 1 involves construction of both directions of I-75 at the same time while detouring traffic for both directions and allowing the Contractor complete access to the freeway.

Segments 1 through 4 (south of 12 Mile Road to north of Adams Road):
Segments 1 through 4 may be constructed as four separate contracts or combined into fewer contracts. The detour for NB and SB I-75 traffic will remain the same regardless of which segment or segments are under construction. The detour for NB and SB I-75 traffic will also apply to the southern section between I-696 and south of 12 Mile Road, which will be combined with Segment 1.

Stage 1 Construction:

- Reconstruct full width of NB and SB I-75 roadways within the segment(s).
- Reconstruct all NB and SB I-75 ramps within the segment(s).
- Reconstruct all bridges within the segment(s).
- Reconstruct all local roadways under I-75 within the segment(s).

Stage 1 Traffic:

- Close and detour NB and SB I-75 traffic as described below and as shown in **Figure 4-58**.
- Close and detour all ramps within the segment(s).
- Local roadways under I-75 to be further investigated for full closure or part-width construction after detailed analysis of the staging during the design phase and with local agency input.

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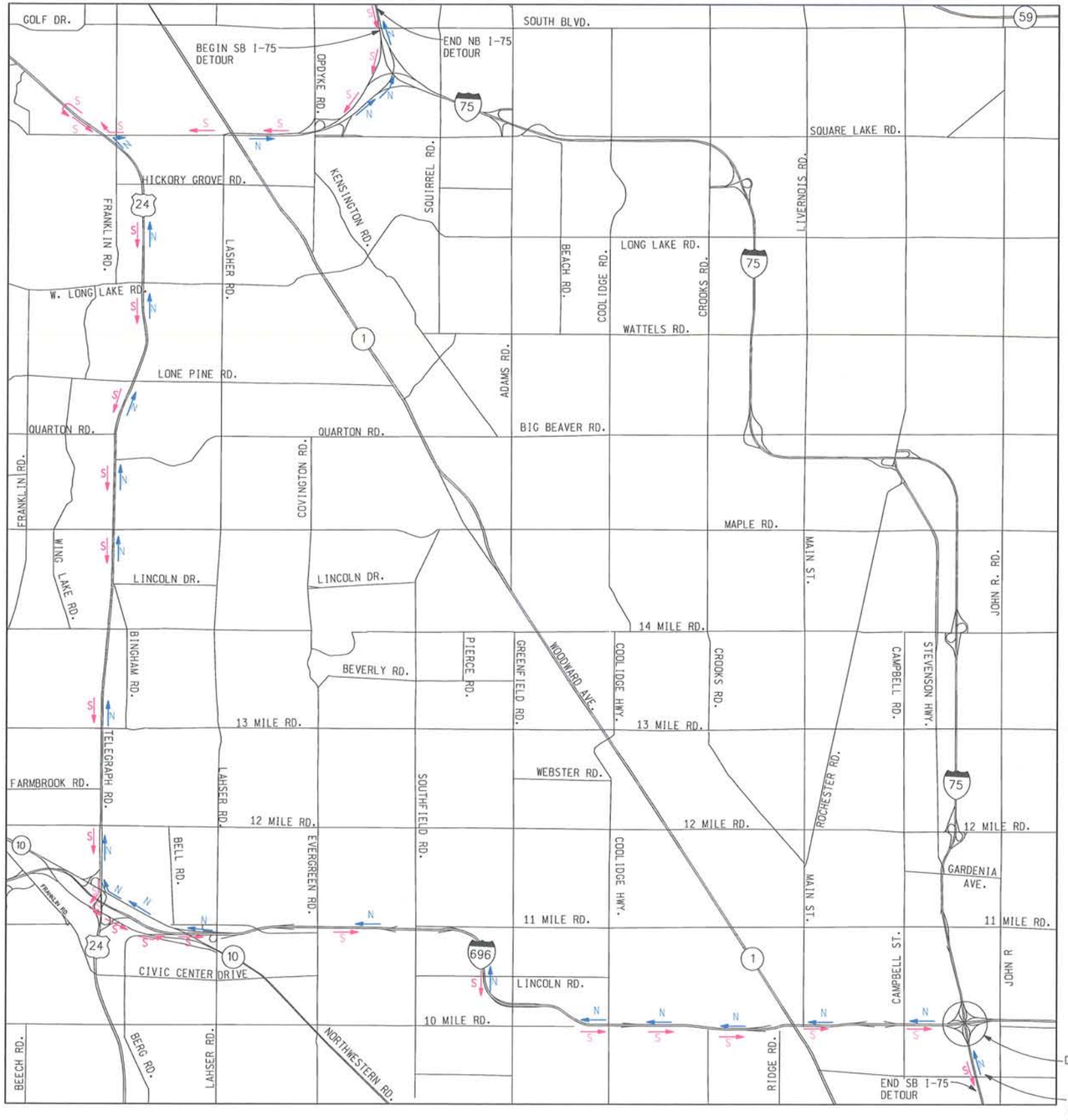
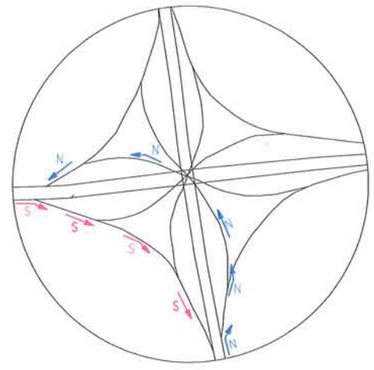


I-75 DETOUR PLAN



DETAIL 1
I-75/I-696 INTERCHANGE

LEGEND
- NB I-75 DETOUR
- SB I-75 DETOUR

FIGURE 4-58
ALT 1: FULL FREEWAY CLOSURE OF I-75
STAGE CONSTRUCTION TYPICALS

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- NB I-75 detour
  - Post detour for NB I-75 traffic to go west on I-696, north on US-24, east on I-75 BL (Square Lake Road) and north on I-75.
  - Ramps on NB I-75 between I-696 and segment(s) under construction are closed.
  - Ramps on NB I-75 north of segments(s) under construction are open.

  SB I-75 detour:
  - Post detour for SB I-75 traffic to go west on I-75 BL (Square Lake Road), south on US-24, east on I-696 and south on I-75.
  - Ramps on SB I-75 between Square Lake Road and segment(s) under construction are closed.
  - Ramps on SB I-75 south of the segment(s) under construction are open.

Segment 5 (north of Adams Road to south of M-59):

Stage 1 Construction:
- Reconstruct full width of NB and SB I-75 roadways.
- Reconstruct all NB and SB I-75 ramps within Segment 5.
- Reconstruct all bridges within Segment 5.

Stage 1 Traffic:
- Close and detour NB and SB I-75 traffic as described below and as shown in **Figure 4-59.**
- Close and detour all ramps within Segment 5.

NB I-75 detour
- Post detour for NB I-75 traffic to go west on I-696, north on US-24, east on M-59 and north on I-75.
- Ramps on NB I-75 between I-696 and Segment 5 are closed.

Note: The detour may not be posted using the I-75/Square Lake interchange since Ramp NW (ramp from NB I-75 to WB I-75 BL/Square Lake Road) is closed.

SB I-75 detour
- Post detour for SB I-75 traffic to go west on M-59, south on US-24, east on I-75 BL (Square Lake Road) and south on I-75.
- Ramps on SB I-75 between Segment 5 and M-59 are closed.
- Ramps on SB I-75 south of Segment 5 are open.

Note: To make the detour possible, a portion of the SB I-75 roadway is constructed part-width to maintain Ramp ES (ramp from SB I-75 to WB I-75 BL).

Advantages of Alternative 1:
- Only one stage of construction - results in the shortest construction duration compared to the other alternatives.
- Requires no temporary pavement or temporary bridge widening, no temporary freeway or ramp crossovers, no temporary signals, and requires the least amount of temporary sheet piling - results in the lowest overall construction cost compared to the other alternatives (excluding user delay costs).
- Bridge work for structures carrying I-75 over local roadways impacts local traffic below only once since substructure work may be constructed for both directions of I-75 at the same time.
- Simplest staging since it does not require traffic shifts or temporary crossovers.
- Contractor access and lay down areas will have no conflict with traffic - most desirable MOT concept for the Contractor.
- Allows for easier combination of Segments 1 through 4 into fewer contracts.
- MOT concept may apply to the southern section of I-75 between I-696 and south of 12 Mile Road.

Disadvantages of Alternative 1:
- Freeway detour routes are not ideal since they involve miles of non-freeway trunkline with many signalized intersections.
- Results in greatest congestion on the local roadway system since detoured freeway traffic will use local routes to get to their destination.
- Greatest mobility impact when compared to Alternatives 2 and 3, as detailed in the traffic simulation showing severe congestion or failure of the network, detailed in ***APPENDIX F: T-CONCEPTS TRAFFIC MODELING.***
- High user delay costs to drivers and businesses due to increased travel distances.
- Alternative 1 is not addressed in the Environmental Impact Statement.

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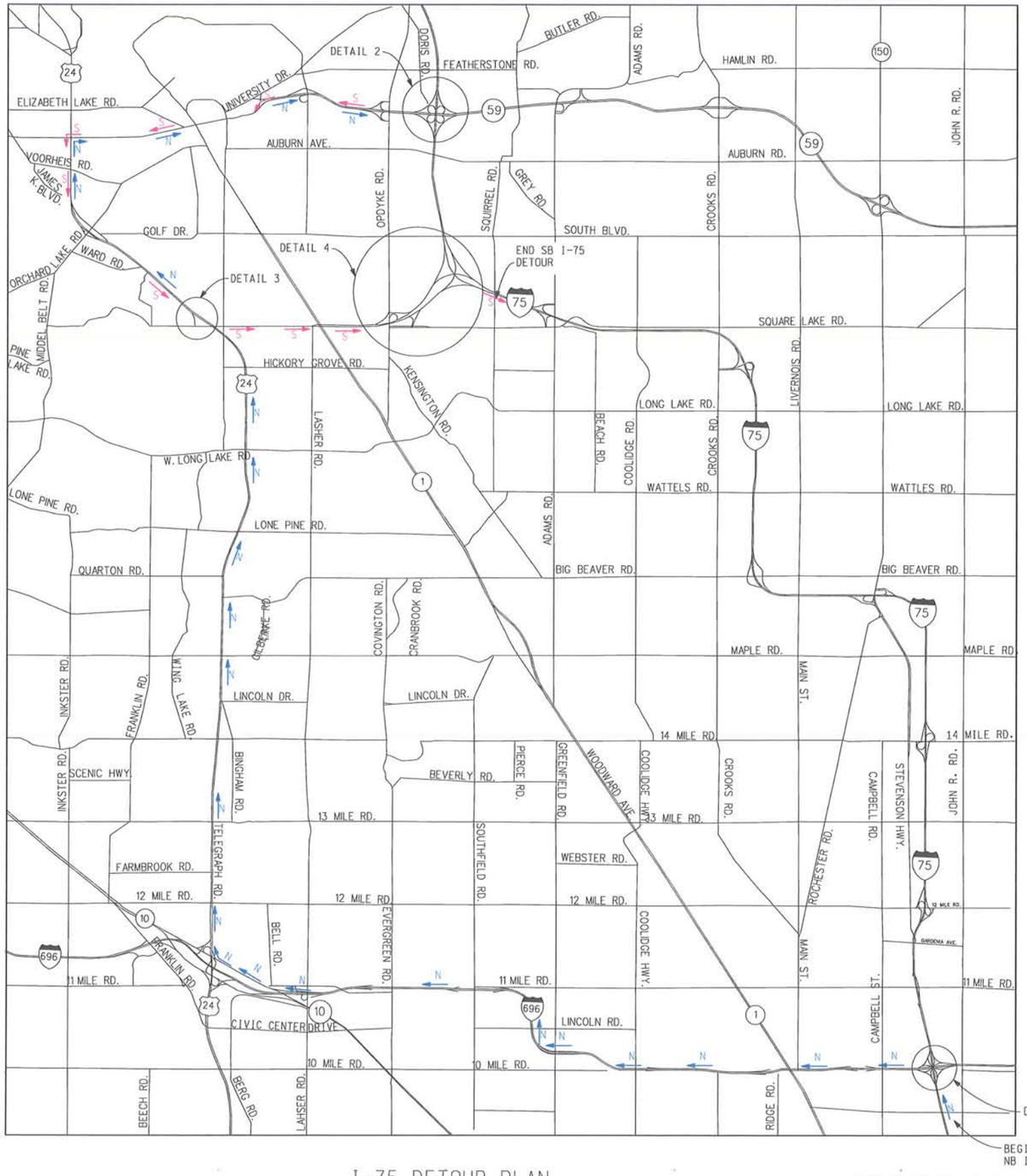
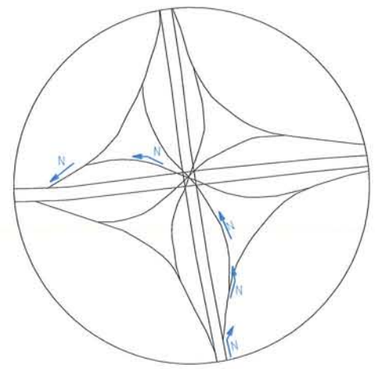
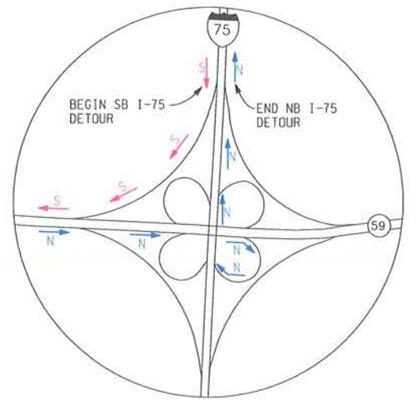


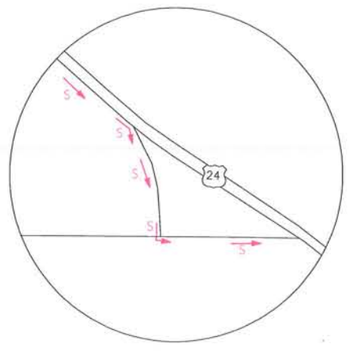
I-75 DETOUR PLAN



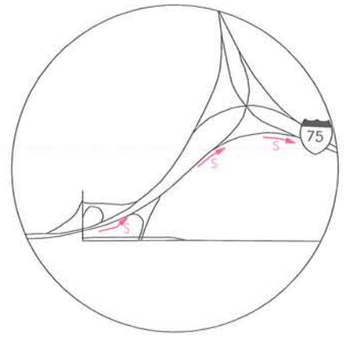
DETAIL 1
I-75/I-696 INTERCHANGE



DETAIL 2
I-75/M-59 INTERCHANGE



DETAIL 3
US-24/SQUARE LAKE RD INTERCHANGE



DETAIL 4
I-75/SQUARE LAKE RD INTERCHANGE

LEGEND
- NB I-75 DETOUR
- SB I-75 DETOUR

FIGURE 4-59
ALT 1: FULL FREEWAY CLOSURE OF I-75
STAGE CONSTRUCTION TYPICALS

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4.14.3.2 Alternative 2: Half Closure of I-75 in One Stage

Alternative 2 involves construction of one direction of I-75 while detouring the other direction in one stage. This involves the use of temporary freeway crossovers in one stage, similar to Alternative 3.

Segments 1 through 4 (south of 12 Mile Road to north of Adams Road):
Segments 1 through 4 may be constructed as four separate contracts or combined into fewer contracts. The detour for NB I-75 traffic will remain the same regardless of which segment or segments are under construction. The detour for NB I-75 traffic will also apply to the southern section between I-696 and south of 12 Mile Road, which will be combined with Segment 1.

The NB I-75 direction is detoured in Stage 1 because the detour movements are more desirable when compared to the detour for the SB I-75 direction. The NB I-75 detour involves free flow ramp movements and right turn movements. The SB I-75 direction involves making indirect left turns from WB I-75 BL (Square Lake Road) to SB US-24 and involves a weaving movement from SB US-24 to EB I-696.

Stage 1 Construction:
- Reconstruct full width of NB I-75 roadway within the segment(s), including median barrier and both valley gutters.
- Reconstruct all NB I-75 ramps within the segment(s).
- Reconstruct all bridges carrying NB I-75 traffic over local roadways/waterways within the segment(s).
- Reconstruct all bridges carrying local roadways over I-75, within the segment(s).
- Construct temporary freeway and ramp crossovers within the segment(s).

Stage 1 Traffic:
- Close and detour NB I-75 traffic as described below and as shown in Figure 4-56.
- Close and detour all NB I-75 ramps within the segment(s) under construction.
- Maintain SB I-75 traffic on the SB roadway shifted toward the SB I-75 outside shoulder as shown in **Figure 4-60**.

  NB I-75 detour
  - Post detour for NB I-75 traffic to go west on I-696, north on US-24, east on I-75 BL (Square Lake Road) and north on I-75.
  - Ramps on NB I-75 between I-696 and segment(s) under construction are closed.
  - Ramps on NB I-75 north of segments(s) under construction are open.

Stage 2 Construction:
Note: Stage 2 Construction of Alternative 2 is the same as Stage 5 Construction of Alternative 3.
- Reconstruct full width of SB I-75 roadway within the segment(s).
- Reconstruct all SB I-75 ramps within the segment(s).
- Reconstruct all bridges carrying SB I-75 traffic over local roadways/waterways within the segment(s).
- Reconstruct all local roadways under I-75 within the segment(s).

Stage 2 Traffic:
Note: Stage 2 Traffic of Alternative 2 is the same as Stage 5 Traffic of Alternative 3.
- Maintain three NB lanes and two SB lanes on the NB roadway as shown in **Figure 4-61**
- Refer to Stage 5 of Alternative 3 for traffic schemes, locations of temporary crossovers, and additional ramp closure details for each segment.
- Local roadways under I-75 to be further investigated for full closure or part-width construction after detailed analysis of the staging during the design phase and with local agency input.

Stage 3 Construction:
Note: Stage 3 Construction of Alternative 2 is the same as Stage 6 Construction of Alternative 3.
- Remove temporary freeway and ramp crossovers.
- Restore existing freeway section outside the limits of the work area to existing configuration prior to construction.
- Construct permanent median barrier and valley gutters gapped out to maintain ramp crossovers.

Stage 3 Traffic:
Note: Stage 3 Traffic of Alternative 2 is the same as Stage 6 Traffic of Alternative 3.
- Maintain three NB lanes and three SB lanes in their respective roadways as shown in **Figures 4-62** and **4-63**.
- Open all ramps.

Other Options for Stage 2:
The NB I-75 direction could have continued to be detoured in Stage 2. However, the proposed roadway width of NB I-75 constructed in Stage 2 can fit five lanes of traffic. Therefore, for purposes of this report, Stage 2 of Alternative 2 is exactly the same as Stage 5 of Alternative 3 (Two Lane Operation Minimum in Each Direction Using Crossovers).

Once the project is in the design phase, variations to the Stage 2 MOT Concepts are available:
- Option 1: Continue to detour NB I-75 traffic but maintain one local NB lane with a full shoulder and three SB lanes on the NB roadway using temporary freeway crossovers.
- Option 2: Maintain five lanes of I-75 traffic on the NB roadway but maintain three SB lanes and two NB lanes.

Options 1 and 2 described above take advantage of the NB I-75 freeway closure already in place from Stage 1. The public will view any lanes opened along NB I-75 as an improvement to the previous stage. At the same time, SB I-75 through traffic is never closed during these options.

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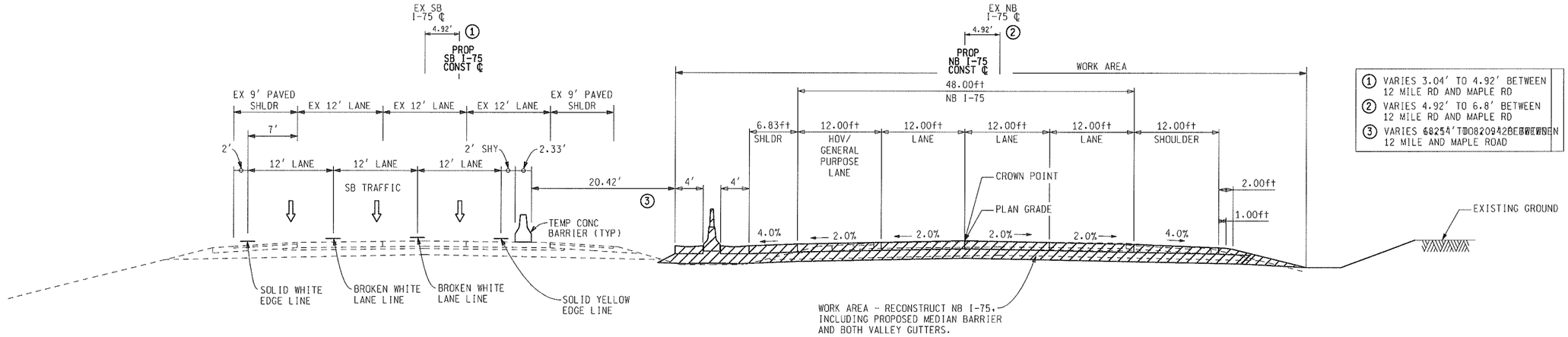
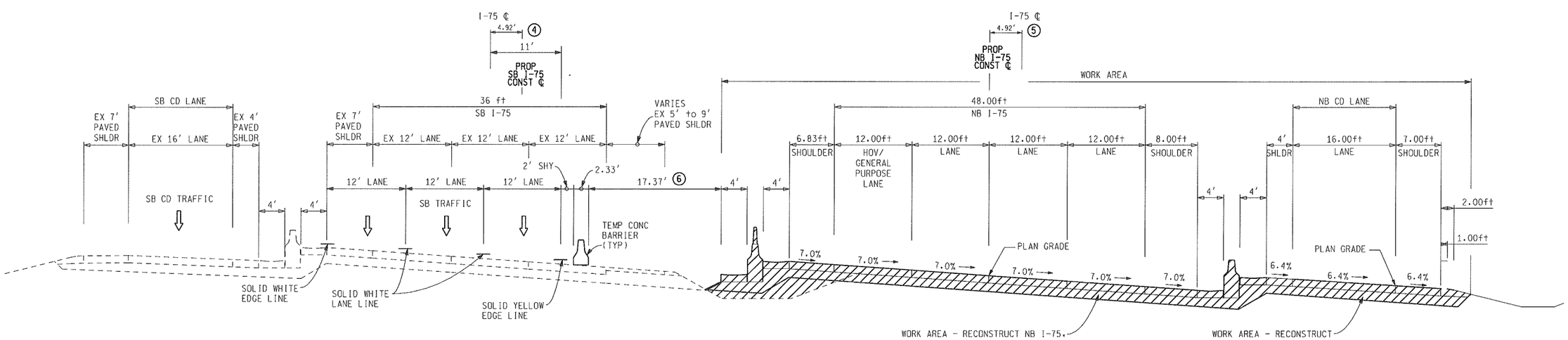


STAGE 1 MAINTAINING TRAFFIC TYPICAL 1
(NB I-75 CLOSED AND DETOURED)

SEGMENTS 1 THROUGH 4
POB TO POE



STAGE 1 MAINTAINING TRAFFIC TYPICAL 2
(NB I-75 CLOSED AND DETOURED)

SEGMENT 3
AT BIG BEAVER RD

FIGURE 4-60
ALT 2: HALF FREEWAY CLOSURE OF I-75 IN 1 STAGE
STAGE CONSTRUCTION TYPICALS

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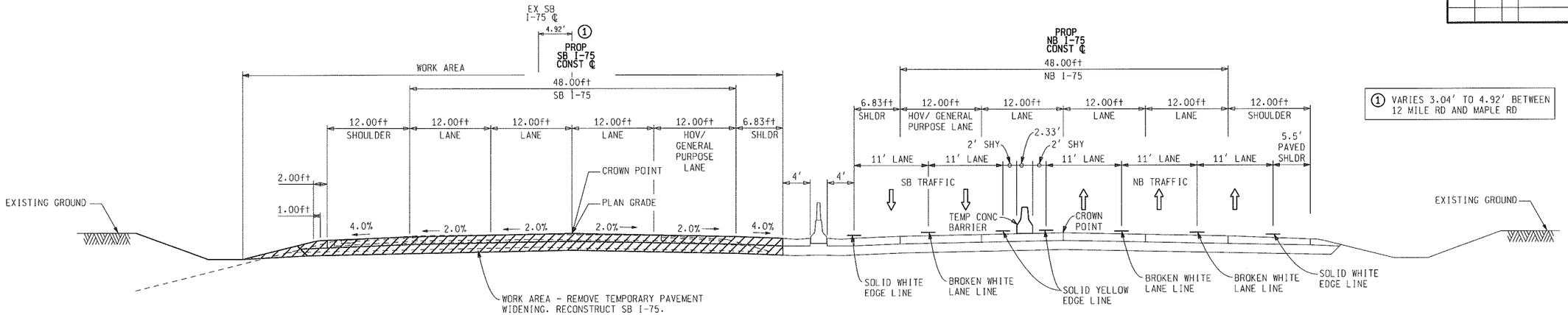
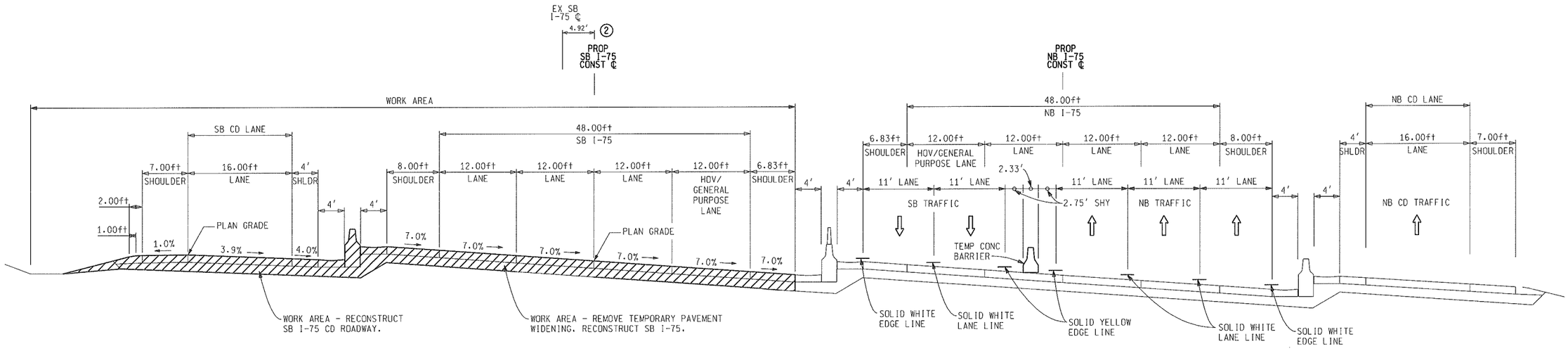


STAGE 5 MAINTAINING TRAFFIC TYPICAL 1
SEGMENTS 1 THROUGH 4
POB TO POE
(EXCEPT AT BIG BEAVER RD)



STAGE 5 MAINTAINING TRAFFIC TYPICAL 2
SEGMENT 3
AT BIG BEAVER RD

FIGURE 4-61
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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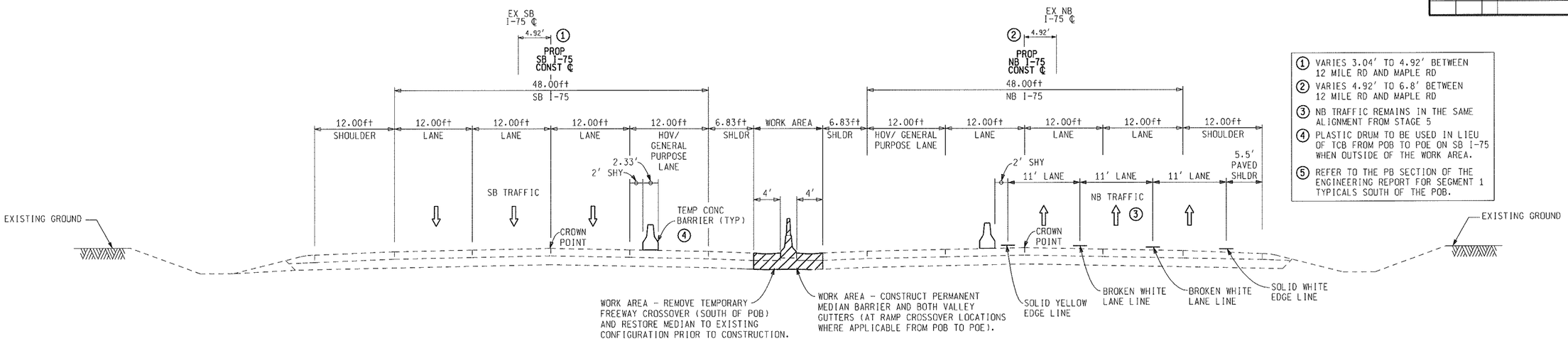
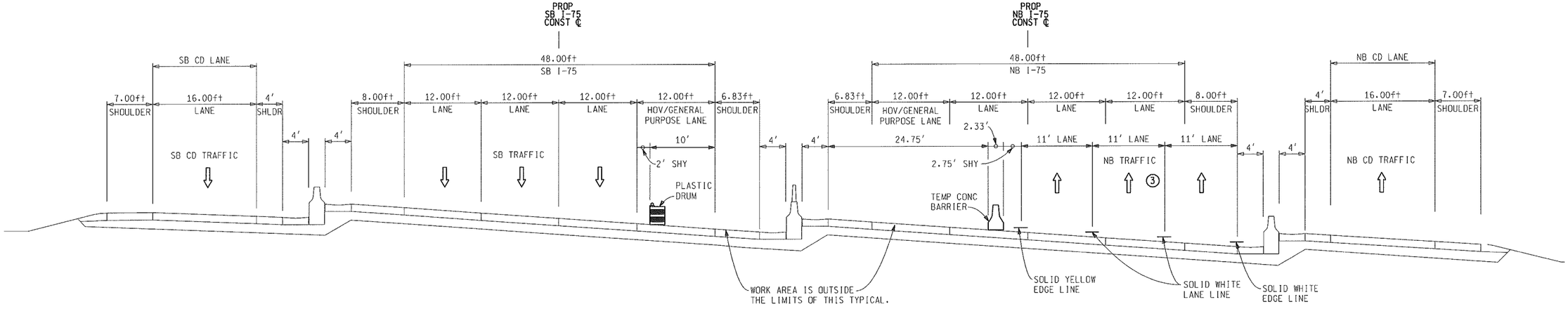


1. VARIES 3.04′ TO 4.92′ BETWEEN 12 MILE RD AND MAPLE RD
2. VARIES 4.92′ TO 6.8′ BETWEEN 12 MILE RD AND MAPLE RD
3. NB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 5
4. PLASTIC DRUM TO BE USED IN LIEU OF TCB FROM POB TO POE ON SB I-75 WHEN OUTSIDE OF THE WORK AREA.
5. REFER TO THE PB SECTION OF THE ENGINEERING REPORT FOR SEGMENT 1 TYPICALS SOUTH OF THE POB.

STAGE 6 MAINTAINING TRAFFIC TYPICAL 1

SEGMENTS 2 THROUGH 4 ⑤
SOUTH OF POB (AT FREEWAY CROSSOVER) AND
POB TO POE (AT RAMP CROSSOVERS)



③ NB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 5

STAGE 6 MAINTAINING TRAFFIC TYPICAL 2

SEGMENT 3
AT BIG BEAVER RD

FIGURE 4-62
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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SEGMENT 1 - 4, S. OF 12 MILE TO N. OF ADAMS

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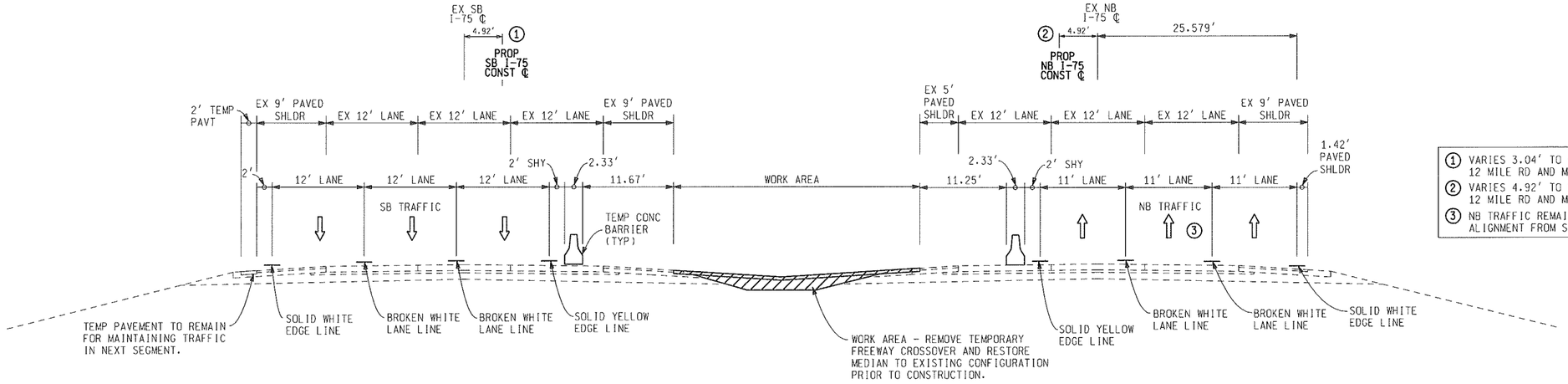

1. VARIES 3.04' TO 4.92' BETWEEN 12 MILE RD AND MAPLE RD
2. VARIES 4.92' TO 6.8' BETWEEN 12 MILE RD AND MAPLE RD
3. NB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 5

STAGE 6 MAINTAINING TRAFFIC TYPICAL 3

SEGMENTS 1 THROUGH 4
NORTH OF POE (AT FREEWAY CROSSOVER)

FIGURE 4-63
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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Segment 5 (north of Adams Road to south of M-59):
The SB I-75 direction is detoured because it is the shorter detour route when compared to that of the NB I-75 direction. Detouring the NB I-75 roadway would involve closing NB I-75 between I-696 and M-59 (a total length of over 13 miles), when the work area is only at Segment 5.

Stage 1A Construction:
- Reconstruct the median half of SB I-75 from POB to Ramp ES (ramp from EB I-75 BL/Square Lake Road to SB I-75), including median barrier and both valley gutters.
- Reconstruct full width of SB I-75 roadway, including median barrier and both valley gutters, between Ramp ES and the POE.
- Reconstruct all bridges and all ramps within Segment 5, including a portion of Ramp ES.
- Construct temporary freeway and temporary Ramp ES connection for maintaining traffic in Stage 1B.

Stage 1A Traffic:
- Close and detour SB I-75 traffic as shown in Figure 4-57.
- Maintain NB I-75 traffic on the NB roadway shifted toward the NB I-75 outside shoulder as shown in **Figure 4-64**.
- Maintain Ramp ES on the outside of the SB I-75 roadway as shown in Figure 4-62.
- Close and detour all ramps within Segment 5, except for Ramp ES.

SB I-75 detour
  - Post detour for SB I-75 traffic to go west on M-59, south on US-24, east on I-75 BL (Square Lake Road) and south on I-75.
  - Ramps on SB I-75 between Segment 5 and M-59 are closed.
  - Ramps on SB I-75 south of Segment 5 are open.

Stage 1B Construction:
Same as Stage 1A Construction with the following changes:
- Reconstruct the outside half of SB I-75 from POB to Ramp ES (ramp from EB I-75 BL/Square Lake Road to SB I-75).

Stage 1B Traffic:
Same as Stage 1A Traffic with the following changes:
- Maintain NB I-75 traffic on the NB roadway shifted toward the NB I-75 outside shoulder as shown in **Figure 4-65**.
- Maintain Ramp ES on the median side of the SB I-75 roadway as shown in Figure4-63.

Stage 2 Construction:
Note: Stage 2 Construction of Alternative 2 is the same as Stage 5 Construction of Alternative 3.
- Reconstruct full width of NB I-75 roadway.
- Continue construction of the bridges and the NB I-75 ramps.

Stage 2 Traffic:
Note: Stage 2 Traffic of Alternative 2 is the same as Stage 5 Traffic of Alternative 3.
- Maintain two NB lanes and three SB lanes on the SB roadway as shown in **Figures 4-66** through **4-68**.
- Refer to Stage 5 of Alternative 3 for traffic schemes, locations of temporary crossovers, and additional ramp closure details for Segment 5.

Stage 3 Construction:
Note: Stage 3 Construction of Alternative 2 is the same as Stage 6 Construction of Alternative 3.
- Remove temporary freeway and ramp connections and construct slope to permanent condition.
- Restore existing freeway section outside the limits of the work area to existing configuration prior to construction.

Stage 3 Traffic:
Note: Stage 3 Traffic of Alternative 2 is the same as Stage 6 Traffic of Alternative 3.
- Maintain three NB lanes and three SB lanes in their respective roadways as shown in **Figure 4-69**.
- Open all ramps.

Advantages of Alternative 2:
- Only three stages of construction - results in a shorter construction duration when compared to Alternative 3.
- Requires no temporary pavement widening prior to Stage 1 and requires less temporary sheet piling than Alternative 3 - results in a lower overall construction cost compared to Alternative 3 (excluding user delay costs).
- Better mobility than Alternative 1 since only one direction of I-75 is detoured.
- Contractor access and lay down areas will have minimal conflict with traffic due to closure of one side of the freeway – same as Alternative 3.
- Allows for easier combination of Segments 1 through 4 into fewer contracts when compared to Alternative 3.
- MOT concept may apply to the southern section of I-75 between I-696 and south of 12 Mile Road.

Disadvantages of Alternative 2:
- Freeway detour routes are not ideal since they involve miles of non-freeway trunkline with many signalized intersections.
- Results in more congestion on the local roadway system when compared to Alternative 3, since detoured freeway traffic will use local routes to get to their destination.
- Greater mobility impact than Alternative 3, as detailed in the traffic simulation showing severe congestion or failure of the network, detailed in ***APPENDIX F: T-CONCEPTS TRAFFIC MODELING***.
- High user delay costs to drivers and businesses due to increased travel distance.
- Alternative 2 is not addressed in the Environmental Impact Statement.

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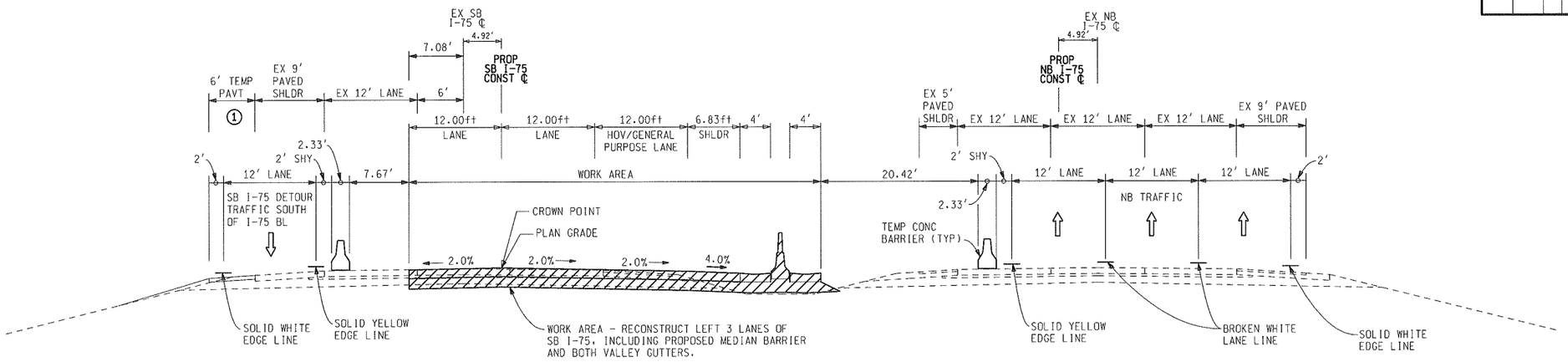
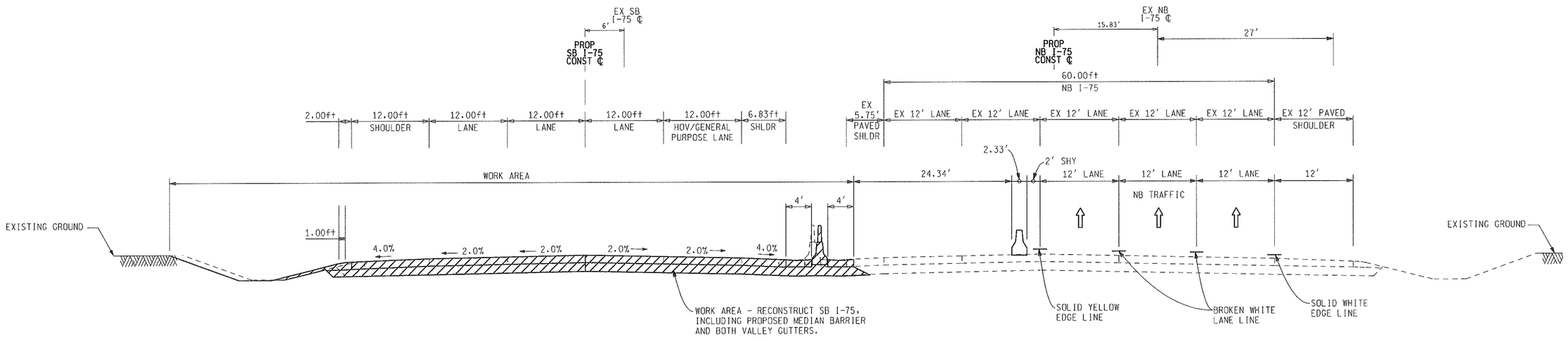


STAGE 1A MAINTAINING TRAFFIC TYPICAL 1
(SB I-75 CLOSED AND DETOURED)

SEGMENT 5
POB TO RAMP ES (SQUARE LAKE RD CONNECTOR TO SB I-75)

① TEMP PAVEMENT WIDENING VARIES 6' TO 0' APPROACHING EXISTING RAMP ES (SQUARE LAKE RD CONNECTOR TO SB I-75).



STAGE 1A MAINTAINING TRAFFIC TYPICAL 2
(SB I-75 CLOSED AND DETOURED)

SEGMENT 5
RAMP SW (SB I-75 TO SQUARE LAKE RD CONNECTOR) TO POE

FIGURE 4-64
ALT 2: HALF FREEWAY CLOSURE OF I-75 IN 1 STAGE
STAGE CONSTRUCTION TYPICALS

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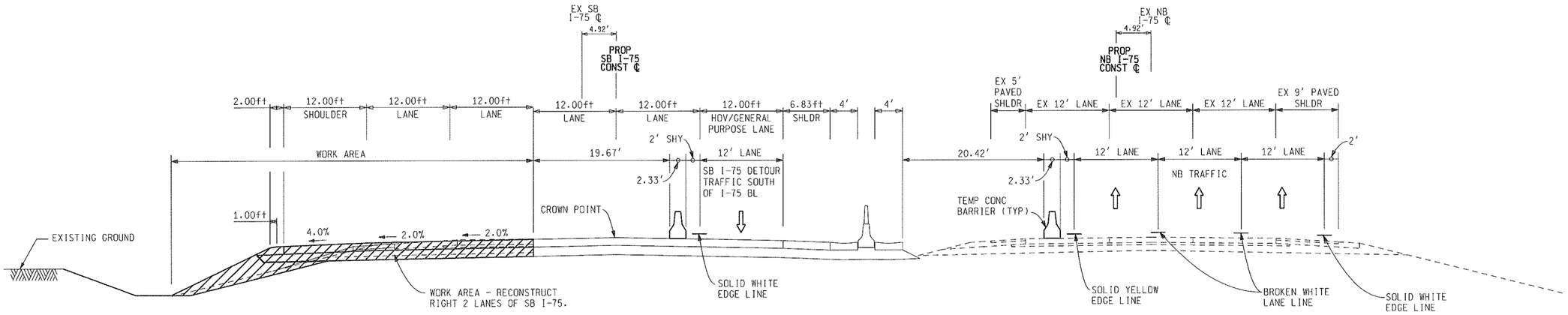

STAGE 1B MAINTAINING TRAFFIC TYPICAL 1
(SB I-75 CLOSED AND DETOURED)

SEGMENT 5
POB TO RAMP ES (SQUARE LAKE RD CONNECTOR TO SB I-75)

FIGURE 4-65
ALT 2: HALF FREEWAY CLOSURE OF I-75 IN 1 STAGE
STAGE CONSTRUCTION TYPICALS

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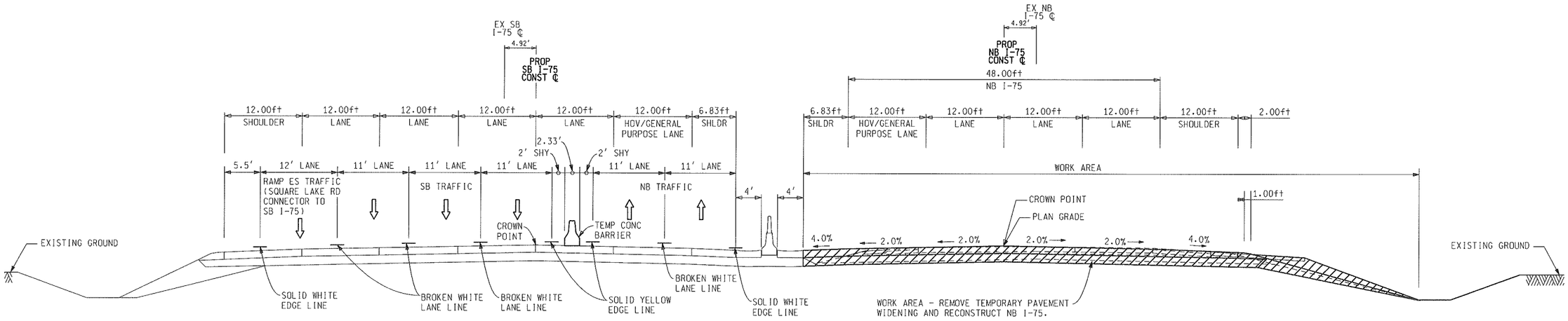

STAGE 5 MAINTAINING TRAFFIC TYPICAL 1

SEGMENT 5

POB TO RAMP ES (SQUARE LAKE RD CONNECTOR TO SB I-75)

FIGURE 4-66
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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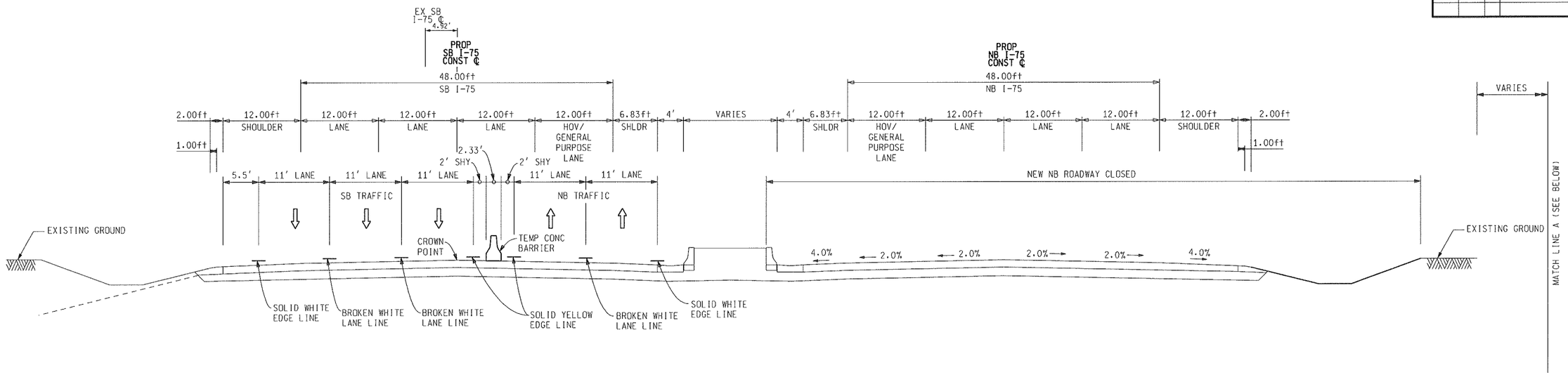

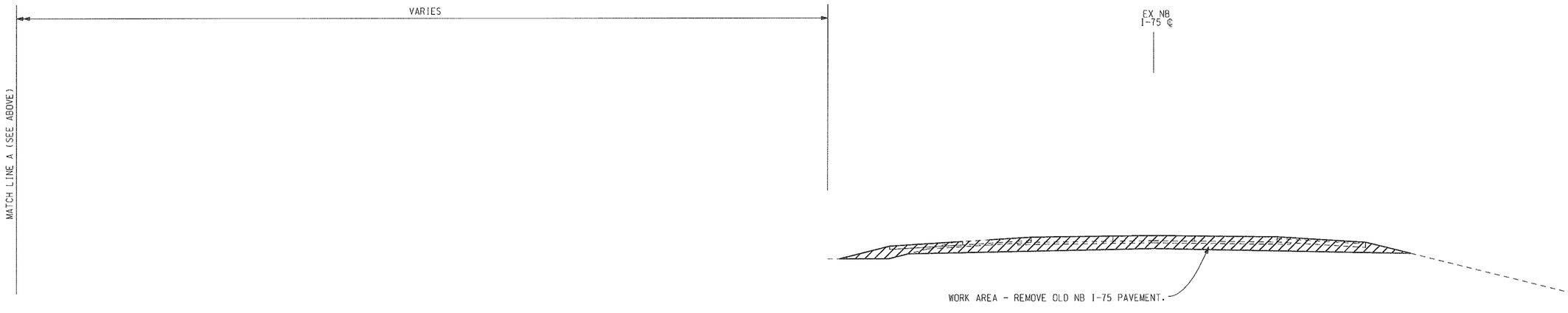

STAGE 5 MAINTAINING TRAFFIC TYPICAL 2

SEGMENT 5
RAMP ES (SQUARE LAKE RD CONNECTOR TO SB I-75) TO
RAMP SW (SB I-75 TO SQUARE LAKE RD CONNECTOR)

FIGURE 4-67
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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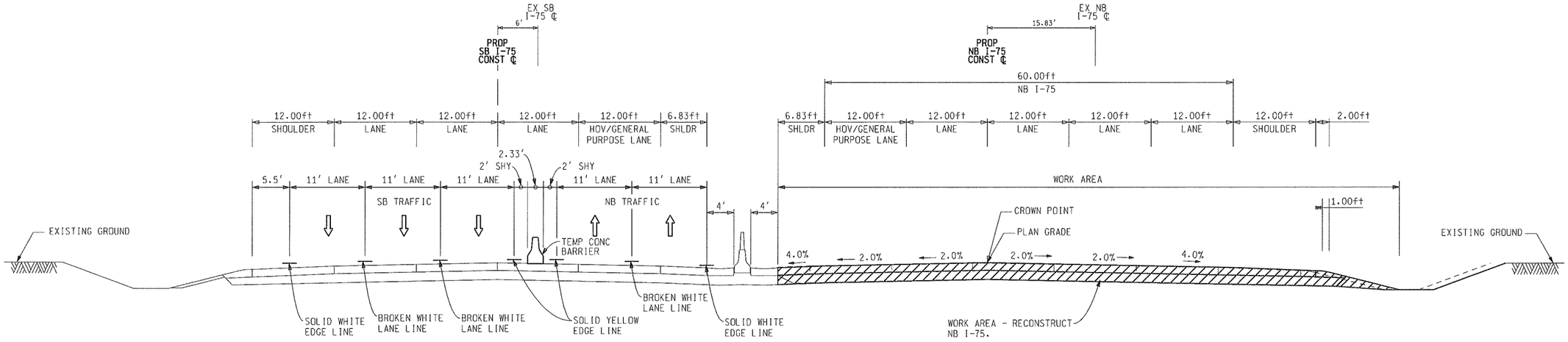

STAGE 5 MAINTAINING TRAFFIC TYPICAL 3

SEGMENT 5
RAMP SW (SB I-75 TO SQUARE LAKE RD CONNECTOR) TO POE

FIGURE 4-68
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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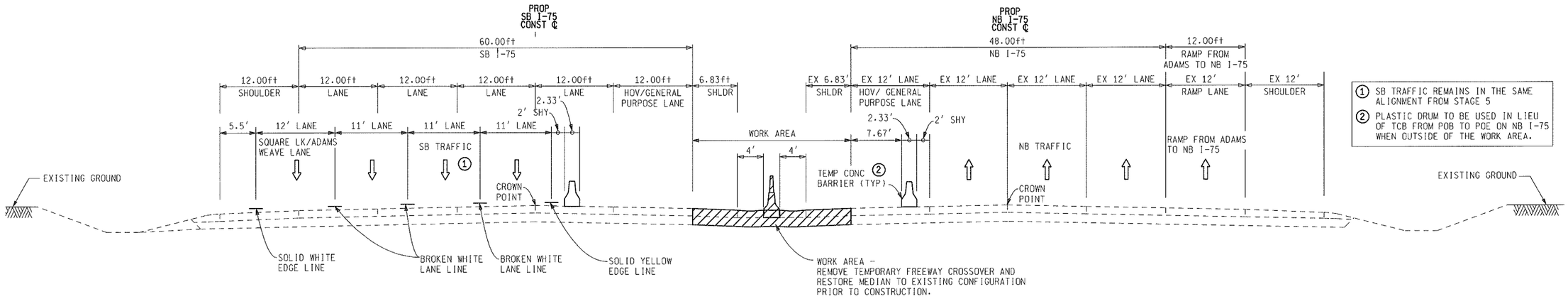
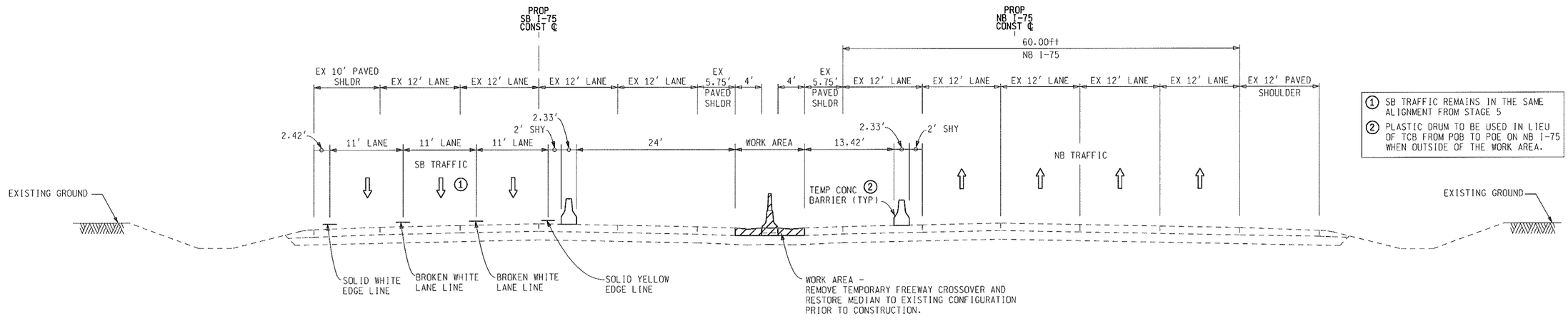


STAGE 6 MAINTAINING TRAFFIC TYPICAL 1
SEGMENT 5
SOUTH OF POB (AT FREEWAY CROSSOVER)



STAGE 6 MAINTAINING TRAFFIC TYPICAL 2
SEGMENT 5
NORTH OF POE (AT FREEWAY CROSSOVER)

FIGURE 4-69
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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4.14.3.3 Alternative 3: Two Lane Operation Minimum in Each Direction of I-75

Alternative 3 involves construction of one direction of I-75 while maintaining a minimum of two NB lanes and two SB lanes in the other direction using temporary freeway crossovers.

Staging for Segments 1 through 4 is described below. The staging assumes that each segment is constructed separately from each other. The same concepts will apply even if the segments are divided into fewer contracts. However, construction of consecutive interchanges and staging of the ramp closures will need to be further evaluated.

Segments 1 through 4 (south of 12 Mile Road to north of Adams Road):

Stage 1 Construction:
- Construct temporary pavement widening on the outside of the SB I-75 roadway within the segment(s).
- Remove all bridges carrying local roadways over I-75 within the segment(s) due to location of existing piers.

Stage 1 Traffic:
- Close right lane of SB I-75 as shown on **Figure 4-70**.
- Close local roadway traffic over I-75 due to closure of bridges carrying local traffic over I-75.

Stage 2 Construction:
- Construct temporary pavement widening on the outside of the SB I-75 roadway within the segment(s).
- Construct temporary bridge widening on the outside of S03-2 (12 Mile Road) and the median side of B02-2 (Red Run Drain) – applies to Segment 1 only.
- Construct temporary freeway and ramp crossovers within the segment(s).

Stage 2 Traffic:
- Close left lane in each direction of I-75 as shown on **Figures 4-71** and **4-72.**

Stage 3 Construction:
- Reconstruct full width of NB I-75 roadway within the segment(s), including median barrier and both valley gutters.
- Reconstruct all NB I-75 ramps within the segment(s).
- Reconstruct all bridges carrying NB I-75 traffic over local roadways/waterways within the segment(s).
- Reconstruct all bridges carrying local roadways over I-75, within the segment(s).

Stage 3 Traffic:
- Maintain two NB lanes and two SB lanes on the SB roadway using temporary freeway crossovers as shown in **Figure 4-73**.
- Close all NB I-75 ramps within the segment(s) under construction.
- Refer to discussion of Stage 3 traffic schemes for locations of temporary crossovers and additional ramp closure details for Segments 1 through 4.
- Refer to **Figure 4-74** for short term night or weekend closures of I-75 for bridge demolition work on bridges carrying local traffic over I-75. This applies to Segments 1, 3 and 4.

Stage 4 Construction:
- Set up traffic switch for Stage 5.
- Construct temporary ramp crossovers as needed.

Stage 4 Traffic:
- Maintain two SB lanes on the SB roadway (set up from Stage 3) as shown in **Figures 4-75** and **4-76**.
- Maintain three NB lanes on the NB roadway (set up for Stage 5) as shown in Figures 4-75 and 4-76.
- Open all NB I-75 ramps (with exception of some entrance ramps).

Stage 5 Construction:
- Reconstruct full width of SB I-75 roadway within the segment(s).
- Reconstruct all SB I-75 ramps within the segment(s).
- Reconstruct all bridges carrying SB I-75 traffic over local roadways/waterways within the segment(s).
- Reconstruct all local roadways under I-75 within the segment(s).

Stage 5 Traffic:
- Maintain three NB lanes and two SB lanes on the NB roadway using temporary freeway crossovers as shown on Figure 4-59.
- Close all SB I-75 ramps within the segment(s) under construction.
- Open all local roadway traffic over I-75.
- Local roadways under I-75 to be further investigated for full closure or part-width construction after local agency input.
- Refer to discussion of Stage 5 traffic schemes for locations of temporary crossovers and additional ramp closure details for Segments 1 through 4.

Stage 6 Construction:
- Remove temporary freeway crossovers.
- Restore existing freeway section outside the limits of the work area to existing configuration prior to construction.
- Construct permanent median barrier and valley gutters gapped out in previous stages.

Stage 6 Traffic:
- Maintain three NB lanes and three SB lanes in their respective roadways as shown in Figures 4-60 and 4-61.
- Open all ramps.

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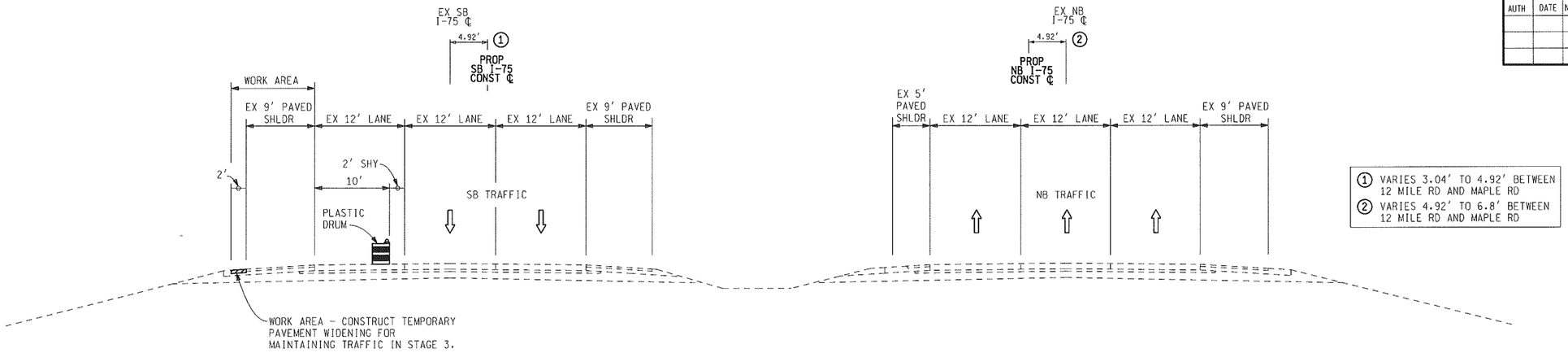
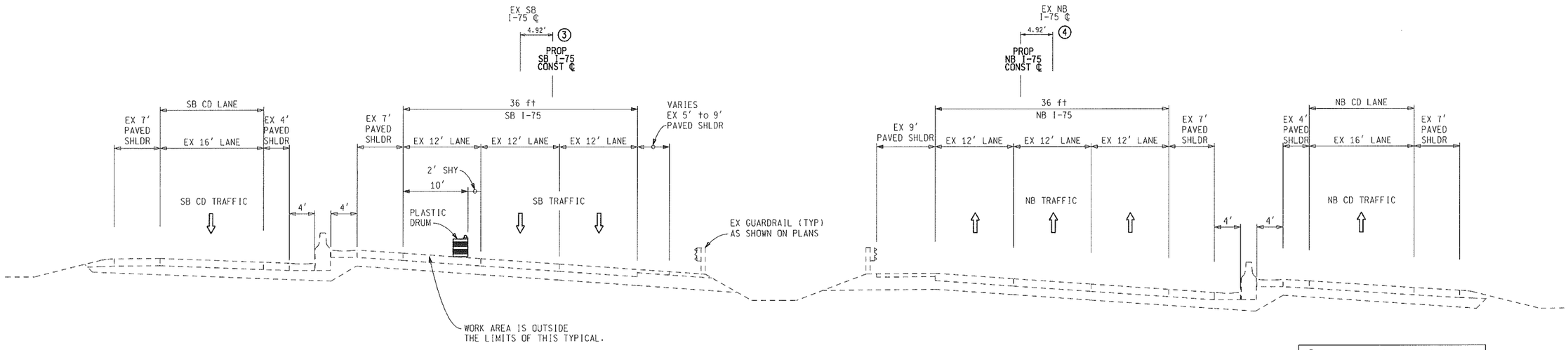


STAGE 1 MAINTAINING TRAFFIC TYPICAL 1

SEGMENTS 1 THROUGH 4
POB TO POE
(EXCEPT AT BIG BEAVER RD)



STAGE 1 MAINTAINING TRAFFIC TYPICAL 2

SEGMENT 3
AT BIG BEAVER RD

FIGURE 4-70
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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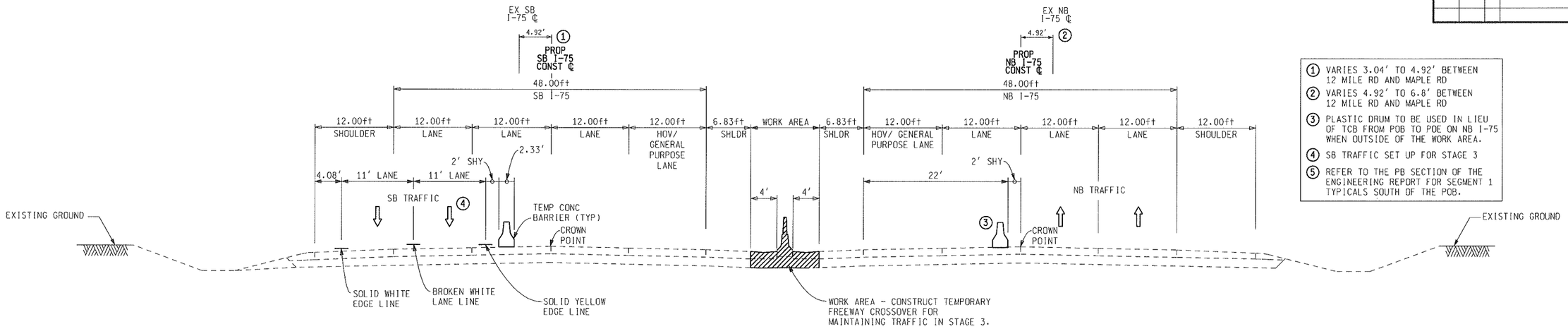
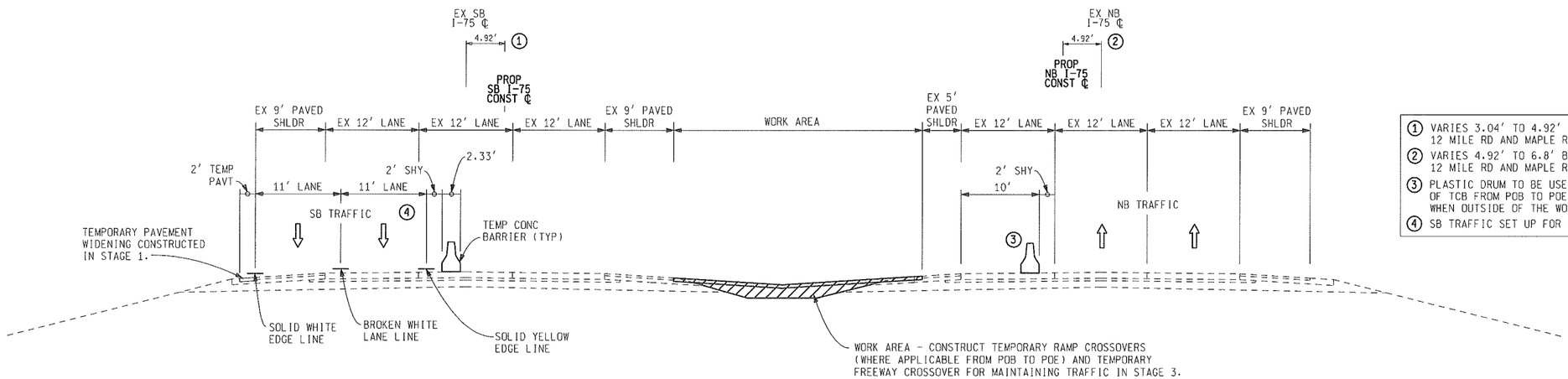


1. VARIES 3.04′ TO 4.92′ BETWEEN 12 MILE RD AND MAPLE RD
2. VARIES 4.92′ TO 6.8′ BETWEEN 12 MILE RD AND MAPLE RD
3. PLASTIC DRUM TO BE USED IN LIEU OF TCB FROM POB TO POE ON NB I-75 WHEN OUTSIDE OF THE WORK AREA.
4. SB TRAFFIC SET UP FOR STAGE 3
5. REFER TO THE PB SECTION OF THE ENGINEERING REPORT FOR SEGMENT 1 TYPICALS SOUTH OF THE POB.

STAGE 2 MAINTAINING TRAFFIC TYPICAL 1

SEGMENTS 2 THROUGH 4 ⑤
SOUTH OF POB (AT FREEWAY CROSSOVER)



1. VARIES 3.04′ TO 4.92′ BETWEEN 12 MILE RD AND MAPLE RD
2. VARIES 4.92′ TO 6.8′ BETWEEN 12 MILE RD AND MAPLE RD
3. PLASTIC DRUM TO BE USED IN LIEU OF TCB FROM POB TO POE ON NB I-75 WHEN OUTSIDE OF THE WORK AREA.
4. SB TRAFFIC SET UP FOR STAGE 3

STAGE 2 MAINTAINING TRAFFIC TYPICAL 2

SEGMENTS 1 THROUGH 4
POB TO POE (AT RAMP CROSSOVERS) AND
NORTH OF POE (AT FREEWAY CROSSOVER)

FIGURE 4-71
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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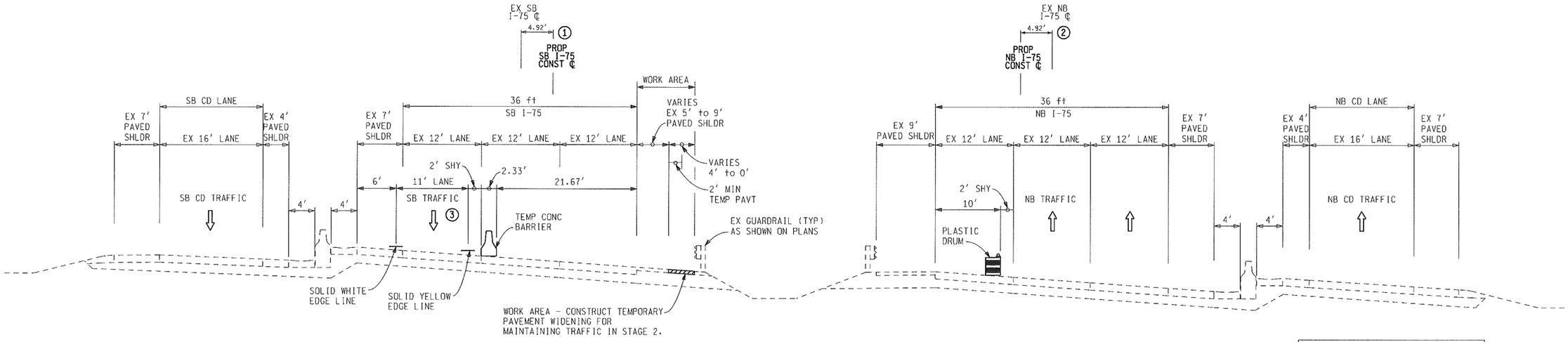

1. VARIES 4.92′ TO 7.92′ BETWEEN LIVERNOIS RD AND BIG BEAVER RD
2. VARIES 4.92′ TO 1.92′ BETWEEN LIVERNOIS RD AND BIG BEAVER RD
3. SB TRAFFIC SET UP FOR STAGE 3

STAGE 2 MAINTAINING TRAFFIC TYPICAL 3

SEGMENT 3
AT BIG BEAVER RD

FIGURE 4-72
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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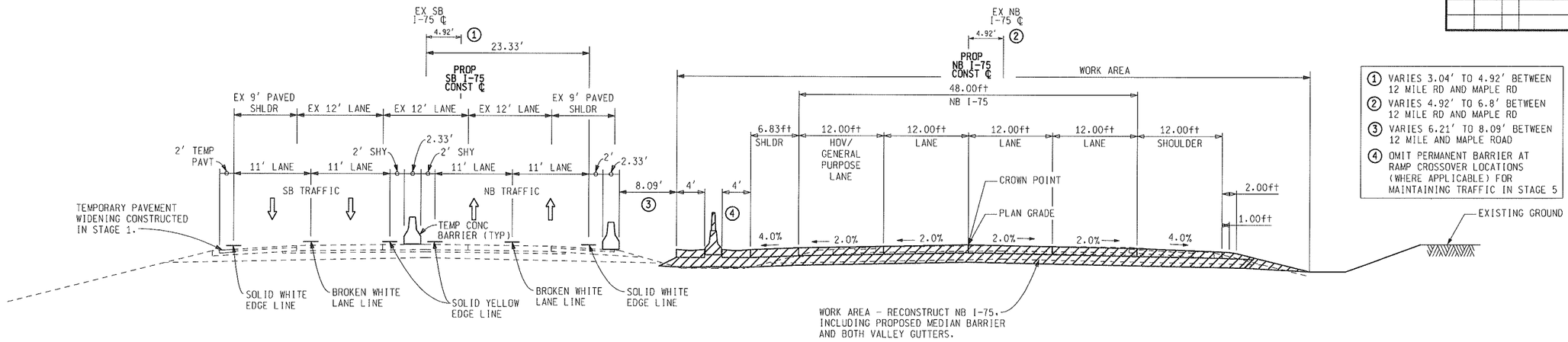
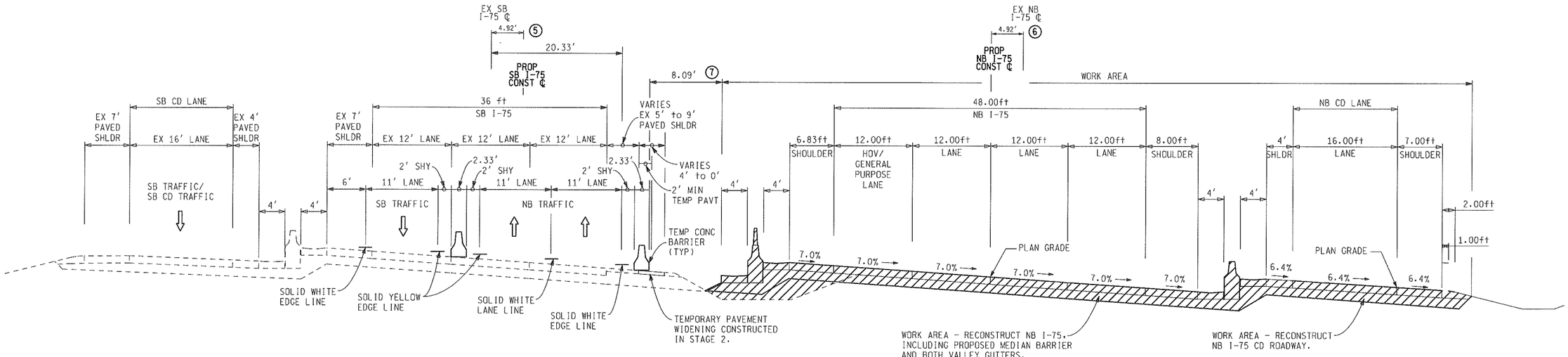


① VARIES 3.04′ TO 4.92′ BETWEEN 12 MILE RD AND MAPLE RD
② VARIES 4.92′ TO 6.8′ BETWEEN 12 MILE RD AND MAPLE RD
③ VARIES 6.21′ TO 8.09′ BETWEEN 12 MILE AND MAPLE ROAD
④ OMIT PERMANENT BARRIER AT RAMP CROSSOVER LOCATIONS (WHERE APPLICABLE) FOR MAINTAINING TRAFFIC IN STAGE 5

STAGE 3 MAINTAINING TRAFFIC TYPICAL 1

SEGMENTS 1 THROUGH 4
POB TO POE
(EXCEPT AT BIG BEAVER RD)



⑤ VARIES 4.92′ TO 7.92′ BETWEEN LIVERNOIS RD AND BIG BEAVER RD
⑥ VARIES 4.92′ TO 1.92′ BETWEEN LIVERNOIS RD AND BIG BEAVER RD
⑦ VARIES 8.09′ TO 11.09′ BETWEEN LIVERNOIS RD AND BIG BEAVER RD

STAGE 3 MAINTAINING TRAFFIC TYPICAL 2

SEGMENT 3
AT BIG BEAVER RD

FIGURE 4-73
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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SEGMENT 1 - 4, S. OF 12 MILE TO N. OF ADAMS

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
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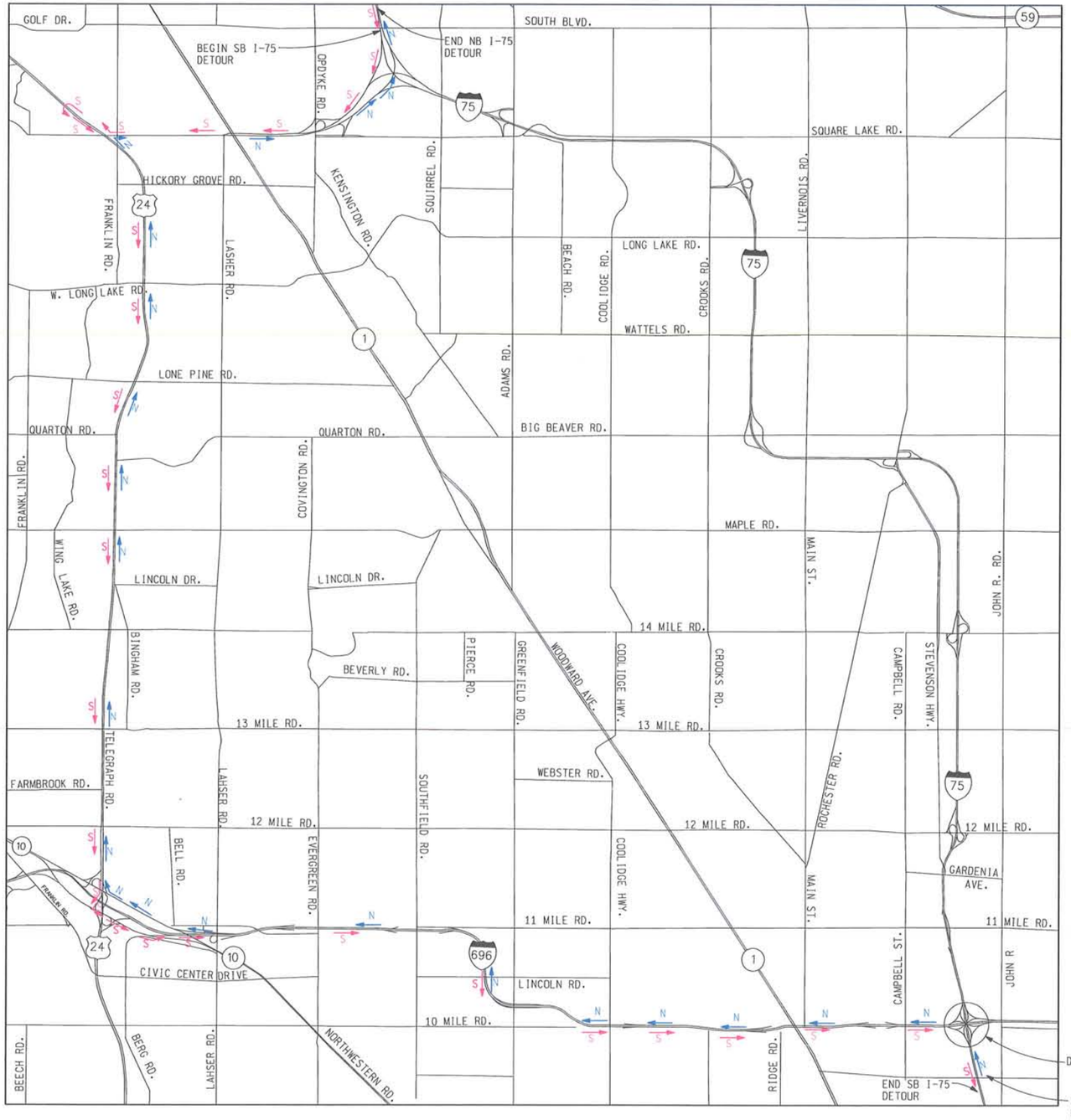
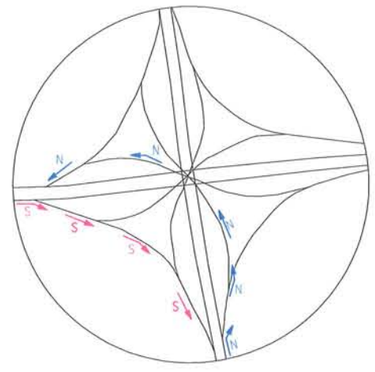


I-75 DETOUR PLAN



DETAIL 1
I-75/I-696 INTERCHANGE

LEGEND

NB I-75 DETOUR

SB I-75 DETOUR

FIGURE 4-74
ALT 3: FREEWAY DETOUR PLAN FOR I-75
FOR BRIDGE DEMOLITION WORK

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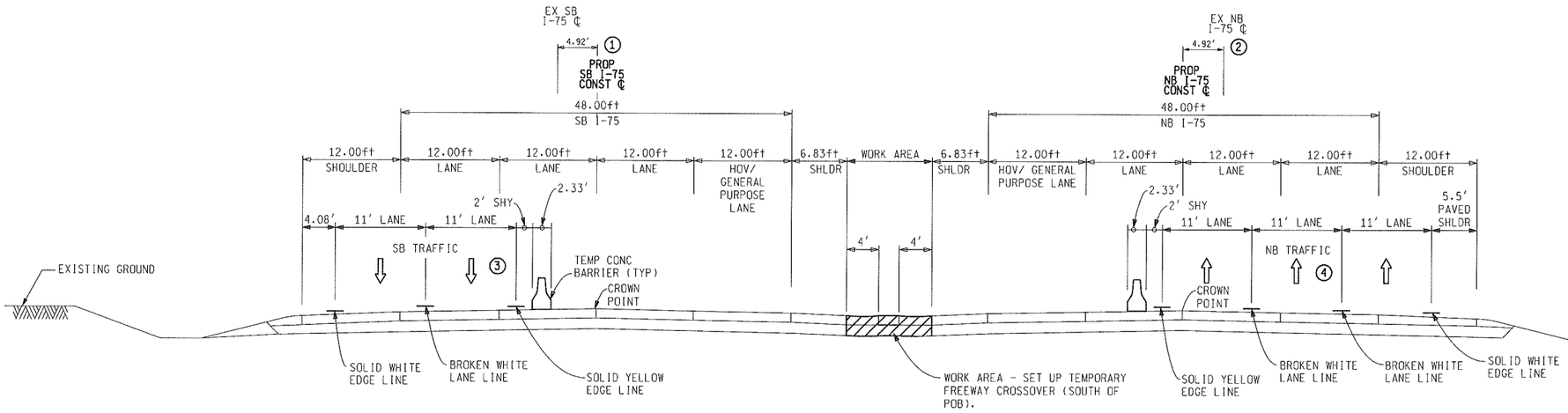
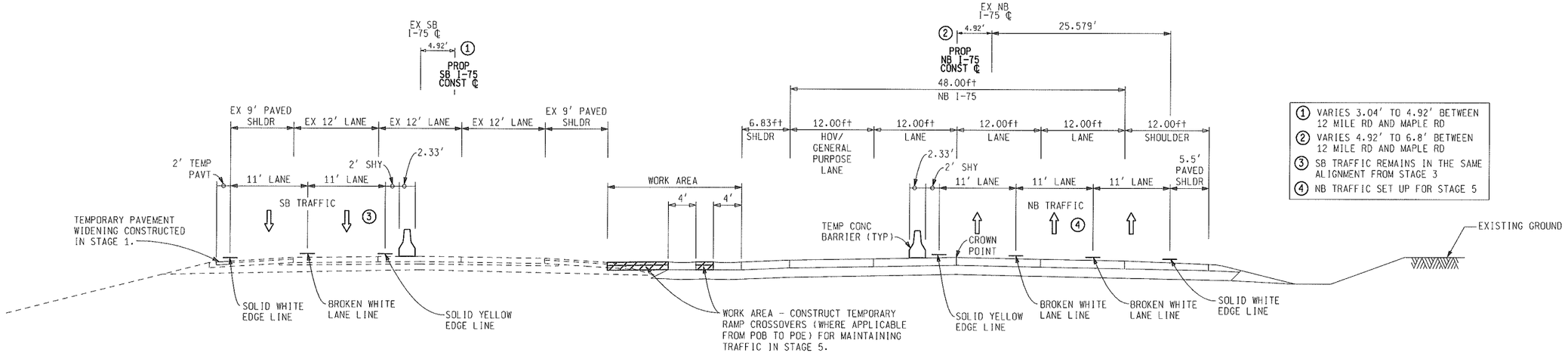


1. VARIES 3.04′ TO 4.92′ BETWEEN 12 MILE RD AND MAPLE RD
2. VARIES 4.92′ TO 6.8′ BETWEEN 12 MILE RD AND MAPLE RD
3. SB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 3
4. NB TRAFFIC SET UP FOR STAGE 5
5. REFER TO THE PB SECTION OF THE ENGINEERING REPORT FOR SEGMENT 1 TYPICALS SOUTH OF THE POB.

STAGE 4 MAINTAINING TRAFFIC TYPICAL 1

SEGMENTS 2 THROUGH 4 ⑤
SOUTH OF POB (AT FREEWAY CROSSOVER)



1. VARIES 3.04′ TO 4.92′ BETWEEN 12 MILE RD AND MAPLE RD
2. VARIES 4.92′ TO 6.8′ BETWEEN 12 MILE RD AND MAPLE RD
3. SB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 3
4. NB TRAFFIC SET UP FOR STAGE 5

STAGE 4 MAINTAINING TRAFFIC TYPICAL 2

SEGMENTS 1 THROUGH 4
POB TO POE (AT RAMP CROSSOVERS)

FIGURE 4-75
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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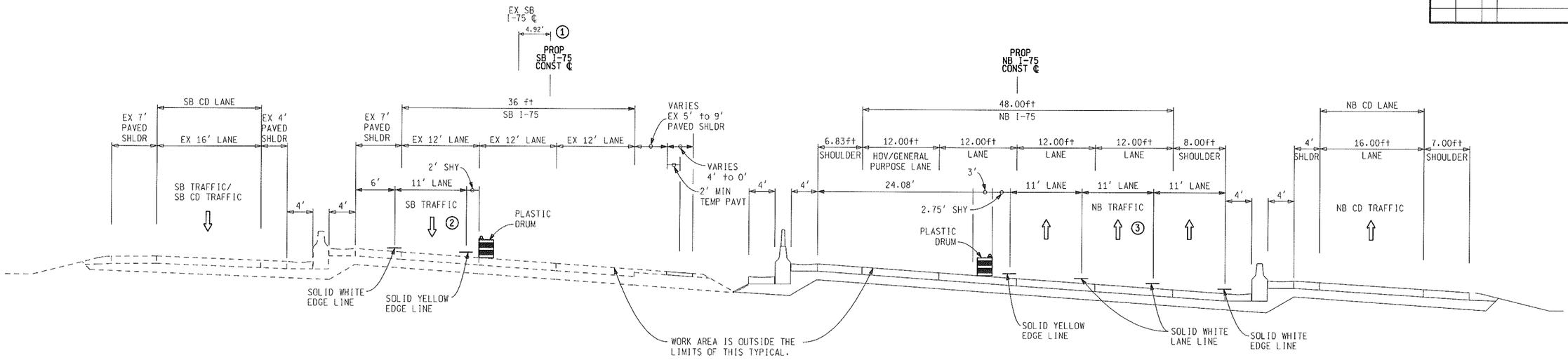
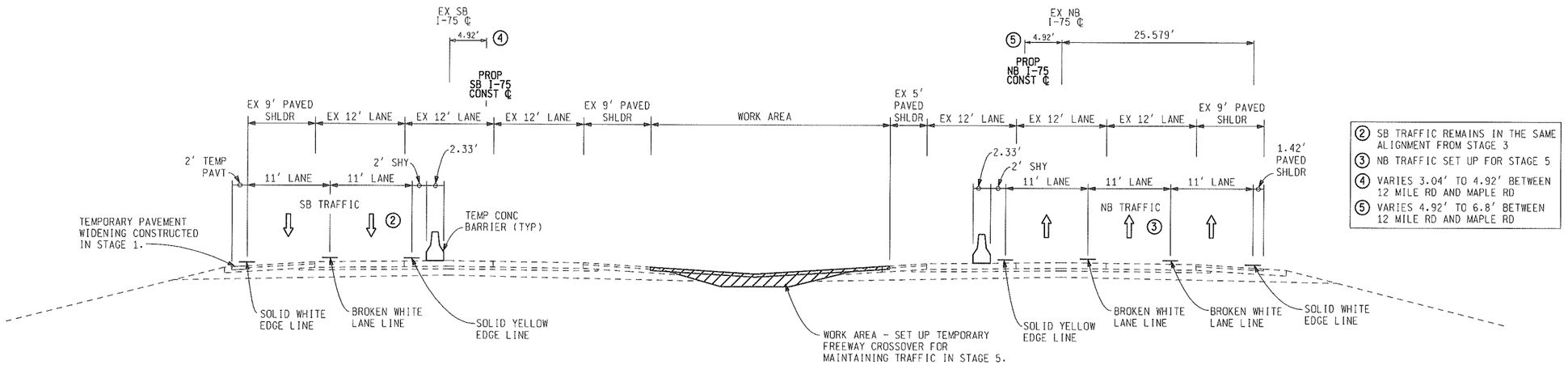


1. VARIES 4.92' TO 7.92' BETWEEN LIVERNOIS RD AND BIG BEAVER RD
2. SB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 3
3. NB TRAFFIC SET UP FOR STAGE 5

STAGE 4 MAINTAINING TRAFFIC TYPICAL 3

SEGMENT 3
AT BIG BEAVER RD



2. SB TRAFFIC REMAINS IN THE SAME ALIGNMENT FROM STAGE 3
3. NB TRAFFIC SET UP FOR STAGE 5
4. VARIES 3.04' TO 4.92' BETWEEN 12 MILE RD AND MAPLE RD
5. VARIES 4.92' TO 6.8' BETWEEN 12 MILE RD AND MAPLE RD

STAGE 4 MAINTAINING TRAFFIC TYPICAL 4

SEGMENTS 1 THROUGH 4
NORTH OF POE (AT FREEWAY CROSSOVER)

FIGURE 4-76
ALT 3: TWO LANE OPERATION USING CROSSOVERS
STAGE CONSTRUCTION TYPICALS

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Discussion of Traffic Schemes for Stage 3 and Stage 5:
Schemes are included for Stage 3 and 5 for each segment since these stages have the most ramp, roadway, and bridge closures, resulting in the greatest impact to mobility in this alternative. Traffic simulation was performed on Stage 3 and Stage 5 for purposes of this report.

Some ramp closures in Stage 3 and 5 may apply to Stage 1, 2, 4 and 6. However, these stages do not involve traffic being crossed over, have less ramp closures when compared to Stage 3 and 5, and have a shorter duration than Stage 3 and 5.

Segment 1 (south of 12 Mile Road to north of 13 Mile Road):
Construction of Segment 1 is shown on **Figure 4-77**.

Stage 3 Traffic:
Stage 3 traffic schemes are shown on **Figures 4-78** and **4-79**. Segment 1, to be combined with details developed with the southern section of I-75 from I-696 to south of 12 Mile Road.

Location of southern crossover: south of the northern I-696 ramps (coordination with southern I-75 project)
- Right lane of NB I-75 closed south of crossover.

Location of northern crossover: south of 14 Mile Road
- Left lane of SB I-75 closed north of 14 Mile Road.

Ramp and Roadway Closures and Detours:
- **NB I-75 to 12 Mile Road**
  Post detour for NB I-75 traffic to exit at 14 Mile Road; EB traffic to exit onto EB 14 Mile and go south on John R to 12 Mile Road; WB traffic to exit onto WB 14 Mile and go south on Stephenson Highway to 12 Mile Road.

- **EB 12 Mile Road to NB I-75**
  Post detour for EB 12 Mile Road traffic to go north on Stephenson Highway, east on 14 Mile Road, and take the ramp from EB 14 Mile Road to NB I-75.

- **WB 12 Mile Road to NB I-75**
  Post detour for WB 12 Mile Road traffic to go north on John R, west on 14 Mile Road, and take the ramp from WB 14 Mile to NB I-75.

- **EB 12 Mile Road to SB I-75**
  Post detour for EB 12 Mile Road traffic to go south on Stephenson Highway, which becomes the SB I-75 service drive south of I-696, continue south across 9 Mile Road and take the ramp from 9 Mile Road to SB I-75.

- **WB 12 Mile Road to SB I-75**
  Post detour for WB 12 Mile Road traffic to go south on John R, west on 9 Mile Road, and take the ramp from 9 Mile Road to SB I-75.

- **SB I-75 to EB 14 Mile Road**
  This ramp serves SB I-75 traffic destined for Oakland Mall. Close ramp but maintain traffic via temporary left turn signal at the ramp from SB I-75 to WB 14 Mile Road.

- **12 Mile Road** – nights/weekends only (for bridge demo of NB I-75 bridge)
  Post detour to send traffic north to 13 Mile Road using Stephenson Highway to the west and John R to the east. Do not close 13 Mile at the same time.

- **13 Mile Road** – nights/weekends only (for bridge demo of NB I-75 bridge)
  Post detour to send traffic south to 12 Mile using Stephenson Highway to the west and John R to the east. Do not close 13 Mile Road at the same time.

- **NB I-75** – nights/weekends only (for bridge demo of P01 bridge)
  Post detour for NB I-75 traffic to go west on I-696, north on US-24, east on I-75 BL (Square Lake Road) and north on I-75, as shown on Figure 4-72.

- **SB I-75** – nights/weekends only (for bridge demo of P01 bridge)
  Post detour for SB I-75 traffic to go west on I-75 BL (Square Lake Road), south on US-24, east on I-696 and south on I-75, as shown on Figure 4-72.

Additional Stage 3 Traffic Notes:
- Stage 3 detours for Segment 1 assume the worst case scenario when combined with the southern section between I-696 and south of 12 Mile Road. It is assumed that the NB I-75 ramps at the 11 Mile interchange and the northern I-696 ramps are also closed
- Some ramp closure detours may need to be revised during night/weekend closures of 12 Mile Road or 13 Mile Road.
- Evaluate feasibility of maintaining pedestrian traffic on existing P01 (12 Mile Road walkover) structure while constructing the proposed P01 structure located south of the existing structure. The proposed P01 structure may need to be constructed as part of an advance contract if the existing structure must be removed during Stage 3 Construction.

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PB PORTION OF THE I-75 ENGINEERING REPORT

URS PORTION OF THE I-75 ENGINEERING REPORT

POB STA 828+50

STA 907+00

POE STA 999+00

N

RAMP FROM SB I-75 TO EB AND WB I-696

RAMP FROM 11 MILE TO SB I-75

P01 OF 63174
CONSTRUCT PROPOSED STRUCTURE SOUTH OF EXISTING STRUCTURE IN STAGE 3: REMOVE EXISTING STRUCTURE AFTER NEW STRUCTURE IS OPEN TO PEDESTRIAN TRAFFIC

RAMP A
RAMP FROM EB 12 MILE RD TO SB I-75 (RECONSTRUCT IN STAGE 5)

S03-2 OF 63174
REMOVE AND REPLACE STRUCTURE IN STAGE 5

RAMP F
RAMP FROM WB 12 MILE RD TO SB I-75 (RECONSTRUCT IN STAGE 5)

PROPOSED RAMP E
RAMP FROM SB I-75 TO 12 MILE RD (CONSTRUCT IN STAGE 5)

EXISTING RAMP E
RAMP FROM SB I-75 TO 12 MILE RD (REMOVE IN STAGE 5)

B02-2 OF 63174
REMOVE AND REPLACE STRUCTURE IN STAGE 5

FIGURE 4-78 & 4-80

FIGURE 4-79

FIGURE 4-81 & 4-82

FIGURE 4-83

STEPHENSON HWY

RAMP FROM SB I-75 TO 11 MILE

RAMP FROM 11 MILE TO NB I-75

S01 OF 63174

S02 OF 63174

S03-1 OF 63174
REMOVE AND REPLACE STRUCTURE IN STAGE 3

B02-1 OF 63174
REMOVE AND REPLACE STRUCTURE IN STAGE 5

STAGE 5 WORK AREA-RECONSTRUCT SB I-75

STAGE 3 WORK AREA-RECONSTRUCT NB I-75 INCLUDING PERMANENT MEDIAN BARRIER AND BOTH VALLEY GUTTERS

LOCATION OF STAGE 5 OPTION 2 RAMP CROSSOVER FOR RAMP FROM 14 MILE TO SB I-75

S04-2 OF 63174
REMOVE AND REPLACE STRUCTURE IN STAGE 5

S04-1 OF 63174
REMOVE AND REPLACE STRUCTURE IN STAGE 3

RAMP C
RAMP FROM 14 MILE RD TO SB I-75

RAMP E
RAMP FROM SB I-75 TO EB 14 MILE RD

S05-2 OF 63174

RAMP D
RAMP FROM SB I-75 TO WB 14 MILE RD

I-75

S05-1 OF 63174

LOCATION OF STAGE 5 OPTION 2 NORTHERN FREEWAY CROSSOVER (TO MAINTAIN RAMP CROSSOVER FOR 14 MILE TRAFFIC TO SB I-75)

RAMP FROM NB I-75 TO 11 MILE

RAMPS FROM EB AND WB I-696 TO NB I-75

LOCATION OF SOUTHERN FREEWAY CROSSOVER IN STAGE 3 AND 5

RAMP B
RAMP FROM NB I-75 TO 12 MILE RD (RECONSTRUCT IN STAGE 3)

RAMP C
RAMP FROM EB 12 MILE RD TO NB I-75 (RECONSTRUCT IN STAGE 3)

STAGE 5 WORK AREA-RECONSTRUCT 12 MILE ROAD

RAMP D
RAMP FROM WB 12 MILE RD TO NB I-75 (RECONSTRUCT IN STAGE 3)

STAGE 3 WORK AREA-

LOCATION OF NORTHERN FREEWAY CROSSOVER IN STAGE 3 AND LOCATION OF STAGE 5 OPTION 1 NORTHERN FREEWAY CROSSOVER.

RAMP A
RAMP FROM NB I-75 TO EB 14 MILE RD

RAMP F
RAMP FROM NB I-75 TO WB 12 MILE RD

RAMP B
RAMP FROM 14 MILE RD TO NB I-75

STA 889+00

STA 945+00

STA 996+00

STA 992+00 (STAGE 3)

STA 1041+00

STA 1037+00 (STAGE 3)

STA 1082+00

LEGEND

SEGMENT 1 WORK AREA

I-696 GARDENIA 12 MILE RD RED RUN DRAIN 13 MILE RD 14 MILE RD

NOTE:

SEGMENT 1 IS ONE CONSTRUCTION CONTRACT FROM I-696 TO 13 MILE ROAD. THE PORTION BETWEEN I-696 AND STEPHENSON HIGHWAY (POB 828+50 TO STA 907+00) IS DISCUSSED IN GREATER DETAIL IN THE PB ENGINEERING REPORT.

NOTE: FREEWAY CLOSURE OF NB AND SB I-75 MAY BE REQUIRED FOR BRIDGE DEMOLITION WORK ON THE BRIDGES BETWEEN I-696 AND 12 MILE ROAD. SEE FREEWAY DETOUR PLAN ON SHEET 46.

FIGURE 4-77
ALT 3: TWO LANE OPERATION USING CROSSOVERS
SEGMENT 1 COVER SHEET

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SEGMENT 1, S. OF 12 MILE TO N. OF 13 MILE

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GARDENIA

12 MILE RD

RED RUN DRAIN

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PB PORTION OF THE ENGINEERING REPORT

URS PORTION OF THE ENGINEERING REPORT

I-75

SEE STAGE 3 OF THE PB PORTION OF THE ENGINEERING REPORT FOR CONTINUATION OF TRAFFIC CONTROL TO I-696

TO WB I-696 SERVICE DR

FROM EB I-696 SERVICE DR

MAINTAIN 2 LANES OF NB TRAFFIC AND 2 LANES OF SB TRAFFIC ON THE SB ROADWAY

STEPHENSON HWY

SO1 OF 63174
SEE PB PORTION OF ENGINEERING REPORT

SO2 OF 63174
SEE PB PORTION OF ENGINEERING REPORT

SO3-2 OF 63174
EXISTING STRUCTURE TO BE REMOVED AND REPLACED IN STAGE 5

SEE NOTE (2)

RAMP A
RAMP FROM EB 12 MILE RD TO SB I-75 (CLOSED)

TEMPORARY BRIDGE WIDENING ON OUTSIDE OF SO3-2 CONSTRUCTED IN STAGE 1

TEMPORARY WIDENING ALONG THE OUTSIDE OF SB I-75 CONSTRUCTED IN STAGE 1

RAMP F
RAMP FROM WB 12 MILE RD TO SB I-75 (CLOSED)

RAMP E
RAMP FROM SB I-75 TO 12 MILE RD (OPEN)

BO2-2 OF 63174
EXISTING STRUCTURE TO BE REMOVED AND REPLACED IN STAGE 5

TEMPORARY BRIDGE WIDENING ON MEDIAN OF BO2-2 CONSTRUCTED IN STAGE 2

SEE NOTE (1)

PO1 OF 63174
WORK AREA-
CONSTRUCT PROPOSED NEW STRUCTURE

PO1 OF 63174
WORK AREA-
REMOVE EXISTING STRUCTURE AFTER PROPOSED STRUCTURE IS OPEN TO PEDESTRIAN TRAFFIC

SEE NOTE (3)

STA 907+00

WORK AREA - RECONSTRUCT RAMP B

WORK AREA - RECONSTRUCT RAMP D

RAMP D
RAMP FROM WB 12 MILE RD TO NB I-75 (CLOSED)

RAMP B
RAMP FROM NB I-75 TO 12 MILE RD (CLOSED)

BO2-1 OF 63174
WORK AREA-
REMOVE AND REPLACE STRUCTURE

SO3-1 OF 63174
WORK AREA-
REMOVE AND REPLACE STRUCTURE

WORK AREA - RECONSTRUCT RAMP C

RAMP C
RAMP FROM EB 12 MILE RD TO NB I-75 (CLOSED)

WORK AREA - RECONSTRUCT NB I-75 ROADWAY, INCLUDING PROPOSED MEDIAN BARRIER AND BOTH VALLEY GUTTERS.

I-75

SHEETS ARE NOT PROVIDED BETWEEN STA 945+00 AND STA 996+00 TRAFFIC CONTROL CONTINUES AS SHOWN

LEGEND

- WORK AREA
- NB I-75 TRAFFIC
- SB I-75 TRAFFIC

(1) MAINTAIN 2' MINIMUM SHY DISTANCE TO TEMPORARY OR PERMANENT CONCRETE BARRIER UNLESS NOTED OTHERWISE.

MAINTAIN 2' MINIMUM PAVED OUTSIDE SHOULDER FOR SB TRAFFIC WITHIN THE WORK AREA.

(2) SHORT TERM CLOSURE OF 12 MILE RD MAY BE REQUIRED FOR BRIDGE DEMOLITION WORK.

(3) SEGMENT 1 INCLUDES POB STA 828+50 (NORTH OF I-696) TO STA 907+00, COVERED IN THE PB PORTION OF THE ENGINEERING REPORT. SEE STAGE 3 OF THE PB PORTION OF THE ENGINEERING REPORT FOR CONTINUATION OF TRAFFIC CONTROL TO I-696, LOCATION OF THE SOUTHERN FREEWAY CROSSOVER, AND LOCATION OF THE RIGHT LANE CLOSURE ON NB I-75.

12 MILE RD

RED RUN DRAIN

GARDENIA

FIGURE 4-78
ALT 3: STAGE 3 MAINTAINING TRAFFIC
I-75 STA 889+00 TO STA 945+00

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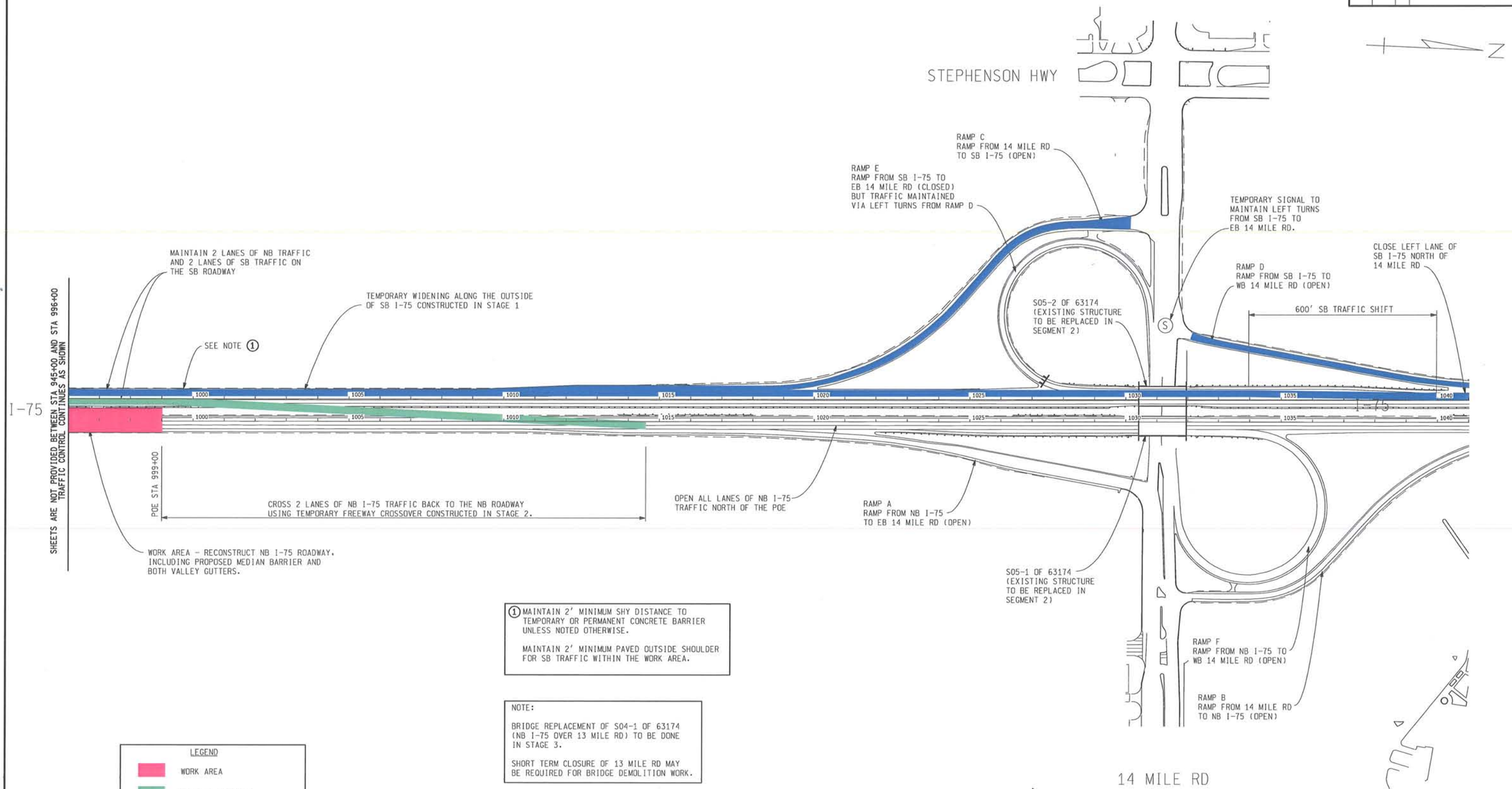

1 MAINTAIN 2' MINIMUM SHY DISTANCE TO TEMPORARY OR PERMANENT CONCRETE BARRIER UNLESS NOTED OTHERWISE.

MAINTAIN 2' MINIMUM PAVED OUTSIDE SHOULDER FOR SB TRAFFIC WITHIN THE WORK AREA.

NOTE:

BRIDGE REPLACEMENT OF S04-1 OF 63174 (NB I-75 OVER 13 MILE RD) TO BE DONE IN STAGE 3.

SHORT TERM CLOSURE OF 13 MILE RD MAY BE REQUIRED FOR BRIDGE DEMOLITION WORK.

LEGEND

- WORK AREA
- NB I-75 TRAFFIC
- SB I-75 TRAFFIC

FIGURE 4-79
ALT 3: STAGE 3 MAINTAINING TRAFFIC
I-75 STA 996+00 TO STA 1041+00

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Stage 5 Traffic:
Stage 5 traffic schemes are shown on **Figures 4-80** through **4-83**

Location of southern crossover: south of the northern I-696 ramps (same as Stage 3)
- No lane closures on NB I-75 south of crossover

Location of northern crossover:
- Option 1: south of 14 Mile Road (same as Stage 3)
- Option 2: north of 14 Mile Road (to maintain ramp from 14 Mile to SB I-75)

- Right lane of SB I-75 closed north of 14 Mile Road for both options

Ramp Closures and Detours:
- **NB I-75 to 12 Mile Road** - limited time only (during reconstruction of 12 Mile Road); open once 14 Mile Road reconstruction is complete.
  Same detour as Stage 3.

- **EB 12 Mile Road to NB I-75** - limited time only (during reconstruction of 12 Mile Road); open once 14 Mile Road reconstruction is complete.
  Same detour as Stage 3.

- **WB 12 Mile Road to NB I-75** - limited time only (during reconstruction of 12 Mile Road); open once 14 Mile Road reconstruction is complete.
  Same detour as Stage 3.

- **EB 12 Mile Road to SB I-75** – same detour as Stage 3.

- **WB 12 Mile Road to SB I-75** – same detour as Stage 3.

- **SB I-75 to 12 Mile Road**
  Post detour for SB I-75 traffic to exit at 14 Mile; EB traffic to exit onto EB 14 Mile Road and go south on John R to 12 Mile Road; WB traffic to exit onto WB 14 Mile Road and go south on Stephenson Highway to 12 Mile Road.

- **14 Mile Road to SB I-75** (for Option 1 location of northern crossover only)
  Post detour for 14 Mile Road traffic to go south on John R, west on 9 Mile Road, and take the ramp from 9 Mile Road to SB I-75.

- **NB I-75 to WB 14 Mile Road** (for Option 2 location of northern crossover only)
  Close ramp but maintain traffic via temporary left turn signal at the ramp from NB I-75 to EB 14 Mile Road.

- **12 Mile Road** – nights/weekends only (for bridge demo of SB I-75 bridge)
  Same detour as Stage 3.

- **13 Mile Road** – nights/weekends only (for bridge demo of SB I-75 bridge)
  Same detour as Stage 3.

Additional Stage 5 Traffic Notes:
- Stage 5 detours for Segment 1 assume the worst case scenario when combined with the southern section between I-696 and south of 12 Mile Road. It is assumed that the SB I-75 ramps at the 11 Mile interchange and the northern I-696 ramps are also closed.
- Some ramp closure detours may need to be revised during night/weekend closures of 12 Mile Road or 13 Mile Road.
- Reconstruction of 12 Mile Road may be accomplished using part-width construction, full closure, or a combination of both. Grade differentials between existing and proposed 12 Mile Road pavement will need to be taken into account when considering maintaining traffic options.
  - Full closure will shorten the construction time but will impact businesses between Stephenson Highway and John R.
  - Part-width construction will allow 12 Mile Road through traffic to be maintained but will have limited ramp movements to and from I-75.

  These options have not been fully investigated since they require more detailed analysis of Alternative 3 and will require input from local agencies.
- Reconstruction of a portion of 13 Mile Road under I-75 is required due to removal of existing I-75 bridge piers and construction of proposed I-75 bridge piers. Reconstruction may be accomplished using full closure or part-width construction. These options have not been fully investigated since they require more detailed analysis of Alternative 3 and will require input from local agencies.
- A recommendation was not made between Option 1 and Option 2 for the location of the northern crossover in Stage 5 since ramp closure details for Stage 5 of the southern section are needed.

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GARDENIA

12 MILE RD

RED RUN DRAIN

PB PORTION OF THE ENGINEERING REPORT

URS PORTION OF THE ENGINEERING REPORT

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SEE STAGE 5 OF THE PB PORTION OF THE ENGINEERING REPORT FOR CONTINUATION OF TRAFFIC CONTROL TO I-696

I-75

TO WB I-696 SERVICE DR

FROM EB I-696 SERVICE DR

S01 OF 63174
SEE PB PORTION OF ENGINEERING REPORT

S02 OF 63174
SEE PB PORTION OF ENGINEERING REPORT

SEE NOTE (4)

STA 907+00

P01 OF 63174
NEW PED STRUCTURE CONSTRUCTED IN STAGE 3

WORK AREA - RECONSTRUCT 12 MILE RD
(OPTION 1 - PART WIDTH)
(OPTION 2 - FULL CLOSURE)
SEE NOTE (2)

STEPHENSON HWY

RAMP A
RAMP FROM EB 12 MILE RD TO SB I-75 (CLOSED)

WORK AREA - RECONSTRUCT RAMP A

S03-2 OF 63174
WORK AREA- REMOVE AND REPLACE STRUCTURE

RAMP F
RAMP FROM WB 12 MILE RD TO SB I-75 (CLOSED)

EXISTING RAMP E
RAMP FROM SB I-75 TO WB 12 MILE RD (CLOSED)

WORK AREA - REMOVE RAMP F.

WORK AREA - CONSTRUCT PROPOSED RAMP E

PROPOSED RAMP E
RAMP FROM SB I-75 TO 12 MILE RD (CLOSED)

B02-2 OF 63174
WORK AREA- REMOVE AND REPLACE STRUCTURE

EXISTING RAMP E
RAMP FROM SB I-75 TO 12 MILE RD (CLOSED)
SEE NOTE (3)

WORK AREA - REMOVE EXISTING RAMP E

WORK AREA - RECONSTRUCT SB I-75 ROADWAY

RAMP B
RAMP FROM NB I-75 TO 12 MILE RD (CLOSED FOR A LIMITED TIME DURING RAMP TERMINAL RECONSTRUCTION. OPEN ALL OTHER TIMES.)

RAMP C
RAMP FROM EB 12 MILE RD TO NB I-75 (REMAINS CLOSED FROM STAGE 3, MAY BE OPENED ONCE RECONSTRUCTION OF 12 MILE IS COMPLETED.)

RAMP D
RAMP FROM WB 12 MILE RD TO NB I-75 (CLOSED FOR A LIMITED TIME DURING RAMP TERMINAL RECONSTRUCTION, OPEN ALL OTHER TIMES.)

B02-1 OF 63174
STRUCTURE REMOVED AND REPLACED IN STAGE 3

S03-1 OF 63174
STRUCTURE REMOVED AND REPLACED IN STAGE 3

SEE NOTE (1)

MAINTAIN 3 LANES OF NB TRAFFIC AND 2 LANES OF SB TRAFFIC ON THE NB ROADWAY

SHEETS ARE NOT PROVIDED BETWEEN STA 945+00 AND STA 992+00
TRAFFIC CONTROL CONTINUES AS SHOWN

I-75

12 MILE RD

LEGEND

- WORK AREA
- CROSS ROAD WORK AREA
- NB I-75 TRAFFIC
- SB I-75 TRAFFIC

(1) MAINTAIN 2' MINIMUM SHY DISTANCE TO TEMPORARY OF PERMANENT CONCRETE BARRIER.

MAINTAIN 5.5' MINIMUM PAVED OUTSIDE SHOULDER FOR NB TRAFFIC WITHIN THE WORK AREA.

(2) IF PART WIDTH CONSTRUCTION IS CHOSEN FOR RECONSTRUCTION OF 12 MILE RD, SHORT TERM CLOSURE MAY STILL BE REQUIRED FOR BRIDGE DEMOLITION WORK.

(3) EVALUATE FEASIBILITY OF MAINTAINING A TEMPORARY RAMP CROSSOVER FOR EXISTING RAMP E (SB I-75 EXIT RAMP TO WB 12 MILE RD) AFTER 12 MILE RD HAS BEEN RECONSTRUCTED. MAINTAIN TEMPORARY LEFT TURNS FROM EXISTING RAMP E TO MAINTAIN SB I-75 TO EB 12 MILE RD TRAFFIC.

(4) SEGMENT 1 INCLUDES POB STA 828+50 (NORTH OF I-696) TO STA 907+00, COVERED IN THE PB PORTION OF THE ENGINEERING REPORT. SEE STAGE 5 OF THE PB PORTION OF THE ENGINEERING REPORT FOR CONTINUATION OF TRAFFIC CONTROL TO I-696, LOCATION OF THE SOUTHERN FREEWAY CROSSOVER, AND LOCATION OF THE TRAFFIC SHIFT ON NB I-75.

RED RUN DRAIN

GARDENIA

FIGURE 4-80
ALT 3: STAGE 5 MAINTAINING TRAFFIC
I-75 STA 889+00 TO STA 945+00

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SEGMENT 1, S. OF 12 MILE TO N. OF 13 MILE

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
12/2009	63174	88168C	DATTA		

DATE:

WORKED ON BY:

DATE:

CHECKED BY:

FILE NAME: seq1 st5s SHT 1.dgn

			FINAL R.O.W.
AUTH	DATE	NO.	REVISION

14 MILE RD

STEPHENSON HWY

RAMP C
RAMP FROM 14 MILE RD
TO SB I-75 (CLOSED)

RAMP E
RAMP FROM SB I-75 TO
EB 14 MILE RD (OPEN)

RAMP D
RAMP FROM SB I-75 TO
WB 14 MILE RD (OPEN)

S05-2 OF 63174
(EXISTING STRUCTURE
TO BE REPLACED IN
SEGMENT 2)

CLOSE RIGHT LANE OF
SB I-75 NORTH OF
14 MILE RD

WORK AREA - RECONSTRUCT SB I-75 ROADWAY

200'

542' SB BUFFER

CROSS 2 LANES OF SB I-75 TRAFFIC TO THE NB ROADWAY
USING TEMPORARY FREEWAY CROSSOVER CONSTRUCTED IN STAGE 2.

POE STA 999+00

I-75

995 1000 1005 1010 1015 1020 1025 1030 1035

I-75

SHEETS ARE NOT PROVIDED BETWEEN STA 945+00 AND STA 992+00
TRAFFIC CONTROL CONTINUES AS SHOWN

SEE NOTE (1)

260'

630' NB TRAFFIC SHIFT

OPEN ALL LANES OF NB I-75
TRAFFIC NORTH OF THE POE

RAMP A
RAMP FROM NB I-75 TO
EB 14 MILE RD (OPEN)

S05-1 OF 63174
(EXISTING STRUCTURE
TO BE REPLACED IN
SEGMENT 2)

RAMP F
RAMP FROM NB I-75 TO
WB 14 MILE RD (OPEN)

RAMP B
RAMP FROM 14 MILE RD
TO NB I-75 (OPEN)

MAINTAIN 3 LANES OF NB TRAFFIC AND
2 LANES OF SB TRAFFIC ON THE NB ROADWAY

(1) MAINTAIN 2' MINIMUM SHY DISTANCE TO
TEMPORARY OF PERMANENT CONCRETE BARRIER.

MAINTAIN 5.5' MINIMUM PAVED OUTSIDE SHOULDER
FOR NB TRAFFIC WITHIN THE WORK AREA.

NOTE:

BRIDGE REPLACEMENT OF S04-2 OF 63174
(SB I-75 OVER 13 MILE RD) TO BE DONE
IN STAGE 5.

SHORT TERM CLOSURE OF 13 MILE RD MAY
BE REQUIRED FOR BRIDGE DEMOLITION WORK.

EVALUATE 2 OPTIONS FOR RECONSTRUCTION OF
13 MILE ROAD UNDER I-75 TO BE DONE IN STAGE 5:
FULL CLOSURE OR PART-WIDTH CONSTRUCTION.

LEGEND

- WORK AREA
- NB I-75 TRAFFIC
- SB I-75 TRAFFIC

14 MILE RD

FIGURE 4-81
ALT 3: STAGE 5 MAINTAINING TRAFFIC (OPTION 1)
I-75 STA 992+00 TO STA 1037+00

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SEGMENT 1, S. OF 12 MILE TO N. OF 13 MILE

DATE	CONT. SEC.	JOB NO.	DESIGN UNIT	SHEET NO. R.O.W	SHEET NO. CONST.
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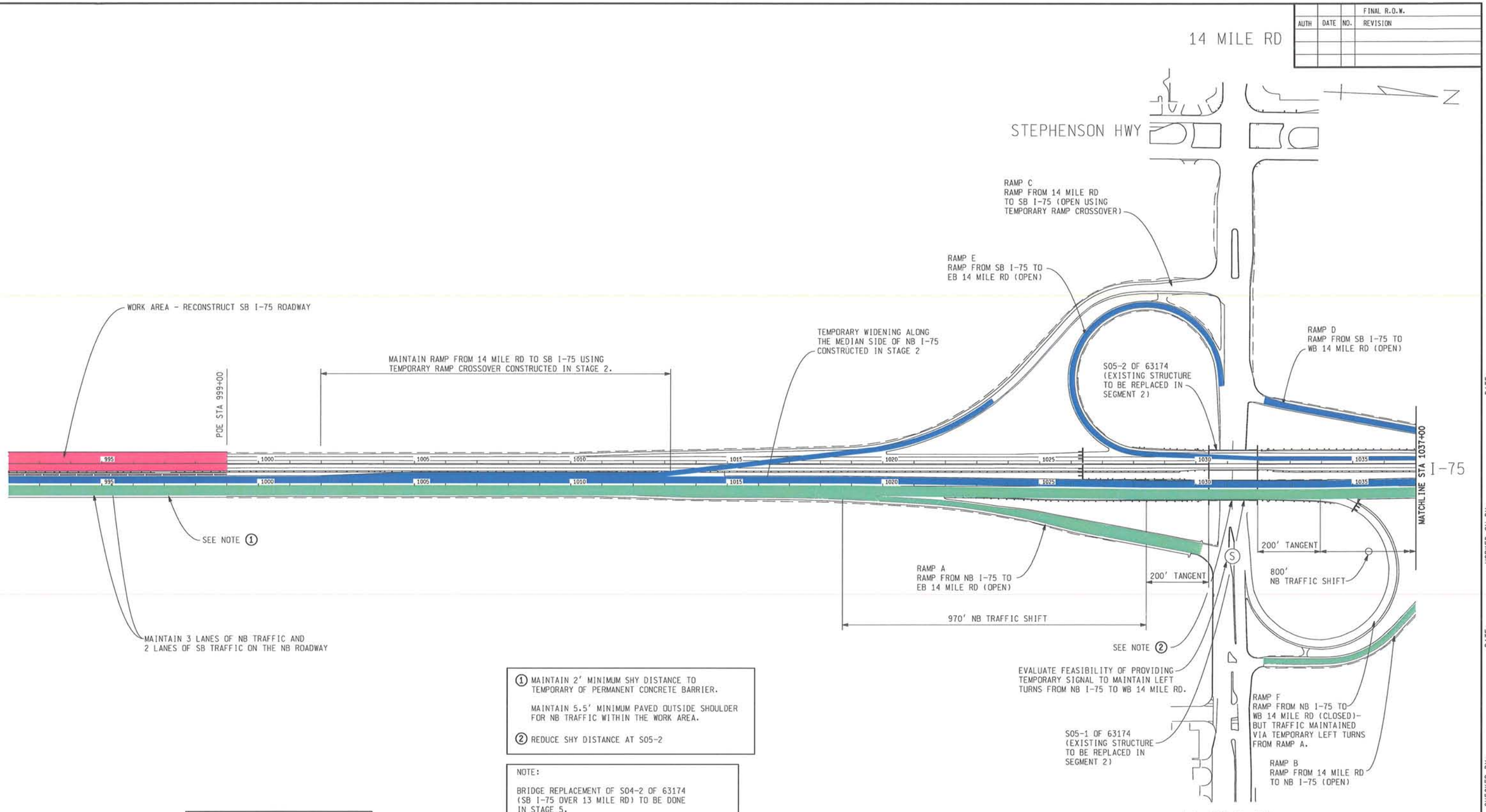

(1) MAINTAIN 2' MINIMUM SHY DISTANCE TO TEMPORARY OF PERMANENT CONCRETE BARRIER.

MAINTAIN 5.5' MINIMUM PAVED OUTSIDE SHOULDER FOR NB TRAFFIC WITHIN THE WORK AREA.

(2) REDUCE SHY DISTANCE AT S05-2

NOTE:

BRIDGE REPLACEMENT OF S04-2 OF 63174 (SB I-75 OVER 13 MILE RD) TO BE DONE IN STAGE 5.

SHORT TERM CLOSURE OF 13 MILE RD MAY BE REQUIRED FOR BRIDGE DEMOLITION WORK.

EVALUATE 2 OPTIONS FOR RECONSTRUCTION OF 13 MILE ROAD UNDER I-75 TO BE DONE IN STAGE 5: FULL CLOSURE OR PART-WIDTH CONSTRUCTION.

LEGEND

- WORK AREA
- NB I-75 TRAFFIC
- SB I-75 TRAFFIC

FIGURE 4-82
ALT 3: STAGE 5 MAINTAINING TRAFFIC (OPTION 2)
I-75 STA 992+00 TO STA 1037+00

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SEGMENT 1, S. OF 12 MILE TO N. OF 13 MILE

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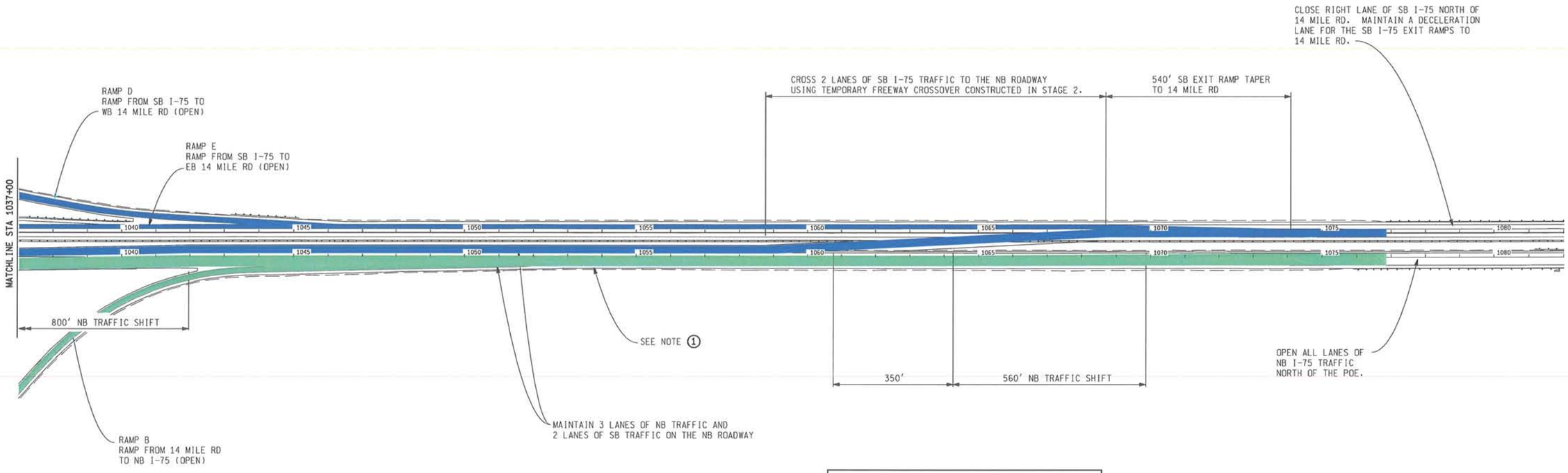

(1) MAINTAIN 2' MINIMUM SHY DISTANCE TO TEMPORARY OF PERMANENT CONCRETE BARRIER.

MAINTAIN 5.5' MINIMUM PAVED OUTSIDE SHOULDER FOR NB TRAFFIC WITHIN THE WORK AREA.

FIGURE 4-83
ALT 3: STAGE 5 MAINTAINING TRAFFIC (OPTION 2)
I-75 STA 1037+00 TO STA 1082+00

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