## Section Two

# ALTERNATIVES EVALUATED

During the US-12 Improvement Study, many Illustrative Alternatives, or major improvement alternatives, were proposed and evaluated. During the evaluation, the relative merits of each alternative were assessed according to specific criteria in order to determine which alternatives best met the study purpose and need. After this screening process, several Illustrative Alternatives were eliminated from further consideration. The remaining alternatives, known as Practical Alternatives, were again evaluated according to established criteria. The Preferred Alternative was then selected. The July 2002 *Illustrative Alternatives Report* describes the alternatives evaluation process in detail for the Illustrative Alternatives and the selection of the Practical Alternatives.

This section describes the evaluation process for the alternatives considered during the Illustrative Alternatives and Practical Alternatives phases of the study. The section culminates in the reasons for the selection of the Preferred Alternative and demonstrates its suitability for meeting the study purpose and need.

## 2.1 ILLUSTRATIVE ALTERNATIVES CONSIDERED DURING THE US-12 IMPROVEMENT STUDY

The Illustrative Alternatives that were developed and evaluated included the following alternative categories:

- No-Build Alternative
- Transit/Travel Demand Management (TDM) strategies
- Transportation System Management (TSM) strategies
- Build Alternatives

### No-Build Alternative

Under this alternative, there would be no major change in the existing US-12 roadway. Typical low-cost, low impact improvements, such as roadway resurfacing or intersection improvements, would be accomplished as needed. The No-Build Alternative assumes that all the projects in the 2025 SEMCOG *Regional Transportation Plan* will be implemented, except any major improvements to US-12. SEMCOG's planned road projects in Washtenaw County from 2001 to 2005 include the following:

- Bemis Road - from Carpenter Road east to Whittaker Road (4.0 miles): reconstruct to two lanes
- Carpenter Road - from US-12 north to Ellsworth (1.5 miles): widen to four lanes with five lanes at intersections.

- Industrial Park Drive - from US-12 north to Woodland (1 mile): reconstruct (no further details).
- Platt Road - from Lorraine south to Ellsworth (0.417 miles): install non-motorized path.
- US-12 center turn lane from US-12/US-23 interchange to Sauk Trail west of Platt Road.

SEMCOG's planned road projects from 2006 to 2025 include:

- Carpenter Road - from Bemis Road north to Textile Road (2 miles): widen to four lanes with five lanes at intersections.
- Carpenter Road - from Textile Road north to US-12 (0.5 miles): reconstruct from two to five lanes.
- State Road - from US-12 to Ellsworth (3.3 miles): widen to five lanes with curb and gutter.

There would be no major improvement construction costs associated with this alternative and no additional right-of-way would be required. Existing Level of Service (LOS) on US-12 would deteriorate, and increased traffic congestion would be anticipated in the future.

**Transit/TDM Strategies**

Several transit and TDM strategies were considered during the Illustrative Alternatives phase. These strategies included increasing bus transit service in the US-12 study area, implementing carpools or transit vanpools, constructing high occupancy vehicle (HOV) lanes, and increasing pedestrian/bicycle connections. With regard to bus transit, which is operated by the Ann Arbor Transportation Authority (AATA), there are currently no bus routes operating on US-12 or crossing US-12 within the study limits. There are also no planned bus routes in the study corridor. No organized carpool or vanpool programs exist in the study area. It is difficult to attract transit riders and induce ridesharing in areas where there is a surplus of free parking and generally low-density development. In addition, the implementation of HOV lanes on US-12 would be difficult, costly, and impractical mainly because US-12 is an at-grade, free-access roadway. Increasing pedestrian and bicycle connections, while improving pedestrian circulation in localized areas of the US-12 study area, would not eliminate enough vehicle trips on US-12 to achieve acceptable LOS as a stand alone alternative.

As a result, the Transit/TDM Alternative was eliminated from further study. However, the implementation of certain TDM strategies, such as implementation of future bus routes and increased pedestrian and bicycle connections, could complement the implementation of the Preferred Alternative and contribute to the overall efficiency of the regional transportation system. MDOT will coordinate with Pittsfield Township to accommodate future local pedestrian and bicycle projects along US-12 and will provide right-of-way to accommodate these improvements.

### TSM Strategies

TSM includes improvements that maximize the efficiency of the present transportation system. Several TSM strategies, such as widening roadway intersections or improving traffic signal timing, were considered during the Illustrative Alternatives phase. Some interim solutions have already been implemented to improve traffic flow, including the widening of US-12 at major intersections, and signal phase changes and new signal installation at the US-12/US-23 interchange. However, because these TSM strategies would not produce acceptable LOS or meet the transportation needs for the US-12 study area, they were eliminated from further study as a stand-alone alternative. However, TSM strategies, as appropriate, will be considered as design elements of the Preferred Alternative.

### Build Alternatives

Build Alternatives considered during the Illustrative Alternatives phase included several roadway alignments. One of these follows the existing roadway alignment (Alternative 1), two alignments partially run to the north of existing US-12 (Alternatives 1-N and 2-N), and two alignments partially run to the south of the existing roadway (Alternatives 1-S and 2-S). Figure 2.1 depicts the various Build Alternatives evaluated during the Illustrative Alternatives phase

In addition, the Morgan Road Alternative was developed based on community input during Fall 2001 stakeholder meetings. This alternative begins near its current connection with US-12 just east of Crane Road and just west of Munger Road, the eastern study limit. Morgan Road is then widened and paved from US-12 directly west to the Morgan Road/State Road intersection. An overpass of US-23 (also called the Morgan Road Bridge) was proposed as part of this alternative (see Figure 2.1).

Several roadway cross sections including the five-lane urban arterial, four-lane urban boulevard, a combination four-lane boulevard and a five-lane arterial, as well as a three-lane cross section, were evaluated during the Illustrative Alternatives phase. Several US-12/US-23 interchange options were also considered during this phase. The partial cloverleaf was evaluated, as well as the rural diamond and single point urban interchange (SPUI).

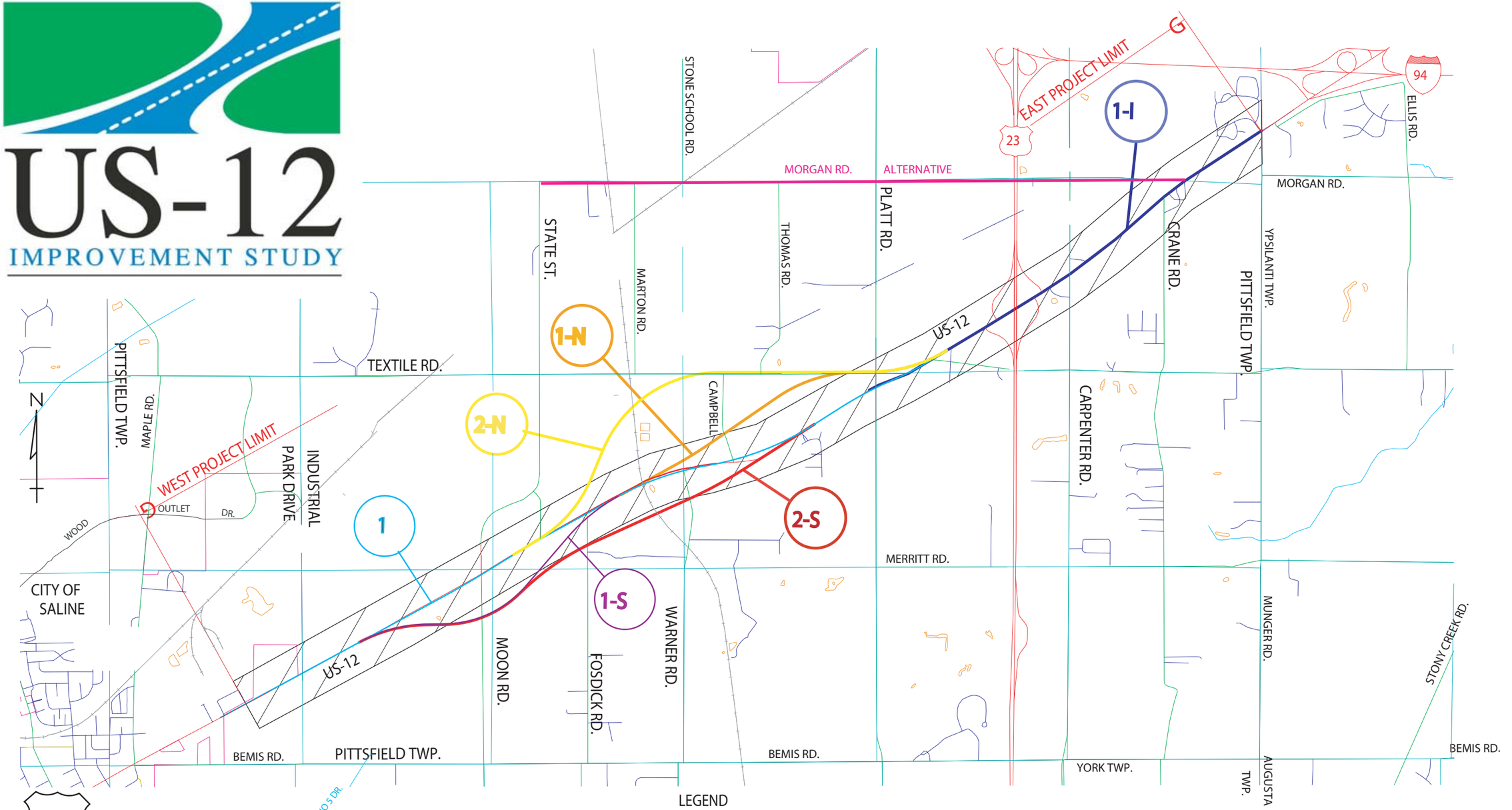
## 2.2 ILLUSTRATIVE ALTERNATIVES EVALUATION AND RESULTS

Illustrative Alternatives were evaluated according to specific criteria. The evaluation process was used to analyze, differentiate among, and screen Illustrative Alternatives to a set of Practical Alternatives. Detailed information regarding the evaluation process is included in the *Illustrative Alternatives Technical Report.*

After the Illustrative Alternatives were evaluated, three of the four off-alignment alternatives developed for the current study were eliminated from further consideration due to right-of-way needs and anticipated impacts on both the natural and the human environment (see Figure 2.1). The alternatives eliminated from further study were as follows:

- 2-N (far northern off-alignment alternative)
- 1-S (southern off-alignment alternative)
- 2-S (far southern off-alignment alternative)

# US-12
## IMPROVEMENT STUDY




LEGEND

1 Illustrative Alternative on Existing Alignment
1-N Illustrative Alternative North of Existing Alignment
2-N Illustrative Alternative North of Existing Alignment
1-S Illustrative Alternative South of Existing Alignment
2-S Illustrative Alternative South of Existing Alignment
1-I Illustrative Alternative on Existing Alignment
(Interchange configuration will vary)

PARSONS TRANSPORTATION GROUP

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**FIGURE 2.1**
**ILLUSTRATIVE ALTERNATIVES**

In addition, it was recommended that the Morgan Road Alternative be eliminated as a stand-alone alternative because it required more residential and business displacements, more community impacts and impacts on woodlot habitat and wetlands. Also, this alternative did not meet the study purpose and need or adequately address the future travel demand needs along the entirety of the US-12 study area.

Two roadway cross sections, the four-lane urban boulevard and the five-lane urban arterial, were considered to be more viable than the other proposed options and were carried forward for further study. Both of these cross sections were considered feasible for the Practical Alternatives that were carried forward.

Regarding the three-lane cross section, since its theoretical capacity is approximately 18,000 vehicles per day (vpd), it was determined that this cross section would not achieve the study purpose and need. Existing US-12 traffic volumes range from 23,000 to 32,000 vehicles. Furthermore, at various US-12 intersections and other locations in the study area where turning movements are high, the existing two-lane cross section of US-12 has already been widened to accommodate center left-turn lanes or left-turn passing lanes, thus creating a three-lane cross section.

## 2.3 DESCRIPTION OF PRACTICAL ALTERNATIVES

After the completion of the evaluation process, the following Build Alternatives were selected for analysis as Practical Alternatives: Alternative 1 and Alternative 1-N (see Figure 2.2). These Practical Alternatives were compared against the No-Build Alternative, called Alternative 1-A during this phase of the study. Three roadway cross sections were considered, as described below. However, only the five-lane urban arterial was considered from the US-12/US-23 interchange to Munger Road, due to the traffic operations, additional right-of-way requirements, impacts to the natural and built environment, and anticipated design difficulties of providing a boulevard cross section through a major system interchange (US-12/US-23). For each Practical Alternative, four interchange options, the rural diamond, partial cloverleaf, SPUI, and a modified existing diamond were considered.

### No-Build Alternative

The No-Build Alternative is the same as that described in section 2.1.

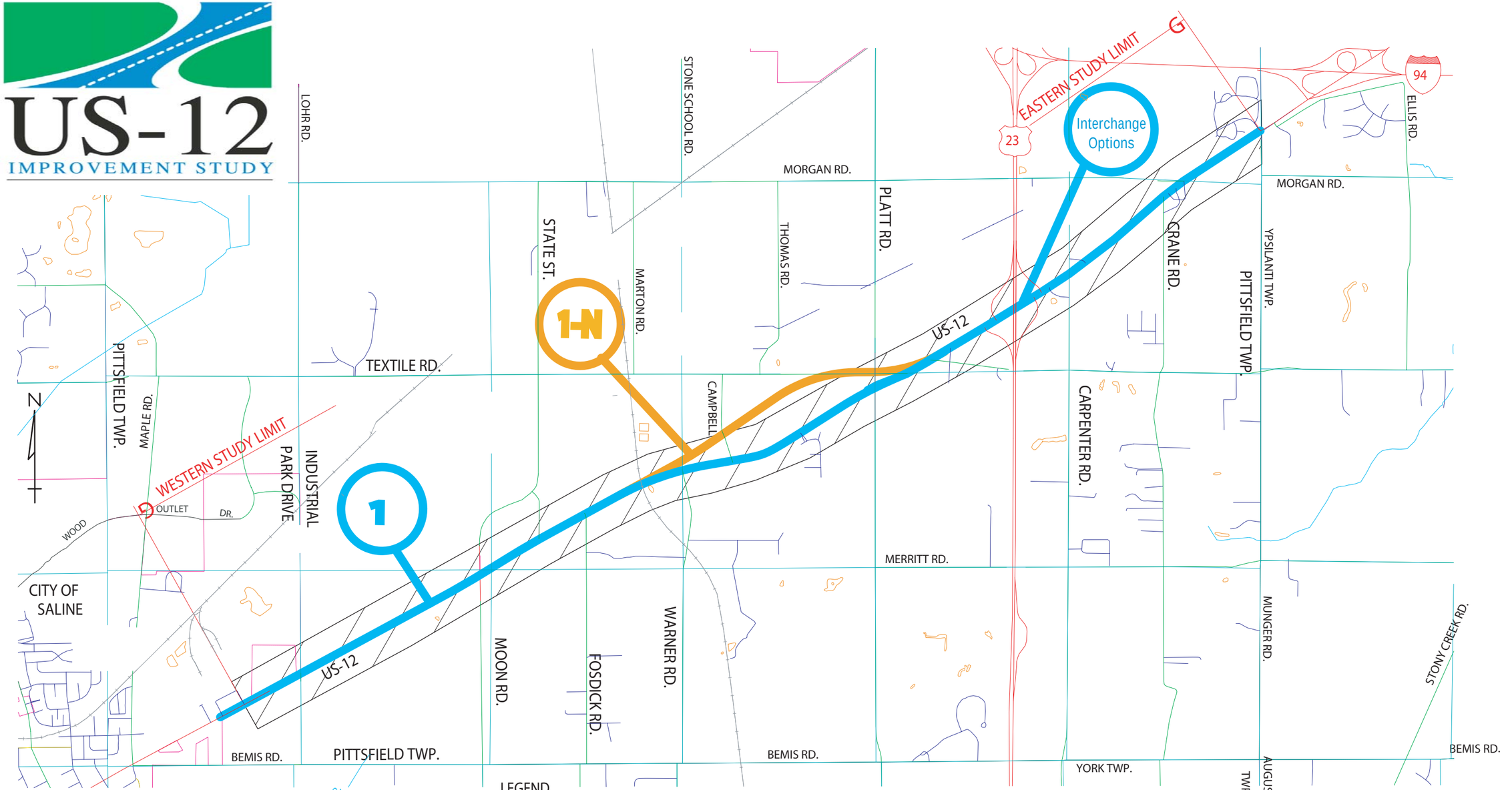
### Build Alternatives

#### *Roadway Alignments*

Two roadway alignments were evaluated during the Practical Alternatives phase: Alternatives 1 and 1-N (see Figure 2.2). A one-way roadway pair was considered as a result of public input and is discussed briefly in the following paragraphs.

**Alternative 1.** This alternative followed the existing US-12 roadway alignment throughout the study limits, starting from 2500 feet west of the Industrial Park Drive (east of Visteon plant entrance) and traveling through the Munger Road intersection.

# US-12
## IMPROVEMENT STUDY




LEGEND

1 Practical Alternative on Existing Alignment

1-N Practical Alternative North of Existing Alignment

US-23 / US-12 Interchange Options for Practical Alternatives 1 and 1-N

NOT TO SCALE

MDOT Michigan Department of Transportation

**FIGURE 2 . 2**

**PRACTICAL ALTERNATIVES CONSIDERED DURING STUDY**

**Alternative 1-N.** This alternative followed the existing US-12 roadway within the study limits, except for one section between Warner Road and the intersection of US-12 and Textile Road. Alternative 1-N departed the existing US-12 centerline just west of the Warner Road/US-12 intersection. The alignment paralleled existing US-12 approximately 1160 feet to the north of the existing roadway. Alternative 1-N then ran northeast and tied into Textile Road approximately 900 feet west of the Platt Road intersection. Alternative 1-N then followed Textile Road to the east until it rejoined the existing US-12 roadway at the Textile Road/US-12 intersection (see Figure 2.2).

**One-Way Roadway Pair.** Input from the October 2002 Stakeholder Meetings (see section 6.2) resulted in the evaluation of a one-way roadway pair between Warner Road and Platt Road. The one-way pair followed existing US-12 for eastbound traffic and the Alternative 1-N alignment for westbound traffic. This option was eliminated from further study because its implementation would create limited access to land uses for the opposing directions of US-12 traffic, potentially inhibit emergency services, and lead to increased construction and maintenance costs.

### Roadway Cross Sections

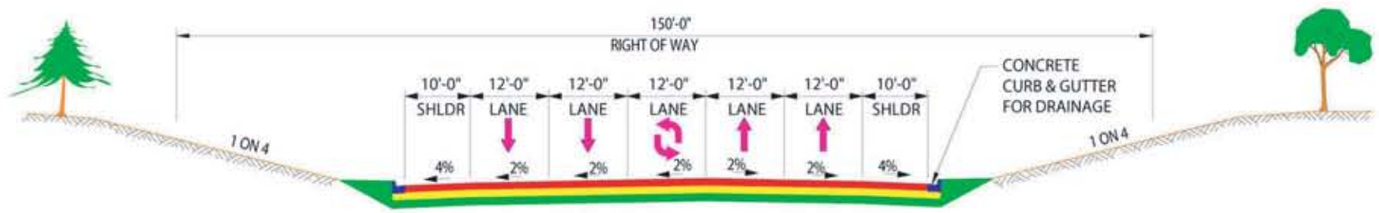
Two of the roadway cross sections considered during the Illustrative Alternatives phase, as well as a combination cross section option, were evaluated during the Practical Alternatives phase of the US-12 Improvement Study. These three cross sections are described below:

#### *Five-Lane Urban Arterial*

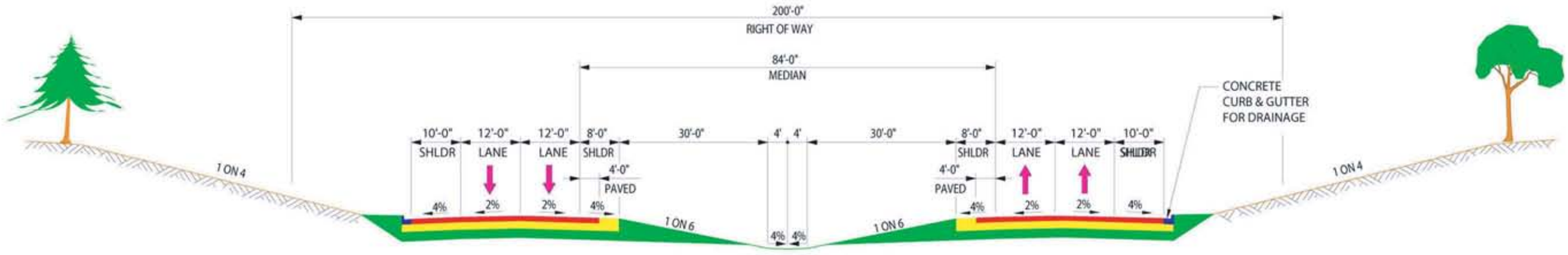
The proposed five-lane urban arterial roadway cross section consists of two 12-foot lanes in each direction, a 12-foot center lane that would allow left-turn movements in either direction, and 10-foot paved shoulders on each side of the proposed US-12 roadway (see Figure 2.3). The right of way required for this cross-section would be approximately 150 feet wide in most areas, and curb and gutter drainage would be provided. This cross-section can be used for each of the Build Practical Alternatives: Alternatives 1 and 1-N.

#### *Four-Lane Urban Boulevard*

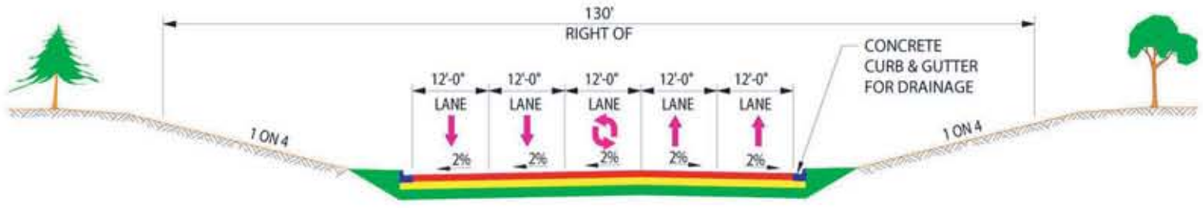
The four-lane urban boulevard is access-controlled and consists of two 12-foot lanes in each travel direction, an 84-foot open ditch median, and curb and gutter drainage (outside road shoulders only), as shown in Figure 2.3. Other median widths for the boulevard cross section have also been considered. The right-of-way required for this alternative would be approximately 200 feet wide in most areas. This four-lane boulevard cross-section can be used for both Alternatives 1 and 1-N, from west of Moon/State roads to a point just west of the US-12/US-23 interchange. Evaluation results have determined that the five-lane urban arterial cross-section better accommodates traffic operations and produces fewer land use, environmental and community impacts in the section of US-12 from the US-12/US-23 interchange to the east study limits at Munger Road




US-12 TYPICAL CROSS SECTION
5-LANE URBAN ARTERIAL




US-12 TYPICAL CROSS SECTION
4-LANE URBAN BOULEVARD-84 FT. MEDIAN




US-12 TYPICAL CROSS SECTION
5-LANE URBAN ARTERIAL-W/O SHOULDERS

Not to Scale

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Michigan Department of Transportation

Typical Cross Sections
US-12 IMPROVEMENT STUDY

FIGURE 2.3

### Combination Five-Lane Arterial/Four-Lane Boulevard

The combination roadway cross section was considered for both Alternative 1 and 1-N. It has the same design characteristics of both the five-lane arterial and four-lane boulevard cross sections. It consists of a five-lane urban arterial throughout the US-12 study area, except from about 2,000 feet west of the State Road/Moon Road intersection to about 2,000 feet east of Old State Road, approaching the Ann Arbor Railroad. In this section of US-12 roadway, it has a four-lane urban boulevard cross section.

With this option, access to adjacent US-12 land uses on the opposite side of the boulevard median would be provided only at select locations along the proposed roadway. These locations would be determined after further detailed traffic and engineering analysis for a Recommended Alternative.

### US-12/US-23 Interchange Options

The following four interchange configurations were considered during the Practical Alternatives phase of the study. The first three interchanges were evaluated during the Illustrative Alternatives phase (see Figure 2.4). Another interchange option, modify the existing rural diamond, was also considered during the Practical Alternatives phase (see Figure 2.5). All interchange designs can accommodate 2025 projected travel demand.

#### *Rural Diamond Interchange*

This interchange option consists of realigning the existing interchange ramps. The southbound entrance and exit ramps are aligned directly across from one another, as are the northbound entrance and exit ramps. The southbound and northbound ramps would be signalized, reducing the number of traffic signals controlling the interchange from three to two signals. This interchange option would require substantial new right-of-way (see Figure 2.4).

#### *Partial Cloverleaf Interchange (Parclo A)*

This interchange option consists of reconfiguring the existing interchange to a partial cloverleaf interchange design. Loop ramps are added in the northwest and southeast quadrants of the interchange, providing free-flowing access for traffic moving from eastbound US-12 to northbound US-23, as well as westbound US-12 to southbound US-23. To accommodate the loop ramps, new outer ramps are located in the northwest and southeast quadrants approximately 200 feet out from their present locations (see Figure 2.4)

For this option, the southbound US-23 ramp to US-12 and the eastbound US-12 ramp to southbound US-23 are aligned directly across from one another, as are the westbound US-12 ramp to northbound US-23 and US-23 northbound ramp to US-12. The two sets of ramp terminal locations would be signalized, reducing the number of traffic signals that control the interchange from the existing three traffic signals to two. This interchange option would require a substantial amount of right-of-way.

### *Single Point Urban Interchange (SPUI)*

The SPUI design consists of reconfiguring the existing interchange ramps to converge at a single signalized location, reducing the number of traffic signals controlling the interchange from three to one. This option would require no additional right-of-way; however, construction costs would be higher than those associated with a partial cloverleaf interchange design (see Figure 2.4).

### *Modified Existing Diamond Interchange*

This interchange option consists of ramp modifications to the existing rural diamond interchange. Modifications include realigning the US-23 southbound entrance ramp (southwest quadrant) to tie directly into the US-23 southbound exit ramp. In addition, the US-23 northbound entrance ramp (northeast quadrant) is realigned to tie directly into the US-23 northbound exit ramp (see Figure 2.5). The southbound and northbound ramps would be signalized, reducing the number of traffic signals controlling traffic movements from three to two within the US-12/US-23 interchange. The interchange option would require some additional right-of-way in the southeast quadrant of the existing interchange.

## 2.4 EVALUATION OF PRACTICAL ALTERNATIVES

As with the Illustrative Alternatives, the Practical Alternatives were subject to refinement as public input was received. Alternatives evaluation proceeded according to the five study goals outlined in Section 1.3, i.e., transportation, engineering design, socioeconomic, environmental, and land. Tables 2.1 and 2.2 present the evaluation results of the Practical Alternatives 1 and 1-N. Evaluation criteria developed for each of the study goals were used to evaluate and compare the Practical Alternatives. Preliminary cost estimates for construction of the Practical Alternatives were also considered as part of the evaluation (see Table 2.2). Cost was added as an evaluation criterion during the Practical Alternatives phase under the category of Engineering Design.

### Evaluation Results

Practical Alternatives 1 and 1-N were evaluated in the context of selecting a Preferred Alternative. Table 2.2, the Practical Alternatives Evaluation Matrix, presents the comparison and impact results, including both roadway cross sections, for transportation, engineering, the resources of land use (residences/businesses, right-of-way), wetlands, woodlands, streams, historic properties, recreational properties, and other socioeconomic and environmental resources.

US-12
IMPROVEMENT STUDY
PROPOSED RIGHT OF WAY
US-23
US-12
SINGLE POINT URBAN INTERCHANGE (SPUI)
US-23
US-12
PARTIAL CLOVER LEAF (TYPE A)
US-23
US-12
RURAL DIAMOND INTERCHANGE
Not to Scale
MDOT
Michigan Department of Transportation
Interchange Options Considered
US-12 Improvement Study
Pittsfield Township, City of Saline to Munger Road
Figure 2.4


FIGURE 2.5
US-12/US-23 INTERCHANGE
MODIFIED EXISTING DIAMOND
PREFERRED INTERCHANGE ALTERNATIVE

## Table 2.1
## COMPARISON OF IMPACTS
## PRACTICAL ALTERNATIVES 1 and 1-N
## US-12 IMPROVEMENT STUDY

| Alternatives | | Displacements | | New ROW Required* (acres) | Wetlands Affected* (acres) | Woodlands Affected ** (acres) | Stream Crossings | Historic Properties Affected*** | Recreational Properties Affected (acres)**** |
|---|---|---|---|---|---|---|---|---|---|
| | | Residences | Businesses | | | | | | |
| Alternative 1 | Five-Lane Urban | 7 | 1 | 66.7 | 4.1 | 0.5 | 3 | 3 | 1.4 |
| | Four-Lane Blvd. | 14 | 4 | 79.7 | 4.7 | 1.1 | 3 | 3 | 1.3 |
| Alternative 1-N | Five-Lane Urban | 9 | 2 | 84.7 | 5.3 | 6 | 3 | 3 | 16 |
| | Four-Lane Blvd. | 15 | 3 | 104.7 | 6.1 | 9 | 3 | 3 | 20 |

* Includes Improvements to the US-12/US-23 Interchange and additional right-of-way for stormwater detention.
** Woodlands north/south of Textile Road contain potential Indiana Bat habitat.
*** Effects on historic properties would include taking additional land for road right-of-way.
****Recreational property is the Pittsfield Preserve.

# TABLE 2.2
# EVALUATION MATRIX
# Practical Alternatives
# US-12 Improvement Study, Saline to Munger Road, Pittsfield Township

| | EVALUATION CRITERIA | Practical Alternatives | | | |
|---|---|---|---|---|---|
| | | **Alternative 1 5-Lane** | **Alternative 1 4-Lane Boulevard** | **Alternative 1-N 5-Lane** | **Alternative 1-N 4-Lane Boulevard** |
| TRANSPORTATION | **Level of Congestion/ Level of Service** | Can accommodate the traffic adequately. Would improve level of service during peak travel demand. | Can accommodate the traffic adequately. Would improve level of service during peak travel demand. | Can accommodate the traffic adequately. Would improve level of service during peak travel demand. | Can accommodate the traffic adequately. Would improve level of service during peak travel demand. |
| | | The center left turn lane of the 5-Lane will remove the left turns from the through lanes, thus increasing capacity. | High capacity through intersections with the elimination of left turns. Could possibly introduce additional signals on US-12 if median crossovers need to be signalized. | The center left turn lane of the 5-Lane will remove the left turns from the through lanes, thus increasing capacity. | High capacity through intersections with the elimination of left turns. Negatively, could possibly introduce additional signals on US-12 if median crossovers need to be signalized. |
| | **Access and Mobility** | Full access will be provided to developments along both sides of US-12. Possibility of left-turn conflicts for vehicles attempting to access closely spaced driveways. | Directional access to developments along US-12 may be limited due to the boulevard median (crossovers would need to be strategically located). Would make it easier to turn out of driveways along US-12. | Full access will be provided to developments along both sides of US-12. Additional access to businesses and residences along existing US-12 would be required. | Directional access to developments along US-12 will be limited due to the boulevard median (crossovers would need to be strategically located). Would make it easier to turn out of driveways along US-12. Additional access to businesses and residences along existing US-12 would be required. |
| | **Roadway Compatibility** | Yes - both ends of the study corridor are currently 5-lanes. | Less compatible - both ends of the study corridor are currently 5-lanes. | Yes - both ends of the study corridor are currently 5-lanes. | Not as compatible - both ends of the study corridor are currently 5-lanes. |
| ENGINEERING DESIGN | **Compatibility with MDOT Design Standards** | Design is compatible with MDOT and AASHTO design standards. | Design is compatible with MDOT and AASHTO design standards. | Design is compatible with MDOT and AASHTO design standards. | Design is compatible with MDOT and AASHTO design standards. |
| | **Crash Rates and High Crash Locations** | Multi-lane roads typically will reduce crashes by 19-35% over 2-lane roads. | Multi-lane roads typically will reduce crashes by 19-35% over 2-lane roads. Some studies have shown that boulevards have lower crash rates than five-lane roadways. | Multi-lane roads typically will reduce crashes by 19-35% over 2-lane roads. | Multi-lane roads typically will reduce crashes by 19-35% over 2-lane roads. Some studies have shown that boulevards have lower crash rates than five-lane roadways. |
| | **Estimated Cost** | $ 100 Million with Diamond Interchange<br>$ 104 Million with Partial Cloverleaf Interchange<br>$ 110 Million with Single Point Urban Interchange<br>$ 99 Million with Modified Diamond Interchange | $ 112 Million with Diamond Interchange<br>$ 117 Million with Partial Cloverleaf Interchange<br>$ 123 Million with Single Point Urban Interchange<br>$ 111 Million with Modified Diamond Interchange | $ 108 Million with Diamond Interchange<br>$ 112 Million with Partial Cloverleaf Interchange<br>$ 118 Million with Single Point Urban Interchange<br>$ 107 Million with Modified Diamond Interchange | $ 119 Million with Diamond Interchange<br>$ 123 Million with Partial Cloverleaf Interchange<br>$ 129 Million with Single Point Urban Interchange<br>$ 118 Million with Modified Diamond Interchange |
| SOCIO-ECONOMIC | **Economic Impacts and Benefits** | Minor economic impact, primarily during construction; allows high visibility for businesses; left turn movements can be a safety concern. | Could limit expansion of existing businesses due to ROW requirements; ease of left turn movement can be a benefit. | Minor economic impact, primarily during construction; allows high visibility for businesses; may affect businesses along existing US-12 between Warner and Platt Roads; left turn movements can be a safety concern. | Could limit expansion of existing businesses due to ROW requirements; may affect businesses along existing US-12 between Warner and Platt Roads; ease of left turn movement can be a benefit. |
| | **Community Impacts (including noise and environmental justice)** | There will be an increase in noise levels; no environmental justice impacts anticipated; pedestrian crossing of 5-lane roadway a potential safety concern. | There will be an increase in noise levels; no environmental justice impacts anticipated; boulevard can provide safe spot for pedestrians although increase length of pedestrian crossing. | There will be an increase in noise levels; no environmental justice impacts anticipated; pedestrian crossing of 5-lane cross-section a potential safety concern. | There will be an increase in noise levels; no environmental justice impacts anticipated; boulevard can provide safe spot for pedestrians although this increases length of pedestrian crossing. |
| | **Parklands** | Impact to Pittsfield Preserve (1.4 ac); consistent with Township parks and recreation plan; provides alternative to minimize use of Section 4(f) land. | Impact to Pittsfield Preserve (1.3 ac); consistent with Township parks and recreation plan; provides alternative to minimize use of Section 4(f) land. | Impact to Pittsfield Preserve (16.0 ac) thus requiring Section 4(f) documentation and Township concurrence; it will be difficult to substantiate that Alternative 1 is not prudent and feasible alternative to use of 4(f) land. | Impact to Pittsfield Preserve (20.0 ac) thus requiring Section 4(f) documentation and Township concurrence; it will be difficult to substantiate that Alternative 1 is not prudent and feasible alternative to use of 4(f) land. |
| | **Farmlands/ Open Areas** | Minor farmland impact only due to expansion of ROW; no Part 361 farmlands in the study corridor. | Minor farmland impact (slightly more than Alt 1 5-Lane due to increased ROW); no Part 361 farmlands in the study corridor. | Impacts farmland; ROW take and bisects lands currently being farmed; however no Part 361 farmlands in the study corridor. | Impacts farmland; ROW take and bisects lands currently being farmed; however no Part 361 farmlands in the study corridor. |

# TABLE 2.2
# EVALUATION MATRIX
# Practical Alternatives
# US-12 Improvement Study, Saline to Munger Road, Pittsfield Township

| | EVALUATION CRITERIA | Practical Alternatives | | | |
|---|---|---|---|---|---|
| | | **Alternative 1 5-Lane** | **Alternative 1 4-Lane Boulevard** | **Alternative 1-N 5-Lane** | **Alternative 1-N 4-Lane Boulevard** |
| **ENVIRONMENTAL** | **Ecological Resources** | Minor impact to ecological resources only due to expansion of ROW. | Minor impact to ecological resources only due to expansion of ROW. | This Alternative will further fragment wildlife habitat in the area. | This Alternative will further fragment wildlife habitat in the area even more than 1-N 5-Lane due to increased ROW requirements. |
| | **Wetlands and Streams** | 4.1acres of wetland impact in two watersheds; mitigation can be provided at one site per MDOT; 3 stream crossings with impaired water quality and aquatic resource value, | 4.7 acres of wetland impact in two watersheds; mitigation can be provided at one site per MDOT; 3 stream crossings with impaired water quality and aquatic resource value. | 5.3 acres of wetland impact in two watersheds; mitigation can be provided at one site per MDOT; 3 stream crossings with impaired water quality and aquatic resource value. | 6.1 acres of wetland impact in two watersheds; mitigation can be provided at one site per MDOT; 3 stream crossings with impaired water quality and aquatic resource value. |
| | **Threatened and Endangered Species** | Minor impact to Indiana bat habitat (0.5 acres); will require limited secondary/cumulative impact analysis | Minor impact to Indiana bat habitat (1.1 acres); will require limited secondary/cumulative impact analysis | Major impact to Indiana bat habitat (6 acres); will require substantial Section 7 consultation and mitigation for habitat loss. | Major impact to Indiana bat habitat (9 acres); will require substantial Section 7 consultation and mitigation for habitat loss. |
| | **Historic/Cultural Resources** | Would affect 3 historic properties including displacement of Morton-Hertler house | Would affect 3 historic properties including displacement of Morton-Hertler house | Would affect 3 historic properties including displacement of Morton-Hertler house; avoids impact to Harwood house. | Would affect 3 historic properties including displacement of Morton-Hertler house; avoids impact to Harwood house. |
| | **Hazardous Materials** | Contamination concerns are relatively minor; interchange options that require ROW (Diamond Interchange and Partial Cloverleaf Interchange) provide more concern. | New ROW needed for boulevard cross-section would displace used car business at Platt Road that has potential for contamination; interchange options that require ROW (Diamond Interchange and Partial Cloverleaf Interchange) provide more concern. | Displaces used car business at Platt Road that has potential for contamination; interchange options that require ROW (Diamond Interchange and Partial Cloverleaf Interchange) provide more concern. | Displaces used car business at Platt Road that has potential for contamination; interchange options that require ROW (Diamond Interchange and Partial Cloverleaf Interchange) provide more concern. |
| **LAND USE** | **Consistency with Local Plans and Regional Transportation Plan** | Consistent with local plans; would accommodate planned development; could lead to some increase in commercial development and requests for rezoning. | Consistent with local plans; would accommodate planned development. | Not consistent with local plans; this Alternative is located on lands zoned for ag and low-density residential; could lead to rapid increase in commercial development and requests for rezoning; would have more secondary impacts to existing land uses. | Not consistent with local plans; this Alternative is located on lands zoned for ag and low-density residential; could lead to rapid increase in commercial development and requests for rezoning; would have more secondary impacts to existing land uses. |
| | **Right-of-Way (ROW) Acquisitions / Displacements** | Requires 66.7 acres of new right-of-way (ROW); would relocate 7 residences and 1 business; Diamond Interchange, Partial Cloverleaf Interchange and Modified Diamond Interchange would require additional ROW. | Requires 79.7 acres of new right-of-way (ROW); would relocate 14 residences and 4 businesses; Diamond Interchange, Partial Cloverleaf Interchange and Modified Diamond Interchange would require additional ROW. | Requires 84.7 acres of new right-of-way (ROW); would relocate 9 residences and 2 businesses; Diamond Interchange, Partial Cloverleaf Interchange and Modified Diamond Interchange would require additional ROW. | Requires 104.7 acres of new right-of-way (ROW); would relocate 15 residences and 3 businesses; Diamond Interchange, Partial Cloverleaf Interchange and Modified Diamond Interchange would require additional ROW. |

**Transportation**

The five-lane arterial and four-lane boulevard cross sections each would suffice to accommodate projected future traffic volumes for both Alternatives 1 and 1-N. Also, for each Practical Alternative, improving the two-lane US-12 roadway to either a four-lane boulevard or a five-lane urban arterial would improve operations to acceptable LOS, i.e., LOS D or better during peak travel demand.

With regard to access and mobility, Alternative 1 performs the best since this alternative is on-alignment. Minor impacts to existing access are anticipated using a five-lane cross section, whereas a four-lane boulevard cross section would impact access somewhat by forcing motorists to access businesses or residences by using median crossovers. For Alternative 1-N, access to the existing land uses along US-12 would be affected in the roadway section between Warner Road and Textile Road, since additional means of access to existing businesses and residences along US-12 would be required. Existing US-12 would still need to be maintained as an access road.

The five-lane roadway cross section for either Alternative 1 or 1-N has complete roadway compatibility within the US-12 study area, since a five-lane cross section exists at both ends of the study corridor. The five-lane cross section would allow left turns to be made from a center left turn lane, thus removing the left turns from the through traffic lanes, subsequently increasing the capacity of the roadway. Full access would be provided to existing land uses and proposed developments along both sides of US-12. There is a possibility of left-turn conflicts for vehicles attempting to access closely spaced driveways. However, crash studies have shown that multi-lane roadways typically reduce crashes by 19 to 35 percent over two-lane roadways (see Table 2.2).

The four-lane boulevard cross section would provide high capacity through the intersections with the elimination of left-turn movements. However, roadway capacity could be reduced on the arterial segments of US-12 with the addition of traffic signals if median crossovers require the installation of traffic signals. Access to developments along US-12 would be limited due to the boulevard median, and the median crossovers would need to be strategically located. However, since no left turns would be allowed from driveways, it would be safer and easier to access US-12.

The four-lane boulevard is less compatible than the five-lane arterial cross-section, since both ends of the study area contain five-lane cross sections. The four-lane urban boulevard cross section would also not be compatible with the proposed US-12/US-23 interchange options and the Ann Arbor Railroad crossing.

**Engineering Design**

Practical Alternatives 1 and 1-N would conform to current MDOT, FHWA, and AASHTO guidelines, policies, and standards (see Table 2.3). Therefore, with respect to design standards, there is no difference between the alternatives for either their roadway alignments or cross sections. For Alternative 1-N, for either the five-lane arterial or the four-lane boulevard cross section, new intersections with existing north-south roadways (Campbell Road, Thomas Road, and Platt Road) would need to be designed and constructed at different

locations than currently exist along US-12. For both Alternatives 1 and 1-N, new intersections with Textile Road and Morgan Road would be required as part of the design.

With regard to crash rates and high accident locations, implementation of all the Practical Alternatives would result in improvements, whether the four-lane boulevard or a five-lane cross section is used. The advantages of a multi-lane roadway over a two-lane roadway include: (1) improved traffic capacity for through traffic, (2) less delay for through vehicles caused by left-turning vehicles, (3) fewer occurrences of rear-end and angle crashes associated with left-turning vehicles, (4) better separation between vehicles driving in opposing directions, and (5) better operation flexibility. Crash studies have shown that multi-lane roadways typically reduce crashes by 19 to 35 percent over two-lane roadways, and some studies have shown that boulevard cross sections have lower crash rates than five-lane cross sections.

Preliminary cost estimates were prepared for each Build Practical Alternative with each roadway cross section and each interchange option. The estimated costs are shown in Table 2.2 for comparison purposes only. Compared to Alternative 1, Alternative 1-N would have a higher construction cost for new roadway connections at Campbell, Thomas and Platt Roads, and a higher right-of-way cost, especially in the area between Warner Road and Platt Road where the roadway alignment departs from existing US-12. The four-lane boulevard cross section at $2.5 million per lane-mile, would be more expensive to construct compared to $1.75 million per lane mile for the five-lane arterial cross section. Therefore, Alternative 1-N with the four-lane boulevard would be the most expensive alternative, and Alternative 1 with the five-lane arterial would be the least costly alternative.

The cost estimates for the Practical Alternatives were developed using general construction costs per lane mile: $1.75 million per lane mile for the five-lane arterial and $2.5 million for the four- lane boulevard. The cost was supplemented with a 25% contingency. The dollar per lane mile figures used at the Practical Alternative phase are not as detailed as those used for a Preferred Alternative because more engineering work is required to develop a more detailed roadway design.

For the US-12/US-23 interchange, the rural diamond and modified existing diamond configurations are the least costly to construct due to their straightforward design. The SPUI would be the most costly due to the larger bridge structure over US-23 that is required.

***Social and Economic***

When evaluating the economic impacts and benefits, Alternative 1 better serves existing businesses and residences along US-12 and requires fewer residential relocations than Alternative 1-N. Alternative 1 would displace seven residences and one business with the five-lane urban arterial roadway cross section, and Alternative 1-N would displace nine residences and two businesses (see Table 2.1). Alternative 1-N would not serve existing business along US-12 as well as Alternative 1 in the section of the proposed roadway that deviates from the existing alignment. Alternative 1-N would also displace more businesses than Alternative 1, which might have a negative effect on local tax revenues.

## Table 2.3
## US-12 Roadway Design Criteria

| Item | Reference | US-12 | |
|---|---|---|---|
| | | 5-Lane Urban Arterial | 4-Lane Urban Boulevard |
| Roadway Classification | AASHTO | Arterial | Arterial |
| Design Level of Service | AASHTO Exhibit 2-32 (p. 85), MDOT Scope Desirable (Minimum) | C (D) | C (D) |
| Design Speed (MPH) | MDM 3.06.03 | 60 | 60 |
| ADT for Existing Year 2001 | Traffic Report | 28,000 | 28,000 |
| ADT for Design Year 2025 | Traffic Report | 44,000 | 44,000 |
| **Horizontal Alignment** | | | |
| Minimum Radius (desirable) | MDM 3.03.01A | 1650' (2700') | 1650' (2700') |
| Minimum Length of Curve (desirable) | MDM 3.03.01B | 900' (1800') | 900' (1800') |
| Minimum Radius Not Requiring a Spiral | Std Plan R-107-C | 2000' | 2000' |
| Maximum Super elevation (desirable) | Std Plan R-107-C | 7% (0%) | 7% (0%) |
| Maximum Rollover (shoulder) | Std Plan R-107-C | 6.0% | 6.0% |
| **Vertical Alignment** | | | |
| Maximum Percent of Grade | MDM 2.02.01 | 3.0% | 3.0% |
| Minimum Percent of Grade | MDM 2.02.01 | 0.4% | 0.4% |
| Minimum Stopping Sight Distance | AASHTO Exhibit 3-1 (p. 112) | 570' | 570' |
| Minimum Passing Sight Distance | NA | NA | NA |
| Minimum Passing Zone Length | NA | NA | NA |
| Minimum K-Value For Crest VC | AASHTO Exhibit 3-76 (p. 274) | 151 | 151 |
| Minimum K-Value For Sag VC | AASHTO Exhibit 3-79 (p. 280) | 136 | 136 |
| Minimum Vertical Clearance For Bridges (desirable) | BDM 7.01.08 | 16.0' (16.5') | 16.0' (16.5') |
| **Cross section Elements** | | | |
| Total Number of Lanes | Design Report & Studies | 5 | 4 |
| Lane Width | MDM 3.07A | 12' | 12' |
| Median/Left Shoulder Width | MDM 3.09, 6.05.04 E & Std Plan R-110-A | 10' | 8' |
| Right Shoulder Width | MDM 3.09, 6.05.04 E & Std Plan R-110-A | 10' | 10' |
| Curb and Gutter Drainage | Design Report & Studies | Yes | Yes |
| Maximum Fore Slope (desirable) | MDM 2.03.01 | 1 on 2 (1 on 6) | 1 on 2 (1 on 6) |
| Maximum Back Slope (desirable) | MDM 2.03.01 | 1 on 2 (1 on 4) | 1 on 2 (1 on 4) |
| Minimum Ditch Width (desirable) | MDM 4.04.02 | 4' (6') | 4' (6') |
| Minimum Ditch Grade (desirable) | MDM 4.04.01 | 0.1% (0.3%) | 0.1% (0.3%) |
| Pavement Cross Slope | Std Plan R-107-C | 2% | 2% |
| Shoulder Cross Slope | MDM 6.05.05A | 4% | 4% |

*Source: Parsons Transportation Group, 6/24/02*
*AASHTO = American Association of State Highway and Transportation Officials: A Policy on Geometric Design of Highways and Streets, 2001*
*MDM= Michigan Design Manual*
*Std Plan = MDOT Standard Plans*
*MMUTCD = Manual of Uniform Traffic Control Devices*
*NA = Not Applicable*

Community impacts, such as changes in access, community cohesion, and noise levels, were also evaluated for Alternatives 1 and 1-N. The four-lane urban boulevard cross section would have more impacts on access than the five-lane roadway cross section. The four-lane cross section may provide better pedestrian crossings; crossing a five-lane roadway may be a safety concern for pedestrians.

With regard to noise, existing noise levels are relatively high, and approach or exceed FHWA noise abatement criteria in several locations throughout the US-12 study area. Noise levels for the two Practical Alternatives would generally only increase by 2 to 3 decibels (dBA) over existing noise levels. (This 2 to 3 dBA increase is imperceptible to the human ear.) For both Alternatives, projected noise levels would exceed FHWA noise abatement criteria near the Arbor Glen, Arbor Ridge, and Hickory Pointe residential subdivisions. Alternative 1 would create higher noise levels near the Warner Creek subdivision than Alternative 1-N. However, Alternative 1-N would create higher noise impacts than Alternative 1 for residences along Textile Road from Platt to Campbell roads, and higher noise levels at Saline Meadows.

Results from the air quality analysis show that impacts are not expected for either Alternative 1 or 1-N.

The Practical Alternatives would potentially have minor effects on the Rentschler Farmstead along US-12. Additional right-of-way would not be needed for the five-lane arterial but would be needed for the four-lane boulevard cross section. Alternative 1-N would have greater farmland impacts for roadway right-of-way than Alternative 1, and would significantly affect property recently purchased by Pittsfield Township (Pittsfield Preserve) for use as a park and a recreational open space. Requirements of Section 4(f) of the 1966 U.S. Department of Transportation Act would need to be met before Alternative 1-N could be approved by FHWA (see Section 4). No effects on environmental justice populations are anticipated with either of the Practical Alternatives.

***Environmental***

As shown in Table 2.2, Alternative 1 would have fewer direct impacts to wetlands than Alternative 1-N, with 4.1 for Alternative 1 and 5.3 acres for Alternative 1-N of direct impact, respectively (five-lane urban arterial), respectively, and 4.7 for Alternative 1 and 6.1 for Alternative 1-N, acres of impact, respectively (four-lane urban boulevard roadway cross section). The modified existing diamond interchange would have the least wetland impacts compared to the other interchange configurations.

Impacts to historic properties due to right-of-way acquisition are similar for the Practical Alternatives. Both Alternatives 1 and 1-N would displace the Morton-Hertler house, the Valentine School, and have some impacts on the Boss-Schmidt house, each considered historic eligible structures. Alternative 1-N would avoid the Harwood house, another historic structure, and Alternative 1 displaces the Harwood house.

Concerns regarding potentially contaminated sites are generally the same for both Alternatives 1 and 1-N. However, Alternative 1-N would displace one commercial property where the potential for contamination exists. The partial cloverleaf interchange is better than the rural diamond and SPUI, since no new right-of-way would be required for the partial cloverleaf

interchange. A number of known or potentially contaminated sites exist in or near the existing US-12/US-23 interchange.

### *Land Use*

Alternatives 1 and 1-N are generally compatible with local land-use plans and WATS *Transportation Plan*. Alternative 1-N would require more residential displacements than Alternative 1 (nine residential displacements for Alternative 1-N compared to seven displacements for Alternative 1 with the five-lane urban arterial). Alternative 1-N would also require more right-of-way than Alternative 1 (66.7 acres for Alternative 1 compared to 84.7 acres for Alternative 1-N with the five-lane arterial). For the interchange options, the rural diamond and SPUI interchanges would require 14 acres of right-of-way, whereas the partial cloverleaf would require no new right-of-way and the modified existing interchange would require 5.7 acres of new right-of-way.

Alternative 1-N could potentially cause significant secondary impacts and cumulative effects on community and natural resources. There would be development pressure to rezone the property along the 1-N alignment between Textile/Platt roads and Warner Road from low-density residential to commercial. This new commercial development could affect community character and impact important wetlands, threatened and endangered species habitat, as well as the Pittsfield Preserve.

## 2.5 DESCRIPTION OF PREFERRED ALTERNATIVE

Based upon the detailed evaluation conducted of the Practical Alternatives, a modification of Alternative 1 with the combination five-lane arterial/four-lane boulevard roadway cross section and the modified existing diamond interchange was selected as the Preferred Alternative. The Preferred Alternative is described in detail below and shown in Appendix I - Figure 2.6. Appendix I is located at the end of this EA document. Figure 2.3 illustrates the combination roadway cross section and Figure 2.5 depicts the modified existing diamond interchange. Tables 2.4 and 2.5 provide an impact summary and evaluation results for the Preferred Alternative. Figure 2.7, at the end of this section, shows all the alternatives evaluated, including those alternatives carried forward through the Practical Alternatives to the selection of the Preferred Alternative. The proposed roadway alignment for the Preferred Alternative straightens the curve east of Campbell Road providing a safer roadway design. This roadway alignment is similar to an alignment evaluated earlier in the study.

### *Roadway Alignment*

The Preferred Alternative follows the existing US-12 roadway alignment throughout the study limits, starting from 2,500 feet west of Industrial Park Drive (east of Visteon plant entrance) to Munger Road. The only variation in the proposed roadway is at the curve just east of Campbell Road where the proposed alignment is straightened to meet current MDOT roadway design standards. This straightened alignment would displace the Harwood house, located on the north side of US-12 just east of Campbell Road. The Harwood house has been considered eligible for the National Register of Historic Places (NRHP) due to its owners' historical significance and connection with the Underground Railroad. Coordination with the State

Historic Preservation Office (SHPO) is ongoing as to potential impacts and measures to minimize harm to this historic resource. See Section 4 of the EA for more details. The Preferred Alternative roadway improvements would also realign Morgan Road and Crane Road to create a new intersection with US-12 (see Figure 2.6).

### *Roadway Cross Section - Combination Five-Lane Arterial/Four-Lane Boulevard*

The combination roadway cross section has the design characteristics of both the five-lane arterial and four-lane boulevard cross sections. The combination cross section would be a five-lane urban arterial throughout the 6.5 mile study area except from about 3,300 feet west of the State Road//Moon Road intersection to about 4,300 feet east of State Road/Moon Road, approaching the Ann Arbor Railroad. In this section of US-12 roadway, the cross section would be a four-lane urban boulevard.

Motorist access to adjacent US-12 land uses on the opposite side of the boulevard median would be provided only at select locations along the proposed roadway. These locations will be determined after a Recommended Alternative is approved.

The five-lane urban arterial roadway cross section extends from the east city limits of Saline to the beginning of the boulevard section and from west of the Ann Arbor Railroad to Platt Road. It consists of two 12-foot lanes in each travel direction, a 12-foot center lane that would allow left-turn movements in either direction, 10-foot paved shoulders on each side of the proposed US-12 roadway, and curb and gutter for drainage (see Figure 2.3). The right-of-way required for this cross section would be approximately 150 feet wide in most areas, and curb and gutter drainage would be provided. Although the posted speed limit is 45 mph, the design speed would be 60 mph.

The five-lane urban arterial roadway cross section from the east of Platt Road to Munger Road will consist of two 12-foot lanes, a 12-foot center lane, and curb and gutter drainage. The right-of-way required for this cross section would be approximately 130 feet wide in most areas, and curb and gutter drainage would be provided. Although the posted speed limit is 45 mph, the design speed would be 50 mph (see Figure 2.3).

The four-lane urban boulevard section (about 1.4 miles) is access-controlled and consists of two 12-foot lanes in each travel direction, an 84-foot median with an open ditch and no inside curb and gutter next to the median. The outside of the cross section would include curb and gutter drainage. The right-of-way required for this alternative would be approximately 200 feet wide in most areas (see Figure 2.3). Although the posted speed limit is likely to remain at 45 to 55 mph, the design speed would be 60 mph. Providing an 84-foot grass ditch median allows the roadway to be expanded later, if necessary, to six lanes while maintaining the 60-foot median required for semi-trucks to make indirect left-turns.

### *US-12/US-23 Interchange Option - Modified Existing Diamond Interchange*

The Preferred Alternative interchange option consists of ramp modifications to the existing rural diamond interchange. Modifications would include realigning the US-23 southbound entrance ramp (southwest quadrant) to tie directly into the US-23 southbound exit ramp. In

addition, the US-23 northbound entrance ramp (northeast quadrant) would be realigned to tie directly into the US-23 northbound exit ramp. The southbound and northbound ramps would be signalized, reducing the number of traffic signals controlling traffic movements from three to two within the US-12/US-23 interchange. In the southeast quadrant, ramp modifications would accommodate a future eastbound US-12 to northbound US-23 loop ramp (see Figure 2.5).

## 2.6 EVALUATION OF PREFERRED ALTERNATIVE

The Preferred Alternative is a modification of Alternative 1. The proposed roadway location between Campbell Road and Sauk Trail has been shifted up to 80 feet north of existing US-12 in the area of the Warner Creek subdivision. This alignment shift provides a safer roadway design and a reduction in noise impacts for the single-family residences located south of existing US-12 and east of Campbell Road. Comparing the Preferred Alternative to Alternative 1-N, the Preferred Alternative causes less impacts to wetlands, woodlands including important Indiana bat habitat, and less impacts to the Pittsfield Preserve than Alternative 1-N. The Preferred Alternative requires 3.8 acres from the Pittsfield Preserve and Alternative 1-N requires 16 acres (five-lane arterial) and 20 acres (four-lane boulevard) respectively (see Table 2.4). The Preferred Alternative also requires less right-of-way and has fewer residential and business displacements than Alternative 1-N (four-lane boulevard).

Comparing the Preferred Alternative to Alternative 1, the Preferred Alternative causes fewer community impacts to planned and existing residences between Fosdick Road and Platt Road, south of US-12. The Preferred Alternative also requires less residential and business displacements than Alternative 1 (four-lane boulevard). The wetland and woodlands impacts of the Preferred Alternative and Alternative 1 are similar. The higher residential and commercial displacements and increased ROW impacts associated with the Preferred Alternative (when compared to Alternative 1 (five-lane arterial) are primarily the result of adding the four-lane boulevard section between the Rolling Hills subdivision and the Ann Arbor Railroad. This cross-section was chosen for the Preferred Alternative for the increased travel efficiency, mobility, vehicular safety, and pedestrian and non-motorized safety benefits this option provides US-12 for the State/Moon Road, Old State Road, and Fosdick Road intersections.

Overall, the Preferred Alternative provides a more balanced solution to the area's identified transportation needs and meets the study's purpose and need better than both Alternative 1 and 1-N. A summary of the impacts for the Preferred Alternative is shown in Tables 2.4 and 2.5. Detailed analysis for each impacted resource is provided in Section 3.0 (Affected Environment, Potential Impacts).

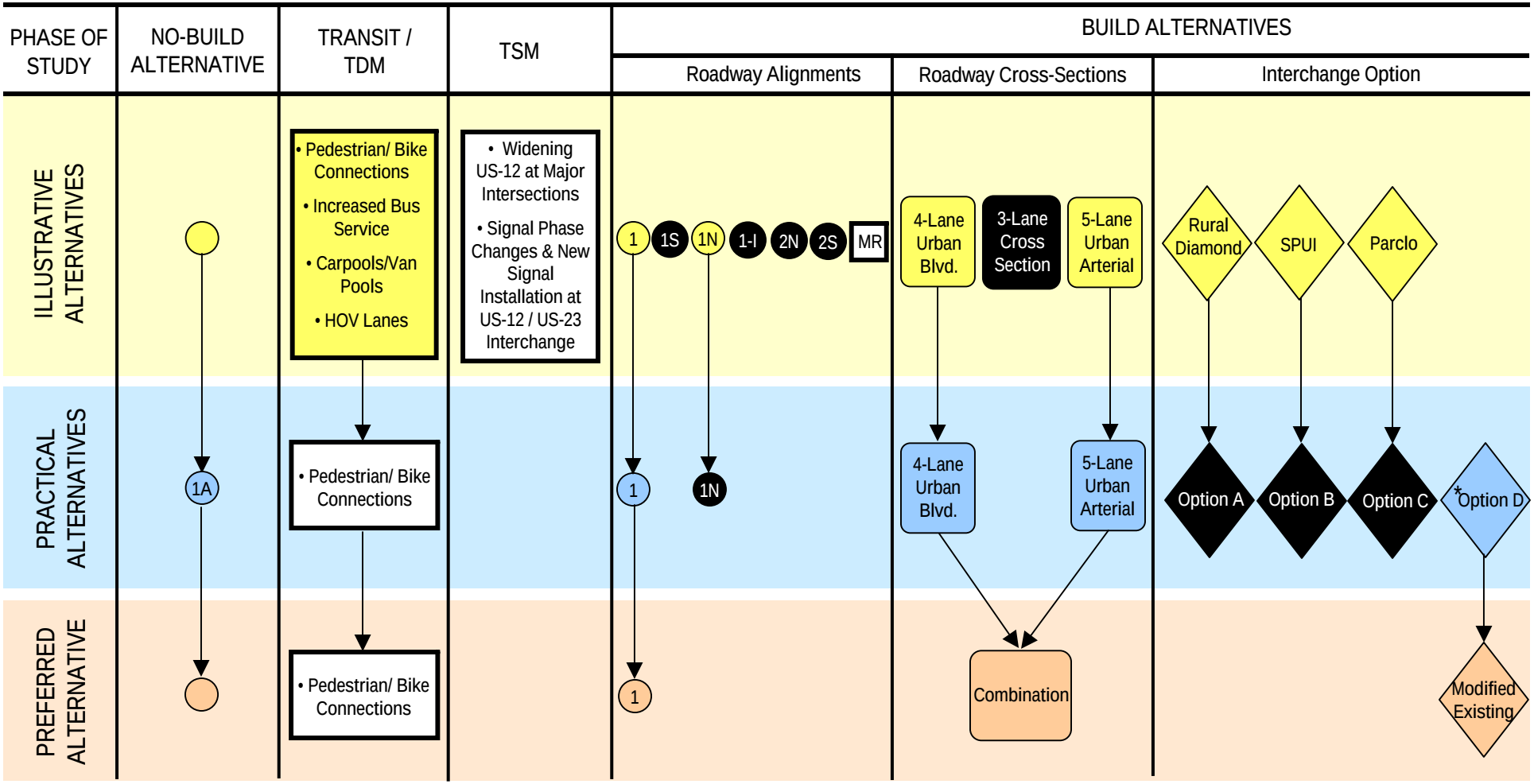
## Table 2.4
## PREFERRED ALTERNATIVE AND ALTERNATIVES 1 and 1-N
## COMPARISON OF IMPACTS
## US-12 IMPROVEMENT STUDY

| Alternatives | | Displacements | | New ROW Required* (acres) | Wetlands Affected* (acres) | Woodlands Affected ** (acres) | Stream Crossings | Historic Properties Affected*** | Recreational Properties Affected (acres)**** |
|---|---|---|---|---|---|---|---|---|---|
| | | Residences | Businesses | | | | | | |
| Preferred | Combination Five-Lane Arterial and Four Lane Boulevard | 10 | 2 | 77.2 | 4.4 | 0.7 | 3 | 4 | 3.8 |
| Alternative 1 | Five-Lane Arterial | 7 | 1 | 66.7 | 4.1 | 0.5 | 3 | 3 | 1.4 |
| | Four-Lane Blvd. | 14 | 4 | 79.7 | 4.7 | 1.1 | 3 | 3 | 1.3 |
| Alternative 1-N | Five-Lane Arterial | 9 | 2 | 84.7 | 5.3 | 6 | 3 | 3 | 16 |
| | Four-Lane Blvd. | 15 | 3 | 104.7 | 6.1 | 9 | 3 | 3 | 20 |

* Includes Improvements to the US-12/US-23 Interchange and additional right-of-way for stormwater detention.
** Woodlands north/south of Textile Road contain potential Indiana Bat habitat.
*** Effects on historic properties would include taking additional land for road right-of-way.
****Recreational property is the Pittsfield Preserve.
Note: The Preferred Alternative was developed as a refinement of Alternative 1 and includes a combination five-lane arterial and four-lane boulevard roadway cross-section. The higher residential and commercial displacements and increased ROW impacts associated with the Preferred Alternative, when compared to Alternative 1 (five-lane arterial) are primarily the result of adding the boulevard section between the Rolling Hills subdivision and the Ann Arbor Railroad. This cross-section was chosen for the Preferred Alternative for the increased travel efficiency, mobility, vehicular safety, and pedestrian and non-motorized safety benefits this option provides US-12 for the State/Moon Road, Old State Road and Fosdick Road intersections. This cross-section is also more compatible with future land uses planned for this section of the US-12 corridor.

## TABLE 2.5
## EVALUATION MATRIX
## Preferred Alternative
## US-12 Improvement Study, Saline to Munger Road, Pittsfield Township

| | EVALUATION CRITERIA | Preferred Alternative<br>Combination 5-Lane Arterial and 4-Lane Boulevard Roadway |
|---|---|---|
| TRANSPORTATION | Level of Congestion/ Level of Service (LOS) | Can accommodate the traffic adequately. Would improve level of service during peak travel demand.<br><br>The center left turn lane of the 5-lane sections will remove the left turns from the through lanes, thus increasing capacity. All intersections operate at LOS B, C, or D for the future 2025 conditions.<br><br>For 4-lane boulevard section, high travel capacity would be achieved through intersections with the elimination of left turns. May possibly introduce additional signals on US-12 if median crossovers need to be signalized. |
| | Access and Mobility | For 5-lane sections, full access will be provided to developments along both sides of US-12. Possibility of left-turn conflicts for vehicles attempting to access closely spaced driveways.<br><br>For 4-lane boulevard section, directional access to developments along US-12 may be limited due to the boulevard median (crossovers will be strategically located). Would make it easier to turn out of driveways along US-12. Roadway right-of-way would accomodate pedestrians and bicycle improvements throughout corridor. |
| | Roadway Compatibility | Yes - it is compatible. The proposed design at both ends of the study corridor is 5-lanes which matches the existing US-12 cross-section. |
| ENGINEERING DESIGN | Compatibility with MDOT Design Standards | Design is compatible with MDOT and AASHTO design standards. |
| | Crash Rates and High Crash Locations | Multi-lane roads typically will reduce crashes by 19-35% over 2-lane roads.<br><br>For boulevard section, studies have shown that boulevards have lower crash rates than five-lane roadways. |
| | Estimated Cost | $ 79,328,407 for Preferred Alternative with modified diamond interchange. See Section 6 of the EA for additonal information. |
| SOCIO-ECONOMIC | Economic Impacts and Benefits | Minor economic impact, primarily during construction; allows high visibility for businesses; left turn movements can be a safety concern.<br><br>For the 4-lane boulevard section, ease of left turn movement can be a benefit. |
| | Community Impacts (including noise and environmental justice) | There will be an overall increase in noise levels; no environmental justice impacts anticipated; pedestrian crossing of 5-lane roadway a potential safety concern. Localized noise reductioin benefits are expected between Campbell and Platt roads.<br><br>For the 4-lane boulevard section, median can provide safe spot for pedestrians although it increases length of pedestrian crossing. |
| | Parklands | Impact to Pittsfield Preserve (3.8 acres). Preferred Alternative is consistent with Pittsfield Township Parks and Recreation Master Plan; provides alternative to minimize use of Section 4(f) land. |
| | Farmlands/Open Areas | Minor farmland impact due to expansion of ROW; no Part 361 farmlands in the US-12 study corridor. |
| ENVIRONMENTAL | Ecological Resources | Minor impact to ecological resources due to expansion of ROW. |
| | Wetlands and Streams | 4.4 acres of wetland impact in two watersheds; mitigation will be provided at one site; 3 stream crossings with existing impaired water quality and aquatic resource value; |
| | Threatened and Endangered Species | Minor impact to Indiana bat habitat (0.7 acres) in woodlot west of Platt Road (north of US-12).. |
| | Historic/Cultural Resources | Would affect 4 historic properties including possible relocation of Morton-Hertler house, Valentine school, and Harwood house. |
| | Hazardous Materials | Contamination concerns are relatively minor; interchange at US-12/US-23 requires ROW and would cause more concern. |
| LAND USE | Consistency with Local Plans and Regional Transportation Plan | Consistent with local plans; would accommodate planned development; could lead to some increase in commercial development and requests for rezoning. |
| | Right-of-Way (ROW) Acquisitions / Displacements | Requires 77.2 acres of new right-of-way (ROW); would relocate or displace 10 residences and 2 businesses; Modified Rural Diamond Interchange would require new ROW in southeast quadrant of existing interchange. ROW total includes additional area needed for stormwater detention. |




LEGEND

XX — ALTERNATIVES ELIMINATED DURING THE COURSE OF THE US-12 IMPROVEMENT STUDY

XX — ALTERNATIVES ELIMINATED AS STAND-ALONE ALTERNATIVES

1-A — EVALUATION OF NO-BUILD ALTERNATIVE, CALLED 1A DURING PRACTICAL ALTERNATIVES PHASE, REQUIRED BY NEPA

1-I — ALIGNMENT ALTERNATIVE WITH INTERCHANGE OPTIONS CALLED 1-I DURING ILLUSTRATIVE ALTERNATIVES PHASE

| | |
|---|---|
| TDM | TRAVEL DEMAND MANAGEMENT |
| TSM | TRANSPORTATION SYSTEM MANAGEMENT |
| HOV | HIGH OCCUPANCY VEHICLE |
| MR | MORGAN ROAD ALTERNATIVE |
| COMBINATION | COMBINATION 4-LANE URBAN BOULEVARD AND 5-LANE URBAN ARTERIAL |
| PARCLO | PARTIAL CLOVERLEAF |
| SPUI | SINGLE POINT URBAN INTERCHANGE |

NOTE:

* OPTION D INTERCHANGE IS EQUIVALENT TO MODIFIED EXISTING INTERCHANGE

US-12 IMPROVEMENT STUDY

MDOT Michigan Department of Transportation

FIGURE 2.7
ALTERNATIVES SELECTION PROCESS