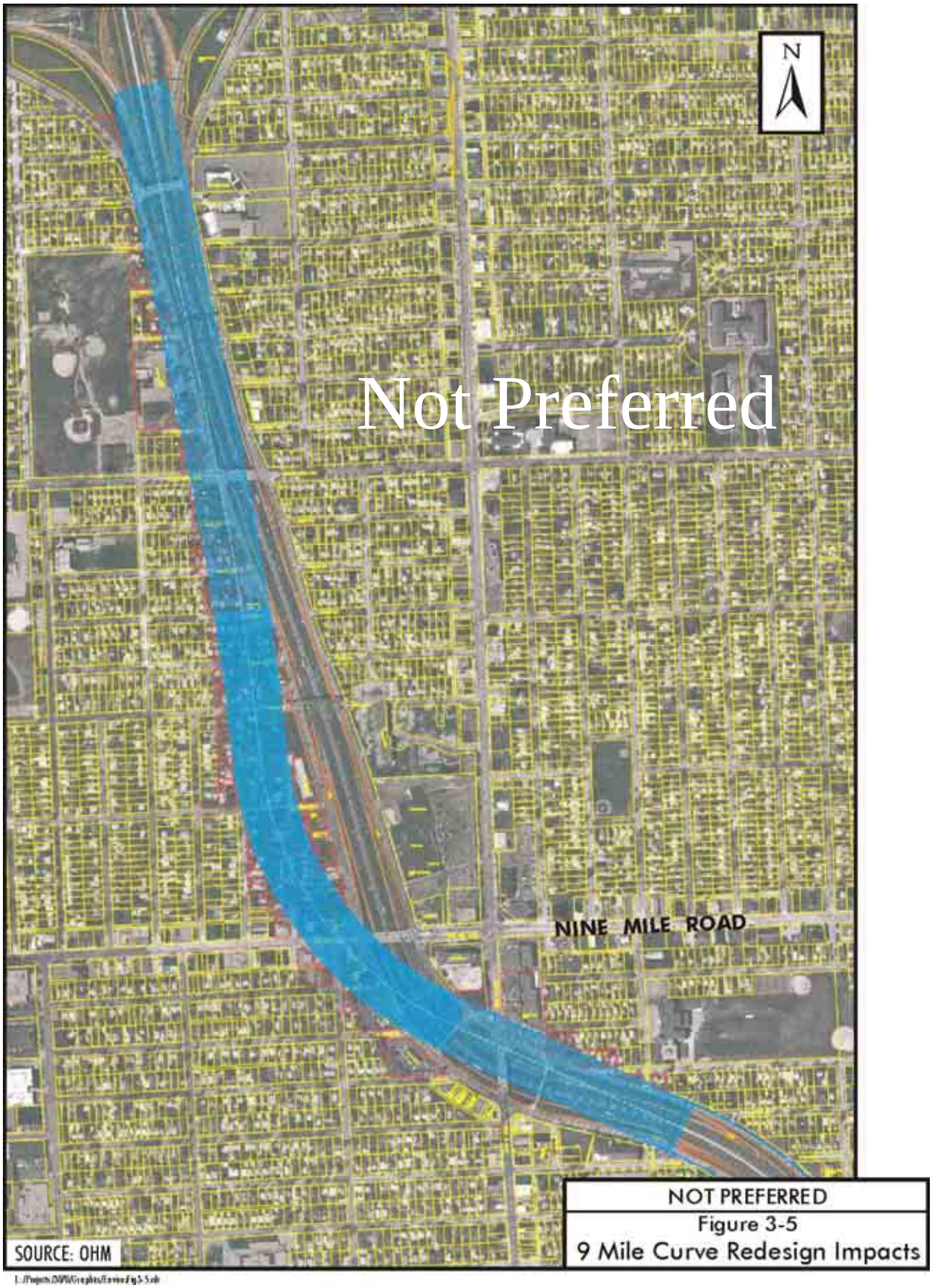
N
Not Preferred
NINE MILE ROAD
SOURCE: OHM
NOT PREFERRED
Figure 3-5
9 Mile Curve Redesign Impacts

3.7.2 I-75 Lane Addition for HOV Use – HOV Alternative

The proposed fourth lane would be dedicated for use by high-occupancy vehicles in peak hour periods only. The proposal is to limit this lane for use by vehicles carrying two or more persons (carpools, vanpools, and buses) during the morning and afternoon peak periods (preliminary analysis of traffic data suggests a morning period of 7 to 9 AM, and an afternoon period of 4 to 6 PM.) Computer modeling found that limiting the HOV lane to 3 or more persons restricted use to the point that the lane is not viable. For the lane to be effective, enforcement must be strict.[46]

Based on the experience with HOV in other locations nationwide, a standard, 12-foot highway lane can be marked for HOV use (Figure 3-6). The HOV lane would be on the inside, concurrent with other I-75 traffic flow. It would be designated by signing and pavement markings.

Three HOV options were tested during DEIS analysis.[47] Testing extended north to M-15, as this was the northern limit of its viability, according to the modeling effort. This does not mean HOV would extend that far north under the Preferred Alternative. It merely provided the background of analysis necessary to test the inclusion of HOV in the final practical alternatives.

Option A called for one new HOV lane in each direction between M-102 and M-15, with modifications at interchanges (except M-102) to allow direct access to the HOV lane on the inside of the freeway. Flyovers or special ramps would connect directly to the HOV lane. This approach would require right-of-way acquisition because, wherever a ramp enters or exits, a space must be created between the general-purpose travel lanes and the HOV lane for the special access ramp to occupy (Figure 3-7). Option B took a similar approach (special access), but limited the extent of HOV to the section of I-75 between I-696 and M-59, which computer modeling found to be the most attractive for HOV. Option C called for only striping and signing of the HOV lane, from M-102 to M-15 and special construction northbound through the Square Lake interchange (Figure 3-8).

The result of the impact analysis found the differences among the options were significant (Table 3-2). Option C would not require relocation of homes or businesses. Option A, between M-102 and M-59, could result in impacts to 24 business structures, 78 single-family dwellings, 74 multi-family dwellings, 3 churches, 3 institutions and 8 acres of wetlands. Option A would also substantially increase the project's construction cost, adding an estimated $262 million that does not include right-of-way costs. If the full-access HOV concept were limited to the section between I-696 and M-59 (Option B) the impacts would be less: 9 businesses, 37 single-family dwellings, 74 multi-family dwellings, 2 churches, 3 institutions, and 8 acres of wetlands, at a construction cost of $179 million. Options A and B were not considered practical.

Option C, basic HOV designation through signing and striping (shaded in Table 3-2), had few additional impacts relative to the GP Alternative. The exception was 0.4 acres of wetland and a minimal additional cost. This HOV approach would require special construction through the Square Lake Road interchange in the northbound direction (Figure 3-8). The HOV lane would separate from the northbound through lanes of I-75 to allow it to pass over the left exit to Square Lake Road and the left entrance from Square Lake Road. The bridges associated with this treatment would cost an estimated $2.5 million. The Option C approach, which required no special access and minimal impacts was incorporated into the Preferred Alternative within the project limits only.

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[46] *I-75 Corridor Planning/Environmental Study Refined Analysis of Transit and HOV Concepts (Technical Memorandum No. 2)* by The Corradino Group for MDOT, October 2002.
[47] Ibid.

Signing

HOV Operation

Enforcement

Figure 3-6
Basic HOV
Example Facilities

SOURCE: HOV Interactive 1.0, Federal Highway Administration, 1996

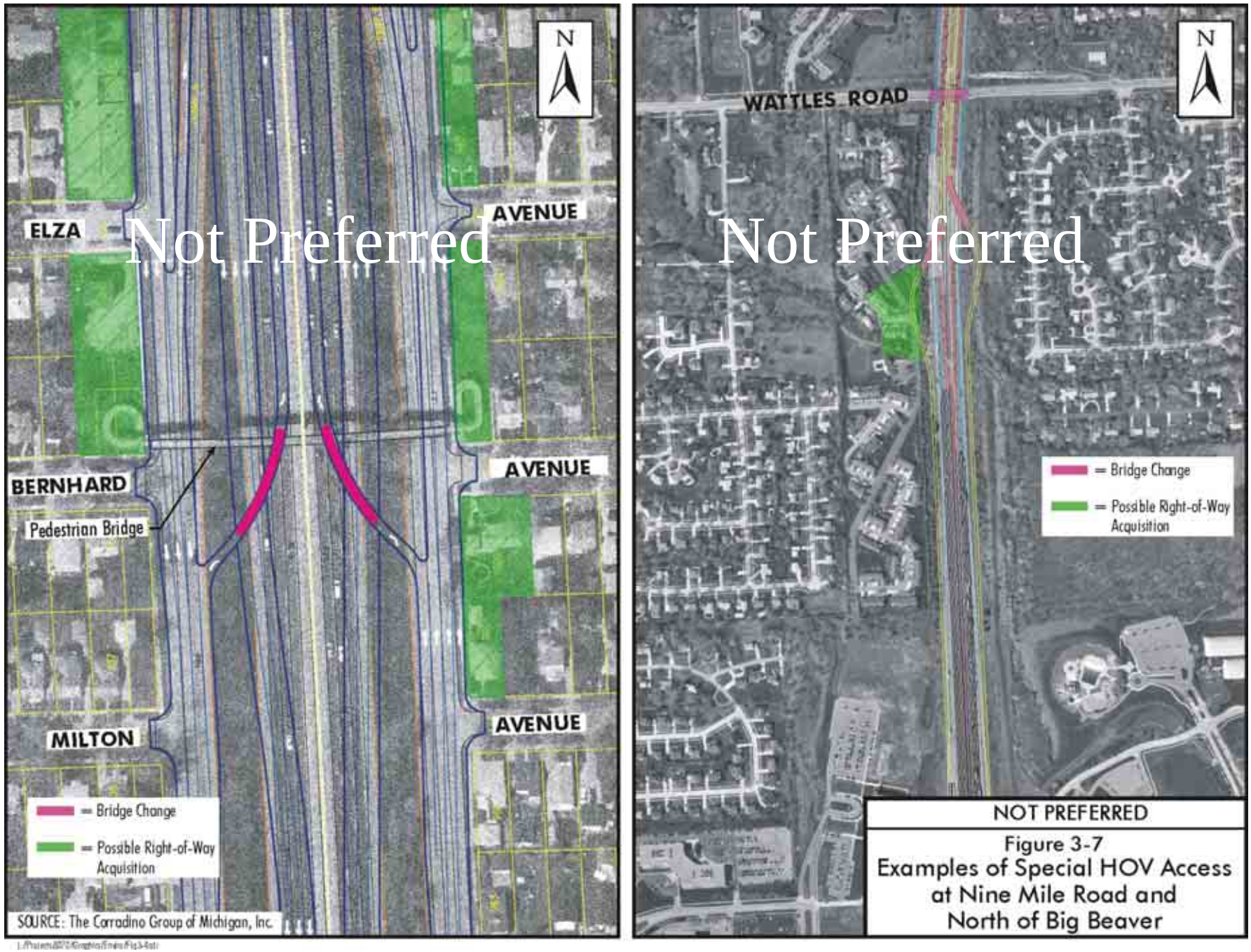


Figure 3-7
Examples of Special HOV Access at Nine Mile Road and North of Big Beaver

Figure 3-8
HOV Lane - Northbound
Through Square Lake Interchange

Table 3-2
Impacts of HOV Options

TYPE OF IMPACT	OPTION A	OPTION B	OPTION C
Relocated Business Structures	24	9	0
Relocated Single-family Dwellings	78	37	0
Relocated Multiple-family Dwellings	74	74	0
Relocated Churches	3	2	0
Relocated Institutions	3	3	0
Wetlands Taken (acres)	8	8	0.4
Cost	$262,000,000	$179,000,000	$6,000,000

Source: The Corradino Group of Michigan, Inc.
Note: Option A is special access from M-102 to M-15. Option B is special access from I-696 to M-59. Option C is signing and striping only and is shaded, as it is the preferred option.

For any HOV option, capital costs related to signing and striping could amount to another $3.5 million. And, enforcement is essential for the proper functioning of the lane. Costs could range from $1 to $4 million, annually, depending on the level of stringency. The more enforcement, the greater the effectiveness of the HOV lane. Enforcement responsibilities would need to be discussed among the Michigan State Police and local jurisdictions.

The above analysis led to the conclusion that the costs and impacts of the full-access HOV lane make Options A and B infeasible, especially considering that special access ramps led to virtually no additional use of the HOV lane. The additional costs and impacts cannot be justified. Therefore, only the basic HOV concept (Option C) was advanced for consideration in this EIS.

Four through lanes are already present on I-75 north of Square Lake Road to west of M-24. To carry the HOV lane north of Square Lake Road will require federal approval to convert the existing fourth through lane from a general-purpose lane to an HOV lane. Long-range planning calls for the fourth lane on I-75 to be constructed north to the Oakland / Genesee county line. Computer modeling indicates the portion of I-75 north to M-15 meets the criteria for HOV designation. So, if that section is built later, the HOV lane could extend to M-15.

The key to determining whether HOV should be pursued is how well it performs relative to development of a general-purpose (single-occupancy) lane and how well it may be received by institutions and the public. Enforcement is an important component of public acceptance.

Tests indicate an HOV lane as proposed under Option C would meet the following, generally accepted criteria for HOVs:[48]

- There should be at least 700 vehicles in the HOV lane during the peak hour.
- The HOV lane should carry more people than the adjacent general-purpose lane.
- The total freeway throughput should be greater with the HOV lane than without.

[48] SEMCOG's regional transportation computer model was used as a base. A "mode-choice" component was added to the model by The Corradino Group for the HOV analysis for this EIS. SEMCOG has developed peak hour factors that can be used for the afternoon peak hour, but there are no such factors for the morning peak, so all model runs are for the PM peak. More detailed model results are in *Technical Memorandum 2, Refined Analysis of Transit and HOV Concepts*, December 2002.

To test the HOV lane in a realistic manner, the assumption was made that "violators" - driver-only (single occupant) vehicles would try to take advantage of the reduced congestion and higher speed of the HOV lane. The violation rate in the computer model was set at 20 percent. This reflects real world experience when there is a moderate rate of enforcement. Option C meets all three criteria in the northbound direction with the 20 percent violation assumption (Table 3-3). The HOV lane, as noted previously, was assumed to extend to M-15 which modeling showed to be the northern limit of HOV viability. Also, the modeling was for 2+ HOVs. A test of three or more persons per vehicle did not satisfy any of the three criteria listed above.

An examination of the southbound HOV conditions found that even in the non-peak direction (the travel model represents peak afternoon conditions only) two of three criteria are met. But for M-102 to M-59, all three criteria are met and those are the limits of this project. This test was run with no violations to minimize the number of vehicles in the HOV lane (Table 3-4).

Table 3-3
HOV Tests - 2025 PM Peak Hour – Northbound – 20% Violation Rate

Key Segment	Total HOV Lane Vehicles per Hour	Person Throughput per Lane		HOV Increase in Total Freeway Person Throughput	Passes Test
		HOV Lane	General Purpose Lane Average		
M-102 to I-696	1,660	3,630	1,920	30+	Yes
I-696 to 12 Mile	2,270	5,020	2,390	840+	Yes
12 Mile to 14 Mile	2,020	4,480	2,080	410+	Yes
Square Lake to M-59	2,140	4,710	2,170	660+	Yes
Sashabaw to M-15	1,110	2,340	1,540	240+	Yes

Source: The Corradino Group of Michigan, Inc.

Table 3-4
HOV Tests - 2025 PM Peak Hour – Southbound – No Violators

Key Segment	Total HOV Lane Vehicles per Hour	Person Throughput per Lane		HOV Increase in Total Freeway Person Throughput	Passes Test
		HOV Lane	General Purpose Lane Average		
M-102 to I-696	1,450	3,620	1,820	180+	Yes
I-696 to 12 Mile	2,150	5,350	2,410	1,190+	Yes
12 Mile to 14 Mile	1,780	4,420	1,950	370+	Yes
Square Lake to M-59	1,540	3,800	1,970	80+	Yes
Sashabaw to M-15	320	770	1,050	10+	No

Source: The Corradino Group of Michigan, Inc.

Because the test was for the non-peak direction, the viability of an HOV lane all the way to M-15 is still supported. However, this result highlights a common problem with the implementation of HOV lanes - the "empty lane" syndrome. For an HOV lane to function properly, it must carry fewer vehicles than the adjacent general-purpose lane. Some motorists feel that the lane is "not being used" and "taxpayer's money is being wasted," when in fact, the lane should be somewhat "empty" since the real test of HOV is whether the overall throughput of the road is increased.

An examination of traffic data available from two MDOT permanent traffic count recorder stations assisted in a determination that operation of HOV lanes should be in both directions during both the morning and afternoon peak periods, likely from 7 to 9 AM and 4 to 6 PM. This scenario will be subject to review at the time of HOV implementation. As HOV has become the Preferred Alternative, the development of additional carpool lots and park-and-ride facilities[49] along this corridor is being pursued to support the implementation of the HOV lane (see Section 3.9).

3.7.3 Specific Design Issues

This section documents consideration of several specific design elements that were considered for inclusion in the build alternatives.

10-Foot Inside (Median) Shoulders

Ten-foot inside shoulders meet modern design standards, but 12-foot inside (median) shoulders are desirable compared to 10-foot shoulders when more than 250 trucks are present in the peak travel hour, as would be the case on I-75. I-75 is now designed with 10-foot shoulders. To add the two additional feet would require total reconstruction of all the bridges from 12 Mile Road north to the north project limit. With 10-foot shoulders the bridges could be widened. Ten-foot median shoulders are considered practical. Twelve-foot shoulders are not, for the following reasons:

- Consistency/Safety: The Square Lake interchange improvements constructed in 2002 included a 10-foot median shoulder. The designs for I-75 at its interchanges with M-59 and Crooks/Long Lake roads are designed with a 10-foot median shoulder. And, I-75 to the south of M-102 and north of M-59 have 10-foot median shoulders.
- "Gapping out": meaning limiting 12-foot median shoulders to those locations where they fit, would limit its use to about half of the project's 18 miles between M-102 and M-59. Changing the median shoulder width to 12 feet in some sections of I-75 will negatively affect driver expectation and, potentially, safety.
- Community Relocations: There would be impacts to four churches and four residential parcels (no more than 0.1 acres total of land purchased from frontages over the 10-foot median condition).
- Cost: Development of a 12-foot median shoulder would lead to an increase in project costs of over $100 million.

Redesigning the Big Beaver Road Curve

The curve at the Big Beaver interchange does not conform to the rural standards to which it was designed, but the area is now urbanized. It does meet urban standards. Redesigning the curve to the rural standard would require reconstruction of the interchange. The interchange could be shifted to smooth the curve, but a motel and buildings of the City of Troy government complex, which are located on the inside of the curve, would be affected. Therefore, this option is not considered practical.

[49] Carpool lots are managed by MDOT. SEMCOG assists in management of park-and-ride facilities, which include transit service. Lots along I-75 could be served by SMART – the Suburban Mobility Authority for Regional Transportation.

Eliminating the Left Exit/Entrance on Northbound I-75 at Square Lake Road

The policy of the American Association of State Highway and Transportation Officials (AASHTO) is that "left-hand entrances and exits are contrary to the concept of driver expectancy when intermixed with right-hand entrances and exits."[50] To convert the left exit and entrance to a right exit and entrance on northbound I-75 at Square Lake Road would require the construction of two flyover type ramps (Figure 3-10). Both would require new right-of-way acquisition or realignment of the northbound lanes of I-75.

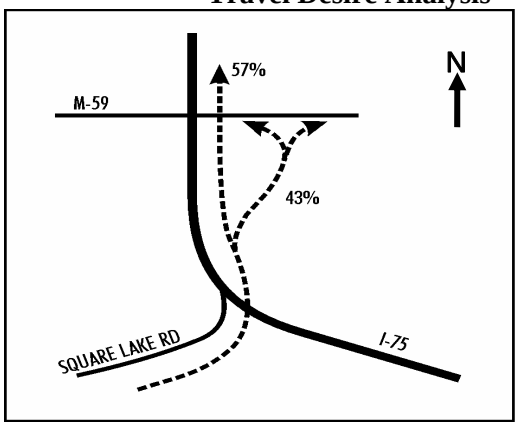
Shifting the **left exit** to the right would impact an estimated 11 single-family homes, 0.1 acres of wetland, a private retention pond, and a noise wall, which would have to be relocated. Shifting the **left entrance** to the right would affect an additional 37 townhouse-style condominiums and a second noise wall would have to be relocated.

The construction cost of the flyovers, the noise wall relocations, wetland mitigation and a new retention pond would be about $8.2 million. Right-of-way acquisition for the residences at the exit and entrance ramps would add $22 million more for a total of $30.2 million. Shifting the mainline lanes of I-75 to avoid right-of-way impacts would be very costly, as the geometry of the interchange would be affected.

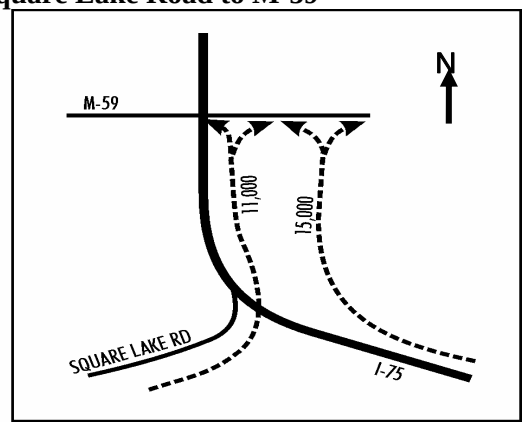
An analysis based on data from the computer travel model found that those vehicles entering northbound I-75 from eastbound Square Lake Road generally want to go north on I-75, rather than weaving over to the right to get to M-59 (Figure 3-9). And, the number of vehicles northbound on I-75 that want to go to M-59 is greater than the number from eastbound Square Lake Road that want to go to M-59. So, the analysis supports leaving the left exit and entrance where they are.

Crash data in Table 2-8 do not indicate a problem at the Square Lake interchange. Potential relocations, cost, environmental impacts, and the examination of travel patterns support leaving the left exit and entrance. Therefore, it is recommended that the existing configuration be left in place.

Figure 3-9
Travel Desire Analysis – Square Lake Road to M-59



A greater % of vehicles from eastbound Square Lake Road go north on I-75 than to M-59



More vehicles from I-75 exit to M-59 than from eastbound Square Lake Road

[50] *A Policy on Geometric Design of Highways and Streets*, Chapter 10, p. 845, American Association of State Highway and Transportation Officials, 2001.

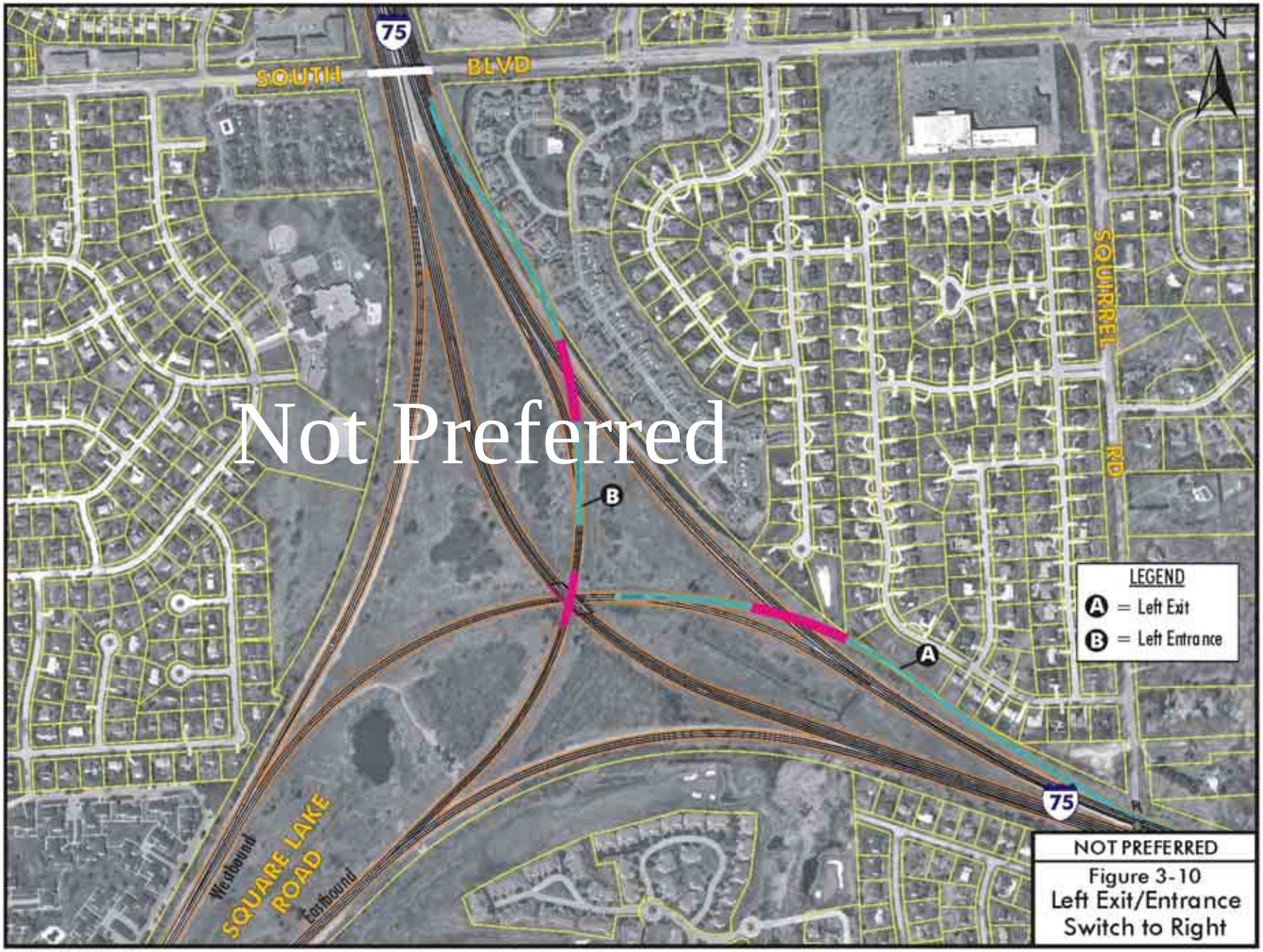
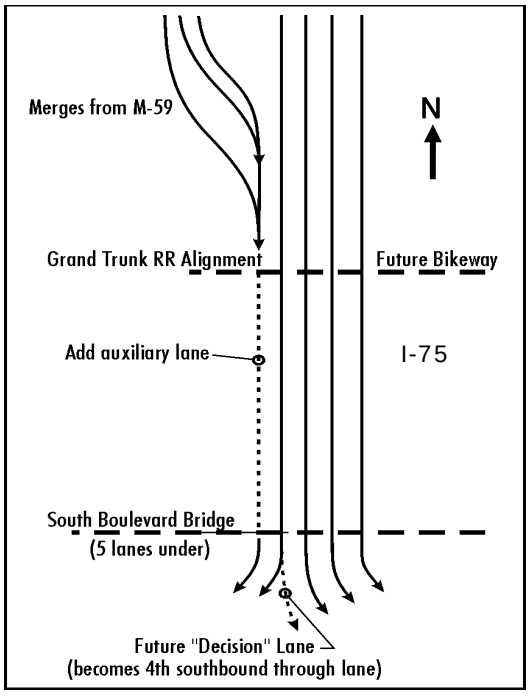

Not Preferred
75
SOUTH
BLVD
SQUIRREL
RD
N
B
A
LEGEND
A = Left Exit
B = Left Entrance
75
SQUARE LAKE
ROAD
Westbound
Eastbound
NOT PREFERRED
Figure 3-10
Left Exit/Entrance
Switch to Right

Figure 3-11
Southbound Lane Use M-59 to Square Lake



Auxiliary Lane, Southbound I-75 from M-59 to Square Lake Road

The M-59 interchange with I-75 is to be reconstructed as a separate project. When that interchange is rebuilt, a collector-distributor road that carries local traffic southbound through the interchange and the ramps from M-59 will merge, successively, with southbound I-75 (Figure 3-11). Discussion with M-59 designers indicates that an auxiliary lane should be carried south all the way to the Square Lake Road interchange. The successive southbound merges from the I-75/M-59 interchange will reduce, in the end, to one. That lane will continue as an auxiliary lane to become an exit-only lane at the Square Lake Road interchange. So, the Preferred Alternative will tie to the separate I-75/M-59 interchange project to the north of South Boulevard.

Auxiliary Lane, Northbound I-75 from Square Lake Road to M-59

Northbound, two lanes from Square Lake Road now join the three lanes of I-75 to form the five-lane section that proceeds north to M-59. In the future, an additional northbound lane will be added. Six lanes will then carry under the South Boulevard bridge and continue north to the I-75/M-59 interchange. At that point, two lanes will exit (to eastbound and westbound M-59) and four lanes will continue through the interchange.

I-696 Interchange

Traffic exiting eastbound I-696 to northbound I-75 backs up frequently, blocking through-movements on I-696. Reconstruction of the entire four-level interchange linking these interstates is not practical, because of significant impacts and costs. The primary cause of backups at this location is an inability to merge into the northbound traffic flow on I-75. Increasing the length of the merge will help alleviate this situation. To do this, the recommendation is to shift the off-ramp to 11 Mile Road to a point south of Lincoln Avenue so it can pass under the merged northbound on ramps from I-696 (Figure 3-12). This avoids the conflict between the two ramps. This safety and operational improvement could require relocation of 23 single-family dwellings and a church (subject to refinement during the design phase). The ramps from eastbound I-696 and from westbound I-696 would merge first, as they do today. Then, this merged ramp would pass over the off-ramp to 11 Mile Road. The two-way crossover bridge at Dallas Avenue would be removed to accomplish the braiding. Its function would be replaced by a new bridge just south of Lincoln Avenue serving the east-to-west movement. The west-to-east traffic now served at the existing Dallas Avenue bridge is minimal and would be served by the Lincoln Avenue bridge. Royal Oak and Madison Heights favor retaining the Dallas bridge, but the braid cannot be built without its removal.

Figure 3-12
I-696 Ramp Braiding

12 Mile Road Interchange

The I-75 Feasibility Study suggested the interchange at 12 Mile Road should be reconstructed as a Single-Point Urban Interchange (SPUI) (Figure 3-13a). The SPUI design brings ramp ends together at a single point and provides for a three-phase traffic signal operation. The three phases control: 1) left turns from the ramps ends; 2) left turns to the entrance ramps; and, 3) the through movement of the cross road (12 Mile Road). The SPUI proposed for 12 Mile Road would reduce the footprint of the interchange, releasing the land for other uses. The Road Commission for Oakland County supports SPUI development (see letter dated January 15, 2004 in Section 6.4, Letter 12).

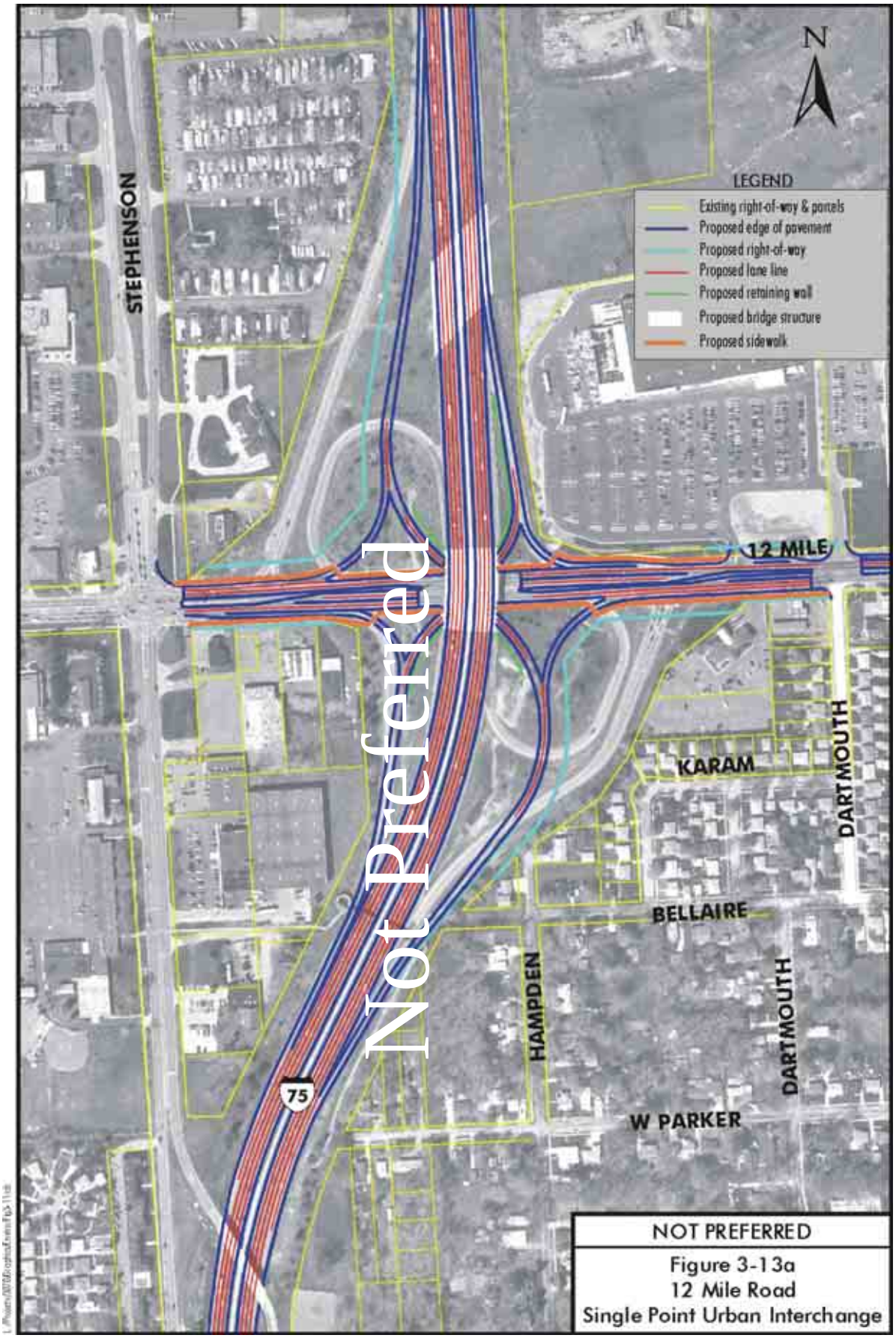
More detailed analysis for this EIS found that the existing interchange could be modified to serve traffic adequately (Figure 3-13b), as volumes at this interchange are relative low. Backups on 12 Mile Road from Stephenson Highway block vehicles exiting the southbound off-ramp. To remedy this situation, the loop ramp in the northwest quadrant could be eliminated to allow the end of the southbound off-ramp to be shifted east, away from Stephenson Highway. The substitute for the loop ramp would be a left turn from westbound 12 Mile Road to the existing southbound on-ramp in the southwest quadrant of the interchange. 12 Mile Road and the southbound on-ramp would be modified. The necessary widening of 12 Mile Road would require reconstruction of the I-75 bridges over 12 Mile Road. The signalized intersection at the end of the southbound off ramp would also control the westbound to southbound left turn from 12 Mile Road. The overall 2025 PM peak hour level of service of this intersection would be C, but the left turn would be E. The LOS of the intersection at the end of the northbound off ramp would be C. These compare to a LOS with the SPUI of C (Table 3-5).

Table 3-5
Level of Service – 12 and 14 Mile Road Interchange Options

Signalized Intersection			2025 AM Peak Hour	2025 PM Peak Hour
12 Mile	SPUI	Central Signal	C	C
	Modification	West	C	C
		East	B	C
14 Mile	SPUI	Central Signal	D	F
	Modification	Southbound Off	C	C
		Southbound On	B	B
		Northbound Off	C	D
		Northbound On	A	A

Source: URS Corporation

Both options that were considered provided sidewalks along the north and south sides of 12 Mile Road (see the orange lines in Figures 3-13a and 3-13b). With the SPUI, most ramp traffic is stopped at some point by signals. (The exceptions are right turns from off-ramp ends and right turns to entrance ramps.) Reducing the speed of vehicles at crossing points helps pedestrians and bicyclists. The speed of vehicles in the SPUI can be controlled by minimizing the radius of curvature of the ramps near where pedestrians cross, consistent with design standards.



NOT PREFERRED

Figure 3-13a
12 Mile Road
Single Point Urban Interchange

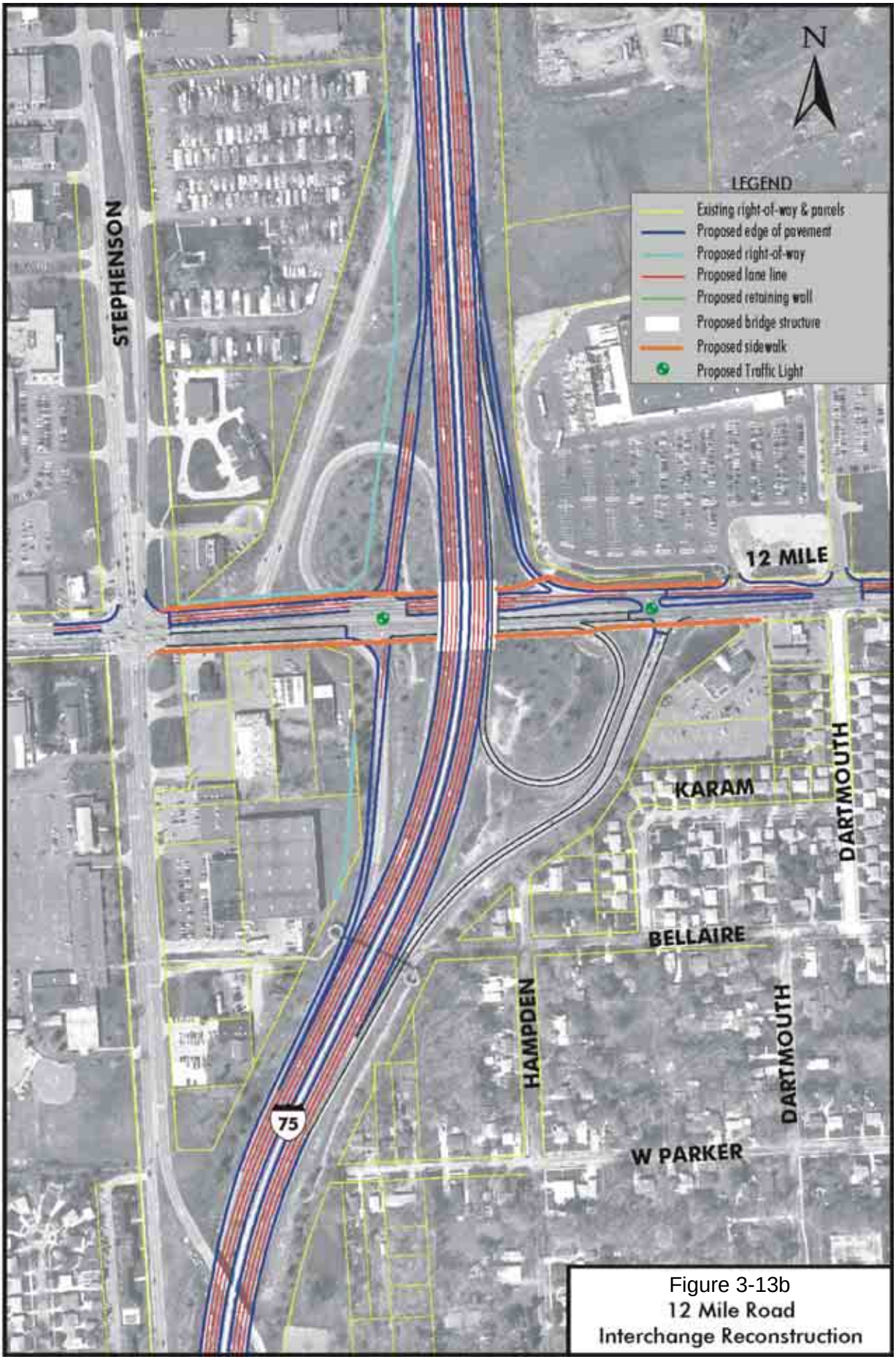


Figure 3-13b
12 Mile Road
Interchange Reconstruction

Because both options at 12 Mile Road are feasible and practical, MDOT will re-examine the interchange design (modification, SPUI, etc.) in the design and value engineering phases of the project. The reconstruction of the interchange is included as a part of the Preferred Alternative.

14 Mile Road Interchange

The I-75 Feasibility Study made a preliminary determination that the 14 Mile Road interchange would be reconstructed as a SPUI. More detailed analysis for this EIS found that modification of the existing interchange would serve traffic better than the SPUI design. SPUIs operate well in situations where the turn movements are relatively balanced (i.e., opposing left turns or through movements have similar volumes). This is not the case at 14 Mile Road. With the SPUI, the LOS of the single intersection would be F (Table 3-5). Modifying the existing configuration would result in a LOS of C at the terminus of the southbound off ramp and an LOS D at the terminus of the northbound off ramp. The intersections that control entrance to the on ramps would operate at LOS B (west) and LOS A (east).

The Oakland Mall and associated developments draw travel to the east of I-75. This attraction is much stronger than it is to the west. This unbalanced situation will continue and is better served by adding capacity to the existing interchange (Figure 3-14). In particular, through capacity will be added on 14 Mile Road, and left-turn capacity from 14 Mile Road to I-75 will be increased. These changes will necessitate the reconstruction of the I-75 bridges over 14 Mile Road.

Substantial improvement in traffic flow in the vicinity of the 14 Mile Road interchange can only be realized if improvements are made to 14 Mile Road at the Oakland Mall. MDOT has sponsored meetings on this subject with the Road Commission for Oakland County, the cities of Troy and Madison Heights, and representatives of the Oakland Mall. Dialogue on improvements to 14 Mile Road is expected to continue beyond this project.

Sidewalks will be provided along both the north and south side of 14 Mile Road through the interchange. Workers and shoppers at the Oakland Mall walk to and from the transit service provided on Stephenson Highway. There is a sidewalk only on the north side, but the City of Madison Heights is planning to construct a similar sidewalk on the south side. Sight distance is critical to the safety of pedestrians and bicyclists where they cross the loop ramps. These areas should be kept clear of landscaping materials.

3.8 Practical Alternatives

Several key impacts of the potential build alternatives that led to the determination of practical alternatives are noted in Table 3-6. Construction of the lane addition to full standards (fixing the 9 Mile Road curve) and the special access HOV options had significantly greater impacts and cost than the GP Alternative or the basic HOV (Option C) Alternative. Therefore, the practical alternatives carried forward through the DEIS were:

- No Build Alternative – Continued regular maintenance with no capacity improvements.
- GP Alternative – Addition of a general-purpose travel lane between M-102 and north of Square Lake Road to bring the number of through travel lanes to a total of four in each direction.

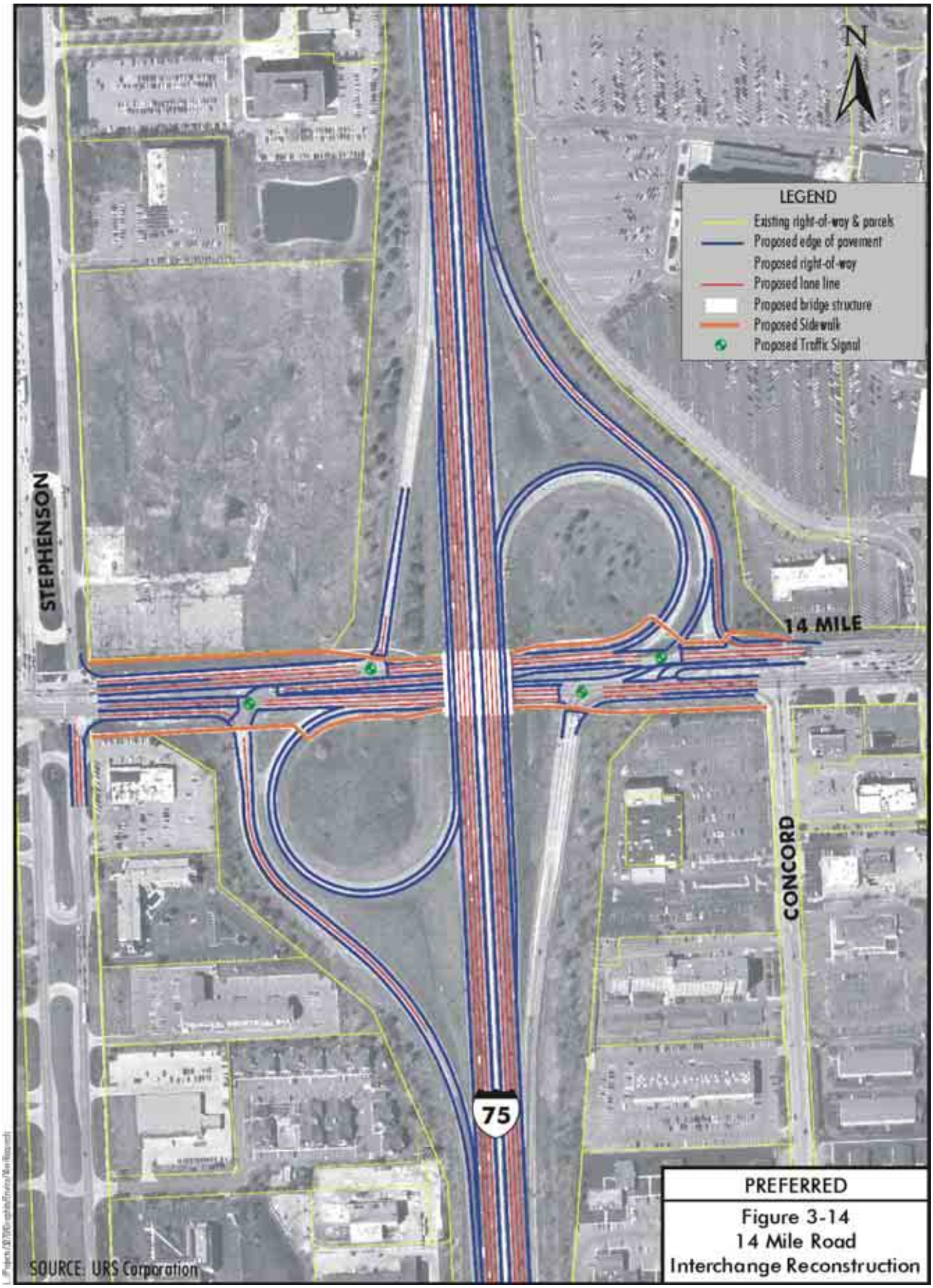

N
LEGEND
Existing right-of-way & parcels
Proposed edge of pavement
Proposed right-of-way
Proposed lane line
Proposed bridge structure
Proposed Sidewalk
Proposed Traffic Signal
STEPHENSON
14 MILE
CONCORD
75
SOURCE: URS Corporation
PREFERRED
Figure 3-14
14 Mile Road
Interchange Reconstruction

Table 3-6
DEIS Build Alternatives Impact Summary
(Note that these alternatives are distinct from the Preferred Alternative, but the refinement of Option C led to the Preferred Alternative)

Alternative	Cost (millions 2004)	Wetlands (acres)	Relocations		
			Dwelling Units	Businesses	Institutions
General Purpose	$530	0	1	2	0
Lane Addition - Full Standards[a]	$649	0	100	22	2
HOV - Option A - Special Access M-102 to M-15	$816	8	152	24	6
HOV - Option B - Special Access I-696 to M-59	$730	8	111	9	5
HOV - Option C - Signing & Striping	$546	0.4	11	2	0

Source: The Corradino Group of Michigan, Inc.
[a]This alternative would have reconstructed the 9 Mile curve to modern standards. Totals to the right do not include 30 vacant lots.

- HOV Alternative – Addition of an HOV lane in the same manner as the general-purpose lane, but signed and striped for HOV use during the peak hours (Option C). The HOV lane is carried through the Square Lake Road interchange.

The GP and HOV practical alternatives were to be accompanied by:

1. Replacement of all bridges in the depressed section from north of M-102 to south of 12 Mile Road, as all need to be lengthened.
2. Widening of all I-75 bridges north of 14 Mile Road (plus the I-75 bridge over 13 Mile Road) to accommodate the lane addition.
3. Improvements at the 12 Mile Road interchange (two options) and 14 Mile Road interchange;
4. Ten-foot, rather than 12-foot inside (median) shoulders;
5. The ramp braiding north of I-696 (with the relocation of the Dallas Avenue crossover bridge to south of Lincoln Avenue);
6. Reconstruction of the pedestrian bridges over the depressed section of the freeway, and addition of a sidewalk through the I-696 interchange on the east side of I-75;
7. Construction of a new storm water system in the south part of the corridor; and,
8. New storm water retention in the north section of the corridor.

Computer modeling finds that mass transit is viable in the Woodward Corridor, but clearly shows that, even under the best-case scenario, a Mass Transit Alternative cannot eliminate the need for four travel lanes in each direction through the project length on I-75. Nevertheless, the transit concept has been included in the background system, along with the roadways in the cost-feasible *Regional Transportation Plan*. TSM, TDM, and ITS are also incorporated into all alternatives.

The practical alternatives included auxiliary lanes planned with the separate I-75/M-59 project. The interchanges of I-75 with M-59 and Crooks/Long Lake Road, while not part of this project and EIS, are considered part of the background system. The designs of the three projects will be integrated with each other, even though each has independent utility.

These practical alternatives were presented at the public hearing.

3.9 Preferred Alternative

A Preferred Alternative was identified after the public hearing and comment period when all comments had been considered. It includes the HOV approach of Option C within the project limits, as identified in Section 3.8. This HOV application is consistent with the findings of an MDOT study conducted in 1999 to identify potential HOV lane development locations in Southeast Michigan.[51] The Preferred Alternative lane addition will be built as shown in Figure 1-1. The Preferred Alternative will also include:

1. Replacement of all bridges in the depressed section from north of M-102 to south of 12 Mile Road, as all need to be lengthened.
2. Widening of all I-75 bridges north of 14 Mile Road (plus the I-75 bridge over 13 Mile Road) to accommodate the lane addition.
3. Improvements at the 12 Mile Road interchange (two options) and 14 Mile Road interchange;
4. Ten-foot, rather than 12-foot inside (median) shoulders;
5. The ramp braiding north of I-696 (with the relocation of the Dallas Avenue crossover bridge to south of Lincoln Avenue);
6. Reconstruction of the pedestrian bridges over the depressed section of the freeway, and addition of a sidewalk through the I-696 interchange on the east side of I-75;
7. Construction of a new storm water system in the south part of the corridor; and,
8. New storm water retention in the north section of the corridor.

3.9.1 Additional Considerations Not Included in Preferred Alternative

Several refinements and additions considered as a consequence of the public hearing / comment process were not included in the Preferred Alternative or require further study. These are:

- A shift of the southbound I-75 on ramp that is south of 11 Mile Road.
- A modified treatment over the Red Run Drain so the option of a non-motorized path under I-75 is not precluded, and inclusion of a non-motorized path extending north from Gardenia or 12 Mile Road to 14 Mile Road.
- HOT lanes.

Shifting the 4th Street Southbound On Ramp North to 11 Mile Road

In comments on the DEIS, the City of Royal Oak and a number of citizens opposed this shift. They maintain that traffic will divert to three local residential streets, as traffic on 4th Street found its way north to 11 Mile Road to access the shifted ramp. They further indicate that the emergency response time to incidents on I-75 will suffer. These issues are discussed in Section 6.3. MDOT and FHWA have studied this location. Shifting the ramp will not occur and the geometrics of the entry point to the ramp at 4th Street will be improved.

Modified Bridge over the Red Run Drain and Non-motorized Path Extending north from Gardenia or 12 Mile Road to 14 Mile Road

The DEIS recommended that the bridge over the Red Run Drain be eliminated. In their comments on the DEIS, Madison Heights requested that the potential for non-motorized access

[51] *Southeast Michigan High-Occupancy Vehicle (HOV) Feasibility Study, Final Report*, Parsons Brinckerhoff Michigan, Inc. for the Michigan Department of Transportation, May 7, 1999.

under the I-75 bridge not be eliminated. The Red Run Drain is in a 14'3"x13'3" triple box culvert beneath the ground surface that one sees under the I-75 bridge. There is soil, rather than a watercourse under the existing bridge. Due to the presence of the drain below ground level, modification of the existing bridge over the drain must account for the loading placed on the drain and the maintenance of access to it. The design phase will consider all these factors in replacing/modifying this structure.

Madison Heights also requested continuing non-motorized access along the east side of I-75 from Gardenia north to 14 Mile Road. This recommendation would be subject to an adopted county-wide plan.

HOT Lanes

The Road Commission for Oakland County has indicated they do not support the development of HOV lanes at the loss of through lanes (see letter dated January 15, 2004 in, Section 6.4, Letter 12). This project will not develop HOV at the loss of a through lane; a lane is to be added. RCOC also suggests considering the development of high occupancy toll lanes (HOT) lanes. That suggestion is considered here.

HOT lanes combine HOV and pricing strategies, (i.e. tolls) to maximize capacity of existing freeways, while providing revenue. An HOV lane is intended to move traffic faster than adjacent general-purpose lanes, otherwise there is no travel time advantage and no reason for the lane. Experience has shown the general public sometimes perceives the lane to be "underused" at the expense of its own mobility. The result is what is described as the "empty lane" syndrome.

HOT lanes offer a means of adjusting demand up or down through dynamic pricing (i.e., the application of fees/tolls) to maximize use of an HOV lane, while maintaining a high level of service. The advantages of HOT lanes indicated by proponents are that they:

1. Expand mobility options in congested areas for those willing to pay;
2. Generate a new source of revenue, which can pay for transportation improvements, including transit development; and,
3. Improve the efficiency of HOV facilities by utilizing unused capacity.

A review of the literature[52] on HOT lanes, and discussion with FHWA staff involved in HOV and HOT lane development, finds that HOT lanes and pricing strategies have only been implemented in situations where monitoring and enforcement are manageable. On freeways, the HOV lanes that have been converted to HOT lanes are barrier-separated from general-purpose lanes.[53] There are no known examples of concurrent-flow, 12-foot HOT lanes with continuous access and egress from adjacent general-purpose lanes (i.e., barrier free).

Analysis presented earlier in this EIS noted that to expand the freeway by only a few feet in the median area would result in substantial costs and impacts (see discussion related to a 12-foot median barrier in Section 3.7.3). The provision of a barrier to separate the lane addition for use as an HOT lane would result in such costs and impacts and is not considered practical for those reasons. However, after implementation of the HOV lane and if conditions warrant it, HOT lanes may be studied in the future.

[52] Especially, *A Guide for HOT lane Development*, by Parsons Brinckerhoff, with Texas Transportation Institute, in partnership with the Federal Highway Administration, 2003.
[53] Examples are SR 91 in Orange County, California, I-15 in San Diego, California, and the Katy Freeway and US 290 in Harris County (Houston), Texas.

3.9.2 Additional Considerations Included in Preferred Alternative

Ongoing analysis after the public hearing resulted in the following modifications that have been included in the Preferred Alternative.

- A recommended safety improvement to shift the northbound on and southbound off ramps serving M-102 (8 Mile Road).
- A modified braid design at I-696.
- A reconstructed 12 Mile Road interchange, rather than a SPUI, subject to review during the design and value engineering phases.

Shifting 8 Mile Road Ramps

As noted in Section 2.2.6, shifting the ramps on the north side of 8 Mile Road to the south would provide for better spacing of ramps along I-75. These ramps are now closer than desired to the 9 Mile Road ramps. Apart from safety, the effect of shifting the ramps to the south will be to reduce traffic over portions of the adjacent service drives. Northbound, the shift will reduce traffic between Hayes and Maxlow Avenues. Southbound traffic will be reduced between Bernhard and Milton Avenues. The noise analysis took these shifts into account.

Modified Braid Design

Due to concerns of the cities of Royal Oak and Madison Heights, the braid design included in the DEIS has been modified so that access to 11 Mile Road is maintained from I-696.

Reconstruction of 12 Mile Road Interchange

Review of engineering and other considerations led to the conclusion that the 12 Mile Road interchange should be reconstructed as shown in Figure 3-13b. This design is approximately $6 million cheaper that construction of a SPUI. It satisfies the need to provide a greater distance between Stephenson Highway and the end of the southbound off ramp from I-75 to 12 Mile Road. Today, westbound traffic on 12 Mile Road waiting for the traffic light at Stephenson Highway backs up into the intersection of the I-75 southbound off ramp with 12 Mile Road. This causes traffic to back up onto the ramp. During design and value engineering, the SPUI design will be reexamined.

3.9.3 Conclusion

The determination to dedicate the lane addition to HOV is based on the success of similar designations elsewhere that have increased corridor capacity. More persons can be moved per lane with HOV. There are few alternatives to I-75 for mid- to long-range trips. Transit analysis has found that, even with a rapid transit system on Woodward Avenue (the corridor designated through other planning studies as the priority corridor for high-type transit), little relief is provided to I-75. HOV is the best way to get the maximum use out of I-75. HOV lanes support bus transit development, vanpooling, and conventional carpooling. The potential exists to substantially increase people movement in these higher density modes.

In conclusion, the Preferred Alternative will add a lane to I-75 in each direction between M-102 (8 Mile Road) and M-59, to bring the number of through travel lanes to four in each direction. One lane in each direction will be dedicated to High-Occupancy Vehicle use during the morning

and afternoon peak periods (for example, 7 AM to 9 AM and 4 PM to 6 PM). The lanes would be available to all vehicles at all other times. All bridges in the depressed section of the project between M-102 and south of 12 Mile Road will be replaced. The 12 Mile and 14 Mile Road interchanges will be reconstructed. Pedestrian bridges that cross over I-75 will be replaced. The storm water system in the depressed section of I-75 will be separated from the existing combined sewer system. The eastbound and westbound I-696 ramps to northbound I-75 will be modified to improve traffic flow and safety. The result is that the Preferred Alternative is the environmentally preferred alternative.

SECTION 4
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the existing conditions of the natural and human environmental resources that were investigated as part of this study. It also discusses the impacted resources and the environmental consequences of the Preferred Alternative. Those impacts with a reasonable possibility for individual or cumulative significant impacts were analyzed further. The results are discussed below. For the most part, the impacts are unchanged, and remain as noted in the DEIS. Where the project has been modified or changes have been made from the DEIS, changes are noted below.

4.1 Relocations

To construct the Preferred Alternative, permanent fee right-of-way and grading permits will be required at the time of right-of-way acquisition.[54] New right-of-way that MDOT will likely need to acquire is identified in the *Engineering Report*[55] prepared for this project. Acquisition of right-of-way will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. A *Conceptual Stage Relocation Plan* (Appendix B) was developed based on a review of real estate available in the corridor. It has been changed for this FEIS to reflect changes in the proposed I-75/I-696 braid design. It was determined that there are an adequate number of residences and business properties for sale to allow relocation without hardship.

Physical features of the project that will require right-of-way acquisition are:

- The lane addition;
- "Braiding" of ramps north of I-696;
- Reconstruction of pedestrian bridges; and
- Storm water detention.

The proposed lane addition will require no dwelling units, but approximately one acre of land is needed, and two businesses in Hazel Park must be relocated. One business currently encroaches on the existing right-of-way and another is so close that it cannot be avoided. Also in Hazel Park, about 16 parking spaces of 340 could be needed from one commercial area, and about 17 spaces of 380 spaces could be required from a church.

Right-of-way will be required for the "braiding" of ramps north of I-696. This safety and operational improvement will relocate approximately 23 single-family dwellings and a church. The land taken would be approximately 7 acres.

[54] Grading permits allow MDOT to temporarily enter private property to make minor grading changes - those that will not alter the permanent nature of the ground significantly or negatively. Basically, MDOT pays a fee for "renting" the property for a short period of time to make these minor changes. Often the result is an improved driveway grade. If a large grade change is made, mitigation may be necessary, i.e. timber retaining walls, vegetation, etc. Decisions on grading permits are made during the design phase.
[55] *Engineering Report*, The Corradino Group and Orchard Hiltz and McCliment, January 2005.

Approximately an acre of right-of-way will be required as six pedestrian bridges are reconstructed. The northernmost is in Madison Heights. The others are in Hazel Park. The clearances under the bridges must increase (for safety) and reconstruction must be in accordance with the Americans with Disabilities Act (ADA), which requires more gradually sloping ramps and, therefore, more land.[56] Steps will be provided, where feasible, in addition to the ramps to provide more direct routings for ambulatory persons. The pedestrian bridge at Harry Avenue in Hazel Park could require the relocation of three homes. The relocation impacts of the pedestrian bridges will be refined during the design phase when more detailed information is available.

Storm water pump stations in the depressed section of the corridor will be relocated to other locations within the right-of-way to avoid land acquisition. Storm water detention requirements in the north section of the project could require right-of-way acquisition of up to seven acres in Troy southeast of Rochester Road. Detention will be designed to avoid relocations. Managing the storm water within the right-of-way in pipes is an option, however, this option is more costly.

A summary of relocations is presented in Table 4-1. Adequate housing is available close to the residential units that would be relocated, and sufficient commercial space is likewise available. Relocations are subject to refinement during the design phase.

Table 4-1
Relocation Summary

IMPROVEMENT	DISPLACEMENTS
Lane Addition	2 businesses
Ramp Braiding	23 single-family dwellings and one church
Pedestrian Bridges	3 single-family dwellings
Storm Water Detention	None
TOTAL	26 single-family dwellings, 2 businesses, and one church

Source: The Corradino Group of Michigan, Inc., Rowe, Inc., and Orchard, Hiltz, and McCliment

4.2 Social Impacts / Community Cohesion

This section reviews the relationship of the project to community facilities, pedestrian access and bicycle use, mass transit service and carpooling, maintaining local and regional access during construction, population, employment trends, and other socioeconomic characteristics.

The section of I-75 south of 12 Mile Road follows a historic travel corridor. The neighborhoods that grew up around this corridor after World War II were thus divided by a wide right-of-way from the time of their origin. The creation of I-75 within this right-of-way did, however, have an effect on access across the right-of-way, as the construction of the freeway and its depression meant that travel across I-75 could occur only at vehicular and pedestrian bridges. North of 12 Mile Road, development mostly occurred with I-75 in place.

[56] Draft ADA guidelines under review may allow the option of ramps or elevators. There are issues with regard to elevators with respect to ongoing maintenance, but their implementation may avoid right-of-way acquisition. For more discussion see Section 4.2.2.

Community cohesion will not change with the Preferred Alternative, as the footprint of I-75 will not change. Pedestrian and bicycle access across the freeway will be improved. (See Section 4.2.2 and Table 4.2.)

4.2.1 Community Facilities

Community facilities such as emergency services (fire, emergency medical, and police), schools, medical centers, and other institutions are described below from south to north (Figure 4-1).

Emergency Services (Fire, Emergency Medical and Police)

Fire stations in close proximity to I-75 are located at:

- The city offices of Madison Heights on the north side of 13 Mile Road. This office also houses the community's ambulance service. 13 Mile Road does not connect to I-75. There would be no effect on this station or its services.
- Troy Fire Station No. 6 is on the west side of Coolidge Highway and south side of I-75. Coolidge Highway does not connect to I-75. There would be no effect on this station or its services.
- Near the city offices of Royal Oak at 215 E Sixth Street. Emergency medical services also operate out of this location.

The City of Royal Oak indicated opposition to several elements in the DEIS (see response to comments in Section 6.4, Letter 9). Several meetings were held with Royal Oak staff (engineering and emergency services) to better understand their concerns and work together to resolve design issues.

When noise walls are built, provisions must be made for fire hydrant access through the walls. Discussions with all adjacent municipalities will be necessary during the design phase to identify these locations, and other locations where emergency access through the wall may be necessary.

Police stations in the vicinity of I-75 are:

- Hazel Park - 111 East 9 Mile Road;
- Ferndale - 310 East 9 Mile;
- Madison Heights - 280 West 13 Mile Road;
- Royal Oak - 221 East Third Street; and
- Troy – 500 West Big Beaver Road.

The Royal Oak Police Department had concerns similar to those of the Fire Department that were addressed by meeting with city officials.

The City of Madison Heights has indicated that it will not commit to enforcement of the HOV lane. Enforcement of traffic laws is a responsibility shared by the Michigan State Police and local political jurisdictions.

Today, there are no median cuts for emergency vehicles in the depressed portion of the I-75 project length. There were numerous median cuts between 12 Mile Road and Square Lake Road until a median safety barrier was installed in 2001. Crossovers are now present at only three locations: north of 13 Mile Road, south of Long Lake Road, and midway between Crooks Road

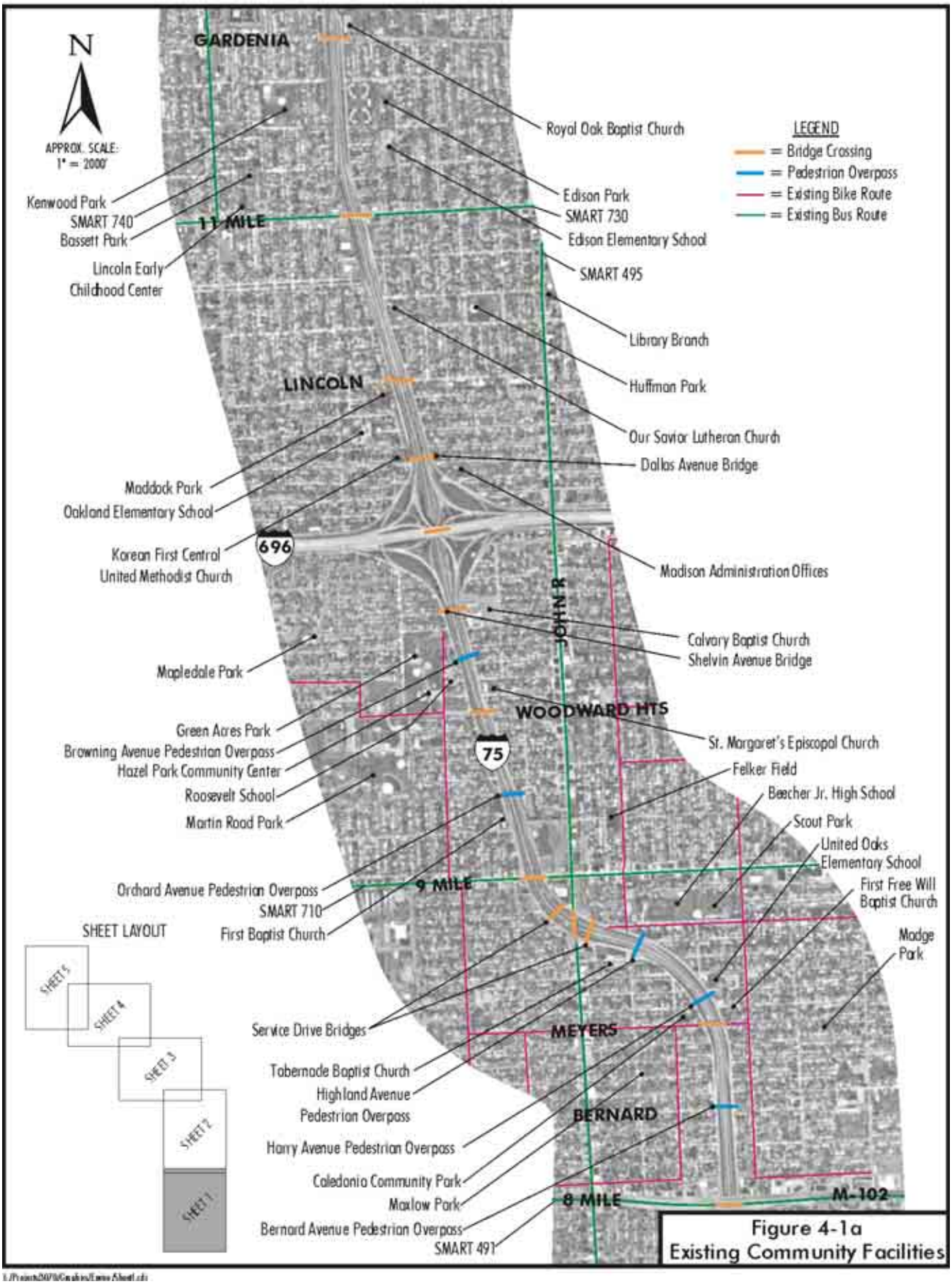
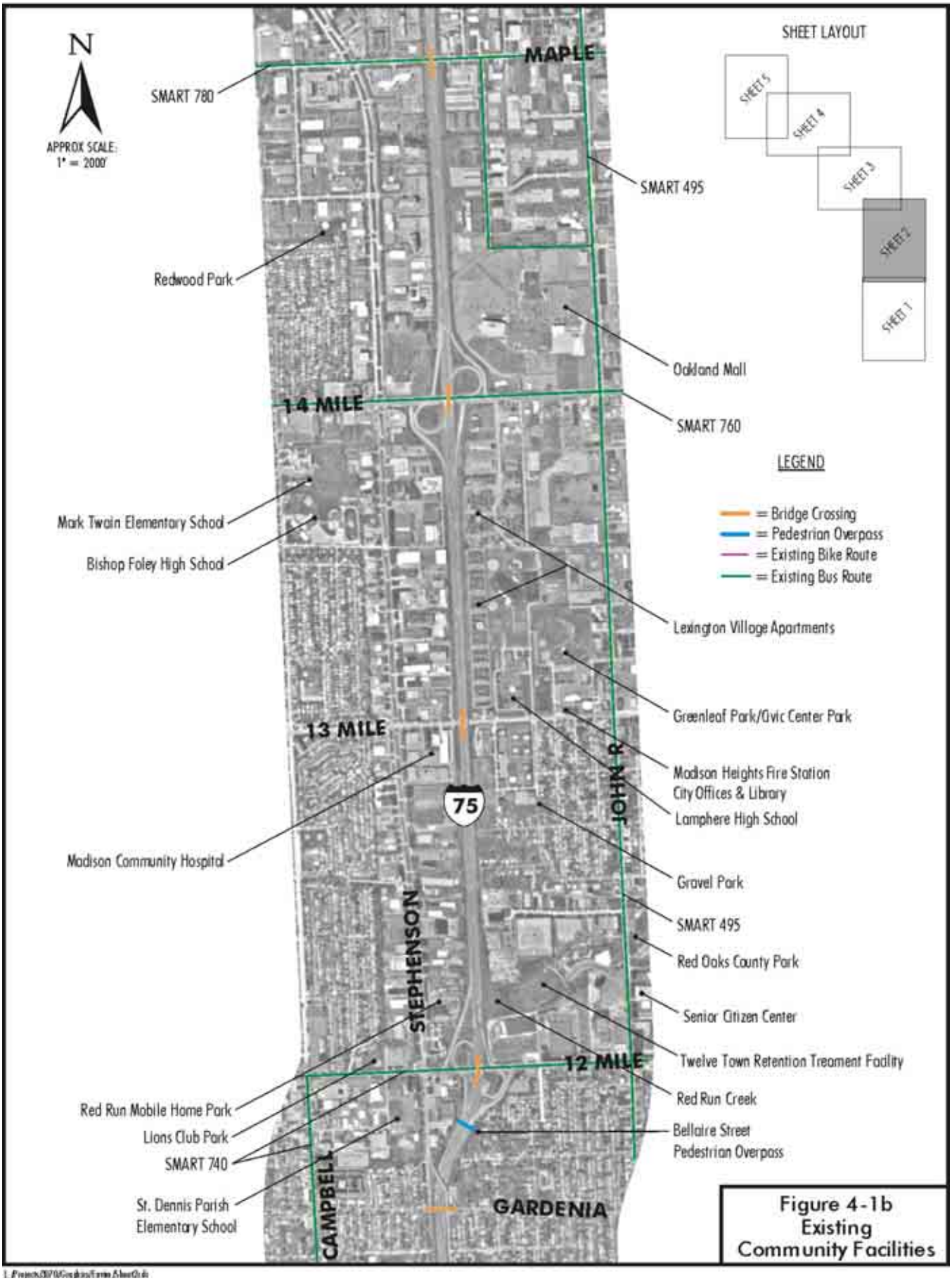


Figure 4-1a
Existing Community Facilities


N
APPROX SCALE:
1" = 2000'
SHEET LAYOUT
SHEET 5
SHEET 4
SHEET 3
SHEET 2
SHEET 1
MAPLE
SMART 780
SMART 495
Redwood Park
Oakland Mall
14 MILE
SMART 760
LEGEND
= Bridge Crossing
= Pedestrian Overpass
= Existing Bike Route
= Existing Bus Route
Mark Twain Elementary School
Bishop Foley High School
Lexington Village Apartments
Greenleaf Park/Civic Center Park
13 MILE
Madison Heights Fire Station
City Offices & Library
Lamphere High School
JOHN R
75
Madison Community Hospital
Gravel Park
SMART 495
Red Oaks County Park
STEPHENSON
Senior Citizen Center
Twelve Town Retention Treament Facility
12 MILE
Red Run Creek
Red Run Mobile Home Park
Lions Club Park
SMART 740
Bellaire Street
Pedestrian Overpass
St. Dennis Parish
Elementary School
CAMPBELL
GARDENIA
Figure 4-1b
Existing
Community Facilities

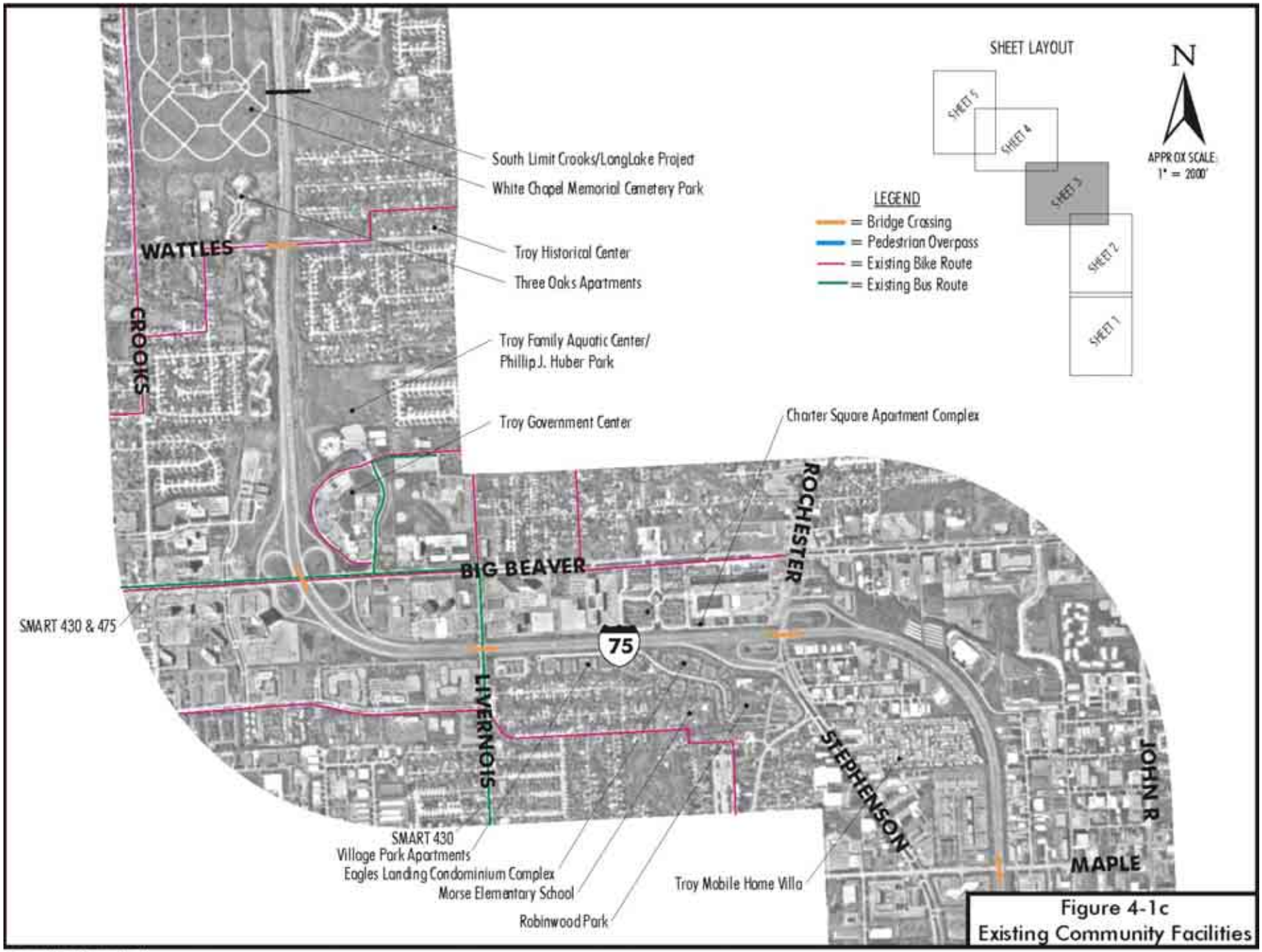


Figure 4-1c
Existing Community Facilities

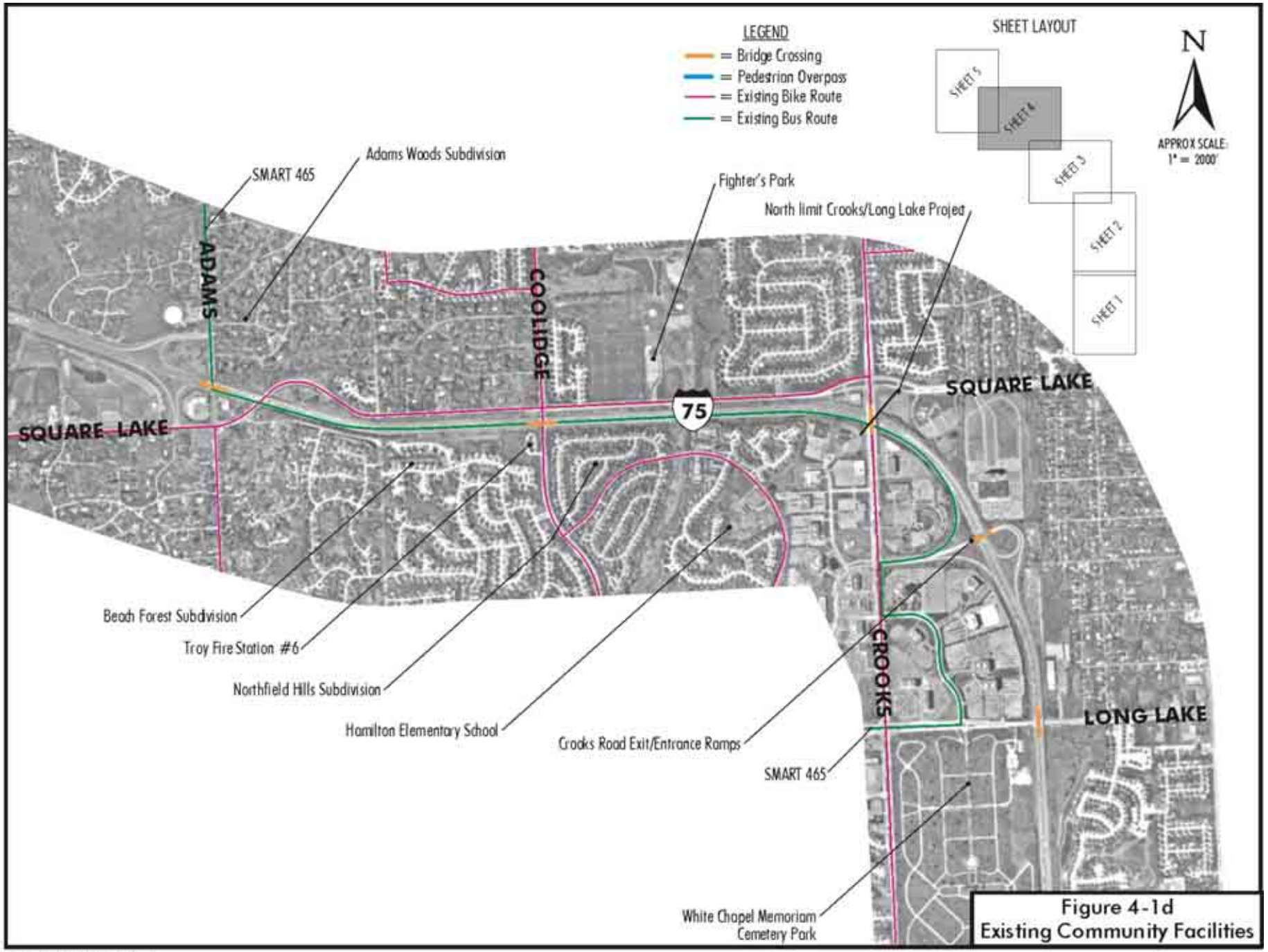


Figure 4-1d
Existing Community Facilities

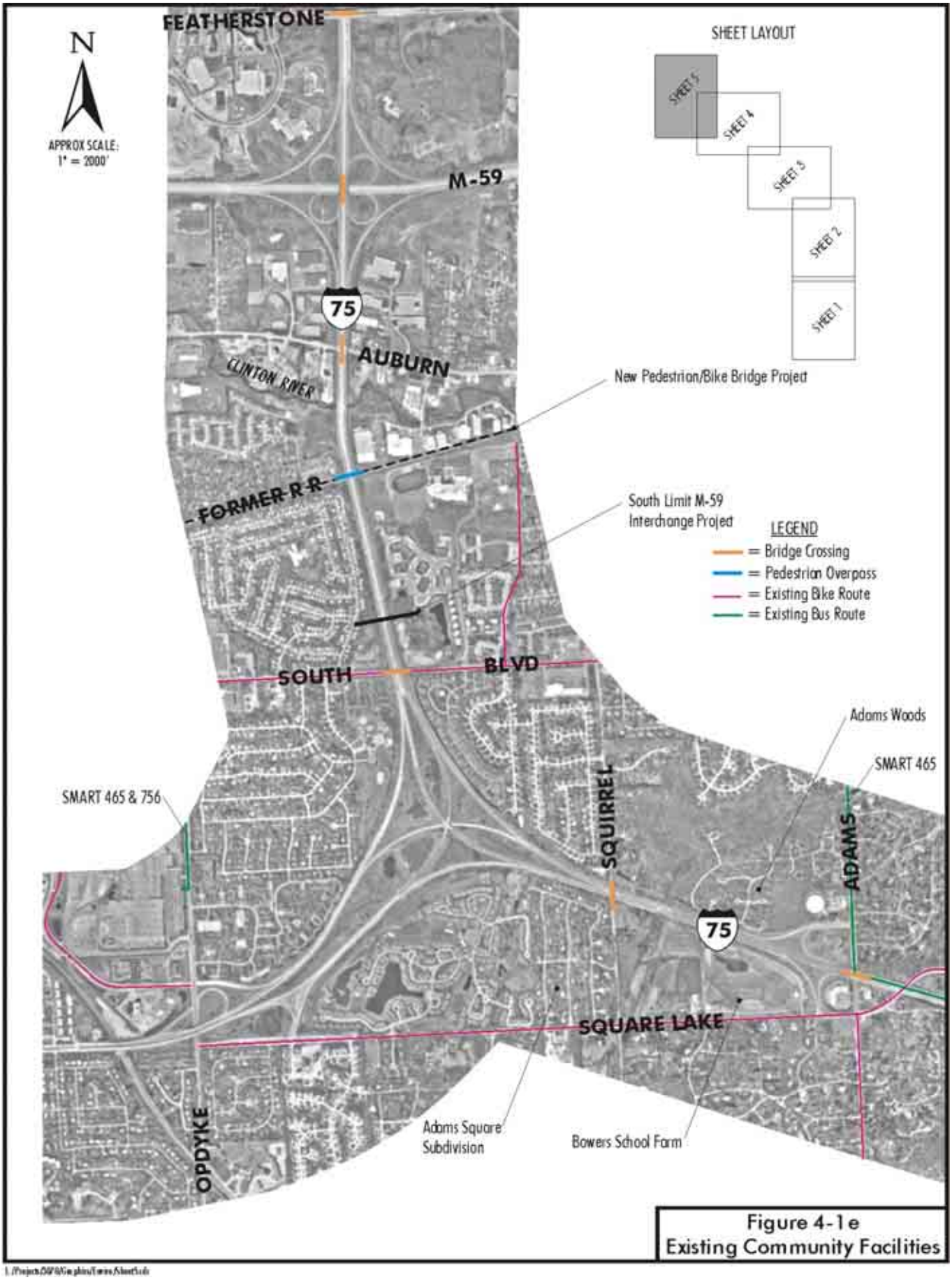


Figure 4-1e
Existing Community Facilities

and Coolidge Highway. With the construction of the median concrete safety barrier proposed with this project, these three existing median crossovers would be closed. With this project, emergency vehicles will use interchanges to get from the northbound lanes to the southbound lanes and vice versa.

Hazel Park requested that the crossover bridges north and south of 9 Mile Road be moved further away from 9 Mile Road for capacity purposes, and the Preferred Alternative does so. In addition, these crossovers will be widened to accommodate larger trucks, including fire apparatus.

Schools

Each municipality has its own school district, with each providing bus services to its schools. No routes use I-75. Conversations with school officials did not indicate any problems with the planned I-75 improvements related to bus use. Schools along I-75 are listed below.

- The United Oaks Elementary School is on the north side of Harry Avenue, one block east of I-75. The grounds are extensive. A new school building (2003) is approximately 150 feet from I-75. There would be no effect on school access or functions, except that the pedestrian bridge over I-75 at Harry Avenue would be modified. As the clearance height under the bridge must be increased and the ramps lengthened to meet ADA standards, the ramps would be longer. Stairs are planned for non-handicapped persons. Elevators for handicapped persons may be an option in the future (Section 4.2.2).
- Beecher Junior High School is one block south of 9 Mile Road on the east side of I-75. The school has been newly reconstructed (2003). The existing main building is approximately 250 feet from I-75. There would be no effect on school access or functions. The pedestrian bridge over I-75 at Highland Avenue serving this school would be reconstructed with stairs and either longer ramps or elevators to meet ADA standards.
- Roosevelt School serves special needs children. It is on the southbound service drive, just north of Woodward Heights Avenue. The students at this school would not be using the adjacent pedestrian bridge over I-75. There would be no effect on school access or functions. A grading permit may be needed during reconstruction of the service drive. Noise would increase in a way that most people would not notice.
- Oakland Elementary School is a block south of Lincoln Avenue, one block west of I-75. Access is off Brockton Avenue south of the school and Kalama Avenue north of the school. Both connect to the southbound service drive of I-75. There would be a minimal effect on school access or functions. The City of Royal Oak has noted that eliminating the Dallas Avenue bridge will increase traffic on the southbound service drive, impacting parents and buses going to and from the Oakland School. Observations and counts at the school found traffic volumes to be low. Volumes on the service drive could go up, but would be well below volumes on numerous streets in the area.
- The Lincoln Early Childhood Center is on the north side of 11 Mile Road three blocks west of I-75. Its access is from 11 Mile Road. There would be no effect on school access or functions.
- The St. Denis Parrish Elementary School is on the west side of Stephenson Highway, on the south side of 12 Mile Road. There would be no effect on school access or functions.

- Bishop Foley High School is located north of 13 Mile Road three blocks west of Stephenson Highway. There would be no effect on school access or functions.
- Lamphere High School is on the north side of 13 Mile Road one block east of I-75. There would be no effect on school access or functions.
- Mark Twain Elementary School is on the east side of Campbell Road midway between 13 Mile Road and 14 Mile Road. Its access is from Campbell Road. There would be no effect on school access or functions.
- Morse Elementary School is in the southwest quadrant of the Rochester Road interchange, separated from I-75 by a condominium complex. Its access is from Robinwood Street. There would be no effect on school access or functions.
- Hamilton Elementary School is in the Northfield Hills Subdivision on Northfield Parkway. There would be no effect on school access or functions.
- Fields and open space of the Bowers School Farm is located adjacent to I-75 west of Adams Road. It is part of the science instructional program of Bloomfield Hills Schools, serving as a land laboratory for students from preschool through adult. Its access is from Square Lake Road. There would be no effect on school access or functions.

In summary, a grading permit may be necessary at Roosevelt School for reconstruction of the service drive.

Libraries

- Hazel Park Library is at 123 East 9 Mile Road. Its access is via 9 Mile Road. It is approximately 700 feet east of I-75. No facilities or parking would be affected.
- Ferndale Library is at 300 East 9 Mile Road. Its access is via 9 Mile Road. It is approximately 0.8 miles west of I-75. No facilities or parking would be affected.
- Royal Oak Library is at 222 East 11 Mile Road. Its access is via 11 Mile Road. It is approximately 1.4 miles west of I-75. No facilities or parking would be affected.
- Madison Heights Library is at 240 West 13 Mile Road. Its access is via 13 Mile Road. It is approximately 0.3 miles east of I-75. No facilities or parking would be affected.
- Troy Library is at 510 West Big Beaver Road. Its access is via Big Beaver Road. It is approximately 800 feet east of I-75. No facilities or parking would be affected.

No library facilities or parking would be affected by the Preferred Alternative.

Government Offices and Services

- Hazel Park's offices are at 111 East 9 Mile Road, approximately 800 feet east of I-75. These would be unaffected.
- Ferndale's offices are at 300 East 9 Mile Road, approximately 0.8 miles west of I-75. These would be unaffected.
- Royal Oak's offices are at 211 South Williams Street, approximately 1.4 miles east of I-75. These would be unaffected.
- Madison Heights's offices are at 300 West 13 Mile Road, approximately 0.3 miles east of I-75. These would be unaffected.

- Troy's offices are at 500 West Big Beaver Road in the northeast quadrant of the I-75 Big Beaver interchange. These would be unaffected.
- Auburn Hill's offices are 1827 North Squirrel Road, approximately 1.0 mile east of I-75. These would be unaffected.

No government offices or services would be affected by the Preferred Alternative.

Medical Facilities

- The Madison Community Hospital is south of 13 Mile Road at Stephenson Highway on the west side of I-75. It would be unaffected by the project.

No medical facilities would be affected by the Preferred Alternative.

Churches

Churches contiguous to I-75 or along the service drive right-of-way are:

- First Free Will Baptist Church is on the northbound service drive, north of Meyers Avenue.
- Tabernacle Baptist Church is on the southbound service drive, north of Highland Avenue.
- First Baptist Church is on the southbound service drive, one block north of 9 Mile Road.
- St. Margaret's Episcopal Church is on the northbound service drive, one block north of Woodward Heights Boulevard.
- Calvary Baptist Church is on the northbound service drive at Shelvin Avenue, just south of I-696.
- Korean First Central United Methodist Church is on the southbound service drive at Dallas Avenue.
- Our Savior Lutheran Church is on the northbound service drive, one block north of Lincoln Avenue.
- Royal Oak Baptist Church is on the northeast corner of the northbound service drive and Gardenia Avenue.

Very minor strips of land (typically in the five- to ten-foot range) could be taken from the First Baptist Church, St. Margaret's Episcopal Church, Calvary Baptist Church, and the Korean First Central United Methodist Church, totaling 0.14 acres. The Calvary Baptist Church would lose 17 of 380 parking spaces and the Korean First Central United Methodist Church would lose its sign. The churches would be compensated in accordance with standard mitigation (see Section 5.1). Grading permits are possible at all the above-listed churches, particularly from those whose property is affected. Our Savior Lutheran Church would likely be relocated based on the modified braid design.

Parks

- Hazel Park - Maxlow Park is about 0.1 miles north of 8 Mile Road off Madge Avenue, two blocks west of I-75.
- Hazel Park - Madge Park is about 0.5 miles north of 8 Mile Road off Madge Avenue, two blocks east of I-75.

- Hazel Park – Caledonia Community Park is just north of Meyers Avenue, one block west of I-75 on Caledonia Avenue.
- Hazel Park - Scout Park is south of 9 Mile Road off East Otis Avenue, three blocks east of I-75.
- Hazel Park - Felker Field is one block north of 9 Mile Road off of Felker Avenue, three blocks east of I-75.
- Ferndale - Martin Road Park is two blocks north of 9 Mile Road off Orchard Avenue, three blocks west of I-75.
- Hazel Park - Green Acres Park is south of I-696 off Woodward Heights Boulevard, one block west of I-75.
- Hazel Park – Mapledale Park is 0.2 miles south of I-696, three blocks west of I-75.
- Royal Oak – Maddock Park is south of Lincoln Avenue adjacent to the southbound I-75 service drive. It is the only park that is actually contiguous to a service drive.
- Royal Oak - Bassett Park is north of 11 Mile Road off University Avenue, four blocks west of I-75.
- Royal Oak - Kenwood Park is one block south of Gardenia Avenue off Forest Avenue, two blocks west of I-75.
- Madison Heights – Huffman Park is north of Lincoln Avenue, four blocks east of I-75.
- Madison Heights – Edison Park is midway between 11 Mile Road and Gardenia, two blocks east of I-75.
- Madison Heights – Lions Club Park is on the north side of 12 Mile Road, two blocks west of I-75.
- Madison Heights - Red Oaks County Park follows Red Run Creek between 12 Mile Road and 13 Mile Road, east of John R.
- Madison Heights – Gravel Park is two blocks south of 13 Mile Road and two blocks east of I-75.
- Madison Heights - Greenleaf Park/Civic Center Park is north of 13 Mile Road two blocks east of I-75.
- Troy – Redwood Park is north of 14 Mile Road and west of Stephenson Highway.
- Troy – Robinwood Park is in the southwest quadrant of the interchange of I-75 with Rochester Road.
- Troy – Troy Family Aquatic Center/Phillip J. Huber Park is at the north end of the Troy Civic Center in the northeast quadrant of the interchange of I-75 with Big Beaver Road.
- Troy – The Troy Historical Center is on the north side of Wattles Road 0.4 miles east of I-75.
- Troy – Firefighters Park is on the north side of Square Lake Road between Coolidge Highway and Crooks Road.

There will be no impacts to any of these parks.

4.2.2 Considerations Relating to Pedestrian Access and Bicycle Use

Hazel Park, Troy, and Auburn Hills have signed bike routes[57] that cross I-75 at Meyers Avenue, Big Beaver, Wattles Road, Crooks Road, Coolidge Highway, Square Lake, and South Boulevard (Figure 4-1). A bike path constructed in 2003 bridges over I-75 on the former Grand Trunk

[57] *Oakland County Linked Path/Trail System Map*, Oakland County Department of Community and Economic Development.

Railroad alignment parallel to and south of Auburn Road. It is part of the Clinton River Trail planned to cross all of Oakland County.

Six pedestrian bridges now provide access across I-75 in the depressed section south of 12 Mile Road. These would be reconstructed with the project because their supporting piers would be affected by the lane addition. The bridges are at: Bernhard Avenue, Harry Avenue, Highland Avenue, Orchard Avenue, Browning Avenue, and Bellaire Street. The first five pedestrian bridges are in Hazel Park. The Bellaire Street bridge is in Madison Heights.

The underclearance of the bridges must be increased two to three feet[58] and reconstruction must conform to the Americans with Disabilities Act (ADA). Under current regulations (2004) more gradually sloping ramps are required. Together the effect is longer ramps and, therefore, more land. Steps will be provided, where feasible, to provide more direct routings for ambulatory persons, as the ramp lengths would approximately double (from about 150 feet to 300 feet per ramp). The ADA guidelines are undergoing revision. The first draft of the ADA guidelines released to the public required an elevator where there is a change of more than five feet in elevation. A second draft is now being prepared. It may allow use of ramps or elevators. At the time of project implementation, the new guidelines will likely be in effect. MDOT may or may not have the option of elevators. A recent development that is becoming more widespread is use of Limited Use, Limited Access (LULA) elevators. These are small elevators designed to accommodate wheelchairs. They are not available to the general public; only qualifying individuals can use them. Qualifying persons are issued access cards. The small footprint of such elevators means that the existing pedestrian bridges could likely be reconstructed without the need for right-of-way acquisition. This would reduce capital costs and impacts, but would require ongoing maintenance. MDOT will make the determination regarding how best to provide ADA compliant access during the design phase, when the guidelines are likely to be in effect and there is more experience with LULAs, if they, in fact, become an option.

In May 2002, at the beginning of the study, officials of the municipalities along the corridor were interviewed to record their unofficial thoughts regarding pedestrian and bicycle activity related to I-75. These comments are noted below by community from south to north, and any likely design elements that would be part of any build alternative are provided after the comments.

Hazel Park

- Wants no reduction of pedestrian crosswalks.
- Sees opportunity to rework/refurbish pedestrian crosswalks, which desperately is needed.
- Desires screening on road bridges across I-75 that have sidewalks, especially the Woodward Heights Boulevard bridge.

Royal Oak

- Had no comments specific to pedestrian or bicycle needs.

Madison Heights

- Has pedestrian bridge over I-75 near Gardenia.

[58] Pedestrian bridges have an extra-high under-clearance of 17’3” over the service drives to prevent bridges from being hit by vehicles passing underneath.

- Has a "Sidewalk Program and Gap Map" that highlights improvements and/or additions to the city's sidewalk system, including the installation of sidewalks along the south sides of the 14 Mile Road/I-75 Bridge and the 12 Mile Road/I-75 Bridge. Has a concern about the timing of a proposed pedestrian path with the proposed changes to the 14 Mile Road Bridge. Currently have workers trying to access public transportation in a very unfriendly pedestrian environment.
- Desires new sidewalks.
- Wants true pedestrian access over all of the bridges – wheelchair ramps.
- Wants bicycle connections to go north/south as well as with other cities.
- Wants sidewalks for schools maintained. Currently children from one Madison Heights neighborhood at 11 Mile Road and the service drive go to a Royal Oak School on the other side of freeway.

Troy

- Desires sidewalks on at least one side of all bridges, as today – most of the sidewalks are underneath the interstate. There are appearance and safety issues concerning these pathways.
- Sees no need for any new exclusive pedestrian bridges.

Bloomfield Township

- Sees no issues if their existing infrastructure is not reduced. Few children cross I-75 to reach school – almost all children ride buses.

Auburn Hills

- Supports MDOT plans to build pedestrian bridge south of Auburn Road using old Grand Trunk Railroad right-of-way.
- Plans a comprehensive pedestrian trail along South Boulevard.
- Almost all children ride school buses to school – almost no children directly cross the interstate.

In response to the concerns of the communities noted above, all vehicular bridges will be reconstructed to accommodate bicyclists and pedestrians (including wheelchairs), where appropriate. With the exception of the bridges specifically designed for U-turns by vehicles, which are not designed for pedestrian use, links across the freeway would be improved. Walk/wait signals will be provided where warranted. Sidewalks will be reconstructed within project limits where existing sidewalks are affected. New sidewalks will be added within project limits as indicated in Table 4-2.

It is noted that MDOT requires that all bridges over I-75 where pedestrians are present have screening so that objects cannot reach the pavement below. Also, all new facilities will be designed to conform to the Americans with Disabilities Act.

Table 4-2
Sidewalk and Shoulder Conditions – Existing and With Project

BRIDGE/UNDERPASS LOCATION	SIDEWALKS	SHOULDERS	HANDICAP ACCESS	PROJECT EFFECT
Pedestrian Overpass at East Bernhard	NA	NA	Yes [a]	New ADA pedestrian bridge
Meyers Avenue Bridge	N & S	No	Yes	New bridge - w/sidewalks
Pedestrian Overpass at Harry Avenue	NA	NA	Yes [a]	New ADA pedestrian bridge
Pedestrian Overpass at Highland Avenue	NA	NA	Yes [a]	New ADA pedestrian bridge
One-Way Cross-Over for SB to NB Service Drive	No	No	No	New bridge - vehicles only
John R. Bridge	E & W	No	Yes	New bridge - w/sidewalks
One-Way Cross-Over for NB to SB Service Drive	No	No	No	New bridge - vehicles only
One-Way Cross-Over for SB to NB Service Drive	No	No	No	New bridge - vehicles only
9 Mile Road Bridge	N & S	No	Yes	New bridge - w/sidewalks
Pedestrian Overpass at Orchard Street	NA	NA	Yes [a]	New ADA pedestrian bridge
Woodward Heights Boulevard Bridge	N & S	No	Yes	New bridge - w/sidewalks
Pedestrian Overpass at West Browning	NA	NA	Yes [a]	New ADA pedestrian bridge
Two-Way Cross-Over at W. Shelvin	No	No	No	New bridge - vehicles only
Sidewalks along Service Drives through I-696 Interchange	West side only	No	West side only	New sidewalk on east side to match west.
Two-Way Cross-Over at Dallas Avenue	No	No	No	New bridge - vehicles only - shifted north, NB to SB only
Lincoln Avenue (10 ½ Mile Road) Bridge	N & S	No	No	New bridge - w/sidewalks
11 Mile Road Bridge	N & S	No	No	New bridge - w/sidewalks
Gardenia Avenue Bridge	N & S	No	No	New bridge - w/sidewalks
NB Stevenson Bridge	No	W	No	New Bridge - vehicles only
Pedestrian Overpass at Bellaire Avenue	NA	NA	Yes [a]	New ADA pedestrian bridge
12 Mile under I-75	N	No	No	Interchange reconstruct continues one loop ramp. Sidewalks both N & S
Red Run under I-75	N	No	No	Potential future non-motorized access [b]
13 Mile under I-75	N & S	No	Yes	Sidewalks will remain
14 Mile under I-75	N	Yes	Yes	Interchange reconstruct continues loop ramps. Sidewalks both N & S
15 Mile (Maple Road) under I-75	N & S	No	Yes	Sidewalks will remain
Rochester Road under I-75	E & W	No	Yes	Sidewalks will remain
Livernois Road under I-75	E & W	No	Yes	Sidewalks will remain
Big Beaver under I-75	N & S	No	Yes	Sidewalks will remain
Wattles Rd Pedestrian over I-75	S	No	Yes	Combine w/new vehicular bridge
Wattles Road (17 Mile) over I-75	Yes	No	Yes	New bridge - w/sidewalk
Coolidge Road under I-75	Yes	No	Yes	New bridge - w/sidewalk
Square Lake Road under I-75	N	No	Yes	Sidewalk will remain
Adams Road under I-75	N	No	No	No sidewalks planned
Squirrel Road over I-75	No	No	No	New bridge - w/shoulders
South Boulevard over I-75	Yes	Yes	Yes	Existing bridge remains

Source: The Corradino Group of Michigan, Inc. and Schutt & Company
[a] Ramps are present, but do not meet Americans with Disabilities Act requirements.
[b] A study is to be undertaken by MDOT to determine non-motorized needs associated with Michigan's trunkline system in Southeast Michigan on a county-by-county basis. Access under I-75 at Red Run would be included in that analysis.
Note: N/A means Not Applicable, N = North, S = South, E = East, and W = West.

At an I-75 Council Meeting on June 5, 2002, it was noted that travel through the I-696 interchange area was difficult for pedestrians. There is a continuous sidewalk today on the west side of I-75 that follows the service drive through the interchange. On the east side of I-75, there is no such continuous sidewalk. This project would include addition of such a sidewalk on the east side.

At the 12 Mile Road interchange sidewalks would be provided along both sides of 12 Mile Road.

At 14 Mile Road, the presence of loop ramps makes safe pedestrian and bicycle movements through the interchange difficult. This intersection is planned for reconstruction in the same basic configuration as currently exists. Madison Heights is planning a sidewalk on the south side of 14 Mile Road through the interchange, similar to the existing walk along the north side. Pedestrian access through this area will be a focus of detailed analysis during the design phase.

4.2.3 Considerations Relating to Mass Transit Service and Ridesharing

The Suburban Mobility Authority for Regional Transportation (SMART) provides fixed-route bus services in Oakland County, including the I-75 corridor (Figure 4-1). Fixed-route service close to I-75 is provided on John R Road and Campbell Road. Routes cross I-75 at 8 Mile Road, 9 Mile Road, 11 Mile Road, 12 Mile Road, 14 Mile Road, Maple Road, Livernois Road, Big Beaver Road, and Coolidge Highway. SMART Route 465 is the only route using I-75 (between Crooks and Adams Roads). Park-and-ride lots served by SMART are located in the Oakland Mall and Troy Civic Center. Dial-a-ride service[59] is provided in Troy.

As discussed in Section 3.6, computer modeling for this EIS found rapid transit to be viable in the Woodward Corridor as far north as 9 Mile Road, but it cannot meet the purpose and need of this project. There are no current plans for significant expansion of transit services in Oakland County. In fall of 2002, county residents approved a referendum to continue SMART service. Planning continues for improved transit along the Woodward Corridor in the City of Detroit. The *Woodward Corridor Transit Alternatives Study*[60] confirmed that bus rapid transit or light rail transit are the preferred technologies. In May 2003, the Regional Transportation Coordinating Council, with representatives from Macomb, Oakland, and Wayne counties and the City of Detroit, signed an interlocal agreement to form the Detroit Area Regional Transportation Authority (DARTA). This group is expected to pursue rapid transit development in the Woodward Corridor at some future point in time. If rapid transit were to develop in the corridor it would have a beneficial effect and would provide an alternative to use of I-75. In particular, if its implementation preceded that of the lane addition on I-75, it would provide an alternative means of travel during construction, reducing the traffic diversions that will occur.

MDOT maintains five carpool lots along I-75 in Oakland County (Table 4-3). Expansions are planned. MDOT is also actively looking for additional lots to develop. Data for four lots date to 1984, when the population of the north corridor (where three lots are located) was substantially lower. The Grange Hall lot was opened recently and data are not yet available. Overall, lot usage is principally related to the condition of the economy and gasoline prices.

[59] Dial-a-ride service is usually a point-to-point bus service that is provided to qualified users who call ahead and schedule their trips.
[60] *Woodward Corridor Transit Alternatives Study*, IBI Group, May 2000.

Table 4-3
Average Daily MDOT Carpool Lot Use

LOT LOCATION	EXIT #	CAPACITY	1984	1996	1997	1998	1999	2000	2001	2002	2003
Auburn Hills – Baldwin Road	Exit 84 SW Quadrant	44	18	6	18	44	29	29	29	25	25
Clarkston NE – Sashabaw Road	Exit 89 NE Quadrant	100	30	32	45	68	83	60	63	58	46
Clarkston N – M-15	Exit 91 SW Quadrant	32	25	12	17	15	15	10	6	11	9
Clarkston NW – Dixie Highway	Exit 93 NE Quadrant	41	30	22	17	23	29	46[a]	33	21	19
Grange Hall	Exit 101 SE Quadrant	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Totals		217	103	72	97	150	156	145	131	115	99

Source: MDOT
[a] The capacity of this lot is often exceeded. Cars park on the grass adjacent to the lot.

Transit and carpooling will be important components of maintaining traffic during construction (see next section). If transit routes developed during the construction period build a sound ridership base and an ongoing funding source can be found, the opportunity exists to maintain these services after construction ends.

4.2.4 Maintaining Local and Regional Access During Construction

During the construction of the Preferred Alternative both local and regional access will be maintained. A minimum of two lanes of traffic in each direction will be maintained on I-75 at all times. Staged construction will be employed. For most of the corridor, part-width construction techniques will be used. This means maintaining traffic on a portion of the road, while the other portion is being reconstructed. Part-width construction is applicable when a road is being widened, such as with this project. But, as total reconstruction of I-75 is planned to coincide with the lane additions, the entire road width will be closed at one time or another. In the depressed section, bridges will be replaced. This means there will be brief periods when one side of the freeway will have to be totally closed as bridge beams are removed and new ones put in place.

MDOT will establish official detour routes over the state trunkline system. The project will be built in phases so that the entire length of I-75 is not under construction at once. Consequently, the posted detours will vary depending on the section under construction. It is likely that detour routes will include all state trunklines in the area, including M-1 (Woodward Avenue), M-102 (8 Mile Road), I-696, I-75 BL/BR 24 (Square Lake Road), and M-59. Construction phasing and official detour routes will be developed during the next phases of the project in consultation with local jurisdiction.

The service drives on either side of the depressed section are available for traffic diversion and will undoubtedly be used. Due to the short blocks that prevail in this section of the corridor, access can be maintained to local properties.

MichiVan is the Michigan operation of a nationwide organization that promotes ridesharing strategies. MDOT and MichiVan have collaborated in concert with SEMCOG to encourage vanpooling. Implementation of an HOV lane offers a unique opportunity to expand the existing collaboration by providing a strong incentive to rideshare. MDOT will meet with MichiVan well

in advance of the implementation date of the project to discuss strategies to expand the rideshare efforts as much as feasible prior to the start of construction.

Based on available funding, special transit services will be initiated for the construction period. MDOT will, in conjunction with SMART (or DARTA), SEMCOG, and MichiVan develop and coordinate park-and-ride locations, in addition to the existing ones at the Troy Civic Center and Oakland Mall. At the same time, MDOT will work with transit providers to offer high-quality, low-cost transit service designed to maximize relief of travel demand on I-75.

4.2.5 Population and Employment Trends

There has been extensive growth in Oakland County in population and employment, and a shift in population and employment north from Detroit and the suburbs in southern Oakland County (Table 4-4). Between 1980 and 1990 Oakland County's population increased seven percent from 1,012,000 to 1,084,000. By 2000 it had increased nearly 10 percent more to 1,194,000. It is expected to grow an additional 12 percent to 1,330,000 over the next 30 years. Because household size is shrinking, the rate of household growth is even greater than population growth.

The growth in households supports the maintenance of the tax base (see next section). For communities contiguous to the project, Auburn Hills is greatest in recent population growth (in terms of percentage), followed by Troy. Other communities lost population. All are projected to lose population by 2030 except Auburn Hills. If the remaining townships within Oakland County along I-75 are included, the population growth in the last decade was five percent. This total is expected to grow another two percent by 2030.

Employment in Oakland County has increased by 34 percent from 681,000 to 910,000 over the last decade (Table 4-5). It is expected to increase by an additional 19 percent to almost 1,100,000 over the next 30 years.[61] Oakland County now leads the state in jobs. In 2020 Oakland County is expected to have nearly 19 percent of the state of Michigan's total employment and more than 29 percent of its total earnings.[62]

4.2.6 Other Socioeconomic Characteristics

An examination of communities adjacent to I-75 finds the northern townships have higher income levels and median home values than those to the south (Table 4-5). The percentages of minorities vary from less than ten percent in Hazel Park, Ferndale and Royal Oak, to the teens in Madison Heights, Troy and Bloomfield Township, to 24 percent in Auburn Hills. The townships to the north of Pontiac have minority percentages of seven percent or less.

For contiguous communities the percentage of households in poverty is eight percent or less except for Hazel Park. Hazel Park has the lowest median household income, the lowest median house value, and the highest percentage of households in poverty. All the communities contiguous to the project have elderly populations in the double digits, compared to the townships further north, which are all under ten percent, except Holly Township. This reflects the fact that Hazel Park, Ferndale, Royal Oak, and Madison Heights are older communities with populations who arrived early in the development of Oakland County and have, in many cases, remained.

[61] *2030 Regional Development Forecast for Southeast Michigan*, Southeast Michigan Council of Governments (SEMCOG), 2001.
[62] *1999 State Profile; Michigan,* Woods and Poole Economics, Inc.

Table 4-4
Population and Household Growth

	Population							Households				
	Totals				Percent Change			Totals			Percent Change	
Place	1980	1990	2000	2030 est.	80 to 90	90 to 00	00 to 30	1990	2000	2030 est.	90 to 00	00 to 30
Hazel Park	20,914	20,051	18,963	15,860	-4.1%	-5.4%	-16.4%	7,284	7,284	7,179	0.0%	-1.4%
Ferndale	26,227	25,084	22,105	17,880	-4.4%	-11.9%	-19.1%	9,845	9,871	9,899	0.3%	0.3%
Madison Heights	35,375	32,196	31,101	26,564	-9.0%	-3.4%	-14.6%	12,850	13,299	13,538	3.5%	1.8%
Royal Oak	70,893	65,410	60,062	52,233	-7.7%	-8.2%	-13.0%	28,344	28,880	29,168	1.9%	1.0%
Troy	67,102	72,884	80,959	77,046	8.6%	11.1%	-4.8%	26,167	30,018	32,621	14.7%	8.7%
Bloomfield Township	42,876	42,473	43,023	39,180	-0.9%	1.3%	-8.9%	15,734	16,804	17,409	6.8%	3.6%
Pontiac Twp./ Auburn Hills [a]	15,388	17,076	19,837	21,013	11.0%	16.2%	5.9%	6,453	8,064	9,753	25.0%	20.9%
Contiguous Communities Subtotal	280,755	277,164	278,050	249,776	-1.3%	0.3%	-10.2%	108,667	116,220	119,567	7.0%	2.9%
Pontiac	76,715	71,136	66,337	75,544	-7.3%	-6.7%	13.9%	24,763	24,234	30,204	-2.1%	24.6%
Orion Township	19,566	21,019	30,748	40,948	7.4%	46.3%	33.2%	7,331	11,048	16,030	50.7%	45.1%
Independence Township	20,569	23,717	32,581	38,103	15.3%	37.4%	16.9%	7,977	11,765	15,381	47.5%	30.7%
Springfield Twp.	8,295	9,927	13,338	20,326	19.7%	34.4%	52.4%	3,276	4,619	7,854	41.0%	70.0%
Holly Township	3,612	3,257	3,902	7,167	-9.8%	19.8%	83.7%	1,095	1,321	2,890	20.6%	118.8%
Groveland Twp.	4,114	4,705	6,150	7,239	14.4%	30.7%	17.7%	1,534	2,106	2,819	37.3%	33.9%
Corridor Total	413,626	410,925	431,106	439,103	-0.7%	4.9%	1.9%	154,643	171,313	194,745	10.8%	13.7%
Oakland County	1,011,793	1,083,592	1,194,156	1,333,573	7.1%	10.2%	11.7%	410,488	471,115	581,838	14.8%	23.5%
Michigan	9,262,044	9,295,287	9,938,444	NA	0.4%	6.9%	NA	3,419,331	3,785,661	NA	10.7%	NA

Source: *Historical Population and Employment by Minor Civil division, Southeast Michigan,* SEMCOG, June 2002
[a] Auburn Hills was incorporated in 1983 from Pontiac Township.

Table 4-5
Socioeconomic Characteristics

	Employment											
	Totals			Percent Change		2000 Socioeconomic Characteristics						
Place	1990	2000	2030 est.	90 to 00	00 to 30	Median House-hold Income[a]	Median House Value	Percent Renters	Percent Minority	% House-holds in Poverty	% Older Than 65
Hazel Park	5,003	4,883	4,099	-2.4%	-16.1%	$ 37,045	$77,000	25%	8%	12%	11%
Ferndale	10,577	11,312	11,173	6.9%	-1.2%	$45,629	$102,900	28%	9%	8%	10%
Madison Heights	27,408	28,848	27,538	5.3%	-4.5%	$42,326	$110,600	29%	10%	8%	14%
Royal Oak	34,871	42,252	43,583	21.2%	3.2%	$52,252	$150,900	29%	5%	5%	15%
Troy	104,498	135,977	144,882	30.1%	6.5%	$77,538	$219,800	22%	18%	3%	10%
Bloomfield Township	15,013	24,943	33,161	66.1%	32.9%	$103,897	$356,800	9%	12%	3%	18%
Auburn Hills	22,202	54,253	77,684	144.4%	43.2%	$51,376	$137,200	45%	24%	7%	15%
Contiguous Communities Subtotal	219,572	302,468	342,120	37.8%	13.1%	NA	NA	NA	NA	NA	NA
Pontiac	56,308	63,070	76,787	12.0%	21.7%	$31,207	$74,300	43%	60%	21%	9%
Orion Township	7,379	9,057	17,232	22.7%	90.3%	$73,755	$199,100	15%	5%	3%	5%
Independence Township	4,445	7,725	10,990	73.8%	42.3%	$74,993	$203,600	16%	4%	2%	8%
Springfield Township	1,244	2,685	6,805	115.8%	153.4%	$71,977	$209,100	8%	3%	4%	6%
Holly Township	326	815	1,789	150.0%	119.5%	$67,813	$158,400	9%	7%	5%	11%
Groveland Township	417	926	2,143	122.1%	131.4%	$72,188	$197,300	5%	3%	5%	5%
Corridor Total	509,263	689,214	799,986	35.3%	16.1%	NA	NA	NA	NA	NA	NA
Oakland County	681,037	910,363	1,087,399	33.7%	19.4%	$61,907	$181,200	24%	17%	5%	11%
Michigan	4,826,388	5,654,522	NA	17.2%	NA	$44,667	$115,600	26%	18%	12%	12%

Source: *Historical Population and Employment by Minor Civil division, Southeast Michigan*, SEMCOG, June 2002
[a] 1999 data, most recent available.

4.3 Environmental Justice

The purpose of *Executive Order 12898 on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations. Although the project will affect minority and low-income populations within the project area, the proposed action will not have a disproportionately high and adverse human health or environmental effects on any minority and low-income populations within the project area.

The presence of minority and low-income populations within the project area was determined by analyzing census data, field reviews, and public involvement efforts. The census tracts adjacent to the I-75 corridor were examined with respect to minorities and low- income populations (Table 4-6 and Figure 4-2). The census tracts with the highest proportion of minorities are tracts 1406 and 1810, each with minority populations of 35 percent. In tract 1810, the minority populations include Asian/Pacific Islanders (20 percent), African Americans (9 percent), American Indian/Eskimo and "other" (both 1 percent), and Multiple Race (5 percent). The Hispanic population is 2 percent of the total population of tract 1810. "Hispanic Population" is a separate category, because Hispanic individuals can consider themselves any of a number of races. In tract 1406, the minority population consists of African American (27 percent), Asian/Pacific Islander (5 percent), and Multiple Race (2 percent). The Hispanic population is 2 percent of the tract total.

The census tract with the highest percentage of low-income persons is tract 1810 with 19.3 percent. In Madison Heights the percentage is 8.8 percent, while the percentage of low-income persons in Oakland County and the State of Michigan is 5.5 percent and 10.5 percent respectively.

The proposed project will affect minority and low-income populations within the project area. Project impacts include relocations (Section 4.1), an increase in noise levels (Section 4.8), and temporary impacts during construction (Sections 5.11, 5.13, 5.14).

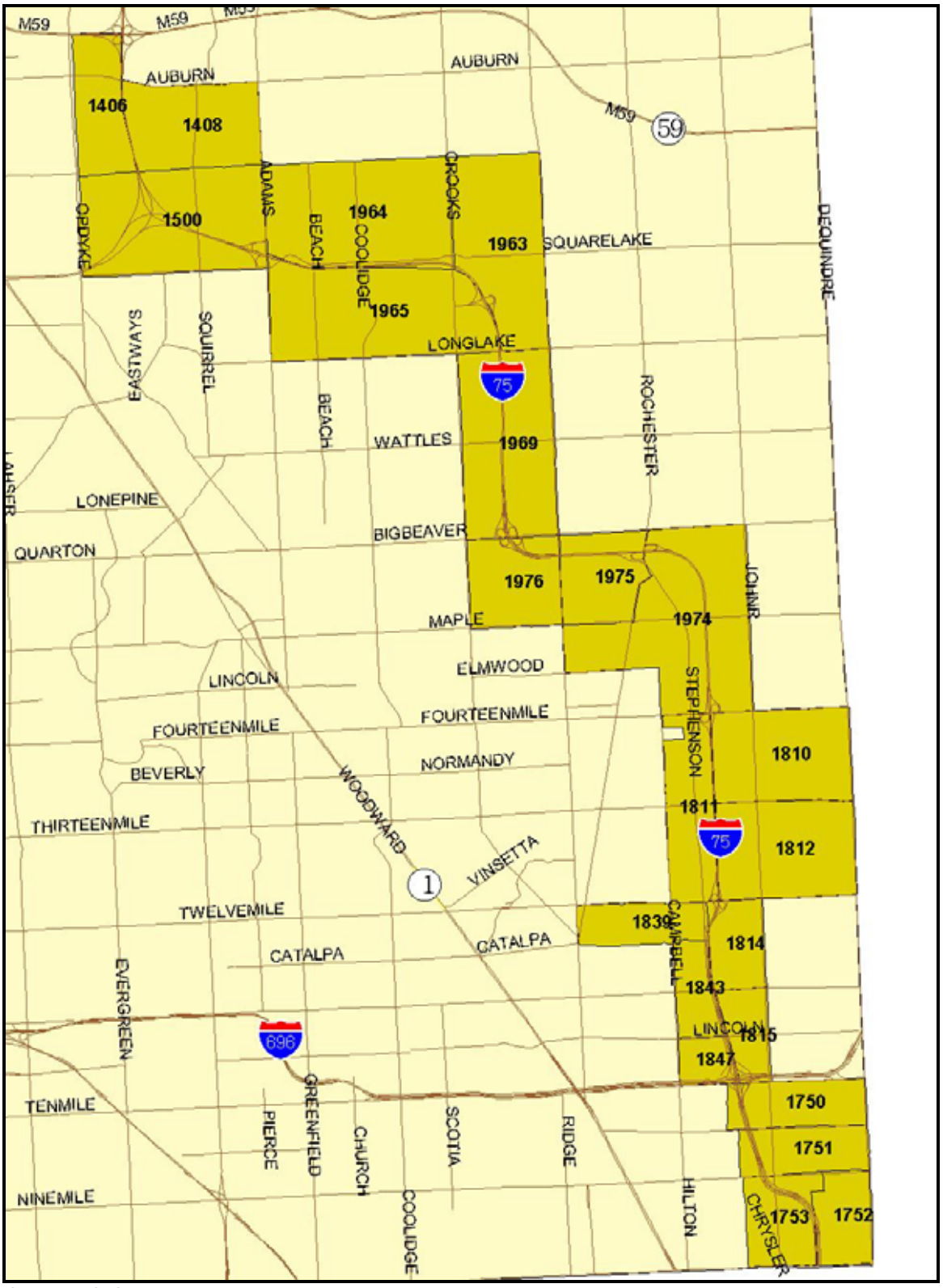
Most of the project impacts are relocations that would occur in tract 1815 in Madison Heights, where homes will need to be relocated due to the I-696 ramp braiding improvements. Tract 1815's boundaries are Stephenson Highway on the west, John R on the east, 10 Mile Road on the south, and 11 Mile Road on the north. In Tract 1815, the percent of minorities is 6 percent, which is lower than Madison Heights (10 percent), Oakland County (20 percent), and the State of Michigan (20 percent). The percent of persons in poverty in Tract 1815 is 8.4 percent, which is lower than that of Madison Heights as a whole (8.8 percent), and the state of Michigan (10.5 percent), but higher than Oakland County (5.5 percent). Although the relocations will affect minority and low-income populations as well as other populations in the project area, these impacts are not disproportionate to minority or low-income populations.

MDOT will provide mitigation measures for acquiring impacted properties, increased noise levels and minimizing impacts during construction. For a complete description of these mitigation measures refer to Section 5 – Mitigation of Impacts and the Green Sheet: Project Mitigation Summary.

Table 4-6
Minority and Low-Income Populations in Contiguous Census Tracts

Community	2000 Census Tract	% Low-Income Persons (1999 data)	Percent Minority (2000 data)	Percent Hispanic (2000 data)	Top Three Non-White Races (2000 data)[a]
Hazel Park	1750	11.1%	6%	3%	MR/B/A
	1751	11.5%	9%	2%	MR/B/A
	1752	11.8%	10%	2%	MR/A/B
	1753	14.3%	9%	2%	MR/A/B
	All tracts	12.3%	8%	2%	MR/A/B
Royal Oak	1839	2.6%	4%	2%	B/MR/A
	1843	3.3%	5%	1%	MR/A/B
	1847	5.8%	3%	2%	MR/A/B
	All tracts	4.2%	5%	1%	A/B/MR
Madison Heights	1810	19.3%	35%	2%	A/B/MR
	1811	4.8%	3%	1%	A/MR/B
	1812	5.6%	9%	1%	A/MR/B
	1814	6.7%	8%	3%	A/MR/B
	1815	8.4%	6%	2%	A/MR/B
	All tracts	8.8%	10%	2%	A/MR/B
Troy	1963	1.8%	16%	1%	A/B/MR
	1964	0.8%	16%	1%	A/B/MR
	1965	0.9%	22%	1%	A/B/MR
	1969	2.3%	23%	1%	A/MR/B
	1974	6.1%	7%	2%	MR/A/B
	1975	6.1%	34%	2%	A/B/MR
	1976	2.6%	24%	4%	A/B/MR
	All tracts	2.7%	18%	1%	A/B/MR
Bloomfield Twp	1500	2.7%	20%	2%	A/B/MR
	All tracts	2.5%	12%	1%	A/B/MR
Auburn Hills	1406	3.0%	35%	2%	B/A/MR
	1408	4.6%	27%	3%	A/B/MR
	All tracts	5.8%	24%	4%	B/A/MR
Oakland County	All tracts	5.5%	20%	2%	B/MR/A
Michigan	All tracts	10.5%	20%	3%	B/MR/A

Source: 2000 U.S. Census
*A=Asian or Pacific Islander; B= Black or African American; MR=Multiple Race.



Source: U.S. Census

Figure 4-2
Census Tracts along I-75

The proposed project will benefit minority and low-income populations as well as other populations who live near or travel I-75 each day. The benefits include improved access on and off the freeway system, and implementation of an HOV lane, which will encourage enhanced transit services and ridesharing. Both of these services improve mobility for those who do not have access to car. All those who live near I-75 will benefit from noise abatement (Section 4.8.5), reduced congestion and its associated air quality.

A public involvement program was established to solicit input from potentially affected property owners, including minority and low-income populations, as well as other interested parties. Over 7,000 postcard notifications were mailed approximately ten days in advance of each meeting. The meetings, which included five I-75 Council meetings and three rounds of public meetings held prior to the public hearing (Section 6.2), were held at various times and locations within the project corridor. During these meetings, the public had an opportunity to view and comment on the various alternatives, regarding their development.

The proposed project will not cause disproportionately high and adverse impacts to minority populations and low-income populations located in and near the project area at this time. Impacts such as relocations, increase in noise levels and construction impacts will affect all populations who live near or travel I-75 each day. As previously mentioned, MDOT will mitigate for these impacts. However, a continuing effort will be made to identify any additional impacts that may have a disproportionately high and adverse affect on minority and low-income populations during subsequent phases of this project. If any new impacts are identified, every effort will be made to actively involve these populations in the project development process, and to avoid or mitigate these impacts.

4.4 Economic Impacts and Tax Base Loss

4.4.1 Economic Background

Economic activity in the project area is generated by a variety of market sectors including retail trade, services, education, and public administration. The I-75 corridor throughout Oakland County has been subject to rapid development. This trend is expected to continue, but at a reduced pace in the south part of the corridor.

During the 1990s, Oakland County employment grew about 50 percent faster than the nation as a whole, while per capita income grew 34 percent faster. Private sector job growth was 33 percent, creating an average of 21,900 new jobs annually. Oakland County is the number one job-producing county in Michigan, responsible for 25 percent of all new Michigan jobs in the last decade. Oakland County is also Michigan's leading center for international commercial activity. In a strong rebound from the recession of the early 1990s, Oakland gained 30,400 jobs in 1994 and continued to add between 10,000 and 26,000 jobs for several years thereafter. This trend is due to growth in both manufacturing (33%) and non-manufacturing (also 33%) jobs over the ten-year period. From 1992 to 2000, the number of businesses rose about 30 percent to 42,000 with the total annual payroll increasing by 90 percent to $31.9 billion.

During the 1990s, employment shifted from trade industries to services, such as health, technology, and finance. Manufacturing has maintained its share of employment, which is unusual among Michigan's local economies and a departure from Oakland's trend in the 1980s. In fact, manufacturing employment declined in the nation as a whole during this period.

Oakland's March 2003 unemployment rate of 5.1 percent was lower than Michigan's 6.8 percent and the nation's 6.2 percent. Oakland County's per capita income is the highest in the state. This wealth manifests itself in the housing market. Housing demand has caused the sales volume of new construction and existing homes to increase by 17 percent between 1997 and 2000. And, the average price of single-family homes increased by 28 percent from $160,000 to $204,000.

Census data for 2000 (Table 4-7) show more commuters now travel from Wayne County to Oakland County to work (124,137) than the reverse (106,405). And overall, 115,000 more workers commute into Oakland County than the reverse.

Table 4-7
Commuting to and from Oakland County

COUNTY OF RESIDENCE	COUNTY OF WORK	WORKERS	PERCENT
Oakland	Oakland	429,030	71.5%
Oakland	Wayne	106,405	17.7%
Oakland	Macomb	41,935	7.0%
Oakland	Washtenaw	6,723	1.1%
Oakland	Genesee	6,307	1.1%
Oakland	All Other Counties	9,783	1.6%
Total Workers Living in Oakland County		600,183	100.0%
Oakland	Oakland	429,030	60.0%
Wayne	Oakland	124,137	17.4%
Macomb	Oakland	94,376	13.2%
Genesee	Oakland	20,061	2.8%
Livingston	Oakland	17,064	2.4%
All Other Counties	Oakland	30,808	4.3%
Total Workers in Oakland County		715,476	100.0%

Source: US Census

Predictions are for continued population/employment and traffic growth. But, adding capacity to I-75 is a response to the growth that has already occurred and anticipates the growth predicted by the local political jurisdictions in the corridor.

The tax base in the corridor has increased steadily. In all cases, but one, the State Equalized Value in jurisdictions has risen considerably faster than the Consumer Price Index (Table 4-8). This is true for inner suburbs and outer suburbs, but the outer suburbs have experienced greater rates of growth in SEV, as they had a lower base to begin with. Interestingly, Pontiac in the 1990s kept pace with the outer suburbs.

Table 4-8
Change in State Equalized Value
(millions of 2002 dollars adjusted from base year with Consumer Price Index)

TAX DISTRICT	1970	1980	1990	2000	SEV % CHANGE		
	SEV	SEV	SEV	SEV	70>80	80>90	90>00
Hazel Park	17	56	115	272	331%	206%	236%
Ferndale	29	82	194	537	281%	238%	277%
Royal Oak	73	279	770	1961	382%	276%	255%
Madison Heights	38	158	507	1077	421%	321%	212%
Troy	67	534	2098	4931	798%	393%	235%
Bloomfield Township	140	394	1307	3057	281%	332%	234%
Auburn Hills (Pontiac Twp.)	20	54	264	1677	265%	492%	635%
Subtotal	383	1556	5256	13512	406%	338%	257%
Southfield	126	547	1556	3263	436%	285%	210%
Bloomfield Hills	11	71	307	760	648%	431%	247%
Pontiac	113	294	431	1141	261%	147%	265%
Rochester Hills (Avon Twp.)	55	236	1111	2804	429%	471%	252%
Subtotal	304	1148	3404	7967	377%	297%	234%
Orion Township	28	93	324	1394	331%	348%	430%
Independence Township	27	102	352	1210	379%	347%	344%
Springfield Township	8	39	125	477	466%	320%	383%
Holly Township	11	30	76	247	282%	250%	325%
Groveland Township	5	23	60	201	460%	258%	335%
Subtotal	79	287	937	3529	363%	326%	377%
Oakland County	1042	5530	18439	49549	531%	333%	269%
Consumer Price Index	39.5	85.3	128.6	169.8	216%	151%	132%

Source: Oakland County Tax Equalization Office

Data from the Oakland County Equalization Division show interesting recent trends. Percent increases in taxable property value (State Equalized Value change from 2001 to 2002) for communities adjacent to the project are:

- Auburn Hills - 10.79 percent;
- Bloomfield Township - 4.77 percent;
- Ferndale - 12.19 percent;
- Hazel Park - 14.16 percent;
- Madison Heights - 3.53 percent;
- Pontiac - 3.68 percent;
- Royal Oak - 6.69 percent; and,
- Troy - 3.90 percent.

These compare favorably to changes further north in the more rapidly developing areas.

- Brandon Township - 4.01 percent;
- Groveland Township - 8.35 percent;
- Highland Township - 8.92 percent;
- Holly Township - 6.52 percent;
- Independence Township - 6.98 percent;
- Springfield Township - 8.51 percent;
- Waterford Township - 7.37 percent; and,
- County Average - 6.77 percent.

4.4.2 Tax Base Loss

The right-of-way cost estimate indicates that property acquisition will result in short-term reductions in real property tax revenues for several communities as shown in Table 4-9. These numbers are small in consideration of recent percentage increases in SEV in these communities (Table 4-8). The effect will be greatest (in terms of percentage) on Hazel Park, which would realize a likely tax loss of over $60,000 or 0.02% of its base. Any loss is important to these communities, but the increase in SEV over the coming years will outweigh potential losses.

Table 4-9
Tax Base Loss (2004 dollars)

Taxing Entity	ROW Cost[a]	Value[b]	Tax Loss[c]	% of Total Taxes[d]
Hazel Park	$ 2,126,950	$ 1,063,475	$ 62,900	0.0231%
Royal Oak	$ 2,060	$ 1,030	$ 50	0.0000%
Madison Heights	$ 5,057,300	$ 2,528,650	$ 107,990	0.0100%
Troy	$ 360,500	$ 180,250	$ 8,510	0.0002%
Total	$ 7,546,810	$ 3,773,405	$ 179,446	NA

Source: Tax Equalization Offices
[a] Fair market value of the land and structures required for right-of-way.
[b] This is 50% of the estimated "fair market value."
[c] Value times tax rate, then rounded.
[d] Tax loss divided by total State Equivalent Value for the community.

4.5 Land Use and Planning Consistency

Land use along I-75 in the project length, is predominately: small lot single-family residential in the south (Hazel Park, Ferndale, Royal Oak, and south Madison Heights), with commercial development where arterial streets intersect; commercial and some light industrial in Madison Heights from 12 Mile Road north; office and commercial with apartment and condominium development in mid-Troy; a mix of single- and multi-family in north Troy; and, single-family in Bloomfield Township and Auburn Hills (Figure 4-3).

Planning documents for each of the communities contiguous to the project were reviewed for references to I-75. They indicate:

- **Auburn Hills** -- *Master Plan* adopted on November 7, 2002. No mention of I-75.
- **Ferndale** -- *Master Plan* adopted in June of 1998. No mention of I-75.
- **Hazel Park** -- *Master Plan* adopted on March 21, 2000. I-75 mentioned in relation to access to the Hazel Park racetrack, and as a major north/south thoroughfare in relation to collector streets. Noise – "The primary noise pollutant in Hazel Park is I-75 which traverses the City from its southern boundary at 8 Mile Road east of John R. Road to the north boundary at Ten Mile Road west of John R. Road. The areas where noise could be a problem are the residential neighborhood along the I-75 corridor, particularly, in the northwest area of Hazel Park where I-75 interchanges with I-696. Noise abatement is provided by the series of walls erected along I-75 and I-696". The downtown Hazel Park area (9 Mile Road and John R. Road) needs "…redevelopment of the service drive and a

new bridge across I-75." Improved pedestrian access across the I-75 overpass (9 Mile Road) is needed.

- **Madison Heights** -- *Master Plan* adopted on October 16, 1990. "The development of the I-75 corridor (north of Square Lake Road) will provide opportunities for employment for Madison Heights residents as well as the potential for business exchange between existing industrial and office uses in Madison Heights and businesses in the Oakland Technology Park. The I-75 road improvements have also provided for improved travel time to the north." And, "According to the planning methodology for multi-lane highways in the Highway Capacity Manual, by the Transportation Research Board, I-75 should have eight-lanes divided in order to properly support 105,000 vehicles per day, not the six-lanes divided currently in place."
- **Royal Oak** -- *Master Plan* adopted in August of 1999. No mention of I-75.
- **Troy** -- *Future Land Use Plan* adopted on January 8, 2002. No mention of I-75.
- **Bloomfield Township** -- *Master Plan* adopted in 1991. No mention of I-75.

It is noted that, consistent with Hazel Park planning, noted above, the new highway bridges planned with the Preferred Alternative at 9 Mile Road and John R. Road will have sidewalks and improve pedestrian access.

The Preferred Alternative will reduce travel times during congested periods. Land use change may occur in response to travel time changes. Land use will change in accordance with land use decisions made in each community, as planning and zoning is a local function. SEMCOG has noted a number of influences regionally on land use change (see Section 1.3.3).

The Preferred Alternative is consistent with local and regional transportation and land use planning, including Oakland County's *Composite Master Plan Map* and SEMCOG's *Regional Transportation Plan*.

4.6 Farmland/Michigan Act 451, Part 361 Lands/Forest Land

There is no agricultural or forestry zoning or land use in any of the jurisdictions adjacent to the Preferred Alternative. No Part 361 (The Farmland and Open Space Preservation Act) of Michigan Public Act 451, parcels are adjacent to I-75 in the project area.[63] No additional review under the Federal Farmland Protection Policy Act is required. Therefore, an A.D. 1006 form was not prepared for coordination with the USDA/NRCS. In a letter dated September 18, 2002 the Michigan Department of Agriculture notes that " . . . since the widening of I-75 is to be accomplished largely within the existing right-of-way in a highly developed traffic corridor, little or no adverse impacts to agriculture are anticipated" (Appendix C, Section 4). Likewise, in its review of the DEIS the Michigan Department of Agriculture (see letter dated January 20, 2004, in Section 6.4 Letter 5) notes "no major impacts to agriculture". Its principle concern is impacts to established county and intercounty drains. These concerns are addressed in Section 4.10.

[63] Based on a search of the Act 451, Part 361 database for Oakland County.

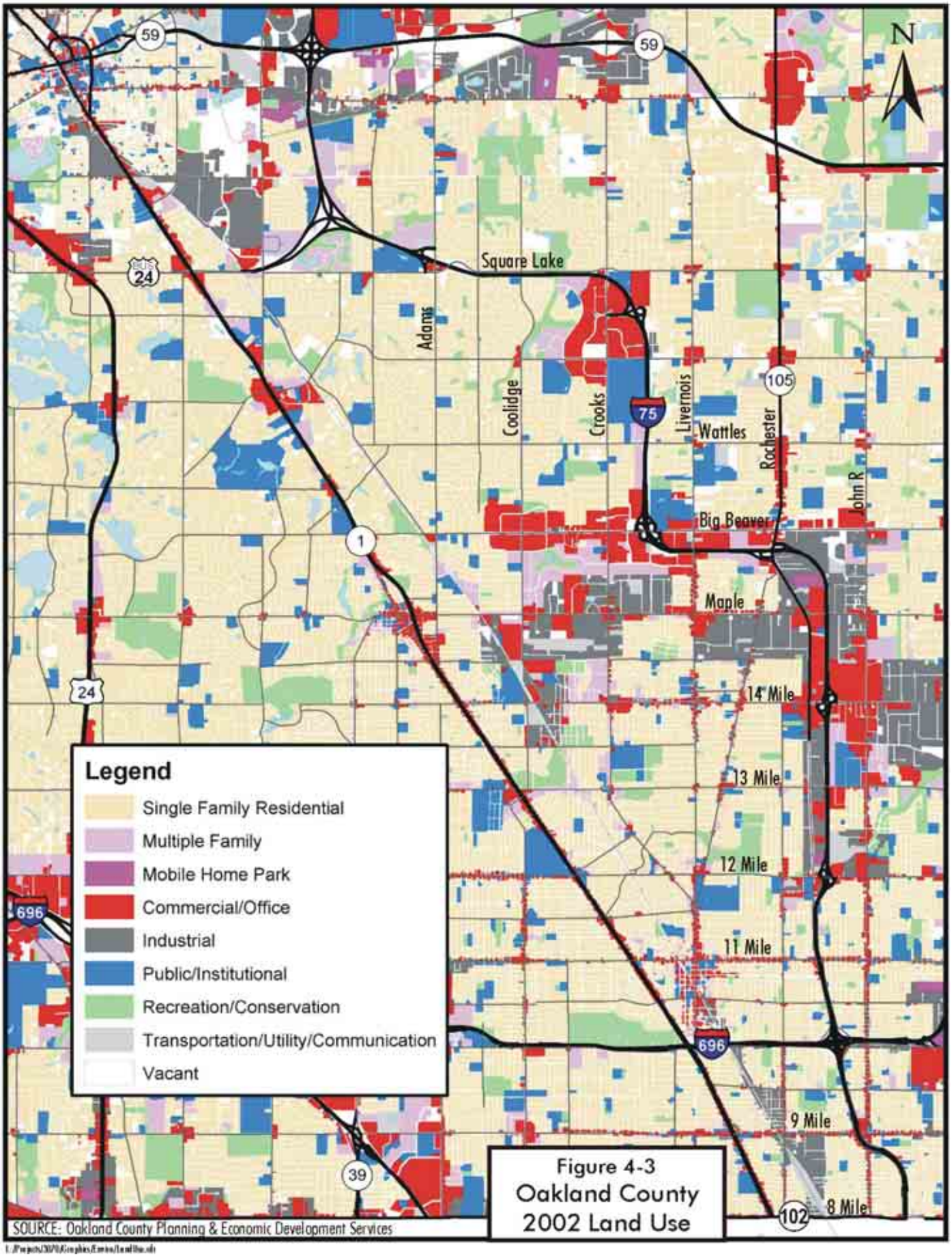


Figure 4-3
Oakland County
2002 Land Use

In its review of the DEIS (see letter dated December 31, 2003, in Section 6.4, Letter 1), the United States Department of Agriculture, National Resources Conservation Service agrees that, " . . . it is anticipated that there will be no negative effects on prime and unique farmland since the proposed project alternatives will be completed on soil areas that have already been converted to urban uses."

4.7 Air Quality Analysis

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for the following pollutants that are considered to be harmful to public health and the environment: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter, and sulfur dioxide (SO_2). The NAAQS, which include primary or health-related standards and secondary or welfare-related standards, define the maximum permissible concentrations of these pollutants (Table 4-10). For this project pollutants of principal concern are ozone and carbon monoxide.

Table 4-10
National Ambient Air Quality Standards

Pollutants	Average Time	Primary Standard [a]	Secondary Standard [b]
Carbon Monoxide	1-hr	35 ppm (40mg/m^3)	No Secondary Standard
	8-hr	9 ppm (10mg/m^3)	No Secondary Standard
Lead	Quarterly	1.5 µg/m^3	Same as Primary
Nitrogen Dioxide	Annual	0.053 ppm (100µg /m^3)	Same as Primary
Ozone	1-hr	0.12 ppm (235µg/m^3)	Same as Primary
	8-hr	0.08 ppm (157µg/m^3)	Same as Primary
Respirable Particulate Matter (10 microns or less) (PM_{10})	24-hr	150 µg/m^3	Same as Primary
	Annual	50 µg/m^3	Same as Primary
Respirable Particulate Matter (2.5 microns or less) ($PM_{2.5}$)	24-hr	65 µg/m^3	Same as Primary
	Annual	15 µg/m^3	Same as Primary
Sulfur Dioxide	3-hr	–	0.5 ppm (1300µg/m^3)
	24-hr	0.14 ppm (365µg/ m^3)	–
	Annual	0.03 ppm (235µg/ m^3)	–

Source: Code of Federal Regulations, Title 40, Part 50.
[a] Primary NAAQS: the levels of air quality that the EPA judges necessary, with an adequate margin of safety, to protect the public health.
[b] Secondary NAAQS: the levels of air quality that the EPA judges necessary to protect the public welfare from any known or anticipated adverse effects.

4.7.1 Air Quality Conformity

The Clean Air Act requires Michigan (and all other states) to have a *State Implementation Plan* (SIP) to demonstrate how it will attain and/or maintain the NAAQS. SEMCOG, collaborates with the Air Quality Division of the Michigan Department of Environmental Quality (DEQ) on the work needed to prepare and/or update a SIP. SEMCOG is responsible for reviewing mobile source (vehicular) emissions in Southeast Michigan when projects are proposed for inclusion in their long-range transportation plan. SEMCOG's *2030 Regional Transportation Plan* (RTP) has successfully undergone a quantitative analysis, demonstrating that emissions levels associated with implementing the planned projects are below designated emissions level limits (budgets) set forth in the SIP. The Preferred Alternative is included on the 2030 Plan, and so has successfully undergone air quality conformity review.

Air quality conformity analyses for mobile sources required in Southeast Michigan currently involve two major pollutants: carbon monoxide (CO) and ozone (and its precursors volatile organic compounds and nitrogen oxides). A new standard will require such analysis for $PM_{2.5}$ by April 2006. This attainment status of the region is as follows:

Carbon monoxide - In 1999, Wayne, Oakland, and Macomb counties were redesignated from nonattainment to maintenance for CO. Similar to ozone, a positive conformity determination for CO requires that emissions in any future year remain at or below the approved mobile source emissions budget of 3,843 tons/day. On January 28, 2005, (effective March 28, 2005) EPA approved a revised CO budget of 1946 tons /day.

One-hour ozone - In 1995, the seven-county SEMCOG region was redesignated from nonattainment to maintenance for the one-hour ozone standard. At that time, a maintenance plan was developed establishing emissions budgets for the two precursors of ozone: volatile organic compounds (VOCs) and nitrogen oxides (NOx). In order for a conformity determination to be made with regard to the one-hour ozone standard, VOCs emissions cannot exceed the mobile source emissions budgets of 218 tons/day for years 2004-2014, and 173 tons/day for years 2015 and beyond. For NOx, emissions cannot exceed the budget of 413 tons/day in any analysis year. The 8-hour standard (see below) now supplants the 1-hour standard, but until an 8-hour emissions budget is established, conformity will be the same as for 1-hour.

Eight-hour ozone - On April 15, 2004, the EPA officially designated the seven-county SEMCOG region, plus Lenawee County, a moderate nonattainment area for the 8-hour ozone standard. In September 2004, EPA approved reclassification from moderate to marginal ozone nonattainment. A SIP, which must be approved by 2007, is currently being developed to address this issue. As noted, for the time being, the test of 8-hour conformity remains the same as that used to demonstrate conformity for one hour.

PM_{10} - As mobile sources in Southeast Michigan currently meets the NAAQS for this pollutant, a regional transportation conformity analysis is not required.

$PM_{2.5}$ - EPA designated seven counties in Southeast Michigan as nonattainment for this new standard December 15, 2004. Conformity determinations for $PM_{2.5}$ will be required by April 5, 2006.

4.7.2 Analysis Needs

Based on the above discussion, and in accordance with MDOT, FHWA, SEMCOG, and EPA procedures, the air quality impact analysis for this project consisted of:

1. A regional (macroscale) conformity analysis performed on the Preferred Alternative by SEMCOG. The conformity analysis for ozone was on a seven-county basis. The conformity analysis for CO was on a three-county basis.
2. The microscale analysis of CO concentrations summarized below.[64]

4.7.3 Analysis Results

The conformity analyses have been successfully completed by SEMCOG. The proposed I-75 project conforms to the Clean Air Act, as it is part of the conforming, cost-feasible, *2030 Regional Transportation Plan.* Note also that when there is a substantial period of time between a project's FEIS and its implementation, it must be "reevaluated". During the course of the reevaluation process, the conformity procedures for $PM_{2.5}$ will go into effect. Conformity testing for $PM_{2.5}$ will be performed at that time.

Carbon Monoxide Analysis

For CO, the criterion for adverse impact is an exceedance of the NAAQS at a sensitive receptor modeled for the year of opening (2015) and design year (2025). The assumptions with respect to ambient (background) levels of CO were 4.5 parts per million (ppm) and 3.0 ppm, for one hour and eights hours, respectively. These values were obtained from the nearest CO monitoring station at Oak Park. Emission factors (in grams per mile) used in the analysis were drawn from MOBILE6.2, a computer program developed by EPA to generate emission factors for regulated pollutants for various vehicle types over a range of speeds.

The difference between the GP and HOV alternatives on CO concentrations was negligible. A computer program, CAL3QHC, was used to estimate CO concentrations at over fifty sensitive receptors at eleven locations along the corridor using emission factors from MOBILE6.2. Sensitive receptors are outside locations where persons would normally be present for some time. Receptors were identified along I-75 and its service drives and at intersections near residential areas.

The worst-case one-hour CO concentration in 2015 was found to be near Gardenia Avenue (Table 4-11). The predicted concentration was 9.2 parts per million (ppm), well below the NAAQS of 35 ppm. Converting this to an eight-hour value using a persistency factor of 0.67 results in an eight-hour forecast of 6.1 compared to the standard of 9 ppm. Worst-case one- and eight-hour concentrations in 2025 are estimated to be 9.3 and 6.2 ppm, respectively, also well below standards.

[64] *Air Quality Technical Report* The Corradino Group, October 2003.

Table 4-11
CO Concentrations

Modeling Site	Location	Receptor	Existing (2003)		Build (2015)		No Build (2015)		Build (2025)		No Build (2025)	
			1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr	1-Hr	8-Hr
1	South of 9 Mile Rd at Highland Ave	1	10.5	7.0	8.1	5.4	7.8	5.2	8.1	5.4	7.6	5.1
		2	8.7	5.8	7.2	4.8	7.0	4.7	7.2	4.8	6.9	4.6
2	South of 1-75/696 Interchange at Mapledale Ave	1	9.4	6.3	7.6	5.1	7.3	4.9	7.6	5.1	7.2	4.8
		2	9.9	6.6	7.9	5.3	7.5	5.0	7.9	5.3	7.4	4.9
		3	8.6	5.7	7.1	4.7	6.9	4.6	7.1	4.7	6.8	4.5
		4	8.2	5.5	6.7	4.5	6.6	4.4	6.7	4.5	6.4	4.3
3	I-75 at W Gardenia Ave	1	11.5	7.7	8.9	5.9	8.6	5.7	8.8	5.9	8.3	5.5
		2	10.0	6.7	7.9	5.3	7.7	5.1	8.0	5.3	7.6	5.1
		3	11.0	7.4	8.4	5.6	8.2	5.5	8.3	5.5	7.9	5.3
		4	11.6	7.8	9.2	6.1	8.5	5.7	9.3	6.2	8.4	5.6
4	North of 12 Mile Interchange at off-ramp	1	7.6	5.1	6.7	4.5	6.3	4.2	6.6	4.4	6.3	4.2
		2	9.4	6.3	7.9	5.3	7.5	5.0	8.1	5.4	7.4	4.9
		3	8.9	5.9	7.6	5.1	7.0	4.7	7.6	5.1	6.9	4.6
5	South of 14 Mile Rd at Whitcomb Ave	1	8.6	5.7	7.3	4.9	7.0	4.7	7.4	4.9	6.8	4.5
		2	8.7	5.8	7.5	5.0	7.0	4.7	7.6	5.1	6.8	4.5
6	North of Maple Rd at Larchwood Ave	1	8.5	5.7	7.2	4.8	6.9	4.6	7.3	4.9	6.8	4.5
		2	8.3	5.5	7.2	4.8	6.9	4.6	7.3	4.9	6.8	4.5
7	I-75/Rochester Rd Interchange	1	8.3	5.5	6.3	4.2	6.6	4.4	6.7	4.5	6.5	4.3
		2	11.4	7.6	8.1	5.4	8.4	5.6	8.9	5.9	8.3	5.5
		3	8.6	5.7	6.5	4.3	6.7	4.5	7.2	4.8	6.7	4.5
8	South of Wattles Rd at Old Creek Rd	1	9.2	6.1	7.8	5.2	7.4	4.9	8.0	5.3	7.5	5.0
		2	8.1	5.4	7.0	4.7	6.7	4.5	7.1	4.7	6.7	4.5
		3	6.4	4.3	5.9	3.9	5.7	3.8	5.9	3.9	5.7	3.8
9	South of Coolidge Hwy at Fleetwood	1	10.0	6.7	8.2	5.5	7.7	5.1	8.4	5.6	7.7	5.1
		2	8.6	5.7	7.3	4.9	6.9	4.6	7.4	4.9	6.9	4.6
10	I-75/Adams Rd Interchange	1	5.7	3.8	5.2	3.5	5.3	3.5	5.3	3.5	5.2	3.5
		2	6.6	4.4	5.9	3.9	5.9	3.9	6.0	4.0	5.8	3.9
11	North of Squirrel Rd at Brenthaven	1	7.8	5.2	6.7	4.5	6.6	4.4	6.8	4.5	6.7	4.5
		2	7.8	5.2	6.7	4.5	6.7	4.5	6.9	4.6	6.9	4.6

Source: The Corradino Group of Michigan, Inc.
Notes: A Persistence Factor of 0.67 was used to estimate 8-hour concentrations. The 1-hr background concentration (4.5 ppm) is the 1-hr, 2nd highest value recorded at the Oak Park Station (26-125-0001) in 2001. The 8-hr background concentration (3.0 ppm) is the 8-hr, 2nd highest value recorded at the Oak Park Station (26-125-0001) in 2001.

4.7.4 Air Toxics and Particulates

Air toxics and $PM_{2.5}$ are of growing concern. Both are acknowledged to pose health risks. Air toxics include a variety of organic (carbon-based) compounds, metals, and other materials that have a negative effect on health and/or human welfare. They are emitted by vehicles, particularly diesel trucks. Data from the 1996 National Toxics Inventory indicate that mobile sources (cars, trucks, and other "non-point" sources) account for approximately 50 percent of air toxics emissions (EPA, 2000).

$PM_{2.5}$ represents the smallest of particles. Once inhaled, they can penetrate deep into the lungs. Standards have been set for $PM_{2.5}$ and increasingly stringent standards are being applied to diesel engines.

On May 10, 2004 EPA announced it is extending stringent standards to non-road diesel engines (engines in construction and other heavy-duty equipment) as well as on-road engines (regular cars, buses and trucks). By 2007, 90 percent of the sulfur in diesel fuel for on-road vehicles is to be eliminated. Cleaner fuel for non-road vehicles follows by about three years. (Sulfur fouls pollution control equipment.) Together with tougher engine standards, these measures will substantially reduce diesel emissions and $PM_{2.5}$. The largest effects will be on NOx and particulates. EPA estimates that affected non-road diesel engines currently account for about 60 percent of total diesel PM emissions and about 30 percent of total NOx emissions from mobile sources nationwide. The new non-road diesel emission standards will reduce emissions by more than 90 percent.

MOBILE6.2 was approved by EPA on May 19, 2004. It allows calculation of air toxic and particulate emission factors. There are neither NAAQS standards for air toxics nor requirements to perform conformity or hotspot analysis for air toxics. SEMCOG has noted their belief that the MOBILE6.2 toxics calculator is an approved method (see letter dated February 23, 2004, in Section 6.4, Letter 13). There is a "PM Calculator"[65] that is available for use to help states develop PM_{10} and $PM_{2.5}$ emission inventories for point sources, but this would not be applicable to toxics from mobile sources.

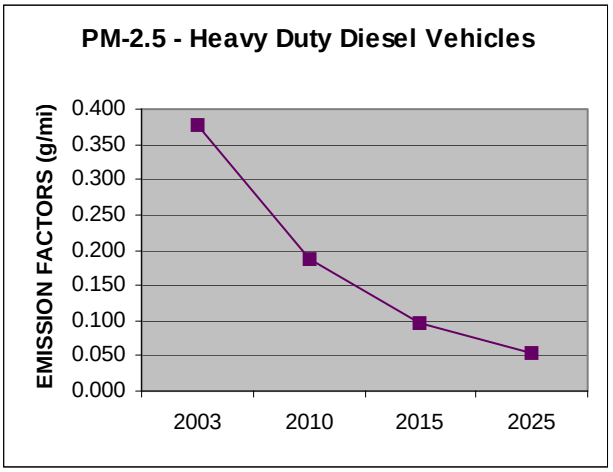
Though no national standards have been set for air toxics by EPA, data are being collected and measures are underway to reduce them. EPA has issued a suite of motor vehicle and fuels regulations, including tailpipe emission standards for cars, SUVs, mini-vans, pickup trucks and heavy trucks and buses; standards for cleaner-burning gasoline; a national low-emission vehicle program; and, standards for low-sulfur gasoline and diesel fuel. By the year 2020, these requirements are expected to reduce emissions of a number of air toxics (benzene, formaldehyde, acetaldehyde and 1,3-butadiene) from highway motor vehicles by about 75 percent and diesel particulate matter by over 90 percent from 1990 levels (EPA, 2000).

In response to the DEIS, MDEQ "supports a quantitative assessment of emissions and impact, with risk characterization, for select air toxics (formaldehyde, benzene, 1,3-butadiene, acetaldehyde and acrolein) . . . The toxicity of these substances has been demonstrated, and should not be ignored." MDOT agrees that the toxicity has been demonstrated. It does not agree that there are scientifically-based means of measuring exposure or risk. There are a number of uncertainties related to air toxics and $PM_{2.5}$. While there are health effects, they are difficult to quantify, and relationships between various pollutants are poorly understood. Data are being collected and computer models are currently being developed and tested to estimate concentrations of these pollutants, but to date there are limitations from a scientific basis. Some pollutants are reactive, others are not. Reactivity affects the way pollutants disperse. Background levels are difficult to determine and pollutant data collected thus far appear to contain anomalies. For these reasons quantitative analysis is not yet reliable.

[65] *PM Calculator User's Manual*, E.H. Pechan & Associates, Inc. for US EPA, September 2003.

MOBILE6.2 is a computer program developed by EPA to generate emission factors for regulated pollutants for various vehicle types over a range of speeds. It contains information related to anticipated $PM_{2.5}$ trends. For example, the model will provide the grams per mile of $PM_{2.5}$ emissions from a heavy-duty diesel truck operating at various speeds. By comparing the emission factors over time, it is clear that $PM_{2.5}$ emissions are expected to continue to decrease (Figure 4-4), just as they have in the past as new pollutant controls have been implemented.

Figure 4-4
Emission Factor Trends – $PM_{2.5}$



Source: EPA's MOBILE6.2 model

In summary, air pollutants have been trending downward and are expected to continue to do so. The project would not result in any violations of current air quality standards as presently being applied. This project is expected to have a positive impact on air quality by reducing congestion. Stop-and-go traffic is evident along I-75 on a daily basis. Without the Preferred Alternative, the frequency and duration of these occurrences will increase. Air pollution emissions increase substantially when vehicles are idling and/or changing speeds. The proposed lane addition will smooth traffic flow and allow a greater opportunity to bypass incidents that cause traffic delay. The result will be reduced tailpipe emissions.

4.8 Noise Analysis

This section summarizes existing and future noise conditions and where noise walls have been identified for consideration. It summarizes the results of a *Noise Study Report.* [66]

The noise unit used herein is the decibel (dB). The sound spectrum is expressed for human hearing in terms of an A weighting, so the unit is called dBA. A 10-dBA increase is a ten-fold increase in sound energy, but is perceived as a doubling of loudness. A 3-dBA increase is a two-fold increase in sound energy and is generally the smallest change in noise perceptible to most people outside of a laboratory setting.

4.8.1 Background and Guiding Criteria

To double the energy of sound and get a perceptible increase in noise, there must be twice as much traffic, or the distance between a sound source and receiver must be halved. Neither will be the case with the proposed widening of I-75. Rather, traffic has already grown over the years to the point that noise guidelines are exceeded in some places. As a result, when a new project is proposed along I-75, noise mitigation must be considered.

FHWA has promulgated noise abatement criteria, which have been incorporated into MDOT's Noise Policy (Table 4-12). For the exterior of residences, churches, hospitals, parks, and libraries, FHWA has established a noise guideline of 67 decibels (dBA), measured as an

[66] *Noise Study Report*, The Corradino Group, December 2004.

"average" of sound over a one-hour period (referred to as L_{eq1h}).[67] This level is not to be "approached or exceeded." Should the guideline at these sensitive receptors be approached or exceeded, noise abatement measures must be considered. "Approach" is defined in Michigan as a 1-dBA reduction from the maximum of 67 dBA. So, the effective criterion for consideration of mitigation is 66 dBA during the loudest hour of the day. Mitigation must also be considered if a project results in a substantial increase (10 dBA or more) in noise levels. Normally, mitigation is not considered in commercial areas.

Table 4-12
FHWA Noise Abatement Criteria
(Hourly A-Weighted Sound Level-decibels [dBA])

Activity Category	Leq(h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance, serve an important need, and where the preservation of those qualities is essential, if the area is to continue to service its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A and B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

Source: State Transportation Commission Policy 10136 – Noise Abatement, Appendix A

Land uses fronting onto I-75 include low- and high-density residential areas, one school, and several churches. The 66-dBA criterion applies to all these areas. Noise modeling shows that many homes are exposed to noise levels exceeding abatement criteria today. Generally, these same areas will continue to exceed criteria with or without the project. But, where a new lane is built, noise will increase as a function of the increased traffic capacity (4 lanes instead of 3 lanes in each direction). Based on the mathematics of noise energy, if all other conditions are equal, the noise level increase associated with adding a lane in each direction would be only 1.2 dBA. This increase is imperceptible, but it adds to levels already above applicable criteria. So, mitigation must be considered. Noise level changes are, of course, also a function of the geometry of each site. When the road is reconstructed, this geometry changes. Noise modeling considers all these factors.

4.8.2 Existing Noise Conditions

Many of the receptors along I-75 today experience noise levels above 66 dBA. Noise measurements were made at 26 locations along the corridor following standard procedures with calibrated equipment.[68] Three five-minute measurements were averaged to obtain the existing noise levels. Measurements ranged from near 60 to over 80 dBA, with about half the

[67] Title 23, Code of Federal Regulations (CFR), Part 772, revised April 1998.
[68] Measurements were made in conformance with *Measurement of Highway Noise*, U.S. Department of Transportation, May 1996, and MDOT practice. A Quest Technologies Q-400 Type 2 dosimeter was used for measurements. It was calibrated before measurements.

measurements over 70 dBA (compared to the criterion of 66 dBA). In the southern, depressed section, measurement locations generally represented the building line, as homes are very close to road right-of-way. Further north, where there is active residential yard space, measurements and modeling focused on a point 25 feet from the backs of homes towards the freeway (or in other appropriate areas, depending on lot orientations, single versus multiple-family use, and other special considerations).

4.8.3 Future Noise Conditions

The Transportation Noise Model (TNM2.1), available through FHWA, was used to predict noise levels based on: roadway geometry, the location of sensitive receptors, and traffic information such as speed and the mix of vehicles.[69] For analysis purposes, the corridor was divided into segments that have consistent roadway geometry and traffic. Model runs were made for existing, no-build, and build conditions. Model runs of existing conditions were compared to actual field measurements to ensure the accuracy of the work. These efforts allowed a determination of the number of dwelling units that would be covered by the 66-dBA criterion under 2025 build and no build conditions (Table 4-13).

Table 4-13
Existing and Future Noise Levels
(Leq(h) Noise Levels in dBA)

Segment	Modeled Receptors	# Dwelling Units Repre-sented[a]	Modeled Noise Level			Dwelling Units over 66 dBA	
			Existing (2003)	No Build (2025)	Build (2025)	No Build (2025)	Build (2025)
8 Mile to Meyer Road	66	66	54-74	54-74	54-74	29	32
Meyer Road to 9 Mile	27	27	58-71	59-71	59-71	9	9
9 Mile to Woodward Heights	36	36	44-66	44-66	46-67	3	4
Woodward Heights to I-696	21	21	54-72	55-72	55-72	8	8
I-696 to Gardenia Ave.	44	44	NA[b]	NA[b]	47-71	NA[b]	8
Gardenia to north of 12 Mile	41	58	46-74	46-75	47-75	25	25
North of 12 Mile to 14 Mile	34	144	39-73	39-74	39-74	76	76
14 Mile to Rochester	16	28	60-74	60-74	60-74	17	17
Rochester to Livernois	57	198	62-74	62-74	62-75	153	153
Livernois to Wattles	43	105	45-77	45-77	46-79	45	61
Wattles to Coolidge	63	90	51-74	52-75	54-76	66	70
Coolidge to Square Lake	55	55	44-73	45-73	47-75	5	9
Total						436	472

Source: The Corradino Group of Michigan, Inc.
[a] In some cases a modeled receptor represents multiple dwelling units. The church and school are represented as dwelling units for the purposes of this table.
[b] NA – a noise wall is already present at this location.

The analysis found that 430 dwelling units, one school, and five churches would be exposed to noise levels exceeding the 66 dBA criterion under future no build conditions compared to 466 dwelling units, one school, and five churches with the Preferred Alternative. Future traffic would

[69] *Noise Study Report,* The Corradino Group, December 2004.

be closer to residences with the wider roadway in the depressed section of I-75, but with the new lane constructed into the embankment, it will tend to be shielded from sensitive receptors. In the northern, at-grade and elevated sections, the lane will be added in the median, so the center-of-road noise will actually move slightly away from receptors. And, the proposed concrete median safety barrier would provide some limited benefit.

4.8.4 Noise Mitigation Considerations

The test of whether noise mitigation should be pursued rests on whether such mitigation is "feasible" and "reasonable." The "feasible" test relates to whether mitigation is physically or institutionally possible and can achieve the desired reduction in noise levels of at least five decibels. Feasible solutions can generally be achieved, but not always. For example, with noise walls, there are engineering limitations on height, especially on bridges. In other cases, there may be a noise source that cannot be controlled with a noise wall. Also, noise wall construction must adhere to safety design criteria, especially stopping sight distance, i.e., walls must be clear of intersections and be positioned in ramp merge areas so that motorists have a clear field of view.

The "reasonable" test addresses whether noise mitigation is cost-effective. This involves examination of how many sensitive receptors can benefit per dollar invested. The current inflation-adjusted value per benefiting dwelling unit is $34,772 (2004 dollars). This applies to those units that would experience at least a 5-decibel reduction in the loudest hour. The current costs to construct a noise wall are $23.77 per square foot, plus $219.60 per linear foot for wall foundation, drainage, and other considerations.

Noise mitigation falls into two general categories. "Type I" projects involve new roadway construction of a type that increases roadway capacity, i.e., in other words, projects that could serve greater traffic volumes and hence generate more traffic noise. These are eligible for federal funding through FHWA as a normal part of project construction. "Type II" projects may be described as retrofits, independent noise mitigation not related to any roadway capacity increase.

With the Preferred Alternative, noise mitigation will be included as a normal part of the I-75 project's federal funding (subject to local review and approval of property owners). With the No Build Alternative any mitigation would be considered Type II. While MDOT does undertake Type II projects, funding is limited:[70]

> "MDOT will construct Type II sound walls only in years when MDOT's Road and Bridge Program, excluding maintenance, exceeds $1.0 billion, adjusted to the Consumer Price Index (CPI) using 2002 as the base year. MDOT will not spend more than one half of one percent of the budget on sound walls. MDOT will give priority to those communities where the freeway was constructed through an existing neighborhood and where 80 percent or more of the existing residential units were there prior to the construction of the freeway. Communities must make application to MDOT and provide a local match of 10 percent of the cost of the sound wall."

It is evident from this policy that, under no-build conditions, only the southern section of the corridor would be eligible for walls. Communities to the north allowed residential development to occur in areas too close to the freeway, after the freeway was built in the 1960s.

[70] *Noise Abatement*, Michigan State Transportation Commission Policy 10136, July 31, 2003.

A number of potential mitigation measures may be considered to reduce noises levels. These include lowering the roadway profile, restricting or prohibiting truck traffic, reducing traffic speeds, insulating public use or nonprofit institutional structures, and constructing noise berms or barriers. Some lowering of the roadway will occur in the depressed section of I-75 to gain more clearance under bridges. But, connections to the numerous ramps and the grades and tapers associated with these ramps limit the ability to lower the freeway. For these reasons, lowering the roadway profile is not considered feasible or reasonable. Restricting or prohibiting truck traffic is not feasible because I-75 is an interstate highway. It is specifically designed to accommodate commercial traffic. Similarly, lowering the speed limits for noise reduction is counter to the purpose of moving people and goods in an efficient manner over the state highway system. MDOT is committed to maintaining speed limits that allow safe and efficient travel, which means maintaining a 55 mph minimum speed limit, and increasing it, where possible, up to the state limit of 70 mph.

Noise barriers can consist of earthen berms or walls, or combinations of the two. Berms are cost-effective and can substantially reduce noise levels. However, they take up a lot of space. In the I-75 corridor such space is limited due to needs for drainage and the proposed lane addition. Construction of berms would require property acquisition, meaning additional relocations and wetland impacts, and local tax base loss. So, berms were not considered reasonable. This leaves noise walls as the preferred mitigation. Under special circumstances insulating public use or nonprofit institutional structures will be considered.

4.8.5 Noise Barrier Analysis

Noise mitigation was examined for all residential areas along the corridor, where traffic-generated noise was expected to be 66 dBA or greater, except where development densities are very low. In the depressed section of I-75 south of 12 Mile Road, noise walls were modeled for placement between the mainline lanes and the service drives, or between ramps and service drives. In this position, they are effective in breaking the line-of-site between homes and mainline I-75 traffic. Where ramps are present, mainline and ramp walls were overlapped in the modeling to prevent gaps. The walls in this analysis were positioned with sight distance and clear-view angle distances taken into account in ramp areas and at intersections. So, walls must end some distance away from intersections. Often commercial uses are at these intersections. So, ending walls in these areas generally does not limit the protection afforded to residential locations.

Noise walls could be positioned between the service drive and adjacent homes. However, as the service drives are local streets (not MDOT-maintained roads), any positioning of such walls would require an agreement with the local government. Sections 9 and 10 of the noise abatement policy under "Type I Projects Procedures and Rules" state:

> "9. MDOT will maintain the structural integrity of the noise abatement structure and will be responsible for the aesthetic condition of the structure on the freeway side only. The exception being that when the structure is on the residential side of a service road, MDOT will maintain the structural integrity for five years, but will not be responsible for either side of [a] structure's aesthetic condition, including the surrounding grounds.
>
> 10. Local authorities must agree, through agreements, resolutions, or ordinances, to provide:
>
> - A share of the state and local funding based on population (per State of Michigan Act 51).

- Aesthetic maintenance on the residential side of the structure, or on both sides when the structure is on the residential side of a service road.
- Structural maintenance after five years when the structure is on the residential side of a service road.

Explanation of bullets two and three: These statements have been included because there is no right of way access to these walls for maintenance purposes.

Failure to meet all of the above requirements will make the noise abatement project unreasonable."

Because service drives provide direct access to homes, and/or connect to the many cross streets on which these homes front, positioning walls between the service drives and homes would cut access to the homes or streets. Usually, closing connecting streets is not practical. Typically, cul-de-sacs must be provided for emergency vehicle turnarounds. These cul-de-sacs require right-of-way, which often means taking residential property, including homes. For this reason walls have not been positioned outside the service drives in the southern-most part of the corridor. Nevertheless, this option does remain, if the local community is willing to take over ownership.

In sections of the corridor where I-75 is not in a depressed section, i.e., from 12 Mile Road to the north, walls would be positioned behind guards rails where possible, and at the right-of-way edge otherwise. When a road is at-grade or elevated, noise walls are usually most effective at the roadway edge, rather than the right-of-way edge. It is noted that safety, maintenance, and drainage issues encountered during roadway design could change the assumptions used in the analysis of noise for this EIS.

Barriers that were found reasonable and feasible are listed in bold in Table 4-14 and are shown on Figure 4-5. Two walls would protect churches. (For purposes of analysis, these institutions are counted as the equivalent of 10 dwelling units in the cost formula, if there is also a benefiting residential receptor.) Existing noise wall sections in the northeast quadrant of the I-696 interchange will be removed by the proposed ramp braiding. New walls would replace the walls removed for the ramp braiding in this section.

It is noted that where noise walls are not found to be reasonable, i.e., where the cost exceeds $34,772 per benefiting dwelling unit, the local community can participate in funding to bring the cost down to the $34,772 level. Therefore, other walls could become reasonable, if a local community decided to participate in funding.

The noise analysis examined 12 segments. The TNM2.1 model was run for the first 11. No runs were needed for Segment 12, as residential development is very sparse in that segment. Segments are defined below.

- Segment 1 - 8-Mile Rd. to Meyers Ave.
- Segment 2 - Meyers Ave. to 9 Mile Road
- Segment 3 - 9 Mile to Woodward Heights
- Segment 4 - Woodward Heights to I-696
- Segment 5 - I-696 to Gardenia Avenue
- Segment 6 - Gardenia to north of 12 Mile
- Segment 7 - North of 12 Mile to 14 Mile
- Segment 8 - 14 Mile to Rochester Road
- Segment 9 - Rochester Road to Livernois
- Segment 10 - Livernois Road to Wattles
- Segment 11 - Wattles to Coolidge
- Segment 12 - Coolidge to North Project Limit

Table 4-14
Noise Barrier Analysis
(See Figures 4-5a to 4-5e)

	Location/Designation	Length (Feet)	Average Height	Cost	Benefiting Receivers	Cost per Ben. Rec.
Feasible and Reasonable Walls	Seg. 1 - 8 Mile to Meyers Avenue					
	Wall 0 – NB 1	**2,117**	**10.5**	**$994,630**	**31**	**$32,085**
	Wall 1 - SB 1	**1,002**	**7.5**	**$397,831**	**12**	**$33,153**
	Seg. 2 - Meyers Avenue to 9 Mile Road					
	Wall 17 - NB Church - Church 10 dwellings[a]	**403**	**10**	**$184,074**	**11**	**$16,734**
	Wall 2 - NB 1	**644**	**10.0**	**$294,440**	**10**	**$29,444**
	Seg. 3 - 9 Mile to Woodward Heights Blvd.					
	Wall 3 - SB 1	**594**	**8.0**	**$243,598**	**8**	**$30,450**
	Seg. 4 - Woodward Heights Blvd. To I-696					
	Wall 4 - NB - Church counts as 10 dwellings[a]	**669**	**10.0**	**$306,052**	**12**	**$25,504**
	Seg. 5 - I-696 to Gardenia Avenue					
	Wall 6 - Replacement Wall @ Braid	**3,700**	**12.0**	**$1,869,000**	**NA[b]**	**NA[b]**
	Seg. 6 - Gardenia to North of 12 Mile Road					
	Wall 7 - SB1	**598**	**13.0**	**$316,898**	**14**	**$22,636**
	Seg. 7 - North of 12 Mile Rd to 14 Mile Road					
	Wall 8 - NB 1	**658**	**12.0**	**$332,325**	**12**	**$27,694**
	Wall 9 - NB 2	**3,310**	**12.7**	**$1,723,718**	**92**	**$18,736**
	Seg 8 - 14 Mile Road to Rochester Road					
	Wall 10 - SB 1	**1,223**	**10.0**	**$559,432**	**17**	**$32,908**
	Seg. 9 - Rochester Road to Livernois Road					
	Wall 11 - NB1	**695**	**10.9**	**$332,568**	**10**	**$33,257**
	Wall 12 - NB2	**1,143**	**11.9**	**$575,489**	**17**	**$33,852**
	Wall 13 - SB1	**646**	**10.0**	**$295,208**	**24**	**$12,300**
	Wall 14 - SB2	**2,381**	**13.1**	**$1,263,340**	**83**	**$15,221**
	Seg. 10 - Livernois Road to Wattles Road					
	Wall 15 - SB 1	**2,749**	**13.5**	**$1,486,948**	**56**	**$26,553**
	Seg. 11 - Wattles Road to Coolidge Highway					
	Wall 16 - SB1 & SB2	**2,078**	**12.5**	**$1,072,462**	**35**	**$30,642**
	Wall 18 - SB3	**472**	**12.0**	**$238,524**	**22**	**$10,842**
	Totals	**25,738**		**$12,548,132**	**454**	**$27,639**
Walls Not Feasible or Reasonable	Seg. 1 - 8 Mile to Meyers Avenue					
	SB 2	1,880	11.5	$927,153	5	$185,431
	Seg. 2 - Meyers Avenue to 9 Mile Road					
	NB 2	600	8.8	$257,861	4	$64,465
	SB 1	1,323	7	$510,202	9	$56,689
	Seg. 3 - 9 Mile to Woodward Heights Blvd.					
	NB 1	1,333	12.7	$693,555	15	$46,237
	Seg. 4 - Woodward Heights Blvd. To I-696					
	SB 1	465	16	$278,969	0	-
	SB 2 -School does not count as 10 dwellings [c]	656	10.0	$300,119	1	$300,120
	Seg. 6 - Gardenia to North of 12 Mile Road					
	NB 1	447	14.6	$253,656	6	$42,276
	SB2	676	10	$308,921	0	-
	Seg. 11 - Wattles Road to Coolidge Highway					
	NB	1,596	10	$729,658	7	$104,237
	Square Lake Noise Wall Project[d]					

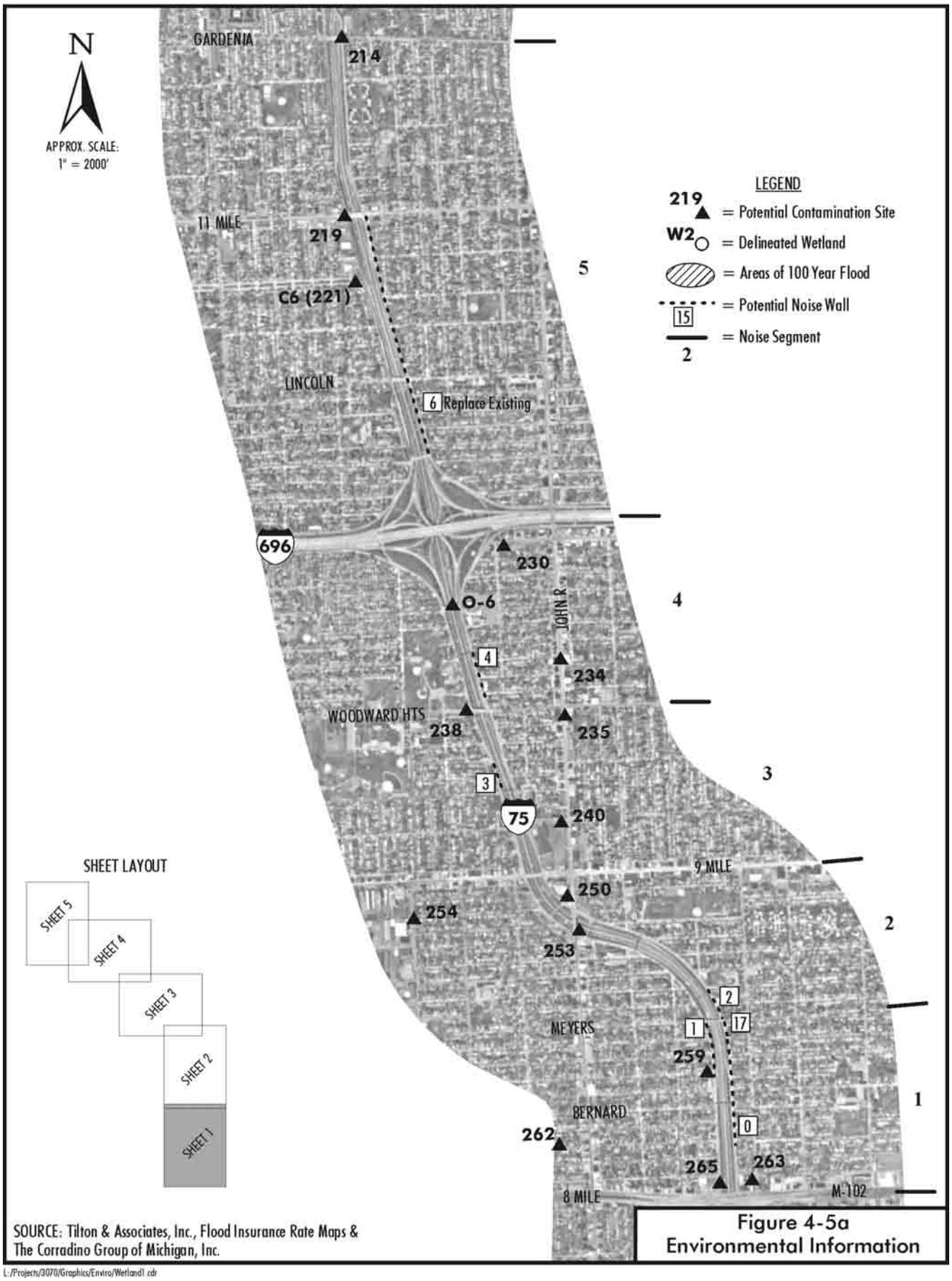
Source: The Corradino Group of Michigan, Inc.

[a] These walls are considered reasonable because schools and churches are counted as 10 dwelling units, "when they are within or adjacent to residential dwelling unit boundaries" (State Transportation Commission Policy 10136, Noise Abatement).

[b] North of I-696 on the east side the planned ramp braiding will remove and replace existing walls.

[c] This wall was considered reasonable in the DEIS, but further review found that there no adjacent benefiting residences to support counting the school as 10 dwelling units. Counting the church as only one receptor makes the wall not reasonable.

[d] Noise walls were completed in 2003 in the Square Lake Road area as a separate project. See Figure 4-5e.



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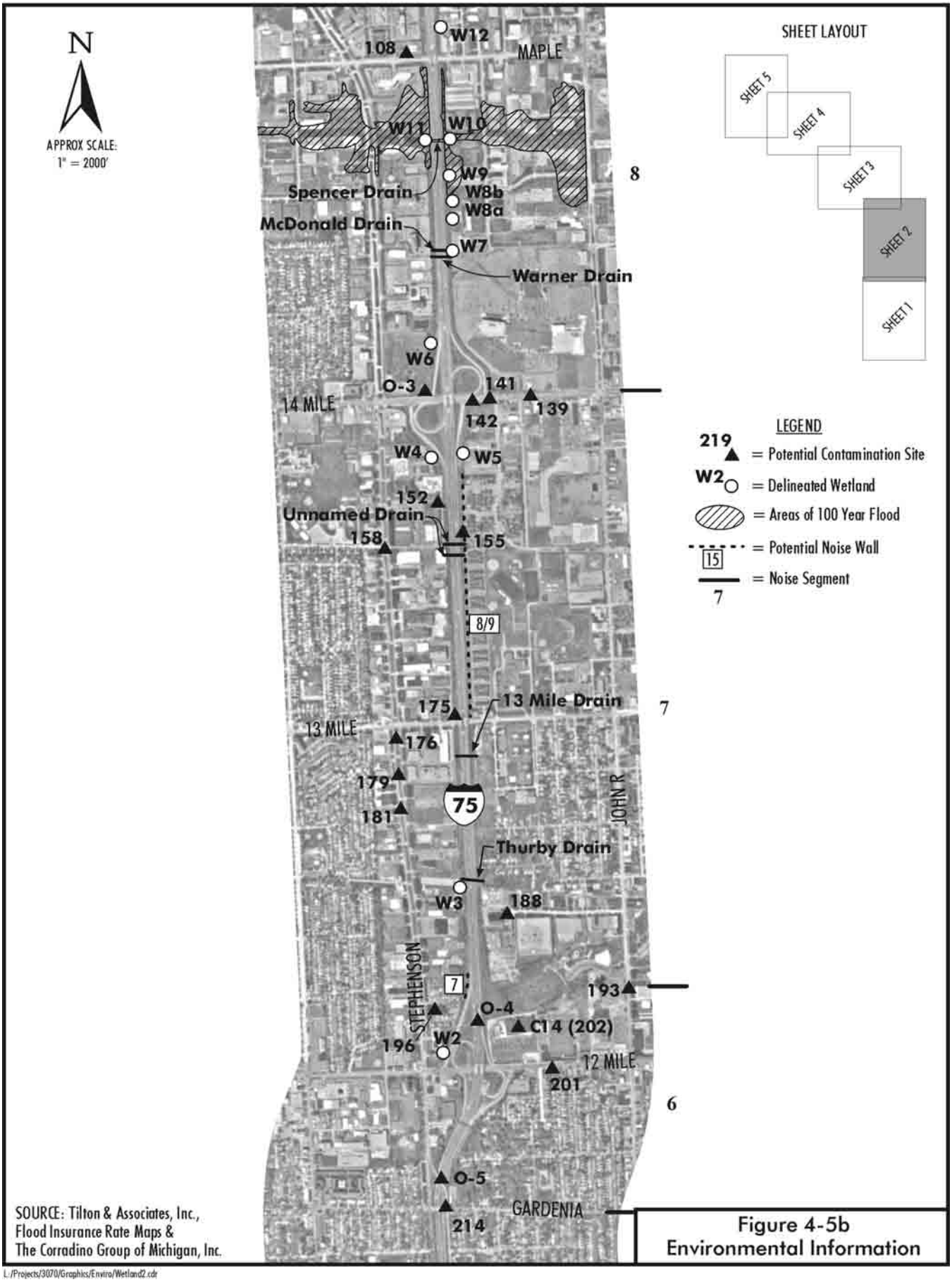

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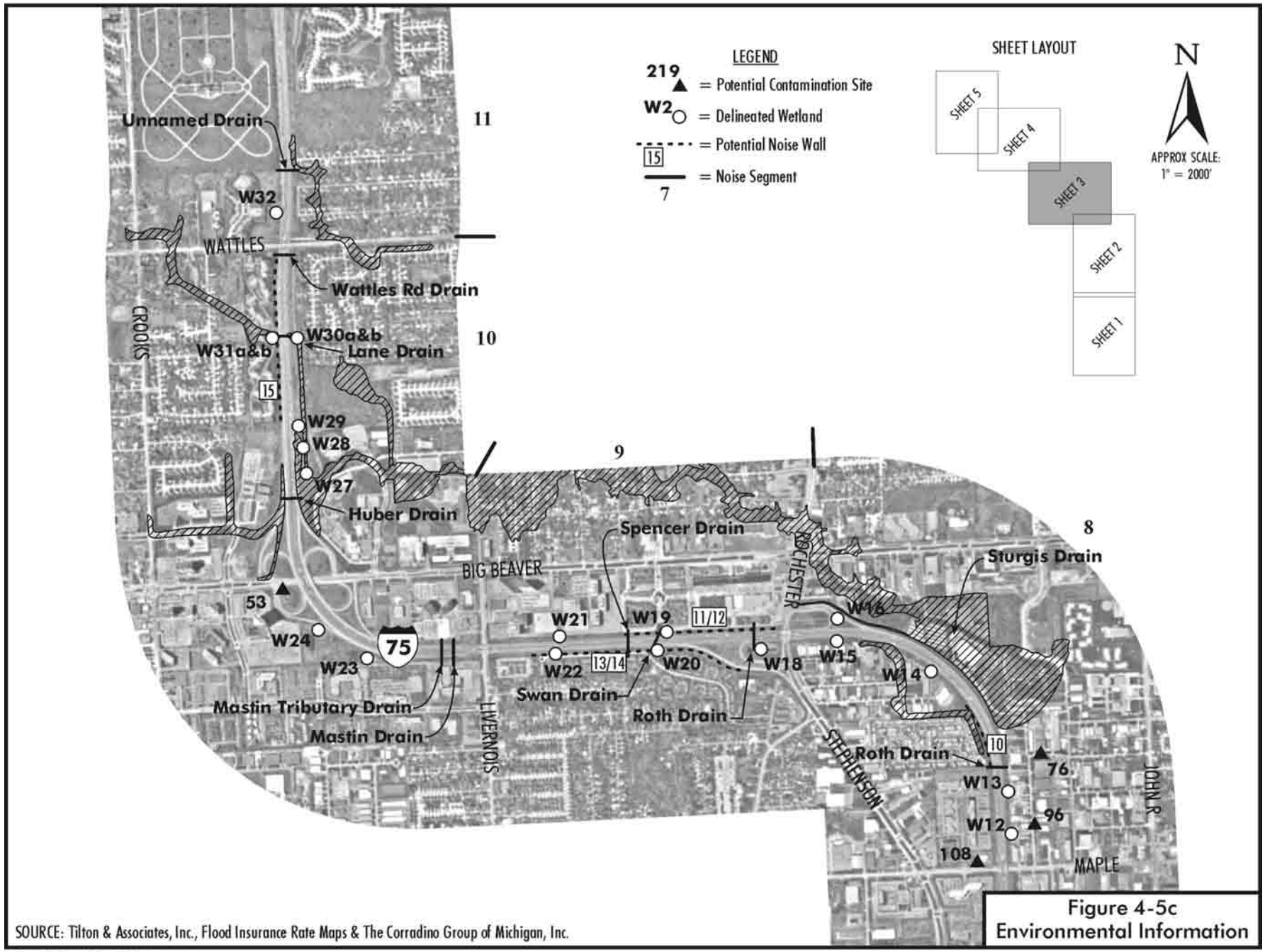

SOURCE: Tilton & Associates, Inc., Flood Insurance Rate Maps & The Corradino Group of Michigan, Inc.

Figure 4-5c
Environmental Information

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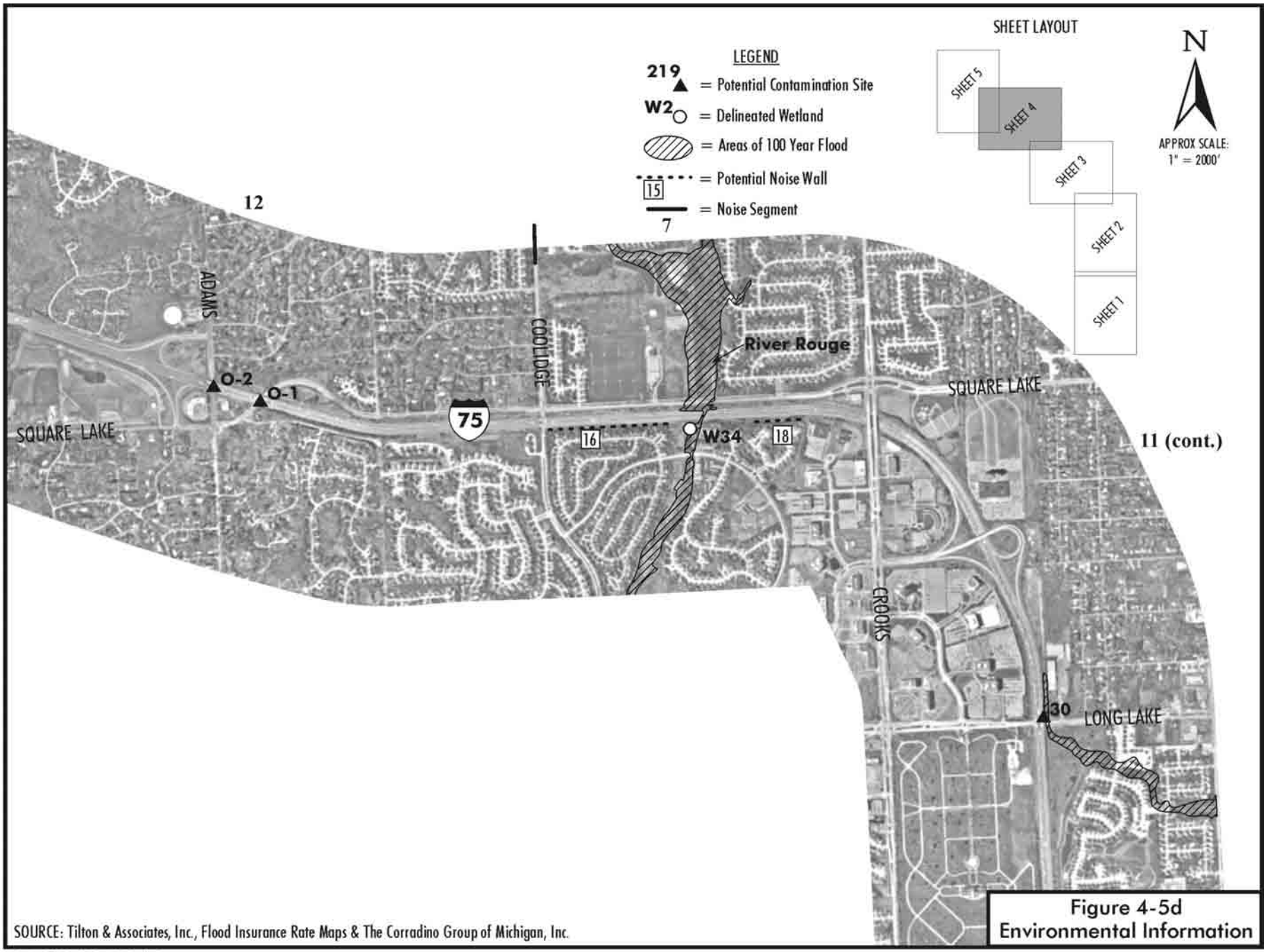

SOURCE: Tilton & Associates, Inc., Flood Insurance Rate Maps & The Corradino Group of Michigan, Inc.

Figure 4-5d
Environmental Information

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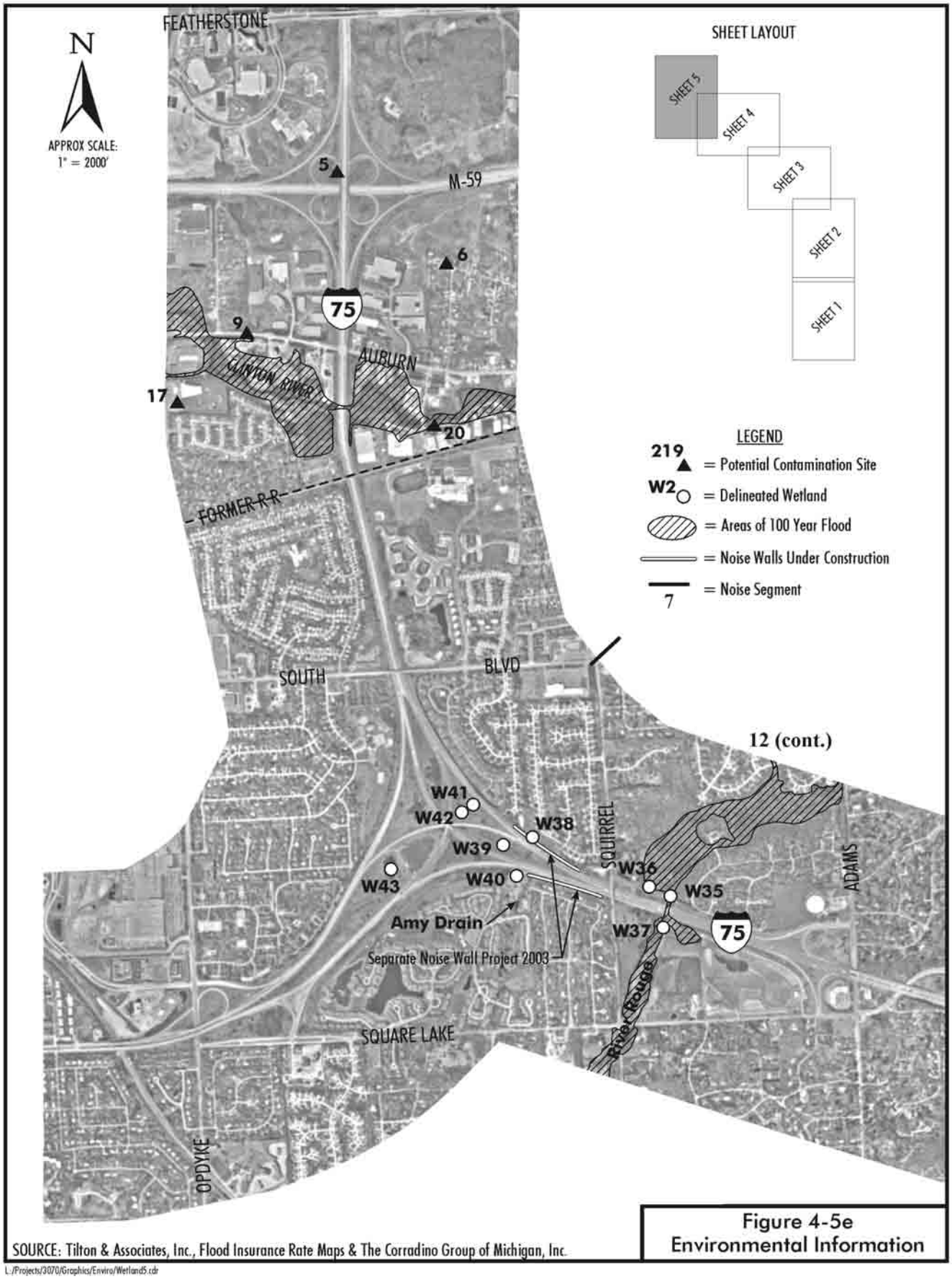

Figure 4-5e
Environmental Information

SOURCE: Tilton & Associates, Inc., Flood Insurance Rate Maps & The Corradino Group of Michigan, Inc.

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Segment 1 – 8 Mile Road to Meyers Avenue

Three noise walls were considered in this segment. Northbound, a wall was modeled between the lanes of I-75 and its service drive beginning at Hayes Avenue and extending north beyond Madge Avenue (this wall is called NB 1, Wall 0). The safety setback requirements were observed in setting the endpoints of the walls in the vicinity of the on-ramp near Hayes Avenue and Meyers Avenue.

Walls were modeled on the southbound (west) side of I-75 to protect residences on that side of the road from I-75 noise (SB 1 and SB 2). Two of the three walls modeled, NB 1 and SB 1, were considered to be reasonable, meaning the cost per benefiting receiver was less than $34,722 (see Wall 0 and Wall 1 in Figure 4-5a).

The first wall found to be feasible and reasonable in this segment extends from north of the on-ramp from 8 Mile Road to north of Madge Avenue. The proposed design calls for shifting the on-ramp to northbound I-75 to the south from it present position. This shift has the effect of reducing the length of the service drive that carries the heavy traffic volumes from 8 Mile Road to I-75. That means a wall between I-75 and the service drive is not rendered ineffectual by the service drive volumes. The dwellings along the service drive are uniformly dense. So, 31 receivers would benefit from a five-decibel reduction in noise if a wall about 2,100 feet long and 10.5 feet high were built. The cost per benefiting receiver would be $32,100.

The second reasonable and feasible wall in this section, SB 1, is on the west side of I-75 between Meyers Avenue and the southbound off-ramp to the service drive three blocks to the south. Here, all lots adjacent to the service drive are occupied by single-family dwelling units, the density on successive lots away from the service drive is high, and the service drive volume is relatively low. There are an estimated 12 benefiting receivers, at a cost per benefiting receiver of $33,200. The proposed wall is approximately 1,000 feet long and is found reasonable at a height of 8 feet.

Segment 2 – Meyers Avenue to 9 Mile Road

The next segment considered was Meyers Avenue to 9 Mile Road. Three walls were tested in the northbound direction and one wall in the southbound direction. This section of I-75 curves to the west against the grain of the background grid street system. As a consequence, the residences along this section have a staggered position with respect to the travel lanes of I-75 and its parallel service drives. Commercial uses are also interspersed with the residential uses, principally at the north and south ends of the segment. There is a northbound off-ramp and southbound on-ramp in the vicinity of Highland Avenue. These ramps serve traffic destined to John R. and 9 Mile Roads or coming from those roads to I-75 south. The Free Will Baptist Church is on the northbound service drive two blocks north of Meyers Avenue, and the Tabernacle Baptist Church is on the southbound service drive

The location called NB Church (see Wall 17 on Figure 4-5a) was found to be feasible and reasonable, if the church is considered as 10 dwelling units. The noise wall would stretch only from north of Meyers Avenue, at the point at which sight distance allows, to Harry Avenue, a distance of 400 feet. This wall was added after the DEIS.

The location called NB 1 was found to be feasible and reasonable, benefiting 10 dwelling units at a cost per unit of about $29,400. It would be approximately 640 feet in length and 10 feet in height, and stretch from East Pearl Avenue north one block to East Roberts Avenue, ending where the off-ramp from I-75 northbound meets the service drive (see Wall 2 on Figure 4-5a).

I-75 through this section is closer to being at-grade than at points to the north and south where it passes under cross roads. Therefore, a wall provides better protection from this nearly at-grade portion of I-75.

The location called NB 2, extending from the exit ramp north to John R. Road, would be short and would be truncated by the U-turn channel bridge southeast of John R. Road. Traffic volumes on the service drive at this point were in the neighborhood of 500 per hour, which makes protection of the homes in this section difficult. Several of the fronting parcels are triangular and vacant in this section. Therefore, the density simply does not support a noise wall.

The only wall modeled southbound (SB1) was from the point past the southbound on-ramp south to East Meyers Avenue. North of this point is the Tabernacle Baptist Church. The service drive volumes are too high to provide a feasible wall to mitigate noise at this church. Further south, a wall positioned between the service drive and mainline I-75 lanes would not protect a sufficient density of residences to be reasonable. As was the case in the northbound direction, there are several triangular lots that are vacant that have frontage to the service drive and I-75.

Segment 3 – 9 Mile Road to Woodward Heights Boulevard

Two noise walls were modeled in this segment, one on each side of I-75. On the east side (northbound) there is housing from Orchard Avenue north to Woodward Heights Boulevard. As is true further south in the corridor, the crossroads to the service drive are at a perpendicular and spaced such that only two dwellings occupy the end of each block. A wall (NB 1) was tested between the mainline lanes of I-75 and the service drive at the top of the slope. The low density resulted in a per-unit cost too high for the wall to be considered reasonable.

On the west side of I-75 (southbound) are two apartment houses and the First Baptist Church. No wall is feasible at the First Baptist Church because there is a southbound off-ramp right in front of the church. Sight distance requirements prevent a wall in this location. But, the apartments provide a sufficient density of housing for a wall (SB 1) to be reasonable. Feasibility is aided in this segment by a service drive volume under 400 per hour. The proposed wall would be approximately 600 feet long and 8 feet high (see Wall 3 in Figure 4-5a). The cost per benefiting receptor for eight units would be $30,450.

Segment 4 – Woodward Heights Boulevard to I-696

On the east side of I-75, north of Woodward Heights Boulevard, residential density is relatively sparse. St. Margaret's Episcopal Church and Calvary Baptist Church are located here.

Counting St. Margaret's Episcopal Church as a special case in the reasonability formula (10 dwelling units), a wall in front of the church can be justified, even though there are few homes to support the justification of this wall. This wall would be 670 feet long and 10 feet high (see Wall 4 in Figure 4-5a).

Providing a wall for the Calvary Baptist Church is not feasible. The Shelvin Avenue crossover bridge serving the I-696 interchange is in front of this church. The bridge and service drive generate noise. Meanwhile the presence of the bridge would prevent noise wall construction along a substantial portion of the church's frontage because of required sight distances on either side.

Southbound, there is no benefiting residential receptor adjacent to Roosevelt School to count the school as 10 residences. A pedestrian bridge crossover occupies several lots on both sides of I-75, decreasing residential density. Without counting the school as 10 residences, a wall 660 feet long and 10 feet high would not be reasonable. The DEIS considered it reasonable because the need for a benefiting residential receiver was not included in the analysis.

Segment 5 – I-696 to Gardenia Avenue

This segment through Madison Heights on the east and Royal Oak on the west has noise walls today. These noise walls would remain, but some would be relocated. Relocation could occur if the lane addition into the embankment through this depressed section is in jeopardy of undermining the wall. Further, with the proposed ramp braiding in the northeast quadrant of the I-696 interchange, the new northbound ramps from I-696 would be placed on the residential side of the existing noise wall. A new wall could be positioned along the reconstructed ramp edge replacing the existing wall. The replacement walls would be approximately 3,700 feet long and average 12 feet in height (see Wall 6 in Figure 4-5a).

Segment 6 – Gardenia Avenue to North of 12 Mile Road

A wall was modeled along the outside edge of the northbound exit ramp from I-75 to 12-Mile Road (NB 1). In this quadrant of the interchange there is very low-density residential development. This is especially evident in the area adjacent to I-75. The density increases as the distance away from I-75 increases. As a result of the low density, a noise wall is not considered reasonable in this area.

A wall was modeled on the west (southbound) side of I-75 from Gardenia Avenue for several hundred feet to Stephenson Highway (SB 2). There is a long two-story apartment house in this section. The wall, which was modeled at the top of the bank between the service drive and I-75, could require a break, if the storm sewer pump station located here were to remain. But, it was modeled with the assumption that the wall would be continuous. In spite of this, several factors prevent the reasonableness of a noise wall at this location: the southbound volumes from Stephenson Highway are relatively high; I-75 is in the deepest part of its cut section; and, the northbound service drive crossing I-75 at this point acts as a barrier for noise from the section of I-75 immediately to the north.

A wall was tested on the west side of I-75 just north of the 12 Mile interchange (SB 1), at the Red Run Mobile Home Park. Housing there is dense enough to support a reasonable wall about 600 feet long and an average of 13 feet in height. There would be approximately 16 benefiting units at a cost of $22,600 per unit (see Wall 7 in Figure 4-5b).

Segment 7 – North of 12 Mile Road to 14 Mile Road

The west side of this segment is all commercial. On the east side of I-75, two walls were tested along the extensive apartment complex development (Lexington Village Apartments) north of 13-Mile Road (NB 1 and NB 2) (see Wall 8/9 in Figure 4-5b). The first of these walls was placed in the simulation at the outside shoulder edge as I-75 crosses over 13-Mile Road. The noise wall would begin at the north end of this bridge and extend along the shoulder edge to the point that the guardrail ends. At this point, a second wall would overlap the first, placed at the right-of-way line and extending north along the entire frontage of the apartment units. It would end near the 14 Mile Road interchange, where the off-ramp diverges from the main lanes of I-75. Placing a wall along the edge of this shoulder is an effective way to intercept noise from the freeway. This

can only be done in a situation where there is a guardrail section so that the wall is protected from impact. The wall overlap would be sufficient to protect the apartment complex from noise escaping between the two walls and would allow for proper maintenance. The first wall segment would be approximately 660 feet long and 12 feet high. The second wall at the right-of-way line would be approximately 3,300 feet long and average about 13 feet in height. Combined, these walls would provide benefits to over 100 receptors at a cost of under $20,000 per benefiting receiver.

Segment 8 – 14 Mile Road to Rochester Road

A wall was tested on the west side of I-75 at Troy Mobile Home Villa located off Stephenson Highway. This wall would extend for approximately 1,200 feet at a height of 10 feet (see Wall 10 in Figure 4-5c). The wall would benefit some 17 homes at approximately $32,900 per home.

Segment 9 – Rochester Road to Livernois Road

Both sides of I-75 hold concentrations of apartment units in this segment. Two walls were modeled to protect the Charter Square Apartment complex on the north side of I-75 (northbound direction) (see Wall 11/12 in Figure 4-5c). The first (NB 1) would extend along the shoulder behind the guardrail from the west end of the bridge over Rochester Road, west approximately 700 feet with an average height of 11 feet. A second wall (NB 2) would continue along the right-of-way edge (with an overlap) for another 1,100 feet with an average height of 12 feet. In this apartment complex, the units on the first floor were found to be benefiting receivers where they have frontal exposure to the freeway. Second-story units were counted where the walls extend high enough to protect such units (as where the wall is built on the shoulder edge in elevated section). The first wall northbound would benefit 10 dwelling units at an average cost of approximately $33,300 per unit. The second wall would benefit at least 17 units at an average cost of approximately $33,900 per unit.

Two walls were similarly modeled southbound and found reasonable and feasible (see Wall 13/14 in Figure 4-5c). The northernmost of these two (SB 1) would be at the shoulder protected by a guardrail and would extend for approximately 650 feet at a height of 10 feet. The second wall further south (SB 2) would extend another 2,400 feet at the right-of-way edge, with an average height of 13 feet. The first wall would afford protection to approximately 24 dwelling units at a cost of $12,300 per unit. The second wall would benefit about 83 receivers at a cost of approximately $15,200 per unit.

Segment 10 – Livernois Road to Wattles Road

On the east side of I-75 between Big Beaver and Wattles Road, the Lane Drain occupies an extra-wide right-of-way contiguous with I-75, so 300 feet separates the centerline of I-75 from the east right-of-way line. The Lane Drain occupies this area. City of Troy parkland is on the east side in this section, including their Family Aquatic Center. A berm approximately 20 to 25 feet high separates the roadway from the park area. This, in addition to the extra-wide right-of-way occupied by the Lane Drain results in no noise impacts to the park area. Further north, the same situation is true for the Meadowbrook Subdivision.

On the west side of I-75 in this segment, there is an extensive patio home/condominium development. There is an existing low berm that affords the development some noise protection. Analysis finds that a wall 2700 feet long would afford protection in this segment to about 50 units at a cost of $26,600 per unit (see Wall 15 in Figure 4-5c).

Segment 11 – Wattles Road to Coolidge Highway

The midsection of this segment falls within the separate Crooks/Long Lake interchange project. The southern section, which falls in the I-75 project, consists on the east side of very dispersed single-family residences that do not have sufficient density to make a noise wall in this area reasonable. On the west side of I-75 north of Wattles Road is the Three Oaks Apartment complex. The intervening distance between the apartments and I-75 would require a very long wall to provide adequate protection. The length of such a wall would make the cost prohibitive and not considered reasonable based on the number of units that could be protected.

West of Crooks Road, Square Lake Road parallels the north side of I-75. Single-family dwelling units face away from Square Lake to an internal subdivision road. Square Lake Road generates too much noise to allow a noise wall between I-75 and Square Lake Road to be feasible. This condition is also affected by the distance between I-75 and the dwelling units.

The south side of I-75 between Coolidge Highway and Crooks Road includes a subdivision street (Fleetwood Drive) that is part of Northfield Hills to the west and condominium/patio home development to the east. Each can be afforded reasonable and feasible walls. SB 1 & 2 (combined) would protect homes on Fleetwood Drive (see Wall 16 in Figure 4-5d). It would be 2,100 feet long and average 12 feet high, and would be located along the shoulder of I-75. The cost per benefiting unit would be $30,600. Overall, the condominium patio home area to the east did not have sufficient density to support a wall. However, a short wall protecting the closest condominium patio homes (SB 3, see Wall 18 in Figure 4-5d) was reasonable. The length would be 472 feet, with an average height of 12 feet and a cost per benefiting unit of $10,800. A low berm is present in this area.

Segment 12 Coolidge Highway to North Project Limit

West and north of Coolidge Highway there is residential development, but it is of low density and/or set back farther from I-75 than homes further south. One subdivision to the south of I-75 has a substantial berm on private property (Beach Forest). Further west, near the I-75 crossing of Square Lake Road, the area to the south is elevated well above I-75 and noise measurements did not approach or exceed noise abatement criteria. West of Adams Road and north of I-75 is a patio home development (Adams Woods) with its own noise wall. This wall is effective enough that a new full height MDOT wall outside this private wall would not be feasible or reasonable, when considering the minimal additional noise mitigation the MDOT wall would provide.

At the Square Lake Road interchange, the existing noise wall was lengthened and a new wall constructed in the fall of 2003. The location of these walls is shown on Figure 4-5e.

Conclusion

Based on the noise analysis, MDOT intends to implement the mitigation measures that are feasible and reasonable. Eighteen barriers meet the criteria. Plus, noise walls in the northeast quadrant of the I-696 interchange would be replaced. Because the analysis of the noise impacts and mitigation measures are based on preliminary design (planning), the mitigation measures will be reviewed as a part of final design. Consistent with normal MDOT procedures, a final decision on noise barrier installation will be made upon completion of the next phase (design) and the public involvement process that accompanies noise wall implementation.

Madison Heights states that the EIS needs to clarify the design, materials, costs, maintenance and jurisdiction of the sound walls and does not support transferring responsibility for maintenance and reconstruction to the City. Design and materials are determined in the design phase of a project, in consultation with adjacent property owners. The final costs of the walls will be determined at that point as well. With respect to responsibility for maintenance and reconstruction, the Transportation Commission's Noise Policy states that if the local jurisdiction does not agree to the terms of maintenance, the walls are not considered reasonable and will not be built.

4.9 Threatened and Endangered Species

Threatened and endangered species are officially protected in Michigan by both federal and state Endangered Species Acts: Public Law 93-205 and Part 365 of PA 451, the Michigan Natural Resources and Environmental Protection Act of 1994, respectively. An endangered species (E) under the acts is defined as in danger of extinction throughout all or a significant portion of its range. A threatened species (T) under the acts is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Special concern species (SC) are not afforded legal protection under the acts. They are species with declining or relict populations in Michigan or are species for which more information is needed.

Although the corridor is a largely developed urban corridor, a biological field review was conducted in conjunction with the wetland analysis along I-75 (spring and early summer of 2003) to ensure there would be no effect on federal threatened or endangered species or state-listed species.[71] None were found (see results of field work in Section 4.10.1 under discussion of River Rouge).

In a letter dated September 16, 2002, the Michigan Department of Natural Resources (MDNR), Wildlife Division that keeps the Michigan Natural Features Inventory (MNFI - the most complete database available for all of Michigan's T/E/SC species), notes "the project should have no impact on rare or unique natural features" (Appendix C, Section 4). In a letter dated March 21, 2003, the U.S. Fish and Wildlife Service indicated it had not found any federally-listed species as endangered or threatened, or species proposed for listing in the I-75 corridor (Appendix C, Section 4). In a letter dated March 10, 2004, the U.S. Department of the Interior recommends that if the project initiation extends beyond six months of its letter, an updated list of endangered or threatened species be requested from the U.S. Fish and Wildlife Service (Section 6.4, Letter 3) in the I-75 corridor. MDOT keeps up-to-date on endangered species listings and will have updated lists to refer to when the project commences.

4.10 Surface Water Features/Water Quality/Floodplains

A comprehensive drainage study was performed. Results of that study enhanced the information in this section.[72] Surface water features are shown in Figures 4-5a to 4-5e.

4.10.1 Waterways and Drains

The information below is drawn from analysis performed for the wetland analysis, from a drainage study performed in 2000[73], and from the drainage study associated with this EIS.

[71] *Wetland Report*, Tilton and Associates, Inc. October 2003.
[72] *Drainage Study - M-102 to M-59*, Orchard Hiltz & McCliment and Rowe, Inc., October 2003.

The study area contains or crosses surface water features including Red Run Drain, Thurby Drain, Lawson Drain (former, now abandoned and sealed), 13 Mile Drain, 14 Mile Drain, Warner Drain, McDonald Drain, Barnard (Spencer) Drain, Roth Drain, Hawthorne Drain (former, now abandoned and sealed), Swan Drain, Livernois Avenue Drain, Mastin Drain, Huber Drain, Lane Drain, Wattles Road Drain, Long Lake Road Drain, Sturgis Drain, Sprague Drain, Amy Drain, Levinson Drain, and the River Rouge (two crossings), along with a number of unnamed drains. The drains generally carry storm water from northwest to southeast and carry water from small areas.

The Clinton River is within the limits of the separate I-75/M-59 project. Two small ponds and several storm water detention basins also occur in or adjacent to the road right-of-way. Roadside drainage ditches border I-75 north of 12 Mile Road. Emergent, scrub-shrub, forested, and open-water wetlands are associated with some ditches (see Section 4.11).

For the most part, waterways, drains, and ditches will not be affected by construction associated with the build alternatives because construction of the additional lane will be in the median and most of the culverts extend uninterrupted, underneath the roadbed, with no break at the median. Much of the alignment will include a new storm sewer in the median area, so that breaks would occur at a number of crossings to link this center median storm sewer to crossing drains. At this time no extension of any pipe or culvert is expected to exceed 24 feet total on each side. This will be confirmed in final design. Proposed changes focus on adding wide-bottomed ditches designed to detain storm water and detention ponds to be constructed within interchanges. Managing the storm water within the right-of-way in pipes is an option, however, this option is more costly and use of ditches is preferred from a water quality standpoint, as pollutants are filtered by the vegetation therein.

The existing condition of each crossing is shown in Table 4-15, together with anticipated changes. These are described in the paragraphs that follow. The only crossings that serve a drainage area greater than 2 square miles are Spencer Drain, south of Maple Road and the River Rouge at its crossing east of Coolidge Road.[74] No changes are anticipated at these two locations. The helical elliptical metal pipe serving the River Rouge crossing east of Squirrel Road will likely be replaced. Other such pipes at Lane Drain and an unnamed drain north of Wattles Road would also likely be replaced.

The following paragraphs describe the watercourses associated with this project. If aquatic habitat is present, it is also described.

Red Run Creek/Drain

Red Run Creek is now enclosed underground as part of a Combined Sewer Overflow (CSO) tunnel system upgrade, including the Twelve Town Retention Treatment Facility. I-75 passes over Red Run with a bridge structure just north of 12 Mile Road. As drainage is now underground at this location, the need for a bridge at this location will be evaluated. Madison Heights has requested that any action taken not preclude the potential for a future nonmotorized connection under I-75. As noted earlier, MDOT will address this request after a county-wide non-motorized plan has been adopted.

[73] *I-75 from 12 Mile Road to Adams Road Drainage Study*, CH2M Hill, May 2000.
[74] *Drainage Study - M-102 to M-59*, Orchard Hiltz & McCliment and Rowe, Inc., October 2003.

Table 4-15
Waterway Crossing Characteristics (Refer to Exhibit 4-5)
(Likely *Replacements* [in bold Italics] and Drainage Areas Greater Than 2 Square Miles [in Bold])

Water Crossing Name	Setting	Existing Structure Type	Proposed Work[a]	Drainage Area	
				Acres	Sq. Mile
Red Run Creek – N of 12 Mile Road	Commercial	Bridge	Bridge removal [b]	NA	NA
Thurby Drain – between 12 and 13 Mile Roads	Commercial	24" Culvert, 18" outlet	None at this time [c]	13	0.02
13 Mile Drain – south of 13 Mile Road	Commercial	24" Concrete w/end sections	None at this time [c]	7	0.01
Unnamed Drain – midway between 13 and 14 Mile Roads	Commercial	36" Concrete w/end sections	None at this time [c]	12	0.02
Warner Drain – N of 14 Mile Road	Commercial	36" Concrete w/end sections	None at this time [c]	19	0.03
McDonald Drain – midway between 14 Mile Road and Maple Road	Commercial	78" Concrete pipe (enclosed)[c]	None at this time [c]	NA	NA
Barnard (Spencer) Drain – S of Maple Road	**Commercial**	**14' x 6' Box culvert, 15' Tunnel**	**None at this time [c]**	**2200**	**3.44**
Roth Drain – N of Maple Road	Commercial	90" Concrete tunnel[c]	None at this time [c]	NA	NA
Roth Drain – W of Rochester Road	Commercial	48" Tunnel[c]	None at this time [c]	51	0.08
Swan Drain – between Livernois and Rochester Roads	Apartments	36" Concrete w/end sections	None at this time [c]	45	0.07
Spencer Drain – W of Swan Drain	Apartments	42" Concrete	None at this time [c]	70	0.11
Mastin Drain – W of Livernois	Commercial	72" Tunnel [d]	None at this time [c]	22	0.03
Mastin Drain Tributary – W of Mastin Drain	Commercial	42" Concrete w/headwalls	None at this time [c]	61	0.10
Lane Extension (Huber) Drain - in Big Beaver interchange, N side	Commercial	60" Culvert	None at this time [c]	457	0.71
Lane Drain –S of Wattles Road	***Apt./Single-family***	***58" x 91" Helical elliptical***	***Replace [e]***	***790***	***1.23***
Wattles Road – at Wattles Road	Residential	24" Concrete w/headwalls	None at this time [c]	5	0.01
Unnamed Drain – N of Wattles Road	***Residential***	***43" x 68" Helical elliptical***	***Replace [e]***	***181***	***0.28***
River Rouge (Sprague Drain) – midway between Coolidge and Crooks Roads	**Apt./Single-family**	**Twin 9' x 8.5' Box culverts w/headwalls**	**None at this time [c]**	**5100**	**7.97**
River Rouge – E of Squirrel Road	***Apt./Single-family***	***72" x 113" Helical eliptical w/headwalls***	***Replace [e]***	***373***	***0.58***
Amy Drain – in Square Lake interchange, southbound I-75 lanes	Apt./Single-family	5' x 10' Box culvert w/headwalls	None at this time [c]	209	0.33
Amy Drain – in Square Lake interchange, northbound I-75 lanes	Apt./Single-family	5' x 10' Box culvert w/headwalls	None at this time [c]	156	0.24
Levison Drain	Single family	108" Tunnel [d]	None at this time [c]	NA	NA

Source: Rowe Inc., The Corradino Group of Michigan, Inc., Tilton and Associates, and CH2M Hill
NA means Not Applicable.
[a] Except for reworking of the pipe ends, headwalls, and similar minor changes.
[b] The need for the bridge is reduced with the construction of a Combined Sewer Overflow (CSO) tunnel system upgrade, including the Twelve Town Retention Treatment Facility. The Red Run Drain is now underground, rather than on the surface.
[c] The drainage system appears to be adequate. Replacement in kind may be necessary due to condition only.
[d] Enclosed and "tunnel" mean the drain passes under the right-of-way without surfacing, and would not be affected by the project.
[e] Helical elliptical is a metal pipe that due to material type would likely be replaced at some future time, as needed.

Storm water from the below-grade section of I-75, between 8 Mile and 12 Mile roads, now flows to a combined sewer system, i.e. the system carries both storm water and sanitary sewage. The proposed lane addition will increase the area of impervious surface in this depressed highway section, increasing the amount of storm water runoff. Such an increase in runoff would increase the frequency and amount of combined sewer overflows. Two options for addressing the increased flow were considered; both call for separating the I-75 storm water from the existing combined sewer system, and both would add oil/water separators to the system.

One option was to direct some of the storm water to the storm water system serving I-696. Insufficient data were available to determine whether the I-696 system has excess capacity for additional flow from I-75. As a result, a second option is recommended. The existing connections to the combined sewer system would be closed and a new sewer would be built along the east side of I-75 under the service drive. The sewer would flow from south to north, then outflow to a pipe following the alignment of the Red Run Drain east to Dequindre Road, which is the Oakland/Macomb county line. (Surface detention may also be constructed at the 12 Mile Road interchange.) At Dequindre Road the pipe outfall would flow into Red Run Creek, just as the outflow from the Twelve Town Retention Treatment Facility does. (Details of the effects on that facility will be determined during the design phase.) During low-flow conditions, this new system would redirect water to its historic course to the Clinton River and thence to Lake St. Clair. Currently, the combined sewage is flowing south to the Detroit Wastewater Treatment Plant. During storm events the pipe to that plant cannot accommodate the flow and the combined storm and sanitary water flow directly to Red Run Drain. The Twelve Town Treatment Facility is designed to provide primary treatment of this water before it flows to Red Run Drain, outfalling at Dequindre Road.

The proposed new storm sewer would cause I-75 storm water to bypass the Twelve Town Retention Treatment Facility, as it would be storm water only, with no sanitary component. The outfall would be at Dequindre Road. Thus, during storm events, the water would flow to the same location, Red Run Drain at Dequindre Road, but through independent piping. And, it would reduce demand on the Twelve Towns Treatment Facility. Detention will be built into each of the pump stations that will be part of the I-75 separated storm water system and possibly at the 12 Mile Road interchange. This will allow settling of debris and sediment and metering of flow.

Thurby Drain – Station 930

This 24-inch reinforced concrete culvert is midway between 12 Mile Road and 13 Mile Road. It is surrounded by vegetation and was 50 percent full of water at the time of a previous investigation (April 2000).[75] The proposed improvement is to remove and replace an end section and add a section of 8' wide detention ditch. Additional detention is required at this location. This could occur through pipe storage or retention in the 12 Mile Road interchange.

Lawson Drain – Station 974

This drain is now sealed and abandoned. No work will occur here. This drain formerly flowed under I-75 in a 24-inch reinforced concrete culvert from west to east just south of 13 Mile Road. There is no break in the culvert from ditch to ditch. Standing water is present in the culvert under I-75. Nearby, the channel flows to the north along the east side of I-75, just inside the ROW. The channel is a well-vegetated swale that may have pockets of standing water during the growing season. However, flow is only present during precipitation runoff. This area does not

[75] *I-75 from 12 Mile Road to Adams Road Drainage Study*, CH2M Hill, May 2000.

likely contain lotic (moving water) habitat that could be impacted from I-75 expansion. Although the vegetation communities associated with the drain along I-75 are of low quality, the present habitat does have some wildlife value. Wildlife that may be associated with this habitat includes frogs, songbirds, rabbits, raccoons, squirrels, voles, mice, and birds-of-prey. Small mammal (mostly rabbit) tracks were observed in the snow on February 26, 2003.

13 Mile Drain – Station 980

This 60-inch drain flows east to west along 13 Mile Road and receives flow from I-75. Ditches in the area will be re-established.

Unnamed Drain – Station 1004 and 1012

Between 13 Mile Road and 14 Mile Road are 24-inch and 36-inch unnamed drains that cross I-75 in concrete pipes. The end sections of these pipes will be replaced. I-75 ditches in this area will be reconstructed to detain storm water.

14 Mile Road Drain – Station 1031

The 24-inch concrete pipe along the north side of 14 Mile Road will be replaced within the interchange. Wet detention ponds are proposed for the southwest and northeast quadrants of this interchange, which will be modified by the project.

Warner Drain – Station 1051

Warner Drain passes west to east under I-75 just north of 14 Mile Road in a 36-inch reinforced concrete culvert. The upstream end of the culvert is damaged and will be repaired. Detention ditches will be constructed in the area.

McDonald Drain – Station 1051

This 78-inch drain is totally enclosed and would not be affected by the project. Highway drainage is conveyed to it through a 36" diameter stubout.

Barnard Drain (Spencer Drain) –Station 1073

Spencer Drain is a 14-foot wide by 6-foot high reinforced concrete box culvert crossed by I-75 just south of Maple Road. It flows from west to east after exiting a storm water retention basin on private property on the west side of I-75. There is an adjacent 15-inch diameter pipe. The *Drainage study* calls for additional analysis at this location, but for the time being does not call for any construction. There is no break in the culvert from ditch to ditch. Three blunt-nose minnows and one crayfish were observed on an ice shelf in spring 2003 just downstream of a retention basin. Likely these were washed from the retention basin during recent high flows from snowmelt runoff. No aquatic insects in the open channel downstream (east) of the highway were observed. The channel bed was silted and algal[76] growth on the substrates was heavy. Dissolved oxygen concentrations may be low during periods of high temperatures and low flow. This situation alone would limit the survival of fish and all but the most tolerant aquatic invertebrates. The reach immediately downstream of the highway contained some pool-riffle diversity formed

[76] Algae are any of various chiefly aquatic, eukaryotic, photosynthetic organisms.

from concrete rubble. The highway culvert creates poor lotic habitat, and probably prevents fish passage; the water depth is too shallow at low flows and velocities are too high at higher flows.

Roth Drain – Station 1102

The 90-inch Roth Drain is in tunnel under I-75 and is connected to the surface only by storm water inlets, which will be repaired. Drainage ditch retention will be added in this area. A wet detention pond is also recommended on the outside of the I-75 curve at this point, adjacent to the Sturgis Drain. The detention area would not connect to Sturgis Drain, but would outflow through pipe to the Roth Drain, maintaining the existing outflow pattern.

Hawthorne Drain – Station 1103 and 1157

The two crossings of this former drain have been sealed and abandoned.

Sturgis Drain

The Sturgis Drain parallels the north side of the curve of I-75, east of the Rochester Road interchange. It is not crossed by I-75.

Roth Drain – Station 1157

The 48-inch Roth Drain is in tunnel under I-75 and is connected to the surface only by storm water inlets, which will be repaired. Drainage ditch retention will be added in this area. Wet detention is recommended on the south side of I-75 and west of Rochester Road. This detention will have to avoid the wetland within the loop of the southwest quadrant.

Swan Drain – Station 1168

This drain carries water from north to south under I-75 just east of midway between Livernois Road and Rochester Road. The 36-inch reinforced concrete culvert was partially submerged at the time of investigation (April 2000). On the north side is a detention pond associated with an apartment complex. A pipe end must be replaced and detention ditch will be constructed in the area. Regrading of the ditch is also required. A wetland there will be avoided in constructing this detention.

Spencer Drain – Station 1185

This is a 42-inch concrete pipe midway between Rochester Road and Livernois Road. The ditches in the area must be regraded. Detention ditches will be constructed in the area. Wetlands there must be avoided in constructing this detention.

Livernois Avenue Ditch – Station 1197

This 24-inch drain under Livernois will have improved pipe end sections and detention ditches will be added in the area.

Mastin Drain and Mastin Drain Tributary – Station 1209 and 1211

The 72-inch Mastin Drain itself is in tunnel and would be unaffected by the project. Its tributary is in a 42-inch concrete pipe. Damaged ends of the tributary pipe will be fixed. These drains are adjacent to one another west of Livernois Road.

Big Beaver Interchange Area – Station 1230

Four wet detention areas are proposed within the Big Beaver interchange, all on the east side of I-75.

Lane Extension (Huber Drain) – Station 1240

The Lane Extension is a 60-inch reinforced concrete culvert crossing under I-75 on the north side of the Big Beaver interchange. It flows from west to east. There was standing water at the time of inspection (April 2000). The proposal is to construct a second 60" culvert parallel to the existing culvert.

Lane Drain – Station 1269

Lane Drain is a branch of the Sturgis Drain. It flows from west to east in an enclosed 91 x 58 inch elliptical culvert from ditch to ditch south of Wattles Road and parallels the right-of-way of I-75 for some distance to the south. These are no plans for changes at this time, but helical elliptical pipes are no longer in use, so it may be replaced at a future date. There is evidence of accelerated water velocities downstream of I-75, leading to channel instability. Bed incision and bank erosion are evident. The channel bed consists of highly erodible coarse sands and fine gravels. Even under moderate flow, this material is easily transported, resulting in poor habitat quality. Site conditions suggest that the water flow rate is highly variable. In February 2003, base flow was minimal, yet flow debris was observed in vegetation approximately 2 to 3 feet above that base flow. Although the channel has some structural and flow diversity, the overall habitat for stream organisms is poor.

Wattles Road Drain – Station 1284

This is a 24-inch reinforced concrete culvert flowing west to east, south of Wattles Road. Detention ditch construction is planned north of Wattles Road.

Unnamed Drain – Station 1297

This is a 43 x 68 inch helical elliptical metal pipe flowing from west to east, north of Wattles Road. It would likely be replaced at a future date, to update the pipe material.

Long Lake Drain – Station 529[77]
Detention ditch construction is planned for the area south of Long Lake Road.

[77] The project stationing breaks in this area.

Sturgis Drain – Station 532

Planning is incomplete in this area until design for the new Crooks Road / Long Lake Road interchange is completed. It is anticipated that the design for that interchange will identify retention areas within the new interchange.

River Rouge Main Branch Between Coolidge Highway and Crooks Road (Sprague Drain) – Station 616

I-75 crosses the River Rouge twice. The more easterly crossing is of the Main Branch and is between Coolidge Highway and Crooks Road. The second is further west near Squirrel Road.

The first crossing is over the Main Branch, where the channel width is approximately 12 feet and average depth is approximately 0.5 feet. The flow is from north to south. It is contained in twin 9 x 8.5-foot box culverts that stretch from ditch to ditch. Base flow was good at this site when observed in February 2003. The Main Branch is channelized upstream (north) of I-75 and the habitat quality is poor. Downstream of I-75, the Main Branch contains some meanders and more structural diversity. Lotic habitat is fair to good. In 1986 and 1995, MDNR, Fisheries Division conducted rapid bioassessments at Beach Road, approximately 1.5 river miles downstream of I-75.[78] Using an Index of Biological Integrity (IBI), the MDNR rated the fish community at this location of the Rouge River as "Fair" to "Good" in 1986 and as "Fair" in 1995. MDNR also used Great Lakes Environmental Assessment Standard Procedure 51 (P51) in 1995 to assess habitat quality and rate the fish community. Using P51, MDNR rated the habitat at this site as "Poor," and rated the fish community as "Good – Slightly Impaired." An independent P51 rapid assessment performed for this EIS (April 2003)[79] found the biological integrity of the fish and macroinvertebrate community to be "acceptable" and "acceptable, tending toward poor," respectively.

Although habitat is "good, tending toward marginal," the riparian corridor is affected by housing developments, where woody vegetation is absent and turf grass is maintained to the top of bank. Pool and riffle habitat is present, but limited during low summer flows. Excess nutrient loading may also cause dissolved oxygen sags and high water temperatures during low flow. A species listing found during field investigations is attached to the *Wetlands Report* as an appendix.

In summary, the reach of the Rouge River Main Branch downstream of I-75 has fair to good habitat and biological integrity. Sediment loading during construction and increased storm water volume after construction could impact the biological communities. Sections 5.3 and 5.4 outline mitigation to be used at this location.

The drainage study called for: 1) removal of obstructing debris from right-of-way line to right-of-way line; 2) removal of sediment within the culvert; 3) reshaping the channel to culvert transition between the culvert faces and right-of-way lines; 4) repairing structure cracks; 5) placing heavy riprap on upstream and downstream embankments; and, 6) placing heavy riprap in the downstream channel bottom.

The United States Department of the Interior, Office of the Secretary has indicated (see letter dated March 10, 2004, in Section 6.4, Letter 3) that work in the channel of the River Rouge "be

[78] *An Assessment of the Rouge River Fish Community*, Michigan Department of Natural Resources, Fisheries Division, June 14, 1996.
[79] *Wetlands Report*, Tilton and Associates, Inc., October 2003.

avoided at all times, regardless of flow level, except as necessary to prevent erosion." The work proposed is necessary to maintain flow. Riprap will be added to prevent further erosion.

River Rouge at Squirrel Road (Sprague Branch) – Station 726

The second crossing of the River Rouge is east of Squirrel Road. It is contained in a 72 x 113 inch helical elliptical metal pipe from ditch to ditch with a south to north flow.

This is in the headwaters of Sprague Branch. Surface flow is minimal and poorly defined. There is a wetland system with diffused, low gradient surface flow. While the lotic habitat at this crossing is limited, the floristic and wildlife habitat quality are high. Further, this headwater area is important to the overall function and biological productivity of the Main Branch Rouge River. Based on topology and geology, this corridor could be a source for groundwater recharge for the River Rouge headwaters. Wildlife that may be associated with this habitat includes turtles, frogs, songbirds, rabbits, raccoons, squirrels, weasels, mink, fox, coyote, mice, and birds-of-prey. No frogs, toads, snakes, turtles, or terrestrial or flying invertebrates were observed during a site visit by a qualified biologist in May 2003. (Roadway noise made it very difficult to hear bird or frog calls). North of I-75, 36 plant species were identified and six birds. White tail deer tracks were observed. South of I-75, 17 plant species were observed. No species were observed which are state or federally-listed as threatened or endangered.

It is likely that this metal pipe will be replaced, as this kind of pipe is no longer used. The United States Department of the Interior, Office of the Secretary has indicated (see letter dated March 10, 2004, in Section 6.4, Letter 3) that work in the channel of the River Rouge "be avoided at all times, regardless of flow level, except as necessary to prevent erosion." If it becomes necessary to replace the existing pipe, such work will be required. Sections 5.3 and 5.4 outline mitigation.

Amy Drain – Station 750

I-75 crosses Amy Drain west of Squirrel Road. Amy Drain flows northeast to southwest. Amy Drain is enclosed in a 5 x 10 foot box culvert that passes beneath the northbound lanes of I-75. It then opens into an in-line storm water detention basin. It then passes through another 5 x 10 foot box culvert under the southbound lanes of I-75 and connects to the ditch along the southern roadway edge. There is no lotic habitat associated with Amy Drain. The median area is mowed. Lentic (still water) habitat associated with storm water infrastructure is of poor quality. The drainage study calls for an expansion of the retention area, and that it be wet. The design will have to accommodate delineated wetlands within this interchange area and the HOV lane, which will bisect the area. Dry detention is also called for at the north end of the interchange near South Boulevard. It too must be created in a way that does not conflict with the HOV lane, which merges back into northbound I-75 at this point.

Levison Drain – Station 792

This 108-inch drain flows under I-75 with no connection to the surface. I-75 runoff flows into the Levison Drain via a 24-inch stubout from that drain.

Summary of Impacts

The lane addition to I-75 would cross two watersheds of greater than two square miles – Barnard (Spencer) Drain and the main channel of the River Rouge (Sprague Drain) between Crooks and Coolidge roads (Table 4-15). The drainage study calls for further analysis of the Barnard Drain

during the design phase, but no action is proposed at this time. At the River Rouge some structural repairs are needed, sediment and debris must be cleared, and riprap put in place to prevent erosion.

Replacement of three drains is possible over the long term, as necessary, where helical/elliptical structures are present: Lane Drain south of Wattles Road, an unnamed drain north of Wattles Road, and the River Rouge east of Squirrel Road.

The proposed lane addition would add approximately 20 percent to the amount of impervious surface of I-75. This increase is minor compared to the adjacent watersheds. Detention would be provided to offset the increased impervious surface. Detention is recommended in a number of locations, both in wide-bottomed ditches and in detention ponds. Most of the latter fall within interchange right-of-way. The exception is one planned wet detention area on the outside of the curve of I-75 east of Rochester Road.

There will be no loss of stream bank habitat or changes to the bed of the River Rouge, so there will be no long-term effect on macroinvertebrates, including snails, clams, or insects.

The potential for impact to this wildlife, including direct loss of habitat and indirect effects of increased volumes of salts and other constituents that may be carried in the runoff from road surfaces will be minimized through mitigation efforts. Absorbent drainage features such as grassed swales, where feasible, would minimize the inputs of water-borne contaminants that would otherwise flow directly to the River Rouge and drains.

The Oakland County Drain Commissioner reviewed the DEIS and commented (see letter dated January 30, 2004, in Section 6.4, Letter 11), " . . . detailed plans for all drain involvements need to be submitted to this office prior to the start of any construction affecting a County Drain . . . with calculations and drainage break-up sheets. Any proposed watercourse isolations . . . need to be submitted prior to construction. A permit for the work will be required."

4.10.2 Water Quality and Groundwater

Through early coordination, MDEQ has indicated that discharge from storm water sewers into open water is discouraged. MDOT and MDEQ agree that filtration through vegetation, rather than the use of detention basins, is preferred. However, due to capacity limitations of drains in the region, detention will be necessary to prevent an increase in the flow rate of storm water from I-75. When detention is needed, a "two-cell" pond approach is recommended. This allows settlement of debris and sediment. The drainage study shows preliminary locations of proposed detention, much of it in widened roadside ditches. This fulfills the desire to release storm water through vegetated areas.

Planning is also occurring in conjunction with this EIS to separate the storm water now flowing from the depressed section of I-75 between 8 and 12 Mile Roads into a combined sewer system. The Preferred Alternative will separate such flow, reducing the need to bypass the sewage treatment plant during storms. The result will be substantially improved water quality during storms.

MDEQ is working with communities in the state to establish wellhead protection plans to protect drinking water drawn from groundwater. Many plans are being developed, but none are close to I-75 and none will be affected by the project. The nearest of such plans in Oakland County are all

quite a distance from the project, in the townships of Lyon, Independence, Highland, and the communities of Oxford, Milford, South Lyon and Holly.

Groundwater flow will not be substantially affected by the project. There will be no disturbance of bedrock. I-75 is in a cut section between M-102 (8 Mile Road) and Gardenia. The deepest proposed cut will match the existing road profile and the cuts will be into earthen embankments. Otherwise, the roadbed is built up relative to the surrounding ground. Thus, the effects on groundwater flow will be insignificant.

4.10.3 Floodways and Floodplains

The *Drainage Study* performed for this project finds there will be no encroachment on any regulatory floodway (the main channel that carries water). Floodplain (the area into which water extends during periods of flooding) will likewise not be affected (Figure 4-5). The analysis performed was consistent with 23 CFR 650 and Executive Order 11998. Floodplain analysis must examine whether a project creates or increases a hazard to people and/or property, and whether there is an impact on natural and beneficial floodplain values. These values include: fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge.

The *Drainage Study* makes recommendations for structures. These were designed to prevent the base floodplain elevation from causing a harmful interference at any natural crossing. All structures will pass the 100-year storm flow. Thus, no significant hazard to people or property will result from the project.

Wetlands associated with the floodways and floodplains have been identified (see next section). The analysis finds that the project will not result in a substantial loss in natural and beneficial floodplain values as measures to minimize the project's impact on wetlands and to restore their flood control values are incorporated into the project's design.

4.11 Wetlands

4.11.1 Methodology

The project traverses two regional landscape ecosystem types: the Maumee Lake Plain and the Ann Arbor Moraines. The former consists of flat, clay lake plains dissected by broad sandy glacial drainage ways. Lacustrine (lake) deposits range from five to 100 feet thick over bedrock. Glacial landforms include clay lake plains intermingled with broad channels of lacustrine sand. Other landforms include end moraines in the northern part of the region. Beach ridges and sand dunes also occur. Ann Arbor Moraines are fine and medium-textured ground and end moraines, consisting of glacial drift 100 to 250 feet thick. Ground moraines of less than 6 percent slope form broad plains, whereas end moraine ridges have slopes up to 15 percent. These landforms often include wetlands.

As a result of the presence of historic wetlands and engineered drainage ditches, MDOT in conjunction with MDEQ delineated wetlands within the MDOT right-of-way, but not where the "wetland" area was originally engineered as a ditch for purposes of drainage. Also excluded are the slopes leading from the roadway down to the ditch or wetland.

The wetland delineation began with a review of available plan sheets dating from the early 1980s. In summary, areas mapped as wetland in the highway right-of-way met one or more of the following conditions:

- Wetlands contiguous to a lake, stream, pond, or drain. Open water areas found between the ordinary high water marks of streams and drains were excluded from wetland impact area calculations.
- Wetlands found in depressions that were significantly wider than the typical ditch profile.
- Wetlands found that were part of a larger wetland adjacent to the right-of-way.
- Wetlands shown in the National Wetland Inventory (1982) and presumed to pre-date the construction of I-75.

The methodology used to identify wetlands was consistent with that used by MDEQ and the U.S. Army Corps of Engineers (Environmental Laboratory 1987, MDEQ 2001). Wetlands were delineated using a combination of USGS topographic maps (1:24,000), National Wetland Inventory (NWI) maps (1:24,000), Q3-level digital flood insurance rate maps (digital Q3 FIRMs, scale variable), the Soil Survey Oakland County, Michigan (Feenstra 1982), inspection of aerial photographs, and on-site field investigations. Three parameters considered in delineating wetlands are vegetation, soils, and hydrology.

Dominant vegetation was identified to the species level. The percentage of cover within the wetland community and wetland indicator status of each was then determined. The wetland indicators are from the U. S. Fish & Wildlife Service's *National List of Plant Species that Occur in Wetlands* (Reed 1988), or, for species not classified in Reed (1988), Appendix C (Michigan Plants Database – 1996) of the *Floristic Quality Assessment with Wetland Categories and Computer Application Programs for the State of Michigan* (Herman *et al*. 1996). *The National List* (and Herman *et al.* 1996) identifies plant species known to occur in wetlands and assigns each a wetland indicator (probability of occurring in wetlands) based on that species' affinity for wetland habitat.

Soil sampling and hydric soil evaluation was based on information in the *Soil Survey of Oakland County, Michigan* (Feenstra 1982) and on-site examination of soils, in accordance with the methodologies outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and in the *Field Indicators of Hydric Soils in the United States, Version 4.0* (USDA-NRCS 1998).

4.11.2 Wetland Functions and Priorities

Wetlands were rated according to their functional values, ecological complexity, and biological integrity. The highest scoring (Priority 1) wetlands are generally forested, and/or part of a large wetland complex, and/or provide significant wildlife habitat, greater than average plant biodiversity, or unusual potential for water quality enhancement. Priority 3 wetlands score lowest and are associated with roadside depressions dominated by cattails (Typha spp.), reed canary grass (Phalaris arundinacea), or reed grass (Phragmites australis). They have low-biodiversity and non-native species, and are generally easier to replicate through compensatory mitigation. Intermediate-scoring (Priority 2) wetlands have functional values between those of Priority 1 and 3 wetlands.

4.11.3 Delineation Summary

Forty-one wetlands were identified and flagged within the proposed highway right-of-way.[80] Six were forested (PFO) wetlands, 13 were emergent (PEM) wetlands, and five were scrub-shrub (PSS) wetlands. In addition, there were 12 stands of mixed emergent and scrub-shrub (PEM/PSS) wetlands, one stand of mixed emergent and forested (PEM/PFO) wetlands, two stands of mixed scrub-shrub and forested (PSS/PFO) wetlands, one stand of mixed emergent, scrub-shrub, and forested (PEM/PSS/PFO) wetlands, and one stand of mixed emergent, forested, and open water (PEM/PSS/POW) wetlands. Three wetlands were considered Priority 1, 16 were considered Priority 2, and 22 were considered Priority 3.

4.11.4 Impacts

Wetlands are limited to the area north of 12 Mile Road. The proposed lane addition would occur in the median, and wetlands are primarily located in ditch areas. The project includes major reconstruction of the interstate (complete pavement replacement). Ordinarily disturbance limits of construction equipment are broad in such circumstances. Due to the presence of wetlands along I-75, construction contracts will specify that there be no disturbance in wetland areas.

Impacts to wetlands would occur with the HOV Alternative, which is the Preferred Alternative only. The GP Alternative would not affect any wetlands. Impacts to wetlands under the HOV Alternative would occur at two wetlands, W39 and W41 in the Square Lake interchange. The characteristics of these wetlands are shown in Table 4-16.

Table 4-16
Summary of Wetland Characteristics – Impacted Wetlands

Wetland ID	Priority Class	Wetland Community Classification	Wetland Area (acres)	POW PSS PEM	Lake Fringe or PFO	Description
W39	2	PSS/PEM	0.89	0.89	0.00	**Vegetation**: Willows (*Salix* spp.), glossy buckthorn (*Rhamnus frangula*), narrow-leaf cattail (*Typha angustifolia*), tussock sedge (*Carex stricta*). **Soils**: Loam soils with low-chroma matrix and redox concentrations. HS indicator: F3. **Hydrology**: partial saturation within 12 inches of the ground surface, drainage pattern, partial inundation.
W41	3	PEM/PSS	0.16	0.16	0.00	**Vegetation**: Narrow-leaf cattail (*Typha angustifolia*), hard-stem bulrush (*Scirpus acutus*), sedges (*Carex* spp.), glossy buckthorn (*Rhamnus frangula*). **Soils**: Loamy fine sand with low-chroma matrix and redox concentrations. HS indicator S5. **Hydrology**: Drainage pattern.
Total			**1.05**	**1.05**	**0.00**	

Source: Tilton and Associates, Inc.
Note: All wetland impacts will be mitigated because of the use of federal funds (E.O. 11990).
[a]Priority classes applied to this project were: 1, highest quality; 2, medium quality; and 3, lowest quality.
[b]PEM – Palustrine emergent; PFO – Palustrine forested; PSS – Palustrine shrub-scrub; Palustrine Open Water - POW.
[c] "Drainage pattern" means there is a visible drainage pattern showing a flow of water.

[80] *Wetlands Report*, Tilton and Associates, Inc. October 2003.

A preliminary determination has been made with respect to mitigation, based on the criteria outlined in Part 303, Wetland Protection, of the Natural Resources and Environmental Protection Act 451 of 1994, as amended. Any dredging, filling, or construction in regulated wetlands requires an MDEQ permit before beginning the construction activity. A permit applicant must demonstrate that the activity is dependent on being located in the wetland, and/or no feasible or prudent alternative exists that would avoid or minimize the impact. Design standards guide how the HOV lane will traverse the Square Lake Road interchange, and its alignment cannot avoid the wetlands.

The MDEQ considers the magnitude and justification of the impact in granting a permit. The permit is expected to require compensatory mitigation, which is the creation of wetland to replace the affected acreage. The Palustrine Emergent (PEM) and Palustrine Shrub/Scrub (PSS) wetlands affected by this project are usually mitigated at a 1.5 to 1 ratio. The tentative conclusion is that approximately 0.41 acres of wetland are subject to mitigation, with a likely mitigation need of 0.6 acres (Table 4-17). Mitigation is discussed further in Section 5.15.

Table 4-17
Estimated Wetland Impacts and Potential Compensatory Mitigation

Wetland Type	Wetland	Estimated Impact (acres)	Probable Mitigation Ratio	Estimated Compensatory Mitigation (acres)
PEM/PSS	W39	0.25	1.5 to 1	0.37
PEM/PSS	W41	0.16	1.5 to 1	0.24
Total		0.41		0.61

Source: Tilton and Associates, Inc.

4.11.5 Wetland Finding

The Preferred Alternative is in compliance with Executive Order 11990, "Protection of Wetlands." It has been determined that there is no practical alternative to the proposed action, and that the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

4.12 Historic and Archaeological Resources – Section 106

There are established criteria for determining historic significance and eligibility for the *National Register of Historic Places*. A property must have integrity of location, design, setting, materials, workmanship, feeling, and association. Additionally, the property must typically be fifty years old or older, and at least meet one of the following criteria: a) be associated with events of local, state, and/or national significance; b) be associated with the lives of significant persons; c) embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master; or, d) have yielded or may be likely to yield information important in history or prehistory (usually archaeological sites).

For Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act, MDOT contacted the Michigan State Historic Preservation Office (SHPO) for help in identifying project area historic and archaeological sites. Cultural resource surveys

began by delineating an Area of Potential Effect (APE) for the project. The APE represents the maximum area potentially affected, both directly and indirectly, by the project and was approved by the State Historic Preservation Office (SHPO) in a letter dated October 1, 2003 (Appendix C, Section 4).

Surveys of historic and archaeological resources took place within the APE in 2002 and 2003. The survey results and project impacts are described in the *Phase I Cultural Resources Survey of the Proposed I-75 Improvement Between M-102 and M-59 Oakland County, Michigan*.[81] As there are no properties on or eligible for listing on the *National Register* within the approved Area of Potential Effect, there are no effects on any such properties, and no further analysis is necessary. The SHPO concurred in a letter dated May 14, 2003 (Appendix C, Section 4). In a letter dated February 20, 2004, the SHPO further states that it has reviewed and accepted the DEIS (Section 6.4, Letter 7).

4.13 Parkland – Section 4(f) and Section 6(f) Resources

No Section 4(f) or Section 6(f) parkland is affected by the Preferred Alternative. Section 4(f) of the Department of Transportation Act of 1966 protects parklands (and *National Register* eligible historic sites) from transportation uses. Section 6(f) lands are those developed or purchased with federal Land and Water Conservation Funds. Maddock Park and the Troy Family Aquatic Center are contiguous to the project. A third park, Firefighters Park, is near I-75, but is separated from I-75 by Square Lake Road, west of Crooks Road. None will be affected by the project.

Maddock Park is in Royal Oak on the west side of the southbound service drive between Lincoln Avenue and Kalama Avenue (south of 11 Mile Road, Figure 4-1a). There is a noise wall between the southbound service drive and this depressed section of I-75. It shields the park from I-75 noise. A grading permit may be necessary to reconstruct a short section of the service drive near the park, but no permit is needed for the park. The noise wall will remain with the project. Therefore, there is no affect on this park.

The Troy Family Aquatic Center is north of Big Beaver Road on the east of I-75 (Figure 4-1c). It is separated from I-75 by an earth berm approximately 25 feet high. I-75 is not visible from the park, and the park is not visible from I-75. There would be no change in noise and there would be no effect on this park.

As Firefighters Park is separated from I-75 by Square Lake Road and there are no noise effects, there would be no effect on this park.

4.14 Visual Conditions

Visual effects relate to the view of the road and from the road for each of I-75's two distinct sections. The depressed section, between M-102 and 12 Mile Road, is flanked by grassy banks and occasional ornamental trees (Figure 1-1). Drivers see only the road, bridges over I-75, embankments on either side, or adjacent buildings. With the project some remnants of grassy banks may remain in wider areas of the depressed section, but overall there will be a more monolithic concrete visual environment, including a concrete median safety barrier. Portions of the depressed section between I-696 and Gardenia are bordered by brick noise walls at the top of

[81] *Phase I Cultural Resources Survey of the Proposed I-75 Improvement Between M-102 and M-59 Oakland County, Michigan*, Commonwealth Cultural Resources Group, December 2002.

the grassy banks. The noise walls will remain (though some may be relocated). Additional noise walls will be built, subject to final analysis and community acceptance. The view of the road in the depressed section is limited, as the road is below grade level. This will change where noise walls are added. The walls will be evident from the surrounding area with the project.

In its comment letter on the DEIS, the city of Madison Heights asked if there will be a visual effect from the construction of the ramp braiding north of I-696. There will not. Neither ramp will be above existing grade level.

The northern at-grade/elevated section has a grassy median. Construction of either build alternative will remove this vegetation. North of 12 Mile Road, I-75 is generally above the surrounding landscape at cross roads, so the adjacent land uses are visible. These views will not change as a result of the project. Since construction during the 1960s, vegetation has grown up along the fence lines. The mature vegetation along fence lines should not be disturbed with the project except in areas where noise walls are built. The view from the road would change only in these areas where noise walls are built. Likewise the view of the road will not change as the widening is within the median. Some clearance of vegetation is recommended for safety purposes (sight distance) within interchanges at Big Beaver Road and Rochester Road.

Design elements of the Preferred Alternative would be refined in conjunction with the Crooks/Long Lake I-75 Interchange Project and the I-75/M-59 Interchange Project.

4.15 Contaminated Sites

A *Project Area Contamination Survey* (PACS) was conducted.[82] The survey included a reconnaissance of the project corridor and review of federal and state environmental records.

The Preferred Alternative will require approximately 7 acres of new right-of-way from a mix of residential and commercial lots, plus 7 acres could be acquired for storm water detention.

The review of federal and state environmental records identified 47 listed sites within the project corridor (Table 4-18 and Figure 4-5). None would be subject to total acquisition. Most of these were underground storage tank (UST) sites and/or permitted small- quantity hazardous waste generators. These sites were rated for their contamination potential based on their proximity to I-75 and their current environmental condition. A partial acquisition from one of the 47 sites would likely be required (depending on final design). It was rated medium/high for contamination potential and additional investigation of this site (Phase II) is recommended. It involves USTs. The other sites were rated low for contamination potential.

The primary concern to the project from nearby sites is the possibility that contamination from leaking USTs or other sources at nearby properties has migrated onto or beneath the I-75 right-of-way. The Project Area Contamination Survey recommended that provisions be made to address contaminated soil and groundwater if encountered during construction.

[82] *Project Area Contamination Survey*, The Corradino Group, October 2003.

Table 4-18
Contamination Summary

SID No.	Site Name	Address or Location	City	Federal Records Databases				State Records Databases					Build Alternative	
				NPL	CERCLIS	RCRIS	ERNS	State Haz. Waste	State Landfill	LUST	UST	Inactive Solid Waste Facilities	ROW[1] (W/A/N)	Contamination Potential Rating
5	MDOT Bridge I-75 over M-59	NB and SB	Auburn Hills			X							W	L
6	Northeast LF & Sand Co	2715 Churchill N of Auburn	Pontiac									X	N	L
9	Goddard Coatings Co*	2280 Auburn Rd	Auburn Hills					X		X	X		N	L
17	Saltarelli Landfill	SE Corner Auburn/Opdyke Rd	Pontiac									X	N	L
20	Auburn Court Associates*	2740 Auburn Ct	Auburn Hills			X	X	X		X	X		N	L
30	Kamax-G B Dupont LP*	500 W Long Lake Rd	Troy			X				X-c	X		A	L
53	Sunoco Service Station	911 W Big Beaver-Suite 411	Troy			X							A	L
76	Humboldt Investment Co*	1864-80 Austin Road	Troy			X				X	X		N	L
96	Knight Construction Co*	1931 Austin Dr	Troy			X				X	X		N	L
108	Sunoco #0001-4738	1490 E Maple Rd	Troy							X	X		N	L
139	DDR Station*	510 W 14 Mile	Troy			X				X			N	L
141	JC Penney	700 W 14 Mile Rd	Troy							X-c	X		A	L
142	Baby World N Teens	512 W 14 Mile	Troy								X		A	L
152	Gould Inc Industrial Battery Div*	32305 Mally Rd	Madison Hts			X							A	L
155	Maschmeyer Concrete Co	32400 Mally Dr	Madison Hts							X-c	X		A	L
158	Henkel Surface Technologies	32100 Stephenson Hwy	Madison Hts			X					X		N	L
175	Valenite Div*	1100 W 13 Mile Rd	Madison Hts							X	X		A	L
176	Fuel Zone Inc	31015 Stephenson Hwy	Madison Hts							X	X		N	L
179	Biomagenic Resonance Inc*	30781 Stephenson Hwy	Madison Hts			X				X	X		N	L
181	Borden Dairy & Services*	30550 Stephenson Hwy	Detroit			X				X	X		N	L
188	Madison Hts Dept/Public Service	801 Ajax Dr	Madison Hts							X	X		N	L
193	S.E. Oakland Co RR Authority*	29470 John R Rd	Madison Hts			X			X			X	N	L
196	D-M-E Co*	29215 Stephenson Hwy	Madison Hts			X				X	X		N	L
201	Saturn Corp*	434 W 12 Mile Rd	Madison Hts			X				X	X		N	L
C14 (202)	Home Depot*	650 W 12 Mile Rd	Madison Hts			X							W	L
214	MDOT Bridge I-75 Under Gardenia	I-75 under Gardenia	Royal Oak			X							W	L
219	11 Mile & 75 Food Mart	2419 E 11 Mile Rd	Royal Oak							X-c	X		A	L
C6 (221)	**Marathon Unit #1711 (Service Drive Auto)**	**402 S Stephenson Hwy**	**Royal Oak**								**X**		**W**	**M/H**
230	KC Jones Plating Co	321 W 10 Mile Rd	Hazel Park			X	X						N	L
234	G and W Gas	24309 John R Rd	Hazel Park			X				X	X		N	L
235	United Unit #6199*	23990 John R Rd	Hazel Park			X				X	X		N	L
238	X Cel Industries*	505 W 9 Mile Rd	Hazel Park			X							A	L
240	Former John R Road Station 23201	23201 John R Rd	Hazel Park							X			N	L
250	City of Hazel Park	22600 N Chrysler Drive	Hazel Park			X					X		A	L
253	MDOT Bridge I-75 Under John R/Shell Service Station	I-75 under John R/22411 S Chry	Hazel Park			X				X-c	X		A	L
254	Advanced Friction Materials Co Plt 1	1435 Wanda	Ferndale			X		X					N	L
259	Color Coat Plating Co	21325 S Chrysler Dr	Hazel Park			X							A	L
262	Mr Jones Backyard	118 West George	Hazel Park		X								N	L
263	Jefferson Screw Products	1201 E 8 Mile Rd	Hazel Park							X			N	L
265	MDOT Bridge I-75 Under M-102 EBD Svc Rd	I-75 under M-102	Detroit			X							W	L

* - Indicates multiple site names and records are listed for this site.
[1] Proximity to Right-of-Way, W - Within ROW; A - Adjacent to ROW; N - Near ROW.
[2] Contamination Potential Rating, L - Low; M - Medium; H - high.
NPL - National Priority List (Superfund)
CERCLIS - Comprehensive Environmental Response, Compensation and Liability Information System; NFRAP-No further remedial action planned.
RCRIS - Resource Conservation and Recovery Information System; SQG-Small Quanity Generator; LQG-Large Quantity Generator; Corracts-Corrective Action Reports.
ERNS - Emergency Response Notification System
UST - Underground storage tank
LUST - Leaking underground storage tank; X-c - Closed case; X- Open case.

Table 4-18
Contamination Summary
(continued)

SID No.*	Site Name	Address or Location	City	Federal Records Databases				State Records Databases					Build Alternative	
				NPL	CERCLIS	RCRIS	ERNS	State Haz. Waste	State Landfill	LUST	UST	Inactive Solid Waste Facilities	ROW[1] (W/A/N)	Contamination Potential Rating
	Unmapped Sites													
O-1	MDOT Bridge I-75 over Square Lake Rd	I-75 over Square Lake Rd	Troy			X							W	L
O-2	MDOT Bridge I-75 over Adams Rd	I-75 over Adams Rd	Troy			X							W	L
O-3	MDOT Bridge I-75 under 14 Mile Rd	I-75 under 14 Mile Rd	Troy			X							W	L
O-4	MDOT Bridge I-75 over Red Run Drain	I-75 over Red Run Drain	Madison Hts			X							W	L
O-5	MDOT Bridge I-75 under 12 Mile Ped Walk	I-75 under 12 Mile Ped Walk	Madison Hts			X							W	L
O-6	MDOT Bridge I-75 under Shelvin U Turn	I-75 under Shelvin U Turn	Hazel Park			X							W	L
O-7	MDOT Bridge I-75 under Winchester	I-75 under Winchester	Detroit			X							W	L

* - These sites were not given a unique SID No. in the Environmental Atlas; The designations were assigned for identification purposes in this report.
[1] Proximity to Right-of-Way, W - Within ROW; A - Adjacent to ROW; N - Near ROW.
[2] Contamination Potential Rating, L - Low; M - Medium; H - high.
NPL - National Priority List (Superfund)
CERCLIS - Comprehensive Environmental Response, Compensation and Liability Information System; NFRAP-No further remedial action planned.
RCRIS - Resource Conservation and Recovery Information System; SQG-Small Quanity Generator; LQG-Large Quantity Generator; Corracts-Corrective Action Reports.
ERNS - Emergency Response Notification System
UST - Underground storage tank
LUST - Leaking underground storage tank; X-c - Closed case; X- Open case.

Source: The Corradino Group of Michigan, Inc.

4.16 Soils and Utilities

Mucky and peat soils are present in some locations in the north portion of the corridor. This could affect the cost of noise wall construction, but is not expected to affect roadway construction. Geotechnical studies have been performed to support project cost estimates.

A 120 kV electrical transmission line in the north section of the 12 Mile Road interchange would not be affected as the towers are clear of disturbance areas. Similarly, a cell tower at Square Lake Road and Adams road is close to I-75, but would not be affected. Other cell towers are unaffected. There will be some effect on MDOT traffic monitoring equipment, some of which is located in the median. Effects on utilities will be consistent with normal utility relocation for roadway projects. Particularly, in the depressed section of the corridor utilities are carried across I-75 on the crossroad bridges.

4.17 Construction Permits

Permits will be required from the Road Commission for Oakland County to reconstruct bridges over or modify county roads. There will be permits necessary from the Oakland County Drain Office for each of the county drains that are crossed.

Michigan Department of Environmental Quality permits will be required during the construction phase for use of wetlands, stream crossings, and storm water discharges (Section 5.5).

4.18 Indirect and Cumulative Effects

The indirect (secondary) and cumulative effects analysis begins with assembling a sound database, including the following:[83]

- From SEMCOG:
  - ✓ "Detroit Wetlands and 300 years of Metropolitan Growth"
  - ✓ Future land use maps
  - ✓ "Land Use Change in Southeast Michigan, Causes and Consequences," March 2003
  - ✓ Sewer service areas
  - ✓ "Quality of Life Survey," 2002/2003
  - ✓ "Historical Population and Employment by Minor Civil Division," June 2002
  - ✓ "2030 Regional Development Forecast for Southeast Michigan"
- From U.S. Census
  - ✓ Population
  - ✓ Agriculture
- MIRIS (Michigan Resource Inventory System) mapping
- Michigan Natural Features Inventory, maintained by MDNR
- "I-75 Corridor Study in Oakland County" by the Michigan Department of Transportation, 2002
- County plat maps
- Aerial photography provided by the Oakland County Department of Planning
- Detroit Area Study 2001, University of Michigan

[83] See also, *Indirect and Cumulative Impact Analysis Technical Report*, January 2005.

It is recognized at the outset that this database is limited. Nevertheless, federal guidance is helpful in this situation, i.e., "… the continuing challenge of cumulative effects analysis is the focus on important cumulative issues, recognizing that a better decision, rather than a perfect cumulative effect analysis, is the goal of NEPA" (National Environmental Policy Act).

Experience indicates that a sound basis upon which to establish the geographic scope for indirect and cumulative assessment of impacts is an area of traffic influence. Access is both a facilitator and a consequence of land use change. Because of the extensive networks of roads in Southeast Michigan, residents and businesses have large areas to choose from in deciding where to locate. But, the spread-out pattern/low density of housing makes providing transit service difficult in many suburban communities and outlying areas of the region, leaving highway travel to predominate. So, highway travel assignments are used to define the area of traffic influence.

In defining this area, aerial photography since 1971 was examined. The aerial mapping allows an assessment of the extent to which roadway improvements, as well as land developments, have occurred over the last 30+ years. Based on the analysis of this mapping, a series of issues can be focused upon by which indirect (secondary)/cumulative effects can be measured. These include:

- Mobility
  - ✓ Safety
  - ✓ Effects on non-motorized public
- Community issues
  - ✓ Community cohesion
  - ✓ Residential displacements
  - ✓ Aesthetics
  - ✓ Environmental justice
  - ✓ Effects on emergency services
- Environment
  - ✓ Noise
  - ✓ Air quality
  - ✓ Parks
  - ✓ Cultural resources/historic properties
  - ✓ Wetlands
  - ✓ Water quality
  - ✓ Sensitive plant/animal habitat
- Economics
  - ✓ Business displacements
  - ✓ Effects on economic vitality
- Cost
  - ✓ Construction
  - ✓ Right-of-way

To support this analysis, SEMCOG's transportation modeling platform was used. But, because SEMCOG's new model-building efforts to analyze transit were not complete at the time this work was undertaken, a model was developed, tested and applied to allow assessment of the use of transit and high-occupancy vehicle lanes.

4.18.1 Rapid Transit and HOV Testing

Rapid Transit

A primary purpose of the modeling effort was to assess whether either rapid transit in the Woodward Avenue corridor, or high-occupancy vehicle lanes (one in each direction) added to I-75 would make unnecessary the need by 2025 to widen I-75 for a "general purpose" lane. The analysis, at the same time, was to indicate whether rapid transit in the Woodward Avenue corridor holds promise as part of an overall regional transportation strategy, regardless of whether it would provide significant traffic relief to I-75. The travel-forecasting model was applied to answer these questions.

The transit concept evaluated is a high performance system running on Woodward Avenue from Pontiac in Oakland County to Jefferson Avenue in Downtown Detroit (Figure 4-6). It would include 28 stations and be characterized by:

- High speed (60 mph where distances and conditions permit);
- High quality vehicles with a quiet, smooth ride;
- Separation from other traffic to avoid congestion;
- Short headways (time between arriving vehicles), 3 minutes;
- Short dwell times (time spent at a station), 15 seconds or less;
- Timed transfers with intersecting routes to avoid missed transfers;
- Communication between buses to also avoid missed transfers;
- Park-and-ride lots at stops north of, and including, the Michigan State Fairgrounds;
- Fare integration with intersecting transit service to permit a single fare for all segments of a trip; and,
- Pre-paid fares at platforms to reduce boarding times.

This concept was tested to assess whether it would relieve congestion along I-75 in the 2025 target year. Table 4-19 summarizes the results of this analysis.

Table 4-19
Rapid Transit and HOV Concepts
I-75 PM Peak Hour Characteristics (2025)

Measure	Alternatives	
	No Build	Rapid Transit
Regional Daily Transit Trips (Linked)[a]	117,682	164,945
Regional Transit Boardings (Unlinked)[b]	177,285	272,020
Woodward Rapid Transit Boardings	NA	49,782
Detroit People Mover (DPM) Boardings	10,967	9,608

Source: The Corradino Group of Michigan, Inc.
[a]Origin to destination.
[b]Stop to stop.

Figure 4-6
Proposed High Quality Transit Alternative Attractions & Transit Connections/Stations

The addition of the Woodward Corridor rapid transit line would increase daily linked transit trips (origin to destination) from 117,682 in the no-build condition to 164,945; daily transit boardings (stop-to-stop) from 177,285 to 272,020; and, would provide rapid transit service to almost 50,000 daily transit riders. This ridership level is comparable to that forecast (50,000 daily boardings in 2020) in the most recent study of rapid transit in the Woodward Corridor by IBI Group.[84]

While this analysis indicates ridership is high enough to conclude that rapid transit in the Woodward Corridor merits further study, it does not offer relief of travel on I-75 regardless, because:

- Congestion levels on I-75 are so high that travelers in the corridor who would choose to use the new rapid transit system are quickly replaced by other auto travelers who might have previously chosen surface routes because of I-75 congestion.
- While the rapid transit system and I-75 are in the same general travel corridor, they are still more than two miles apart in most locations. Moreover, "indirect" travel would be required to get to a rapid transit station compared to driving on I-75.
- Most users of I-75 in Oakland County are not within walking distance of the rapid transit system and the DDOT and SMART bus lines that feed the rapid transit system. This is largely because of the dispersed residential development in Oakland County, and the fact that the majority of travelers on I-75 in Oakland County begins and ends its trips in Oakland County. Most Oakland County travelers with a Detroit destination would be presented with the choice of driving to an rapid transit station and transferring, or driving the entire trip. Most travelers choose to drive the entire trip.

High-Occupancy Vehicle Lane

The effectiveness of a high-occupancy vehicle (HOV) lane alternative was assessed by examining the PM peak hour throughput. One test assesses whether the HOV lane would carry more persons than the adjacent general purpose lane. Modeling shows this occurs along every part of the HOV facility (Table 4-20) in the northbound (i.e., peak) direction in the PM peak hour. This indicates that the HOV lanes would be effective.

Other tests also demonstrate the viability of HOV on I-75 plus its potential to operate successfully in both the northbound and southbound directions in both the AM and PM peak periods.

Based on the travel analysis, it was concluded that the "2-plus" HOV lane is a viable alternate when widening I-75 by one lane. And, while rapid transit in the Woodward Corridor is considered viable, and MDOT supports it, continuing analysis of this concept is left to the advancement of SEMCOG's Speed Link concept, as it does not alleviate the need to widen I-75.

[84] *Woodward Corridor Transit Alternatives Study Final Report*, Detroit Transportation Corporation; by IBI Group, May 2000.

Table 4-20
2025 PM Peak Hour Throughput (Vehicles and Persons)
HOV Lane (2-plus) vs. General Purpose Lane at Key Segments of I-75

Location	Total HOV Vehicles per Hour		Person Throughput per Lane				Passes Test in PM Peak Direction (NB)
			HOV		Adjacent General Purpose		
	NB	SB	NB	SB	NB	SB	
8 Mile to I-696	1,471	1,279	3,687	3,189	1,952	1,954	Yes
I-696 to 12 Mile	1,889	1,913	4,737	4,782	1,982	1,943	Yes
12 Mile to 14 Mile	1,870	1,713	4,684	4,277	2,058	1,934	Yes
Square Lake Road to M-59	1,586	1,072	3,949	2,684	2,512	2,233	Yes
Sashabaw to M-15	892	294	2,170	725	1,604	1,096	Yes
M-15 to U.S. 24	422	245	995	598	1,516	912	No
U.S. 24 to Genesee Co. Line	422	0	995	0	1,247	1,179	No

Source: The Corradino Group of Michigan, Inc.
Note: NB is the PM Peak Direction.

4.18.2 Results

Based upon the information discussed earlier, and the proposed plan to widen I-75, the following information is presented about indirect and cumulative effects.

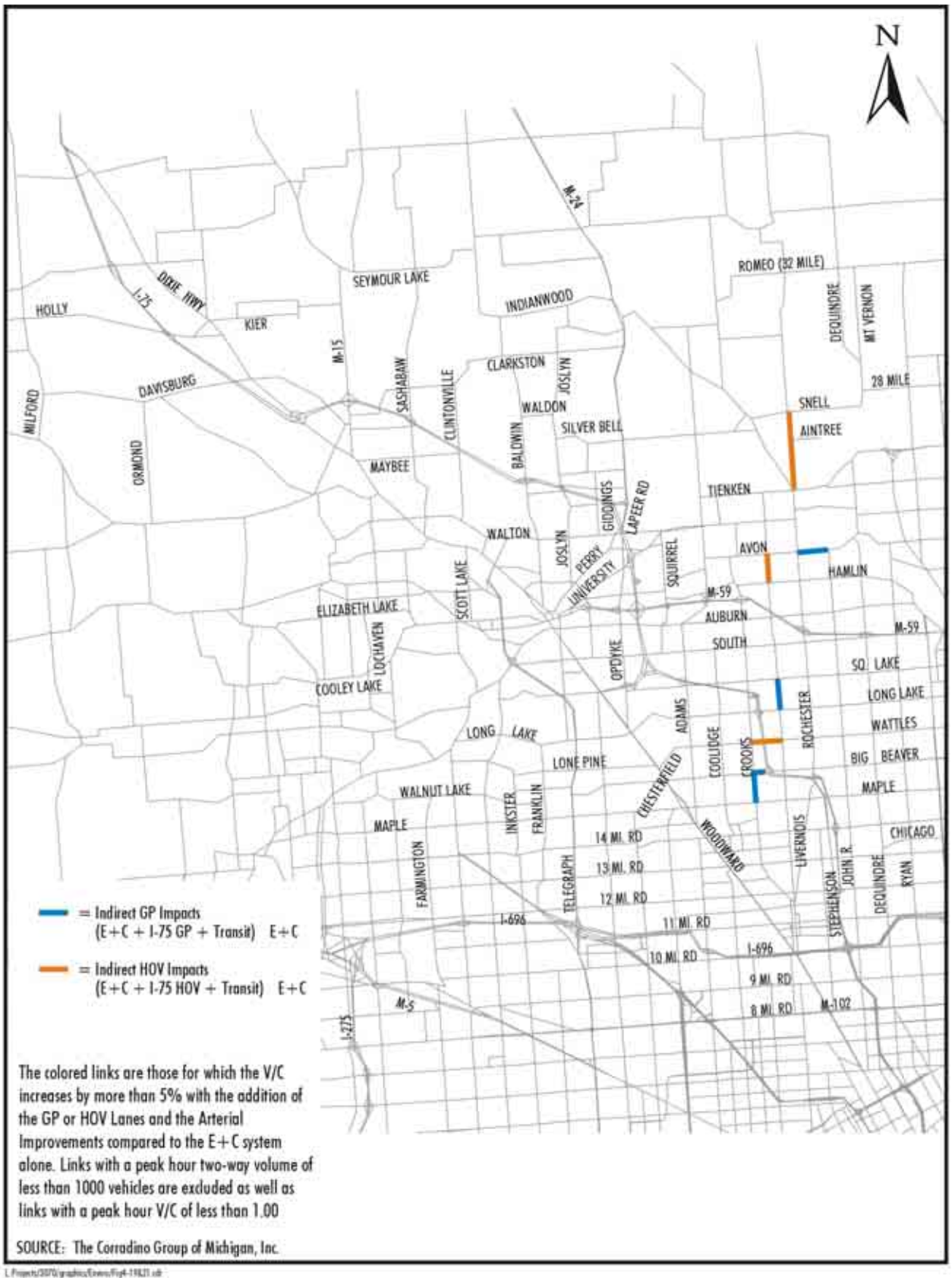
Indirect Impacts

To determine the indirect effects of widening I-75, the analysis involves defining how the change in congestion on the existing-plus-committed (E+C) network alone compares to conditions with: 1) E+C road improvements in place; 2) the proposed action, i.e., widening I-75; and, 3) the rapid transit and supporting bus system in the Woodward Avenue corridor (refer to Figure 4-6). This was done using the transportation modeling system discussed earlier. Two items are noteworthy in this regard: 1) the background system includes an improved transit component, consistent with discussions between MDOT and FHWA; and, 2) the existing-plus-committed network in Oakland County is defined for this analysis as only those highway projects included in the 2025 Regional Transportation Plan which will be implemented by 2005.

The results of the analysis of the HOV and general-purpose lane actions, are illustrated in Figure 4-7. These results indicate the links on which indirect effects would occur are:

1. Avon Road – Rochester Road to John R Road: from two (2) to five (5) lanes
2. Big Beaver – Crooks Road to I-75: from six (6) to seven (7) lanes
3. Crooks Road – Maple Road to Big Beaver Road: from five (5) to seven (7) lanes
4. Livernois Road – Long Lake Road to Square Lake Road: from two (2) to five (5) lanes
5. **Livernois Road – Hamlin Road to Avon Road: from two (2) to five (5) lanes**
6. **Rochester Road – Tienken Road to Snell Road: from two (2) to five (5) lanes**
7. **Wattles Road – Crooks Road to Livernois Road: from two (2) to five (5) lanes**

Figure 4-7
Indirect Impacts Congestion Comparison



The items in bold are associated with HOV development under the Preferred Alternative. It is noteworthy that the year 2000 I-75 Feasibility Study included the Livernois Road widening from Square Lake to Avon Roads, so these impacts have been anticipated (Table 4-21). It is also anticipated that all of these roadways, except Avon Road (between Rochester Road and John R) are expected to be carrying a volume of traffic no more than 15 percent above capacity. This degree of congestion will require closer examination over time to determine if these roadway segments truly need widening.

The results of the indirect impacts analysis are shown on Table 4-22 and summarized as follows. The effects noted are for the Preferred Alternative, which are represented by the last three columns in Table 4-22.

Mobility - Traffic and Safety and Non-motorized Travel

Conditions at seven high crash locations[85] will potentially be improved with upgraded design. New construction would bring improved or expanded sidewalks.

Community – Relocations, Environmental Justice, and Emergency Services

One residential, but no business or institutional relocations are expected. The indirect developments associated with widening I-75 must be consistent with local planning and zoning, and the transportation planning of the Road Commission for Oakland County, SEMCOG, and local jurisdictions. There would be no disproportionately high and/or adverse human health or environmental effects on minority or low-income populations. Emergency services would encounter less congestion.

Environmental – Noise, Air Quality, Parks, Cultural Resources/Historic Properties, Wetlands, Water Quality, Farmland, and Sensitive Habitats

Noise will likely increase slightly for some 130 residential properties along the local widened arterials indirectly related to the Preferred Alternative, if the widened arterial becomes closer to homes. No hospitals or schools are expected to experience increased noise, but three churches could for projects indirectly related to the Preferred Alternative.

Smoother traffic flow is expected to have a positive effect on air quality for those arterials to be widened as an indirect result of I-75 widening.

One park, at the southeast corner of Avon Road and Livernois Road could possibly be affected as an indirect consequence of widening I-75.

Two archaeological sites will need to be reviewed for impacts as arterial widenings indirectly associated with I-75 widening go forward.

A tenth of an acre of wetland near the Clinton River (Livernois Road) could require mitigation by the local road entity, plus another five-tenths along Rochester Road north of Tienken Road. Surface runoff would increase with any increase in roadway surface, but would be subject to county and state permitting.

[85]Compiled by the Traffic Improvement Association of Oakland County.

Table 4-21
Arterial (Non I-75 Roadway) Improvements – 2025
(Revised June 2000)

		LIMITS		
	NORTH-SOUTH ROADS	**FROM**	**TO**	**TYPE OF IMPROVEMENT**
1	Dequindre	Long Lake	Auburn	Widen to 5 lanes
2	John R Road	Long Lake	South Boulevard	Widen to 5 lanes
3	Rochester Road	North of Big Beaver	Hamlin	Widen to 6 lane boulevard
4	Livernois Road[a]	I-75	Wattles Road	Widen
5	Livernois Road[b]	Long Lake	Square Lake	Widen to 5 lanes
6	Livernois Road[b]	Square Lake	Avon	Widen to 5 lanes
7	Crooks Road	Fourteen-Mile	Maple	Widen to 5 lanes
8	Crooks Road[a]	Square Lake	Auburn	Widen to 4 lane boulevard
9	Greenfield	Thirteen-Mile	14 Mile	Widen to 3 lanes
10	Adams	Big Beaver	Auburn	Widen to 5 lanes
11	Adams	Hamlin	Tienken	Widen to 5 lanes
12	Opdyke[a]	Square Lake	Walton	Widen to 6 lane boulevard
13	Joslyn	Brown	Silver Bell	Widen to 5 lanes
14	Baldwin	Morgan	Waldon	Widen to 5 lanes
15	Sashabaw	Dixie	Clarkston	Widen to 5 lanes
16	Scott Lake	Watkins Lake	U.S. 24/Dixie	Widen to 5 lanes
	EAST-WEST ROADS			
17	Taylor Road	Gidings Road	M-24	New Road – Extend
18	13 Mile	Greenfield	Southfield	Widen to 5 lanes
19	Big Beaver	Dequindre	Rochester	Widen to 6 lane boulevard
20	Quarton	Woodward	Adams	Widen to 5 lanes
21	Long Lake	Coolidge	Adams	Widen to 5 lanes
22	Square Lake	Telegraph	Franklin	Intersection Improvement
23	South Boulevard	Dequindre	I-75	Widen to 5 lanes
24	S. University Drive	Paddock	MLK	Widen to 5 lanes
25	Pontiac Lake Road	Scott Lake Road	County Center Drive	Widen to 5 lanes
26	Dixie (Oakland)	Telegraph	Woodward	Connector signage/signal timing
27	Walton Boulevard	Perry Street	Squirrel	Widen to 5 lanes
28	Williams Lake Road	Airport	Dixie	Widen to 5 lanes
29	County Center Drive	Pontiac Lake	Telegraph	Widen to 5 lanes
30	Holcomb Road/Bridge Lake Road	Davisburg Road	I-75	Pave 2-lane road
31	Dixie Highway (U.S. 24)	Davisburg Road	I-75	Widen to 5 lanes

Source: The Corradino Group of Michigan, Inc.
[a]Project has been completed.
[b]Project included in indirect impacts discussion.

Table 4-22
Potential Indirect Effects of Widening I-75 -Additional Segments
(Preferred Alternative in Bold)

		Avon Road	Big Beaver	Crooks Road	Livernois		**Rochester**	**Wattles Road**
	Evaluation Factors	Rochester Road to John R Road	Crooks Road to I-75	Maple Road to Big Beaver	Long Lake to Square Lake	**Hamlin to Avon**	**Tienken Road to Snell Road**	**Crooks Road to Livernois**
		1	2	3	4	**5**	**6**	**7**
Mobility	Safety - High Crash Locations Potentially Improved	0	0	4	2	**2**	**2**	**1**
	Effect on Non-motorized Travel	Low	Low	Low	Low	**Low**	**Low**	**Low**
Community	Residential Relocation Potential	0	0	0	0	**1**	**0**	**0**
	Business and Institutional Relocation Potential	0	0	0	0	**0**	**0**	**0**
	Environmental Justice	No disproportionate effect	No disproportionate effect	No disproportionate effect	No disproportionate effect	**No disproportionate effect**	**No disproportionate effect**	**No disproportionate effect**
	Effects on Emergency Services	Positive	Positive	Positive	Positive	**Positive**	**Positive**	**Positive**
Environmental	No. of Residential Units Potentially Exposed to Increased Noise Levels	47	0	10	52	**31**	**75**	**34**
	No. of Churches Exposed to Potentially Increased Noise Levels	1	0	2	0	**1**	**0**	**2**
	Air Quality	Positive	Positive	Positive	Positive	**Positive**	**Positive**	**Positive**
	Parks – Potential Acres Affected	0	0	0	0	**0.4**	**0**	**0**
	Cultural Resources/Historic Properties – Potential Number Affected	0	0	0	2	**1**	**0**	**0**
	Wetland – Potential Acres Affected	0	0	0	0	**0.1**	**0.5**	**0**
	Water Quality – Potential for Increased Runoff	Yes	Yes	Yes	Yes	**Yes**	**Yes**	**Yes**
	Sensitive Plant/Animal Habitats Impact	Minimal	Minimal	Minimal	Minimal	**Minimal**	**Moderate**	**Minimal**
Economic	Effect on Economic Vitality	Minimal	Positive	Positive	Positive	**Minimal**	**Moderate**	**Positive**

Source: The Corradino Group of Michigan

No impacts to prime or unique farmland are expected.

There would be no effect on any threatened or endangered species or any habitat supporting these.

Economy
Improving the five miles of arterial roads indirectly associated with the Preferred Alternative will have a minimal to positive effect on local economies. While property will be acquired for arterial construction, the improved access and safety will enhance the viability of the area, allowing the economy to continue to be sustained.

Cumulative Impacts

To determine the scope of the cumulative effects of other actions " … past, present and (in the) reasonably foreseeable future …", the congestion analysis used in the "Indirect Impacts" analysis was repeated using the same two networks but adding a set of arterial improvements that the Road Commission for Oakland County committed to make as a result of the I-75 Feasibility Study (Table 4-21 and Figure 4-8). It is noteworthy that projects No. 4 (Livernois Road from I-75 to Wattles Rd.); No. 8 (Crooks Road between Square Lake Road and Auburn Road); and, No. 12 (Opdyke Road between Square Lake and Joslyn Roads) have been completed and are, therefore, removed from the analysis. Similarly, Livernois Road between Hamlin and Avon Roads is considered a project with an indirect impact and, therefore, its effects were covered in the previous section.

The results of the two congestion tests (Figure 4-9) lead to the following roadway links in addition to those listed above to be focused on for their cumulative effects:

1. Adams Road – Maple Road to Big Beaver Road: from four (4) to eight (8) lanes
2. Wattles Road – Chesterfield Road to Adams Road: from two (2) to five (5) lanes

Note that these are associated with the HOV (Preferred) Alternative only.

The Road Commission for Oakland County and other political entities intend to improve a host of facilities as listed on Table 4-21 and Figure 4-8. It is noted that to represent these improvements fairly in terms of traffic and impact data, "widening" of an arterial is often indicated. But, further work, in cooperation with local governments will define precisely the improvements to be made that yield the most traffic capacity increase with the least negative impact.

The cumulative impacts on mobility, the community, the environment, economics, as well as the cost of these improvements to 56+ miles of arterial roads in Oakland County are shown on Table 2-23 and summarized below.

Figure 4-8
I-75 Feasibility Study Additional Arterial Projects

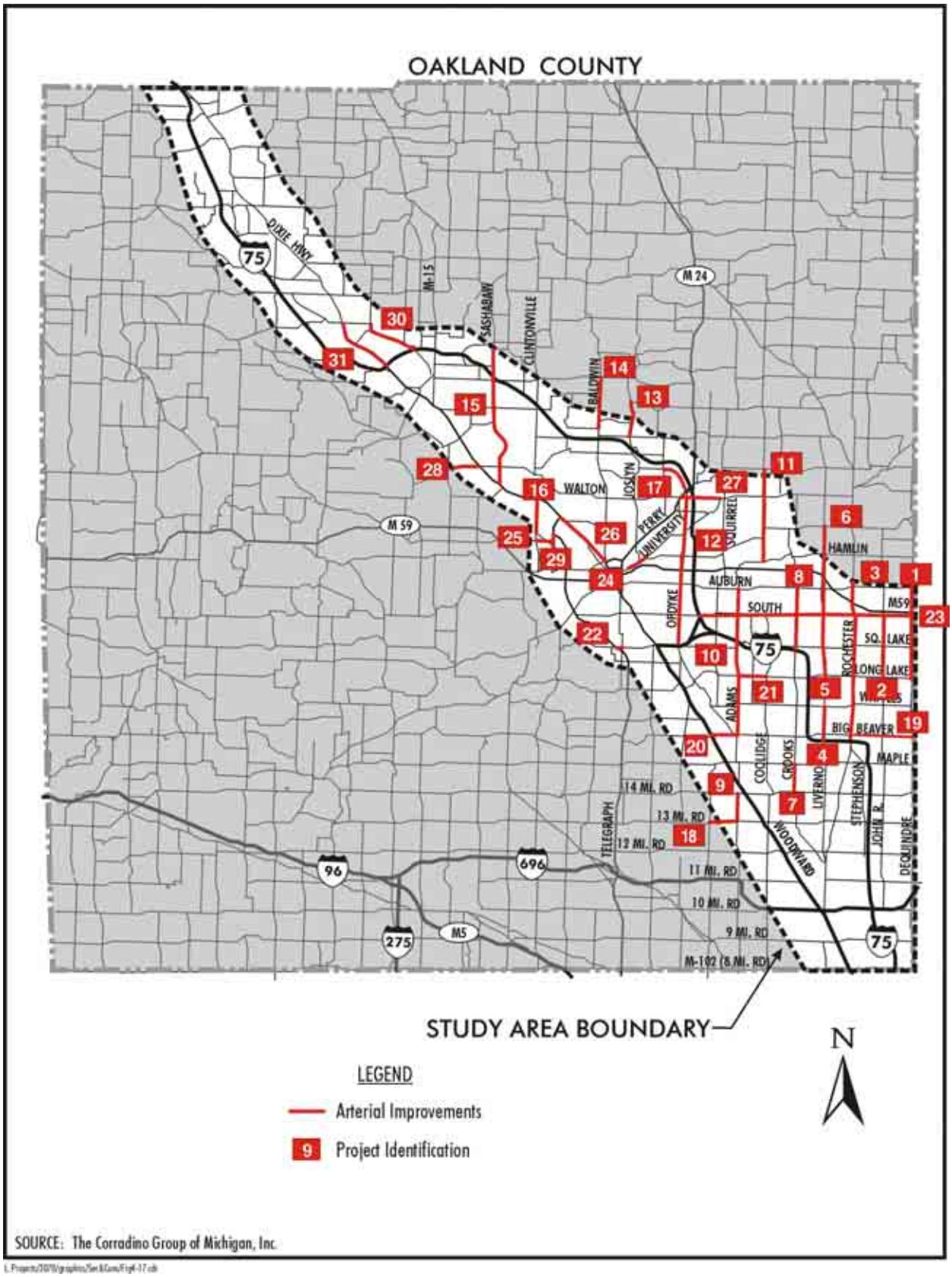


Figure 4-9
Cumulative Impacts Congestion Comparison