
Section 3 FUTURE-YEAR ANALYSES

This section provides an analysis of traffic conditions along 4 Mile Road for two future-year scenarios—2015 and 2030. The purpose of the analysis is to determine a future cross-section width of 4 Mile Road consistent with the volumes that are anticipated during these future years.

3.1 Land Use Plans

Developing traffic projections is an inexact science at best, and the further into the future that projections are made, the less reliable those projections become. Traffic projections for the 4 Mile Road corridor are based on the most-recently adopted land use plans of the city of Walker and Alpine Township. The generation of trips is most closely linked to land use.

The most recent Alpine Township Master Plan (from 1998) is depicted in **Figure 3-1**. As shown in Figure 3-1, the land use along the north side of 4 Mile Road is primarily zoned as residential uses. The majority of the township is zoned agricultural. Alpine Township is currently updating their 1998 Master Plan. Discussions with Alpine Township indicate that the zoning along 4 Mile Road and the large areas of agricultural zoning are not anticipated to change when the updated Master Plan is approved in the near future.

The most recent Future Land Use Plan (from 1998) for the City of Walker is depicted in **Figure 3-2**. Like Alpine Township, the city of Walker is currently in the process of updating their Future Land Use Plan for the entire city. Approval of the new (2006) Future Land Use Plan is being completed in phases with separate approvals in four (4) distinct sub areas. The Future Land Use Plan for only one sub area (Sub-Area #1) has been approved by the Planning Commission at this time. Sub-Area #1 is bounded by 4 Mile Road on the north, 3 Mile Road on the south, Fruit Ridge Avenue on the west and Bristol Avenue on the east. Sub-Area #1 will have the greatest traffic impact along 4 Mile Road compared to other yet-to-be-approved sub areas. The Future Land Use Plan for Sub-Area #1 is depicted in **Figure 3-3**. As shown in Figure 3-3, the approved Future Land Use Plan for Sub-Area #1 depicts primarily single-family residential uses along the south side of the 4 Mile Road corridor west of Walker Avenue and a “Village Center” use east of Walker Avenue.

3.2 Orchard Park Town Center

Traffic projections along 4 Mile Road are anticipated to be significantly impacted by the Orchard Park Town Center, currently being proposed by a developer as the “Village Center” use in the city of Walker. The Orchard Park Town Center is bounded by 4 Mile Road on the north, Walker Avenue on the west, I-96 on the south, and Bristol Avenue on the east. The proposed 240-acre multi-use development will contain a wide variety of residential, commercial, and retail uses.

A detailed traffic impact analysis corresponding to the Orchard Park Town Center is currently being completed for the city of Walker as part of the city’s site plan review process. The site is anticipated to generate approximately 2,400 new trips during a typical weekday morning peak hour, approximately 5,000 new trips during a typical weekday afternoon peak hour, and more than 6,000 trips during a typical Saturday peak hour (Orchard Park Town Center Traffic Impact Study, Metro Transportation Group, September 2006). The overall site would be constructed in phases with full build-out anticipated in 2011.

Because of the size of the Orchard Park Town Center, the results of the full build-out analysis (2011) for the Orchard Park Town Center Traffic Impact Study (September 2006) was used as a baseline for the development of the 2015 and 2030 traffic projections along 4 Mile Road. In each case (2015 and 2030), the infrastructure improvements recommended to mitigate traffic operations for the Orchard Park Town Center were assumed to be “in-place” for the

2015 and 2030 analyses contained herein for the 4 Mile Road corridor. The following is a synopsis of the infrastructure modifications that are anticipated to be constructed as part of the Orchard Park Town Center:

- Extension of Northridge Drive east of Walker Avenue into the Orchard Park Town Center site, terminating at Bristol Avenue.
- Capacity improvements at the Walker Avenue / Northridge Drive intersection. Exact design to be determined.
- Extension of Baumhoff Avenue south of 4 Mile Road into the Orchard Park Town Center site to Northridge Drive, including construction of left-turn lanes at the 4 Mile Road/Baumhoff Avenue intersection.
- Realignment of the Bristol Road approaches to 4 Mile Road, including construction of left-turn lanes on 4 Mile Road and signalization of the 4 Mile Road/Bristol Avenue intersection.
- Signalization of the eastbound I-96 off-ramp at Walker Avenue, including construction of a third northbound through lane on Walker Avenue that terminates as a right-turn lane at the eastbound I-96 on-ramp.
- Construction of a third southbound through lane on Walker Avenue from Northridge Drive through the westbound I-96 ramp terminal intersection, terminating as a right-turn lane at the eastbound I-96 on-ramp (loop).
- Realignment of the 4 Mile Road / Walker Avenue intersection, including signalization. Exact realignment and design to be determined.

In addition to the above-listed improvements, the city of Walker also plans to extend Northridge Drive further west to Fruit Ridge Avenue as part of its Master Plan. Following construction of the Orchard Park Town Center, the city of Walker also plans to extend Northridge Drive east of Bristol Avenue, curving northward to tie into 4 Mile Road opposite Cordes Avenue. If such an extension occurs (likely to be in conjunction with site development east of Bristol Avenue), the proposed signal at the 4 Mile Road/Bristol Avenue intersection may become unwarranted and may need to be moved to the 4 Mile Road/Bristol Avenue/Northridge Drive intersection.

3.3 Future-Year Traffic Projections (2015 and 2030)

The future-year traffic projections for the 4 Mile Road corridor were developed using the opening year (2011) traffic projections prepared for the Orchard Park Town Center as a base. The same 2.5 % annual compounded growth rate used to determine the 2011 traffic projections was used to generate the 2015 traffic projections. A smaller rate of growth—2 % compounded annually—was used to generate the 2030 projections from the 2015 projections. These rates of growth are consistent with historical growth, the existing land use plans in both the city of Walker and Alpine Township, and socio-economic data provided by the Grand Valley Metro Council. The projected Average Daily Traffic (ADT) volumes for 4 Mile Road are depicted in **Table 3-1** for the 2015 and 2030 horizons. Future-year (2015 and 2030) peak-hour volumes are depicted in **Figure 3-4** and **Figure 3-5** respectively.

**TABLE 3-1
FUTURE-YEAR (2015 AND 2030) AVERAGE DAILY TRAFFIC**

Segment	Existing (2006) ADT	Future-Year (2015) ADT	Future-Year (2030) ADT
West of Fruit Ridge Avenue	2,600	3,300	4,300
East of Fruit Ridge Avenue	5,500	6,900	9,000
West of Walker Avenue	8,100	10,100	13,100
East of Walker Avenue	10,200	12,800	16,700
West of Bristol Avenue	9,400	11,800	15,400
East of Bristol Avenue	10,200	12,800	16,700
West of M-37	14,900	18,600	24,200

Source: URS Corporation, November 2006

3.4 Future Cross-Section of 4 Mile Road

The proposed cross-section of 4 Mile Road must be able to serve the projected 2015 and 2030 volumes at an adequate Level of Service. **Table 3-2** depicts the maximum value of ADT for each Level-of-Service for a variety of roadway cross-sections. The information in Table 3-2 was developed from information provided in the Highway Capacity Manual (2000) for multilane highways and adjusted for signalization. A comparison of the ADT values depicted in Table 3-1 and Table 3-2 reveals that a 3-lane cross-section along 4 Mile Road west of Cordes Avenue and a 5-lane cross-section east of Cordes Avenue would operate at Level of Service “C” under future-year (2015 and 2030) traffic volumes.

TABLE 3-2
MAXIMUM PEAK-HOUR SERVICE FLOWS AND APPROXIMATE MAXIMUM ADT VALUES
FOR VARIOUS LEVELS-OF-SERVICE AND FACILITY TYPES

Facility Type	Level-of-Service									
	A		B		C		D		E	
	MSF (pcph)*	ADT	MSF (pcph)*	ADT	MSF (pcph)*	ADT	MSF (pcph)*	ADT	MSF (pcph)*	ADT
2-lane Undiv.	245	4,455	405	7,364	585	10,636	775	14,091	950	17,273
3-lane Undiv.	408	7,424	675	12,273	975	17,727	1292	23,485	1583	28,788
4-lane Undiv.	490	8,909	810	14,727	1170	21,273	1550	28,182	1900	34,545
4-lane Div.	653	11,879	1080	19,636	1560	28,364	2067	37,576	2533	46,061
5-lane Undiv.	653	11,879	1080	19,636	1560	28,364	2067	37,576	2533	46,061
6-lane Undiv.	735	13,364	1215	22,091	1755	31,909	2325	42,273	2850	51,818
6-lane Div	898	16,333	1485	27,000	2145	39,000	2842	51,667	3483	63,333

*pcph = passenger cars per hour in peak direction

Note: This table is developed from Table 21-2 of the Highway Capacity Manual (2000). The table assumes turn lanes have two-thirds the capacity of through lanes, g/C = 0.5, D-factor = 0.55, k-factor = 0.1, and free-flow speed = 45 mph.

The proposed cross-sections for 4 Mile Road are depicted in **Figure 3-6**. The cross-sections were developed in consultation with the Kent County Road Commission, using the geometric standards consistent with other county primary routes in Kent County. The proposed right-of-way width for 4 Mile Road is 100 feet for the entire study corridor (from Fruit Ridge Avenue to M-37) in anticipation of any future need to widen the proposed 3-lane section west of Cordes Avenue into a 5-lane section. It is possible that the construction of the Orchard Park Town Center may increase pressure to rezone residential properties adjacent to the Orchard Park Town Center into uses with greater trip-generating capability. Although the soon-to-be-approved Master Plan in Alpine Township and the Future Land Use Plan in the city of Walker do not currently envision this happening, acquiring right-of-way for a future 5-lane pavement west of Cordes Avenue appears prudent.

3.5 Future-Year (2015 and 2030) Capacity Analyses

Future-year (2015 and 2030) peak-hour volumes are depicted in Figure 3-4 and Figure 3-5 respectively. Future-year (2015 and 2030) peak-hour Levels of Service for the signalized intersections within the project limits are depicted in **Table 3-3** on the next page. The results depicted in Table 3-3 assume reconstruction of 4 Mile Road as a 3-lane cross-section west of Cordes Avenue and a 5-lane cross-section east of Cordes Avenue. The results also assume the mitigation improvements associated with Orchard Park Town Center (listed in Section 3.2) are also in place. **Figure 3-7** depicts the lane usage at each of the intersections in the study area upon which the results in Table 3-3 are based. **Figure 3-8** through **Figure 3-12** depicts the proposed improvements along 4 Mile Road from Fruit Ridge Avenue to M-37 in plan view.

**TABLE 3-3
FUTURE-YEAR (2015 AND 2030) PEAK-HOUR LEVELS OF SERVICE
SIGNALIZED INTERSECTIONS**

Intersection	Future Year	AM-Peak Hour		PM-Peak Hour	
		Level of Service	Average Delay (sec/veh)	Level of Service	Average Delay (sec/veh)
4 Mile Road / Fruit Ridge Avenue	2015	B	15.9	B	11.4
	2030	C	27.1	B	19.1
4 Mile Road / Walker Avenue	2015	B	14.9	B	14.6
	2030	C	24.6	B	19.0
4 Mile Road / Bristol Avenue	2015	B	16.6	C	19.5
	2030	B	18.2	C	30.5
4 Mile Road / M-37	2015	D	53.5	F	82.5
	2030	F	113.5	F	191.8
I-96 WB Ramp / Walker Avenue	2015	B	13.7	B	13.8
	2030	C	21.3	D	41.0
I-96 EB Ramp / Walker Avenue	2015	B	10.5	B	14.2
	2030	C	24.9	D	38.4

Note: Results assume laneage depicted in Figure 3-7

Source: URS Corporation, November 2006

As shown in Table 3-3, each of the signalized intersections operates at an acceptable Level of Service (i.e. LOS “D” or better) during future-year (2015 and 2030) peak hours, except for the 4 Mile Road / M-37 intersection which is anticipated to operate at Level of Service “F” during future-year peak hours. The analysis assumed no capacity improvements at the 4 Mile Road/M-37 intersection, so it is apparent that improvements will be required in the future.

Movement-by-movement Levels of Service are shown in Figure 3-4 (for 2015) and Figure 3-5 (for 2030) at each signalized and unsignalized intersection in the study area. Several unsignalized movements operate at Level of Service “E” or “F” as depicted in **Table 3-4** for future-year (2015) and in **Table 3-5** for future-year (2030).

**TABLE 3-4
FUTURE-YEAR (2015) PEAK HOUR MOVEMENTS AT LEVEL OF SERVICE “E” OR “F”
UNSIGNALIZED INTERSECTIONS**

Intersection	Movement	Peak	Volume	Level of Service	95% Queue Length (feet)	Traffic Control
4 Mile Road / Hendershot Avenue	SB-to-EB Left	AM	120	F	198	2-Way STOP
4 Mile Road / Cordes Avenue	SB-to-EB Left	PM	30	F	54	2-Way STOP
	NB-to-WB Left	PM	5	F	10	

Note: Results assume laneage depicted in Figure 3-7

Source: URS Corporation, November 2006

TABLE 3-5
FUTURE-YEAR (2030) PEAK HOUR MOVEMENTS AT LEVEL OF SERVICE “E” OR “F”
UNSIGNALIZED INTERSECTIONS

Intersection	Movement	Peak	Volume	Level of Service	95% Queue Length (feet)	Traffic Control
4 Mile Road / Hendershot Avenue	SB-to-EB Left	AM	140	F	418	2-Way STOP
4 Mile Road / Peach Ridge Avenue	SB Approach	AM	80	F	110	2-Way STOP
	SB Approach	PM	60	E	69	
4 Mile Road / Baumhoff Avenue	NB-to-WB Left	PM	40	F	49	2-Way STOP
	SB-to-EB Left	PM	25	E	28	
4 Mile Road / Cordes Avenue	NB-to-WB Left	AM	5	F	7	2-Way STOP
	SB-to-EB Left	AM	40	F	74	
	NB-to-WB Left	PM	5	F	25	
	SB-to-EB Left	PM	35	F	125	
	NB Thru/Right	PM	25	F	38	
	SB Thru/Right	PM	55	F	40	

Note: Results assume laneage depicted in Figure 3-7

Source: URS Corporation, November 2006

The queues depicted in Table 3-4 are not large, so it is not anticipated that signalization will be necessary at Hendershot Avenue or Cordes Avenue by 2015. But the 418-foot queue depicted in Table 3-5 for Hendershot Avenue indicates that a signal may be necessary by 2030 to service traffic safely to and from the Kenowa Hills schools on Hendershot Avenue.

Finally, the analysis assumes that a future connection of Northridge Drive from east of Bristol Avenue to Cordes Avenue is not in place. If the future connection of Northridge Drive to Cordes Avenue occurs, the resulting 4 Mile Road/Cordes Avenue/Northridge Drive intersection would become signalized and the proposed signal at the 4 Mile Road/Bristol Avenue intersection would be eliminated.

Capacity analysis worksheets for all future-year (2015 and 2030) intersection analyses are included in **Appendix B** and **Appendix C**, respectively, of this report.

3.6 Non-Motorized Facilities

A connection of the Musketawa Trail in Ottawa County and the White Pine Trail in Kent County has been proposed by the Kent County Parks Department. The proposed connection would follow 4 Mile Road through at least part of the study area limits. The details for the trail design, exact location, and trail crossing of M-37 have yet to be determined. However, the proposed 3-lane cross-section between Fruit Ridge Avenue and Cordes Avenue includes 5'-6" bicycle lanes in each direction to accommodate bicycles. (See Figure 3-6.)

1998 Future Land Use Plan As Amended

Alpine Township
Kent County, Michigan
Originally adopted June 18, 1998 by the
Alpine Township Planning Commission

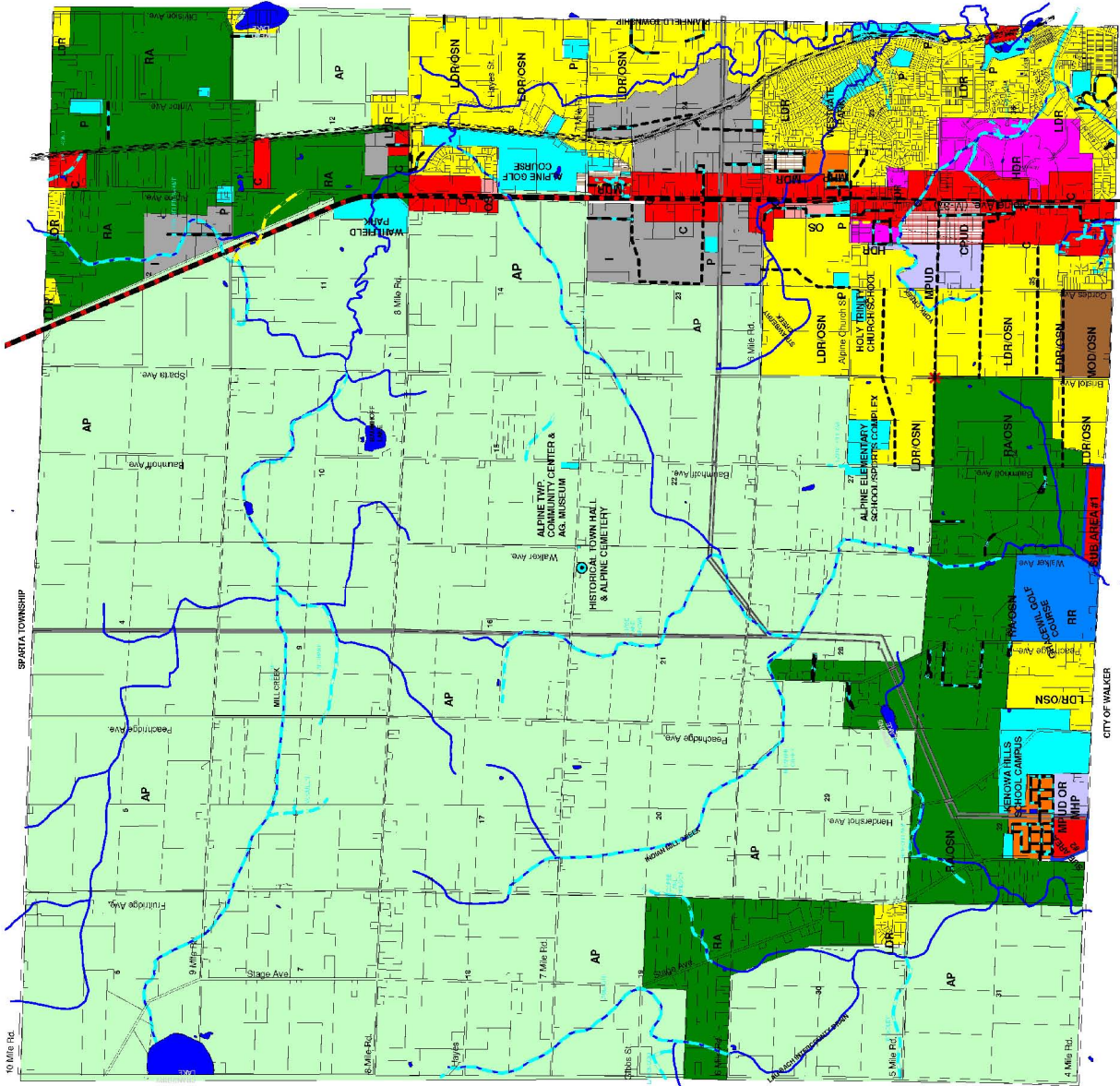
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- Shopping Center
- Future Roads
- Private Roads
- M-37 State Highway
- County Roads
- Creeks/Streams
- Lakes & Ponds
- Railways
- Consumers Power Utility Line

- AP AGRICULTURAL PRESERVATION
- RA RURAL AGRICULTURAL
- OSN OPEN SPACE NEIGHBORHOOD
- LDR LOW DENSITY RESIDENTIAL
- MOD MODERATE DENSITY RESIDENTIAL
- MBR MEDIUM DENSITY RESIDENTIAL
- HDSR HIGH DENSITY RESIDENTIAL
- MPUD MIXED USE PUD
- MAP MOBILE HOME PARK
- OS OFFICE/SERVICE
- C COMMERCIAL
- I INDUSTRIAL
- REC/RES RECREATION/RESIDENTIAL
- P PUBLIC/SEMI-PUBLIC
- SUB AREA PLAN



2 Miles

Map prepared by the Alpine Township
Planning Department, with assistance from
Mani Street Planning Company, Grand Rapids, Michigan



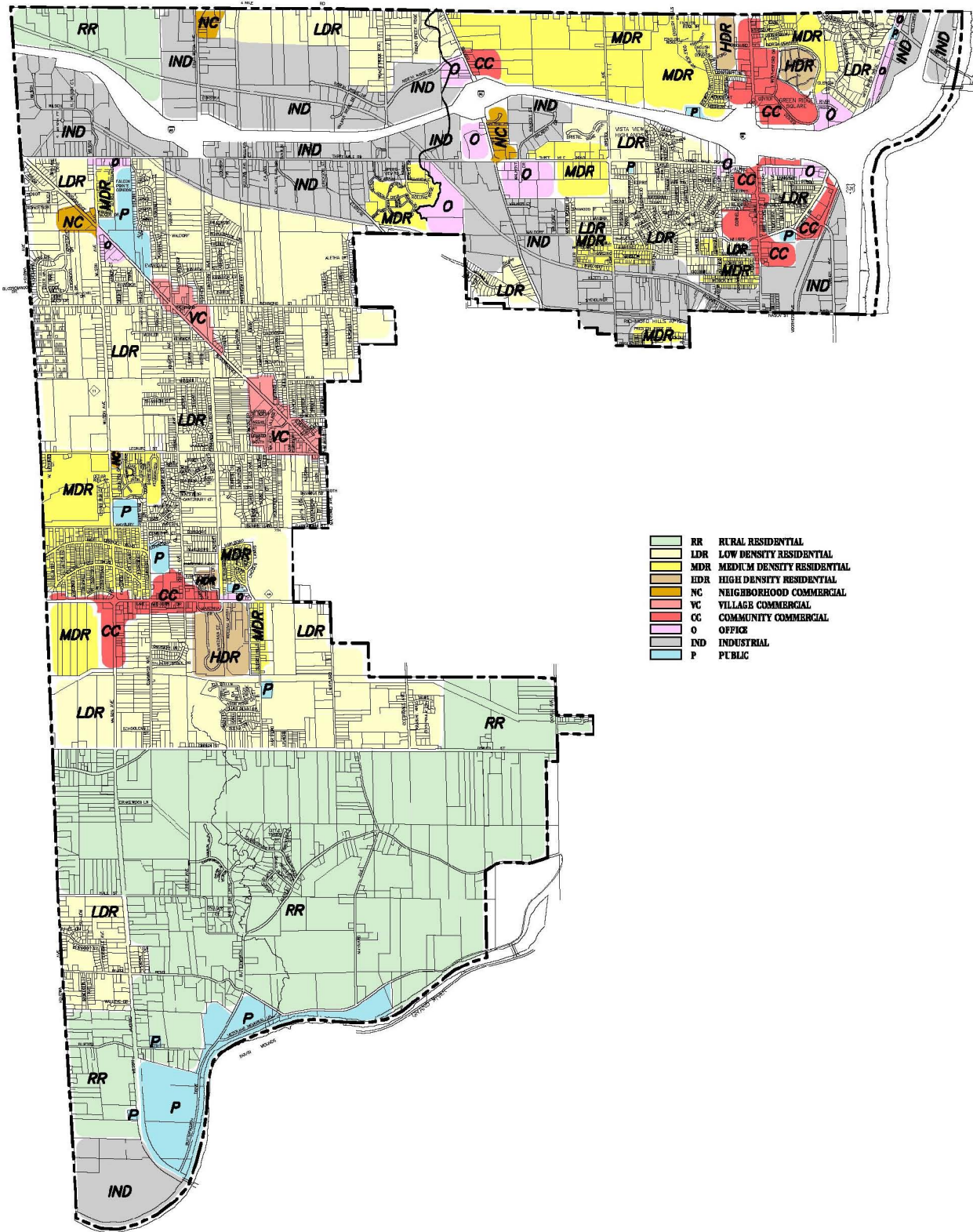
4 MILE ROAD CORRIDOR STUDY



PREPARED BY:
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**ALPINE TOWNSHIP
MASTER PLAN (1998)**

**FIGURE
3-1**



4 MILE ROAD CORRIDOR STUDY

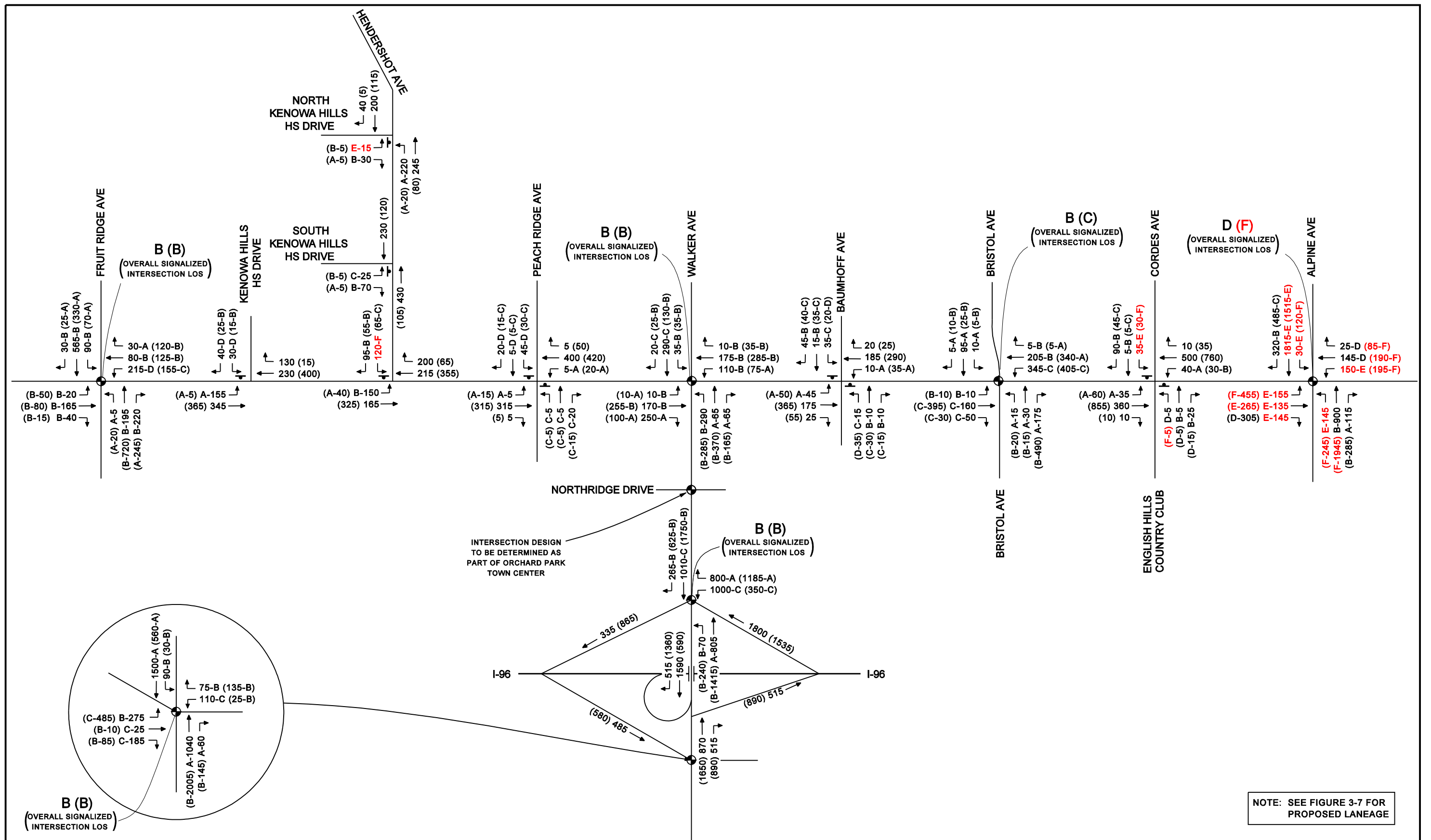


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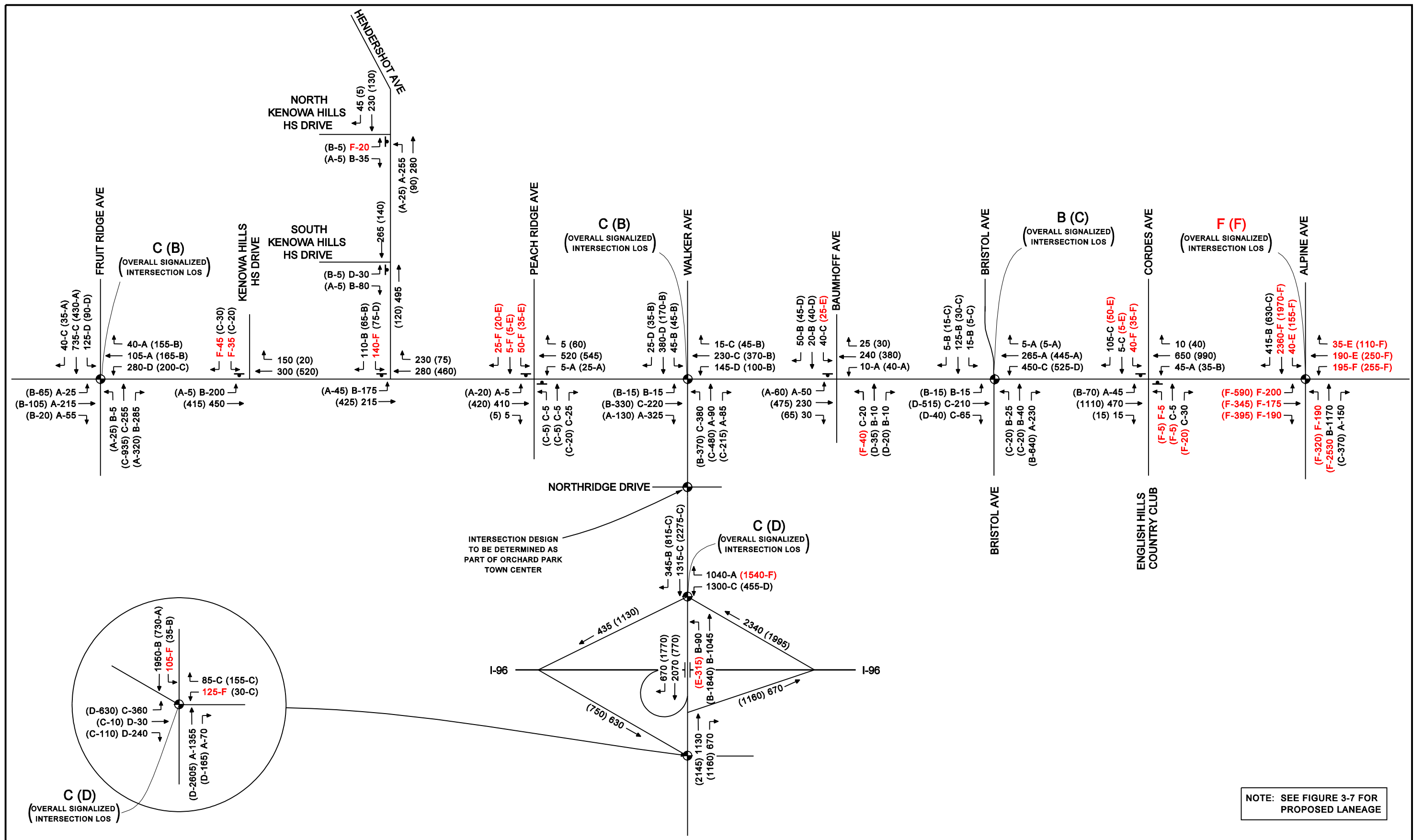
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CITY OF WALKER
FUTURE LAND USE PLAN (1998)

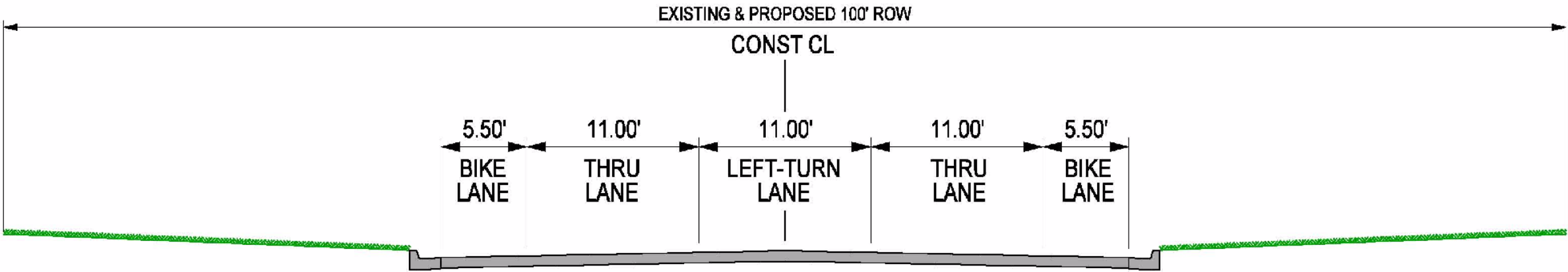
FIGURE
3-2



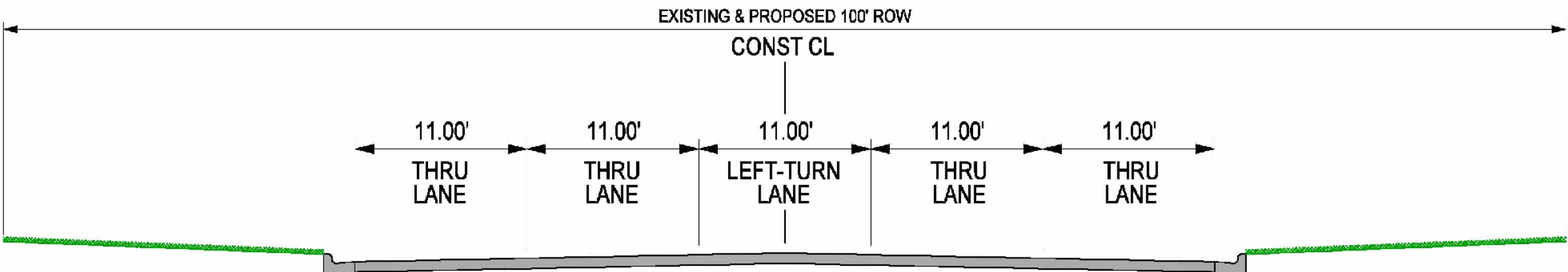
NOTE: SEE FIGURE 3-7 FOR PROPOSED LANEAGE



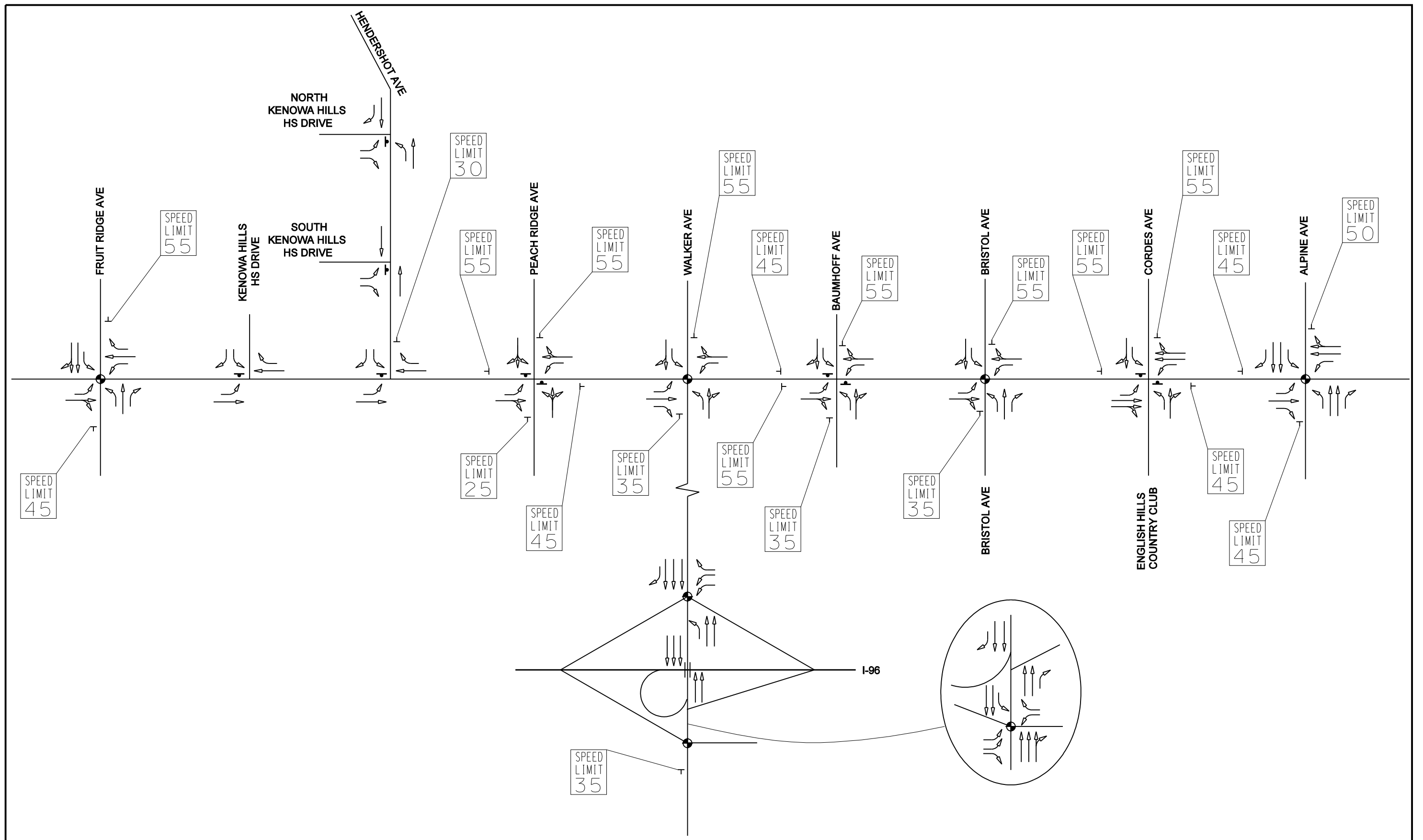
NOTE: SEE FIGURE 3-7 FOR PROPOSED LANEAGE



THREE LANE SECTION



FIVE LANE SECTION



Draft November 2006

Legend

Proposed Road Improvements

Proposed 100' ROW

Existing ROW

Existing Sidewalks

Parcel Lines

Existing Traffic Signals



Draft November 2006

Legend

- Proposed Road Improvements
- Proposed 100' ROW
- Existing ROW
- Existing Sidewalks
- Parcel Lines
- Existing Traffic Signals



0 250 500 Feet



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4 MILE ROAD CORRIDOR STUDY
PROPOSED IMPROVEMENTS

FIGURE
3-9

Draft November 2006



0 250 500 Feet



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4 MILE ROAD CORRIDOR STUDY
PROPOSED IMPROVEMENTS

FIGURE
3-10

Draft November 2006

Legend

Proposed Road Improvements

Proposed 100' ROW

Existing ROW

Existing Sidewalks

Parcel Lines

Existing Traffic Signals

0

250

500

Feet

Prepared by:

4 MILE ROAD CORRIDOR STUDY

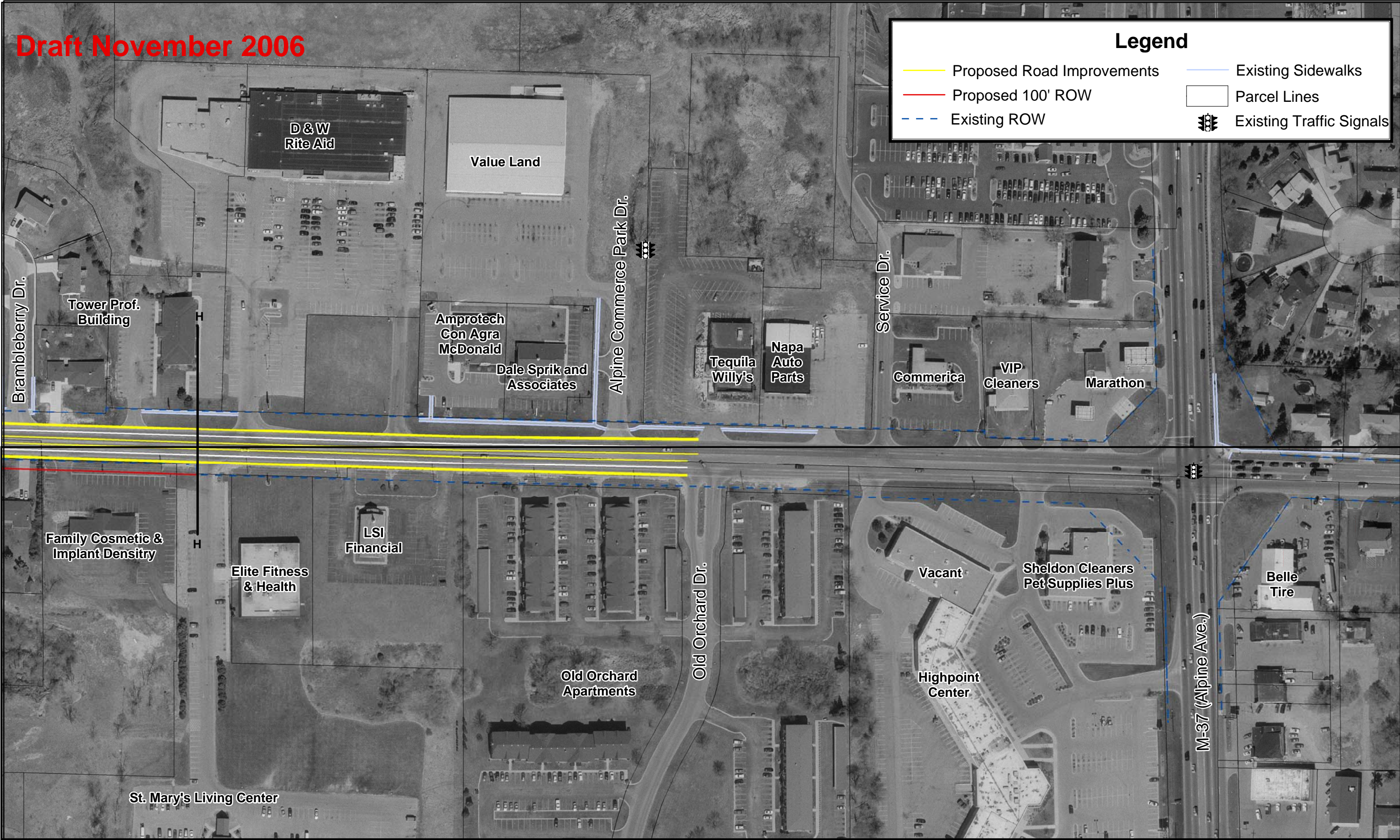
PROPOSED IMPROVEMENTS

FIGURE

3-11

3-16

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0 250 500 Feet



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4 MILE ROAD CORRIDOR STUDY
PROPOSED IMPROVEMENTS

FIGURE
3-12