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Community-based traffic engineering and transportation planning consultants

in association with

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Skyway Corridor Study

BCAG

Butte County Association of Governments

Town of Paradise California

November 19, 2008

Tonight's Agenda

Introduction

Project Overview

- Background
- Activities to Date
- Studies to Date

Review Alternatives

- Themes, Features, and Implications

Review Preferred Alternative

Questions and Comments

Process

Investigated Existing Traffic Conditions

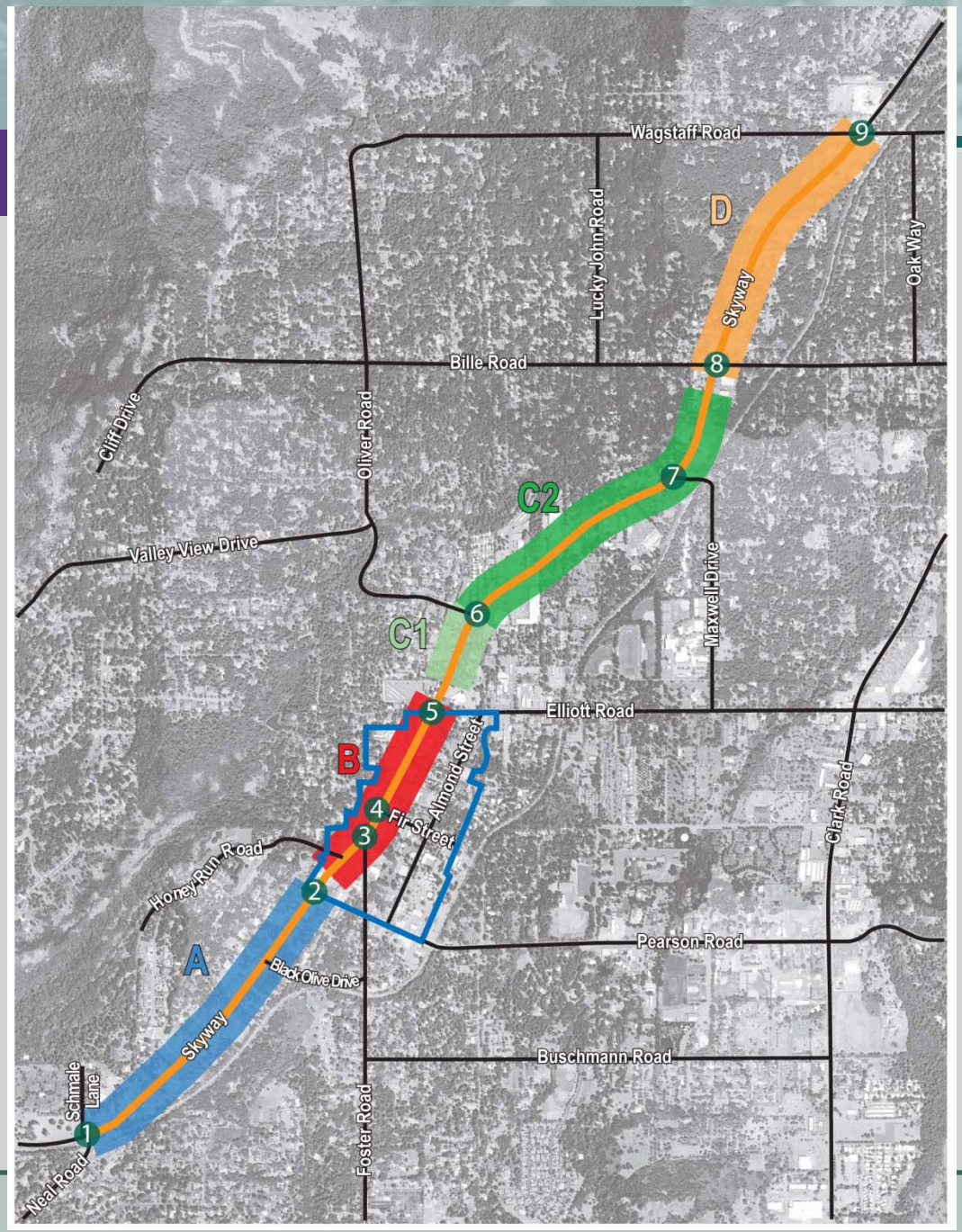
Stakeholder Interviews

Alternative Treatment Options

Public Workshop 9-18-08

Presentation of Preferred Concept

Final Report and Concept Plans



Corridor Study Segments

Study Area

- Skyway
- Neal Road to Wagstaff Road
- Downtown focus
- Intersection operations
- Traffic Safety
- Pedestrian and Bike Facilities
- Parking

Current Issues

- Speed of traffic
- Pedestrian safety
- Need to enhance downtown/attract shoppers
- Conflicts with through traffic
- Need for turn lanes
- Bicycle safety

Daily Traffic Volumes

Existing 2008

12,700 north of Bille Road

17,500 in downtown area

23,500 south of Pearson Road

Year 2035

16-500 - 16,700 north of Bille Road

26,000 – 32,700 in downtown area

41,800-45,300 south of Pearson Road

Existing Conditions

Intersection	AM PEAK		PM PEAK	
	Delay	LOS	Delay	LOS
Neal-Schmale Lane	14.3	B	18.9	B
Pearson Road	16.6	B	**22.7**	**C**
Elliott Road	**20.3**	**C**	**33.7**	**C**
Oliver Street	18.4	B	16.1	B
Maxwell Drive	13.2	B	16.7	B
Bille Road	28.0	C	29.3	C
Wagstaff Road				
All-Way Stop	19.6	C	31.6	D
Signalized	16.9	B	18.7	B

Future Conditions

Intersection	AM PEAK		PM PEAK	
	Delay	LOS	Delay	LOS
Neal-Schmale Lane	21.3	C	22.9	C
Pearson Road	25.3	C	**37.1**	**D**
Elliott Road	**21.9**	**C**	**43.5**	**D**
Oliver Street	18.1	B	16.6	B
Maxwell Drive	13.6	B	14.4	B
Bille Road	32.8	C	30.9	C
Wagstaff Road	19.4	B	20.0	B

Collisions

Intersection	Collisions (1998-2006)	Calculated Rate (c/mve)	State Average (c/mve)	Ratio
1 Black Olive Drive	**29**	**0.39**	**0.14**	**2.79**
2 Foster Road	**16**	**0.23**	**0.14**	**1.64**
3 Fir Street	**15**	**0.23**	**0.18**	**1.64**
4 Honey Run-Birch St.	**21**	**0.35**	**0.22**	**1.59**
5 Bille Road	30	0.45	0.43	1.05
6 Elliott Road	32	0.40	0.43	0.93
7 Oliver Road	18	0.25	0.28	0.89
8 Pearson Road	13	0.16	0.28	0.57
9 Wagstaff Road	9	0.20	0.41	0.49
10 Neal- Schmale Lane	12	0.17	0.43	0.39

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Spring 2008 Travel Time and Delay

Southbound AM Peak

- 19 mph (N of Wagstaff to S of Neal)
- 260 seconds of delay
- 60 % of delay at Wagstaff

Northbound PM Peak

- 26 mph (N of Wagstaff to S of Neal)
- 100 seconds of delay
- 35 % of delay at Wagstaff

Stakeholder Interview Results

- **Increase Pedestrian Safety- very difficult/dangerous to cross Skyway**

- **Slow Traffic Speeds – Skyway is used as a freeway corridor to Chico and Magalia**

- **Sidewalks are too narrow and aren't continuous throughout downtown**

- **Not safe to bike on Skyway**

Stakeholder Interview Results

- Need a distinctive element/character that defines the downtown area

- Need more landscaping

- Parking is an issue, difficult/unsafe to park on the street

- Lack of pedestrian connections to and through downtown

Design Features Considered

- Reducing number of through lanes
- Reducing width of lanes
- Wider sidewalks with added amenities
- Provide new street trees
- On-street bicycle lanes
- Downtown plaza
- Center turn lanes and medians
- Synchronized traffic signals

Segment A - Neal Road to Pearson Road

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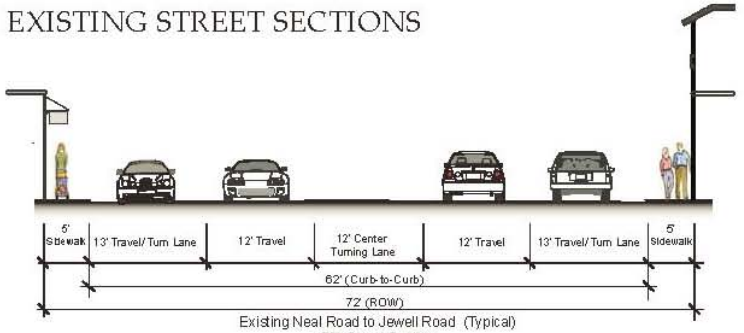
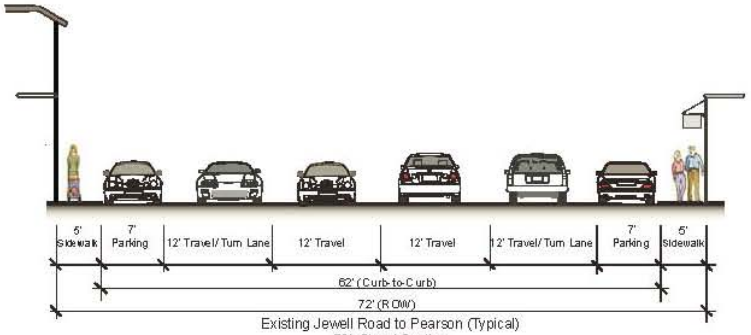
KEY MAP

EXISTING STREET SECTIONS

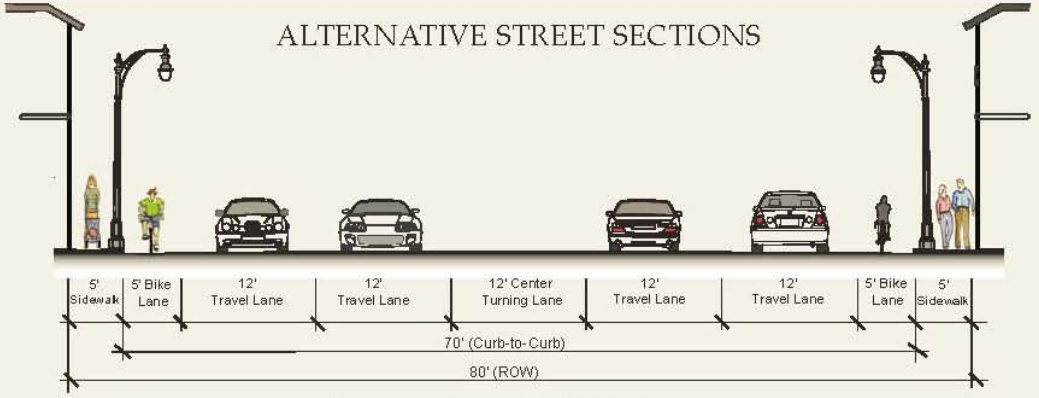


Existing Neal Road to Jewell Road (Typical)
72' Street Section

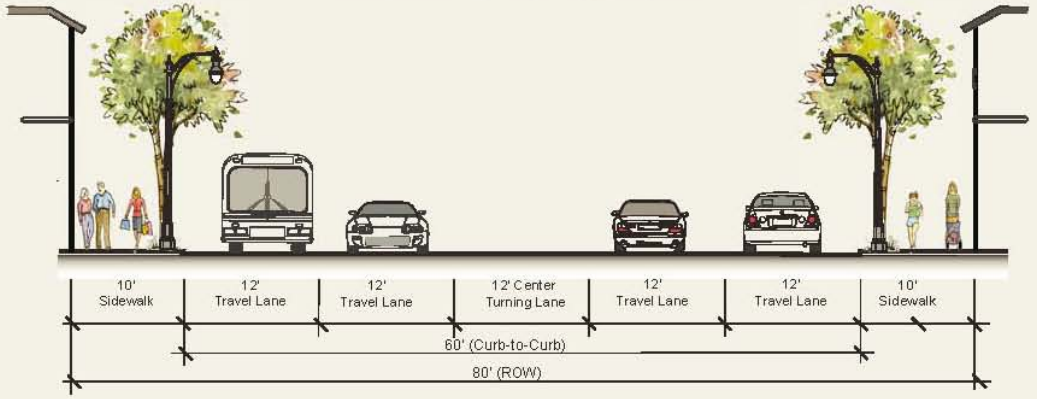


Existing Jewell Road to Pearson (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



Alternative A.1 - 80' Street Section



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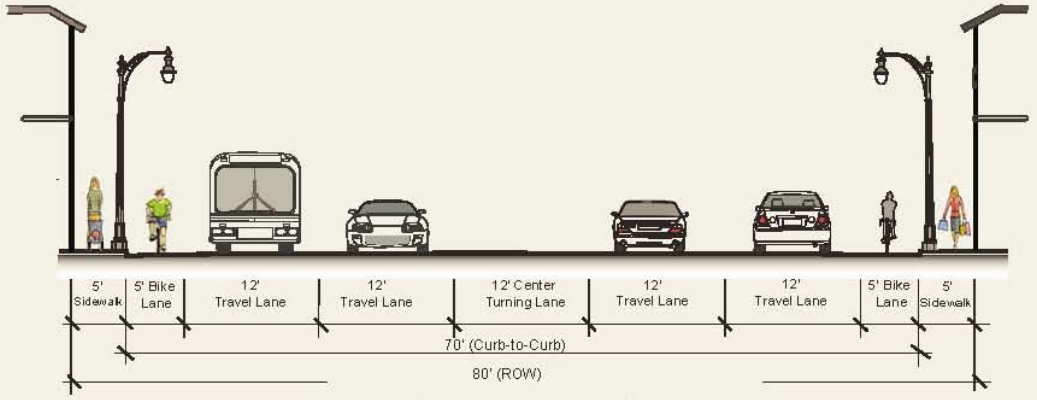
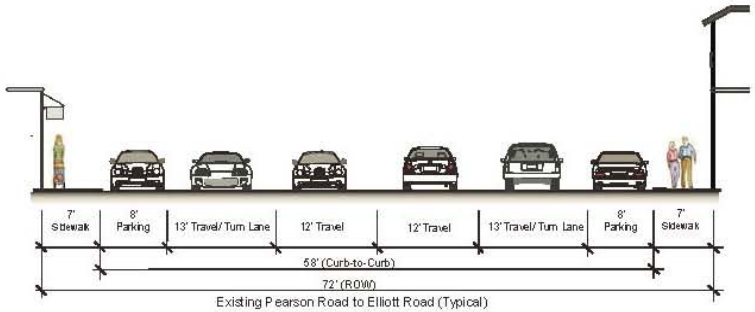


Alternative A.3 - 80' Street Section

Segment B - Pearson Road to Elliott Road

KEY MAP

EXISTING STREET SECTION



Existing Pearson Road to Elliott Road (Typical)
72' Street Section

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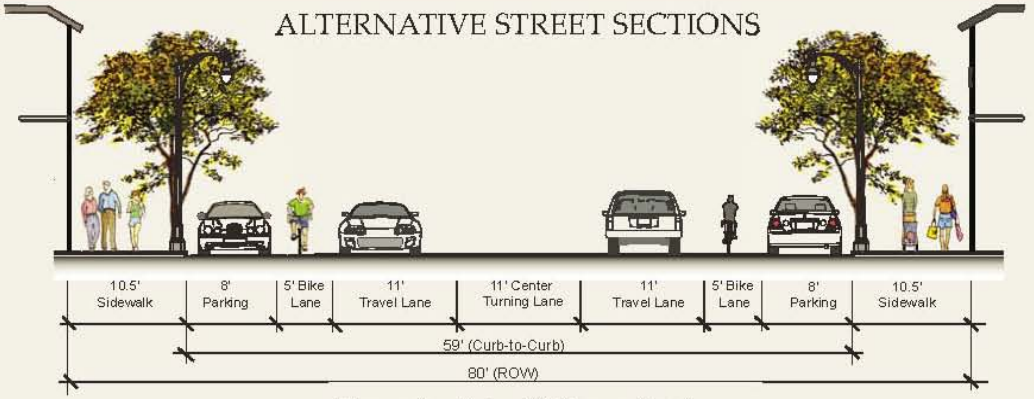

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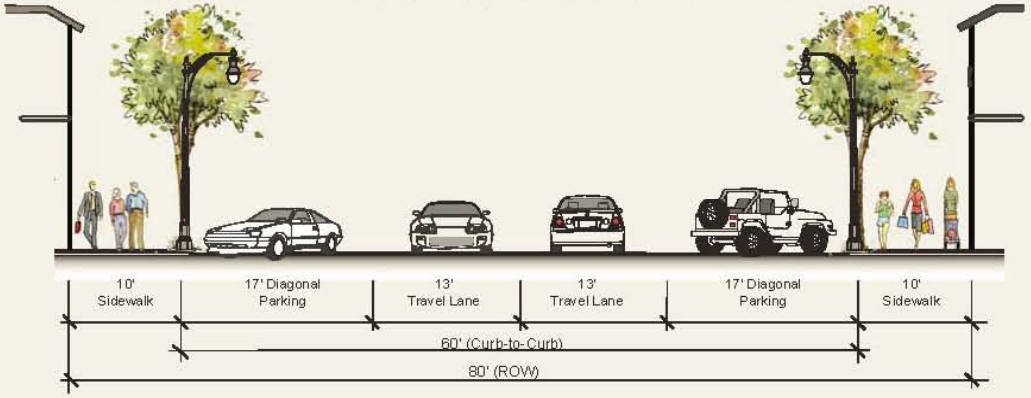

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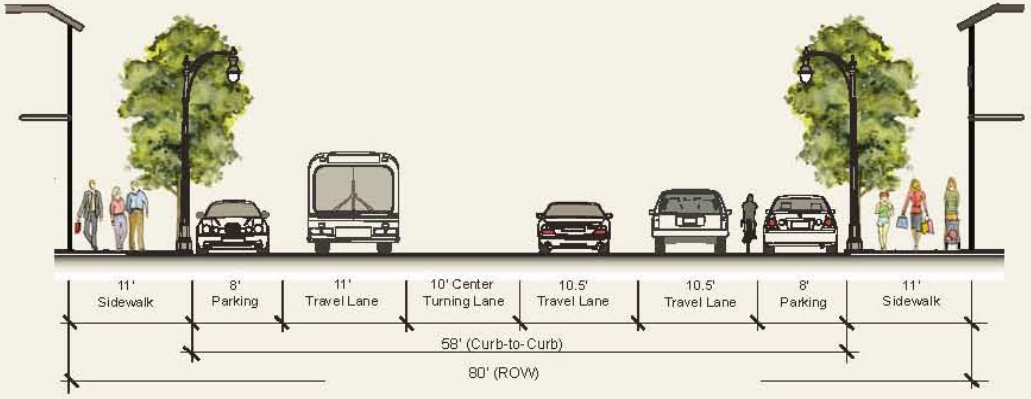

Alternative B.3 - 80' Street Section

Segment C - Elliott Road to Bille Road

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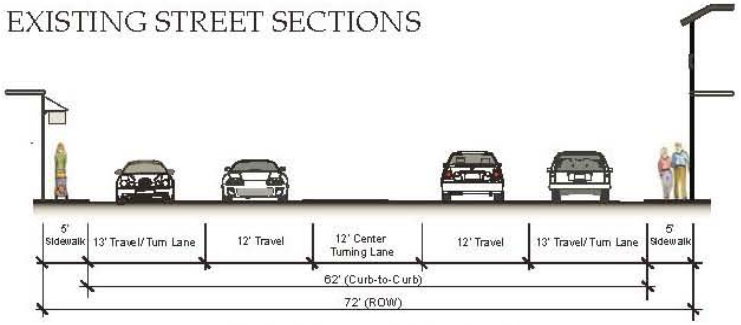
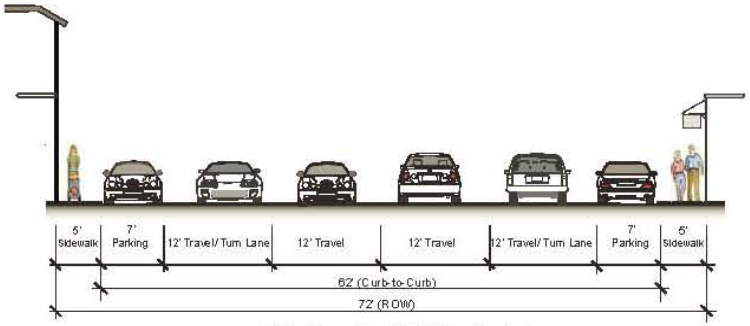
KEY MAP

EXISTING STREET SECTIONS

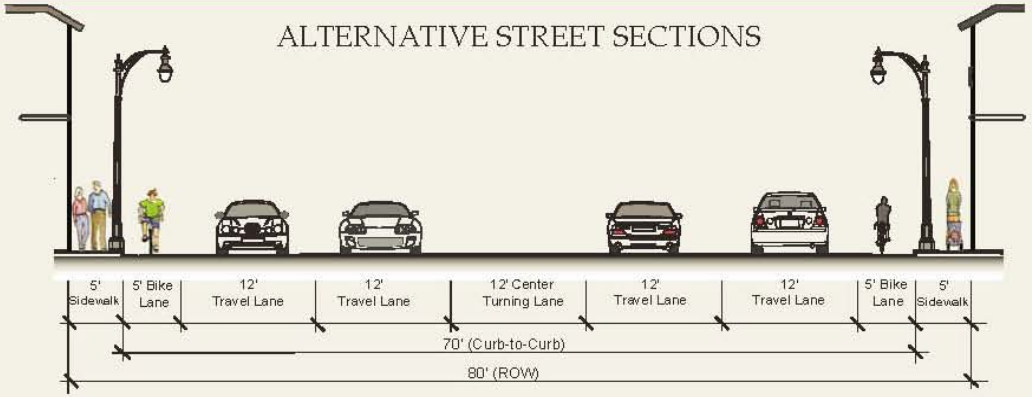


Existing Elliott Road to Maxwell Road (Typical)
72' Street Section



Existing Maxwell Road to Bille Road (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



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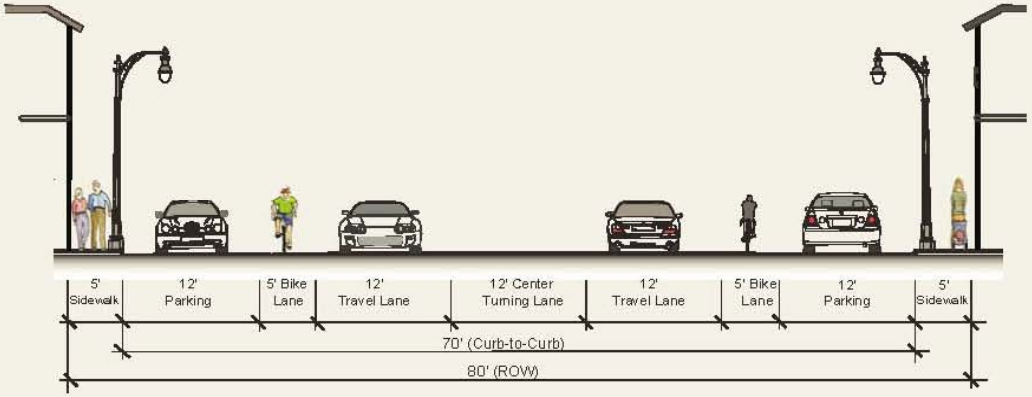

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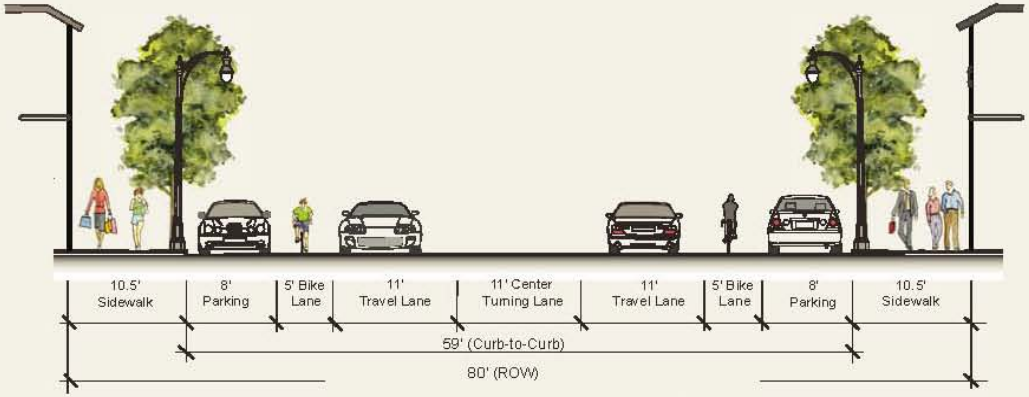
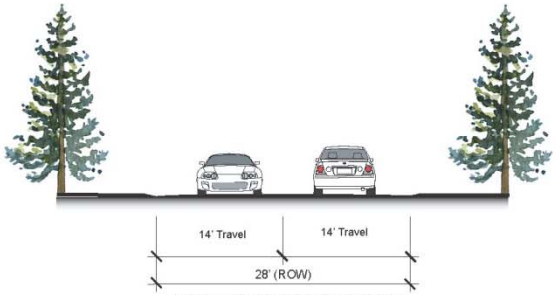


Alternative C.3 - 80' Street Section

Segment D - Bille Road to Wagstaff Road

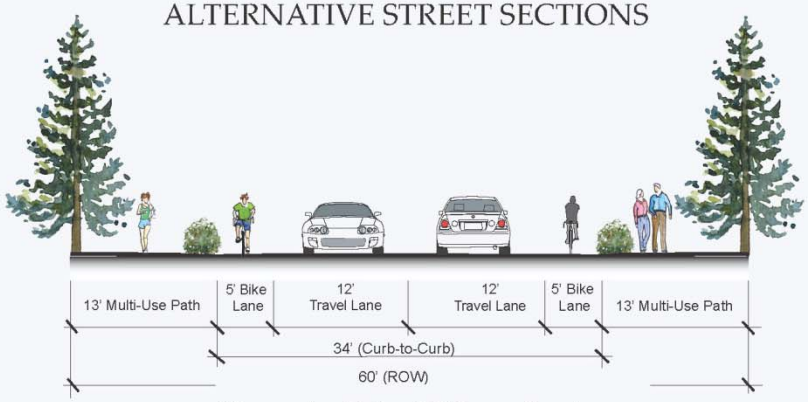
KEY MAP

EXISTING STREET SECTION

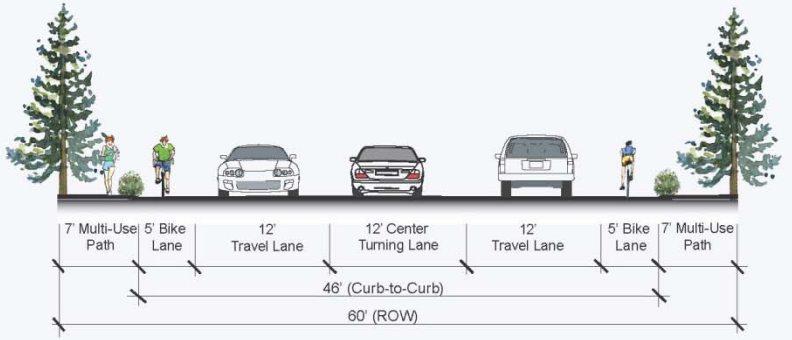


Existing Bille Road to Wagstaff Road
(Varies Significantly)
28' Street Section

ALTERNATIVE STREET SECTIONS



Alternative D.1 - 60' Street Section



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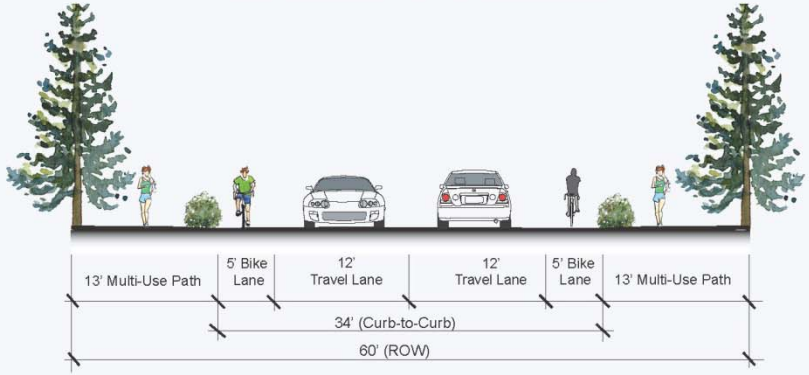


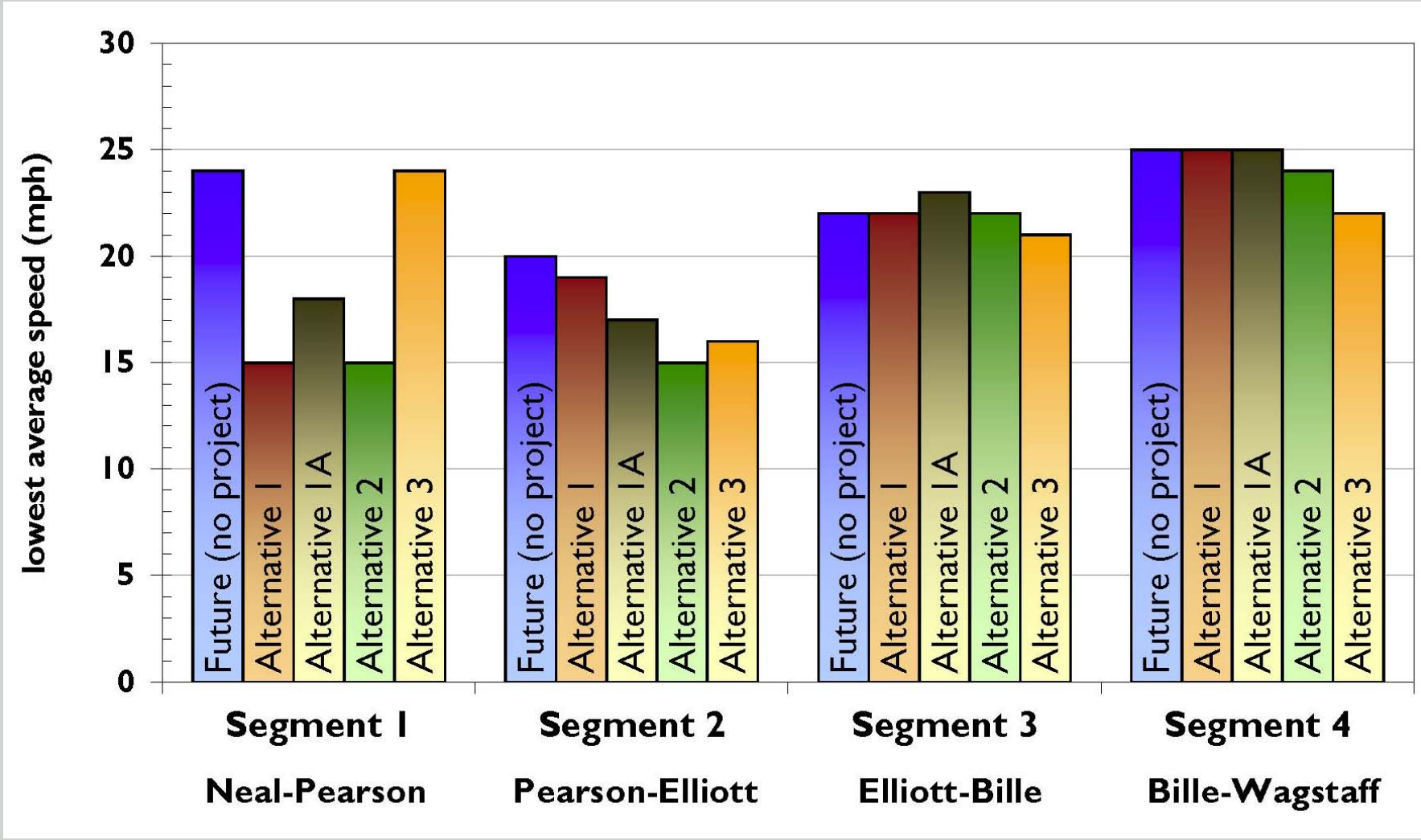
Alternative D.3 - 60' Street Section

Traffic Analysis

Average Vehicle Speeds

	Future (No change)		Future + Alt 1		Future + Alt 1A		Future + Alt 2		Future + Alt 3	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
1 – Neal to Pearson										
AM Peak Hour	27	30	23	30	24	28	24	30	26	30
PM Peak Hour	24	30	**15**	31	18	30	**15**	32	24	31
2 – Pearson to Elliott										
AM Peak Hour	23	24	21	20	19	20	22	18	21	21
PM Peak Hour	20	24	19	23	17	18	17	**15**	17	16
3 – Elliott to Bille										
AM Peak Hour	24	26	24	24	25	24	23	22	23	22
PM Peak Hour	22	24	22	25	23	25	22	24	21	22
4 – Bille to Wagstaff										
AM Peak Hour	28	25	28	25	30	25	31	24	29	22
PM Peak Hour	28	27	28	26	27	26	28	26	28	25

Traffic Analysis



Potential Sources of Delay

Alternatives 1 and 2

Northbound backups at Pearson as lanes narrow from two through lanes to one

Potential Sources of Delay

Alternative 2

Southbound backups at Foster created by left turns from Skyway

Delays caused by diagonal parking maneuvers

Potential Safety Improvements

Intersection	Alt 1	Alt 1A	Alt 2	Alt 3
1 Black Olive Drive	✓	✓ ✓	✓	✓
2 Foster Road	✓	✓		✓
3 Fir Street	✓	✓ ✓		✓
4 Bille Road	Intersection-level treatments may be needed			
5 Elliott Road	Intersection-level treatments may be needed			
6 Honey Run-Birch St	✓	✓		✓

Positive Findings

Downtown

Smooth flow can be maintained with single through lanes and center turn lanes

Neal to Pearson and Elliott to Bille

All alternatives can work; best results include new signals at Fir and Black Olive with coordination of signal system

Bille to Wagstaff

All alternatives can work

Alternatives with center turn lanes

Landscaped medians and pedestrian refuge areas can also be added in select areas

Issues to Consider

Downtown

Single through lanes with diagonal parking (Alternative 2) likely to create notable delays; benefits and constraints should be carefully weighed

Transition Areas

Special consideration needed to maintain traffic flow where two through lanes transition to and from one travel lane

Alternative Routes

Consider benefits and constraints of "bypass" traffic on Almond Street

Gateway Plaza at Foster Road

Potential Benefits

Strengthen downtown identity

Gateway / traffic calming element

Create gathering space

Establish location for special events

Options

Three plaza sizes and three access options (mix and match)

No change is also an option

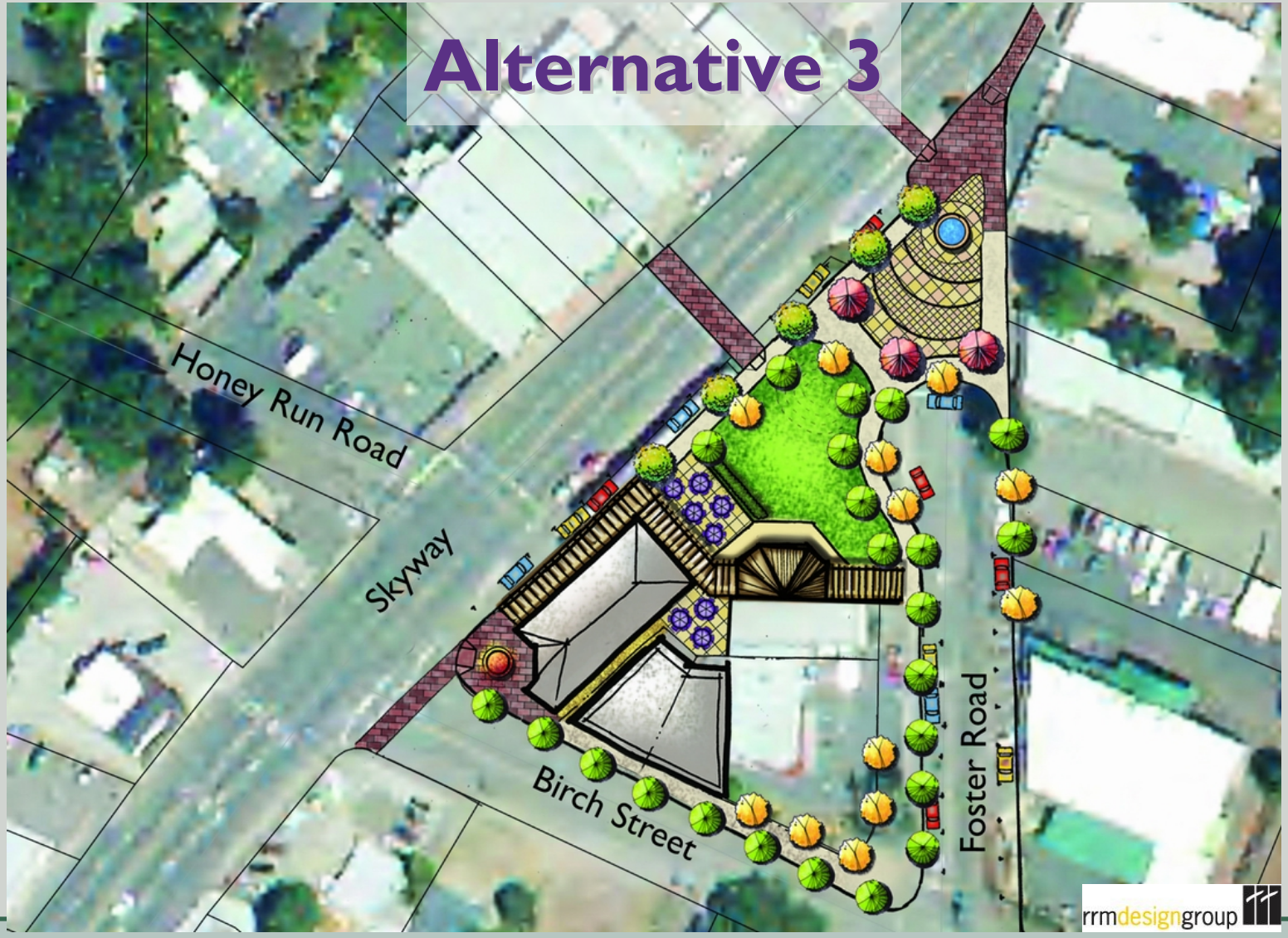
Reconfiguration of Foster Road

Foster Road could remain full access, become right turns out only, or become a cul-de-sac

Downtown Gateway Plaza

Downtown Gateway Plaza

Downtown Gateway Plaza



Segment A - Neal Road to Pearson Road

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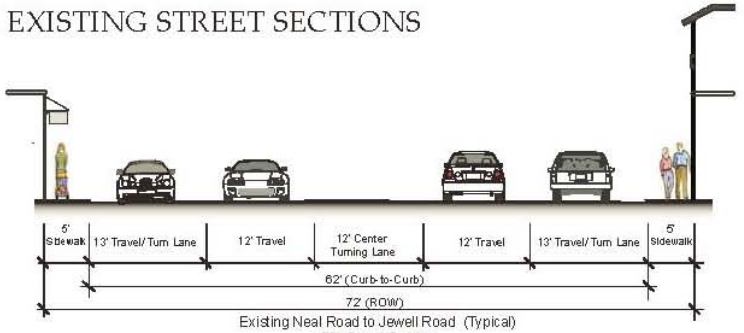
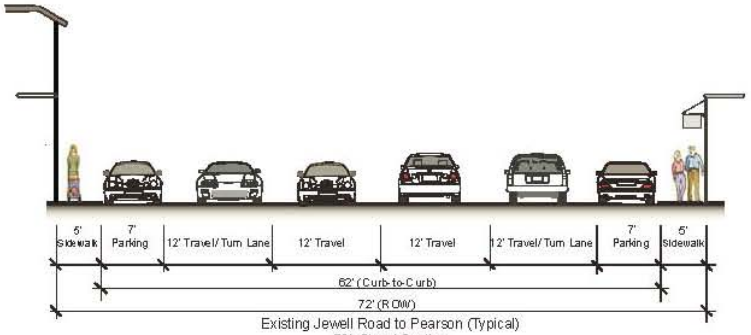
KEY MAP

EXISTING STREET SECTIONS



Existing Neal Road to Jewell Road (Typical)
72' Street Section



Existing Jewell Road to Pearson (Typical)
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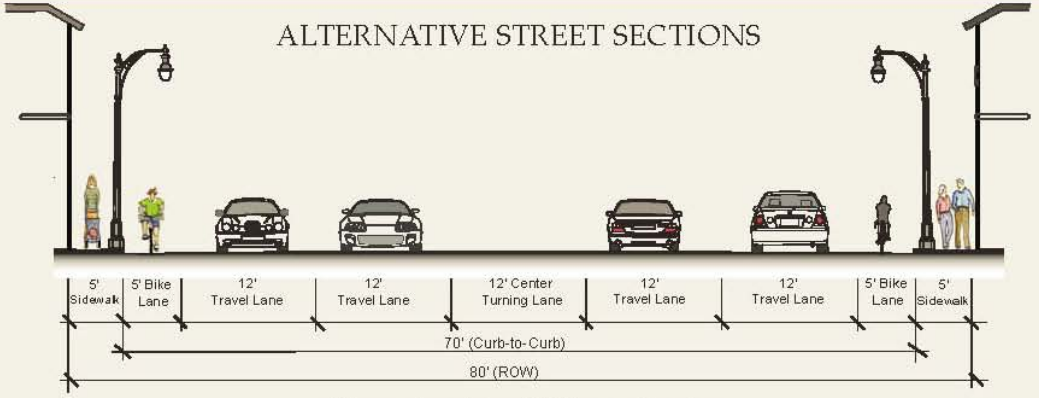
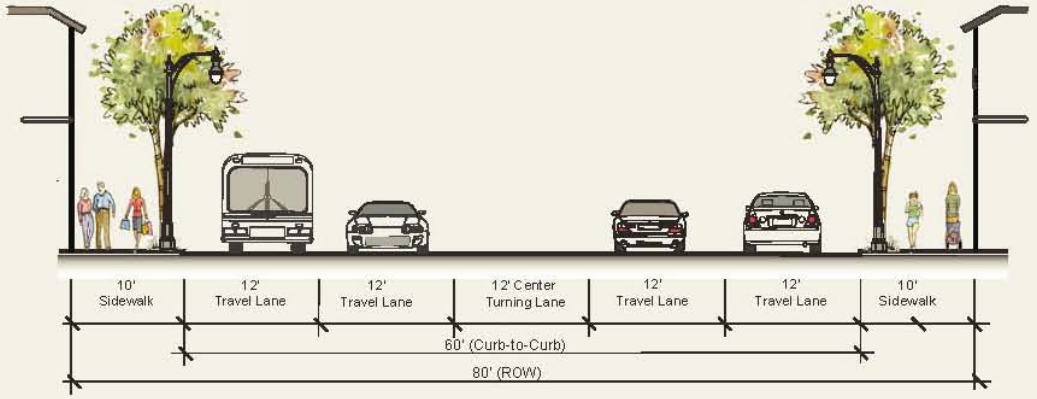
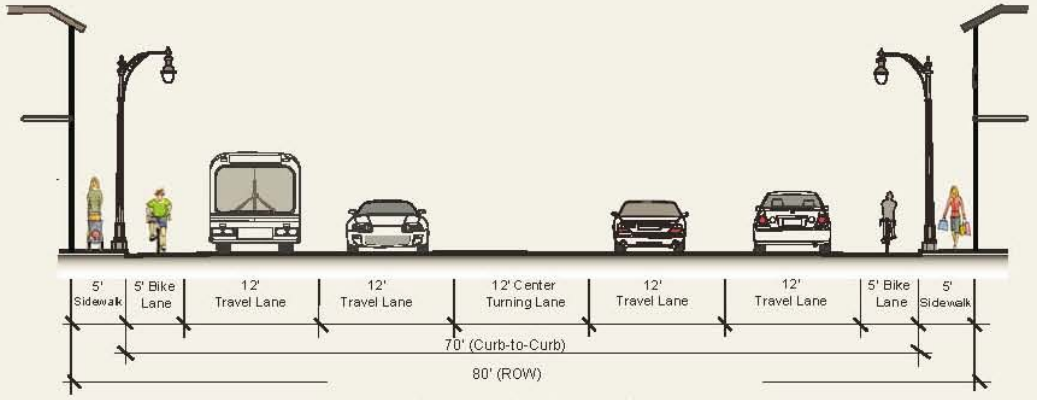
ALTERNATIVE STREET SECTIONS



Alternative A.1 - 80' Street Section



Alternative A.2 - 80' Street Section



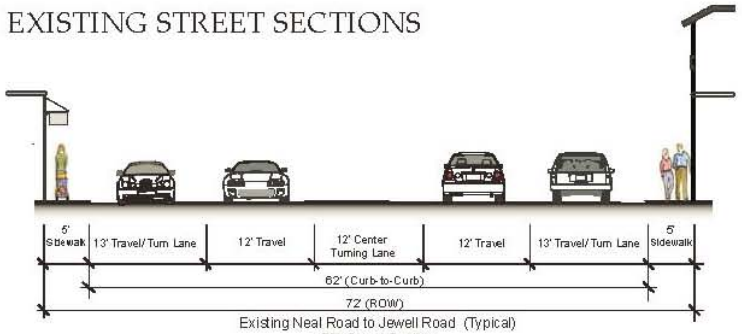
Alternative A.3 - 80' Street Section

Segment A - Neal Road to Pearson Road

KEY MAP

63%

EXISTING STREET SECTIONS



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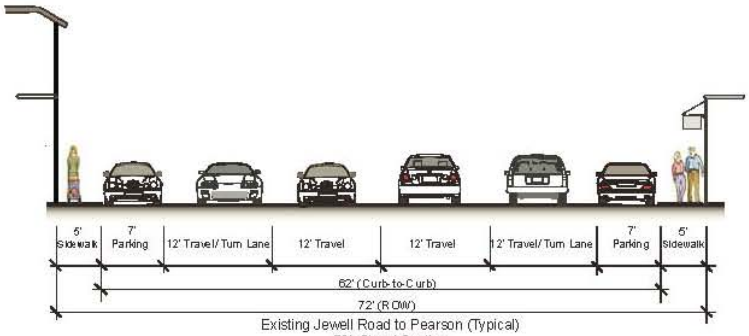
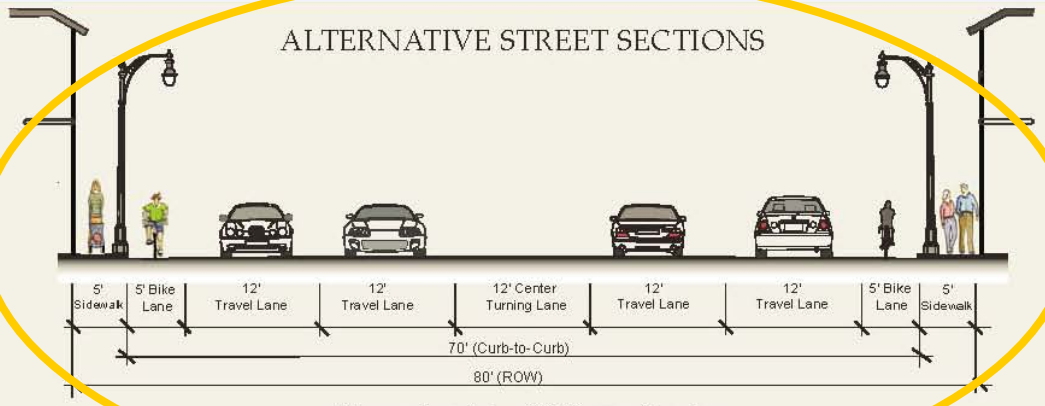


Existing Jewell Road to Pearson (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



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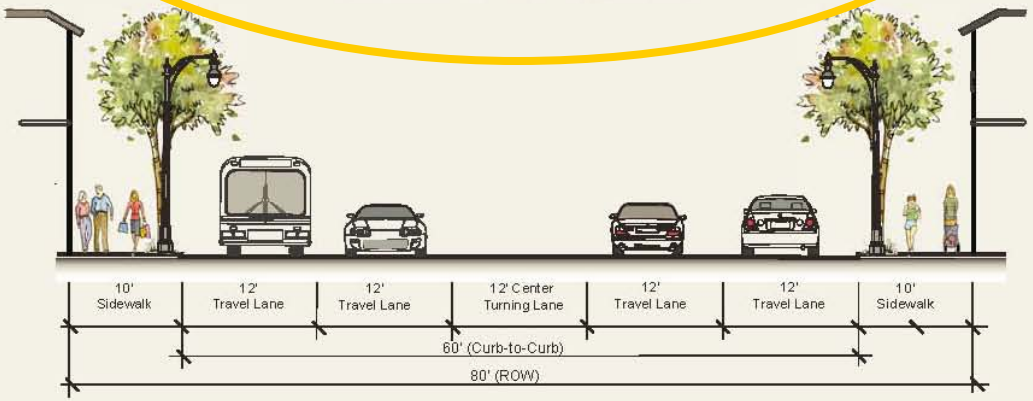

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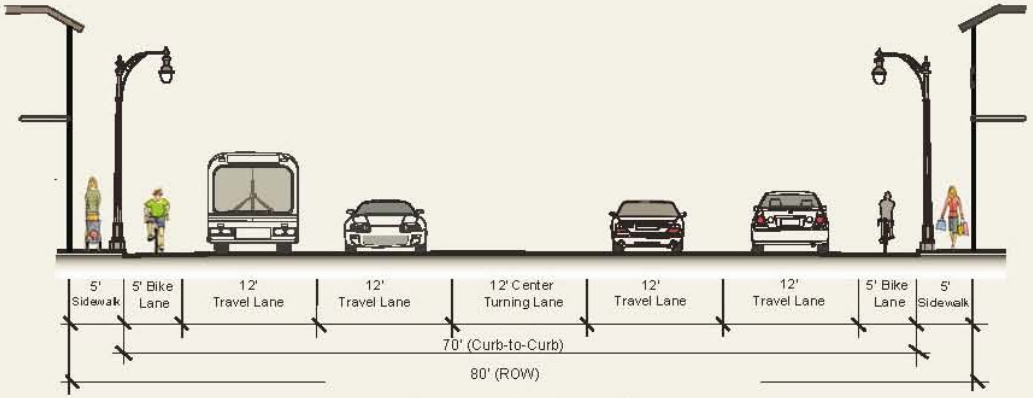
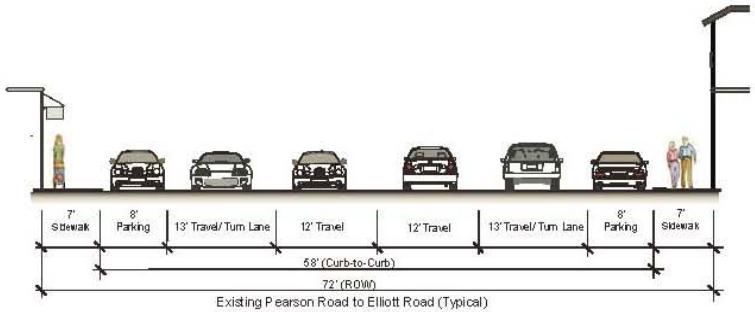


Alternative A.3 - 80' Street Section

Segment B - Pearson Road to Elliott Road

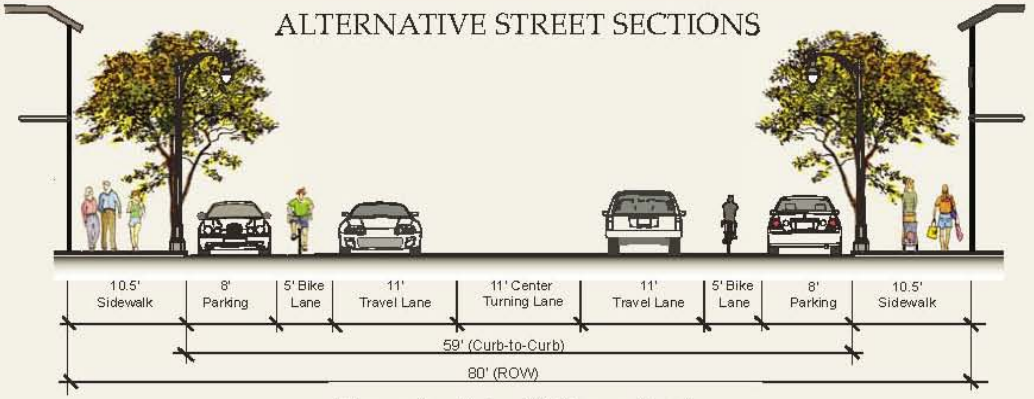
KEY MAP

EXISTING STREET SECTION



Existing Pearson Road to Elliott Road (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



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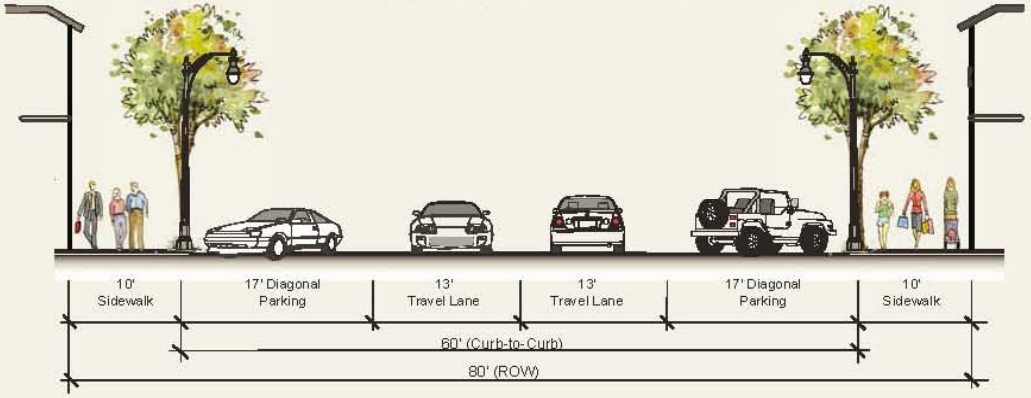
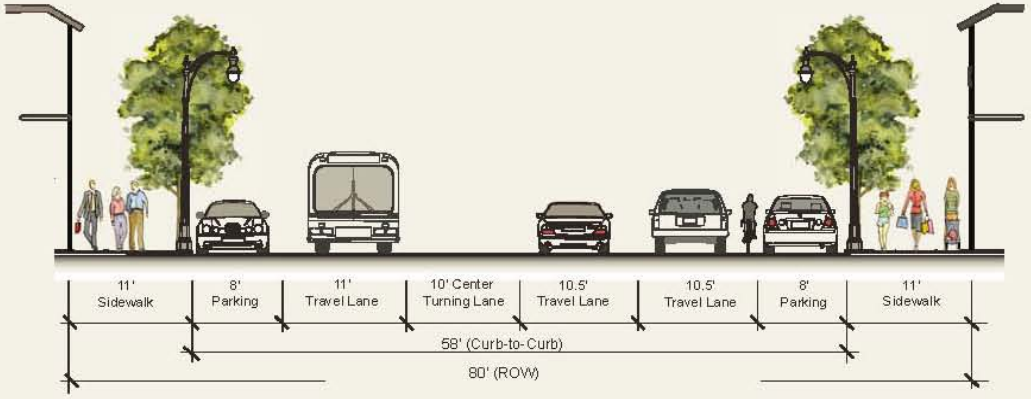


Alternative B.2 - 80' Street Section



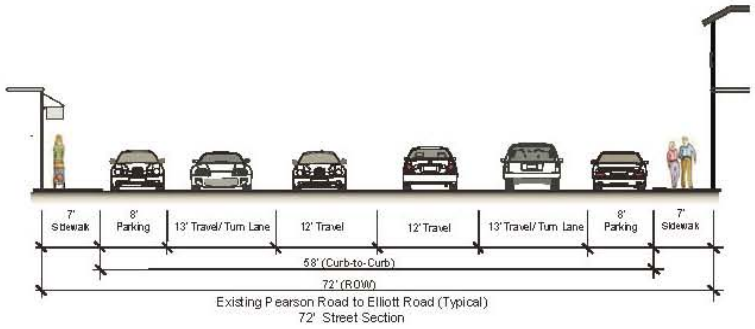
Alternative B.3 - 80' Street Section

Segment B - Pearson Road to Elliott Road

KEY MAP

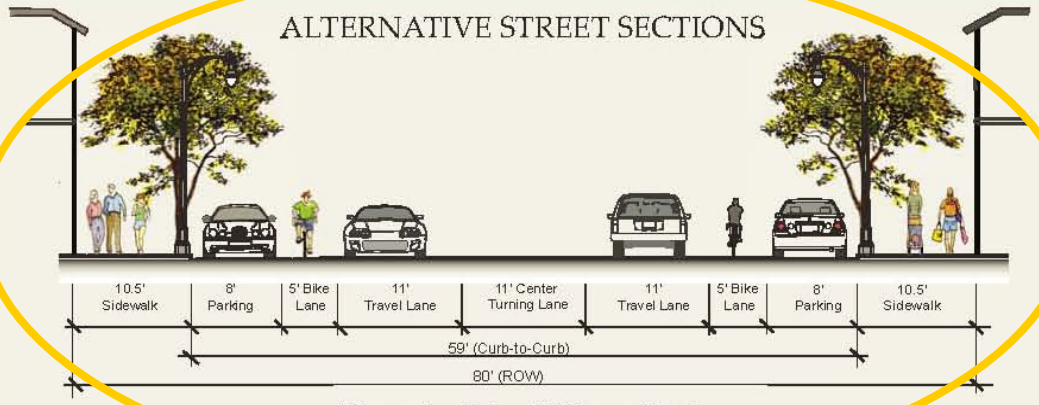
62%

EXISTING STREET SECTION



Existing Pearson Road to Elliott Road (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



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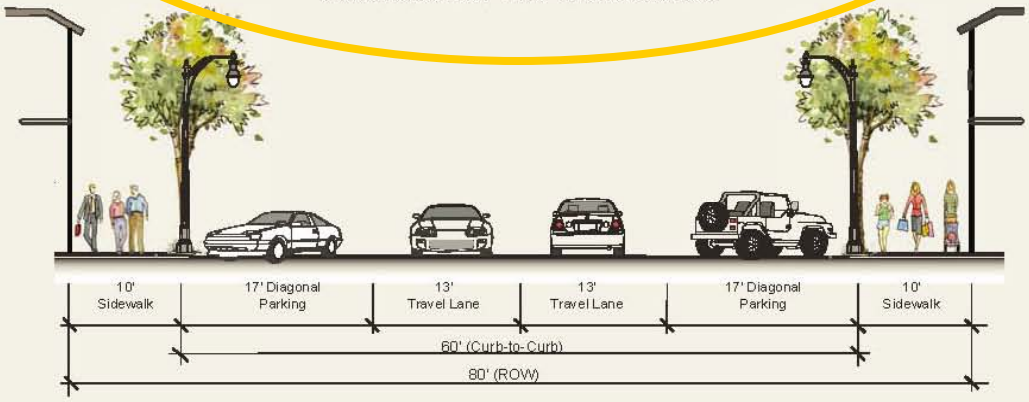
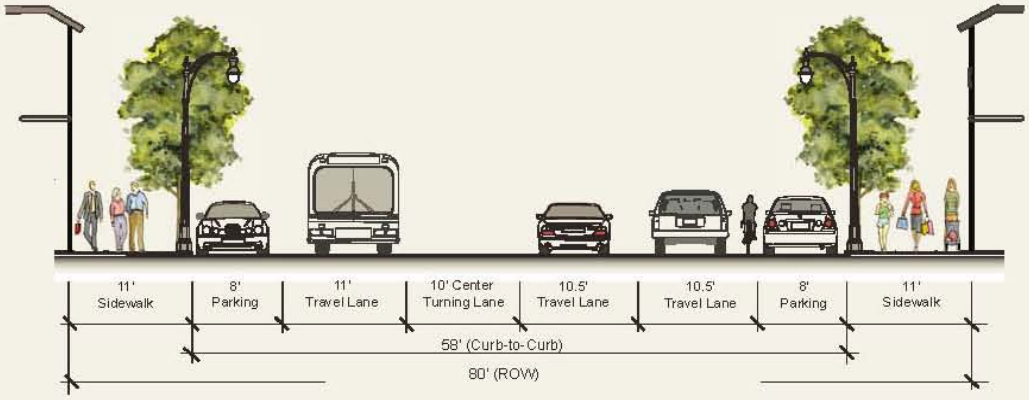


Alternative B.2 - 80' Street Section



Alternative B.3 - 80' Street Section

Segment C - Elliott Road to Bille Road

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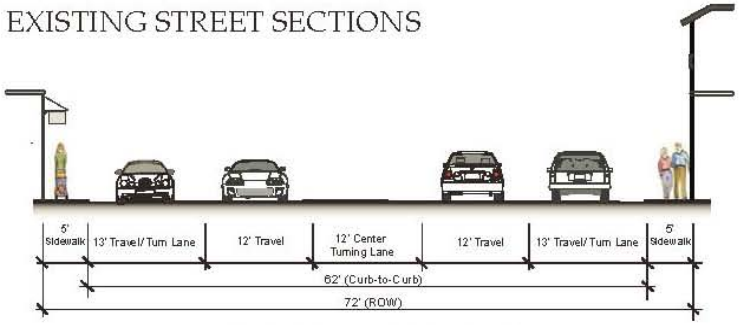
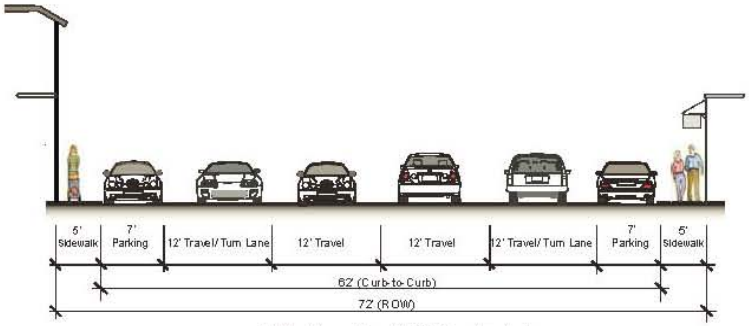
KEY MAP

EXISTING STREET SECTIONS

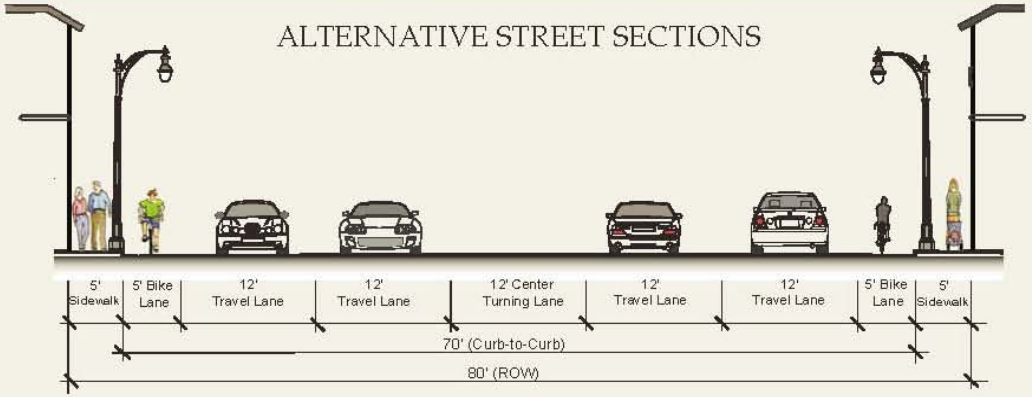


Existing Elliott Road to Maxwell Road (Typical)
72' Street Section

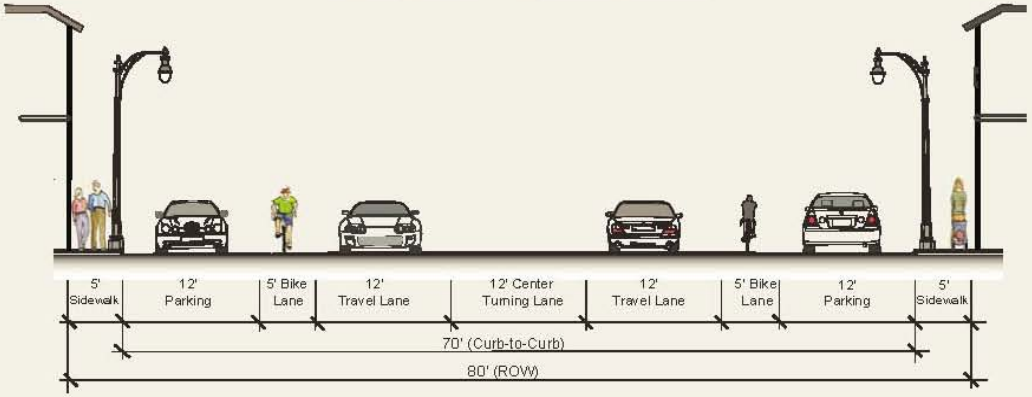


Existing Maxwell Road to Bille Road (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



Alternative C.1 - 80' Street Section



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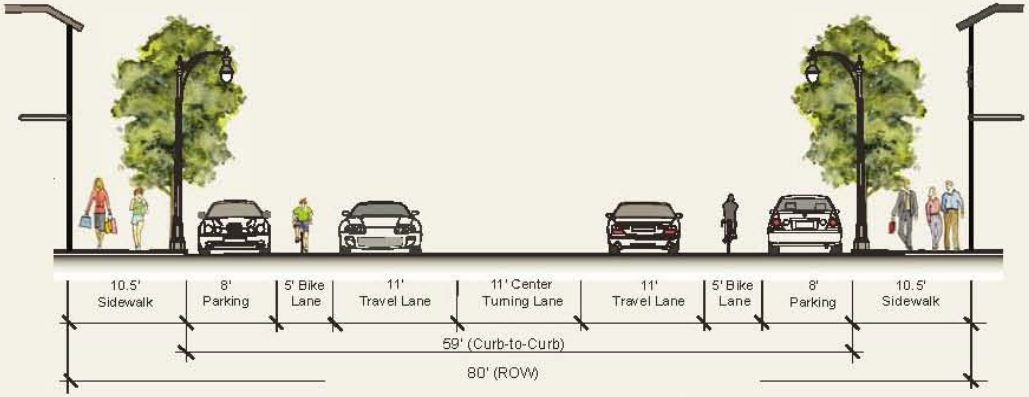

Alternative C.3 - 80' Street Section

Segment C - Elliott Road to Bille Road

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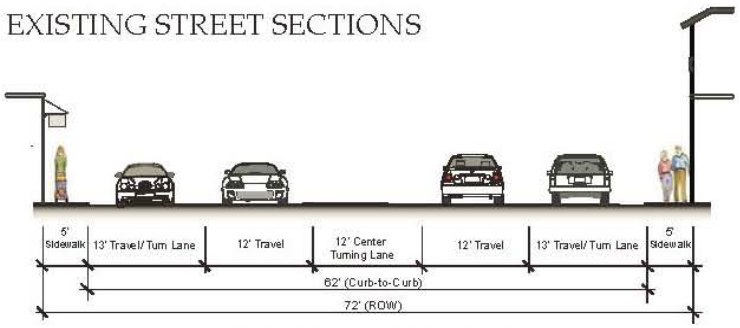
KEY MAP

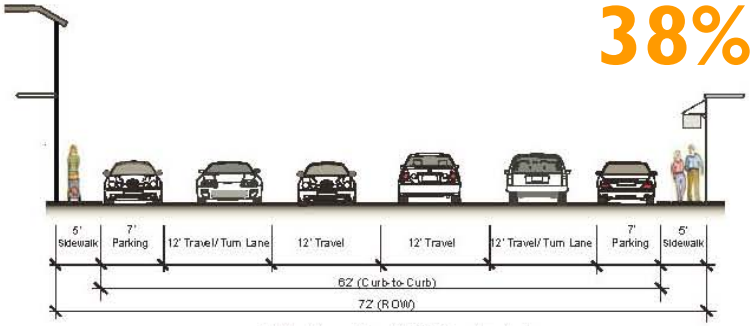
38%

EXISTING STREET SECTIONS



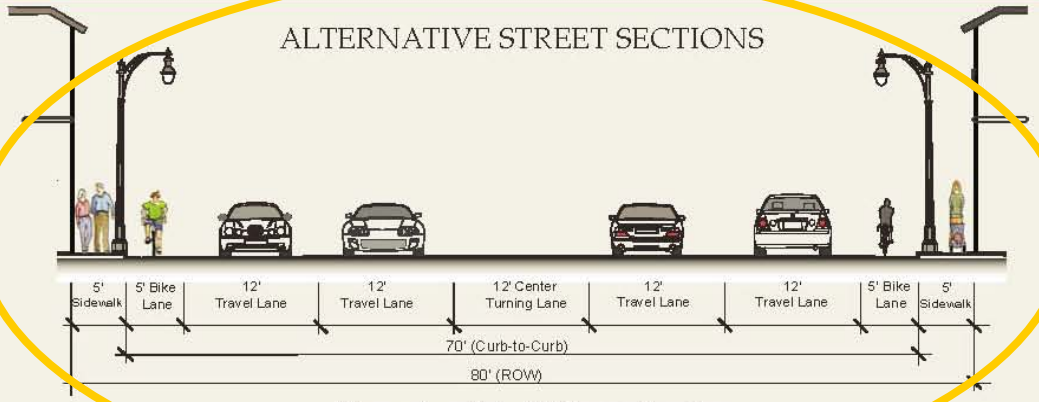
Existing Elliott Road to Maxwell Road (Typical)
72' Street Section

38%

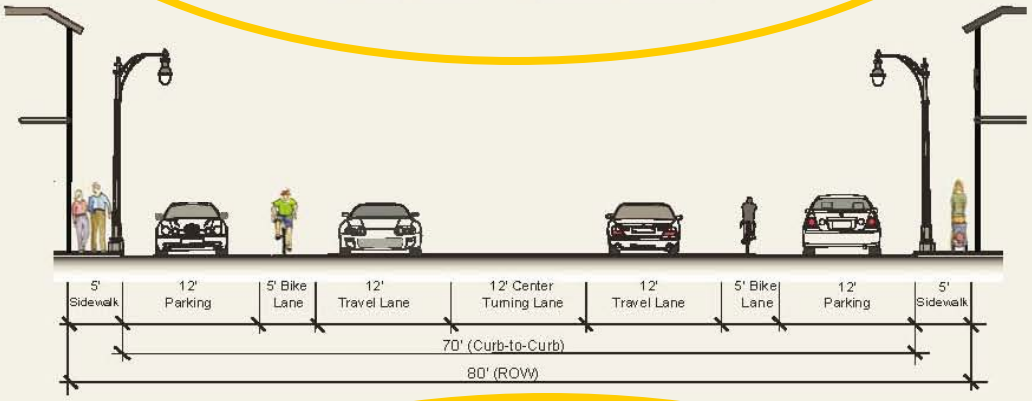


Existing Maxwell Road to Bille Road (Typical)
72' Street Section

ALTERNATIVE STREET SECTIONS



Alternative C.1 - 80' Street Section



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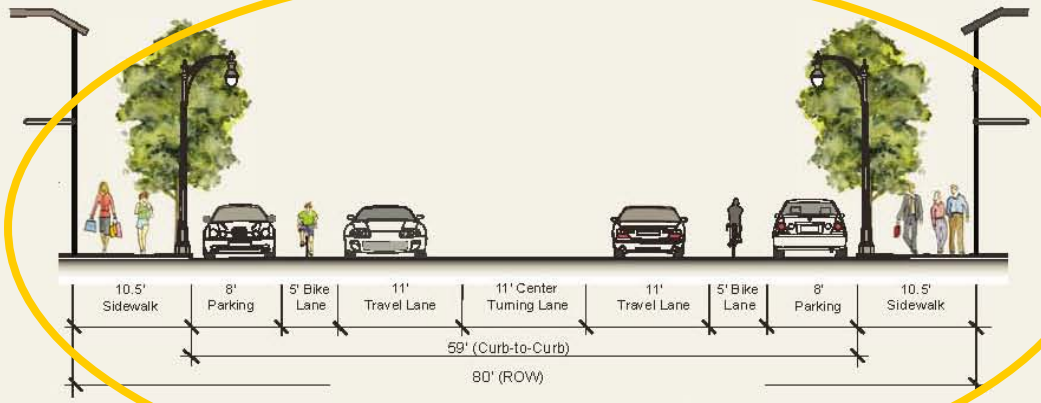
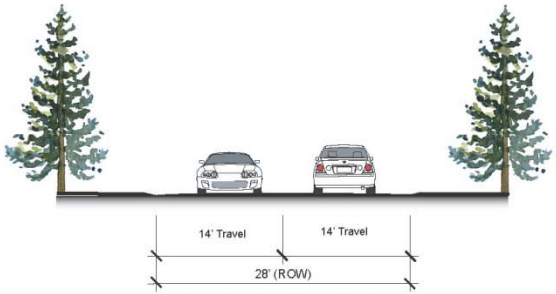


Alternative C.3 - 80' Street Section

Segment D - Bille Road to Wagstaff Road

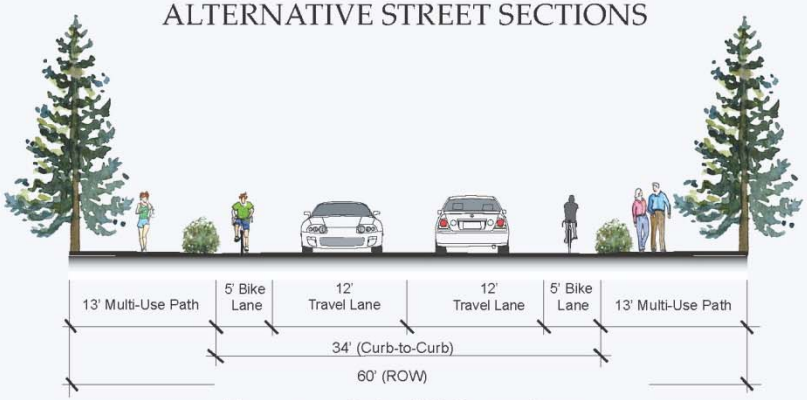
KEY MAP

EXISTING STREET SECTION

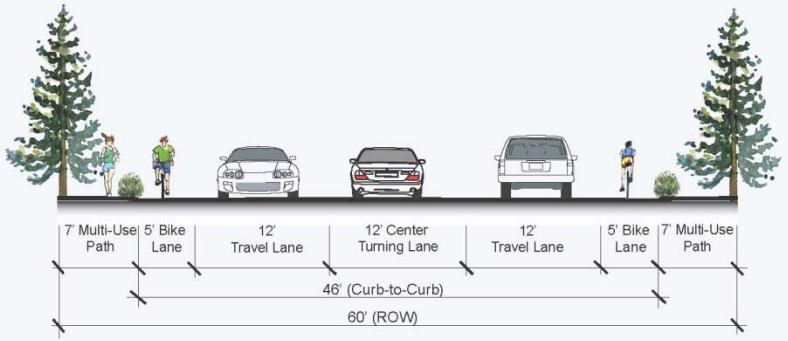


Existing Bille Road to Wagstaff Road
(Varies Significantly)
28' Street Section

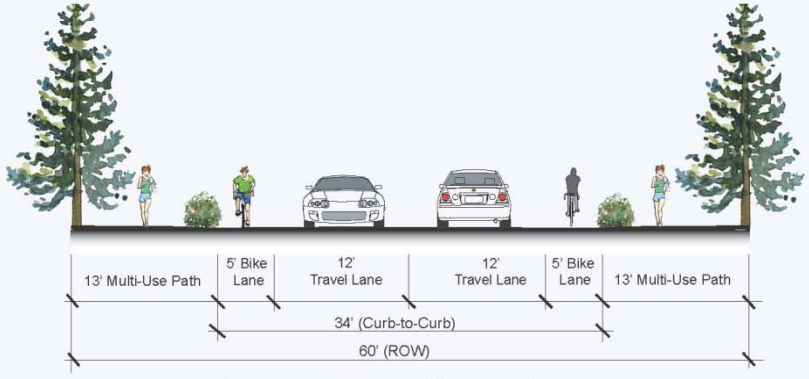
ALTERNATIVE STREET SECTIONS



Alternative D.1 - 60' Street Section



Alternative D.2 - 60' Street Section



Segment D - Bille Road to Wagstaff Road

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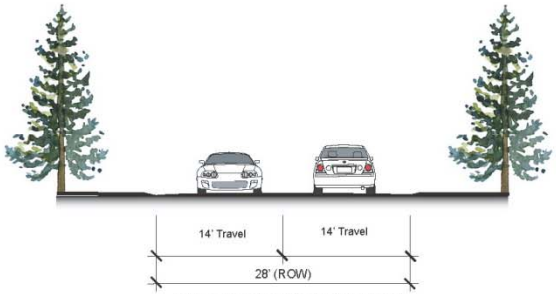
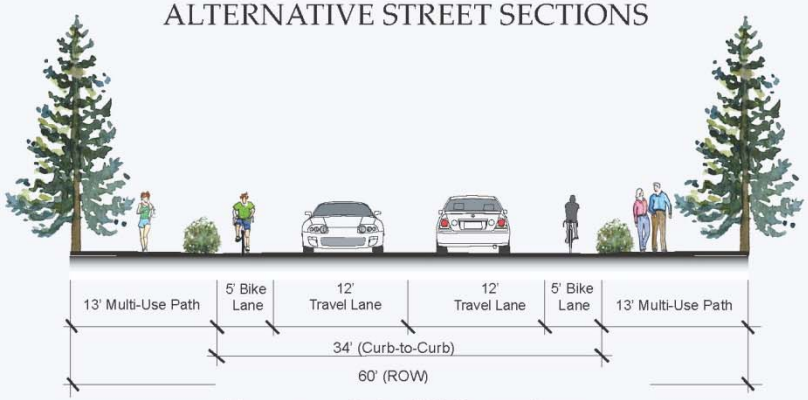
KEY MAP

EXISTING STREET SECTION



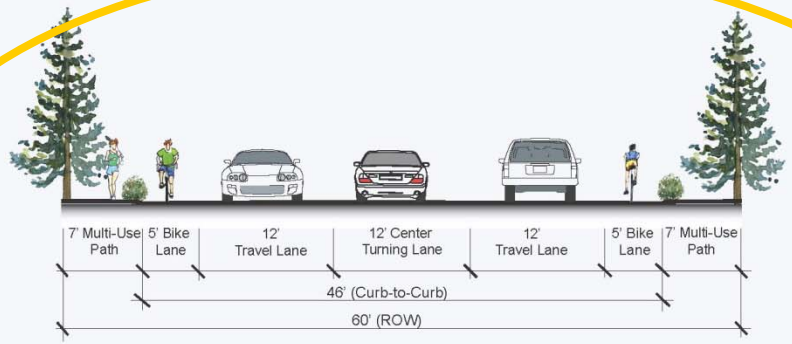
Existing Bille Road to Wagstaff Road
(Varies Significantly)
28' Street Section

ALTERNATIVE STREET SECTIONS

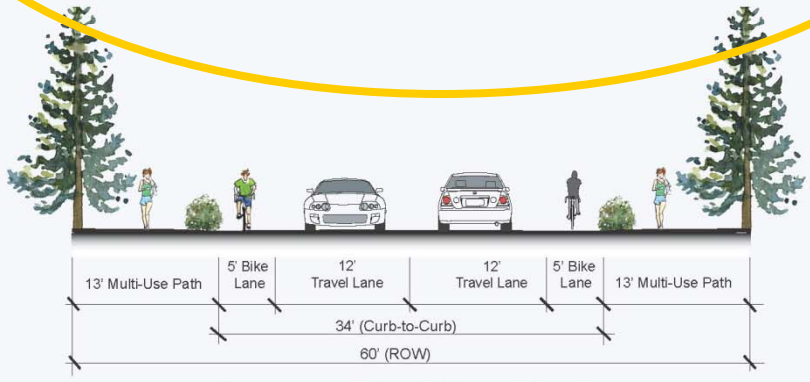


Alternative D.1 - 60' Street Section

73%



Alternative D.2 - 60' Street Section



Summary of Input

Skyway Corridor Features	Support	Moderate Support	No Support
One lane in each direction with a center median	67%	29%	5%
On-street parallel parking	62%	33%	5%
On-street diagonal parking in downtown core	37%	11%	53%
Bike lanes	52%	19%	29%
Safety enhanced pedestrian crossings	**92%**	8%	0%
Wide sidewalks	64%	36%	0%
Sidewalk furniture (benches, etc.)	67%	33%	0%
Sidewalk lighting	**88%**	13%	0%
Large canopied trees	**86%**	9%	5%

Summary of Input

A majority of participants highly support a **center turning lane** throughout the corridor, with some support for one lane travel in each direction.

A **gateway plaza** is highly supported for the entry to the Downtown, and there is support for using the entire triangular block of parcels at the intersection of Birch Street, Foster Road, and Skyway.

Due to split public opinion, the segment of **Elliott Road to Bille Road** needs to be studied more to verify if one lane in each direction will be efficient for traffic flow.

There was overwhelming support for the **pedestrian safe features** of: safety enhanced pedestrian crossings, sidewalk lighting, and large canopied trees.

All of the preferred street sections include a 5' **bike lane**.

Segment A

Segment A - Neal Road to Pearson Road

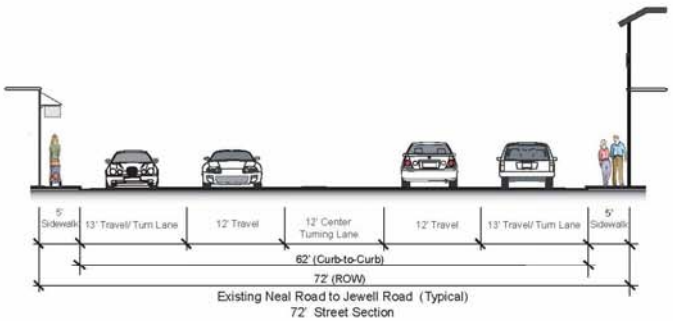
Segment A (Neal-Schmale Lane to Pearson Road)

Preferred Alternative: A1

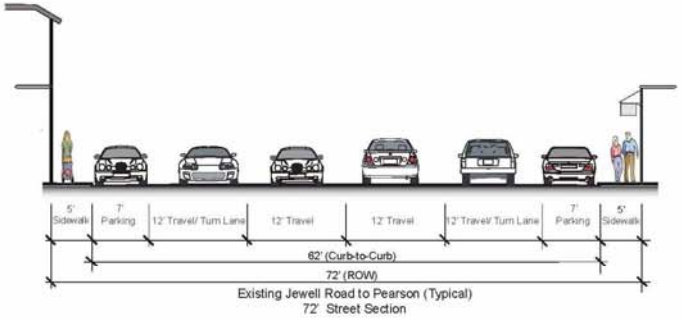
- Maintains 5-foot sidewalks
- Adds 5-foot bike lanes
- Narrows the five travel lanes from 14-feet to 12-feet
- Eliminates existing on-street parking

Key Map

EXISTING STREET SECTIONS

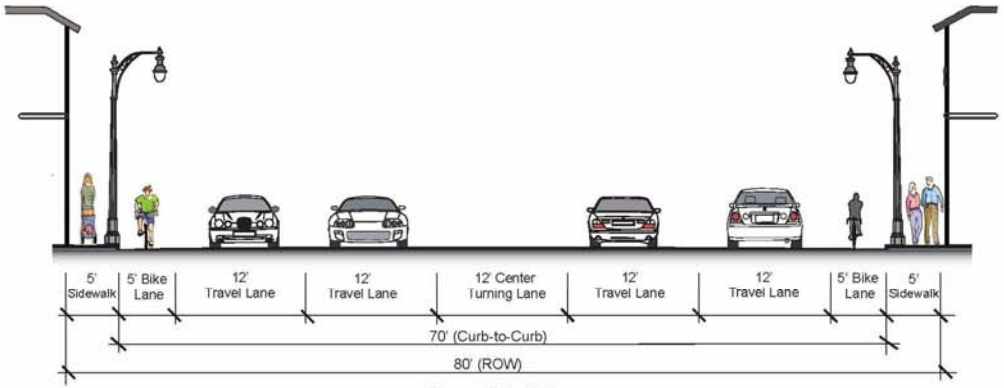


Existing Neal Road to Jewell Road (Typical)
72' Street Section



Existing Jewell Road to Pearson (Typical)
72' Street Section

PREFFERED STREET SECTION



Segment A- Alt A
80' Street Section

Segment A

Neal-Schmale Lane to Pearson Road

maintains 5-foot sidewalks
adds 5-foot bike lanes
narrows the five travel lanes to 12-feet
eliminates existing on-street parking

Segment B

Segment B - Pearson Road to Elliott Road

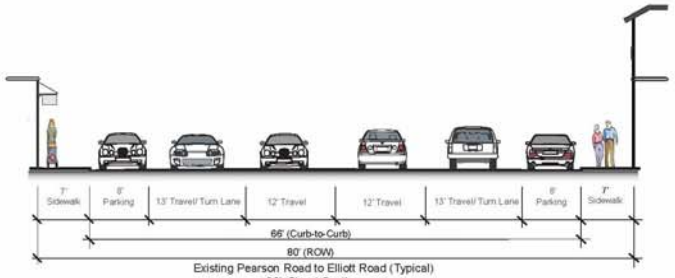
Segment B (Pearson Road to Elliott Road in downtown)

Preferred Alternative: B1a

- Widens the sidewalks from 5-feet to 10.5-Feet
- Maintains 8-foot on-street parallel parking
- Adds 5-foot bike lanes
- Reduces lanes from four 13-14-foot lanes to two 11-foot through lanes
- Adds an 11-foot, center two-way left-turn lane
- Adds traffic signal at the black olive drive intersection
- Adds traffic signal at the fir street intersection
- Implements coordinated signal timing between oliver road and black olive drive
- Restricts foster road to right-turn movements out only
- Plans for additional parking and a small public gathering space on the triangular parcel adjacent to the skyway/foster road intersection
- Use of decorative pavement in the center lane area through downtown
- Accommodates two southbound lanes in times of emergency evacuation

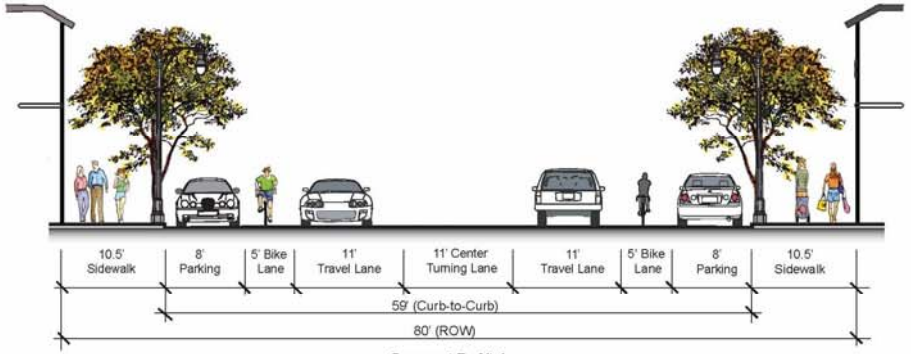
Key Map

EXISTING STREET SECTION



Existing Pearson Road to Elliott Road (Typical)
80' Street Section

PREFFERED STREET SECTION



Segment B- Alt 1
80' Street Section

Segment B

Pearson Road to Elliott Road in downtown

widens the sidewalks from 5-feet to 10.5-feet
maintains 8-foot on-street parallel parking
adds 5-foot bike lanes
reduces lanes from four 13-14-foot lanes to two 11-foot through lanes
adds an 11-foot, center two-way left-turn lane
adds traffic signal at the Black Olive Drive intersection
adds traffic signal at the Fir Street intersection
implements coordinated signal timing between Oliver Road and Black Olive Drive
restricts Foster Road to right-turn movements out only
plans for additional parking and a small public gathering space
use of decorative pavement in the center lane area through downtown
accommodates two southbound lanes in times of emergency evacuation

Segment C - Elliott Road to Bille Road

Section C1 (Elliott Road to Oliver Road)

Note: Section C was divided into two sub-segments C1 and C2. It is recommended that segment C1 include parking to serve the Veterans' Park area.

Preferred Alternative: C3

- Adds 5-foot bike lanes
- Reduces the lanes to three 12-foot lanes
- Either maintains 5-foot sidewalks or provides room for 9-foot sidewalks
- Provides for 12 feet for on-street parking or 8 feet of parallel parking to allow for wider sidewalks

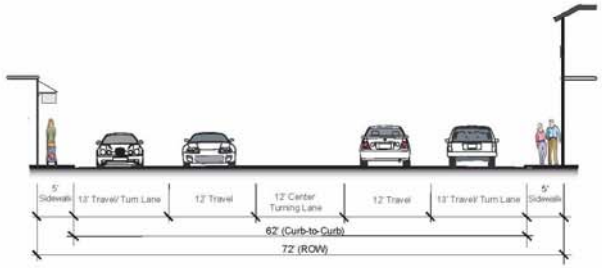
Section C2 (Oliver Road to Bille Road)

Preferred Alternative: C1

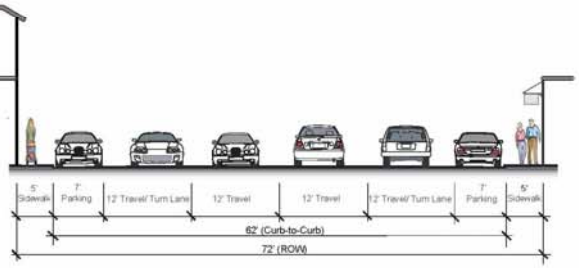
- Maintains 5-foot sidewalks
- Adds 5-foot bike lanes
- Narrows the five travel lanes from 14-feet to 12-feet
- Adds a center two-way left-turn lane where currently missing
- Eliminates existing on-street parking

Key Map

EXISTING STREET SECTIONS



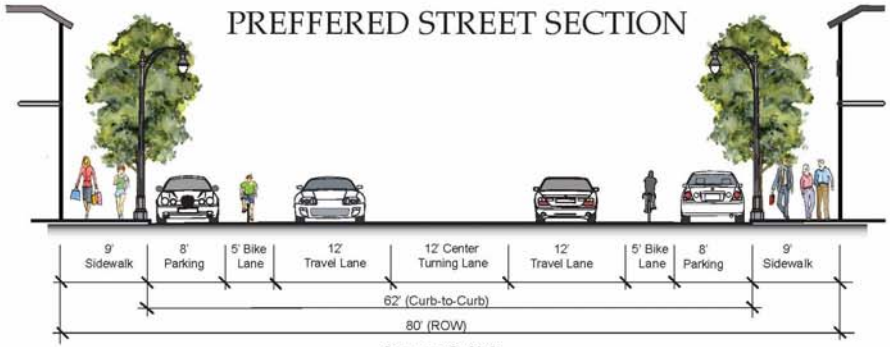
Existing Elliott Road to Maxwell Road (Typical)
72' Street Section



Existing Maxwell Road to Bille Road (Typical)
72' Street Section

Segment C1 - Elliott Road to Oliver Road

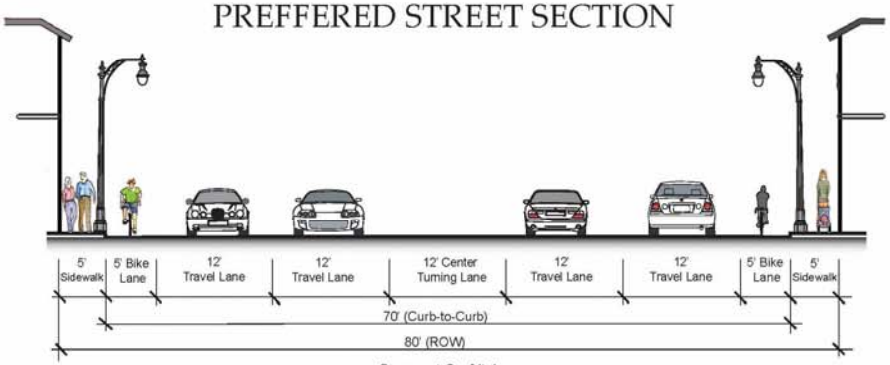
PREFFERED STREET SECTION



Segment C- Alt 3
80' Street Section

Segment C2 - Oliver Road to Bille Road

PREFFERED STREET SECTION



Segment C - Alt 1

Segment C

Section C1 (Elliott Road to Oliver Road)

adds 5-foot bike lanes
reduces the lanes to three 12-foot lanes
either maintains 5-foot sidewalks or provides room for 9-foot sidewalks
provides for on-street parking

Section C2 (Oliver Road to Bille Road)

maintains 5-foot sidewalks
adds 5-foot bike lanes
narrows the five travel lanes to 12-feet
adds a center two-way left-turn lane where currently missing
eliminates existing on-street parking

Segment D

Segment D - Bille Road to Wagstaff Road

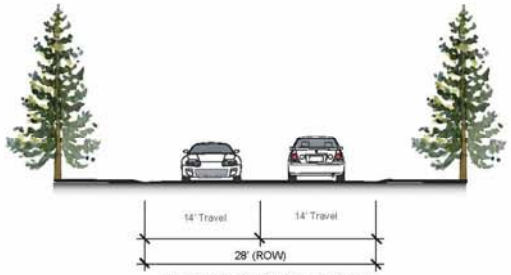
Segment D (Bille Road to Wagstaff Road)

Preferred Alternative: D2a

- Maintains the two 12-foot travel lanes
- Add a 12-foot center two-way left-turn lane
- Includes the creation of a 10-foot asphalt multi-use path for pedestrians and bicyclists
- Provides a 2-foot buffer between edge of travel way and multi-use path
- Provides the opportunity to maintain tree coverage adjacent to road

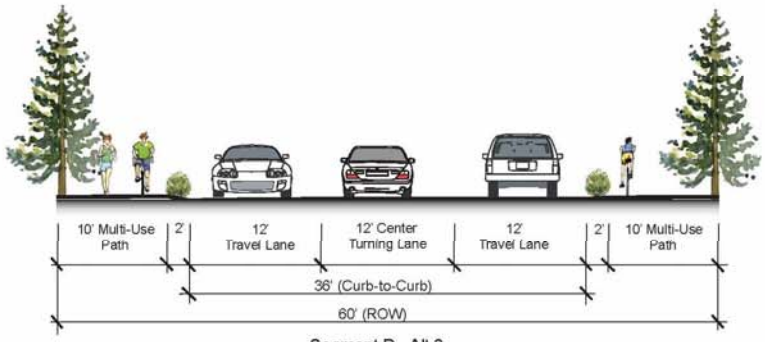
Key Map

EXISTING STREET SECTION



Existing Bille Road to Wagstaff Road
(Varies Significantly)
28' Street Section

PREFFERED STREET SECTION



Segment D - Alt 2
60' Street Section

Segment D

Segment D (Bille Road to Wagstaff Road)

maintains the two 12-foot travel lanes
add a 12-foot center two-way left-turn lane
includes a 10-foot asphalt multi-use path for pedestrians and bicyclists
provides a 2-foot buffer between edge of travel way and multi-use path
provides the opportunity to maintain tree coverage adjacent to road


Skyway
Foster Road

Summary of Intersection LOS

Table 8
Summary of Future Intersection Level of Service Calculations

Intersection on Skyway	Future Base (No Project)		Future with Preferred Plan					
			Unconstrained Model		Moderately Constrained		Constrained Model	
	AM	PM	AM	PM	AM	PM	AM	PM
Neal Road	21.3/B	22.9/C	22.4/C	21.6/C	20.9/C	21.4/C	21.4/C	19.3/B
Black Olive Dr	n/a	n/a	9.6/A	10.4/B	9.3/A	8.9/A	12.3/B	8.1/A
Pearson Road	25.3/C	37.1/D	24.7/C	54.6/D	20.0/C	51.5/D	17.8/B	47.0/D
Fir Street	n/a	n/a	9.5/A	52.3/D	7.2/A	46.4/D	4.5/A	38.7/D
Elliott Road	21.9/C	43.5/D	24.0/C	56.9/E	26.0/C	49.1/D	26.6/C	36.1/D
Mitigated	-	-	*23.2/C*	*40.9/D*	-	-	-	-
Oliver Street	18.1/B	16.6/B	22.6/C	23.4/C	25.8/C	20.5/C	21.0/C	20.7/C
Maxwell Drive	13.6/B	14.4/B	13.7/B	14.6/B	15.5/B	14.3/B	14.9/B	14.5/B
Bille Road	32.8/C	30.9/C	30.5/C	31.2/C	29.7/C	30.3/C	26.6/C	29.8/C
Wagstaff Road	19.4/B	20.0/B	23.9/C	20.6/C	19.6/B	19.7/B	19.7/B	19.6/B

Corridor Speeds

Table 9
Skyway Corridor Average Vehicle Speeds – Unconstrained

Segment	Future 2035 (No Project)		Future 2035 with Preferred Plan	
	NB	SB	NB	SB
Segment 1 – Neal to Pearson				
AM Peak Hour	27	30	25	28
PM Peak Hour	24	30	25	30
Segment 2 – Pearson to Elliott				
AM Peak Hour	23	24	25	18
PM Peak Hour	20	24	14	19
Segment 3 – Elliott to Bille				
AM Peak Hour	24	26	24	22
PM Peak Hour	22	24	22	21
Segment 4 – Bille to Wagstaff				
AM Peak Hour	28	25	28	24
PM Peak Hour	28	27	28	27

Other Issues

- Bypass Traffic
- Safety
- Pedestrian Crossings
- Emergency Vehicle Evacuation
- Phasing of Improvements

Summary of Improvements

- Striping of bike lanes between Neal Road and Bille Road
- Provision of an off-street pedestrian/bike trail between Bille and Wagstaff Road.
- Narrowing from two to one through lane in each direction between Pearson Road and Oliver Road
- Addition of a center two-way left-turn lane where currently missing between Pearson and Wagstaff Roads
- Widening of the sidewalk in downtown from 5-feet to 10.5-feet
- Maintaining on-street parallel parking between Pearson Road and Oliver Road
- Elimination of parking between Neal Road and Pearson Road and between Oliver Road and Bille Road
- New traffic signals added at intersections with Black Olive Drive and Fir Street
- Implementation of coordinated signal timing between Oliver and Black Olive Drive

Summary of Improvements (cont.)

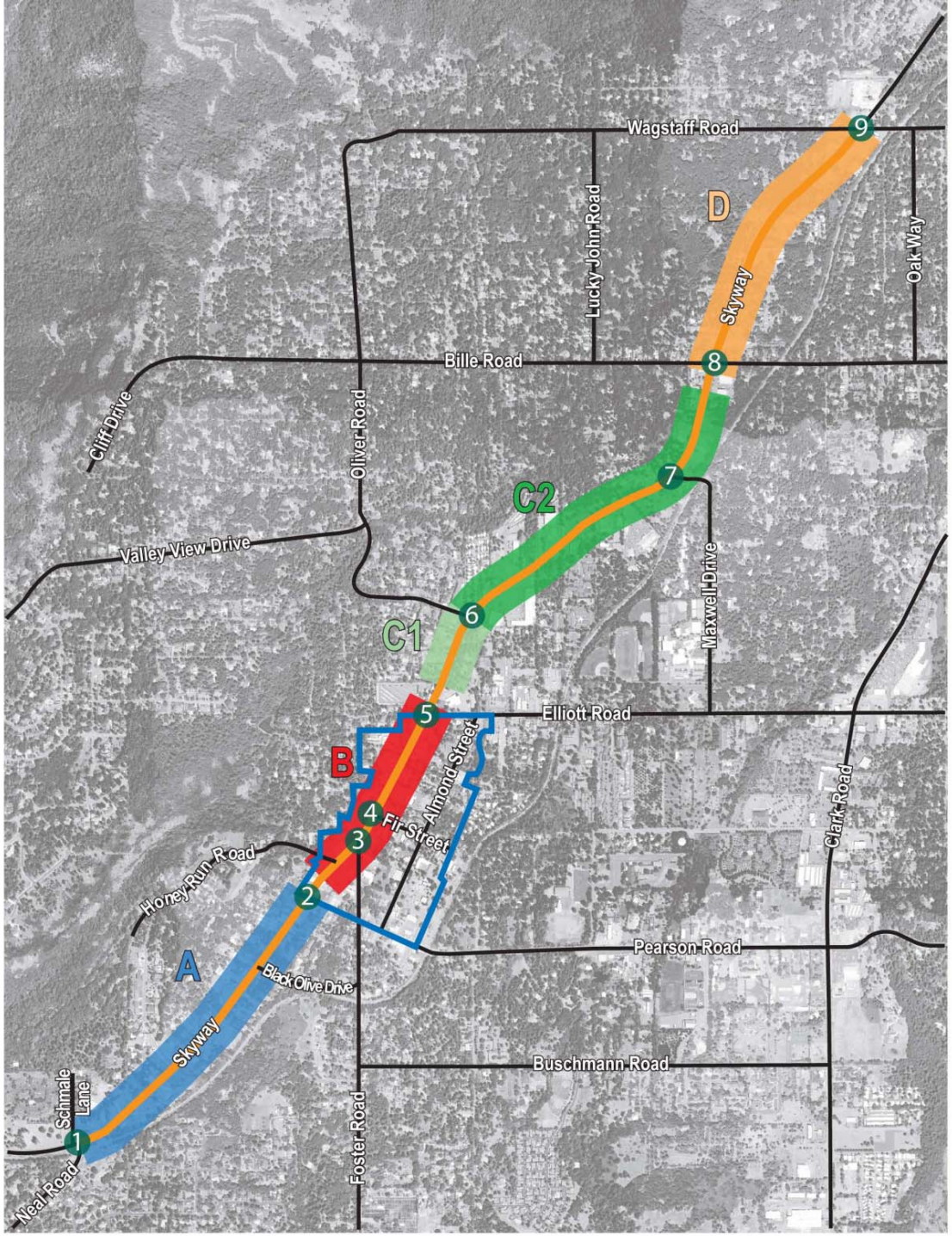
- Partial closure of the Foster Road/Skyway intersection
- Plans for more parking and a small public gathering space
- Birch Street limited to right-turn in and out only
- Intersection enhancements at Almond Street's intersections with Elliott Road and Pearson Road
- Pedestrian safety improvements at all uncontrolled crossings of Skyway between Neal and Wagstaff Roads
- Curb bulbouts at all uncontrolled crossings of Skyway in the downtown area.
- Addition of street streets and other landscaping through the corridor.
- Planning for additional southbound left-turn lane on Skyway at Elliott Road
- Provision for a second eastbound lane on Elliott Road to receive the southbound double-left turn.
- Uses decorative pavement in the center lane area through downtown
- Provisions for use of the center lane in downtown as a second southbound lane in times of emergency

Conclusions

- Reduction in travel speeds in the corridor
- Increased pedestrian safety
- Creation of traffic conditions more conducive to a walkable downtown
- Provision of separate left-turn lane on the corridor
- Accommodation of bicycle travel
- Enhanced access for side streets w/center refuge lane and traffic signals
- Improvement in safety at high-frequency collision locations
- Maintenance of on-street parking through downtown

Trade Off:

- Existing Conditions: 71 seconds with an average speed of 24 mph
- Future Year 2035 with no changes: **85** sec w/average speed of 20 mph
- Future Year 2035 with Preferred Plan: **158** sec w/ave speed of 14 mph


Wagstaff Road
Lucky John Road
Skyway
Oak Way
Bille Road
Cliff Drive
Oliver Road
Valley View Drive
Maxwell Drive
Elliott Road
Almond Street
Fir Street
Honey Run Road
Clark Road
Pearson Road
Black Olive Drive
Buschmann Road
Schmale Lane
Foster Road
Neal Road
A
B
C1
C2
D
1
2
3
4
5
6
7
8
9

w-trans

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