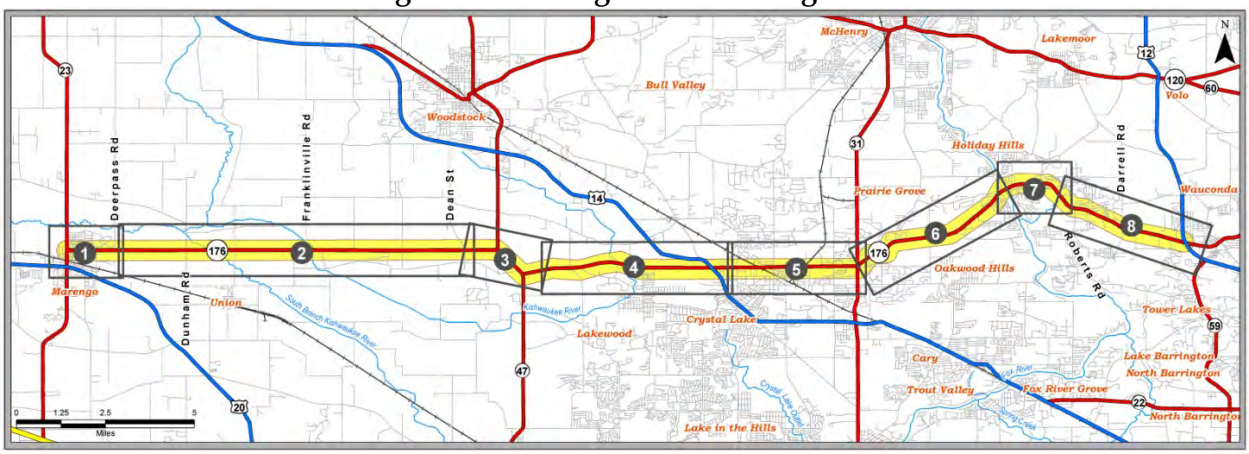
Chapter 3 – Route Analysis

The Route Analysis of the SRA design concepts is presented in this chapter by individual route segments. These segments were defined based on changes in projected traffic volumes as well as changes in land use (**See Figure 3.1**).

Figure 3.1 The Eight Corridor Segments



Segment 1 – IL 23 (State Street) to Deerpass Road (0.99 Miles)
Segment 2 – Deerpass Road to Dean Street (7.35 Miles)
Segment 3 – Dean Street to Mt. Thabor Road (2.61 Miles)
Segment 4 – Mt. Thabor Road to Oak Street (3.59 Miles)
Segment 5 – Oak Street to IL 31 (3.02 Miles)
Segment 6 – IL 31 to Nish Road (3.78 Miles)
Segment 7 – Nish Road to Roberts Road (2.02 Miles)
Segment 8 – Roberts Road to US 12 (Rand Road) (2.58 Miles)

For each segment, the existing facility, land use and environmental characteristics are discussed. Data was collected from the Chicago Metropolitan Agency for Planning (CMAP), field surveys, the Department of Natural Resources, the Illinois Department of Transportation, and from individual community interviews. This data is detailed:

Exhibit A The existing facility characteristics
Exhibit B The planning constraints

Following the discussion regarding the existing characteristics, the recommended SRA roadway configuration is defined in terms of recommended roadway, traffic control/intersection configuration, overhead signage, transit, structures, and lighting. Recommendations are detailed in:

Exhibit C The recommended SRA corridor plan based on Advisory Panel review including recommended lane arrangements, right-of-way requirements, and access control

Exhibit D Recommended intersection configurations for major and signalized intersections

For each segment, additional right-of-way requirements and potential environmental concerns are listed. The report also provides initial estimates of probable construction costs and right-of-way costs for the study year.

3.1 Segment 1 - IL 23 (State Street) to Deerpass Road

3.1.1 Location

Segment 1 begins and ends within the City of Marengo in eastern McHenry County. It begins at IL 23 (State Street) and ends approximately 0.99 miles to the east at Deerpass Road.

Facing North through the IL 23 (State Street) and IL 176 Intersection

3.1.2 Existing Facility Characteristics (Exhibits A-01 to A-02)

Existing Roadway Configuration

The existing right-of-way width for IL 176 is 60 feet between IL 23 (State Street) and Grace Street and 80 feet between Grace Street and Deerpass Road. The roadway is configured as shown in **Table 3.1.1**. There is a traffic signal installed at the IL 23 (State Street) intersection.

Table 3.1.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
IL 23 (State St.) To Grace St.	60 ft.	2	12 ft.	Painted Line	-	8 ft.
Grace Street To Deerpass Rd.	80 ft.	2	12 ft.	Painted Line	-	8 ft.

Existing Traffic Conditions

According to IDOT, this segment of road averaged 8,800 vehicles per day in 2007. There were no high accident locations identified.

Existing Transit Service

There is no Pace suburban bus service or Metra commuter rail service provided along this segment of IL 176.

3.1.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B–01 to B-03)

Along this segment of the IL 176 SRA Corridor, there are sensitive land uses, floodplain, a leaking underground storage tank, and a historic house.

Sensitive Land Uses

- The Emmanuel Baptist Church is located southwest of the Prospect Street and IL 176 intersection.

- There is a house north of IL 176 between Kishwaukee Street and Grace Street that is potentially eligible for inclusion on the National Register of Historic Places.

Streams/Wetlands/Floodplains

- A portion of the Kishwaukee River floodplain is in the City of Marengo between Page Street and Prospect Street.

Leaking Underground Storage Tanks

- There is a leaking underground storage tank southeast of the IL 23 (State Street) and IL 176 intersection.

3.1.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B–01 to B-03)

This segment is within the City of Marengo. The area is residential between IL 23 (State Street) and Grace Street, and the residences have individual curb-cuts. From Grace Street to Deerpass Road, residential subdivisions have consolidated access on the north side of the road; however, on the south side of the road, residences still have individual curb-cuts. It is along this southern stretch of land between Grace Street and Deerpass Road that the City of Marengo is anticipating some commercial development.

The Marengo Rescue Squad District is located northeast of the IL 23 (State Street) intersection. The ability for emergency response vehicles to access IL 176 could be limited by the addition of turning lanes.

3.1.5 Recommended SRA Cross Section (Exhibits C-01 to C-03)

This section identifies the ultimate roadway improvements recommended to enable this segment to function as an urban SRA. The desirable route characteristics for urban SRA routes were developed to provide adequate traffic service and geometric design. In addition, the requirements protect right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, transit, and right-of-way requirements.

Roadway

A five-lane roadway facility is recommended as the ultimate IL 176 roadway configuration from IL 23 (State Street) to Deerpass Road in Marengo. The configurations of the ultimate cross section are summarized in **Table 3.1.2**. The 11 foot median will provide a two-way left turn lane to increase the efficiency of through movements. A barrier median may be needed if the westbound dual left-turn lanes at the IL 23 intersection are found to be warranted to ensure safe and efficient operations on a day to day basis. IDOT will need to coordinate with the Marengo Rescue Squad District should this intersection become part of a Phase 1 Study.

Table 3.1.2 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
IL 23 (State St.) To Deerpass Rd.	100 ft.	4	12 ft.	Two-Way Center Left Turn Lane	12 ft.	5 ft.	B6.24 Curb and Gutter
A 10 ft. wide multi-use path will be provided.							

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.1.3**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak hour traffic volume will be level of service (LOS) "A" in each direction.

Table 3.1.3 Capacity Analysis for Segment 1

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level of Service	Adequate to Meet Projected Demand?
IL 23 (State St.) to Deerpass Rd.	8,800	12,000	36%	2	A	Yes

Traffic Control/Intersection Configuration (Exhibit D-01 to D-03)

The Prospect Street and IL 176 intersection is recommended to have fully actuated traffic signals installed. These signals are recommended to be interconnected into a signal system to provide for optimal traffic progression during peak periods.

Separate left turn lanes will be developed. The existing traffic signal at IL 23 (State Street) will be reconfigured to match the recommended lane configuration changes (**Exhibit D-1**). The curb radii at these intersections will be designed to meet a WB-65 design vehicle to accommodate frequently turning truck traffic. However, smaller design vehicles may be used at certain intersections as appropriate when a Phase 1 engineering study is completed.

Parking

On-street parking is not recommended. Adequate off-street parking exists on the local side streets.

Overhead Signing

The intersection of IL 176 and IL 23 (State Street) is recommended to have advance overhead signing with route numbers, names, and regional destinations. The lettering will be large enough to read at a distance of 350 feet to 400 feet and in accordance with the guideline set forth in the Manual on Uniform Traffic Control Devices (MUTCD).

Structures

Drainage tiles between Page Street and Prospect Street will need to be replaced and/or installed as needed to mitigate possible Kishwaukee River flooding in the City of Marengo.

Lighting

The IL 176 signalized intersections will have appropriate lighting installed for both vehicular and pedestrian safety purposes.

Transit

Transit signal prioritization (TSP) is recommended at the IL 176 and Prospect Street intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended. The curb radii at these intersections will be designed to meet a WB-65 design vehicle to accommodate frequently turning truck traffic which is adequate to accommodate the turning radii needed for bus operations.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit facilities. New user-friendly passenger facilities including shelters, benches and sidewalks at a minimum are recommended.

3.1.6 Additional Right-of-Way Requirements

Between IL 23 (State Street) and Grace Street, additional right-of-way width of 40 feet is recommended, 20 feet on either side of the roadway. From Grace Street to Deerpass Road on IL 176, additional right-of-way of 20 feet is recommended, 10 feet on either side of the roadway.

This investigation and analysis did not include topographical surveys and drainage investigations. Surveys, topography, drainage and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.1.7 Potential Environmental Concerns

Expansion of the roadway may impact the floodplains and wetlands existent along this segment. Expansion of the roadway also may interact with leakage from underground storage tanks which will have negative impacts that requires mitigation and sensitive noise receptors identified. These environmental impacts will require further study during the Phase I process.

3.1.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.1.4**.

Table 3.1.4 2009 Construction Cost Estimates for Segment 1 (0.99 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	5.0	$1,800,000	$8,910,000
Intersection Signals	Intersection	3	$179,000	$537,000
Intersection Realignments	Intersection	0	$775,000	$0
Transit Improvement	Bus Stop	4	$30,000	$120,000
	Signal Priority	2	$7,200	$14,400
	Park/Ride	0	$60,000	$0
Sidewalk/Multi-Use Path**	Linear Feet	10,500	$66	$693,000
Lighting	Pole	12	$6,000	$72,000
Total Construction Cost				**$10,346,400**
Phase I Engineering	6%			$621,000
Phase II Engineering	8.5%			$879,000
Construction Engineering	10%			$1,035,000
Total Engineering Cost				**$2,535,000**
Right-of-way Acquisition	Acre	4.8	$84,000	**$403,000**
TOTAL ESTIMATED COST				**$13,284,400**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.2 Segment 2 - Deerpass Road to Dean Street

Facing North at the Kishwaukee River from IL 176

3.2.1 Location

Segment 2 begins at Deerpass Road and ends approximately 7.35 miles to the east at Dean Street.

3.2.2 Existing Facility Characteristics (Exhibits A-02 to A-10)

Existing Roadway Configuration

The existing right-of-way width for IL 176 along this segment is 80 feet except at the Millstream Road/Dunham Road intersection and at the two Kishwaukee River crossings where the right-of-way is 60 feet. The roadway is configured as shown in **Table 3.2.1**. There are no traffic signals along this segment of IL 176. There are stop signs posted on the side streets.

Table 3.2.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
Deerpass Rd. to IL 47 (Eastwood Dr.)	60 ft.* - 80 ft.	2	12 ft.	Painted-Line	-	8 ft.
*60 ft. at Millstream Road at the two Kishwaukee River crossings.						

IL 176 crosses a drainage ditch approximately 550 feet east of Deerpass Road over a box culvert. IL 176 crosses the Kishwaukee River at two locations. The first crossing is west of North Union Road, structure number 056-0004 (**Exhibit A-04**). The second crossing is between Franklinville Road and McCue Road, structure number 056-0005 (**Exhibit A-06**). Both structures have been rebuilt in the last few years. The configurations are summarized in **Table 3.2.2**.

Table 3.2.2 Existing Structure Configuration

Structure Location	Structure Number	Feature Crossed	Total Length	Deck Width	Roadway Width
West of North Union Rd.	056-0004	Kishwaukee River	78 ft. 4 in.	33 ft.	30 ft.
Franklinville Rd. and McCue Rd.	056-0005	Kishwaukee River	43 ft.	33 ft.	30 ft.

Existing Traffic Conditions

According to IDOT, this segment of road averaged 9,600 vehicles per day from Deerpass Road to Sunnyside Road and 10,300 vehicles per day from Sunnyside Road to Dean Street in 2007. The Millstream Road intersection was identified in the 2008 and 2009 Illinois Five Percent Reports as a location within the top five percent of the entire state having safety needs. In addition, the North Union Road and Dean Street intersections were identified in the 2009 Illinois Five Percent Report. Deerpass Road to Millstream Road was identified in the 2008

Illinois Five Percent Report as a segment within the top five percent of the entire state have safety needs.

Existing Transit Service

There is no Pace suburban bus service or Metra commuter rail service provided along this segment of IL 176.

3.2.3 Existing Environmental Characteristics and Environmental Considerations (Exhibits B-02 to B-10)

Along this segment of the IL 176 SRA Corridor there are environmental issues that may constrain SRA development: a drainage ditch, a river, wetlands, floodplains, endangered species, and sensitive land uses.

Streams/Rivers/Wetlands/Floodplains

- There is a drainage ditch approximately 550 feet east of Deerpass Road.
- Segment 2 is within the Kishwaukee River floodplain.
- The south branch of the Kishwaukee River flows under IL 176 between Millstream Road and North Union Road as well as between Franklinville Road and McCue Road. There is wetland along the river at these locations. The Kishwaukee River has been rated a Class "A" river by the Illinois Department of Natural Resources. The Class "A" rating identifies the Kishwaukee River as a unique aquatic resource comparable to a stream without human disturbance. The Class "A" rating also indicates the presence of a significant number of intolerant species of fish.
- There is a pond southeast of the McCue Road and IL 176 intersection.
- There is wetland approximately 850 feet west of Gee Road on either side of IL 176.
- There is a pond and wetland southwest of the Gee Road and IL 176 intersection.
- There are two ponds southeast of the Gee Road and IL 176 intersection.
- There is wetland south of IL 176 approximately 500 feet west of Timber Lane.
- There is wetland on either side of IL 176 approximately 800 feet west of IL 47 (Eastwood Drive).

Threatened and Endangered Species

- The Pale Vetchling is an endangered plant species identified approximately 600 feet west of Sunnyside Road.
- The Sandhill Crane is a large migratory bird that nests in this area. It has been identified south of IL 176 near Dean Street.
- The Blanding's Turtle has been found in this area south of IL 176 near Dean Street. It is listed as threatened by the Illinois Department of Natural Resources.
- The Iowa Darter, an endangered fish within the perch family, has been identified in this area.

Sensitive Land Uses

- The Marengo Congregation of Jehovah's Witnesses is located southwest of the North Union Road and IL 176 intersection.
- The New Life Christian Center is located southwest of the Dean Street and IL 176 intersection.

3.2.4 Existing Land Use Characteristics and Land Use Considerations (Exhibits B-02 to B-10)

The land use in this area is agricultural. The soil in this area is prime farmland.

3.2.5 Recommended SRA Cross Section (Exhibits C-02 to C-10)

This section identifies the ultimate roadway improvements recommended to enable this segment to function as a rural SRA. The desirable route characteristics for rural SRA routes were developed to provide adequate traffic service and geometric design. In addition, the requirements protect right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, transit, and right-of-way requirements.

Roadway

The 100 foot urban cross section recommended from IL 23 (State Street) and Deerpass Road will transition into a 220 foot rural cross section east of Deerpass Road. The intersections of McCue Road and Dean Street will be realigned in order to correct the existing angle deficiencies.

The rural cross section includes two lanes in each direction with a 50 foot depressed grass median. Bicycles will be accommodated by the 10 foot paved right shoulder. The configurations of the ultimate recommended cross section for Segment 2 are summarized in **Table 3.2.3**.

Table 3.2.3 Ultimate Roadway Configuration

	ROW	Lanes		Median		Shoulders	Drainage
	Width	#	Width	Type	Width	Width	Type
Deerpass Rd. to Dean St.	220 ft.	4	12 ft.	Depressed Grass	50 ft.	10 ft. Right and 6 ft. Left	Ditch

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.2.4**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak hour traffic volume will be LOS "A" in each direction.

Table 3.2.4 Capacity Analysis for Segment 2

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
Deerpass Rd. to Sunnyside Rd.	9,600	12,000	25%	2	A	Yes
Sunnyside Rd. to Dean St.	10,300	17,000	65%	2	A	Yes

Traffic Control/Intersection Configuration (Exhibits D-03, D-04, D-06, D-07, D-07A, D-08, and D-10)

The intersections of Deerpass Road, Millstream Road, North Union Road, Franklinville Road, Gee Road, and Sunnyside Road are recommended to have fully actuated traffic signals installed. The realignment of McCue Road intersection from an obtuse angle to a right angle is also recommended for further investigation during a future Phase 1 engineering study. The curb radii will be designed to meet a WB-65 design vehicle. However, smaller design vehicles may be used at certain intersections as appropriate when a Phase 1 engineering study is completed.

Structures

Two box culverts are recommended approximately 550 feet east of Deerpass Road. The structures will be 200 feet in length to pass under IL 176.

At the two Kishwaukee River crossings, the two recently constructed structures are recommended to have their deck widths widened from 33 feet to 40 feet at the time of their replacement.

Lighting

The signalized intersections and their approaches will have appropriate intersection lighting installed.

Transit

Transit signal prioritization (TSP) is recommended at the Deerpass Road, Millstream Road, North Union Road, Franklinville Road, Gee Road, and Sunnyside Road intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended. The intersections will be configured to accommodate the turning radii needed for bus operation.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit

facilities. New user-friendly passenger facilities including shelter, benches, and sidewalks at minimum are recommended.

3.2.6 Additional Right-of-Way Requirements

Additional right-of-way of 140 feet is recommended, 70 feet on either side of the roadway. At Millstream Road and the two stream crossings where the existing right-of-way is 60 feet, an additional right-of-way of 160 feet is recommended, 80 feet on either side of the roadway.

This investigation and analysis did not include topographical surveys and drainage investigations. Surveys, topography, drainage, and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.2.7 Potential Environmental Concerns

The Kishwaukee River has been rated as one of the state's most pristine rivers. Expansion of the roadway may impact floodplains and wetlands in this segment. Expansion of the roadway may also impact the quantity and quality of habitat for the endangered and threatened species in the Kishwaukee River area. The impact to these resources and species will require further study during a future Phase I study. The roadway typical sections could be minimized across this area by using concrete traffic barriers instead of grass medians. This compressed cross section would save approximately 100 feet of right-of-way (50 feet on each side) across the park.

3.2.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.2.5**.

Table 3.2.5 2009 Construction Cost Estimates for Segment 2 (7.35 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	29.2	$1,800,000	$52,560,000
Intersection Signals	Intersection	6	$179,000	$1,074,000
Intersection Realignments	Intersection	2	$775,000	$1,550,000
Transit Improvement	Bus Stop	33	$30,000	$990,000
	Signal Priority	6	$7,200	$43,200
	Park/Ride	0	$60,000	$0
Sidewalk/Multi-Use Path**	Linear Feet	0	$66	$0
Lighting	Pole	24	$6,000	$144,000
Culvert Structures	Linear Feet	80	$500	$40,000
Kishwaukee River Bridges				
SN 056-004	Square Feet	3,132	$150	$469,800
SN 056-005	Square Feet	1,720	$150	$258,000
Total Construction Cost				**$57,129,000**
Phase I Engineering	6%			$3,428,000
Phase II Engineering	8.5%			$4,856,000
Construction Engineering	10%			$5,713,000
Total Engineering Cost				**$13,997,000**
Right-of-way Acquisition	Acre	133.0	$84,000	**$11,172,000**
TOTAL ESTIMATED COST				**$82,298,000**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.3 Segment 3 - Dean Street to Mt. Thabor Road

3.3.1 Location

This section of the IL 176 SRA Corridor begins from Dean Street and ends approximately 2.61 miles at Mt. Thabor Road.

Facing West through the IL 47 and IL 176 Northern Intersection (North Jog)

3.3.2 Existing Facility Characteristics (Exhibits A-10 to A-12)

Existing Roadway Configuration

At this location, the existing right-of-way is 80 feet from Dean Street to the IL 47 (Eastwood Drive)/IL 176 northern intersection and 150 feet south of this intersection. The existing roadway configuration is summarized in **Table 3.3.1**. The northern IL 47 (Eastwood Drive)/IL 176 intersection is signalized.

Table 3.3.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulder
	Width	#	Width	Type	Width	Width
Dean St. to IL 47 (Eastwood Dr.)/IL 176 North	80 ft.	2	12 ft.	Painted Line	-	8 ft.
IL 47 (Eastwood Dr.)/IL 176 North to IL 47 (Eastwood Dr.)/IL 176 South	150 ft.	2	12 ft.	Painted Line	-	10 ft.
IL 47 (Eastwood Dr.)/IL 176 South to Mt. Thabor Rd.	100 ft.	2	12 ft.	Painted-Line	–	8 ft.

Existing Traffic Conditions

According to IDOT, this segment of IL 176 averaged 10,300 vehicles per day from Dean Street to the IL 47 (Eastwood Drive)/IL 176 northern intersection, 21,800 vehicles per day between the two IL 47 (Eastwood Drive)/IL 176 intersections, and 10,900 vehicles per day from IL 47 (Eastwood Drive)/IL 176 to Mt. Thabor Road in 2007. The Dean Street and IL 47 (Eastwood Drive)/IL 176 South intersections were identified in the 2009 Illinois Five Percent Report as a location within the top five percent of the entire state having safety needs.

Existing Transit Service

There is no Pace suburban bus service or Metra commuter rail service provided along this segment of IL 176.

3.3.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B-10 to B-12)

Along this segment of the IL 176 SRA Corridor, there are environmental issues that may constrain SRA development: a pond, a creek, wetlands, and threatened species habitat.

Streams/Ponds, Wetlands/Floodplains

- There is a creek that crosses under IL 47 (Eastwood Drive)/IL 176 approximately 400 ft. from south of Swanson Road. There is floodplain and wetland along the creek.
- There is wetland between the two intersections of IL 47 (Eastwood Drive) and IL 176.
- There is a pond southwest of the Pleasant Valley intersection.

Threatened and Endangered Species

- The Blanding's Turtle and the Iowa Darter have been identified within this area.

3.3.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B-10 to B-12)

The land use in this area is currently agricultural and the soil in this area is prime farmland. East of IL 47 (Eastwood Drive), a development of over 1,300 homes has been proposed off of Dean Street between IL 176 and the City of Woodstock. West of IL 47 (Eastwood Drive), Crystal Lake has annexed lands to the IL 47 (Eastwood Drive)/IL 176 intersection. There are plans by the City of Crystal Lake to extend sewer services intersection along the north end of IL 176 to this intersection. The Village of Lakewood has indicated a desire to develop the area as a regional shopping center.

3.3.5 Recommended SRA Cross Section (Exhibits C-10 to C-12)

This section identifies the ultimate roadway improvements recommended to enable this segment to function as a rural SRA. The desirable route characteristics for rural SRA routes were developed to provide adequate traffic service and geometric design as well as protection of right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, transit, and right-of-way requirements.

Roadway

From Dean Street to Mt. Thabor Road, the 220 foot rural cross section is continued from the previous section. This section consists of a four-lane divided rural arterial with a 50 foot depressed grass median.

The configurations of the ultimate recommended cross section for IL 176 are summarized in **Table 3.3.2**.

Table 3.3.2 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
Dean Street to Mt. Thabor Road	220 ft.	4	12 ft.	Depressed	50 ft.	NA	Ditch

The intersections at Dean Street, IL 47 north, IL 47 south, and Mt. Thabor Road are recommended to be reconfigured to improve access and operations.

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.3.3**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak hour traffic volume will be LOS "A" in each direction.

Table 3.3.3 Capacity Analysis for Segment 3

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
Dean St. to IL 47 (Eastwood Dr.)/IL 176 North	10,300	17,000	65%	3	A	Yes
IL 47 (Eastwood Dr.)/IL 176 North to IL 47 (Eastwood Dr.)/IL 176 South	21,800	30,000	38%	3	A	Yes
IL 47 (Eastwood Dr.)/IL 176 South to Mt. Thabor Rd.	10,900	13,000	19%	3	A	Yes

Traffic Control/Intersection Configuration (Exhibits D-10 and D-11)

The intersection of Dean Street is recommended to have fully actuated traffic signals installed. Separated left and right turn lanes are recommended for the eastbound and westbound approaches at this intersection. Separate left turn lanes are recommended for the northbound and southbound approaches. The intersection's north approach on Dean Street is also recommended to be realigned perpendicular to IL 176 for better traffic operation and is be investigated further in a future Phase I engineering study. The curb radii will be designed to meet a WB-65 design vehicle. However, smaller design vehicles may be used at certain intersections as appropriate when a Phase 1 engineering study is completed.

Structures

A new box culvert is recommended south of the northern IL 47 (Eastwood Drive)/IL 176 intersection to cross over a drainage ditch.

Overhead Signing

Both intersections of IL 176 with IL 47 (Eastwood Drive) are recommended to have advance overhead signing with route numbers, names, and regional destinations (ex. Woodstock, Huntley, Marengo). The lettering will be large enough to read at a distance of 350 feet to 400 feet and in accordance with the guideline set forth in the Manual on Uniform Traffic Control Devices (MUTCD).

Lighting

The signalized intersections and their approaches will have appropriate lighting installed for both vehicular and pedestrian safety purposes. Unsignalized and right-in and right-out intersections are recommended to have basic lighting.

Transit

Transit signal prioritization (TSP) is recommended for the Dean Street and the IL 47 (Eastwood Drive)/IL 176 intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended. The intersections will be configured to accommodate the turning radii needed for bus operation.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. New user-friendly passenger facilities including shelter, benches, and sidewalks at minimum are recommended. Space is also recommended (50 stalls, roughly 0.6 acres) to be provided for a park-and-ride facility near the northern or southern IL 47 (Eastwood Drive)/IL 176 intersections. The specific locations of these facilities will be planned by local governments to ensure the coordination of development with the development of roadway and public transit facilities.

3.3.6 Additional Right-of-Way Requirements

Between Dean Street and Mt. Thabor Road, the IL 176 configuration consists of a rural arterial requiring 298 feet of right-of-way with additional right-of-way at each intersection.

Field visits identified a drainage ditch and low lying area approximately 1,000 feet in length from the IL 47 (Eastwood Drive)/IL 176 intersection south. Given the noted topography, additional right-of-way may be required along this segment in order to construct the recommended road facility.

This investigation and analysis did not include topographical surveys and drainage investigations. Surveys, topography, drainage and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.3.7 Potential Environmental Concerns

Expansion of the right-of-way may impact floodplains and wetlands in this segment. Expansion of the right-of-way may also impact the quantity and quality of habitat for the Blanding's Turtle and the Iowa Darter. The impact to these resources and species will require further study during the Phase I process.

3.3.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment are shown in **Table 3.3.4**.

Table 3.3.4 2009 Construction Cost Estimates for Segment 3 (2.61 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	7.8	$1,800,000	$14,040,000
Intersection Signals	Intersection	2	$179,000	$358,000
Intersection Realignments	Intersection	2	$775,000	$1,550,000
Transit Improvement	Bus Stop	6	$30,000	$180,000
	Signal Priority	3	$72,000	$216,000
	Park/Ride	1	$60,000	$60,000
Sidewalk/Multi-Use Path**	Linear Feet	-	$66	$0
Lighting	Pole	8	$6,000	$48,000
Culvert Structures	Linear Feet	150	$500	$75,000
Total Construction Cost				**$16,527,000**
Phase I Engineering	6%			$992,000
Phase II Engineering	8.5%			$1,405,000
Construction Engineering	10%			$1,653,000
Total Engineering Cost				**$4,050,000**
Right-of-way Acquisition	Acre	28.0	$84,000	**$2,352,000**
TOTAL ESTIMATED COST				**$22,929,000**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.4 Segment 4 - Mt. Thabor Road to Oak Street

3.4.1 Location

Segment 4 begins at Mt. Thabor Road and ends at Oak Street approximately 3.59 miles to the east. This Segment is within the corporate boundaries of the City of Crystal Lake.

Facing East through the US 14 and IL 176 Intersection

3.4.2 Existing Facility Characteristics (Exhibits A-13 to A-16)

Existing Roadway Configuration

The existing right-of-way is 100 feet from the southern IL 47 (Eastwood Drive)/IL 176 intersection to US 14. The existing roadway configuration is summarized in **Table 3.4.1**. The southern IL 47 (Eastwood Drive)/IL 176 intersection is signalized.

Table 3.4.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
Mt. Thabor Rd. to Oak St.	100 ft.	2	12 ft.	Painted-Line	_	8 ft.

IL 176 crosses over the Kishwaukee River on a bridge west of Ohnstad Road. The geometrics of this structure are summarized in **Table 3.4.2**.

Table 3.4.2 Existing Structure Configuration

Structure Location	Structure Number	Feature Crossed	Total Length	Deck Width	Roadway Width
West of North Union Rd.	056-0069	Kishwaukee River	54.1 ft.	42.7 ft.	39.4 ft.

Existing Traffic Conditions

According to IDOT, this segment of road averaged 10,900 vehicles per day from Mt. Thabor Road to Briarwood Road, 15,100 vehicles per day from Briarwood Road to US 14, and 15,000 vehicles per day from US 14 to Oak Street in 2007. Briarwood Road to Lippold Road was identified in the 2009 Illinois Five Percent Report as a segment within the top five percent of the entire state having safety needs.

Existing Transit Service

There is no Pace suburban bus service or Metra commuter rail service provided along this segment of IL 176.

3.4.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B-13 to B-16)

Along this segment of the IL 176, there are environmental issues that may constrain SRA development: sensitive land uses, wetlands, floodplain, and a leaking underground storage tank.

Sensitive Land Uses

- The Mt. Thabor Cemetery is located northwest of the Haligus Road and IL 176 intersection.
- The Grand Oaks Recreation Center is located southeast of Briarwood Road.
- Lippold Park, located east of the Grand Oaks Recreation Center, abuts approximately 4,000 feet of IL 176.
- The Crystal Lake Park District also owns a couple of agricultural parcels of land north of IL 176 between Briarwood Road and the western edge of Lippold Park.
- The Fox Valley Christian Church is located between a bend in Briarwood Road and IL 176. The church has access on both roads.
- The Fair Oaks Health Care Center is located south of IL 176 between Ridge Avenue and Oak Street.
- St. Thomas Church is located south of IL 176 between Ridge Avenue and Oak Street.
- The Nunda Township Crystal Lake School is located approximately 500 feet south of IL 176 west of Oak Street.

Streams/Ponds/Wetlands/Floodplains

- Three ponds are located near IL 176 southeast of the southern IL 47 (Eastwood Drive)/IL 176 intersection.
- There is a pond 1,600 feet to the west of Mt. Thabor Road.
- Much of the area along Segment 4 is wetland. Wetlands abut IL 176 at several locations along this segment.
- There is a stream (a tributary of the Kishwaukee river) approximately 2,500 feet west of Briarwood Road. The stream crosses under IL 176 and has floodplain in this area.
- There is wetland located northeast of the Ridge Avenue and IL176 intersection.

Leaking Underground Storage Tanks

- There is a leaking underground storage tank northwest of the US 14 and IL 176 intersection.
- There is a leaking underground storage tank southeast of the US 14 and IL 176 intersection.
- There is a leaking underground storage tank north of IL 176 approximately 300 feet west of Hickory Drive.

3.4.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B-13 to B-16)

The land use in this area is currently agricultural. The soil in this area is prime farmland. According to commercial development plans by the City of Crystal Lake as well as indicated by the McHenry County 2020 Transportation and Land Use Plan, this area is not likely to remain agricultural.

3.4.5 Recommended SRA Cross Section (Exhibit C-13 to Exhibit C-16)

This section identifies the ultimate roadway improvements recommended to enable this segment to function as a suburban SRA. The desirable route characteristics for suburban SRA routes were developed to provide adequate traffic service and geometric design as well as protection of right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, transit, and right-of-way requirements.

Roadway

A four-lane suburban roadway is recommended with two lanes in each direction and a 22 foot barrier median to manage access and restrict left turn movements. The configuration of the ultimate recommended cross section for Segment 4 is summarized in **Table 3.4.3**.

Table 3.4.3 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
Mt. Thabor Rd. to Oak St.	120 ft.	4	12 ft.	Typical Barrier	22 ft.	10 ft. Multi-use Path & 5 ft. sidewalk	B6.24 Curb and Gutter

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.4.4**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak direction LOS will be "A" from Mt. Thabor Road to Briarwood Road and "B" from Briarwood Road to Oak Street.

Table 3.4.4 Capacity Analysis for Segment 4

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
Mt. Thabor Rd. to Briarwood Rd.	10,900	13,000	19%	2	A	Yes
Briarwood Rd. to US 14	15,100	19,000	26%	2	B	Yes
US 14 to Oak St.	15,000	24,000	60%	2	B	Yes

Traffic Control/Intersection Configuration (Exhibits D-12 to D-14,)

The intersection of IL 176 with Haligus Road is recommended to be realigned to line up with Mt. Thabor Road to the north and realigned to the south to avoid Mt. Thabor Cemetery. This intersection will also serve as the transition point from a rural SRA with a 50 foot grass median to a suburban SRA with a 22 foot barrier median. The intersection with IL 176 should be signalized and have a minimum separation of 400 feet between intersections.

Briarwood Road and Ohnstad Road are recommended to be realigned to provide a single intersection with perpendicular approaches to IL 176.

Fully actuated signals are recommended at the following intersections at Mt. Thabor Road and Haligus Road; Briarwood Road and Ohnstad Road; and US 14. Dual left turn lanes and a dedicated right turn lane are recommended at the US 14 intersection. A single left turn lane and a dedicated right turn lane is recommended at the Mt. Thabor Road and Haligus Road intersection, and at the Briarwood Road and Ohnstad Road intersection. Direct access to IL 176 for Hickory Avenue is recommended to be relegated to right-in/right-out due to its close proximity to Ridge Avenue.

Structures

The bridge over the Kishwaukee River west of Briarwood Road, (**SN 056-0069 on Exhibit C-14**), is recommended to be widened, paired or replaced with a parallel structure. The existing bridge has recently been rated in superior condition and can accommodate two lanes of travel. The parallel structure will have a deck width of at least 96 feet to accommodate two 12 feet through lanes, two 14 feet outer lanes, a five foot sidewalk on one side and a 10 foot multi-use path on the other side, and a 22 foot median to separate opposing traffic lanes. The deck width of the existing structure (42.7 feet) is recommended be widened to at least 96 feet or replaced at the time major rehabilitation.

Overhead Signing

The intersection of IL 176 with US 14 is recommended to have advance overhead signing with route numbers, names, and regional destinations (i.e. McHenry County Community College). The lettering will be large enough to read at a distance of 350 feet to 400 feet.

Transit

Transit signal prioritization (TSP) is recommended at the US 14, Haligus Road, and Briarwood Road intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended. Improvements are needed at these intersections for larger bus turning radii.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit

facilities. New user-friendly passenger facilities including shelter, benches, and sidewalks at minimum are recommended.

Lighting

For safety purposes, all signalized intersections and their approaches include lighting.

3.4.6 Additional Right-of-Way Requirements

Additional right-of-way of up to 20 feet is recommended, 10 feet on either side of the roadway. This investigation and analysis did not include topographical surveys and drainage investigations. Surveys, topography, drainage and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.4.7 Potential Environmental Concerns

Expansion of the roadway may cause negative impacts to the floodplain and wetlands along this segment. Expansion of the roadway may also cause negative impacts that interact with leakage from underground storage tank identified and requires mitigation. A noise analysis may be necessary to examine the impacts to sensitive receptors from an expanded cross section. Any taking of property of the Crystal Lake Park District identified along this segment of IL 176 will require a 303C (4F) documentation and reporting.

The Kishwaukee River has been rated as one of Illinois' most pristine rivers. Expansion of the right-of-way may impact floodplains and wetlands in this segment. Expansion of the right-of-way may also impact the quantity and quality of habitat for the threatened and endangered species in the Kishwaukee River area.

These environmental impacts and possible mitigation techniques will require further study during the Phase I process.

3.4.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.4.5**.

Table 3.4.5 2009 Construction Cost Estimates for Segment 4 (3.59 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	19.6	$1,800,000	$35,190,000
Intersection Signals	Intersection	3	$179,000	$537,000
Intersection Realignments	Intersection	2	$775,000	$1,550,000
Transit Improvement	Bus Stop	33	$30,000	$990,000
	Signal Priority	3	$72,000	$216,000
	Park/Ride	0	$60,000	$0
Sidewalk/Multi-Use Path**	Linear Feet	77,000	$66	$5,082,000
Lighting	Pole	12	$6,000	$72,000
Kishwaukee River Bridge SN 056-0069	Square Feet	6,287	$150	$943,080
Total Construction Cost				**$44,580,080**
Phase I Engineering	6%			$2,675,000
Phase II Engineering	8.5%			$3,789,000
Construction Engineering	10%			$4,458,000
Total Engineering Cost				**$10,922,000**
Right-of-way Acquisition	Acre	18.1	$70,000	**$1,267,000**
TOTAL ESTIMATED COST				**$56,769,080**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.5 Segment 5 - Oak Street to IL 31

Facing East through the US 14 and IL 176 Intersection

3.5.1 Location

Segment 5 is from Oak Street to IL 31, approximately 3.02 miles to the east. This segment is entirely within the City of Crystal Lake.

3.5.2 Existing Facility Characteristics (Exhibits A-16 to A-19)

Existing Roadway Configuration

The existing right-of-way width of IL 176 at this location varies between 66 feet and 160 feet. The existing roadway configurations are summarized in **Table 3.5.1**. There are three signalized intersections along this segment: Oak Street, Walkup Road, and Terra Cotta Road. There is a five-lane cross section planned approximately 1,500 feet east and west of the Walkup Road and IL 176 intersection. This proposed cross section includes a dedicated center left turn lane.

This segment passes under a 101 foot long Metra/Union Pacific concrete bridge. The structure number for this railroad bridge is 056-0045. It provides 14 feet and 3 inches of vertical clearance for vehicles passing underneath. The roadway width directly under this structure is approximately 48 feet wide. East of this structure at station location #428+32, the McHenry Branch of the Union Pacific Northwest Line crosses IL 176 at the same grade as the roadway. Warning lights and a crossing gate have been installed on either side of the tracks to protect traffic on IL 176.

Table 3.5.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
Oak St. to Lincoln Pkwy.	120 ft.	2	12 ft.	Painted Line		8 ft.
Lincoln Pkwy. to Marian Pkwy.	80 ft.	2	12 ft.	Painted Line		8 ft.
Marian Pkwy. to Walkup Rd.	105 ft. to 164 ft.	2	12 ft.	Painted Flush	12 ft.	6 ft. shoulders and B6.12 Curb and Gutter
Walkup Rd. to Elsworth St.	66 ft.	2	12 ft.	Painted Flush	12 ft.	8 ft.
Elsworth St. to UPRR at-grade crossing	66 ft.	2	14 ft.	Painted Line		B6.12 Curb and Gutter
UPRR at-grade crossing to IL 31	80 ft.	2	12 ft.	Painted Line		3 ft.

Existing Traffic Conditions

According to IDOT, this segment of IL 176 averaged 15,000 vehicles per day from Oak Street to Main Street and 16,000 to IL 31, in 2007. Terra Cotta Road to IL 31 was identified in the 2008 Illinois Five Percent Report as a segment within the top five percent of the entire state have safety needs.

Existing Transit Service

Pace suburban bus and Metra commuter rail provide public transportation within this segment of the IL 176 corridor. Pace Route 808 runs on IL 176 from Oak Street to US 14. On an average weekday 78 passengers ride Route 808. The Crystal Lake Metra Station is approximately one-fourth mile south of the IL 176 corridor, located off Grant Street between Railroad Street and Woodstock Street in the middle of downtown Crystal Lake.

In the center of Crystal Lake, the Union Pacific Northwest Line branches north toward McHenry. Both branches of the line cross IL 176. The Harvard branch overpasses IL 176 at Elmhurst Street. The McHenry branch crosses IL 176 at-grade between Park Boulevard and Erick Street. Each weekday three inbound and three outbound Metra trains cross IL 176 at this location.

3.5.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B-16 to B-19)

Along this segment of the IL 176, there are environmental issues that may constrain SRA development: sensitive land uses, wetlands, leaking underground storage tanks, and a historic site.

Sensitive Land Uses

- Veteran Acres Park is located approximately 150 feet north of IL 176 between Walkup Road and Main Street. Access to this park from IL 176 is provided at Second Street. The Wingate Prairie Nature Preserve is part of Veteran Acres Park.
- Part of the Crystal Lake bicycle path system crosses IL 176 at Glen Avenue and Lorraine Avenue.
- A Crystal Lake Water Pumping Station is located northwest of the Erick Street and IL 176 intersection.

Bicycle Path Crossing Facing Northeast at the Lorraine Avenue Intersection

- The Sunrise Assisted Living Complex is located southwest of the Mistwood Lane and IL 176 intersection.
- The Colonel Palmer House is located northeast of the Terra Cotta Road and IL 176 intersection. This house built circa 1858 is on the National Register of Historic Places and is maintained by the Crystal Lake Park District.

The Colonel Palmer House, circa 1858

Streams/Ponds/Wetlands/Floodplains

- There is a pond located in Veteran Acres Park north of IL 176 between Walkup Road and Main Street.
- There is wetland located north of IL 176 between the Chicago and Northwestern Railroad and Erick Street.
- There is wetland that abuts IL 176 south of the Knaack Boulevard and IL 176 intersection.

Leaking Underground Storage Tanks

- There is a leaking underground storage tank approximately 200 feet south of IL 176 and 400 feet west of Walkup Road.
- There is a leaking underground storage tank northeast of the Park Boulevard and IL 176 intersection.
- There is a leaking underground storage tank northeast of the Erick Street and IL 176 intersection.
- There is a leaking underground storage tank northwest of the Knaack Boulevard and IL 176 intersection.

3.5.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B-16 to B-19)

The area is urban with mixed land uses with frontage abutting IL 176. From US 14 to Park Boulevard, the area is predominately residential. East of Park Boulevard, the area is predominately industrial. Manufacturing industries are located adjacent to both branches of the Union Pacific Railroad. The Terra Cotta Technology Center is located between Knaack Boulevard and Terra Cotta Road. This development is for industrial, commercial, and office development.

3.5.5 Recommended SRA Cross Section (Exhibits C-16 to C-19)

This section identifies the ultimate roadway improvements recommended to enable this segment to function as a suburban or urban SRA. The desirable route characteristics for suburban SRA routes were developed to provide adequate traffic service and geometric design as well as protection of right-of-way for future needs. The desirable route characteristics for urban SRA routes were developed to provide adequate traffic service and geometric design given limited right-of-way. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, transit, and right-of-way requirements.

Roadway

The configurations of the ultimate recommended cross section for IL 176 are summarized in **Table 3.5.2**. During the design phase, the design of this facility must take into account the high crash locations identified by applying the appropriate roadside safety improvements as discussed in Chapter 38 of the BDE Manual.

Table 3.5.2 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
Oak St. to Lincoln Pkwy.	138 ft.	4	12 ft.	Barrier Median	22 ft.	10 ft. Multi-use Path & 5 ft. sidewalk	B.6.24 Curb and Gutter
Lincoln Pkwy. to IL 31	100 ft. - 120 ft.	4	12 ft.	Barrier Median	22 ft.	10 ft. Multi-use Path & 5 ft. sidewalk	B.6.24 Curb and Gutter

East of Oak Street, IL 176 is recommended to be a suburban section with a 22 foot barrier median. The alignment of IL 176 is also recommended to shift south to avoid any property impacts to the Colonel Palmer Historic site located in the northeast quadrant of IL 176 and Terra Cotta Road intersection. The urban cross section for this segment of IL 176 is compatible with the existing plans for a similar facility proposed near Walkup Road and will reduce the amount of required right-of-way and access control.

To place a grade separation over the Union Pacific Railroad Harvard branch structure overpass would require roughly 1,000 feet of no access on each side of the rail tracks to provide the 23 foot minimum vertical clearance over the rail. This no access zone would close multiple industrial businesses or require traffic be detoured over residential streets. The grade separation should be considered in a future Phase I engineering study as part of a long-term solution. However; due to the costs and possible delays in a grade separation, a short-term solution consisting of signals, gates, and warning lights should also be included.

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.5.3**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak hour traffic volume will be LOS "B" in each direction.

Table 3.5.3 Capacity Analysis for Segment 5

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
Oak St. to Main St.	15,000	24,000	60%	2	B	Yes
Main St. to IL 31	16,000	21,000	31%	2	B	Yes

Traffic Control/Intersection Configuration (Exhibits D-15, D-16, D-17, D-18, D-19, and D-20)

The existing traffic signal at Oak Street will be reconfigured to match the recommended changes of lane configurations. The frontage road access to Lincoln Parkway and the Lincoln Parkway access to IL 176 will be maintained and include dedicated left turn lanes on IL 176 and Lincoln Parkway. The existing traffic signal at Walkup Road will be reconfigured to match the recommended changes of lane configurations. Direct access to IL 176 for First Street is recommended to be relegated to right-in/right-out. A new fully actuated traffic signal is recommended at Main Street since this intersection is within a high crash area. Direct access to IL 176 for Ellsworth Street is recommended to be relegated to right-in/right-out. New fully actuated signals are also recommended at Erick Street and Knaack Boulevard only when future traffic volumes meet signal warrants. A new fully actuated traffic signal is recommended at Mistwood Lane since this intersection is within a high crash area.

Structures

The Union Pacific Railroad Northwestern Metra Line (Harvard Branch) bridged over IL 176 near Elmhurst Street will be replaced and widened to match recommended changes of lane configurations along the SRA corridor. The profile of IL 176 will have to be lowered to provide six more inches of clearance under the bridge (14 feet 3 inches to 14 feet 9 inches) as indicated in the BDE as desirable for suburban or urban SRAs.

A grade-separation (either an overpass bridge or an underpass tunnel) is recommended at the Union Pacific Northwest Metra Line (McHenry Branch) crossing as an alternative. If it is determined during a future Phase I engineering study that a grade-separation of this railroad is not feasible, it is highly recommended that the use of constant warning time (CWT) devices be investigated.

For the urban cross section, a structure with a road deck width of 81 feet will be needed for two 12 foot inner lanes, two 14 foot outer lanes, five foot sidewalks on each side, and a 22 foot median separating the opposing traffic lanes. The roadway will need roughly 1,000 feet on either side of the railroad to incline 23 feet at a six percent grade over the railroad (23 feet is the minimum clearance required for railroads). The existing intersections of Glen Avenue, Lorraine Drive, Park Boulevard, and Erick Street will have to have their profile raised to meet IL 176. The feasibility of rising the profiles of these intersections will have to be determined during a future Phase I engineering study.

Lowering IL 176 under the railroad will likely have fewer impacts than a structure over the railroad. Assuming a grade of 4.5 percent and 14 feet 9 inches of vertical clearance, IL 176 will begin to decline approximately 700 feet east or west of the railroad. The profiles of Glen Avenue, Lorraine Drive, and Erick Street will not likely have to be altered. The profile of Park Boulevard will still have to be lowered in this case.

Overhead Signing

The intersection of IL 176 with IL 31 is recommended to have advance overhead signing with route numbers, name, regional destinations (i.e. McHenry, Algonquin). The lettering will be large enough to read at a distance of 350 feet to 400 feet.

Transit

Transit signal prioritization (TSP) is recommended at the US 14, Oak Street, Walkup Road, Main Street, Terra Cotta Road, and Mistwood Lane intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended. Improvements are needed at the US 14 and IL 31 intersections for larger bus turning radii.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. Space is also recommended (50 stalls, roughly 0.6 acres) to be provided for a park-and-ride facility near the US 14/IL 176 intersection. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit facilities. New user-friendly passenger facilities including shelter, benches and sidewalks at minimum are recommended.

Lighting

The signalized intersections will have appropriate lighting installed for both vehicular and pedestrian safety purposes.

3.5.6 Additional Right-of-Way Requirements

Table 3.5.4 summarizes the additional right-of-way required for the recommended roadway. Between Oak Street and Lincoln Parkway, the urban cross section will require 10 feet of additional right-of-way to the north. IL 176 will be widened 10 feet to the south within the existing parkway between the frontage road and IL 176. Between Lincoln Parkway and IL 31, an urban cross section will require 20 feet of additional right-of-way, 10 feet on each side with the exception between Walkup Road and Union Pacific Railroad McHenry Branch, where the existing right-of-way is 66 feet will require up to 39 feet of additional right-of-way.

Table 3.5.4 Additional Right-of-Way Requirements

		Suburban/Urban Alternative
Location	**Miles**	**Feet Needed**
US 14 to Oak St.	0.55	20
Oak St. to Lincoln Pkwy.	0.19	10
Lincoln Pkwy. to UPRR Harvard Branch	0.34	20
UPRR Harvard Branch to UPRR McHenry Branch	0.59	34
UPRR McHenry Branch to Mistwood Lane	1.08	20
IL 31 Eastbound Approach	0.11	20
Total Acres		**6.94**

This investigation and analysis did not include topographical surveys and drainage investigations. Surveys, topography, drainage and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.5.7 Potential Environmental Concerns

Expansion of the roadway may cause negative impacts to the wetlands along this segment. Any taking of the Veteran Acres Park will require 303C (4F) documentation and reporting. Any taking of the Colonel Palmer Historic property will require Section 106 and 303C (4F) documentation and reporting. Expansion of the roadway may cause negative impacts that interact with leakage from underground storage tanks identified and requires mitigation. A noise analysis may be necessary to examine the impacts to sensitive receptors from an expanded cross section. These environmental impacts and possible mitigation techniques will require further study during the Phase I process.

3.5.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.5.5**.

Table 3.5.5 2009 Construction Cost Estimates for Segment 5 (3.02 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	12.8	$1,800,000	$23,022,000
Intersection Signals	Intersection	8	$179,000	$1,432,000
Intersection Realignments	Intersection	0	$775,000	$0
Transit Improvement	Bus Stop	14	$30,000	$420,000
	Signal Priority	6	$7,200	$43,200
	Park/Ride	1	$60,000	$60,000
Sidewalk/Multi-Use Path**	Linear Feet	48,000	$22	$1,056,000
Lighting	Pole	32	$6,000	$192,000
Rail Bridge SN 056-0045	Square Feet	4,000	$250	$1,000,000
Bike Path Grade-Separation	Bicycle Bridge	1	$2,000,000	$2,000,000
4-Lane CNW Railroad Grade-Separation	Lump Sum	1	$5,800,000	$5,800,000
Total Construction Cost				**$35,025,200**
Phase I Engineering	6%			$2,102,000
Phase II Engineering	8.5%			$2,977,000
Construction Engineering	10%			$3,503,000
Total Engineering Cost				**$8,582,000**
Right-of-way Acquisition	Acre	14.6	$84,000	**$1,226,000**
TOTAL ESTIMATED COST				**$44,833,200**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.6 Segment 6 - IL 31 to Nish Road

Facing East through the Valley View Road and IL 176 Intersection

3.6.1 Location

Segment 6 is from IL 31 to Nish Road approximately 3.78 miles to the east.

3.6.2 Existing Facility Characteristics (Exhibits A-19 to A-23)

Existing Roadway Configuration

At this location, the existing right-of-way is 80 feet from IL 31 to Nish Road. The existing roadway configuration is summarized in **Table 3.6.1**. Traffic signals are installed at the IL 31 and Valley View Road intersections.

Table 3.6.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
IL 31 to Nish Rd.	80 ft.	2	13 ft.	Painted-Line	-	8 ft.

Existing Traffic Conditions

According to IDOT, this segment of road averaged 13,800 vehicles per day from IL 31 to Smith Road, 13,000 vehicles per day from Smith Road to Valley View Road, and 16,100 vehicles per day from Valley View Road to Nish Road in 2007. The Valley View Road intersection was identified in the 2008 Illinois Five Percent Report as a location within the top five percent of the entire state having safety needs. In addition, IL 31 to Smith Road and Behan Road to Sherman Boulevard were identified in the 2009 Illinois Five Percent Report as segments within the top five percent of the entire state having safety needs.

Existing Transit Service

Pace Route 806 runs north and south through the IL 31/IL 176 intersection on IL 31. On an average weekday, 58 passengers ride Route 806. There is no weekend service on Route 806.

3.6.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B-19 to B-23)

Along this segment of IL 176, there are environmental issues that may constrain SRA development: sensitive land uses, wetland, and leaking underground storage tanks.

Sensitive Land Uses

- The Prairie Grove Cemetery is located north of IL 176 approximately 800 feet west of Behan Road.
- The Silver Creek Conservation Area is located approximately 500 feet south of IL 176 to the east of Buhl Road.
- The Prairie Isle Golf Club is located north of IL 176 between Buhl Road and Sherman Boulevard.
- The Faith Community United Church of Christ is located northeast of the Sherman Boulevard and IL 176 intersection.
- The Nunda Rural Fire Protection District is located northeast of the Burton Trail and IL 176 intersection.
- Prairie Grove District 46 Administrative Offices and K-8 classrooms.

Wetlands

- There is a wetland between Sherman Boulevard and Blue Island Avenue north of IL 176.

Leaking Underground Storage Tanks

- There is a leaking underground storage tank south of IL 176 near the Nunda Township Prairie Grove School approximately 800 feet west of the Valley View Road and IL 176 intersection.

3.6.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B-19 to B-23)

The land use along this segment is mostly rural. There are housing subdivisions at Smith Road, Barreville Road, Blue Island Avenue. Between Sherman Boulevard and Blue Island Avenue, the area transitions from rural to suburban residential.

3.6.5 Recommended SRA Cross Section (Exhibits C-19 to C-23)

This section identifies recommended ultimate roadway improvements to enable this segment to function as a suburban SRA. The desirable route characteristics for suburban SRA routes were developed to provide adequate traffic service and geometric design as well as protection of right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, transit, and right-of-way requirements.

Roadway

The configurations of the ultimate recommended cross section for IL 176 are summarized in **Table 3.6.2**. During the design phase, the design of this facility must take into account the high crash location of this segment by applying the roadside safety improvements as discussed in Chapter 38 of the BDE Manual.

Table 3.6.2 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
IL 31 to Nish Rd.	120 ft.	4	12 ft.	Typical Barrier	22 ft.	5 ft.	B6.24 Curb and Gutter
A 10 ft. wide multi-use path will be provided							

Access from Terra Cotta Avenue to the IL 31/IL 176 intersection will be closed by the construction of a cul-de-sac. The possibility of realigning the entire intersection north to correct the angle deficiency of IL 176 through this intersection is recommended to be investigated in a future Phase I engineering study. In addition to this realignment, the intersections of Barreville Road, Behan Road, Buhl Road, and Sherman Boulevard will have their offsets and approach angles corrected.

IL 176 is recommended to shift north of its existing centerline at Valley View Road to avoid taking the historic property at the southwest corner of the intersection. IL 176 is recommended to shift south of its existing centerline between Valley View Road and Behan Road to avoid any takings of the Prairie Grove Cemetery.

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.6.3**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak hour traffic volume will be LOS "B" in each direction.

Table 3.6.3 Capacity Analysis for Segment 6

	2003 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
IL 31 to Smith Rd.	13,800	19,000	38%	2	B	Yes
Smith Rd. Valley View Rd.	13,000	16,000	23%	2	B	Yes
Valley View Rd. to Nish Rd.	16,100	19,000	18%	2	B	Yes

Traffic Control/Intersection Configuration (Exhibits D-20a, D-20b, D-21, D-22, D-23a, and D-23b)

At the IL 31 intersection, the lane configuration will include two through lanes, dual left turn lanes and a right turn lane in all approaches. The curb radii for the IL 31 road will be designed to meet a WB-65 design vehicle. However, smaller design vehicles may be used at certain intersections as appropriate when a Phase 1 engineering study is completed.

Fully actuated traffic signals are recommended at Barreville Road, Behan Road, Buhl Road, and Bay View Beach Road. The existing traffic signal at Valley View Road will be reconfigured to match the recommended lane configurations. The lane configurations at these intersections

include two through lanes on IL 176 as well as left turn lanes and a dedicated right turn lane for all approaches. Center channelization and corner islands are recommended at this location to direct traffic and reduce the wide expansion.

Transit

Transit signal prioritization (TSP) is recommended at the IL 31, Smith Road, Valley View Road, Barreville Road, Buhl Road, and Sherman Boulevard intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended. Improvements are needed at the IL 31 intersection for larger bus turning radii.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. Space is also recommended (50 stalls, roughly 0.6 acres) to be provided for a park-and-ride facility near the IL 31/IL 176 intersection. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit facilities. New user-friendly passenger facilities including shelter, benches and sidewalks at minimum are recommended.

Lighting

Signalized intersections and their approaches will have appropriate lighting installed for safety purposes. Unsignalized intersections and right-in and right-out side roads are recommended to have basic lighting.

3.6.6 Additional Right-of-Way Requirements

Additional right-of-way of 40 feet is recommended, 20 feet on either side of the roadway. Field visits identified three areas where additional right-of-way may be required in order to construct the recommended road facility due to topography. On either side of Smith Road there are hilly areas approximately 800 feet to 1,000 feet in length where the roadway is cut into the hillsides. There is a third hilly area approximately 1,800 feet in length between Behan Road and Buhl Road where the roadway is cut into the hillsides.

This investigation and analysis did not include topographical surveys and drainage investigations. Surveys, topography, drainage and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.6.7 Initial Environmental Concerns

The Prairie Isle Golf Club is located between Buhl Road and Sherman Boulevard north of IL 176. Negative impacts to the golf course fairway and general playability of each hole due to the expansion of the roadway must be avoided during future engineering phases so as to avoid the acquisition of the entire golf course. Expansion of the roadway may also cause negative impacts that interact with leakage from underground storage tanks identified. A noise analysis may be necessary to examine the impacts to sensitive receptors from an expanded cross section.

These environmental impacts and possible mitigation techniques will require further study during the Phase I process.

3.6.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.6.4.**

Table 3.6.4 2009 Construction Cost Estimates for Segment 6 (3.78 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	15.1	$1,800,000	$27,144,000
Intersection Signals	Intersection	4	$179,000	$716,000
Intersection Realignments	Intersection	6	$775,000	$4,650,000
Transit Improvement	Bus Stop	16	$30,000	$480,000
	Signal Priority	6	$7,200	$43,200
	Park/Ride	1	$60,000	$60,000
Sidewalk/Multi-Use Path**	Linear Feet	60,000	$66	$3,960,000
Lighting	Pole	16	$6,000	$96,000
Total Construction Cost				**$37,149,200**
Phase I Engineering	6%			$2,229,000
Phase II Engineering	8.5%			$3,158,000
Construction Engineering	10%			$3,715,000
Total Engineering Cost				**$9,102,000**
Right-of-way Acquisition	Acre	18.3	$84,000	**$1,537,000**
TOTAL ESTIMATED COST				**$47,788,200**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.7 Segment 7 - Nish Road to Roberts Road

Facing East at Burton's Bridge Crossing the Fox River

3.7.1 Location

Segment 7 is approximately 2.02 miles long from Nish Road to Roberts Road. This segment crosses the Fox River on Burton's Bridge.

3.7.2 Existing Facility Characteristics (Exhibits A-24 to A-25)

Existing Roadway Configuration

At this location, the existing right-of-way is 80 feet except between River Road and Newport Court where the right-of-way is 100 feet. The River Road and Newport Court intersections with IL 176 are signalized. The existing roadway configuration is summarized in **Table 3.7.1**.

IL 176 crosses the Fox River on Burton's Bridge east of Nish Street (See **Table 3.7.2.**). The overall condition of this bridge has been rated at equal to desirable. IL 176 also crosses Cotton Creek east of Lakeview Drive. The overall condition of this bridge has been rated better than adequate.

Table 3.7.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
Nish Rd. to Roberts Rd.	80 ft.*	2	13 ft.	Painted-Line	-	8 ft.
*Between River Rd. and Newport St. is 100 ft.						

Table 3.7.2 Existing Structures Configuration

Structure Location	Structure Number	Feature Crossed	Total Length	Deck Width	Roadway Width
East of Nish Rd.	056-0038	Fox River	414 ft.	43.2 ft.	26 ft.
East of Lakeview Dr.	056-0034	Cotton Creek	26 ft.	55.5 ft.	27.9 ft.

Existing Traffic Conditions

According to IDOT, this segment of IL 176 averaged 17,900 vehicles per day from Nish Road to River Road and 21,800 vehicles per day from River Road to Roberts Road in 2007. Lakeview Drive to Greenleaf Avenue was identified in the 2009 Illinois Five Percent Report as a segment within the top five percent of the entire state having safety needs.

Existing Transit Service

There is no Pace suburban bus service Metra commuter rail service provided along this segment of IL 176.

3.7.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B-24 to B-25)

Along this segment of the IL 176, there are environmental issues that may constrain SRA development: sensitive land uses, leaking underground storage tanks, floodplain, wetland, and a historic site.

Sensitive Land Uses

- Veteran's Memorial Park is located east of IL 176 between Newport Court and Lakeview Drive. The Village of Island Lake has plans to extend the park to the west of IL 176 south of Newport Court with possible access off of Newport Court. A bicycle path under IL 176 has been proposed as a concept to connect the two sections of the park.
- The Cotton Creek Grade School is located southwest of the Newport Court and IL 176 intersection.
- St. John Lutheran Church is located approximately 600 feet to the east of the Lakeview Drive and IL 176 intersection.
- The Cotton Creek Marsh Nature Preserve is located south of IL 176 between Lakeview Drive and Roberts Road.
- There is a historic structure northeast of the Lakeview Drive and IL 176 intersection. This is the last of three ornamental stone gateway markers constructed for the old entrances into Island Lake.

Streams/Ponds/Wetlands/Floodplains

- The Fox River is located between Nish Road and Woods Avenue. The Fox River floodplain extends approximately 200 feet to the west on IL 176 and approximately 400 feet to the east of IL 176.
- Island Lake is located north of IL 176 between Lakeview Drive and Midway Drive. The floodplain of the lake abuts the east side of IL 176.
- Cotton Creek crosses under IL 176 between Lakeview Drive and Midway Drive.
- There is a large wetland complex south of IL 176 across from Lakeview Drive.

Leaking Underground Storage Tanks

- There is a leaking underground storage tank northeast of the Nish Road and IL 176 intersection.
- There is a leaking underground storage tank southeast of the Lakeview Drive and IL 176 intersection.

Threatened and Endangered Species

- Blanding's Turtle has been found in the Cotton Creek and Island Lake area.
- The Sandhill Crane has been found in the Cotton Creek and Island Lake area.
- The small White Lady's Slipper has been found in the Cotton Creek Marsh Nature Preserve.

3.7.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B-24 to B-25)

This area is suburban in nature with residential subdivisions and strip commercial developments.

3.7.5 Recommended SRA Cross section (Exhibits C-24 to C-25)

This section identifies recommended ultimate roadway improvements to enable this segment to function as a suburban SRA. The desirable route characteristics for suburban SRA routes were developed to provide adequate traffic service and geometric design as well as protection of right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, bridge structure, transit, and right-of-way requirements.

Roadway

The configurations of the ultimate recommended cross section for IL 176 are summarized in **Table 3.7.3**.

Table 3.7.3 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
Nish Rd. to Roberts Rd.	120 ft.	4	12 ft.	Typical Barrier	22 ft.	5 ft.	B6.24 Curb and Gutter
A 10 ft. wide multi-use path will be provided.							

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.7.4**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak hour traffic volume will be LOS "C" in each direction. To improve operation, safety hazard, and limit the number of access points as recommended for suburban SRAs, access is recommended to be eliminated from Woods Avenue and Griswold Avenue which are local low traffic streets.

Table 3.7.4 Capacity Analysis for Segment 7

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
Nish Rd. to River Rd.	17,900	25,000	40%	2	C	Yes
River Rd. to Roberts Rd.	21,800	26,000	19%	2	C	Yes

Traffic Control/Intersection Configuration (Exhibits D-25, D-26, D-27)

Access is recommended to be relocated from S. Wright Road onto Nish Road due to proximity to the Nish Road/IL 176 intersection. Access for S. Wright Road and East Drive to Nish Road is recommended to be combined 400 feet north of IL 176 to provide better signal operation. Access to Blue Island Avenue and Burton Trail will be limited to right-in and right-out only by barrier median. A break in the median barrier should be provided at the fire station east of Burton Trail to allow emergency vehicle access.

Direct access to IL 176 from Wauconda Road and Dedlow Road will be closed and traffic detoured to the proposed signalized intersection at Robin Lane.

The realignments of Griswold Avenue and Newport Court to River Road are recommended to be studied during a future Phase I engineering study. Access to IL 176 from Griswold Avenue and Auburn Drive is recommended to be limited to right-in and right out movements. Full access will be provided via the Newport Court and River Road intersections.

New fully actuated traffic signals are recommended at Nish Road/Fox Street, Hale Lane, and Cherry Avenue. The Newport Court and River Road intersections will be configured to match the recommended lane configurations. The lane configurations will be two through lanes, a dedicated left turn lane, and a dedicated right turn lane along IL 176. The curb radii at these intersections will be designed to meet a WB-65 design vehicle. However, smaller design vehicles may be used at certain intersections as appropriate when a Phase 1 engineering study is completed.

Structures

In order to accommodate a four-lane roadway, the existing bridge over the Fox River must be widened, paired, or replaced. A structure with a road deck width of 75 feet will be needed to carry two 12 foot inner lanes, two 14 foot outer lanes, a five foot sidewalk on each side, and a six foot median separating the opposing traffic lanes. The additional two feet on the outer lanes will accommodate bicycle travel over the Fox River. The bridge will meet the minimum horizontal and vertical clearances established by the Department of Natural Resources through the Rivers, Lakes and Streams Act. For bridges over the Fox River between Algonquin and IL 173, the Department of Natural Resources has set a minimum right-of-limit of 100 feet and a minimum vertical clearance for such bridges of 15 feet above normal pool level. (**Source: Amended at 15 Ill. Reg. 9068, effective June 10, 1991)** The Fox River is a navigable waterway and is therefore under the jurisdiction of the U. S. Army Corps of Engineers. The widening, or new construction of Burton's Bridge over the Fox River must also be coordinated with the Corps.

In order to accommodate a four-lane roadway, the existing bridge over Cotton Creek (SN056-0034) must be replaced or widened. A structure with a road deck width of 91 feet will be needed to carry two 12 feet inner lanes, two 14 feet outer lanes, a five foot sidewalk on each side, and a 22 foot median separating opposing traffic lanes. The additional two feet on the outer lanes will accommodate bicycle travel over the creek.

Lighting

Signalized intersections and their approaches will have appropriate lighting installed for safety purposes.

Transit

Transit signal prioritization (TSP) is recommended at the Nish Road, Hale Lane, Cherry Avenue, and River Road intersections for transit operations. Coordination of the TSP systems between buses and general traffic progression is recommended.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit facilities. New user-friendly passenger facilities including shelter, benches, and sidewalks at minimum are recommended.

3.7.6 Additional Right-of-Way Requirements

Additional right-of-way of 40 feet is recommended, 20 feet on either side of the roadway except between River Road and Newport Court where additional right-of-way of 20 feet is recommended, 10 feet on either side of the roadway.

Facing West on IL 176 Near Midway Drive

Field visits identified two areas where additional right-of-way may be required in order to construct the recommended road facility due to topography. Additional right-of-way may be required for the construction of a new or expanded Fox River Bridge as well as for the widening of the roadway approaches to the bridge. Between Lakeview Drive and Roberts Road, IL 176 crosses Cotton Creek and bends toward the east along the side of a hill **(Exhibit C-25**). The terrain drops over 30 feet to the southwest and rises several feet to the northeast. Additional right-of-way may be required between Lakeview Drive and Roberts Road to construct the recommended roadway into the hillside.

This investigation and analysis (P-91-200-00) did not include topographical surveys and drainage investigations. Surveys, topography, drainage, and other engineering documentation will be completed during a future Phase I engineering study. During Phase I, the need for additional right-of-way, temporary easements, and other design issues not identified in this study will be investigated.

3.7.7 Potential Environmental Concerns

There are potential environmental impacts identified along this segment of IL 176. The following potential impacts and possible mitigation techniques will require further study during the Phase I process:

- Expansion of the right-of-way may cause negative impacts to the floodplain and wetlands along this segment. Any taking of the Veteran's Memorial Park will require 303C (4F) documentation and reporting. Any taking of Island Lake's historic gateway marker may require Section 106 and 303C (4F) documentation and reporting.
- Burton's Bridge over the Fox River would be widened, paired, or replaced. The Fox River is a navigable waterway and is therefore under the jurisdiction of the U. S. Army Corps of Engineers. The widening or new construction of Burton's Bridge over the Fox River must be coordinated with the Corps.
- Expansion of the roadway may cause negative impacts that interact with leakage from underground storage tanks identified. A noise analysis may be necessary to examine the impacts to sensitive receptors from an expanded roadway.

3.7.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.7.5**.

Table 3.7.5 2009 Construction Cost Estimates for Segment 7 (2.02 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	8.1	$1,800,000	$14,544,000
Intersection Signals	Intersection	6	$179,000	$1,074,000
Intersection Realignments	Intersection	3	$775,000	$2,325,000
Transit Improvement	Bus Stop	8	$30,000	$240,000
	Signal Priority	4	$7,200	$28,800
	Park/Ride	0	$60,000	$0
Sidewalk/Multi-Use Path**	Linear Feet	21,300	$66	$1,405,800
Lighting	Pole	24	$6,000	$144,000
Fox River Bridge SN 056-0038	Square Feet	139,200	$250	$34,800,000
Cotton Creek Bridge SN 056-0034	Square Feet	3,016	$150	$452,400
Total Construction Cost				**$55,014,000**
Phase I Engineering	6%			$3,301,000
Phase II Engineering	8.5%			$4,676,000
Construction Engineering	10%			$5,501,000
Total Engineering Cost				**$13,478,000**
Right-of-way Acquisition	Acre	9.8	$84,000	**$823,000**
TOTAL ESTIMATED COST				**$69,315,000**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.

3.8 Segment 8 - Roberts Road to US 12 (Rand Road)

3.8.1 Location

This section of the IL 176 SRA Corridor is in Lake County from Roberts Road to US 12 (Rand Road) approximately 2.58 miles to the east.

Facing East towards the US 12 (Rand Road) Interchange

3.8.2 Existing Facility Characteristics (Exhibits A-26 to A-28)

Existing Roadway Configuration

At this location, the existing right-of-way is 80 feet except between Larkdale Row and US 12 (Rand Road) western ramps where the right-of-way varies from 90 feet to 108 feet. There are traffic signals at Roberts Road, Eastway Drive, Westridge Drive, Darrell Road, Larkdale Row, Commercial Drive, and two at the US 12 (Rand Road) interchange. The existing roadway configuration is summarized in **Table 3.8.1**.

The eastern terminus of the study corridor is US 12 (Rand Road), which is also an SRA route. Access is controlled from IL 176 to US 12 (Rand Road) by a grade-separated diamond interchange. US 12 (Rand Road) is carried over IL 176 on two parallel bridge structures indicated in **Table 3.8.2**. The interchange has an eastern pair of on- and off-ramps and a western pair of on- and off-ramps. Each pair meets IL 176 forming a signalized intersection. The traffic signals for these ramps, Larkdale Row, and Commercial Drive are within 1,400 feet of each other. Coordination between the signal timings has been implemented; however, the limited spacing between these signals continues to be problematic.

Table 3.8.1 Existing Roadway Configuration

	ROW	Lanes		Median		Shoulders
	Width	#	Width	Type	Width	Width
Roberts Rd. to US 12 (Rand Rd.)	80 ft.*	2	13 ft.	Painted Line	_	8 ft.
*Between Larkdale Rd. and US 12 is 90 to 108 ft.						

Table 3.8.2 Existing Structures Configuration at US 12

Structure Location	Structure Number	Feature Crossed	Total Width	Total Length	Horizontal Clearance on SRA	Vertical Clearance on SRA
US 12 (Rand Rd.) Interchange	049-0022	IL 176	41 ft.	160 ft.	39 ft.	14 ft. 6 in.
	049-0022	IL 176	41 ft.	160 ft.	39 ft.	14 ft. 6 in.

Existing Traffic Conditions

According to IDOT, this segment of road averaged 19,200 vehicles per day from Roberts Road to Darrell Road and 20,000 vehicles per day from Darrell Road to US 12 (Rand Road) in 2007.

Lakeview Drive to Greenleaf Avenue was identified in the 2009 Illinois Five Percent Report as a segment within the top five percent of the entire state having safety needs.

Existing Transit Service

There is no Pace suburban bus service or Metra commuter rail service provided along this segment of IL 176.

3.8.3 Existing Environmental Characteristics and Environmental Constraints (Exhibits B-26 to B-28)

Along this segment of the IL 176, there are environmental issues that may constrain SRA development: sensitive land uses, streams, wetlands, floodplains, and leaking underground storage tanks.

Sensitive Land Uses

- The Evangelical Free Church is located to the southeast of the Anderson Road and IL 176 intersection.

Streams/Ponds/Wetlands/Floodplains

- There is wetland at the Greenleaf Avenue and IL 176 intersection.
- There is wetland west of the Westridge Drive and IL 176 intersection. Flooding problems were noted by the Village of Island Lake at this intersection.
- There is wetland on both sides of Orchard Drive near IL 176.
- There is wetland at the Darrell Road intersection.
- Slocum Creek flows in an east-west direction and crosses IL 176 three times between Darrell Road and US 12 (Rand Road). Much of IL 176 between Darrell Road and Anderson Road is within the Slocum Creek floodplain. There is wetland along Slocum Creek that abuts IL 176 where the creek crosses the road.

Leaking Underground Storage Tanks

- There is a leaking underground storage tank northwest of the Woodlawn Drive and IL 176 intersection.
- There is a leaking underground storage tank northwest of the Eastway Drive and IL 176 intersection.

3.8.4 Existing Land Use Characteristics and Land Use Constraints (Exhibits B-26 to B-28)

The area is suburban in nature with residential subdivisions and strip commercial developments. Between Darrell Road and Anderson Road development has been constrained due to the Slocum Creek floodplain which has preserved a rural character.

3.8.5 Recommended SRA Cross Section (Exhibits C-26 to C-28)

This section identifies recommended ultimate roadway improvements to enable this segment to function as a suburban SRA. The desirable route characteristics for suburban SRA routes were developed to provide adequate traffic service and geometric design as well as protection of right-of-way for future needs. These recommendations cover the following: roadway facilities, traffic control/intersection configurations, US 12 (Rand Road) interchange, transit, and right-of-way requirements.

Roadway

The configurations of the ultimate recommended cross section for IL 176 are summarized in **Table 3.8.3**. During the design phase, the design of this facility must take into account the high crash locations along this segment by applying the roadside safety improvements as discussed in Chapter 38 of the BDE Manual.

Table 3.8.3 Ultimate Roadway Configuration

	ROW	Lanes		Median		Sidewalks	Drainage
	Width	#	Width	Type	Width	Width	Type
Roberts Rd. to US 12 (Rand Rd.)	120 ft.	4	12 ft.	Typical Barrier	22 ft.	5 ft.	B6.24 Curb and Gutter
*A 10 ft. wide multi-use path will be provided.							

To improve traffic operations, reduce safety hazards, and limit the number of access points as recommended for suburban SRAs, access is recommended to be eliminated from Converse Road. Access for pedestrians and bicycles will be maintained.

The intersections of Mack Drive and Forest Garden Road are recommended to be realigned into a single intersection.

For other curb cuts, access is recommended to be limited to right-in and right-out. Along this segment driveways will be consolidated to conform to current IDOT access standards as parcels redevelop.

Average daily traffic volumes based on 2030 socioeconomic projections were estimated by CMAP for the year 2030 (**Table 3.8.4**). An analysis of roadway capacity was conducted based on the 2030 projected travel demand and the recommended roadway configurations. The analysis indicated that the peak direction LOS will be "C".

Table 3.8.4 Capacity Analysis for Segment 8

	2007 Existing Average Daily Traffic	2030 Travel Demand (AADT)	Predicted Traffic Increase	Recommended Through Lanes per Direction	Peak Direction Level-of-Service	Adequate to Meet Projected Demand?
Roberts Rd. to Darrell Rd.	19,200	28,000	46%	2	C	Yes
Darrell Rd. to US 12 (Rand Rd.)	20,000	30,000	50%	2	C	Yes

Traffic Control/Intersection Configuration (Exhibits D-26, D-27, and D-28)

The existing traffic signal at Eastway Drive/Beech Street, Westridge Drive, Darrell Road, and Larkdale Row will be reconfigured to match recommended changes of lane configurations. The lane configurations will be two through lanes, left and right turn lanes along IL 176. Center channelization and corner islands are recommended at Roberts Road/Midway Drive and Eastway Drive/Beech Street intersections to direct traffic through the wide intersection. The curb radii at Darrell Road will be designed to meet a WB-65 design vehicle. However, smaller design vehicles may be used at certain intersections as appropriate when a Phase 1 engineering study is completed. The traffic signal at Larkdale Row will be interconnected with the US 12 (Rand Road) interchange signal system to provide for optimal traffic progression. Beech Street will be realigned to line up with Eastway Drive. A new signalized intersection is recommended east of Darrell Road.

Structures

Three box culverts are recommended to be widened or replaced at the Slocum Creek crossings.

An SRA study for US 12 (Rand Road) was completed in November 1994. The study recommended widening US 12 (Rand Road) to provide three lanes in each direction. Improvements of the interchange ramps were also recommended to and from IL 176 which will eliminate local access drives onto these ramps. Improvements to the US 12 (Rand Road) interchange will be investigated during a future Phase 1 engineering study.

Overhead Signing

The interchange of IL 176 with US 12 is recommended to have advanced overhead signing with route numbers, name, regional destinations (i.e. Fox Lake, Lake Zurich). The lettering will be large enough to read at a distance of 350 feet to 400 feet and in accordance with the guideline set forth in the Manual on Uniform Traffic Control Devices (MUTCD).

Transit

Transit signal prioritization (TSP) is recommended at the Roberts Road, Eastway Drive, Westridge Drive, Darrell Road, Larkdale Row, and Commercial Drive intersections as well as the US 12 (Rand Road) ramps for transit operations. Coordination of the TSP systems between

buses and general traffic progression is recommended. Improvements to the US 12 (Rand Road) interchange ramps will accommodate larger bus turning radii.

Space is recommended to be provided for existing and future bus stops, shelters, and turnouts at regular intervals. Space is also recommended (50 stalls, roughly 0.6 acres) to be provided for a park-and-ride facility near the US 12 (Rand Road) interchange. The specific locations of these facilities will be planned by local governments to ensure coordination of development with transportation and public transit facilities. New user-friendly passenger facilities including shelter, benches, and sidewalks at minimum are recommended.

Lighting

The signalized intersections, their approaches, and the US 12 ramps will have appropriate lighting installed for both vehicular and pedestrian safety purposes.

3.8.6 Additional Right-of-Way Requirements

Additional right-of-way of 40 feet is recommended, 20 feet on either side of the roadway. Field visits identified six areas where additional right-of-way may be required in order to construct the recommended road facility due to topography. Additional right-of-way may be needed east of the Roberts Road/Midway Drive intersection to accommodate the irregular terrain. IL 176 crosses Slocum Creek three times between Darrell Road and Anderson Road. At each of these locations, additional right-of-way may be required.

3.8.7 Initial Environmental Concerns

Expansion of the right-of-way may cause negative impacts on the creek, floodplain, and wetlands along this segment. Expansion of the right-of-way may also cause negative impacts related to the leaking underground storage tanks. A noise analysis may be necessary to examine the impacts to sensitive receptors from an expanded cross section. These environmental impacts and possible mitigation techniques will require further study during the Phase I process.

3.8.8 Construction/Right-of-Way Cost Estimates

A summary of the construction/right-of-way cost estimates for the recommended improvements to this segment is shown in **Table 3.8.5**.

Table 3.8.5 2009 Construction Cost Estimates for Segment 8 (2.58 Miles)

Improvement	Units	Quantity	Cost	Estimated Cost
Roadway*	Lane Mile	10.2	$1,800,000	$18,288,000
Intersection Signals	Intersection	6	$179,000	$1,074,000
Intersection Realignments	Intersection	2	$775,000	$1,550,000
Transit Improvement	Bus Stop	12	$30,000	$360,000
	Signal Priority	7	$7,200	$50,400
	Park/Ride	1	$60,000	$60,000
Sidewalk/Multi-Use Path**	Linear Feet	40,500	$66	$2,673,000
Lighting	Pole	24	$6,000	$144,000
Culvert Structures (3)	Linear Feet	478	$500	$239,000
Total Construction Cost				**$24,438,400**
Phase I Engineering	6%			$1,466,000
Phase II Engineering	8.5%			$2,077,000
Construction Engineering	10%			$2,444,000
Total Engineering Cost				**$5,987,000**
Right-of-way Acquisition	Acre	12.3	$84,000	**$1,033,000**
TOTAL ESTIMATED COST				**$31,458,400**

*Roadway miles do not include 200 ft. at realigned intersections.
** Sidewalk cost includes a 10 ft. multi-use path and a 5 ft. sidewalk.