

I-70 & Kipling Interchange PEL Study

Level 2 Screening



Diamond with Roundabout at Ramps & Frontage Road Alternative 3

This interchange consists of a series of four roundabouts on Kipling Street at the ramps and frontage road intersections. Signalized pedestrian crossings are provided at multilane roundabout approaches. The alternative eliminates four traffic signals on Kipling Street and reduces traffic speeds on Kipling Street.

Operations and Safety

- Peak hour delay increase experienced at ramp and frontage road intersections.
- Southbound and northbound Kipling Street peak hour queues leading to the interchange substantially increased.
- Peak hour queues on the westbound I-70 off ramp are reduced by 45%.
- Movements through closely-spaced multilane roundabouts may be difficult for drivers to understand.

Multimodal Connections

- Due to roundabout spacing, no pedestrian crossing of Kipling Street provided at the ramp intersections.
- Bicycle lanes transition to/from shared use path through the interchange area.
- Transit stops must move north and south of roundabouts.

Environmental and Community Impacts

- Interchange estimated to directly impact 14 properties with three full and 11 partial acquisitions (total = 2.6 acres).
- Increased congestion during peak hours may increase traffic traveling through the surrounding neighborhoods.

Constructability

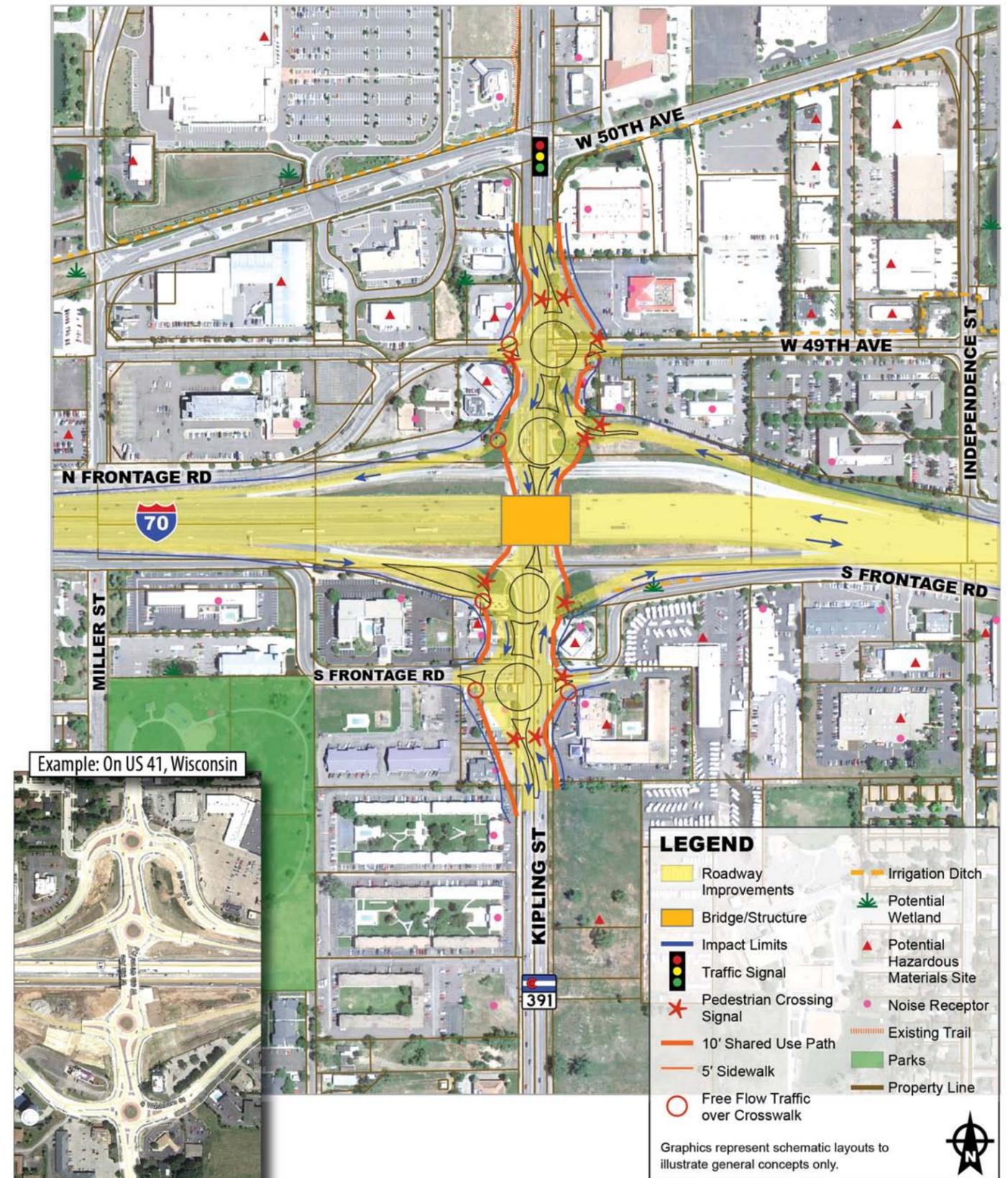
- Difficult to maintain traffic on Kipling Street with roundabout construction and limited opportunities for to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Reduced speed during off-peak hours 	<ul style="list-style-type: none"> • Degraded peak hour vehicular operations • Difficult perceived driver expectancy • Out-of-direction multimodal connections • Relatively difficult construction impacts compared to other alternatives • Limited opportunities to construct in phases

Recommendation:

ELIMINATED



I-70 & Kipling Interchange PEL Study

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Diamond with Six-Leg Roundabout at Ramps & Frontage Roads Alternative 4

This interchange consists of two roundabouts on Kipling Street providing movements at the ramps and frontage road intersections. Signalized pedestrian crossings are provided at the roundabout approaches. The alternative eliminates four traffic signals on Kipling Street and reduces traffic speeds on Kipling Street.

Operations and Safety

- Peak hour delay increase experienced at ramp and frontage road intersections.
- Southbound and northbound Kipling Street and westbound I-70 off ramp peak hour queues leading to the interchange substantially increased.
- Movements through closely-spaced multilane roundabouts may be difficult for drivers to understand.

Multimodal Connections

- Due to roundabout spacing, no pedestrian crossing of Kipling Street provided at the ramp intersections.
- Bicycle lanes transition to/from shared use path through the interchange area.
- Transit stops must move north and south of roundabouts.

Environmental and Community Impacts

- Interchange estimated to directly impact 11 properties with three full and eight partial acquisitions (total = 2.5 acres).
- Increased congestion during peak hours may increase traffic traveling through the surrounding neighborhoods.

Constructability

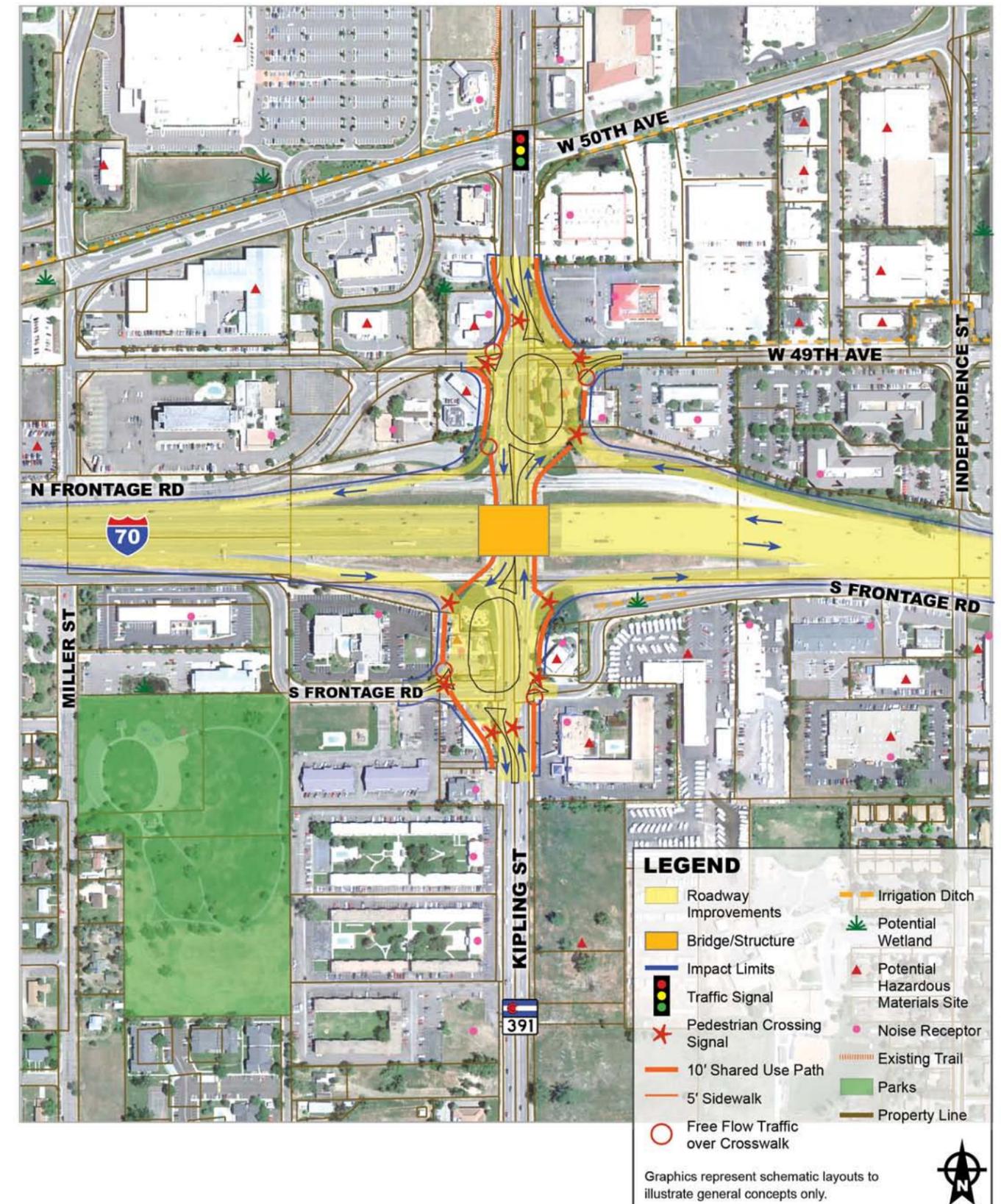
- Difficult to maintain traffic on Kipling Street with roundabout construction and limited opportunities for to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Reduced speed during off-peak hours 	<ul style="list-style-type: none"> • Degraded peak hour vehicular operations • Difficult perceived driver expectancy • Out-of-direction multimodal connections • Relatively difficult construction impacts compared to other alternatives • Limited opportunities to construct in phases

Recommendation:

ELIMINATED



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Fully Directional Interchange Alternative 6

This interchange consists of four levels of directional ramps with no signals for ramp movements. The frontage road traffic signals remain open under flyover ramps without access between the ramps and frontage roads.

The alternative maximizes the interchange vehicular traffic capacity.

Operations and Safety

- Southbound and northbound Kipling Street peak hour queues leading to the interchange are reduced by up to 70% in the peak hours.
- Peak hour queues on the westbound I-70 off ramp are reduced by 80% in the PM peak hour.
- Safety concerns with higher speed differential on Kipling Street with directional ramp connections to a lower speed arterial.

Multimodal Connections

- Shared use path provides grade separated crossings through the interchange area, but with some out-of-direction travel required.
- Bicycle lanes cross high-speed ramp movements on and off Kipling Street.

Environmental and Community Impacts

- Interchange estimated to directly impact 38 properties with 13 full and 25 partial acquisitions (total = 18.2 acres).
- Limited access between ramps and frontage roads may increase traffic traveling through the surrounding neighborhoods.

Constructability

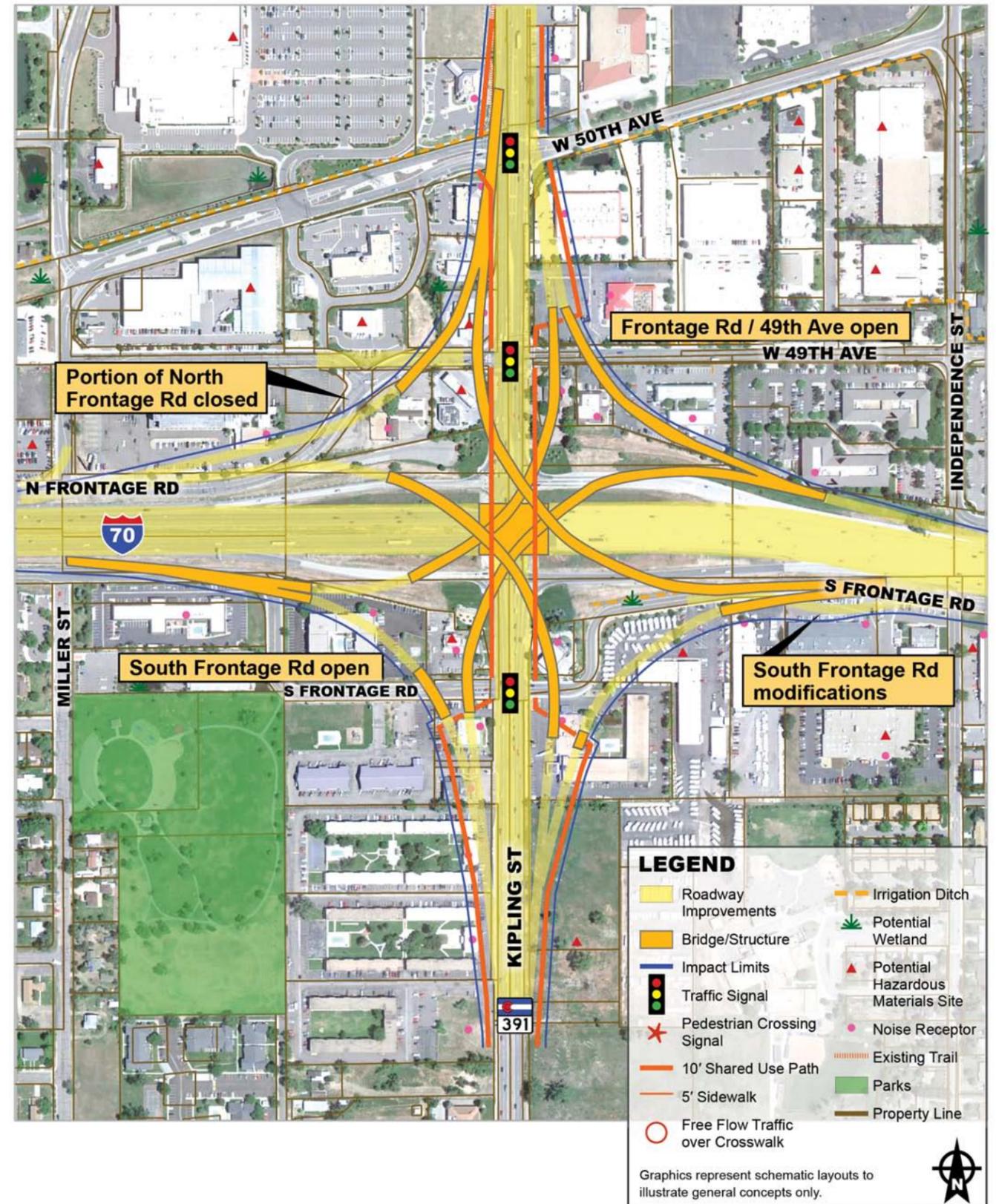
- Relatively difficult to construct with multiple flyover ramps.
- Ramps have opportunity to be constructed and opened in separate phases.
- Substantial construction expected with substantial right-of-way costs. (\$\$\$\$ - relative very high costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Improved peak hour vehicular capacity 	<ul style="list-style-type: none"> • Safety concerns with speed differential • Bicycle lanes crossing high-speed ramp movements • Major community and right-of-way impacts • Very high construction cost

Recommendation:

ELIMINATED



LEGEND

Roadway Improvements	Irrigation Ditch
Bridge/Structure	Potential Wetland
Impact Limits	Potential Hazardous Materials Site
Traffic Signal	Noise Receptor
Pedestrian Crossing Signal	Existing Trail
10' Shared Use Path	Parks
5' Sidewalk	Property Line
Free Flow Traffic over Crosswalk	

Graphics represent schematic layouts to illustrate general concepts only.

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Level 2 Screening



Partial Cloverleaf with Loops Southwest & Northwest Quadrants Alternative 9

This interchange consists of a loop ramp in the southwest quadrant providing free-flow operations for the left turn movement from southbound Kipling Street to eastbound I-70 and a loop ramp in the northwest quadrant providing free-flow operations for the left turn from the westbound off ramp to southbound Kipling Street. South Frontage Road is relocated with a traffic signal on Kipling Street south of the interchange with the location depending on local land use plans.

The alternative eliminates two traffic signals by eliminating the two heaviest left turn movements in the interchange area and increases signal spacing on Kipling Street.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 70% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange are reduced by about 70%.
- Westbound I-70 off ramp are free-flow movements merging onto Kipling Street without signals.
- Safety concerns with loop ramp serving traffic exiting freeway and area of weaving traffic along Kipling Street between the loop ramps.

Multimodal Connections

- Grade separated crossings of loop ramps provided for shared use path, but with some out-of-direction travel required.
- Bicycle lanes transition to/from shared use path on west side of Kipling Street to avoid weaving area.

Environmental and Community Impacts

- Interchange estimated to directly impact 19 to 21 properties with six to eight full and 13 partial acquisitions (total = 12.9 to 19.8 acres), depending on South Frontage Road relocation.
- Direct access to west side of frontage road in northwest quadrant is closed.

Constructability

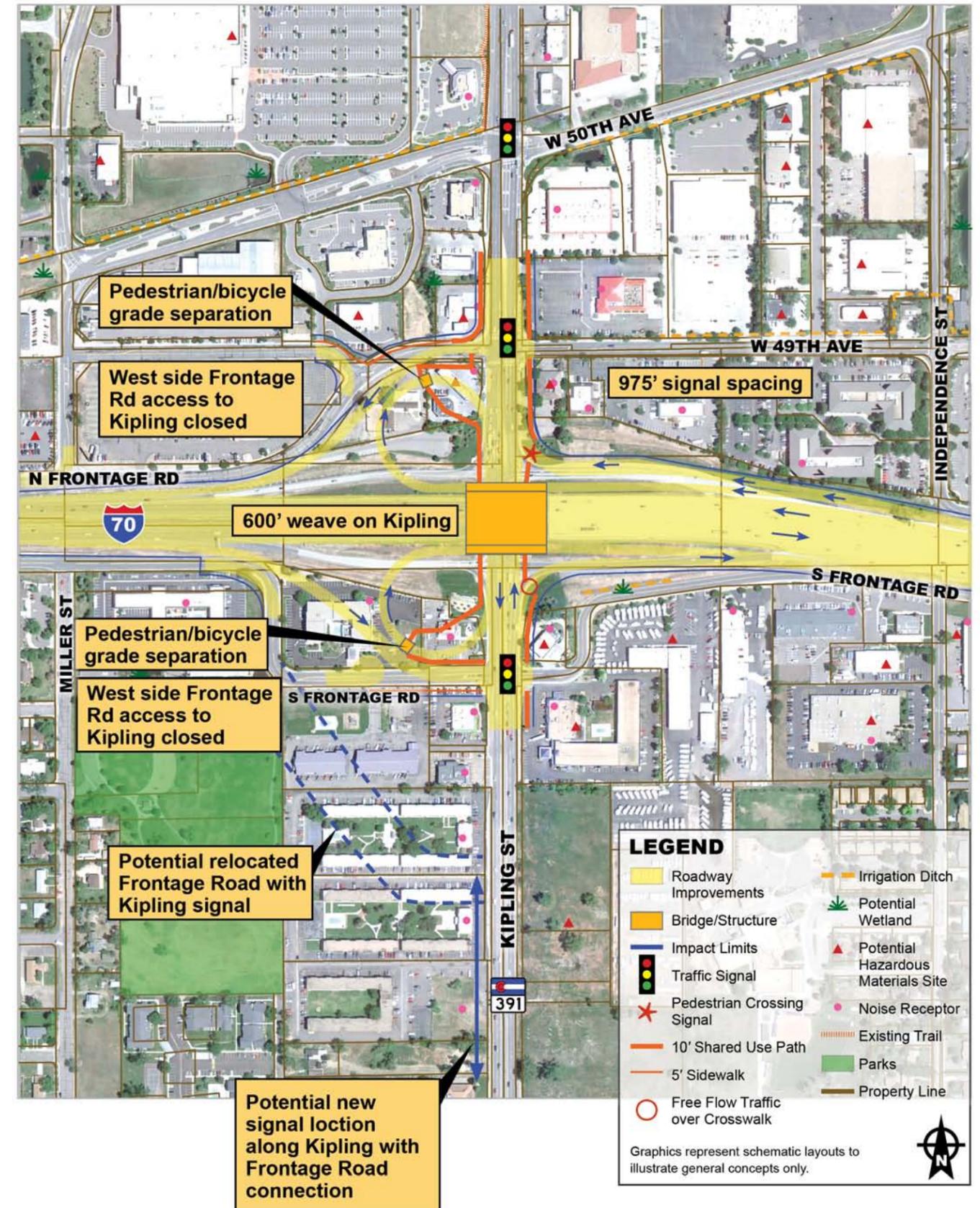
- Relatively easy to construct with areas outside Kipling Street and opportunities to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Improved vehicular operations • Moderately easy perceived driver expectancy • Opportunities to construct in phases 	<ul style="list-style-type: none"> • Out-of-direction multimodal connections • Safety concerns with weave area along Kipling Street between loop ramps • Frontage road access to northwest quadrant closed • Moderate right-of-way impacts

Recommendation:

ELIMINATED



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Texas Frontage Road Diamond Alternative 11

This interchange consists of a diamond interchange with frontage road access provided directly to/from the freeway ramps. The frontage road intersections from the ramps may be a roundabout (shown in the northwest quadrant), stop-controlled (shown in the southeast quadrant), or merging operations. The existing frontage road intersections on Kipling are unsignalized with limited movements. The South Frontage Road is relocated with a traffic signal on Kipling Street south of the interchange with the location depending on local land use plans.

The alternative eliminates two traffic signals on Kipling Street and provides access between I-70 and the frontage roads.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 60% from the No Action alternative in the PM peak hour.
- South Frontage Road experiences increase in delay at unsignalized access.
- Southbound Kipling Street peak hour queues leading to the interchange are reduced by about 45%.
- Peak hour queues on the westbound I-70 off ramp are reduced by almost 70%.
- Safety concerns with speed differential of freeway and local traffic on ramps and difficulty for drivers to negotiate unusual movements through interchange.

Multimodal Connections

- No pedestrian crossing of Kipling Street provided at unsignalized frontage road intersection, so out-of-direction travel required.
- Bicycle lanes are provided along Kipling Street directly through the interchange.

Environmental and Community Impacts

- Interchange estimated to directly impact 20 to 26 properties with three to eight full and 17 to 18 partial acquisitions (total = 8.2 to 23.3 acres), depending on South Frontage Road relocation.
- No increase in traffic traveling through neighborhoods expected.

Constructability

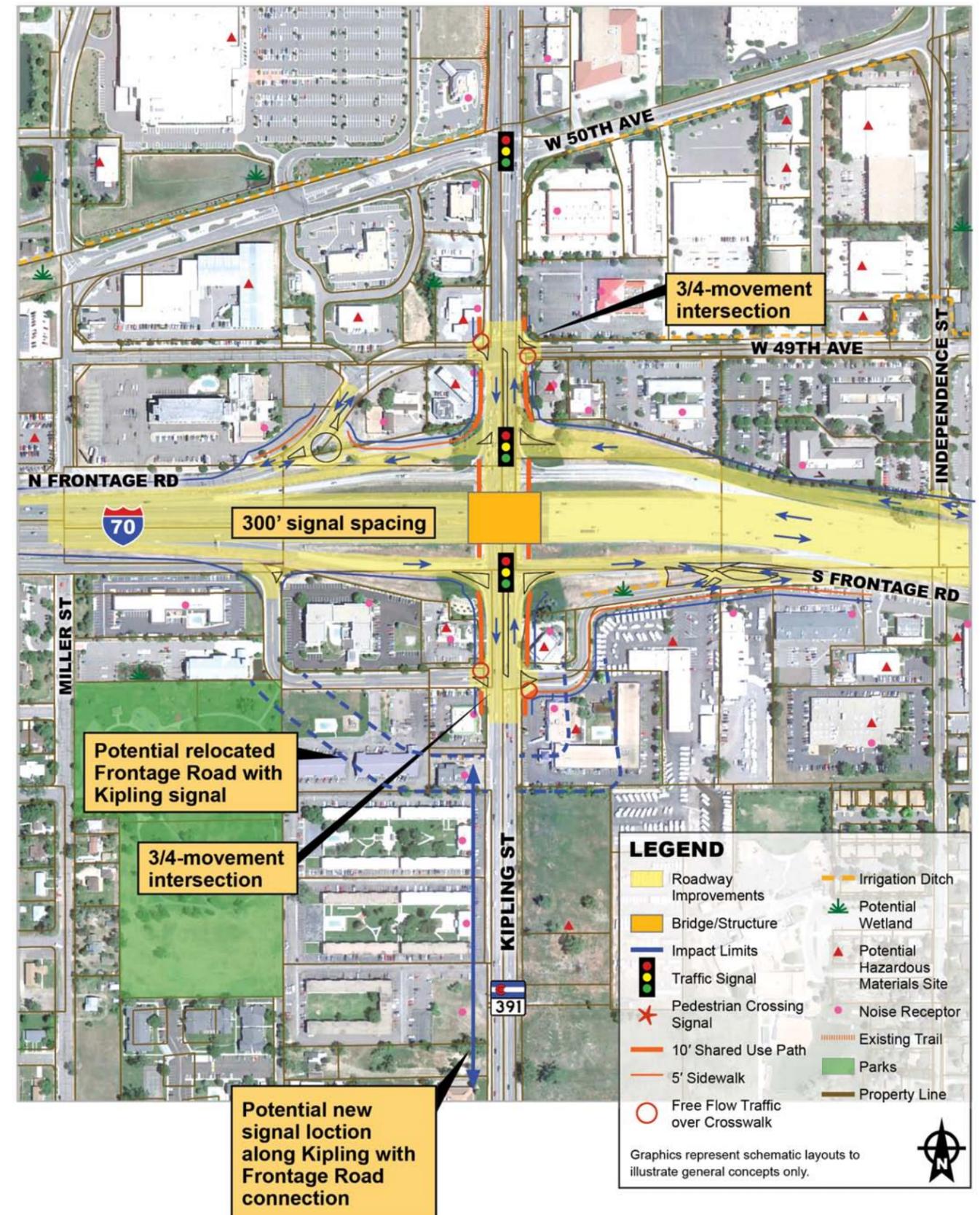
- Moderately difficult to construct within tight interchange area with opportunities to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Full access between ramps and frontage roads • Opportunities to construct in phases 	<ul style="list-style-type: none"> • Safety concerns with freeway and local traffic mix on ramps and unusual interchange movements • Moderate right-of-way impacts with South Frontage Road relocation

Recommendation:

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Michigan Lefts for Ramps Alternative 2I

This interchange consists of a diamond interchange with left turns restricted at the ramp intersections, so drivers must turn right then do a U-turn at the frontage road intersection. The alternative eliminates two traffic signals on Kipling Street.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 35% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange increase.
- Peak hour queues on the westbound I-70 off ramp are reduced by 50%.
- Unusual turn movements for ramp access to Kipling Street is relatively difficult for drivers to negotiate.

Multimodal Connections

- Grade separated crossing of multilane ramp provided for shared use path, but with some out-of-direction travel required.
- Unusual configuration and vehicular movements may be intimidating for bicyclists and pedestrians to negotiate.

Environmental and Community Impacts

- Interchange estimated to directly impact ten properties with three full and seven partial acquisitions (total = 2.6 acres).
- No increase in traffic traveling through neighborhoods expected.

Constructability

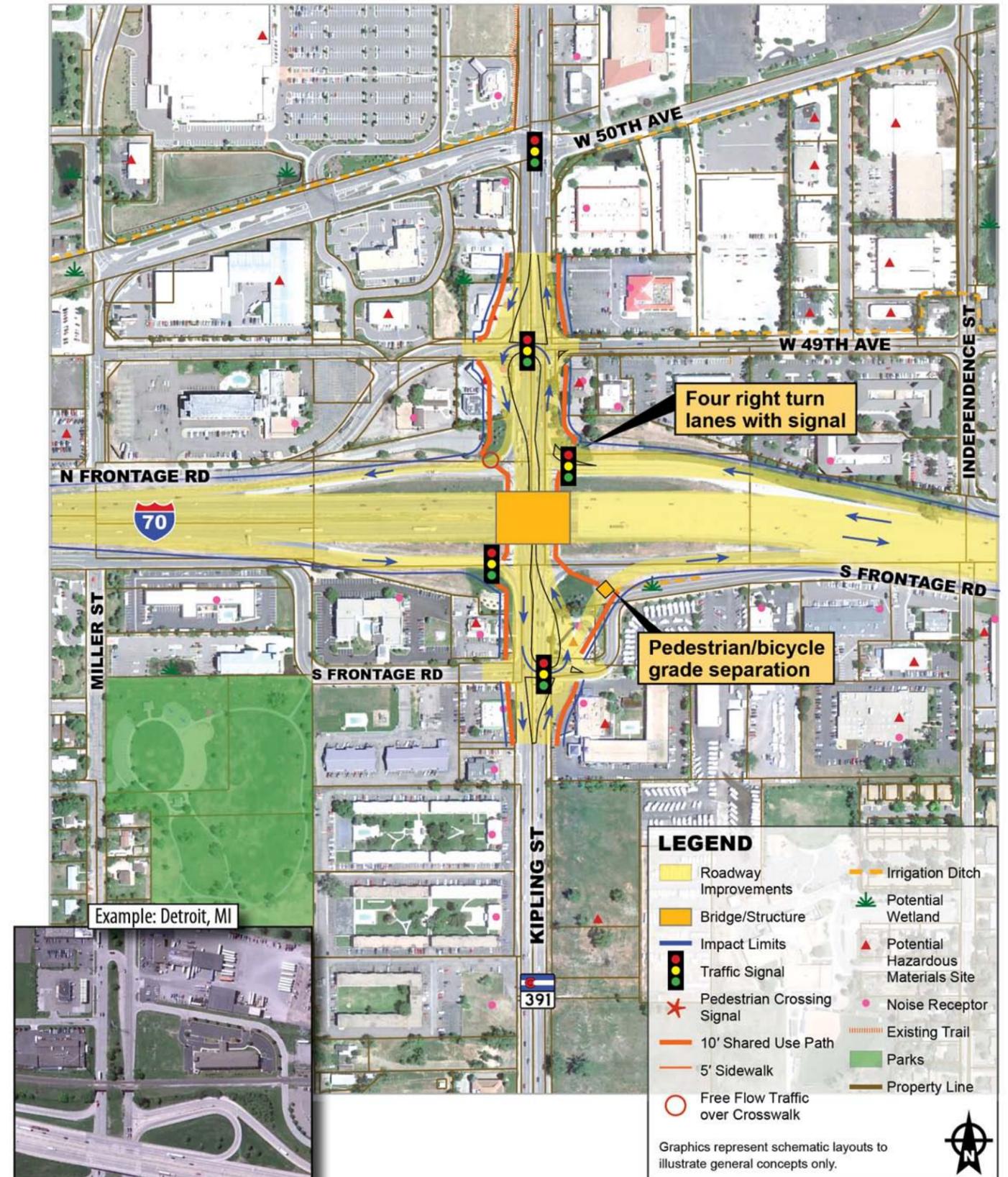
- Difficult to maintain traffic on Kipling Street with construction with opportunities to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Opportunities to construct in phases 	<ul style="list-style-type: none"> • Difficult perceived driver expectancy • Out-of-direction multimodal connections • Relatively difficult construction impacts compared to other alternatives • Moderate right-of-way impacts

Recommendation:

ELIMINATED



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Single Roundabout Interchange Alternative 3I

This interchange consists of a single large roundabout on Kipling Street providing one-way movements at the ramps and frontage road intersections.

The alternative provides access between the I-70, Kipling Street, and the frontage roads with a one-way circle.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 25% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange increase.
- Peak hour queues on the westbound I-70 off ramp are reduced by 60%.
- Unusual series of closely-spaced signals along one-way circle may be difficult for drivers to understand.

Multimodal Connections

- Out-of direction travel required for pedestrians and bicyclists on shared use path due to large circular layout.
- Bicycle lanes transition to/from shared use path through the interchange area.

Environmental and Community Impacts

- Interchange estimated to directly impact 16 properties with six full and ten partial acquisitions (total = 4.8 acres).
- No increase in traffic traveling through neighborhoods expected.

Constructability

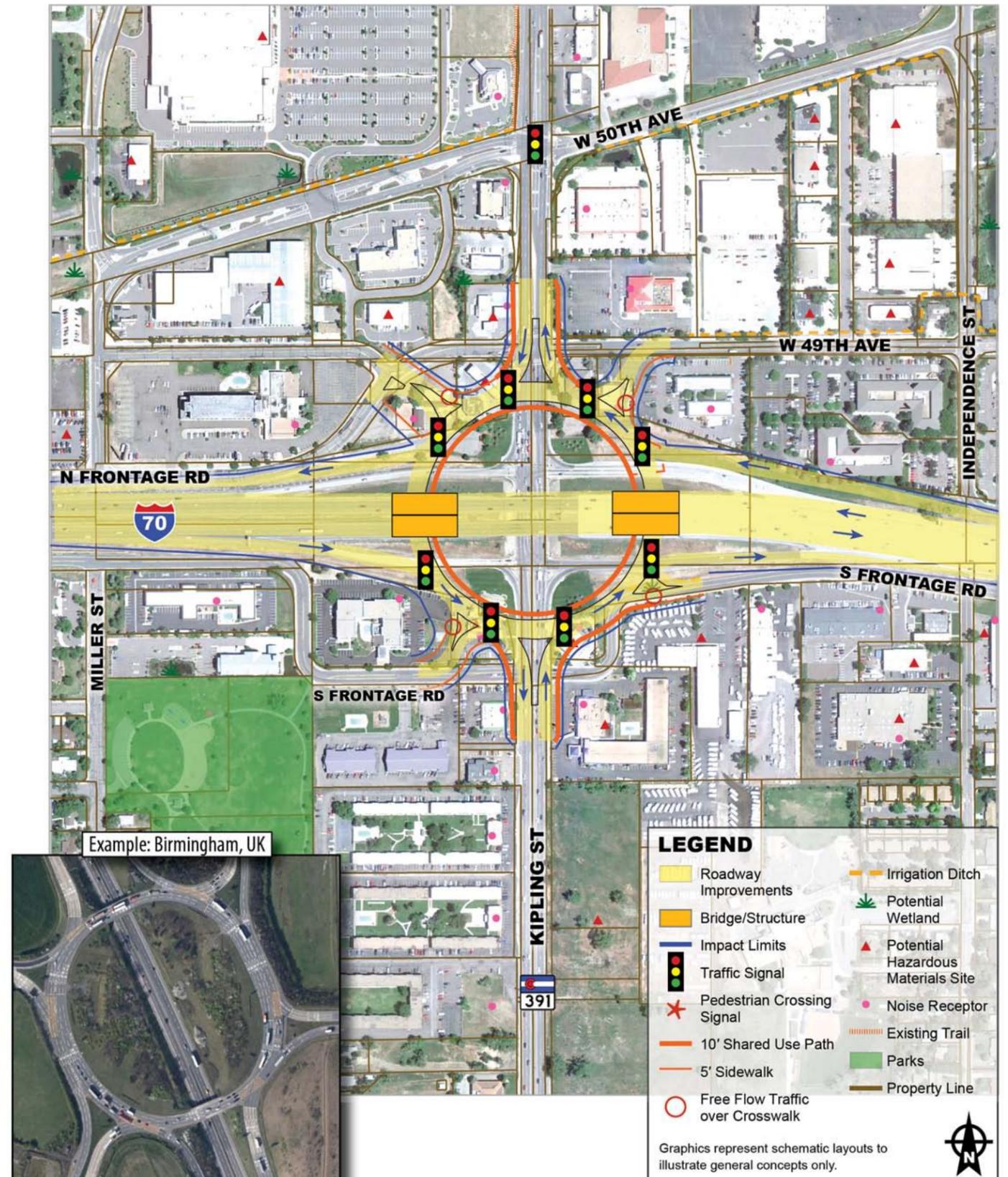
- Difficult to construct with long duration for multiple structures and limited opportunities for to construct in phases.
- Substantial construction costs expected with moderate right-of-way costs. (\$\$\$ - relative high costs)

Summary of Critical Considerations

Advantages	Disadvantages
	<ul style="list-style-type: none"> • Difficult perceived driver expectancy • Out-of-direction multimodal connections • Relatively difficult construction impacts compared to other alternatives • Limited opportunities to construct in phases • High construction cost

Recommendation:

ELIMINATED



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Loop Southwest Quadrant & Improved Westbound Ramps Alternative 33

This interchange consists of a loop ramp in the southwest quadrant providing free-flow operations for the left turn movement from southbound Kipling Street to eastbound I-70 and diamond ramps north of I-70 with frontage road access provided directly to/from the freeway ramps. The existing north frontage road intersection is unsignalized with limited movements. The South Frontage Road is relocated with a traffic signal on Kipling Street south of the interchange with the location depending on local land use plans. The alternative eliminates two traffic signals on Kipling Street, increases signal spacing, and provides access between I-70 and the frontage roads north of I-70.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 55% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange are reduced by 40%.
- Peak hour queues on the westbound I-70 off ramp are reduced by almost 75%.
- Safety concerns with speed differential of freeway and local traffic on ramps and difficulty for drivers to negotiate unusual movements on north side of interchange.

Multimodal Connections

- No pedestrian crossing of Kipling Street provided at unsignalized north frontage road intersection, so out-of-direction travel required.
- Bicycle lanes are provided along Kipling Street directly through the interchange.

Environmental and Community Impacts

- Interchange estimated to directly impact 18 to 21 properties with three to four to six full and 14 to 15 partial acquisitions (total = 11.2 to 18.2 acres), depending on South Frontage Road relocation.
- No increase in traffic traveling through neighborhoods expected.

Constructability

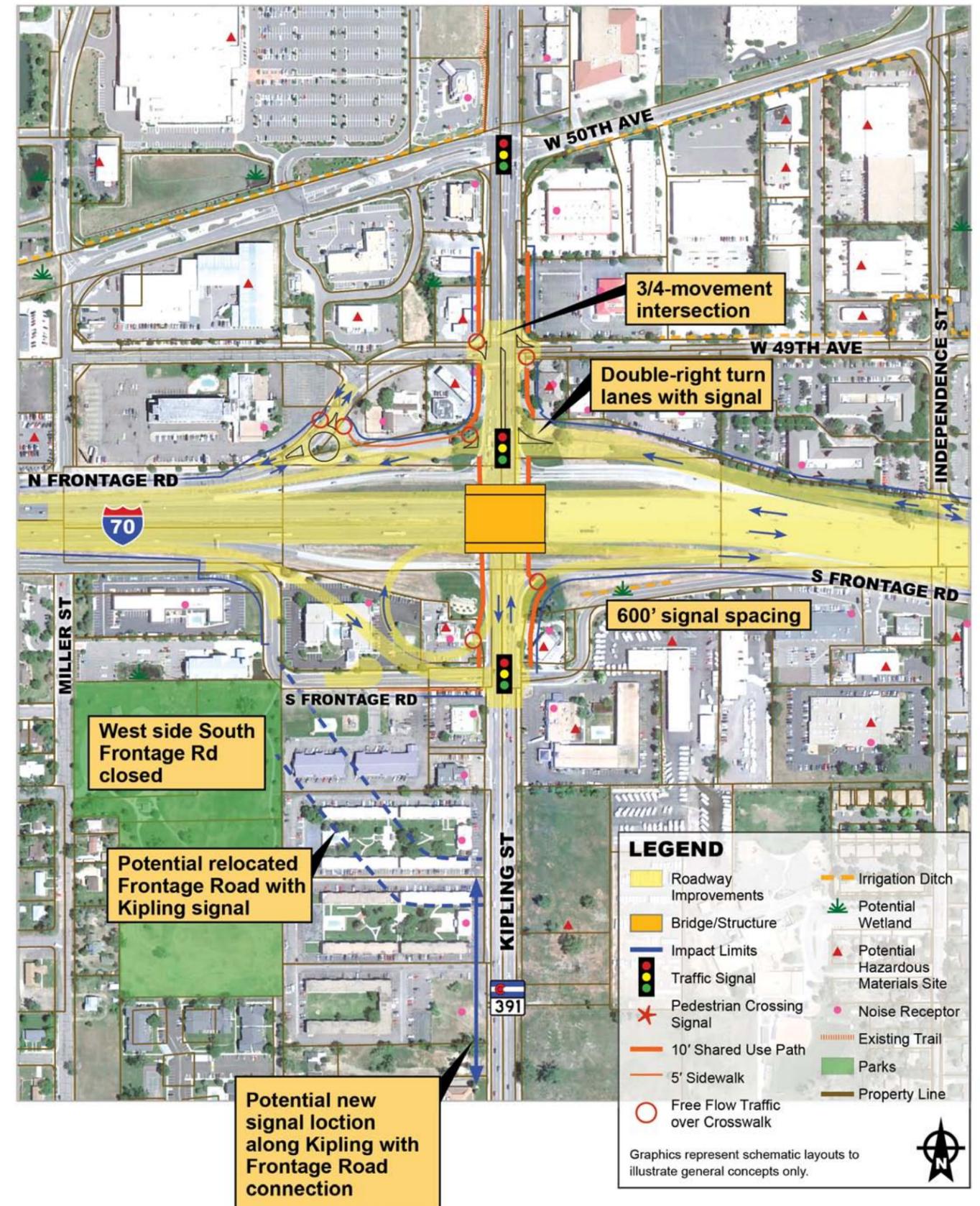
- Moderately difficult to construct within tight interchange area with opportunities to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Improved vehicular operations • Opportunities to construct in phases 	<ul style="list-style-type: none"> • Safety concerns with freeway and local traffic mix on ramps and unusual interchange movements • Moderate right-of-way impacts

Recommendation:

ELIMINATED



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Improved Tight Diamond with Southbound to Eastbound Flyover Alternative 34

This interchange consists of current configuration with two tightly-spaced signalized intersections on Kipling Street serving the I-70 ramps and a flyover ramp serving the heavy movement from southbound Kipling Street to eastbound I-70.

The alternative provides a a free-flow movement for the heavy southbound to eastbound movement through the interchange.

Operations and Safety

- Peak hour delays at the 49th Avenue and Kipling Street intersection increase.
- Westbound I-70 Off Ramp delay reduced by 70% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange are reduced by about 80%.
- Peak hour queues on the westbound I-70 off ramp are reduced by about 70%.
- One out-of-direction movement with an unexpected early decision point may be moderately difficult for drivers to negotiate.

Multimodal Connections

- Shared use path and bicycle lanes are provided directly through the interchange.
- Pedestrians and bicyclists cross ramp intersections at signals.

Environmental and Community Impacts

- Interchange estimated to directly impact seven properties with seven partial acquisitions (total = 0.7 acres).
- Moderate access impacts due to flyover ramp.
- No increase in traffic traveling through neighborhoods expected.

Constructability

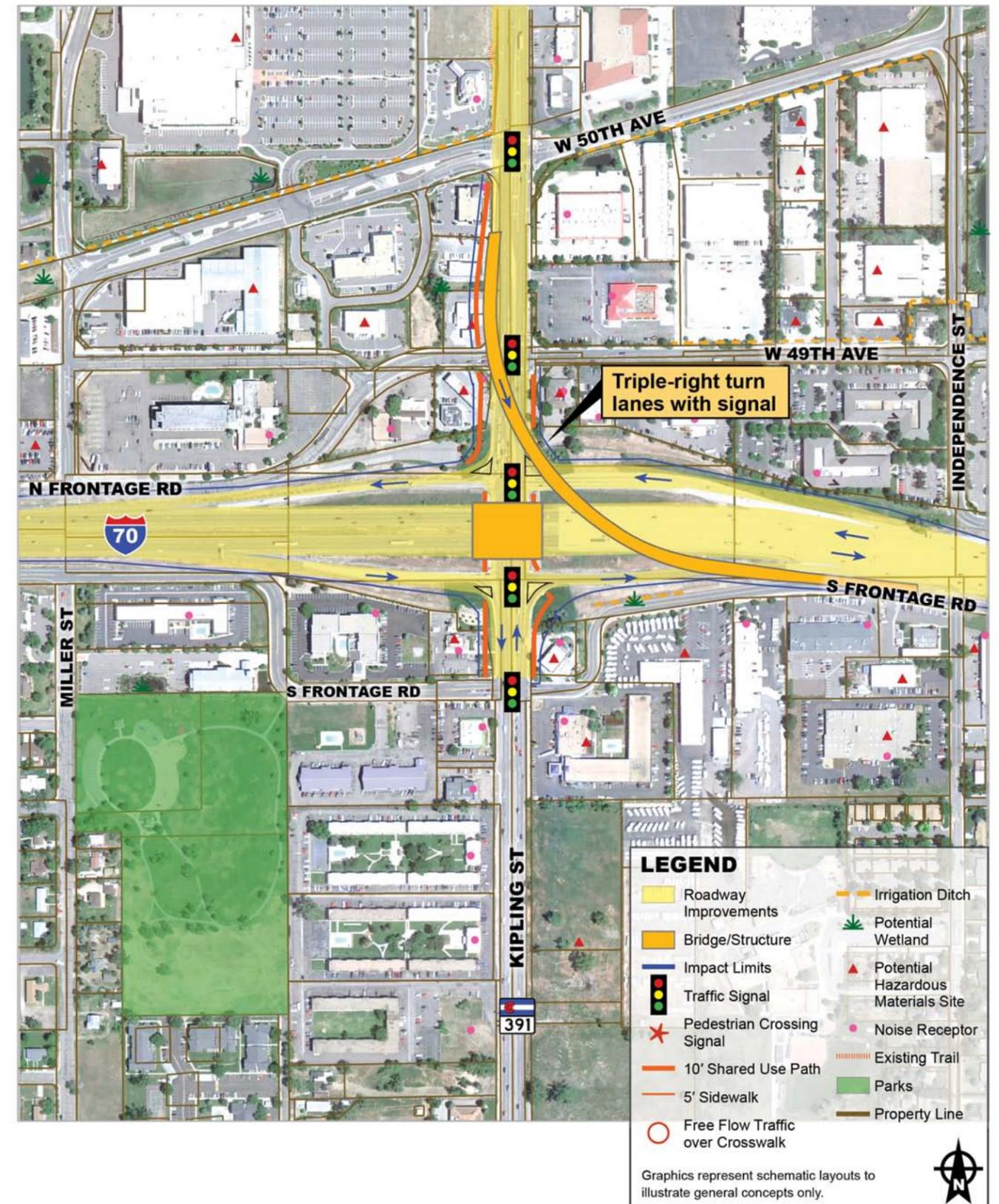
- Relatively difficult to construct with multiple flyover ramps.
- Opportunity for flyover ramp to be constructed prior to other interchange phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Direct multimodal connections through interchange • Opportunities to construct in phases 	<ul style="list-style-type: none"> • Degraded vehicular operations at 49th Avenue • Moderately difficult perceived driver expectancy • Moderate right-of-way impacts due to access impacts

Recommendation:

ELIMINATED



I-70 & Kipling Interchange PEL Study

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Double Crossover Diamond Interchange Alternative 35

This interchange consists of a diamond interchange with Kipling Street movements shifted to the other side of the street under the bridge to allow left turn movements that do not cross traffic. The existing frontage road intersections are unsignalized and limited to right-in/right-out movements. The South Frontage Road is relocated with a traffic signal on Kipling Street south of the interchange with the location depending on local land use plans.

The alternative provides a eliminates two signals on Kipling Street and increases signal spacing.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 55% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange increase.
- Peak hour queues on the westbound I-70 off ramp are reduced by almost 60%.
- Crossover layout at ramp intersections and unusual turn movements for ramp access to Kipling Street is relatively difficult for drivers to negotiate.

Multimodal Connections

- Shared use path and bicycle lanes are provided directly through the interchange.
- Unusual configuration and vehicular movements may be intimidating for bicyclists and pedestrians to negotiate.

Environmental and Community Impacts

- Interchange estimated to directly impact 17 to 21 properties with three to seven full and 14 partial acquisitions (total = 7.3 to 19.8 acres), depending on South Frontage Road relocation.
- Potential increase in traffic traveling on Independence Street in northeast quadrant expected due to limitation of left turns at access to frontage road.

Constructability

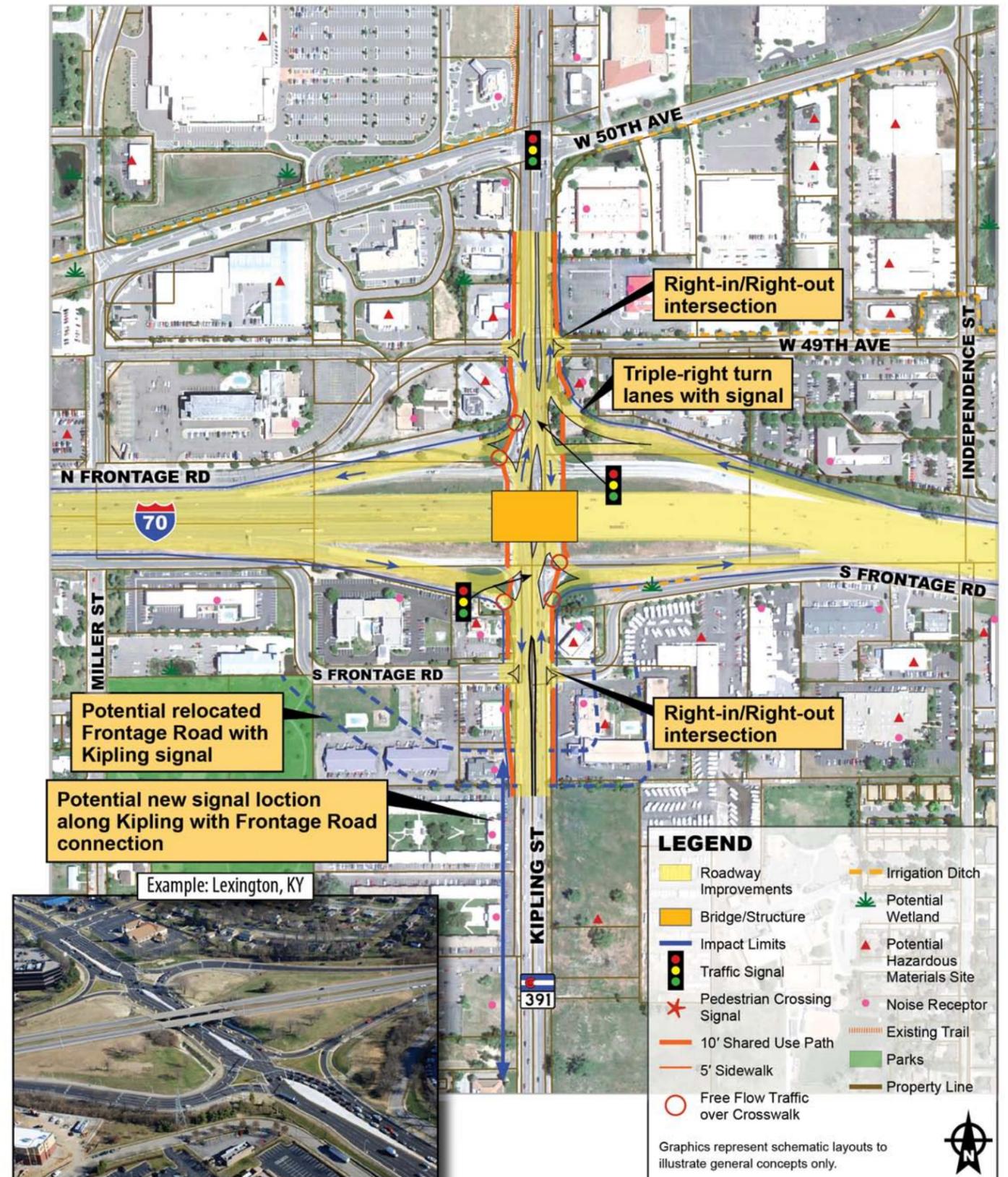
- Difficult to maintain traffic on Kipling Street with construction.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Direct multimodal connections through interchange 	<ul style="list-style-type: none"> • Difficult perceived driver expectancy • Difficult multimodal movements • Moderate right-of-way impacts with South Frontage Road relocation

Recommendation:

ELIMINATED



I-70 & Kipling Interchange PEL Study

Level 2 Screening



Button Hook Ramps South and Improved Westbound Ramps Alternative 36

This interchange consists of a loop ramp in the southwest quadrant providing free-flow operations for the left turn movement from southbound Kipling Street to eastbound I-70 and diamond ramps north of I-70 with frontage road access provided directly to/from the freeway ramps. The existing north frontage road intersection is unsignalized with limited movements.

The alternative eliminates two traffic signals on Kipling Street, increases signal spacing, and provides access between I-70 and the frontage roads north of I-70.

Operations and Safety

- Westbound I-70 Off Ramp delay reduced by 55% from the No Action alternative in the PM peak hour.
- Southbound Kipling Street peak hour queues leading to the interchange are reduced by 50%.
- Peak hour queues on the westbound I-70 off ramp are reduced by 75%.
- Safety concerns with speed differential of freeway and local traffic on ramps and difficulty for drivers to negotiate unusual movements on north side of interchange.

Multimodal Connections

- No pedestrian crossing of Kipling Street provided at unsignalized north frontage road intersection, so out-of-direction travel required.
- Bicycle lanes are provided along Kipling Street directly through the interchange.

Environmental and Community Impacts

- Interchange estimated to directly impact 18 properties with two full and 16 partial acquisitions (total = 4.1 acres).
- No increase in traffic traveling through neighborhoods expected.

Constructability

- Moderately difficult to construct within tight interchange area with opportunities to construct in phases.
- Typical construction costs expected with moderate right-of-way costs. (\$\$ - relative moderate costs)

Summary of Critical Considerations

Advantages	Disadvantages
<ul style="list-style-type: none"> • Improved vehicular operations • Direct multimodal connections through interchange • Full access between ramps and frontage roads • Opportunities to construct in phases 	<ul style="list-style-type: none"> • Safety concerns with freeway and local traffic mix on ramps and unusual interchange movements • Moderate right-of-way impacts

Recommendation:

ELIMINATED

