I-70 & Kipling Interchange PEL Study
Level 2 Screening Matrix

Category	Level 2 Screening Criteria	Color-Code Legend	NA	1	2	3	4	6	7	9	11	12	17	21	31	33	34	35	36
			No Action	Single Point Urban Interchange (SPUI)	Diamond with Roundabouts at Ramps & Frontage Roads	Diamond with Six-Leg Roundabout at Ramps & Frontage Roads	Fully Directional Interchange	Partial Cloverleaf with Loops SW & NE Quadrants	Partial Cloverleaf with Loops SW & NW Quadrants	Texas Frontage Road Diamond	Traditional Diamond Interchange	Button Hook Ramps	Michigan Lefts for Ramps	Single Roundabout Interchange	Loop SW Quadrant & Improved WB Ramps	Improved Tight Diamond with SB to EB Flyover	Double Crossover Diamond Interchange	Button Hook Ramps South & Improved WB Ramps
Optimize operations and reduce congestion	Intersection peak hour Level of Service (LOS) and delay (sec) (AM / PM)	Red = LOS E or F	49th Ave: B (13) / B (17) WB Ramps: D (37) / D (45) EB Ramps: A (9) / A (5) S Frontage: B (18) / B (10)	49th Ave: B (19) / D (38) Ramps: C (26) / C (31) S Frontage: C (22) / C (20)	49th Ave: E (50) / F (70) WB Ramps: F (305) / E (63) EB Ramps: E (69) / F (84) S Frontage: E (55) / C (35)	WB Ramps: F (169) / F (168) EB Ramps: F (61) / F (101)	49th Ave: B (10) / B (17) S Frontage: B (10) / A (9)	WB Ramps: B (12) / B (11) EB Ramps: A (7) / B (13)	WB Ramps: A (9) / B (14) EB Ramp: A (5) / C (27)	49th Ave: B (11) / B (12) WB Ramps: B (18) / B (17) EB Ramps: C (20) / B (12) S Frontage: C (21) / A (16)	WB Ramps: A (8) / B (11) EB Ramps: B (10) / A (9)	49th Ave: B (11) / C (25) WB Ramps: A (7) / B (13) S Frontage: B (17) / C (27)	49th Ave: W: C (25) / B (17) 49th Ave: E: B (20) / C (31) WB Ramps: C (20) / C (29) EB Ramps: B (31) / C (23) S Frontage: W: A (9) / A (8) S Frontage: E: B (16) / B (17)	49th Ave: W: C (29) / C (34) 49th Ave: E: B (16) / C (30) WB Ramps: C (24) / C (23) EB Ramps: B (31) / C (23) S Frontage: W: A (9) / A (8) S Frontage: E: B (16) / B (17)	49th Ave: A (8) / B (12) WB Ramps: B (17) / C (20) S Frontage: A (5) / B (12)	49th Ave: B(17) / D (40) WB Ramps: C (21) / B (14) EB Ramps: A (5) / A (3) S Frontage: A (9) / B (10)	49th Ave: A (8) / B (12) WB Ramps: B (13) / E (37) EB Ramps: A (7) / B (12) S Frontage: B (17) / C (27)	49th Ave: A (8) / B (12) WB Ramps: B (13) / E (37) EB Ramps: A (7) / B (12) S Frontage: B (17) / C (27)
	Peak hour queue lengths (ft) approaching interchange (AM / PM)	Red = Queues longer than No Action or 500 feet, whichever is greater	SB Kipling: 492/340 NB Kipling: 86/218 WB Exit Ramp: 682/1312	SB Kipling: 136/527 NB Kipling: 146/94 WB Exit Ramp: 147/356	SB Kipling: 3010/326 NB Kipling: 1368/1241 WB Exit Ramp: 110/718	SB Kipling: 3042/150 NB Kipling: 1568/1612 WB Exit Ramp: 2717/4058	SB Kipling: 142 / 154 NB Kipling: 162 / 198 WB Exit Ramp: 192 / 285	SB Kipling: 121/382 NB Kipling: 397/588 WB Exit Ramp: 308/419	SB Kipling: 136/149 NB Kipling: 253/588	SB Kipling: 275/306 NB Kipling: 154/239 WB Exit Ramp: 285/421	SB Kipling: 114/266 NB Kipling: 617/38 WB Exit Ramp: 282/93	SB Kipling: 80/154 NB Kipling: 352/363 WB Exit Ramp: 178/329	SB Kipling: 560 / 579 NB Kipling: 235 / 421 WB Exit Ramp: 309 / 635	SB Kipling: 581 / 483 NB Kipling: 343 / 343 WB Exit Ramp: 274 / 476	SB Kipling: 294/326 NB Kipling: 186/475 WB Exit Ramp: 298/322	SB Kipling: 100/169 NB Kipling: 94/85 WB Exit Ramp: 278/355	SB Kipling: 111 / 792 NB Kipling: 264 / 200 WB Exit Ramp: 155 / 365	SB Kipling: 258/315 NB Kipling: 348/518 WB Exit Ramp: 303/322
	Volume-to-Capacity ratio (overall intersection) (AM / PM)	Red = V/C at 1.00 or more	49th Ave: 0.92/1.00 WB Ramps: 0.95/1.34 EB Ramps: 0.76/0.75 S Frontage: 0.74/0.64	49th Ave: 0.94/0.92 Ramps: 0.66/0.73 S Frontage: 0.61/0.61	49th Ave: 1.08/1.93 WB Ramps: 1.38/1.25 EB Ramps: 1.23/1.56 S Frontage: 0.71/0.71	WB Ramps: 1.65/1.23 EB Ramps: 1.16/1.54	49th Ave: 0.38 / 0.52 S Frontage: 0.32 / 0.36	WB Ramps: 0.83/0.84 EB Ramps: 0.71/0.82	EB Ramp: 0.58/0.78	WB Ramps: 0.79/0.77 EB Ramps: 0.86/0.87	WB Ramps: 0.66/0.73 EB Ramps: 0.69/0.68	49th Ave: 0.88/0.78 WB Ramps: 0.52/0.67 S Frontage: 0.67/0.79	49th Ave: W: 0.88 / 0.79 49th Ave: E: 0.46 / 0.76 WB Ramps: 0.43 / 0.84 EB Ramps: 0.68 / 0.72 S Frontage W: 0.61 / 0.52 S Frontage E: 0.86 / 0.93	49th Ave: W: 0.98 / 0.96 49th Ave: E: 0.70 / 0.96 WB Ramps: 0.53 / 0.79 EB Ramps: 0.66 / 0.69 S Frontage W: 0.67 / 0.64 S Frontage E: 0.78 / 0.90	WB Ramps: 0.81/0.79 S Frontage: 0.70/0.77	49th Ave: 0.86/1.00 WB Ramps: 0.42/0.73 EB Ramps: 0.55/0.59 S Frontage: 0.56/0.60	WB Ramps: 0.67 / 0.74 EB Ramps: 1.10 / 0.93	WB Ramps: 0.80/0.68 S Frontage: 0.60/0.80
	Perceived driver expectancy (easy, moderate, difficult)	(see description)	**Moderate** Close intersection spacing makes maneuvering difficult, but typical interchange layout for urban area	**Easy** Greater intersection spacing and directional interchange layout	**Difficult** Movements through multilane roundabouts difficult for drivers to understand	**Difficult** Movements through multilane roundabouts difficult for drivers to understand	**Difficult** Out-of-direction movements to access I-70 and ramps from Kipling require unexpected early decision points	**Moderate** Some out-of-direction movements, but typical interchange layout for urban area	**Difficult** Unusual movements with local road access on freeway ramps	**Easy** Greater intersection spacing and directional interchange layout typical in urban area	**Difficult** Unusual movements for ramp access to/from Kipling via frontage roads	**Difficult** Out-of-direction and unusual turn movements to/from freeway	**Difficult** Unusual series of closely-spaced signals with unexpected turn movements required between I-70, Kipling, and frontage roads	**Difficult** Some out-of-direction movements and unusual movements with local road access on freeway ramps	**Moderate** One out-of-direction movement for flyover with an unexpected early decision point, but other movements typical in urban area	**Difficult** Crossover layout unusual for drivers	**Difficult** Unusual movements with local road access on freeway ramps
Improve traveler safety	Expected change in number of accidents	(see description)	**Increase** due to a additional congestion as traffic volumes increase	**Decrease** due to reduction in congestion and less conflict points with fewer intersections	**Increase/Less Severe** with roundabouts compared to signalized intersections, but with increased congestion during peak hours	**Increase/Less Severe** with roundabouts compared to signalized intersections, but with increased congestion during peak hours	**Minimal Change** due to reduction in congestion and less conflict points, but higher speed differential on Kipling	**Decrease** due to reductions in congestion and less conflict points with directional ramps	**Minimal Change** due to reduction in congestion and conflict points, but weave increases potential for sideswipe accidents and speed differential introduced with loop ramp for exiting traffic	**Minimal Change** due to reduction in congestion and less conflict points with fewer intersections, but speed differential on ramps with frontage road traffic mix	**Decrease** due to reductions in congestion and less conflict points with fewer intersections	**Decrease** due to reductions in congestion and less conflict points with fewer intersections	**Minimal Change** due to increase in congestion, but less conflict points with fewer intersections	**Minimal Change** due to increase in signals, but decrease in left turn conflicts	**Minimal Change** due to reduction in congestion and less conflict points with fewer intersections, but speed differential on ramps with frontage road traffic mix	**Minimal Change** due to only small reduction in congestion with no change in number and spacing of traffic signals	**Decrease** due to reduction in congestion and less conflict points	**Minimal Change** due to reduction in congestion and less conflict points with fewer intersections, but speed differential on ramps with frontage road traffic mix
	Reduction in multimodal conflict points (ramps and frontage road intersections on Kipling)	Relative Scale: Red = Reduction less than 10% Black = Reduction 10-50% Green = Reduction more than 50%	Vehicular = 90 points	Vehicular = 84 points Pedestrian crossings of high-speed right turns	Vehicular = 28 points	Vehicular = 16 points	Vehicular = 76 points Bicycle lane crosses directional ramps	Vehicular = 42 points Pedestrian crossings of high-speed right turns	Vehicular = 43 points Pedestrian and bicycle crossings of high-speed right turns	Vehicular = 59 points	Vehicular = 34 points	Vehicular = 82 points	Vehicular = 27 points	Vehicular = 16 points	Vehicular = 65 points Pedestrian crossings of high-speed right turns	Vehicular = 84 points	Vehicular = 22 points Pedestrian crossings of high-speed right turns	Vehicular = 71 points
Accommodate multimodal connections	Missing sidewalk/path links & out-of-direction travel	Red = Substantial out-of-direction travel & no bike lanes Black = Some out-of-direction travel Green = Direct connections	Only narrow sidewalk provided directly through interchange and no bike lanes	Path and bicycle lanes provided directly through interchange	Major out-of-direction travel to cross Kipling. Bicycles in bike lanes must transition to/from shared use path	Major out-of-direction travel to cross Kipling. Bicycles in bike lanes must transition to/from shared use path	Out-of-direction travel for pedestrians to cross under ramps	Path and bicycle lanes provided directly through interchange	Major out-of-direction travel for pedestrians crossing Kipling due to no crossings at frontage roads	Major out-of-direction travel for pedestrians crossing Kipling due to no crossings at frontage roads	Path and bicycle lanes provided directly through interchange	Path and bicycle lanes provided directly through interchange	Major out-of-direction travel for pedestrians on east side	Major out-of-direction travel for pedestrians and bicyclists due to large circular layout	Minor out-of-direction travel for pedestrians crossing Kipling at 49th Ave	Path and bicycle lanes provided directly through interchange	Out-of-direction travel for pedestrians crossing Kipling at 49th Ave and limited Kipling crossing opportunities at ramps due to crossover movements	Minor out-of-direction travel for pedestrians crossing Kipling at 49th Ave
	Accommodation of transit connections	Black = Transit stops require relocation or no signal for crossing at stop Green = Transit stops remain in current location	No change to transit stops	Accommodates transit stops in current location	Transit stops must move north and south out of roundabouts	Transit stops must move north and south out of roundabouts	Accommodates transit stops in current location, but limits future I-70 transit connection	Accommodates transit stops in current location	Accommodates transit stops in current location	Accommodates transit stops in current location, but transit users may attempt to cross Kipling at 49th Ave	Transit stops likely require relocation. Transit users may attempt to cross Kipling at 49th Ave	Accommodates transit stops in current location	Transit stops likely require relocation along Kipling	Transit stops likely require relocations. Transit users need to negotiate large intersections to reach stops	Accommodates transit stops in current location, but transit users may attempt to cross Kipling at 49th Ave	Accommodates transit stops in current location	Transit stops likely require relocation. Transit users may attempt to cross Kipling at 49th Ave	Accommodates transit stops in current location, but transit users may attempt to cross Kipling at 49th Ave
	User perception of comfort and safety of pedestrian and bicycle movements (easy, moderate, difficult)	(see description)	**Difficult** Increasingly uncomfortable for pedestrians with increased vehicular congestion and sidewalks under the bridge with limited median refuge areas	**Moderate** The large center intersection may be intimidating for bicyclists and pedestrians to negotiate.	Moderate Bicyclists must transition to shared use path to travel north/south	Moderate Bicyclists must transition to shared use path to travel north/south	**Difficult** Many free flow ramp movements for pedestrians and bicycles to negotiate	**Moderate** Some free flow ramp movements for bicyclists and pedestrians to negotiate	Moderate Bicyclists must transition to shared use path to travel southbound on west shared use of Kipling to avoid weave area	**Easy** Meets expectancy for drivers and pedestrians/bicyclists crossing at signals with relatively tight intersection layout	**Easy** Meets expectancy for drivers and pedestrians/bicyclists crossing at signals with relatively tight intersection layout	**Moderate** Some free flow ramp and secondary roundabout movements for bicyclists and pedestrians to negotiate	**Difficult** Unusual intersection configuration and vehicular movements may be intimidating for bicyclists in bike lane and pedestrians in crosswalks	**Difficult** Bicyclists must transition to shared use path to travel northbound and complicated routing of pedestrians and bicyclists to middle of circle is challenging	**Moderate** Some free flow ramp movements for bicyclists and pedestrians to negotiate	**Moderate** Diamond meets expectancy for drivers and pedestrians/bicyclists, but flyover ramp creates major free flow movement for bicyclists and pedestrians to negotiate	**Difficult** Unusual intersection configuration and vehicular movements may be intimidating for bicyclists in bike lane and pedestrians in crosswalks	**Moderate** Some free flow ramp and secondary roundabout movements for bicyclists and pedestrians to negotiate
Avoid and minimize environmental impacts	Potentially impacted noise receptors	Red = Moderate increase to surrounding homes and hotels from increase in congestion Black = Slight increase or decrease Green = Moderate decrease	Moderate noise increase to surrounding homes and hotels from increase in congestion	Slight noise reduction from decrease in congestion	Slight noise increase from increase in congestion	Slight noise increase from increase in congestion	Moderate noise increase from elevated ramps, higher ramp speeds, and ramps closer to homes and hotels	Moderate noise increase from higher speeds and ramps closer to homes and hotels	Moderate noise increase from higher speeds and ramps closer to homes and hotels	Slight noise reduction from decrease in congestion and traffic volumes at frontage road intersections	Slight noise increase from higher speeds and ramps closer to homes and hotels	Moderate noise increase from ramps closer to homes and hotels	Moderate noise increase from ramp movements and volumes at Frontage road intersections closer to homes and hotels	Moderate noise increase from Kipling volumes around circle closer to homes and hotels	Slight noise increase in SW quadrant from higher speeds and ramps closer to homes and hotels	Moderate noise increase from elevated ramp and higher ramp speeds	Slight noise reduction from decrease in congestion	Slight noise increase in SW quadrant from ramps closer to homes and hotels
	Potentially impacted hazardous material sites	Relative Scale: Red = 7 or more sites Black = 5-6 sites Green = 4 or less sites	No impacts	4 potential hazardous materials sites	7 potential hazardous materials sites	7 potential hazardous materials sites	10 potential hazardous materials sites	6 potential hazardous materials sites	4 potential hazardous materials sites	3 potential hazardous materials sites	4 potential hazardous materials sites	4 potential hazardous materials sites	5 potential hazardous materials sites	6 potential hazardous materials sites	3 potential hazardous materials sites	3 potential hazardous materials sites	4 potential hazardous materials sites	3 potential hazardous materials sites
	Potentially impacted parks & recreation areas (Kipling Trail, Fruitdale Park)	Relative Scale: Red = Minor or major impact Black = Slight impact Green = No impact expected	No impacts	No impacts expected	No impacts expected	No impacts expected	Potential minor impact to trail along west side of Kipling north of 50th	Potential minor impact to edge of park with relocation of S Frontage Road	Potential minor impact to edge of park with relocation of S Frontage Road	Potential minor impact to edge of park with relocation of S Frontage Road	Potential minor impact to edge of park with relocation of S Frontage Road	Potential impact to edge of park with roundabout in SW quadrant	No impacts expected	No impacts expected	Potential minor impact to edge of park with relocation of S Frontage Road	No impacts expected	Potential minor impact to edge of park with relocation of S Frontage Road	Potential impact to edge of park with roundabout in SW quadrant
Avoid and minimize community impacts	Right-of-Way required	Relative Scale: Red = 6 or more full acquisitions Black = 5 or less full acquisitions Green = No full acquisitions	None	Full = None Partial = 5 properties; 0.2 ac	Full = 3 properties; 1.8 ac Partial = 11 properties; 0.8 ac	Full = 3 properties; 1.8 ac Partial = 8 properties; 0.7 ac	Full = 13 properties; 9.6 ac Partial = 25 properties; 8.6 ac	With S Frontage Rd Moved: Full = 7-9 properties; 11.1-20.0 ac Partial = 11 properties; 1.2 ac	With S Frontage Rd Moved: Full = 6-8 properties; 11.9-18.8 ac Partial = 13 properties; 1.0 ac	With S Frontage Rd Moved: Full = 3-8 properties; 6.5-21.6 ac Partial = 17-18 properties; 1.7-2.2 ac	With S Frontage Rd Moved: Full = 5-7 properties; 6.5-18.0 ac Partial = 15 properties; 0.8-1.8 ac	Full = 4 properties; 5.0 ac Partial = 14 properties; 1.2 ac	Full = 3 properties; 1.7 ac Partial = 7 properties; 0.9 ac	Full = 6 properties; 3.7 ac Partial = 10 properties; 1.1 ac	With S Frontage Rd Moved: Full = 4-6 properties; 10.2-17.1 ac Partial = 14-15 properties; 1.0-1.1 ac	Full = None Partial = 7 properties; 0.7 ac	With S Frontage Rd Moved: Full = 2-7 properties; 6.5-18.0 ac Partial = 14 properties; 0.8-1.8 ac	Full = 2 properties; 3.3 ac Partial = 16 properties; 0.8 ac
	Number of property accesses impacted	Relative Scale: Red = 13 or more accesses Black = 7-12 accesses Green = 6 or less accesses	No impacts	3 existing accesses impacted	14 existing accesses impacted	11 existing accesses impacted	36 existing accesses impacted	With S Frontage Rd Moved: 19-24 existing accesses impacted	With S Frontage Rd Moved: 19-24 existing accesses impacted	With S Frontage Rd Moved: 13-23 existing accesses impacted	With S Frontage Rd Moved: 14-16 existing accesses impacted	16 existing accesses impacted	11 existing accesses impacted	19 existing accesses impacted	With S Frontage Rd Moved: 16-22 existing accesses impacted	8 existing accesses impacted	With S Frontage Rd Moved: 13-21 existing accesses impacted	8 existing accesses impacted
	Number of buildings impacted	Relative Scale: Red = 6 or more buildings Black = 3-5 buildings Green = 2 or less buildings	No impacts	Commercial = None Residential = None	Commercial = 3 Residential = None	Commercial = 4 Residential = None	Commercial = 31 Residential = None	With S Frontage Rd Moved: Commercial = 8-9 Residential = 1-3	With S Frontage Rd Moved: Commercial = 6-8 Residential = 1-3	Commercial = 5 Residential = 0-4	Commercial = 5 Residential = 0-4	Commercial = 7 Residential = None	Commercial = 6 Residential = None	Commercial = 11 Residential = None	With S Frontage Rd Moved: Commercial = 5 Residential = 5-2	Commercial = 2 Residential = None	Commercial = 5 Residential = 0-4	Commercial = 4 Residential = None
	Business property impacts for partial acquisitions	Red = Major impacts in all quadrants Black = Moderate & minor impacts in several quadrants or major impacts in one quadrant Green = Minor impacts	No impacts	Minor landscaping impacts in SW and NE quadrants and potential circulation impacts for gas stations	Minor parking and landscaping impacts in all quadrants and circulation impacts for gas stations	Moderate parking and landscaping impacts in all quadrants and circulation impacts for gas stations	Major parking, landscaping, and circulation impacts in all quadrants	Potential moderate impacts in SW quadrant with S Frontage Rd moved and minor parking and landscaping impacts in NE quadrant and potential circulation impacts for gas stations	Potential moderate impacts in SW quadrant with S Frontage Rd moved and minor parking and landscaping impacts in NW quadrant and potential circulation impacts for gas stations	Potential moderate impacts in SW quadrant with S Frontage Rd moved and minor landscaping impacts in NE quadrant and potential circulation impacts for gas stations	Potential moderate impacts in SW quadrant with S Frontage Rd moved and minor landscaping impacts in NW quadrant and potential circulation impacts for gas stations	Moderate parking impacts in the SW and NW quadrants and minor landscaping impacts in the NE and SE quadrants	Moderate parking impacts in SW quadrant and minor landscaping impacts in SW and NE quadrants	Moderate parking, landscaping, and circulation impacts in all quadrants	Potential moderate impacts in SW quadrant with S Frontage Rd moved and minor landscaping impacts in NW quadrant and potential circulation impacts for gas stations	Moderate parking and circulation impacts in NW quadrant and minor landscaping impacts in all quadrants	Potential moderate impacts in SW quadrant with S Frontage Rd moved and minor landscaping impacts in NE quadrant and potential circulation impacts for gas stations	Moderate parking impacts in the SW quadrant and minor landscaping impacts in other quadrants
	Increase in traffic traveling through neighborhoods	Red = Increase due to limited frontage road movements Black = Increase due to congestion Green = No increase expected	Increased congestion may create neighborhood cut-through	No increase expected	Increased congestion may create neighborhood cut-through	Increased congestion may create neighborhood cut-through	Potential increase due to out-of-direction travel required for access to surrounding area	Potential increase due to Independence Street due to closure of frontage road access in NE quadrant	Potential increase due to Independence Street due to closure of frontage road access in NE quadrant	No increase expected	Potential increase on Independence Street due to closure of north frontage road access	No increase expected	Increased congestion may create neighborhood cut-through	No increase expected	No increase expected	No increase expected	Potential increase on Independence Street due to closure of north frontage road access	No increase expected
	Perceived difficulty to access area businesses (easy, moderate, difficult)	(see description)	**Moderate** Increased congestion creates issues for accessing businesses due to congestion in peak travel hours	**Easy** Typical urban interchange layout and full access to frontage roads	**Difficult** Series of multi-lane roundabouts create confusion for turn movements to access frontage roads	**Difficult** Multi-lane and multi-leg roundabouts create confusion for turn movements to access frontage roads	**Difficult** Substantial out-of-direction travel required to access surrounding businesses from the freeway	**Moderate** Direct access to NW and SE quadrants, but no access to NE quadrant	**Moderate** Direct access to SE quadrant, but further travel for access to NW quadrant	**Moderate** Full access between ramps and frontage road, but unusual configuration may create confusion for directions to businesses	**Moderate** Typical urban interchange layout, but access for some frontage road movements limited	**Moderate** Full access between ramps and frontage road, but unusual configuration may create confusion for directions to businesses	**Difficult** Full access for frontage roads, but out-of-direction and unusual turn movements may create confusion for directions to businesses	**Difficult** Full access for frontage roads, but out-of-direction and unusual turn movements may create confusion for directions to businesses	**Moderate** Full access between ramps and frontage road, but unusual configuration may create confusion for directions to businesses	**Moderate** Typical urban interchange layout and full access to frontage roads at tight diamond, but flyover ramp may impact access in NW quadrant	**Moderate** Unusual crossover layout may create confusion for directions to businesses	**Moderate** Full access between ramps and frontage road, but unusual configuration may create confusion for directions to businesses
	Consistency with established local plans and visions	Red = Not consistent Green = Consistent	**Not Consistent** Local plans include interchange improvements	**Consistent** Typical urban interchange layout and full access to ramps and frontage roads for area business	**Not Consistent** Roundabouts not consistent with Kipling as six-lane major arterial	**Not Consistent** Roundabouts not consistent with Kipling as six-lane major arterial	**Not Consistent** Multi-level interchange and large footprint	**Consistent** Typical urban interchange layout, but limited access to SW quadrant without frontage road relocation	**Consistent** Typical urban interchange layout, but limited frontage road access to NW quadrant without frontage road relocation	**Consistent** Full access to ramps and frontage roads for area business	**Consistent** Typical urban interchange layout, but limited frontage road access	**Consistent** Full access to ramps and frontage roads for area business	**Consistent** Full access to ramps and frontage roads for area business	**Consistent** Full access to ramps and frontage roads for area business	**Consistent** Interchange improvement but limited access to SW quadrant without frontage road relocation	**Consistent** Full access to ramps and frontage roads for area business	**Consistent** Interchange improvement but limited access to SW quadrant without frontage road relocation	**Consistent** Full access to ramps and frontage roads for area business
Maximize constructability	Conceptual-level probable costs (low, moderate, high, very high)	(see description)	None	$ Low Typical construction and minimal ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$$$ Very High Substantial construction and substantial ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$$ High Substantial construction and moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW	$$ Moderate Typical construction with moderate ROW
	Ease and cost of maintenance (low, moderate, high)	(see description)	**Moderate** Aging bridge structure and traffic signals with tight access constraints	**Low** Long clear span structure with tight access constraints	**Low** Typical structure and no traffic signals	**Low** Typical structure and no traffic signals	**High** Increase in structures and length of ramps with tight access constraints	**Moderate** Typical structure and less signals, but increased length of ramps	**Moderate** Typical structure and less signals, but increased length of ramps	**Low** Typical structure and less traffic signals	**Low** Typical structure and less traffic signals	**Low** Typical structure and less traffic signals	**Moderate** Typical structure and less signals, but tight access constraints	**High** Increase in structures, signals, and length of Kipling with large open area	**Moderate** Typical structure and less signals, but increased length of ramps	**High** Increase in structure and length of ramp with tight access constraints	**Moderate** Typical structure and less signals, but tight access constraints	**Low** Typical structure and less traffic signals
	Constructability (easy, moderate, difficult)	(see description)	N/A	**Difficult** due to building clear-span bridge over Kipling adjacent to existing I-70 bridges	**Difficult** due to constructing roundabout geometric changes while maintaining multi-lane Kipling traffic	**Difficult** due to constructing roundabout geometric changes while maintaining multi-lane Kipling traffic	**Difficult** due to multiple phases to build flyovers and major utility conflicts at 50th	**Easy** because most construction is outside of traffic on new alignments with typical structure construction	**Easy** because most construction is outside of traffic on new alignments with typical structure construction	**Moderate** because new ramps are close to existing ramps with tight staging area constraints	**Easy** because most construction is outside of traffic on new alignments with typical structure construction	**Easy** because most construction is outside of traffic on new alignments with typical structure construction	**Difficult** due to constructing geometric changes while maintaining multi-lane Kipling traffic	**Difficult** due to constructing new bridges while keeping existing bridges open with temporary ramp alignments	**Moderate** because new ramps are close to existing ramps with tight staging area constraints	**Difficult** due to constructing single flyover within tight staging area constraints and maintaining multi-lane Kipling traffic	**Moderate** due to constructing geometric changes with tight staging area constraints	**Moderate** because new ramps are close to existing ramps with tight staging area constraints
	Assessment of construction phasing impacts (easy, moderate, difficult)	(see description)	N/A	**Difficult** due to multiple phases and changes to Kipling within existing envelope	**Difficult** due to number of phases, temporary signals, and changes to Kipling within existing envelope	**Difficult** due to number of phases, temporary signals, and changes to Kipling within existing envelope	**Moderate** because most construction is outside of traffic, but with many full closures at night for flyover construction	**Easy** because most changes are outside of Kipling envelope	**Easy** because most changes are outside of Kipling envelope	**Moderate** because changes to Kipling within existing cross section and moderate intersection work adjacent to existing intersections	**Easy** because most new intersections/ramps built were from existing interchange	**Easy** because most changes are outside of Kipling envelope	**Difficult** due to number of phases, temporary signals, and changes to Kipling within existing envelope	**Difficult** due to multiple phases and long duration for I-70 impacts with structures construction	**Moderate** because most changes visible/over roadways, but with full closures at night for flyover construction	**Moderate** because changes to Kipling within existing cross section and moderate intersection work adjacent to existing intersections	**Difficult** due to overall duration and closures required during changeover to crossing traffic on Kipling	**Moderate** because changes to Kipling within existing cross section and moderate intersection work adjacent to existing intersections
	Ability to construct in phases (easy, moderate, difficult)	(see description)	N/A	**Difficult** Usable pieces cannot be implemented in phases	**Difficult** Usable pieces cannot be implemented in phases	**Difficult** Usable pieces cannot be implemented in phases	**Easy** Opportunity for ramps to be constructed and opened separately	**Easy** Opportunity for ramps to be constructed and opened separately, but need to consider ultimate replacement of bridge	**Easy** Opportunity for ramps to be constructed and opened separately, but need to consider ultimate replacement of bridge	**Easy** Opportunity for each quadrant to be implemented separately	**Easy** Opportunity for north and south ramps to be implemented separately with bridge work implemented later	**Easy** Opportunity for north and south ramps to be implemented separately with bridge work implemented later	**Easy** Opportunity for north and south ramps to be implemented separately with bridge work implemented later	**Difficult** Usable pieces cannot be implemented in phases	**Easy** Opportunity for north and south ramps to be implemented separately with bridge work implemented later	**Easy** Opportunity for north and south ramps to be implemented separately with bridge work implemented later	**Moderate** Requires Kipling reconstruction at time of implementation, but bridge work can be implemented later	**Easy** Opportunity for north and south ramps to be implemented separately with bridge work implemented later
SUMMARY OF RESULTS			**CARRIED FORWARD** further analysis required for comparison	**CARRIED FORWARD**	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**CARRIED FORWARD**	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**CARRIED FORWARD**	**CARRIED FORWARD**	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis	**ELIMINATED** from further analysis
NOTES			Poor traffic operations and increasing safety issues due to additional congestion by 2035. Minimal accommodation of multimodal connections	Improved vehicular operations with minor community and ROW impacts and direct multimodal connections through the interchange area Typical urban interchange layout with no change to current frontage road access Difficult construction impacts and limited opportunities to construct in phases	Degraded peak hour traffic operations with perceived driver expectancy issues Multimodal connections are much more out-of-direction than other alternatives Difficult construction impacts and limited opportunities to construct in phases	Degraded peak hour traffic operations with perceived driver expectancy issues Multimodal connections are much more out-of-direction than other alternatives Difficult construction impacts and limited opportunities to construct in phases	Improved vehicular capacity, but minimal safety improvements due to speed differential on Kipling Major community, ROW, and environmental impacts Very high construction cost and increased maintenance	Improved vehicular operations and safety with direct multimodal connections through interchange area, although free flow ramp crossings for pedestrians and bicyclists Moderate community and ROW impacts, but limited to two quadrants of the interchange Moderate cost and opportunities to construct in phases	Similar operational benefits and community and ROW impacts to Alternative 7 Weave movements on Kipling create safety concerns and out-of-direction multimodal connections	Improved vehicular operations less than other alternatives and moderate ROW impacts with S Frontage Rd relocation Major perceived driver expectancy issues and potential safety concerns with local road access on freeway ramps	Improved vehicular operations and safety with typical urban interchange layout and direct multimodal connections through interchange area Impacts to a new business access with change in frontage road access Opportunities to construct in phases, but moderate ROW impacts with S Frontage Rd relocation	Improved vehicular operations with full access between ramps and frontage road Moderate community and ROW impacts, but limited to two quadrants of the interchange Moderate cost and opportunities to construct in phases	Improved vehicular operations less than other alternatives with moderate community impacts Perceived driver expectancy and multimodal connection issues with unusual turn movements Difficult construction impacts	Improved vehicular operations less than other alternatives and major impacts to multimodal connections and ROW impacts High construction cost with increased maintenance and limited opportunities to construct in phases	Similar operational benefits and community and ROW impacts to Alternative 17 Major perceived driver expectancy issues and potential safety concerns with local road access on freeway ramps	Improved vehicular operations less than other alternatives with moderate construction cost, increased maintenance, and difficult construction impacts	Improved vehicular operations and safety with ROW impacts to multimodal connections Moderate issues with perceived driver expectancy and area business access due to unusual layout and limited opportunities to construct in phases	Similar operational benefits and community and ROW impacts to Alternative 17 Major perceived driver expectancy issues and potential safety concerns with local road access on freeway ramps
			No Action	**Single Point Urban Interchange (SPUI)**	**Diamond with Roundabouts at Ramps & Frontage Roads**	**Diamond with Six-Leg Roundabout at Ramps & Frontage Roads**	**Fully Directional Interchange**	**Partial Cloverleaf with Loops SW & NE Quadrants**	**Partial Cloverleaf with Loops SW & NW Quadrants**	**Texas Frontage Road Diamond**	**Traditional Diamond Interchange**	**Button Hook Ramps**	**Michigan Lefts for Ramps**	**Single Roundabout Interchange**	**Loop SW Quadrant & Improved WB Ramps**	**Improved Tight Diamond with SB to EB Flyover**	**Double Crossover Diamond Interchange**	**Button Hook Ramps South & Improved WB Ramps**
			NA	1	2	3	4	6	7	9	11	12	17	21	31	33	34	35	36