

Valley Line West LRT Crossing Assessment Summary of Results - 104 Avenue, 107 and 109 Street

104 Avenue, 107 Street and 109 Street Intersections

The 107 Street and 109 Street intersections on 104 Avenue are located in Downtown and are in the vicinity of MacEwan University, Norquest College and a mix of residential and commercial developments. The LRT alignment is along the west side of 107 Street, turns onto 104 Avenue and continues west along the center of 104 Avenue. The two adjacent LRT stops are located at-grade on 107 Street, between 103 Avenue and 104 Avenue, and on 104 Avenue, between 111 Street and 112 Street. With the introduction of LRT on 104 Avenue, the roadway configuration will be reduced to 2 lanes in each direction.

For the purpose of the LRT crossing assessment, the 107 Street and 109 Street intersections are reviewed together due to their close proximity to each other. Three design options were considered: 1) at-grade LRT crossings at 107 Street and 109 Street with at-grade LRT Stop on 107 Street, 2) underground LRT, descend to tunnel beginning at 102 Avenue and 107 Street and ascends back to at-grade at 104 Avenue and 112 Street, and 3) elevated LRT, ascend to guideway beginning at 103 Avenue and 107 Street and descend back to at-grade at 104 Avenue and 112 Street. For Option 2 and 3, the 107 Street LRT Stop is redesigned to either an underground LRT station or an elevated LRT station at 104 Avenue and 108 Street. Both the underground and elevated LRT options deviate from the approved LRT concept plan.

The below table summarizes performance of the top three design options in response to each of the assessment criteria.

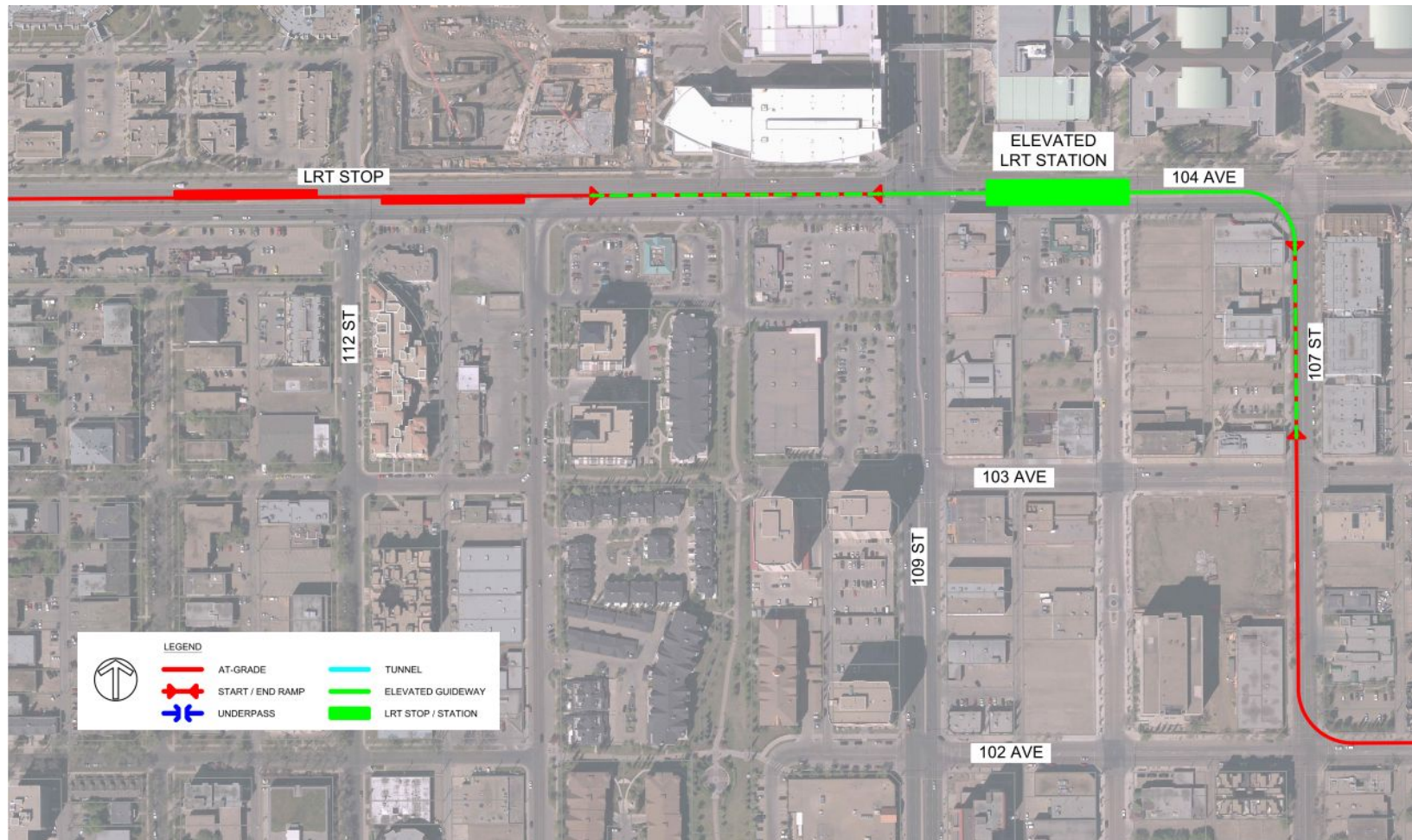
Based on the LRT crossing assessment, the best performing option is to continue LRT at-grade from the LRT stop located along the west side of 107 Street, turning west to travel down the centre of 104 Avenue and cross the 109 Street intersection at-grade. The at-grade LRT option scored high in the accessibility, urban design/social environment and feasibility/constructability categories. The at-grade LRT option also provides a better overall fit into the urban downtown environment.



At-Grade LRT, West Side of 107 Street to Center of 104 Avenue



Underground LRT, Underground Station at 104 Avenue



Elevated LRT Guideway, Elevated Station at 104 Avenue

	At-Grade LRT, West Side of 107 Street to Center of 104 Avenue	Underground LRT, Underground Station at 104 Avenue	Elevated LRT, Elevated Station at 104 Avenue																																							
Accessibility	✓✓✓	✓	✓✓																																							
Considerations	<ul style="list-style-type: none"> The elevated LRT option would result in an elevated LRT Station on 104 Avenue, requiring infrastructure such as elevators, escalators and stairs. The underground LRT option would result in an underground LRT Station on 104 Avenue. In the underground LRT option, the tunnel ramps would cross 103 Avenue impeding east/west pedestrian movements and blocking vehicle traffic. Existing vehicular accesses adjacent to tunnel ramps would be restricted in the underground LRT option. Relocation of existing fire hall on 107 Street would likely be required. 																																									
Network Operations	✓	✓✓	✓✓																																							
Considerations	<ul style="list-style-type: none"> The underground and elevated LRT options would provide an LRT travel time savings of approximately 60 seconds through the intersections. Compared to the at-grade LRT option, the underground LRT option is better for vehicle operation at both the 107 Street and 109 Street intersections. However vehicle traffic on 103 Avenue and would be blocked by the tunnel ramp. Compared to the at-grade LRT option, grade separation of LRT is better for vehicle operation at both the 107 Street and 109 Street intersections. The introduction of an at-grade LRT will change traffic patterns in the downtown area. With an at-grade LRT on 104 Avenue crossing 109 Street and the reduction from 6 to 4 lanes on 104 Avenue, vehicular traffic will utilize alternate routes where possible to get to destinations in the downtown. The introduction of LRT grade separation will attract additional traffic in the range of 400-500 vehicles per hour for the peak direction to 109 Street from adjacent roadways. <p>Afternoon Peak Model Average Delay (seconds/vehicle)</p> <table border="1"> <thead> <tr> <th></th> <th>EBL</th> <th>EBT</th> <th>EBR</th> <th>WBL</th> <th>WBT</th> <th>WBR</th> <th>NBL</th> <th>NBT</th> <th>NBR</th> <th>SBL</th> <th>SBT</th> <th>SBR</th> </tr> </thead> <tbody> <tr> <td>Opening Day, No LRT</td> <td>84</td> <td>34</td> <td>15</td> <td>28</td> <td>23</td> <td>9</td> <td>60</td> <td>54</td> <td>30</td> <td>56</td> <td>56</td> <td>50</td> </tr> <tr> <td>30 year, At-Grade</td> <td>284</td> <td>20</td> <td>19</td> <td>93</td> <td>18</td> <td>13</td> <td>82</td> <td>86</td> <td>85</td> <td>102</td> <td>101</td> <td>79</td> </tr> </tbody> </table>				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Opening Day, No LRT	84	34	15	28	23	9	60	54	30	56	56	50	30 year, At-Grade	284	20	19	93	18	13	82	86	85	102	101	79
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																														
Opening Day, No LRT	84	34	15	28	23	9	60	54	30	56	56	50																														
30 year, At-Grade	284	20	19	93	18	13	82	86	85	102	101	79																														

	30 year, Grade Separated	80	23	22	35	22	17	56	54	30	72	59	47
Urban Design and Social Environment		✓✓✓					✓✓					✓	
Considerations		<ul style="list-style-type: none"> • The ramps and portals of the underground LRT option create visual impacts, constrain the streetscape on 107 Street, and impact the operation of existing fire hall. • For the underground LRT option, additional property would be required to accommodate tunnel ramps and underground LRT Station access points. • For the elevated LRT option, additional property would be required to accommodate elevated LRT station access points. • Visual impact of elevated guideway and elevated LRT station is significant for the surrounding areas. 											
Feasibility and Construction		✓✓✓					✓					✓✓	
Considerations		<ul style="list-style-type: none"> • The underground LRT option would have higher cost and greater constructability challenges, such as additional property requirements to accommodate tunnel ramps, property impacts due to access constraints, stormwater storage facilities, underground LRT Station and underground utility conflicts. • Constructing a tunnel on 104 Avenue and 107 Street would be challenging considering the restricted work space. 											
Relative Ranking		1			3				2				
Order of Magnitude Cost Estimate (+/-30%)		-			An additional \$300 million				An additional \$110 million				