



## Executive Summary

Macleod Trail is an important link in Calgary's transportation network, providing a direct connection into the downtown core from the south. For a good portion of its length, Macleod Trail is closely paralleled by the south leg of the LRT—the "Red Line"—which serves as the primary transit link between south Calgary and the downtown. 25 Avenue is an important east-west route that intersects with Macleod Trail approximately 400 m south of the Elbow River. 25 Avenue provides access to the Stampede grounds, The City's Manchester yards, and provides an indirect connection to Blackfoot Trail. As a result of high traffic volumes, and frequent pre-emption of the signal operation due to LRT interaction, the Macleod Trail/ 25 Avenue intersection is a well-known bottleneck in the area, particularly during the weekday commuter peak periods.

Planning for a grade-separated interchange at Macleod Trail/25 Avenue, to address the congestion due to traffic volumes and LRT pre-emption, dates back to the late 1970s. More recently, as part of a planning study for the "25<sup>th</sup>/26<sup>th</sup> Avenue - Blackfoot Connector" (completed and submitted to Network Planning in 2009) Morrison Hershfield (MH) prepared a plan for an interchange at Macleod Trail/25 Avenue. In order to accommodate this planned interchange, land outside of the current right-of-way is required; this includes a significant number of properties in the southwest quadrant of the intersection. Based on planning for an interchange at this location, The City has already acquired properties in the other quadrants of the intersection.

The land adjacent to Macleod Trail is designated as an Urban Corridor in the Municipal Development Plan (MDP) and Macleod Trail itself is designated as an Urban Boulevard in the Calgary Transportation Plan (CTP). The 2013 Macleod Trail Corridor Study recommended retaining the planning for a future interchange at the intersection of Macleod Trail and 25 Avenue in order to remove conflicts created with the at-grade LRT crossing located directly east of the intersection. When the Macleod Trail Corridor Study was presented for approval in mid-2015, the Transportation Department was tasked with determining the feasibility of alternative grade separation concepts to look at taking the full interchange option at Macleod Trail/25 Avenue out of The City's long range plans. If alternative grade separation concepts are available and viable lands that have been held/reserved for accommodating the interchange may be released. Should direction be provided to remove the interchange from The City's long range plans, The City would then have the option of planning for other uses of the land that would be needed for the interchange.

As pre-emption of the traffic signal operation by the adjacent LRT tracks is a key contributing factor to congestion at the Macleod Trail/25 Avenue intersection, elimination of the at-grade LRT crossing of 25 Avenue has been identified to help improve the operating conditions in the area. Should an alternative grade separation arrangement be found to be viable, it could potentially justify the removal of the full interchange from the long range plans for the Macleod Trail/25 Avenue intersection. This study investigates alternatives for grade separating the LRT and 25 Avenue at a "proof of concept" level of detail only; further more detailed work will be required to establish a preferred configuration, should an alternative grade separation concept be carried forward.

Grade separation alternatives can be undertaken in one of two ways. Either the road goes over the rail, which is what was used for the planned interchange, or the rail can go over the road; in all cases, the alternative results in a change to the elevation of either the roadway or the rail tracks, or both. Other than a full grade separated interchange that involves elevating 25 Avenue over both the LRT and Macleod Trail, there are only a limited number of general concepts for grade separating the LRT and 25 Avenue:

- Construct a new train alignment that goes over, or under, 25 Avenue, with no significant change in the current road elevation.

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- Reconstruct 25 Avenue such that it goes over, or under, the LRT, with no significant change in the LRT elevation.
- Reconstruct both LRT and 25 Avenue to create the desired vertical separation, with either the road raised/LRT dropped, or LRT raised/road dropped.

In each of these cases, changes to the horizontal alignment of the LRT, 25 Avenue, or both may be required. The following concepts were initially considered, with the initial high-level review identifying some concepts that were not taken forward for further consideration:

- LRT Tunnel under Current 25 Avenue Alignment: not carried forward for further consideration because of significant technical and/or construction impact and cost challenges
- LRT Elevated over Current 25 Avenue Alignment: not carried forward for further consideration because of significant technical and/or construction impact and cost challenges
- LRT over Realigned East Leg of 25 Avenue – LRT on Elevated Guideway: carried forward as Concept 1 for further consideration
- LRT over Realigned/Lowered East Leg of 25 Avenue – LRT on Embankment: carried forward as Concept 2 for further consideration
- Partial Interchange Concepts: not carried forward for further consideration because of significant land acquisition challenges

Two interim at-grade solutions were also considered, one of which (referred to in the study as Concept 3) could be implemented as a first stage of concepts that would place the LRT on an Elevated Guideway, and one which would involve only minor geometric improvements to the existing Macleod Trail/25 Avenue intersection.

Given the proximity of the LRT line, Macleod Trail and 25 Avenue to the Elbow River, input was sought from the City's Water Resources group with respect to the concept of grade separating the LRT and 25 Avenue. This report provides a summary of their comments regarding items/issues that will need to be considered for any concept involving changes to the alignment and/or grade of the LRT line and/or 25 Avenue. These points are important to keep in mind at this "proof of concept" stage, but can only be evaluated in detail in the next stage of planning, specifically in the preparation of a functional level design for any changes to elevations in the area.

Based on the technical review completed, both Concept 1 and Concept 2 as noted above were found to represent technically feasible alternatives to the full interchange option in that they would completely remove LRT-vehicle interaction in this area. Both concepts would involve the following elements:

- Realigning the LRT tracks to the east, around the existing Erlton/Stampede station. While this is more expensive than rebuilding the LRT above the current track alignment, it does allow the new LRT tracks to be constructed with minimal impact on LRT operations, with necessary shutdowns of LRT service being limited to weekends. Closure of the Erlton/Stampede station during construction would be required with either of the concepts.
- A new bridge to carry the LRT across the Elbow River.
- Both concepts would have the LRT return to grade and tie back to the existing line just south of the Big 4 building.
- A northward realignment of the east leg of 25 Avenue, to connect with Macleod Trail at a signalized "T" intersection. The west leg of 25 Avenue would remain in its current location, thus the LRT grade separation concept would result in two "T" intersections on Macleod Trail in place of the existing four-legged intersection. A direct side-by-side comparison of a single four-legged intersection with the replacement pair of "T" intersections is difficult at this early planning stage, as there are factors that need to be modelled in more detail and optimized to achieve optimal operating conditions. For example, the

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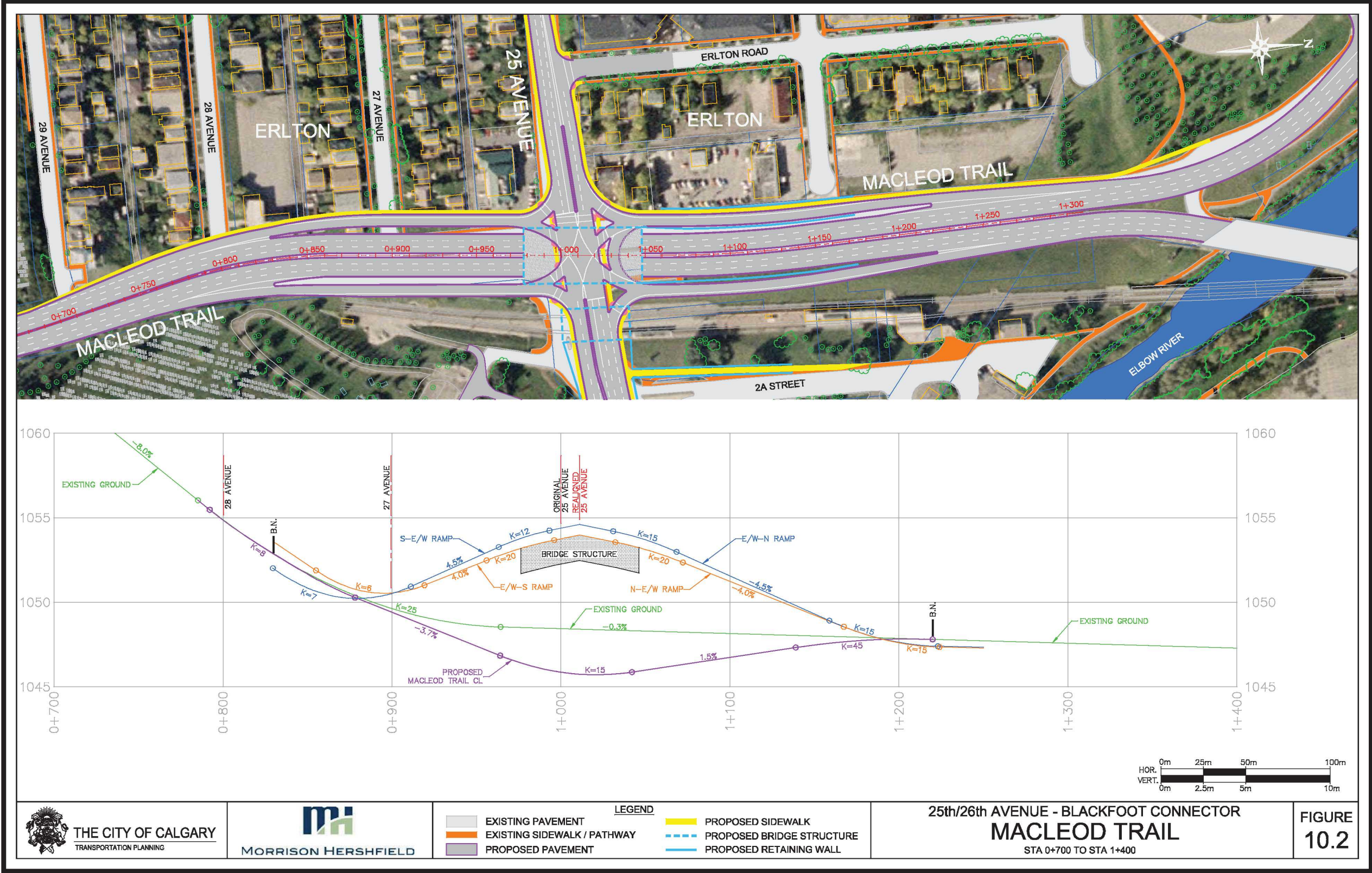


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selection of which movement(s) will be coordinated through the two “T” intersections will affect the performance of the individual pairs of movements that pass through both intersections. If north-south Macleod Trail traffic receives the benefits of coordination between the two “T” intersections (which serves the primary commuter traffic movements), the left-turn movements from the two side street (25 Avenue) approaches would be more likely to incur additional delay as a result of the splitting of the four-legged intersection into two “T” intersections.

- Both grade separation concepts would allow for a signalized intersection at 3 Street to maintain connectivity for the south end of the Stampede grounds, and also for the Stampede lands south of the river that are ready for redevelopment.

The estimated capital costs for the grade separation alternatives considered range from \$94 Million for Concept 2, with the LRT on embankment, to \$130M for Concept 1, with the LRT elevated on guideway. Concept 3, as a potential at-grade precursor to Concept 1, is estimated to cost approximately \$22M; if this was implemented, the cost to later upgrade to the grade separation (per Concept 1, with guideway) would be less than \$130M as the road realignment and the new intersection on Macleod Trail would already have been completed. Further consideration of each concept, to account for the potential costs of land acquisition, and offsetting value of lands made available for development/redevelopment, is required for a full understanding of the comparison between the interchange and the alternative LRT grade separation concepts.

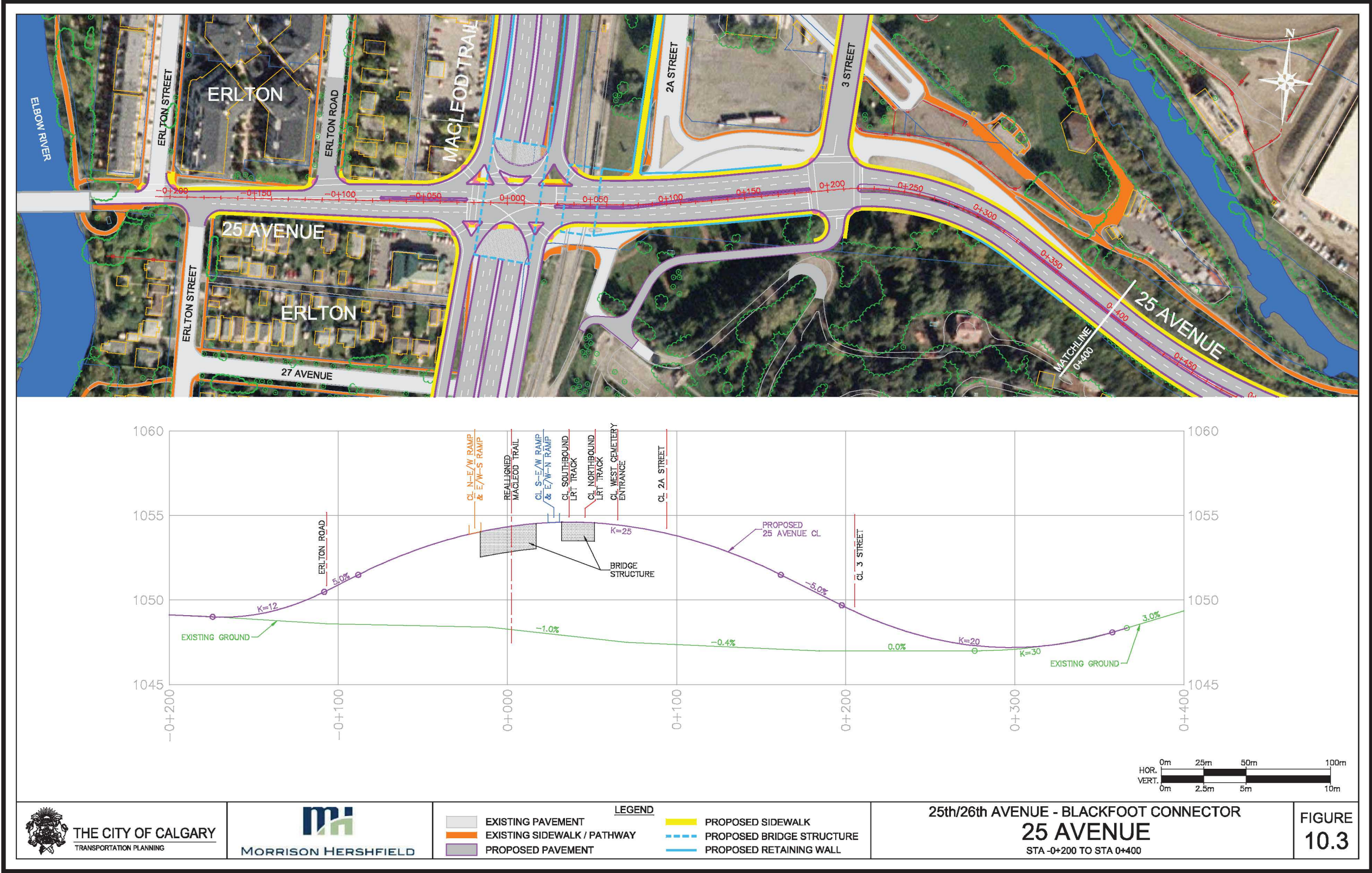


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MACLEOD TRAIL PLAN/PROFILE

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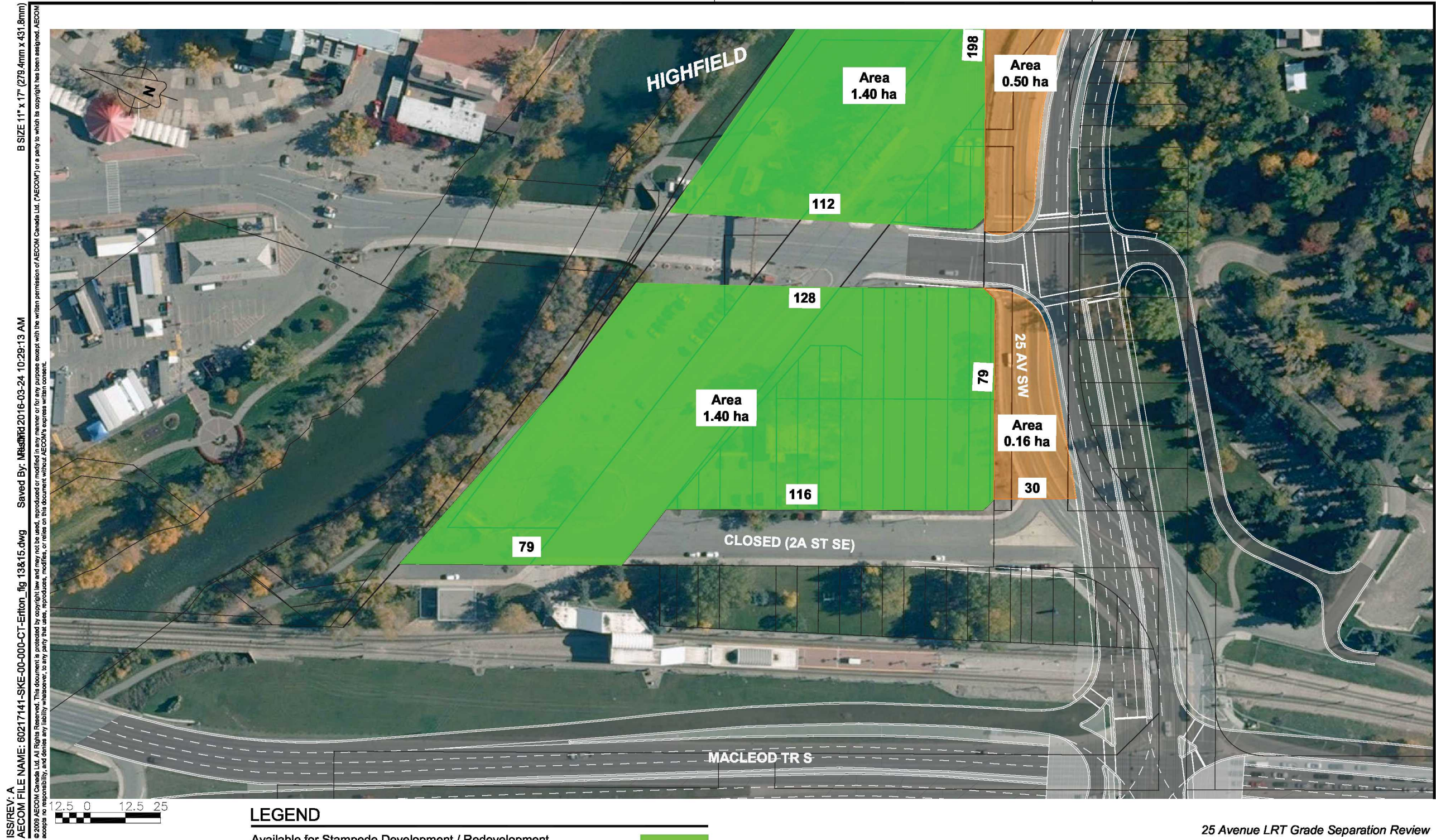
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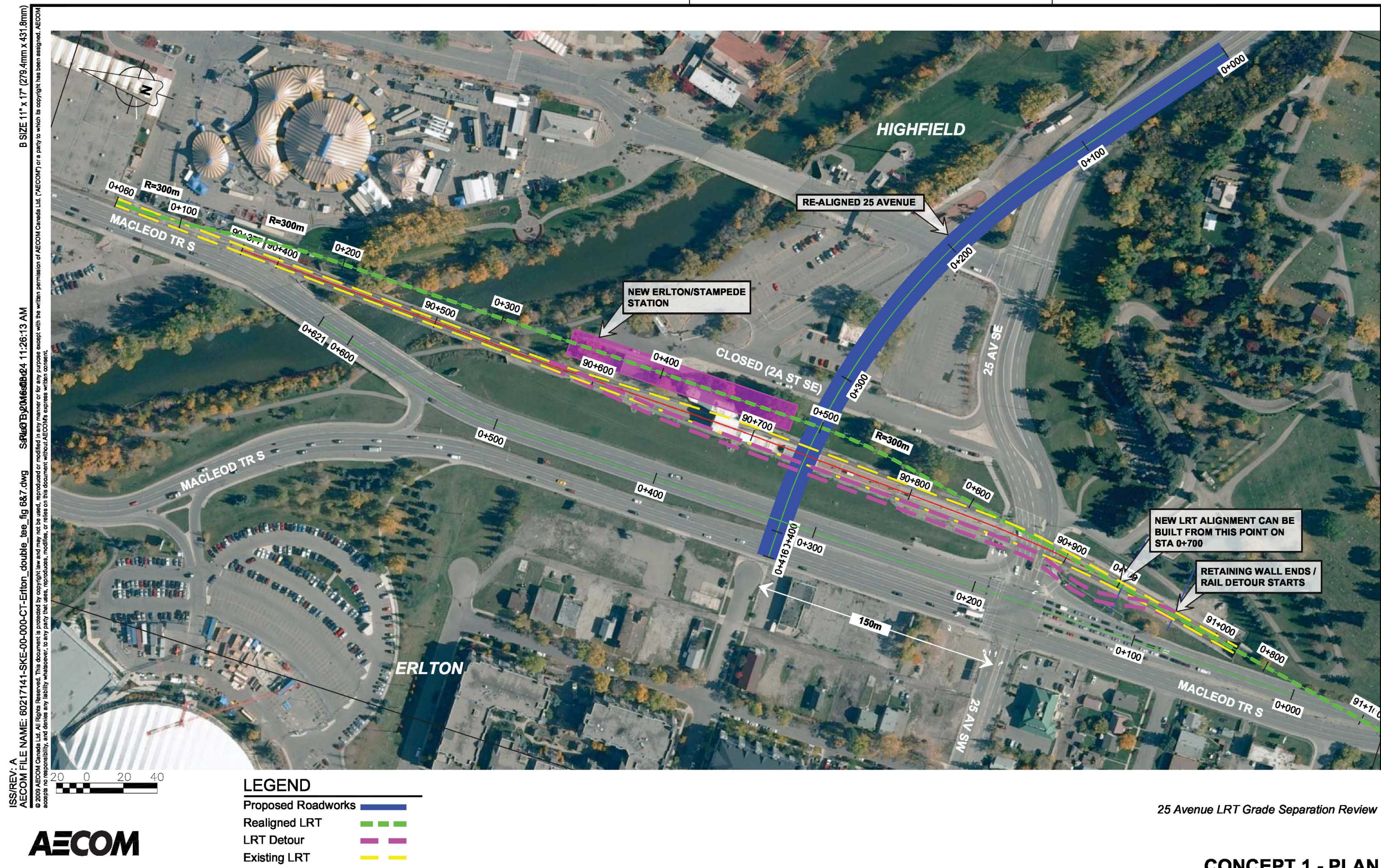
25 AVENUE PLAN/PROFILE



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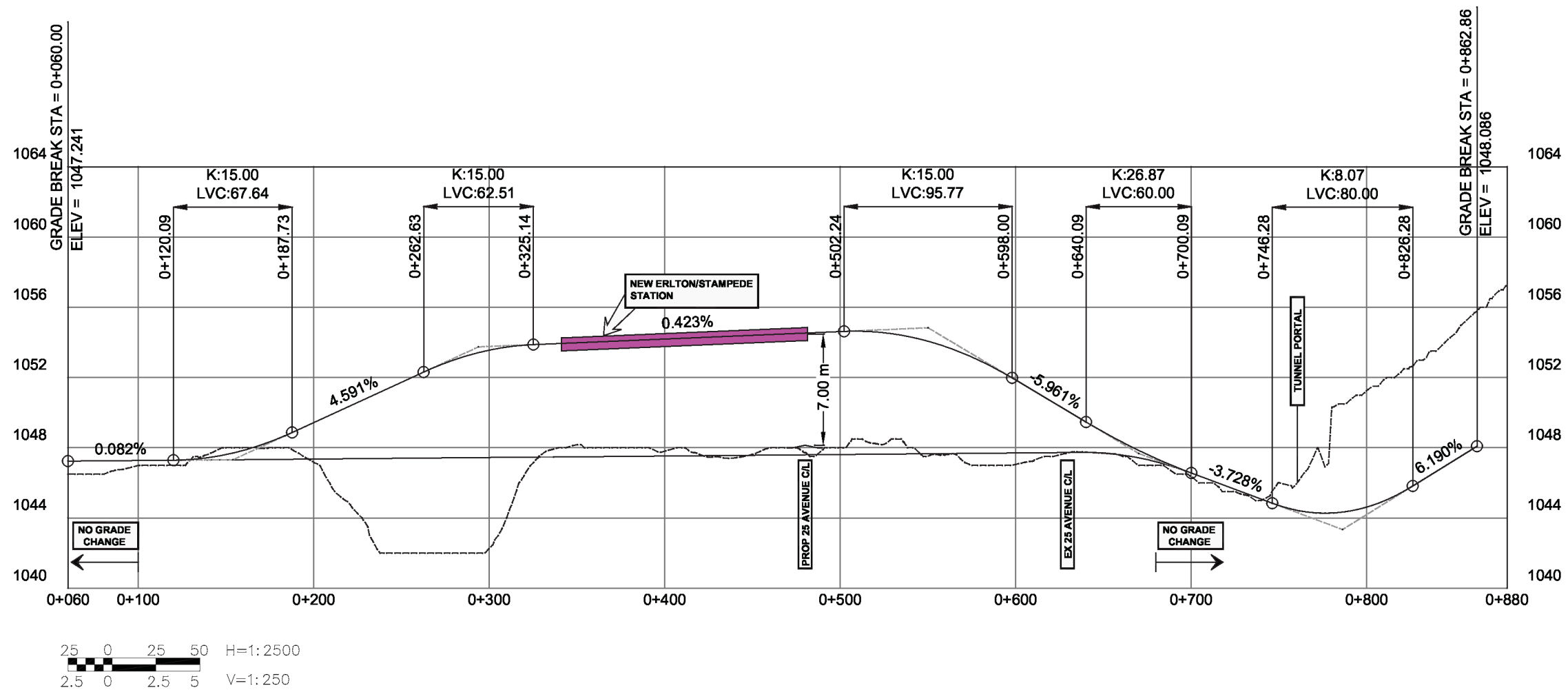


INTERCHANGE AREA  
REDEVELOPMENT POTENTIAL  
- NE QUADRANT



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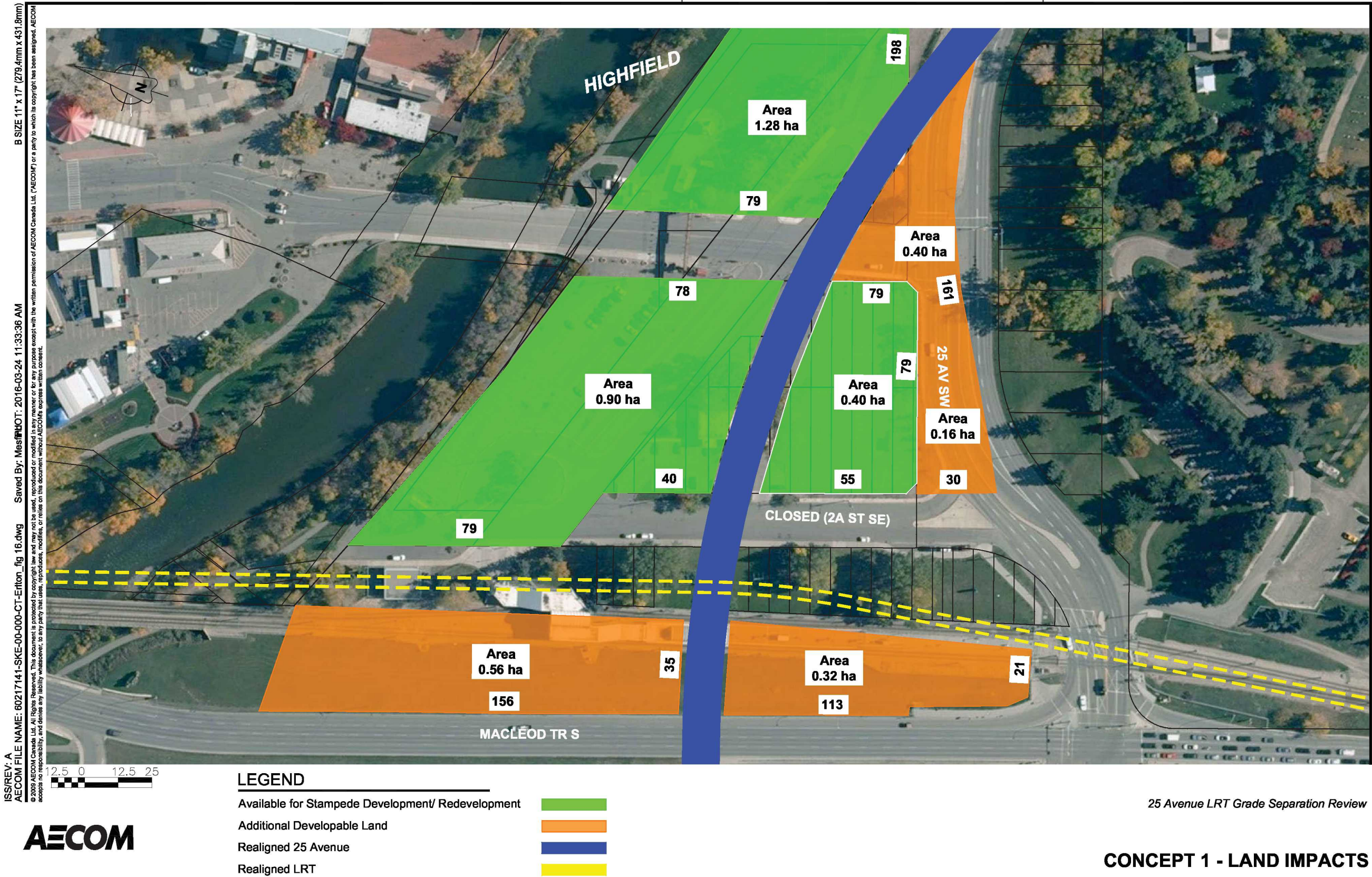
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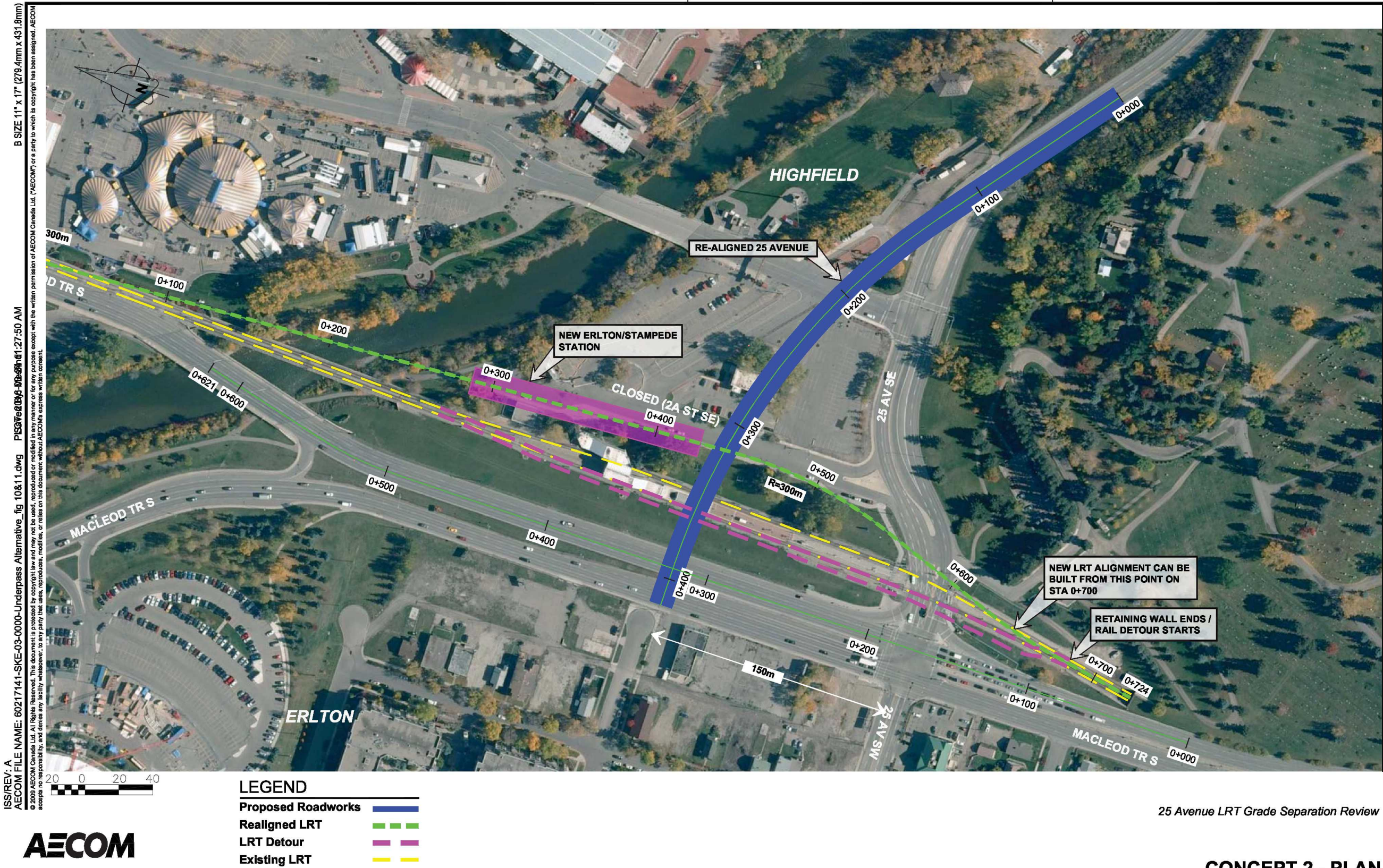
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CONCEPT 1 - PROFILE



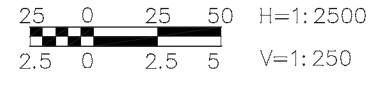
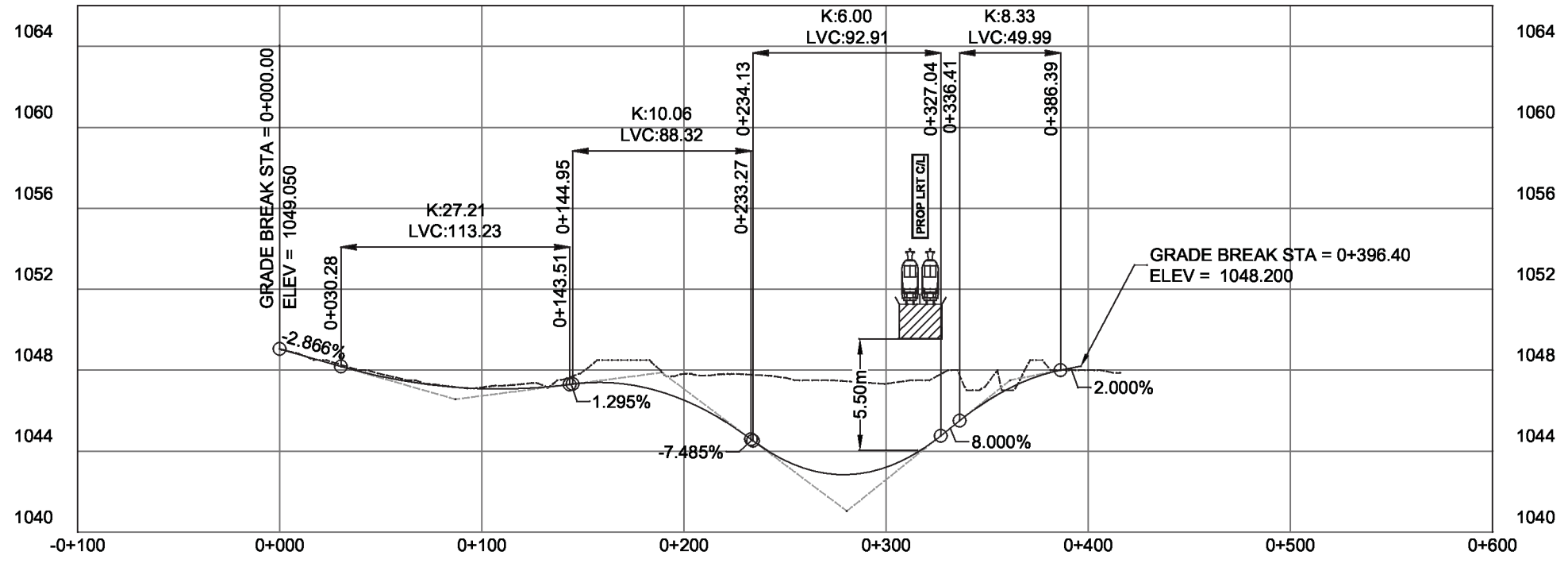
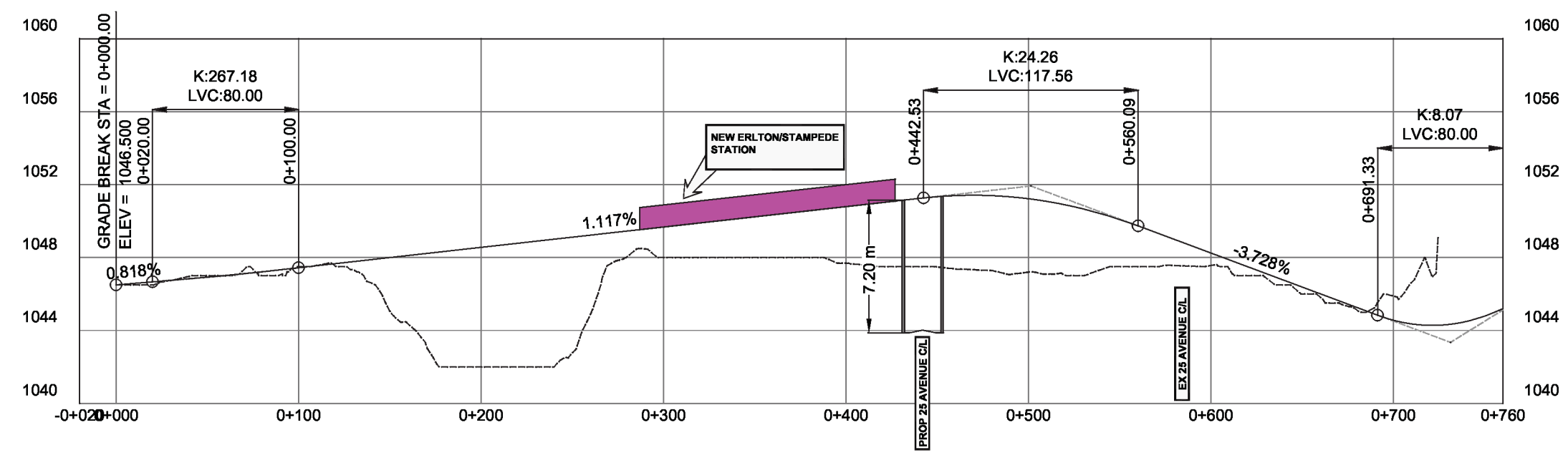
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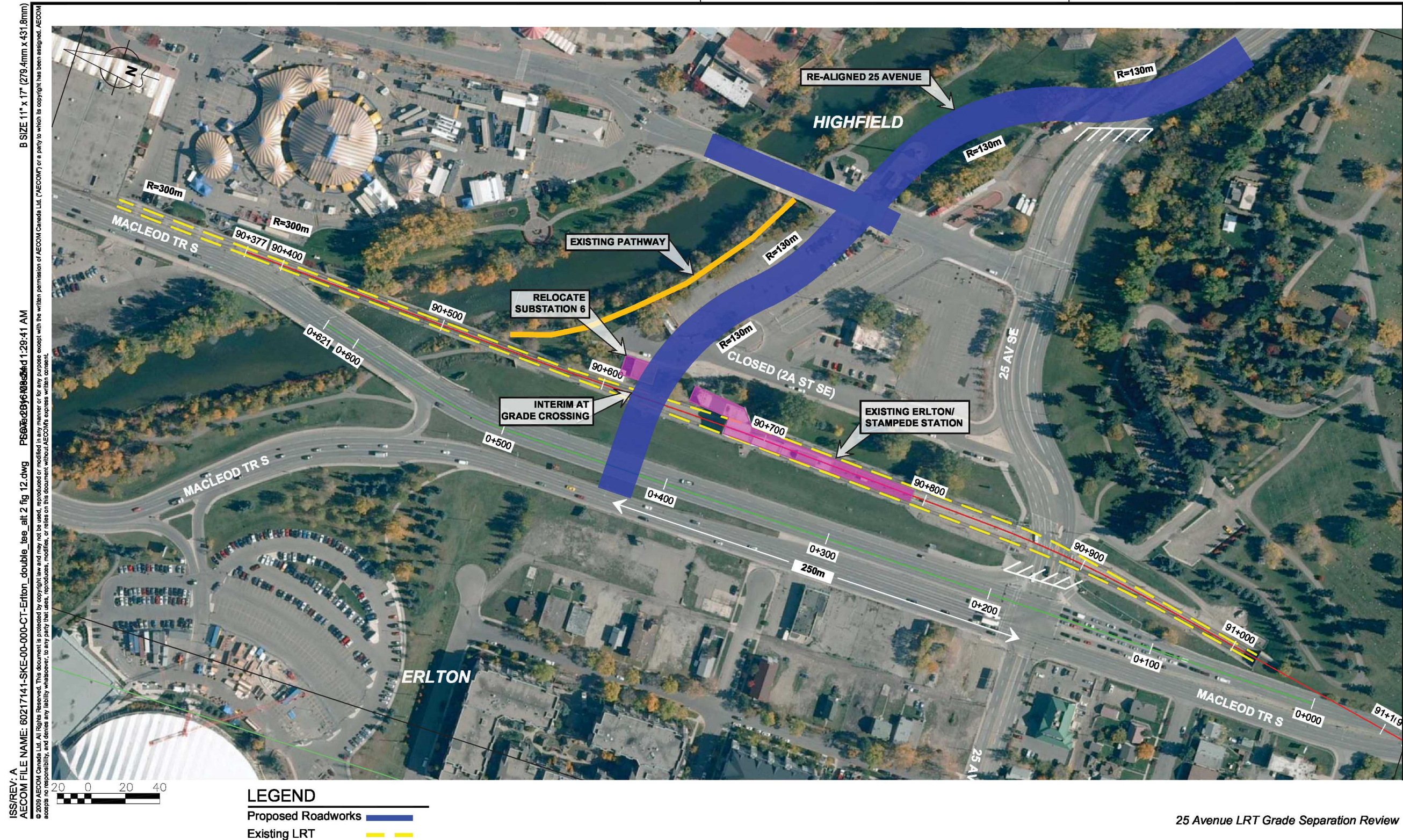


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CONCEPT 2 - PROFILE

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CONCEPT 3 - PLAN