

4 CONCEPT DESIGNS AND COST ESTIMATES

4.1 CONCEPT DESIGNS

Concept designs of the proposed intersection improvements were completed at 1"=100' scale using aerial imagery provided by the City of Longmont's GIS Division. **Appendix B** shows the proposed concept layouts for each intersection. These layouts reflect the lane configuration recommendations generated from the operational analysis. The layouts generally follow Colorado Department of Transportation (CDOT) standards for state highways (Ken Pratt Boulevard / SH 119, Ute Highway / SH 66, and Main Street / US 287), and City of Longmont standards for city streets. Proposed lane widths vary based on roadway classification as well as context and specific site constraints. Additionally, bicycle and pedestrian facilities were included as part of the estimates based on consultation with City staff in an effort to reflect the intent of the *Longmont Multi-Modal Transportation Plan*. Neither horizontal nor vertical survey was available for the concept designs, so the intersection geometry shown on the aerial drawings is approximate and may not precisely depict proposed conditions.

Due to the extensive length of the proposed corridor improvements (27 miles for all corridors combined), concept designs for the corridors were not prepared. Rather, typical cross sections were assumed for each roadway segment using appropriate City or CDOT standards for lane widths, shoulders, bike lanes and sidewalks.

4.2 COST ESTIMATES

4.2.1 Intersection Cost Estimates

Major cost items were estimated based on site visits, aerial imagery, and photographs. Quantities were based on CAD measurements of the horizontal design. In generating the intersection estimates, major construction work was quantified for items such as earthwork, pavement, flatwork, retaining walls, railroad crossings, removals, and traffic signals. Depending on the nature of the existing topography, it was generally assumed that the vertical design would closely match the existing roadway conditions, and that there would be very few areas with major cut and fill slopes. Some intersections were identified for full concrete or asphalt reconstruction, while others were identified for minor widening and resurfacing, based on consultation with City staff regarding the condition of the existing roadway facilities. Unit costs were developed based on 2013 CDOT cost data, and percentages of major items were based on historic trends and engineering judgment.

Construction items such as erosion control, drainage, traffic control, signing and striping, surveying, and landscaping were presented as lump sum percentages of the major construction items. Estimates of utility relocations, design costs and construction engineering costs were included as a percentage of major construction items. Right-of-way impacts were determined based on zoning classifications and coordination with City staff. These costs are summarized in the previously shown evaluation matrix (**Figure 3-3**). A detailed itemized listing of the planning level cost estimate for each intersection is provided in **Appendix C**.

4.2.2 Corridor Cost Estimates

New corridor segments and widening of existing corridor segments were estimated on a per mile basis. Previous City of Longmont and CDOT corridor improvement costs were reviewed to determine a planning level per mile cost for improvements. The unit cost of \$1,000,000 per lane mile was applied for basic improvements. Additional costs were added for items such as bridges, retaining walls, noise walls, and railroad crossings. Existing corridors proposed for widening were assumed to require resurfacing for the existing street section. Similar to the intersection cost estimates, costs for design, survey, geotechnical engineering and construction engineering were estimated using a flat percentage rate of the major construction costs. Right-of-way costs were determined based on zoning classifications and coordination with City staff. These costs are summarized in the previously shown evaluation matrix (**Figure 3-1**). A detailed itemized listing of the planning level cost estimate for each corridor is provided in **Appendix D**.

4.2.3 Pace Street Connection Alternatives

A related effort to this study included the development of alignment alternatives and planning level cost estimates for the extension of Pace Street from the Ken Pratt Boulevard (SH 119) / 119th Street intersection to the 3rd Avenue / Pace Street intersection. Four alignment alternatives were developed and are shown in **Appendix G**. A description of the alternatives is provided below:

- **Option 1:** This alternative attempted to provide a straight alignment between 3rd Avenue and Ken Pratt Boulevard. It has the advantage of providing the most direct connection between 3rd Avenue and Ken Pratt Boulevard, while also maximizing developable land to the east of the alignment. However, after evaluating the vertical profile of the alignment, it was determined to be infeasible due to a significant elevation difference (16 feet) between the Great Western Railroad and Sugar Mill Road. Therefore, a cost estimate was not developed for this option.
- **Option 2a and 2b:** These two options attempted to minimize right-of-way and building takes by following the East Rogers Road alignment to its intersection with Sugar Mill Road, and then curving to the southwest to connect with the Ken Pratt Boulevard / 119th Street intersection. Option 2A provides a 30 mph approach speed at the intersection with 3rd Avenue while Option 2B uses a 20 mph approach speed, mirroring the Pace Street alignment to the north of 3rd Avenue. Both of these options would significantly divide the vacant large parcel of land north of Ken Pratt Boulevard, resulting in fewer development opportunities. The planning level cost estimate for both options is \$10.0 million.
- **Option 3:** This option provides a “middle ground” approach between Options 1 and 2 by creating a gradual reverse curve alignment that preserves the majority of the undeveloped land to the east of Pace Street. It potentially has more impacts to existing developed land uses and would require a new crossing of the Great Western Railroad in exchange for closing the existing crossing at East Rogers Road. It also results in less out-of-direction travel than Options 2a and 2b. The planning level cost estimate for Option 3 is \$9.7 million.