

Design Elements and Alternatives Development

During review of comments and ideas received at the Open House, Workshops, and Lead Team Meetings, various alternative design categories or elements began to stand out. When looking at the permutations and combinations of these design elements, the theoretical potential number of alternatives can become quite large. It was, therefore, important to begin with a set of three alternatives that cover the majority of design elements.

Design Elements

Four design elements were identified. The first design element is **transit mode**, such as rubber-tire bus, light rail, and commuter rail. The second design element was referred to as **lateral alignment**, whether the transit travels along the east side of the existing railroad, the west side or both sides. The third design element was whether this alternative assumes **at-grade or grade separated**

crossings for bicycles, pedestrians, and transit at the major intersections. The fourth design element examined was **transit alignment deviations/connections**, which addresses whether the route remains along the Mason Street Transportation Corridor or deviates to other destinations.

Transit Modes

It was not necessary to examine all transit alternatives but rather examine a family of transit alternative modes that are at-grade or elevated. All of the at-

grade alternatives, whether rubber-tire or steel wheel, have similar operating widths. They also can be expanded from one technology to the next. As an example, one could take existing bus service that travels along College Avenue and reroute that service to a dedicated busway. Later, tracks could be laid along the dedicated busway that would permit operation of vintage streetcars, which then could be converted to Diesel Multiple Unit (DMU) rail and culminate with light rail.

A second family of transit modes is elevated transit. Primarily, this includes

technologies such as Personal Rapid Transit (PRT) and monorails; however, buses could also operate on an elevated structure. Whereas these alternatives benefit from being separated from at-grade conflicts, they result in a physical presence.

The third family of transit modes is regional service, either commuter rail or DMU. Alternative development should, at worst, not preclude regional transit opportunities and, instead, provide a system of bicycle, pedestrian, transit, and automobile connections to support regional rail along this Corridor.

AT GRADE FAMILY OF MODES



ELEVATED FAMILY OF MODES



REGIONAL SERVICE



Lateral Alignment

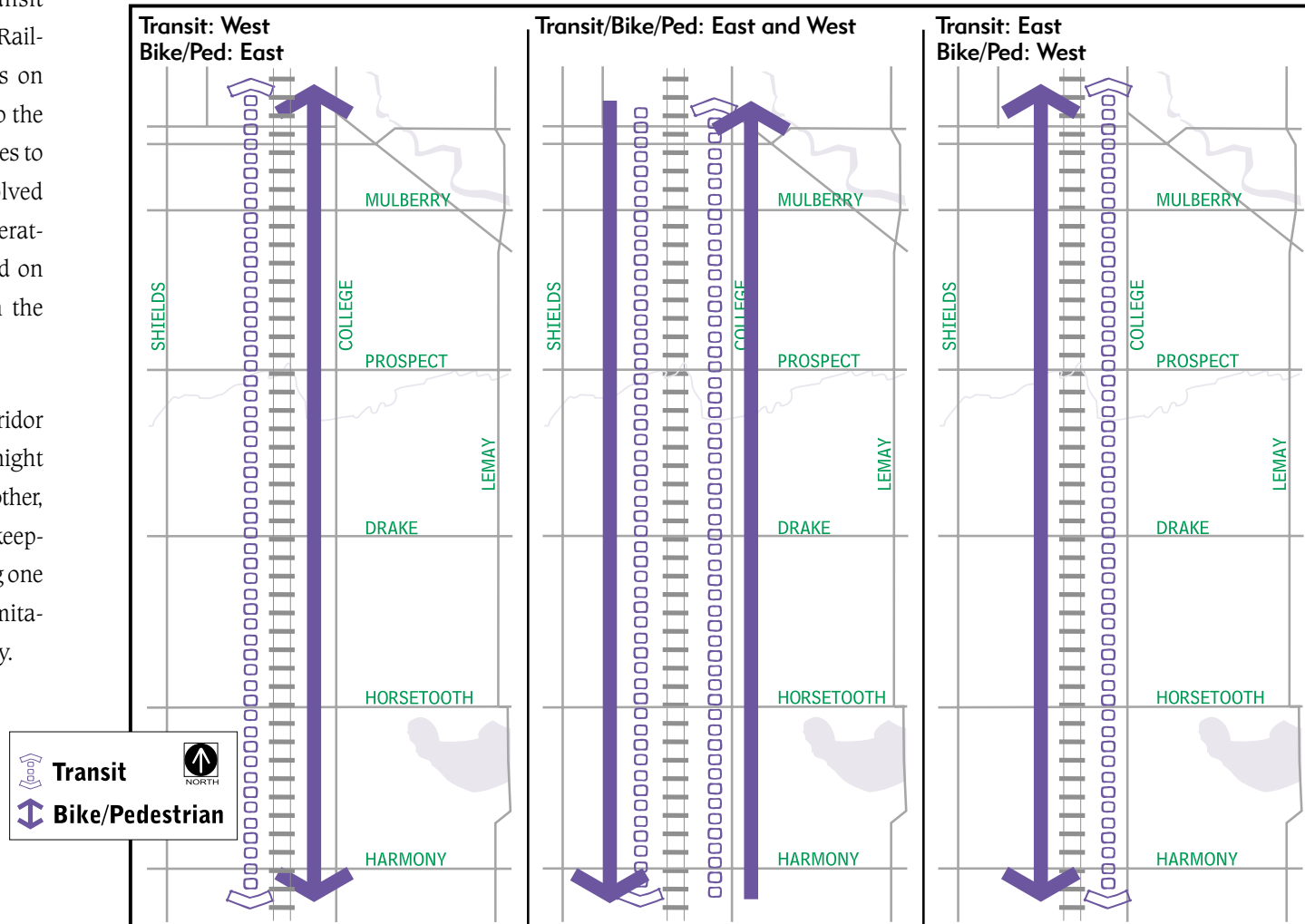
When reviewing alternative concepts developed at the design workshops, options ranged from placing transit along the east side of the BNSF Railway, and bicycles and pedestrians on the west, to reversing the transit to the west, and bicycle/pedestrian facilities to the east. Other alternatives involved transit, bicycle and pedestrians operating on both sides (i.e., northbound on the east side and southbound on the west side).

Whereas each segment of the Corridor has different characteristics that might favor one lateral alignment over another, there are some practicalities for keeping the rail transit alignments along one side or another because of the limitations of crossing the BNSF Railway.

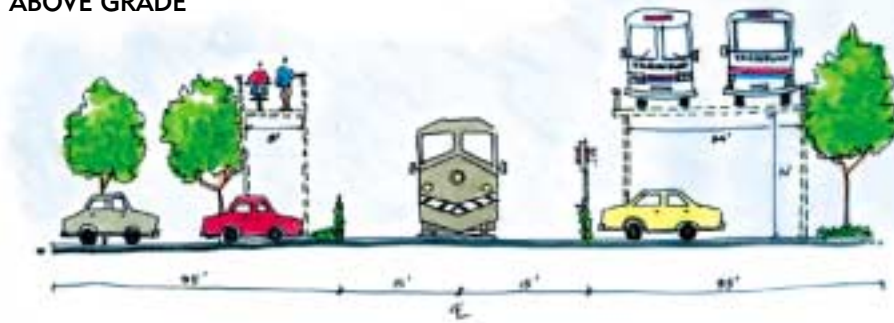
The development patterns and street network along each segment have a major influence on the development of the alternatives. As an example, there is

limited right-of-way within the CSU campus that may preclude one lateral alignment or another. In the downtown area, with a one-way northbound Mason Street,

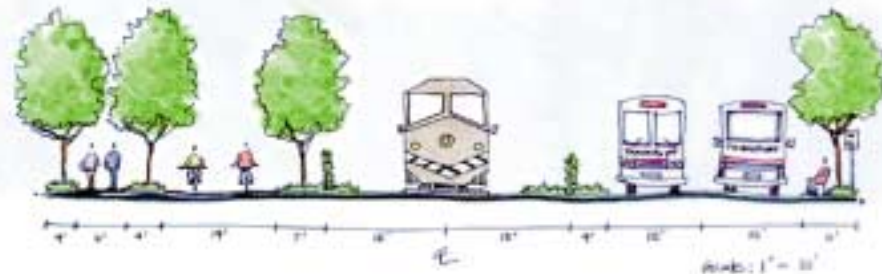
opportunities to provide southbound transit may not be practical and might require a southbound return via Howes Street or College Avenue.



ABOVE GRADE



AT-GRADE



BELOW GRADE



Intersection Crossings

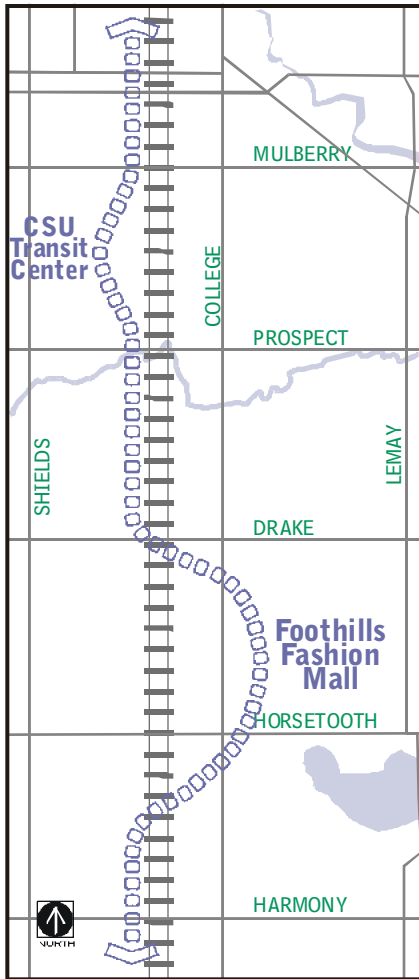
In order to provide safety, minimize travel times, and create a corridor connection from Cherry Street to Harmony Road, the design of the street crossings at Prospect, Drake, Horsetooth, and Harmony were determined to be extremely important. Conventional at-grade street crossings will need to be provided by some form of signal protection. Because of parallel streets, the BNSF Railway crossing safety gates, and the high volumes of east-west traffic, signalized grade crossings might take away green time from the east-west traffic and increase congestion and delay.

One option for the at-grade crossings is to elevate the bicycle/pedestrian paths and/or transit above the cross street. An alternative would be to provide an under crossing. A variation of the under crossing was also examined which would lower the east-west road under the bicycle, pedestrian, and transit corridors. Whereas the advantage of this alternative was to remove the east-west automobile conflict with the railroad, it

was not physically possible to lower the street the necessary 17 feet without severe access and intersection impacts and was subsequently not proposed for further detailed analysis.

Transit Alignment
Deviations/Connections

When examining transit routing, two general concepts were explored. The first was a line-haul service, where transit travels back and forth along the Corridor. East-west transit feeder service would tie into the north-south Mason Street Transportation Corridor at strategic transit stations/stops. This would require a transfer time that affects mode choice when considering overall travel time. An option would be to have transit deviate from the Corridor and tie into key destinations, such as the CSU Transit Center or the Foothills Fashion Mall, to eliminate the transfer time penalty between bus routes. The downside is that overall travel time along the Corridor would increase to accommodate the route deviations.



A possible transit alignment option would be to have transit deviate from the Corridor and tie into key destinations such as the CSU Transit Center or the Foothills Fashion Mall.

Alternatives Development

When considering three transit mode families, three lateral alignments, four treatments for intersection crossings, and line-haul versus transit alignment deviations, there are upwards of 50 alternative combinations. When considering options may vary within the six segments, this list of alternatives jumps to 300 alternatives. Recognizing that there are five major street crossings to address and five segments along the Corridor with different urban design and street network characteristics, the possible list of alternatives is in the thousands.

In review of the design elements, it was agreed that only transit technologies that were in current revenue service should be considered. The two transit options that were identified were some form of rubber tire bus rapid transit and light rail, either electric or diesel multiple unit.

The lateral alignment selected for all alternatives was to have the bicycle and pedestrian trails located on the west side of the railroad and the transit along the east side. This decision was based on a number of factors:

- The bicycle and pedestrian trails were deemed to be less obtrusive to the neighborhoods on the west side of the tracks as compared to transit.
- Transit stops along the east side of the railroad would better serve the higher density commercial and office uses also on the east side.
- The west side of the BNSF Railway has greater opportunities for expanding the alignment Corridor into undeveloped open space. Bicycle and pedestrian routes would better take advantage of this opportunity of expanded alignment through minor meandering of trails, bicycle and pedestrian trail separation, and landscaping. This additional alignment was not critical for the transit operation.
- One extremely narrow segment of the Corridor adjacent to CSU's power plant would require transit to operate on the east side.

In order to minimize conflict between pedestrian and bicycles from automo-

bile traffic along the arterials, all alternatives have proposed under-crossings of the bicycle and pedestrian trails under Prospect, Drake, Horsetooth, and Harmony. Two transit options were selected, at-grade and elevated.

In review of basic transit alignment routings, the concept of route deviation was identified as counter productive to rapid line-haul service along the Mason Street Transportation Corridor. Rather than route deviations, connecting shuttle service, if necessary, could provide these connections.

Ultimately three alternatives were selected. The first alternative was at-grade bus rapid transit along the east side of the BNSF Railroad with bicycle and pedestrian trails along the west side. The second alternative replaced the bus rapid transit with light rail. The third alternative considered an elevated transitway with a guided busway.

These alternatives were presented to the Fort Collins City Council and approved for subsequent alternatives evaluation.