To: Kevin Lilly, Les MacDonald, City of Moscow

From: Derek Abe, Joe Gilpin, Alta Planning + Design

Date: May 25, 2018

Re: Moscow 3rd Street Bikeway Study FINAL

This technical memorandum provides a thorough review of the City’s Plan C Concept for the E 3rd Street Bikeway, and offers recommendations to improve these designs to enhance bike and pedestrian safety and comfort along the corridor. This assessment is based on a design review of the preferred alternative, Plan “C,” an in-person field visit, and several conversations with City staff about the various opportunities and constraints along the corridor.

Based on this study, Alta supports the City’s Plan C alternative with modifications noted in this memorandum. This memo reviews the corridor at key intersection locations, traveling west to east from Washington Street to Mountain View Drive. Concept benefits are detailed for the proposed changes, and concept challenges are noted where multiple alternatives are proposed. Proposed changes are illustrated further in the Appendix.

Plan “C” Review and Recommendations

City staff selected the Plan “C” design as the preferred alternative for the 3rd Street Bikeway from Washington Street to Mountain View Drive. This alternative provides a two-way protected bike lane on the north side of the street, relocation of on-street parking, and several pedestrian crossing enhancements at key locations along the corridor. The City further developed two alternative treatments at the western terminus of the corridor.

3rd Street Between Washington and Jefferson

The Alta team found substantial road space that was being underutilized in the City’s drawings. Through this section, proposed parking lanes are proposed to be reduced from 10’-11’ to 8’-9’. This provides an additional 3.5’ of buffer space for the two-way protected bikeway, allowing more operational width for people on bikes, and adequate clear space for people exiting parked vehicles on the passenger side.

Two alternative concepts were created for this section. Concept 1 (Figure 1) depicts a continuation of the two-way protected bike lane to Washington, and Concept 2 (Figure 3) establishes conventional directional
bike lanes for more confident riders. With Concept 1, the facility would then continue up Washington on the west side of the street for one block to 2nd Street.

As a State facility, any improvement to Washington Street would require coordination with, and approval from the ITD.

Figure 1. Concept 1 – 3rd Street from Washington to Jefferson

Concept 1 Benefits:

- Provides link to 2nd Street Greenway Route
- Provides wider buffer than Plan C to increase separation from vehicles
- Clarifies lanes along Washington by creating a lane drop onto 3rd Street, where most vehicles using that lane are already turning (Figure 2)
- Improves visibility and safety for pedestrian crosswalk at 2nd Street and Washington. Reduces the number of travel lanes crossed from 3 to 2 lanes.
- Provides no anticipated capacity issues on Washington.
- Provides a direct connection to the retail destinations around Main Street and 2nd Street.
Concept 1 Challenges:

- Any improvement to Washington Street would require coordination with, and approval from the ITD.
- For those bicyclists looking to go south downtown, this would introduce a less intuitive block of out-of-direction travel. Additionally, some people will likely still choose to do a two-stage left turn onto Jefferson to access downtown.
- While this design would provide a comfortable and somewhat intuitive connection into the downtown, it would be significantly more expensive to construct than the facility presented in Concept 2.
- Accessibility considerations exist with the curb extension at the NW corner of Washington. Proper clarification of pedestrian vs bicycle path of travel will be difficult to achieve. A pedestrian refuge paired with a street-level bikeway crossing would address this.
Concept 2 Benefits:

- Transitions two-way facility on north side of 3rd Street to E-W routes via Jefferson St in advance of heavier downtown traffic, and provides directional bike lanes on 3rd St for more confident riders seeking a more direct route into downtown.
- Leaves navigation of downtown more to the control of the bicyclist rather than channelizing them into a set path. Connection to 2nd Street Greenway for example can be facilitated at Jefferson Street through wayfinding only. Jefferson is also the existing bike route into downtown to access the southern stretch of Main Street.
- Provides a double buffered bike lane to parked cars in the westbound direction, a bike box at Washington Street, and two left turn boxes at Jefferson, to provide a 2-stage transition for bicyclists headed north to 2nd Street, or south to 5th Street.
- Less expensive than Concept 1.

Concept 2 Challenges

- Bike box needed at Washington Street intersection to transition westbound bikes into shared lane environment west of the intersection. The bike box will only work on red signal indications as bicyclists will have to maneuver in advance during stale green signal indications.
- Conventional 6’ bike lane on south side of street remains sandwiched between travel lane and curbside parking lane. The current door zone buffer would also be removed, unless some space from the buffer in the WB buffered bike lane were reallocated to this bike lane.
**3rd Street & Jefferson Street**

Plan C as proposed by the City, featured a center median with a pedestrian refuge on the westbound approach. The Alta concept illustrated in Figure 4, relocates this center median slightly to the north. This modification improves the operation of the intersection in several ways discussed below.

![Figure 4. Plan C (Left) and Alta Concept 1 (Right)](image)

**Benefits**

- Provides set back crossing from right turning vehicles from 3rd to Jefferson. This geometry is created by the parking lane on the north side of the street, which is not possible with the center median option in Plan C.
- Provides space to provide a turning box for WB to SB bikes. This is not possible with within Plan C.
- Reduces pedestrian crossing distance on 3rd Street to approximately 24 feet, versus 52 feet currently. The only deficiency with the Alta plan versus the Plan C median is that pedestrians will still cross two lanes of opposing traffic at once versus having the crossing broken into two stages which each cross one direction of traffic. However, field observations noted that driver yielding compliance to crossing pedestrians was extremely high.
- Left-turn box for the WB to SB movement (and EB to NB movement in Concept 2).
- Curb extensions shorten the pedestrian crossing distance on the NE, SE, and SW corners (Concept 1), and the NE, SE, and NW corners (Concept 2)
Other notable features

- Sight distance for Southbound vehicular travel is currently challenged due to a long row of street trees, and will remain so with the proposed concept. Field observations show that the improvements will not improve nor further impede sight distance to approaching vehicles from the east (Figure 5).
- It should be noted that the vehicle WB to NB turning volumes at this location are relatively low (approximately 42 vehicles in the AM peak hour, and 31 vehicles during the PM peak hour).

Figure 5. Sight distance looking eastbound from the southbound approach.
**3rd Street and Adams Street**

The Plan C design at this location continues the two-way protected bike lane on the north side of 3rd Street, with a lane of parking between the bike facility and the WB travel lane. The Alta concept (Figure 6) updates this configuration to shift the parking lane to the south side of the street (from Adams Street to Polk Street).

![Figure 6. 3rd Street and Adams Street](image-url)

**Benefits**

- While a parking lane next to the bikeway would increase separation from moving traffic, it would also reduce visibility of bicyclists at the frequent cross-streets. The Alta team suggests that the visibility of bicyclists outweighs the benefits of increased separation at this location, and recommends that the parking be relocated to the south side of the street. Some of this space could then be reallocated as loading zones for the high school. It should also be noted that the vehicle WB to NB turning volumes at this location are relatively low (approximately 19 vehicles in the PM peak hour, and 22 vehicles during the AM peak hour).

- Relocating the parking lane to the south side means parked vehicle doors would only open onto moving traffic on one side, rather than two. This also eliminates the potential for “dooring” bicyclists. A potential tradeoff would be that people going to 1912 Center would need to cross the street if they chose to park along 3rd Street, but this is considered a relatively minimal impact.

- Shifting the parking to the south side of the street also creates a space to provide a curb extension on the southeast and southwest corners of the intersection. This shortens the pedestrian crossing distance and reduces pedestrian exposure to vehicles. The additional curb extension on the south side of the street minimizes delay for the bus by stopping in the travel lane, and provides a more convenient boarding and alighting platform for bus passengers.
Reducing the 9’ wide parking lane in Plan C to 8’ provides an additional 1’ of buffer space for the two-way protected bike lane.

**3rd Street from Polk Street to Blaine Street**

3rd Street from Polk Street to Blaine Street is very constrained at a width of 30 feet curb-to-curb (Figure 7). This width presents significant challenges to providing comfortable facilities for bicyclists and motorists. Few alternatives exist dimensionally to improve the facility beyond the City’s Plan C concept; however, some interesting ideas were discussed during the field visit.

- Alta recommends not providing a centerline stripe outside of the first 25 feet near intersections so that bicyclists may use the full effective width of the facility (7 feet total). The American Association of State Highway Transportation Officials (AASHTO’s) Guide for the Development of Bicycle Facilities (4th Edition, 2012) describes the minimum operating envelope of a single bicyclist at 4 feet. As such, demarcating a “lane” of this size would leave little room to maneuver.
Alta also recommends that the City explore creating a raised bikeway in the constrained sections. The bikeway would be raised three to six inches and involve minor utility adjustments. Doing so would have the following benefits:
  o Maximize the effective width of the constrained facility by allowing the 1’ buffer and 6” curb to act as available width, this would increase the feel of the bikeway to nearly 9 feet when factoring in the tops of curb, more than the 8’ min recommended for constrained situations.
  o Provide a facility that doesn’t feel as compromising to the street. A raised facility would feel more permanent and part of the street rather than something squeezed in at a minimum.
  o Provide a facility that feels safer to its users.
  o Provide a facility that is more easily maintained using existing City equipment.

Other notable features
  o Alta supports the implementation of the pedestrian improvements detailed along this segment of 3rd Street in Plan C, including raised marked crossings, and new curb extensions
  o Additionally, several opportunities exist to realign curb ramps and marked crossings, specifically at Monroe Street, Lincoln Street, Hayes Street, and Blaine Street.
**Connections to Mountain View Drive**

Once east of the new bridge over Paradise Creek, the separated two-way bike lane on the north side of 3rd Street must cross Mountain View Drive to reach the existing and future sections of shared-use path on the east side of the roadway. The City’s proposed Plan C depicts some form of raised area for bikes along with a separate marked crossing parallel to the existing pedestrian crossing over Mountain View Drive (Figure 8).

![Figure 8. 3rd Street at Mountain View Drive](image)

During a field visit to this site with City Staff, Alta proposed a variation of the concept that includes the following:

- **Combined crossing with pedestrians**
  - Reduces ADA challenges with leading pedestrians down the bike crossing
  - Simplifies corner geometry and grading
  - Maximizes available corner space for shared use rather than constrained segregated use
  - Matches condition on east side of Mountain View Drive where a shared-use path exists

- **Simplifies crossing treatment (RRFB or Solar HAWK)**
  - Mountain View Drive is a 35mph posted street. Some form of activated beacon will be beneficial to pedestrians and bicyclists crossing the street.
  - Alta suggests the city consider solar powered pedestrian hybrid beacons (also known as HAWKs, Figure 9). These would be pole-mounted at both sides of the crossing and would affordably provide a device that stops traffic and provides a pedestrian crossing signal to pedestrians and bicyclists.
• Reduces the need for sidewalk expansion and right-of-way acquisition by constructing entirely in existing right-of-way.

Figure 9. Potential Pedestrian Hybrid Beacon (HAWK) configuration for use at 3rd Street and Mountain View Drive.

This intersection is the current terminus of 3rd Street and provides a direct connection to the regional trail system. The intersection of 3rd St and Mountain View Drive is expected to experience increased volumes of pedestrians, bicyclists, and vehicles once the Paradise Creek bridge is constructed and the Harvest Hills Addition subdivision east of Mountain View Drive is developed. Taking this into consideration, the Alta team suggests a HAWK beacon be installed at the intersection. This device will provide a level of safety similar to a full traffic signal and minimize delay for drivers on Mountain View Drive as volumes of people walking and biking across the intersection increase.

Other notable features
Much of the corridor east of Blaine Street is missing sidewalks on at least one side of the street. Sidewalks are critical from an accessibility and safety standpoint and will be essential to provide pedestrian connectivity along this segment of 3rd Street. Constructing new sidewalks will require detailed survey and in-depth discussions with property owners to determine feasibility.