To: WYDOT, Town of Jackson, Teton County, Friends of Pathways

From: Joe Gilpin, Alta Planning + Design

Date: 12/30/2016

Re: Proposed Design Changes to the ‘Y-Intersection’

Purpose:

This memo provides suggestions for improving the current WYDOT design for the Y-Intersectiion to better serve pedestrians and bicyclists while acknowledging the need for this intersection to efficiently move considerable and increasing amounts of vehicular traffic. This analysis does not recommend any change to the proposed signal phasing, this analysis also is acutely aware of the large number of buried utilities. This analysis is meant to provide talking points and form the basis of a dialogue with WYDOT to proactively enhance the currently proposed design from the goal of improving convenience and safety for pedestrians and bicyclists.

Background:

Current design plans were provided by WYDOT for review. These plans transition the intersection to be more compact, efficient with traffic movement, integrate protected pedestrian signal phasing and modify access from Buffalo Way to a right only configuration. Signal, Striping, Utility and geometric plan sheets were provided.

Findings:

After review and consultation with representatives of Teton County and the Town of Jackson the following areas are suggested for improvement (in order of relative importance to Town/County staff).

1. Improvement to width and orientation of pedestrian/bicycle access

Current plans show WDOT standard pedestrian ramps and sidewalk width access approaches. These facilities are opportunities for improvement to improve capacity and flow of increasing numbers of bicyclists and pedestrians. Recent improvements such as the WY22 Pathway and the Broadway Cycle Tracks will increase in use as the system expands both for transportation and recreation use. This intersection is a key decision point between downtown Jackson and the WY22 Pathway. Through the use of pathways and separate sidewalks and exclusive bikeways it will be important to provide sufficient width for these modes to mix, queue and intuitively navigate the intersection, which will minimize undesirable behavior. It is recommended that corner ‘plazas’ be created with 10 feet minimum in cross-sectional width. Ramps should be 10 feet minimum in width. Desire lines for people walking and bicycling should be maintained and accommodated, with some emphasis on slowing users at uncontrolled crossings of channelized right turns.

2. Treat aprons on slip lanes and NE, NW corners to suggest preferred path of private vehicles while still allowing for WB-67 movement

Current phasing plans show blank out signs being utilized to prohibit right turns during actuated pedestrian phases. This is an admirable design that demonstrates WYDOT’s commitment to safety. The Town/County still have some degree of concern with the large corner radii which facilitate turning of the WB-67 design vehicle. It is recommended to provide some additional guidance for the majority of vehicles using the intersection which will reinforce a slower cornering speed and improved visibility of pedestrians and bicyclists. Compliance with the blank
out signs is expected to be good, but not perfect, similarly pedestrians and/or bicyclists may enter the intersection at times outside of the ‘walk’ interval. For these reasons it is requested that some effort be made to provide a reduced radius turn for cars, this could be accomplished with a variety of materials including, paint, concrete, colored concrete or even a raised mountable apron. The Town/County are requesting a material change to help define the desired corner radius.

| Painted apron | Concrete apron | Colored/Textured angled apron |

3. Improve angle of channelized right turn lane from NB Buffalo Way to Broadway in accordance with FHWA recommended practice

FHWA and the NCHRP have issued guidance which defines preferred geometry for channelized right turns. Lowering the approach angle with approaching traffic yields numerous safety benefits. Preliminary analysis shows that a 112 degree approach angle is possible for the NB Buffalo Way channelized right turn. This will reduce the footprint of the intersection slightly and reduce cornering speed. See references for more information.¹

![Diagram showing preferred angle](https://www.nap.edu/catalog/22238/design-guidance-for-channelized-right-turn-lanes)

This change would necessitate the relocation of the main signal mast caisson several feet to the west. After review of the utility plans, it does not appear that this move would be any more problematic than the existing location.

4. Improve angle of channelized right turn lane from Broadway to SB Buffalo Way in accordance with FHWA recommended practice

The Broadway to SB Buffalo Way turn is different from the above example in that it creates a lane on buffalo way and does not have a yielding condition. The Town may be considering changing this configuration as the current ‘add’ lane quickly terminates into a right turn only lane leading to the Albertson’s parking lot. At this time it is unknown what changes might be forthcoming (if any), however there may be the potential to achieve the same optimal geometry if the right turn lane merges with the south bound through lane.

¹ [http://safety.fhwa.dot.gov/older_users/fhwasa15088/ch2.cfm#ss17](http://safety.fhwa.dot.gov/older_users/fhwasa15088/ch2.cfm#ss17)  
https://www.nap.edu/catalog/22238/design-guidance-for-channelized-right-turn-lanes

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The change in orientation would also improve upon pedestrian and bicyclist queuing potential in the pork chop island over the current island, which is extremely constrained and may lack sufficient storage capacity to store more than a couple of bicyclists if pedestrians are present.

5. As pedestrian signal phasing is protected, provide additional bicycle signal heads to provide positive guidance to large numbers of bicyclists using the signal.

It is likely that high percentages of the pedestrian signal users will be bicyclists. With the current proposal for protected pedestrian signal phasing it is possible that bicycle specific signal heads could be provided under the conditions if FHWA's Interim Approval #162, which requires that there be no conflicting vehicle movements. Separate bicycle signal heads would provide several benefits including:

- Provide a secondary clearance interval and green interval timed to bicycle speeds. This would reduce bicyclists entering the intersection with small amount of time left on the countdown pedestrian signal.
- Provide positive guidance for bicyclists to use the crosswalks and not enter or exit the traffic stream at random.
- Better link the varied and bicycle oriented off-street infrastructure (existing and future)

Conclusion:

We believe that the proposed design has some significant advantages to safety and traffic flow over the existing intersection. It is possible that some changes to the periphery of the intersection could yield additional benefits to all users. Accompanying pdf materials show conceptual layouts for discussion purposes.

2 http://mutcd.fhwa.dot.gov/resources/interim_approval/ia16/
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1) Highest treatment - Colored and raised mountable corner apron
2) Recommended treatment - Concrete or other visually contrasted level corner apron
3) Lowest treatment - Painted level corner apron