Project Synopsis

North Broadway from Gladstone City Limit to Barry Road

North Broadway is a local collector located parallel and ¼ mile east of Highway 169 in the Northland. The proposed improvements are about 4,100 feet long. The northern 1,200 feet are commercial on the west side. The northern 250 feet are commercial on the east side. All other frontage is residential. The existing road has been relatively recently overlaid; however, it is narrow with open-ditch drainage and few sidewalks. Hobby Hill Park is directly south of this project in Gladstone. Gladstone has improved N. Broadway up to the Kansas City city limit with on-street 4-foot bike lanes and a sidewalk on one side. The stated goal for Kansas City's project is to provide the multi-modal connectivity for bicyclists as well as pedestrians, including the many school buses which drop off students on this road. A total reconstruction is assumed for numerous reasons. The vertical profile is being altered to ensure adequate sight and stopping distance. The proposed typical section is wider and includes curb & gutter. Stable subgrade must be established to create the foundation for improvements. As will be discussed, the road cross-section (superelevation) is being adjusted. All these issues combine to suggest that piecemeal construction would be more difficult, take longer, provide a less sustainable and resilient product, and ultimately be more expensive, both for initial construction and longer-term maintenance and life-cycle considerations.

Design Criteria

Project Criteria	
Road Classification:	Local Collector
Design Speed:	35 mph
Crest Minimum K:	29
Sag (Lighted) Minimum K:	25
Peak Hour (AM)	219
Peak Hour (PM)	481
L.E.D. Streetlighting	
Enclosed Drainage	
4'-0" On-Street Bike Lanes	

Existing Traffic Counts

The traffic counts shown above are from a KCMO count of Barry Road which noted the Broadway numbers at the intersection. According to Jeff Bryan those are the only numbers the city has. Mr. Bryan did note that MoDOT had a Broadway count in Gladstone which suggests a much higher ADT. It would be approximately five times a calculated ADT based upon the KCMO count. Casual observation suggests the KCMO number to be more in line with actual traffic, but in absence of a specific Broadway count it is uncertain.

Study Phase Design Strategy

Using GIS surfaces, a preliminary layout was designed to identify potential challenges and opportunities. The intent is to assure the proposed typical section will work, and then to develop a preliminary opinion of construction costs, within an order of magnitude, from those design quantities. After discussion, a 2-lane road with a 4-foot bike lane on each side (which matches the Gladstone section) was identified as the best, first alternative. These non-buffered bike lanes are adequate for the low-speed, low-volume nature of Broadway.

Currently, the 2,900-feet between the south limit of the project and 82nd Street has only 690-feet of sidewalk. A proposed 5-foot sidewalk, with ADA ramps was placed on only one side of the road, which will provide connectivity the entire length of the project while minimizing right of way requirements. On the south half the sidewalk is on the east side, and at 80th Street on to the north, the sidewalk crosses to the west side. The right of way, for purposes of cost estimating will be 30-feet on the side with the sidewalk and 25-feet on the non-sidewalk side.

New LED streetlights will be provided. These will provide visibility and safety for motorists, cyclists and pedestrians, designed to city standard.

Enclosed drainage will be designed during final design to replace the existing open ditches. Fortunately, Broadway runs along an existing ridge with existing draws both east and west of the road. Therefore, the current ditches are not large, and they drain east or west at most low points. There are very few existing cross-road pipes for this same reason. During this study phase, for the purposes of cost estimating, it was assumed that, on average, 30-inch pipe will be used. This does not imply that during final design, in an area where an existing 18-inch pipe is currently adequately providing drainage, that the 18-inch pipe would be up-sized.

There are two locations where there are existing cross-road storm pipes. Just north of 82nd Street a 24" pipe collects two 15" pipes then heads westerly off Broadway. (Sta. 132+00). North of 83rd Street, an existing 42" culvert crosses under Broadway and also heads west (Sta. 139+25). No other cross-road pies have currently been identified. Generally, ditches on the east side drain down side streets to the east, and westside ditches drain westerly. At the southern end, there is also a drainage system in Gladstone which accepts ditches from both sides of Broadway as the ditches flow southerly out of KCMO. The drainage outlets are also marked on the plan sheets with blue arrows.

Specific Design Considerations

A preliminary plan set including title, quantities & opinion of costs, typicals, plan & profiles, and cross-sections has been developed. This plan development exercise identified several potential issues which will be addressed when better information from a topographic survey is available during design.

At the south end of the project, particularly south of the city limit, the surface seems suspicious. The vertical and horizontal curves of Broadway will need to be refined once better topo is available. The existing information provides a rough indication which should be sufficient for this study. A second concern at the south end is the berm and trees on the east side. The widened

road and sidewalk on the east side will impact the bank. Two potential wall sections might address the concerns.

1. An integral sidewalk retaining wall (maximum height 30-inches) would be less costly, would avoid the necessity of placing a metal railing on top of the wall, and might increase visibility on the inside of the horizontal curve, relative to a taller wall. The ground would need to be laid back (preferably with a mowable 4:1 slope) into the resident's yard. (currently shown in the plan set)
2. A full-height wall (maximum height 5-ft to 6-ft) would be more costly, would require a metal railing to provide fall protection, and might be more difficult to see around/over on this relatively low-volume, low-speed road. The wall would minimize impact to the resident's yard during construction and reduce the amount of temporary easement required.

The existing asphalt pavement on Broadway is typically between 22' to 24' wide with no curbs or shoulders. Driveways currently start at the edge of the traveled way. The proposed typical section, with bike lanes, curb & gutter, as well as sidewalk on one side, creates a much wider template from which to start tying driveways back to existing. Transitioning from a crown section to a proposed section which slants across the entire street at 2% depending upon the general lay of the land, greatly reduces the impacts to the driveways. This is exhibited as superelevation transition tables across the top of the profiles. It is also demonstrated on the respective typical sections and cross-sections.

On the southwest corner of Broadway and 82nd there is an existing private entrance which accesses Broadway within a few feet of the 82nd Street curb return. This is a potentially dangerous situation because a motorist turning south onto Broadway from eastbound 82nd is going to be looking left (north) for on-coming traffic and could pull right into a vehicle entering or leaving the driveway. The plans recommend eliminating the access point on Broadway which currently violates city access protocol. To appease the resident, the plans show building a 2-car driveway which accesses 82nd Street.

North of 82nd Street there are several potential typical section alternative options which could be considered. While each potential scenario reduces construction costs as opposed to full build-out, each scenario also reduces the quality of the final product delivered to all stakeholders.

- North of 82nd Street the existing Broadway pavement widens all the way to Barry Road. Between 82nd and 83rd, Broadway is currently pavement-marked as a wide 2-lane section. North of 83rd, the Broadway pavement marking creates a left turn lane for traffic onto Barry Road. It has been proposed that construction could be eliminated north of 82nd Street to reduce construction costs. The section between 82nd and 83rd is wide enough to continue the 4' bike lanes. There is existing curb & gutter and a sidewalk on the west side north of 82nd, so in a sense, the existing Broadway typical already matches the improvements proposed for south of 82nd, except that the existing sidewalk is only 4' wide. The preliminary plans also call for a new fill wall on the west side because there is a steep slope down to the commercial parking lot. Not touching this section would avoid

that wall cost. North of 83rd, the bike lanes would need to be marked as "sharrow" lanes. The curb is not new, and the streetlights are not LED, currently.

- Construction could also be eliminated only from 83rd Street to Barry Road. This would provide a reconstructed section for the residential homes which are located between 82nd Street and 83rd Street on the east side. The construction south of 83rd Street would necessitate constructing the fill wall on the west side, but it would allow for the 5' sidewalk, which would match the remainder of the project to the south, to be constructed.
- A third option would be not to touch between the curbs north of 82nd Street but upgrade the sidewalk to 5' wide all the way to Barry Road. Presumably the streetlights in all scenarios would be upgraded to LED standards.
- A fourth consideration concerns the "sharrow" lanes north of 83rd Street. To provide cyclists exclusive pavement all the way from Gladstone to Barry Road might involve providing behind-the-curb bike lanes where the left turn lane utilizes the additional existing width of the pavement for vehicles. The intent is for the bike trails to be one-way, so the opinion of construction costs assumes an 8-foot section for these.

Water Services

There are existing water mains ranging from 8" to 30" under and along Broadway. These are shown on the plan view sheets in existing street right of way. Assuming the main is a minimum of 48" deep, there are few places where the proposed road improvements should conflict with the main. Water services has been asked whether replacing/upgrading the main is currently expected, but there has not been a response, to date.

Likewise, there is an 8" sanitary sewer which wanders down the middle of Broadway, as shown on the plan sheets. There is no combined sewer in the area. Water Services has responded that they have no plans to upgrade the system.

Sustainability

The N. Broadway project will be designed with sustainability features as prescribed in the Envision© rating system. The system is divided into 5 major categories: Quality of Life, Leadership, Resource Allocation, Natural World & Climate and Risk.

This project positively impacts Quality of Life. The improved sidewalks and bike lanes increase mobility, safety, access and utility for users other than motorists. This enhances public space.

Leadership will be addressed by utilizing public involvement to encourage stakeholder involvement.

Resources are being managed by reducing and limiting the amount of excavation on the project and using LED streetlights which not only provide better illumination but do so using less energy.

Within the Natural World, stormwater management is the primary consideration.

As design proceeds and other opportunities present themselves, the design team will proactively pursue these goals, knowing that the City of Kansas City has identified them as a priority.