DOWNTOWN TRAFFIC STUDY

Billings, Montana



Downtown Traffic Study

Prepared For:

City of Billings, Montana



Prepared By:

Kittelson & Associates, Inc.



In association with:

DOWL



August 2019



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PREFACE

The Downtown Traffic Study was performed under the guidance of the Project Management Team (PMT) and Project Advisory Committee (PAC). The PMT served as the ultimate decision-making group for the study, considering feedback from the PAC alongside the technical evaluation of alternatives. All PMT members were also members of the PAC. The PAC involved representatives from numerous local organizations, which included city leaders, state transportation department, downtown commerce representatives, business owners, emergency responders, intermodal transportation providers, engineers and architects, and local residents. The primary role of the PAC was to provide a wide range of perspectives by bringing valuable information and dialogue to the PMT throughout the study.

ACKNOWLEDGEMENTS

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Thank you to all the PMT and PAC members for your dedication and commitment to the Downtown Traffic Study. Your thoughtful comments and suggestions were very helpful in creating dialogue to provide additional perspectives and direction throughout the study. A special thanks to the City of Billings Planning and Community Services for hosting each of the three PAC meetings.



EXECUTIVE SUMMARY

The City of Billings (City) continues its commitment to the vitality of the downtown core through its transportation network. The City recognizes the important role that transportation plays in the growth and livability of downtown. The purpose of the Downtown Traffic Study (Study) was to:

- Understand how the downtown transportation network operates today and in the future year 2040.
- Test different transportation network alternatives and identify which ones work or do not work for traffic operations in downtown Billings.
- Summarize the technical tradeoffs of the transportation network alternatives that work for traffic operations.

The study area encompassed 1.5 square miles, focusing on the roadways and intersections from Division Street to Main Street, and north to south from 6th Avenue North to 1st Avenue South. A Project Advisory Committee (PAC) comprised of local agencies, downtown representatives and business owners met three times to provide input on the Study.

The alternatives development process consisted of seven initial alternatives, which were evaluated and resulted in identifying six refined alternatives that provided acceptable traffic operations. The six refined alternatives are described below:

- North and South One-Way to Two-Way Street Conversions This alternative converts remaining north and south one-way streets between Division Street and 24th Street to two-way operation and provides potential bicycle facility connections consistent with the City's Bikeways & Trails Master Plan.
- 2nd Avenue N & 3rd Avenue N One-Way to Two-Way Conversions This alternative converts remaining one-way street on 2nd Avenue N and 3rd Avenue N west of 22nd Street to Division Street and provides potential bicycle facility connections consistent with the City's Bikeways & Trails Master Plan.
- Montana Avenue Road Diet (Division Street to 18th Street) This alternative reduces Montana Avenue from three lanes to two lanes from Division Street to 18th Street, provides potential bicycle facility connections consistent with the City's Bikeways & Trails Master Plan, and maximize on-street parking.
- 6th Avenue N Road Diet (Main Street to Division Street) This alternative reduces 6th Avenue N from five lanes to four lanes between Main Street and 10th Street, reduces 6th Avenue N from four lanes to three lanes 10th Street to Division Street, and provides a potential long-range bicycle facility consistent with the vision in the City's Bikeways & Trails Master Plan.
- 13th Street Road Diet between 6th Avenue N and 1st Avenue N This alternative converts 13th Street to a two-lane roadway with and without a center turn lane and provides a potential bicycle facility connection consistent with the City's Bikeways & Trails Master Plan.
- Broadway Street Closure (Permanent Closure) This alternative creates a permanent festival street by closing Broadway Street to vehicles between 1st Avenue N and 2nd Avenue.

Each alternative has tradeoffs with regards to traffic operations, parking impacts, bike facility types, and cost. These key tradeoffs are summarized in the table on the next page.

Refined Alternatives Summary Findings

	Change in Level of Service**				
Alternative	Per Intersection (seconds)	Per Corridor (seconds)	Parking Impacts (number of spaces)	Potential Bike Facility Miles	Planning Level Cost Estimate (million)
North and South One-Way to Two- Way Street Conversions					
 25th Street, 26th Street, 29th Street, 30th Street, 31st Street, 32nd Street, 33rd Street, 34th Street, 35th Street 	+5.0 +1.0	-	-16 to -70	+1.6	\$5.8 – 7.8
2nd Avenue N and 3rd Avenue N One- Way to Two-Way Street Conversions	+1.4 +4.8	-	-38 to -62	+1.9	\$3.1 - 4.1
Montana Avenue Road Diet	-	+6 +18	-10 to +47	+1.2	\$1.0 – 5.0
6th Avenue N Road Diet (13th Street to Main Street)	-	None	None	+0.5	\$0.5 – 1.5
13th Street Road Diet (6th Avenue N to 1st Avenue N)	-0.6 -2.0	-	None	+0.35	\$0.5 – 0.7
Broadway Avenue Street Closure	+0.4 +0.3	_	-24	Varies	Varies

^{**2040} AM Peak Hour | 2040 PM Peak Hour

This Study provides the City with six alternatives and various cross sections that are feasible for consideration in enhancing the connectivity and livability within downtown Billings. These alternatives and cross sections provide the City with flexibility to implement transportation alternatives as funding becomes available and select the appropriate alternatives based on the level and time frame of the funding allocated. Moving forward, this Study can serve as a solid foundation for the City to continue the discussion with other agencies, stakeholders, property owners, businesses, and the public about finding ways to enhance the downtown transportation network.



PROJECT OVERVIEW

The City of Billings (City) is continuing its commitment to the vitality of the downtown core through its transportation network. The City recognizes the important role that transportation plays in the growth and livability of downtown. In the past, various transportation ideas have been suggested to and considered by the City. However, there has been reluctance to implement previous ideas and alternatives because of the unknown impacts to other areas of downtown. The City desired a traffic study to look at downtown from a wholistic approach with the ability to analyze various alternatives and how they impact the downtown Billings transportation network. The Downtown Traffic Study (Study) was conducted and engaged local agencies, downtown representatives and business owners to identify and test various transportation network alternatives to address key questions, such as:

- How does the transportation network operate today and in the future?
- What opportunities exist for modifying the transportation network?
- What transportation network alternatives work or do not work for downtown Billings?

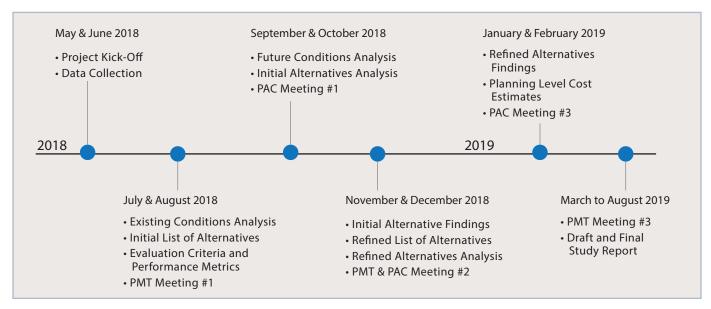
- What types of changes support a livable downtown?
- What are the costs of the potential changes to the transportation network?

This Study established a framework of evaluation criteria and performance measures used for evaluating each of the various transportation network alternatives in downtown Billings. Stakeholders vetted the alternatives based on these criteria and provided guidance for the Study and for future decisions by the City. Details of these alternatives are presented in the Refined Alternative section of this report.

TIMELINE

The Study kicked offin May 2018 with data collection occurring the first two months of the project. There were three Project Management Team (PMT) and Project Advisory Committee (PAC) meetings throughout the project, presenting existing and future conditions, initial alternative findings, and the refined alternative evaluation. Analysis, evaluation, and final comments received from PAC wrapped up in February 2019, with the final study report delivery in August 2019. **Figure 1** illustrates the Study timeline.

Figure 1. Downtown Traffic Study Timeline



BACKGROUND

During this Study, collaboration occurred with the City, Montana Department of Transportation (MDT), and Billings Metropolitan Transit (MET) regarding other ongoing or recently completed projects within downtown. These projects range from planning to final design and were included in the analysis of existing and/or future conditions. These projects are located inside the study area and include:

Planning Projects

- 2018 Billings Urban Area Long Range Transportation Plan (MPO)
- Billings Urban Area Regional Travel Demand Model (MPO)
- 27th Street Railroad Crossing Feasibility Study (MDT)
- Exposition Drive Pedestrian Crossing Feasibility Study (EBURD)
- ONE Big Sky Center Development (private)
- Hospitality Corridor Planning Study (MPO)
- East Billings Urban Renewal District Master Plan (EBURD)
- Billings Bikeway and Trails Master Plan (City of Billings)
- Billings Parking Strategic Plan (City of Billings)
- City of Billings Complete Streets Progress Report (City of Billings)

Final Design Projects

- Airport Road & Main Street (MDT)
- 1st Avenue North (MDT)
- Exposition Drive & 1st Avenue North (MDT)
- Main Street Signal Timing (MDT)
- 27th Street 1st Ave S to Airport (MDT)

Construction Projects

- Exposition Gateway Project
- · Main Street Pavement Preservation Project

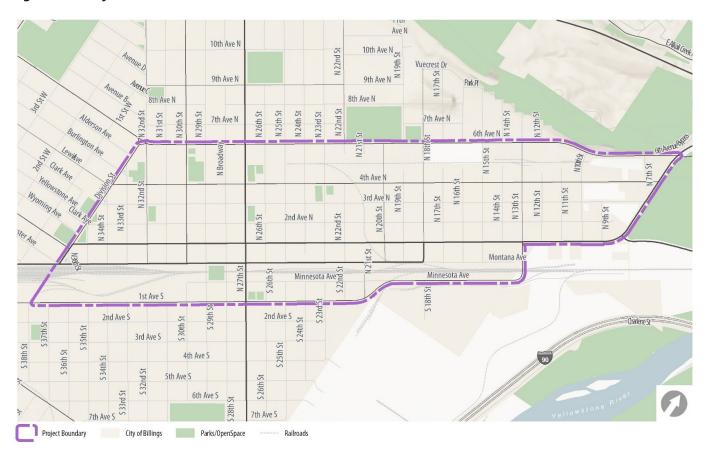
STUDY AREA

Downtown Billings serves as an economic hub for eastern Montana. Industry and commerce continue to grow within the region, driving further economic development and urban growth within downtown. The transportation network plays a vital role in encouraging and sustaining this growth. Billing's downtown transportation network is unique in that it provides accessibility for people commuting in and out of downtown but also provides regional connections to the state highway system and U.S. highway and interstate system as well.

The downtown study area encompassed 1.5 square miles, focusing on the roadways and intersections from Division Street to Main Street, and north to south from 6th Avenue North to 1st Avenue South. The study area is highlighted in **Figure 2.**



Figure 2. Study Area



GOALS AND OBJECTIVES

Goal #1: Understand how the downtown transportation network operates today and in the future.

- Evaluate the existing and forecast year nobuild operational performance of roadways and intersections via a traffic operations analysis and compare to the City's and MDT's level of service standards.
- Identify opportunities for modifying the transportation network based on results from the existing and future no-build operations analysis.

Goal #2: Identify transportation network alternatives that work or do not work for downtown Billings.

- Listen to and involve the PAC to understand community priorities and concerns to identify opportunities and constraints that may influence the development and evaluation of alternatives.
- Evaluate and refine network alternatives that are expected to maintain an acceptable level of service along roadways and at the intersections.

Goal #3: Establish a framework of evaluation criteria and performance measures to be used for evaluating the various transportation network alternatives in downtown Billings.

- Determine and document benefits and tradeoffs based on traffic operations results, land use implications, costs, accessibility for all users, and sustainability.
- Identify a list of refined alternatives with cross section options that are feasible for future consideration of implementation.

Goal #4: Provide the City with existing and future condition traffic models to address key questions and test various transportation network alternatives.

 Provide the existing and future Synchro models to the City so that the City can use them to test future network opportunities upon completion of this Study.

EXISTING CONDITIONS

The existing conditions evaluation identifies the current physical and environmental conditions within the study area, including the operational and geometric characteristics of roadways and intersections as well as recent safety performance of the transportation network. Existing conditions are used to identify current needs and deficiencies as well as opportunities for future transportation network alternatives. The existing conditions serves as a basis to compare with future condition alternatives. **Appendix A** provides the base mapping and summary of existing conditions.

Traffic Data

The study area includes 187 study intersections, 48 of which are existing traffic signals. Traffic counts were collected at 105 of the 187 intersections and were collected during the a.m. (7:00 a.m. to 9:00 a.m.) and p.m. (4:00 p.m. to 6:00 p.m.) peak periods in June 2018. Counts were also provided at study intersections that had previously been collected by other studies. Turning movement counts were collected at each signalized intersection. At the unsignalized intersections that were not counted, traffic volumes were estimated by interpolating between traffic counts obtained on the corridor upstream and downstream of the intersection and based on turning movement counts at similar intersections in the area or along the corridor.

Kittelson and DOWL staff visited and inventoried the study area to verify information regarding roadway characteristics, lane configurations, speed limits, traffic control devices, and pedestrian and bicycle infrastructure.

TRANSPORTATION FACILITIES

The downtown transportation network serves commuting traffic as well as regional connections located outside of the study area.

Roadway Infrastructure

Roadway classifications range from principal arterials to local streets, summarized in **Table 1.** All streets within downtown have a posted speed limit of 25 mph or 35 mph.

Traffic control devices at each of the study intersections are provided in **Figure 3.** As shown, most signalized intersections are grouped between 32nd Street and 26th Street from 6th Avenue N to Montana Avenue. This area represents the core of downtown, as it has the highest density of buildings and pedestrian activity, including office and retail, residential, hotels, and parking garages.

Montana Railroad Lines

Situated between Montana Avenue and Minnesota Avenue, the Montana rail lines provide an important intermodal connection for regional commerce. Within the downtown study area there are five roadways that provide north/south crossings of the railroad tracks. These crossings are critical for providing accessibility between the north and south sides of the study area and are highlighted in Figure 3. The currently ongoing 27th Street Railroad Crossing Study (Reference 1) is analyzing and evaluating the feasibility of providing a grade separated crossing of the railroad tracks at the 27th Street crossing. Additionally, there are spur lines running through the east side of the study area. One spur line runs in a north/south direction between 20th Street and 22nd Street with connection to the other, which runs east/west between 6th Avenue N and 4th Avenue N. These spur lines are no longer being used, and there are future visions for abandoning the spur lines and replacing with green space, including recreational pedestrian and bicycle facilities as described in the East Billings Urban Renewal District Master Plan (Reference 2).

Metropolitan Transit System

The Metropolitan Transit System, commonly referred to as MET, provides fixed-route bus and paratransit services within the City of Billings. There are currently 19 fixed-routes that provide bus service Monday through Friday from 5:50 a.m. to 6:50 p.m. Seven routes provide service on Saturdays from 8:10 a.m. to 5:45 p.m. Currently, 13 of the fixed-routes utilize the Downtown Transfer Center located on 25th Street between 3rd Avenue N and 2nd Avenue N. The Transfer Center, shown in **Figure 4,** provides a central connection point for destinations within downtown or transfers to other routes throughout the City.



Table 1. Roadway Classifications

Functional Classification	Roadway	Jurisdiction	No. of Lanes	One-Way or Two- Way	Posted Speed Limit (mph)	Average Daily Traffic
	6th Avenue North	City	4-5	One-Way (WB)	25 & 35	15,000 – 17,500
	4th Avenue North	City	3-4	One-Way (EB)	35	9,000 – 14,500
	1st Avenue North	MDT	3-5	One-Way (WB) & Two-Way	25 & 35	10,000 – 15,000
Principal Arterial	Montana Avenue	MDT	3	One-Way (EB)	25 & 35	6,000 – 12,500
Arterial	1st Avenue South	City	4-5	Two-Way	35	9,000 – 11,000
	Division Street	City	4	Two-Way	25	8,500 – 11,500
	Main Street	MDT	7	Two-Way	35	33,000 – 40,000
	27th Street	MDT	5	Two-Way	25	13,000 – 18,500
Minor Arterial	30th Street	City	2	One-Way (SB)	25	3,000 – 5,000
	13th Street	City	2-4	Two-Way	25	2,000 – 5,000
Collector	18th Street	City	2	Two-Way	25	2,000 – 3,000
Collector	20th Street	City	2	Two-Way	25	1,000 – 2,000
	32nd Street	City	2	One-Way (SB)	25	2,000 – 8,000
	2nd Avenue North	City	2-3	Two-Way	25	2,500 – 5,000
Local Street	3rd Avenue North	City	2-3	One-Way (WB)	25	3,000 – 6,000
	Minnesota Avenue	City	2-3	Two-Way	25	<2,000
	All remaining north/south streets	City	2-3	One-Way or Two-Way	25	<5,000

Figure 3. Traffic Control Devices at Study Intersections



Figure 4. MET Downtown Transfer Center



Pedestrian Infrastructure

Nearly all streets within the study area have attached and/or detached sidewalks. Detached sidewalks generally include a landscaped buffer ranging from three to eight feet in width between the curb and sidewalk, as shown in **Figure 5.** The downtown core consists of attached sidewalks with wider walking areas. Many streets include planted trees. There are a few remaining street blocks without sidewalks on the east side of downtown; however, the current phase of the Exposition Gateway Project (Reference 4) is filling in the gaps between sidewalks to create a complete pedestrian network within the study area.

Figure 5. Detached Sidewalk along 6th Avenue N



Bicycle Infrastructure

Bicycle connectivity through downtown's transportation network is limited. Currently, the only bicycle facilities within the study area are on 2nd Avenue N and 3rd Avenue N from Main Street to 22nd Street. The transition from two-way to one-way streets occurs at 22nd Street and continues west to Division Street. A bicycle facility is not present.

There are several bicycle connections to the study area, including bicycle lanes on 30th Street, north of 6th Avenue N (Figure 6), and on 25th Street and 28th Street, south of 1st Avenue S. The 6th Avenue Bypass provides an additional bicycle connection on the east side of the study area. The shared use path connects to nearby trails and the Heights neighborhoods.

Figure 6. Bicycle Facility at 30th Street & 6th Avenue N





Figure 7. Existing Bicycle Facilities



The Billings Area Bikeway & Trails Master Plan Update (Reference 5) envisions increased bicycle connectivity to and through downtown. The Bikeway & Trails Master Plan specifies roadways designated for future bicycle facilities. These roadways were incorporated into future transportation network alternatives with potential cross section options that include bicycle facilities. The existing bicycle facilities within the vicinity of downtown are presented in **Figure 7.**

This Study gathered a planning level inventory of on-street parking spaces to determine on-street parking impacts of potential transportation network alternatives. Parking garages play an important role in trip generation within a downtown. The alternatives that analyzed one-way to two-way street conversions factored these garage locations when developing and refining distribution of trips within the downtown transportation network.

Parking

Parking in downtown comprises on-street parking spaces and off-street parking garages. On-street parking includes a mix of metered and non-metered spaces which include angled, front-in parking and parallel parking depending on the street and block location. Within the downtown core, there are four parking garages with over 2,000 public parking spaces. According to the Downtown Billings Parking Strategic Plan (Reference 3), the peak utilization of onstreet parking within the downtown core was 85% during a typical mid-day peak (11:00 a.m. – 12:00 p.m.); however, onstreet parking utilization typically averaged 60% during the mid-day peak. The four parking garages had an average utilization of 56% during the mid-day peak, with the parking garage west of 27th Street between 2nd Avenue N and 3rd Avenue N at an 87% utilization during this time period.

SAFETY PERFORMANCE

A high-level safety performance evaluation was completed to identify any crash trends within the study area. Crash data was provided by the Montana Department of Transportation (MDT) for the previous five years of complete data (2013 – 2017). The evaluation found that four intersections within the study area are listed on the top 20 crash locations within Billings, per Billings Urban Area Long Range Transportation Plan Update (Reference 6). Three of the intersections have a crash rate higher than one crash per million vehicles entering the intersection. Generally, a crash rate greater than one crash per million entering vehicles (MEV) is used as an indicator that a potential geometric or operational issue may exist, and that further evaluation should be considered. The intersections within the top 20 are listed in **Table 2.**

Table 2. Study Intersections on the City's Top 20 Crash Rate List

Rank on Top #20	Intersection	Crash Rate (Crashes/MEV)
#6	1st Avenue North & Main Street	1.35
#6	6th Avenue North & 27th Street	1.35
#11	1st Avenue North & 27th Street	1.13
#20	6th Avenue North & Main Street	0.53

Safety and operational improvements are currently being studied and addressed at the 1st Avenue N & Main Street and 1st Avenue N and 27th Street intersections in the Exposition Drive & 1st Avenue N Study (Reference 7), and MDT's 27th St – 1st Ave S to Airport Project (Reference 8), respectively.

6th Avenue North & 27th Street

Except for 6th Avenue N & 27th Street, all other intersections are currently being studied in other ongoing projects. The 6th Avenue N & 27th Street intersection has a high number of right-angle crashes, accounting for nearly 40% of all crashes at the intersection. Right-angle crashes occur between vehicles traveling on perpendicular streets, generally between a right-turning vehicle failing to yield at the intersection. Rear-end crashes accounted for approximately 25% of all crashes. There were also eight pedestrian and bicycle related crashes at the intersection. Crash history at the intersection is summarized in **Figure 8.**

Pedestrian and Bicycle Crashes

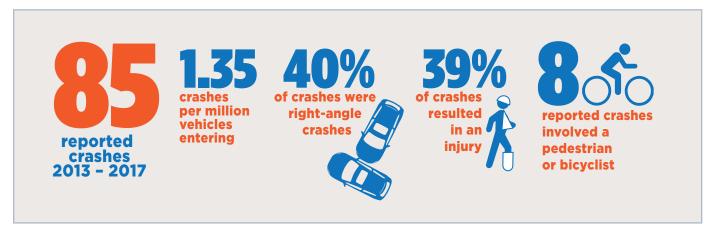
There were a total of 91 reported pedestrian (62) and bicycle (29) related crashes within the study area between 2013 and 2017. One fatality crash involved a pedestrian at 4th Avenue N & 27th Street. A kernel density estimation, shown in **Figure 9,** was used to illustrate the density of pedestrian and bicycle crashes within the study area. As shown, the majority of pedestrian and bicycle crashes occur

Figure 9. Kernel Density Estimation of Pedestrian and Bicycle Crashes



along or within the vicinity of 27th Street, which does not have detached sidewalks or bicycle facilities present on or within the vicinity.

Figure 8. Crash History at 6th Avenue N & 27th Street





TRAFFIC OPERATIONS **ANALYSIS**

The traffic operations analysis used Synchro 10 software, implementing the Highway Capacity Manual (HCM) 2000 (Reference 9) methodology. The HCM 2000 methodology was used for all signalized and unsignalized intersections, as it calculates a vehicle-to-capacity ratio (V/C ratio) for the signalized intersections and produced results consistent with field observations. Intersection performance measures reported in this study include, but are not limited to, level of service (LOS), V/C ratio, delay, and 95th percentile queue lengths. Traffic standards used for evaluation were consistent with the goals set in the Billings Urban Area Long Range Transportation Plan Update. LOS standards of D or better were used and a V/C ratio of less than or equal to 0.90 was used to evaluate intersection performance.

Synchro Model

The Synchro models include all intersections and roadways within the study area with verified lane configurations and posted speed limits. The analysis includes a separate model for the weekday a.m. and p.m. peak hours. Key assumptions include:

- Peak hour factors at each intersection were derived from the intersection's turning movement counts.
- Saturation flow rate of 1,750 vehicles per hour per lane was used throughout the model.

- To model parking maneuvers, the parking lane adjustment assumed up to seven vehicle maneuvers per hour for blocks with angled parking.
- Signal timing was collected from MDT and the City and incorporated into the Synchro model.

A complete model of the existing Synchro network for the weekday a.m. and p.m. peak hours was provided as a tool for the City. The models can be used to test and analyze various downtown transportation network questions that arise.

Level of Service

The traffic analysis found that the downtown weekday a.m. and p.m. peak hour generally occurs from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m., respectively. During the weekday a.m. peak hour, most intersections operate at LOS C or better. As shown in **Figure 10,** most intersections operating at LOS D, E or F are located along 6th Avenue N and 4th Avenue N. These intersections are stop controlled on the minor street approaches, and while the V/C ratio of these minor street approaches are well below capacity, high delay crossing or turning onto 6th Avenue N and 4th Avenue N is the cause for the low level of service. 6th Avenue N provides a critical westbound route for vehicles traveling from the Heights area and on Main Street during the weekday a.m. peak hour. Conversely, during the weekday p.m. peak hour, 4th Avenue N carries a heavy eastbound movement for vehicles heading back towards the Heights area and on Main Street. Because of these peaking characteristics, the stop controlled, minor street approaches at unsignalized intersections along these roadways experience high delay, resulting in substandard LOS during these peak hours.



Figure 10. Existing Traffic Conditions Level of Service

Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM

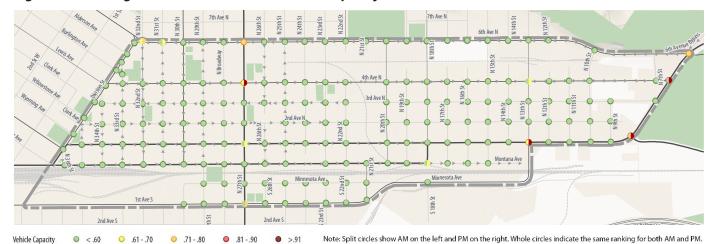


Figure 11. Existing Traffic Conditions Vehicle-to-Capacity Ratio

Vehicle-to-Capacity Ratio

All intersections during the weekday a.m. peak hour operate at with a V/C ratio less than 0.80. During the weekday p.m. peak hour, four intersections operate with a V/C ratio over 0.91. **Figure 11** provides existing V/C ratios during the weekday a.m. and p.m. peak hours. Intersections operating with a V/C ratio over 0.91 during the weekday p.m. peak hour include:

- 27th Street & 4th Avenue N
- 13th Street & 1st Avenue N
- Main Street & 1st Avenue N
- Main Street & 4th Avenue N

Each of these intersections are currently being studied and are included in projects that will be recommending improvements to increase capacity at these locations.

Overall, the existing conditions traffic analysis found that there is sufficient capacity along the roadways and at intersections within downtown. Daily traffic volumes coupled with the existing infrastructure on downtown roadways allows the City to explore opportunities for converting oneway streets to two-way streets, modifying cross sections,

and adding bicycle and pedestrian facilities to improve the downtown transportation network.

PROJECT ADVISORY COMMITTEE

The PAC included 18 members with representation from the following groups: city leaders, state transportation department, downtown commerce representatives, business owners, emergency responders, intermodal transportation providers, engineers and architects, and local residents. The PAC's role was to serve a liaison for their organization, learn about the Study, and provide input on current transportation needs and the development and evaluation of possible transportation infrastructure alternatives being explored for downtown Billings. The PAC met three times during the Study.

Existing conditions were presented at the first PAC meeting on September 24, 2018. **Appendix B** provides the meeting summary of PMT and PAC meeting #1.



FUTURE CONDITIONS

Future conditions reflect downtown's transportation network in year 2040, which incorporates programmed facility improvements, growth within the region, and the anticipated operational performance within the study area. Future year 2040 no-build conditions serve as a basis for the traffic operational analyses of the initial and refined downtown network alternatives. Like existing conditions, a Synchro model was developed for the no-build conditions and each alternative. **Appendix C** provides the base mapping summary of the future no-build traffic conditions.

KEY ASSUMPTIONS

To properly analyze future traffic conditions, there were a few key assumptions that were incorporated into the future models.

- Planned roadway improvements at the following locations were included:
 - 1st Avenue N & 13th Street adds a second northbound right-turn lane;
 - 1st Avenue N & 27th Street signal timing refinements and adds a southbound left-turn lane and phase;
 - 6th Avenue N & Main Street removes one of the two channelized, southbound right-turn lanes onto 6th Avenue;
 - 2nd Avenue N, east of 13th Street completes sidewalk and bicycle lane connections to Main Street; and
 - 3rd Avenue N, east of 13th Street completes sidewalk and bicycle lane connections to Main Street.
- Annual growth rates of 0.5 percent and 1.0 percent were assumed within downtown and along Main Street, respectively.
 - This annual growth rate is consistent with the Billings Urban Area Long Range Transportation Plan (Reference 6) and Billings Urban Area Travel Demand Model (Reference 10).
- Intersection peak hour factors were not adjusted, and therefore consistent with the existing conditions

- analysis, providing conservative future year traffic operation results.
- Downtown transportation alternatives that analyzed one-way to two-way street conversions assumed the following:
 - Street volumes were reassigned between street pairs;
 - There was an equal number of turning movements at adjacent intersections; and
 - Generally, there was a 60/40 split between existing one-way and future two-way street volumes.
- The Billings Area Bikeway and Trails Master
 Plan (Reference 5) was used as a reference in
 development of the alternatives to provide options
 for bicycle facilities on streets that are identified for
 bicycle facilities in this plan.

NO-BUILD TRAFFIC OPERATIONS ANALYSIS

The year 2040 no-build traffic operations analysis assumes no transportation network improvements beyond what was described in the subsection above. Results are similar to the analysis results presented for existing traffic conditions. Lower levels of service continue for minor street approaches at unsignalized intersections along 6th Avenue N and 4th Avenue N. Future year weekday a.m. and p.m. peak hour LOS is presented in **Figure 12.** Average vehicle delay for the downtown network during the a.m. and p.m. peak hour is expected to increase by approximately 12% and 15%, respectively. This results in an average increase in vehicular delay of approximately two seconds during the a.m. and p.m. peak hours. As shown, most intersections continue to operate at LOS C or better during the weekday a.m. and p.m. peak hours.

V/C ratios continue to operate at or near capacity during the weekday p.m. peak hour along Main Street and at 4th Avenue N and 6th Avenue N on 27th Street. As mentioned previously, there are ongoing studies along Main Street and 27th Street to address signal timing and capacity improvements. With the programmed improvements at 1st Avenue N & 13th Street, the intersection is expected to operate at LOS C or better

with a V/C ratio of less than 0.85 during the weekday a.m. and p.m. peak hours. With the expected growth in vehicular volumes, the average V/C ratio at study intersections within downtown are expected to increase approximately 15% and 16% during the a.m. and p.m. peak hour, respectively.

Overall, future year 2040 no-build traffic conditions are expected to continue to provide adequate capacity at intersections and along roadways within downtown. Most intersections are expected to operate with a V/C ratio of less than 0.60 during the weekday a.m. and p.m. peak hour, as shown in **Figure 13.**

Overall, the findings of the 2040 no-build traffic indicate that there is expected to be adequate capacity along the roadways and at intersections within downtown. Most intersections under a no-build future traffic condition are expected to continue to operate within City standards, like existing traffic conditions. Future daily traffic volumes coupled with the existing and planned infrastructure on downtown roadways allows the City to explore opportunities for converting one-way streets to two-way streets, modifying cross sections, and adding bicycle and pedestrian facilities to improve the downtown transportation network.

Figure 12. Year 2040 No-Build Traffic Conditions Level of Service

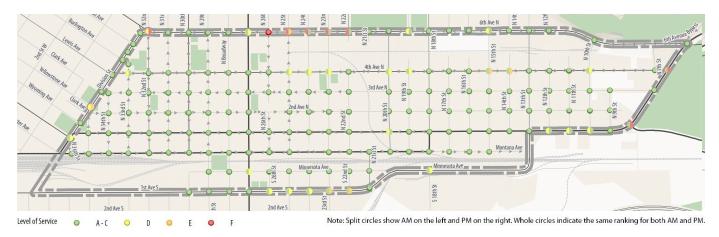


Figure 13. Year 2040 No-Build Traffic Conditions Vehicle-to-Capacity Ratio





ALTERNATIVES DEVELOPMENT AND EVALUATION

The alternatives process applied a tiered approach to developing, evaluating, and screening alternatives for the downtown transportation network. The alternatives development began upon the completion of the existing and future year traffic operations analysis. The initial alternatives (Tier 1) were developed based on input from the City, PAC, and PMT. Through this input, seven initial alternatives (including the no-build alternative) were identified and developed for use in screening evaluation.

The refined alternatives (Tier 2) include development of cross section options and planning-level cost estimates and were screened based on the evaluation criteria. In fulfillment of one of the goals of the study, there was no recommended alternative. Rather, the refined alternatives were developed, screened and vetted for the City to consider for future implementation when roadway programming projects or funding becomes available. It is anticipated that a public and stakeholder outreach effort would be part of a next phase with the City.

INITIAL ALTERNATIVES (TIER 1)

The seven initial alternatives were developed based on the identified downtown transportation deficiencies and opportunities that the were vetted with the PAC and PMT. The alternatives seek to address future traffic patterns and operational deficiencies, safety performance, connectivity to businesses, and increased accessibility and mobility for all transportation users. Initial alternative graphics summarizing evaluation criteria can be found in **Appendix D.**

The initial alternatives screening evaluated each of the initial alternatives in respect to the evaluation criteria and level of support from the PAC. The evaluation criteria for parking impacts and cost was not included within Tier 1, as detailed understanding of these impacts and cost would be included in the refined alternatives once cross section elements were more defined. **Table 3** on the following page summarizes each of the initial alternatives.

The PMT identified the starred alternatives in **Table 3** as alternatives to carry forward for the refined alternative evaluation. PMT and PAC Meeting #2 summaries are provided in **Appendix E.**

The initial alternative screening resulted in the elimination of the All One-Way to Two-Way Street Conversion alternative. The 6th Avenue Road Diet alternative was modified to only include the roadway segment from Main Street to 13th Street. A new alternative, 13th Street Road Diet between 6th Avenue N and 1st Avenue N, was added through input from the PAC and PMT as an outcome of PAC Meeting #2, held on December 10, 2018. This idea was based on the potential ability to utilize the excess roadway capacity to provide safety enhancements and bicycle facility connections on the east side of downtown.

The initial screening found the following downtown transportation alternatives are feasible from a traffic operations standpoint.

Table 3. Initial Alternatives Summary

Alternative	Brief Description
No-Build*	A "do nothing strategy"Used to compare to other alternatives
North and South One- Way to Two-Way Street Conversions*	 Converts remaining north and south one-way streets to two-way streets between Division Street and 24th Street Provides opportunity for bicycle facility connections consistent with the City's Bikeways & Trails Master Plan
2nd Avenue N & 3rd Avenue N One-Way to Two- Way Conversions*	 Convert remaining one-way street to a two-way street on 2nd Avenue N and 3rd Avenue N west of 22nd Street to Division Street Provides opportunity for bicycle facility connections consistent with the City's Bikeways & Trails Master Plan
All One-Way to Two-Way Street Conversions	Converts all one-way streets to two-way streets within downtown
Montana Avenue Road Diet (Division Street to 18th Street)*	 Reduce Montana Avenue from three lanes to two lanes from Division Street to 18th Street Provides opportunity for bicycle facility connections consistent with the City's Bikeways & Trails Master Plan Maximize on-street parking
6th Avenue N Road Diet (Main Street to Division Street)*	 Reduces 6th Avenue N from five lanes to four lanes between Main Street and 10th Street Reduces 6th Avenue N from four lanes to three lanes 10th Street to Division Street Provides opportunity for a long-range bicycle facility consistent with the vision in the City's Bikeways & Trails Master Plan
Broadway Street Closure (Permanent Closure)*	 Permanently close the road to vehicles between 1st Avenue N and 2nd Avenue N Creates a permanent festival street

^{*}Represents Initial Alternatives moved forward to Refined Alternatives



REFINED ALTERNATIVES

The refined alternatives assessment carried forward each of the highlighted alternatives provided in the table below, except for the no-build alternative. While the PMT recognizes that the no-build is feasible from a traffic operations standpoint, there is no value in presenting further information. The refined alternatives in this section are presented in a graphical chapter format. Each refined alternative includes an alternative description, traffic operations results and recommendations, cross section options along alternative roadways, parking impacts, costs, considerations, and PAC feedback. The PAC had a chance to review and provide feedback for each of the refined alternatives as well as next steps at the third and final PAC meeting on February 20, 2019. **Appendix F** provides the materials and summary from PMT and PAC Meeting #3.

EVALUATION CRITERIA

The evaluation criteria were developed to include quantifiable and qualitative measures, benefit and tradeoffs, and planning-level cost estimates. The criteria focused on traffic operations, mobility and accessibility for pedestrians, bicyclists and transit, parking impacts, and land use implications. The evaluation criteria helped determine fatal flaws and remove alternatives from consideration. The evaluation criteria for the transportation network alternatives are presented in **Table 4.**

Table 4. Evaluation Criteria for Transportation Network Alternatives

Evaluation Criteria	Quantifiable and Qualitative Measures	
	Number of intersection falling below City LOS and V/C ratio standards	
Traffic Operations	Number of intersections requiring mitigations	
	Number of modified signalized intersections	
	Number of new signalized intersections	
	Does the alternative help to reduce speed limits?	
	Estimated bicycle facility miles	
Mahilitu	Number of new signalized pedestrian crossings	
Mobility	Impacts to bus circulation at downtown transfer center	
	Does the alternative increase or decrease accessibility for all users?	
Davidia a	Impacts to on-street parking (gained or lost)	
Parking	Parking type (angled versus parallel)	
	Does the alternative provide increased exposure for businesses?	
Land Use	Does the alternative encourage alternative modes of travel?	
	Does the alternative promote a sustainable downtown?	
Cost	Planning level cost estimates for refined alternatives	

TRAFFIC OPERATIONS

The refined alternative evaluation took a closer look at the traffic operations for each alternative. Like the initial alternatives traffic operations analysis, the refined traffic operations analysis assumed year 2040 weekday a.m. and p.m. peak hour conditions, with peak hour factors consistent with existing conditions. LOS comparisons are provided based on a 2040 no-build and build alternative. In general, with the implementation of the refined alternative and recommended turn lanes and traffic signals presented below, LOS C or better is feasible at all intersections and roadways during the weekday a.m. and p.m. peak hours in the year 2040. Traffic operations specific to the refined alternatives are discussed in more detail in their respective section.

Traffic Signals and Turn Lanes Recommendations

The refined alternatives analysis provided recommended locations for turn lanes and new traffic signals. For most alternatives, turn lane and traffic signal recommendations are provided to continue to ensure sufficient capacity and minimize delay. The PMT understands that most of these recommendations do not reflect a fatal flaw if not provided.

Traffic signal warrants based on the Manual Uniform Traffic Control Devises (MUTCD) (Reference 11) were not performed at locations of recommended traffic signals. Traffic signal warrants based on the MUTCD procedures are recommended to be completed during the design phase of a refined alternative, so that it can be determined if a traffic signal is required at the onset of the roadway modification or at a later date.

CROSS SECTION OPTIONS

Cross section options were provided for each refined alternative. Most cross section options used the existing curb-to-curb widths to provide alternative options along alternative roadways. Cross section options that extended curb-to-curb widths included raised bike lanes and multi-use paths. Minimum travel lane widths were assumed to be 11 feet, or 12.5 feet for outside lanes adjacent to curb and gutter, consistent with recommendations in the American Association of State highway Transportation Officials (AASHTO), A Guide to Geometric Design of Highways and Streets, 6th Edition

(Reference 12). Bike facilities including bicycle lanes and cycle tracks assumed a minimum of 5 feet and 10 feet, respectively, with minimum buffer widths of 1.5 feet. These minimums are consistent with the recommendations provided in the National Association of City Transportation Officials (NACTO), Urban Bikeway Design Guide (Reference 13), and the Federal Highway Administration (FHWA), Separated Bike Lane Planning and Design Guide (Reference 14).



Minimum parallel parking lane widths were assumed to be 7.5 feet to maximize curb-to-curb width and help to slow vehicle speeds along urban roadways, as described in NACTO's, Urban Street Design Guide (Reference 15). These national publications provided guidance to augment cross section option safety and accessibility while still providing adequate capacity and level of service for vehicular operations.

POTENTIAL BICYCLE FACILITY LOCATIONS

Refined alternatives with cross section options that include bicycle facilities are consistent with the vision outlined in the City's Bikeways & Trails Master Plan.

Potential bicycle facilities have been identified for the north/south roadways of 32nd Street, 30th Street, 25th Street, and 13th Street as well as the east/west corridors of Montana Avenue, 2nd Avenue N, 3rd Avenue N, and the east end of 6th Avenue N. These potential bicycle facilities would provide connectivity to existing bicycle infrastructure

outside of the downtown study area. A specific bicycle facility for each of these roadways has not been identified. Cross sections provide options for a potential bicycle facility based on the feasibility of a street conversion or road diet and the utilization of existing right-of-way.

PARKING IMPACTS

Parking impacts were estimated based on on-street parking inventory for each alternative street. On-street parking inventory was counted via updated imagery of the downtown area. Existing on-street parking spaces and projected parking impacts are provided for planning purposes. Final parking impacts and the exact number of on-street parking gained or lost would be determined based on the alternative and cross section being implemented.

COST ESTIMATES

Planning-level cost estimates were developed for each of the refined alternatives based on the cross-section options and using the latest City of Billings bid items (e.g. milling, new pavement, signal equipment, curb & gutter, etc.). As a conservative and consistency measure, the PMT assumed that each alternative would consist of a milling and overlay and recognizes that the City's PAVER Program could be a potential use of funding for the future implementation of an alternative. The PMT also recognizes that a way to cut costs could include a chip-seal treatment instead of a milling and overlay. For items not quantifiable at the planning level (e.g. drainage system, traffic control, mobilization, etc.) including design and construction management fees, a percentage of the quantifiable items total was used to estimate approximate costs. A contingency percentage of 20% was applied to account for unknown costs for each of the alternatives. Worksheets documenting the planninglevel construction cost estimates for the refined alternatives can be found in **Appendix G.**

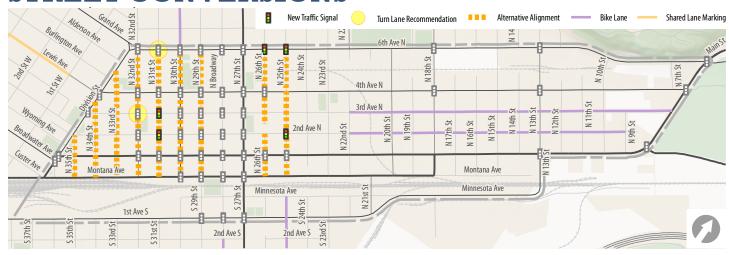
REFINED ALTERNATIVES GRAPHICS

On the next several pages, the refined alternatives are presented in a graphical chapter format. Each refined alternative includes an alternative description, traffic operations results and recommendations, cross section options along alternative roadways, parking impacts, costs, and considerations. These graphical chapters are intended to inform the City about the benefits and trade offs associated with each alternative and cross section options considered for the roadway. These chapters can be printed on their own for use in the field during a walking tour of the roadway.





NORTH AND SOUTH ONE-WAY TO TWO-WAY STREET CONVERSIONS



Description

Lined with small businesses, larger office buildings, and residential units, each north/south street provides a vital connection to commerce and continued growth within downtown. Presently, all north/south streets west of 24th Street are currently one-way streets except for 27th Street and 28th Street (Broadway Avenue). Even numbered streets west of 24th Street are one-way in the southbound direction, and conversely, odd numbered streets are one-way in the northbound direction. Depending on location, a north/south street carries an average of less than 1,000 to approximately 5,000 daily vehicles. Most street blocks feature 50 feet curb-to-curb width, including two lanes in one direction with parking and sidewalks on both sides of the street and no bicycle facilities. These one-way, north/south streets have a posted speed limit of 25 mph.

The one-way to two-way conversion of the remaining north/ south streets moves toward a consistent network of two-way streets within downtown Billings, increasing accessibility for all users. Because daily and peak hour volumes are relatively low and evenly dispersed, conversion of the remaining one-way, north/south streets is feasible from a traffic operations perspective. The existing 50 feet curb-to-curb width allows flexibility for cross section options to include a travel lane in each direction, parking on both sides of the street and bicycle facilities on streets identified in the Bikeways & Trails Master Plan.

Benefits/Tradeoffs

Benefits	Tradeoffs

Moves toward a consistent network of two-way streets	Cost for signal modifications
Increases accessibility for all users	Cost for new signals
Increased exposure for businesses	Minor increase in delay and travel time for off peak directions
Provides north and south bicycle connectivity through downtown	Minor increase in congestion at some intersections, but all intersections still operate at a LOS C or better
Utilizes available capacity at existing intersections	Minimal impact to on- street parking
Street conversions could be implemented in phases	

Traffic Operations & Turn Lanes

The traffic operation analysis found that the conversion of the remaining one-way, north/south streets can be converted to two-way streets with minimal impact to vehicle delay and travel times. With the north/south conversion of one-way to two-way streets, future level of service (LOS) is expected to operate at LOS C or better during the a.m. and p.m. peak hours with recommendations explained below. Traffic operation results show benefits at some intersection locations because of the divergence of vehicle volumes. However, most intersections





experience a minor increase in delay and queuing for off peak directions due to the removal of a travel lane. Average vehicle delay at intersections is expected to increase by five seconds and one second during the a.m. and p.m. peak hour, respectively. Overall, one travel lane in each direction provides adequate capacity on the roadways, with turn lane recommendations at the following locations:

- Two southbound left-turn lanes at 32nd Street & 4th Avenue N
- One northbound left-turn lane at 31st Street & 6th Avenue N

New Traffic Signals

There are five new traffic signal recommendations. The new traffic signals will provide consistency within the downtown core, increase safety for pedestrian and bicycle crossings, and reduce vehicular delay for minor street approaches. The installation of traffic signals would need to be warranted based on MUTCD signal warrant criteria. New traffic signals are recommended at the following locations:

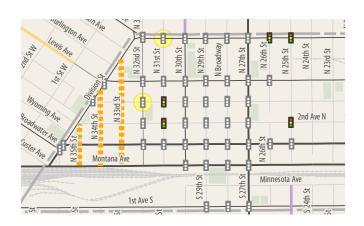
- 25th Street & 6th Avenue N (reduces vehicular delay for the minor street approaches and provides safer pedestrian and bicycle crossing opportunities)
- 25th Street & 2nd Avenue N (provides transit vehicle priority for buses leaving the MET Transfer Center)
- 26th Street & 6th Avenue N (reduces vehicular delay for the minor street approaches and provides safer pedestrian and bicycle crossing opportunities)
- 31st Street & 2nd Avenue N (completes traffic signal continuity within the downtown core and provides safer pedestrian and bicycle crossing opportunities)

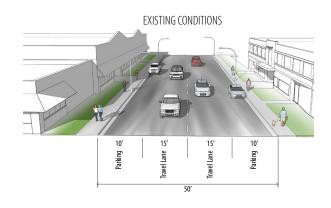
• 31st Street & 3rd Avenue N (completes traffic signal continuity within the downtown core and provides safer pedestrian and bicycle crossing opportunities)

At the Grand Avenue/Division Street/6th Avenue N & 32nd Street intersection, the two-way conversion adds a northbound phase to the traffic signal, which results in LOS B and LOS C operations in year 2040 a.m. and p.m. peak hour, respectively. Optimally, a corresponding north/south pedestrian phase would coincide with the northbound phase time, eliminating the existing north/south pedestrian crossing on the west side of the intersection, reducing delay and optimizing phase times and cycle lengths at the intersection.

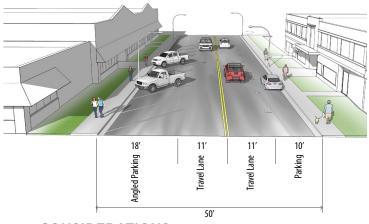
In summary, the traffic operations for the conversion of oneway to two-way streets is projected to operate at acceptable levels of service with each and all refined alternatives discussed in this section.

33rd Street, 34th Street, and 35th Street North and South One-Way to Two-Way Street Conversions





TWO-WAY WITH FRONT-IN ANGLED AND PARALLEL PARKING



CONSIDERATIONS

· Greatest increase of on-street parking

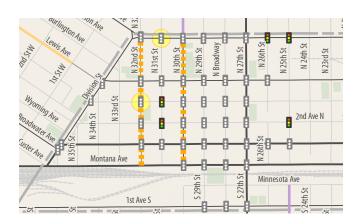
TWO-WAY WITH PARALLEL PARKING 10' 15' 15' 10' 10' 15' 15' 10' 50'

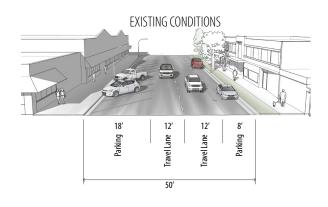
CONSIDERATIONS

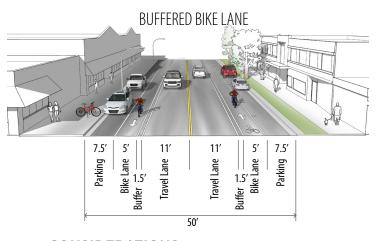
• Some increase of on-street parking spaces



30th Street and 32nd Street North and South One-Way to Two-Way Street Conversions

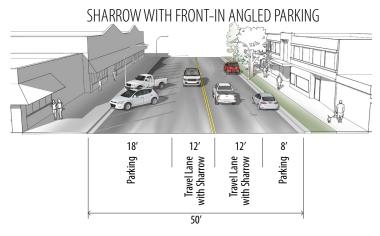






CONSIDERATIONS

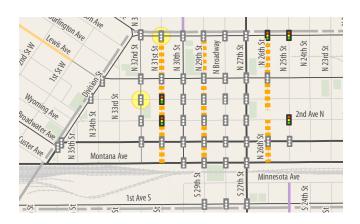
- · Less on-street parking
- Bicycle connectivity
- Enhanced comfort for cyclists
- Low cost

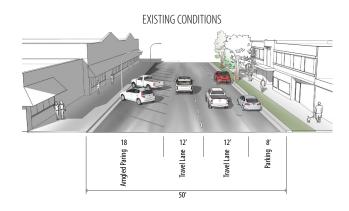


CONSIDERATIONS

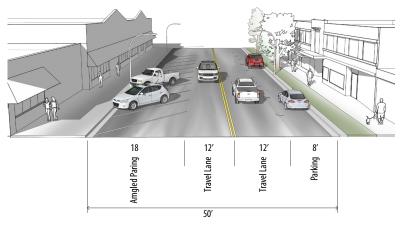
- Most on-street parking
- Bicycle connectivity
- Less comfort for cyclists
- Low cost

31st Street, 29th Street, and 26th Street North and South One-Way to Two-Way Street Conversions





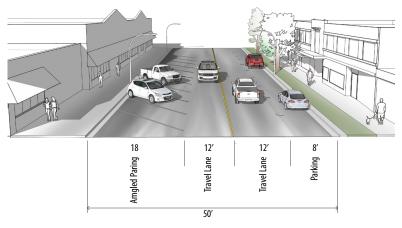
TWO-WAY WITH FRONT-IN ANGLED AND PARALLEL PARKING



CONSIDERATIONS

• No change to on-street parking

TWO-WAY WITH BACK-IN ANGLED AND PARALLEL PARKING

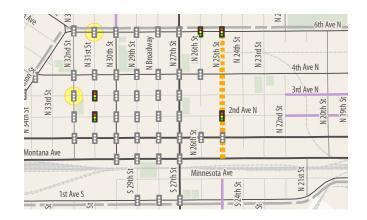


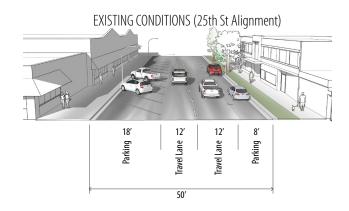
CONSIDERATIONS

• No change to on-street parking

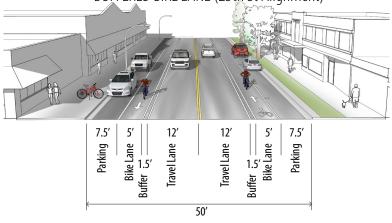


25th Street North and South One-Way to Two-Way Street Conversions





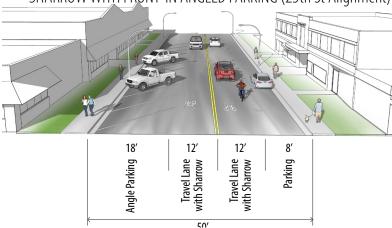




CONSIDERATIONS

- · Less on-street parking
- Bicycle connectivity
- Enhanced comfort for cyclists
- Low cost



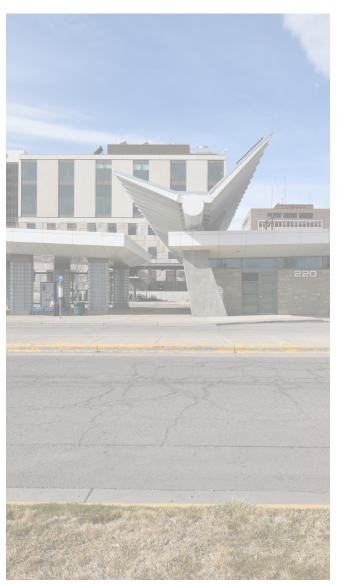


- Most on-street parking
- Bicycle connectivity
- Less comfort for cyclists
- Low cost

25th Street

North and South One-Way to Two-Way Street Conversions (cont.)





EXISTING CONDITIONS (Transfer Station) 21' | 13.5' | 7.5' | 13' | 8.5' | uel and length of the state of the

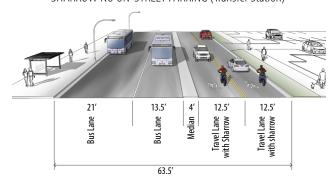
63.5′



CONSIDERATIONS

- No on-street parking
- Bicycle connectivity
- Moderate comfort for cyclists

SHARROW NO ON-STREET PARKING (Transfer Station)



- No on-street parking
- Bicycle connectivity
- Less comfort for cyclists



TRAFFIC OPERATIONS YEAR 2040 AVERAGE INTERSECTION VEHICLE DELAY (S)

AM PERIOD



PM PERIOD

NO BUILD



14.0

STREET CONVERSION



15.0

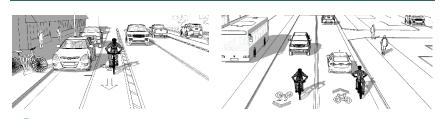
PARKING IMPACTS



POTENTIAL BICYCLE FACILITY MILES

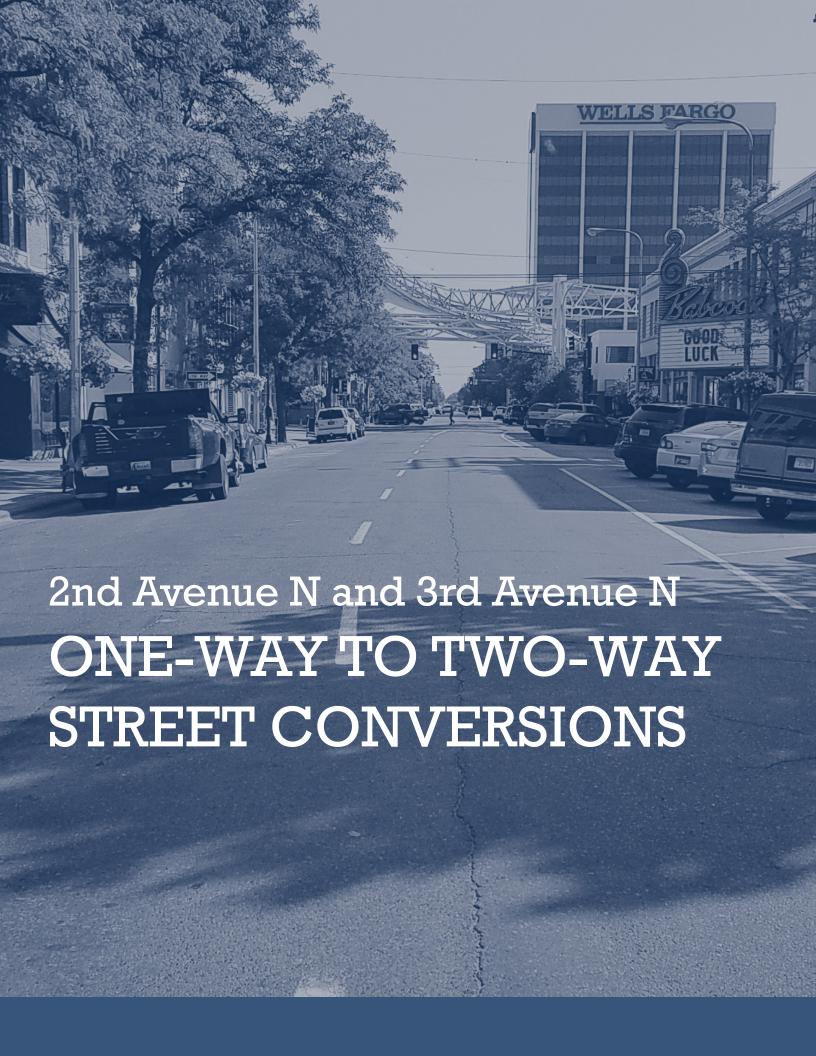


PLANNING LEVEL COST ESTIMATE

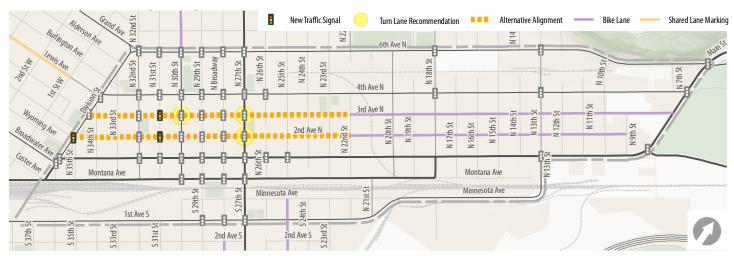


\$5.8-7.8 million

- Adequate capacity with one travel lane in each direction.
- Opportunity to provide north/south bicycle connections consistent with the Bikeways & Trails Master Plan.
- New signals provide safer crossing opportunities for pedestrians and bicyclists.
- Traffic operations are projected to operate at LOS C or better during a.m. and p.m. peak hours with the implementation of all refined alternatives.



2ND AVENUE N AND 3RD AVENUE N ONE-WAY TO TWO-WAY STREET CONVERSIONS



Description

2nd Avenue N and 3rd Avenue N intersect the middle of downtown, providing east/west connections through downtown's core. These two streets carry fewer daily vehicles than the one-way, east/west streets to the north and south because of their lack of regional connectivity. This provides calmer traffic conditions, as the roadways generally carry between 3,000 and 6,000 daily vehicles. Currently, east of 22nd Street, 2nd Avenue N and 3rd Avenue N are two-way roadways with one travel lane in each direction. They consist of a 50-foot curb-to-curb cross section with bicycle lanes and parallel parking on both sides of the street. The one-way to two-way conversion of 2nd Avenue N and 3rd Avenue N would occur west of 22nd Street to Division Street. West of 22nd Street, the majority of 2nd Avenue N (eastbound) and 3rd Avenue N (westbound) would consist of three, one-way travel lanes with a combination of front-in angled and parallel parking on both sides of the streets.

The one-way to two-way conversion would utilize available capacity at intersections west of 22nd Street to provide two-way continuity for 2nd Avenue N and 3rd Avenue N, increasing accessibility through downtown's core. Cross section options utilize existing curb-to-curb widths to provide on-street parking and potential bicycle facilities consistent with the Bikeways & Trails Master Plan.

Benefits/Tradeoffs

Benefits	Tradeoffs
Moves toward a consistent network of two-way streets	Cost for signal modifications
Increases accessibility for all users	Cost for new signals
Increased exposure for businesses	Minor increase in delay and travel time for off peak directions
Completes bicycle connectivity from Division Street to Main Street	Minor increase in congestion at some intersections
Utilizes available capacity at existing intersections	Removal of some on- street parking for turn lanes

Traffic Operations & Turn Lanes

The conversion of 2nd Avenue N and 3rd Avenue N has minimal traffic operational impact to the existing roadways and downtown roadway network. With the conversion of both roadways, future level of service (LOS) is expected to operate at LOS C or better during the a.m. and p.m. peak hour. Average vehicle delay at intersections is expected to increase approximately 1.4 seconds and 4.8 seconds during the a.m. and p.m. peak hour, respectively. A minor increase in delay and queuing for off peak directions attributes to some intersections operating at LOS C. These LOS results include the assumption of converting the remaining north and south one-way streets. Therefore, the conversion of all north/south





streets as well as 2nd Avenue N and 3rd Avenue N is feasible from a traffic operations perspective.

Turn lane recommendations are based on year 2040 traffic operations and are recommended to increase capacity and reduce delay, particularly at the two intersections at 27th Street. Without recommended turn lanes, the intersections will still operate under capacity, but greater delay and longer queues will occur during the peak hours. The recommended turn lane locations include:

- An eastbound and westbound left-turn lane at 2nd Avenue N & 27th Street
- An eastbound and westbound left-turn lane at 3rd Avenue N & 27th Street
- An eastbound and westbound left-turn lane at 3rd Avenue N & 30th Street

New Traffic Signals

Three new signalized intersections are recommended with this two-way conversion. However, traffic signals would have to be warranted based on MUTCD signal warrant criteria. If traffic signals are not warranted, traffic operations would continue to operate under capacity without installing the traffic signals. It is recommended that a traffic signal be installed at the following location:

• 2nd Avenue N & Division Street

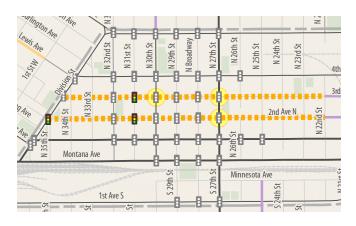
This traffic signal would tie in the converted street and allow left-turns onto Division Street. If the intersection is left unsignalized, future delay and queuing may result in vehicles choosing to continue to use 3rd Avenue N or 1st Avenue N,

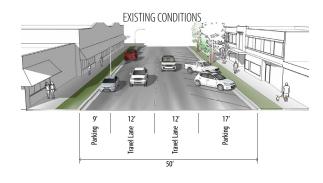
therefore losing the benefit of the full two-way conversion. With full access to/from Division Street at this location, access to/from 35th Street at this location would require reconfiguration and would operate at an acceptable LOS if access was eliminated. It is recommended that a dedicated westbound right- and left-turn lane be provided at this intersection.

- 2nd Avenue N & 31st Street
- 3rd Avenue N & 31st Street

Similar to the north and south one-way to two-way conversion it is recommended that traffic signals are installed on 2nd Avenue N and 3rd Avenue N at 31st Street. These traffic signal would complete the traffic signal continuity within the downtown core, providing safer pedestrian and bicycle crossing opportunities and synchronizing vehicle platoons through the transportation network

2nd Avenue N and 3rd Avenue N **One-Way to Two-Way Street Conversions**

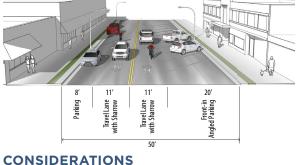






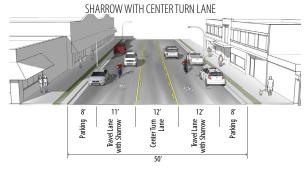
CONSIDERATIONS

- · Less on-street parking
- Bicycle connectivity
- Enhanced comfort for cyclists
- Low cost



SHARROW WITH FRONT-IN ANGLE PARKING

- · Most on-street parking
- Bicycle connectivity
- Less comfort for cyclists
- Low cost



- · Less on-street parking
- Bicycle connectivity
- Less comfort for cyclists
- Enhanced safety performance with center turn lane
- Low cost



TRAFFIC OPERATIONS

YEAR 2040 AVERAGE INTERSECTION VEHICLE DELAY (S)

AM PERIOD



NO BUILD





PM PERIOD



15.0



PARKING IMPACTS

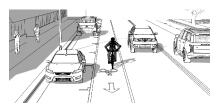


-38 to -62

POTENTIAL BICYCLE FACILITY MILES



PLANNING LEVEL COST ESTIMATE





\$3.1-4.1 million

- Adequate capacity with one travel lane in each direction.
- Opportunity to complete east/west bicycle connection through downtown, consistent with the Bikeways & Trails Master Plan.
- New traffic signal at 2nd
 Avenue N & Division Street to
 maximize two-way
 conversion benefit.
- Traffic operations are projected to operate at LOS C or better during the a.m. and p.m. peak hours with the implementation of one-way to two-way conversions.



MONTANA AVENUE ROAD DIET



Description

Montana Avenue is currently a one-way, three-lane roadway located on the north side and adjacent to Montana railroad lines. Montana Avenue provides a critical eastbound connection through the south end of downtown, serving an average of 12,500 daily vehicles. The corridor has a posted speed limit of 35 mph on both ends of the corridor with 25 mph posted speed limit between 32nd Street and 23rd Street. There are no bicycle facilities. Sidewalks and parallel parking are provided on both sides of the street except for the south side of the roadway from Division Street to 30th Street. The curb-to-curb width is generally 50 feet from 36th Street to 27th Street and 52 feet east of 27th Street to 18th Street.

The Montana Avenue Road Diet analyzed the traffic operational effects of removing a travel lane along the length of the corridor. An evaluation of benefits and tradeoffs as well as a planning level cost estimate was provided to understand the options of repurposing the existing curb-to-curb width along the corridor. Cross section options include narrowing lane widths to help reduce speeds, adding a bicycle facility to provide east-west connectivity south of 1st Avenue N, and providing options for parallel, front-in angle, and back-in angle parking.

Benefits/Tradeoffs

	Benefits	Tradeoffs
	Utilizes excess capacity along roadway and at intersections	Increases congestion and queuing at signalized intersections
	Lower speeds along Montana Avenue	Turn lanes recommended at railroad crossings
	Increases bicycle connectivity	Minimal impact to on- street parking
	Increased exposure for businesses	Cost of roadway and signal modifications
	Options to increase on-	





Traffic Operations and Turn Lanes

The traffic operations analysis found that removing a travel lane along Montana Avenue is feasible with minimal recommended improvements along the corridor. If no road diet was implemented, most intersections are expected to operate at LOS A or B during the 2040 a.m. and p.m. peak hour. Alternatively, the removal of a travel lane along the corridor results in most intersections expected to operate at LOS B or C during the a.m. and p.m. peak hour, with no intersections operating below LOS C. With two through lanes along Montana Avenue, travel times between Division Street and 27th Street are expected to increase by six seconds and 20 seconds during the a.m. and p.m. peak hour, respectively.

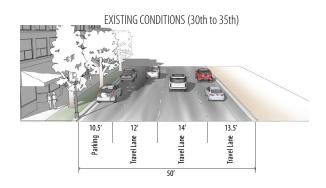
A microsimulation model was created to confirm that two through lanes along Montana Avenue provide adequate capacity and that queue lengths are contained between street blocks along the corridor. Eastbound queue lengths between the signalized intersections are not expected to exceed each block length. The eastbound through movement's 95th percentile queue at 27th Street is expected to be 250 feet and 125 feet during the year 2040 a.m. and p.m. peak hours, respectively.

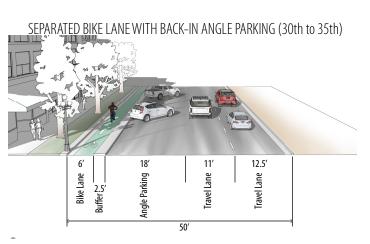
Refined analysis found that at the signalized intersections of 29th Street, Broadway Avenue, and 27th Street, an eastbound right-turn lane is recommended for vehicles making a right-turn to cross the railroad tracks. The eastbound right-turn lanes are recommended to be a minimum of 150 feet before the taper. Turn lanes at these locations provide the following benefits:

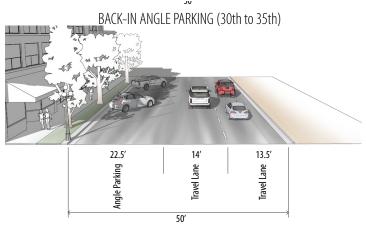
- Provides additional capacity at the signalized intersections
- Reduces the impact of queue spillback to the eastbound through lanes along Montana Avenue when a train is present and prevents the crossing of vehicles over the railroad tracks

30th Street to 35th Street - Montana Avenue Road Diet







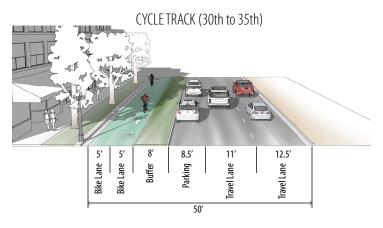


CONSIDERATIONS

- Most on-street parking
- Enhanced comfort for cyclists
- Low cost for narrower buffer

CONSIDERATIONS

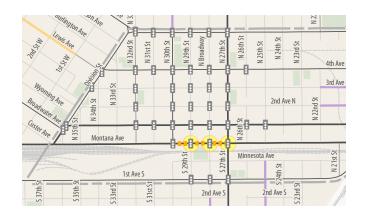
- Most on-street parking
- No bicycle connectivity
- Low cost

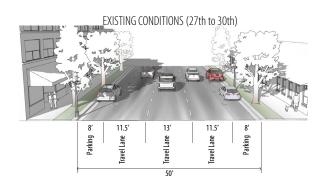


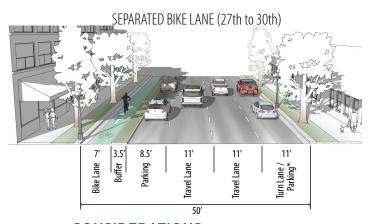
- Least on-street parking
- Enhanced streetscape with wider buffer
- Two-way connectivity for cyclists on southside of downtown. No bicycle facilities planned on 1st Ave N
- · Medium cost for wide buffer



27th Street to 30th Street - Montana Avenue Road Diet







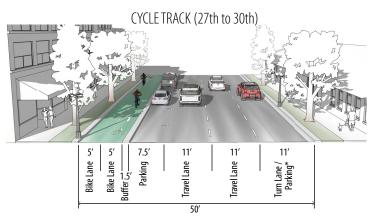
CONSIDERATIONS

- · Least on-street parking
- Enhanced streetscape with wider buffer
- Enhanced comfort for cyclists
- High cost for wider buffer



CONSIDERATIONS

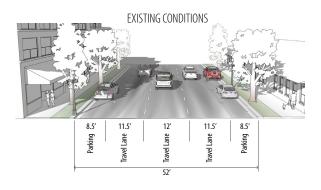
- · Most on-street parking
- No bicycle connectivity
- · Low cost

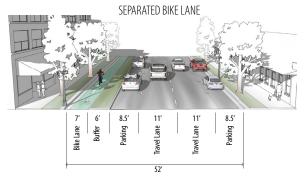


- Least on-street parking
- Two-way connectivity for cyclists on southside of downtown. No bicycle facilities planned on 1st Ave N
- Low cost for narrower buffer

18th Street to 27th Street - Montana Avenue Road Diet

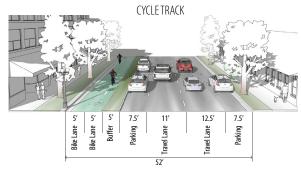






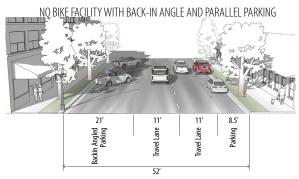
CONSIDERATIONS

- · Least on-street parking
- Enhanced streetscape with wider buffer
- Enhanced comfort for cyclists
- Medium cost for wider buffer



CONSIDERATIONS

- · Least on-street parking
- Enhanced streetscape with wider buffer
- Two-way connectivity for cyclists on southside of downtown. No bicycle facilities planned on 1st Ave N
- Medium cost for wider buffer



- · Most on-street parking
- No bicycle connectivity
- Low cost



TRAFFIC OPERATIONS - DIVISION ST TO 27TH ST YEAR 2040 TRAVEL TIME (MIN)

AM PERIOD



NO BUILD



ROAD DIET

PM PERIOD



PARKING IMPACTS



POTENTIAL BICYCLE FACILITY MILES



PLANNING LEVEL COST ESTIMATE

SEPARATED **BICYCLE LANE**



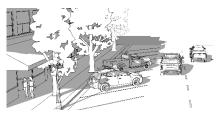
million

CYCLE TRACK

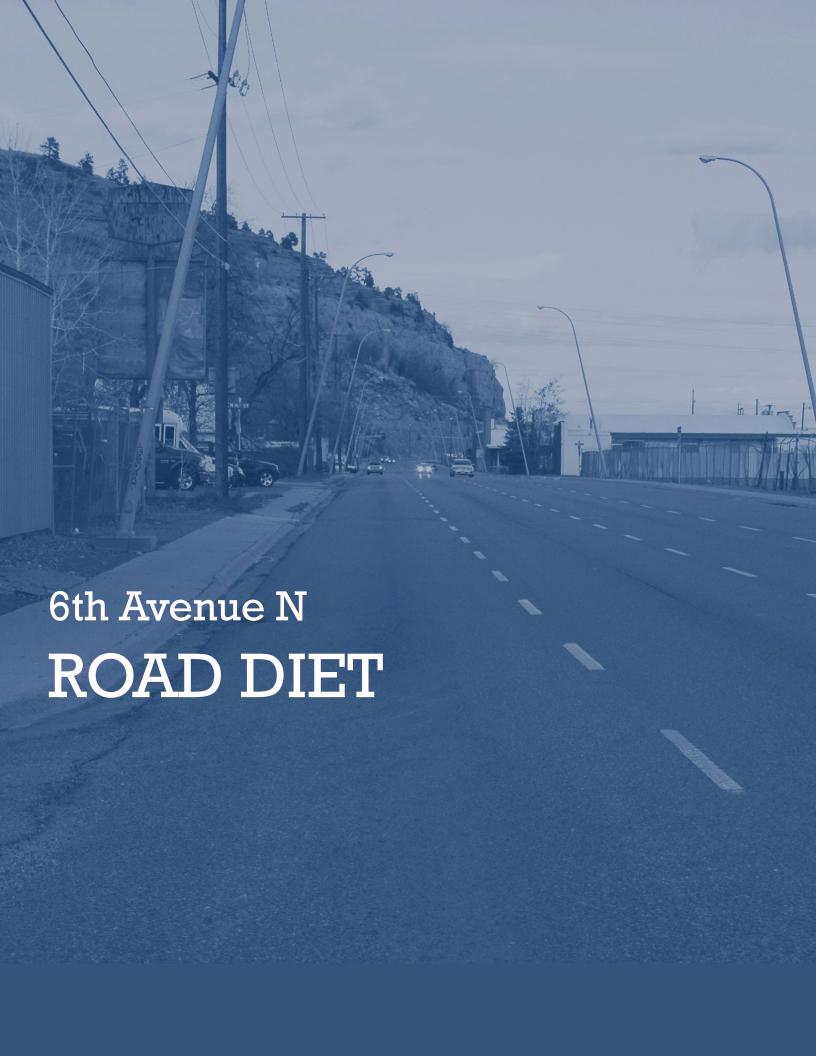


4.1-5.0 million

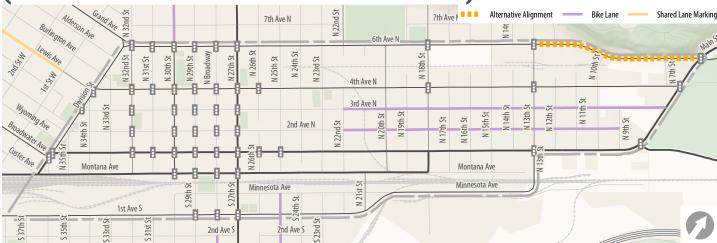
PARKING (NO BIKE LANES) millior



- Minimal impacts to traffic operations along Montana Avenue corridor.
- Eastbound right-turn lanes recommended at 29th Street, Broadway Avenue, and 27th Street intersections.
- Cross section options include options to provide east-west bicycle connectivity on the south side of downtown, since 1st Avenue N is not programmed to include bicycle lanes.



6TH AVENUE N ROAD DIET (13TH STREET TO MAIN STREET)



Description

6th Avenue N begins at the Main Street intersection and provides a vital one-way, westbound connection on the northside of downtown, carrying an average of over 15,000 daily vehicles. The roadway transitions from five lanes to four lanes between Main Street and 10th Street and carries on westbound as a four-lane roadway from 10th Street to Division Street. The posted speed limit is 35 mph. However, due to the existing curb-to-curb width of 58 to 60 feet and under capacity operations between Main Street and 13th Street, there is a perception of high vehicular speeds through this segment of roadway with uncomfortable facilities for walking and bicycling.

With the implementation of the Airport Road & Main Street Final Design project, one of the two channelized right-turn lanes from Main Street onto 6th Avenue N is planned to be removed, making the roadway four lanes for the entire length of its corridor. The 6th Avenue N Road Diet analyzed the impacts of a four-lane roadway segment between Main Street and 13th Street. Focusing on the analysis of the operational impact of a four-lane roadway within this section of the corridor, and evaluating options to reduce lane widths and potentially utilize the excess space for comfortability and increased connectivity for alternative modes of travel.

Benefits/Tradeoffs

Benefits

Utilizes excess capacity along roadway and at intersections	Cost of roadway improvements
Lower speeds along 6th Avenue N	Maintenance of bicycle facility
Increases bicycle connectivity within vision of the City's Bikeways & Trails Master Plan	

Tradeoffs

Traffic Operations

Increased exposure for

Reduces crossing distance

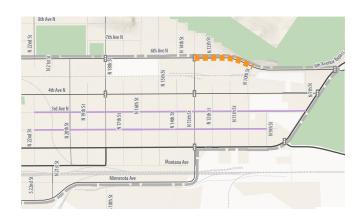
businesses

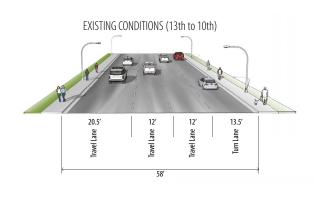
for pedestrians

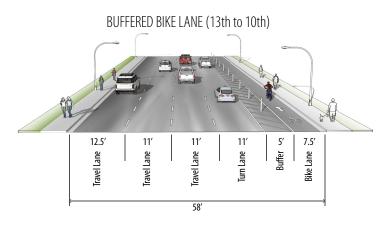
The traffic operations analysis found that removing a travel lane along 6th Avenue N at Main Street has little to no effect on traffic operations. Because there are currently four lanes at the signalized intersection of 13th Street and at the unsignalized intersection of 10th Street, no change to traffic operations are expected. Future travel times between Main Street and 13th Street are expected to be one minute with or without the road diet from five lanes to four lanes in this section of 6th Avenue N. The intersection at 6th Avenue N & 7th Street is expected to continue to operate with a level of service (LOS) B with a four-lane cross section.



13th Street to 10th Street - 6th Avenue N Road Diet

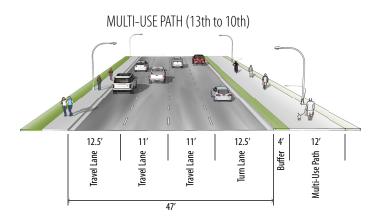






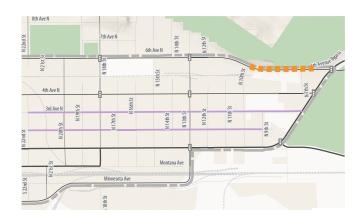
CONSIDERATIONS

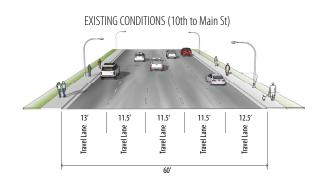
• Enhanced comfort for cyclists and pedestrians

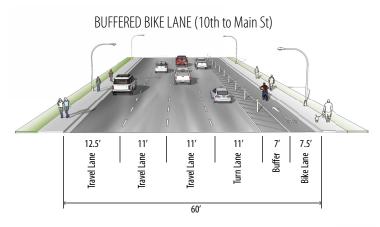


- Enhanced streetscape
- Two-way connectivity for cyclists
- · Greatest comfort for cyclists and pedestrians
- Narrows curb-to-curb roadway width

10th Street to Main Street - 6th Avenue N Road Diet

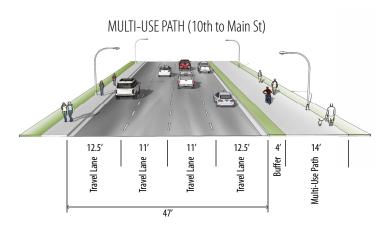






CONSIDERATIONS

· Enhanced comfort for cyclists and pedestrians



- Enhanced streetscape
- Two-way connectivity for cyclists
- Greatest comfort for cyclists and pedestrians



TRAFFIC OPERATIONS - MAIN ST TO 13TH ST YEAR 2040 TRAVEL TIME (MIN)

AM PERIOD









PM PERIOD







PARKING IMPACTS



POTENTIAL BICYCLE FACILITY MILES



PLANNING LEVEL COST ESTIMATE

BUFFERED BIKE LANE



MULTI-USE PATH

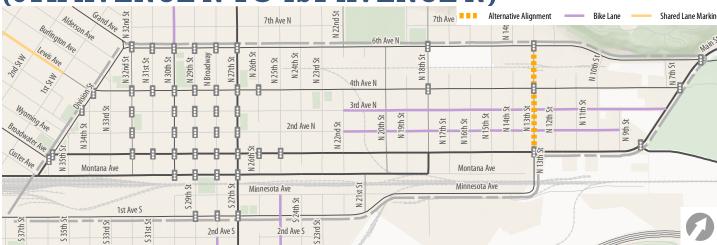


\$1.1-1.5 million

- Little to no impact to traffic operations along 6th Avenue N.
- Utilizes existing curb-to-curb widths to reduce lane widths to promote slower speeds.
- Provides an east-west bicycle connection on the northside of downtown for people traveling to/from the Heights.



13TH STREET ROAD DIET (6TH AVENUE N TO 1ST AVENUE N)



Description

13th Street serves as an important two-way, north/south corridor on the east end of downtown, carrying approximately 4,000 daily vehicles. Traffic signals at 6th Avenue N and 1st Avenue N provide connections to major arterials in the eastbound and westbound directions. Currently, between 6th Avenue N and 4th Avenue N, the roadway has a 48-foot curb-to-curb width, consisting of one travel lane in each direction with parallel parking on both sides of the street. Between 4th Avenue N and 1st Avenue N, the street widens to 65 feet between curbs with two travel lanes in each direction and parallel parking on both sides of the street.

The 13th Street Road Diet utilizes excess roadway capacity and curb-to-curb width to provide a single travel lane in each direction with cross section options to provide a center-turn lane, on-street bicycle facilities, and on-street parking. Cross sections presented along the corridor are within the vision of creating a "Main Street" for the 13th Street corridor as described in the East Billings Urban Renewal District (EBURD) Master Plan and Bikeways & Trails Master Plan.

Benefits/Tradeoffs

Benefits	Tradeoffs
Utilizes excess capacity along roadway and at intersections	Cost of roadway improvements
Provides streetscape improvements and increases bicycle connectivity within vision of the EBURD Master Plan and the City's Bikeways & Trails Master Plan	Maintenance of bicycle facility
Reduces crossing distance for pedestrians	Minimal impact to on- street parking north of 4th Avenue N
Opportunity to provide turn lane storage for left-turns at the intersections	



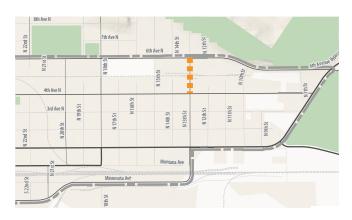


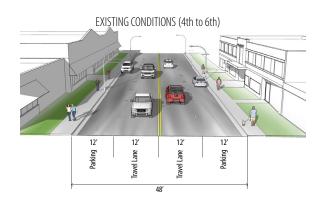
Traffic Operations

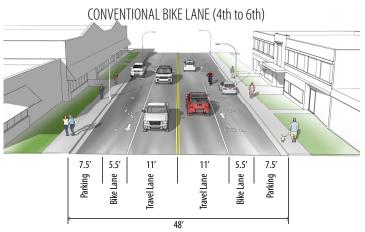
The traffic operations analysis found that removing a travel lane in each direction along 13th Street between 4th Avenue N and 1st Avenue N has little to no traffic operational impacts during the a.m. and p.m. peak hour in year 2040. A nobuild scenario in year 2040 results in LOS A to C during the a.m. and p.m. peak hours along the corridor. The road diet analyzed the most conservative cross section option, consisting of one lane in each direction with no center turn lane. By removing a travel lane and not providing a center turn lane, level of service remains at LOS B/C and intersections continue to operate under capacity. Additionally, the analysis found that at the 1st Avenue N & 13th Street intersection, the southbound approach's lane configuration would operate at LOS C with a dedicated left-turn lane and shared through/right-turn lane. This would allow additional room at the intersection for bicycle facilities.

Lastly, there are additional operational benefits to the cross sections which include the center turn lane. The center turn lane provides protection and storage for left-turning vehicles and thereby minimizes delay to LOS B for the side streets. With the addition of the center turn lane average vehicle delay at intersections along 13th Street are expected to decrease by 5% and 12% during the a.m. and p.m. peak hour, respectively.

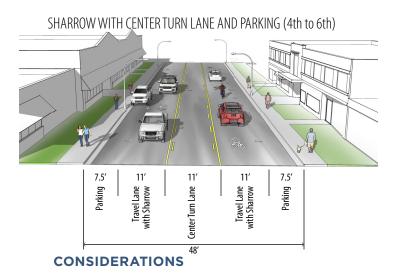
4th Avenue N to 6th Avenue N - 13th Street Road Diet







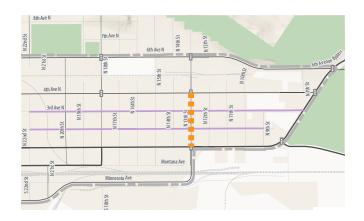
- On-street parking
- Bicycle connectivity

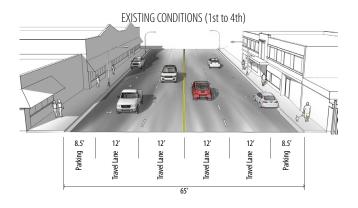


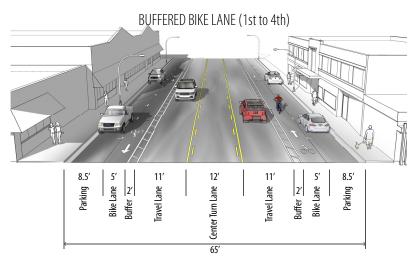
- · On-street parking
- Bicycle connectivity
- Less comfort for cyclists
- Enhanced safety performance with center turn lane



1st Avenue N to 4th Avenue N - 13th Street Road Diet







- On-street parking (both sides)
- Bicycle connectivity
- Enhanced comfort for cyclists
- Enhanced safety performance with center turn lane

TRAFFIC OPERATIONS

YEAR 2040 AVERAGE VEHICLE DELAY (S)

AM PERIOD



STREET CONVERSION



PM PERIOD



17.1



PARKING IMPACTS



NONE

POTENTIAL BICYCLE FACILITY MILES



PLANNING LEVEL COST ESTIMATE

BUFFERED BIKE LANE

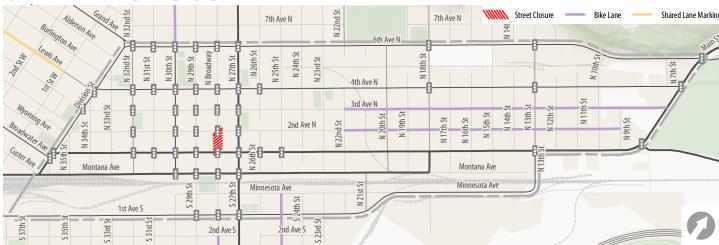


- Little to no impact to traffic operations along 13th Street.
- Traffic operations and safety benefits for cross section options with center turn lane.
- Southbound approach at 1st Avenue N & 13th Street operates at LOS C with one dedicated left-turn lane and one shared through/right-turn lane.
- Relatively low cost and low impact to provide main street atmosphere as planned in the EBURD Master Plan.





BROADWAY AVENUE STREET CLOSURE



Description

Broadway Avenue between 1st Avenue North and 2nd Avenue North currently serves as a festival street for the downtown Billings core. This block consists of restaurants, retail, office space, and residential units on both sides of the street, making it a natural draw for people coming to the downtown core. The block hosts monthly events throughout the year, many of which temporarily close the street. There were approximately 33 temporary street closures in 2018, including closures for farmer's markets, races, parades, music concerts, and festivals. In general, there is 50 feet of curb-to-curb width with an existing curb extension or parklet with a mid-block on the east side of the street. This block has one travel lane in each direction with approximately 24 front-in, angled parking spaces on the west side of the street.

The Broadway Avenue closure analyzed the impact of permanently closing the street between 1st Avenue North and 2nd Avenue North. Cross sections for the street closures were not drafted, as there are many considerations for modifying and utilizing a vacated street. Determination of future streetscape features and atmosphere of a permanent street closure needs to be discussed with the City and downtown stakeholders if a permanent street closure is to be considered. Permanent and temporary street closure treatments recommendations are discussed in detail in the National Association of City Transportation Officials (NACTO) Urban Street Design Guide.

Benefits/Tradeoffs

Benefits	Tradeoffs
Provides main street atmosphere and central meeting place in the downtown core	Cost of streetscape improvements and closure treatments
Continue to spur economic development within downtown core	Maintenance of added streetscape
Provides a safe streetscape for pedestria and bicyclists	Loss of 24 parking spaces if permanently closed
Opportunity to provide more greenspace with downtown core	Decreased vehicle accessibility
Driver awareness and predictability of permanent closure	





Traffic Operations

The City understands that temporary street closures happening today have little effect on the surrounding roadway network. Therefore, the focus of the traffic operations analysis was to understand the impact of future traffic volumes. Future traffic volumes represent year 2040 traffic conditions, which found that a no-build scenario or no road closures results in level of service (LOS) B and C within the vicinity of the block during the a.m. and p.m. peak hours. A permanent or temporary road closure results in intersections continuing to operate at LOS B and LOS C during the year 2040 a.m. and p.m. peak hours. The analysis found that the rerouting of vehicles has little operational effect on nearby intersections, with an expected increase in average vehicle delay at intersections to be approximately 4% and 3% during the a.m. and p.m. peak hour respectively.

Minimal impact occurs to the surrounding roadway network if the one-way to two-way street conversions have been implemented on the north and south streets and along 2nd Avenue N and 3rd Avenue N. The two-way streets provide additional accessibility and options for drivers to divert their route, therefore resulting in fewer vehicle movements. If the street is to become permanently closed, driver awareness and predictability of the road closure will help to improve route choices within the vicinity of the road closure. Therefore, a nominal impact to the transportation network will be experienced.

Cross-Section Options

Cross section options were not developed for the Broadway Street closure. A permanent closure of Broadway Avenue with any streetscape alternatives or enhancements should be considered between the City and downtown stakeholders.

Closure Treatments Options

Street closure treatments were discussed for consideration of a temporary or permanent closure. These treatments include:

- Temporary Closure Treatments
 - Retractable Metal Bollards
 - Movable planters
- Permanent Closure Treatments
 - Concrete planters
 - Fixed signage
 - Gateway
 - Curb and gutter with landscape

TRAFFIC OPERATIONS

YEAR 2040 AVERAGE VEHICLE DELAY (S)

AM PERIOD



NO BUILD



STREET CLOSURE



PM PERIOD



PARKING IMPACTS



POTENTIAL BICYCLE FACILITY MILES



DEPENDENT ON STREETSCAPE TREATMENT **OPTIONS**

PLANNING LEVEL COST ESTIMATE



DEPENDENT ON STREETSCAPE TREATMENT **OPTIONS**

- Little to no impact to traffic operations if the street block is to be permanently or temporarily closed.
- Two-way street network improves accessibility within vicinity of the road closure, improving taffic operations.
- Options to enhance temporary closure treatments to provide permanent road closure feel.



NEXT STEPS

Establishing a prioritized implementation plan for any of the refined alternatives was not a primary goal of the Study. The goal was to identify, develop, and evaluate various downtown transportation alternatives and summarize the alternatives that are feasible and ones that are not feasible from a traffic operations perspective for the City of Billings. It is understood that funding for future work is not currently allocated and it is unknown when and how much funding may be provided in the future.

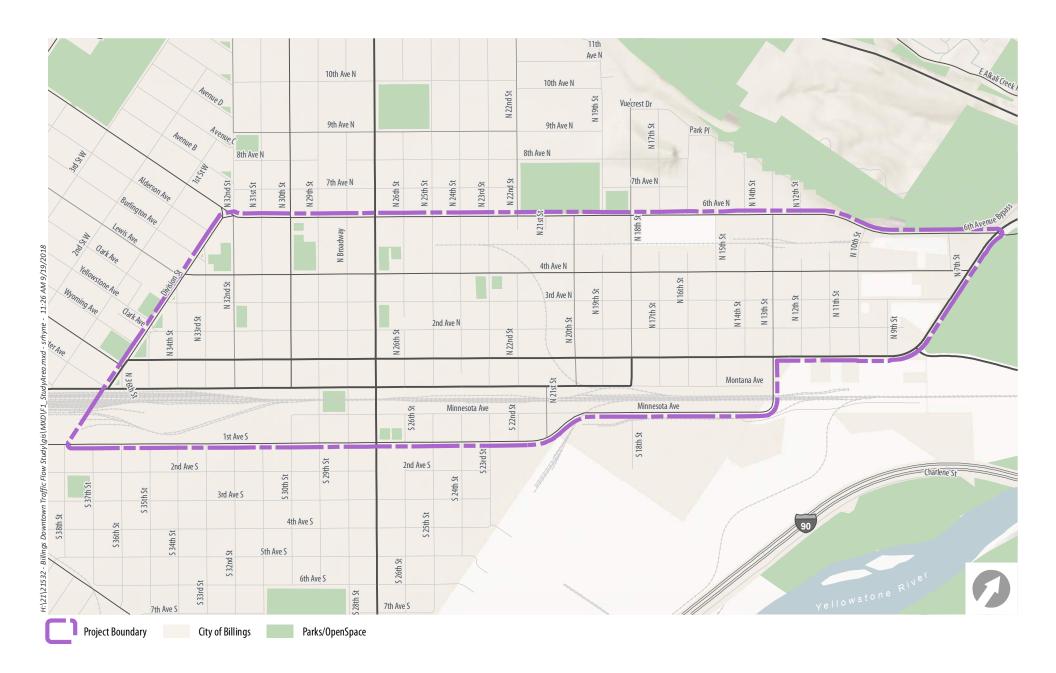
The Study provides the City with six alternatives and various cross sections that are feasible for consideration in enhancing the connectivity and livability within downtown Billings.

These alternatives and cross sections provide the City with flexibility to implement transportation alternatives as funding becomes available and select the appropriate alternatives based on the level and time frame of the funding allocated. Moving forward, this Study can serve as a solid foundation for the City to continue the discussion with other agencies, stakeholders, property owners, businesses, and the public about finding ways to enhance the downtown transportation network.

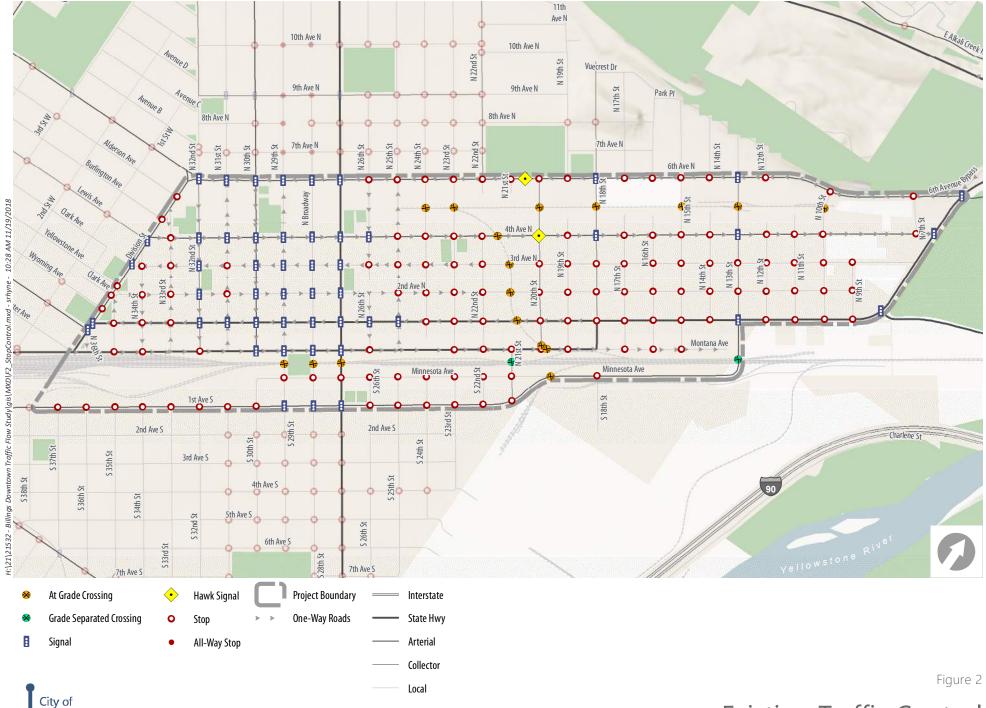


Appendix A

Existing Conditions
Base Maps



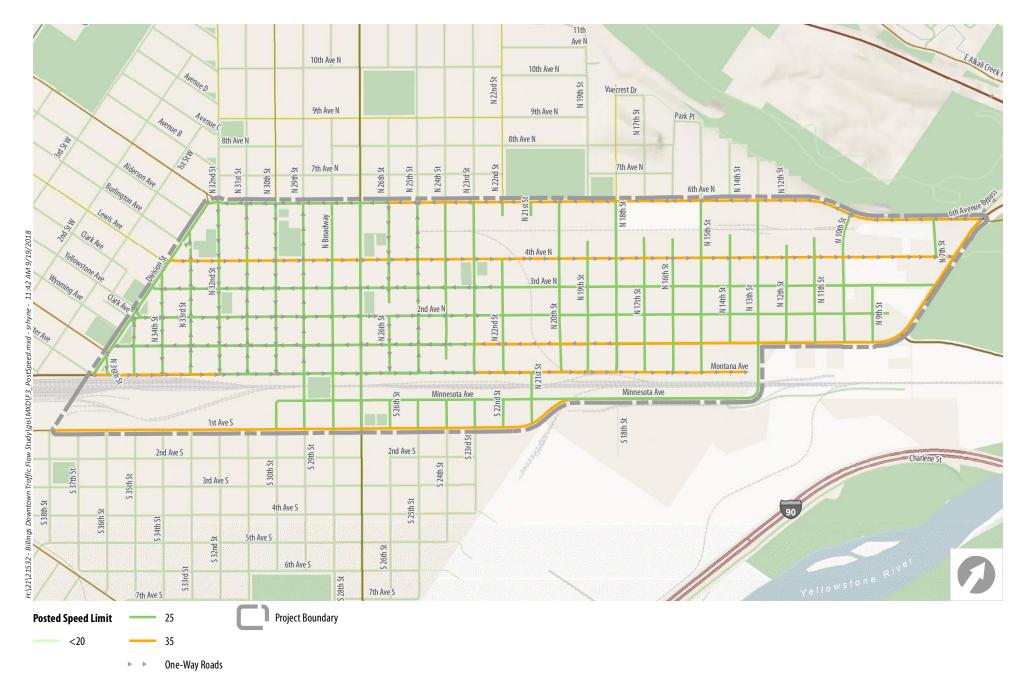




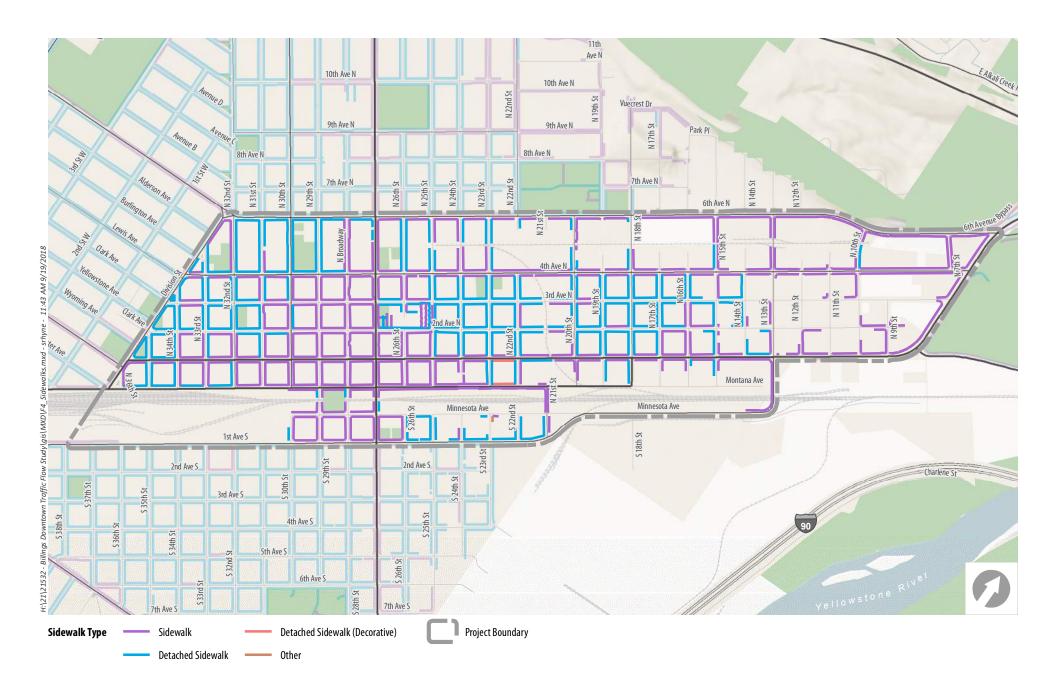
BILLINGS

Downtown Traffic Study

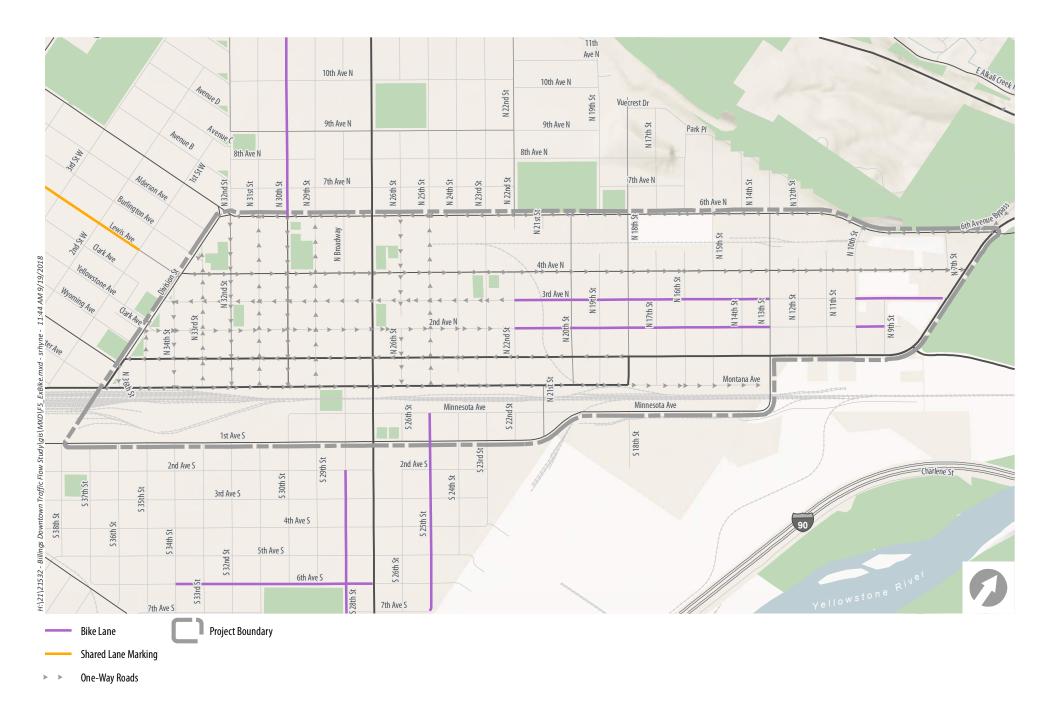
Existing Traffic Control



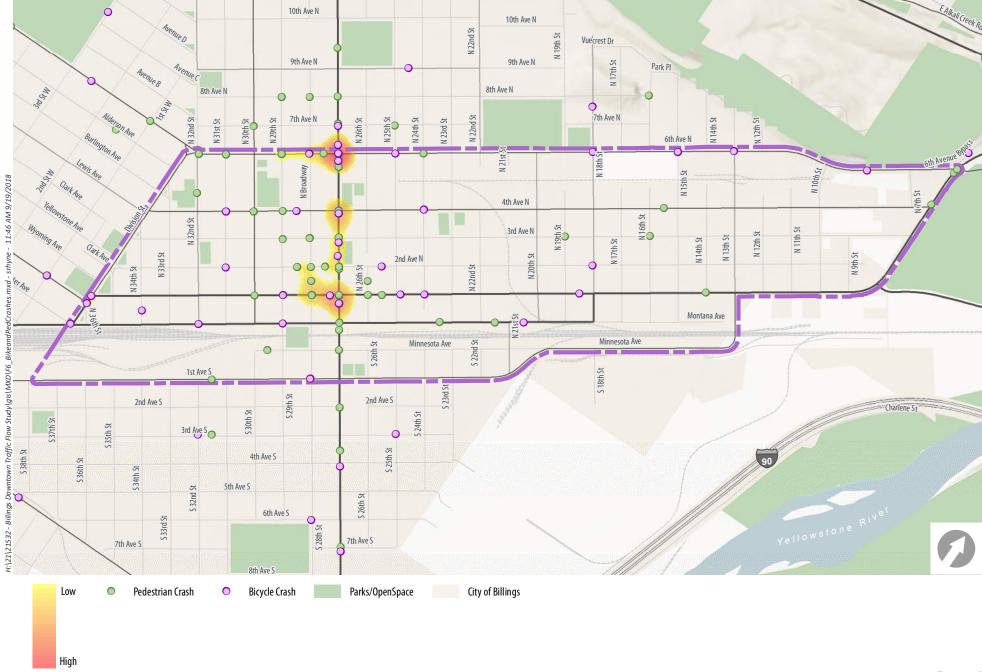




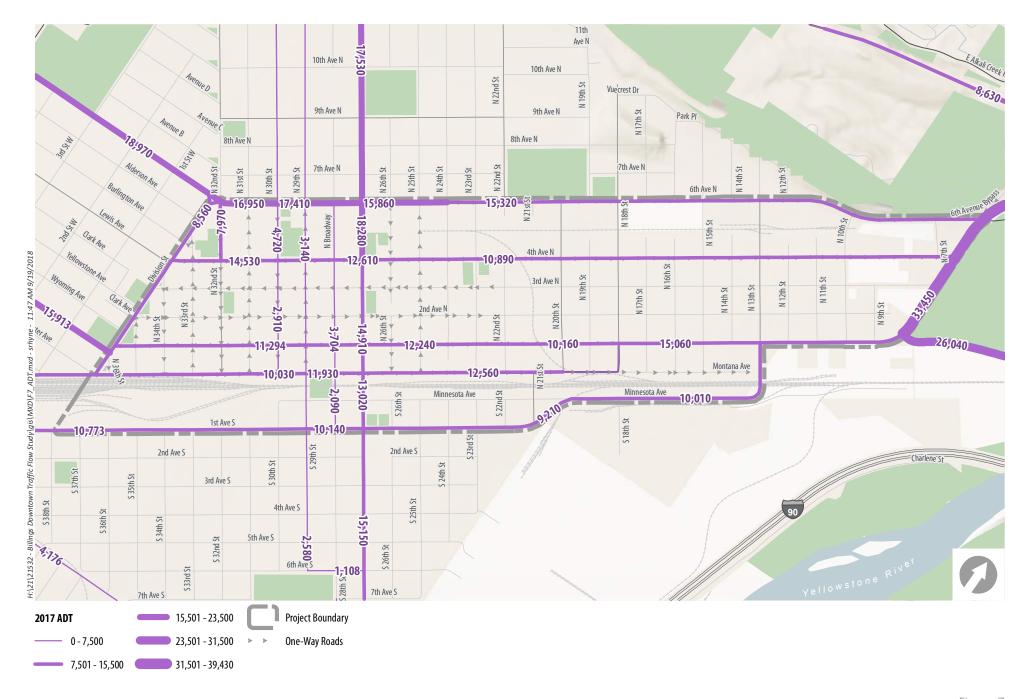
















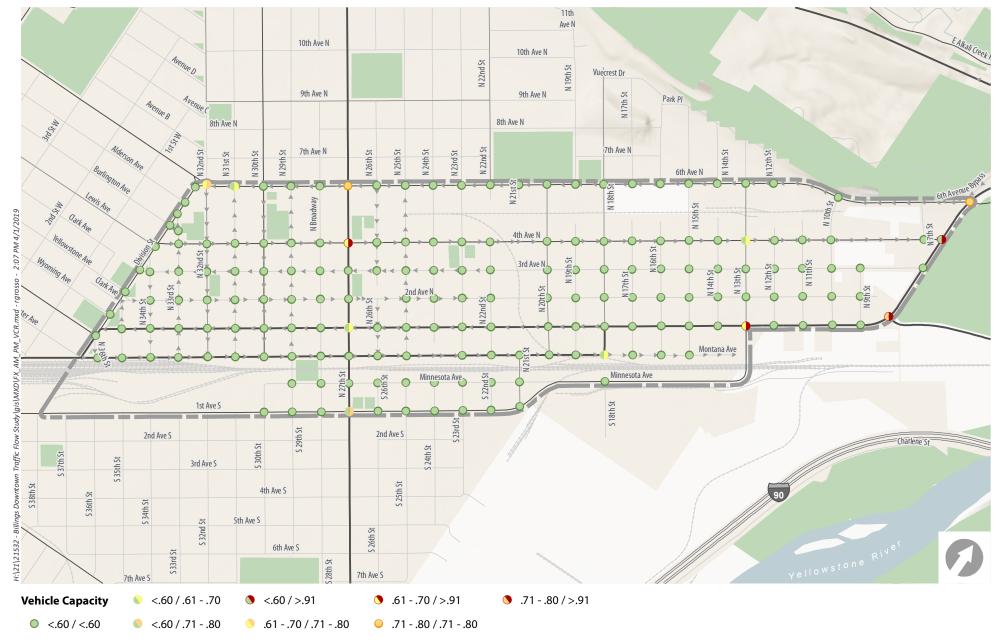
Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.



Existing - 2018

AM / PM Peak Hour Level of Service





Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.



Existing - 2018



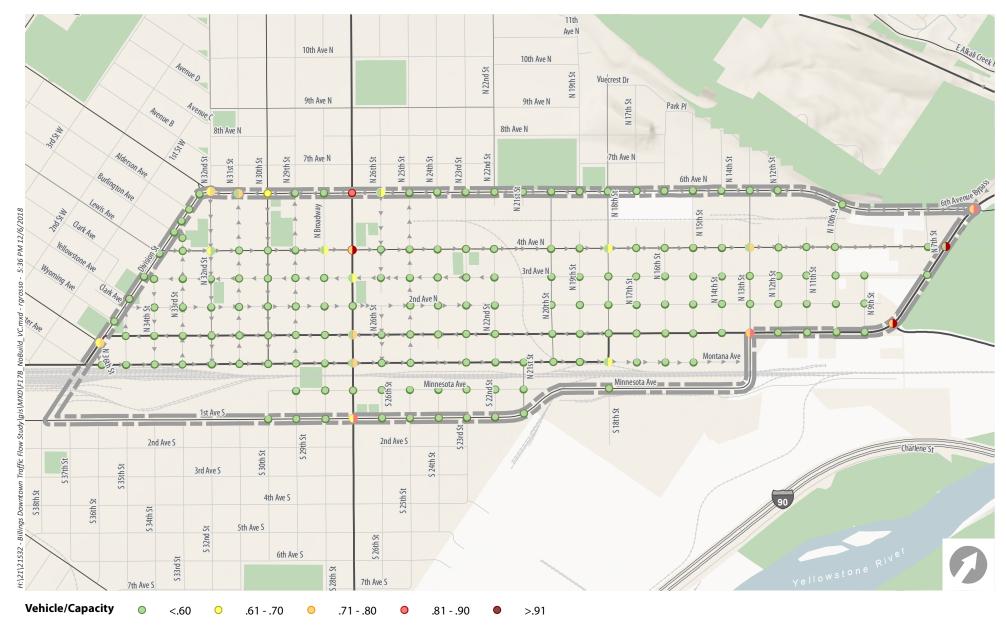
Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 17A

No Build - 2040

AM/PM Peak Hour Level of Service





Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 17B

No Build - 2040

AM/PM Peak Hour Vehicle Capacity



Appendix B

PMT and PAC
Meeting #1
Materials and
Summary

PMT Meeting #1 Agenda

Downtown Traffic Study, Billings

Work Order 18-09

Friday, August 10, 2018 - 10:00 to 11:00 AM

City of Billings Public Works Department – Billings Conference Room

The purpose of this meeting is to kick-off the study with the project management team (PMT), review the scope of work and schedule, and provide an update on the data collection and preliminary existing condition findings.

- 1. Introductions
- 2. Study Purpose and Location
- 3. Scope of Work and Schedule
- 4. PAC Members and Meeting Frequency
 - a. Finalize member list and contact information
 - b. Draft Welcome/Invite/Project Introduction email
 - c. Meeting dates
 - i. PAC Meeting #1 (*Tentative Week of September 24*th)
 - 1. Existing Conditions
 - 2. Evaluation criteria and initial list of alternatives
- 5. Task 002 Data Collection Update
 - a. Traffic counts and travel times
 - b. Synchro network
 - c. GIS data
 - d. Ongoing studies
- 6. Task 003 Preliminary Existing and Future Conditions
 - a. Existing transportation infrastructure and volumes
 - b. Preliminary existing conditions operations and safety analyses
 - c. Year 2040 traffic volume forecasting
- 7. Task 004 Alternatives Development, Analysis, and Evaluation
 - a. Initial alternatives discussion
- 8. Summary of Action Items from Today's Meeting



PMT Meeting #1 Summary

Downtown Traffic Study, Billings

Work Order 18-09

Friday, August 10, 2018 - 10:00 to 11:00 AM

City of Billings Public Works Department – Billings Conference Room

The purpose of this meeting is to kick-off the study with the project management team (PMT), review the scope of work and schedule, and provide an update on the data collection and preliminary existing condition findings.

- 1. Introductions
- 2. Study Purpose and Location
 - Analyze various transportation network alternatives and how they impact the surrounding downtown Billings streets.
 - Provide the City with existing and future conditions, as well as an opportunity to test various network alternatives to address key questions.
 - Establish a framework of evaluation criteria and performance measures to be used for evaluating the various roadway network alternatives in downtown Billings.
 - Northern and southern limits include roadways from 6th Avenue North to 1st Avenue
 South and the western to eastern limits include roadways from Division Street to Main
 Street.
- 3. Scope of Work and Schedule
 - PAC Meeting #1 set for Sept. 24th or 25th
 - PMT Meeting #2 set for following week (Oct. 1st)
- 4. PAC Members and Meeting Frequency
 - a. Finalize member list and contact information
 - Different contact at Billings Police Department
 - Add Randy Hafer (High Plains Architects) to be invited
 - Mike Schaer (Computers Unlimited) to be invited
 - Big Sky Economic development agency to be invited
 - Traffic Operations form MDT, Helena to be invited
 - b. Invite letter to PAC members to be sent at the end of next week Erin to review



- Study purpose, PAC purpose, commitment (meeting dates)
- c. Meeting dates
 - i. PAC Meeting #1 (*Tentative September 24*th or September 25th)
 - 1. Existing Conditions (Key components what and how are we showing it?)
 - 2. Provide project examples in other cities
 - 3. Evaluation criteria and initial list of alternatives
 - 4. Group work session for collaborative ideas, identifying challenges and opportunities within downtown
 - ii. PAC Meeting #2 (Tentative Mid December)
 - iii. PAC Meeting #3 (Tentative Mid February)
- 5. Task 002 Data Collection Update
 - a. Traffic counts and travel times
 - TMC collected at 105 of the 187 intersections within the study area
 - Traffic counts that were not collected were estimated by interpolating between traffic counts obtained on the corridor upstream and downstream of the intersection and/or estimated based on TMC at similar intersections in the area or along the corridor.
 - Traffic counts along 1st Ave N east of 13th St to be collected under 1st Ave N/Exposition Dr Study (minor/unsignalized intersections)
 - Travel times collected along the east-west and north-south corridors will be used for validating the existing conditions model.
 - o Additional figure for existing conditions package/deliverable
 - b. Synchro network
 - Completed existing conditions model, further discussion topics include:
 - For "apples to apples comparison" use HCM 2000 for all intersection anlaysis
 - Include the PHB at 4th Ave N/20th St (15 PM Peds) and 6th Ave N/west of 20th St (0 AM Peds at intersection)?



- We will include them and coordinate with the downstream signal, we feel there's enough ped crossing to analyze the effect of the ped crossings
- Modeling adjustments for bike lanes and angled parking?
 - Adj. Parking Lane (estimated 7 parking maneuvers per hour for angled parking)
 - Currently using a saturation flow rate of 1,750 vphpl throughout the model
- Should we model the train crossings particularly s/o Montana Ave?
 - We will model RR x-ing when necessary, but will keep on our radar to understand impact to alternatives

c. GIS data

- Collected data for base mapping efforts, including curb lines, utilities, sidewalks (incomplete), ROW, bicycle network, traffic control
 - Draft base maps provided

d. Ongoing studies

- Billings Urban Area Long Range Transportation Plan Update Reference for intersection and roadway improvements, crash data, GIS mapping data
- Billings Urban Area Regional Travel Demand Model Model will be used for identifying future volumes (next three weeks, early projections)
- 27th Street Railroad Crossing Study (HDR) In depth RR Xing analysis
- Exposition Drive & 1st Ave N Intersection Study Counts to be collected
- Airport Rd & Main St Final Design
- 1st Ave N Final Design (Sanderson Stewart) Assumption of bike lanes along 1st
 Ave corridor for our study?
- Main Street Signals Billings Project (MDT)
- Main St Pavement Preservation Project (MDT)
- Exposition Drive Pedestrian Crossing Feasibility Study
- 6. Task 003 Preliminary Existing and Future Conditions
 - a. Existing transportation infrastructure and volumes
 - Sidewalk network is incomplete (verified by City); sidewalk type and conditions will be documented per alternative – Figure 2
 - 48 signalized intersections; 123 TWSC intersections; 0 AWSC intersections –
 Figure 3



- Limited connecting bicycle infrastructure within study area or to areas outside study area – Figure 4
 - Ongoing project on east side of downtown to connect existing bike lanes on 2nd Ave and 3rd Ave and fill in gaps in existing sidewalk
 - Master plan to work towards a complete system and this project will provide an analysis and evaluation towards a complete system
 - 1st Ave N Project
 - Billings Bikeway and Trail Master Plan (shared use paths, bike lanes, buffered bike lanes, visionary long range bikeways)
- Posted speed limits range between 25 mph and 35 mph within study area –
 Figure 5
 - Double check roadways with posted 30 mph do not believe there are any in downtown
- Average daily traffic Figure 6
 - Capacity within downtown ability to reduce at least a lane on one-way streets with three plus lanes. (we'll look at this as part of our alts)
- b. Preliminary existing conditions operations and safety analyses
 - Total of 108 pedestrian (70) and bicycle (38) crashes within the study area, with most of the crashes occurring along 27th St. Other corridors of note include, 6th Ave N; 4th Ave N; 2nd Ave N; 1st Ave N; and Montana Ave Figure 8
 - Continuing to refine safety evaluation four fatal crashes (1 ped)
 - Four intersections within study area are among the top 20 highest crash rate intersections. These include 1st Ave N/Main St (1.35 rate 92 crashes); 6th Ave N/27th St (1.35 rate 85 crashes); 1st Ave N/27th St (1.13 rate 53 crashes); 6th Ave N/Main St (0.53 rate 53 crashes).
 - No intersections exceed a v/c ratio of 1.0 during AM or PM peak hour Figures
 9-12
 - Intersections with LOS F along 6th Ave N and 4th Ave N
 - Double check intersections: Montana/32nd (PM); 13th/1st (PM); 13th/2nd (PM)



- c. Year 2040 traffic volume forecasting
 - Will use Billings Urban Area Regional Travel Demand Model for forecasting 2040 traffic volumes
- 7. Task 004 Alternatives Development, Analysis, and Evaluation
 - a. Initial alternatives discussion Figure 13
- 8. Summary of Action Items from Today's Meeting
 - a. Erin to provide contact information for additional PAC Members to be invited
 - b. KAI to update existing conditions:
 - i. HCM 2000 methodology for all intersections
 - ii. Include PHB signals on 4th Ave and 6th Ave
 - iii. Update posted speed map
 - iv. Check operations at Montana/32nd (PM); 13th/1st (PM); 13th/2nd (PM)
 - c. Draft invite letter to PAC Members
 - i. Erin to review
 - d. Prepare for PAC Meeting #1
 - i. Refine existing conditions
 - ii. Find project examples for similar projects in other downtown settings
 - iii. Workshop structure and materials

PAC Meeting #1 Agenda

Downtown Traffic Study, Billings

Work Order 18-09

Monday, September 24, 2018 - 10:00 AM to 12:00 PM

2825 3rd Avenue North, Miller Building - 1st Floor Conference Room

The purpose of this meeting is to introduce PAC members to the study and provide a summary of existing transportation infrastructure and traffic conditions. The goal for the PAC is to learn about the study and other perspectives, as well as provide input on the development and evaluation of possible transportation infrastructure alternatives.

- 1. Introductions
- 2. Study Purpose and PAC Purpose
- 3. Study Timeline
 - a. PMT Meeting #2 (Tentative Week of December 10th)
 - b. PMT Meeting #3 (*Tentative Week of February 11*th)
- 4. Similar Studies
 - a. Downtown Boise Implementation Plan Boise, Idaho
 - b. City of Hillsboro Downtown Plan Hillsboro, Oregon
- 5. Study Area Figure 1
- 6. Existing Transportation Infrastructure Figures 2 5
- 7. Existing Safety Evaluation and Traffic Conditions Figures 6 11
 - a. Travel time video (data collected via Google Maps Traffic Layer)
- 8. Initial Alternatives Figure 12
 - a. One-way to two-way street conversions
 - b. Road diet/lane reductions
 - c. Road closures
- 9. Evaluation Criteria
- 10. PAC Member Workshop
 - a. Identify current transportation deficiencies and/or challenges
 - b. Identify transportation opportunities that would improve downtown
 - c. Identify potential transportation alternatives that should be considered in this study
- 11. Next Steps





Downtown Traffic Study

PAC Meeting #1 Monday, September 24, 2018

Introductions

- Agency
 - City of Billings Engineering



- Consultants
 - Kittelson & Associates, Inc.
 - DOWL





- PAC Members
 - 16 members
 - What are you looking to learn or takeaway from the study?



Study Purpose & PAC Purpose

- Identify and test various transportation infrastructure alternatives
- Establish a framework of evaluation criteria and performance measures to address key questions

- Serve as a liaison for your organization
- Provide input on the development and evaluation of possible transportation infrastructure alternatives
- Participate in three PAC Meetings



Study Timeline

May & June 2018

- Project kick-off
- Data collection

July & Aug 2018

- Existing conditions
 - Initial list of alternatives
- Evaluation criteria and performance metrics

Sept & Oct 2018

- Future conditions
- Initial alternatives analysis
- PAC Meeting #1 (Sept 24th)

Nov & Dec 2018

- Refined list of alternatives
- Refined alternatives evaluation
- Planning level cost estimates
- PMT Meeting #2 (Week of Dec. 10th)

Jan & Feb 2019

- Alternatives evaluation
- Documentation
- PMT Meeting # 3 (Week of Feb. 11th)



Similar Studies - DBIP

Downtown Boise Implementation Plan (DBIP) – Boise, Idaho

Established a coordinated blueprint for the implementation of transportation and streetscape improvements downtown

 Shorten timeframe in which all envisioned downtown projects are brought to fruition

 Implement in effective manner to maintain circulation and access within downtown

 Compilation of planned overlay and maintenance work streetscape and sidewalk improvements, key planned developments and utility improvements





Similar Studies - DBIP

 Compilation of planned overlay and maintenance work, streetscape and sidewalk improvements, key planned developments and utility improvements



ADA ramp and crossing improvements



Sidewalk widening and streetscape improvements



Similar Studies - DBIP

- Recommendations for the conversion of existing one-way streets to two-way streets
 - Jefferson St (pictured right)
 - 3rd St & 4th St (completed)
 - 11th, 12th, 13th, 14th
 Streets (completed)
 - 5th St & 6th St (final design)



 Refined downtown bicycle plan for improvements to bicycle facilities, networks and routes within downtown







Similar Studies - HDTP

- City of Hillsboro Downtown Plan Hillsboro, Oregon
 - Initial planning, traffic modeling/analysis, concept development
 - Converting one-way to two-way streets
 - Pedestrian and bicycle circulation and transit operations
 - Preliminary design, PS&E, construction management







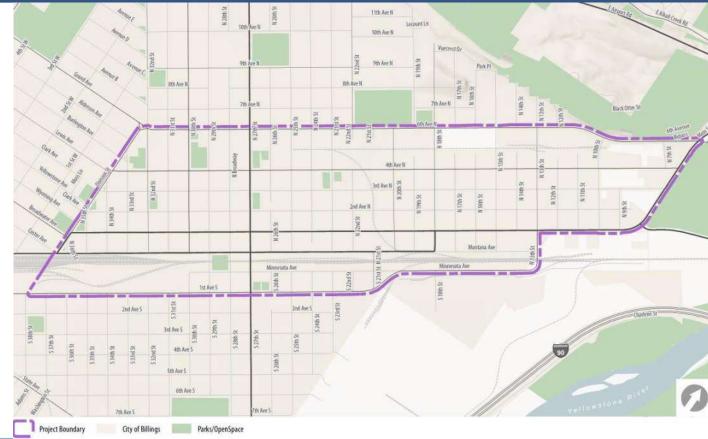
Ongoing Studies - Billings

- Billings Urban Area Long Range Transportation Plan Update
 - Reference for intersection and roadway improvements, crash data, GIS mapping data
- Billings Urban Area Regional Travel Demand Model
 - Model will be used for identifying future volumes
- 27th Street Railroad Crossing Study (HDR)
 - In depth RR Xing analysis
- Exposition Drive & 1st Ave N Intersection Study
- 1st Ave N Final Design (Sanderson Stewart)
- Main Street Signals Billings Project (MDT)
- Main St Pavement Preservation Project (MDT)
- Exposition Drive Pedestrian Crossing Feasibility Study



Study Area

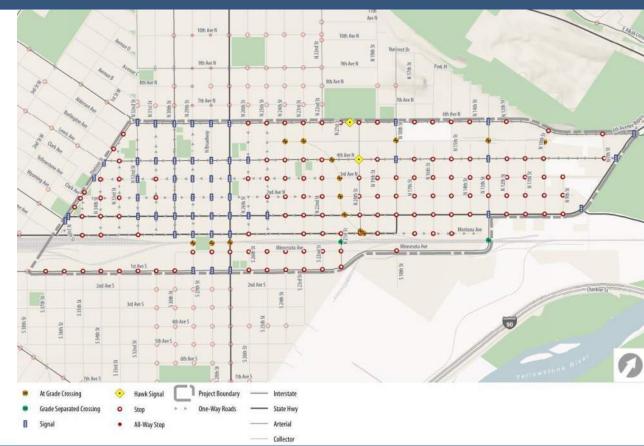
- North to South
 - 6th Avenue North to 1st Avenue South
- West to East
 - Division Street to Main Street





Existing Traffic Control

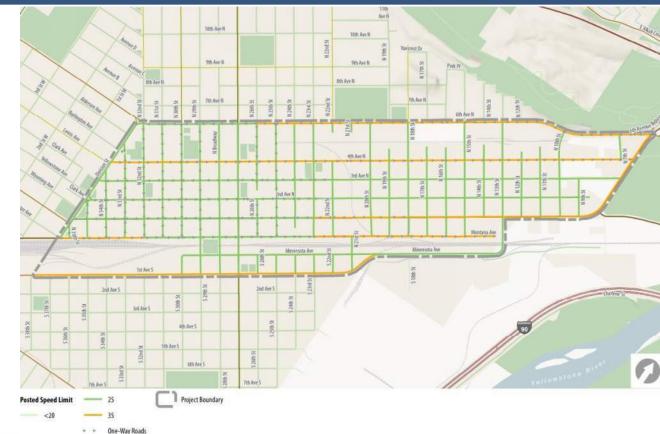
- Data Collection
 - May and June 2018
 - 179 study intersections
 - 48 traffic signals
 - Inventoried existing transportation infrastructure





Posted Speed Limit

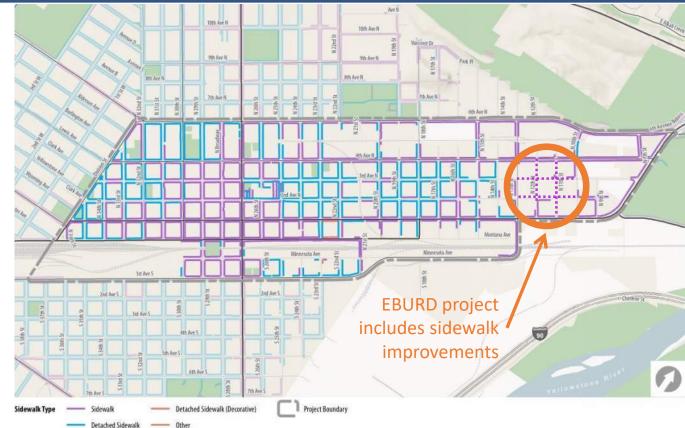
25 mph and 35 mph





Existing Sidewalks

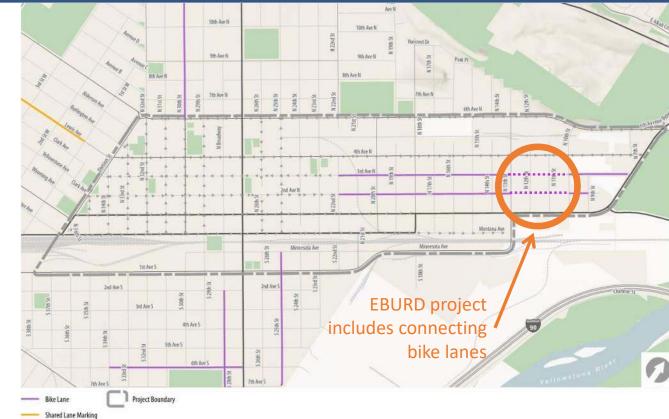
- Sidewalks
 - Attached and detached (landscape buffer)
 - Current EBURD Project
 - Updated street cross sections
 - Includes sidewalk improvements





Existing Bikeways

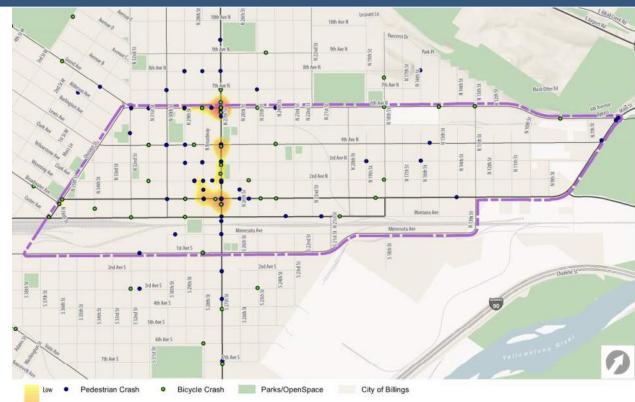
- Bike Lanes
 - 2nd Ave N & 3rd Ave N
 - Current EBURD project connects existing bike lanes
 - No signed bike routes through downtown





Safety Evaluation

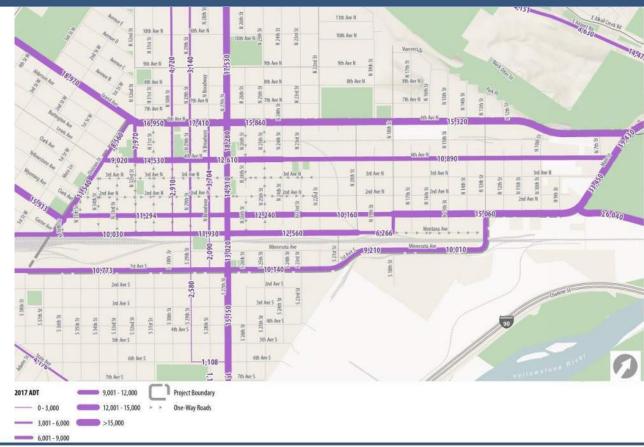
- Top 20 crash rate intersections #6 – 1st Ave N/Main St (1.35) #6 – 6th Ave N/27th St (1.35) #11 – 1st Ave N/27th St (1.13) #20 - 6th Ave N/Main St (0.53)
- Bicycle and Pedestrian Crashes
 - Total of 91 (62 ped/29 bike)
 - Fatality crashes
 - 4th Ave N/27th St (Pedestrian)
 - 7th Ave N/27th St (Pedestrian) outside of study area
 - 6th Ave Bypass (Bicyclist) outside of study area





Existing Conditions - ADT

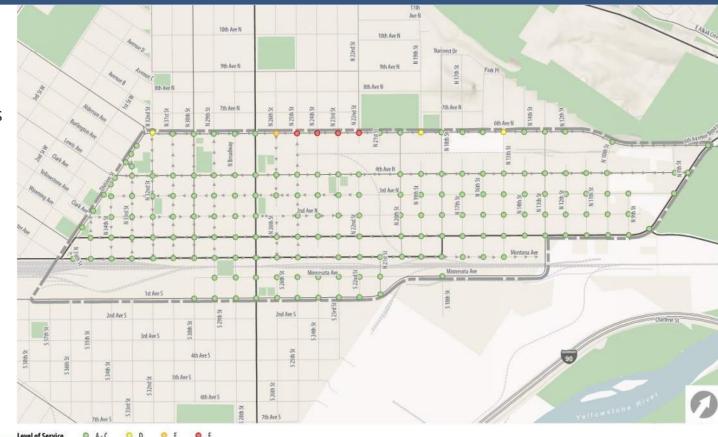
- Average Daily Traffic (ADT)
 Volumes Figure 6
 (pictured right)
 - ADT verifies adequate roadway capacity
- Birds eye view of travel times
 - Captures 24-hour of vehicular travel into and out of downtown
 - Google Travel Time Data





Existing Conditions – AM Peak Hour

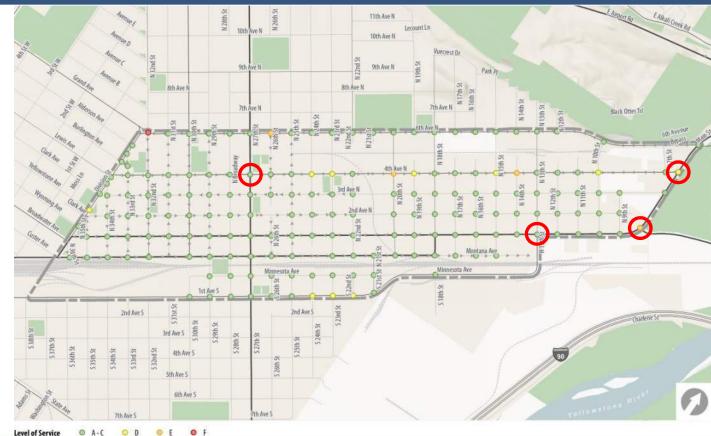
- AM Peak Hour
 - Low delay within downtown
 - Except for side streets accessing 6th Ave N
 - Sufficient capacity (<0.80)





Existing Conditions – PM Peak Hour

- PM Peak Hour
 - Low delay within downtown
 - Except for side streets accessing 4th Ave N
 - Sufficient capacity at most intersections
 - Intersections with a v/c ratio over 0.91 include:
 - 27th St/4th Ave N 13th St/1st Ave N Main St/1st Ave N Main St/4th Ave N





Existing Condition Summary

- What does it mean?
 - Sufficient capacity at majority of intersections and roadways
 - Limited railroad crossings
 - Incomplete bicycle network through downtown
 - Safety considerations



Initial Alternatives

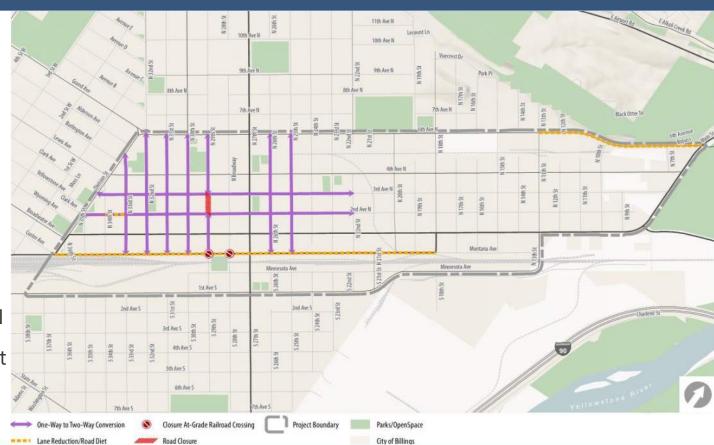
- Purpose
 - Provide better connectivity, access and safety to all users
 - How can we do that?





Initial Alternatives

- One-way to two-way street conversions
 - All north/south streets
 - 2nd Ave N and 3rd Ave N
 - All north/south streets and east west streets
- Road diet/lane reduction
 - Montana Avenue
 - 6th Ave N
- Road Closure
 - 29th St between 2nd Ave N and 3rd Ave N
 - RR X-ing closure at 29th St





Evaluation Criteria

- Six evaluation criteria
 - Auto mobility
 - Pedestrian accessibility and mobility
 - Bicycle accessibility and mobility
 - Transit accessibility
 - Parking
 - Land use
- Evaluation to include quantifiable and qualitative measure
 - Intersection LOS, v/c ratio, travel times; No. of parking spaces; Addition of biking facility;
 Addition of signalized crossing; etc.
 - Additional benefits and tradeoffs
- Planning level cost estimates



Workshop

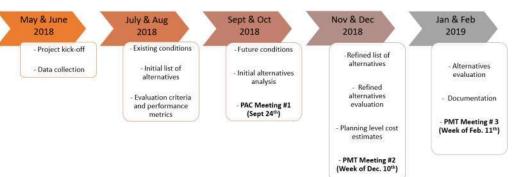
- Focus on three topics
 - 1. Identify current transportation deficiencies and/or challenges
 - 2. Identify transportation opportunities that would improve downtown
 - 3. Identify potential transportation alternatives that should be considered in this study





Next Steps

- PAC
 - Complete and return comment sheet by Monday, October 1st
- Consultant Team
 - Gather and summarize feedback
 - Refine alternatives list
 - Refine evaluation criteria and performance measures
 - Complete future year 2040 traffic operations
 - Analyze and evaluate initial alternatives
 - Prepare for and attend PAC Meeting #2
 - Week of December 10th







PAC Meeting #1 Notes

Downtown Traffic Study, Billings

Work Order 18-09

Monday, September 24, 2018 - 10:00 AM to 12:00 PM

2825 3rd Avenue North, Miller Building - 1st Floor Conference Room

The purpose of this meeting is to introduce PAC members to the study and provide a summary of existing transportation infrastructure and traffic conditions. The goal for the PAC is to learn about the study and other perspectives, as well as provide input on the development and evaluation of possible transportation infrastructure alternatives.

- Introductions What are you looking to learn and/or takeaway from the study?
 - **Erin Claunch** *City of Billings* Looking to get a global look at potential transportation alternatives of what might work for downtown
 - **Debra Hagel** *MET Transit* Ensuring bus operations in downtown; turning buses is critical and making sure alternatives provide that accessibility for buses
 - Tracy Scott Parking Division Understand the alternatives and how they would impact parking; being able to work with the other departments
 - Zach Kirkemo MDT Billings District Concerned with MDT facilities and how alternatives would impact operations
 - Scott Walker City Transportation Planning Want to see what can be done based on transportation plans; interested in feasibility of one-way to two-way conversions
 - Danielle Bolan MDT Helena Important to look at this globally; understand what impacts may occur in downtown; alternatives need to accommodate larger trucks and buses in downtown
 - **Joe Stout** *DBA* Interested in what will get people to stop and spend money with a focus on how to incorporate all modes into downtown transportation system
 - **Katie Easton** *DBA* Strategic Plan 2018 focuses on making the downtown walkable, bikeable, etc.; encourage people to slow down and get out and enjoy downtown
 - **Tim Goodridge** *EBURD* Traffic just passes / speeds through the area; EBURD has two-way operations; would like to learn how to like to make the area more useful
 - Mike Schaer Property owner on Montana Avenue & 2nd Avenue Been here in 30+ years; love to see downtown be more attractive with an emphasis on slowing people down, enforce traffic laws and help with safety in downtown
 - Brian Korell City Police Looking forward to hearing and contributing solutions for downtown
 - Nick Bailey MRL Public Works Operates the rail through downtown; interested in closing existing at-grade crossings; identify grade closings for closure
 - Sarah Patterson DOWL
 - **Brett Korporaal** *Kittelson & Associates, Inc.*
 - Andy Daleiden Kittelson & Associates, Inc.



- 2. Study Purpose and PAC Purpose
 - Understand existing traffic conditions and transportation infrastructure
 - Test various transportation alternatives and their impact on the overall downtown network
 - Develop fact sheets for tested alternatives
 - Planning level cost estimates will be provided and considered
 - Results and evaluation of alternatives to provide facts for future decision making and implementation

3. Study Timeline

- PMT Meeting #2 (Tentative Week of December 10th)
- PMT Meeting #3 (Tentative Week of February 11th)

4. Similar Studies

- Downtown Boise Implementation Plan Boise, Idaho
- City of Hillsboro Downtown Plan Hillsboro, Oregon
- Add 27th Street Project construction in 2019 (MDT project)
 - o Project limits: Interstate 90 to Airport Rd
 - Project Scope: To include traffic signal upgrades, ADA improvements, and adding protective-permissive left turn at Montana Avenue and maybe at 1st Avenue N
 - Action: MDT provide design plans and details for 27th St improvement project
- One Big Sky Center
 - o November 2018 timeframe
 - Planning document that will establish three catalyst efforts.
 - Action: Kittelson reach out to One Big Sky Center team to understand more about this project.
- NW Energy beginning retrofit of street lights to LED in downtown
- 5. Study Area Figure 1
 - No comments
- 6. Existing Transportation Infrastructure Figures 2 5
 - Counts
 - Did we capture any locations with oversaturation conditions? If so, how did we address this item?
 - Counts were collected for two-hour during the a.m. and p.m. peak periods
 - Locations along Main St experience oversaturated conditions specific projects to address these issues (Airport Rd/Main St; 1st Ave/Expo Dr., etc.)
 - Speed data
 - o Have we done any speed compliance / speed studies in downtown?
 - Speed data was not collected for this study

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- Action: MDT performed a speed study on Montana Avenue. MDT to provide this information.
- 6th Avenue N and Montana Avenue: City has been doing some specific enforcement areas for speed
- 7. Existing Safety Evaluation and Traffic Conditions Figures 6 11
 - Travel time video (data collected via Google Maps Traffic Layer)
 - More orange and red is a good thing in downtown creates opportunities for balancing movements
- 8. What does this all mean?
 - Question about snow plowing routes Let's look at this?
 - Action: Kittelson to obtain the routes from the City
- 9. Initial Alternatives Figure 12
 - One-way to two-way street conversions
 - Road diet/lane reductions
 - Road and at-grade crossing closures
 - o Railroad Why? Need to link this effort to the 27th Street RR Study
 - Add underpass at 13th
 - Existing infrastructure opportunity
 - Increase the potential of the capacity for all users
 - Refer to recent feasible studies at this location
 - Add underpass at 21st
 - Existing infrastructure opportunity
 - Increase the potential of the capacity for all users
 - Refer to recent feasible studies at this location
 - o Note: 25th St South has a bike lane on it.

10. Evaluation Criteria

- No comments
- 11. PAC Member Workshop 30 minutes
 - Identify current transportation deficiencies and/or challenges
 - Identify transportation opportunities that would improve downtown
 - Identify potential transportation alternatives that should be considered in this study

12. Next Steps

- Action Items:
 - Send Synchro model to MDT
 - o MDT provide design plans and details for the 27th St improvements
 - o Kittelson reach out to One Big Sky Center team
 - o MDT to provide information for completed speed study on Montana Ave
 - Kittelson to obtain snow plowing routes from City

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COMMENT SUMMARY

The comment summary was generated from PAC member feedback via emails, comment sheets received during and after the PAC Meeting #1, as well as comments provided on the maps during the PAC Meeting #1 workshop.

The word cloud pictured right, illustrates words used most often in the comments and



feedback, this includes each of the three comment categories. Words are randomly placed, with the word size varying based on how many times it was mentioned.

We asked three guestions of the PAC and the following themes were identified from the responses:

Transportation deficiencies and/or challenges that currently exist in downtown – 22 Comments

- Biking downtown is perceived to be unfriendly, and not safe, particularly for cyclists who
 are less confident bicycling on the road.
- Pedestrian facilities throughout downtown, particularly along 27th Street does not provide a comfortable space for walking because there is not much separation between pedestrians and roadways.
- There is limited vehicle accessibility through downtown because of the one-way grid system.
 - One-way streets make wayfinding difficult and contribute to high speeds and lower pedestrian traffic.
 - The challenge will be how to convert roadways and still provide enough capacity.
- The intersection of 1st Ave N & 13th Street is nearing capacity with a high-volume northbound right-turn movement.
 - Finding a long-term solution for this intersection and undercrossing could be a challenge.
- Vehicular speeds throughout downtown are perceived to be high, which could be due to wide, one-way avenues.



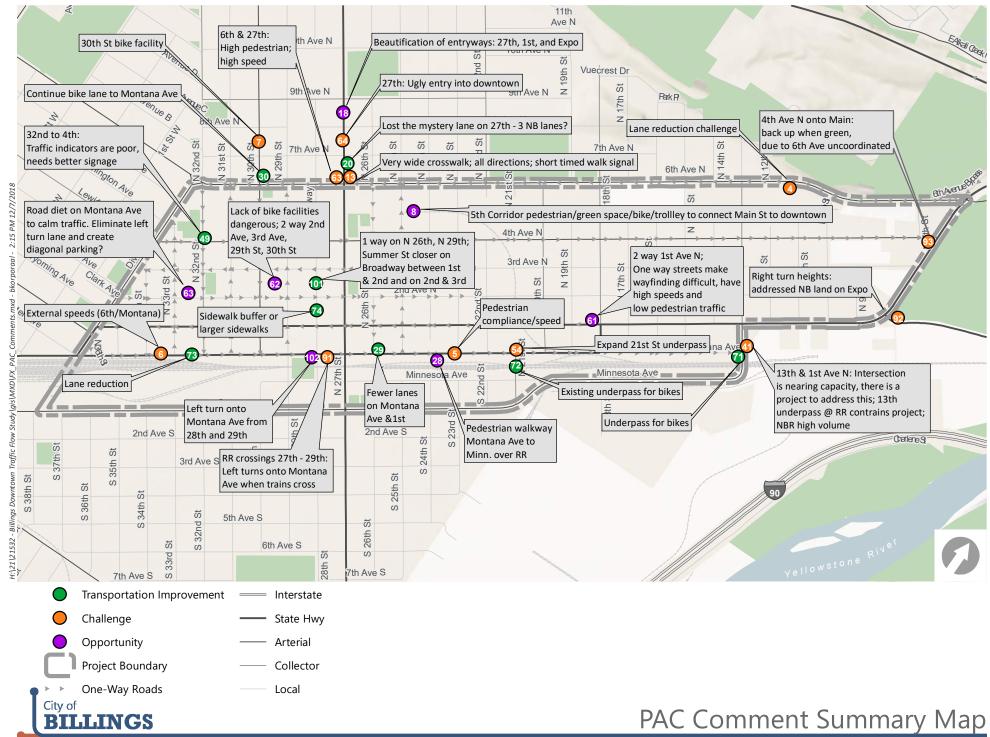
Transportation opportunities that would improve downtown – 48 Comments

- One-way to two-way street conversions and/or lane reductions will help to decrease speeds and improve accessibility for all modes.
- Enhance beautification and streetscape, particularly along entryways (27th Street, 1st Avenue N).
- While parking supply meets demand during certain peak times, in general, on-street parking deficiency is a perception.
- The existing underpasses at 13th Street and 21st Street should be utilized to enhance pedestrian and bicycle connectivity.
- 5th Avenue corridor could be converted into "green space" with pedestrian and bicycle facilities connecting to downtown.
- Increase safety for bicyclist by providing bike lanes throughout downtown.

Transportation alternatives that should be considered in this study – 35 Comments

- Bike lanes should be completed on 2nd Avenue N, 3rd Avenue N, and 30th Street.
 - Utilize and improve existing underpass crossings of the railroad for bicycling connectivity north and south of the railroad tracks.
- The 13th Street & 1st Avenue N intersection and 13th Street underpass of the railroad tracks should be improved to accommodate northbound right-turn movement, as well as pedestrian and bicyclist facilities.
- All north and south one-way streets in downtown should be converted to two-way streets.
- Incorporate planned improvements along 27th St currently in design phase.
- Lane reduction along Montana Ave to reduce speeds and provide a bicycle facility.

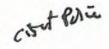
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COMMENTS

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What transp	portation opp	ortunities w	ould in	prove downto	wn?		
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Using the spatternatives	pace below a	e considered	in this	study?		ntial trans	
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PAC Meeting #1 September 24, 2018

WORKSHOP COMMENTS

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What transportation deficiencies, and/or challenges exist in downtown?

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Downtown Traffic Study

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No. Comment

(01- one way streets make may find difficult, high speeds low pedestrian traffic

62-lack of bike facilities -dangerous for bikers

(03- 64n; 27th high pedestrian (vagnary, tresspass) high speed

(04- 27th - 46LY entry into Lowartown

(05- parking has a bad reputation - befler way-finding, marketing

What transportation opportunities would improve downtown?

Comment

9 - Bike lanes

29 - Fewer lanes on MT/(s+)

39 - two Mane conversions

49 - 32nd to 4+4 traffic indicators are poor-Better signage

59 - LONG TERM planning =

Using the space below and map on the back of this page, identify potential transportation alternatives that should be considered in this study?

Str Ave Corridor - pedestrian / bike / tholley Connect pountown

Green Space

18 Bount from of antyways 27th = 18t = Expo

28 pedestrian walkway MT Minn. other Rail

-connecting H to S E to W



Downtown Traffic Study

What transporta	ation deficiencies, and/or challenges exist in downtown?
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What transportation deficiencies, and/or challenges exist in downtown?

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6	External speeds (6th/Montare)
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7 5 4	Ped compliance / speed
4	Ped compliance speed Lane reduction challenge
	Dike access to the south
	27th / 2rd / Montana NBR turn @ 1st / 13th
	NOR turn (a 1st/13th
What transp	portation opportunities would improve downtown?
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	back-in parking at diagnal parking
71	underpass for bikes?
72	Existing underpass for biles?
73	tan reduction
74	sidewalk briffer / larger sidewalks
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Using the s	pace below and map on the back of this page, identify potential transportation
alternatives	that should be considered in this study?
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Brett Korporaal

From:

Monat, Elyse <monate@ci.billings.mt.us>

Sent:

Monday, October 1, 2018 4:57 PM

To:

Brett Korporaal Walker, Scott

Cc: Subject:

RE: Downtown Traffic Study - PAC Meeting #1 Materials

Hi Brett.

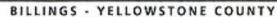
I think 30th would be a good connection but I think the important pair to that would be N. 29th as they are both one way streets running in opposite directions. I think the hard part with the north/south streets is that they are shorter within the study area so we would need to address a lot more of these streets to create the same level of connectivity that we would get from making improvements along all of 2nd and 3rd for example. So short answer, yes, I think there needs to be other improvements on north/south streets but I don't have any off the top of my head that would be good candidates. I think access under the N. 13th underpass could be improved for bikes and peds as I don't know how nice that sidewalk underpass is for walking and I think you would have to be a pretty confident cyclist to ride there. I don't go east of 27th quite as much except for on Montana so that is for sure an area that I need to learn more about to better understand what improvements would be most effective where.

I may do some bike riding before the next meeting to get a better sense of this question!

Elyse Monat

Active Transportation Planner Planning & Community Services Department 2825 3rd Avenue North, 4th Floor Billings, MT 59101

Office: (406) 247-8637





From: Brett Korporaal [mailto:bkorporaal@kittelson.com]

Sent: Monday, October 1, 2018 4:10 PM
To: Monat, Elyse <monate@ci.billings.mt.us>
Cc: Walker, Scott <WalkerS@ci.billings.mt.us>

Subject: RE: Downtown Traffic Study - PAC Meeting #1 Materials

Thank you, Elyse!

I appreciate the comments. Multiple PAC members mentioned 27th St as feeling uncomfortable. In your opinion are there any particular north/south streets that would benefit from bike facilities? Our small group at the PAC Meeting brought up 30th St as a potential because of the bike lanes north of the study area. Would you agree? Any others?

Thanks, Brett

From: Monat, Elyse <monate@ci.billings.mt.us>

Sent: Monday, October 1, 2018 3:59 PM

To: Brett Korporaal

bkorporaal@kittelson.com>

Cc: Walker, Scott <WalkerS@ci.billings.mt.us>

Subject: RE: Downtown Traffic Study - PAC Meeting #1 Materials

Hi Brett.

I just wanted to say that I am pleased biking, walking, and transit are being taken into consideration.

Looking at your comment sheet, for deficiencies and challenges, I would say that walking along 27th is unpleasant due to all the traffic and the fact that there is not much separation between pedestrians and the roadway. Montana can be hard to cross safely and is not bike friendly at a place that we would want people to be riding their bikes and enjoying local businesses. There are several other streets that are difficult for biking including 1st Ave. N and S., 4th Ave. N, and 6th Ave. N. Some of the north-south streets are ok for biking on for confident bicyclists but can be intimidating for those who are less familiar with biking on the road.

For transportation opportunities that would improve downtown, I would say more bike lanes, traffic calming, and the 1 to 2 way street conversions. Also, other placemaking elements that would make 27th more pleasant for walking and encourage people throughout downtown to walk and bike like more wayfinding signage would be helpful.

My main mode of traveling through downtown alternates between walking and biking.

Thank you!

Elyse Monat

Active Transportation Planner Planning & Community Services Department 2825 3rd Avenue North, 4th Floor Billings, MT 59101

Office: (406) 247-8637



From: Brett Korporaal [mailto:bkorporaal@kittelson.com]

Sent: Monday, October 1, 2018 3:09 PM

To: Walker, Scott <WalkerS@ci.billings.mt.us>; Scott, Tracy <scottt@ci.billings.mt.us>; Monat, Elyse <monate@ci.billings.mt.us>; Hagel, Debra <hageld@ci.billings.mt.us>; Korell, Brian <korellb@ci.billings.mt.us>; dbolan@mt.gov; zkirkemo@mt.gov; billingsbird@gmail.com; keaston@downtownbillings.com; nbailey@mtrail.com; daniel@billingschamber.com; Tuss, Mike <miket@ctagroup.com>; rhafer@highplainsarchitects.com;

Appendix C

Future Conditions
Base Maps



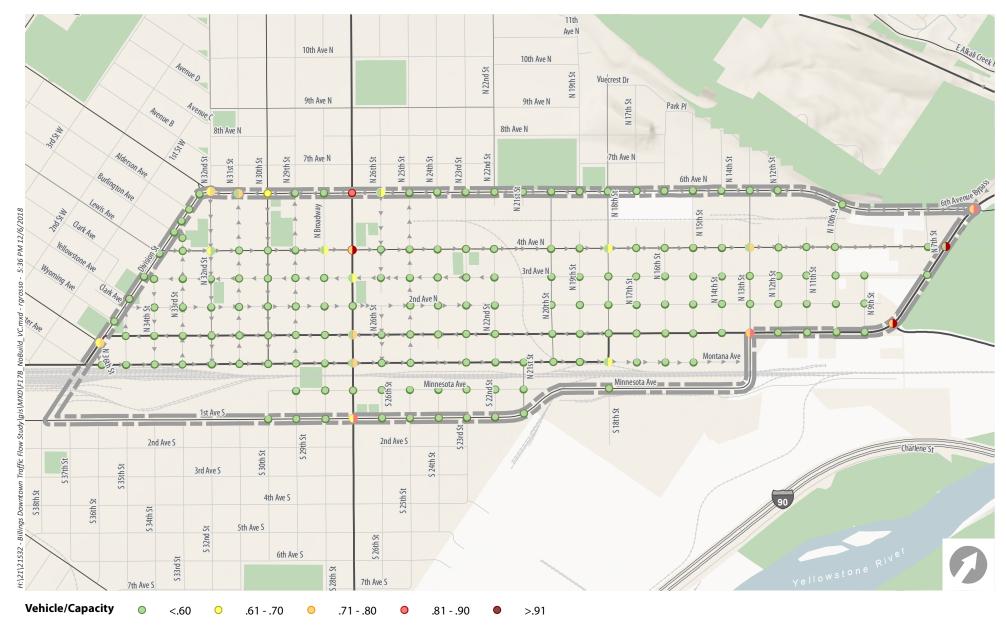
Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 17A

No Build - 2040

AM/PM Peak Hour Level of Service





Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 17B

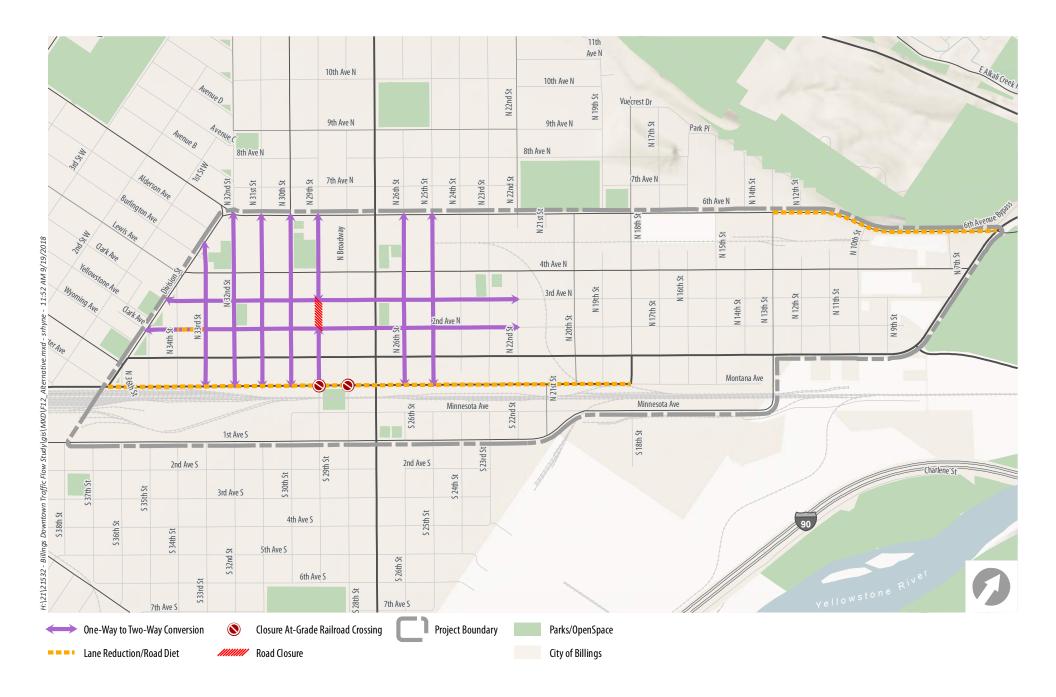
No Build - 2040

AM/PM Peak Hour Vehicle Capacity



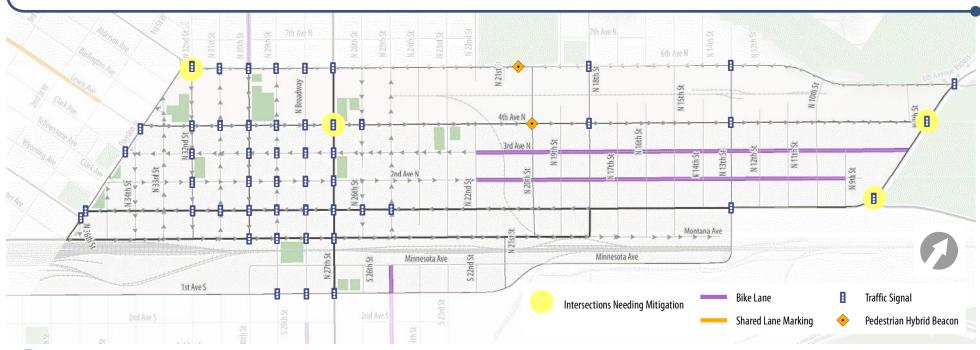
Appendix D

Initial Alternatives
Evaluation and
Summary Graphics





No-Build





Intersections needing mitigation = 4 Modified signalized intersections = 3 New signalized intersections = 0



Estimated bike facility miles = 2.2 Signalized crossing = 51 Modified bus circulation at transit center = No



Impact to on-street parking spaces = No



Construction and ₱\$XXX Maintenance **Cost Estimate**

\$XXX

Not Applicable

Benefits

No construction or right-of-way

Driver familiarity with downtown network

No change to on-street parking

Tradeoffs Limited bicycle connections

Less exposure for businesses

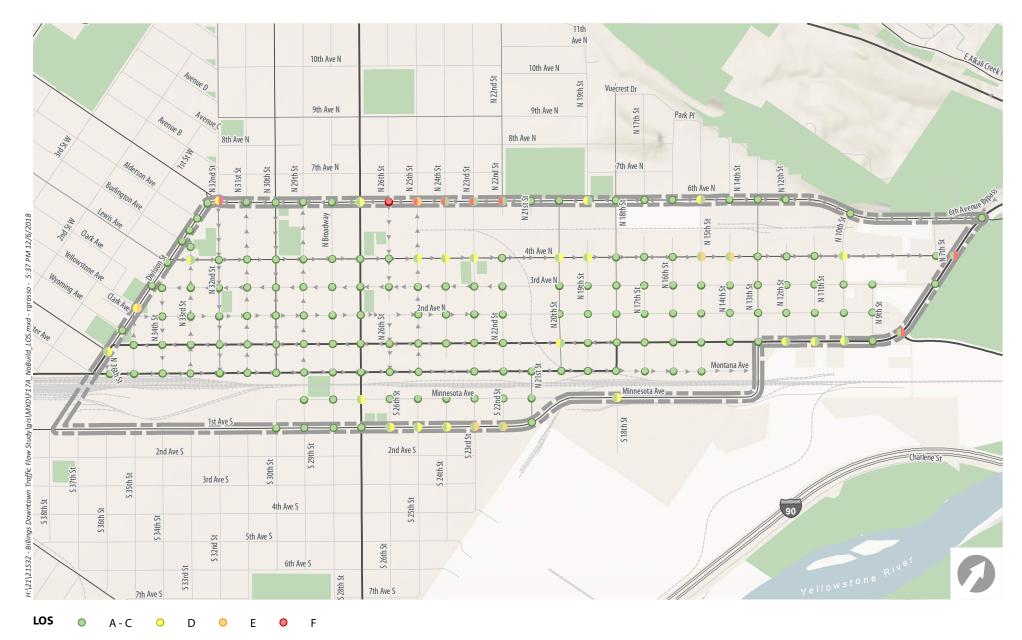
Unused capacity and space at existing intersections

Reduced accessibility for all users

Out of direction travel

Limited pedestrian crossing opportunities of railroad

Inconsistent network of one-way to two-way streets



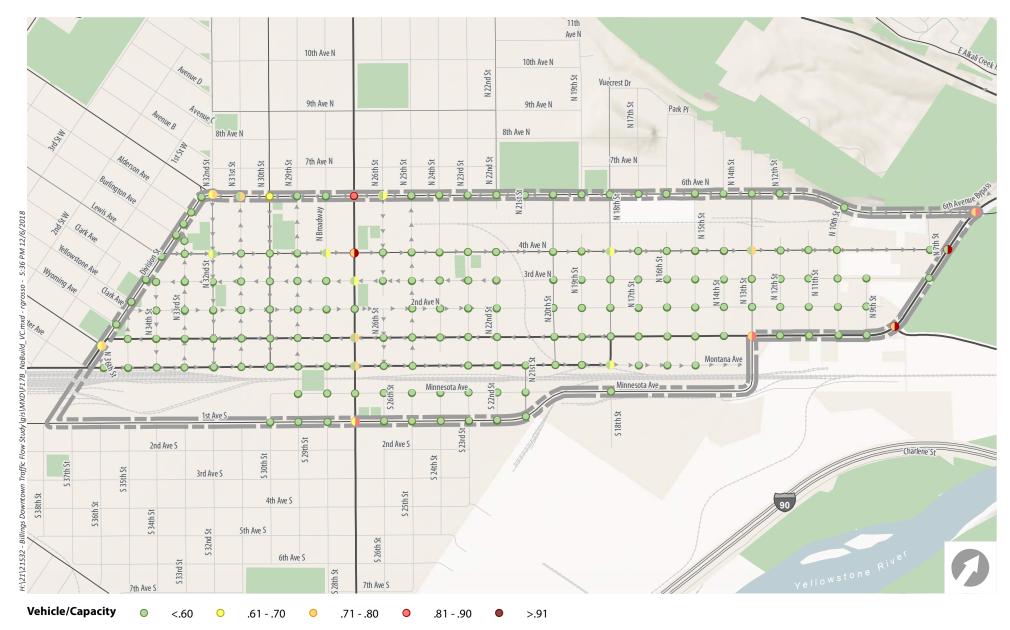
Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 17A

No Build - 2040

AM/PM Peak Hour Level of Service





Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

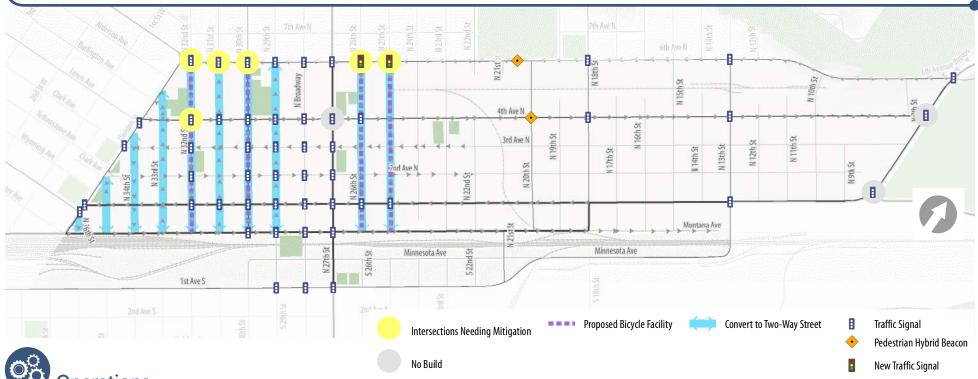
Figure 17B

No Build - 2040

AM/PM Peak Hour Vehicle Capacity



North & South One-Way to Two-Way Street Conversion



Operations

Intersections needing mitigation = 5 Modified signalized intersections = 23 New signalized intersections = 2



Estimated bike facility miles = 4.3 Signalized crossing = 53 Modified bus circulation at transit center = Yes



Impact to on-street parking spaces = Yes

Benefits

Moves towards a consistent network of two-way streets

Utilizes excess capacity at existing intersections

Increases accessibility for all users

Adds exposure for businesses

Multiple north/south bicycle connections

Could implement roadway conversions in phases

Tradeoffs

Cost for signal modifications

Increased delay and travel time for off-peak directions

Increases congestion at some intersections

On-street parking spaces removed

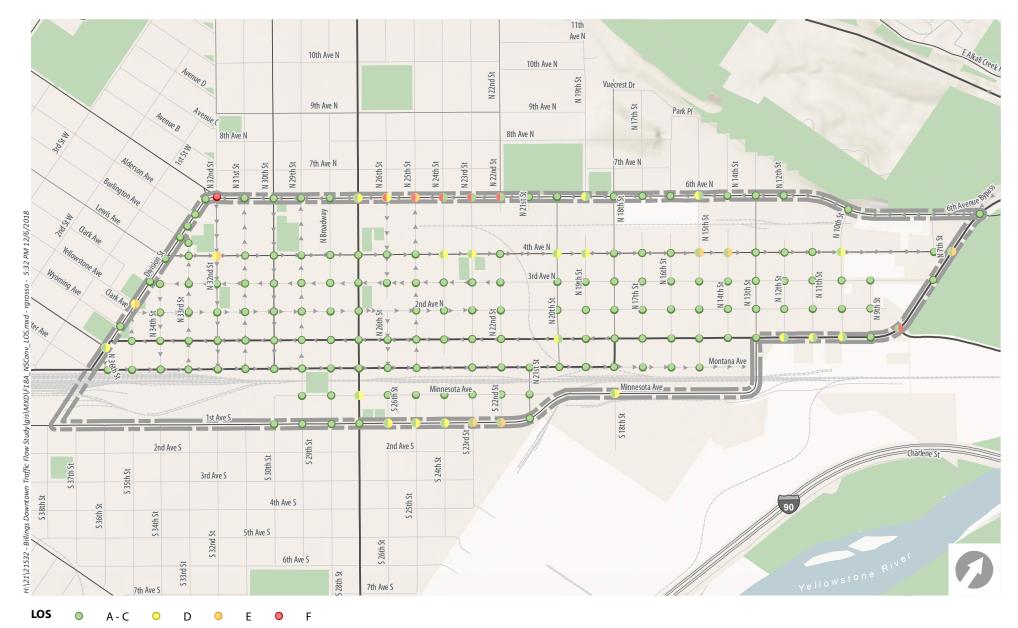
Construction and Maintenance
Cost Estimate

₱ Medium

\$XXX



Downtown Traffic Study

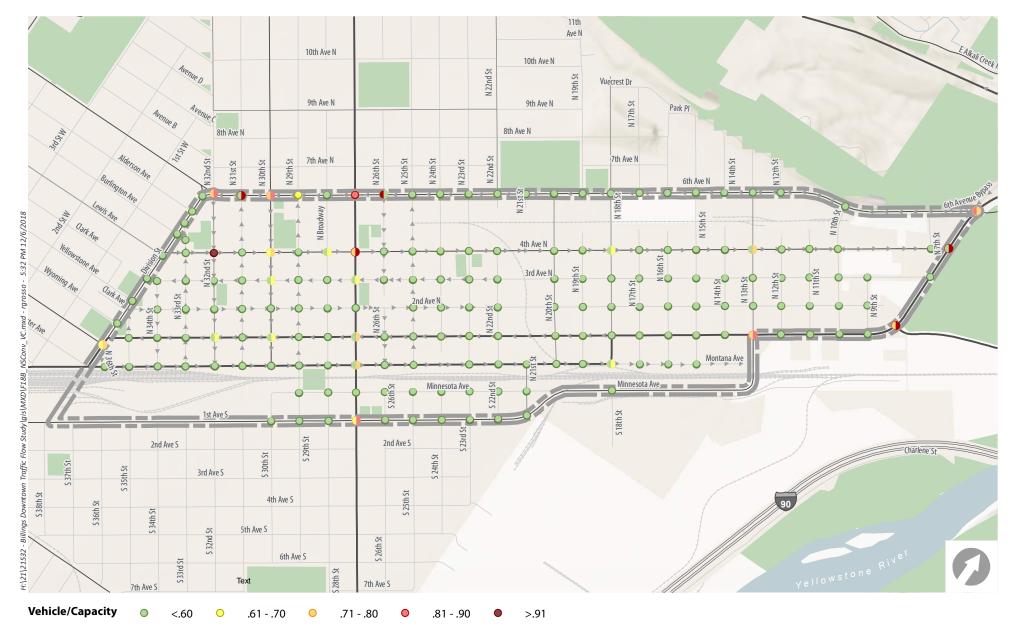


Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 18A

North/South Conversion - 2040
AM/PM Peak Hour Vehicle/Capacity





Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

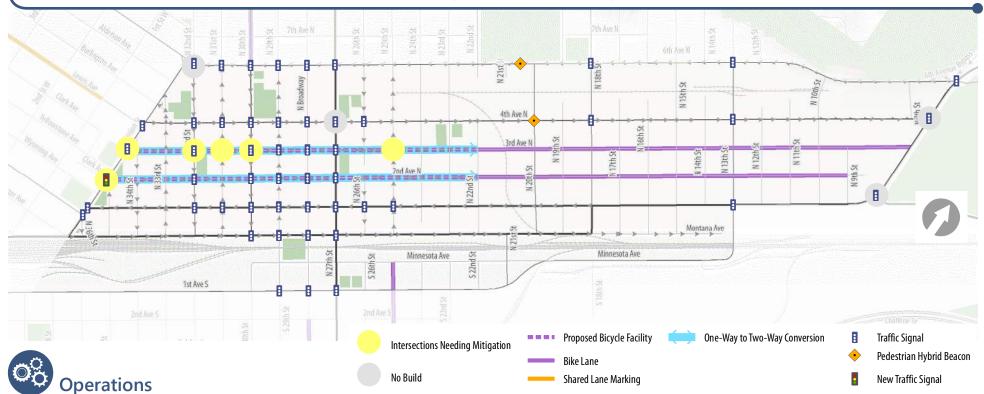
Figure 18B



AM/PM Peak Hour Vehicle/Capacity



2nd Ave N and 3rd Ave N One-Way to Two-Way Conversion



Intersections needing mitigation = 6 Modified signalized intersections = 7 New signalized intersections = 1



Estimated bike facility miles = 4.0 Signalized crossing = 53 Modified bus circulation at transit center = Yes

Benefits

Moves towards a consistent network of two-way streets

Utilizes excess capacity at existing intersections

Increases accessibility for all users

Adds exposure for businesses

Completes 2nd Ave N and 3rd Ave N east / west bicycle connection from Division St to Main St

Tradeoffs

Cost for signal modifications

Increased delay and travel time for off-peak directions

Increases congestion at some intersections

On-street parking spaces removed

Need to impliment conversion at the same time for greatest benefit



Impact to on-street parking spaces = Yes

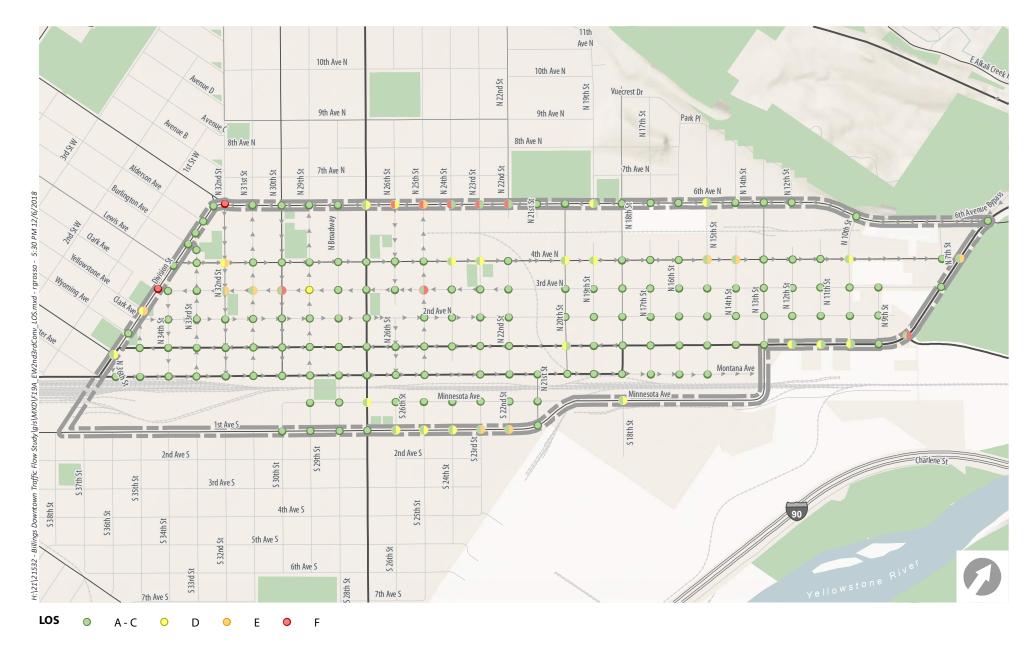
City of BILLINGS

Downtown Traffic Study

Construction and Maintenance
Cost Estimate

₱\$XXX

Low



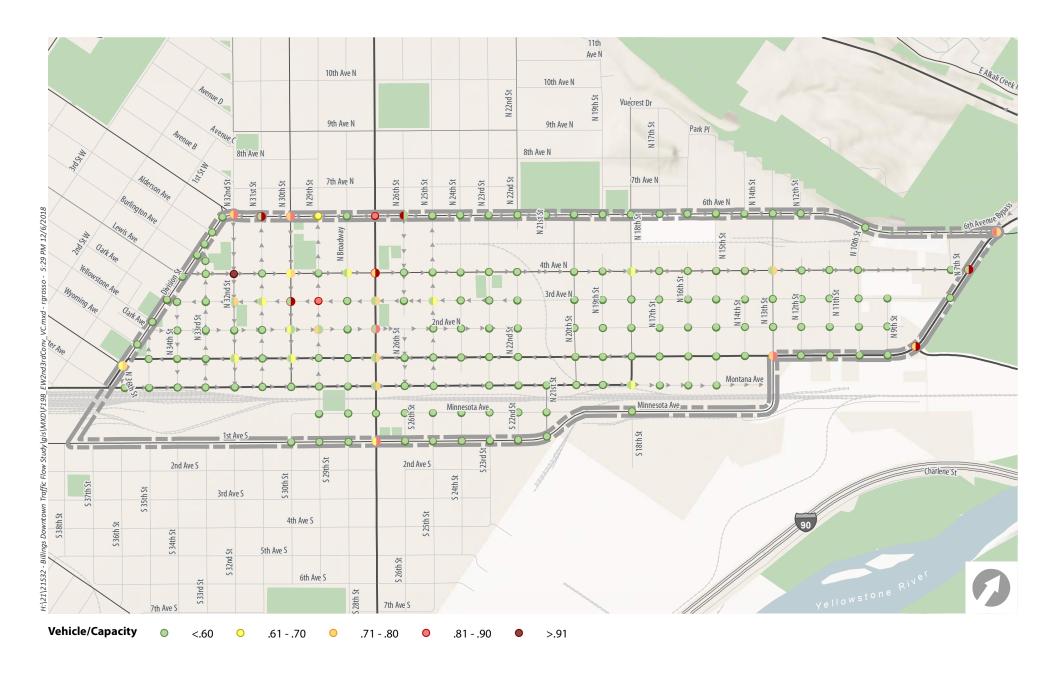
Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 19A



East/West 2nd & 3rd Ave Conversion - 2040

AM/PM Peak Hour Level of Service



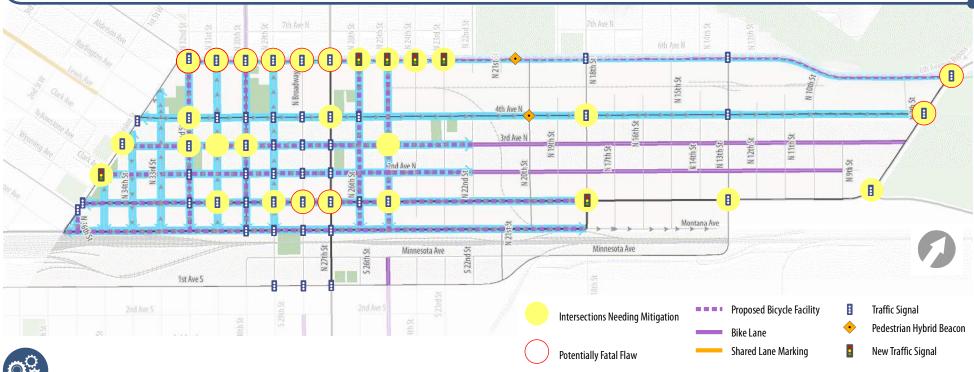


East/West Conversion 2nd & 3rdAve - 2040

AM/PM Peak Hour Vehicle Capacity



All One-Way to Two-Way Street Conversions





Intersections needing mitigation = 28 Modified signalized intersections = 49 New signalized intersections = 8



Estimated bike facility miles = 11.4 Signalized crossing = 59 Modified bus circulation at transit center = Yes

Parking

Impact to on-street parking spaces = Yes





Benefits

Increased accessibility for all users
Added exposure for businesses

Complete two-way network

Increased crossing opportunity for pedestrians

Could impliment conversion in phases

Tradeoffs

Cost for new traffic signals and signal modifications

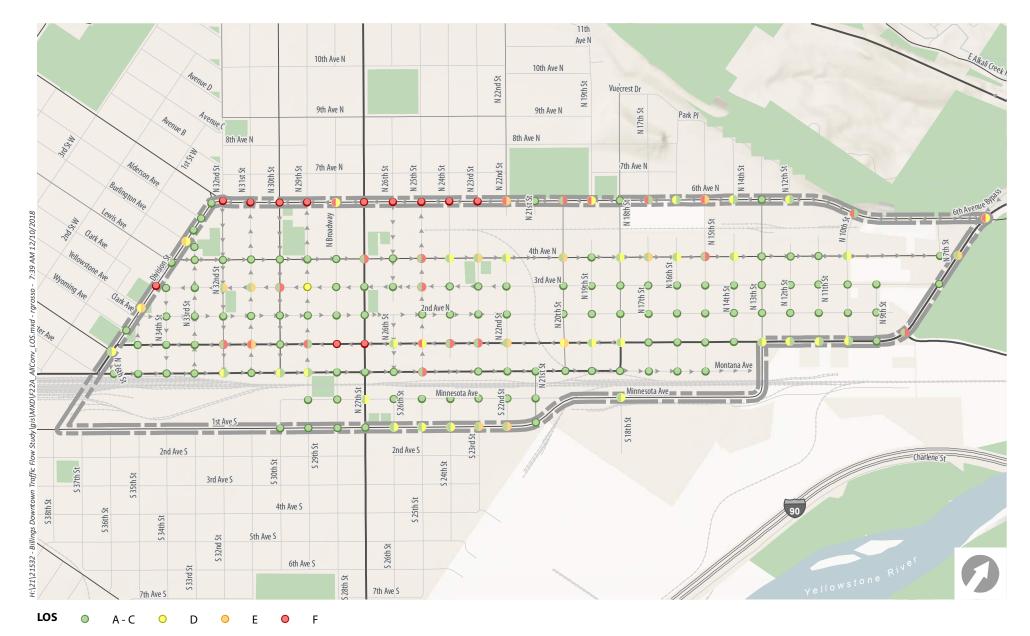
Increased delay and travel time for off-peak directions

Increase congestion at most intersections

On-street parking spaces removed

• \$XXX

\$XXX

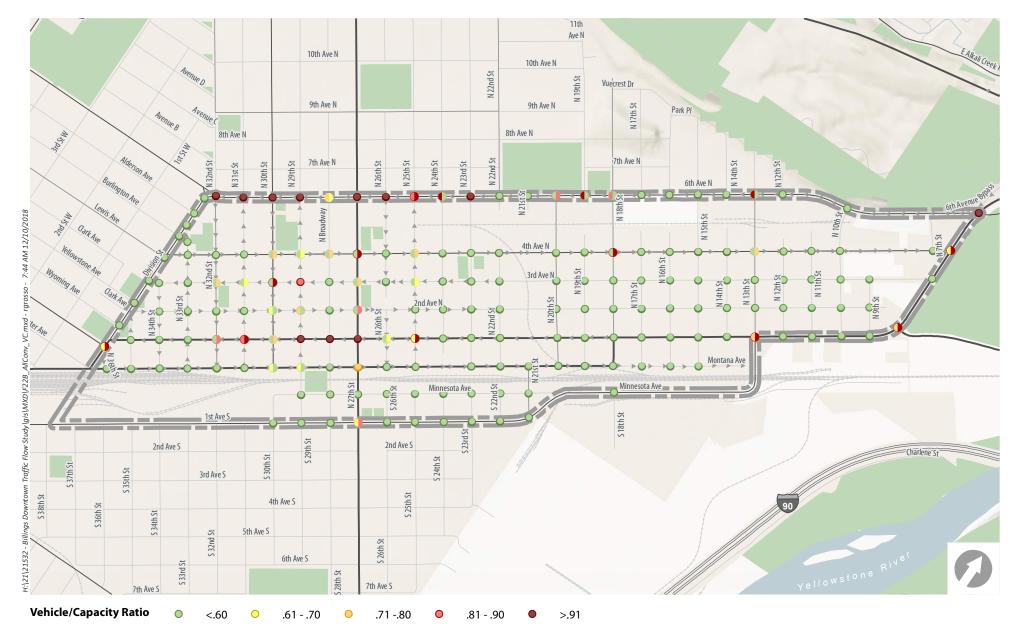


Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.





All One-Way to Two-Way Conversions - 2040



Note: Split circles show AM on the left and PM on the right.
Whole circles indicate the same ranking for both AM and PM.





All One-Way to Two-Way Conversions - 2040

Road Diet (3 Lanes to 2 Lanes) - Montana Ave (Division St to 18th St)





Intersections needing mitigation = 3 Modified signalized intersections = 4 New signalized intersections = 0



Estimated bike facility miles = 3.5 Signalized crossing = 51 Modified bus circulation at transit center = No

Benefits

Utilizes excess capacity along roadway and at intersections

Increases bicycle connectivity

Lower speeds on Montana Ave

Reduces crossing distance for pedestrians

Tradeoffs

Minimal impact to on-street parking

Increases congestion and queuing at signalized intersections

Cost for roadway and signal modifications



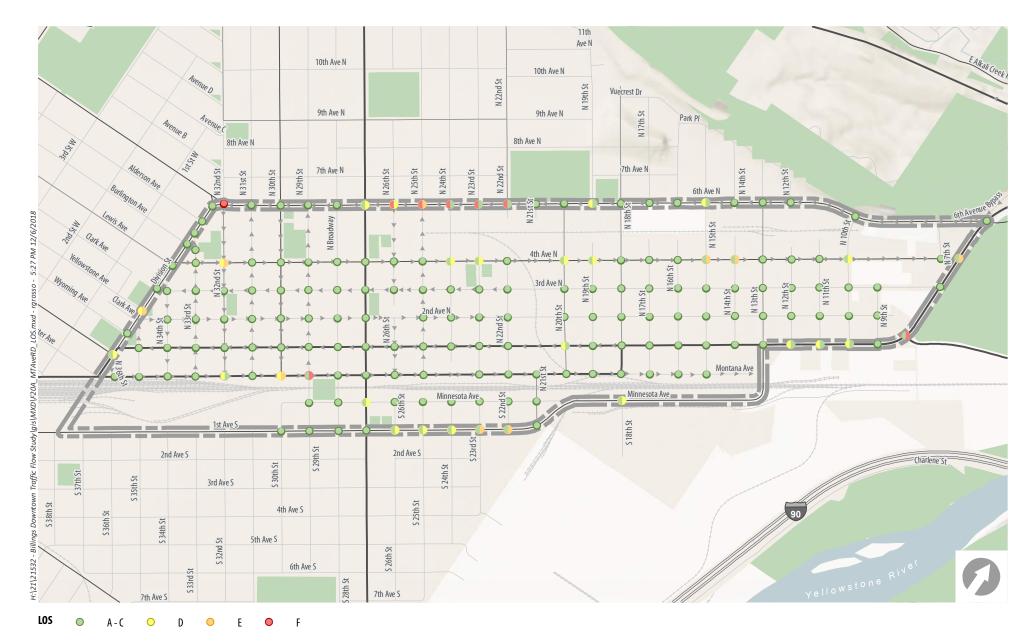
Impact to on-street parking spaces = Yes



Construction and Maintenance
Cost Estimate

• \$XXX

Low



Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 20A



AM/PM Peak Hour Level of Service



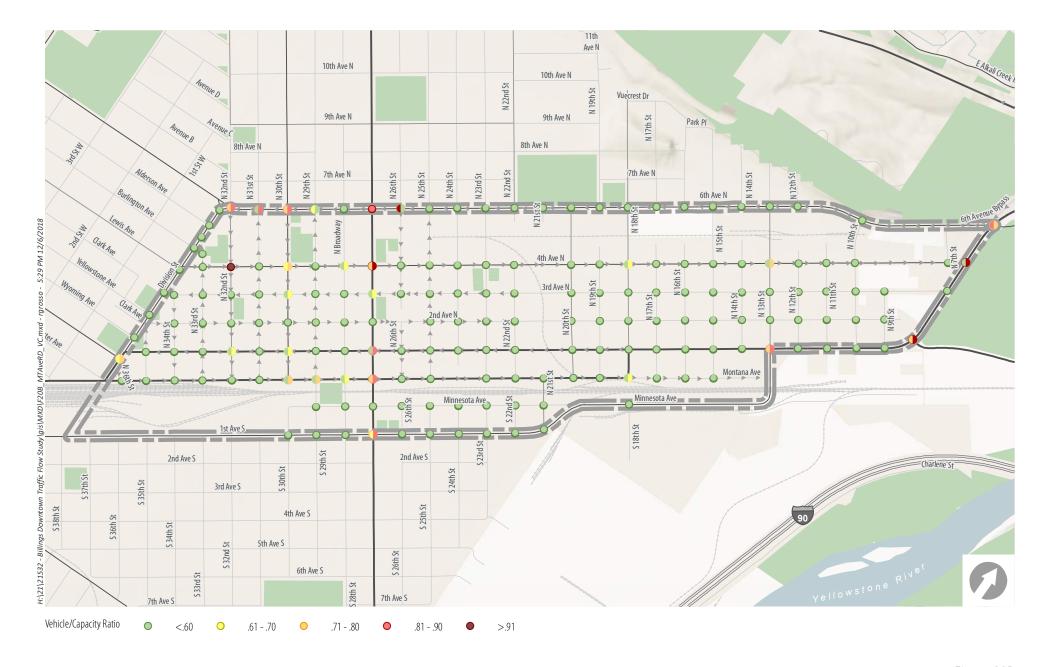


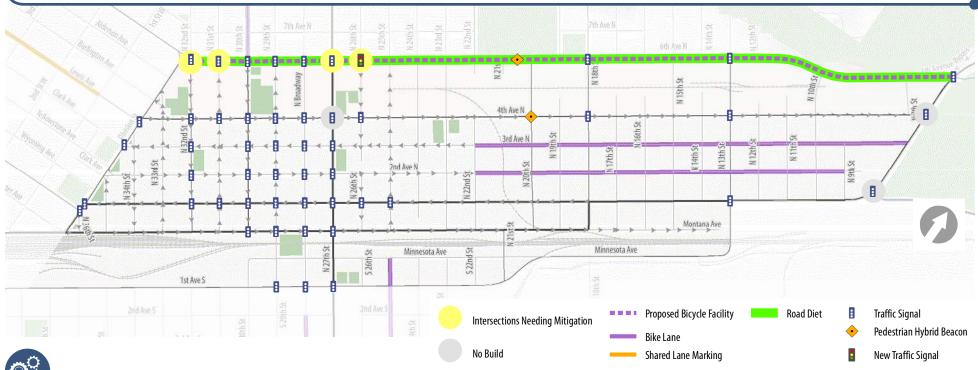
Figure 20B

Montana Ave Road Diet - 2040

AM/PM Peak Hour Vehicle/Capacity Ratio



Road Diet (5 Lanes to 3 Lanes) - 6th Ave N (Main St to Division St)





Intersections needing mitigation = 4 Modified signalized intersections = 9 New signalized intersections = 1



Estimated bike facility miles = 4.1 Signalized crossing = 52 Modified bus circulation at transit center = No

Benefits

Utilizes excess capacity along roadway and at intersections

Increases bicycle connectivity within vision of the City's Bike Master Plan for the long range bikeway

Lower speeds on 6th Ave N

Reduces crossing distance for pedestrians

Tradeoffs

Increased congestion and queuing at signalized intersections

Cost for roadway and signal modifications

Maintenance of long range bikeway



Impact to on-street parking spaces = No

Construction and ₱\$XXX Maintenance **Cost Estimate**

Medium

\$XXX



Downtown Traffic Study



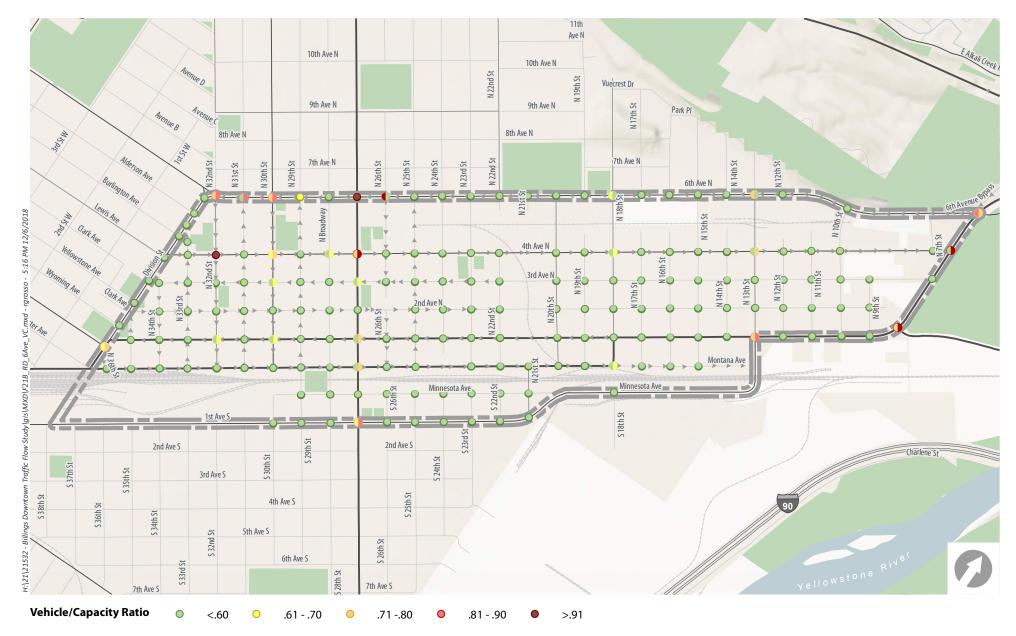
Note: Split circles show AM on the left and PM on the right. Whole circles indicate the same ranking for both AM and PM.

Figure 21A

6th Ave Road Diet - 2040

AM/PM Peak Hour Level of Service





Note: Split circles show AM on the left and PM on the right.
Whole circles indicate the same ranking for both AM and PM.

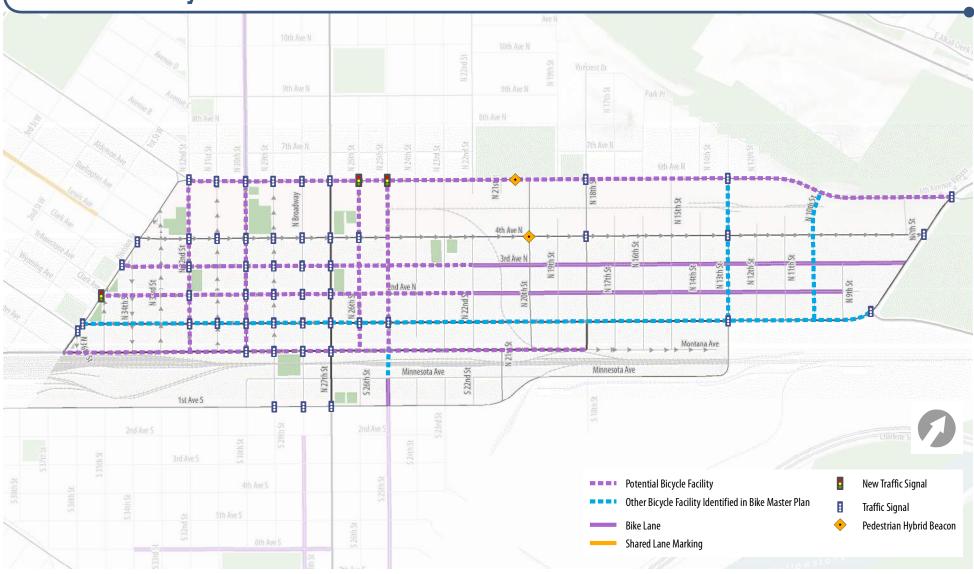
Figure 21B

6th Ave Road Diet - 2040





Potential Bicycle Network





Appendix E

PMT and PAC
Meeting #2
Materials and
Summary

PAC Meeting #2 Summary

Downtown Traffic Study, Billings

Work Order 18-09

Tuesday, December 11, 2018 - 10:00 AM to 12:00 PM

2825 3rd Avenue North, Miller Building - 1st Floor Conference Room

The purpose of this meeting is to review the feedback and comments from PAC Meeting #1, present the findings from the future no-build and initial alternatives analysis and evaluation, and gather input from the PAC on the initial alternatives. *Discussion is presented in italics text. PowerPoint slides of the presentation are provided in Attachment A.*

1. Introductions

- a. The PAC Meeting #1 was attended by 20 members. Attachment B includes the sign-in sheet.
- b. Updates from concurrent studies within the study area we should be aware of?
 - Coulson Park Master Plan off I-90, starting in January 2019
 - https://www.billingsparks.org/park/coulson/
 - 27th Street Railroad Crossing looking at underpass and overpass alternatives
 - https://www.mdt.mt.gov/pubinvolve/billings27thstreet/
 - 1st Avenue N no bike lanes with the design;
 - o https://www.mdt.mt.gov/pubinvolve/1stAveNorth/
- c. Any additional comments/questions for consideration in this study?
 - i. No additional comments were provided by the PAC.

2. Study Timeline

- a. Update since PAC Meeting #1
- b. PAC Meeting #3 (Tentative Week of February 11th)
 - Brett provided an overview of the PAC Meeting #1 summary and overall study timeline.
- 3. PAC Meeting #1 Meeting Notes and Comment Summary
 - Brett provided an overview of the summary.
 - Other comments and questions?
 - No additional comments were provided by the PAC.

4. Future Conditions

- Brett provided an overview of these items.
 - a. Regional travel demand model update and growth rate assumptions
 - b. Planned improvements (assumed)
 - c. Methodology for estimating traffic volumes for one-way to two-way conversions
- Any questions and/or comments?
 - o Bike lane additions
 - What does that look like for parking removal and striping costs?



- Tradeoffs with the cross sections
 - Bulb outs
 - Bike lanes or sharrows
 - Type of parking (e.g. parallel, angled)

5. Recap of Initial Alternatives

a. No Build

- i. This alternative includes the programmed improvements at 1^{st} Avenue $N/27^{th}$ Street, 1^{st} Avenue $N/13^{th}$ Street, 6^{th} Avenue N/Main Street.
- ii. Major takeaway -> most of the downtown network works well without any additional changes in the year 2040 under no build scenario, and there is expected to be adequate capacity to accommodate future growth in downtown.

b. North & South One-Way to Two-Way Street Conversions

- i. Include potential impacts to parking and the various tradeoffs with each type
 - 1. Consider shared lane markings
 - 2. Consider advisory bike lanes
- ii. There are a lot of variations for the cross sections...
- iii. Bus circulation check with bus routes and accommodating buses at the intersections with MET Transit
- iv. Tradeoffs of slower speeds, capacity changes, bike facility enhancements, removal of parking spaces
- v. This study is looking at what could happen to make downtown user-friendly without significant impacts to parking, capacity, etc.
- vi. It was noted that parking garages are starting to be at capacity during some peak times, but still enough capacity on-street

c. 2nd Ave N & 3rd Ave N One- Way to Two-Way Street Conversions

- i. Does this assessment identify number of parking spaces?
 - 1. Not yet. This assessment will be done at the next iteration at the block by block level analysis.
- ii. Pedestrian crossing (PHB or RRFB) was looked at Division & Clark Could this be added?
 - 1. 2nd & Division intersection
 - a. Look at PHB/HAWK
 - b. Look at a traffic signal
- iii. How are we looking at the signals and need?
 - 1. Network approach
 - Operational need (LOS and v/c)
- iv. How are we looking at 2^{nd} & 3^{rd} ?
 - 1. Only the 2nd and 3rd for the infographic, but we did include the N/S network converted to ensure acceptable operations.

d. All One-Way to Two-Way Street Conversions

- This alternative has several potential fatal flaws with failing intersections and roadway segments, need for five lanes on several facilities, and larger intersection footprints.
- ii. It would be the highest cost.



iii. <u>Consultant team recommendation is to not change 6th Ave, 4th Ave, 1st Ave, or Montana Ave to 2-way streets.</u>

e. Road Diet - Montana Avenue (Division St to 18th St)

- i. Without eastbound right turns at 27th, 28th, 29th...ops would be near v/c of 0.90, but still projected to operate to acceptable standards.
- ii. With eastbound right turns at 27^{th} , 28^{th} , 29^{th} ...ops improve and address queue management when a train is passing through and vehicles spillback from the railroad crossings.
- iii. Can we see the operations in SIMTraffic on Montana Avenue or some level of visualization?
 - 1. This would be great to see for future touchpoints of the project.
 - 2. This element is not currently part of the scope of work. It could be included in the next phase of the project during public involvement and outreach.

iv. Cycle track

- 1. Potential additional impacts to parking due to sight lines
- 2. Bulb outs could be impacted as well
- 3. Missoula example Cycle track on Broadway & N Higgens Avenue MDT noted that parking was removed to improve sight lines for vehicles and bicyclists at cross streets.
- v. There will be 3-4 cross sections look at for this road diet
 - 1. Cycle track north side
 - 2. Cycle track south side
 - 3. Bike lane eastbound only

f. Road Diet – 6th Ave N (Division St to Main St)

- i. 4 to 3 lanes for 6th Avenue N
 - 1. Focus will likely be between 13th St N and Main St with cycle track or trail on northside of the street.

g. Bicycle Network

- i. This includes all four of the alternatives
- ii. Add 18th Street to the bike map.

6. Additional alternative

- a. Full closure on 29th St or Broadway
 - i. Broadway Street
 - 1. This one has been discussed between the City and DBA.
- b. One Big Sky Center will present at City Council on Monday (12/17/2018); this detailed information can be obtained from the design team after this presentation.
 - i. Several locations and more facilities throughout downtown
 - ii. They would all be connected off of the arterials.
 - iii. It includes a convention center, hotel, residential, hospital and parking facilities.
 - iv. Any road closures? Still some potential...
 - To verify with development team for future analysis included in this Study



7. Comment Sheet

a. Complete by December 17th

8. General comments

- a. The current street system has been made for throughput.
- b. The downtown system should be easier and friendlier for all users and work with people.
- c. The one-way streets are challenging and frustrating.
- d. Parking
 - i. It would be nice to have electronic meters and technology-based information to help manage parking.
 - ii. This should be part of the discussion.
- e. Autonomous vehicles this discussion should be factored in when discussing future traffic operations within downtown...
- f. Incremental implementation of two-way streets is a positive...
 - i. Utilize lessons learned from other locations...
 - 1. If you did 2nd Ave N & 3rd Ave N
- g. Montana Avenue
 - i. The issue here is speed.
 - ii. Look at diagonal parking as an alternative
- h. Bike lanes
 - i. $N 30^{th}$ Street My observations are 2 bikes per week north of 6^{th} Ave N.
 - ii. Add left turn lane on 2nd and Montana on 27th St
 - Southbound left-turn lane onto Montana Ave is occurring with MDT project in 2019.

9. Next Steps

- a. Receive PAC comments on initial alternatives and findings (Attachment C)
- b. Confirm date and time for PAC Meeting #3 (Tentative Week of February 11th)
- c. Refine alternatives and evaluation results
 - i. Assess bus routing and circulation
 - ii. Consider delivery vehicle access from two-way to two-way streets
 - iii. Coordinate and add One Big Sky Center to the alternative analysis regarding potential street closure, → most likely to analyze closure of Broadway
 - iv. Update Bicycle Network map to include bike facilities on 18th Street
 - v. Add angled parking to the cross-section options
 - vi. Assess whether SIMTraffic could be used as a visualization tool with the Study, particularly for the Montana Ave road diet alternative
- d. Develop preliminary cost estimates for the alternatives
- e. Prepare draft report



Attachment A
PowerPoint Presentation
Slides





Introductions

- Agency
 - City of Billings Engineering



- Consultants
 - Kittelson & Associates, Inc.
 - DOWL

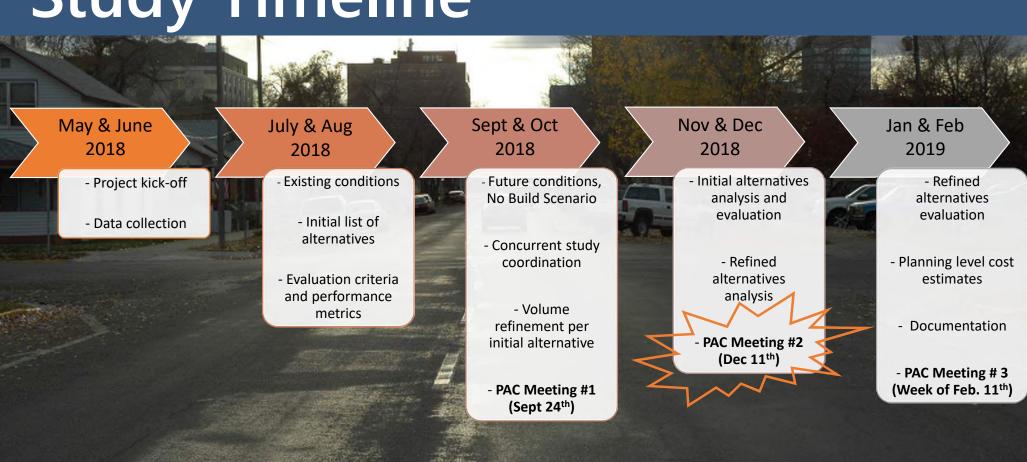




- PAC Members
 - Updates from concurrent studies with the study area we should be aware of?
 - Any additional comments/questions for consideration in this study?



Study Timeline



PAC Comment Summary

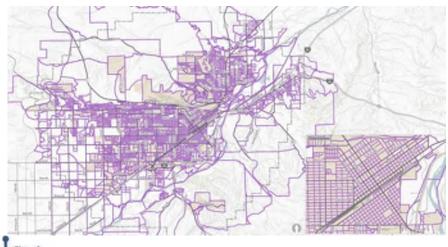
- Total of 105 comments
- Transportation deficiencies/challenges 22 comments
 - Biking downtown is perceived to be unfriendly
 - Limited vehicle accessibility
 - Perception of high vehicular speeds downtown
- Transportation opportunities 48 comments
 - One-way to two-way street conversions
 - Enhance beautification and streetscape
 - Sufficient on- and off-street parking
- Transportation Improvements 35 comments
 - Bike lane to be completed on 2nd Ave N, 3rd Ave N and 30th St
 - All north and south streets should be converted to two-way street
 - Lane reduction along Montana Ave to reduce speeds





Future Conditions

- Billings Urban Area Travel Demand Model
 - Recently completed
 - Incorporated in the Billings LRTP
 - Used to determine annual growth rate



Planned Improvements





Future Conditions

Key Assumptions

- Incorporated planned roadway improvements
- 0.5% annual growth rate within downtown
 - Consistent with Billings LRTP and Billings Urban Area Travel Demand Model
 - 1% annual along Main St
- Peak Hour Factor (PHF)
 - Consistent with existing conditions for conservative analysis
- One-Way to Two-Way conversion alternatives
 - Reassigned volumes between street pairs
 - Equal number of turning movements
 - Generally a 60/40 split between existing one-way to two-way street volume



Evaluation Criteria

Operations

- Intersections needing mitigation (level of service and vehicle-to-capacity ratio)
- Modified signalized intersections
- New signalized intersections

Mobility

- Estimated bicycle facility miles
- Signalized crossing
- Modified bus circulation at transit center.

Parking

- Impact to on-street parking
- Land Use
- Cost Estimate
 - High/Medium/Low
 - Relative to other initial alternatives





No Build

Impact to on-street parking spaces = No

BILLINGS
Downtown Traffic Study



Construction and \$XXX Maintenance

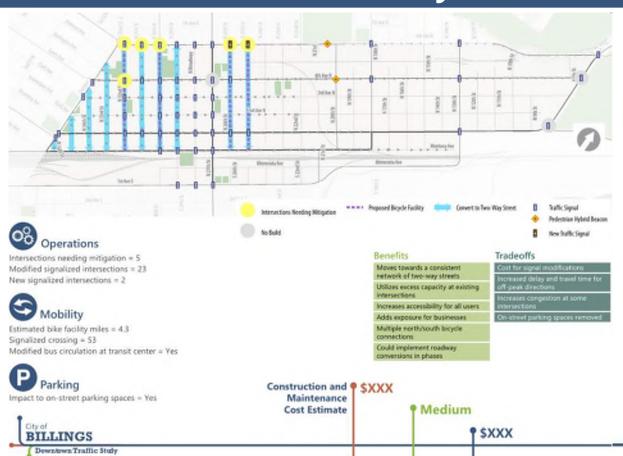
Cost Estimate

9 SXXX

Not Applicable

- Recommended mitigations
 - Main Street
 - Current signal timing study
 - Exposition Dr/1st Ave N Study
 - 4th Ave N/27th St
 - LOS C w/ v/c ratio > 1.0
 - Signal timing adjustments
 - 6th Ave N/Grand Ave/Division St & 32nd St
 - Signal timing adjustments

North & South One-Way to Two-Way Street Conversion

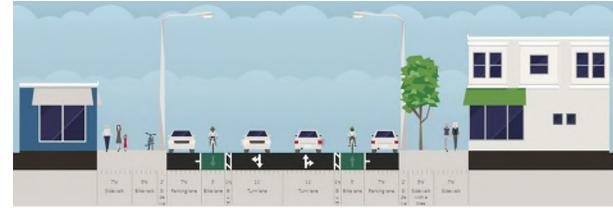


- Key Assumption
 - Assumed two lane road ways without turn lanes
- Key Takeaways
 - Adds 2.1 miles of bike facilities
 - Consistent network of north/south two-way streets
- Recommendations
 - Two new signalized intersections:
 - 6th Ave N/26th St
 - 6th Ave N/25th St
 - Turn lanes recommended at:
 - 4th Ave N/32nd St
 - 6th Ave N/31st St

North & South One-Way to Two-Way Street Conversion

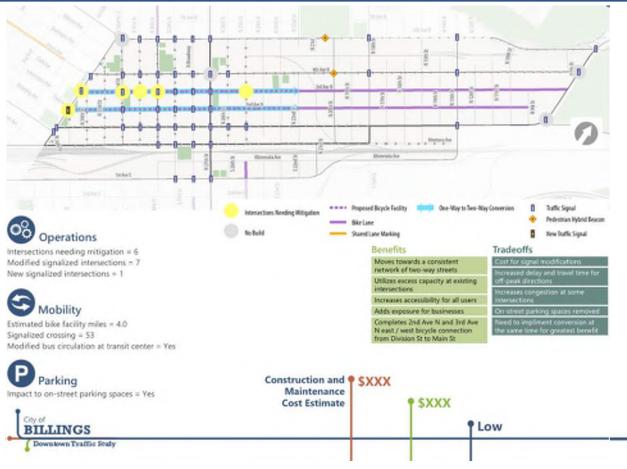
- Cross Section Example 30th St (2nd Ave N to 1st Ave N)
 - Current Cross Section
 - ~50 feet curb-to-curb width
 - On-street parking spaces = 24
 - Bike Facility No
 - Potential Cross Section
 - 50 feet curb-to-curb width
 - On-street parking spaces = 19
 - Bike Facility Yes





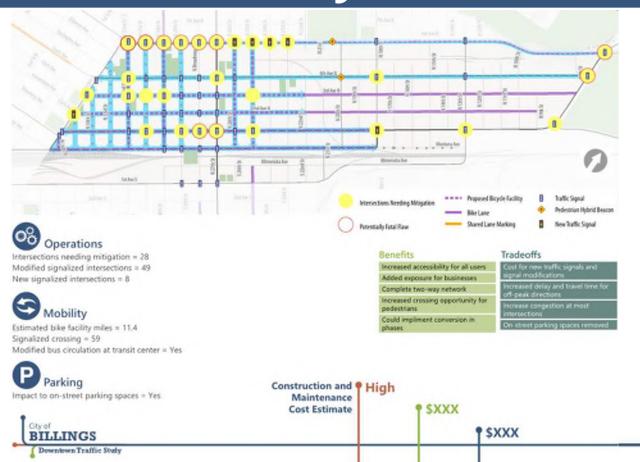


2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion



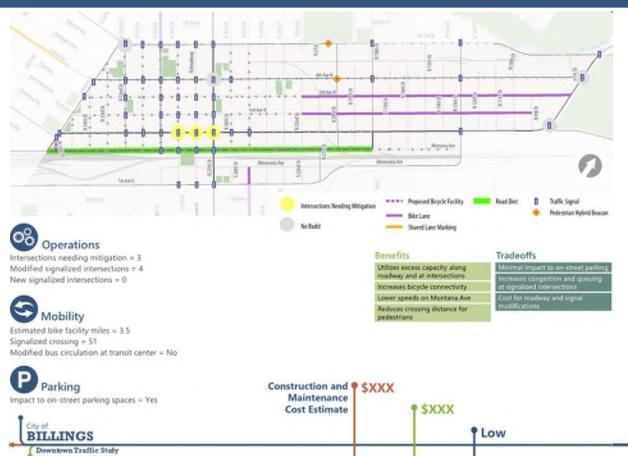
- Key Assumptions
 - Assumed two lane roadways without turn lanes
- Key Takeaways
 - Completes two-way street network along 2nd Ave N and 3rd Ave between Division St and Main St
 - Includes east/west bike lanes
- Recommendations
 - One new signalized intersection:
 - 2nd Ave N/Division St
 - Turn lanes recommended at:
 - 3rd Ave N/30th St
 - 3rd Ave N/32nd St

All One-Way to Two-Way Conversion



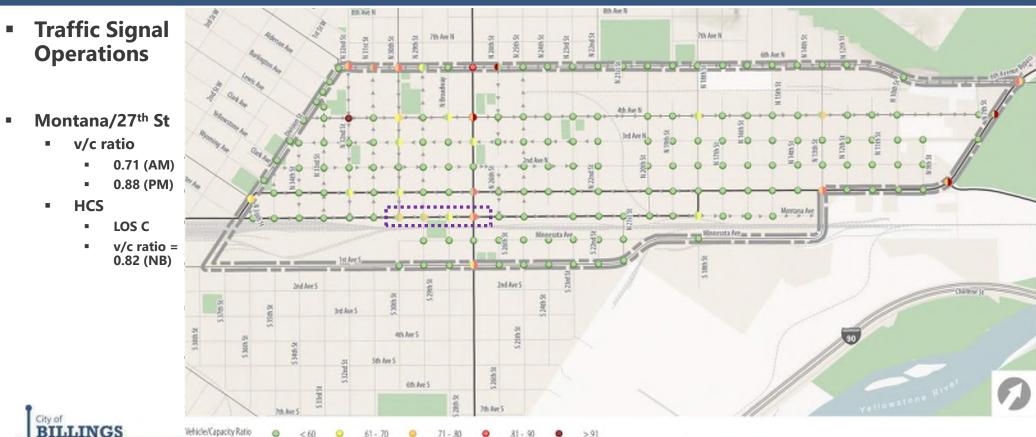
- Key Assumptions
 - 6th Ave N 4 lane cross section
 - 4th Ave N 4 lane cross section
 - 1st Ave N 3 lane cross section
 - Montana Ave 3 lane cross section
- Key Takeaways
 - 6th Ave N and 1st Ave N –
 Provides direct east/west
 connection between Main St and
 Division St
 - Majority of volume shift
- Potential Fatal Flaws
 - 5 lane cross section on 6th Ave N
 - 5 lane cross section on 1st Ave N
 - Additional phases at Main St intersections

Road Diet (3 Lanes to 2 Lanes) – Montana Ave



- Key Assumptions
 - One-Way → Two EB travel lanes
 - All north/south streets, two-way
- Key Takeaways
 - Minimal impact to future no build conditions
 - 1.3 miles of east/west bicycle facility
 - Could include one-way bike lane or cycle track
- Recommendations
 - To prevent queuing on Montana Ave when railroad crossing is unavailable:
 - Install right-turn lanes at:
 - 29th St, 28th St and 27th St

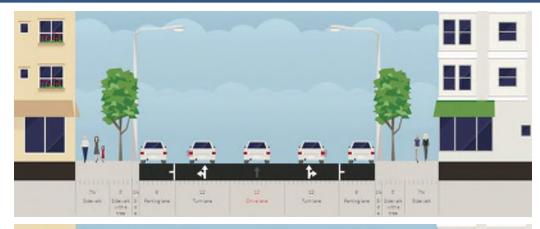
Road Diet (3 Lanes to 2 Lanes) – Montana Ave



Downtown Traffic Study

Road Diet (3 Lanes to 2 Lanes) – Montana Ave

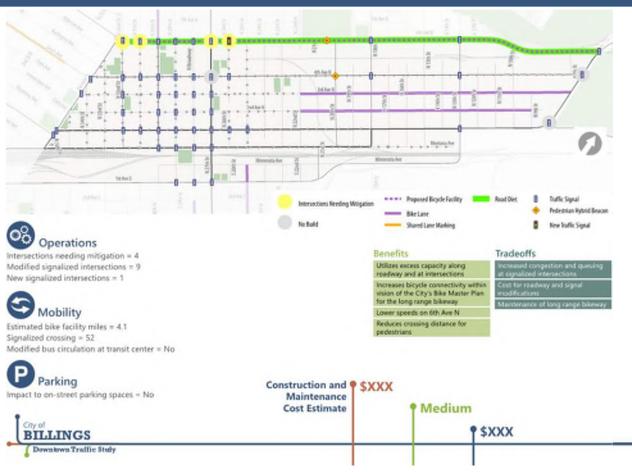
- Cross Section Example Montana Ave (28th St to 27th St)
 - Current Cross Section
 - ~52 feet curb-to-curb width
 - On-street parking spaces = 20
 - Bike Facility No
 - Potential Cross Section
 - 52 feet curb-to-curb width
 - On-street parking spaces = 14
 - Bike Facility Yes







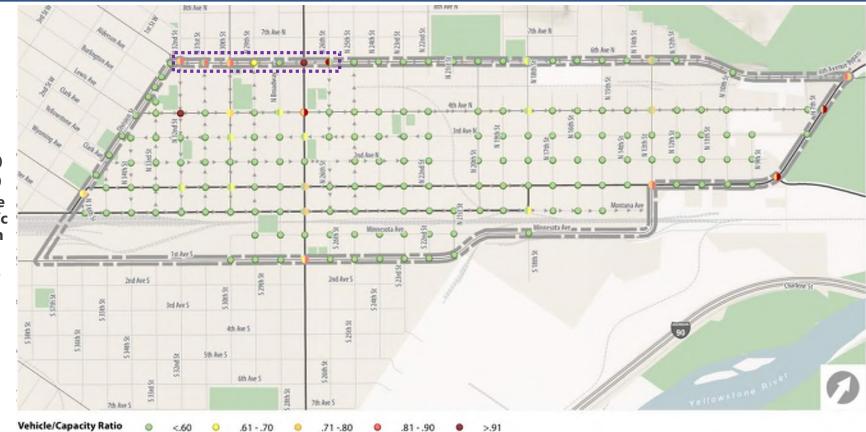
Road Diet (4 Lanes to 3 Lanes) – 6th Ave N



- Key Assumptions
 - One-Way → Three WB travel lanes
 - All north/south streets, two-way
- Key Takeaways
 - Minimal impact to overall traffic operations along 6th Ave N
 - Flexibility for one-way bike lanes or cycle track
- Recommendations
 - New traffic signal at 26th St
 - NBL turn lane at 31st St
 - Signal timing adjustments

Road Diet (4 Lanes to 3 Lanes) – 6th Ave N

- Traffic Signal Operations
- 6th Ave N/27th St
 - v/c ratio
 - 0.96 (AM)
 - 0.95 (PM)
 - WBL turn lane needed for v/c ratio less than 0.91
 - Currently five lane cross section with on-street parking





Road Diet (4 Lanes to 3 Lanes) – 6th Ave N

- Cross Section Example –
 6th Ave N (30th St to 31st St)
 - Current Cross Section
 - ~50 feet curb-to-curb width
 - Four vehicle travel lanes
 - Bike Facility No
 - Potential Cross Section
 - 50 feet curb-to-curb width
 - Three vehicle travel lanes
 - Bike Facility Yes

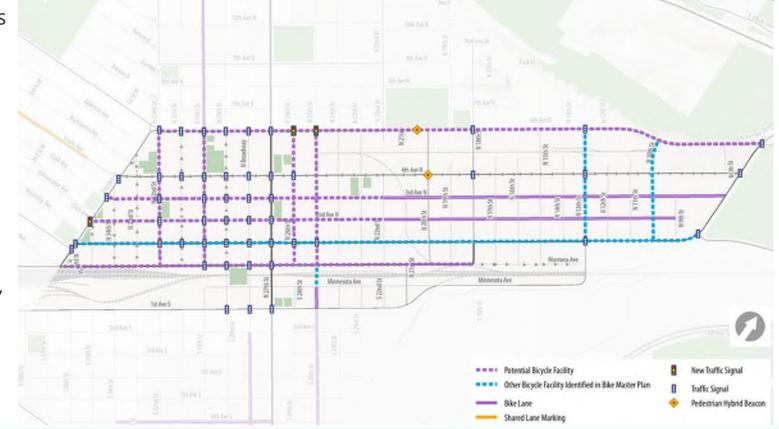






Potential Bike Network

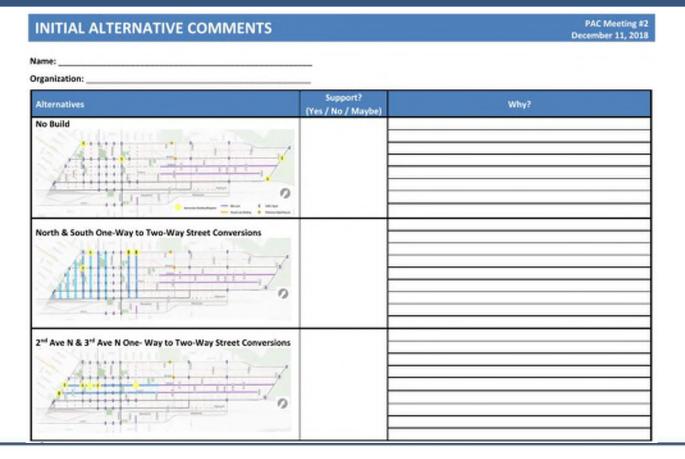
- Consistent with Billings Area Bikeway and Trail Master Plan Update
- Provides north/south and east/west connections through downtown
- Potential bicycle network would add ~7 miles of bicycle facilities (Total ~9.2 miles)





Initial Alternative Comment Sheet

- We'd like to know your thoughts
- Complete and return comment sheet by Monday, December 17th





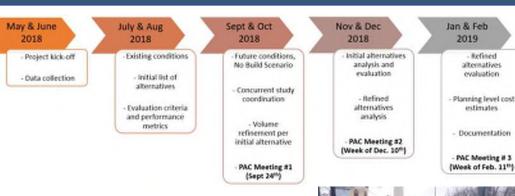
Alternative Refinement

- Document recommended mitigation locations per alternative
- Define bicycle facility per alternative (staying within curb-to-curb width)
- Quantify on-street parking impact
- Determine impact to bus routing for one-way to two-way street conversions
- Conduct planning level cost estimates per alternative
- Produce cross section graphics for each alternative



Next Steps

- PAC
 - Complete and return comment sheet by Monday, December 17th
- Consultant Team
 - Gather and summarize feedback
 - Refine alternatives and evaluation results
 - Develop preliminary cost estimates
 - Prepare draft report
 - Prepare for and attend PAC Meeting #3
 - Week of February 11th



2019

Refined

alternatives

evaluation

Planning level cost

estimates

Documentation

- PAC Meeting # 3



Attachment B PAC Meeting #2 Sign-In Sheet



PAC Meeting #2 Sign-In Sheet

Downtown Traffic Study, Billings

Work Order 18-09

Tuesday, December 11, 2018 - 10:00 AM to 12:00 PM

2825 3rd Avenue North, Miller Building - 1st Floor Conference Room

NAME	ORGANIZATION	EMAIL
BRETT KORPORDAL	KITTELSON ASSOCIATE	s, INC. bkorporal Ckittelson.com
Sarah Patterson	DOWL	spatterson @dowl.com
Debra Hagel	MET Transit	
Elyse Monat Zack Kirkama	MOT Billings	monateracio billings mt. vs
	MOT Billings	zkohenoe m tigor
Beion Korall	Billings Police	· Korellibeci. Willings. wit.
Scott WALKEY	c de place	1) ay
D.J. Clark	Candenson Stewart	delarkosandersenstewart.com
MIKE SCHAER	ComputersUnlimi	red MIKE@CU, NET
Day Engerson	BOWL	denderson@dowl.com
ERIN CLAUNCH,	CITY OF BILLINGS - PU	claunche@ci.billings .not. 45
Tim Goodsidge		billings bird egniceil
Andy Deleiden	Kittelson & Assoc.	adaleidens kittelson.com
Patrick Klugman	BSED	Whymma big skyedn. org
Karty Easton	DBA Keaston aldo	wntown hillings. Com
JOE STOUT	DBA JOES@DOL	INTOWNBELLINGS COM
Eric Schnelbach	Billing Police Schnelb	ache eci. billings mitus
Michael Tuss	CTA Architects Engineers	miketectagroup.com
CANDY HAPEN	HI GH PLAINS AGEINTEOTS	rhater chiapplainsauchitects um
Danielle Bolan	MDT-Traffic Hele	era abolan@mt.gov

Attachment C
Initial Alternative Comment Sheet



Alternatives	Support? (Yes / No / Maybe)	Why?
No Build Intercian bring Stoper No Sept Annual Property Sept Annual	Maybe	The lityand State will continue to address defections on an as-nucled lands. No-leveled as a sesult of this proper will not result in as action morning ferwood.
North & South One-Way to Two-Way Street Conversions	Yes	Provides pettel wewlature down town
2 nd Ave N & 3 rd Ave N One- Way to Two-Way Street Conversions	Yes	faviles bette mulation devotaren.



Downtown Traffic Study

Alternatives	Support? (Yes / No / Maybe)	Why?
All One-Way to Two-Way Street Conversions	No	Too muny fatal flows. (oth, 4th, 1st, and Mentanu. need to remain as one-way couplets to more traffic through town. The topsampley of bellings requires efficient throughfuses through Launtown.
Road Diet (3 Lanes to 2 Lanes) – Montana Avenue	Yes	If Montana Average on a diet still carries the projected traffic. Hum T. can get on board w/ a diet.
Road Diet (5 Lanes to 3 Lanes) – 6 th Avenue North	Yes	Same mach as Montana Avenue mad diet.

Please return comment sheet to the sign in table at PAC Meeting #2 or return to Brett Korporaal at bkorporaal@kittelson.com by Monday, December 17th.



INITIAL ALTERNATIVE COMMENTS

Name: Eric Schnelbach
Organization: BPD

Alternatives	Support? (Yes / No / Maybe)	Why?
No Build Second to be desired to be desir	Maybe	- trashe thous nell night now, - those is some development downtown ight now, ever with one way meets i.e. Montand Are
North & South One-Way to Two-Way Street Conversions	Yes	- But keep N Jar St a 1-way from 4th Are N to 6th Are N. - Physe there streets to dony in part to see how it works,
2 nd Ave N & 3 rd Ave N One- Way to Two-Way Street Conversions	Maybe Maybe	- could cause traffice isting on outpron St.

Alternatives	Support? (Yes / No / Maybe)	Why?
All One-Way to Two-Way Street Conversions	200	greatly reduces downtown's alothy to handle tradite.
Road Diet (3 Lanes to 2 Lanes) – Montana Avenue	n0	there are much better ways to Slow down truther on Montera - speed humps
Road Diet (5 Lanes to 3 Lanes) – 6 th Avenue North	h 0	that is unnescenary and has

Please return comment sheet to the sign in table at PAC Meeting #2 or return to Brett Korporaal at bkorporaal@kittelson.com by Monday, December 17th.



Name: DANDY HAFOR

Organization: BID CHAIR; HIGH PLAINS ARCHITECTS; DOWNTOWN PROPERTY OWNER; DOWNTOWN RESIDENT.

Alternatives	Support? (Yes / No / Maybe)	Why?
No Build Section State Section State Management Management	110	ONEWAY STREETS CREATE CONFUSION AND DIM USINS DOWNTOWN, NEGATIVELY IMPACT ECONDAMY VITALITY (COMPANY N BLORDWAY TO N 29#) DOWNTOWN (S A DESTINATION OF ECONOMY BY CONE DETTE REGION, NOT A PASS THROUGH THE ONE WAYS ALL THE PRODUCT OF A BY-CONE TIME
North & South One-Way to Two-Way Street Conversions	YES IN COMBINATION WY #3	THE NORTH/SOUTH ONE WAYS SHOULD HE CONVENTED TO TWO WAY ALONG W/ 2ND & 3NL THE PLANNING EFFORT SHOULD POWS ON THE PHASE-IN OVER A 2-7 YEAR PENLOD
2 nd Ave N & 3 rd Ave N One- Way to Two-Way Street Conversions	MES IN COMMINATION W#2	SEE ABOVE (#2) AND BELOW



Alternatives	Support? (Yes / No / Maybe)	Why?	
All One-Way to Two-Way Street Conversions	MAYBE	I WOULD LOVE TO SEE ALL BUE-WAYS CONVENIED TO TWO-WAY, BUT I COULD LIVE W/ 4th of LITH MONTHUM & \$12 ALL N. STAYING ONE-WAY IF DITHER LAND ROLLEMENTS— SAFETY +ACSTLETTIC-ALE MAND TO THISE STREETS. SEE MINER BELOW.	
Road Diet (3 Lanes to 2 Lanes) – Montana Avenue	YES-SEE TRAPPIC CAUMING PUNN POR MONTANA AVE 2004	1'D LIKE TOSES THE LAND REDUCTION, 1'D LIKE THE LAND REDUCTION REDUCTION, 1'D LIKE TOSES THE LAND REDUCTION REDUCTION, 1'D LIKE TOSES THE LAND REDUCTION REDUCTIO	
Road Diet (5 Lanes to 3 Lanes) – 6 th Avenue North	YES	A LAND REPORTION WOULD BE VELLY HELPFUL. ALSO PAPELING ALBAS SHOULD BE PATHTED ON THE STREET TO VISUALLY MENULE THE WHOTH OF THE STREET (!! 12/15 IS THE LETTST HEDDSTRIAN PRICEMBLY INTERSECTION DOWNTOWN-NEEDS HELP. 1 PHEDWENTLY CROSS (I! ON POOT @ 12/15, 244 ON 25/12; DANGEROUS AND UNPLEASANT.	

Please return comment sheet to the sign in table at PAC Meeting #2 or return to Brett Korporaal at bkorporaal@kittelson.com by Monday, December 17th.



Name: Tim Goodridge
Organization: EBURD

Alternatives	Support? (Yes / No / Maybe)	Why?
No Build Investors have formed and the state of the st		
North & South One-Way to Two-Way Street Conversions	Mayke	Instead of all street. maybe 30th 1st.
2 nd Ave N & 3 rd Ave N One- Way to Two-Way Street Conversions	Yes	seems most possible completes 2 way from the existing east Makes bike across possible City Junisdiction

Brett Korporaal

From: Brett Korporaal

Sent: Wednesday, December 19, 2018 3:56 PM

To: Monat, Elyse

Subject: RE: Comments on initial alternatives

Hi Elyse,

Thank you for passing this rendering along. Taking a quick look at the rendering, I think we'd need to convert the inside left-turn lane for the eastbound traffic. This is helpful and we we'll use this as an option for tying into Division/Clark at 3rd Ave N.

I will keep and update your comment along 6th Ave N. It sounds like the most feasible road diet along 6th Ave N would occur between 13th St N and Main St, at least for a first implementation. I talked to Erin about looking at options along 13th St to incorporate bicycle connections and we decided to add that to the refined alternatives. We'll be looking at road diet options along 13th St and what impacts would be if a bike facility were to be included. Roadway volumes aren't very high, so I think we have pavement to work with. I'll keep you updated. Thank you again for your input and insight, it's very helpful. Let me know if you have any questions. Otherwise have a Merry Christmas!

Sincerely, Brett

Brett Korporaal

Engineering and Planning Associate

Kittelson & Associates, Inc.

Boise - Ext. 1609 208.472.9809 (direct) bkorporaal@kittelson.com

From: Monat, Elyse <monate@ci.billings.mt.us>
Sent: Wednesday, December 19, 2018 10:31 AM
To: Brett Korporaal

> Subject: RE: Comments on initial alternatives

Hi Brett,

Scott reminded me of this concept (attached) that my predecessor put together as an option to make it easier for people biking to get from 3rd Ave. N to Clark Ave. and asked that I send it along.

I was also wondering if it would be possible for me to revise one comment on my sheet that I sent in on Monday. After more thought and discussions in the office, I think a road diet on 6th is very important as 6th essentially cuts off nearby neighborhoods such as North Park and the North Elevation area from the downtown core. Also, as the street is right now, walking on 6th is fairly unpleasant for most of the way and biking is really only possible for the most confident of riders.

Thank you,

Elyse Monat

Active Transportation Planner Planning & Community Services Department 2825 3rd Avenue North, 4th Floor Billings, MT 59101

Office: (406) 247-8637





From: Brett Korporaal [mailto:bkorporaal@kittelson.com]

Sent: Monday, December 17, 2018 3:00 PM **To:** Monat, Elyse < monate@ci.billings.mt.us > **Subject:** RE: Comments on initial alternatives

Agreed. I think 13th St is a key connection on the east side of downtown.

Thanks, Brett

From: Monat, Elyse <monate@ci.billings.mt.us>
Sent: Monday, December 17, 2018 2:57 PM
To: Brett Korporaal

Subject: RE: Comments on initial alternatives

Ok, sounds like a plan. I guess the other thing to keep in mind about N. 13th is that there are currently bike lanes on 2nd Ave. N and 3rd Ave. N for part of the length. I think at this point those streets are the lowest stress ways to get to the downtown core from the east side of downtown. Those streets may also get additional bike improvements at some point so getting people to one of those streets would probably be the biggest connections on N. 13th.

Thanks,

Elyse Monat

Active Transportation Planner Planning & Community Services Department 2825 3rd Avenue North, 4th Floor Billings, MT 59101

Office: (406) 247-8637





From: Brett Korporaal [mailto:bkorporaal@kittelson.com]

Sent: Monday, December 17, 2018 2:36 PM **To:** Monat, Elyse <<u>monate@ci.billings.mt.us</u>> **Subject:** RE: Comments on initial alternatives

Hi Elyse,

This is helpful, thank you. In regard to 13th St, at this point we don't have a alternative that would impact 13th St... I'll be talking with Erin tomorrow and can mention it. If it is something that the City hears regularly it may be worth considering. Especially since there's a connection across the railroad tracks at 13th. From a quick glance it looks like onstreet parking would have to be removed to keep the current lane configuration and add bike lanes. A facility under the tracks would probably be deemed not feasible because of the current railroad overcrossing. I'll follow up with Erin and get his thoughts. Feel free to reach out to him if you think it would be helpful as well.

Thanks, Brett

Brett Korporaal

Engineering and Planning Associate

Kittelson & Associates, Inc.

Boise - Ext. 1609 208.472.9809 (direct) bkorporaal@kittelson.com

From: Monat, Elyse <<u>monate@ci.billings.mt.us</u>>
Sent: Monday, December 17, 2018 2:10 PM
To: Brett Korporaal <<u>bkorporaal@kittelson.com</u>>
Subject: RE: Comments on initial alternatives

Hi Brett.

The most specific information that we have about specific bike treatments is in our Spring 2017 Bikeway and Trails Master Plan Update. Looking on the recommendations map (Map 4.1), N 30th and N 32nd are listed as "buffered bike lanes." The plan goes on to say this about buffered bike lanes:

Separated Bike Lanes

Several of the on-street recommendations are coded as buffered bicycle lanes. These facilities could be implemented using only striping to buffer bicyclists from motor vehicles or could be enhanced through the provision of a physical barrier that provides added 'separation' between the bicyclist and motor vehicle traffic.

Separated bike lanes are protected from traffic by a physical barrier of some kind and are also distinct from the sidewalk. Some separated bike lanes are at street level, while others are raised. There are many different types of physical separation that can be used for separated bike lanes, including raised curbs, parking, stationary or flexible bollards, and other streetscape elements, such as planters. The applicability and feasibility of different types of separation depend on traffic volumes, speeds, driveway and cross street frequency, presence and type of on-street parking, maintenance capacity, and pedestrian volumes. Separated bike lanes can be configured for either one-way or two-way travel.

So basically, buffered bike lanes can be true buffered bike lanes or separated bike lanes.

Other than that looking on the map, I see there being conventional bike lanes on N. 28th, looks like a short one on N. 26th, one on N. 18th, N 13th, and N 10th. I believe Public Works is widening the trail along 6th Ave. N. this coming summer, and the trail will end at N. 13th. I don't see anything in the CIP about putting in a bike lane at N. 13th but Scott mentioned that it might be happening. If you like, I can get in touch with Erin about that and see what the thought is. Having a safer route from the Heights to Downtown is a frequent request we hear.

Best,

Elyse Monat

Active Transportation Planner Planning & Community Services Department 2825 3rd Avenue North, 4th Floor Billings, MT 59101

Office: (406) 247-8637





From: Brett Korporaal [mailto:bkorporaal@kittelson.com]

Sent: Monday, December 17, 2018 9:30 AM **To:** Monat, Elyse <<u>monate@ci.billings.mt.us</u>> **Subject:** RE: Comments on initial alternatives

Thank you, Elyse.

You're input is very helpful. We'll be in touch this next round as we get into the refined alternatives. Curious to know if you or the City has explored specific bike treatments on any of the north/south streets. Or if the City has a particular preference. We're thinking we'll probably provide a couple options for each alternative.

Thank you,

Brett

Brett Korporaal

Engineering and Planning Associate

Kittelson & Associates, Inc.

Boise - Ext. 1609 208.472.9809 (direct) bkorporaal@kittelson.com

From: Monat, Elyse <<u>monate@ci.billings.mt.us</u>>
Sent: Monday, December 17, 2018 9:23 AM
To: Brett Korporaal <<u>bkorporaal@kittelson.com</u>>
Subject: Comments on initial alternatives

Hi Brett,

Attached are my comments on the alternatives presented last week. Please let me know if anything does not make

Thank you,

Elyse Monat

Active Transportation Planner Planning & Community Services Department 2825 3rd Avenue North, 4th Floor Billings, MT 59101

Office: (406) 247-8637





From: Copier

Sent: Monday, December 17, 2018 9:28 AM **To:** Monat, Elyse <<u>monate@ci.billings.mt.us</u>>

Subject: Attached Image

Name: Elyse Monot

return by December 17

Organization: MPO

Alternatives	Support? (Yes / No / Maybe)	Why?
No Build Internal Straight St	No	Would prefer not to-our downtown COVID greatly beneit from Slower traffic and in creased comfort for people bitings working. Some of the roads through downtown are currently very high volumn + high Speed.
North & South One-Way to Two-Way Street Conversions	Yes	hopefully Slow down frakic
2 nd Ave N & 3 rd Ave N One- Way to Two-Way Street Conversions	Yes	Study has Shown there is excess capecity, usual help complete east-mast hike connections through downtown

Alternatives	Support? (Yes / No / Maybe)	Why?
All One-Way to Two-Way Street Conversions	No	Pokatiol forter flows
Road Diet (3 Lanes to 2 Lanes) — Montana Avenue	Ye8	Important consider for businesses ment to make it more friently for bike/pcd, slow down car traffic so look more of businesses
Road Diet (5 Lanes to 3 Lanes) – 6 th Avenue North	Yes.	between down town and the neighborhoods to the north. Don't think this is quite as vital to down town a other projects, as it is eight on the edge of downtown.

Please return comment sheet to the sign in table at PAC Meeting #2 or return to Brett Korporaal at bkorporaal@kittelson.com by Monday, December 17th.



Intersection of 3rd Ave N & Division St.



NACTO: Traffic Diverter

Restricts motorvehicle access while maintaining permiability for people walking or riding a bicycle. Colored egress lane clearly defines potential conflict area.



NACTO: Bike Box

Safe and visible way to reduce 'right hook' conflicts with turning vehicles at start of green signal. Implementing NACTO

ng NACTO

Colored ingress lane clearly defines bicycle space and increases access to the bike box.

Bike lane: N 32nd St to Division St



Accurately count bicycles in road with permanent installation.



Two way street conversion and shared lane markings lead towards bike routes and improve internal traffic circulation.



Signal detects bicycles.





This project bridges downtown to a low stress bicycle route. Addressing the urban core is a primary public concern. These treatments increase safety for all road users, including those walking, riding a bicycle or driving a vehicle.

This opportunity will compliment existing bike lanes on 3rd Avenue North, east of North 27th,

Brett Korporaal

From: DJ Clark <dclark@sandersonstewart.com>
Sent: Monday, December 17, 2018 4:02 PM

To: Brett Korporaal

Subject: RE: Downtown Traffic Study - Initial Alternative Comments

Hi Brett,

A couple thoughts I had:

- 1. During your discussion of a road diet for 6th Avenue North, there wasn't any discussion about what would happen at the Division Street intersection. I'm assuming that 2-lanes would be maintained to Grand Avenue. Would a middle, shared lane then also provide two-lane access to Division Street or would the connection to Division be reduced to one lane?
- 2. I would suggest portraying that diet as a "4-lane to 3-lane" reduction since the 5-lane portion of 6th Avenue North is very short. A two-lane reduction sounds extreme, when it reality this is generally just a one-lane reduction.
- 3. The conversions of 2nd Avenue North and 3rd Avenue North along with conversions of the north/south streets makes a lot of sense to me, because none of those streets are used heavily by pass-through commuters. The conversions of Montana, 1st, 4th and/or 6th would be much more impactful to commuter traffic.

Thanks for the opportunity to comment!

DJ Clark PE, PTOE

Associate | Community Transportation Studio Manager

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Billings • Bozeman • Denver • Fort Collins



From: Brett Korporaal
 bkorporaal@kittelson.com>

Sent: Monday, December 17, 2018 1:57 PM

To: Walker, Scott <WalkerS@ci.billings.mt.us>; Scott, Tracy <scottt@ci.billings.mt.us>; Monat, Elyse <monate@ci.billings.mt.us>; Hagel, Debra <hageld@ci.billings.mt.us>; Korell, Brian <korellb@ci.billings.mt.us>; dbolan@mt.gov; zkirkemo@mt.gov; billingsbird@gmail.com; keaston@downtownbillings.com; joes@downtownbillings.com; nbailey@mtrail.com; daniel@billingschamber.com; Tuss, Mike <miket@ctagroup.com>; rhafer@highplainsarchitects.com; Patrick@bigskyeda.org; mike@cu.net; DJ Clark <dclark@sandersonstewart.com> **Cc:** Claunch, Erin <claunche@ci.billings.mt.us>; Andy Daleiden <ADALEIDEN@kittelson.com>; Sarah Patterson

<spatterson@DOWL.COM>; Douglas EndersonOEnderson@dowl.com>
Subject: Downtown Traffic Study - Initial Alternative Comments

Hello PAC,

Great meeting and discussion last week. Thank you for those that have submitted their comments regarding the initial alternatives. I just wanted to remind folks who haven't submitted comments yet, to please do so by the end of the day today. If you have any questions please feel free to give me a call. I've attached a comment sheet if needed.

Thank you, Brett

Brett Korporaal

Engineering and Planning Associate

<u>Kittelson & Associates, Inc.</u> Boise - Ext. 1609 208.472.9809 (direct) bkorporaal@kittelson.com

Brett,

Thank you the very good analysis of the two way streets in downtown Billings. Our offices are at 2407 Montana Avenue. Computers Unlimited employs 180 people (2 live downtown and the rest live mainly in the Heights and West End). I also have the McCormick Café at 2419 Montana Avenue and the Carlin Hotel at 2501 Montana Avenue. We currently have adequate parking in the Depot Lot, the Lobby Liquor Lot, the REX Lot, and the Used Camera Lot.

MONTANA AVENUE (27th to 18th).

The main issue with Montana Avenue is the high rate of speed of the traffic. It is difficult and unsafe to walk across the street from our parking lots to our offices and for our customers going to the McCormick Café to park and walk across the street. There are three lanes of traffic on Montana Avenue. The slow and mostly left turn lane, the dense high speed traffic lane, and the super high speed never stop lane.

Our proposed solution is to reduce the lanes from three lanes to two lanes (from at least 27th to 18th). Stripe diagonal parking (front-in type) on the North Side (from at least 26th to 21st). This solves the speed issue and increases the available parking. Leaving Montana Avenue one way is OK with most businesses on the street. We currently have some difficulty with Heights customers getting to Montana Avenue. At one time, after they came down 6th avenue they did a left turn at 26th and crossed over to Montana Avenue. However, with the construction of the Federal Building which blocked off 26th, this is no longer possible. If 25th were 2 way, this would solve the cross traffic. Also, since currently 25th is the wrong way this means that they use 24th. Getting across 1st avenue at 24th is next to impossible and 24th street also ends at the REX restaurant forcing travel through the REX parking lot. In addition, using 27th street for cross traffic is bad because there are no controlled left turn lights on 27th street to Montana Avenue.

FOR THE RECORD, WE HAVE A CONTRACT WITH THE CITY TO NEVER INSTALL PARKING METERS ON MONTANA AVENUE.

HOW ABOUT MAKING DOWNTOWN BILLINGS PARKING METER FREE (TWO HOUR FREE FROM 7AM TO 5PM AND COMPLETELY FREE AFTER THAT).

BIKE LANES IN DOWNTOWN BILLINGS.

It seems to me that there are two types of Bike Lanes. Those that surround the city that are used for recreation, site seeing, and in general having a good time. These are used by the general population and many tourists to the Billings community and seem to be doing well. Then there are transportation bike lanes that feed to the downtown business community. I do not have a bike but do drive down 30th Street North twice a day. North 30th has a bike lane on either side of the two automobile lanes. They are also directly next to the parallel parked car area. Since Sept 10th, I have never seen a single bike using these bike lanes. I assume that it is too dangerous for bikers (either being hit by a car or running into an open door from a parked car).

According to my assessment, putting bike lanes into downtown Billings will reduce on-street parking by 10 to 20 percent. In addition, they will be mostly unused from October to March. Bike transportation works great in Vancouver BC and Portland Oregon because they have year around biking weather (with a good rain coat). Transportation biking from the Heights to downtown and the West-End to downtown will never be used because of the many cross streets and the high speed traffic currently taking place.

Please do not put bike lanes on Montana Avenue. The property owners and businesses do not want bike lanes. They want more people on the sidewalks and more parking-parking-parking.

TWO WAY STREETS DOWNTOWN.

I want two way streets in downtown Billings in order to slow down traffic and make downtown Billings a destination rather that a place to get through as quickly as possible. Two way streets should be 3rd and 4th from Division Avenue to the east end where they are currently two way. All the North-South streets east of 27th should be completely two way. 29th should be two way (do it now). 30th is questionable since it takes a lot of traffic from North 30th. Either one way or two way would work. The rest of the North South streets in West downtown Billings could be two way (I am not as familiar with these streets). ALL BUSINESSES IN DOWNTOWN BILLINGS WANT MORE PARKING. Keep all the diagonal parking (it slows down traffic – which is good). Two way streets will reduce parking somewhat. Keep the Left and Right turn lanes as short as possible (except 27th street at 2nd Avenue and Montana Avenue).

Mike Schaer Business Owner in Downtown Billings.

INITIAL ALTERNATIVE COMMENTS

Mike Tuss CTA Architects Engineers

No Build

- 1. I am encouraged that the existing infrastructure is projected to function adequately in 2040.
- 2. Do not believe "No Build" is an acceptable scenario. Not supportive of this strategy.

North & South One-Way to Two-Way Street Conversion

- 1. Supportive of this strategy.
- 2. Comment on the graphic plan. On North 26th you should not be showing through-street connection on North 26th at the federal courthouse. I am guessing your model knows this is not a through-street but the graphic is incorrect.
- 3. I like the increased bicycle facility mileage.
- 4. Two-way conversion will benefit downtown. One-ways are a deterrent to many people. Some locals are intimidated by one-way streets. Out of towners get confused. Surprisingly, I often see Yellowstone County plates also going the wrong way. The one-ways encourage higher speeds when we really want slower speeds and a better pedestrian/retail environment.
- 5. I have lived in Billings long enough to recall the days when all the downtown streets were two-way. Perhaps coincidentally, the one-way conversion in the mid-70's coincides with the rapid loss of downtown retail. The mid-70's also coincides with the opening of Rimrock Mall and could explain the loss of retail. However, we had West Park Plaza (indoor mall at 16th and Grand) concurrently for nearly 20 years and it did not kill downtown so I don't know that all the demise of downtown retail can be linked to Rimrock Mall.
- 6. I feel the loss of on-street parking is acceptable if the overall environment downtown is improved.

2nd Avenue N and 3rd Avenue N One-Way to Two-Way Conversion

- 1. Same thoughts as the mentioned in the north/south street conversion.
- 2. East of 27th, conversion of the north/south streets, 2nd, and 3rd could be implemented almost immediately with very little cost and disruption due to few signalized intersections. Currently, the only signals occur on 1st Avenue N and could easily be modified for two-way when the street is reconstructed in the near future.
- 3. The abrupt end of the one-way and beginning of two-way at 22nd is shocking. I am surprised there have not been some horrific accidents. On many occasions I have witnessed vehicles traveling the wrong way on 2nd several blocks west of 22nd.

All One-Way to Two-Way Street Conversion

1. In a perfect world we would have all two-ways downtown. However, I understand the complexities, especially on 6th Avenue N. I think the downtown will be greatly improved with the conversion of all streets except 4th, 6th, Montana, and 1st.

Road Diet – Montana Avenue

- 1. Supportive of this strategy.
- 2. Speed of traffic on Montana is dangerous. The road diet will help calm traffic.
- 3. I would implement the road diet strategy along with other traffic calming and pedestrian environment strategies further east. Or install a couple more traffic signals to control progression to the east.

- 4. I like Mike Schaer's comments about angle parking on the north side of Montana.
- 5. Addition of a bike lane would be great. I don't think a cycle track is practical.
- 6. Left turn eastbound from southbound 27th is a necessity.

Road Diet – 6th Avenue N

- 1. Supportive of this strategy.
- 2. Traffic speeds east of 27th are excessive. We need to look for additional traffic calming strategies if signals east of 27th are not warranted.
- 3. Agree there is a good opportunity on this street for a separated cycle track.
- 4. Initially I questioned the need for signals on 6th Avenue North at 26th and 25th. Upon further consideration, I think a signal in at least one of the locations would greatly improve pedestrian safety at 27th. Currently, cars travel at high speed on 6th because it is wide and there are no traffic controls for over 1/2 mile. Having a signal before 27th could slow traffic and create more orderly progression prior to reaching 27th.

Potential Bicycle Network

- 1. I am supportive of more bicycle facilities and creation of a greatly improved pedestrian environment downtown.
- 2. I bicycle commute around 230 days per year. I am comfortable in traffic but most cyclists are not. Adding bike lanes where possible will greatly encourage bicycle use in downtown. We need to create a bike-friendly environment before we see many people cycling downtown.

PAC Initial Alternative Comment Summary

Initial Alternative	Yes	Maybe	No	Comments	City Engineering Comments
No Build		2	4	Does not address speeds for vehicles or comfortability of other modes	Supportive of it since it works operationally
North and South One-Way to Two-Way Conversion	7	1		Good connection; Under utilized streets; Increased Access; keep 32nd St on- way between 4th Ave and 6th Ave; Implement in phases (2-7 years); loss of parking acceptable if environment is improved	Supportive of the alternative with 2nd/3rd; it might be helpful to keep 32nd one way southbound
2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion	7	1		Good connection; Under utilized streets; Increased Access; Could cause traffi issues on division; safety issue of current configuration at 22nd St	c Supportive of the alternative with N/S
All One-Way to Two-Way Street Conversion		1	4	Too many fatal flaws; greatly reduces downtown's ability to handle traffic	Non supporter of the alternative
Montana Avenue Road Diet (3 Lanes to 2 Lanes)	4		1	Important corridor for businesses; slower speeds; there are better ways to slow traffic (speed humps); provide angled parking	Maybe; Need to take a hard look at the traffic impacts; Does the road diet occur after 27th since right/left turn lanes needed at some cross streets?
6th Ave N Road Diet (4 Lanes to 3 Lanes)	3	1	1	How to tie in at Division; Not as vital as other projects; unnecessary and no real benefit; would like to see lane reduction	Not supportive of this road diet for the entire length of 6th Avenue N; support consideration for a road diet between 13th and Main

PMT Meeting #2 Agenda

Downtown Traffic Study, Billings

Work Order 18-09

Tuesday, December 18, 2018 - 10:00 to 11:00 AM

Phone Conference

The purpose of this meeting is to reflect on PAC Meeting #2, review comments that we've received from the PAC regarding the initial alternatives, discuss approach to the refined alternatives analysis and evaluation, and identify content/format for the final report.

- 1. PAC Meeting #2 Reflections
- 2. Comments on Initial Alternatives
 - a. PAC comment summary
 - b. City's thoughts and comments
- 3. Refined Alternatives
 - a. Document recommended mitigations
 - b. Define cross-section options for streets
 - c. Quantify on-street parking impacts
 - d. Conduct planning-level cost estimates
 - e. Additional alternatives to consider?
 - i. Closure of 28th St and/or 29th St
 - 1. Need input from One Big Sky Center
 - ii. Bike lanes along 13th St
- 4. Report Development
 - a. What would be most helpful for the City's future decision making?
 - b. Refined infographics
- 5. Schedule PAC Meeting #3
 - a. Tentatively Week of Feb 11th
- 6. Summary of Action Items from Today's Meeting



PMT Meeting #2 Summary

Downtown Traffic Study, Billings

Work Order 18-09

Tuesday, December 18, 2018 - 10:00 to 11:00 AM

Phone Conference

The purpose of this meeting is to reflect on PAC Meeting #2, review comments that we've received from the PAC regarding the initial alternatives, discuss approach to the refined alternatives analysis and evaluation, and identify content/format for the final report.

1. PAC Meeting #2 Reflections

- Good meeting and discussion
- Competing interests
- Technical analysis solid, helpful for getting consensus
- Parking impacts this will continue to be a critical item/issue; quantifying this information will be important in the next phase.

2. Comments on Initial Alternatives

- a. PAC comment summary
 - i. We have had received nine responses from the PAC to date.
 - 1. Greatest support for one-way to two-way conversions for the north/south streets, as well as 2^{nd} Ave N and 3^{rd} Ave N
 - 2. No support for the all one-way to two-way conversion alternative
 - 3. Road diets along Montana Ave and 6th Ave N are generally supported
 - ii. Complete summary will be provided once all the PAC inputs has been gathered
- b. City's thoughts and comments
 - i. Supportive of no-build since it works operationally
 - ii. Supportive of north/south one-way to two-way conversion with the conversion of 2^{nd} Ave N and 3^{rd} Ave N
 - iii. Not supportive of all one-way streets to two-way streets
 - iv. Possibly supportive of Montana Ave road diet → need to take a hard look at the traffic impacts, should road diet occur after 27th street because of the need of turn lanes?
 - v. Not supportive of 6^{th} Avenue North road diet west of 13^{th} St N; to look at a road diet between 13^{th} St N and Main St

3. Refined Alternatives

- a. Document recommended mitigations
- b. Define cross-section options for streets
- c. Quantify on-street parking impacts
- d. Conduct planning-level cost estimates



i. Bid item costs

- 1. DOWL has some recent construction bids through the City projects. Kittelson will follow up with the City and DOWL on this item.
- 2. Kittelson will check with MDT on 27th Avenue and 1st Avenue N. The costs may not reflect the entire cost of the traffic signals.
- e. Additional alternatives to consider?
 - i. Closure of 28th St and/or 29th St
 - 1. Need input from One Big Sky Center
 - a. Focus on closure of Broadway between 1st and 3rd with cross traffic open City
 - b. City will provide number of times it is closed on an annual basis for Broadway.
 - ii. Bike lanes along 13th St Add a cross-section for this roadway.
 - iii. 6th Avenue N Modify this segment between 13th and Main
 - iv. Action Kittelson will send a summary of the list of final alternatives and if it falls within the scope of work to the City. Send email to City.

4. Report Development

- a. What would be most helpful for the City's future decision making?
- b. Refined infographics
 - i. These are helpful products. 1-page handouts for each alternative is beneficial.
 - ii. We need to document the process...
 - iii. For cross-sections, we should define either/or options for how this space can be used. Provide flexibility within the cross-sections.
 - iv. Keep a technical appendix

Schedule PAC Meeting #3

- a. Include a review of PAC Meeting #3 materials for engineering before sending out to the PAC.
 - i. 1-week timeframe
- b. Tentatively Week of Feb 11th
 - i. Move to Feb 19th or 20th
- 6. Summary of Action Items from Today's Meeting
 - a. Provide KAI recent roadway construction bid item costs City and DOWL
 - b. Quantify how many times 28th Street is closed throughout the year City
 - c. Send email summary to the City of final alternatives with scope of work and schedule check KAI
 - d. Confirm PAC Meeting #3 date for February 19th or 20th



Appendix F

PMT and PAC
Meeting #3
Materials and
Summary

PAC Meeting #3 Summary

Downtown Traffic Study, Billings

Work Order 18-09

Wednesday, February 20, 2019 - 10:00 AM to 12:00 PM

2825 3rd Avenue North, Miller Building - 1st Floor Conference Room

The purpose of this meeting is to review the feedback and comments from PAC Meeting #2; present findings from the refined alternatives, including cross section options, parking impacts and planning-level cost estimates; and to gather feedback and level of support for each of the refined alternatives/cross section options. *The PAC Meeting #3 PowerPoint presentation is provided in Attachment A.*

- 1. Introductions (Attachment B)
 - Brett Korporaal (Kittelson& Associates, Inc.)
 - Sarah Patterson (DOWL)
 - Erin Claunch (City Engineering)
 - Debra Hagel (MET Transit)
 - Zach Kirkemo (MDT/Billings)
 - Scott Walker (City/County Planning)
 - Tim Goodridge (EBURD)
 - Mike Schaer (Business owner)
 - Doug Enderson (DOWL)
 - Elyse Monat (City/County Planning Bike/Ped)
 - Tracy Scott (City Parking)
 - Stan Brelin (MDT/Helena)
 - Danielle Bolan (MDT/Helena)
 - Mike Tuss (CTA)
 - Joe Stout (Downtown Billings Alliance)
 - Katie Easton (Downtown Billings Alliance)
 - Randy Hafer (High Plains Architects)
 - Patrick Klugman (Big Sky Economic Development Agency)
 - Lora Mattox (City/County Planning)
 - DJ Clark (Sanderson Stewart)
 - Eric Schnelbach (Billings Police Department)
 - Wende Wilber (Kittelson & Associates, Inc.)
 - Andy Daleiden (Kittelson& Associates, Inc.)
 - Any updates from concurrent studies within the study area we should be aware of?
 - None mentioned.



- 2. PAC Meeting #3 Purpose and Study Timeline
 - Looking for feedback on refined alternatives/cross section options
 - Did we miss anything?
 - Do the cross sections make sense?
 - Any changes to what we shared?
- 3. Update since PAC Meeting #2
 - PMT and PAC Initial Alternatives Comment Summary
 - Refined alternatives
 - Follow up on PAC Meeting #2 Minutes
 - Comments?
 - MET buses at transfer center 5 or 6 buses stage on 25th St adjacent to roadway; the remainder occur in the area within the transfer center. No buses stage on 2nd Ave N or 3rd Ave N.
- 4. Refined Alternatives Evaluation and Cross Section Options
 - The goal of this this study is to determine the feasibility of traffic impacts and operations within the downtown roadway network. The refined alternatives listed below were determined to be feasible alternatives from a traffic operations perspective.
 - Refined alternatives which include one-way to two-way street conversions or road dieting measures, allow the City to consider cross section options that are different from today.
 - The cross section options which include bicycle facilities and/or on-street
 parking options are presented as options to consider and have little to no impact
 on the traffic operations for the refined alternatives.
 - This study will not provide a recommendation for one cross section option over another, but rather provide cross section options for each of the refined alternatives that are feasible from a traffic operations standpoint.
 - Broadway Street Closure
 - Comments:
 - 1st Ave and 29th St "Mixed-use district" proposed as part of ONE Big Sky Center; temporary closure on 29th Street; farmer's market may move over from Broadway Ave or connect on the roadways.
 - Downtown operations can still work with a temporary closure of 29th St and full closure of Broadway Ave.
 - Retractable bollards could be a good option to consider today on Broadway Ave; alternatively, planters could be incorporated in a temporary manner using a fork lift to place the planters prior to and after a temporary closure. When not in use, planters would have to be stored in designated spaces along sidewalk or existing curb returns if space allows.
 - One-Way to Two-Way Street Conversions North & South Streets

- Comments (33rd St, 34th St, and 35th St):
 - o None
- Comments (26th St, 30th St, 32nd St):
 - Bike lanes vs separated bike lanes vs sharrows any of these options has similar operational results for traffic
 - 1. Provide insights on parking type tradeoffs
 - Back-in angled parking
 - 1. Both EBURD projects have back-in angled 60 degrees vs 45 degrees
 - 2. Back-in angled parking provided at McKinley Elementary School
 - 3. Will it be observed in high occupancy areas? Or during inclement weather? Particularly is roads are not properly plowed?
 - 4. Provides better sight lines for vehicles and bicyclists
 - Traffic analysis
 - 1. 32nd St between 4th Ave N and 6th Ave N
 - a. The 4th Ave N/32nd St intersection includes a dual southbound left-turn lane at this location
 - Recommended dual SBL turn lane for year 2040 traffic volumes. Without dual SBL turn lanes in year 2040, SBL turn lane group is expected to operate at or over capacity.
 - ii. With dual SBL turn lanes and shared through/rightturn lane, bicycle facilities around this intersection may need to be modified for optimal lane configuration.
 - b. Traffic operations can work at 6th Ave N/Division/Grand with signal modification.
 - i. Time for northbound approach would run congruently with northbound pedestrian phase.
- Comments (31st St, 29th St):
 - o Do costs include signal modifications?
 - 1. Yes.
- Comments (25th St):
 - o Do we need the separator/buffer for the signal operation?
 - Yes. It helps define the usage of space and provides a safety benefit to the buses, as well as optimal operations for each leg of the intersection.
 - O How does the bus signal work?
 - 1. Provides a specific signal and signal phase to allow buses departing the transfer center to make a left turn, through movement, or right turn.
 - What are the statistics for bike usage between bike facility types?
 - 1. It would be helpful to present available information for bicycle facility type usage in the report and next phase of the project.



- o Are there corridors that make sense to serve as the bike corridors?
 - 1. Yes, and they are documented in the *Bikeway and Trails Master Plan* and are consistent with this study's assumptions.
- o How do we convert our streets from one-way to two-way streets?
 - 1. One comment -- What if we had a program that do not include any bike facilities?
 - a. We can look at adding an option on Montana Avenue (east of 27th).
 - 2. One comment was made that there is not adequate parking in downtown.
 - a. Previous parking data and studies have shown that there is adequate supply in downtown with some spot locations that could be improved. Several of the parking garages are underutilized.
 - 3. Bike type options on the different roadways were considered based on consistency with and consideration the recommendations in the *Bikeway and Trails Master Plan*.
- One-Way to Two-Way Street Conversions 2nd Ave N & 3rd Ave N
 - No comments.
- Road Diet Montana Avenue (Division St to 18th St)
 - Comments:
 - Action: Add another option with parking on both sides and no bike lanes on Montana Avenue (east of 27th Street).
 - 1. Parking is prohibited on the south side of Montana Avenue from Division St to 30th St.
 - a. There no pedestrian facilities on the southside of Montana Ave in this area and there would not be a safe way of crossing Montana Ave if parking was provided.
 - Are queues accommodated on these roadways? Yes, but we will continue to refine the analysis for estimating vehicle queues. The refined analysis is being looked at as part of the 27th Street Railroad Crossing Study.
 - 1. Action: Continue to assess the queues with a train event for the determining the length of the right turn lanes at 29th St and 27th St.
- Road Diet 6th Ave N (13th St to Main St)
 - Comments:
 - o Can we reassess the section between 13th St and 27th St? It would be nice to reduce the lane widths and increase sidewalks, etc. in this area to improve this environment. Goal is to lower vehicle speeds by reducing lane widths and make pedestrian and/or bicycle facilities more comfortable in this area.
 - 1. Adding traffic lights at 25th St and 26th St (as recommended in the oneway to two-way street conversions) will help with reducing speeds.
 - 2. MUTCD warrants
 - a. Peak hour warrant we will need to look at this more carefully for the signals at 25th St and 26th St.



- b. Progression warrant and pedestrian warrant may be considered.
- c. Action: Include a discussion about MUTCD signal warrants for new traffic signals, particularly along MDT corridors.
- o Why did we remove the bike facility connection between 13th St and 27th St?
 - 1. Feasibility of acquiring funding for that length of corridor.
 - a. Roadway between 13th St and Main St seems to be viable as an initial road diet alternative.
 - b. Can tie into current design occurring at 6th Ave N/Main St as part of the Airport Rd/Main St corridor design.
 - 2. Available width may allow for restriping opportunities without adjustments to curbs to keep costs down.
 - a. Goal is to lower speeds along 6th Ave N and provide increased comfortability for alternative modes of travel.
- Road Diet 13th St (6th Ave N to 1st Ave N)
 - Comments:
 - No comments

5. General Comments

- Super excited to see the results; two-way network is great!
- Costs seem high, so figure out the range to refine the costs.
 - Each alternative's cost was estimated and presented independently of other alternatives.
 - Costs include 20% design fees and 20% contingency.
 - Opportunity to save costs if alternatives are combined.
 - Paver program (west of 27th St)
 - 1. Add this to the discussion for how these projects are funded?
- Action: Add a discussion about costs in the report, what projects are already occurring as part of the PAVER program, other City/MDT projects, and private partnerships. The costs need to be tempered to effectively present the various options going forward to elected officials and the public.
- 6. Work Session (Attachment C)
 - What is your level of support for the refined alternatives and cross section options?
 - For next steps, what ideas do you have for taking this project out to the public?

7. Next Steps

- Summarize PAC Meeting #3 minutes
- Receive and summarize PAC comments on refined alternatives and findings
- PMT Meeting #3 (week of March 4th)
- Refine cross section graphics for final report
- Prepare draft and final report



Attachment A PAC Meeting #3 PowerPoint Presentation





Introductions

- Agency
 - City of Billings Engineering



- Consultants
 - Kittelson & Associates, Inc.
 - DOWL

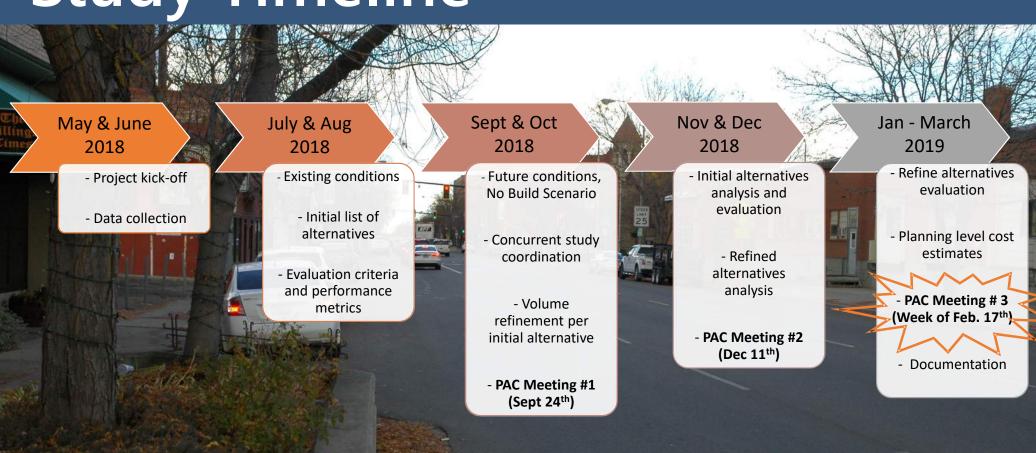




- PAC Members
 - Any updates from concurrent studies with the study area we should be aware of?



Study Timeline



PAC Meeting #3 Purpose

- Looking for feedback on refined alternatives and cross section options
 - Did we miss anything?
 - Do the cross sections make sense?
 - Any changes to what we've shared?
- Looking ahead
 - What ideas do you have for taking this project out to the public once this project is complete?
 - Who to involve?
 - Where and what information to provide?





Initial Alternative Comment Summary

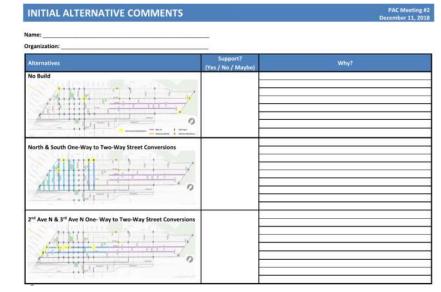
PAC and PMT comments provided guidance for refined alternatives

Themes from the comments include

- No Build Helpful to understand that system will continue to operate acceptably
- Strong support for north/south and 2nd Ave & 3rd Ave one-way to two-way street conversions
- Unanimous support against all one-way to two-way street conversion of 6th Ave N, 4th Ave N, 1st Ave N, and Montana Ave
- General support for road diet options along 6th Ave N and Montana Ave

Other General Comments

- Support alternatives to promote slower speeds along corridors
- Provide bicycle connectivity on east side of study area
- Explore road diet on 13th Street





Follow up on PAC Meeting #2 Minutes

Outstanding Questions

- Delivery vehicle access from one-way to two-way street conversions
- Bus routing and circulation at MET's Downtown Transfer Center

Refined Alternatives Analysis

- Develop preliminary cost estimates
- Update recommendations
 - Turn lane locations
 - New traffic signals
- Add angled parking to cross section options
 - Front-in and back-in angled parking
- Include SIMTraffic visualization for Montana Ave Road Diet
- Modified 6th Ave N Road Diet
- Analyze 13th Street Road Diet
- Analyze closure of Broadway Avenue





Refined Alternative Evaluation

Base Assumptions for Cross Section Options

- NACTO Urban Street Design Guide
- NACTO Urban Bikeway Design Guide
- AASHTO A Policy on Geometric Design of Highways and Streets
 - Minimum lane widths assumed = 11' (12.5' for outside lane with curb/gutter)
 - Minimum bicycle lane width = 5' (10' cycle track)
 - Bicycle facility connections consistent Bikeway and Trails Master Plan
 - Minimum on-street parking width used = 7.5'
- Cost includes milling and overlay of existing asphalt
- Presenting ideas
 - Not advocating for one cross section over the other





Broadway Avenue Closure

- Assumed street closure between 1st Ave N & 2nd Ave N
 - Monthly events throughout the calendar year
 - Approximately 33 temporary street closures last year
 - Permanent street closure can be accommodated
 - LOS C or better during AM and PM Peak Hours
 - Existing roadway network and/or
 - Future conversion alternatives
 - Loss of 24 on-street parking spaces
 - Temporary or permanent street closure options could be considered







North & South One-Way to Two-Way Street Conversion 35th Street – 33rd Street



Opportunity to gain ~20 – 50 parking spaces with striping

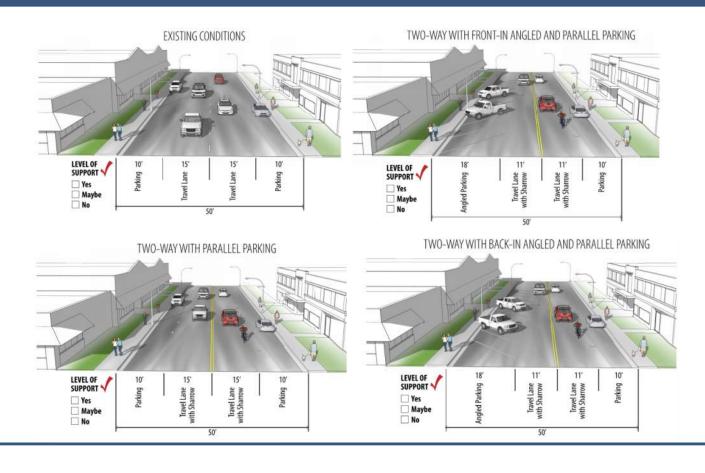
No bicycle facilities presented

~\$700k - \$1.4 million (includes milling and overlay)

- Existing Conditions
 - 50' curb-to-curb
 - No striped parking spaces
 - ~136 non-striped spaces
- Cross Section Options
 - Parallel parking only
 - Existing conditions
 - Parallel with front-in or back-in angled parking



North & South One-Way to Two-Way Street Conversion 35th Street – 33rd Street



BILLINGS

Downtown Traffic Study

North & South One-Way to Two-Way Street Conversion 32nd Street, 30th Street, and 26th Street



- Existing Conditions
 - 50' curb-to-curb
 - Angled and parallel parking
 - ~254 spaces
- Cross Section Options
 - Buffered or Separated Bike Lane (parallel parking)
 - Sharrows with existing parking

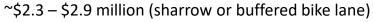


Min. loss of ~16 parking spaces (turn lanes)

Max. loss of ~58 parking spaces (turn lanes + parallel parking)



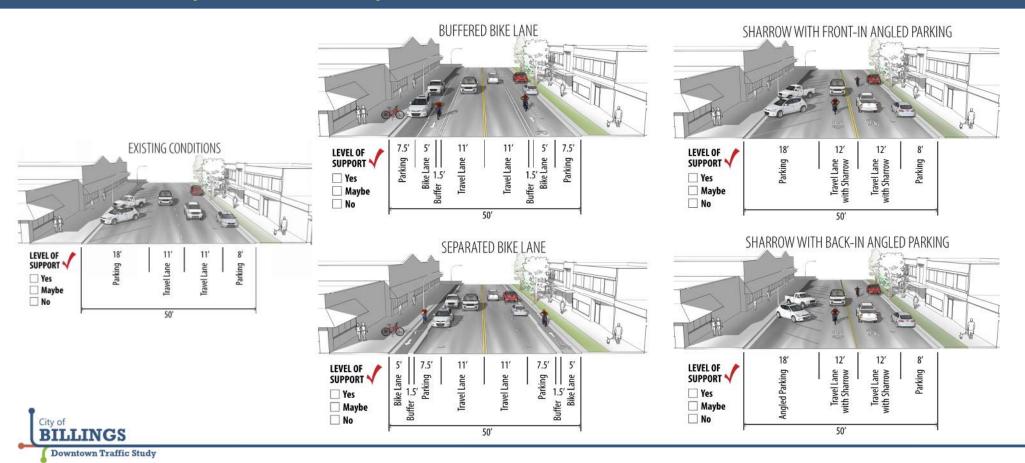
~1.2 miles of new bicycle facilities presented



~\$3.0 – \$3.7 million (separated bike lane)



North & South One-Way to Two-Way Street Conversion 32nd Street, 30th Street, and 26th Street



North & South One-Way to Two-Way Street Conversion 31st Street and 29th Street



Minimal to no impact to on-street parking Opportunity to gain spaces with new striping

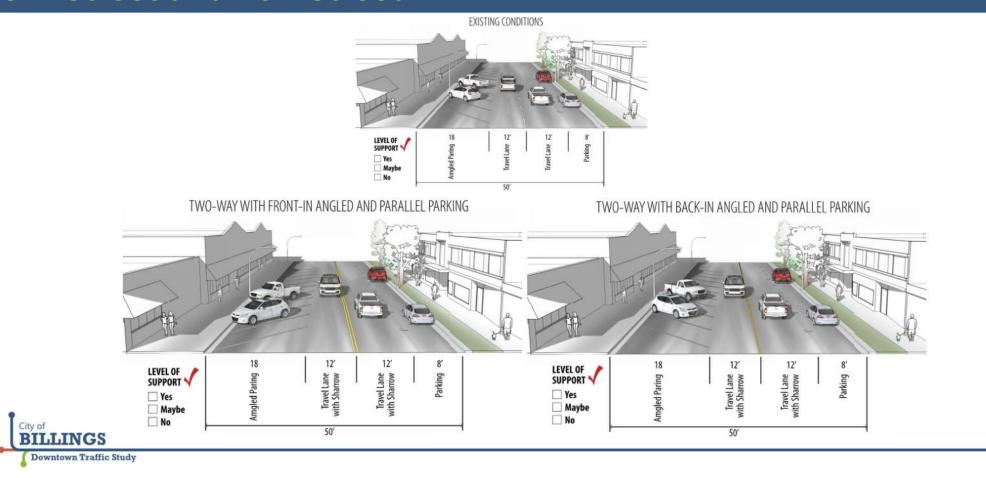
No bicycle facilities presented

~\$1.8 – \$2.3 million (parallel and angled parking)

- Existing Conditions
 - 50' curb-to-curb
 - Angled and parallel parking
 - ~ 111 spaces (31st St)
 - ~ 138 spaces (29th St)
- Cross Section Options
 - Two-way cross sections
 - No bicycle facilities
 - Parallel and front-in or back-in angled parking



North & South One-Way to Two-Way Street Conversion 31st Street and 29th Street



North & South One-Way to Two-Way Street Conversion 25th Street & MET Transfer Center



- Existing Conditions
 - 50' and 21.5' curb-to-curb
 - Angled and parallel parking
 - ~47 spaces
- Cross Section Options
 - Buffered and Separated Bike Lane (parallel parking)
 - Sharrows with existing parking



Loss of ~12 parking spaces



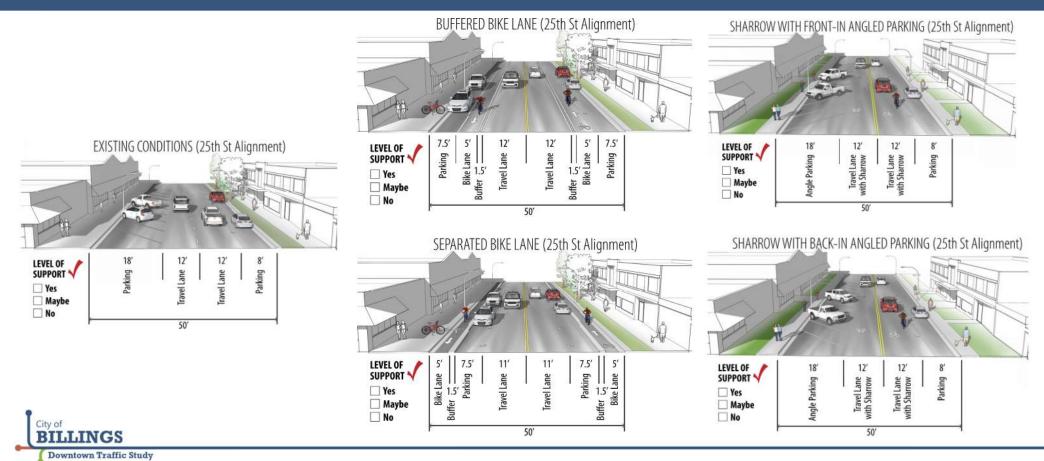
~0.4 miles of new bicycle facilities presented



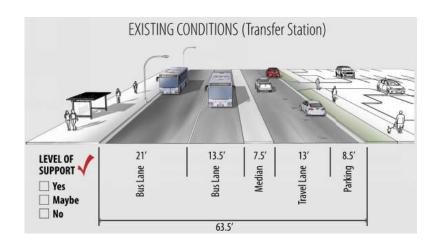
 $^{\sim}$ \$1.0 – \$1.2 million (sharrow or buffered bike lane)

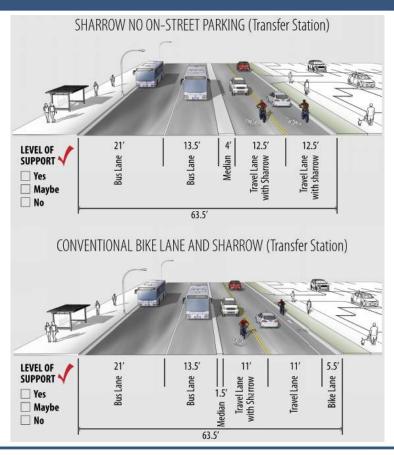
~\$1.3 – \$1.7 million (separated bike lane)

North & South One-Way to Two-Way Street Conversion 25th Street & MET Transfer Center



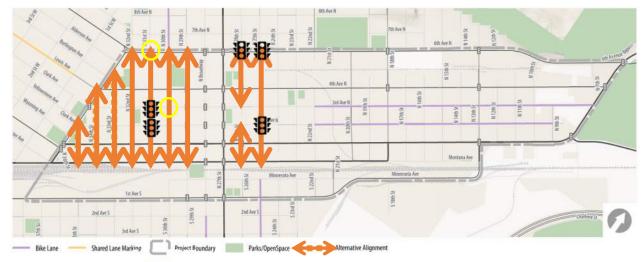
North & South One-Way to Two-Way Street Conversion 25th Street & MET Transfer Center







North & South One-Way to Two-Way Street Conversion Summary





Min. loss of ~16 parking spaces Max. loss of ~ 70 parking spaces



~1.6 miles of new bicycle facilities presented

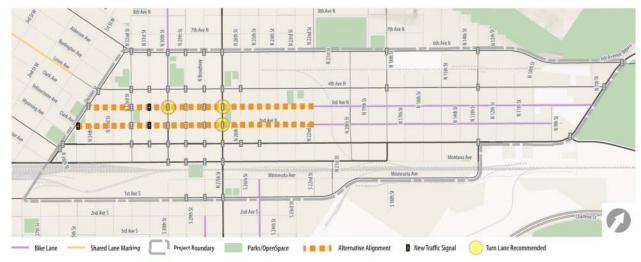
~\$5.8 – \$7.8 million (sharrow and/or buffered bike lanes)

~\$6.8 - \$9.1 million (separated bike lanes)

- Five new traffic signals
- Turn lanes
 - 6th Ave N/31st St
 - 3rd Ave N/30th St
- Bicycle facility options on 32nd
 St, 30th St, 26th St, and 25th St
 - Consistent with Bikeway and Trails Master Plan
 - 1.5 miles of new bicycle facilities
- Opportunity to gain back onstreet parking on roads without bicycle facilities



2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion 3rd Avenue N

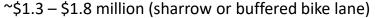




Loss of $\sim 27 - 34$ parking spaces (turn lanes + parallel parking)



~0.9 miles of new bicycle facilities presented



- ~\$2.2 \$2.7 million (separated bike lane)
- 2 2.8 \$3.5 million (raised bike lanes)

- Existing Conditions
 - 50' curb-to-curb
 - Angled and parallel parking
 - ~209 spaces
- Cross Section Options
 - Buffered, Separated, and Raised Bike Lanes
 - Parallel parking
 - Sharrows
 - Existing parking
 - Center Turn Lane w/Sharrows
 - Parallel parking



2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion 2nd Avenue N





Loss of ~ 11 – 28 parking spaces (turn lanes + parallel parking)



~1.0 mile of new bicycle facilities presented



~\$1.8 - \$2.3 million (sharrow or buffered bike lane)



~\$2.7 - \$3.2 million (separated bike lane)



~\$3.3 - \$3.9 million (raised bike lanes)



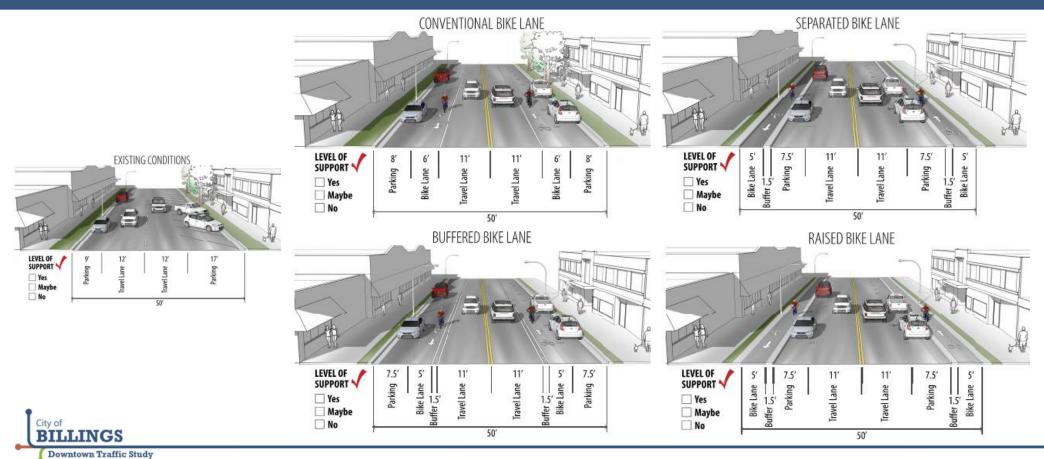
- 50' curb-to-curb
- Angled and parallel parking
 - ~219 spaces

Cross Section Options

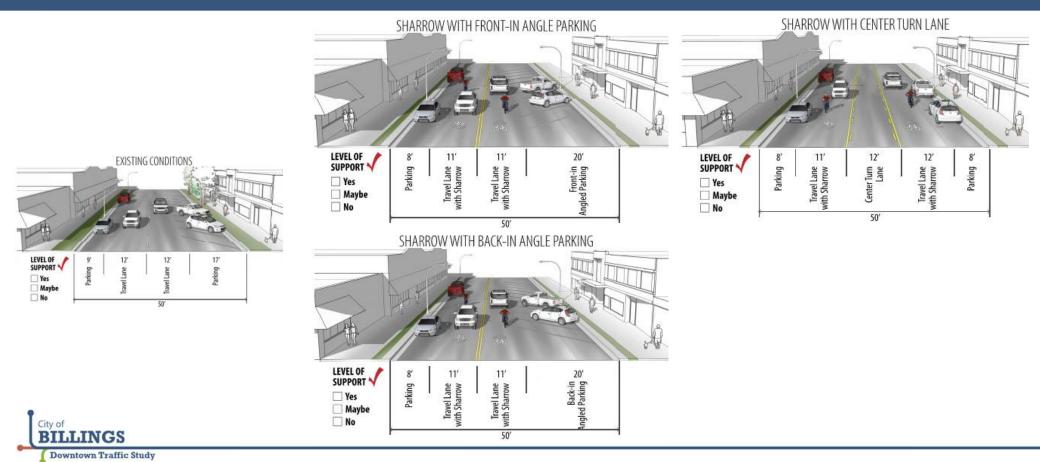
- Buffered, Separated, and Raised Bike Lanes
 - Parallel parking
- Sharrows
 - Existing parking
- Center Turn Lane w/Sharrows
 - Parallel parking



2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion 2nd Avenue N & 3rd Avenue N



2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion 2nd Avenue N & 3rd Avenue N



2nd Ave N & 3rd Ave N One-Way to Two-Way Conversion Summary





Min. Loss of ~ 38 parking spaces (turn lanes)
Max. Loss of ~ 62 parking spaces (turn lanes + parallel parking)



~1.9 miles of new bicycle facilities presented

 $^{\$}3.1 - 4.1 million (sharrow or buffered bike lane)

 \sim \$4.9 – \$5.9 million (separated bike lane)

 \sim \$6.1 – \$7.4 million (raised bike lanes)

- Three new traffic signals
- Angled and parallel parking
 - ~428 spaces (2nd & 3rd Ave)
 - ~8%-14% reduction w/bike

Ex. transition at 22nd St/2nd Ave





Road Diet – Montana Ave Division Street to 27th Street





Loss of approx. ~9 parking spaces (parallel)
Gain of approx. ~10 parking spaces (angled)



~0.6 miles of new bicycle facilities presented

~\$1.4 – \$3.3 million (separated bike lane)

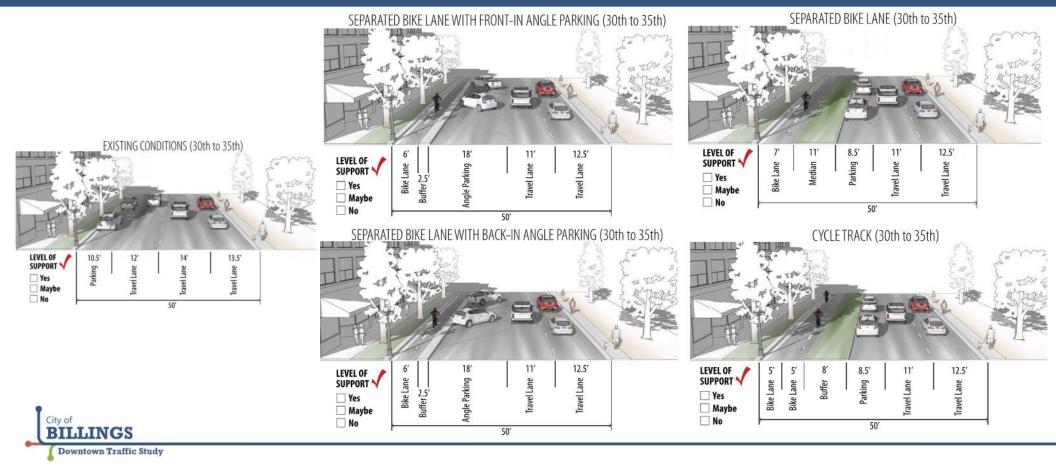
 \sim \$2.0 – \$2.4 million (cycle track)



- 50' curb-to-curb
- Angled and parallel parking
 - ~100 spaces
- Cross Section Options (35th 30th)
 - Separated Bike Lane (parallel or angled parking)
 - Cycle Track (parallel parking)
- Cross Section Options (30th 27th)
 - No angled parking
 - Turn lane / parking (south side)

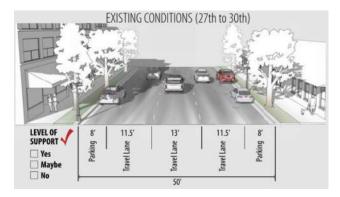


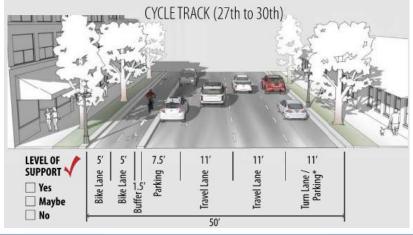
Road Diet – Montana Ave Division Street to 30th Street

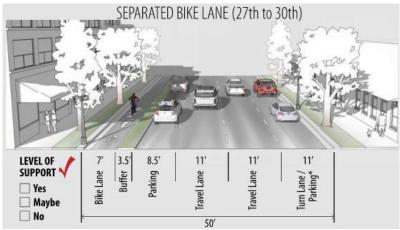


Road Diet – Montana Ave

30th Street to 27th Street









Road Diet – Montana Ave

27th Street to 18th Street





No impact (parallel)
Loss of approx. ~28 parking spaces (angled)



~0.6 miles of new bicycle facilities presented

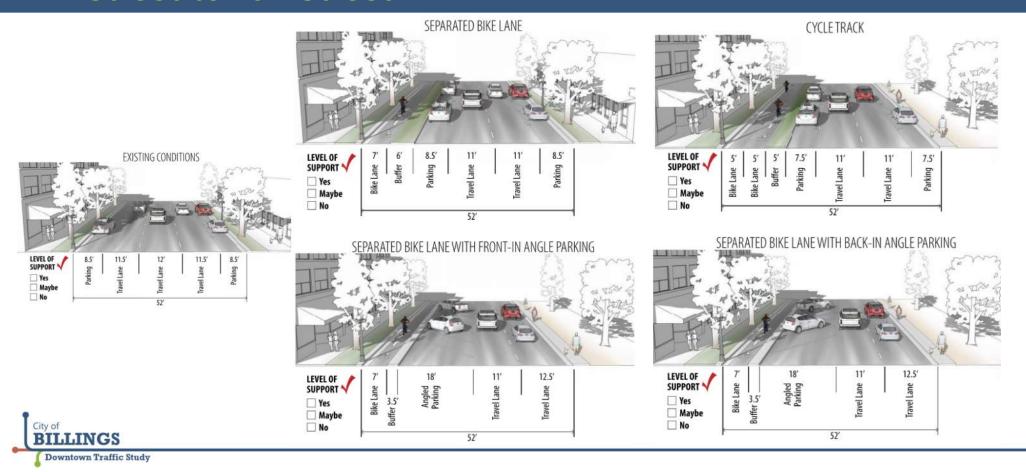
- ~\$1.6 \$2.4 million (separated bike lane)
- $^{\$}2.1 \2.6 million (cycle track)

- Existing Conditions
 - 52' curb-to-curb
 - Angled and parallel parking
 - ~103 spaces
- Cross Section Options
 - Separated Bike Lane (parallel or angled parking)
 - Angled parking eliminates parking on southside of road
 - Cycle Track (parallel parking)



Road Diet – Montana Ave

27th Street to 18th Street



Road Diet – Montana Ave Summary

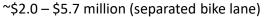




Loss of ~37 parking spaces (parallel 35th to 27th + angled e/o 27th) Gain of ~10 parking spaces (angled 35th to 27th + parallel e/o 27th)



~1.2 miles of new bicycle facilities presented



 $^{\$}4.1 - 5.0 million (cycle track)



- Cannot accommodate angled parking between (30th St and 27th St)
- Angled parking is not advantageous east of 27th St
 - Eliminates parking on southside of roadway
- Turn lane not needed at Broadway Ave
- Cycle track provides bidirectional connections on the southside of downtown
 - No planned bicycle improvement on 1st Ave N



Road Diet – 6th Ave N 13th Str to 10th St





No On-Street Parking Impact



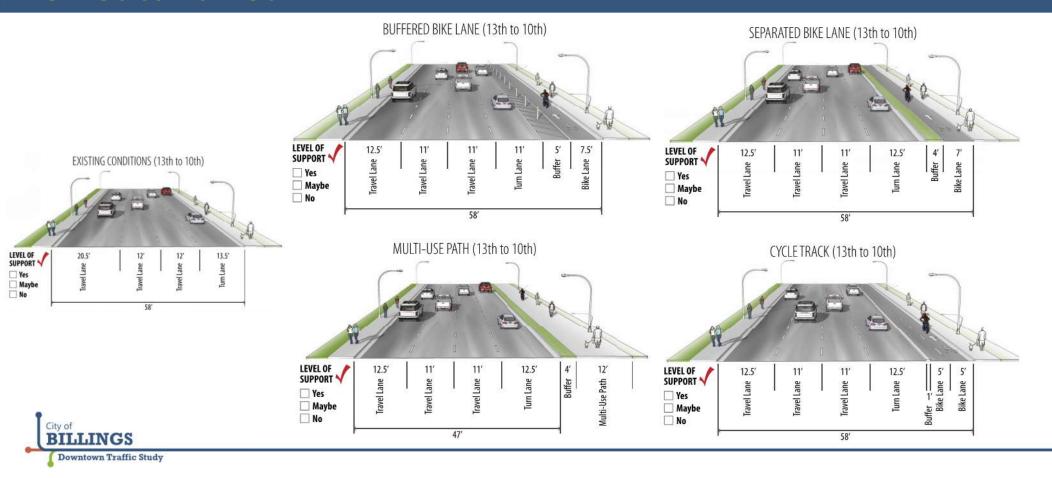
~0.25 miles of new bicycle facilities presented

- Existing Conditions
 - 58' curb-to-curb
 - Four travel lanes
 - No on-street parking
 - ~5' attached sidewalks
- Cross Section Options
 - Narrowing travel lanes
 - Bicycle facility on northside of 6th Ave N
 - Buffered Bike Lane
 - Separated Bike Lane
 - Cycle Track
 - Multi-Use Path



Road Diet – 6th Ave N

13th St to 10th St



Road Diet – 6th Ave N 10th Street to Main Street





No On-Street Parking Impact

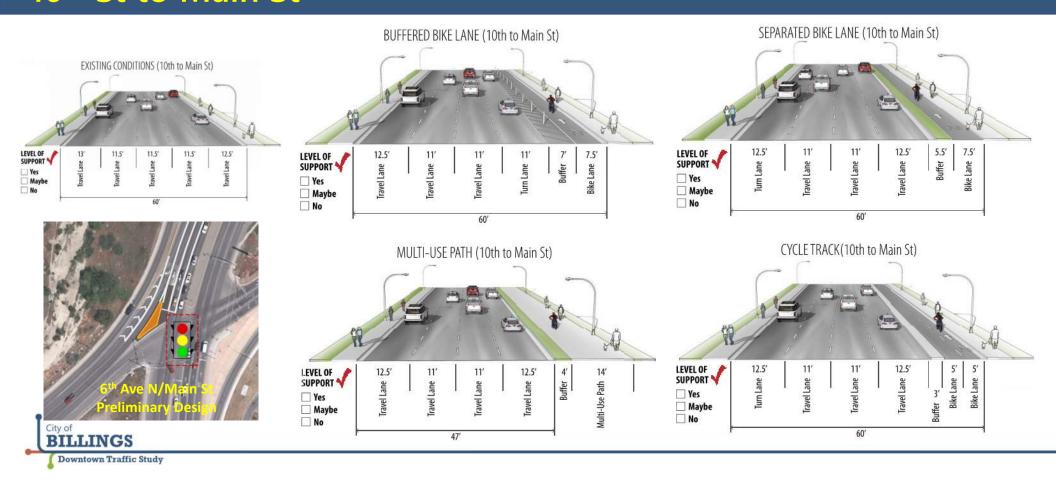


~0.25 miles of new bicycle facilities presented

- Existing Conditions
 - 60' curb-to-curb
 - Five travel lanes
 - No on-street parking
 - ~5' attached sidewalks
- Cross Section Options
 - Narrowing travel lanes
 - Bicycle facility on northside of 6th Ave N
 - Buffered Bike Lane
 - Separated Bike Lane
 - Cycle Track
 - Multi-Use Path



Road Diet – 6th Ave N 10th St to Main St



Road Diet – 6th Ave N

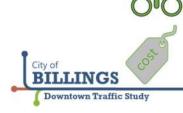
Summary



- Lane reduction from five lanes to four lanes
- Lane width reduction
- Tie into design preliminary design at 6th Ave N/Main St
- Bicycle facility on the northside of 6th Ave N

~0.5 miles of new bicycle facilities presented

- ~\$500k \$700k (buffered bike lane)
- ~\$1.6 \$2.0 million (separated bike lane)
- \sim \$900k \$1.2 million (cycle track)
- ~\$1.1 \$1.5 million (multi-use path)



Road Diet – 13th St

6th Ave N to 4th Ave N





Max. loss of 21 parking spaces (north of 4th Ave N)

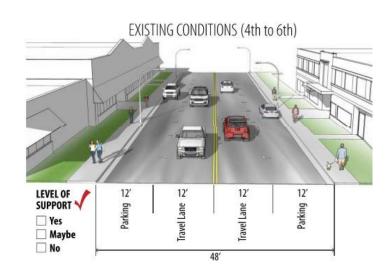


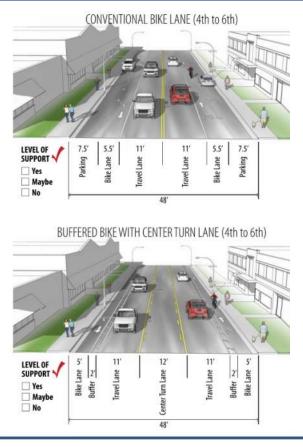
~0.15 miles of new bicycle facilities presented

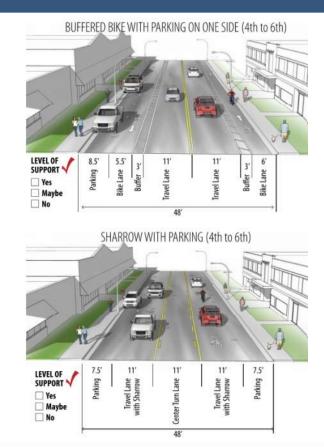
- Existing Conditions
 - 48' curb-to-curb
 - Two travel lanes
 - Parallel parking
 - ~21 on-street
- Cross Section Options
 - Narrowing travel lanes
 - Bicycle facility options
 - Consistent with Bikeways to Trails Master Plan
 - Center turn lane
 - Can operate with or without
 - Minimizes delay, provides protection for left-turns



Road Diet – 13th St 6th Ave N to 4th Ave N









Road Diet – 13th St

4th Ave N to 1st Ave N

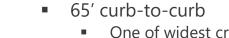




No impact to on-street parking



~0.2 miles of new bicycle facilities presented



Existing conditions

- One of widest cross section in study area
- Four travel lanes
- Parallel parking
 - ~43 on-street

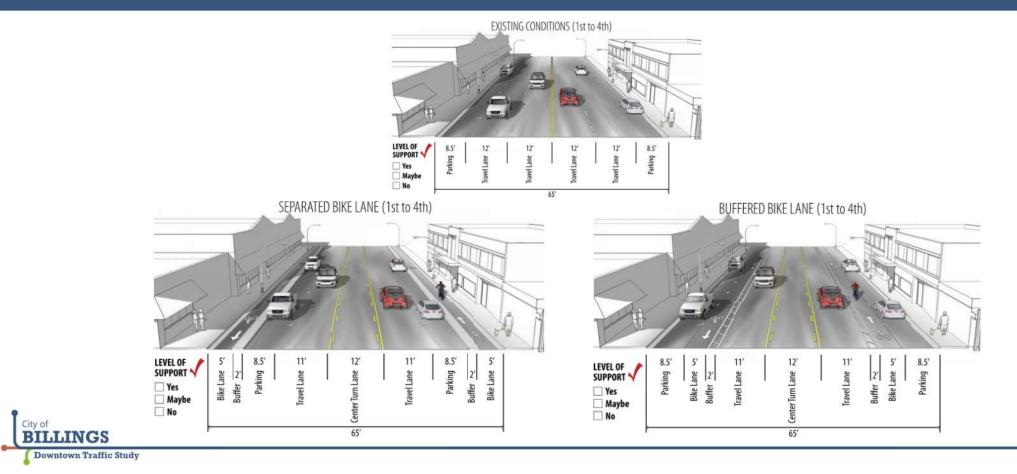
Cross Section Options

- Narrowing travel lanes
- Bicycle facility options
 - Consistent with Bikeways to Trails Master Plan
- Center turn lane
 - Can operate with or without
 - Minimizes delay provides protection



Road Diet – 13th St

4th Ave N to 1st Ave N



Road Diet – 13th St

Summary

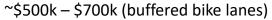




Max. loss of 21 parking spaces (north of 4th Ave N)



~0.35 miles of new bicycle facilities presented

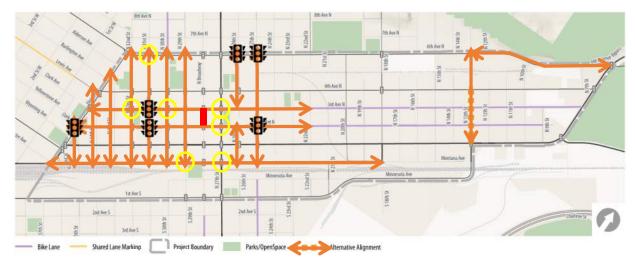


~\$850k - \$1.1 million (separated bike lane)

- Sufficient capacity with one lane in each direction
- Southbound approach could be modified to include
 - Dedicated left-turn lanes
 - Shared through/right-turn lane
- Advantage of center turn lane
 - Minimizes delay, provides protection for left-turns
- Widest cross section within alternatives
 - Between 4th Ave N and 1st Ave N
- Minimal parking impacts to the corridor
- Consistent with Bikeways to Trails Master Plan



Refined Alternative Summary





Min. loss of 48 parking spaces; Max loss of 190 parking spaces Potential to gain ~10-50 parking spaces



~5.55 miles of new bicycle facilities presented



Min. cost range $^{\$}11.5 - \15.7 million Max. cost range $^{\$}16.9 - \21.7 million

- Six refined alternatives
 - Approx. seven miles of roadway
 - Six new traffic signals
 - Seven turn lane locations
- Opportunity to
 - Reduce speeds
 - Provide bicycle connectivity
 - Enhance pedestrian facilities
 - Limit loss of on-street parking
 - Increase mobility for MET routes
 - Create a mostly two-way transportation network
 - Simplify the user (traveler) experience downtown

Refined Alternative Work Session

- We'd like to know your thoughts...
- Take 20 minutes to provide your thoughts
 - Level of support?
 - Refined Alternatives
 - Cross Sections
 - Ideas for taking this project out to the public?

REFINED ALTERNATIVE COMMENTS

PAC Meeting #3 February 20, 2019

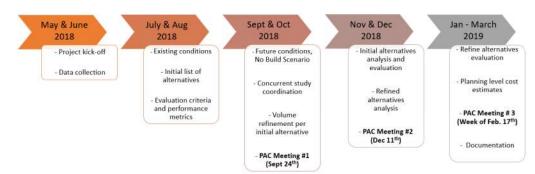
Name:	 	
Organization:		

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions		
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions		
Montana Avenue Road Diet (Division Street to 18 th Street)		



Next Steps

- Consultant Team
 - Gather and summarize feedback
 - Summarize PAC Meeting #3
 - Refine cross section graphics for final report
 - Prepare draft and final report
 - Submit to City by end of March







Attachment B PAC Meeting #3 Sign-in Sheet



PAC Meeting #3 Sign-In Sheet

Downtown Traffic Study, Billings

Work Order 18-09

Wednesday, February 20, 2019 - 10:00 AM to 12:00 PM

2825 3rd Avenue North, Miller Building - 1st Floor Conference Room

NAME	ORGANIZATION	EMAIL
BRETT KORPORAAL	KITTELSON; ALSOCIATES	s, lac bkorporaal @ Kitlelson.com
Sarah Patterson	DOWL	spatterson@dowl.com
ERIN CLAUNCH	CITY ENGINGER	ING claunche@cibillings, act. 45
Lach Korkemo	MET Transit MDT-Billings	hagelda ci. billings. M.US zkirhense nt. jov
Sun Whiken	c/= Play	· .
Tim Goodidg	East Billings Ulba	Page
MIKE SCHAER	/	ed MIKEQCU. NET
Dag ENDERSON	POWL	denderson Eder Vicem
Elya Monot	C/CPlng	monated C.T. billings mt. vs
Tracy Scott	City Parking	scottleci billings.mt.us
Stan Brelin	MBT - Helena To	GHic Strelinent. sov
Danielle Bolan	MDT-Traffic	dodanent.gov
Mike Jusq	OTA Architects En	linears mikes e tograpocons
JOE STOUT	DBA	JOES @ DOWNTOWN BILLINGS. COM
Katy Easton	DBA Kel	istan a downtown billing s. com
RANDY HAPER	HIGH PLANNS ARCHITE	or rhater chigh plains are hitect.
Patrick Klugman	BSED	Klugman@big Skyeda. Org
Fra mattex	c/c Planning	0 0 0
J. J. Clark	Sanderson Stewart	dclark@sandersonstewart.com
Eric Schnelbach	Bro	schnelbache @ci. billings, mrt. ws
Andy Daleiden	KAI	adaleiden@kittelson.com
Wende Wilber	KAI	wwilberexHelson.com

Attachment C Refined Alternative Comment Sheet



Name:	WALKER
Organization:	(c Plug.

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions		CONE THIS IDEA.
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions		LOSE THIS TEDER
Montana Avenue Road Diet (Division Street to 18 th Street)		CAN BE DONE !



Downtown Traffic Study

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street		Ruth Deet All The why To Division / 32M
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North		CALDAT IDEA
Broadway Street Closure		LOVE THIS IDEA NOW THIS Samutal
Looking Ahead: What ideas do you have for	taking this project out	to the public once this project is complete?
c F		
E E N(he		



REFINED ALTERNATIVE COMMENTS

PAC Meeting #3 February 20, 2019

Name: MANDY HAVEN

Organization: MGH RUMN'S ALCHITEUS

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions	ya.	gurd alts
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	yes	god all
Montana Avenue Road Diet (Division Street to 18 th Street)	tyes	mantana (23432) for 5/w



Downtown Traffic Study

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	ys.	
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	M.	Ald "painting" parling busis on Not suite of street blion 13th
Broadway Street Closure	temp. ency + 29th term	only
Looking Ahead: What ideas do you have for	taking this project out	to the public once this project is complete?
lets do it - develop phasing plan of	get utarted A	SATP (



Downtown Traffic Study

REFINED ALTERNATIVE COMMENTS

Name: JOE STOOT

Organization: DBA

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?	
North & South One-Way to Two-Way Street Conversions	UES	STEP AT A TIME, STARTING AT 21 AND MOVING. WEST	
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	YES	THIS SHOULD BE THE FIRST STAGE	
Montana Avenue Road Diet (Division Street to 18 th Street)	YES	DO TT. PUT IN BIKE TRACKS OR SHARROWS. OPINIONS ABOUT NOT HANDAR BIKES ARR OUTMODED	



Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	YES	RAISED BIKE PATH IS GOOD!
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	YES	NARROW, BILL PATH, ZTRAFFIC W/TURN LANE IS PERFECT
Broadway Street Closure	EH.	
Looking Ahead: What ideas do you have for PR PROBABLY WON'T BR DEFFICULT.		to the public once this project is complete? PLENTIFUL.



Downtown Traffic Study

Name: _	Kath	Easton	
Organiza	tion:	TOPA	

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions	YE S	
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	YES	
Montana Avenue Road Diet (Division Street to 18 th Street)	Maybe	not as important to add lenke facilities but I also have my concern which so and don't see a challenge which powers



Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	Yes	
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	gwe	
Broadway Street Closure	Maybe	needs more programming at any and loss please.
Looking Ahead: What ideas do you have for	taking this project out	to the public once this project is complete?



Name: Selo	ra tagel	
Organization:	MET Transit	

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions	yes	
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	ys	
Montana Avenue Road Diet (Division Street to 18 th Street)	yes	



Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	yes	
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	yes	
Broadway Street Closure	yes	
Looking Ahead: What ideas do you have for	taking this project out	to the public once this project is complete?



Downtown Traffic Study

REFINED ALTERNATIVE COMMENTS

Name: Elyse Monot

Organization: C/C Planning

Sidwa miss anything?

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions	Yes	I would like to see Some 50 /t of bike facility on 26m, 30m, and 32 nd as true and all included in the Bike way + Trail Mask plans Billings VMCA is on N 32 nd and proper always cross midblock from the V to the parking lot, so this or ignit be something to trail into consideration.
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	Yes	There are really some of the colour steets; of down town. They have been designated to have bike laws, some bithred/seperated in our Bike way + trail plan soit is important we follow up to this to provide an option or people biking to trave I from east to west and vie versa.
Montana Avenue Road Diet (Division Street to 18 th Street)	Yes!	Bike not Trail Plan calls for a bike lone on Montaray Some buffered Speeds are so fast on Montana, that I think it would make Deople biking feel much sake to have some Sout of aphysical buffer.



Downtown Traffic Study

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	Yes	People on going to need a significant buffer to full safer walking/biking on 6th. This will be the only connection from the Heights Soit is important to make paper of all comfort levels fee I safe conformic and projected.
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	Yes	This is an important part of the bikuped connection from down town. Since this would really be to only connection, it is impossed that it be comfortable for all.
Broadway Street Closure	Yes	Think this would be got to be gote to do, at least come of the options you stood should that are more formal than just some signs, but still removable.
Looking Ahead: What ideas do you have for Pop-up de monstration projects w get mere people out and partice		
	Cross-seedion	on of people after these events and



REFINED ALTERNATIVE COMMENTS

Name: Zach Kirke no
Organization: MDT - Billings

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
North & South One-Way to Two-Way Street Conversions	tes	made souse, nothing to all
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	Yes	made sense, nothing to add
Montana Avenue Road Diet (Division Street to 18 th Street)	yes	make sure EB right-tun laves at RR crossings have adequate storage when a train blocks crossings.



Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	Yes	made sense, withing to add
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	yes	made sense, nothing to add
Broadway Street Closure	1 May be	containe ul temporary closieres
Looking Ahead: What ideas do you have for	taking this project out	to the public once this project is complete?
Alternatives (Yes / No / Maybe) Do the cross sections make sense? Any changes to what we shared? Fes Made sense, withing to all made sense, nothing to all controve of temporary chosenes May be		
7 / / /	1 1 1 1	



REFINED ALTERNATIVE COMMENTS

Name: Mike Tuss

Organization: CTA Architects Engineers

Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?						
North & South One-Way to Two-Way Street Conversions	Yes	Need to find a way to convert these streets as soon as possible. Michael Sanderson will quote statistics where the one-ways are more safe for pedestrians. However, the trade-off is a downtown that is not vehicle or pedestrian or retailer friendly.						
2 nd Ave N & 3 rd Ave N One-Way to Two-Way Street Conversions	Yes	We need to find a way to get this done soon. The transition that occurs at 22nd is a death waiting to happen. It is not uncommon to find a vehicle in the wrong lane as far west as 24th. The road diet should happen along with other traffic calming						
Montana Avenue Road Diet (Division Street to 18 th Street)	Yes	The road diet should happen along with other traffic calming measures. Consideration should be given to a bike lane on the north side. Otherwise, the closest good east/west biking street will be 2 blocks north which does little to support alternative modes on Montana. I have biked this street. It is the most bike unfriendly street in the downtown.						



Alternatives	Support? (Yes / No / Maybe)	Did we miss anything? Do the cross sections make sense? Any changes to what we shared?
6 th Avenue North Road Diet – 13 th Street to Main Street	Yes	I was disappointed that alternative modes were not included west of 13th. There is plenty of road width. As it exists, this is a very unfriendly street to all users and encourages high rates of speed. Your approach should be reevaluated.
13 th Street Road Diet – 6 th Avenue North to 1 st Avenue North	Yes	The goal of the EBURD zoning code is to create a main street atmosphere on 13th. The current street width creates a highway atmosphere. A narrower and more pedestrian-friendly street is the goal.
Broadway Street Closure	Yes	I like the concept of temporary closures using tree planters as barriers. We would acquire a larger forklift to move the planters. They would be stored each side of the street, taking up a parking space when not in use.
Looking Ahead: What ideas do you have for	taking this project out	to the public once this project is complete?



PMT Meeting #3 Notes

Downtown Traffic Study, Billings

Work Order 18-09

Friday, March 8, 2019 - 2:00 to 3:00 PM

Phone Conference

The purpose of this meeting is to reflect on PAC Meeting #3, review comments that we've received from the PAC regarding the refined alternatives and discuss approach to completing the study and study report.

- Erin Claunch City of Billings
- Brett Korporaal Kittelson & Associates, Inc.
- Andy Daleiden Kittelson & Associates, Inc.
- Doug Enderson DOWL
- Sarah Patterson DOWL
- 1. PAC Meeting #3 Reflections
 - a. Good meeting and discussion;
 - b. Helpful feedback and guidance for completing Study Report
- 2. Comments on Refined Alternatives and Cross Sections
 - a. PAC comment summary
 - i. Brett created and reviewed a spreadsheet with this information.
 - ii. Consider adding discussion to Study Report about what could be considered on 6th Avenue west of 13th Street. Explore lane widths, parking changes, etc. to provide a bike facility
 - iii. Cross section options
 - 1. PAC comments helps to inform this study, but we want to keep all options on the table Let's not publish this information at this time
 - 2. Highlight PAC support keep it at this level.
 - 3. Are MDT's comments included this in this item?
 - a. Yes.
 - b. City's thoughts and comments
 - i. Helpful to understand what works from a traffic operations perspective
 - ii. Important to know what the PAC supports and possibilities for moving alternatives forward in the future
- 3. Refined Alternatives Follow Up
 - a. North and South One-Way to Two-Way Conversion
 - i. Include discussion about MUTCD signal warrants for new traffic signals
 - 1. These need to be investigated at the next level during final design.



b. Montana Avenue

- i. Add another cross-section option with parking on both sides of the street and no bike lane (east of 27th St)
 - 1. Yes. Add this option.
 - 2. Remove this option: angle parking (north side) and no parallel parking (south side) and bike lanes on the north side.
- ii. Continue to assess the queues with a train event for determining the length of the right turn lanes at 29th St and 27th St
 - Refined analysis is being looked at as part of the 27th St Railroad Crossing Study
 - 2. Brett followed up with Nick at MRL regarding a train log, so that we can refine our analysis for estimating 95th percentile queues and understanding the length of right turn lanes.
- c. Planning level cost estimates
 - i. How would we like to refine them?
 - 1. It's good to mention potential savings about doing multiple projects at the same time in the projects. Percentages are okay right now.
 - 2. The order of magnitude is helpful and seems to be reasonable.
 - 3. Side streets \rightarrow use a chipseal concept versus mill/overlay
 - 4. PAVER Program
 - a. Downtown streets
 - b. Action: Erin will provide the timeline/cycle of streets within the PAVER Program.
 - 5. Let's not rework the numbers; but add a strong discussion about the various cost savings options and explain the assumptions.
 - 6. This is 2018 dollars (no inflation).

4. Report Development

- a. What is the intended audience for the report?
 - i. Internal, but will likely get rolled out to the public and other groups.
- b. What would be most helpful for the City's future decision making?
 - i. Brett provided an overview of the report.
 - 1. Introduction
 - 2. Stakeholder process
 - 3. Existing and Future Conditions
 - 4. Alternatives
 - a. What worked? What does not?
 - Traffic operations LOS and v/c graphic (use these figures from the analysis)
 - c. Planning level cost estimates
 - 5. Refined Alternatives (individual chapter/section) refer to example slip sheet
 - a. Traffic impacts
 - i. Add LOS #'s It goes from XX to YY with the changes.
 - ii. Add representative queues
 - iii. Add travel time
- c. Example layout for refined alternative in the report

Kittelson & Associates, Inc. Boise, Idaho

i. Good example; user friendly and include the traffic operations/LOS information in the report.

d. Implementation?

- i. Effectively present the various options going forward to elected officials and the public.
- ii. Discussion about costs in the report, what projects are already occurring as part of the PAVER program, other City/MDT projects, and private partnerships.
- iii. Should this be discussed as Next Steps; No need to include an implementation/next steps section...Include it as a closing discussion (1-2 paragraphs)

5. Summary of Action Items from Today's Meeting

• Action: Erin will provide the timeline/cycle of streets within the PAVER Program.

Kittelson & Associates, Inc. Boise, Idaho

Appendix G

Planning Level Cost Estimates

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 33rd, 34th, & 35th Streets with Parallel Parking



Engineer's Estimate - Conceptual

repared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019			
		This Estimate has a Rating of:	2B	(See rating scale guide b			below.)	
	ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE		TOTAL COST		
	To a supplier of the supplier	T						
1	Cold Milling - Asphalt, 2"	SY	21,890	\$	1.29	\$	28,238.1	
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	2,482	\$	117.00	_	290,432.1	
3	SS-1 Asphalt Tack Coat	GAL	1,095	\$	2.85	\$	3,119.3	
4	Concrete Curb and Gutter	LF	0	\$	41.74	٠.	-	
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	-	
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-	
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	0	\$	7,692.92	\$	-	
8	Concrete Accessibility Ramp, 6"	EACH	6	\$	861.56		5,169.3	
9	Detectable Warning Panels	EACH	18	\$	301.60	\$	5,428.8	
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	136	\$	450.00	\$	61,200.0	
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	11,768	\$	1.22	\$	14,356.9	
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-	
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	2,750	\$	11.77	\$	32,367.5	
14	Epoxy White Turn Lane Symbol - Arrows	EACH	0	\$	59.00	\$	-	
15	Existing Traffic Signal System Modification	LS	0	\$	30,000	\$	-	
16	New Traffic Signal System	LS	0	\$	175,000	\$	-	
17	Signing - Urban	% of Subtotal A	2%	\$	440,312	<u> </u>	8,806.2	
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	440,312	<u> </u>	8,806.2	
19	Utility Relocation	% of Subtotal A	5%	\$	440,312	_	22,015.6	
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	440,312	_	26,418.7	
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	440,312	\$	30,821.8	
					Subtotal B	\$	96,86	
22	Dight of Way Area	SF	0	\$	20.00	خ		
23	Right-of-Way Area	% of Subtotal A & B	2%	\$	537,181	\$	10,743.6	
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	537,181	٠.	10,743.6	
24	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	537,181	\$	107,500.0	
					Subtotal C	\$	118,24	
			TOTA	L PR	OJECT SUBTOTAL	\$	655,42	
					20% Contingency	ć	131,0	
					20% Contingency	٧.		

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%. **Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 33rd, 34th, & 35th Streets with Parallel Parking (No Milling and Overlay)



Engineer's Estimate - Conceptual

epared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		This Estimate has a Rating of:	2B	(See	rating scale guide l	nelos	A/)
	ITEM	UNIT	TOTAL QUANTITY	LINIT PRICE		TOTAL COST	
1	Cold Milling - Asphalt, 2"	SY	0	\$	1.29	\$	-
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	0	\$	117.00		-
3	SS-1 Asphalt Tack Coat	GAL	0	\$	2.85	\$	-
4	Obliterate Existing Striping	LS	14	\$	2,784.38	\$	38,981.
5	Concrete Curb and Gutter	LF	0	\$	41.74	\$	-
6	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-
7	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-
8	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	0	\$	7,692.92	\$	-
9	Concrete Accessibility Ramp, 6"	EACH	6	\$	861.56	\$	5,169.
10	Detectable Warning Panels	EACH	18	\$	301.60	\$	5,428.
11	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$	450.00	\$	-
12	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	11,768	\$	1.22	\$	14,356.
13	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	_
14	24" Epoxy, White (Crosswalks and Stop Bars)	LF	2,750	\$	11.77	\$	32,367.
15	Epoxy White Turn Lane Symbol - Arrows	EACH	0	\$	59.00	\$	-
16	Existing Traffic Signal System Modification	LS	0	\$	30,000	\$	-
17	New Traffic Signal System	LS	0	\$	175,000	\$	-
					Subtotal A	\$	96,3
18	Signing - Urban	% of Subtotal A	2%	\$	96,304	\$	1,926.
19	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	96,304	\$	1,926.
20	Utility Relocation	% of Subtotal A	5%	\$	96,304	\$	4,815.
22	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	96,304	\$	5,778.
21	Mobilization / Demobilization	% of Subtotal A	7%	\$	96,304	\$	6,741.
					Subtotal B	\$	21,1
23	Right-of-Way Area	SF	0	\$	20.00	\$	
24	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	117,491	_	2,349.
25	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	117,491	\$	23,500.
					Subtotal C	\$	25,8
			TOTA	L PR	OJECT SUBTOTAL	\$	143,3
					20% Contingency	\$	28,6

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%. **Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 26th, 30th, & 32nd Streets with Sharrows & Parallel Parking



Engineer's Estimate - Conceptual

	d By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE			Date: February 2019						
		This Estimate has a Rating of:	2B	(See	(See rating scale guide below.)					
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE	T	OTAL COS			
	To the sum of the sum	T								
1	Cold Milling - Asphalt, 2"	SY	33,880	\$	1.29	\$				
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	3,842	\$	117.00		449,513.0			
3	SS-1 Asphalt Tack Coat	GAL	1,694	\$	2.85	\$	4,827.9			
4	Concrete Curb and Gutter	LF	0	\$	41.74	٠.	-			
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	·	-			
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-			
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	40	\$	7,692.92	·	307,716.8			
8	Concrete Accessibility Ramp, 6"	EACH	6	\$	861.56	\$	5,169.3			
9	Detectable Warning Panels	EACH	6	\$	301.60	\$	1,809.6			
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$	450.00	_	-			
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	15,442	\$	1.22	\$	18,839.2			
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-			
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	3,500	\$	11.77	\$	41,195.0			
14	Epoxy White Turn Lane Symbol - Arrows	EACH	130	\$	59.00	\$	7,670.0			
15	Existing Traffic Signal System Modification	LS	13	\$	30,000	\$	390,000.0			
16	New Traffic Signal System	LS	1	\$	175,000	\$	175,000.0			
	To a sure					_				
17	Signing - Urban	% of Subtotal A	2%	\$	1,445,446	\$	28,908.9			
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,445,446	\$	28,908.9			
19	Utility Relocation	% of Subtotal A	5%	\$	1,445,446	\$	72,272.3			
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	1,445,446	\$				
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	1,445,446	\$	101,181.2			
							317,99			
					Subtotal B	\$	317,99			
22	District War Asso	- CT		ı d			517,99			
22	Right-of-Way Area	SF OVERSTAND BY	0	\$	20.00	\$	-			
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	20.00 1,763,444	\$	35,268.8			
	,			_	20.00	\$	35,268.8			
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	20.00 1,763,444	\$ \$	35,268.8			
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2% 20%	\$	20.00 1,763,444 1,763,444	\$ \$ \$	35,268.i 352,700.i			
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2% 20%	\$	20.00 1,763,444 1,763,444 Subtotal C	\$ \$	35,268. 352,700. 387,9			

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 26th, 30th, & 32nd Streets with Buffer Bike Lane & Parallel Parking



repared	pared By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE				Date: February 2019						
		This Estimate has a Rating of:	2B	2B (See rating scale guide b							
	ITEM	UNIT	TOTAL QUANTITY	LINIT PRICE			OTAL COST				
1	Cold Milling - Asphalt, 2"	SY	33,880	\$	1.29	\$	43,705.20				
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	3,842	\$	117.00	\$	449,513.0				
3	SS-1 Asphalt Tack Coat	GAL	1,694	\$	2.85	\$	4,827.9				
4	Concrete Curb and Gutter	LF	0	\$	41.74	\$	-				
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-				
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-				
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	40	\$	7,692.92	\$	307,716.8				
8	Concrete Accessibility Ramp, 6"	EACH	6	\$	861.56	\$	5,169.3				
9	Detectable Warning Panels	EACH	6	\$	301.60	\$	1,809.6				
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	208	\$	450.00	\$	93,600.0				
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	13,880	\$	1.22	\$	16,933.6				
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	24,640	\$	2.37	\$	58,396.8				
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	3,500	\$	11.77	\$	41,195.0				
14	Epoxy White Turn Lane Symbol - Arrows	EACH	68	\$	59.00	\$	4,012.0				
15	Existing Traffic Signal System Modification	LS	13	\$	30,000	Ś	390,000.0				
16	New Traffic Signal System	LS	1	\$	175,000	-	175,000.0				
					Subtotal A						
17	Signing - Urban	% of Subtotal A	2%	\$	1,591,879	\$	31,837.5				
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,591,879	\$	31,837.5				
19	Utility Relocation	% of Subtotal A	5%	\$	1,591,879	\$	79,593.9				
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	1,591,879	\$	95,512.7				
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	1,591,879	\$	111,431.5				
					Subtotal B	\$	350,21				
22	le: L. CW. A				20.22						
22	Right-of-Way Area	SF OF SELECTION OF SE	0	\$	20.00		-				
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	1,942,093	\$	38,841.8				
24	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	1,942,093	\$	388,500.0				
					Subtotal C	\$	427,34				
			TOTA	AL PF	OJECT SUBTOTAL	\$	2,369,43				
					20% Contingency	\$	473,89				

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 29th & 31st with Parallel and Angled Parking



Engineer's Estimate - Conceptual

Prepared	red By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE				019								
		This Estimate has a Ratina of: 2B		/C -	See rating scale quide below.)								
_		This Estimate has a Rating of:	TOTAL	(See	e rating scale guide t	рею	w.)						
	ITEM	UNIT	QUANTITY		UNIT PRICE	TO	OTAL COST						
1	Cold Milling - Asphalt, 2"	SY	24,200	\$	1.29	\$	31,218.00						
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	2,744	\$	117.00	\$	321,080.76						
3	SS-1 Asphalt Tack Coat	GAL	1,210	\$	2.85	\$	3,448.50						
4	Concrete Curb and Gutter	LF	0	\$	41.74	\$	-						
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-						
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-						
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	28	\$	7,692.92	\$	215,401.76						
8	Concrete Accessibility Ramp, 6"	EACH	8	\$	861.56	\$	6,892.48						
9	Detectable Warning Panels	EACH	8	\$	301.60	\$	2,412.80						
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$	450.00	\$	-						
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	13,372	\$	1.22	\$	16,313.84						
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-						
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	2,375	\$	11.77	\$	27,953.75						
14	Epoxy White Turn Lane Symbol - Arrows	EACH	41	\$	59.00	\$	2,419.00						
15	Existing Traffic Signal System Modification	LS	9	\$	30,000	\$	270,000.00						
16	New Traffic Signal System	LS	2	\$	175.000	_	350,000.00						
	la company			1 4									
17	Signing - Urban	% of Subtotal A	2%	\$	1,247,141	\$	24,942.82						
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,247,141	_							
19	Utility Relocation	% of Subtotal A	5%	\$	1,247,141	\$	62,357.04						
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	1,247,141	\$	74,828.45						
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	1,247,141	\$	87,299.86						
					Subtotal B	\$	274,371						
	The state of the s												
22	Right-of-Way Area	SF	0	\$	20.00		-						
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	1,521,512	\$	30,430.24						
24	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	1,521,512	\$	304,400.00						
					Subtotal C	\$	334,83						
			TOTA	L PF	OJECT SUBTOTAL	\$	1,856,342						
					20% Contingency	\$	371,27						
			FOTAL FOTU	AAT	ED DDOLECT COST	ć.	2 227 64						
			IOTAL ESTI	VIAI	ED PROJECT COST	Ş	Z, 227,61						

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%. **Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 25th Street with Sharrow & Parking



Engineer's Estimate - Conceptual

repared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE			ary 2	019							
		This Estimate has a Rating of:	2B	(See rating scale guide below.)								
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE	T	OTAL COS					
			ı	T .								
1	Cold Milling - Asphalt, 2"	SY	9,735	\$	1.29	\$	•					
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	1,104	\$	117.00	-	129,162.					
3	SS-1 Asphalt Tack Coat	GAL	487	\$	2.85	\$	1,387.					
4	Concrete Curb and Gutter	LF	0	\$	41.74	\$	-					
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-					
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-					
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	12	\$	7,692.92	\$	92,315.					
8	Concrete Accessibility Ramp, 6"	EACH	2	\$	861.56	\$	1,723.					
9	Detectable Warning Panels	EACH	2	\$	301.60	\$	603.					
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$	450.00	\$	-					
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	4,145	\$	1.22	\$	5,056.					
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-					
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	1,125	\$	11.77	\$	13,241.					
14	Epoxy White Turn Lane Symbol - Arrows	EACH	42	\$	59.00	\$	2,478.					
15	Existing Traffic Signal System Modification	LS	1	\$	30,000	\$	30,000.					
16	New Traffic Signal System	LS	2	\$	175.000	\$	350,000.0					
	la					1						
17	Signing - Urban	% of Subtotal A	2%	\$	638,524	\$	12,770.					
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	638,524	_	12,770.					
19	Utility Relocation	% of Subtotal A	5%	\$	638,524	_	31,926.					
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	638,524	_	38,311.					
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	638,524	\$	44,696.					
					Subtotal B	\$	140,4					
22	Right-of-Way Area	SF	0	\$	20.00	Ś						
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	779.000	\$	15,579.					
24	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	779,000		- ,					
					Subtotal C	ć	171,3					
			TOTA	AL PR	OJECT SUBTOTAL	\$	950,3					
					20% Contingency	\$	190,0					
			TOTAL ESTIN	ΜΔΤ	ED PROJECT COST	ć	1 1/10 /					

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%. **Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction

Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations North and South Street One-Way to Two-Way Street Conversions 25th Street with Buffered Bike Lane



Engineer's Estimate - Conceptual

	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		71:5::		10			,
		This Estimate has a Rating of:	2B TOTAL	(See	rating scale guide l	pelo	w.)
	ITEM	UNIT	QUANTITY		UNIT PRICE	T	OTAL COST
1	Cold Milling - Asphalt, 2"	SY	9,735	\$	1.29	\$	12,558.15
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	1,104	\$	117.00	_	129,162.03
3	SS-1 Asphalt Tack Coat	GAL	487	\$	2.85	\$	1,387.24
4	Concrete Curb and Gutter	LF	0	\$	41.74		-
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	-
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	12	\$	7,692.92	\$	92,315.04
8	Concrete Accessibility Ramp, 6"	EACH	2	\$	861.56		1,723.12
9	Detectable Warning Panels	EACH	2	\$	301.60	\$	603.20
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	35	\$	450.00	\$	15,750.00
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	3,803	\$	1.22	\$	4,639.05
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	8,448	\$	2.37	\$	20,021.76
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	1,125	\$	11.77	\$	13,241.2
14	Epoxy White Turn Lane Symbol - Arrows	EACH	0	\$	59.00	\$	-
15	Existing Traffic Signal System Modification	LS	1	\$	30,000	\$	30,000.00
16	New Traffic Signal System	LS	2	\$	175,000	\$	350,000.00
					Subtotal A	\$	671,401
	To a second						
17	Signing - Urban	% of Subtotal A	2%	\$	671,401	\$	13,428.02
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	671,401 671,401	\$	13,428.02 13,428.02
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	671,401 671,401 671,401	\$ \$ \$	13,428.02 13,428.02 33,570.04
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$ \$	671,401 671,401 671,401 671,401	\$ \$ \$ \$	13,428.02 13,428.02 33,570.04 40,284.05
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	671,401 671,401 671,401	\$ \$ \$	13,428.02 13,428.02 33,570.04 40,284.05 46,998.06
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$ \$	671,401 671,401 671,401 671,401	\$ \$ \$ \$	13,428.02 13,428.02 33,570.04 40,284.05
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$	671,401 671,401 671,401 671,401 671,401 Subtotal B	\$ \$ \$ \$ \$	13,428.02 13,428.02 33,570.04 40,284.09 46,998.06
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	671,401 671,401 671,401 671,401 671,401 Subtotal B	\$ \$ \$ \$	13,428.0: 13,428.0: 33,570.0- 40,284.0: 46,998.00 147,708
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	671,401 671,401 671,401 671,401 671,401 571,401 Subtotal B	\$ \$ \$	13,428.02 13,428.02 33,570.04 40,284.05 46,998.06 147,708
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	671,401 671,401 671,401 671,401 671,401 571,401 Subtotal B	\$ \$ \$	13,428.02 13,428.02 33,570.04 40,284.09 46,998.00
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	671,401 671,401 671,401 671,401 671,401 571,401 Subtotal B	\$ \$ \$ \$	13,428.0: 13,428.0: 33,570.0- 40,284.0: 46,998.0: 147,70:
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	671,401 671,401 671,401 671,401 671,401 671,401 Subtotal B 20.00 819,109	\$ \$ \$	13,428.0 13,428.0 33,570.0 40,284.0 46,998.0 147,70 - 16,382.1 163,900.0
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	671,401 671,401 671,401 671,401 671,401 Subtotal B 20.00 819,109 819,109	\$ \$ \$ \$ \$ \$	13,428.0 13,428.0 33,570.0 40,284.0 46,998.0 147,70 - 16,382.1 163,900.0

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations 2nd Ave N & 3rd Ave N One-Way to Two-Way Street Conversions Buffered Bike Lane with Parallel Parking



Engineer's Estimate - Conceptual

	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		This Estimate has a Rating of:	2B	(500	rating scale guide b	helo	nw)
	ITEM	UNIT	TOTAL QUANTITY	Joec	UNIT PRICE		OTAL COS
			T				
1	Cold Milling - Asphalt, 2"	SY	52,635	\$	1.29	\$	67,899.
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	5,969	\$	117.00	\$	698,350.
3	SS-1 Asphalt Tack Coat	GAL	2,632	\$	2.85	<u> </u>	7,500.
4	Concrete Curb and Gutter	LF	0	\$	41.74		-
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	48	\$	7,692.92	\$	369,260.3
8	Concrete Accessibility Ramp, 6"	EACH	10	\$	861.56	\$	8,615.0
9	Detectable Warning Panels	EACH	10	\$	301.60	\$	3,016.0
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	183	\$	450.00	\$	82,350.0
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	26,940	\$	1.22	\$	32,866.8
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	38,280	\$	2.37	\$	90,723.6
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	6,250	\$	11.77	\$	73,562.5
14	Epoxy White Turn Lane Symbol - Arrows	EACH	106	\$	59.00	\$	6,254.0
15	Existing Traffic Signal System Modification	LS	10	\$	30,000	\$	300,000.0
16	New Traffic Signal System	LS	3	\$	175,000	\$	525,000.0
					Subtotal A	\$	2,265,39
17	Cissias, Ushan	0/ of Cubtotal A	20/	٤			
17	Signing - Urban	% of Subtotal A	2%	\$	2,265,399	\$	45,307.9
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	2,265,399 2,265,399	\$	45,307.9 45,307.9
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	2,265,399 2,265,399 2,265,399	\$ \$	45,307.9 45,307.9 113,269.9
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$	2,265,399 2,265,399 2,265,399 2,265,399	\$ \$ \$ \$	45,307.9 45,307.9 113,269.9 135,923.9
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	2,265,399 2,265,399 2,265,399	\$ \$ \$ \$	45,307.9 45,307.9 113,269.9 135,923.9 158,577.9
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$	2,265,399 2,265,399 2,265,399 2,265,399	\$ \$ \$ \$ \$	45,307.9 45,307.9 113,269.9 135,923.9 158,577.9
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 Subtotal B	\$ \$ \$ \$ \$	45,307.9 45,307.9 113,269.9 135,923.9 158,577.9
18 19 21 20 22	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 Subtotal B	\$ \$ \$	45,307.9 45,307.9 113,269.9 135,923.9 158,577.9
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 Subtotal B	\$ \$ \$ \$	45,307.9 45,307.9 113,269.9 135,923.9 158,577.9
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 Subtotal B	\$ \$ \$ \$	45,307.45,307.45,307.413,269.135,923.158,577.498,34
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 Subtotal B 20.00 2,763,787 2,763,787	\$ \$ \$	45,307. 45,307. 113,269. 135,923. 158,577. 498,3
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	2,265,399 2,265,399 2,265,399 2,265,399 2,265,399 Subtotal B 20.00 2,763,787 2,763,787	\$ \$ \$ \$	45,307. 45,307. 113,269. 135,923. 158,577. 498,3

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations 2nd Ave N & 3rd Ave N One-Way to Two-Way Street Conversions Sharrow with Parallel Parking



Enaineer's Estimate - Conceptual

repared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	2019	_	
		This Estimate has a Rating of:	2B	(See	e rating scale quide l	belo	w.)
	ITEM	UNIT	TOTAL QUANTITY	,	UNIT PRICE	TO	OTAL COS
	To the way to be all	1 64		1 4		_	
1	Cold Milling - Asphalt, 2"	SY	52,635	\$	1.29	\$	67,899.3
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	5,969	\$	117.00	_	698,350.
3	SS-1 Asphalt Tack Coat	GAL	2,632	\$	2.85	\$	7,500.
4	Concrete Curb and Gutter	LF	0	\$	41.74	٠.	
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	-
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	_	-
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	48	\$	7,692.92	_	369,260.
8	Concrete Accessibility Ramp, 6"	EACH	10	\$	861.56	\$	8,615.
9	Detectable Warning Panels	EACH	10	\$	301.60	\$	3,016.
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$	450.00	\$	-
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	27,700	\$	1.22	\$	33,794.0
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	6,250	\$	11.77	\$	73,562
14	Epoxy White Turn Lane Symbol - Arrows	EACH	106	\$	59.00	\$	6,254.
15	Existing Traffic Signal System Modification	LS	10	\$	30,000	\$	300,000.0
16	New Traffic Signal System	LS	3	\$	175,000	\$	525,000.0
					Subtotal A		
17	Signing - Urban	% of Subtotal A	2%	\$	2,093,253	\$	41,865.0
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	2,093,253	\$	41,865.0
19	Utility Relocation	% of Subtotal A	5%	\$	2,093,253	\$	104,662.6
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	2,093,253	\$	125,595.3
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	2,093,253	\$	146,527.0
					Subtotal B	\$	460,51
22	Right-of-Way Area	SF	0	\$	20.00	ć	
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$	2,553,768	\$	51,075.
24	Engineering Design & Construction Management	% of Subtotal A & B	2%	\$	2,553,768	_	51,075
24	Engineering besign & construction Management	% OI SUDIOIAI A & B	20%	Ş	2,553,768	Ş	510,800.0
					Subtotal C	\$	561,8
			тот	AL PI	ROJECT SUBTOTAL	\$	3,115,6
					20% Contingency	\$	623,1
			TOTAL ESTI	MAT	ED PROJECT COST	\$	3,738,7

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%. **Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction

Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations 2nd Ave N & 3rd Ave N One-Way to Two-Way Street Conversions Sharrow with Center Turn Lane



Engineer's Estimate - Conceptual

	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		This Estimate has a Rating of:	2B	1500	rating scale guide b	helo	147.)
	ITEM	UNIT	TOTAL QUANTITY	Joce	UNIT PRICE		OTAL COS
			T				
1	Cold Milling - Asphalt, 2"	SY	52,635	\$	1.29	\$	67,899.
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	5,969	\$	117.00	\$	
3	SS-1 Asphalt Tack Coat	GAL	2,632	\$	2.85	\$	7,500.
4	Concrete Curb and Gutter	LF	0	\$	41.74	٠.	-
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	88	\$	7,692.92	\$	676,976.
8	Concrete Accessibility Ramp, 6"	EACH	16	\$	861.56	\$	13,784.9
9	Detectable Warning Panels	EACH	16	\$	301.60	\$	4,825.
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	183	\$	450.00	\$	82,350.0
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	41,208	\$	1.22	\$	50,273.
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	6,250	\$	11.77	\$	73,562.5
14	Epoxy White Turn Lane Symbol - Arrows	EACH	206	\$	59.00	\$	12,154.
15	Existing Traffic Signal System Modification	LS	10	\$	30,000	\$	300,000.
16	New Traffic Signal System	LS	3	\$	175.000	\$	525,000.0
					Subtotal A	\$	2,512,67
47	Circina Urban	Of at Cultural A	20/	ć			
17	Signing - Urban	% of Subtotal A	2%	\$	2,512,678	\$	50,253.
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	2,512,678 2,512,678	\$	50,253. 50,253.
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	2,512,678 2,512,678 2,512,678	\$ \$ \$	50,253 50,253 125,633
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	2,512,678 2,512,678 2,512,678 2,512,678	\$ \$ \$ \$	50,253.5 50,253.5 125,633.5 150,760.6
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	2,512,678 2,512,678 2,512,678 2,512,678	\$ \$ \$ \$	50,253.5
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	2,512,678 2,512,678 2,512,678 2,512,678	\$ \$ \$ \$	50,253. 50,253. 125,633. 150,760. 175,887.
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	2,512,678 2,512,678 2,512,678 2,512,678 2,512,678	\$ \$ \$	50,253. 50,253. 125,633. 150,760. 175,887.
18 19 21 20 22	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 Subtotal B	\$ \$ \$	50,253.: 50,253.: 125,633.: 150,760.: 175,887.:
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 Subtotal B	\$ \$ \$	50,253. 50,253. 125,633. 150,760. 175,887.
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 Subtotal B	\$ \$ \$ \$	50,253. 50,253. 125,633. 150,760. 175,887. 552,7 61,309. 613,100.
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 Subtotal B 20.00 3,065,467 3,065,467	\$ \$ \$	50,253 50,253 125,633 150,760 175,887 552,7 61,309 613,100
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 2,512,678 Subtotal B 20.00 3,065,467 3,065,467 Subtotal C	\$ \$ \$ \$	50,253 50,253 125,633 150,760 175,887 552,7 61,309 613,100 674,4

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations Montana Avenue Road Diet

30th-35th Streets with Separated Bike Lane with Parallel Parking



Enaineer's Estimate - Conceptual

repared i	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	2019	_	
		This Estimate has a Rating of:	2B	(Se	e rating scale guide l	belo	w.)
	ITEM	UNIT	TOTAL QUANTITY	,	UNIT PRICE	TC	OTAL COS
			1				
1	Cold Milling - Asphalt, 2"	SY	8,151	\$	1.29	\$	10,514.7
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	924	\$	117.00		108,145.8
3	SS-1 Asphalt Tack Coat	GAL	408	\$	2.85	\$	1,161.5
4	Concrete Curb and Gutter	LF	0	\$	41.74		
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	
6	Raised Median - Decorative Concrete, 6"	SF	20,900	\$	55.00		!#######
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	10	\$	7,692.92	\$	76,929.2
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	-
9	Detectable Warning Panels	EACH	0	\$	301.60	· ·	-
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	68	\$	450.00	\$	30,600.0
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	3,522	\$	1.22	\$	4,296.8
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	1,250	\$	11.77	\$	14,712.5
14	Epoxy White Turn Lane Symbol - Arrows	EACH	12	\$	59.00	\$	708.0
15	Existing Traffic Signal System Modification	LS	1	\$	10,000	\$	10,000.0
16	New Traffic Signal System	LS	0	\$	175,000	\$	-
					Subtotal A	\$	1,406,56
17	Signing - Urban	% of Subtotal A	2%	\$	1,406,569	\$	28,131.3
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,406,569	\$	28,131.3
19	Utility Relocation	% of Subtotal A	5%	\$	1,406,569	\$	70,328.4
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	1,406,569	\$	84,394.1
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	1,406,569	\$	98,459.8
					Subtotal B	\$	309,44
22	Right-of-Way Area	SF	0	\$	20.00	ċ	_
23		% of Subtotal A & B	2%	\$	1,716,014	-	34,320.2
23	Construction/Right-of-Way Easement Area Engineering Design & Construction Management	% of Subtotal A & B	2%	\$	1,716,014	_	34,320.2
24	Engineering besign & construction Management	% OI SUDIOIAI A & B	20%	Ş	1,716,014	Ş	343,300.0
					Subtotal C	\$	377,62
			TOT	AL PI	ROJECT SUBTOTAL	\$	2,093,63
					20% Contingency	\$	418,73
			TOTAL ESTI	MAT	ED PROJECT COST	\$	2,512,3

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations Montana Avenue Road Diet

30th-35th Streets with Cycle Track and Parking



Engineer's Estimate - Conceptual

	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 20	019		
		This Estimate has a Rating of:	2B	(See	rating scale guide b	pelo	w.)
	ІТЕМ	UNIT	TOTAL QUANTITY		UNIT PRICE	T	OTAL CO
	To the sum of the sum	1					
1	Cold Milling - Asphalt, 2"	SY	8,778	\$	1.29	\$	11,323
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	995	\$	117.00	_	116,464
3	SS-1 Asphalt Tack Coat	GAL	439	\$	2.85	\$	1,250
4	Concrete Curb and Gutter	LF	0	\$	41.74		
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	
6	Raised Median - Decorative Concrete, 6"	SF	15,200	\$	55.00	\$	836,000
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	0	\$	7,692.92	\$	
8	Concrete Accessibility Ramp, 6"	EACH	6	\$	861.56	\$	5,169
9	Detectable Warning Panels	EACH	10	\$	301.60	\$	3,016
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	39	\$	450.00	\$	17,550
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	3,334	\$	1.22	\$	4,066
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	1,250	\$	11.77	\$	14,712
14	Epoxy White Turn Lane Symbol - Arrows	EACH	0	\$	59.00	\$	
15	Existing Traffic Signal System Modification	LS	1	\$	10,000	\$	10,000
16	New Traffic Signal System	LS	0	Ś	175,000	Ś	
					Subtotal A	\$	1,019,5
17	Signing - Urban	% of Subtotal A	2%	\$	1,019,554	\$	20,391.
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,019,554 1,019,554	\$	20,391
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	1,019,554 1,019,554 1,019,554	\$ \$ \$	20,391 20,391 50,977
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	1,019,554 1,019,554 1,019,554 1,019,554	\$ \$ \$ \$	20,391 20,391 50,977 61,173
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	1,019,554 1,019,554 1,019,554 1,019,554	\$ \$ \$ \$	20,391
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	1,019,554 1,019,554 1,019,554 1,019,554	\$ \$ \$ \$ \$	20,391 20,391 50,977 61,173 71,368
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	1,019,554 1,019,554 1,019,554 1,019,554 1,019,554	\$ \$ \$ \$ \$	20,391 20,391 50,977 61,173 71,368
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A % of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6% 7%	\$ \$	1,019,554 1,019,554 1,019,554 1,019,554 1,019,554 Subtotal B	\$ \$ \$ \$ \$	20,391 20,391 50,977 61,173 71,368
18 19 21 20 22	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$	1,019,554 1,019,554 1,019,554 1,019,554 1,019,554 Subtotal B	\$ \$ \$ \$ \$	20,391 20,391 50,977 61,173 71,368
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	1,019,554 1,019,554 1,019,554 1,019,554 1,019,554 Subtotal B	\$ \$ \$ \$ \$	20,39 20,39 50,97 61,17 71,366 224,
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	1,019,554 1,019,554 1,019,554 1,019,554 1,019,554 Subtotal B 20.00 1,243,856 1,243,856	\$ \$ \$ \$ \$ \$	20,39: 20,39: 50,97: 61,17: 71,366: 224, 24,87: 248,800: 273,
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	1,019,554 1,019,554 1,019,554 1,019,554 1,019,554 Subtotal B 20.00 1,243,856 1,243,856	\$ \$ \$ \$ \$ \$ \$	20,39 20,39 50,97 61,17 71,36 224, 24,87 248,80

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations Montana Avenue Road Diet

27th-30th Streets with Separated Bike Lane and Parking



Enaineer's Estimate - Conceptual

repared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	2019	_	
		This Estimate has a Rating of:	2B	(See	e rating scale guide b	belo	w.)
	ITEM	UNIT	TOTAL QUANTITY	,	UNIT PRICE	TC	OTAL COS
			1				
1	Cold Milling - Asphalt, 2"	SY	6,138	\$	1.29	\$	7,918.0
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	696	\$	117.00	\$	81,437.
3	SS-1 Asphalt Tack Coat	GAL	307	\$	2.85	\$	874.
4	Concrete Curb and Gutter	LF	0	\$	41.74		-
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	
6	Raised Median - Decorative Concrete, 6"	SF	4,200	\$		_	231,000.
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	8	\$	7,692.92	\$	61,543.
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	-
9	Detectable Warning Panels	EACH	0	\$	301.60	\$	-
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	27	\$	450.00	\$	12,150.
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	1,421	\$	1.22	\$	1,733.
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	520	\$	11.77	\$	6,120.
14	Epoxy White Turn Lane Symbol - Arrows	EACH	10	\$	59.00	\$	590.
15	Existing Traffic Signal System Modification	LS	3	\$	10,000	\$	30,000.
16	New Traffic Signal System	LS	0	\$	175,000	\$	
					Subtotal A	Ÿ	433,30
17	Signing - Urban	% of Subtotal A	2%	\$	433,368	\$	8,667.
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	433,368	\$	8,667.
19	Utility Relocation	% of Subtotal A	5%	\$	433,368	\$	21,668.
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	433,368	\$	26,002.
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	433,368	\$	30,335.
					Subtotal B	\$	95,3
22	Dight of Way Area	SF	0	\$	20.00	ć	
23	Right-of-Way Area	% of Subtotal A & B	2%	\$		\$	10,574.
23	Construction/Right-of-Way Easement Area			\$	528,709	_	
24	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	528,709	\$	105,800.
					Subtotal C	\$	116,3
			тот	AL PE	ROJECT SUBTOTAL	\$	645,0
					20% Contingency	\$	129,0
			TOTAL ESTI	MAT	ED PROJECT COST	\$	774,1

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations Montana Avenue Road Diet

27th-30th Street with Cycle Track and Parking



Engineer's Estimate - Conceptual

parca	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		This Estimate has a Rating of:	2B	(See	rating scale guide b	nelov	w)
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE		OTAL CO
1	Cold Million - Applicate 20	CV.	C 402	ć	1 20	ć	0.250
1	Cold Milling - Asphalt, 2"	SY	6,402	\$	1.29	\$	8,258
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	726	\$	117.00	\$	84,940
3	SS-1 Asphalt Tack Coat	GAL	320	\$	2.85	\$	912
4	Concrete Curb and Gutter	LF	0	\$	41.74		
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	
6	Raised Median - Decorative Concrete, 6"	SF	1,800	\$	55.00	\$	99,000
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	8	\$	7,692.92	\$	61,543
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	
9	Detectable Warning Panels	EACH	0	\$			
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	27	\$	450.00	\$	12,150
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	1,403	\$	1.22	\$	1,711
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	520	\$	11.77	\$	6,120
14	Epoxy White Turn Lane Symbol - Arrows	EACH	10	\$		\$	590
15	Existing Traffic Signal System Modification	LS	3	\$	10,000	\$	30,000
16	New Traffic Signal System	LS	0	\$	175,000	\$	
			•				
					Subtotal A	\$	305,2
17	Signing - Urban	% of Subtotal A	2%	\$			305,2 6,104
17	Signing - Urban Taxes / Bonds / Insurance		2% 2%		305,226	\$	6,104
17 18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	305,226 305,226	\$	6,104 6,104
17 18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	305,226 305,226 305,226	\$ \$ \$	6,104 6,104 15,261
17 18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	305,226 305,226 305,226 305,226	\$ \$ \$ \$	6,104 6,104 15,261 18,313
17 18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	305,226 305,226 305,226	\$ \$ \$	6,104 6,104 15,261
17 18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	305,226 305,226 305,226 305,226	\$ \$ \$ \$ \$	6,104 6,104 15,261 18,313
17 18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B	\$ \$ \$	6,104 6,104 15,261 18,313 21,365
17 18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B	\$ \$ \$ \$ \$	6,104 6,104 15,261 18,313 21,365
17 18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B	\$ \$ \$ \$ \$	6,104 6,104 15,261 18,313 21,365 67,
17 18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B	\$ \$ \$ \$ \$	6,104 6,104 15,262 18,313 21,365 67,
17 18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B	\$ \$ \$ \$ \$	6,104 6,104 15,262 18,313 21,365
17 18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B 20.00 372,376	\$ \$ \$ \$ \$ \$ \$ \$ \$	6,10 6,10 15,26 18,31 21,36 67, 7,44 74,50
17 18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$	305,226 305,226 305,226 305,226 305,226 Subtotal B 20.00 372,376 372,376	\$ \$ \$ \$ \$ \$ \$	6,100 6,100 15,26 18,31 21,36 67, 7,44 74,50

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations Montana Avenue Road Diet

18th-27th Streets with Separated Bike Lane





			Date: Febru				
		This Estimate has a Rating of:	2B	(See	e rating scale guide b	belo	w.)
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE	T	OTAL CO
1	Cold Milling - Asphalt, 2"	SY	17,710	\$	1.29	\$	22,845
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	2,008	\$	117.00	_	234,972
3	SS-1 Asphalt Tack Coat	GAL	886	\$	2.85	\$	2,523
4	Concrete Curb and Gutter	LF	21,000	\$	41.74	\$	876,540
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	17	Ś		Ś	130,779
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	
9	Detectable Warning Panels	EACH	0	\$		_	
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	103	Ś	450.00	Ś	46,350
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	4,376	\$	1.22	\$	5,338
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-,
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	910	\$	11.77	<u> </u>	10,710
14	Epoxy White Turn Lane Symbol - Arrows	EACH	10	\$	59.00	_	590
15	Existing Traffic Signal System Modification	LS	0	\$	10,000	_	
16	New Traffic Signal System	LS	0	\$	175,000	·	
					Subtotal A	\$	1,330,6
17	Circuing Hebra	0/ of Cubtotal A	20/	خ			
17	Signing - Urban	% of Subtotal A	2%	\$	1,330,651	\$	26,613
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,330,651 1,330,651	\$	26,613 26,613
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	1,330,651 1,330,651 1,330,651	\$ \$	26,613 26,613 66,532
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651	\$ \$ \$ \$	26,613 26,613 66,532 79,839
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	1,330,651 1,330,651 1,330,651	\$ \$ \$ \$	26,613 26,613 66,532 79,839 93,145
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651	\$ \$ \$ \$	26,613 26,613 66,532 79,839 93,149
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 Subtotal B	\$ \$ \$ \$ \$	26,613 26,613 66,532 79,839 93,149
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 Subtotal B	\$ \$ \$ \$	26,613 26,613 66,532 79,833 93,145 292,
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 Subtotal B	\$ \$ \$ \$	26,613 26,613 66,532 79,839 93,145 292,
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 Subtotal B 20.00 1,623,394 1,623,394	\$ \$ \$ \$	26,61: 26,61: 66,53: 79,83: 93,14: 292, 32,46: 324,700
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 Subtotal B	\$ \$ \$ \$	26,61 26,61 66,53 79,83 93,14 292,
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 Subtotal B 20.00 1,623,394 1,623,394	\$ \$ \$	26,61 26,61 66,53 79,83 93,14 292, 32,46 324,70
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$	1,330,651 1,330,651 1,330,651 1,330,651 1,330,651 20.00 1,623,394 1,623,394	\$ \$ \$ \$	26,61 26,61 66,53 79,83 93,14 292, 32,46 324,70 357,

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

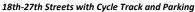
Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations Montana Avenue Road Diet





Engineer's Estimate - Conceptual

•	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		This Estimate has a Rating of:	2B	(See	rating scale guide b	helo	w)
	ITEM	UNIT	TOTAL QUANTITY	1300	UNIT PRICE		OTAL CO
1	Cold Milling - Asphalt, 2"	SY	18,095	\$	1.29	\$	23,342.
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	2,052	\$	117.00	_	240,080.
3	SS-1 Asphalt Tack Coat	GAL	905	\$	2.85	\$	2,578.
4	Concrete Curb and Gutter	LF	0	\$	41.74		-
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	\$	-
6	Raised Median - Decorative Concrete, 6"	SF	17,500	\$	55.00	\$	962,500.
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	17	\$	7,692.92	\$	130,779.
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	-
9	Detectable Warning Panels	EACH	0	\$	301.60	\$	-
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	103	\$	450.00	\$	46,350.0
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	4,376	\$	1.22	\$	5,338.1
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	910	\$	11.77	\$	10,710.
14	Epoxy White Turn Lane Symbol - Arrows	EACH	10	\$	59.00	\$	590.0
15	Existing Traffic Signal System Modification	LS	0	\$	10,000	\$	-
16	New Traffic Signal System	LS	0	\$	175,000	\$	-
			_		Subtotal A	\$	1,422,27
17	Signing - Urban	% of Subtotal A	2%	ć			
17	Signing - Urban	% of Subtotal A	2%	\$	1,422,270	\$	28,445.4
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	1,422,270 1,422,270	\$	28,445.4 28,445.4
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	1,422,270 1,422,270 1,422,270	\$ \$	28,445.4 28,445.4 71,113.5
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$	1,422,270 1,422,270 1,422,270 1,422,270	\$ \$ \$ \$	28,445. 28,445. 71,113. 85,336.
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	1,422,270 1,422,270 1,422,270	\$ \$	28,445.4 28,445.4 71,113.5 85,336.3 99,558.9
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$	1,422,270 1,422,270 1,422,270 1,422,270	\$ \$ \$ \$	28,445. 28,445. 71,113. 85,336. 99,558.
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$ \$	1,422,270 1,422,270 1,422,270 1,422,270 1,422,270	\$ \$ \$	28,445. 28,445. 71,113. 85,336. 99,558.
18 19 21 20 22	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	1,422,270 1,422,270 1,422,270 1,422,270 1,422,270 Subtotal B	\$ \$ \$	28,445 28,445 71,113 85,336 99,558
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A % of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6% 7%	\$ \$ \$	1,422,270 1,422,270 1,422,270 1,422,270 1,422,270 Subtotal B	\$ \$ \$	28,445. 28,445. 71,113. 85,336. 99,558. 312,8
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	1,422,270 1,422,270 1,422,270 1,422,270 1,422,270 Subtotal B	\$ \$ \$ \$	28,445 28,445 71,113 85,336 99,558 312,8
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	1,422,270 1,422,270 1,422,270 1,422,270 1,422,270 Subtotal B 20.00 1,735,170 1,735,170	\$ \$ \$	28,445 28,445 71,113 85,336 99,558 312,8 34,703 347,100
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	1,422,270 1,422,270 1,422,270 1,422,270 1,422,270 Subtotal B 20.00 1,735,170 1,735,170 Subtotal C	\$ \$ \$ \$	28,445 28,445 71,113 85,336 99,558 312,8 34,703 347,100

Scope Accuracy:

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Task 004 - Alternatives Development & Evaluation - Cost Estimations 6th Ave N Road Diet - 13th St to Main St Buffered Bike Lane



Engineer's Estimate - Conceptual

pared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Februa	ary 20	J19		
		This Estimate has a Rating of:	2B	(See	rating scale guide b	elo	w.)
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE	TC	OTAL CO
1	Cold Million, Applicate 20	SY	40.470	Ś	1.29	ć	25 446
1	Cold Milling - Asphalt, 2"		19,470			\$	25,116
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	2,208	\$	117.00	_	258,324
3	SS-1 Asphalt Tack Coat	GAL	974	\$	2.85	\$	2,774
4	Concrete Curb and Gutter	LF	0	\$	41.74	_	
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	•	
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	6	\$	7,692.92	\$	46,157
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	
9	Detectable Warning Panels	EACH	0	\$	301.60	\$	
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$		\$	
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	9,000	\$	1.22	\$	10,980
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	6,000	\$	2.37	\$	14,220
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	375	\$	11.77	\$	4,413
14	Epoxy White Turn Lane Symbol - Arrows	EACH	6	\$	59.00	\$	35
15	Existing Traffic Signal System Modification	LS	1	\$	10,000	\$	10,00
16	New Traffic Signal System	LS	0	Ś	175,000	\$	
10	New Hame Signal System	1.5	U	Ş	Subtotal A		372,
				•	Subtotal A	\$	
17	Signing - Urban	% of Subtotal A	2%	\$	Subtotal A 372,340	\$	7,44
17 18	Signing - Urban Taxes / Bonds / Insurance	% of Subtotal A % of Subtotal A	2% 2%	\$	Subtotal A 372,340 372,340	\$ \$ \$	7,44 7,44
17 18 19	Signing - Urban Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A % of Subtotal A	2% 2% 5%	\$ \$	Subtotal A 372,340 372,340 372,340	\$ \$	7,44 7,44 18,61
17 18 19 21	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A % of Subtotal A	2% 2% 5% 6%	\$ \$ \$	372,340 372,340 372,340 372,340 372,340	\$ \$ \$ \$	7,44 7,44 18,61 22,34
17 18 19	Signing - Urban Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A % of Subtotal A	2% 2% 5%	\$ \$	Subtotal A 372,340 372,340 372,340	\$ \$	7,44 7,44
17 18 19 21	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A % of Subtotal A	2% 2% 5% 6%	\$ \$ \$	372,340 372,340 372,340 372,340 372,340	\$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 2% 5% 6% 7%	\$ \$ \$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340	\$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 2% 5% 6% 7%	\$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340	\$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 2% 5% 6% 7%	\$ \$ \$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340	\$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A Sof Subtotal A	2% 2% 5% 6% 7%	\$ \$ \$ \$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340 Subtotal B 20.00 454,255 454,255	\$ \$ \$ \$ \$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06 81 9,08 90,90
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A Sof Subtotal A	2% 2% 5% 6% 7%	\$ \$ \$ \$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340 Subtotal B	\$ \$ \$ \$ \$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06 81
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A Sof Subtotal A	2% 2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340 Subtotal B 20.00 454,255 454,255	\$ \$ \$ \$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06 81 9,08 90,90
17 18 19 21 20	Signing - Urban Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A Sof Subtotal A	2% 2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	372,340 372,340 372,340 372,340 372,340 372,340 Subtotal B 20.00 454,255 454,255	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	7,44 7,44 18,61 22,34 26,06 81 9,08 90,90

Scope Accuracy:

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Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations 6th Ave N Road Diet - 13th St to Main St Multi-Use Path



Engineer's Estimate - Conceptual

- /	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019		
		This Estimate has a Rating of:	2B	(See	rating scale guide b	helo	w)
	ITEM	UNIT	TOTAL QUANTITY	1500	UNIT PRICE		OTAL COS
	To travelle and the off	- CV	45.540	۱,	1.20		20.007.
1	Cold Milling - Asphalt, 2"	SY	15,510	\$	1.29	\$	20,007.
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	1,759	\$	117.00	_	205,783.
3	SS-1 Asphalt Tack Coat	GAL	776	\$	2.85	_	2,210.
4	Concrete Curb and Gutter	LF	3,000	\$			125,220.
5	Concrete Sidewalk, 4"	SF	36,000	\$	10.16	_	365,760.0
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	6	\$	7,692.92	\$	46,157.5
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	-
9	Detectable Warning Panels	EACH	0	\$	301.60	_	-
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	0	\$	450.00		-
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	9,000	\$	1.22	\$	10,980.0
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	0	\$	2.37	\$	-
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	375	\$	11.77	\$	4,413.
14	Epoxy White Turn Lane Symbol - Arrows	EACH	6	\$	59.00	\$	354.
15	Existing Traffic Signal System Modification	LS	1	\$	10,000	\$	10,000.0
16	New Traffic Signal System	LS	0	\$	175,000	\$	-
			_		Subtotal A	\$	790,88
17	Signing - Urban	% of Subtotal A	2%	ć			
17	Signing - Urban	% of Subtotal A	2%	\$	790,887	\$	15,817.7
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	790,887 790,887	\$	15,817.7 15,817.7
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	790,887 790,887 790,887	\$ \$ \$	15,817.7 15,817.7 39,544.3
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	790,887 790,887 790,887 790,887	\$ \$ \$	15,817.7 15,817.7 39,544.3 47,453.2
18 19	Taxes / Bonds / Insurance Utility Relocation	% of Subtotal A % of Subtotal A	2% 5%	\$	790,887 790,887 790,887	\$ \$ \$	15,817.7 15,817.7 39,544.3
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	790,887 790,887 790,887 790,887	\$ \$ \$ \$	15,817 15,817 39,544 47,453 55,362.0
18 19 21	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A % of Subtotal A % of Subtotal A	2% 5% 6%	\$	790,887 790,887 790,887 790,887 790,887	\$ \$ \$ \$ \$	15,817. 15,817. 39,544 47,453 55,362.
18 19 21 20 22	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area	% of Subtotal A	2% 5% 6% 7%	\$ \$ \$	790,887 790,887 790,887 790,887 790,887 Subtotal B	\$ \$ \$ \$	15,817 15,817 39,544 47,453 55,362
18 19 21 20	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization	% of Subtotal A	2% 5% 6% 7%	\$ \$	790,887 790,887 790,887 790,887 790,887 Subtotal B	\$ \$ \$	15,817. 15,817. 39,544 47,453 55,362.
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2%	\$ \$ \$	790,887 790,887 790,887 790,887 790,887 Subtotal B	\$ \$ \$ \$	15,817. 15,817. 39,544. 47,453. 55,362. 173,9
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$	790,887 790,887 790,887 790,887 790,887 Subtotal B 20.00 964,882 964,882	\$ \$ \$	15,817. 15,817. 39,544. 47,453. 55,362. 173,9 19,297. 193,000.
18 19 21 20 22 22 23	Taxes / Bonds / Insurance Utility Relocation Temporary Protection & Direction of Traffic Mobilization / Demobilization Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	2% 5% 6% 7% 0 2% 20%	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	790,887 790,887 790,887 790,887 790,887 Subtotal B 20.00 964,882 964,882	\$ \$ \$ \$	15,817. 15,817. 39,544. 47,453. 55,362. 173,9 19,297. 193,000.

Scope Accuracy:

 $\textbf{Level 1:} \ \textbf{Project scope well understood and well defined}.$

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations 13th St Road Diet - 6th Ave N to 4th Ave N Buffered Bike Lane



Engineer's Estimate - Conceptual

repared	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019			
		This Estimate has a Rating of:	2B	2B (See rating scale guide			below.)	
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE	TC	OTAL COS	
			ı					
1	Cold Milling - Asphalt, 2"	SY	3,696	\$	1.29	\$	4,767.8	
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	419	\$	117.00	\$	49,037.	
3	SS-1 Asphalt Tack Coat	GAL	185	\$	2.85	\$	526.0	
4	Concrete Curb and Gutter	LF	0	\$	41.74		-	
5	Concrete Sidewalk, 4"	SF	0	\$	10.16	_	-	
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$	-	
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	4	\$	7,692.92	\$	30,771.6	
8	Concrete Accessibility Ramp, 6"	EACH	0	\$	861.56	\$	-	
9	Detectable Warning Panels	EACH	0	\$	301.60	_	-	
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	21	\$	450.00	\$	9,450.0	
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	2,958	\$	1.22	\$	3,608.1	
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	1,400	\$	2.37	\$	3,318.0	
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	240	\$	11.77	\$	2,824.8	
14	Epoxy White Turn Lane Symbol - Arrows	EACH	2	\$	59.00	\$	118.0	
15	Existing Traffic Signal System Modification	LS	1	\$	10,000	\$	10,000.0	
16	New Traffic Signal System	LS	0	\$	175,000	\$	-	
		T						
17	Signing - Urban	% of Subtotal A	2%	\$	114,423	-	2,288.4	
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	114,423	_	2,288.4	
19	Utility Relocation	% of Subtotal A	5%	\$	114,423	_	5,721.1	
21	Temporary Protection & Direction of Traffic	% of Subtotal A	6%	\$	114,423		6,865.3	
20	Mobilization / Demobilization	% of Subtotal A	7%	\$	114,423	\$	8,009.6	
					Subtotal B	\$	25,17	
22	Dishe of Way Ave	C.F.		ć	20.00	ć		
22	Right-of-Way Area	SF 0/ -f Substant A R R	0	\$	20.00	_	2 701 1	
23	Construction/Right-of-Way Easement Area	% of Subtotal A & B	2%	\$,	•	2,791.9	
24	Engineering Design & Construction Management	% of Subtotal A & B	20%	\$	139,596	\$	28,000.0	
							30,7	
					Subtotal C	\$	30,7	
			TOTA	L PR	Subtotal C		170,3	
			TOTA	L PR		\$		

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%. **Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction

Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Task 004 - Alternatives Development & Evaluation - Cost Estimations 13th St Road Diet - 4th Ave N to 1st Ave N Buffered Bike Lane



Engineer's Estimate - Conceptual

	By: Brett Korporaal, Lauren Hunt & Andy Daleiden, PE		Date: Febru	ary 2	019			
		This Estimate has a Rating of: 2B		2B (See rating scale guide b			pelow.)	
	ITEM	UNIT	TOTAL QUANTITY		UNIT PRICE	TC	OTAL CC	
	To the sum of the sum							
1	Cold Milling - Asphalt, 2"	SY	7,865	\$	1.29	\$	10,145	
2	Asphalt Concrete Surface Course Grade A, 2"	TONS	892	\$	117.00	_	104,35	
3	SS-1 Asphalt Tack Coat	GAL	393	\$	2.85	\$	1,120	
4	Concrete Curb and Gutter	LF	0	\$	41.74	_		
5	Concrete Sidewalk, 4"	SF	0	\$	10.16			
6	Raised Median - Decorative Concrete, 6"	SF	0	\$	55.00	\$		
7	Curb Extension, Bulb-out (Includes Concrete Accessibility Ramp)	EACH	10	\$	7,692.92	\$	76,929	
8	Concrete Accessibility Ramp, 6"	EACH	4	\$	861.56	\$	3,446	
9	Detectable Warning Panels	EACH	4	\$	301.60	\$	1,20	
10	On-Street Parking Meter (Single-Space, Sloar Powered w/Wireless Comm.)	EACH	43	\$	450.00	\$	19,350	
11	4" Epoxy, White and/or Yellow (Lane Lines and Parking Striping)	LF	6,923	\$	1.22	\$	8,44	
12	8" Epoxy, White (Bike Lane Striping/Buffer)	LF	2,200	\$	2.37	\$	5,21	
13	24" Epoxy, White (Crosswalks and Stop Bars)	LF	978	\$	11.77	\$	11,51	
14	Epoxy White Turn Lane Symbol - Arrows	EACH	12	\$	59.00	\$	708	
15	Existing Traffic Signal System Modification	LS	1	\$	10,000	\$	10,000	
16	New Traffic Signal System	LS	0	\$	175,000	\$		
	In a second			_	272.422			
17	Signing - Urban	% of Subtotal A	2%	\$	252,428	_	5,048	
18	Taxes / Bonds / Insurance	% of Subtotal A	2%	\$	- , -	_	5,048	
19	Utility Relocation	% of Subtotal A	5%	\$	252,428	\$	12,62	
21	Temporary Protection & Direction of Traffic					-		
		% of Subtotal A	6%	\$	252,428	\$		
20	Mobilization / Demobilization	% of Subtotal A	6% 7%	\$	252,428 252,428		15,145 17,669	
20	Mobilization / Demobilization			_		\$		
20			7%	\$	252,428 Subtotal B	\$	17,66	
22	Right-of-Way Area	% of Subtotal A	7%	\$	252,428 Subtotal B	\$	17,66 55,	
22 23		% of Subtotal A	7%	\$	252,428 Subtotal B	\$	17,66	
22 23	Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	7% 0 2%	\$	252,428 Subtotal B 20.00 307,962	\$ \$	17,66 55 6,15	
22 23	Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	7% 0 2% 20%	\$ \$	252,428 Subtotal B 20.00 307,962 307,962 Subtotal C	\$ \$ \$	17,666 55 6,15 61,60	
	Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	7% 0 2% 20%	\$ \$ \$ \$	252,428 Subtotal B 20.00 307,962 307,962 Subtotal C	\$ \$	17,666 555 6,15 61,60 67	
22	Right-of-Way Area Construction/Right-of-Way Easement Area	% of Subtotal A SF % of Subtotal A & B	7% 0 2% 20%	\$ \$ \$ \$	252,428 Subtotal B 20.00 307,962 307,962 Subtotal C	\$ \$	17,66 55 6,15 61,60	

Scope Accuracy:

Level 1: Project scope well understood and well defined.

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Downtown Traffic Study

Billings, Montana August 2019