MEMORANDUM

TO:	Ali Marienau, Project Manager – KMPO
FROM:	Dave Simmons, P.E. – DOWL Adam Miles, P.E. – DOWL
DATE:	September 23, 2021
SUBJECT:	Coeur D'Alene Health Corridor Implementation Plan

This memorandum outlines the implementation plan recommendations for the transportation solutions developed as part of the Kootenai Metropolitan Planning Organization (KMPO) Coeur d'Alene Health Corridor District Transportation Planning and Traffic Analysis Study. Using the list of future transportation projects prepared in the prior Future Conditions Analysis Memo[1], this effort assigns projected construction years and lead agencies to each project in the Health Corridor.

BACKGROUND

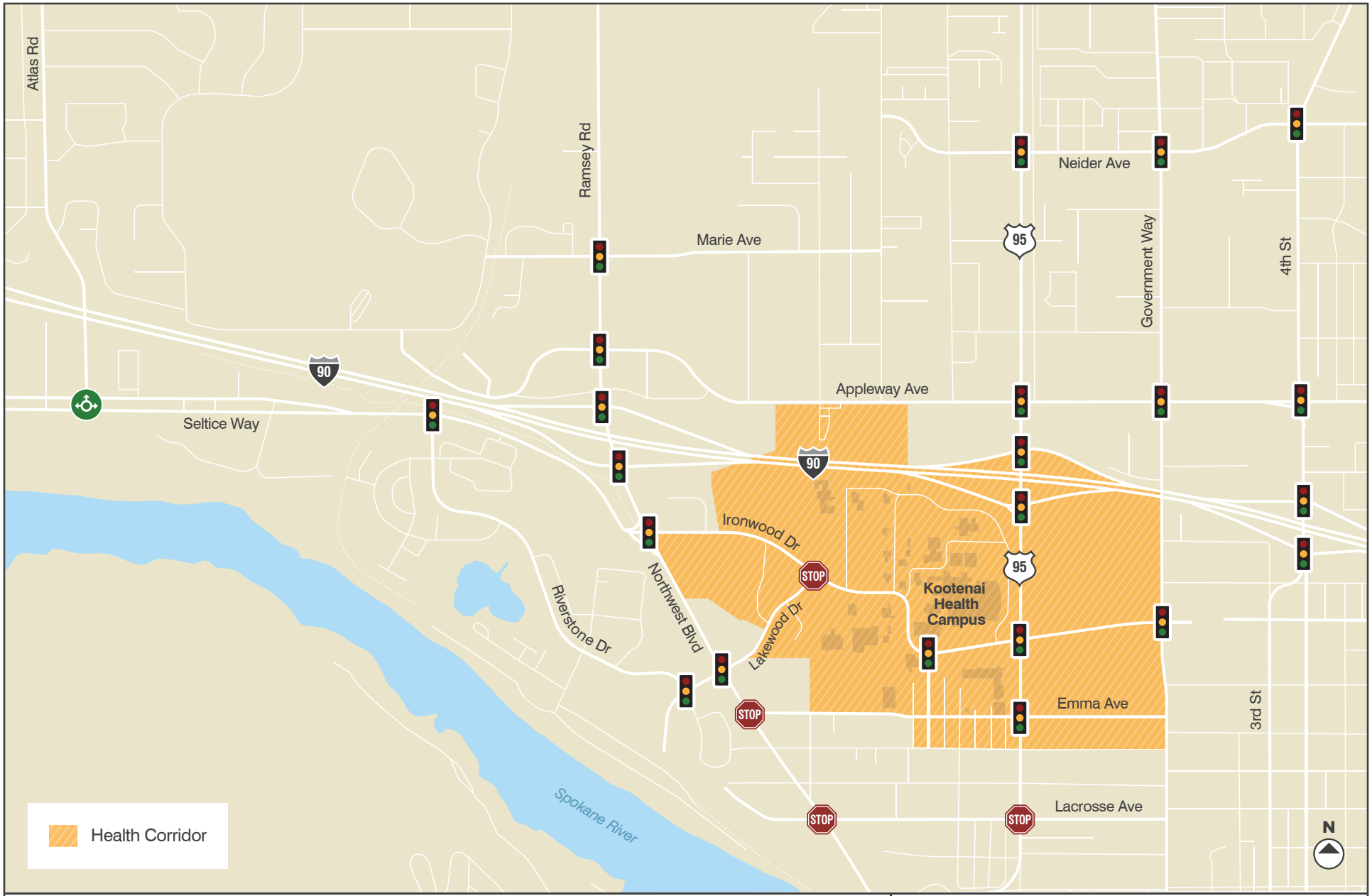
KMPO in association with ignite cda, Kootenai Health, City of Coeur d' Alene, and the Idaho Transportation Department have partnered to identify the transportation changes needed to accommodate development in and around the Health Corridor Urban Renewal District (See Figure 1: Vicinity Map). The Health Corridor Master Plan, approved in November 2019, proposed a new development pattern for the Health Corridor with the "intent to allow for both Kootenai Health's campus expansion as well as complementary community development."[2] However, the Master Plan did not evaluate the traffic implications of the various transportation roadway network elements recommended.

The Master Plan referred to the need for "Mobility Improvements" and recommended further study to review and refine the transportation infrastructure needs. The purpose of the current Transportation Planning and Traffic Analysis Study is to build upon the Master Plan and evaluate existing and future transportation needs to develop recommendations for transportation solutions that address congestion and safety issues within and around the Health Corridor.

The project scope included the following:

- Review the **Existing Conditions and Short-Term Solutions**[3] to address transportation system needs in 2021.
- Determine future transportation needs through a **Future Conditions Analysis** to accommodate the future growth of Kootenai County and specifically the Health Corridor.
- Review the needs and proposed solutions with the community through **Stakeholder and Public Outreach**.
- Develop an **Implementation Plan** for construction of the proposed solutions that meets the future transportation needs and identifies the lead public agencies to champion each project.

[1] Future Conditions Analysis, DOWL, August 25, 2021. See Appendix C.
[2] Page 5, Health Corridor Master Plan, 2019.
[3] Existing Conditions and Short-Term Solutions, DOWL, November 20, 2020. See Appendix B.



Study Intersections

Signalized Intersection

Unsignalized Intersection

Roundabout

Vicinity Map

CDA Health Corridor Traffic Analysis

September 2021

Figure 1

EXISTING CONDITIONS AND SHORT-TERM SOLUTIONS

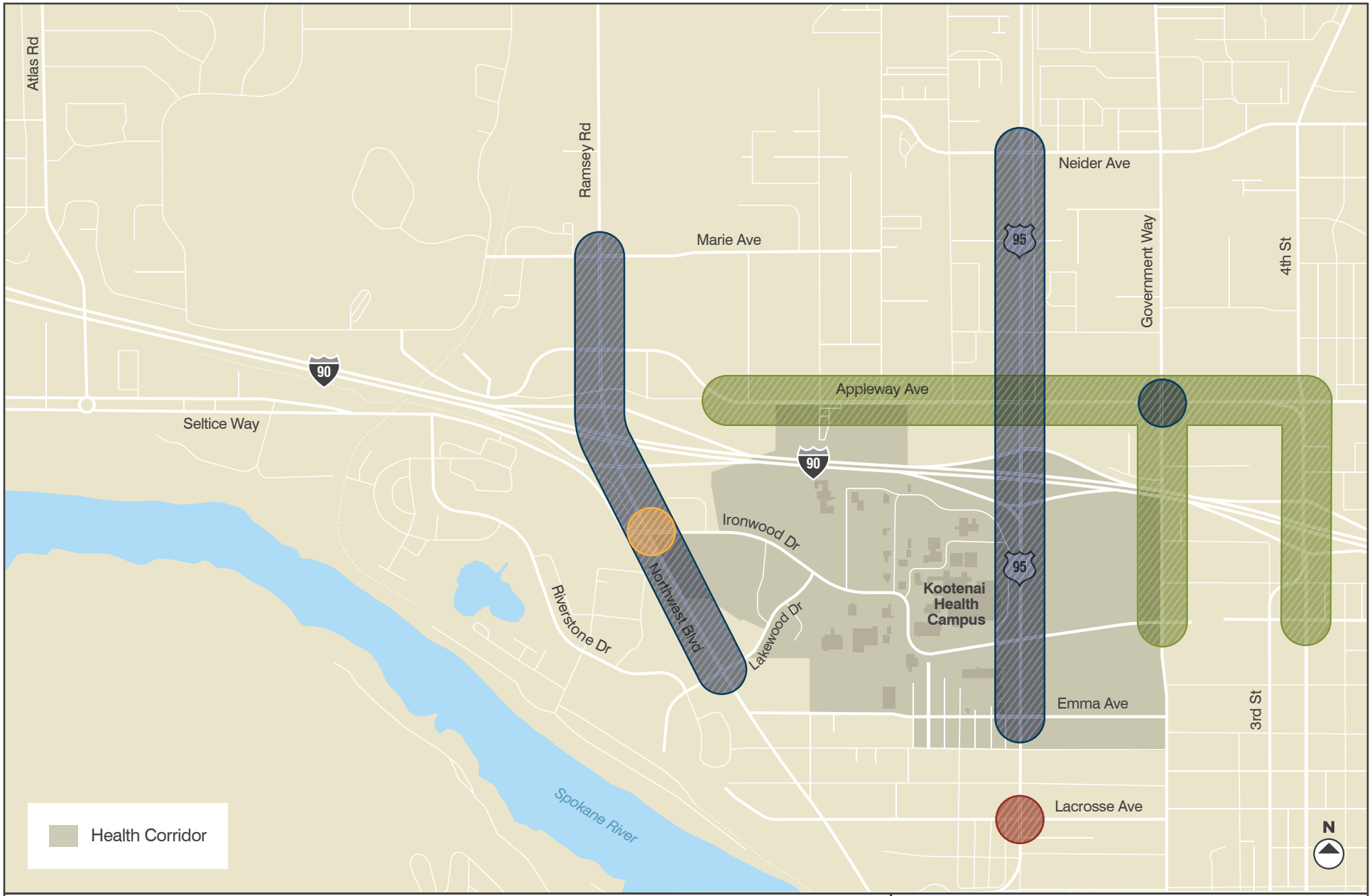
Due to the COVID-19 pandemic traffic volumes and patterns during 2020 were dramatically altered and new traffic counts were not obtainable for this study. In response, the project team collected all available traffic data from local agencies and a big-data platform (Streetlight Data™) and assembled this information into a useable form to evaluate the existing traffic volumes. This information was documented in the *Traffic Data Suitability and Calibration memorandum*.[4]

After establishing the existing traffic volumes, a review of the existing transportation system's operations and safety revealed several intersections that do not meet agency operating standards and several roadway corridors which exceed the statewide average collision rates for arterials.

The *Existing Conditions and Short-Term Solutions memorandum*[5] laid out this analysis in further detail, but the recommended short-term solutions are shown in Figure 2, and can be summarized as the following:

- Signal Timing Adjustments: All of the north-south arterial corridors (Ramsey Rd-Northwest Blvd, US-95, Government Way, 4th St) should be re-timed to optimize green time utilization and improve north-south progression.
- Safety Improvements: Detailed access management evaluations are recommended for Appleway Ave, Government Way, and 4th St. The goal of these efforts should be the reduction of angle collisions through the use of turn restrictions, raised medians, driveway closures, and the conversion of two-way left turn lanes to dedicated left turn pockets where necessary.

[4] Traffic Data Suitability and Calibration, DOWL, October 16, 2020. See Appendix A.
[5] Existing Conditions and Short-Term Solutions, DOWL, November 20, 2020. See Appendix B.



AM Peak Hour Coordinated Signal Timing Adjustments

PM Peak Hour Coordinated Signal Timing Adjustments

Access Management Study Area

Median Installation

Short-Term Solutions

CDA Health Corridor Traffic Analysis

September 2021 | Figure 2

FUTURE CONDITIONS ANALYSIS

The future conditions analysis was based on the 20-year future travel demand model provided by KMPO. The project team examined three future transportation scenarios (No-Build, Master Plan Build, and Build Alternative) to identify traffic concerns within and surrounding the Health Corridor resulting from the existing and proposed growth patterns outlined in the current KMPO model and proposed in the Master Plan.

Future development within Kootenai County will generate failures along Northwest Blvd and US-95 that are not addressed by the current planned transportation projects. The introduction of an overpass between the Health Corridor and Appleway Ave to the north, as well as Ironwood Dr intersection capacity improvements proposed in the Master Plan moved congestion away from the center of the Health Corridor and put increased pressure on the US-95/I-90 interchange. Adjustments to the original concepts provided in the Master Plan to improve connectivity and adding frontage roads between the Northwest Blvd/I-90 interchange and the new Julia St overpass dramatically improved study area operations and congestion. This work was documented in the *Future Conditions Analysis memorandum*.[6]

A final list of the recommended future transportation projects is provided below with costs provided in Appendix C. The cost estimates developed use current year (2021) dollars. As project construction years are determined, the associated costs should be inflated using a compounded escalation factor. ITD has traditionally used a 2% per year compounded inflation factor in their Statewide Transportation Improvement Program (STIP).

- Background Transportation Projects
    - Huetter Corridor (I-90 to US-95)
    - I-90 3rd Lane Widening (Washington State Line to Sherman Ave)
        - Includes US-95/I-90 Interchange Upgrade
        - Includes US-95 widening to 7-lanes (Neider Ave to Ironwood Dr)
    - Lacrosse Ave Extension and Traffic Signal at Northwest Blvd
- Master Plan Transportation Projects
    - Ironwood Dr Access Consolidation
    - Neighborhood Pedestrian Improvements
    - Centennial Trail Access Undercrossing
    - Ironwood Dr/Lakewood Dr Traffic Signal
    - Health Corridor Southern Local Access Rd
- Additional Future Transportation Projects
    - Julia St Overpass (Ironwood Dr to Neider Ave)
    - Northwest Blvd to Julia St Overpass Frontage Roads
    - US-95/Lacrosse Ave Traffic Signal
    - Northwest Blvd Median (Lakewood Dr to Lacrosse Ave)
    - US-95 Median (Ironwood Dr to Lacrosse Ave)
        - Includes US-95/Emma Ave Traffic Signal Removal
    - Northwest Blvd Interchange Capacity Improvement

[6] Future Conditions Analysis, DOWL, August 25, 2021. See Appendix C.

STAKEHOLDER AND PUBLIC OUTREACH

Throughout this study, guidance and feedback for the technical team has been provided by the Project Stakeholder Committee, which includes the lead agency KMPO, ignite cda, Kootenai Health, City of Coeur d'Alene, and the Idaho Transportation Department (ITD). This group met four times at key milestones to review and provide feedback on the work products and gather information to brief members within their own organizations. Briefings have also been provided to the KMPO Board of Directors, Kootenai County Area Transportation Team, Kootenai Health Executive Team and the ignite Board of Directors.

Public outreach has included website content maintained by KMPO and two virtual open houses. Notice of the open houses, held in June and August 2021 was posted on the KMPO website, published in the Coeur d'Alene Press and emailed to an interested parties list. A two-week public comment period was held for each open house. A recording of the open houses is posted on the website. Articles about the project were also published in the Coeur d'Alene Press in January and June of 2021.

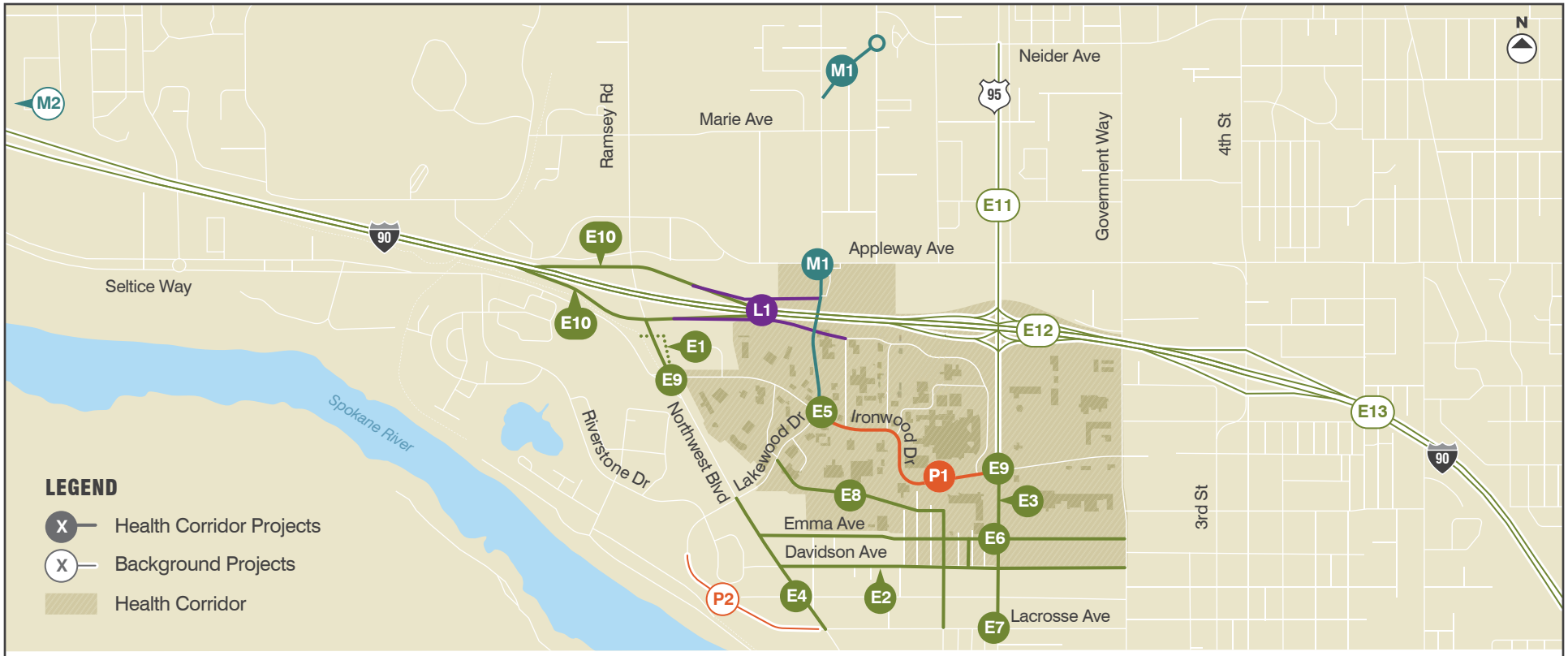
IMPLEMENTATION PLAN

After vetting the transportation improvements identified by the Future Conditions Analysis through the stakeholder and public outreach process, the project team aligned each improvement with a time horizon for implementation. This enables local agencies and future developers to plan projects in a sequence which will maintain adequate levels of service between now and the future 2040 condition. For coordination purposes with the Health Corridor Master Plan, a similar naming convention was utilized from the Master Plan. These phases include:

- Preliminary Phase (1-3 years)
- Early Phase (4-7 years)
- Middle Phase (8-15 years)
- Late Phase (16-20 years)

As mentioned in the Future Conditions Analysis, several background transportation improvements included in the long-range transportation plan will reduce congestion on the arterials and I-90 adjacent to the Health Corridor. For example, the scope of the ITD-led widening of I-90 includes capacity improvements along US-95 in conjunction with the interchange upgrade planned for the US-95/I-90 interchange. These background projects are retained in this implementation plan as the framework for timing the implementation of other Health Corridor related improvements.

The timing for the Master Plan and additional Future Transportation Improvements balances the need for additional roadway capacity and improved safety with the opportunity for synergy with the background projects. Figure 3 outlines the implementation plan for completing the transportation projects identified during this study (including the master plan and background projects).



Preliminary Phase (1-3 years)

- P1 Ironwood Dr Access Consolidation
- P2 Lacrosse Ave Extension and Traffic Signal at Northwest Blvd

Early Phase (4-7 years)

- E1 Centennial Trail Access Undercrossing*
- E2 Neighborhood Pedestrian Improvements*
- E3 US-95 Median
- E4 Northwest Blvd Median
- E5 Ironwood Dr/Lakewood Dr Traffic Signal
- E6 Emma Ave Signal Removal
- E7 U.S. 95/Lacrosse Ave Traffic Signal
- E8 Health Corridor Southern Local Access Rd*
- E9 Ironwood Drive Capacity Improvements**
- E10 Northwest Blvd Interchange Capacity Improvements**
- E11 US-95 Widening (7 Lanes)
- E12 US-95 Interchange Upgrade
- E13 I-90 3rd Lane Widening

Middle Phase (8-15 years)

- M1 Julia St Overpass (Ironwood Dr to Neider Ave)
- M2 Huetter Corridor

Late Phase (16-20 years)

- L1 Northwest Blvd to Julia St Overpass Frontage Roads

* *In conjunction with Master Plan redevelopment*

** *In conjunction with ITD I-90 interchange improvements*

Implementation Plan

CDA Health Corridor Traffic Analysis

September 2021 | Figure 3

Preliminary Phase (1-3 years)

During the preliminary phase of the master plan, limited development is anticipated. As opportunities present themselves, accesses should be consolidated along Ironwood Dr to improve traffic flow and safety. As shown in Table 1, the project team sees this as an ignite cda and City of Coeur d'Alene led effort, supported by the rest of the project stakeholders. The Lacrosse Ave extension and traffic signal at Northwest Blvd is currently under construction by the City of Coeur d'Alene with anticipated completion within the preliminary phase.

Table 1: Preliminary Phase Projects

Project	Lead Agency
Ironwood Dr Access Consolidation	ignite cda/City of CdA
Lacrosse Ave Extension and Traffic Signal at Northwest Blvd	City of CdA

Early Phase (4-7 years)

As of 2021, ITD is in the process of completing environmental documentation for the anticipated widening of I-90 to three lanes and rebuilding the US-95 interchange within the next 5-7 years. This led the project team to include many of the ITD-led project work within the Early Phase (see Table 2). The project limits for these background projects will include rebuilding portions of US-95 north and south of the new interchange. This provides an excellent opportunity to install the median south of Ironwood Dr, remove the existing Emma Ave signal, and install a new traffic signal at the US-95/Lacrosse intersection for consistency between Northwest Blvd and US-95. Any upgrades to the US-95 and Northwest Blvd interchanges should also include modification of the interchange ramps and their laneage with Ironwood Dr/Seltice Way to the south.

Table 2: Early Phase Projects

Project	Lead Agency
Centennial Trail Access Undercrossing	ignite cda/City of CdA
Neighborhood Pedestrian Improvements	ignite cda/City of CdA
Ironwood Dr/Lakewood Dr Traffic Signal	ignite cda/City of CdA
Health Corridor Southern Local Access Rd	ignite cda/City of CdA
Northwest Blvd Median (Lakewood Dr to Lacrosse Ave)	City of CdA
US-95 Median (includes Emma Ave Traffic Signal Removal)	ITD
US-95/Lacrosse Ave Traffic Signal	ITD
Northwest Blvd Interchange Capacity Improvements*	ITD
I-90 3rd Lane Widening	ITD
US-95 Interchange Upgrade	ITD
US-95 Widening to 7-lanes (Neider Ave to Ironwood Dr) *	ITD

*Includes Ironwood Dr intersection capacity improvements

The Early Phase also includes several smaller projects primarily led by ignite cda and the City of Coeur d'Alene in coordination with Health Corridor development. The Northwest Blvd median project led by the City of Coeur d'Alene will also improve traffic flow and safety within and around the district. Efforts

should continue from the Preliminary Phase to consolidate access along Ironwood Dr and eventually install a traffic signal at Lakewood Dr when warranted. Installing medians along Northwest Blvd and US-95, in conjunction with neighborhood pedestrian improvements, will ease arterial traffic flow and improve safety while reducing cut-through traffic in the residential neighborhood south of Emma Ave. As redevelopment occurs south of Ironwood Dr, a new local road connection to Lakewood Dr will improve Health Corridor circulation.

Middle Phase (8-15 years)

During the middle phase (see Table 3), the project team expects the Julia St Overpass (Ironwood Dr to Neider Ave) will be led through an ignite cda/City of Coeur d'Alene partnership and constructed over I-90. This project provides an important connection from the Health Corridor to the north and includes a crossover connection further north between Julia St and Howard St. This provides Health Corridor traffic a new north-south connection to Kathleen Ave.

Continued progress on background projects by ITD is anticipated on key regional projects such as the Huetter Corridor. As of 2021, ITD District 1 has received funding to complete environmental documentation for the Huetter Corridor but the project is not currently listed for design and construction in KMPO's six-year transportation improvement plan. The project team anticipates the full completion of the Huetter Corridor will occur towards the end of the middle phase.

Table 3: Middle Phase Projects

Project	Lead Agency
Julia St Overpass (Ironwood Dr to Neider Ave)	ignite cda/City of CdA
Huetter Corridor (I-90 to US-95)	ITD

Late Phase (16-20 years)

As shown in Table 4, the final stages of Health Corridor development could bring about the construction of new frontage roads from the Julia St Overpass to the Northwest Blvd interchange, which will provide a significant connection to the Health Corridor and reduce pressure on the US-95/I-90 interchange. This ITD-led effort also reduces traffic from key arterial intersections on Ironwood Dr at Northwest Blvd and US-95.

Table 4: Late Phase Projects

Project	Lead Agency
Northwest Blvd to Julia St Overpass Frontage Roads	ITD

APPENDIX A: TRAFFIC DATA SUITABILITY AND CALIBRATION MEMORANDUM

MEMORANDUM

TO:	Ali Marienau – KMPO Project Manager
FROM:	David Simmons, P.E. – DOWL Adam Miles, P.E. – DOWL
DATE:	October 16, 2020
SUBJECT:	Traffic Data Suitability and Calibration

INTRODUCTION

The impacts of COVID-19 have dramatically altered traffic volumes and patterns over the past 6 months, which has eliminated the ability to collect new traffic counts within the study area that would be compatible with pre-pandemic counts. DOWL developed this traffic data suitability and calibration memorandum to document existing data sources for the Coeur d'Alene Health Corridor District Transportation Planning and Traffic Analysis Study. These sources include traffic counts, Automatic Traffic Recorders (ATRs), and user-generated data from vehicle detection cameras and Streetlight Data.

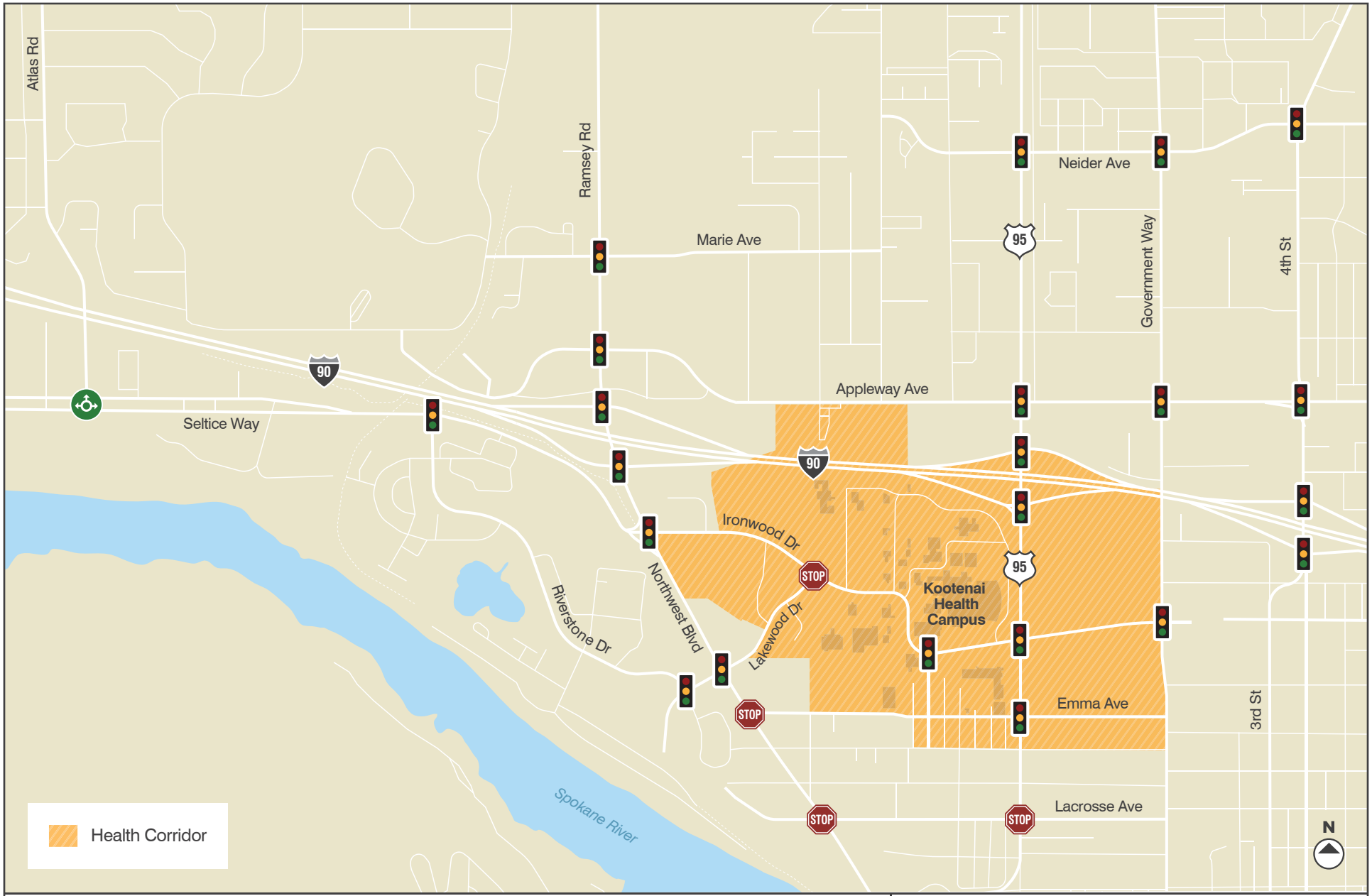
The goals of this memorandum are to:

- Evaluate historical turning movement counts conducted by Idaho Transportation Department, City of Coeur d'Alene, and consultant traffic analyses in the project area
- Determine reasonable seasonal factors and growth factors to estimate 2020 baseline traffic volumes in lieu of new traffic counts.
- Supplement any data gaps with calibrated user-generated data such as Streetlight Data.
- Recommend 2020 baseline traffic volumes for existing conditions operational analysis and as the starting point for future volume forecasts.

STUDY AREA

The Health Corridor District is generally bounded by Appleway Avenue to the north, Government Way to the east, Davidson Avenue to the south and Northwest Boulevard to the west. Ironwood Drive, Lakewood Drive, Emma Avenue, and Davidson Avenue provide the primary east-west access within the District. The Northwest Boulevard and U.S. 95 interchanges with Interstate 90, as well as their associated intersections with Ironwood Drive, are among the busiest intersections in North Idaho. Figure 1 shows the Health Corridor District boundary along with study area roadways and intersections. The primary form of intersection traffic control is designated for each study intersection.

Additional intersections south of Lacrosse Avenue on Northwest Boulevard and U.S. 95 as well as those south of Ironwood Drive-Annie Avenue on Government Way, 3rd Street, and 4th Street were considered during the scoping phase and data collection phases of this project. Diminishing total intersection volumes (30-50% less) on Northwest Boulevard, U.S. 95, and Government Way south of Ironwood Drive indicate congestion related to capacity constraints occur at Ironwood Drive or to the north. The minimal data available for these intersections was used in the calibration of study-area volumes.



Study Intersections

Signalized Intersection

STOP Unsignalized Intersection

Roundabout

Vicinity Map

CDA Health Corridor Traffic Analysis

October 2020 | Figure 1

EXISTING TURNING MOVEMENT COUNTS

Traffic counts at study intersections were collected from two recent traffic studies[1,2] and include both AM and PM peak periods. ITD also conducted turning movement counts at multiple study intersections in 2019.[3] However, not all study intersections and peak periods are contained within the existing counts. Table 1 lists the study area intersections and indicates the count source and time period available. As shown, four intersections do not have existing turning movement counts and ten intersections only have PM peak period counts.

Table 1: Available Turning Movement Counts

Intersection	Atlas Waterfront		I-90/US-95		ITD 2019	
	AM	*PM*	*AM*	*PM*	*AM*	*PM*
Ramsey Rd/ Golf Course Rd/ Marie Rd		✓				
Ramsey Rd/ Appleway Ave		✓	✓	✓		
Northwest Blvd/ I-90 Westbound Ramps		✓	✓	✓		
Northwest Blvd/ I-90 Eastbound Ramps		✓	✓	✓		
Northwest Blvd/ Seltice Way/ Ironwood Dr		✓	✓	✓		
Northwest Blvd/ Lakewood Dr		✓				
Northwest Blvd/ Emma Ave		✓				
Northwest Blvd/ Lacrosse Ave		✓				
U.S. 95/ Neider Ave			✓	✓		
U.S. 95/ Appleway Ave			✓	✓		
U.S. 95/ I-90 Westbound Ramps			✓	✓		
U.S. 95/ I-90 Eastbound Ramps			✓	✓		
U.S. 95/ Ironwood Dr			✓	✓		
U.S. 95/ Emma Ave		✓	✓	✓		
U.S. 95/ Lacrosse Ave		✓				
Government Way/ Neider Ave						✓
Government Way/ Appleway Ave						
Government Way/ Ironwood Dr						
4th St/ Neider Ave						✓
4th St/ Appleway Ave			✓	✓		
4th St/ I-90 Westbound Ramps			✓	✓		
4th St/ I-90 Eastbound Ramps			✓	✓		
Riverstone Dr/ Seltice Way		✓				
Riverstone Dr/ Lakewood Dr		✓				
Lakewood Dr/ Ironwood Dr						
Ironwood Dr/ Medina St						
Seltice Way/ Atlas Rd		✓				

[1] Atlas Waterfront/Riverstone Traffic Impact Study, Welch-Comer, January 2019. Data collected August 22, 2018.
[2] I-90/US-95 Interchange and Access Study (KN13416), HDR, March 2019. Data collected March 6-7, 2018.
[3] Data collected by ITD Roadway Data Section on April 24, 2019 and October 16, 2019.

30th Highest Hour Traffic Volume Adjustments

Because traffic volumes vary and it is not economically feasible to design the roadway system based on the needs of the absolute highest hour of the entire year, the focus of traffic analysis is on the year's 30th highest hour. Rather than being limited to only collecting traffic volumes on the exact 30th highest hour, an adjustment factor can be applied to peak hour traffic counts to approximate the 30th highest hour volumes (see Equation 1).

$$Volume_{(30th\ highest\ hour)} = Volume_{(peak\ hour)} \times Adjustment\ Factor \qquad \textit{(Equation 1)}$$

Idaho Transportation Department (ITD) has strategically placed automatic traffic recorders (ATRs) throughout the region to provide year-round hourly traffic volume data and show historical traffic trends. The nearest ATR to the study area is ATR 048 – U.S. 95 @ Haycraft Avenue. The adjustment factor shown in Equation 1 is the ratio of the 30th highest hour volume measure by the ATR compared to the ATR volume during the time of the measured turning movement count. This adjustment factor is shown in Table 2, calculated for each date of existing counts. After applying the adjustment factor to existing turning movement counts, the new baseline volumes were then rounded to the nearest five vehicles. Final 2020 baseline volumes are shown at the end of this memo in Figure 2 and Figure 3. These adjusted count volumes also were integral in estimating 30th highest hour volumes for the four intersections without any turn movement counts.

Table 2: 30th Highest Hour Volume Adjustment Factors

Existing Count Date (Time)	ATR 048 – U.S. 95 @ Haycraft Ave		30th HHV Adjustment Factor
	ATR volume at time of count	*30th HHV*	
March 6, 2018 (4:00 p.m.)	2,996	3,196	1.067
August 22, 2018 (4:00 p.m.)	3,031	3,196	1.054
April 24, 2019 (4:00 p.m.)	3,015	3,187	1.057
October 16, 2019 (5:00 p.m.)	2,726	3,187	1.169

USER-GENERATED TURNING MOVEMENT VOLUMES

As shown in Table 1, not all intersections have available turning movement counts. When evaluating the ability to supplement existing counts with user-generated data such as vehicle detection data or Streetlight Data, a key indicator is the number of adjacent intersections with known turning movement counts. These intersections are used to calibrate user-generated data. Fewer adjacent intersections with known counts increases the risk existing baseline volumes will not lead to accurate conclusions during operational analysis. As shown in Table 3, 14 intersections do not have data for the AM peak period, and of those, only one has two or more adjacent counts.

Table 3: Data Availability Assessment

Time Period	Data Available	Data Missing	Qty of missing intersections with (n) adjacent counts				
			4	*3*	*2*	*1*	*0*
AM peak	13	14			1	10	2
PM peak	23	4		1	2*	1	

*Government Way/Ironwood Dr intersection has two adjacent counts out of three adjacent intersections.

Based on this information, we recommend the AM peak operational analysis be performed for a reduced study area where AM data is available and only two study intersections require supplemented count information. This area includes Appleway Ave from Ramsey Rd to U.S. 95, Ironwood Dr from Northwest Blvd to U.S. 95, and both U.S. 95 and Ramsey Rd/Northwest Blvd from Appleway Ave to Ironwood Dr. This area would consist of ten study intersections total, shown at the end of this memo in Figure 2.

The PM peak period, in contrast, has available traffic counts for 23 of the 27 intersections, and of the four intersections missing data, three have two or more adjacent intersection counts. Turn movements can be estimated at these three intersections through the use of user-generated Streetlight Data. City-provided vehicle detection data was also considered but found inadequate for the reasons explained below.

Vehicle Detection Data

Three of the four intersections without historical traffic counts are controlled by City-operated video detection cameras, which are normally used as inputs for traffic signal timing. This data has the potential to be re-purposed for use in traffic analyses as vehicle counts. However, based on conversations with City of Coeur d'Alene staff, vehicle detection data is only stored within the traffic signal controller for the prior month (July/August 2020). Due to the impacts of COVID-19, this data was first vetted at an intersection with a known turning movement count. The intersection of Northwest Boulevard/ Seltice Way/ Ironwood Drive revealed large differences in turning movement patterns between existing August 2018 data and the August 2020 vehicle detection data. Volumes ranged from -60% to +200%. For this reason, vehicle detection data was not used in estimating the missing turning movement counts.

Streetlight Data

Streetlight Data is derived from two types of location-based "Big Data" stretching back to 2016. This includes navigation-GPS data provided by suppliers such as INRIX and location-based services (LBS) data provided by suppliers such as Cuebiq. This data is then combined and processed according to Streetlight's proprietary algorithms to clean the data for quality and accuracy, as well as data mine for probable 'trips'. These trips are then converted into Origin-Destination (O-D) pairs and can be used for large regional planning analyses as well as small turning movement count assessments.[4]

Part of incorporating Streetlight Data into a study area involves implementing a methodology to calibrate the raw Streetlight Data volumes produced by a six-month average with the available turning movement counts at adjacent intersections.[5] Without this process, large imbalances between intersections occur that do not reflect real-world conditions. The four-step calibration process outlined on the next page developed PM peak hour volumes for each of the four remaining study area intersections. The values in the example provided (Tables 4-7) are for the Government Way/ Ironwood Drive intersection.

Step 1: Calculate turning movement percentages from 1-hour Streetlight Volumes.[6] Both entering and exiting percentages are determined to limit distortions created by the Streetlight Data source and mid-block traffic when using adjacent intersection counts.

Table 4: Streetlight Data Conversion

Government Way/ Ironwood Dr	1-hr Streetlight Volumes			Streetlight (% Entering)			Streetlight (% Exiting)		
	Left	*Through*	*Right*	*Left*	*Through*	*Right*	*From Left*	*From Through*	*From Right*
Northbound	170	585	10	22%	77%	1%	44%	55%	1%
Eastbound	465	5	180	72%	1%	27%	50%	17%	33%
Southbound	5	590	285	1%	67%	32%	1%	76%	23%
Westbound	1	1	5	22%	26%	52%	37%	1%	62%

[4] "Our Methodology and Data Sources", Streetlight Insight, July 2019.
[5] Streetlight recommends a minimum six months of data be used to ensure turning movement validity. For this analysis April 2019 – September 2019 were selected.
[6] Streetlight provided data was 3-hr AM and PM peak period volumes. A 36% factor was applied to these volumes based on the ratio of the peak hour to the 3-hr peak period.

Step 2: Determine enter- and exit-based volumes from available adjacent intersection counts and Streetlight Data turning movement percentages.

Table 5: Enter- and Exit-Based Turning Movement Volumes Using Streetlight Data Percentages

Government Way/ Ironwood Dr	Adj. Int. Entering Volume	Adj. Int. Exiting Volume	Enter-Based Volumes			Exit-Based Volumes		
			Left	*Through*	*Right*	*Left*	*Through*	*Right*
Northbound	610	*	135	469	6	207	*	*
Eastbound	735	*	529	3	203	*	*	153
Southbound	*	655	*	*	*	*	501	351
Westbound	*	560	*	*	*	2	3	*

*Data for the intersection north of Government Way/ Ironwood Dr, and driveway to east are not available.

Step 3: Either (A) take the average of the enter- and exit-based volumes, or (B) when either enter- or exit-based volumes are not available, include the expected Streetlight Data volume from Table 4 in the average calculation. Round all volumes to the nearest five vehicles.

Table 6: Average Turning Movement Volume Development

Government Way/ Ironwood Dr	(A) Average Enter- and Exit-Based			(B) Average with Streetlight Data		
	Left	*Through*	*Right*	*Left*	*Through*	*Right*
Northbound	**170**	*	*	170	**525**	**10**
Eastbound	*	*	**180**	**495**	**5**	180
Southbound		*	*	**	**545**	**320**
Westbound	*	*		**1**	**1**	**

* Only Enter- or Exit-Based Volumes available, See (B).
** No Enter- or Exit-Based Volumes available, See Step 4.

Step 4: Fill in remaining turning movement volumes with Streetlight Data. Because the Government Way/ Appleway Avenue intersection has fewer adjacent intersection turning movement counts, raw volumes from Streetlight Data are required to finish the baseline turning movement volume estimate. However, this is a last resort and not typical. The turning movements calculated using this method do not exceed 11% of the intersection's total entering volume.

Table 7: Baseline Turning Movement Volumes with Streetlight Data Supplement

Government Way/ Appleway Ave	(A) Average Enter- and Exit-Based		
	Left	*Through*	*Right*
Northbound	170	525	10
Eastbound	495	5	180
Southbound	**5**	545	320
Westbound	1	1	**5**

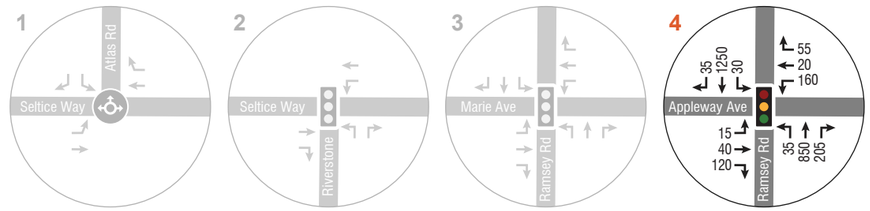
FINAL BASELINE TURNING MOVEMENT VOLUMES

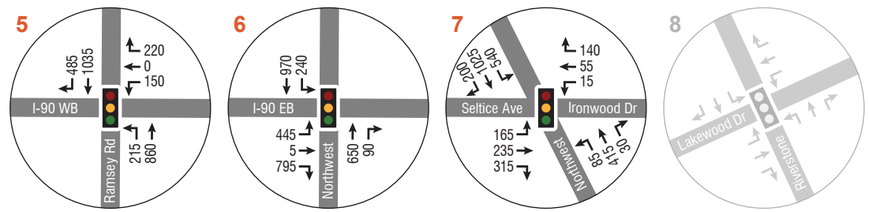
Once the turning movement volumes were established for the intersections with no available data, all the baseline volumes were compiled into AM peak hour and PM peak hour traffic figures. The final 2020 Baseline Volumes are found in Figure 2 for the AM peak hour and Figure 3 for the PM peak hour.

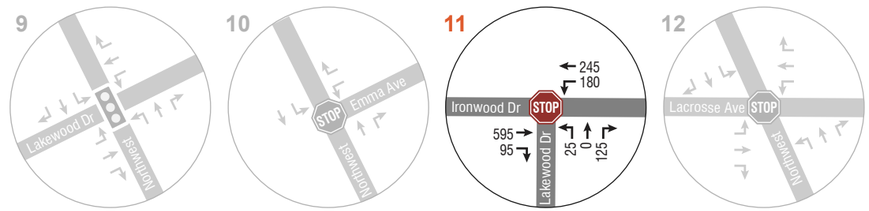
SUMMARY

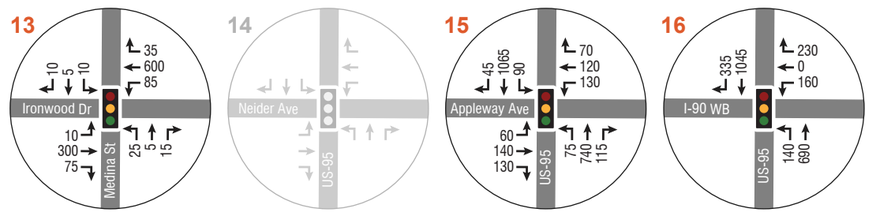
Key findings from the traffic data suitability and calibration analysis are as follows:

- Traffic counts for both AM and PM peak periods were collected from two recent traffic studies and ITD. Of the 27 study area intersections, four did not have existing turning movement counts and ten had only PM peak period counts.
- All existing traffic counts were multiplied by appropriate 30th highest hour adjustment factors to establish baseline turning movement volumes for available intersections.
- After an evaluation of the available data at adjacent intersections, a modified study area of ten intersections was developed for the AM peak hour. Two intersections required volumes estimated using Streetlight Data following the four-step calibration process to limit distortions in the data source and mid-block traffic when using adjacent intersection counts. The 2020 AM Baseline Volumes are shown in Figure 2.
- The PM peak period has available traffic counts for 23 of the 27 intersections. All four intersections missing data required volumes estimated using Streetlight Data following the four-step calibration process to limited distortions. Final 2020 PM Baseline Volumes are shown in Figure 3.









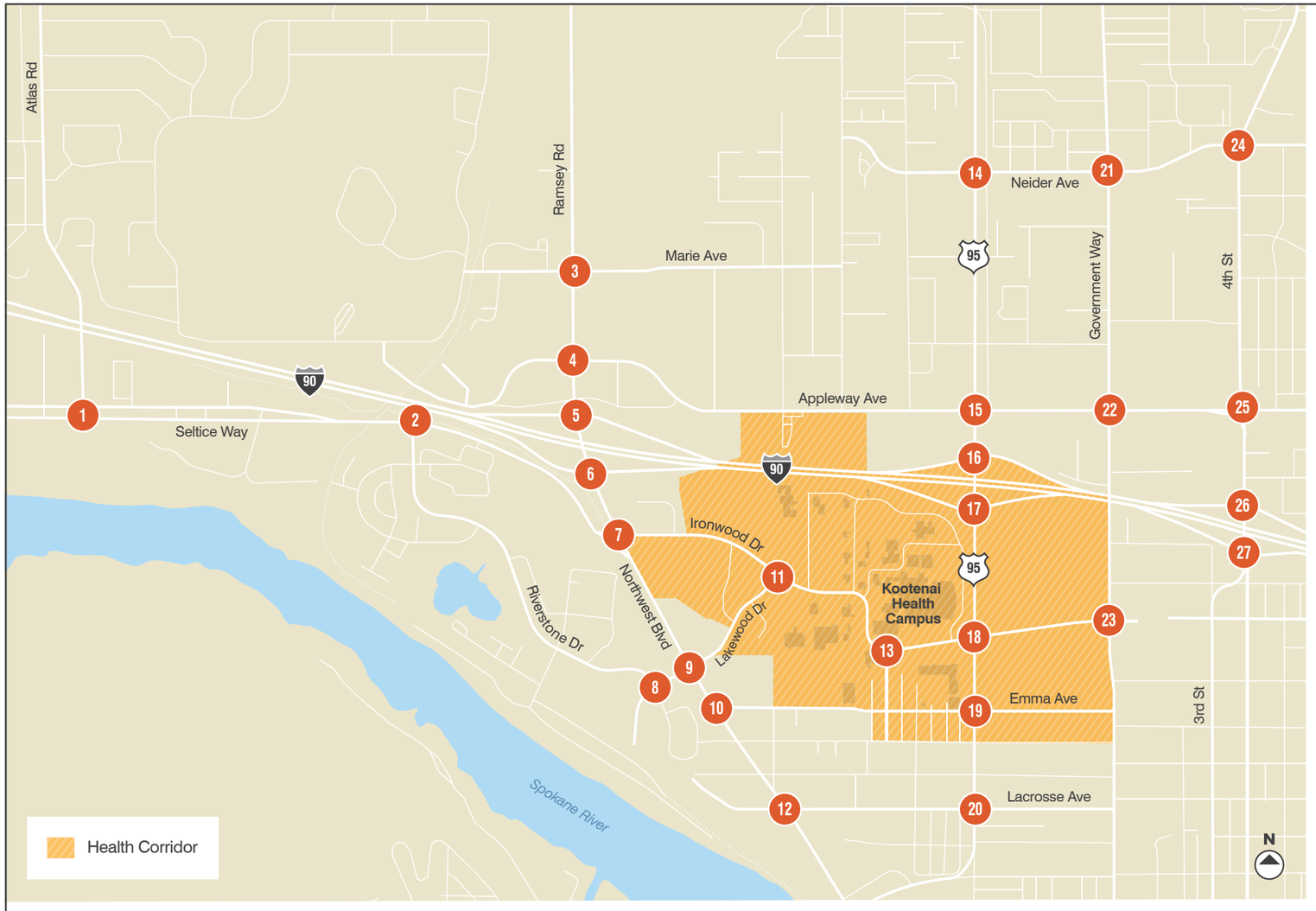
Study Intersections

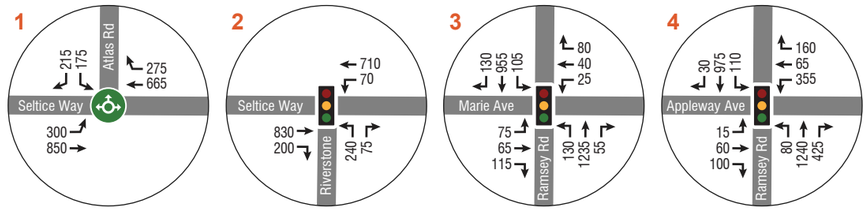
- # Intersection ID
- Signalized Intersection
- STOP Unsignalized Intersection
- Roundabout

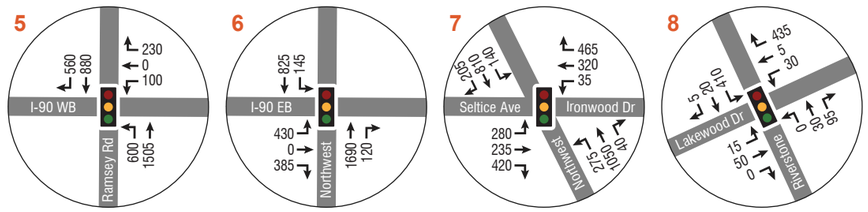
2020 AM Baseline Volumes

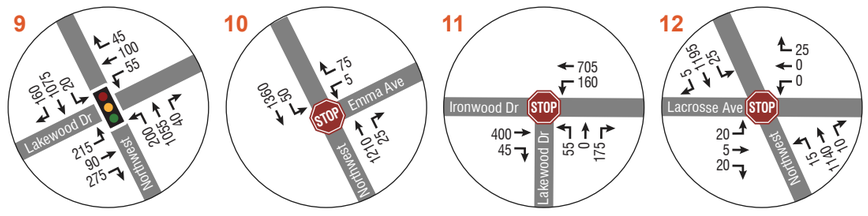
CDA Health Corridor Traffic Analysis

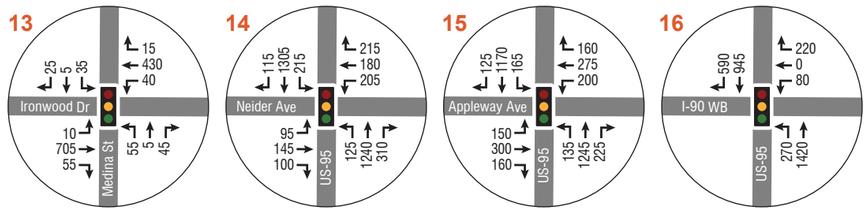
October 2020 | Figure 2

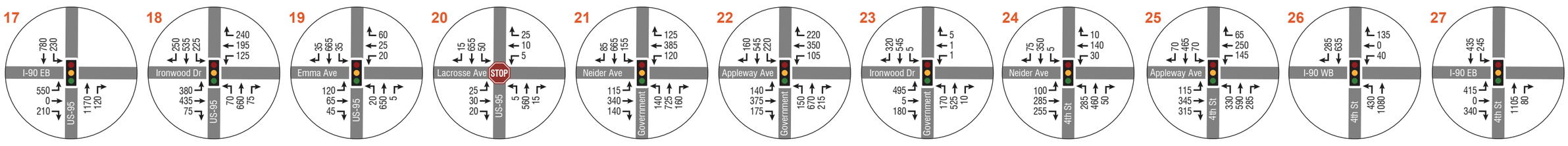












Study Intersections

- # Intersection ID
- Signalized Intersection
- STOP Unsignalized Intersection
- Roundabout

2020 PM Baseline Volumes

CDA Health Corridor Traffic Analysis

October 2020 | Figure 3

APPENDIX B: EXISTING CONDITIONS AND SHORT-TERM SOLUTIONS MEMORANDUM

MEMORANDUM

TO:	Ali Marienau, Project Manager – KMPO
FROM:	Dave Simmons, P.E. – DOWL Adam Miles, P.E. – DOWL
DATE:	November 20, 2020
SUBJECT:	Coeur D'Alene Health Corridor Existing Conditions and Short-Term Solutions

This memorandum presents the existing conditions traffic analysis for the Coeur d'Alene Health Corridor District Transportation Planning and Traffic Analysis Study. Using volumes prepared in the prior Traffic Data Suitability and Calibration memo,[1] this effort identifies existing operational and safety deficiencies within the Health Corridor study area and lays out short-term traffic solutions that can benefit specific intersections and corridors without requiring large capital investments. These solutions will establish a baseline for an accurate assessment of capacity needs during the future conditions analysis.

COEUR D'ALENE HEALTH CORRIDOR STUDY AREA

The CDA Health Corridor study area is shown in Figure 1 and includes 27 study intersections primarily located along the following 6 corridors:

- Ramsey Road-Northwest Boulevard (from Marie Avenue to Lacrosse Avenue)
- U.S. 95-Lincoln Way (from Neider Avenue to Lacrosse Avenue)
- Government Way (from Neider Avenue to Ironwood Drive)
- 4th Street (from Neider Avenue to Annie Avenue)
- Seltice Way-Ironwood Drive (from Atlas Road to Government Way)
- Appleway Avenue (from Ramsey Road to 4th Street)

All signalized and the key stop-controlled intersections along these corridors are included in addition to the signalized intersection at Riverstone Drive and Lakewood Drive.

Study Area Roadway Characteristics

The study area roadways and their key characteristics are listed in Table 1. The functional classifications and posted speed limits are identified in the Metropolitan Transportation Plan.[2] Average annual daily traffic (AADT) for the entire roadway within the study area was estimate from available 2018 counts.

Roadways such as Northwest Boulevard, U.S. 95, and 4th Street have acute segment deviations from the corridor level average. Northwest Boulevard experiences an AADT above 34,000 vehicles between Appleway Avenue and Ironwood Drive. North and south of these limits, Ramsey Road and Northwest Boulevard are balanced in AADT, indicating the interchange acts as a distribution point for two key routes.

[1] Traffic Data Suitability and Calibration, DOWL, October 16, 2020

[2] KMPO Metropolitan Transportation Plan 2020-2040, Kootenai Metropolitan Planning Organization (KMPO), May 2020.

U.S. 95 and 4th Street both experience directional increases in AADT volumes. For U.S. 95, volumes above 34,000 vehicles occur north of I-90, but south of I-90 the volumes diminish to less than 15,000 vehicles per day at Lacrosse Avenue. For 4th Street, volumes are less than 16,000 vehicles per day north of Appleway Avenue and exceed 22,000 vehicles per day to the south. The directional emphasis on each corridor indicates their primary use. U.S. 95 is the primary north-south arterial corridor for traffic north of I-90. In contrast, 4th Street and its couplet with 3rd Street increase in traffic to the south as the alternative freeway interchange to Northwest Boulevard with direct access to downtown Coeur d'Alene.

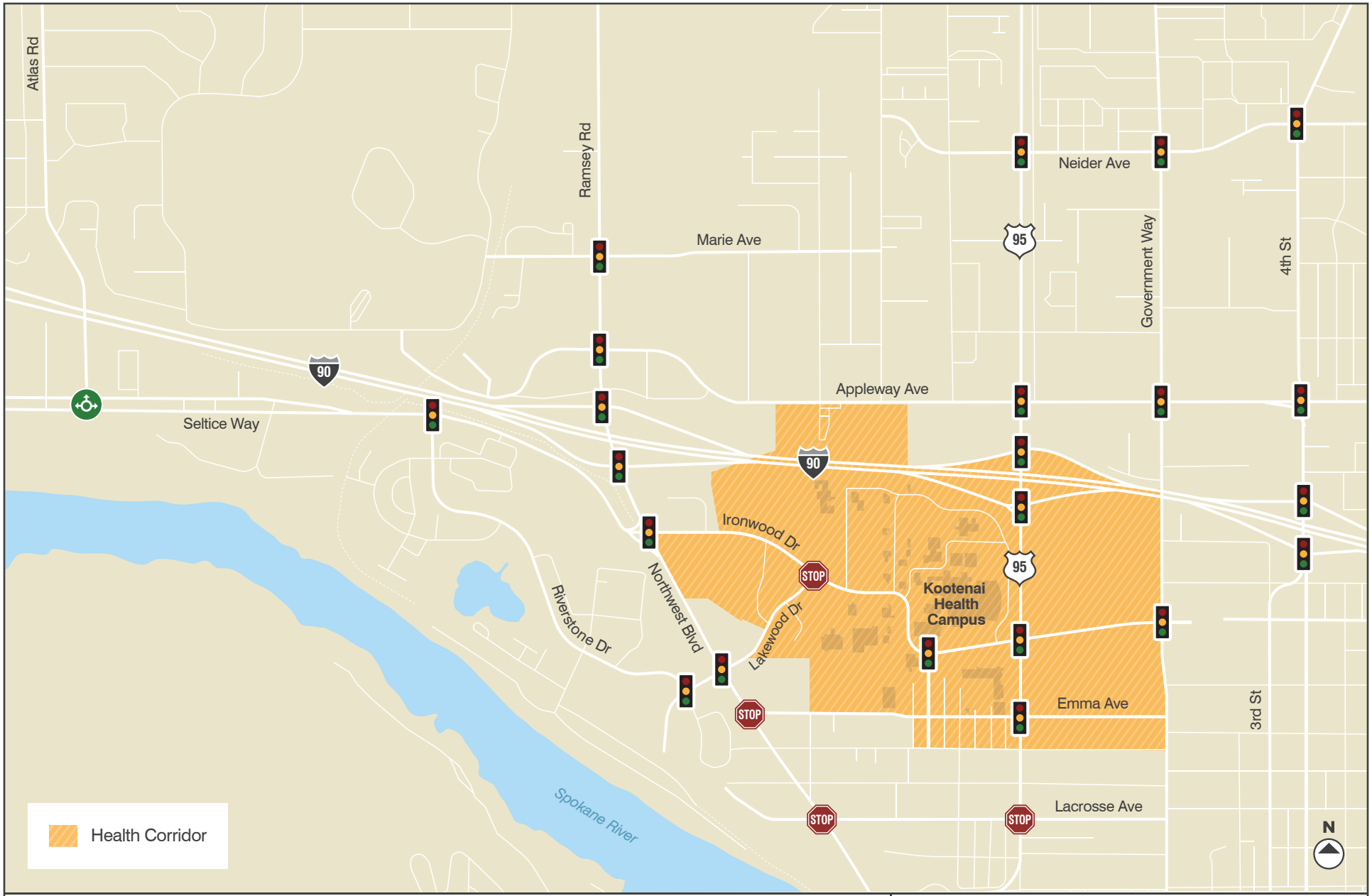
Table 1: Study Area Roadways (In Project Vicinity)

Roadway	Functional Classification[a]	Posted Speed[a]	Number of Lanes	Est. 2018 AADT	On-Street Parking	Sidewalks	Bike Lanes
Ramsey Rd-Northwest Blvd	Minor Arterial	35 mph	4-5[b]	29,700	No	Yes	Incomplete
U.S. 95	Principal Arterial	35 mph	4-6[c]	28,000	No	Some	No
Government Way	Minor Arterial	35 mph	4-5[b]	19,500	No	Yes	Incomplete
4th St	Collector	35 mph	3-6[d]	19,300	No	Yes	Incomplete
Neider Ave	Collector	35 mph	3-5[e]	13,500	No	Yes	Incomplete
Appleway Blvd	Minor Arterial	35 mph	5	14,600	No	One Side	No
I-90	Interstate	60 mph	4	49,500	-	-	-
Seltice Way	Principal Arterial	35-45 mph	4-5[b]	20,300	No	Multi-Use Path	
Ironwood Dr	Collector	25 mph	3-5[f]	17,900	No	Yes	Yes
Lakewood Dr	Local	25 mph	2-5[g]	4,300	Yes	Yes	No
Riverstone Dr	Local	25 mph	2	8,200	No	Yes	Incomplete
Emma Ave	Local	25 mph	2	2,600	Yes	Incomplete	No
Lacrosse Ave	Local	25 mph	2	1,000	Yes	Incomplete	No
Atlas Rd	Minor Arterial	35 mph	2	10,600	No	Yes	No
Marie Ave-Golf Course Rd	Local	25 mph	2	5,000	No	One Side	No

[a]KMPO Metropolitan Transportation Plan Figures 3.2b and 3.4b.
[b]4 lanes vs 5 lanes dependent on availability of center turn lane.
[c]U.S. 95 widens from 4 lanes north of Neider to 5 lanes. This becomes 6 lanes in the vicinity of Appleway Avenue.
[d]4th Street north of Appleway Avenue is 3 lanes. South of Appleway Avenue the roadway widens to 6 lanes through the I-90 interchange, gradually reducing to a total of 4 at the 3rd Street-4th Street couplet.
[e]Neider Avenue narrows to 3 lanes east of Government Way.
[f]Ironwood Drive widens to 5 lanes east of Medina Street.
[g]Lakewood Drive narrows to 2 lanes north of Northwest Boulevard.

As shown, the roadway functional classification does not always appear consistent with the posted speed, number of lanes (capacity), and daily volumes being serviced by the roadway. In addition, the number of lanes across roadway corridors can vary drastically with minimal lane consistency. Review of the designated functional classifications and intended use is recommended to align policy with actual driver behavior.

Non-vehicle facilities in the study area with complete routes are limited. Most roadways have a sidewalk in both directions for pedestrian use, but no complete bike lanes outside of Ironwood Drive. Seltice Way provides a multi-use path connection to the North Idaho Centennial Trail and extends east to Northwest Boulevard.



Study Intersections

Signalized Intersection

STOP Unsignalized Intersection

Roundabout

Vicinity Map

CDA Health Corridor Traffic Analysis

October 2020 | Figure 1

EXISTING CONDITIONS

Existing traffic conditions were evaluated for the study area. This memorandum documents existing traffic volumes, intersection operations, and collision history.

Existing Traffic Volumes

Since early 2020, the COVID-19 pandemic has significantly altered traffic volumes and patterns, which has affected the usefulness of collecting and analyzing existing traffic counts as the basis for this study. Therefore, this study relies on historical traffic data consisting of a combination of turn movement counts collected in prior years and user-generated data sourced from StreetLight data. [3] A growth factor was applied to estimate 2020 baseline volumes consistent with pre-pandemic conditions, and the resulting volumes are provided in Figure 2 for the AM peak hour and Figure 3 for the PM peak hour.

When examining the AM and PM peak hour volumes, the following patterns emerge:

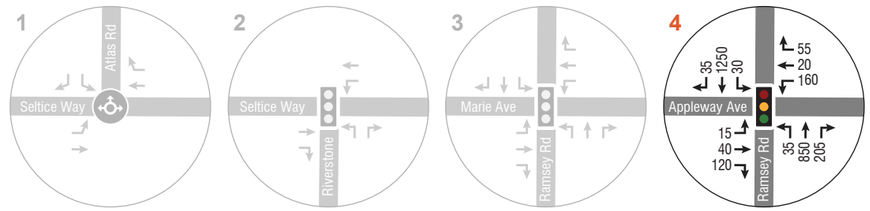
- Higher southbound volumes in the AM peak hour and northbound volumes in the PM peak hour on Ramsey Road and U.S. 95 indicate a clear commuting pattern.
- The Health Corridor generates critical turning movements in the AM peak hour (particularly for the southbound left turn at Northwest Boulevard/Ironwood Drive and southbound right turn at U.S. 95/Ironwood Drive) and PM peak hour (particularly for westbound through and right at Northwest Boulevard/Ironwood Drive and eastbound through and left turn at U.S. 95/Ironwood Drive). However, volumes for most intersection approaches and movements are higher in the PM peak hour and will dictate the capacity needs for the intersections.
- Large intersection imbalances on Ironwood Drive between Lakewood Drive and Medina Street indicate increased driveway activity and a concentration of Health Corridor trip-ends on this block.

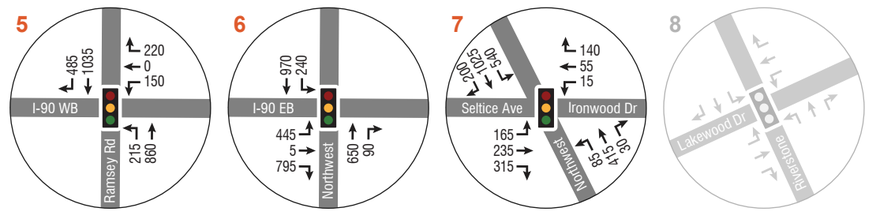
StreetLight Data Observations

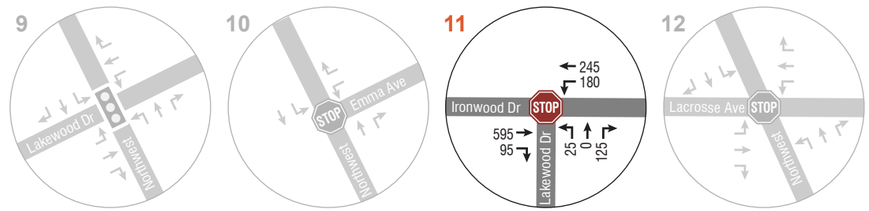
An origin-destination and top routes analysis of the Health Corridor traffic in StreetLight revealed additional insights not directly observed in the turning movement count data.[4] These include:

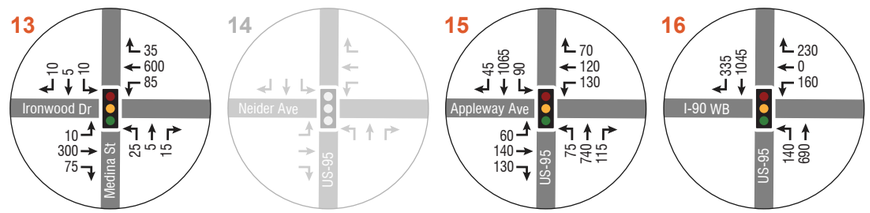
- The top morning traffic generators in the Health Corridor are Kootenai Health Medical Center (KHMC) (31%) and the Peak Health block (20%). Top roadway origin/destinations for corridor traffic include I-90 west (26%), Ramsey Road north (15%), and U.S. 95 north (15%). Inbound traffic exceeds outbound traffic 4:1.
- The top evening traffic generators in the Health Corridor are KHMC (24%), Ironwood Square (19%), and the Peak Health Block (18%). Top roadway origin/destinations for corridor traffic includes I-90 west (20%), U.S. 95 north (16%), and Ramsey Road north (15%). Outbound traffic exceeds inbound traffic 2:1.
- Seltice Way generates the most cut through traffic along Ironwood Drive (57%) as traffic navigates to or from the north-south arterial network. The second highest source of cut through traffic (16-25%) is drivers who use Ironwood drive to switch between north-south arterials (e.g. Ramsey Road-Northwest Boulevard, U.S. 95, and Government Way).

[3] Traffic Data Suitability and Calibration Memorandum, DOWL, October 16, 2020.
[4] StreetLight Data Results Memorandum, DKS Associates, November 11, 2020.









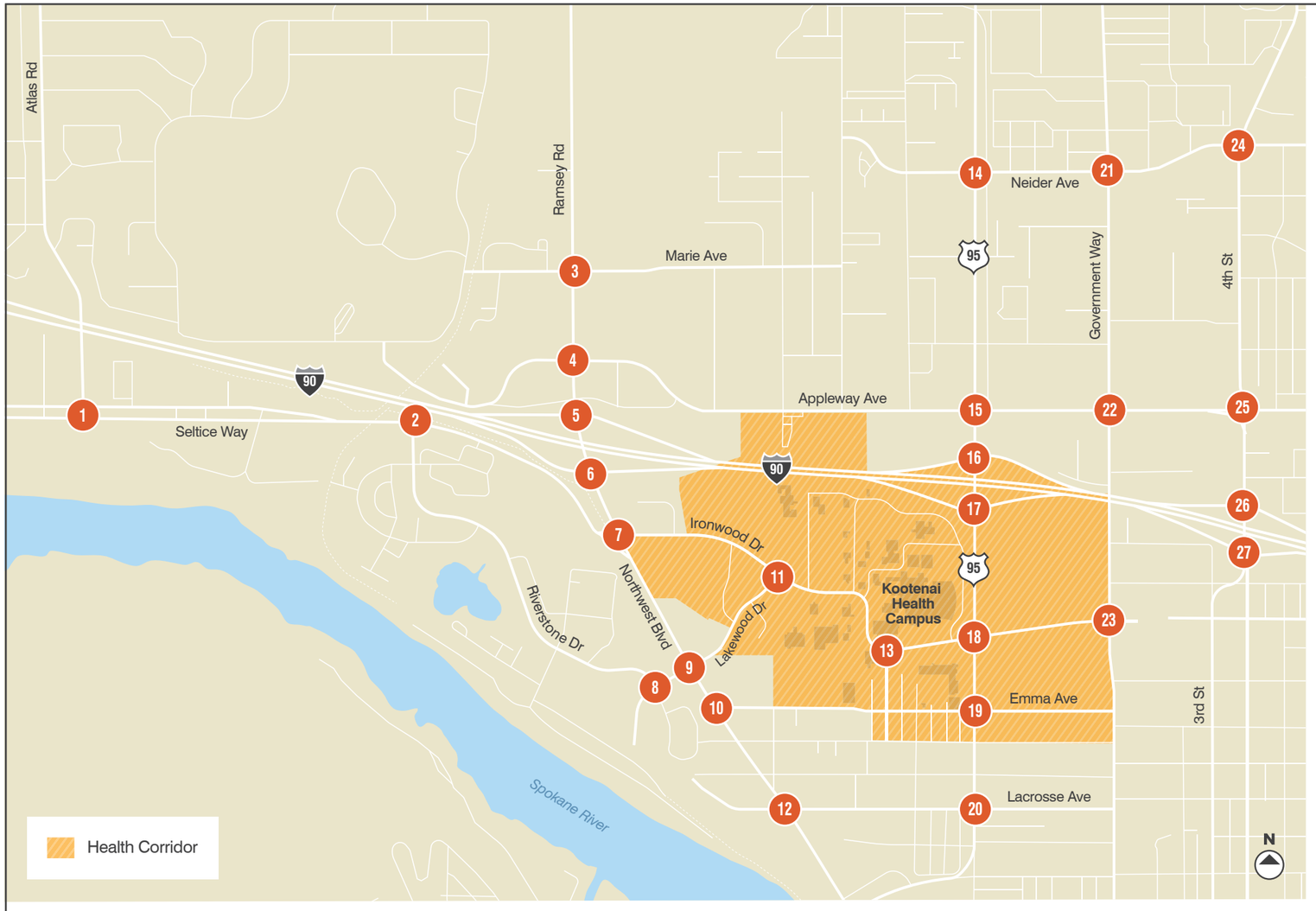
Study Intersections

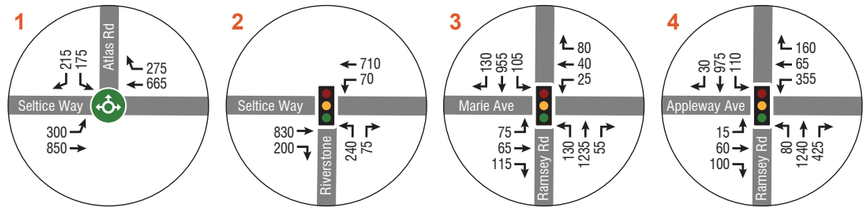
- # Intersection ID
- Signalized Intersection
- STOP Unsignalized Intersection
- Roundabout

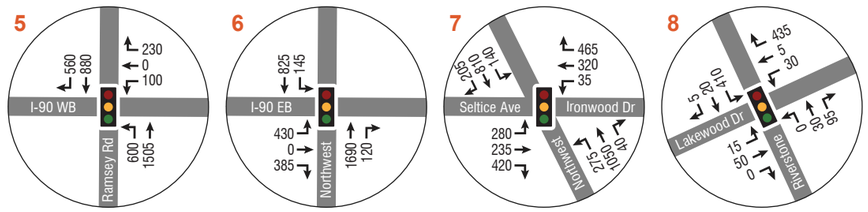
2020 AM Baseline Volumes

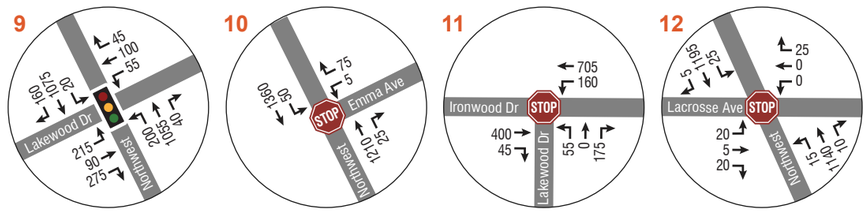
CDA Health Corridor Traffic Analysis

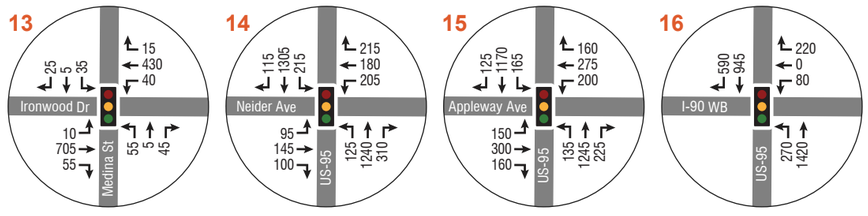
October 2020 | Figure 2

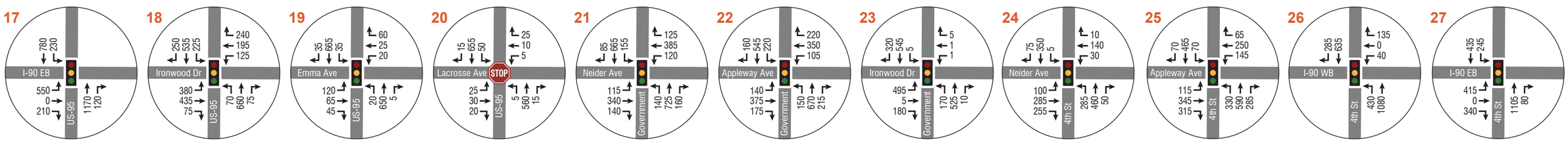












Study Intersections

- # Intersection ID
- Signalized Intersection
- STOP Unsignalized Intersection
- Roundabout

2020 PM Baseline Volumes

CDA Health Corridor Traffic Analysis

October 2020 | Figure 3

Existing Intersection Operations

Intersection operations analysis performed for both the AM and PM peak hours used the current Highway Capacity Manual (HCM), 6th Edition for the signalized, unsignalized, and roundabout intersections. An exception was required for a handful of intersections with non-NEMA[5] signal phasing, where HCM 6th Edition methodologies cannot be applied and HCM 2000 methodologies were used instead. The City of Coeur d'Alene and Idaho Transportation Department (ITD) provided the existing signal timing for all study intersections.

Performance measures included the following:

- **Level of service (LOS)** is a commonly used performance measure that quantifies intersection operations by using a "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident by the presence of long queues and delays.
- **Average delay** (i.e., control delay) is the number of seconds of excess travel time that it takes the average vehicle to pass through an intersection. It is estimated for each turn movement, lane group, approach leg, and/or the intersection as a whole.
- **Volume-to-capacity (v/c) ratio** is a decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is estimated to be greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

Federal guidelines indicate that LOS D and better (i.e., LOS A, B, and C) are acceptable for intersections on federal roads.[6] For City roads, the acceptable traffic operation is also LOS D and better.[7] The LOS, average vehicle delay, and v/c for the study intersections during the AM and PM peak hours are shown in Table 2. As shown, all study intersections meet operating standards during the AM peak period, but the following four do not meet standards during the PM peak period. Explanations are also provided regarding key contributing factors.

- **Northwest Boulevard / Lakewood Drive** – Green time allocation is weighted toward Lakewood Drive eastbound left but does not allow a leading left concurrent with the eastbound through. This causes unnecessary delay to the northbound and southbound through movements while inefficiently serving Lakewood Drive traffic exiting the Riverstone development.

[5] NEMA = National Electrical Manufacturers Association

[6] A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2018

[7] Phone call with KMPO staff, September 24, 2020.

- **U.S. 95 / Appleway Avenue** and **U.S. 95/Ironwood Drive** – The high 174-second cycle length increases intersection capacity at the expense of average delay. Using lagging lefts increases the average delay for turning movements, which are in higher demand than side street through traffic. Finally, split phasing for the Appleway Avenue approaches to U.S. 95 impairs the intersection's ability to return to serving mainline traffic in a prompt timeframe.
- **U.S. 95 / Lacrosse Avenue** – Northbound traffic has insufficient gaps, which contributes to increased delays for eastbound through and left-turn movements.

Table 2: 2020 Baseline Traffic Operations

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	*Ave. Delay (sec/veh)*	*V/C*	*LOS*	*Ave. Delay (sec/veh)*	*V/C*
Signalized						
Ramsey Rd/Marie Ave				C	29.6	0.66
Ramsey Rd/Appleway Ave	C	21.3	0.60	C	26.5	0.65
Northwest Blvd/I-90 WB Ramp	C	21.6	0.48	A	9.2	0.59
Northwest Blvd/I-90 EB Ramp	C	20.6	0.56	A	7.4	0.53
Northwest Blvd/Seltice Way/ Ironwood Dr	C	20.1	0.56	C	32.9	0.55
Northwest Blvd/Lakewood Dr				**F**	90.5	0.66
U.S. 95/Neider Ave				D	42.7	0.76
U.S. 95/Appleway Ave	C	30.3	0.51	**E**	57.7	0.73
U.S. 95/I-90 WB Ramps	B	18.2	0.45	D	35.9	0.59
U.S. 95/I-90 EB Ramps	B	16.9	0.45	D	35.4	0.50
U.S. 95/Ironwood Dr	D	44.3	0.50	**E**	70.7	0.57
U.S. 95/Emma Ave				B	16.8	0.26
Government Way/Neider Ave				C	34.5	0.73
Government Way/Appleway Ave				D	36.4	0.77
Government Way/Ironwood Dr				C	27.6	0.72
4th St/Neider Ave				B	16.2	0.53
4th St/Appleway Ave/Best Ave				C	34.7	0.59
4th St/I-90 WB Ramps				C	20.6	0.65
4th St/I-90 EB Ramps				C	27.7	0.79
Seltice Way/Riverstone Dr				B	10.3	0.38
Ironwood Dr/Medina St	C	23.3	0.44	B	15.6	0.53
Riverstone Dr/Lakewood Dr				A	8.7	0.16
Unsignalized						
Northwest Blvd/Emma Ave				B/C	18.1	0.24
Northwest Blvd/Lacrosse Ave				B/B	14.0	0.07
U.S. 95/Lacrosse Ave				**A/F**	69.6	0.64
Ironwood Dr/Lakewood Dr	A/C	22.5	0.46	A/D	26.3	0.61
Roundabout						
Seltice Way/Atlas Rd				A	9.4	0.50

Signalized and Roundabout
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection

Unsignalized
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

Queuing Analysis

Queuing analysis was performed for the AM and PM peak hours at the study intersections using SimTraffic™ simulation to estimate the 95th percentile queues for each movement. Using the 95th percentile queues is standard engineering practice to determine the adequacy of existing storage lanes. When traffic queues exceed the available storage length, traffic spills into adjacent lanes or extends back to adjacent intersections and affects the traffic flow.

The main findings of the queuing analysis include the following (with detailed information provided as an attachment to this memorandum):

- During the AM peak hours, existing storage for the southbound left turn at the Northwest Boulevard/ Seltice Way/ Ironwood Drive intersection is insufficient. This queue spills back to the I-90 eastbound and westbound ramps creating excessive queues for the southbound through movement into downtown Coeur d'Alene. A side effect of this issue is increased queuing on the I-90 eastbound off-ramp as vehicles cannot complete a right turn due to congestion on Northwest Boulevard.
- During the PM peak hours, the priority of northbound/southbound operations and usage of lagging lefts is creating queue spill back from the left turn pockets on all the major north-south corridors. This has the potential to increase rear-end collisions and limit north/south capacity.
- Excessive queuing occurs at different turn movements and intersections between the AM and PM peak hours. The I-90 eastbound ramp approach to Northwest Boulevard is the only location with queue storage concerns in both the AM and PM peak hours.

Safety Analysis

Collision data for the study area was obtained for 2015-2019 from ITD. The collision data was sorted and analyzed with pivot tables in Microsoft Excel, with the signalized intersections and roundabout being considered separately from the unsignalized portions of the study corridors.

Signalized Intersections and Roundabout

The signalized intersections and roundabout experienced 656 collisions in the last five years. Table 3 provides a breakdown of the collisions by intersection and severity. Most collisions (407 = 62%) resulted in property damage only, while the others (249 = 38%) resulted in injuries (permanent or temporary). None of the signalized intersections or roundabout had a fatal collision during the analysis timeframe. The greatest number of collisions occurred at U.S. 95/Appleway Avenue, which also had a collision rate of 1.02 collisions per million entering vehicles; this rate exceeds the typical industry threshold of 1.0 used to identify locations that would benefit from detailed analysis as a high collision area.

Table 3: 2015-2019 Intersection Collision Data

Intersection	Severity				Total Rate[b] (#/100MVMT)
	PDO[a]	*Injury*	*Fatal*	***Total***	
Ramsey Rd / Golf Course Rd / Marie Ave	22	16	0	38	0.69
Ramsey Rd / Appleway Ave	21	13	0	34	0.52
Ramsey Rd / I-90 WB Ramps	17	9	0	26	0.37
Ramsey Rd / I-90 EB Ramps	10	9	0	19	0.29
Northwest Blvd / Seltice Way / Ironwood Dr	42	27	0	69	0.88
Northwest Blvd / Lakewood Dr	6	10	0	16	0.26
Northwest Blvd / Emma Ave	4	3	0	7	0.14
Northwest Blvd / Lacrosse Ave	2	1	0	3	0.07
U.S. 95 / Neider	23	13	0	36	0.46
U.S. 95 / Appleway Ave	50	30	0	80	**1.02**
U.S. 95 / USI-90 WB Ramps	13	6	0	19	0.30
U.S. 95 / USI-90 EB Ramps	16	10	0	26	0.47
U.S. 95 / Ironwood Dr	26	17	0	43	0.72
U.S. 95 / Emma Ave	16	11	0	27	0.85
U.S. 95 / Lacrosse	10	7	0	17	0.66
Government Way / Neider Ave	17	6	0	23	0.40
Government Way / Appleway Ave	21	8	0	29	0.48
Government Way / Ironwood Dr	3	5	0	8	0.19
4th St / Neider Ave	13	5	0	18	0.48
4th St / Appleway Ave / Best Ave	21	20	0	41	0.74
4th St / I-90 WB Ramps	14	4	0	18	0.38
4th St / I-90 EB Ramps	16	10	0	26	0.54
Riverstone Dr / Seltice Way	6	3	0	9	0.39
Medina St / Ironwood Dr	2	0	0	2	0.08
Lakewood Dr / Ironwood Dr	2	2	0	4	0.14
Riverstone Dr / Lakewood Dr	2	1	0	3	0.15
Seltice Way / Atlas Rd	12	3	0	15	0.33
TOTAL	**407**	**249**	**0**	**656**	

[a] PDO = Property damage only.
[b] Total Rate = average annual collisions per million entering vehicles. **Bold** values are above the 1.0 collisions per million entering vehicles threshold.

Study Corridors

The unsignalized segments of the study corridors experienced 747 collisions during the data timeframe. Table 4 provides a breakdown of the collisions by corridor and severity. Similar to the signalized intersections, most corridor collisions (474 = 64.3%) resulted in property damage only, while 260 of the collisions (35.3%) resulted in physical injuries. In addition, three of the collisions resulted in fatalities.

Appleway Avenue experienced the highest number of collisions and had a total collision rate of 490.94 collisions per hundred million vehicle-miles traveled (100MVMT). This exceeds the state average for urban roads (i.e., 221.6 collisions per 100MVMT), suggesting this segment would benefit from detailed analysis as a high collision area. In addition, 4th Street and Government Way also have collision rates over the state average. All three corridors exceed the state average of 81.7 injury collisions per 100MVMT.

Table 4: 2015-2019 Corridor Collision Data

Corridor	Severity				Collision Rate (#/100MVMT)	
	PDO[c]	*Injury*	*Fatal*	***Total***	*Total*[a]	*Injury*[b]
Ramsey Rd/Northwest Blvd	76	30	0	106	164.76	46.63
U.S. 95 / Lincoln Way	89	50	0	139	199.65	71.82
Government Way	89	46	1	136	**306.00**	**103.50**
4th St	73	40	0	113	**247.28**	**87.53**
Seltice Way / Ironwood Dr	51	26	0	77	171.96	58.07
Appleway Ave / Best Ave	96	68	2	166	**490.94**	**201.11**
TOTAL	474	260	3	737		

[a] Total Rate = average annual collisions per hundred million vehicle-miles traveled (100MVMT). **Bold** values are above the state average 221.6 collisions per 100MVMT.
[b] Injury Rate = average annual collisions per 100MVMT resulting to physical injuries. **Bold** values are above the state average 81.7 collisions per 100MVMT.
[c] PDO = Property damage only.

High Collision Areas

To better understand collision trends at the high collision intersections and corridors, the collision types were considered and are shown in Table 5.

Rear ends are the most common collision type at the U.S. 95/Appleway Avenue intersection. Rear-end collisions are typically expected for signalized intersections with high volumes and long queues. At the U.S. 95/Appleway Avenue intersection, most of the collisions occurred when both vehicles were traveling straight, as opposed to turning at the intersection or switching lanes. Therefore, reduced delays and queues at this intersection are expected to reduce the number of collisions.

Angled collisions were the most common collision type along the unsignalized corridors. These collisions occur when a vehicle turning to or from a side street or driveway, or traveling across a roadway, does not yield the right-of-way, and collides with another vehicle at an angle. These three corridors have numerous closely spaced driveways, and most of the angled collisions involve drivers turning left. Therefore, access management along the corridors is expected to help reduce the number of collisions.

Table 5: 2015-2019 Intersection Collision Data Breakdown by Type

Location	Collision Type							
	Angle	*Rear-End*	*Ped/ Bike*	*Head-On*	*Side-Swipe*	*Same Direction Turning*	*Other*	***Total***
Intersection								
U.S. 95 / Appleway	19	32	3	4	15	7	0	**80**
Corridor								
Appleway Ave	89	31	16	11	5	8	6	**166**
Government Way	61	28	13	9	17	4	4	**136**
4th St	45	25	8	9	11	9	6	**113**

SHORT-TERM SOLUTIONS

Short-term solutions consist of signal timing adjustments, safety improvements, and median installation that can contribute to improved operations and safety in the study area. Figure 5 shows the locations of the short-term solutions described below.

Signal Timing Adjustments

A review of the AM peak hour and PM peak hour signal timing plans indicated there are several adjustments to the existing signal timing and phase operation plans that can improve study area intersection operations.

For the AM peak hour these include:

- Northwest Boulevard / Seltice Way / Ironwood Drive – Change southbound left-turn movement to lead phase concurrent with the southbound through movement, add 3 additional seconds to the southbound left-turn phase (taken from northbound through movement), and optimize offset to minimize southbound queuing.

For the PM peak hour these include:

- Ramsey Rd-Northwest Boulevard Corridor – Adjust corridor cycle length to 120s with 60s half-cycles for the I-90 eastbound and westbound ramp intersections. Optimize intersection offsets and update left turn movement green time splits to limit queue spillback.
- U.S. 95 corridor – Adjust corridor cycle length from 174s to 120s. Optimize intersection offsets and update left turn movement green time splits to limit queue spillback. Additional intersection specific adjustments are detailed below.
    - U.S. 95 / Neider Avenue – Remove the split phase eastbound/westbound signal timing and opt for protected left turns. Add a right turn overlap phase for dedicated right turn lanes.
    - U.S. 95 / Appleway Avenue – Remove the split phase eastbound/westbound signal timing if intersection geometry allows. Add northbound right turn overlap phase.
    - U.S. 95 / Emma Avenue – Remove the northbound and southbound protected left turn phase and opt for permissive only phasing.
- Government Way / Neider Avenue – Re-time the available max greens to allow a 90s maximum cycle length. Add an overlap phase for the eastbound right turn lane. Adjust signal phase diagram to lead with concurrent northbound left and through movements
- Government Way / Appleway Avenue – Add signal interconnect and coordination with Ramsey Road / Appleway Avenue and U.S. 95 / Appleway Avenue intersections. Coordinate this signal with the recommended 120s cycle lengths for the Ramsey Road and U.S. 95 corridors to minimize east-west queuing on Appleway Avenue.
- Government Way / Ironwood Drive – Re-time the available max green to allow a 90s maximum cycle length. Close the north leg crosswalk and update intersection green time splits to account for no pedestrian phase on this leg.
- 4th Street Corridor – Re-time all the available max greens to allow 70-90s maximum cycle length as appropriate. Update left turn movement green time splits to limit queue spillback.

- Seltice Way / Riverstone Drive, Ironwood Drive / Medina Street, and Riverstone Drive / Lakewood Drive - Re-time all the available max greens to allow 90s maximum cycle length as appropriate. Update left turn movement green time splits to limit queue spillback.

An initial analysis of these short-term adjustments to the traffic signal operations reduced average vehicle delay in the study area by 15% and reduced the total estimated queue length in the network by 10%. All traffic signals currently operating at LOS E or F were improved to an acceptable LOS D or better.

Safety Improvements

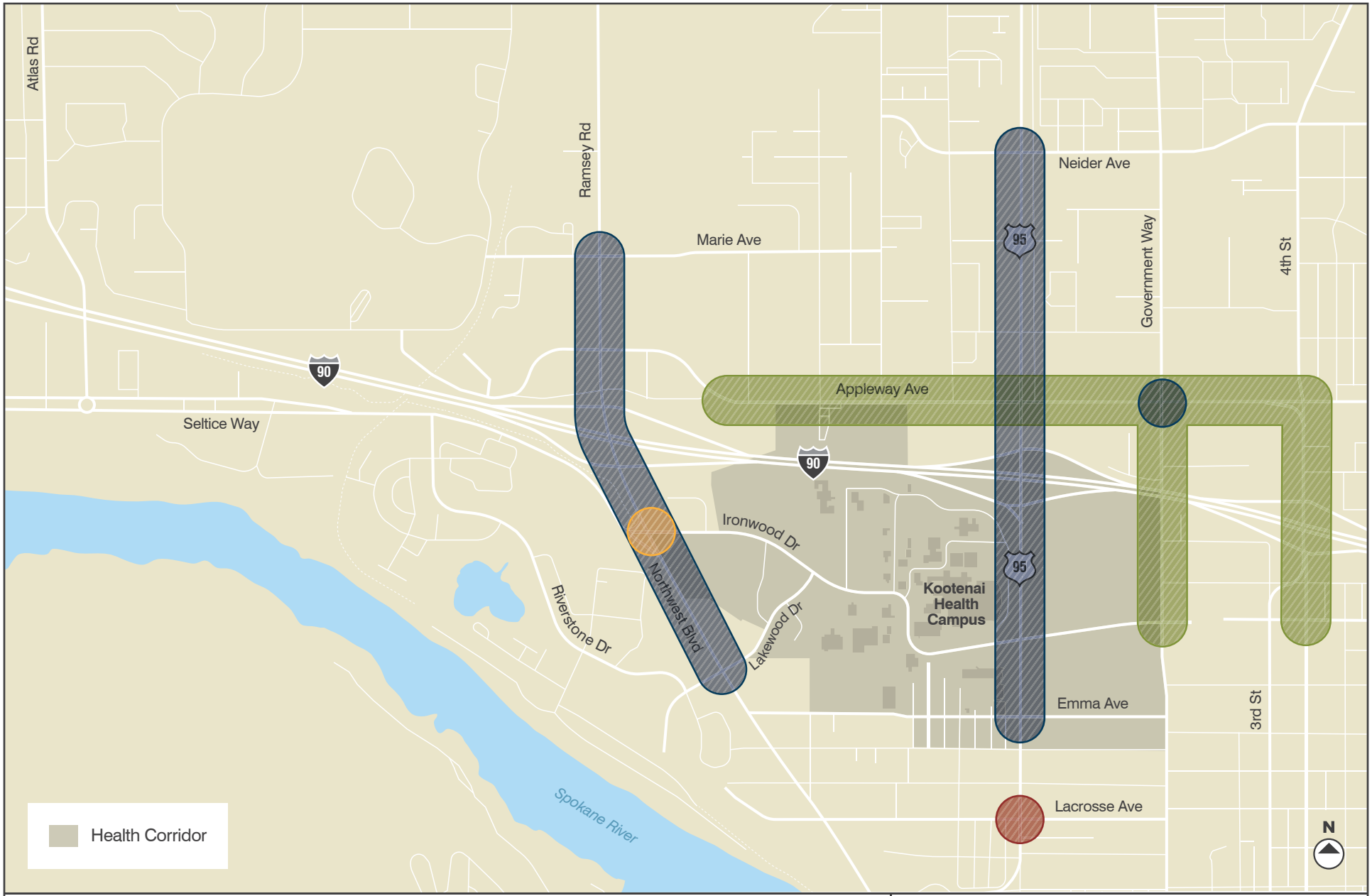
In addition to operational adjustments, the safety concerns noted in the high collision areas should be addressed through the following measures:

- Appleway Avenue – Perform a detailed access management study with the goal of reducing angle collisions along Appleway Avenue from Julia Street to 5th Street. Driveway closures, turn restrictions, and raised medians should be considered.
- Government Way - Perform a detailed access management study with the goal of reducing angle collisions along Government Way from Neider Avenue to Ironwood Drive. Driveway closures, turn restrictions, raised medians, and conversion of the two-way left turn lane to dedicated left turn pockets should be considered.
- 4th Street – Perform a detailed access management study with the goal of reducing angle collisions along 4th Street from Appleway Avenue to Annie Avenue. Driveway closures, turn restrictions, raised medians, and conversion of the two-way left turn lane to dedicated left turn pockets should be considered.
- U.S. 95 / Appleway Avenue – Improved signal timing (see operational adjustments) should reduce rear-end collisions and removal of the dual westbound left turn should reduce the side-swipe collision frequency. Improved access management within 500-feet of the intersection along Appleway Avenue will reduce angle-related collisions near the intersection. A mid-term consideration to limit angle collisions would be the consideration of offset left turn pockets in the northbound and southbound direction.

Median Installation

At the U.S. 95 / Lacrosse Avenue intersection, northbound traffic has insufficient gaps, which contributes to increased delays for eastbound through and left-turn movements. Although a center two-way left-turn lane could allow the possibility for two-stage gap acceptance, this would not be preferred due to the quantity of southbound left turns that have priority use of the center turn lane. Given the low eastbound volumes and proximity of a nearby signal at Emma Avenue, Lacrosse Avenue would be a good candidate intersection for a north/south median to restrict turn movements from the side streets while still allowing a southbound left-turn movement.

Figure 4: U.S. 95 / Lacrosse Avenue Median Option



AM Peak Hour Coordinated Signal Timing Adjustments

PM Peak Hour Coordinated Signal Timing Adjustments

Access Management Study Area

Median Installation

Short-Term Solutions

CDA Health Corridor Traffic Analysis

October 2020 | Figure 5

APPENDIX C: FUTURE CONDITIONS MEMORANDUM

MEMORANDUM

TO:	Ali Marienau, Project Manager – KMPO
FROM:	Dave Simmons, P.E. – DOWL Adam Miles, P.E. – DOWL
DATE:	August 25, 2021
SUBJECT:	Coeur D'Alene Health Corridor Future Conditions Analysis

This memorandum presents the future conditions traffic analysis for the Coeur d'Alene Health Corridor District Transportation Planning and Traffic Analysis Study. This effort included development of future traffic volumes for three future transportation network scenarios followed by evaluation of the future transportation operating conditions surrounding each scenario. Planning-level cost evaluations for the recommended list of transportation projects is provided at the conclusion of this memo for reference. The final recommended future transportation projects will be assigned projected construction years in the forthcoming implementation plan.

FUTURE SCENARIOS OVERVIEW

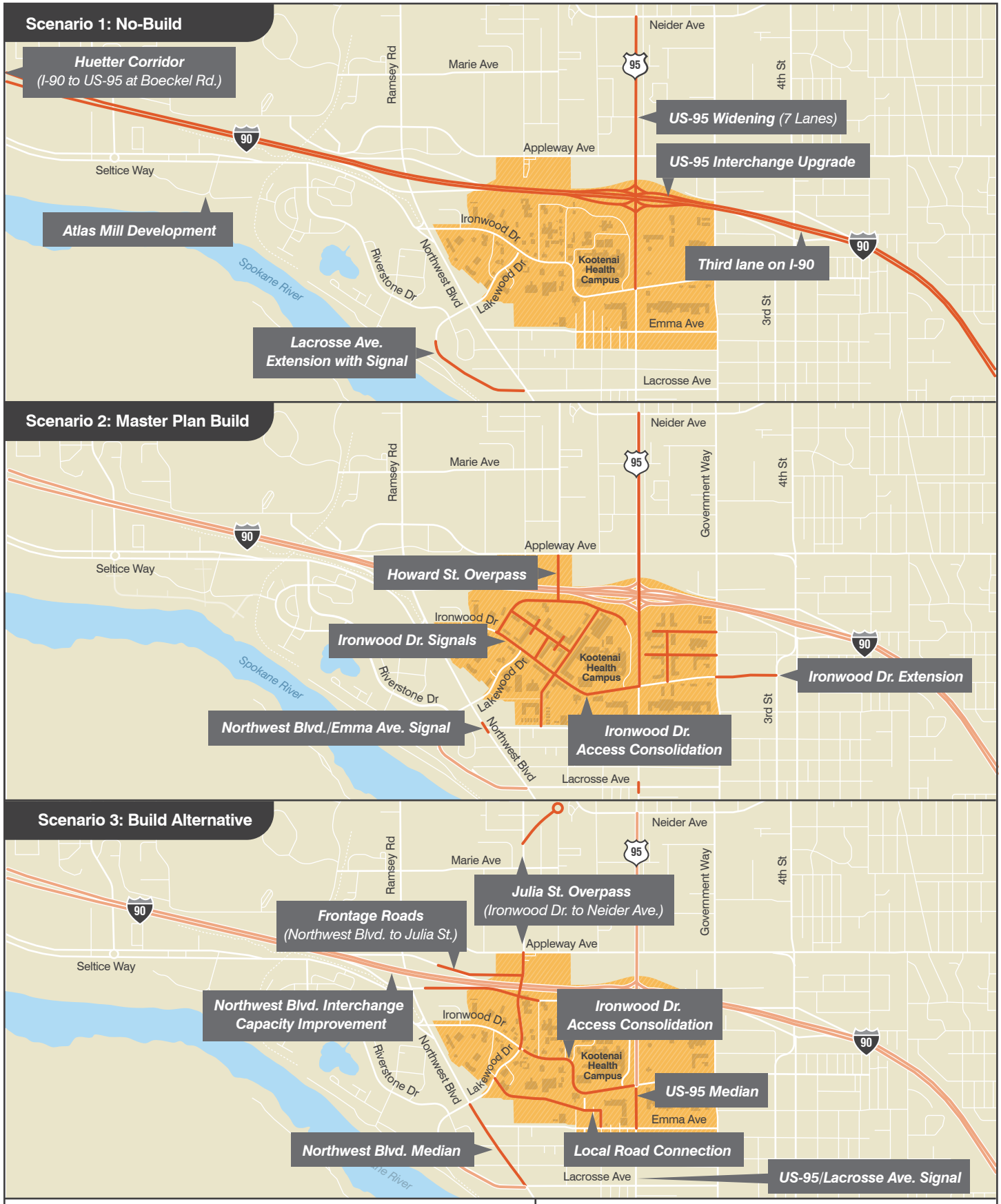
Forecasted traffic conditions within the Health Corridor are based on the 20-year future travel demand model provided by Kootenai Metropolitan Planning Organization (KMPO). This model is designed to reflect the land use patterns, planned roadway projects, employment projections, and anticipated residential growth within the urban area of Kootenai County.

The Health Corridor Master Plan, approved in November 2019, proposed a new development pattern for the Health Corridor with the "intent to allow for both Kootenai Health's campus expansion as well as complementary community development."[1] However, the Health Corridor Master Plan did not evaluate the traffic implications of the various transportation roadway network elements recommended.

The project team examined three future transportation scenarios to identify traffic concerns within and surrounding the Health Corridor resulting from the existing and proposed growth patterns outlined in the current KMPO model and proposed in the Health Corridor Master Plan. The scenarios include the No Build, Master Plan Build, and Build Alternative.

Each of the projects described in the following subsections are shown in Figure 1 for comparison of all three future scenarios.

[1] Page 5, Health Corridor Master Plan, 2019.



Health Corridor

Scenario Improvements

Background Improvements

Scenario Maps

CDA Health Corridor Traffic Analysis

August 2021 | Figure 1

Scenario 1: No Build

The No Build scenario includes all anticipated growth within the Health Corridor based upon current land use, employment, and residential projections provided to KMPO by local jurisdictions. For the purpose of this study, additional employment and residential growth envisioned by the Health Corridor Master Plan is included in Scenario 2.

The future roadway network includes all the planned infrastructure projects in each stakeholder's jurisdiction as well as signal timing updates or non-intrusive lane assignment adjustments (such as updated striping) to present a conservative evaluation of the corridor's operating conditions. No infrastructure improvements (i.e. bridges, traffic signals, roundabouts, etc) beyond those already planned are included in this scenario.

The major planned projects in this scenario, shown in Figure 1, include the following:

- Huetter Corridor (I-90 to US-95 at Boeckel Rd)
- I-90 3rd Lane Widening (Washington State Line to Coeur d'Alene)
- US-95 Widening (7 lanes)
- Lacrosse Ave Extension and Traffic Signal at Northwest Blvd
- I-90/US-95 Interchange Upgrade

Note: The I-90/US-95 Interchange and Access Study (HDR, 2019) "…identified three viable [interchange] configurations: SPUI, DDI, and Diamond." For Scenario 1, Idaho Transportation Department's (ITD) preferred Single Point Urban Interchange (SPUI) configuration is assumed.

Scenario 2: Master Plan Build

This scenario adds the Health Corridor Master Plan development and associated roadway network to the future conditions represented in Scenario 1. The Master Plan replaces approximately 153,570 square feet of existing office space with over 446,000 square feet of office space, 133,000 square feet of Hotel space, and over 900,000 square feet of residential space. This also includes over 83,000 square feet of new civic/recreational space.[2]

For comparison with other future scenarios, some roadway network modifications (i.e. traffic signal installations) not explicitly outlined in the Health Corridor Master Plan were assumed in the development of this scenario to present a reasonable interpretation of the Master Plan's intent. [3]

The mobility improvements included in this scenario, shown in Figure 1, are:

- Howard St Overpass
- Ironwood Dr traffic signals at new local access street intersections

[2] Development Yield, Page 100, Health Corridor Master Plan, 2019.

[3] The Health Corridor Master Plan explicitly left placement of stop signs and signals along Ironwood Dr for further evaluation and discussion. Page 63, Health Corridor Master Plan, 2019.

- Northwest Blvd/Emma Ave Signal[4]
- Ironwood Dr extension to Annie Ave with new traffic signals at 3rd St and 4th St
- Ironwood Dr access consolidation between Lakewood Dr and US-95

In addition to the mobility improvements, the Master Plan also included the following pedestrian facility improvement projects:

- Centennial Trail Access Undercrossing
- Neighborhood Pedestrian Improvements (south of Emma Ave)

Scenario 3: Build Alternative

The Build Alternative assumes the same development pattern included in Scenario 2 but does not use the same roadway network assumptions contained within the Health Corridor Master Plan. Instead, the project team worked with KMPO staff to screen a series of transportation improvements with the potential to alleviate traffic concerns within and surrounding the Health Corridor.

*Note: The project team did evaluate t*wo of the three viable interchange configurations noted at the I-90/US-95 interchange. Both the SPUI and Diamond configurations served similar traffic volumes according to KMPO's model, and our findings were consistent with the *I-90/US-95 Interchange and Access Study (HDR, 2019) which stated "the SPUI slightly outperformed" the Diamond configuration. Both interchanges meet level of service guidelines in 2040.*

The resulting list of projects focuses on creating direct connections for the most common origin-destination routes desired by Health Corridor traffic. This includes north-south connectivity between the Health Corridor and other retail centers to the north and south, as well as improved connectivity to I-90 west of Northwest Blvd. Circulation concerns noted within the Health Corridor Master Plan were also carried forward into Scenario 3 in a revised fashion.

The finalized list of transportation projects, shown in Figure 1, are:

- Julia St Overpass (Ironwood Dr to Neider Ave)
- Northwest Blvd to Julia St Overpass Frontage Roads
- Local Road connection between Lakewood Dr and Melrose St
- Northwest Blvd and US-95 Medians
- US-95/Lacrosse Signal
- Northwest Blvd Interchange Capacity Improvement
- Ironwood Dr access consolidation between Lakewood Dr and US-95

[4] This signal was not identified as a concern in the Health Corridor Master Plan but was added by the project team. During the course of modeling Scenario 2 it became clear the model would not operate unless this intersection was signalized.

FUTURE TRAFFIC VOLUMES

Future traffic volumes for the AM and PM peak hours of each future scenario were derived from the output of KMPO's travel demand model and post-processed using methodology outlined in the National Cooperative highway Research Program (NCHRP) Report 765.[5] This methodology consists of adding the applicable increment or ratio of growth between the existing 2020 and future 2040 model results to the existing traffic counts to develop future year traffic volumes that are better calibrated to real-world data. For consistency with the existing conditions analysis the project team carried forward a reduced study area during the AM peak hour analysis where AM data is available[6]

As with all future forecasting, an acceptable level of error is inherent to every methodology. This is in addition to the probability error associated with the travel demand model's projections. Future turning movement volumes for each scenario are based on an average error of ±10% for the total entering volume of each intersection. Generally, new intersections or roadway approaches led to higher average error in the forecasting while existing intersections or approaches led to lower average error.

Scenario 1: No Build

In the No Build scenario, future traffic continues to predominantly flow north and south along the Ramsey Rd/Northwest Blvd and US-95 corridors. The modeled increase in east-west traffic on I-90 over the next 20 years places added pressure on the turning movements surrounding the arterial interchanges.

As shown in Figure 2, the AM volumes experience a noticeable southbound commute pattern for both the Health Corridor and downtown Coeur d'Alene. This pattern is reversed in Figure 3, which shows the PM volumes for the corridor. In addition to the commute pattern, the PM volumes also reflect the continued increase in office and retail related trips to the surrounding land uses. This includes the Ironwood Plaza east of US-95. The combination of the commute pattern and increased office/retail traffic creates conflicting priorities for the traffic signal at the Ironwood Dr/US-95 intersection.

Scenario 2: Master Plan Build

The future traffic volumes for the Master Plan Build scenario shown in Figure 4 (AM peak hour) and Figure 5 (PM peak hour) are comparable to those in the No Build Scenario. However, there are key differences due to the additional development proposed in the Health Corridor Master Plan that increase traffic volumes. An example of the higher traffic volume is the southbound right turn at the US-95/Ironwood Dr intersection that increases by approximately 300 vehicles in the AM peak hour.

In the PM peak hour, the evening commute traffic from the Health Corridor utilizes the proposed Howard St overpass, which alleviates pressure south of I-90 on Ironwood Dr, Northwest Blvd, and US-95. However, volumes north of I-90 increase along Appleway Ave as Health Corridor traffic uses this parallel alternate route to bypass the interchange ramps and rejoin with Ramsey Rd or US-95 north of their respective interchanges.

[5] *Analytical Travel Forecasting Approaches for Project-Level Planning and Design*, NCHRP 765, 2014.
[6] Traffic Data Suitability and Calibration Memo, DOWL, October 16, 2020.

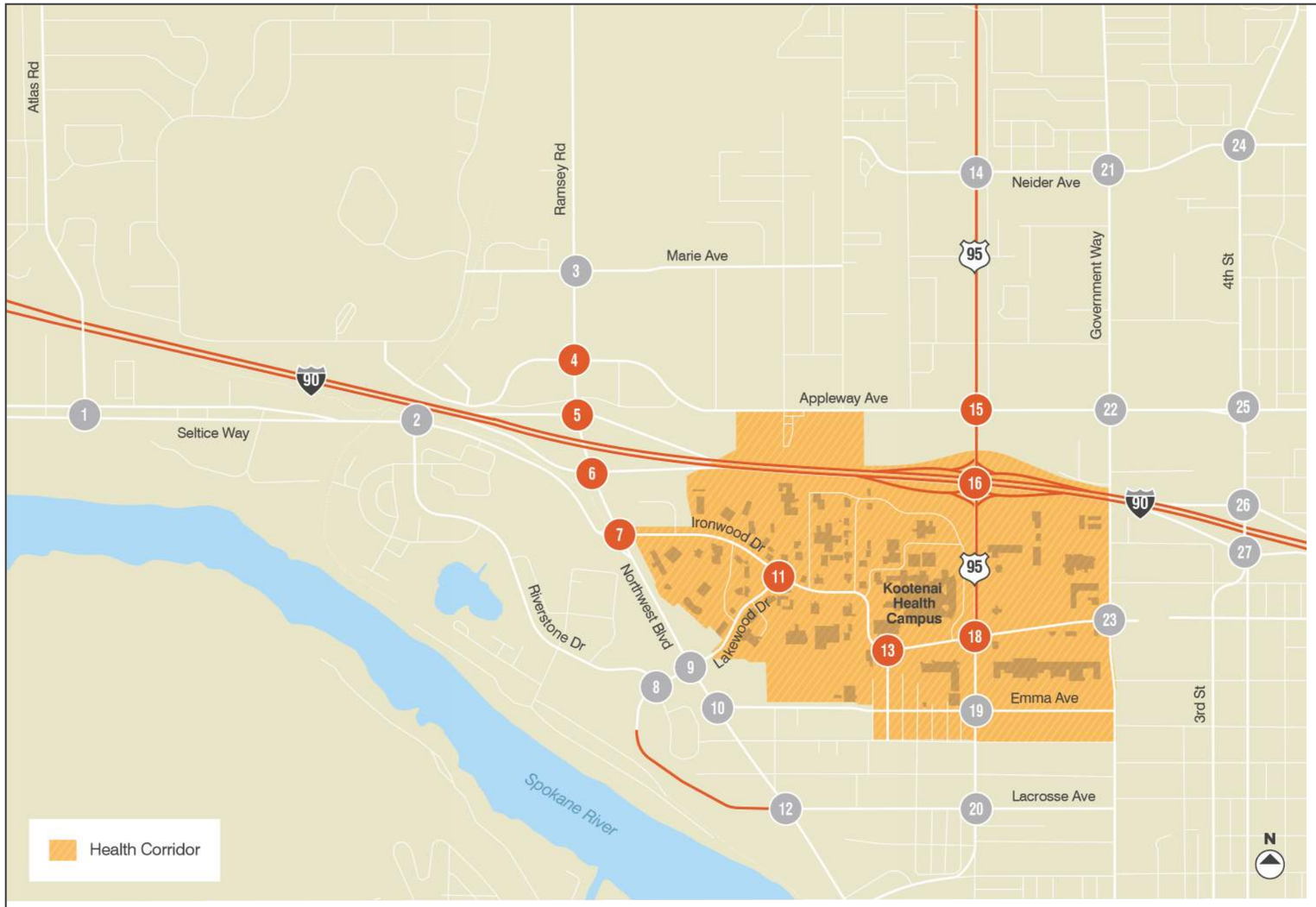
Scenario 3: Build Alternative

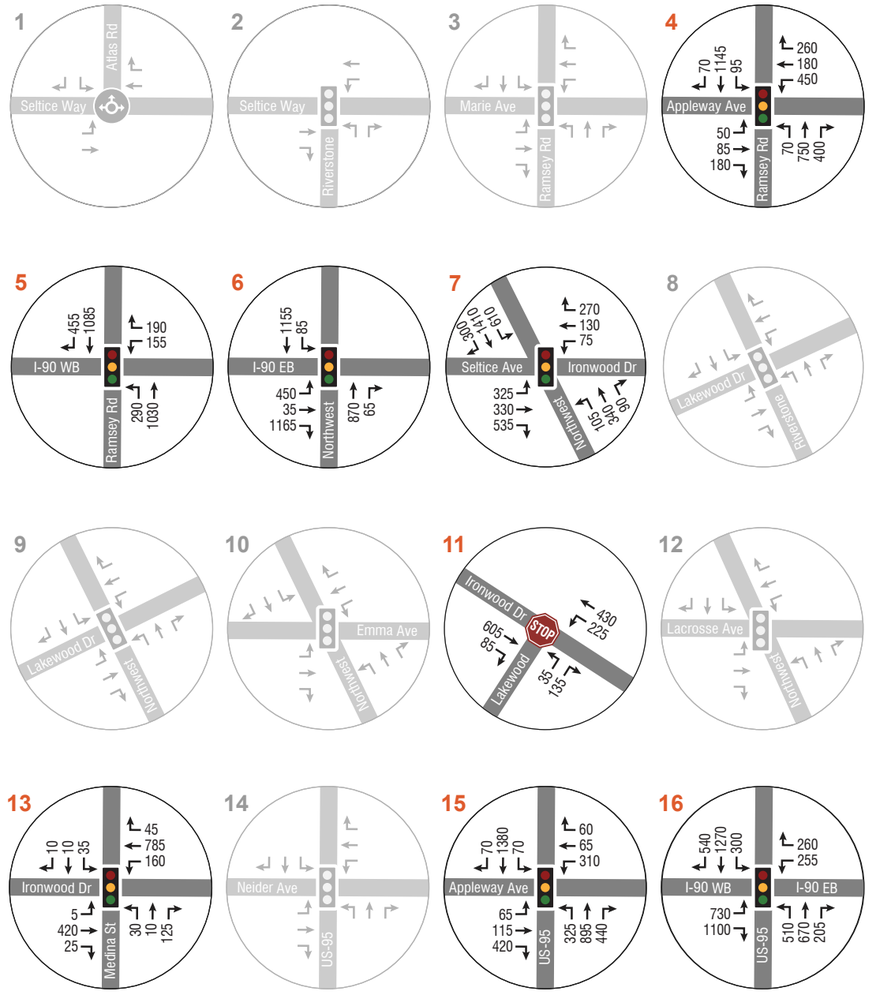
After adding the transportation projects for the Build Alternative a significant shift occurs in the future traffic volumes throughout the Health Corridor. Figure 6 and Figure 7 provide the AM and PM peak hour volumes for Scenario 3.

Comparing the traffic volumes of Scenarios 2 and 3 illustrates the effect of modifying the Northwest Blvd interchange and adding frontage road connections between Northwest Blvd and Julia St. During the AM peak hour, these new roadway connections remove approximately 500 vehicles from the I-90/US-95 eastbound ramp terminal and 300 vehicles from the US-95/Ironwood Dr southbound right-turn. These vehicles instead shift to the through volumes at the Northwest Blvd interchange ramps.

The PM peak hour sees similar changes to the AM peak hour at each interchange. Reductions in turning movement volumes at the interchanges allowed the travel demand model to increase north-south throughput along the US-95 and Northwest Blvd arterials. For example, the northbound through traffic at the I-90/US-95 interchange increased by almost 300 vehicles.

Note: The project team recommends a thorough study of the I-90 interchange corridor between Northwest Blvd and 4th St due to the highly correlated nature of the interchanges. As seen in this study, a modification to one interchange's form or connections will have impacts at the other interchanges and potentially along I-90.





Study Intersections

Intersection ID | Signalized Intersection | STOP Unsignalized Intersection | Roundabout

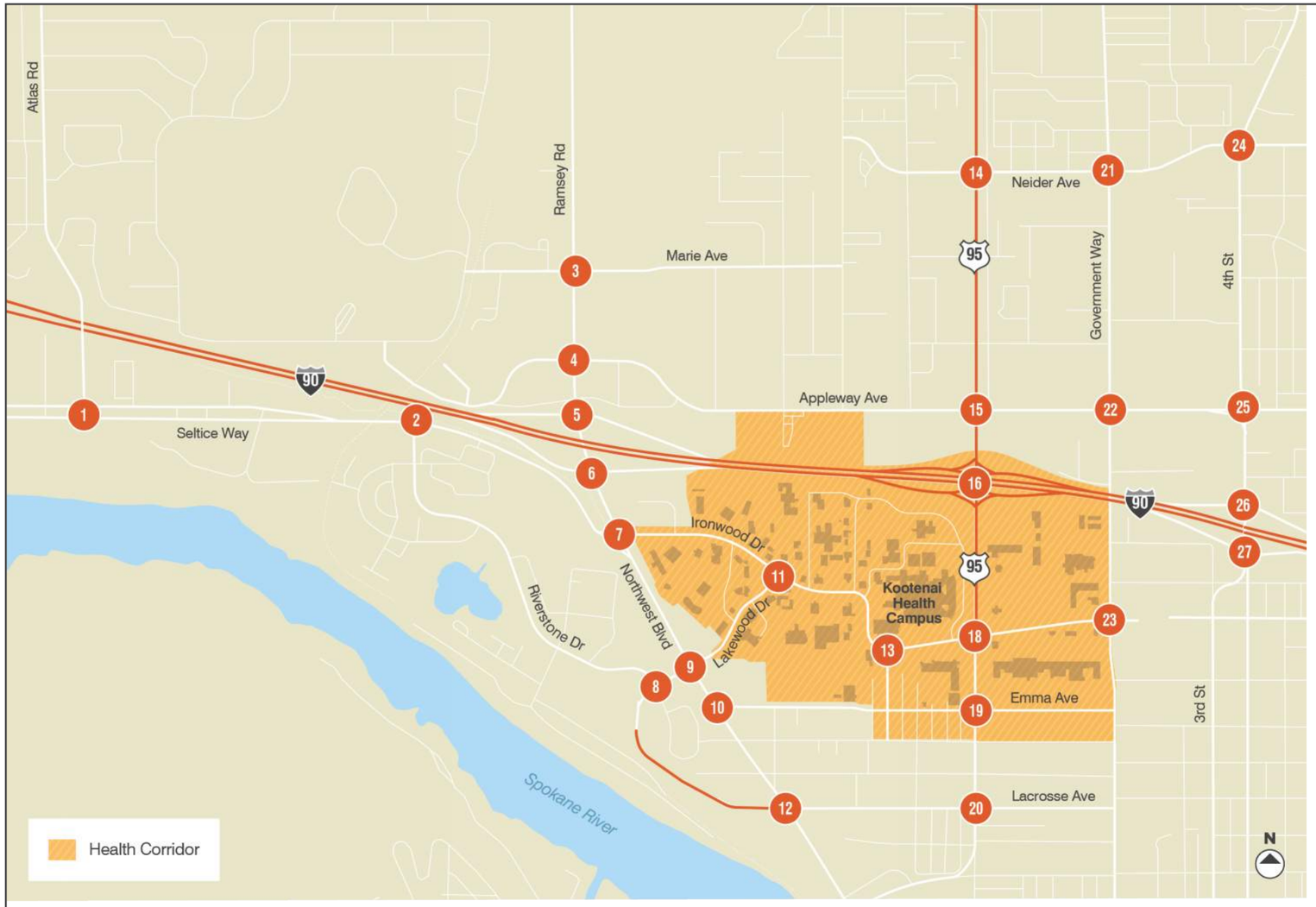
NOTE: Greyed-out intersections were not included in AM peak hour analysis

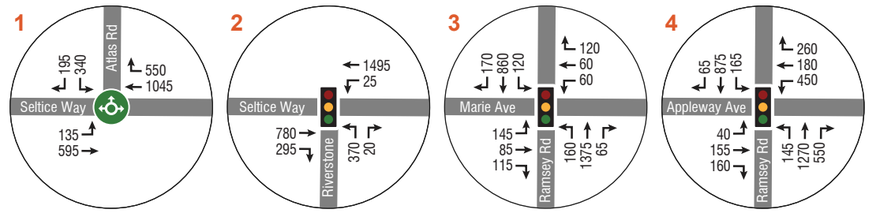
**Intersection Removed by US-95 Interchange Upgrade*

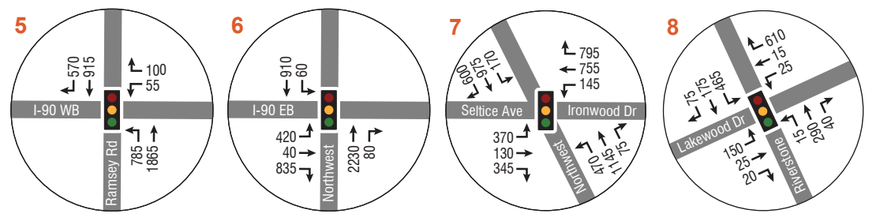
Scenario 1 - AM Volumes

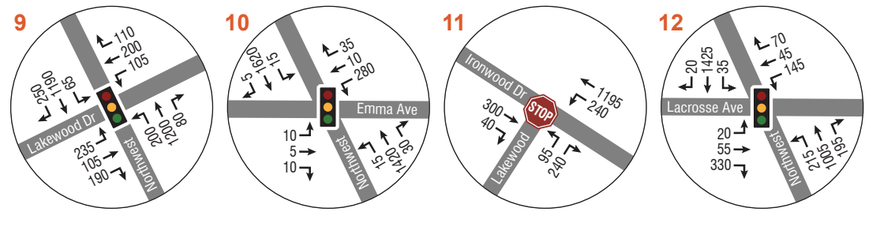
CDA Health Corridor Traffic Analysis

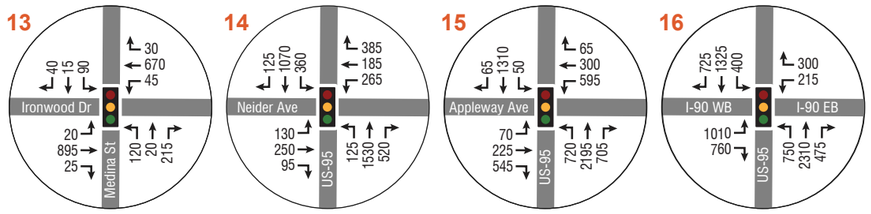
July 2021 | Figure 2

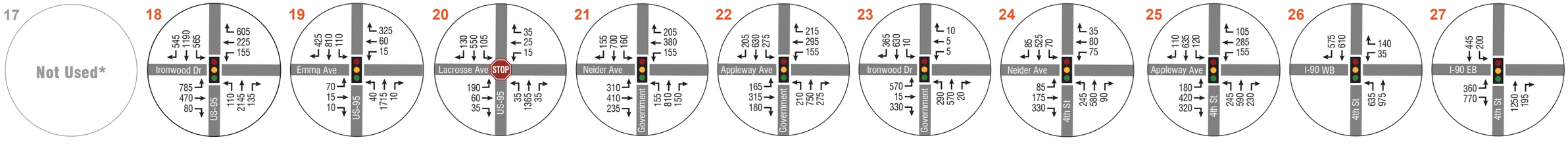












Study Intersections

Intersection ID | Signalized Intersection | STOP Unsignalized Intersection | Roundabout

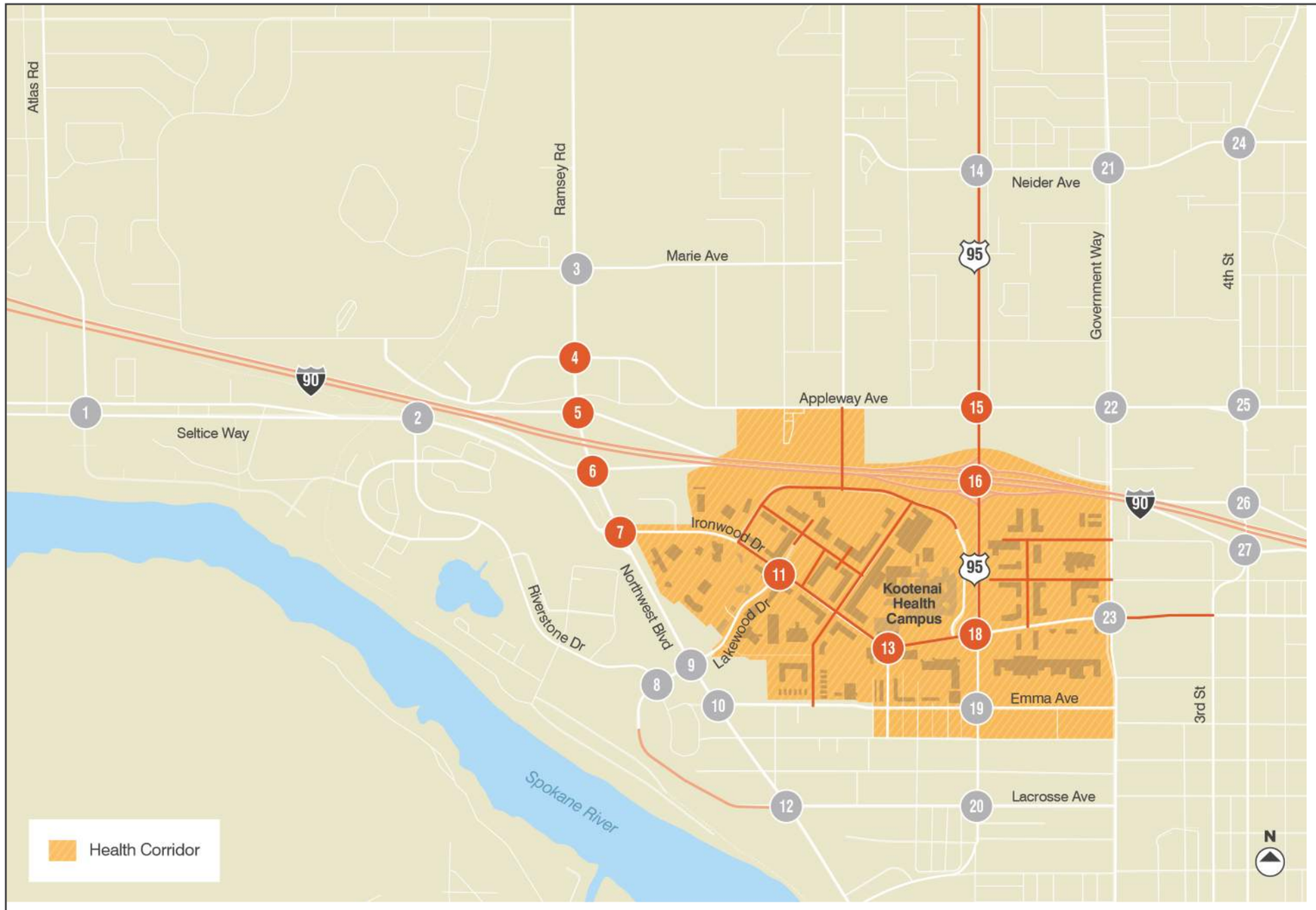
NOTE: Greyed-out intersections were not included in AM peak hour analysis

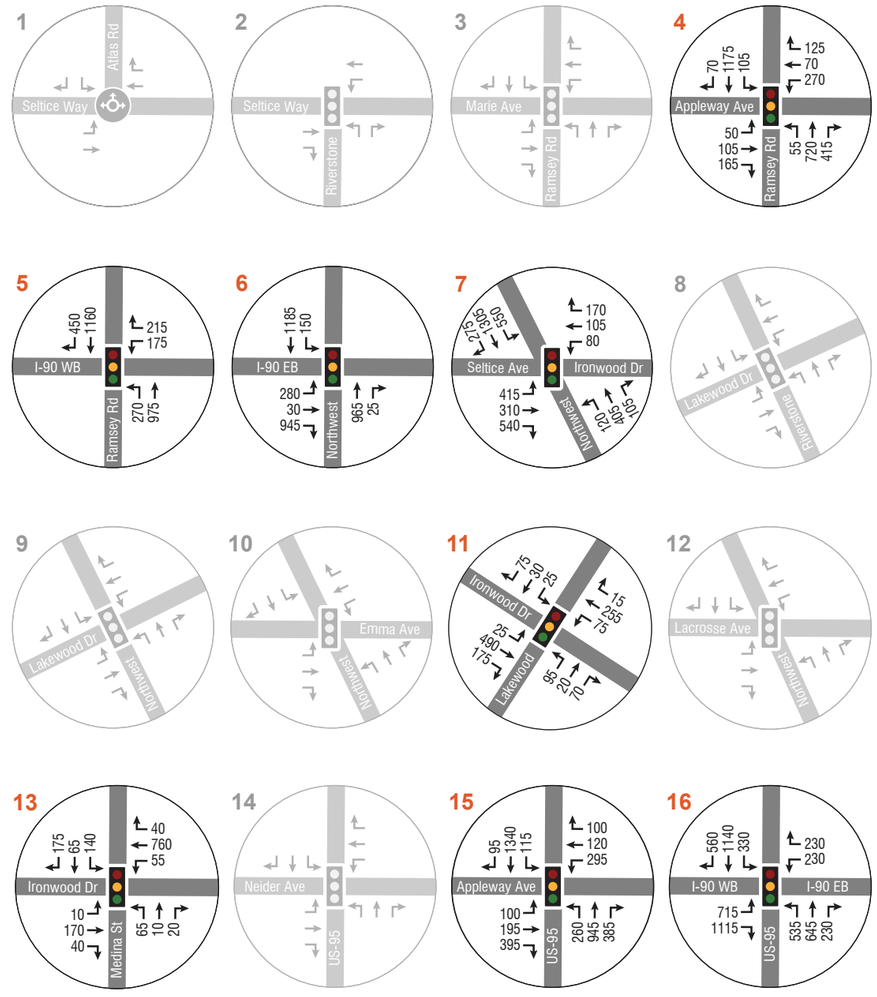
**Intersection Removed by US-95 Interchange Upgrade*

Scenario 1 - PM Volumes

CDA Health Corridor Traffic Analysis

July 2021 | Figure 3





Study Intersections

Intersection ID | Signalized Intersection | STOP Unsignalized Intersection | Roundabout

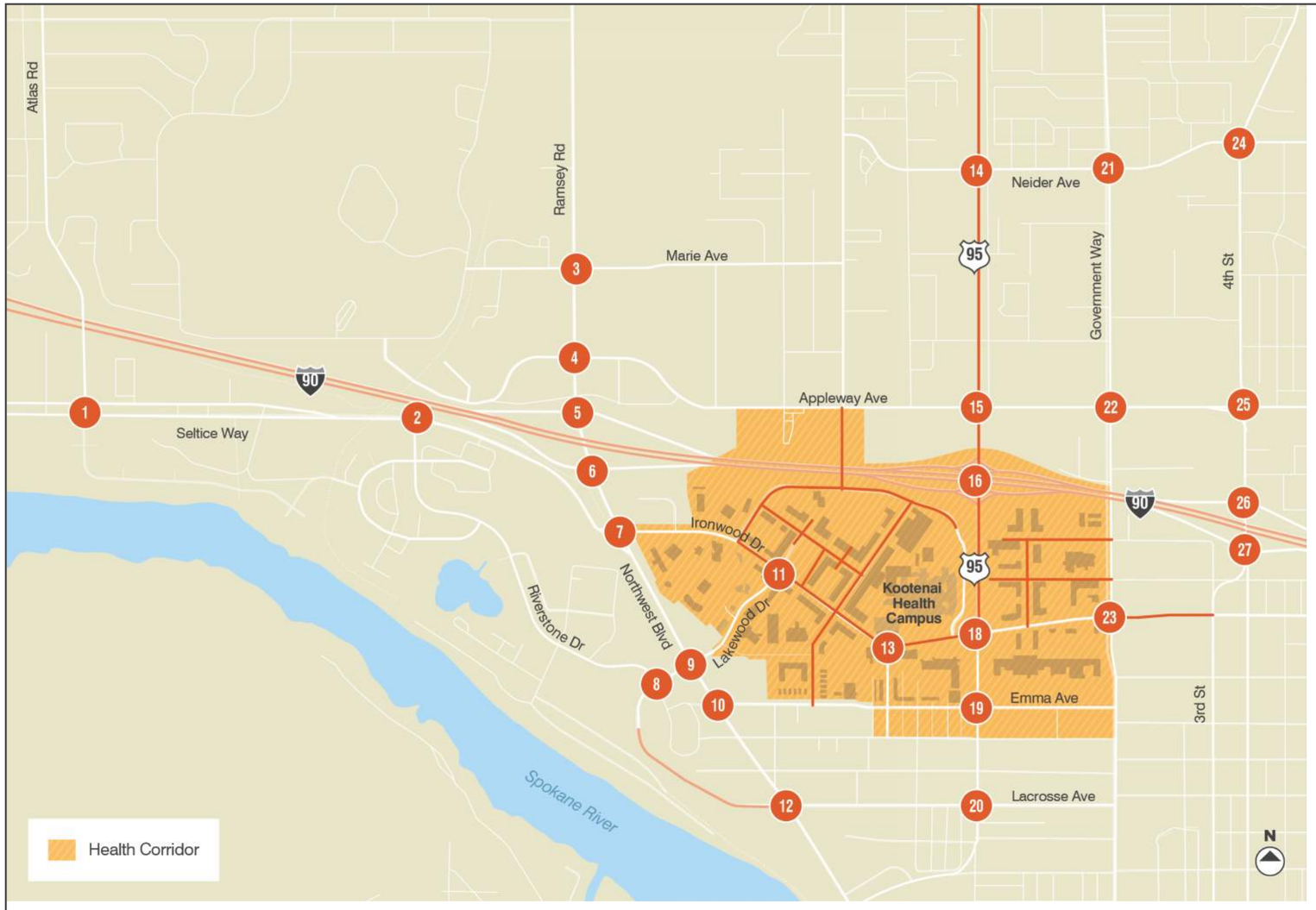
NOTE: Greyed-out intersections were not included in AM peak hour analysis

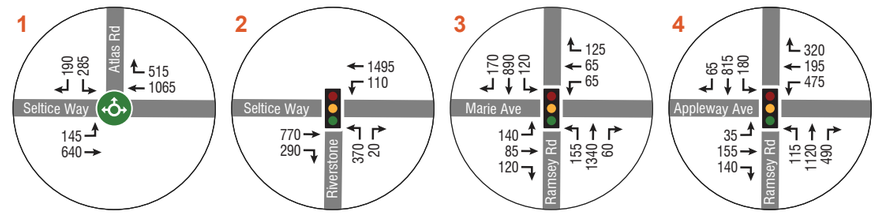
**Intersection Removed by US-95 Interchange Upgrade*

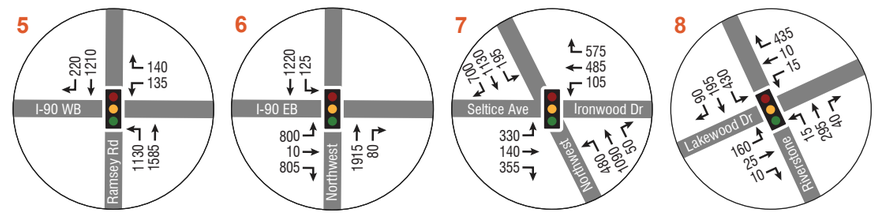
Scenario 2 - AM Volumes

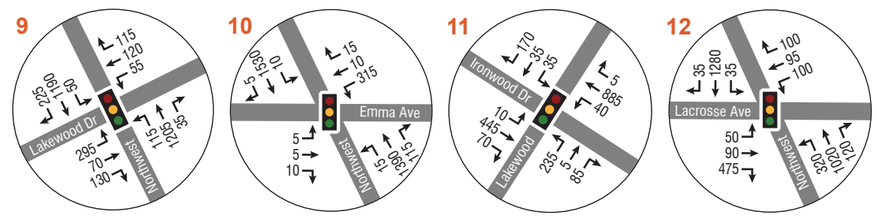
CDA Health Corridor Traffic Analysis

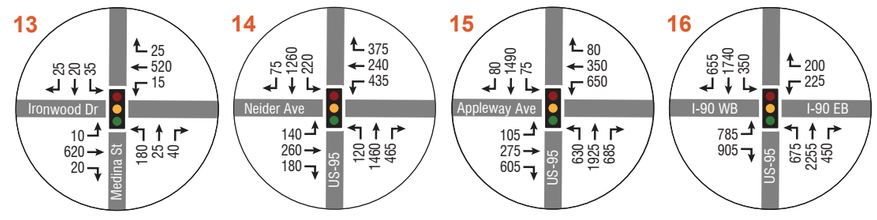
July 2021 | Figure 4

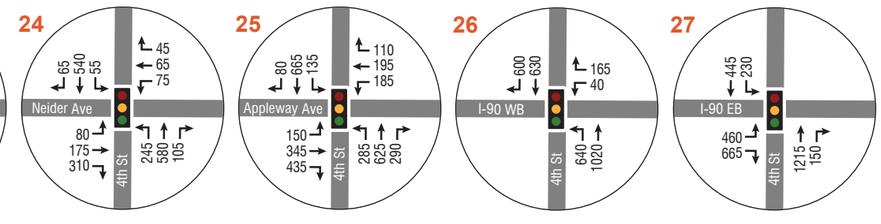












Study Intersections

Intersection ID | Signalized Intersection | STOP Unsignalized Intersection | Roundabout

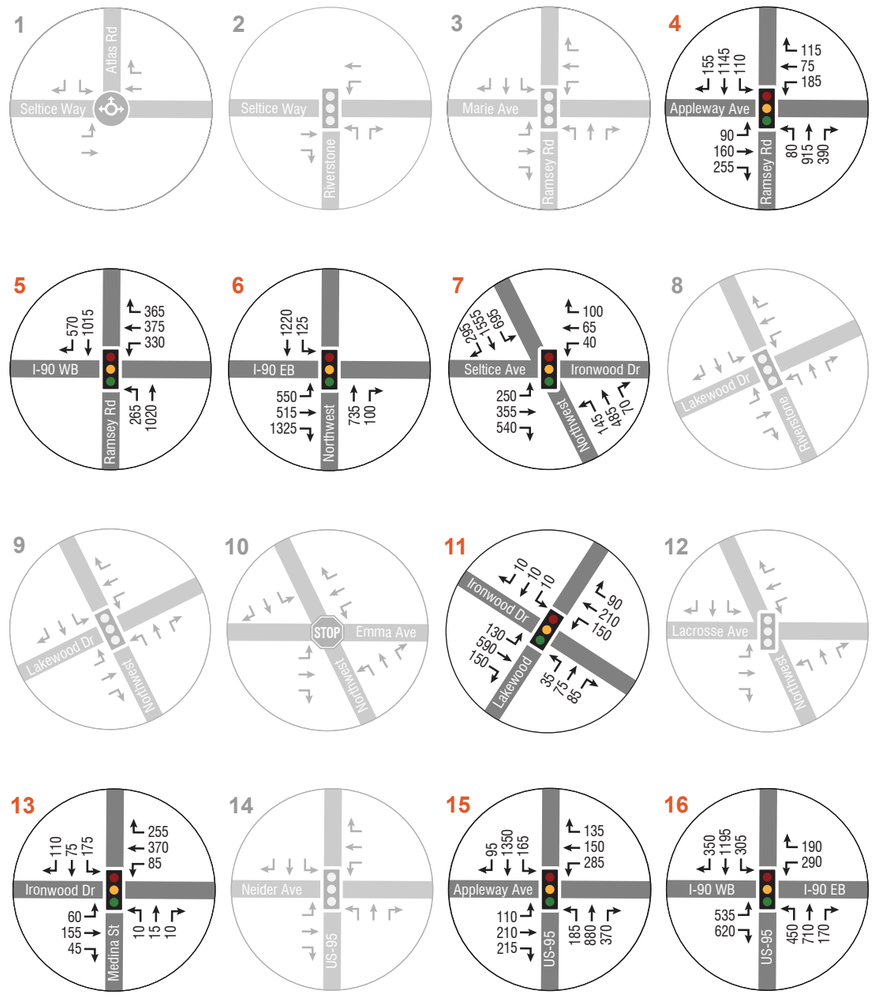
NOTE: Greyed-out intersections were not included in AM peak hour analysis

**Intersection Removed by US-95 Interchange Upgrade*

Scenario 2 - PM Volumes

CDA Health Corridor Traffic Analysis

July 2021 | Figure 5



Study Intersections

Intersection ID | Signalized Intersection | STOP Unsignalized Intersection | Roundabout

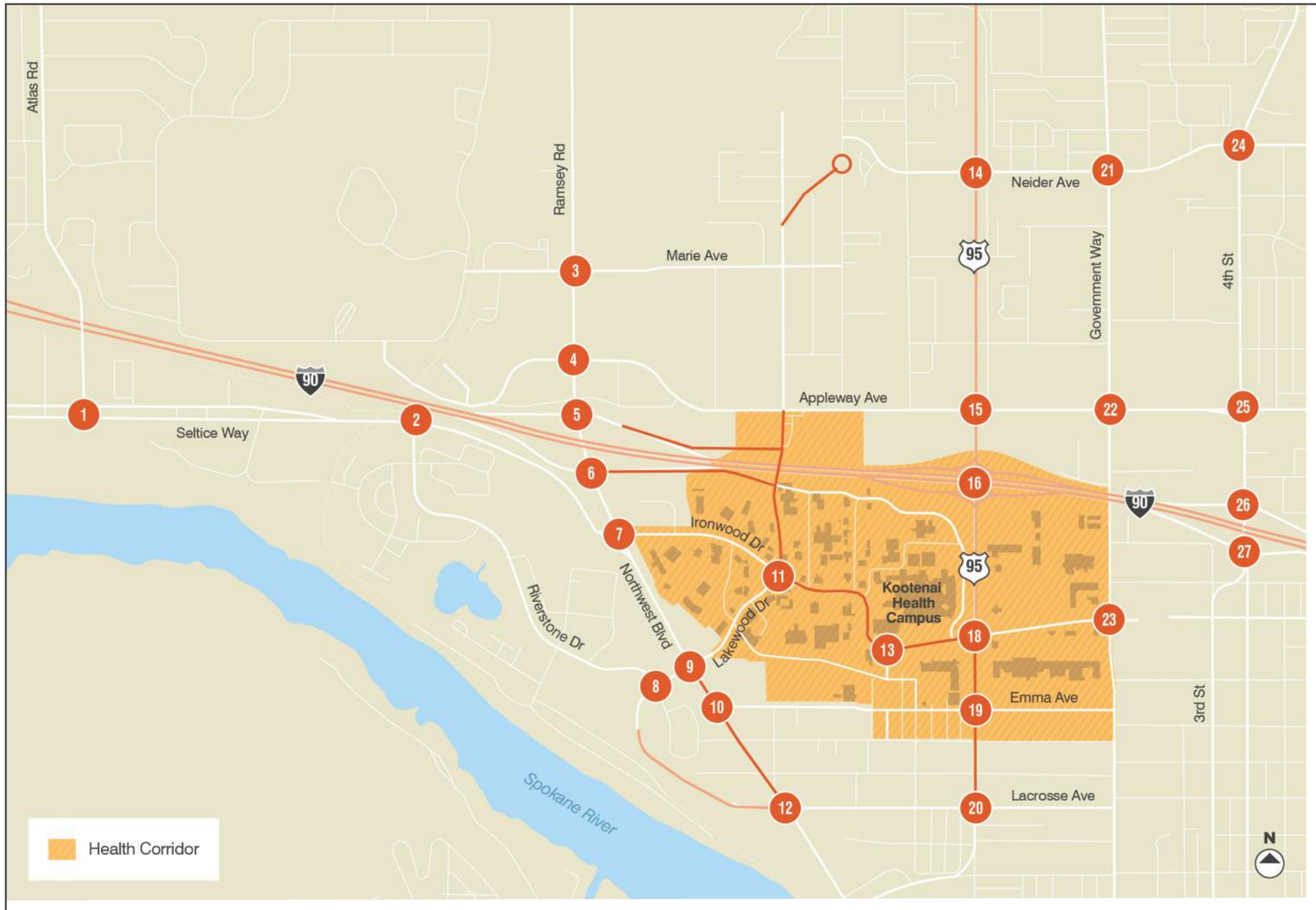
NOTE: Greyed-out intersections were not included in AM peak hour analysis

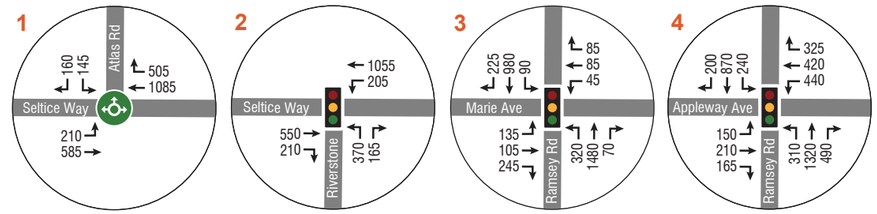
**Intersection Removed by US-95 Interchange Upgrade*

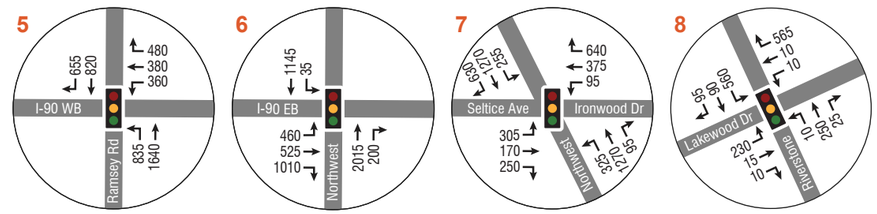
Scenario 3 - AM Volumes

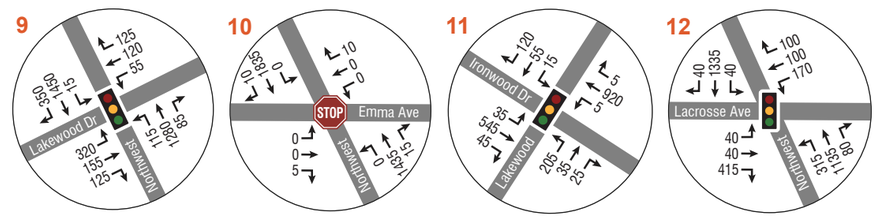
CDA Health Corridor Traffic Analysis

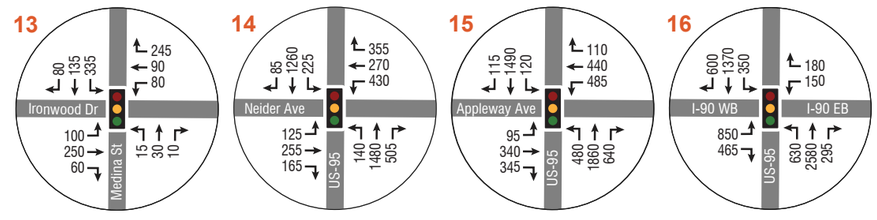
July 2021 | Figure 6

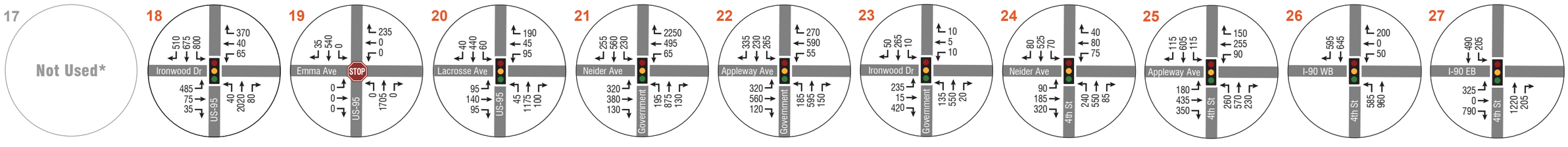












Study Intersections

Intersection ID | Signalized Intersection | STOP Unsignalized Intersection | Roundabout

NOTE: Greyed-out intersections were not included in AM peak hour analysis

**Intersection Removed by US-95 Interchange Upgrade*

Scenario 3 - PM Volumes

CDA Health Corridor Traffic Analysis

July 2021 | Figure 7

FUTURE TRAFFIC OPERATIONS

The projected future traffic operations for each scenario and associated level of congestion are laid out in the following sections. Each evaluation includes a review of both the AM and PM peak hours at each study intersection.

Intersection operations analysis was performed using the current Highway Capacity Manual (HCM), 6th Edition for the signalized, unsignalized, and roundabout intersections. An exception was required for a handful of intersections with non-NEMA[7] signal phasing, where HCM 6th Edition methodologies cannot be applied, and HCM 2000 methodologies were used instead.

Performance measures included the following:

- **Level of service (LOS)** is a commonly used performance measure that quantifies intersection operations by using a "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident by the presence of long queues and delays.
- **Average delay** (i.e., control delay) is the number of seconds of excess travel time that it takes the average vehicle to pass through an intersection. It is estimated for each turn movement, lane group, approach leg, and/or the intersection as a whole.
- **Volume-to-capacity (v/c) ratio** is a decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance worsens. If the ratio is estimated to be greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

Federal guidelines indicate that LOS D and better (i.e., LOS A, B, and C) are acceptable for intersections on federal roads.[8] For City roads, the acceptable traffic operation is also LOS D and better.[9] The LOS, average vehicle delay, and v/c for the study intersections during the AM and PM peak hours are shown for each scenario.

[7] NEMA = National Electrical Manufacturers Association

[8] A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2018

[9] Phone call with KMPO staff, September 24, 2020.

Scenario 1 Operations Analysis

As shown in Table 1, the No Build scenario has nine intersections that do not meet the current operating standards for Coeur d'Alene. While the I-90 interchanges at Northwest Blvd and US-95 meet operating standards, the arterial intersections that feed the interchanges consistently struggle. Unsignalized intersections with minor street left-turn capability (e.g. Emma Ave, Lacrosse Ave) consistently fail to meet operating standards due to the lack of gaps in arterial traffic. Not reflected in Table 1 is the minor street failure at the Seltice Way/Atlas Rd roundabout. Similar to Northwest Blvd and US-95, Seltice Way carries twice as much volume as Atlas Rd and does not provide adequate gaps in traffic. This leads to an average delay over 60 seconds for southbound Atlas Rd traffic.

Table 1: Scenario 1 Traffic Operations

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	*Ave. Delay (sec/veh)*	*V/C*	*LOS*	*Ave. Delay (sec/veh)*	*V/C*
Signalized						
Ramsey Rd/Marie Ave				D	36.0	0.73
Ramsey Rd/Appleway Ave	C	24.9	0.53	C	27.0	0.65
Northwest Blvd/I-90 WB Ramp	A	5.6	0.43	A	1.8	0.61
Northwest Blvd/I-90 EB Ramp	C	23.8	0.65	B	12.7	0.66
Northwest Blvd/Seltice Way/ Ironwood Dr	D	36.7	0.57	E	57.6	0.82
Northwest Blvd/Lakewood Dr				D	51.8	0.68
Northwest Blvd/Lacrosse Ave				E	56.2	0.56
U.S. 95/Neider Ave				E	76.1	0.73
U.S. 95/Appleway Ave	E	61.2	0.97	F	> 100	0.64
U.S. 95/I-90 Interchange	C	24.2	0.96	D	44.9	0.98
U.S. 95/Ironwood Dr	D	40.2	0.61	F	> 100	0.79
U.S. 95/Emma Ave				D	48.4	0.58
Government Way/Neider Ave				C	34.1	0.72
Government Way/Appleway Ave				D	45.3	0.70
Government Way/Ironwood Dr				C	32.6	0.82
4th St/Neider Ave				C	23.9	0.57
4th St/Appleway Ave/Best Ave				C	34.2	0.61
4th St/I-90 WB Ramps				C	27.5	0.58
4th St/I-90 EB Ramps				E	62.5	>1.0
Seltice Way/Riverstone Dr				B	13.0	0.53
Ironwood Dr/Medina St	C	29.1	0.47	C	25.0	0.59
Riverstone Dr/Lakewood Dr				B	15.7	0.30
Unsignalized						
Northwest Blvd/Emma Ave				A/F	> 100	> 1.0
U.S. 95/Lacrosse Ave				C/F	> 100	> 1.0
Ironwood Dr/Lakewood Dr	B/D	4.7	0.54	B/F	43.3	> 1.0
Roundabout						
Seltice Way/Atlas Rd				C	21.8	0.60

Signalized and Roundabout
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection

Unsignalized
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

Scenario 2 Operations Analysis

The Master Plan Build scenario has three intersections in the PM peak hour that do not meet the current LOS operating standards for Coeur d'Alene, as shown in Table 2. The Health Corridor Master Plan transportation projects improved peak hour operating conditions at all the key gateways into the Health Corridor. However, US-95 still experiences significant delays north of I-90 and the new US-95/I-90 single point urban interchange is at capacity in the morning and evening due to the large turning movements on the ramp terminals. In addition, minor street traffic on Lacrosse Ave cannot find sufficient gaps in traffic to complete turning movements. Not reflected in Table 2 is the continued failure of the Atlas Rd leg of the Seltice Way/Atlas Rd roundabout because overall the roundabout still performs at LOS C.

Table 2: Scenario 2 Traffic Operations

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	*Ave. Delay (sec/veh)*	*V/C*	*LOS*	*Ave. Delay (sec/veh)*	*V/C*
Signalized						
Ramsey Rd/Marie Ave				C	31.7	0.73
Ramsey Rd/Appleway Ave	D	36.9	0.69	C	25.8	0.67
Northwest Blvd/I-90 WB Ramp	A	4.2	0.51	A	4.3	0.57
Northwest Blvd/I-90 EB Ramp	B	16.1	0.57	B	15.2	0.73
Northwest Blvd/Seltice Way/ Ironwood Dr	C	32.1	0.54	D	44.7	0.82
Northwest Blvd/Lakewood Dr				D	44.5	0.61
(+) Northwest Blvd/Emma Ave				A	7.2	0.80
Northwest Blvd/Lacrosse Ave				E	76.9	0.85
U.S. 95/Neider Ave				D	54.0	0.59
U.S. 95/Appleway Ave	D	36.9	0.58	E	55.0	0.82
U.S. 95/I-90 Interchange	B	18.5	0.99	D	36.6	1.01
U.S. 95/Ironwood Dr	C	22.7	0.40	D	45.7	0.69
U.S. 95/Emma Ave				D	43.6	0.67
Government Way/Neider Ave				D	42.3	0.70
Government Way/Appleway Ave				D	39.5	0.70
Government Way/Ironwood Dr				C	33.2	0.70
4th St/Neider Ave				C	26.6	0.54
4th St/Appleway Ave/Best Ave				D	38.3	0.60
4th St/I-90 WB Ramps				C	20.1	0.53
4th St/I-90 EB Ramps				D	37.3	0.90
Seltice Way/Riverstone Dr				B	12.9	0.54
Ironwood Dr/Medina St	C	30.3	0.52	C	25.6	0.54
Riverstone Dr/Lakewood Dr				B	10.5	0.28
(+) Ironwood Dr/Lakewood Dr	A	9.0	0.38	C	26.3	0.61
Unsignalized						
U.S. 95/Lacrosse Ave				B/F	> 100	> 1.0
Roundabout						
Seltice Way/Atlas Rd				C	17.1	0.59

Signalized and Roundabout
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection
(+) = New signalized intersection

Unsignalized
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

Scenario 3 Operations Analysis

As shown in Table 3, the transportation improvements implemented in the Build Alternative reduced delay along US-95 north of I-90 and improved operating conditions at the US-95/I-90 interchange by lowering volumes below capacity. The raised medians along US-95 and Northwest Blvd south of Ironwood Dr rerouted traffic from the Health Corridor to the signalized intersections at Lacrosse Ave and this helps US-95 operate at LOS A at Emma Ave. The right-in, right-out at Emma Ave is operating below City standard due to the high right turning volume onto US-95. This volume is expected to drop as drivers find the Lacrosse Ave and Ironwood Dr signals more attractive now that they no longer fail. Also of note, the lowering volumes along Seltice Way improves operations at the Seltice Way/Atlas Rd roundabout and removes the minor street failure.

Table 3: Scenario 3 Traffic Operations

Study Area Intersection	AM Peak Hour			PM Peak Hour		
	LOS	*Ave. Delay (sec/veh)*	*V/C*	*LOS*	*Ave. Delay (sec/veh)*	*V/C*
Signalized						
Ramsey Rd/Marie Ave				D	50.9	0.88
Ramsey Rd/Appleway Ave	D	38.2	0.47	D	45.0	0.66
Northwest Blvd/I-90 WB Ramp	B	15.8	0.50	C	27.0	0.96
Northwest Blvd/I-90 EB Ramp	D	45.5	0.79	C	30.2	0.71
Northwest Blvd/Seltice Way/ Ironwood Dr	D	37.3	0.51	D	47.8	0.62
Northwest Blvd/Lakewood Dr				C	33.0	0.58
Northwest Blvd/Lacrosse Ave				D	53.2	0.68
U.S. 95/Neider Ave				D	47.8	0.58
U.S. 95/Appleway Ave	D	42.5	0.54	D	45.8	0.77
U.S. 95/I-90 Interchange	C	27.7	0.68	D	52.1	0.98
U.S. 95/Ironwood Dr	C	28.2	0.40	D	49.2	0.99
(+) U.S. 95/Lacrosse Ave				B	19.7	0.42
Government Way/Neider Ave				D	47.0	0.72
Government Way/Appleway Ave				D	46.0	0.72
Government Way/Ironwood Dr				C	31.8	0.46
4th St/Neider Ave				C	26.9	0.53
4th St/Appleway Ave/Best Ave				D	35.0	0.57
4th St/I-90 WB Ramps				C	33.3	0.52
4th St/I-90 EB Ramps				C	20.1	0.75
Seltice Way/Riverstone Dr				B	16.0	0.45
Ironwood Dr/Medina St	B	16.7	0.30	C	20.2	0.54
(+) Ironwood Dr/Lakewood Dr	A	8.8	0.38	B	15.6	0.49
Riverstone Dr/Lakewood Dr				C	33.1	0.48
Unsignalized						
Northwest Blvd/Emma Ave				A/C	0.1	0.03
(+) U.S. 95/Emma Ave				A/F	11.1	> 1.0
Roundabout						
Seltice Way/Atlas Rd				B	13.0	0.54

Signalized and Roundabout
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection
(+) = New signalized intersection

Unsignalized
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement
(+) = New unsignalized intersection

Congestion Analysis

In addition to the operations analysis, microsimulation of the Health Corridor using SimTraffic™ was performed to examine the level of congestion within the transportation network. When traffic queues exceed the available storage, traffic spills into adjacent lanes or extends upstream to adjacent intersections and impedes traffic flow. This is expressed in Table 4 and Table 5 as a percentage of the peak hour where traffic could not move to the next block (Upstream Block Time) due to an existing queue at each intersection. An upstream block time of 10% represents six minutes of gridlock between intersections during the peak hour. For each intersection, the movements contributing the most toward the congestion are identified.

As shown in Table 4 the upstream block time typically decreases during the AM peak hour as the Health Corridor Master Plan and Build Alternative transportation projects are implemented. US-95/Appleway Ave is the only intersection which experiences significant upstream blockage during the AM peak hour and this is due to the conflict between two groups of commuters (southbound on US-95 and westbound left-turns) accessing the I-90 interchange ramps.

Table 4: AM Peak Hour Congestion Analysis

Study Area Intersection	Upstream Block Time (%)			Movement(s) of Concern
	Scenario 1	*Scenario 2*	*Scenario 3*	
Ramsey Rd/Appleway Ave	6	3	4	
Northwest Blvd/I-90 WB Ramp	1	0	1	
Northwest Blvd/I-90 EB Ramp	6	5	3	
Northwest Blvd/Seltice Way/ Ironwood Dr	5	5	9	
U.S. 95/Appleway Ave	14	5	0	SB Thru, WB Left
U.S. 95/I-90 Interchange	0	4	0	
U.S. 95/Ironwood Dr	3	9	1	
Ironwood Dr/Medina St	0	0	0	
Ironwood Dr/Lakewood Dr	1	0	0	
Riverstone Dr/Lakewood Dr				
Seltice Way/Atlas Rd				

In the PM peak hour, there are multiple sources of gridlock in Scenario 1 clustered along each of the major north-south arterials of the Health Corridor (Northwest Blvd, US-95, and Lakewood Dr). As shown in Table 5, the Health Corridor Master Plan's transportation projects (Scenario 2) alleviate most of the concerns at gateway intersections to the Health Corridor, but Northwest Blvd still experiences gridlock north and south of the Health Corridor. In addition, congestion increases consistently along Government Way and 4th Street due to the Ironwood Dr extension to Annie Ave.

With the adjustments to the proposed roadway network included in the Build Alternative (Scenario 3) congestion across the Health Corridor continues to decrease, except for an increase in congestion on Ramsey Rd north of Appleway Ave. This increase is directly related to the increased northbound throughput along Northwest Blvd competing with the westbound traffic leaving the retail land uses on the east of Ramsey Rd. Also, the 4th St/I-90 EB Ramps intersection still exceeds 10% block time in Scenario 3. Increased ramp volumes by 2040 will likely lead to a ramp terminal upgrade project beyond 2040.

Table 5: PM Peak Hour Congestion Analysis

Study Area Intersection	Upstream Block Time (%) by Scenario			
	1	*2*	*3*	*Movement(s) of Concern*
Ramsey Rd/Marie Ave	0	0	10	
Ramsey Rd/Appleway Ave	5	0	9	NB Thru
Northwest Blvd/I-90 WB Ramp	1	2	1	
Northwest Blvd/I-90 EB Ramp	4	9	2	NB Thru, EB Ramp
Northwest Blvd/Seltice Way/ Ironwood Dr	13	7	8	NB Thru, SB Thru, WB Thru
Northwest Blvd/Lakewood Dr	24	17	0	NB Thru, EB Left
Northwest Blvd/Emma Ave	21	7	0	NB Thru, WB Approach
Northwest Blvd/Lacrosse Ave	17	19	0	NB Thru
U.S. 95/Neider Ave	9	0	1	
U.S. 95/Appleway Ave	27	12	0	SB Thru, WB Left
U.S. 95/I-90 Interchange	11	5	1	
U.S. 95/Ironwood Dr	32	8	11	NB Thru, SB Left
U.S. 95/Lacrosse Ave	1	0	0	
U.S. 95/Emma Ave	16	3	1	EB Approach, WB Approach
Government Way/Neider Ave	0	0	0	
Government Way/Appleway Ave	3	17	0	
Government Way/Ironwood Dr	0	6	0	
4th St/Neider Ave	0	3	0	
4th St/Appleway Ave/Best Ave	0	10	3	
4th St/I-90 WB Ramps	7	3	0	
4th St/I-90 EB Ramps	3	18	11	EB Approach
Seltice Way/Riverstone Dr	0	0	0	
Ironwood Dr/Medina St	4	0	6	
Ironwood Dr/Lakewood Dr	20	0	0	WB Thru
Riverstone Dr/Lakewood Dr	19	3	4	SB Approach
Seltice Way/Atlas Rd	2	0	0	

PROJECT COST EVALUATION

Planning-level cost estimates were developed for each of the future scenario transportation projects. Projects estimated by prior planning efforts were compiled from the Health Corridor Master Plan and KMPO's Metropolitan Transportation Plan (MTP). The project cost evaluation compares the relative cost between the scenarios and does not represent the total cost of all transportation and redevelopment improvements proposed in the Health Corridor by 2040.

Estimated project costs follow ITD's Construction Cost Estimating Guide[10] and use historical bid prices. The detailed breakdown of each cost estimate is provided in Appendix A and includes the assumed project bid items with percentages for utility relocation, traffic control, mobilization, construction contingency, and preliminary/construction engineering (PE/CE). Right-of-way acquisition (RW) is based on bare land costs and does not include building and business impacts, relocation and/or damages. A summary of the cost estimates are provided in current year (2021) dollars for each scenario in the following tables.

As shown in Table 6, the No Build scenario predominantly consists of the high-cost, high-value projects already included in the long-range transportation plans for ITD and KMPO. Projects such as the I-90 3rd Lane Widening, I-90/US-95 Interchange Upgrade, and Huetter Corridor will begin environmental documentation projects by the end of 2021 and additional funding for design and construction is being identified.

Also, based on a recommendation in the I-90/US-95 Interchange and Access Study (HDR, 2019)[11], Table 6 also includes a comparison of the I-90/US-95 interchange configurations considered as part of this project. The SPUI configuration costs approximately $30 million more than a modified Diamond configuration due to the additional structural work required.

Table 6: Scenario 1 (No Build) Transportation Project Costs

Project	Project Phase			Total Cost
	PE/CE	*RW*	*Construction*	
Huetter Corridor[a]	-	-	-	$340,000,000
I-90 3rd Lane Widening[b]	-	-	-	$174,000,000
I-90/US-95 Interchange Upgrade (SPUI)	$16,600,000	$500,000	$69,500,000	$86,600,000
I-90/US-95 Interchange Upgrade (Diamond)[c]	$13,000,000	$500,000	$43,400,000	$56,900,000
US-95 Widening (7 Lanes)	*Included as part of I-90/US-95 Interchange			-
Lacrosse Ave Extension	**Under Construction 2021			-
Total				**$600,600,000**

[a]Source: Table 6.4, Metropolitan Transportation Plan 2020-2040, KMPO, 2020.
[b]Source: Page 30, Draft 2022-2028 Idaho Transportation Investment Program, ITD, 2021.
[c]Shown as alternate to the I-90/US-95 Interchange Upgrade (SPUI). Not included in Scenario 1 cost total.

[10] *Construction Cost Estimating Guide*, Idaho Transportation Department, April 2020.
[11] Page 53, I-90/US-95 Interchange and Access Study, HDR, 2019.

Table 7 details the transportation projects found within the Health Corridor Master Plan, with the largest expense being the Howard St Overpass, followed by the extension of Ironwood Dr east to Annie Ave. For this estimate, the overcrossing was assumed on a Julia St alignment, rather than Howard St due to the prohibitive right-of-way costs to purchase an office building and a portion of the hotel located north of I-90. Other significant project costs include the local access roads proposed north and south of Ironwood Dr to provide circulation within the Health Corridor and alleviating congestion on Ironwood Dr.

Table 7: Scenario 2 (Master Plan Build) Transportation Project Costs

Project	Project Phase			Total Cost
	PE/CE	*RW*	*Construction*	
Howard St Overpass[a]	$3,200,000	$2,800,000	$10,900,000	$16,900,000
Health Corridor Northern Local Access Rd	*Included as part of Howard St Overpass			-
Health Corridor Southern Local Access Rd[b]	-	-	-	$3,140,000
Ironwood Dr Extension to Annie Ave	$350,000	$950,000	$1,200,000	$2,500,000
Ironwood Dr Signals	$410,000	-	$1,390,000	$1,800,000
Centennial Trail Access Undercrossing[b]	-	-	-	$1,750,000
Neighborhood Pedestrian Improvements[b]	-	-	-	$700,000
Northwest Blvd/Emma Ave Signal	$140,000	-	$460,000	$600,000
Ironwood Dr Access Consolidation[c]	-	-	-	-
Total				**$27,390,000**

[a]Project cost shown assumes a Julia St alignment similar to Scenario 3 due to prohibitive right-of-way costs at Howard St.
[b]Source: Health Corridor Master Plan
[c]In conjunction with redevelopment

Cost estimates for Scenario 3 (Build Alternative) transportation projects are shown in Table 8. Similar to Scenario 2, the highest cost project remains the Julia St Overpass from Ironwood Dr to Neider Ave. The majority of the difference in cost between Scenario 2 and 3 is the inclusion of interchange capacity improvements at Northwest Blvd and new one-way frontage roads between Northwest Blvd and the Julia St alignment.

Ironwood Dr intersection capacity improvements were included in both the Northwest Blvd and US-95 interchange upgrade projects, respectively.

Table 8: Scenario 3 (Build Alternative) Transportation Project Costs

Project	Project Phase			Total Cost
	PE/CE	*RW*	*Construction*	
Julia St Overpass (Ironwood Dr to Neider Ave)	$3,200,000	$2,800,000	$10,900,000	$16,900,000
Northwest Blvd Interchange Capacity Improvements	$2,000,000	-	$6,900,000	$8,900,000
Northwest Blvd to Julia St Overpass Frontage Roads	$1,150,000	$1,100,000	$3,750,000	$6,000,000
Health Corridor Southern Local Access Rd[a]	-	-	-	$3,140,000
Ironwood Dr/Lakewood Dr Signal	$110,000	$5,000	$455,000	$570,000
US-95/Lacrosse Ave Traffic Signal	$110,000	$5,000	$455,000	$570,000
US-95 Median	$130,000	-	$430,000	$560,000
Northwest Blvd Median	$120,000	-	$400,000	$520,000
Emma Ave Signal Removal	*Included in US-95 Median			-
Ironwood Dr Capacity Improvements	**Included in Northwest Blvd and US-95 Interchange Capacity Improvements			-
Total				**$37,160,000**

[a]Source: Health Corridor Master Plan

APPENDIX A

SCENARIO 2: MASTER PLAN BUILD - TRANSPORTATION ELEMENTS

Howard St Overpass*

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	13,541.7	$	1.00	$	13,542
EARTHWORK		CUYD	19,000.0	$	25.00	$	474,999
AGGREGATE BASE		CUYD	5,589.0	$	30.00	$	167,671
TRAFFIC GRAVEL		CUYD	953.3	$	20.00	$	19,067
ASPHALT		TON	4,302.2	$	85.00	$	365,689
GUARD RAIL		LS	1.0	$	28,000.00	$	28,000
SIDEWALK		SQYD	3,177.8	$	85.00	$	270,111
CURB AND GUTTER		LNFT	5,720.0	$	35.00	$	200,200
TOPSOIL AND SEEDING		ACRE	9.0	$	4,100.00	$	37,085
SIGNS - URBAN		MILE	0.5	$	57,000.00	$	30,875
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.5	$	52,000.00	$	28,167
DRAINAGE PIPE - URBAN		MILE	0.5	$	550,000.00	$	297,917
NEW BRIDGE		SQFT	12,600.0	$	250.00	$	3,150,000
SIGNALS		LS	3.0	$	275,000.00	$	825,000
LIGHTS - URBAN		MILE	0.5	$	200,000.00	$	108,333
	Subtotal 1					$	6,566,656
UTILITY RELOCATION					10%	$	656,666
	Subtotal 2					$	7,223,322
TRAFFIC CONTROL					5%	$	361,166
	Subtotal 3					$	7,584,488
MOBILIZATION					10%	$	758,449
	Subtotal 4					$	8,342,937
CONTINGENCY					30%	$	2,502,881
	Subtotal 5					$	10,845,818
PRELIMINARY ENGINEERING					15%	$	1,626,873
CONSTRUCTION ENGINEERING (CE)					15%	$	1,626,873
	Subtotal 6					$	14,099,564
RIGHT-OF-WAY						$	2,775,262
	PRESENT VALUE (2021)					**$**	**16,874,826**

Ironwood Dr Signals

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
SIGNALS		LS	3.0	$	275,000.00	$	825,000
	Subtotal 1					$	825,000
UTILITY RELOCATION					10%	$	82,500
	Subtotal 2					$	907,500
TRAFFIC CONTROL					5%	$	45,375
	Subtotal 3					$	952,875
MOBILIZATION					10%	$	95,288
	Subtotal 4					$	1,048,163
CONTINGENCY					30%	$	314,449
	Subtotal 5					$	1,362,612
PRELIMINARY ENGINEERING					12%	$	163,513
CONSTRUCTION ENGINEERING (CE)					12%	$	163,513
	Subtotal 6					$	1,689,638
RIGHT-OF-WAY						$	15,000
	PRESENT VALUE (2021)					**$**	**1,704,638**

Northwest Blvd / Emma Rd Signal

TYPE		UNITS	QUANTITY	UNIT PRICE	Cost
SIGNALS		LS	1.0	$ 275,000.00	$ 275,000
	Subtotal 1				$ 275,000
UTILITY RELOCATION				10%	$ 27,500
	Subtotal 2				$ 302,500
TRAFFIC CONTROL				5%	$ 15,125
	Subtotal 3				$ 317,625
MOBILIZATION				10%	$ 31,763
	Subtotal 4				$ 349,388
CONTINGENCY				30%	$ 104,816
	Subtotal 5				$ 454,204
PRELIMINARY ENGINEERING				15%	$ 68,131
CONSTRUCTION ENGINEERING (CE)				15%	$ 68,131
	Subtotal 6				$ 590,466
RIGHT-OF-WAY					$ 0
	PRESENT VALUE (2021)				**$ 590,466**

Ironwood Dr Extension to Annie Ave

TYPE		UNITS	QUANTITY	UNIT PRICE	Cost
MISCELLANEOUS WORK		UNIT	5,000.0	$ 1.00	$ 5,000
EARTHWORK		CUYD	6,646.6	$ 25.00	$ 166,164
AGGREGATE BASE		CUYD	1,760.0	$ 30.00	$ 52,800
TRAFFIC GRAVEL		CUYD	320.7	$ 20.00	$ 6,414
ASPHALT		TON	1,335.9	$ 85.00	$ 113,552
SIDEWALK		SQYD	1,173.3	$ 85.00	$ 99,733
CURB AND GUTTER		LNFT	2,112.0	$ 35.00	$ 73,920
TOPSOIL AND SEEDING		ACRE	3.3	$ 4,100.00	$ 13,693
SIGNS - URBAN		MILE	0.2	$ 57,000.00	$ 11,400
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.2	$ 52,000.00	$ 10,400
DRAINAGE PIPE - URBAN		MILE	0.2	$ 550,000.00	$ 110,000
LIGHTS - URBAN		MILE	0.2	$ 200,000.00	$ 40,000
	Subtotal 1				$ 703,076
UTILITY RELOCATION				10%	$ 70,308
	Subtotal 2				$ 773,384
TRAFFIC CONTROL				5%	$ 38,669
	Subtotal 3				$ 812,053
MOBILIZATION				10%	$ 81,205
	Subtotal 4				$ 893,258
CONTINGENCY				30%	$ 267,977
	Subtotal 5				$ 1,161,235
PRELIMINARY ENGINEERING				15%	$ 174,185
CONSTRUCTION ENGINEERING (CE)				15%	$ 174,185
	Subtotal 6				$ 1,509,605
RIGHT-OF-WAY					$ 927,345
	PRESENT VALUE (2021)				**$ 2,436,950**

SCENARIO 3: BUILD ALTERNATIVE - TRANSPORTATION ELEMENTS

Julia St Overpass (Ironwood Dr to Neider Ave)

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	13,541.7	$	1.00	$	13,542
EARTHWORK		CUYD	19,000.0	$	25.00	$	474,999
AGGREGATE BASE		CUYD	5,589.0	$	30.00	$	167,671
TRAFFIC GRAVEL		CUYD	953.3	$	20.00	$	19,067
ASPHALT		TON	4,302.2	$	85.00	$	365,689
GUARD RAIL		LS	1.0	$	28,000.00	$	28,000
SIDEWALK		SQYD	3,177.8	$	85.00	$	270,111
CURB AND GUTTER		LNFT	5,720.0	$	35.00	$	200,200
TOPSOIL AND SEEDING		ACRE	9.0	$	4,100.00	$	37,085
SIGNS - URBAN		MILE	0.5	$	57,000.00	$	30,875
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.5	$	52,000.00	$	28,167
DRAINAGE PIPE - URBAN		MILE	0.5	$	550,000.00	$	297,917
CONCRETE ROUNDABOUTS - ONE LANE		EACH	1.0	$	550,000.00	$	550,000
NEW BRIDGE		SQFT	12,600.0	$	250.00	$	3,150,000
SIGNALS		LS	3.0	$	275,000.00	$	825,000
LIGHTS - URBAN		MILE	0.5	$	200,000.00	$	108,333
	Subtotal 1					$	6,566,656
UTILITY RELOCATION					10%	$	656,666
	Subtotal 2					$	7,223,322
TRAFFIC CONTROL					5%	$	361,166
	Subtotal 3					$	7,584,488
MOBILIZATION					10%	$	758,449
	Subtotal 4					$	8,342,937
CONTINGENCY					30%	$	2,502,881
	Subtotal 5					$	10,845,818
PRELIMINARY ENGINEERING					15%	$	1,626,873
CONSTRUCTION ENGINEERING (CE)					15%	$	1,626,873
	Subtotal 6					$	14,099,564
RIGHT-OF-WAY						$	2,775,262
	PRESENT VALUE (2021)					**$**	**16,874,826**

Northwest Blvd & US-95 Medians w/ Emma Ave Signal Removal

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	14,109.8	$	1.00	$	14,110
SIDEWALK		SQYD	2,648.9	$	85.00	$	225,156
CURB AND GUTTER		LNFT	5,960.0	$	35.00	$	208,600
TOPSOIL AND SEEDING		ACRE	5.6	$	4,100.00	$	23,001
SIGNS - URBAN		MILE	0.6	$	57,000.00	$	32,170
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.6	$	52,000.00	$	29,348
REMOVE SIGNAL POLES		LS	10.0	$	2,000.00	$	20,000
	Subtotal 1					$	552,385
UTILITY RELOCATION					0%	$	0
	Subtotal 2					$	552,385
TRAFFIC CONTROL					5%	$	27,619
	Subtotal 3					$	580,004
MOBILIZATION					10%	$	58,000
	Subtotal 4					$	638,004
CONTINGENCY					30%	$	191,401
	Subtotal 5					$	829,405
PRELIMINARY ENGINEERING					15%	$	124,411
CONSTRUCTION ENGINEERING (CE)					15%	$	124,411
	Subtotal 6					$	1,078,227
RIGHT-OF-WAY						$	0
	PRESENT VALUE (2021)					**$**	**1,078,227**

US-95 / Lacrosse Ave Traffic Signal

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
SIGNALS		LS	1.0	$	275,000.00	$	275,000
	Subtotal 1					$	275,000
UTILITY RELOCATION					10%	$	27,500
	Subtotal 2					$	302,500
TRAFFIC CONTROL					5%	$	15,125
	Subtotal 3					$	317,625
MOBILIZATION					10%	$	31,763
	Subtotal 4					$	349,388
CONTINGENCY					30%	$	104,816
	Subtotal 5					$	454,204
PRELIMINARY ENGINEERING					12%	$	54,504
CONSTRUCTION ENGINEERING (CE)					12%	$	54,504
	Subtotal 6					$	563,212
RIGHT-OF-WAY						$	5,000
	PRESENT VALUE (2021)					**$**	**568,212**

Northwest Blvd to Julia St Overpass Frontage Roads

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	18,300.2	$	1.00	$	18,300
EARTHWORK		CUYD	16,227.3	$	25.00	$	405,683
AGGREGATE BASE		CUYD	3,006.1	$	30.00	$	90,183
TRAFFIC GRAVEL		CUYD	486.7	$	20.00	$	9,734
ASPHALT		TON	2,027.1	$	85.00	$	172,300
SIDEWALK		SQYD	2,147.2	$	85.00	$	182,514
CURB AND GUTTER		LNFT	7,730.0	$	17.50	$	135,275
TOPSOIL AND SEEDING		ACRE	12.2	$	4,100.00	$	50,117
SIGNS - URBAN		MILE	0.7	$	57,000.00	$	41,724
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.7	$	52,000.00	$	38,064
DRAINAGE PIPE - URBAN		MILE	0.7	$	550,000.00	$	402,604
SIGNALS		LS	2.0	$	275,000.00	$	550,000
LIGHTS - URBAN		MILE	0.7	$	200,000.00	$	146,402
	Subtotal 1					$	2,242,900
UTILITY RELOCATION					10%	$	224,290
	Subtotal 2					$	2,467,190
TRAFFIC CONTROL					5%	$	123,360
	Subtotal 3					$	2,590,550
MOBILIZATION					10%	$	259,055
	Subtotal 4					$	2,849,605
CONTINGENCY					30%	$	854,882
	Subtotal 5					$	3,704,487
PRELIMINARY ENGINEERING					15%	$	555,673
CONSTRUCTION ENGINEERING (CE)					15%	$	555,673
	Subtotal 6					$	4,815,833
RIGHT-OF-WAY						$	1,045,966
	PRESENT VALUE (2021)					**$**	**5,861,799**

INTERCHANGE PROJECT COST EVALUATIONS

Scenario 3: Northwest Blvd Interchange Capacity Improvements

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	25,650.2	$	1.00	$	25,650
EARTHWORK		CUYD	14,951.0	$	25.00	$	373,776
AGGREGATE BASE		CUYD	15,484.4	$	30.00	$	464,531
ASPHALT		TON	19,510.9	$	80.00	$	1,560,871
GUARD RAIL-STEEL		LNFT	217.5	$	90.00	$	19,575
SIDEWALK		SQYD	1,185.9	$	85.00	$	100,800
CURB AND GUTTER		LNFT	2,134.6	$	35.00	$	74,710
TOPSOIL AND SEEDING		ACRE	17.1	$	4,300.00	$	73,672
SIGNS - RURAL		MILE	0.8	$	9,000.00	$	7,415
SIGNS - URBAN		MILE	0.2	$	57,000.00	$	11,522
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	0.8	$	9,000.00	$	7,415
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.2	$	52,000.00	$	10,511
DRAINAGE PIPE - RURAL		MILE	0.8	$	90,000.00	$	74,148
DRAINAGE PIPE - URBAN		MILE	0.2	$	300,000.00	$	60,642
SIGNALS		LS	2.5	$	275,000.00	$	687,500
LIGHTS		MILE	1.0	$	200,000.00	$	205,202
	Subtotal 1					$	3,795,976
UTILITY RELOCATION					15%	$	569,396
	Subtotal 2					$	4,365,372
TRAFFIC CONTROL					10%	$	436,537
	Subtotal 3					$	4,801,909
MOBILIZATION					10%	$	480,191
	Subtotal 4					$	5,282,100
CONTINGENCY					30%	$	1,584,630
	Subtotal 5					$	6,866,730
PRELIMINARY ENGINEERING					15%	$	1,030,010
CONSTRUCTION ENGINEERING (CE)					15%	$	1,030,010
	Subtotal 6					$	8,926,750
RIGHT-OF-WAY						$	0
	PRESENT VALUE (2021)					**$**	**8,926,750**

Scenario 1: US-95 Interchange Upgrade (Diamond)

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	93,489.6	$	1.00	$	93,490
EARTHWORK		CUYD	272,126.1	$	15.00	$	4,081,891
AGGREGATE BASE		CUYD	48,494.2	$	30.00	$	1,454,825
ASPHALT		TON	62,729.2	$	80.00	$	5,018,333
GUARD RAIL-STEEL		LNFT	659.8	$	90.00	$	59,378
SIDEWALK		SQYD	7,277.8	$	85.00	$	618,611
CURB AND GUTTER		LNFT	13,100.0	$	35.00	$	458,500
TOPSOIL AND SEEDING		ACRE	62.4	$	4,300.00	$	268,521
SIGNS - RURAL		MILE	2.5	$	9,000.00	$	22,491
SIGNS - URBAN		MILE	1.2	$	57,000.00	$	70,710
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	2.5	$	9,000.00	$	22,491
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	1.2	$	52,000.00	$	64,508
DRAINAGE PIPE - RURAL		MILE	2.5	$	90,000.00	$	224,915
DRAINAGE PIPE - URBAN		MILE	1.2	$	300,000.00	$	372,159
NEW BRIDGE LARGER THAN 100 LINEAL FEET		SQFT	15,936.0	$	250.00	$	3,984,000
REMOVE LARGE MULTIPLE SPAN BRIDGE		LS	1.0	$	150,000.00	$	150,000
SIGNALS		LS	4.0	$	275,000.00	$	1,100,000
LIGHTS		MILE	0.4	$	200,000.00	$	75,758
RETAINING WALLS		SQFT	44,380.0	$	105.00	$	4,659,900
	Subtotal 1					$	22,936,730
UTILITY RELOCATION					15%	$	3,440,510
	Subtotal 2					$	26,377,240
TRAFFIC CONTROL					10%	$	2,637,724
	Subtotal 3					$	29,014,964
MOBILIZATION					15%	$	4,352,245
	Subtotal 4					$	33,367,209
CONTINGENCY					30%	$	10,010,163
	Subtotal 5					$	43,377,372
PRELIMINARY ENGINEERING					15%	$	6,506,606
CONSTRUCTION ENGINEERING (CE)					15%	$	6,506,606
	Subtotal 6					$	56,390,584
RIGHT-OF-WAY						$	500,000
	PRESENT VALUE (2021)					**$**	**56,890,584**

Scenario 1: US-95 Interchange Upgrade (SPUI)

TYPE		UNITS	QUANTITY		UNIT PRICE		Cost
MISCELLANEOUS WORK		UNIT	85,014.2	$	1.00	$	85,014
EARTHWORK		CUYD	234,008.6	$	15.00	$	3,510,129
AGGREGATE BASE		CUYD	45,468.9	$	30.00	$	1,364,067
ASPHALT		TON	58,456.1	$	80.00	$	4,676,485
GUARD RAIL-STEEL		LNFT	692.8	$	90.00	$	62,348
SIDEWALK		SQYD	4,555.6	$	85.00	$	387,222
CURB AND GUTTER		LNFT	8,200.0	$	35.00	$	287,000
TOPSOIL AND SEEDING		ACRE	56.8	$	4,300.00	$	244,178
SIGNS - RURAL		MILE	2.6	$	9,000.00	$	23,616
SIGNS - URBAN		MILE	0.8	$	57,000.00	$	44,261
STRIPING & PAVEMENT MARKINGS - RURAL		MILE	2.6	$	9,000.00	$	23,616
STRIPING & PAVEMENT MARKINGS - URBAN		MILE	0.8	$	52,000.00	$	40,379
DRAINAGE PIPE - RURAL		MILE	2.6	$	90,000.00	$	236,165
DRAINAGE PIPE - URBAN		MILE	0.8	$	300,000.00	$	232,955
NEW BRIDGE - US 95		SQFT	19,920.0	$	250.00	$	4,980,000
NEW BRIDGE - WEST BOUND OFF RAMP		SQFT	37,400.0	$	250.00	$	9,350,000
NEW BRIDGE - WEST BOUND ON RAMP		SQFT	40,000.0	$	250.00	$	10,000,000
REMOVE LARGE MULTIPLE SPAN BRIDGE		LS	1.0	$	150,000.00	$	150,000
SIGNALS		LS	3.0	$	275,000.00	$	825,000
LIGHTS		MILE	0.4	$	200,000.00	$	79,545
RETAINING WALLS		SQFT	46,940.0	$	105.00	$	4,928,700
	Subtotal 1					$	36,729,036
UTILITY RELOCATION					15%	$	5,509,355
	Subtotal 2					$	42,238,391
TRAFFIC CONTROL					10%	$	4,223,839
	Subtotal 3					$	46,462,230
MOBILIZATION					15%	$	6,969,335
	Subtotal 4					$	53,431,565
CONTINGENCY					30%	$	16,029,470
	Subtotal 5					$	69,461,035
PRELIMINARY ENGINEERING					12%	$	8,335,324
CONSTRUCTION ENGINEERING (CE)					12%	$	8,335,324
	Subtotal 6					$	86,131,683
RIGHT-OF-WAY						$	500,000
	PRESENT VALUE (2021)					**$**	**86,631,683**