CANYON HIGHWAY DISTRICT NO. 4

Mid-Star Service Area Capital Improvements Plan

Prepared by Kittelson & Associates, Inc.
May 7, 2021

Prepared for:

Canyon Highway District No. 4
City of Star, Idaho
City of Middleton, Idaho

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INTRODUCTION

Canyon Highway District No. 4 (CHD4) has prepared this Middleton-Star Capital Improvements Plan (herein referred to as "Mid-Star Service Area CIP") to identify, plan and prioritize transportation projects through the year 2040 within the CHD4 Subdistrict No. 1 planning area. Improvements were identified based on an analysis of the existing and future transportation system, utilizing the Community Planning Association of Southwest Idaho's (COMPASS) travel demand model. CHD4, Canyon County, City of Middleton and City of Star were all involved in the CIP development for joint use in adopting transportation impact fees to fund improvements to the highway system, to serve new growth and development, and to protect the health, safety, and general welfare of the citizens of these communities.

A Traffic Impact Fee program (TIF) (*Reference 1*) was developed in conjunction with this CIP so that impact-fee eligible projects from the CIP could be funded through development impact fees in accordance with Idaho Code 67-82 (Idaho Development Impact Fee Act). Development Impact Fee Advisory Committees from Canyon County, City of Star, and City of Middleton (DIFAC) were engaged for the development of the CIP and TIF Program. The joint DIFAC met four times (June 3, 2020; September 15, 2020; November 10, 2020; January 13, 2021) to review materials and provide comments on development of the CIP and TIF. *Meeting materials and summary notes are included in Appendix A. Appendix B contains the requirements laid out in the Idaho code and a general description of how each is addressed in this CIP.*

In order to meet the requirements set forth in Idaho Code 67-8208 (1) (b)- "Commitment for non-Impact Fee revenues to cure Existing System Deficiencies", CHD4, the City of Star, and the City of Middleton commits to using revenue sources other than development impact fees to cure existing system deficiencies, where practical, with the adoption of this Capital Improvement Plan.

Service Area & Service Network

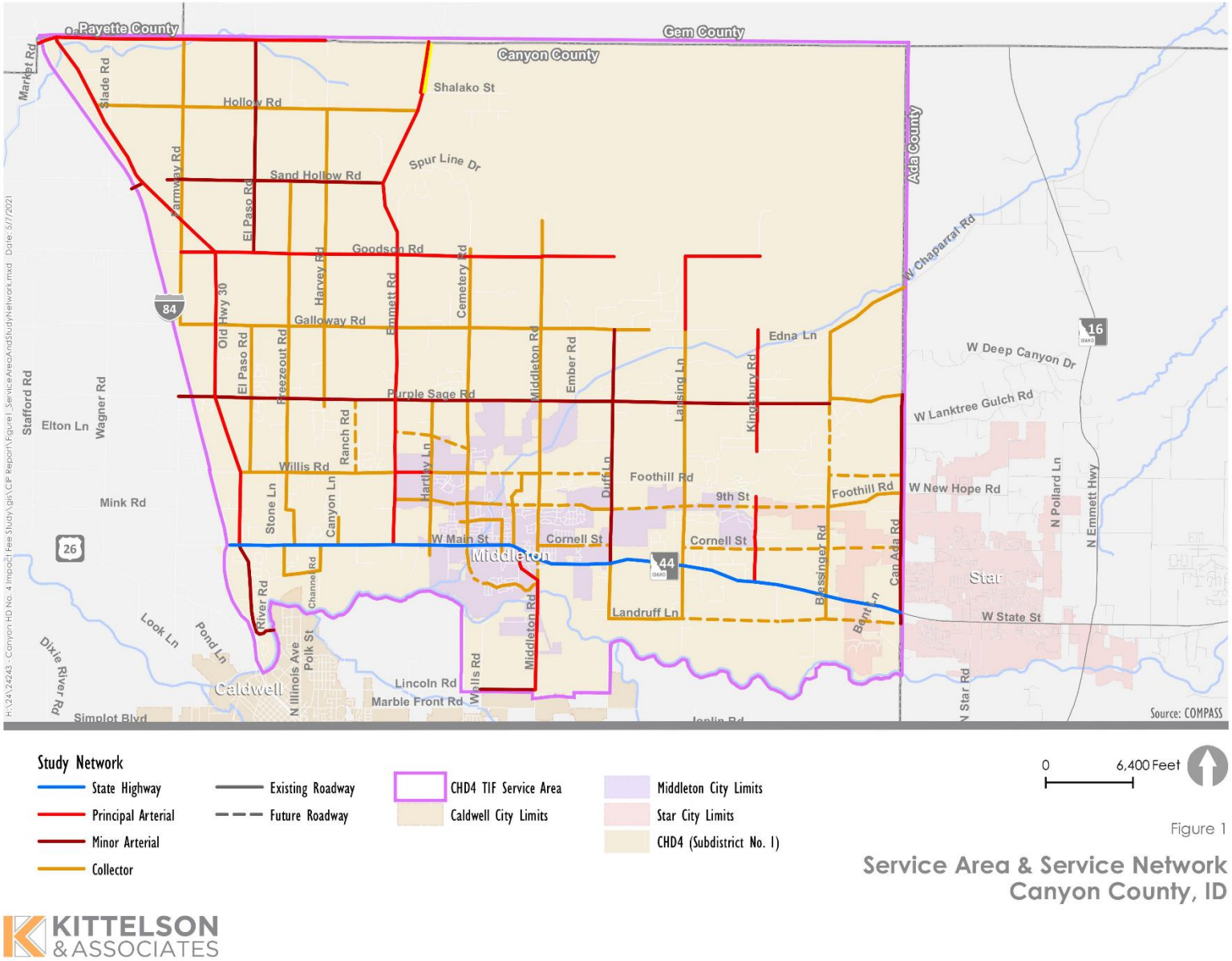
The service area for this CIP and for CHD4's Traffic Impact Fee program include multiple jurisdictions: City of Middleton, the western portion of the City of Star, unincorporated Canyon County and CHD4. The City of Caldwell also has a small park in the southwest corner of the service area but does not have jurisdiction over or maintain any public roadways in the service area. The service area is bounded to the north by Gem County and Payette County, to the south by the Boise River and Lincoln Road, to the west by I-84, and to the east by Ada County. The service area also includes the City of Middleton Area of Impact south of the Boise River, described as the lands east of KCID Road, north of Lincoln Road, and west of Midland Boulevard.

Arterial and certain collector roadways within the service area were identified as the service network for this CIP. These roadways are typically eligible for traffic impact fees as they are utilized by trips of significant length within or through the service area. Those collector roadways deemed regionally significant are generally located on section lines at one-mile intervals, and are likely to develop into a minor arterial function as urban growth expands within the service area. Local roadways and some minor collectors are excluded from this study, as their principal purpose is to distribute trips to and from the regional arterial/collector network. State Highway 44 is maintained by the Idaho Transportation Department (ITD) and is included in this analysis to

evaluate the CHD4-maintained roadway intersections with the highway, and may require improvements due to new growth and development. Improvements to the state highway system maintained by ITD are not included in this CIP and are not eligible for impact fee funding; however, improvements to the local road approaches to the state highway system and the local share of the cost of traffic signal equipment at these intersections are impact fee eligible, and are included in this plan.

Figure 1 shows the boundaries of the service area and arterial and collector roadways included in the service network. *Appendix E includes Technical Memorandum #1B, which provides additional discussion on service area demographics and roadway facilities in the study area.*

Figure 1. Service Area & Service Network



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Existing Service Network

There are three separate roadway jurisdictions within the Mid-Star service area: Canyon Highway District No. 4 (CHD4), City of Middleton, and City of Star. By agreement[1] with City of Star, CHD4 acts as the highway jurisdiction for those portions of Star within Canyon County, and receives from Star the roadway-related tax revenues generated within city limits in Canyon County. City of Middleton has a functioning street department and has jurisdiction over all roadways within its city limits.

There are three existing improved intersections in the service area, consisting of two dual-lane roundabouts on Emmett Road adjacent to Middleton High School, and the existing signalized intersection at SH 44 and Middleton Road in downtown Middleton. All other intersections within the service area are stop controlled (two-way or all-way). All highways included in the service network are two lane rural roads, except at isolated locations where development-related frontage improvements have been constructed.

The existing and anticipated year 2040 service network is described in Table 1, and consists of approximately 116 miles of existing highways:

Table 1. 2020 and 2040 Service Network Mileage by Functional Classification

	2020 Network	2040 Network
Total Network Mileage	116.2	138.2
State Highway	9.4 (8.1%)	9.4 (6.8%)
Principal Arterial	28.5 (24.5%)	28.6 (20.7%)
Minor Arterial	23.8 (20.5%)	23.8 (17.2%)
Collector	54.5 (46.9%)	76.5 (55.3%)

Note: Values represent directional mileage of study network roadways (excludes local roadways)
Source: COMPASS

Existing system deficiencies are described in detail beginning on page 20 of this document.

CIP Process

The following transportation plans, capital improvement plans, and corridor studies were reviewed to identify transportation projects within the service area. These projects were reviewed and considered for inclusion in the CIP to ensure consistency between previous planning efforts.

- CHD4 Transportation Master Plan *(Reference 2)*
- City of Middleton Capital Improvements Plan *(Reference 3)*
- City of Star Comprehensive Plan *(Reference 4)*

[1] Canyon 4/Star Public Agency Coordination Agreement, June 6, 2007.

- SH-44, I-84 to Eagle, Corridor Study *(Reference 5)*
- Middleton Road Corridor Plan *(Reference 6)*

Projects included in this CIP were selected through a planning-level traffic operations analysis. Analyses were completed to identify corridors and intersections with existing (2020) and future (2040) capacity-related deficiencies. The CIP development process is briefly outlined below.

- The COMPASS Travel Demand Model was updated to include current residential land use, and population and employment forecasts for 2040.
- COMPASS model output (existing and future traffic volumes) was used to identify existing and future deficiencies through a planning level traffic operations analysis.
- CIP projects and cost estimates were developed from the list of deficient roadways and intersections.
- TIF-eligibility and other funding mechanisms were determined through discussions with partner agencies, review of funding sources for transportation projects by jurisdiction, and a review of the Idaho Development Impact Fee Act.

METHODOLOGY & ASSUMPTIONS

Land Use

Existing and future roadway and intersection deficiencies were identified using output from the COMPASS Travel Demand Model. COMPASS provided existing and future year traffic volumes for roadways, based on the existing and projected future year demographic data in the Traffic Analysis Zones (TAZ). The COMPASS network includes arterial and collector roadways within the service area. Figure 1 shows the roadways included in the COMPASS model and considered in development of this CIP.

For purposes of this study, the 2040 COMPASS Travel Demand Model was used as a basis for the demographic and land use assumptions in the service area. The current year 2020 demographics from the baseline COMPASS model were adjusted to quantify the existing residential population using aerial photography commissioned by COMPASS in 2019 to identify total existing residential development for each TAZ. Future year 2040 demographics were also modified from the base COMPASS travel demand model to reflect recent and expected development trends in the service area, based on current and planned growth patterns identified in the Canyon County, City of Middleton, and City of Star Comprehensive Plans (References 7, 8, and 9). Table 2 summarizes the year 2020 and year 2040 demographics for the service area. Figure 2 and Figure 3 show the year 2040 population and employment estimates by TAZ. *Appendix C includes figures showing year 2020 population and employment by TAZ.*

Table 2. Year 2020 and Year 2040 Demographics in Mid-Star Service Area

	Population				Employment			
Jurisdiction	2020	2040	Change	Percent	2020	2040	Change	Percent
City of Middleton	9,710	27,342	+17,632	+182%	1,521	3,952	+2,431	+160%
City of Star (in Canyon County)	150	12,646	+12,496	+8,331%	20	361	+341	+1,705%
Unincorporated Canyon County	10,544	4,287	-6,257	-59%	801	600	-201	-25%
Total Service Area	**20,414**	**44,315**	**+23,901**	**+117%**	**2,342**	**4,939**	**+2,597**	**+111%**

Additional coordination occurred with COMPASS and relevant agencies to identify new arterial and collector roadway alignments that are likely to be constructed by year 2040 for inclusion in the model. These roadway alignments were primarily in areas that are expected to experience high population and employment growth by the year 2040.

Service Units by Land Use Category

Traffic impact fees must be developed through use of service units to be consistent with the Idaho Development Impact Fee Act. Service units, or the measure of system demand associated with each new development, are measured in Vehicle Miles Traveled (VMT) on the service network during the PM peak hour. The total amount of PM peak hour trips are used to estimate VMT generated by different land use types. Table 3 shows the estimated growth in PM peak hour trips and in employment by different land-use types as assumed in the COMPASS demographic forecasts.

Table 3. Year 2020 and Year 2040 Demographics in Mid-Star Service Area – Land-Use Categories

Year	P.M. Peak Hour Trips	Population	Employment					
			Retail	Office	Industrial	Government	Agriculture	Education
2020	3,252	20,414	427	757	460	79	107	512
2040	7,384	44,315	1,246	1,946	924	135	83	669

Figure 2. Year 2040 Population by Traffic Analysis Zone

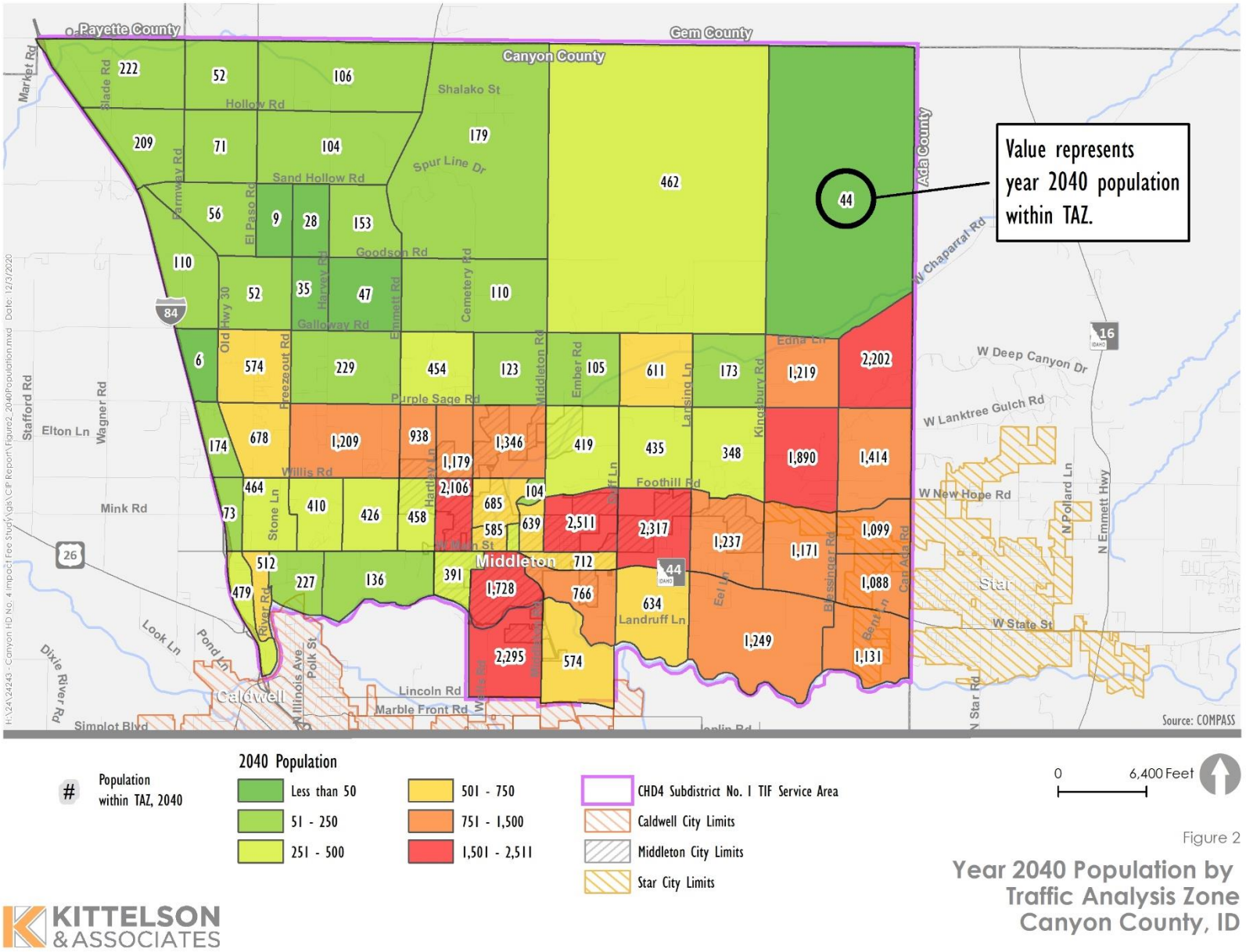

Figure 2

Year 2040 Population by Traffic Analysis Zone Canyon County, ID

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Figure 3. Year 2040 Employment by Traffic Analysis Zone

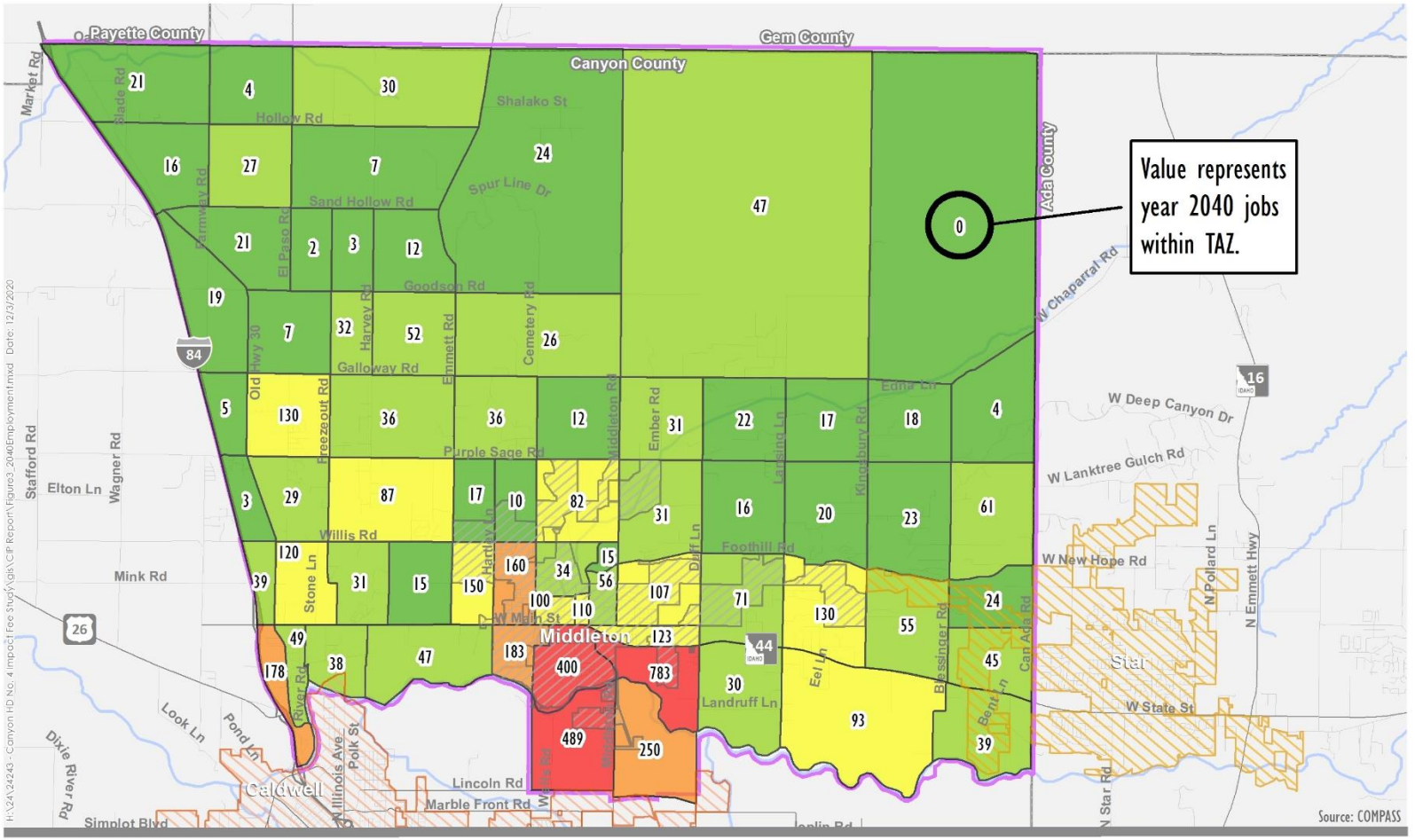

Figure 3

Year 2040 Employment by Traffic Analysis Zone
Canyon County, ID

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Performance Measures & Traffic Operations

A traffic operations analysis was conducted for existing and future roadways and intersections within the service area. The following section outlines the methodologies and processes used in the analysis, as well as the performance measure used to determine deficient segments and intersections. *Appendix D includes Technical Memorandum #1A, which includes additional discussion on traffic operations methodology and performance measures.*

Performance Measure

The traffic operations analysis performed in this CIP utilized a performance measure of **level of service (LOS) D** for roadway segments and intersections, based on the following characteristics:

- Goals and objectives for the service area.
- Consistent with current practice by CHD4 and City of Star.
- Consistent with other transportation agencies in the Treasure Valley.
- The measure is tied to the capacity of the roadway segments and intersections consistent with the Idaho Code 67-82.
- The measure can be calculated via HCM methodology.

Roadway Volumes

The revised year 2040 land use assumptions embedded in the COMPASS travel demand model were used to develop future roadway volumes for the study network. COMPASS provided daily volumes as well as PM peak hour, directional volumes for year 2020 and 2040 analysis years. Figure 4 shows weekday PM peak hour roadway volumes for year 2040.

Figure 4. Year 2040 Roadway Volumes, Weekday PM Peak Hour

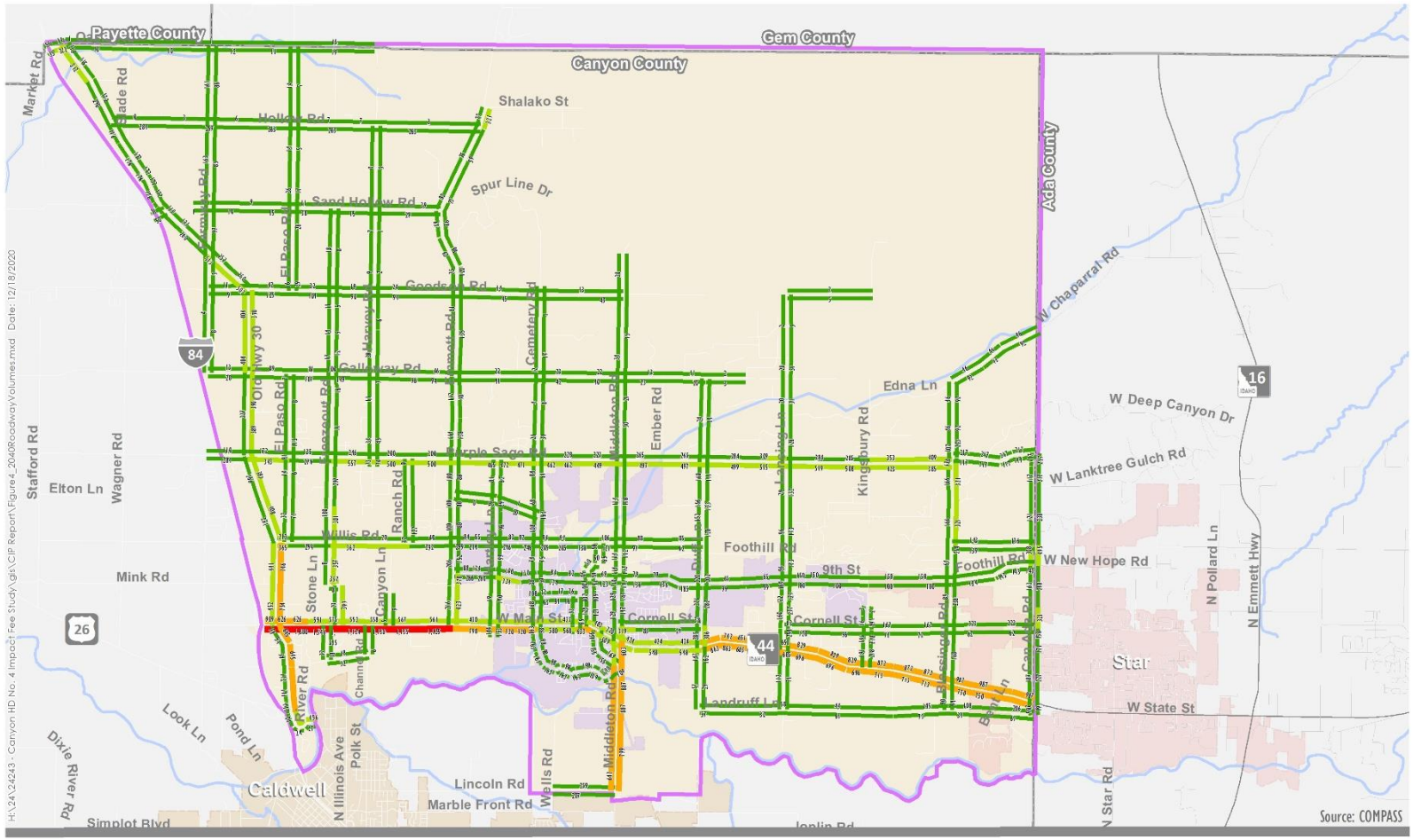

Figure 4

Year 2040 Roadway Volumes, Weekday PM Peak Hour
Canyon County, ID

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Roadway Methodology

Roadway operations were evaluated within the service area using service volume thresholds based on methodologies from the Highway Capacity Manual (HCM), 6th Edition. The specific values used in this analysis were developed using the Florida Department of Transportation's (FDOT) 2020 generalized service volume tables. *For more information regarding this process and other service volume tables, see Technical Memorandum #2 in Appendix F.*

Table 4 provides two distinct sets of service volumes for different roadway classifications, lane configurations, and the presence of turn lanes, center turn-lane, or median. These sets include:

- CHD4 Service Volumes: Urbanized Areas – developed using 2020 FDOT "Urbanized Area" service volume table
- CHD4 Service Volumes: Transitioning Areas – developed using 2020 FDOT "Transitioning and Areas Over 5,000 Not in Urbanized Areas" service volume table

The context of each roadway was categorized as follows: "urbanized area" for roadways within an incorporated city and "transitioning area" for roadways within an unincorporated area of the county. The following describes the methodology for evaluating roadway segments:

Step 1: COMPASS Regional Travel Demand Model output was obtained. Existing (2020) and future (2040) peak-hour directional volumes (weekday PM peak hour) for each roadway were provided from COMPASS model link volumes.

Step 2: Each roadway segment was evaluated by comparing the peak-hour directional volumes calculated in Step 1 with the selected thresholds outlined in Table 4 (on the next page). Using LOS D as the threshold, roadways that require capacity improvements were identified, and project types were recommended for each roadway to meet this performance measure.

Step 3: The list of recommended projects was presented to partner agencies. The project list was refined based on input from partner agencies and incorporated into the CIP. The Freezeout Rd- SH 44 to Willis Rd roadway project exceeded the LOS D threshold. It was removed by observation as it would not logically function as arterial or major collector components to the network.

Table 4. Roadway Service Volume Thresholds

Functional Classification	Characteristics	Number of Lanes per Direction of Travel	Directional Peak Hour Volume Level of Service Planning Thresholds			
			Urbanized Areas		Transitioning Areas	
			LOS D	LOS E	LOS D	LOS E
Principal Arterial	Undivided; No left turn lanes at intersections	1	620	**	560	**
	Undivided; Left turn lanes at intersections	1	790	**	720	**
		2	1,700	**	1,550	**
		3	2,570	**	2,330	**
	Divided (Continuous center left turn lane or median); Left turn lanes at intersections	1	840	**	760	**
		2	1,800	**	1,640	**
		3	2,720	**	2,470	**
Minor Arterial	Undivided; No left turn lanes at intersections	1	530	560	480	500
	Undivided; Left turn lanes at intersections	1	680	720	610	650
		2	1,390	1,450	1,240	1,360
		3	2,140	2,180	1,940	2,060
	Divided (Continuous center left turn lane or median); Left turn lanes at intersections	1	710	760	650	680
		2	1,470	1,530	1,310	1,440
		3	2,270	2,300	2,050	2,180
Collector	Undivided; No left turn lanes at intersections	1	340	360	310	320
	Undivided; Left turn lanes at intersections	1	490	520	440	470
		2	980	1,020	880	960
		3	1,510	1,540	1,370	1,450
	Divided (Continuous center left turn lane or median); Left turn lanes at intersections	1	530	560	480	500
		2	1,060	1,110	950	1,040

Intersection Methodology

Intersection operations were evaluated using methodologies outlined in the HCM and the National Cooperative Highway Research Program (NCHRP) *Report 825: Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual* (Reference 10). The methodology required the following data:

- Year 2020 and 2040 peak hour traffic volume projections on all service area roadways
- Year 2020 and 2040 peak hour intersection turning movement volume projections on certain service area intersections
- Existing peak hour traffic volumes on service area roadways and intersections (not a requirement, but preferred where data is available)

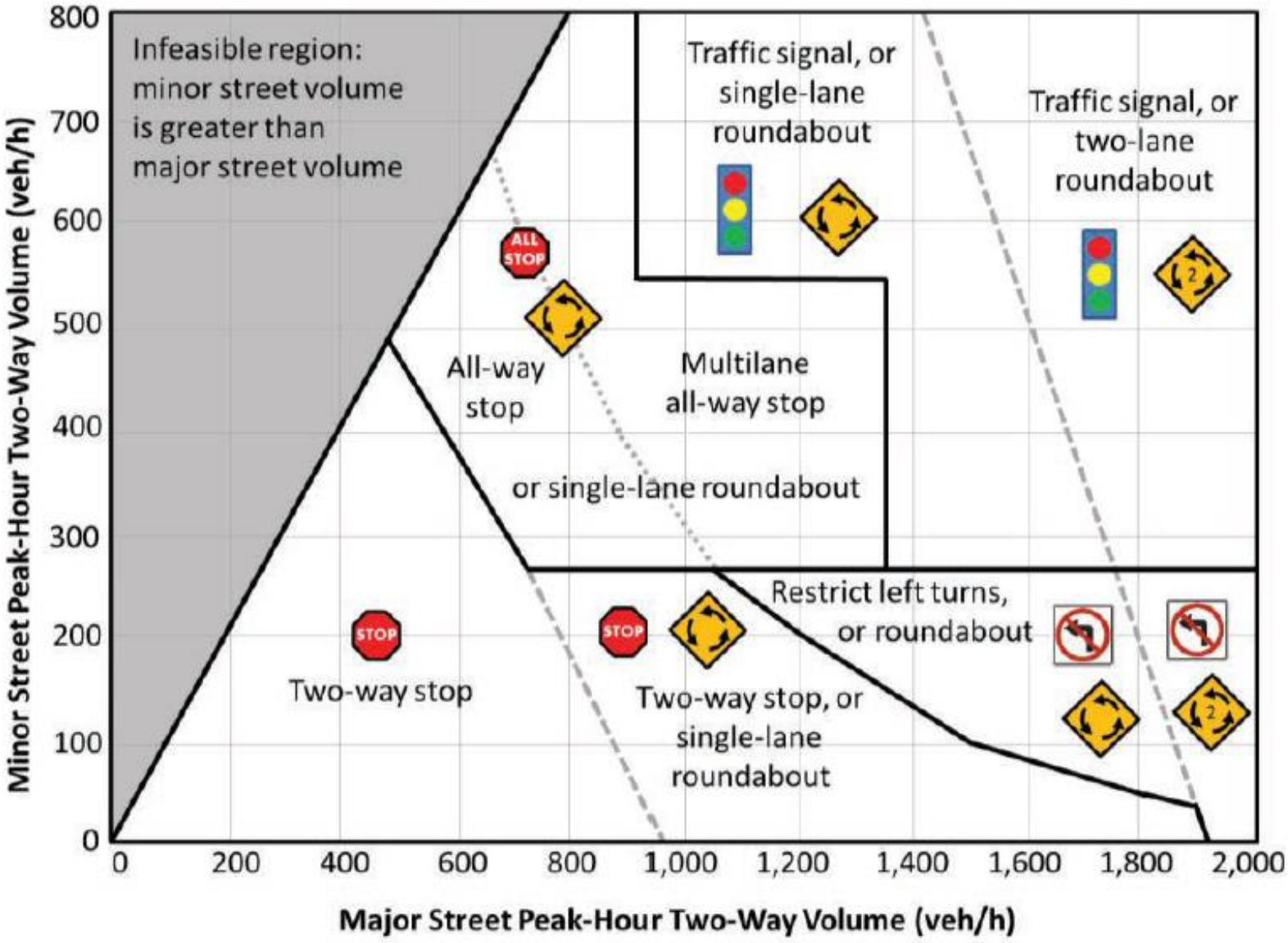
This methodology led to identifying deficiencies and improvements, such as converting a two-way stop-control intersection to an all-way stop-control, roundabout or traffic signal at the intersections. The following steps outline the methodology used for intersection operations analysis.

Step 1: Each intersection within the service area was evaluated under year 2020 and 2040 traffic conditions (weekday PM peak hour) using Exhibit 17 from NCHRP Report 825 (Reference 10), as shown in Figure 5 and Figure 6. This exhibit is based on methodologies of the 6th Edition of the HCM and identifies intersections that warrant a different intersection control type (e. g. stop control, all-way stop, roundabout, signal), based on future traffic volumes on the roadway approaches. This step resulted in a list of intersections in the service area that may warrant an improvement.

Step 2: The compiled list of intersections and preliminary recommendations for intersection control types (created in Step 1) was sent to partner agencies and the DIFAC for review and comment. Based on feedback from partner agencies and the DIFAC, a refined list of intersections and respective control types was developed for inclusion into the CIP.

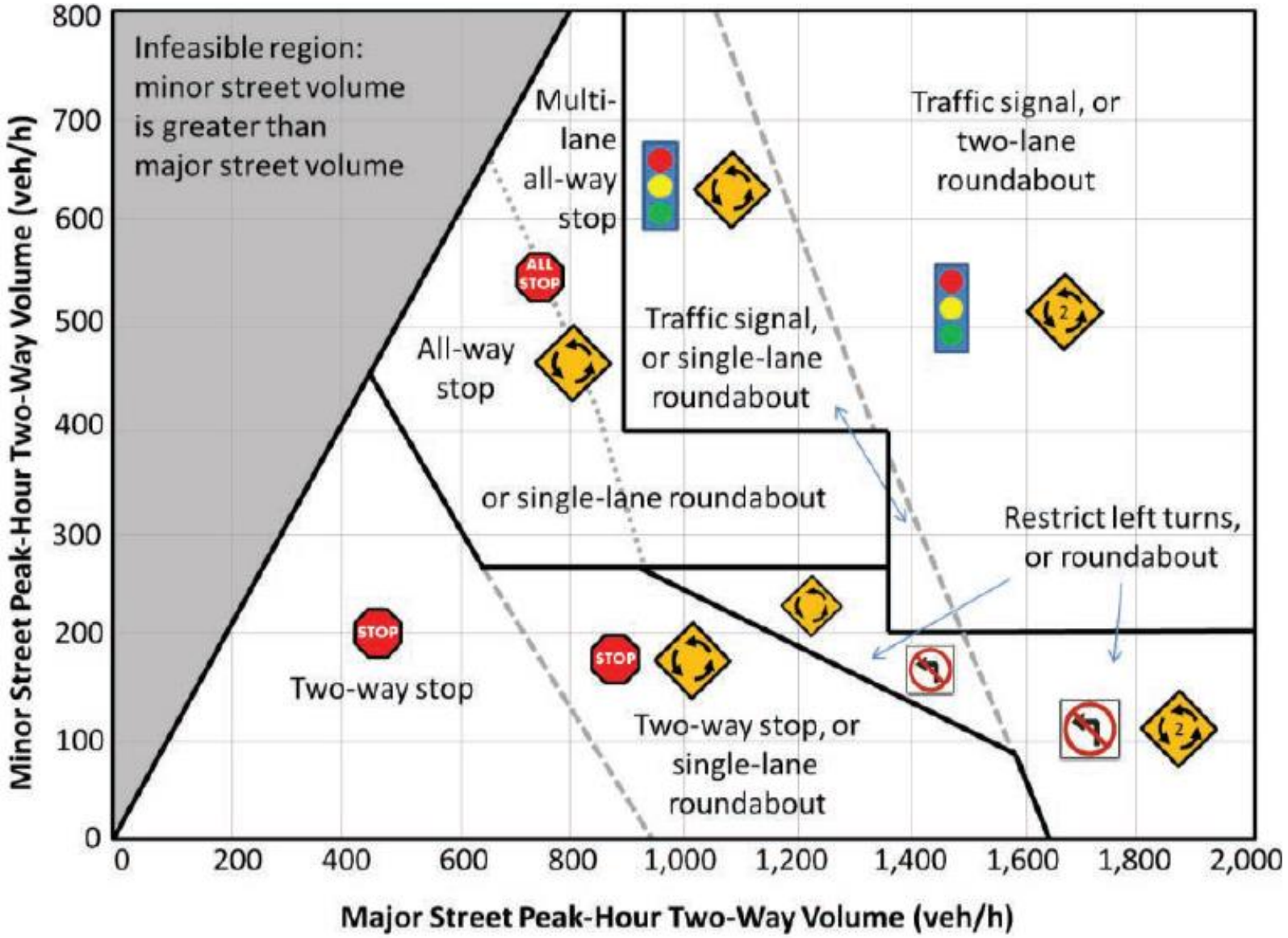
Step 3: Some intersections are identified for further analysis to determine appropriate control type. Previous planning documents for the service area were reviewed for consistency with intersection needs and control types.

Figure 5. Intersection Control Type by Peak Hour Volume – 50/50 Volume Distribution



Source: National Cooperative Highway Research Program (NCHRP) Report 825 (Exhibit 17a)

Figure 6. Intersection Control Type by Peak Hour Volume – 67/33 Volume Distribution



Source: National Cooperative Highway Research Program (NCHRP) Report 825 (Exhibit 17b)

ROADWAY & INTERSECTION DEFICIENCIES

Existing Capacity & Deficiencies

This section identifies the existing capacity and deficiencies of the transportation system as required by Idaho Code 67-82. Five intersections and two roadway segments have traffic demand that exceeds current year 2020 service capacity. All five of the intersections are along SH 44, and all are currently two-way stop-controlled intersections. The critical movement(s) of these intersections are expected to operate over-capacity during the PM peak hour which corresponds with a performance measure of LOS E or worse. The two roadway segments currently operate at LOS E or worse during the PM peak hour and include a small segment of SH 44, less than 1,000 feet from I-84 to Old Highway 30 and a segment of Middleton Road, about 1.5 miles from Lincoln Road to Sawtooth Lake Drive. Capacity improvements that address existing deficiencies are not eligible for TIF funding. Table 5 and Figure 7 identify the existing system deficiencies. The total estimated cost to address existing system deficiencies is $6,312,500, as shown in Table 5.

Table 5. Deficient Intersections & Roadways (Year 2020, Existing System)

Intersection	Existing Control Type	Improvement Needed to Address Existing Deficiency	Cost
SH 44 & Middleton Road[1]	Two-Way Stop	3x5 Traffic Signal	$962,500
SH 44 & Emmett Road[1]	Two-Way Stop	3x5 Traffic Signal	$362,500
SH 44 & Lansing Lane[1]	Two-Way Stop	3x5 Traffic Signal	$1,262,500
SH 44 & Old Highway 30[1]	Two-Way Stop	3x5 Traffic Signal	$1,262,500
SH 44 & Can Ada Road[1]	Two-Way Stop	3x5 Traffic Signal	$1,262,500

Roadway	Threshold	Peak Hour Volume	Existing Configuration	Improvement Needed to Address Existing Deficiency	Cost
SH 44[2] *I-84 to Old Highway 30*	720	923	2 Lanes	Widen to 3 Lanes	$0 (ITD only)
Middleton Road[3] *Lincoln Road to Sawtooth Lake Drive*	560 to 620	676 to 682	3 Lanes	Widen to 3 Lanes	$1,200,000

[1]Mitigation requires traffic signal or roundabout; [2]Mitigation requires two travel lanes in each direction; [3]Mitigation requires turn lanes at intersections

Figure 7. Existing Deficiencies (2020)

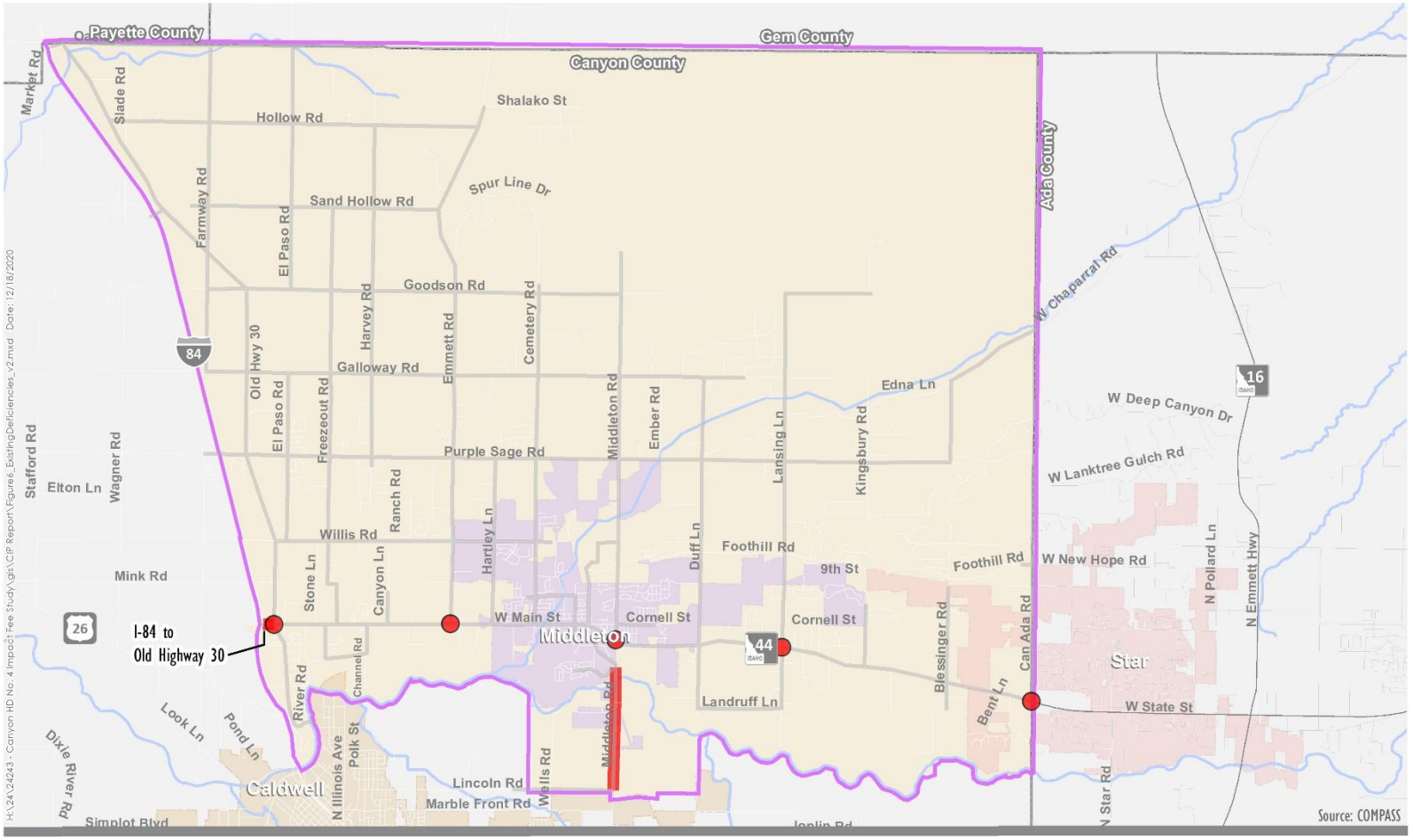


Figure 7

Existing Deficiencies (2020)
Canyon County, ID

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2040 Capacity & Deficiencies

Future travel demand estimates for the Mid-Star service area are based on the land use and growth assumptions described above and are developed through output from the COMPASS travel demand model. The model forecasts the PM peak hour vehicle trips for 2040 horizon year based on the growth assumptions (size, type, and location of new developments), and assigns these trips to roadway segments in the service network.

Service units, or the measure of system demand associated with each new development, are measured in Vehicle Miles Traveled (VMT) on the service network during the PM peak hour. The additional demand attributable to the estimated new growth and development during the 2020 to 2040 planning horizon is 23,280 VMT as shown in Table 6.

Table 6. Change in Vehicle Miles Traveled (Year 2020 to Year 2040)

	Total Service Area VMT
Year 2020	11,743
Year 2040	35,023
Net New System VMT (Change in VMT from New Development)	23,280

The service network was evaluated using the COMPASS travel demand model for the projected 2040 total demand, with 23,280 additional PM peak hour vehicle miles traveled (VMT). Those improvements needed to return the service network intersections and roadway corridors to a LOS D (excluding any 2020 existing deficiencies) are considered the proportionate share of improvements attributable to new growth and development.

Projected traffic demand is expected to exceed service capacity on thirty-two intersections and eleven roadway segments by 2040. Most of the deficient intersections are located along a few major roadways within the service area:

- Sixteen along SH 44 (50%),
- Eight along Purple Sage Road (25%) and
- Four along Old Highway 30 (12.5%).

Five of the thirty-two identified intersections have existing deficiencies in the 2020 year. The portions of projects that address these existing deficiencies are not impact fee eligible, and are excluded from the impact fee-eligible costs in the CIP.

The majority of SH 44 within the service area exceeds service capacity thresholds in year 2040, except for the segment within the City of Middleton. These segments are under the jurisdiction of ITD and therefore are not impact-fee eligible. Other deficient segments in the year 2040 include:

- Purple Sage Road between Freezeout Road and Emmett Road and between Middleton Road and Kingsbury Road, and
- Portions of Old Highway 30, Freezeout Road, Middleton Road, Blessinger Road, Can Ada Road, and Willis Road.

Table 7, Table 8, and Figure 8 illustrate intersection and roadway deficiencies in the year 2040.

Table 7. Deficient Intersections (Year 2040)

Intersection	Existing Deficiency	Existing Control Type
Old Highway 30 & Galloway Road	No	Two-Way Stop
Old Highway 30 & Purple Sage Road	No	Two-Way Stop
Old Highway 30 & Willis Road	No	Two-Way Stop
Purple Sage Road & Middleton Road	No	Two-Way Stop
Purple Sage Road & Duff Lane	No	Two-Way Stop
Purple Sage Road & Lansing Lane	No	Two-Way Stop
Purple Sage Road & Emmett Road	No	Two-Way Stop
Purple Sage Road & Harvey Road	No	Two-Way Stop
Purple Sage Road & Freezeout Road	No	Two-Way Stop
Purple Sage Road & Blessinger Road	No	Two-Way Stop
Freezeout Road & Willis Road	No	Two-Way Stop
SH 44 & Middleton Road	Yes	Two-Way Stop
SH 44 & Dewey Avenue	No	Two-Way Stop
SH 44 & Hawthorne Drive	No	Two-Way Stop
SH 44 & Cemetery Road	No	Two-Way Stop
SH 44 & Hartley Road	No	Two-Way Stop
SH 44 & Emmett Road	Yes	Two-Way Stop
SH 44 & Duff Lane	No	Two-Way Stop
SH 44 & Canyon Lane	No	Two-Way Stop
SH 44 & Channel Road	No	Two-Way Stop
SH 44 & Lansing Lane	Yes	Two-Way Stop
SH 44 & River Road	No	Two-Way Stop
SH 44 & Freezeout Road	No	Two-Way Stop
SH 44 & Old Highway 30	Yes	Two-Way Stop
SH 44 & Kingsbury Lane	No	Two-Way Stop
SH 44 & Blessinger Road	No	Two-Way Stop
SH 44 & Can Ada Road	Yes	Two-Way Stop
Middleton Road & Sawtooth Lake Drive	No	Two-Way Stop
Middleton Road & Lincoln Road	No	Two-Way Stop
Middleton Road & Cornell Street	No	All-Way Stop
Can Ada Road & Willis Road	No	Two-Way Stop[1]
Can Ada Road & Foothill Road	No	All-Way Stop

1. *Future intersection – TWSC assumed for all future intersections in this analysis*

Table 8. Deficient Roadway Segments (2040)

Roadway	Threshold[1]	Peak Hour Volume
Blessinger Road *Willis Road to Purple Sage Road*	310	321
Can Ada Road *New Hope Road to Willis Road*	480	495
Middleton Road *Lincoln Road to SH 44*	490 to 620	533 to 887
Old Highway 30 *US 26 to Willis Road*	480 to 560	645 to 754
Purple Sage Road *Freezeout Road to Emmett Road*	480	500 to 557
Purple Sage Road *Middleton Road to Kingsbury Road*	480	497 to 519
SH 44 *Old Highway 30 to Rainbow Ridge*	1,550	1,600
SH 44 *Canyon Lane to Hartley Lane*	720	798 to 1,135
SH 44 *Duff Lane to Can Ada Road*	720	742 to 987
Willis Road *Old Highway 30 to El Paso Road*	310	365
Willis Road *Freezeout Road to Ranch Road*	310	362

1. *See Table 4 for service volume threshold definitions*

Figure 8. Future Deficiencies (2040)

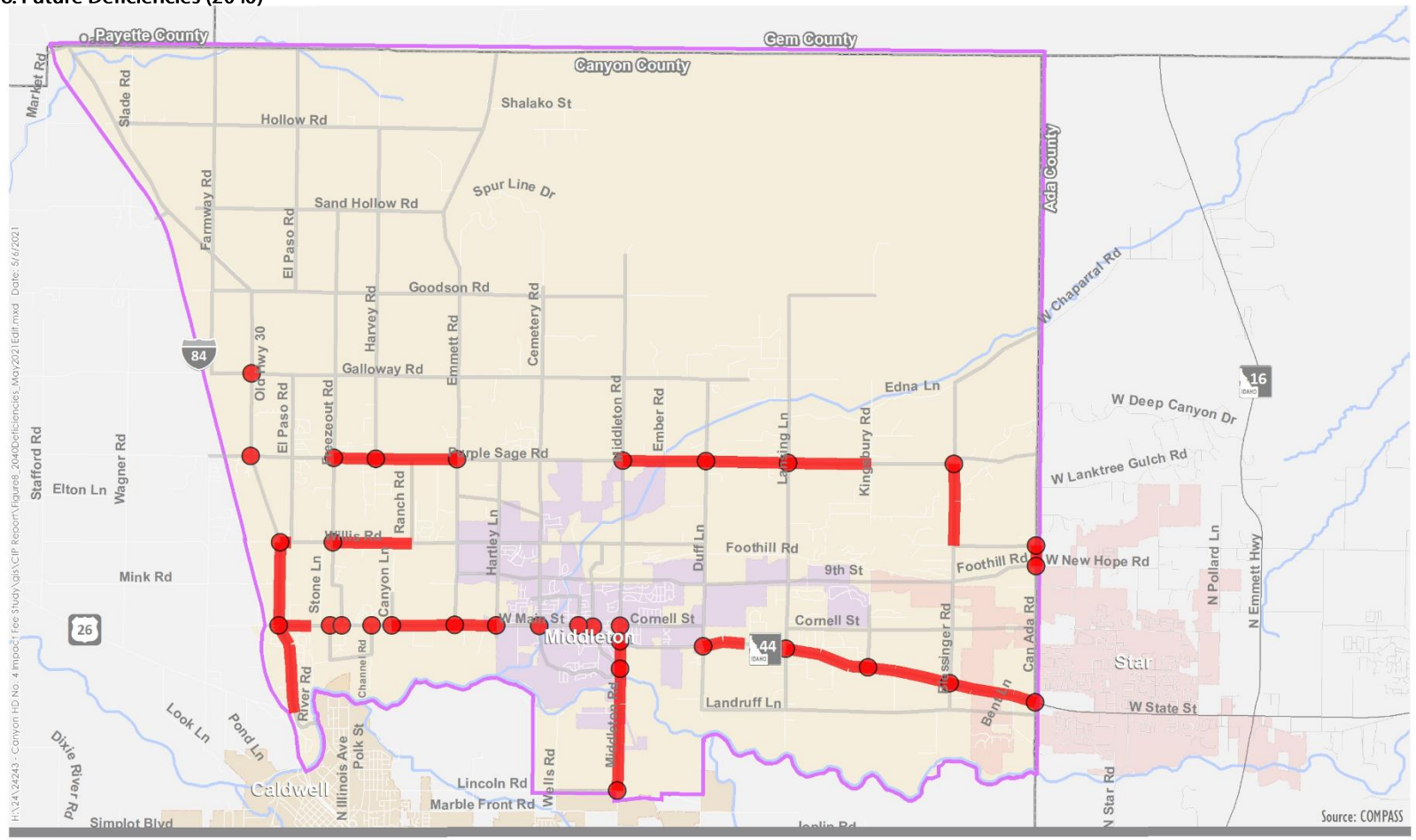

Figure 8

Future Deficiencies (2040)
Canyon County, ID

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CIP PROJECTS

This section presents the proposed CIP projects to address the intersection and roadway deficiencies identified in year 2020 and 2040.

Cost Estimates

The total cost of each project in the CIP was estimated at the planning-level. Table 9 shows unit costs for different project types that were used as a baseline for project costs. The project unit costs were developed based on recent cost estimates for similar projects in the region and collaboration with CHD4. The final CIP project costs were adjusted from the baseline costs shown in Table 9 to account for right-of-way (ROW) impacts, topography challenges, bridges or large culverts, and other potential constraints or design considerations (i.e., number of turn lanes required).

ROW costs are included in the intersection project unit costs. ROW costs for roadway projects were determined on a case-by-case basis using available parcel data and a unit cost of $2.50 per square feet. The unit cost was based on recent project costs in the region. It was assumed that a ROW width of 74 feet is required for two-three lane roadways and that a ROW width of 94 feet is required for four-five lane roadways.

Bridge and/or culvert costs were added for significant waterway crossings using $400 per square foot for design and construction costs. A contingency factor was applied to each project unit cost on a case-by-case basis to account for topographic features and other potential constraints.

Table 9. Cost Estimates - Unit Costs

Project Type	Project Unit Cost	Notes
Single-Lane Roundabout	$2,000,000 per intersection	Cost includes bicycle and pedestrian facilities and limited ROW impacts.
Multi-Lane Roundabout	$3,000,000 per intersection	
Traffic Signal (3x3)[1]	$325,000 per intersection	Cost does not include widening of roadway. Costs associated with turn-lanes added based on need to widen roadway approaches. Cost includes limited ROW impacts and bicycle and pedestrian facilities.
Traffic Signal (5x5)[2]	$400,000 per intersection	
Roadway Widening	$1,500,000 per lane per mile	ROW not included and determined on a case-by-case basis. Assumes cross-section with 12′ travel lanes, 14′ center-turn lanes, sidewalks, bike lanes, and/or multi-use path.
New Roadway	$1,300,000 per lane per mile	ROW not included and determined on a case-by-case basis assuming a unit cost of $2.50 per square foot. Assumes cross-section with 12′ travel lanes, 14′ center-turn lanes, sidewalks, bike lanes, and/or multi-use path.
Turn-Lane Improvement	$300,000 per turn lane	Assumes cost of $75 per square foot. Project unit cost is for 250′ turn lane with 150′ taper.
Bridge or Major Culvert	$400 per square foot	From ITD planning level estimates.

1. 3x3 assumes one through lane, one left-turn lane, and one through lane on each approach.
2. 5x5 assumes two through lanes, one left-turn lane, and two through lanes on each approach.

Impact Fee Eligibility

The overall cost of impact fee eligible projects is used to determine the final impact fee schedule. The proportion of impact fee eligible costs was calculated for each CIP project. Impact fee eligibility is based on the requirements in Idaho Code 67-82 which states that impact fee funding should meet the following criteria:

- *Address deficiencies in capacity*
- *Address deficiencies that are attributable to future development (not existing deficiencies)*
- *Are included in the CIP (requiring updating every five years)*

Intersection projects on SH 44 (ITD facility) should be jointly funded by ITD and CHD4, the City of Star, or the City of Middleton. Only those portions of the SH 44 intersection projects that are outside of the ITD right-of-way (excluding the local share of signal equipment costs) are considered impact fee eligible. Projects, or portions of projects, that address existing deficiencies are not impact fee eligible.

Certain other projects that lie on the boundaries of the service area (for example, Can Ada Road, or the Middleton Road /Lincoln Road intersection), are only partially eligible for impact fee funds collected within the Mid-Star service area. Those projects costs are estimated as a percentage of the total cost, as portions of the total project cost will be borne by the adjacent jurisdiction or service area. The percentage varies with the specific project location and configuration.

In accordance with Idaho Code 67-82, development impact fees may not charge growth and development more than their proportionate share of the system improvements required to serve that growth. Portions of the CIP project costs are fully impact fee eligible to serve this new demand, including right-of-way costs, storm drain facilities, traffic signals, curbs and gutters, intersection approaches, and additional travel lanes. Other project costs do not serve the demand created by new growth, and are not impact fee eligible. These components include re-construction of existing travel lanes, bicycle lanes, sidewalks, irrigation to serve landscaping, landscaping amenities, and street lighting. The percent of each project cost that is attributable to these non-eligible components was determined based on regional project cost estimates and used to create a series of impact fee eligible adjustment factors. The adjustment factors represent the percent of each project's cost estimate that is not impact fee eligible due to the project components. The impact fee eligible project cost adjustment factors are as follows:

- Bicycle and Pedestrian Facilities:
  - Intersection Projects – 4% of total cost
  - New Roadway and Roadway Widening Projects – 10% of total cost
- Re-Construction of Existing Travel Lanes
  - Intersection Projects – 0% of total cost
    - *Roundabout projects planned for use throughout the service area change intersection configuration and do not utilize existing intersection capacity. Traffic signal intersections improvements on the SH-44 corridor are assumed to utilize the existing travel lanes on the minor public road approaches, and can be improved by addition of turn lanes added to the existing roadway.*
  - Roadway Widening Projects – 3% of total cost

- *Roadway widening unit costs assume minimal re-construction of existing travel lanes – re-construction of existing travel lanes is limited to sawcut, fog seal, and striping.*

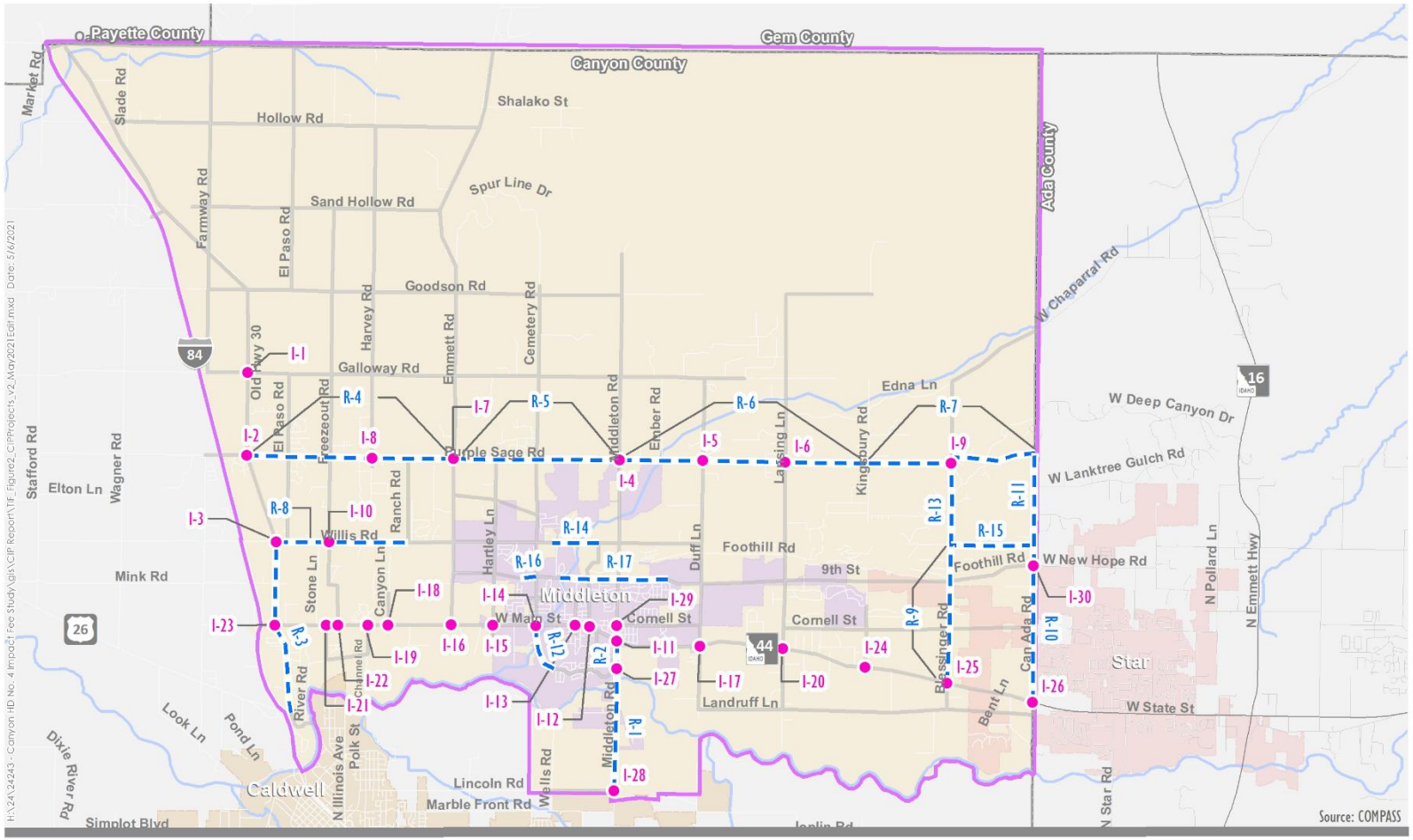
Landscaping and irrigation are also assumed to be non-impact fee eligible, but the costs associated with landscaping and irrigation were assumed to be negligible (less than 1% of total project costs). The costs associated with ROW acquisition services, utility re-location, engineering design and engineering inspection were assumed to be impact fee eligible, and are calculated as 20% of the construction cost of the project.

Certain future collector and arterial roadways within the service area were included in the year 2040 deficiencies analysis to provide a more realistic distribution of year 2040 traffic volumes. The project costs associated with these roadways were considered for impact fee eligibility if the roadways were expected to serve significant amounts of regional traffic. Future roadways shown on the map but not included in the CIP project list are principally for local property access, are not impact fee eligible, and will be constructed by development. These future roadways may be added to subsequent capital improvement plans for this service area if their function becomes more regionally significant as the area develops.

Project List

The final CIP project list is shown in Table 10. , and project locations are displayed in Figure 9. Projects include roadways and intersections with existing and future deficiencies, as well as previously planned future roadways and intersections. Table 10. includes the project cost estimates, TIF eligible costs, and estimated project timeframe.

Figure 9. Mid-Star Service Area Capital Improvement Projects



Intersection Project
Roadway Project
CHD4 TIF Service Area
Caldwell City Limits
Middleton City Limits
Star City Limits
CHD4 (Subdistrict No. 1)

0 6,400 Feet

Figure 9

Mid-Star Service Area Capital Improvement Projects
Canyon County, ID

KITTELSON & ASSOCIATES

Table 10. Mid-Star Service Area CIP Projects

Project ID	Intersection	Existing Deficiency	Project Description	Project Cost Estimate	TIF-Eligible Cost	Timeframe
I-1	Old Highway 30 & Galloway Road	No	Single-Lane Roundabout	$1,600,000	$1,536,000	2035-2040
I-2	Old Highway 30 & Purple Sage Road	No	Single-Lane Roundabout	$2,000,000	$1,920,000	2025-2030
I-3	Old Highway 30 & Willis Road[2]	No	Single-Lane Roundabout	$2,200,000	$2,112,000	2035-2040
I-4	Purple Sage Road & Middleton Road	No	Single-Lane Roundabout	$2,000,000	$1,920,000	2035-2040
I-5	Purple Sage Road & Duff Lane	No	Single-Lane Roundabout	$1,800,000	$1,728,000	2035-2040
I-6	Purple Sage Road & Lansing Lane[3]	No	Single-Lane Roundabout	$2,400,000	$2,304,000	2035-2040
I-7	Purple Sage Road & Emmett Road[2]	No	Single-Lane Roundabout	$2,000,000	$1,920,000	2035-2040
I-8	Purple Sage Road & Harvey Road	No	Single-Lane Roundabout	$1,900,000	$1,824,000	2035-2040
I-9	Purple Sage Road & Blessinger Road	No	Single-Lane Roundabout	$2,400,000	$2,304,000	2025-2030
I-10	Freezeout Road & Willis Road	No	Single-Lane Roundabout	$2,000,000	$1,920,000	2035-2040
I-11	SH 44 & Middleton Road	Yes	Traffic Signal	$962,500	$0	2020-2025
I-12	SH 44 & Dewey Avenue	No	Traffic Signal	$362,500	$166,750	2020-2025
I-13	SH 44 & Hawthorne Drive	No	Traffic Signal	$362,500	$166,750	2020-2025
I-14	SH 44 & Cemetery Road	No	Traffic Signal	$1,262,500	$730,750	2020-2025
I-15	SH 44 & Hartley Road[4]	No	Traffic Signal	$1,562,500	$718,750	2025-2030
I-16	SH 44 & Emmett Road[2]	Yes	Traffic Signal	$362,500	$0	2035-2040
I-17	SH 44 & Duff Lane	No	Traffic Signal	$962,500	$742,750	2020-2025
I-18	SH 44 & Canyon Lane	No	Restricted Left Turn	N.A.[1]	N.A.[1]	2035-2040
I-19	SH 44 & Channel Road[2]	No	Restricted Left Turn	N.A.[1]	N.A.[1]	2035-2040
I-20	SH 44 & Lansing Lane	Yes	Traffic Signal	$1,262,500	$0	2020-2025
I-21	SH 44 & River Road[2]	No	Restricted Left Turn	N.A.[1]	N.A.[1]	2035-2040

I-22	SH 44 & Freezeout Road[2]	No	Traffic Signal	$1,262,500	$430,750	2035-2040
I-23	SH 44 & Old Highway 30[2]	Yes	Traffic Signal	$1,262,500	$0	2035-2040
I-24	SH 44 & Kingsbury Lane	No	Traffic Signal	$1,262,500	$430,750	2020-2025
I-25	SH 44 & Blessinger Road	No	Traffic Signal	$1,562,500	$718,750	2030-2035
I-26	SH 44 & Can Ada Road	Yes	Traffic Signal	$1,262,500	$0	2020-2025
I-27	Middleton Road & Sawtooth Lake Drive	No	Multi-Lane Roundabout[5]	$3,000,000	$2,880,000	2020-2025
I-28	Middleton Road & Lincoln Road[7]	No	Multi-Lane Roundabout[5]	$4,200,000	$2,016,000	2020-2025
I-29	Middleton Road & Cornell Street	No	Single-Lane Roundabout	$2,000,000	$1,920,000	2025-2030
I-30	Can Ada Road & Foothill Road[6]	No	Single-Lane Roundabout	$2,000,000	$1,440,000	2025-2030

Project ID	Roadway	Existing Deficiency	Project Description	Project Cost Estimate	TIF-Eligible Cost	Timeframe
R-1	Middleton Road[2] *Lincoln Road to Sawtooth Lake Drive*	Partial – Existing Deficiency Mitigated by Turn Lanes at Intersections	Widen to 5 Lanes (Lincoln Road to Bass Lane); Add Continuous Left Turn Lane (Bass Lane to Middleton Rd) (3.2 lane miles)	$12,569,545	$9,735,505	2020-2025
R-2	Middleton Road Alignment[2,4] *Sawtooth Lake Drive to SH 44*	Future Roadway	Construct a 4-5 Lane Roadway connecting Sawtooth Lake Drive to SH 44 at the N Middleton Road Alignment	$2,665,909	$2,399,318	2025-2030
R-3	Old Highway 30[2] *US 26 to Willis Road*	No	Widen to 4 Lanes and Add Left Turn Lanes at Intersections (where absent)	$3,705,000	$3,223,350	2035-2040
R-4	Purple Sage Road *Old Hwy 30 to Emmett Road*	No	Add Left Turn Lanes at Intersections (4 turn lanes)	$1,296,000	$1,257,120	2030-2035
R-5	Purple Sage Road[3] *Emmett Road to Middleton Road*	No	Add Left Turn Lanes at Intersections (4 turn lanes)	$1,296,000	$1,257,120	2035-2040

R-6	Purple Sage Road[3] *Middleton Road to Kingsbury Road*	No	Add Left Turn Lanes at Intersections (5 turn lanes)	$1,620,000	$1,571,400	2035-2040
R-7	Purple Sage Road[3] *Kingsbury Road to Can Ada Road*	No	Add Left Turn Lanes at Intersections (5 turn lanes)	$648,000	$628,560	2035-2040
R-8	Willis Road *Old Highway 30 to Ranch Road*	No	Add Left Turn Lanes at Intersections (2 turn lanes)	$768,000	$744,960	2030-2035
R-9	Blessinger Road[3] *SH 44 to Willis Road*	No	Add Left Turn Lanes at Intersections (4 turn lanes)	$1,296,000	$1,257,120	2035-2040
R-10	Can Ada Road[6] *SH 44 to Willis Road*	No	Add Left Turn Lanes at Intersections (3 turn lanes)	$972,000	$471,420	2025-2030
R-11	Can Ada Road[6] *Willis Road to Purple Sage Road*	No	Add Left Turn Lanes at Intersections (2 turn lanes)	$648,000	$471,420	2030-2035
R-12	Cemetery Road[4] *Sawtooth Lake Drive to SH 44*	Future Roadway	Construct Two Lane Roadway	$2,749,242	$2,474,318	2020-2025
R-13	Blessinger Road[3] *Willis Road to Purple Sage Road*	Future Roadway	Construct Two Lane Roadway with Left Turn Lanes at Intersections (4 turn lanes)	$1,552,400	$1,200,000	2035-2040
R-14	Willis Road *Wanda Way to Old Middleton Road*	Future Roadway	Construct Two Lane Roadway (0.74 lane miles)	$2,150,821	$1,935,739	2035-2040
R-15	Willis Road *Blessinger Road to Can Ada Road*	Future Roadway	Construct Two Lane Roadway (1.3 lane miles)	$2,423,300	$2,180,970	2030-2035
R-16	9th Street *Connection west of Cemetery Road*	Future Roadway	Construct Two Lane Roadway (0.2 lane miles)	$256,061	$230,455	2030-2035
R-17	9th Street *Willow Drive to Magic Ave*	Future Roadway	Construct Two Lane Roadway (2.4 lane miles)	$4,708,800	$4,237,920	2030-2035
Total Cost				**$86,537,579**	**$67,126,695**	

1. *Negligible capital costs*
2. *Previously Identified in CHD4 Transportation Master Plan*
3. *Previously identified in City of Star Comprehensive Plan*
4. *Previously Identified in City of Middleton CIP*
5. *Minor roadway will have single-lane entry/exit*
6. *Reduced TIF Eligible costs due to anticipated participation by ACHD*
7. *Reduced TIF Eligible costs due to anticipated participation by new service area south of Mid-Star.*

FUNDING SOURCES

There are three separate roadway jurisdictions within the Mid-Star service area: CHD4, City of Middleton, and City of Star. By agreement[2] with City of Star, CHD4 acts as this highway jurisdiction for those city streets located within Canyon County, similar to the role of Ada County Highway District for Star within Ada County.

Each of these agencies receives, or is eligible to receive, funding for transportation improvements from a variety of sources:

- Property taxes
- Highway User Fund taxes (fuel taxes)
- Vehicle Registration Fees
- Federal Aid or State grant programs
- Traffic Impact Fees (currently City of Middleton only)

Over the 2015-2019 period, total transportation revenues as described in the Annual Road and Streets Report for each agency is shown in Table 11.

Table 11. Annual Transportation Revenues by Agency ($1,000)

Year	CHD4	City of Middleton	City of Star
2019	9,439	1,614	0.587
2018	8,402	1,639	0.598
2017	8,019	1,331	0.553
2016	7,422	1,694	0.541
2015	6,336	2,344	0.528

Note: City of Star collects only 50% of property tax revenue allocated for Road & Bridge construction over a small (< 660 acres) portion of Canyon County. It submits this revenue to CHD4 for use in road maintenance.

Average annual transportation revenues for the service area during the previous 5 reported years is approximately $9.65 M. Assuming a 5% annual growth rate in funding (historical average for CHD4), total transportation revenues for the 2021-2040 CIP horizon can be estimated to be $319,013,000. Historically, capital improvement expenditures have accounted for 5% or less of CHD4 and Middleton's transportation budget, as maintenance and operation of the existing system has been the principal focus for small urban and rural areas. The projected $19,411,000 non-impact fee eligible cost for the CIP projects is equivalent to 6.14% of the estimated total revenue over the 20-year CIP. The agencies participating in funding the CIP will need to account for a moderate additional increment of annual expenditures on capital improvements, which is consistent with the current recognized needs.

[2] Canyon 4/Star Public Agency Coordination Agreement, June 6, 2007.

INTERGOVERMENTAL AGREEMENTS

The land use and transportation agencies active within the Mid-Star service area will enter into intergovernmental agreements to fund and construct the multi-jurisdictional transportation improvement projects. Those intergovernmental agreements will detail the proportionate share of funding for each agency based on contributing trips from each jurisdiction, location with each jurisdiction, and anticipated new growth within each jurisdiction.

REFERENCES

1. Kittelson & Associates. CHD4 Traffic Impact Fee Program. 2020.
2. Canyon Highway District No. 4. Transportation Master Plan. 2020.
3. City of Middleton. Transportation Study and Capital Improvement Plan 2017 Update. 2017.
4. City of Star. City of Star Comprehensive Plan. 2019.
5. Idaho Transportation Department, District 3. SH-44, I-84 to Eagle, Corridor Study. 2019.
6. Kittelson & Associates. Middleton Road Corridor Plan. 2016.
7. Canyon County. Canyon County 2020 Comprehensive Plan. 2016.
8. City of Middleton. City of Middleton Comprehensive Plan. 2016.
9. City of Star. City of Star Comprehensive Plan. 2019.
10. National Cooperative Highway Research Program. NCHRP Report 825: Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual. 2016.

APPENDIX A:

Meeting Materials & Summary Notes

DATE **6/3/2020**

CHD4 SUBDISTRICT NO.1 TRAFFIC IMPACT FEE STUDY

PROJECT BACKGROUND, SCOPE OF WORK AND SERVICE AREA

Development Impact Fee Advisory Committee Meeting #1

KITTELSON & ASSOCIATES

Meeting Purpose and Agenda

- Purpose
  - Introduce Partner Agencies and Development Impact Fee Advisory Committee to the Study
  - Understand and Confirm Service Area
  - Discuss Next Steps
- Agenda
  - Study Background
  - Study Overview
  - Service Area
  - Next Steps

Study Objectives

- Establish a Traffic Impact Fee Program for CHD4 Subdistrict No. 1 to meet requirements in Idaho Code 67-82
- Facilitate a collaborative decision-making process between Star, Middleton, Canyon County, and the Development Impact Fee Advisory Committee (DIFAC)

STUDY BACKGROUND

Study Background

- New development growth results in the need for roadway capacity improvements now and over the next 20 years.
- CHD4 is unable to collect traffic impact fees from new developments by law and must partner with Canyon County.
- CHD4 has intergovernmental agreements with City of Star and City of Middleton regarding roadways.
- Traffic Impact Fee (TIF) Feasibility Study was completed in January 2020.

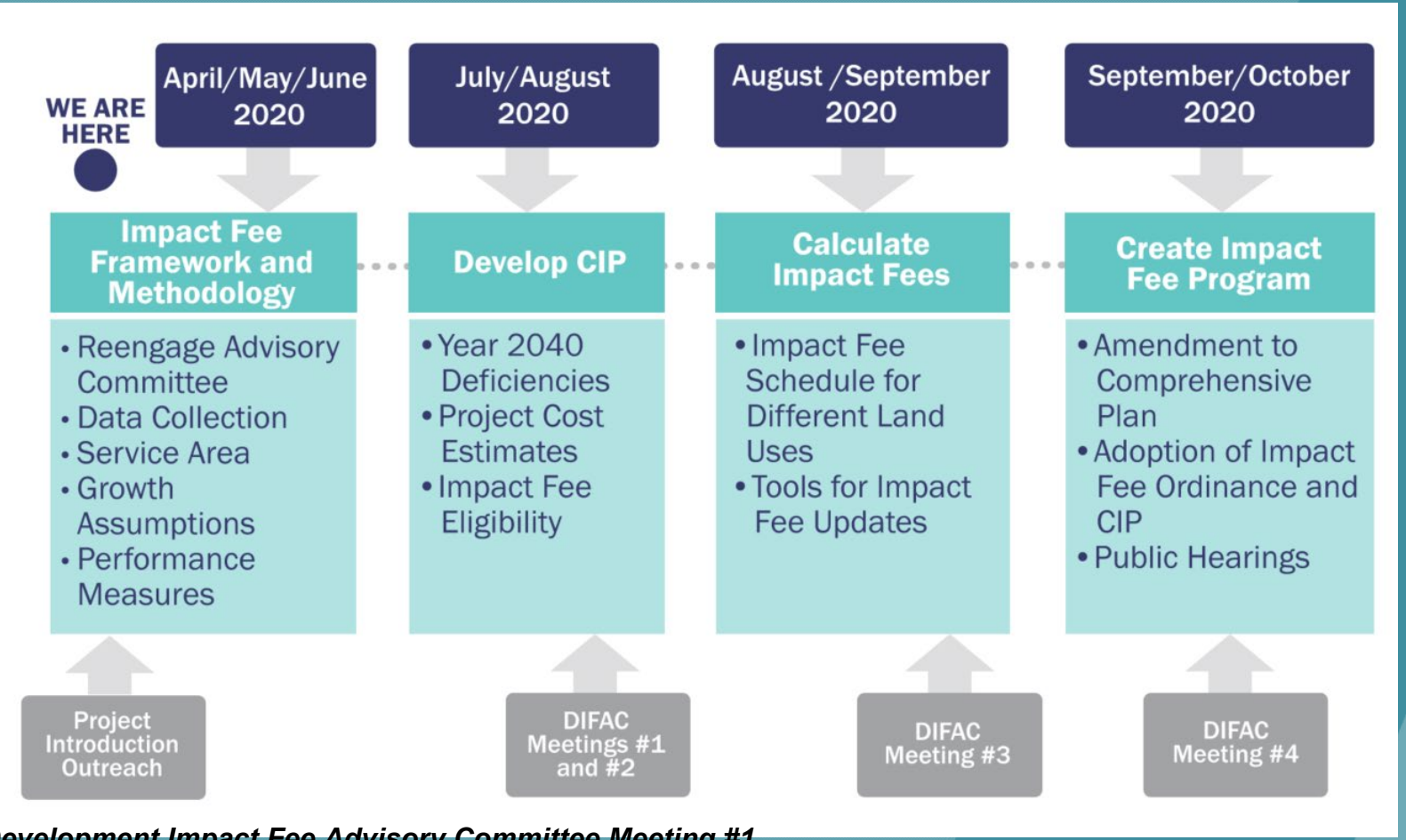
TIF Feasibility Study

- Examined what is required and what should be considered in a traffic impact fee program
- Key findings:
  - Create one service area with CHD4, the City of Middleton, and the City of Star
  - Develop capital improvement plan (CIP) for entire service area
  - Utilize COMPASS travel demand model data
  - Calculate impact fees using average vehicle-miles-traveled (VMT) methodology, similar to ACHD

STUDY OVERVIEW

KITTELSON & ASSOCIATES

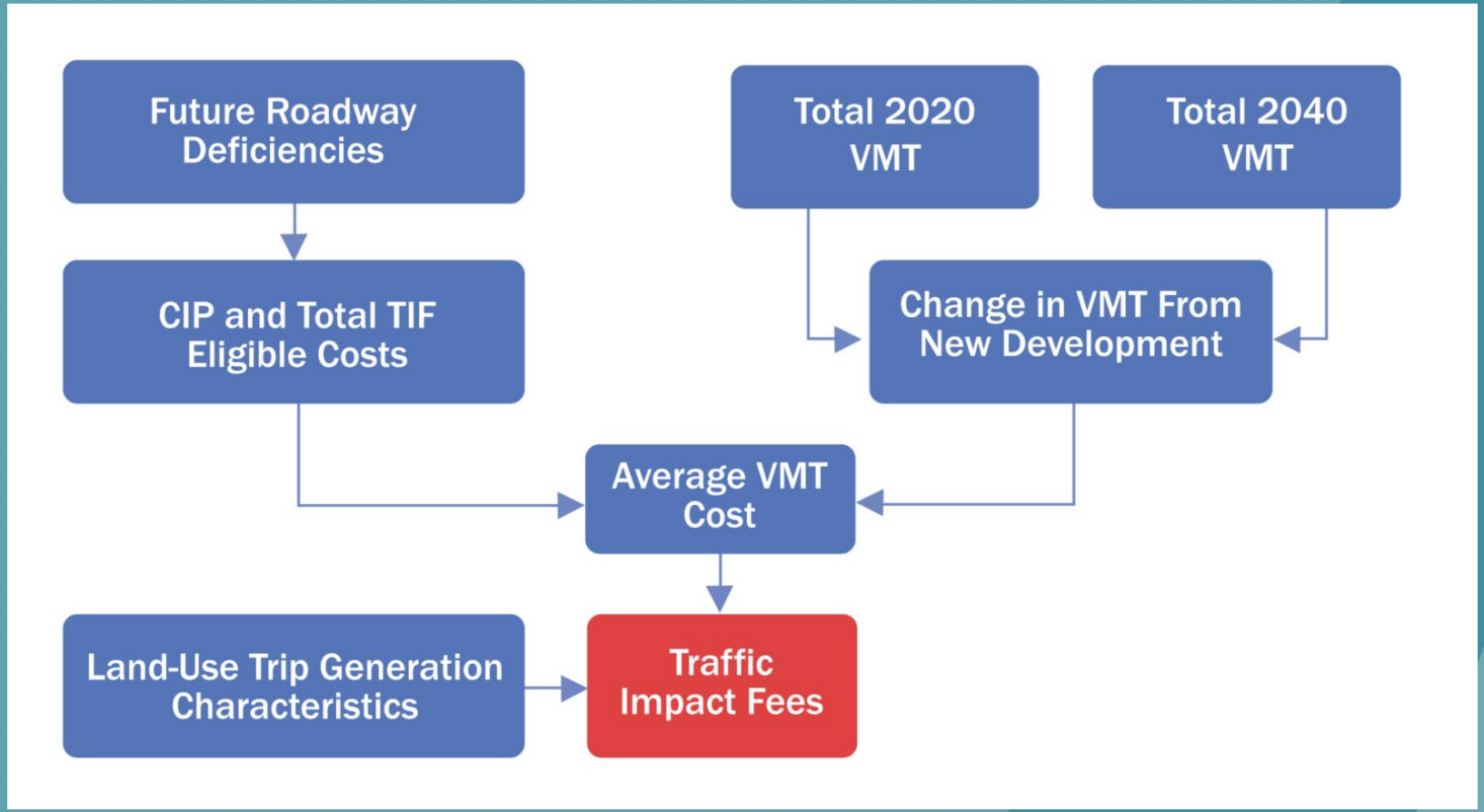
Schedule


WE ARE HERE
April/May/June 2020
July/August 2020
August /September 2020
September/October 2020
Impact Fee Framework and Methodology
• Reengage Advisory Committee
• Data Collection
• Service Area
• Growth Assumptions
• Performance Measures
Develop CIP
• Year 2040 Deficiencies
• Project Cost Estimates
• Impact Fee Eligibility
Calculate Impact Fees
• Impact Fee Schedule for Different Land Uses
• Tools for Impact Fee Updates
Create Impact Fee Program
• Amendment to Comprehensive Plan
• Adoption of Impact Fee Ordinance and CIP
• Public Hearings
Project Introduction Outreach
DIFAC Meetings #1 and #2
DIFAC Meeting #3
DIFAC Meeting #4

Key Terms

- VMT = Vehicle-Miles-Traveled
  - A measure of how much the average person drives
  - Common measure used in impact fees
- Land-Use Trip Generation Characteristics
  - Different land-uses generate different amounts of daily vehicle trips and vehicle trips of different lengths
    - Retail (shopping center, gas station, restaurants, etc.)
    - Industrial (warehouse, manufacturing, distribution, etc.)
    - Residential (single-family, apartments, etc.)

Traffic Impact Fee Calculation Process



Example Traffic Impact Fee Calculations

Example Traffic Impact Fee Calculations for Single Family Housing		
Project Costs		
Total TIF Eligible Costs:	$ 50,000,000	*Includes all TIF Eligible Costs for 2040 Capital Improvement Projects.*
VMT Estimates (PM Peak Hour)		
2020 Total VMT	10,000	*PM peak hour VMT in service area on arterial and collector roadways.*
2050 Total VMT	20,000	*Can be determined via COMPASS model output for Link-Based VMT.*
Change in VMT	10,000	*= 2050 Link Based VMT - 2020 Link Based VMT*
VMT Cost		
VMT Cost	$ 5,000	*= Total TIF Eligible Costs / Change in VMT*
Impact Fee Schedule Factors		
Peak Hour Trip Gen Rate	0.445	*Single Family Housing (210) ITE 10th Edition - One-Way Trip*
New Trip Factor	1	*Factor can be used to account for pass-by trips*
Average Trip Length (miles)	10.0	*Average trip length within Service Area. Can be determined via COMPASS model output.*
Network Adjustment Factor	0.250	*Proportion of average trip lengths occuring on non-ITD facilities.*
Impact Fee for Residential (Single Family Housing)		
Residential Impact Fee	$ 5,563	*=VMT Cost x Peak Hour Trip Gen Rate x New Trip Factor x Avg. Trip Length x Network Adjustment Factor*

How Are Impact Fees Collected?

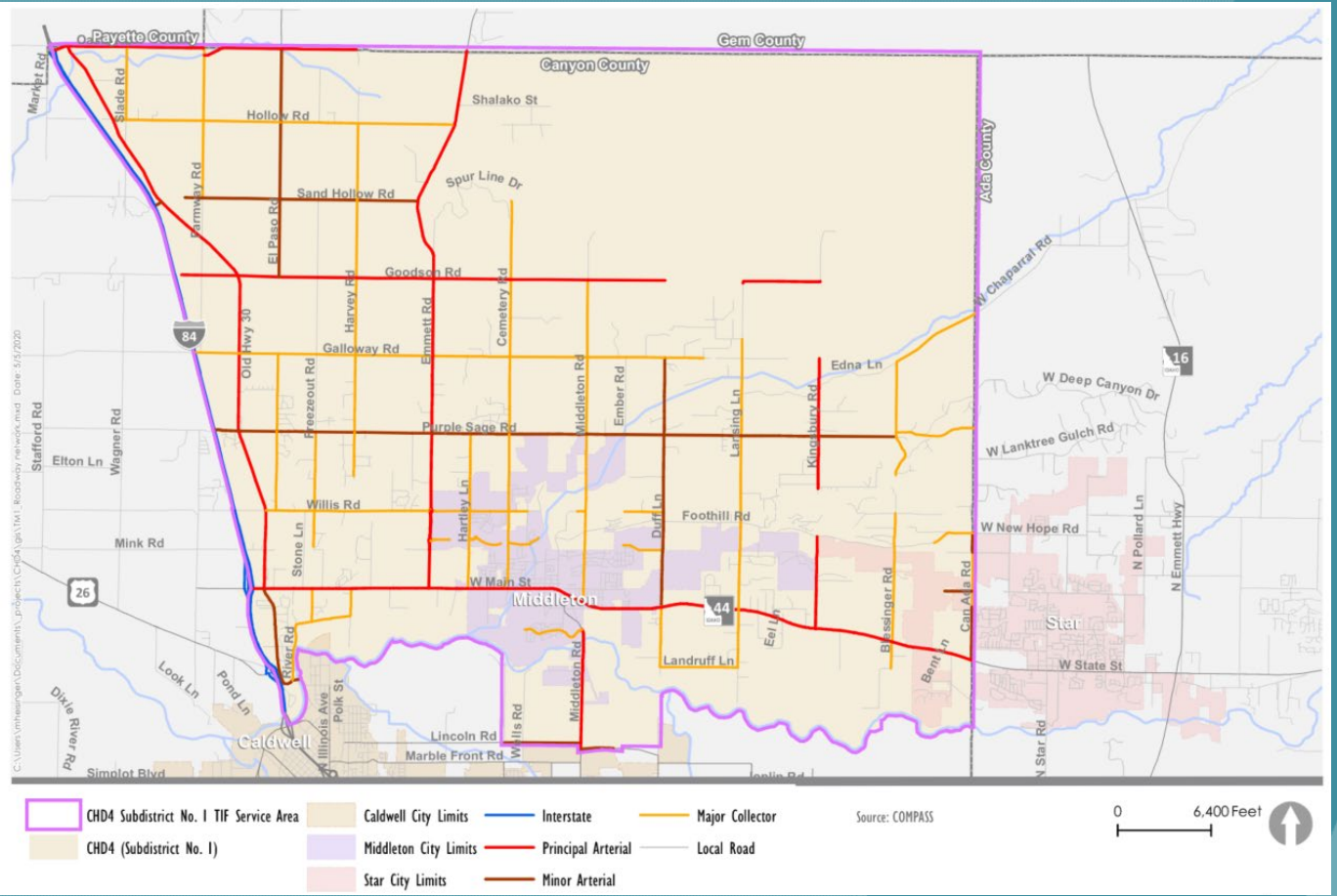
- Step 1: New development comes into service area.
- Step 2: Developer applies for building permit and pays impact fees to subject agency (Star, Middleton, or Canyon County).
- Step 3: Partner agencies will undertake individual or joint projects based on proportionate share (determined as part of the CIP).

Key Study Deliverables

- Traffic Impact Fee Program - Final Report
  - Capital Improvement Plan for Service Area
  - Impact Fee Schedule
- Excel Database
  - CIP Analysis
  - Updates to Impact Fees
- CIP Online GIS Platform

SERVICE AREA

Service Area and Existing Roadway Functional Classification



Service Area Demographics

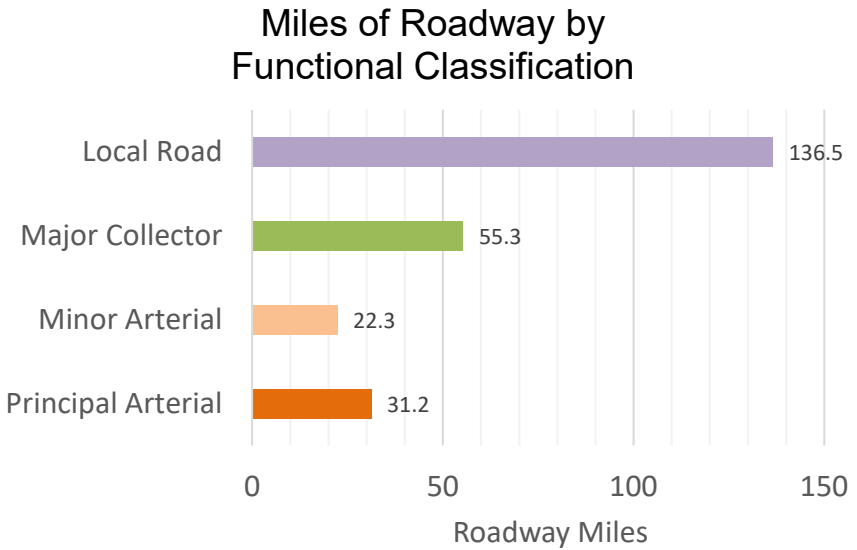
Jurisdiction	2020 Population	Estimated 2040 Population	2020 Jobs	Estimated 2040 Jobs
City of Middleton	9,780	19,596	1,521	3,333
City of Star (within Canyon County)	150	521	20	73
Unincorporated Canyon County	10,544	8,769	801	705
Total Service Area	**20,414**	**28,886**	**2,342**	**4,111**

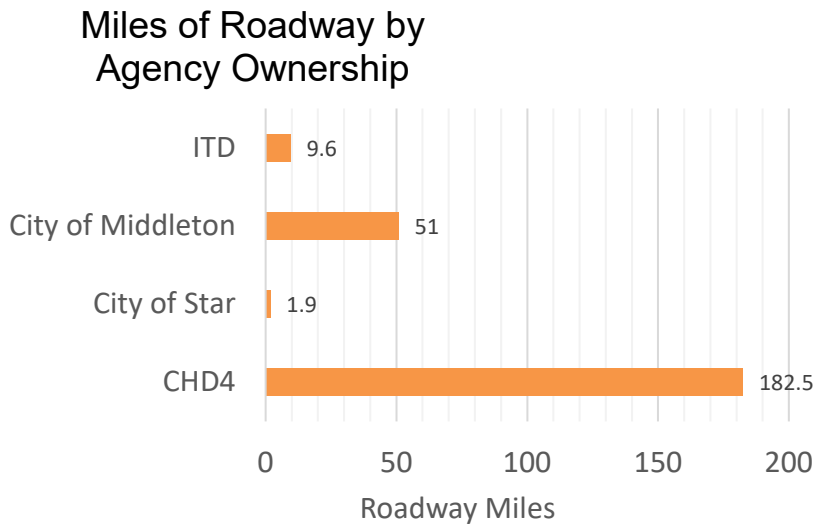
Source: COMPASS

Population Growth Rates

- COMPASS Communities in Motion 2.0 (2020-2040)
  - 1.8%
- CHD4 Draft Transportation Plan (2018-2040)
  - 2.8%
- City of Middleton Transportation Plan (2015-2035)
  - 5.0%

Service Area Roadway Facilities





Source: COMPASS

NEXT STEPS

Next DIFAC Meeting

- Impact Fee Methodology Assumptions
  - COMPASS Data
  - Performance Measures
  - Proportionate Share
  - Background on CIP

DATE **9/15/2020**

CHD4 SUBDISTRICT NO.1 TRAFFIC IMPACT FEE STUDY

DEVELOPMENT IMPACT FEE ADVISORY COMMITTEE - MEETING #2:
TRAFFIC IMPACT FEE PROGRAM METHODOLOGY AND ASSUMPTIONS

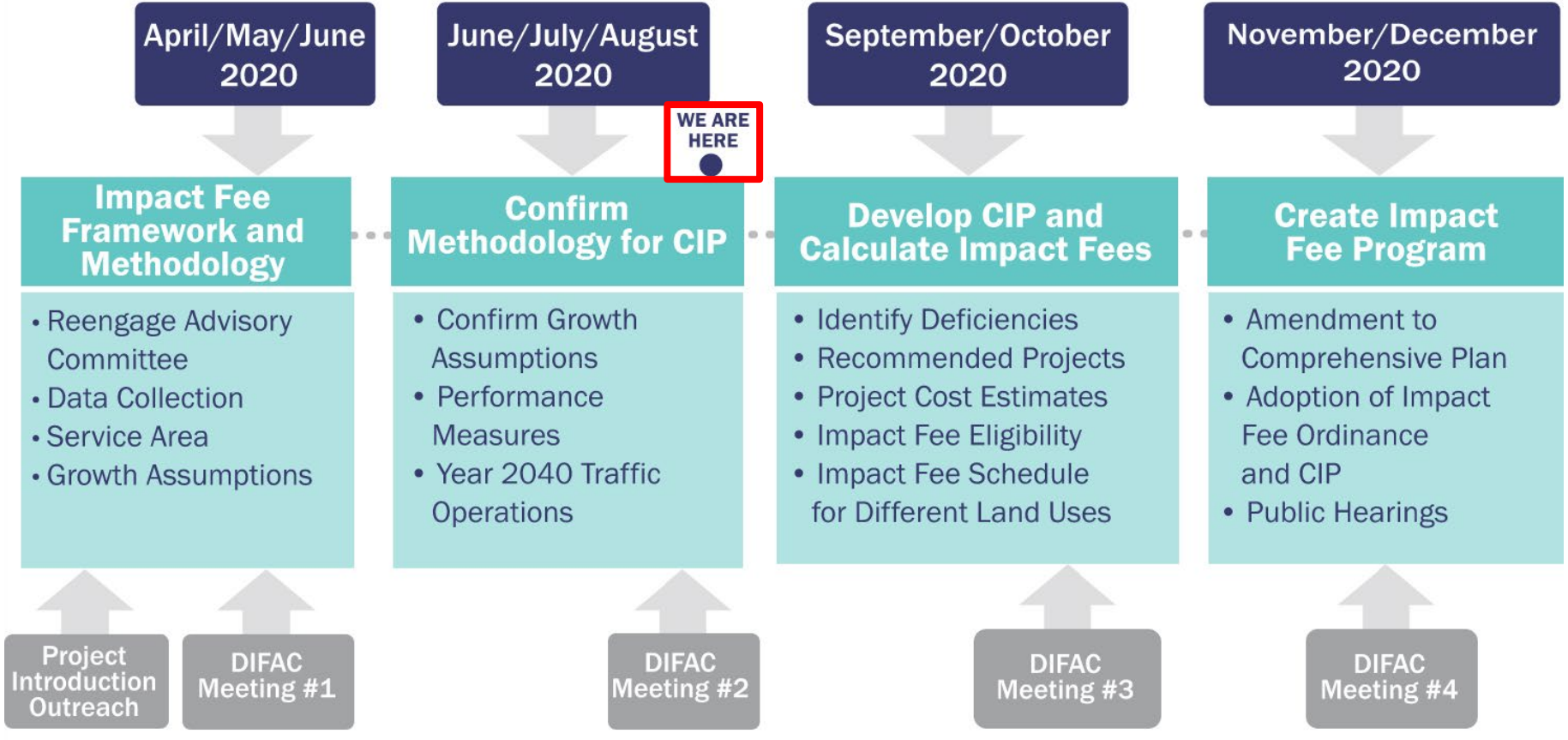
KITTELSON & ASSOCIATES

Meeting Purpose and Agenda

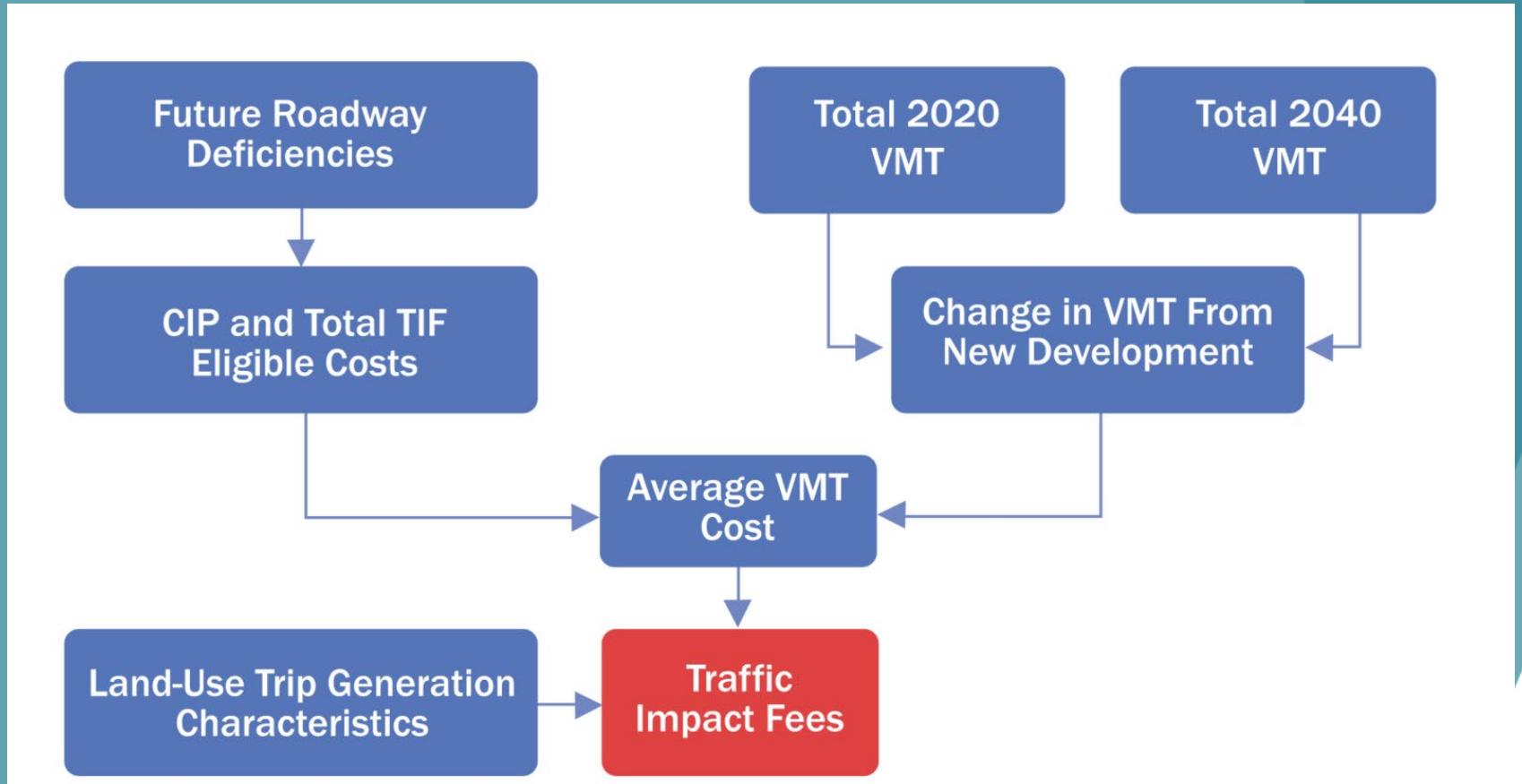
- Purpose
  - Review and Confirm
    - Year 2040 Demographic Projections
    - Performance Measures
    - Traffic Operations Methodology
  - Discuss Agency Proportionate Share

- Agenda
  - Study Schedule
  - Traffic Impact Fee Calculation Process
  - Year 2040 Demographics
  - Performance Measures
  - Traffic Operations Methodology
  - Proportionate Share
  - Next Steps

Study Schedule



Traffic Impact Fee Calculation Process



YEAR 2040 DEMOGRAPHICS

KITTELSON & ASSOCIATES

Year 2040 Demographics

- Why are they important?
  - Year 2040 demographics inform projected traffic volumes.
  - Traffic volumes are used to analyze traffic operations and identify roadway and intersection capacity projects.

- Year 2040 COMPASS demographics were used as a baseline and revised based on input from Canyon County, Star, and Middleton.

Year 2040 Demographics

Jurisdiction	COMPASS 2020 Population	Estimated 2040 Population		COMPASS 2020 Jobs	Estimated 2040 Jobs	
		COMPASS Model	*Proposed*		*COMPASS Model*	*Proposed*
City of Middleton	9,780	19,189	27,528	1,521	3,270	4,003
City of Star (within Canyon County)	150	5,701	12,463	20	241	361
Unincorporated Canyon County	10,554	3,996	4,324	801	600	639
Total Service Area	**20,414**	**28,886**	**44,315**	**2,342**	**4,111**	**5,004**
		117% Increase from 2020			*110% Increase from 2020*	
		4% annual growth rate			*3.9% annual growth rate*	

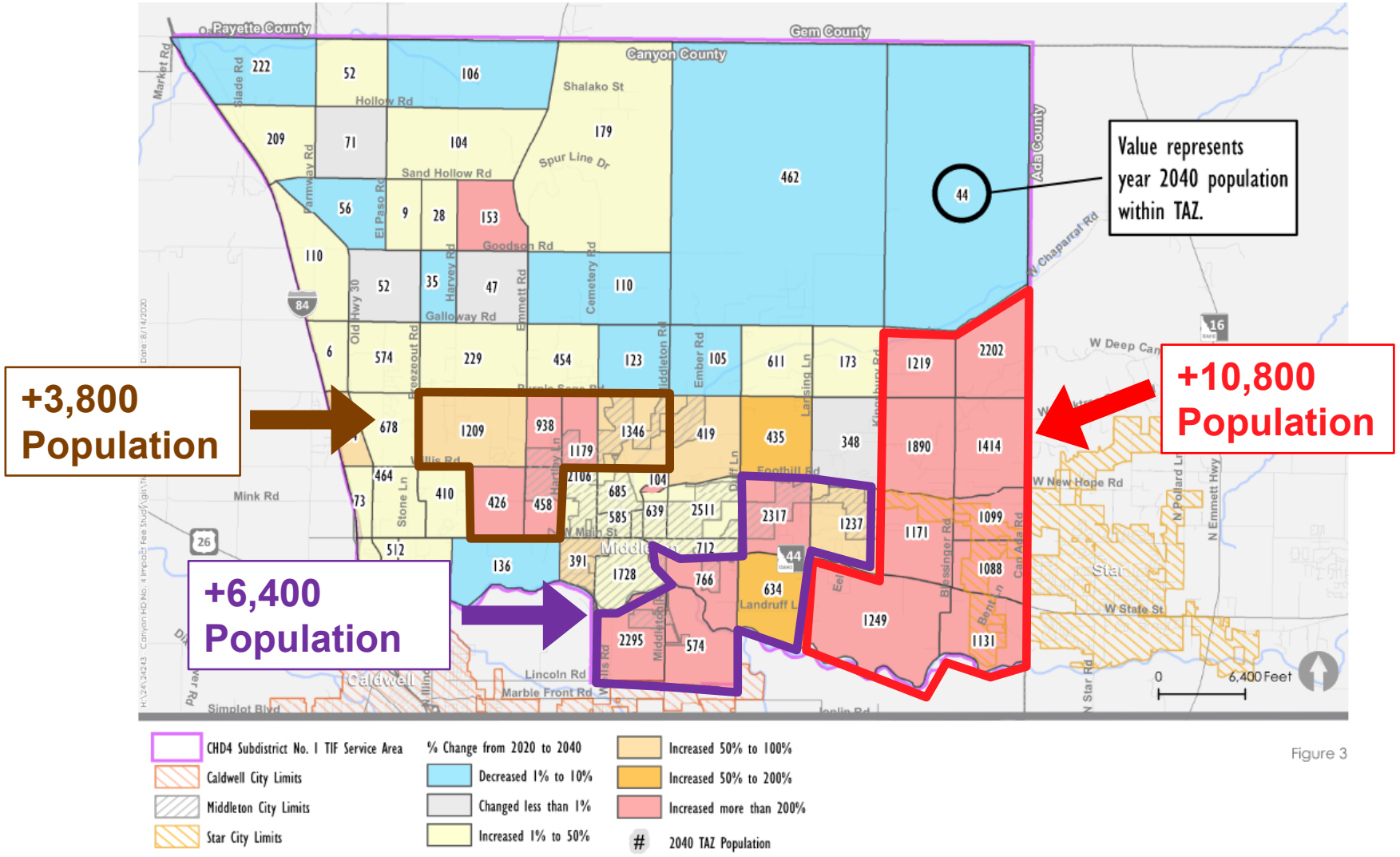

Payette County
Gem County
Canyon County
Ada County
Value represents year 2040 population within TAZ.
+3,800 Population
+10,800 Population
+6,400 Population
Shalako St
Hollow Rd
Sand Hollow Rd
Spur Line Dr
Goodson Rd
Galloway Rd
Cemetery Rd
Emmett Rd
Harvey Rd
Old Hwy 30
Parma Way Rd
El Paso Rd
Market Rd
Blade Rd
Middleton Rd
Ember Rd
Larsing Ln
Kingsbury Rd
W Chaparral Rd
W Deep Canyon
Foothill Rd
W New Hope Rd
N Emmett Hwy
N Pollard Ln
Can Ada Rd
Blessinger Rd
Ben Ln
W State St
Star
Middleton
Caldwell
Mink Rd
Willis Rd
Stone Ln
Hartley Ln
Diff Ln
W Main St
Lincoln Rd
Marble Front Rd
Simplot Blvd
N Star Rd
Landruff L
84
26
44
16
0
6,400 Feet
CHD4 Subdistrict No. 1 TIF Service Area
Caldwell City Limits
Middleton City Limits
Star City Limits
% Change from 2020 to 2040
Decreased 1% to 10%
Changed less than 1%
Increased 1% to 50%
Increased 50% to 100%
Increased 50% to 200%
Increased more than 200%
2040 TAZ Population

Figure 3

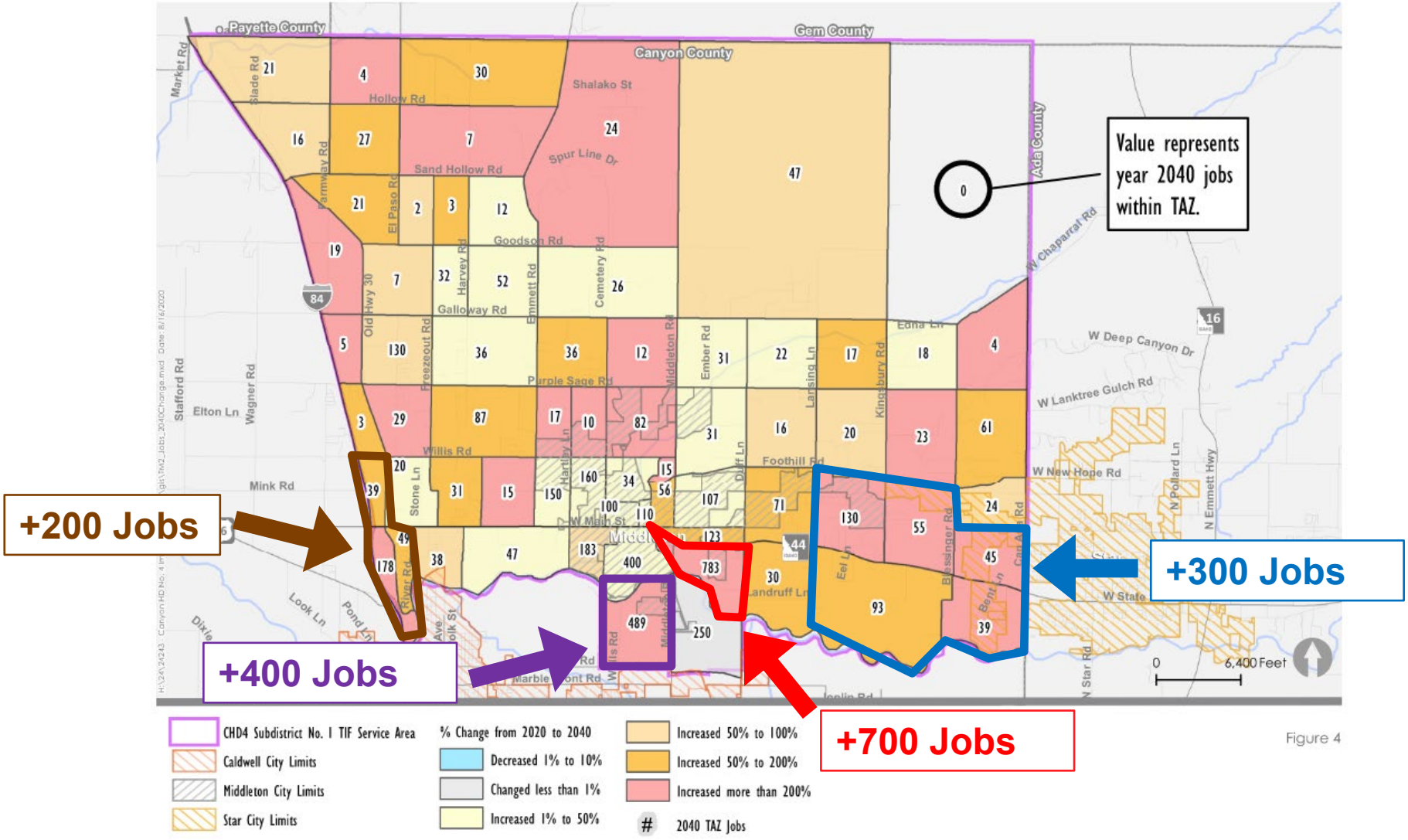


Figure 4

Year 2020 to 2040 Employment Change by TAZ
Canyon County, ID

PERFORMANCE MEASURES

KITTELSON & ASSOCIATES

Performance Measures

- Why are they important?
  - Used to monitor traffic operations and identify roadway facilities that require capacity improvements

- Level-of-Service (LOS)
  - Delay-based (average)
  - If the average driver waits at a stop sign for < 10 seconds, the intersection would be LOS “A”. If the average driver waits at a stop sign for > 1 minute, the intersection would be LOS “F”.

Performance Measures

Agency	Performance Measure
Canyon Highway District No. 4	**LOS D**
City of Middleton	LOS C
City of Star	**LOS D**
Ada County Highway District (ACHD)	LOS E (Roadways), **LOS D (Intersections)**
City of Nampa	**LOS D**
City of Caldwell	**LOS D**
Idaho Transportation Department (ITD)	**LOS D**

Performance Measures

- LOS D recommended
  - Consistent with current practice by CHD4 and Star
  - Consistent with other agencies in the Treasure Valley
  - Appropriate for rural area trending towards suburban
  - The measure can be calculated via Highway Capacity Manual (HCM) methodology

TRAFFIC OPERATIONS METHODOLOGY

KITTELSON & ASSOCIATES

Traffic Operations Methodology

- Analysis is used to identify roadway and intersection improvement projects in service area.
  - Created separate methodologies for roadways and intersections
  - Perform initial screening followed by detailed analysis
- Projects are incorporated in the Capital Improvement Plan (CIP).

Proposed Methodology for Roadways

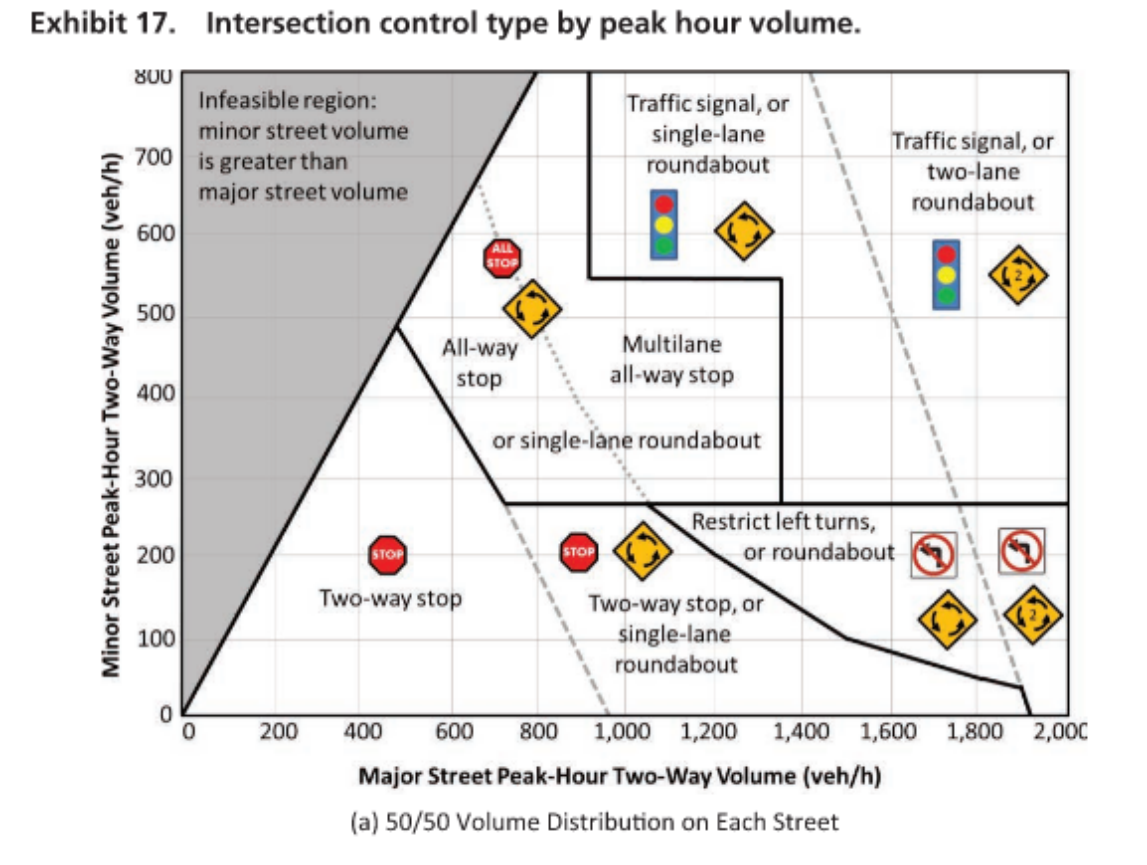
- **Step 1**: Determine peak-hour, directional roadway volumes (refer to table on next slide)
- **Step 2**: Compare roadway volumes with select thresholds (i.e., LOS D) and identify which roadways require widening
- **Step 3**: Develop list of roadway projects for inclusion in CIP

Proposed Roadway Volume Thresholds (Urbanized or Transitioning Areas)

Classification	Characteristics	# of Lanes per Direction	Directional Peak Hour Volume Thresholds	
			Urbanized Areas	Transitioning Areas
			LOS D	LOS D
Principal Arterial	Undivided with no LTL's	1	620	560
	Undivided with LTL's	1	790	720
		2	1,700	1,550
	Divided (Continuous LTL or Median)	1	840	760
		2	1,800	1,640
Minor Arterial	Undivided with no LTL's	1	530	480
	Undivided with LTL's	1	680	610
		2	1,390	1,240
	Divided (Continuous LTL or Median)	1	710	650
		2	1,470	1,310
Collectors	Undivided with no LTL's	1	340	310
	Undivided with LTL's	1	490	440
		2	980	880
	Divided (Continuous LTL or Median)	1	530	480
		2	1,060	950

Proposed Methodology for Intersections

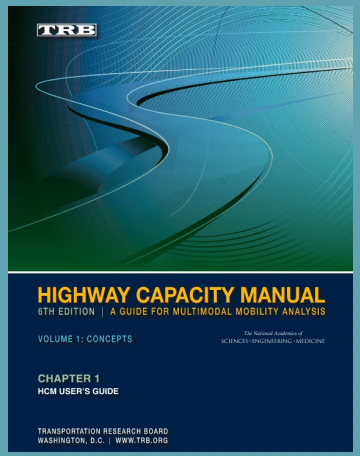
- **Step 1**: Initial screening of service area intersections with roadway volumes

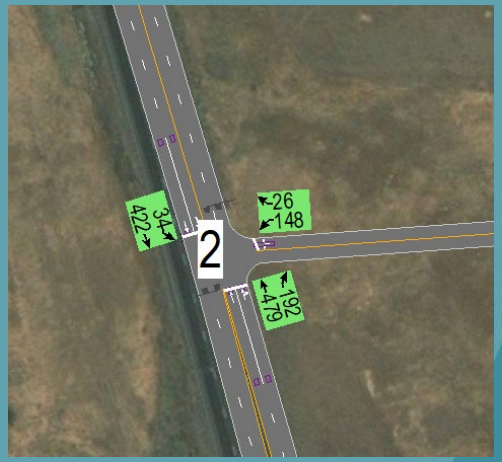


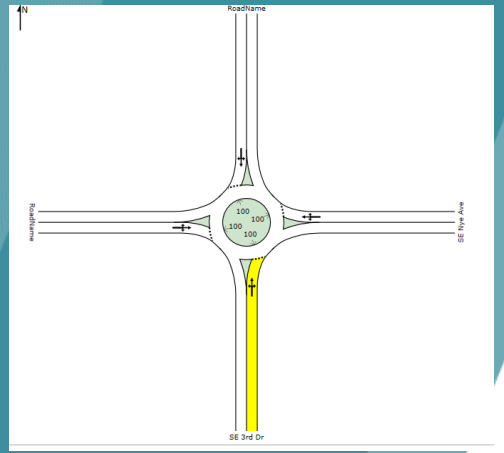
Source: Exhibit 17 from NCHRP Report 825

Proposed Methodology for Intersections

- **Step 2**: Identify intersections for further evaluation
- **Step 3**: Detailed evaluation of select intersections







- **Step 4**: Develop list of intersection projects for inclusion in CIP

PROPORTIONATE SHARE

Agency Proportionate Share

- Partner agencies collect TIFs for development in boundaries.
- Fees are put into separate accounts for Middleton, Star, and Canyon County.
- Fees are spent on projects by agencies within their jurisdictions based on prioritization.

- Advantages
  - Agencies have direct control on how fees are spent within their jurisdiction.
- Challenges
  - Agency may need to delay projects due to lack of funding within the agency impact fee fund.

NEXT STEPS

Next DIFAC Meeting

- Traffic Operations Findings
- Draft Project List for CIP
- Traffic Impact Fee Elements
  - Project Costs
  - Impact Fee Eligibility
  - Impact Fee Schedule

DATE **11/10/2020**

CHD4 SUBDISTRICT NO.1 TRAFFIC IMPACT FEE STUDY

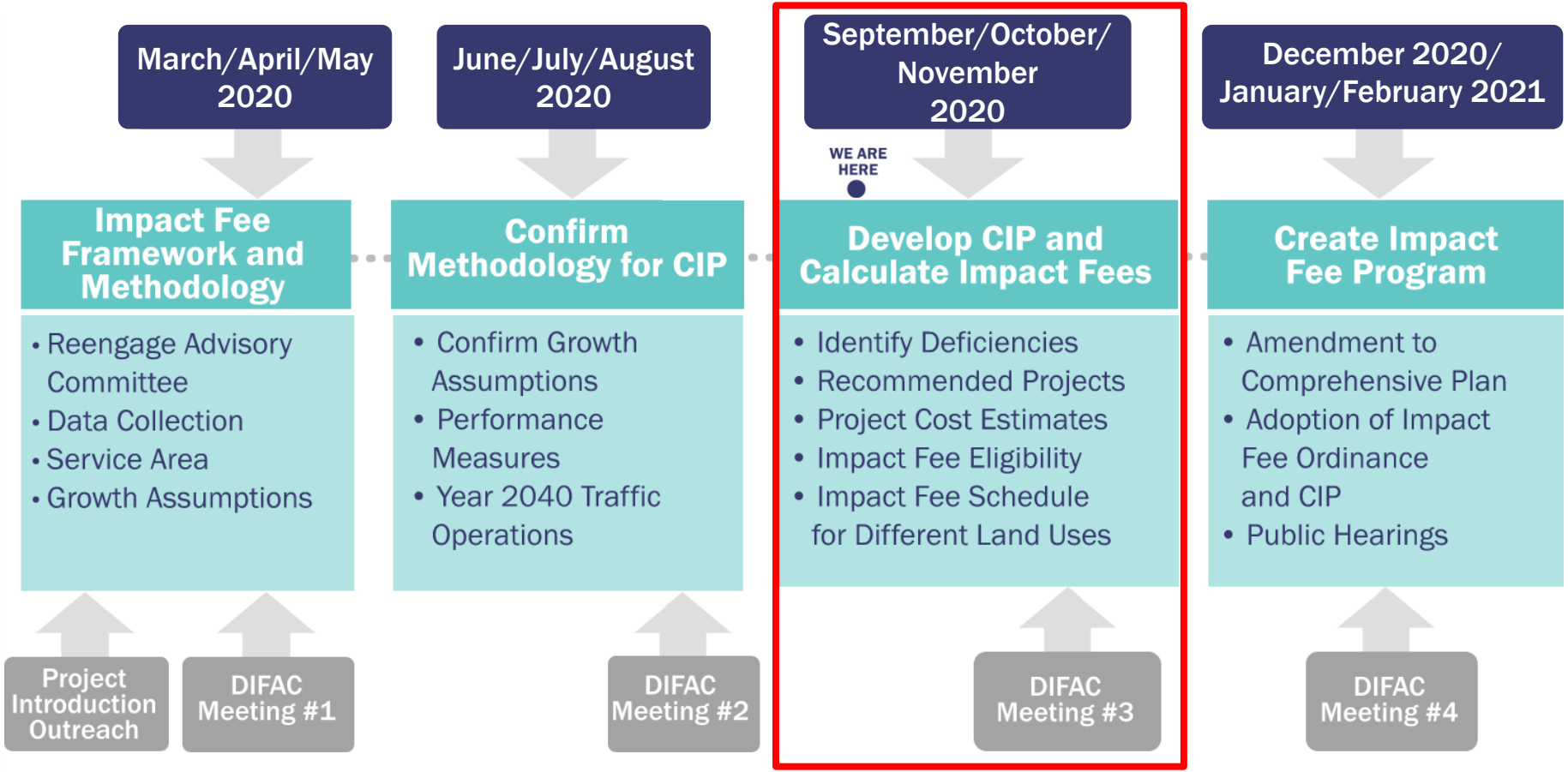
DEVELOPMENT IMPACT FEE ADVISORY COMMITTEE
MEETING #3: PRELIMINARY FINDINGS FOR CAPITAL IMPROVEMENT PLAN (CIP)

KITTELSON & ASSOCIATES

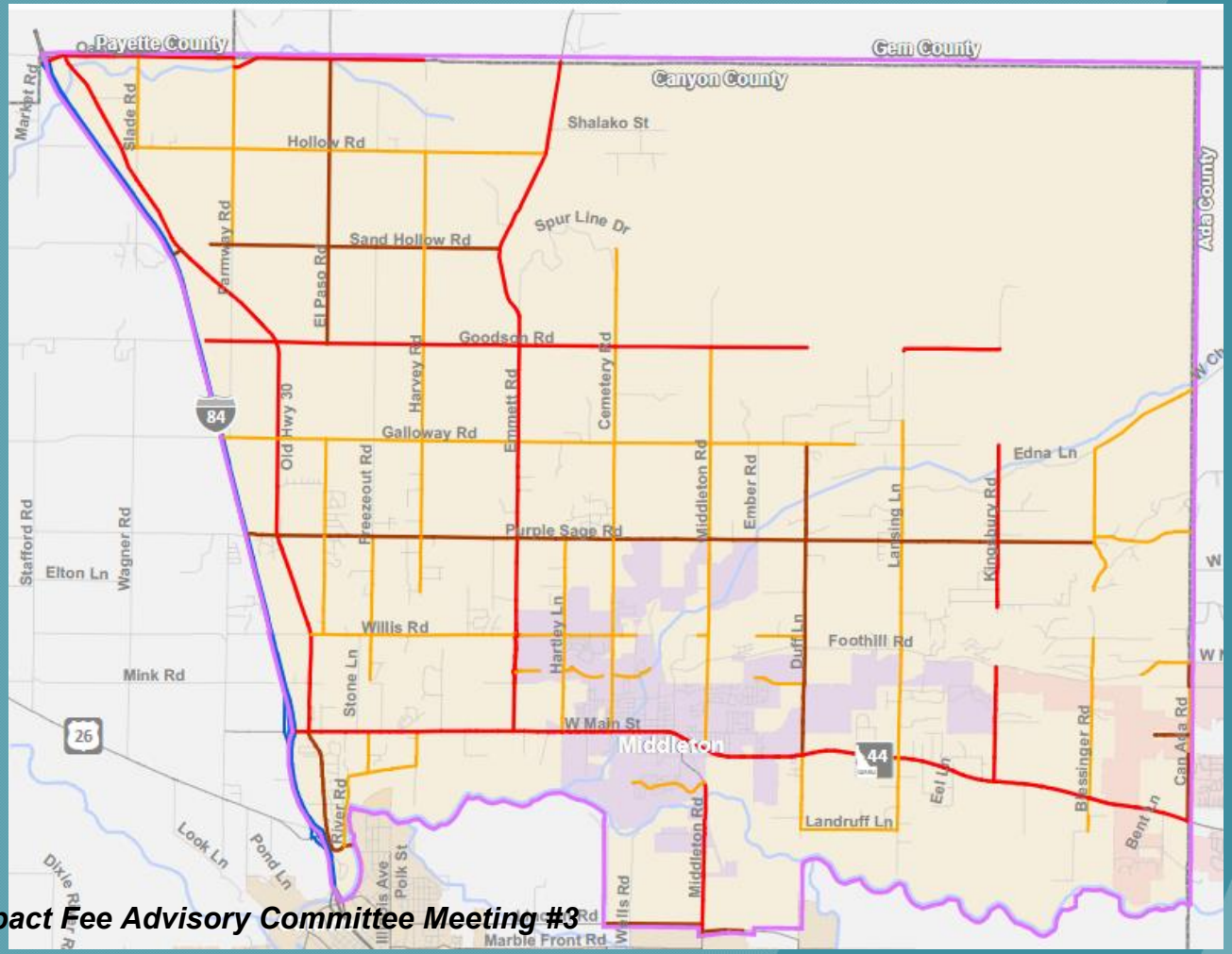
Meeting Purpose and Agenda

- Purpose
  - Review preliminary findings for Capital Improvement Plan (CIP)
  - Address questions from DIFAC
- Agenda
  - Study Schedule and Progress
  - Preliminary Findings for CIP
    - Traffic Operations Results
    - Draft Project List for CIP

Study Schedule



Service Area



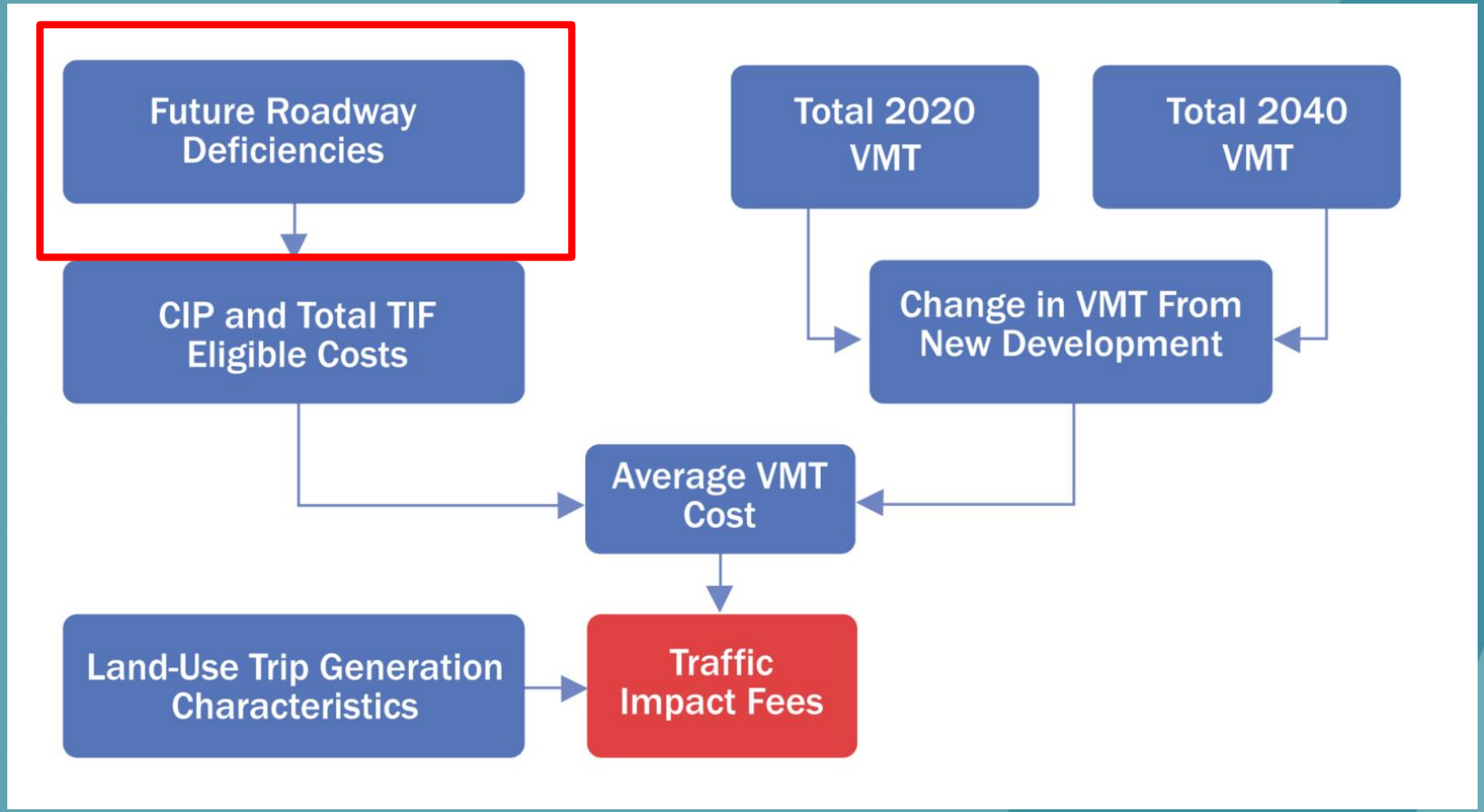
Refresher on Key Assumptions

- Population and Employment Estimate used in COMPASS Model

Jurisdiction	2040 Population	2040 Jobs
City of Middleton	27,528	4,003
City of Star (within Canyon County)	12,463	361
Unincorporated Canyon County	4,324	639
Total Service Area	**44,315 (117% from 2020)**	**5,004 (110% from 2020)**

- Performance Measure
  - **LOS D** for intersections and roadways
- Traffic Operations Analysis Approach
  - Applied roadway thresholds for LOS
  - Assessed intersection operations (initial screening -> detailed operations as needed)

Traffic Impact Fee Calculation Process



PRELIMINARY FINDINGS FOR CAPITAL IMPROVEMENT PLAN (CIP)

Development Impact Fee Advisory Committee Meeting #3

KITTELSON & ASSOCIATES

Methodology for Roadways

- **Step 1**: Determine peak-hour, directional roadway volumes (refer to table on next slide)
- **Step 2**: Compare roadway volumes with select thresholds (i.e., LOS D) and identify which roadways require widening
- **Step 3**: Develop list of roadway projects to address capacity deficiencies and to include in CIP

Step 1: Determine peak-hour, directional roadway volumes

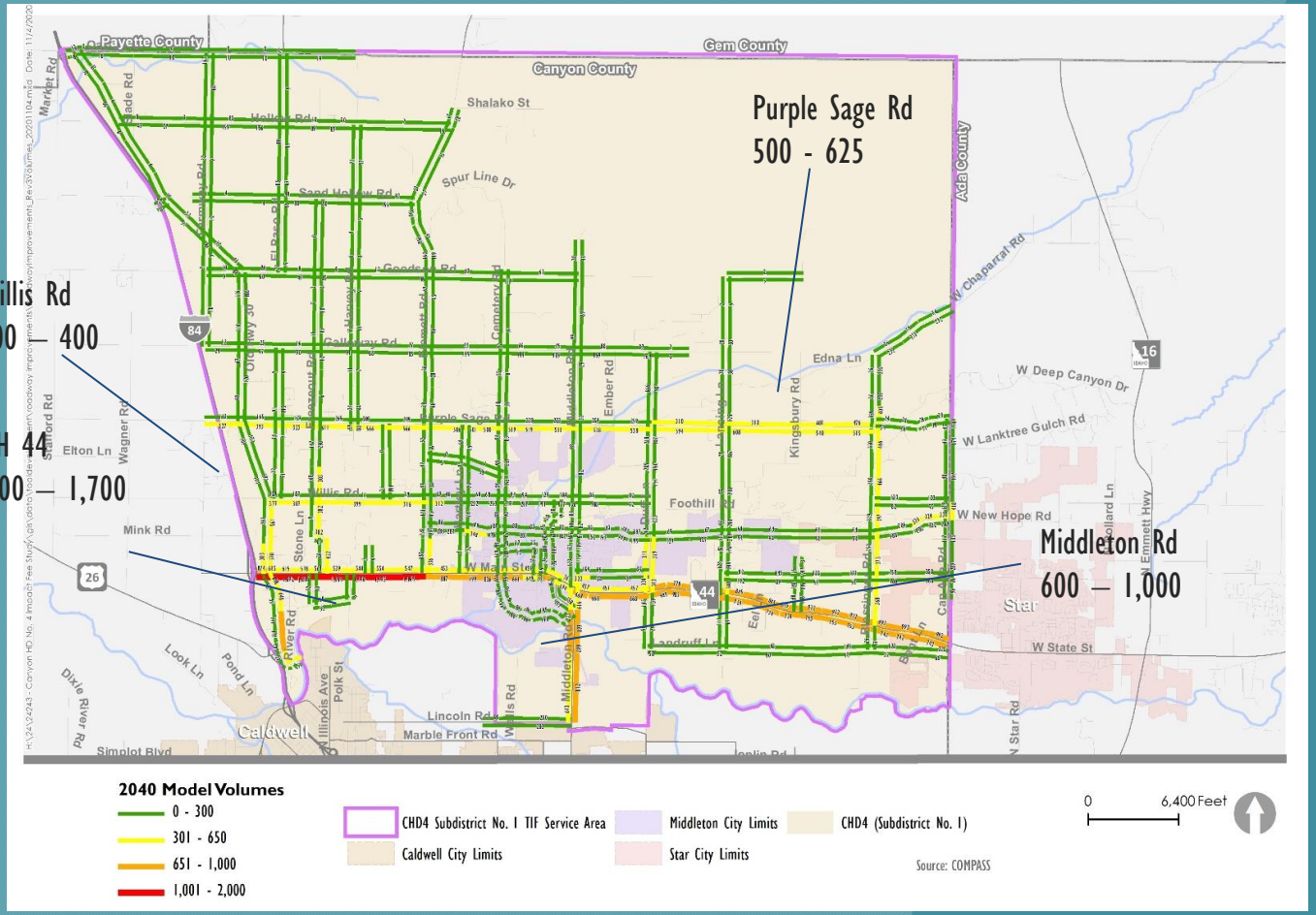
- COMPASS travel demand model output
  - Includes updated socioeconomics
  - Includes updated roadway network

CHD4_Peak40_Rev3

OBJECTID *	Shape *	A	B	DISTANCE	SPEED	COUNTY	FTYPE	DIRECTION	THRULANES	TTLLANES	ROAD	ROADDIR	PM_ID	STATE	HWYDIST	IMPACTFEE	V_1	VT_1	Shape_Length
2951	Polyline	376	5755	0.4318	25	2	14	2	1	2	Blessinger Rd	S	Ble1000015	0	2	21	35.66105	267.7825	2298.81437
2952	Polyline	376	6052	0.4019	25	2	14	2	1	2	Chaparral Rd	N	C41500001001	0	2	21	232.12144	267.7825	2096.349608
5628	Polyline	470	5688	0.6314	35	2	14	2	1	2	El Paso Rd	N	El 100005	0	2	21	70.62675	102.69737	3335.872176
5629	Polyline	470	5694	0.1288	40	2	14	2	1	2	Willis Rd	W	Wil100006	0	2	21	189.43236	566.65894	680.575767
5630	Polyline	470	10090	0.50764	40	2	14	2	1	2	Willis Rd	E	Wil100007	0	2	21	306.59982	463.96155	2682.485222
6421	Polyline	512	5129	0.5103	55	2	6	2	1	2	SH 44	W	SH440021301 1c	1	4	21	992.40381	1734.63367	2695.627327
6422	Polyline	512	7091	0.281	55	2	6	2	1	2	SH 44	E	SH440021301 1c	1	4	21	742.22992	1734.63367	1484.537612
6423	Polyline	512	5128	0.5103	55	2	6	2	1	2	SH 44	E	SH440021301 1c	1	4	21	742.22992	1734.63367	2695.627327
6424	Polyline	512	5130	0.2653	55	2	6	2	1	2	SH 44	W	SH440021301 1c	1	4	21	992.40381	1734.63367	1401.307103
6425	Polyline	513	5129	0.2653	55	2	6	2	1	2	SH 44	E	SH440021301 1c	1	4	21	742.22992	1734.63367	1401.307103
6426	Polyline	513	7301	0.3279	55	2	6	2	1	2	SH 44	W	SH440021301 1b	1	4	21	921.81665	1675.04077	1732.163133
6427	Polyline	513	10977	0.3193	45	2	18	2	1	2	Blessinger	S	Ble100001	0	2	21	76.30397	172.95465	1686.725772
6428	Polyline	513	11165	0.65357	45	2	11	2	1	2	Blessinger	N	Ble100002	0	2	21	367.59	633.25189	3453.05916
6429	Polyline	513	5132	0.3238	55	2	6	2	1	2	SH 44	W	SH440021301 1b	1	4	21	921.81665	1675.04077	1710.473823
6430	Polyline	513	7301	0.3573	55	2	6	2	1	2	SH 44	E	SH440021301 1b	1	4	21	753.22412	1675.04077	1887.390374
6431	Polyline	513	5131	0.3238	55	2	6	2	1	2	SH 44	E	SH440021301 1b	1	4	21	753.22412	1675.04077	1710.473823
6432	Polyline	513	5133	0.2329	55	2	6	2	1	2	SH 44	W	SH440021301 1a	1	4	21	845.05145	1569.37683	1230.59554

1 (0 out of 712 Selected)

Roadway Segment Volumes
(Year 2040 Weekday PM Peak Hour)



Step 2: Compare roadway volumes with select thresholds (i.e., LOS D) and identify which roadways require widening

Classification	Characteristics	# of Lanes per Direction	Directional Peak Hour Volume Thresholds	
			Urbanized Areas	*Transitioning Areas*
Principal Arterial	Undivided with no LTL's	1	620	560
	Undivided with LTL's	1	790	720
		2	1,700	1,550
	Divided (Continuous LTL or Median)	1	840	760
		2	1,800	1,640
Minor Arterial	Undivided with no LTL's	1	530	480
	Undivided with LTL's	1	680	610
		2	1,390	1,240
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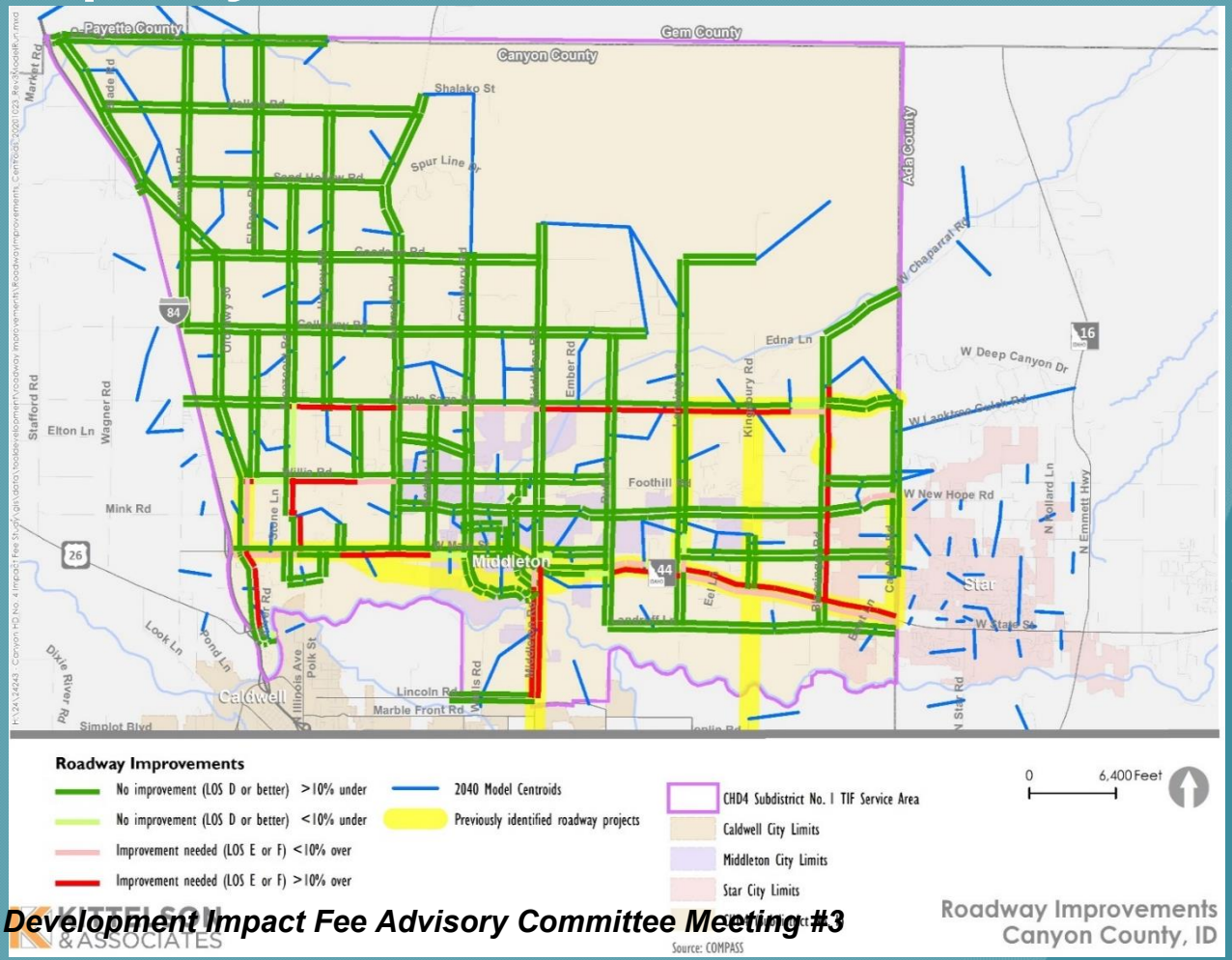
		2	1,470	1,310
Collectors	Undivided with no LTL's	1	340	310
	Undivided with LTL's	1	490	440
		2	980	880
	Divided (Continuous LTL or Median)	1	530	480
		2	1,060	950

Step 3: Develop list of roadway projects to address capacity deficiencies and to include in CIP



- East-West Roadways (LOS E/F)
  - Purple Sage Road
  - Willis Road
  - Foothill Road
  - SH 44 (ITD facility)
- North-South Roadways (LOS E/F)
  - Old Highway 30
  - Freezeout Road
  - Middleton Road
  - Lansing Lane
  - Blessinger Road
- New Roadway Connections
  - 9th Street
  - Cornell Road
  - Willis Road
  - Blessinger Road
  - Cemetery-Sawtooth
  - Ranch Road
  - Meadow Park
  - Landruff Lane

Road	From	To	Analysis Improvement	Previously Identified Project	Volume Range and Threshold	Notes
Identified in Current Analysis + Previously Identified Projects						
Middleton Rd	Lincoln Rd	SH44	Widen to 4 lanes; either LTLs at intersections or divided	Widen to 4 lanes, divided (Ustick Rd to SH44)	Vol. Range: 527 – 899 Threshold Range: 490 – 620	Widening to 3 lanes would almost increase threshold (840 meet PM peak hour volume (899).
Lansing Ln	SH44	Cornell St	Add turn lanes at intersections	Widen to 5 lanes (SH44 to Purple Sage Rd)	Volume: 340 Threshold: 310	Volume is close to turn lane threshold (<10%) between Co and 9th St. Consider extending project north to 9th St .
Old Highway 30	SH44	Willis Rd	Add turn lanes at intersections or continuous left turn lane	Add continuous left turn lane	Vol. Range: 561 – 570 Threshold: 560	Widening to 3 lanes would almost increase threshold (840 PM peak hour volume (873).
Purple Sage Rd	Lansing Ln	Blessinger Rd	Add turn lanes at intersections or continuous left turn lane	Widen to 5 lanes (Lansing Ln to Can Ada Rd)	Vol. Range: 515 – 608 Threshold: 480	
Identified in Current Analysis (NOT previously identified)						
Blessinger Rd	SH44	North of Purple Sage Rd	Add continuous left turn lane or widen to 4 lanes with turn lanes at intersections	---	Vol. Range: 368 – 466 Threshold: 310	
Foothill Rd	West of Can Ada Rd	Can Ada Rd	Add turn lanes at intersections	---	Volume: 324 Threshold: 310	PM peak hour volume (324) just above threshold (310) for segment. Likely needs turn lane at 1or 2 intersections.
Freezeout Rd	SH44	Willis Rd	Add turn lanes at intersections or continuous left turn lane	---	Vol. Range: 382 – 422 Threshold: 310	
Willis Rd	Old Highway 30	Emmett Rd	Add turn lanes at intersections or continuous left turn lane	---	Vol. Range: 307 – 399 Threshold: 310	
Old Highway 30	Highway 26	SH44	Widen to 4 lanes; either LTLs at intersections or divided	---	Vol. Range: 648 – 709 Threshold: 480	
Purple Sage Rd	Freezeout Rd	Lansing Ln	Add turn lanes at intersections or continuous left turn lane	---	Vol. Range: 500 – 611 Threshold: 480	Adding turn lanes at intersections will provide enough capa since this seems to serve as the primary E-W connector, v consider widening to 3 lanes
Previously Identified (NOT Identified in Current Analysis)						
Lansing Ln	9th Street	Purple Sage Road	---	Widen to 5 lanes	Vol. Range: 79 – 284 Threshold Range: 310 – 340	PM Peak Hour volume is 210. Threshold for turn lanes at intersections is 440
Kingsbury Rd	SH 44	Purple Sage Road	---	Widen to 5 lanes	Vol. Range: 3 – 196 Threshold: 560	PM Peak Hour volume is 196. Threshold for turn lanes at intersections is 440.
Can Ada Rd	SH 44	New Hope Rd	---	Add turn lanes	Vol. Range: 81 – 289 Threshold: 530	PM Peak Hour volume is 289. Threshold for turn lanes at intersections is 440
Purple Sage Rd	Blessinger Rd	Can Ada Rd	---	Widen to 5 lanes	Vol. Range: 24 – 34 Threshold: 310	PM Peak Hour volume is 34. Threshold for turn lanes at intersections is 440. PM Peak Hour volume likely low.

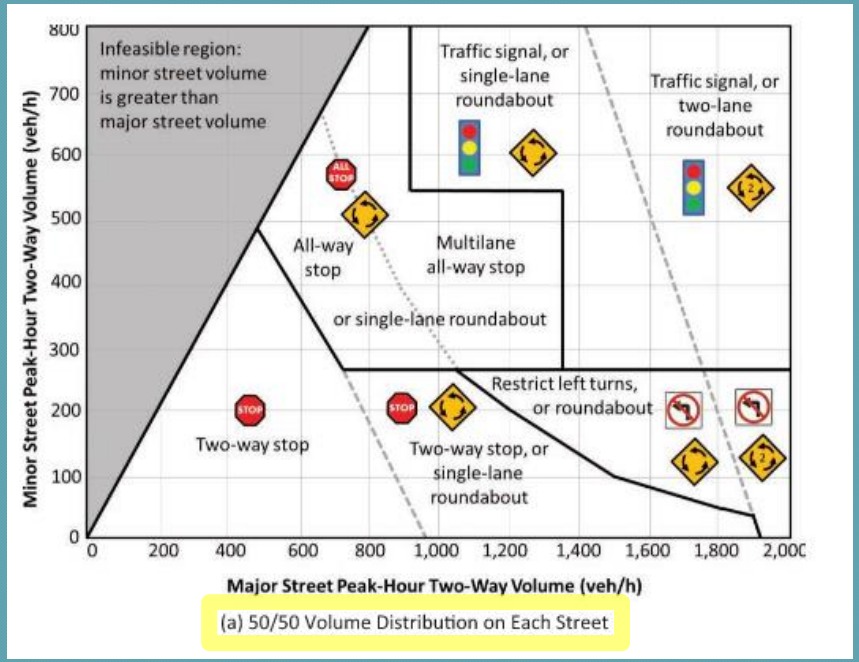
Notes:
All roadways currently exist as 3-lane cross-sections
SH44 is previously identified for widening; portions are also identified in current analysis but are not included in this table

Methodology for Intersection Analysis

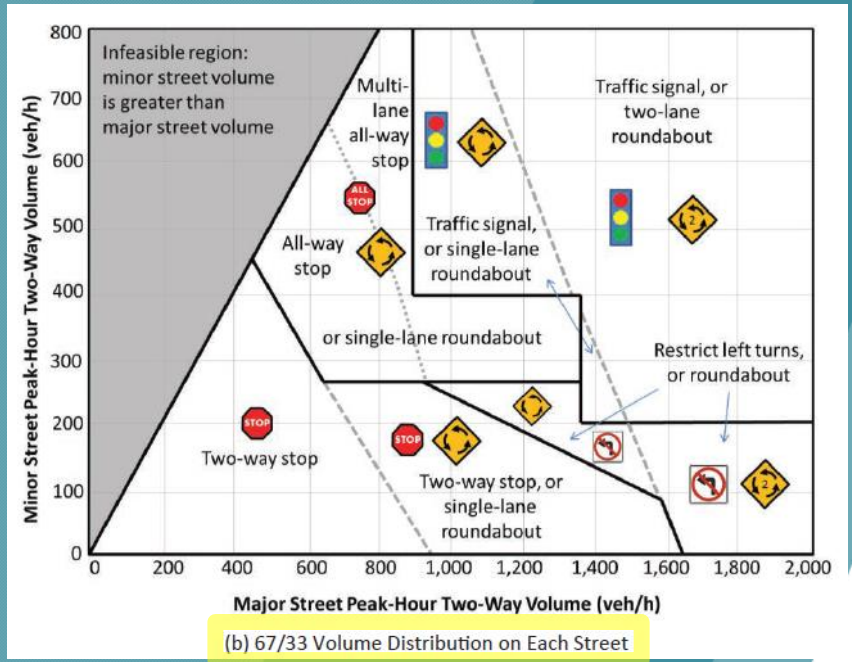
- **Step 1**: Initial screening of service area intersections with roadway volumes
- **Step 2**: Identify intersections for further evaluation

- **Step 3**: Detailed evaluation of select intersections
- **Step 4**: Develop list of intersection projects for inclusion in CIP

Step 1: Initial screening of service area intersections with roadway volumes



(a) 50/50 Volume Distribution on Each Street



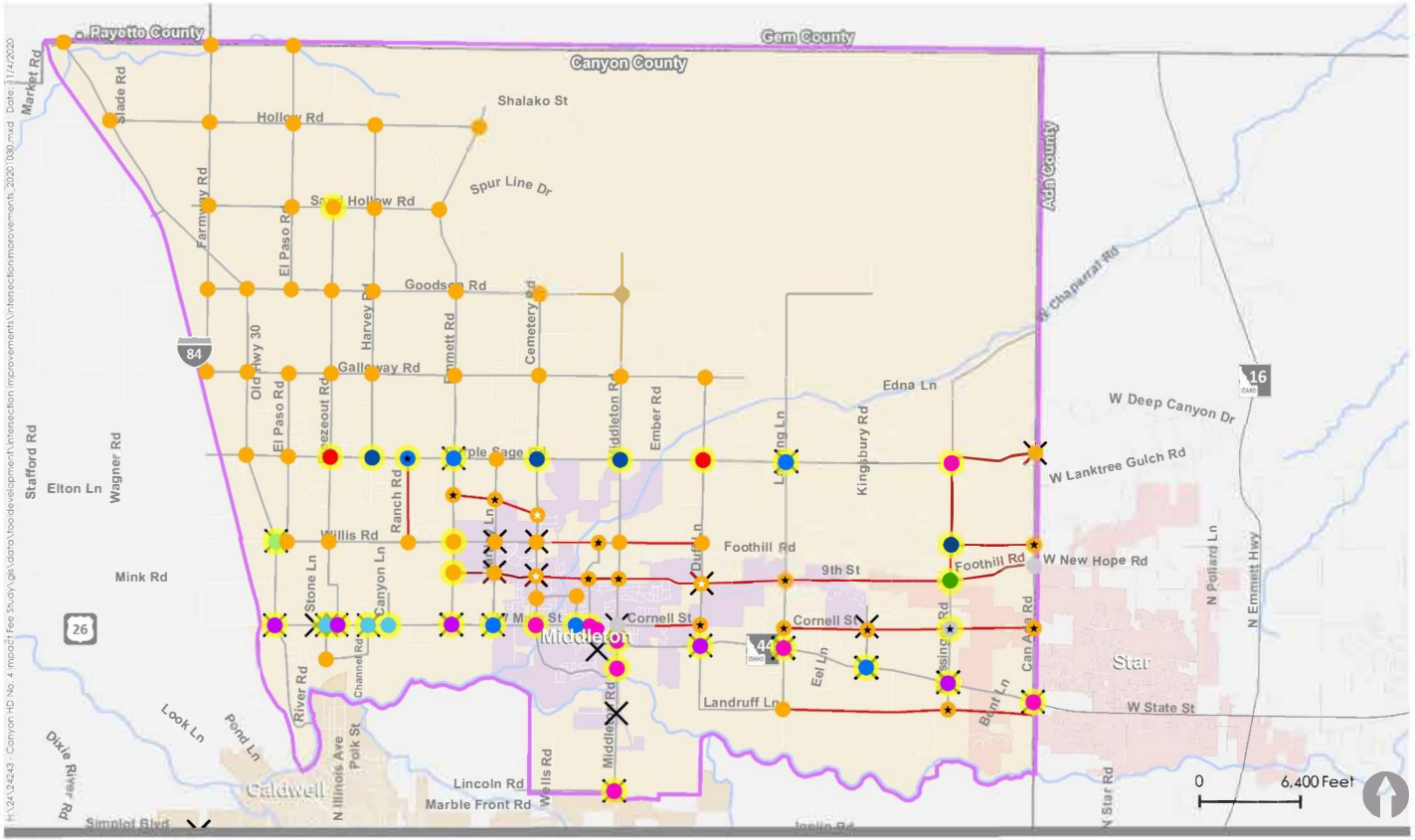
(b) 67/33 Volume Distribution on Each Street

Source: Exhibit 17. Intersection Control Type by Peak Hour Volume from National Cooperative Highway Research Program (NCHRP) Report 825

Step 1: Initial screening of service area intersections with roadway volumes (cont.)

- Identified 97 intersections for screening
  - 92 two-way stop control (TWSC)
  - 2 all-way stop control (AWSC)
  - 2 multi-lane roundabouts
  - 1 signal

- 31 of 97 intersections require a change from TWSC.
  - 3 future intersections
  - 16 intersections along SH44 (ITD facility)



Required Control Types

- Two-Way Stop Control
- All-Way Stop Control
- Multi-Lane All-Way Stop Control
- Two-Way Stop Control or Single-Lane Roundabout
- All-Way Stop Control or Single-Lane Roundabout
- Multilane All-Way Stop Control or Single-Lane Roundabout
- Restricted Left Turn or Roundabout
- Single-Lane Roundabout
- Single-Lane Roundabout or Signal
- Restricted Left Turn or Two-Lane Roundabout (None)
- Signal or Two-Lane Roundabout
- Future Intersection
- Future Leg
- Change in Control Type
- Previously Identified Intersection Project
- COMPASS Network Additions
- COMPASS Network

Source: COMPASS

- CHD4 TIF Service Area
- Caldwell City Limits
- Middleton City Limits
- Star City Limits
- CHD4 (Subdistrict No. 1)

High Level Intersection Screening
Canyon County, ID

Intersection	Existing Control Type	Required Control Type (Current Analysis)	Previously Identified Improvement	Total Entering Volume	Further Analysis	Comments
Identified in Current Analysis + Previously Identified Projects						
Lansing Ln & Purple Sage Rd	Two-Way Stop Control	Single-Lane Roundabout	Unknown	1,149	NO	
Old Hwy 30 & Willis Rd	Two-Way Stop Control	Multi-Lane All-Way Stop Control	Signal/Roundabout	861	YES	Approaching threshold for traffic signal or single-lane roundabout
Old Hwy 30 & SH 44	Two-Way Stop Control	Traffic Signal or Two-Lane Roundabout	Signal	3,169	YES	Close proximity to I-84 ramp intersections
River Rd & SH 44	Two-Way Stop Control	Restricted Left Turn or Roundabout	RCUT	2,195	YES	Low minor street volume (50 vehicles/hour)
Freezeout Rd & SH 44	Two-Way Stop Control	Traffic Signal or Two-Lane Roundabout	RCUT	2,148	YES	
Channel Rd & SH 44	Two-Way Stop Control	Restricted Left Turn or Roundabout	Unknown	1,715	YES	Low minor street volume (<50 vehicles/hour)
Emmett Rd & SH 44	Two-Way Stop Control	Traffic Signal or Two-Lane Roundabout	Unknown	1,770	YES	
Hartley Rd & SH 44	Two-Way Stop Control	Single-Lane Roundabout	Add left turn lane	1,384	YES	
Duff Ln & SH 44	Two-Way Stop Control	Traffic Signal or Two-Lane Roundabout	RCUT	1,930	YES	
Lansing Ln & SH 44	Two-Way Stop Control	Traffic Signal or Single-Lane Roundabout	RCUT	1,864	YES	
Kingsbury Ln & SH 44	Two-Way Stop Control	Single-Lane Roundabout	RCUT	1,794	YES	Approaching threshold for two-lane roundabout or traffic signal
Blessinger Rd & SH 44	Two-Way Stop Control	Traffic Signal or Two-Lane Roundabout	RCUT	2,108	YES	
Can Ada Rd & SH 44	Two-Way Stop Control	Single-Lane Roundabout or Traffic Signal	RCUT (CHD4); Signal (City of Star)	867	YES	
Middleton Rd & Lincoln Rd	Two-Way Stop Control	Traffic Signal or Single-Lane Roundabout	Roundabout	954	NO	
Emmett Rd & Purple Sage Rd	Two-Way Stop Control	Single-Lane Roundabout	Signal/Roundabout	835	NO	Volumes manually adjusted to match existing volumes

Intersection	Existing Control Type	Required Control Type (Current Analysis)	Previously Identified Improvement	Total Entering Volume	Further Analysis	Comments
Identified in Current Analysis (NOT previously identified)						
Freezeout Rd & Purple Sage Rd	Two-Way Stop Control	Multi-Lane All-Way Stop Control or Single-Lane Roundabout	---	911	NO	
Harvey Rd & Purple Sage Rd	Two-Way Stop Control	Two-Way Stop Control or Single-Lane Roundabout	---	895	YES	
Ranch Rd & Purple Sage Rd[1]	Two-Way Stop Control	Single-Lane Roundabout	---	775	NO	
Cemetery Rd & Purple Sage Rd	Two-Way Stop Control	Two-Way Stop Control or Single-Lane Roundabout	---	851	YES	
Middleton Rd & Purple Sage Rd	Two-Way Stop Control	Two-Way Stop Control or Single-Lane Roundabout	---	892	YES	
Duff Ln & Purple Sage Rd	Two-Way Stop Control	Multi-Lane All-Way Stop Control or Single-Lane Roundabout	---	1,161	NO	
Blessinger Rd & Purple Sage Rd	Two-Way Stop Control	Traffic Signal or Single-Lane Roundabout	---	806	NO	
Blessinger Rd & Willis Rd[1]	Two-Way Stop Control	Two-Way Stop Control or Single-Lane Roundabout	---	777	YES	Potential topographical constraints for roundabout
Blessinger Rd & Foothill Rd	Two-Way Stop Control	All-Way Stop Control or Single-Lane Roundabout	---	589	NO	Potential topographical constraints for roundabout
Canyon Ln & SH 44	Two-Way Stop Control	Restricted Left Turn or Roundabout	---	1,729	YES	Low minor street volume (<50 vehicles/hour)
Cemetery Rd & SH 44	Two-Way Stop Control	Traffic Signal or Single-Lane Roundabout	---	1,544	YES	
Hawthorne Dr & SH 44	Two-Way Stop Control	Single-Lane Roundabout	---	1,267	YES	
Dewey Ave & SH 44	Two-Way Stop Control	Traffic Signal or Single-Lane Roundabout	---	1,366	YES	
Middleton Rd & SH 44	Two-Way Stop Control	Single-Lane Roundabout or Traffic Signal	---	1,965	NO	
Blessinger Rd & Cornell St[1]	Two-Way Stop Control	All-Way Stop Control	---	932	NO	
Middleton Rd & Sawtooth Lake Dr	Two-Way Stop Control	Traffic Signal or Single-Lane Roundabout	---	1,692	NO	

Intersection	Existing Control Type	Required Control Type (Current Analysis)	Previously Identified Improvement	Total Entering Volume	Further Analysis	Comments
Previously Identified Projects (NOT identified in current analysis)						
Can Ada Rd & Purple Sage Rd	Two-Way Stop Control	Two-Way Stop Control	Unknown	140	NO	
Hartley Ln & Willis Rd	Two-Way Stop Control	Two-Way Stop Control	Roundabout	103	NO	
Cemetery Rd & Willis Rd	Two-Way Stop Control	Two-Way Stop Control	Roundabout	283	NO	
Hartley Ln & 9th St	Two-Way Stop Control	Two-Way Stop Control	Roundabout	349	NO	
Cemetery Rd & 9th St	Two-Way Stop Control	Two-Way Stop Control	Roundabout	292	NO	
Duff Ln & 9th St	Two-Way Stop Control	Two-Way Stop Control	Roundabout	665	NO	
Middleton Rd & Cornell St	All-Way Stop Control	All-Way Stop Control	Roundabout	702	NO	
Kingsbury Rd & Cornell St	Two-Way Stop Control	Two-Way Stop Control	Roundabout	509	NO	
Stone Ln & SH44[2]	Two-Way Stop Control	---	RCUT	N/A	NO	
Middleton Rd & River St[2]	---	---	Roundabout	N/A	NO	
Middleton Rd & Bass Ln[2]	Two-Way Stop Control	---	Roundabout	N/A	NO	
Intersections approaching improvement thresholds (NOT previously identified or identified in current analysis)						
Can Ada Rd & Cornell St	Two-Way Stop Control	Two-Way Stop Control	---	550	NO	Approaching threshold for all-way stop control
Freezeout Rd & Willis Rd	Two-Way Stop Control	Two-Way Stop Control	---	868	NO	Approaching threshold for all-way stop control

[1] Future intersection

[2] Intersection not in analysis

Step 2: Identify intersections for further evaluation

- Intersections for detailed analysis
  - Old Hwy 30 & Willis Rd
  - Old Hwy 30 & SH 44
  - River Rd & SH 44
  - Freezeout Rd & SH 44
  - Channel Rd & SH 44
  - Emmett Rd & SH 44
  - Hartley Rd & SH 44
  - Duff Ln & SH 44
  - Lansing Ln & SH 44
  - Kingsbury Ln & SH 44
  - Blessinger Rd & SH 44
  - Can Ada Rd & SH 44
  - Canyon Ln & SH 44
  - Cemetery Rd & SH 44
  - Hawthorne Dr & SH 44
  - Dewey Ave & SH 44
  - Harvey Rd & Purple Sage Rd
  - Cemetery Rd and Purple Sage Rd
  - Middleton Rd and Purple Sage Rd
  - Blessinger Rd & Willis Rd

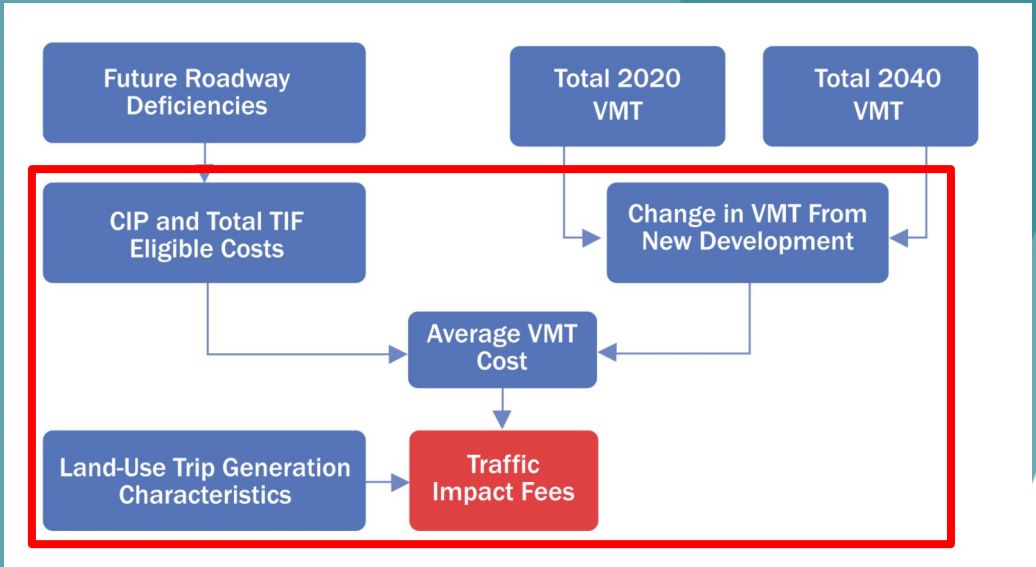
- Items for further evaluation?
  1. Intersection control types (Signal, roundabout, RCUT, or other) for SH 44
     - Checking with ITD and agency partners
  2. Active design projects at any of the intersections
     - Checking with agency partners
  3. Intersection control type preference between signal and roundabout?
     - Roundabout is the default per agency partner discussion.

NEXT STEPS

KITTELSON & ASSOCIATES

Next DIFAC Meeting (~Jan 2021)

- Prepare draft CIP
  - Refine project list
  - Develop cost estimates
  - Identify impact-fee eligibility criteria
- Prepare TIF program
  - Document methodology
  - Summarize traffic impact fees by land use



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Canyon Highway District No. 4 Traffic Impact Fee Study

DIFAC Meeting #3 – Preliminary CIP Findings

November 10, 2020 – 3:00-4:30 PM

Virtual Meeting

DRAFT MEETING NOTES

In Attendance: Chris Hopper, CHD4
Bruce Bayne, City of Middleton
Michael Keyes, City of Star
Tricia Nilsson, Canyon County
Andy Daleiden, KAI
Mark Heisinger, KAI
Andrew McIntyre, KAI
Brett Bishop
John Carpenter
John Tensen
Jon Turnipseed
Spencer Kofoed
Trevor Chadwick
Zach Wesley

Action items are highlighted in **bold text**.

SCHEDULE

- January Goal: Present recommended CIP and impact fee schedule to DIFAC

PRELIMINARY CIP FINDINGS

- Roadway map shows which roadway volumes are above the threshold for LOS D and require improvements (widening or turn lanes at intersections)
- Intersection map represents minimum control type at intersections - determined by an initial screening
  - Intersections that have different options for control type (i.e., could function as signal or roundabout), or are close to the threshold for requiring a different control type, will be evaluated further
- Canyon County: Are new roadways represented on functional classification map?
  - Chris: Yes, most of them
- Would widening of state highways in the model make a difference?

- Not necessarily - model volumes are using roadways like Purple Sage to travel to SH 44 and other regional highways
- How did we determine SH 44 intersections, any direction from ITD?
  - We are still looking into this and coordinating with partner agency - traffic signals will be default
  - We will consider restricting right-turns at some intersections on SH 44
- City of Star intention is to connect Floating Feather to where we show Cornell
  - Star and Middleton/CHD4 to connect internally
- CHD4 to send a follow-up after meeting regarding protocol and deadline for comments
  - **Comments by 11/24 would be most helpful**
- Next meeting will be first or second week of January
- - Do our plans fit ITD's construction plans?
  - One of our action items is to understand intersection control and SH 44 assumptions, including ITD's schedule
- What are ramifications between roundabouts and traffic signals?
  - Roundabouts have much higher safety benefits, and can also have operations benefits, depending on traffic volumes
  - The more info about traffic signals vs. roundabout would be great
- Alternate route beyond Middleton could also affect this section of SH 44
- CIP will be given to COMPASS after adoption

NEXT STEPS

- January Goal: Present recommended CIP and impact fee schedule to DIFAC
- **Kittelson to look into COMPASS model issues and update findings**
  - Purple Sage (Can Ada to Blessinger)
    - Existing volume is 1410/day, model is showing ~400/day
  - CHD4 has identified 14 segments that are mostly lower than existing data
    - More vehicles utilizing Blessinger than Can Ada
      - Blessinger speed is too high
    - Model is showing main connection from Canyon to Gem through Farmway, Emmett is probably main connection
    - Goodson Road volumes are low, especially west of Emmett
    - Old Hwy 30 is low, especially between purple sage and willis

ACTION ITEMS

- **Kittelson to look into COMPASS model issues and update findings**
- **CHD4 to reach out to ITD and see if they have updated plans for SH 44 intersection treatments**
- **DIFAC to provide comments on preliminary CIP findings and send to CHD4 by 11/24**

APPENDIX B:

Capital Improvement Plan Requirements

Table B-1. CIP Requirements

Requirement	How the Requirement is Addressed in the CIP
(a) A general description of all existing public facilities and their existing deficiencies within the service area or areas of the governmental entity and a reasonable estimate of all costs and a plan to develop the funding resources related to curing the existing deficiencies including, but not limited to, the upgrading, updating, improving, expanding or replacing of such facilities to meet existing needs and usage;	Existing roadway facilities are described in the Existing Service Network. Existing roadway and intersection deficiencies were identified in a capacity analysis and discussed in Existing Capacity & Deficiencies. Costs and revenue sources are discussed on page 35.
(b) A commitment by the governmental entity to use other available sources of revenue to cure existing system deficiencies where practical;	CHD4, Star, and Middleton by adoption of this Capital Improvement Plan commit to using revenue sources other than development impact fees to cure existing system deficiencies, where practical. See page 4.
(c) An analysis of the total capacity, the level of current usage, and commitments for usage of capacity of existing capital improvements, which shall be prepared by a qualified professional planner or by a qualified engineer licensed to perform engineering services in this state;	Total capacity on roadway and intersections in the service area was analyzed for existing and year 2040 conditions. Traffic volumes for existing and year 2040 conditions were developed via the COMPASS travel demand model. The analysis methodology is explained in Performance Measures & Traffic Operations, and the results are summarized in Existing Capacity and Deficiencies.
(d) A description of the land use assumptions by the government entity;	Land use assumptions were reviewed with the Development Impact Fee Advisory Committee and developed in coordination with COMPASS to appropriately reflect existing and future transportation conditions. A detailed discussion of land use assumptions is included in the section on Land Use.
(e) A definitive table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of system improvements and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial, agricultural and industrial;	This analysis uses a performance measure of LOS D for roadways and intersections. Definitions of the level of service performance measure and traffic operations methodology are discussed in Performance Measures beginning on page 13.
(f) A description of all system improvements and their costs necessitated by and attributable to new development in the service area based on the approved land use assumptions, to provide a level of service not to exceed the level of service adopted in the development impact fee ordinance;	Future deficiencies attributable to new development were identified through the traffic operations analysis on roadways and intersection within the service area. Projects necessary to address the deficiencies created by new growth and development are detailed in the Project List.

(g) The total number of service units necessitated by and attributable to new development within the service area based on the approved land use assumptions and calculated in accordance with generally accepted engineering or planning criteria;	Traffic volumes on service area roadway facilities were calculated for existing and year 2040 conditions based on land use assumptions approved by the DIFAC. The change in traffic volumes between existing and year 2040 conditions reflects traffic volumes attributable to new development. See 2040 Capacity & Deficiencies.
(h) The projected demand for system improvements required by new service units projected over a reasonable period of time not to exceed twenty (20) years;	Level of service was determined for each roadway and intersection using methodologies outlined in the HCM and NCHRP reports. Features that exceeded the performance measure of LOS D were identified as deficient. Traffic operations methodology is discussed in the Performance Measures section beginning on page 13; Existing and future deficiencies are identified in the Roadway & Intersection Deficiencies section beginning on page 20.
(i) Identification of all sources and levels of funding available to the governmental entity for the financing of the system improvements;	See Funding Sources.
(j) If the proposed system improvements include the improvement of public facilities under the jurisdiction of the state of Idaho or another governmental entity, then an agreement between governmental entities shall specify the reasonable share of funding by each unit, provided the governmental entity authorized to impose development impact fees shall not assume more than its reasonable share of funding joint improvements, nor shall the agreement permit expenditure of development impact fees by a governmental entity which is not authorized to impose development impact fees unless such expenditure is pursuant to a developer agreement under section 67-8214, Idaho Code; and	See Intergovernmental Agreements.
(k) A schedule setting forth estimated dates for commencing and completing construction of all improvements identified in the capital improvements plan.	The CIP Project list (page 32 to 34) assigns 5-year timeframes to each project based on project priority and funding availability.

APPENDIX C:

Population and Employment Maps (2020)

Figure C-1. Year 2020 Population by Traffic Analysis Zone

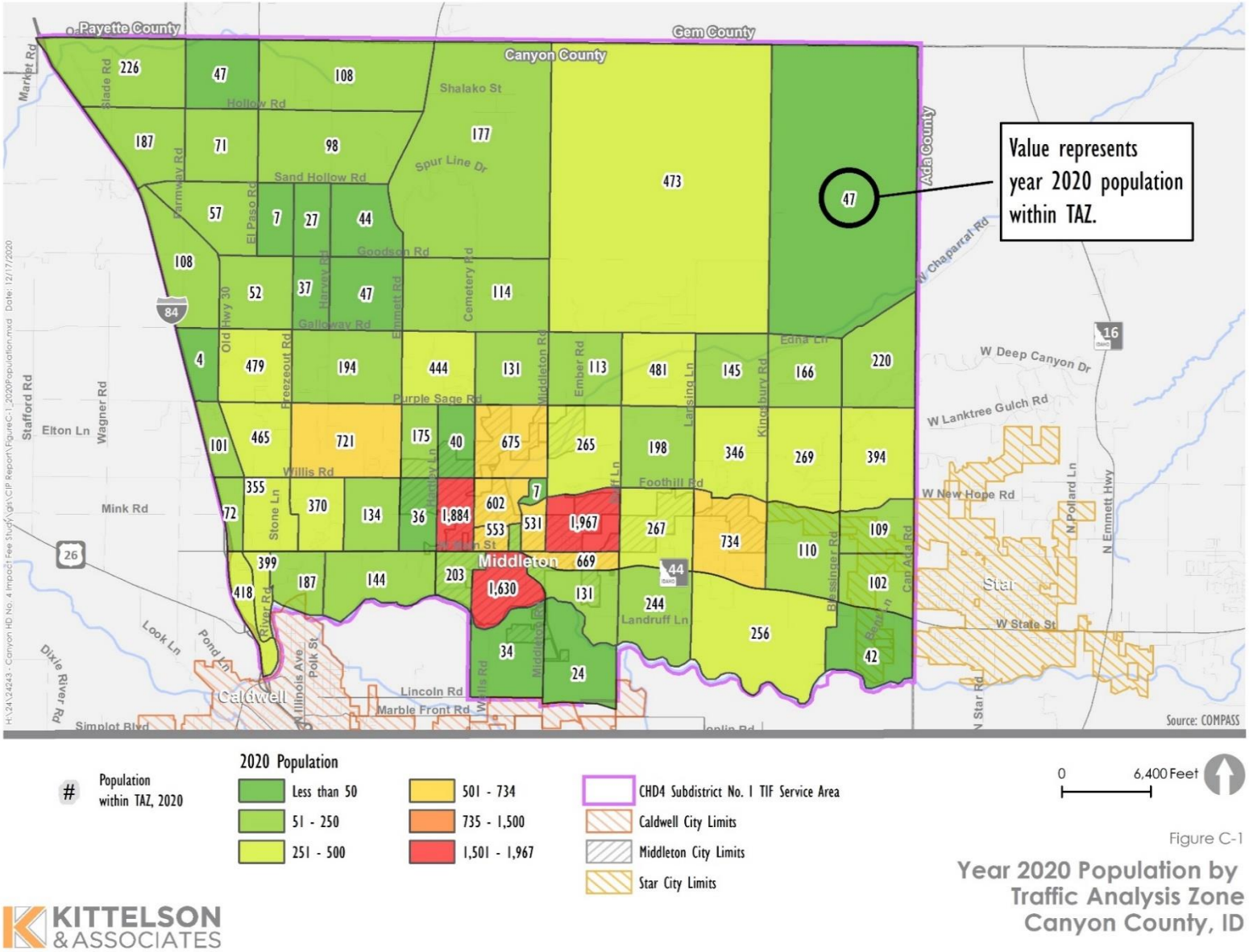
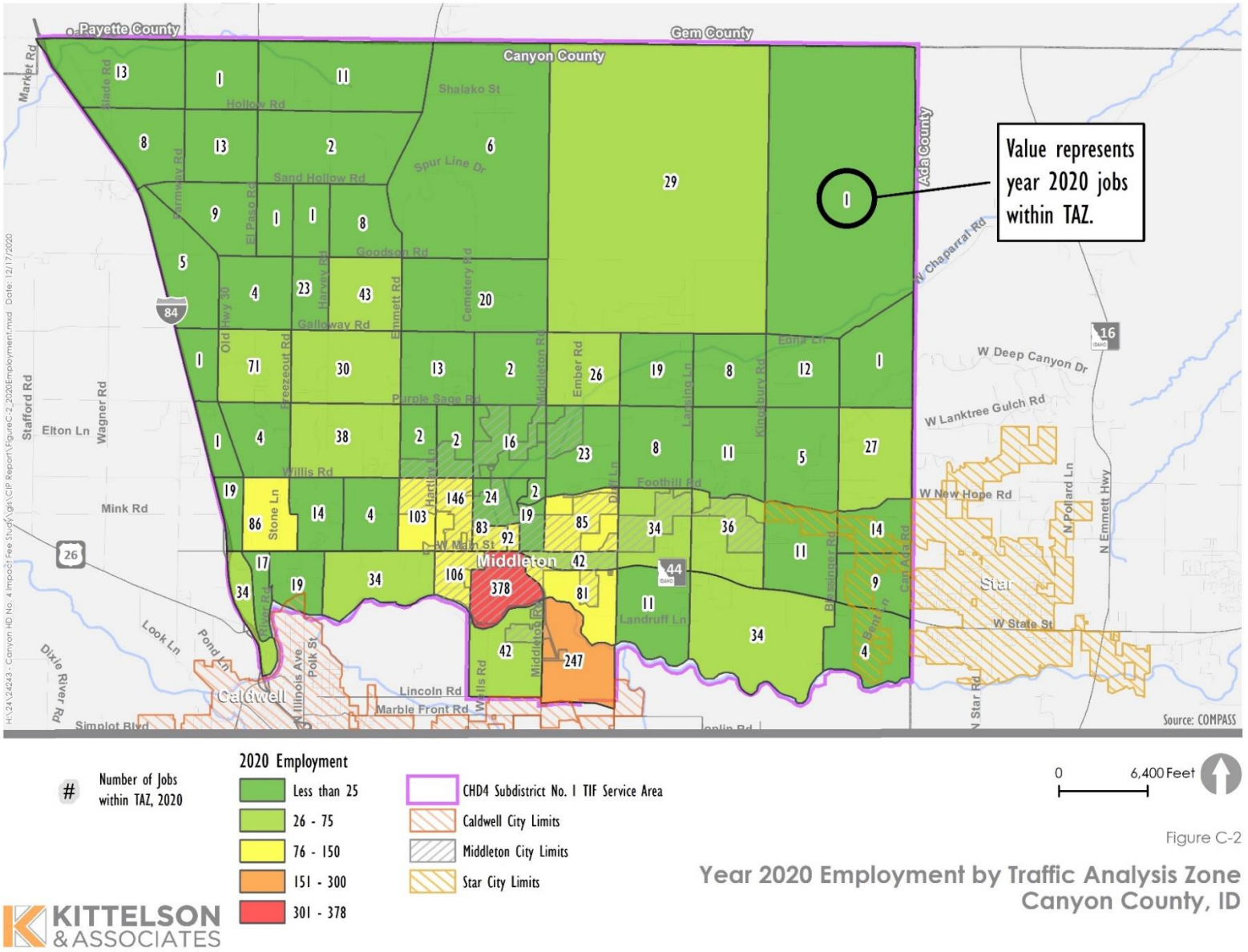


Figure C-2. Year 2020 Employment by Traffic Analysis Zone



APPENDIX D:

Technical Memorandum #1A

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TECHNICAL MEMORANDUM #1A

CHD4 Subdistrict No. 4 Traffic Impact Fee Study - Phase 2

Technical Memorandum #1A - Overview of Scope of Work, Methodology and Assumptions

Date:	May 13, 2020	Project #: 24243
To:	Chris Hopper, PE	
From:	Mark Heisinger, EIT and Andy Daleiden, PE	

INTRODUCTION

This is the first technical memorandum for Phase 2 of the Canyon Highway District No. 4 (CHD4) Traffic Impact Fee (TIF) Study, herein referred as "study". This technical memorandum was made concurrently with *Technical Memorandum 1B – Service Area for CHD4 Subdistrict No. 1 TIF Program*. This memorandum provides a background to the study, summarizes the findings from Phase 1 of the study and describes key components of the Phase 2 scope of work of the study.

PROJECT BACKGROUND

CHD4 initiated Phase 1 of the study, a TIF Feasibility Study, in 2019 to determine the feasibility of establishing traffic impact fees for CHD4 Subdistrict No. 1. Phase 1 reviewed Idaho Code 67-82, the Idaho Development Impact Fee Act, which provides the legal framework associated with impact fees in the State of Idaho. Phase 1 also reviewed local agency studies, policies and ordinances and identified the basic requirements for establishing an impact fee program for CHD4. The TIF Feasibility Study identified a series of tasks for establishing a TIF program for the CHD4 Subdistrict No. 1, which would serve as the basis for Phase 2 of the study.

TIF Feasibility Study

Impact fee programs in Idaho must meet the requirements set forth in Idaho Code 67-82. There are several key assumptions that contribute to the development of an impact fee program regarding methodology factors and data sources, each with potential advantages and disadvantages. The TIF Feasibility Study examined what is required and what should be considered in the development of an impact fee program within the CHD4 service area.

The TIF Feasibility Study identified the following assumptions for use in developing TIF Program.

- **Service Area**: One service area will be established within CHD4 Subdistrict No.1 and include the City of Middleton, Canyon County, and the City of Star (within Canyon County).
- **Forecast Year and Growth Assumptions:** Use Community Planning Association of Southwest Idaho (COMPASS) travel demand model for growth assumptions and future traffic volumes within the service area. The current approved model is associated with Communities in Motion 2040 2.0 Plan. The current COMPASS traffic demand model will be updated and calibrated to better reflect growth projections and traffic volumes within the service area.
- **Capital Improvement Plan (CIP):** Develop a service area-wide CIP using a consistent set of performance measures and leveraging existing CIP's within the service area.
- **Traffic Impact Fee Calculations**: Calculate traffic impact fees based on average vehicle-miles-traveled (VMT) cost and vehicle trip characteristics, similarly to the Ada County Highway District (ACHD) impact fee calculation methodology. The goal will be to have a single traffic impact fee schedule for Star, Middleton, and unincorporated Canyon County within the service area.

TIF PROGRAM STUDY OVERVIEW

The study will develop the framework, methodology and implementation details of establishing a TIF process and ordinance for CHD4 Subdistrict No. 1 that meets the requirements set forth in Idaho Code 67-82. Figure 1 shows a schedule for the study.

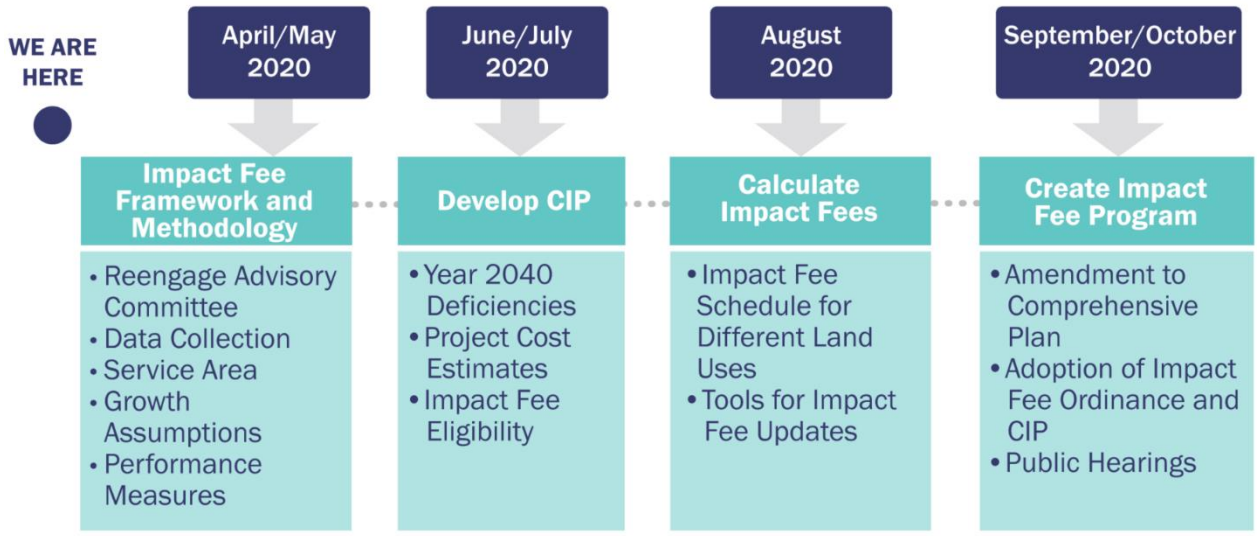

Figure 1 Study Schedule

Impact Fee Framework and Methodology

This task includes reengaging the development impact fee advisory committee and developing the impact fee study methodology for CHD4 Subdistrict No. 1.

Service Area

Figure 2 shows the service area for the proposed CHD4 Subdistrict No. 1 TIF Program. The service area includes multiple jurisdictions: City of Middleton, the western portion of the City of Star, unincorporated-Canyon County and CHD4. The service area is bounded to the north by Gem County, to the south by the Boise River and Lincoln Road, to the west by I-84, and to the east by Ada County.

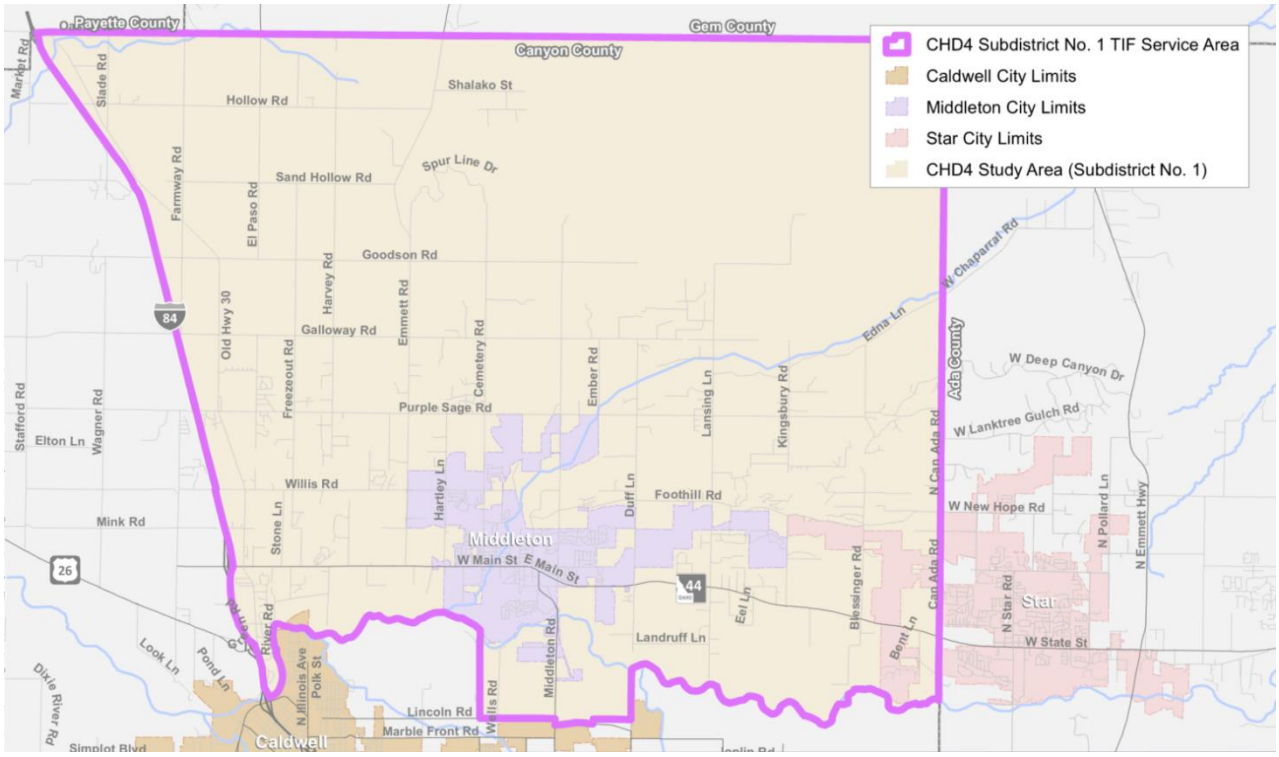

Figure 2 Subdistrict No. 1 Traffic Impact Fee Service Area

CHD4 identified the initial service area boundary as Subdistrict No. 1. The service area was confirmed through the TIF Feasibility Study, as it captures the City of Middleton Area of Impact and the City of Star within Canyon County. The intent of this study is to create a TIF program for Subdistrict No.1 and use as TIF program pilot, with the possibility of expanding to other parts of CHD4 in the future.

The service area is described in greater detail in *Technical Memorandum #1B - Service Area for CHD4 Subdistrict No. 1 TIF Program*.

Development Impact Fee Advisory Committee

The establishment of a development impact fee advisory committee is a requirement of the Idaho Code 67-82. Development impact advisory committees have already been formed within the service area and this task will engage those committees for the development of the study. Engaging partner agencies in the development of the study allows for input and collaboration, and is critical for the establishment of an impact fee program. The primary roles and responsibilities of the development impact fee advisory committee as per Idaho Code 67-82 is as follows:

- Assist in adopting and updating land use assumptions
- Monitor the development and implementation of the CIP
- Report any perceived inequities in the TIF program

TIF Methodology and Assumptions

This task includes developing the TIF methodology and assumptions, including the framework for the CHD4 Subdistrict No. 1 CIP. The major components of this task are as follows:

- **Data Collection**: Collect and consolidate traffic volume and analysis data within the service area, including COMPASS travel demand model data.
- **Land-Use and Growth:** Review and establish year 2040 land use and demographic assumptions within service area.
- **TIF Methodology Assumptions**: Establish performance measures for identifying future deficiencies on roadways and intersections in the CIP (e.g., what capacity-improvement projects will be required as a result of new development in the year 2040?) and proportionate share assumptions as required by Idaho Code 67-82. Examples of performance measures include level-of-service (LOS) or volume-to-capacity (v/c) ratios that can be applied to roadway corridors or intersections.

Develop Capital Improvement Plan (CIP)

This task includes the development of a CIP for CHD4 Subdistrict No. 1. A CIP is a long-range transportation plan that identifies future roadway network deficiencies as a result of expected future development and growth. The CIP includes roadway and/or intersection capacity-improvement projects to address the future deficiencies. Typical CIP projects include traffic signals, roundabouts and/or roadway widening projects.

This task will include a high-level traffic analysis of roadways and intersections within the service area to identify future roadway network deficiencies. Cost estimates and impact fee eligibility will then be developed for each individual project to create the CIP. The total cost of the CIP projects will be used to calculate impact fees for CHD4 Subdistrict No. 1.

Calculate Traffic Impact Fee (TIF) Schedule

This task includes the calculation of the TIFs and development of the TIF implementation guide. TIFs will be calculated for different land uses (i.e., residential, commercial, industrial) based on their trip generation characteristics using an average vehicle-miles-traveled (VMT) cost. The COMPASS travel demand model will be used to calculate total VMT within the service area for year 2020 and year 2040. The change in VMT over that 20-year period can be attributed to new development in the region. Figure 3 illustrates the process used to calculate TIFs.

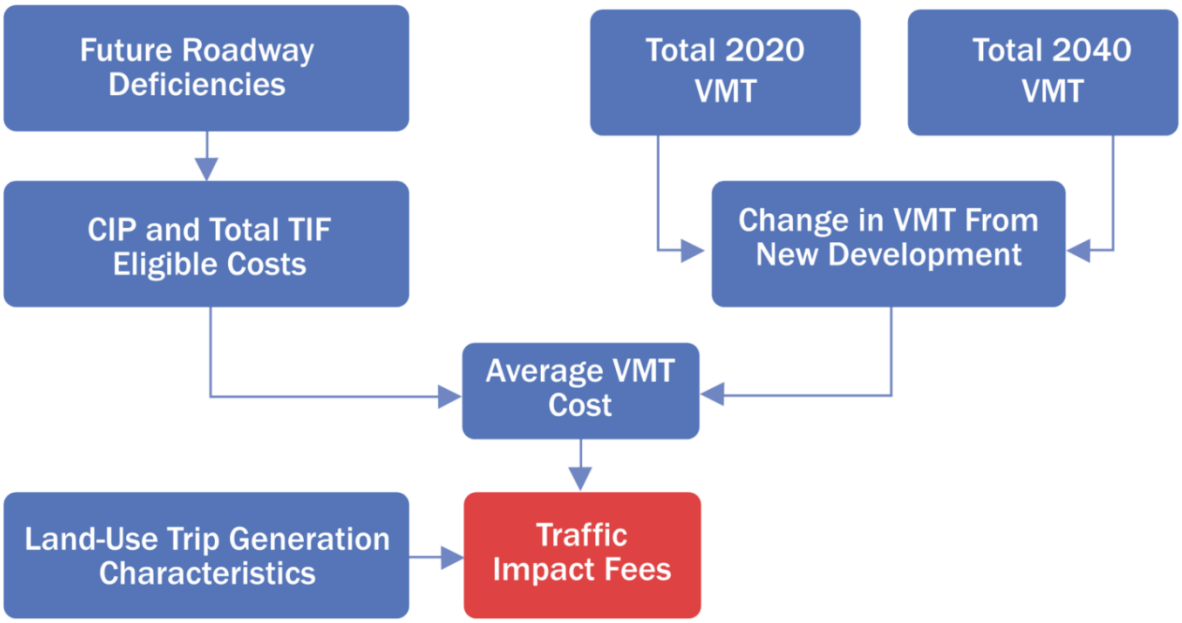

Figure 3 TIF Calculation Process

Develop CIP and Impact Fee Calculation Tools

This study will create spreadsheet and GIS tools that will allow the TIF program to be updated on a continual basis as new data is available. This study will develop the following tools:

- **Excel Database for CIP Analysis:** Spreadsheet tool that identifies capacity improvement projects based on high-level traffic analysis of roadways and intersections. Includes a high-level cost estimate tool.
- **Excel Database for Impact Fee Calculation**: Spreadsheet tool that calculates impact fees for different land uses.
- **CIP Online GIS Platform**: Online GIS web map application to host and display the CIP project locations and project information.

COMPASS is expected to develop year 2050 demographic estimates as part of Communities in Motion 2050 updates. The TIFs developed for this study can be updated with this new data when it becomes available. The year 2050 demographic data is anticipated to be complete by December 2020 followed by updates to the COMPASS travel demand model to reflect year 2050 conditions.

NEXT STEPS

Questions or comments on this memorandum should be directed to Andy Daleiden at adaleiden@kittelson.com. This memorandum will serve as a baseline for the development of the impact fee methodology and CIP.

Technical Memoranda #1A and #2B are the initial deliverables to the development impact fee advisory committee for the CHD4 TIF Study. CHD4 is currently coordinating with partner agencies to schedule the first development impact fee advisory committee meeting. The first development impact fee advisory committee meeting will be used to discuss initial land use, demographic, and roadway network assumptions and other Technical Memoranda 1A and 2B findings.

APPENDIX E:

Technical Memorandum #1B

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TECHNICAL MEMORANDUM #1B

CHD4 Subdistrict No. 4 Traffic Impact Fee Study - Phase 2

Technical Memorandum #1B - Service Area for CHD4 Subdistrict No. 1 TIF Program

Date:	May 13, 2020	Project #: 24243
To:	Chris Hopper, PE	
From:	Mark Heisinger, EIT and Andy Daleiden, PE	

INTRODUCTION

This is the second technical memorandum for Phase 2 of the Canyon Highway District No. 4 (CHD4) Traffic Impact Fee (TIF) Study, herein referred as "study". This technical memorandum was made concurrently with *Technical Memorandum 1A – Overview of Scope of Work, Methodology and Assumptions*. This memorandum describes the study service area, including service area demographics and roadway facilities in the service area.

SERVICE AREA CHARACTERISTICS

One of the first steps to creating a TIF program is establishing a service area. Service areas are required with the establishment of an impact fee program. Service areas are defined in Idaho Code 67-82 as "geographic areas identified by a governmental entity or by intergovernmental agreement in which the public facilities provide service to development within the area". Impact fees collected from a development in a service area must be spent on facilities within that service area. Figure 1 shows the service area for the proposed CHD4 Subdistrict No. 1 TIF program.

The service area includes multiple jurisdictions: City of Middleton, the western portion of the City of Star, unincorporated-Canyon County and CHD4. The City of Caldwell also has a small park in the southwest corner of the service area. The service area is bounded to the north by Gem County, to the south by the Boise River and Lincoln Road, to the west by I-84, and to the east by Ada County.

CHD4 identified the initial service area boundary as Subdistrict No. 1. The service area was confirmed through the TIF Feasibility Study, as it captures the City of Middleton Area of Impact and the City of Star within Canyon County. The intent of this study is to create TIF program for Subdistrict No.1 and use as TIF program pilot, with the possibility of expanding to other parts of CHD4 in the future.

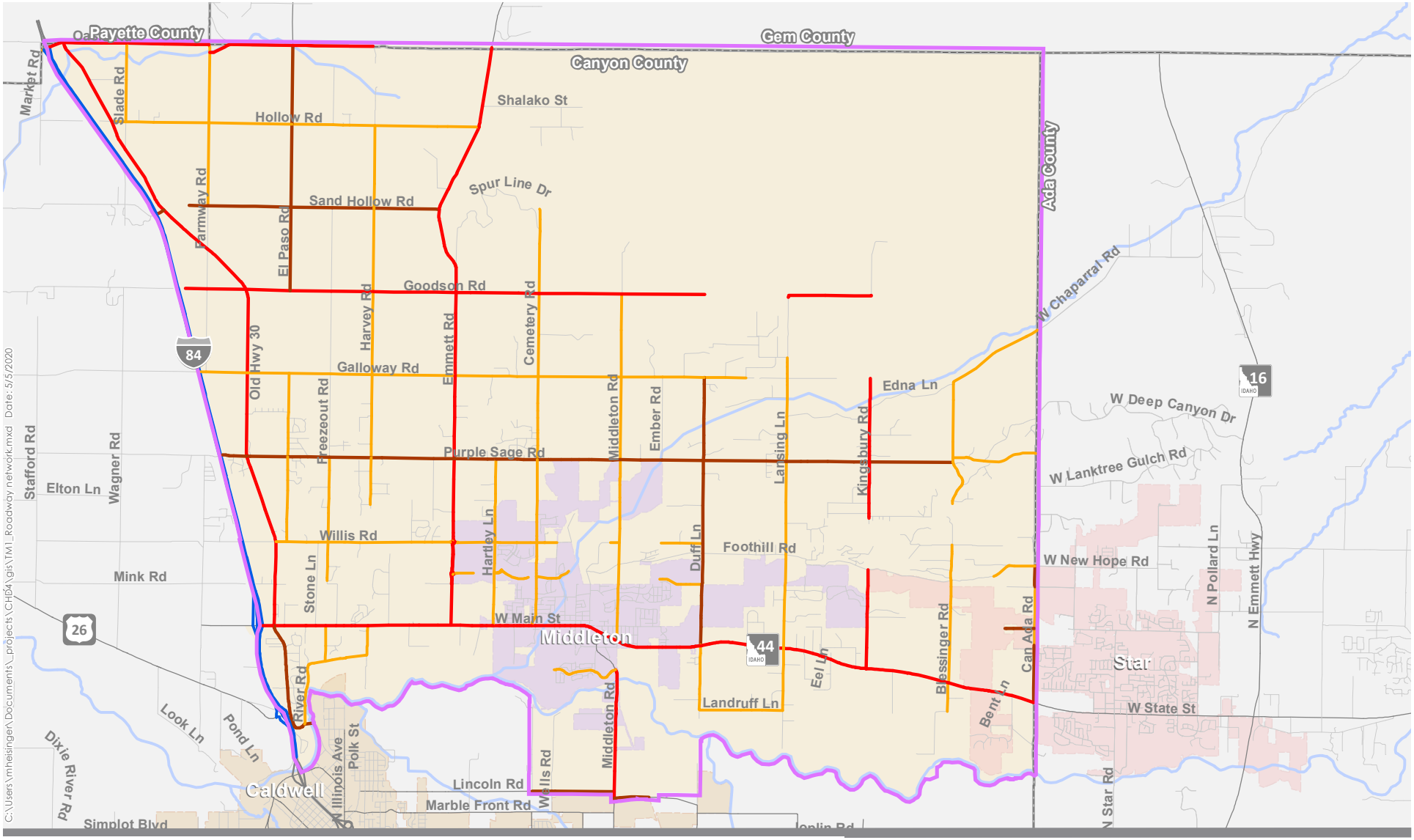

Figure 1

KITTELSON & ASSOCIATES

Service Area and Existing Roadway Functional Classification
Canyon County, ID

Service Area Demographics

Table 1 shows the demographics of the service area broken out by governing jurisdictions. The demographics are based on data from Community Planning Association of Southwest Idaho (COMPASS) Traffic Analysis Zones (TAZs) and COMPASS City Limit Population Estimates.

Table 1 Service Area Demographics[1]

Jurisdiction	Year 2020 Population	Estimated Year 2040 Population	Year 2020 Jobs	Estimated Year 2040 Jobs
City of Middleton[2]	9,710	19,596	1,521	3,333
City of Star (in Canyon County)[3]	150	521	20	73
Unincorporated Canyon County	10,554	8,769	801	705
Total Service Area	**20,414**	**28,886**	**2,342**	**4,111**

[1] Source: COMPASS TAZ Demographics Data. [2]Year 2040 data assumes Middleton Area of Impact (excluding areas that Star has already annexed).
[3]The City of Star data is approximate. COMPASS TAZ boundaries do not align exactly with Middleton and Star city boundaries.

As shown in Table 1, COMPASS projects that the population of the service area will grow by an average annual growth rate of 1.8%, resulting in 42% total growth between year 2020 and year 2040. Jobs within the service area are expected to grow by approximately 76% between year 2020 and year 2040.

The City of Middleton Transportation Plan assumes that the City of Middleton population will grow by an annual average growth rate of 5% between year 2015 and year 2035. The CHD4 Draft Transportation Plan assumes that the population within the CHD4 jurisdiction will grow by an average annual growth rate of 2.8% between year 2018 and year 2040. CHD4 historical traffic count data shown 3.3% annual traffic growth on CHD4 roads in the service area.

The COMPASS population projections within the service area are significantly less than the City of Middleton's projections. Year 2040 demographics in the service area will be evaluated further in later stages of the study. It should be noted that COMPASS is currently revising its demographic projections as part of the Communities in Motion 2050 update.

Service Area Roadway Facilities

Roadway facilities within the service area and their COMPASS functional classification are shown in Figure 1. Roadways classified as arterials or collectors provide regional connections and are typically eligible for impact fees. Local roadways are used to access arterials or collectors and are typically not eligible for impact fees as they are built as part of a development project.

There are approximately 240 miles of roadway within the service area. The miles of roadways for each functional classification within the service area is shown in Figure 2. As shown in Figure 2, most roads within the service area, approximately 70%, are classified as local roads. Approximately 19% and 11% of roads within the service area are classified as collectors and arterials, respectively.

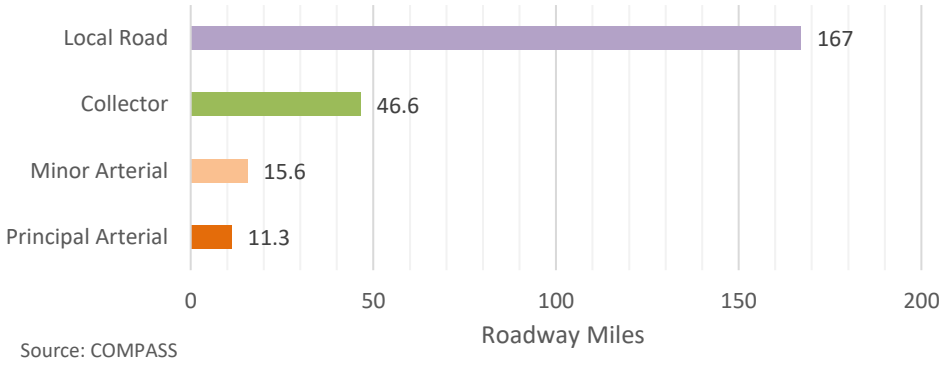

Figure 2 Miles of Roadway in Service Area by Functional Classification

Roadways within the service area are owned and maintained by four different governmental agencies, which is described below:

- CHD4 owns and maintains the roadways within unincorporated Canyon County.
- The City of Middleton owns and maintains the roadways within their city limits.
    - By Agreement, CHD4 and Middleton divide jurisdiction of jointly owned roadways by ½ mile segments or logical boundaries.
- The City of Star owns the roadways within their city limits. CHD4 maintains the roadways within the City of Star as per an intergovernmental agreement.
- ITD owns and maintains state highways within the service area. SH 44 is the only state highway in the service area, as Interstate 84 is located outside the western boundary of the service area.

Figure 3 shows the estimated roadway miles within the service area that are maintained by each governmental agency. Most roadways within the service area, approximately 75%, are owned and maintained by CHD4. Middleton owns and maintains approximately 21% of roadways within the service area and ITD owns and maintains approximately 4% of the roadways within the service area. Star owns approximately 2 miles of mostly local roads within the service area.

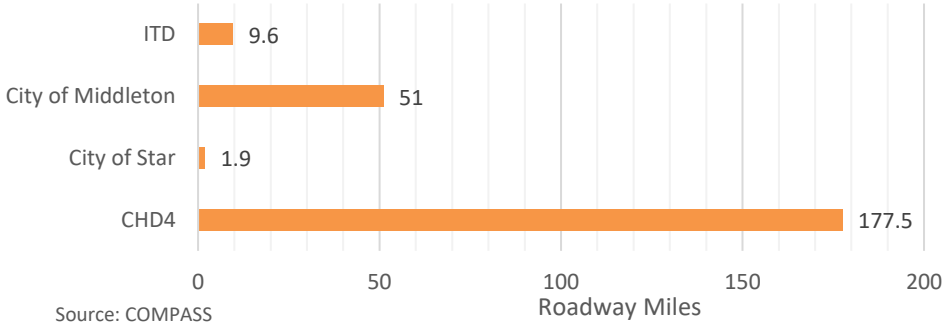

Figure 3 Miles of Roadway in Service Area by Agency Ownership

NEXT STEPS

Questions or comments on this memorandum should be directed to Andy Daleiden at adaleiden@kittelson.com. The service area presented in this memorandum will serve as a baseline for the development of the CHD4 Subdistrict No. 1 TIF Program. We will continue to have agencies review the service area and data presented in this memorandum, including roadway functional classifications, land use assumptions, and growth projections.

Technical Memoranda #1A and #2B are the initial deliverables to the development impact fee advisory committee for the CHD4 TIF Study. CHD4 is currently coordinating with partner agencies to schedule the first development impact fee advisory committee meeting. The first development impact fee advisory committee meeting will be used to discuss initial land use, demographic, and roadway network assumptions and other Technical Memoranda 1A and 2B findings.

APPENDIX F:

Technical Memorandum #2

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TECHNICAL MEMORANDUM #2

CHD4 Subdistrict No. 4 Traffic Impact Fee Study - Phase 2

Traffic Impact Fee Program Methodology and Assumptions

Date:	August 14, 2020	Project #: 24243
To:	Chris Hopper, PE	
From:	Mark Heisinger, EIT, Andrew McIntyre, and Andy Daleiden, PE	

INTRODUCTION

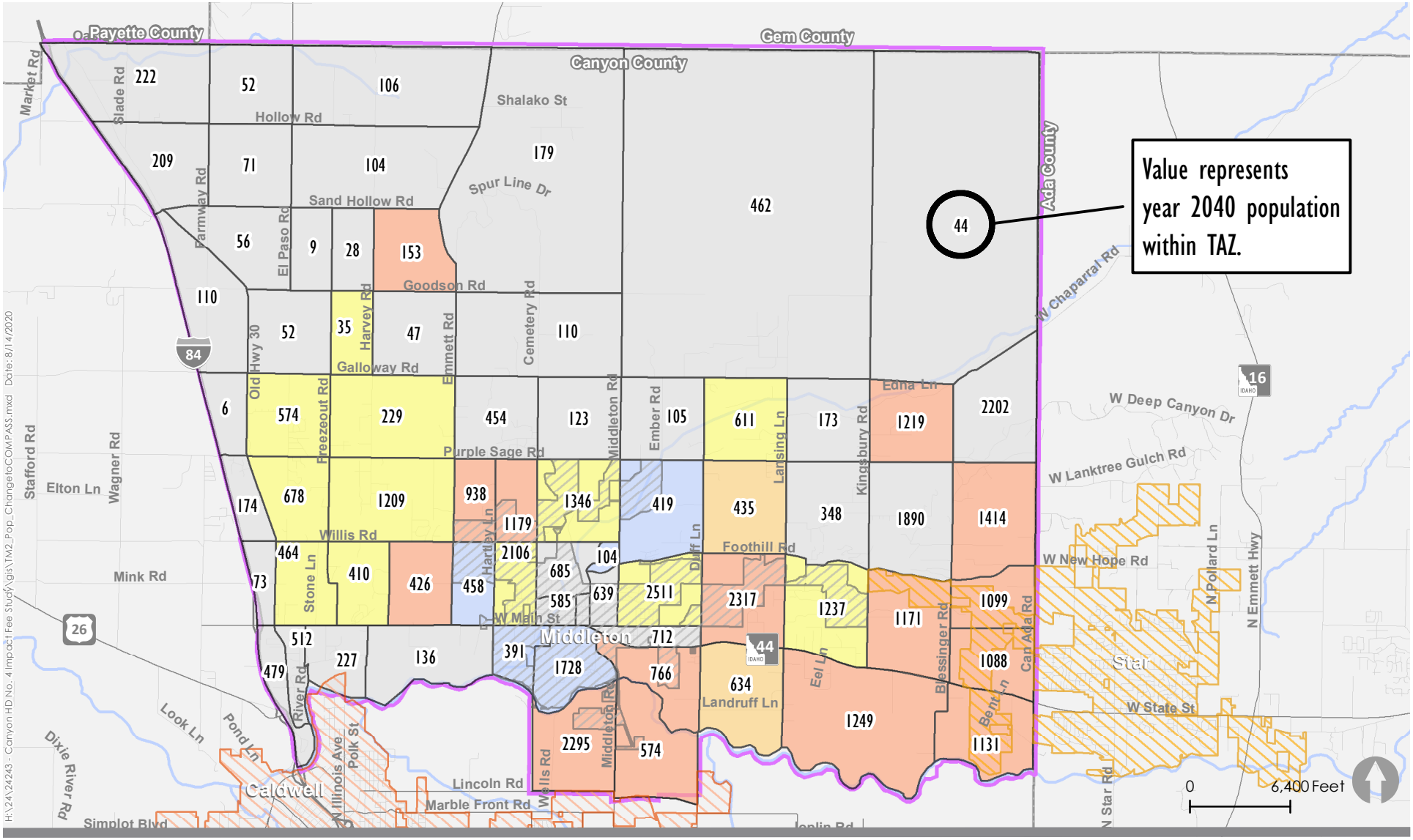
This is the second technical memorandum for Phase 2 of the Canyon Highway District No. 4 (CHD4) Traffic Impact Fee (TIF) Study, herein referred as "study". This memorandum summarizes the proposed methodology and assumptions that will be used to develop the Capital Improvement Plan (CIP) and traffic impact fee program. This memorandum is organized as follows:

- COMPASS Regional Travel Demand Model
- Performance Measures
- Traffic Operations Methodology
- Proportionate Share
- Next Steps

COMPASS REGIONAL TRAVEL DEMAND MODEL

The traffic impact fee program will rely on demographic and traffic data from the Community Planning Association of Southwest Idaho (COMPASS). COMPASS provides existing and future year traffic volumes for roadways, based on the existing and projected future year demographic data in Traffic Analysis Zones (TAZ's).

Kittelson worked with CHD4, Canyon County, the City of Star and the City of Middleton, to modify the year 2040 demographics in certain TAZs within the service area. The modifications were identified to better reflect expected development in the service area. Table 1 summarizes the 2040 demographics prior to and after refinement of the TAZs. Figure 1 shows the 2040 population by TAZ and changes within the service area. Figure 2 shows the 2040 employment by TAZ and changes within the service area. Additional figures showing the total growth in population and employment from 2020 to 2040 by TAZ are shown in Attachment A.



CHD4 Subdistrict No. 1 TIF Service Area
Caldwell City Limits
Middleton City Limits
Star City Limits

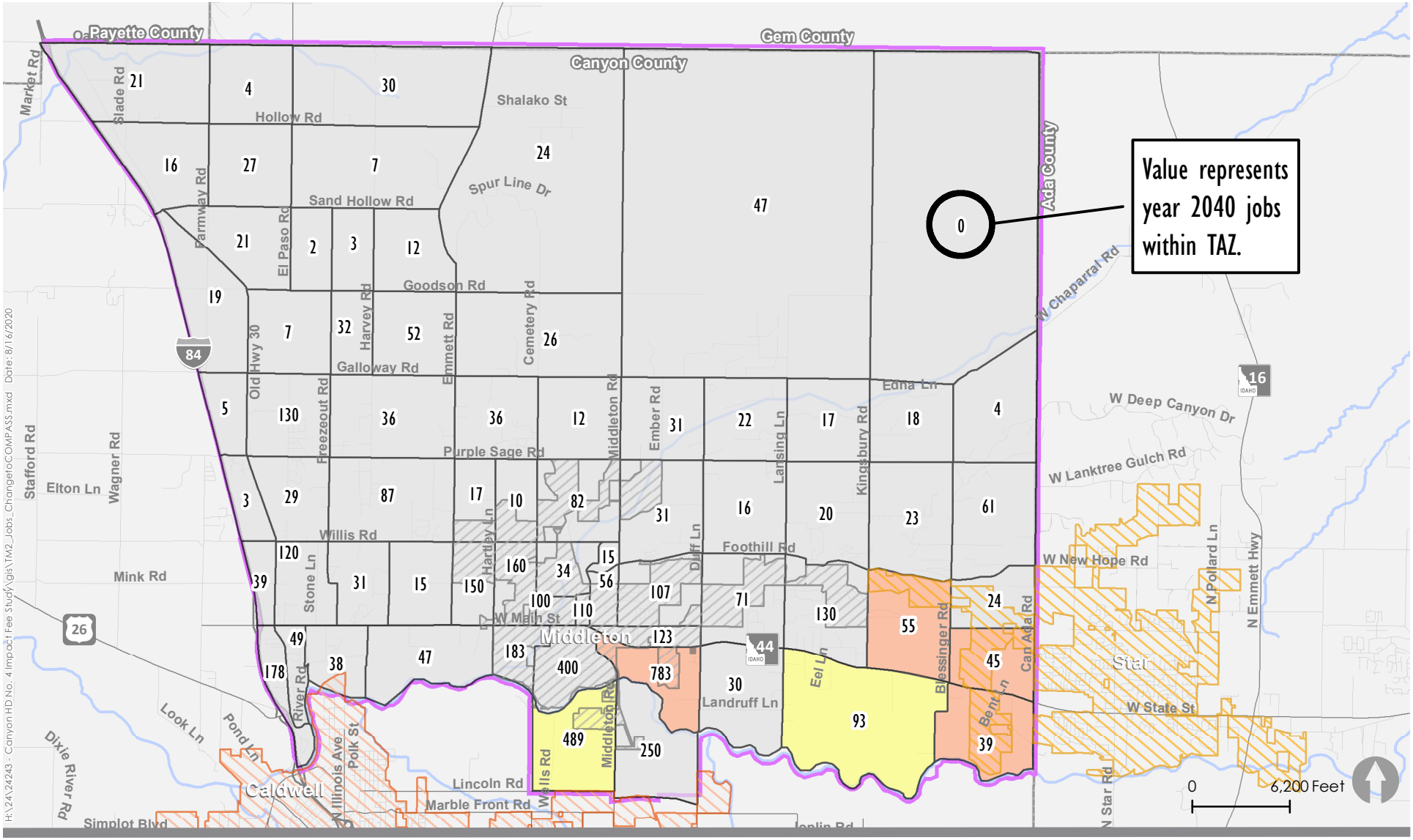
% Change to COMPASS 2040 Population
Decreased 1% to 50%
Changed less than 1%
Increased 1% to 50%
Increased 50% to 100%
Increased more than 100%

TAZ Population

Figure 1

KITTELSON & ASSOCIATES

2040 Population by TAZ & Changes to COMPASS Demographics Canyon County, ID



CHD4 Subdistrict No. 1 TIF Service Area
Caldwell City Limits
Middleton City Limits
Star City Limits

% Change to COMPASS 2040 Jobs
Changed less than 1%
Increased 1% to 50%
Increased 50% to 100%
Increased more than 100%

TAZ Jobs

Figure 2

KITTELSON & ASSOCIATES

2040 Employment by TAZ & Changes to COMPASS Demographics Canyon County, ID

Table 1 Revised Service Area Demographics[1]

Jurisdiction	Year 2020 Population	Estimated Year 2040 Population		Year 2020 Jobs	Estimated Year 2040 Jobs	
		COMPASS Model	Revised		COMPASS Model	Revised
City of Middleton[2]	9,780	19,189	27,528	1,521	3,270	4,003
City of Star (in Canyon County)[3]	150	5,701	12,463	20	241	361
Unincorporated Canyon County	10,554	3,996	4,324	801	600	639
Total Service Area	**20,414**	**28,886**	**44,315**	**2,342**	**4,111**	**5,004**

[1] Source: COMPASS TAZ Demographics Data (Reference 1). [2]Year 2040 data assumes Middleton Area of Impact (excluding areas that Star has already annexed or is expected to annex). [3]The City of Star data is approximate. COMPASS TAZ boundaries do not align exactly with Middleton and Star city boundaries.

The revised year 2040 demographics increase the total service area population by approximately 53 percent and the total number of jobs in the service area by 22 percent. The revised service area population correlates with a 4.0 percent annual growth rate between year 2020 and year 2040. The largest year 2040 population revisions were increases in the City of Star (in Canyon County) and in the south and east portions of the City of Middleton. The largest employment revision was an increase of approximately 600 jobs in the TAZ to the south-east of the Middleton Road and SH 44 intersection.

We will use the revised demographics, shown in Table 1 and on Figures 1 and 2, in developing year 2040 traffic volumes. We will coordinate with COMPASS to run the regional travel demand model with the revised demographic data. COMPASS will provide us with the year 2040 traffic volumes (e.g. daily, PM peak hour link volumes) in the service area. We will use the year 2040 traffic volumes for the traffic operations analysis, as described in the Traffic Operations Methodology section later in this memorandum.

PERFORMANCE MEASURES

Performance measures are criteria that can be used to monitor traffic operations and identify roadway facilities that require capacity improvements. Common performance measures for traffic operations

- **Level of Service (LOS)** is a delay-based performance measure. A letter-grade is used for LOS that indicates the amount of delay that a user experiences at a roadway or intersection, typically during the weekday AM or PM peak hour of traffic congestion.
    - **Example**: If a driver approaches an intersection with a stop sign and waits less than 10 seconds before turning onto a road, the intersection is assigned a letter grade of "A" and it would be reported as LOS "A". If the driver waits more than 50 seconds before turning onto a road, the intersection would be reported as LOS "F".
- **Volume-to-Capacity (V/C) Ratio** is a capacity-based performance measure. The expected volume demand is compared to the total available capacity on a roadway or intersection, typically during the weekday AM or PM peak hour of traffic congestion.

- **Example**: 1,000 cars travel through an intersection during the peak hour of traffic congestion. The intersection's capacity would allow up to 2,000 cars to travel through it in an hour. The V/C ratio would be 0.5 (1,000 divided by 2,000).

PERFORMANCE MEASURES USED IN TREASURE VALLEY

The performance measures used by agencies in the service area and in Treasure Valley are summarized in Table 2.

Table 2 Agency Performance Measures

Agency	Performance Measure	Source
Canyon Highway District No. 4	LOS D	CHD4 Draft Transportation Plan (In-Progress)
City of Middleton	LOS C	City of Middleton Transportation Plan (2016)
City of Star	LOS D	City of Star Comprehensive Plan – Traffic Analysis Memorandum (2019)
Ada County Highway District (ACHD)	LOS E (Roadways), LOS D (Overall Intersection[1]), LOS E (Intersection Lane Group[1])	ACHD Capital Improvements Plan – Exhibit C (2016)
City of Nampa	LOS D	City of Nampa Transportation Plan (2019)
City of Caldwell	LOS D	*Correspondence with City staff (2020)*
Idaho Transportation Department (ITD)	LOS D (Overall Intersection), V/C ≤ 0.90 (Intersection Lane Group)	*Correspondence with ITD staff (2020)*
COMPASS	Vehicles miles traveled (VMT), Congested VMT, Vehicle Hours of Delay	Communities in Motion 2040 2.0 (2018)

[1]Assumes that V/C of 0.9 = LOS D and V/C of 1.0 = LOS E

As shown in Table 2, agencies in the Treasure Valley primarily use a LOS performance measure. To maintain consistency with partner agencies and other agencies in the Treasure Valley, it is recommended that this study use a LOS performance measure.

POTENTIAL OUTCOMES OF A SELECTED PERFORMANCE MEASURE

The Highway Capacity Manual (HCM) 6th Edition (Reference 2) provides criteria for calculating and defining LOS. The HCM recommends that roadways be designed to provide a LOS that balances roadway user's desires and financial resources. The HCM recommends that roadways not be designed to LOS A for cost, environmental impact, and other reasons. The performance measures used for the study should be selected by the land-use characteristics of the service area, the roadway user's desires, and the financial resources of the agencies within the service area.

A more aggressive performance measure (e.g., one that requires a higher quality of service such as LOS C or LOS D) will trigger more capacity-improvement projects then a less aggressive performance measure (LOS E). If LOS C is selected as the performance measure, the service area should anticipate more roadway widening and intersection capacity improvement projects than LOS D or LOS E.

A more aggressive performance measure is typically more appropriate for rural settings. Roadway users in rural settings typically have higher expectations for quality of service (i.e., delay at intersections or congestion on roadways) and roadways in rural settings can experience significant safety benefits with higher levels of service. A less aggressive performance measure is more appropriate for urban settings. Drivers in urban settings have lower expectations for quality of service and capacity improvement projects in urban areas can have a diminishing rate of return, primarily due to the high cost of urban projects.

The service area for this study has predominantly suburban and rural characteristics. Since the rural areas of the service area are trending towards suburban, it is recommended that the performance measure for this study reflect a service area that is primarily suburban.

RECOMMENDED PERFORMANCE MEASURE

We recommend using a performance measure of LOS D for all roadway segments and intersections based on the following:

- Goals and objectives for the service area.
- Consistent with current practice by CHD4 and City of Star.
- Consistent with other transportation agencies in the Treasure Valley.
- The measure can be calculated via HCM methodology.

TRAFFIC OPERATIONS METHODOLOGY

The traffic operations analysis will identify existing and future deficiencies on roadways and intersections within the service area. The goal is to develop a traffic operations methodology with the following characteristics:

- Incorporates national guidance for traffic operations
- Provides efficiency and results that are re-producible
- Utilizes a specific performance measure, such as LOS
- Allows the user to identify deficiencies on the roadways and at intersections
- Provides the ability to distinguish between different intersection and roadway improvements for inclusion in the CIP

PROPOSED METHODOLOGY FOR INTERSECTIONS

This section outlines the proposed methodology for evaluating intersection operations in the service area. This methodology requires the following data:

- Year 2040 peak hour traffic volume projections on all service area roadways
- Year 2040 peak hour intersection turning movement volume projections on certain service area intersections
- Existing peak hour traffic volumes on service area roadways and intersections (not a requirement, but preferred where data is available)

Step 1: Each intersection within the service area will be evaluated under year 2040 traffic conditions (weekday PM peak hour) using Exhibit 17 from National Cooperative Highway Research Program (NCHRP) Report 825 (Reference 3), as shown in Figure 3. This exhibit identifies intersections that warrant a different intersection control type (e.g. stop control, all-way stop, roundabout, signal), based on their existing control type and by the traffic volumes on the roadway approaches. This exhibit is based on the methodologies of the 6th Edition of the Highway Capacity Manual (HCM). The year 2040 traffic volumes on the roadway approaches will be based on COMPASS 2040 travel demand model data and the use of NCHRP Report 765 (Reference 4).

The results of this Step 1 would be a list of intersections in the service area that may warrant different intersection control types, based on Exhibit 17 from NCHRP 825.

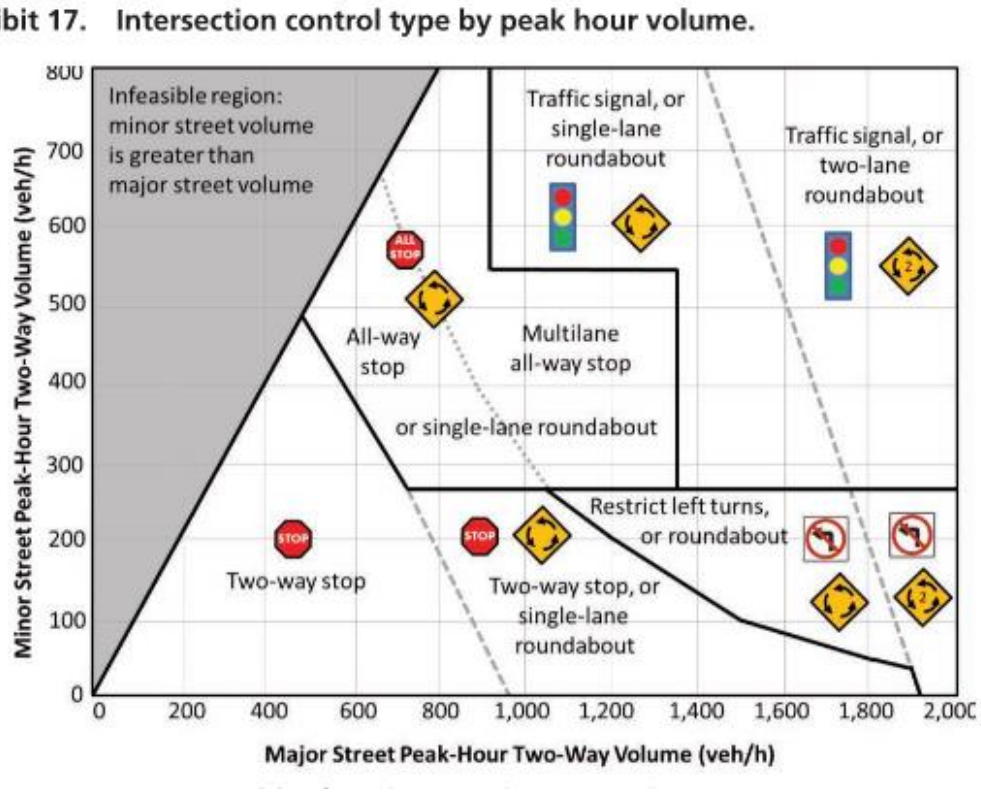


Figure 3 Intersection Control Type by Volume (Exhibit 17 from NCHRP Report 825)

Step 2: The compiled list of intersections and preliminary recommendations for intersection control types (created in Step 1) would be sent to partner agencies for review and comment. Based on feedback

from partner agencies and further discussion, a refined list of intersections and respective control types would be developed for further evaluation.

The results of this Step 2 would be a refined list of intersections for further evaluation.

Step 3: The intersections identified in Step 2 would be analyzed using software that implements the 6th Edition of the HCM (i.e., Highway Capacity Software, Synchro and/or SIDRA). Year 2040 PM peak hour turning movement volumes would be developed at all intersections identified for further evaluation. These intersections would be evaluated based on the defined performance measure (e.g. LOS D). Project types would be recommended for each intersection so that they meet the performance measure. Project types would include traffic control modifications (i.e., converting a stop-controlled intersection to a roundabout or traffic signal) and minor lane geometry modifications (i.e., adding a turn-lane on the major street or minor street roadway of a stop-controlled intersection).

Step 3 will require existing and future year turning movement volumes at each intersection. Where existing turning movements have been counted (e.g. obtain from CHD4, Middleton, Star or other source), future year turning movement volumes would be developed using COMPASS link volumes via the methods presented in NCHRP Report 765. Where existing turning movement counts have not been counted, future year turning movement volumes should be based on the intersection turning movement volume outputs from the COMPASS travel demand model.

The results of this Step 3 would be a detailed intersection operations analysis and recommended list of intersection projects for inclusion in the CIP.

Step 4: The list of recommended projects would be sent to partner agencies. The project list would be refined based on input from partner agencies and incorporated into the CIP.

The results of this Step 4 would be a final list of intersection projects for inclusion in the CIP.

Other Tools and Resources

Attachment A discusses other intersection operation tools and resources that were examined in the development of the proposed methodology.

PROPOSED METHODOLOGY FOR ROADWAYS

This section outlines the proposed methodology for evaluating roadway operations in the service area. The thresholds used in this study are based on methodologies in the HCM - the specific values identified in Table 3 (shown on page 10) were developed using the Florida Department of Transportation's (FDOT) 2020 generalized service volume tables (Reference 5). The process used to calculate the service volumes is similar to the one used by ACHD to develop its Street Service Capacity Guidelines (Reference 6) but utilizes the latest base volumes from the HCM and FDOT. For more information regarding this process and other service volume tables, see Attachment B. Other Tools and Resources

Attachment B discusses other roadway service volume tables and their relationships to the one proposed here, as well as a description of the process used to calculate the proposed volumes.

Table 3 provides three distinct sets of service volumes for different roadway classifications and lane configurations. These sets include:

- *ACHD Service Capacity Guidelines* – developed using 2009 FDOT "Urbanized Area" service volume table (with local adjustment factors)
- *Proposed CHD4 Service Volumes: Urbanized Areas* – developed using 2020 FDOT "Urbanized Area" service volume table
- *Proposed CHD4 Service Volumes: Transitioning Areas* – developed using 2020 FDOT "Transitioning and Areas Over 5,000 Not in Urbanized Areas" service volume table

One of the two proposed sets of service volumes will be selected for use in developing the CIP. Given CHD4's population growth and development projections, utilizing service volumes applicable to urban areas may be more appropriate over the lifespan of the CIP. Using service volumes applicable to "transitioning areas", however, may be more appropriate given CHD4's present conditions. It also represents a more conservative approach.

The following describes the proposed methodology for evaluating roadway segments:

Step 1: COMPASS Regional Travel Demand Model output will be obtained. Future peak-hour directional volumes (weekday PM peak hour) for each roadway will be calculated in accordance with NCHRP 765, using the 2020 and 2040 model link volumes and existing counts. Where existing counts are not available, 2040 model link volumes will be used without calibration.

Step 2: Each roadway segment will be evaluated by comparing the peak-hour directional volumes calculated in Step 1 with the selected thresholds outlined in Table 3 (on the next page). Using LOS D as the threshold, roadways that require capacity improvements will be identified, and project types will be recommended for each roadway to meet this performance measure.

Step 3: The list of recommended projects will be sent to partner agencies. The project list will be refined based on input from partner agencies and incorporated into the CIP

Other Tools and Resources

Attachment B discusses other roadway service volume tables and their relationships to the one proposed here, as well as a description of the process used to calculate the proposed volumes.

Table 3 Proposed Service Volumes

Classification	Characteristics	Number of lanes per direction of travel	Directional Peak Hour Volume Level of Service Planning Thresholds					
			ACHD Service Capacity Guidelines[1]		Proposed CHD4 Service Volumes – Urbanized Areas[2]		Proposed CHD4 Service Volumes – Transitioning Areas[2]	
			LOS D	LOS E	LOS D	LOS E	LOS D	LOS E
Principal Arterial	Undivided; No Left Turn Lanes at Intersections	1	600	690	620	**	560	**
	Undivided; Left Turn Lanes at Intersections	1	-	-	790	**	720	**
		2	-	-	1,700	**	1,550	**
		3	-	-	2,570	**	2,330	**
	Divided (Continuous Center Left Turn Lane or Median); Left Turn Lanes at Intersections	1	770	880	840	**	760	**
		2	1,680	1,780	1,800	**	1,640	**
		3	2,560	2,720	2,720	**	2,470	**
Minor Arterial	Undivided; No Left Turn Lanes at Intersections	1	540	575	530	560	480	500
	Undivided; Left Turn Lanes at Intersections	1	-	-	680	720	610	650
		2	-	-	1,390	1,450	1,240	1,360
		3	-	-	2,140	2,180	1,940	2,060
	Divided (Continuous Center Left Turn Lane or Median); Left Turn Lanes at Intersections	1	675	720	710	760	650	680
		2	1,395	1,540	1,470	1,530	1,310	1,440
		3	2,155	2,370	2,270	2,300	2,050	2,180
Collectors	Undivided; No Left Turn Lanes at Intersections	1	425[3]	525[3]	340	360	310	320
	Undivided; Left Turn Lanes at Intersections	1	-	-	490	520	440	470
		2	-	-	980	1020	880	960
		3	-	-	1,510	1,540	1,370	1,450
	Divided (Continuous Center Left Turn Lane or Median); Left Turn Lanes at Intersections	1	530[3]	660[3]	530	560	480	500
		2	1,080[3]	1,250[3]	1,060	1,110	950	1,040

[1] Developed using FDOT 2009 Generalized Service Volume Tables and localized adjustment factors – In reviewing ACHD Service Capacity Guidelines, we were not able to recreate these values by applying local adjustment factors per the FDOT methodology.
[2] Developed using FDOT 2020 Generalized Service Volume Tables
[3] ACHD does not this include Collector roadways in their CIP. In ACHD's Policy Manual, these values are identified in the traffic impact study guidelines, so reported here for comparison purposes. (Ada County Highway District Policy Manual, 7106.4.1)

PROPORTIONATE SHARE

The impact fee program should be developed using a proportionate share concept. The proportionate share concept means that, a.) impact fees do not charge development more than their proportionate share for roadway facility improvement and that b.) all partner agencies are contributing their proportionate share to projects in the CIP.

DEVELOPMENT PROPORTIONATE SHARE

Idaho Code 67-82 has several items related to development proportionate share. Notably, it states that the development impact fees will not exceed the proportionate share of the cost of roadway facility improvements attributable to growth and development in the service area. The vehicle-miles-traveled (VMT) methodology will be used to calculate the impact fees and will take into consideration the unique impacts that different development types have on roadway facility capacity. The impact fee study will also identify existing capacity deficiencies in the roadway network to ensure that projects that address existing deficiencies are not charged to development.

This overall CHD4 TIF study will develop a methodology that accounts for development proportionate share. The VMT methodology accounts for the specific impacts of development on roadway facilities and the CIP will specify the impact fee eligibility of each project. Additional details regarding development proportionate share will be included in the CIP and final CHD4 TIF program.

AGENCY PROPORTIONATE SHARE

CHD4, the City of Middleton, and the City of Star will need to agree on how to collect and allocate traffic impact fees so that they are all contributing their proportionate share to CIP projects. It is recommended that traffic impact fees are collected and allocated through separate accounts for the City of Middleton, the City of Star, and Canyon County. This method would give agencies direct control on how fees are spent within their jurisdiction and ensure that fees are collected and spent in the same jurisdiction. The following steps should be taken to ensure that partner agencies contribute their proportionate share, and receive proportionate benefits, from the impact fee program:

Step 1: Partner agencies collect development impact fees for developments within jurisdictional boundary.

Step 2: All development impact fees collected in the service area are put into separate accounts for the City of Middleton, the City of Star, and Canyon County.

Step 3: The fees collected are spent on projects by agencies within their jurisdiction based on prioritization.

Project prioritization will be primarily based on when the project is expected to be required (based on the traffic operations analysis) and input from partner agencies. Project prioritization is also contingent

on when and where development occurs within the service area and will be re-established when the impact fee program is updated every four to five years. The initial project prioritization will be established in the development of the CIP.

The cost estimates for each project in the CIP will include the proportion of the cost that is impact fee eligible and the proportion of the cost that each agency is responsible for. Impact eligibility will be based on the requirements in Idaho Code 67-82. Generally, only the proportion of project costs that are associated with capacity improvements will be impact fee eligible (i.e., if a three lane roadway is expanded to five lanes, only the costs associated with the two new lanes are impact fee eligible). The details regarding impact fee eligibility will be established in the development of the CIP. Partner agencies will be responsible for the costs of projects within their jurisdictional boundaries that are not impact fee eligible.

NEXT STEPS

This memorandum provides the methodology for the development of the CIP and impact fee program. Further discussion on this memorandum will occur at upcoming meetings August/September with CHD4, Star, Middleton and Canyon County, and the Development Impact Fee Advisory Committee (DIFAC). Questions or comments on this memorandum should be directed to Andy Daleiden at adaleiden@kittelson.com.

ATTACHMENTS

A – 2020 to 2040 Growth by TAZ Figures

B - Intersection Operations Supplemental Tools and Resources

C - Roadway Operations Supplemental Tools and Resources

REFERENCES

1. Community Planning Association of Southwest Idaho. Communities in Motion 2040 2.0. 2018.
2. Transportation Research Board. *Highway Capacity Manual 6th Edition*. 2016.
3. National Cooperative Highway Research Program. *Report 825 - Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual.* 2016.
4. National Cooperative Highway Research Program. *Report 765 - Analytical Travel Forecasting Approaches for Project-Level Planning and Design*. 2016.
5. Florida Department of Transportation. *Quality/Level of Service Handbook*. 2020.
6. Ada County Highway District. *Capital Improvement Plan – Exhibit C*. 2016.

Attachment A
2020 to 2040 Growth by TAZ
Figures

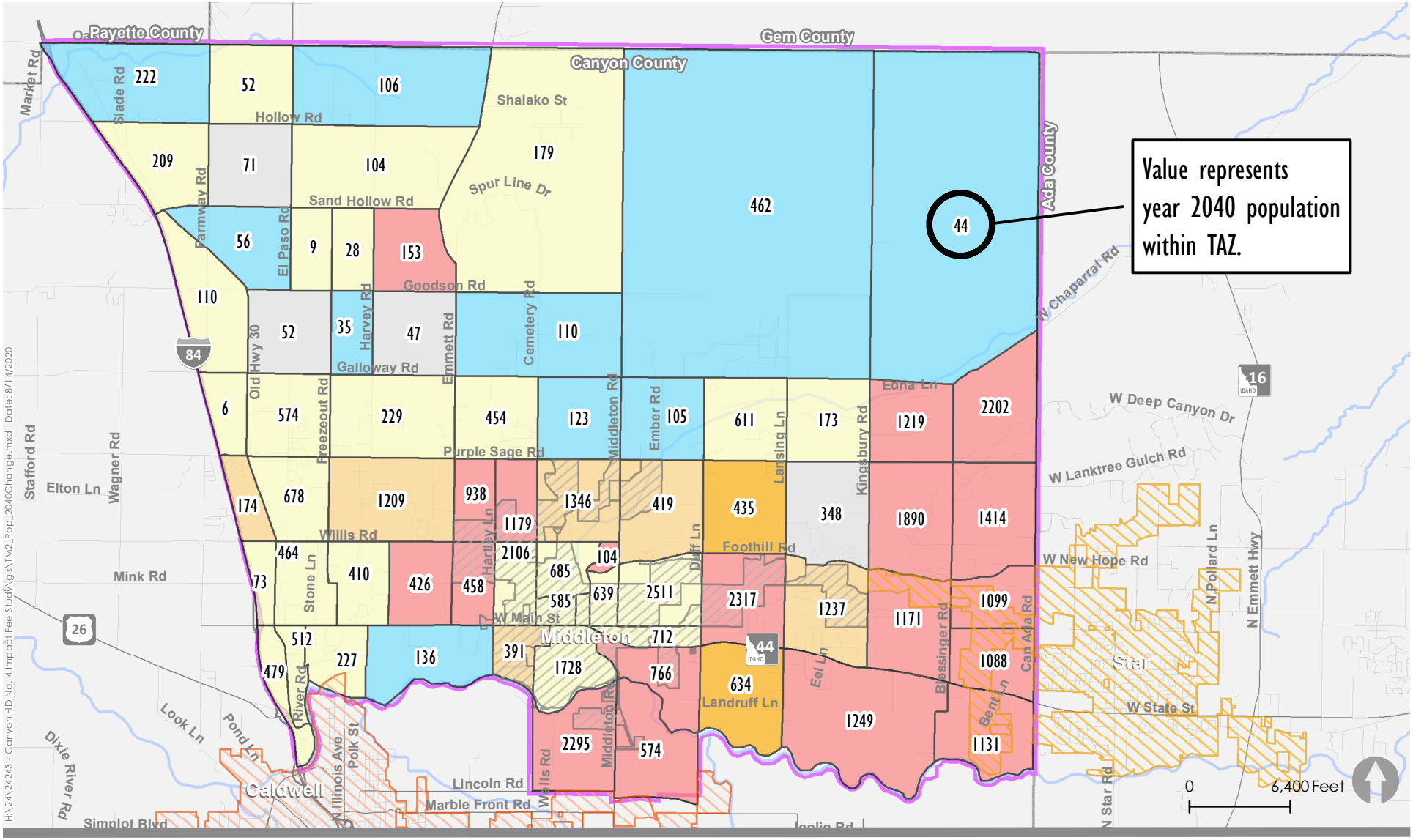


Figure 3

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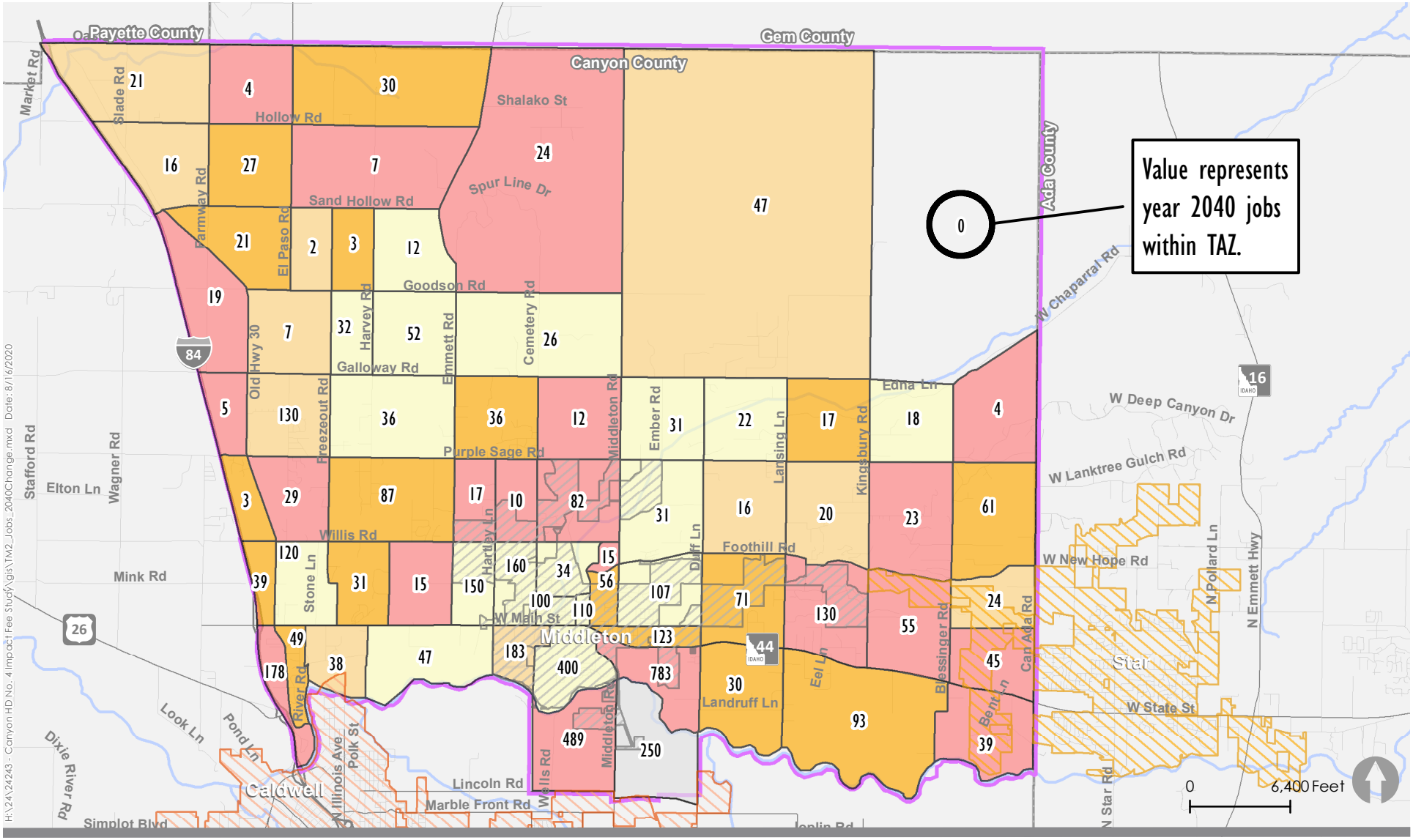
Year 2020 to 2040 Population Change by TAZ
Canyon County, ID



CHD4 Subdistrict No. 1 TIF Service Area
Caldwell City Limits
Middleton City Limits
Star City Limits

% Change from 2020 to 2040
Decreased 1% to 10%
Changed less than 1%
Increased 1% to 50%
Increased 50% to 100%
Increased 50% to 200%
Increased more than 200%
2040 TAZ Jobs

Figure 4

KITTELSON & ASSOCIATES

Year 2020 to 2040 Employment Change by TAZ
Canyon County, ID

Attachment B
Intersection Operations Supplemental Tools and Resources

ATTACHMENT B – Intersection Operations Supplemental Tools and Resources

This document discusses intersection operation methodologies that were examined in the development of the proposed methodology presented in Technical Memorandum #2. This document describes different tools, resources, and methodologies, including potential pros and cons

SERVICE VOLUME TABLE METHODOLOGY

Potential Strategy For All Intersection Types

Description: Create service volume thresholds with dummy HCS, Synchro, or Sidra files. Thresholds would be calculated by measuring the performance of certain intersection types based on different vehicle volume levels (assuming a default volume distribution).

Pros: Easy to implement in excel tool. Can customize thresholds.

Cons: Provides approximate analysis results. Requires time to develop. Results of analysis are not exact enough of an analysis to identify minor geometry improvements (like turn lanes).

Potential Strategy For Two-Way Stop Controlled Intersections

Description: Exhibit 10-29 of HCM 2000 (shown at the end of this document) provides a general service volume table that identifies LOS based on major and minor street peak hour volumes

Pros: Low level of effort to analyze intersections (tool is fully developed, easy to implement in excel tool). Applicable to most intersections in the service area.

Cons: Does not use most recent HCM methodology. Results of analysis are not exact enough of an analysis to identify minor geometry improvements (like turn lanes).

Potential Strategy For All-Way Stop Controlled Intersections

Description: Exhibit 77 from NCHRP 825 provides a general service volume graph, which identifies the critical movement delay based on major and minor street peak hour volumes.

Pros: Low level of effort to analyze intersections (tool is fully developed, easy to implement in excel tool). Uses most recent HCM 6th Edition methodology.

Cons: Results of analysis are not exact enough of an analysis to identify minor geometry improvements (like turn lanes). Limited number of AWSC intersections in service area.

OTHER TOOLS AND RESOURCES

Capacity Analysis for Planning of Junctions (CAP-X) Tool

Description: CAP-X is an excel tool that can be used to evaluate selected types of intersection/interchange designs using peak hour turning movement volumes. The intersections and interchanges are evaluated using the method of critical lane volume summation to provide planning capacity assessment (e.g., v/c ratio) for each intersection/interchange type. The tool implements HCM methodology. Example inputs and outputs are shown at the end of this document.

Pros: Free to use. Relatively low level of effort (approximately 30 minutes per intersection). Provides a moderate level of detail and comparison of intersection alternatives.

Cons: Does not provide LOS results. Limited ability to analyze the effect of minor geometric changes (like added turn lanes) on intersection operations.

SERVICE VOLUME TABLE EXAMPLES

EXHIBIT 10-29. EXAMPLE OF MINOR STREET SERVICE VOLUMES FOR FOUR-LEG INTERSECTION, TWO-WAY STOP
(SEE FOOTNOTE FOR ASSUMED VALUES)

Major Street 2-Way Volume (veh/h)	LOS				
	A	B	C	D	E
Minor Street Approach Service Volumes (veh/h), Major Street = 1 Lane Plus Turn Pockets, Minor Street = 1 Lane, No Turn Pockets					
500	N/A	90	220	260	300
1000	N/A	N/A	30	70	100
1500	N/A	N/A	N/A	N/A	N/A
Minor Street Approach Service Volumes (veh/h), Major Street = 1 Lane Plus Turn Pockets, Minor Street = 1 Lane, Plus Turn Pockets					
500	N/A	170	370	420	470
1000	N/A	N/A	60	130	180
1500	N/A	N/A	N/A	N/A	10
Minor Street Approach Service Volumes (veh/h), Major Street = 2 Lane Plus Turn Pockets, Minor Street = 1 Lane, No Turn Pockets					
500	N/A	120	240	300	340
1000	N/A	N/A	40	100	130
1500	N/A	N/A	N/A	N/A	20
Minor Street Approach Service Volumes (veh/h), Major Street = 2 Lane Plus Turn Pockets, Minor Street = 1 Lane, Plus Turn Pockets					
500	N/A	240	440	500	550
1000	N/A	N/A	110	180	230
1500	N/A	N/A	N/A	N/A	40

Figure 1 Exhibit 10-29 from HCM 2000

Exhibit 77. AWSC intersection planning method, street 1 delay, 20% turns, one-lane approaches.

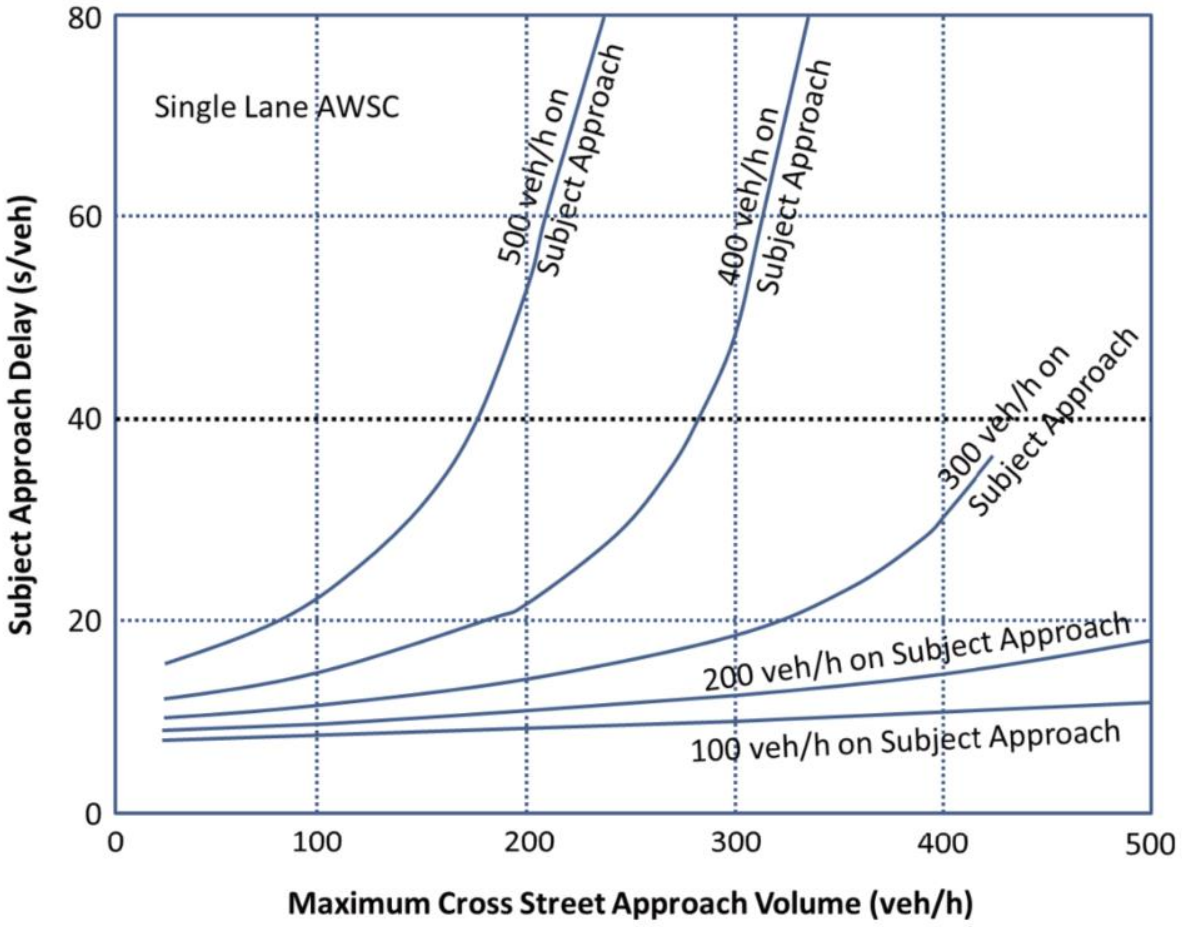


Figure 2 Exhibit 77 from NCHRP 825

CAP-X INPUT AND OUTPUT EXAMPLES

Traffic Volume Demand						
	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	30	200	50	2.00%	0.00%
Westbound	0	30	200	50	2.00%	0.00%
Southbound	0	30	200	50	2.00%	0.00%
Northbound	0	100	500	200	2.00%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		
Truck to PCE Factor				**Suggested = 2.00**	2.00	
Multimodal Activity Level			**Low**	**Multimodal Ped**	**Multimodal Bike**	
Critical Lane Volume Sum Limit	2-phase signal		**Suggested = 1800 (Urban), 1650 (Rural)**		**1800**	
	3-phase signal		**Suggested = 1750 (Urban), 1600 (Rural)**		**1750**	
	4-phase signal		**Suggested = 1700 (Urban), 1550 (Rural)**		**1700**	

Equivalent Passenger Car Volume				
	Volume (Veh/hr)			
	U-Turn	Left	Thru	Right
Eastbound	0	31	204	51
Westbound	0	31	204	51
Southbound	0	31	204	51
Northbound	0	102	510	204

Figure 3 CAP-X Example Input

Number of Lanes for Non-roundabout Intersections																	
TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	1	1		1	1	1		1	1	1		1	1	1
Two-Way Stop Control	N-S		1	1	1		1	1	1		1	1	1		1	1	1
	E-W		1	1	1		1	1	1		1	1	1		1	1	1
All-Way Stop Control	FULL		0	1	0		0	1	0		0	1	0		0	1	0
Continuous Green T	W		1	1				2	1		1		1				
	N						1		1		1	2				2	1
	E			2	1		1	2							1		1
	S		1		1							2	1		1	2	
Quadrant Roadway	S-W	Use the respective intersection tab(s) to specify the # of lanes inputs.															
	N-E																
	S-E																
	N-W																
Partial Displaced Left Turn	N-S		1	1	1		1	1	1		1	2	1		1	2	1
	E-W		1	2	1		1	2	1		1	1	1		1	1	1
Displaced Left Turn	FULL		1	2	1		1	2	1		1	2	1		1	2	1
Signalized Restricted Crossing U-Turn	N-S	1	1	2	1	1	1	2	1				1				1
	E-W				1				1	1	1	2	1	1	1	2	1
Unsignalized Restricted Crossing U-Turn	N-S	1	1	2	1	1	1	2	1				1				1
	E-W				1				1	1	1	2	1	1	1	2	1
Median U-Turn	N-S	1		2	1	1		2	1			2	1			2	1
	E-W			2	1			2	1	1		2	1	1		2	1
Partial Median U-Turn	N-S	1		2	1	1		2	1		1	2	1		1	2	1
	E-W		1	2	1		1	2	1	1		2	1	1		2	1
Bowtie	N-S			1	1			1	1			1	1			1	1
	E-W			1	1			1	1			1	1			1	1

Figure 4 CAP-X Example Input

Attachment C
Roadway Operations Supplemental Tools and Resources

ATTACHMENT C – Roadway Service Volume Tables and Process Used to Calculate Proposed Volumes

This attachment describes service volume tables and outlines the process of defining thresholds for CHD4's CIP/TIF.

DESCRIPTIONS OF OTHER SERVICE VOLUME TABLES

Highway Capacity Manual Generalized Daily Service Volume Tables

The HCM provides generalized daily service volumes for several facility types, including urban streets, two-lane highways, multi-lane highways, and basic freeway segments. Volume thresholds for each facility type are provided for different combinations of roadway characteristics, including number of lanes, posted speed limit, highway class (class I; class II), terrain (level; rolling), roadway context (urban; rural), and K- (peaking) and D- (directional) factors.

Florida Department of Transportation (FDOT) Generalized Service Volume Tables

The Florida Department of Transportation (FDOT) has developed generalized service volume tables based on the HCM methodology as part of its Quality/Level of Service Handbook (Q/LOS Handbook). These tables are recognized as the most extensively researched in the country and are used broadly at the planning level to provide high-level LOS analysis, including for initial identification of deficiencies and needs. FDOT provides daily, peak hour two-way, and peak hour directional service volumes for arterials, highways, and freeways in urbanized areas, transitioning/urban areas, and rural areas. FDOT released its 2020 Q/LOS Handbook to reflect changes stemming from the release of the HCM, 6th Edition.

Ada County Highway District's Street Service Capacity Guidelines

Ada County Highway District established LOS planning thresholds for its arterial streets by customizing the 2009 FDOT tables with local parameters. The ACHD service capacity guidelines provide peak hour volume LOS planning thresholds for different combinations of arterial type (principal arterials, minor arterials, PA/MA in Central Business District), roadway characteristics (continuous center left turn lane, median control, etc.), and number of lanes. These thresholds are embedded in the COMPASS Regional Travel Demand Model for Ada County to analyze future roadway operations.

DEVELOPING CHD4 SERVICE VOLUMES

Technical Memorandum #2 proposes service volumes developed using FDOT's 2020 service volume tables.

The study team spoke with current and former ACHD staff regarding the development of their CIP and corresponding service capacity guidelines to assess whether it was appropriate to utilize ACHD's existing guidelines. The team was able to learn that ACHD utilized the 2009 FDOT tables as a base, applying FDOT-provided adjustments and customizing parameters to better reflect local conditions. A spreadsheet was obtained that provided an early draft version of the tables, showing various adjustments to FDOT's raw values. However, we were unable to identify the specific adjustment factors to achieve the final values included in ACHD's service volume tables.

Considering this information, the study team decided to use a similar process to develop updated service volumes that reflect the 2020 FDOT tables and include values for facility types applicable to CHD4. Adjustments were applied to the base volumes depending on roadway characteristics, including facility type (state signalized roadway), number of lanes, presence of left turn lanes, etc. These adjustments are all based on FDOT recommendations.

The following assumptions were used to develop the proposed service volumes:

- Principal arterials are considered Class I arterials (as defined by FDOT).
- Minor arterials are considered Class II arterials (as defined by FDOT).
- Collectors are considered Class II arterials (as defined by FDOT). An additional 35% reduction from the raw values was applied per FDOT's 2009 Q/LOS adjustment for "Other Signalized Roadways".
- All roadway types are considered "Non-State Signalized Roadways" and values were reduced 10% accordingly.

The final service volumes are included in Table 3 in the memorandum.

OTHER SERVICE VOLUME TABLES

Highway Capacity Manual Generalized Daily Service Volume Tables[1]

Table 1 HCM Generalized Daily Service Volumes for Urban Street Facilities

K-Factor	*D*-Factor	Daily Service Volume by Lanes, LOS, and Speed (1,000 veh/day)											
		Two-Lane Streets				Four-Lane Streets				Six-Lane Streets			
		LOS B	LOS C	LOS D	LOS E	LOS B	LOS C	LOS D	LOS E	LOS B	LOS C	LOS D	LOS E
Posted Speed = 30 mi/h													
0.09	0.55	NA	1.7	11.8	17.8	NA	2.2	24.7	35.8	NA	2.6	38.7	54.0
	0.60	NA	1.6	10.8	16.4	NA	2.0	22.7	32.8	NA	2.4	35.6	49.5
0.10	0.55	NA	1.6	10.7	16.1	NA	2.0	22.3	32.2	NA	2.4	34.9	48.6
	0.60	NA	1.4	9.8	14.7	NA	1.8	20.4	29.5	NA	2.2	32.0	44.5
0.11	0.55	NA	1.4	9.7	14.6	NA	1.8	20.3	29.3	NA	2.1	31.7	44.1
	0.60	NA	1.3	8.9	13.4	NA	1.7	18.6	26.9	NA	2.0	29.1	40.5
Posted Speed = 45 mi/h													
0.09	0.55	NA	7.7	15.9	18.3	NA	16.5	33.6	36.8	NA	25.4	51.7	55.3
	0.60	NA	7.1	14.5	16.8	NA	15.1	30.8	33.7	NA	23.4	47.4	50.7
0.10	0.55	NA	7.0	14.3	16.5	NA	14.9	30.2	33.1	NA	23.0	46.5	49.7
	0.60	NA	6.4	13.1	15.1	NA	13.6	27.7	30.3	NA	21.0	42.7	45.6
0.11	0.55	NA	6.3	13.0	15.0	NA	13.5	27.5	30.1	NA	20.9	42.3	45.2
	0.60	NA	5.8	11.9	13.8	NA	12.4	25.2	27.6	NA	19.1	38.8	41.5

Notes: NA = not applicable; LOS cannot be achieved with the stated assumptions.
General assumptions include no roundabouts or all-way STOP-controlled intersections along the facility; coordinated, semiactuated traffic signals; Arrival Type 4; 120-s cycle time; protected left-turn phases; 0.45 weighted average *g/C* ratio; exclusive left-turn lanes with adequate queue storage provided at traffic signals; no exclusive right-turn lanes provided; no restrictive median; 2-mi facility length; 10% of traffic turns left and 10% turns right at each traffic signal; peak hour factor = 0.92; and base saturation flow rate = 1,900 pc/h/ln.
Additional assumptions for 30-mi/h facilities: signal spacing = 1,050 ft and 20 access points/mi.
Additional assumptions for 45-mi/h facilities: signal spacing = 1,500 ft and 10 access points/mi.

[1] Source: Highway Capacity Manual, 6th Edition (2016). Chapter 16. Exhibit 16-16.

Florida Department of Transportation Generalized Service Volume Tables[2]

Table 2 FDOT Generalized Peak Hour Directional Volumes for Urbanized Areas

2009

STATE SIGNALIZED ARTERIALS

Class I (>0.00 to 1.99 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	510	820	880	***
2	Divided	1,560	1,890	1,960	***
3	Divided	2,400	2,860	2,940	***
4	Divided	3,240	3,830	3,940	***

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	**	560	810	860
2	Divided	**	1,330	1,770	1,870
3	Divided	**	2,080	2,680	2,830
4	Divided	**	2,830	3,590	3,780

Class III/IV (more than 4.50 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	**	270	630	790
2	Divided	**	670	1,500	1,700
3	Divided	**	1,050	2,330	2,570
4	Divided	**	1,440	3,170	3,450

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)

Major City/County Roadways	- 10%
Other Signalized Roadways	- 35%

2020

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2

[2] Source: Florida Department of Transportation. *Quality/Level of Service Handbook* (2009 & 2020).

Table 3 FDOT (2012) Generalized Peak Hour Directional Volumes for Transitioning and Areas Over 5,000 Not in Urbanized Areas

2009

STATE SIGNALIZED ARTERIALS

Class I (>0.00 to 1.99 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	470	750	800	***
2	Divided	1,430	1,710	1,800	***
3	Divided	2,210	2,590	2,720	***

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	**	500	730	780
2	Divided	**	1,210	1,600	1,690
3	Divided	**	1,900	2,420	2,550

Class III (more than 4.50 signalized intersections per mile)

Lanes	Median	B	C	D	E
1	Undivided	**	250	570	710
2	Divided	**	610	1,360	1,540
3	Divided	**	960	2,120	2,340

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Major City/County Roadways - 10%
Other Signalized Roadways - 35%

2020

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	710	800	**
2	Divided	*	1,740	1,820	**
3	Divided	*	2,670	2,740	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	330	680	720
2	Divided	*	500	1,460	1,600
3	Divided	*	810	2,280	2,420

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional volumes in this table by 1.2

Ada County Highway District Street Service Capacity Guidelines

Table 4 ACHD Street Service Capacity Guidelines[3]

Principal Arterials (PA)	# of Lanes per Direction of Travel	Peak Hour Volume Level of Service Planning Thresholds D	E
No Left Turn Lane			
	1	600	690
Continuous Center Left Turn Lane			
	1	770	880
	2	1680	1780
	3	2560	2720
Median Control, Channelized Left Turn Lanes at Major Intersections			
	1	850	920
	2	1860	1960
	3	2800	3000
Minor Arterials (MA)	# Lanes	D	E
No Left Turn Lane			
	1	540	575
Continuous Center Left Turn Lane			
	1	675	720
	2	1395	1540
	3	2155	2370
Median Control, Channelized Left Turn Lanes at Major Intersections			
	1	710	770
	2	1465	1670
	3	2270	2530
PA/MA in Central Business District	# Lanes	D	E
One Way Street	1	680	850
	2	1360	1700
	3	2040	2550
	4	2720	3400

[3] Source: Ada County Highway District Capital Improvements Plan (2016).

Table 5 ACHD Level of Service Planning Thresholds for Roadway Segments (Peak Hour Volume)[4]

Functional Classification	Lanes		
		LOS D	LOS E
Principal Arterials			
No Left-Turn Lanes			
	1	600	690
Continuous Center Left-Turn Lane			
	1	770	880
	2	1680	1780
	3	2560	2720
Median-Control, Channelized Left-Turn Lanes @ Major Intersections			
	1	850	920
	2	1860	1960
	3	2800	3000
Minor Arterials			
No Left-Turn Lane			
	1	540	575
Unrestricted Median, Continuous Left-Turn Lane			
	1	675	720
	2	1395	1540
	3	2155	2370
Median-Control, Channelized Left-Turn Lanes @ Major Intersections			
	1	710	770
	2	1465	1670
	3	2270	2530
Collectors			
No Left-Turn Lanes			
	1	425	525
Unrestricted Median, Continuous Left-Turn Lane			
	1	530	660
	2	1080	1250

[4] Source: Ada County Highway District Policy Manual, 7106.4.1

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