TECHNICAL MEMORANDUM 4:

TRANSPORTATION ANALYSIS METHODS AND ASSUMPTIONS

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SUBJECT: Task 4.2: Transportation Analysis Methods and Assumptions
Tech Memo #4: Final

DKS Project 14180-023

The purpose of this memorandum is to establish the methods and assumptions to be used for the existing and future conditions transportation analysis for the Springfield Main Street (OR126 East) Safety Project. This memorandum summarizes the study intersections and describes the proposed methodology to calculate the peak hour, 2018 30th highest annual hour of traffic (30 HV), and forecasted 2040 volumes, and how the traffic analysis will be completed. The analysis that incorporates the methodology described in this memorandum will be summarized in Technical Memorandum 5: Existing Intersection Operations.

STUDY INTERSECTIONS

Traffic counts (to be summarized in the transportation existing conditions memorandum) were collected via video data collection at each of the following 15 study intersections during the morning (7:00 a.m. to 9:00 a.m.) and evening (4:00 p.m. to 6:00 p.m.) peak periods on Tuesday, May 22, 2018:

- Main Street (OR 126) / 21st Street
- Main Street (OR 126) / 28th Street
- Main Street (OR 126) / 30th Street
- Main Street (OR 126) / 32nd Street

DKS Angelo planning group ECONorthwest jla public involvement OBEC CONSULTING ENGINEERS RTE Roundabouts & Traffic Engineering

- Main Street (OR 126) / 35th Street
- Main Street (OR 126) / 36th Street
- Main Street (OR 126) / S. 41st Street
- Main Street (OR 126) / 42nd Street
- Main Street (OR 126) / 48th Street
- Main Street (OR 126) / S. 51st Street
- Main Street (OR 126) / 54th Street
- Main Street (OR 126) / Bob Straub Parkway
- Main Street (OR 126) / 58th Street
- Main Street (OR 126) / 62nd Place
- Main Street (OR 126) / 69th Street

TRAFFIC VOLUME DEVELOPMENT

Study intersection traffic operations will be analyzed using 30th highest hour traffic volume (30 HV) conditions. The 30 HV period is the typical analysis and design period to account for recurring peak seasonal trends (while not accounting for extreme peaks due to special events or incidents). The 30 HV development process for existing conditions includes determination of the system peak (AM and PM), and seasonal adjustments. The future volume development is based on the Lane Council of Governments (LCOG) Travel Demand Model.

Peak Hour Selection

The traffic count data indicates that the systemwide peak traffic volume occurs between 7:30 a.m. to 8:30 a.m. in the morning and 4:30 p.m. to 5:30 p.m. in the evening. Overall, the individual intersection peak of all study intersections is generally within 10 percent of the systemwide peak.

Development of Seasonal Factors

The traffic count data collected in Springfield in May 2018 represents a period where traffic volumes are slightly lower than peak summer conditions. Adjustments are required to reach the 30HV conditions using methodology from the ODOT *Analysis Procedures Manual (APM)*.

To determine when the summer conditions occur, data is first examined from Automatic Traffic Recorder (ATR) stations that record highway traffic volumes year-round. There is not an existing ATR along Main Street (OR 126 Business) in the study area; however, one exists nearby along OR 126 Bypass, approximately 1.5 miles north of OR126 Business within the City of Springfield (ATR #20-027). The average annual daily traffic at the nearby site is not within ten percent of traffic volumes for Main Street (OR 126), so based on APM guidance cannot be used to perform seasonal factoring.

Next, the ATR Characteristic Table was reviewed to identify an ATR with similar characteristics. The review produced no matches; therefore, we propose using the seasonal trend method to develop seasonal factors for the study intersections. The seasonal trend method averages seasonal trend groupings from the ATR Characteristics Table. For intersections along Main Street (OR 126) in the study area, the "commuter" trend will be applied. Volumes at these locations will be adjusted to 30HV based on a peak in June. This adjustment (1.02, or two percent increase[1]) is minor, given the limited variability of commuter routes, and the proximity of the count period (mid-May) to the peak period (mid-June).

Application of Season Factors to Local Streets

Commuting trips occur within Springfield and between Springfield and the nearby city of Eugene. As a result, peak seasonal trips traveling along OR 126 also impact the local roadway system in Springfield. Therefore, to best represent 30 HV volumes for study intersections, seasonal factoring will be applied. The "commuter" trend factor of 1.02 will be applied to all intersection movements.

2040 Volume Forecasting

Forecasted traffic volumes will be developed using the latest LCOG model for 30 HV conditions in 2040, which will provide a 20-year planning horizon. The LCOG travel demand model is consistent with other regional assumptions (e.g., Comprehensive Plan growth and planned transportation network) and will be utilized as the primary tool to estimate future travel demand in Springfield. Future year 2040 baseline motor vehicle volumes will be developed and post-processed using National Cooperative Highway Research Program (NCHRP) Report 765 guidelines. The resulting volumes will be used in the future volume traffic operations analysis.

TRAFFIC ANALYSIS

Traffic operations (Level of Service [LOS] and Volume to Capacity [v/c]) will be analyzed for all study intersections for existing (2018) and future (2040) conditions. The Highway Capacity Manual (HCM), Sixth Edition methodology will be used for signalized and unsignalized intersections.

Intersection Mobility Targets

All intersections in the study area are under State jurisdiction and must comply with the v/c ratios in the Oregon Highway Plan (OHP). The ODOT v/c targets are based on highway classification and posted speeds (see Table 3). All intersections are classified as statewide highway category and the v/c target is 0.85 at the intersection of Bob Straub Parkway, 0.90 for all other signalized intersections, and 0.95 for the minor (stop-controlled) approached. The City of Springfield's mobility target is based on delay and is LOS D.

[1] 2017 Seasonal Factor Table: 15-May = 0.9123, 1-Jun = 0.9016, 15-Jun = 0.8910. Count date of May 23 is approximately midway between May 15 and June 1. Therefore, seasonal factor for peak period based on count date is [(0.9123+0.9016)/2] / 0.8910 = 1.0179 or 1.02

Table 3: Main Street (OR 126) Study Intersection Mobility Targets

Number	Location	Intersection Control	Mobility Target (ODOT)	Mobility Target (City of Springfield)
1	21st Street	Signalized	0.90 v/c	LOS D
2	28th Street	Signalized	0.90 v/c	LOS D
3	30th Street	Un-signalized	Highway Approaches 0.90 v/c; Side Street Approaches 0.95 v/c	LOS D
4	32nd Street	Signalized	0.90 v/c	LOS D
5	35th Street	Un-signalized	Highway Approaches 0.90 v/c; Side Street Approaches 0.95 v/c	LOS D
6	36th Street	Un-signalized	Highway Approaches 0.90 v/c; Side Street Approaches 0.95 v/c	LOS D
7	S. 41st Street	Un-signalized	Highway Approaches 0.90 v/c; Side Street Approaches 0.95 v/c	LOS D
8	42nd Street	Signalized	0.90 v/c	LOS D
9	48th Street	Un-signalized	Highway Approaches 0.90 v/c; Side Street Approaches 0.95 v/c	LOS D
10	S. 51st Street	Un-signalized	Highway Approaches 0.90 v/c; Side Street Approaches 0.95 v/c	LOS D
11	54th Street	Signalized	0.90 v/c	LOS D
13	Bob Straub Parkway	Signalized	0.85 v/c	LOS D
12	58th Street	Signalized	0.90 v/c	LOS D
14	62nd Place	Signalized	0.90 v/c	LOS D
15	69th Street	Signalized	0.90 v/c	LOS D

Analysis Parameters

Parameters for traffic analysis will be gathered using varying sources and methodologies. Data needed will be gathered via field work, collected traffic volume data, aerial photos, GIS, ODOT inventory, and the 2011 Springfield Main Street (OR126) Safety Study. Table 4 lists some of the possible sources that will be used on specific parameters.

Table 4: Analysis Parameters

Parameter	Description	Source
Intersection / Roadway Geometry	# of lanes, lane configuration, cross-sectional information	Field work, Highway inventory report, Digital video log, aerial photos, TSP, ODOT TransGIS
Operational Data	Posted speeds, intersection control	Field work, Digital video log, aerial photos, TSP
Peak Hour Factor	Peak Hour Factor	Calculated from traffic counts
Traffic Volumes	30 HV	Calculated from new counts; LCOG model
Traffic Operations	v/c, LOS, delay (seconds)	Calculated using HCM 6 methodology for signalized intersections and un-signalized intersections
Ideal Saturation Flows	Ideal saturation flow settings for signalized intersection operation analysis	Default values of 1900 pcpl will be used for area within the MPO

Analysis Software

The following analysis software is proposed:

- Traffic Analysis (HCM 6 methods) – Synchro and SimTraffic version 10

Corridor Freight Activity

Freight activity along the corridor will be reported using two sources. First, peak hour traffic counts at study intersections will be used to provide a general level (percentage) of heavy vehicles at study intersections during the peak hours. Secondly, information from the Oregon Statewide Integrated Model (SWIM2) will be used to provide an approximation of corridor use.

An overview[2] of SWIM is provided on the ODOT Technical Tools website, which includes additional documentation about SWIM:

> *The Oregon Statewide Integrated Model, or SWIM, is an integrated land use transport model covering the entire State of Oregon. It is a second generation model, drawing on previous work done on the First Generation based Statewide Model and the Eugene-Springfield UrbanSim Model. The SWIM2 model incorporates the interaction between Oregon's economy, land use and transportation systems using a set of connected modules that cover different components of the full system.*
>
> - *Economic Model: determines the growth of the state's economy.*
> - *Population Synthesizer.*
> - *Location Model: allocates business productions and transactions.*
> - *Aggregate Land Development: identifies land availability.*
> - *Person travel.*
> - *Commercial goods transport.*
> - *External goods transport.*

TPAU will conduct a select link analysis within SWIM2 to determine attributes of the freight flows along the corridor, which may include: the general origin/destination, approximate daily/annual flows, and commodity. These attributes would be based on aggregated daily/annual flows from the model and would not provide detail for individual freight trips. The specific freight information and detail reported from SWIM2 will be determined through coordination with TPAU following TPAU review of the model outputs in this area.

[22] https://www.oregon.gov/ODOT/Planning/Pages/Technical-Tools.aspx