Janesville Area
2015-2050 Long Range Transportation Plan

STREETS & HIGHWAYS APPENDIX

Contents

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Subject: Metropolitan Planning Organzation (MPO) Level of Service (LOS) Analysis Guide
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Abstract: This document provides guidance for MPO employees who wish to conduct LOS or delay analyses from Travel Demand Model (TDM) output shapefiles received from the Traffic Forecasting Section (TFS). Descriptions of all included fields and codes are given along with methods for producing the same LOS display as seen on the PDF LOS maps provided to the MPO by the TFS.

Data Description

The TFS will provide formatted TDM output shapefiles to the MPO for:

1) Base Year LOS
2) Future Year No-Build LOS (Committed Projects Only)
3) Future Year Build LOS (Committed and Planned Projects)
    a. For multiple build scenarios, a shapefile will be provided for each scenario
    b. If there are no planned projects, only items 1) and 2) will be provided
4) Combined Base and Future Year VMT, VHT, and Delay

These shapefiles are created from the same files used by the TFS to develop the LOS maps provided with the TDM output shapefiles, but are formatted to remove unnecessary information and improve ease-of-use.

The fields contained in these shapefiles are described in Table 1.

Field Name	Description
A	"A" Node ID
B	"B" Node ID
COUNT	Observed Count at location
B_LINKCLASSN	Base-Year Link Functional class
B_AREA	Base-Year Link Area Type
B_LANES	Base-Year Link Number of Lanes
B_SPEED	Base-Year Link Uncongested Speed
B_CROSS	Base-Year Link Cross-Section Type
B_TOTAL	Base Year Link Total Modeled Volume
B_CTIME	Base-Year Link Congested Travel Time (minutes)
B_CSPD	Base-Year Link Congested Speed
B_VMT	Base-Year Link Vehicle Miles Travelled
B_VHT	Base-Year Link Vehicle Hours Travelled
DISTANCE	Link Distance (miles)
NEWLINK	Flag to indicate whether link is added/removed and committed/planned
F_LINKCLASSN	Future-Year Link Functional class
F_AREA	Future-Year Link Area Type
F_LANES	Future-Year Link Number of Lanes
F_SPEED	Future-Year Link Uncongested Speed
F_CROSS	Future-Year Link Cross-Section Type
F_TOTAL	Future Year Link Total Modeled Volume
F_CTIME	Future-Year Link Congested Travel Time (minutes)
F_CSPD	Future-Year Link Congested Speed
ADTCLASS	Identifier for Link LOS Thresholds (Based on Area, Lanes, Speed, and Cross)
F_VMT	Future-Year Vehicle Miles Travelled
F_VHT	Future-Year Vehicle Hours Travelled
ADT_C	One-Way LOS ABC Threshold
ADT_D	One-Way LOS D Threshold
ADT_E	One-Way LOS E Threshold
TWO_WAY_ID	Unique ID to Identify Pairs of Links that belong to the Same Undivided or Two-Way Left Turn Lane (TWLTL) Facility
ADT_C2	Two-Way LOS ABC Threshold
ADT_D2	Two-Way LOS D Threshold
ADT_E2	Two-Way LOS E Threshold
B_LOS_FIN	Base Year Final LOS Assignment (Based on One/Two Way Facility)
F_LOS_FIN	Future Year Final LOS Assignment (Based on One/Two Way Facility)
B_VOL_FIN	Base Year Final Modeled Volume (Based on One/Two Way Facility)
F_VOL_FIN	Future Year Final Modeled Volume (Based on One/Two Way Facility)
B_NCVHT	Base Year Link Uncongested VHT
F_NCVHT	Future Year Link Uncongested VHT
B_CTM_HR	Base Year Link Delay (B_VHT – B_NCVHT)
F_CTM_HR	Future Year Link Delay (F_VHT – F_NCVHT)
B_VMT2	Base-Year Two-Way Vehicle Miles Travelled
B_VHT2	Base-Year Two-Way Vehicle Hours Travelled
B_NCVHT2	Base Year Two-Way Uncongested VHT
B_CTM_HR2	Base Year Two-Way Delay
F_VMT2	Future-Year Two-Way Vehicle Miles Travelled
F_VHT2	Future-Year Two-Way Vehicle Hours Travelled

F_NCVHT2	Future Year Two-Way Uncongested VHT
F_CTM_HR2	Future Year Two-Way Delay

Table 1: TDM Output Shapefile Field Descriptions

Notes:

- For two links with the same "TWO_WAY_ID", the "A" node of the first link will be the "B" node of the second link and the "B" node of the first link will be the "A" node of the second link.
    - Divided and One-way links are assigned a "TWO_WAY_ID" but will not share this ID with any other link.
- "ADT_C2/D2/E2" are calculated by adding "ADT_C/D/E" for both links with the same "TWO_WAY_ID" (ADT_C2 = ADT_C_{Link1} + ADT_C_{Link2} where Link1 and Link2 are a two-way pair)
    - Divided and One-way links have a value of zero for "ADT_C2/D2/E2"
- "B/F_LOS_FIN" is determined using one-way thresholds for divided and one-way links and two-way thresholds for TWLTL and two-way links

The "B/F_LINKCLASSN", "B/F_AREA", "B/F_CROSS" , "NEWLINK", and "ADTCLASS" fields use codes for functional classification, area type, road cross-section, to indicate whether a link is added or removed in the planned or committed conditions, and to determine LOS thresholds. These codes are described in Tables 2 through 6.

Table 7 provides a translation of each LOS designation to the corresponding qualitative level of congestion.

LINKCLASS	DESCRIPTION
1	Interstate
2	Freeway
3	Ramp
4	Expressway
11	Urban Principal Arterial
12	Urban Minor Arterial
13	Urban Collector
14	Urban Local
21	Rural Principal Arterial
22	Rural Minor Arterial
23	Rural Major Collector
24	Rural Minor Collector
25	Rural Local

Table 2: Linkclass Field Code Descriptions

AREA	DESCRIPTION
10	Rural
20	Suburban
30	Urban
40	Dense Urban

Table 3: Area Field Code Descriptions

CROSS-SECTION	DESCRIPTION
0	Undivided
1	Divided
2	Two-Way Left Turn Lane (TWLTL)
3	One-Way

Table 4: Cross-Section Field Code Descriptions

NEWLINK	DESCRIPTION
-2	Removed in "Planned" scenario
-1	Removed in "Committed" scenario
0	Existing link
1	Added in "Committed" scenario
2	Added in "Planned" scenario

Table 5: Newlink Field Code Descriptions

ADT CLASS	LOS ADT THRESHOLDS (MAX)			
	ABC	D	E	F
1	26,900	37,450	44,250	> 44,250
2	45,150	61,000	71,100	> 71,100
3	63,450	82,850	90,050	> 90,050
4	29,400	38,400	45,800	> 45,800
5	48,900	62,400	73,150	> 73,150
6	68,450	84,500	97,500	> 97,500
7	30,050	38,200	44,750	> 44,750
8	49,900	62,150	71,800	> 71,800
9	69,750	84,150	95,750	> 95,750
10	23,000	30,500	36,000	> 36,000
11	35,000	46,500	54,500	> 54,500
12	23,850	30,600	34,000	> 34,000
13	35,950	46,000	51,150	> 51,150
14	7,100	8,050	8,800	> 8,800
15	14,200	16,100	17,600	> 17,600
16	7,500	8,450	9,300	> 9,300
17	7,500	8,450	9,300	> 9,300
18	10,200	11,650	12,950	> 12,950
19	20,400	23,300	25,900	> 25,900
20	13,150	14,950	16,600	> 16,600
21	13,900	15,850	17,550	> 17,550
22	20,450	23,150	25,600	> 25,600
23	40,900	46,300	51,200	> 51,200
24	26,900	30,400	33,550	> 33,550
25	53,800	60,800	67,100	> 67,100
26	8,050	11,500	15,200	> 15,200
27	11,550	16,650	22,350	> 22,350
28	4,350	7,600	15,200	> 15,200
99	999,999	999,999	999,999	999,999

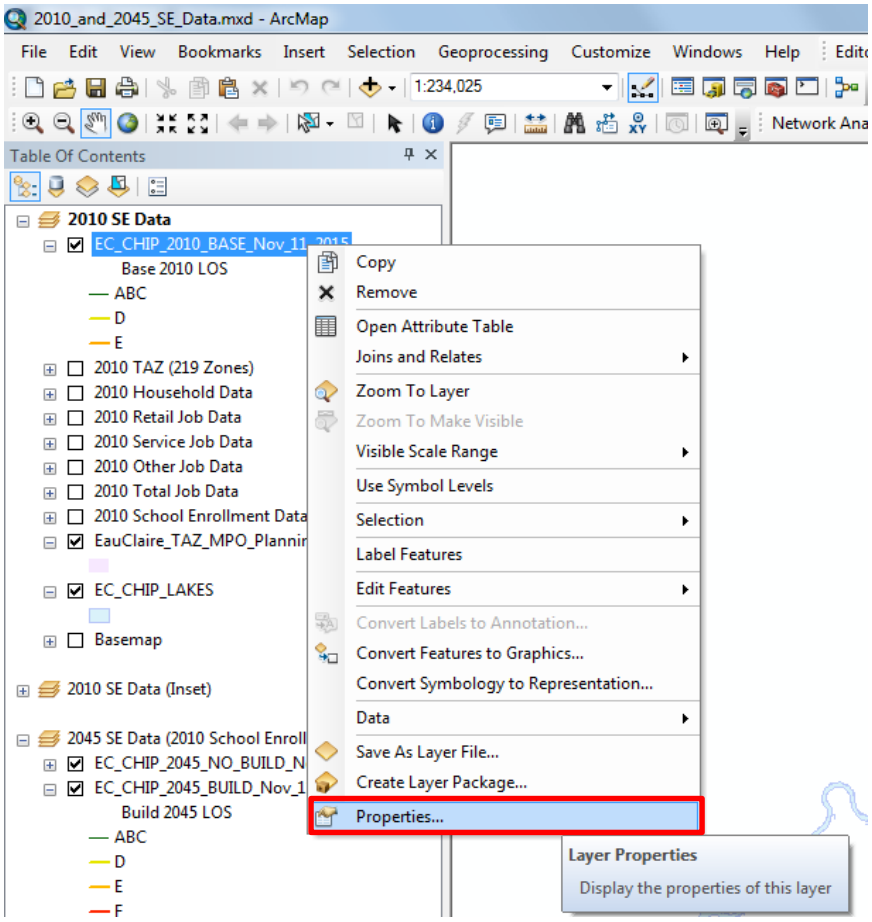
Table 6: ADTCLASS Field Code Lookups

LOS DESIGNATION	DESCRIPTION
ABC	Uncongested
D	Slightly Congested
E	Moderately Congested
F	Severely Congested

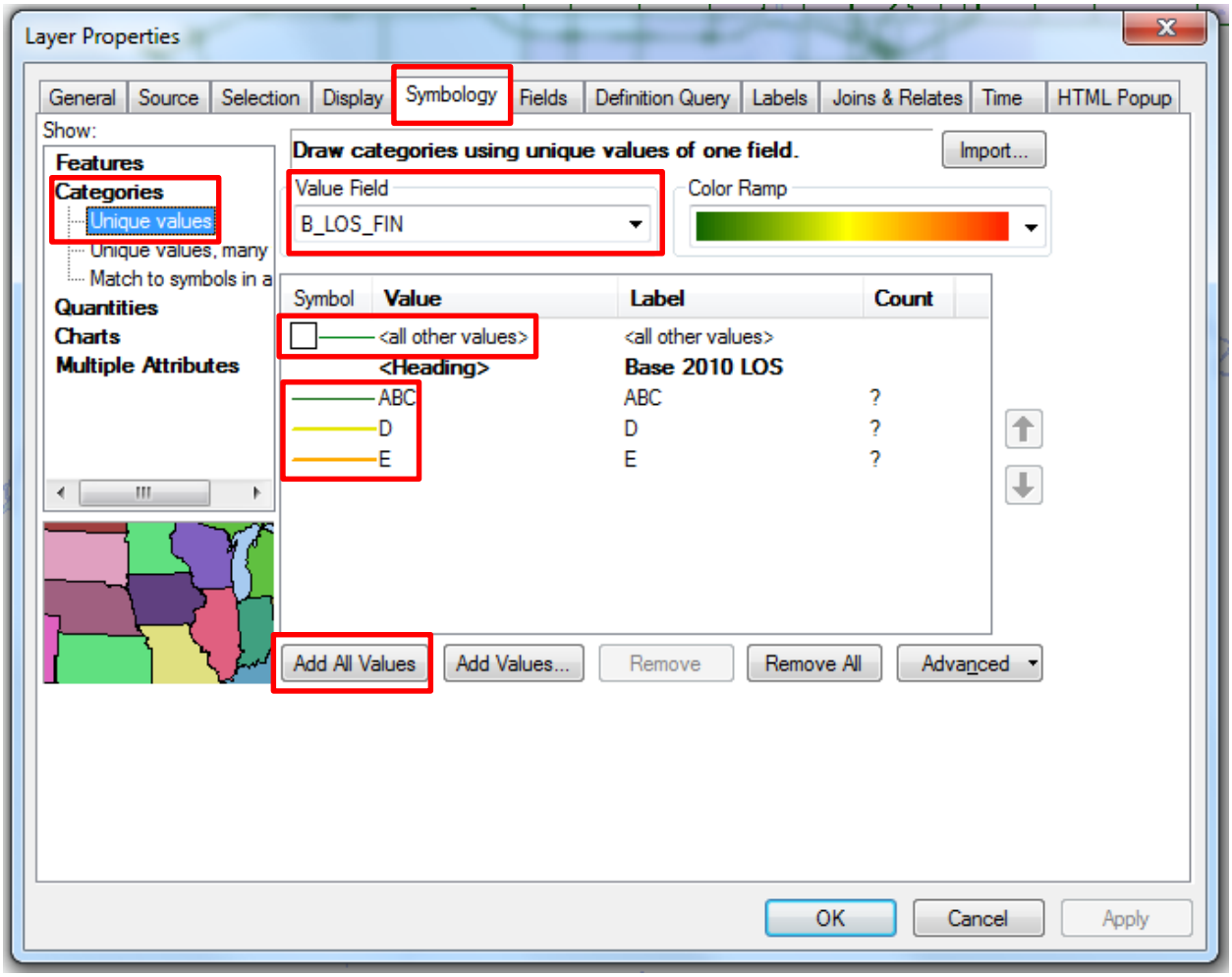
Table 7: LOS Field Code Descriptions

ArcMap LOS Display Methodology

The following pages describe the procedure for creating the LOS display used in the maps provided by the TFS to the MPO. This is intended to help the MPO conduct independent LOS analyses for internal use.



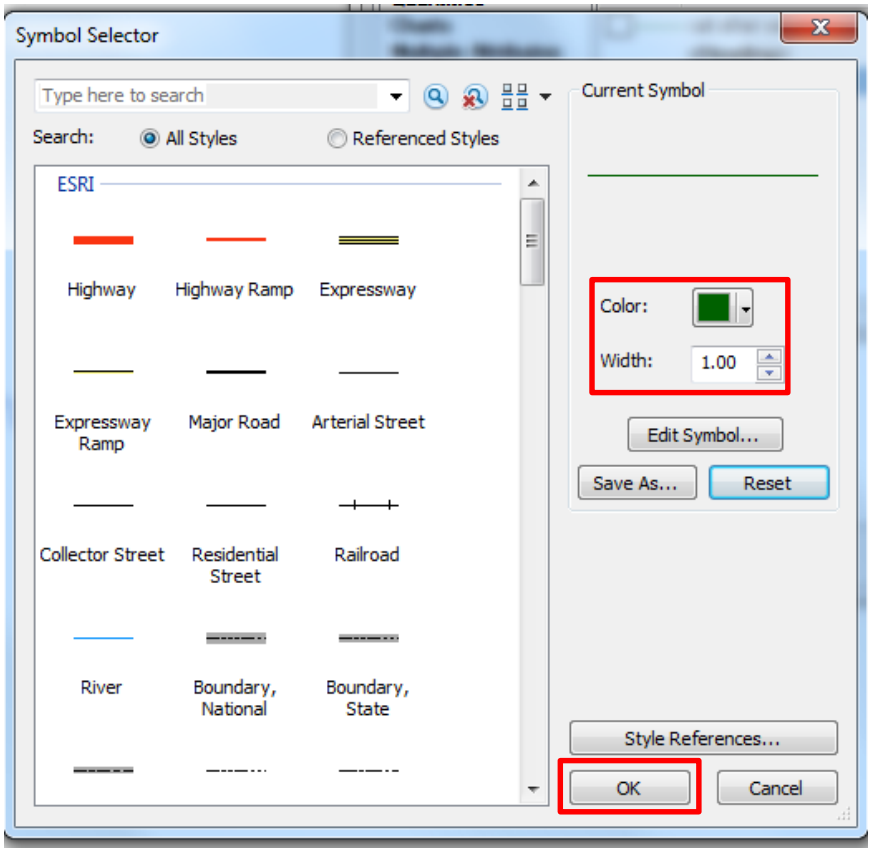
Right-Click the Data Layer and Select "Properties"



1) **Click the "Symbology" Tab (TOP),**
2) **Select "Categories→Unique Values" (LEFT),**
3) **Choose "B/F_LOS_FIN" from "Value Field"**
4) **Click "Add All Values"**
5) **Un-Check "(all other values)"**
6) **Double Click Colored Line(s) in Symbol Column**

Note:

- For Base Year LOS, use "B_LOS_FIN"
- For Future Year LOS, use "F_LOS_FIN"
- Only LOS values found in the data layer will be assigned symbols (e.g. if there are no LOS F links, LOS F will not appear as a category or be assigned a symbol).



1) **Adjust "Color" and "Width" to Match Table 6**
2) **Click "OK"**
3) **Repeat for all available LOS Designations**

LOS DESIGNATION	COLOR	WIDTH
ABC	Green	1.00
D	Yellow	1.25
E	Orange	1.25
F	Red	1.25

Table 6: LOS Designation Symbol Specifications

For questions regarding TDM output shapefiles, LOS calculations, or anything else covered in this guide, please contact Vu Dang or Ethan Frost.

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Calculations for local and state modeled project cost estimates (per mile) were acquired from the Historic Statewide Estimated Highway Improvement and Item Costs (September 2014), a document produced by WisDOT. ArcGIS was used to measure the approximate length of the project. For state projects, the **Miles** of road work is multiplied by the **Cost Estimate** (per mile) to find the **Total Miles Cost**. A **Contingency**, **Research and Engineering (R/E)**, and **Utilities** cost can be found by multiplying 15%, 8%, and 5%, respectively, with the **Total Miles Cost**. The sum of the **Contingency, Research and Engineering, Utilities**, and **Total Miles Cost** will be the aggregated **Final Cost (Yr. 2015).**

Miles = found using ArcGIS and ruler tool
Total Miles Cost = Miles x Cost Estimate
Contingency = 0.15 x Total Miles Cost
R/E = 0.08 x Total Miles Cost
Utilities = 0.05 x Total Miles Cost

Final Cost (Yr. 2015) = **Miles + Total Miles Cost + Contingency + R/E + Utilities**

State Expansion and New Road Projects								
Project	**Location/Segment**	**Miles**	**Cost Estimate (per mile)**	***Total Miles Cost***	***Contingency***	***R/E***	***Utilities***	**Final Cost (Yr. 2015)**
USH 14	**Wright to STH 11 4 lane divided**	3.68	$ 1,500,000	*$ 5,520,000*	*$ 828,000*	*$ 441,600*	*$ 276,000*	$ 7,065,600
USH 14	**Wright to USH 51 6 lane divided**	3.24	$ 1,500,000	*$ 4,860,000*	*$ 729,000*	*$ 388,800*	*$ 243,000*	$ 6,220,800
USH 51	**Blackbridge to STH 14 4 lane undivided**	1.79	$ 1,500,000	*$ 2,685,000*	*$ 402,750*	*$ 214,800*	*$ 134,250*	$ 3,436,800
Westside Bypass	**New 4 lane Court to USH 14**	3.54	$ 11,666,000	*$ 41,297,640*	*$ 6,194,646*	*$ 3,303,811*	*$ 2,064,882*	$ 52,860,979
State Reconstruction								
USH 51	**Court to Joliet**	1.56	$ 1,500,000	*$ 2,340,000*	*$ 351,000*	*$ 187,200*	*$ 117,000*	$ 2,995,200
STH 26	Centerway to 800' N of Randolph/Kennedy	1.4	$ 1,500,000	*$ 10,345,900*	*$ 1,551,885*	*$ 827,672*	*$ 517,295*	$ 13,242,752

To estimate the future cost of the modeled project the Future Value Formula is used to determine the cost of the project in the year it is expected to be constructed.

$FV = PV \times (1 + r)^n$

PV = Present Value or cost of road project today (yr. 2015)
r = rate of inflation
n = number of years

State Expansion and New Road Projects					
Project		**Location/Segment**	**Final Cost (Yr. 2015)**	**Final Cost (Yr. 2030)**	**Final Cost (Yr. 2050)**
USH 14	**E**	**Wright to STH 11 4 lane divided**	$ 7,065,600	$ 10,166,213	$ 15,660,161
USH 14	**E**	**Wright to USH 51 6 lane divided**	$ 6,220,800	$ 8,950,687	$ 13,787,751
USH 51	**E**	**Blackbridge to STH 14 4 lane undivided**	$ 3,436,800	$ 4,944,978	$ 7,617,307
Westside Bypass	**New**	**New 4 lane Court to USH 14**	$ 52,860,979	$ 76,058,077	$ 117,160,815
State Reconstruction					
USH 51	**P**	**Court to Joliet**	$ 2,995,200	$ 4,309,590	$ 6,638,547
STH 26	P	Centerway to 800' N of Randolph/Kennedy	$ 13,242,752	$ 19,054,098	$ 29,351,171

$FV_{2030} = \$7{,}065{,}600 \times (1 + 0.023)^{16}$

$FV_{2030} = 10{,}166{,}213$

2015 to 2030 is 16 years, therefore the numbers of years used is 16 for "n"

Resurfacing Program Discussion 2/14/14

Attendees: Terry Nolan, Dennis Ryan, Duane Cherek

The resurfacing program addresses city owned streets using a local budget of general fund, borrowing, or a combination. Streets to be improved using Local Road Improvement Program (LRIP) or Surface Transportation Program (STP) are not included in the resurfacing budget.

Streets selected for resurfacing are chosen largely by pavement condition. Other factors include citizen complaints, a desire to geographically disperse improvements throughout the city, and economy of scale (multiple blocks instead of just one block of resurfacing).

The process begins with a review of PASER ratings. PASER is a system of rating streets from 1 (failed roadway needing reconstruction) to 10 (excellent condition and usually new construction); Streets rated 3 or 4 indicate a pavement where structural improvement such as overlay is considered. A city map is made showing segments of streets rated 5 or less.

Street rehabilitation goals need be considered to reduce reconstruction cost burdens. Streets typically have a life expectancy between 22-25 years before it falls into PASER 5 or "fair" conditions. It is important to identify streets categorized as "fair" due to their higher rates of degradation. Neglecting "fair" or PASER 4 and 5 condition streets would result in an exponentially higher cost to rehabilitate "very poor" and "failed", or PASER 2 and 1, conditioned streets. By setting goals of 11-13 miles of rehabilitated streets per year, the cost burdens of multiple or high volumes of street rehabilitation would be reduced and spread across multi-year rehabilitation projects.

The City Engineer has recommended the following to City Council:

- Resurface local residential streets only if they are a 3 or below
- Resurface arterial streets only if they are a 4 or below
- Do not resurface a street that is scheduled for reconstruction

Issues regarding adding bike lanes to a street

- There is no policy to implement bike lanes. Bike lanes have been added to streets on a case by case basis, usually at the request of the City Engineer. In some cases bike lanes were added at the time it was resurfaced (Wright Road) but not always (E. Milwaukee).
- Public input and notice to affected property owners is required if parking will be removed. There is often a negative response when parking is removed.
- Resurfacing is often done at small stretches of a few blocks at a time. There was discussion about the utility of putting in bike lanes for a few blocks vs. making a longer more logical stretch. Further discussion needed.

- There was discussion about the recommendations in the Long Range Plan. While some streets are clearly recommended for bike lanes (Kellogg) others are labeled “wide curb lanes” with description that they may be considered for bike lanes. There was discussion about how a street should be evaluated. Further discussion needed.