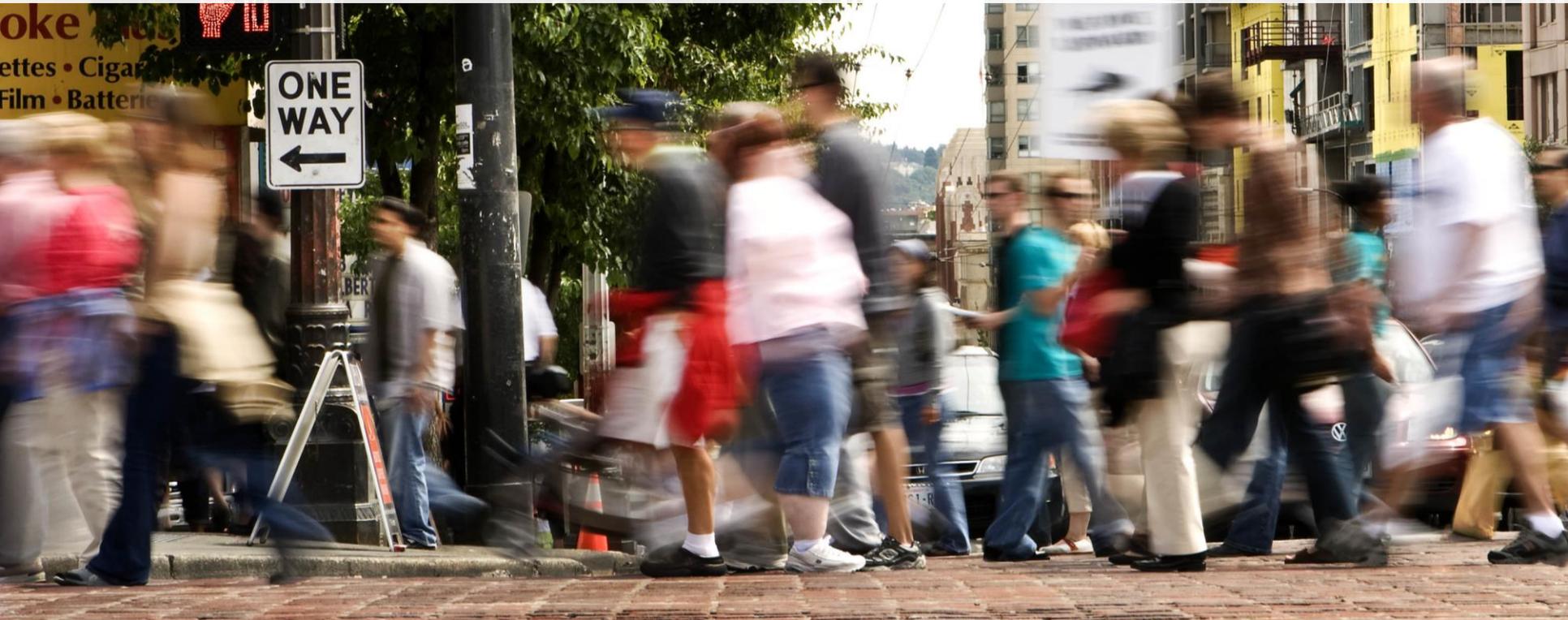


15th Avenue NW Transit Lane

D Line Upgrades



Freight Advisory Board

Jonathan Dong

March 17, 2015

Our mission, vision, and core values

Mission: deliver a high-quality transportation system for Seattle

Vision: connected people, places, and products

Committed to **5 core values** to create a city that is:

- Safe
- Interconnected
- Affordable
- Vibrant
- Innovative

Presentation overview

- Background
- Project area
- Proposal
- Next steps

Background

- D Line began service in fall 2012
- D Line experiences delay through Ballard
- SDOT identified set of measures to improve travel time



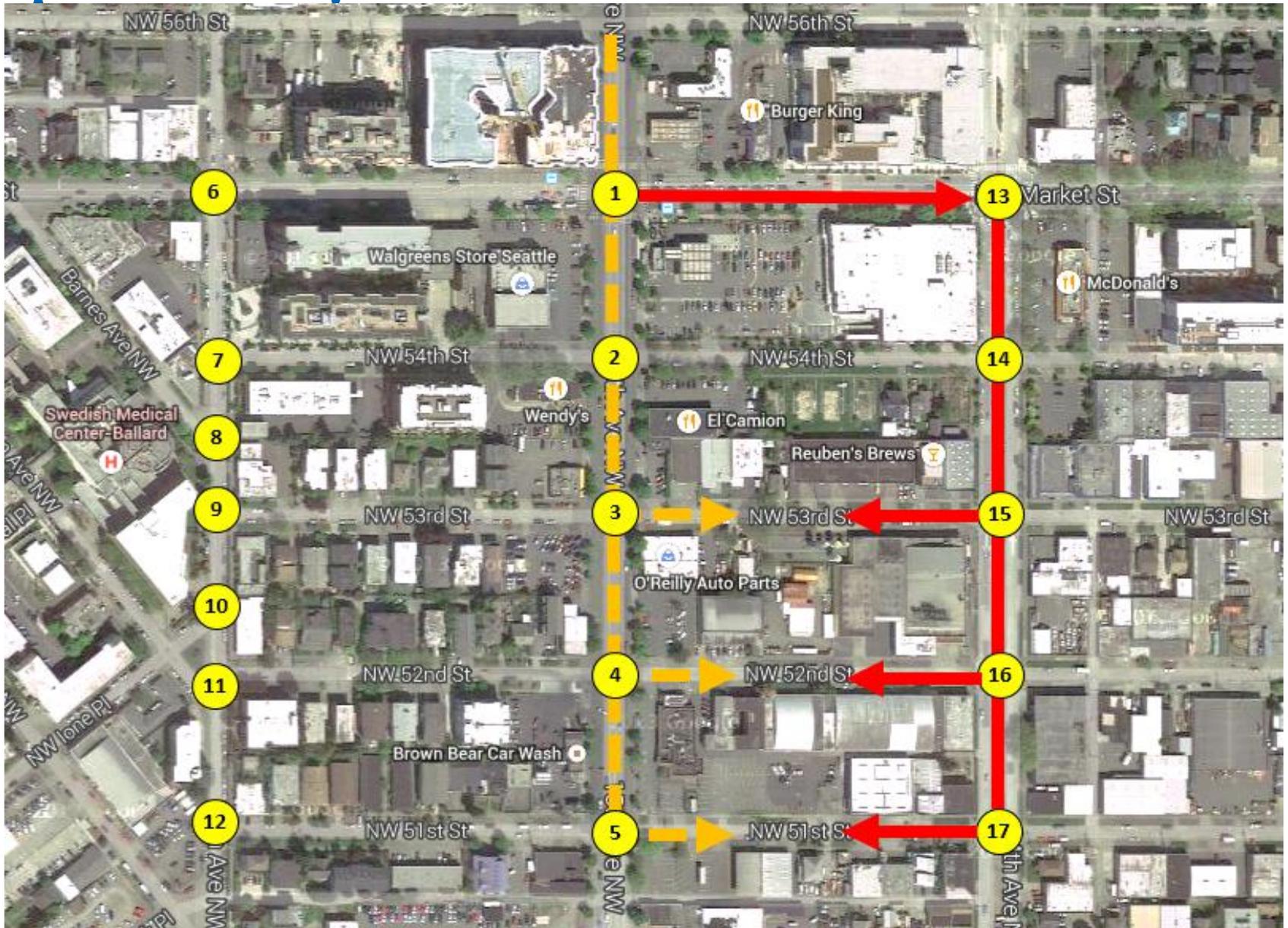
Project area



Northbound re-routing



Southbound re-routing



Existing conditions – traffic operations

Existing Conditions (2015) - Intersection Analysis Summary

Number	Intersection	Control	Existing AM			Existing MIDDAY			Existing PM		
			LOS	Delay (s)	Movement	LOS	Delay (s)	Movement	LOS	Delay (s)	Movement
1	15TH AVE NW & MARKET ST	Signal	D	38.7	-	D	38.7	-	D	35.0	-
2	15TH AVE NW & NW 54TH ST	TWSC	n/a	n/a		n/a	n/a		n/a	n/a	
3	15TH AVE NW & NW 53RD ST	TWSC	F	63.6	WB	C	21.8	WB	C	20.1	WB
4	15TH AVE NW & NW 52ND ST	TWSC	F	357.6	WB	F	74.0	EB	F	67.5	EB
5	15TH AVE NW & NW 51ST ST	TWSC	D	29.2	EB	E	37.4	WB	D	27.1	WB
6	17TH AVE NW & MARKET ST	Signal	B	12.5	-	B	13.8	-	B	16.2	-
7	17TH AVE NW & NW 54TH ST	TWSC	B	10.2	WB	B	11.3	WB	B	12.7	WB
8	17TH AVE NW & BARNES AVE	TWSC	A	9.9	EB	B	10.0	EB	B	10.5	EB
9	17TH AVE NW & NW 53RD ST	TWSC	B	10.1	WB	B	10.7	WB	B	11.9	WB
10	17TH AVE NW & NW LONE PL	TWSC	B	11.1	EB	B	11.1	EB	B	13.7	EB
11	17TH AVE NW & NW 52ND ST	TWSC	B	12.4	EB	B	12.4	EB	C	15.3	EB
12	17TH AVE NW & NW 51ST ST	TWSC	A	9.5	WB	A	9.9	WB	B	11.3	WB
13	14TH AVE NW & MARKET ST	Signal	B	18.4	-	B	15.5	-	B	15.4	-
14	14TH AVE NW & NW 54TH ST	TWSC	C	24.6	WB	C	23.8	EB	D	25.6	EB
15	14TH AVE NW & NW 53RD ST	TWSC	E	37.5	EB	E	37.6	EB	E	37.5	EB
16	14TH AVE NW & NW 52ND ST	TWSC	E	45.1	EB	E	46.0	EB	F	57.0	EB
17	14TH AVE NW & NW 51ST ST	TWSC	F	89.8	EB	E	37.4	EB	F	270.1	EB

Conditions with BAT lane

– conclusions

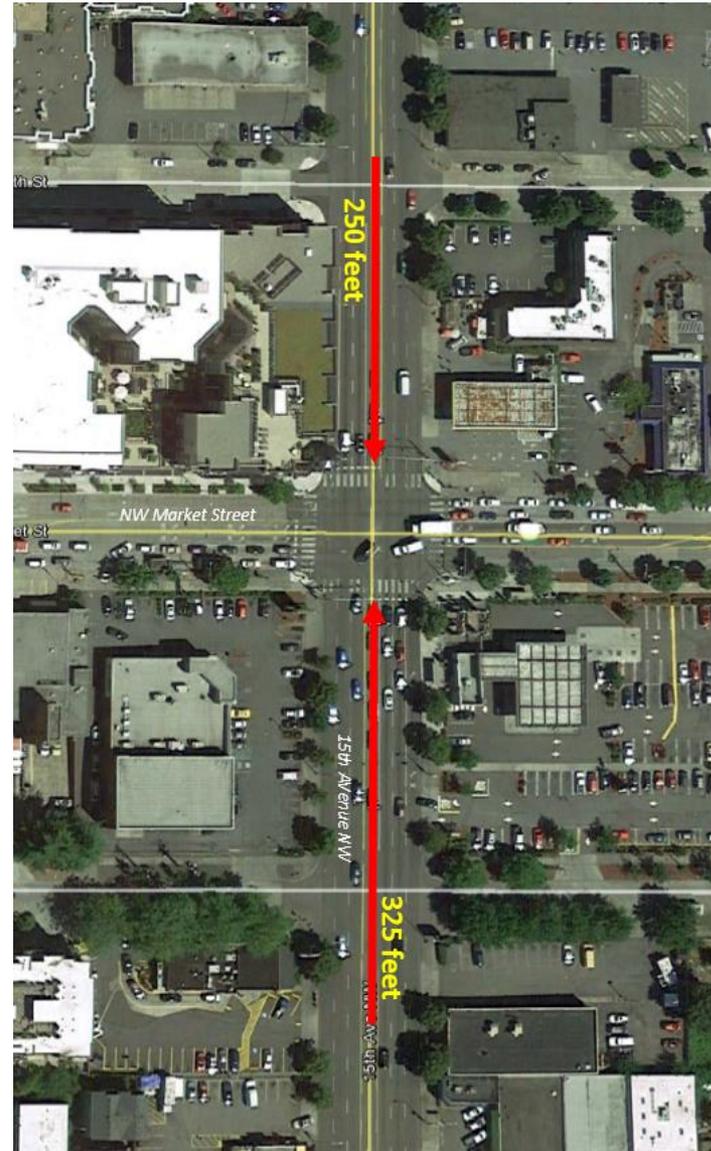
- Left-turn movement queues at 15th Avenue NW/Market Street may increase slightly

95th % Queues (feet)

AM PEAK	SBL	NBL
Existing Condition	125	150
Without Center TWLTL	150	250
<i>Difference</i>	25	100

MIDDAY PEAK	SBL	NBL
Existing Condition	175	175
Without Center TWLTL	250	325
<i>Difference</i>	75	150

PM PEAK	SBL	NBL
Existing Condition	225	100
Without Center TWLTL	225	225
<i>Difference</i>	0	125



Conditions with BAT lane – traffic operations

Number	Intersection	Control	Existing AM			Without Center TWLTL		
			LOS	Delay (s)	Movement	LOS	Delay (s)	Movement
1	15TH AVE NW & MARKET ST	Signal	D	38.7	-	D	44.2	-
			E	71.7	NBL	F	81.4	NBL
			D	45.2	SBL	D	46.1	SBL
			D	51.0	EBL	D	50.7	EBL
			E	55.0	WBL	E	60.2	WBL
2	15TH AVE NW & NW 54TH ST	TWSC	n/a	n/a	n/a	n/a		
3	15TH AVE NW & NW 53RD ST	TWSC	F	63.6	WBL	E	40.8	EBR
4	15TH AVE NW & NW 52ND ST	TWSC	F	357.6	WBL	E	36.7	EBR
5	15TH AVE NW & NW 51ST ST	TWSC	D	29.2	EBR	D	29.2	EBR
6	17TH AVE NW & MARKET ST	Signal	B	12.5	-	B	13.3	-
7	17TH AVE NW & NW 54TH ST	TWSC	B	10.2	WB	B	10.1	WB
8	17TH AVE NW & BARNES AVE	TWSC	A	9.9	EB	B	10.3	EB
9	17TH AVE NW & NW 53RD ST	TWSC	B	10.1	WB	B	10.1	WB
10	17TH AVE NW & NW LONE PL	TWSC	B	11.1	EB	B	11.2	EB
11	17TH AVE NW & NW 52ND ST	TWSC	B	12.4	EB	B	12.9	EB
12	17TH AVE NW & NW 51ST ST	TWSC	A	9.5	WB	A	9.6	WB
13	14TH AVE NW & MARKET ST	Signal	B	18.4	-	B	18.4	-
14	14TH AVE NW & NW 54TH ST	TWSC	C	24.6	WB	D	26.1	WB
15	14TH AVE NW & NW 53RD ST	TWSC	E	37.5	EB	E	42.4	EB
16	14TH AVE NW & NW 52ND ST	TWSC	E	45.1	EB	F	50.3	EB
17	14TH AVE NW & NW 51ST ST	TWSC	F	89.8	EB	F	90.7	EB

Conditions with BAT Lane – traffic operations

Number	Intersection	Control	Existing MIDDAY			Without Center TWLTL		
			LOS	Delay (s)	Movement	LOS	Delay (s)	Movement
1	15TH AVE NW & MARKET ST	Signal	D	38.7	-	D	40.5	-
			D	37.9	NBL	D	52.4	NBL
			D	36.6	SBL	E	56.6	SBL
			D	48.3	EBL	D	44.6	EBL
			D	49.2	WBL	D	49.8	WBL
2	15TH AVE NW & NW 54TH ST	TWSC	n/a	n/a	n/a	n/a		
3	15TH AVE NW & NW 53RD ST	TWSC	C	21.8	WB	C	17.4	EB
4	15TH AVE NW & NW 52ND ST	TWSC	F	74.0	EB	C	16.9	EB
5	15TH AVE NW & NW 51ST ST	TWSC	E	37.4	WB	C	15.8	EB
6	17TH AVE NW & MARKET ST	Signal	B	13.8	-	B	15.8	-
7	17TH AVE NW & NW 54TH ST	TWSC	B	11.3	WB	B	11.3	
8	17TH AVE NW & BARNES AVE	TWSC	B	10.0	EB	B	10.7	EB
9	17TH AVE NW & NW 53RD ST	TWSC	B	10.7	WB	B	10.8	WB
10	17TH AVE NW & NW LONE PL	TWSC	B	11.1	EB	B	11.4	EB
11	17TH AVE NW & NW 52ND ST	TWSC	B	12.4	EB	B	12.8	EB
12	17TH AVE NW & NW 51ST ST	TWSC	A	9.9	WB	B	10.1	WB
13	14TH AVE NW & MARKET ST	Signal	B	15.5	-	B	15.6	-
14	14TH AVE NW & NW 54TH ST	TWSC	C	23.8	EB	D	25.7	EB
15	14TH AVE NW & NW 53RD ST	TWSC	E	37.6	EB	E	43.2	EB
16	14TH AVE NW & NW 52ND ST	TWSC	E	46.0	EB	F	50.1	EB
17	14TH AVE NW & NW 51ST ST	TWSC	E	37.4	EB	E	39.6	EB

Conditions with BAT lane – traffic operations

Number	Intersection	Control	Existing PM			Without Center TWLTL		
			LOS	Delay (s)	Movement	LOS	Delay (s)	Movement
1	15TH AVE NW & MARKET ST	Signal	D	35.0	-	D	38.6	-
			E	72.2	NBL	E	60.3	NBL
			E	60.5	SBL	E	61.5	SBL
			D	51.5	EBL	D	52.6	EBL
			D	50.6	WBL	D	51.2	WBL
2	15TH AVE NW & NW 54TH ST	TWSC	n/a	n/a	n/a	n/a		
3	15TH AVE NW & NW 53RD ST	TWSC	C	20.1	WB	C	15.9	EB
4	15TH AVE NW & NW 52ND ST	TWSC	F	67.5	EB	C	16.9	EB
5	15TH AVE NW & NW 51ST ST	TWSC	D	27.1	WB	C	17.1	EB
6	17TH AVE NW & MARKET ST	Signal	B	16.2	-	B	18.7	-
7	17TH AVE NW & NW 54TH ST	TWSC	B	12.7	WB	B	12.7	WB
8	17TH AVE NW & BARNES AVE	TWSC	B	10.5	EB	B	11.1	EB
9	17TH AVE NW & NW 53RD ST	TWSC	B	11.9	WB	B	12.0	WB
10	17TH AVE NW & NW LONE PL	TWSC	B	13.7	EB	B	14.2	EB
11	17TH AVE NW & NW 52ND ST	TWSC	C	15.3	EB	C	16.2	EB
12	17TH AVE NW & NW 51ST ST	TWSC	B	11.3	WB	B	11.4	WB
13	14TH AVE NW & MARKET ST	Signal	B	15.4	-	B	15.4	-
14	14TH AVE NW & NW 54TH ST	TWSC	D	25.6	EB	D	26.9	EB
15	14TH AVE NW & NW 53RD ST	TWSC	E	37.5	EB	E	40.9	EB
16	14TH AVE NW & NW 52ND ST	TWSC	F	57.0	EB	F	64.8	EB
17	14TH AVE NW & NW 51ST ST	TWSC	F	270.1	EB	F	277.0	EB

Conditions with BAT lane

– conclusions

- Left-turn movement queues at 15th Avenue NW/Market Street may increase slightly

95th % Queues (feet)

AM PEAK	SBL	NBL
Existing Condition	125	150
Without Center TWLTL	150	250
<i>Difference</i>	25	100

MIDDAY PEAK	SBL	NBL
Existing Condition	175	175
Without Center TWLTL	250	325
<i>Difference</i>	75	150

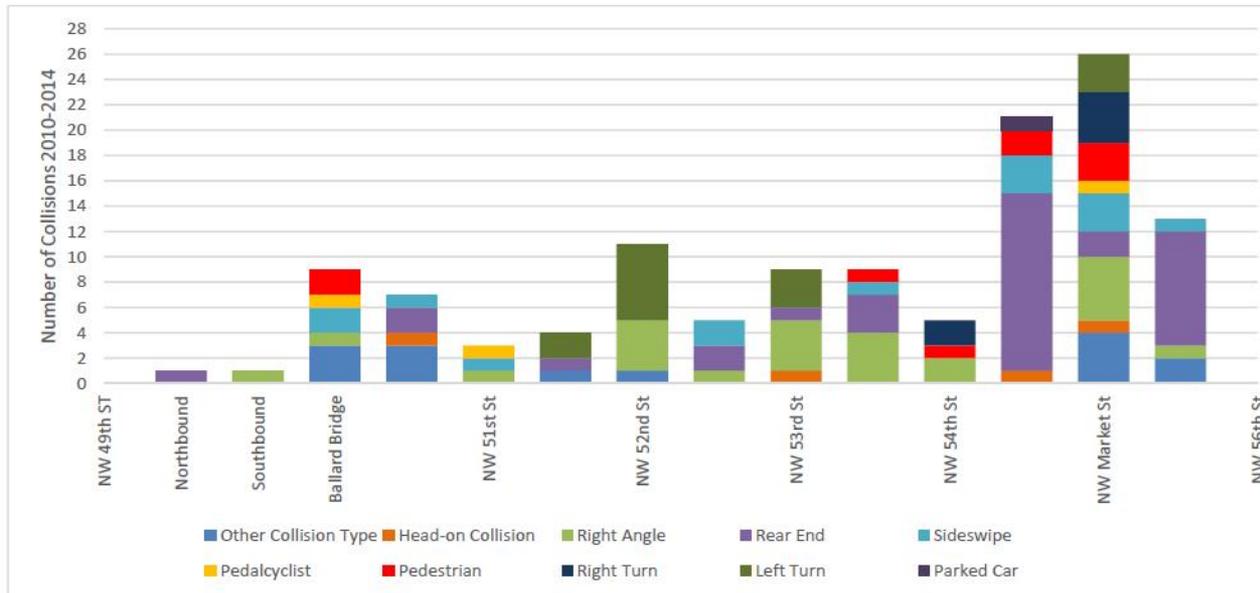
PM PEAK	SBL	NBL
Existing Condition	225	100
Without Center TWLTL	225	225
<i>Difference</i>	0	125



15th Ave BAT Lane: safety analysis



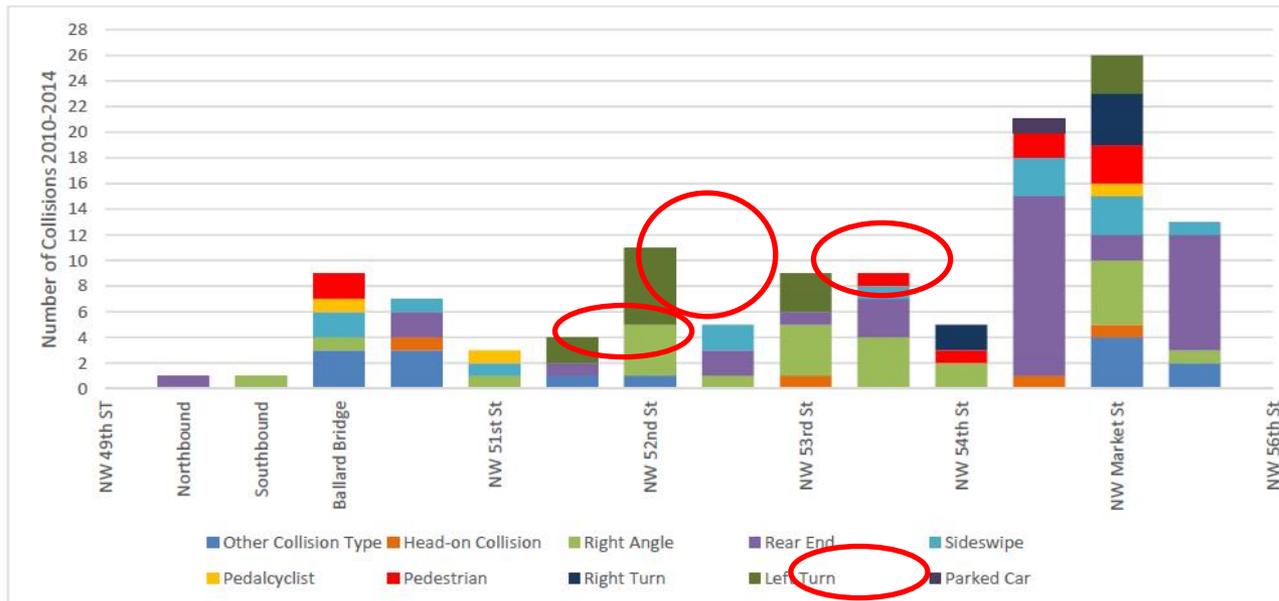
image source: Google Earth



15th Ave BAT Lane: safety analysis



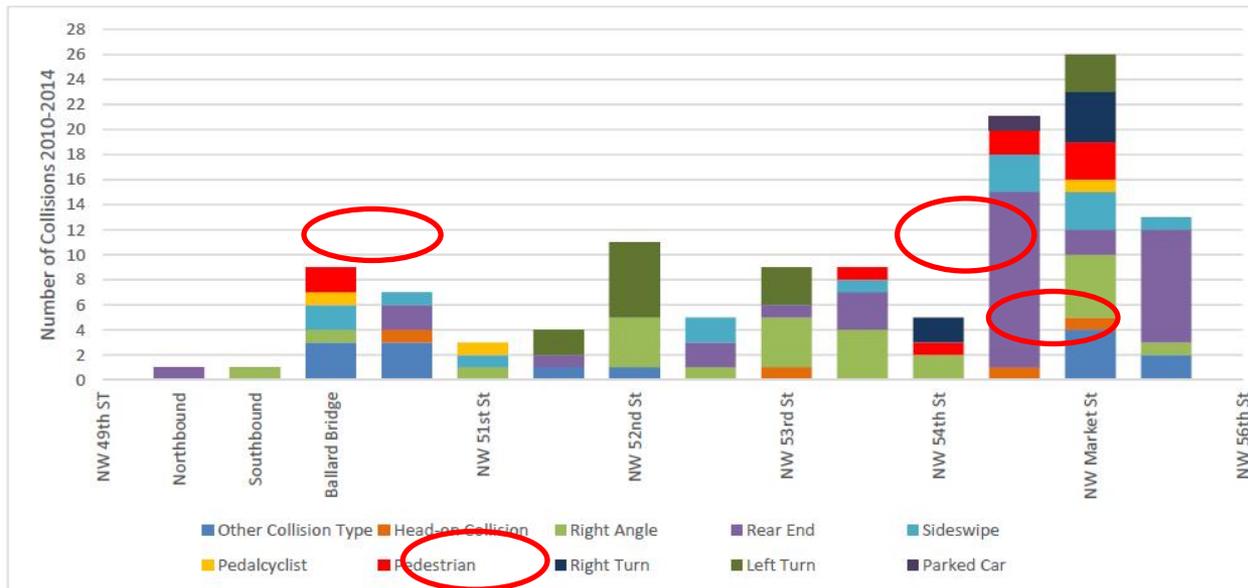
image source: Google Earth



15th Ave BAT Lane: safety analysis



image source: Google Earth



Thresholds for two-way left turn lanes*

Factor	Threshold Value	NW 51ST St – Market St
Accident Rates	3 accidents per million vehicle miles	5.3 accidents per million vehicle miles
Traffic Volumes	28,000 average daily	25,000 average daily
Number of Lanes	> 2 in each direction	3 lanes each direction
Driveway Density	30 driveways per mile	60 driveways per mile

* - source Access Management Manual

Next steps

March 2015	Public Outreach
May 2015	Recommendation to City Traffic Engineer
July 2015	Installation

Questions?

Jonathan.dong@seattle.gov | (206) 233-8564

<http://www.seattle.gov/transportation/bike.htm>

<http://www.seattle.gov/transportation>



Conditions With BAT Lane – Conclusions

- 15th Avenue NW/Market Street:
 - Overall intersection operations not likely to exceed LOS D, with or without BAT Lane
 - Northbound left-turn LOS (AM): LOS E to LOS F
 - Southbound left-turn LOS (MID): LOS D to LOS E
- 14th Avenue NW:
 - Eastbound left-turns conflict with re-routed southbound traffic
 - EBL delay would increase by less than 8 seconds/vehicle
- 17th Avenue NW:
 - Negligible impact to westbound stop-controlled traffic

15th Ave BAT Lane: Ultimate Configuration



- Can be implemented with redevelopment
- Capital cost estimated at ~ \$460,000 plus right of way costs

Traffic Analysis

Existing Conditions (data collection)

- 17 study intersections, 3 primary corridors
 - 15th Avenue NW – 5/6-lane, divided by TWLTL
 - 14th Avenue NW – 2-lane, median-divided, street parking
 - 17th Avenue NW – 2-lane, undivided, street parking
- Traffic counts collected in January, 2015
 - AM PEAK – 6:00 am to 9:00 am
 - MIDDAY PEAK – 12:00 pm to 1:00 pm
 - PM PEAK – 3:00 pm to 7:00 pm

Conditions With BAT Lane – No TWLTL

- Northbound left-turns and westbound through movements – routed to downstream traffic signal at 15th Avenue NW/Market Street
- Southbound left-turns and eastbound through movements – routed upstream to 15th Avenue NW/Market Street
- Origins/destinations assumed to be mid-block, east or west of 15th Avenue NW
- Heavy vehicle percentages on NBL and SBL increased to reflect re-routed vehicles at 15th Avenue NW/Market Street

Mid-block Pedestrian Crossing

- Southbound (all peaks):
 - 95th percentile queues – less than 200 ft. (8 vehicles)
 - Average vehicle delay – less than 5 seconds/veh
 - No impact to operations at 15th Avenue NW/Market Street
- Northbound:
 - Queues from Market Street would likely back up into pedestrian signal (pedestrian signal would not prevent queues from dissipating)
 - 95th percentile queues:
 - Midday – 375 ft.
 - PM – 700 ft. (would extend back to Leary Way, with or without pedestrian signal, result of queueing at Market Street)
 - Average vehicle delay – less than 10 seconds/veh

Mid-block Pedestrian Crossing

- Located approximately 650-700 ft. south of Market Street between NW 53rd Street and NW 52nd Street
- Assumptions:
 - Pedestrian signal would be activated every 4 to 10 minutes
 - Pedestrian crossing time: 24 seconds
 - Volumes analyzed for AM, MIDDAY, PM peaks
- Pedestrian signal not likely to cause adverse impacts to traffic on 15th Avenue NW