

Active Transportation Programs Design Guide Session 3 – Linear Treatments for Pedestrians and Bicyclists

Briana Weisgerber, P.E. Active Transportation Programs Engineer March 27, 2024

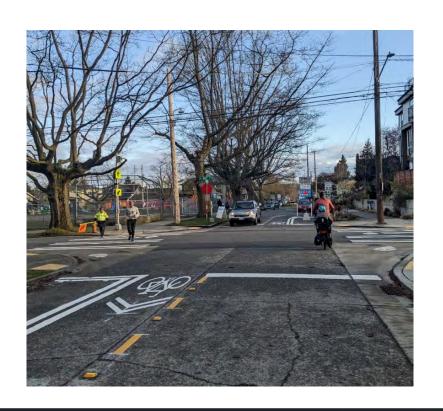
Safe Routes to School and Pedestrian/Bicyclist Programs

- Aim to improve safety for pedestrians and bicyclists
- All roads
- All public agencies & Tribal governments are eligible
- Projects must:
 - Comply with funding requirements
 - No match is required



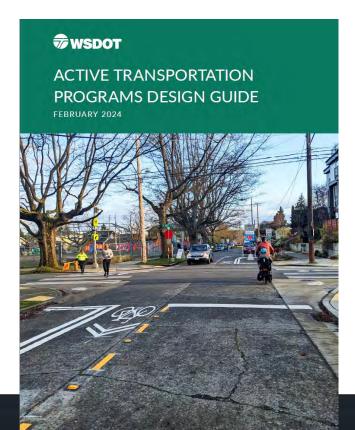
Training on Applications

- Overview Webinar
 - March 11 (recording available)
- Design Guide Trainings
 - March 13
 - March 20
 - March 27
- Application Process Workshop
 - April 15
- For more information about the funding programs, visit:
 - Safe Routes to School Program
 - Pedestrian & Bicycle Program



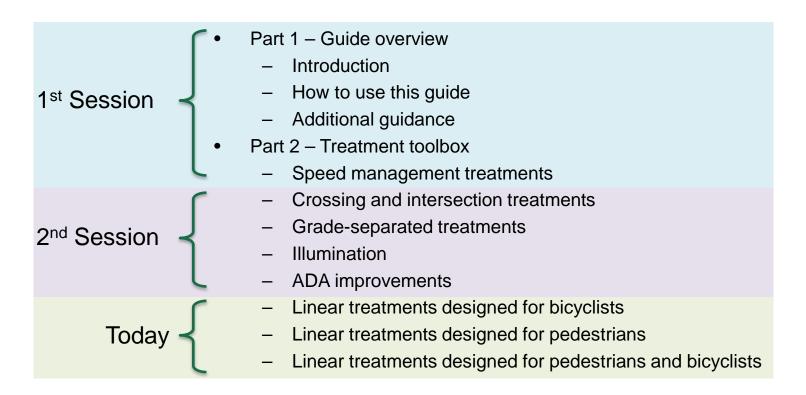


The Design Guide





Guide Outline





Part 2 - Linear Treatments

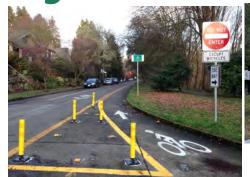
- Projects will be evaluated based on Level of Traffic Stress for pedestrians and bicyclists
- All projects should aim to achieve LTS 1 or 2 for both pedestrians and bicyclists
- All projects should provide ADA accessible pedestrian routes with designated space for people walking or rolling



Part 2 - Linear Treatments Designed for Bicyclists

- 52. Bicycle boulevard
- 53. Bike lanes
- 54. Buffered bike lane
- 55. Separated bike lane
- 56. Contraflow bike lane
- 57. Bike wayfinding signs and markings













Source: Carl Sundstrom, PedBike Images

Bicycle Level of Traffic Stress

(New Exhibit 2023)

Exhibit 1520-5 Bicycle Level of Traffic Stress in mixed traffic (no bicycle facility) (New Exhibit 2023)

BLTS in mixed traffic (no bicycle facility)											
Lanes AADT			Target Speed								
Lanes	AADT	≤20	25	30	35	40	45	50+			
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	2	3	4	4	4	4			
	751 - 1500	1 2 3 4 4 4			4	4					
	1501 - 3000	2 2 3 4 4 4		4	4						
	> 3000	2 3 3 4 4 4				4	4				
2 thru lanes per direction	0 - 6000	3	3	3	4	4	4	4			
	> 6000	3	3	4	4	4	4	4			
3+ thru lanes per direction	Any ADT	4 4 4 4			4	4	4	4			

Buffered Bike Lanes (minimum 2' buffer / greater than or equal to 7 feet total) Target Speed AADT Lanes 35 40 ≤20 1 thru lane per direction (or 1 lane one-way street) 0-750

Exhibit 1520-7 Bicycle Level of Traffic Stress for Buffered Bike Lane (painted buffer 2 foot wide or greater)

45 50+ 751-1500 1501-3000 3000+ 2 thru lanes per direction 0-6000 >6000 3+ thru lanes per direction Any ADT

Exhibit 1520-6 Bicycle Level of Traffic Stress for Conventional Bike Lane (paint stripe only) (New Exhibit 2023)

Conventional Bike Lanes (5' or greater)											
Lanes	AADT	Target Speed									
Lanes	AADT	≤20	25	30	35	40	45	50+			
1 thru lane per direction (or 1 lane one-way street)	0-750	1	2	2	4	4	4	4			
	751-1500	1	2	2	4	4	4	4			
	1501-3000	1	2	2	4	4	4	4			
	3000+	2	2	2	4	4	4	4			
2 thru lanes per direction	0-6000	2	2	3	4	4	4	4			
	>6000	3	3	3	4	4	4	4			
3+ thru lanes per direction	Any ADT	3	3	4	4	4	4	4			

Exhibit 1520-8 Bicycle Level of Traffic Stress for Separated Bike Lane (including buffer 2 foot wide or greater) (New Exhibit 2023)

Separated Bicycle Lane											
l	AADT	Target Speed									
Lanes	AADI	≤20	25	30	35	40	45	50+			
1 thru lane per direction (or 1 lane one-way street)	0-750	1	1	1	2	2	2	2			
	751-1500	1	1	1	2	2	2	2			
	1501-3000	1	1	1	2	2	2	2			
	3000+	2	2	2	2	2	2	2			
2 thru lanes per direction	0-6000	2	2	2	2	2	2	2			
	>6000	2	2	2	2	2	2	2			
3+ thru lanes per direction	Any ADT	2	2	2	2	2	2	2			



Linear Treatments for Bicyclists

- Reduce driver operating speeds
- Reduce bicyclist exposure
- Increase bicyclist conspicuity

	Roadway co	ntext	
Target driving speed	Target motor vehicle volume	Motor vehicle lanes	All ages & abilities bicycle facility
	up to 3,000	1 or less each direction	Bicycle boulevard, conventional bike lane, buffered bike lane, separated bike lane
25 mph (or less)	3,000 to 6,000	2 or less each direction	Conventional bike lane, buffered bike lane, separated bike lane
25 mpn (or less)	>6,000	2 or more lanes each direction	Buffered bike lane, separated bike lane
	- Any	3 or more lanes each direction	Separated bike lane
	Ally	1 or less each direction	Conventional bike lane, buffered bike lane, separated bike lane
30 mph	up to 6,000	2 lanes each direction	Buffered bike lane, separated bike lane
	>6,000	2 or more lanes each direction	Separated bike lane
> 30 mph	Any	Any	Separated bike lane



Part 2 - Linear Treatments Designed for Pedestrians

- 58. Sidewalk without buffer
- 59. Sidewalk with buffer
- 60. Separated walkway with linear stormwater treatment
- 61. Pedestrian-only streets







Pedestrian Level of Traffic Stress



Exhibit 1510-1 Pedestrian Level of Traffic Stress (PLTS) in mixed traffic (no marked bicycle lane, with or without shoulder) (New Exhibit 2023)

PLTS in mixed traffic (no pedestrian facility)											
Lanes	AADT	Target Speed									
Laries	AADI	≤20	25	30	35	40	45	50+			
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	1	3	4	4	4	4			
	751 - 1500	1	2	3	4	4	4	4			
	1501 - 3000	2	2	3	4	4	4	4			
	> 3000		3	3	4	4	4	4			
2 thru lanes per direction	0 – 6000	3	3	3	4	4	4	4			
	> 6000	3	3	4	4	4	4	4			
3+ thru lanes per direction	Any ADT	4	4	4	4	4	4	4			

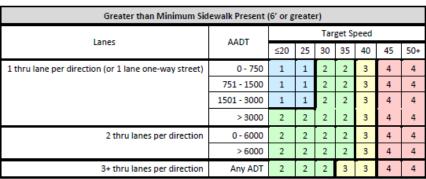


Pedestrian Level of Traffic Stress





Source: Dan Burden, PedBike Images



Minimum Sidewalk Present (5')												
Lanes	AADT	Target Speed										
Laties	AADI	≤20	25	30	35	40	45	50+				
1 thru lane per direction (or 1 lane one-way street)	1	1	2	4	4	4	4					
	751 - 1500	1	1	2	4	4	4	4				
	1501 - 3000	1	1	2	4	4	4	4				
	> 3000	2	2	2	4	4	4	4				
2 thru lanes per direction	0 - 6000	2	2	2	4	4	4	4				
	> 6000	2	2	3	4	4	4	4				
3+ thru lanes per direction	Any ADT	2	2	3	4	4	4	4				



Pedestrian Level of Traffic Stress



Exhibit 1510-3 Pedestrian Level of Traffic Stress (PLTS) based on Buffer Type (New Exhibit 2023)

Sidewalk protected by robust physical barrier											
Lanes	AADT	Target Speed									
Lanes	AADI	≤20	25	30	35	40	45	50+			
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	1	1	2	2	2	2			
	751 - 1500	1	1	1	2	2	2	2			
	1501 - 3000	1	1	1	2	2	2	2			
	> 3000	2	2	2	2	2	2	2			
2 thru lanes per direction	0 - 6000	2	2	2	2	2	2	2			
	> 6000	2	2	2	2	2	2	2			
3+ thru lanes per direction	Any ADT	2	2	2	2	2	2	2			

Wide sidewalk or sidewalk with buffer											
Lanes	AADT	Target Speed									
Lanes	AADI	≤20	25	30	35	40	45	50+			
1 thru lane per direction (or 1 lane one-way street)	0 - 750	1	1	2	2	3	3	4			
	751 - 1500	1	1	2	2	3	3	4			
	1501 - 3000	1	1	2	2	3	3	4			
	> 3000	2	2	2	2	3	3	4			
2 thru lanes per direction	0 - 6000	2	2	2	2	3	3	4			
	> 6000	2	2	2	2	3	3	4			
3+ thru lanes per direction	Any ADT	2	2	2	2	3	3	4			

Part 2 – Linear Treatments Designed for Pedestrians and Bicyclists

62. Shared-use path

63. Sidepath







Shared-use Paths vs. Sidepaths



Sidepath intersection treatments



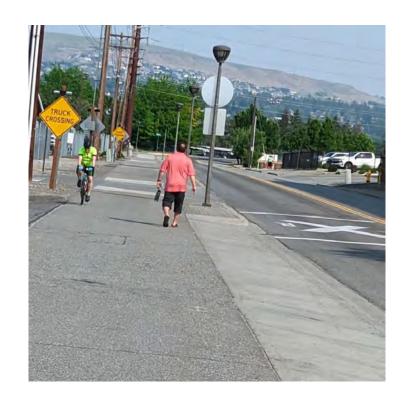
Shared-use path intersection treatments

Source: FHWA



Shared-use Path Widths

Shared Use Path Operating Widths								
Minimum (ft)	SUPLOS "C" Peak Hour							
Minimum (ft)	Volumes at Preferable Width							
11	150 - 300							
12 - 15	300 - 500							
16 - ≥20	500 - ≥600							

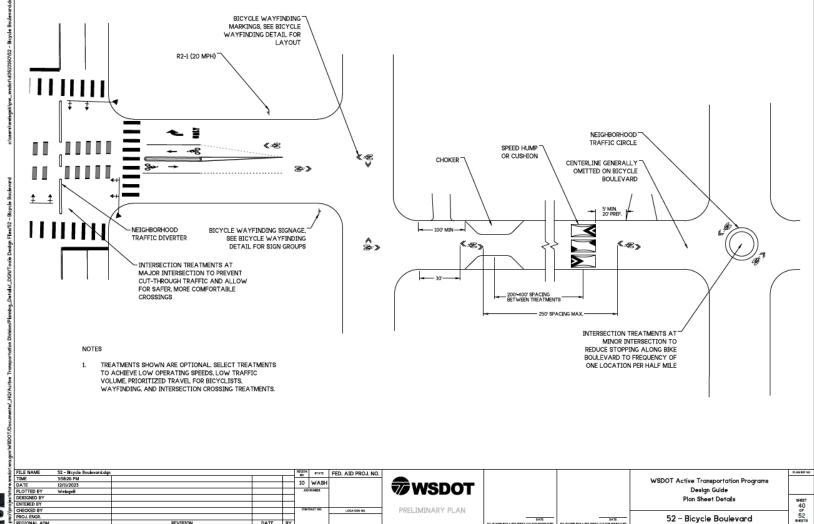




Plan Sheet Details







PRELIMINARY PLAN

DATE

Fil. STAMP BOX - SIZ SHEET CTI FOR SIGNATURE

Fil. STAMP BOX - SIZ SHEET CTI FOR SIGNATURE

Fil. STAMP BOX - SIZ SHEET CTI FOR SIGNATURE

Fil. STAMP BOX - SIZ SHEET CTI FOR SIGNATURE

LOGATION NO.

DATE BY

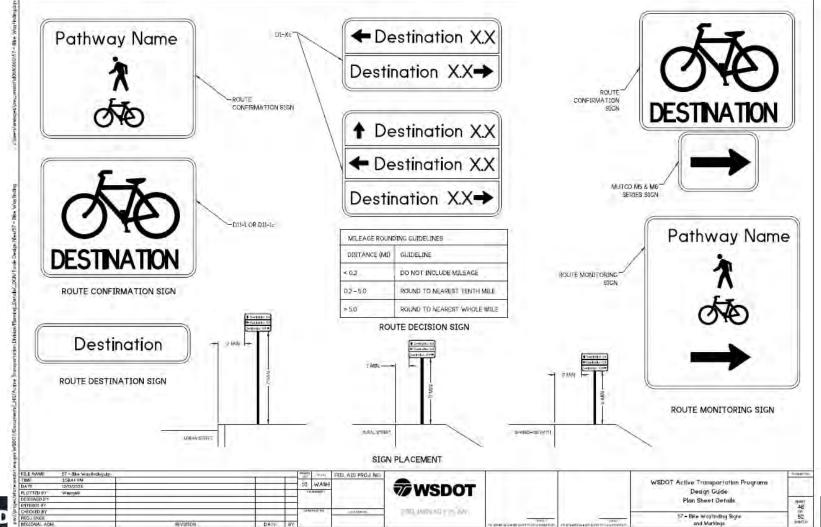


CHECKED BY

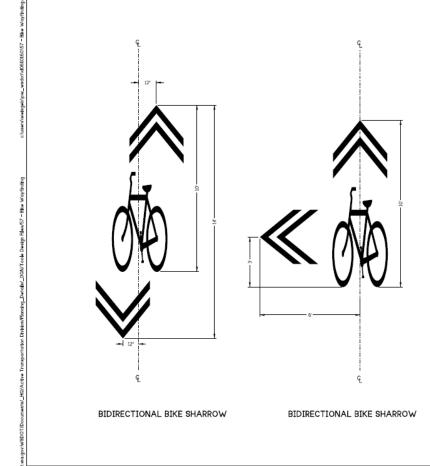
REGIONAL ADM.

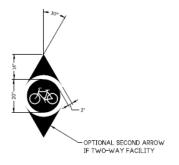
REVISION

52 - Bicycle Boulevard





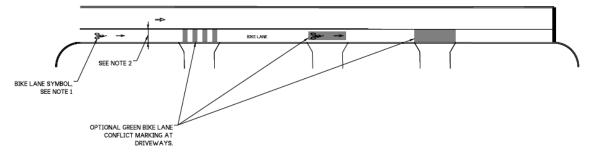




BIKE DOT W/ ARROW(S)

	do	FILE NAME	57 - Bike Wayfinding.dgn				REGROW NO.	STATE	FED. AID PROJ. NO.	
	š	TIME	3:58:43 PM							4
	٤	DATE	12/11/2023					WASH		_ =
	5	PLOTTED BY	WeisgeB				,100	KJOKK		
	5	DESIGNED BY					1			1
	÷	ENTERED BY					1			ı
40	ď	CHECKED BY					COM	BACT NO.	LOCATION NO.	1
	3	PROJ. ENGR.					1			i
	ũ.	REGIONAL ADM.		REVISION	DATE	BY	1			i .

). T					PLAN REF NO
	₽WEDOT			WSDOT Active Transportation Programs	
-	₩SDOT			Design Guide	
-				Plan Sheet Details	SHEET
4	PRELIMINARY PLAN				47
Н	PRELIMINART PLAN			57 - Bike Wayfinding Signs	52
- 1		DATE	DATE	and Markings	SHEETS

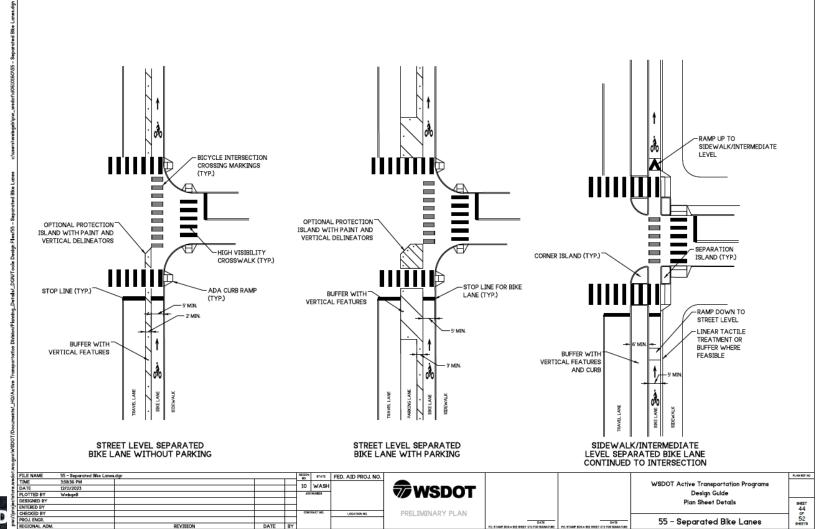


NOTES

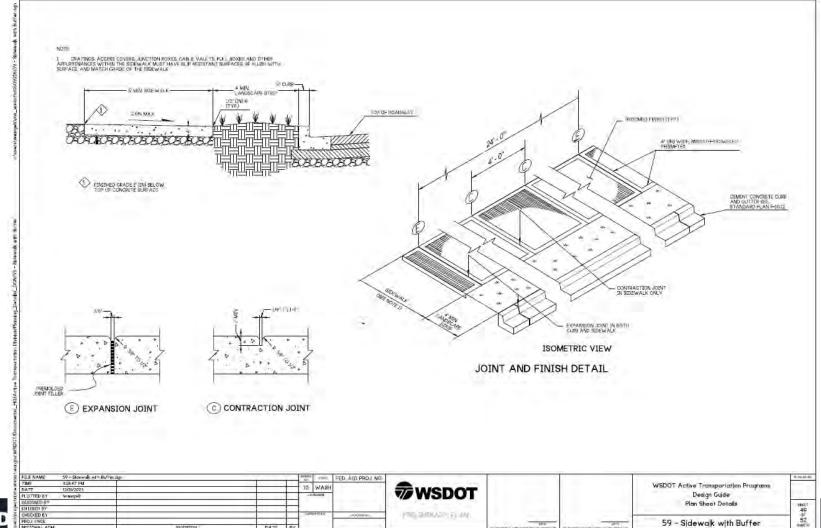
- PLACE BIKE LANE SYMBOL AT BEGINNING OF BLOCK, AFTER LARGE DRIVEWAYS, AND AT REGULAR SPACING (250' - 500') WITH INFREQUENT CROSS STREETS AND LONG BLOCK FACES.
- BIKE LANE WIDTH MEASURED BETWEEN BIKE LANE LINE AND PARKING LINE, EDGE OF GUTTER PAN WHERE PRESENT, OR FACE OF CURB IN THE ABSENCE OF GUTTER PAN. 6' PREFERRED, 5' MINIMUM WIDTH,
- CONSIDER ADDING A BUFFER OR PROTECTION WHEN BIKE LANE WIDTH EXTENDS BEYOND 7" TO DIFFERENTIATE WITH PARKING OR VEHICLE LANE.

	9	FILE NAME	53 - Bike Lanes.dgn				REGION MO.	STATE	FED. AID PROJ. NO.	ſ
	ŝ	TIME	3:58:29 PM							1
	é	DATE	12/11/2023				10	WASH		ı
	6	PLOTTED BY	WelsgeB				300	N,MECR		ı
	į,	DESIGNED BY								ı
	õ	ENTERED BY								ı
	ď	CHECKED BY					CONT	RACT NO.	LOGATION NO.	ı
	W.S	PROJ. ENGR.								ı
-	۵	REGIONAL ADM.		REVISION	DATE	BY				t

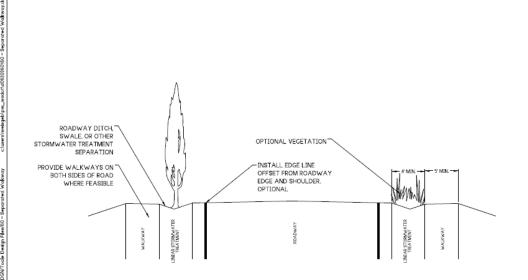
				PLAN REF NO
A			WSDOT Active Transportation Programs	
₩SDOT			Design Guide	
			Plan Sheet Details	SHEET
PRELIMINARY PLAN				41
TREEIMINARTTEAN	DATE	DATE	53 - Bike Lanes	52 8HEET8











NOTES

- BUFFER MAY INCLUDE A ROADWAY DITCH, BIOSWALE, RAIN GARDEN, OR OTHER STORMWATER MANAGEMENT.
- PROVIDE CONTINUOUS VERTICAL DEPTH OR LANDSCAPING IN THE FORM OF CAMOPY TREES, LOW SHRUBS, OR GROUNDCOVER IN THE BUFFER TO DETER DRIVERS FROM TRAVELING OR PARKING IN THE SEPARATION. MAINTAIN SUFFICIENT VISIBILITY FOR PEDESTRIANS AND DRIVERS AT DRIVEWAY CROSSINGS AND INTERSECTIONS.

6	FILE NAME	REGION NO.	STATE	FED. AID PROJ. NO.	Г				
ŝ	TIME	3:58:51 PM							Ĺ
ě	DATE	12/11/2023					WASH		Ĺ
 윤	PLOTTED BY	WefegeB				.009	NAMES		Ĺ
ű	DESIGNED BY								Ĺ
ō	ENTERED BY								Ĺ
ã	CHECKED BY					COMT	RACT NO.	LOCATION NO.	Ĺ
3	PROJ. ENGR.								Ĺ
O.	DECIONAL ADM		DEMISTON	DATE	DV.				

l NO.	** WSDOT
	PRELIMINARY PLAN

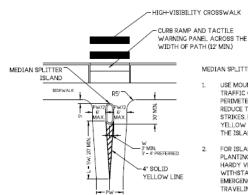
		ī
DATE	DATE	
P.E. STAMP BOX - SEE SHEET CTI FOR SISNATURE	DATE P.E. STRAMP ROX - SEE SHEET CT1 FOR SISMATURE	

	WSDOT Active Transportation Programs Design Guide Plan Sheet Details
DATE P.E. STAMP ROX - SEE SHEET CTI FOR SIGNATURE	60 - Separated Walkway with Linear Stormwater Treatments

MIDBLOCK CROSSING

NOTES

- DETERMINE SHARED-USE PATH WIDTH BASED ON FHWA SHARED-USE PATH LEVEL OF SERVICE CALCULATOR OR THE SHARED-USE PATH OPERATING WIDTHS TABLE. MINIMUM 12' WIDTH.
- RECOVERABLE GRADED SHOULDER OF 5' RECOMMENDED WIDTH (2' MINIMUM AT CONSTRAINED LOCATIONS) WITH MAXIMUM CROSS-SLOPE OF 1V:6H PROVIDED.
- 3. PROVIDE BARRIER ALONG PATH WHERE ADJACENT TO STEEP SLOPE OR HAZARDOUS CONDITION.
- 4. PROVIDE OVERHEAD CLEARANCE OF 10', 8' MINIMUM.
- CONSULT THE AASHTO BIKE GUIDE FOR GEOMETRIC DESIGN OF SHARED USE PATHS INCLUDING VERTICAL AND HORIZONTAL ALIGNMENTS.
- CONSIDER SEPARATION OF PEDESTRIANS AND BICYCLISTS ON HIGH VOLUME FACILITIES, SEE AASHTO BIKE GUIDE FOR DETAILS.
- CROSSING CAN BE SUPPLEMENTED WITH CROSSING ENHANCEMENTS (E.G., RECTANGULAR RAPID FLASHING BEACON, PEDESTRIAN HYBRID BEACON, HALF SIGNAL, CROSSING ISLAND, RAISED CROSSING).
- 8. SEE SIDEPATH DETAIL FOR INFORMATION ON CROSSINGS NEAR INTERSECTIONS.



MEDIAN SPLITTER ISLAND NOTES

- . USE MOUNTABLE CEMENT CONCRETE TRAFFIC CURB AROUND THE PRIMETER OF THE ISLAND TO REDUCE THE POTENTIAL FOR PEDAL STRIKES, PAINT PERMETER CURBING YELLOW TO INCREASE VISIBILITY OF THE ISLAND.
- FOR ISLANDS THAT INCLUDE PLANTINGS, USE LOW GROWING, HARDY VEGETATION CAPABLE OF WITHSTANDING THE OCCASIONAL EMERGENCY MAINTENANCE VEHICLE TRAVELING OVER IT.

TRAIL SPLITTER ISLAND FOR VEHICLE ACCESS PREVENTION



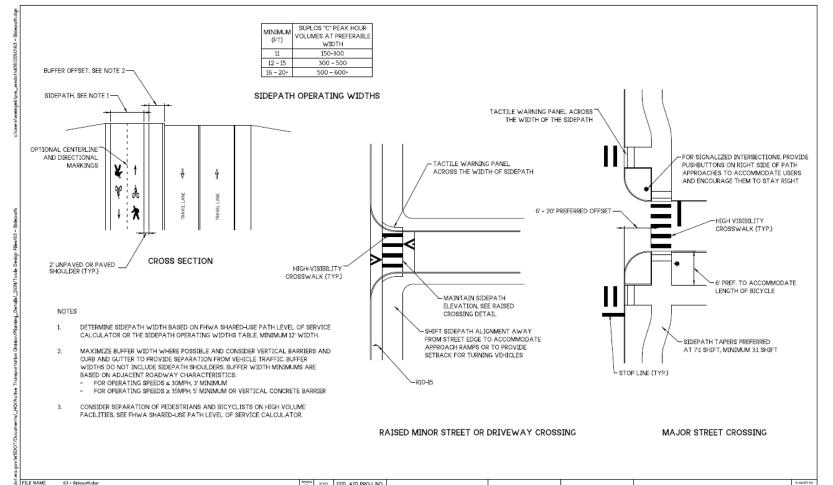
MINIMUM (FT)	SUPLOS "C" PEAK HOUR VOLUMES AT PREFERABLE WIDTH					
11	150-300					
12 - 15	300 - 500					
16 - 20+	500 - 600+					

SHARED-USE PATH OPERATING WIDTHS









	ŝ	TDME	35857 PM								
	٤	DATE	12/11/2023						WASH		=7= \A/4
	윤	PLOTTED BY	We(egeB					,000	NAMER		<i>~//</i> V V V
	ç	DESIGNED BY						ı			
	ö	ENTERED BY									
3.	ď	CHECKED BY						COM	RACT NO.	LOCATION NO.	PRELIMIN
	3	PROJ. ENGR.						1			
	ď	REGIONAL ADM.		R	EVISION	DATE	BY				





Summary

- Programs aim to improve safety for pedestrians and bicyclists
- Review design guide for selected treatments
- Aim to achieve LTS 2 with linear treatments for pedestrians and bicyclists
- All projects will need to meet ADA requirements
- Plan sheet details can support project development and implementation



Future Training Sessions

- Session 1 March 13
- Session 2 March 20
- Session 3 Today
- All are virtual and will be recorded and posted to the <u>LTAP website</u> and the <u>Call for Projects webpages</u>



Questions, Additional Training, and Project Photos



Briana Weisgerber, PE

Active Transportation Programs Engineer

Email: <u>briana.weisgerber@wsdot.wa.gov</u>

Phone: 564-669-4552

