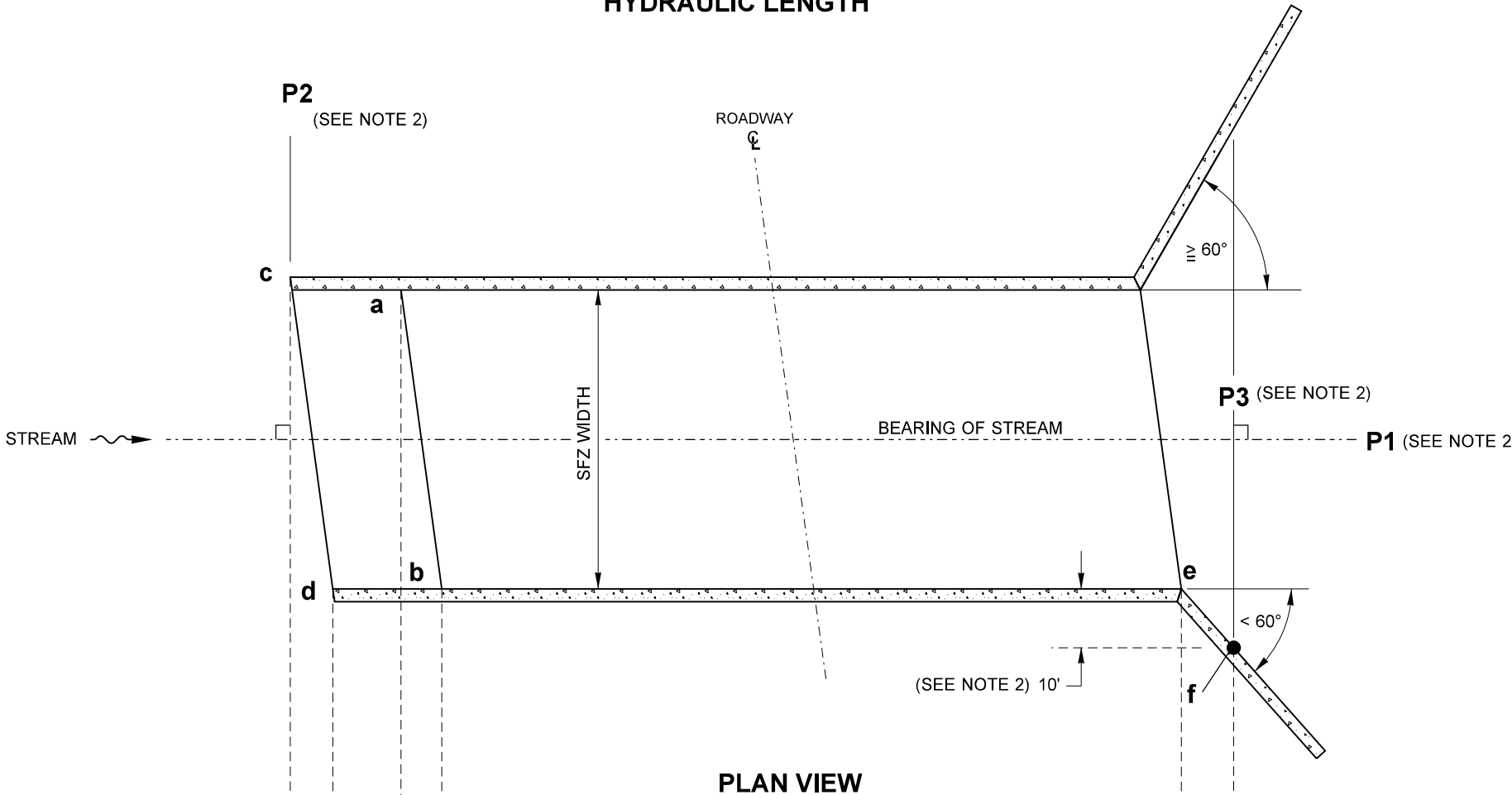
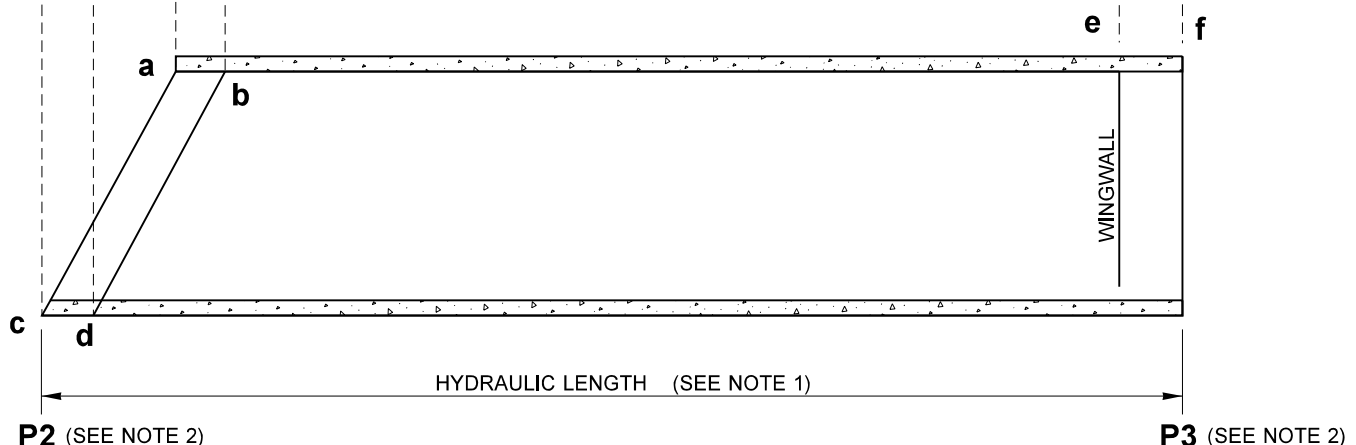


HYDRAULIC LENGTH




PLAN VIEW

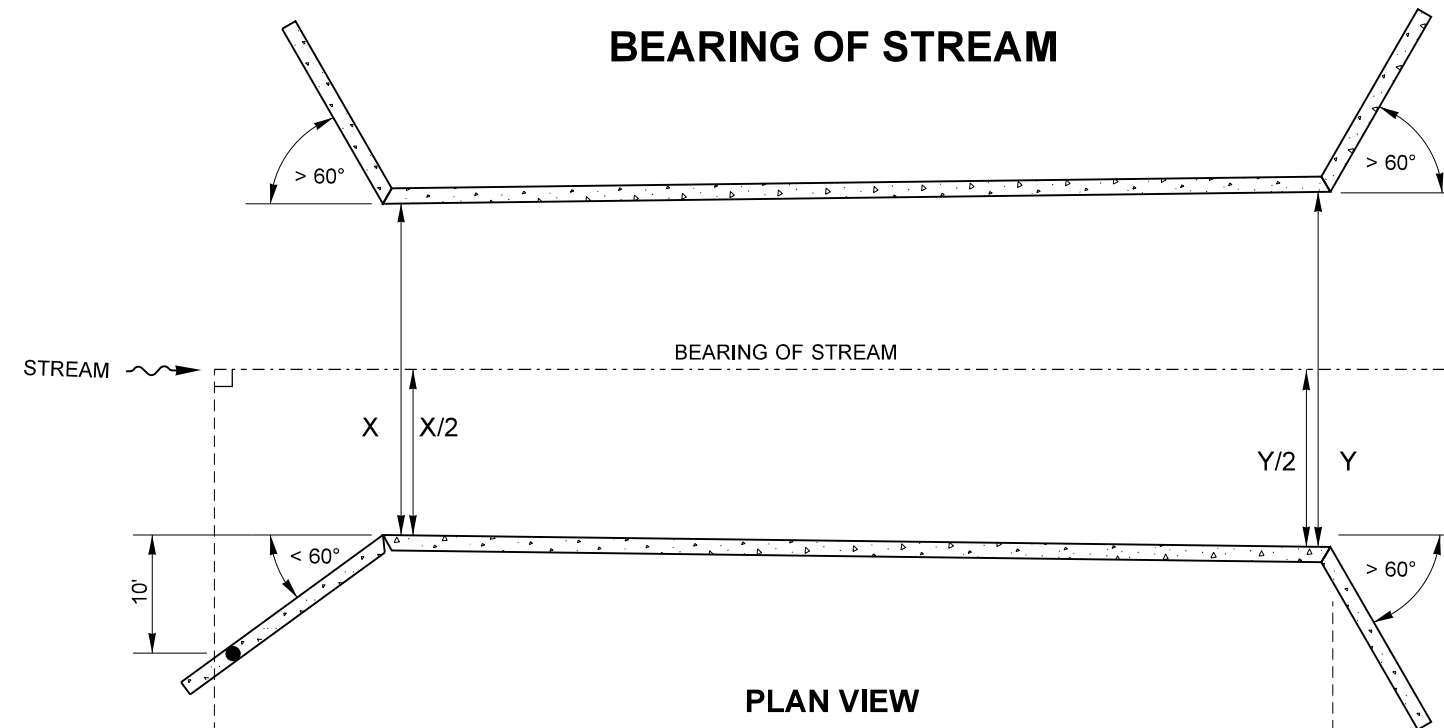


PROFILE VIEW

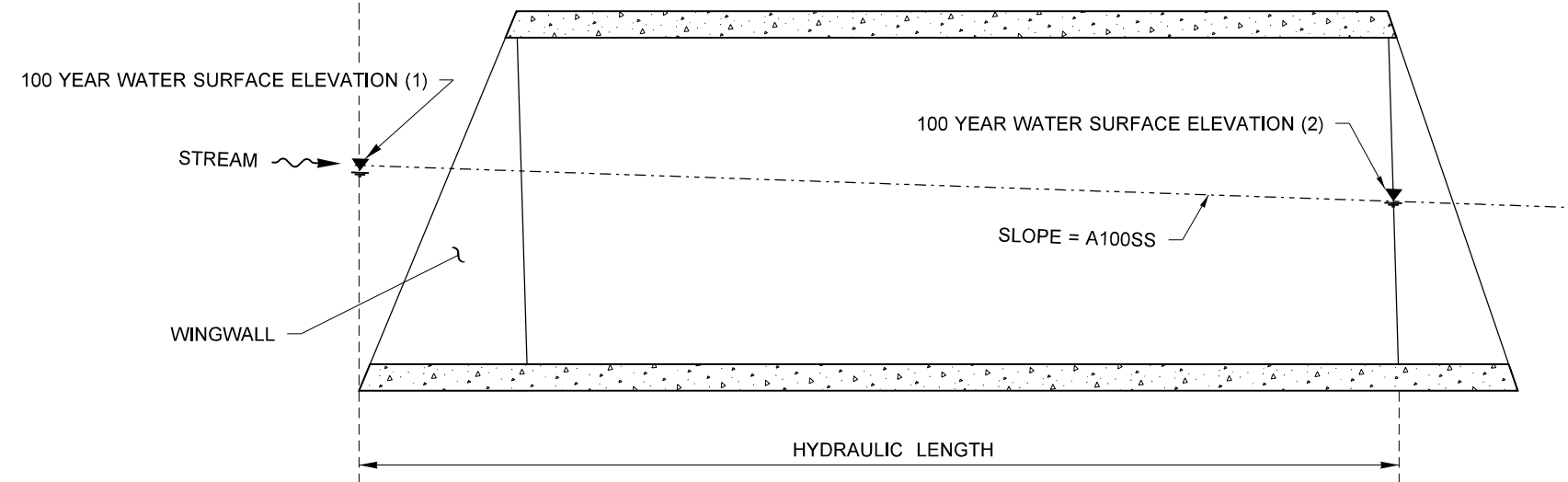
NOTES

- 1. HYDRAULIC LENGTH IS MEASURED HORIZONTALLY.
- 2. LET P1 BE A VERTICAL PLANE CONTAINING THE BEARING OF STREAM. LET P2 BE A VERTICAL PLANE, PERPENDICULAR TO P1, AND PASSING THROUGH THE POINT ON THE STRUCTURE THAT IS FURTHER-MOST UPSTREAM (NOT INCLUDING WING WALLS THAT ARE AT A HORIZONTAL SKEW ANGLE OF 60 DEGREES OR GREATER FROM THE BEARING OF STREAM, OR GREATER THAN 10' OUTSIDE THE SFZ WIDTH.). LET P3 BE A VERTICAL PLANE, PERPENDICULAR TO P1, AND PASSING THROUGH THE POINT ON THE STRUCTURE THAT IS FURTHER-MOST DOWNSTREAM (NOT INCLUDING WING WALLS THAT ARE AT A HORIZONTAL SKEW ANGLE OF 60 DEGREES OR GREATER FROM THE BEARING OF STREAM, OR GREATER THAN 10' OUTSIDE OF THE SFZ WIDTH.).

FILE NAME		S:\Design R P& S\4-Standards\2-Plan Sheet Library\02-Pub\shd PSL(SFZ) Structure Free Zone\SFZ.dgn		REGION NO.		STATE		FED.AID PROJ.NO.		 <p>Washington State Department of Transportation</p>		<p>STRUCTURE FREE ZONE DEFINITIONS EXHIBIT</p> <p>HYDRAULIC LENGTH</p> <p>NO SCOUR COUNTERMEASURES</p>		PLAN REF. NO.	
TIME	9:26:33 AM	PUBLISHED W/2.30 TEMPLATE		6/28/22		10 WASH		LOCATION NO.						SHEET	
DATE	11/20/2023									OF		4			
PLOTTED BY	liddelf									SHEETS		4			
DESIGNED BY	E WINTER														
ENTERED BY	E WINTER														
CHECKED BY	J BENTLEY														
PROJ. ENGR.	M LAMAY														
REGIONAL ADM.	M COTTEN	REVISION		DATE		BY		DATE		P.E. STAMP BOX		DATE			



A100SS = (100 YR WATER SURFACE ELEV 2) - (100 YR WATER SURFACE ELEV 1)
HYDRAULIC LENGTH (SEE SFZ2)



PROFILE VIEW

FILE NAME		S:\Design R P& S\4-Standards\2-Plan Sheet Library\02-Published PSL(SFZ) Structure Free Zone\SFZ.dgn			
TIME	9:31:17 AM	0	PUBLISHED W/2.30 TEMPLATE	6/28/22	
DATE	11/20/2023	1			
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DESIGNED BY	E WINTER				
ENTERED BY	E WINTER				
CHECKED BY	J BENTLEY				
PROJ. ENGR.	M LAMAY				
REGIONAL ADM.	M COTTEN				
	REVISION		DATE	BY	

FED.AID PROJ.NO.

REGION NO. STATE

10 WASH

JOB NUMBER

CONTRACT NO.

LOCATION NO.



Washington State
Department of Transportation

**STRUCTURE FREE ZONE
DEFINITIONS EXHIBIT**

A100SS

BEARING OF STREAM

PLAN REF NO
SFZ

SHEET
1
OF
4
SHEETS

P.E. STAMP BOX

DATE

P.E. STAMP BOX

DATE

NOTE:

1. REFER TO DEFINITIONS IN TECHNICAL REQUIREMENT 2.30.

CASE #1

BECAUSE THE ANGLE IS GREATER THAN OR EQUAL TO 60 DEGREES, DO NOT INCLUDE **a'** TO **b** IN MEASUREMENT OF HYDRAULIC LENGTH.

CASE #2

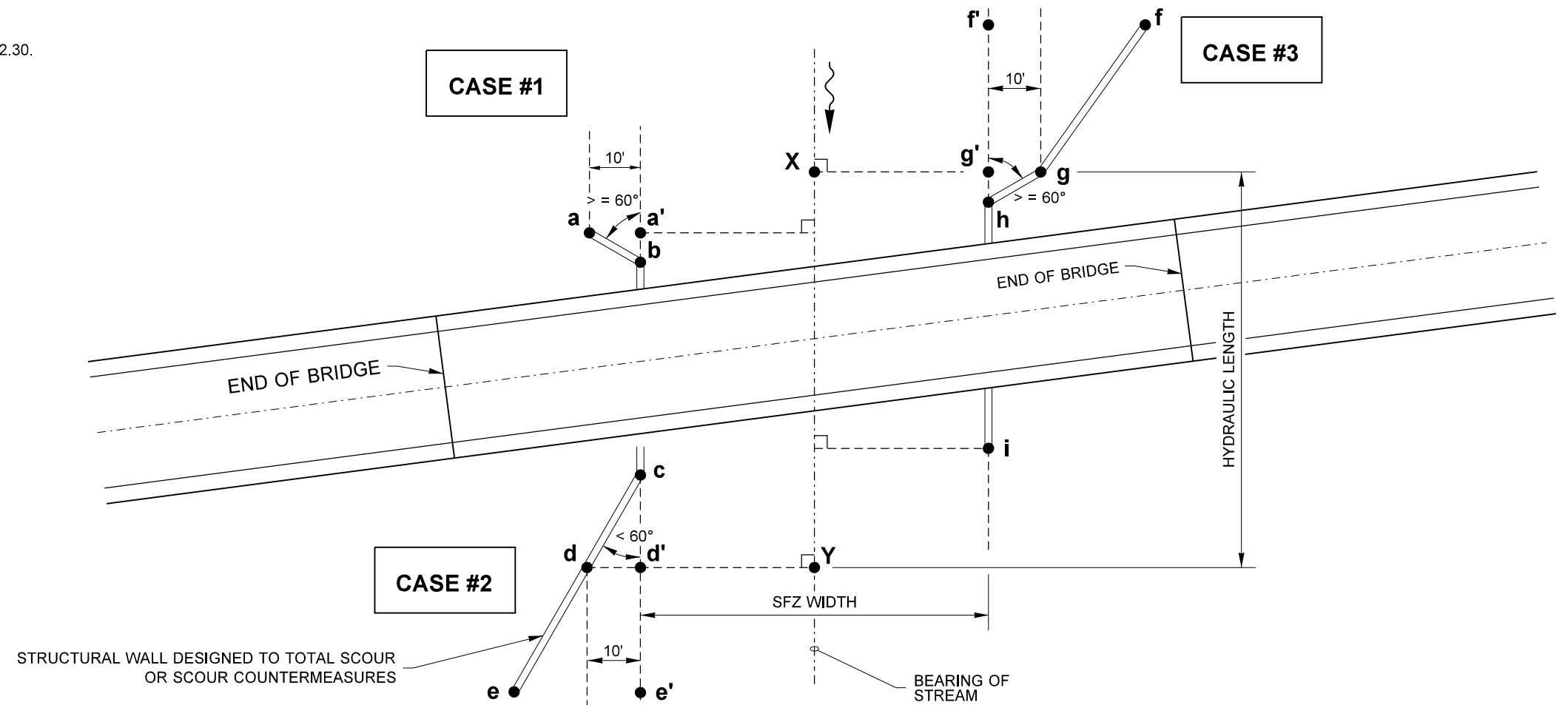
BECAUSE THE ANGLE IS LESS THAN 60 DEGREES, MUST INCLUDE **c** TO **d'** IN MEASUREMENT OF HYDRAULIC LENGTH.

BECAUSE **d** TO **e** IS GREATER THAN OR EQUAL TO 10' OUTSIDE OF SFZ WIDTH, DO NOT INCLUDE **d'** TO **e'** IN MEASUREMENT OF HYDRAULIC LENGTH.

CASE #3

BECAUSE THE ANGLE IS GREATER THAN OR EQUAL TO 60 DEGREES, DO NOT INCLUDE **h** TO **g'** IN MEASUREMENT OF HYDRAULIC LENGTH.

BECAUSE **g** TO **f** IS GREATER THAN OR EQUAL TO 10' BEYOND SFZ, DO NOT INCLUDE **g'** TO **f'** IN MEASUREMENT OF HYDRAULIC LENGTH.

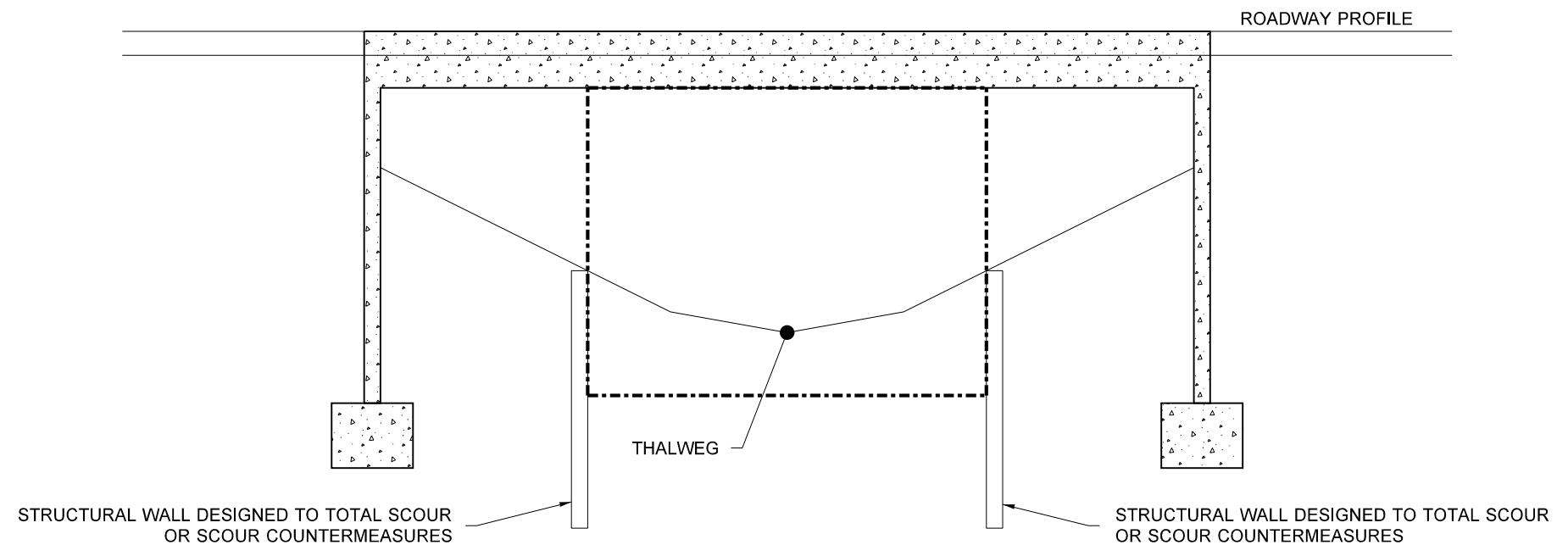


NOTE:

1. REFER TO DEFINITIONS IN TECHNICAL REQUIREMENT 2.30.

LEGEND:

----- STRUCTURE FREE ZONE



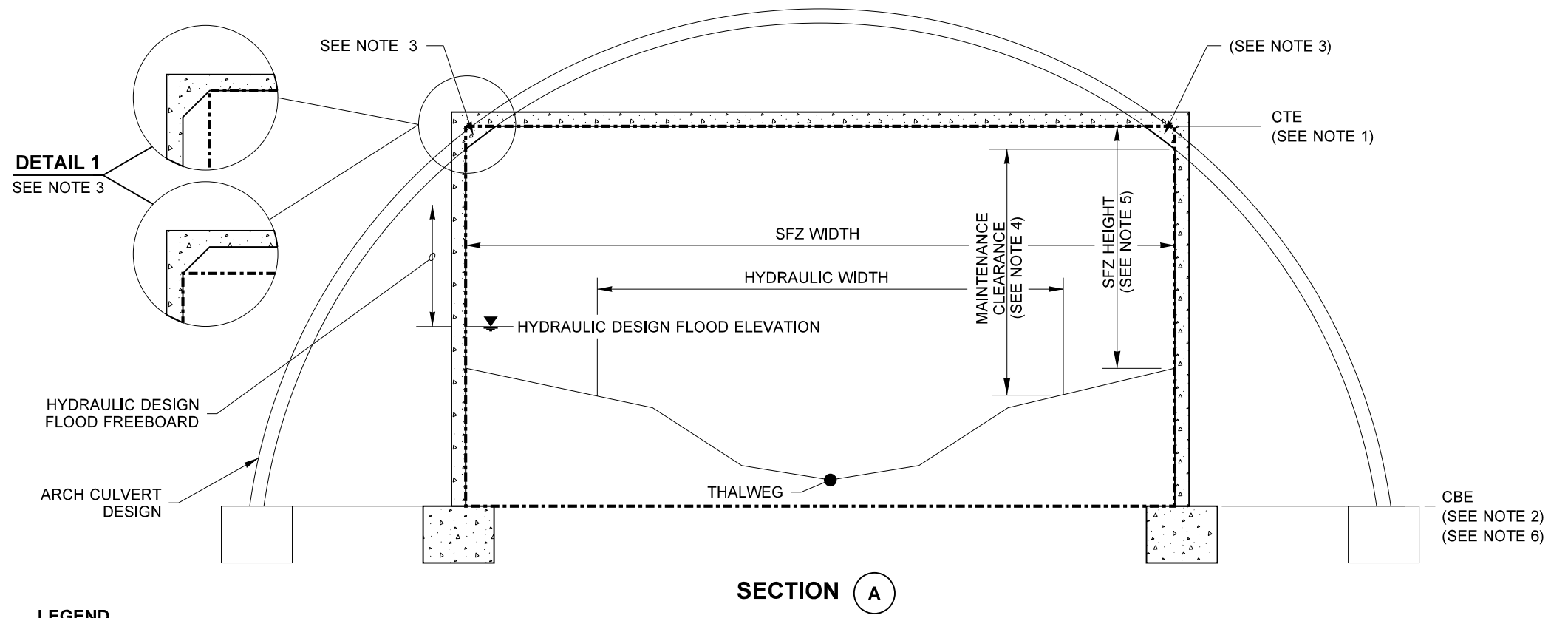
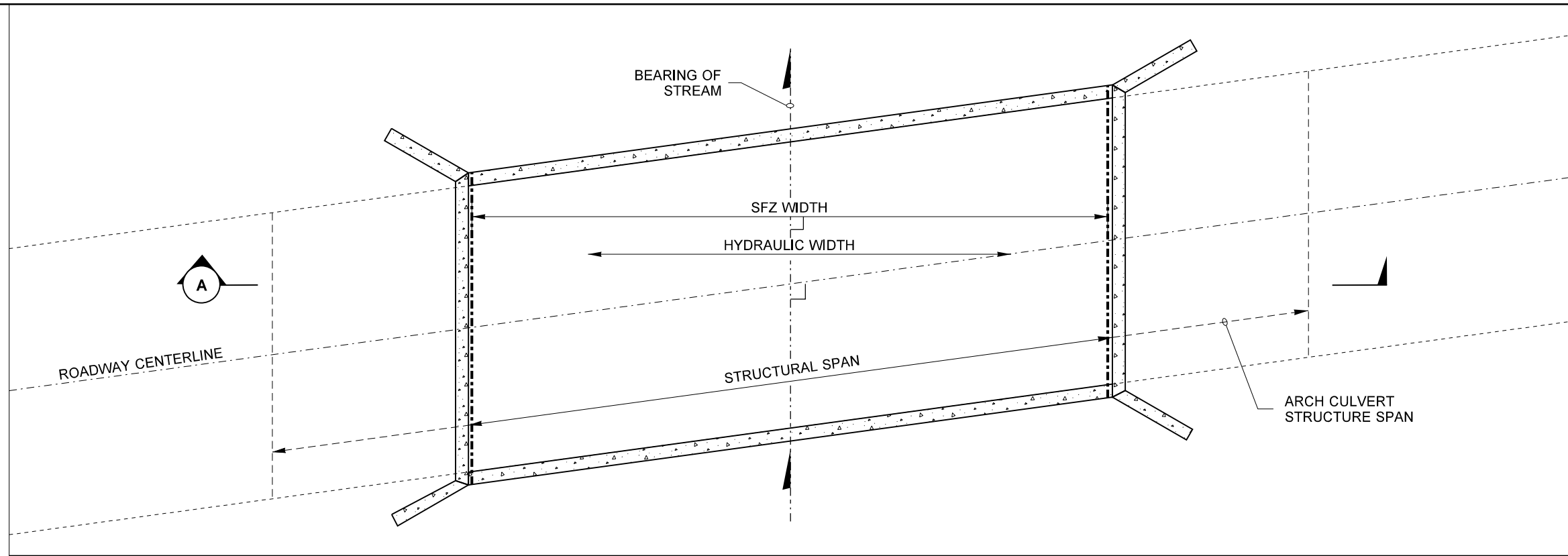
STRUCTURE FREE ZONE DEFINITIONS EXHIBIT

FILE NAME		S:\Design R P& S\4-Standards\2-Plan Sheet Library\02-Published PSL(SFZ) Structure Free Zone\SFZ.dgn		REGION NO.		STATE		FED.AID PROJ.NO.		PLAN REF NO	
TIME		9:23:12 AM		10		WASH				SFZ	
DATE		11/20/2023		JOB NUMBER						SHEET	
PLOTTED BY		liddelf		CONTRACT NO.		LOCATION NO.				3	
DESIGNED BY										OF	
ENTERED BY										4	
CHECKED BY										SHEETS	
PROJ. ENGR.										HYDRAULIC LENGTH & SCOUR COUNTERMEASURES	
REGIONAL ADM.		REVISION		DATE		BY		DATE		DATE	



NOTES:

1. CTE = CONTROLLING TOP ELEVATION
2. CBE = CONTROLLING BOTTOM ELEVATION
3. FILLETS AND ARCHES SHALL BE OUTSIDE SFZ PER DETAIL 1 UNLESS NOTED IN THE WSDOT HYDRAULICS MANUAL AS AN ALLOWABLE EXCEPTION.
4. MEASURE MAINTENANCE CLEARANCE FROM THE HIGHEST GROUND ELEVATION WITHIN THE HORIZONTAL LIMITS OF THE HYDRAULIC WIDTH.
5. MEASURE SFZ HEIGHT FROM THE HIGHEST GROUND ELEVATION WITHIN THE HORIZONTAL LIMITS OF THE SFZ WIDTH.
6. CONTROLLING BOTTOM ELEVATION (CBE) AN IMAGINARY SURFACE THAT REPRESENTS THE BOTTOM BOUNDARY OF THE STRUCTURE FREE ZONE (SFZ). AT ANY VERTICAL CROSS SECTION OF THE SFZ, TAKEN AT A HORIZONTAL ANGLE OF 90 DEGREES TO THE BEARING OF STREAM, THE CBE SHALL BE A HORIZONTAL LINE LOCATED AS FOLLOWS:
 - a) WHEN A FOUR SIDED BURIED STRUCTURE, CIRCULAR PIPE, OR ELLIPTICAL PIPE IS USED, THE CBE SHALL BE THE LOWEST OF THE FOLLOWING ELEVATIONS:
 - b) TWO FEET BELOW THE ELEVATION OF TOTAL SCOUR FOR THE SCOUR DESIGN FLOOD.
 - c) AT THE ELEVATION OF THE TOTAL SCOUR FOR THE SCOUR CHECK FLOOD.
 - d) WHEN A BRIDGE OR THREE SIDED BURIED STRUCTURE IS USED, THE CBE SHALL BE AT THE ELEVATION OF TOTAL SCOUR OF THE SCOUR CHECK FLOOD.
 - e) WHEN SPECIFICATIONS FOR SCOUR REQUIRE THE TOP OF FOUNDATIONS TO BE DEEPER THAN REQUIRED BY THE CONTROLLING BOTTOM ELEVATION DETERMINED BY ITEMS 1 OR 2 ABOVE, THE SCOUR SPECIFICATIONS SHALL CONTROL.



LEGEND
 - - - - - STRUCTURE FREE ZONE

STRUCTURE FREE ZONE DEFINITIONS EXHIBIT

FILE NAME: S:\Design R P & S\4-Standards\2-Plan Sheet Library\02-Published PSL(SFZ) Structure Free Zone\SFZ.dgn		REGION NO. STATE		FED.AID PROJ.NO.				PLAN REF NO	
TIME: 7:55:52 AM	DATE: 12/4/2023	10	WASH					SFZ	
PLOTTED BY: liddelf		JOB NUMBER		LOCATION NO.		WASHINGTON STATE DEPARTMENT OF TRANSPORTATION		SHEET 4 OF 4 SHEETS	
DESIGNED BY:		CONTRACT NO.		DATE				CTE, CBE, SFZ WIDTH & SFZ HEIGHT	
ENTERED BY:		DATE		BY					
CHECKED BY:									
PROJ. ENGR.:									
REGIONAL ADM.:									