

Design Assumptions for
Nebraska Base Drawing NE900-10-004
Concrete Block Chute – Chute Slope (Z) = 3:1

Revised: 4/3/06 Replaces: 5001-18

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This drawings use is limited. Consult the NRCS field engineer for guidance and direction.

This drawing has the following additional structure limitations:

Unit Discharge	$q \leq 10.9$ cfs/ft
Ponded Head	$H_p < 3.0$ ft
Velocity	$V \leq 17$ fps
Overfall	$f \leq 10$ ft
Chute Side Slope	= 2:1

The chute floor slope may be changed and other types of blocks may be used, but this requires special design procedures. Contact the state office for guidance.

Instructions for
Nebraska Base Drawing NE900-10-004
Concrete Block Chute – Chute Slope (Z) = 3:1

Fill in the following data fields to automatically fill in the title block fields on the drawing.

Due to drawing complexities data areas on this drawing will have to be filled in by hand.

Title block

Title line(s)

Subtitle line

County, State

Sheet number of

Who / When

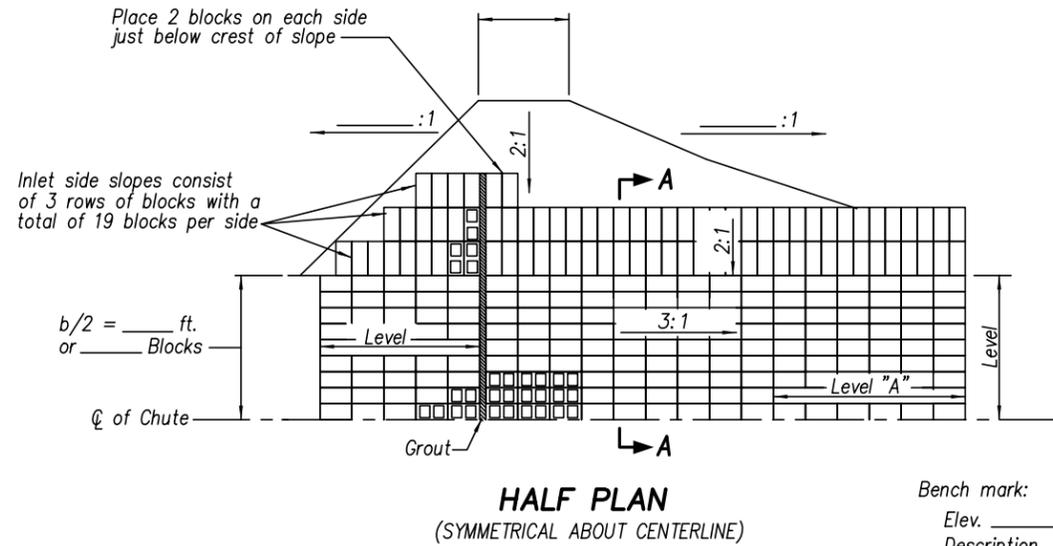
Designed

Drawn

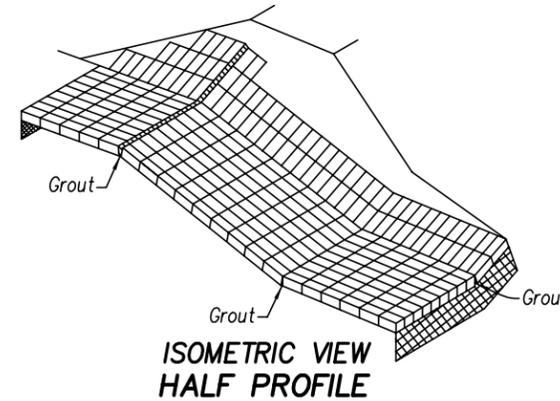
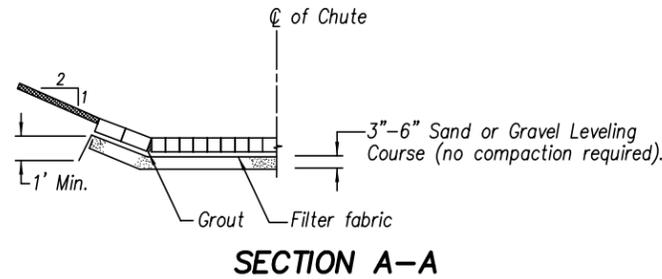
Checked

Enter directly on drawing

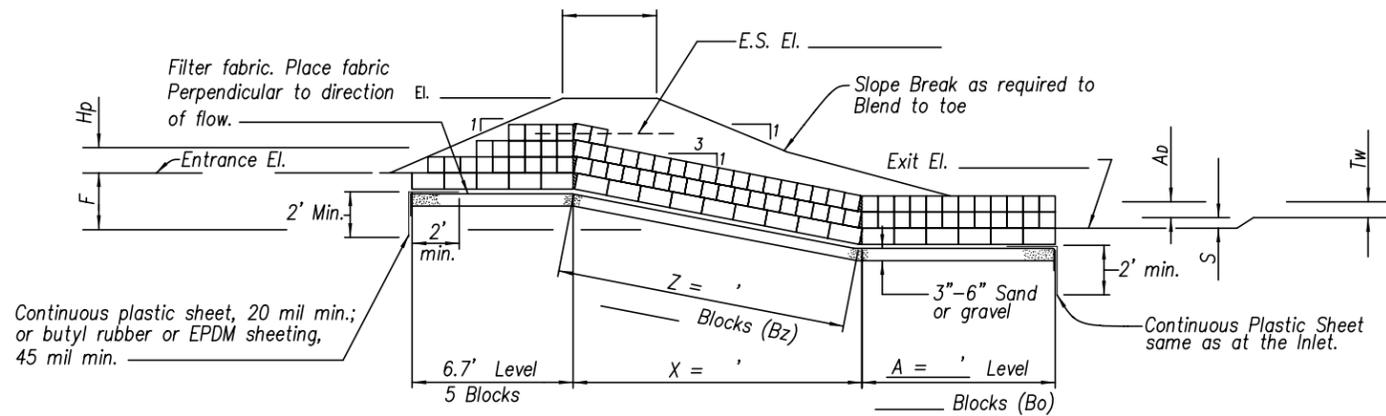
Left click on blue data fields to enter required information.



Bench mark:
Elev. _____
Description _____



- CONSTRUCTION NOTES:
1. CONCRETE BLOCKS SHALL BE NOMINAL 8" X 8" X 16" LONG, IN GOOD CONDITION, AND FREE OF EXCESS MORTAR.
 2. CONCRETE BLOCKS SHALL BE PLACED WITH HOLES UP.
 3. CONCRETE BLOCKS IN FLOOR SHALL BE PLACED WITH LENGTH PARALLEL TO DIRECTION OF FLOW.
 4. BLOCKS IN SIDEWALLS SHALL BE PLACED WITH LENGTH PERPENDICULAR (90°) TO DIRECTION OF FLOW.
 5. FILTER FABRIC SHALL BE NON-WOVEN, ULTRA-VIOLET RESISTANT, WITH AOS EQUAL TO, OR LESS THAN 0.02". TENSILE STRENGTH 90 LBS. MINIMUM, AND PUNCTURE STRENGTH 40 LBS. MINIMUM.
 6. FILTER FABRIC SHALL BE INSTALLED, OVERLAPPED AND ANCHORED AS RECOMMENDED BY THE MANUFACTURER.
 7. A MINIMUM OF 3" CLEAN, WASHED SAND OR GRAVEL FILL (BASE) SHALL BE PLACED BETWEEN THE NATURAL GROUND AND THE FILTER FABRIC. AT LEAST 80% OF THE MATERIALS IN THE BASE SHALL BE LARGER THAN THE HOLES IN THE FILTER FABRIC. NO MATERIAL SHALL BE PLACED BETWEEN THE BLOCKS AND THE FILTER FABRIC.
 8. EXTEND CUTOFF TRENCHES, PLASTIC AND FILTER FABRIC, UPSTREAM AND DOWNSTREAM TO A TOTAL WIDTH OF BLOCK PLACEMENT.
 9. GROUT TRIANGULAR SHAPED VOIDS AT EACH SIDE OF THE 3:1 CHUTE SECTION AND ACROSS CREST OF WEIR. GROUT TO BE 1 PART CEMENT AND 3 PARTS SAND.
 10. HOLES IN CONCRETE BLOCKS MAY BE FILLED WITH SOIL AND SEEDED WITH A WATERWAY SEEDING MIXTURE.
 11. CONCRETE BLOCKS SHALL NOT BE DRIVEN ON BY ANY MACHINERY DURING OR AFTER PLACEMENT.
 12. BERM SHALL BE SEEDED AND MULCHED TO THE CRITICAL AREA SEEDING SPECIFICATIONS.



- DESIGN NOTES:
1. COMPUTE DESIGN FLOW TO COMPLY WITH APPLICABLE PRACTICE STANDARD.
DA = _____ RCN = _____ SLOPE = _____ %
STORM FREQUENCY = _____ YEARS DESIGN FLOW = _____ CFS.
 2. USE CAPACITY TABLE TO DETERMINE REQUIRED BOTTOM WIDTH (IN # OF BLOCKS)
 3. COMPUTE TAILWATER IN OUTLET CHANNEL FOR DESIGN FLOW (ATTACH DOCUMENTATION). IF TAILWATER DEPTH EXCEEDS HEIGHT OF BLOCKS IN SIDEWALLS (1.2 FT.), ADDITIONAL SIDEWALL BLOCKS SHALL BE INSTALLED. ADJUST REQUIREMENT TABLE AS REQUIRED.
 4. DETERMINE THE APRON LENGTH BASED ON THE TAILWATER REQUIREMENTS. THE APRON DEPTH SHOWN IS THE MINIMUM DEPTH REQUIRED FOR THE LENGTH SELECTED. IF THE APRON DEPTH EXCEEDS THE OUTLET CHANNEL TAILWATER DEPTH THEN THE APRON MUST BE SUBMERGED BY "S", Ad - Tw = S, OR THE APRON LENGTH MAY BE EXTENDED UNTIL THE TAILWATER DEPTH EXCEEDS THE APRON DEPTH FOR THE LENGTH SELECTED.
 5. "F" IS THE ORIGINAL OVERFALL + S, OR THE VERTICAL DISTANCE BETWEEN THE ENTRANCE ELEVATION AND THE EXIT ELEVATION.

SLOPE TABLE

F (FT.)	X (FT.)	Z (FT.)	# BLOCKS Bz
2	6.4	6.7	5
2.5	7.6	8.0	6
3	8.8	9.3	7
3.5	10.1	10.7	8
4	12.7	13.3	10
5	15.2	16.0	12
6	19.1	20.0	15
7	21.6	22.7	17
8	24.0	25.3	19
9	26.5	28.0	21
10	30.4	32.0	24

REQUIREMENT TABLE

LENGTH OF FLOOR			X # BLOCKS IN BOTTOM FLOOR WIDTH	= TOTAL # BLOCKS IN FLOOR	* # BLOCKS IN SIDES	= TOTAL # BLOCKS IN CHUTE
# BLOCKS INLET AND SLOPE = Bz + 5	+ # BLOCKS EXIT APRON = Bo	= TOTAL # BLOCKS				
	+	=	X	=	+	=

* # BLOCKS IN SIDES = (Bz + Bo) 8 + 42

FILTER Mt'l DIMENSIONS (B.W. + 7.3)X(Z+A+8.7) (FT.)	= FILTER MATERIAL (SQ.FT.)	PLASTIC Mt'l DIMENSIONS (B.W. X 8) + 21.3 FT.²	= PLASTIC MATERIAL (SQ.FT.)
X	=	+	=

NOTE: QUANTITIES INCLUDE MINIMUM ANCHORAGE AMOUNT BUT DO NOT PROVIDE FOR OVERLAP REQUIREMENTS.

APRON LENGTH REQ'D Vs MINIMUM APRON DEPTH

Hp POND HEAD (FT.)	F OVERFALL (FT.)	A - EXIT APRON LENGTH (FT.)				
		(8.0)	(12.0)	(16.0)	(20.0)	(24.0)
1.0	2	.69	.49	.38	.30	.25
	4	1.07	.84	.69	.57	.49
	6	1.30	1.07	.91	.78	.69
	8	1.45	1.24	1.07	.95	.84
	10	1.55	1.35	1.20	1.07	.97
2.0	2	1.60	1.15	.88	.70	.58
	4	2.50	1.96	1.60	1.34	1.15
	6	3.02	2.50	2.12	1.83	1.60
	8	3.36	2.88	2.50	2.20	1.96
3.0	10	3.60	3.16	2.80	2.50	2.26
	2	2.62	1.88	1.44	1.15	.95
	4	4.10	3.22	2.62	2.20	1.88
	6	4.96	4.10	3.47	3.00	2.62
	8	5.52	4.72	4.10	3.61	3.22
	10	5.91	5.17	4.58	4.10	3.70

VALUES TO THE LEFT OF HEAVY LINE WILL REQUIRE ADDITIONAL SIDEWALL BLOCKS.

CAPACITY OF BLOCK-LINED CHUTES, CFS

Hp = FT.					BOTTOM WIDTH	
1.0	1.5	2.0	2.5	3.0	NO. OF BLOCKS	FT.
Q = CFS						
4	8	13	20	28	4	2.6
8	15	27	40	56	8	5.2
12	23	40	60	84	12	7.8
15	31	54	81	113	16	10.3
19	39	67	101	141	20	12.9
23	47	81	121	169	24	15.5
27	54	94	141	197	28	18.1
31	62	107	161	225	32	20.7
35	70	121	181	253	36	23.3
39	77	134	201	282	40	25.9

(Hp = MAXIMUM PONDING DEPTH ALLOWABLE ABOVE ENTRANCE APRON)

CONCRETE BLOCK CHUTE CHUTE SLOPE (Z) = 3:1

Date _____
Designed _____
Drawn _____
Checked _____
Approved _____



CAD file: NE900-10-004.dwg

Drawing No. _____

Sheet _____ of _____