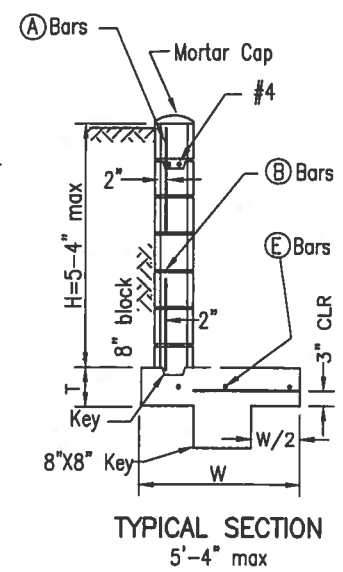
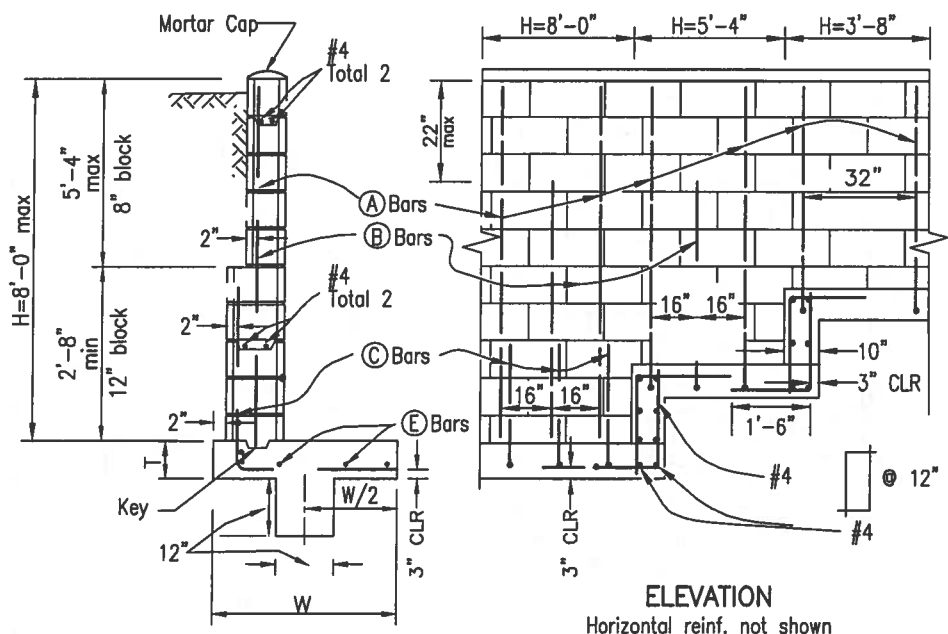
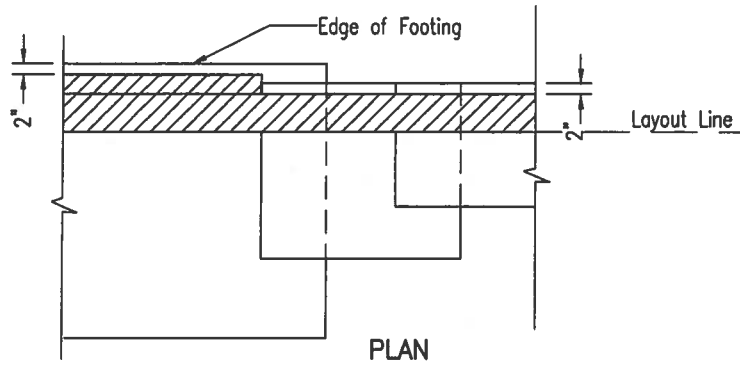


CONCRETE STRUCTURES

CONCRETE STRUCTURES

C



TYPICAL SECTION over 5'-4"

TYPICAL SECTION 5'-4" max

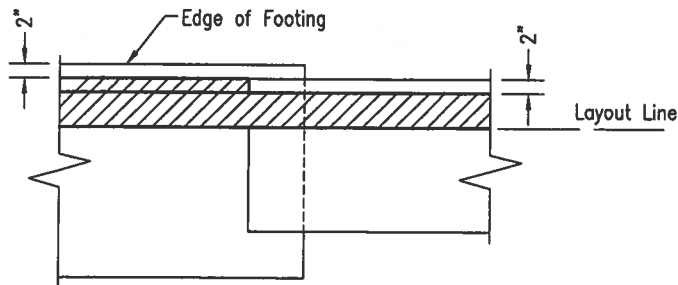
DIMENSIONS AND REINFORCING STEEL			
H (max)	3'-8"	5'-4"	8'-0"
T (min)	0'-8"	0'-10"	1'-0"
W (min)	2'-4"	3'-6"	5'-4"
(A) Bars	#4 @ 32"	#4 @ 32"	#4 @ 32"
(B) Bars	---	#4 @ 32"	#4 @ 32"
(C) Bars	---	---	#6 @ 16"
(E) Bars	#4 Total 4	#4 Total 5	#4 Total 6
max soil pressure	500psf	600psf	800psf

NOTES: 1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

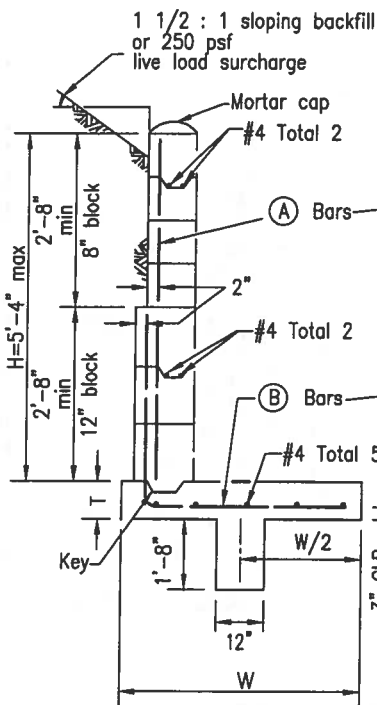
Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Delete Metric	S.S.	T. Shell	03/11

SAN DIEGO REGIONAL STANDARD DRAWING
MASONRY RETAINING WALL TYPE 1
(LEVEL BACKFILL)

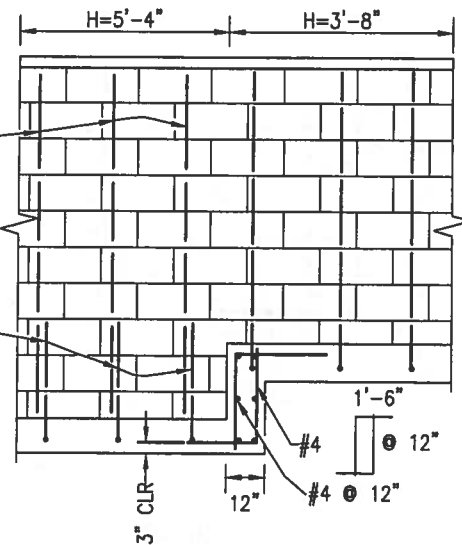
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
T. Stanton 7/26/2012
Chairperson R.C.E. 19246 Date
DRAWING NUMBER C-1



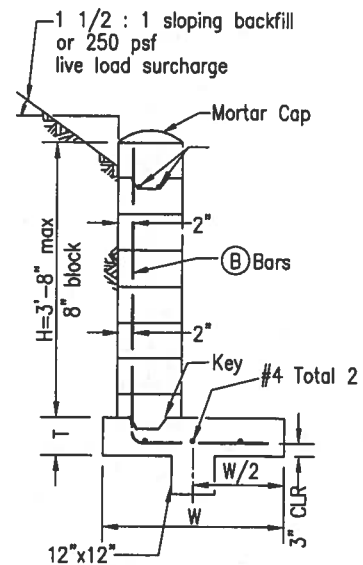
PLAN



TYPICAL SECTION
over 3'-8"



ELEVATION
Horizontal reinf. not shown



TYPICAL SECTION
3'-8" max

DIMENSIONS AND REINFORCING STEEL		
H (max)	5'-4"	3'-8"
T (min)	0'-10"	0'-10"
W (min)	5'-0"	3'-9"
(A) Bars	#4@16"	---
(B) Bars	#6@16"	#4@16"
max soil pressure	700psf	550psf

NOTES:

- See C-7 and C-8 for additional notes and details.
- Fill all block cells with grout.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Delete Metric	S.S.	T. Shell	03/11

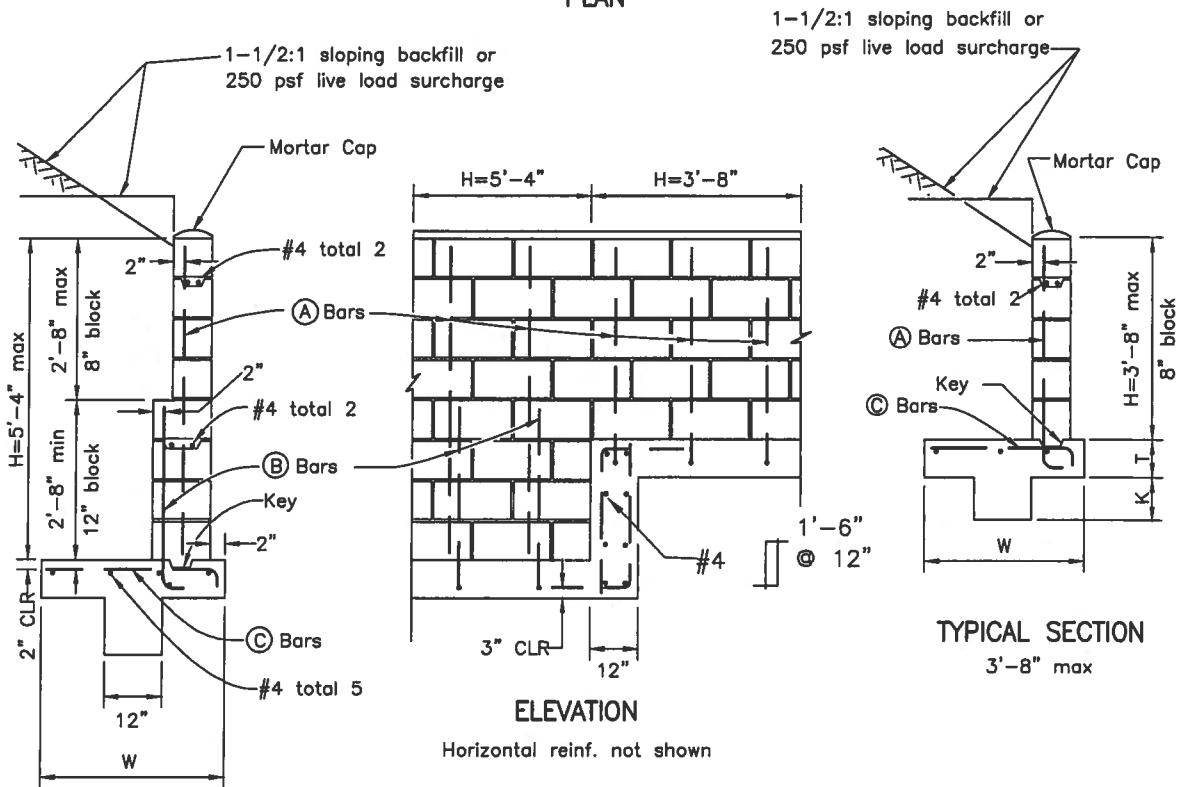
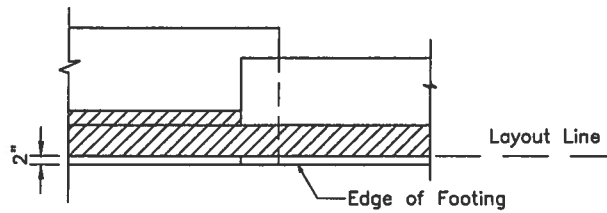
SAN DIEGO REGIONAL STANDARD DRAWING

MANSONRY RETAINING WALL TYPE 2
(LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 7/26/2012
Chairperson R.C.E. 19246 Date

DRAWING NUMBER C-2



DIMENSIONS AND REINFORCING STEEL

H (max)	5'-4"		3'-8"	
T (min)	0'-10"		0'-8"	
W (min)	4'-0"		3'-0"	
(A) Bars	#4@16"		#4@16"	
(B) Bars	#6@16"		---	
Surcharge	sloping	live load	sloping	live load
(C) Bars	#6@8"	#6@16"	#6@16"	#6@16"
K (min)	1'-0"	0'-8"	1'-0"	0'-8"
Toe Press.	2700 psf	1900 psf	1700 psf	1430 psf

NOTES:

- See C-7 and C-8 for additional notes and details.
- Fill all block cells with grout.

Revision	By	Approved	Date
ORIGINAL		Parkinson	02/95
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Delete Metric	S.S.	T. Shell	03/11

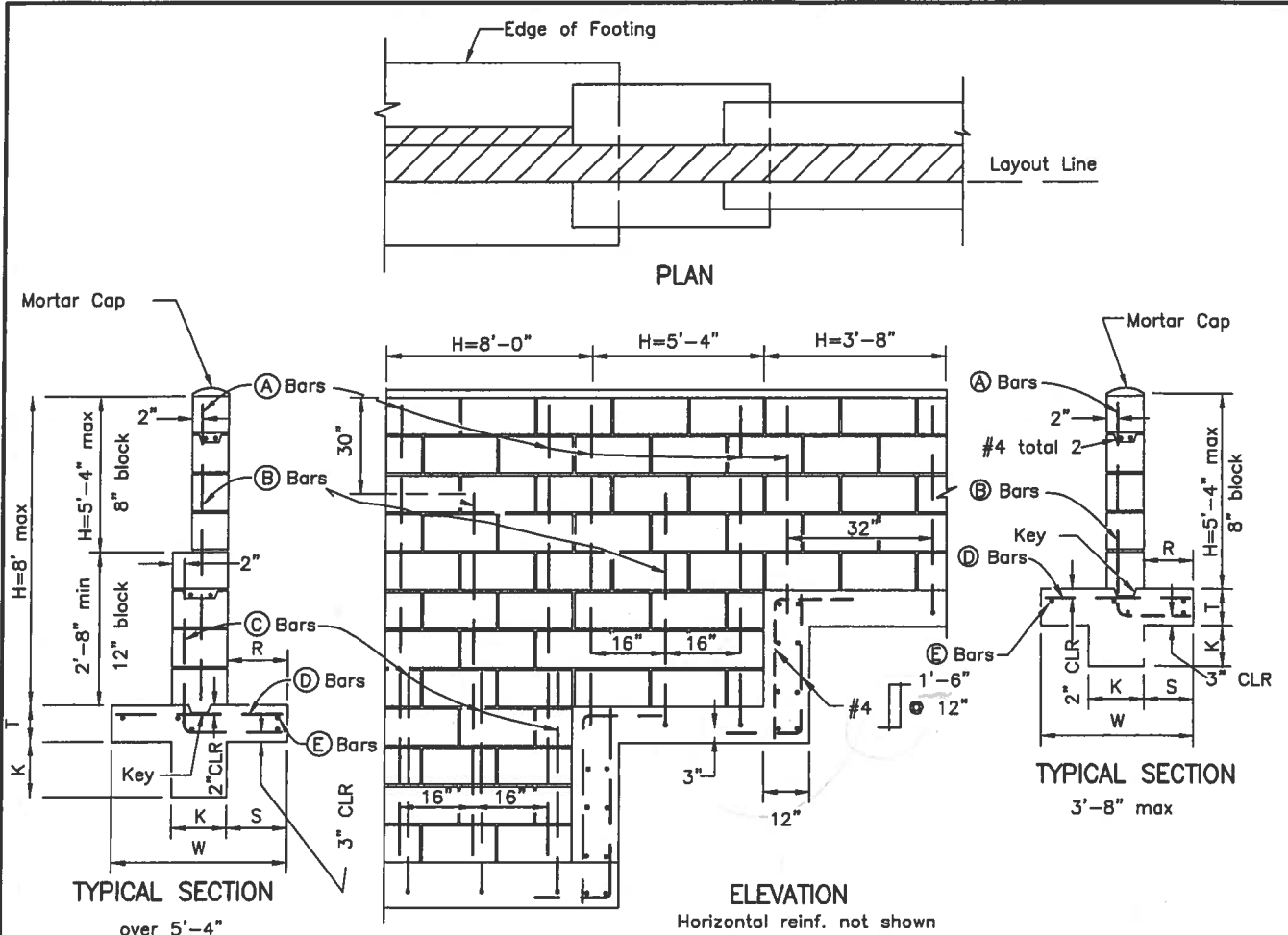
SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 4
(LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 7/26/2012
Chairperson R.C.E. 19246 Date

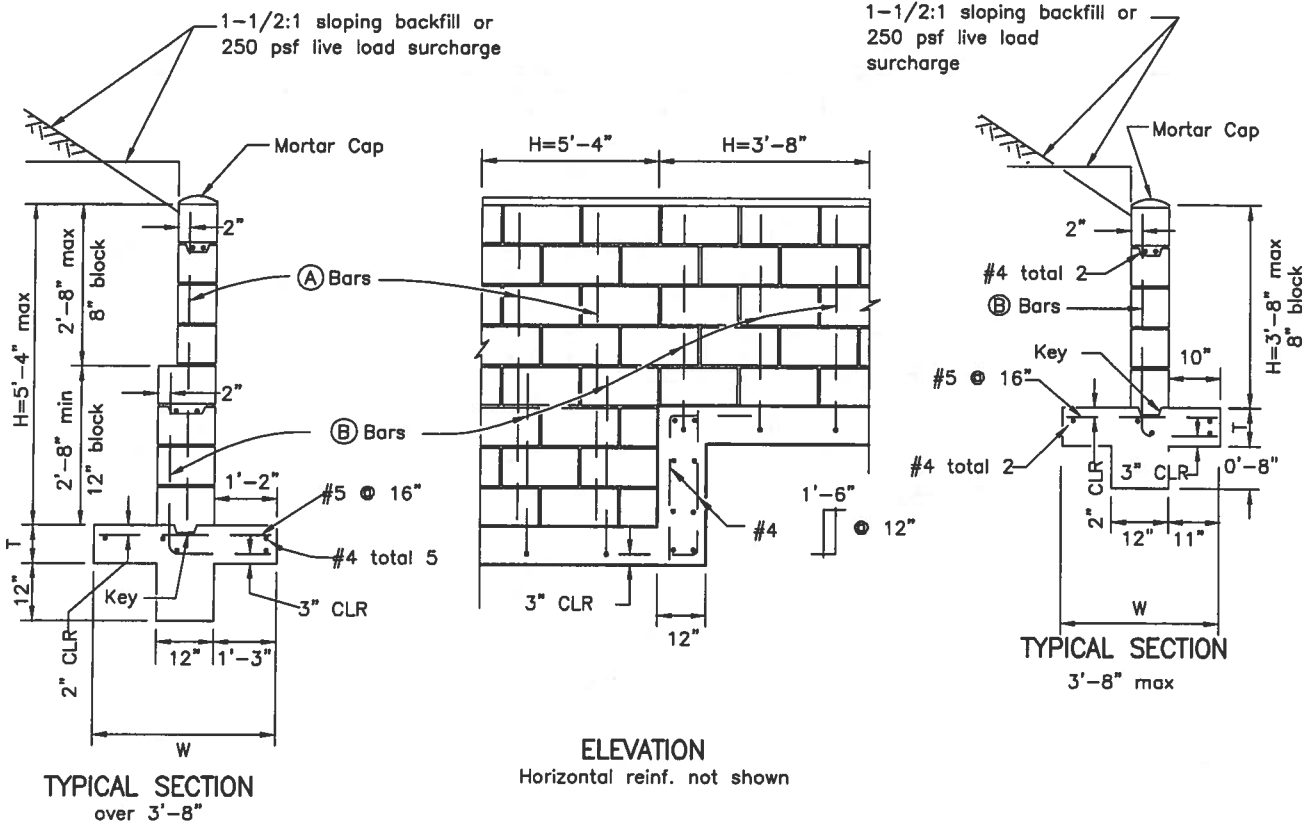
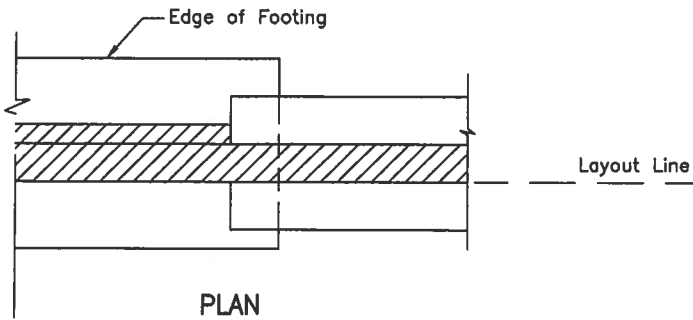
DRAWING NUMBER **C-4**



DIMENSIONS AND REINFORCING STEEL			
H (max)	3'-8"	5'-4"	8'-0"
T (min)	0'-8"	0'-10"	1'-0"
W (min)	2'-1"	3'-1"	4'-3"
R	0'-9"	1'-2"	1'-5"
S	0'-8 1/2"	1'-1 1/2"	1'-7 1/2"
K	0'-8"	0'-8"	1'-0"
(A) Bars	#4@32"	#4@32"	#4@32"
(B) Bars	---	#4@32"	#4@32"
(C) Bars	---	---	#7@16"
(D) Bars	#4@32"	#4@16"	#4@16"
(E) Bars	#4 total 5	#4 total 5	#4 total 6
Max Toe Pressure	774 psf	1,030 psf	1,660 psf

- NOTES:**
- See C-7 and C-8 for additional notes and details.
 - Fill all block cells with grout.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	2/95		
Add Metric		T. Stanton	03/03	MASONRY RETAINING WALL TYPE 5 (LEVEL BACKFILL)	7/26/2012 Chairperson R.C.E. 19246 Date
Delete Metric	S.S.	T. Shell	03/11		
				DRAWING NUMBER	C-5



DIMENSIONS AND REINFORCING STEEL		
H (max)	5'-4"	3'-8"
T (min)	0'-10"	0'-8"
W (min)	3'-10"	2'-9"
(A) Bars	#4 @ 16"	—
(B) Bars	#6 @ 16"	#4 @ 16"
Max Toe Pressure	2,000 psf	1,400 psf

NOTES:

1. See C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		Parkinson	2/95		
Add Metric		T. Stanton	03/03		
Delete Metric	S.S.	T. Shell	03/11		
				DRAWING NUMBER	C-6

DESIGN CONDITIONS:

Walls are to be used for the loading conditions shown for each type wall. Design H shall not be exceeded. Footing key is required except as shown otherwise or when found unnecessary by the Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure listed in table.

DESIGN DATA:

Reinforced Concrete:

Fc=1200 psi F'c=3000 psi
Fs=20,000 psi n=10

Reinforced Masonry:

F'm=600 psi Fm=200 psi
Fs=20,000 psi n=50
Earth=120 pcf and Equivalent Fluid
Pressure=36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with Rankline's formula for unlimited sloping surcharge with a $\phi = 42'$.

REINFORCEMENT:

Intermediate grade, hard grade, or rail steel deformation shall conform ASTM A615, A616, A617. Bars shall lap 40 diameters, where spliced, unless otherwise shown on the plans. Bends shall conform to the Manual of Standard Practice, A.C.1. Backing for hooks is four diameters. All bar embedments are clear distances to outside of bar. Spacing for parallel bars is center to center bars.

MASONRY:

All reinforced masonry retaining walls be constructed of regular or light weight standard units conforming to the "Standard Specifications for Public Works Construction."

JOINTS:

Vertical control joints shall be placed at 32' intervals maximum. Joints shall be designed to resist shear and other lateral forces while permitting longitudinal movement. Vertical expansion joints shall be placed at 96' intervals maximum.

CONCRETE:

Footing concrete shall be 560-C-3250, using Type B aggregate when placing conditions permit.

BACKFILL:

No backfill material shall be placed against masonry retaining walls until grout has reached design strength or until grout has cured for a minimum of 28 days. Compaction of backfill material by jetting or ponding with water will not be permitted. Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compacting is not less than 90%.

FENCING:

Safety fencing shall be installed at the top of the wall as required by the agency.

INSPECTIONS:

Call for inspections as follows:

- A. When the footing has been formed, with the steel tied securely in final position, and is ready for the concrete to be placed.
- B. Where cleanout holes are not provided:
 - (1) After the blocks have been laid up to a height of 4' or full height for walls up to 5', with steel in place but before the grout is poured, and.....
 - (2) After the first lift is properly grouted, the blocks have been laid up to the top of the wall with the steel tied securely in place but before the upper lift is grouted.

Where cleanout holes are provided:

After the blocks have been laid up to the top of the wall, with the steel tied securely in place, but before grouting.

- C. After grouting is complete and after rock or rubble wall drains are in place but before earth backfill is placed.
- D. Final inspection when all work has been completed.

CONCRETE GROUT AND MORTAR MIXES:

Concrete grout shall attain a minimum compressive strength of 2,000 psi in 28 days and mortar shall attain 1,800 psi in 28 days.

All cells shall be filled with grout. Rod or vibrate consolidation. Bring grout within 10 minutes of pouring to insure grout to a point 2" from the top of masonry units when grouting of second lift is to be continued at another time.

MORTAR KEY:

To insure proper bonding between the footing and the first course of block, a mortar key shall be formed by embedding a flat 2 x 4 flush with and at the top of the freshly poured footing. The 2 x 4 should be removed after the concrete has started to harden (approximately 1 hour).

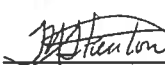
A mortar key may be omitted if the first course of block is set into the fresh concrete when the footing is poured, and a good bond is obtained.

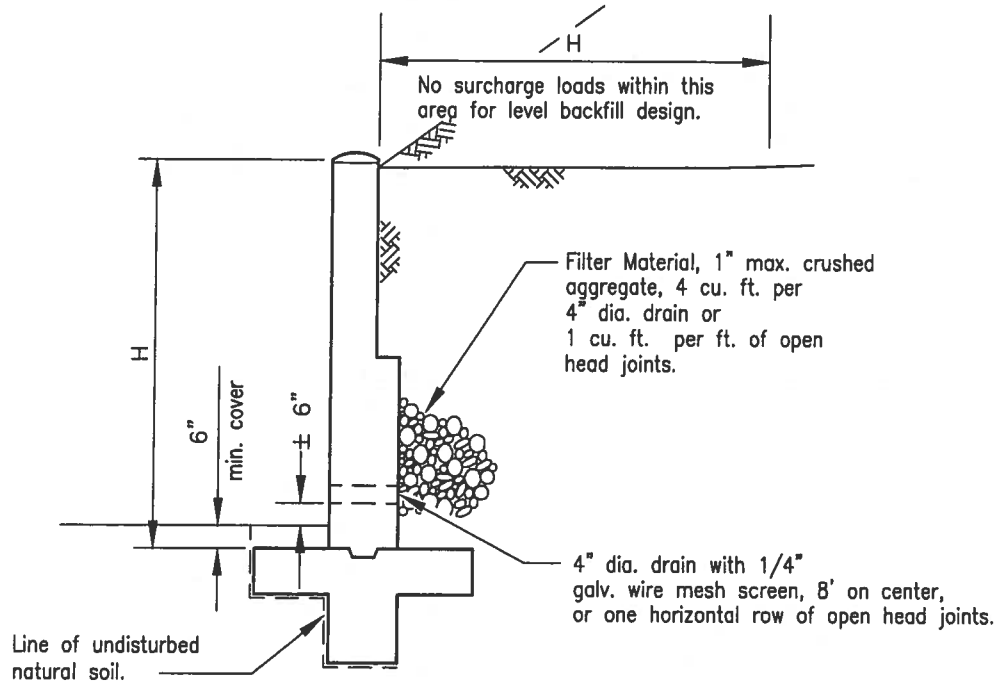
WALL DRAINS:

Wall drains shall be provided in accordance with Standard Drawing C-8.

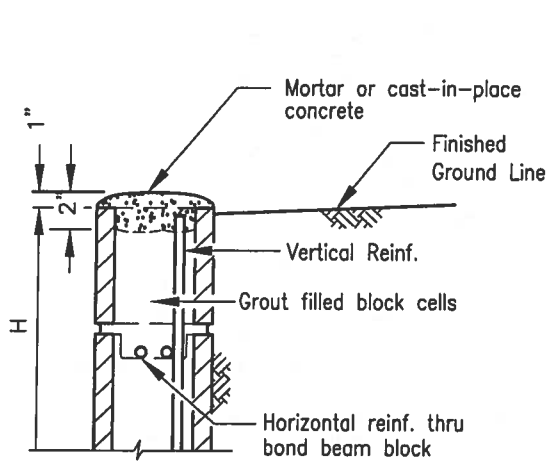
SOIL:

All footings shall extend at least 12" into undisturbed natural soil or approved compacted fill. Soil should be dampened prior to placing concrete in footings.

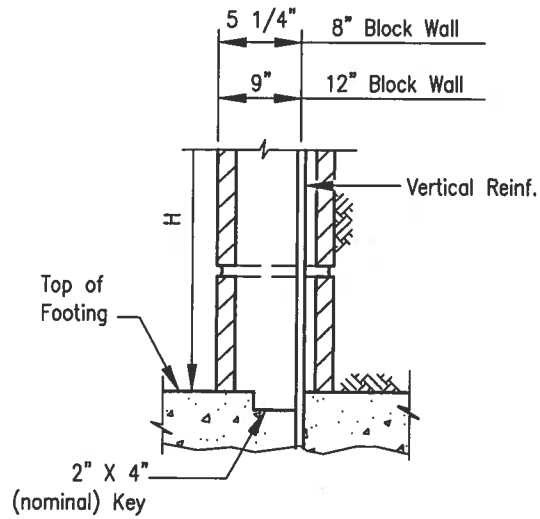
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
ORIGINAL		A. Kercheval	12/75		
Add Metric		T. Stanton	03/03	GENERAL NOTES FOR MASONRY RETAINING WALLS	 7/26/2012
Delete Metric	S.S.	T. Shell	03/11		Chairperson R.C.E. 19246 Date
					DRAWING NUMBER C-7



TYPICAL SECTION



CAP DETAIL

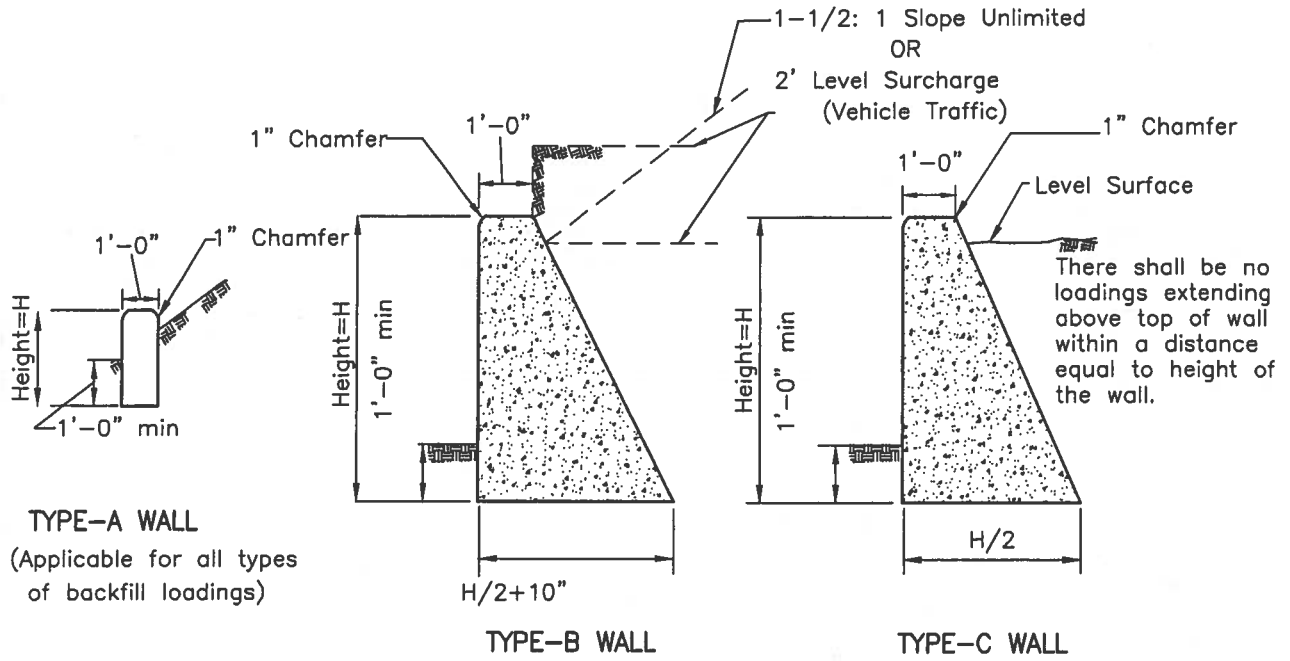


KEY DETAIL

NOTES:

1. All masonry retaining walls shall be constructed with cap, key and drainage details as shown hereon.
2. 4" diameter drain may be formed by placing a block on it's side.

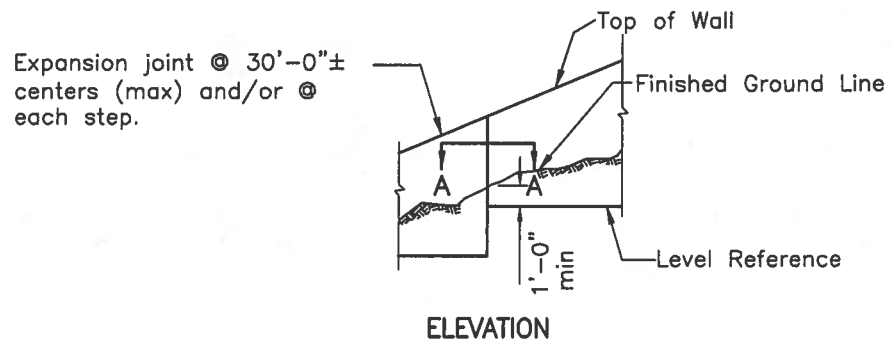
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		DETAILS FOR MASONRY RETAINING WALL	<i>T. Stanton</i> 7/26/2012 Chairperson R.C.E. 19246 Date
Add Metric		T. Stanton	03/03	DRAWING NUMBER		C-8
Delete Metric	S.S.	T. Shell	03/11			



TYPE-A WALL
(Applicable for all types of backfill loadings)

TYPE-B WALL

TYPE-C WALL



ELEVATION

WALL TYPE	HEIGHT	BASE	CONCRETE CF/FT
A	1'-6"	1'-0"	1.50 cu ft.
	2'-0"	1'-0"	2.00 cu ft.
B	3'-0"	2'-4"	4.99 cu ft.
	4'-0"	2'-10"	7.66 cu ft.
	5'-0"	3'-4"	10.82 cu ft.
	6'-0"	3'-10"	14.49 cu ft.
C	3'-0"	1'-6"	3.75 cu ft.
	4'-0"	2'-0"	6.00 cu ft.
	5'-0"	2'-6"	8.75 cu ft.
	6'-0"	3'-0"	12.00 cu ft.

NOTE:
See C-10 for Section A-A, notes and details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
ORIGINAL		Kercheval	12/75		GRAVITY RETAINING WALLS	<i>T. Stanton</i> 7/26/2012
Add Metric		T. Stanton	03/03			Chairperson R.C.E. 19246 Date
Delete Metric	S.S.	T. Shell	03/11			DRAWING NUMBER C-9

CONCRETE

Concrete shall be 560-C-3250.

DESIGN CONDITIONS

Walls are to be used for the loading conditions shown for each type wall. Design H may be exceeded by six inches before going to next size.

DESIGN DATA

$F_c = 1200$ psi
 $F'_c = 3000$ psi
 Earth = 120 pcf
 and equivalent fluid pressure = 36 psf per foot of height

Walls shown for 1-1/2:1 unlimited sloping surcharge are designed in accordance with Rankine's Formula for unlimited sloping surcharge with $\phi = 42^\circ$.

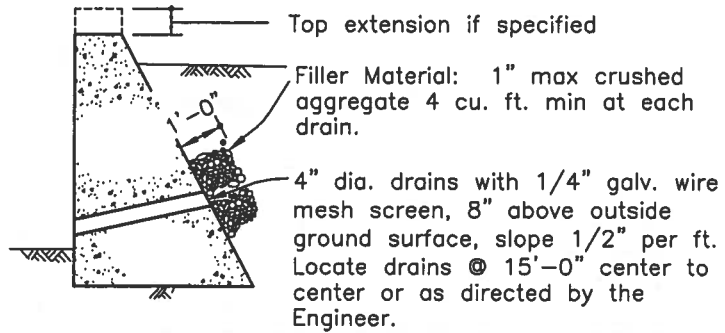
Note: Maximum toe pressure under wall footing = 1-1/2 tons/sq. ft. Special design required where footing material is incapable of supporting this pressure.

EXCAVATION AND BACKFILL

Compaction of backfill material by jetting or ponding with water will not be permitted.

Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than 90 percent.

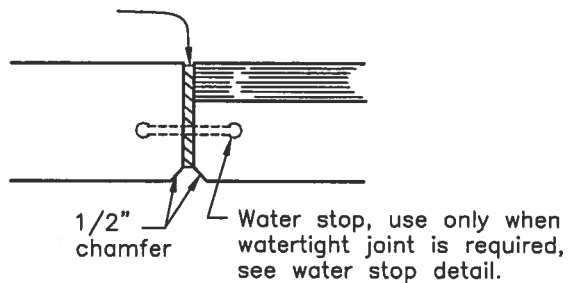
No backfill material shall be deposited against concrete retaining walls until the concrete has developed a strength of 2,500 psi in compression as determined by test cylinders, or until 28 days after wall has been placed.



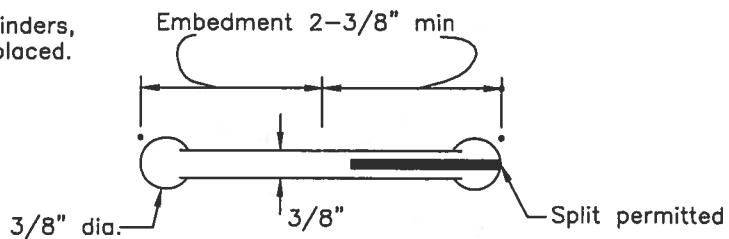
TYPICAL DRAINAGE

WHEN H IS GREATER THAN 4'-0"

1/2" Expansion joint, fill with premolded expansion joint filler. Locate joints at approx. 30'-0" centers or as directed by the Engineer.



SECTION A-A



RUBBER WATERSTOP

Use only when watertight joint is required.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Delete Metric	S.S.	T. Shell	03/11

SAN DIEGO REGIONAL STANDARD DRAWING

GENERAL NOTES AND DETAILS FOR GRAVITY RETAINING WALLS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

T. Stanton 7/26/2012
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **C-10**