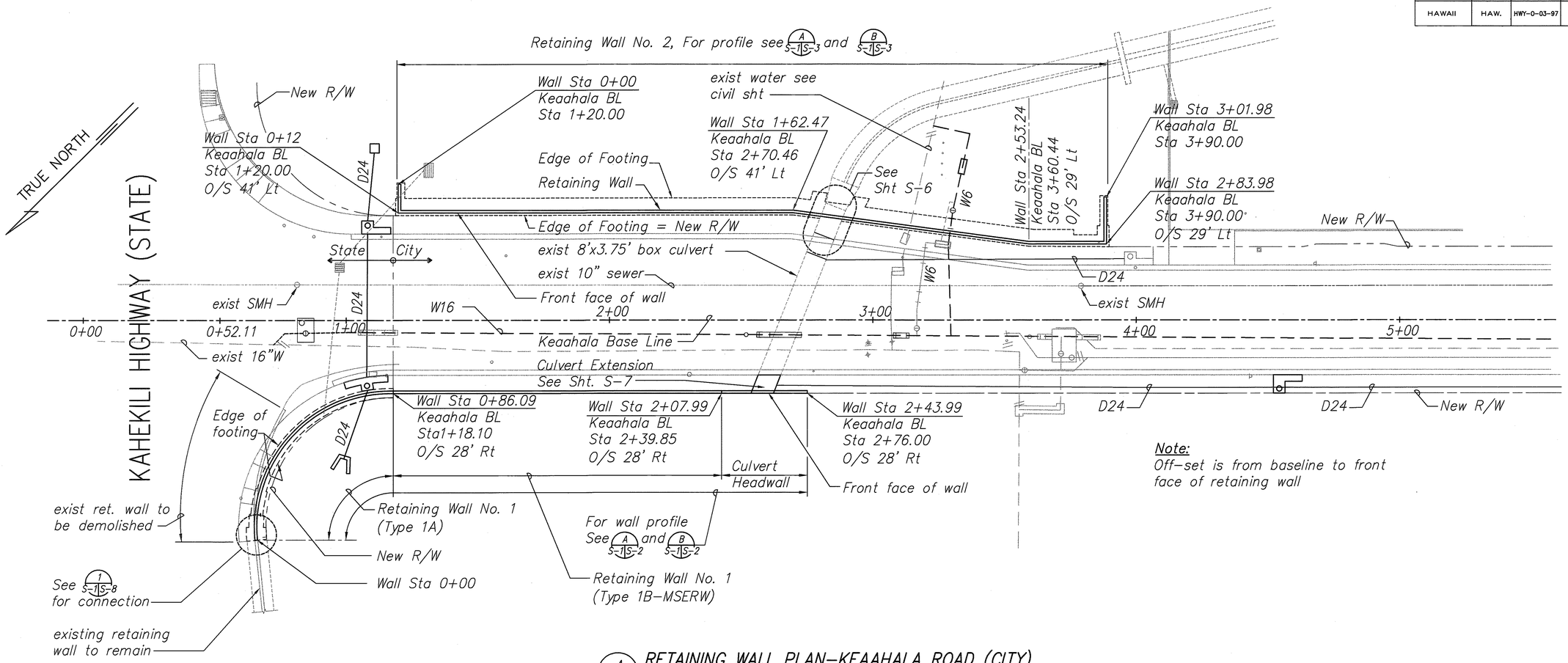
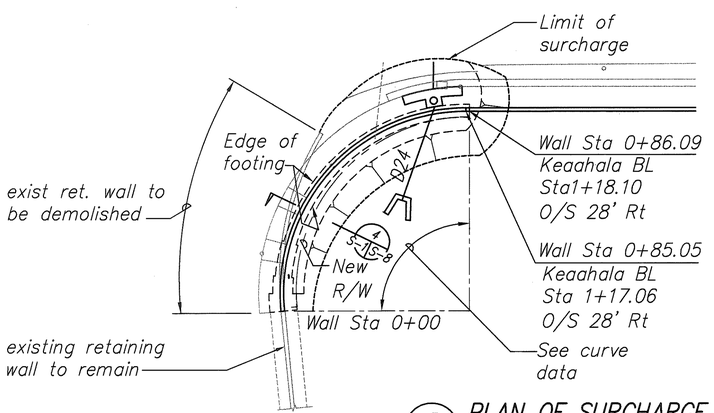
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	56	110



A S-1 S-1 RETAINING WALL PLAN-KEAAHALA ROAD (CITY)
Scale: 1"=20'



Curve Data

△	= 95°33'12"
△/2	= 47°46'36"
R	= 52.00
T	= 57.30
C	= 85.90
Lc	= 86.72

B S-1 S-1 PLAN OF SURCHARGE LIMIT AND WALL LAYOUT
Scale: 1"=20'

APPROVED:

5/4/00

Chief, Civil Engineering Branch — Date
Department of Planning & Permitting
City & County of Honolulu

GRAPHIC SCALE:

0 10' 20' 40' 60'
1"=20'

DATE	REVISION

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL PLAN STA 0+00 TO 5+00

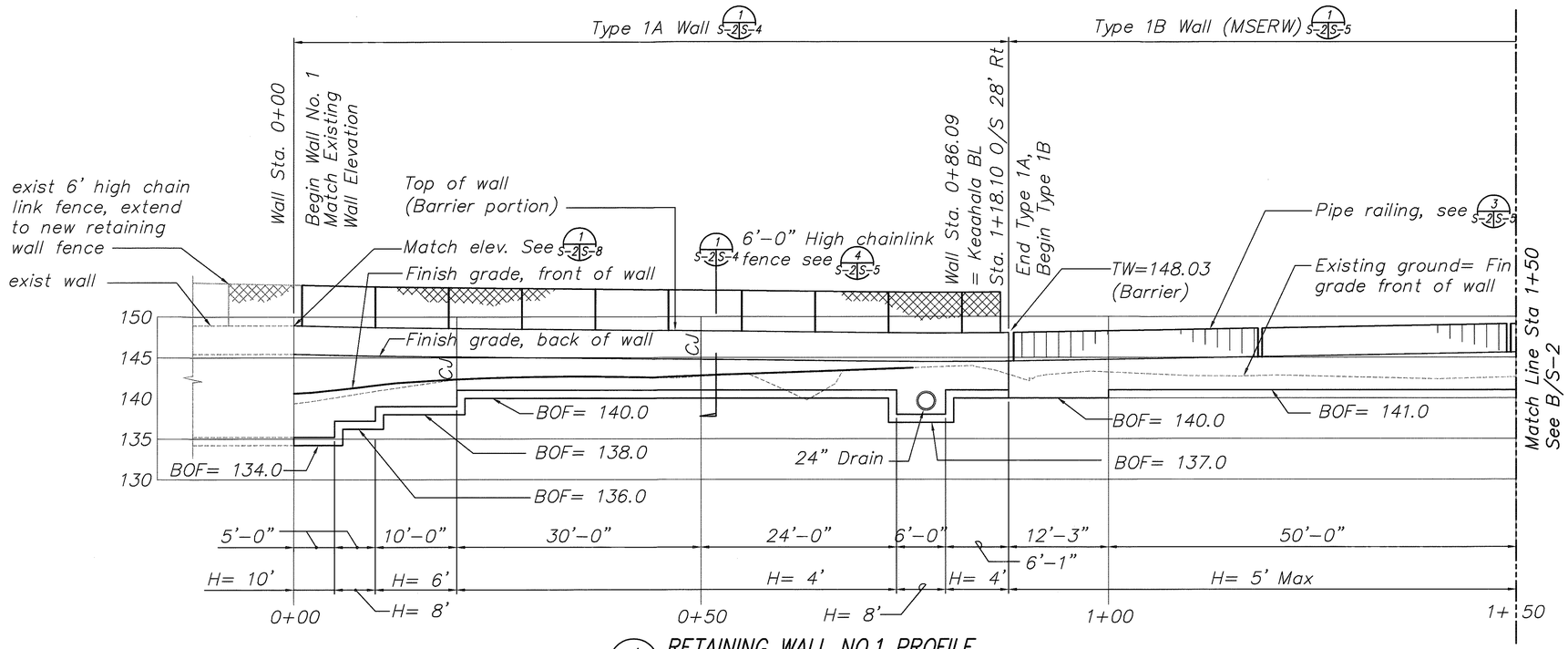
KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

Scale: As shown Date: APRIL 2000

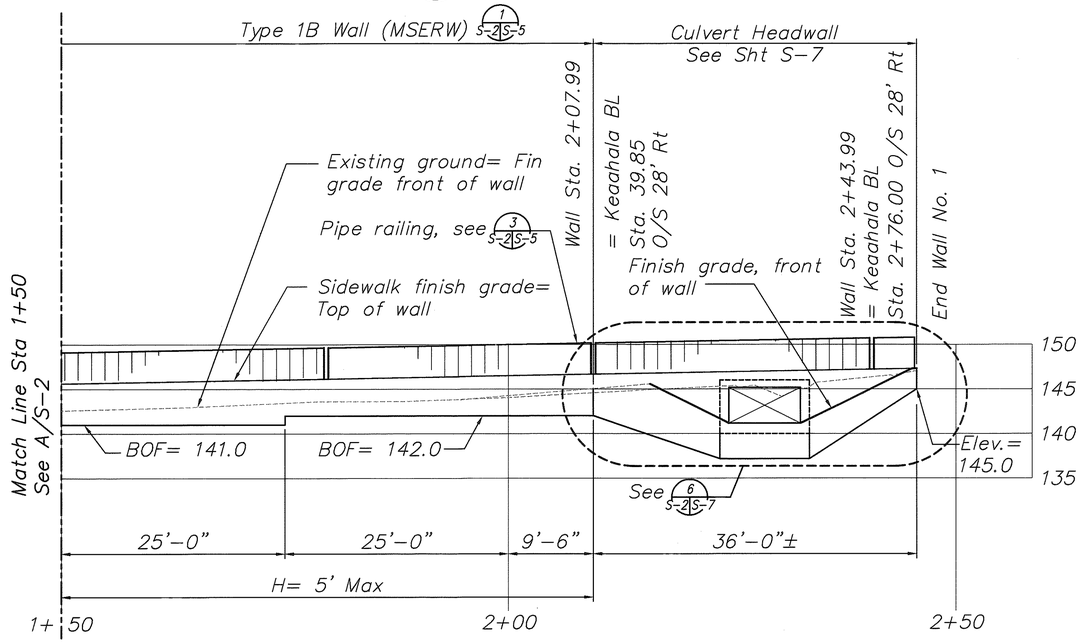
SHEET NO. S-1 OF S-9 SHEETS

ORIGINAL PLAN | NOTEBOOK | No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	57	110



A S-1|S-2 RETAINING WALL NO.1 PROFILE
Scale: 1/8"=1'-0"



B S-1|S-2 RETAINING WALL NO.1 PROFILE
Scale: 1/8"=1'-0"

APPROVED:

M. Tagawa 5/4/00

Chief, Civil Engineering Branch — Date
Department of Planning & Permitting
City & County of Honolulu

GRAPHIC SCALE:

0 2' 4' 6' 9' 12' 22'

1/8"=1'-0"

DATE	REVISION

NORMAN K. NAGAMINE
LICENSED PROFESSIONAL ENGINEER
NO. 5479-S
HAWAII, U.S.A.

Norman K. Nagamine
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL ELEVATIONS

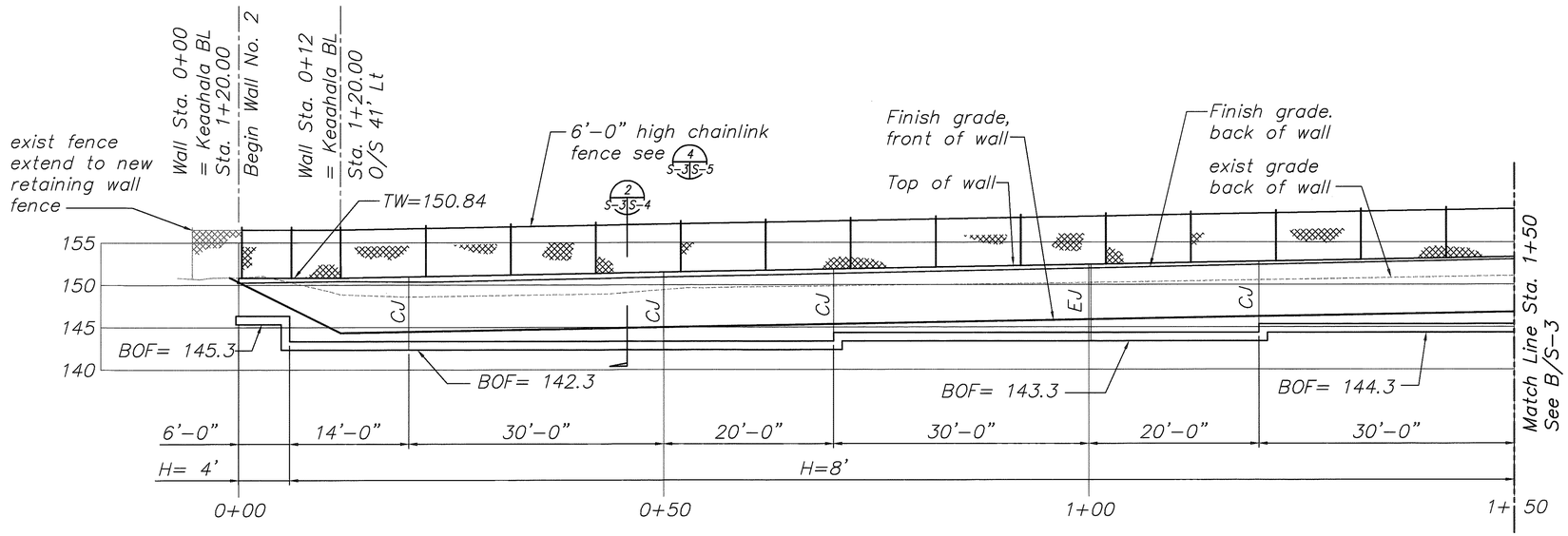
KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

Scale: As shown Date: APRIL 2000

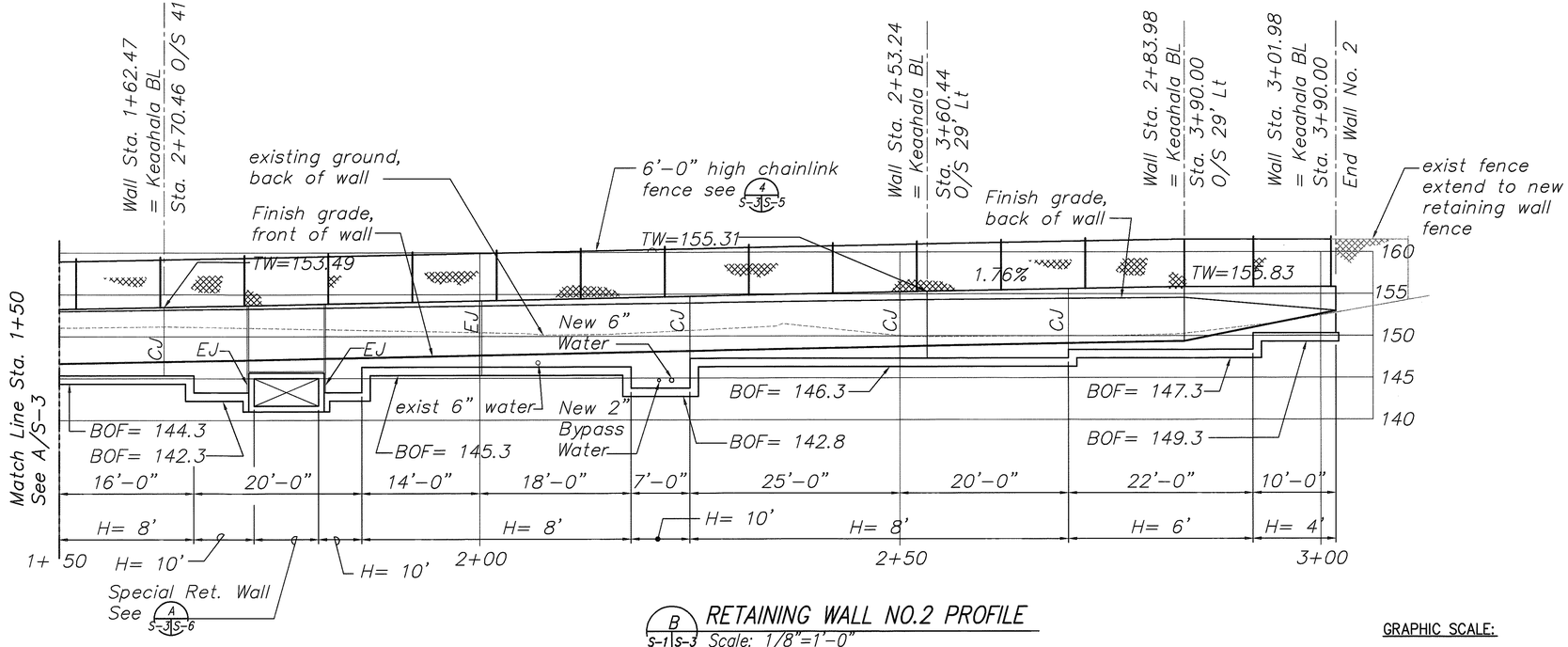
SHEET NO. S-2 OF S-9 SHEETS

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTEBOOK
No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	58	110



A S-1|S-3 RETAINING WALL NO.2 PROFILE
Scale: 1/8"=1'-0"



B S-1|S-3 RETAINING WALL NO.2 PROFILE
Scale: 1/8"=1'-0"

GRAPHIC SCALE:
0 2' 4' 6' 9' 12' 22'
1/8"=1'-0"

APPROVED:

M. [signature] 5/4/00

Chief, Civil Engineering Branch Date
Department of Planning & Permitting
City & County of Honolulu

DATE	REVISION

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

Norman K. Nagamine
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL ELEVATIONS

KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

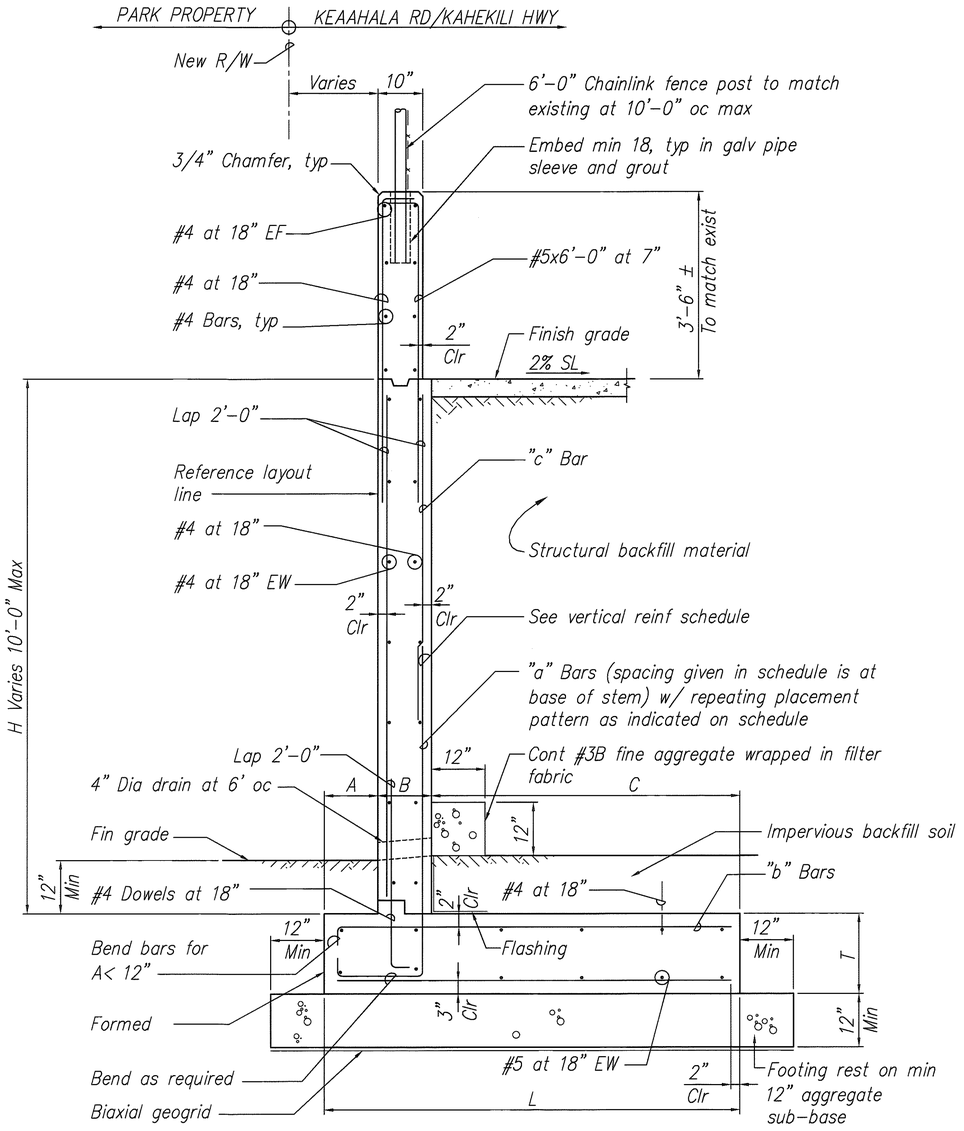
Scale: As shown Date: APRIL 2000

SHEET NO. S-3 OF S-9 SHEETS

SURVEY PLOTTED BY : DATE
DRAWN BY :
TRACED BY :
DESIGNED BY :
QUANTITIES BY :
CHECKED BY :

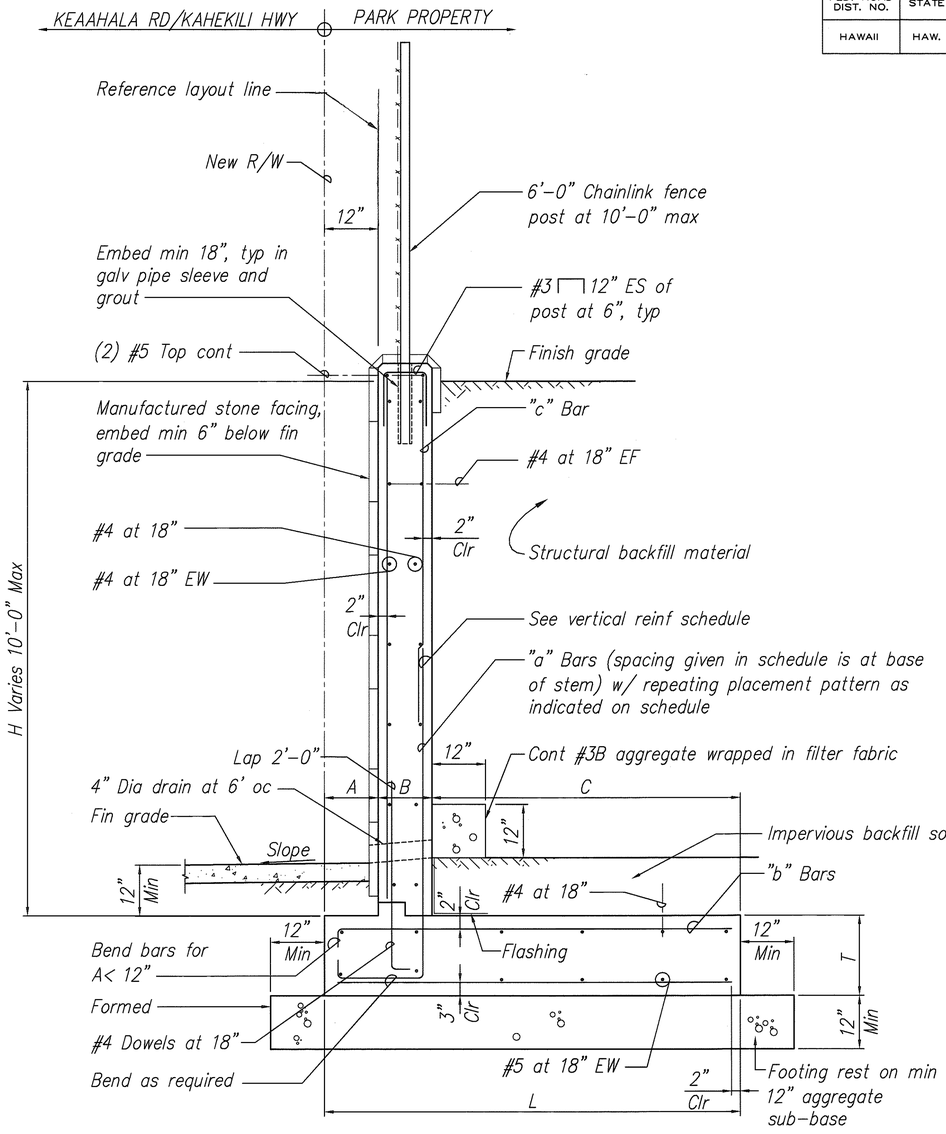
ORIGINAL PLAN
NOTEBOOK No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	59	110



1 S-2 S-4 TYPICAL RETAINING WALL NO.1 (TYPE 1A) SECTION

Not to Scale



2 S-3, S-6 S-4 TYPICAL RETAINING WALL NO.2 SECTION

Not to Scale

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTEBOOK
No.

APPROVED:

5/4/00

Chief, Civil Engineering Branch — Date
Department of Planning & Permitting
City & County of Honolulu

DATE	REVISION

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

Norman K. Nagamine
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL SECTIONS

KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

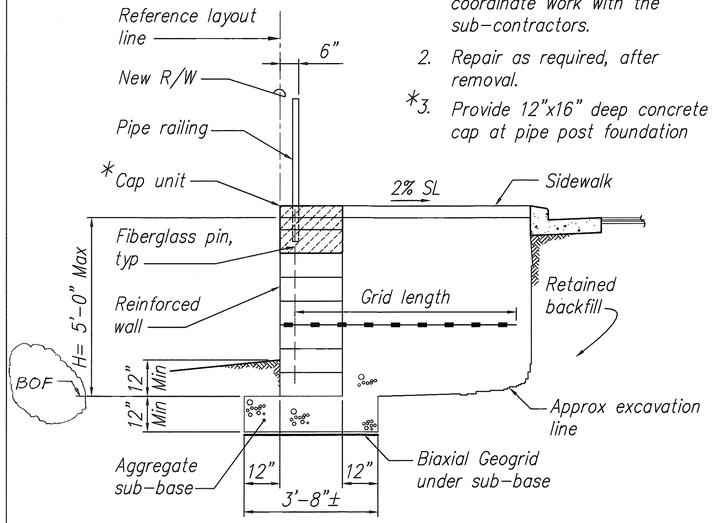
Scale: As shown Date: APRIL 2000

SHEET NO. S-4 OF S-9 SHEETS

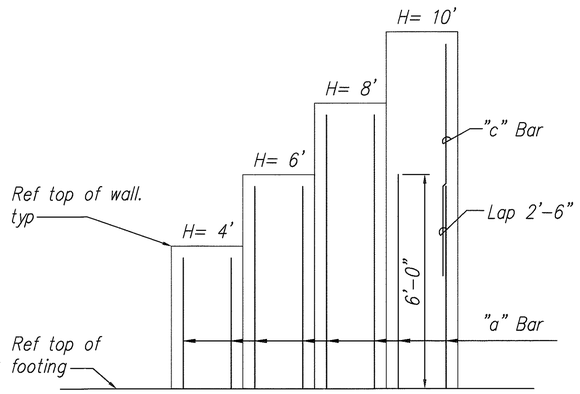
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	60	110

Notes:

1. Where utility pole is to be installed in the MSERW area, coordinate work with the sub-contractors.
2. Repair as required, after removal.
*3. Provide 12"x16" deep concrete cap at pipe post foundation



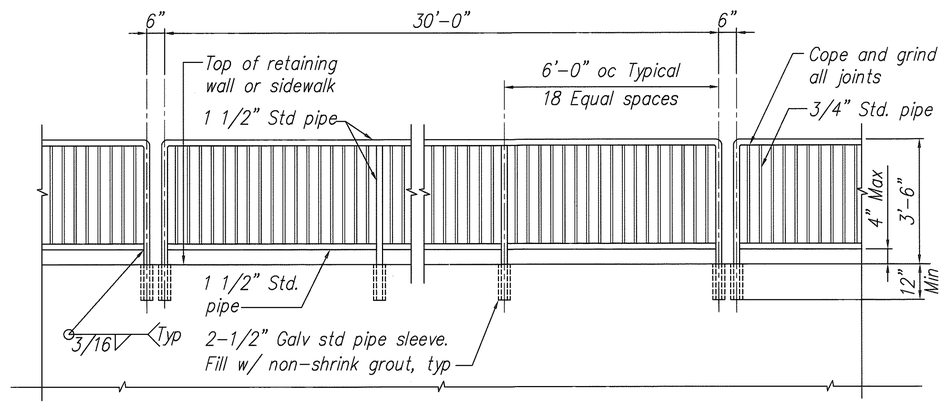
1 S-2 | S-5 TYPICAL RETAINING WALL NO.1 (TYPE 1B-MSERW) SECTION
Not to Scale



2 S-5 | S-5 RETAINING WALL VERT - "a" AND "c" CUT-OFF DIAGRAM
Not to Scale

Notes:

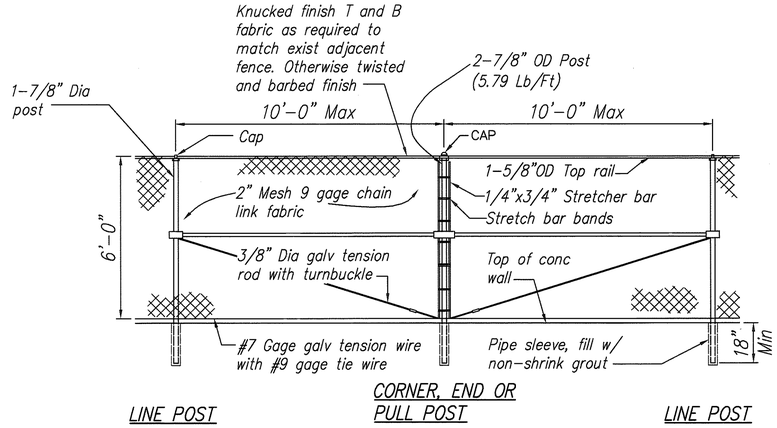
1. All pipe railing to be galvanized.
2. At MSERW wall, break cell to install sleeve. Fill cell with grout.



3 S-2 | S-5 GALVANIZED PIPE RAILING DETAIL
Scale: 1/2"=1'-0"

SCHEDULE OF DIMENSIONS AND REBAR FOR RETAINING WALL

	RET. WALL NO. 1A (NORTH WALL)				RET. WALL NO. 2 (SOUTH WALL)			
Wall Ht. H	10'	8'	6'	4'	10'	8'	6'	4'
L	8'-6"	7'-0"	5'-0"	3'-0"	10'-0"	6'-6"	4'-6"	3'-0"
T	1'-4"	1'-0"	1'-0"	1'-0"	1'-5"	1'-0"	1'-0"	1'-0"
"a" Bar	#6 at 9"	#5 at 12"	#5 at 12"	#5 at 12"	#5 at 9"	#5 at 12"	#5 at 12"	#5 at 12"
"b" Bar	#5 at 10"	#5 at 12"	#5 at 12"	#5 at 12"	#7 at 6"	#5 at 8"	#5 at 12"	#5 at 12"
"c" Bar	#5 at 18"	-	-	-	#5 at 18"	-	-	-
A	3'-9"	2'-6"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	0'-6"
B	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
C	3'-9"	3'-6"	3'-0"	1'-0"	8'-0"	4'-6"	2'-6"	1'-6"



4 S-2, S-3 | S-5 CHAIN LINK FENCE ON RETAINING WALL
Scale: 3/8"=1'-0"

GRAPHIC SCALES:

0 6" 1' 3' 5' 7'
3/8"=1'-0"

0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

APPROVED:

M. [illegible] 5/4/00

Chief, Civil Engineering Branch MT — Date
Department of Planning & Permitting
City & County of Honolulu

DATE	REVISION
6/21/00	CLARIFIED BOF AT MSERW

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

Norman K. Nagamine
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SECTIONS AND SCHEDULE

KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

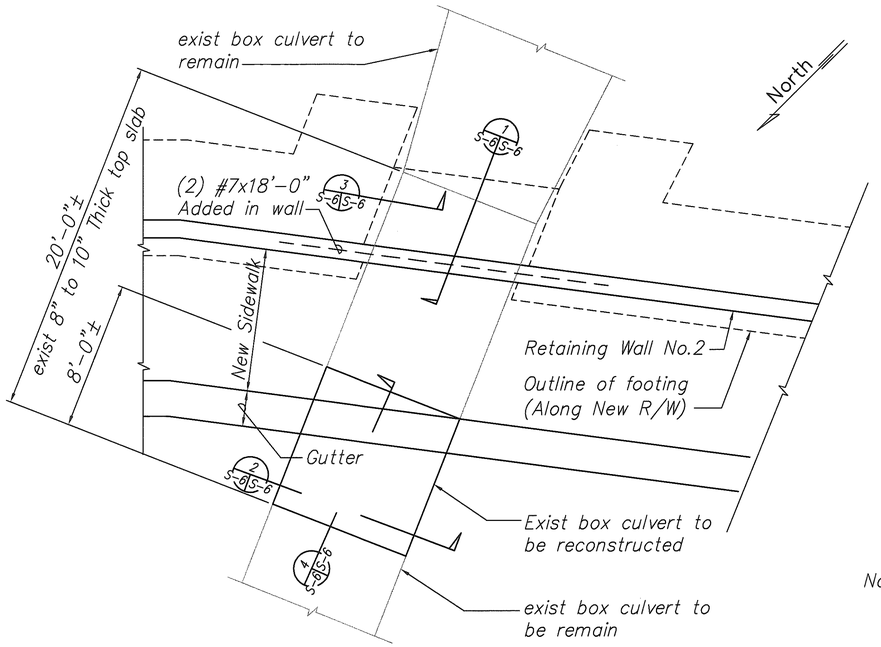
Scale: As shown Date: APRIL 2000

SHEET NO. S-5 OF S-9 SHEETS

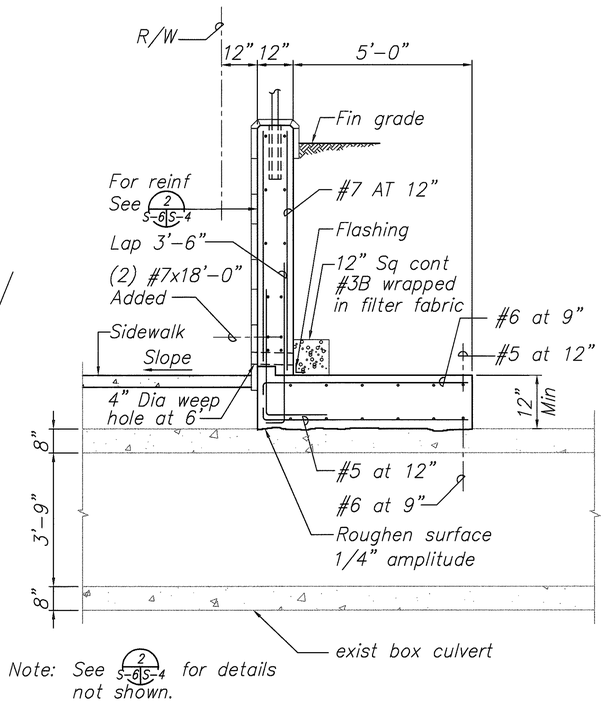
ADD. 60

SURVEY PLOTTED BY — DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
NOTEBOOK — No.

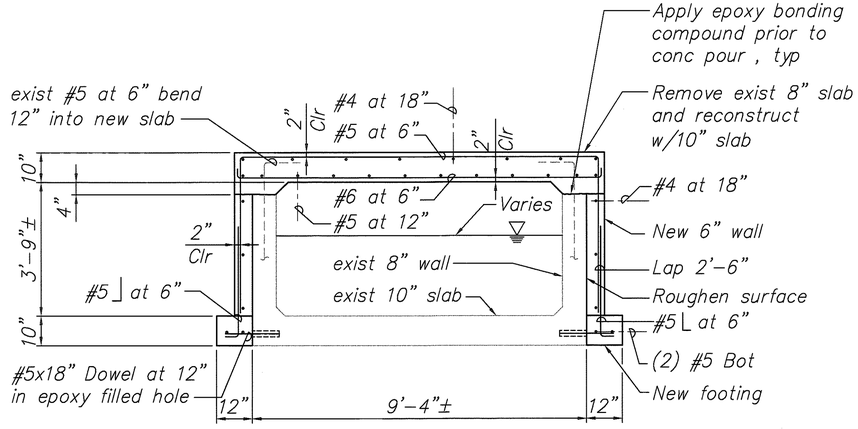
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	61	110



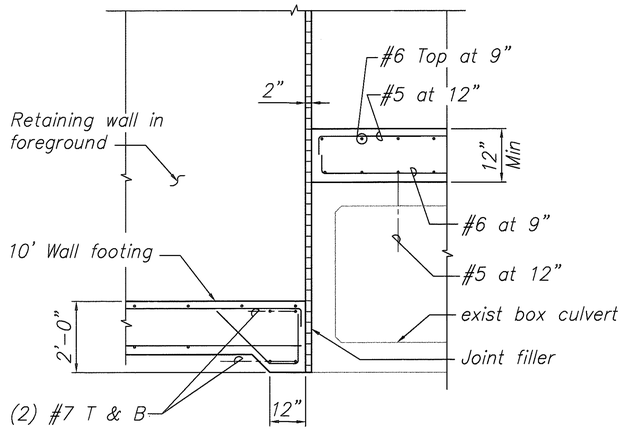
A S-3 S-6 PARTIAL PLAN AT SPECIAL RETAINING WALL (R.W. No.2)
Scale: 1/4"=1'-0"



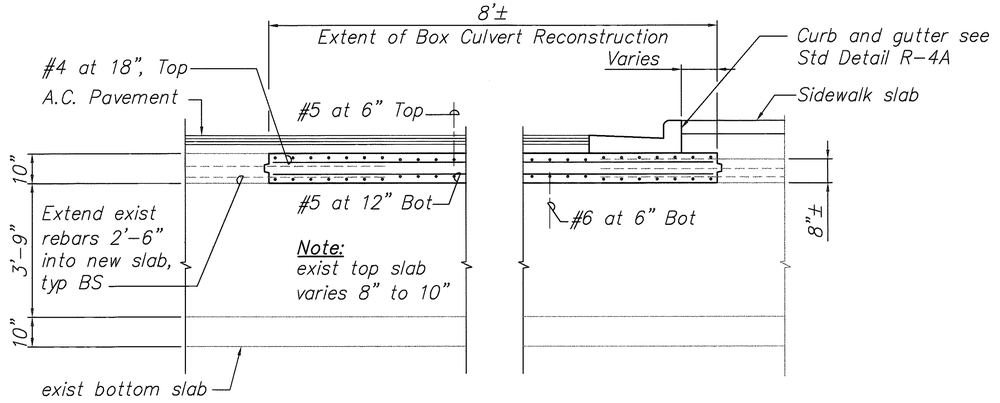
1 S-6 S-6 SPECIAL RETAINING WALL SECTION
Scale: 1/2"=1'-0"



2 S-6 S-6 TYP. CULVERT REINFORCEMENT SECTION
Scale: 1/2"=1'-0"



3 S-6 S-6 SECTION
Scale: 1/2"=1'-0"



4 S-6 S-6 SECTION
Scale: 1/2"=1'-0"

APPROVED:

M. Tagawa 5/4/00

Chief, Civil Engineering Branch — Date
Department of Planning & Permitting
City & County of Honolulu

GRAPHIC SCALES:

0 6" 1' 2' 3' 5' 7' 9' 11'
1/4"=1'-0"

0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

DATE	REVISION

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

Norman K. Nagamine
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SPECIAL RETAINING WALL PLAN AND SECTIONS

KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

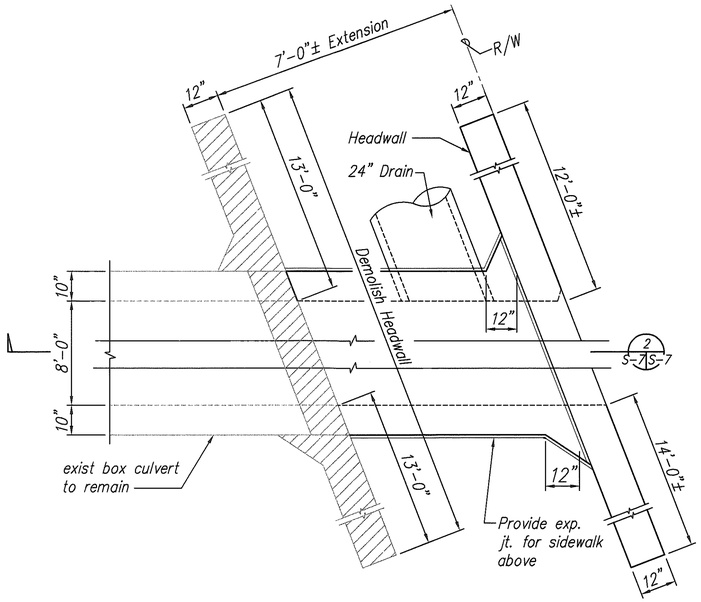
Scale: As shown Date: APRIL 2000

SHEET NO. S-6 OF S-9 SHEETS

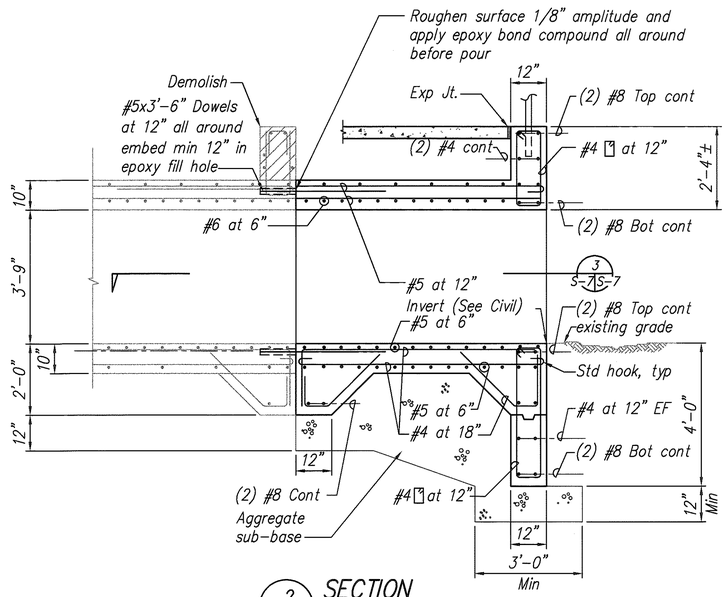
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

ORIGINAL PLAN
NOTEBOOK
No.

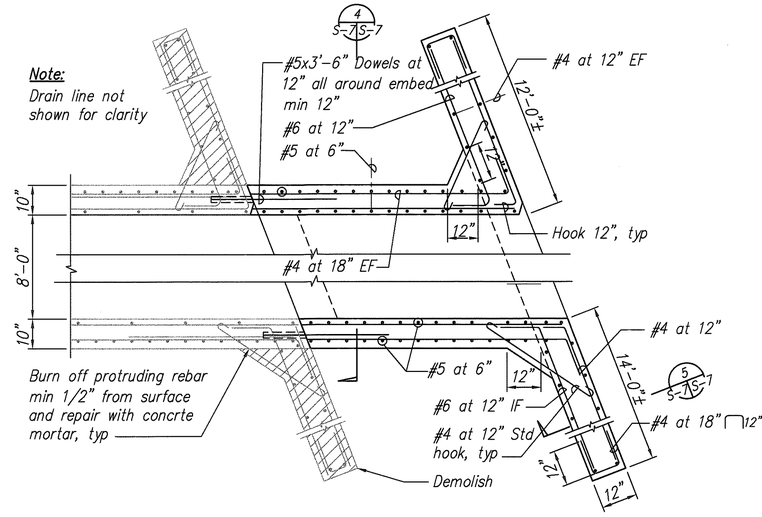
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	62	110



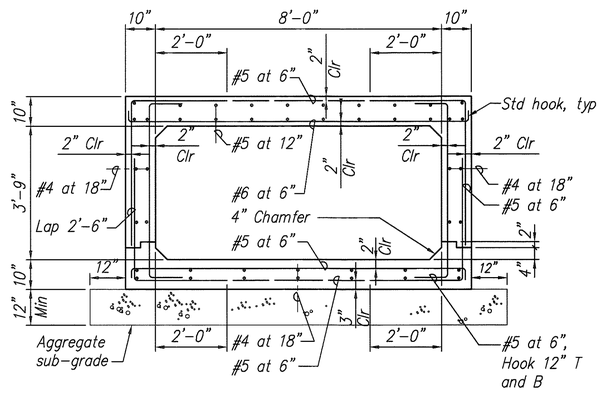
1 S-7 S-7 PLAN OF CULVERT EXTENSION
Scale: 1/2"=1'-0"



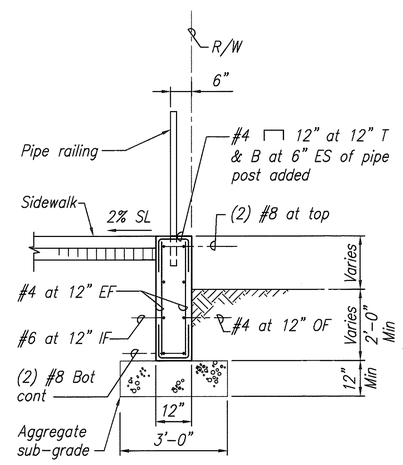
2 S-7 S-7 SECTION
Scale: 1/2"=1'-0"



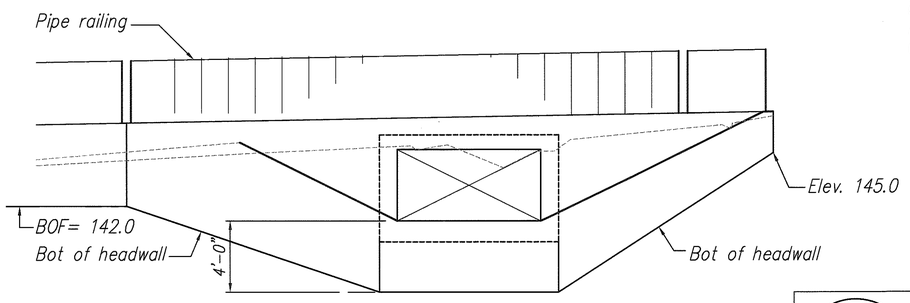
3 S-7 S-7 PLAN – SECTION
Scale: 1/2"=1'-0"



4 S-7 S-7 SECTION
Scale: 1/2"=1'-0"



5 S-7 S-7 SECTION AT HEADWALL
Scale: 1/2"=1'-0"



6 S-2 S-7 HEADWALL ELEVATION
Scale: 1/4"=1'-0"

APPROVED:

M. [signature] 5/4/00

Chief, Civil Engineering Branch Date
Department of Planning & Permitting
City & County of Honolulu

GRAPHIC SCALES:

0 6" 1' 2' 3' 5' 7' 9' 11'
1/4"=1'-0"

0 6" 1' 2' 3' 4' 5' 6'
1/2"=1'-0"

DATE	REVISION

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EXISTING BOX CULVERT EXTENSION AND HEADWALL

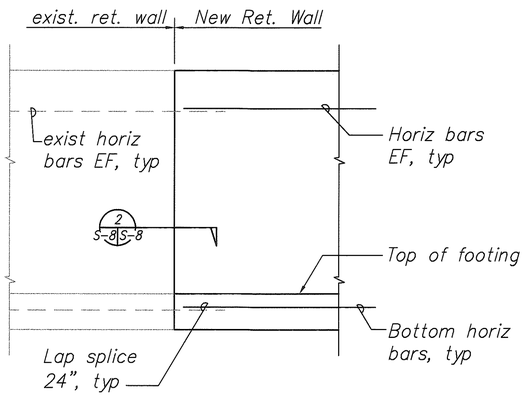
KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

Scale: As shown Date: APRIL 2000

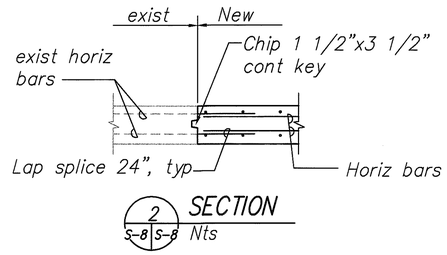
SHEET NO. S-7 OF S-9 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTEBOOK | No.

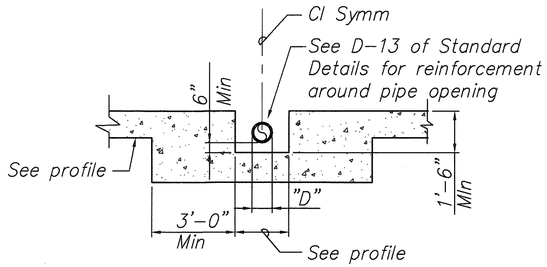
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	63	110



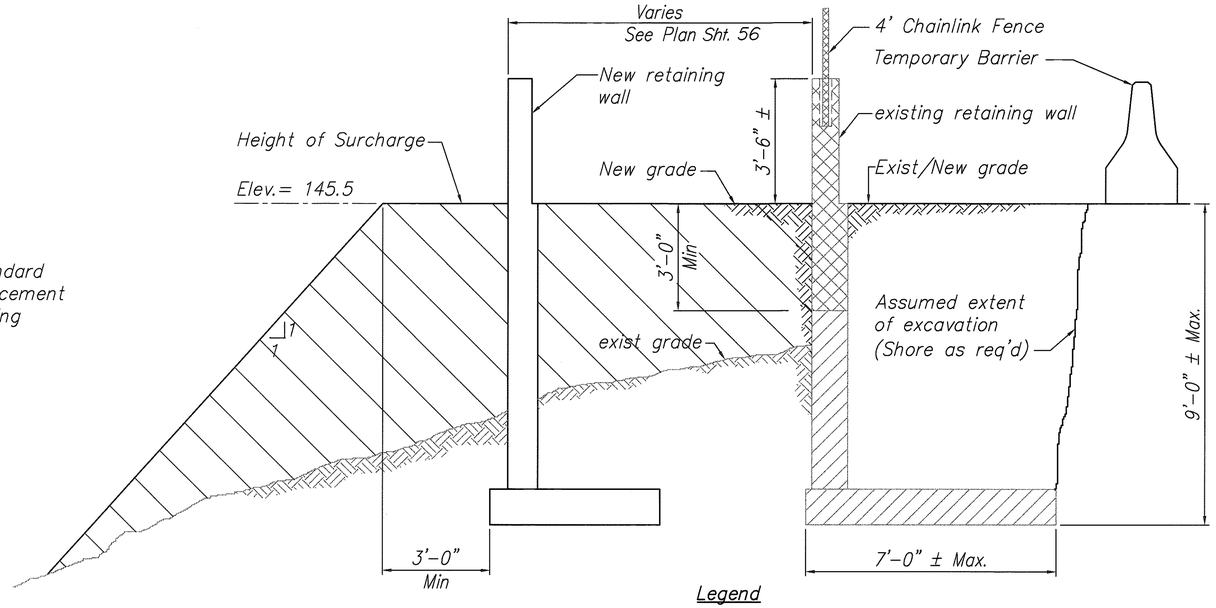
1 S-1, S-2 S-8 **EXIST/NEW RETAINING WALL CONN (R.W. No.1)**
Not to Scale



2 S-8 S-8 **SECTION**
Nts



3 S-8 S-8 **DROPPED FOOTING AT PIPING**
Not to Scale



Legend

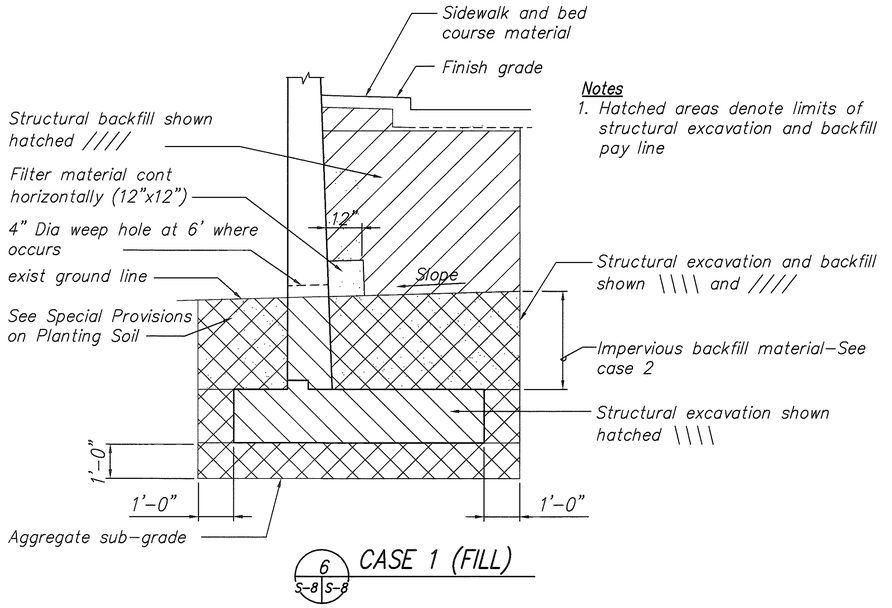
Denotes extent of demolition when installation of new retaining wall is not in conflict.

Denotes extent of demolition when new retaining wall interferes with existing wall.

Denotes extent of surcharge, see drawing notes in civil sheet.

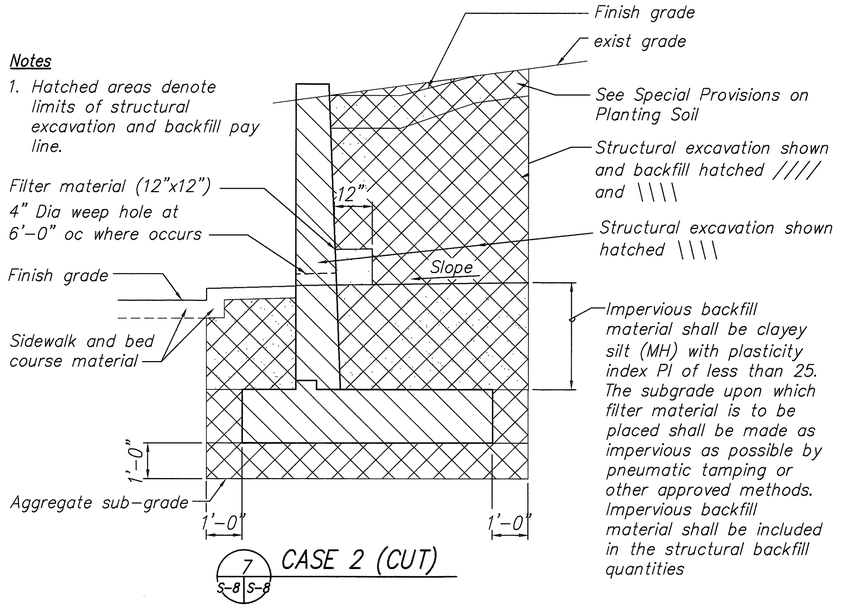
LIMIT OF EXIST RETAINING WALL DEMOLITION AND SURCHARGE

4 S-1 S-8 Not to Scale



Notes
1. Hatched areas denote limits of structural excavation and backfill pay line

6 S-8 S-8 **CASE 1 (FILL)**



Notes
1. Hatched areas denote limits of structural excavation and backfill pay line.

7 S-8 S-8 **CASE 2 (CUT)**

5 S-8 S-8 **TYPICAL EXCAVATION AND BACKFILL PAY LIMITS**
Not to Scale

APPROVED:

M. [illegible] 5/4/00

Chief, Civil Engineering Branch *Date*
Department of Planning & Permitting
City & County of Honolulu

DATE	REVISION

NORMAN K. NAGAMINE LICENSED PROFESSIONAL ENGINEER NO. 5479-S HAWAII, U.S.A.

Norman K. Nagamine
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

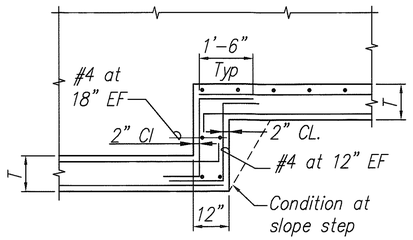
MISCELLANEOUS DETAILS

KEAAHALA ROAD WIDENING
KAHEKILI HIGHWAY TO PO'OKELA STREET
State Project No. HWY-0-03-97

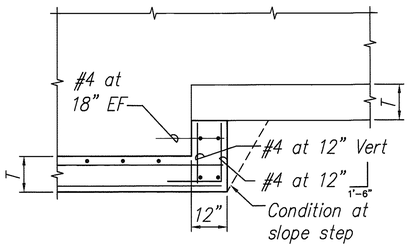
Scale: As shown *Date:* APRIL 2000

SHEET NO. S-8 OF S-9 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTEBOOK | No.



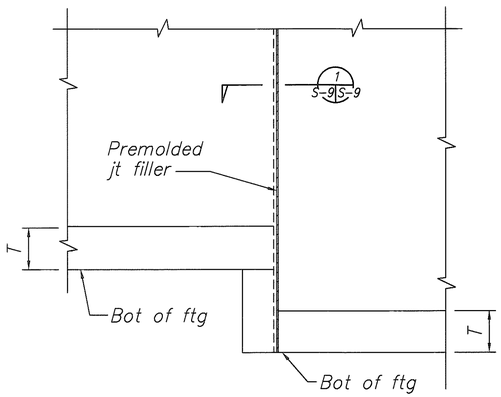
1A S-9 | S-9 SECTION
Not to Scale



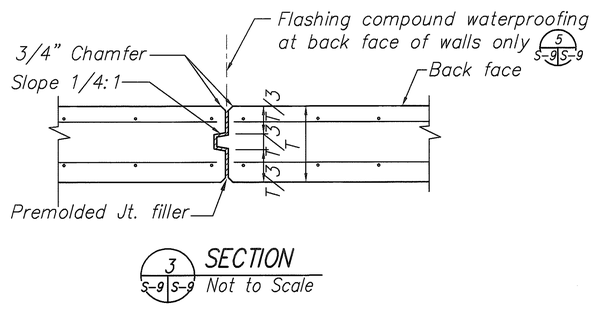
1B S-9 | S-9 SECTION
Not to Scale

TYPICAL FOOTING STEP-UP DETAILS AT CONTINUOUS FOOTING

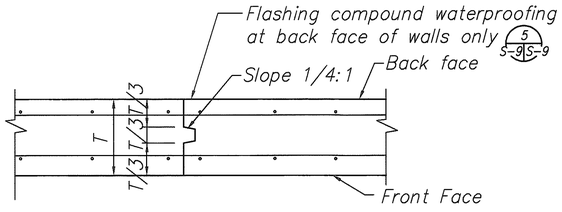
1 S-9 | S-9 Not to Scale



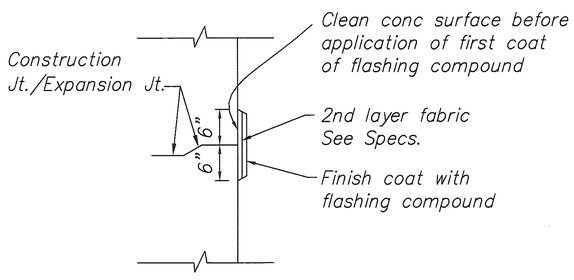
2 S-9 | S-9 EXPANSION JOINT SEAL
Not to Scale



3 S-9 | S-9 SECTION
Not to Scale



4 S-9 | S-9 CONSTRUCTION JOINT DETAIL
Not to Scale



TYPICAL FLASHING COMPOUND WATERPROOFING DETAIL

5 S-9 | S-9 Not to Scale

STRUCTURAL NOTES

1. Reinforced concrete
   - A. Minimum concrete strength at 28 days unless notes otherwise 3,000 PSI.
   - B. All reinforcing steel shall conform to ASTM A615, Grade 60
   - C. Concrete protection for reinforcing unless shown otherwise.
     1. Cast against earth — 3 Inches
     2. Formed — 2 Inches
     3. Elevated slab — 2 Inches
   - D. Dowels from footing shall be the same size and spacing as wall reinforcing steel, uon.
2. Structural fill and backfill
   - A. Fill and backfill material behind the retaining wall shall conform to recommendations from the report dated Oct. 5, 1998 Fewell Geotechnical Engineering, Ltd.
   - B. Backfill in front of wall shall be placed after no more than 2'-0" of backfill is placed behind the wall.
3. All work shall be in accordance with the Hawaii Standard Specification for Bridge and Road Construction, 1994.
4. Design Notes
   - A. Active earth pressure: 40 PCF/FT
   - B. Allowable soil bearing pressure: 1,500 PSF
   - C. Coefficient of friction:
     - Wall No.1A — 0.50
     - Wall No.1B (MSERW) — 500 PSF Cohesion
     - Wall No.2 — 0.40 W/100 PSF Adhesion
   - D. At rest pressure 60 PCF/FT
5. Mechanically Stabilized Earth Retaining Wall (MSERW) shall be designed in accordance with Section 695 of The Special Provisions and Design Notes above. Submit design and calculations for review.
6. Foundation notes
   - A. The Contractor shall have the Engineer inspect all footing excavations before laying any reinforcing steel, and have the Engineer inspect all reinforcing steel 24 hours before pouring any concrete.
   - B. The Contractor shall not backfill over or against concrete structures until the concrete has attained specified compressive strength.
   - C. All existing utilities are shown in approximate locations on civil drawings. Contractor shall use caution when excavating and working in areas where utilities are shown and not damage any utilities.
   - D. Notify Engineer immediately if existing utilities which are not shown are encountered.
   - E. Prior to excavation, contractor shall verify location of existing utility lines. See construction notes on civil drawings.

APPROVED:

M. [signature] 5/4/00

Chief, Civil Engineering Branch — Date
Department of Planning & Permitting
City & County of Honolulu

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-03-97	2000	64	110

ABBREVIATIONS

BOF	Bottom of Footing
BL	Base Line
BOT	Bottom
BS	Both Sides
CL	Center Line
CL, CLR	Clear
CONC	Concrete
CONT	Continuos
DET	Detail
DIA	Diameter
EA	Each
EF	Each Face
EJ	Expansion Joint
ELEV	Elevation
ES	Each Side
EW	Each Way
EX, EXIST	Existing
FIN	Finish
FT	Foot/Feet
FTG	Footing
GRD	Ground
(H), HORIZ	Horizontal
HT	Height
IF	Inside Face
JT	Joint
LT	Left
MAX	Maximum
MIN	Minimum
MSERW	Mechanically Stabalized Earth Retaining Wall
NTS	Not to Scale
OC	On Center
OF	Outside Face
O/S	Off Set
PCF	Pounds Per Cubic Foot
PSF	Pounds Per Square Foot
PSI	Pounds Per Square Inch
REF	Reference
RT	Right
R/W	Right of Way
SHT	Sheet
SIM	Similar
SL	Slope
STA	Station
T & B	Top and Bottom
T.W.	Top of Wall
TYP	Typical
UON	Unless Otherwise Noted
(V), VERT	Vertical

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