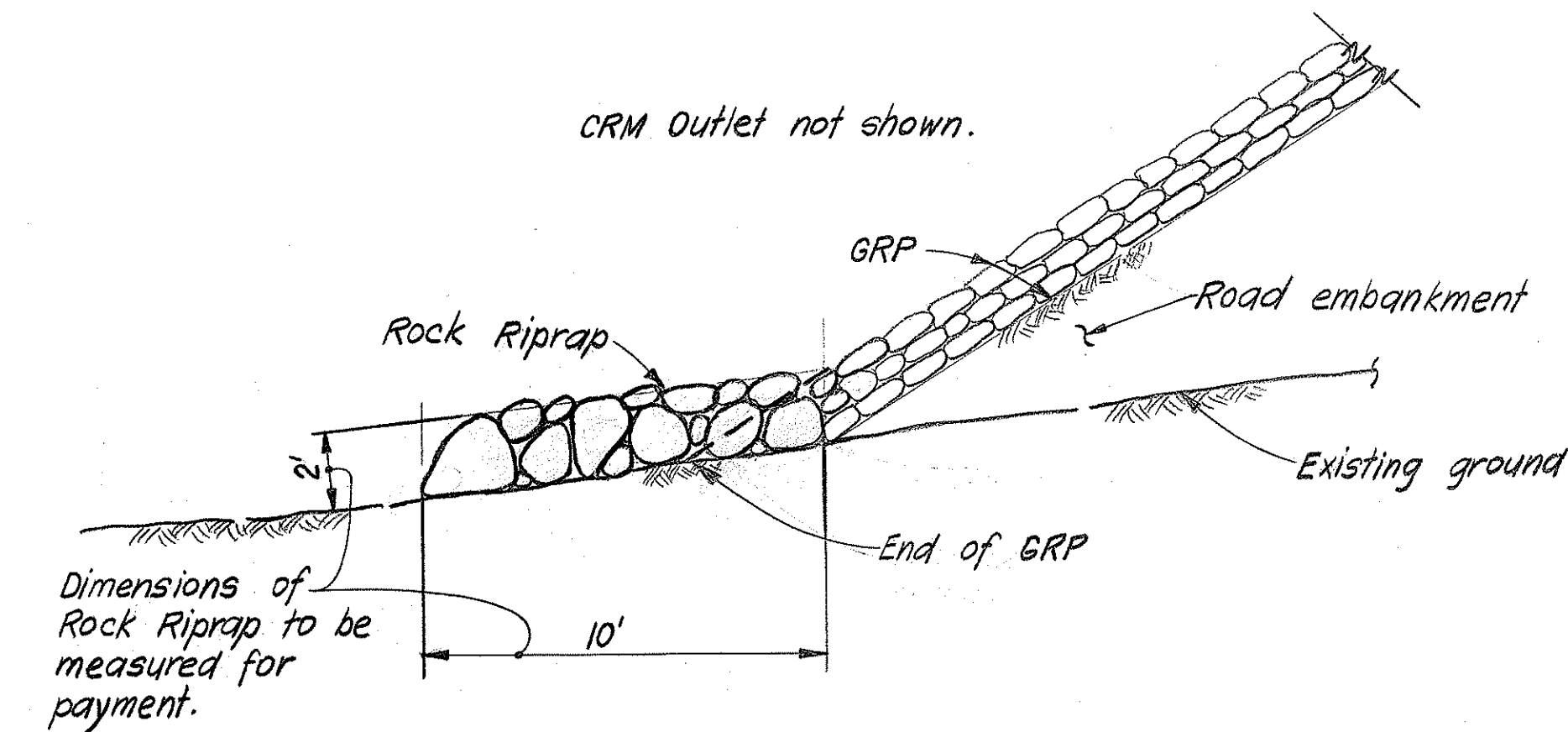
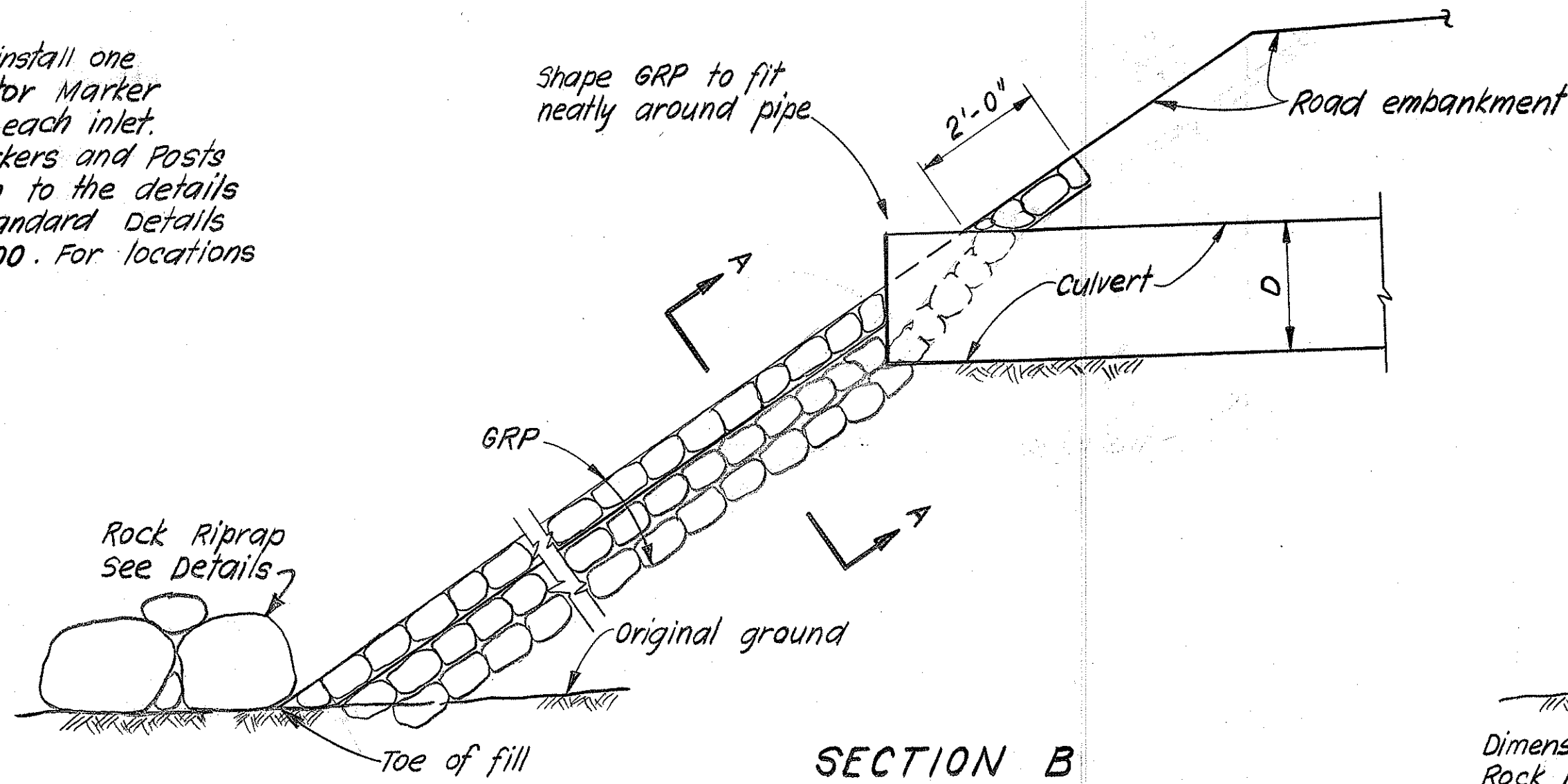
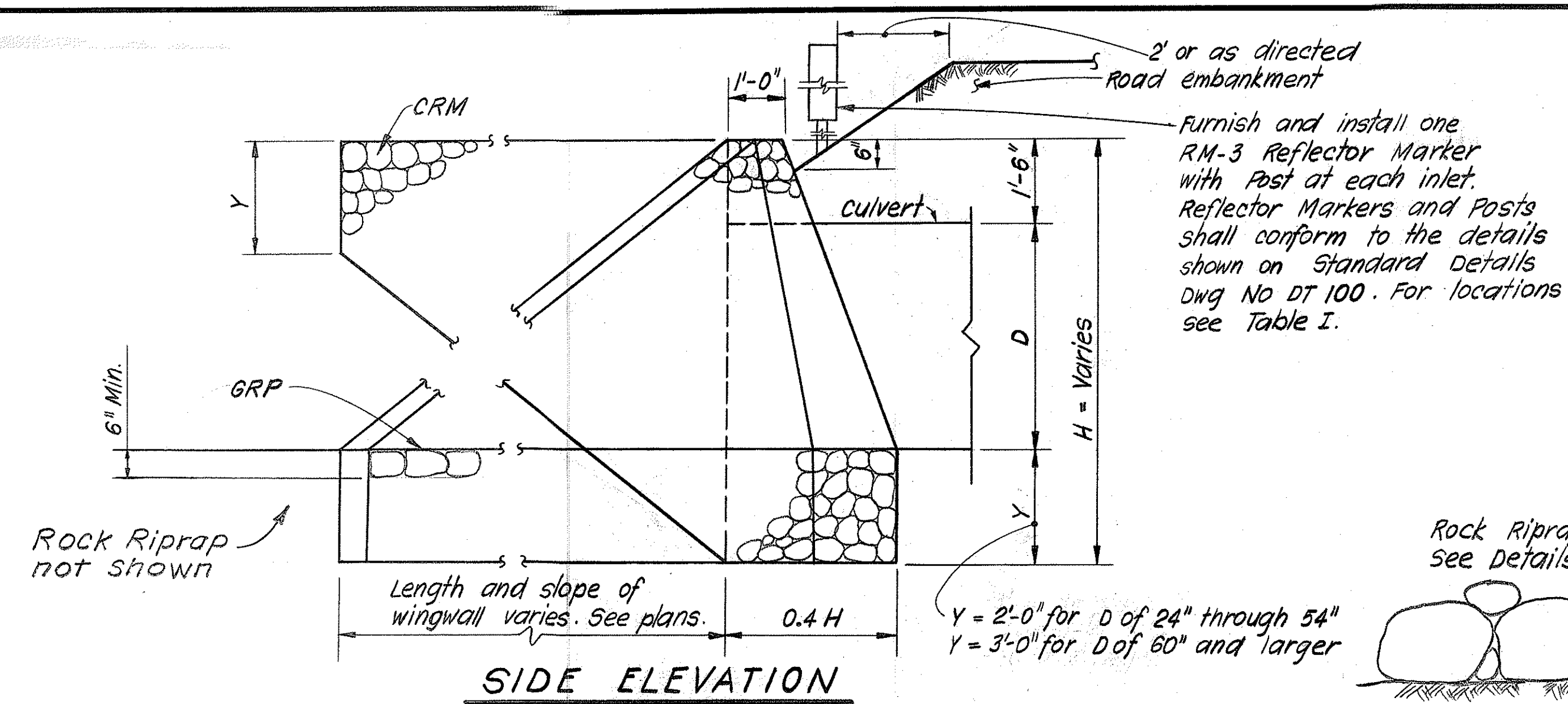
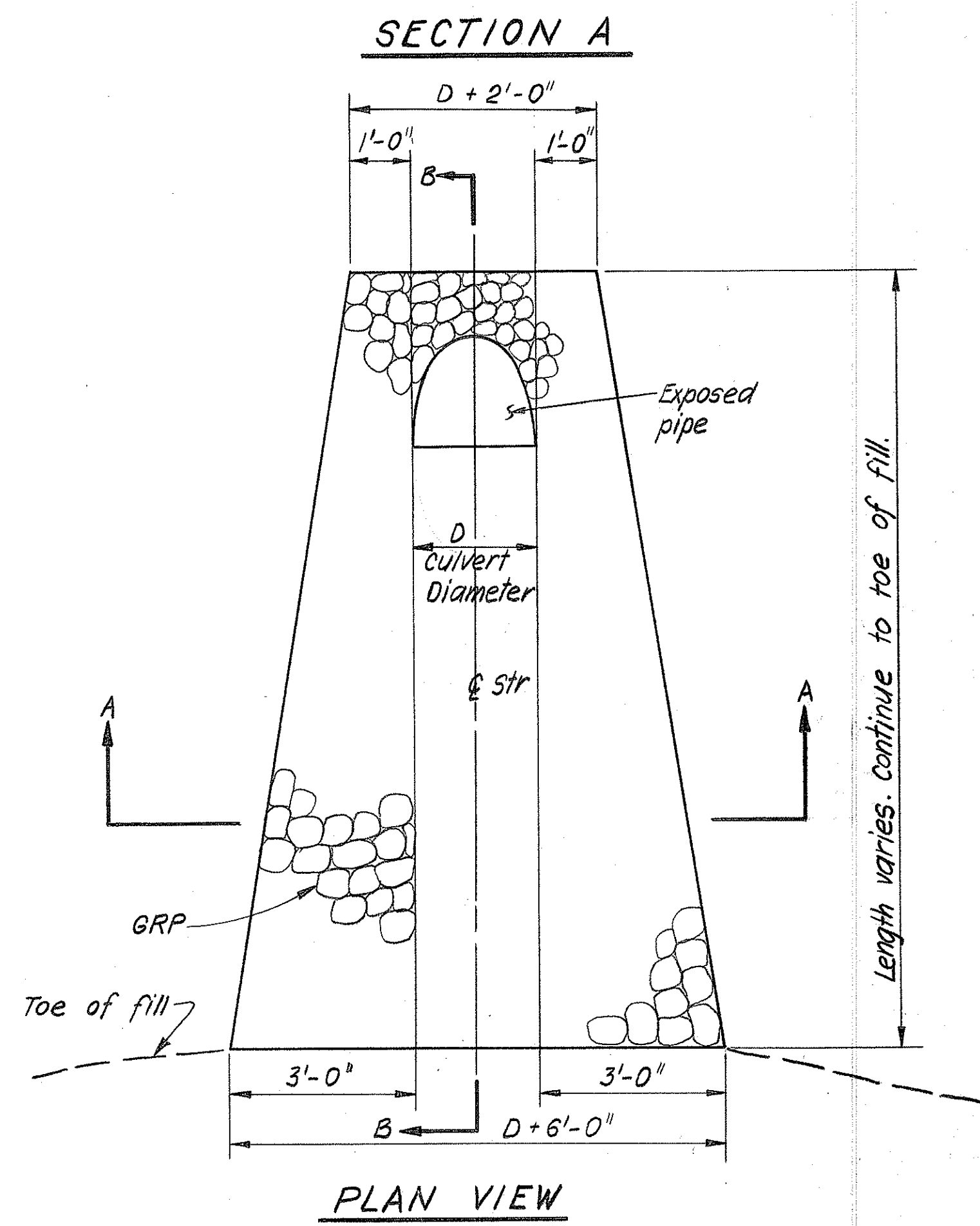
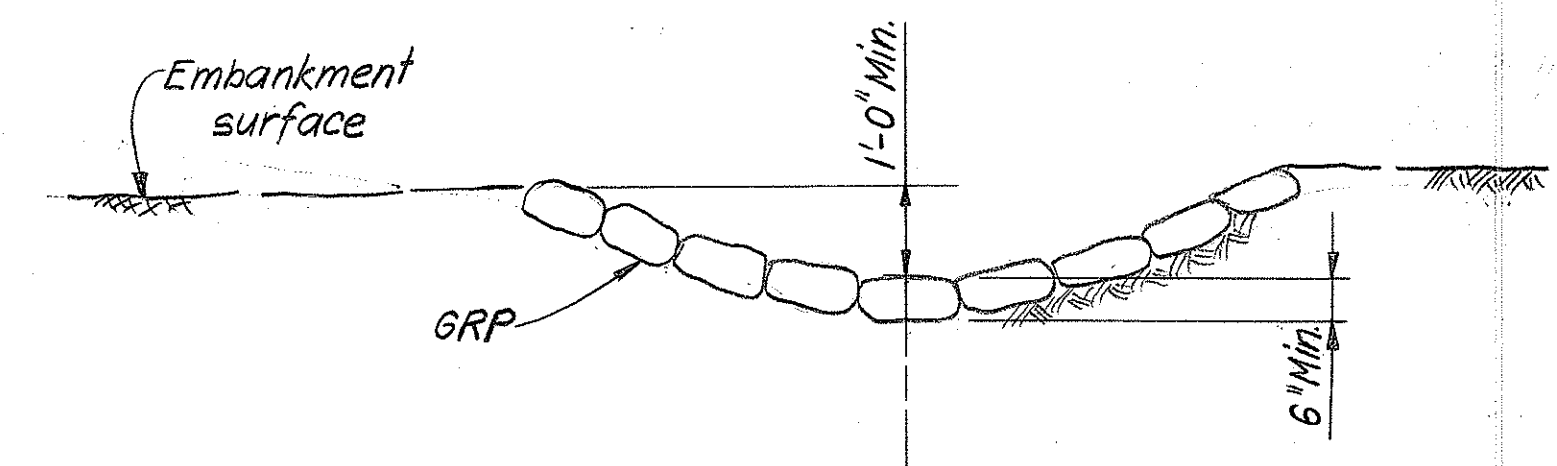
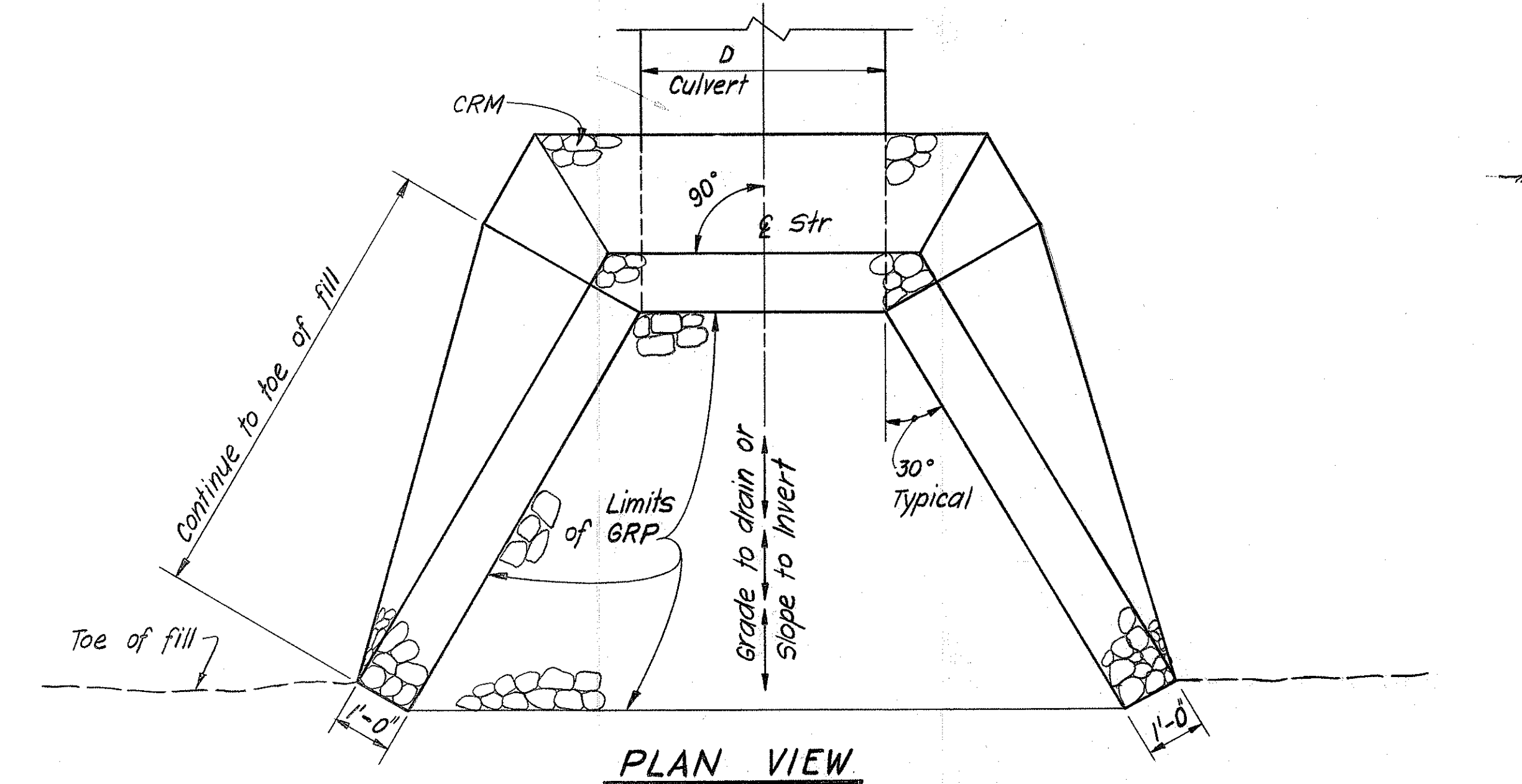


STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD 66-343 PHASE I	FY 74-75	21	41



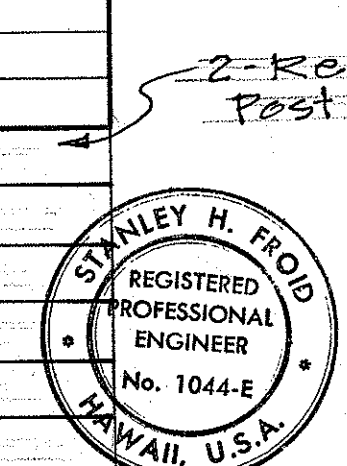
DETAILS OF ROCK RIPRAP
SCALE : 1/4" = 1'-0"



DETAILS OF GRP OUTLET
SCALE : 1/2" = 1'-0"

TABLE I		
Reflector Marker with Post type RM-3		
Station		Quantity
425 + 55	Lt	1
433 + 55	Lt	1
448 + 95	Rt	1
450 + 20.45	Rt	1
461 + 10.45	Rt	1
468 + 65.45	Rt	1
475 + 95	Rt	1
486 + 15.45	Rt	1
497 + 05.55	Lt	1
507 + 40.55	Lt	1
512 + 55.75	Lt	1
523 + 15.517+55	Lt	1
528 + 55	Lt	1
537 + 05.536+55	Lt	1
544 + 15	Lt	1
558 + 65	Rt	1
566 + 20.80	Rt	1
575 + 70	Rt	1
592 + 35	Lt	1
598 + 55	Lt	1
607 + 80	Rt	1
Total		21
422 + 0 to 426 + 0	RT.	5
434 + 0 to 440 + 0	RT.	12
467 + 0 to 473 + 0	LT.	8
476 + 0 to 478 + 0	LT.	3
485 + 0 to 491 + 0	LT.	8
527 + 0 to 529 + 0	RT.	3
579 + 0 to 586 + 0	LT.	8
596 + 0 to 605 + 0	LT.	10
TOTAL		60

- NOTES**
- For horizontal & vertical geometry of road see Dwg No C 101 - C 108.
 - All culverts are normal or radial to road @.
 - cut & fill slopes shall be constructed in accordance with Dwg No C1, except as required to match inlets & outlets.
 - Structural Plate Culverts shall have their vertical dimensions increased by 5% from a full circular cross section before any fill is placed.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**DRAINAGE STRUCTURES
MISCELLANEOUS DETAILS**

MAUNA KEA OBSERVATORY ACCESS ROAD
PROJ. NO. BMD 66 - 343
SCALE : AS NOTED DATE : SEPT 1973

SHEET NO. 1 OF 8 SHEETS C 401

DETAILS OF CRM INLET & OUTLET
SCALE : 1/2" = 1'-0"

DATE _____

SURVEY PLOTTED BY _____

DRAWN BY _____

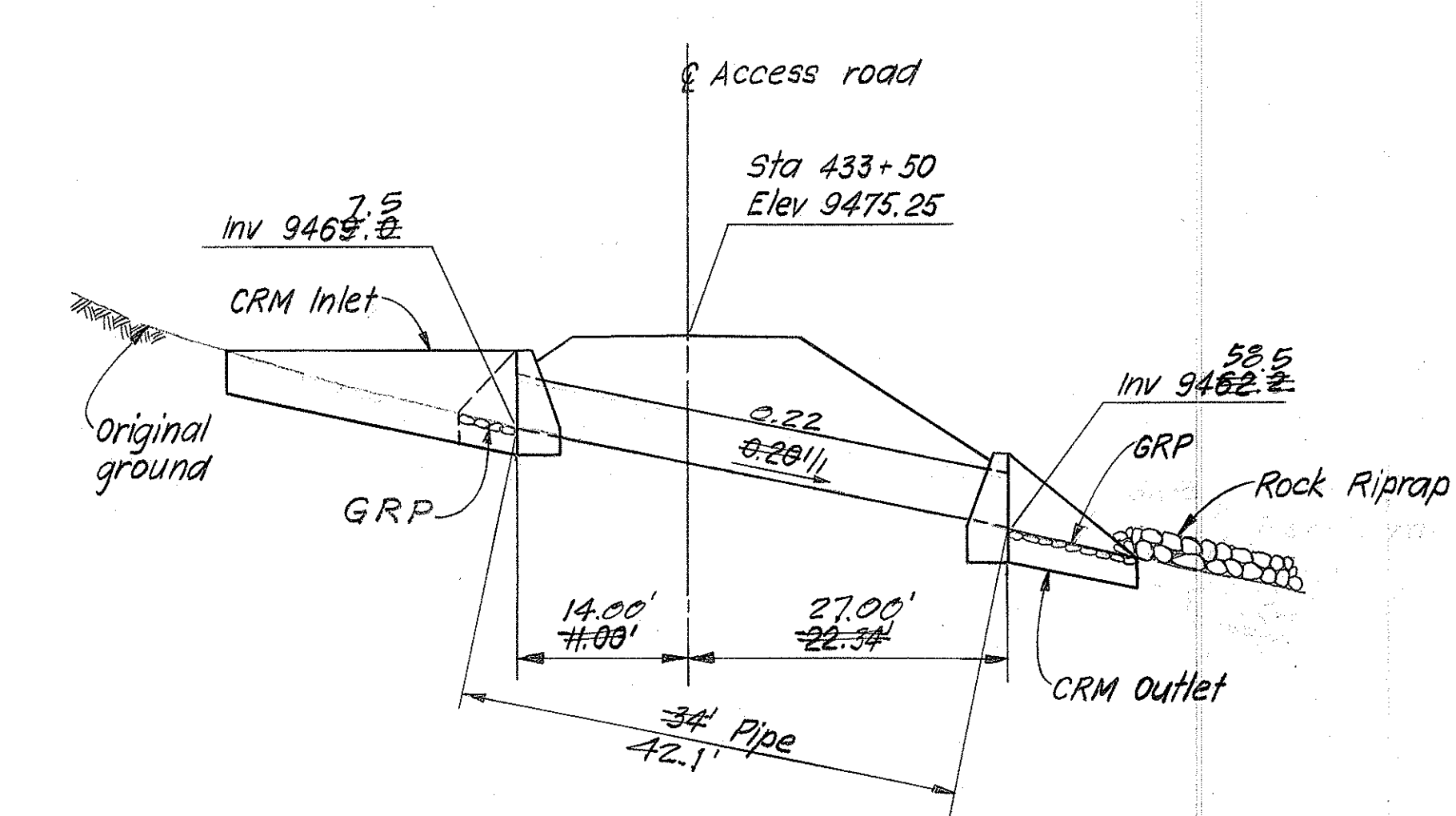
DESIGNED BY _____

CHECKED BY _____

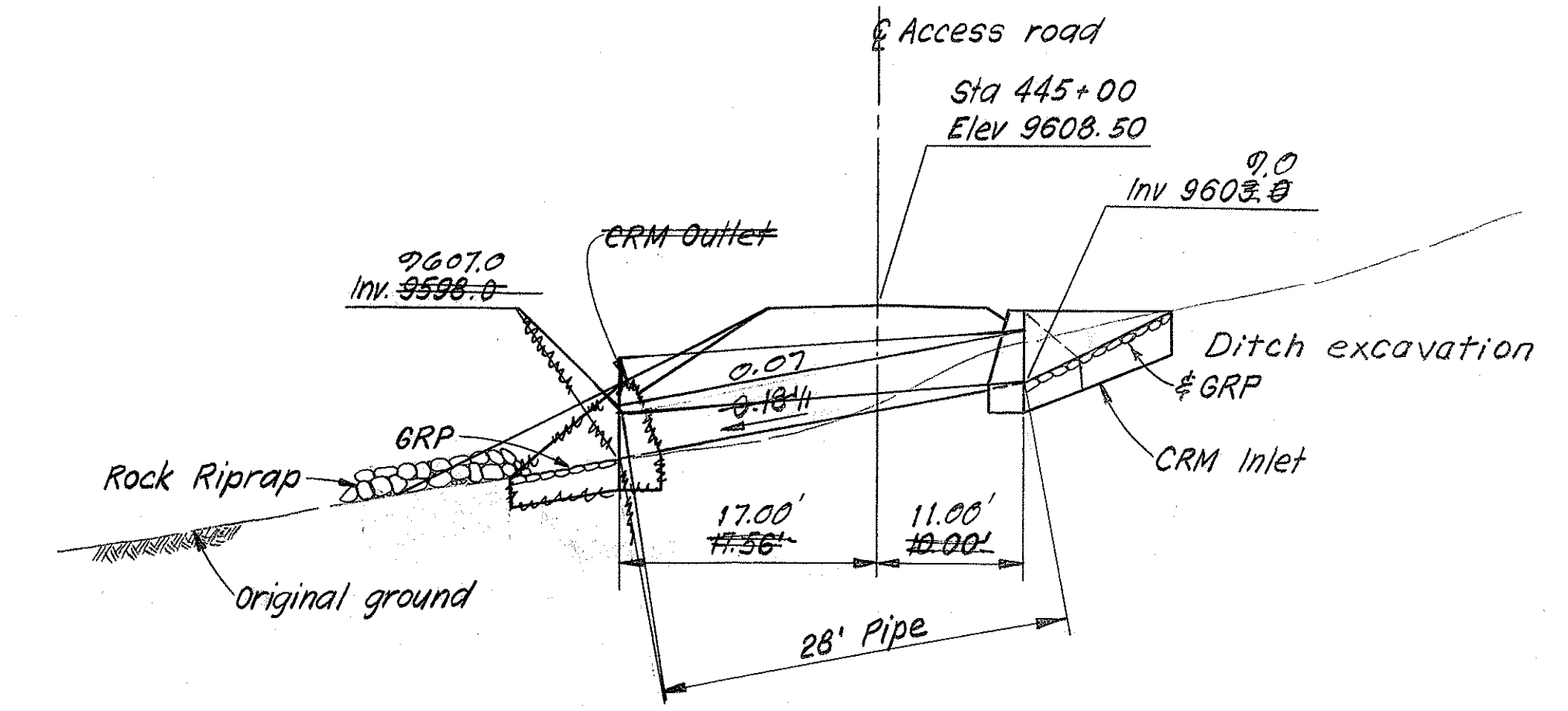
NO. _____

STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD66-343 PHASE I	FY 74-75	22	41

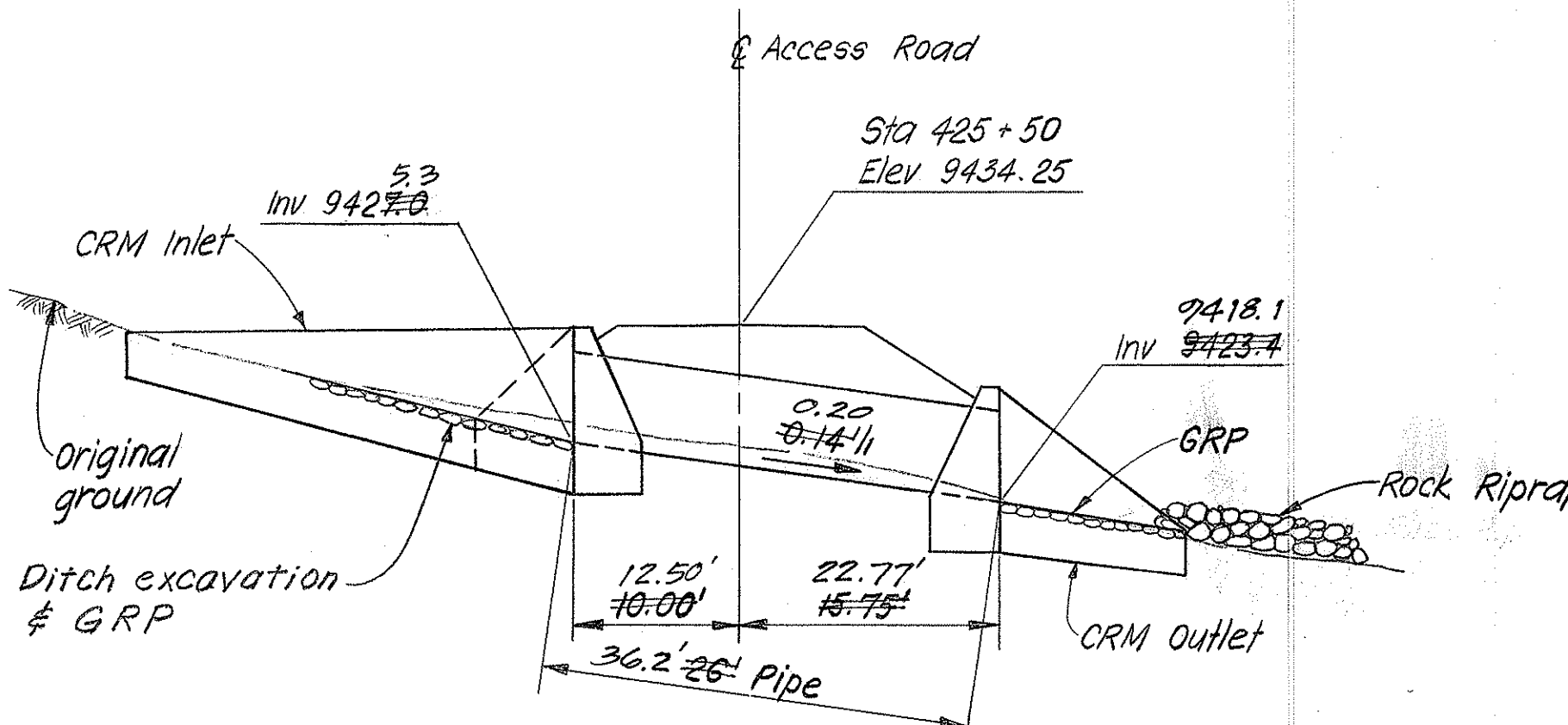
NOTE:
DELETE ALL CONTOUR LINES
SHOWN ON PLAN VIEW



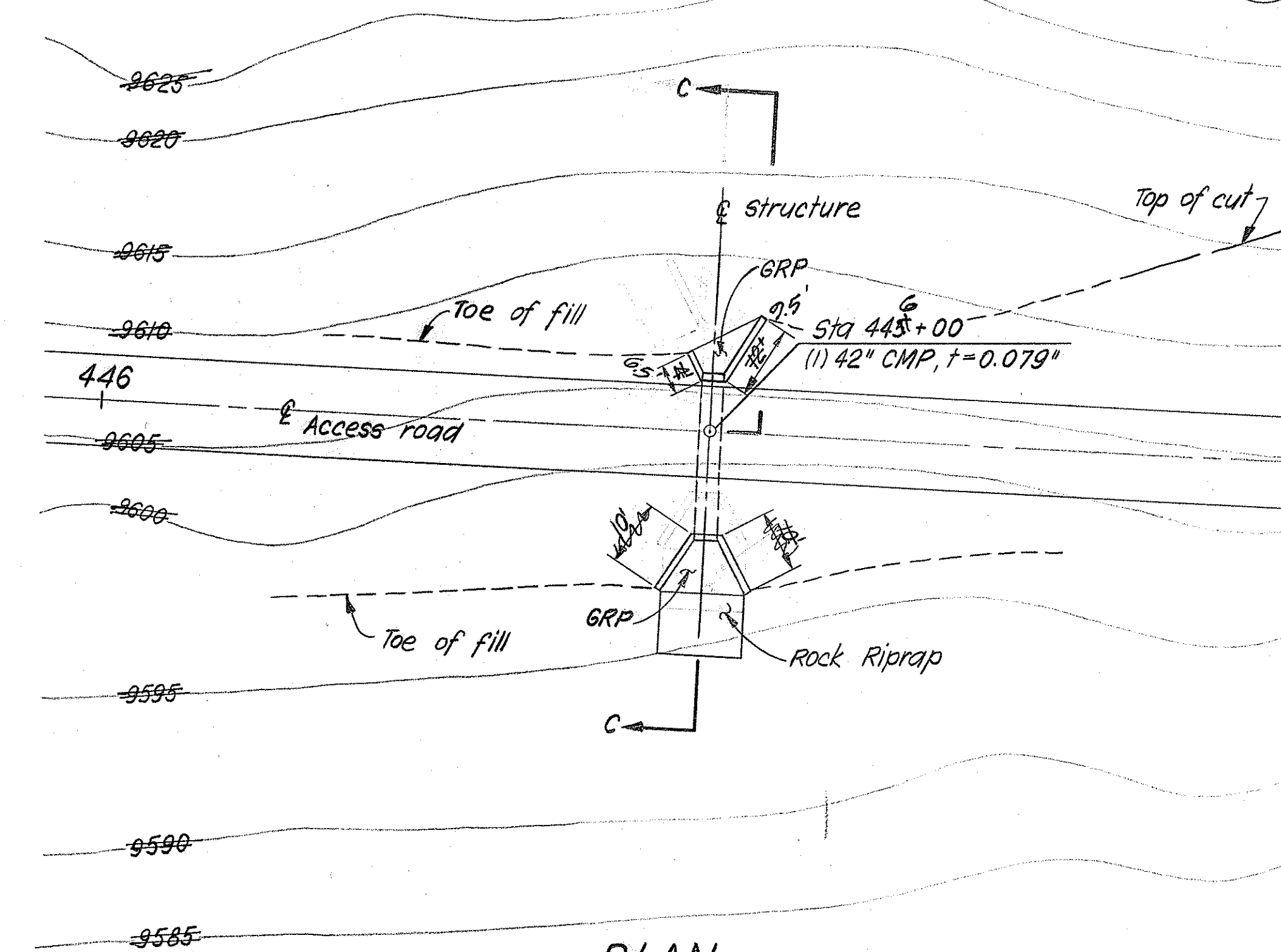
SECTION B
SCALE: 1"=10'
NOT TO SCALE



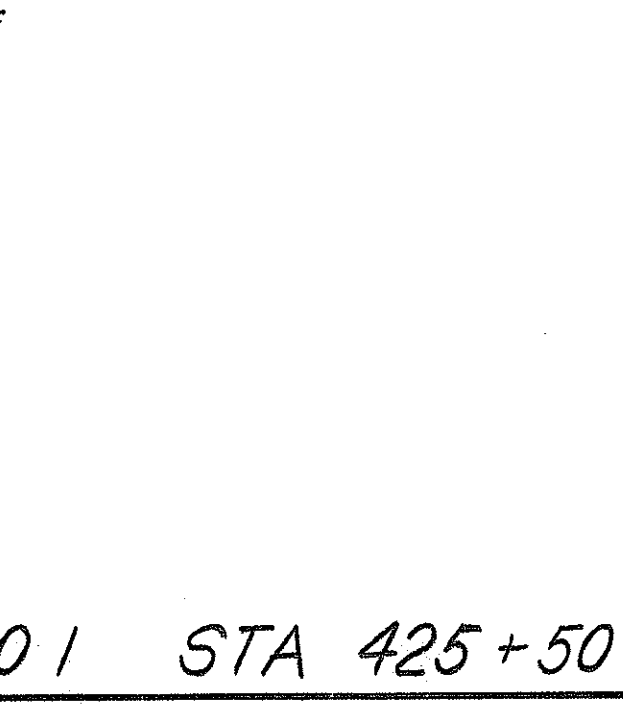
SECTION C
SCALE: 1"=10'
NOT TO SCALE



SECTION A
SCALE: 1"=10'
NOT TO SCALE



PLAN
SCALE: 1"=20'
NOT TO SCALE



PLAN
SCALE: 1"=20'
(SEE NOTE)

STRUCTURE NO 2 STA 433+50

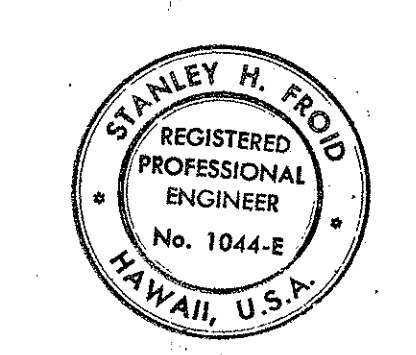
STRUCTURE NO 1 STA 425+50

STRUCTURE NO 3 STA 445+00

QUANTITIES

42" Pipe (Lin Ft)
66" Pipe (Lin Ft)
Structure Excavation (Cu Yd)
Ditch Excavation (Cu Yd)
CRM (Cu Yd)
GRP (Cu Yd)
Rock Riprap (Cu Yd)

STRUCTURE	NO.1	NO.2	NO.3
42" Pipe (Lin Ft)	~ 42.1	~ 28	~ 28
66" Pipe (Lin Ft)	36.2	~ 26	~ 26
Structure Excavation (Cu Yd)	172.3	82.3	48.3
Ditch Excavation (Cu Yd)	4	~ 3	~ 3
CRM (Cu Yd)	65.2	25.3	8.2
GRP (Cu Yd)	5	6.1	8.2
Rock Riprap (Cu Yd)	13	11.5	7.2



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

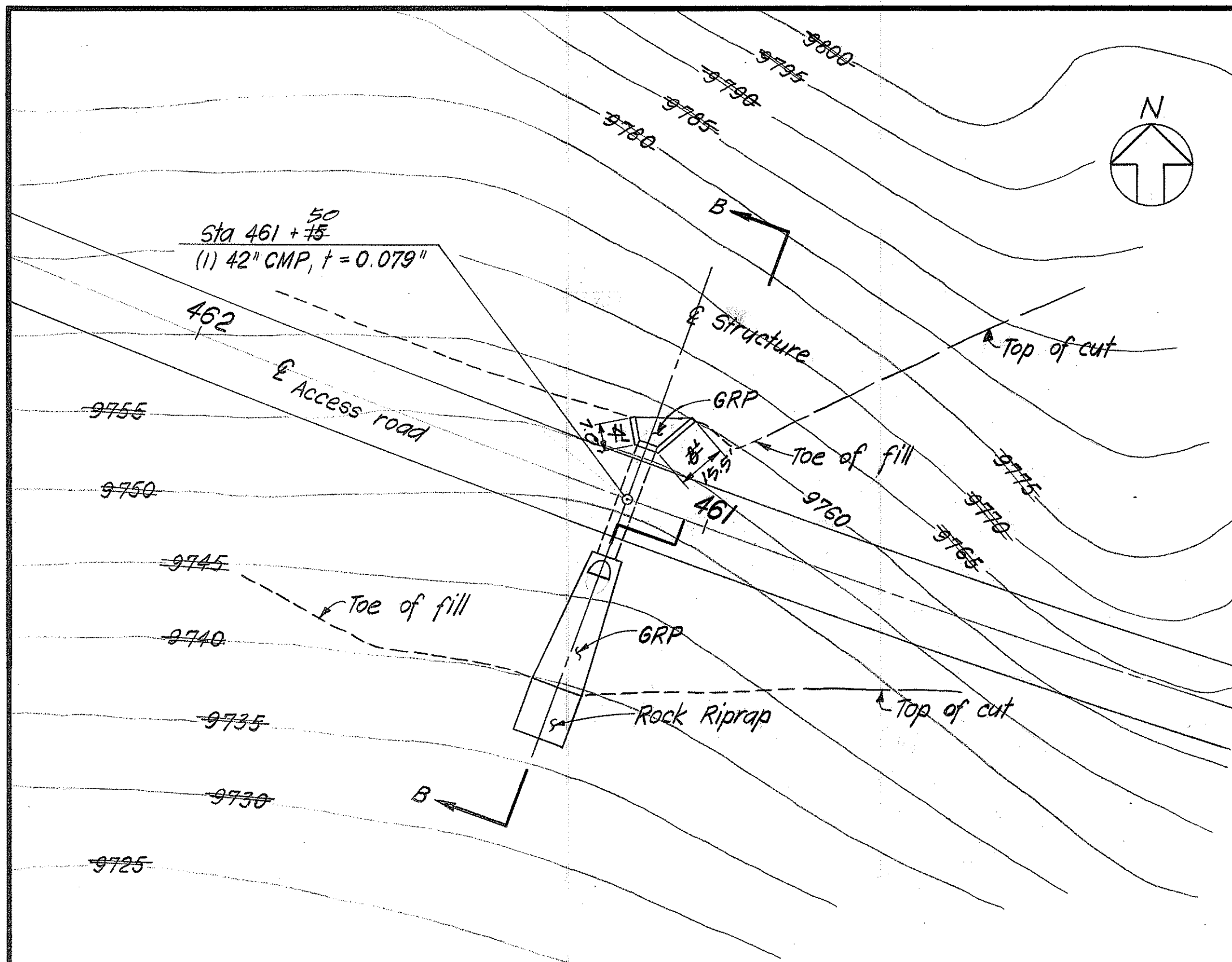
MAUNA KEA OBSERVATORY ACCESS ROAD
PROJ. NO. BMD 66 - 343

SCALE: AS NOTED DATE: SEPT 1973

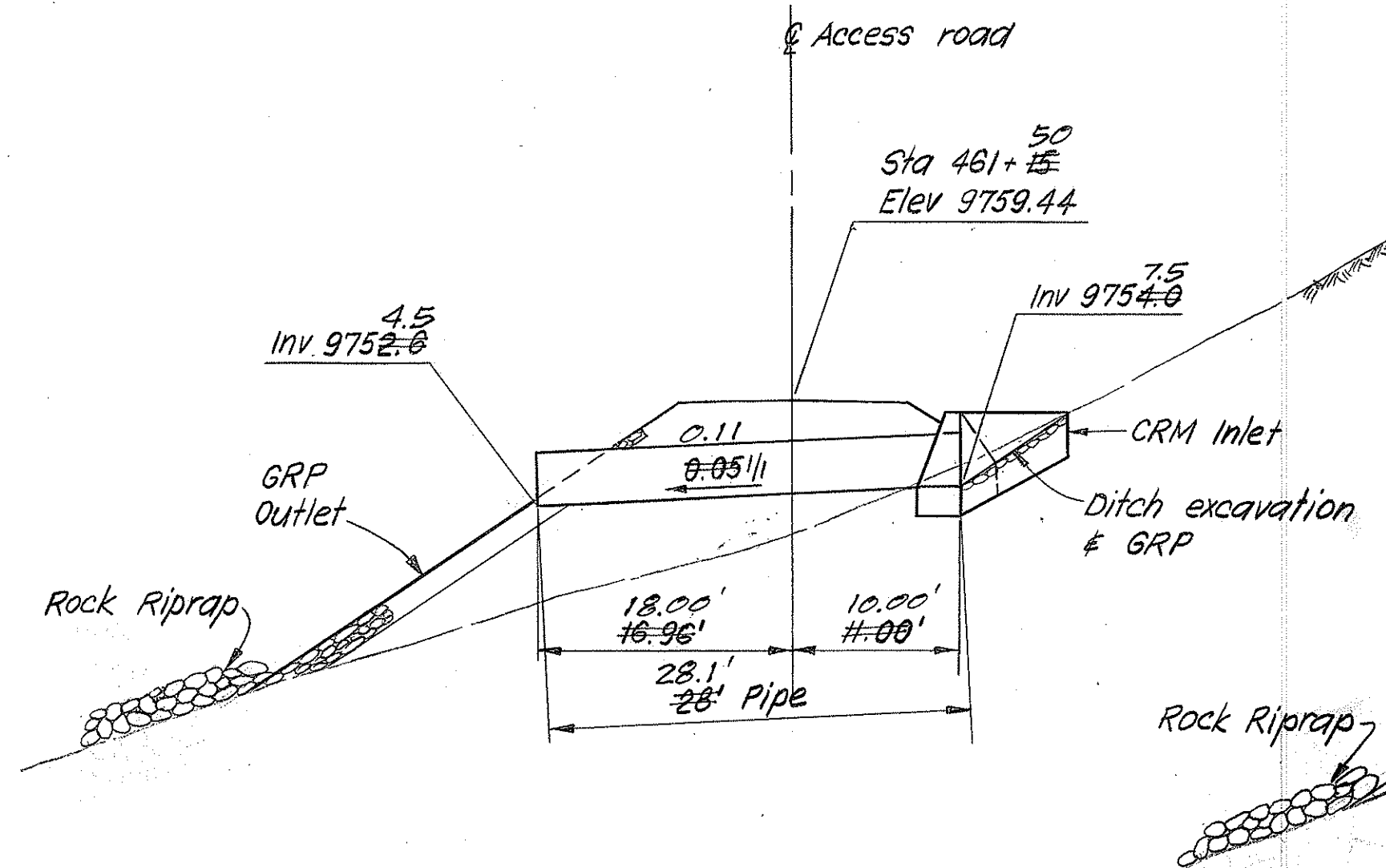
SHEET NO. 2 OF 8 SHEETS C 402

STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD 66-343 PHASE I	FY74-75	23	41

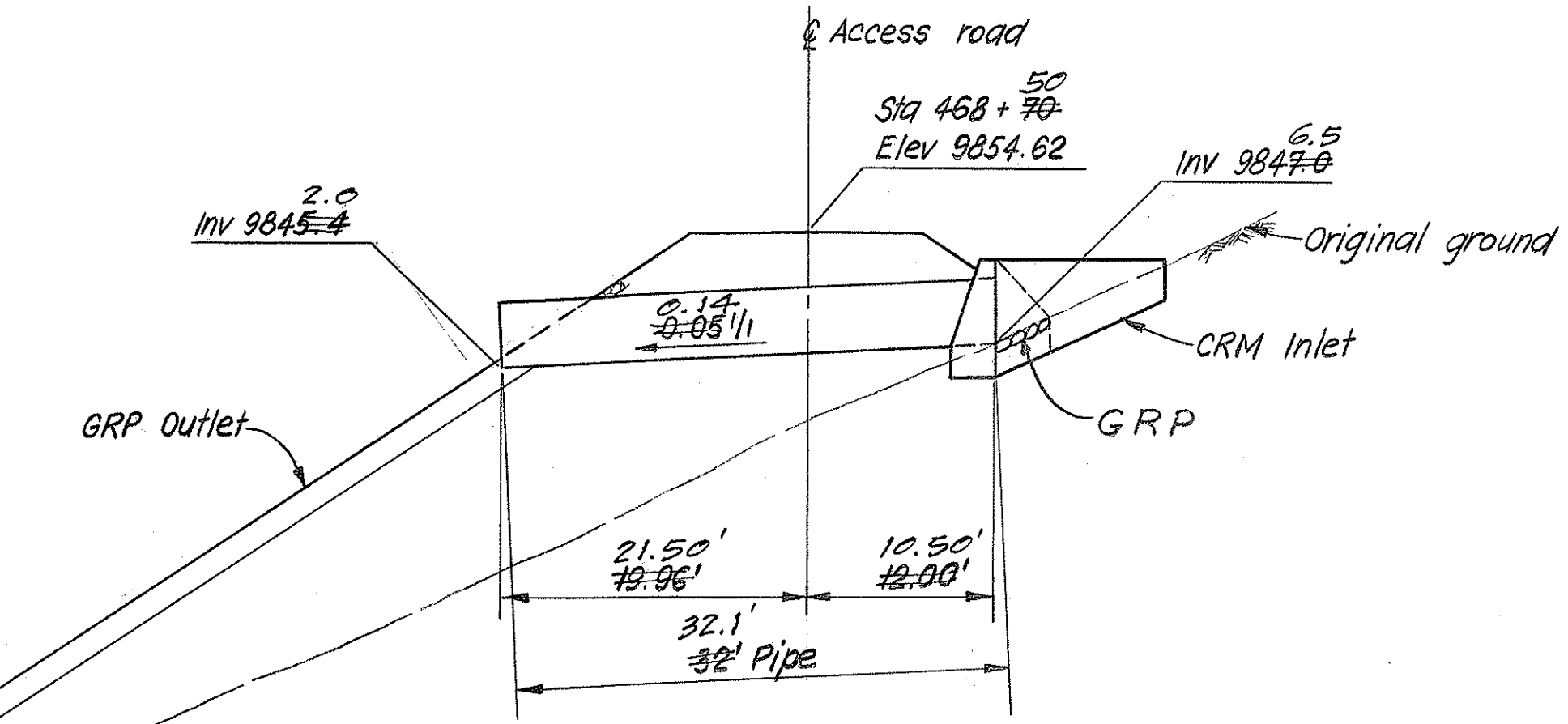
NOTE:
DELETE ALL CONTOUR LINES
SHOWN ON PLAN VIEW.



PLAN
SCALE: 1" = 20'
NOT TO SCALE

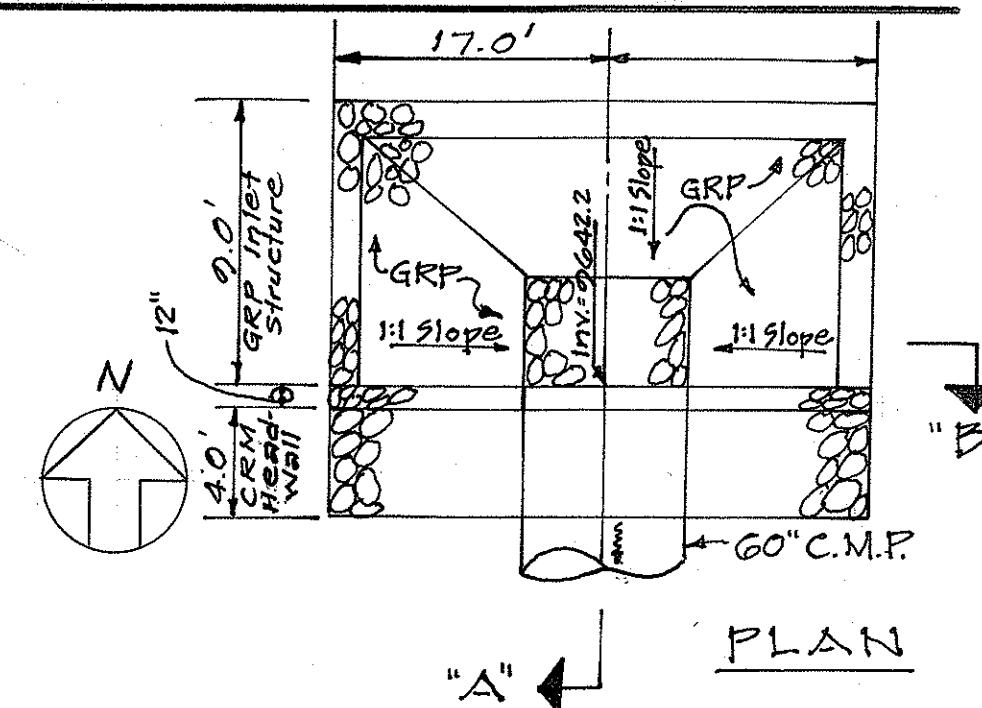


SECTION B
SCALE: 1" = 10'
NOT TO SCALE

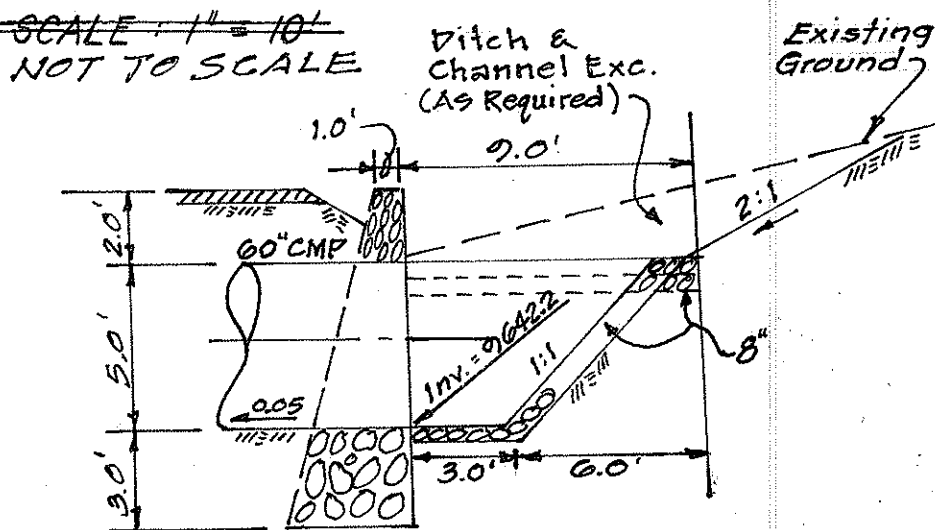


SECTION C
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NOT TO SCALE

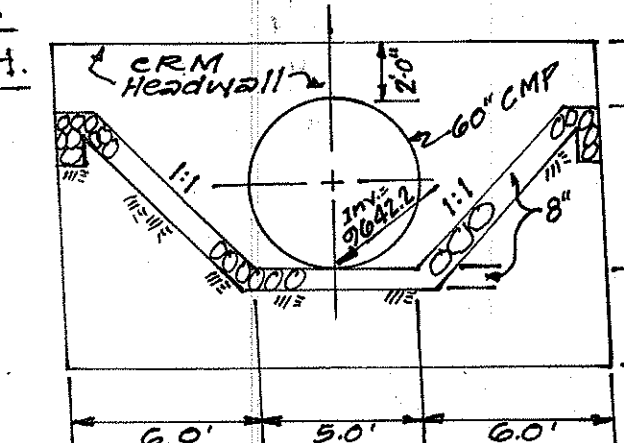
STRUCTURE NO 5 STA 461+75



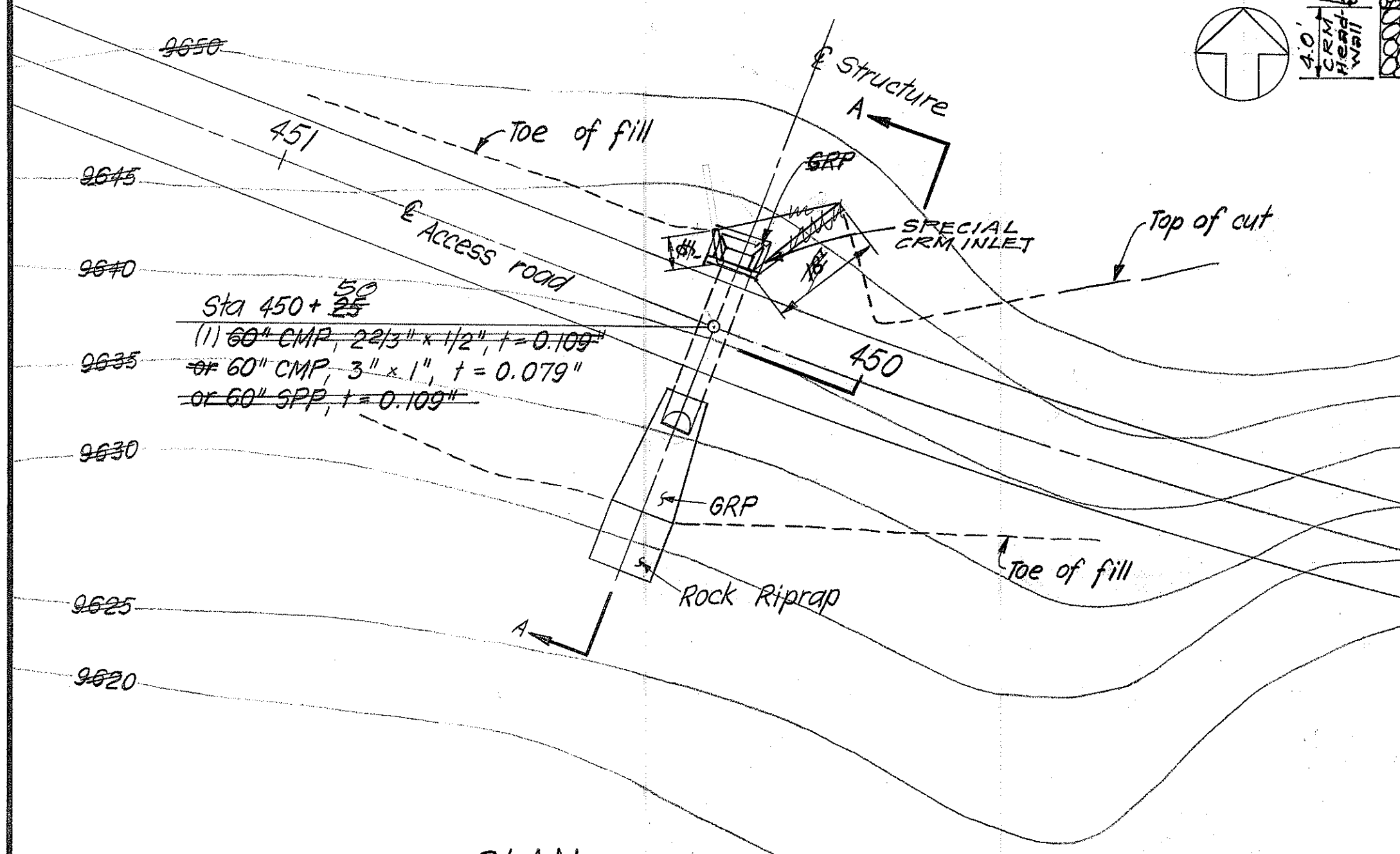
PLAN



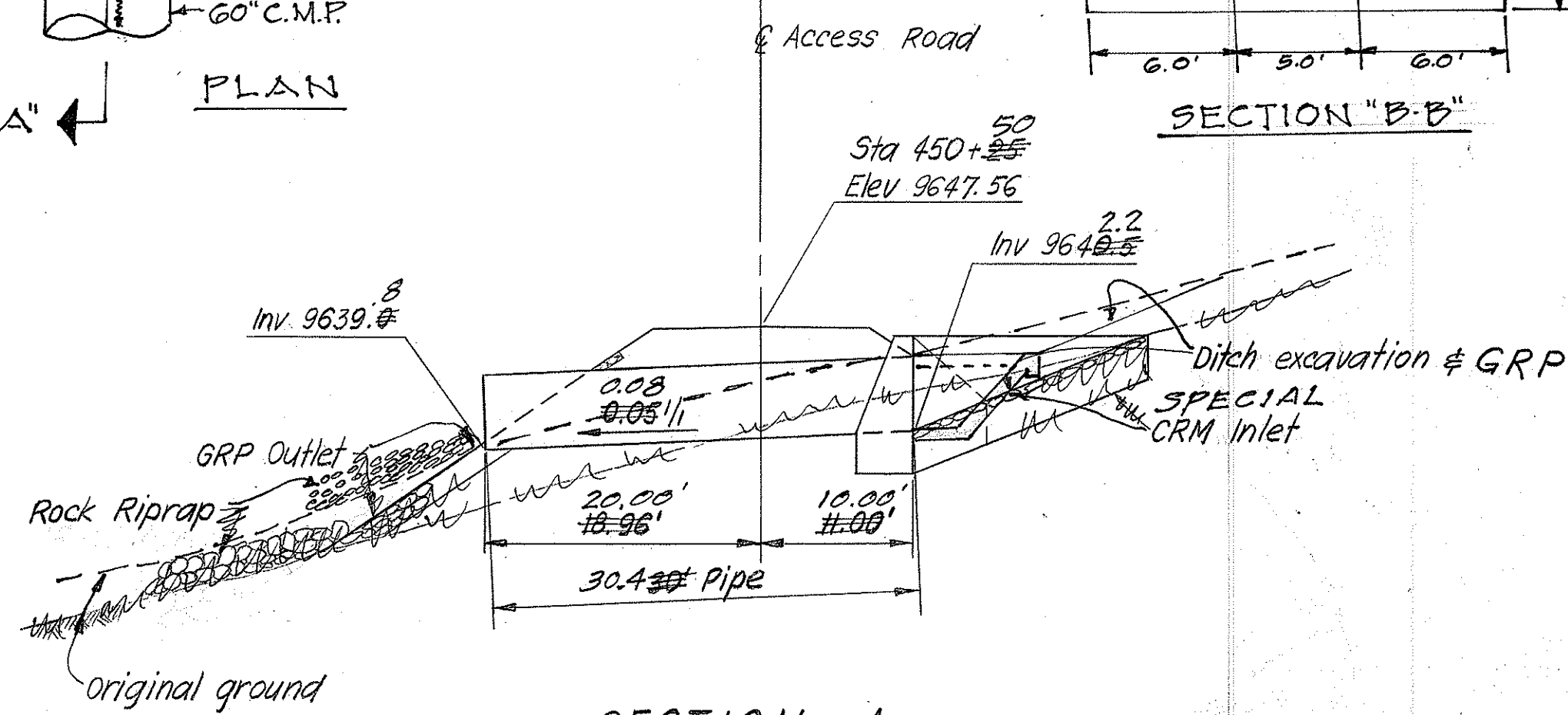
SECTION "A-A"
Details of Special CRM
Inlet Structure No. 4 @ Sta. 450+50 R.I.
Drawing Not to Scale



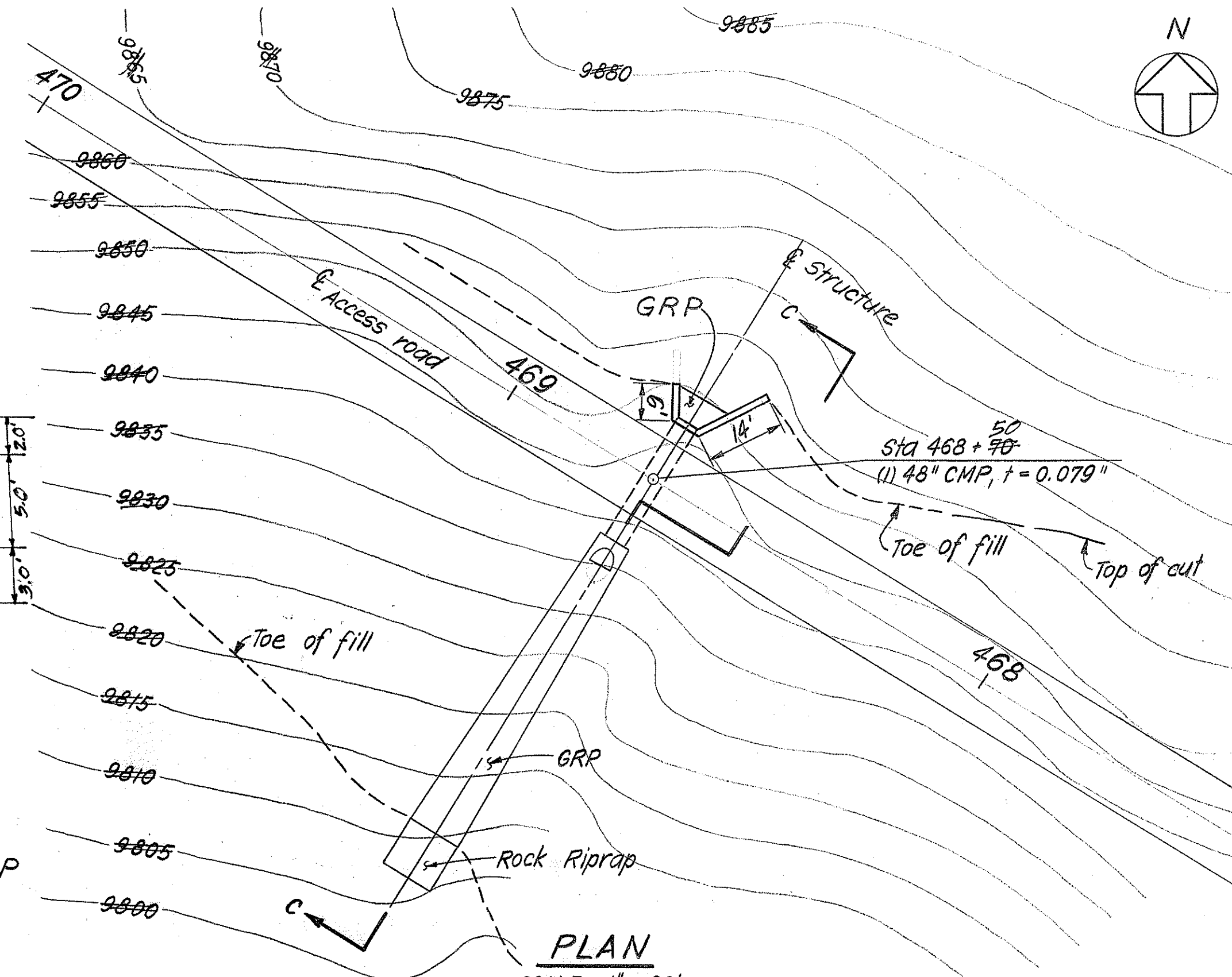
SECTION "B-B"



PLAN
SCALE: 1" = 20'
NOT TO SCALE



SECTION A
SCALE: 1" = 10'
NOT TO SCALE



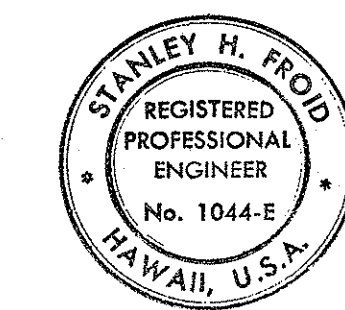
PLAN
SCALE: 1" = 20'
NOT TO SCALE

STRUCTURE NO 6 STA 468+70

QUANTITIES

42" Pipe (Lin Ft)
48" Pipe (Lin Ft)
60" Pipe (Lin Ft)
Structure Excavation (Cu Yd)
Ditch Excavation (Cu Yd)
CRM (Cu Yd)
GRP (Cu Yd)
Rock Riprap (Cu Yd)

STRUCTURE	NO. 4	NO. 5	NO. 6
42" Pipe (Lin Ft)	~	28 1/2	~
48" Pipe (Lin Ft)	~	~	32 1/2
60" Pipe (Lin Ft)	30 1/2	~	~
Structure Excavation (Cu Yd)	110 23/4	48 1/2	79 23/4
Ditch Excavation (Cu Yd)	16 3/4	2	~
CRM (Cu Yd)	17 5/8	9 1/2	10 1/4
GRP (Cu Yd)	6 3/4	8 3/4	27 1/2
Rock Riprap (Cu Yd)	8 1/2	7 1/4	7 1/2



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

MAUNA KEA OBSERVATORY ACCESS ROAD

PROJ. NO. BMD 66 - 343

SCALE: AS NOTED DATE: SEPT 1973

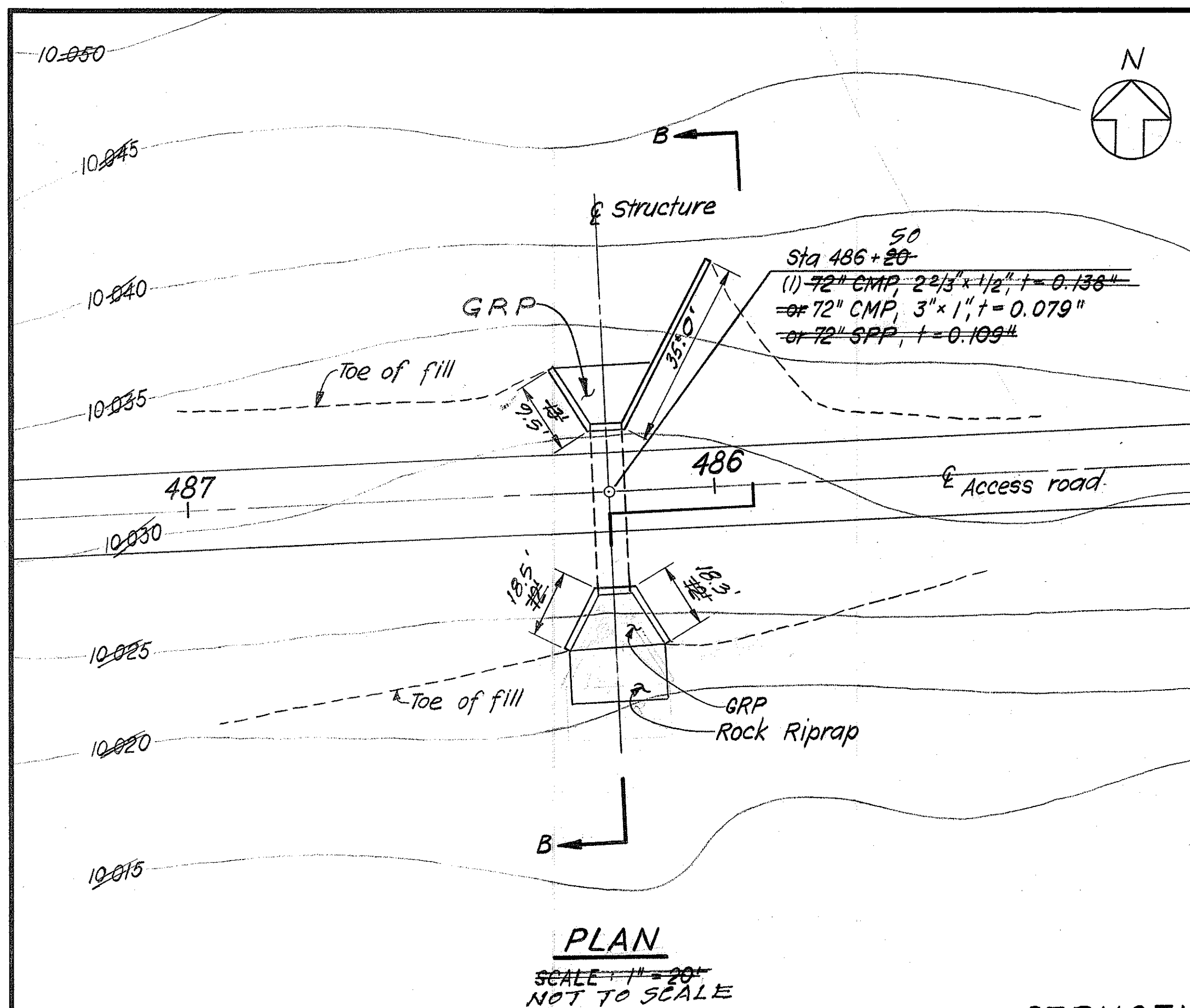
SHEET NO. 3 OF 8 SHEETS C 403

ORIGINAL
PLAN
NO.

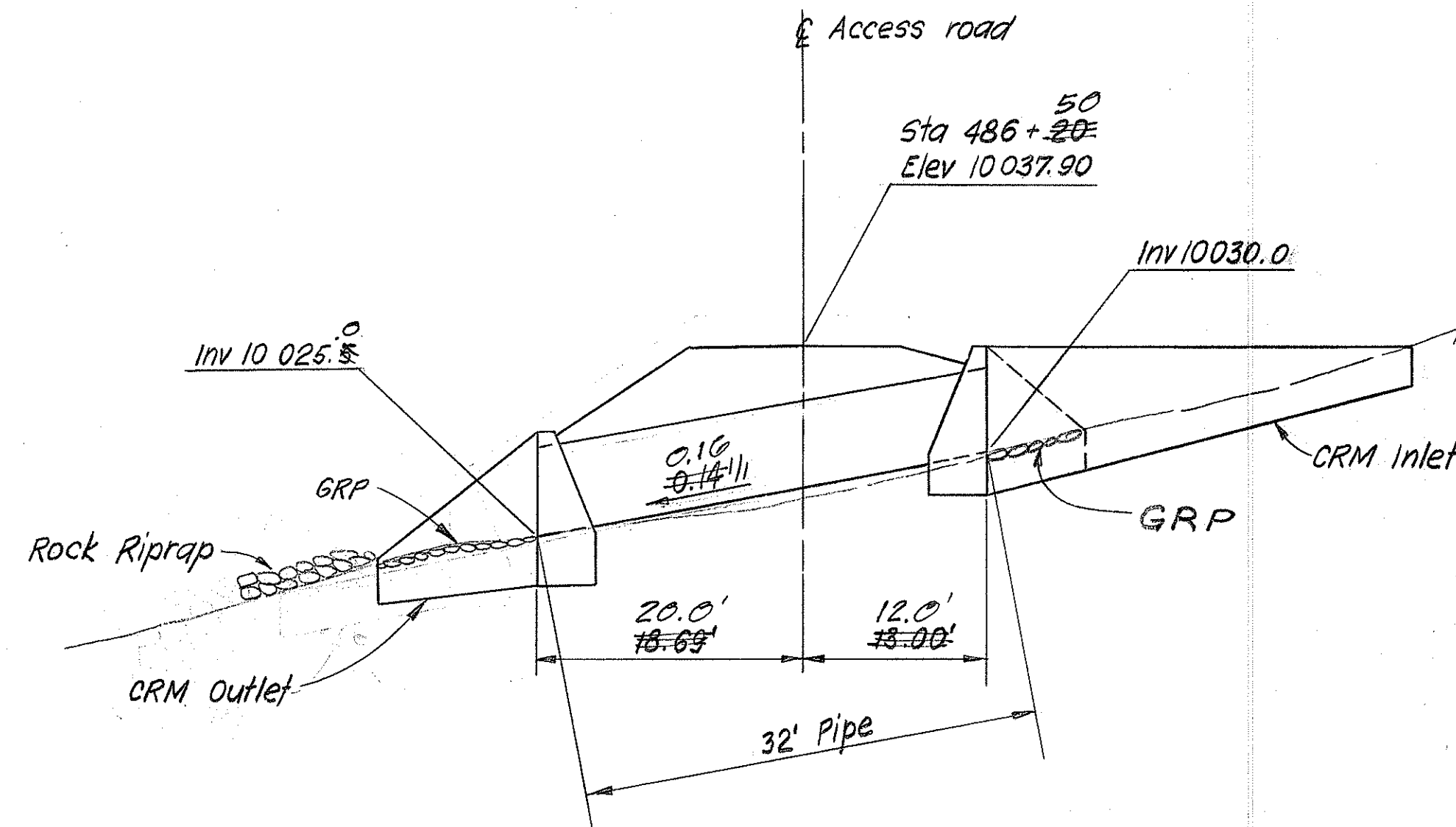
SURVEY PLOTTED BY
DATE

DRAWN BY
TRACED BY
DESIGNED BY
CHECKED BY

STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD 66-343 PHASE I	FY74-75	24	41

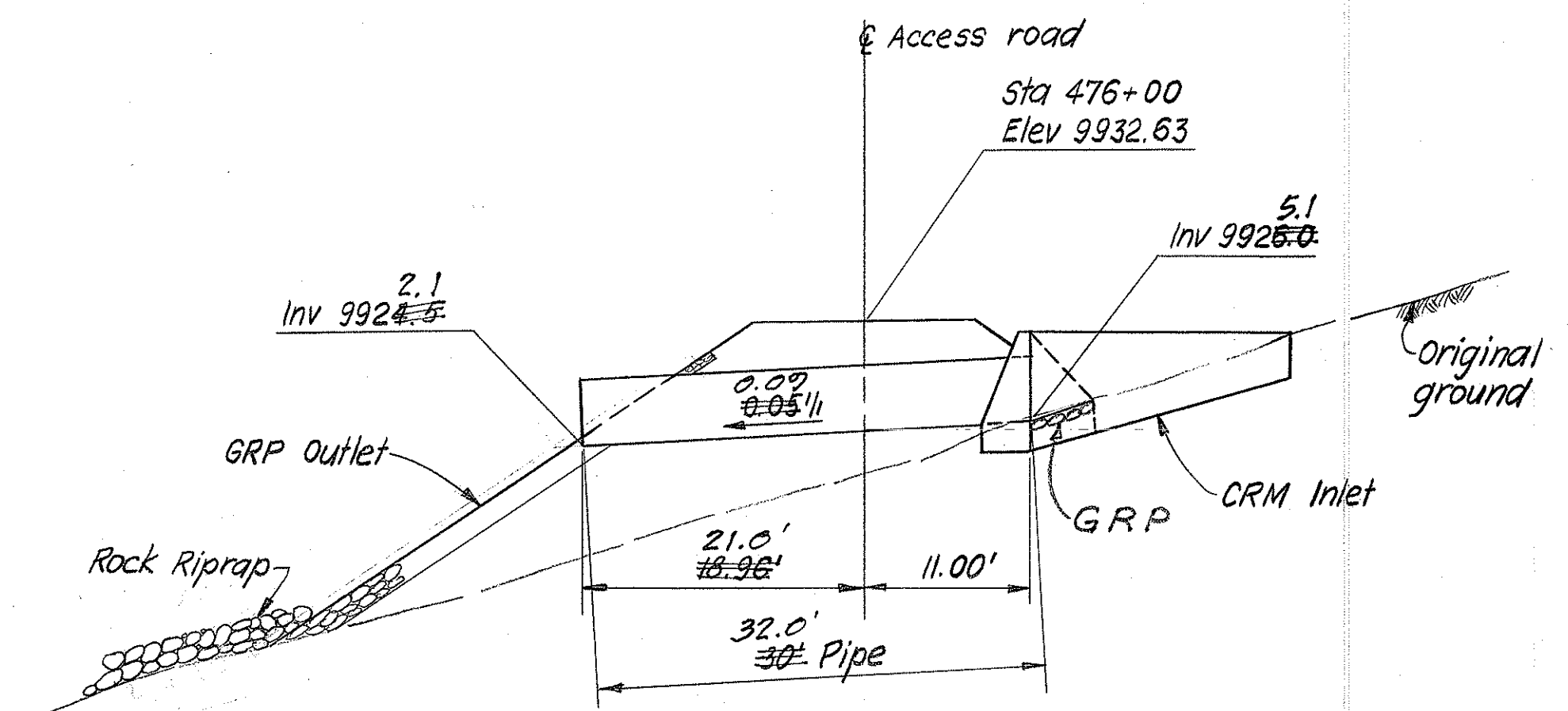
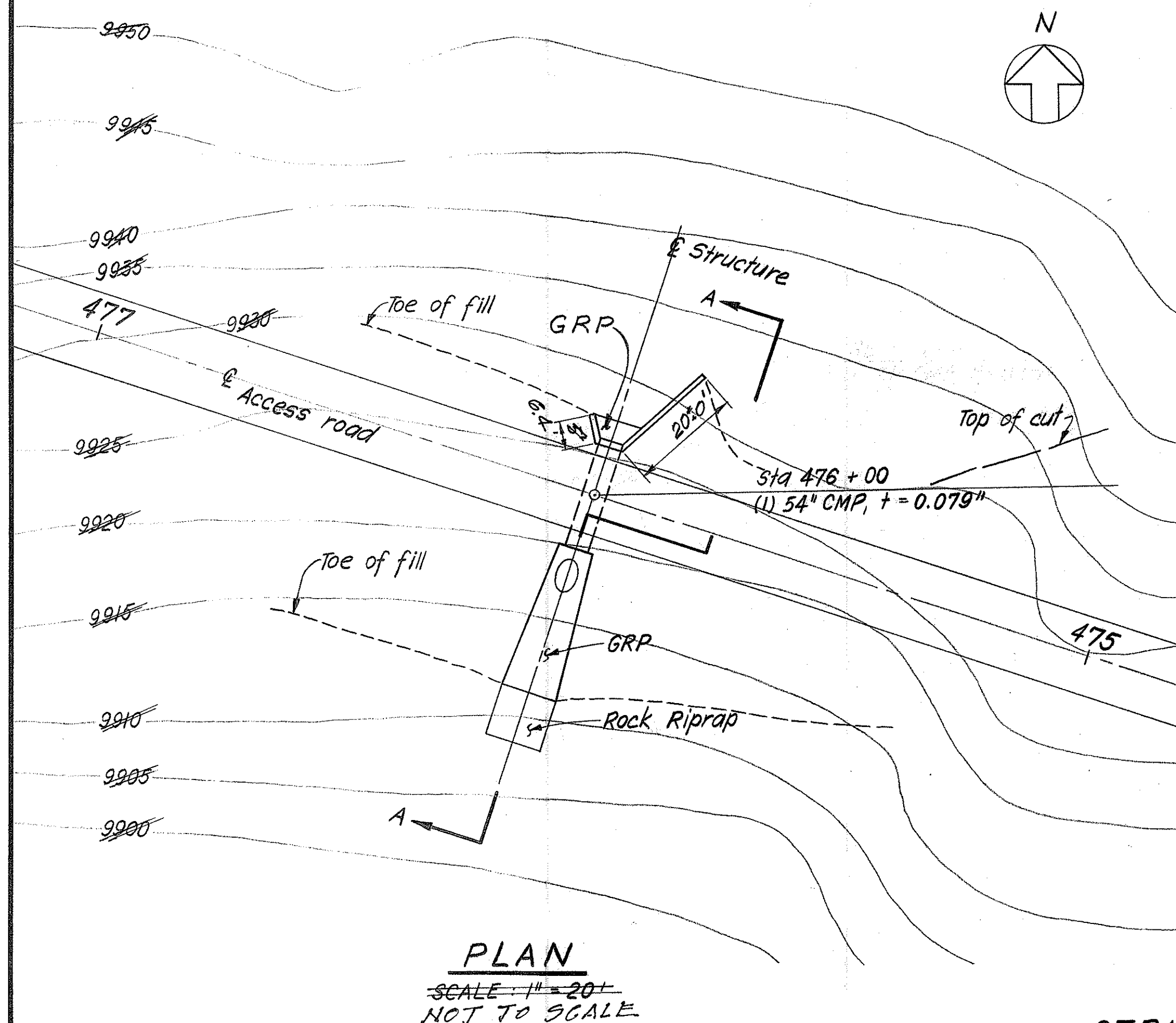


NOTE:
DELETE ALL CONTOUR LINES
SHOWN ON PLAN VIEW.



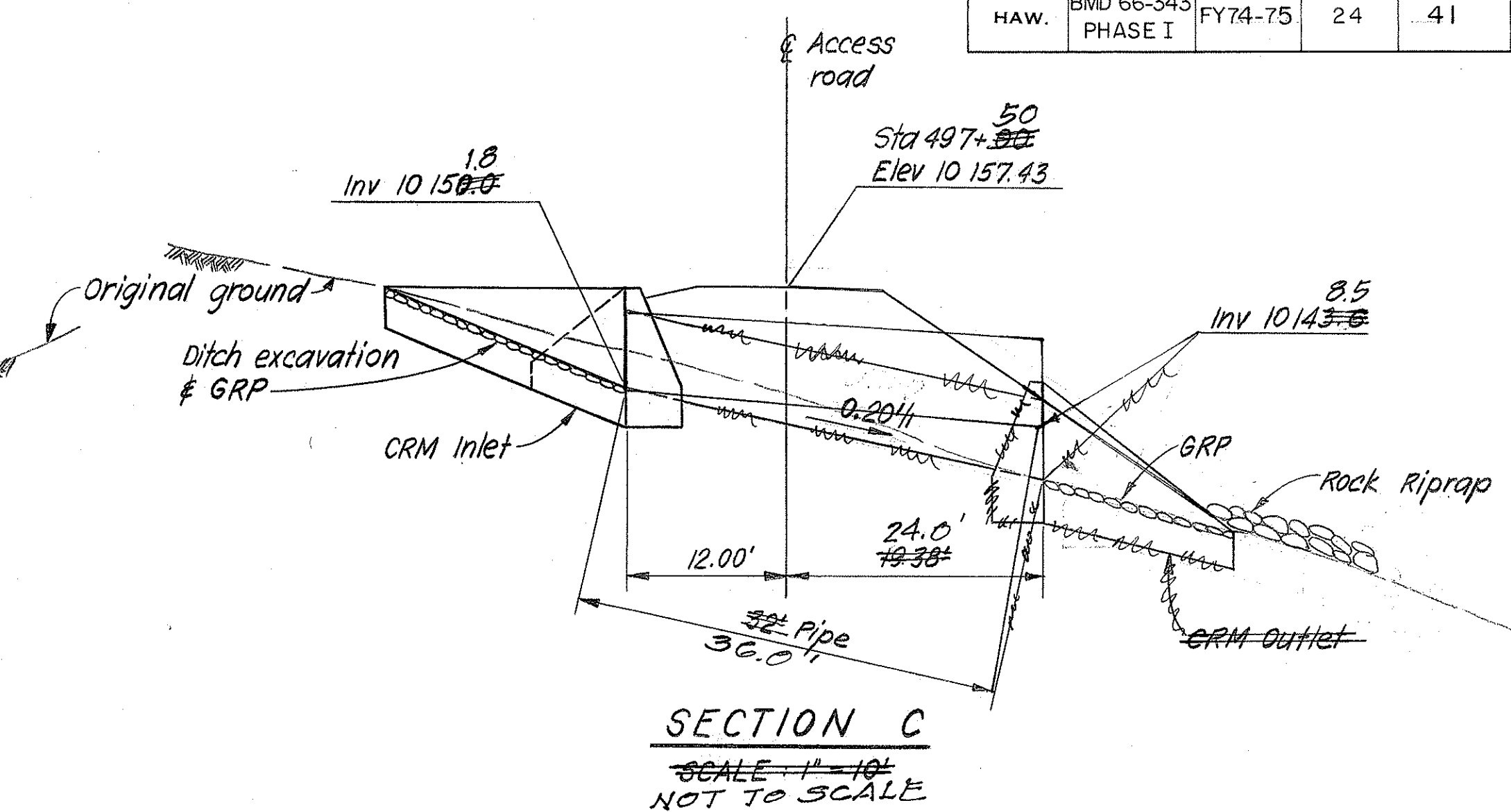
SECTION B
SCALE: 1" = 10'
NOT TO SCALE

STRUCTURE NO 8 STA 486+20

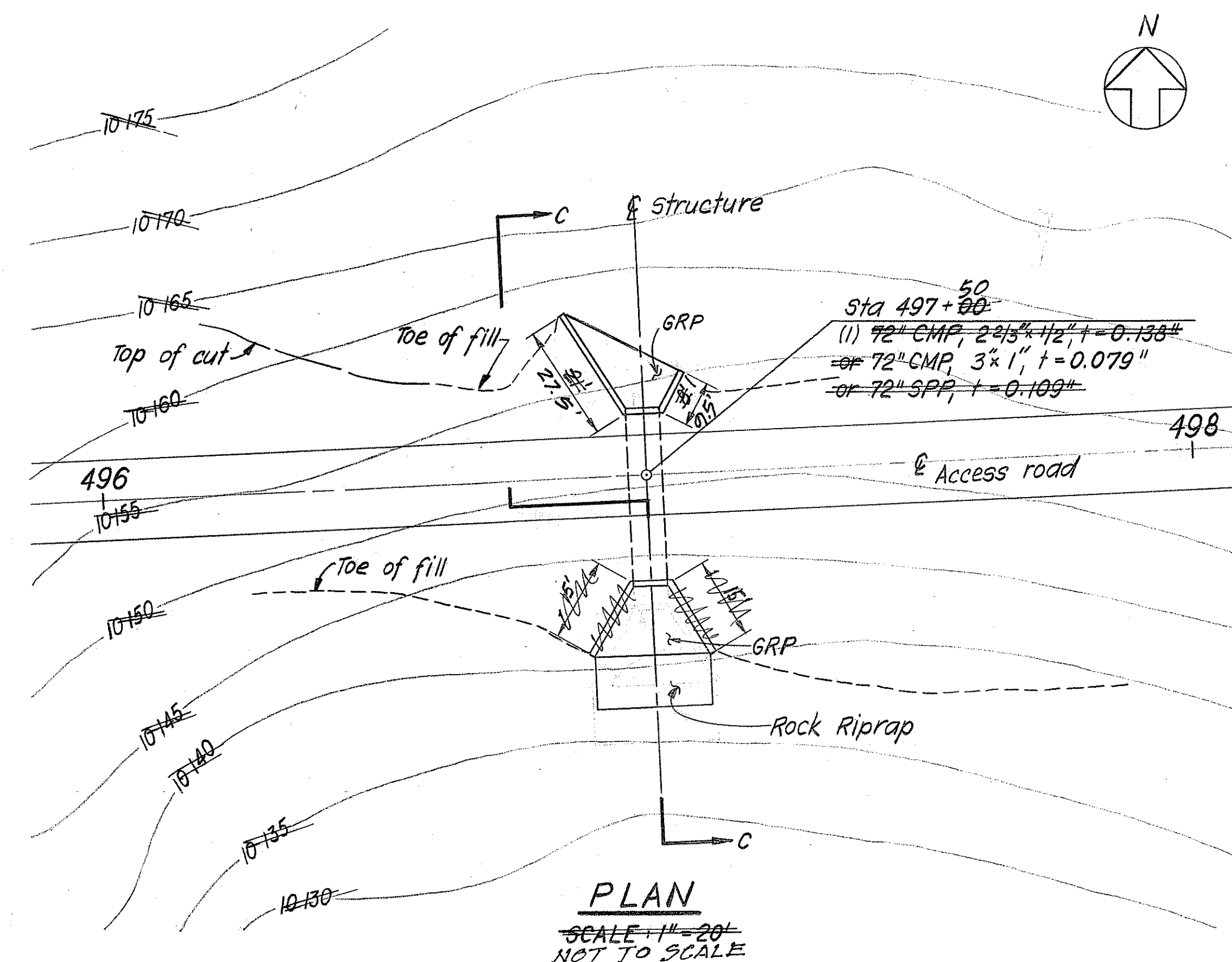


SECTION A
SCALE: 1" = 10'
NOT TO SCALE

STRUCTURE NO 7 STA 476+00



SECTION C
SCALE: 1" = 10'
NOT TO SCALE

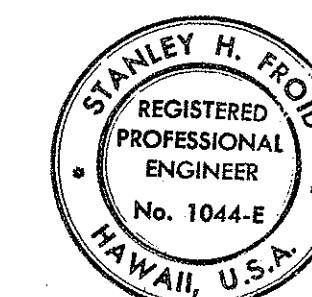


STRUCTURE NO 9 STA 497+00

QUANTITIES

54" Pipe (Lin Ft)
72" Pipe (Lin Ft)
Structure Excavation (Cu Yd)
Ditch Excavation (Cu Yd)
CRM (Cu Yd)
GRP (Cu Yd)
Rock Riprap (Cu Yd)

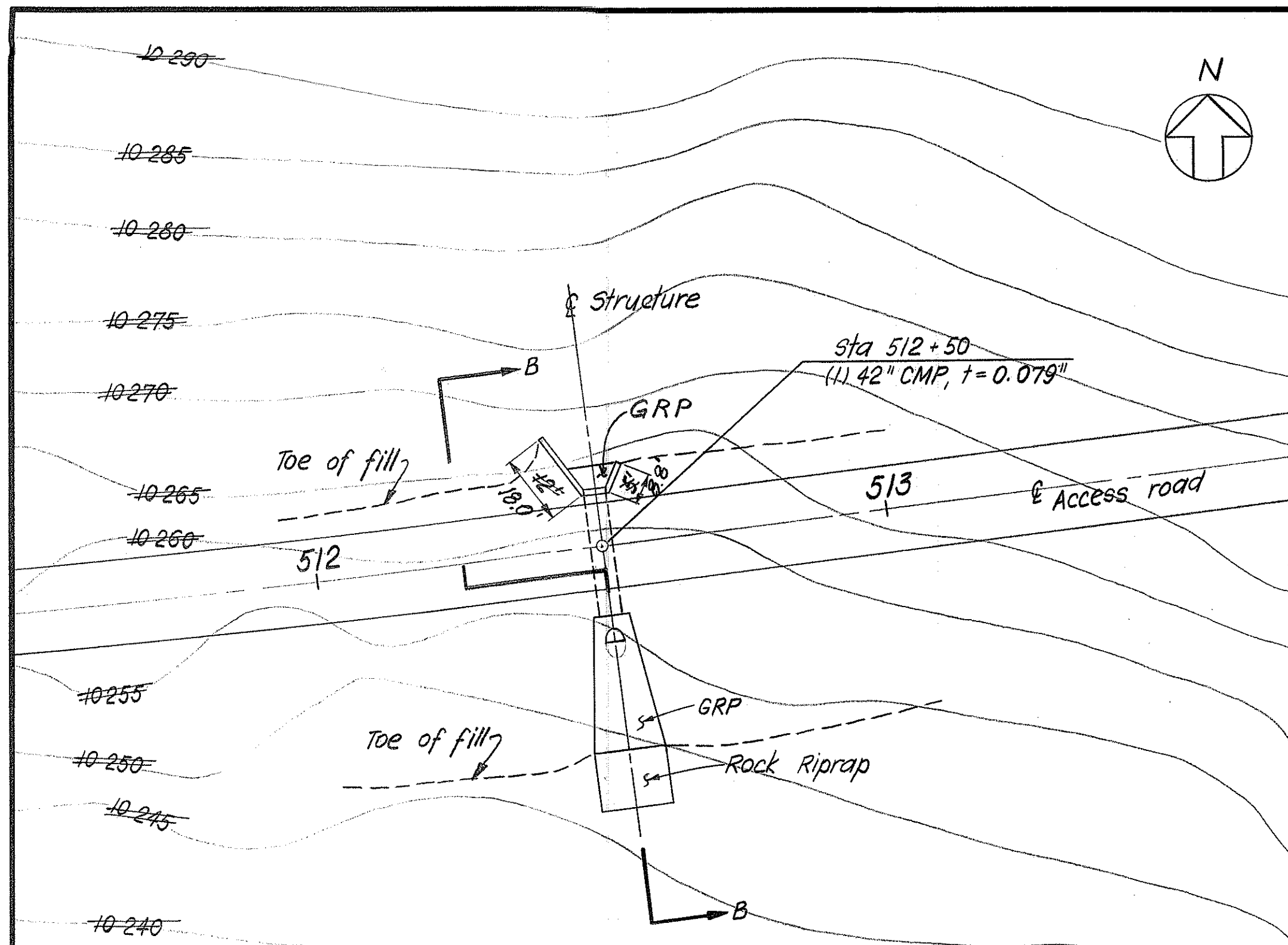
STRUCTURE	NO. 7	NO. 8	NO. 9
54" Pipe	32.0	32.0	32.0
72" Pipe	79.82	182.08	133.82
Structure Excavation	15.21	71.41	32.59
Ditch Excavation	12.21	11.32	7.73
CRM	7.73	17.26	8.82
GRP			
Rock Riprap			



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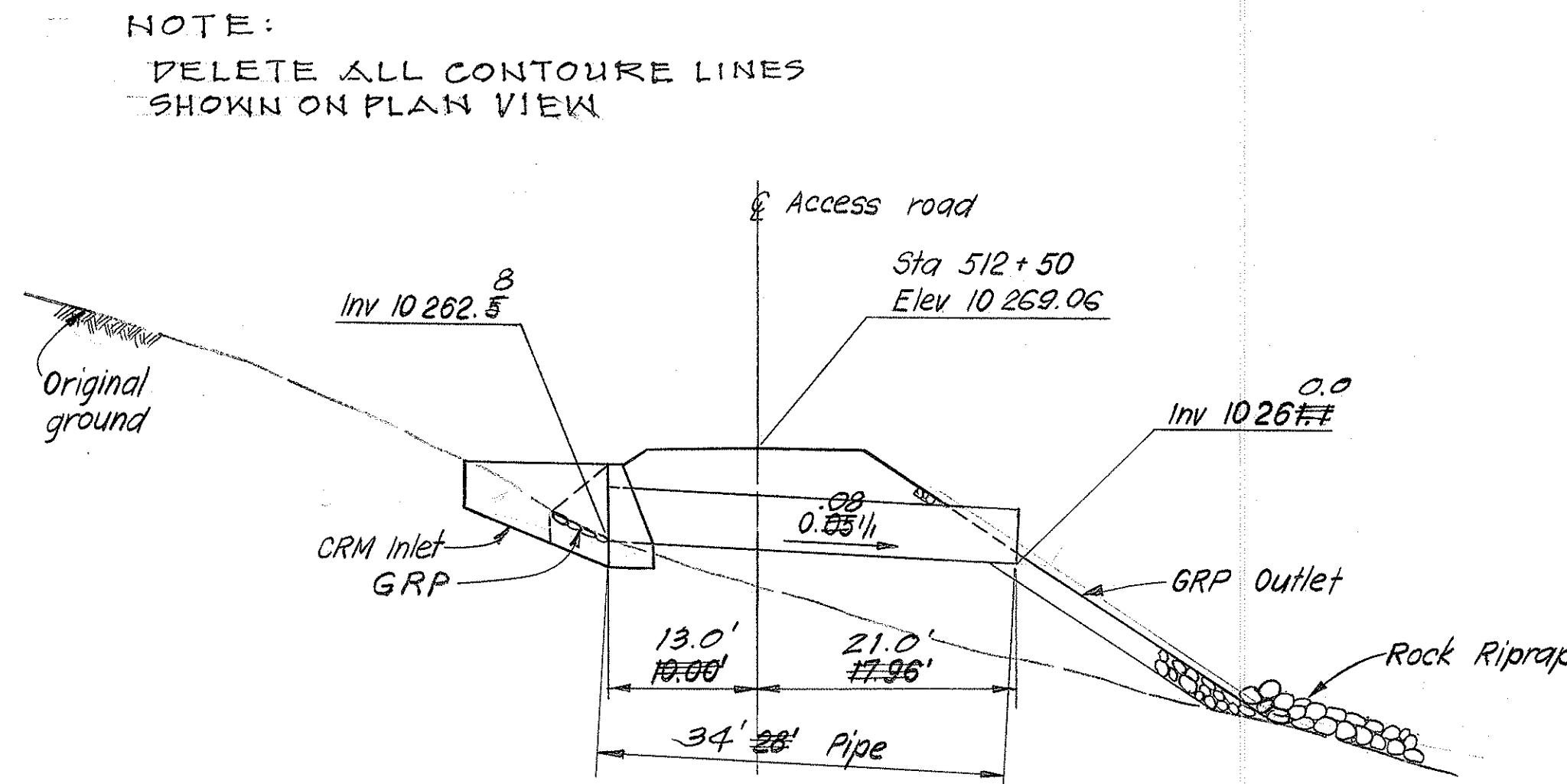
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DRAINAGE STRUCTURE DETAILS	
MAUNA KEA OBSERVATORY ACCESS ROAD	
PROJ. NO. BMD 66 - 343	
SCALE: AS NOTED	DATE: SEPT 1973
SHEET NO. 4 OF 8 SHEETS C 404	

STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD 66-343 PHASE I	FY 74-75	25	41

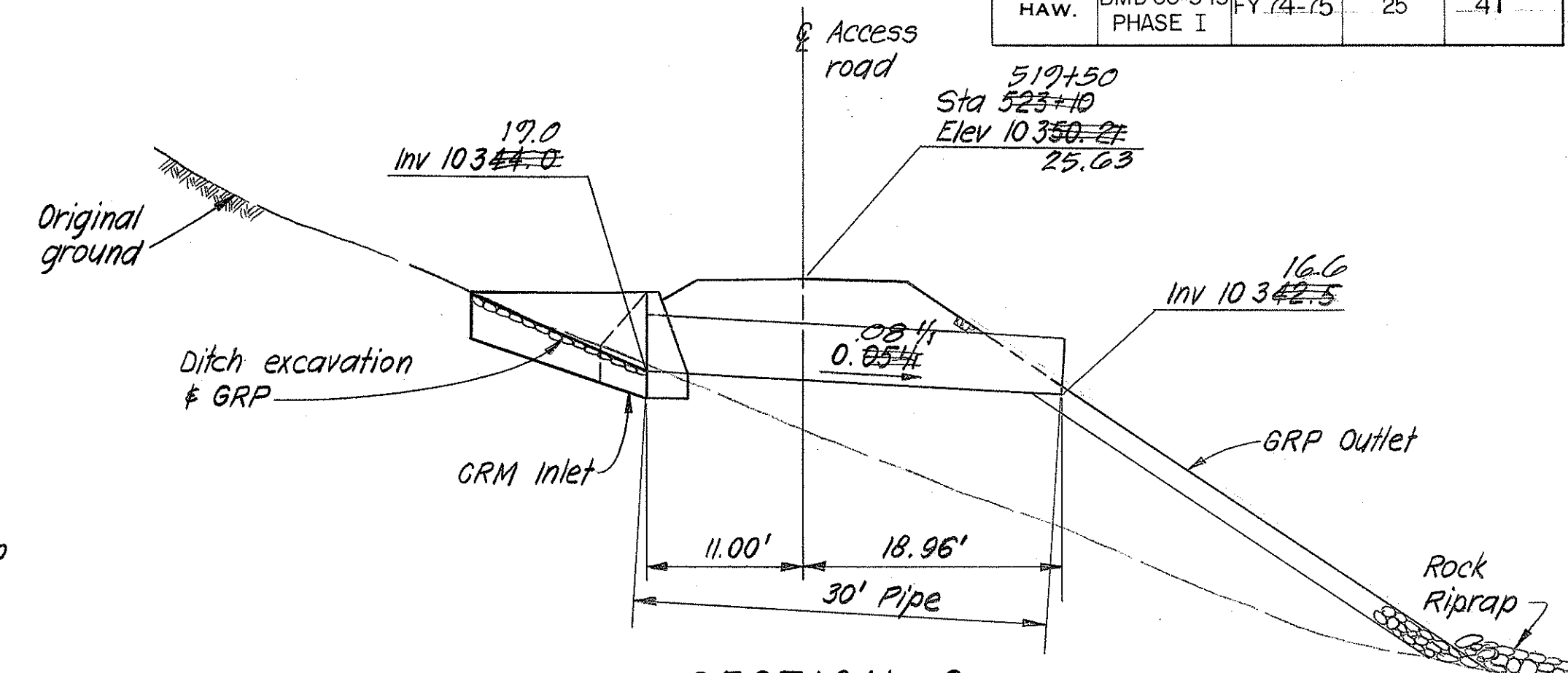


PLAN
SCALE: 1" = 20'
NOT TO SCALE

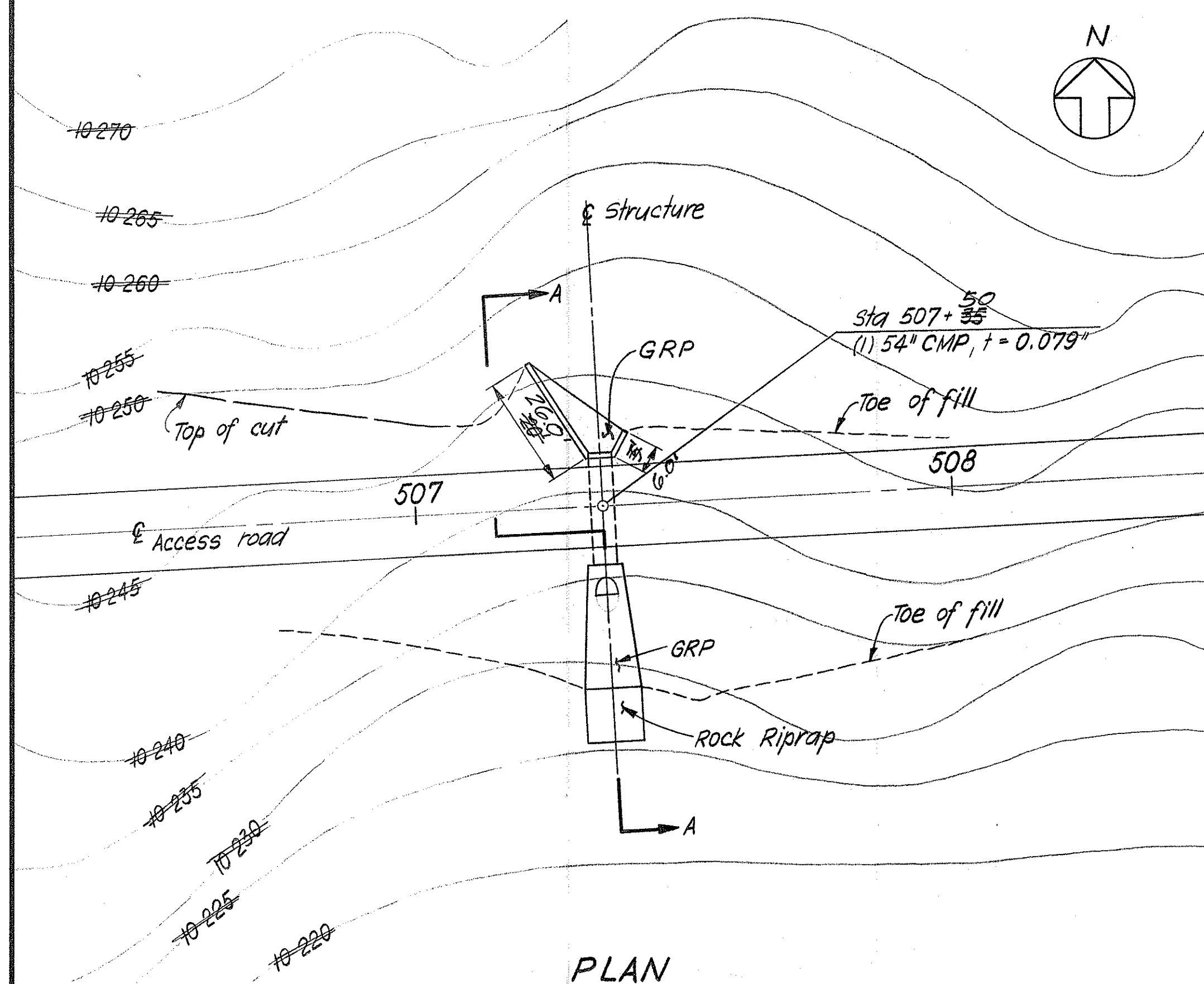
STRUCTURE NO 11 STA 512+50



SECTION B
SCALE: 1" = 10'
NOT TO SCALE

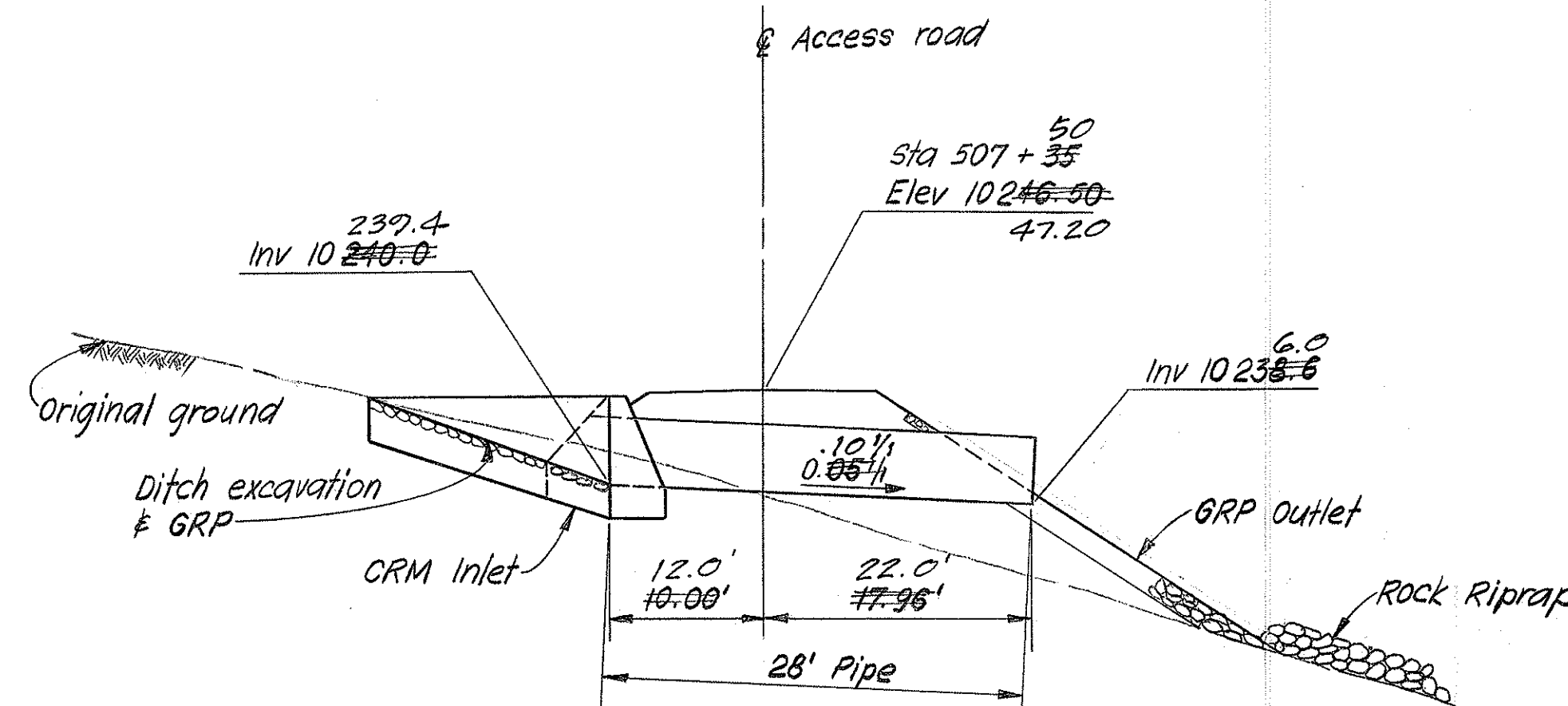


SECTION C
SCALE: 1" = 10'
NOT TO SCALE

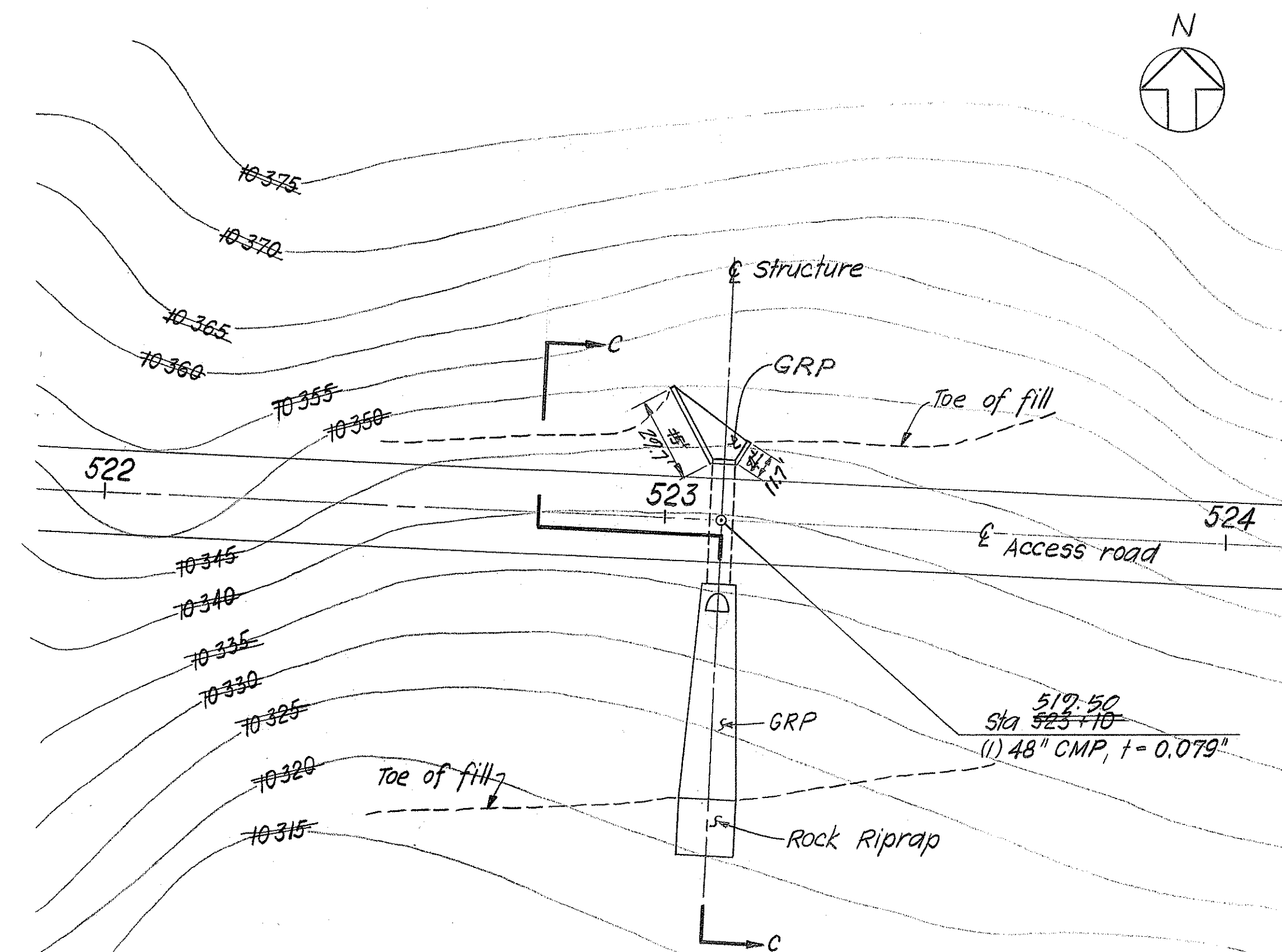


PLAN
SCALE: 1" = 20'
NOT TO SCALE

STRUCTURE NO 10 STA 507+35



SECTION A
SCALE: 1" = 10'
NOT TO SCALE

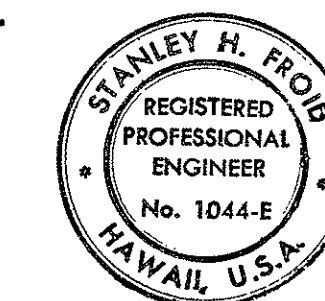


PLAN
SCALE: 1" = 20'
NOT TO SCALE
STRUCTURE NO 12 STA 523+10

QUANTITIES

42" Pipe (Lin Ft) ~ 34' 28"
48" Pipe (Lin Ft) ~ 30' 30"
54" Pipe (Lin Ft) ~ 30' 30"
Structure Excavation (Cu Yd) 90' 29' 53"
Ditch Excavation (Cu Yd) 5
CRM (Cu Yd) 17' 12' 14"
GRP (Cu Yd) 13' 22' 14"
Rock Riprap (Cu Yd) 7' 23' 14"

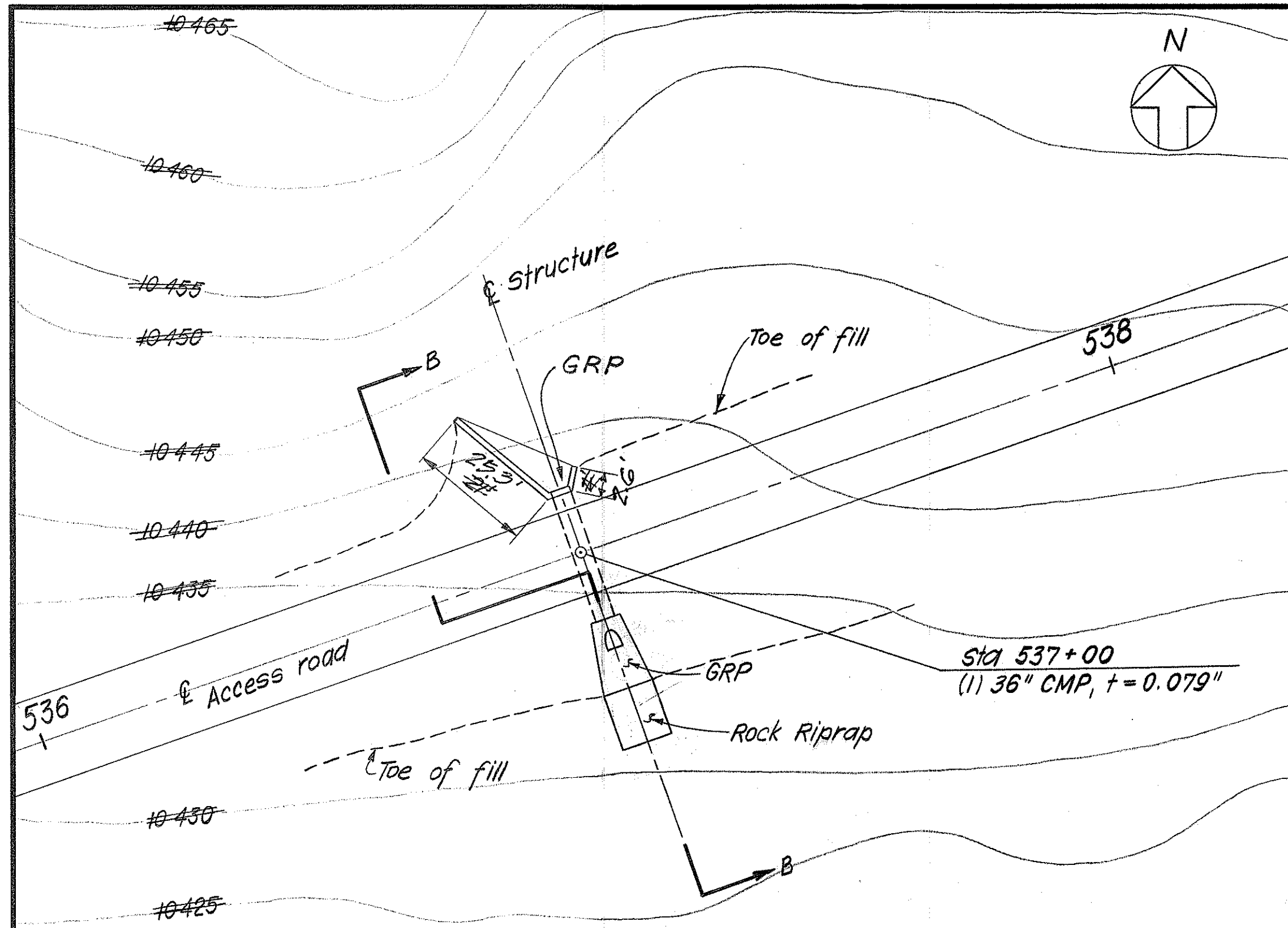
NO. 10	STRUCTURE NO. 11	NO. 12
~	34' 28"	~
~	~	30' 30"
34' 28"	~	~
90' 29' 53"	58' 16"	67' 17"
5	~	2
17' 12' 14"	11' 28"	17' 12' 14"
13' 22' 14"	10' 14"	11' 12' 14"
7' 23' 14"	7' 24"	7' 21"



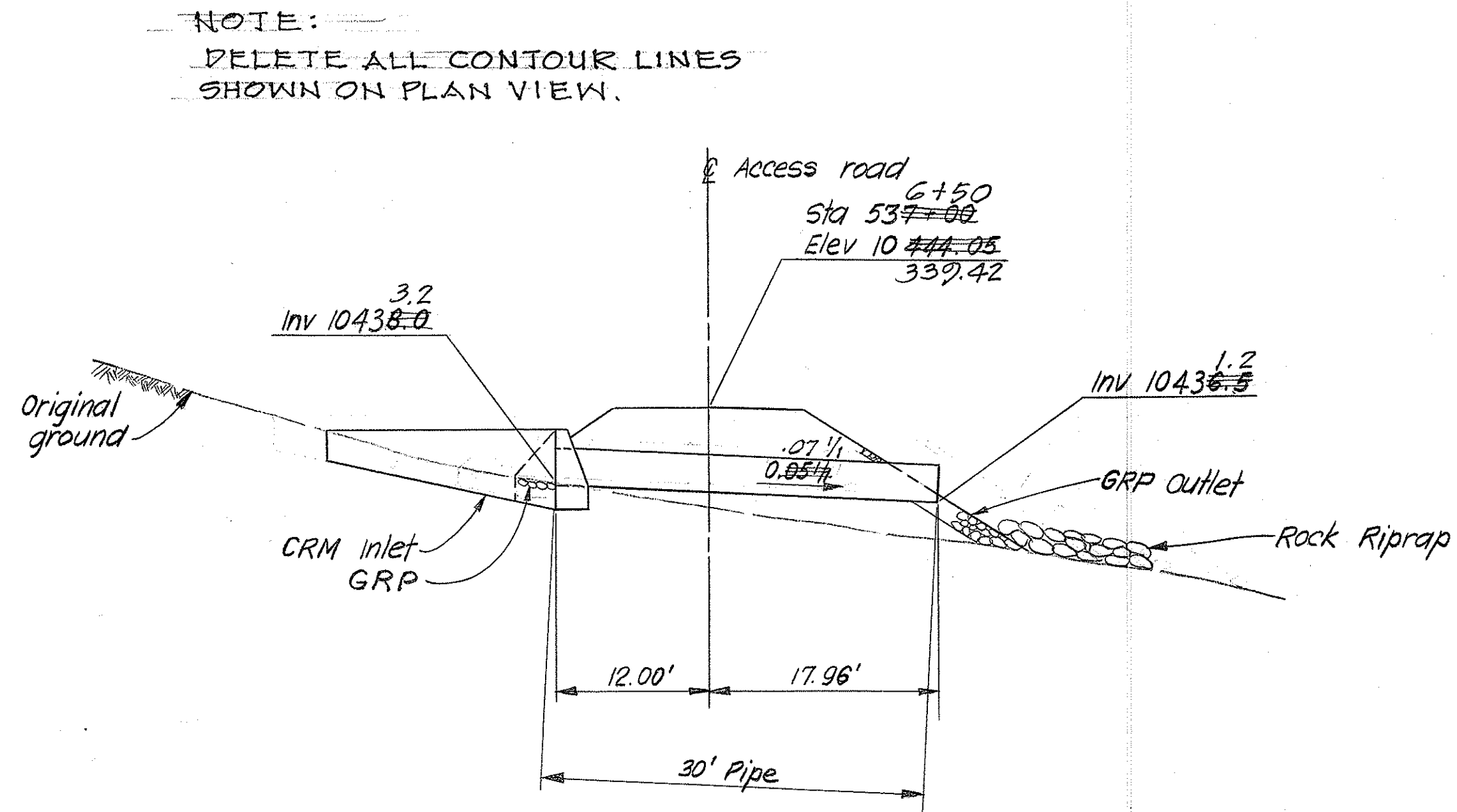
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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DRAINAGE STRUCTURE DETAILS	
MAUNA KEA OBSERVATORY ACCESS ROAD	
PROJ. NO. BMD 66 - 343	
SCALE: AS NOTED	DATE: SEPT 1973
SHEET NO. 5 OF 8 SHEETS C 405	

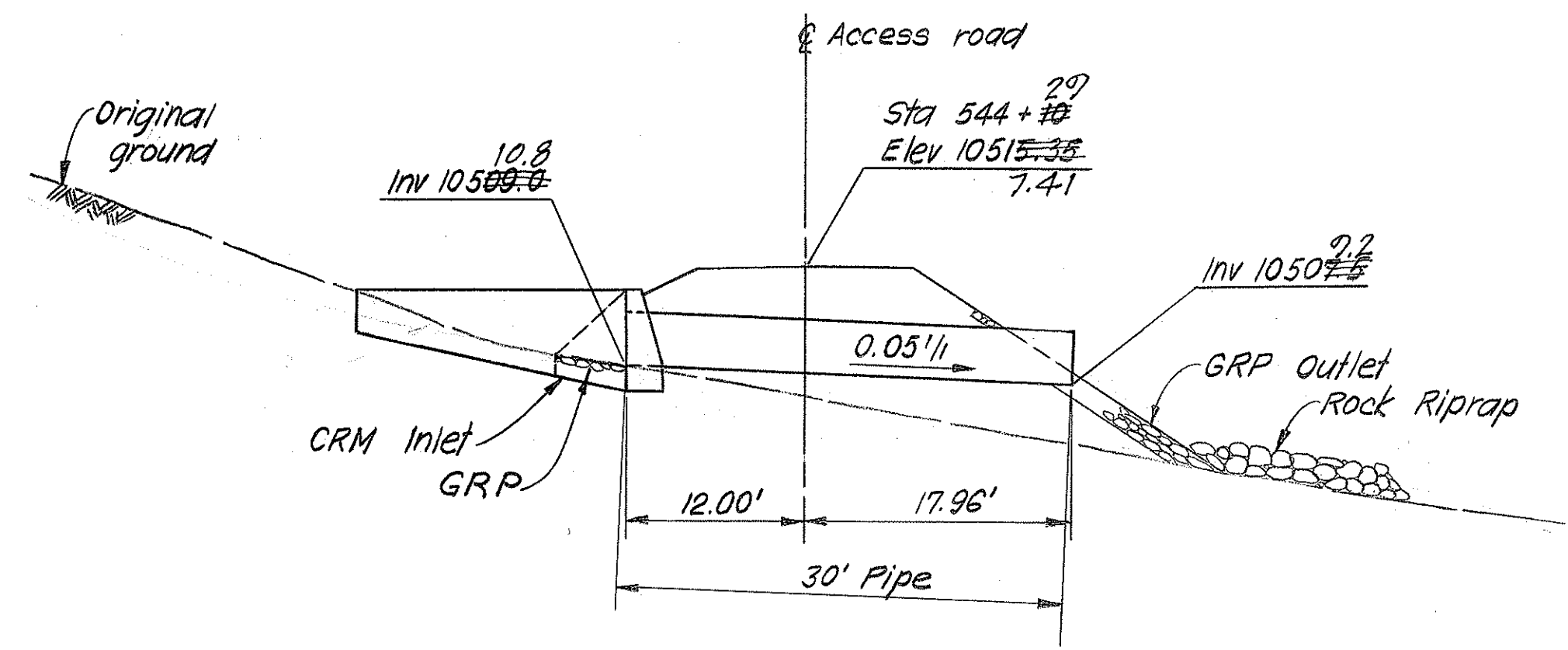
STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD 66-343 PHASE I	FY74-75	26	41



PLAN
SCALE: 1" = 20'
NOT TO SCALE

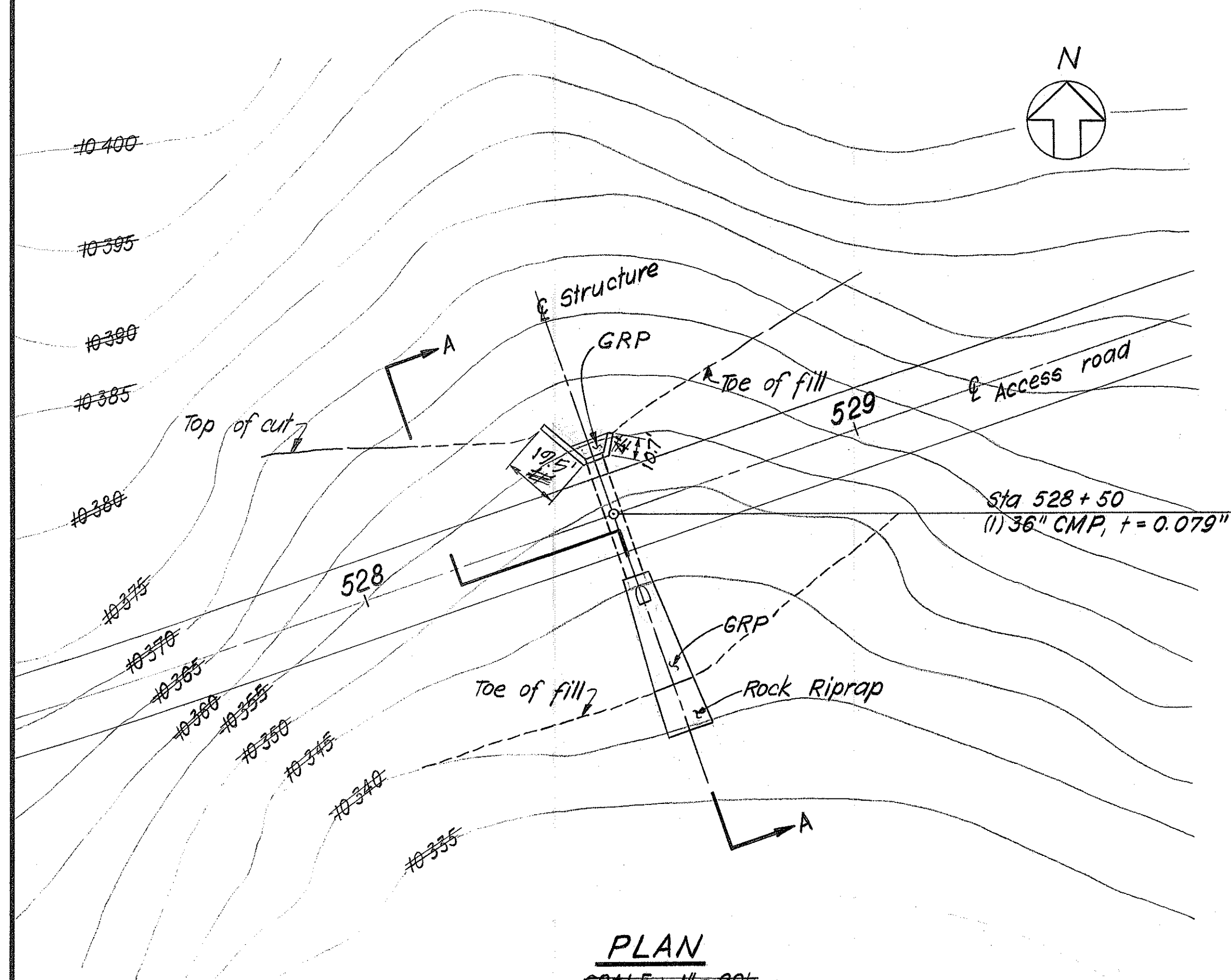


SECTION B
SCALE: 1" = 10'
NOT TO SCALE

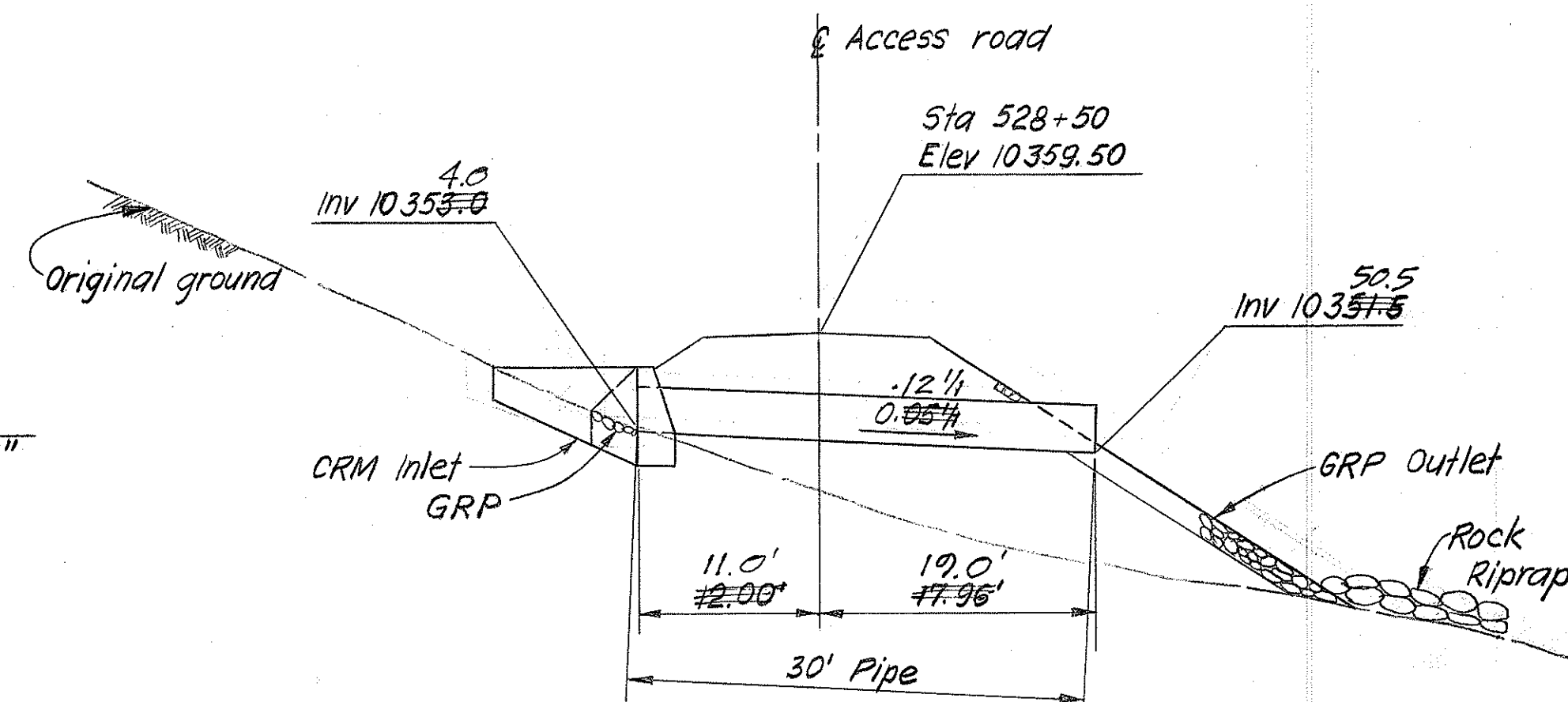


SECTION C
SCALE: 1" = 10'
NOT TO SCALE

STRUCTURE NO 14 STA 537+00

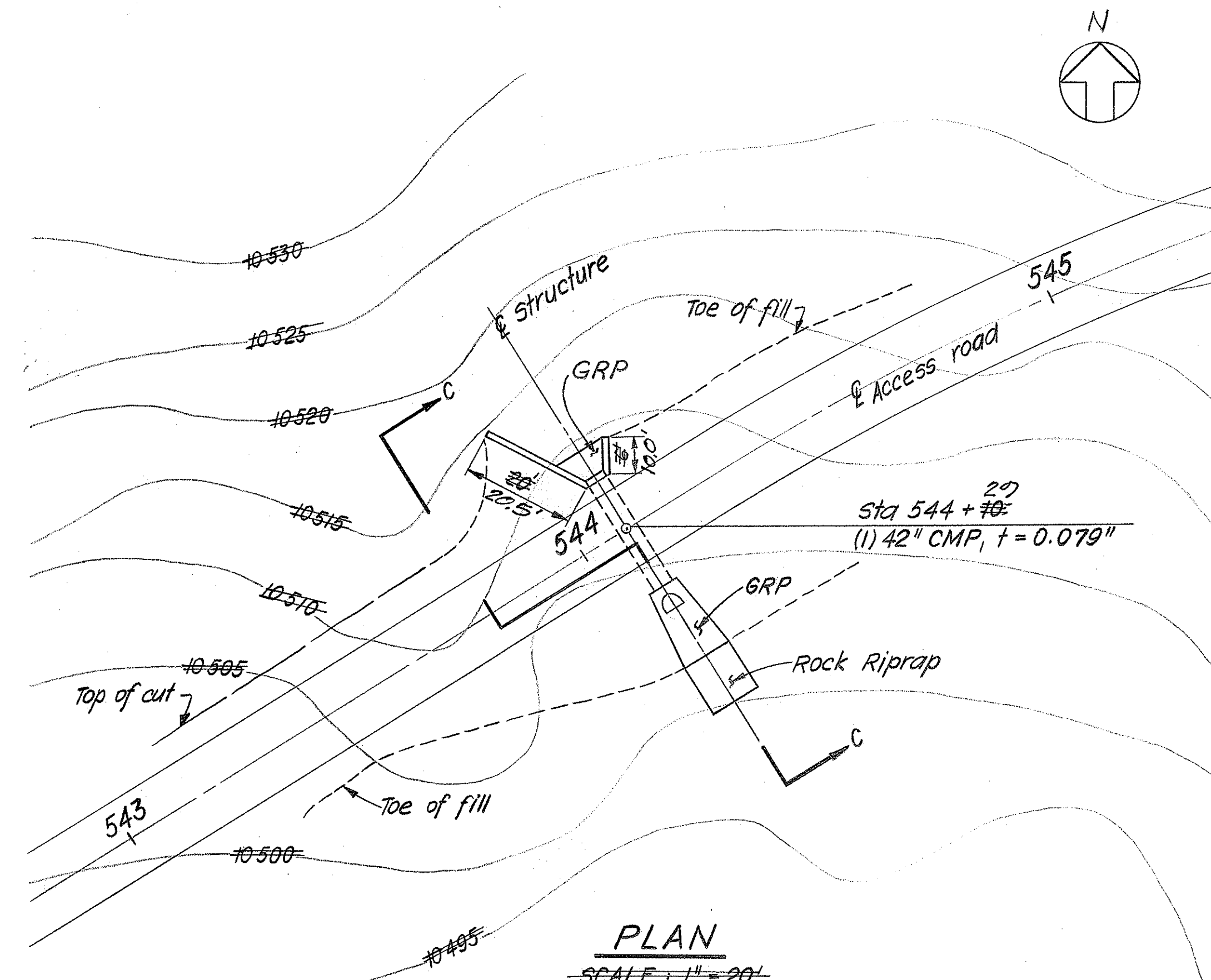


PLAN
SCALE: 1" = 20'
NOT TO SCALE



SECTION A
SCALE: 1" = 10'
NOT TO SCALE

STRUCTURE NO 13 STA 528+50



PLAN
SCALE: 1" = 20'
NOT TO SCALE

STRUCTURE NO 15 STA 544+70

QUANTITIES

36" Pipe (Lin Ft)
42" Pipe (Lin Ft)
Structure Excavation (Cu Yd)
Ditch Excavation (Cu Yd)
CRM (Cu Yd)
GRP (Cu Yd)
Rock Riprap (Cu Yd)

NO. 13	NO. 14	NO. 15
30	30	30
47	43	52
3	3	3
10	11	12
10	5	8
6	6	7



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

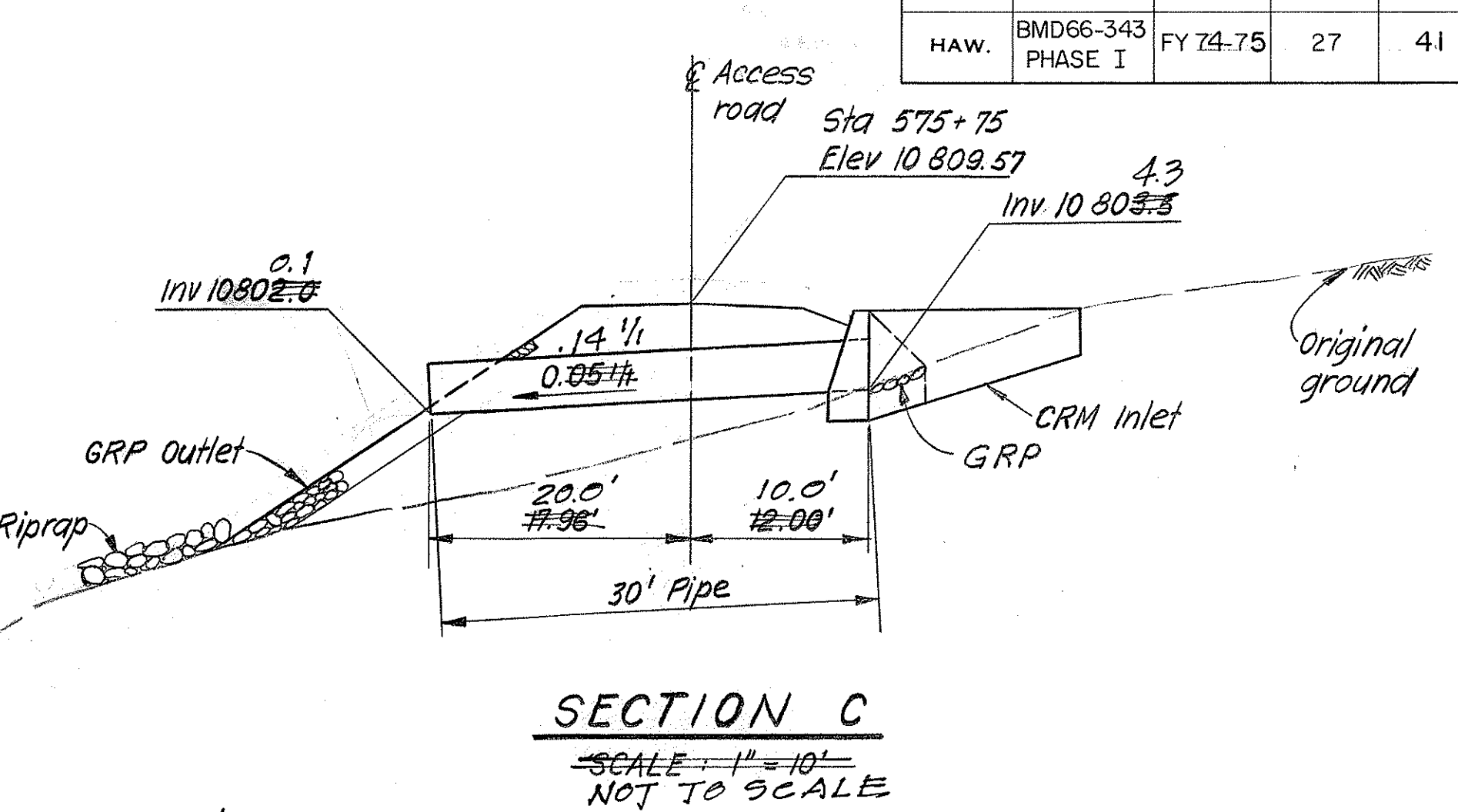
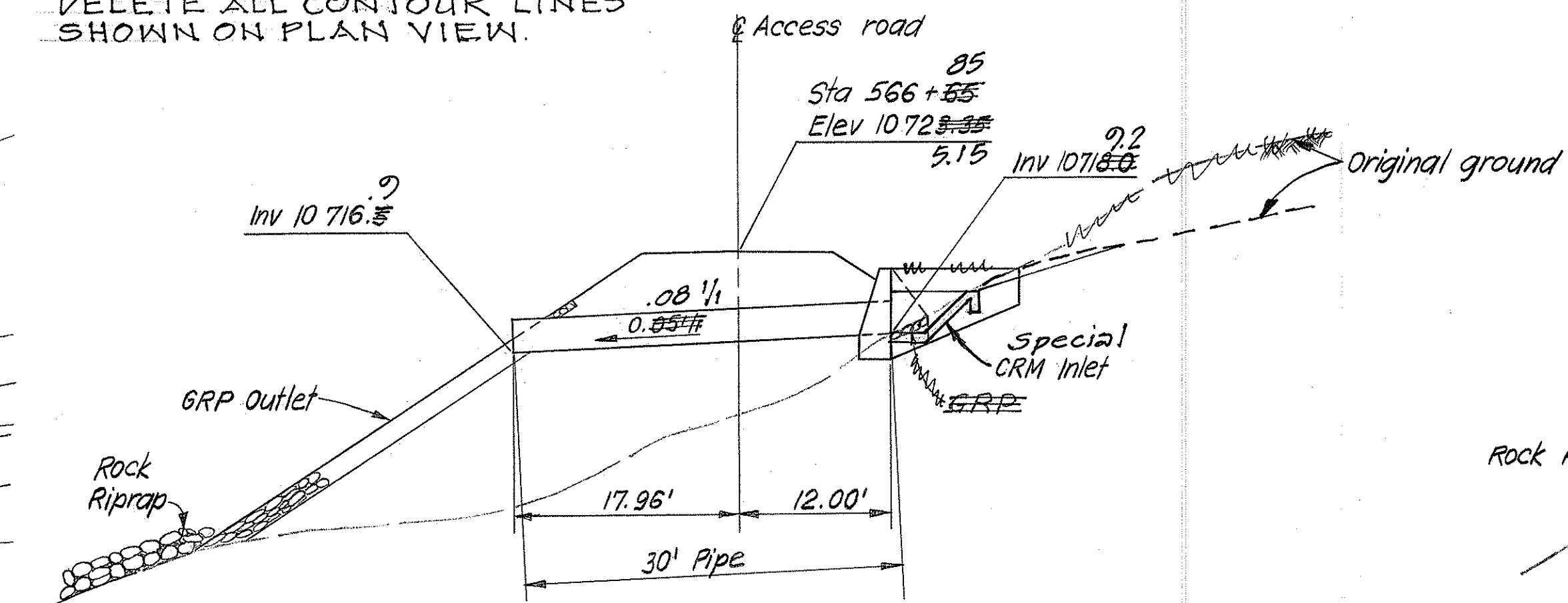
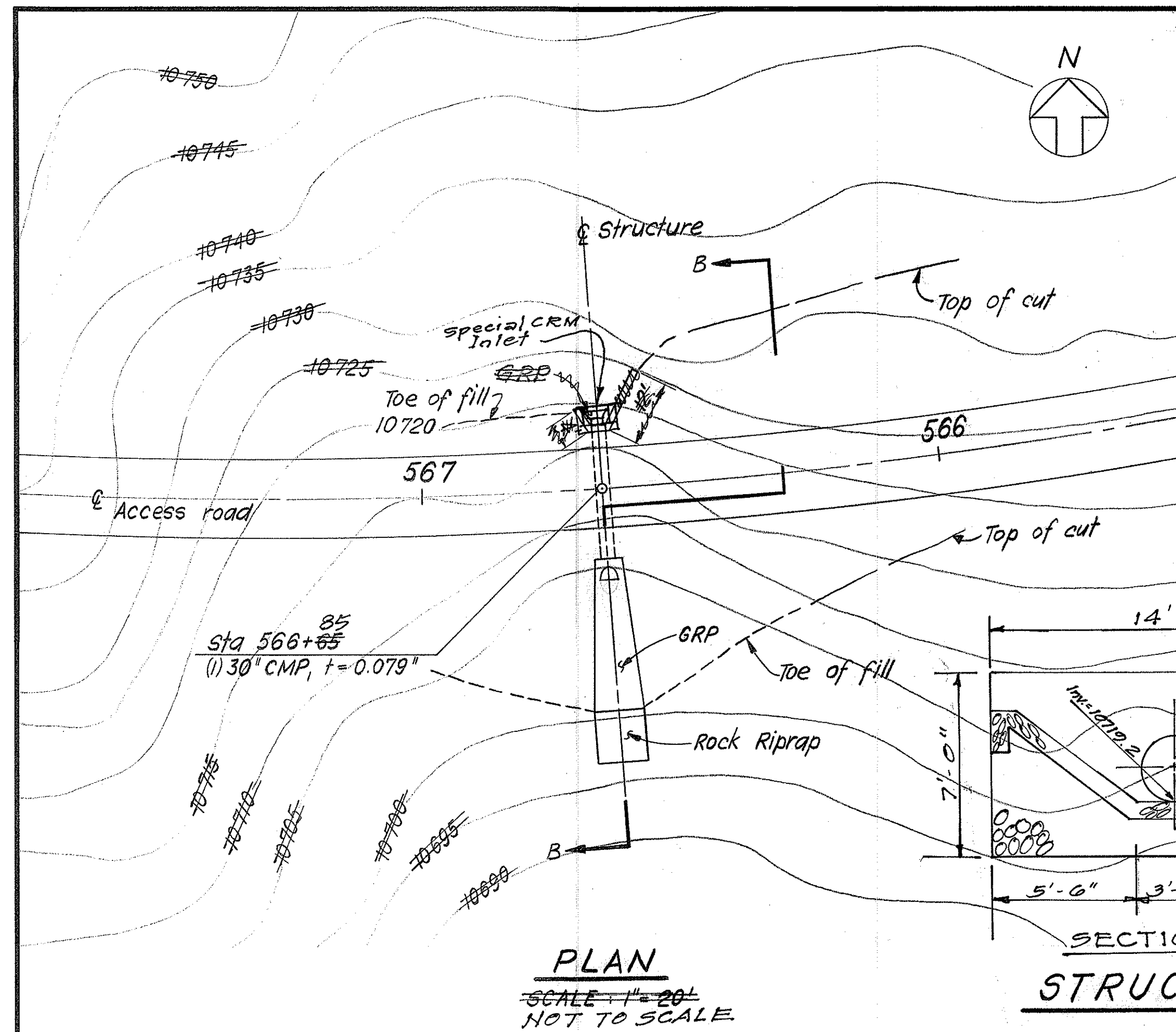
MAUNA KEA OBSERVATORY ACCESS ROAD
PROJ. NO. BMD 66 - 343

SCALE: AS NOTED DATE: SEPT 1973

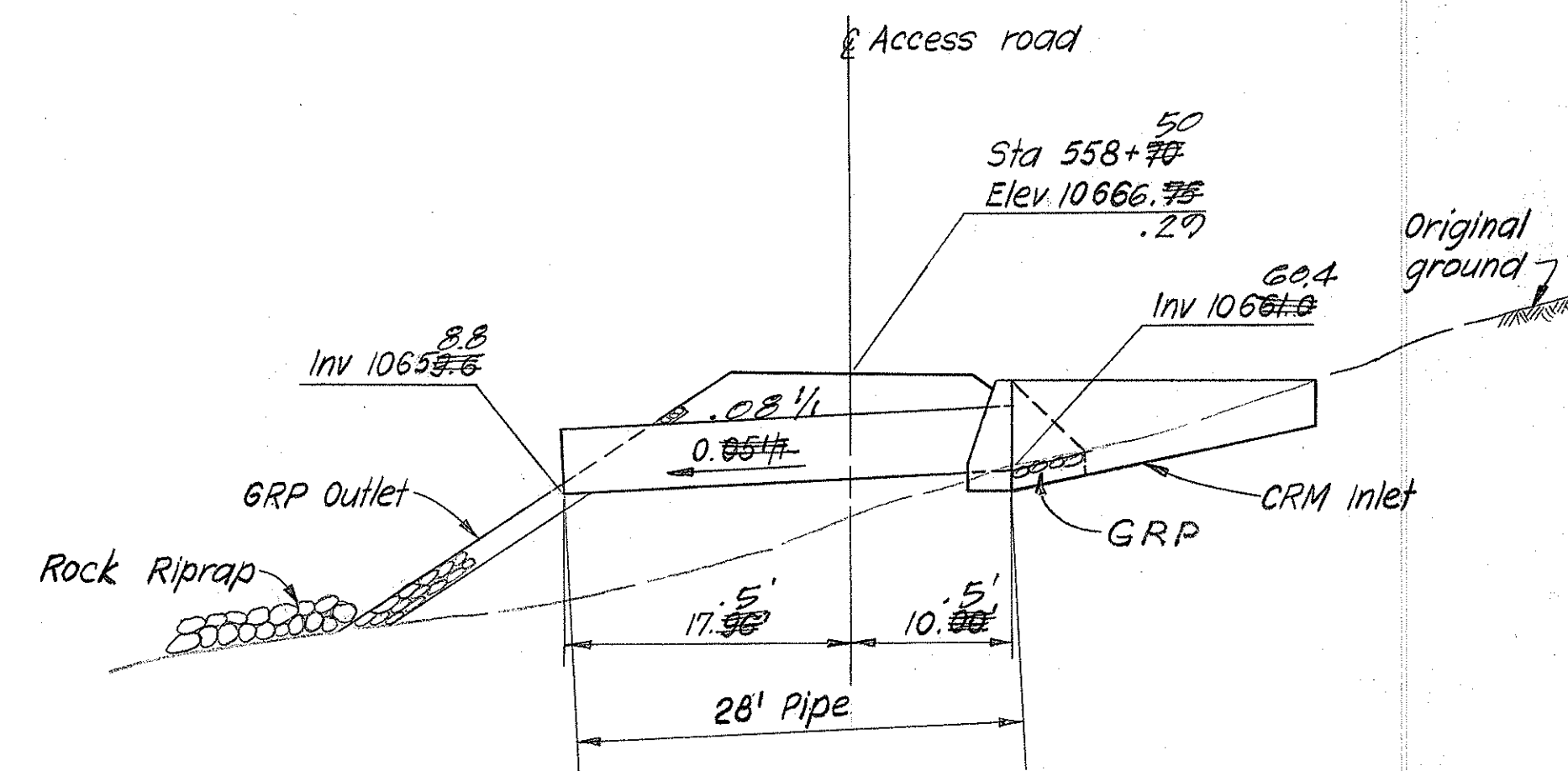
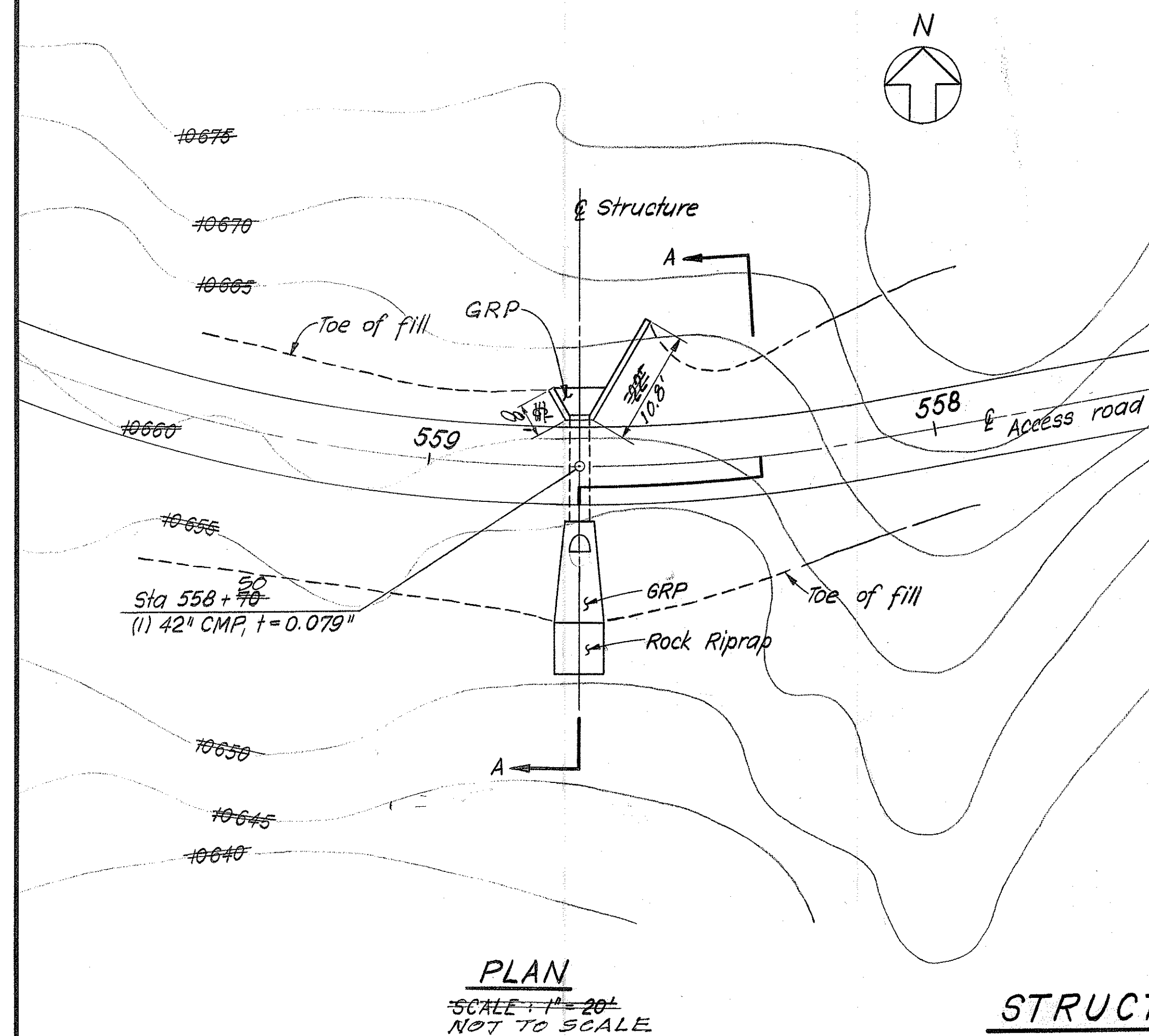
SHEET NO. 6 OF 8 SHEETS C 406

STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD66-343 PHASE I	FY 74-75	27	41

NOTE:
DELETE ALL CONTOUR LINES
SHOWN ON PLAN VIEW.

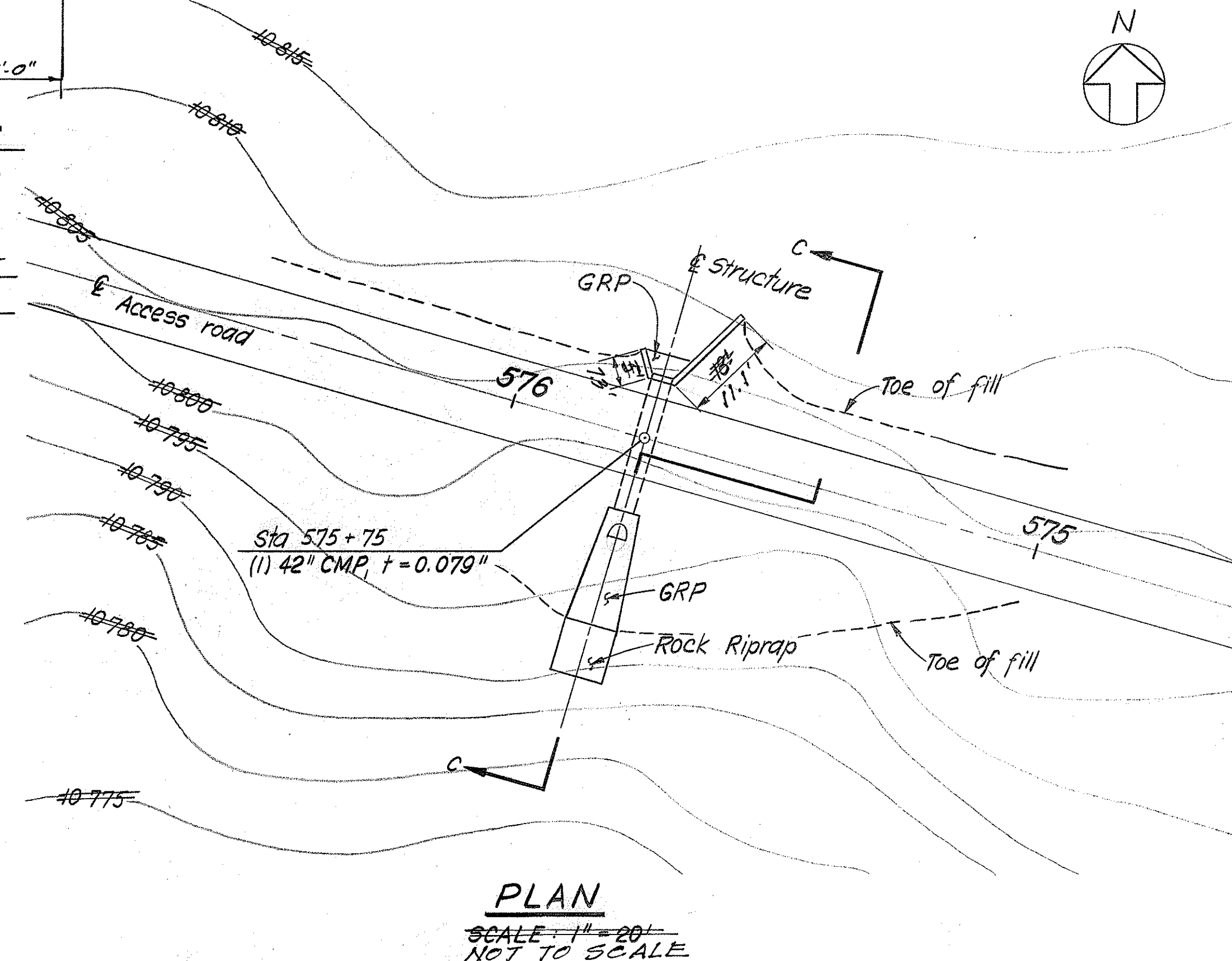


STRUCTURE NO. 17 STA. 566+85



STRUCTURE NO. 16 STA. 558+70

DETAILS OF SPECIAL CRM INLET
STRUC. NO. 17 @ STA. 566+85 RT.
NOT TO SCALE

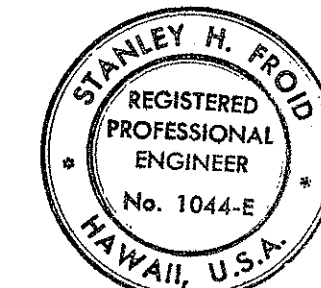


STRUCTURE NO. 18 STA. 575+75

QUANTITIES

30" Pipe (Lin Ft)
42" Pipe (Lin Ft)
Structure Excavation (Cu Yd)
Ditch Excavation (Cu Yd)
CRM (Cu Yd)
GRP (Cu Yd)
Rock Riprap (Cu Yd)

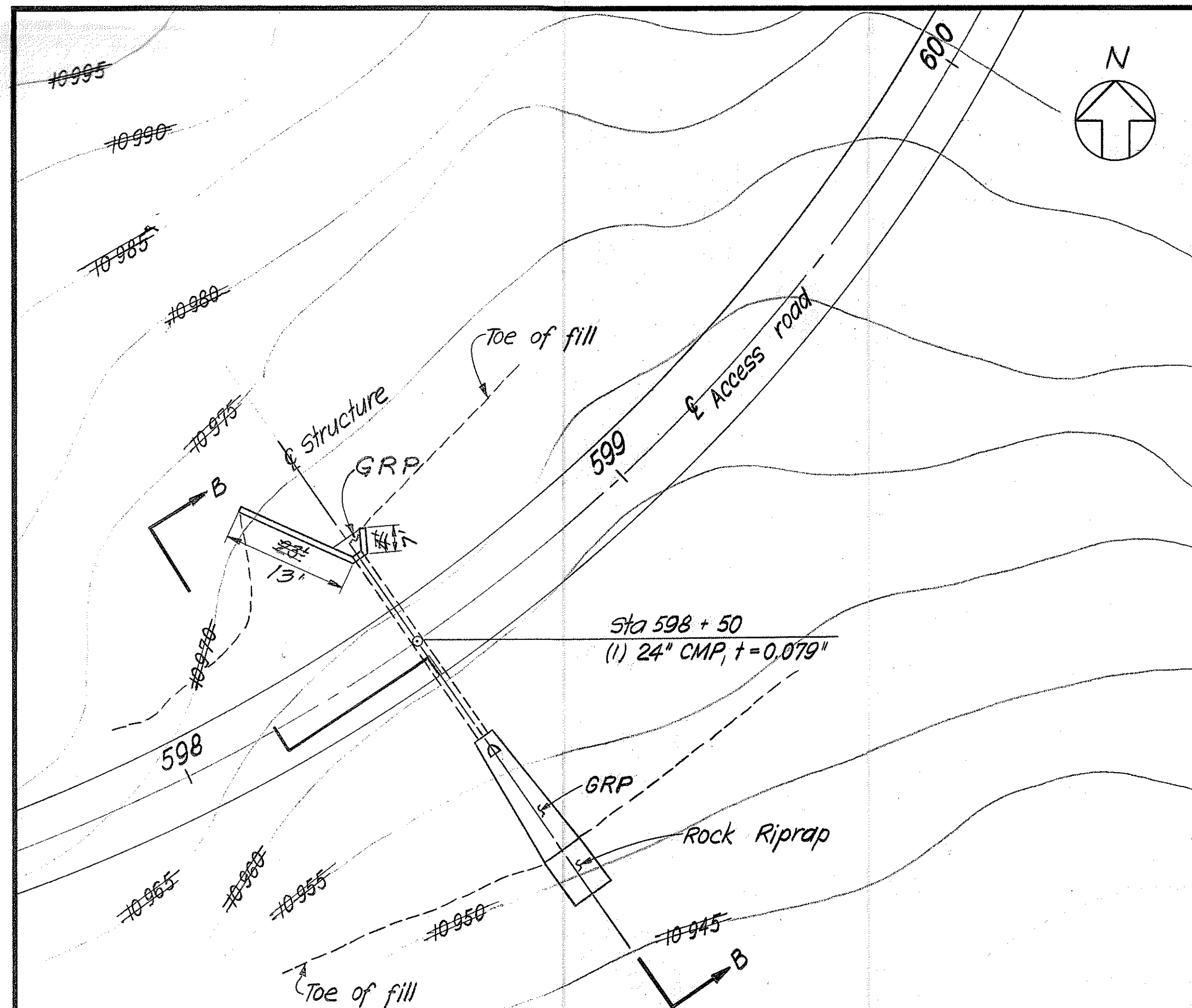
STRUCTURE	NO. 16	NO. 17	NO. 18
30" Pipe (Lin Ft)	~	30.3	~
42" Pipe (Lin Ft)	28	~	30
Structure Excavation (Cu Yd)	46.35	32.55	46.17
Ditch Excavation (Cu Yd)	~	~	~
CRM (Cu Yd)	8.24	8.24	8.62
GRP (Cu Yd)	12.21	8.21	6.21
Rock Riprap (Cu Yd)	7.21	6.30	7.04



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
Stanley H. Froid
Signature

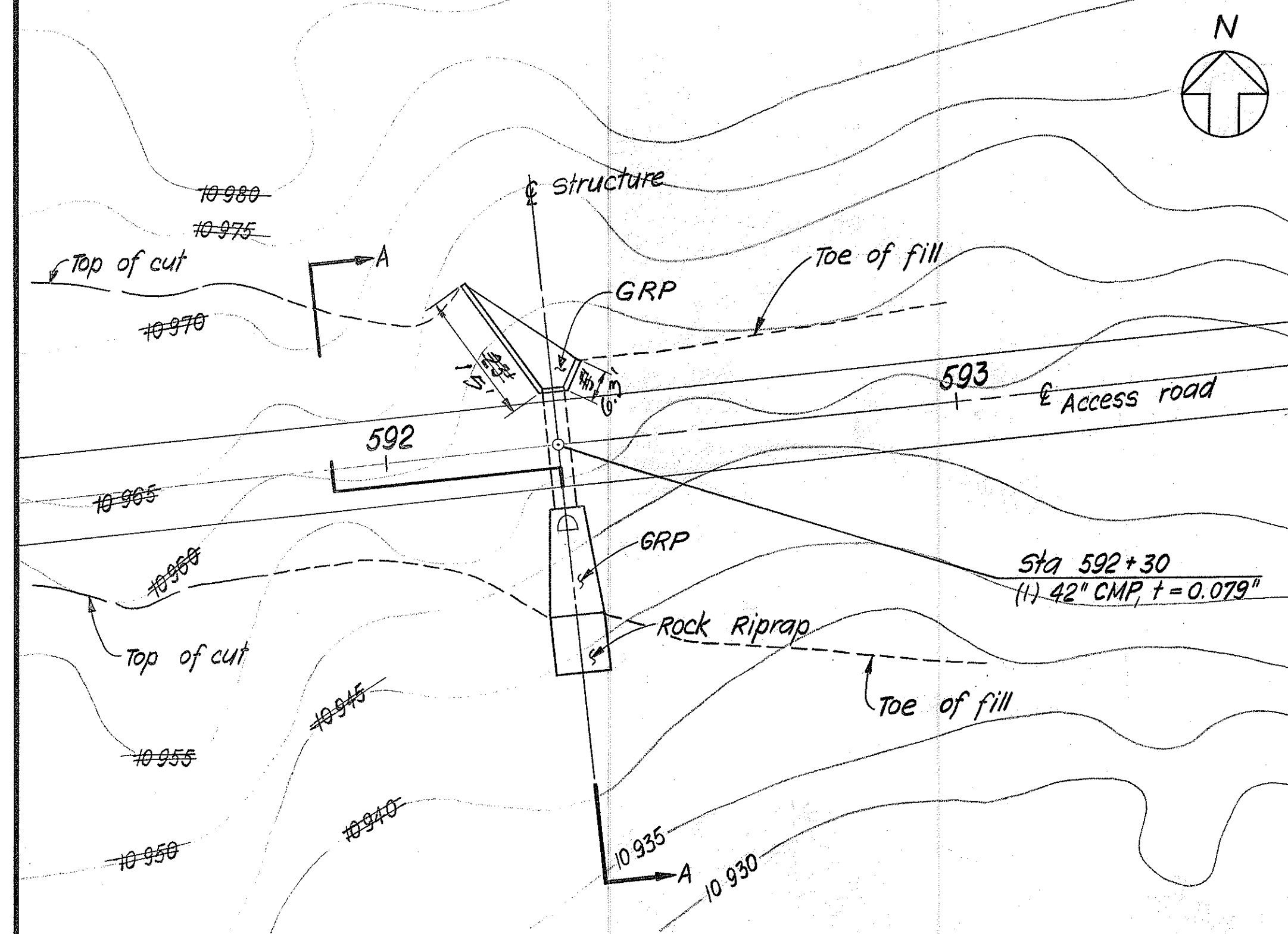
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DRAINAGE STRUCTURE DETAILS	
MAUNA KEA OBSERVATORY ACCESS ROAD	
PROJ. NO. BMD 66 - 343	
SCALE: AS NOTED	DATE: SEPT 1973
SHEET NO. 7 OF 8 SHEETS C 407	

STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	BMD 66-343 PHASE I	FY 74-75	28	41



PLAN
SCALE: 1" = 20'
NOT TO SCALE

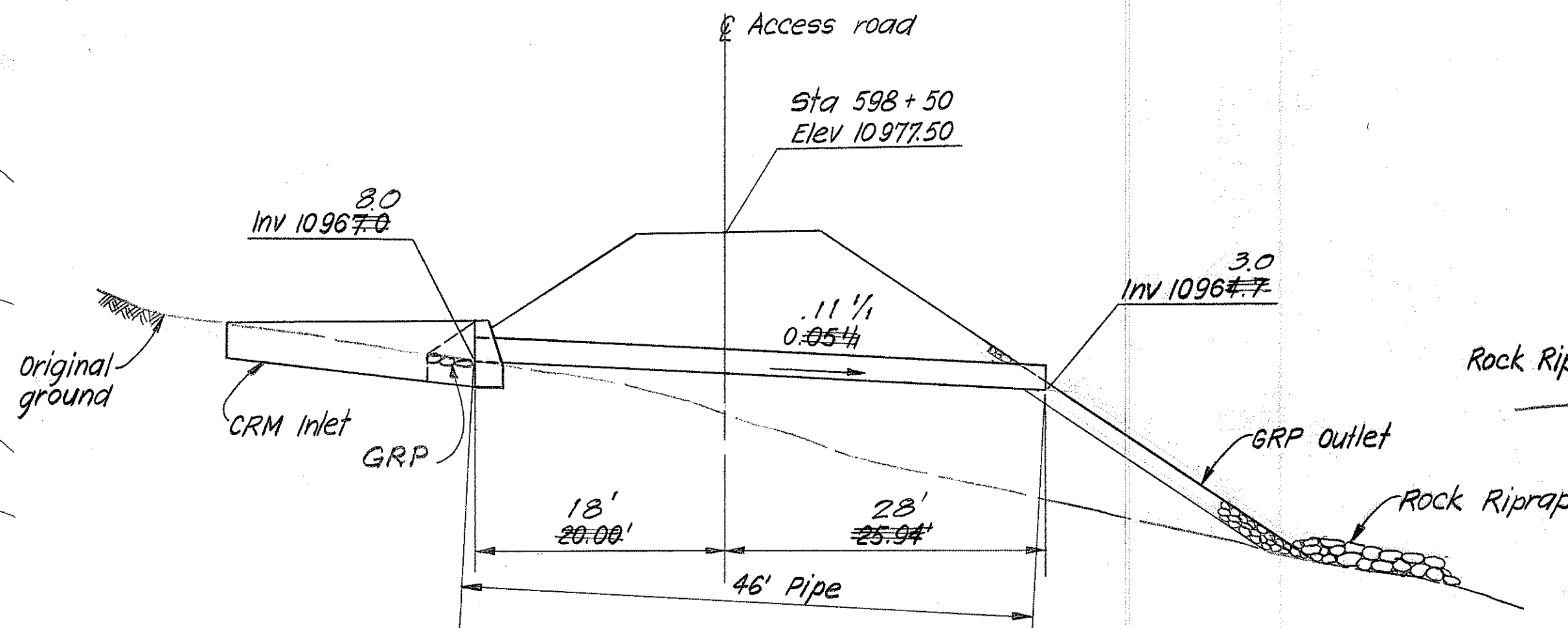
STRUCTURE NO 20 STA 598+50



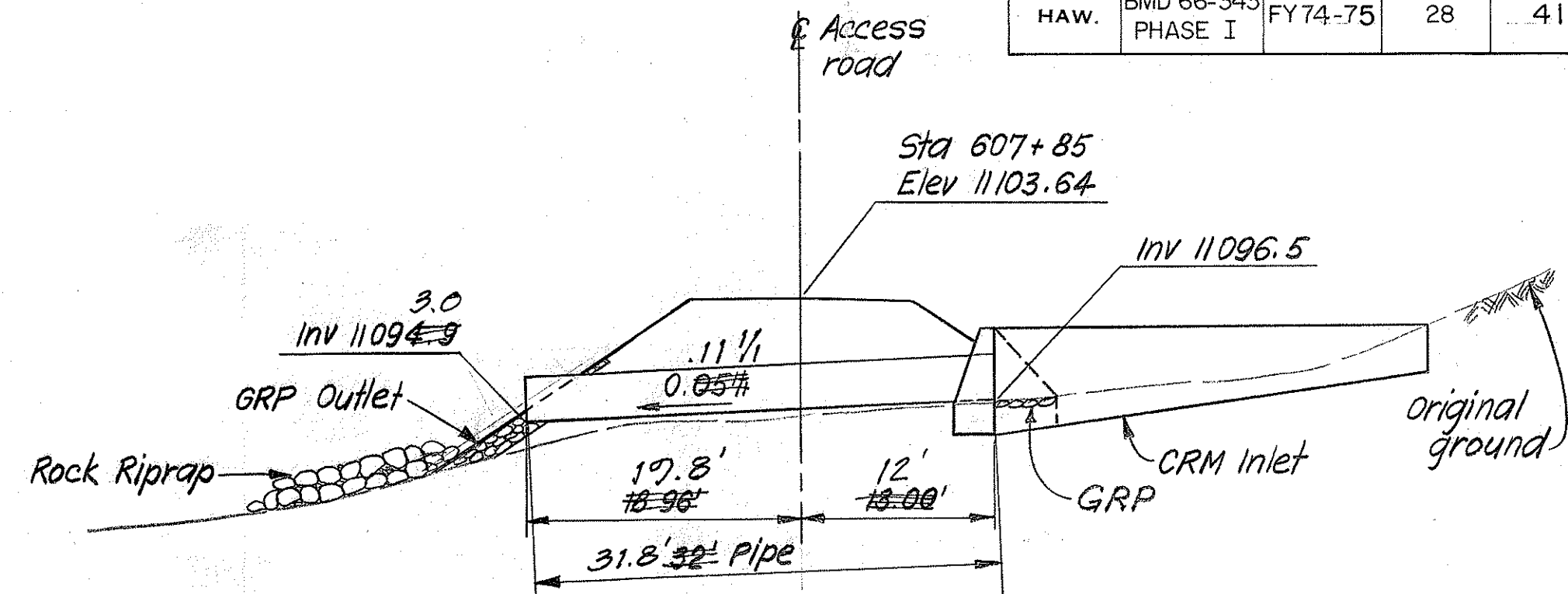
PLAN
SCALE: 1" = 20'
NOT TO SCALE

STRUCTURE NO 19 STA 592+30

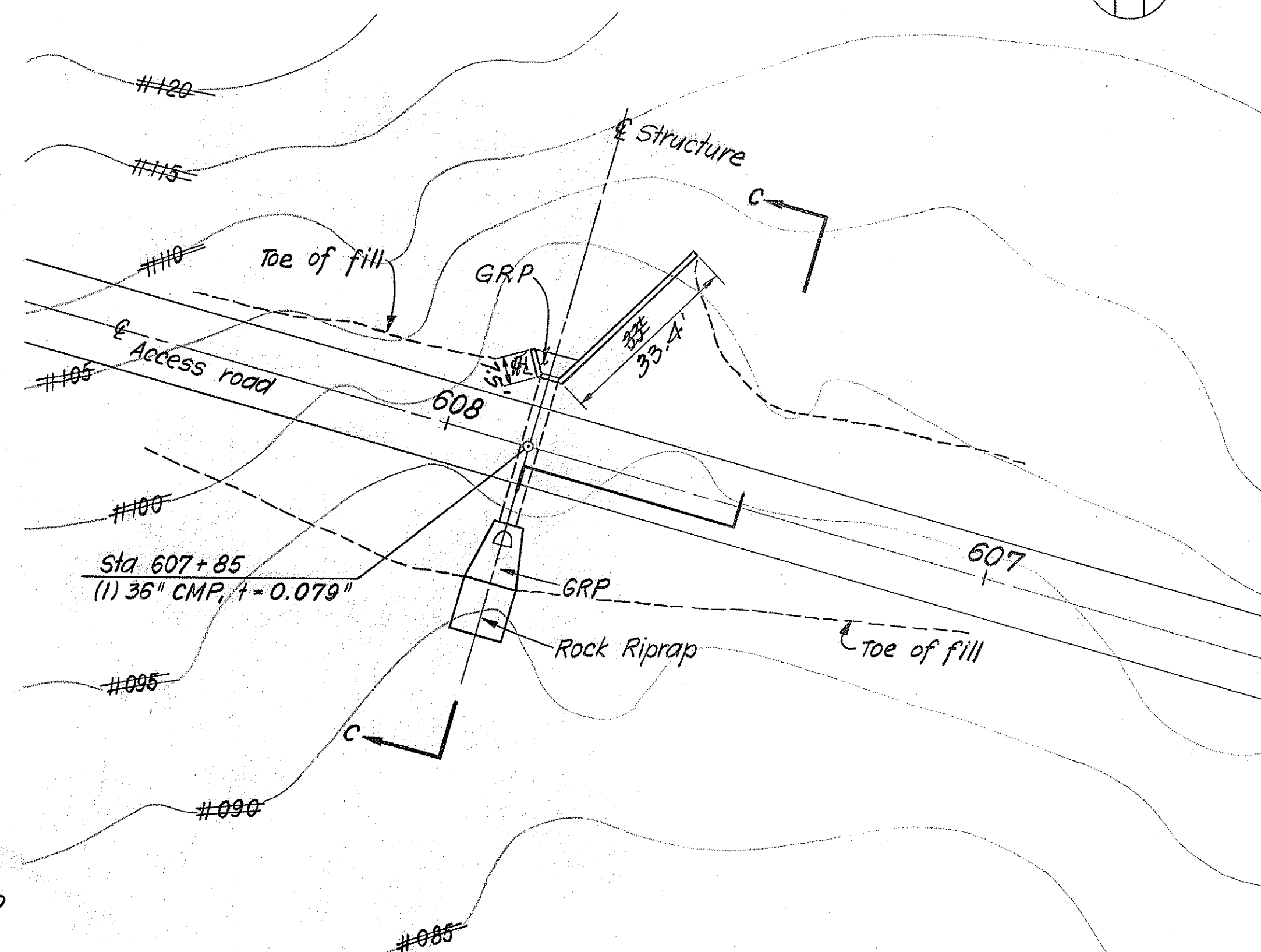
NOTE:
DELETE ALL CONTOUR LINES
SHOWN ON PLAN VIEW.



SECTION B
SCALE: 1" = 10'
NOT TO SCALE



SECTION C
SCALE: 1" = 10'
NOT TO SCALE

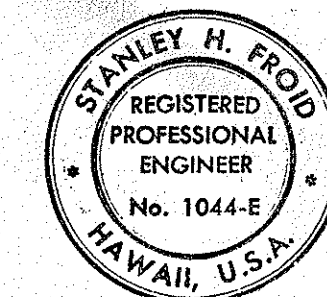


PLAN
SCALE: 1" = 20'
NOT TO SCALE
STRUCTURE NO 21 STA 607+85

SECTION A
SCALE: 1" = 10'
NOT TO SCALE

QUANTITIES

	NO. 19	NO. 20	NO. 21
24" Pipe (Lin Ft)	~	46' ±	~
36" Pipe (Lin Ft)	~	~	32' ±
42" Pipe (Lin Ft)	28' ±	~	~
Structure Excavation (Cu Yd)	47' ±	38' ±	47' ±
Ditch Excavation (Cu Yd)	5	~	~
CRM (Cu Yd)	7' ±	5' ±	13' ±
GRP (Cu Yd)	6' ±	6' ±	6' ±
Rock Riprap (Cu Yd)	7' ±	5' ±	6' ±



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Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE STRUCTURE DETAILS

MAUNA KEA OBSERVATORY ACCESS ROAD

PROJ. NO. BMD 66 - 343

SCALE: AS NOTED

DATE: SEPT 1973

SHEET NO. 8 OF 8 SHEETS C 408