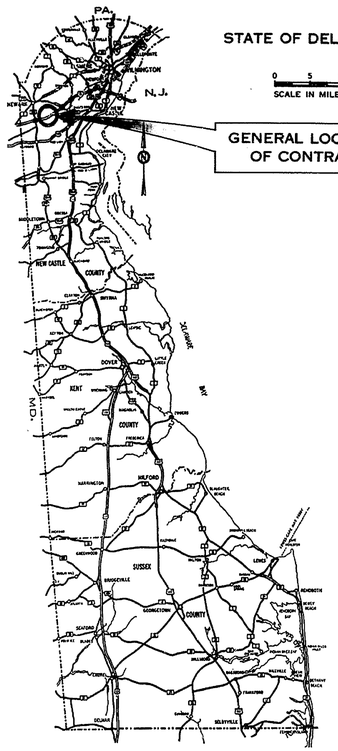
6-2



DESIGN DESIGNATION

FEDERAL CLASS	FAU-85	
A.D.T. (1975)	4,900	
~~D.H.V.~~ (2000)	9,545 (NW 819/T-802)	
DESIGN SPEED	50	M.P.H.
MIN. STOPPING SIGHT DISTANCE	350+	FT.
MAX. S.E.	0.0375	FT./FT.
MAX. DEGREE CURVE	6° 38' 27"	
MAX. % GRADE	4.8859 %	

THE STATE OF DELAWARE

"AS BUILT PLAN IN RED"
10/21/85
R.E.G.

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
SPECIFICATIONS AND
CONSTRUCTION PLAN FOR:

CONTRACT NUMBER 78-021-16

FEDERAL AID PROJECT NUMBER M-1085(1)

BEGIN PROJECT: STATION NO. 0+00.00 **END:** STATION NO. 24+30.26

LENGTH: 2,430.26 FEET = 0.4603 MILES
LENGTH: 740.75 METERS = 0.7407 KILOMETERS

CONTRACT	COUNTY	STATE	F.H.W.A. REG. NO.	FEDERAL AID PROJECT NUMBER	FISCAL YEAR	SHEET NUMBER	TOTAL SHEETS
78-021-16	N. C.	DEL.	3	M-1085(1)		1	54

CHAPMAN ROAD - PHASE I

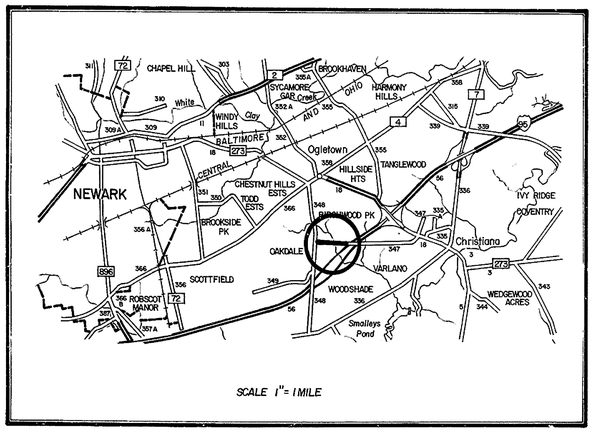
SURVEY BOOKS
L. L.

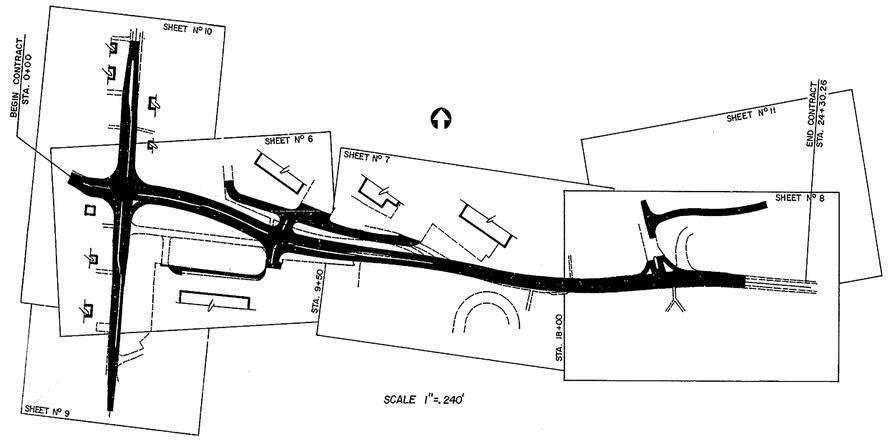
INDEX OF SHEETS

1	TITLE SHEET
2-3	TYPICAL SECTION SHEETS
4-5	QUANTITY SHEET
6-27	PLANS & PROFILE SHEETS
28-33	SIGNING & STRIPING SHEETS
34-54	STANDARD SHEETS- C-1, C-2, C-5, D-1, D-2, D-4, D-6, D-8, D-9, D-13, D-14, D-16, D-19, M-4, M-5, S-1, T-1, T-2, T-3, T-4, T-5

UTILITIES

DELAWARE POWER AND LIGHT	UG DP&L
DIAMOND STATE TELEPHONE	UG DST
DELMARVA POWER (GAS)	DPG
WILMINGTON SUBURBAN WATER	SW
NEW CASTLE CO. DEPT. OF PUBLIC WORKS	SS
EASTERN SHORE NATURAL GAS CO.	ESNG





KEY PLAN

SCALES		
TITLE SHEET	1" = 240 FEET	73.1529 METERS
CONSTRUCTION	1" = 30 FEET	9.1441 METERS
VERTICAL PROFILE	1" = 10 FEET	3.0480 METERS

DIVISION OF HIGHWAYS

RECOMMENDED
Dennis Ho
PROJECT ENGINEER
RECOMMENDED 6/22/ 1982
DENNIS HO REGISTERED NO. 5581 DELAWARE PROFESSIONAL ENGINEER
SEAL

RECOMMENDED
William S. Scarborough
ROAD DESIGN ENGINEER
RECOMMENDED 6/22 1982
WILLIAM S. SCARBOROUGH REGISTERED NO. 3220 DELAWARE PROFESSIONAL ENGINEER
SEAL

RECOMMENDED
Gary B. Homewood
DEPUTY DIRECTOR OF HIGHWAYS
RECOMMENDED 6/22 1982
GARY B. HOMEWOOD REGISTERED NO. 2662 DELAWARE PROFESSIONAL ENGINEER
SEAL

APPROVED
R D Bewick
DIRECTOR OF HIGHWAYS
APPROVED 6/23 1982
ROBERT D. BEWICK JR. REGISTERED No. 1565 DELAWARE PROFESSIONAL ENGINEER
SEAL

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED _____ 19__

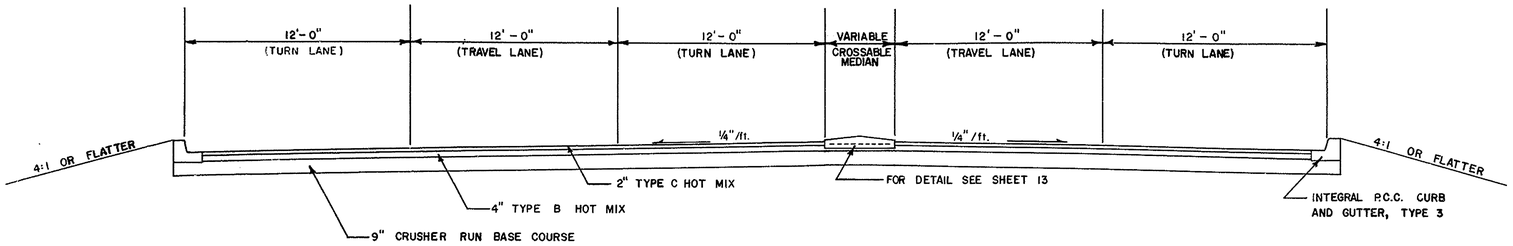
DIVISION ADMINISTRATOR

COUNTY	CONTRACT	P.R.A. REG. NO.	STATE	FED. AND PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-16	3	DEL.		2	54

CHAPMAN ROAD - PHASE I

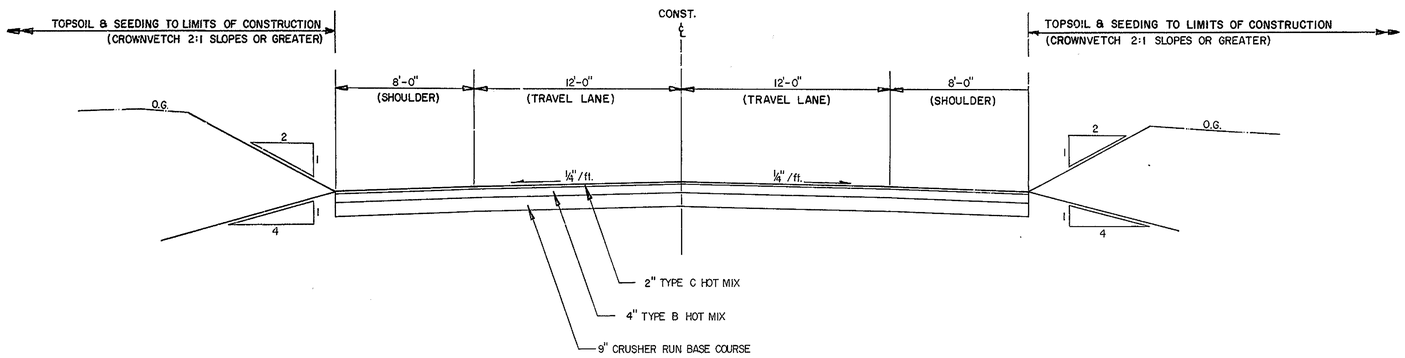
PREL. TRACING [illegible] DESIGN _____ CHKD. _____

REVISIONS



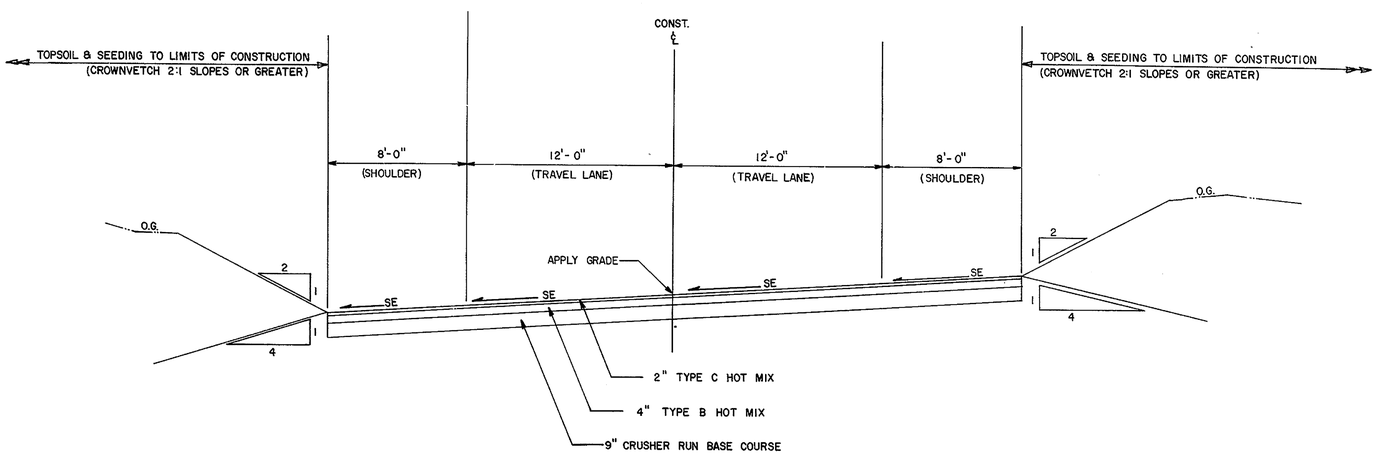
TYPICAL SECTION

SCALE: 1/4" = 1'-0"
STA. A0+00± TO STA. 14+00±
STA. B10+00± TO STA. B16+00±



TYPICAL SECTION

SCALE: 1/4" = 1'-0"
STA. 14+00± TO STA. 24+30.26



TYPICAL SUPERELEVATED SECTION

SCALE: 1/4" = 1'-0"

GENERAL NOTES

1 THIS CONTRACT TO BE BUILT UNDER DELAWARE DEPARTMENT OF HIGHWAYS AND TRANSPORTATION STANDARD SPECIFICATIONS DATED JANUARY 1, 1974; SPECIAL PROVISIONS AND THESE PLANS.

2 CONNECTING INTO EXISTING DRAINAGE FACILITIES TO BE INCIDENTAL TO THE UNIT PRICE BID FOR THAT PARTICULAR SIZE PIPE.

3 THE CONTRACTOR SHALL REMOVE AND RESET ALL MAIL BOXES TO MAINTAIN MAIL SERVICE; REMOVE, RESET AND RECONNECT ALL HOUSE LAMPS AND LAMP POSTS AS DIRECTED BY THE ENGINEER. THESE ITEMS ARE NOT TO BE LEFT LYING ON THE GROUND AT THE END OF ANY WORKING DAY, BUT SHALL BE STORED IN AN ACCEPTABLE MANNER. THE COST THEREOF TO BE INCIDENTAL TO THE UNIT PRICE BID FOR SECTION 201- CLEARING AND GRUBBING.

4 EXISTING AND PROPOSED DRAINAGE PIPES TO BE CLEARED OF ALL OBSTRUCTIONS AND FLUSHED AS DIRECTED BY THE ENGINEER. THE COST SHALL BE INCIDENTAL TO SECTION 202- EXCAVATION AND EMBANKMENT.

5 ALL AREAS DISTURBED BY CONSTRUCTION TO BE TOPSOILED AND SEEDED AS DIRECTED BY THE ENGINEER.

6 THE CONTRACTOR, PRIOR TO LAYING A RUN OF DRAINAGE PIPE, SHALL EXCAVATE WITHIN THE PROPOSED ALIGNMENT AT POINTS OF POSSIBLE CONFLICT TO THE DEPTH OF THE PROPOSED STORM SEWER MAIN TO DETERMINE IF A CONFLICT IS INEVITABLE. IF THE ABOVE TEST HOLES INDICATE A CHANGE IN THE ALIGNMENT OF THE PIPE IS REQUIRED, THE EXCAVATION AND THE BACKFILL OF THE TEST HOLES SHALL BE MEASURED AND PAID FOR IN ACCORDANCE TO SECT. 208- EXCAVATION AND BACKFILL FOR PIPE TRENCHES, BUT ONLY TO THE ACTUAL DEPTH EXCAVATED. IF A CONFLICT IS IMMINENT THE ENGINEER SHALL DETERMINE A NEW INVERT FOR THE PIPE IF POSSIBLE.

7 LOCATION OF UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" TWO CONSECUTIVE WORKING DAYS PRIOR TO ANY EXCAVATION SO THAT ALL AFFECTED UTILITIES MAY RESPOND AND DETERMINE THE EXACT LOCATION OF THEIR EXISTING FACILITIES ON THE JOB SITE.

8 TRASH AND RUBBISH REMOVAL SHALL BE INCIDENTAL TO SECT. 201- CLEAR- AND GRUBBING. NO SEPARATE PAYMENT IS TO BE MADE.

9 SOCCER GOAL, SOCCER FIELD, FOOTBALL FIELD ON HIGH SCHOOL PROPERTY SHALL NOT BE DISTURBED. (STA. 11+00± TO STA. 17+00±)

10 ALL EXPOSED CURB ENDS SHALL BE TAPERED FROM NORMAL TO DEPRESSED CURB FOR A MINIMUM LENGTH OF FIVE (5) FEET.

11 ALL PIPES NOT CONNECTED INTO CATCH BASINS OR MANHOLES ARE TO BE BEVELED ON EXPOSED ENDS. THE COST SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR THAT PARTICULAR SIZE PIPE. PIPES TO BE SHOP CUT AND GALVANIZED BEFORE PLACEMENT.

12 THE CONTRACTOR SHALL MAINTAIN AND BE RESPONSIBLE FOR ALL STREET SIGNS AND TRAFFIC CONTROL DEVICES AND SHALL REPLACE ANY SIGNS REMOVED OR DAMAGED DURING CONSTRUCTION.

13 ALL EXISTING CURBS, CURB AND GUTTER, PIPES, CATCH BASINS, MANHOLES, FENCES, STEPS, GUTTERS, SIDEWALKS, HOT MIX PAVEMENT, ETC., RENDERED OBSOLETE BY THESE IMPROVEMENTS TO BE REMOVED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE COST TO BE INCIDENTAL TO THE UNIT PRICE BID FOR SECTION 202- EXCAVATION AND EMBANKMENT.

14 THE CONTRACTOR WILL PROVIDE AND INSTALL 4" PLASTIC SLEEVES IN PROPOSED CONCRETE SIDEWALK, ISLAND, OR MEDIAN AREAS FOR FUTURE TRAFFIC SIGN POST INSTALLATION AS DIRECTED BY THE ENGINEER. THE COST WILL BE INCIDENTAL TO THE UNIT PRICE BID FOR SECTION 202- EXCAVATION AND EMBANKMENT.

15 TAPER ALL P.C.C. CROSSABLE MEDIAN NOSES FROM A HEIGHT OF THREE (3) INCHES TO ZERO (0) INCHES WITHIN A DISTANCE OF FIVE (5) FEET.

16 ALL CHAIN LINK FENCE, GATES, & ACCESSORIES REMOVED TO BE STORED IN AN ACCEPTABLE MANNER AND IN A LOCATION AS DESIGNATED BY THE TURNPIKE ENGINEER.

17 THE CONTRACTOR MAY USE METAL ROUND PIPE AS AN OPTION TO METAL ARCH PIPE WHERE CONDITIONS PERMIT AND AS DIRECTED BY THE ENGINEER.

ARCH		ROUND
17 x 13	——	15
21 x 15	——	18
24 x 18	——	21
28 x 20	——	24
42 x 29	——	36

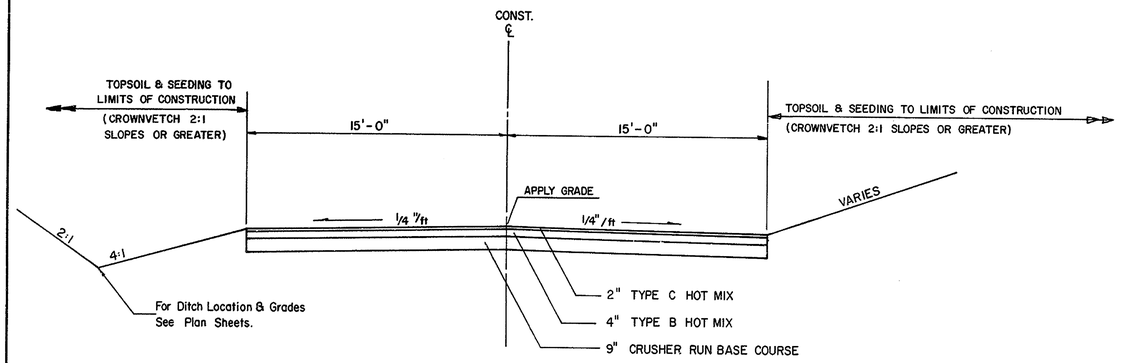
18 A PROPOSAL QUANTITY OF 4" AND 6" P.V.C. PIPES IS INCLUDED IN THE SUMMARY OF QUANTITIES FOR THE REPLACEMENT OF SPOUTING OUTLETS PRESENTLY USING THE ROADWAY FACILITIES AS OUTFALLS. THE REPLACEMENT OF THESE OUTLETS WILL BE AT LOCATIONS DESIGNATED BY THE ENGINEER AND WILL BE OUTLETTED THROUGH THE CURB OR INTO PROPOSED CATCH BASINS WHEREVER POSSIBLE.

COUNTY	CONTRACT	P. B. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-16	3	DEL	M-1085(1)	3	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

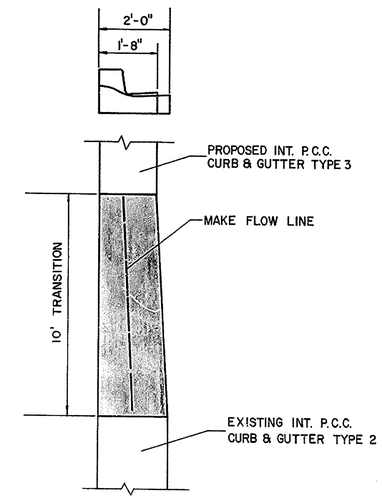
REVISIONS



TYPICAL SECTION

M.H.& I LINES

Scale : 1/4" = 1'-0"



DETAIL FOR CURB TRANSITION

Not to Scale

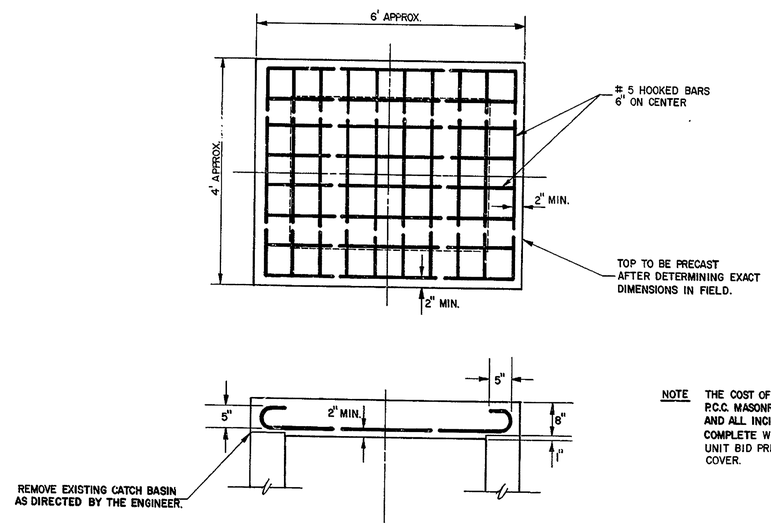
GENERAL LEGEND

EXISTING DETAILS

- Edge Of Flexible Pavement
- Edge Of Rigid Pavement
- Concrete Curb
- Guardrail
- Fence
- Manhole
- Catch Basin
- Headwall
- Gutter
- Utility Pole
- Exist. Right Of Way
- Wood Line
- Mail Box
- Water Valve
- Gas Valve
- Gas Meter
- Survey Centerline
- Reinforced Concrete Pipe
- Junction Box
- Ditch
- Concrete Monument
- Iron Pipe
- Soil Boring Location
- Tree
- Exist. Drainage Easement
- Property Line

PROPOSED CONSTRUCTION

- Construction Centerline
- Guard Rail
- Manhole
- Catch Basin
- Convert Existing Catch Basin To Junction Box
- Proposed Ditch Width, Grade, And Offset
- See Pipe Schedule
- See Catch Basin Schedule
- See Junction Box Schedule
- See Manhole Schedule
- Permanent Easement
- Proposed Right Of Way
- Limit Of Construction
- Temporary Construction Easement
- Perforated Pipe Underdrain
- Chain Link Fence
- Adjust
- Adjust (By Others)
- Remove
- Relocate
- 2" Type C Hot Mix, 4" Type B Hot Mix, 9" Crusher Run Base Course
- 2" Type C Hot Mix, 6" Crusher Run Base Course (Where Needed)
- Taper Hot Mix (2" Avg.) Or Butt Joint
- 3" Type C Hot Mix Resurfacing On Existing Pavement
- P.C.C. Crossable Median (See Detail) Sht. № 13
- 4" P.C.C. Sidewalk, 6" At Drives; 4" Crusher Run Base, 6" At Drives
- Riprap (Plain)
- P.C.C. Curb Type I
- P.C.C. Parkway Curb Type 2
- Integral P.C.C. Curb & Gutter Type 3



NOTE THE COST OF REMOVING CATCH BASIN, P.C.C. MASONRY, REINFORCEMENT STEEL AND ALL INCIDENTALS NECESSARY TO COMPLETE WILL BE INCIDENTAL TO UNIT BID PRICE FOR CEMENT CONCRETE COVER.

CEMENT CONCRETE COVER DETAIL

FOR CONVERTING EXISTING CATCH BASIN TO JUNCTION BOX

NOT TO SCALE

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL	M-1085(1)	4	54

CHAPMAN ROAD- PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

SECTION Nº	201	202	205	206	208	209			303	S.P.	401			736	617						
SECTION NAME	Clearing And Grubbing	Excavation And Embankment	Rock Excavation For Roadway	Rock Excavation For Structures And Trenches	Excavation And Backfill For Pipe Trenches	Borrow			Crusher Run Base Course	Furnishing Borrow Type C for Pipe And Utility Backfill (Adj. Fact. Incl.)	Hot Mix, Hot Laid Bituminous Concrete Pavement			REMOVAL OF EXISTING P.C.C. PAVEMENT, SIDEWALK, CURB, ETC.	Galvanized Corrugated Steel Pipe						
						Type G	Type F				B	C			16 GA. 17"x13"	16 GA. 21"x15"	14 GA. 24"x18"	14 GA. 28"x20"	14 GA. 42"x29"	14 GA. 57"x38"	
UNIT	L.S.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.			S.Y./IN	C.Y.	TON			S.Y.	L.F.						
Sheet 6 - Sta. 0+00 To 9+50		3,292.95			670.21				110,030	836.57	2,641.8	1,325.7		105.0	555	82	—	—	—	—	—
Sheet 7 - Sta. 9+50 To 18+00		1,612.84			756.70				55,015	926.20	1,331.3	660.5		—	70	—	—	—	—	80	—
Sheet 8 - Sta. 18+00 To C22+20.75		717.55			—				34,480	—	859.0	664.0		—	—	—	—	—	—	—	—
Sheet 9 - Sta. B5+00 To B10+00		1,272.65			76.90				26,200	99.80	652.7	336.3		—	116	—	—	—	—	—	—
Sheet 10- Sta. B14+00 To B23+00		1,036.60			927.52				28,220	1,085.60	703.0	360.0		—	255	—	—	—	—	—	—
Sheet 11- Sta. M0+00 To M5+01.23		1,027.41			348.67				15,555	431.83	387.2	243.5		—	—	—	—	—	55	—	—
TOTAL		8,960.00	5	5	2,780.00	100	100		269,500	3,380.00	6,575.0	3,590.0		105.0	996	82	—	—	55	80	—
PROPOSAL	L.S.	8,960	5	5	2,780.0	100	100		269,500	3,380	6,575	3,590		105	996	82	—	—	55	80	—

FOR INFORMATION ONLY

Available Material (+Adj Fact)	Embankment (+Adj Fact)	Borrow Type F (+Adj Fact)	
C.Y.	C.Y.	C.Y.	
8,511.1	8,359.13	100.0	

Topsoil Available =

SECTION Nº	619	705	706	707	708		711								712		713		720		721	723	S.P.	724	
SECTION NAME	STRUCTURAL PLATE PIPE 10'-8" x 6'-11" 6x2 SECTIONAL PLATE, #10 GA. (MIN.)	P.C.C. Curb	P.C.C. Parkway Curb	Integral P.C.C. Curb And Gutter	P.C.C. Sidewalk		Catch Basins								Manholes		Adjusting And Repairing Existing Catch Basins And Manholes		Chain Link Fence	Terminal Posts For Chain Link Fence	Vehicular Gates	Topsoiling	RESET CHAIN LINK FENCE	Permanent Roadside Seeding And Mulching	CROWNVETCH SEEDING AND MULCHING
		TYPE 1	TYPE 2	TYPE 3	4"	6"	PMBD-1	PMBD-2	Type-J	J Modified	Double J	Lawn	M.S.		Standard		C.B.	M.H.	6'	6'	6'	4"			
UNIT	L.F.	L.F.	L.F.	L.F.	S.F.		EACH								EACH		EACH		L.F.	EACH	EACH	S.Y.	L.F.	S.Y.	S.Y.
Sheet 6 - Sta. 0+00 To 9+50	—	685	100	2,280	9,464	120	3	2	3	—	1	2	1		—		1	2	—	—	—	1,523.9	—	5,779.4	—
Sheet 7 - Sta. 9+50 To 18+00	214	—	—	900	—	—	5	—	—	—	—	—	—		1		—	3	—	—	—	316.7	300	1,833.3	555.5
Sheet 8 - Sta. 18+00 To C22+20.75	—	—	80	—	—	—	—	—	—	—	—	—	—		—		1	—	35	2	—	1,334.4	—	3,433.3	—
Sheet 9 - Sta. B5+00 To B10+00	—	—	—	—	81	—	—	—	—	—	—	—	—		—		—	1	—	—	—	—	—	1,422.2	—
Sheet 10- Sta. B14+00 To B23+00	—	—	—	420	—	—	5	1	1	1	—	—	—		—		—	3	—	—	—	—	—	1,611.1	169.5
Sheet 11- Sta. M0+00 To M5+01.23	—	—	—	—	—	—	—	—	—	—	—	—	—		—		—	—	—	2	1	—	—	1,780.7	—
TOTAL	214	685	180	3,600	9,545	120	13	3	4	1	1	2	1		1		2	9	35	4	1	3,175.0	300	15,860.0	725.0
PROPOSAL	214	685	180	3,600	9,545	120	13	3	4	1	1	2	1		1		2	9	35	4	1	3,175	300	15,860	725

SECTION Nº	733	734	735	737	738	739	S.P.	S.P.	S.P.	732	S.P.	609	S.P.	S.P.		S.P.	S.P.	S.P.	S.P.
SECTION NAME	Riprap (Plain)	Lateral Or Longitudinal Ditching	Calcium Chloride For Dust Control	Perforated Pipe Underdrain	Flagman	Field Office	TRAILERS (1)	Maintenance Of Traffic	Initial Expense	SLOPED CONCRETE RIPRAP	P.C.C. Crossable Median	COARSE AGGREGATE FOR FOUNDATION STABILIZATION	SAWING OF JOINTS (HOT MIX)	P.V.C. PIPE		Junction Box		Adjust Sanitary Sewer Laterals	Converting Existing Catch Basin To Junction Box	BUTT JOINT
														4"	6"	TYPE 2	TYPE A			
UNIT	S.Y.	L.F.	TON	L.F.	HOUR		HOUR	L.S.	L.S.	C.Y.	S.F.	TON	L.F.	L.F.	L.F.	EACH	EACH	EACH	EACH	S.Y.
Sheet 6 - Sta. 0+00 To 9+50	—	200		—						—	4,720	—	363			1	1		—	316.7
Sheet 7 - Sta. 9+50 To 18+00	—	—		570						77	2,640	—	80			—	—		1	83.3
Sheet 8 - Sta. 18+00 To C22+20.75	167.2	240		—						—	1,890	542	137			—	—		—	88.9
Sheet 9 - Sta. B5+00 To B10+00	—	440		—						—	2,150	—	60			—	—		—	95.6
Sheet 10- Sta. B14+00 To B23+00	22.8	800		—						—	2,400	—	40			—	—		—	111.1
Sheet 11- Sta. M0+00 To M5+01.23	—	780		—						—	—	—	75			—	—		—	99.4
TOTAL	190.0	2,460	10	570	5,000		L.S.	1,000	L.S.	L.S.	77	13,800	542	755	20	20	1	1	10	1	795.0
PROPOSAL	190	2,460	10	570	5,000		L.S.	1,000	L.S.	L.S	77	13,800	542	755	20	20	1	1	10	1	795

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL.	M-1085(1)	5	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

SECTION Nº	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.
SECTION NAME	4"x 120 Yds. Permanent Loneline 5730 White	4"x 120 Yds. Permanent Centerline 5731 Yellow	6"x 120 Yds. Permanent Striping 5730 White (Stop Bar)	*Painting Of White 4"Line (Less Than 1000 L.F. Per Unit Of Work) *(Inc. Edge Line)	Painting Of Yellow 4"Line (Less Than 1000 L.F. Per Unit Of Work)	1 1/2" Galvanized Conduit Under New Pavement Or In Sodded Trench	2 1/2" Galvanized Conduit Under New Pavement Or In Sodded Trench	3" Non-Metalic Conduit Under New Pavement Or In Sodded Trench	TEMPORARY PAVEMENT STRIPING (4")
UNIT	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.
Sheet 6 - Sta. 0+00 To 9+50									
Sheet 7 - Sta. 9+50 To 18+00									
Sheet 8 - Sta. 18+00 To C22+20.77									
Sheet 9 - Sta. B5+00 To B10+00									
Sheet 10- Sta. B14+00 To B14+00									
Sheet 11- Sta. M0+00 To M5+01.23									
TOTAL	3,045	3,890	300	7,855	5,360	310	1,328	139	2,000
PROPOSAL	3,045	3,890	300	7,855	5,360	310	1,328	139	2,000

SECTION Nº	S.P.	S.P.	S.P.		S.P.		S.P.			S.P.			725				402	S.P.
SECTION NAME	Conduit Junction Well	Pole Base	Small Cabinet Base		Warning Signs		Barricade Warning Lights			Barricades			Erosion Control Excelsior Blanket Net Or Jute Mesh	Erosion Control Excavation And Embankment	Erosion Control Seeding		Hot Mix Bituminous Concrete And/Or Asphalt Cold Patch (T.R.M.)	Crusher Run Base Course (T.R.M.)
	Type 1	Type 2			Temporary	Stationary	Type A	Type B	Type C	Temporary Type II	Temporary Type III				1			
UNIT	EACH	EACH	EACH		EACH		EA./DAY			EACH			S.Y.	C.Y.	Ac.		TON	TON
Sheet 6 - Sta. 0+00 To 9+50																		
Sheet 7 - Sta. 9+50 To 18+00																		
Sheet 8 - Sta. 18+00 To C22+20.75																		
Sheet 9 - Sta. B5+00 To B10+00																		
Sheet 10- Sta. B14+00 To B23+00																		
Sheet 11- Sta. M0+00 To M5+01.23																		
TOTAL	20	2	1		30	15	150	4,800	4,480	40	15		1,000	1,000	1		75	75
PROPOSAL	20	2	1		30	15	150	4,800	4,480	40	15		1,000	1,000	1		75	75

SECTION Nº	615			
SECTION NAME	Reinforced Concrete Pipe			
	15"	18"	21"	24"
UNIT	L.F.			
Sheet 6 - Sta. 0+00 To 9+50	115		108	98
Sheet 7 - Sta. 9+50 To 18+00	654	166		
Sheet 8 - Sta. 18+00 To C22+20.75				
Sheet 9 - Sta. B0+00 To B10+00				
Sheet 10 - Sta. B14+00 To B23+00				912
Sheet 11 - Sta. M0+00 To M5+01.23				
TOTAL	769	166	108	1010
PROPOSAL	770	166	108	1010

FOR PROFILE SEE SHEET № 12.	FOR GRADES & GEOMETRICS SEE SHEET № 15.	FOR DRAINAGE SCHEDULE SEE THIS SHEET.

COUNTY	CONTRACT	F.B.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	79-021-16	3	DEL	M-1085(1)	6	54

CHAPMAN ROAD - PHASE I

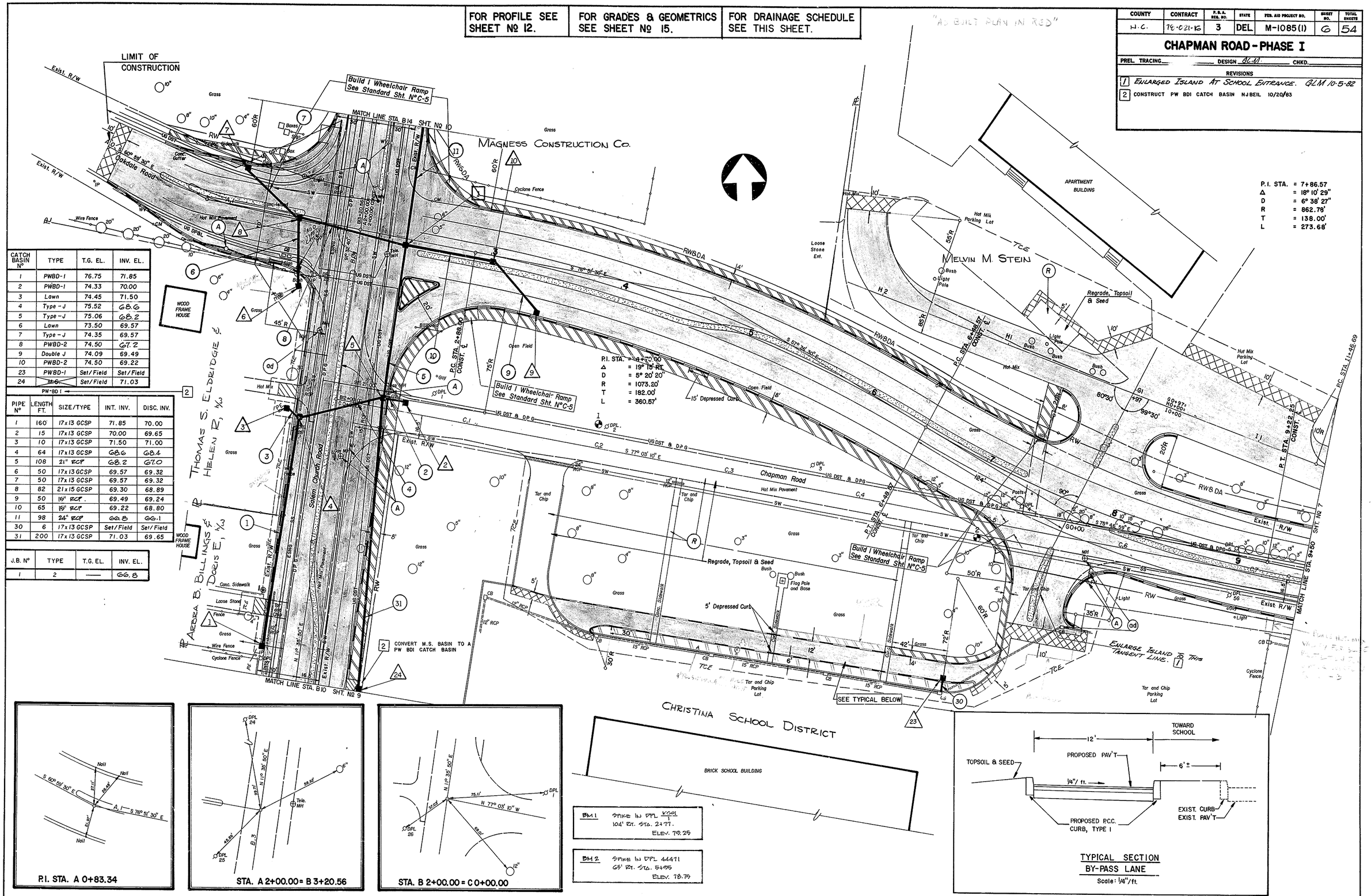
PREL. TRACING ____ DESIGN GLM CHKD. ____

REVISIONS

1 ENLARGED ISLAND AT SCHOOL ENTRANCE. GLM 10-5-82

2 CONSTRUCT PW BDI CATCH BASIN NJ BEIL 10/20/83

"AS BUILT PLAN IN RED"



CATCH BASIN N°	TYPE	T.G. EL.	INV. EL.
1	PWBD-1	76.75	71.85
2	PWBD-1	74.33	70.00
3	Lawn	74.45	71.50
4	Type-J	75.52	68.6
5	Type-J	75.06	68.2
6	Lawn	73.50	69.57
7	Type-J	74.35	69.57
8	PWBD-2	74.50	67.2
9	Double J	74.09	69.49
10	PWBD-2	74.50	69.22
23	PWBD-1	Set/Field	Set/Field
24	~~PW-BD 1~~ 2	Set/Field	71.03

PIPE N°	LENGTH FT.	SIZE/TYPE	INT. INV.	DISC. INV.
1	160'	17x13 GCSP	71.85	70.00
2	15	17x13 GCSP	70.00	69.65
3	10	17x13 GCSP	71.50	71.00
4	64	17x13 GCSP	68.6	68.4
5	108	21" RCP	68.2	67.0
6	50	17x13 GCSP	69.57	69.32
7	50	17x13 GCSP	69.57	69.32
8	82	21x15 GCSP	69.30	68.89
9	50	19" RCP	69.49	69.24
10	65	19" RCP	69.22	68.80
11	98	24" RCP	66.8	66.1
30	6	17x13 GCSP	Set/Field	Set/Field
31	200	17x13 GCSP	71.03	69.65

J.B. N°	TYPE	T.G. EL.	INV. EL.
1	2	——	66.8

P.I. STA. A 0+83.34

STA. A 2+00.00 = B 3+20.56

STA. B 2+00.00 = C 0+00.00

BM 1 SPIKE IN DPL K501
104' RT. STA. 2+77.
ELEV. 70.25

BM 2 SPIKE IN DPL 44471
65' RT. STA. 5+95
ELEV. 78.79

TYPICAL SECTION
BY-PASS LANE
Scale: 1/4"/ft.

CATCH BASIN Nº	TYPE	T.G. EL.	INV. EL.
18	PWBD-1	Set/Field	Set/Field
19	PWBD-1	72.29	67.00
20	PWBD-1	72.50	66.50
21	~~PWBD-1~~	69.30	64.30
22	PWBD-1	63.03	58.00

PIPE Nº	LENGTH FT.	SIZE/TYPE	INT. INV.	DISC. INV.
18	70	17 x 13 GCSP	Set/Field	Set/Field
19	60	15" RCP	67.00	66.50
20	198	15" RCP	66.50	64.32
21	198	15" RCP	64.30	58.02
22	198	15" RCP	58.00	50.02
23	166	18" RCP	50.00	42.50
28	80	57 x 38 GCSP	40.77	40.15

MH. Nº	TYPE	T.G. EL.	INV. EL.
1	Standard	55.25	50.00

FOR PROFILE SEE SHEET Nº 12.

FOR GRADES & GEOMETRICS SEE SHEET Nº 16.

FOR DRAINAGE SCHEDULE SEE THIS SHEET.

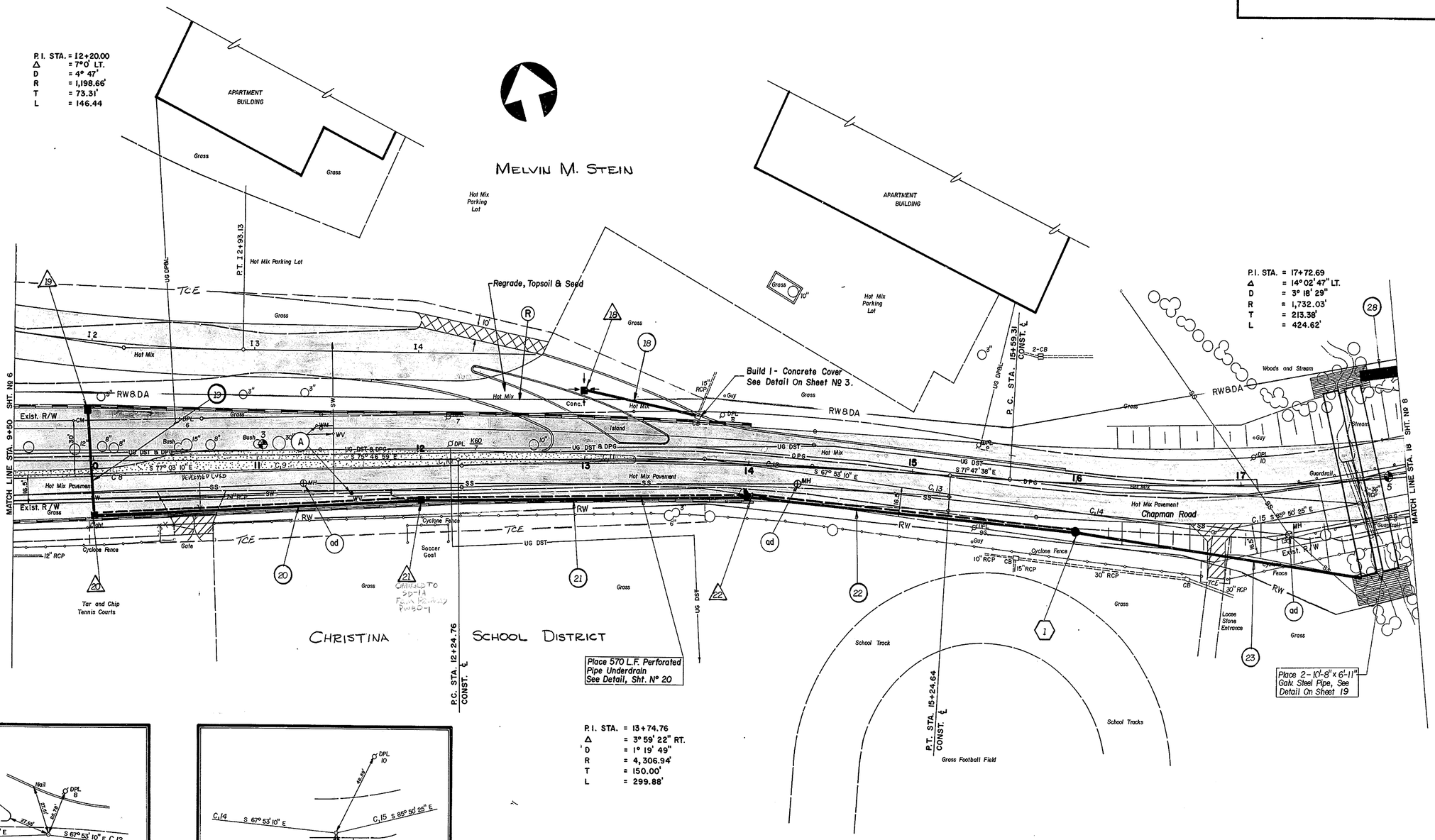
"AS BUILT PLAN IN RED"

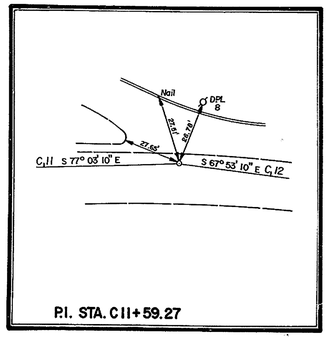
COUNTY	CONTRACT	P.R.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL		7	54

CHAPMAN ROAD - PHASE I

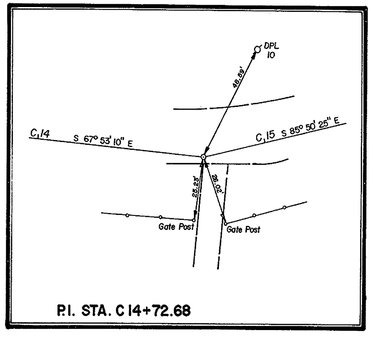
PREL. TRACING J. White DESIGN B.L.M. CHKD.

REVISIONS





P.I. STA. C11+59.27



P.I. STA. C14+72.68

BM3 SPIKE IN DPL K601 6 29' LT. STA. 10+53 ELEV. 75.05

BM4 CHISELED X IN S-W CORNER CONC. SIDEWALK, 87' LT. STA. 15+72. ELEV. 53.46

PIPE Nº	LENGTH FT.	SIZE/TYPE	INT. INV.	DISC. INV.
28	80	57x38 GCSP	40.77	40.15

FOR PROFILE SEE SHEET Nº 13.

FOR DRAINAGE SCHEDULE SEE THIS SHEET.

FOR GRADES & GEOMETRICS SEE SHEET Nº 17.

COUNTY	CONTRACT	F.B.A. RES. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL	M-1085(1)	8	54

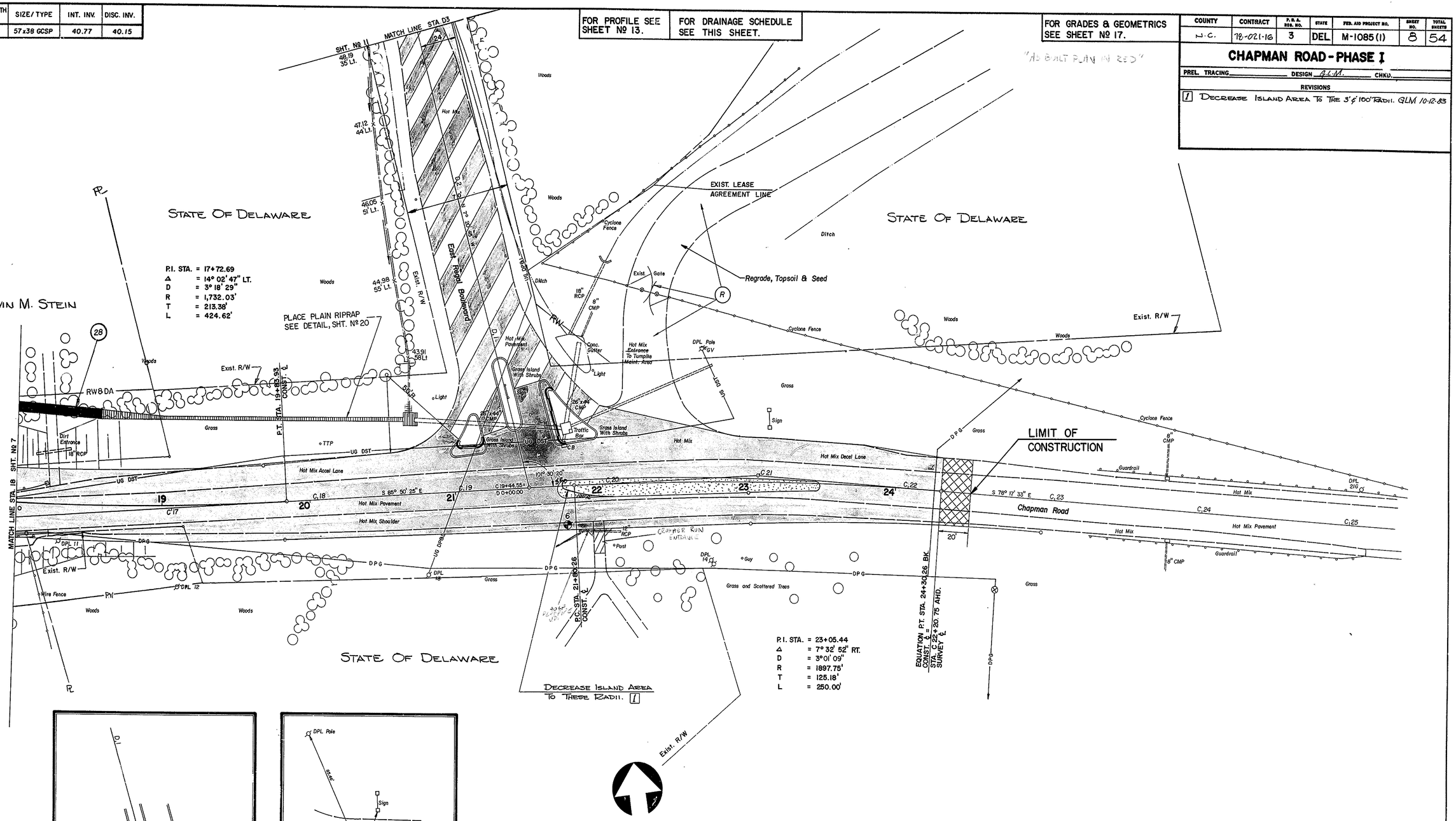
CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN G.L.M. CHKD. _____

REVISIONS

1 DECREASE ISLAND AREA TO THE 3'& 100' RADII. GLM 10-12-83

"AS BUILT PLAN IN RED"



PIPE Nº	LENGTH FT.	SIZE / TYPE	INT. INV.	DISC. INV.
26	66	17x13 GCSP	75.20	74.80
27	50	17x13 GCSP	76.30	75.40
40	58	17 X 13 GCSP	SET IN FIELD	SET IN FIELD
41	146	17X 13 GCSP	SET IN FIELD	SET IN FIELD
42	40	17 X 13 GCSP	SET INFIELD	SET IN FIELD

1

CATCH BASIN NO.	TYPE	T.G. EL.	INV. EL.
30	PW BDI	SET IN FIELD	SET IN FIELD

FOR PROFILE SEE SHEET Nº 14.	FOR GRADES & GEOMETRICS SEE SHEET Nº 18.	SEE THIS SHEET FOR DRAINAGE SCHEDULE

"AS BUILT PLAN IN RED"

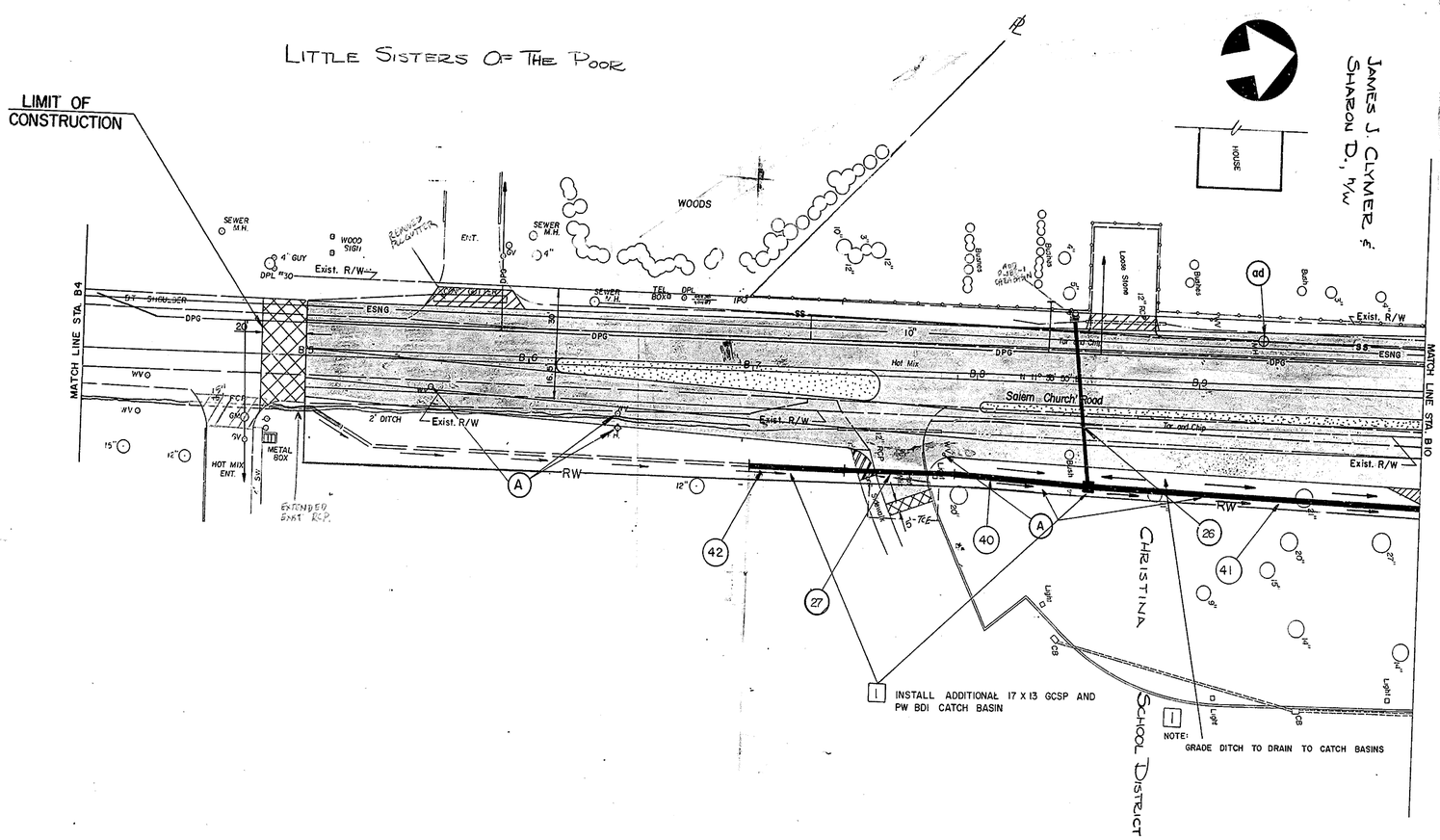
COUNTY	CONTRACT	F.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL.	M-1085(1)	9	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN GLM CHKD. _____

REVISIONS

1 INSTALL ADDITIONAL 17 X 13 GCSP AND PW BDI CATCH BASIN NJBEIL 10/20/83



CATCH BASIN Nº	TYPE	T.G. EL.	INV. EL.
11	J Mod.	73.40	66.10
12	PWBD-1	72.50	67.30
13	Type-J	73.17	66.50
14	PWBD-2	71.66	64.97
15	PWBD-1	69.18	63.09
16	PWBD-1	Set/Field	60.80
17	PWBD-1	Set/Field	57.01
25	PWBD-1	71.21	68.20

PIPE Nº	LENGTH FT.	SIZE/TYPE	INT. INV.	DISC. INV.
11	98	24" RCP	66.80	66.10
12	58	17 x 13 GCSP	67.30	66.70
13	62	17 x 13 GCSP	66.50	66.20
14	162	24" RCP	66.10	65.10
15	224	24" RCP	64.97	63.60
16	148	24" RCP	63.09	60.10
17	248	24" RCP	60.80	57.03
24	130	24" RCP	57.01	55.01
25	10	17 x 13 GCSP	Set/Field	Set/Field
32	125	17 x 13 GCSP	68.20	67.50

FOR PROFILE SEE SHEET Nº 14.

FOR GRADES & GEOMETRICS SEE SHEET Nº 18.

FOR DRAINAGE SCHEDULE SEE THIS SHEET.

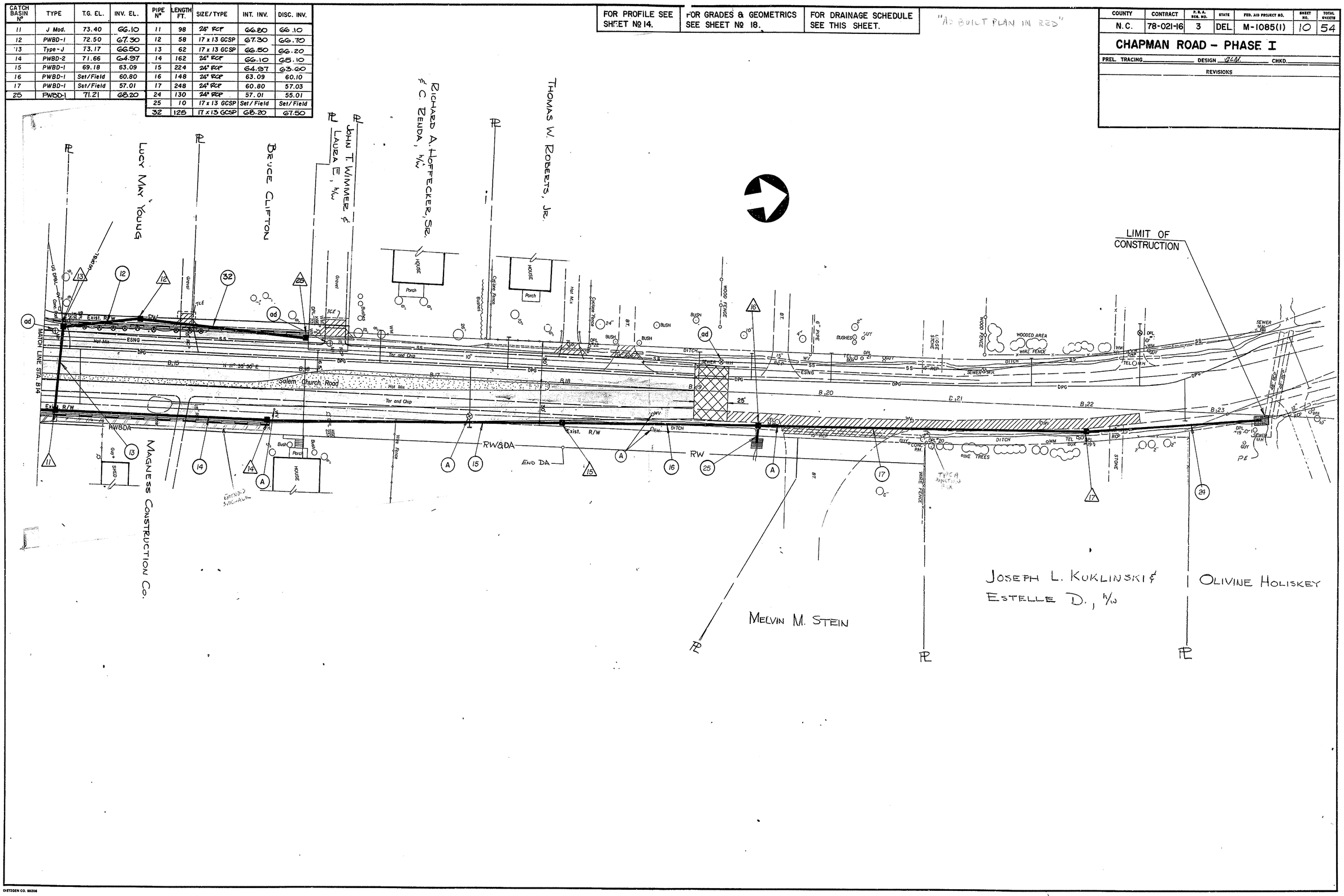
"AS BUILT PLAN IN RED"

COUNTY	CONTRACT	F.E.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL	M-1085(1)	10	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN GCM CHKD. _____

REVISIONS



PIPE Nº	LENGTH FT.	SIZE/TYPE	INT. INV.	DISC. INV.
29	55	42x29 GCSP	50.50	50.00

FOR PROFILE SEE SHEET Nº 13.	FOR TYPICAL SECTION SEE SHEET Nº 3.	FOR DRAINAGE SCHEDULE SEE THIS SHEET.

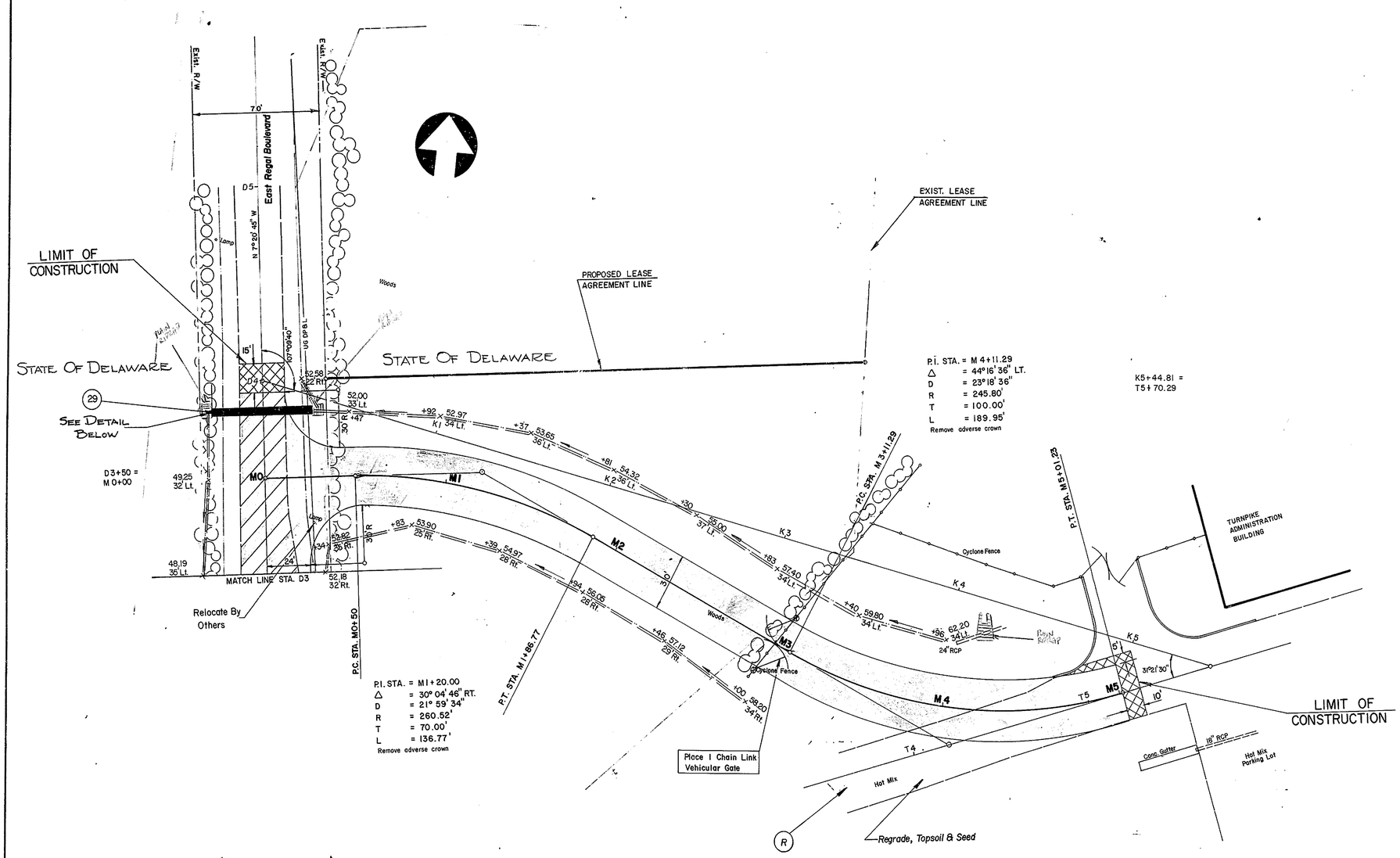
"AS BUILT PLAN IN RED"

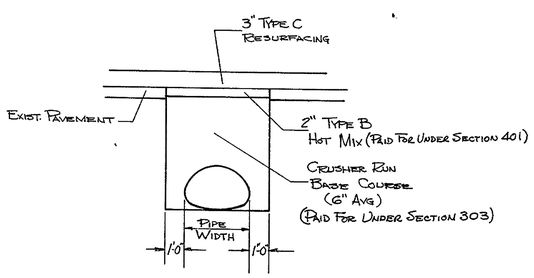
COUNTY	CONTRACT	P.B.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-16	3	DEL.	M-1085(1)	11	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN G.L.M. CHKD. _____

REVISIONS





PIPE TRENCH DETAIL

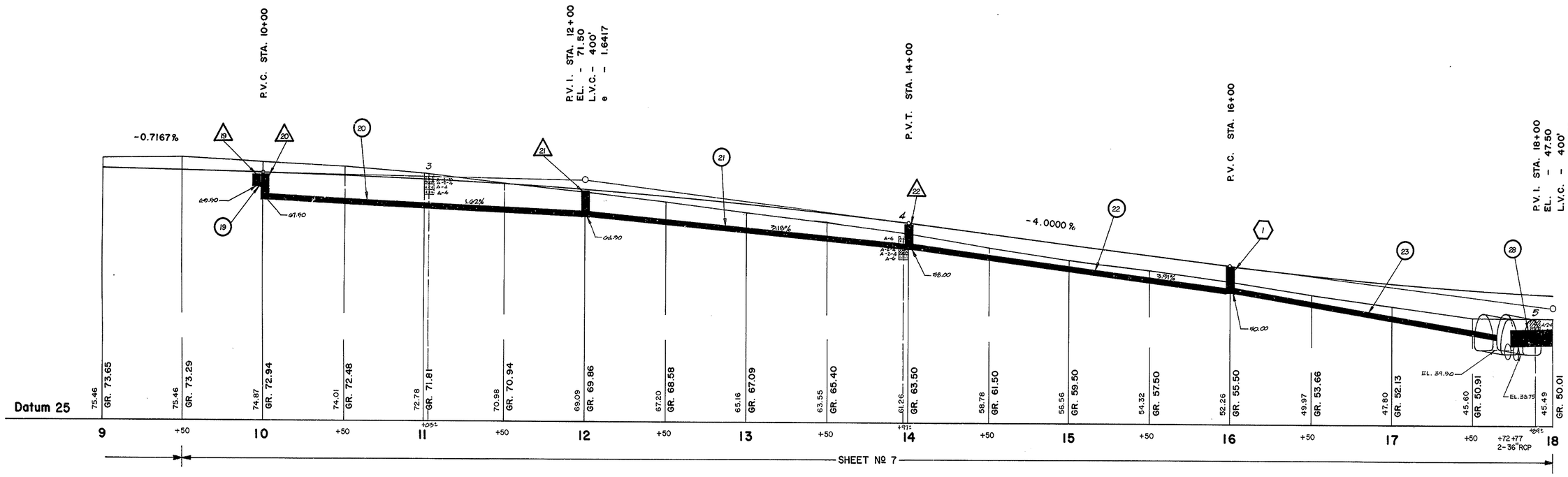
FOR DRAINAGE SCHEDULE
SEE SHEET № 9.

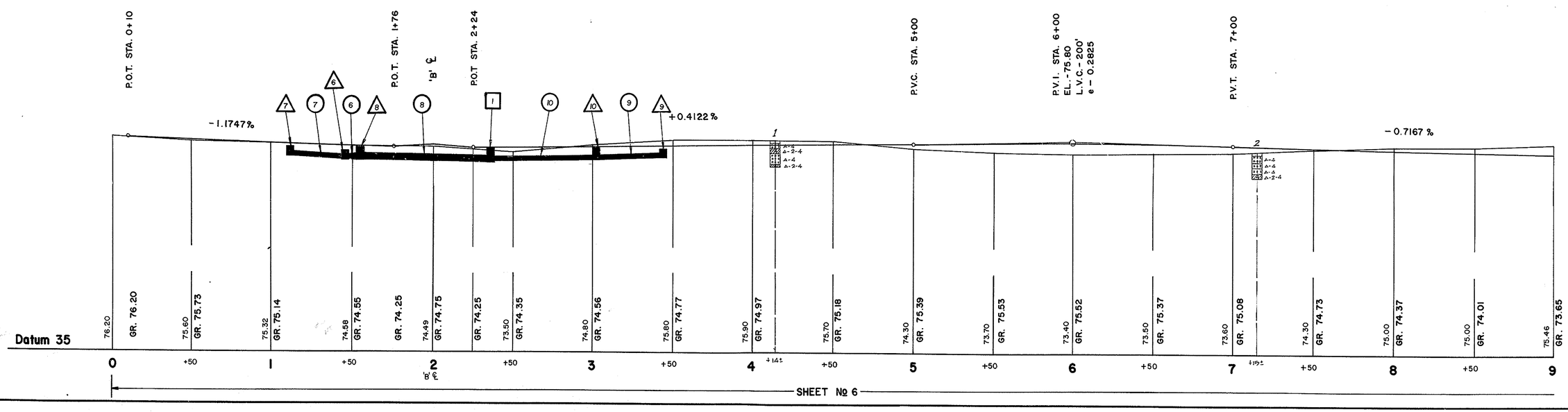
COUNTY	CONTRACT	F.E.D. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-16	3	DEL	M-1085 (1)	12	54

CHAPMAN ROAD - PHASE I

PREL. TRACING G.L.M. DESIGN _____ CHKD. _____

REVISIONS





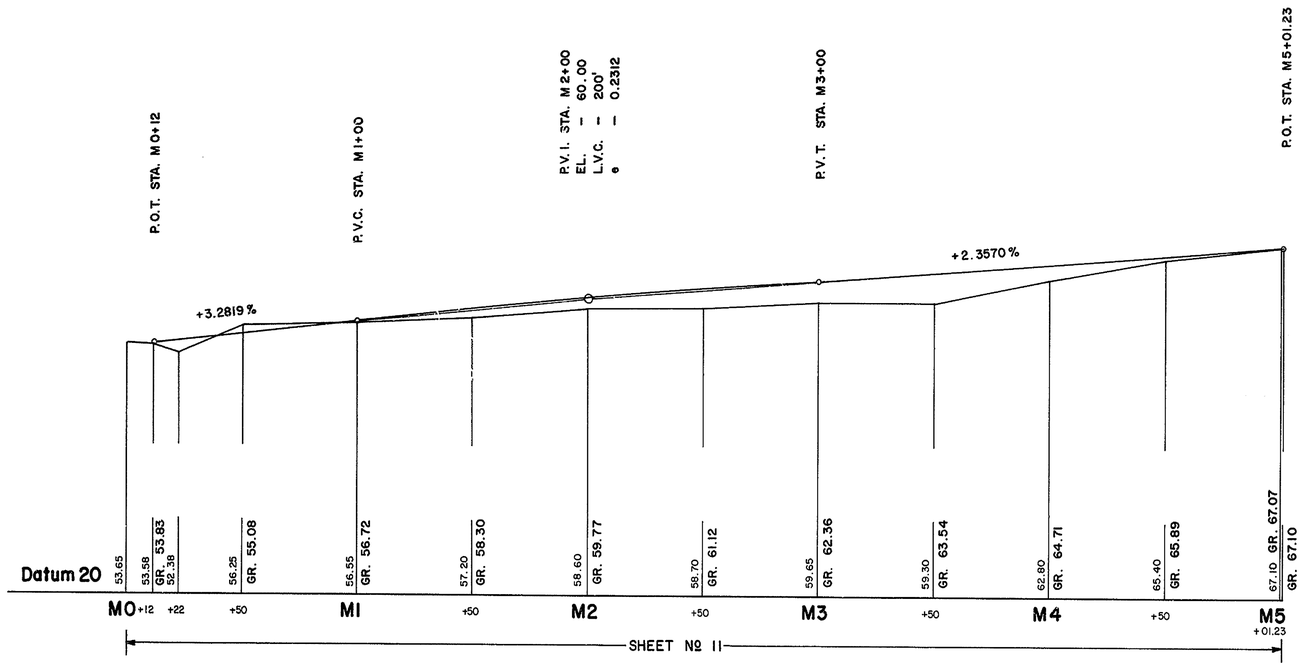
FOR DRAINAGE SCHEDULE
SEE SHEET № 9.

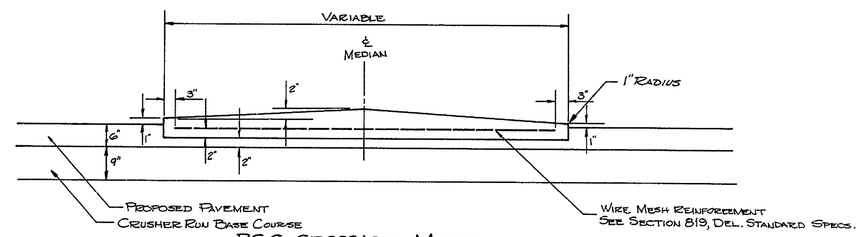
COUNTY	CONTRACT	P.E.&. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-16	3	DEL.	M-1085(1)	13	54

CHAPMAN ROAD - PHASE I

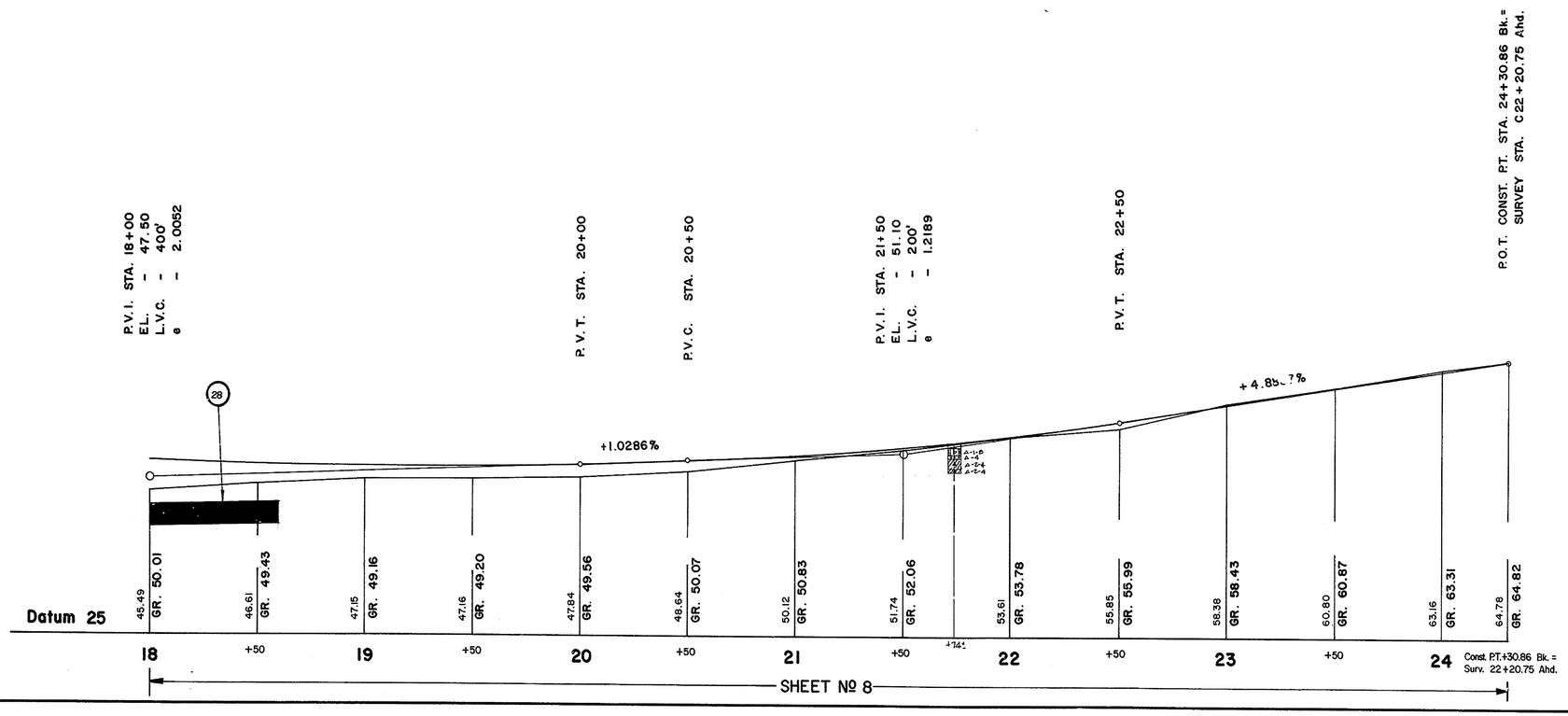
PREL. TRACING G.L.M. DESIGN _____ CHKD. _____

REVISIONS





P.C.C. CROSSABLE MEDIAN DETAIL



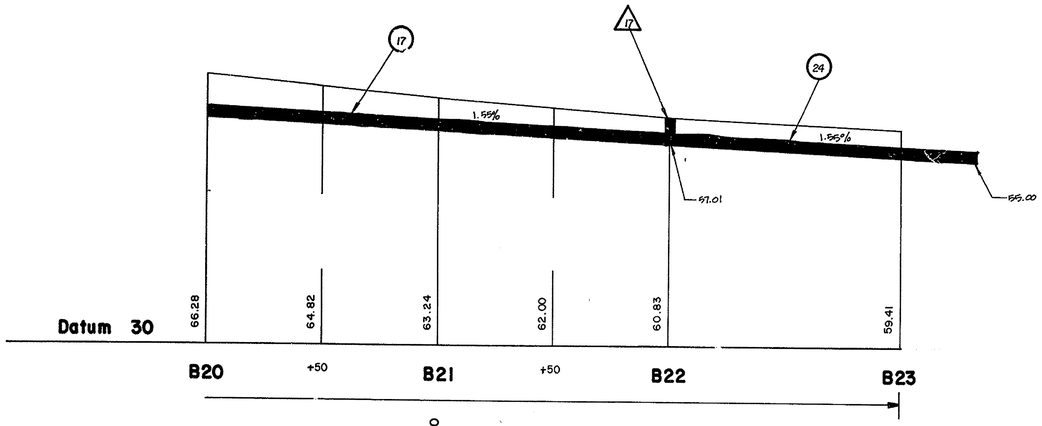
FOR DRAINAGE SCHEDULE
SEE SHEET № 9.

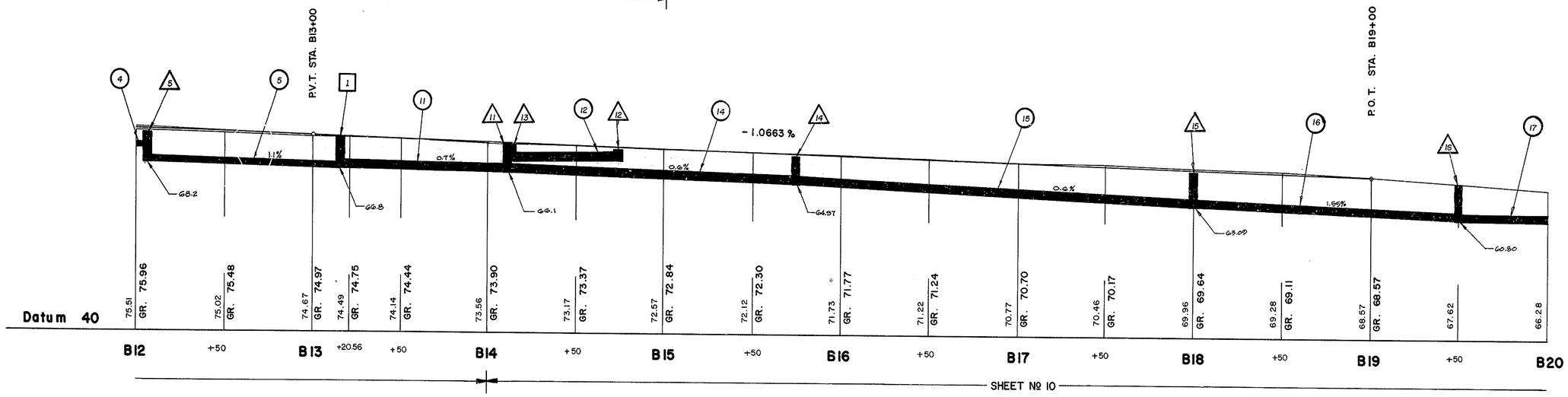
COUNTY	CONTRACT	F.A.P. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL		14	54

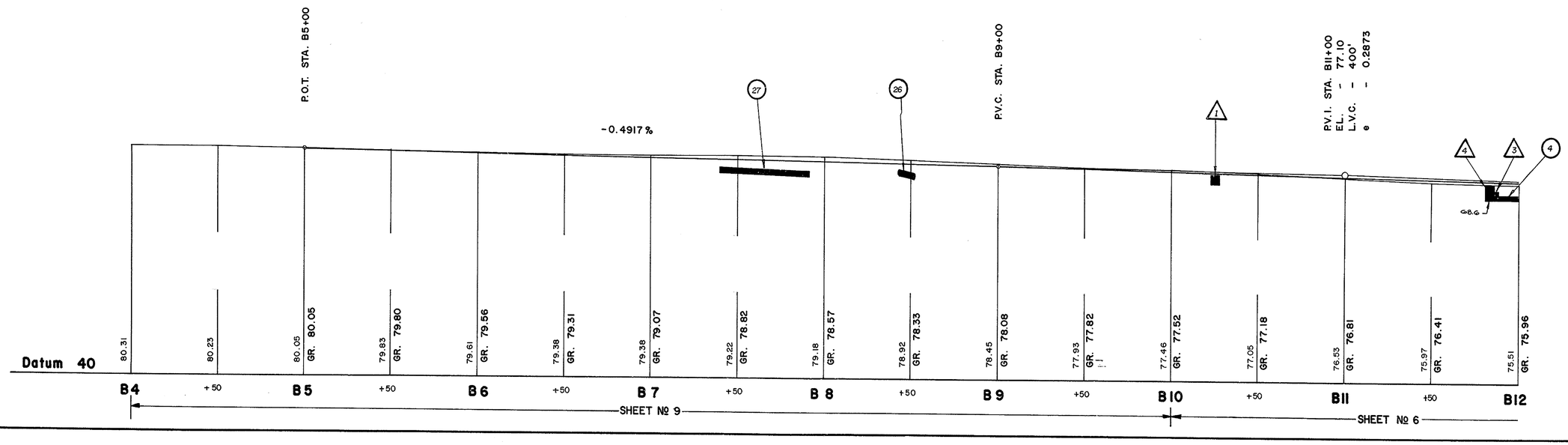
CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS







GRADES & GEOMETRICS

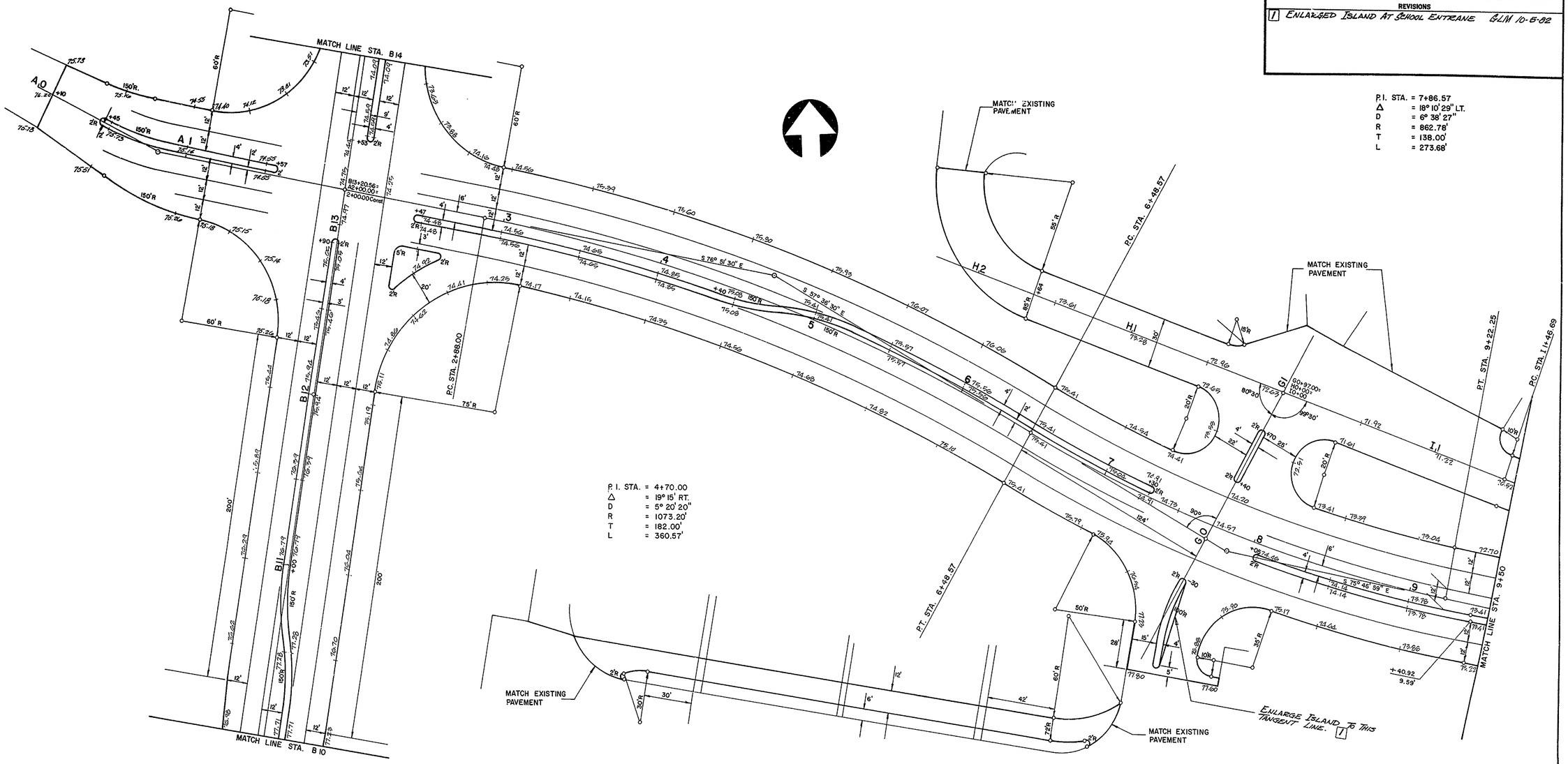
COUNTY	CONTRACT	P.B.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL.	M-1085(1)	15	54

CHAPMAN ROAD — PHASE I

PREL. TRACING G.L.M. DESIGN _____ CHKD. _____

REVISIONS

1 ENLARGED ISLAND AT SCHOOL ENTRANE GLM 10-6-82



GRADES & GEOMETRICS

COUNTY	CONTRACT	F.B.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL.	M-1085(1)	16	54

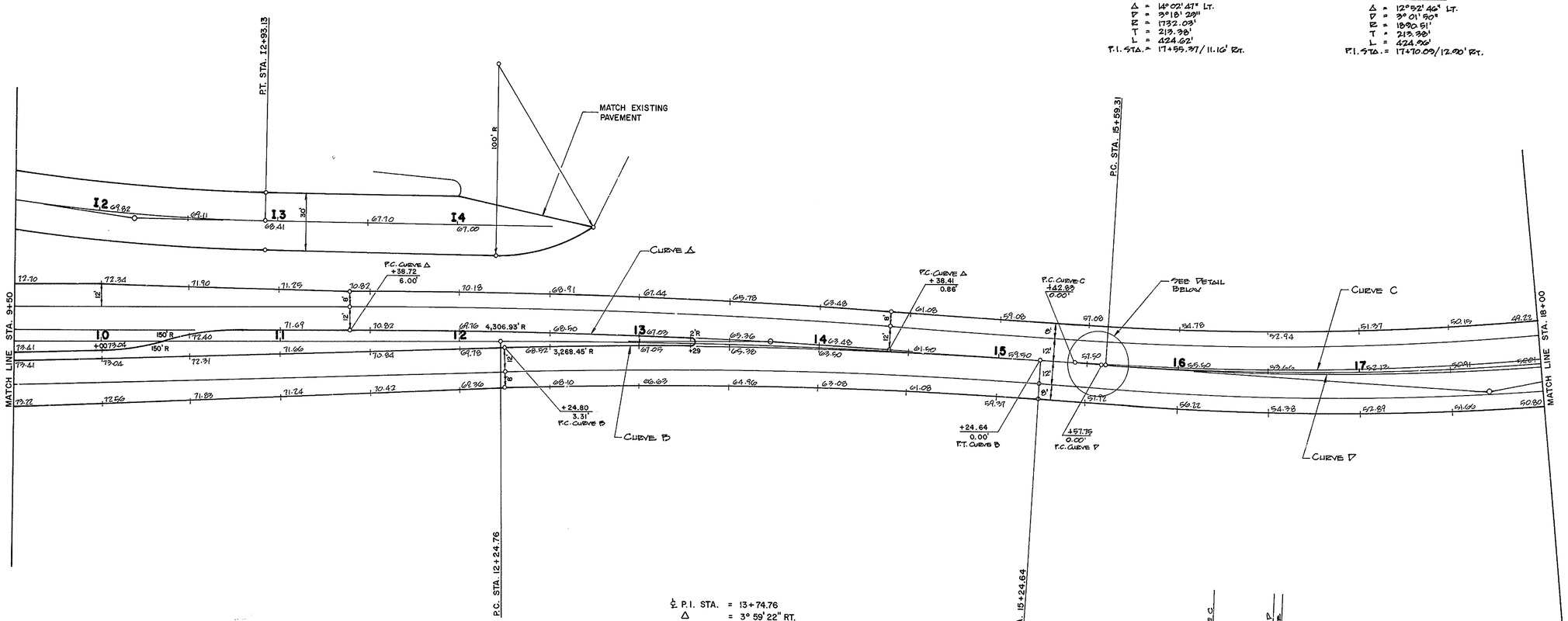
CHAPMAN ROAD – PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

P.I. STA. = I 2+20.00
Δ = 7° 0' LT.
D = 4° 47'
R = 1,198.66'
T = 73.31'
L = 146.44'

℄ P.I. STA. = 17+72.69
Δ = 14° 02' 47" LT.
D = 3° 18' 29"
R = 1,732.03'
T = 213.38'
L = 424.62'



℄ P.I. STA. = 13+74.76
Δ = 3° 59' 22" RT.
D = 1° 19' 49"
R = 4,306.94'
T = 150.00'
L = 299.88'

CURVE C

Δ = 14° 02' 47" LT.
D = 3° 18' 29"
R = 1732.03'
T = 213.38'
L = 424.62'
P.I. STA. = 17+55.37/11.16' RT.

CURVE D

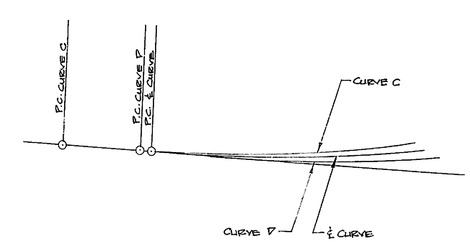
Δ = 12° 52' 46" LT.
D = 3° 01' 50"
R = 1890.51'
T = 213.38'
L = 424.96'
P.I. STA. = 17+70.09/12.00' RT.

CURVE A

Δ = 3° 59' 22" RT.
D = 1° 19' 49"
R = 4306.94'
T = 150.00'
L = 299.88'
P.I. STA. = 12+88.63/6.47' LT.

CURVE B

Δ = 5° 15' 19" RT.
D = 1° 45' 11"
R = 3268.45'
T = 150.00'
L = 299.79'
P.I. STA. = 13+74.76/2.61' LT.



GRADES & GEOMETRICS

COUNTY	CONTRACT	F.E.D. & REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL	M-1085(1)	17	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

1 DECREASE ISLAND AREA TO THE 3' & 100' RADII. GLM 10-12-83

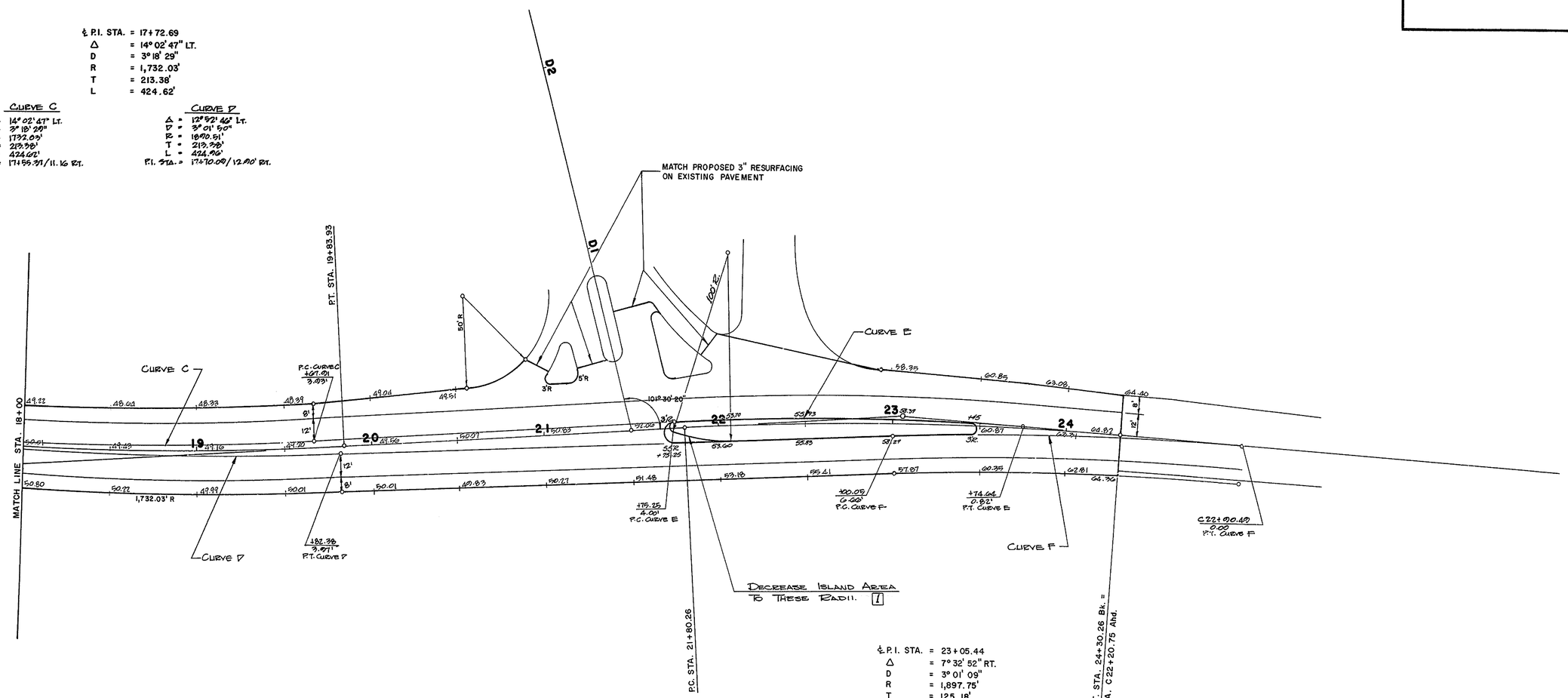
℄ P.I. STA. = 17+72.69
Δ = 14° 02' 47" LT.
D = 3° 18' 29"
R = 1,732.03'
T = 213.38'
L = 424.62'

CURVE C

Δ = 14° 02' 47" LT.
D = 3° 18' 29"
R = 1732.03'
T = 213.38'
L = 424.62'
P.I. STA. = 17+55.31/11.16 RT.

CURVE D

Δ = 12° 52' 42" LT.
D = 3° 01' 50"
R = 1890.51'
T = 213.38'
L = 424.96'
P.I. STA. = 17+70.00/12.00' RT.



℄ P.I. STA. = 23+05.44
Δ = 7° 32' 52" RT.
D = 3° 01' 09"
R = 1,897.75'
T = 125.18'
L = 250.00'

CURVE E

Δ = 7° 32' 52" RT.
D = 3° 46' 46"
R = 1516.02'
T = 100.00'
L = 199.71'
P.I. STA. = 22+74.97/6.37' LT.

CURVE F

Δ = 6° 22' 50" RT.
D = 3° 11' 37"
R = 1794.08'
T = 100.00'
L = 199.79'
P.I. STA. = 23+99.99/0.24' LT.

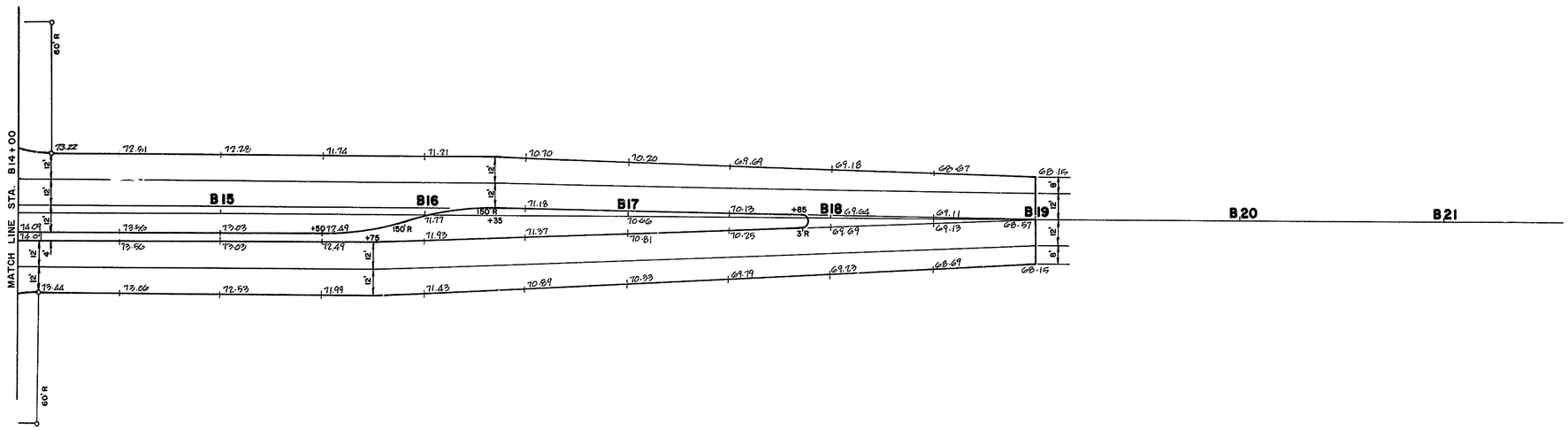
GRADES & GEOMETRICS

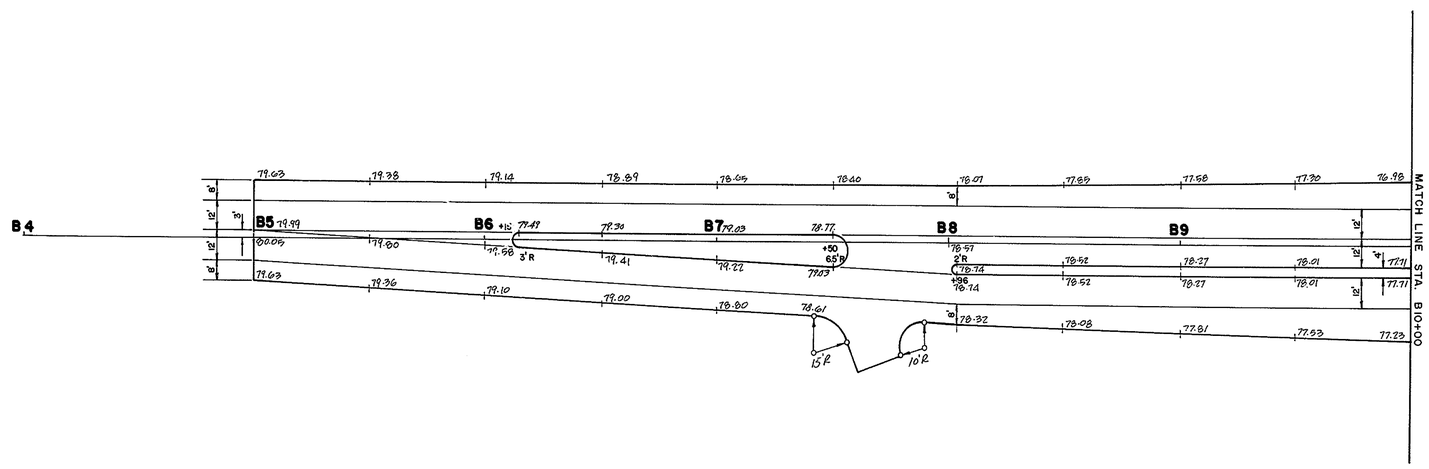
COUNTY	CONTRACT	F. B. A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-16	3	DEL	M-1085(1)	18	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS



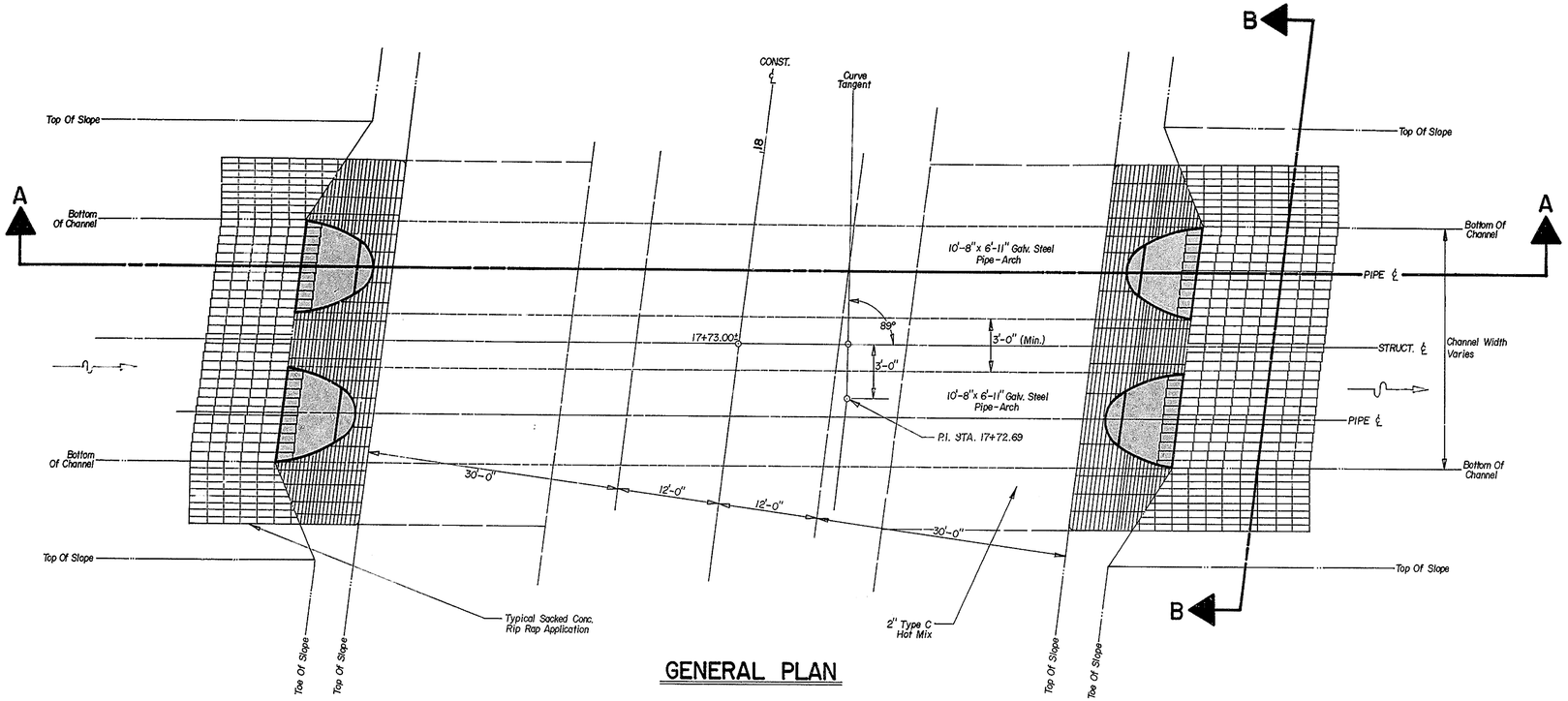


COUNTY	CONTRACT	P.B.A. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL	M-1085 (1)	19	54

CHAPMAN ROAD - PHASE I

PREL. TRACING [illegible] DESIGN _____ CHKD. _____

REVISIONS

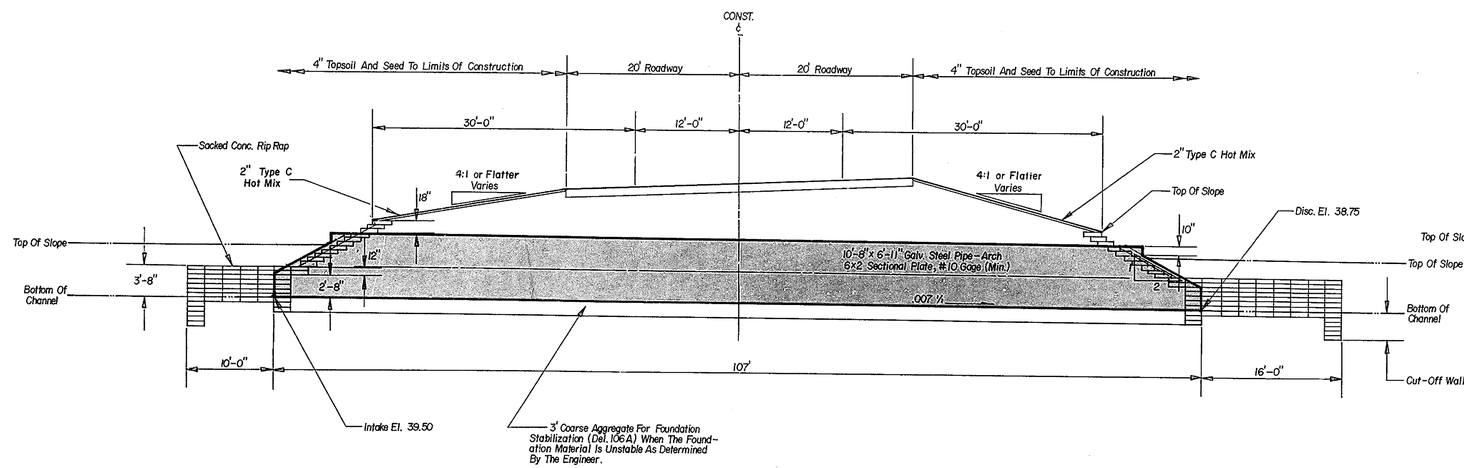


GENERAL PLAN

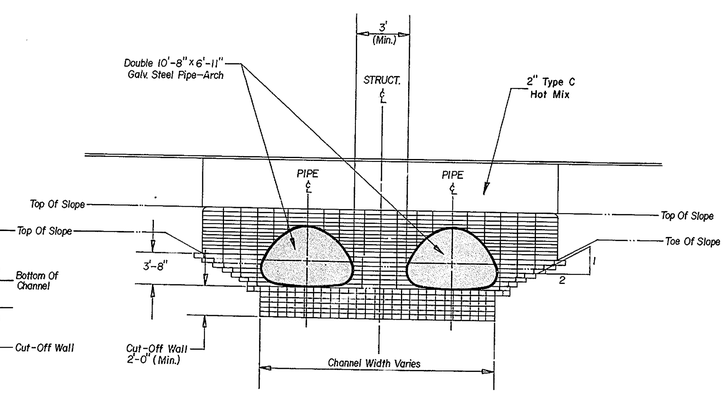
*STA. 17+90, 11.0' LT. ℄

*SOIL BORING SUMMARY

SAMPLE No.	Depth	Blows/6"	SAMPLE DESCRIPTION	STRATA	Depth	Casing Blows	REMARKS
1	4.0-4.5	W H	Wet Brown Soft Sandy Silt.				
	4.5-5.0	W H					
	5.0-5.5	W H					
	5.5-6.0	1	10" Sple - 10" Rec.				
2	6.0-6.5	8	Wet Brown Medium Dense Fine Coarse				
	6.5-7.0	12	Sand With Some Silt And Fine To				
	7.0-7.5	13	Gravel.				
	7.5-8.0	10	14" Sple - 14" Rec.				
3	8.0-8.5	6	Wet Gray Stiff Fine Sandy Silt.				
	8.5-9.0	6					
	9.0-9.5	7					
	9.5-10.0	8	14" Sple - 14" Rec.				
4	10.0-10.5	4	Wet Gray Stiff Fine Sandy Silt				
	10.5-11.0	7					
	11.0-11.5	7	17" Sple - 17" Rec.				
	11.5-12.0	10					
5	12.0-12.5	5	Wet Gray Very Stiff Fine Sandy Silt				
	12.5-13.0	8					
	13.0-13.5	8					
	13.5-14.0	6	17" Sple - 17" Rec.				
6	14.0-14.5	4	Wet Gray Very Stiff Fine Sandy Silt				
	14.5-15.0	7					
	15.0-15.5	10					
	15.5-16.0	11	18" Sple - 18" Rec.				
7	19.0-19.5	5	Wet Gray Very Stiff Fine Sandy Silt				
	19.5-20.0	9					
	20.0-20.5	14					25 More Did Not Move -
	20.5-20.75	25 Blows On 3"	18" Sple - 18" Rec.				Total 50 Blows. Decomposed Rock In Tip.



SECTION A-A



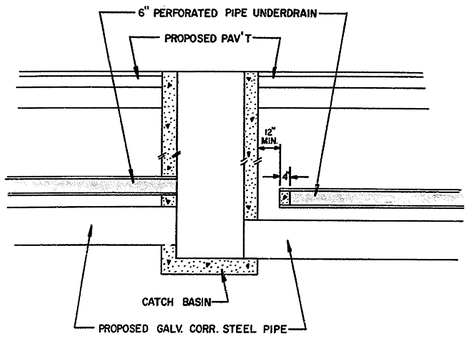
SECTION B-B

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL	M-1085(1)	20	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

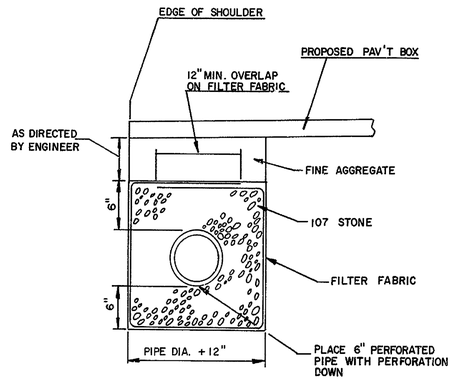
REVISIONS



NOTE: UNDERDRAIN PIPE TO FLOW IN DIRECTION OF, AND DISCHARGE INTO, LOWER CATCH BASIN. MINIMUM SLOPE 0.5%
PLUG UPPER END OF UNDERDRAIN PIPE WITH P.C.C. OR AS DIRECTED BY THE ENGINEER, TO BE INCIDENT TO THE UNIT PRICE BID FOR SECTION 737- PERFORATED PIPE UNDERDRAIN.

DETAIL FOR CONNECTING PERFORATED PIPE UNDERDRAIN TO CATCH BASIN

NOT TO SCALE

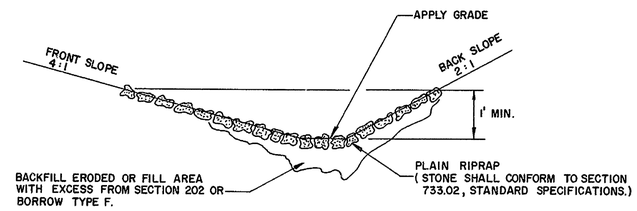


NOTE: COST OF FILTER FABRIC, 107 STONE AND ALL INCIDENTALS NECESSARY TO COMPLETE TO BE INCLUDED IN UNIT PRICE BID FOR SECTION 737 - PERFORATED PIPE UNDERDRAIN.

DETAIL FOR PERFORATED PIPE UNDERDRAIN

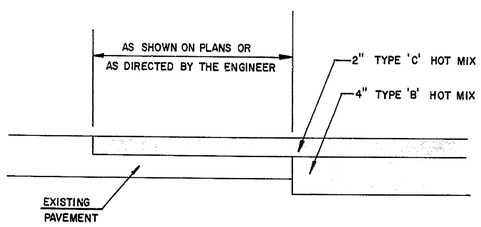
NOT TO SCALE

(FROM STA. 172+0.00 TO STA. 196+0.00)



DETAIL FOR PLAIN RIPRAP GUTTER

NOT TO SCALE



NOTE: HOT MIX USED IN BOX TO BE INCLUDED IN THE UNIT PRICE BID FOR SECTION 401, HOT MIX, HOT LAID BIT. CONC. PAV'T.

PREPARATION OF BOX TO BE PAID FOR UNDER SECTION S.P., BUTT JOINT.

DETAIL FOR BUTT JOINT

NOT TO SCALE

TRAFFIC MAINTENANCE SHEET

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-16	3	DEL.	M-1085(1)	21	54

CHAPMAN ROAD - PHASE I

PREL. TRACING _____ DESIGN _____ CHKD. _____

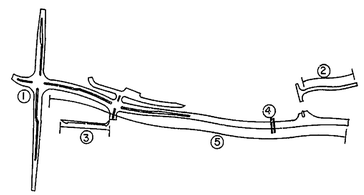
REVISIONS

CONSTRUCTION SEQUENCE

Stage — Description

1. BUILD THE SALEM CHURCH ROAD & CHAPMAN ROAD INTERSECTION. SEE DETAILS ON THIS SHEET (PHASES I, II, & III) INCLUDING DRAINAGE.
2. BUILD ENTRANCE INTO DELAWARE TURNPIKE MAINTENANCE YARD.
3. BY-PASS LANE IN FRONT OF SCHOOL.
4. PLACE THE STRUCTURAL PLATE PIPE (STA. 17+73±).
5. PAVEMENT SECTION ON CHAPMAN ROAD (STA. 3+00± TO STA. 24+50±).

ANY WORK SECTIONS NOT MENTIONED IN THE ABOVE SEQUENCE ARE NOT CRITICAL TO THE MAINTENANCE OF TRAFFIC FOR THIS PROJECT. THEIR CONSTRUCTION SHALL BE LEFT TO THE CONTRACTORS DISCRETION.



NOTES

THE TRAFFIC CONTROL PLAN AS RECOMMENDED IS FOR PLACEMENT OF THE PAVEMENT PROPER. ALL OTHER WORK SHALL BE PERFORMED IN A MANNER THAT WILL INSURE THE LEAST PRACTICABLE OBSTRUCTION TO THE TRAFFIC, CONSISTANT WITH SAFETY AND SHALL COMPLY WITH THE MANUAL TITLED DELAWARE TRAFFIC CONTROLS FOR STREETS AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS, AS REVISED MAY, 1977.

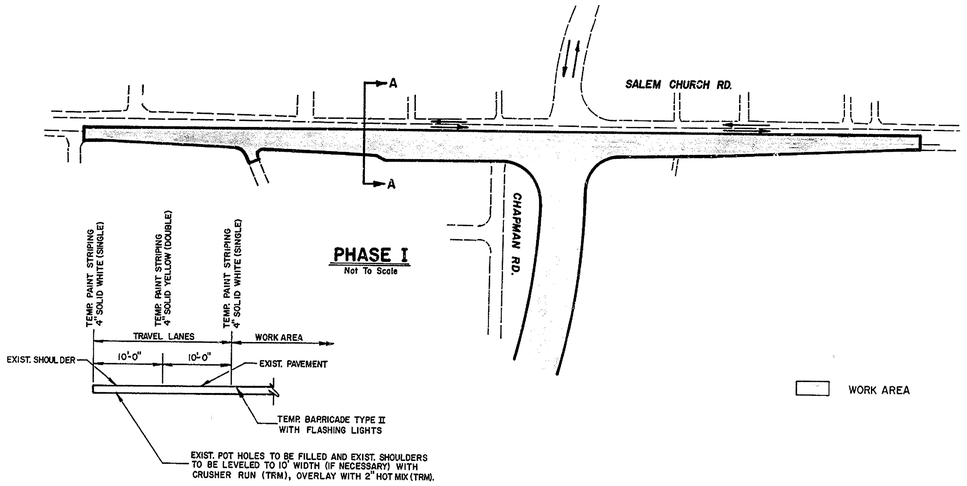
IF THE CONTRACTOR WISHES TO DEVIATE FROM THE RECOMMENDED TRAFFIC CONTROL PLAN, HE MUST SUBMIT HIS TRAFFIC CONTROL PLAN IN THE SAME FORMAT AS THE ONE DESCRIBED BELOW TO THE DEPARTMENT FOR APPROVAL.

THE CONTRACTOR IS REQUIRED TO OBLITERATE ALL HOT MIX PAVEMENT MARKINGS THAT DO NOT PERTAIN TO THE OPERATING TRAFFIC PATTERN IN A MANNER SATISFACTORY TO THE ENGINEER. (PAINTING OVER MARKINGS WILL NOT BE AN ACCEPTABLE MANNER) COST TO BE INCLUDED IN THE UNIT PRICE BID FOR S.P.-TEMPORARY PAVEMENT STRIPING.

ALL SEGMENTS OF ROADWAY NOT USED FOR THE MAINTENANCE OF TRAFFIC TO BE CLOSED WITH TYPE III OR TYPE II BARRICADES. REFER TO TRAFFIC MANUAL FOR DETAILS.

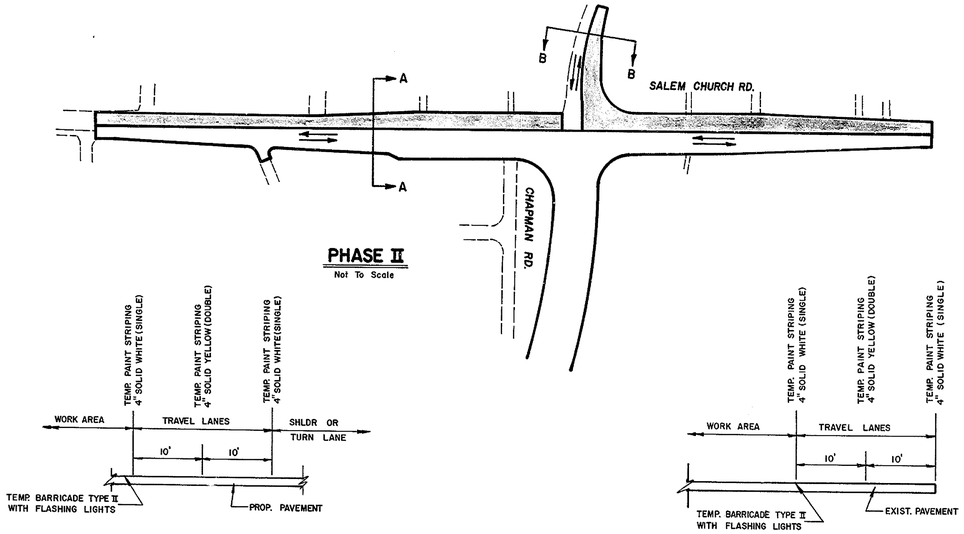
WHEN THE CLOSURE OF CHAPMAN ROAD IS REQUIRED FOR THE PLACEMENT OF THE STRUCTURAL PLATE PIPE AND/OR PAVEMENT, CASE XV-A OF THE DELAWARE TRAFFIC CONTROLS FOR STREETS AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS, AS REVISED MAY, 1977, SHALL BE FOLLOWED, EXCEPT AS AMENDED BY SPECIAL PROVISIONS OR THESE PLANS.

SIGN, BARRICADE, & LIGHT PLACEMENT FOR PHASE I & II OF THE SALEM CHURCH ROAD & CHAPMAN ROAD INTERSECTION SHALL BE CONSISTANT WITH CASE X-A OF THE DELAWARE TRAFFIC CONTROLS FOR STREETS AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS, AS REVISED MAY, 1977.



PHASE I
Not To Scale

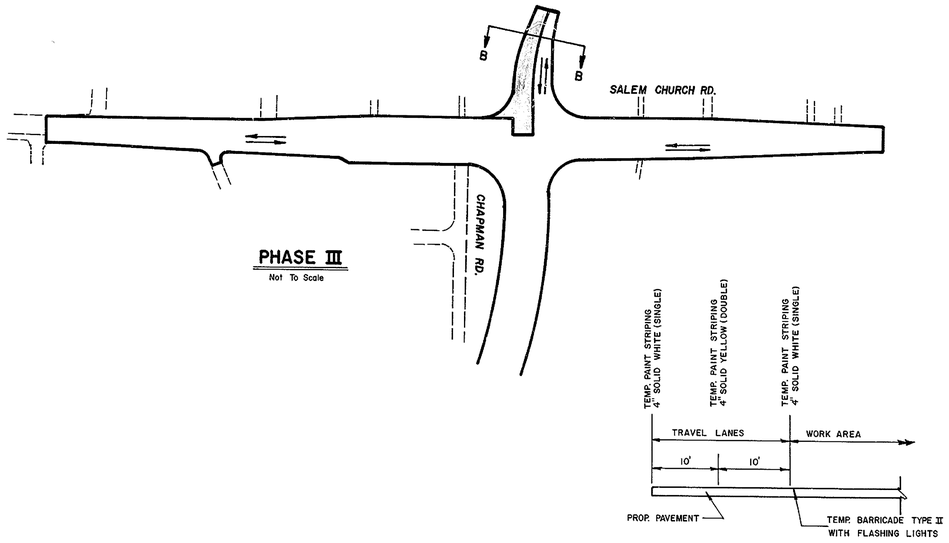
SECTION A-A



PHASE II
Not To Scale

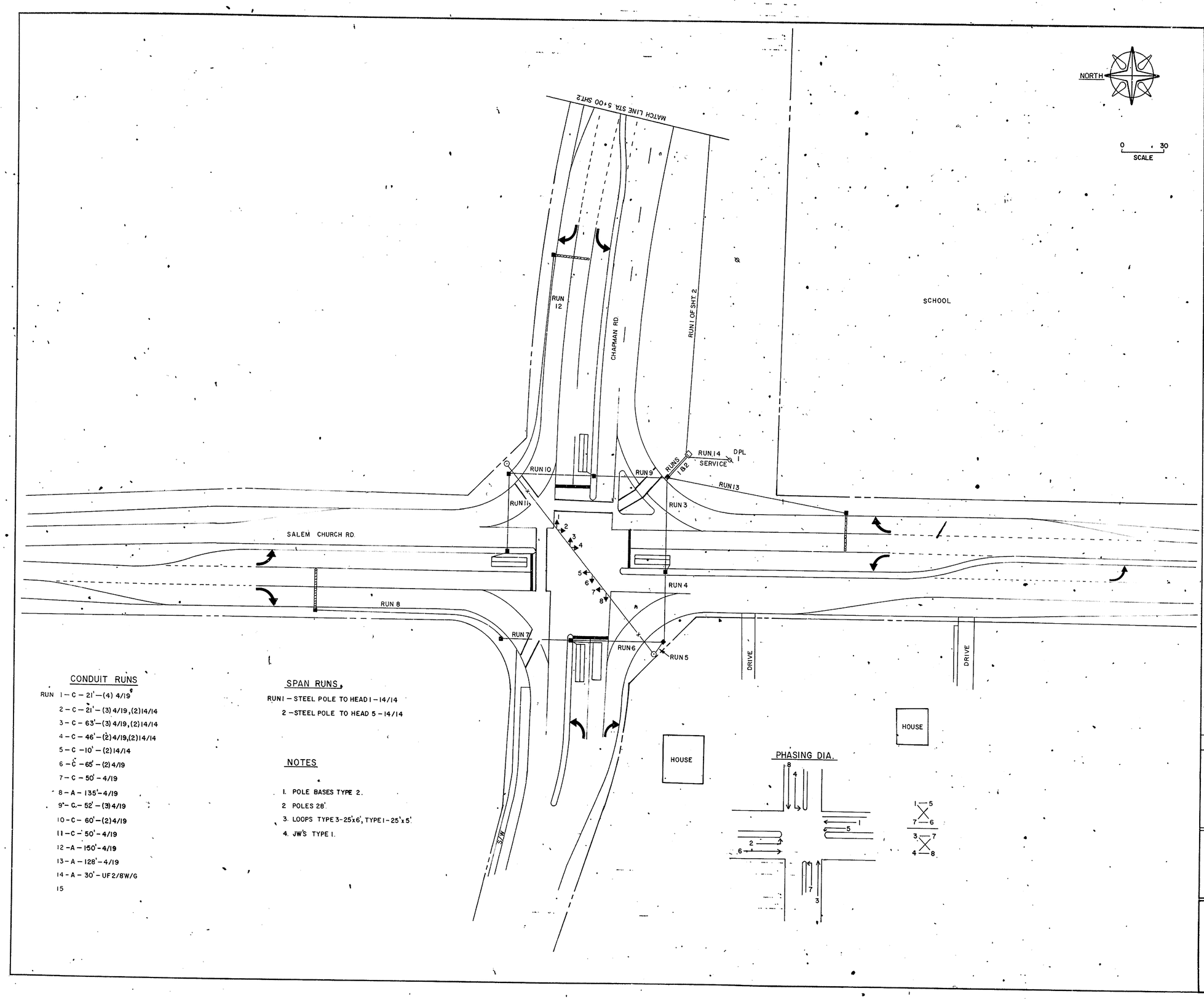
SECTION A-A

SECTION B-B



PHASE III
Not To Scale

SECTION B-B



CONDUIT RUNS

RUN 1 – C – 21' – (4) 4/19
2 – C – 21' – (3) 4/19, (2) 14/14
3 – C – 63' – (3) 4/19, (2) 14/14
4 – C – 46' – (2) 4/19, (2) 14/14
5 – C – 10' – (2) 14/14
6 – C – 65' – (2) 4/19
7 – C – 50' – 4/19
8 – A – 135' – 4/19
9 – C – 52' – (3) 4/19
10 – C – 60' – (2) 4/19
11 – C – 50' – 4/19
12 – A – 150' – 4/19
13 – A – 128' – 4/19
14 – A – 30' – UF 2/8W/G
15

SPAN RUNS

RUN 1 – STEEL POLE TO HEAD 1 – 14/14
2 – STEEL POLE TO HEAD 5 – 14/14

NOTES

1. POLE BASES TYPE 2.
2. POLES 28'.
3. LOOPS TYPE 3 – 25'x6', TYPE 1 – 25'x5'.
4. JW'S TYPE 1.

DELAWARE DIVISION OF HIGHWAYS

BUREAU OF TRAFFIC

BEAR DELAWARE

PERMIT NO.	CONTRACT NO.	FED. AID NO.	SHEET NO.	TOTAL
	78-021-16		22	54

CHAPMAN RD & SALEM CHURCH RD.

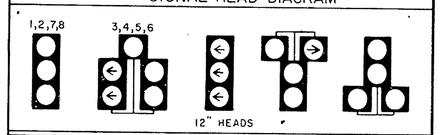
PREL. TRACING	DATE	DESIGN	DATE

REVISION

LEGEND

- POLE BASE TYPE (#1-6)
- EXISTING STEEL POLE BASE
- EXISTING ALUMINUM POLE BASE
- PEDESTAL BASE
- EXISTING PEDESTAL BASE
- WOOD POLE
- EXISTING WOOD POLES
- EXISTING D.P.&L. AND D.S.T. POLES
- CABINET BASE
- EXISTING CABINET BASE
- RIGHT-OF-WAY OR PROPERTY LINE
- GALVANIZED CONDUIT
- EXISTING GALV. CONDUIT
- NON-METALLIC CONDUIT
- EXISTING NON-METALLIC CONDUIT
- LP # — LOOP DETECTOR TYPE (#1-7)
- EXISTING LOOP DETECTOR
- JUNCTION WELL TYPE (#1-4)
- EXISTING JUNCTION WELL
- —x— SPAN WIRE
- —xx— EXISTING SPAN WIRE
- —c— OVERHEAD CABLE
- —cc— EXISTING OVERHEAD CABLE
- SIGNAL HEAD
- EXISTING SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- EXISTING PED. SIGNAL HEAD
- MAST ARM
- (R) REMOVE
- (A) ABANDON
- (RB) REMOVE EXISTING CONCRETE BASE 6" BELOW GROUND LEVEL AND COVER
- LUMINAIRE (WATTAGE)
- EXISTING LUMINAIRE (WATTAGE)
- A — 1 1/2" GALVANIZED CONDUIT
- B — 2" GALVANIZED CONDUIT
- C — 2 1/2" GALVANIZED CONDUIT
- D — 3" NON-METALLIC CONDUIT
- E — 4" NON-METALLIC CONDUIT

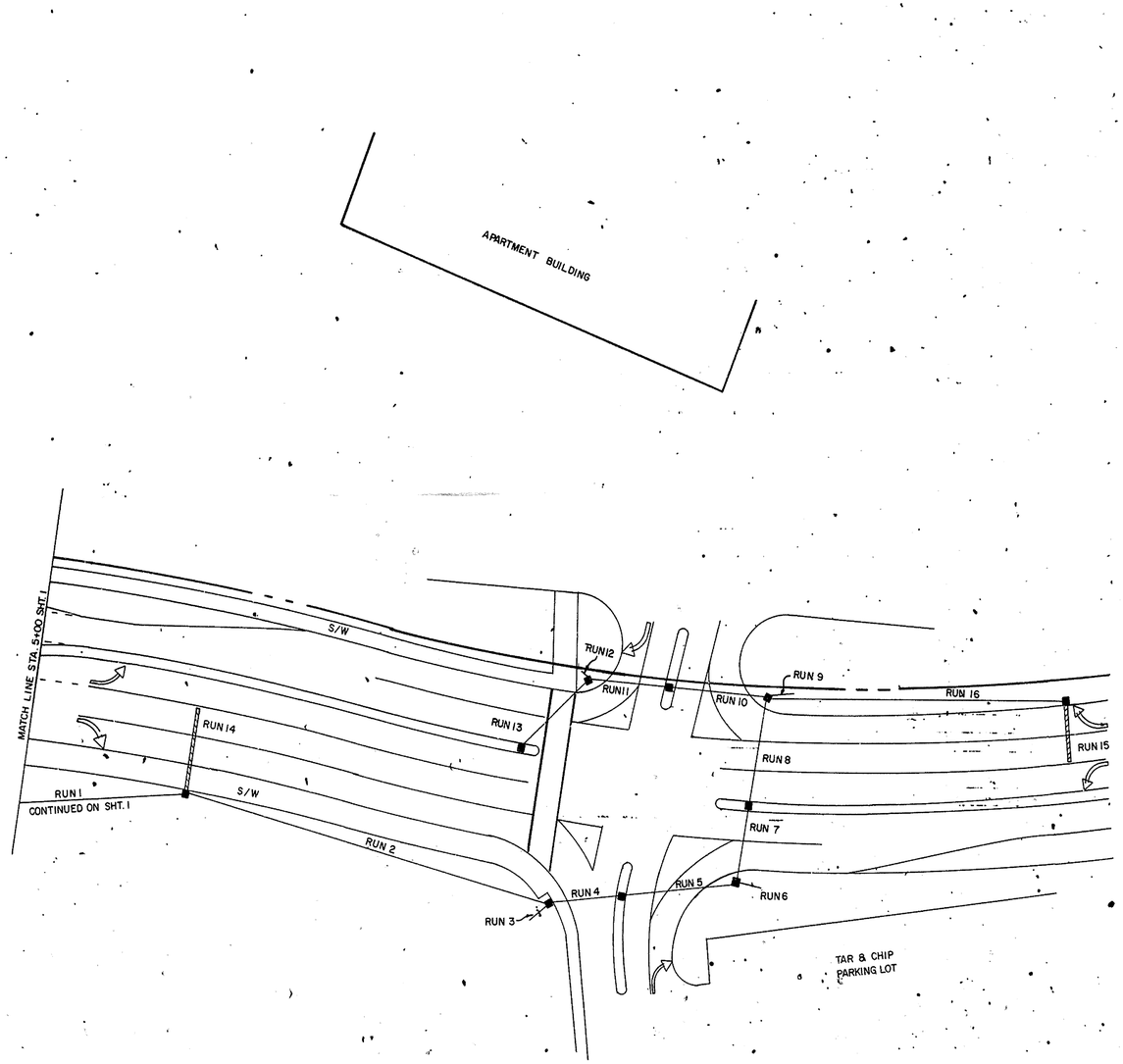
SIGNAL HEAD DIAGRAM



RECOMMENDED _____ 19__ _____
RECOMMENDED _____ 19__ _____
RECOMMENDED _____ 19__ _____

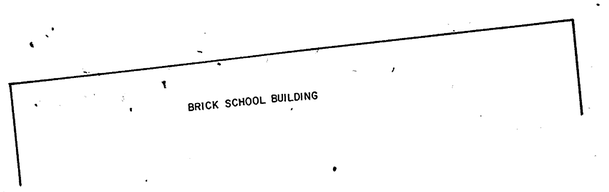
APPROVED F. H. W. A. _____ DATE _____

APPROVED for INSTL. CHIEF TRAFFIC ENGINEER _____ DATE _____



CONDUIT RUNS

RUN 1 - C - 275'
2 - C - 167'
3 - A - 10'
4 - C - 32'
5 - C - 50'
6 - A - 10'
7 - C - 32'
8 - C - 45'
9 - A - 10'
10 - C - 44'
11 - C - 36'
12 - A - 5'
13 - C - 42'
14 - D - 36'
15 - D - 26'
16 - A - 132'



DELAWARE DIVISION OF HIGHWAYS

BUREAU OF TRAFFIC

BEAR DELAWARE

PERMIT NO.	CONTRACT NO.	FED. AID NO.	SHEET NO.	TOTAL
	78-021-16		23	54

1 UNDERGROUND

CHAPMAN ROAD & SANDALWOOD APT'S. ENT.

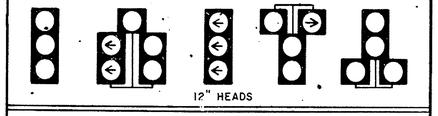
PREL. TRACING	DATE	DESIGN	DATE
DJP	3/4/82	DJP	3/4/82

REVISION

LEGEND

- POLE BASE TYPE (#1-6)
- EXISTING STEEL POLE BASE
- EXISTING ALUMINUM POLE BASE
- PEDESTAL BASE
- EXISTING PEDESTAL BASE
- WOOD POLE
- EXISTING WOOD POLES
- EXISTING D.P.&L. AND D.S.T. POLES
- CABINET BASE
- EXISTING CABINET BASE
- RIGHT-OF-WAY OR PROPERTY LINE
- GALVANIZED CONDUIT
- EXISTING GALV. CONDUIT
- NON-METALLIC CONDUIT
- EXISTING NON-METALLIC CONDUIT
- LP # — LOOP DETECTOR TYPE (#1-7)
- EXISTING LOOP DETECTOR
- JUNCTION WELL TYPE (#1-4)
- EXISTING JUNCTION WELL
- —X— SPAN WIRE
- —XX— EXISTING SPAN WIRE
- —C— OVERHEAD CABLE
- —CC— EXISTING OVERHEAD CABLE
- SIGNAL HEAD
- EXISTING SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- EXISTING PED. SIGNAL HEAD
- MAST ARM
- (R) REMOVE
- (A) ABANDON
- (RB) REMOVE EXISTING CONCRETE BASE 6" BELOW GROUND LEVEL AND COVER.
- LUMINAIRE (WATTAGE)
- EXISTING LUMINAIRE (WATTAGE)
- A — 1 1/2" GALVANIZED CONDUIT
- B — 2" GALVANIZED CONDUIT
- C — 2 1/2" GALVANIZED CONDUIT
- D — 3" NON-METALLIC CONDUIT
- E — 4" NON-METALLIC CONDUIT

SIGNAL HEAD DIAGRAM



RECOMMENDED _____ 19__ _____
RECOMMENDED _____ 19__ _____
RECOMMENDED _____ 19__ _____

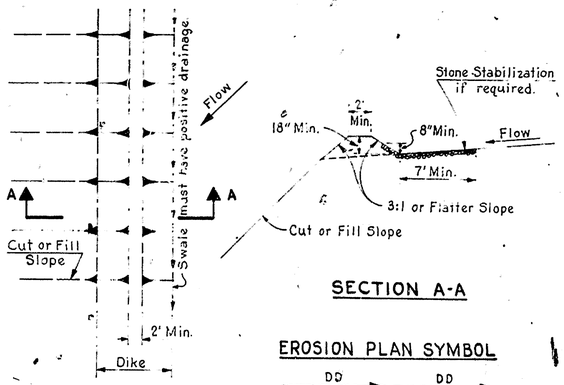
APPROVED F. H. W. A. _____ DATE _____

APPROVED for INSTL. _____ DATE _____
CHIEF TRAFFIC ENGINEER

APPROVED: DATE:	CHAPMAN ROAD - PHASE I	SHEET NO. 24 / TOTAL SHEETS 54
DIRECTOR OF HIGHWAYS	~~STANDARD~~ SHEET NUMBER EC-1 EROSION CONTROL DETAILS TEMPORARY DIKES	
RECOMMENDED: DATE:	PREL. TRACING WD DESIGN WD CHKD.	
DEPUTY DIRECTOR OF HIGHWAYS	REVISIONS	

TEMPORARY DIVERSION DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil with a general life expectancy of one year or less, constructed immediately above a cut or fill slope, that intercepts storm runoff from higher areas and diverts it away from exposed slopes to a stabilized outlet. Used to prevent excessive erosion until the permanent storm drainage features are installed and the slopes are stabilized.



PLAN VIEW

SECTION A-A

EROSION PLAN SYMBOL

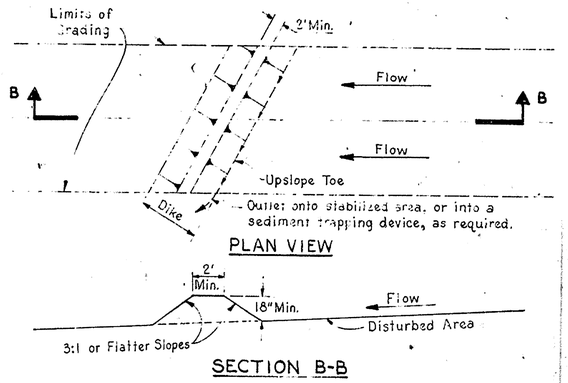
DD DD

NOTES:

1. All dikes shall be machine compacted.
2. The swale formed by the upslope toe of the dike must have positive drainage (minimum of 0.25% grade) to the outlet. This design does not apply when the grade of the swale is greater than 10% (maximum grade).
3. Where the slope of the swale is less than 2%, stabilization may not be required, but should be added if periodic inspection deems necessary. When the slope is from 2% to 5% the channel (flow area) should be stabilized; using Section 725, "Erosion Control, Excelsior Blanket, Net or Jute Mesh"; Section 725, "Chemical Erosion Control"; or "Stone Stabilization". Where the slope of the swale is greater than 5%; "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103 which is placed in a 3 inch thick layer and pressed into the soil, shall be used. The area to be stabilized by the stone shall be as shown by Section A-A above.
4. Runoff diverted from a protected or stabilized area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or unstable upland area shall be conveyed to a sediment trapping device such as a sediment trap or a sediment basin, or to an area that is protected by any of these practices.
5. Diversion dikes must be protected with Section 725, "Erosion Control, Seeding I" or Section 725, "Erosion Control, Seeding II" applied immediately after construction.
6. Periodic inspection and required maintenance shall be provided.

TEMPORARY INTERCEPTOR DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil or gravel, to remain for a period of usually less than one year, constructed across disturbed rights of way and similar sloping areas. Used to shorten the length of exposed slopes thereby reducing the potential for erosion by intercepting the storm runoff and diverting it to stabilized outlets until permanent stabilization of the slopes is established.



PLAN VIEW

SECTION B-B

EROSION PLAN SYMBOL

ID ID

NOTES:

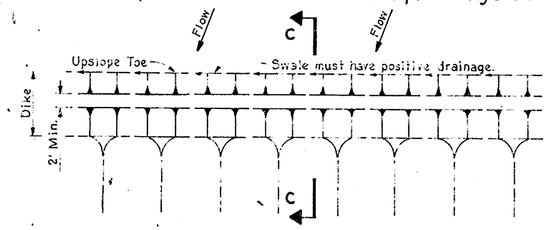
1. All dikes shall be machine compacted.
2. All interceptor dikes must have positive drainage to an outlet. The grade of the swale, formed at the upslope toe of the dike, shall be from 0.5% to 1.0%.
3. The top width may be wider and side slopes may be flatter if desired to facilitate crossing by construction traffic. The area of the construction crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, which is placed in two seperate layers each three inches thick. Each layer is compacted into the soil after placement.
4. The spacing of the interceptor dikes along the graded slope shall be as follows:

Maximum slope of area above dike	>10%	5 to 10%	< 5%
Distance between interceptor dikes	100 Feet	200 Feet	300 Feet

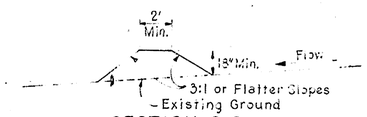
The field location may be adjusted as needed in order to utilize a stabilized safe outlet.
5. Interceptor dikes must have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin, when either the interceptor dike swale or the drainage area above the dike are not adequately stabilized.
6. When it is deemed necessary by the periodic inspections, the flow area of the swale shall be stabilized using "Stone Stabilization", which consist of a three inch thick layer of stone (Delaware Standard Gradation Size № 103) that is pressed into the soil. The area to be covered by the stone shall be as shown by Section A-A for Temporary Diversion Dikes
7. Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately after construction to protect the dike from erosion.
8. Periodic inspection and required maintenance shall be provided.

TEMPORARY PERIMETER DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil, life expectancy of one year or less, constructed at the perimeter of the site or disturbed area that is used to divert sediment laden storm runoff to an on-site trapping facility or to divert runoff from a stabilized upland area away from the construction area. These dikes shall remain in place until the construction site is permanently stabilized.



PLAN VIEW



SECTION C-C

EROSION PLAN SYMBOL

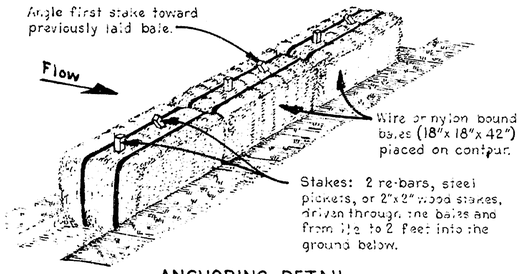
PD PD

NOTES:

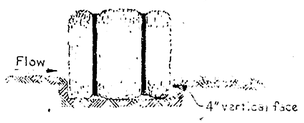
1. All dikes shall be machine compacted.
2. The grade of the swale formed at the upslope toe of the dike is dependent upon the topography, but must have positive drainage to an outlet. This design should not be used when the grade for the swale will be greater than 10% (maximum grade).
3. When the slope of the swale is less than 2%, stabilization may not be required; however, it should be added where periodic inspection deems necessary. When the slope is 2% or greater, stabilization shall be required. See Note 3 for Temporary Diversion Dike for details. The minimum area to be stabilized shall be the swale flow area.
4. Runoff diverted from a protected or stabilized area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment basin, sediment trap, or gravel outlet structure.
5. The dikes must be located far enough away from the disturbed area to permit machine regrading and cleanout.
6. Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately following construction to protect the dike.
7. Periodic inspection and required maintenance shall be provided.

TEMPORARY STRAW (or HAY) BALE DIKE
(DRAINAGE AREAS LESS THAN ½ ACRE)

A barrier installed across, or at the toe of a slope, that is used to intercept and detain small amounts of sediment from unprotected areas of less than one-half (½) acre. Straw bales must not be used on high sediment producing areas, above "high risk" areas, where water is concentrated in a channel, or where there is a possibility of a washout. They may be used where erosion would normally occur in the form of sheet erosion and where the length of the slope above the barrier is less than 100 feet.



ANCHORING DETAIL



EMBEDDING DETAIL

EROSION PLAN SYMBOL

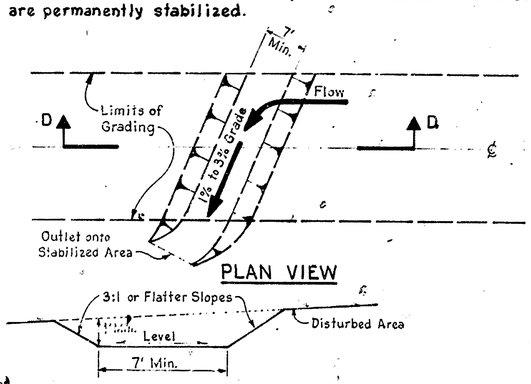
SBD SBD

NOTES:

1. Bales shall be placed in a row with ends tightly abutting the adjacent bales.
2. Each bale shall be embedded in the soil a minimum of 4".
3. Bales shall be securely anchored in place by stakes or re-bars driven through the bales. The first stake in each bale shall be angled toward previously laid bale to force bales together.
4. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
5. Bales shall be removed when they have served their usefulness in order to prevent the blocking or impeding of storm flow or drainage.

TEMPORARY INTERCEPTOR SWALE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary excavated drainageway located across disturbed areas or rights of way. Used to shorten the length of exposed slopes, thereby reducing the potential for erosion by intercepting the storm runoff and diverting it to a stabilized outlet or sediment trapping device. The swale shall remain in place until the disturbed areas are permanently stabilized.



EROSION PLAN SYMBOL

IS IS

NOTES:

1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

2. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free of bank projections or other irregularities which will impede normal flow. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the swale. Fills shall be compacted to prevent unequal settlement that will cause damage in the completed swale.

3. Interceptor swales shall have a minimum grade of one percent and the bottom of the swale shall be level.

4. The spacing of the interceptor swales along the graded slope shall be as follows:

Maximum slope of area above swale	>10%	5 to 10%	<5%
Distance between interceptor swales	100 Feet	200 Feet	300 Feet

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

5. Interceptor swales must have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin.

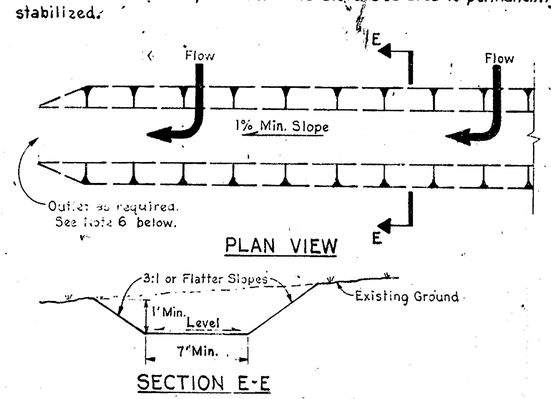
6. When it is deemed necessary by the periodic inspections, the flow area of the swale shall be stabilized using "Stone Stabilization", which consists of a three inch thick layer of stone (Delaware Standard Gradation Size № 103) that is pressed into the soil. The lining shall extend across the bottom and up both sides of the channel to a height of at least 8 inches vertically above the bottom.

7. At all points where several or more vehicle crossings per day will be made, the side slopes may be made flatter to allow construction traffic to cross. The entire swale area in the vicinity of the crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, that is placed in two seperate layers each three inches thick. Each layer is compacted into the soil after placement.

8. Periodic inspection and required maintenance shall be provided.

TEMPORARY PERIMETER SWALE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary excavated drainageway, located along the perimeter of the site or disturbed areas, that is used to prevent offsite storm runoff from entering the disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area. The swale shall remain in place until the disturbed area is permanently stabilized.



EROSION PLAN SYMBOL

PS PS

NOTES:

1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

2. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free of bank projections or other irregularities which will impede normal flow. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the swale. Fills shall be compacted to prevent unequal settlement that will cause damage in the completed swale.

3. Perimeter swales shall have a minimum grade of one percent and the bottom of the swale shall be level.

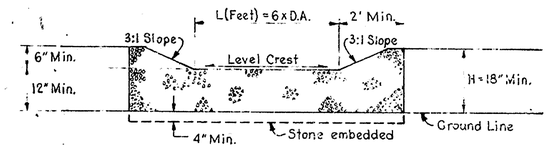
4. Runoff diverted from a protected or stabilized upland area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment basin, sediment trap, or to an area that is protected by any of these practices.

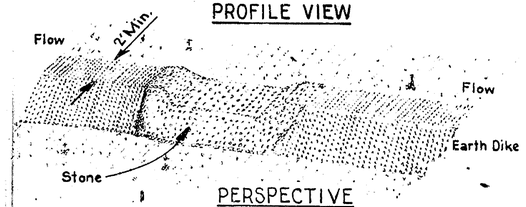
5. Where the slope of the swale is less than 2%, stabilization may not be required, but should be added if deemed necessary by the periodic inspections. When the slope is from 2% to 5% the channel (flow area) should be stabilized with Section 725, "Erosion Control, Excelsior Blanket, Net or Jute Mesh"; Section 725, "Chemical Erosion Control"; or "Stone Stabilization". Where the slope of the swale is greater than 5%; "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, which is placed in a 3 inch thick layer and then is pressed into the soil, shall be used. The lining shall extend across the bottom and up both sides of the channel to a height of at least 8" vertically above the bottom.

6. Periodic inspection and required maintenance shall be provided.

STONE OUTLET STRUCTURE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary crushed stone dike installed in conjunction with and as a part of a diversion dike, interceptor dike, or perimeter dike that is used to provide a protected outlet for the dike. They apply to any point of discharge where there is a need to dispose of runoff at a protected outlet or to diffuse concentrated flow for the duration of the period of construction. Stone outlet structures also allow the area behind the dike to dewater.





EROSION PLAN SYMBOL

SOS

L=

NOTES:

1. The stone shall be crushed stone. Gravel may be used only when crushed stone is not available. The stone shall meet Delaware Standard Gradation Size № 103.

2. The crest of the stone dike shall be at least six inches lower than the lowest elevation of the top of the earth dike. The crest shall be level.

3. The stone outlet structure shall be embedded into the soil a minimum of four inches.

4. The minimum length, in feet, of the crest of the stone outlet structure shall be equal to six times the number of acres of the contributing drainage area.

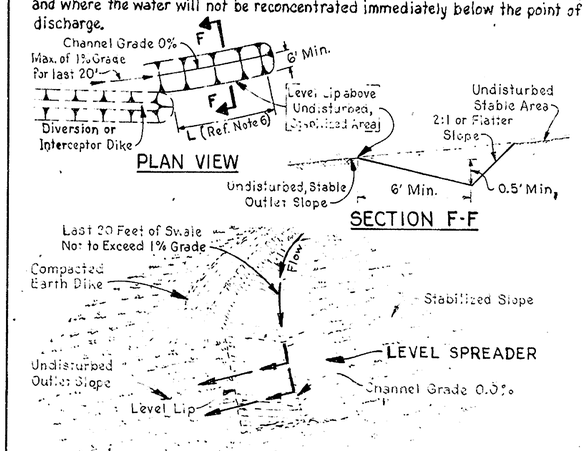
5. The stone outlet structure shall be inspected after each rain, and the stone shall be replaced when the structure ceases to function as intended due to silt accumulation among the stone, washout, construction traffic damage, etc.

6. When the drainage area above the structure is not stabilized, a sediment basin or a sediment trap must be used in conjunction with the stone outlet structure.

APPROVED: DATE:	CHAPMAN ROAD - PHASE I	SHEET NO. 25	TOTAL SHEETS 54
DIRECTOR OF HIGHWAYS	~~STANDARD~~ SHEET NUMBER EC-2 EROSION CONTROL DETAILS TEMPORARY SWALES and OUTLET STRUCTURES		
RECOMMENDED: DATE:	PREL. TRACING WRJ DESIGN WRJ CHK.: REVISIONS		
DEPUTY DIRECTOR OF HIGHWAYS			

TEMPORARY LEVEL SPREADER

An outlet that is constructed at zero percent grade across the slope whereby concentrated runoff may be discharged at non-erosive velocities onto an undisturbed area that is stabilized by existing vegetation. Used to convert a concentrated flow of sediment-free storm runoff into sheet flow and to outlet it onto areas that are stabilized by existing vegetation in a manner that does not cause erosion. Should be used only in those situations where the spreader can be constructed on undisturbed soil, where the area directly below the level lip is stabilized by existing vegetation, where the drainage area above the spreader is stabilized by existing vegetation, and where the water will not be reconcentrated immediately below the point of discharge.



EROSION PLAN SYMBOL

L=

NOTES:

1. Level spreaders shall be constructed under the direct supervision of the Engineer.

2. Construct level lip on zero percent grade to insure uniform spreading of sediment-free runoff (converting channel flow to sheet flow).

3. Level spreader shall be constructed on undisturbed soil (not on fill).

4. The entrance channel shall not exceed a 1% grade for at least 20 feet before entering the spreader.

5. Storm runoff converted to sheet flow shall outlet onto stabilized areas. Water shall not be reconcentrated immediately below the point of discharge.

6. Spreader length will be determined by estimating Q_{10} (10 year frequency storm flow) and selecting the appropriate length from table below:

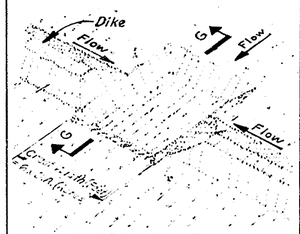
Design Q_{10} (c.f.s.)	Maximum Length L' (feet)
Up to 10	15
11 to 20	20
21 to 30	26
31 to 40	36
41 to 50	44

7. Periodic inspection and required maintenance shall be provided.

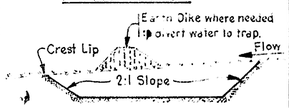
EARTH OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

An earth outlet sediment trap consists of a basin formed by excavation and/or embankment. The discharge point for the trap is over a crest or by an outlet channel that are cut into natural ground.

EXCAVATED EARTH OUTLET SEDIMENT TRAP



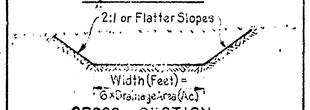
PERSPECTIVE



SECTION G-G

EMBANKMENT EARTH OUTLET SEDIMENT TRAP

PERSPECTIVE



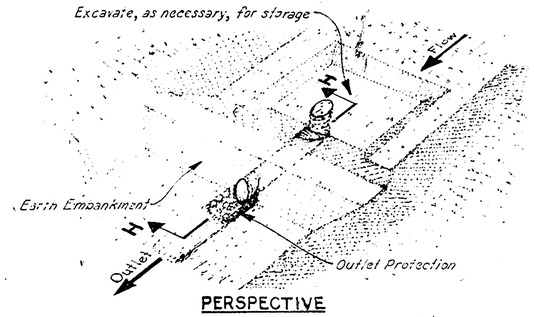
CROSS SECTION
OUTLET CHANEL

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The crest of the earth outlet shall be level. The outlet width (feet) shall be equal to 6 times the drainage area (acres). If an embankment is used to form the sediment trap, the outlet crest shall be at least one foot below the top of the embankment. The outlet shall be free of any restrictions to flow.
4. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
5. Sediment shall be removed and the trap restored to its original dimensions, when the sediment has accumulated to one-half of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that it will not erode.
6. The structure shall be inspected after each rain and repairs shall be made when required.
7. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
8. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

PIPE OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A pipe outlet sediment trap consists of a basin formed by an embankment or by excavation and embankment. The outlet for the trap is a perforated riser pipe with an outfall pipe through the embankment.



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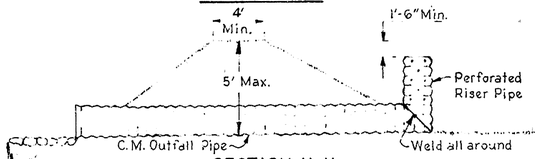


SECTION H-H

NOTES:

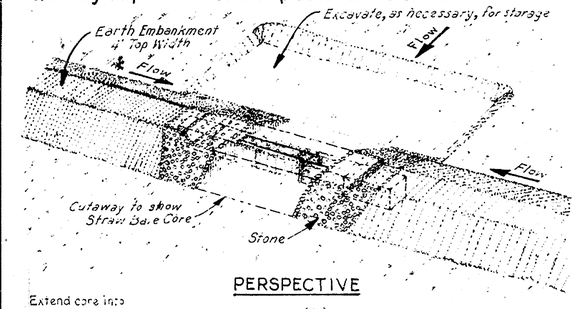
1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The top of the embankment shall be at least 1½ feet above the crest of the riser.
4. The outfall pipe and perforated riser shall be made from corrugated metal. All pipe connections shall be watertight.
5. The diameter of the riser shall be the same or larger than the diameter of the outfall pipe. At least the top ⅔ of the riser shall be perforated with ½ inch diameter holes spaced 6 inches vertically and 10 to 12 inches horizontally. Select the required diameter for the outfall pipe from the following table:

Maximum Drainage Area (acres)	1	2	3	4	5
Minimum Pipe Diameter (Inches)	12	18	21	24	30

6. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
7. Fill material around the outfall pipe shall be hand compacted in 4-inch layers. A minimum of 2 feet of hand compacted backfill shall be placed before construction equipment will be permitted to operate or cross over the pipe.
8. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
9. The structure shall be inspected after each rain and repairs shall be made when required.
10. Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to ½ of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that erosion will not occur.
11. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

STONE OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A stone outlet sediment trap consists of a basin formed by an embankment or by excavation and embankment. The outlet for the trap is over a level stone section. The stone outlet for a sediment trap differs from that for a stone outlet structure because of the intentional ponding of water behind the stone. To provide for the ponding, a relatively impervious core is placed in the stone.



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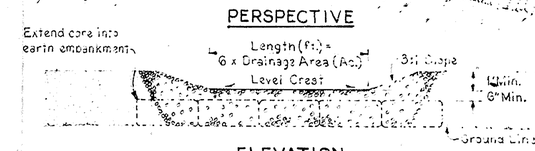


ELEVATION

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The crest of the stone outlet shall be level and at least 1 foot below the top of the embankment. The crest width (feet) of the outlet shall be equal to 6 times the drainage area (acres).
4. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments, used to form sediment traps, shall be 4 feet.
5. The crushed stone used to form the outlet shall meet Delaware Standard Gradation Size № 103. Gravel meeting the above gradation requirement may be used if crushed stone is not available.
6. The drawings above show straw bales being used to form the core. The bales shall be anchored in accordance with the details for Straw Bale Dike, shown on Standard Sheet Number EC-1. Other materials (timber, concrete block, etc.) may be used for the core. All core material must be firmly anchored to the ground. The core shall be covered by a minimum of 6 inches of stone.
7. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
8. The structure shall be inspected after each rain and repairs shall be made when required.
9. Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to ½ of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that erosion will not occur.
10. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

APPROVED: DATE:	CHAPMAN ROAD - PHASE I	SHEET NO. 26	TOTAL SHEETS 54
DIRECTOR OF HIGHWAYS	~~STANDARD~~ SHEET NUMBER EC-3 EROSION CONTROL DETAILS SEDIMENT TRAPS		
RECOMMENDED: DATE:	PREL TRACING WRD DESIGN WRD CHKD REVISIONS		
DEPUTY DIRECTOR OF HIGHWAYS			

GENERAL NOTES FOR SEDIMENT TRAPS

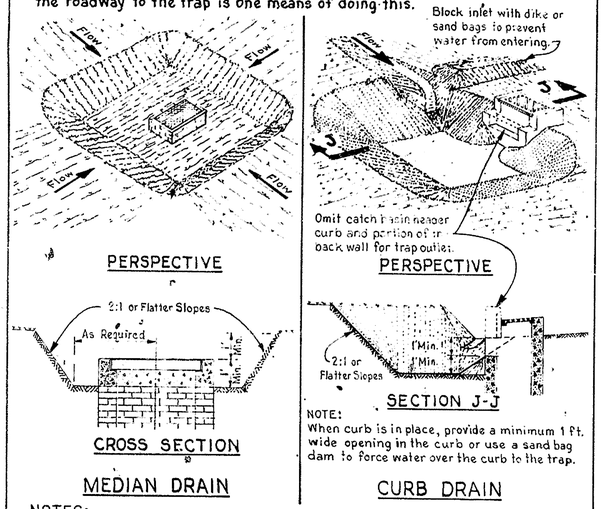
A sediment trap is a temporary basin of limited capacity formed by excavation and/or embankment, that is used to intercept sediment laden storm runoff and to trap and retain the sediment in order to protect drainageways, properties and rights of way below the sediment trap from sedimentation. They are usually installed in a drainageway, at a storm drainage inlet, or at other points of discharge from a disturbed area.

1. The drainage area for a sediment trap shall not exceed 5 acres.
2. The sediment trap should be located to obtain the maximum storage benefit from the terrain, for ease of cleanout of the trapped sediment and to minimize interference with construction activities.
3. The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 1,800 cubic feet per acre of drainage area. The volume of the trap shall be calculated using standard mathematical procedures. The volume of a natural basin may be approximated by the equation; Volume (cu. ft.) = 0.4 x surface area (sq. ft.) x maximum depth (ft.).
4. All embankments for sediment traps shall not exceed 5 feet in height, as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum top width of 4 feet.
5. There are 4 types of outlets for sediment traps. Each sediment trap is named according to the type of outlet that it has. Each of the types have different design criteria and are discussed seperately. The outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the trap and that erosion of the outlet does not occur.
6. A trap may have several different outlets with each outlet conveying part of the flow based on the criteria for each outlet type, and the combined outlet capacity shall be adequate to carry the total required flow. For example, a 12 foot earth outlet (adequate for 2 acres) and a 12 inch diameter pipe outlet (adequate for 1 acre) could be used for a three acre drainage area.
7. There is no standard symbol for a sediment trap. Each type shall be delineated on the Erosion Plan in such a manner that it will not be confused with any other features. Each trap in the plans shall be numbered consecutively and a summary table (on the same plan sheet) shall show the following information:
   a) type of trap
   b) size of outlet
   c) trap dimensions
   d) embankment height and depth of excavation
   e) drainage area.

APPROVED: DATE:	CHAPMAN ROAD - PHASE I	SHEET NO. 27	TOTAL SHEETS 34
DIRECTOR OF HIGHWAYS	~~STANDARD~~ SHEET NUMBER EC-4 EROSION CONTROL DETAILS SEDIMENT TRAPS AND GRADE STABILIZATION STRUCTURES		
RECOMMENDED: DATE:	PREL. TRACE WRU DESIGN WRU CHKD. REVISIONS		
DEPUTY DIRECTOR OF HIGHWAYS			

STORM INLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A storm inlet sediment trap consist of a basin formed by excavation or by natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet wall. An inlet located in a median swale or a side ditch of the roadway might use the inlet opening as an outlet. A pavement inlet in a curbed section would require a temporary opening. The trap should be out of the roadway so as not to interfere with construction. Placing the trap back of the curb and diverting water from the roadway to the trap is one means of doing this.



MEDIAN DRAIN

NOTE:
When curb is in place, provide a minimum 1 ft. wide opening in the curb or use a sand bag dam to force water over the curb to the trap.

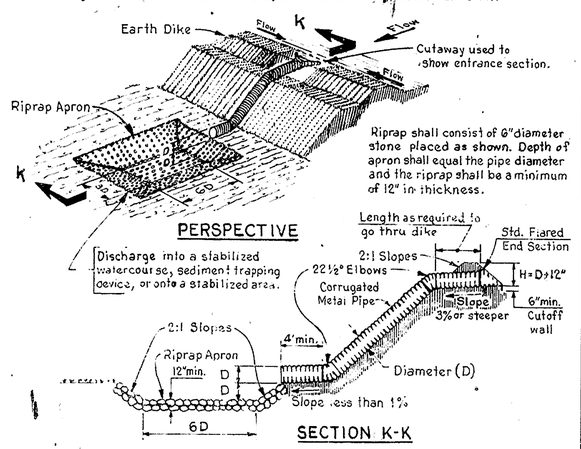
CURB DRAIN

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The outlet crest shall be at least 1 foot below the top of any embankment, or in the case of excavation, at least 1 foot below the ground adjacent to the trap.
4. The capacity of the outlet shall be based on the size of the catch basin outlet pipe. Select the allowable drainage area from the table in Note 5 under Pipe Outlet Sediment Traps on Standard Sheet Number EC-3.
5. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
6. The structure shall be inspected after each rain and repairs shall be made when required.
7. Sediment shall be removed and the trap restored to its original dimensions, when the sediment has accumulated to ½ the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that it will not erode.
8. Construction operations shall be carried out in such a manner that erosion and water polution are minimized.
9. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.
10. See also the General Notes for Sediment Traps on Standard Sheet EC-3.

GRADE STABILIZATION STRUCTURE
RIGID PIPE SLOPE DRAINS
(DRAINAGE AREA: 5 ACRES OR LESS)

A rigid pipe with a prefabricated flared entrance section, temporarily placed to extend from the top to the bottom of a slope, used to convey surface runoff safely down the slope without causing erosion. Pipe slope drains are to be used whenever concentrated flows of surface runoff are to be conveyed down a cut or fill slope in order to prevent erosion.



EROSION PLAN SYMBOL

RPSD-Diameter Example: RPSD-12 = Rigid Pipe Slope Drain with 12" C.M. Pipe.

NOTES:

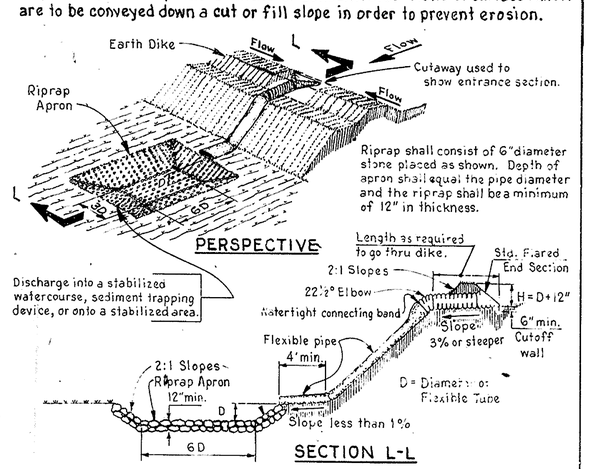
1. The entrance section and the inlet pipe shall have a slope of 3% or steeper.
2. The top of the earth dike over the inlet pipe and of all dikes carrying water to the slope drain shall be at least 1 foot higher at all points than the top of the inlet pipe.
3. The pipe shall be corrugated metal pipe with water tight connecting bands at all joints.
4. A riprap apron shall be provided at the outlet. The stone shall have a minimum dimension of 6" and shall be placed in a layer at least 12" in thickness, to the lines and grades shown by the drawing above.
5. The soil around and under the inlet pipe and entrance section shall be hand tamped in 4" lifts to the top of the earth dike.
6. Pipe slope drains are to be sized in accordance with the following table:

Maximum Drainage Area (acres)	0.5	1.5	2.5	3.5	5.0
Minimum Pipe Diameter (inches)	12	18	21	24	30

7. Follow-up inspection and any needed maintenance shall be performed after each storm.

GRADE STABILIZATION STRUCTURE
FLEXIBLE PIPE SLOPE DRAINS
(DRAINAGE AREA: 5 ACRES OR LESS)

A flexible tubing with a rigid pipe and prefabricated flared entrance section, temporarily placed to extend from the top to the bottom of a slope, used to convey surface runoff safely down the slope without causing erosion. Pipe slope drains are to be used whenever concentrated flows of surface runoff are to be conveyed down a cut or fill slope in order to prevent erosion.



EROSION PLAN SYMBOL

FPSD-Diameter Example: FPSD-18 = Flexible Pipe Slope Drain with 18" C.M. Pipe inlet section and 18" dia. flexible tubing.

NOTES:

1. The entrance section and the inlet pipe shall have a slope of 3% or steeper.
2. The top of the earth dike over the inlet pipe and of all dikes carrying water to the slope drain shall be at least 1 foot higher at all points than the top of the inlet pipe.
3. The inlet pipe shall be corrugated metal pipe with water tight connecting bands at all joints.
4. The flexible tubing shall be the same diameter as the inlet pipe and shall be constructed of a durable material with hold-down grommets spaced 10' on centers.
5. The flexible tubing shall be securely fastened to the corrugated metal pipe with metal strapping or watertight connecting collars.
6. The flexible tubing shall be securely anchored to the slope by staking at the grommets provided.
7. A riprap apron shall be provided at the outlet. The stone shall have a minimum dimension of 6" and shall be placed in a layer at least 12" in thickness, to the lines and grades shown by the drawing above.
8. The soil around and under the inlet pipe and entrance section shall be hand tamped in 4" lifts to the top of the earth dike.
9. Pipe slope drains are to be sized in accordance with the following table:

Maximum Drainage Area (acres)	0.5	1.5	2.5	3.5	5.0
Minimum Pipe Diameter (inches)	12	18	21	24	30

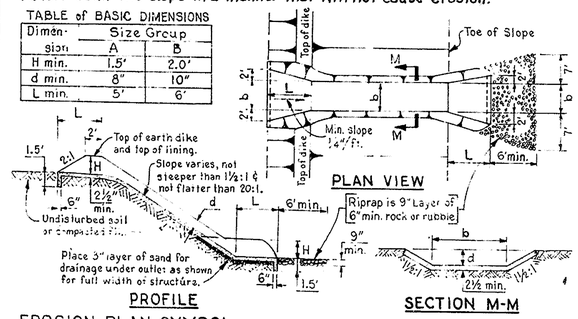
10. Follow-up inspection and any needed maintenance shall be performed after each storm.

GRADE STABILIZATION STRUCTURE
PAVED CHUTE OR FLUME
(DRAINAGE AREA: 36 ACRES OR LESS)

A temporary channel lined with bituminous concrete, Portland cement concrete, or comparable non-erodible material, placed to extend from the top of a slope to the bottom of a slope, that is used to convey concentrated flow of surface runoff down the slope in a manner that will not cause erosion.

TABLE of BASIC DIMENSIONS

Dimension	Size Group A	Size Group B
H min.	1.5'	2.0'
d min.	8"	10"
L min.	5'	6'



EROSION PLAN SYMBOL

PCF-Size Group, Bottom Width Example: PCF-A2 = Paved chute or flume, Size Group A with a 2 ft. bottom width (b). The selected size shall be shown on the erosion plan.

NOTES:

1. The structure shall be placed on undisturbed soil or on well compacted fill.
2. The cut or fill slope shall not be steeper than 1½:1 and shall not be flatter than 20:1.
3. The top of the earth dike at the entrance and of all dikes carrying water to the entrance shall not be lower at any point than the top of the lining at the entrance to the structure.
4. The lining at the entrance to the structure shall extend the distance H above the lining crest as shown in the drawing above.
5. The lining shall be placed beginning at the lower end and proceeding up the slope to the upper end. The lining shall be well compacted and free of voids and have a reasonably smooth surface finish.
6. The entrance floor at the upper end of the structure shall be sloped toward the outlet at a rate of ¼ to ½ inch per foot.
7. The cutoff walls at the entrance and discharge aprons shall be continuous with the lining.
8. The lining shall consist of Portland cement concrete, bituminous concrete, or comparable non-erodible material.
9. An energy dissipator of adequate design shall be used at the outlet to prevent erosion.
10. Chutes or flumes are divided into two size groups, which have basic dimensions as shown by the tabulation in the drawing above. Each size group has various bottom widths and allowable drainage areas as shown below:

Size	Bottom Width b, feet	Max. D.A. acres
A-2	2	5
A-4	4	8
A-6	6	11
A-8	8	14
A-10	10	18

Size	Bottom Width b, feet	Max. D.A. acres
B-4	4	14
B-6	6	20
B-8	8	25
B-10	10	31
B-12	12	36

If a minimum of 75% of the drainage area will have a good grass or woodland cover throughout the life of the structure, the drainage areas listed above may be increased by 50%. If a minimum of 75% of the drainage area will have a good mulch cover throughout the life of the structure, the drainage areas listed above may be increased by 25%. Structures of size group B shall have their outfall velocity checked for erosion potential downstream.