STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	11C.086024	1	13

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

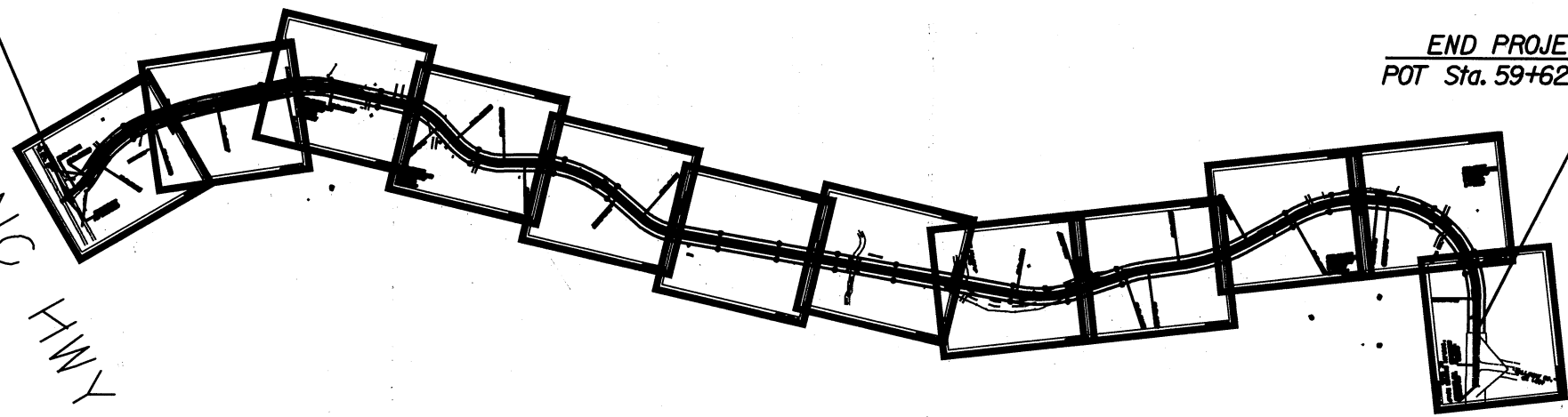
SURRY COUNTY

LOCATION: SR 1345 BEULAH CHURCH RD. FROM THE INTERSECTION OF US HWY. 89 STA. 10+00 TO END OF PROJECT STA. 59+62.47

TYPE OF WORK: GRADE, DRAIN, BASE, PAVE – 0.96 MILES

BEGIN PROJECT
POT Sta. 10+00.00

END PROJECT
POT Sta. 59+62.47



"NC HWY. 89"

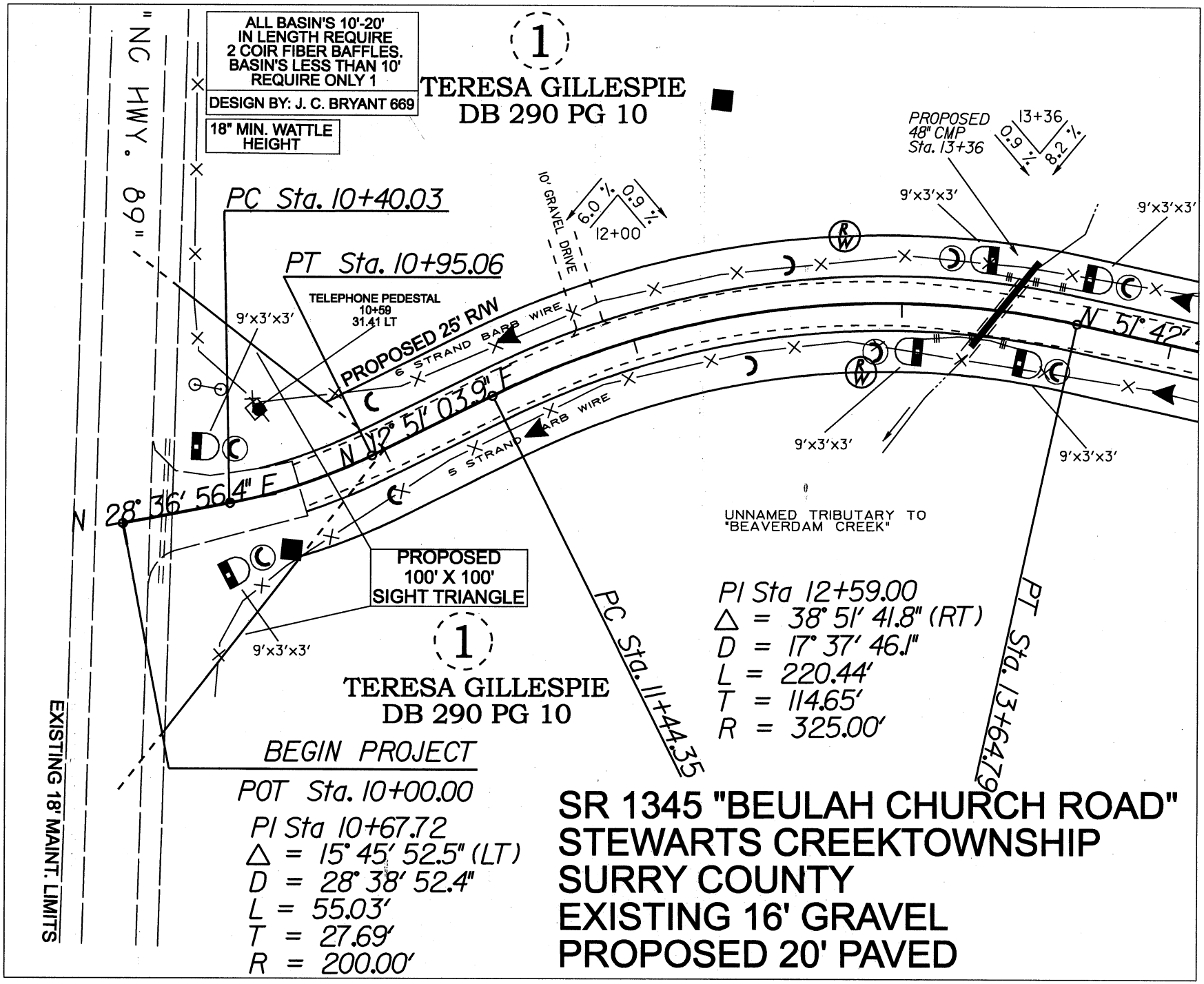
"CALLOWAY RD."
SR 1609

DISCLAIMER

THIS MAP IS NOT A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS. THE PROPERTY SHOWN ON THIS MAP WAS LOCATED FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION FOR HIGHWAY DESIGN PURPOSES. SOME ERROR MAY EXIST BETWEEN THE GRAPHICAL AND ACTUAL GROUND LOCATIONS OF PROPERTY LINES. THIS MAP IS TO BE USED AS A GRAPHICAL REPRESENTATION OF THE NCDOT'S INTENT TO ACQUIRE PROPERTY FOR RIGHT OF WAY PURPOSES, AND IN NO WAY REPRESENTS AN ACTUAL BOUNDARY SURVEY OF THIS PROPERTY.

GRAPHIC SCALES	DESIGN DATA	PROJECT LENGTH	Prepared in the Office of: DIVISION OF HIGHWAYS DIVISION 11, DISTRICT 1, ELKIN P.O. BOX 558 ELKIN, NC 28621	DIVISION ENGINEER	DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA
		0.96 MILES	RIGHT OF WAY DATE: APRIL 23, 2009 LETTING DATE:	M.A. PETTYJOHN, P.E. DIVISION ENGINEER B.W. WHITAKER, P.E. DISTRICT ENGINEER	SIGNATURE: P.E. DISTRICT ENGINEER SIGNATURE: P.E.	STATE DESIGN ENGINEER P.E. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION APPROVED DIVISION ADMINISTRATOR DATE

PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 02

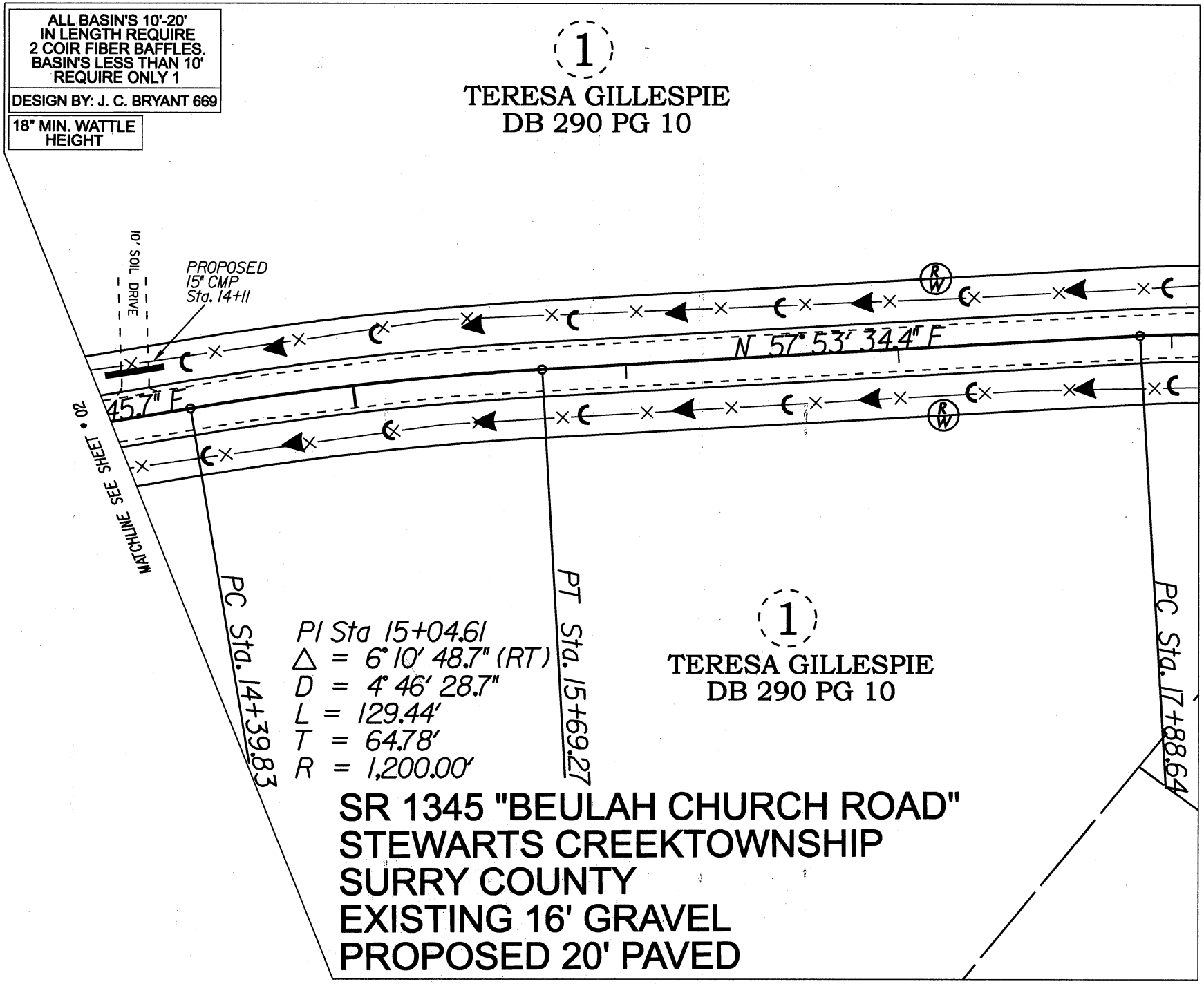


PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 03

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



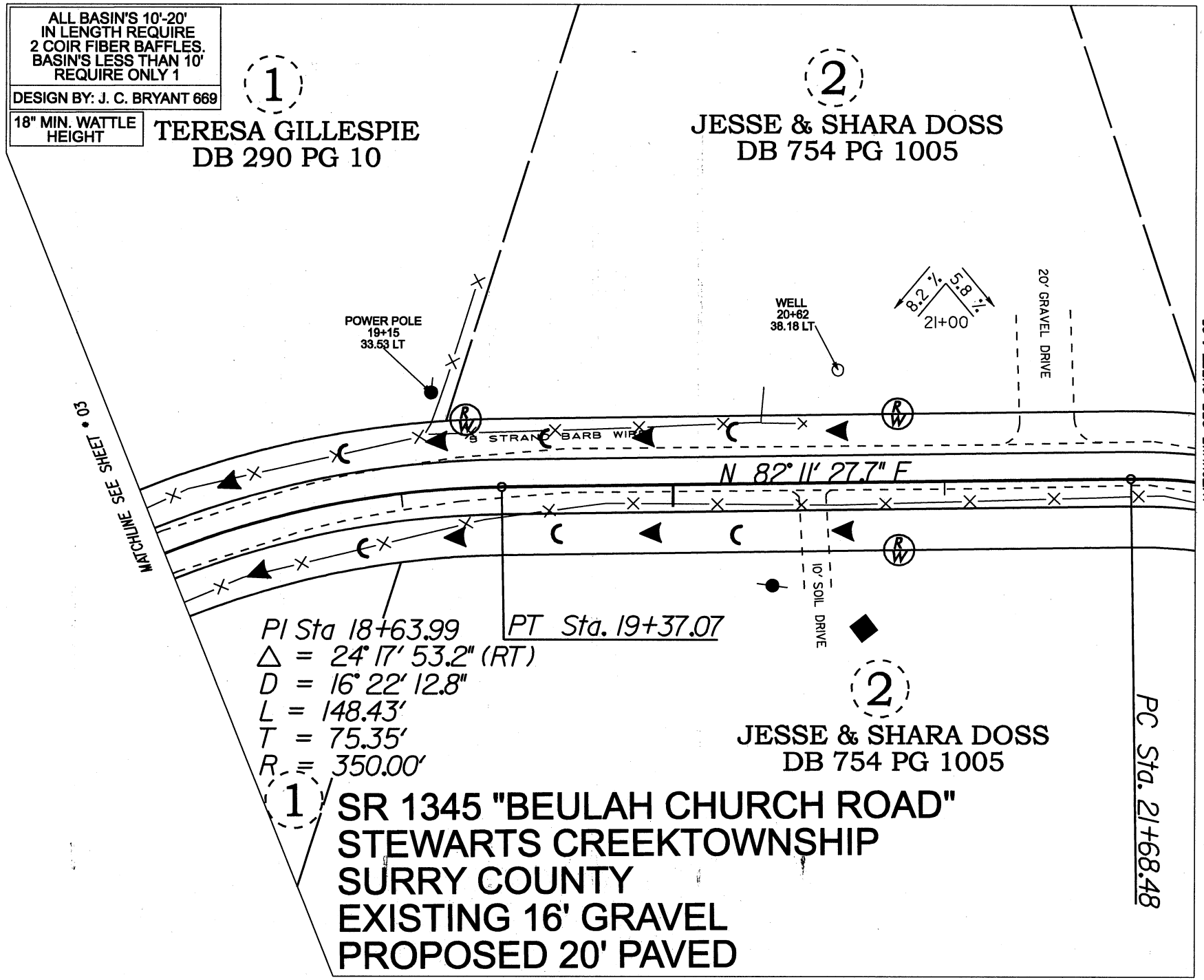
HORIZONAL SCALE 1"= 50'

PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 04

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



HORIZONAL SCALE 1"= 50'

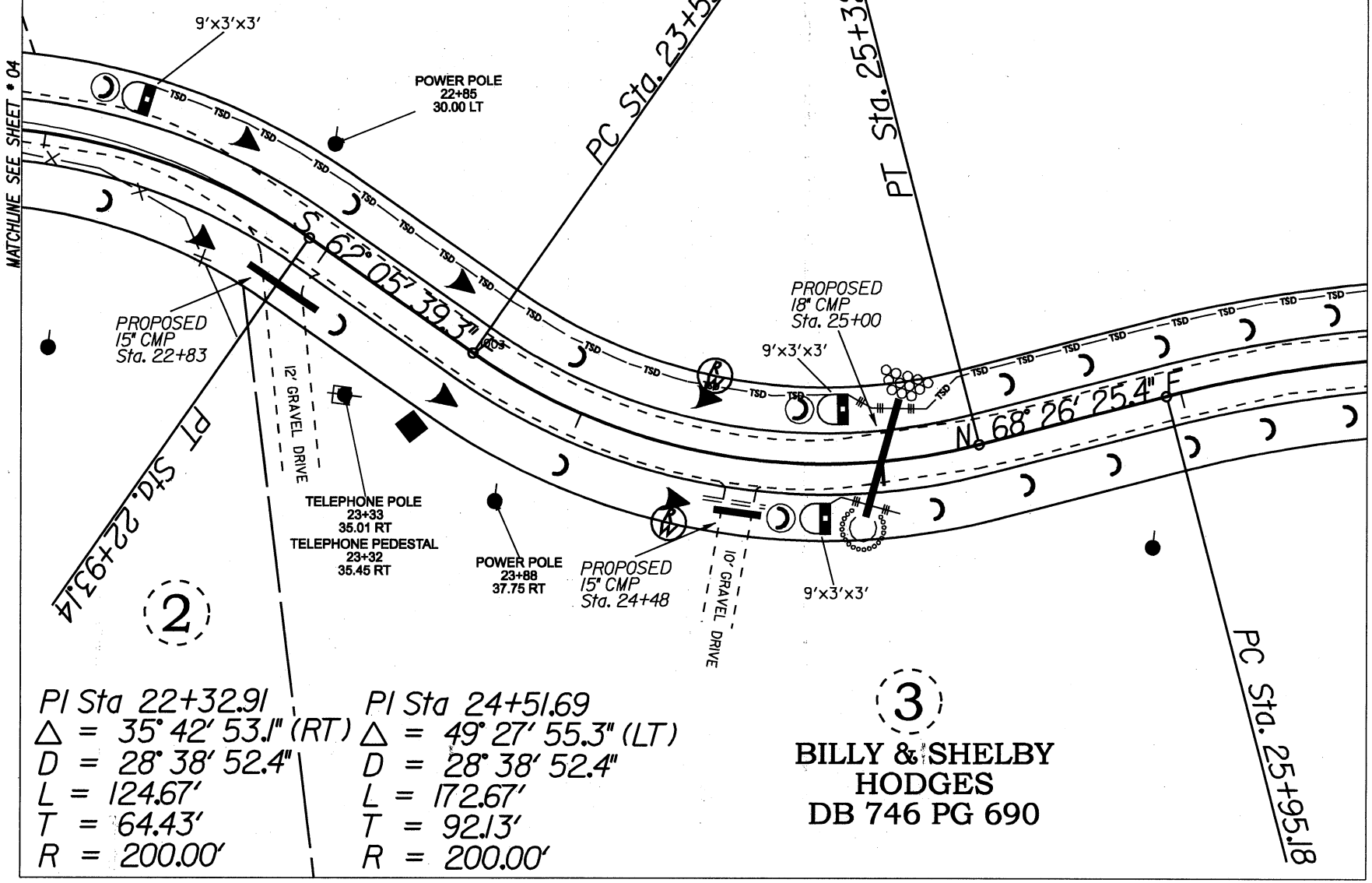
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 05

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



PI Sta 22+32.91
Δ = 35° 42' 53.1" (RT)
D = 28° 38' 52.4"
L = 124.67'
T = 64.43'
R = 200.00'

PI Sta 24+51.69
Δ = 49° 27' 55.3" (LT)
D = 28° 38' 52.4"
L = 172.67'
T = 92.13'
R = 200.00'

HORIZONAL SCALE 1"= 50'

PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH_06

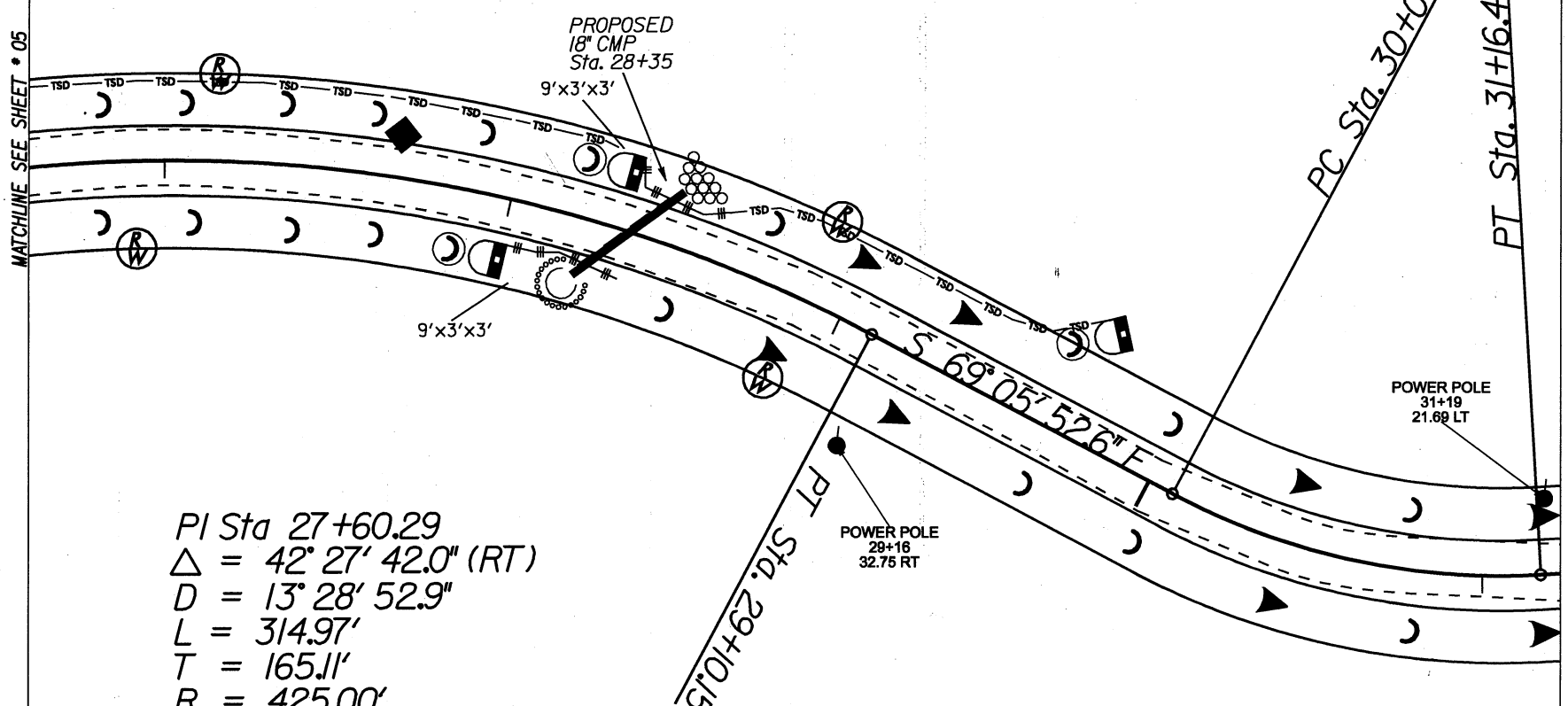
ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT

PI Sta 30+63.43
△ = 31° 11' 21.3" (LT)
D = 28° 38' 52.4"
L = 108.87'
T = 55.82'
R = 200.00'

3
BILLY & SHELBY HODGES
DB 746 PG 690



PI Sta 27+60.29
△ = 42° 27' 42.0" (RT)
D = 13° 28' 52.9"
L = 314.97'
T = 165.11'
R = 425.00'

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

3
BILLY & SHELBY HODGES
DB 746 PG 690

HORIZONAL SCALE 1"= 50'

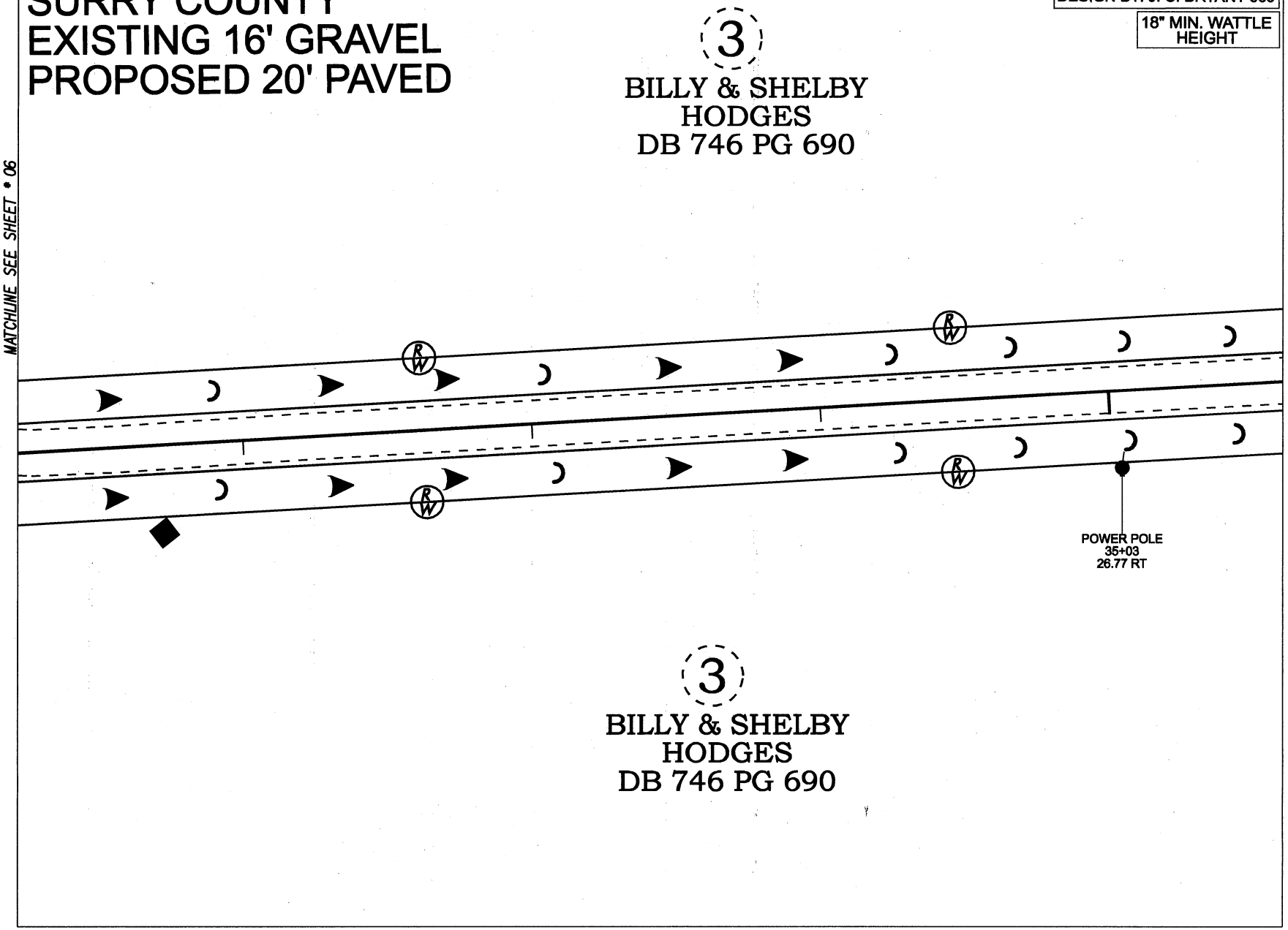
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 07

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



HORIZONAL SCALE 1"= 50'

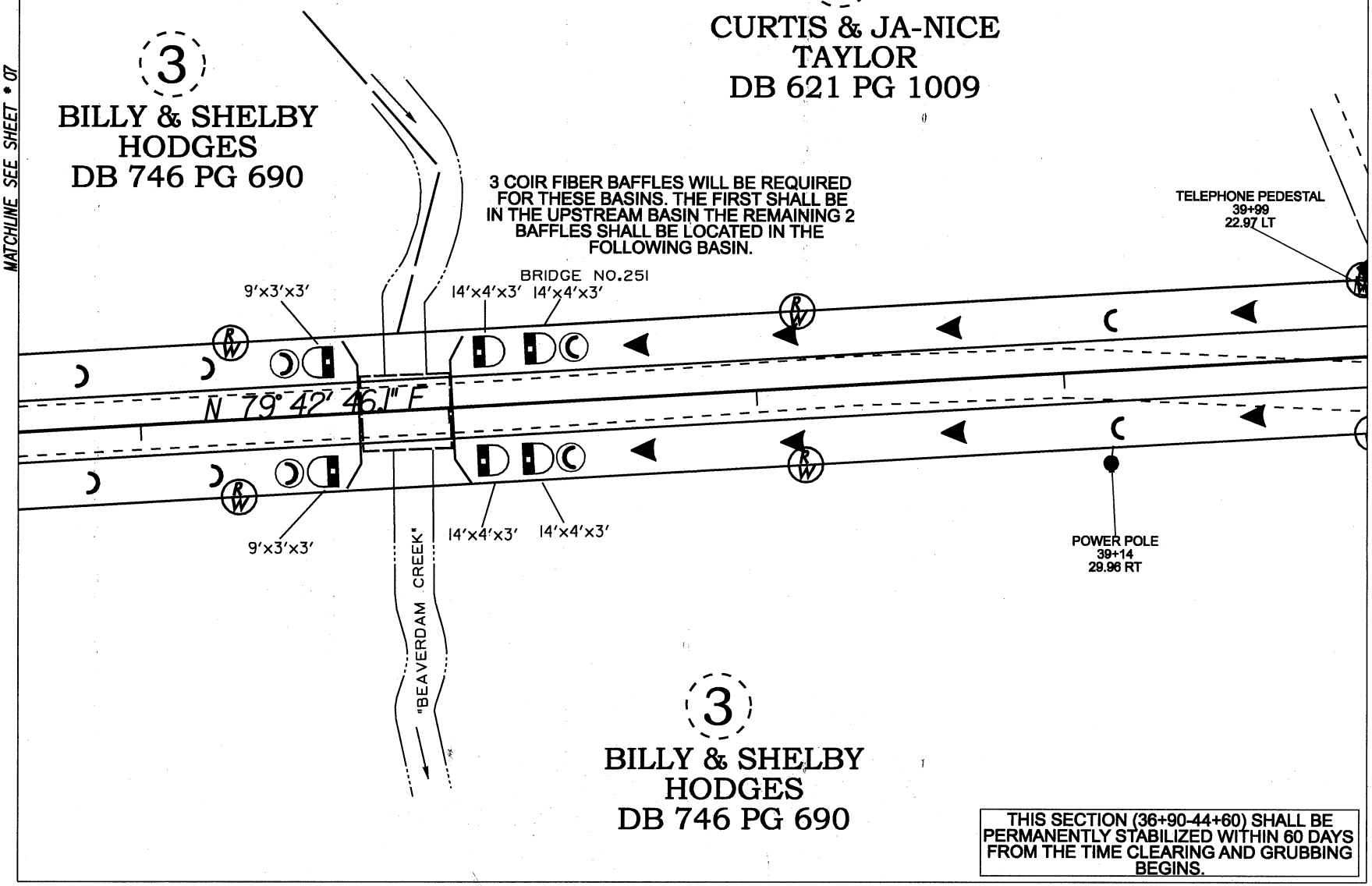
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 08

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



THIS SECTION (36+90-44+60) SHALL BE PERMANENTLY STABILIZED WITHIN 60 DAYS FROM THE TIME CLEARING AND GRUBBING BEGINS.

HORIZONAL SCALE 1"= 50'

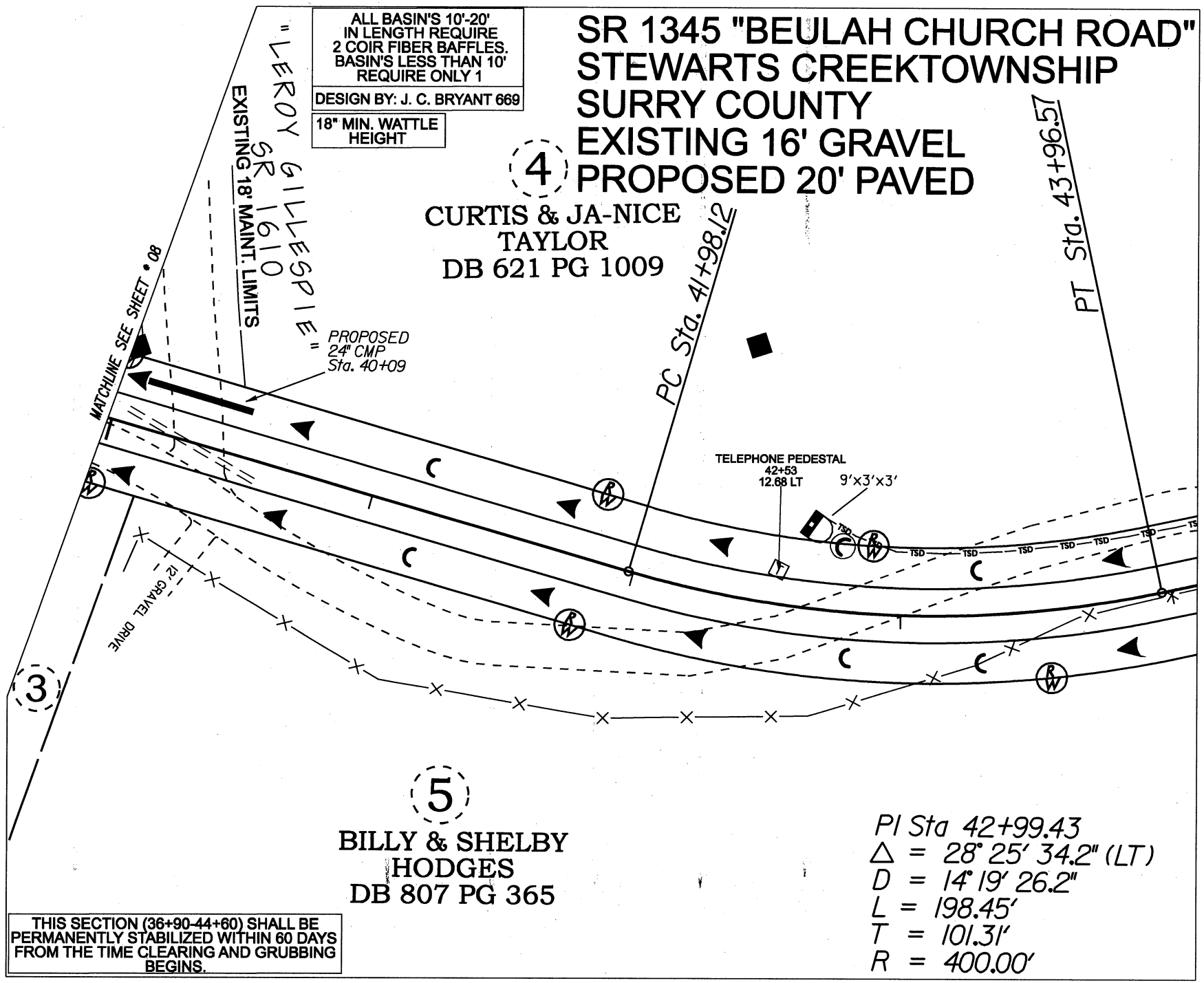
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 09

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED



PI Sta 42+99.43
Δ = 28° 25' 34.2" (LT)
D = 14° 19' 26.2"
L = 198.45'
T = 101.31'
R = 400.00'

THIS SECTION (36+90-44+60) SHALL BE PERMANENTLY STABILIZED WITHIN 60 DAYS FROM THE TIME CLEARING AND GRUBBING BEGINS.

HORIZONAL SCALE 1"= 50'

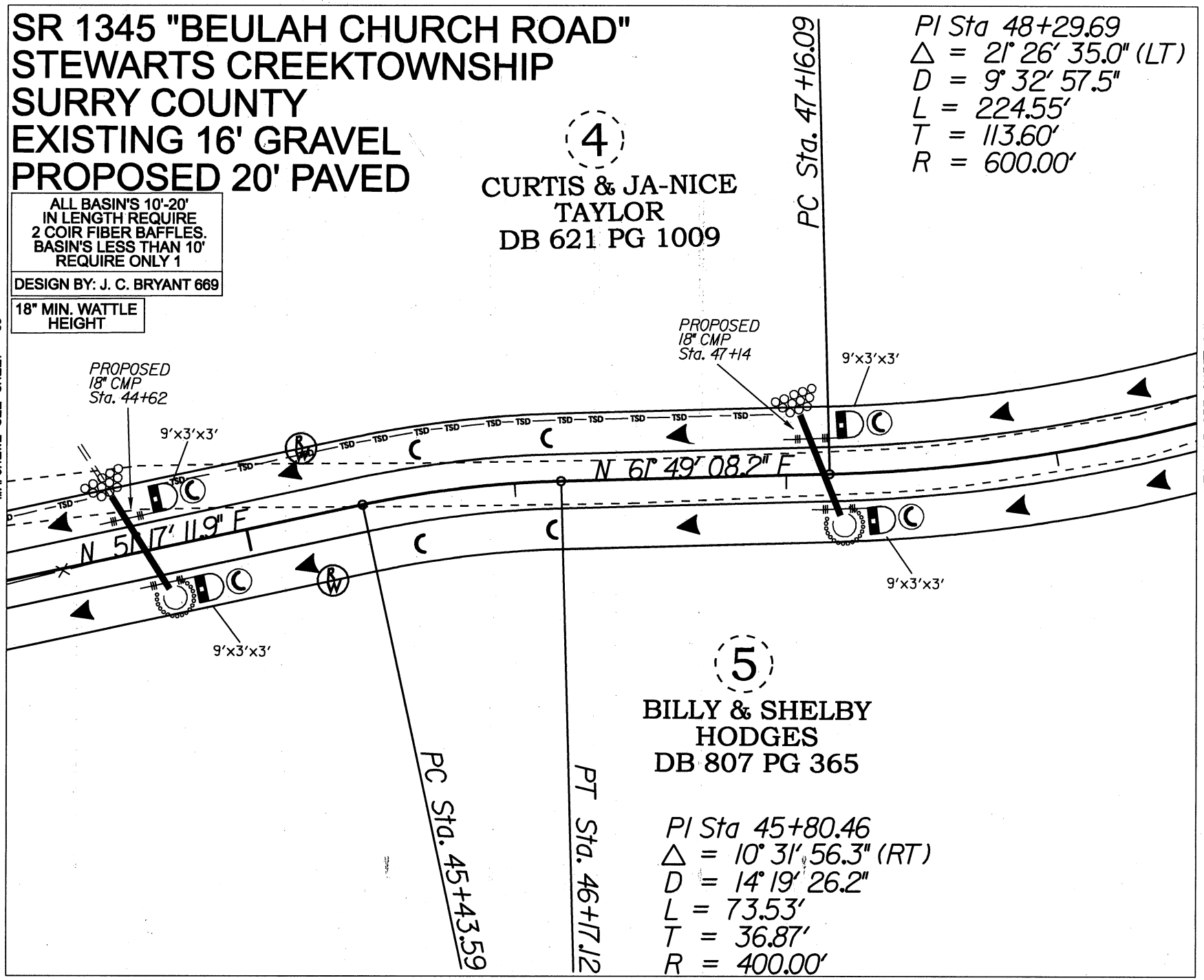
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 10

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



HORIZONAL SCALE 1"= 50'

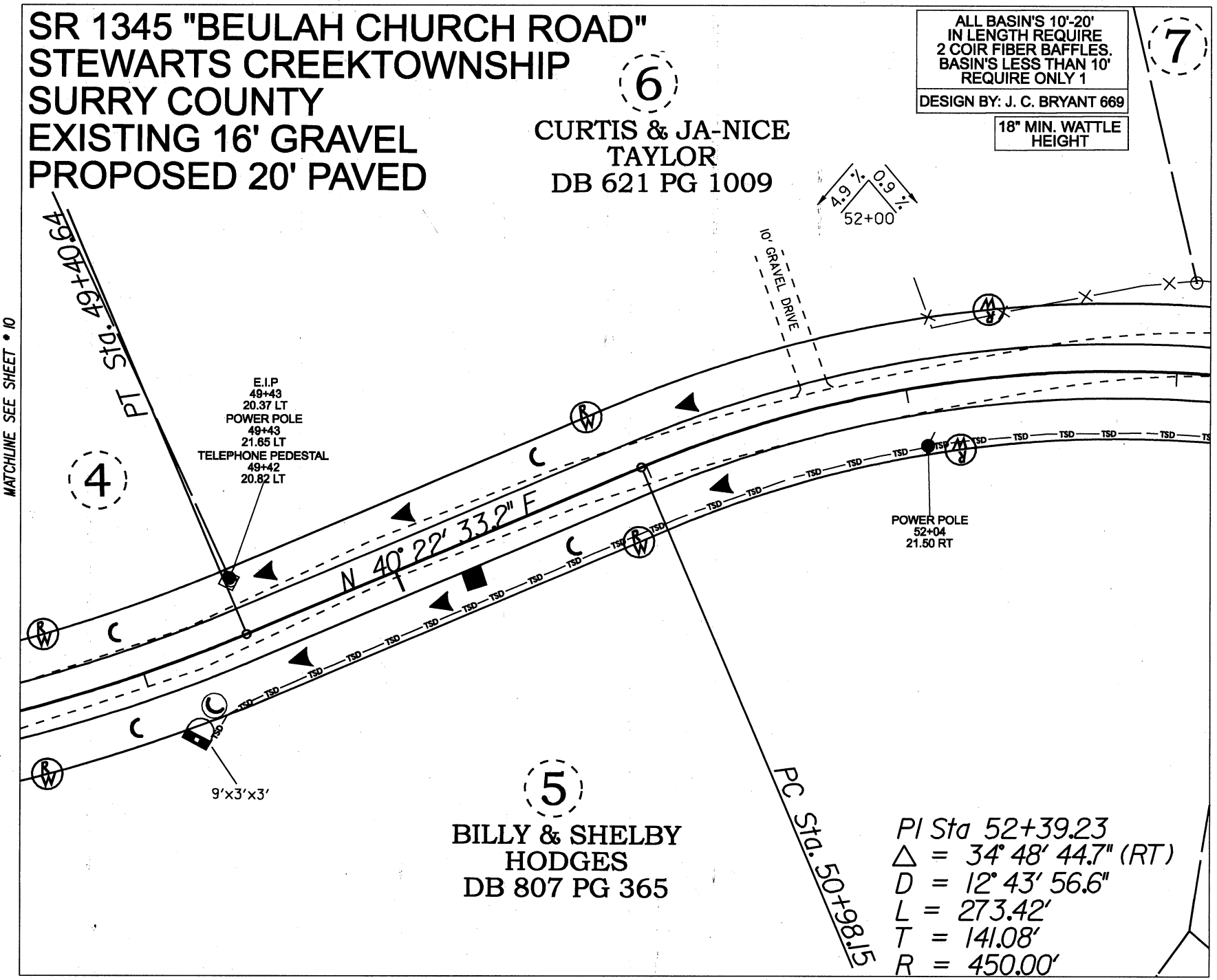
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 11

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



PI Sta 52+39.23
Δ = 34° 48' 44.7" (RT)
D = 12° 43' 56.6"
L = 273.42'
T = 141.08'
R = 450.00'

HORIZONAL SCALE 1"= 50'

PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 12

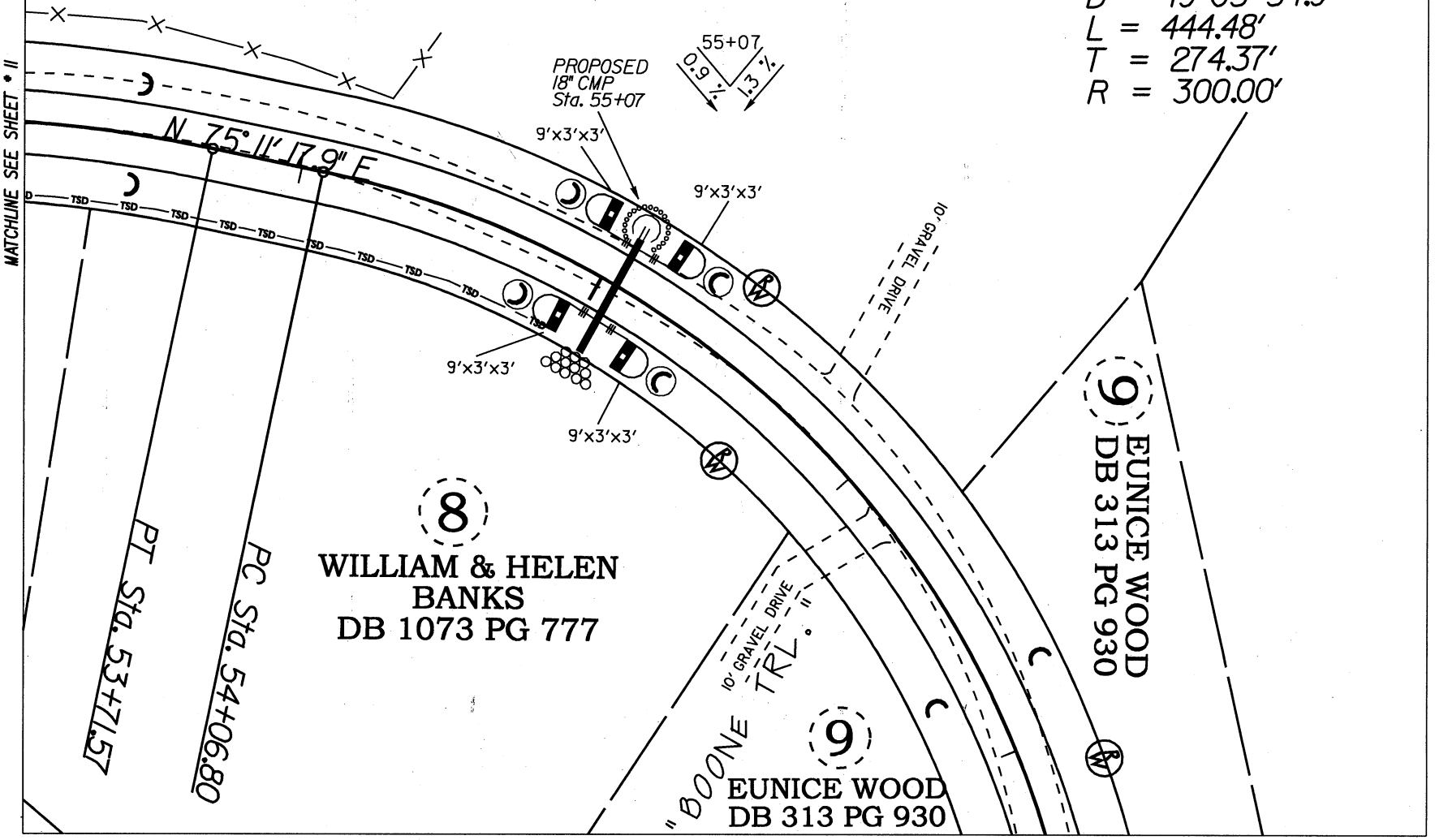
ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

PI Sta 56+81.17
Δ = 84° 53' 23.6" (RT)
D = 19° 05' 54.9"
L = 444.48'
T = 274.37'
R = 300.00'



HORIZONAL SCALE 1"= 50'

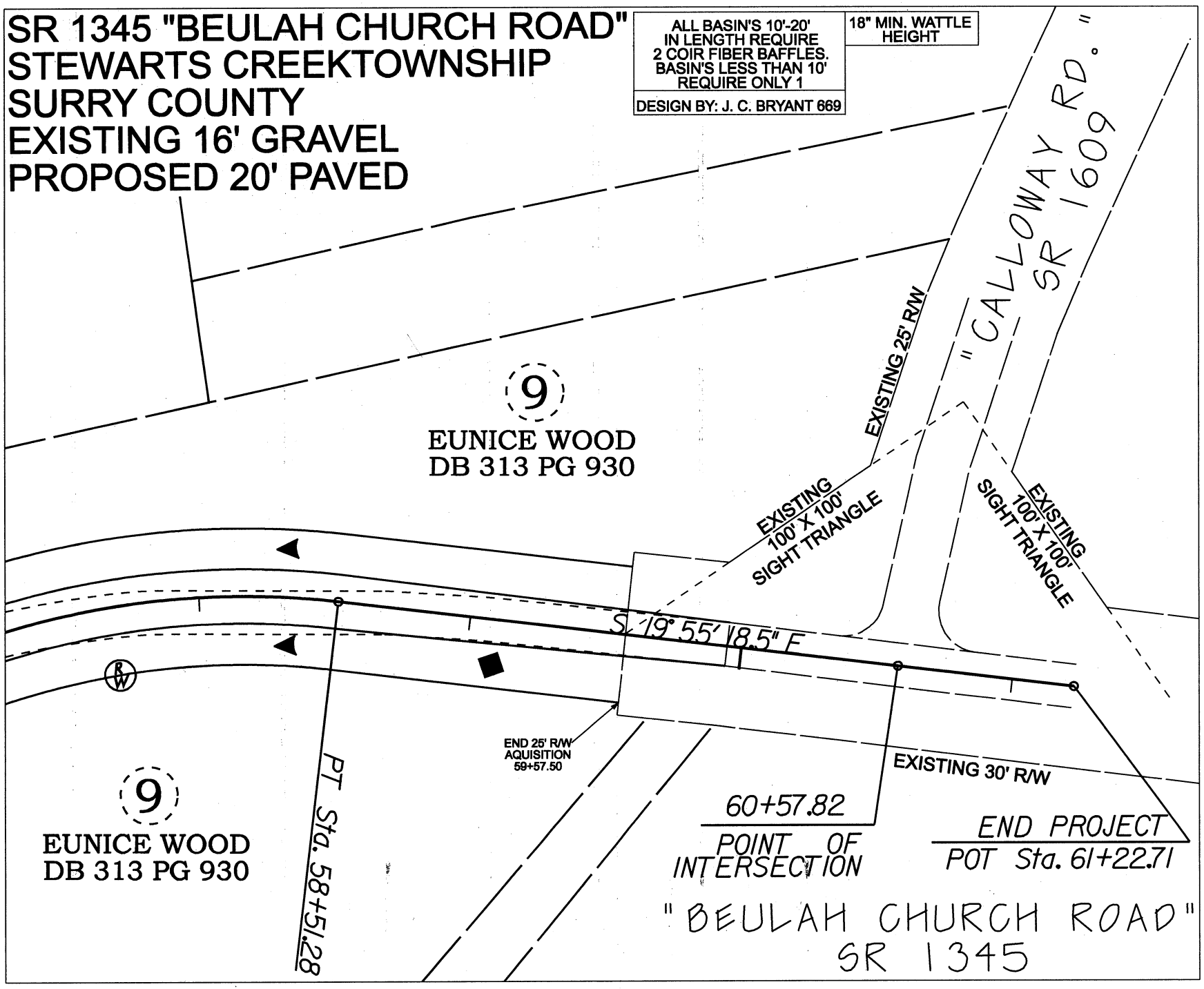
PROJECT REFERENCE NO.	SHEET NO.
11C.086024	PSH 13

SR 1345 "BEULAH CHURCH ROAD"
STEWARTS CREEKTOWNSHIP
SURRY COUNTY
EXISTING 16' GRAVEL
PROPOSED 20' PAVED

ALL BASIN'S 10'-20' IN LENGTH REQUIRE 2 COIR FIBER BAFFLES. BASIN'S LESS THAN 10' REQUIRE ONLY 1

DESIGN BY: J. C. BRYANT 669

18" MIN. WATTLE HEIGHT



HORIZONAL SCALE 1"= 50'

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3 Special Sediment Control Fence

4 Temporary Silt Ditch

5 Temporary Diversion

6 Temporary Slope Drain

7 Riser Basin

8 Silt Basin, Type B

9 Temporary Rock Silt Check, Type A

10 Temporary Rock Silt Check, Type B

11 Temporary Rock Sediment Dam, Type A

12 Temporary Rock Sediment Dam, Type B

13 Rock Pipe Inlet Sediment Trap, Type A

14 Rock Pipe Inlet Sediment Trap, Type B

15 Skimmer Basin

16 Stilling Basin

17 Rock Inlet Sediment Trap, Type A

18 Rock Inlet Sediment Trap, Type B

19 Rock Inlet Sediment Trap, Type C

20 Coir Fiber Baffle

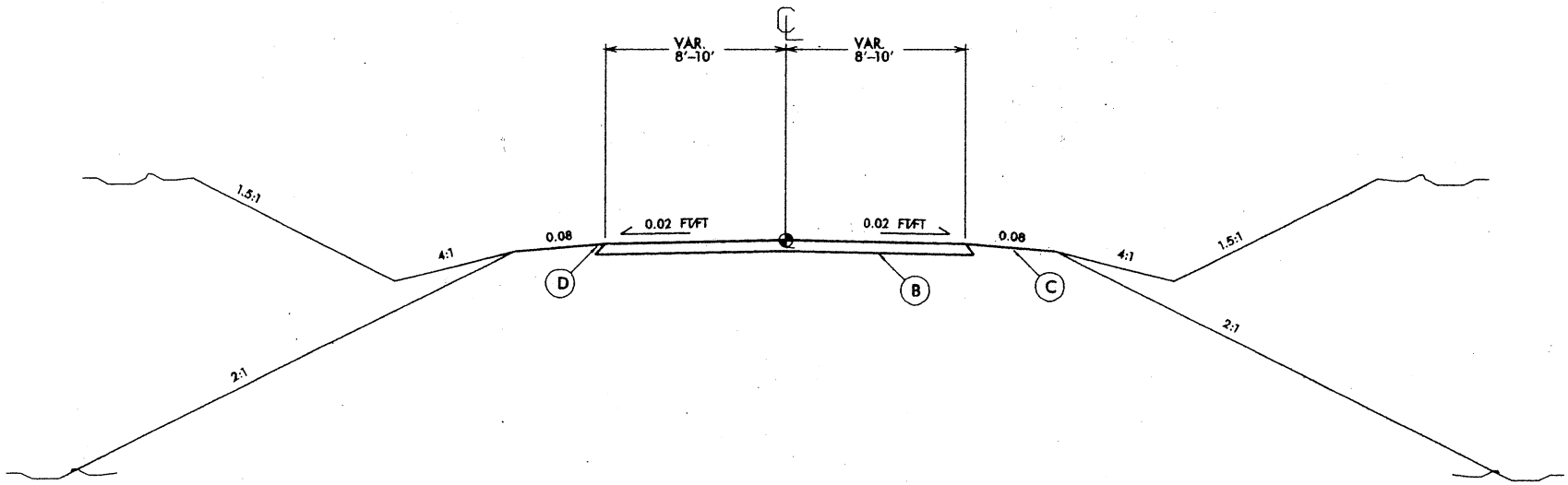
21 Gravel Construction Entrance

22 Special Stilling Basin

23 Temporary Stream Crossing

24 Wattle with Polyacrylamide (PAM)

25 Silt Check Type A with Excelsior Matting and Polyacrylamide (PAM)



B *8" (compacted) ABC*

C *Shoulder varies: Cut side = 4' shoulder on .08 ft/ft transition to a 4:1 slope for a distance of 4' to center of the ditch line*

Fill side = 6' to shoulder break

D *Base should be 1' wider than overall proposed road width*

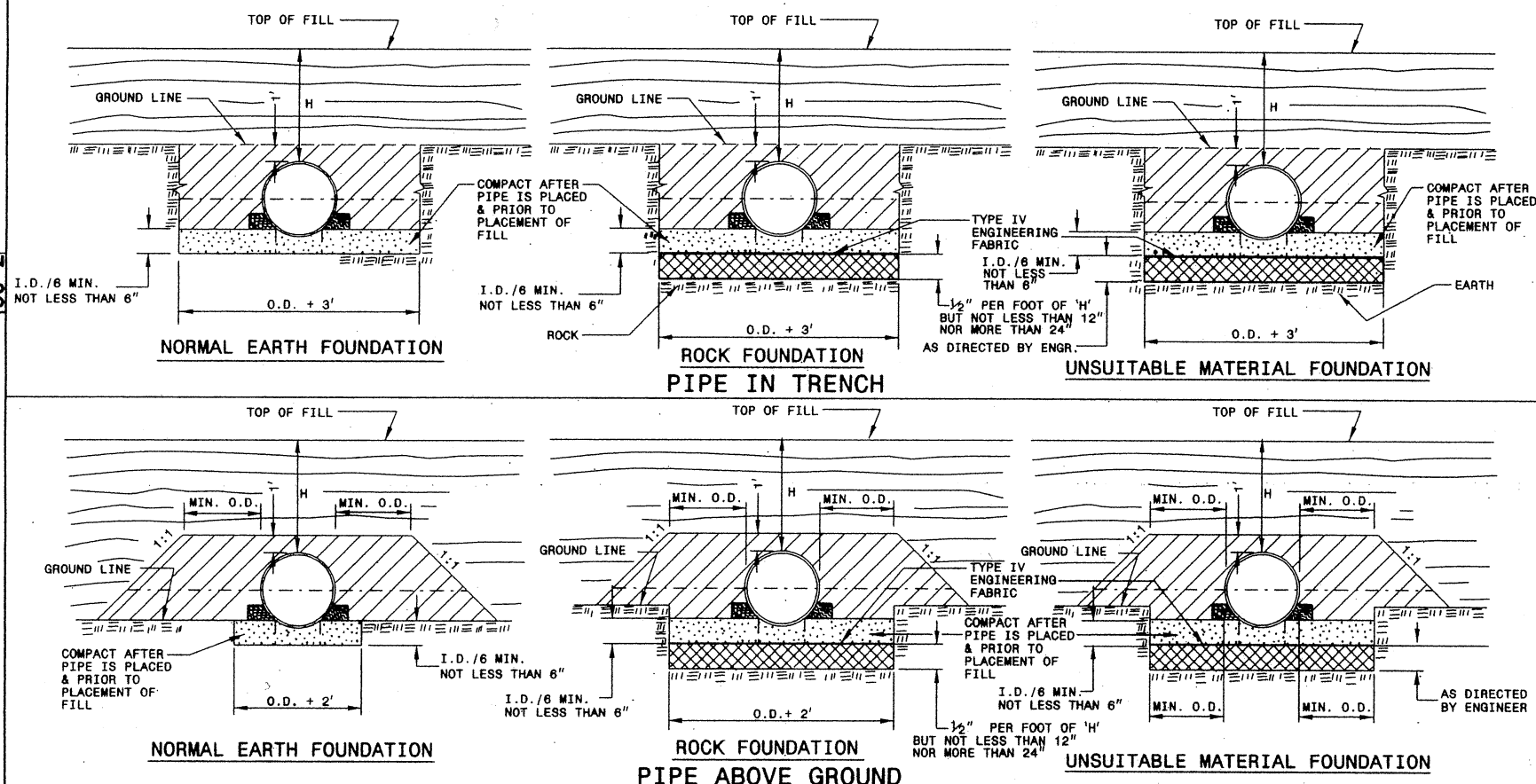
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

3010 2593

SHEET 1 OF 3

300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FLEXIBLE PIPE

SHEET 1 OF 3

300D01

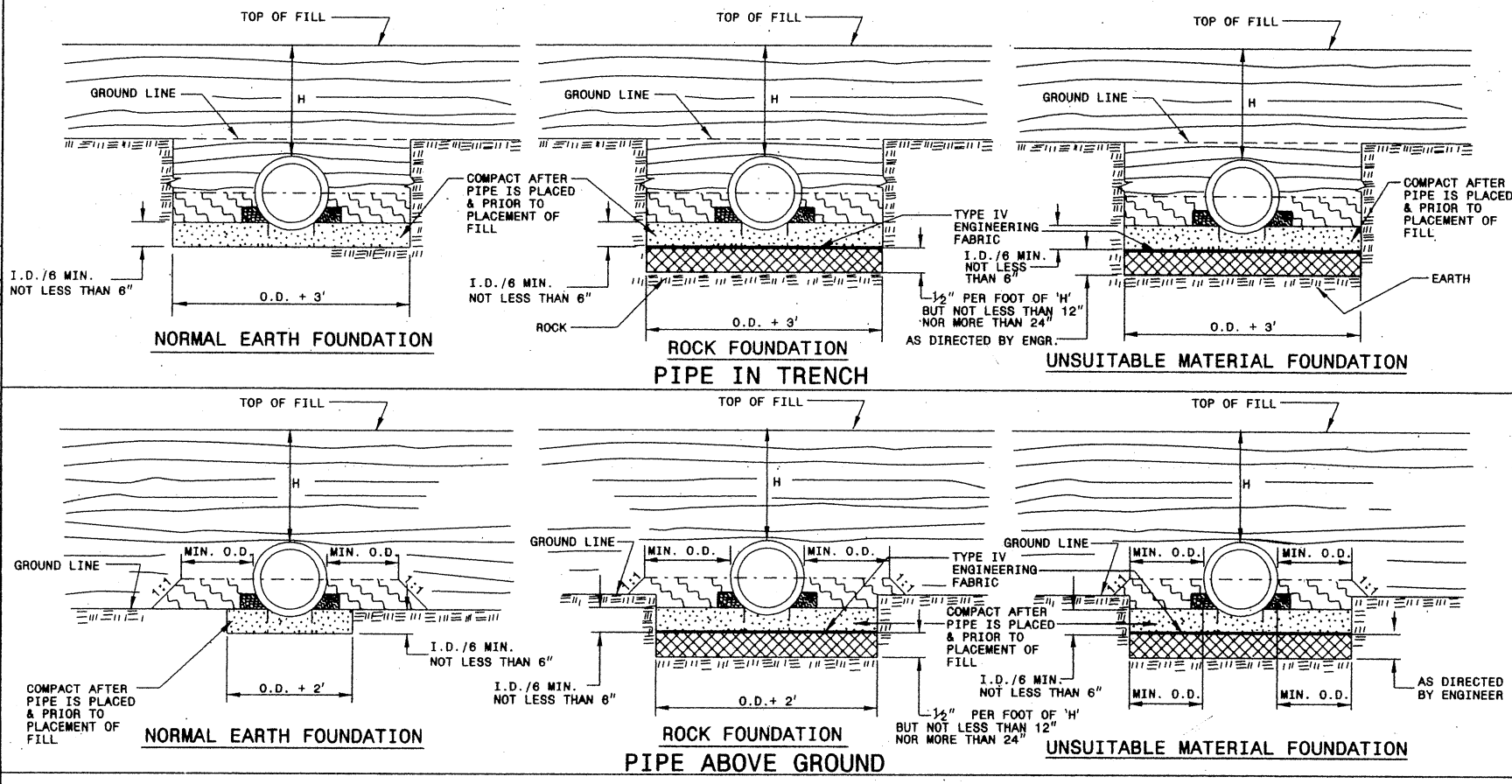
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 3
300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	218	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

HDPE - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
* (Maximum fill) 20' for pipe diameters ≤ 24"
17' for pipe diameters ≥ 30" and ≤ 60"

PVC - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"
* (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

RIGID PIPE

RCP - * (Minimum fill) 1' for Class IV & CLASS V
2' for Class III & Class II

* (Maximum fill) 10' - Class II pipe
20' - Class III pipe
30' - Class IV pipe
40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

Temporary Liner (Matting) in Ditchline Calculations (English)

Construction Line (-L-,-Y-,etc.)	L	L	L	L	L	L	L	L	L	L
Left or Right (LT.,RT.,Median)	LT/RT	LT/RT	LT/RT	RT	RT	LT/RT	LT/RT	RT	LT/RT	LT.
Upper Station No.	1030	1200	1336	2100	2500	2833	3690	4460	4750	5200
Upper Station Elevation (ft.)	996.97	1007.2	1006	1069	1046	1010	946	998.02	1001	1023
Lower Station No.	1200	1336	2100	2500	2833	3690	4460	4750	5200	5505
Lower Station Elevation (ft.)	1007.2	1006	1069	1046	1010	946	988.02	1001	1023	1020.4
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Frontslope Grade (i.e. 2 for 2:1)	4	4	4	4	4	4	4	4	4	4
Backslope Grade (i.e. 2 for 2:1)	2	2	2	2	2	2	2	2	2	2
Base Width (ft., 0 for V-Ditches)	0	0	0	0	0	0	0	0	0	0
Measured Ditchline Length (ft.)	170	136	764	400	333	857	770	290	450	305
Ditch Grade (%)	6.02	0.88	8.25	5.75	10.81	7.47	5.46	1.03	4.89	0.85
Velocity (ft/s)	4.60	1.76	5.38	4.50	6.16	5.12	4.38	1.90	4.15	1.73
Shear Stress in Ditch (lb/ft^2)	1.24	0.18	1.70	1.18	2.23	1.54	1.12	0.21	1.01	0.18
Ditch Liner Requirement	**PSRM**	**None**	**RIPRAP**	**PSRM**	**RIPRAP**	**RIPRAP**	**PSRM**	**None**	**PSRM**	**None**
Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PSRM Matting Quantity (yd^2)	**215**	**0**	**0**	**505**	**0**	**0**	**970**	**0**	**570**	**0**

12-2
L
LT/RT
5505
1020.4
6000
1027
0.33
1.8
4
2
0
495
1.33
2.16
0.27
MATTING
625
0