

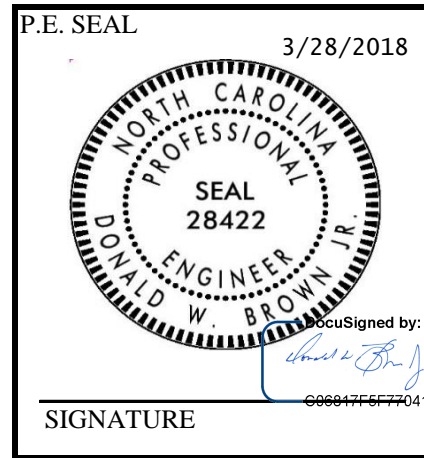
FOUNDATION RECOMMENDATIONS

Prepared for NCDOT by: Stewart

PROJECT 17BP.6.R.92
 TIP NO. SF-230222
 COUNTY Columbus
 STATION 21+12.00 -L-

DESCRIPTION Bridge No. 222 on SR 1700
(Red Hill Road) over Red Hill Swamp

	INITIALS	DATE
DESIGN	CT	3/8/18
CHECK	DB	3/15/18
APPROVAL		



Not considered final until all signatures are complete

	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	ADDITIONAL INFORMATION
END BENT 1	20+65.80 -L-	Cap on HP 12 x 53 Steel H-Piles	60 Tons/Pile	Avg. Bottom of Cap Elev. = 65.8 ft± Average Estimated Pile Length = 40 ft Number of Piles/Cap = 7
BENT 1	21+07.00 -L-	Cap on HP 14 x 73 Steel H-Piles	100 Tons/Pile	Avg. Bottom of Cap Elev. = 65.7 ft± Point of Fixity Elev. = 37 ft Tip No Higher Than Elev. = 31 ft Average Estimated Pile Length = 55 ft Number of Piles/Cap = 8
END BENT 2	21+58.20 -L-	Cap on HP 12 x 53 Steel H-Piles	70 Tons/Pile	Avg. Bottom of Cap Elev. = 65.6 ft± Average Estimated Pile Length = 45 ft Number of Piles/Cap = 7

(SEE NOTES ON PLANS AND COMMENTS ON FOLLOWING PAGES.)

FOUNDATION RECOMMENDATIONS NOTES ON PLANS

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.
3. PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
4. PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.
5. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.
6. DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
7. DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.
8. INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 31 FT.
9. THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 47 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
10. TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT NO. 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
11. STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BENT NO. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOUNDATION RECOMMENDATIONS COMMENTS

1. A SINGLE ROW WITH 7 PLUMB PILES IS PLANNED FOR END BENT NO. 1 AND END BENT NO. 2. A SINGLE ROW WITH 8 PLUMB PILES IS PLANNED FOR BENT NO. 1.
2. NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.
3. END BENT SLOPES OF 1.5H:1V ARE SATISFACTORY WITH SLOPE PROTECTION.
4. USE TYPE II BRIDGE APPROACH DETAIL.
5. A DYNAMIC RESISTANCE FACTOR OF 0.6 WAS USED FOR ALL BENTS.
6. DESIGN SCOUR ELEVATION FOR BENT NO. 1 IS 49 FEET.

PILE PAY ITEMS

(Revised 8/11/15)

WBS ELEMENT 17BP.6.R.92

DATE 3/15/2018

TIP NO. B-4479

DESIGNED BY CT

COUNTY Columbus

CHECKED BY DB

STATION 21+12.00 -L-

DESCRIPTION Bridge No. 222 on SR 1700 (Red Hill Road) over Red Hill Swamp

NUMBER OF BENTS WITH PILES _____
 NUMBER OF PILES PER BENT _____
 NUMBER OF END BENTS WITH PILES _____
 NUMBER OF PILES PER END BENT _____

Only required for "Predrilling
for Piles" & "Pile
Excavation" pay items

	PILE PAY ITEM QUANTITIES								
	Bent # or End Bent #	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling For Piles (per linear ft)	Pile Redrives (per each)	Pile Excavation (per linear ft)		PDA Testing (per each)	
						In Soil			Not In Soil
END BENT #1				4			X		
BENT #1	YES			5					
END BENT #2				4					
TOTALS			0	13	0	0	1		

Notes:

Blanks or "no" represent quantity of zero.

If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

Show quantity of "PDA Testing" on the plans as total only.

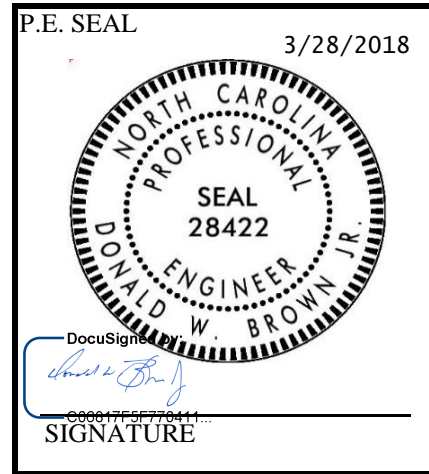
FOUNDATION RECOMMENDATIONS

Prepared for NCDOT by: Stewart

PROJECT 17BP.6.R.92
 TIP NO. SF-230226
 COUNTY Columbus
 STATION 26+85.50 -L-

DESCRIPTION Bridge No. 226 on SR 1700
(Red Hill Road) over Red Hill Swamp

	INITIALS	DATE
DESIGN	CT	3/12/18
CHECK	DB	3/16/18
APPROVAL		



Not considered final until all signatures are complete

	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	ADDITIONAL INFORMATION
END BENT 1	26+36.81 -L-	Cap on HP 12 x 53 Steel H-Piles	65 Tons/Pile	Avg. Bottom of Cap Elev. = 65.4 ft± Average Estimated Pile Length = 50 ft Number of Piles/Cap = 7
BENT 1	26+83.00 -L-	Cap on HP 14 x 73 Steel H-Piles	120 Tons/Pile	Avg. Bottom of Cap Elev. = 65.3 ft± Point of Fixity Elev. = 37 ft Tip No Higher Than Elev. = 30 ft Average Estimated Pile Length = 70 ft Number of Piles/Cap = 8
END BENT 2	27+34.19 -L-	Cap on HP 12 x 53 Steel H-Piles	70 Tons/Pile	Avg. Bottom of Cap Elev. = 65.2 ft± Average Estimated Pile Length = 45 ft Number of Piles/Cap = 7

(SEE NOTES ON PLANS AND COMMENTS ON FOLLOWING PAGES.)

FOUNDATION RECOMMENDATIONS NOTES ON PLANS

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.
3. PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.
4. PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.
5. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 90 TONS PER PILE.
6. DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 165 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
7. DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.
8. INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 30 FT.
9. STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BENT NO. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
10. THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 48.5 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
11. TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT NO. 1 OR END BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
12. TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT NO. 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOUNDATION RECOMMENDATIONS COMMENTS

1. A SINGLE ROW WITH 7 PLUMB PILES IS PLANNED FOR END BENT NO. 1 AND END BENT NO. 2. A SINGLE ROW WITH 8 PLUMB PILES IS PLANNED FOR BENT NO. 1
2. NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.
3. END BENT SLOPES OF 1.5H:1V ARE SATISFACTORY WITH SLOPE PROTECTION.
4. USE TYPE II BRIDGE APPROACH DETAIL.
5. A DYNAMIC RESISTANCE FACTOR OF 0.75 WAS USED FOR ALL BENTS.
6. DESIGN SCOUR ELEVATION FOR BENT NO. 1 IS 50.5 FEET.

PILE PAY ITEMS

(Revised 8/11/15)

WBS ELEMENT 17BP.6.R.92

DATE 3/16/2018

TIP NO. SF-230226

DESIGNED BY CT

COUNTY Columbus

CHECKED BY DB

STATION 26+85.50 -L-

DESCRIPTION Bridge No. 226 on SR 1700 (Red Hill Road) over Red Hill Swamp

NUMBER OF BENTS WITH PILES _____	}	Only required for "Predrilling for Piles" & "Pile Excavation" pay items
NUMBER OF PILES PER BENT _____		
NUMBER OF END BENTS WITH PILES _____		
NUMBER OF PILES PER END BENT _____		

Bent # or End Bent #	PILE PAY ITEM QUANTITIES						PDA Testing (per each)
	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling For Piles (per linear ft)	Pile Redrives (per each)	Pile Excavation (per linear ft)		
					In Soil	Not In Soil	
END BENT #1				4			X
BENT #1	YES			5			
END BENT #2				4			
TOTALS			0	13	0	0	

Notes:

Blanks or "no" represent quantity of zero.

If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

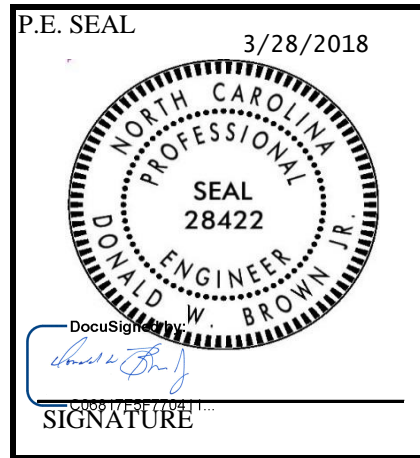
Show quantity of "PDA Testing" on the plans as total only.

FOUNDATION RECOMMENDATIONS

Prepared for NCDOT by: Stewart

PROJECT 17BP.6.R.92
 TIP NO. SF-230228
 COUNTY Columbus
 STATION 31+52.00 -L-

DESCRIPTION Bridge No. 228 on SR 1700
(Red Hill Road) over Red Hill Swamp



Not considered final until all signatures are complete

	INITIALS	DATE
DESIGN	CT	3/12/18
CHECK	DB	3/16/18
APPROVAL		

	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	ADDITIONAL INFORMATION
END BENT 1	31+05.81 -L-	Cap on HP 12 x 53 Steel H-Piles	60 Tons/Pile	Bottom of Cap Elev. = 64.9 ft± Average Estimated Pile Length = 50 ft Number of Piles/Cap = 7
BENT 1	31+47.00 -L-	Cap on HP 14 x 73 Steel H-Piles	100 Tons/Pile	Bottom of Cap Elev. = 64.8 ft± Point of Fixity Elev. = 42 ft Tip No Higher Than Elev. = 35 ft Average Estimated Pile Length = 60 ft Number of Piles/Cap = 8
END BENT 2	31+98.19 -L-	Cap on HP 12 x 53 Steel H-Piles	70 Tons/Pile	Bottom of Cap Elev. = 64.8 ft± Average Estimated Pile Length = 45 ft Number of Piles/Cap = 7

(SEE NOTES ON PLANS AND COMMENTS ON FOLLOWING PAGES.)

FOUNDATION RECOMMENDATIONS NOTES ON PLANS

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.
3. PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.
4. PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.
5. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 80 TONS PER PILE.
6. DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
7. DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.
8. INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 35 FT.
9. THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 51.5 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
10. TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT NO. 1 OR END BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
11. TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT NO. 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOUNDATION RECOMMENDATIONS COMMENTS

1. A SINGLE ROW WITH 7 PLUMB PILES IS PLANNED FOR END BENT NO. 1 AND END BENT NO. 2. A SINGLE ROW WITH 8 PLUMB PILES IS PLANNED FOR BENT NO. 1.
2. NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.
3. END BENT SLOPES OF 1.5H:1V ARE SATISFACTORY WITH SLOPE PROTECTION.
4. USE TYPE II BRIDGE APPROACH DETAIL.
5. A DYNAMIC RESISTANCE FACTOR OF 0.75 WAS USED FOR ALL END BENTS.
6. DESIGN SCOUR ELEVATION FOR BENT NO. 1 IS 53.5 FEET.

PILE PAY ITEMS

(Revised 8/11/15)

WBS ELEMENT 17BP.6.R.92

DATE 3/16/2018

TIP NO. SF-230228

DESIGNED BY CT

COUNTY Columbus

CHECKED BY DB

STATION 31+52.00 -L-

DESCRIPTION Bridge No. 228 on SR 1700 (Red Hill Road) over Red Hill Swamp

NUMBER OF BENTS WITH PILES _____	}	Only required for "Predrilling for Piles" & "Pile Excavation" pay items
NUMBER OF PILES PER BENT _____		
NUMBER OF END BENTS WITH PILES _____		
NUMBER OF PILES PER END BENT _____		

Bent # or End Bent #	PILE PAY ITEM QUANTITIES						PDA Testing (per each)
	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling For Piles (per linear ft)	Pile Redrives (per each)	Pile Excavation (per linear ft)		
					In Soil	Not In Soil	
END BENT #1				4			X
BENT #1				5			
END BENT #2				4			
TOTALS			0	13	0	0	

Notes:

Blanks or "no" represent quantity of zero.

If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

Show quantity of "PDA Testing" on the plans as total only.

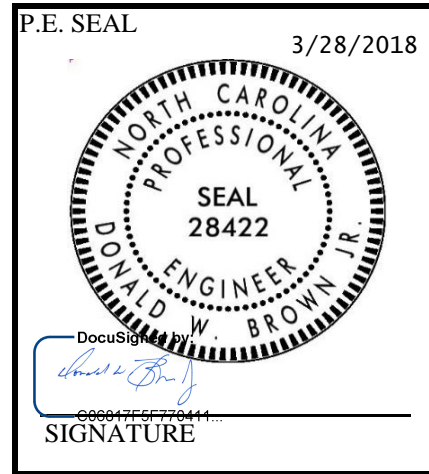
FOUNDATION RECOMMENDATIONS

Prepared for NCDOT by: Stewart

PROJECT 17BP.6.R.92
 TIP NO. SF-230230
 COUNTY Columbus
 STATION 45+32.50 -L-

DESCRIPTION Bridge No. 230 on SR 1700
(Red Hill Road) over Red Hill Swamp

	INITIALS	DATE
DESIGN	CT	3/12/18
CHECK	DB	3/16/18
APPROVAL		



Not considered final until all signatures are complete

	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	ADDITIONAL INFORMATION
END BENT 1	44+93.81 -L-	Cap on HP 12 x 53 Steel H-Piles	55 Tons/Pile	Bottom of Cap Elev. = 65.3 ft± Average Estimated Pile Length = 45 ft Number of Piles/Cap = 7
BENT 1	45+30.00 -L-	Cap on HP 14 x 73 Steel H-Piles	90 Tons/Pile	Bottom of Cap Elev. = 65.4 ft± Point of Fixity Elev. = 42 ft Tip No Higher Than Elev. = 35 ft Average Estimated Pile Length = 55 ft Number of Piles/Cap = 8
END BENT 2	45+71.19 -L-	Cap on HP 12 x 53 Steel H-Piles	60 Tons/Pile	Bottom of Cap Elev. = 65.2 ft± Average Estimated Pile Length = 45 ft Number of Piles/Cap = 7

(SEE NOTES ON PLANS AND COMMENTS ON FOLLOWING PAGES.)

FOUNDATION RECOMMENDATIONS NOTES ON PLANS

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 55 TONS PER PILE.
3. PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.
4. PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.
5. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.
6. DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 155 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
7. DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.
8. INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 35 FT.
9. THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 52.7 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOUNDATION RECOMMENDATIONS COMMENTS

1. A SINGLE ROW WITH 7 PLUMB PILES IS PLANNED FOR END BENT NO. 1 AND END BENT NO. 2. A SINGLE ROW WITH 8 PLUMB PILES IS PLANNED FOR BENT NO. 1
2. NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.
3. END BENT SLOPES OF 1.5H:1V ARE SATISFACTORY WITH SLOPE PROTECTION.
4. USE TYPE II BRIDGE APPROACH DETAIL.
5. A DYNAMIC RESISTANCE FACTOR OF 0.75 WAS USED FOR ALL BENTS.
6. DESIGN SCOUR ELEVATION FOR BENT NO. 1 IS 54.7 FEET.

PILE PAY ITEMS

(Revised 8/11/15)

WBS ELEMENT 17BP.6.R.92

DATE 3/16/2018

TIP NO. SF-230230

DESIGNED BY CT

COUNTY Columbus

CHECKED BY DB

STATION 45+32.50 -L-

DESCRIPTION Bridge No. 230 on SR 1700 (Red Hill Road) over Red Hill Swamp

NUMBER OF BENTS WITH PILES _____
 NUMBER OF PILES PER BENT _____
 NUMBER OF END BENTS WITH PILES _____
 NUMBER OF PILES PER END BENT _____

Only required for "Predrilling for Piles" & "Pile Excavation" pay items

Bent # or End Bent #	PILE PAY ITEM QUANTITIES						PDA Testing (per each)
	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling For Piles (per linear ft)	Pile Redrives (per each)	Pile Excavation (per linear ft)		
					In Soil	Not In Soil	
END BENT #1				4			X
BENT #1				5			
END BENT #2				4			
TOTALS			0	13	0	0	

Notes:

Blanks or "no" represent quantity of zero.

If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

Show quantity of "PDA Testing" on the plans as total only.