

BRIDGE NO. SC1-139-1500

STRUCTURE FILE NO. 7303940

EUTHENICS INC. 
CONSULTING ENGINEERS

QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 202 PAGE NO. 1

ITEM NAME: WEARING COURSE REMOVED

MADE BY: AJM DATE: 12/3/19

CHECKED BY: MMP DATE: 12/13/19

MEMBER/LOCATION: BRIDGE DECK

QUANTITY CALCULATIONS	QUAN.	UNIT
<p><u>ITEM 202- WEARING COURSE REMOVED</u></p> <p>REMOVE ASPHALT WEARING COURSE FROM BRIDGE DECK.</p> <p>AREA = $25.42' \times 20.5' / 9.0 \text{ FT.}^2 / \text{YD.}^2$ = 57.9 YD.² → USE 58 YD.²</p>	58	SY

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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 503 PAGE NO. 1

ITEM NAME: COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

MADE BY: AJM DATE: 12/5/19

CHECKED BY: MMP DATE: 12/13/19

MEMBER/LOCATION:

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 503-COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN</p> <p>SUPPORT EXISTING ROADWAY ON BRIDGE APPROACHES WHILE PHASE I OF CULVERT IS CONSTRUCTED. STEEL H-PILE WITH TIMBER LAGGING WALL WILL BE ADEQUATE TO SUPPORT THE ROADWAY. → LUMP SUM</p>	LUMP	

EUTHENICS INC. 
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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE
SCIO TO RIVER

JOB NO. 1056 ITEM NO. 503 PAGE NO. _____

MADE BY: AJM DATE: 12/4/19

ITEM NAME: UNCLASSIFIED EXCAVATION,

CHECKED BY: MMP DATE: 12/13/19

MEMBER/LOCATION: ^{INCLUDING SHALE} CULVERT

QUANTITY CALCULATIONS	QUAN.	UNIT
<p><u>ITEM 503 - UNCLASSIFIED EXCAVATION, INCLUDING SHALE</u></p> <p>REMOVAL OF EXISTING BRIDGE ABUTMENTS & FOOTINGS WILL PROVIDE EXCAVATION FOR THE CULVERT.</p> <p>NORTH FOOTING $LENGTH_1 = 78.0' - 45.0'$ $= 33.0'$ 37.5' OK $DEPTH_1 = 10.0'$ (AVE.) $AREA_1 = 33.0' \times 10.0'$ $= 330 \text{ FT.}^2$ 3750 OK</p> <p>NW WINGWALL $LENGTH_2 = \frac{(9.17' + 6.33')}{2}$ $= 7.75'$ $DEPTH_2 = \frac{5.0' + 9.0'}{2}$ $= 7.0'$ $AREA_2 = 7.75' \times 7.0'$ $= 54.25 \text{ FT.}^2$</p> <p>NE WINGWALL $L_3 = \frac{12.5' + 15.5'}{2}$ $= 14.0'$ $DEPTH_3 = 609.0' - 600.25'$ $= 8.75'$ $AREA_3 = 14.0' \times 8.75'$ $= 122.5 \text{ FT.}^2$</p> <p>$VOLUME = (330 \text{ FT.}^2 + 54.25 \text{ FT.}^2 + 122.5 \text{ FT.}^2) \times 7.00'$ $= 3,547 \text{ FT.}^3$</p> <p>SOUTH FOOTING $LENGTH_4 = 78.0' - 40.0'$ $= 38.0'$ $DEPTH_4 = 10.0'$ (AVE.) $A_4 = 38.0' \times 10.0'$ $= 380 \text{ FT.}^2$</p>		



QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 503 PAGE NO. 2

MADE BY: AJM DATE: 12/11/19

ITEM NAME: UNCLASSIFIED EXCAVATION

CHECKED BY: _____ DATE: _____

MEMBER/LOCATION: CULVERT

QUANTITY CALCULATIONS	QUAN.	UNIT
<p><u>ITEM 503 - UNCLASSIFIED EXCAVATION (CONT'D)</u></p> <p>SW WINGWALL $L_5 = (9.83' + 6.75') / 2 = 8.29'$ $D_5 = 609.0 - 600.25 = 8.75'$ $A_5 = 8.29' \times 8.75' = 72.5 \text{ FT.}^2$</p> <p>SE WINGWALL $L_6 = 4.0'$ $D_6 = 608.68 - 5 = 7.87 = 10.81'$ $A_6 = 4.0 \times 10.81 = 43.2 \text{ FT.}^2$</p> <p>$L_7 = 24.0' - 7.0' = 17.0'$ $D_7 = 608.0 - 597.87 = 10.13'$ $A_7 = 17.0 \times 10.13' = 172.2 \text{ FT.}^2$</p> <p>VOLUME = $(380 \text{ FT.}^2 + 72.5 \text{ FT.}^2 + 43.2 \text{ FT.}^2) \times 7.0' + 172.2 \text{ FT.}^2 \times 7.50'$ $= 4,762 \text{ FT.}^3$</p> <p>TOTAL VOLUME = $(3547 + 4762) / 27 \text{ FT.}^3 / \text{YD.}^3$ $= 308 \text{ YD.}^3 \rightarrow \text{USE } 310 \text{ YD.}^3$</p>	310	CY

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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 509 PAGE NO. 1

MADE BY: AJM DATE: 12/12/19

ITEM NAME: EPOXY COATED REINFORCING STEEL

CHECKED BY: MMP DATE: 12/16/19

MEMBER/LOCATION: CULVERT

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 509 - EPOXY COATED STEEL REINFORCEMENT SEE REINFORCEMENT SCHEDULE</p> <p style="text-align: right;">TOTAL = 10,308 LBS.</p>	10,308	LB



QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 511 PAGE NO. 2

MADE BY: AJM DATE: 12/12/19

ITEM NAME: CLASS QC1 CONCRETE, WINGWALL

CHECKED BY: MMP DATE: 12/16/19

MEMBER/LOCATION: ^{NOT INCLUDING FOOTING} CULVERT & WINGWALLS

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 511- CLASS QC1 CONCRETE, WINGWALL, NOT INCLUDING HEADWALLS FOOTING</p> <p>INLET HT. = 5'-9", WIDTH = 1'-0", L = 9'-10"</p> <p>VOLUME = (5.75' x 1.00' x 9.83') x 2</p> <p>= 113 FT.³</p> <p>ON TOP OF BOX L = 16.0' / cos 30°</p> <p>= 18.5'</p> <p>VOL. = 1.0' x 1.0' x 18.5'</p> <p>= 18.5 FT.³</p> <p>OUTLET HT. = 5'-9", W = 1'-0"</p> <p>L = 15'-7" VOL. = 5.75' x 1.00' x 15.58'</p> <p>= 89.6 FT.³</p> <p>L = 3'-3" VOL. = 5.75' x 1.0' x 3.25'</p> <p>= 18.7 FT.³</p> <p>HT. = 6.83', W = 1'-6", L = 19'-0" PENETRATED BY 53" x 83" RCP</p> <p>VOL. = (6.83' x 17.0' - 35.4 FT.²) x 1.50'</p> <p>+ (2.0' x 5.75' x 1.50')</p> <p>= 139 FT.³</p> <p>VOL. = (113 FT.³ + 2 x 18.5 FT.³ + 89.6 + 18.7 + 139) / 27 FT.³ / YD.³</p> <p>= 14.7 YD.³ → USE 15 YD.³</p>	15	CY

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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 511 PAGE NO. 1

ITEM NAME: CLASS QCI CONCRETE, FOOTING

MEMBER/LOCATION: CULVERT & WINGWALLS

MADE BY: AJM DATE: 12/5/19

CHECKED BY: MMP DATE: 12/16/19

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 511- CLASS QCI CONCRETE, FOOTING FOOTINGS CULVERT L= 76.0', WIDTH= 5'-0", THICKNESS = 4'-0" VOLUME = (76.0' x 5.0' x 4.0') x 2 = 3040 FT.³</p> <p>NW WINGWALL L = (6.37' + 9.33')/2 WIDTH = 5.0', T = 1.50' = 7.85' VOLUME = 7.85' x 5.0' x 1.50' + 1.50' x 2.50' x 9.33' = 93.9 FT.³</p> <p>NE WINGWALL L = (15.59' + 12.75')/2 W = 5.0' T = 1.50' = 14.17' VOLUME = 14.17' x 5.0' x 1.50' + 1.50' x 2.50' x 12.75' = 154 FT.³</p> <p>SW WINGWALL L = (9.84' + 7.0)/2 W = 5.0', T = 1.50' = 8.42' VOLUME = 8.42 x 5.0 x 1.50' + 1.50' x 2.50' x 7.0' = 89.4 FT.³</p> <p>SE WINGWALL L = (4.0' + 7.0)/2 W = 5.0', T = 4.0 = 5.50' L = 17.0', W = 5.50', T = 1.50' VOLUME = 5.50 x 5.0 x 4.0 + 17.0 x (5.50 x 1.50' + 1.50' x 2.50') = 314 FT.³</p> <p>TOTAL VOL. = (3040 + 94 + 154 + 90 + 314)/27 = 136.7 YD.³ → USE 137 YD.³</p>	137	CY



QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 518 PAGE NO. 1

MADE BY: AJM DATE: 12/13/19

ITEM NAME: POROUS BACKFILL WITH FILTER FABRIC

CHECKED BY: MMP DATE: 12/16/19

MEMBER/LOCATION: WINGWALL

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 518 - POROUS BACKFILL WITH FILTER FABRIC PROVIDE BEHIND WINGWALLS DOWN TO 6" BELOW WEEP HOLES. TOP OF FOOTINGS</p> <p>INLET WALL LENGTH = 9.83' DEPTH = 3.50' 7 WIDTH = 2'-0" 7 VOLUME = (9.83' x 3.50' x 2.00') x 2 = 138 FT.³ 275.24 FT.³</p> <p>OUTLET LENGTH = 7.5' DEPTH = 4.75' W = 2.0' LENGTH = 8.08' DEPTH = 2.33' W = 2.0' VOL. = 7.50 x 4.75 x 2.0' + 8.08 x 2.33 x 2.0' = 109 FT.³</p> <p>L = 3.25', D = 5.50' W = 2.0' L = 8.0 + 2.0 D = 4.50', W = 2.0 = 10.0' VOL. = 3.25 x 5.50 x 2.0' + 10.0 x 4.50 x 2.0' = 126.7 FT.³</p> <p>TOTAL VOL. = (138 + 109 + 126) / 27 FT.³ / YD.³ = 13.8 YD.³ → USE 14 YD.³</p>		
<p>OUTLET - N.E = 13.58 (5.75) x 2 = 20.28 156.17 FT.³ S.E = 2 (5.75) (2) + 2 [(17 x 7) - 35.4] 2 = 190.2</p>		14 CY
<p>TOTAL = 275.4 + 156.17 + 190.2 = 621.8 FT.³ = 23</p>	23	CY



QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 512 PAGE NO. 1

MADE BY: AJM DATE: 12/12/19

ITEM NAME: SEALING OF CONCRETE SURFACES

CHECKED BY: MMP DATE: 12/16/19

MEMBER/LOCATION: WINGWALLS

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 512 - SEALING OF CONCRETE SURFACES</p> <p>SEAL ALL EXPOSED WINGWALL & FORESLOPE WALL CONCRETE SURFACES AND ENDS OF CULVERT.</p> <p>INLET</p> $\text{AREA} = 9.83' \times 5.75' / 2 + 1.50' \times 9.83' \text{ (TOP)} + 2.0' \times 1.0'$ $= 41.0 \text{ FT.}^2 \text{ / WINGWALL}$ <p>END OF CULVERT LENGTH = 18.5' (FORESLOPE WALLS OF BOX W = 1.0' / COS 30° WALL)</p> $= 1.15'$ $\text{AREA} = 18.5' \times (1.0' + 1.0' + 1.0' + 1.0' + 0.5') + 4.0' \times 1.15' \times 2$ $+ 2.0' \times (2 \times 16.2' + 2 \times 4.0')$ $= 173.25 \text{ FT.}^2$ <p>OUTLET</p> $\text{AREA}_{\text{WW}} = 15.58' \times 5.75' / 2 + 1.50' \times 15.58' + 2.0' \times 1.0' +$ $3.25' \times 5.75' + 3.25' \times 1.5' + 17.0' \times (6.83') / 2 + 2.0' \times 5.75'$ $1.50' \times 20.0' + 2.0' \times 1.0'$ $= 44.8 + 23.4 + 2.0 + 18.7 + 4.88 + 58.1 + 30.0 + 11.5$ $= 194 \text{ FT.}^2$ <p>END OF CULVERT AREA = 173.25 FT.²</p> $\text{TOTAL AREA} = (2 \times 41.0 + 2 \times 173.25 + 194) / 9.0 \text{ FT.}^2 / \text{YD.}^2$ $= 69.5 \text{ YD.}^2 \rightarrow \text{USE } 70 \text{ YD.}^2$	70	SY

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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 512 PAGE NO. 1

ITEM NAME: TYPE 2 WATERPROOFING

MADE BY: AJM DATE: 12/9/19

CHECKED BY: MMP DATE: 12/13/19

MEMBER/LOCATION: CULVERT

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 512-TYPE 2 WATERPROOFING APPLY TO THE TOP AND DOWN TO TOP OF FOOTING FOR PRECAST CULVERT SECTIONS TOP $(14.0' + 2.0' + 2 \times 1.0') \times 75.0' = 1,350 \text{ FT.}^2$ SIDES $(5.0' \times 76.0') \times 2 = 760 \text{ FT.}^2$ $\underline{\hspace{10em}}$ $2,110 \text{ FT.}^2$ $2,110 \text{ FT.}^2 / 9 \text{ FT.}^2 / \text{YD.}^2 = 234.4 \text{ YD.}^2 \rightarrow \text{USE } 235$</p>	235	SY

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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 516 PAGE NO. 1

MADE BY: AJM DATE: 12/12/19

ITEM NAME: 1" PREFORMED EXPANSION JOINT FILLER

CHECKED BY: MMP DATE: 12/13/19

MEMBER/LOCATION: WINGWALLS

QUANTITY CALCULATIONS

QUAN. UNIT

ITEM 516 - 1" PREFORMED EXPANSION JOINT FILLER

PROVIDE BETWEEN CULVERT SIDES AND WINGWALLS

HT. = 5.75' WIDTH = 1.0' / cos 30° = 1.15'

AREA = (5.75' x 1.15') x 4 = 26.5 FT² → USE 27 FT²

27 SF

BRIDGE NO. SC1-139-1500

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QUANTITY CALCULATIONS

JOB NAME: S.R. 139 OVER TRIBUTARY TO LITTLE SCIOTO RIVER

JOB NO. 1056 ITEM NO. 611 PAGE NO. 1

MADE BY: AJM DATE: 12/9/19

ITEM NAME: 14'x4' CONDUIT, TYPE A, 706.05, AS

CHECKED BY: MMP DATE: 12/13/19

MEMBER/LOCATION: PER PLAN CULVERT

QUANTITY CALCULATIONS	QUAN.	UNIT
<p>ITEM 611- CONDUIT, TYPE A, PRECAST REINFORCED CONCRETE THREE SIDED FLAT TOPPED CULVERT LENGTH = 76'-0"</p>	76	FT

BY MMP DATE 3/28/19 SUBJECT Stage 1 Quantities JOB NO. 1056
 CHKD. BY AJM DATE 8/26/19

SCI-139-15.00 Bridge Replacement

Item No. 202E11001 Structure Removed, As Per Plan

Deck: 510 S.F. @ \$25 /S.F. = \$12,750

Abutments:

Height = 7.5 ft.
 Length = 37.5 ft.
 Thickness = 3 ft.

62.5 C.Y. @ \$275 /C.Y. = \$17,188

Total = \$29,938

Use = \$30,000

Item No. 5 Unclassified Excavation

Excavation Depth = 8 ft.
 Excavation Area = 933 S.F. / Abutment

Excavation Volume = 14928 C.F.
 = 552.9 C.Y.

Item No. 203E98500 Roadway Misc.: De-Watering

Assumed LS= \$50,000

Item No. 503E11101 Cofferdams and Excavation Bracing, As Per Plan

Assumed LS= \$50,000

BY MMP DATE 3/28/19 SUBJECT Stage 1 Quantities JOB NO. 1056
 CHKD. BY AJM DATE 3/27/19

SCI-139-15.00 Bridge Replacement

Item No. 509E10000 Epoxy Coated Reinforcing Steel

Total Concrete Volume = 3716 Cu. Ft.
 1% of Concrete = 37.16 Cu. Ft.
 Unit Weight of Steel = 490 lb./Cu. Ft.
 18,206 LB.

Item No. 511E46510 Class QC1 Concrete, Footing

Culvert Footing:

Length = 82.5 ft.
 Height = 4 ft.
 Width = 5.4 ft.
 97.78 C.Y.

Wingwall Footings:

Inlet Left WW:

Footing Cross Section Area = 11.25 S.F.
 Average Length = 8.33 ft.

Inlet Right WW:

Footing Cross Section Area = 11.25 S.F.
 Average Length = 8.33 ft.

Outlet Left WW:

Footing Cross Section Area = 11.25 S.F.
 Average Length = 14.08 ft.

Outlet Right WW:

Footing Cross Section Area = 12.00 S.F.
 Average Length = 20.75 ft.

22.03 C.Y.



BY MMP DATE 3/28/19 SUBJECT Stage 1 Quantities JOB NO. 1056
CHKD. BY AJ DATE 3/28/19

SCI-139-15.00 Bridge Replacement

Total = ¹²⁰
~~120~~ C.Y.

BY MMP DATE 3/28/19 SUBJECT Stage 1 Quantities JOB NO. 1056
 CHKD. BY AIN DATE 8/2/19

SCI-139-15.00 Bridge Replacement

Item No. 511E46611 Class QC1 Concrete, Headwall

Inlet Left WW:

Length= 9.83 ft.
 Height= 7 ft.
 Thickness= 1 ft.
 Volume= 68.83 C.F.

Inlet Right WW:

Length= 9.83 ft.
 Height= 7 ft.
 Thickness= 1 ft.
 Volume= 68.83 C.F.

Outlet Left WW:

Length= 22.25 ft.
 Height= 7 ft.
 Thickness= 1.5 ft.
 Pipe Opening Area = 36 S.F.
 Volume= ~~177~~ 197.63 C.F.

Outlet Right WW:

Length= 15.58 ft.
 Height= 7 ft.
 Thickness= 1 ft.
 Volume= 109.08 C.F.

Headwalls

Length= 18.48 ft.
 Height= 1 ft.
 Thickness= 1 ft.
 Number of Headwalls= 2
 Headwalls Volume = 36.96 C.F.

Summary

Wingwalls Volume= ~~444.38~~ 444.38 C.F.
 Headwalls Volume= 36.96 C.F.

Total Volume= ~~481.33~~ 481.33 C.F.
 = ~~17.80~~ 17.80 C.Y.

BY MMP DATE 3/28/19 SUBJECT Stage 1 Quantities JOB NO. 1056
 CHKD. BY A.W. DATE 8/29/19

SCI-139-15.00 Bridge Replacement

Item No. 512E33001 Type 2 Waterproofing, As Per Plan

Per CMS 512.08, install type 2 membrane on the exterior vertical and exterior top horizontal surfaces

Exterior Horizontal Surfaces		Exterior Vertical Surfaces	
Culvert Length=	78 ft.	Culvert Height=	4 ft.
Culvert Width=	16 ft.	Culvert Length=	78 ft.
Number of surfaces=	1	Number of surfaces=	2
Exterior Horizontal Surface=	1248.00 S.F.	Ext. Vert. Surface =	624.00 S.F.
=	138.67 S.Y.	=	69.33 S.Y.
Total Area=	208 S.Y.		

Item No. 512E10000 Sealing Of Concrete Surfaces

Wingwalls Height=	7 ft.	Area 1=	165.25 S.F.
Wingwalls Length=	57.50 ft.	Area 2=	57.5 S.F.
Thickness=	1 ft.	Area 3=	28.75 S.F.
Back of wall exposed height=	0.5 ft.		
Wingwalls Exposed Surface=	251.5 S.F.		
=	27.94 S.Y.		
Headwall and Culvert		Inside of Box	
Exposed Perimeter of Culvert=	27.5 S.F.	Width=	2 ft.
Headwall Length=	18.48 ft.	Inside Perimeter=	26.5 ft.
Headwall Sealed Perimeter =	2.5 ft.	Total inside of box=	106 S.F.
Headwall Exposed Surface =	46.20 S.F.		
Headwall And Culvert Exposed Surface=	179.70 S.F.		
=	19.97 S.Y.		
Total Area=	47.91 S.Y.		

BY MMP DATE 3/28/19 SUBJECT Stage 1 Quantities JOB NO. 1056
 CHKD. BY AJA DATE 3/28/19

SCI-139-15.00 Bridge Replacement

Item No. 518E21200 Porous Backfill with Filter Fabric

Culvert Length = 78.0 ft.
 Wingwall Length = 57.5 ft.
 Porous Backfill Height = 4.0 ft.
 Porous Backfill Thickness = 2.0 ft.

Total Volume = 4360.25 Cu. Ft.
 = 161 C.Y.

Item No. ~~Structural Backfill~~

~~Culvert Length = 78.0 ft.
 Wingwall Length = 57.5 ft.
 Culvert Width = 16.0 ft.
 Culvert Cover Depth = 1.75 ft.~~

~~Total Volume = 1560 Cu. Ft.
 = 58 C.Y.~~

DON'T PAY FOR FILLING
 TRENCH WHEN YOU INSTALL
 A PIPE (CONDUIT)

Item No. 611E95001 14' X 4' Conduit, Type A, 706.05, As Per Plan

Culvert Length= 78 ft.