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Subject: CLI-28/124-4.52/5.47/0.54 PID 102731 Project No.: 18-00114-010

CLI-124-0054 Structure Quant_Tracings Sheet 1 of 8

Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20

Update by: SAC Date: 9/7/20

CLI-124-0054 Quantities - Tracings

Item 202 Ext. 11000, Structure Removed **LUMP**

Item 503, Ext. 11100, Cofferdams and Excavation Bracing **LUMP**

Item 503, Ext. 21300, Unclassified Excavation **LUMP** *

* Use unit "Lump" for plan quantities. For "CU YD" units for filing, see calcs on pages 6 and 7.

Item 509, Ext. 10000, Epoxy Coated Reinforcing Steel

See "Reinforcing Schedule" in plans.	Inlet Headwall, Wingwalls, and Footing	1705	LB
	Outlet Headwall, Wingwalls, and Footing	1565	LB
	Total	**3270**	**LB**

Item 511, Ext. 46011, Class QC1 Concrete, Retaining/Wingwall Not Including Footing, As Per Plan

As Per Plan due to option for pre-cast headwalls and wingwalls

Inlet Wingwalls:	No. 1 (Right)Wall:	Ave. Height = (7.0' + 5.25')/2 =	6.1	ft	
		Width = 1.0'			
		Length = 8.0'			
		Volume = (6.1' x 1.0' x 8.0') =			48.80 CU FT
	No. 2 (Left)Wall:	Ave. Height = (7.0' + 5.25')/2 =	6.1	ft	
		Width = 1.0'			
		Length = 8.5'			
		Volume = (6.1' x 1.0' x 8.5') =			51.85 CU FT
Outlet Wingwalls:	No. 1 (Right)Wall:	Ave. Height = (7.0' + 4.33')/2 =	5.7	ft	
		Width = 1.0'			
		Length = 6.0'			
		Volume = (5.7' x 1.0' x 6.0') =			34.20 CU FT
	No. 2 (Left)Wall:	Ave. Height = (7.0' + 4.0')/2 =	5.5	ft	
		Width = 1.0'			
		Length = 8.0'			
		Volume = (5.5' x 1.0' x 8.0') =			44.00 CU FT
				Total	179.00 CU FT
					6.63 CY YD
				Roundup =	**7 CY YD**

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Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20
Update by: SAC Date: 9/7/20

Item 511, Ext. 46510, Class QC1 Concrete, Footing

Inlet Wingwalls:	Wall Footing:	Ave. Length = (33.33' + 28.75')/2 =	31.04 ft	
		Width = 5.5'		
CADD Area = 170.79sf		Depth = 1.5'		
Depth = 1.5'		Volume = (31.04' x 5.5' x 1.5') =		256.1 CU FT
Vol = 256.19cf				
	Inv. Footing:	Length = 14.0'		
CADD Area = 2.40sf		Ave. Width = (2.77' + 2.08')/2 = 2.43'		
Length = 14.0'		Depth = 1.0'		
Vol = 33.60cf		Volume = (14.0' x 2.43' x 1.0') =		34 CU FT
	Cutoff Wall:	Ave. Length = (30.00' + 28.75')/2 =	29.38 ft	
CADD Area = 44.09sf		Width = 1.5'		
Depth = 2.5'		Depth = 2.5'		
Vol = 110.23cf		Volume = (29.38' x 1.5' x 2.5') =		110.2 CU FT
Outlet Wingwalls:	Wall Footing:	Ave. Length = (30.83' + 26.25')/2 =	28.54 ft	
		Width = 5.5'		
CADD Area = 157.04sf		Depth = 1.5'		
Depth = 1.5'		Volume = (28.54' x 5.5' x 1.5') =		235.5 CU FT
Vol = 235.56cf				
	Inv. Footing:	Length = 14.0'		
CADD Area = 1.76sf		Ave. Width = (1.39' + 2.08')/2 = 1.74'		
Length = 14.0'		Depth = 1.0'		
Vol = 24.64cf		Volume = (14.0' x 1.74' x 1.0') =		24.4 CU FT
	Cutoff Wall:	Ave. Length = (27.50' + 26.25')/2 =	26.88 ft	
CADD Area = 40.34sf		Width = 1.5'		
Depth = 2.5'		Depth = 2.5'		
Vol = 100.85cf		Volume = (26.88' x 1.5' x 2.5') =		100.8 CU FT
			Total	**761 CU FT**
Tot. Vol = 761.07cf (cadd)				28.19 CY YD
Tot. Vol = 28.12cf (cadd)			**Roundup =**	**29 CY YD**

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CLI-124-0054 Structure Quant_Tracings Sheet 3 of 8
Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20
Update by: SAC Date: 9/7/20

Item 511, Ext. 46610, Class QC1 Concrete, Headwall			
Inlet Headwall:	Length = 14.0'		
	Width = 1.0'		
	Height = 1.0'		
	Volume = (14.0' x 1.0' x 0.5')/27 =	0.5	CU YD
Outlet Headwall:	Length = 14.0'		
	Width = 1.0'		
	Height = 1.0'		
	Volume = (14.0' x 1.0' x 1.0')/27 =	0.5	CU YD
	Total	**1**	**CU YD**
Item 512, Ext. 10100, Sealing of Concrete Surfaces (Epoxy-Urethane)			
Inlet: No 2 (Left) Wingwall:	Back of Wall = 8.5'L x 0.5'H =	4.3	SQ FT
	Top of Wall = 8.5'L x 1.0'W =	8.5	SQ FT
aprox. exposed side height=>	Side of Wall = 1.0'H x 1.0'W =	1.0	SQ FT
	Front of Wall =((1.0'+6.0')/2)'H x 8.5'W =	29.8	SQ FT
No 1 (Right) Wingwall:	Back of Wall = 8.0'L x 0.5'H =	4.0	SQ FT
	Top of Wall = 8.0'L x 1.0'W =	8.0	SQ FT
aprox. exposed side height=>	Side of Wall = 1.0'H x 1.0'W =	1.0	SQ FT
	Front of Wall =((1.0'+6.0')/2)'H x 8.0'W =	28.0	SQ FT
Headwall:	Back of Wall = 14.0'L x 0.5'H =	7.0	SQ FT
	Top of Wall = 14.0'L x 1.0'W =	14.0	SQ FT
	Front of Wall = 14.0'L x 1.0'H =	14.0	SQ FT
Outlet: No 2 (Left) Wingwall:	Back of Wall = 8.0'L x 0.5'H =	4.0	SQ FT
	Top of Wall = 8.0'L x 1.0'W =	8.0	SQ FT
aprox. exposed side height=>	Side of Wall = 1.0'H x 1.0'W =	1.0	SQ FT
	Front of Wall =((1.0'+6.0')/2)'H x 8.0'W =	28.0	SQ FT
No 1 (Right) Wingwall:	Back of Wall = 6.0'L x 0.5'H =	3.0	SQ FT
	Top of Wall = 6.0'L x 1.0'W =	6.0	SQ FT
aprox. exposed side height=>	Side of Wall = 1.0'H x 1.0'W =	1.0	SQ FT

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	Front of Wall =((1.0'+6.0')/2)'H x 6.0'W =	21.0	SQ FT	
Headwall:	Back of Wall = 14.0'L x 0.5'H =	7.0	SQ FT	
	Top of Wall = 14.0'L x 1.0'W =	14.0	SQ FT	
	Front of Wall = 14.0'L x 1.0'H =	14.0	SQ FT	
Culvert Ends:	Exterior 1' for wall, slab, and top thickness of the culvert plus the last 2' of the culvert interior. See details in structure plans.			
	Area = (12' + 4' + 12' + 4', length) x (3', width) x 2 ends =	192.0	SQ FT	
	Total	419.0	SQ FT	
		47	**SQ YD**	

Item 512, Ext. 33000, Type 2 Waterproofing

Applied to vertical sides of the culvert. Top of culvert is covered with Type 3 due to pavement contact.

Height = height of box = 4' rise + 1' thick top + 1' thick bottom =	6	FT
Length = length of culvert + 1' along wingwall at each end =	76	FT
Area = (6' x 76' x 2 sides)/9 =	**101**	**SQ YD**

Item 512, Ext. 33010, Type 3 Waterproofing

Due to low cover, most of the pavement will be directly on top of the culvert box.

Width = top surface of box + 1 foot vertical down each side		
= 12' span + 1' thick wall + 1' thick wall + 1' vert. + 1' vert. =	16	FT
Length = length of culvert =	74	FT
Area = (16' x 74')/9 =	**132**	**SQ YD**

Item 516, Ext. 13600, 1" Preformed Expansion Joint Filler

Inlet:	Height = height of wingwall interface with the culvert box and headwall =		7.0	FT
	Width = width of wingwall =	1.0	FT	
	Area = (7.0' x 1') x 2 sides =		14.0	SQ FT
Outlet:	Height = height of wingwall interface with the culvert box and headwall =		7.0	FT
	Width = width of wingwall =	1.0	FT	
	Area = (7.0' x 1') x 2 sides =		14.0	SQ FT
	Total		**28.0**	**SQ FT**

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CLI-124-0054 Structure Quant_Tracings Sheet 5 of 8

Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20

Update by: SAC Date: 9/7/20

Item 518 Ext. 21230, Porous Backfill with Geotextile Fabric	**LUMP**	*		
*	Use unit "Lump" for plan quantities. For "CU YD" units for filing, see calcs on pages 8.			
Item 611, Ext. 95601, 12' x 4' Conduit, Type A, 706.05, As Per Plan			**74**	**FT**
	Note: This item includes the Structural Backfill Type 1			

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Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20

Update by: SAC Date: 9/7/20

Item 503, Ext. 21100, Unclassified Excavation CU YD *

* For Information Only. Unit "CU YD" quantity used for filing of plans.

Applies to excavation for constructing headwalls and wingwalls.

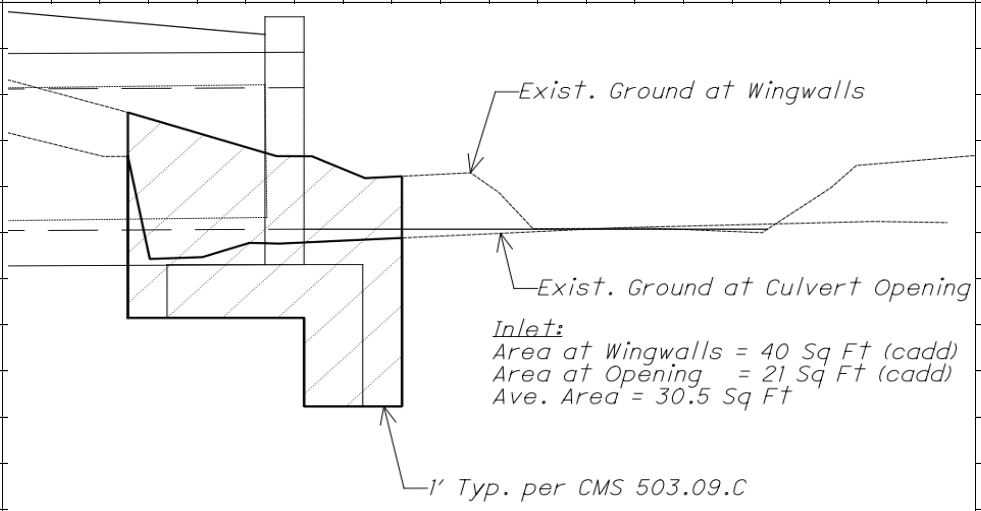
Excavation for the culvert is included in Item 611.

CMS 503.09.C, use 1' outside the outer edge of the footing or wall.

Dimensions measured in CADD.

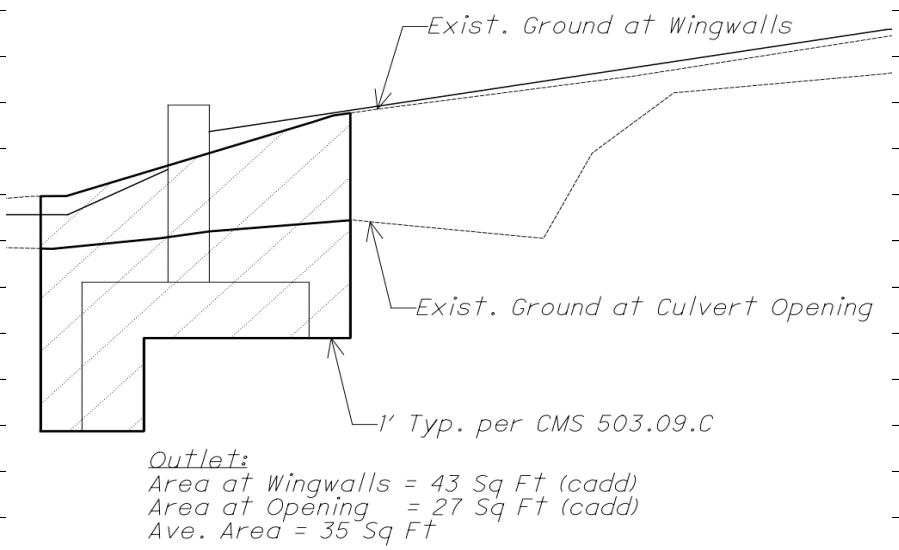
Inlet Section View

(dimensions measured in CADD)



Outlet Section View

(dimensions measured in CADD)



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Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20

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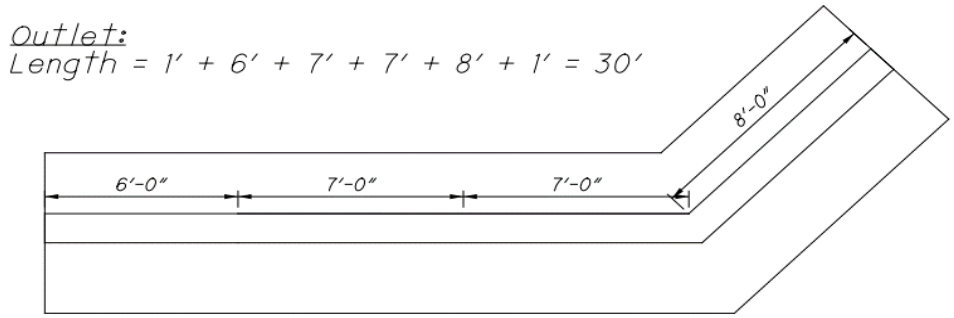
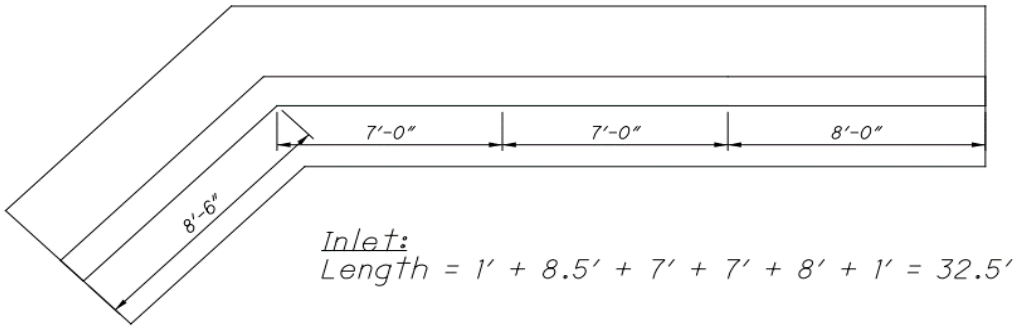
Item 503, Ext. 21100, Unclassified Excavation (Cont'd)

Outlet Footing



Inlet Footing



Volume at Inlet = (30.5 Sq Ft, ave.) x (30 Ft length) =	915.0	CU FT
Volume at Outlet = (35 Sq Ft, ave.) x (32.5 Ft length) =	1137.5	CU FT
Total	2052.5	CU FT
	76	**CU YD**

For Information Only

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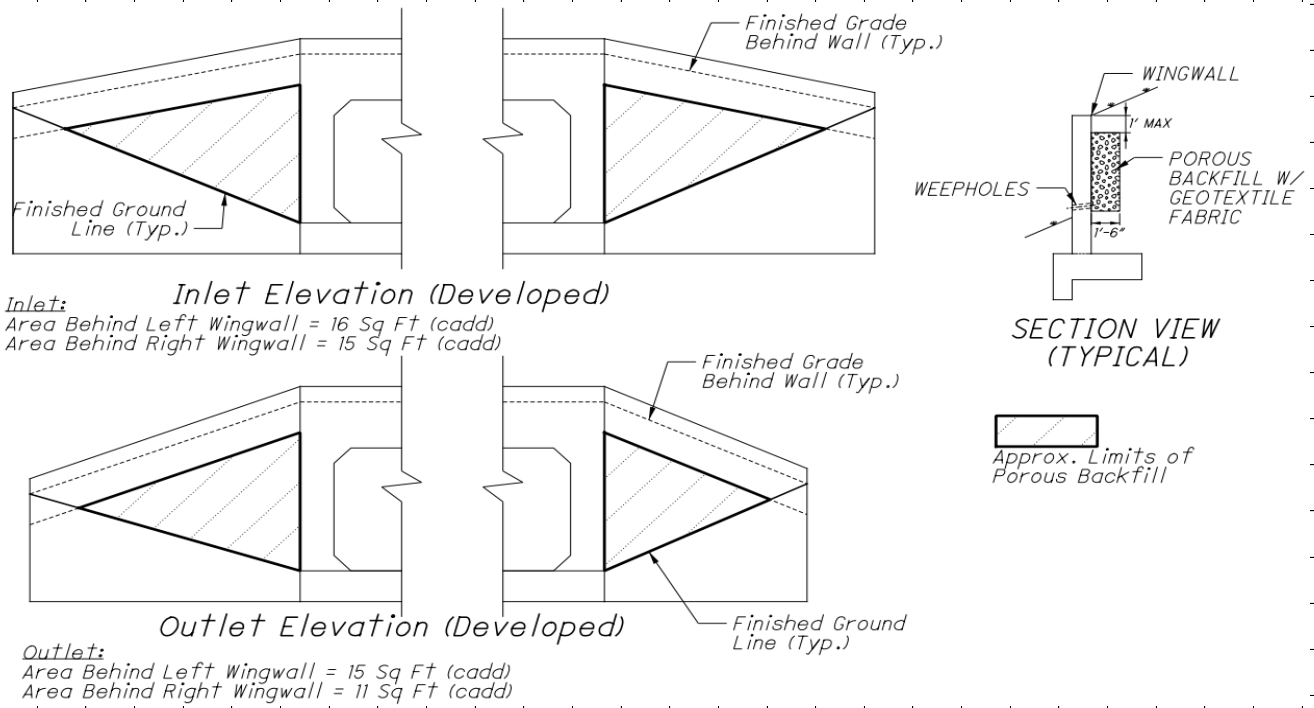
Calc. by: SAC Date: 5/5/20 Check by: RMS Date: 5/18/20

Update by: SAC Date: 9/7/20

Item 518 Ext. 21200, Porous Backfill with Geotextile Fabric CU YD *

* For Information Only. Unit "CU YD" quantity used for filing of plans.

Applies to areas behind wingwalls. 1' (+/-) below grade down to the weepholes. See plan details.



Volume at Inlet = (16 Sq Ft + 15 Sq Ft) x (1.5 Ft thick) =	46.5	CU FT
Volume at Outlet = (15 Sq Ft + 11 Sq Ft) x (1.5 Ft thick) =	39.0	CU FT
Total	85.5	CU FT
	3	**CU YD**

For Information Only