hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

Via Email

March 2, 2023

Town of Chapel Hill
405 Martin Luther King Jr. Blvd.
Chapel Hill, NC 28514

Attention: Mr. John Richardson

Subject: Updated Remedial Alternatives Evaluation
Chapel Hill Police Department
828 Martin Luther King Jr. Blvd Property
Chapel Hill, North Carolina
Brownfields Project No. 23022-19-068
H&H Job No. TCH-009

Dear John:

Per your request, Hart & Hickman, PC (H&H) has prepared an updated evaluation of remedial alternatives for the coal combustion products (CCPs) present at the property located at 828 Martin Luther King, Jr. Blvd. in Chapel Hill. H&H provided our initial evaluation to the Town on August 20, 2018. In the 2023 evaluations, we considered the following two options:

- Option 1 – Removal of the CCPs and restoration of the property. The updated estimated costs for this alternative are $8.8MM to $11.2MM for 30,000 cubic yards (cy) of CCPs and $14.5MM to $18.2MM for 60,000 cy of CCPs, with the range dependent upon variable estimates of CCP volumes and costs obtained from three remedial contractors.

- Option 2 – Installation of an earth retention system along the embankment at the base of the CCP fill area to obtain an appropriate embankment grade, cover of exposed CCP along the embankment and in areas where minimal cover is present, and restoration. The estimated costs for this alternative are $2.9MM to $4.3MM, with the range largely dependent upon the type of earth retention system used.

The assumptions for each option are summarized in Table 1, with additional details provided in Table 2 for Option 1 and in Tables 3 and 4 for Option 2.

Please note the following with regard to the cost estimates:

- For comparison purposes, the 2023 cost estimate evaluation columns are in white and the 2018 cost estimate evaluation columns are in grey highlighting.
- The CCP volumes used in the 2023 evaluation were modified based upon subsurface information obtained during assessment activities conducted after the 2018 evaluation. Based upon observations made during drilling through the fill materials in 2019 and 2020, which are documented in H&H's *Results of Post-Data Gap Assessment* report dated December 1, 2020, the previous volume estimate of CCPs present at the Site (60,700 cy) is likely an overestimate. As such, for the 2023 estimate, we used a range of CCP volume ranging from 30,000 cy to 60,000 cy.
- Because erosional CCP Areas G, H, and I (volume of 700 cy) were removed as part of the Interim Remedial Measurements as documented in H&H's *Interim Remedial Measures Report* dated April 19, 2021, removal of these materials is not included in the 2023 cost estimate.

If you have any questions or comments concerning our evaluation, please let us know.

Sincerely,

Hart & Hickman, PC

Steve Hart, PG
Principal

Justin Ballard, PG
Project Manager

cc: Mary Jane Nirdlinger, Town of Chapel Hill (via email)

Attachments

Table 1 (Page 1 of 2)
Remedial Options and Costs Summary
828 Martin Luther King, Jr. Blvd
Chapel Hill, North Carolina
H&H Job No. TCH-009

Option 1 - Full Removal of CCP and Site Restoration		
	Estimated Cost (2023)	Estimated Cost (2018)
Option 1 includes full removal of CCP at the site to the extent practicable and is based upon the following assumptions: - Pre-construction sampling to obtain pre-approval to direct load CCP and cover soil for off-site disposal. - Implementation of Erosion and Sediment Control measures. - Site clearing and grubbing. - Existing police building structure demolition. Costs assume no significant asbestos containing materials in building. - Excavation, transportation, and disposal of approximately 30,000 to 60,000 cubic yards (45,500 to 90,000 tons) of non-hazardous CCP in Areas A-F. - Excavation, transportation, and disposal of approximately 19,000 cubic yards (28,500 tons) of non-hazardous cover soil overlying the CCP which contains CCP constituents. - Backfill placement and compaction of approximately 45,500 to 90,000 tons and grading to promote positive drainage in the disturbed area. - Engineering and oversight costs. Total of approximately 100 to 200 field days of work assumed. - Area of disturbance of approximately 5 acres. - 20% Contingency applied to all costs. Table 2 details costs associated with the full removal remedial option. Costs from three different remedial contractors were obtained to provide a range of costs.	$8.8MM - $11.2MM (30,000 cubic yards) $14.5MM - $18.2MM (60,000 cubic yards)	$13.4MM - $15.9MM (60,700 cubic yards)

Option 2 - Installation of Earth Retention System Along Embankment, Cover of Exposed CCP Along Embankment and Where Existing Cover is Minimal, and Site Restoration		
Option 2 includes placement of additional soil cover in an upland area of the site where the existing soil cover is less than 2 ft thick, installation of an earth retention system at the base of the CCP fill area, and placement of backfill behind the earth retention system and to cover exposed CCP along the embankment. Key assumptions for this option are as follows: - Performance of geotechnical evaluation to determine feasibility and design of earth retention system. - Implementation of Erosion and Sediment Control measures. - Site clearing and grubbing. - Placement of approximately 800 cubic yards (1,200 tons) of additional soil cover over Area A where existing soil cover is less than 2 ft thick. - Installation of a variable height (approximately 2 to 19 ft high), approximately 9,000 sq ft area, and 370-ft long earth retention system at the base of the CCP fill area (see Appendix A). Costs are provided for two types of earth retention systems: Mechanically Stabilized Earth (MSE) Wall or Cast-In-Place Wall. - Backfill placement and compaction of approximately 10,640 tons of import soil to support the earth retention system and cover the exposed CCP along the embankment. The soil import volumes are based upon the cut/fill analysis as summarized in Appendix A and assume a maximum 3:1 slope and at least 2 ft of additional soil cover on the embankment. - Removal and off-site disposal of approximately 200 to 500 tons of non hazardous soil impacted with CCP for the earth retention system foundation. Volume dependent upon the type of earth retention system selected. - Area of total site disturbance estimated to be approximately 1.2 acres. - Engineering and oversight costs. Total of 110 field days assumed. - 20% Contingency applied to all costs. Tables 3A and 3B detail costs associated with Option 2. Each table represents a different type of earth retention system and also includes costs for three different remedial contractors. Details regarding the installation of an earth retention system and the associated cut/fill analysis are included in Table 4 and Appendix A, respectively.	Estimated Cost (2023) $2.9MM - $4.3MM[1]	Estimated Cost (2018) $1.6MM - $3.5MM[1]

Notes:

[1] Estimated cost range represents MSE Wall (low end) and Cast-In-Place Wall (high end).

Table 2
Option 1 Details - Full Removal of CCP
828 Martin Luther King, Jr. Blvd
Chapel Hill, North Carolina
H&H Job No. TCH-009

Task Description	2018				2023								
	Remedial Contractor #1		Remedial Contractor #2		Remedial Contractor #1			Remedial Contractor #2			Remedial Contractor #3		
	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total (60,000 cy)	Total (30,000 cy)	Unit Cost	Total (60,000 cy)	Total (30,000 cy)	Unit Cost	Total (60,000 cy)	Total (30,000 cy)
Remedial Subcontractor Costs													
Planning, Permitting, Mobilization, & Demobilization	LS	$20,000	LS	$15,000	LS	$23,000	$23,000	LS	$64,000	$64,000	LS	$17,500	$17,500
Erosion & Sediment Control	LS	$30,000	LS	$30,000	LS	$32,000	$32,000	LS	$186,000	$186,000	LS	$37,500	$37,500
Clearing and Tree Removal (5 acres)	LS	$75,000	$18,000/AC	$90,000	LS	$86,500	$86,500	LS	$52,000	$52,000	LS	$97,500	$97,500
Removal of On-Site Structure	LS	$165,000	LS	$250,000	LS	$188,500	$188,500	LS	$98,000	$98,000	LS	$295,000	$295,000
Remove Asphalt Parking Lot and Driveway	--	--	$25/ton	$41,250	--	--	--	--	--	--	$35/Ton	$57,500	$57,500
Non-Haz CCP Excavation, Transportation, & Disposal for Areas A-F (30,000 cy / 45,500 tons to 60,000 cy / 90,000 tons)	$85/ton	$7,735,000	$65/ton	$5,947,500	$98/Ton	$8,775,000	$4,459,000	$106/Ton	$9,540,000	$4,823,000	$68.50/Ton	$6,165,000	$3,116,750
Non-Haz Cover Soil Excavation, Transportation, & Disposal for Areas A, B, C, and E (19,000 cy / 28,500 tons)	$85/ton	$2,422,500	$65/ton	$1,852,500	$98/Ton	$2,778,750	$2,778,750	$106/Ton	$3,021,000	$3,021,000	$68.50/Ton	$1,952,250	$1,952,250
Import, Place, & Compact Backfill (45,500 to 90,000 tons)	$25/ton	$2,250,000	$28/ton	$2,520,000	$30/Ton	$2,700,000	$1,350,000	$13.75/Ton	$1,237,500	$618,750	$33.50/Ton	$3,015,000	$1,507,500
Site Restoration (5 acres)	LS	$175,000	$7,500/AC	$37,500	LS	$185,000	$185,000	LS	$73,000	$73,000	LS	$37,000	$37,000
Remedial Subcontractor Subtotals	**$12,872,500**		**$10,783,750**		**$14,768,750**		**$9,102,750**	**$14,271,500**		**$8,935,750**	**$11,674,250**		**$7,118,500**
Engineering/Oversight Costs*													
Planning and Permitting	--	$30,000	--	$30,000	--	$34,500	$34,500	--	$34,500	$34,500	--	$34,500	$34,500
Live Loading Grid Sampling (49,000 to 79,000 cy)	$140/1,000 cy	$11,760	$140/1,000 cy	$11,760	$160/1,000 cy	$12,640	$7,350	$160/1,000 cy	$12,640	$7,350	$160/1,000 cy	$12,640	$7,350
Oversight & Project Management (100 to 200 days)	$1,500/day	$300,000	$1,500/day	$300,000	$1,725/day	$345,000	$172,500	$1,725/day	$345,000	$172,500	$1,725/day	$345,000	$172,500
Final Reporting and As Built Drawings	--	$30,000	--	$30,000	--	$34,500	$34,500	--	$34,500	$34,500	--	$34,500	$34,500
20% Contingency													
Contingency Costs (20%)	%	$2,636,852	%	$2,219,102	%	$3,025,278	$1,856,520	%	$2,925,828	$1,823,120	%	$2,406,378	$1,459,670
Estimated Project Totals (Rounded)	**$15,900,000**		**$13,400,000**		**$18,200,000**		**$11,200,000**	**$17,600,000**		**$11,000,000**	**$14,500,000**		**$8,800,000**

Notes:
cy = cubic yard; LS = lump sum; AC = acre; * = 15% increase in labor and laboratory costs for 2023

Table 3A
Option 2A Details - Installation of Earth Retention System (MSE Wall)
828 Martin Luther King, Jr. Blvd
Chapel Hill, North Carolina
H&H Job No. TCH-009

Task Description	2018				2023					
	Remedial Contractor #1		Remedial Contractor #2		Remedial Contractor #1		Remedial Contractor #2		Remedial Contractor #3	
	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Remedial Subcontractor Costs										
Planning, Permitting, Mobilization, & Demobilization	LS	$20,000	LS	$10,000	LS	$23,000	LS	$49,000	LS	$11,500
Erosion & Sediment Control	LS	$30,000	LS	$15,000	LS	$32,000	LS	$68,000	LS	$15,000
Clearing and Tree Removal (1.2 acres)	LS	$35,000	$40,000/AC	$48,000	LS	$40,000	LS	$14,500	LS	$54,900
Import, Place, & Compact Backfill for Area A (800 cy / 1,200 tons)	$30/ton	$36,000	$32/ton	$48,000	$40/ton	$48,000	$13.75/Ton	$16,500	$72/Ton	$86,400
Earth Retention System (370 ft long with variable height)*	--	$1,265,600	--	$110/sqft	--	$1,645,280	--	$1,645,280	--	$1,645,280
Earth Retention System Drainage Layer	--	$74,000	--	$74,000	--	$96,200	--	$96,200	--	$96,200
Non-Haz Foundation Excavation, Transportation, & Disposal for Retaining Wall (500 tons)	$105/ton	$52,500	$85/ton	$42,500	$120/ton	$60,000	$106/Ton	$53,000	$95/Ton	$47,500
Import, Place, & Compact Backfill for Retaining Wall (7,093 cy / 10,640 tons)** Amount of soil backfil reduced by one-half to account for some backfill costs included in estimate of retention wall system.	$30/ton	$319,200	$32/ton	$340,480	$40/ton	$425,600	$13.75/Ton	$146,300	$33.50/Ton	$356,440
Site Restoration (1.2 acres)	LS	$85,000	LS	$30,000	LS	$97,500	LS	$21,000		$9,150
Remedial Subcontractor Subtotals	**$1,917,300**		**$607,980**		**$2,467,580**		**$2,109,780**		**$2,322,370**	
Engineering/Oversight Costs***										
Planning and Permitting	--	$30,000	--	$30,000	--	$34,500	--	$34,500	--	$34,500
Geotechnical Evaluation for Earth Retention System Selection	--	$50,000	--	$50,000	--	$57,500	--	$57,500	--	$57,500
Oversight & Project Management (110 days)	$1,500/day	$165,000	$1,500/day	$165,000	$1,725/day	$189,750	$1,725/day	$189,750	$1,725/day	$189,750
Final Reporting and As Built Drawings	--	$30,000	--	$30,000	--	$34,500	--	$34,500	--	$34,500
Engineering/Oversight Subtotal	**$275,000**		**$275,000**		**$316,250**		**$316,250**		**$316,250**	
20% Contingency										
Contingency Costs (20%)	%	$416,460	%	$154,596	%	$531,466	%	$459,906	%	$502,424
Estimated Project Totals (Rounded)	**$2,600,000**		**$1,000,000**		**$3,300,000**		**$2,900,000**		**$3,100,000**	

Notes:
cy = cubic yard; ft = feet; LS = lump sum; * = See Table 4 (high end cost used); ** = see Appendix A; *** = 15% increase in labor costs for 2023

Table 3B
Option 2B - Installation of Earth Retention System (Cast-In-Place)
828 Martin Luther King, Jr. Blvd
Chapel Hill, North Carolina
H&H Job No. TCH-009

Task Description	2018				2023					
	Remedial Contractor #1		Remedial Contractor #2		Remedial Contractor #1		Remedial Contractor #2		Remedial Contractor #3	
	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Remedial Subcontractor Costs										
Planning, Permitting, Mobilization, & Demobilization	LS	$20,000	LS	$10,000	LS	$23,000	LS	$49,000	LS	$11,500
Erosion & Sediment Control	LS	$30,000	LS	$15,000	LS	$32,000	LS	$68,000	LS	$15,000
Clearing and Tree Removal (1.2 acres)	LS	$35,000	$40,000/AC	$48,000	LS	$40,000	LS	$14,500	LS	$54,900
Import, Place, & Compact Backfill for Area A (800 cy / 1,200 tons)	$30/ton	$36,000	$32/ton	$48,000	$40/ton	$48,000	$13.75/Ton	$16,500	$72/Ton	$86,400
Earth Retention System (370 ft long with variable height)*	--	$1,582,000	--	$65/sqft	--	$2,061,120	--	$2,061,120	--	$2,061,120
Earth Retention System Drainage Layer	--	$74,000	--	$74,000	--	$96,200	--	$96,200	--	$96,200
Non-Haz Foundation Excavation, Transportation, & Disposal for Retaining Wall (500 tons)	$105/ton	$52,500	$85/ton	$42,500	$120/ton	$60,000	$106/Ton	$53,000	$95/Ton	$47,500
Import, Place, & Compact Backfill for Retaining Wall (13,850 cy / 20,775 tons)**	$30/ton	$623,250	$32/ton	$664,800	$40/ton	$831,000	$13.75/Ton	$285,656	$33.50/Ton	$695,963
Site Restoration (1.2 acres)	LS	$85,000	LS	$30,000	LS	$97,500	LS	$21,000		$9,150
Remedial Subcontractor Subtotal	**$2,537,750**		**$932,300**		**$3,288,820**		**$2,664,976**		**$3,077,733**	
Engineering/Oversight Costs***										
Planning and Permitting	--	$30,000	--	$30,000	--	$34,500	--	$34,500	--	$34,500
Geotechnical Evaluation for Earth Retention System Selection	--	$50,000	--	$50,000	--	$57,500	--	$57,500	--	$57,500
Oversight & Project Management (110 days)	$1,500/day	$165,000	$1,500/day	$165,000	$1,725/day	$189,750	$1,725/day	$189,750	$1,725/day	$189,750
Final Reporting and As Built Drawings	--	$30,000	--	$30,000	--	$34,500	--	$34,500	--	$34,500
Engineering/Oversight Subtotal	**$275,000**		**$275,000**		**$316,250**		**$316,250**		**$316,250**	
20% Contingency										
Contingency Costs (20%)	%	$540,550	%	$219,460	%	$695,714	%	$570,945	%	$653,497
Estimated Project Totals (Rounded)	**$3,400,000**		**$1,400,000**		**$4,300,000**		**$3,600,000**		**$4,000,000**	

Notes:
cy = cubic yard; ft = feet; LS = lump sum; * = See Table 4 (high end cost used); ** = see Appendix A; *** = 15% increase in labor costs for 2023

Table 4
Earth Retention Systems Details
828 Martin Luther King, Jr. Blvd
Chapel Hill, North Carolina
H&H Job No. TCH-009

Earth Retention Systems	Estimated Cost Range									
	Unit Cost (2018)		Total (2018)		Unit Cost (2023)			Total (2023)		
	Low End	High End	Low End	High End	Low End	Mid Range	High End	Low End	Mid Range	High End
MSE Retaining Wall System	$35/sqft	$140/sqft*	$316,400	$1,265,600	$36/sqft	$110/sqft	$182/sqft	$325,440	$994,400	$1,645,280
Cast-In-Place Concrete Retaining Wall System	$70/sqft	$175/sqft	$632,800	$1,582,000	$43/sqft	$65/sqft	$228/sqft	$388,720	$587,600	$2,061,120

Notes:

Budgetary estimations utilize a 9,040 sqft earth retention system with variable height. Estimations also assume retention system foundations will be set on bedrock, approximated at 10 feet below ground surface. See Appendix A for further details regarding system heights.

sqft = square feet; MSE = mechanically stabilized earth; * = pricing includes partial backfill costs

MW-5
MARTIN LUTHER KING JR BOULEVARD
RESIDENTIAL
PARKING LOT
A
AST
POLICE DEPARTMENT BUILDING
BOLINWOOD DRIVE
RESIDENTIAL
MW-1
MW-1A
B
EXISTING STORMWATER POND
PARKING LOT
MW-11D
MW-9
D
MW-8
C
E
F
MW-6
MW-7
BRIDGE
MW-3A
CHAIN-LINK FENCE
MW-4A
APARTMENTS
BOLIN CREEK TRAIL
GAS STATION
AUTO REPAIR
UMSTEAD DRIVE
HILLSBOROUGH STREET

LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 328 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE (HYDROSEEDED)
- BOLIN CREEK TRAIL
- EXISTING SILT FENCE
- STORM DIVERSION CHANNEL
- STORM OUTFALL CHANNEL
- STORMWATER CULVERT
- AST APPROXIMATE DIESEL AST LOCATION
- A CCP AREA DESIGNATION

N

APPROXIMATE
0 115 230
SCALE IN FEET

TITLE
SITE MAP

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

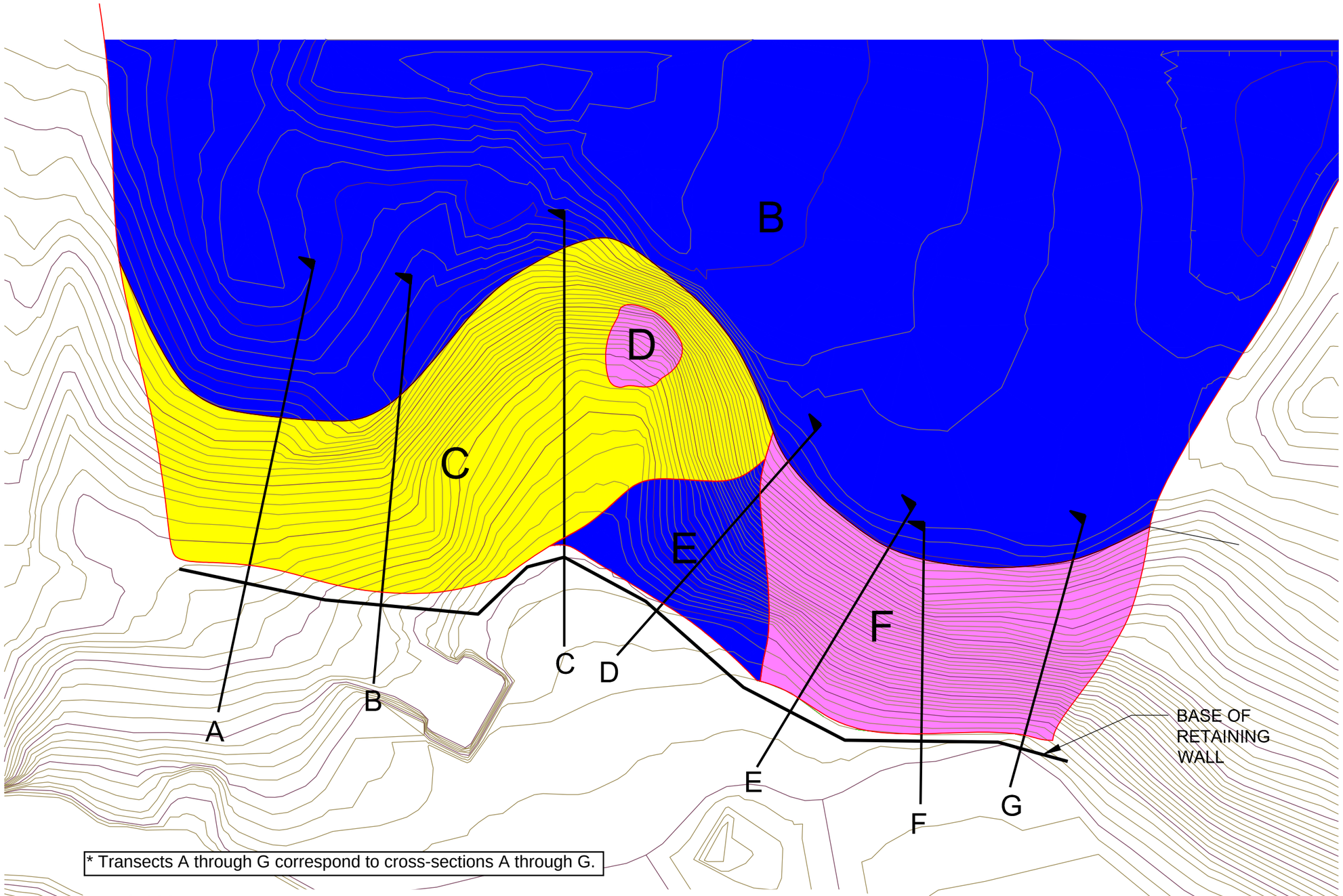
hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
3921 Sunset Ridge Road, Suite 301
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)
License # C-1269 / #C-245 Geology

DATE: 10-17-22 | REVISION NO. 0
JOB NO. TCH-009 | FIGURE NO. 1

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Brownfields Documents\Brownfields Assessment Report\Figures\TCH.009 20221031-FIGs.dwg, FIG 2, 11/4/2022 11:00:01 AM, shaynes

Appendix A

Cut/Fill Analysis for Earth Retention System



* Transects A through G correspond to cross-sections A through G.

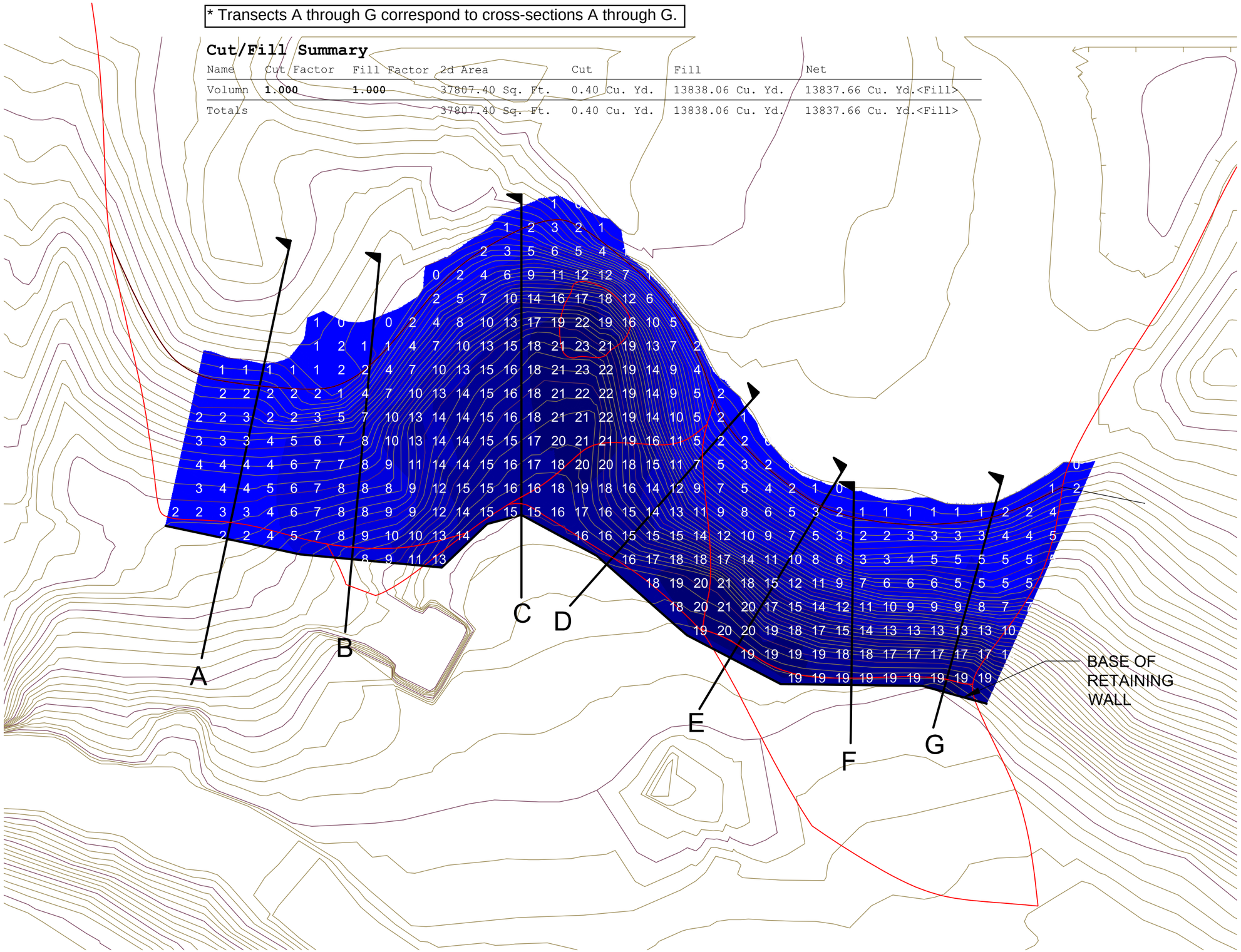
Cut/Fill Summary

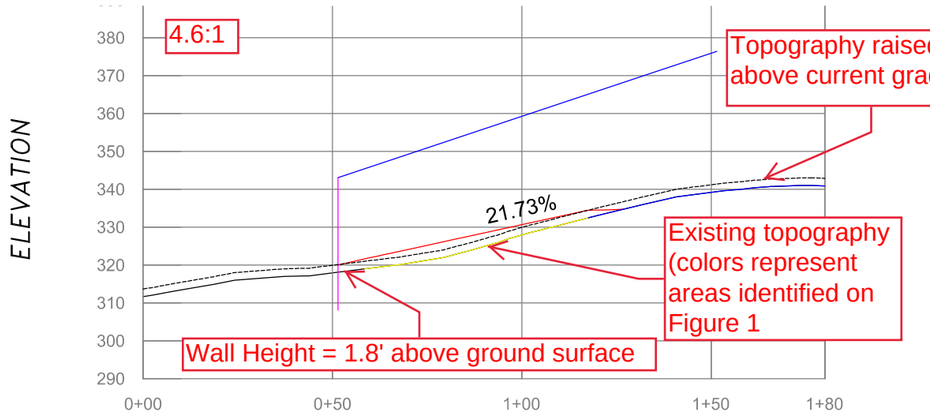
Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Volumn	**1.000**	**1.000**	37807.40 Sq. Ft.	0.40 Cu. Yd.	13838.06 Cu. Yd.	13837.66 Cu. Yd.<Fill>
Totals			37807.40 Sq. Ft.	0.40 Cu. Yd.	13838.06 Cu. Yd.	13837.66 Cu. Yd.<Fill>

* Transects A through G correspond to cross-sections A through G.

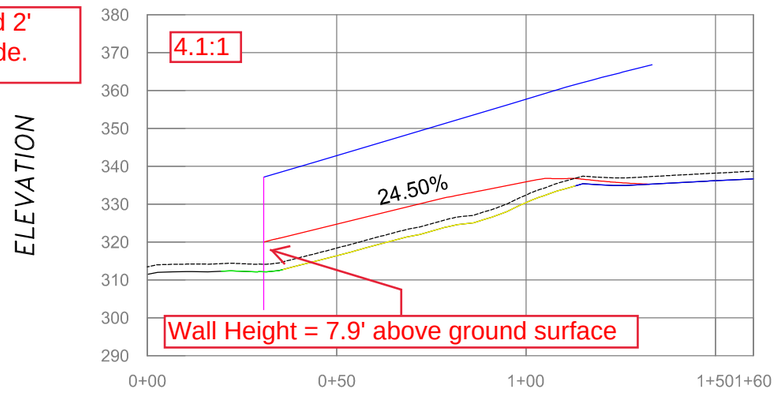
Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Volumn	1.000	1.000	37807.40 Sq. Ft.	0.40 Cu. Yd.	13838.06 Cu. Yd.	13837.66 Cu. Yd.<Fill>
Totals			37807.40 Sq. Ft.	0.40 Cu. Yd.	13838.06 Cu. Yd.	13837.66 Cu. Yd.<Fill>





CROSS-SECTION "Alignment - A"



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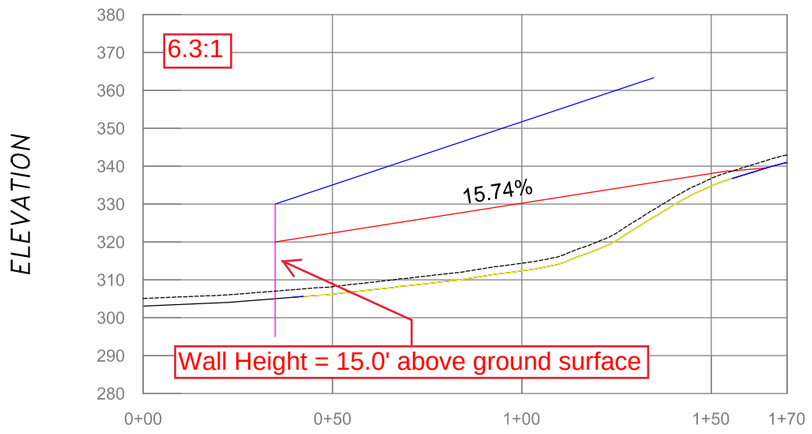

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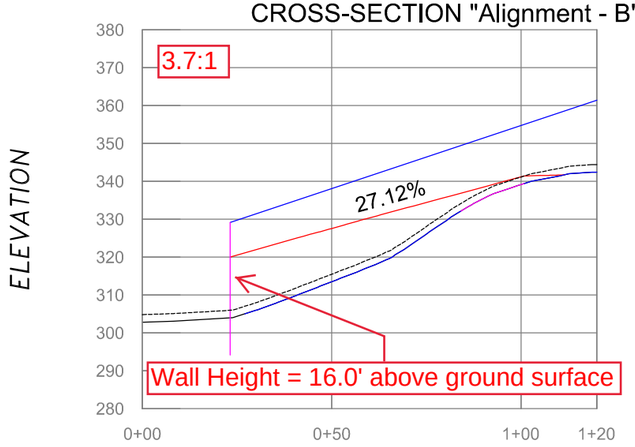
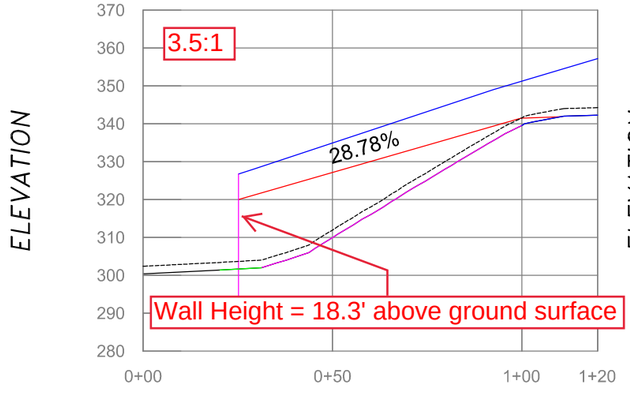


CROSS-SECTION "Alignment - D"



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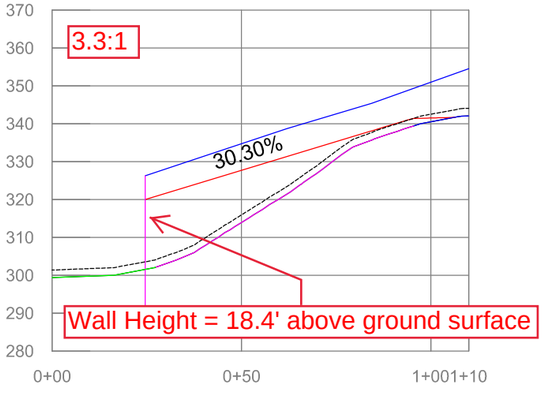

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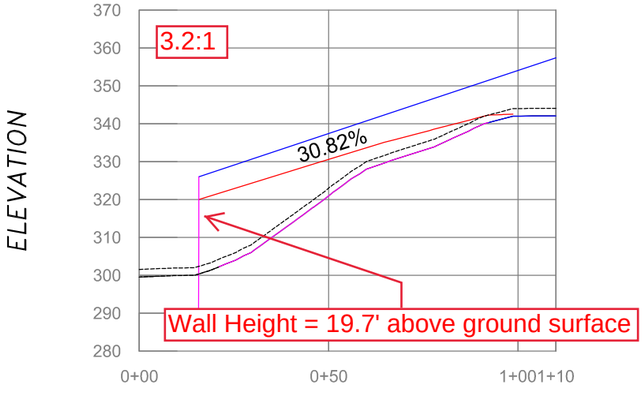

CROSS-SECTION "Alignment - G"