



Airspace Management Report

Southeastern Public Service Authority

Regional Landfill, Cells V and VI

Suffolk, Virginia

Issued for Review January 2022

Final Report January 14, 2022





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- Figure C, Varying Density
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Purpose

This Airspace Management Report has been prepared to assist the Southeastern Public Service Authority (SPSA) with management of the remaining airspace for the Regional Landfill Cells V and VI. The report describes the assumptions and calculations used to estimate the remaining airspace, municipal solid waste (MSW) in-place density, and remaining life expectancy of the landfill.

Tonnage Data

HDR Engineering, Inc. (HDR) has compiled the following information regarding the quantity of waste accepted at the landfill.

- Based on scale records provided by SPSA, a total of **12,110,991 tons** of MSW, construction demolition debris (CDD), and ash were disposed of in Cells V and VI at the Regional Landfill from May 2000 through December 15, 2020. A total of **305,221 tons** were disposed in the 2021 reporting period December 15, 2020 – December 17, 2021. See attached Tonnage Between Survey Dates Summary Table.
- Since January 24, 2018 when MSW from the western communities has been discharged at the Regional Landfill, the average monthly disposal rate for MSW, CDD, and ash is **32,619 tons per month (tpm)**. Figure A (attached) shows the monthly and rolling 12-month average tonnage disposed at the landfill through **December 2021**.
- The average monthly disposal rate for just MSW and CDD at the landfill since January 24, 2018 is **12,035 tpm**.
- The average monthly disposal rate for ash (ash and non-qualifying ash) at the landfill over the past 12 months is **14,120 tpm**.

Operating Airspace

Topography

Since Cell V began operation in May 2000, annual topographic surveys have been prepared to assist in managing the landfill airspace. Cell VI began accepting part of the incoming waste in May 2006, but did not take all of the incoming waste until November 2006, when Cell V stopped taking waste. The following topographic files have been utilized in determining consumed and remaining airspace including the in-place density of the compacted MSW in Cells V and VI.

- July 28, 2000, As-Built Regional Landfill Cell V prepared by G.R. Jenkins – Land Surveyor.
- May 11, 2006, Cell VI Phase 1 operational cover as-built prepared by Bateman Civil Survey Company, P.C.
- November 30, 2007, Cell VI Phase 2 operational cover as-built prepared by Bateman Civil Survey Company, P.C.
- December 15, 2020 topography prepared from aerial drone photography by SPSA utilizing Propeller Trimble Stratus software.

- December 17, 2021 topography prepared from aerial drone photography by SPSA utilizing Propeller Trimble Stratus software.

Airspace

The AutoCAD Civil 3D program was used to calculate remaining and consumed gross volume. A three-dimensional surface was created for the operational cover surface for Cell V and VI and the **December 17, 2021** topo. The 3-D surfaces were compared to determine volumes. As appropriate, volumes representing final cover system thickness were accounted for in determining the operating airspace. Operating airspace is defined as the volume determined between the top of operational cover and the bottom of the final cover system and is comprised of MSW and daily and intermediate cover.

In addition to determining operating airspace, the volumes were utilized to determine cumulative in-place densities. In-place densities were determined by dividing tonnage by consumed airspace. The following table summarizes the periodic consumption of airspace and densities.

To keep records of the landfill development, drawings have been prepared to indicate the consumption of available airspace. Drawings C-01 and C-02 depict the existing conditions as of the surveys on December 15, 2020 and December 17, 2021. Drawings C-03 through C-06 include the calculations of airspace consumed over the last year, airspace remaining, recoverable airspace remaining (neglects minor fills on lower slopes of Cell V and revised filling to accommodate existing roadway and settlement of slopes), and total airspace consumed to date. Drawings C-07 through C-09 depict several cross-sections of the landfill depicting the bottom of waste, filling completed in 2021, airspace gained in 2021 through settlement, the permitted final top of waste grades, and the recoverable top of waste grades.



Table A

Airspace Management Report	Survey Date	Disposed To Date (Tons) ⁽¹⁾	Airspace Consumed To Date (CY)	Operating Airspace Remaining (CY)	Disposed In-place Density (lbs/CY) ^(1, 2)	Periodic Airspace Consumed (CY) ⁽⁴⁾	Operational In-place Density (lbs/CY) ⁽⁴⁾
February 2008 (V&VI)	12/27/07	6,753,342	7,942,485	7,292,881	1,701		-
February 2009	12/28/09	7,768,309	9,310,547	6,144,716	1,669		-
November 2009	10/29/09	8,274,614	9,550,947	5,712,089	1,733		-
January 2011	1/5/11	8,618,420	9,859,976	5,395,091	1,748		-
February 2012	1/31/12	8,825,464	9,808,952	5,419,716	1,799		-
February 2013	2/14/13	9,078,922	9,901,716	5,336,169	1,833		-
March 2014 ⁽³⁾	3/18/14	9,647,921	10,075,542	5,173,609	1,915		-
March 2015	3/15/15	9,992,157	10,320,231	4,918,558	1,900		-
November 2015	11/24/15	10,274,587	10,489,200	4,740,401	1,959		-
January 2017	1/19/17	10,627,401	10,697,546	4,543,105	1,987	278,569	2,533
December 2017	12/16/17	10,865,168	10,831,703	4,412,901	2,008	204,462	2,326
December 2018 ⁽⁵⁾	12/17/18	11,177,785	11,152,613	3,728,814	2,005	337,261	1,854
December 2019 ⁽⁵⁾	12/5/19	11,466,983	11,423,983	3,408,065	2,008	332,716	1,738
December 2020 ⁽⁵⁾	12/15/20	11,805,770	11,821,884	3,036,939	1,997	355,981	1,903
December 2021 ⁽⁵⁾	12/17/21	12,110,991	12,083,851	2,644,503	1,998	343,303	1,778

- (1) Disposed includes both MSW and ash up to survey dates. Tonnage of clean soil fill from Clearfield used for daily and intermediate cover have been deducted from the disposed tons in 2021.
- (2) Density reported is cumulative since the beginning of operations in May 2000.
- (3) The March 2014 report figures shown include soils used for Cell V regrading, which is responsible for the large increase in Disposed In-place Density.
- (4) Operational In-Place Density calculated from the periodic airspace consumed in the active fill area and tons disposed and does not consider site wide airspace consumed and settlement of waste.
- (5) The Operating Airspace Remaining for 2018, 2019, 2020 and 2021 are calculated for recoverable airspace which is adjusted for settlement of existing surfaces at the limit of filling, and the configuration of existing access roadway.

Remaining Site Life

We understand that the current landfill operations include receipt of MSW ash residue and MSW waste materials from western SPSA communities. This operation is likely to remain similar through at least June 30, 2024 at which time the contract with Wheelabrator is anticipated to be terminated. Following termination of the agreement it is anticipated that 450,000 tons per year of MSW will be disposed of at the Regional Landfill. Operations have been successful in achieving a high in place density of waste, ash and cover materials and in 2021 they achieved **1,778 lbs/CY** based on the periodic airspace consumed in the active filling area of 343,303 CY and **305,222 Tons** disposed between the December 15, 2020 and December 17, 2021 surveys.

Figure B depicts the tonnage and airspace scenario for Cell V and VI based on varying waste acceptance rates, the current 1,778 lbs/CY or 0.899 operational in-place density, and an assumed MSW waste density of 0.800 or 1600 lb/CY following the termination of the Wheelabrator agreement. If the current waste disposal rate and operational in-place density were to continue to June 30, 2024 Cell V and VI would last until approximately May 2027.

Under a 1% annual tonnage increase scenario, the capacity could be reached as early as January 2027.

Figure C depicts the tonnage and airspace scenario for varying in-place densities after June 30, 2024. If SPSA continues to accept 305,222 tons per year of ash, MSW and CDD for disposal until June 30, 2024, and then waste acceptance rates increase to 491,000 tons per year, Cell VI could reach capacity as early as January 2027 if the operational in-place density approaches 1400 lbs/CY. If operations are able to successfully work and compact the waste materials to maintain the airspace utilization rate at 1600 lbs/CY or 1800 lbs/CY, then capacity would not be reached until May 2027 or September 2027, respectfully.

Findings

The remaining airspace volume has not been adjusted to address the fact that there may be difficulty in maintaining the outside slopes at or above the proposed elevations as the height of the fill progresses or to address the relocation of the access road. As the waste settles and degrades over the next few years, the 3H: 1V slopes may become flatter. The most critical area to meet or become steeper than the proposed contours is the first couple of lifts above the stormwater benches. This is the most difficult area to revisit with waste placement and it has the most effect on the capacity at higher grades. It is difficult to predict how settlement will affect the slopes during the remaining active life.

Review of the existing topographic surveys indicates that the exterior slopes of the landfill are being filled in general accordance with the permit slopes of 3H:1V and fill plan. As waste filling elevations continue to go higher in Cell V and as Cell VI is further developed, conformance with the exterior permit slopes should be confirmed in order to utilize as much of the available capacity as practical.

SPSA should plan to have additional constructed capacity available for disposal in mid-2026 to accommodate variations in waste acceptance rates, densities and to support initial operations in the next cell. As is demonstrated from the various remaining site life projections, Cells V and VI airspace will be consumed in 2027.

Future Capacity

In addition to Cells V and VI, the SPSA Regional Landfill includes a 56-acre lateral expansion known as Cell VII. Cell VII was approved by the Virginia Department of Environmental Quality on June 8, 2011. The capacity of Cell VII is approximately 10,800,000 cubic yards of operating airspace, as permitted. Without the permitted overlap onto Cell V, the available airspace would be reduced to approximately 8,600,000 CY. Site life estimates for Cell VII and life estimate of future phases for various disposal rates and densities are included as an attachment. Drawing C-10 is also enclosed to depict the Master Plan Buildout and life for the future cells based on current disposal rates and density.



Attachments

- Figure A, Tonnage History
- Figure B, Tonnage Scenario
- Figure C, Varying Density Calculations
- Tonnage Reports
- Airspace Calculations
- Cell VII –XII Life Estimates
- Airspace Drawings

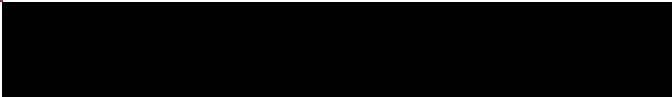


Figure A

Tonnage History

SPSA Regional Landfill Cells V & VI

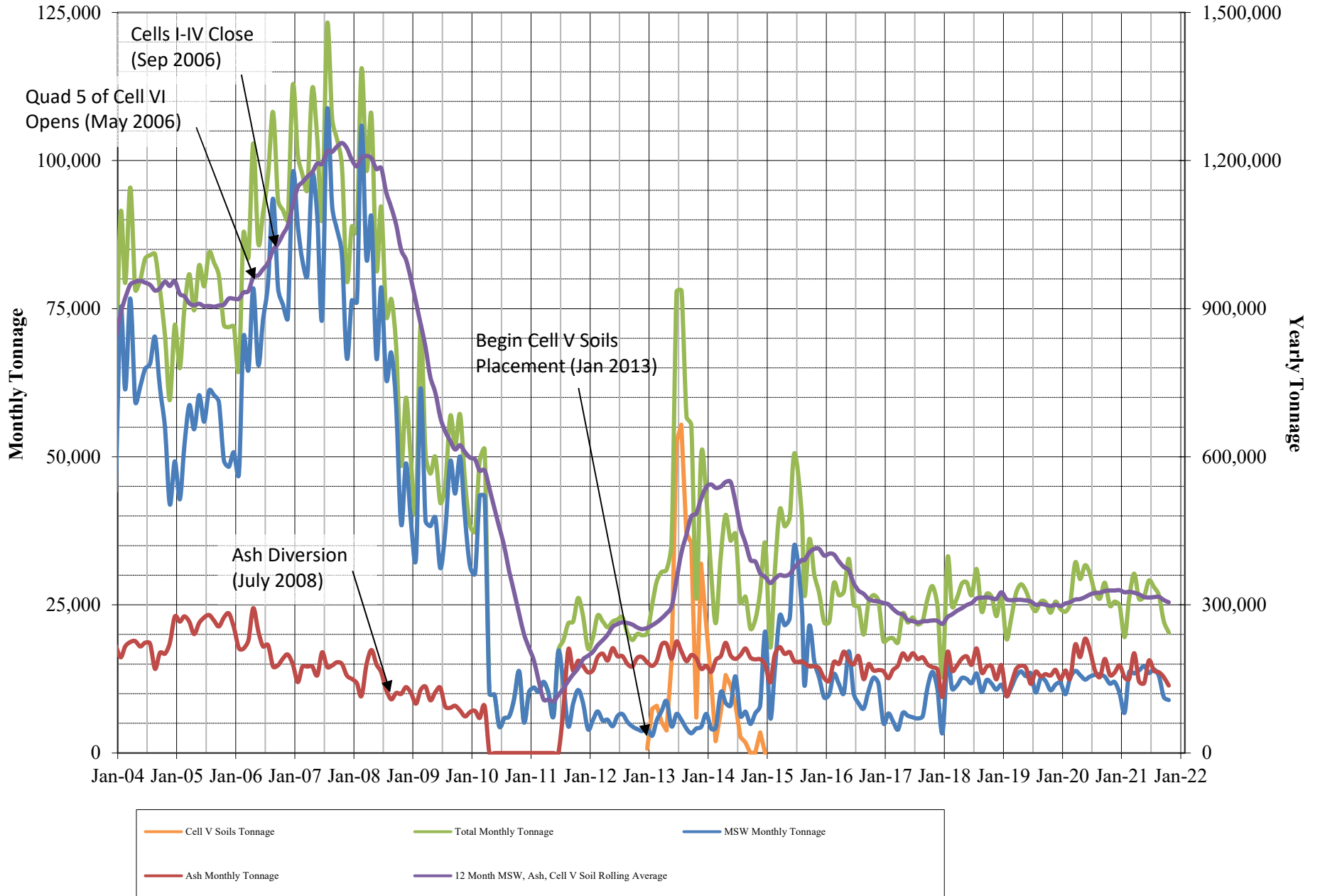


Figure B
Tonnage Scenario
 SPSA Regional Landfill Cells V & VI
 Density 1600 lbs/CY after June 2024

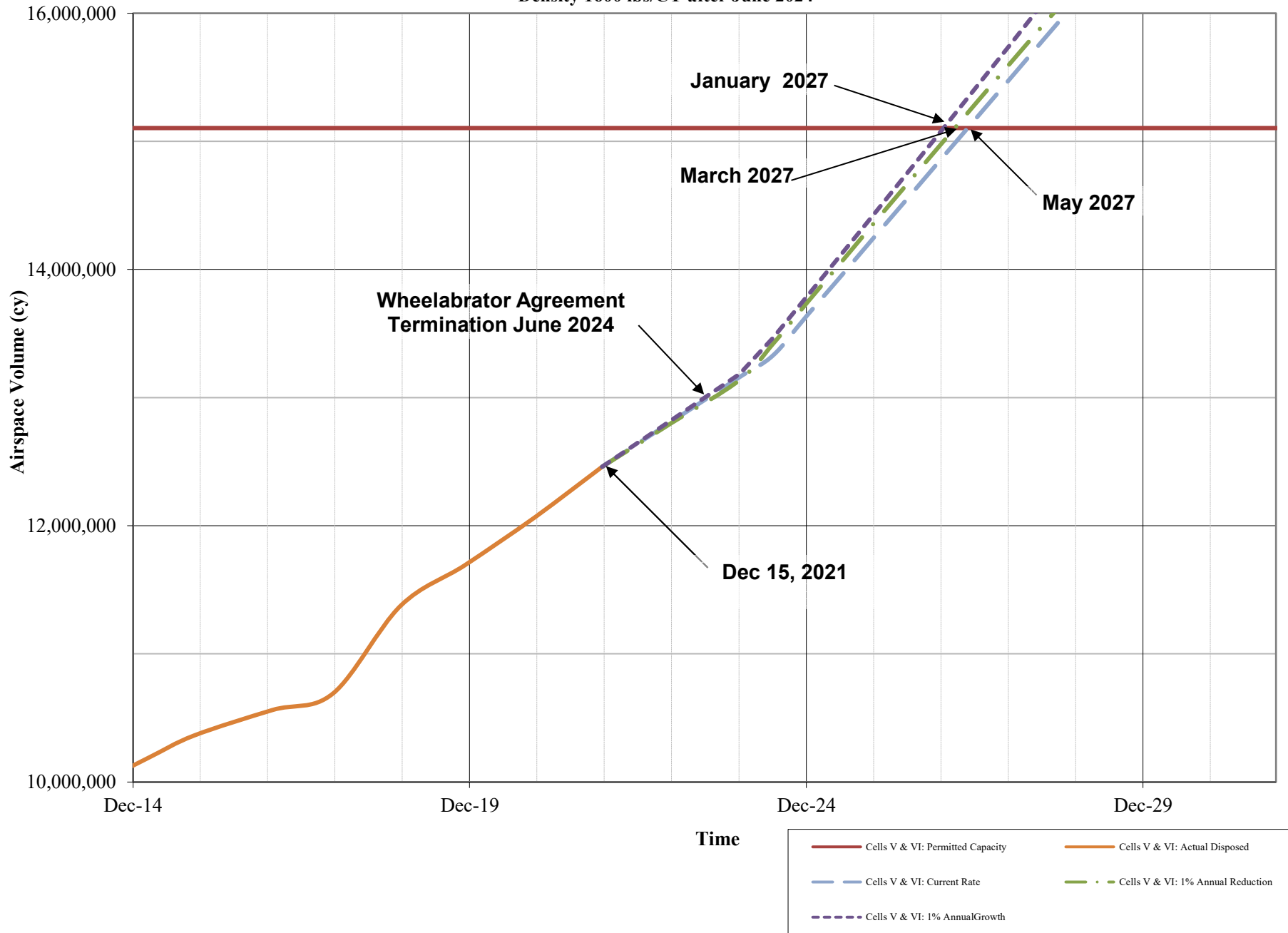
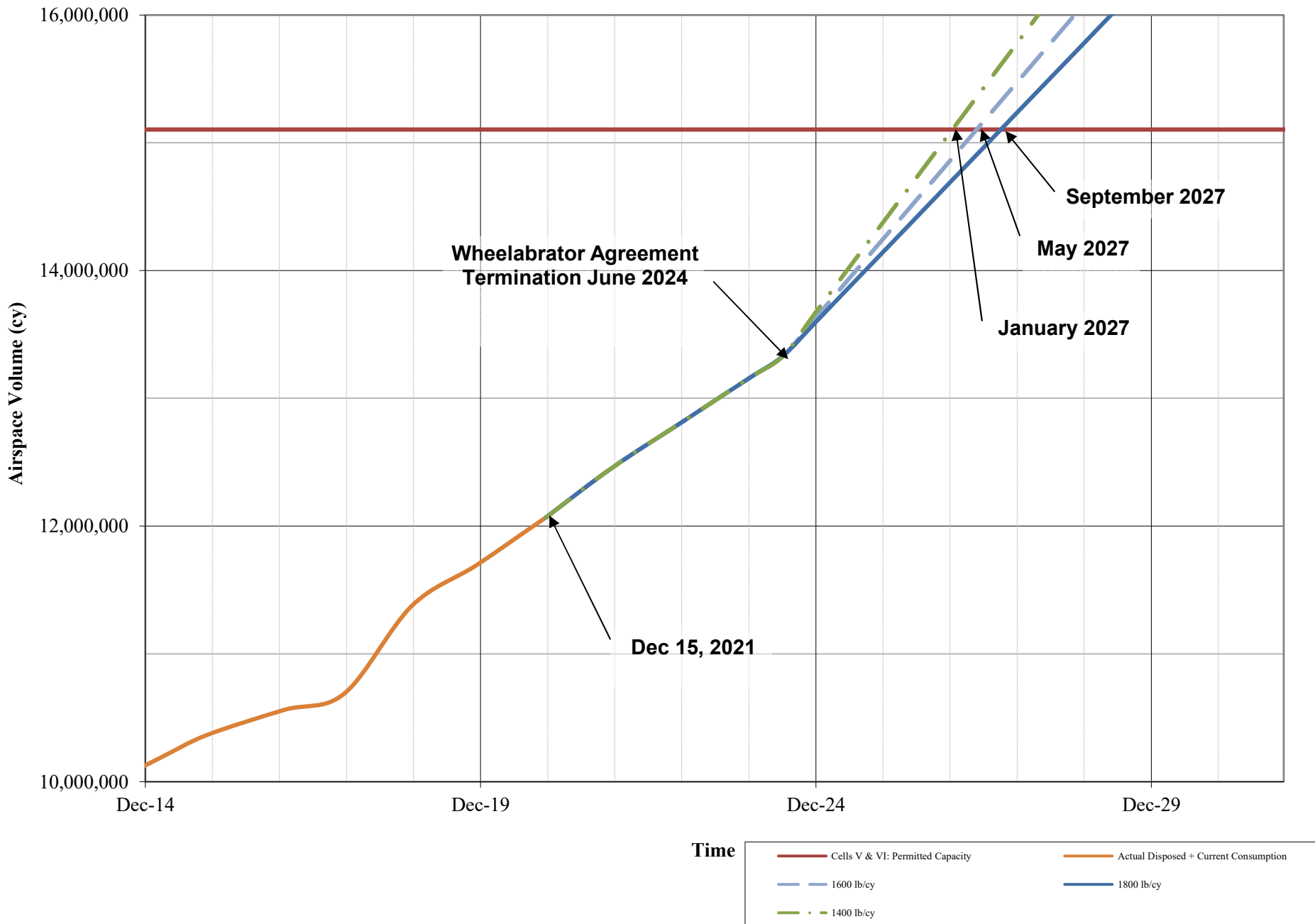


Figure C Varying Density Scenario SPSA Regional Landfill Cells V & VI



Fiscal Year 2014-2022 Tonnage

Regional Landfill Waste Stream

Types of Waste (tons)	Dec 1, 2020 - Dec 15, 2020		Days months																
	Dec 15, 2020 - Dec 31, 2020	Dec 15, 2020 - Dec 31, 2020	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	FY2021	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	CY2021	1/24/2018	12/15/2021	1421.00	46.71781
CDD	277	142	473	284	736	595	627	618	6,522	609	636	713	1,023	765	7,593	741	tons/month since Jan 24 2018		
Sludge - Norfolk	187	198	442	432	354	260	523	458	4,717	534	528	482	398	608	5,510	447	tons/month since Jan 24 2018		
Sludge - Suffolk	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1			
Industrial Waste	-	0	-	13	9	55	81	18	603	46	2	0	-	4	228	38	tons/month since Jan 24 2018		
Fines C&D	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Soils	36	32	157	350	880	619	717	405	5,841	501	517	443	562	70	5,271	602	tons/month since Jan 24 2018		
Brick & Block	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Clean Fill	-	0	-	-	-	-	137	-	2,282	-	54	-	-	-	191	2,309	tons/month since Jan 24 2018		
Peanut Dust/Peanut Hulls	138	141	414	407	369	437	418	269	4,566	514	230	296	308	510	4,489	360	tons/month since Jan 24 2018		
Municipal Solid Waste ¹	-	0	-	-	-	-	-	-	-	-	-	-	-	-	1				
Suffolk Municipal NP Solid Waste	108	96	240	63	209	40	25	27	2,691	26	28	33	23	10	845	80	tons/month since Jan 24 2018		
Southampton Cty Municipal NP Solid Waste	-	0	2	-	-	-	-	-	2	-	-	-	-	-	2	0			
Chesapeake Municipal NP Solid Waste	2	0	-	-	-	-	16	-	18	-	-	-	-	-	16	3			
Portsmouth Municipal NP Solid Waste	-	0	-	-	-	-	18	-	18	-	-	-	-	-	18	1			
Virginia Beach Municipal NP Solid Waste	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Norfolk Municipal NP Solid Waste	-	0	-	-	1	-	-	-	1	-	-	-	-	-	1	0			
NP from Municipal HHW Users	25	24	36	64	35	46	45	66	674	60	69	82	57	95	701	60	tons/month since Jan 24 2018		
Navy Waste ¹	22	0	-	-	29	51	118	24	298	23	7	10	11	8	285	21	tons/month since Jan 24 2018		
Contract Processable Waste	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Non-Processible Commercial Waste ²	45	26	83	115	61	74	82	99	892	102	218	206	186	133	1,423	76	tons/month since Jan 24 2018		
Fluff from BiMetals	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Concrete/Asphalt	-	0	-	-	-	-	-	-	-	22	-	-	-	-	7	29	6	tons/month since Jan 24 2018	
Shredded Tires	96	156	157	87	105	338	865	1,475	6,102	709	800	808	751	569	7,217	517	tons/month since Jan 24 2018		
Ash	6,657	4,631	13,662	11,844	11,367	14,925	11,114	10,548	150,880	13,658	11,883	12,114	11,665	9,912	144,850	11,176	tons/month since Jan 24 2018		
Non-Qualifying Ash	1,266	1,015	1,136	901	1,118	1,899	999	1,254	16,679	1,946	2,015	1,510	1,151	1,471	17,276	2,944	tons/month since Jan 24 2018		
Cell V Slope	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
MSW from Tsf Stations	4,725	5,429	8,001	4,942	10,139	10,555	9,473	10,770	112,431	10,293	9,652	9,873	6,159	6,164	104,717	8,850	tons/month since Jan 24 2018		
Clean Fill - Clearfield (1.35 factor)	2,835	76	3,156	4,914	2,552	4,177	3,988	5,103	48,535	3,289	2,797	6,143	4,555	4,895	45,644	4,155	tons/month since Jan 24 2018		
Clearfield Residual (1.35 factor)	76	0	76	57	-	95	95	-	815	76	76	19	-	-	491	44	tons/month since Jan 24 2018		
Non-Processible Waste (from Tsf Stations)	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Non-Processible Waste (from RDF)	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Diverted Processible Waste (from RDF)	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Diverted Processible Waste (from Tsf Stations)	-	0	-	-	718	271	824	437	2,250	-	1,347	-	-	-	4,259	191	tons/month since Jan 24 2018		
Total	16,495	11,966	28,035	24,472	28,681	34,435	30,164	31,571	366,817	32,406	30,857	32,732	26,848	25,219	351,057	32,619	tons/month since Jan 24 2018		
Total without clean fill	13,660	11,890	24,879	19,558	26,130	30,258	26,038	26,468	11,890	29,118	28,006	26,589	22,294	20,324	305,222	26,155	tons/month since Jan 24 2018		
Total without ash	5,737	6,244	10,081	6,814	13,645	13,435	13,926	14,666	14,666	13,513	14,108	12,965	9,478	8,942	143,095	12,035	tons/month w/o ash		
Total non-MSW	1,012	815	2,080	1,871	3,507	2,880	4,452	3,896	3,896	3,220	4,456	3,092	3,319	2,778	38,378	3,185	tons/month other waste		

¹ Represents CDD from Suffolk Contractors

² Boats, Flour, Frozen Foods, Other items too large for Suffolk Transfer Station

Project:	SPSA	Computed: AMM	1/5/2022
Subject:	Regional Landfill Cell V & VI	Checked: JSM	1/7/2022
Task:	Airspace Calculations	Sheet: 1	Of: 1

Base Drawing for volume calculations: Cell V Design Subgrade (Design Bottom of Clay) and Cell VI Operational Cover

A 15,103,930 cy Permit Net Airspace Capacity for MSW, D&I Cover (No Final Cover)
(Permitted operational capacity; refer to permit for Cell VI)

B 12,083,851 cy Volume Consumed as of 12-17-21 (AutoCADD, Base Drawings vs. 12-17-21 Survey)

C 0 cy Cell V subgrade surface modified to top of operational cover in 2018
44.6 Acres
1.1 Clay Liner, assumed additional 0.1' of over build
1.6 Op Cover, assumed additional 0.1' of over build

D 12,083,851 cy Airspace Consumed as of 12-17-21	(B-C)
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Includes MSW, D&I Cover

Airspace Consumption Check

E 11,821,884 cy Airspace Consumed in Cells V&VI as of 12-15-20 (Base Drawing vs. 12-15-20 Survey)

F 343,303 cy Airspace Consumed between 12-15-20 and 12-17-21 (12-15-20 Survey vs. 12-17-21 Survey)
(includes only volume consumed within active fill area)

G 12,165,187 cy Airspace Consumed as of 12-17-21 based on the 12-17-21 survey
and the 12-15-20 survey **(E + F)**

-0.67% % Difference of the Consumed AutoCADD and calculated Consumed Airspace **(1-G/D)**

H 12,124,519 cy Airspace Consumed (avg of AutoCADD volume and calculated volume) **(Average of D & G)**

-0.34% % Difference of the Consumed Average and calculated Consumed Airspace **(1-H/D)**

Airspace Remaining Check

I 3,161,275 cy Remaining Airspace as of 12-17-21 (12-17-21 survey vs. 3:1 Top of Waste, AutoCAD)

J 3,020,079 cy calculated Remaining Airspace as of 12-15-20 **(A - D)**
(Permit Net Airspace less Airspace Consumed)

K 4.68% % Difference of the Remaining AutoCADD and calculated Remaining Airspace **(1-I/J)**

L 2,644,503 cy Recoverable Remaining Airspace as of 12-17-21 (12-15-21 vs Revised Top of Waste, AutoCADD)

M 19.54% % Difference Calculated vs Recoverable Airspace **(1-I/L)**

N 3,161,275 cy Total Remaining Airspace as of 12-17-21	(I)
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Includes MSW, D&I Cover

O 2,644,503 cy Recoverable Airspace Remaining as of 12-17-21	(L)
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Includes MSW, D&I Cover

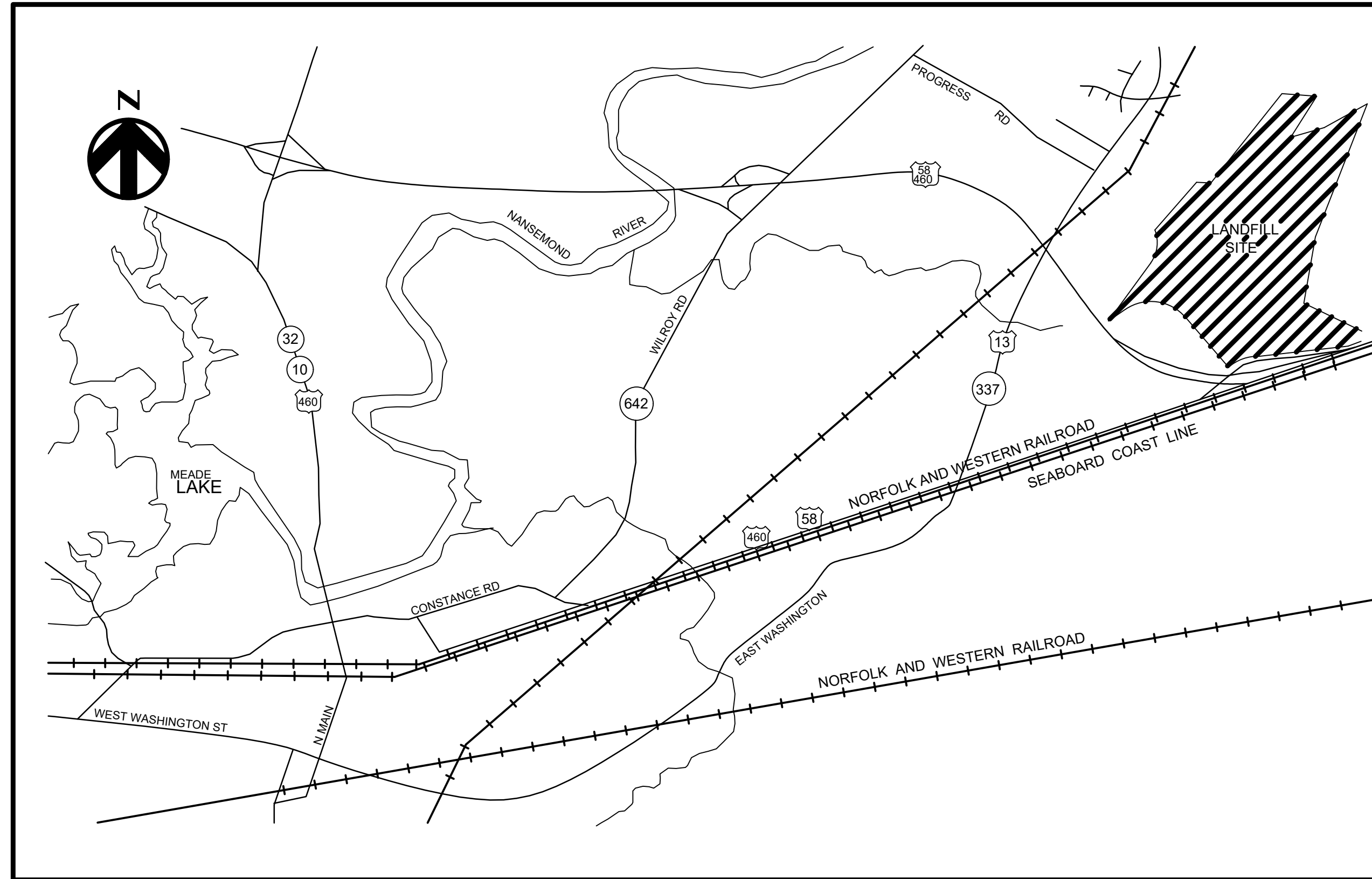
Project:	SPSA Life Projections	Computed: JSM	Date: 1/7/22
Subject:	Varying Disposal Materials	Checked:	Date: 1/7/22
Task:	Airspace & Timeline For MSW	Sheet: 1	Of: 1

Date of Survey:	12/15/2021		Capacity	
			Tons	
Permitted airspace for Cells 5 and 6	15,103,930	cy	13,593,537	
Airspace consumed as of December 15, 2020	12,083,851	cy	10,875,466	
Calculated Airspace Remaining for Cells 5-6	3,020,079	cy	2,718,071	
Recoverable Airspace Remaining for Cells 5-6	2,644,503	cy	2,380,053	1800
Permitted Airspace for Cell 7	8,600,000	8,600,000	6,020,000	1400
Estimated Airspace for Cells 8 and 9	15,696,181	24,296,181	10,987,327	
Estimated Airspace for Cells 10-12	21,326,523	45,622,704	14,928,566	

Year Site Life Expires

Incoming waste volume, tons/yr	Cumulative Life Estimations			
	Cells 5/6	Cell 7	Cells 8/9	Cells 10/11/12
	2.64M CY 2.38M Tons	8.6M CY 6.0M Tons	15.7M CY 10.9M Tons	21.3M CY 14.9M Tons
200,000	2033	2063	2118	2193
300,000	2029	2049	2086	2136
400,000	2027	2042	2070	2107
500,000	2026	2038	2060	2090
600,000	2025	2035	2054	2079
700,000	2025	2033	2049	2070

- Notes:
- 1 Assume 0.70 tons MSW per cubic yard density for filling in Cells 7-12. Life of Cell 5/6 assumes 0.9 tons/CY for existing conditions
 - 2 Cell 7 volume assumes reduction in permitted capacity with no overlap onto Cell V as shown on drawing.
 - 3 Cells 10 through 12 volumes are estimated as a 20' intragradient base and 200' top elevation.
 - 4 Cell 7-12 Life calculated from end of Cell V/VI based on Ash, MSW and C&D filling



LOCATION MAP
1" = 2000'

Contract Drawings For

Regional Landfill

2022 Airspace Management

Issued for Review
January 2022

Project No.
10316827

Suffolk, Virginia



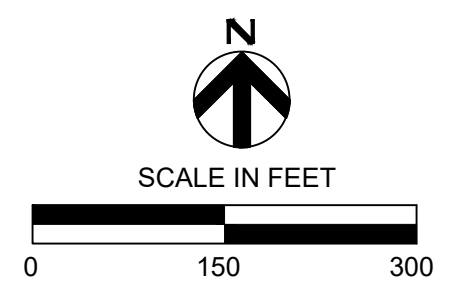
INDEX OF DRAWINGS

GENERAL

00G-01 COVER SHEET

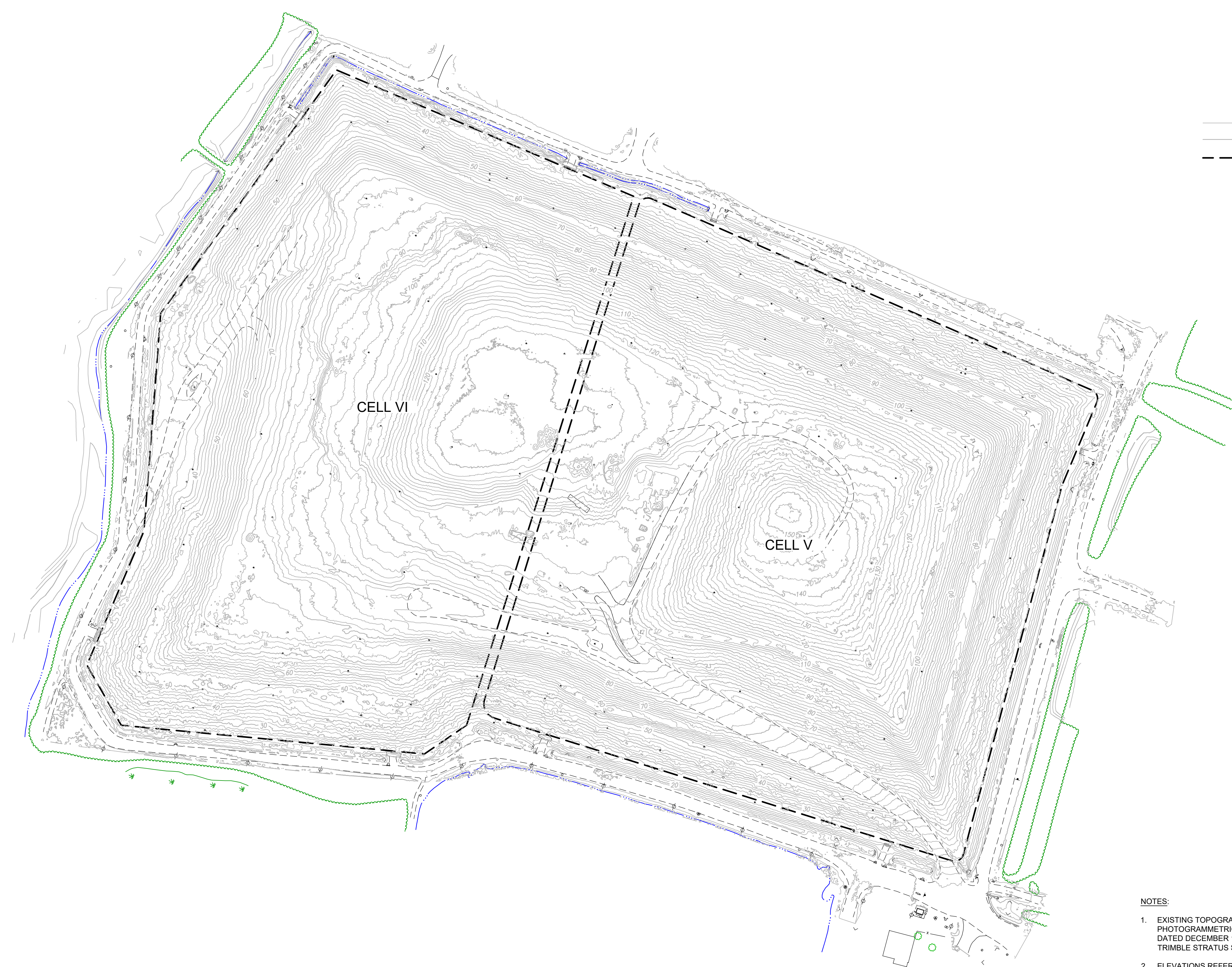
CIVIL

- 00C-01 EXISTING SITE CONDITIONS (DECEMBER 15, 2020)
- 00C-02 EXISTING SITE CONDITIONS (DECEMBER 17, 2021)
- 00C-03 AIRSPACE CONSUMED - 2020 VS 2021
- 00C-04 AIRSPACE REMAINING - 2021 VS TOP OF WASTE
- 00C-05 RECOVERABLE AIRSPACE - 2021 VS TOP OF WASTE RECOVERABLE
- 00C-06 TOTAL AIRSPACE CONSUMED - BOTTOM OF WASTE VS 2021
- 00C-07 SITE CROSS SECTIONS (SHEET 1 OF 3)
- 00C-08 SITE CROSS SECTIONS (SHEET 2 OF 3)
- 00C-09 SITE CROSS SECTIONS (SHEET 3 OF 3)
- 00C-10 MASTER PLAN BUILDOUT

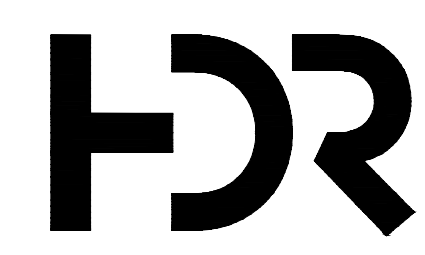


LEGEND

	EXISTING MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	PHASE BOUNDARY LIMITS

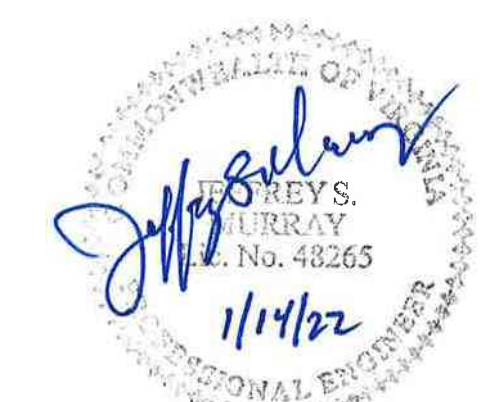


- NOTES:**
- EXISTING TOPOGRAPHY SHOWN HEREON COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL DRONE PHOTOGRAPHY DATED DECEMBER 15, 2020 AND PREPARED BY SPSA UTILIZING PROPELLOR TRIMBLE STRATUS SOFTWARE.
 - ELEVATIONS REFER TO NATIONAL GEODETIC SURVEY (NGS) NGS MEAN SEA LEVEL HORIZONTAL CONTROL BASED UPON VIRGINIA STATE PLANE COORDINATE SYSTEM SOUTH ZONE NORTH AMERICAN DATUM (NAD) 1983.



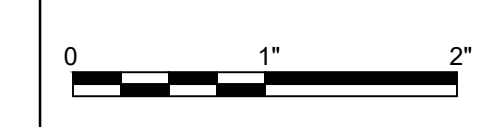
ISSUE	DATE	DESCRIPTION
A	01/2022	ISSUED FOR REVIEW

PROJECT MANAGER	J. MURRAY, P.E.
DESIGNED BY	D. DIXON
DRAWN BY	D. DIXON
CHECKED BY	T. YANOSCHAK, P.E.
PROJECT NUMBER	10316827



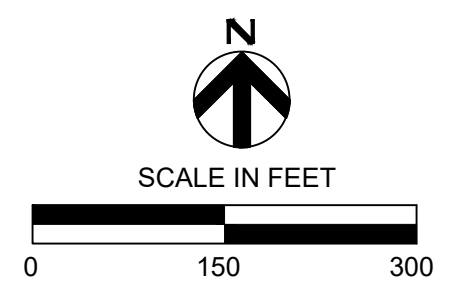
**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**

**EXISTING SITE CONDITIONS
DECEMBER 15, 2020**



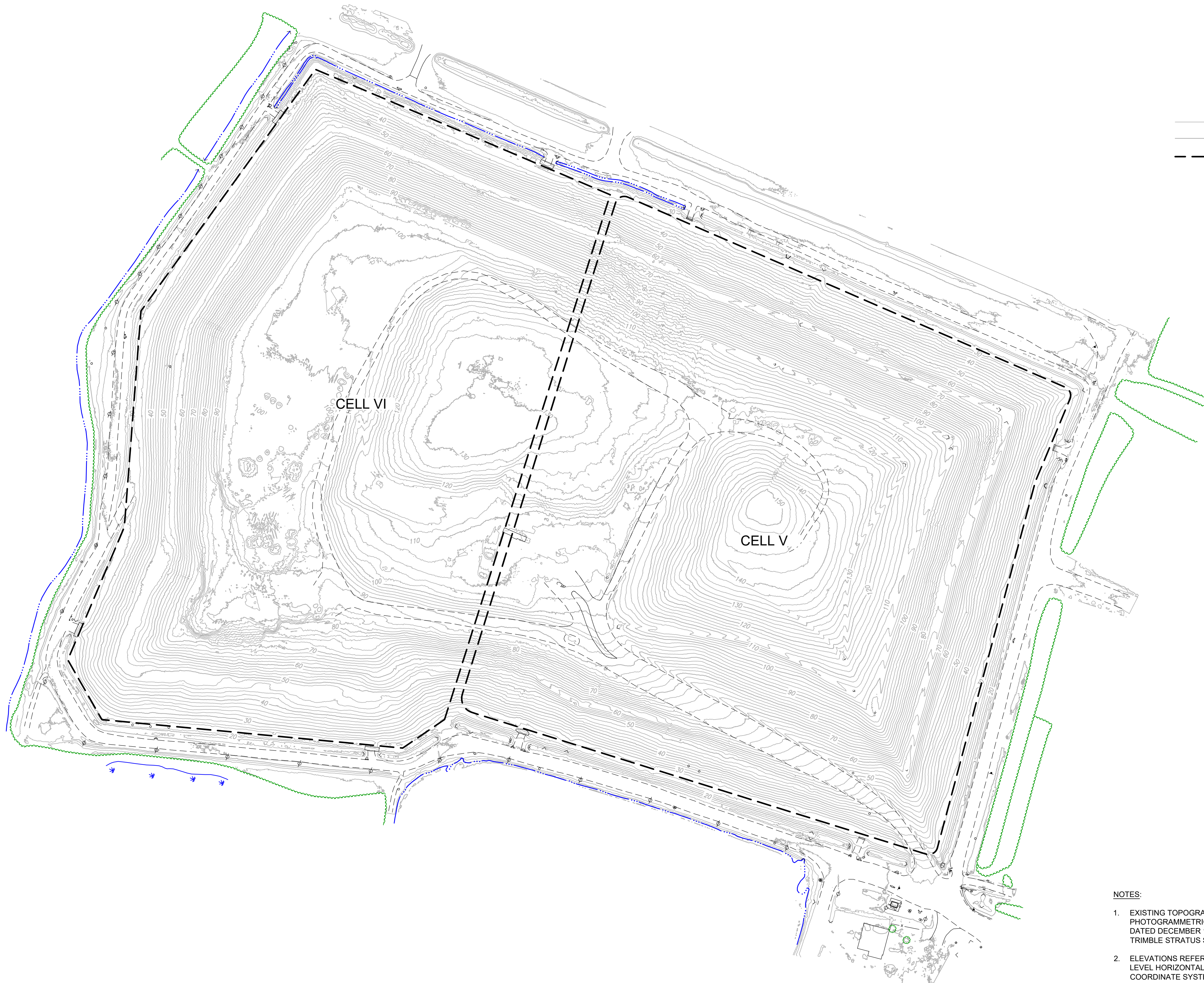
FILENAME | 00C-01.DWG
SCALE | 1"=150'

SHEET | **00C-01** | DWG NO. | XXX

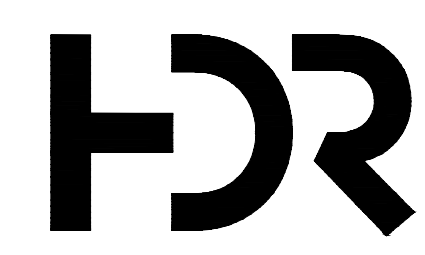


LEGEND

	EXISTING MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	PHASE BOUNDARY LIMITS



- NOTES:**
- EXISTING TOPOGRAPHY SHOWN HEREON COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL DRONE PHOTOGRAPHY DATED DECEMBER 17, 2021 AND PREPARED BY SPSA UTILIZING PROPELLOR TRIMBLE STRATUS SOFTWARE.
 - ELEVATIONS REFER TO NATIONAL GEODETIC SURVEY (NGS) NGS MEAN SEA LEVEL HORIZONTAL CONTROL BASED UPON VIRGINIA STATE PLANE COORDINATE SYSTEM SOUTH ZONE NORTH AMERICAN DATUM (NAD) 1983.



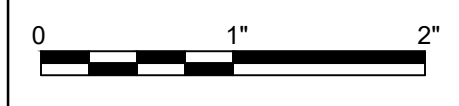
ISSUE	DATE	DESCRIPTION
A	01/2022	ISSUED FOR REVIEW

PROJECT MANAGER	J. MURRAY, P.E.
DESIGNED BY	D. DIXON
DRAWN BY	D. DIXON
CHECKED BY	T. YANOSCHAK, P.E.
PROJECT NUMBER	10316827



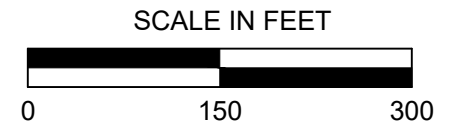
**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**

**EXISTING SITE CONDITIONS
DECEMBER 17, 2021**



FILENAME | 00C-02.DWG
SCALE | 1"=150'

SHEET | **00C-02** | DWG NO. | XXX



LEGEND

- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PHASE BOUNDARY LIMITS
- ACTIVE FILLING AREA LIMITS
- × 16.5 CUT
- × 16.5 FILL

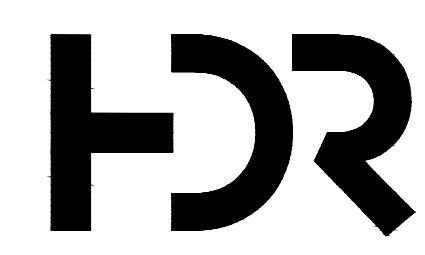
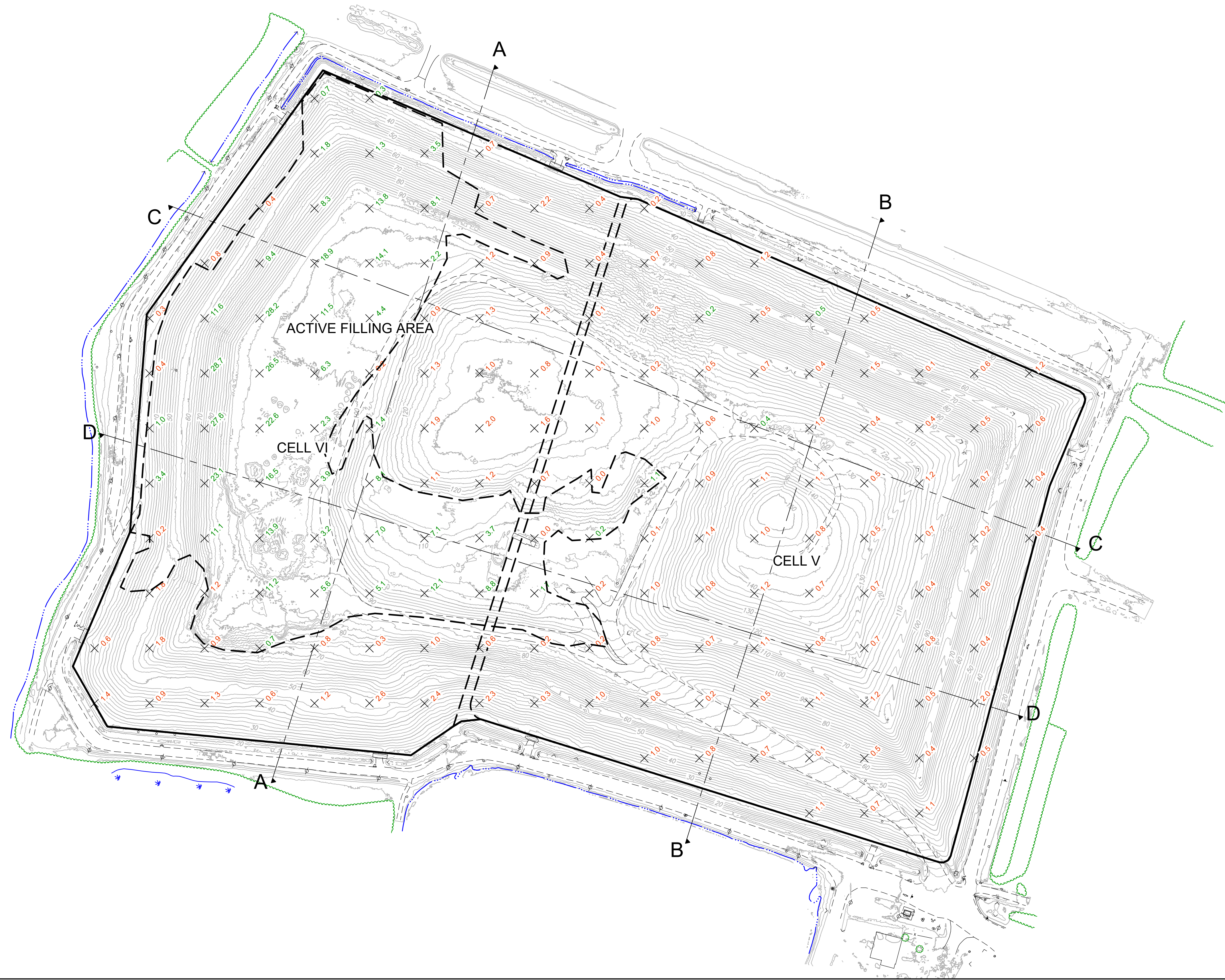
ENTIRE LANDFILL AREA

	SETTLEMENT (CY)	FILL (CY)	NET AIRSPACE CONSUMED (CY)
2020 TO 2021	96,974	348,817	251,843

ACTIVE FILLING AREA ONLY

	SETTLEMENT (CY)	FILL (CY)	NET AIRSPACE CONSUMED (CY)
2020 TO 2021	1,804	345,107	343,303

- NOTES:
- ELEVATIONS AND CORRESPONDING COLORS REPRESENT DIFFERENCE BETWEEN DECEMBER 15, 2020 AND DECEMBER 17, 2021 SURVEYS.



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REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT



AIRSPACE CONSUMED
2020 AERIAL SURVEY VS 2021 AERIAL SURVEY

FILENAME	00C-03.DWG	SHEET	00C-03	DWG NO.	XXX
SCALE	1"=150'				



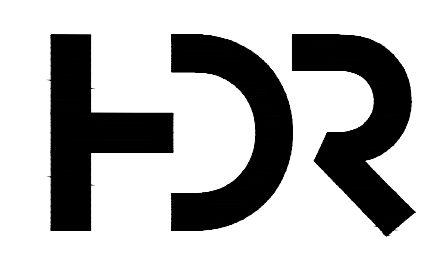
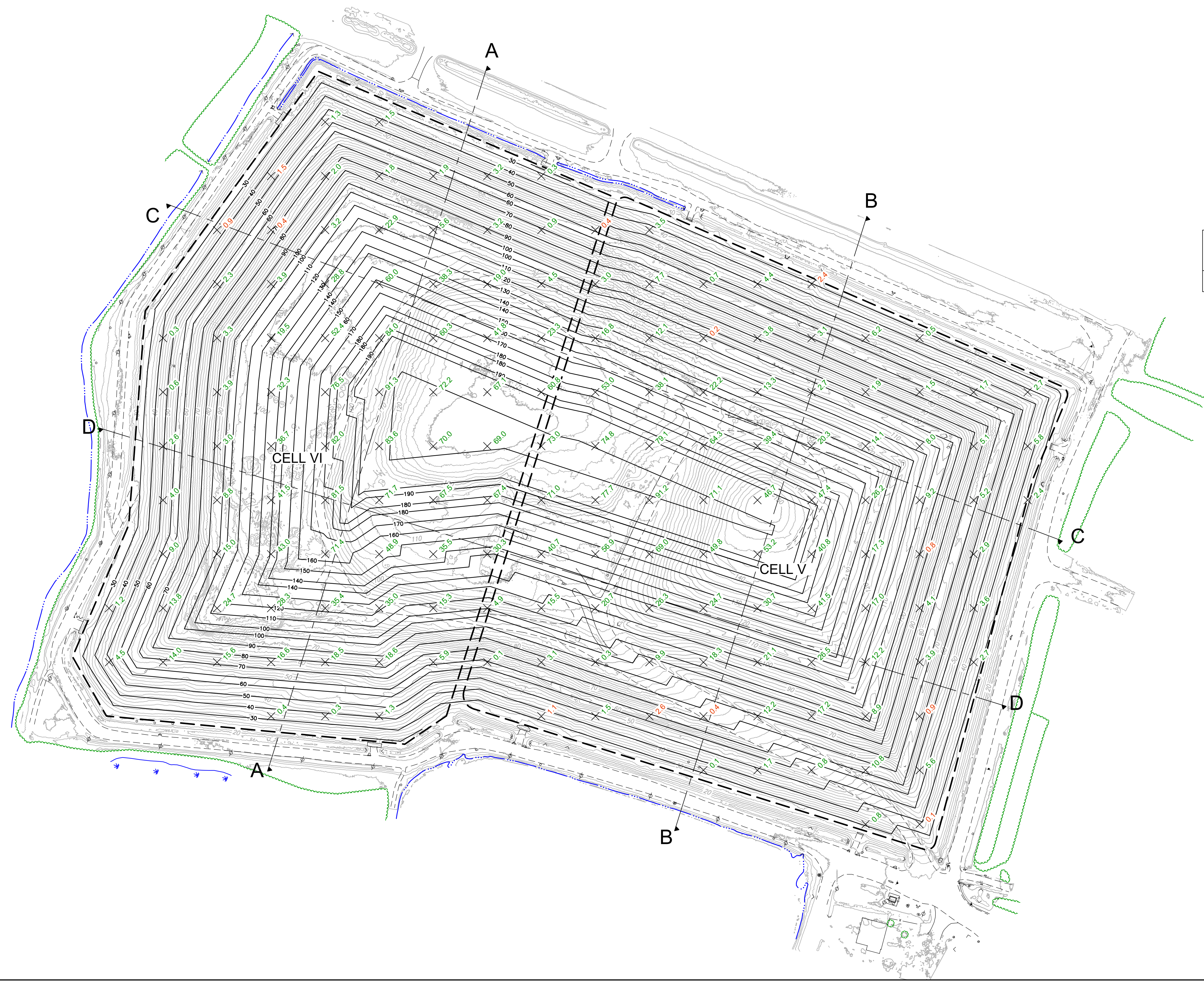
LEGEND

- EXISTING MINOR CONTOUR
- 170 EXISTING MAJOR CONTOUR
- PHASE BOUNDARY LIMITS
- 170 PROPOSED MAJOR CONTOUR
- x 16.5 CUT
- x 16.5 FILL

	CUT (CY)	FILL (CY)	NET AIRSPACE REMAINING (CY)
2021 TO TOP OF WASTE	15,242	3,176,517	3,161,275

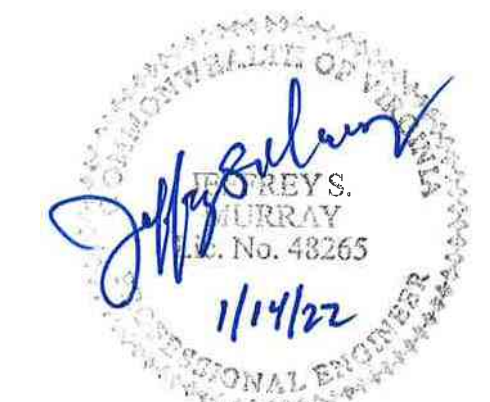
NOTES:

1. ELEVATIONS AND CORRESPONDING COLORS REPRESENT DIFFERENCE BETWEEN 2021 AERIAL SURVEY AND TOP OF WASTE GRADES.
2. PROPOSED GRADES REPRESENT TOP OF WASTE (INTERMEDIATE COVER), OR 3.5' BELOW PERMITTED FINAL GRADES.

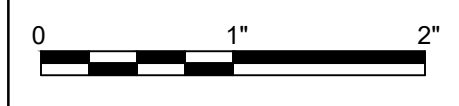


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PROJECT NUMBER	10316827



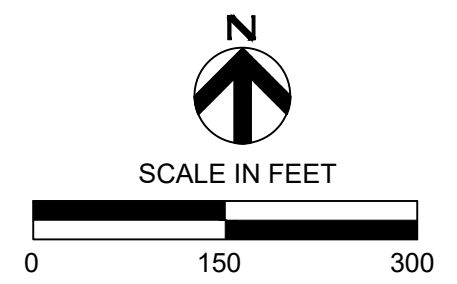
REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT



FILENAME | 00C-04.DWG
SCALE | 1" = 150'

AIRSPACE REMAINING
2021 AERIAL SURVEY VS TOP OF WASTE GRADES

SHEET	DWG NO.
00C-04	XXX

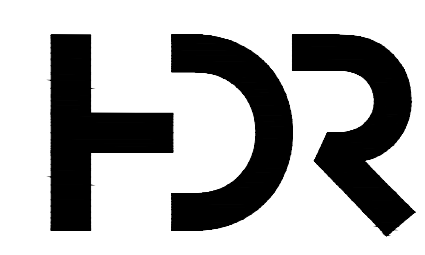
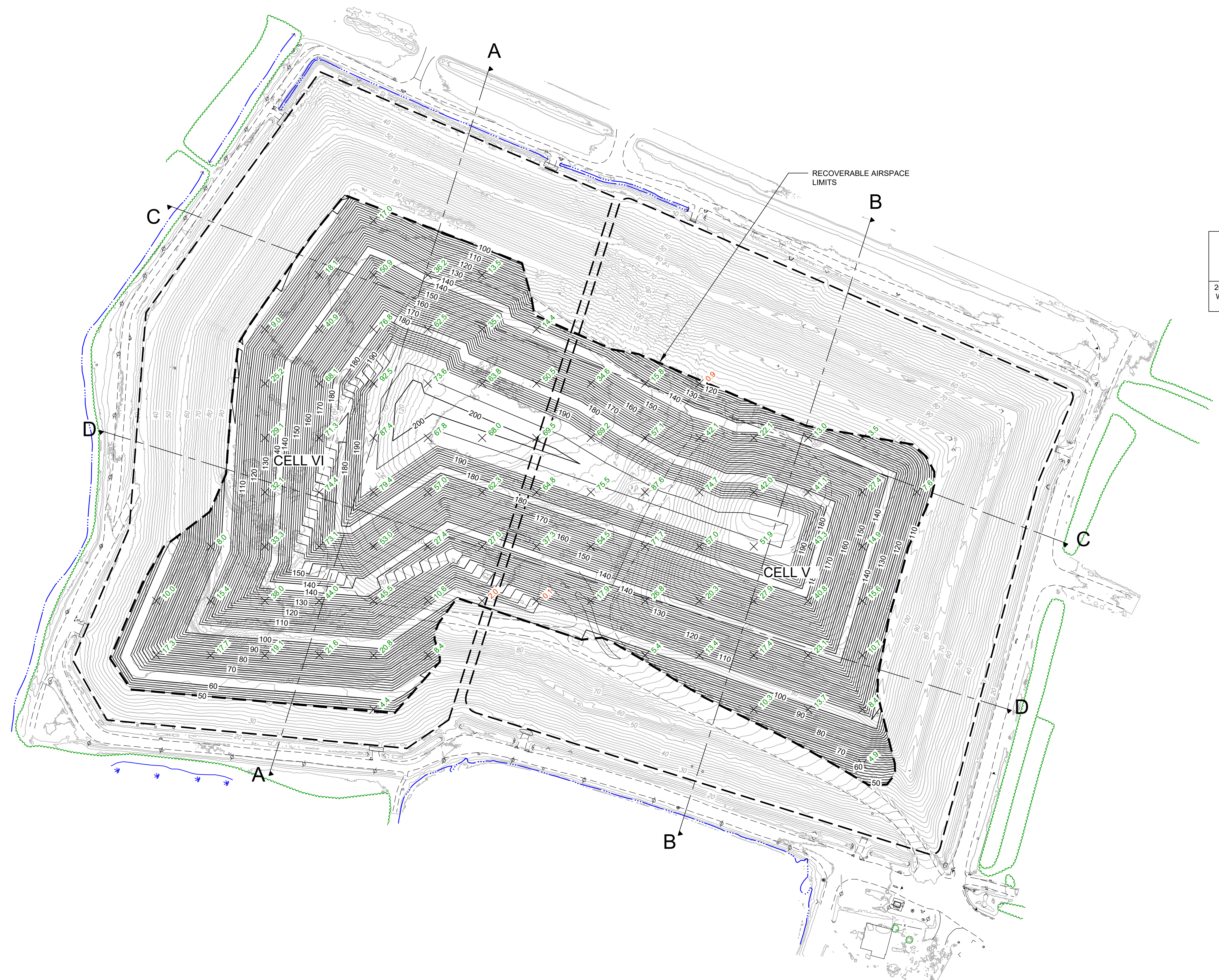


LEGEND

	EXISTING MINOR CONTOUR
	EXISTING MAJOR CONTOUR
	PHASE BOUNDARY LIMITS
	PROPOSED MAJOR CONTOUR
	CUT
	FILL

	CUT (CY)	FILL (CY)	NET RECOVERABLE AIRSPACE REMAINING (CY)
2021 TO TOP OF WASTE WITHIN RECOVERABLE AIRSPACE LIMITS	407	2,644,910	2,644,503

- NOTES:**
- ELEVATIONS AND CORRESPONDING COLORS REPRESENT DIFFERENCE BETWEEN 2021 AERIAL SURVEY AND RECOVERABLE TOP OF WASTE GRADES.
 - PROPOSED RECOVERABLE AIRSPACE FINAL GRADES WERE DEVELOPED TO COORDINATE WITH EXISTING GRADES AND AREAS WHERE FILLING CAN BE ACHIEVED DURING OPERATION OF CELL VI.
 - PROPOSED GRADES REPRESENT TOP OF WASTE (INTERMEDIATE COVER), OR 3.5' BELOW REVISED RECOVERABLE GRADES.

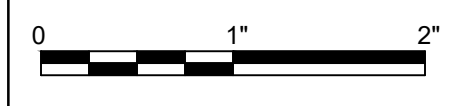


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PROJECT NUMBER	10316827



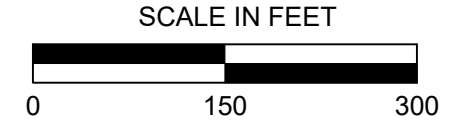
**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**



**RECOVERABLE AIRSPACE REMAINING
2021 AERIAL SURVEY VS
TOP OF WASTE GRADES RECOVERABLE**

FILENAME | 00C-05.DWG
SCALE | 1" = 150'

SHEET | **00C-05** | DWG NO. | XXX



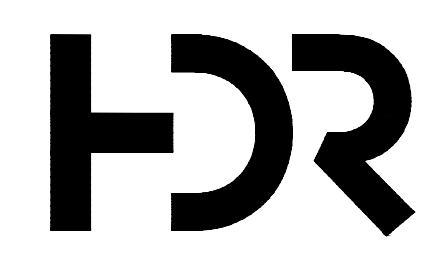
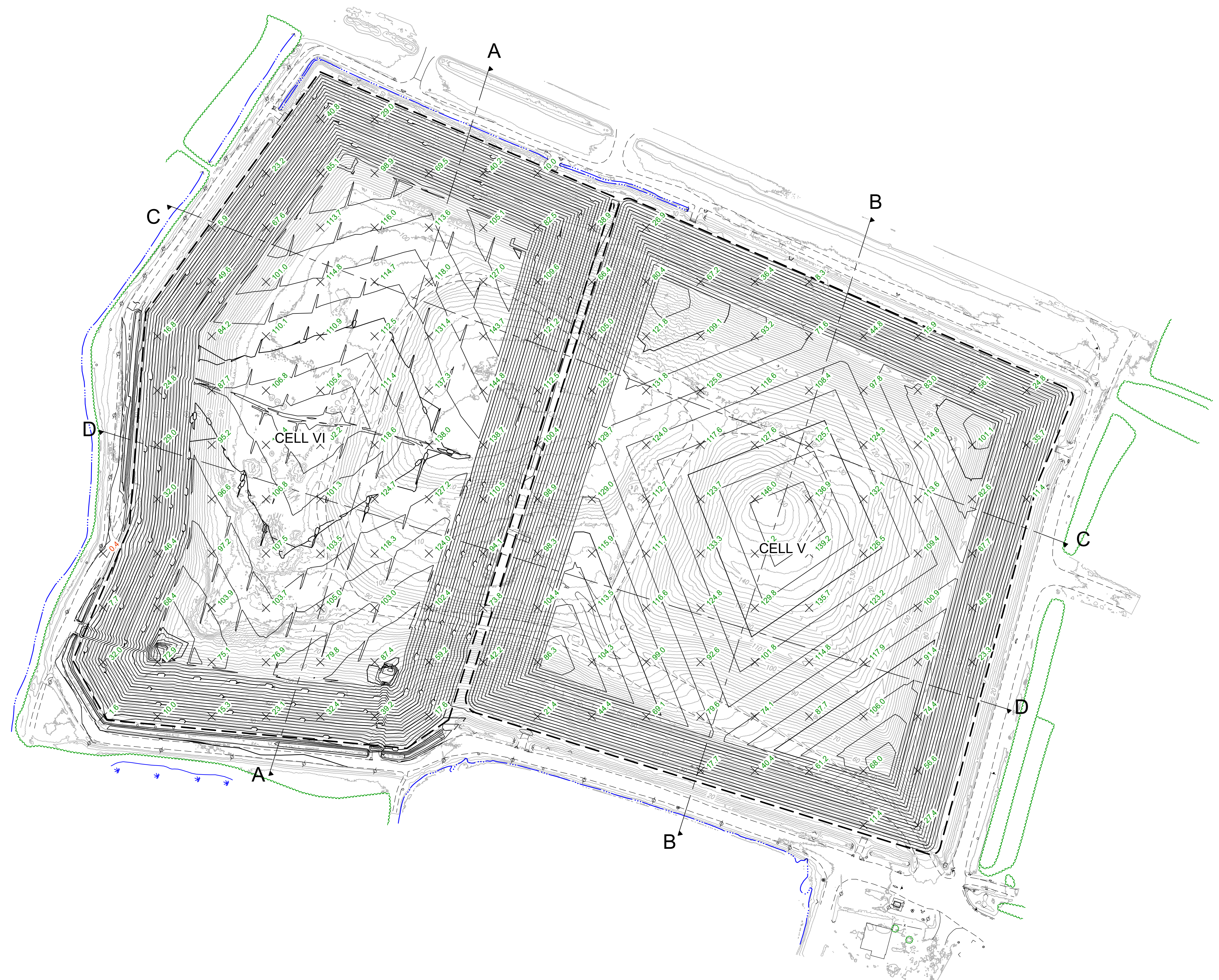
LEGEND

- EXISTING MINOR CONTOUR
- 170 — EXISTING MAJOR CONTOUR
- - - PHASE BOUNDARY LIMITS
- 170 — PROPOSED MAJOR CONTOUR
- x 16.5 CUT
- x 16.5 FILL

	AIRSPACE CONSUMED (CY)
BOTTOM OF WASTE VS 2021	12,083,851

NOTES:

1. ELEVATIONS AND CORRESPONDING COLORS REPRESENT DIFFERENCE BETWEEN BOTTOM OF WASTE GRADES AND 2021 AERIAL SURVEY.
2. BOTTOM OF WASTE GRADES REPRESENT OPERATIONAL COVER.

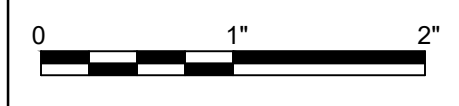


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PROJECT NUMBER	10316827



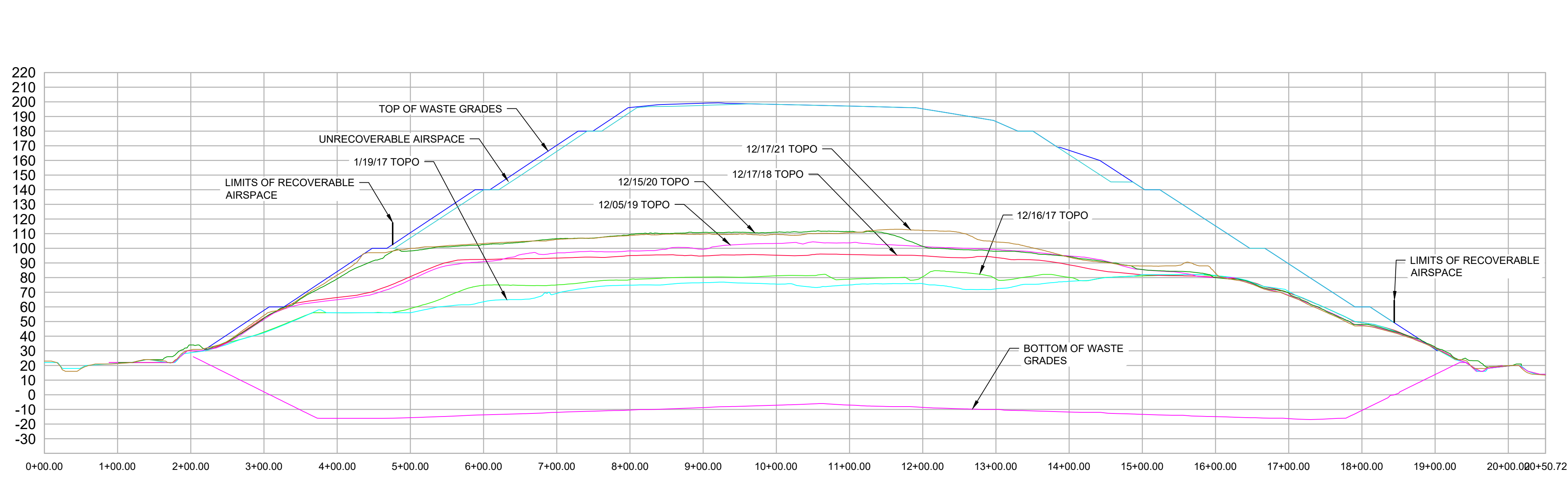
**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**



FILENAME | 00C-06.DWG
SCALE | 1"=150'

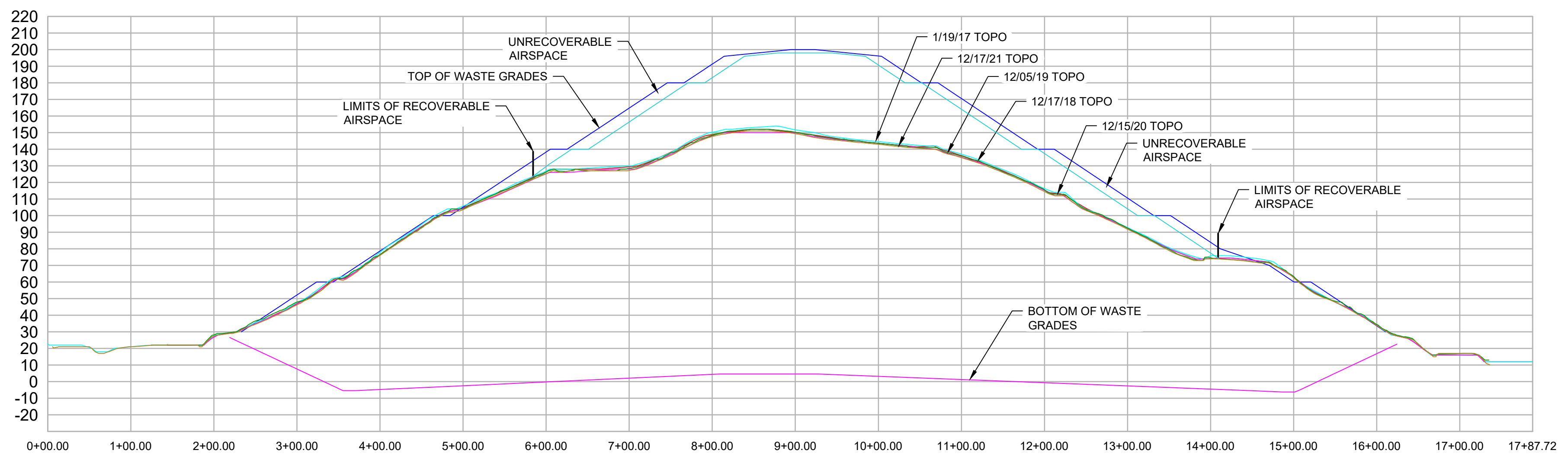
**TOTAL AIRSPACE CONSUMED
BOTTOM OF WASTE GRADES VS 2021 AERIAL SURVEY**

SHEET	DWG NO.
00C-06	XXX

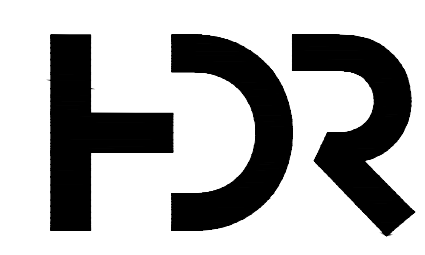
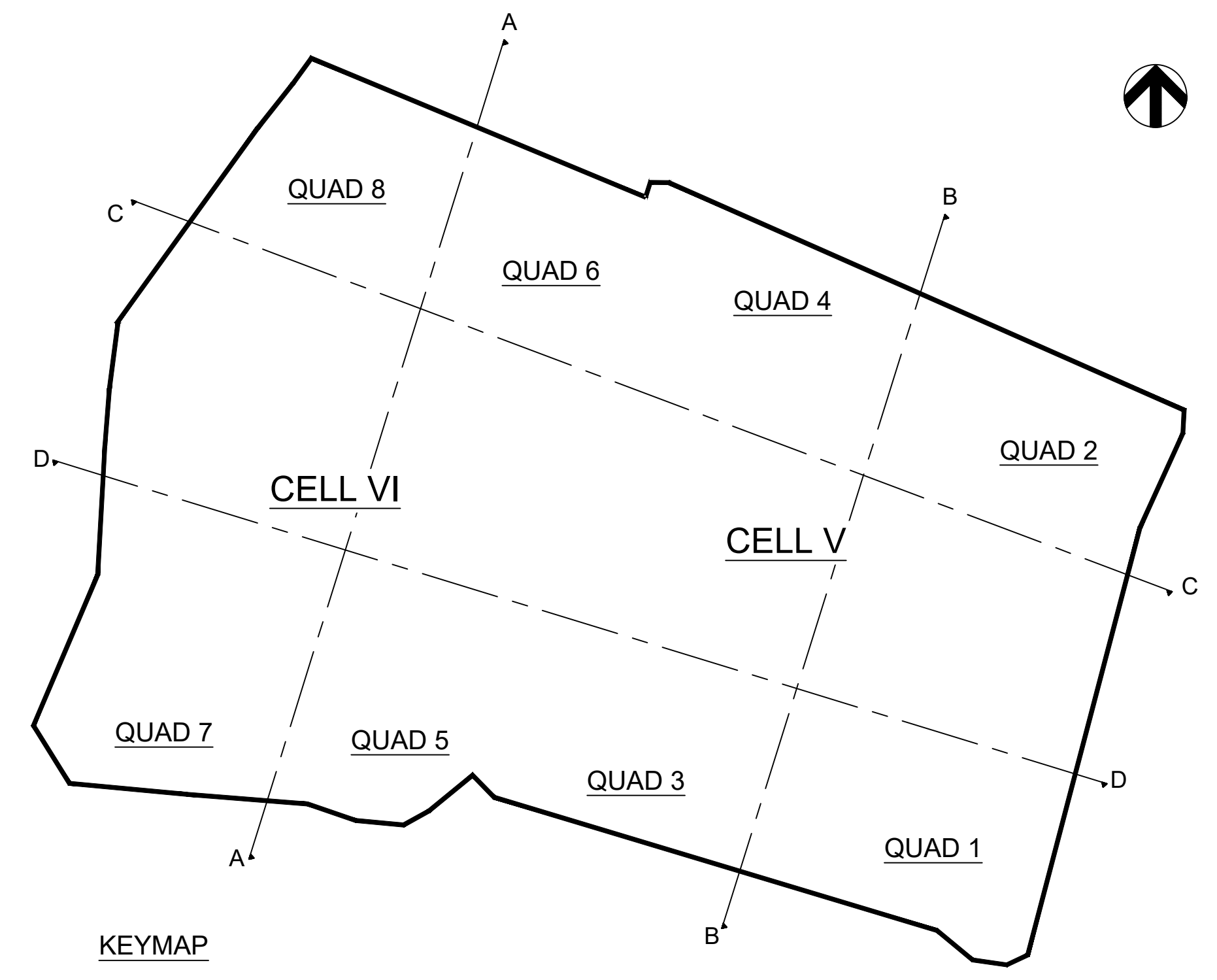
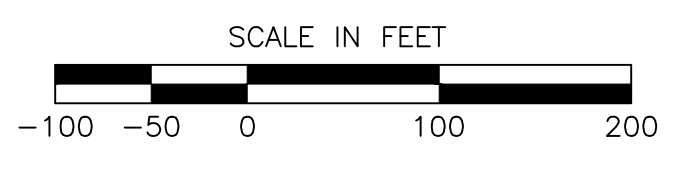


SECTION A
H: 1"=100' ; V: 1"=50'

- TOP OF WASTE RECOVERABLE GRADES
- TOP OF WASTE GRADES
- BOTTOM OF WASTE GRADES
- 1/19/17 TOPO
- 12/16/17 TOPO
- 12/17/18 TOPO
- 12/05/19 TOPO
- 12/15/20 TOPO
- 12/17/21 TOPO



SECTION B
H: 1"=100' ; V: 1"=50'



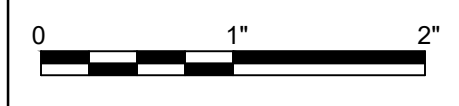
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**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**

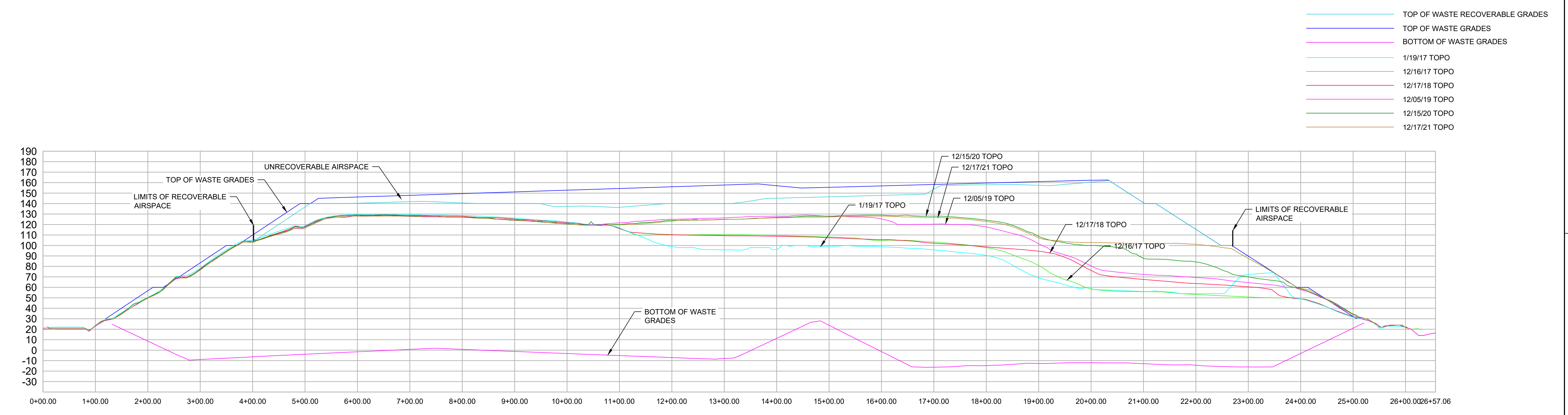
**SITE CROSS SECTIONS
(SHEET 1 OF 3)**



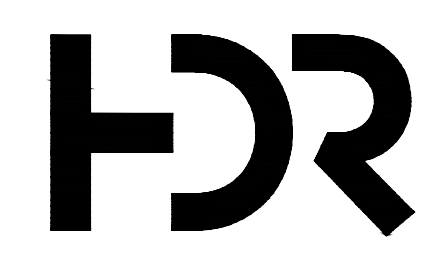
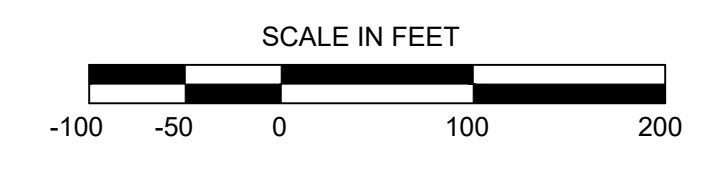
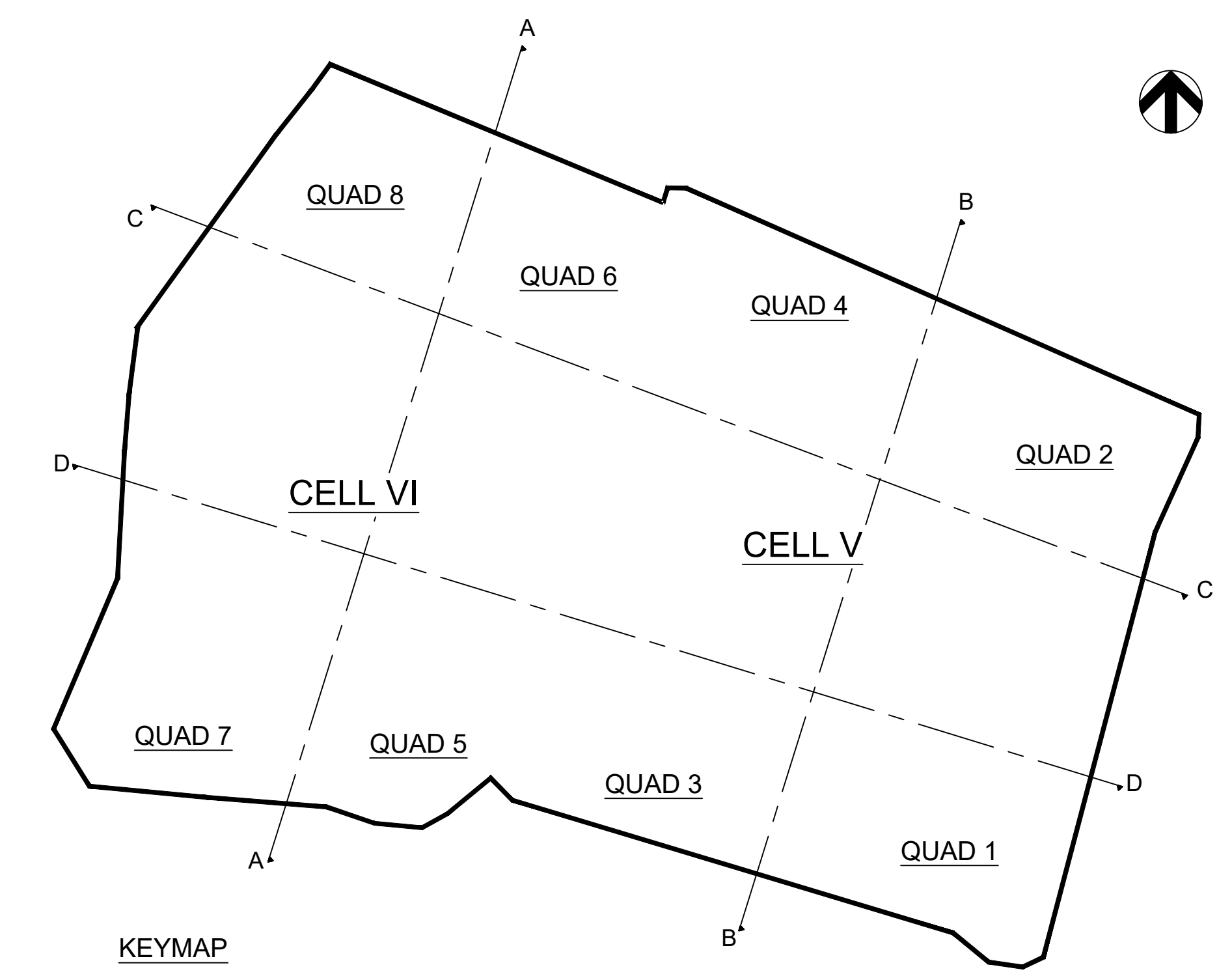
FILENAME | 00C-07.DWG
SCALE | 1" = 100'

SHEET | **00C-07**

DWG NO. | XXX

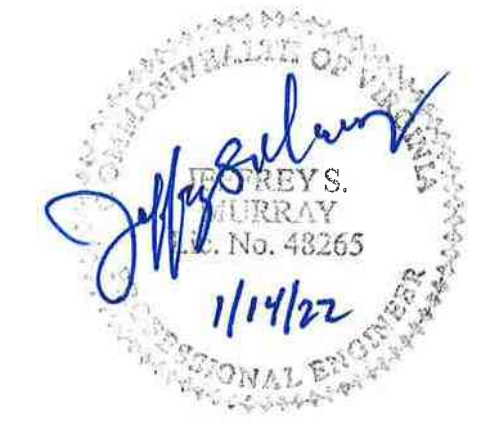


SECTION C
H: 1"=100' ; V: 1"=50'

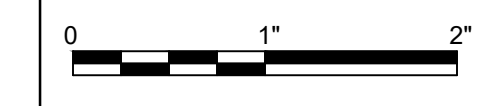


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DESIGNED BY	D. DIXON
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CHECKED BY	T. YANOSCHAK, P.E.
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**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**



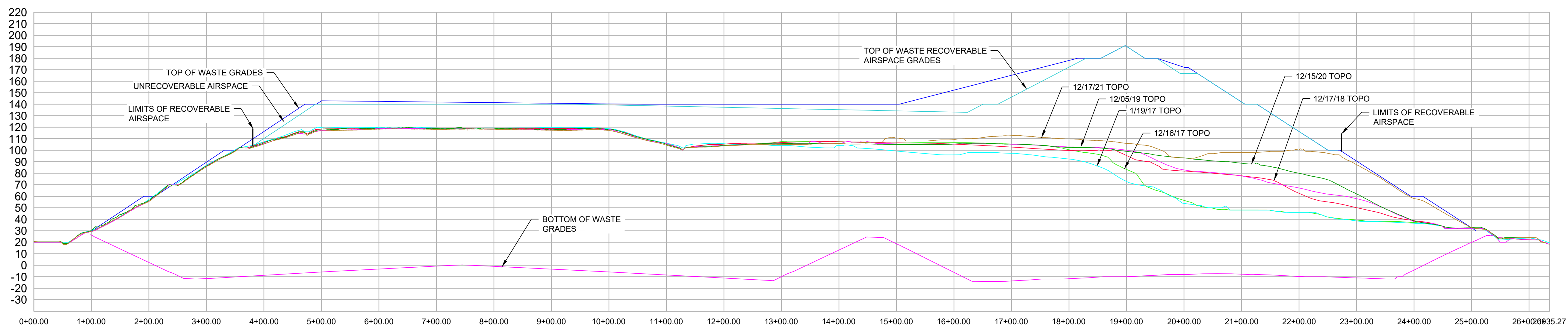
**SITE CROSS SECTIONS
(SHEET 2 OF 3)**

FILENAME: 00C-08.DWG
SCALE: 1" = 100'

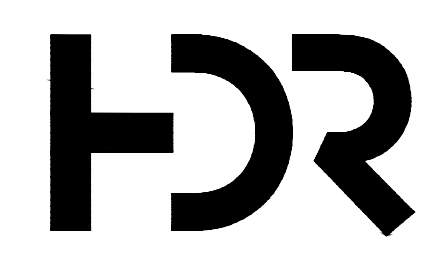
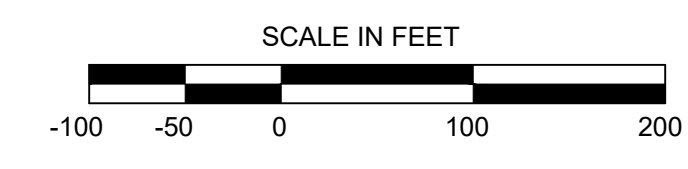
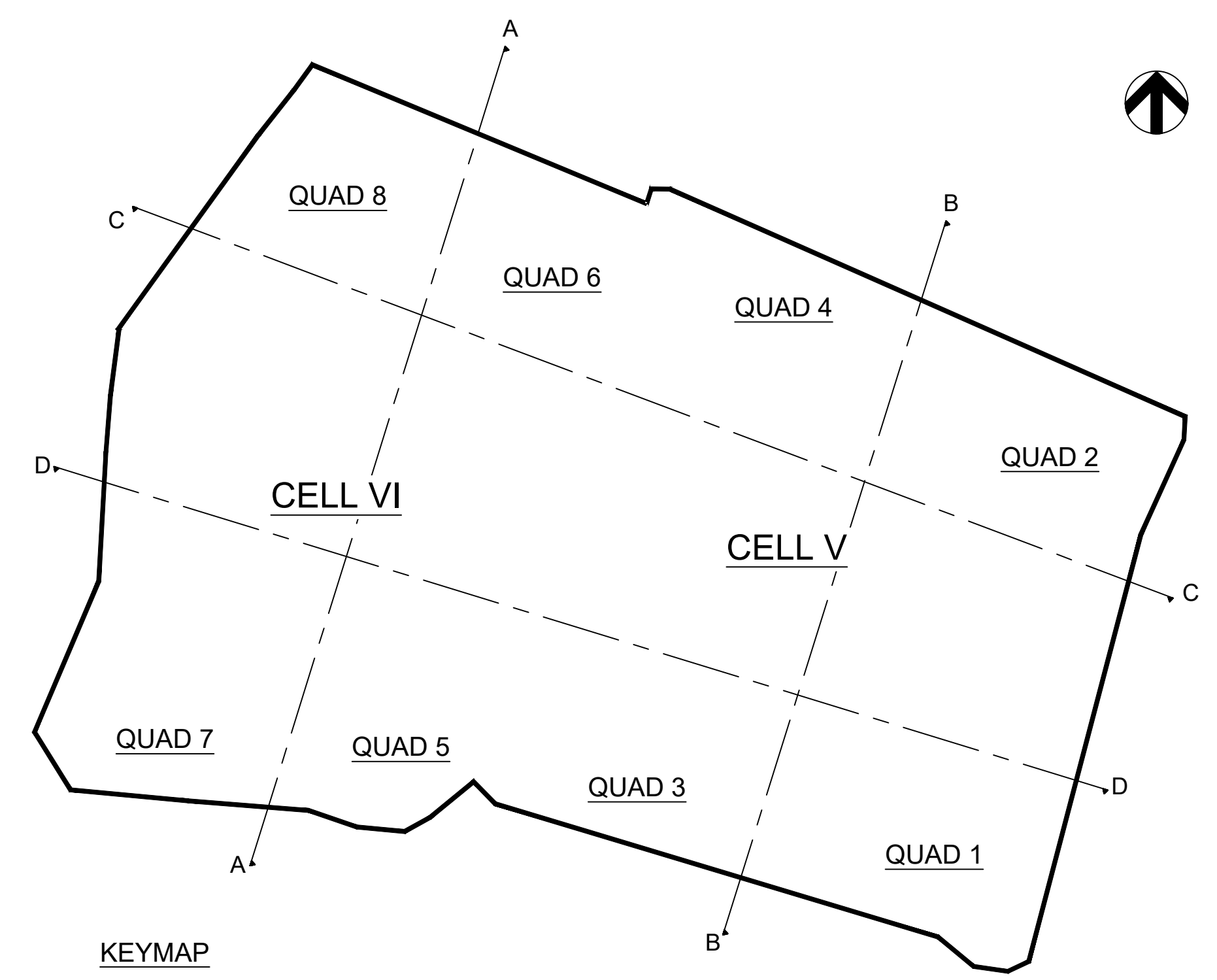
SHEET: 00C-08

DWG NO.: XXX

- TOP OF WASTE RECOVERABLE GRADES
- TOP OF WASTE GRADES
- BOTTOM OF WASTE GRADES
- 1/19/17 TOPO
- 12/16/17 TOPO
- 12/17/18 TOPO
- 12/05/19 TOPO
- 12/15/20 TOPO
- 12/17/21 TOPO



SECTION D
H: 1"=100' ; V: 1"=50'

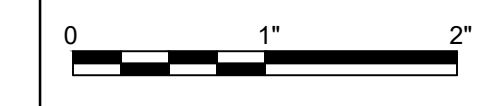


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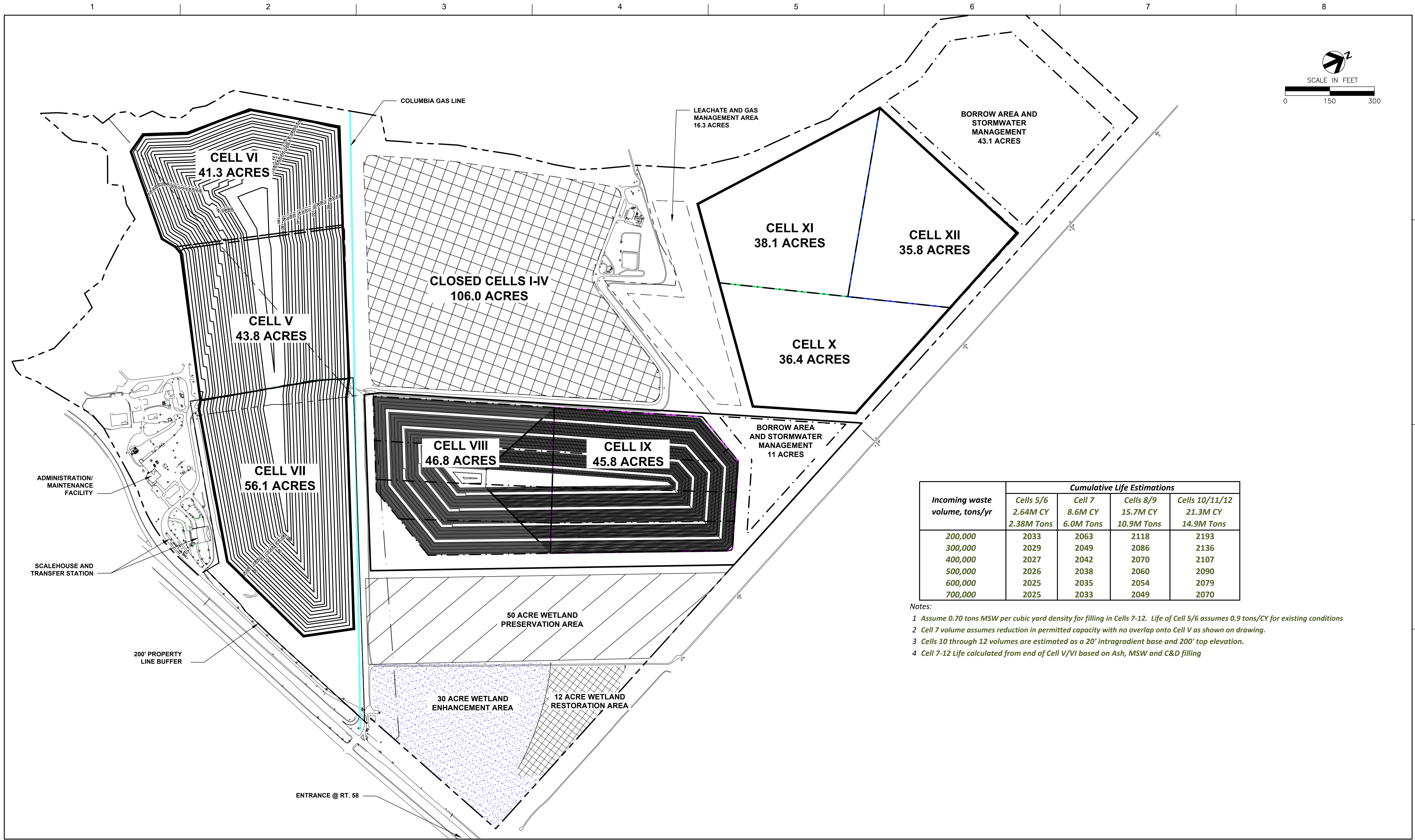
**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**



**SITE CROSS SECTIONS
(SHEET 3 OF 3)**

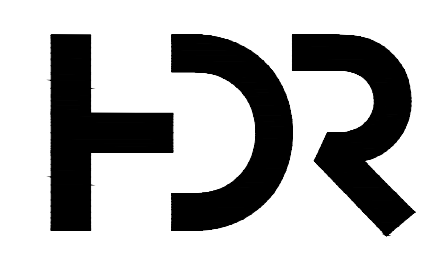
FILENAME | 00C-09.DWG
SCALE | 1" = 100'

SHEET | **00C-09**
DWG NO. | XXX



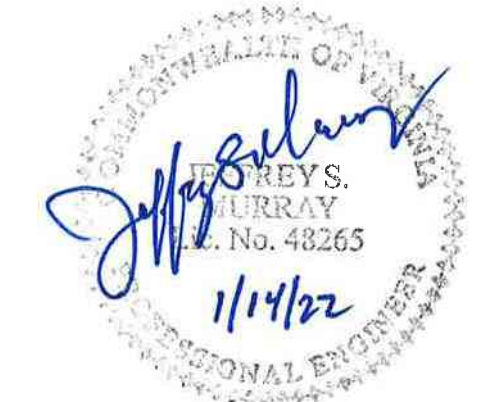
Incoming waste volume, tons/yr	Cumulative Life Estimations			
	Cells 5/6	Cell 7	Cells 8/9	Cells 10/11/12
	2.64M CY 2.38M Tons	8.6M CY 6.0M Tons	15.7M CY 10.9M Tons	21.3M CY 14.9M Tons
200,000	2033	2063	2118	2193
300,000	2029	2049	2086	2136
400,000	2027	2042	2070	2107
500,000	2026	2038	2060	2090
600,000	2025	2035	2054	2079
700,000	2025	2033	2049	2070

- Notes:
- 1 Assume 0.70 tons MSW per cubic yard density for filling in Cells 7-12. Life of Cell 5/6 assumes 0.9 tons/CY for existing conditions
 - 2 Cell 7 volume assumes reduction in permitted capacity with no overlap onto Cell V as shown on drawing.
 - 3 Cells 10 through 12 volumes are estimated as a 20' intragradient base and 200' top elevation.
 - 4 Cell 7-12 Life calculated from end of Cell V/VI based on Ash, MSW and C&D filling



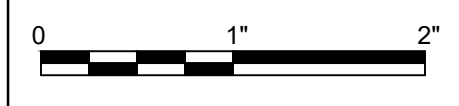
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**REGIONAL LANDFILL
2022 AIRSPACE MANAGEMENT**

MASTER PLAN BUILDOUT



FILENAME | 00C-10.DWG
SCALE | 1"=150'

SHEET | **00C-10** | DWG NO. | XXX