

Johnson, Sabrina O

From: Henry C. Norris <Henry.Norris@citrusbocc.com>
Sent: Wednesday, January 15, 2020 11:10 AM
To: SWD_Waste; Morgan, Steve; Fetrow, Chad
Cc: Troy Hays; Randall S. Olney
Subject: 2019 Site Life Calculations Report, Citrus County Central Landfill, WACS ID#39859
Attachments: 2019_Site_Life_Calc_Report_Signed.pdf; Annual Site Life Transmittal2018.19.pdf

See attached 2018-19 site life calculations/report



Henry C Norris Jr
Solid Waste Division Director
Citrus County Board of County Commissioners
230 W. Gulf to Lake Hwy
Lecanto, FL 34461
352.527.7670

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Board of County Commissioners
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE MANAGEMENT DIVISION

P.O. Box 340, Lecanto, Florida 34460
Telephone: (352) 527-7670 FAX: (352) 527-7672
TDD Telephone 527-5303
email: landfillinfo@bocc.citrus.fl.us
Citrus Springs/Dunnellon/Inglis/Yankeetown area Toll Free (352) 489-2120

January 15, 2020

Mr. Steve Morgan
Manager, Air & Solid Waste Permitting
Florida Department of Environmental Protection
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926

Re: Citrus County Central Class I Landfill (FDEP Permit No. 21375-025-SO-01)
Annual Site Life Calculation Transmittal for Phases 1/1A, 2 and 3

Dear Mr. Morgan:

Specific Condition # C.13.e. of the subject landfill operation permit requires that the annual landfill site life calculations be submitted no later than January 15th of each year. Enclosed please find the 2018-2019 Site Life Calculations Report and supporting documentation prepared by the Citrus County Division of Engineering.

If you should need additional information, please let me know.

Sincerely,

Henry C. Norris, Jr.
Director, Division of Solid Waste Management

CC: Randall Olney, P.E., Public Works Director



**DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING**

3600 W. Sovereign Path, Suite 241
Lecanto, Florida 34461

Telephone: (352) 527-5446 Fax: (352) 527-5476
Citrus Springs/Dunnellon/Inglis/Yankeetown area - Toll Free (352) 489-2120
TTY Telephone: (352) 527-0825 or (352) 527-5312

**CITRUS COUNTY CENTRAL LANDFILL
OCTOBER 2019 SITE LIFE CALCULATION ANNUAL REPORT**

FDEP PERMIT NO.: 21375-025-S0-01

(Replaces Permit No.: 21375-018-SO-01)

WACS FACILITY ID NO.: 39859

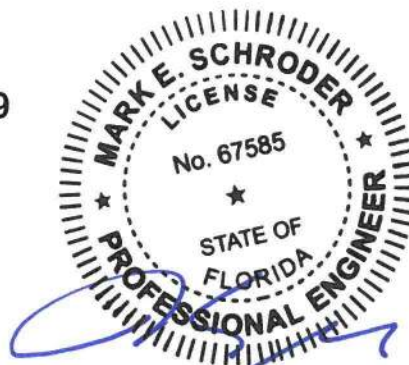
PHASES 1/1A, 2 and 3

Located in S1/T19S/R18E, Citrus County, Florida

Prepared for:

**Citrus County Department of Public Works
Solid Waste Management Division
Attn: Henry Norris, Director
230 W. Gulf-to-Lake Highway
Lecanto, FL 34461
(352) 527-7670**

Prepared on January 2, 2019



1/3/20

**Mark E Schroder, P.E.
FL. License No. 67585
Engineer I**

Citrus County's Department of Public Works - Division of Engineering has calculated the remaining site life for Phases 1/1A, 2 and 3 of the Citrus County Central Landfill based on the past twelve months of data. The remaining site life was estimated using population projections, projections of future waste receipts and topographic survey efforts performed by the Citrus County Survey Section and Dragonfly Aerosolutions. All topographic information is based on NAVD88 datum. The original design closure elevations were based on NGVD29 datum and have been converted to NAVD88 Datum for the purposes of this report

Phases 1/1A,2, and 3:

The airspace consumed from October 2018 to September 2019 was calculated by comparing the digitally generated surfaces from a Drone mounted RTK system performed in September 2019. The airspace consumed during the 2018-2019 time period was 127,589CY, as shown on sheet 1 of 3 in attachment A. Waste tonnage records supplied by Citrus County Solid Waste Management Division for the same period recorded 99,280 tons entering the landfill. This translates to an effective airspace consumption rate of 1,556 LB/CY or 1.29 CY/TN of waste disposed. The volume of the Cap was entered on the calculation as zero. For the calculations, the final closure surface has been lowered by two feet and the final 4' cap will be installed after 2' of settlement. Therefore the volume of the cap was entered into the calculations as 0CY assuming that the airspace will be available before placement.

The remaining life through build out of Phases 1/1A, 2 and 3 was estimated by multiplying the future projected quantities of waste by the current effective airspace consumption rate. Waste tonnage was assumed to increase each year at the same rate as the population. Population growth in Citrus County from 2018 to 2019 was higher than last year. This year, population growth has been estimated using the "Medium" projections published in the University of Florida Bureau of Economic and Business Research (BEBR) population projections for Citrus County. The actual growth of the Citrus County population closely matched the Medium Growth rate published in Volume 52, Bulletin 183, April 2019 – Florida Population Studies. The projected waste tonnage for each year is multiplied by the effective airspace consumption rate to obtain the airspace volume consumed each year. This is then subtracted from the remaining airspace for each year until the available airspace is depleted. The calculations indicate that Phases 1/1A, 2, and 3 have approximately 1,467,709CY of available airspace as of the September 24, 2019 survey (Attachment #1, Sheet 2) and that this airspace could be completely utilized by November 2028. This assumes that waste will continue to be added to the landfill at the current generation rates and effective density. As Statutory Recycling is implemented waste generation rates should decrease thereby adding a factor of safety to the calculations. For quick reference, the previous Site Life Calculation Report prepared on December 14, 2018 estimated this date to be July 2029 using BEBR Medium projection.

Phases 1/1A, 2, and 3

Landfill Side Slopes

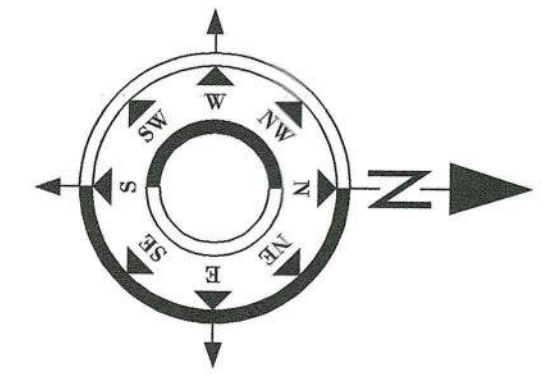
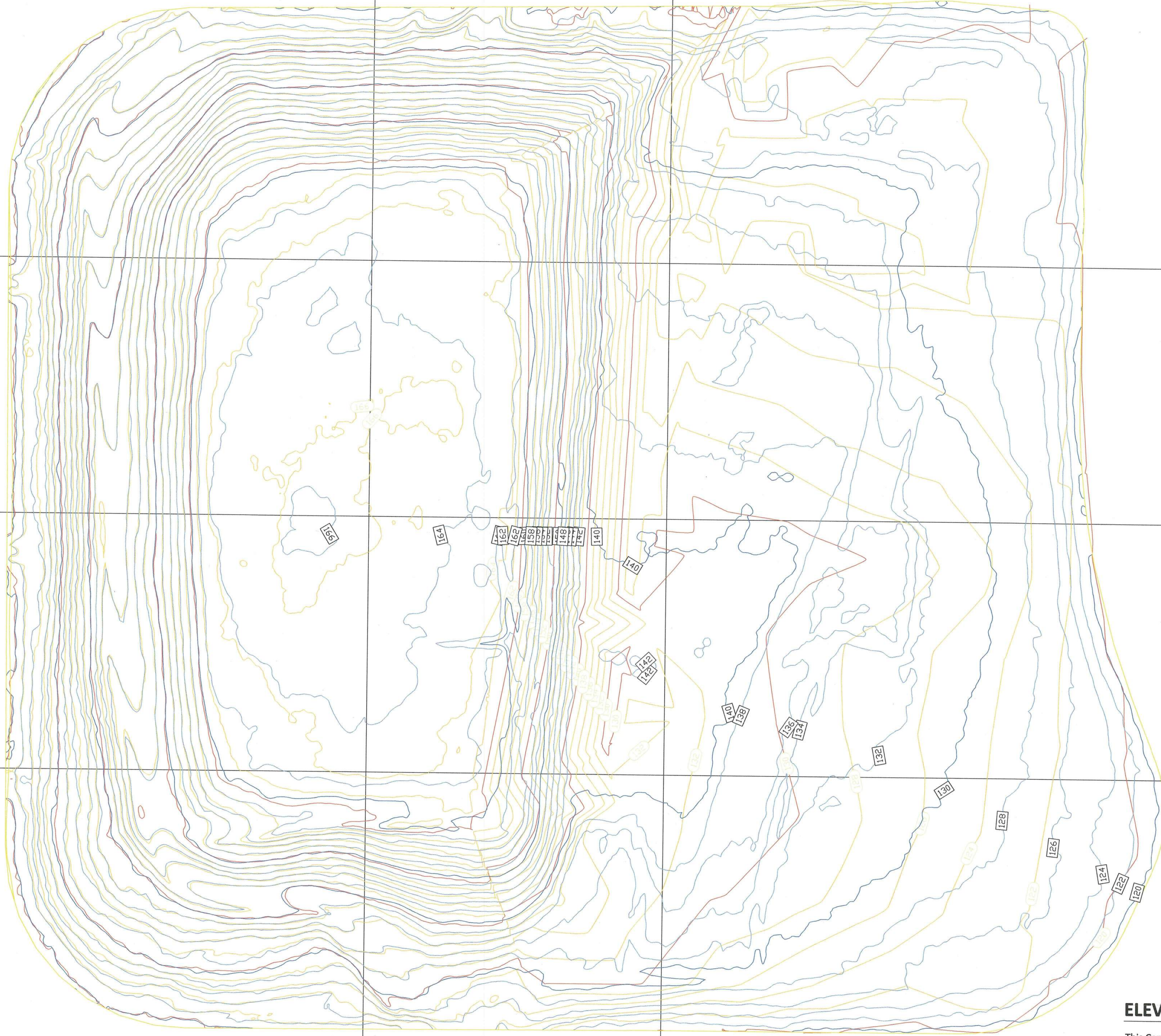
Specific Condition C.13.f of the site's FDEP Permit (Permit No. 21375-008-S0/01) requires that the disposal capacity and site life calculations submitted each year be accompanied by a survey indicating that the actual above grade side slopes are no greater than the design slopes and that the top elevation does not exceed the design elevation. As shown in the cross-sections provided on Sheets 3 & 4 of Attachment #1, the side slopes appear to be less than or equal to the design slopes, and the design top elevation of the landfill has not been attained.

ATTACHMENT 1

VOLUME CALCULATION DRAWINGS

(Refer to 24"x36" Drawings)

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PROFILE 1

LEGEND AND ABBREVIATIONS

- CURRENT YEAR MAJOR CONTOUR (10' INTERVAL) 9/24/2019 SURVEY
- CURRENT YEAR MINOR CONTOUR (2' INTERVAL) 9/24/2019 SURVEY
- PREVIOUS YEAR MAJOR CONTOUR (10' INTERVAL) 9/26/2018 SURVEY
- PREVIOUS YEAR MINOR CONTOUR (2' INTERVAL) 9/26/2018 SURVEY

PROFILE 2

SITE VOLUME TABLE

SITE	CITRUS COUNTY CENTRAL LANDFILL
SURFACE 1	AERIAL SURVEY - SEPTEMBER 2017 (Flight Date 9/15/17)
SURFACE 1 - UPDATE	RTK SURVEY - SEPTEMBER 2018 (Field Date 9/26/18)
SURFACE 2	RTK DRONE SURVEY - SEPTEMBER 2019 (Field Date 9/24/19)
2018-2019 CONSUMPTION	128,690 CU. YD. (Composite Method)

PROFILE VIEWS ARE ON SHEETS 3 & 4

PROFILE 3

PROFILE 5

PROFILE 4

CONTOUR LABELS WITH
RECTANGULAR BORDER ARE 2019
SURFACE LABELS. ALL OTHER
CONTOUR LABELS ARE 2018 SURFACE.

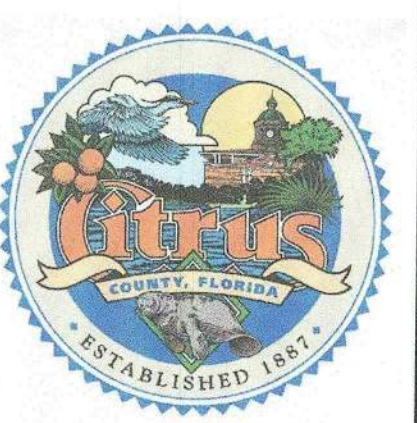
ELEVATION DATUM NOTE

This Comparable Volume report for the period stated was calculated based on a comparison between an aerial topographic survey performed by Pickett and Associates in 2017 (updated with an RTK survey performed by the Citrus County Survey Section in 2018) and the Final Closure Design.

The original designed Landfill closure surface was calculated and published utilizing NGVD29. The 2017 aerial survey, 2018 RTK surveys performed by the Citrus County Survey Section and the RTK Drone survey performed by Dragonfly Aerosolutions were collected in NAVD88. The closure surface has been adjusted -0.85' per NGS Vertcon transformation, converting the NGVD29 elevations to NAVD88 elevations for relative volume calculations.

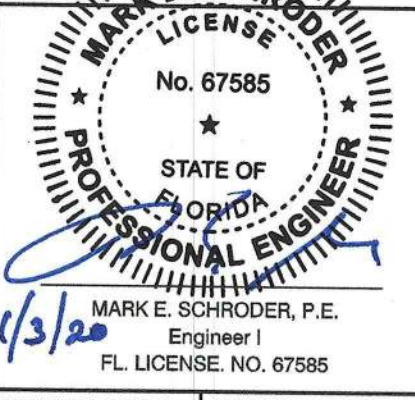
CITRUS COUNTY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING

CITRUS COUNTY
CENTRAL LANDFILL
2019 SITE
LIFE CALCULATION
REPORT



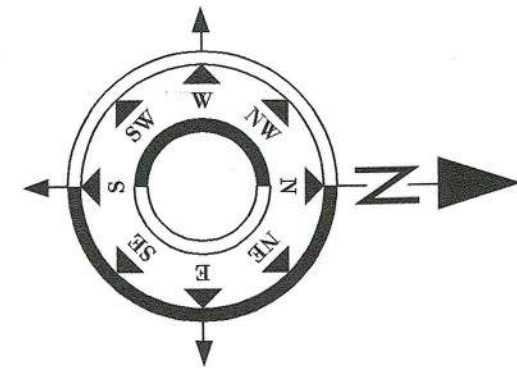
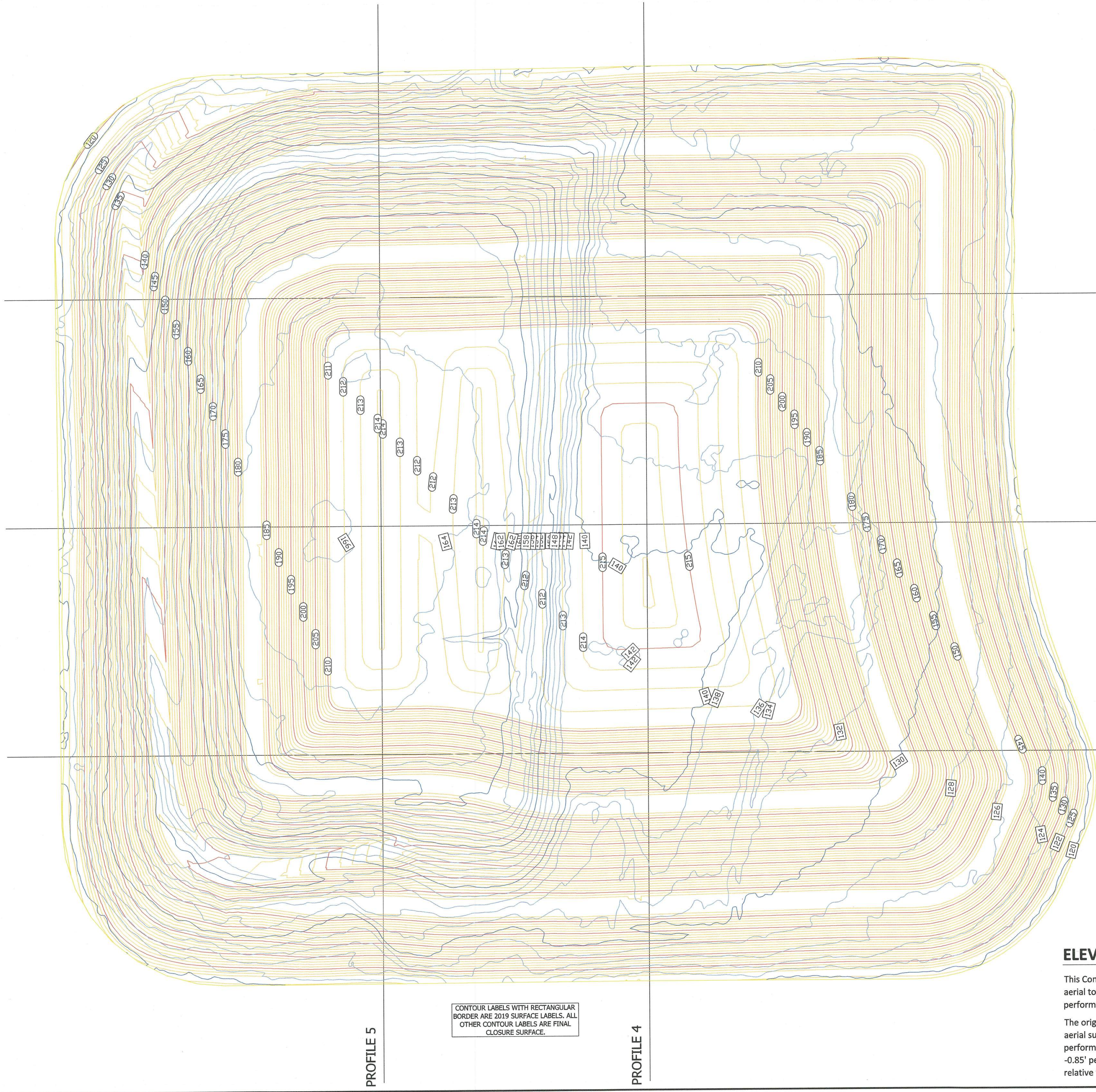
CITRUS COUNTY
CENTRAL LANDFILL
09/24/2019 SURVEY
VS.
09/26/2018 SURVEY

CONSUMPTION
ESTIMATE PLAN



SURVEY PROJECT NO.	1
DATE:	1/2/20
SCALE:	1" = 60'

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PROFILE 1

PROFILE 2

PROFILE 3

PROFILE 5

PROFILE 4

CONTOUR LABELS WITH RECTANGULAR BORDER ARE 2019 SURFACE LABELS. ALL OTHER CONTOUR LABELS ARE FINAL CLOSURE SURFACE.

LEGEND AND ABBREVIATIONS

- CURRENT MAJOR CONTOUR (10' INTERVAL) 09/24/2019 SURVEY
- CURRENT MINOR CONTOUR (2' INTERVAL) 09/24/2019 SURVEY
- DESIGN MAJOR CONTOUR (5' INTERVAL) FINAL CLOSURE
- DESIGN MINOR CONTOUR (1' INTERVAL) FINAL CLOSURE

PROFILE VIEWS ARE ON SHEETS 3 & 4

SITE VOLUME TABLE

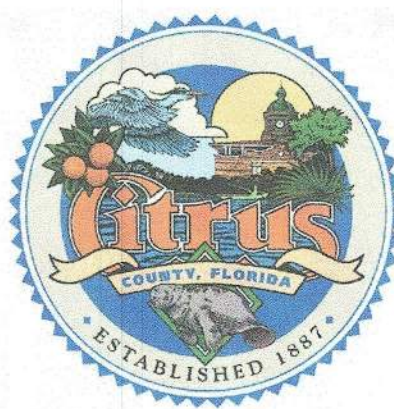
SITE	CITRUS COUNTY CENTRAL LANDFILL
SURFACE 1	FINAL CLOSURE DESIGN (Converted to NAVD88)
SURFACE 2	RTK DRONE SURVEY SEPTEMBER 2019
AVAILABLE AIRSPACE	1,467,709 CU. YD.
METHOD	COMPOSITE (CIVIL 3D)

ELEVATION DATUM NOTE

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CITRUS COUNTY
CENTRAL LANDFILL
2019 SITE
LIFE CALCULATION
REPORT



CITRUS COUNTY
CENTRAL LANDFILL
FINAL CLOSURE
VS.

09/24/2019 SURVEY

REMAINING AIRSPACE

ESTIMATE BY



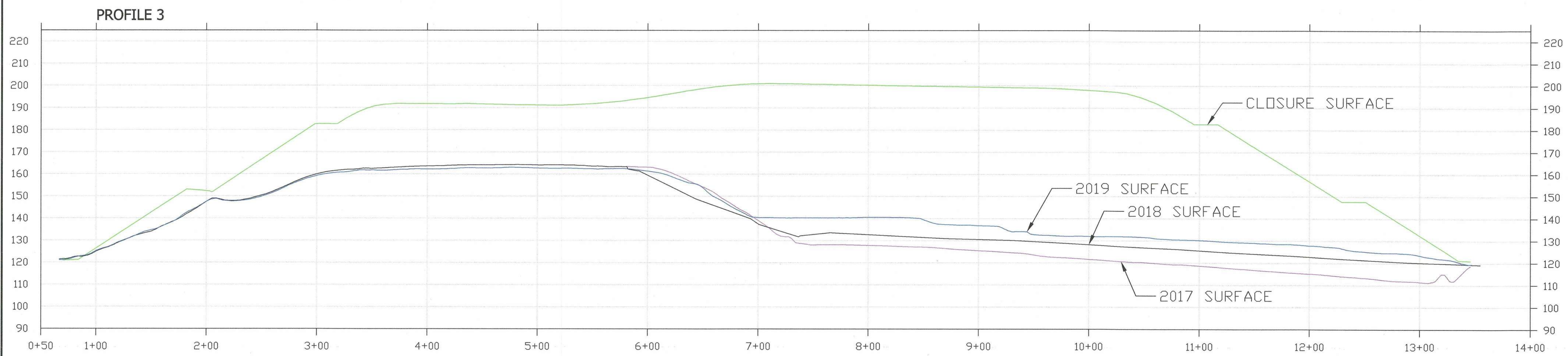
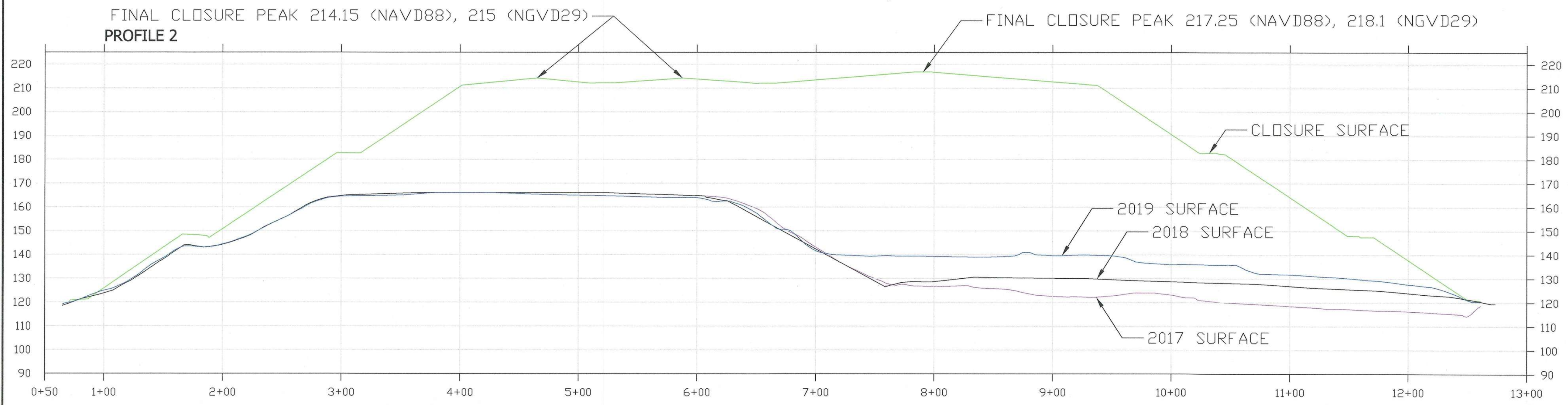
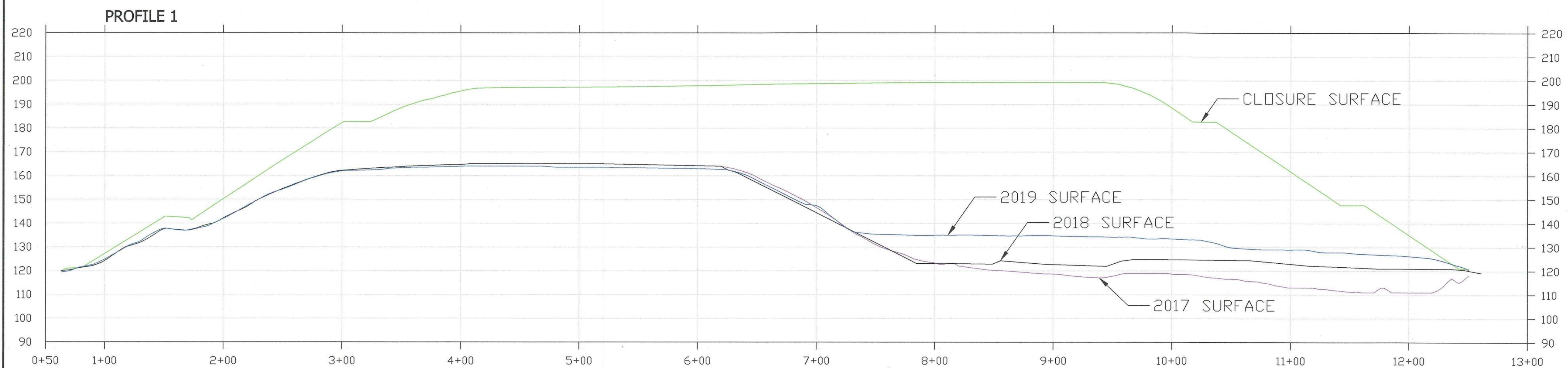
1/3/20 MARK E. SCHRÖDER, P.E.
Engineer 1
FL LICENSE NO. 67585

SURVEY PROJECT NO.	SHEET NO.
XX	2
DATE: 1/2/20	OF 4
SCALE: 1" = 60'	

3800 SOVEREIGN PATH
SUITE 241
LEICANTO, FLORIDA 34461
(850) 527-5446

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DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING

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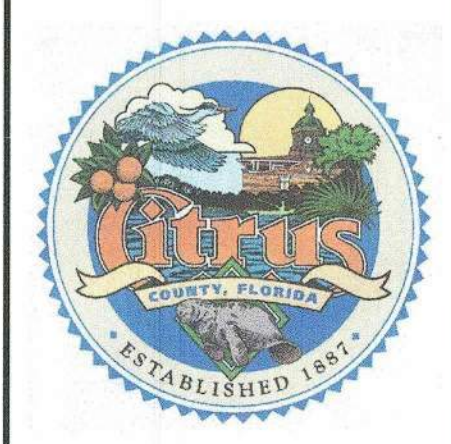
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LEGEND AND ABBREVIATIONS

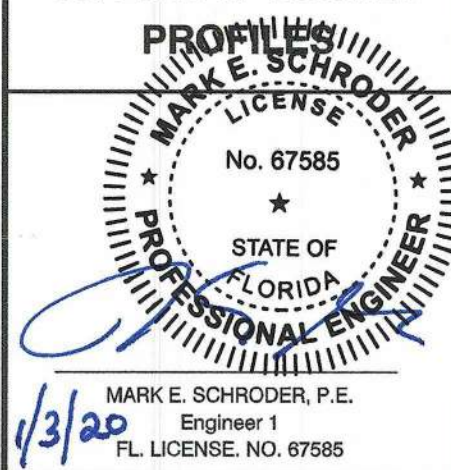
- FINAL CLOSURE (CONVERTED TO NAVD88)
 - SEPTEMBER 15, 2017 (AERIAL SURVEY BY PICKETT SURVEYING AND PHOTOGRAMMETRY, NAVD88)
 - SEPTEMBER 26, 2018 (RTK SURVEY BY CITRUS COUNTY SURVEY SECTION, NAVD88)
 - SEPTEMBER 24, 2019 (DRONE RTK SURVEY BY DRAGONFLY AEROSOLUTIONS, NAVD88)
- PLAN VIEWS ARE ON SHEETS 1 AND 2

CITRUS COUNTY
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DIVISION OF ENGINEERING

CITRUS COUNTY
CENTRAL LANDFILL
2019 SITE
LIFE CALCULATION
REPORT



CITRUS COUNTY
CENTRAL LANDFILL
FINAL CLOSURE
09/24/2019 SURVEY
09/26/2018 SURVEY
09/15/2017 SURVEY



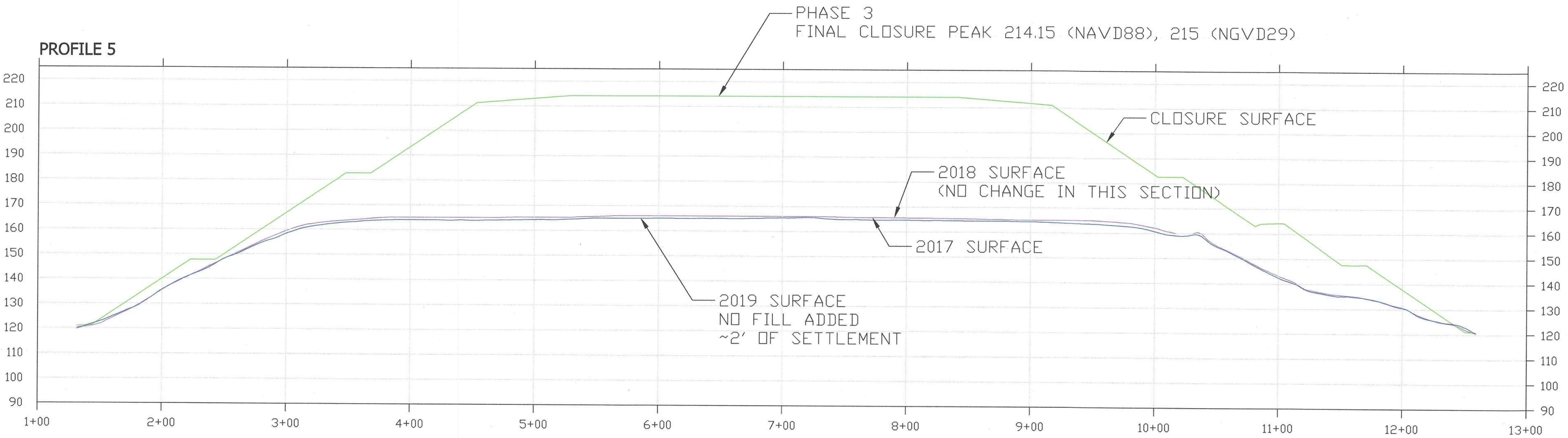
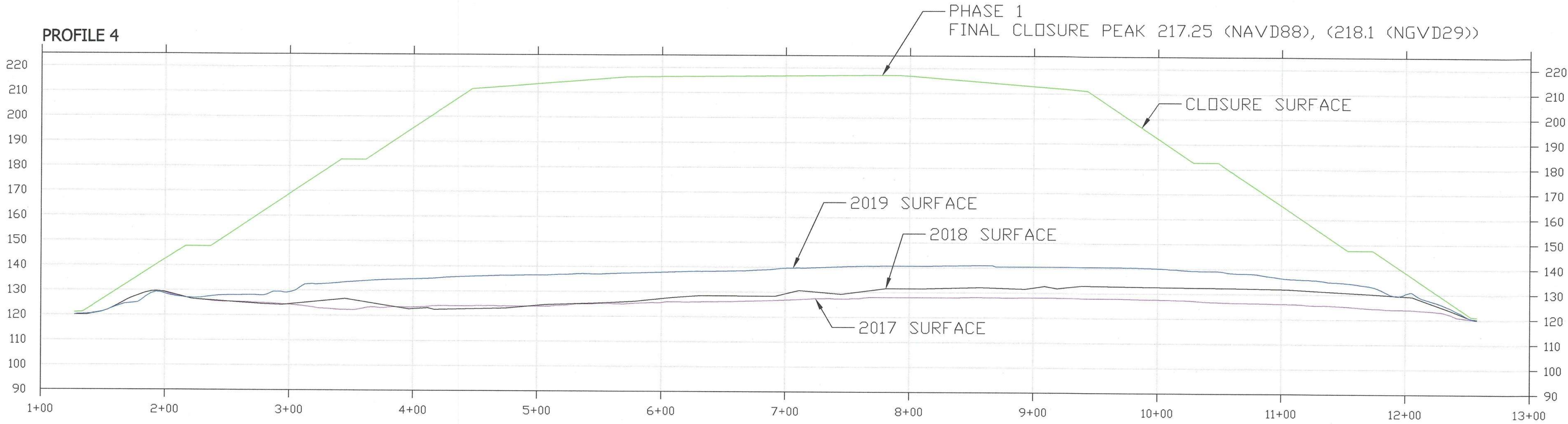
SURVEY PROJECT NO.	SHEET NO.
XX	3
DATE:	
1/2/20	OF
SCALE: 1" = 50' H 1" = 25' V	4

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ELEVATION DATUM NOTE

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LEGEND AND ABBREVIATIONS

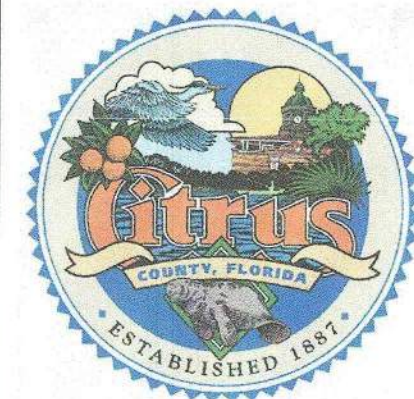
FINAL CLOSURE (CONVERTED TO NAVD88)
SEPTEMBER 15, 2017 (AERIAL SURVEY BY PICKETT SURVEYING AND PHOTOGRAMMETRY, NAVD88)
SEPTEMBER 26, 2018 (RTK SURVEY BY CITRUS COUNTY SURVEY SECTION, NAVD88)
SEPTEMBER 24, 2019 (DRONE RTK SURVEY BY DRAGONFLY AEROSOLUTIONS, NAVD88)

PLAN VIEWS ARE ON SHEETS 1 AND 2

3800 SOVEREIGN PATH
SUITE 241
LEICANTO, FLORIDA 34461
(882) 327-5446

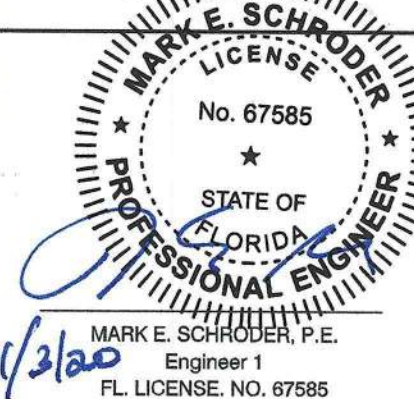
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CITRUS COUNTY
CENTRAL LANDFILL
2019 SITE
LIFE CALCULATION
REPORT



CITRUS COUNTY
CENTRAL LANDFILL
FINAL CLOSURE
09/24/2019 SURVEY
09/26/2018 SURVEY
09/15/2017 SURVEY

PROFILES



SURVEY PROJECT NO.	SHEET NO.
XX	4
DATE:	
1/2/20	
SCALE:	
1" = 50' H	
1" = 25' V	

ATTACHMENT 2

SITE LIFE CALCULATIONS

**CITRUS COUNTY SOLID WASTE MANAGEMENT DIVISION
CENTRAL LANDFILL SITE LIFE CALCULATION
DECEMBER 2019 REPORT**

Objective: Calculate the 2019 remaining site life for Phases 1/1a, 2 & 3 using waste tonnage records from Citrus County and calculated waste generation projections.

Approach:

1. Calculate the available airspace as of the most recent survey.
2. Calculate the "Effective Density" using volume consumed between October 2018 through September 2019.
3. Use the effective density to calculate the remaining life of the available airspace.

Available Airspace Calculation:

Airspace available from Sep 2019 to Final Grade =	1,467,709	CY	(From Surveys)
Air volume consumed Oct 2018 through September 2019 =	127,589	CY	(Calculated)

Effective Density Calculation:

Waste Disposed of between 10/2018 through 09/2019 =	99,280	tons	(From Landfill Records)
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Effective Density=	$\frac{99,280}{127,589}$	$\frac{\text{ton}}{\text{CY}}$	$\frac{2,000}{\text{ton}}$	$\frac{\text{lbs}}{\text{ton}}$	$\frac{1,556}{\text{lbs/CY}}$
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Effective Airspace Consumption Rate=	$\frac{127,589}{99,280}$	$\frac{\text{CY}}{\text{ton}}$	$\frac{1.29}{\text{CY/ton}}$
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Assuming the waste will be filled up to the final capacity and allowed to settle before placing the cover soil.

Cap Volume = 0 CY

Subtract Cap Volume from air volume (airspace available) to determine useable waste volume for site life calculation.

Remaining Volume= 1,467,709 CY - 0 CY = 1,467,709 CY

Site Life Calculation

The site life calculation is based on Citrus County waste tonnage records and population projections from the University of Florida Bureau of Business and Economic Research (BEER). The historic population growth trends have been in between the BEER Low and Medium estimates. This year population growth rate was just above the BEER Medium estimate growth rates. The Medium population projection was used for this year's estimate.

FISCAL YEAR	TONNAGE	VOLUME CONSUMED (CY)	NET REMAINING AIRSPACE (CY)
2018-2019	97,064	124,741	1,467,709
2019-2020	99,280	127,589	1,340,120
2020-2021	99,183	127,465	1,212,655
2021-2022	99,909	128,397	1,084,258
2022-2023	100,635	129,330	954,928
2023-2024	101,360	130,263	824,665
2024-2025	102,086	131,195	693,470
2025-2026	102,812	132,128	561,342
2026-2027	103,444	132,940	428,402
2027-2028	104,075	133,752	294,651
2028-2029	104,707	134,563	160,088
2029-2030	105,338	135,375	24,713
2030-2031	105,970	136,187	-111,474
2031-2032	106,494	136,860	-248,335
2032-2033	107,018	137,534	-385,869
2033-2034	107,543	138,208	-524,076
2034-2035	108,067	138,881	-662,958
2035-2036	108,591	139,555	-802,512
2036-2037	109,021	140,107	-942,620
2037-2038	109,451	140,660	-1,083,280
2038-2039	109,881	141,213	-1,224,493

CONCLUSION: **Estimated Phases 1/1A, 2 & 3 Fill Completion Date = November 2028**