

**From:** [crgilbert@comcast.net](mailto:crgilbert@comcast.net)  
**To:** [REDICK Daniel](#)  
**Subject:** Draft Report Additions 12 -12-2022  
**Date:** Monday, December 12, 2022 8:32:28 AM  
**Attachments:** [Appendix A- B Intake Volume Capcity Volume Data .xlsx](#)  
[Draft Report additions landfill size capacity longevity subcommittee report 12-122022.docx](#)  
[macnab 112222 coffin butte capacity.pdf](#)

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Hi Daniel,

Attached please find additional comments in the draft memo and spreadsheet.

If you have any questions, please let me know at your earliest convenience.

Thanks.

Year	Annual CBR Intake Tons	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)
1993	310,648			
1994	268,472			
1995	287,932			
1996	369,835			
1997	378,919			
1998	395,751			
1999	403,697			
2000	413,493			
2001	426,000	0.9	473000	25,238,000
2002	457,000	0.98	561,592	24,776,627
2003	550,360	0.98	561,592	24,209,320
2004	589,147	0.80	736,434	24,513,192
2005	580,275	0.80	725,344	29,916,144
2006	624,875	0.8	781,094	29,135,051
2007	546,996	0.8	683,746	28,451,306
2008	528,395	0.8	660,494	27,785,082
2009	519,058	0.8	648,823	27,136,259
2010	458,590	0.892	514,111	27,382,241
2011	482,951	1.0375	465,495	24,807,718
2012	473,440	0.83	572,825	23,741,843
2013	479,160	0.92	523,100	24,458,567
2014	499,687	0.92	545,510	23,839,138
2015	530,971	0.89	595,593	23,839,138
2016	552,979	0.93	592,689	22453729
2017	941,430	0.97	969,048	21,727,371
2018	1,010,879	0.99	1,021,090	18,015,098
2019	1,034,934	0.8	1,293,668	18,352,257
2020	863,210	1	863,210	17,621,208
2021	1,046,067	0.98	1,067,415	17,249,778
2022	1,100,000	0.999	1,089,900	16,008,557
2023	1,100,000	0.999	1,089,900	14,918,657
2024	1,100,000	0.999	1,089,900	13,828,757
2025	1,100,000	0.999	1,089,900	12,738,857
2026	1,100,000	0.999	1,089,900	11,648,957
2027	1,100,000	0.999	1,089,900	10,559,057
2028	1,100,000	0.999	1,089,900	9,469,157
2029	1,100,000	0.999	1,089,900	8,379,257
2030	1,100,000	0.999	1,089,900	7,289,357

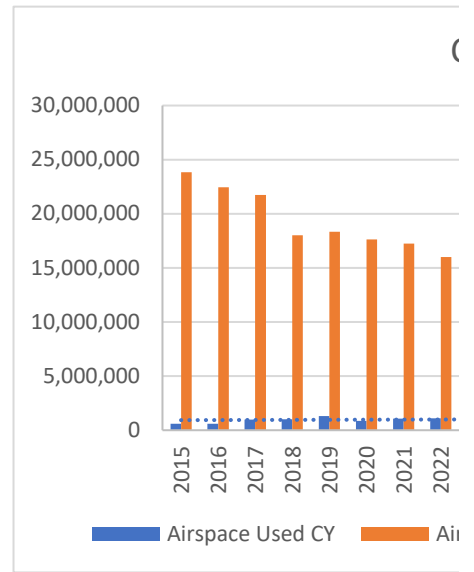
2031	1,100,000	0.999	1,089,900	6,199,457
2031	1,100,000	0.999	1,089,900	5,109,557
2033	1,100,000	0.999	1,089,900	4,019,657
2034	1,100,000	0.999	1,089,900	2,929,757
2034	1,100,000	0.999	1,089,900	1,839,857
2035	1,100,000	0.999	1,089,900	749,957
2036	750,708	0.999	749,957	0

Year	Intake Tons	Airspace Used CY	Airspace Remain CY
2015	530,971	595,593	23,839,138
2016	552,979	592,689	22,453,729
2017	941,430	969,048	21,727,371
2018	1,010,879	1,021,090	18,015,098
2019	1,034,934	1,293,668	18,352,257
2020	863,210	863,210	17,621,208
2021	1,046,067	1,067,415	17,249,778
2022	1,100,000	1,089,900	16,008,557
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2029	1,100,000	1,089,900	8,379,257
2030	1,100,000	1,089,900	7,289,357
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2035	1,100,000	1,089,900	749,957
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Year	Airspace Used CY	Airspace Remain CY
2015	595,593	23,839,138

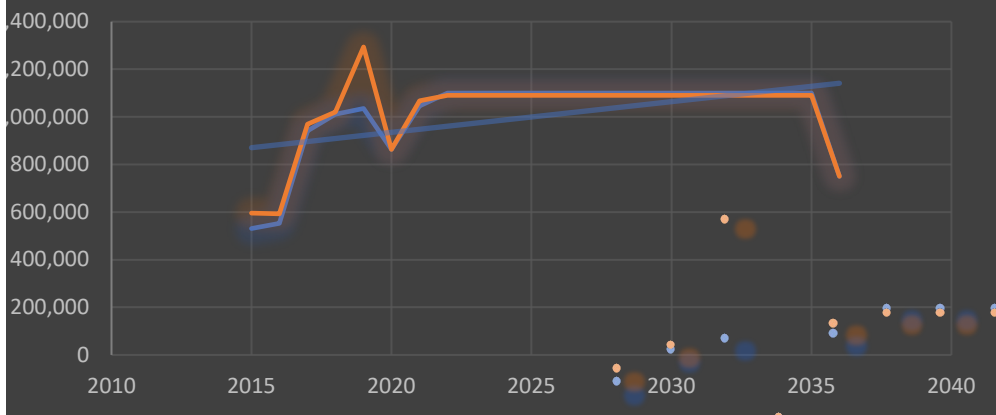
2016	592,689	22453729
2017	969,048	21,727,371
2018	1,021,090	18,015,098
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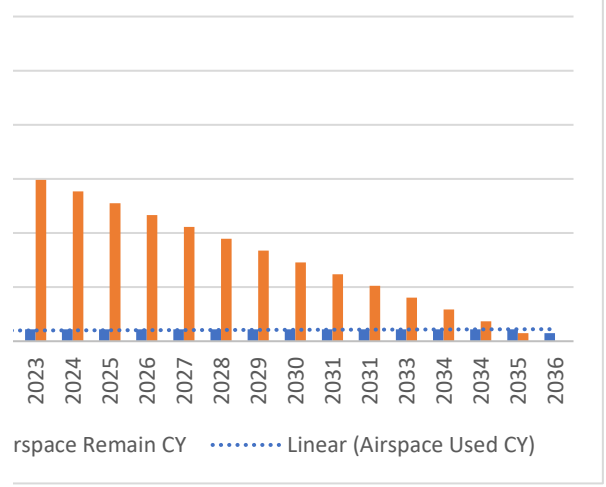


### Coffin Butte Landfill

Intake Tons    Airspace Used CY    Linear (Intake Tons)



# Chart Title



1) A chronological history of key Coffin Butte Landfill topics:

- a. Size;
- b. Specific locations;
- c. Conditions of past land use approvals;
- d. Compliance with prior land use approvals and SWMP;
- e. Reporting requirements;

2)

- f. Assumptions (e.g., when will the landfill close;)
- g. Economics (i.e., Benefit – Cost, etc.;;) and
- h. Examples from other jurisdictions hosting landfills, e.g.:
- i. Typical land use conditions of approval; and
- ii. Issue sequencing, (e.g., in what order are landfill versus hauling approvals done, etc.

## Appendix \_\_ : Capacity Data - Site Life Projections



Airspace used and remaining

Year	Annual CBR Intake Tons	CBR Density Ration	CBR Annual Airspace Used (CY)	CBR Remaining Airspace (cy)
1993	310,648			
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2010	458,590	0.892	514,111	27,382,241
2011	482,951	1.0375	465,495	24,807,718
2012	473,440	0.83	572,825	23,741,843
2013	479,160	0.92	523,100	24,458,567
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2030	1,100,000	0.999	1,089,900	7,289,357
2031	1,100,000	0.999	1,089,900	6,199,457
2031	1,100,000	0.999	1,089,900	5,109,557
2033	1,100,000	0.999	1,089,900	4,019,657
2034	1,100,000	0.999	1,089,900	2,929,757
2034	1,100,000	0.999	1,089,900	1,839,857
2035	1,100,000	0.999	1,089,900	749,957
2036	750,708	0.999	749,957	0

airspace for Coffin Butte landfill.

The following Year 2021 is a summary of information used for the annual reports for Coffin Butte landfill.

Each year Republic Services produces an annual report for Coffin Butte Landfill & Pacific Region Compost (CBR).

In particular, during year of 2021 the landfill accepted 1,046,067 tons of solid waste. Based on historical aerial fly-over data, the average effective density of the in-place waste at the Coffin Butte Landfill is 0.98 tons/cy (1,961 lbs. /cy – 2021 Operational Density). Therefore, an estimated 1,067,415 cubic yards of airspace was used for the year. A total of 21,389,767 cubic yards has been consumed as of December 31, 2021. The remaining capacity for the entire permitted landfill footprint as of the end of 2021 was approximately 17,249,778 cubic yards. This information is updated annually with aerial flyovers. Using 0.80 tons/cy, the remaining available landfill space expressed in tons is about 13,799,822 tons. Using an average disposal rate of approximately 750,000 tons per year, there are about 18.40 years of landfill space available. If we use our 3-year density average of 0.93 tons/cy, the site life extends to 21.38 years.

This illustrates the importance of density on landfill site life.

As the density (compaction) is lowered per ton of solid waste due to the varying waste composition, then more headspace is consumed in the landfill thereby lowering landfill space available.

The remaining Airspace (CY) in the table to the left for Year2022 is adjusted for Scenario 2 data provided by Ian MacNab member of Subcommittee A1 – Republic Services.

*Reference MacNab's e-mail of 11/22/22 – Coffin Butte Landfill Capacity, which outlines the following scenarios for for site life of the landfill.*

Site life scenarios are based on the capping of the cells when reaching the final design elevation of the landfill, but does not include the decomposition cycle of the solid waste when the cell is capped.

Scenario 1

Tons per Year 1,000,000 Tons  
Projected Remaining Airspace 12/31/22 16,008,557 CY  
2022 3-year Density Avg 0.999 Tons/CY  
Site Life 15.99 Years

Scenario 2

Tons per Year 1,100,000 Tons  
Projected Remaining Airspace 12/31/22 16,008,557 CY  
2022 3-year Density Avg 0.999 Tons/CY  
Site Life 14.54 Years

Definitions:

Tons per Year: Projected tonnage based off  
recent history\*

Projected Remaining Airspace: Airspace  
remaining at the end of 2022 based off  
projected 2022 tons and 2022 3-year  
density average

2022 3-year Density Avg: Average density  
measured during 2020, 2021 and 2022, measurements

Site Life: Total site life including the fully  
excavated quarry area

\*Variables can and do impact tonnage and  
available airspace, and can include changes  
in disposal and diversion rates, natur  
disasters and other unforeseen market  
changes, etc.

Although the above table reflects a good scenario of the total site life including the fully excavated quarry area, there still may be a synchronization dynamic with Knife River's schedule for quarry excavation completion.

The below 2021 Site Development Plan update is still relevant with the design portion of cell 6, if excavation of the quarry is not completed.

Site:	Coffin Butte Landfill
Project Name:	2021 Site Development Plan Update
Date:	12/23/2021
Calc By:	ASO
Reviewed By:	RB

Projected Daily Waste Receipt                      2,959 tons/day    (from 2021 5 Yr Fill Plans)

Assume <sup>1</sup>	0.0 % growth rate
Operational Density	0.8 ton/cy    (from 2021 5 Yr Fill Plans)
Operational Days	286 days/year
Remaining Site Life	18 Years

Note<sup>1</sup>: Growth Rate Based On Site Aerial Budget Model

Year	Consumed Airspace (cy)	Remaining Airspace (cy)
2021	1,072,037	4,834,330 *Cell 5D/5E Constructed Remaining from 3/30/21 survey date
2022	1,057,700	3,776,631
2023	1,057,700	2,718,931
2024	1,057,700	1,661,232
2025	1,057,700	603,532
2026	1,057,700	1,028,093 Construct Phase 6A (Add 1,482,260 cy)
2027	1,057,700	999,823 Construct Phase 6B (Add 1,029,430 cy)
2028	1,057,700	1,684,254 Construct Phase 6C (Add 1,742,130 cy)
2029	1,057,700	626,554
2030	1,057,700	1,428,675 Construct Phase 6D (Add 1,859,820 cy)
2031	1,057,700	370,975
2032	1,057,700	391,696 Construct Phase 6E (Add 1,078,420 cy)
2033	1,057,700	1,020,066 Construct Phase 6F (Add 1,686,070 cy)
2034	1,057,700	1,977,627 Construct Phase 6G (Add 2,015,260 cy)
2035	1,057,700	919,927
2036	1,057,700	1,157,678 Construct Phase 6H (Add 1,295,450 cy)
2037	1,057,700	99,978
2038	1,057,700	664,409 Construct Phase 6I (Add 1,622,130 cy)
2039	664,409	0

2)

**From:** [Macnab, Ian](#)  
**To:** [REDICK Daniel](#)  
**Subject:** Coffin Butte Capacity  
**Date:** Tuesday, November 22, 2022 3:30:42 PM  
**Attachments:** [Coffin Butte Capacity.pdf](#)

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Daniel,

See attached for what we've put together regarding Coffin Butte's capacity. Let me know if you have any questions.

## Ian Macnab

Environmental Manager - Oregon

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Corvallis, OR 97330

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Sustainability in Action

### Scenario 1

<b>Tons per Year</b>	1,000,000 Tons
<b>Projected Remaining Airspace 12/31/22</b>	16,008,557 CY
<b>2022 3-year Density Avg</b>	0.999 Tons/CY
<b>Site Life</b>	15.99 Years

### Scenario 2

<b>Tons per Year</b>	1,100,000 Tons
<b>Projected Remaining Airspace 12/31/22</b>	16,008,557 CY
<b>2022 3-year Density Avg</b>	0.999 Tons/CY
<b>Site Life</b>	14.54 Years

#### Definitions:

**Tons per Year:** Projected tonnage based off recent history\*

**Projected Remaining Airspace:** Airspace remaining at the end of 2022 based off projected 2022 tons and 2022 3-year density average

**2022 3-year Density Avg:** Average density measured during 2020, 2021 and 2022 measurements

**Site Life:** Total site life including the fully excavated quarry area

\*Variables can and do impact tonnage and available airspace, and can include changes in disposal and diversion rates, natural disasters and other unforeseen market changes, etc.