

Project Statement

Cinder Lake Landfill requires a plan for landfill mining and re-sequencing to allow the design for Re-use Cell D.

How will this be achieved?

Order processes that are used by re-sequencing Cell D that will include a portion of Cell E to the back of the site.

Site Background

Cinder Lake Landfill

- 800-acre industrial solid waste landfill
- Located in East Tugay, AZ
- Section 5 of the National Response Act

Current Conditions

- Limited soils
- 100' (1) - Road track
- 100' (1) - Construction site
- Stack Trunk - Municipal Solid Waste (MSW)

Landfill Mining & Excavation Plan

Project Schematics

Cell Volumes

What are the design volumes?

Segregation Areas

How are materials separated for segregation?

Project Duration & Processing Rate

How long will the project take and how much material can be processed per day?

Area	Capacity	MSW	MSW	MSW
Cell D	100	100	100	100
Cell E	100	100	100	100
Cell F	100	100	100	100

Equipment

What equipment will be used to support the re-sequencing process?

Mass Balance

How much material is being processed and what is the output?

Environmental Controls

Cost of Implementation

What are the costs associated with the project?

Total Cost = \$10,000,000

Impacts

Economic Benefits

- Creation of new jobs
- Increase in local economy
- Recovery of valuable materials

Environmental

- Minimizing the risk of disaster

Cinder Lake Landfill : Re-sequencing Cell D

Aspen Engineering & Environmental Services

Saleh AlAzmi
Coral Martz
Shayla Woodhouse



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Project Schematics

Cell Volumes

What are the design volumes?

Segregation Areas

How are the materials separated for segregation?

Project Duration & Processing Rate

How long will the project take and how much material can be processed per day?

Material	Cell D	Cell E	Stack Trunk
Volume (cubic yards)	100,000	100,000	100,000
Processing Rate (cubic yards per day)	100	100	100
Duration (days)	1,000	1,000	1,000

Equipment

What equipment will be used to support the re-sequencing process?

Mass Balance

How is the mass of materials balanced throughout the re-sequencing process?

Environmental Controls

Cost of Implementation

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Total Cost = \$10,000,000

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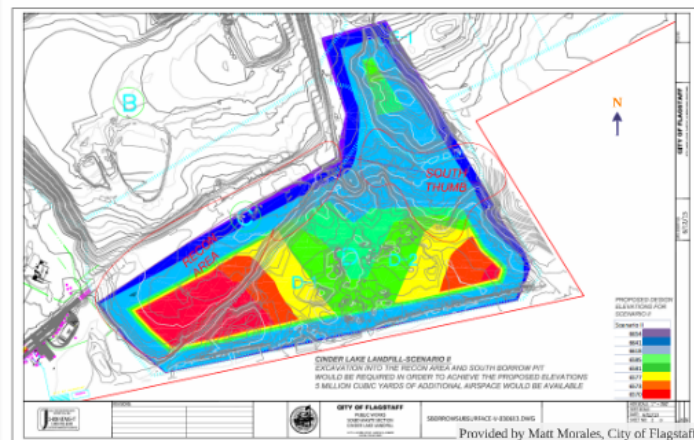


Project Statement

Cinder Lake Landfill requires a plan for landfill mining and excavation to achieve the design for future Cell D.

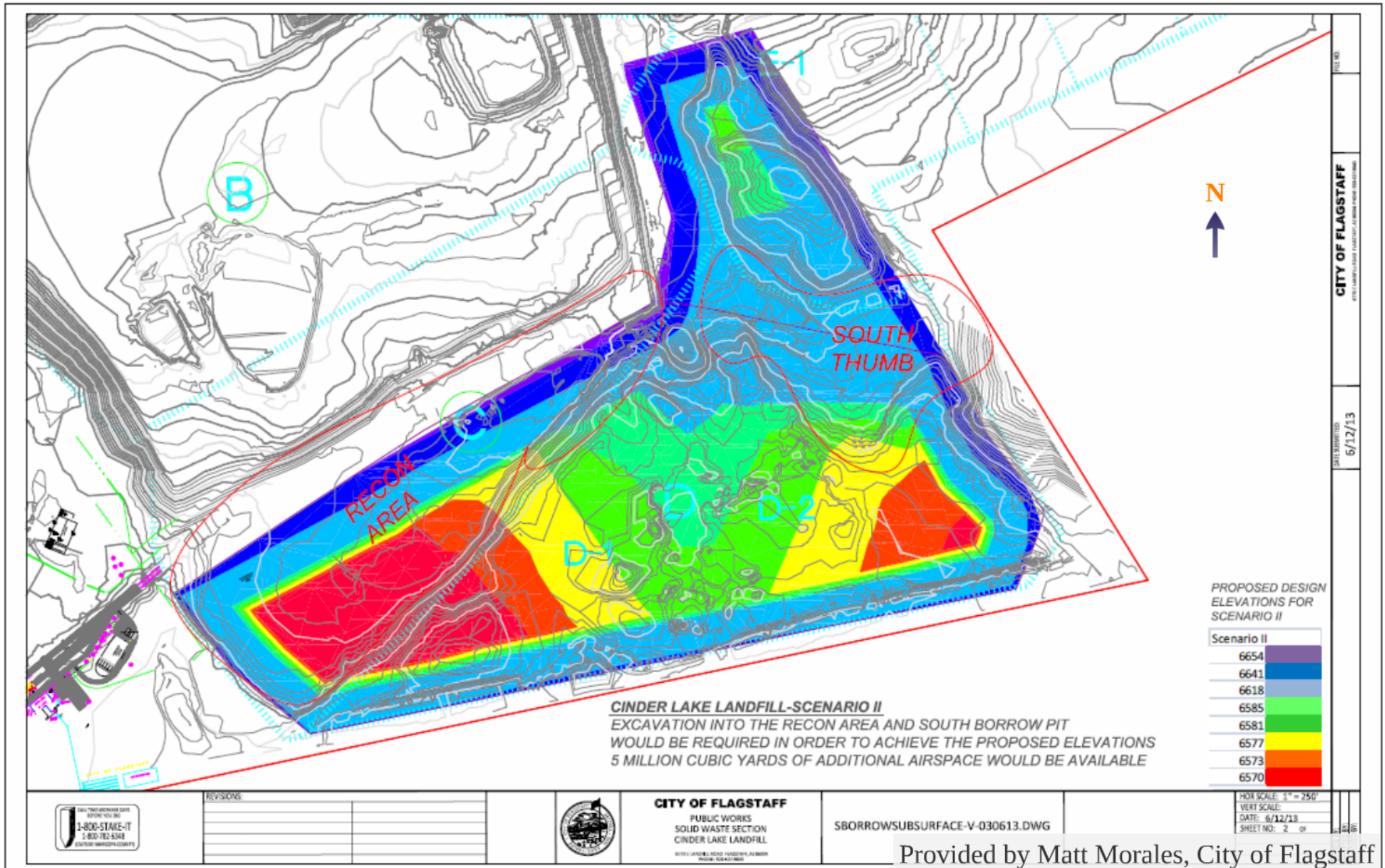
How will this be achieved?

Create more space for future waste by re-sequencing Cell D that will include a portion of Cell C & the South Thumb



Provided by Matt Morales, City of Flagstaff

Cell C & the South Thumb



Provided by Matt Morales, City of Flagstaff

Site Background

Cinder Lake Landfill

- 343-acre municipal solid waste landfill
- Located in East Flagstaff, AZ
- Services a 70-mile radius around Flagstaff



Current Conditions

- Involved cells
 - *Cell D : Basalt rock
 - *Cell C : Construction debris
 - *South Thumb : Municipal Solid Waste (MSW)





Google Earth (Annotated)

Site Background

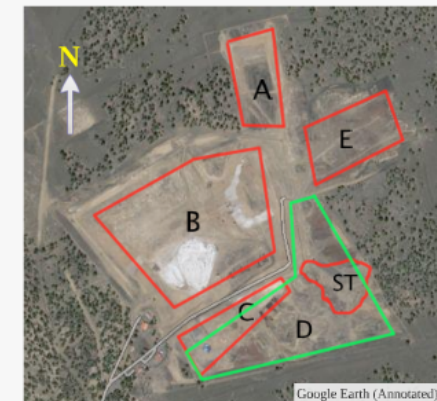
Cinder Lake Landfill

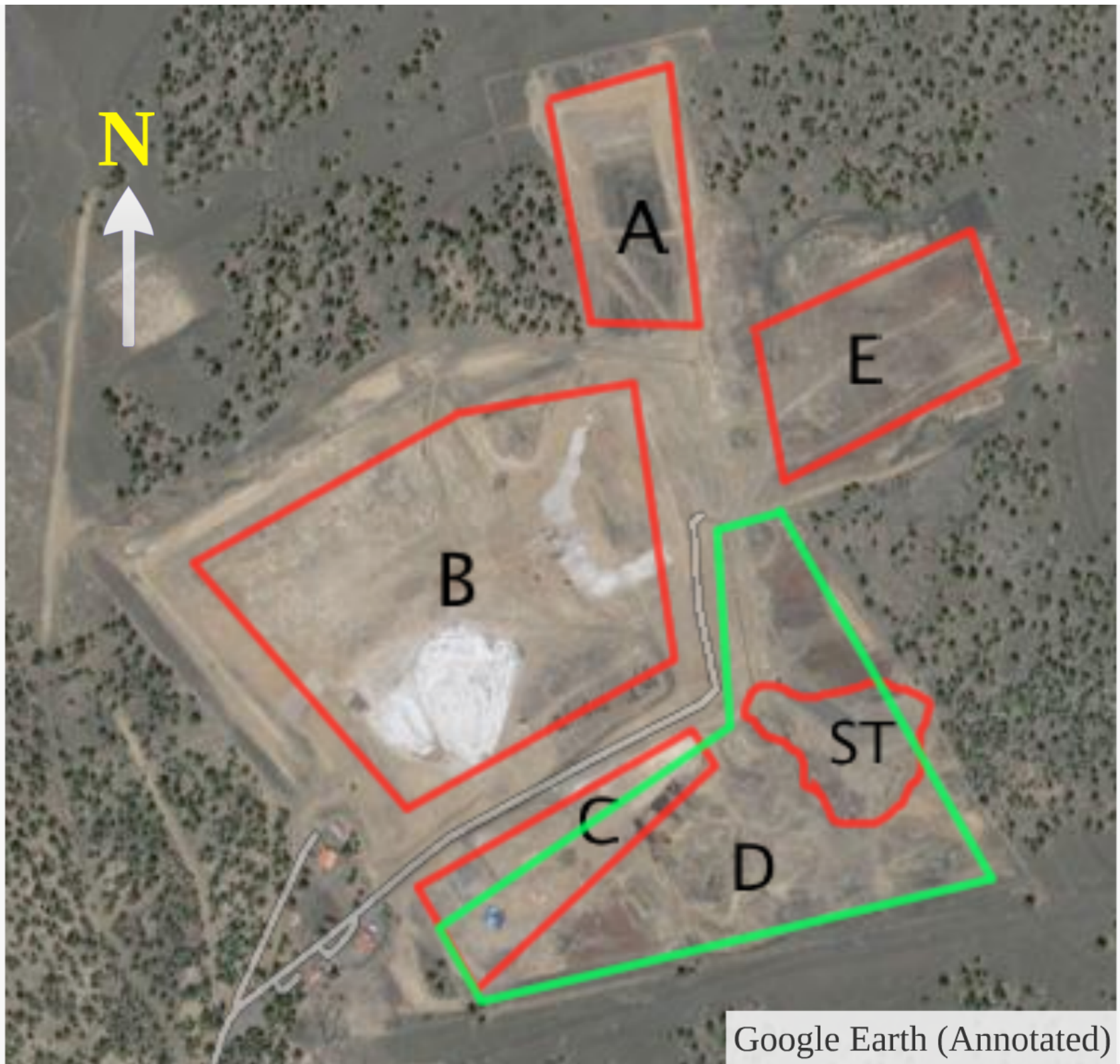
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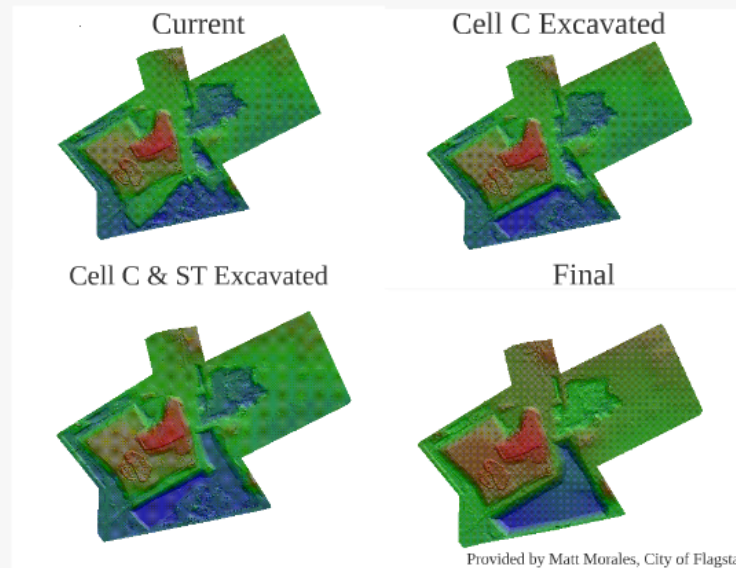
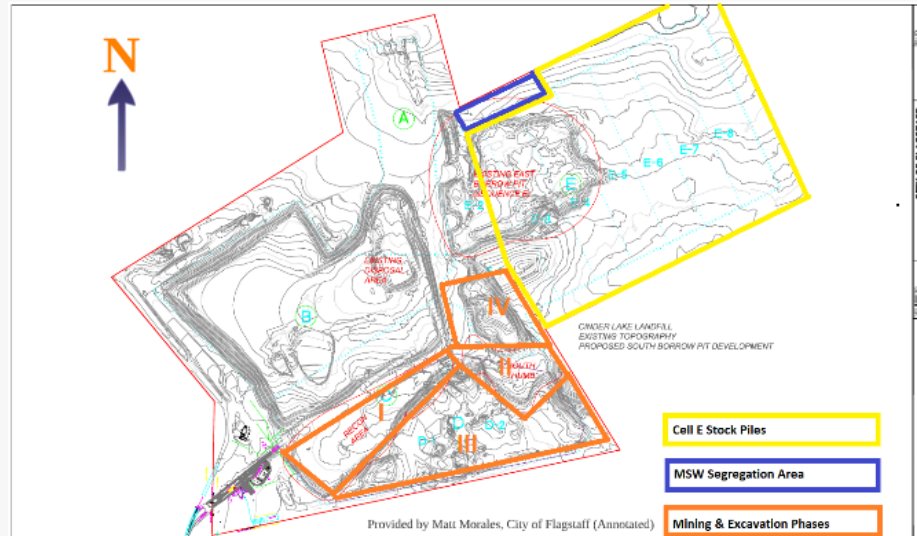




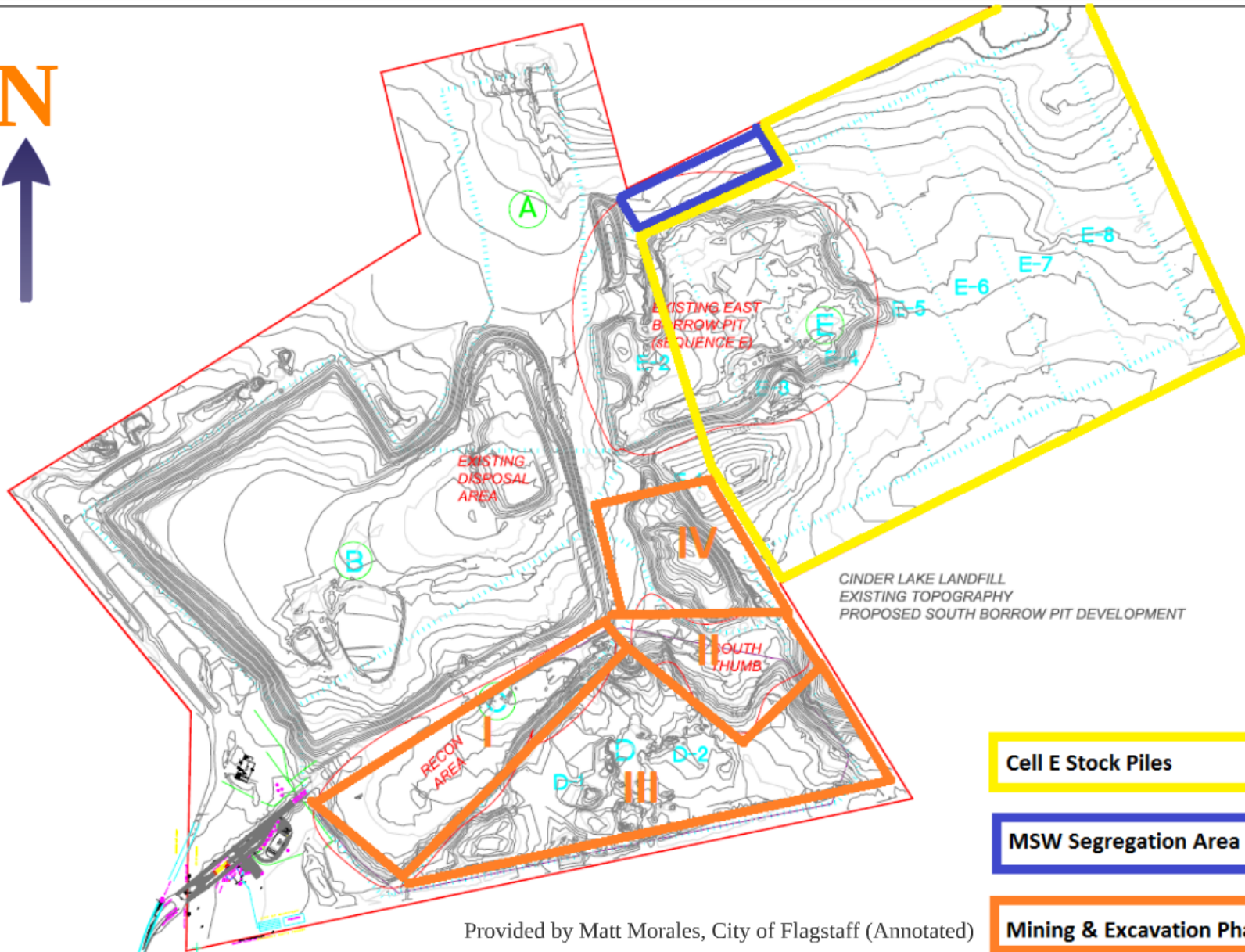
Google Earth (Annotated)

Landfill Mining & Excavation Plan

Project Schematics



Project Schematics



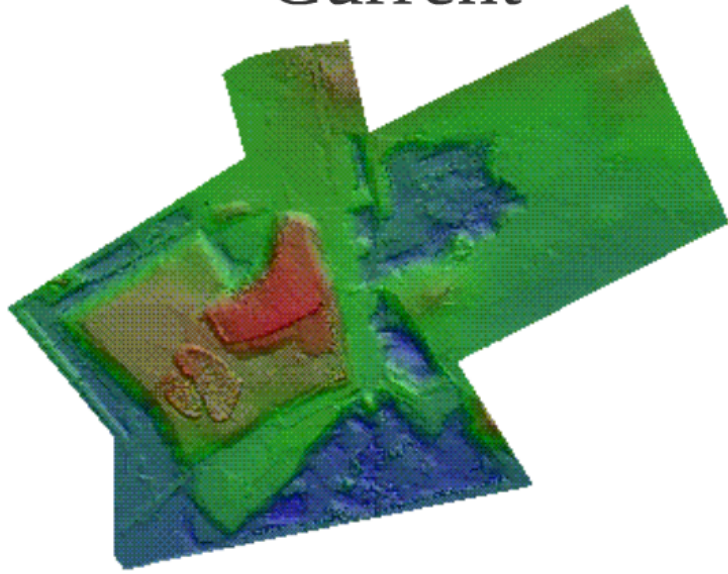
Provided by Matt Morales, City of Flagstaff (Annotated)

Cell E Stock Piles

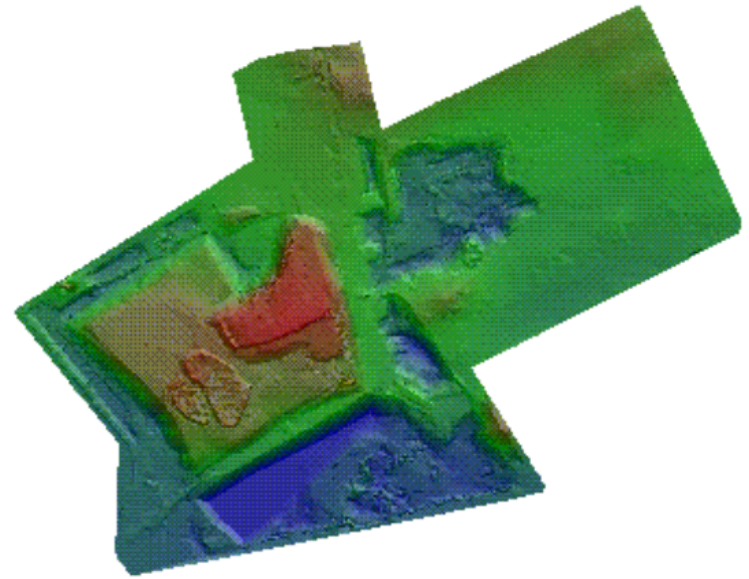
MSW Segregation Area

Mining & Excavation Phases

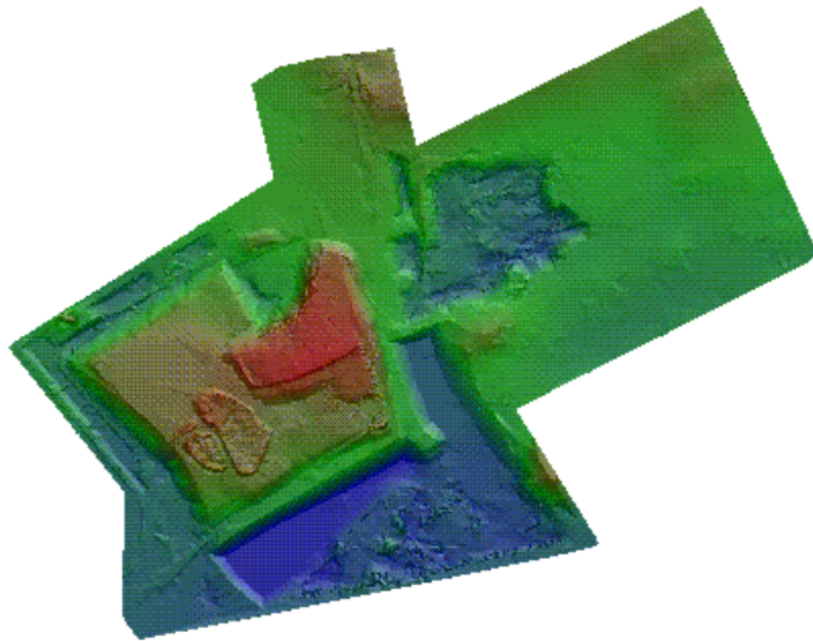
Current



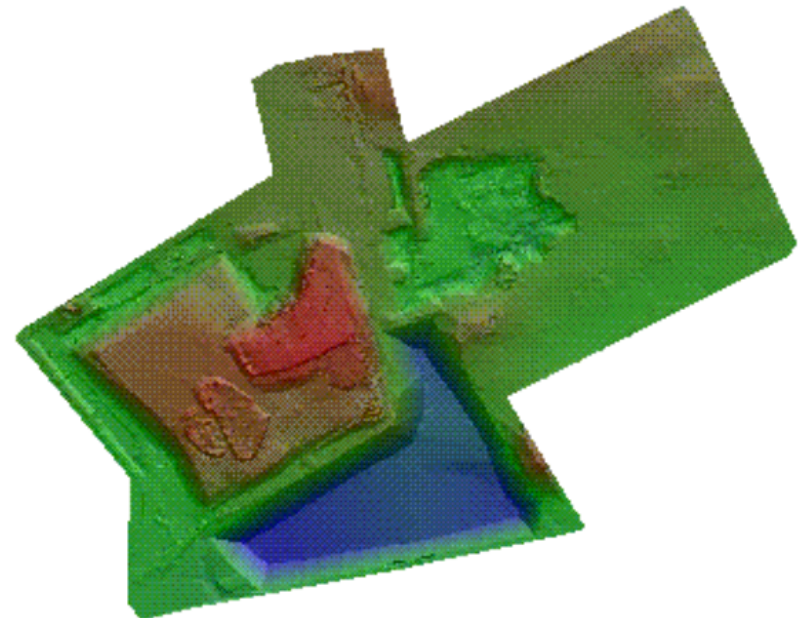
Cell C Excavated



Cell C & ST Excavated



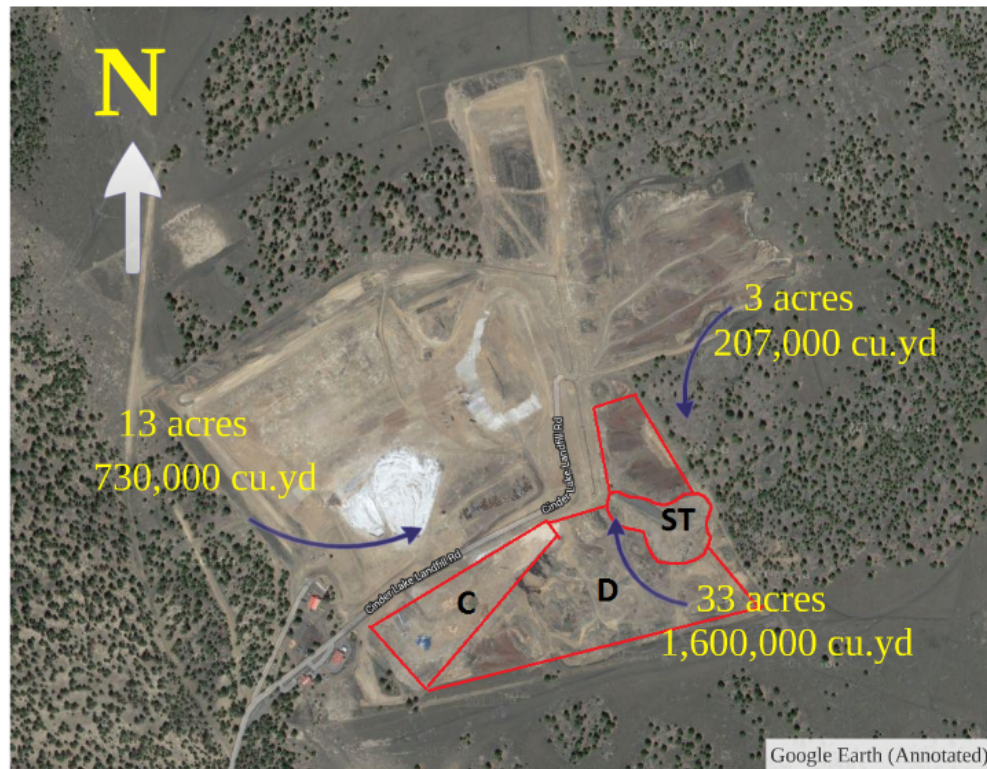
Final



Provided by Matt Morales, City of Flagstaff

Cell Volumes

What are the design volumes?



N



13 acres
730,000 cu.yd

3 acres
207,000 cu.yd



Project Duration & Processing Rate

How many cubic yards per day will need to be excavated & mined, and for how many days?

	Cell D	Cell C	South Thumb
Volume (cu.yd/day)	1,600,000 <i>soil expansion</i> 2,080,000	730,000	207,000
Duration (months)	39	16	5
Daily Rate (cu.yd/day)	1,900	2,100	1,900

Overall

2,300 cu.yd/day
60 months

Equipment

What equipment will be needed to perform the excavation
& mining?

Excavator



Loader



Vibratory Screener



Truck



Dozer



Trommel



ScreenMachine

Backhoe

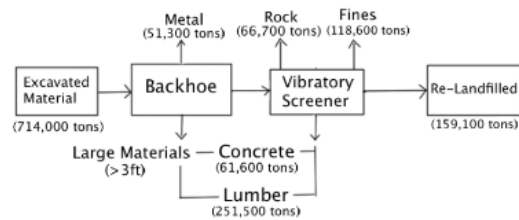


Cat Equipment

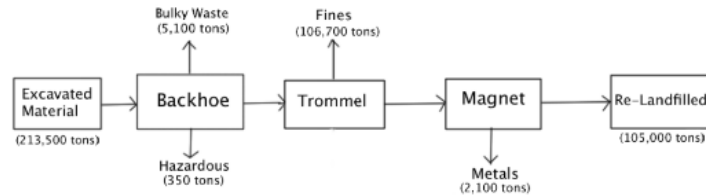
Mass Balance

Now that everything has been excavated, where is it all going?

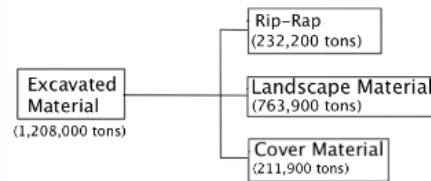
Mass Balance Cell C



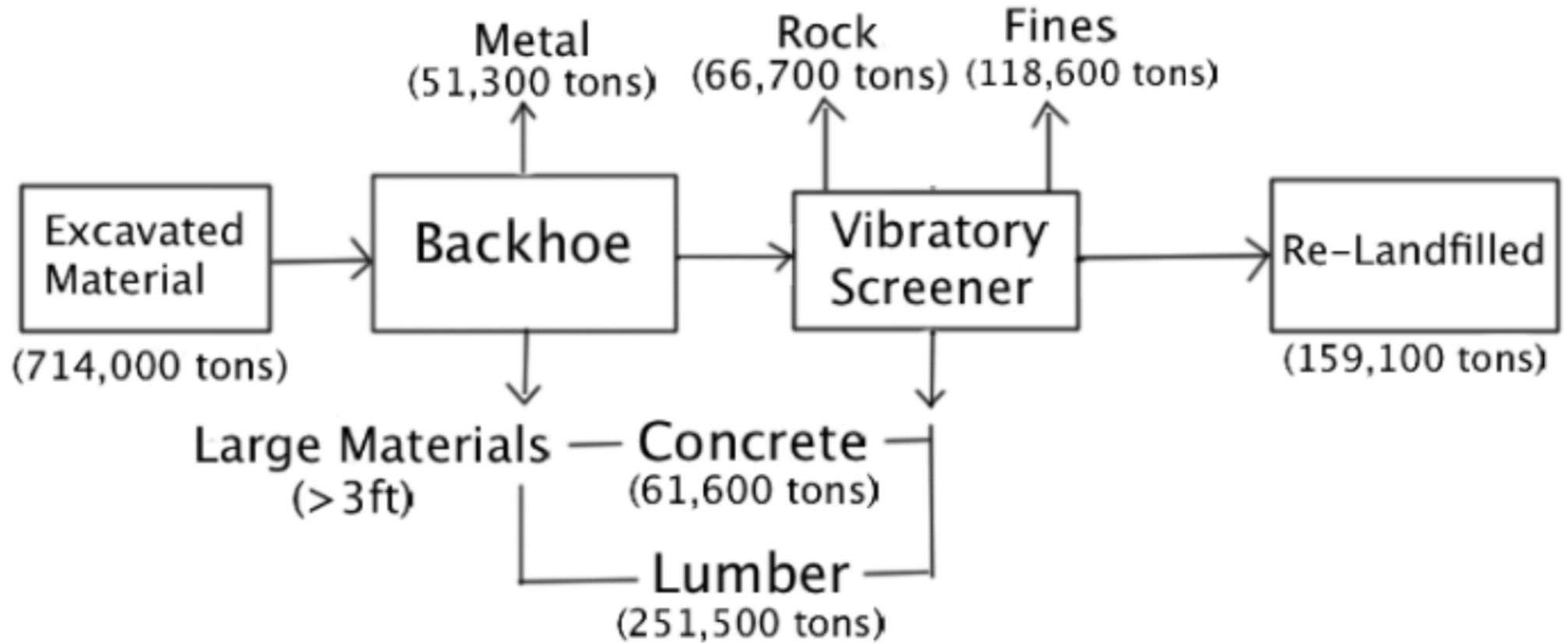
Mass Balance South Thumb



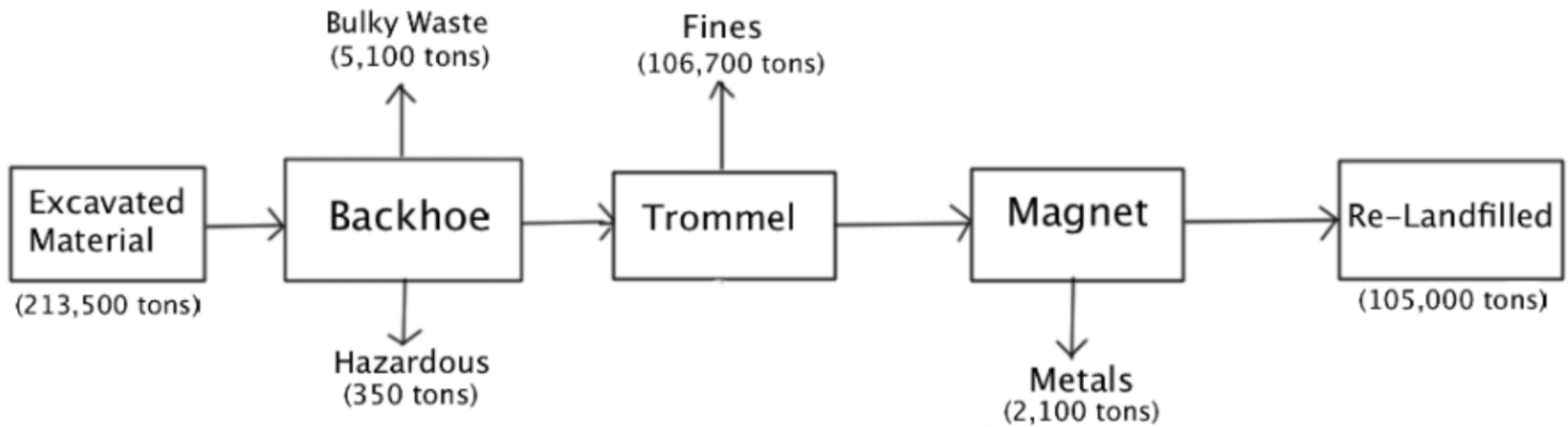
Mass Balance Cell D



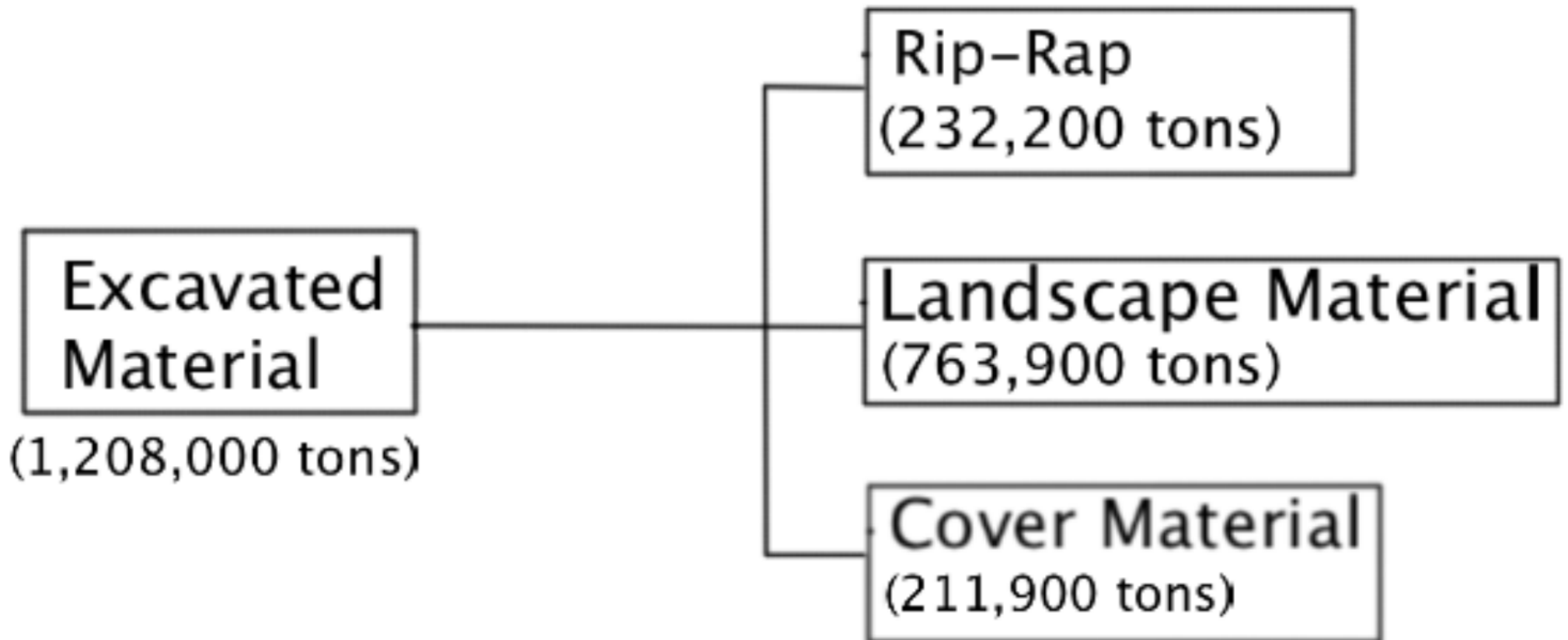
Mass Balance Cell C



Mass Balance South Thumb

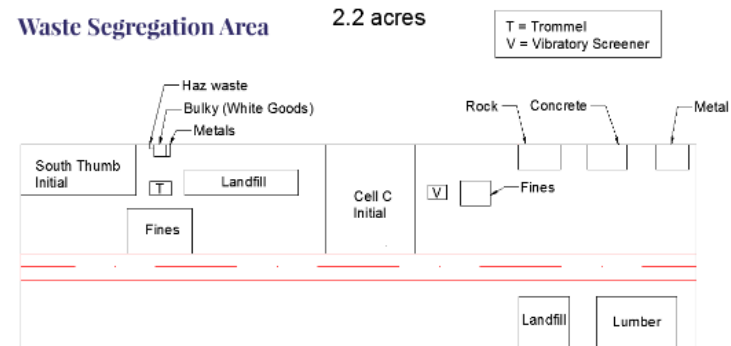


Mass Balance Cell D



Segregation Areas

How will the excavated material be segregated?



Rock Segregation Area

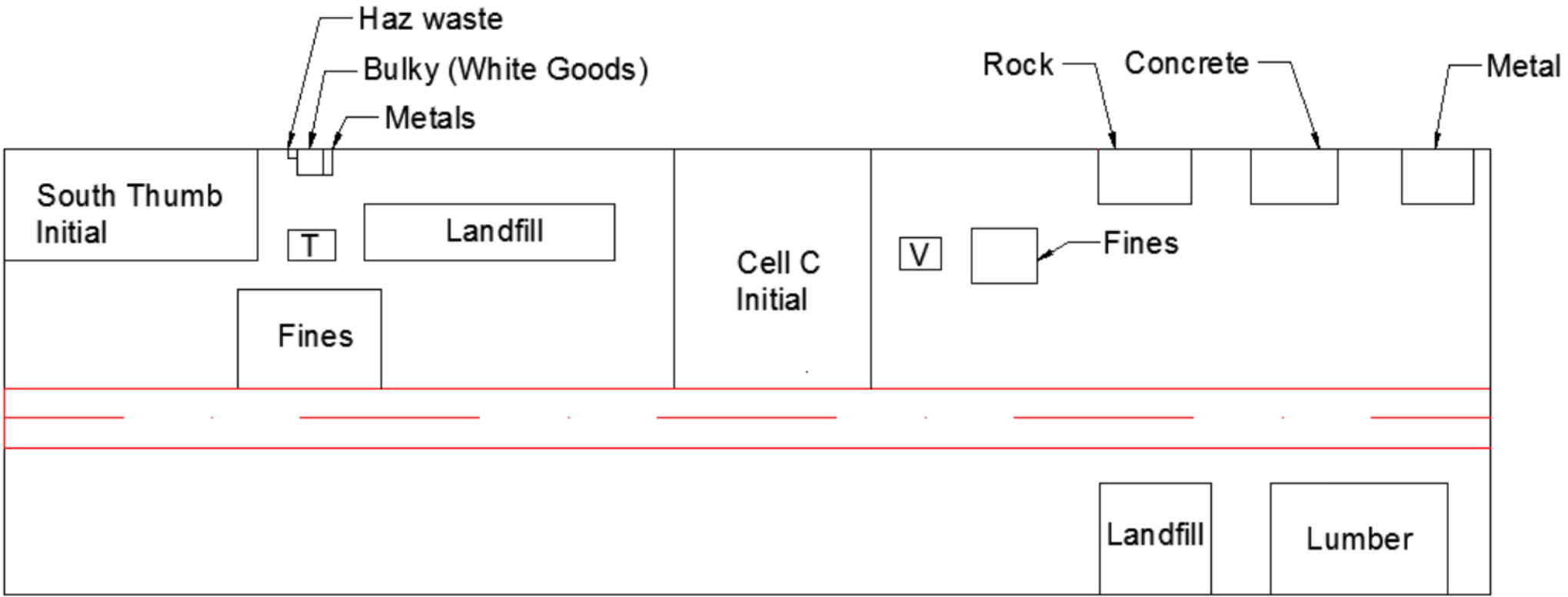
30 acres

Rip-Rap 1	Cover 1	Landscaping 1	Landscaping 3	Landscaping 5	Landscaping 7
Rip-Rap 2	Cover 2	Landscaping 2	Landscaping 4	Landscaping 6	Landscaping 6

Waste Segregation Area

2.2 acres

T = Trommel
V = Vibratory Screener



Rock Segregation Area

30 acres

Rip-Rap 1	Cover 1	Landscaping 1	Landscaping 3	Landscaping 5	Landscaping 7	
Rip-Rap 2	Cover 2	Landscaping 2	Landscaping 4	Landscaping 6	Landscaping 8	

Environmental Controls

Air Quality

Dust Controls

- Water spraying (3 water trucks)
- 3000 gallons of reclaimed water every 25 minutes

Dust Monitoring

- Digital Opacity Compliance System (DOCSII)



Visual Technology, LLC (2015) (2015)



Visual Technology, LLC (2015) (2015)

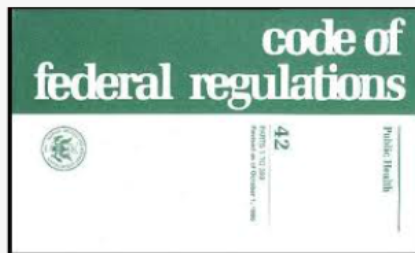
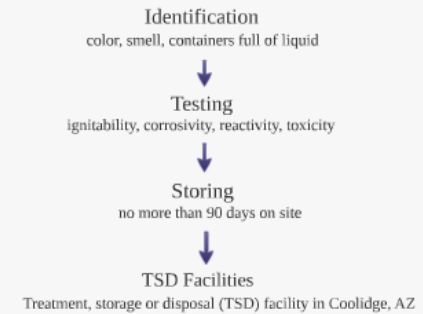
Air Monitoring

- Gases
 - Hydrogen Sulfide
 - Carbon Monoxide
 - Methane
- GEM2000 & MiniRAE3000



Hazardous Waste

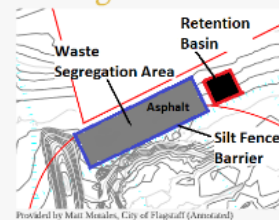
If encountered, must be handled and managed properly



Stormwater Management

Waste Segregation Area

- Asphalt platform
- Silt fence barrier



Provided by Matt Morales, City of Flagstaff (Arizona)

Retention Basin

- Polyethylene lined retention basin

Water Monitoring

- Test against Clean Water Act
- Transport to wastewater treatment plant



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Virtual Technology, LLC (DOCSII 2013)



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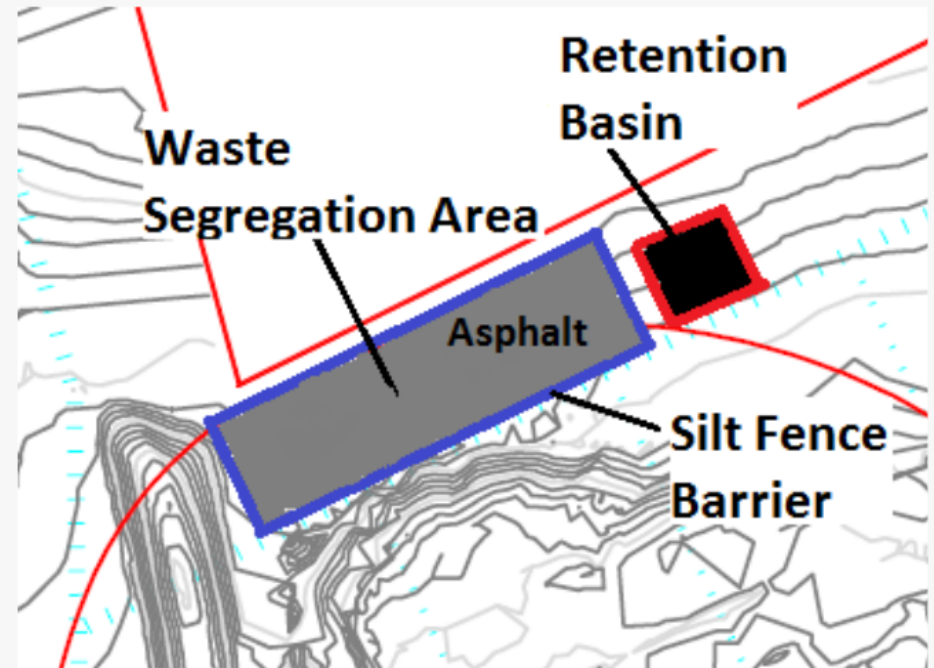
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Hazardous Waste

If encountered, must be handled and managed properly

Identification

color, smell, containers full of liquid



Testing

ignitability, corrosivity, reactivity, toxicity



Storing

no more than 90 days on site



TSD Facilities

Treatment, storage or disposal (TSD) facility in Coolidge, AZ

Cost of Implementation

Cycle Hauling = \$5,580,000

Excavation = \$5,800,000

Waste Segregation Area = \$716,000

Air Quality & Dust Control = \$407,000

Hazardous Waste = \$14,000



Total Cost = \$12,520,000

Impacts

Economic benefits

- Extension of closure date
- Recovery of landfill cover
- Recovery of sellable materials



Environmental

- Minimizing the use of resources

Acknowledgments

Clients - Matt Morales, P.E.

Brian Bluelake, P.E.

Technical Advisors - Dr. Bridget Bero, P.E.

Dr. Thomas Rogers, P.E.

Questions?



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Area 2	100	100	100	100
Area 3	100	100	100	100

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