An Environmental Cold Case Detective Story: Discovery and Repair of the Soil Cover on the Cell 3 Landfill

1

Agenda

- Introducing the Detectives
- Scene of the Crime
  - Location and History of the Closed Sanitary Landfill (CSL)
  - Opening the Casefile for Cell 3 Landfill
- Detective Work
  - Contract setup and modifications
  - Crime Scene Investigations
  - Solving the Case
- Installation Perspective and Issues
- Questions/Comments

2

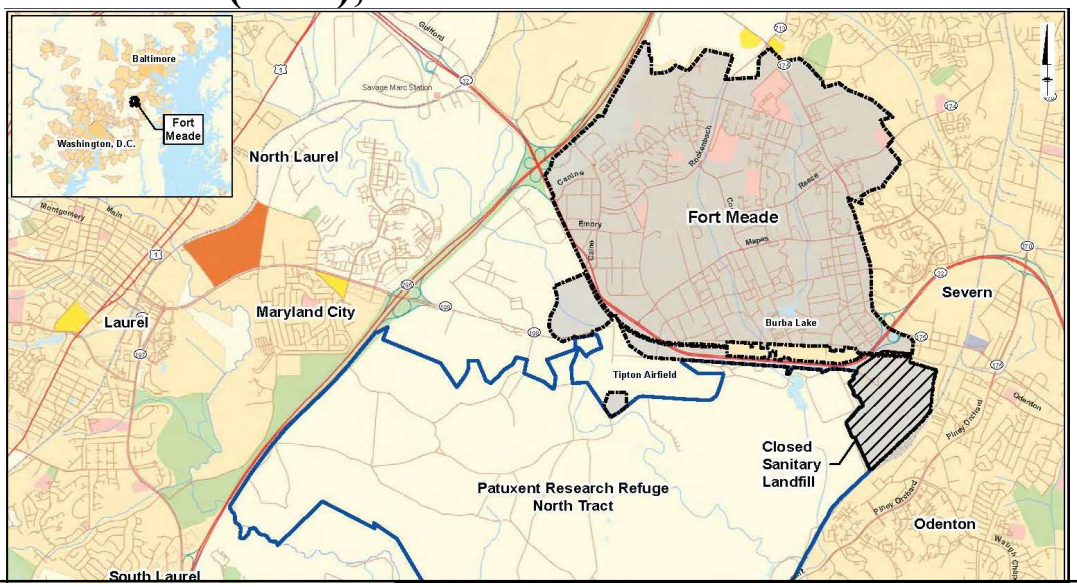
The Investigators

- Emily Cline (USACE) – Scene of the Crime; Opening the Casefile
- Tim Peck (USACE) – Detective Work
- Jerry Kashatus (AECOM) – Investigating the Site and Solving the Case
- Mitch Keiler (FGGM) - Installation Perspective and Issues

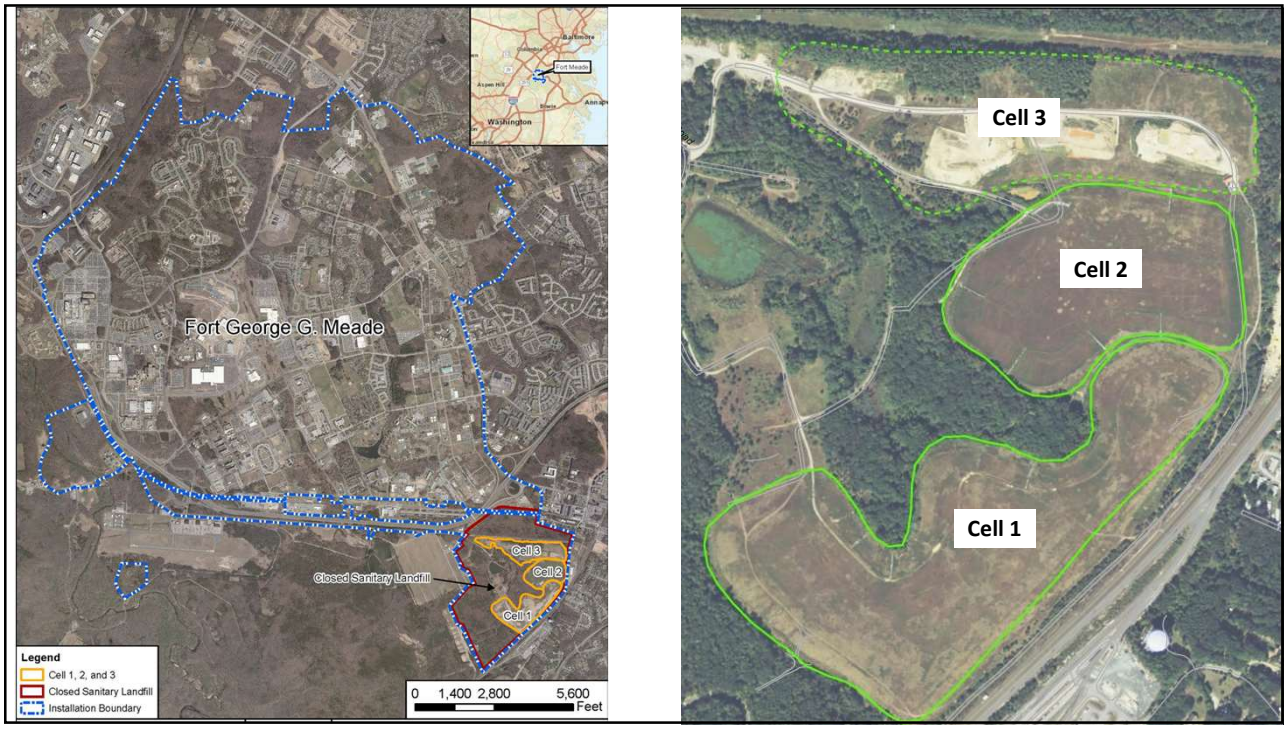
3

4

Ft Meade (FGGM) and the Closed Sanitary Landfill (CSL), which Contains Cell 3



5



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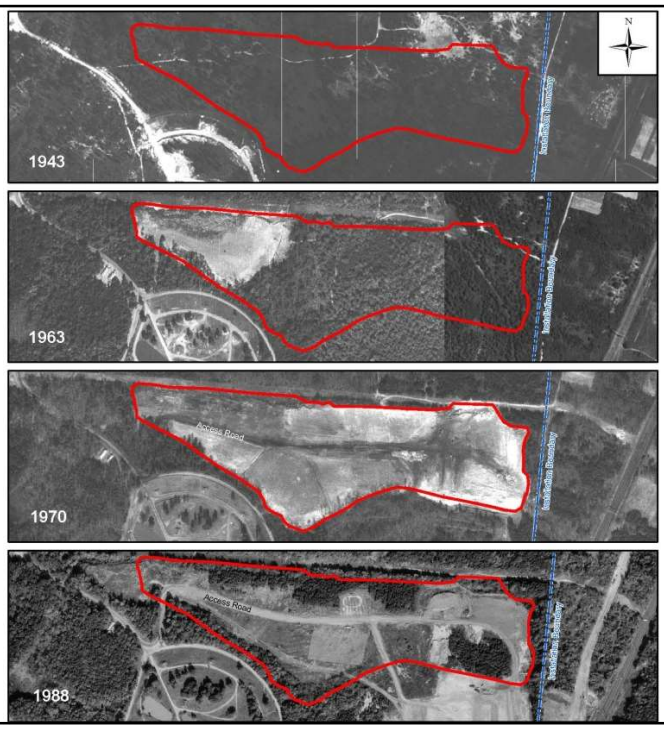


Facts of the Case

- THE CRIME:
  Landfill operations began at the Cell 3 in 1958 and ceased in 1976.
- MODUS OPERANDI:
  trench and fill method.
- CONCEALING THE EVIDENCE:
  Cell 3 was closed in 1976 with 2-feet of soil cover before modern regulations were implemented in 1988.

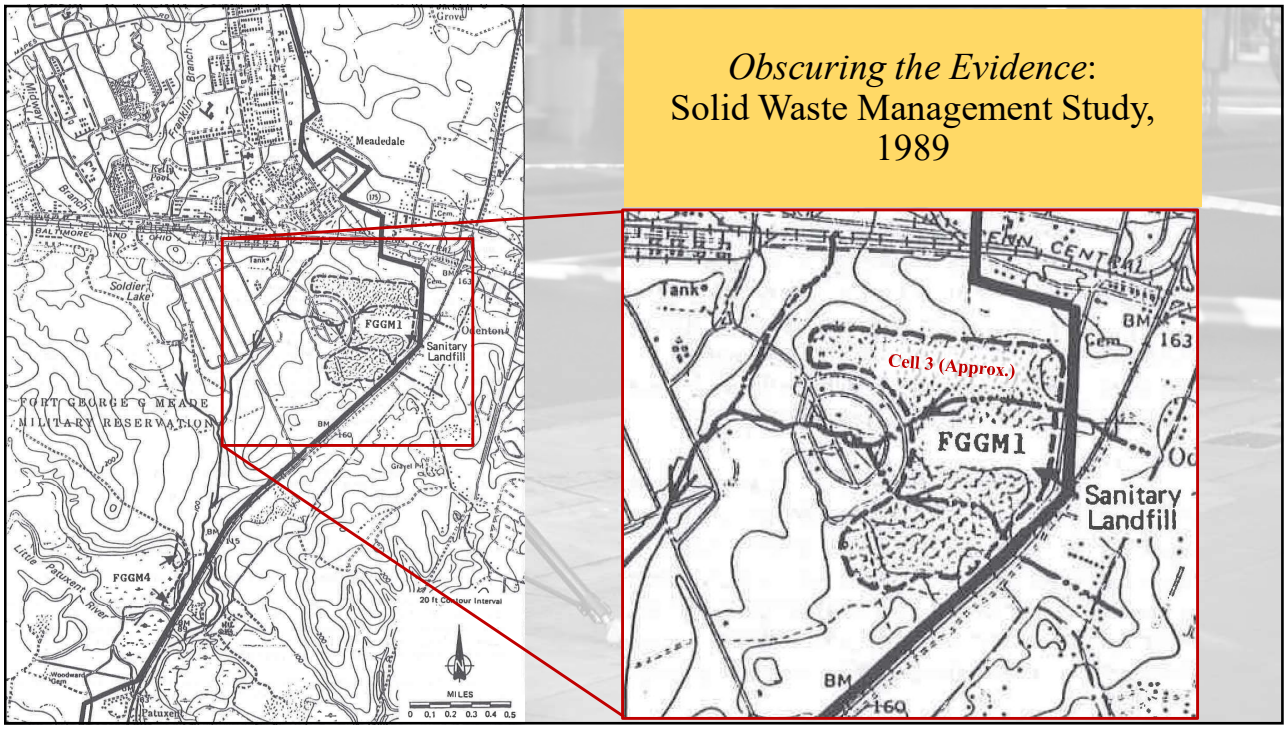
7

7

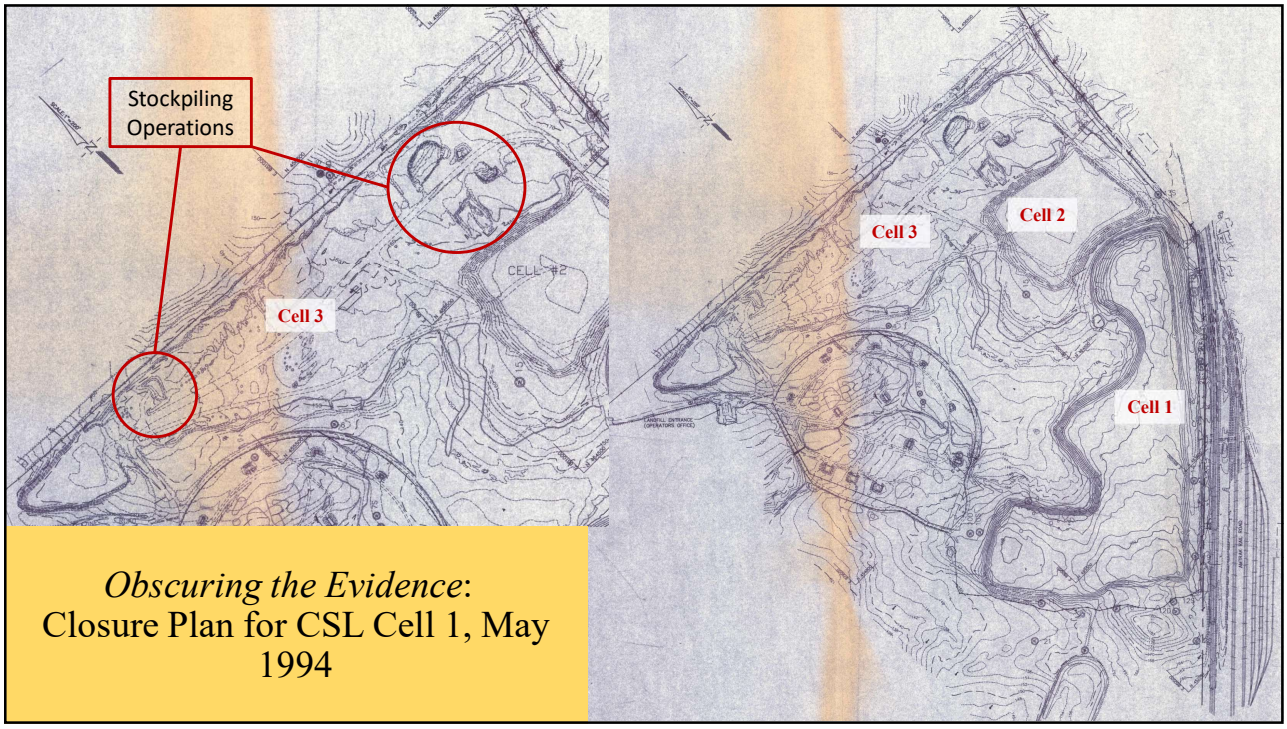
Why Did Cell 3 Become a Cold Case?

- Landfill operations ceased at Cell 3 in 1976, but continued at Cells 1 and 2 until the mid 1990s.
  - Transitioned from trench and fill to area-fill method.
- Paper records and institutional knowledge from personnel turnover was lost over the decades.
- Outdated management practices (i.e., reforestation) and ongoing stockpiling obscured the presence of Cell 3.

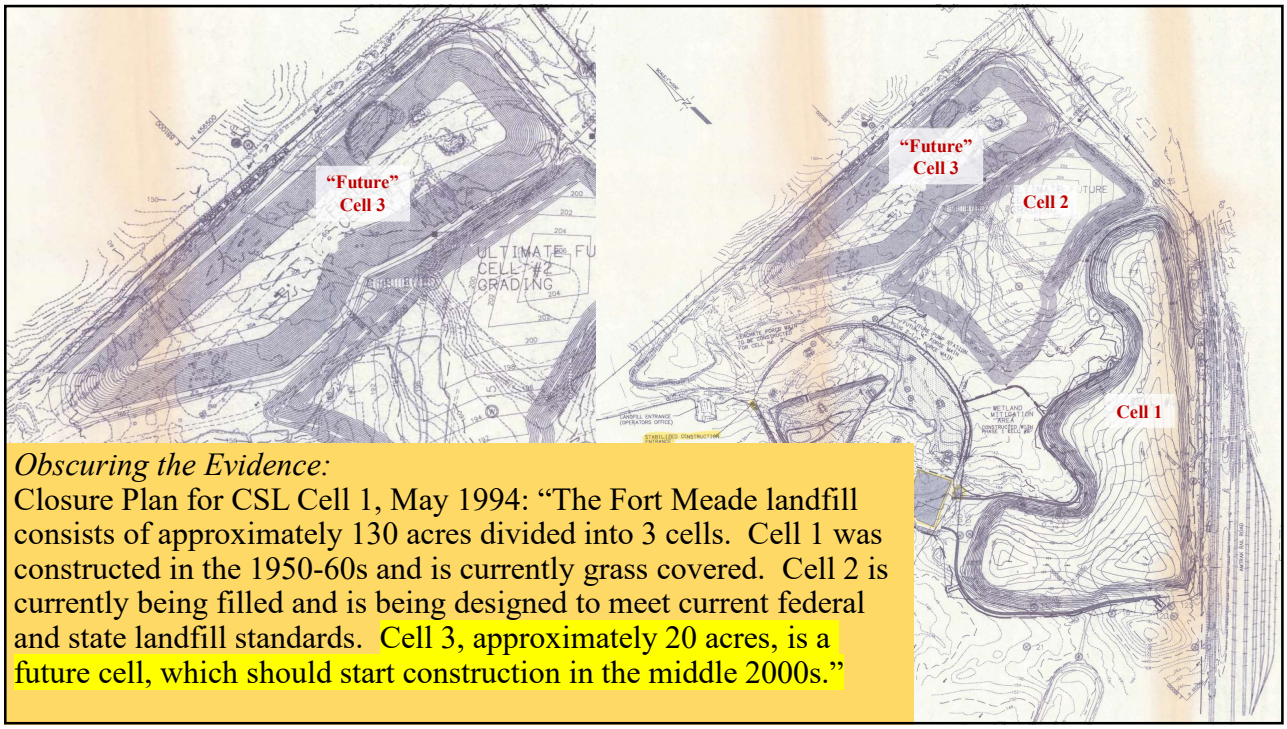
8


Obscuring the Evidence:
Solid Waste Management Study, 1989
Meadedale
FGGM1
Sanitary Landfill
FORT GEORGE G MEADE MILITARY RESERVATION
FGGM4
Cell 3 (Approx.)
Tank
BM
163
160
20 ft Contour Interval
MILES

9


Stockpiling Operations
Cell 3
Cell 2
Cell 1
Obscuring the Evidence:
Closure Plan for CSL Cell 1, May 1994

10



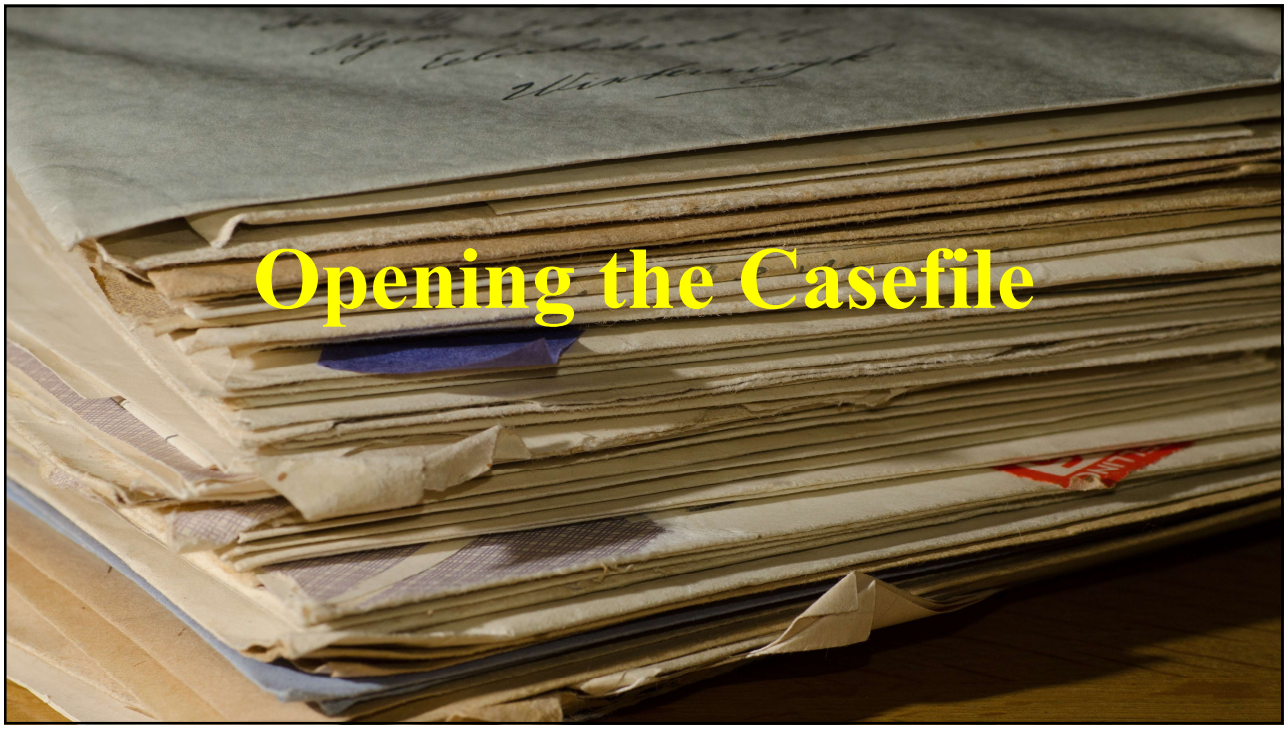
Obscuring the Evidence:
Closure Plan for CSL Cell 1, May 1994: "The Fort Meade landfill consists of approximately 130 acres divided into 3 cells. Cell 1 was constructed in the 1950-60s and is currently grass covered. Cell 2 is currently being filled and is being designed to meet current federal and state landfill standards. Cell 3, approximately 20 acres, is a future cell, which should start construction in the middle 2000s."

11

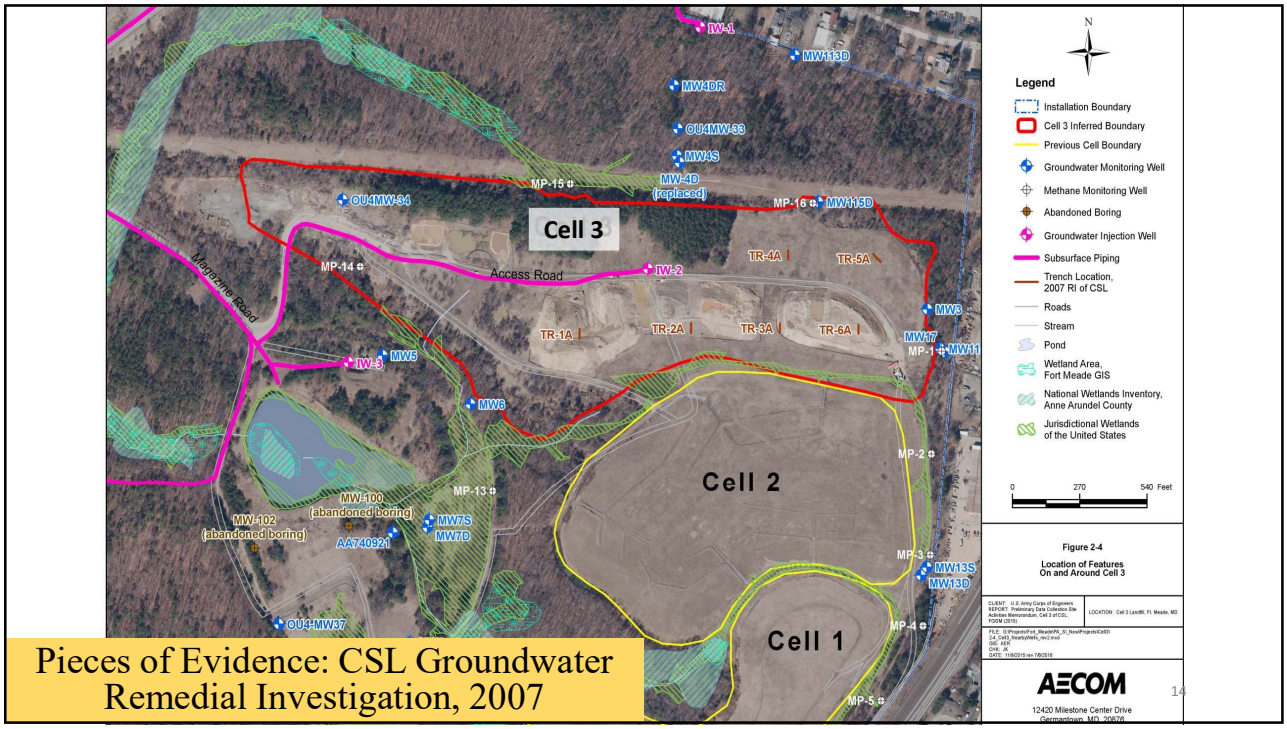
Shelving the Case

- Although the Cell 3 was slated as a future, structured landfill location in the 1994 plan, all landfilling operations at the CSL ceased in 1996.
- Between 1995 and 1998 both Cells 1 and 2 were capped and closed.
- Much of the institutional knowledge about Cell 3 was lost from the early 1990s to the mid 2000s. Other environmental investigations in the area were performed, but did not key in on Cell 3.

12


Opening the Casefile

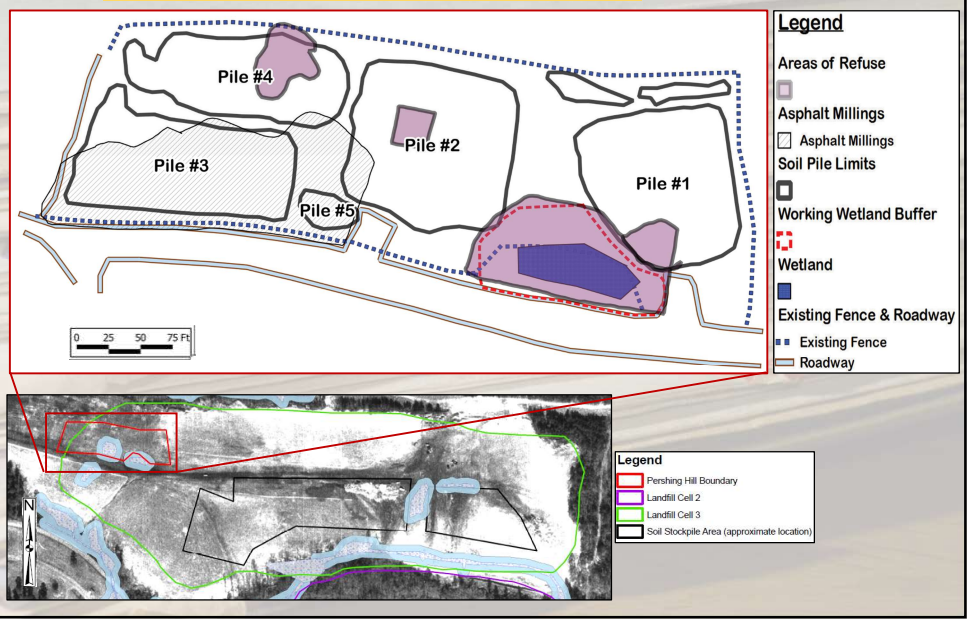
13


IW-1
MW13D
MW4DR
OU4MW-33
MW4S
MW-4D (replaced)
MP-15
MP-16
MW15D
OU4MW-34
Cell 3
MP-14
Access Road
IW-2
TR-4A
TR-5A
Mcgraine Road
MW3
TR-1A
TR-2A
TR-3A
TR-6A
MW17
MP-1
MW11
IW-3
MW5
MW6
MP-2
Cell 2
MW-100 (abandoned boring)
MP-13
MW-102 (abandoned boring)
MW7S
MW7D
AA740921
MP-3
MW13S
MW13D
OU4-MW37
Cell 1
MP-4
MP-5
N
Legend
Installation Boundary
Cell 3 Inferred Boundary
Previous Cell Boundary
Groundwater Monitoring Well
Methane Monitoring Well
Abandoned Boring
Groundwater Injection Well
Subsurface Piping
Trench Location, 2007 RI of CSL
Roads
Stream
Pond
Wetland Area, Fort Meade GIS
National Wetlands Inventory, Anne Arundel County
Jurisdictional Wetlands of the United States
0
270
540 Feet
Figure 2-4
Location of Features On and Around Cell 3
AECOM
12420 Milestone Center Drive
Germantown, MD 20876
14
Pieces of Evidence: CSL Groundwater Remedial Investigation, 2007

14

Rediscovering the Crime Scene: June 2013 – "remains discovered"

- Stockpiled waste soils were removed, creating a depression.
- The underlying 2-ft soil cover was also removed, revealing buried waste.
- Catalyst for inclusion of Cell 3 in the Installation Restoration Program (IRP).



15

Crime Scene Photos; June 2013

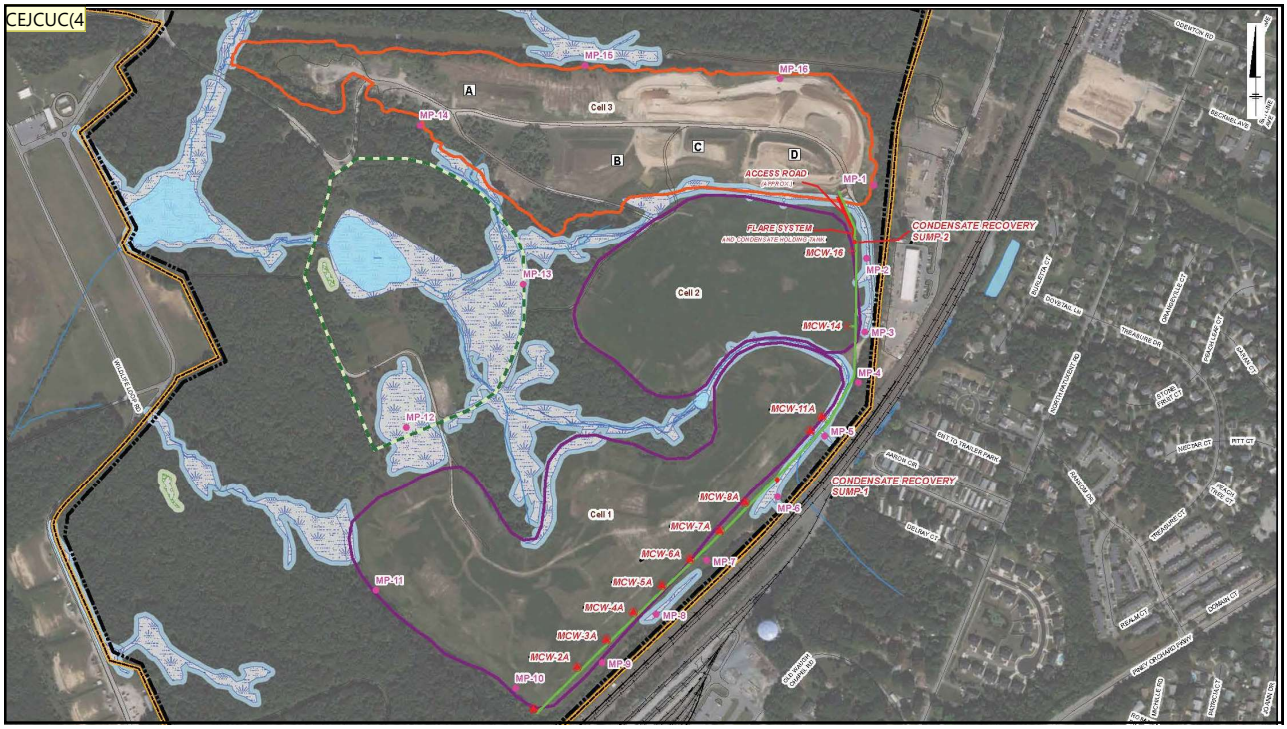
16

Typical Monitoring Well

Typical Methane Monitoring Point

- 1994 - Detection Monitoring Program initiated.
- 2007 – Remedial Investigation of Cells 1 and 2.

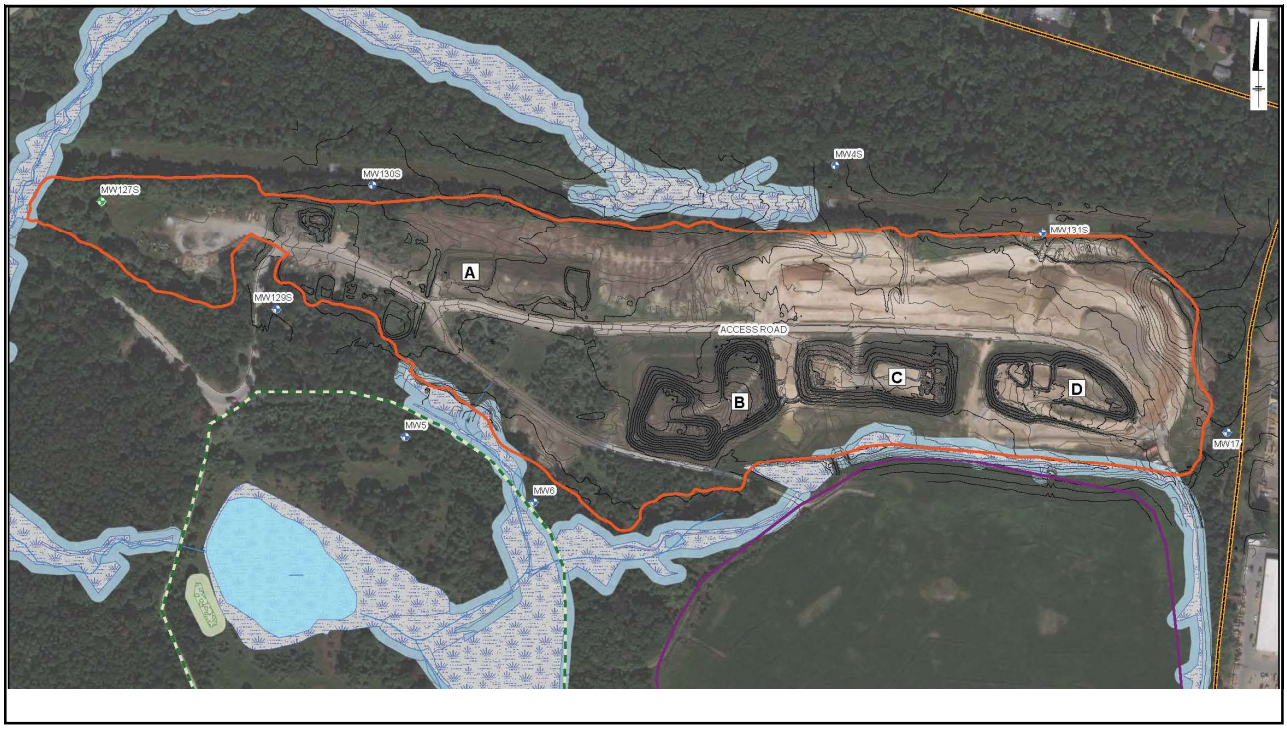
17



18

Slide 18

CEJCUC(4 Does the methane study tie into the remedy for Cell 3? If not, it may just end up confusing the message.
Cline, Emily J CIV USARMY CENAB (USA), 1/8/2021



19

Audience Question

Have you ever come across a site that was buried/forgotten?

You can choose multiple answers:

- Buried drums
- Buried waste
- Buried ash
- Other (you can type your response in the comment area)
- No, I have not

20

Detective Work

21

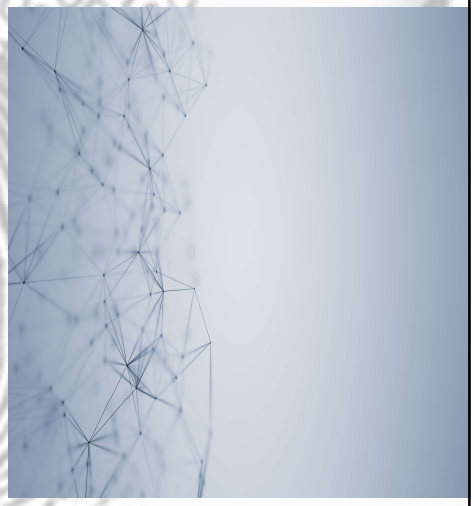
Detective Strategy

- IRP Program
  - Cell 3 site was identified for CERCLA action in the Army Installation Restoration Program (IRP): 2013
- Setting up a Performance Based Contract: 2015
- Gathering the Evidence: beginning 2016
  - Site recon and Remedial Investigation

22

Performance Base Acquisition (PBA): Theory

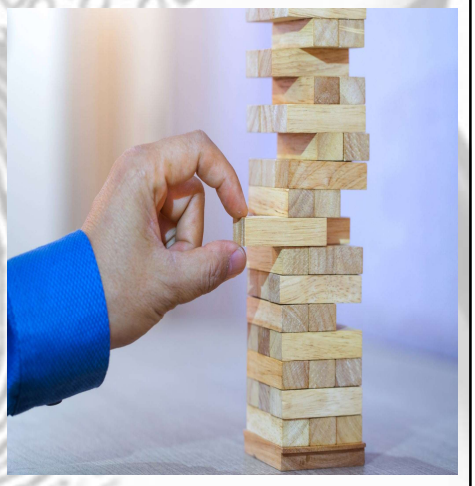
- Contracting approach structured around the **END RESULTS** versus ***scoping*** the ***Activities:*** *performance objectives*
- Flexibility and encouraged to innovate approach to lower cost
- Fixed price contract > > project ***risk*** shifted to contractor
- Project setting is defined but with ***risks***: How well defined?
- ***Risk*** to ALL parties.



23

PBA

- **Lower the *risk* – greater chance for success!**
  - Reduced project cost
  - Reduce the unknowns and contingencies
  - Still there are many external factors impacting the project
    - Regulatory reviews and approvals
    - Changing site conditions and new situations
    - Weather, site security access, etc.



24

PBA

- Best value procurement: effective, complete strategy and cost effective
- Performance objectives:
  - Repair soil cover in compliance with state and federal regulations
  - Achieve final RI/FS of landfill site (38 acres)
- Reduce the ***risk*** – set clear expectations:
  - Provide available site data reports
  - *Anticipation that soil cover is the final remedy given age of landfill*. Grandfathering of pre-1988 landfill regulations.
  - Available large soil stockpiles on the site to use for cover – vs. transporting clean fill to site.

25





The contractor needed to consider soil quality, but with an opportunity to reduce cost.

26

Strategy for Project Success
A Shared Responsibility

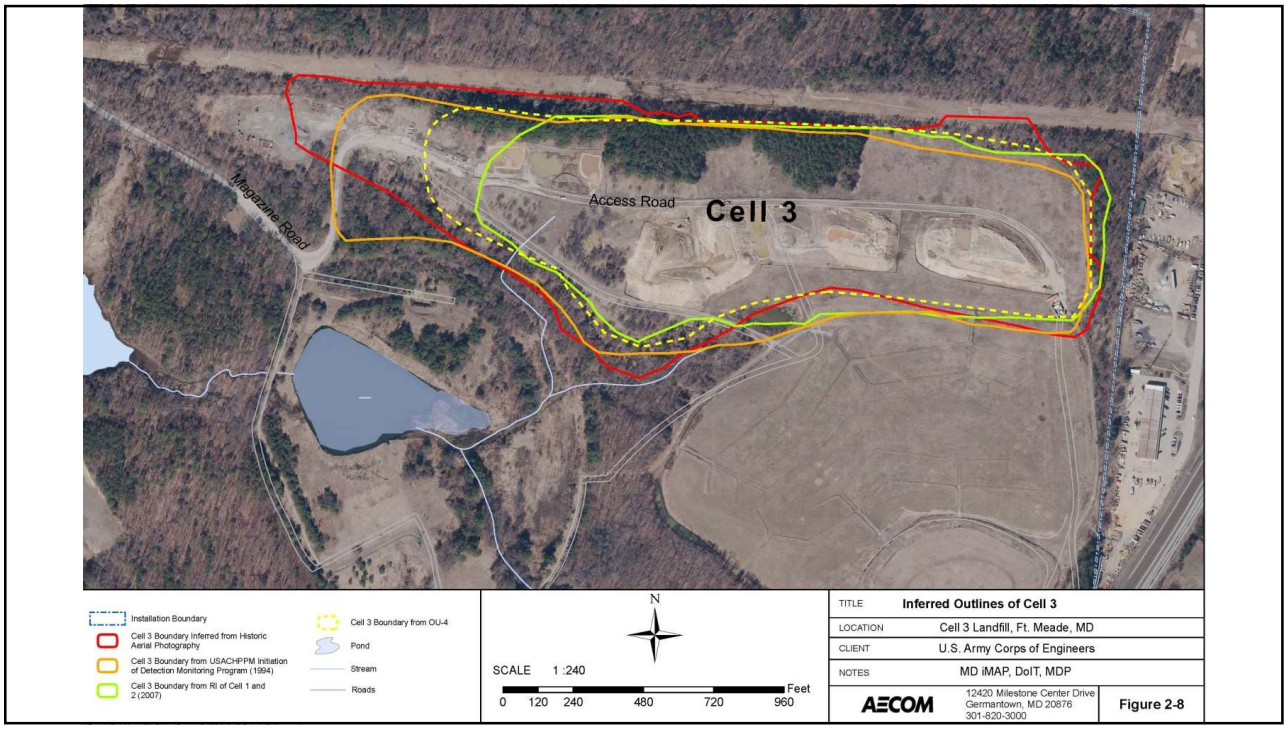
- **Effective Contractor- Government relationship**
  - Ensure fairness: all bidders have same site information
  - Avoid insufficient proposals in level of effort and lack of understanding
    - The lowest cost may be insufficient in effort
  - Outline expectations, while not being overly prescriptive
  - With reduced ***risk***, lower proposed prices are expected.

27

Continuing to Gather the Evidence

Cell 3 was determined to have been used as a landfill in the past, but what is the boundary of Cell 3?

28

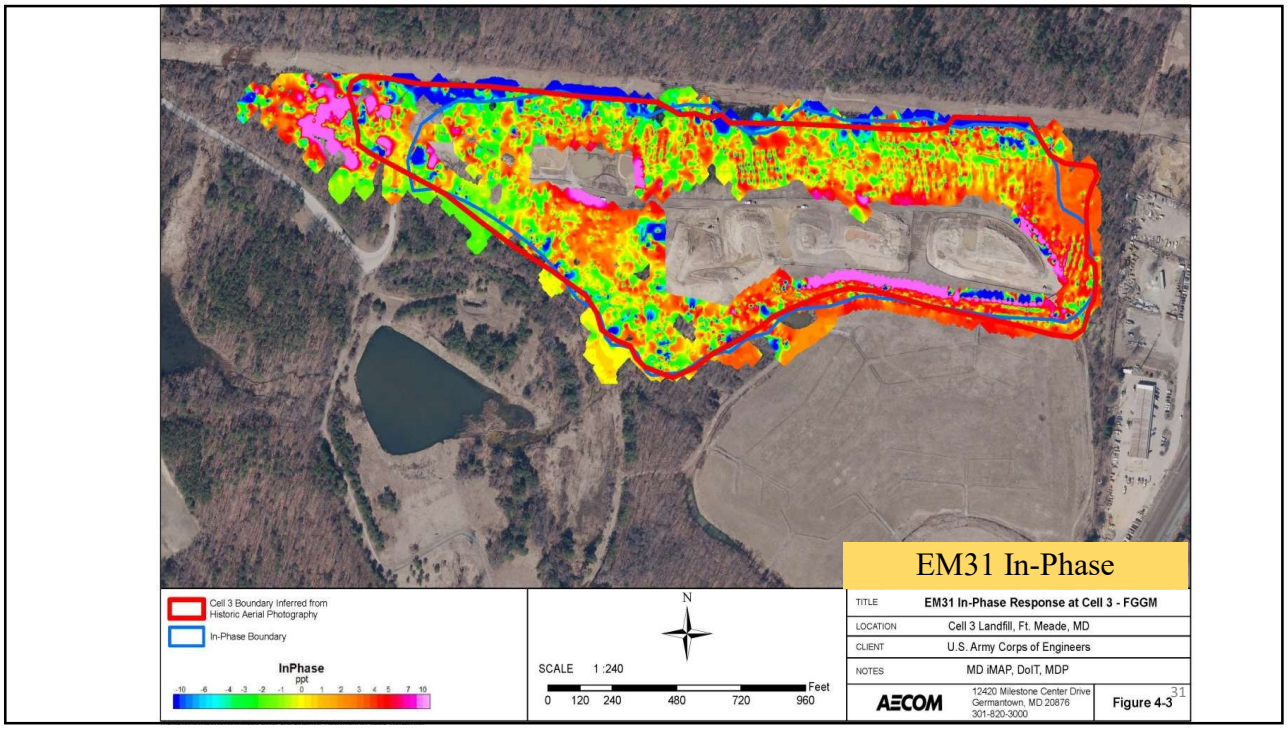


29

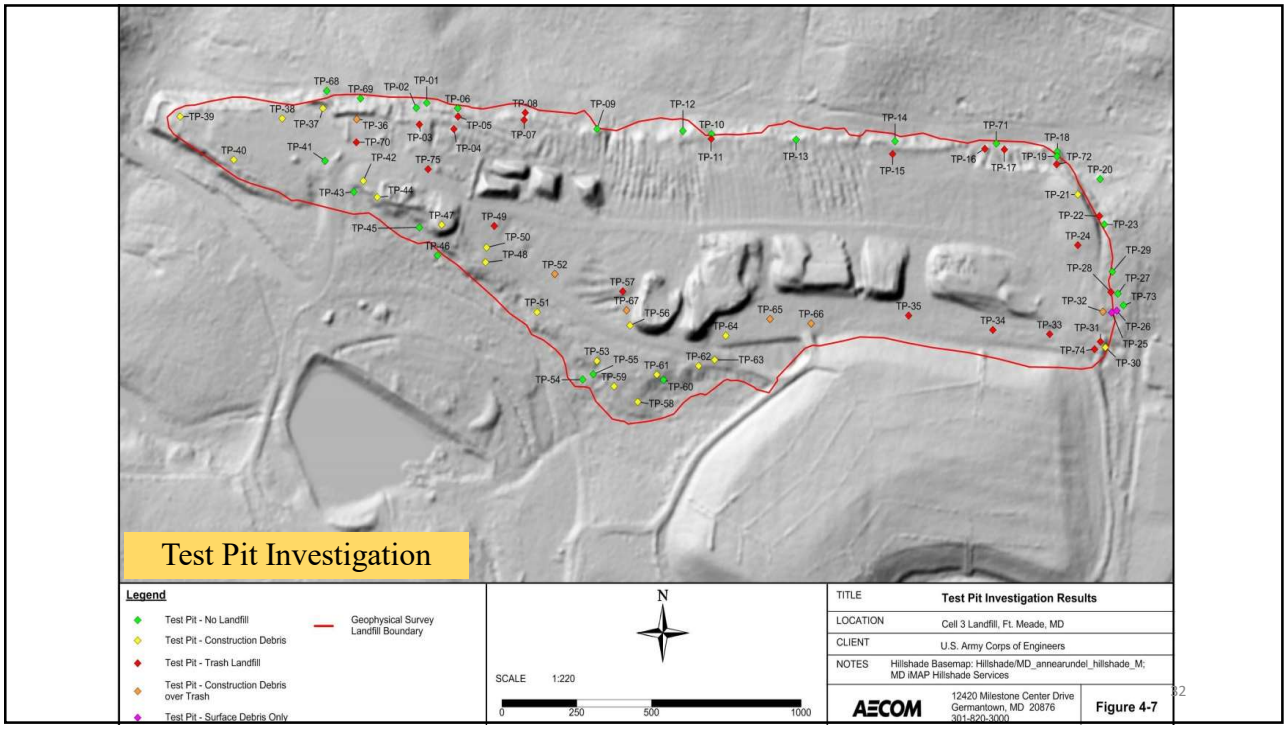
Gathering the Evidence

- Preliminary Data Collection
  - Geophysical survey and test pits to determine:
    - the boundaries of Cell 3
    - depth of existing soil cover
    - composition of the landfill material (household waste or construction debris)

30


EM31 In-Phase
Cell 3 Boundary Inferred from Historic Aerial Photography
In-Phase Boundary
InPhase
ppt
-10 -6 -4 -3 -2 -1 0 1 2 3 4 5 7 10
N
SCALE 1 :240
0 120 240 480 720 960 Feet
TITLE EM31 In-Phase Response at Cell 3 - FGGM
LOCATION Cell 3 Landfill, Ft. Meade, MD
CLIENT U.S. Army Corps of Engineers
NOTES MD iMAP, DoIT, MDP
AECOM
12420 Milestone Center Drive
Germantown, MD 20876
301-820-3000
Figure 4-3
31

31


Test Pit Investigation
TP-68 TP-69 TP-02 TP-01 TP-06 TP-08 TP-09 TP-12 TP-10 TP-14 TP-71 TP-18
TP-39 TP-38 TP-37 TP-36 TP-05 TP-07 TP-11 TP-13 TP-15 TP-16 TP-17 TP-19 TP-72 TP-20
TP-40 TP-41 TP-70 TP-03 TP-04 TP-42 TP-75 TP-21
TP-43 TP-44 TP-22 TP-23
TP-45 TP-47 TP-49 TP-24 TP-29
TP-46 TP-50 TP-48 TP-28 TP-27
TP-52 TP-73
TP-57 TP-67 TP-56 TP-65 TP-66 TP-35 TP-32
TP-51 TP-64 TP-34 TP-33 TP-31 TP-26
TP-53 TP-55 TP-61 TP-62 TP-63 TP-74 TP-25
TP-54 TP-59 TP-60 TP-30
TP-58
Legend
Test Pit - No Landfill
Test Pit - Construction Debris
Test Pit - Trash Landfill
Test Pit - Construction Debris over Trash
Test Pit - Surface Debris Only
Geophysical Survey Landfill Boundary
N
SCALE 1:220
0 250 500 1000
TITLE Test Pit Investigation Results
LOCATION Cell 3 Landfill, Ft. Meade, MD
CLIENT U.S. Army Corps of Engineers
NOTES Hillshade Basemap: Hillshade/MD_annearundel_hillshade_M; MD iMAP Hillshade Services
AECOM
12420 Milestone Center Drive
Germantown, MD 20876
301-820-3000
Figure 4-7
32

32

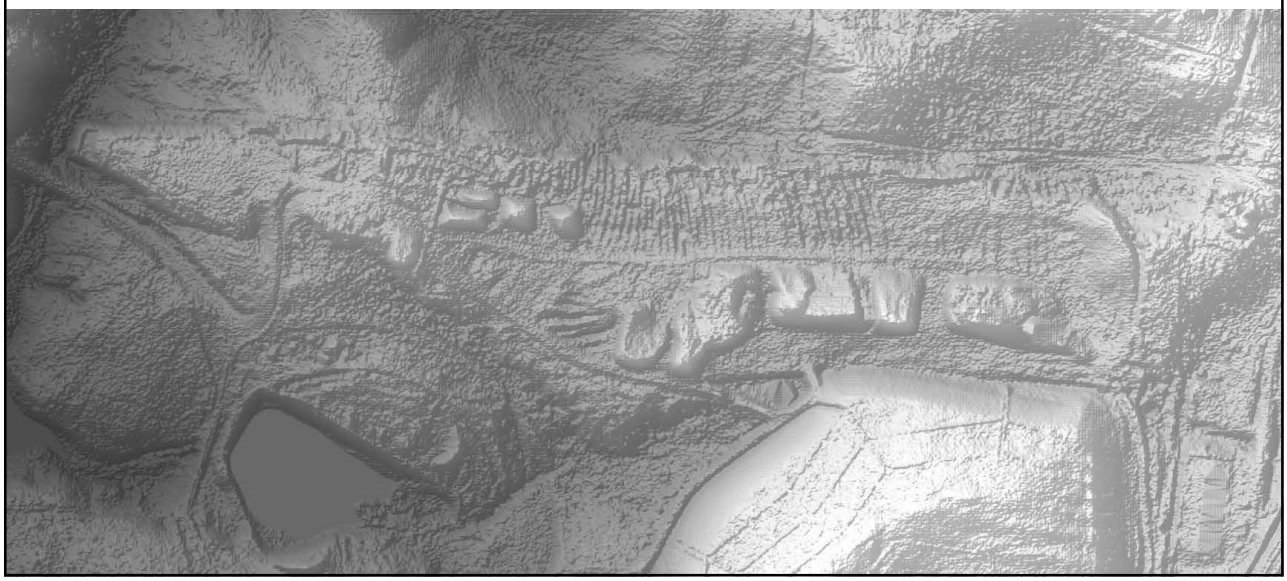
Wooded Area	• Area of trees north of road.

33

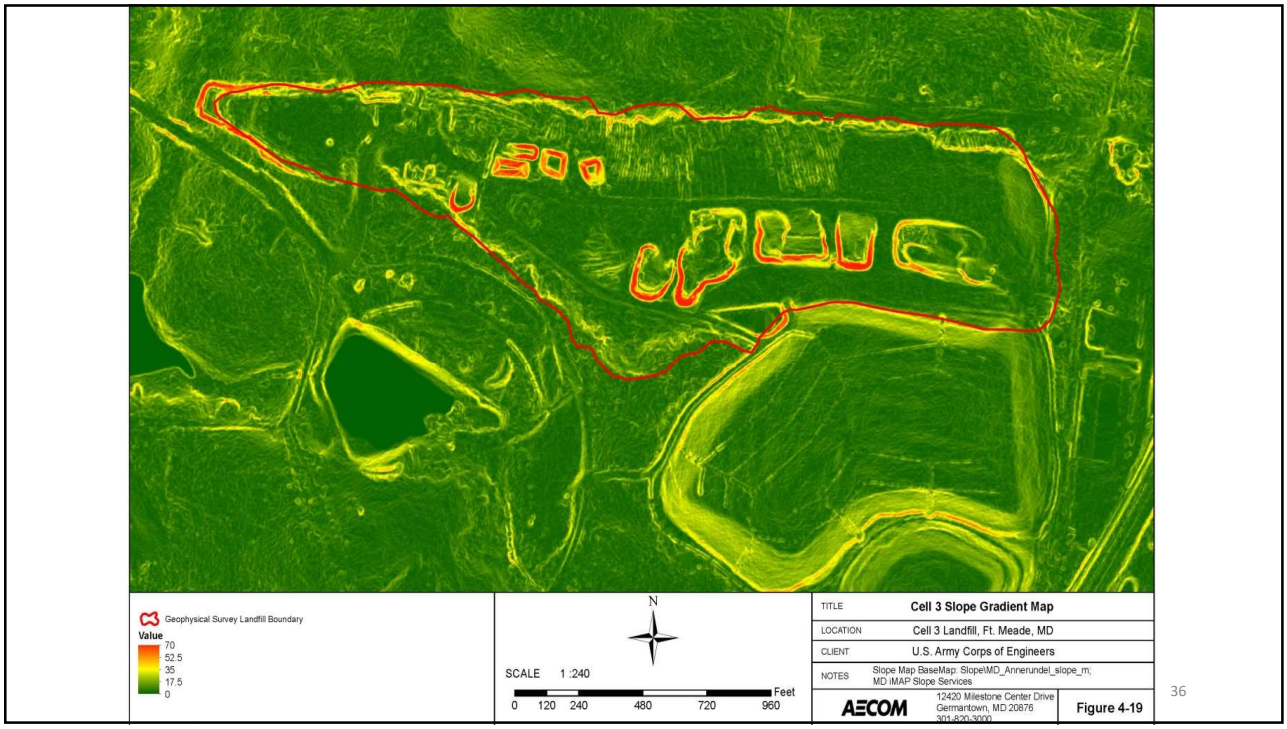
Hummocky landscape in wooded area.

34

Lidar Image Shows Remnants of Trench and Fill Landfill

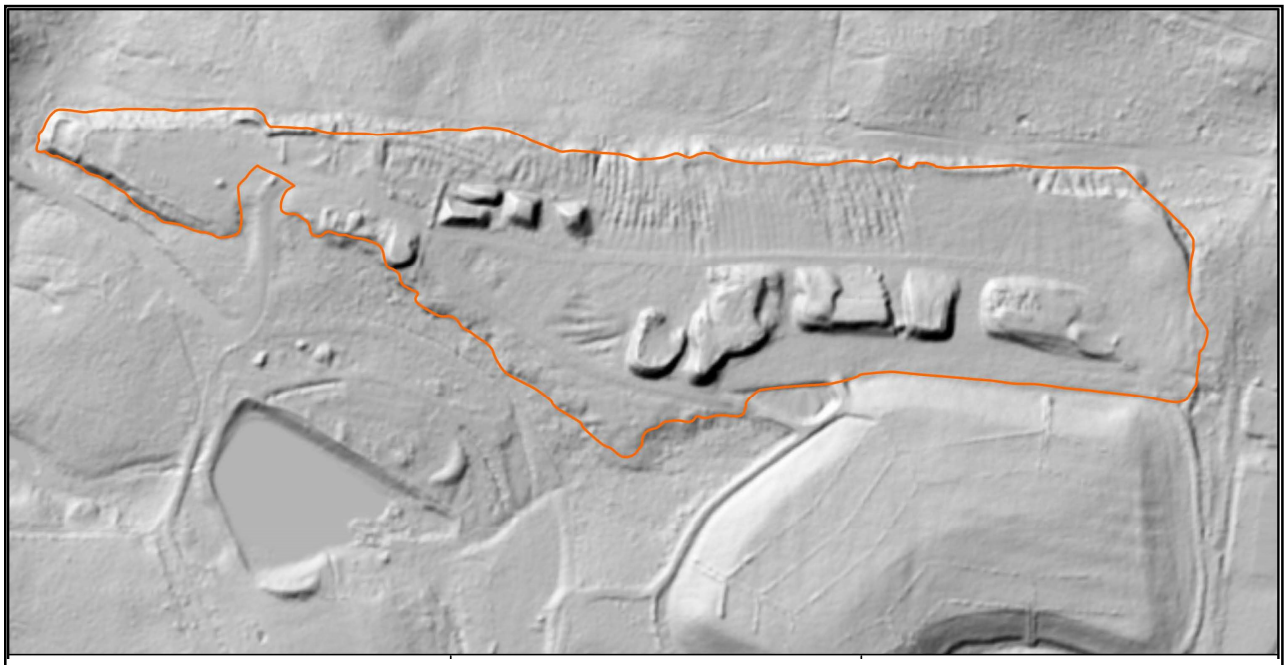


35



36

36



Final Boundary of Cell 3

37

Cell 3 RI/FS

Remedial Investigation/Feasibility Study (RI/FS)

March 2016 to September 2017	Work Plan preparation, review, and approval; field work; and preparation of RI/FS report.
12/13/18 to 10/16/20	Submittal of the Draft Cell 3 RI/FS to EPA and MDE to EPA approval of the Final Cell 3 RI/FS.

38

There were piles of construction debris in the western portion of Cell 3

and soil stockpiles in the eastern portion of Cell 3

39

Building the Case: Contract Modification

- Stockpiles were going to stay on the eastern 31 acres.
- Contract modification to complete the two-foot soil cover repair on the western 6.2 acres of Cell 3: July 2019
  - Modification considered the total cost for work in the 6.2 acres vs. the original cost of 38 acres.
  - Addition of many site change conditions realized from site recon.

40

PTJCUC(1

Changed Site Conditions

- Full Cell 3 delineation included various debris and rubble piles.
  - RI/FS longer path for approval: Non-time critical removal action (NTCRA)
  - EPA Action Memo and Engineering Evaluation/Cost Analysis (EE/CA) for landfill cover action
  - Assess usability of rubble for use in base of cover fill
  - State approval: *Innovative Reuse and Beneficial use of Dredged Material,* August 2017.
  - Debris removal: concrete with rebar and asphalt that fail state standard
- Reduce the ***risk*** and cost:
  - Set up unit costs for debris disposal to use as actually realized.
  - Reuse the rubble in the cover.

41

Audience Question

In your opinion, what type of contract would work best in this situation?

- Cost reimbursable contract
- Time and materials contract
- Other (you can type your response in the comment area)

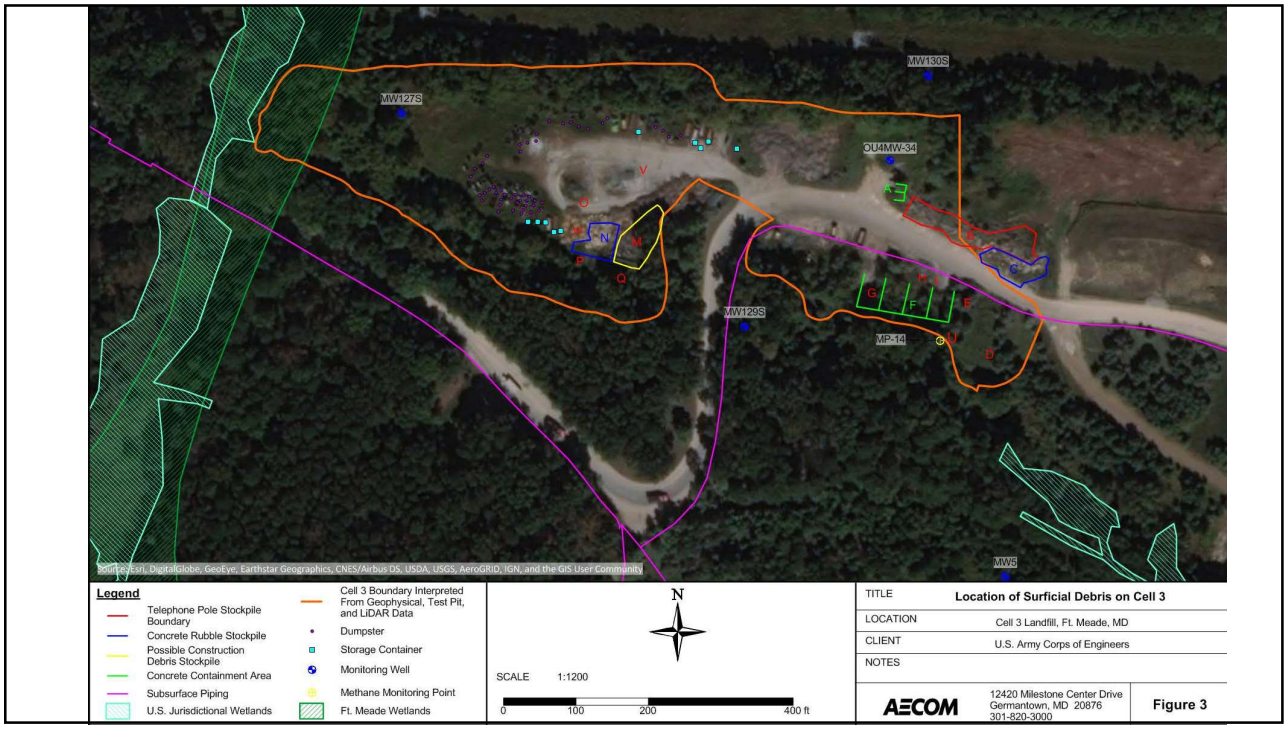
42

Slide 41

PTJCUC(1 Peck, Timothy J CIV USARMY CENAB (USA), 2/23/2021


Cell 3 western 6.2 acres outlined in green
0 115 230 460 690 920
Feet

43


MW130S
MW127S
OU4MW-34
MW129S
MP-14
MW5
V
O
N
M
P
Q
A
B
C
D
E
F
G
U
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Legend
Telephone Pole Stockpile Boundary
Concrete Rubble Stockpile
Possible Construction Debris Stockpile
Concrete Containment Area
Subsurface Piping
U.S. Jurisdictional Wetlands
Cell 3 Boundary Interpreted From Geophysical, Test Pit, and LiDAR Data
Dumpster
Storage Container
Monitoring Well
Methane Monitoring Point
Ft. Meade Wetlands
N
SCALE 1:1200
0 100 200 400 ft
TITLE Location of Surficial Debris on Cell 3
LOCATION Cell 3 Landfill, Ft. Meade, MD
CLIENT U.S. Army Corps of Engineers
NOTES
AECOM
12420 Milestone Center Drive
Germantown, MD 20876
301-820-3000
Figure 3

44

45

46

47

48

Presenting our Case to the Jury

Variance Request

- 2/20/19 FGGM submitted a Variance Request to MDE and EPA.
  - This request was to reuse surficial debris consisting of asphalt, concrete rubble and soil on Cell 3 as foundation material for the two-foot soil cover repair.
- 2/27/19 MDE approved The Cell 3 Variance Request
  - The concrete had to be crushed to less than 6 inches diameter
  - The debris can be used in areas where at least 3 feet of soil will cover the debris.

49

Design for Repair of Soil Cover and Field Prep

Design for the Repair of the 2-foot Soil Cover and the Erosion and Sediment Control Plan (ESCP)

- 10/11/19 EPA approved the Cell 3 design for the 2-ft. soil cover repair.
- 11/22/19 MDE Sediment and Stormwater Plan Review Division approved the Erosion and Sediment Control Plan for the Cell 3 2-ft. Soil Cover Repair.
- 12/20/19 MDE Solid Waste concurred on the 100% Design for the Cell 3 2-ft. Soil Cover Repair.

Concurrent Field Preparation Work

- 9/23/19 Non-invasive site preparation work began. A description of this non-invasive work is on a future slide.
- 10/9/19 FGGM approved the excavation permit for the Cell 3 soil cover field work.
- 12/9/19 Pre-Construction meeting with MDE Sediment and Stormwater Plan Review Division representative.

50

1,500 yds3 of crushed concrete was used as base material.

51

Surveying for the limit of disturbance, silt fence, and filter logs.

52

Tree clearing but not stump removal.

53

Erosion Control Measures Installed

- **1,450'** of Silt Fence
- **1,950'** of Filter Log
- **1** Sediment Trap with rock outfall and **175'** of Perimeter Swale
- **4** Temporary Stone Outlet Structures
- **2,312** ft^2 of Sediment Basin
- **170'** of Permanent Letdown
- **1,360** ft^2 of Rip-Rap Letdowns
- **2** Construction Entrances with Mountable Berms

54

Installing 1,950’
of Filter Log

55

Gabion Outlet Structures
and 170’ of Permanent Letdown

56

Western Construction Entrance and Mountable Berm

57

Eastern Construction Entrance and Mountable Berm

58

Protecting trees and installed super silt fence

59

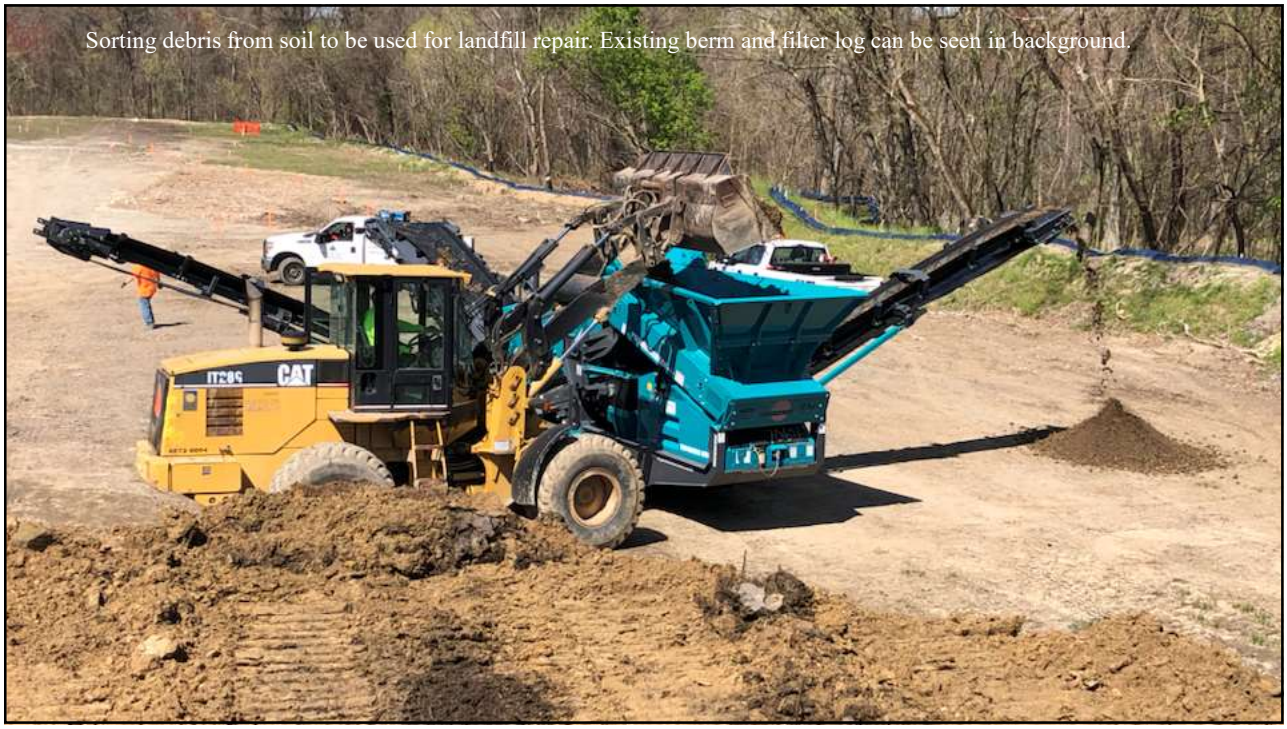
Sediment Trap # 1 After Construction and After Grass Growth

Letdown # 1 is the grey gravel on the left side of this picture.

60

Placement of Soil on the Western 6.2 Acres of Cell 3 Repair of the 2-foot Soil Cover

61



Sorting debris from soil to be used for landfill repair. Existing berm and filter log can be seen in background.

62

Modified 1,535’ of existing berm and constructed 235’ of new berm along the edges of the cover.

Moving soil and building up the existing berm

63

Obtaining a 4% slope.

27,214 yds3of soil was used for landfill repair/upgrade

64



Progress on cover repair

Installed 26,550 ft^2 of erosion control matting to keep the soil in place until the grass could be established.

65

66

67

Before pictures of asphalt and concrete debris piles and picture after debris removed. 1,500 yds3 of crushed concrete and asphalt was used as base material.

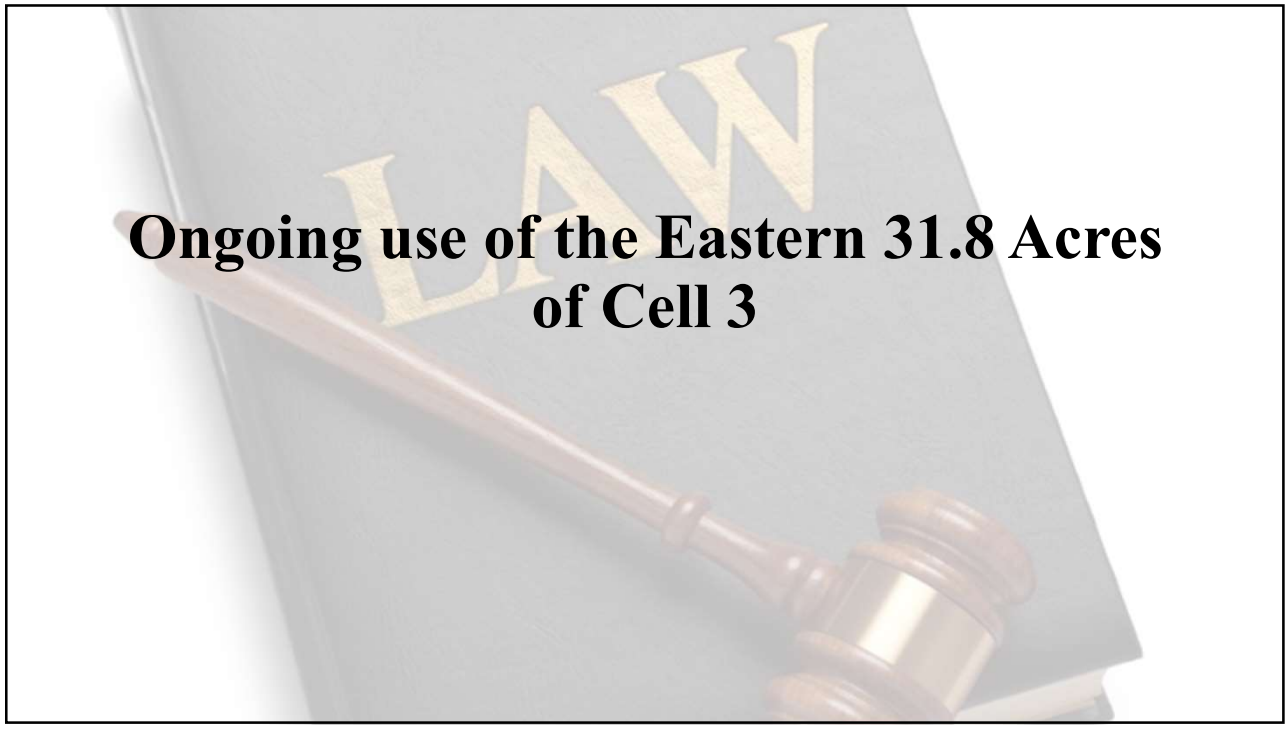
68

Landfill Repairs/Upgrades

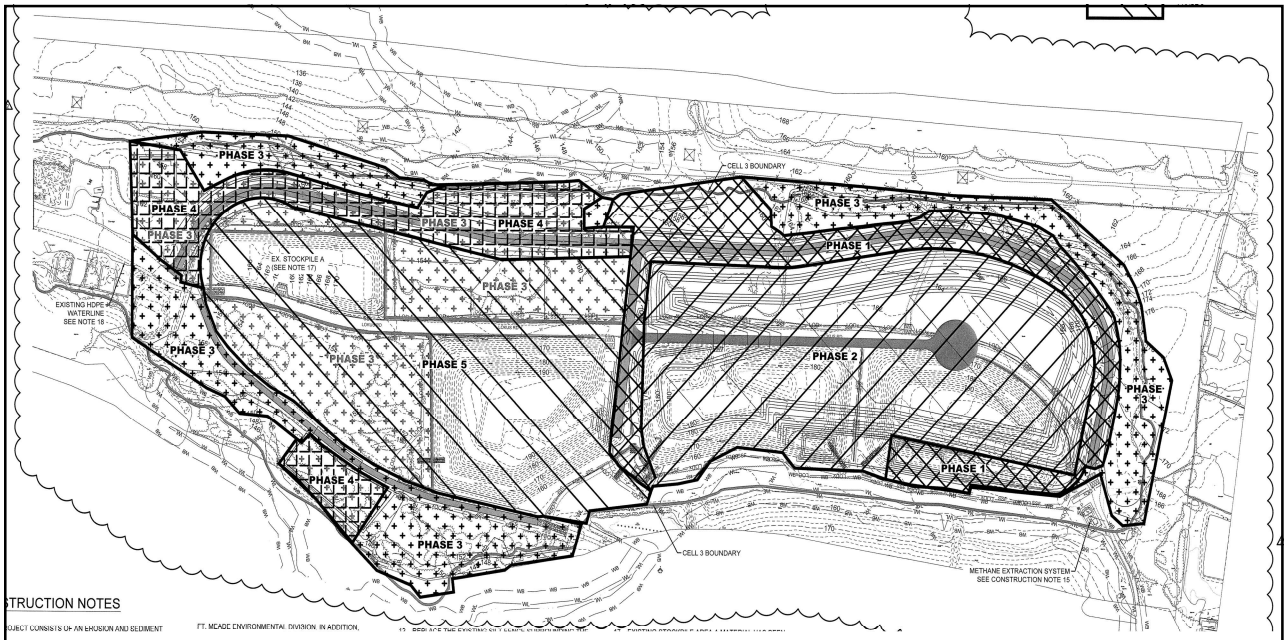
- **1,500** yds^3 crushed concrete used as base material
- **27,214** yds^3 of soil used for landfill repair/upgrade
- **27,491** ft^2 required grass stabilization
- Modified **1,535'** of existing berm
- Installed **235'** of new berm
- **26,550** Square Feet Erosion Control Matting
- Installed **450'** of temporary roadway
- Upgraded **602'** of permanent roadway.

69

Ongoing use of the Eastern 31.8 Acres of Cell 3

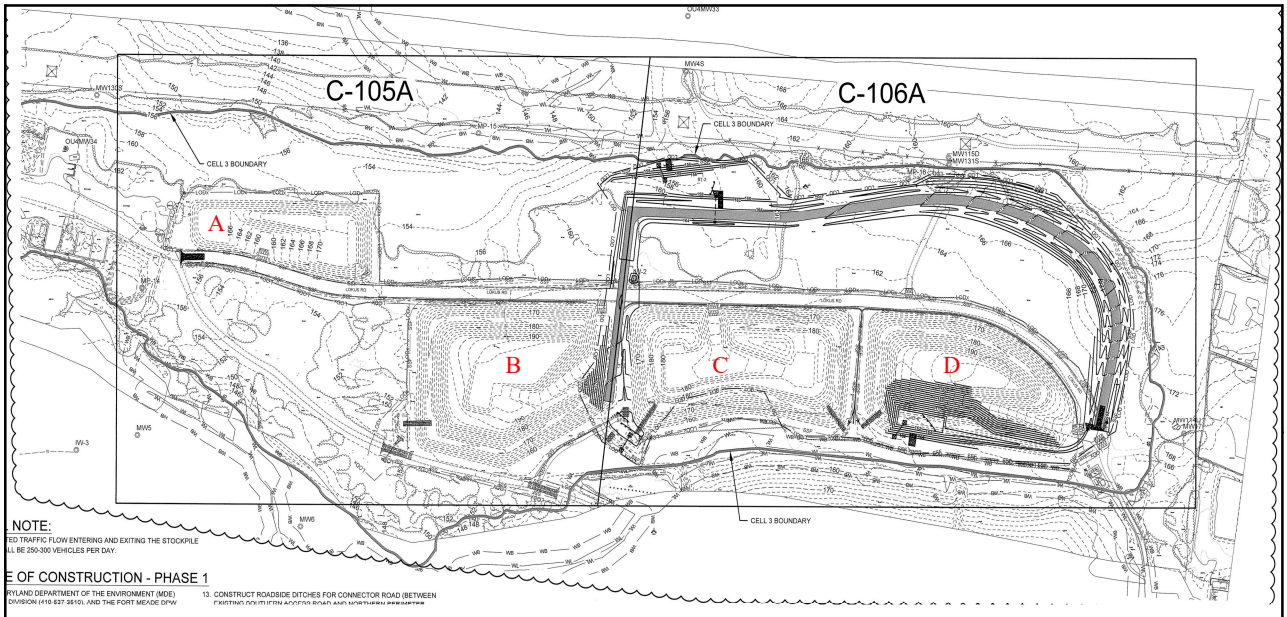


70



Overall Plan for Eastern 31.8 Acres

71



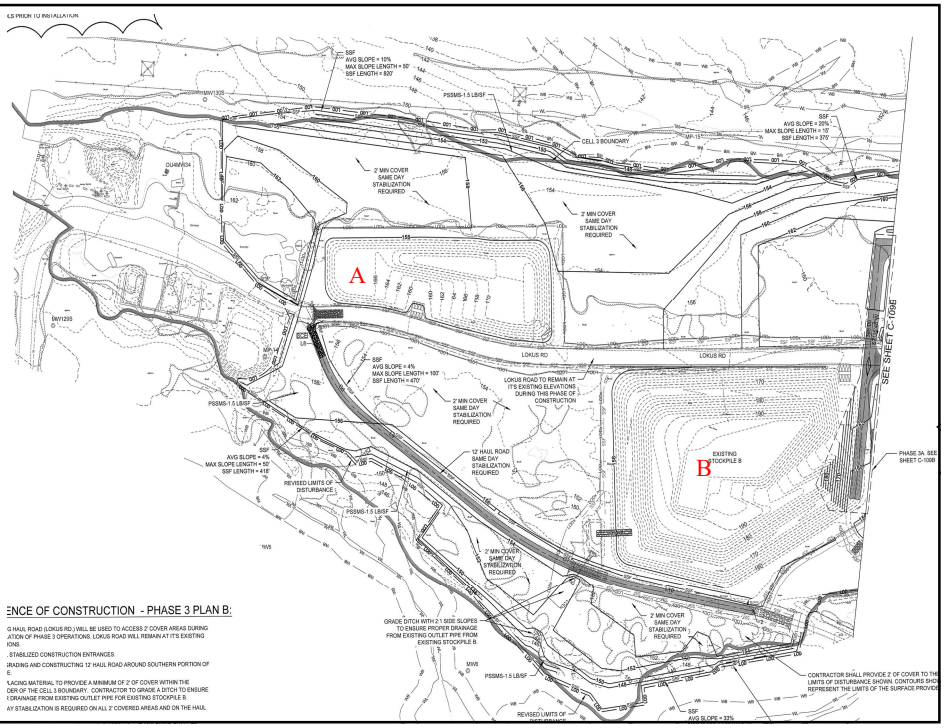
Existing Stockpiles and new Access Road

72

73

74

Stockpile A



75

Grading East Plateau stockpile borrow area

76

Current Conditions

- Waiting for the grass to grow on the western 6.2 acres of Cell 3 (27,491 square feet requires grass stabilization).
- Most of the eastern 31.8 acres is stabilized or waiting for stabilization; Stockpile A is still active.

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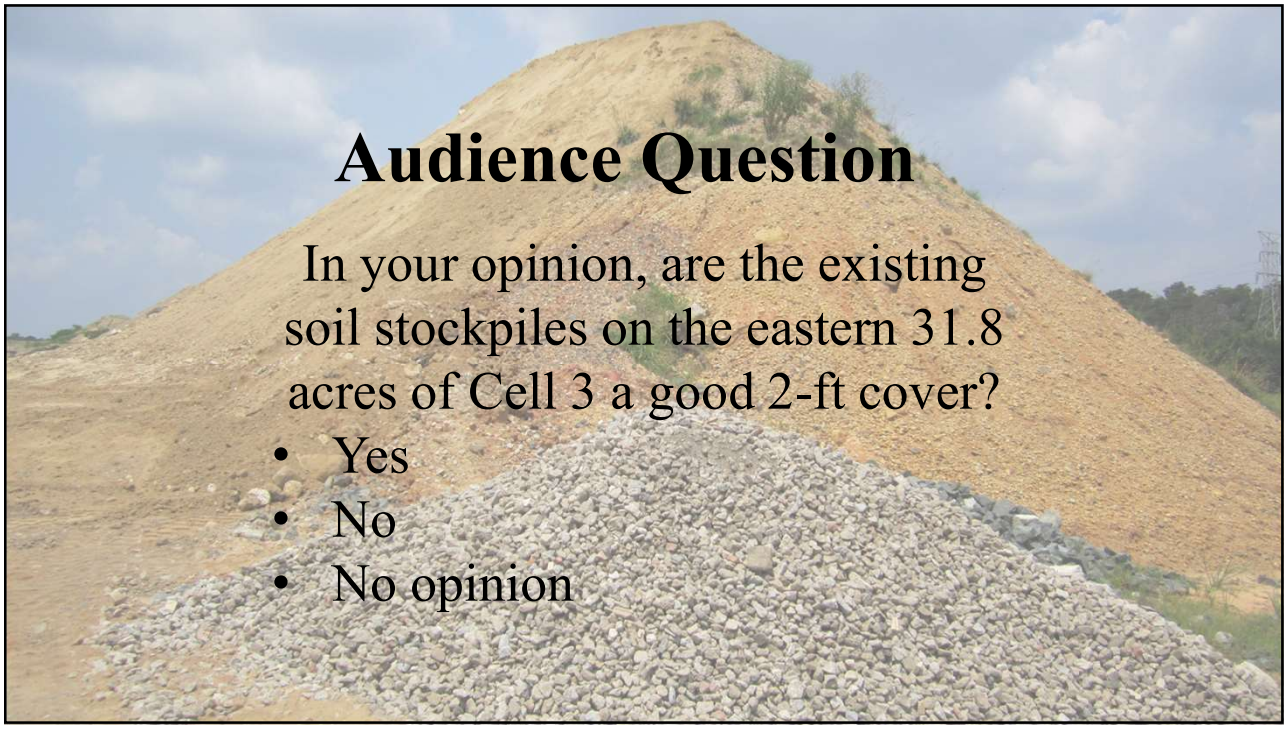

Audience Question

In your opinion, are the existing soil stockpiles on the eastern 31.8 acres of Cell 3 a good 2-ft cover?

- Yes
- No
- No opinion

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That's a Wrap

- Cell 3 was forgotten as of mid-2000s then rediscovered as a CERCLA site in 2013.
- The full extent of Cell 3 needed to be determined.
- The contract was flexible to accommodate changing site conditions.
- Reducing risk in the contract encouraged project success and controlled costs.
- The contractor had to innovate to manage challenging scenarios.
- The contractor worked with multiple stakeholders to achieve success.

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Questions?

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References

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- 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. December 2011.

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