

December Monthly Compliance Report

Solid Waste Permit #498
Bristol Integrated Solid Waste Management Facility
2655 Valley Drive
Bristol, VA 24201
(276) 645-7233

SCS ENGINEERS

02218208.05 | January 10, 2023
Revised January 11, 2023

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INTRODUCTION

On behalf of the City of Bristol, Virginia (City), SCS Engineers has prepared this report to the Virginia Department of Environmental Quality (VDEQ) outlining steps taken towards the actions that VDEQ has requested the City perform. This report covers the Solid Waste Permit (SWP) #498 Landfill during the month of December.

1.0 LEACHATE PUMP STATION

The City is in the process of repairing the pumps and addressing other concerns related to the leachate pump station. The steps taken by the City are outlined in the following sections.

1.1 FLOATING MATERIAL

On July 6, 2022 SCS received the results of samples taken from the Solid Waste Permit 498 Wet Well on May 25, 2022. Based on SCS' review of the data, the data indicated the liquid is non-hazardous. SCS submitted a letter to the City on July 7, 2022 with SCS' review of the data and the underlying lab analysis. A copy of this letter was included in the October Monthly Compliance Report for the SWP #498 Landfill

As described in the October Monthly Compliance Report for the SWP #498 Landfill, the floating material in the wet well was resolved.

1.2 PUMP REPLACEMENT

The City contracted with Buchanan Pump Service (Buchanan) to complete repairs to the pumps and infrastructure at the 498 wet well. Buchanan ordered the necessary materials to complete the repair and will commence work when the materials arrive. Gaskets required to replace the pump did not arrive until early January. Buchanan is expected to mobilize to the site on January 10, 2023 to initiate the repairs.

1.3 ALARM/NOTIFICATION SYSTEM

The City's Information Technology (IT) department has identified and ordered the materials to repair the system. The City received the equipment and their IT department has scheduled the repairs for late January.

2.0 COVER INTEGRITY AND EXPOSED WASTES

The sections below describe steps taken by the City to address cover integrity and exposed wastes.

2.1 INTERMEDIATE COVER

The City continued hauling soil to the landfill to install an intermediate cover across the entire landfill. The City has completed intermediate cover installation on large portions of the landfill. City staff estimate that intermediate cover has been placed on more than 85 percent of the landfill area. The slopes of the landfill continue to present challenging conditions for the City. Inclement weather has continued to prevent the City from safely placing cover on the slopes. In addition, placement of

intermediate cover on the slopes has been slowed by the presence of thick vegetation that must be removed prior to placement. The City intends to complete soil placement on the Solid Waste Permit #498 landfill during the month of January if weather permits.

2.2 SURFACE EMISSIONS MONITORING

On December 19, 2022, SCS performed surface emissions monitoring on the landfill. The monitoring was performed in accordance with the site-specific GCCS Design Plan, the facility's Title V Permit, the requirements of 40 CFR 63.1960(c) and (d), 40 CFR 60.36f(c) and (d), and 40 CFR 60, Appendix A, Method 21. The landfill gas (LFG) collection system is required to operate such that the methane concentration is less than 500 ppm above background at the landfill surface.

The monitoring route included all applicable areas of the Permit No. 498 landfill. Sampling was conducted with a Thermo Scientific TVA-2020 Flame Ionization Detector (FID) at 30-meter intervals and where visual observations indicated the potential for elevated concentrations of LFG, such as distressed vegetation and surface cover cracks. In addition, in accordance with 40 CFR 63.1958(d)(ii)(2) and 40 CFR 60.34f(d), monitoring was conducted at all surface cover penetrations within the waste footprint.

VDEQ will be copied on a letter outlining the results at a later date. Table 1 summarizes the results of the monitoring event.

Table 1. Summary of December Surface Emissions Monitoring

Description	December 19, 2022
Number of Points Sampled	68
Number of Points in Serpentine Route	65
Number of Points at Surface Cover Penetrations	3
Number of Exceedances	0
Number of Serpentine Exceedances	0
Number of Pipe Penetration Exceedances	0

These results are consistent with the SEM performed in October in which no exceedances were detected.

3.0 GAS COLLECTION

On December 20, 2022, SCS Field Services (SCS-FS) visited the landfill and performed monitoring of EW-19 which had been returned to operation earlier in the month. The results of that monitoring were submitted to VDEQ on January 4, 2023 and are included in Appendix A. This data will be used to optimize the wellfield and address oxygen intrusion along with the activities described in the rest of Section 3.

3.1 CURRENT SYSTEM OPTIMIZATION

The City and its contractors continued to evaluate plans to reconnect wells EW-20 and EW-21 the rest of the gas collection and control system (GCCS). Work to connect these wells is expected to continue during the month of January.

3.2 OPTIMIZATION PLAN

On December 1, 2022, on behalf of the City, SCS submitted a plan that provides for means and methods for optimizing the performance of the existing gas extraction system in the Solid Waste Permit #498 landfill. Additional details about that plan were included along with a copy of the plan in the November Monthly Compliance Report for the SWP #498 Landfill.

4.0 GRADING, GEOMETRIC CONFIGURATION AND GAS EXPANSION

SCS's design will require grading of the landfill to establish stormwater drainage from the west side of the landfill to the east side. Outside fill material may be required to reach the desired geometric configuration of the landfill.

SCS intends to restore functionality to as much of the existing 6 inch LFG header as possible within the waste footprint. SCS plans to expand the gas collection system by building upon the existing infrastructure, potentially including extending the existing 6 inch LFG header and adding laterals for approximately four new gas wells. Ideally, the existing header will be extended to form a redundant loop within the 498 landfill. The installation of a new condensate sump or trap may be required at the low point of the loop.

5.0 LEACHATE SEEPS AND PONDING

The sections below are the steps taken by the City to address leachate seeps and ponding.

5.1 PERIODIC INSPECTIONS

The City initiated a process of tracking precipitation events that have the potential to create ponding and leachate seeps. Inspections are made following events that exceed 0.25 inches as recorded by the on-site weather station. For the purposes of these inspections, if precipitation is continuous for at least 8 hours during a storm that lasts multiple days, that storm will be considered a single event requiring a single inspection. After each such event, City personnel will inspect the landfill for ponding and leachate seeps. Locations of ponding and seeps will be marked in the field.

During the month of December 3 events occurred that met that criteria. Inspections during or after those events were performed on December 5, 2022; December 7, 2022, and December 15, 2022. Section 6 describes the self-inspection logs that were used to record observations during the inspections. During the inspections, some ponding was identified along with build-up in some stormwater inlets. These conditions were documented on the inspection reports in Appendix B.

5.2 COMPLETION OF WORK ACTIVITIES

During the month of January, the City will begin the process of addressing the conditions, identified in the inspections described in Section 5.1, as requiring remediation. These actions will be performed as part of intermediate cover placement and grading activities. The City will also address any conditions that require remedial actions identified in future inspections.

6.0 STORMWATER DRAINAGE AND MANAGEMENT

SCS intends to include diversion berms and down chute channels within the landfill footprint to facilitate the stormwater flow while reducing potential erosion. The existing landfill perimeter stormwater channels along the east side of the landfill will be enlarged and fortified to accept the stormwater while minimizing channel erosion.

New slope drain and storm drain pipes will be designed to pass stormwater runoff from the perimeter channels through the perimeter berm and into the existing stormwater pond. The existing stormwater pond discharges into a 42 inch reinforced concrete pipe which discharges offsite.

7.0 SELF-INSPECTION AND RECORDKEEPING

SCS prepared two self-inspection log templates, the Stormwater Management Inspection Log and the Daily Landfill Inspection Log. SCS provided updated self-inspection logs for SWP 498 to the City and VDEQ and completed self-inspection training with facility staff on November 30, 2022.

7.1 UPDATED SELF-INSPECTION LOGS

Copies of updated self-inspection log templates were submitted to VDEQ on November 30, 2022. Details about these log and the intended inspection process were detailed in the November Monthly Compliance Report for the SWP #498 Landfill. Copies of the log templates are also included in that report.

7.2 FACILITY TRAINING

On November 30, 2022, SCS personnel, Ryan Mahon, met members of the Facility staff to complete self-inspection training. A summary of this training and a record of attendees was included in the November Monthly Compliance Report for the SWP #498 Landfill.

7.3 SELF-INSPECTION AND RECORDKEEPING ASSIGNMENTS

Completed inspections will be held on-site at the facility office available for review as needed. Currently, self-inspections are being completed by Jonathan Hayes. Dave Cochran will serve as the primary alternate for inspections with the other members of the staff trained on inspection procedures filling in as needed. Inspection forms will be scanned and stored on the landfill computer server in a folder designated for the purpose of storing environmental records.

Appendix A

December Monthly Wellhead Monitoring Data

January 4, 2023
File No. 07220028.00 Task 6

SENT VIA EMAIL on January 4, 2023

MEMORANDUM

TO: Jonathan Chapman, VDEQ – SWRO

FROM: Mike Gibbons, SCS Field Services

SUBJECT: Monthly Landfill Gas System Wellhead Monitoring Data
for December, 2022 Landfill Permit Areas 221 and 498
Bristol Integrated Solid Waste Management Facility, Bristol, Virginia

SCS Field Services is submitting this data on behalf of the City of Bristol per DEQ request for monthly landfill gas (LFG) wellhead monitoring data for Solid Waste Permit Areas #221 and #498 for the month of December, 2022.

Area 221

There are currently 15 vertical extraction wells in the SWP #221 Landfill Area (Well Nos. 1 – 15). In waste disposal units where the age of the buried wastes is greater than 40 years, as is the case at SWP #221 landfill, the rate and quantity of decomposition gas production declines significantly compared to the rate and quantity of LFG generated in more recently buried wastes. There is no historical evidence of elevated temperatures in SWP #221. Also, the #221 Landfill Area is not believed to be a significant source of fugitive LFG emissions or odors.

Adjustments are made during wellhead monitoring to optimize gas quality and applied vacuum on the Area 221 wells. All Area 221 are under vacuum. During the December monitoring, slight adjustments were noted at the following wells GW-01, -02, -03, -04, -05, -06, -08, -09, -10, -11, -12, -13, -14, and -15 in response to high methane at the wellhead. The average gas composition in the Area 221 wells is shown in Table 1. Methane and carbon dioxide concentrations increased over the previous month while oxygen concentration decreased, which is likely attributed to the corresponding reduction in applied vacuum.

Table 1. Monthly Average Wellhead LFG Composition – Area 221 Wells

Month	Average CH ₄ (% Vol)	Average CO ₂ (% Vol)	Average O ₂ (% Vol)	Average Pressure (inches w.c.)
October '22	40.0	29.2	6.4	-14.9
November '22	47.4	33.7	3.3	-11.9
December '22	58.7	39.6	0.3	-2.7

Area 498


The SWP #498 Landfill is approximately 12.0 acres and is located south of the SWP #221 Landfill and east of the SWP #588 Landfill. As of September 2022, mining in Permit #498 has concluded. The majority of the SWP #498 Landfill does not have an active LFG collection system, due to mining operations which have occurred since waste placement was completed. The current system includes four vertical wells (GW-19, GW-20, GW-21, and GW-22) and a condensate trap (CT-1) at the low point. Field reconnaissance efforts in September/October 2022 identified that the header pipe serving the four wells had been severed, blocked, or otherwise compromised. The buried wastes in SWP #498 Landfill Area are greater than 25 years old, thus, the rate and quantity of decomposition gas production has declined significantly compared to the rate and quantity of LFG generated in more recently buried wastes. Accordingly, the methane concentration tends to be substantially lower, the oxygen and nitrogen concentrations tend to be substantially greater, and the quantity of LFG collected declines substantially compared to the years immediately after waste placement. Furthermore, much of the organic wastes in the upper layer have likely decomposed aerobically (i.e., were composted) because of the mining operations. There is no historical evidence of elevated temperatures in SWP #498; however, the methane-to-carbon dioxide ratio measured in the wellheads can sometimes be less than 1 due to the fact that the wastes are becoming biochemically stabilized (meaning organic wastes have been more fully decomposed) and the rate of methanogenesis has declined. Also, the #498 Landfill Area is not believed to be a significant source of odors.

Extraction well GW-19 in Area 498 was monitored and adjusted to control migration. Work is planned to restore vacuum to the remaining wells in Area 498 by excavating the existed header piping and repairing or replacing it as needed. Extraction wells GW-16, -17, -18, and -23 are perimeter migration control wells affiliated with Permit #498. These wells were monitored and adjusted as needed to control migration.



Bristol Virginia Landfill - Permit 221 and 498 Well Data - 12/01/2022 to 12/31/2022

Point Name	Record Date	CH4 (% by vol)	CO2 (% by vol)	O2 (% by vol)	Bal Gas (% by vol)	Init Static Pressure ("H2O)	Adj Static Pressure ("H2O)	Temp (F)	Flow (scfm)	System Pressure ("H2O)	Comments
01	12/8/2022 11:41	60.0	40.0	0.0	0.0	-3.6	-3.6	57.5	126.1	-3.6	Opened Valve 1/2 to 1 Turn
02	12/8/2022 11:33	56.0	37.0	1.1	5.9	-1.7	-4.0	64.2	134.5	-3.2	Opened Valve 1/2 to 1 Turn
03	12/8/2022 11:16	56.6	40.6	0.6	2.2	-0.6	-2.7	58.4	121.9	-3.6	Opened Valve 1/2 to 1 Turn
04	12/8/2022 11:03	58.9	41.1	0.0	0.0	-2.3	-2.3	58.2	125.7	-3.8	Opened Valve 1/2 to 1 Turn
05	12/8/2022 10:57	58.3	41.7	0.0	0.0	-3.9	-3.9	56.4	125.3	-3.8	Opened Valve 1/2 to 1 Turn
06	12/8/2022 12:19	57.4	35.0	1.5	6.1	-3.1	-3.0	61.4	127.3	-3.4	Opened Valve 1/2 Turn or Less
07	12/8/2022 12:15	58.4	41.1	0.0	0.5	-2.1	-2.1	61.6	134.9	-3.4	No Change
08	12/8/2022 12:12	60.5	39.5	0.0	0.0	-1.4	-1.4	61.8	126.4	-3.5	Opened Valve 1/2 to 1 Turn
09	12/8/2022 12:03	59.7	40.3	0.0	0.0	-3.1	-3.0	68.8	124.8	-3.4	Opened Valve 1/2 to 1 Turn
09	12/8/2022 12:04	59.6	40.4	0.0	0.0	-3.4	-3.4	62.6	125.4	-3.4	No Change
10	12/8/2022 11:59	57.6	42.4	0.0	0.0	-1.6	-2.1	63.7	145.2	-3.6	Opened Valve 1/2 to 1 Turn
11	12/8/2022 11:51	59.5	40.2	0.3	0.0	-4.4	-4.5	63.9	140.3	-3.2	Opened Valve 1/2 to 1 Turn
12	12/8/2022 11:45	55.5	37.1	1.4	6.0	-4.2	-4.2	57.8	136.2	-4.2	Opened Valve 1/2 to 1 Turn
13	12/8/2022 11:11	57.2	40.2	0.1	2.5	-3.5	-3.6	56.8	125.6	-3.7	Opened Valve 1/2 to 1 Turn
14	12/8/2022 12:09	63.3	36.7	0.0	0.0	-0.2	-0.2	71.5	127.2	-3.5	Opened Valve 1/2 to 1 Turn
15	12/8/2022 11:55	60.0	40.0	0.0	0.0	-4.3	-4.8	58.0	143.9	-4.8	Opened Valve 1/2 to 1 Turn
Average Permit 221		58.7	39.6	0.3	1.5	-2.7					
GW19	12/20/2022 12:03	0.3	6.0	19.0	74.7	-17.7	-17.8	52.7	0.0	-23.1	Opened Valve 1/2 to 1 Turn
Average Permit 498		0.3	6.0	19.0	74.7	-17.7					
16	12/8/2022 12:33	52.4	37.4	0.0	10.2	-6.8	-6.1	60.8	124.7	-8.3	No Change
17	12/8/2022 12:35	58.2	41.6	0.0	0.2	-7.7	-8.2	61.7	128.8	-8.8	Increased Flow/Vacuum
18	12/8/2022 12:43	52.9	39.9	0.0	7.2	-5.3	-5.9	60.4	123.7	-9.7	Opened Valve 1/2 to 1 Turn
23	12/8/2022 12:24	0.4	0.5	20.9	78.2	-0.3	-0.2	53.1	122.9	-3.9	Increased Flow/Vacuum
Average Perimeter Migration Control Wells		41.0	29.9	5.2	24.0	-5.0					



Appendix B
Stormwater Inspection Records

Solid Waste Permit 498 Inspection Checklist

Bristol Integrated Solid Waste Management Facility

Date of Inspection 5 Dec 2022 Weather Clear + 39°

Inspector's Name Jon Hayes

Stormwater Management (Complete After Rain Event Greater than 0.25-in)

1. Is there any debris, build up, or damage at the discharge location of the Fire Basin? Yes No

If yes, describe: ~2" below culvert

2. Describe water level of Fire Basin: ~2" below culvert

3. Is there any debris, build up, or damage in or around the inlet of the Fire Basin? Yes No

If yes, describe: _____

4. Is there any debris, build up, or damage in or around Culvert 1? Yes No

5. Is there any debris, build up, or damage in or around Culvert 2? Yes No

If yes, describe: _____

6. Is there any debris, build up, or damage in or around SCC-1 or SCC-2? Yes No

7. Is there any debris, build up, or damage in or around SCC-8 or SCC-9? Yes No

If yes, describe: _____

8. Is there build up or debris that will impede flow to DI-A? Yes No

9. Is there build up or debris that will impede flow to DI-B? N/A ~~Yes~~ ~~No~~

10. Is there build up or debris that will impede flow to DI-C? Yes No

If yes, describe: _____

11. Is there build up or debris that will impede flow to Downslope Drain? Yes No

If yes, describe: _____

12. Is there standing/ponded water within the SWP 498 boundary? Yes No *on map on back*

13. Any visible leachate seeps with in SWP 498 boundary? Yes No

Describe locations and depth of ponded water or leachate seep (mark locations in the field):

14. Describe any intended remediation actions: SWP 498 will be re-graded during final cap application

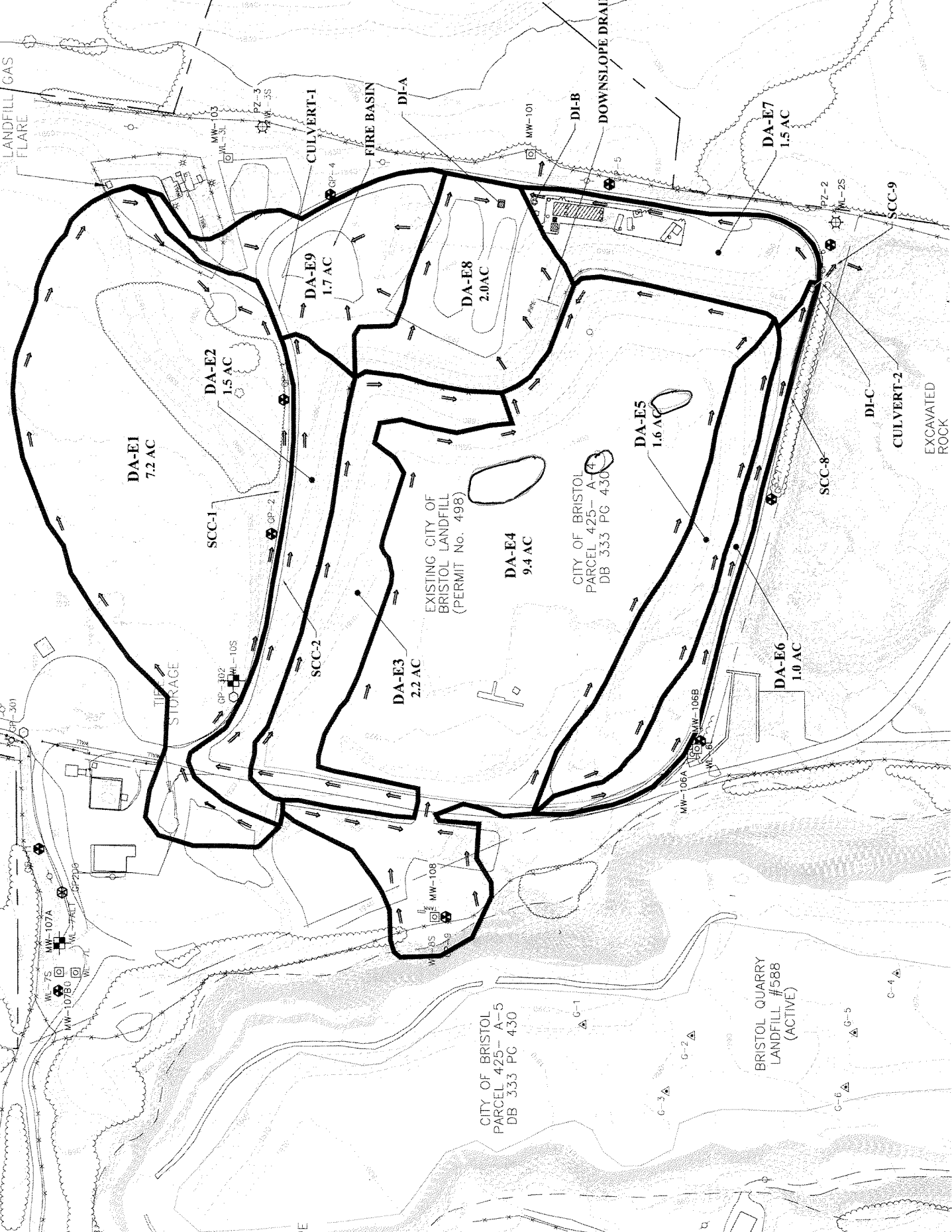
PARCEL 425- A-1
DB 333 PG 430
CLOSED CITY OF
BRISTOL LANDFILL
(FORMER PERMIT 221)

MW-109
MW-95
MW-115
OP-301

MW-75
MW-107A
MW-107B
MW-107C
MW-107D
MW-107E
MW-107F
MW-107G
MW-107H
MW-107I
MW-107J
MW-107K
MW-107L
MW-107M
MW-107N
MW-107O
MW-107P
MW-107Q
MW-107R
MW-107S
MW-107T
MW-107U
MW-107V
MW-107W
MW-107X
MW-107Y
MW-107Z

PIPE

35A
35B
35C
35D
35E
35F
35G
35H
35I
35J
35K
35L
35M
35N
35O
35P
35Q
35R
35S
35T
35U
35V
35W
35X
35Y
35Z



CITY OF BRISTOL
PARCEL 425- A-5
DB 333 PG 430

BRISTOL QUARRY
LANDFILL #588
(ACTIVE)

G-1
G-2
G-3
G-4
G-5

Solid Waste Permit 498 Inspection Checklist

Bristol Integrated Solid Waste Management Facility

Date of Inspection 7 Dec 2022 Weather Overcast, ~60°

Inspector's Name Jon Hayes

Stormwater Management (Complete After Rain Event Greater than 0.25-in)

1. Is there any debris, build up, or damage at the discharge location of the Fire Basin? Yes No

If yes, describe: _____

2. Describe water level of Fire Basin: At culvert.

3. Is there any debris, build up, or damage in or around the inlet of the Fire Basin? Yes No

If yes, describe: _____

4. Is there any debris, build up, or damage in or around Culvert 1? Yes No

5. Is there any debris, build up, or damage in or around Culvert 2? Yes No

If yes, describe: _____

6. Is there any debris, build up, or damage in or around SCC-1 or SCC-2? Yes No

7. Is there any debris, build up, or damage in or around SCC-8 or SCC-9? Yes No

If yes, describe: _____

8. Is there build up or debris that will impede flow to DI-A? Yes No

9. Is there build up or debris that will impede flow to DI-B? ~~Yes~~ No

10. Is there build up or debris that will impede flow to DI-C? Yes No

If yes, describe: _____

11. Is there build up or debris that will impede flow to Downslope Drain? Yes No

If yes, describe: _____

12. Is there standing/ponded water within the SWP 498 boundary? Yes No

13. Any visible leachate seeps with in SWP 498 boundary? Yes No

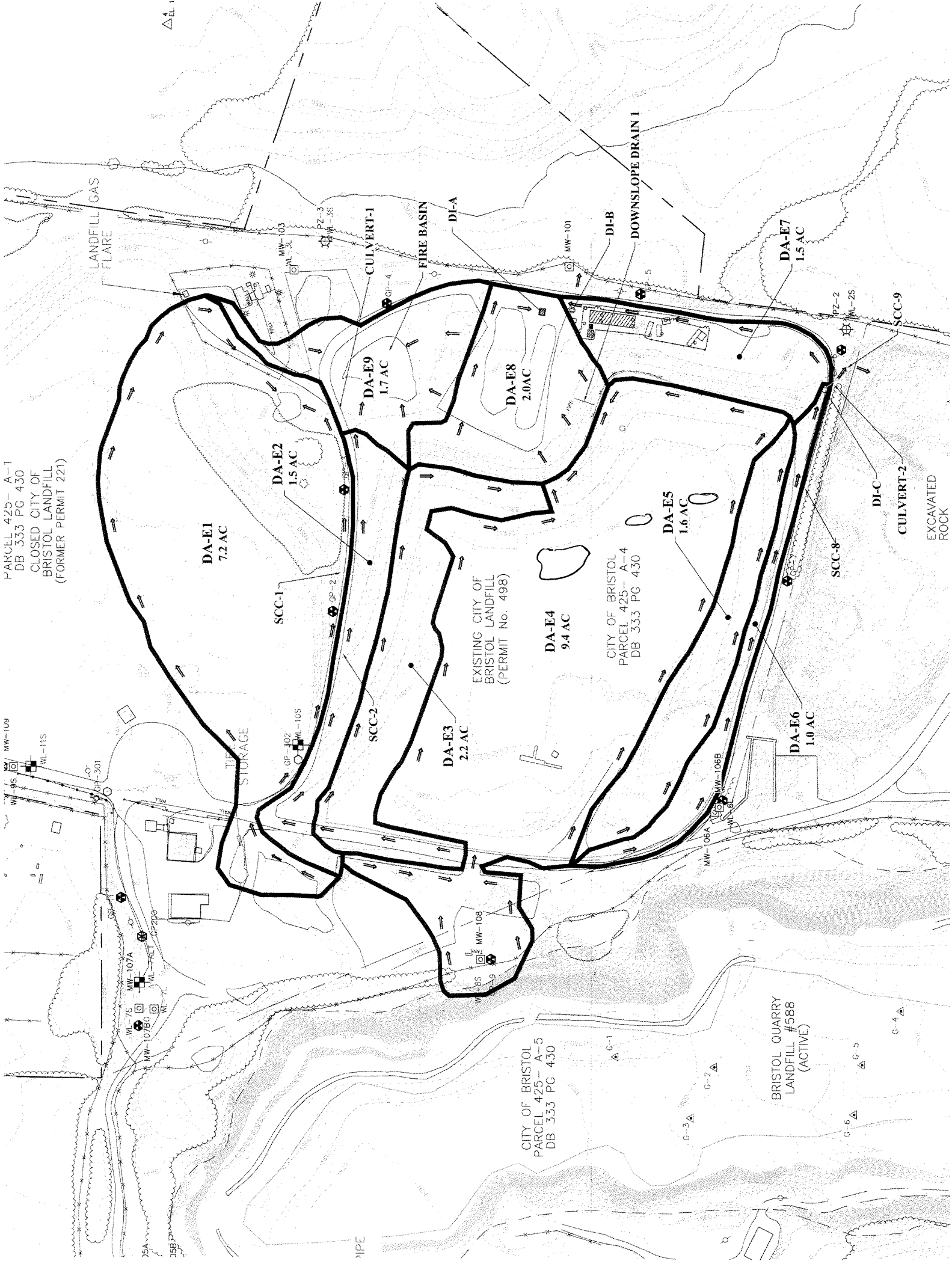
Describe locations and depth of ponded water or leachate seep (mark locations in the field):

On map.

14. Describe any intended remediation actions: 498 will be fine graded during

final cap installation.

PARCEL 425- A-1
DB 333 PG 430
CLOSED CITY OF
BRISTOL LANDFILL
(FORMER PERMIT 221)



EXCAVATED
ROCK

BRISTOL QUARRY
LANDFILL #588
(ACTIVE)

CITY OF BRISTOL
PARCEL 425- A-5
DB 333 PG 430

CITY OF BRISTOL
PARCEL 425- A-4
DB 333 PG 430

EXISTING CITY OF
BRISTOL LANDFILL
(PERMIT No. 498)

DA-E1
7.2 AC

DA-E2
1.5 AC

DA-E3
2.2 AC

DA-E4
9.4 AC

DA-E5
1.6 AC

DA-E6
1.0 AC

DA-E7
1.5 AC

DA-E8
2.0 AC

DA-E9
1.7 AC

LANDFILL GAS
FLARE

CULVERT-1

FIRE BASIN

DI-A

DI-B

DOWNSLOPE DRAIN I

SCC-9

DI-C

CULVERT-2

SCC-8

SCC-2

SCC-1

SCC-2

STORAGE

MW-109

MW-115

MW-107A

MW-107B

MW-108

MW-108A

MW-108B

G-1

G-2

G-3

G-4

G-5

G-6

35A

35B

PIPE

△ E1

Solid Waste Permit 498 Inspection Checklist

Bristol Integrated Solid Waste Management Facility

Date of Inspection 15 Dec 2022 Weather Rainy, 45°

Inspector's Name Jon Hayes

Stormwater Management (Complete After Rain Event Greater than 0.25-in)

1. Is there any debris, build up, or damage at the discharge location of the Fire Basin? Yes No

If yes, describe: _____

2. Describe water level of Fire Basin: above bottom of culvert

3. Is there any debris, build up, or damage in or around the inlet of the Fire Basin? Yes No

If yes, describe: _____

4. Is there any debris, build up, or damage in or around Culvert 1? Yes No

5. Is there any debris, build up, or damage in or around Culvert 2? Yes No

If yes, describe: _____

6. Is there any debris, build up, or damage in or around SCC-1 or SCC-2? Yes No

7. Is there any debris, build up, or damage in or around SCC-8 or SCC-9? Yes No

If yes, describe: _____

8. Is there build up or debris that will impede flow to DI-A? Yes No

9. Is there build up or debris that will impede flow to DI-B? ~~Yes~~ No

10. Is there build up or debris that will impede flow to DI-C? Yes No

If yes, describe: _____

11. Is there build up or debris that will impede flow to Downslope Drain? Yes No

If yes, describe: Vegetative debris on intake.

12. Is there standing/ponded water within the SWP 498 boundary? Yes No

13. Any visible leachate seeps with in SWP 498 boundary? Yes No

Describe locations and depth of ponded water or leachate seep (mark locations in the field):

Ponding shown on map. ~4-6 inches deep.

14. Describe any intended remediation actions: Fine grading for final cap installation

will remove low spots. Debris removed from Down Slope ^{Drain} intake.

PARCEL 425- A-1
DB 333 PG 430
CLOSED CITY OF
BRISTOL LANDFILL
(FORMER PERMIT 221)

MW-109

MW-115

MW-107A

MW-107B

MW-107C

MW-107D

MW-107E

MW-107F

MW-107G

MW-107H

MW-107I

MW-107J

MW-107K

MW-107L

MW-107M

MW-107N

MW-107O

MW-107P

MW-107Q

MW-107R

MW-107S

MW-107T

MW-107U

MW-107V

MW-107W

MW-107X

MW-107Y

MW-107Z

MW-108

MW-109

MW-110

MW-111

MW-112

MW-113

MW-114

MW-115

MW-116

MW-117

MW-118

MW-119

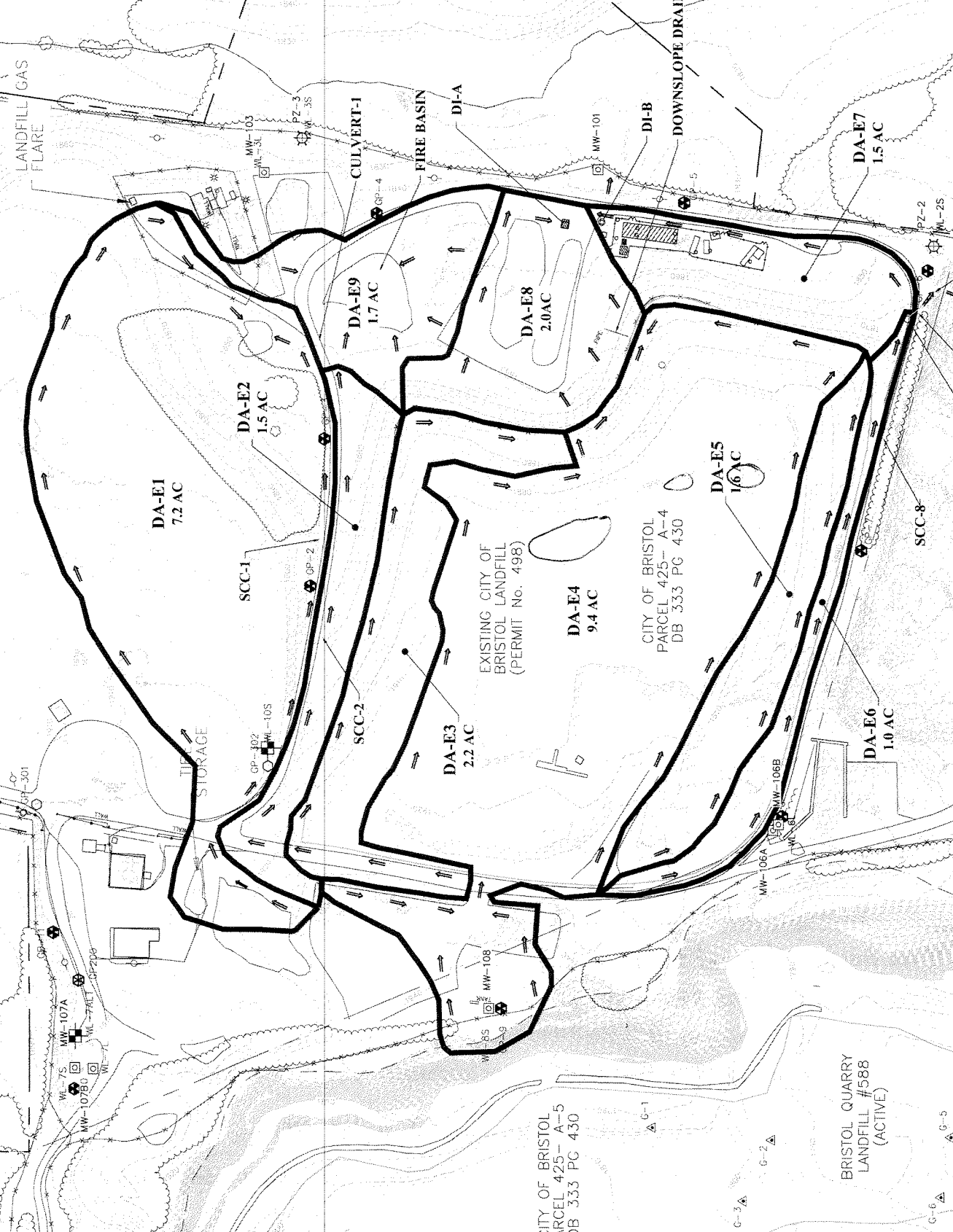
MW-120

MW-121

MW-122

MW-123

MW-124



EXISTING CITY OF
BRISTOL LANDFILL
(PERMIT No. 498)

CITY OF BRISTOL
PARCEL 425- A-4
DB 333 PG 430

BRISTOL QUARRY
LANDFILL #588
(ACTIVE)

CITY OF BRISTOL
PARCEL 425- A-5
DB 333 PG 430

EXCAVATED
ROCK