GUAM SOLID WASTE AUTHORITY
BOARD OF DIRECTORS MEETING
AGENDA
Thursday, June 20, 2024 3:00p.m.
VIA VIDEO CONFERENCE

I. CALL TO ORDER
II. ROLL CALL
III. DETERMINATION OF PROOF OF PUBLICATION
IV. APPROVAL OF AGENDA ITEMS
V. APPROVAL OF MINUTES
VI. REPORTS
    a. MANAGEMENT REPORTS
        i. OPERATIONAL UPDATE
        ii. FINANCIAL UPDATE
    b. LEGAL COUNSEL'S REPORT
    c. COMMITTEE REPORTS
VII. UNFINISHED BUSINESS
    a. ISLAND WIDE TRASH COLLECTION INITIATIVE
    b. ORDOT POST CLOSURE PLAN UPDATE
        i. FEDERAL RECEIVERSHIP UPDATES / INFORMATION
    c. LAYON CELLS 1 AND 2 CLOSURE
    d. RATE CASE WITH PUBLIC UTILITIES COMMISSION
VIII. NEW BUSINESS
IX. COMMUNICATIONS AND CORRESPONDENCE
X. PUBLIC FORUM - MEMBERS OF THE PUBLIC TO CONTACT GSWA TO BE PLACED ON THE AGENDA IF THEY WISH TO ADDRESS THE BOARD.
XI. NEXT MEETING
XII. ADJOURN

DIPÅTTAMENTON I KAOHAO GUINAHAN CHAMORU
DEPARTMENT OF CHAMORU AFFAIRS
193 Chalan Santo Papa Juan Pablo Dos Hagåtña, Guam 96910
Tel: (671) 989-2426/4455 • Fax: (671) 989-7219

REGULAR BOARD OF TRUSTEES MEETING
Thursday, June 20, 2024 – 10:00 a.m.
Guam Museum Conference Room and Zoom Video Conference
Zoom Link: : : https://us02web.zoom.us/j/86709267719
Meeting ID: 867 0926 7719 Passcode: 358312

AGENDA:

I. CALL TO ORDER
II. ROLL CALL
III. APPROVAL OF MINUTES
  a. April 11, 2024
  b. May 9, 2024
IV. PRESIDENT'S REPORT
  a. CHamoru Village Update
  b. Guam Museum Update
    1. AAM Trip Report
  c. Guam Cultural Repository Update
  d. Finance / Admin
    1. Financial Reports
V. Old Business
  a. Guam Museum Arch Repair Project Update
  b. Guam Museum HVAC Replacement Update
  c. FEMA UPDATE (Project #730121)
VI. New Business
VII. Adjournment

For special accommodations, please contact Nathan Jon Cruz at (671) 989-2426

/s/ Melvin Won Pat-Borja, DCA President
This AD was paid for with government funds.

Guam Solid Waste Authority Board of Directors Regular Meeting

Thursday, June 20, 2024, 3:00 p.m. (ChST)
Join Zoom Meeting
Link: https://zoom.us/j/9140408814?pwd=TjZ3U0dHSVd0ajlKRjBhcWFrc1ZYZz09
Meeting ID: 914 040 8814 Passcode: 777546

The Guam Solid Waste Authority Board of Directors will have a board meeting June 20, 2024 at 3:00 p.m. The meeting will be conducted via Zoom.

Agenda:
I. CALL TO ORDER; II. ROLL CALL; III. DETERMINATION OF PROOF OF PUBLICATION; IV. APPROVAL OF AGENDA ITEMS; V. APPROVAL OF MINUTES; VI. REPORTS A. MANAGEMENT REPORTS I. OPERATIONAL UPDATE II. FINANCIAL UPDATE B. LEGAL COUNSEL'S REPORT C. COMMITTEE REPORTS VII. UNFINISHED BUSINESS A. ISLAND WIDE TRASH COLLECTION INITIATIVE B. ORDOT POST CLOSURE PLAN UPDATE I. FEDERAL RECEIVERSHIP UPDATES / INFORMATION C. LAYON CELLS 1 AND 2 CLOSURE D. RATE CASE WITH PUBLIC UTILITIES COMMISSION VIII. NEW BUSINESS IX. COMMUNICATIONS AND CORRESPONDENCE X. PUBLIC FORUM – MEMBERS OF THE PUBLIC MUST CONTACT GSWA TO BE PLACED ON THE AGENDA IF THEY WISH TO ADDRESS THE BOARD. XI. NEXT MEETING XII. ADJOURN

Access live stream of the meeting on GSWA website: https://www.gswa.guam.gov/

For more information, please contact GSWA Admin at admin@gswa.guam.gov or 671-646-3215. Persons needing telecommunication device for the Hearing/Speech Impaired (TDD) may contact 671-646-3111. This advertisement was paid for by GSWA.

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Attorneys for Petitioners
Jaclyn Anne L. Ocampo-Dela Cruz and Frankie John C. Dela Cruz, Jr.

IN THE SUPERIOR COURT OF GUAM
IN THE MATTER OF THE ADOPTION of T.C.O.C (DOB: 06/21/2007) and A.J.O.C. (DOB: 12/28/2009), Minors, by JACLYN ANNE L. OCAMPO-DELA CRUZ and FRANKIE JOHN C. DELA CRUZ, JR., Petitioners.
ADOPTION CASE NO. AT0022-23
AMENDED SUMMONS

TO : ALAN VINCENT CALUGAY, Father of Minors (T.C.O.C. (DOB: 06/21/2007) and A.J.O.C. (DOB: 12/28/2009))

You are hereby summoned to appear in person or by Zoom, before the HONORABLE ARTHUR R. BARCINAS, at the Judiciary of Guam, Superior Court of Guam, 120 West O'Brien Drive, Hagåtña, Guam, for a court hearing on:

THURSDAY, JUNE 27, 2024, AT 11:00 A.M.
Zoom Meeting ID: 752-425-5848 / Password: JARB

YOUR PARENTAL RIGHTS CONCERNING THE CHILDREN WHO ARE THE SUBJECT OF THE ABOVE ADOPTION PROCEEDINGS MAY BE TERMINATED BY AN ORDER OF THIS COURT IF YOU FAIL TO APPEAR OR OTHERWISE PARTICIPATE BY OR ON THE DATE SET FORTH IN THIS SUMMONS.

DATED: THIS MAY 15, 2024

JANICE M. CAMACHO-PEREZ, ESQ.
Clerk of Court / Superior Court of Guam
By: /s/ SARAI A.T. TERLAJE
Deputy Clerk

Guam Solid Waste Authority Board of Directors Regular Meeting

Thursday, June 20, 2024, 3:00 p.m. (ChST)
Join Zoom Meeting

Link: https://zoom.us/j/9140408814?pwd=TjZ3U0dHSVd0ajlKRjBhcWFrc1ZYZz09
Meeting ID: 914 040 8814 Passcode: 777546

The Guam Solid Waste Authority Board of Directors will have a board meeting June 20, 2024 at 3:00 p.m. The meeting will be conducted via Zoom.

Agenda:

I. CALL TO ORDER; II. ROLL CALL; III. DETERMINATION OF PROOF OF PUBLICATION; IV. APPROVAL OF AGENDA ITEMS; V. APPROVAL OF MINUTES; VI. REPORTS A. MANAGEMENT REPORTS I. OPERATIONAL UPDATE II. FINANCIAL UPDATE B. LEGAL COUNSEL'S REPORT C. COMMITTEE REPORTS VII. UNFINISHED BUSINESS A. ISLAND WIDE TRASH COLLECTION INITIATIVE B. ORDOT POST CLOSURE PLAN UPDATE I. FEDERAL RECEIVERSHIP UPDATES / INFORMATION C. LAYON CELLS 1 AND 2 CLOSURE D. RATE CASE WITH PUBLIC UTILITIES COMMISSION VIII. NEW BUSINESS IX. COMMUNICATIONS AND CORRESPONDENCE X. PUBLIC FORUM – MEMBERS OF THE PUBLIC MUST CONTACT GSWA TO BE PLACED ON THE AGENDA IF THEY WISH TO ADDRESS THE BOARD. XI. NEXT MEETING XII. ADJOURN

Access live stream of the meeting on GSWA website: https://www.gswa.guam.gov/

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Law Office of Louie J. Yanza
A Professional Corporation
MVP Building
862 South Marine Corps Drive, Suite 203
Tamuning, Guam 96913
Telephone: (671) 477-7059
Facsimile: (671) 472-5487

Attorney for Petitioner
Kuris M. Iekar

SUPERIOR COURT OF GUAM
IN THE MATTER OF THE ESTATE OF DELBOTB RIDEB KEBEKOL and NGIRACHEMOI KERKIRS KEBEKOL, Deceased.

PROBATE CASE NO. PR0196-23
NOTICE OF HEARING ON PETITION FOR FINAL DISTRIBUTION

THIS NOTICE IS REQUIRED BY LAW. YOU ARE NOT REQUIRED TO APPEAR IN COURT UNLESS YOU DESIRE.

NOTICE IS HEREBY GIVEN that the Petitioner, Kuris M. Iekar, has filed herein a Petition for Final Distribution of the above-referenced Estate, reference to which Petition is made for further particulars, that the time and place of hearing of the same has been set for JUN 26 2024 at the hour of 9:30 a.m. at the Superior Court of Guam, 120 West O'Brien Drive, Hagåtña, Guam, and that all persons interested are hereby notified to appear and show cause, if any they have, why the Petition should not be granted.

Dated: May 02, 2024

JANICE M. CAMACHO-PEREZ
Clerk of Court/Superior Court of Guam
BY: /s/ Pauline I. Untalan
Courtroom/Chamber Clerk

You may appear in person at the Courtroom of Judge Dana A. Gutierrez, 120 W. O'Brien Drive, Hagåtña, Guam or you may participate via Zoom by logging onto https://guamcourts-org.zoom.us and enter the Meeting ID: 839 7874 0380 and Passcode: 189701. For technical ssistahce, please call (671) 475-3207 five (5) minutes prior the designated hearing time.

GUAM board of accountancy

NOTICE OF MEETING

The Guam Board of Accountancy will hold its monthly Board meeting on Thursday, June 20, 2024, at 9:00 a.m. This meeting is open to the public via Zoom Video Conference. Anyone desiring to join the virtual meeting may enter the following link in a browser:

Meeting URL: https://us06web.zoom.us/j/87002127777?pwd=hP8WdXjzed9ME9FiEI8qYzaxQyakkd.1
Meeting ID: 870 0212 7777 • Passcode: DHfv..hf9%

Our YouTube livestreaming events link for all Regular Board Meetings is available on the Board's website at: http://www.guamboa.org/policies/activities.htm.

AGENDA

I. CALL TO ORDER
II. APPROVAL OF MINUTES – May 23, 2024
III. OLD BUSINESS
- Guam Accountancy Endowment Fund Update

IV. NEW BUSINESS
A. Requests for Approval
- Applications for Initial Certification & Licensure

V. GENERAL DISCUSSION/ANNOUNCEMENTS
- NASBA 2024 Q2 Quarterly Communications
- FY2024 GBOA YTD Financial Summary

VI. ADJOURNMENT

The names of applicants being considered are available on the Board's website at: http://www.guamboa.org/policies/activities.htm, along with other Board meeting materials. Detail materials will be available on the website one day before the meeting. Individuals requiring special accommodations or information may contact Ms. Anna Aflague at the Guam Board of Accountancy at 671-647-0813 FAX: 671-647-0816 or support@guamboa.org for assistance.

Guam Solid Waste Authority Board of Directors Regular Meeting
Thursday, June 20, 2024 – 3:00 PM (ChST)
Join Zoom Meeting
Link: https://zoom.us/j/9140408814?pwd=TjZ3U0dHSVd0ajlKRjBhcWFrc1ZYZz09
Meeting ID: 914 040 8814 **Passcode: 777546**

THE GUAM SOLID WASTE AUTHORITY BOARD OF DIRECTORS WILL HAVE A BOARD MEETING JUNE 20, 2024 AT 3:00 PM. THE MEETING WILL BE CONDUCTED VIA ZOOM.

AGENDA: I. CALL TO ORDER; II. ROLL CALL; III. DETERMINATION OF PROOF OF PUBLICATION; IV. APPROVAL OF AGENDA ITEMS; V. APPROVAL OF MINUTES; VI. REPORTS A. MANAGEMENT REPORTS I. OPERATIONAL UPDATE II. FINANCIAL UPDATE B. LEGAL COUNSEL'S REPORT C. COMMITTEE REPORTS VII. UNFINISHED BUSINESS A. ISLAND WIDE TRASH COLLECTION INITIATIVE B. ORDOT POST CLOSURE PLAN UPDATE I. FEDERAL RECEIVERSHIP UPDATES / INFORMATION C. LAYON CELLS 1 AND 2 CLOSURE D. RATE CASE WITH PUBLIC UTILITIES COMMISSION VIII. NEW BUSINESS IX. COMMUNICATIONS AND CORRESPONDENCE X. PUBLIC FORUM – MEMBERS OF THE PUBLIC MUST CONTACT GSWA TO BE PLACED ON THE AGENDA IF THEY WISH TO ADDRESS THE BOARD. XI. NEXT MEETING XII. ADJOURN

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GUAM SOLID WASTE AUTHORITY
BOARD OF DIRECTORS' MEETING MINUTES
Thursday, May 23, 2024
Via Video Conference

I. Call to Order

Chairman Gayle called the meeting to order for the Guam Solid Waste Authority (GSWA) Board of Directors' meeting at 1:04 p.m.

II. Roll Call

Board Members:

Andrew Gayle	Chairman
Minakshi Hemlani	Vice Chairwoman
Peggy Denney	Secretary
Corazon Montellano	Member
Jim Oehlerking	Member

Management & Staff:

Irvin Slike	General Manager
Kathrine Kakigi	Comptroller
Alicia Fejeran	Chief of Administration
Roman Perez	Operations Superintendent
Keilani Mesa	Administrative Officer

Guests:

Shannon Taitano	GSWA Attorney
Harvey Gershman	GBB Federal Receiver Representative
Christopher Lund	GBB Federal Receiver Representative
Steven Schilling	GBB Federal Receiver Representative
Joyce Tang	Attorney for GBB Federal Receiver
Jesse Chargualaf	Senator Perez Office
Joe Taitano	Guam Pacific Daily News

III. Determination of Proof of Publication

1st Publication with Guam Daily Post, Thursday, May 16, 2024
2nd Publication with Guam Daily Post, Tuesday, May 21, 2024

IV. Approval of Agenda Items

Vice Chair Hemlani motioned to proceed with the agenda prepared and provided by Chairman Gayle. Member Montellano seconded the motion. The motion passed unanimously.

V. Approval of Minutes

Board members reviewed the draft minutes of the April 11, 2024 meeting. Secretary Denney motioned to approve the minutes, and Member Oehlerking seconded the motion. The minutes for the Board meeting held on April 22, 2024 were approved.

VI. Reports

a. Management Reports

i. Operational Update

General Manager Slike reported to the Board that GSWA is experiencing attendance issues, which directly affect the collection of residential trash and recycle services. He also mentioned that GSWA management decided to close the transfer stations and contract out the roll-off collection services on Mondays to mitigate delays. Additionally, General Manager Slike informed the Board that, despite management taking corrective disciplinary action for habitual attendance issues, GSWA's temporary staffing contractor, Pacific Human Resources, is unable to supply replacements in a timely manner.

Member Oehlerking inquired about the requirements candidates need to fulfill these positions. General Manager Slike explained that for the Government of Guam, the Equipment Operator position requires a Chauffeur's license along with a high school diploma or equivalent, while the Sanitation Worker position only requires a high school diploma. However, these requirements do not apply to the contractual employees employed under PHR.

Member Oehlerking also asked whether GSWA management is considering hiring additional staffing service providers. Chairman Gayle and Member Oehlerking inquired about an acceptable rate to meet GSWA's service requirements. General Manager Slike stated that an acceptable level would be achieved if callouts could be reduced to two or three per day. Member Oehlerking stated that the on-time collection report did not correlate with the conversation they just had about delays. General Manager Slike responded that he would investigate how the numbers are being calculated.

Chief of Administration Alicia Fejeran reported on customer service performance indicators, explaining to the Board that the increase in calls was directly related to the delays in service. She stated that five customer service representatives strictly answering calls are needed to handle the call volume effectively, but currently only four representatives are available, and not every day has all four representatives present. As a result, the answer rate is averaging about 70-80 percent, with the representatives adjusting their tasks as necessary.

ii. Financial Update

General Manager Slike reported on the operating budget, stating that the soil project at the old Dededo Transfer Station significantly boosted the bottom line, with a 24%

increase over this time last year. He noted that expenses only rose by about 9%. Member Montellano commented on the improvement in interest income. Comptroller Kakigi attributed this improvement primarily to Ordot investments and noted that total expenditures for operational costs have decreased compared to last year. She also reported a nearly 50% decrease in the overtime rate for the GSWA Mechanic and highlighted that GSWA has begun accepting soil, which has increased revenue.

Chairman Gayle inquired about the status of accepting asbestos at the landfill. General Manager Slike responded that contractors have completed their asbestos training and certification, and he needs to coordinate with Miguel Bordallo of GWA regarding asbestos pipes they plan to dispose of. Secretary Denney asked about the location of asbestos disposal and the testing of contaminated soils. General Manager Slike explained that most of the soil contained plastics and was used as cover material, essentially considering it as trash, and that proper records of testing are maintained.

Secretary Denney also inquired about the decrease in number of active residential customers. Comptroller Kakigi explained that the decrease is due to GSWA repossessing bins from delinquent customers. She stated that key indicators are still good across the board, except for accounts payable, which is affected by the implementation of a new financial management system.

a. **GSWA Board Resolution: 2024-009 Authorization to Approve the Treasurer of Guam to Establish a Checking Account for Guam Solid Waste Authority.**
   Comptroller Kakigi explained that this resolution will give GSWA more control over when payments are remitted to vendors. Member Montellano suggested that GSWA adjust their target payment date to vendors from 45 days to 30 days. Comptroller Kakigi agreed, provided that the 30-day period begins from the receipt of the invoice.

   GSWA Management Team presented Board Resolution 2024-009. A motion to approve GSWA Board Resolution No. 2024-009 was made by Secretary Denney. Vice Chair Hemlani seconded the motion. The motion was passed and the Board approved the resolution.

b. **GSWA Board Resolution: 2024-010 Relative to Approve the Funding Source for Pacific Human Resources and Green Group Holdings Contract from the Equipment Replacement Fund.**
   General Manager Slike requested to table this resolution pending additional information and quotations. Chairman Gayle approved to table the resolution for next month.

c. **GSWA Board Resolution: 2024-011 Relative to the Approval and Authorization of GSWA's Management Team to Expand GSWA Investment Authority Beyond Layon Landfill Reserves.**
Comptroller Kakigi asked for Board approval to invest additional cash flow that is not available for immediate use as the previous request was limited to just the Layon Landfill Reserves. Secretary Denney requested to make a correction to the typo that read effective instead of effectively.

GSWA Management Team presented Board Resolution 2024-011. A motion to approve GSWA Board Resolution No. 2024-011 was made by Secretary Denney. Member Montellano seconded the motion. The motion was passed and the Board approved the resolution.

b. **Legal Counsel's Report**
Attorney Taitano reported that the Morrico attorney appealed GSWA's procurement of a Compact Wheel Loader, and that the Attorney General's Office is representing GSWA in this matter. Attorney Taitano also reported that there is a grievance filed with the Civil Service Commission (CSC) and legal counsel had submitted a motion to dismiss.

c. **Committee Reports**
None.

VII. Unfinished Business

a. **Island Wide Trash Collection Initiative**
Chairman Gayle stated that the Governor vetoed the bill passed by the legislature, specifically referencing the lower income and elderly subsidy. Chairman Gayle mentioned that he and General Manager Slike will speak with the Governor about these issues.

b. **Ordot Post Closure Plan Update**
Receiver Representative Harvey Gershman presented to the Board, highlighting the GSWA Organizational Chart. He stated that the receiver concurs with the former Receiver Representative's recommendation to hire a contractor with CERCLA experience and a solid waste engineer with SWANA MOLO and RCRA experience to assist General Manager Slike. Gershman also reported that the leachate flow is trending downwards, noting that in 2022 it was likely due to GWA leaks.

Receiver Attorney Joyce Tang discussed PL 37-64, which was created for the Ordot Dump Reserve, and mentioned an update on the payment, indicating it would be about $1.5 million if the trust accounts are not funded. She briefly discussed the $30 million settlement with Kelley Drye and presented the Receiver's Recommendations. Option 1 is for GSWA to transfer necessary funds to fully fund the PCCE to the Receiver Trust Account. Option 2 is for GSWA to fully fund the PCCE, depositing it in a new RCRA-compliant Trust Account to be set up by the Receiver with the Bank of Guam. Tang emphasized that investment decisions would be made jointly with the approval of Comptroller Katherine Kakigi and the Receiver.

Harvey Gershman also presented the Post Closure Cost Estimate, stating that they needed clarification from GEPA because GEPA used a different inflation index for their estimates. Additionally, he updated the Board on the status of the two Receiver Trust Accounts. Attorney Tang discussed the calculation of damages in the GWA claim and provided their updates.

c. Layon Cells 1 and 2 Closure
Tabled.

d. Rate Case with Public Utilities Commission
Tabled.

VIII. New Business

None.

IX. Communications and Correspondence

None.

X. Public Forum: Members of the public to contact GSWA to be placed on the agenda if they wish to address the board.

None.

XI. Next meeting

The next meeting will be held via video conference on Thursday, June 20 2024.

XIII. Adjourn

Vice Chairwoman Hemlani motioned to adjourn meeting. Secretary Denney seconded the motion. Motion was passed unanimously, and the meeting was adjourned 2:37 p.m.

PERFORMANCE INDICATORS

RESIDENTIAL TRASH COLLECTION:	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	DIFFERENCE
NO. OF TRASH COLLECTIONS:	85,808	85,832	85,924	86,220	86,380	***160***
MISSED SERVICE:	362	434	491	272	650	***378***
CUSTOMER SERVICE:						
EMPLOYEE COUNT (PHONES):	2	2	2	3	3	-
EMPLOYEE COUNT (WALK IN):	2	2	2	1	1	-
EMPLOYEE COUNT (EMAILS & SUPERVISION):	1	1	1	1	1	-
TOTAL EMPLOYEE COUNT:	5	5	5	5	5	-
TOTAL WALK-INS:	1125	933	930	1,074	818	***(256)***
CALLS RECEIVED:	4,901	3,438	4,231	6,691	3,931	***(2,760)***
CALLS ANSWERED:	1,584	1,755	1,860	2,568	2,893	***325***
CALLS ABANDONED	3,132	1,665	2,039	4,079	1,038	***(3,041)***
ANSWER RATE:	32.32%	51.05%	47.67%	38.38%	73.60%	***35.22%***
AVERAGE WAIT TIME:	6:29	5:00	4:54	6:46	2:30	***19:44***
AVERAGE HANDLE TIME:	3:32	3:23	3:25	2:56	2:51	***-00:05***
AVERAGE TIME TO ABANDONMENT:	5:39	4:28	4:04	6:27	3:18	***-03:09***

****ONE CSR ON MEDICAL LEAVE FROM 3/25 - PRESENT.***

Current Status and Implementation Report to Chace Anderson's Recommendations as of June 20, 2024

RECOMMENDATION FOR CHIEF OF ADMINISTRATION	CURRENT STATUS
1) Bring and keep the CSRs FTE at no less than 5.	GSWA currently employs 5 CSRs.
2) Continue with the plan to implement RAMS Pro Visual	In progress
RECOMMENDATION FOR ENGINEER SUPERVISOR	**CURRENT STATUS**
1) Develop management and operational plan for assuming Ordot Post Closure activities.	Procurement for Monitoring services in progress; Negotiations in progress with Brown and Caldwell for contract extension and scope of work.
2) GSWA should add an additional solid waste engineer with a Manager of Landfill Operations (MOLO) certification from SWANA and have contracted an engineering firm with CERCLA/Superfund experience.	GSWA's currently contracts with GGH who is MOLO certified.
RECOMMENDATION FOR OPERATIONS	**CURRENT STATUS**
1) Operations is an important portion of GSWA's work. Operators are the frontline workers for GSWA who customers see and talk with. Currently the manager of GSWA operations, titled Assistant GM, is vacant with no plans by GSWA management to fill the position. The supervision of operations is currently concentrated in the Residential Collections Supervisor in the absence of the Assistant GM being filled. When the Court transitions Ordot Dump Post Closure to GSWA, the GM's attention will be diverted more than it is now. It is recommended that operations have a devoted manager who oversees and evaluates the Residential Collections Supervisor and other staff.	Recruitment in progess.
2) Continue to Advocate for Temporary Labor to the PUC. Absenteeism in the trash business can hinder daily operations. Having a temporary labor source to pull labor from can eliminate the need for GSWA to hire more FTEs than is daily needed to cover unplanned absences.	GSWA continues to do this.
3) Recycling should be a benefit to the local society by keeping items out of the landfill. It should not be a free trash collection for customers. GSWA management is working with other groups to develop an education/marketing campaign for the curbside recycling collection service and that is commendable. But if contamination does not significantly drop after this campaign, then GSWA should consider going to a subscription basis for those who want recycling and collect customers on a once-a-month schedule thereby cutting the collection cost and servicing the customers who recycle.	Guhan Waste just repaired sorting equipment. GSWA will run pilot program to compare selected neighborhood recycling with general customers to measure contamination rate. Goal would be to re-educate all customers and implement with 5 day collection schedule with same day recycle collection
RECOMMENDATION FOR HHW AND GGH	**CURRENT STATUS**
1) Take one of the two current GSWA employees stationed at the HHW facility and utilize him for such things as vehicle parts inventory control and fluid checks in the trash collection vehicles at the end of every working day.	GSWA utilizes the Operations clerk for assisting in parts inventory and tracking.
2) The GM should provide to the Board of Directors a cost/benefit examination of large vs small trash cell designs and construction.	Presented June 20, 2024
RECOMMENDATION FOR HAULER TRANSFER STATION	**CURRENT STATUS**
1) GSWA should follow through with the Government of Guam's commitment to provide a vehicle escort on the said Haul Route until such time the Government of Guam corrects the road hazards along said Haul Route.	Discussed and rejected at May 8, 2024 Court Hearing, Guahan Waste is contractually liable
RECOMMENDATION FOR FLEET	**CURRENT STATUS**
1) When incorporating new equipment into operations, GSWA should have a paper trail on training operating personnel on the equipment.	Coordination of training is in progress with vendor
2) Implement a parts inventory software where each item in GSWA's inventory is barcoded and tracked to which truck it was used for.	GSWA's part inventory is very small and does not require special software or barcoding.
3) Part time assistance to the mechanic for inventory responsibility and fluid checks and refills at the end of the shift.	In progress
4) Quarterly report to the Board of Directors on rolling stock equipment. This report should designate each type of truck by its number, current miles, miles used during the quarter, maintenance and repair costs per quarter and total spent since purchase, [po0days it was down for repair during the quarter and since purchase, and years left on life expectancy.	This can be added to Trash talk report.
5) Quarterly report to the Board of Directors on in-and-out of house maintenance and repair in labor and parts; cost to date since beginning of fiscal year; GSWA expenditure on in-house mechanic in overtime.	This can be added to Trash talk report.
RECOMMENDATION FOR ISLAND WIDE	**CURRENT STATUS**
1) Lower the expected number of carts collected on a route by automated side loaders from 1,400 to 1,000.	Side Loaders are in the beginning stages of usage and training. Currently practicing on 560 homes. Also working with GWA to balance house counts, each route will have about 1k households

Guam Solid Waste Operations Fund
Operating Budget Revenues, Expenditures, Reserves
As of April 30, 2024

Unaudited

	Annual Budget Operations	Carryover ARPA	Modification	Carryover FY23 Fund Balance	Total Budget	April Budget	April 2024	Variance	% Variance	YTD Budget	YTD	Variance	% Variance
Revenues:													
Commercial Fees (Large)	9,758,051			0	9,758,051	802,014	854,161	52,147	*7%*	5,694,408	7,395,777	1,701,369	*30%*
Others - Government/Commercial Fees	987,518			0	987,518	81,164	1,879,007	1,797,843	*2215%*	576,276	3,076,889	2,500,613	*434%*
Residential Collection Fees, net 3% Bad Debt	7,951,648			0	7,951,648	653,546	651,849	(1,697)	*-0.3%*	4,640,264	4,561,589	(78,675)	*-2%*
Host Community Fees	300,000			0	300,000	24,657	70,100	45,443	*184%*	290,806	290,806	0	*0%*
Other Revenues	431,284			0	431,284	35,447	34,822	(626)	*-2%*	251,680	258,379	6,699	*3%*
Interest Income	0			0	0	0	89	89	*n/a*	0	631	631	*n/a*
Prior Year Revenues	0			0	0	0	0	0	*n/a*	0	0	0	*n/a*
Total revenues	**19,428,501**	**0**	**0**	**0**	**19,428,501**	**1,596,828**	**3,490,028**	**1,893,199**	*119%*	**11,453,434**	**15,584,071**	4,130,637	*36%*
Fund Balance Allocation	0	0		2,283,829	2,283,829	0	0	0	*0%*	1,195,658	1,195,658	0	*0%*
ARPA Budget Allocation	0	8,535,247		0	8,535,247	0	0	0	*0%*	2,278,957	2,278,957	0	*0%*
Transfer In - Recycling Revolving Fund	400,000				400,000	33,333	33,333	0	*0%*	233,333	233,333	0	*0%*
Total Revenues/Transfers In/ARPA Allocation	19,828,501	8,535,247	0	2,283,829	30,647,580	1,630,162	3,523,361	1,893,199	*116%*	15,161,382	19,292,019	4,130,637	*27%*
Expenditures by Object:													
Salaries and wages	4,002,582			0	4,002,582	307,047	**282,530**	(24,517)	*-8%*	**2,215,128**	**2,108,922**	(106,206)	*-5%*
Contractual services:													
Layon Operator	3,085,593			844,407	3,930,000	304,123	304,557	434	*0%*	2,168,296	2,329,416	161,120	*7%*
Layon Monitoring	420,000			0	420,000	35,000	28,107	(6,893)	*-20%*	232,172	232,172	0	*0%*
Harmon Hauler Station Operations	2,400,000			1,239,422	3,639,422	303,285	316,376	13,091	*4%*	2,122,996	2,272,817	149,821	*7.1%*
Ordot Postclosure care	2,000,000			0	2,000,000	166,667	166,667	0	*0%*	1,166,667	1,166,667	0	*0%*
Recycling Programs	605,098			0	605,098	44,592	23,947	(20,645)	*-46%*	352,974	197,307	(155,667)	*-44%*
GEPA Appropriation	202,992			0	202,992	0	0	0	*0%*	0	0	0	*0%*
Contractual Employees	500,000		475,635	0	975,635	81,303	94,730	13,427	*17%*	565,163	565,163	0	*0%*
Vehicle Maintenance	550,000			0	550,000	45,833	14,564	(31,269)	*-68%*	320,833	149,297	(171,536)	*-53%*
PUC/Rate Study Consultant/Legal Expenses/Ordot Expenses	180,000			0	180,000	2,220	2,220	0		119,650	119,650	0	*0%*
Others	482,695	1,080,000		200,000	1,762,695	69,629	51,665	(17,964)	*-26%*	281,572	245,470	(36,102)	*-13%*
Total contractual services:	10,426,378	1,080,000	475,635	2,283,829	14,265,842	1,052,651	**1,002,833**	(49,818)	*-5%*	**7,330,323**	**7,277,959**	(52,365)	*-1%*
Receiver	0			0	0	0	**102,600**	**102,600**	*n/a*	**0**	**673,287**	673,287	*n/a*
Travel	24,286			0	24,286	0	0	0	*0%*	8,366	8,366	0	*0%*
Supplies	451,655			0	451,655	37,638	37,298	(340)	*-1%*	263,465	261,002	(2,463)	*-1%*
Vehicle Supplies	300,000			0	300,000	25,000	18,395	(6,605)	*-26%*	175,000	144,160	(30,840)	*-18%*
Worker's compensation	1,000			0	1,000	83	0	(83)	*-100%*	0	0	0	*0%*
Drug testing	1,000			0	1,000	83	154	71	*85%*	583	931	348	*60%*
Equipment	10,242			0	10,242	5,950	5,950	0	*0%*	5,950	5,950	0	*0%*
Utilities - power	110,000			0	110,000	9,167	7,899	(1,268)	*-14%*	64,167	54,661	(9,506)	*-15%*
Utilities - water	18,500			0	18,500	1,542	858	(684)	*-44%*	10,792	5,128	(5,664)	*-52%*
Communications	61,515			0	61,515	5,126	4,888	(238)	*-5%*	35,884	33,742	(2,142)	*-6%*
Capital outlays	680,635	7,455,247	-475,635	0	7,660,247	56,720	56,720	0	*0%*	2,675,994	2,675,994	0	*0%*
Miscellaneous	243,708			0	243,708	20,309	19,434	(875)	*-4%*	142,163	156,072	13,909	*10%*
Reserves - Layon Landfill	200,000			0	200,000	16,667	16,667	0	*0%*	116,667	116,667	0	*0%*
Transfers to Host Community Fund	300,000			0	300,000	70,100	70,100	0	*0%*	290,806	290,806	0	*0%*
Transfer out to General Fund (Debt Service), Cell 3 Expenses	2,997,000			0	2,997,000	249,750	254,000	4,250	*2%*	1,748,250	1,778,000	29,750	*2%*
Other Expenditures	5,399,542	7,455,247	-475,635	0	12,379,153	498,134	**492,362**	**-5,772**	*-1%*	**5,538,087**	**5,531,478**	(6,609)	*-0.1%*
TOTAL EXPENDITURES:	**19,828,501**	**8,535,247**	**0**	**2,283,829**	**30,647,580**	**1,857,832**	**1,880,326**	**22,494**	*1.2%*	**15,083,539**	**15,591,647**	508,108	*3%*
				22,112,330									
Excess (deficiency) of revenues over (under expenditures							**1,643,035**				**3,700,373**		

Less: Carry Over Encumbrances/Expenditures:

Less: Obligations not included in Budget - Interest			-1,887,950
Net Change including allocated Fund Balance			1,812,423
Deduct: Budgeted Fund Balance			-1,195,658
Net Change of Revenues less Expenditures:			616,765

FY2024 SWOF Budget funding source includes Fund Balance allocation of $2.3 million.

Summary of Carry over Encumbrances:	Total Encumbrance	Payments	Balance
Fund Balance CY -Transfer for Interest Payment - OPCC	1,886,800	1,886,800	0
Vehicle Supplies	1,150	1,150	0
	1,887,950	1,887,950	0

Note:

This report is based on preliminary month end numbers and is subject to change based on DOA updates and accounting adjustments.

ARPA Funds revenues are allocated based on when they are expended.

Carry over encumbrances such as contracts and purchase orders funded by prior year receipts but expended this fiscal year.

Allowance is estimated at 3% of Residential Revenues.

Public Law 37-42 allocated to GEPA $202,992 to fund duties and responsibilities related to the closure, monitoring and opening of the island's landfill.

P.L. 37-42 allocated $19,428,501 to fund GSWA's budget.

P.L. 36-115 allocated $400,000 to from the Recycling Revolving Fund to GSWA to fund the Residential Recycling Program and is a continuing appropriation.

GUAM SOLID WASTE AUTHORITY FUNDS

FUND BALANCE as of April 30, 2024

Unaudited

	Operational Fund	Ordot Post Closure Fund	Total
Fund Balance, September 30, 2023 *unaudited*	7,032,938	4,912,400	11,945,338
Add: Revenues/Other Sources:	*18,096,362*	*1,351,266*	*19,447,628*
Transfers In- SWOF	*0*	*1,886,800*	*1,886,800*
	18,096,362	*3,238,067*	*21,334,428*
Less: Expenditures/Reserves:	*15,591,647*	*718,211*	*16,309,857*
Transfers Out - OPCC	*1,886,800*	*0*	*1,886,800*
Carry Over Encumbrances	*1,150*	*0*	*1,150*
	17,479,597	*718,211*	*18,197,807*
Net Operating Budget	*616,765*	*2,519,856*	*3,136,621*
Add back:			
Capital Outlay - Equipment Replacement reserves set asides	*397,037*	*0*	*397,037*
Layon Reserves	*116,667*	*0*	*116,667*
Total Net change in Fund Balance	**1,130,469**	**2,519,856**	**3,650,324**
Ending Fund Balance, April 30, 2024 (unaudited)	8,163,407	*7,432,256*	15,595,662

Note:

FY2024 SWOF Budget funding source includes Fund Balance allocation of $2.3 million.

Solid Waste Operations Fund
Operating Balance Sheet
As of April 30, 2024 and September 30, 2023
(Unaudited)

	As of 31-Mar-24	As of 30-Sep-23	Change	% Change
ASSETS				
Cash and cash equivalents, unrestricted	4,865,011	5,702,502	-837,491	-15%
Cash and cash equivalents, restricted	647,580	5,963,590	-5,316,010	-89%
Investments, Restricted	7,184,359	0	7,184,359	
Receivables, net:		0		
Tipping Fees	5,037,704	4,192,816	844,888	20%
Due from other funds		0		
Due from component units		0		
Deposits and other assets		0		
Total assets	17,734,654	15,858,908	1,875,746	12%
LIABILITIES AND FUND BALANCES (DEFICIT)				
Liabilities:				
Accounts payable	0	0	0	
Accrued payroll and other	759,099	1,625,285	-866,186	-53%
Due to component units	0	0		
Due to other funds	1,075,677	2,240,108	-1,164,431	-52%
Deferred revenue	256,038	0	256,038	n/a
Deposits and other liabilities	48,177	48,177	0	
Total liabilities	2,138,991	3,913,570	-1,774,579	-45%
Fund balance (deficit):				
Restricted, OPCC	7,432,256	4,912,400	2,519,856	51%
Committed	0		0	
Assigned	8,163,407	7,032,938	1,130,469	16%
Unassigned	0	0	0	
Total fund balance (deficit)	15,595,663	11,945,338	3,650,325	31%
Total liabilities and fund balances (deficit)	17,734,654	15,858,908	1,875,745	12%

Note:
This report is based on preliminary month end numbers and is subject to change based on DOA updates and accounting adjustments.

Operating Budget Revenues, Expenditures

As of April 30, 2024

Unaudited	FY2024 Actuals to Date	FY2023 Actuals to Date	Variance	% Increase (Decrease)
Revenues:				
Commercial Fees (Large)	7,395,777	5,411,745	1,984,032	36.7%
Others - Government/Commercial Fees	3,076,889	597,545	2,479,344	414.9%
Residential Collection Fees (net 3%)	4,561,589	4,754,943	(193,354)	-4.1%
Host Community Fees	290,806	192,836	97,970	50.8%
Other Revenues	258,379	250,537	7,842	3.1%
Interest Income/Gains/Losses	185,228	1,207	184,021	15246.2%
Prior Year Revenues	0	0	0	0.0%
Total Revenues	**15,768,669**	**11,208,813**	**4,559,856**	**40.7%**
ARPA Budget Allocation	2,278,957	2,011,571	267,386	13.3%
Transfers In- Reimb from Cell 3	0	0	0	0.0%
Transfers In - Recycling Revolving Fund	233,333	233,333	0	n/a
Total Other Resources/Transfers In	2,512,290	2,244,904	267,386	11.9%
Total Revenues/Other Resources/Transfers In:	**18,280,959**	**13,453,716**	**4,827,242**	**35.9%**
Expenditures by Object:				
Salaries and wages - regular	1,389,346	1,189,870	199,475	16.8%
Salaries and wages - overtime	153,104	186,245	(33,141)	-17.8%
Salaries and wages - fringe benefits	566,473	473,338	93,136	19.7%
	2,108,922	1,849,453	259,470	14.0%
Contractual services:				
Layon Operations	2,329,416	2,228,086	101,330	4.5%
Layon Others	232,172	476,957	(244,785)	-51.3%
Harmon Hauler Station Operations	2,272,817	2,198,688	74,129	3.4%
Ordot Postclosure care (OPCC)	718,211	1,242,133	(523,922)	-42.2%
Recycling/Other Programs	197,307	479,686	(282,379)	-58.9%
GEPA Appropriation	0	34,754	(34,754)	-100.0%
Contractual Employees	565,163	813,122	(247,959)	-30.5%
Vehicle Maintenance	149,297	597,427	(448,130)	-75.0%
PUC/Legal Expenses	119,650	100,250	19,400	19.4%
Other Contractual	245,470	252,413	(6,943)	-2.8%
Total Contractual	6,829,501	8,423,516	(1,594,012)	-18.9%
Receiver	673,287	387,755	285,532	73.6%
Travel	8,366	14,485	(6,119)	-42.2%
Supplies	261,002	316,626	(55,624)	-17.6%
Vehicle Supplies	145,310	139,897	5,413	n/a
Worker's compensation	0	0	0	0.0%
Drug testing	931	1,398	(467)	-33.4%
Equipment	5,950	30,733	(24,783)	-80.6%
Utilities - power	54,661	75,936	(21,275)	-28.0%
Utilities - water	5,128	5,757	(629)	-10.9%
Communications	33,742	32,567	1,175	3.6%
Capital outlays	2,278,957	115,192	2,163,765	n/a
Miscellaneous	156,072	161,541	(5,470)	-3.4%
Reserves	0	0	0	0.0%
Transfers to Host Community Fund	290,806	192,836	97,970	50.8%
Transfer out to General Fund (Debt Service), Cell 3 Expenses	1,778,000	1,776,687	1,313	0.1%
Other Expenditures	5,018,923	2,863,655	2,155,269	75.3%
TOTAL EXPENDITURES:	**14,630,635**	**13,524,381**	**1,106,258**	**8.2%**
Excess (deficiency) of revenues over (under expenditures	3,650,324	-70,668	3,720,992	-5265.5%
Other financing sources (uses),		0		
Transfers in from other funds	0	0	0	
Transfers out to other funds	0	0	0	
Total other financing sources (uses), net	0	**0**	0	
Net Change in Fund Balance:	**3,650,324**	**-70,668**	**3,720,992**	-5265.5%
Beginning Fund Balance, 09-30 (audited)	11,945,338	10,190,449	1,754,889	17.2%
Ending Fund Balance, April (unaudited)	15,595,660	10,119,781	5,475,879	54.1%

Note:
This report is based on preliminary month end numbers and is subject to change based on DOA updates and accounting adjustments.

TYPHOON MAWAR
Typhoon related Revenues and Government Reimbursement
May 29, 2023 to January 2024

Site	May 29 to June 30	July	August	September	FY2023 Total	October	November	December	January	FY2024 Total	Grand Total
DPW Typhoon Waste/Sites	161,280.77	97,222.85	19,359.79	84,876.87	362,740.28	106,088.27	5,293.64	53,263.94	13,773.62	178,419.47	541,159.75
Mayor's Typhoon Waste	10,024.98	0.00	0.00	0.00	10,024.98	0.00			322.31	322.31	10,347.29
Commercial Typhoon Waste	272,871.07	0.00	0.00	0.00	272,871.07	31,644.65	9,418.89	47,828.42		88,891.96	361,763.03
Residential Typhoon Waste	0.00	628,300.00	0.00	0.00	628,300.00	0.00				0.00	628,300.00
Residential Transfer Stations	0.00	77,550.00	0.00	0.00	77,550.00	0.00				0.00	77,550.00
PFM/Commercial	0.00		23,782.79	45,574.02	69,356.81	340,977.15	110,584.80			451,561.95	520,918.76
ECC/Commercial	0.00	0.00	383,218.49	224,404.90	607,623.39	318,599.04	438,983.50			757,582.54	1,365,205.93
Typhoon Revenues/Reimbursement Grand Total:	444,176.82	803,072.85	426,361.07	354,855.79	2,028,466.53	797,309.11	564,280.83	101,092.36	14,095.93	1,476,778.23	3,505,244.76

Special Waste
Tonnage and Revenue Report
October 2023 - April 2024

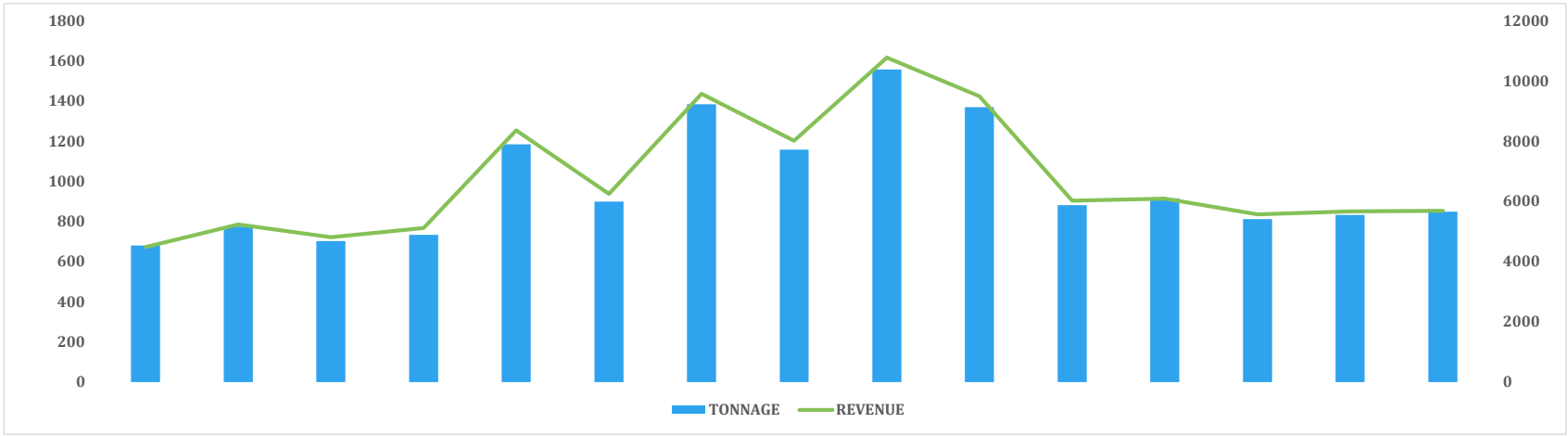
	OCT	NOV	DEC	JAN	FEB	MAR	APR	TOTAL
Tonnage	258	54	130	270	81	1,316	11,309	13,418
Revenue	$ 42,861	$ 9,646	$ 21,730	$ 46,318	$ 13,869	$ 208,256	$ 1,770,098	$ 2,112,778

Special Waste Type by Tons:

	OCT	NOV	DEC	JAN	FEB	MAR	APR	TOTAL	% of Tons
Treated Wood	258	54	130	270	70	142	176	1,100	8%
Rubberized Paint					11			11	0.1%
Regulated Soil					0	1,122	10,936	12,059	90%
Non-Regulared Soil						51	197	248	2%
TOTAL	258	54	130	270	81	1,316	11,309	13,418	100%

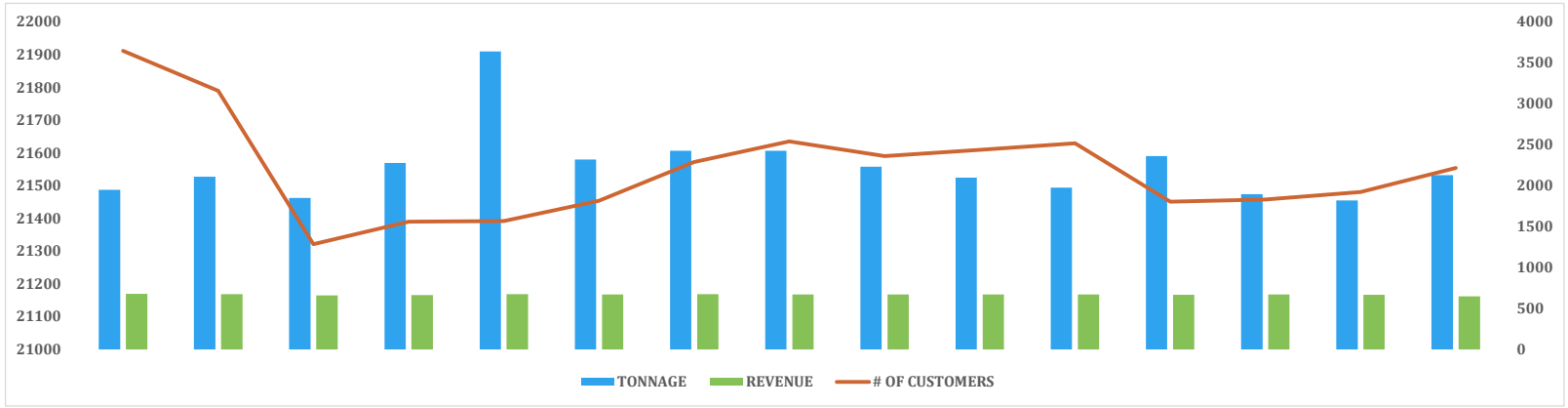
Commercial/Military Revenue & Tonnage
Period February 2023 - April 2024
Fifteen (15) months

	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
TONNAGE	4,536	5,169	4,683	4,889	7,898	5,994	9,225	7,717	10,388	9,130	5,881	6,099	5,414	5,552	5,655
REVENUE	$ 674	$ 786	$ 722	$ 768	$ 1,254	$ 937	$ 1,436	$ 1,202	$ 1,617	$ 1,424	$ 903	$ 914	$ 835	$ 850	$ 854



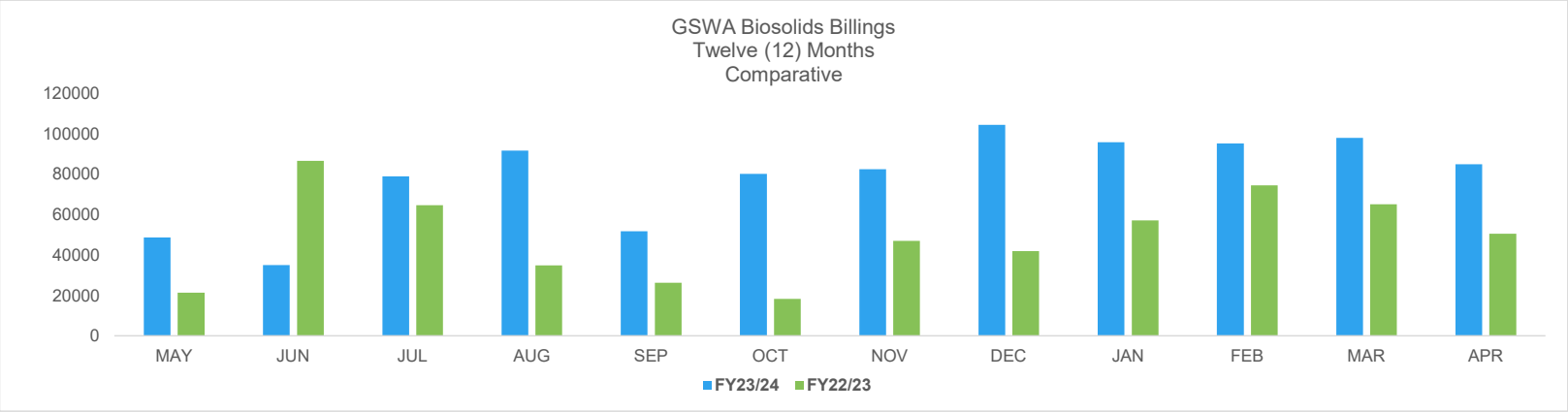
Residential Revenue & Tonnage
Period February 2023 - April 2024
Fifteen (15) months

	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
TONNAGE	1,951	2,114	1,854	2,281	3,643	2,323	2,428	2,428	2,236	2,102	1,978	2,365	1,897	1,824	2,133
REVENUE	$ 681	$ 679	$ 663	$ 664	$ 678	$ 672	$ 677	$ 673	$ 674	$ 673	$ 674	$ 670	$ 672	$ 669	$ 651
# OF CUSTOM	21,912	21,790	21,322	21,391	21,393	21,455	21,573	21,636	21,591	21,610	21,630	21,452	21,458	21,481	21,555



Guam WaterWorks Authority Biosolids
Billings Comparative
Twelve (12) Months Comparative

	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
FY23/24	$ 48,860	$ 35,164	$ 79,091	$ 91,761	$ 51,868	$ 80,266	$ 82,601	$ 104,520	$ 96,030	$ 95,429	$ 98,195	$ 85,019
FY22/23	$ 21,457	$ 86,755	$ 64,783	$ 35,015	$ 26,430	$ 18,316	$ 47,135	$ 41,967	$ 57,200	$ 74,600	$ 65,312	$ 50,589



Stockpile of sludge in a temporary drying bed that will likely be disposed during this fiscal year estimated to be around $340,000.
We are expecting a estimated decrease between 50% to 70% of the Northern District plant for the remainder of the fiscal year.

KEY INDICATORS
As of April 30, 2024

Indicators	Target	Feb-24	Mar-24	Apr-24
Days in Cash	90	74	75	80
Residential Collection Rate:				
* Month to Date	98%	105%	103%	104%
* Year to Date	98%	102%	102%	102%
Commercial Collection Rate:				
* Month to Date	98%	91%	99%	62%
* Year to Date	98%	111%	109%	97%
Account Receivable Days	60	56	58	72
Account Payable Days	30	60	45	Pending
Residential Customers	21,691	21458	21481	21555
Trucks Procured/Purchased - FY2023	6	6	6	6
Trucks Procured/Purchased - FY2024	4	4	4	4
Trucks Not Delivered	4	4	4	4
Plastic	5%	0	0	0
Contamination Rate	25.0%	100%	100%	100%

Note: April 2024 includes a charge of $1.7 million of contaminated soil.

GUAM SOLID WASTE AUTHORITY

LOURDES A. LEON GUERRERO
Governor of Guam

JOSHUA F. TENORIO
Lt. Governor of Guam

IRVIN L. SLIKE
General Manager

June 14, 2024

MEMORANDUM

To: GSWA Board of Directors

From: Irvin L. Slike, General Manager

Subject: Proposal for Alternative Plan for Layon Landfill Cell 4

Board Members,

The Federal Receiver has developed a design and construction plan for Layon Landfill Cell 4. However, I have formulated an alternative plan that deviates from the Receiver's design.

Enclosed, please find a 2016 generic study on landfill siting, construction, and operation, specifically page 8, section 18.4.1, which recommends landfill cells be between 3 to 8 acres with a lifespan of 1 to 3 years. This memorandum aims to explain the rationale behind my proposed plan and its benefits compared to the existing design.

The attached study and previous discussions between GSWA General Managers and Board members underscore the need for smaller landfill cells, primarily to mitigate leachate generation and manage rainfall effectively. Currently, Layon's Cell 3 spans 13 acres with an operational life of 8 years, which contradicts the recommendations for optimal cell size and lifespan. Early in my career, larger cells with extended lifespans up to 8 to 12 years were often advocated by design engineers due to cost savings on liner materials and reduced frequency of design, permitting, procurement, and construction processes.

However, my experience with Waste Management and the City of Winnipeg has demonstrated the effectiveness of smaller cell designs. I successfully implemented a landfill master plan that incorporated smaller cell configurations, sequential closures, and detailed planning for leachate generation, landfill gas production, and soil management which included detailed estimates of soil quantities to eliminate stockpiling. These plans streamlined the permitting process and allowed for strategic scheduling of cell construction and closures.

Additionally, I was able to craft 5-year design/build contracts for both organizations that spanned at least two landfill cells and their closures within the time period. Future design/build contracts adhered to the overall master plan, with cell construction and closures timed for optimal weather scenarios. This strategic approach achieved economies of scale for liner material delivery and installation. Moreover, sequential cell construction allowed new cells to be built while the current cell was nearing completion. As long as no waste was placed in the newly completed landfill cell, any accumulated rainwater was efficiently pumped out to existing stormwater ditches.

This proposed plan also significantly reduces costs associated with cell construction and post closure care financial commitments. By adopting smaller cells and sequential closures, we can reduce post-closure care obligations, potentially removing a third of these financial commitments from GSWA's books by the end of Layon's 75-year operating life. The enclosed cost-benefit analysis indicates an additional $3,740,000 in construction costs for Cell 4, necessitating an additional $900,000 per year or a $4 per month increase per customer. However, this model does not account for potential savings from reduced leachate management and more efficient soil handling.

While the Receiver's plan for Layon Landfill Cell 4 is well-developed, my proposed alternative offers significant long-term benefits through cost savings, operational efficiency, and reduced post-closure liabilities. These concepts were discussed from time to time at GSWA Board meetings, but it was never formalized as a reason to deviate from the Receiver's plan for Layon.

Si Yu'os Ma'ase,

Irvin L Slike

IRVIN L. SLIKE

Attachments

Landfill Design and Operation

Chapter · August 2016

DOI: 10.1061/9780784414101.ch18

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CHAPTER 18

Landfill Design and Operation

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18.1 INTRODUCTION

Municipal solid waste landfills (MSWLFs) receive household waste. MSWLFs can also receive non-hazardous sludge, industrial solid waste, and construction and demolition debris. Modern landfills are well-engineered facilities that are located, designed, operated, and monitored to ensure compliance with federal regulations. Solid waste landfills must be designed to protect the environment from contaminants which may be present in the solid waste stream. The landfill siting plan prevents the siting of landfills in environmentally-sensitive areas while on-site environmental monitoring systems monitor for any sign of groundwater contamination and for landfill gas, and provides additional safeguards. In addition, many new landfills collect potentially harmful landfill gas emissions and convert the gas into energy.

This chapter provides a comprehensive but brief discussion on all aspects associated with landfill design, construction and operation. Siting, regulations and other important steps that need to happen before design stage are also presented in brief. Information on monitoring and post closure requirements is discussed at the end of the chapter. It should be noted that discussions provided on landfill design are qualitative as they do not include detailed designs. Readers are encouraged to refer to references included for detailed information on landfill designs.

18.2 TYPES OF LANDFILLS

Prior to 1950s landfills in the USA were merely dumpsites and there are still waste dumpsites in most developing nations. Contamination issues were not considered seriously due to a general belief that the leachate produced by waste is completely

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purified by soil and ground water. However, several studies conducted after mid 1950's proved otherwise (Vesilind et al. 2002). This led to the introduction of new and stricter regulations. Considering municipal solid waste (MSW) is less harmful compared to leachate produced by industrial wastes that included chemicals, waste in general was divided into two types: hazardous and nonhazardous (Bagchi 2004). New regulations eventually transformed nonhazardous waste dumpsites into "sanitary landfills." In the past any landfill that practiced use of a daily cover was considered to be a sanitary landfill. Today sanitary landfill refers to an engineered MSW disposal facility designed and operated to minimize environmental and health impacts. Sanitary landfilling continues to be and affordable and environmentally acceptable method of solid waste disposal (Reddy et al. 2009).

In a conventional sanitary landfill, waste is kept effectively dry by using a base liner and cover. Figure 18.1 shows a cross sectional view of a conventional sanitary landfill. Such design would prevent rain infiltration and the liquid resulting from biodegradation of waste, termed leachate, is collected at the bottom of the landfill and securely disposed. Containment and restriction of liquid infiltration retards degradation of MSW resulting in less complete and less predictable degradation that drags for years (Sharma and Reddy, 2004). Recent landfill mining activities show newsprint in a state of degradation such that news articles could be read in their entirety. Excavated waste was dated to 1949 by newsprint. Slow degradation of waste increases liability and also decreases return on investment of valuable landfill space.

In recent years, there has been a shift in philosophy of landfill design from the dry storage concept towards the bioreactor approach (Reddy et al. 2009). In the bioreactor approach, the moisture content of the MSW is increased by recirculation of leachate to enhance the biodegradation. This is a financially attractive

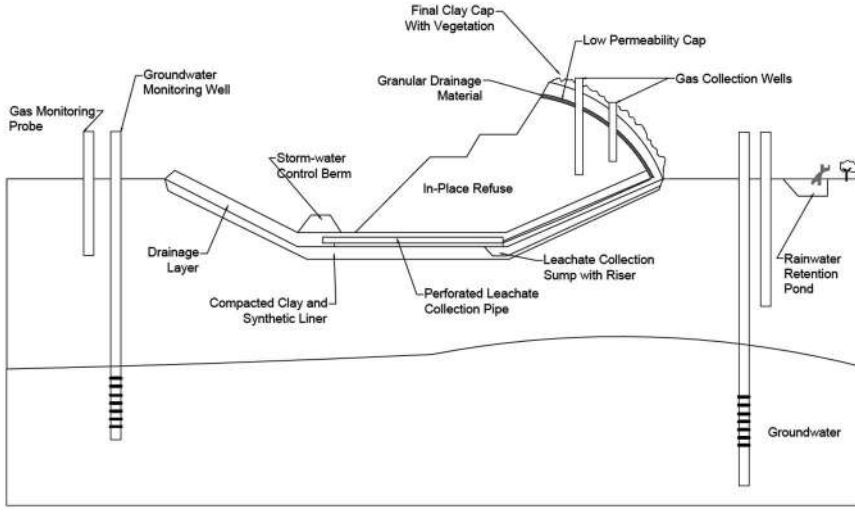

Figure 18.1. Cross section of a typical modern sanitary landfill

option as to securely dispose collected leachate would be expensive and by recirculating leachate one can eliminate the expensive treatment cost of leachate. In addition, due to high moisture content due to leachate recirculation, there is rapid degradation of waste. Hence bioreactor landfills offer a significant reduction in post-closure management time and operation cost (Reddy and Bogner 2003). SWANA (2001) defines a bioreactor landfill as:

> *"Any permitted Subtitle D landfill (see Section 20.3) or landfill cell, subject to new source performance standard/emissions guidelines, where liquid or air, in addition to leachate and landfill gas condensate, is injected in a controlled fashion into the waste mass in order to accelerate or enhance bio-stabilization of the waste."*

Bioreactor landfills can be categorized into three types: anaerobic, aerobic and hybrid. In anaerobic bioreactor landfills, biodegradation is accelerated by anaerobic microorganisms that do not use oxygen for cellular respiration. These microorganisms convert organic wastes into organic acids and ultimately into methane and carbon dioxide (Sharma and Reddy 2004). Aerobic bioreactor landfills utilize aerobic microorganisms that require oxygen for cellular respiration and produces carbon dioxide. Hybrid bioreactor landfills use a combination of above two approaches.

A "Sustainable Landfill" is a variation of the bioreactor landfill approach, which entails the operation of a waste cell in different modes to maximize resource and space recovery. One example is the Landfill Biocell pilot project run by the City of Calgary. During the first phase, the Biocell operates as an anaerobic bioreactor with leachate recirculation and gas extraction for power generation. The second phase is operated as an aerobic bioreactor and converts MSW to a compost-like product. The third phase of operation is mining to recover resources and space, allowing the empty cell to again receive waste and for the cycle to be repeated. These phases of operation are summarized in Figure 18.2. The Calgary Biocell is a full-scale pilot project that has been implemented to acquire data and demonstrate the applicability of the Biocell concept under extremely cold temperatures.

Bioreactor landfills are becoming increasingly popular as a sustainable alternative to dry landfills. New design guidelines and regulations are being introduced for bioreactor landfills, but it happens at a very slow pace. Sustainable landfills have not become a reality at a commercial level yet. Within this context, rest of the topics in this chapter is primarily focused on design, construction and maintenance of conventional MSW landfills. Bioreactor landfill approach is also briefly discussed wherever it is appropriate.

18.3 SITING AND REGULATORY REQUIREMENTS

Siting a landfill is a lengthy process and is very important that the selected site needs to be acceptable to general public. Usually the process begins with drawing a circle using a search radius keeping the MSW generator at its center. Search radius

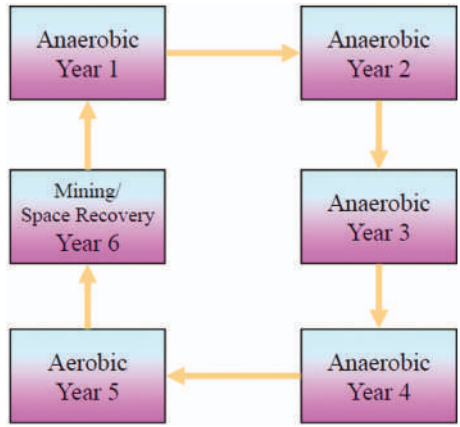

Figure 18.2. Phases of Biocell Operation with example durations
Source: Hsieh et al. 2008; © ASCE

is determined by the economics of MSW hauling. If the general public is going to be affected due to location chosen, they need to be informed immediately. Key aspects of the siting process are discussed briefly in the following paragraphs.

18.3.1 Size of the landfill

The required volume of the landfill should be calculated based on the expected future waste generation and the expected life of the landfill. Foot print area of the landfill can be estimated once the depth is finalized. Service, buildings, access roads, buffer zones and etc. must be included in estimating the general size of the landfill as a facility.

18.3.2 Traffic and Access

Landfill generated traffic (during construction and operation) can give rise to noise, vibration, exhaust emissions, dust, dirt and visual intrusion. Heavy vehicles on narrow roads may create traffic management issues including delays to other traffic, damage to roads and can be a source of complaint. The following should be evaluated as part of the site selection process:

- Distance of potential sites from waste generation areas where regard should be taken to the Proximity Principle and objectives of County Development Plans and Local Area Plans.
- Proximity to the existing national/regional road or rail network and expected vehicle movements where landfill should have good access to national or regional road routes or rail lines.
- Any required upgrading or new road infrastructure to accommodate additional traffic.
- The residential nature of potential access routes.

18.3.3 Site-specific Information

A comprehensive study should be performed to collect all pertinent information about the site and the vicinity that may affect the final decision of selection as well as construction/maintenance of the landfill. Following list includes the most important aspects that need attention:

- Soil, topographic, floodplain, land use, road, and utility maps
- Soil/geological reports
- Presence of water wells
- Aerial photographs
- Flood insurance rating
- Nearby wetlands and nature preserves
- Real estate values
- At least 15 miles away from an airport to avoid impact from birds

18.3.4 Site Hydrology

A hydrogeological report should be prepared for the selected site. To compile this report, a comprehensive site investigation program should be performed with the following key components (Sharma and Reddy 2004): soil boring, test pits, groundwater sampling and testing, and field and laboratory hydraulic conductivity.

18.3.5 Permits

Once the site selection is completed and an environmental impact study that includes traffic analysis is performed, the project details are presented to state and local authorities for approval. Obtaining a development permit is the first of many steps. In addition to submission of all documents and proof of addressing any issues encountered, the process may also include public hearings about the proposed project (Sharma and Reddy 2004). Development permit only permits the construction of a landfill. Once the construction is completed, the owner must request for an operating permit to become operational.

18.3.6 Other Regulatory Issues

Many countries have adopted statutes governing standards for solid waste management. These statutes allow regulatory bodies to impose minimum standard for landfills. Therefore, it is necessary to obtain information about all relevant authorities that have the control over different aspects related to landfill design and operation. To ease the process, Bagchi (2004) recommends construction of a flow diagram indicating regulatory requirements and the name of the authority involved in each operation to plan for the approval process. Design and maintenance of solid waste landfills are federally mandated by the Resources

Conservation and Recovery Act (RCRA), which was passed in 1976 by the US Congress. Amendments made to this act in 1984 made it stronger to address issues with hazardous waste but also specified guidelines for nonhazardous solid waste as well. MSW is covered by the Subtitle D of this legislation and hence landfills that fall under these requirements are usually called "Subtitle D landfills" (Vesilind et al. 2002). Local regulations should be taken serious as they may be stricter than the federal regulations. State and local authorities have the ability to adopt federal regulations or to develop new laws and regulations that are more stringent. Fulfilling regulatory requirements is usually a lengthy process and it may take few years. Note that as opposed to North American policy on waste management, the European Union (EU) encourages recycling and discourages landfilling. The policy of EU on waste management can be summarized as (Environmental Protection Agency of Ireland 1997):

- Prevention of waste
- Reducing the quantity of non-recoverable waste
- Recycling and reusing waste to the maximum extent for raw material and energy
- Disposing safely of any remaining wastes which cannot be recovered

18.3.7 Additional Regulatory Requirements for Bioreactor Landfills

Similar to conventional dry landfills, bioreactor landfills must also meet requirements of RCRA Subtitle D. As per the Code of Federal Regulation 40CFR part 258, introduction of leachate or other nutrients into waste is allowed (USEPA 2002). However, leachate recirculation is only allowed in MSW landfills that have composite liners with minimum of 0.6 m thick compacted clay with hydraulic conductivity equal or less than to 10^{-7} cm/s.

18.4 TYPICAL LANDFILL CONFIGURATIONS

Both above-ground and below-ground landfill configurations are commonly used. Four such configurations are given in Figure 18.3. Figure 18.3 (a) is an *area fill* (above ground) that requires no excavation. It is the best suited for flat terrains with shallow groundwater elevations. Figure 18.3 (d) is a below-ground option called *valley fill* (or *canyon fill*) used in mountainous terrains. Figure 18.3 (c) is *above and below ground fill* and Figure 18.3 (b) is a *Trench fill,* and both are combined above and below ground options. These are suitable for relatively flat areas. Trench fills are often used for small scale waste streams. Few other important aspects related to landfill configurations are briefly discussed in the following subsections. Figure 18.4 shows excavation for Calgary Biocell which is *above and below ground fill.*

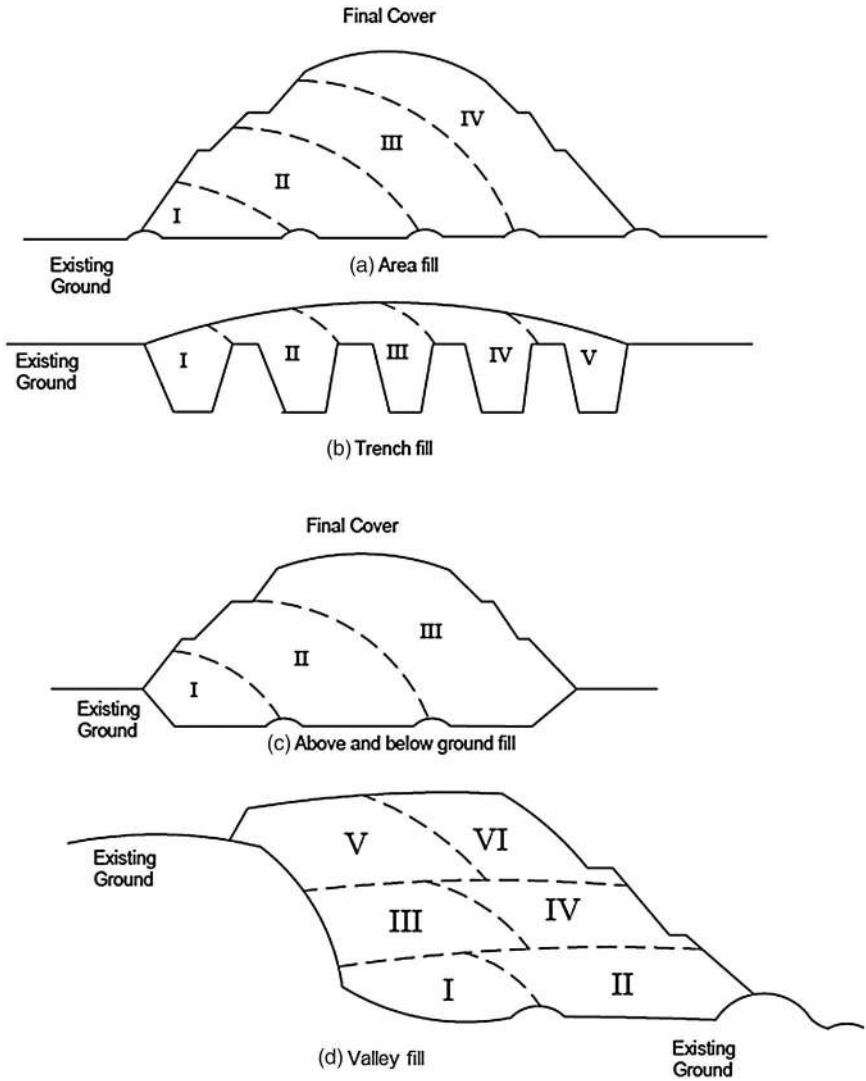

Figure 18.3. Different landfill configurations
Source: Adapted from Qian et al. (2002)

18.4.1 Cell Layout

Waste footprint area is divided into cells and usually the landfill is constructed one cell at a time to keep the initial capital cost to a minimum. This will also help to minimize the leachate generation and the costs associated with stockpiling of excavated soils. Typical cell size often varies between 2 to 8 acres (Sharma and Reddy 2004). Cell filling may take from 1 to 3 years.

Figure 18.4. Excavation of Calgary Biocell

18.4.2 Water Table, Aquifers, and Bedrock

Regulatory requirements usually dictate the distance to the water table from the sub-base. If not, sub-grade must be kept above water table. Excavating bedrock adds a drastic increase to the total cost. Keeping the base near or above bedrock is encouraged wherever possible.

18.4.3 Landfill Foundation and Slope Stability

Landfill foundation should avoid any previously mined areas or sink holes beneath. If located below water table, uplifting can become an issue as well. This is really critical during the construction phase. If there are any aquifers with artesian pressures then a sufficient gap between the sub-base and the top of the aquifer must be maintained to achieve a factor of safety much greater than one. Stability of the excavated slopes as well as waste slopes needs to be checked to prevent failures. Limit equilibrium method is often used for slope stability analysis. It is important to evaluate both intermediate and final waste slopes. Seismic stability analysis is also required in addition to static analysis, if the landfill is located in a seismically active zone.

18.4.4 Site Development Plan

A master plan is needed to identify the location of the property boundary, optimal waste footprint, cell implementation phases and locations for various facilities. The facilities needed within the property boundary may include:

- Office buildings
- Scale and scale house

- Areas for truck loading and washing
- Stockpiling areas
- Leachate holding tanks
- Access roads
- Landfill gas collection system

18.5 KEY ASPECTS OF DESIGN AND CONSTRUCTION

Modern landfills are well-engineered facilities that are located, designed, operated, and monitored to ensure compliance with federal regulations. Landfill design involves designing of physical elements of the landfill as well as the operational systems. The major design components of a landfill are illustrated in Figure 18.1. They include: sub-base, liner, leachate management system, gas management system, final cap, and stormwater management.

18.5.1 Preparation of Landfill Sub-Base

It is important to have a properly prepared sub-base as the landfill liner is constructed directly on the sub-base. If sub-base is not properly compacted, waste compaction in the first few lifts becomes challenging. In Sandy soils, the general recommendation is to compact the sub-base to 85–90% of the relative density. During construction, density is usually checked at 30 m grid points (Bagchi 2004). Nuclear density gauge may be used to measure the *in situ* density. If there is clay in the sub-base, then consolidation characteristics of the material need to be investigated as well.

18.5.2 Liner Design

The primary objective of a liner system is to prevent contamination of soil and groundwater. It also facilitates collection and removal of leachate produced by the waste. In general a liner system consists of multiple layers of clay or geo-synthetics (mostly geo-membranes) to prevent movement of any liquid between the landfill and surrounding site. Liner material selection should be based on the type of waste and method of landfill operation. Leachate must not make any adverse effect on the liner material. Traditionally liners were made out of clay. If clay is in short supply, it can be mixed with sand to make a relatively impermeable soil liner. Clay does not cut down permeability completely. However, permeability in clay liners decreases with time, possibly due to clogging of the pore spaces by the contaminant from the landfill. One advantage of clay liners is that they are not easily damaged during installation or service.

Geosynthetic liners can limit leakage more efficiently, but they are susceptible to damage during installation. If heavy compaction equipment is expected to be used on a geosynthetic liner, the thickness of the drainage blanket needs to be

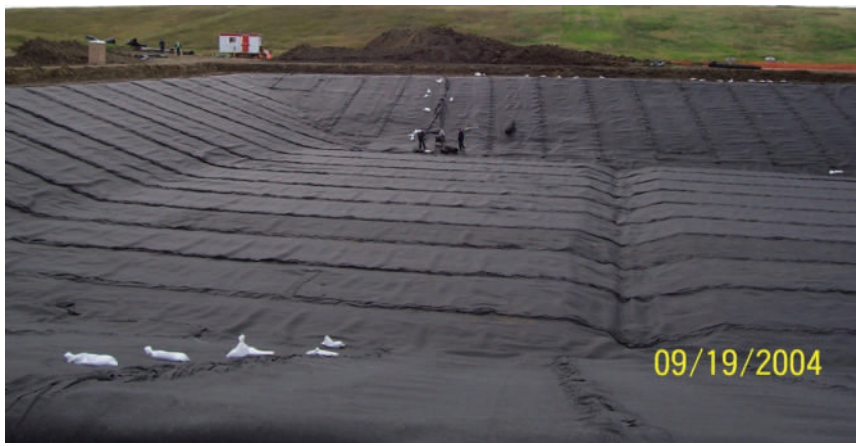

Figure 18.5. Calgary Biocell HDPE liner construction

Figure 18.6. Calgary Biocell composite liner construction

increased to protect the geosynthetic layer. High density polyethylene (HDPE) geomembranes are recommended for landfill use due to their resistance to most chemicals. Figure 18.5 shows Calgary Biocell HDPE liner construction and Figure 18.6 shows Calgary Biocell composite liner construction.

Landfills are designed as single-lined or multiple-lined landfills, depending on the applicable local, state or federal regulations. Some example cross-sections of both types are shown in Figure 18.7. A single liner system only includes either a clay liner or a geo-membrane. A composite single liner consists of a geo-membrane sitting on clay (or Geo-synthetic Clay Liner i.e. GCL). This

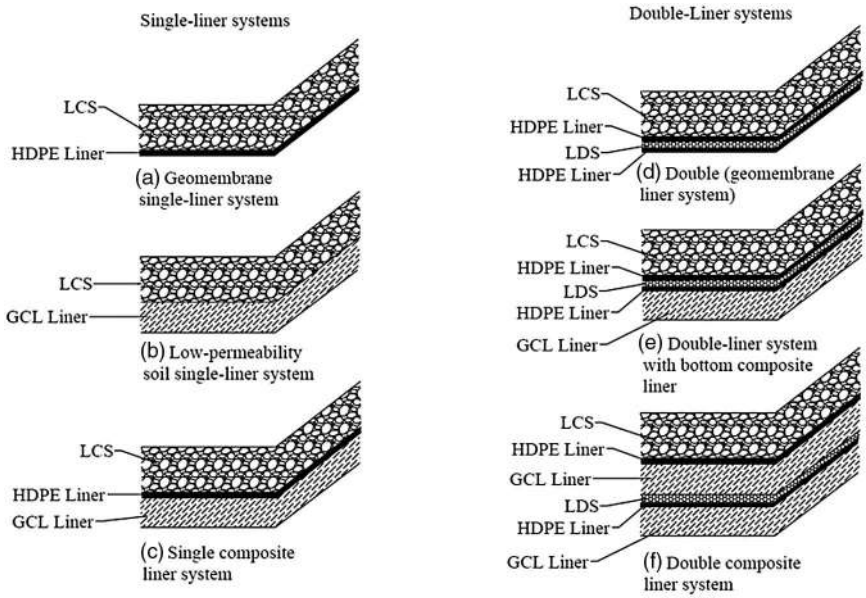

Figure 18.7. Example liner systems
Source: Adapted from Vesilind et al. 2002

configuration is the minimum requirement set by the RCRA for Subtitle D landfills.

Thickness of a liner always depends on the type of material selected. With geo-synthetics, the main concerns are puncture resistance during installation and the degradation due to ultraviolet rays. In general 1.5–2.0 mm thick geo-membranes are used for lining landfills (Bagchi 2004). Clay liner thicknesses are governed by the construction related issues and freeze–thaw degradation. On theoretical grounds at a minimum a 15–30 cm thick clay layer is recommended. However, thicker layers are used to better handle the construction related issues.

18.5.3 Leachate Management

RCRA regulations restrict leachate head on the liner to 30 cm for Subtitle D landfills. Leachate in excess of 30 m should be removed from the landfill. Leachate can be removed by using gravity flow or by pumping. Leachate collected from the landfill may be stored on site to be treated later, or transported for treatment and disposal off site. Surface impoundments and tanks are the typical leachate storage methods. The most economical option is to transport leachate to an offsite facility for treatment and disposal (Vesilind et al. 2002). This allows the owner/operator to focus on their primary goal of managing the landfill while the leachate is handled by an expert on wastewater treatment. From the owner/operator's side, this option

Table 18.1. Summary of leachate treatment options

Treatment Option	*Removal Objective*	*Comments*
Biological		Best used on "young" leachate
Activated sludge	BOD/COD	Flexible, shock resistant, proven, minimum SRT increases with increasing Organic strength, >90% BOD removal possible
Aerated lagoons	BOD/COD	Good application to small flows, >90% BOD removal possible
Anaerobic	BOD/COD	Aerobic polishing necessary to achieve high-quality effluent
Powdered activated carbon/act. sludge	BOD/COD	>95% COD removal, >99% BOD removal
Physical/Chemical		Useful as polishing step or for treatment of "old" leachate
Coagulation/ Precipitation	Heavy metals	High removal of Fe, Zn; moderate removal of Cr, Cu, Mn; little removal of Cd, Pb, Ni
Chemical oxidation	COD	Raw leachate treatment requires high chemical dosages, better used as polishing step
Ion exchange	COD	10–70% COD removal, slight metal removal
Adsorption	BOD/COD	30–70% COD removal after biological or chemical treatment
Reverse osmosis	TDS	90–96% TDS removal

Notes: COD – Chemical oxygen demand; BOD – biological oxygen demand; TDS – Total dissolved solids
Source: Data from Vesilind et al. 2002 and King and Mureebe 1992

also eliminates the burden associated with the permitting, testing, monitoring and reporting requirements.

Leachate treatment is challenging mainly because of the irregular production rates and variable compositions. A summary of commonly used treatment methods is presented in Table 18.1. More than one method is often required to achieve the intended goal. Leachate treatment practiced at the Al Turi Landfill in New York is an example for use of multiple methods (Vesilind et al. 2002). They used polymer coagulation, flocculation, sedimentation, anaerobic biological treatment, aerobic biological treatment, and filtration in their process (King and Mureebe 1992).

18.5.4 Landfill Gas Management

Gas collection systems can be designed as active or passive. Passive systems use vents to release landfill gas into the atmosphere. They are usually used in small landfills (<40,000 m^3). Passive gas venting system may consist of a series of isolated gas vents. A schematic of a passive vent is shown in Figure 18.8. Depth of a passive vent can be as deep as 75% of the landfill depth or as shallow as just few feet below the cap. One vent per every 7,500 m^3 is typically used as spacing (Vesilind et al. 2002).

An active venting system consists of a series of deep extraction wells linked by a header pipe. Active systems use vacuum pressure to collect landfill gas through extraction wells. Passive landfill gas collection systems use vertical as well as horizontal wells. Vertical wells are more popular and a cross sectional view is given in Figure 18.9. Gas is extracted using central blowers that are sized according to the volume of the gas that needs to be transported (Vesilind et al. 2002). Use of large pipes and minimizing the number of bends and valves used in them can help minimize head losses.

Spacing of wells is based on expected gas flow from the landfill. It is recommended to install them so the zones of influence overlap each other by a certain percentage. A 100% overlap may be achieved by installing them on corners of hexagons and a 60% overlap can be achieved if they are installed in a square array (Bagchi 2004). Gas extraction wells are connected to a blower through HDPE header pipes (15–20 cm diameter). Header pipes are embedded

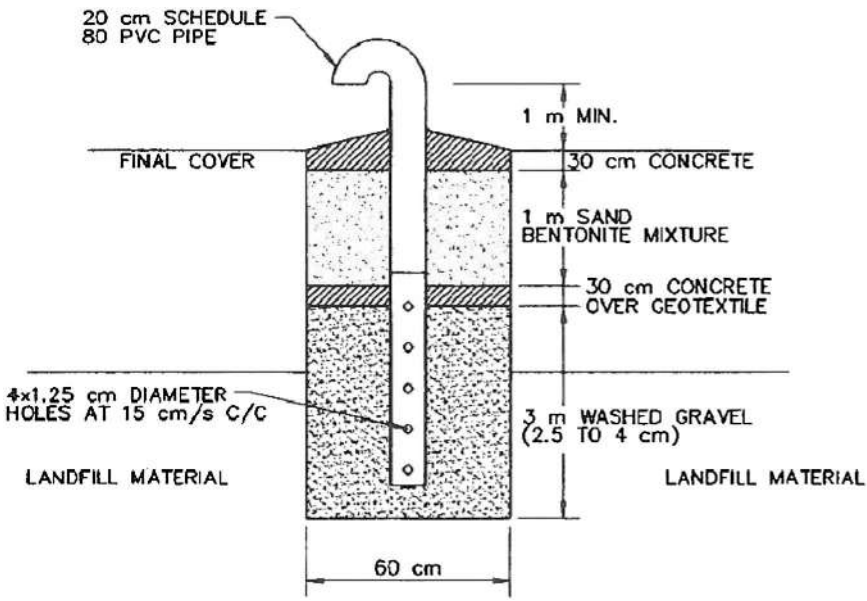

Figure 18.8. Schematic of a passive landfill gas vent
Source: Adapted from USACE 1995

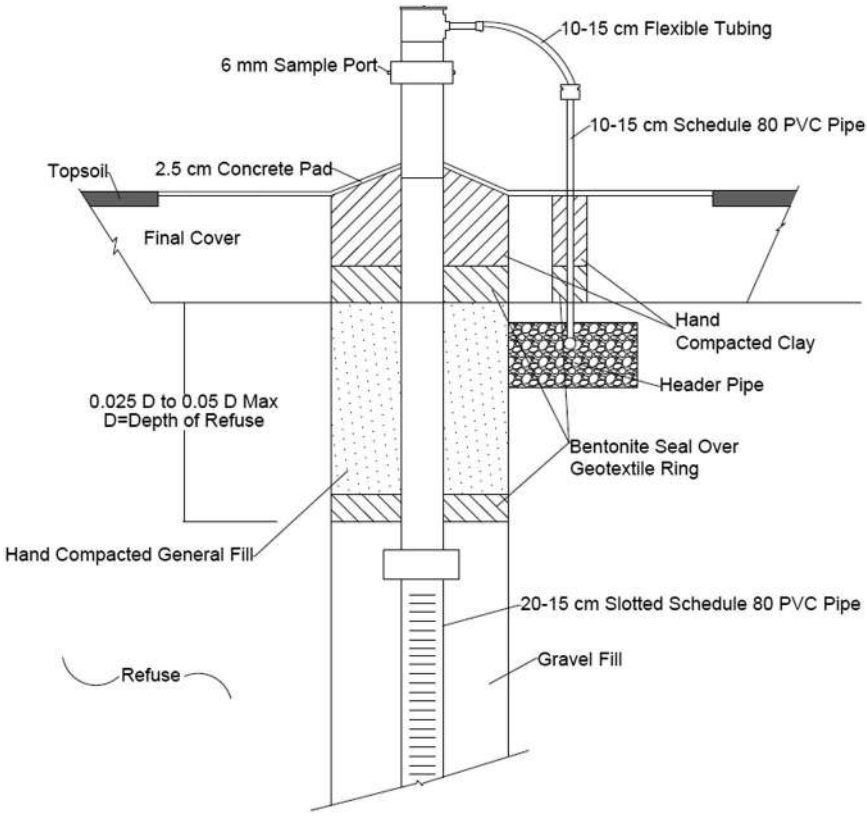

Figure 18.9. Vertical landfill gas extraction well
Source: Adapted from Bagchi 2004

in trenches filled with sand. The blower needs to be installed at a slightly higher elevation than the header pipes to facilitate dripping of condensate (Bagchi 2004). Condensation is a common occurrence due to the drop in temperature of the saturated landfill gas while moving in the header pipe. Condensate collected in the pipes may be released back into the landfill or treated similar to leachate. In colder climates one should be mindful of freezing of condensate and clogging of pipes.

18.5.5 Daily, Intermediate and Final Cover Design

Daily cover is the name given to the layer of compressed soil or earth which is laid on top of a day's deposition of waste on an operational landfill site. The cover helps prevent the interaction between the waste and the air, reducing odors and enabling a firm support upon which for vehicles to operate. While soils are the traditional materials employed in daily cover, alternative options such as "green waste", mixtures of paper sludge and tire derived aggregate (TDA) have displayed mechanical characteristics desirable for daily cover. When compared to traditional

soil layers, the paper sludge paste was 2-3 times lighter, at least two orders of magnitude more impermeable, and comparable in shear strength (Ng and Lo 2007).

Intermediate covers are placed on previously active working faces of the landfill that will not be covered with waste for an extended period of time, typically from about 7 to 60 days or longer. Intermediate covers have traditionally consisted of a layer of soil, and in some circumstances included the use of an additional layer of plastic scrim or geotextile material. The reason for using intermediate covers are in part the same as those for using daily covers – controlling odors from contaminants, blowing litter, vectors and fires.

A final cover (or cap) is placed on MSW, when it reaches its design height to minimize rainwater intrusion, spread of waste, and odor. USEPA regulations require that the cover be less permeable than that of the liner (Vesilind et al. 2002). Typical side slopes are from 1 : 3–1 : 4. As illustrated in Figure 18.10, they

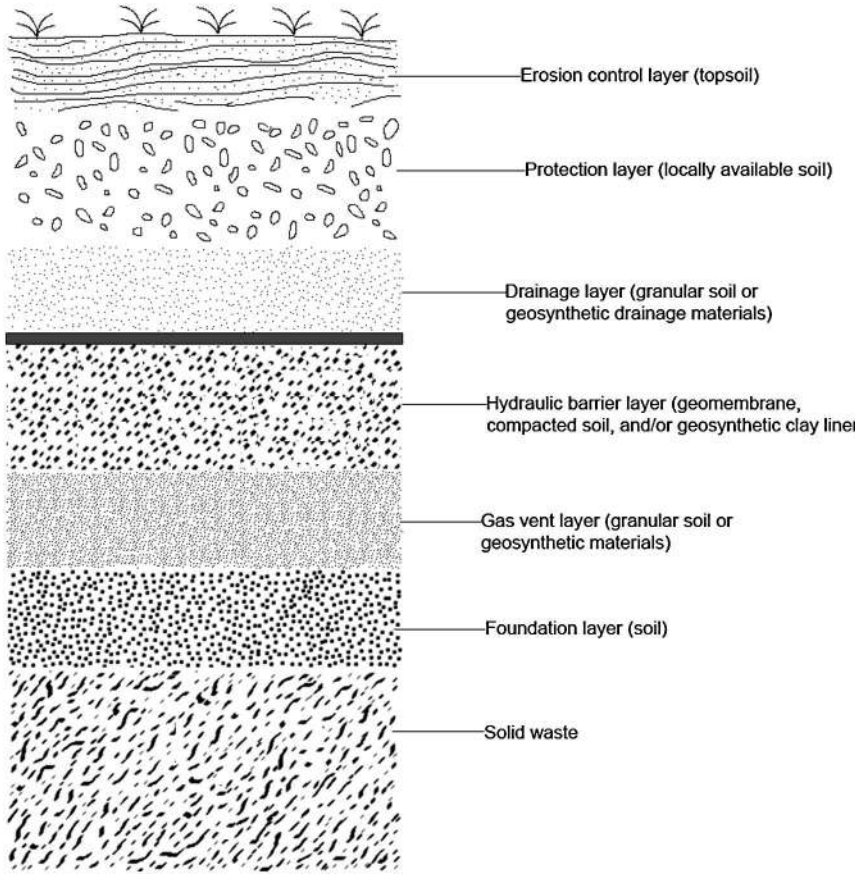

Figure 18.10. Cross-section of a typical final cover system
Source: Adapted from Qian et al. 2002

typically consists of a vegetation layer (at the top) followed by a supporting soil later, filter/drainage layer, hydraulic barrier, gas control layer, and a foundation layer.

A foundation layer of soil may be first introduced to ease the construction process. This layer is also known as the grading layer as it provides a stable foundation to build upon rest of the cover layers. A layer of geotextiles may be used below this layer. The gas control layer is then built on the foundation soil layer which consists of 15–60 mm of coarse grained material. Thickness selection should be based on the stability and the design of gas collection system.

A barrier layer is constructed on top of the gas control layer, using clay or GCL or a geo-membrane. If clay is the choice, it needs to be a minimum of 60 cm in thickness. If geo-membrane is used, minimum of 1 mm thick Low Density Polyethylene (LDPE) layer is recommended. Construction of a low permeability layer below the geo-membrane is also required to minimize infiltration in the event of a formation of a leak in the membrane.

Coarse sand may be used to construct the drainage layer (30 cm minimum thickness) on the clay barrier. Role of this layer becomes very critical if the barrier is geosynthetic. Soil-geosynthetic interface tends to lose friction when saturated. But an efficient drainage in the drainage layer can prevent that by avoiding unstable soil conditions leading to failure. A 45–90 mm layer of soil may be used as a protective layer. However, if the protective layer is sandy, having a separate drainage layer is not required. To facilitate vegetation, about 15 cm organic soil should be spread on the top of the protective layer. To encourage the growth of vegetation, necessary nutrients may be added to the top soil after consulting a horticulturist (Bagchi 2004). It should be noted that all these layers may not be needed in some cases. For example the gas control layer may be combined with the foundation layer or gas control layer may not be necessary if the waste in concern is not expected to produce large quantities of landfill gas (Qian et al. 2002).

18.5.6 Stormwater Management

Storm-water run-on and runoff is regulated by the RCRA for subtitle D landfills. Run-on and runoff control is needed to prevent stormwater getting into the active phase of the landfill to minimize leachate production. This is achieved by diverting stormwater from the active phase in the landfill. A facility must be capable of handling a peak volume from a 24 hour, 25 year storm (Vesilind et al. 2002; U.S. EPA 2005). Precipitation water falling on landfill needs to be routed to natural drainage paths. Stormwater is collected using stormwater ditches and then directed to stormwater basins before releasing to the natural environment (Figure 18.11). There can be several ditches running over a landfill depending on the estimated volume of runoff water through each section of the landfill. Principles used in open channel flows are applicable to ditch design, and therefore, the Manning equation is usually employed. One of the main difficulties associated with this process is to find an appropriate roughness values to be used in the

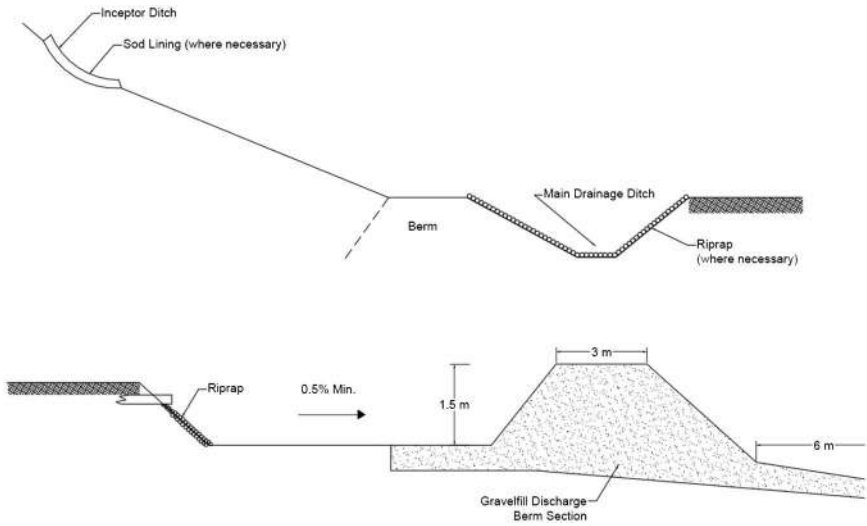

Figure 18.11. Example cross sections of a storm water ditch and a basin used in landfill designs
Source: Adapted from Bagchi 2004

Manning equation. Usually triangular or trapezoidal sections are used. If higher velocities are expected additional erosion protection measures such as rip-rap lining or erosion mats may be used (Bagchi 2004). About 10% base slopes are recommended to discourage erosion.

Sedimentation basins are used to reduce the total dissolved solids in in the surface water. Theses basins need periodic cleaning to remove collected sediments. Sedimentation is usually modeled using the Stoke's law. However, currents and particle interaction need to be taken into account (Bagchi 2004). Usually 2:1 length to width ratio with a depth of 1.5 m is recommended for storm-water basins in landfills. A new generation of landfill cover termed Phytocap is developed that could also address storm water issues. Phytocap is a natural soil-plant alternative to the conventional engineered landfill cover design. It requires less engineering input and has a lower cost than conventional impermeable covers as it only utilizes local recourses. It also offers the advantage of oxidizing methane to reduce landfill greenhouse emissions. This type of covers has the potential to make a significant difference in the way that developing countries are capping their waste sites.

18.5.7 Bioreactor Landfill Design

Most components of a bioreactor landfill are designed similar to that of a traditional dry landfill. Key exceptions are discussed in the next few paragraphs.

Usually liner consists of a geo-membrane placed over a clay layer. About 1.5 mm minimum thickness of geo-membranes and 1.2–1.5 m of clay layers are recommended. Some states in the US have more stringent requirements for

bioreactor landfills and specify a multiple liners. Gravel is recommended for the drainage blanket and a geotextile must be placed above it.

Traditional dry landfills are maintained at 12–15% of moisture whereas in the bioreactor landfills it is expected to be near 40% (Tchobanoglous and Kreith 2002). This is achieved through leachate recirculation. Leachate can be recirculated using many different techniques including surface wetting, spraying, and horizontal as well as vertical injection. Recirculation operation should be moved from one place to another with intense pumping rates to achieve better results. On site or offsite leachate treatment may not be necessary for bioreactor landfills due to recirculation of leachate. However, for developing nations with high organic content waste, excess leachate is generated, so on site or offsite leachate treatment may be necessary. The down side of the recirculation is that it is not a complete alternative to treatment. When there is a surplus of leachate the facility must be ready to address. When there is a shortage in leachate to be recirculated, there should be contingency plan for that as well.

Due to the increased unit weight of MSW as a result of leachate recirculation and also the large deformations expected from differential settlements, structural integrity of the leachate collection system must be checked. Increased diameters are also recommended for leachate collection system. Increased MSW moisture content poses stability issues in bioreactor landfills. Tchobanoglous and Kreith (2002) suggested conducting stability analysis considering 10% increase and 30–40% increase in moisture content in addition to a regular stability checks. Internal stability as well as stability along the geomembranes on side slopes must be checked. Theses checks should also take potential leachate mounding in to account.

18.5.8 Landfill Construction

Bagchi (2004) describes two different types of construction specifications: work-type based and performance based. In the work-type, the contractor is given detailed instructions on "what" and "how" and it is more close to traditional design-bid-build delivery method. Performance based method requires to specify the final product and not the process and more similar to the emerging delivery method of design-build. Performance based specification method is often preferred as the details necessary for the work-type method is difficult to gather and there is huge uncertainly. Hiring independent quality control staff is essential to the successful implementation of the project.

18.6 LANDFILL OPERATION

Having a detailed operation plan is a must to make the day-to-day landfill operation smooth. Tchobanoglous and Kreith (2002) present a detailed account on important factors that must be considered during the operation of a landfill. Operating schedule, filling plan, equipment requirements, operating records,

Table 18.2. Factors that must be considered during the operation of a landfill

Factors	*Remarks*
Communications	Telephone for emergencies
Days and hours of operation	Usual practice is 5 to 6 days/week and 8 to 10 h/day
Employee facilities	Rest rooms and drinking water should be provided
Equipment maintenance	A covered shed should be provided for field maintenance of equipment
Litter control	Use movable fences at unloading areas; crews should pick up litter at least once per month or as required
Pest control	Implementation and enforcement of daily cover
Operation plan	With or without the co-disposal of treatment plant sludges and the recovery of gas
Operational records	Tonnage, transactions, and billing if a disposal fee is charged
Salvage	No scavenging; salvage should occur away from the unloading area; no salvage storage on site
Security	Provide locked gates and fencing, lighting of sensitive areas
Spreading and compaction	Spread and compact waste in layers less than 0.6 m thick
Unloading Area	Keep small, generally under 30 m on a side; operate unloading areas for automobiles and commercial trucks

Source: Data from Tchobanoglous and Kreith 2002

billing information, traffic control, safety and security are among the top priorities. Other factors that must be considered are listed in Table 18.2. A proper plan assures safe working environment, optimizes use of the space, and also minimizes environmental damage. Important aspects related to landfill filling and special considerations for bioreactor landfills are discussed briefly in the following paragraphs.

18.6.1 Waste Acceptance at Landfills

During landfill operations, the waste collection vehicles are weighed at a weigh-bridge on arrival and their load is inspected for wastes that do not accord with waste acceptance criteria of the landfill. Afterward, the waste collection vehicles

use the existing road network on their way to the tipping face or working front where they unload their contents. After loads are deposited, compactors or bulldozers are used to spread and compact the waste on the working face. Before leaving the landfill boundaries, the waste collection vehicles pass through a wheel cleaning facility. If necessary, they return to the weighbridge in order to be weighed without their load. Through the weighing process, the daily incoming waste tonnage can be calculated and listed in databases for record keeping. In addition to trucks, some landfills may be equipped to handle railroad containers. The use of 'rail-haul' permits landfills to be located at more remote sites, without the problems associated with many truck trips. At the end of each operational day, the working face of the landfill must be covered for environmental and public health reasons. This helps to control odor, diseases, rodents, and spread of litter by wind and animals.

18.6.2 Waste Filling and Compaction

When the landfill is ready to accept waste, it is filled in lifts (see Figure 18.12). First lift is directly placed on the top of the liner. Each lift is compacted using heavy compactors to optimize usable landfill space. Types of waste, moisture content, lift thickness are the primary factors that govern the compaction. Compaction equipment selection depends on the slopes. Slopes steeper than 1:3 are better compacted by track-type tractors while shallower slopes are better handled by landfill compactors (Vesilind et al. 2002). Figure 18.13 shows the filling operation of Calgary Biocell and Figure 18.14 shows a truck unloading the collected waste. Waste in the first lift needs to be screened to remove any sharp objects so they may not damage the liner. Filling sequence must be defined during the design/permitting stage (Vesilind et al. 2002). The working face must be large enough to concurrently handle unloading waste from several trucks.

18.6.3 Bioreactor Landfill Operations

Sharma and Reddy (2004) points out that a bioreactor landfill should be treated similar to a large biological digester. The operational procedure must be aimed at enhancing the efficiency of the biodegradation. Therefore, close monitoring is a must. A daily operational plan may consider some type of waste pretreatment such as shredding and/or management of nutrients in the waste mass.

Shredding is the most common pretreatment option. Shredding allows waste to come out of plastic bags to enhance biodegradation. Separation or segregation of organic waste is another option. For an example, separation and exclusion of construction and demolition waste improve the percentage of biodegradable fraction in waste. Nutrients necessary for the biodegradation activities is generally supplied by the waste itself or through the recirculation of the leachate collected from the same landfill. The deficient nutrients may also be added to the recirculated leachate. In addition, other chemical or biological supplements may also enhance the biodegradation activities (Sharma and Reddy 2004).

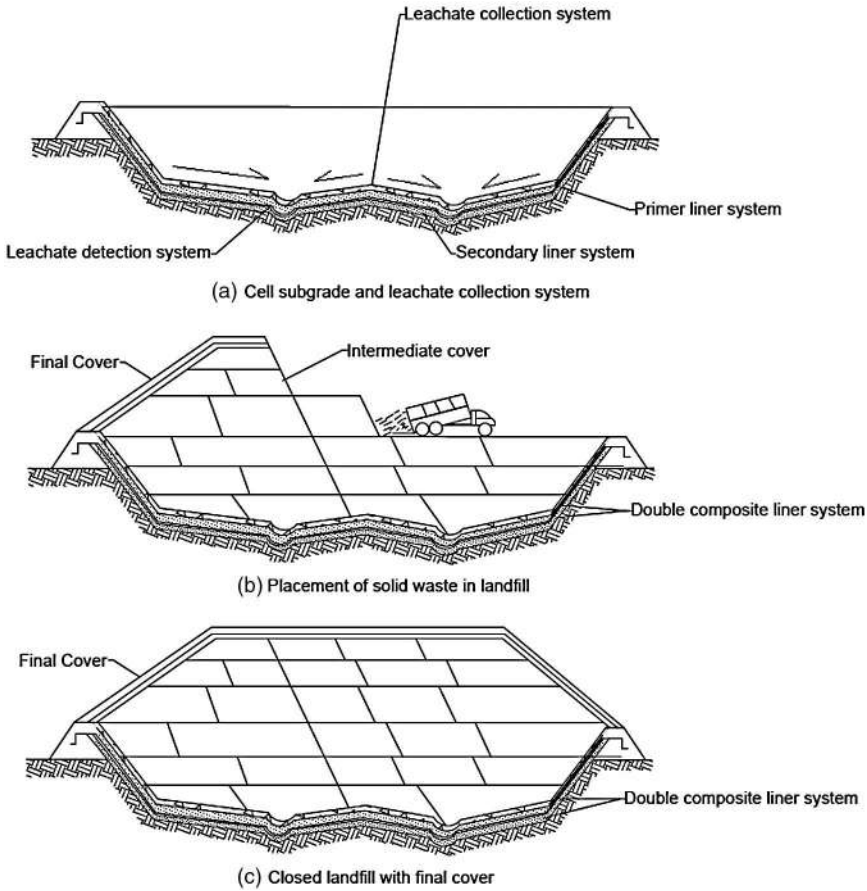

Figure 18.12. Construction sequence of a solid waste landfill
Source: Adapted from Qian et al. 2002

Heavy compaction of MSW is always encouraged in dry landfills. However, in bioreactor landfills it is somewhat questionable as heavy compaction can result in lower hydraulic conductivity and can make a negative impact on biodegradation. In the Calgary Biocell the deposited waste was neither compacted by earth moving equipment nor used daily cover. The waste in the Biocell was therefore allowed to compact by its own weight (Hettiarachchi et al. 2013). A back analysis performed by Hunte et al. (2007) revealed that during the construction of lift two of the Calgary Biocell, the unit weight of MSW in the bottom layer was approximately 5.6 kN/m^3.

The enhancement in biodegradation due to leachate recirculation may result in increased gas production even during filling. Therefore, the gas collection system may be installed during active filling, which is challenging in terms of construction and maintenance point of view.

Figure 18.13. Filling operation of Calgary Biocell

Figure 18.14. A truck unloading the collected waste

18.7 POST-CONSTRUCTION MONITORING

Monitoring is an important task during landfill construction/operation as well as after closure. Leachate, possible leakage through liner system, groundwater quality, landfill gas migration, and stability are among the most commonly monitored aspects.

18.7.1 Leachate Monitoring and Leakage Detection

Leachate monitoring includes monitoring leachate head on the liner as well as the quality and quantity of leachate produced. Monitoring leachate head on the liner is required to control the potential leakages due to high heads. Leakage is usually detected using a lysimeter installed below the crest of the liner, which is considered the point of maximum leakage potential. Location and the number of lysimeters can vary but at least more than one need to be installed (Vesilind et al. 1988). Leakage detection is performed by monitoring the unsaturated zone between the sub-base and the seasonal high water level. Two approaches are used: direct monitoring and indirect monitoring (Bagchi 2004). Direct monitoring approach involves instrumentation that collects samples. Figure 18.15 is a schematic of a lysimeter (porous cup suction) used for liquid sample collection. Indirect method uses instruments to detect water percolation.

18.7.2 Groundwater Monitoring

Groundwater quality monitoring is conducted through sampling of monitoring wells. Ideally, a few groundwater wells should be installed at different depths in the vicinity of the landfill. Additional wells are placed near or at the property boundary (Vesilind et al. 2002). A schematic of a typical monitoring well is shown in Figure 18.16. The wells should cover up-gradient as well as the down-gradient to compare. If down-gradient results vary significantly from up-gradient, then more thorough investigations are conducted.

18.7.3 Landfill Gas Migration

Quality and composition of the landfill gas in the landfill and in the nearby soil need to be monitored. Gas monitoring probes are installed to monitor the concentration of methane and other hazardous air contaminants. Bagchi (2004) points out that there is a high chance for gas migration in the soil when the ground is frozen or saturated. Schematic of a vadoze zone gas monitoring probe is shown in Figure 18.17.

18.7.4 Stability of the Final Cover

Excessive deformation due to differential settlement can fail the cover especially when synthetic covers are employed. Stability of clay covers also need to be monitored if the waste slopes are higher than usual. Settlement of cover should be often monitored using a 100 ft grid. Monitoring should be performed quarterly or biannually (Bagchi 2004).

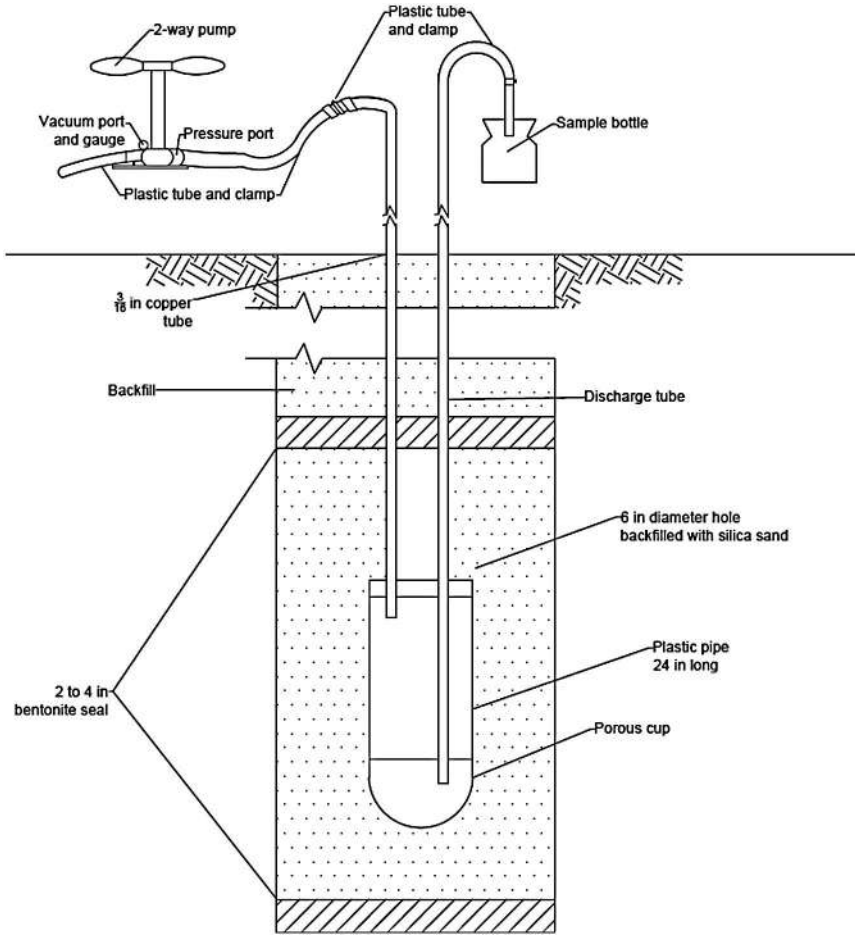

Figure 18.15. Schematic of a porous cup suction lysimeter used for liquid sample collection
Source: Adapted from Tchobanoglous and Kreith 2002

18.8 LANDFILL POST CLOSURE

Closure activities must begin within 30 days of the last receipt of waste and must be completed within 180 days. Critical technical issues that must be faced by the designer regarding the closure include the following.

- Degree and rate of post-closure settlement and stresses imposed on soil liner components
- Long-term durability and survivability of cover system
- Long-term waste decomposition and management of landfill leachate and gases

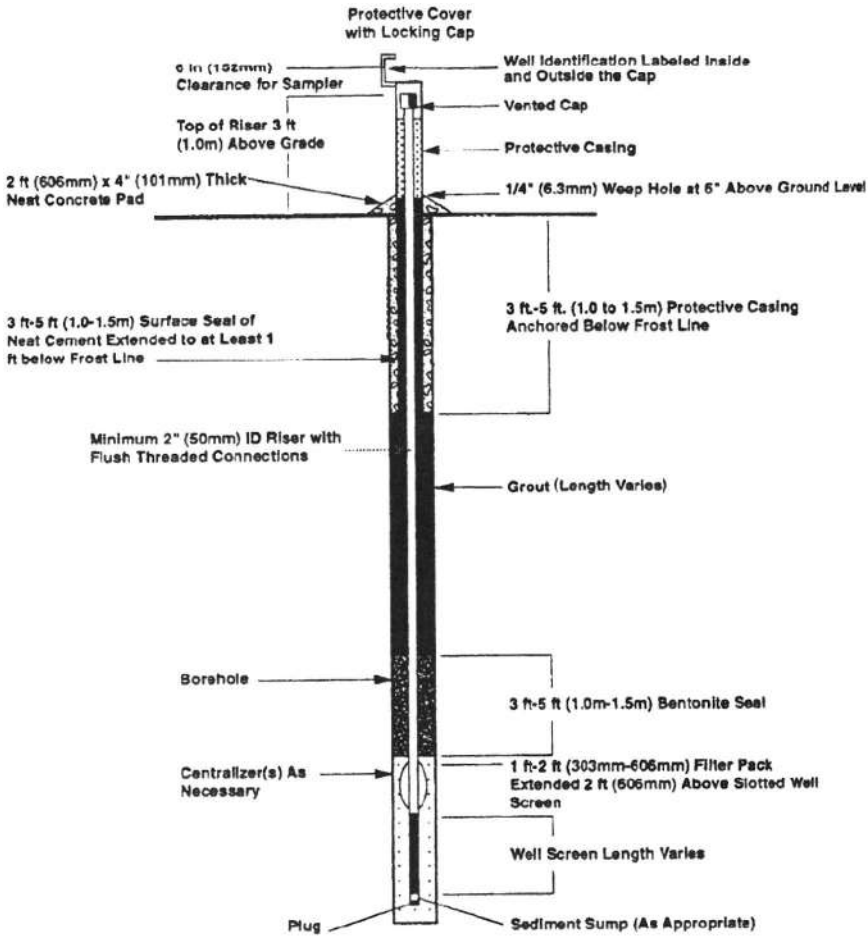

Figure 18.16. Schematic of a groundwater monitoring well
Source: U.S. EPA 1993

- Environmental performance of the combined bottom liner and final cover system.

Post-closure care requirements are focused on operating and maintaining the proper functions of four systems that prevent or monitor releases from the MSWLF unit:

- Cover system
- Leachate collection system
- Ground-water monitoring system
- Gas monitoring system

Owners or operators must comply with these environmental requirements for a period of 30 years following closure. Following completion of the post-closure

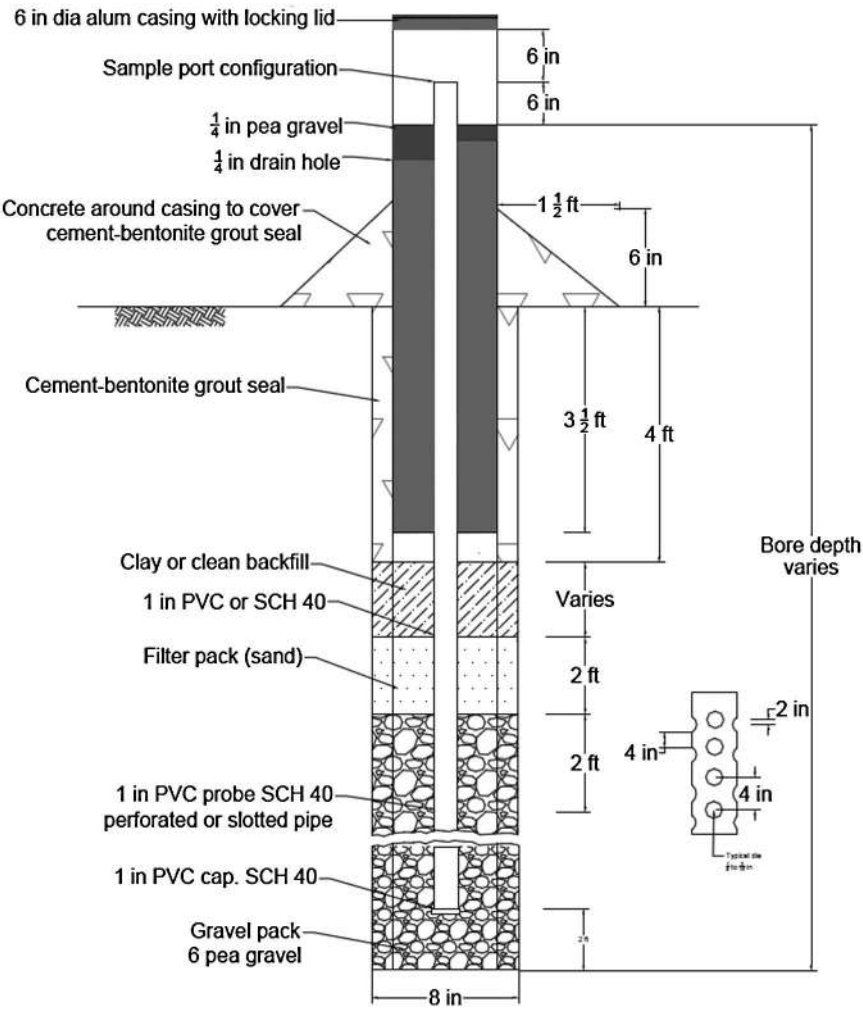

Figure 18.17. Schematic of a vadoze zone gas monitoring probe
Source: Adapted from Tchobanoglous and Kreith 2002

care period, the State Director must be notified that an independent registered professional engineer has verified and certified that post-closure care has been completed in accordance with the post closure plan and that this certification has been placed in the operating record (U.S. EPA 1993)

18.9 LANDFILL REDEVELOPMENT

The movement of brownfields redevelopment has helped invigorate existing slow process of remediation of contaminated sites. The use of risk based clean-up

approaches now allowed in many states has facilitated brownfields redevelopment. Landfills are a particular subset of brownfields, particularly older landfills in industrialized areas. Older landfills that were never properly closed are true brownfields with idle land from which pollutants are often discharged. With investigation and limited remediation, this subset of brownfields-like sites presents unique opportunities for redevelopment. Redeveloping landfills is particularly challenging not only due to clean-up issues, but also the geotechnical issues of building on waste.

Most of the unregistered landfills were never properly closed. Only a handful of unregistered landfills were properly closed and received a Closure and Post Closure Plan Approval pursuant to the Amended State Solid Waste Management Act of 1975 and/or the Sanitary Landfill Facility Closure and Contingency Fund Act of 1992. The few properly closed landfills were either large private commercial landfills, sole source industrial landfills owned by major corporations, or municipal landfills. Hundreds of registered landfills were never properly closed because the owners lacked the resources to comply with regulatory closure requirements. While the Sanitary Landfill Facility Closure and Contingency Fund Act provides a revenue source through a tax on operating landfills, the State has historically not utilized these funds for closure of abandoned landfills and reserved the public funds for emergency actions, such as extinguishing a landfill fire or remediating methane migration.

A wide variety of remediation techniques can be utilized in landfill redevelopment. In the simplest case, waste can be capped in place with one foot of silty, clayey material and one and one-half feet soil cover. In the most complex case, a slurry wall/sheet pile wall can be used to contain leachate from outflow from the site and an interior leachate system can be installed. The degree of capping, containment and leachate collection depends on the underlying geology, leachate strength and site specific cap design.

18.10 CONCLUSIONS

Modern landfills are well-engineered facilities. They are sited, designed, operated, and monitored in accordance with federal regulations and local regulations. Three types of landfills are identified in literature. Conventional dry landfills are the most widely used option. Bioreactor Landfills are becoming popular as a more environmental friendly alternative to dry landfills. Sustainable landfills are the most recent addition to the list. Sustainable landfills allow resource mining and refilling.

Landfills can be regarded as a viable and abundant source of materials and energy. In the developing world, this is widely understood and one may thus often find waste pickers scavenging for usable materials. In the developing world either landfilling is discouraged or landfills are mined to recover resources. Within this context sustainable landfills may be viewed as a concept that provides a common solution to waste disposal in both developed and developing nations.

18.11 ACKNOWLEDGEMENTS

Authors would like to acknowledge the City of Calgary, Canada for allow sharing information about the Biocell landfill and also Ms. Masroor Khan of New Jersey Institute of Technology for drafting all figures.

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Guam Solid Waste Authority

DRAFT - Cost of Service Study FY2023

No Island Wide

Projection Summary

Ordot

Small Cell Construction

Fiscal Year	Residential Rate	Major Commercial Haulers Rate (with discount)	Commercial Discount per ton	Gov Agencies and Small Commercial Rate	Projected Cash Balances	Recommended Minimum Cash	Fiscal Year
	$	$	$	$	$	$	
2024	30.38	358.00	22.00	380.00	4,389,572	3,776,927	2024
	$	$	$	$	$	$	
2025	37.67	396.40	14.00	410.40	4,931,396	4,040,458	2025
2026	37.67	396.40	14.00	410.40	6,914,722	4,073,605	2026
2027	37.67	396.40	14.00	410.40	5,555,082	4,114,292	2027
2028	39.55	409.61	7.63	417.24	5,574,619	4,195,146	2028
2029	39.55	409.61	7.63	417.24	5,480,501	4,260,280	2029

Guam Solid Waste Authority

DRAFT - Cost of Service Study FY2023

No Island Wide

Projection Summary

Ordot

Cell 4 large

Fiscal Year	Residential Rate	Major Commercial Haulers Rate (with discount)	Commercial Discount per ton	Gov Agencies and Small Commercial Rate	Projected Cash Balances	Recommended Minimum Cash	Fiscal Year
	$	$	$	$	$	$	
2024	30.38	358.00	22.00	380.00	4,389,572	3,776,927	2024
	$	$	$	$	$	$	
2025	37.67	396.40	14.00	410.40	4,931,396	4,136,622	2025
2026	37.67	396.40	14.00	410.40	5,939,722	4,169,770	2026
2027	37.67	396.40	14.00	410.40	3,605,082	4,210,457	2027
2028	39.55	409.61	7.63	417.24	2,649,619	4,291,310	2028
2029	39.55	409.61	7.63	417.24	1,580,501	4,356,445	2029

Guam SOLID WASTE RECEIVER

Presentation to the GSWA Board

June 20, 2024

3 PM ChST

GBB SOLID WASTE MANAGEMENT CONSULTANTS

Gershman, Brickner & Bratton, Inc.

Topics

1. GWA Claim Update
2. Important Development in the Consent Decree Case
3. RCRA Trust Agreement Plans
4. Brown and Caldwell Leachate and Seeps Report Overview
5. B&C O&M Contract Extension Update
6. GSWA RFQ for Landfill Services
7. Transition Plan Outline
8. Receiver Portion of SEP Report Status
9. Questions

Source: Google Maps

1. GWA Claim Update

Calculations of Damages:

1. GWA Demand Letter Dated August 16, 2023 - $2.65M for additional leachate cost incurred between 2018 – 2022
2. Allocation of costs attributed to additional leachate quantities (January 01, 2023 to October 31, 2023)
3. Brown and Caldwell Work Orders (January 1, 2018 through May 31, 2024 for work resulting from the GWA Leak Impact
4. Allocation of Receiver's costs related to addressing additional leachate quantities (January 01, 2018 through May 31, 2024)
5. Allocation of Detry trucking charges related to additional leachate costs due to GWA leak impact
6. Pump Power Costs for additional leachate volumes from GWA Leak Impact (2018 through October 31, 2023)
7. Allocation of cost of repair of equipment over "normal" cost

2. Important Development in the Consent Decree Case

- Receiver's Immunity under Appointment Order
- Receiver cannot be sued without the consent of Chief Judge Tydingco-Gatewood
- On 6/7/2024 the Receiver filed a Motion requiring GovGuam to seek Chief Judge Tydingco-Gatewood's consent in the Consent Decree Case
- Lawsuit disrupts and interferes with the work of the Receiver

3. RCRA Trust Agreement Plans

Bank of Guam Trust Accounts

- Receiver Trust Account #1 – earns essentially no interest income
  - Current balance as of May 31, 2024: $ 797,090.43
- Receiver Trust Account #2 – earns significant interest income @ ~5% per annum rate
  - Current balance as of 5/31/2024 - $7,198,615.65
- **Total - $7,995,706.08**
- Trust Account #2 investments made with review and consent of the GSWA Controller

3. RCRA Trust Agreement Plans (cont'd)

- 2023 PCCE: $31,322,061.21
- 2023 Escalation Payment: $1,140,123.03
- **Total PCCE for 2024: $32,462,184.24**

- Possible Sources to fully fund PCCE:

  Gov Guam – USA Settlement Funds: $30,000,000.00

  Receiver Trust Account #2: $ 2,462,184.24

  Total: $32,462,184.24

3. RCRA Trust Agreement Plans (cont'd)

- P.L. 37-64 Created the Ordot Dump Reserve Fund :
  - Authorized use:

    (1) GSWA costs related to closure and Maintenance of Ordot Dump, and/or

    (2) Expansion of Layon Landfill
  - No allocation of how funds are to be used

- Funds are to be deposited in a RCRA compliant trust
  - Receiver / GSWA / DOJ have agreed to work with Bank of Guam to finalize RCRA compliant trust
  - Court concurs per its Order after May 8, 2024 Status Hearing

3. RCRA Trust Agreement Plans (cont'd)

- US EPA asking for new RCRA compliant trust agreement in the name of GSWA only
- Receiver is in charge of Ordot under the Receivership so the funds should be with the Receiver
- Receiver suggests that new RCRA compliant trust agreement have Receiver as Grantor and includes reference to changing to GSWA once Receivership ends

3. RCRA Trust Agreement Plans (cont'd)

GSWA Required to Continue Payments

- Because the post closure trust account is not funded, GSWA is required to pay:
  - Monthly payments of $166,667 through August 2026
  - Annual inflation payments until fully funded
    - 2023 escalation payment @ $1,140,123.03 due on or before December 31, 2024 (US EPA estimate)

- Meanwhile, the $30 million settlement with Kelley Drye is not invested and not accruing any interest (@ 5% = $1,500,000 lost annual revenue)

3. RCRA Trust Agreement Plans (cont'd)

Receiver's Recommendation

(1) GSWA transfer funds necessary to fully fund the PCCE to the Receiver Trust Account #2

- ~ $24.5 million needed to fully fund
- GSWA could keep $5.5 million for future Layon capital needs

OR

(2) GSWA fully funds PCCE which is deposited in a new Receiver RCRA compliant Trust Account to be set up by the Receiver with Bank of Guam

- Full $30 million needed for this so Receiver still has funds for Ordot expenses

4. Brown and Caldwell Leachate and Seeps Report Overview

Phase 1 – Leachate and Seeps Investigation

1. Previous Brown and Caldwell report – Technical Memorandum No. 1 dated February 4, 2023, report on joint reconnaissance Nov. 2022 and leachate investigations performed up until that time
2. Previous Brown and Caldwell report – Technical Memorandum No. 2 dated July 21, 2023 preliminary findings of data through April 2023
3. Brown and Caldwell Report – Report on all data and investigations cumulatively collected through Dec. 2023 and additional observations of data in first quarter 2024.

Ordot Dump Post Closure Facility – Report on Leachate Flow Evaluation and Cessation of Discharges to Waters of the United States

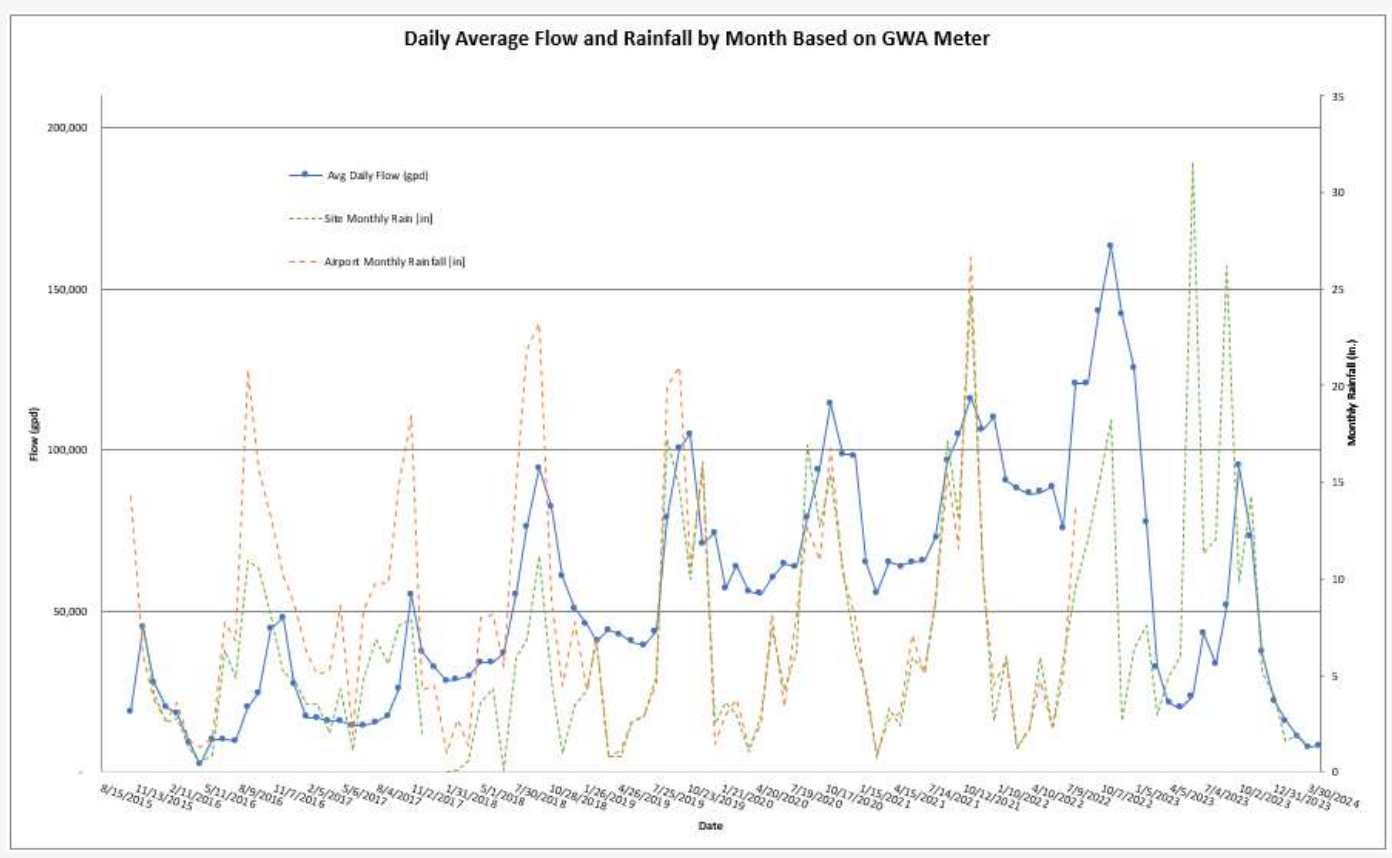
GBB SOLID WASTE MANAGEMENT CONSULTANTS

Brown AND Caldwell

Study Objectives

- Analyze leachate flow trends since closure was completed
- Evaluate potential sources of water influencing leachate flow
- Evaluate leachate discharges to water of the United States
- Recommend enhancements based on outcome, if warranted

Leachate flow … trending down



Closure Design … addresses pre-closure conditions

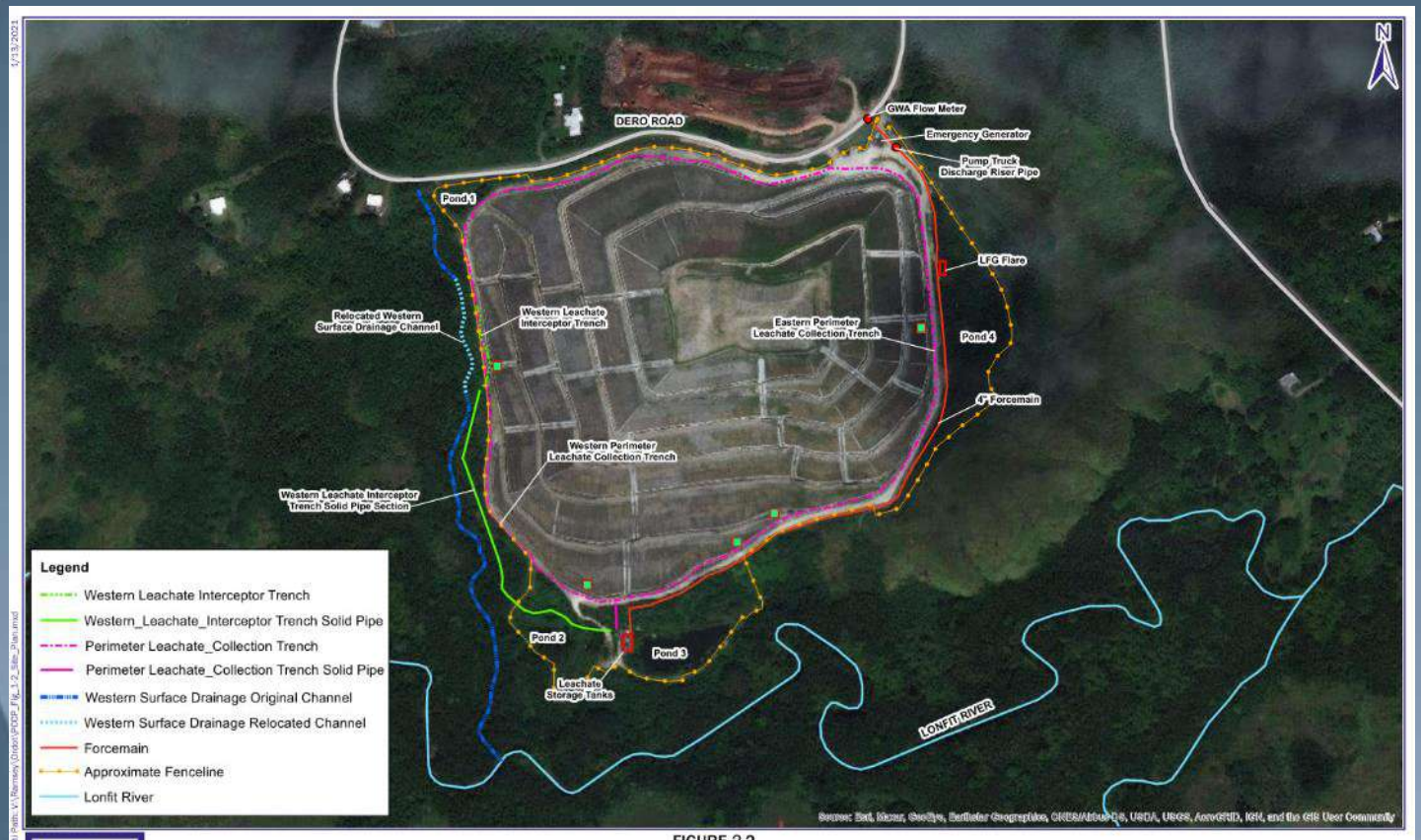


FIGURE 2-2
SITE PLAN
ORDOT DUMP POST-CLOSURE FACILITY
GUAM

GBB SOLID WASTE MANAGEMENT CONSULTANTS

Conclusions

- Leachate flow has been trending downward since waterline repairs in Dec 2022 – flow is at the lowest since 2017
- Cover system and LCRS are functioning as designed
- Pre-closure seeps and discharges have been addressed by the closure design
- Water quality in samples taken downgradient are similar in quality to the groundwater upgradient of the Dump

Recommendations

- Continue visual observations on west side of the Facility at the location influenced by Dero Road waterline leaks
- Continue separate flow measurements for PLCT and WLIT on a weekly basis
- Continue to institute the operations and maintenance plan in the PCCP of the GEPA post-closure permit

GWA Pond 1 and 4 Dye Tests

- Pond 1 test completed
- GWA, awaiting delivery of a fluorometer to help detect presence of dye that may reach observation points in the leachate collection system carried by groundwater
- GWA has conducted same testing in Pond 4 (May 2024)
- The Receiver and its consultant, B&C, are not clear that the testing plan or protocol will provide GWA with any useful information.

5. Brown and Caldwell O&M Contract Extension Update

- Brown and Caldwell (B&C) operator pursuant to contract dated May 8, 2018
- Contract amended to:
  - Adjust the first Renewal Term from 5 years to 28 months to be in sync with term of Layon Landfill operator contract
  - Give GSWA ability to cancel two (2) scopes of work that may be performed by contractor(s) providing similar services at Layon Landfill or other similar services

6. GSWA RFQ for Landfill Services

- GSWA procurement scope for Ordot is not consistent with the Brown and Caldwell O&M Contract Extension
- Procurement services related to Ordot requires Receiver approval
- Any contract for those services need to be with the Receiver through the end of the term of the O&M contract extension

7. Transition Plan Outline

- Receiver advancing outline
- Plan to present at the July Board meeting
- Chace Anderson has been authorized to assist in this process

8. Receiver Portion of SEP Report Status

- Submitted Receiver portion of SEP Report (299 pages) to USEPA on June 3, 2024
- Report documents construction and operation (1-year) of the HHW Facility with costs totaling $826,317.62
- USEPA will review and either accept or reject within approximately 30-days of submission
  (May 8, 2024 Status Hearing, see ECF 2068)
  - Report the result of extensive collaboration with USEPA to minimize the need to reject the Report and prevent excessive back and forth revisions

9. QUESTIONS?