



DEVELOPING SMALL-SCALE SOLID WASTE TRANSFER STATIONS ON TRIBAL LANDS





•••• WELCOME AND INTRODUCTIONS

Meet your instructor Meet your classmates Course Logistics Questions



If the materials covered during today's session do not address the conditions present in your community, please contact Jim Penor, EPA's Tribal Solid Waste Liaison for Alaska. Jim can provide you with assistance that is specific for your site and local conditions.

Jim Penor: <u>Penor.James@epa.gov</u>, 907-500-4963

•••• Online Course Overview

Session #1: Fundamentals/Needs Assessment

- Intro
- Transfer Station Fundamentals
- Siting
- Planning for capacity & functional needs

Session #2: Design Factors/Real Life Examples

- Calculating facility size
- Hauling
- Neighbor issues
- Regulations
- Budgeting for construction
- Transfer Station Types & Examples

Session #3: From Design to Completion

- Site Design & Layout
- Ancillary Facilities & Equipment
- Vehicles & Utilities
- Capital Costs

Session #4: Operational Challenges

- Operation & Maintenance Tasks & Costs
- Waste Handling
- Site Maintenance & Security
- Emergencies
- Illegal Dumping

Introduction

- Transfer Station Fundamentals: What's a Transfer Station? Do we need one?
- Siting a Transfer Station: Where should it go?
- Planning for capacity and functional needs: How Big?

Transfer Station Fundamentals

> What is a transfer station? How can it help my Tribe?

TRANSFER STATION DEFINITION

- A site at which solid wastes are concentrated for transport to a processing facility or land disposal site
- May be fixed or mobile



TRANSFER STATION FUNCTION

Receives solid waste and recyclables

- Public and collection vehicles
- Processing/diversion options
 - Recyclables
 - Organics
 - Special wastes
- Loading into transfer vehicles
- Long-haul to processing/disposal
- NOT final disposal



•••• Transfer Station Potential Benefits

- Transportation cost savings
- Environmental benefits
- Waste diversion and material recovery
- Waste screening
- Collection fleet efficiency
- Convenience
- Flexibility in selecting processing or disposal sites
- Reduced illegal dumping



•••• Transfer Station Implementation Process



• Transfer Station Fundamentals: Concepts

$\bullet \bullet \bullet \bullet$

Hoopa Valley Tribal Site



Planning

- Siting
- Requirements
- Type determination



•••• Siting Factors

- Compatible use
- Community buy-in
- Central location to service population
- Access to major transportation routes
- Access to utilities
- Site size requirements
- Truck and traffic compatibility and queuing
- Gently sloping topography/drainage
- Space for recycling, composting, and other processing
- Expansion potential
- Regulatory requirements



•••• Siting – Exclusionary Criteria

- Wetlands and floodplains
- Near an airport
- Water pollution potential
- Endangered flora and fauna habitat
- Historical/cultural site
- Prime agricultural land
- Parks and preserves
- Sensitive receptors
 - Schools, residences, public facilities



•••• Hoopa Valley Tribe Transfer Station Site

Advantages:

- Central Location
- Access to transportation routes
- Gently sloping topography Disadvantages:
- Compatible use concerns
- Truck and traffic compatibility & queueing
- Site size requirements
- Water pollution potential



Planning

- Siting
- Requirements
- Type determination

What needs and limits do we face as we start planning?

Requirements: Needs and Limitations for our Transfer Station Plan



Tonnage: how much material will we be handling?

- Population
 - Residents
 - Businesses
 - Seasonal Residents
 - Visitors
 - Future growth
- Days/Hours of Operation



Tonnage- Transfer Station Size



Tonnage- Planning Tipping Floor Area

	Tipping Fl	oor Area Calcu	lator	
Waste and Recyclables	Tons per year	Tons per week	Tons per 5 day week	Round up
Total	1,220	23.5	4.7	5.0
Residential (80%)	976	18.8	3.8	
Commercial/Industrial (20%)	244	4.7	0.9	
Transfer station metric 4.000 sq. ft. + 20 sq. ft./ton/day		Sq. ft.	• Calcul • Conve • Deter	late tons per yea ert to tons per we mine days open
20 sq. ft /ton/day Base square feet	5.0 x 20 =	100 4,000	• Calcul • Tippin	late tons per day ng area size base
Total square feet		4,100	• Does i	not include recyc

20

•••• Waste Composition: what material will we handle?

- Waste composition assists with determining number, type, and size of containers for layout
- Types of Waste
 - MSW
 - Recyclables
 - Organics
 - Bulky items
- Quantity of Waste
 - Residential vs commercial

Total U.S. Municipal Solid Waste Generated by Material, 2017 267.8 million tons



Source: EPA

Consider conducting a waste characterization study

$\bullet \bullet \bullet \bullet$

Hoopa Valley Waste Composition Example

Hoopa Valley Indian Reservation – Waste Characterization

- 3,346 inhabitants
- 1,220 tons per year solid waste and recyclables
 - 80% households 30-gallon bags self-haul to transfer station or curbside
 - 20% commercial/industrial tribe/private haul to landfill

Transfer station rates

- Fee per pound (0-40 lb. \$5, >40 lb., \$0.14/lb.)
- Oil and green material free
- Special charges some items metal, e-waste, tires, car batteries, paint
- Free dump days



•••• Waste Streams



Solid Waste

- Residential
- Business



Recyclables



Organics

- Green material can make up 20-30% of solid waste stream
- Clean wood waste can be ground for use as mulch
 - Onsite, give-away, sale
- Yard waste and brush can be ground and composted
- Demolition wood
- Food waste options

• Metal

- Paper
- Cardboard
- Beverage containers

*Consider trailer collection or portable bin

•••• Waste Streams (cont.)



Demolition

- Demolition wastes heavy
- Wood, inerts, metal, concrete, asphalt, roofing, fixtures
- Difficult to manage due to size
- Reuse/repurpose options



Special Wastes

- Mattresses
- Carpet
- Tires
- E-waste
- Inerts
- White goods (Special Cautions)
 - Freons, ammonia, sulfur dioxide, Oils, Capacitors, Mercury, Other hazardous materials



Reuse

- Provides opportunity for diverting items that would become wastes
- Higher level of waste management hierarchy
- Reduces disposal costs
- Provides community service
- Opportunity for repurpose and repair
- Must have safety protocols
- Separate area
- Monitored to control usage

•••• Waste Streams – Household Hazardous Waste

Household Hazardous Waste (HHW)

- Common household products that exhibit characteristic of hazardous wastes including paints, cleaners, oils, batteries, and pesticides can contain hazardous ingredients and require special care when you dispose of them.
- Exempt from federal hazardous waste classification

- Some states regulate management of HHW
- Collection of HHW reduces
- Worker injuries
- Toxicity of solid waste landfilled







HHW Facilities Collection

- All types of HHW
- Specific wastes only such as:
 - Used oil and filters
 - Batteries car and household
 - Fluorescent lamps
 - E-waste
 - Paint

- Simple
- Complex



•••• Waste Composition – Household Hazardous Waste & Used Oil

Collection facilities



HHW on shelf in corner of building



Small storage building and oil tank



Hay barn with lockers on sides



Larger storage locker with compartments



Carport with raised concrete pad for used oil collection

- Fundamentals: Transfer stations mean different things in different contexts
- Do we need one? Why? Convincing our community and leadership
- Siting: Location is a long term decision
- Capacity: Evaluating our waste disposal habits must guide our design needs
- Design - our next session focus!



NEXT SESSION PREVIEW: DESIGN PHASE

- Calculating Facility Size
- Hauling
- Regulations
- Budgeting for Construction
- Transfer station types and real life examples



- Evaluation questions
- We'll be sending you a copy of today's slides

THANK YOU! See you next Thursday!





DEVELOPING SMALL-SCALE SOLID WASTE TRANSFER STATIONS ON TRIBAL LANDS





Introduction and Welcome

- Brief re-introductions facilitator, instructor, EPA
- Logistics review
- Feedback from last session
- Questions from last week before we start?

Online Course Overview

Session #1: Fundamentals/Needs Assessment

- Intro
- Transfer Station Fundamentals
- Siting
- Planning for capacity & functional needs

Session #2: Design Factors/Real Life Examples

- Calculating facility size
- Hauling
- Regulations
- Budgeting for construction
- Transfer Station Types & Examples
- Sample Layouts

Session #3: From Design to Completion

- Designing a Layout
- Ancillary Facilities & Equipment
- Vehicles & Utilities
- Capital Costs

Session #4: Operational Challenges

- Operation & Maintenance Tasks & Costs
- Waste Handling
- Site Maintenance & Security
- Emergencies
- Illegal Dumping



SESSION TWO: DESIGN FACTORS AND EXAMPLES

- Calculating Facility Size
- Hauling
- Budgeting for Construction
- Transfer station types and real life examples
- Designing transfer station layouts

Property Size Calculation Example

- Site may be pre-selected
- Need to fit all activities
 - Tipping area
 - Diversion containers/areas
 - Gatehouse/scale
 - Queuing public and haulers
 - Parking
 - Roads ingress and egress



Hauling Distance and Routes

Hauling Distance

- Transfer station benefit
 - Encourages use of more distant landfill
 - Allows larger payloads
 - More time and fuel efficient
- Consider transporting diverted materials
 - Might transfer mixed materials

Routes

- Road and bridge limits
- Railroad crossings
- Overpass height clearance
- Tolls
- Future route improvements
- Weather (snow)



Rule of thumb: Typically see 35 miles as the break even point ---If the disposal site is more than 35 miles from the community, then a transfer station is likely to be cost effective.

•••• Hauling - Containers

Bins, roll-off, debris box

- Bins, debris box, roll-off
- Commonly used for small load (40 cubic yards) of waste or recyclables
- Useful for bulky items
- Not cost effective for long distance haul
- Potential to haul two bins at same time with trailer

Compactor

- Usually used at business (e.g., cardboard)
- Can be used for transfer
- Need roll-off/debris box truck to transport
- Not effective for long hauls




•••• Hauling – Trailer Types

End Dump

- Large compartment trailer
- Advantages
 - More efficient transport than boxes for metal
 - Discharge anywhere

Disadvantages

- Payload typical maximum volume 36 cubic yards
- Unstable in high winds when unloading

Walking Floor

- Trailer contains movable slats to move payload in and out
- Advantages
 - Allows discharge anywhere
- Disadvantages
 - Reduced payload due to increased equipment weight
 - Susceptible to damage
 - Cannot discharge if broken
 - Cost



Trailer Tipper

- "Possum-belly" Entire trailer is tipped to unload
- Advantages
 - Maximized payload
- Disadvantages
 - Requires landfill tipper equipment
 - Cannot discharge without tipper
 - Potential unstable tipper

•••• Hauling - Disposal Facility Concerns

- Agreements
- Acceptable and unacceptable wastes
- Hours of operation
- Unloading technology
- Rejection criteria and penalties
- Permit status
- Permit capacity available and site life
- Emergency considerations for hours and tonnage



Hauling – Hire Tribal Staff or use Contractor?

Staff

- Advantages
 - Employment
 - Control
- Disadvantages
 - Replacing staff vacancies

Contractor

- Advantages
 - Professional service
 - Hire/fire flexibility
 - Provides own vehicles/equipment
- Disadvantages
 - Limited control
 - Need mutual terms

•••• Contingency Planning

Disaster shutdowns (natural or manmade) require backup plan with prior tribal approval How to manage incoming waste if hauling slows / stops EPA's Tribal Climate Resilient Waste Management Planning Tool can help



•••• Applicable Regulations

• In Session One we covered federal regulations specific to siting.

- Many states regulate transfer station operations via permit. Although Tribes are exempt from state regulations, they could provide helpful guidance as you build your own systems and tribal codes.
- Anticipate that state regulations usually apply once waste leaves tribal lands! Disposal facilities used might impose standards for operation including state and local requirements.

•••• Expansion Potential

- Population increases
- Business increases
- New business, industry
- More or new processing (e.g., composting)





- When determining the size needs for your facility keep the budget in mind
- Determine costs
 - Facility design
 - Facility construction including earth work
 - Operational costs
 - Hauling and disposal costs
 - Maintenance
 - Contingency
- Budgetary limitations may force redesign or phased in features/programs

•••• Case Study – Hoopa Valley Requirements

- Tonnage needs
- Neighbors, competing uses
- Hauling distances
- Property size
- Expansion potential
- Budget





Planning

- Siting
- Requirements
- Type determination

What type of transfer station would best suit our needs?

Convenience Center/Drop-Off Station



Recyclables

•••• Direct Discharge









•••• Direct Discharge (cont.)



Floor Loading



•••• Precompaction



$\bullet \bullet \bullet \bullet$

Ord Ranch Transfer Station





Design

• Site schematics

- Site furnishings
- Architectural & engineering
- Utilities

Determining Layout and Waste Flow

 Entrance with queuing •Waste/material flow Traffic flow •Unloading area with queuing Diversion activities •Loadout waste and recyclables •Trailer/container capacity Ancillary areas •Security, fencing Prevailing wind direction





Additional Layout Ideas

Typical Configuration













Cement Base under transfer bins, concrete and steel reinforced retaining walls

Additional Design Features





Cement Base under transfer bins, concrete and steel reinforced retaining walls.

Height of bin compared to the platform-Transfer







Railing to prevent vehicles backing over the platform edge

$\bullet \bullet \bullet \bullet$

What's Wrong with These Pictures?



Ε











$\bullet \bullet \bullet \bullet$

Traffic Routing and Safety Design

Traffic Routing

- Safe routing critical safety design
- Clear directions
- Incoming
 - Public
 - Collection vehicles
 - Emergency vehicles
- Outgoing
 - Customers
 - Recyclable materials and waste transfer

Safety

- Facility should be designed for safety
- Security features gate, fence
- Road surface maintained paved, gravel, dirt
- Avoid water ponding
- Routing minimize cross traffic
- Curbs on road and tip area
- Emergency vehicle access

•••• Waste Loading and Ancillary Facilities

Waste Loading

- Means for transferring wastes to vehicles/containers
- Transfer diverted materials to larger containers
 - Tippers
 - Loader
- Shipment to destination

Ancillary Facilities

- Administration
- Maintenance
- Collection
- Fueling
- Parking
 - Customers
 - Employees
 - Equipment

•••• Landscaping

Landscaping	Stormwater	Rainwater Harvesting
 Provides aesthetic appearance Can be good neighbor Screen activities Wind and litter control benefit 	 Need to manage storm water prior to discharge offsite Consider bioswales (possible use of compost or mulch) Consider retention basin Drainage channels direct flow Typical design 25-year 	 Cisterns to capture rainwater from roofs and directly Can be used for irrigation and toilet flushing

storm

•••• Environmental Considerations

- Site drainage
- Water pollution
- Weather

- Dust Control
- Odor
- Covered loads

- Noise
- Neighbors
- Climate impacts and resiliency



ACTIVITY: CREATE A TWO-DIMENSIONAL LAYOUT





SESSION TWO RECAP: DESIGN FACTORS AND EXAMPLES

- Calculating Facility Size
- Hauling
- Budgeting for Construction
- Transfer station types and real life examples
- Designing transfer station layouts



SESSION 3 PREVIEW: FROM DESIGN TO COMPLETION

- Site Design & Layout, continued
 Ancillary Facilities & Equipment
 Vehicles & Utilities
- Capital Costs



THANK YOU

Please submit an evaluation!

Presentation will be emailed at end of today's session





DEVELOPING SMALL-SCALE SOLID WASTE TRANSFER STATIONS ON TRIBAL LANDS





$\bullet \bullet \bullet \bullet$

MUTING YOUR MICROPHONE



Mute/unmute microphone:

Hover mouse at top of WebEx screen, find dropdown menu, select:

"Mute Me" to mute your microphone



Join chat:

- Hover mouse top of WebEx screen, find dropdown men, select "Chat"
 - Chat panel will pop open, click dropdown to the left of "Send to:" and select "All Participants" if you'd like to chat with presenters and attendees
 - Or, chat with one individual by right clicking their name

- Brief re-introductions facilitator, instructor, EPA
- Logistics review
- Feedback from last session and questions?



- This webinar is provided as part of the U.S. EPA Waste & Materials Management Training Series for Tribes and EPA's Sustainable Materials Management Webinar series.
- This document does not constitute EPA policy. Mention of trade names or commercial products does not constitute endorsement or recommendation of use. Links to non-EPA websites do not imply any official EPA endorsement of or a responsibility for the opinions, ideas, data or products presented at those locations or guarantee the validity of the information provided. Links to non-EPA servers are provided solely as a pointer to information that might be useful to EPA staff and the public.

Online Course Overview

Session #1: Fundamentals/Needs Assessment

- Intro
- Transfer Station Fundamentals
- Siting
- Planning for capacity & functional needs

Session #2: Design Factors/Real Life Examples

- Calculating facility size
- Hauling
- Neighbor issues
- Regulations
- Budgeting for construction
- Transfer Station Types & Examples

Session #3: From Design to Completion

- Site Design & Layout
- Ancillary Facilities & Equipment
- Vehicles & Utilities
- Capital Costs
- Funding

Session #4: Operational Challenges

- Operation & Maintenance Tasks & Costs
- Waste Handling
- Site Maintenance & Security
- Emergencies
- Illegal Dumping



SESSION 3 PREVIEW: FROM DESIGN TO COMPLETION

- Site Design & Layout
- Ancillary Facilities & Equipment
- Vehicles & Utilities
- Capital Costs
- Financing

Design

- Site schematics
- Site furnishings
- Architectural & engineering
- Utilities
In-House Small-Scale Transfer Station Design and Construction

Small – scale transfer operation constructed by Pechanga Band of Luiseno Indians









- Aboveground
- Inground
- Maybe confined space when servicing
- Volume conversion alternative common in rural areas



•••• Containers

- Portable storage for segregated materials
 - Examples: metal, cardboard, appliances
- May require equipment for moving or removal of materials
- Many sizes and types available







Container Examples - Public Drop-Off



•••• Container Examples – Open Bin

Duck Valley Cardboard Collections (bins are open but housed under a 3-sided, covered shelter)



•••• Container Examples – Recycling Trailers







Pueblo of Santa Ana in New Mexico Great signage and the cage design helps users know exactly what is supposed to go in

•••• Container Examples - Other



Sorted Collection Trailer



Dumpster



Cart / x gallon tote

Open-top Roll-off



Covered Sorted Roll-off / Gable Top Divided Recycling Roll-off



$\bullet \bullet \bullet \bullet$

Container Examples - HHW and Used Oil





Fibrex Group: Used Oil Filter Container

•••• Sorting Equipment

Conveyers

- Commonly used for beverage containers and cardboard or other baled materials
- Moves material from floor up to containers
- Need loader to place material on conveyor
- May need misting system



•••• Compaction Equipment - Balers

Compaction Balers

- Compresses material into high-density, selfcontained units
 - Primarily use cardboard, paper, cans, plastic
- Large and small units
- Bound with wire tie
- Can be moved with forklift
- Can be transported on flat bed trucks
- Safety precautions mandatory
 - Lock-out/tag-out
 - Broken binding wires dangerous
- Vertical baler
 - Example: 750-1,600 pound bale weight 60"x30"x48"



Cram-A-Lot 60 Inch Vertical Baler

Compaction Equipment - Compactors

Compactor

- Stationary
 - Compress waste or material into containers/trailers or bales
 - Separate from container/trailer to save weight
- Mobile
 - Roll-off type unit
 - Decreases payload due to integrated weight
 - Typical used at businesses
 - Hauled directly to landfill/processor



Cram-A-Lot Self-Contained Trash Compactor ~\$22,000



- Vehicles used on site for moving materials
 - Forklifts
 - Loaders
 - Large
 - Skid
 - Backhoe/bucket
- Maintenance truck
- Roll-off





•••• Signage





• Visitors/Users

- Name and contact
- Hours of operation
- Acceptable/unacceptance wastes
- Conditions of use
- Speed limit
- Directional
- Area designation

Design

- Site schematics
- Site furnishings
- Architectural &
- engineering design
- Utilities

•••• Structure Design

Roof

- Open configuration (Most common for small sites)
- Roof over tipping area (Moderate expensive)
- Enclosed structure (high cost)
 - Full walls with doors
 - Partial walls
- Provides weather protection heat, rain, snow
- Need free-spanning
- Clear span minimum 30 feet
- May need fire suppression
- Skylights are nice
- Consider snow load for design







•••• Structure Design (continued)

Walls

- Can provide full or partial enclosure
- Can be masonry, metal, fence with slats
- Interior push-walls maybe needed
- Advantages
 - Provide protection from weather
 - Essential in high wind areas
 - Reduces litter
 - Provides screening
- Disadvantages
 - Added cost
 - Expensive for small sites
 - Maintenance required for removing dust

•••• Structure Design (cont.)

Tipping Floor

- Area where waste is unloaded
- Some diversion may occur
- Waste pushed into trainer/container
- Requires loader
- Need push walls on side to protect building
- Garbage is abrasive needing replacement

Storage Bunker

- For recyclables and other material storage prior to load out
- Can unload hoppers in stall
- Direct loading from sort line



Design

- Site schematics
- Site furnishings
- Architectural & engineering
- Utilities



Utilities

Energy Usage	Water Supply	Sewer
 Source Solar Biomass Electricity Propane Lighting Consider skylights or open areas 	 Well water Water line Onsite storage tanks Potable vs. dust suppression vs. fire suppression 	 Treatment plant or septic system for discharges Site Restrooms Water contacting solid waste is considered leachate and needs management May need septic system

•••• Utilities (continued)

Communications

- Onsite
 - Radios
 - Speakers
 - Emergency alert
- External
 - Telephone
 - Satellite phone option
 - Emergency services

Fire Suppression

Need water access
Maybe portable storage tanks
Alternative systems, e.g. foam





Case Study: Hoopa Valley Tribe – Current Status

- Four 40-yard bins solid waste
- Tire & scrap metal storage
- Bins metal, white goods, e-waste
- Used oil collection
- Stationary compactor (w/Hopper)
- 40 cy compaction container
- 6 cy rear loader
- 16 cy rear loader
- Baler



•••• CASE STUDY – HOOPA VALLEY TRIBE: IMPROVE CURRENT SITE?



- Formalize / Resolve shared land use issues at current site: dedicating area for exclusive use for scale and tip area
- Remediate pooling water and possibly contaminated drainage to river via grading, paving
- Reconstruct ramp
- Containers for used oil, HHW, recyclables

RAMPS FOR SELF-HAUL AT TRANSFER STATIONS





RAMP DESIGN CALCULATOR

RAMP CALCULATOR	Formula	Sample
Slope (%)	Slope	5%

Slope percent is height divided by length. Max recommendation 5%.

Ramp	Feet	Feet
Width	w	40
Height	Н	6
Length	=H/S	120
Tipping Area (Flat area at top. Matches height)		
Length	Х	15



Volume	Formula	Cubic Feet	Cubic Yards
Ramp wedge	1/2 x W x H x L	14,400	533
Tipping area, wedge	HxWxX	3,600	133
Total	Compacted		667

•••• CASE STUDY – HOOPA VALLEY TRIBE: BUILD AT NEW SITE?



Possible Site Design costs:

- Site survey costs
- Geotech investigation
- Layout Design (coordinate with utility providers, state highways agency)
- Architectural services
- Engineering Design
- Electrical system design

CASE STUDY – HOOPA VALLEY TRIBE: BUILD AT NEW SITE? (CONT.)



Site Construction:

- Grading and road access
- Utilities installation including water, electrical
- Fencing
- Ramp construction
- Stormwater drainage

Construction

- Costs & financing
- Bid development
- Project
 management



Calculating costs considerations

- Start with optimal design
- Consider phasing
- Consider retrofit
- Develop total cost
- Calculate cost per ton
- May consider outside expertise

Cost categories

- Site development
- Land purchase
- Improvements and environmental considerations
- Grading and excavation pits, loading
- Utility access
- Local approval and permitting
- Building constructions





What to consider when:



Resource: Tribal Solid Waste Program Costing Tool <u>https://www.epa.gov/file/tribal-solid-waste-program-costing-tool</u>

SAMPLE CAPITAL COSTS: SIMPLE CONVENIENCE CENTER





- Fencing (\$4,000)
- Containers (vehicle?)
 \$2,000-\$5,000 each)
- Grading/Paving \$8,000)
- Drainage
- Signage (\$400)
- Trail camera?

Sample Capital Costs: Full -Service Transfer Station

Assumptions:

Convenience transfer drop-off Dumpster/roll-off (3) Paved site Disposal 100 miles

Source: Tribal Solid Waste Costing Tool

Construction Item				Cost
Site, Pad and Ramp Grading			\$	12,000
Concrete Pads for Roll-off Containers	& Attend	lant Bldg.	\$	18,000
Gravel and Asphalt			\$	24,000
Attendant Building Infrastructure			\$	30,000
Electrical Work for entire site			\$	20,000
Plumbing Work for entire site			\$	20,000
Fence/Gates			\$	10,000
Signage			\$	1,000
Electrical Work for Compactor			\$	1,000
Lighting System			\$	1,500
Security Cameras			\$	2,000
Total Construction			\$	139,500
			_	
Equipment Costs	Quantity	Unit Cost	T	otal Cost
Compactor / 30 Yard Container	1	\$ 41,000	\$	41,000
Roll-off Container, 20 yard	3	\$ 3,900	\$	11,700
Roll-off Truck with Hoist 1 \$230,0		\$230,000	\$	230,000
Recycling Trailer, 20 yard, 16 feet 1 \$ 4,500		\$	4,500	
Pickup Truck, 3.3L V6	1	\$ 32,000	\$	32,000
Skid Steer	1	\$ 30,000	\$	30,000
Total Equipment			\$	349,200

BID DEVELOPMENT AND PROJECT MANAGEMENT

- Bid Development
- Request for Proposals
- Request for Qualifications
- Complete or Partial Bid
- Evaluating Proposals

- Project Management
- Construction Management
- Design, Bid, Build
- Design Build

•••• Types of Financing

- EPA GAP, Hazardous Waste Grant, Brownfields
- Indian Health Service
- US Department of Agriculture
- US Housing and Urban Development
- General Services Administration (equipment)
- State funding
- EPA's Tribal Waste Management Funding Resources Directory

$\bullet \bullet \bullet \bullet$

Allowable Transfer Station-related Capital Costs under EPA GAP

Description	Examples
Source separation projects (activities that are	Source separation supplies and equipment
part of a sustainable waste management	
program designed to increase waste source	
reduction, recycling, composting, and sustainable	
materials management)	
The repair, upgrade, and replacement of	Repairing, upgrading, and replacing regular trash
municipal solid waste supplies and equipment.	collection program supplies and equipment
The construction, repair, upgrade, and	Constructing, repairing, upgrading, and replacing
replacement of municipal solid waste facilities.	regular trash collection program facilities. Due to
	the general prohibition on use of GAP funds for
(OITA-AIEO-GAP-2016-001)	construction, [grantees must] receive approval
	from the AIEO Director for all construction
	activities.

- Cooperative Agreement, Direct Payment, or Federal Contract
- Environmental engineering assistance with utility master planning. Development of multi-agency-funded sanitation projects, interagency coordination, leveraging of IHS funds.
- Provision of water supply and waste disposal facilities.
- Professional engineering design and/or construction services for water supply and waste disposal facilities.
- Technical consultation and training for waste disposal operators.

- Technical Assistance provided by grantees to tribes tribes can also be technical assistance providers
- Free technical assistance and/or training provided by the grant recipients
- Program improves planning and management of solid waste sites in rural areas
- Cannot be used for construction
- Competitive grant

EPA Hazardous Waste Management Grant Program for Tribes

- Funds for building capacity to improve and maintain regulatory compliance, and for developing solutions to address improper management of hazardous waste on tribal lands
- Can fund household hazardous waste collection stations; reuse stations for hazardous materials like paint, wood stains, etc; oil collection stations; codes and ordinances development
- Usually awards 3 grants per year at approximately \$97,000
- Emphasis on technical assistance/transferability of project successes to other tribes
- Competitive grant usually announced each April
- State Response Program grants under CERCLA 128(a) can fund improvements to HHW collection areas under some circumstances
- If locating future transfer station on potentially contaminated property, Targeted Brownfields Assessment can evaluate cleanup needs
- Brownfields competitive cleanup grants can fund future site design and engineering, plus installation of pavement if capping contaminated soil

USDA Water and Waste Disposal Loan and Grant Program

- Helps communities extend and improve water and waste treatment facilities
- Assists qualified applicants who can't obtain commercial credit on reasonable terms
- Funds may be used to finance the acquisition, construction or improvement of solid waste collection, disposal or closure
- Long-term, low-interest loans up to a 40-year payback period
- If funds available, a grant may be combined with a loan to keep user costs reasonable

$\bullet \bullet \bullet \bullet$

HUD Indian Community Development Block Grant (ICDBG)

- US Housing and Urban Development (HUD) funds housing, community facilities, and economic development. Community Facilities includes infrastructure construction, e.g., roads, water and sewer facilities; and, single or multipurpose community buildings.
- Awards are \$500,000 to \$5,000,000, with average award of \$600,000
- Preapplication coordination is required with your regional HUD office
- Applications due annually about April May

 $\bullet \bullet \bullet \bullet$

Allowable Operating Costs Eligible under EPA GAP

Costs are allowable – if resources allow:

- Staffing costs beyond pilot phase
- Fuel
- Tipping fees
- Supplies
- Vehicle maintenance



SESSION 3 RECAP: FROM DESIGN TO COMPLETION

- Site Design & Layout
- Ancillary Facilities & Equipment
- Vehicles & Utilities
- Capital Costs
- Financing

 $\bullet \bullet \bullet \bullet$



SESSION 4 PREVIEW: OPERATIONAL CHALLENGES

- Operation & Maintenance Tasks & Costs
- Waste Handling
- Site Maintenance & Security
- Emergencies
- Illegal Dumping

THANK YOU PLEASE SUBMIT EVALUATION





DEVELOPING SMALL-SCALE SOLID WASTE TRANSFER STATIONS ON TRIBAL LANDS





• Welcome

Introductions in the chat bar: please enter your name & indicate –

- Does your tribe currently charge residents for curbside pickup?
- If so, what percent of residents actually pay?
- Reintroducing your instructor
- Responding to questions and comments from last session

Online Course Overview

Session #1: Fundamentals/Needs Assessment

- Intro
- Transfer Station Fundamentals
- Siting
- Planning for capacity & functional needs

Session #2: Design Factors/Real Life Examples

- Calculating facility size
- Hauling

€PA

- Neighbor issues
- Regulations
- Budgeting for construction
- Transfer Station Types & Examples

Session #3: From Design to Completion

- Site Design & Layout
- Ancillary Facilities & Equipment
- Vehicles & Utilities
- Capital Costs
- Funding

Session #4: Operational Challenges

- Operation & Maintenance Tasks & Costs
- Waste Handling
- Site Maintenance & Security
- Emergencies
- Illegal Dumping

•••• LIGHTNING ROUND! RESPONSES TO COMMENTS & QUESTIONS

Cooperative arrangements between small transfer stations? Light bulb crushers HHW collection events for tribes Purchasing scales Tire options: shredders or compactors? Recycling: how to stay on top of markets? Design and equipment for wet weather





SESSION 4 PREVIEW: OPERATIONAL CHALLENGES

- Operation & Maintenance Tasks & Costs
- Waste Handling
- Site Maintenance & Security
- Emergencies
- Illegal Dumping



Operation & Maintenance

• O&M costs

- Personnel
- Waste handling
- Maintenance
- Health & safety



- Facility Maintenance
- Personnel
- Equipment
- Revenue from recyclables
- Transportation costs
- Disposal costs



Transfer Station Equipment Specifications Handout

Designing Small-Scale Transfer Stations on Tribal Lands Online Course August 2020

This handout provides estimates and approximations that may be useful when designing a solid waste transfer station.

Volume-to-Weight Conversion Factors:

https://www.epa.gov/sites/production/files/2016-

<u>04/documents/volume to weight conversion factors memorandum 04192016 508fnl.pdf</u> Source: US EPA Office of Resource Conservation and Recovery. Volume-to-Weight Conversion Factors. April 2016

Equipment and specifications	Volume	Dimensions	Gross vehicle	Estimated Cost
	(cubic yards)	L x W x H (ft)	weight (lbs)	
Roll-off box (debris box)	40	22 x 8 x 8	6,500	\$5,000
Roll-off box "Dirt"	10	12 x 8 x 3.5	3,500	\$3,000
Recycling Trailer	20	30 x 8.5 x 6	9,900	\$5,100
Recycling trailer, compartment, with hydraulic lift	9 to 28	30 x 8.5 x 6	9,900	\$20,000
Landscape/cage trailer	18	14 x 6.4 x 6	9,900	\$4,000
Baler, vertical (material dependent 50-1,000 pounds/bale)	NA	Varies 4 x 2 x 5	NA	25,000
End dumn	36	40 x 8 5 x 6 3	12 400	\$20,000

Small "skip" loader



https://www.123rf.com/photo_114300199_yellowmini-loader-with-small-bucket-3d-render-on-whitebackground-with-shadow.html

Turning radius example



Roll-off, 10 cubic yard, open top

https://www.orangecansinc.com/wpcontent/uploads/2012/09/IMG_0956.jpg

Roll-off truck and container



Photo from Sweetser & Associates, Inc.

Trailer, Possum belly



Photo from Sweetser & Associates, Inc. End dump



https://www.overdriveonline.com/wpcontent/uploads/sites/8/2012/12/Trail-King-Steel-Half-Round-800x581.jpg

•••• Costs (Facilities/Personnel)

Operating Costs

Facility Maintenance

- Tip floor e.g. 12 inches reinforced concrete
- Roof
- Walls
 - Exterior
 - Interior push walls
- Loading area
- Equipment
- Roads
- Landscaping
- Ancillary areas

Personnel

- Varies by hours of operation
- Varies by activities/roles
- Rates

Costs (Equipment/Revenue)

Operating Costs

Equipment

- Area where waste is unloaded
- Some diversion may occur
- Waste pushed into trainer/container
- Requires loader
- Need push walls on side to protect building
- Garbage is abrasive needing replacement
- Maintenance

Recycling Revenue

- Provide revenue (sometimes)
- Market fluctuations common
- Some negative net value
- Not usually self-supporting
- Fewer export outlets
- Storage concerns –weather, vectors
- Quality control
- How to ship
- Avoid stockpiling
- Short-term landfill consideration



•••• Costs (Transportation/Disposal)

Operating Costs					
Transportation	Disposal				
 Formula Cost per ton = (Trailer cost/hour) x (Number of hours)/(Tons per load) Cost per hour ≈ \$70 per hour Hours ≈ Miles / Miles per hour Average payload ≈ 20 tons e.g. Cost per ton = (\$70/hr. x (50 miles/50 mph))/20 tons = \$35/ton 	 Negotiated rate Select several site for options Guarantee capacity Due diligence 				

•••• Sample Operating Costs

	Annual Operating	
Category/Description	Expenses	
Ops & Maintenance		
Fuel Costs	\$ 25,068	
O & M, Truck and Equipment	\$ 2,600	
Insurance for trucks	\$ 707	
Permits/Licensing	\$ 177	
Utilities	\$ 3,600	
Other recurring site costs	\$ 3,600	
Total Ops and Maintenance	\$ 35,752	
Staff		
Employee Salaries	\$ 79,560	
Employee Payroll Tax / Benefits	\$ 22,277	
Total Staff	\$ 101,837	
Total Annual Operating Expenses	\$ 137,588	

 $\bullet \bullet \bullet \bullet$

Allowable Operating Costs Eligible under EPA GAP

Costs are allowable – if resources allow:

- Staffing costs beyond pilot phase
- Fuel
- Tipping fees
- Supplies
- Vehicle maintenance



Operation & Maintenance

- O&M costs
- Personnel
- Waste handling
- Maintenance
- Health & safety

•••• Personnel/Staffing

Typical Responsibilities

- Gate attendant/scale weighmaster
- Open/close, collect fees, direct users, recordkeeping
- Laborer
- Traffic, recycling, waste screening, litter, etc.
- Equipment operator
- Loaders, forklift, bin truck
- Driver
- Long-haul, recyclables
- Maintenance
- HHW staff

Staffing Plans

- Staffing levels
- Tasks
- Cross trained
- Backups

Training

- Operations
- Safety
- Equipment
- HAZWOPER
- PPE
- Occupational hazards



Operation & Maintenance

- O&M costs
- Personnel
- Waste handling
- Maintenance
- Health & safety

- Acceptable wastes/materials list
- Terms of acceptance
- Waste/material specific pricing
- Recycling commonly subsidized
- Unaccepted wastes maybe illegally disposed

•••• Used Oil Collection: Is Contamination Suspected?

- 1. DO NOT ask hauler to take a little more
- 2. Stop adding oil to tank Lock it out
- 3. Tell employees tank closed
- 4. Post sign
- 5. Take sample and test
 - Contact hauler for testing service
 - Typically test PCB, flash point, other?
 - Need test for reimbursement & disposal

•••• Waste Screening

- Best efforts to prevent acceptance of hazardous and other prohibited wastes
- Customer notification/education
- Visual surveillance
- Waste inspection
- Provide safe management options



Education and Outreach

- Hours
- Acceptable/unacceptable wastes
- Fees
- Special wastes
- Terms and conditions of use
- Methods
 - Signage, flyers, media



- Daily log
- Tonnages
- Waste types
- Environmental testing
- Incident reports
- Training
- Agency reports





Operation & Maintenance

- O&M costs
- Personnel
- Waste handling
- Maintenance
- Health & safety



- Written procedures each component
- Plan daily, periodic and emergency activities
- Design for ease of maintenance
- Preventative maintenance protects investment
- Garbage is abrasive and erode steel and concrete over time





Operation & Maintenance

- O&M costs
- Personnel
- Waste handling
- Maintenance
- Health & safety



- Need security site
- Scale secure (handles cash)
- Fencing and entrance gate
- Allow visibility of operating areas



•••• Animal Control

Vectors and Animal Considerations

- Solid waste attractive nuisance
 - Especially food waste and unwashed recyclables
- Animals and Vectors
 - Mammals
 - Reptiles
 - Insects
 - Birds
- Deterrents
- Bear Bin Cover
 - Cover slides into place to allow locking "lid"
 - Minimize animal intrusion

Vector Control

- Keeping the facility clean will keep out disease vectors.
- The facility should have a perimeter fence to keep out bears, foxes, racoons, others.
- Use sustainable practices rather than pesticides











- Schedule daily/weekly litter control
- Fencing to control litter
- Cover waste/material containers





- Health and safety plan
- Training
- Recognition
 - Fires
 - Spills
- Procedures
- Cleanup






- Abandoned wastes
- Onsite
- Access roads
- Community cleanup
- Drug lab wastes



REVIEW & WRAP UP Priority Concepts

€EPA

31

$\bullet \bullet \bullet \bullet$

Objectives – Recap

- Evaluate different options for transfer stations or community convenience areas/drop-off sites serving smaller populations
- Right size a transfer facility for your needs
- Understand siting concerns and resource needs for conceptual design, site preparation, construction, and operation of small transfer stations or community drop-off sites



Review and moving forward



•••• Putting it All Together

- More training options coming soon
- Your contact for support and info your EPA tribal solid waste coordinator:

Region 5	Dolly Tong	Tong.Dolly@epa.gov
Region 9	Deirdre Nurre Jenny Stephenson Robert Seaman	<u>Nurre.Deirdre@epa.gov</u> <u>Stephenson.Jenny@epa.gov</u> <u>Seaman.Robert@epa.gov</u>
Region 8	Alison Ruhs	Ruhs.Alison@epa.gov
Region 10	Rick McMonagle Angel Ip Gabriela Carvalho	McMonagle.Richard@epa.gov Ip.Angel@epa.gov Carvalho.Gabriela@epa.gov

Thank you