

# MANAGING WASTEWATER FOR NATIVE AMERICANS

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**Onsite  
Wastewater  
Siting.**

**Know your  
problem  
before you  
fix it.**

# DAN'S CREDENTIALS

- 33 years **experience** in the on-site wastewater design field.
- My **mentor** was a Civil Engineer who had been active in the industry for even more years. He said it was a very **unique field**.
- Degree in both **Land Surveying and Civil Engineering**.
- Worked for civil engineering and surveying companies **in the private sector**.
- Started my own business in 1989 and grew it to a five employee company.
- I have a **passion** for the business which means I try to **get it right the first time**. It is important to me that we use **guidelines**:
  1. It works
  2. Follows rules and regulations
  3. Cost effective

# HOW DO WE MANAGE WASTEWATER FOR NATIVE AMERICANS

## A. On-site wastewater system (septic)

1. Many Tribe's property is rural in nature

## B. Public sewer system

1. Used when cluster housing is used
2. When large commercial sites are involved
3. Commonly use sewage lagoons or MBR's

# MONEY SPENT ON WASTEWATER IN INDIAN COUNTRY

- Major contributors:

- a) EPA:

- \$\_\_\_\_\_ sewer infrastructure (big pipe)

- \$5 to 20 Grand each site (decentralized on-site septic)

- b) Indian Health Service \$20,000 maximum in my area (soon may be \$25K)

# DRIVERS

- EPA: 1996 Clean Water Act
- IHS: Public Law 86-121 amendment of August 5, 1954 (68 Stat 674)
- Population growth and density in both urban and rural areas

# DETERMINING/DEVELOPING LONG-TERM STRATEGIES

- Sustainability and lifecycle cost:
  1. Public sewer
    - a) Maintain collection system
    - b) Maintain sewage treatment plant
    - c) Ground water intrusion problems
  2. Onsite septic
    - a) Original construction costs less
    - b) Operation and Maintenance less
    - c) Mostly installed high in soil profile out of ground water

# WASTEWATER QUANTITY AND QUALITY

- Treatment standards, sewage treatment plants very commonly required to be typically:

30 / 30 / 200  
BOD/TSS/Fecal

- Treatment standard on-site septic very commonly required to be:

10 / 10 / 200  
BOD/TSS/Fecal

# SEWAGE STRENGTH FOR PUBLIC SEWER

Table 1, below. All figures represent maximum effluent limits unless otherwise indicated. The permittee must comply with the effluent limits in the tables at all times unless otherwise indicated, regardless of the frequency of monitoring or reporting required by other provisions of this permit.

**Table 1: Effluent Limitations and Monitoring Requirements**

Parameter	Effluent Limitations				Monitoring Requirements		
	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Percent Removal <sup>3</sup>	Sample Location	Sample Frequency	Sample Type
Flow, mgd	Report	---	Report Max. Daily Value	---	Effluent	Continuous	Recording
Biochemical Oxygen Demand (BOD <sub>5</sub> )	30 mg/l	45 mg/l	---	85% (Min.) <sup>3</sup>	Influent and Effluent	2/week	24-hour composite
	154 lb/day	231 lb/day	---				Cal-culation <sup>2</sup>
Total Suspended Solids (TSS)	30 mg/l	45 mg/l	---	85% (Min.) <sup>3</sup>	Influent and Effluent	2/week	24-hour composite
	154 lb/day	231 lb/day	---				Cal-culation <sup>2</sup>
Fecal Coliform Bacteria <sup>1</sup>	200/100 ml	400/100 ml	---	---	Effluent	5/week	Grab
pH	Within the range of 6.0 to 9.0				Effluent	Daily	Grab
Total Ammonia as N, mg/l <sup>5</sup>	Report <sup>5</sup>	---	Report Max. Daily Value <sup>5</sup>	---	Effluent	1/quarter	24-hour composite
Alkalinity, mg/l as CaCO <sub>3</sub>	Report	---	Report Max. Daily Value	---	Effluent	1/year	Grab
Temperature, degrees C	Report	---	Report Max. Daily Value	---	Effluent	Daily <sup>6</sup>	Grab

# SEWAGE STRENGTH FOR ON-SITE SYSTEMS

On-site Sewage Systems Chapter 246-272A WAC  
Effective Date: July 1, 2007

**TABLE III**  
**Product Performance Requirements for Proprietary Treatment Products**

Treatment Component/Sequence Category	Product Performance Requirements					
<b>Category 1</b> Designed to treat sewage with strength typical of a residential source when septic tank effluent is anticipated to be equal to or less than treatment level E.	<b>Treatment System Performance Testing Levels</b>					
	Level	Parameters				
		CBOD <sub>5</sub> (mg/L)	TSS (mg/L)	O&G (mg/L)	FC (#/100 ml)	TN (mg/L)
	A	10	10	----	200	----
	B	15	15	----	1,000	----
	C	25	30	----	50,000	----
	D	25	30	----	----	----
	E	125	80	20	----	----
N	----	----	----	----	20	
	Values for Levels A - D are 30-day values (averages for CBOD <sub>5</sub> , TSS, and geometric mean for FC.) All 30-day averages throughout the test period must meet these values in order to be registered at these levels. Values for Levels E and N are derived from full test averages.					
<b>Category 2</b> Designed to treat high-strength sewage when septic tank effluent is anticipated to be greater than treatment level E.  (Such as at restaurants, grocery stores, mini-marts, group homes, medical clinics, residences, etc.)	All of the following requirements must be met:  (1) All full test averages must meet Level E; and (2) Establish the treatment capacity of the product tested in pounds per day for CBOD <sub>5</sub> .					
<b>Category 3</b> Black water component of residential sewage (such as composting and incinerating toilets).	Test results must meet the performance requirements established in the NSF test protocol.					
<b>Total Nitrogen Reduction in Categories 1 &amp; 2 (Above)</b>	Test results must establish product performance effluent quality meeting Level N, when presented as the full test average.					

# HOW TO APPROACH APPLICATION TO REPLACE OR REPAIR WASTEWATER SYSTEM

## A. Before site visit, do your home/office work!

### 1. Information on property should include:

- Property line
- Easements
- Right of Ways
- As-Built drawing
- Google Earth map view
- Soil survey information from USDA/NRCS
- Etc.

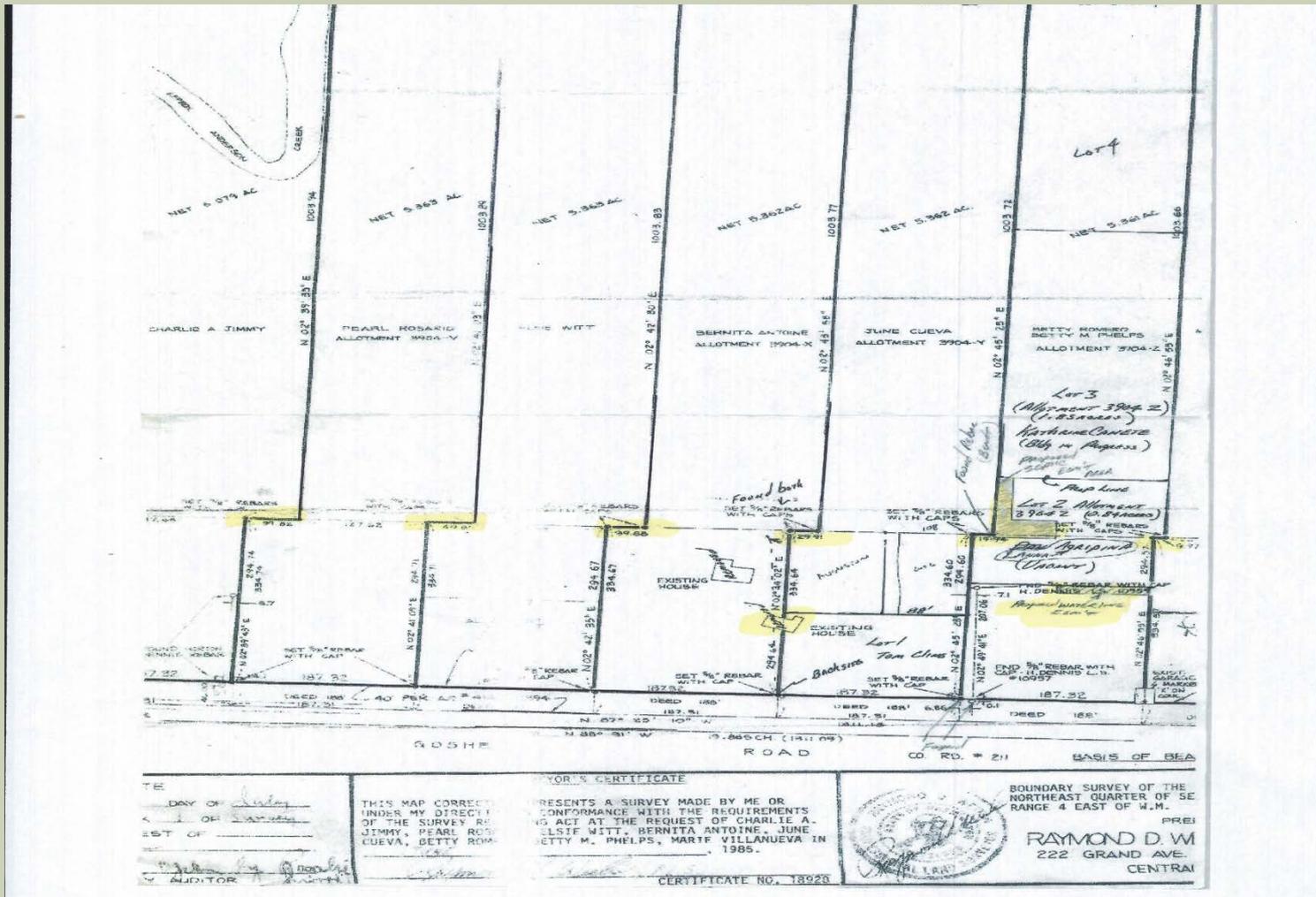
## B. Interview applicant

### 1. Is it normal house-strength wastewater?

### 2. How many people use system?

- Daycare
- Meeting place
- Inspection of septic system tanks
- Construction activity

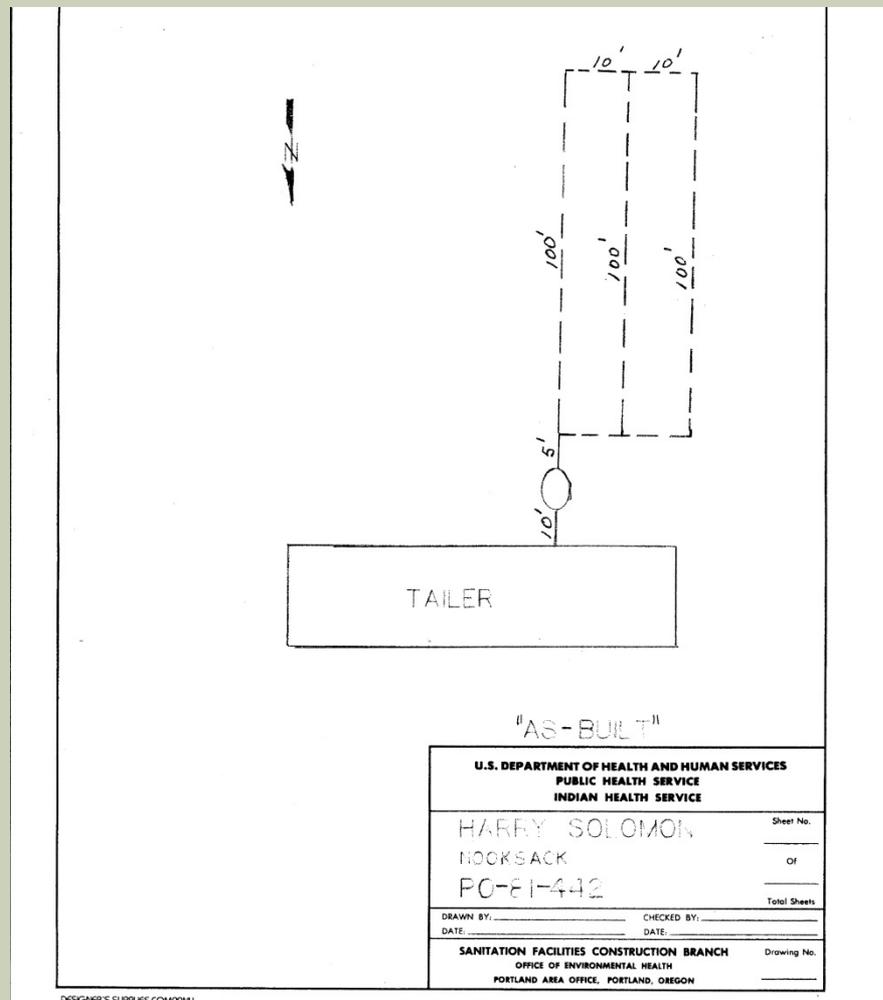
# RECORD OF SURVEY SHOWING, PROPERTY LINES, EASEMENTS, AND RIGHT OF WAYS



# LOOK UP EXISTING AS-BUILT

## What's wrong with this drawing?

1. Notice the North arrow – it's pointing down and should be up.
2. No reference to road.
3. No reference to property lines.
4. No reference to existing well.
5. Once trailer is removed, no idea where the drain field is.





# STEP 1: ON-LINE SOIL SURVEY INFORMATION THROUGH WEB SOIL SURVEY

URL:

<http://websoilsurvey.nrcs.usda.gov>

Another possible web site:

<http://soils.usda.gov>

The screenshot shows the USDA Web Soil Survey homepage. At the top, there is a banner with the USDA logo, the text "United States Department of Agriculture Natural Resources Conservation Service", and the title "Web Soil Survey" in large yellow letters. Below the banner is a navigation menu with links for "Home", "About Soils", "Help", and "Contact Us". The main content area features a search box with the text "Enter Keywords" and a "Go" button, and a "Browse by Subject" menu with various categories like "Soils Home", "National Cooperative Soil Survey (NCSS)", etc. A large green button labeled "START WSS" is prominent. To the right, there is a "I Want To..." section with links for starting the survey, knowing requirements, and finding soil data. Below that is an "Announcements/Events" section with a link for "Web Soil Survey 2.3 has been released!". At the bottom, there is a "I Want Help With..." section with links for getting started, using the survey, and known problems. The main text area contains a welcome message and a "Four Basic Steps" section, with the first step being "Define" and a sub-section for "Area of Interest (AOI)" showing a map interface.

USDA United States Department of Agriculture Natural Resources Conservation Service

## Web Soil Survey

Home About Soils Help Contact Us

You are here: Web Soil Survey Home

The simple yet powerful way to access and use soil data.

**START WSS**

**Welcome to Web Soil Survey (WSS)**

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

**Four Basic Steps**

1 Define.

**Area of Interest (AOI)** Use the Area of Interest tab to define your area of interest.

Click to view larger image.

**I Want To...**

- Start Web Soil Survey (WSS)
- Know the requirements for running Web Soil Survey — will Web Soil Survey work in my web browser?
- Know the Web Soil Survey hours of operation
- Find what areas of the U.S. have soil data

**Announcements/Events**

- Web Soil Survey 2.3 has been released! View description of new features.
- Web Soil Survey Release History

**I Want Help With...**

- Getting Started With Web Soil Survey
- How to use Web Soil Survey
- How to use Web Soil Survey Online Help
- Known Problems and Workarounds

**Search**

Enter Keywords

All NRCS Sites

**Browse by Subject**

- Soils Home
- National Cooperative Soil Survey (NCSS)
- Archived Soil Surveys
- Status Maps
- Official Soil Series Descriptions (OSD)
- Soil Series Extent Mapping Tool
- Soil Data Mart
- Geospatial Data Gateway
- eFOTG
- National Soil Characterization Data
- Soil Geochemistry Spatial Database
- Soil Quality
- Soil Geography
- Geospatial One Stop

# HOW TO APPROACH APPLICATION OF REPLACE OR REPAIR WASTEWATER SYSTEM

## C. Upon visit, check surroundings:

- Is there “any” mode to determine how much use/demand on existing system
  - Water meter available (both public and private) on event control panel
  - Drain field area being treated properly such as:
    - Too much water being consumed
    - Used for parking
    - Used for driveways
    - Covered with building or concrete

# WATER METER USAGE



# HOW TO APPROACH APPLICATION TO REPLACE OR REPAIR WASTEWATER SYSTEM

## D. Interview applicant

1. Is it normal house-strength wastewater
2. How many people use system
  - Daycare
  - Meeting place
  - Inspection of septic system tanks

# DIG DEEPER

- If you find **NO** logical reason system failed, “Dig Deeper”
  1. Wastewater testing
  2. Tanks inspected “then pumped”
  3. Dig up portion of drain field, determine condition -- or is it all being used?

# TIGHT SOILS WITH HIGH WATER TABLES ON PREVIOUS REVIEW



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CLIENT NAME/JOB # IHS / Termont / Canete / 208153  
PROPERTY ID# Lot 3 (3904-Z)  
DRAWN BY DM DATE November 7, 2008  
SCALE NTS SHEET NO. 4 OF 20

## Soil Log Detail

HOLES LOGGED November 6, 2008

SYSTEM TYPE: MOUND

SOIL LOG 1	COLOR/ MODIFIER	SOIL TEXTURE	RATE	TYPE
0 TO 18 INCHES	BRN	SIL	0.45	5
18 TO 22 INCHES	TAN GREY	SIL	-	-

WATER: NONE  
MOTTLING: 18+

ROOTS: 23

SOIL LOG 2	COLOR/ MODIFIER	SOIL TEXTURE	RATE	TYPE
0 TO 12 INCHES	BRN	SIL	0.45	5
12 TO 21 INCHES	TAN GREY	SIL	-	-

WATER: NONE  
MOTTLING: 12+

ROOTS: 18

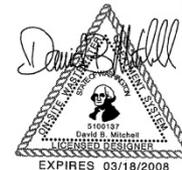
SOIL LOG 2	COLOR/ MODIFIER	SOIL TEXTURE	RATE	TYPE
0 TO 4 INCHES	GREY	SIL	0.45	5
4 TO 21 INCHES	TAN GREY	SIL	0.45	5

WATER: NONE  
MOTTLING: 4+

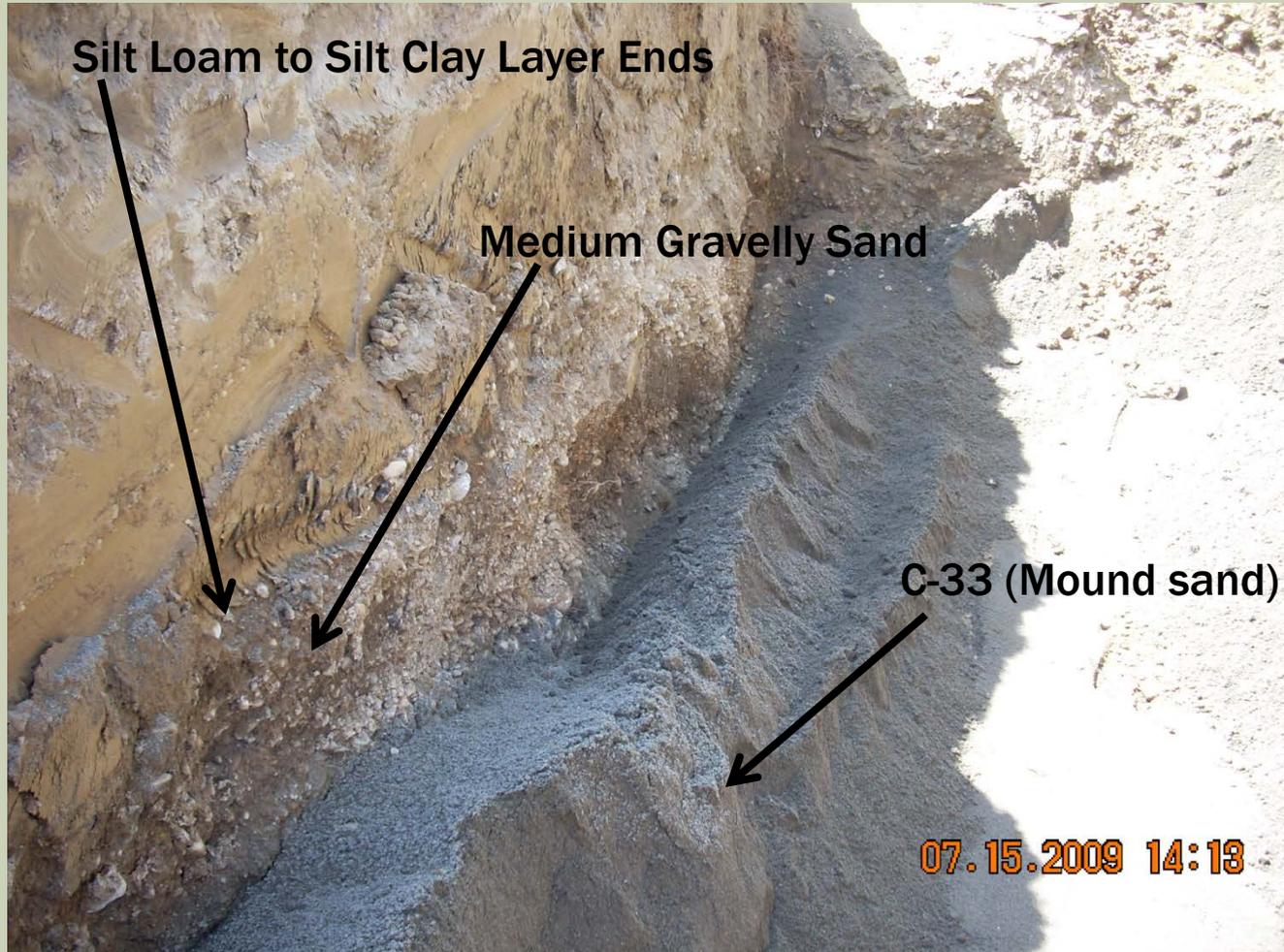
ROOTS: 14

*Pore soils Shallow!*

BL = BLUE; BR = BROWN; BK = BLACK; C = CLAY; CL = CLAY LOAM; CMTD = CEMENTED;  
COB = COBBLY; CPTD = COMPACTED; CS = COARSE SAND; DK = DARK; FN = FINE; FS = FINE SAND  
GRV = GRAVELLY; GR = GRAY; L = LOAM; LFS = LOAMY FINE SAND; LCS = LOAMY COARSE SAND;  
LMS = LOAMY MED SAND; LS = LOAMY SAND; LVFS = LOAMY VERY FINE SAND; MED = MEDIUM;  
MTS = MOTTLES; OL = OLIVE; OM = ORGANIC MATTER; OR = ORANGE; R = RED;  
RK = ROCKY; RTS = ROOTS (DEPTH); SCL = SANDY CLAY LOAM; SIL = SILTY CLAY LOAM;  
SIL = SILT LOAM; SIL = SANDY LOAM; ST = STRONG; TN = TAN;  
V = VERY; X = EXTREMELY; YL = YELLOW



# 4' SILT LOAM OVER GRAVELLY SAND



Silt Loam to Silt Clay Layer Ends

Medium Gravelly Sand

C-33 (Mound sand) imported

07.15.2009 14:13

**ASK TO SEE SEPTIC TANK BEFORE PUMPED;  
DETERMINE IF FLUID LEVEL IS TOO HIGH**



# REMOVAL OF TREE DAMAGED/CUT OFF DRAIN FIELD FROM SEPTIC TANK



**DRAIN FIELD FOUND TO BE IN GOOD WORKING ORDER JUST DISCONNECTED FROM TANK. TOTAL REPAIR LESS THAN \$2,000.00**



# DRAIN FIELD REPAIRED EXISTS UNDER DECK. CUSTOMER IS HAPPY!



# DON'T BE A PIGEON

Determine what needs to be done, not just doing something

- A. Do what is **right** for Client, Tribe and Environment
- B. Make sure you are doing **things right** by following three rules:
  1. Systems must work! We are looking for treatment and disposal. For too long we have designed for just disposal.
  2. Follow the rules and regulations even if you are on Tribal Land. They have been put there to protect public health, that's what we do!
  3. Cost is important. However, design for easy maintenance and minor repairs. If we do our job right, these systems should last 30-50 years!

# PIONEER SQUARE, SEATTLE

