

**Agency: Commerce, Community and Economic Development****Grants to Municipalities (AS 37.05.315)****Grant Recipient: Bethel****Federal Tax ID: 92-6001644****Project Title:****Project Type: Maintenance and Repairs**

# Bethel - Sewage Lagoon

**State Funding Requested: \$1,286,510****House District: 37 / S**

One-Time Need

**Brief Project Description:**

Emergency repairs to Bethel's sewage lagoon

**Funding Plan:**

Total Project Cost: \$1,286,510

Funding Already Secured: (\$0)

FY2015 State Funding Request: (\$1,286,510)

Project Deficit: \$0

*Funding Details:**Not applicable. This is an emergency request.***Detailed Project Description and Justification:**

Please see attached engineer's report for information regarding the current situation and needs.

This is a health and life safety issue for the Bethel community. The attached engineers's report notes it is not safe for sewage trucks to approach within 15 ft. of the lagoon's edge (which hampers their ability to transfer sewage into the lagoon. Also, splitting metal and separating seams in the wall structures may quickly become prone to significant leakage.

Funds may be used to further assess the current facility - as well as for design and realization a new new durable structure to safely serve the Bethel community.

**Project Timeline:**

Expenditures will begin immediately upon receipt of funds.

**Entity Responsible for the Ongoing Operation and Maintenance of this Project:**

City of Bethel

**Grant Recipient Contact Information:**

Name: John Sargeant  
 Title: Grant Manager  
 Address: PO Box 1388 / 300 State Highway  
 Bethel, Alaska 99559  
 Phone Number: (907)543-1386  
 Email: jsargent@cityofbethel.net

Total Project Snapshot Report

2014 Legislature

TPS Report 62696v1

Has this project been through a public review process at the local level and is it a community priority?  Yes  No

ACTIVITY	MATERIAL	QUANTITY	UNIT	UNIT COST	COST	LABOR HOURS	UNIT LABOR COST	LABOR COST	EQUIPMENT COST/DAY	DAYS	EQUIPMENT COST	FREIGHT	TOTAL
<b>CONTRACTOR GENERAL REQUIREMENTS</b>													
Overhead and Profit						600	\$ 145	\$ 87,000					\$ 87,000
Travel								\$ 93,236					\$ 93,236
Per Diem								\$ 12,000					\$ 12,000
								\$ 65,000					\$ 65,000
<b>MOBILIZATION</b>													
<b>SITE PREPARATION</b>													
TEMPLATE CONSTRUCTION	MISC STEEL	25000	LBS	\$ 0.80	\$ 20,000	300	\$ 75	\$ 22,500	1200	5	\$ 6,000		\$ 48,500
DRIVE SHEETS	AS 500 SHEET	121,800	LBS	\$ 1.60	\$ 194,880	300	\$ 75	\$ 22,500	5,000	5	\$ 25,000		\$ 242,380
REMOVE EXISTING SHEETS						300	\$ 75	\$ 22,500	5000	5	\$ 25,000		\$ 47,500
COMPLETE FILL	FILL	150	CU YDS	\$ 20.00	\$ 3,000	160	\$ 65	\$ 10,400	3500	2	\$ 7,000		\$ 20,400
DEMOLIBLIZE						120	\$ 75	\$ 9,000	1500	6	\$ 9,000	\$ 15,000	\$ 33,000
<b>SUBTOTAL</b>													
CONTINGENCY													\$ 723,416
CONSTRUCTION TOTAL (Rounded)													\$ 289,366
													\$ 1,013,000
<b>CITY ADMINISTRATION</b>													
ENGINEERING													\$ 30,390
CONSTRUCTION SUPPORT SERVICES													\$ 101,300
													\$ 141,820
<b>TOTAL ESTIMATED PROJECT COST</b>													
ACCURACY RANGE (Rounded)													\$ 1,286,510
													\$ 1,930,000
													\$ 900,000

Assumptions:

- Sheet pile lengths of 35 feet are sufficient
  - A crane is available in Bethel to hang a vibratory hammer on
  - Vibratory hammer shipped from Anchorage.
  - Six man work crew for most of the work.
  - Crane can be walked out into position to perform the work.
  - Existing sheets can be extracted with the vibratory hammer.
  - No permit fees or permitting efforts are included.
- NOTE: The cost opinion shown as been prepared for guidance in project evaluation from the information available at the time of preparation. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final schedule and other variable factors. As a result, the final project costs will vary from those presented above. Because of these factor, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.**

## Bethel Lagoon Truck Dump Site Field Report

PREPARED FOR: City of Bethel Public Works Department  
PREPARED BY: Mark Parent, P.E./CH2M HILL  
COPIES: Tom Wolf, P.E./CH2M HILL, Bud Alto, P.E./CH2M HILL  
DATE: April 10, 2014  
PROJECT NUMBER: 492385

### Introduction

On April 3, 2014 CH2M HILL conducted field observations of City of Bethel's sewage lagoon truck dump site. The purpose of this report is to describe the existing conditions of the truck dump site and to provide recommendations for its future use. The recommendations in this report are conceptual in nature and are not intended to represent engineered solutions.

### Description of Existing Truck Dump Site

The existing truck dump site is composed of a short sandy, gravel road leading out to the lagoon and dead-ending at a semi-circular bulkhead wall. Sewage trucks use this site to back up the edge of the bulkhead and empty the trucks contents into the lagoon. The bulkhead wall consists of 3/8" thick x 24" wide x 9" deep Z-type steel sheet piles. The bulkhead wall has an arc length of approximately 160 feet and had a maximum height above the water surface of 7'-8" at the time of observation. No existing construction documents for this bulkhead wall have been located to date.

### Field Observations

Approaching the bulkhead wall a visible slope in grade towards the lagoon was noted (See Photo 1). The bulkhead wall was observed to be leaning out over the lagoon to a significant degree (See Photo 2) which is likely the cause of the observed change in grade. The angle of the sheet pile wall at the point of maximum lean was measured to be 15.2 degrees relative to the vertical plane.



Photo 1: Sloping grade near bulkhead wall.



Photo 2: Leaning sheet pile wall.

The sheet pile steel was corroded, but did not show signs of significant scaling or loss of sections. Splitting of the steel and separation at the pile interlocking seams was observed at multiple locations (See Photos 3 and 4).

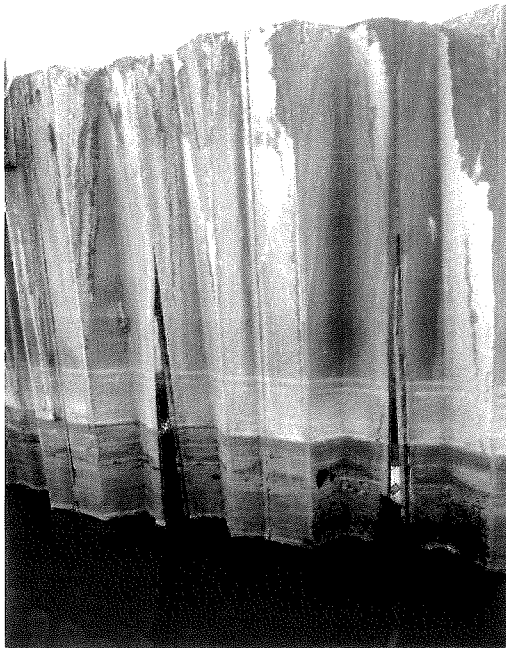


*Photo 3: Splitting steel at top of wall.*



*Photo 4: Separation at wall seam.*

Multiple seams of the interlocking sheet pile sections were also observed to be separating from the bottom up. The two most extreme instances of this separation appeared to have separated by approximately 4 to 6 inches at the water surface level and extended half- to three-quarters of the way up the wall (See Photos 5 and 6). Voids in the soil behind the wall were also noted indicating soil migration into the lagoon.



*Photo 5: Separation at wall seams.*



*Photo 6: Separation at wall seams.*

## Conclusions & Recommendations

The current condition of the sheet pile bulkhead wall at the lagoon signifies a failed structure. The extreme angle of the sheet pile wall and the large separations at the interlocking seams indicate that the wall is not structurally fit for its intended use of supporting 4,000 gallon sewage trucks. The separation of the sheet pile sections appears to be undermining the stability of the soil it is meant to retain. The soils were frozen at the time of these observations, but soil migration into the lagoon can be expected to increase in the spring as it thaws. It is recommended that the City of Bethel restrict vehicle access to a minimum of 15 feet from the edge of the existing bulkhead wall until it can be replaced.

The existing design of the bulkhead wall is somewhat unusual due to its curved profile with Z-type sheet pile. Z-type sheet pile is generally not designed to resist the additional stress created by a curved profile. Additionally, the cantilevered height of this wall above the water surface is fairly high considering the truck loading requirements and the section size of the sheet pile. CH2M HILL recommends the existing bulkhead wall be replaced with a closed cell cofferdam wall (See Figure 1). Cofferdam walls can be designed as self-supporting wall that do not require supplementary waling and anchoring.

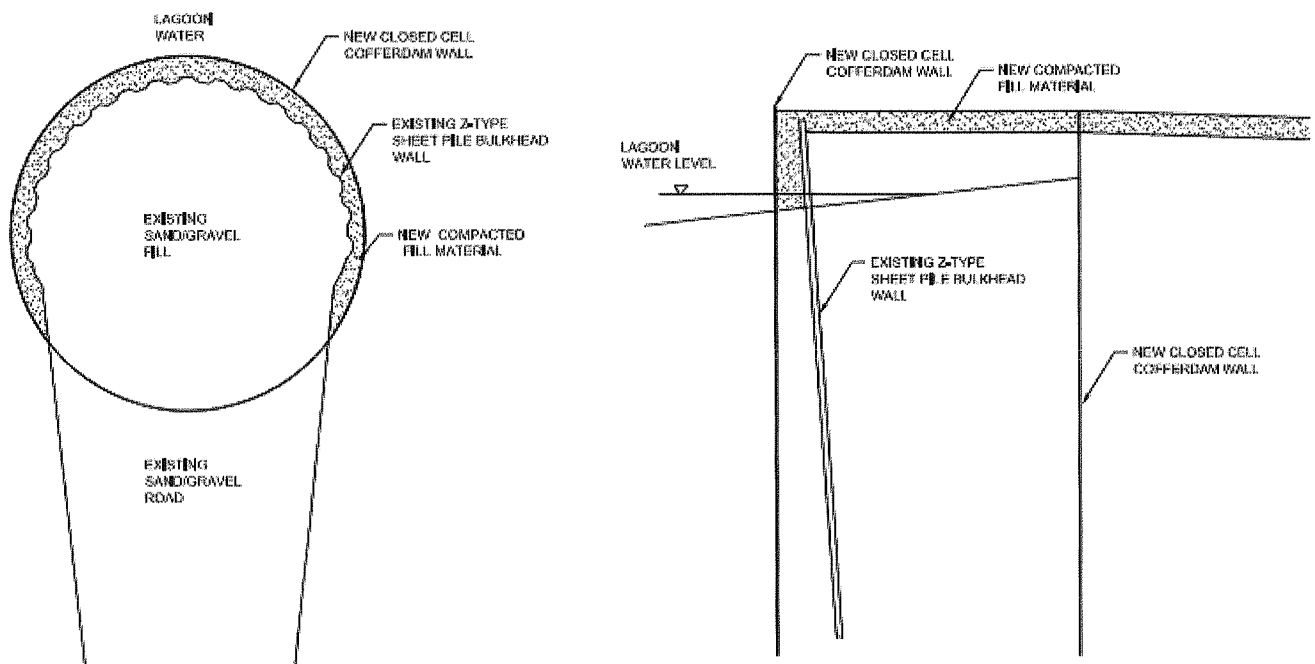


Figure 1: Closed cell cofferdam wall conceptual sketch. Not to scale & not for construction.