	State of Washington Department of Ecology WASTEWATER TREATMENT PLANT COMPLIANCE INSPECTION REPORT	Northwest Regional Office 3190160 th Ave SE Bellevue, WA 98008 (425) 649-7000 ph (425) 649-7098 fax (last update 6-11-07)
	Section A: General Information	

Report Version <input checked="" type="checkbox"/> New <input type="checkbox"/> Changed <input type="checkbox"/> Deleted	PERMIT # WA-002056-7	mo/day/yr 09-15-2009	Inspection Type C	Inspector Code S	Facility Type <input checked="" type="checkbox"/> 1 Municipal <input type="checkbox"/> Public <input type="checkbox"/> Private
Remarks					
Inspection work days 2.5	Facility Self-Monitoring 5	Photos Taken <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Samples Taken <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	BI N	QA N

Lead Ecology Inspector(s)
Shawn McKone

Section B: Facility Data		
Name, Location, and Phone of Facility Inspected City of Oak Harbor Wastewater Treatment Plants 1501 SE City Beach Dr. Oak Harbor, WA 98277	Entry Time 12:30 pm	Permit Effective Date June 1, 2005
	Exit Time 5:00 pm	Permit Expiration Date May 25, 2010
Name(s)/Title(s) of On-Site Representative(s) Larry Michaels, Plant Supervisor; Scott Hubbard, Lab Coordinator; Rob Kelley, Lead Operator; Steve Bebee, Collections Operations Manager Cathy Rosen, Public Works Director; Eric Johnston, City Engineer	Ecology Staff On-Site Shawn McKone	
Name, Address, Title, Phone, and Fax Number of Responsible Official Cathy Rosen, Public Works Director 1400 NE 16 th Avenue Oak Harbor, WA 98277	Other Facility Data Last inspection was 1-30-08; Class 1 with Mark Toy – DOH. Additional site visit on 11-19-2009 to follow-up on lagoon flooding protection issues.	
Phone Number (360) 279-4751 Fax	Contacted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Section C: Areas Evaluated During Inspection (Check only those areas evaluated)					
<input checked="" type="checkbox"/> Permit	<input type="checkbox"/> Flow Measurement	<input checked="" type="checkbox"/> Operations & Maintenance	<input type="checkbox"/> CSO/SSO (Sewer Overflow)		
<input checked="" type="checkbox"/> Records/Reports	<input type="checkbox"/> Effluent <input type="checkbox"/> Receiving Water	<input type="checkbox"/> Sludge Handling/Disposal	<input type="checkbox"/> Pollution Prevention		
<input checked="" type="checkbox"/> Facility Site Review	<input type="checkbox"/> Compliance Schedules	<input type="checkbox"/> Pretreatment	<input type="checkbox"/> Multimedia		
<input type="checkbox"/> Self-Monitoring Program	<input type="checkbox"/> Laboratory	<input type="checkbox"/> Storm Water	<input checked="" type="checkbox"/> Other		

Section D: Summary of Findings/Comments
<p>I. INTRODUCTION</p> <p>The Department of Ecology (Ecology) conducted a Regional Class I Inspection at the City of Oak Harbor RBC and Seaplane Lagoon Wastewater Treatment Plants (WWTP) on September 15, 2009. Shawn McKone, Ecology's Northwest Regional Office Water Quality (NWRO-WQ) Facility Manger, conducted the inspection with assistance from Larry Michaels, Rob Kelley, and Scott Hubbard. Ecology also met with Cathy Rosen, Eric Johnston and Steve Beebe during the inspection to discuss the City's planning process for a new treatment plant. The facilities are regulated by Permit no. WA-002056-7, which was issued on May 25, 2005, and expires on May 25, 2010.</p> <p>Ecology had two primary goals for this inspection: 1) review current operating status of the RBC facility and 2) observe the impacts the recently completed restoration of a tidal marsh adjacent to the Seaplane Lagoon facility has on surface water surrounding the plant. Ecology returned to the Lagoon facility on November 19, 2009, to reassess flooding potential from the restored marsh.</p> <p>II. RESULTS AND DISCUSSION</p> <p>RBC Plant:</p> <p>Over the last year several changes have been made at the facility to improve operations management and overall safety. Although the RBC facility is not in the City's long-term plans, staff is committed to keeping the facility well maintained and operated. Larry conducted a safety audit of the facility and identified several areas for improvement. Improvements made include new alarms on the anaerobic digester, updates to signs alerting staff to hazards around the facility and expanding confined space entry protocols. Larry relied on previous experience with reviewing and responding to findings from Labor and Industries' investigation at Spokane County's WWTP to help guide his safety audit. Additional improvements put in place over the last year include:</p> <ul style="list-style-type: none"> Grease removal at the RBC plant influent structure is now placed on a routine schedule.

- All pumps with water seals have new water control valves to regulate water use.
- Gas alarms have been installed on the anaerobic digesters and new pressure controls have been installed to help better manage digester gas wasting. New SOPs have been implemented for digester gas handling.
- Temperature controls in the RBC huts are being improved to help manage odors.
- All gears on the RBC drives have been tuned up.

City is migrating to electronic record keeping for daily process and equipment checks. To support this effort, new forms have been created for daily data collection (photo 6). The new system, which uses Excel-based spreadsheets, will flag values entered by operators that are outside of expected values. Operators are required to document corrective actions taken for each flagged parameter. If no corrective actions are taken, operators must include some sort of narrative to provide more information about the flag. This system is being used for operations at both the RBC and lagoon facilities.

The city is in the process of purchasing a new skid-mounted 750 kw generator to be installed at the RBC facility. The generator will be capable of providing power to the RBC plant and the diversion lift station. The city also recently purchased and installed a new pump and motor for the diversion lift station. Although the pump and motor are physically installed, there is currently no power supply for the motor. If an emergency arose that required use of the new motor, the city can run temporary power to the motor. However the city needed to complete the installation of the new generator and associated electrical work before the new pump is available for use.

Staffing:

As of the original inspection date (9/15/2009), the treatment plants were staffed with 5 full time operators: Larry Michaels, Plant Supervisor; Rob Kelley, Lead Operator; Scott Hubbard, Lab Coordinator; Phil Mathews, Plant Operator II; and Dave Worley, Plant Operator I. The City was scheduled to conduct interviews for an additional operator who would be hired as an OIT with a requirement to be a group I operator within 1 year. By the November follow up visit, the city had filled this position; new operator's name is Wade Iverson.

Future Facility Planning:

The September site visit included a brief meeting with Cathy Rosen, Larry Michaels, Eric Johnston and Steve Bebee to discuss the City's ongoing process for planning for a new treatment facility and the status of the outfall from the lagoon facility. The outfall inspection required by the permit identified damage to the outfall line and raised concerns for the long-term viability of the line. Although short term repairs have been made to the line and the outfall is operable, the city is uncertain whether that line will continue to be part of the long-term plan for treatment and disposal. I indicated that Ecology requires that the outfall to be maintained so that discharges occur only at the diffuser and that the system operates as designed. I also indicated that there would not be a requirement to make extensive repairs to the outfall while the city is planning for a new facility; the potential need to repair the outfall should be a consideration examined during facility planning.

Along with discussions of the outfall status, the meeting served as an opportunity to touch bases on the current facility planning status and direction. The City indicated that they were scheduled to issue a Request for Qualifications in late September. The RFQ's goal was to identify a pool of potential engineering firms to develop a facility plan for the new plant. Their intent was to follow up the RFQ with a more detailed Request for Proposals from the smaller, qualified group. There was also additional preliminary discussions regarding the potential for more stringent treatment requirements in the future, concerns for flood risk at the lagoon site and Ecology's funding process. I indicated that it was still too early to tell whether there would be increased regulatory pressure for treatment plants to move to advanced treatment for nutrient (nitrogen) removal. I also advised the city that there was enough evidence to suggest nutrient removal could be a possible requirement in the future and that it would be justifiable to evaluate the feasibility of systems/strategies treating to remove nitrogen.

Lagoon Facility and Tidal Marsh Restoration:

In late August the Navy completed a project to reopen the marsh area surrounding the lagoon treatment plant to tidal influences from Crescent Harbor. The marsh had previously been isolated from tidal exchange by a tide gate near the beach. The restoration project cut a new channel through the beach, reopening the marsh to tidal exchanges. The restoration of tidal exchange has resulted in the lagoon facility now being virtually surrounded by water during high tide periods.

Shortly after the restoration project was complete, City staff observed that water level in the marsh during peak high tides was approaching the top of the dike around the facility. This was especially evident at the south end of the facility, closest to Crescent Harbor. At tide levels near 12.5 feet on a calm day with little antecedent rain, water elevations were within 2-5 feet of the top of the dikes (photos 9, 11 and 15). Approximately 2 months later when maximum high tides were near 13.5 feet and there was considerably more upland runoff, water surface elevations were within 1-3 feet of the top of the dike on the south side of the facility (photos 10, 12 and 16). On November 17, 2009, when a high tide of more than 13 feet coincided with a strong storm that brought in heavy rains and high winds, the marsh level overtopped dikes near the roadway leading to the facility causing minor to moderate flooding.

The increased water levels in the marsh may present several long-term problems for the facility site. Those include increased potential for flooding during high tides and severe storms, significant localized increase in groundwater elevations and increased risk

to a conveyance line from the Navy's housing. Photos 13 and 14 provide evidence that groundwater levels may have significantly increased around the facility. The facility has an abandoned unlined basin near the plant entrance that generally serves as a stormwater detention pond. According to plant staff, this basin is typically dry in mid-September at the time of the initial site visit. As shown in photo 13, the basin now holds a significant amount of water now that the marsh is flooded. There had not been any significant rainfall prior to the visit that would account for the increase in water in the basin. Photo 14 shows an even larger amount of water now being held in the basin, although there had been significant rainfall that would account for some increase in the storage volume.

A significant concern resulting from the restoration project involves the increase in risk to a sewer conveyance line that is owned by the Navy and discharges to the lagoon facility (photos 17-20). The line, which serves the Navy's Capehart housing area northeast of the treatment plant, runs through an old dike that cuts across the marsh area and connects to the lagoon facility at its northeast corner. The restoration project required that the dike be partially removed to allow water to flow to the northwest portion of the marsh. The pipeline in the area where the dike was removed is now suspended over a channel by a small bridge; there are also 2 new manholes installed on either side of the bridge. Water now flows under the bridge through the relatively narrow cut in the dike at fairly high velocity (photo 17). This high velocity increases the potential for bank erosion of portions of the old dike near the cut that were not armored (photo 18). The erosion puts the new manhole on the upstream side of the pipe at risk of failure due to loss of supporting material. There is also minor evidence of soils supporting the bridge footing on the southwest end of the bridge being washed away at high tides (photo 20). Finally, as evident by debris on the bridge (photos 18 and 19), the bridge deck becomes submerged when tides are at or above 13.5 feet will, placing the line at further risk.

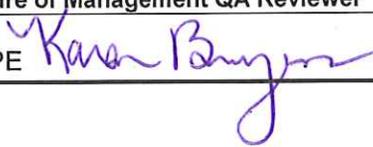
III. CONCLUSION

Despite the age of the RBC facility, it continues to operate adequately to produce secondary-quality effluent. Recent process management and safety related changes at both facilities will ensure that the city can provide acceptable treatment while planning for future upgrades. While an outfall inspection in 2008 identified concerns with the physical condition of outfall #002 (lagoon facility to Crescent Harbor), Ecology is satisfied that the facility planning effort the City is currently undertaking will provide alternatives for long-term disposal of effluent into Crescent Harbor. Based on discussions with City staff, Ecology's expectation is that the plans for a new facility will include plans for either repair, replacement or abandonment of the existing outfall #002 line. A compliance schedule may be included in the next permit to reinforce this expectation.

Based on observations at the lagoon facility during high tides, Ecology has significant concerns regarding the long-term viability of the lagoon treatment plant site as a long-term option for the City's treatment needs. The marsh restoration project has effectively turned the facility into an island in the middle of the marsh. There is evidence that groundwater levels at the site have increased, possibly to the point where there is no longer any separation between the bottom of the lagoons and seasonal high groundwater. There is an increased potential for flooding to either cut off access to the plant or to overtop the dikes and flow into the treatment plant's footprint. The City has identified this site as a possible site for a future facility. While there is insufficient cause at this time to rule this site out, Ecology will require the facility plan to include a thorough review of flooding hazards as part of the alternatives analysis. The City must justify that a future facility on the site would be protected from 100-year flood elevations that are anticipated for the newly restored marsh.

Along with concerns over the viability of a future facility, Ecology has concerns about the ability of the current lagoon facility to adequately protect surface water and groundwater quality. There is evidence suggesting that groundwater elevations due to the marsh restoration have risen to a point where there is no longer any separation between the existing lagoon bottoms and seasonal high ground water. Ecology's current design guidance for lagoon facilities requires a minimum 5-foot separation between the bottom of the lagoon and seasonal high groundwater when the lagoons use only a single liner. Given the suspected increased groundwater levels, Ecology will require the City to conduct groundwater quality and groundwater elevation monitoring in the next permit. Monitoring will utilize wells the City established in 2008.

Along with the increased groundwater elevations, risks to the Navy's Capehart sewer line due to changes in the marsh near its route has increased the potential for that line to discharge raw sewage into surface waters. Although the Navy is ultimately responsible for this line and for any discharges that may result from failure of the line, the City has an obligation to take reasonable steps to alert the Navy to the potential hazards. Ecology will work with the City and the Navy as needed to minimize the potential discharge risk of this line.

Name(s) and Signatures of Inspector(s)	Agency/Office/Telephone	Date
 Shawn McKone, PE	WA Dept. of Ecology, NWRO, (425)649-7037	12-2-09
Name and Signature of Management QA Reviewer	Agency/Office/Telephone	Date
Karen Burgess, PE 	WA Dept. of Ecology, NWRO, (425)649-7207	12-3-09

ANNOUNCED Inspection

INSTRUCTIONS

Section A: General Information

Report Version: N for 1st version, C for Changed or amended, or D for Delete

NPDES Permit No.: Enter the facility's NPDES or State permit number.

Inspection Date: Insert the date entry was made into the facility. Use the month/day/year format (e.g., 06/30/04 = June 30, 2004).

Inspection Type: Use one of the codes listed below to describe the type of inspection:

A Performance Audit	L Enforcement Case Support	2 IU Sampling Inspection
B Compliance Biomonitoring	M Multimedia	3 IU Non-Sampling Inspection
C Compliance Evaluation (non-sampling)	P Pretreatment Compliance Inspection	4 IU Toxics Inspection
D Diagnostic	R Reconnaissance	5 IU Sampling Inspection with Pretreatment
E Corps of Engineers Inspection	S Compliance Sampling	6 IU Non-Sampling Inspection with pretreatment
F Pretreatment Follow-up	U IU Inspection with Pretreatment Audit	7 IU Toxics with Pretreatment
G Pretreatment Audit	X Toxics Inspection	
I Industrial User (IU) Inspection	Z Sludge	

Inspector Code: Use one of the codes listed below to describe the *lead agency* in the inspection:

C - Contractor or Other Inspectors (Specify in Remarks Columns)	N - NEIC Inspectors
E - Corps of Engineers	R - EPA Regional Inspector
J - Joint EPA/State Inspectors - EPA Lead	S - State Inspector
	T - Joint State/EPA Inspectors - State Lead

Facility Type: Use one of the choices below to describe the facility.

- 1 - Municipal. Publicly Owned Treatment Works (POTWs) with 1987 Standard Industrial Code (SIC) 4952.
- 2 - Industrial. Other than municipal, agricultural, and Federal facilities.
- 3 - Agricultural. Facilities classified with 1987 SIC 0111 to 0971.
- 4 - Federal. Facilities identified as Federal by the EPA Regional Office

Remarks: These columns are reserved for remarks.

Inspection Work Days.: Estimate the total work effort (to the nearest 0.1 work day), up to 99.9 days, that were used to complete the inspection. This estimate includes the accumulative effort of all participating inspectors; any effort for laboratory analyses, testing, travel time and preparation time. This estimate does not require detailed documentation.

Facility Evaluation Rating: Use information gathered during the inspection (regardless of inspection type) to evaluate the quality of the facility self-monitoring program. Grade the program using a scale of 1 to 5 with a score of 5 being used for very reliable self-monitoring programs, 3 being satisfactory, and 1 being used for very unreliable programs.

Biomonitoring Information. Enter D for static testing. Enter F for flow through testing. Enter N for no biomonitoring.

Quality Assurance Data Inspection. Enter Q if the inspection was conducted as follow-up on quality assurance sample results. Enter N otherwise.

Photos Taken: Yes or No

Samples Taken: Yes or No

Lead Ecology Inspector: Enter lead inspector's name

Section B: Facility Data

This section is self-explanatory except for: "Other Facility Data," which may include new information not in the permit or PCS (e.g., new outfalls, names of receiving waters, new ownership, and other updates to the record), e-mail addresses...; and "Ecology Staff On-Site", which may include staff names, titles, phone numbers, or e-mail addresses.

Section C: Areas Evaluated During Inspection

Check only those areas evaluated by marking the appropriate box. Use Section D and additional sheets as necessary.

Section D: Summary of Findings/Comments

Support the findings, as necessary, in a narrative report. Use the headings given on the report form (staffing, back-up power) as appropriate. Reference a list of attachments, such as completed checklists, photos, lab reports, etc. Use extra sheets as necessary.

LINKS AND INFORMATION:

"Informational Manual for Treatment Plant Operators"; February 2004; by the Department of Ecology
Publication Number 04-10-020:

<http://www.ecy.wa.gov/pubs/0410020.pdf>

The manual was prepared to help wastewater treatment plant operators complete and submit their Discharge Monitoring Reports (DMRs) and other annual reports to the Department of Ecology. The manual is available in hard copy. To request a copy, contact the Department of Ecology, Publications Distribution Center at P.O. Box 47600, Olympia, WA 98504-7600 or by Telephone: (360) 407-7472. Updates to the manual are included on the website version.

Ecology's Wastewater and Reuse website:

<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

Ecology's Operator Certification website:

http://www.ecy.wa.gov/programs/wq/wastewater/op_cert/index.html

Ecology's Laboratory Accreditation website:

http://www.ecy.wa.gov/programs/eap/labs/labs_main.html

Ecology's Biosolids website:

<http://www.ecy.wa.gov/programs/swfa/biosolids/>

Ecology's Operator Outreach: Carl Jones (360) 407-6431; cjon461@ecy.wa.gov

Ecology's Municipal Compliance Specialist (Northwest Regional Office): Amy Jankowiak (425) 649-7195;

ajan461@ecy.wa.gov

Ecology's Wastewater Operator Certification Coordinator: Poppy Carre (360) 407-6449; 1-800-633-6193 (within the state)

poca461@ecy.wa.gov

Ecology's Biosolids Coordinator (Northwest Regional Office)" Marietta Sharp (425) 649-7258 mars461@ecy.wa.gov

Reporting Spills/Overflows/Upsets/Bypasses/Loss of Disinfection IMMEDIATELY:

Ecology's 24-hour number: (425) 649-7000 to report a spill

Department of Health – Shellfish Program 24-hour number: (360) 236-3330

Inspection Photos

PHOTO NO. 1

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Chlorine solution tank in chlorine generation room with new labeling indicating alarm set points.

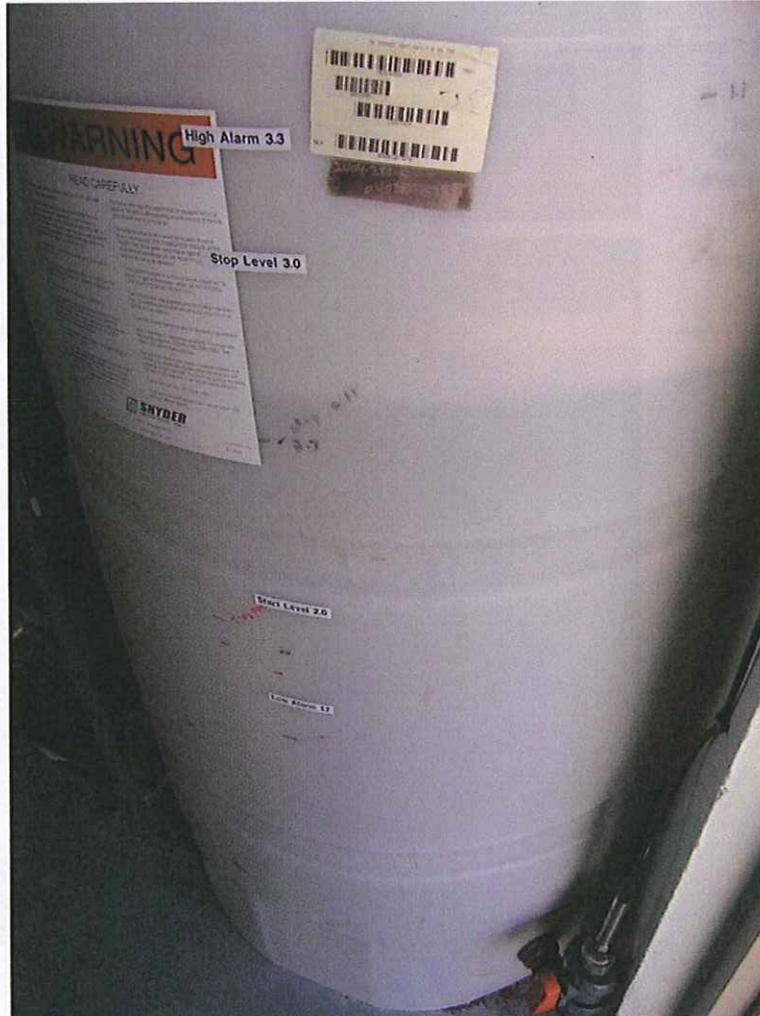


PHOTO NO. 2

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: New scum pit siphon at RBC influent structure. The siphon was installed by the staff to help automate the decanting of the scum pit ant to help reduce odors by discharging decant water below the influent water line.



PHOTO NO. 3

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: New pump at influent diversion station. All pumps in the station now have protective cages around the drive shafts, which were fabricated by plant staff (Dave Worley).

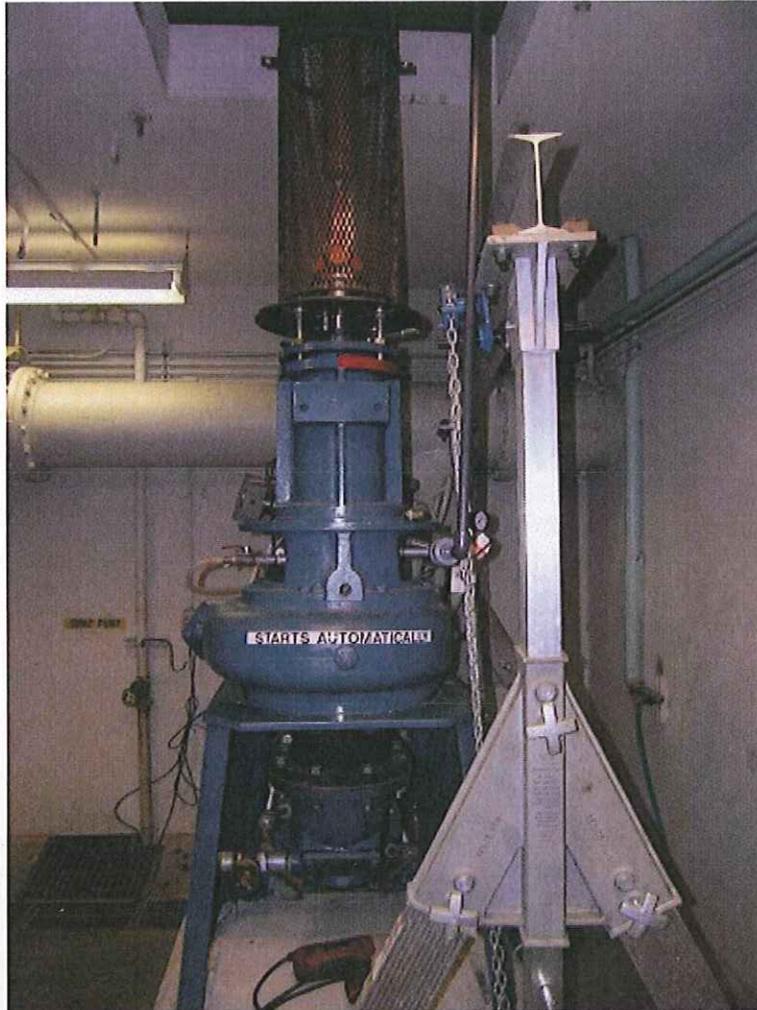


PHOTO NO. 4

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Bypass pumping access port in diversion lift station. Port allows for quick connection of a portable pump to the diversion force main. Bypassing with a portable pump is a redundant back-up to be used if there is a complete mechanical failure of all pumps in the lift station or failure of both main power and stand-by power.

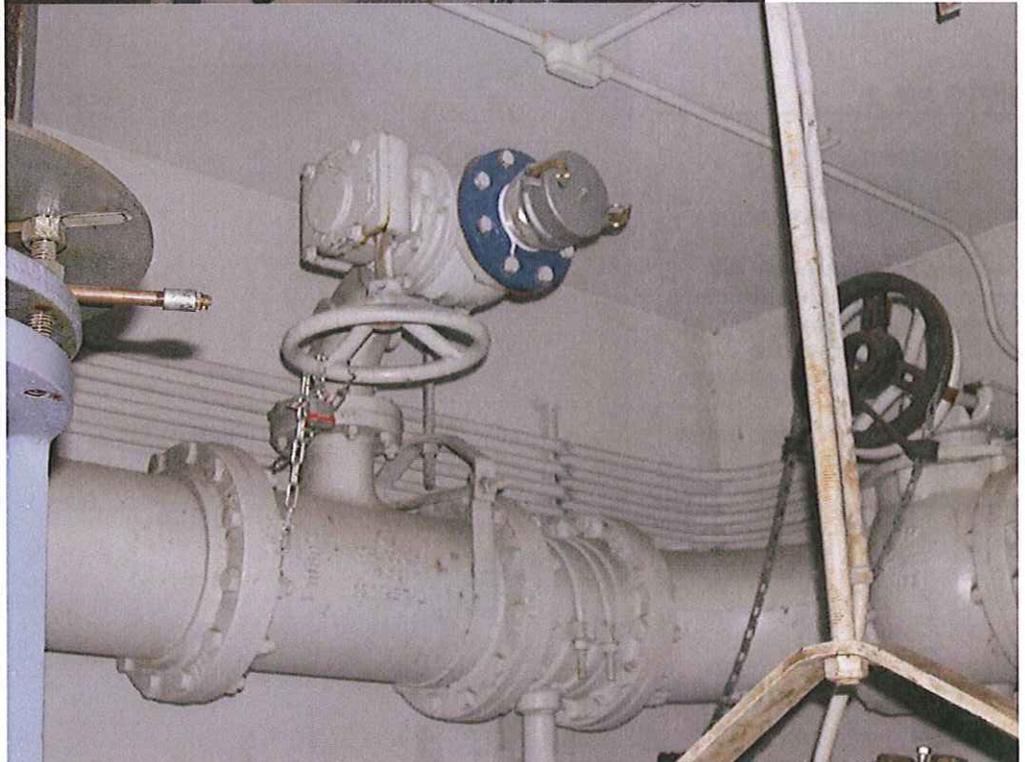


PHOTO NO. 5

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Diversion lift station pump motor with new mounting base. Mounting base fabricated by plant staff.

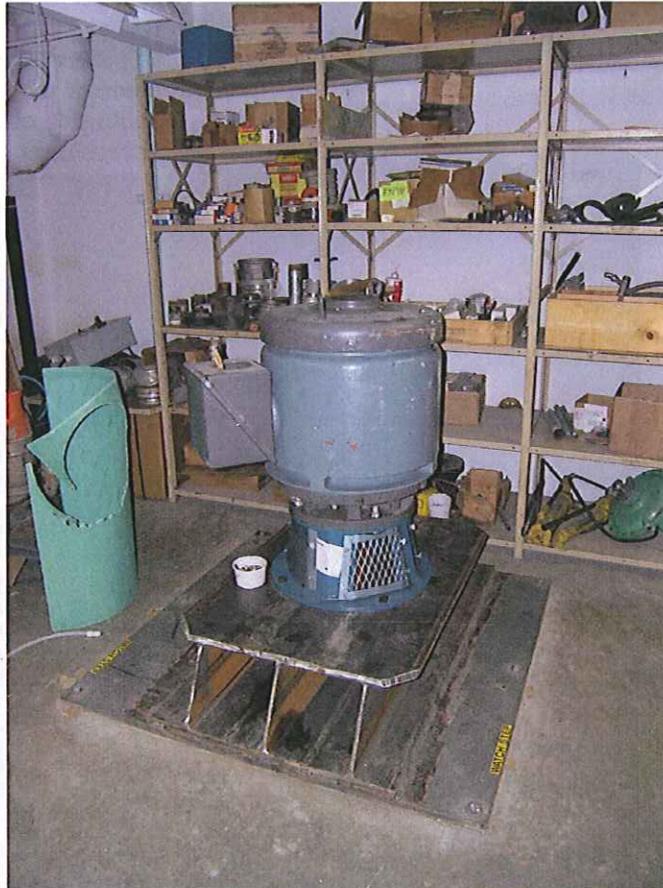


PHOTO NO. 6

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: New daily log forms for plant inspections. Forms identify equipment and systems that require daily checks. Forms are an integral part of the plant's migration to electronic record keeping. Data recorded on the forms during daily checks is transferred into a spreadsheet that will flag values that are out of range and prompt operators to record corrective actions.

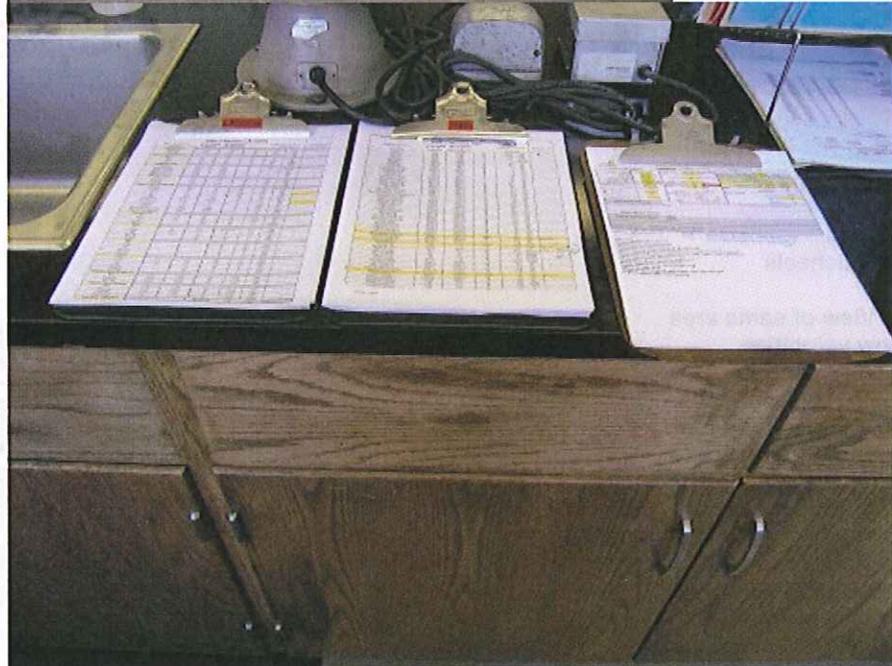
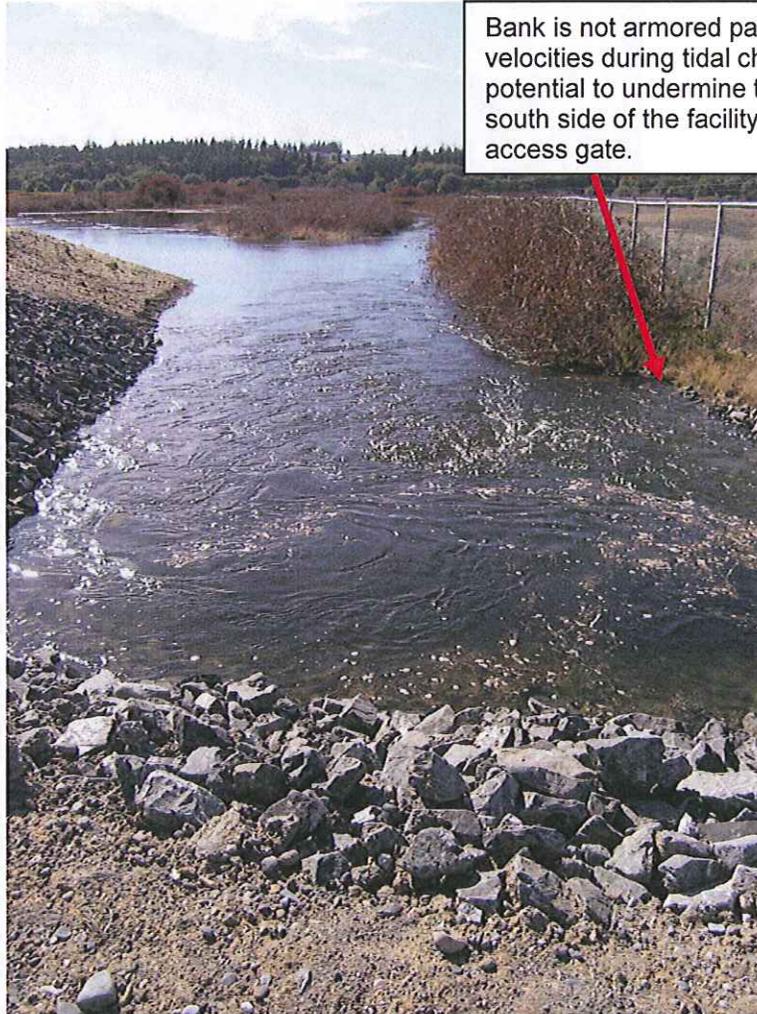


PHOTO NO. 7

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Water flowing at high velocity through culvert under access road to lagoon treatment plant. Culvert allows water from newly restored tidal marsh surrounding the lagoon facility to flow to the west side of the access road. High velocities could present a concern for increased scouring around the plant fence line that is not armored with rip rap.

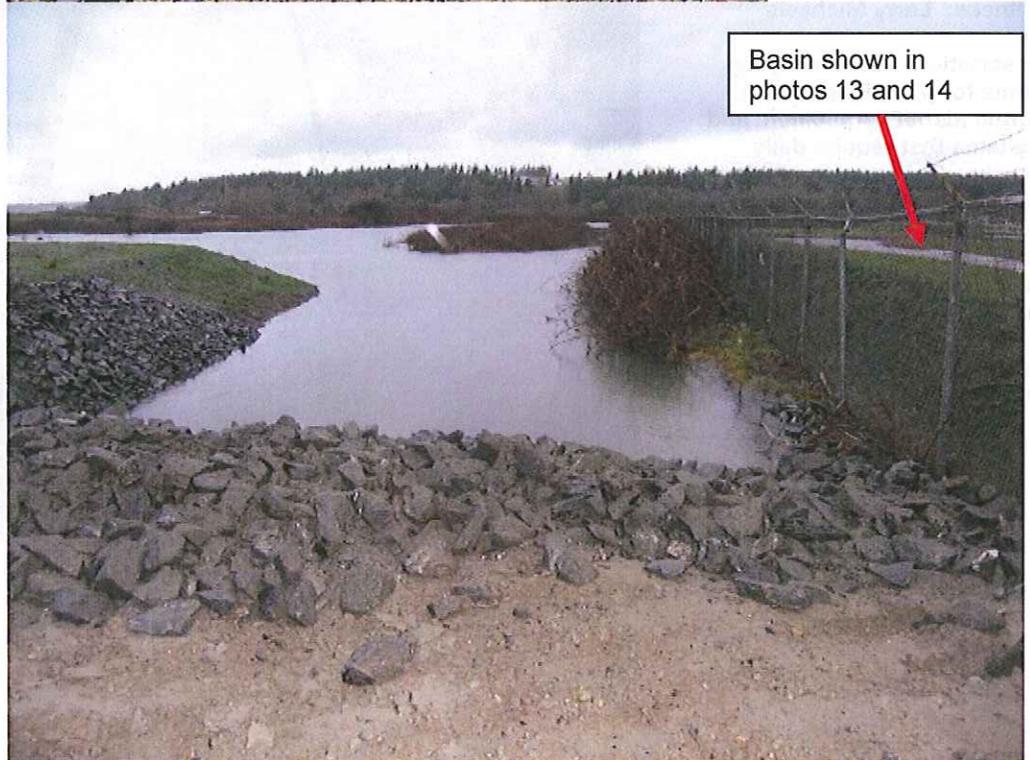


Bank is not armored past this point. High velocities during tidal changes have the potential to undermine toe of dike on the south side of the facility near the plant access gate.

PHOTO NO. 8

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: View of same area in photo 7. Flow velocities through culvert appear greatly diminished. This is possibly the result of timing (photo taken just after high tide rather than on an incoming tide, which was the case with photo 7). However the Navy added more rip rap along the edge of the access road. Unknown if that rip rap addition resulted in partially blocking the culver opening, thereby helping decrease flow to the west.



Basin shown in photos 13 and 14

PHOTO NO. 9

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Tidal marsh water level on dike next to plant access road. View looking south from plant with Crescent Harbor in background. Tide level at time was approximately 11' 3".



PHOTO NO. 10

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: Same view from photo 9 taken at a higher tide level. Tide at the time of the photo was approximately 12' 5". Tide water over-topped the dike in this area and in an area adjacent to the main road (in background) on 11/17/2009 when a tide of 12' 4" coincided with a storm that delivered heavy rain and high southerly winds. Tides in excess of 13.5" are predicted in January and February 2010. Based on conditions observed on 11/19/2009, these tide elevations may be right at the top of the dikes or may overtop the dikes again, especially if an average winter storm occurs at the same time.

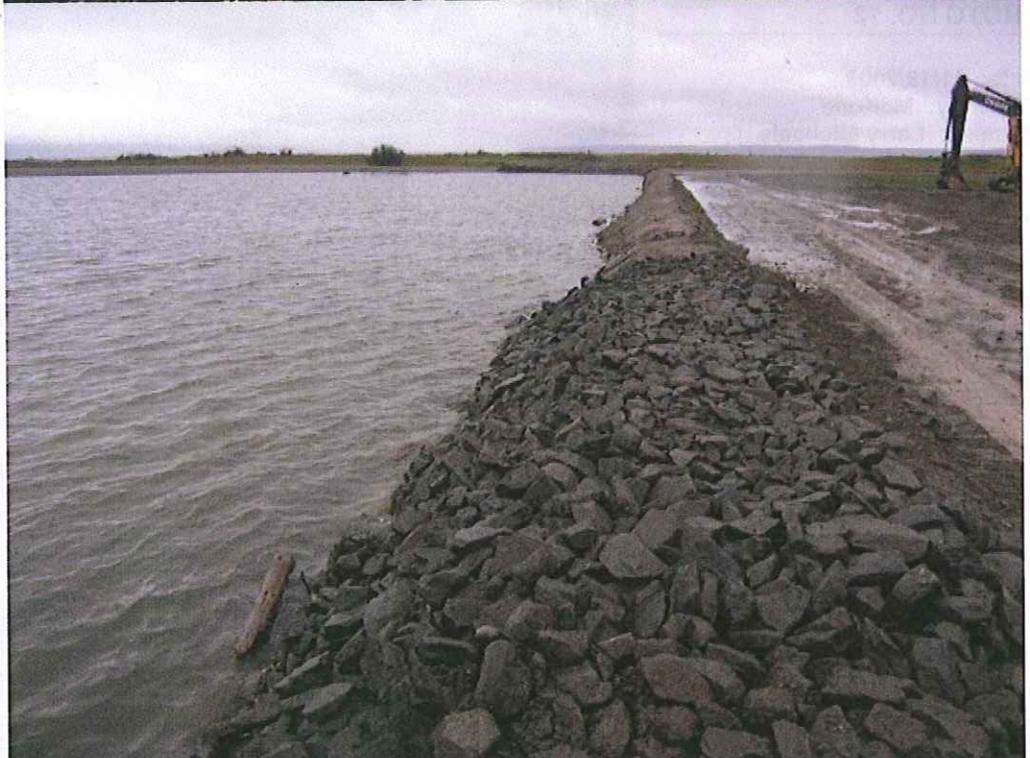


PHOTO NO. 11

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: East side dike, view looking north at lagoon entrance.



PHOTO NO. 12

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: Comparison of water level on east side dike. Difference in tide between photo 11 and 12 is a little more than one foot. November condition is also influenced by upland runoff from recent storms.

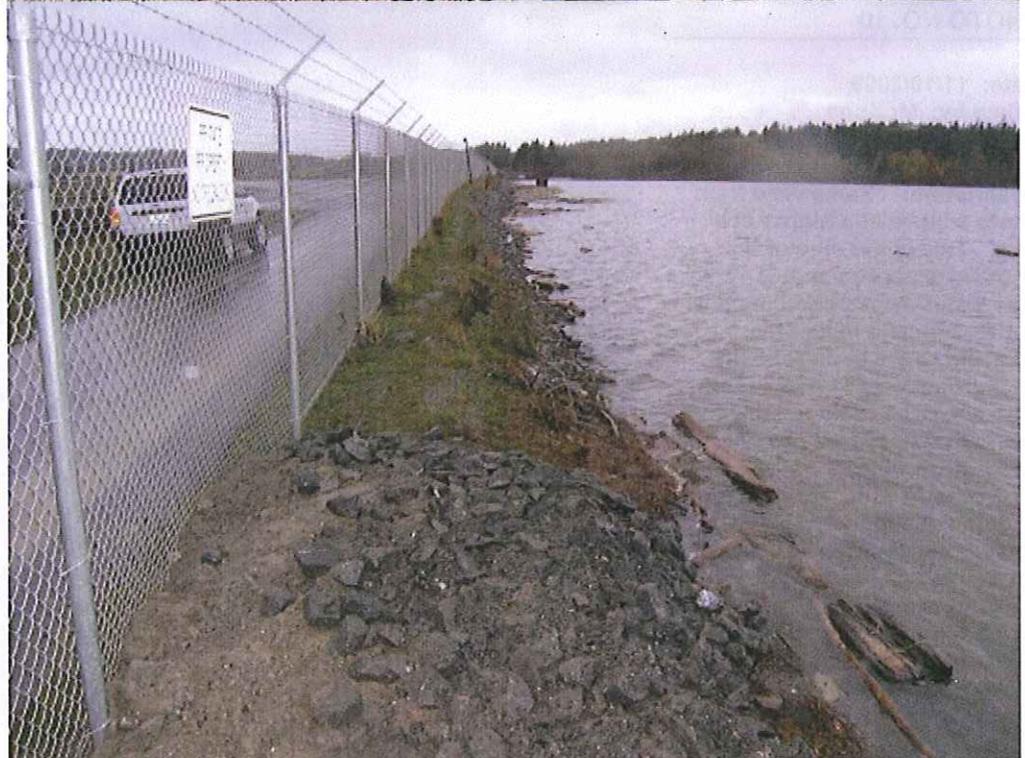


PHOTO NO. 13

Date: 9/15/02009
Taken by: McKone
Witness: Larry Michaels

Description: Abandoned basin that has traditionally served as a stormwater detention basin. According to staff this basin, which is unlined, is typically dry at this time of year. Presence of such a large volume of water suggest that the marsh restoration has significantly raised the local groundwater elevation . Basin is adjacent to the dike at the entrance to the facility. South side of dike is shown in photos 7 and 8.



PHOTO NO. 14

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: Detention basin two months later. Increase in water volume potentially the combined result of stormwater detention from recent storms and continuing increase in groundwater elevations due to marsh flooding.



PHOTO NO. 15

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Distant view across tidal marsh of dike on east side of lagoon facility.



PHOTO NO. 16

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: East side of lagoon facility. In comparison to photo 15, there is a significant increase in water surface elevation on the dike separating the marsh from the lagoons.

(Note: photo cropped from original size in an attempt to achieve a similar perspective for comparison).

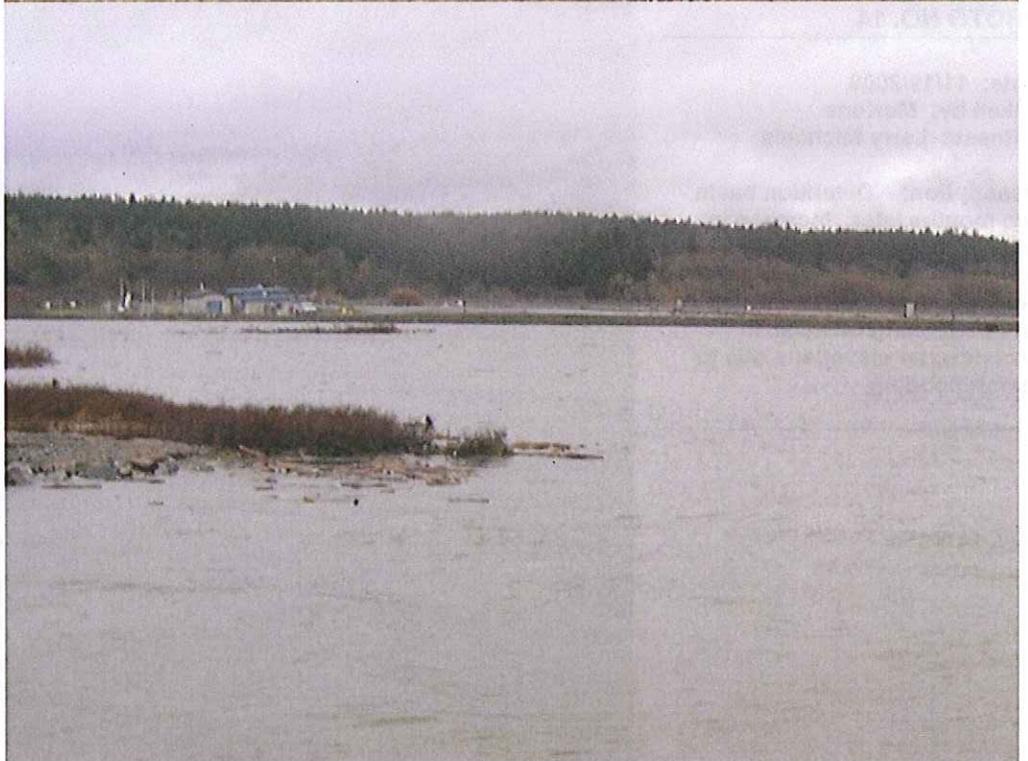


PHOTO NO. 17

Date: 9/15/2009
Taken by: McKone
Witness: Larry Michaels

Description: Marsh channel on northeast corner of lagoon facility. The restoration project required removal of a culvert and a portion of an existing dike through the area. The old dike was used as a utility corridor for a raw sewage line from the Navy's capehart housing. A potable water line for the treatment plant also runs through the dike. A small bridge was installed across the cut in the dike to carry the Navy's sewer line and the potable water line. Due to the high volume of tide water now flowing through the relatively narrow cut, velocities through the channel can be very high.



PHOTO NO. 18

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: High flow velocities entering the new cut in the utility dike appears to be leading to significant bank erosion on the northeast side of the dike. Continued erosion of this bank has the potential to lead to undermining of the sewer manhole on the upstream side of the capehart line. Note also that the water surface at this tide condition is right at the bottom of the utility bridge. (photo lighting adjusted from original)

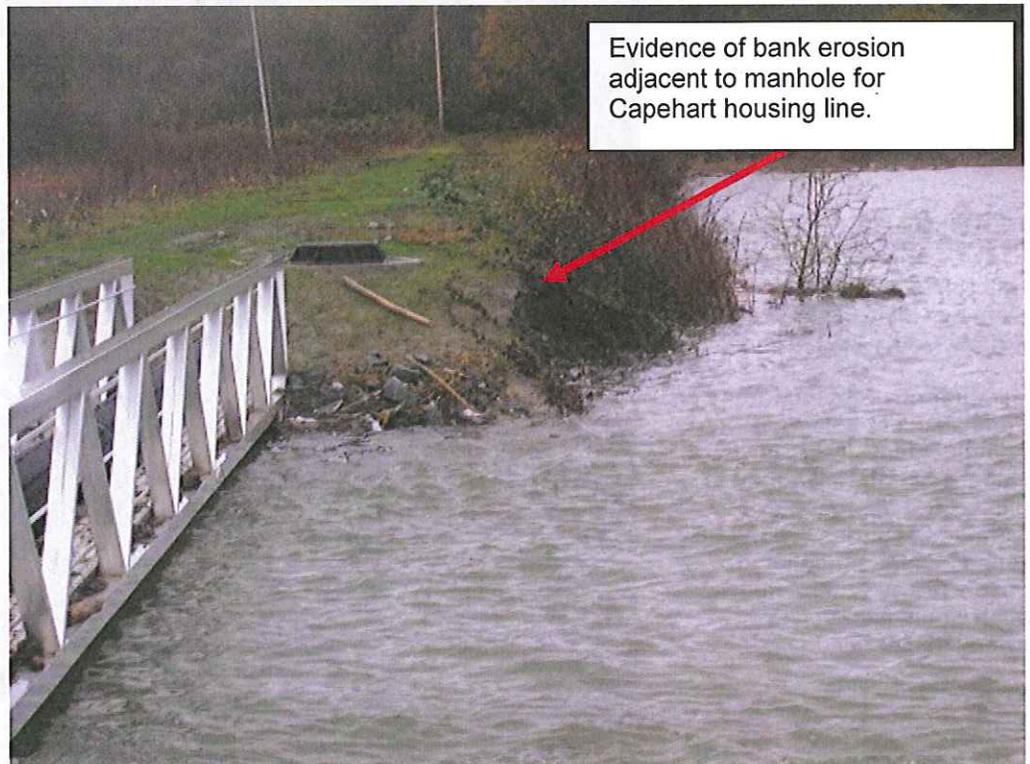


PHOTO NO. 19

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: Utility bridge carrying raw sewer line from Navy capehart housing and potable water line for the treatment facility. Debris on bridge surface indicates that water elevation had been high enough to inundate the bridge. In addition, large driftwood becomes hung up on the bridge during high tides. The fact that this bridge has little or no separation with surface water at high tides indicates a significant risk for this bridge to fail, which would result in discharge of raw sewage and a loss of water necessary for plant operations.

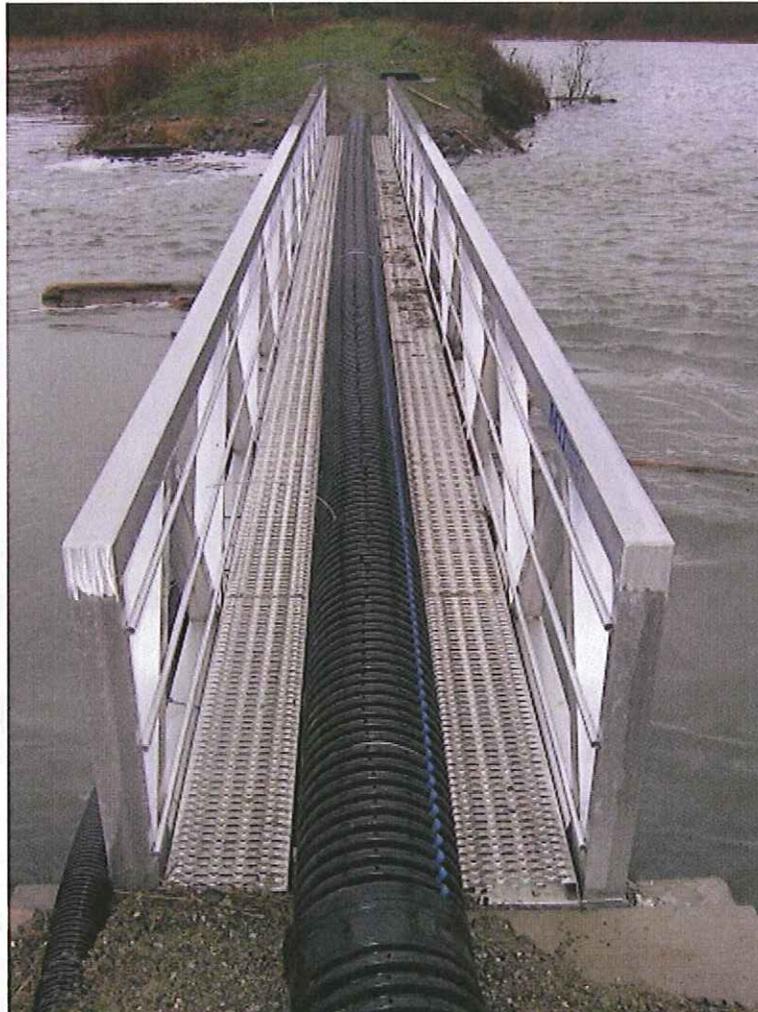


PHOTO NO. 20

Date: 11/19/2009
Taken by: McKone
Witness: Larry Michaels

Description: Footing for utility bridge adjacent to lagoon treatment plant. There is visual evidence of minor scouring of soils behind the footing. Continued scouring around this footing has the potential to cause a failure of the bridge, which would lead to a raw sewage discharge.

