# EMERGENCY ACTION PLAN

Project Name: Trout Lake Storage Dam

DSO File Number: SJ02-0202

Location: Town of Friday Harbor, San Juan County,
Unnamed Stream

OWNER: Town of Friday Harbor, PO Box 219,
Friday Harbor, WA 98250

ISSUE DATE: MAY 2007

REVISION DATES:

# TABLE OF CONTENTS

# SECTION I – INTRODUCTION

This Emergency Action Plan (EAP) defines responsibilities and provides procedures designed to:

- Identify unusual and unlikely conditions which may endanger the dam.
- Initiate remedial actions to prevent or minimize the downstream impacts of a dam failure.
- Initiate emergency actions to warn downstream residents of impending or actual failure of the dam.

Official Dam Name: Trout Lake Dam

Located on: An unnamed Creek, San Juan County

Section 35 Township 35 North Range 3 West W. M.

Dam Owner and Operator: Town of Friday Harbor, Washington

Type of Dam: Concrete Arch Dam

Dimensions of Dam:

Dam Height: 37 ft Structural/35.5 ft Hydraulic

Dam Crest Length: 121.5 ft

Dam Crest Width: 2 ft

Downstream Flood Path:

- Trout Lake Dam via unnamed creek across Julie Road, with run up toward Woods Reservoir,
- Across Prohaska Road with run up toward Nettle Creek Dr.,
- Across Wold Road and a small portion of Ellison Lane,
- Into Upper and Lower Zylstara Lake,
- Across Valley Farms Road,
- Across Bailer Hill Road and a portion of False Bay Drive, and
- Out False Bay and into the Strait.

Downstream Hazard Classification: Class 1C, High

Number of Homes in the Floodplain: 4 in the flood plain (3 are occupied as of Jan 2007). Several more are very close.

Downstream Property with Structures Description:

| Street Address | Owner | Mailing Address | Description |
|---|---|---|---|
| 346 Julie Road | DANIEL B SHELLEY & ELIZABETH BUCK | PO BOX 1161 FRIDAY HARBOR, WA 98250-1161 | Sheet 1: one house above Julie Road at approximately 0.61 miles is not inundated but the water comes uncomfortably close<br>~5 minutes to arrival, 9 minutes to peak |
| 375 Julie Road | BOYD & SAIFON CRUMPACKER | PO BOX 3034 FRIDAY HARBOR, WA 98250 | Sheet 1: one house and outbuildings below Julie Road also at approximately 0.61 miles<br>~6 minutes to arrival, 10 minutes to peak |
| 390 Prohaska Rd | MICHAEL J LAZZARI & ROBERTA L BLAIR-JT/RS | 474 PROHASKA FRIDAY HARBOR, WA 98250 | Sheet 1: one trailer at approximately 1.33 miles<br>~14 minutes to arrival, 36 minutes to peak |
| 530 Wold Rd | TOWN OF FRIDAY HARBOR | PO BOX 219 FRIDAY HARBOR, WA 98250 | Sheet 2: the Town of Friday Harbor's Water Treatment Plant at approximately 1.46 miles is not inundated but the water comes uncomfortably close<br>~18 minutes to arrival, 38 minutes to peak |
| 378 Wold Rd | JOHN L DWYER | PO BOX 2031 FRIDAY HARBOR, WA 98250 | Sheet 2: one house at approximately 1.65 miles is not inundated but the water comes uncomfortably close<br>~20 minutes to arrival, 41 minutes to peak |
| 74 Wold Rd | GARRETT C & LEISHA M HOLMES | PO BOX 3214 FRIDAY HARBOR, WA 98250 | Sheet 2: one house at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 72 Wold Rd | GARRETT C & LEISHA M HOLMES, or | PO BOX 3214 FRIDAY HARBOR, WA 98250, or | Sheet 2: one barn also at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 112 Wold Rd | BRADFORD T SMITH | PO BOX 596 OCCIDENTAL, CA 95465 | Sheet 2: one barn also at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 1069 Bailer Hill Rd | SIDNEY E & SUSAN E CLARK | 305 BLUE RIDGE PARKWAY MADISON, WI 53705 | Sheet 6: no structures, minor water on northeast corner of property at approximately 4.98 miles<br>~1 hr 31 min to arrival, 2 hr 20 min to peak |
| 3213 False Bay Dr | AMANDA A DUFF | 1600 HUNTINGTON DR SO PASADENA, CA 91030 | Sheet 6: one house at approximately 5.20 miles<br>~1 hr 38 min to arrival, 2 hr 23 min to peak |
| 2416 False Bay Dr | LADDIA A WHITTIER,CUST FOR AMANDA DUFF & PAUL DUFF | PO BOX 9 FRIDAY HARBOR, WA 98250 | Sheet 7: one barn at approximately 5.41 miles<br>This address corresponds to a house that is NOT in the inundated area, but the nearby barn is in the inundated area.<br>~1 hr 45 min to arrival, 2 hr 27 min to peak |

# RESPONSIBILITIES

Day to day operation and maintenance of the dam: Utilities Superintendent, Town of Friday Harbor (Mike Wilks) at (360) 378-2154. In the absence of the Utilities Superintendent, the Lead Water Supervisor, Town of Friday Harbor (Mike Deegan) at (360) 378-8353 is responsible for fulfilling the Utilities Superintendent's duties.

Implementation of the Emergency Action Plan: Utilities Superintendent, Town of Friday Harbor (Mike Wilks) or the Town Administrator, Town of Friday Harbor (King Fitch). In the absence of the Utilities Superintendent (Mike Wilks), the Lead Water Supervisor (Mike Deegan) is responsible for fulfilling the duties of the Utilities Superintendent.

Determining and identifying conditions or events that require emergency action: Mike Wilks, Utilities Superintendent, Town of Friday Harbor. In the absence of Mike Wilks-Utilities Superintendent, Mike Deegan-Lead Water Supervisor (360) 378-8353 is responsible for fulfilling the duties of the Utilities Superintendent.

Mike Wilks-Utilities Superintendent (360) 378-2154 as representative of the dam owner is also responsible for the implementation of the EAP which includes:

a) Notifying Residents in downstream homes of the Emergency
b) Contacting San Juan County/Town of Friday Harbor Emergency Management
c) Contacting the San Juan County Sheriff
d) Contacting the DOE Dam Safety Section
e) Obtaining Emergency Supplies and Equipment

(In the absence the Utilities Superintendent (Mike Wilks), the Lead Water Supervisor (Mike Deegan) is responsible for fulfilling the duties of the Utilities Superintendent.

The Town Administrator (King Fitch) at (360) 378-2390 is responsible for notifying the Press and News Media.

The Utilities Superintendent (Mike Wilks) is also responsible for:

a) Coordinating activities at the dam and staying in contact with the Town Administrator (King Fitch)

b) Taking emergency measures at the dam to prevent failure, as directed by the Town Administrator (King Fitch)

(In the absence of the Utilities Superintendent (Mike Wilks), the Lead Water Supervisor (Mike Deegan) is responsible for fulfilling the duties of the Utilities Superintendent.

The 911 Dispatcher is responsible for activating the NOAA alert system.

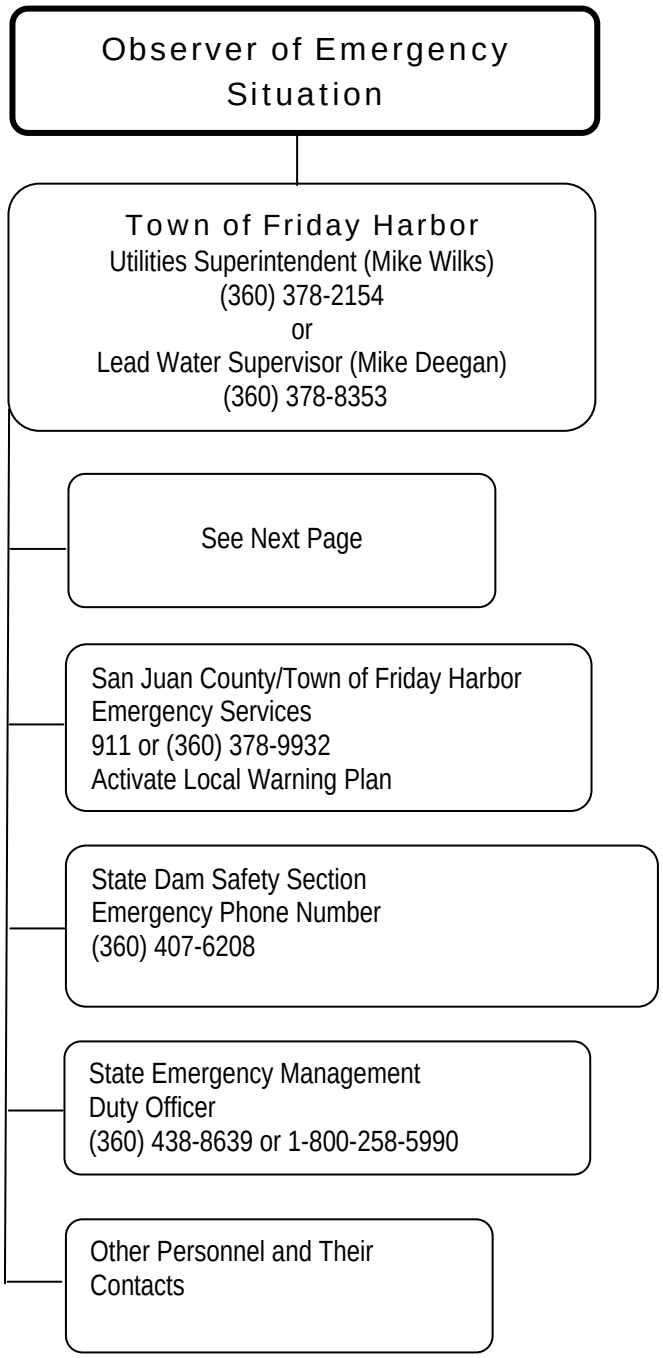
The responsibilities are also shown in Appendix C

# FAILURE HAS OCCURRED

If a **failure has occurred**, downstream evacuation of the floodplain must be started immediately in accordance with the following:

- Notify persons downstream from the dam of the failure;
- Coordinate efforts with other dam owners downstream to try and reduce flooding, if applicable.

## Notification Flowchart



# SECTION II - NOTIFICATION FLOWCHART

## FAILURE HAS OCCURRED

If a **failure has occurred** downstream evacuation of the floodplain must be started immediately in accordance with the following:

1. The Utilities Superintendent (Mike Wilks) or in his absence the Lead Water Supervisor (Mike Deegan) will notify persons in the following properties immediately downstream from the dam of the failure;

   *We have received information or other indications that Trout Lake Dam has failed. Evacuate now using the information contained in your Individual Emergency Action Plan.*

   Order of calls to be made. Should a phone not answer after six rings, go to the next number one the list one except for the 911 call where you must wait for an answer. An alternative number for 911 is (360) 378-4151. If there is no answer at 375 and 346 Julie Road, make several more attempts to contact them at after you have contacted the 911 Dispatcher. After several unsuccessful attempts to contact 375 and 346 Julie Road proceed down the list.

| Street Address | Owner/Residents | Phone | Description |
|---|---|---|---|
| 346 Julie Road | DANIEL B SHELLEY & ELIZABETH BUCK | (360) 378-7908<br>Jan 07 | Sheet 1: one house and outbuildings below Julie Road at approximately 0.61 miles<br>~6 minutes to arrival, 10 minutes to peak |
| 375 Julie Road | BOYD & SAIFON CRUMPACKER | (360) 378-1931<br>Cell (360) 472-0201<br>Cell (360) 298-0943<br>Feb 07 | Sheet 1: one house above Julie Road at approximately 0.61 miles is not inundated but the water comes uncomfortably close<br>~5 minutes to arrival, 9 minutes to peak |
| Not Applicable | | 911<br>or<br>(360) 378-4151<br>Jan 07 | The 911 Dispatcher is responsible for putting in place the NOAA SAME alerts.<br>Suggested language:<br>*This is the 911 Dispatcher. I have received information that Trout Lake Dam has failed. Evacuate now!* |
| 530 Wold Rd | TOWN OF FRIDAY HARBOR | (360) 378-2160<br>Jan 07 | Sheet 2: the Town of Friday Harbor's Water Treatment Plant at approximately 1.46 miles is not inundated but the water comes uncomfortably close<br>~18 minutes to arrival, 38 minutes to peak |

| Street Address | Owner/Residents | Phone | Description |
|---|---|---|---|
| 390 Prohaska Rd | MICHAEL J LAZZARI & ROBERTA L BLAIR-JT/RS | (360) 378-2514 | Sheet 1: one trailer at approximately 1.33 miles<br>~14 minutes to arrival, 36 minutes to peak |
| 378 Wold Rd | JOHN L DWYER | (360) 378-5831<br>Jan 07 | Sheet 2: one house at approximately 1.65 miles is not inundated but the water comes uncomfortably close<br>~20 minutes to arrival, 41 minutes to peak |
| 74 Wold Rd | GREG HERTEL<br>LIENNETTE HIGDON-HERTEL<br>DANIELLE FISHER | (360) 378-2818<br>(360) 317-4321<br>(360) 378-2818<br>Jan 07 | Sheet 2: one house at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 72 Wold Rd | GARRETT C & LEISHA M HOLMES, or | (360) 378-8836<br>W(360) 378-5255<br>W(360) 378-2287<br>Feb 07 | Sheet 2: one barn also at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 112 Wold Rd | BRADFORD T SMITH | | Sheet 2: one barn also at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 1069 Bailer Hill Rd | SIDNEY E & SUSAN E CLARK | (608) 239-0125c<br>(608) 239-0234<br>March O7<br>Call is **informational call. It should be made after the other notifications**. | Sheet 6: one shed at approximately 4.98 miles<br>~1 hr 31 min to arrival, 2 hr 20 min to peak<br>Jan 07, owners indicated that residence was unoccupied. March 07, owner provided survey data indicated that only a small area on the northwest corner of the property may be subject to water. |
| 3213 False Bay Dr | AMANDA A DUFF | | Sheet 6: one house at approximately 5.20 miles<br>~1 hr 36 min to arrival, 2 hr 23 min to peak |
| 2416 False Bay Dr | LADDIA A WHITTIER,CUST FOR AMANDA DUFF &<br>PAUL DUFF | (360) 378-5048 | Sheet 7: one barn at approximately 5.41 miles<br>This address corresponds to a house that is NOT in the inundated area, but the nearby barn is in the inundated area.<br>~1 hr 45 min to arrival, 2 hr 27 min to peak |

2. Contact San Juan County/Town of Friday Harbor Emergency Services at 911 or (360) 378-9932.
3. Contact Town of Friday Harbor Public Works Department at (360) 378-2154

4. Contact the Washington State Department of Ecology, Dam Safety Office and begin any recommended procedures. Call out numbers are shown below:
    - Dam Safety Office Emergency Phone Number (360) 407-6208
    - Doug Johnson, Dam Safety Supervisor (360) 407-6623 direct line
    - Doug Johnson, Dam Safety Supervisor (360) 971-6347 pager
    - Doug Johnson, Dam Safety Supervisor (360) 588-2797 home
    - Jerald LaVassar, DSO, Geotechnical Engineer (360) 407-6625 direct line
    - Jerald LaVassar, DSO, Geotechnical Engineer (360) 456-1370 home
5. Contact the Washington State Emergency Management Duty Officer at (360) 438-8639 or 1 (800) 258-5990
6. Take preventive actions described in Section V of this plan.

## List of Properties Downstream First Affected by Flood Waters

| Street Address | Owner | Mailing Address | Description |
|---|---|---|---|
| 346 Julie Road | DANIEL B SHELLEY & ELIZABETH BUCK | PO BOX 1161 FRIDAY HARBOR, WA 98250-1161 | Sheet 1: one house above Julie Road at approximately 0.61 miles is not inundated but the water comes uncomfortably close<br>~4 minutes to arrival, 9 minutes to peak |
| 375 Julie Road | BOYD & SAIFON CRUMPACKER | PO BOX 3034 FRIDAY HARBOR, WA 98250 | Sheet 1: one house and outbuildings below Julie Road also at approximately 0.61 miles<br>~6 minutes to arrival, 10 minutes to peak |
| 390 Prohaska Rd | MICHAEL J LAZZARI & ROBERTA L BLAIR-JT/RS | 474 PROHASKA FRIDAY HARBOR, WA 98250 | Sheet 1: one trailer at approximately 1.33 miles<br>~15 minutes to arrival, 37 minutes to peak |
| 530 Wold Rd | TOWN OF FRIDAY HARBOR | PO BOX 219 FRIDAY HARBOR, WA 98250 | Sheet 2: one house at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 378 Wold Rd | JOHN L DWYER | PO BOX 2031 FRIDAY HARBOR, WA 98250 | Sheet 2: one house at approximately 1.65 miles is not inundated but the water comes uncomfortably close<br>~20 minutes to arrival, 41 minutes to peak |
| 72 Wold Rd | GARRETT C & LEISHA M HOLMES | PO BOX 3214 FRIDAY HARBOR, WA 98250 | Sheet 2: one house at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutesto peak |
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| 112 Wold Rd | BRADFORD T SMITH | PO BOX 596 OCCIDENTAL, CA 95465 | Sheet 2: one barn also at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |
| 1069 Bailer Hill Rd | SIDNEY E & SUSAN E CLARK | 305 BLUE RIDGE PARKWAY MADISON, WI 53705 | Sheet 6: no structures, minor water on northeast corner of property at approximately 4.98 miles<br>~1 hr 31 min to arrival, 2 hr 20 min to peak |
| 3213 False Bay Dr | AMANDA A DUFF | 1600 HUNTINGTON DR SO PASADENA, CA 91030 | Sheet 6: one house at approximately 5.20 miles<br>~1 hr 36 min to arrival, 2 hr 23 min to peak |
| 2416 False Bay Dr | LADDIA A WHITTIER,CUST FOR AMANDA DUFF & PAUL DUFF | PO BOX 9 FRIDAY HARBOR, WA 98250 | Sheet 7: one barn at approximately 5.41 miles<br>This address corresponds to a house that is NOT in the inundated area, but the nearby barn is in the inundated area.<br>~1 hr 45 min to arrival, 2 hr 27 min to peak |

Provide courtesy notification of the following person who are not in the inundation path but have expressed interest in receiving notification.

| Address | Owner/Residents | Phone | Description |
|---|---|---|---|
| 230 Julie Road | Ed Bailey | (360) 378-6686<br>(360) 378-9554<br>(360) 317-8650 cell | Appears above Inundated Area |
| 455 Boyce Road | Kate Wisnicwski | (206) 297-1042<br>(206) 999-1432 | Appears above inundated area;<br>Used as a vacation rental |
| 531 Boyce Road | Jim and Lisa Lawrence | (360) 378-5575<br>(360) 298-1812 cell | Appears above Inundated Area |
| 236 Ellison Lane | Roger Ellison | (360) 370-5795;<br>(360) 298-1033 cell | Appears above Inundated Area |
| 236 Ellison Lane | Anita Barreca | (360) 370-5795<br>(206) 604-4385c | Appears above Inundated Area |
| 146 Nettle Creek | Mike or Tamara Gregon | (360) 378-7955<br>(360) 378-5884 work | Appears above Inundated Area |
| 1314 Douglas Road | Peter J. Wangoe II | (360) 378-7278<br>(360) 378-8051 | Appears above Inundated Area |
| 1314 Douglas Road | Leasa Birch | (360) 378-7278<br>(360) 298-0422 | Appears above Inundated Area |
| 862 Valley Farms Road | Chuck Tomas | (360) 378-3652<br>(818) 378-0495 cell | Appears above Inundated Area |
| 862 Valley Farms Road | Evelyn Lee/Trahan | (360) 378-8719<br>(360) 317-4807 cell | Appears above Inundated Area |
| 862 Valley Farms Road | Laura Tomas | (360) 378-8904<br>(360) 317-6931 cell | Appears above Inundated Area |
| 1069 Bailer Hill Road | Sidney Clark | (608) 239-0125 | No one living at this address |
| 1069 Bailer Hill Road | Susan Clark | (608) 239-0234 | No one living at this address |
| 2143 False Bay Road | A Richard Weisbrod | (360) 378-5460 | Unused Residence |

# DEACTIVATION

The Utilities Superintendent after consultation with the Town Administrator, the San Juan County and Town of Friday Harbor Emergency Manager, the Town of Friday Harbor's Fire Chief, the San Juan County Fire District #3's Chief and the DOE's representative on site will notify the impacted parties that the dam has released its contents and that the flooding has peaked.

The Utilities Superintendent will make the deactivation notification in the same order as on the notification flow chart.

It is possible that deactivation will occur at different times in the inundated area depending on the distance from the dam, the slope of the ground and other factors.

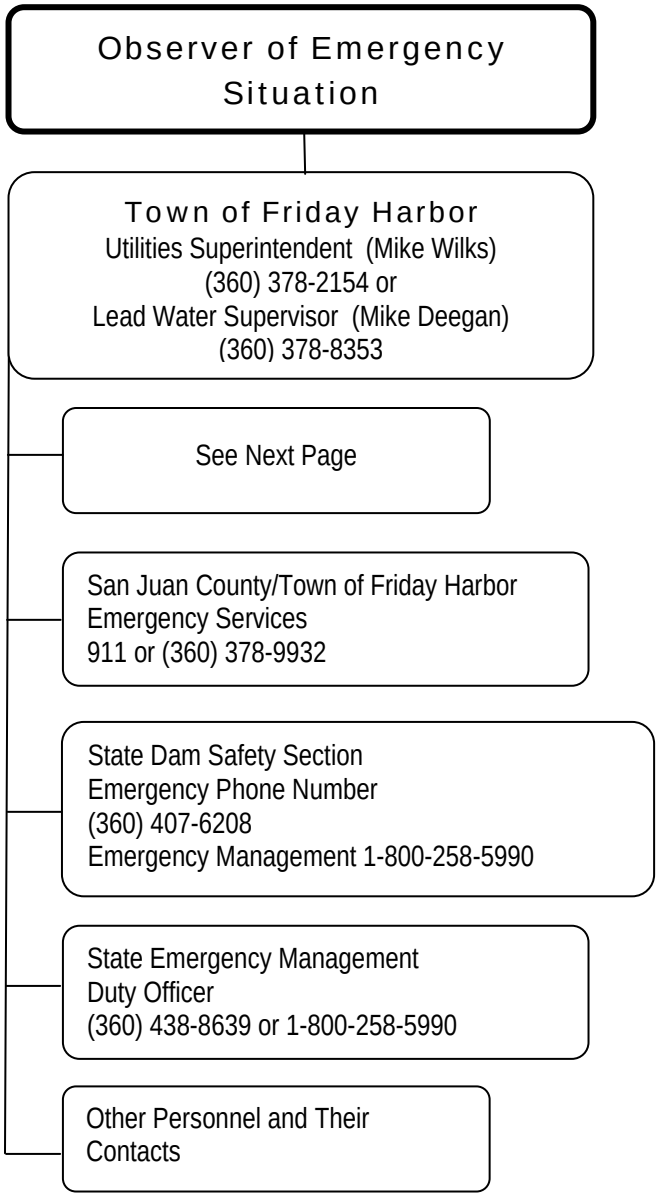
(In the absence of the Utilities Superintendent, the Lead Water Supervisor is responsible for fulfilling the duties of the Utilities Superintendent.

# FAILURE IMMINENT

If **failure of the dam is imminent**, but has not yet begun, the following steps should be initiated immediately:

- Advise persons residing immediately downstream from the dam to evacuate due to the potential failure of the dam;
- Implement the notification flow chart;
- Contact State Dam Safety Office and begin any recommended procedures;
- Take preventive actions described in Section V of this plan;

## Notification Flowchart



## FAILURE IS IMMINENT

If a **failure is imminent,** but has not yet begun, the following steps should be taken immediately:

1. The Utilities Superintendent (Mike Wilks) on in his absence the Lead Water Supervisor (Mike Deegan) will notify persons in the following properties immediately downstream from the dam to evacuate due to the potential of the failure of the dam;

   *We have received information or other indications that Trout Lake Dam is about to fail. Get ready to evacuate!*

   Order of calls to be made. Should a phone not answer after six rings, go to the next number on the list except for the 911 call where you must wait for an answer. An alternative number for 911 is (360) 378-4151. If there is no answer at 375 and 346 Julie Road, make several more attempts to contact the residents at after you have contacted the 911 Dispatcher. After several unsuccessful attempts to contact 375 and 346 Julie Road proceed down the list.

   List of properties that receive direct notification:

| Street Address | Owner | Phone | Description |
|---|---|---|---|
| 346 Julie Road | DANIEL B SHELLEY & ELIZABETH BUCK | (360) 378-7908<br>Jan 07 | Sheet 1: one house and outbuildings below Julie Road at approximately 0.61 miles<br>~6 minutes to arrival, 10 minutes to peak |
| 375 Julie Road | BOYD & SAIFON CRUMPACKER | (360) 378-1931<br>Cell (360) 472-0201<br>Cell (360) 298-0943<br>Feb 07 | Sheet 1: one house above Julie Road at approximately 0.61 miles is not inundated but the water comes uncomfortably close<br>~5 minutes to arrival, 9 minutes to peak |
| Town Water Treatment Plant | | 911<br>or<br>(360) 378-4151<br>Jan 07 | The 911 Dispatcher is responsible for putting in place the NOAA SAME alerts. Suggested Language: *This is the 911 dispatcher, I have received information that Trout Lake Dam is about to fail. Get ready to evacuate.* |
| 530 Wold RD | TOWN OF FRIDAY HARBOR | (360) 378-2160<br>Jan 07 | Sheet 2: one house at approximately 1.80 miles<br>~22 minutes to arrival, 52 minutes to peak |

| Street Address | Owner | Phone | Description |
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| 390 Prohaska Rd | MICHAEL J LAZZARI & ROBERTA L BLAIR-JT/RS | (360) 378-2514 | Sheet 1: one trailer at approximately 1.33 miles<br>~14 minutes to arrival, 36 minutes to peak |
| 378 Wold Road | JOHN DWYER | (360) 378-5831<br>Jan 07 | Sheet 2: one house at approximately 1.65 miles is not inundated but the water comes uncomfortably close<br>~20 minutes to arrival, 41 minutes to peak |
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2. Contact San Juan County/Town of Friday Harbor Emergency Services at 911 or (360) 378-9932.
3. Contact Town of Friday Harbor Public Works Department (360) 378-2154

4. Contact the Washington State Department of Ecology, Dam Safety Office and begin any recommended procedures. Call out numbers are shown below:
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5. Contact the Washington State Emergency Management Duty Officer at (360) 438-8639 or 1 (800) 258-5990
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| 3213 False Bay Dr | AMANDA A DUFF | 1600 HUNTINGTON DR SO PASADENA, CA 91030 | Sheet 6: one house at approximately 5.20 miles<br>~1 hr 36 min to arrival, 2 hr 23 min to peak |
| 2416 False Bay Dr | LADDIA A WHITTIER,CUST FOR AMANDA DUFF & PAUL DUFF | PO BOX 9 FRIDAY HARBOR, WA 98250 | Sheet 7: one barn at approximately 5.41 miles<br>This address corresponds to a house that is NOT in the inundated area, but the nearby barn is in the inundated area.<br>~1 hr 45 min to arrival, 2 hr 27 min to peak |

Provide courtesy notification of the following person who are not in the inundation path but have expressed interest in receiving notification.

| Address | Owner/Residents | Phone | Description |
|---|---|---|---|
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| 455 Boyce Road | Kate Wisnicwski | (206) 297-1042<br>(206) 999-1432 | Appears above inundated area;<br>Used as a vacation rental |
| 531 Boyce Road | Jim and Lisa Lawrence | (360) 378-5575<br>(360) 298-1812 cell | Appears above Inundated Area |
| 236 Ellison Lane | Roger Ellison | (360) 370-5795;<br>(360) 298-1033 cell | Appears above Inundated Area |
| 236 Ellison Lane | Anita Barreca | (360) 370-5795<br>(206) 604-4385 cell | Appears above Inundated Area |
| 146 Nettle Creek | Mike or Tamara Gregon | (360) 378-7955<br>(360) 378-5884 work | Appears above Inundated Area |
| 1314 Douglas Road | Peter J. Wangoe II | (360) 378-7278<br>(360) 378-8051 | Appears above Inundated Area |
| 1314 Douglas Road | Leasa Birch | (360) 378-7278<br>(360) 298-0422 | Appears above Inundated Area |
| 739 Telegraph Lane | Mary and Cal Ryan | (360) 378-2524 | Appears above Inundated Area |
| 862 Valley Farms Road | Chuck Tomas | (360) 378-3652<br>(818) 378-0495 cell | Appears above Inundated Area |
| 862 Valley Farms Road | Evelyn Lee/Trahan | (360) 378-8719<br>(360) 317-4807 cell | Appears above Inundated Area |
| 862 Valley Farms Road | Laura Tomas | (360) 378-8904<br>(360) 317-6931 cell | Appears above Inundated Area |
| 1069 Bailer Hill Road | Sidney Clark | (608) 239-0125 | No one living at this address |
| 1069 Bailer Hill Road | Susan Clark | (608) 239-0234 | No one living at this address |
| 2143 False Bay Road | A Richard Weisbrod | (360) 378-5460 | Unused Residence |

# DEACTIVATION

The Utilities Superintendent after consultation with the Town Administrator, the San Juan County and Town of Friday Harbor Emergency Manager, the Town of Friday Harbor's Fire Chief, the San Juan County Fire District #3's Chief and the DOE's representative on site will notify the impacted parties that the situation has stabilized.

The Utilities Superintendent will make the deactivation notification in the same order as on the notification flow chart.

It is possible that deactivation will occur at different times in the inundated area depending on the distance from the dam, the slope of the ground and other factors.

(In the absence of the Utilities Superintendent, the Lead Water Supervisor is responsible for fulfilling the duties of the Utilities Superintendent.

## SLOWLY DEVELOPING FAILURE OR UNUSUAL SITUATION

If there is a slowly developing failure or unusual situation where failure is not imminent, but could occur if no action is taken, dam tending personnel should:

Notify the Utilities Superintendent, Town of Friday Harbor (Mike Wilks) at (360) 378-2154. In the absence of the Utilities Superintendent, the Lead Water Supervisor (Mike Deegan) at (360) 378-8353 is responsible for fulfilling the duties of the Utilities Superintendent.

Notify San Juan County/Town of Friday Harbor Emergency Services (360) 378-9932 of the potential problem and keep them advised of the situation.

Suggested Language: *We have received information or other indications that Trout Lake Dam maybe experiencing problems or that a hazardous situation is developing. We need your assistance to initiate evaluation and possible notification procedures.*

Contact the Washington State Department of Ecology, Dam Safety Office and begin any recommended procedures. Call out numbers are shown below:

- Dam Safety Office Emergency Phone Number (360) 407-6208
- Doug Johnson, Dam Safety Supervisor (360) 407-6623 direct line
- Doug Johnson, Dam Safety Supervisor (360) 971-6347 pager
- Doug Johnson, Dam Safety Supervisor (360) 588-2797 home
- Jerald LaVassar, DSO, Geotechnical Engineer (360) 407-6625 direct line
- Jerald LaVassar, DSO, Geotechnical Engineer (360) 456-1370 home

During these contacts, find out if there are any immediate actions that can be taken to reduce the risk of failure.

If necessary, implement preventative actions described in Section V, pages 1 and 2 of this plan.

If situation deteriorates, be prepared to implement NOTIFICATION FLOWCHART EAP-1 OR EAP-2 AS APPROPRIATE.

# DEACTIVATION

The Utilities Superintendent (Mike Wilks), after consultation, will notify the impacted parties that the conditions have stabilized and that they can return to their normal activities.

The Utilities Superintendent will make the deactivation notification in the same order as the notification.

(In the absence of the Utilities Superintendent, the Lead Water Supervisor (Mike Deegan) at (360) 378-8353 is responsible for fulfilling the duties of the Utilities Superintendent.)

# SECTION IV — POSSIBLE EMERGENCY CONDITIONS

Listed below are some, not necessarily all, of the events which can lead directly to the failure of the dam. Included after each condition is a brief outline of the steps to take in trying to stabilize the situation.

## EARTHQUAKE

Very little warning time is available. Although the Finite Element Analysis of the dam conducted in 1993 showed the dam to be stable in an earthquake, should the dam fail in an earthquake, the failure is likely to occur quickly. If the Dam is breeched, the time it takes the water to get adjacent to the first residence is on the order of 5 minutes. The time for water to get to False Bay is 1 hour and 45 minutes.

If an earthquake of Richter Magnitude 5.0 or greater has been reported in the vicinity, or the responsible individual(s) has felt ground motions and experienced damage a large earthquake characterized by the following:

> *"Felt by all. Persons walk unsteadily. Windows, dishes, glassware are broken. Knickknacks, books etc. are knocked off shelves. Furniture moves or is overturned. Weak plaster and masonry crack. Trees bushes shaken visibly, or heard to rustle."*

1) Immediately, the Utility Superintendent (Mike Wilks) will conduct a general overall visual inspection of the dam. In the absence of the Utility Superintendent, the Lead Water Supervisor (Mike Deegan) will fulfill his duties.

2) If the dam is failing, or is damaged to the extent that there is increased flow passing downstream, immediately implement NOTIFICATION FLOWCHART procedures based on the nature of the observations.

3) If the dam is stable, check the dam crest for cracks or damage and the dam for additional cracking or increased flow from the cracks. If any of these have occurred, start to lower the reservoir pool level as a precautionary measure while an engineering evaluation of the structure is undertaken. Contact the DOE's Dam Safety Office (360) 407-6208 or their personnel (see activation flow charts for numbers) for further instructions. Also contact the San Juan County/Town of Friday Harbor's Emergency Management Office at (360) 378-9932. If the outlet works are damaged, it may be necessary to install siphon pipes or pumps to lower the pool level. The pool should remain drawn down until the dam can be examined by the Department of Ecology, Dam Safety Office or other qualified professional engineers.

4) Otherwise, if damage has occurred, but is not judged serious enough to cause failure of the dam, quickly observe the nature, location, and extent of the damage, and evaluate the potential for failure. Then contact the Department of Ecology, Dam Safety Office at (360) 407-6208. Also contact the San Juan County/Town of Friday Harbor's Emergency Management Office at (360) 378-9932. Provide a description of slides, sloughs, new or increased seepage, and

sudden subsidence, including the location, extent, rate of subsidence, effects on adjoining structures, springs or seeps, reservoir elevation, prevailing weather conditions, and other pertinent facts to DOE and San Juan County/Town of Friday Harbor's Emergency Management Office.

5) If there appears to be no imminent danger of dam failure the dam owner should thoroughly inspect the following:

   a) Both faces of the dam for additional cracks or increased leakage from existing cracks;

   b) Abutments for possible displacement;

   c) Spillway to confirm that continued safe operation is possible;

   d) Outlet works and valves for structural integrity;

   e) Seeps and cracks for increased flow, turbidity, or muddy water;

   f) Reservoir and downstream areas for landslides;

Report all findings to the Department of Ecology, Dam Safety Office and all other agencies that had been contacted earlier during the emergency. Also make sure to keep close watch on the dam for the next two to four weeks as some damage may not show up immediately after the quake.

## FLOODING

Overtopping of the dam can usually be predicted. Warning is likely to be on the order of several hours. If the Dam is breeched, the time it takes the water to get adjacent to the first residence is on the order of 5 minutes. The time for water to get to False Bay is 1 hour and 45 minutes.

Routing of the Inflow Design Flood indicates that the spillway may not be able to handle the expected runoff without the dam overtopping. The action levels are summarized on the table immediately following this page.

# Trout Lake Dam
## RESERVOIR ACTION LEVELS

| Elevation, feet | Inches down from crest | | Dry Day | Rainy Day | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Severe Rain | Intense Rain | Heavy Rain | Moderate Rain | Some Rain |
| 281.00 | | Dam Crest | | | | | | |
| 280.92 | 1 | | NOTICE | NOTICE | NOTICE | NOTICE | NOTICE | NOTICE |
| 280.83 | 2 | | NOTICE | NOTICE | NOTICE | NOTICE | NOTICE | NOTICE |
| 280.75 | 3 | | NOTICE | NOTICE | NOTICE | NOTICE | NOTICE | NOTICE |
| 280.67 | 4 | | Continuous | Continuous | Continuous | Continuous | Continuous | Continuous |
| 280.58 | 5 | | Every 2 hours | Continuous | Continuous | Continuous | Continuous | Continuous |
| 280.50 | 6 | | Every 2 hours | Continuous | Continuous | Continuous | Every 2 hours | Every 2 hours |
| 280.42 | 7 | | Every 8 hours | Continuous | Continuous | Every 2 hours | Every 2 hours | Every 8 hours |
| 280.33 | 8 | | Every Day | Every 2 hours | Every 2 hours | Every 2 hours | Every 8 hours | Every Day |
| 280.25 | 9 | | Mon-Wed-Fri | Every 2 hours | Every 2 hours | Every 8 hours | Every Day | Every Day |
| 280.17 | 10 | | Mon-Wed-Fri | Every 8 hours | Every 8 hours | Every Day | Every Day | Mon-Wed-Fri |
| 280.08 | 11 | Top of Stop Log | Mon-Wed-Fri | Every 8 hours | Every Day | Every Day | Mon-Wed-Fri | Mon-Wed-Fri |
| 280.00 | 12 | | Mon-Wed-Fri | Every Day | Every Day | Every Day | Mon-Wed-Fri | Mon-Wed-Fri |
| 279.92 | 13 | | Mon-Wed-Fri | Every Day | Every Day | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri |
| 279.83 | 14 | | Mon-Wed-Fri | Every Day | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri |
| | | | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri |
| 279.42 | 19 | Spillway Crest | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri |
| Below 279.42 | | | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri | Mon-Wed-Fri |

NOTICE MEANS---USE EAP TO NOTIFY DOWNSTREAM RESIDENTS OF AN UNUSUAL CONDITION
CONTINUOUS MEANS---THE DAM MUST BE CONTINUOUSLY OBSERVED
EVERY 2 HOURS MEANS---THE DAM MUST BE OBSERVED EVERY TWO HOURS ROUND THE CLOCK
EVERY 8 HOURS MEANS---THE DAM MUST BE OBSERVED EVERY EIGHT HOURS ROUND THE CLOCK
**M** – Means MODERATE RAIN---A PREDICTION OF 1 INCH IN 24 HOURS OR 0.5 INCH IN 12 HOURS
**H** – Means HEAVY RAIN---A PREDICTION OF 2 INCHES IN 24 HOURS OR 1 INCH IN 12 HOURS
**I** – Means INTENSE RAIN---A PREDICTION OF 3 INCHES IN 24 HOURS OR 1.5 INCHES IN 12 HOURS
**S** – Means SEVERE RAIN---A PREDICATION OF 4 INCHES IN 24 HOURS OR 2 INCHES IN 12 HOURS
IF THE RESERVOIR LEVELS ARE BELOW THESE ACTIONS LEVELS, THE DAM MUST BE OBSERVED AS A MINIMUM
EVERY MONDAY, WEDNESDAY AND FRIDAY

ANYTIME THE LEVEL OF WATER IN THE RESERVOIR IS WITHIN 4-INCHES OF THE CREST OR ELEVATION (280.67) OR WITHIN THE LEVELS SHOWN ON THE CHART ON THE PREVIOUS PAGE

## CONTINUOUS OBSERVATION OF THE DAM IS REQUIRED

If the reservoir level is within or less than 3 inches from the crest of the dam (elevation 280.75), immediately implement the following procedures:

a) Contact San Juan County/Town of Friday Harbor Emergency Management/Services (360) 378-9932 and the Department of Ecology, Dam Safety Office (360) 407-6623 or (360) 407-6208 and inform them of the situation.

b) Gradually increase discharge through outlet works, if possible. The Utilities Superintendent (Mike Wilks) is responsible for operating the outlet to increase the downstream flow. In the absence of the Utilities Superintendent, the Lead Water Supervisor (Mike Deegan) will assume his duties.

c) Notify downstream residents of the increases in discharge, and increase the discharge.

d) Check the dam and downstream toe and abutments for any increase in flow, increase in new seepage or abnormal toe drain leakage. If there is any indication of muddy or silty flow, and/or the flow is substantially increasing implement the SLOWLY DEVELOPING FAILURE OR UNUSUAL SITUATION PROCEDURES.

e) Check for increased/decreased seepage due to a change in water level.

f) Check for cracks, slumping, sloughing, sliding, or other signs of distress near the dam abutment or crest.

## EROSION, SLUMPING/SLOUGHING, OR CRACKING OF THE DAM OR ABUTMENT

Erosion, slumping/sloughing or cracking of the dam or abutment usually takes place over a long period...several months or more. Routine observation will spot a problem early while it can be mitigated. However, in unusual circumstances, cracking of the dam or settlement of the foundation can take place fairly rapidly. If the Dam is breeched, the time it takes the water to get adjacent to the first residence is on the order of 5 minutes. The time for water to get to False Bay is 1 hour and 45 minutes.

Determine the location and size of the affected area(s) (height, width, and depth) severity, estimated seepage discharge, clear or cloudy seepage, and the reservoir and tailwater elevations. If failure appears likely, immediately implement FAILURE IMMINENT PROCEDURES; if failure does not appear likely, contact Department of Ecology, Dam Safety Office for instructions.

## NEW CRACKS OR INCREASE IN FLOW FROM EXISTING CRACKS

New cracks or increase in flow from existing cracks is generally a long term change...several months or more. Routine observation and measurement of flow will usually result in the detection of a problem while it can be mitigated. However, in unusual circumstances, these changes can place fairly rapidly. If the Dam is breeched, the time it takes the water to get adjacent to the first residence is on the order of 5 minutes. The time for water to get to False Bay is 1 hour and 45 minutes.

If there are new cracks or an appreciable increase in flow from the old cracks, an increase in seepage under or around the abutments of the dam, then location, size of the affected area, estimated discharge, nature of the discharge (clear or cloudy), and reservoir elevation (a map of the area may be helpful to illustrate where the problem is located) must be determined. If failure appears likely, implement FAILURE IMMINENT PROCEDURES; if failure does not appear imminent, report all findings to the DOE's Dam Safety Office and wait for further instructions.

## LANDSLIDES IN TO THE RESERVOIR OR ADJACENT TO THE DAM

If the Dam is breeched, the time it takes the water to get adjacent to the first residence is on the order of 5 minutes. The time for water to get to False Bay is 1 hour and 45 minutes.

Very large rapid landslides into a reservoir have been known to put additional stress on the dam from the result surge of water displaced by the landslide. Visual inspection of the nature of the material up slope and up stream of Trout Lake Dam, makes this seem unlikely. However, a localized landslide or instability in the immediate vicinity of the dam is possible. If that happens, an assessment of the impact of the earth movement on the stability of the dam or the outlet piping should be made.

## SPILLWAY AND OUTLET WORKS FAILURES

Once the O and M plan is implemented, the condition of the outlet works will be monitored thus decreasing the possibility of an unexpected sudden release of water. Small leaks can be corrected easily. Larger leaks require more effort. A sudden pipe break must be addressed immediately in order to reduce any undermining of the foundation. If the Dam is breeched, the time it takes the water to get adjacent to the first residence is on the order of 5 minutes. The time for water to get to False Bay is 1 hour and 45 minutes.

In case of sudden, planned or unplanned, large water releases from the outlet works or spillway (e.g. opening valves, pipe or stoplogs breaking), notify downstream residents and the appropriate agencies of the increased flow.

## ABNORMAL WEIR OR OTHER INSTRUMENT READINGS

Once the O and M plan is implemented, the periodic readings of the weirs will allow the Town of Friday Harbor to track changes and thus to get early notification of any changes in the condition of the dam. Changes in weir reading will normally take place over a long period of time. Any sudden changes in weir readings must be quickly investigated.

After taking weir or other readings, compare the current readings to previous readings at the same reservoir level. If the reading appears abnormal, **Mike Wilks-Utilities Superintendent** is responsible for:

1) Determining:
    a) Changes from the normal readings;
    b) Other pertinent facts such as leakage through the cracks, additional flow from the abutments.
2) Contacting an engineer and the Department of Ecology, Dam Safety Office for their assistance in determining if the change is significant or not.

## OTHER PROBLEMS

In case of other problems occurring that might pose a threat to the dam safety, contact the Department of Ecology, Dam Safety Office and explain the situation.

## END OF EMERGENCY SITUATION AND FOLLOW-UP ACTIONS

Once conditions indicate that there is no longer an emergency at the dam site and the proper authorities (e.g. Department of Ecology - Dam Safety Office, or a professional engineer) have declared the dam safe, the Utilities Superintendent (Mike Wilks) at (360) 378-2154, will notify the impacted parties that the conditions are normal and that they can return to their normal activities.

Utilities Superintendent will make the deactivation notification in the same order as the notification.

(In the absence of the Utilities Superintendent, the Lead Water Supervisor (Mike Deegan) at (360) 378-8353 is responsible for fulfilling Mike Wilks duties.)

# SECTION V — PREVENTATIVE ACTIONS

The following actions describe some of the steps that could be taken at the dam to prevent or delay failure after an adverse condition or emergency is first discovered.

## ACTIONS TO BE TAKEN IN THE EVENT OF:

### Reduction in Freeboard:

- Make sure that the AUG1 and AUG2 pumps are turned off.
- Increase flow in the pipeline to the water treatment to its maximum...including wasting water.
- Open the drain valve (if this can be done safely).
- Remove the stoplog if it is in place and removal can be done safely. It may be necessary to cut the stoplog or use a hoist to remove it. Personnel safety is paramount.

### Overtopping by Flood Waters

- Utilize the steps above if they can be done safely.
- Immediately protect any areas at the end of the spillway or abutments that may be eroding.
- Report overtopping and any mitigation actions to the DOE's Dam Safety Office.
- If necessary, active the appropriate portion of this plan.

### Increased leakage of existing cracks, new cracks, additional leakage from the Abutments

- Determine if the water from the abutments is cloudy or turbid...indicating that erosion is taking place.
- Determine if the flow is increasing.
- Immediately report the situation to DOE's Dam Safety Office
- If necessary, active the appropriate portion of this plan.

### Undercutting of Soil off the End of the Spillway

- If it can be done safely, place sandbags or additional material at the toe of the spillway to prevent additional undercutting.

## Bank Sloughing

- If it can be done safely, remove material if it poses a threat such as obstructing or partially obstructing the spillway.
- Determine if additional material is likely to slough and attempt to stabilize if it can be done safely.

## Failure of Outlet Pipe

- Determine if the failure is downstream of the two sets of valves located at the toe of the dam and the second set about 75 feet further downstream.
- If the failure is upstream of the values, determine if the pipe can be plugged on the downstream side of the dam using normal water main repair techniques.
- If the failure is upstream of the valves, it may be necessary to obtain the services of a diver to block the outlet on the upstream side of the dam. This should be done rapidly as erosion of soil from the toe of the dam should be stopped quickly to prevent weakening the foundation of the dam. Such work is considered hazardous and must be only be attempted by professional divers.

# SECTION VI — SUPPLIES & RESOURCES

An up to date listing of available that can be used is available on San Juan County Emergency Management's website at www.sanjuandem.net/resources .

A section of 36-inch corrugated metal pipe to help rebuild Prohaska Road is available in the Town of Friday Harbor's shops.

# APPENDIX A

# UPDATING THE EAP

# UPDATING THE EAP

Updating information for the EAP is required annually and/or when major changes have occurred or when new houses have been built in the inundated areas. As a minimum, the following information needs to be checked and revisions made on an annual basis.

- Phone Numbers
- New Homes
- Supplies and the locations
- Personnel Change or Changes in Responsibilities
- Locations of copies of the EAPs
- Changes made to the dam or operational changes in the water supply system that could impact the dam.

## Update Dates

# APPENDIX B

# LOCATIONS OF THE EAPs, EAP FLOW CHARTS, and INUNDATION MAPS

# LOCATIONS OF THE EAPS, EAP FLOW CHARTS, and INUNDATION MAPS

The copies of complete EAPs, EAP Flow Charts and Inundation Maps are located at:

- Town of Friday Harbor Town Hall
- Town of Friday Harbor Water Treatment Plant
- Town of Friday Harbor Maintenance Shops
- Town of Friday Harbor Fire Department
- San Juan County/Town of Friday Harbor Emergency Management Office
- San Juan Fire District #3
- San Juan County 911 Dispatcher
- San Juan County Maintenance Shops
- Department of Ecology, Dam Safety Office

Copies of the Inundation Maps are located at the locations shown above.

Copies of individual EAP are located in the homes and other structures in the inundated area.

Individual EAPs have be prepared for:

- 346 Julie Road
- 375 Julie Road
- 530 Wold Road
- 390 Prohaska Road
- 378 Wold Road
- 74 Wold Road
- 72 Wold Road
- 112 Wold Road
- 2416 False Bay Road

# APPENDIX C

# RESPONSIBILITIES OF INDIVIDUALS

# RESPONSIBILITIES OF INDIVIDUALS

Day to day operation and maintenance of the dam: Utilities Superintendent, Town of Friday Harbor (Mike Wilks) at (360) 378-2154. In the absence of the Utilities Superintendent, the Lead Water Supervisor, Town of Friday Harbor (Mike Deegan) at (360) 378-8353 is responsible for fulfilling the Utilities Superintendent's duties.

Implementation of the Emergency Action Plan: Utilities Superintendent, Town of Friday Harbor (Mike Wilks) or the Town Administrator, Town of Friday Harbor (King Fitch). In the absence of the Utilities Superintendent (Mike Wilks), the Lead Water Supervisor (Mike Deegan) is responsible for fulfilling the duties of the Utilities Superintendent.

Determining and identifying conditions or events that require emergency action: Mike Wilks, Utilities Superintendent, Town of Friday Harbor. In the absence of Mike Wilks-Utilities Superintendent, Mike Deegan-Lead Water Supervisor (360) 378-8353 is responsible for fulfilling the Wilks' duties of the Utilities Superintendent.

Mike Wilks-Utilities Superintendent (360) 378-2154 as representative of the dam owner is also responsible for immediately activating the EAP by:

f) Notifying Residents in downstream homes of the Emergency

g) Contacting San Juan County/Town of Friday Harbor Emergency Management

h) Contacting the San Juan County Sheriff

i) Contacting the DOE Dam Safety Section

j) Obtaining Emergency Supplies and Equipment

(In the absence the Utilities Superintendent (Mike Wilks), the Lead Water Supervisor (Mike Deegan) is responsible for fulfilling the duties of the Utilities Superintendent.

C. The Town Administrator (King Fitch) at (360) 378-2390 is responsible for Notifying the Press and News Media.

The Utilities Superintendent (Mike Wilks) is also responsible for:

c) Coordinating activities at the dam and staying in contact with the Town Administrator (King Fitch)

d) Taking emergency measures at the dam to prevent failure, as directed by the Town Administrator (King Fitch)

(In the absence of the Utilities Superintendent (Mike Wilks), the Lead Water Supervisor (Mike Deegan) is responsible for fulfilling the duties of the Utilities Superintendent.

The 911 Dispatcher is responsible for activating the NOAA alert system.

# APPENDIX D

# ACCEPTANCE OF THE EAP

# ACCEPTANCE OF THE EAP

The following agencies have accepted the EAP and concur with the proposed notification procedures:

- Town of Friday Harbor, Dam Owner
- Town of Friday Harbor, Dam Operator
- San Juan County/Town of Friday Harbor, Emergency Services
- Washington State, Department of Ecology, Dam Safety Section
- San Juan County Fire District #3

# APPENDIX E

# COMMUNICATION SYSTEMS

# COMMUNICATION SYSTEMS

Cell phones are not reliable at the dam site.

Town of Friday Harbor Truck Radios (but not necessarily the handhelds) can communicate with the San Juan County Sheriff's Office and the Town of Friday Harbor Fire Department from the vicinity of the dam.

Pagers

Location of Radios

- Trucks
- Water Treatment Plant
- Town Shops
- Town Hall

# APPENDIX F

# REFERENCES AND CORRESPONDENCE

# REFERENCES and CORRESPONDENCE

References:

*Guidance for performing a Failure Mode Analysis for FERC Part 12 Dam Safety Inspections*, Feb, 2003, FERC

*Dam Safety Evaluations of Existing Dams*, 1992, US Bureau of Reclamation

*Managing the Risks of Dam Project Development, Safety and Operation*, Aug 1998, 18th Annual USCOLD Lecture Series, USCOLD

*Quantifying the Cost of Upgrading Non-Federally Owned Dams*, Oct 1994, Association of State Dam Safety Officials and FEMA

*FERC Dam Safety*, Independent Consultant Inspection Workshop, March 2001, Portland, OR FERC

*Guidelines for Achieving Public Protection in Dam Safety Decision Making*, April 1997, US Bureau of Reclamation

*Guidelines for the Preparation of Standing Operating Procedures for Dams and Reservoirs*, 1993, US Bureau of Reclamation

*Guidelines for Reporting the Performance of Dams*, October 1993, Association of State Dam Safety Officials and Stanford University

*Guidelines for Developing Dam Emergency Action Plans*, Feb 1995, Washington State Department of Ecology

*Dams Risks to Third Parties,* 1982*,* International Commission on Large Dams

# Trout Lake Dam Correspondence

Topic: Trout Lake Dam
From: DOE  Sep 20, 1985
Subject: Results of inspection of dam on 8/1/85

This report is the first inspection of the dam in the Town's files. There are two outlets, one outlet provides water to town; the other is an outlet or drain for the reservoir. The spillway had an earthen embankment across it. There were two CMP's though the spillway embankment. It appeared that the embankment on the spillway had been overtopped. The downstream toe was obscured by trees and brush. Suggestions...

- Earth on spillway should be removed
- Hydrology should be investigated
- Vegetation should be removed from base of the dam so that the downstream toe can be observed.
- The Town should institute a regular maintenance program.

Topic: Trout Lake Inspection Report
From: DOE  Feb 3, 1988
Subject: Results of the inspection of dam on 1/20/88

The report noted the repairs that were made in 1986. This inspection was at the request of Mr. Fitch. The earthen berm on spillway had been removed. A new concrete channel was added at the end of the spillway. There is minor seepage at toe of east abutment. There is an indication that seepage increases with increasing water level. There is some indication that seepage also happens on the west abutment when the reservoir is at a high level. Seepage is indicated by the amount of brush growing. Two vertical joints in the rock on west abutment were noted. Suggestions:

- **Monitor the Seepage**---Install three weirs; two at the toe from east and west sides and one to monitor the total. Record observation is a log book.
- **Periodically observe the cracks...**monthly and record
- **Periodically measure the displacement of the dam**
- **Observe abutment and foundation conditions**. (Note any increase in width of joint to west abutment, signs of movement in rock forming the abutments, new seepage locations in abutments, sudden increase in the quantity of seepage.)
- **Annual activities**....a person should be made responsible for clearing trees and brush, cleaning of trashracks, lubrication of gate mechanisms

and records of all monitoring activity, maintenance actions, and any other activity at the dam.

- **Develop** EAP....an EAP needs to be developed for earthquakes and floods.

Topic: Trout Lake Dam
From: DOE Feb 3, 1988
Subject: Summary of results of inspection of dam on 1/20/88

Cover letter for report above but adds several long term issues...the need for an EAP and O&M manual. DOE requests that they be provided copies of monitoring data on a yearly basis for review...reservoir levels, seepage quantities, measured displacements of the dam, air temperatures at the time of measurements. They requested “as builts” of the spillway extension and drawings of the proposed bridge across the spillway.

Topic: Reconnaissance Inspection of Trout Lake Dam
From: DOE Aug 16, 1991
Subject: Results of inspection of dam on 8/2/1991

The reconnaissance was performed as a result of an increase in the seepage of the dam. Leakage was from the lower portion of the dam....lower most lift line leaks at about 4 gpm. Two more leaks were found 10 and 25 feet to the left of the above seep. These two leaks were probably 20 to 30 gpm.

Topic: Invoice for Commercial Diving
From: Emerald Seas International Dec 8, 1992
Subject: Inspection invoice for divers to obtain access to the valve and pipe in the dam. (No report was found.)

Topic: Trout Lake Dam
From: DOE Jan 13, 1993
Subject: Preliminary findings about stability of the dam

Results of inspection of the dam in April 1992.

- Dam is stable under normal loads.
- Vertical cracks are the result of shrinkage and not a sign of structural instability.
- Deterioration is taking place along the cold joints in the dam. Repairs are needed.
- Spillway does not have capacity to handle the inflow design flood. But the foundation is erosion resistant and the overtopping (by 1 foot) is not considered a problem.

Topic: Periodic Dam Safety Inspection Report
From: DOE March 1993
Subject: Inspection Report on 4/9/92 Inspection of the dam

Formal 18 page report. Results of inspection of 4/9/1992. "Fairly well maintained and operated facility" Static and Seismic stability is adequate. Issues:

- Seepage and repair of concrete. Vertical joints need to be repaired.
- Spillway is inadequate
- Outlet sluice ways and valves are inoperative.
- Need formal procedure for Operations and Maintenance
- EAP is needed
- DOE would like any available information about the design of the dam.
- At the design flood, the spillway is over topped by about a foot
- Needs written O&M plan
    - Visual inspection of the dam weekly
    - Weirs are to be recorded
- Required actions
    - Repair concrete, seal lift lines, place a 3 to 4 inch concrete cover to protect the damaged areas
    - Seal vertical cracks
    - Repair outlet works
    - O&M manual
        - Define who does the work
        - Project Data Sheet
        - Rule Curve
        - Description of each device that regulates flow in to and out of the dam
        - List items that need periodic monitoring...which items, how often, procedures for monitoring, measuring and record keeping.
        - List of items requiring period maintenance and procedures for doing the maintenance
        - List of items that need periodic inspections or testing...how often and how
    - EAP
        - Notification Procedures
        - Situations that require notifications...excessive cloudy seepage, embankment sumps or depressions on the slopes.

Topic: Draft Structural Analysis Trout Lake Dam
From: DOE April 1993
Subject: Draft Report on structural analysis of the dam

Finite Element Method analysis of the dam was undertaken. Conclusion, "Therefore, during a major seismic event, it is likely that the dam will continue to transfer the water load across the crack and into abutment rock."

Topic: Structural Analysis Trout Lake Dam
From: DOE April 1993
Subject: Report on structural analysis of the dam

Final of above report.

Topic: Repairs to Cold Joint
From: Steffen Roberson and Kirsten, Nov 30, 1993
Subject: Proposal to repair "cold joint"

Letter proposal for repairs to the cold joint.

Topic: Trout Lake Capacity Analysis
From: KCM, June 1994
Subject: Report on the volume of water stored

The latest of the capacity studies (469 MG, 318 MG, and 385 MG were suggested values under various conditions). Report states that the volume of water stored is 468 MG at capacity. (Brown and Caldwell could not determine if that counted the flashboards being in place or not.)

Topic: Trout Lake Dam
From: DOE, Jan 27, 1995
Subject: Results of the inspection of the dam on 1/20/1995

Inspection was in response to a contractor's call. When DOE's DSO looked at the dam, it really hadn't changed that much. Repairs appear to have been properly made. Some blistering but otherwise the repairs appear ok. Town should watch for blistering of the repairs after the next round of freeze thaw cycles. Future safe operation requires:

- Sealing of the remaining vertical cracks with flexible mastic...otherwise freeze-thaw of the face of the dam
- Sluice gates and downstream valves need to be inspected and made operational
- Develop formal O&M manual
- Develop EAP

Topic: Draft Trout Lake Dam Improvement Feasibility Study
From: KCM, Oct 1997
Subject: Report on various methods of raising the dam

Topic: Trout Lake Dam
From: DOE, Feb 18, 1998
Subject: Comments of DOE on the Feasibility Study of raising the lake.

> Rockfill is probably the best alternative because there isn't competition for concrete on the islands. Visual inspection gives the impression of a faulty structure...but it isn't. There are vertical cracks but they have intact aggregate interlocks. Also attached was a report from Jerald LaVassar on the seismic assessment of Trout Lake Dam.

Topic: Trout Lake Dam, Margo's Lake Dam
From: DOE, Feb 19, 1999
Subject: Letter informing Town of upcoming inspection

Topic: Trout Lake Dam, Margo's Lake Dam
From: DOE, March 24, 1999
Subject: Letter informing Town of date of inspection of dam

Topic: Trout Lake Storage Dam, Margo's Lake Dam
From: DOE, July 18, 2000
Subject: Results of brief inspection of the dam on 7/8/2000

Observations:

- There was so much brush that the downstream contact plane could not be observed
- An area 15 to 20 feet downstream of the dam should be cleared of brush
- If the splashboards are in place too soon or too late, they add to risk

Topic: Trout Lake
From: DOE, Jan 31, 2005
Subject: Requests Inundation Maps, EAP, and O&M Manuals

Observations

- The dam meets DOE's requirements on a "conditional basis"
- The dam poses a significant downstream hazard
- The Town should recalculate the dam's stability with existing conditions and knowledge because of the degree of uncertainty in the earlier analysis

- Need to know the inundated area
- O&M manual is needed
- EAP is needed

Topic: Periodic Dam Safety Inspection Report
From: DOE, Jan 2005
Subject: Results of most recent dam inspection 4/16/2002

The 1992 repairs by Quantum Construction of Anacortes on the dam itself are discussed. The repairs were accomplished by a diver hand-packing mastic into the upstream side of the cracks. Downstream was cleared of algae. There is an old dam downstream of the structure that one can use as an indication of the amount of water running around the dam. The single flashboard is installed during the month of April. Outlet works remain inoperable in the open position for the outlet valve and in the closed position for the drain valve. Replacement or repair by a diver is required if they are replaced or repaired...no requirement in the report.

Required actions:

- If dam is raised, then there is a need to restore the operation of the outlet works
- The suspected area of inundation needs to be inspected on the ground
- The Town needs to get O&M procedures in place
- The Town needs to produce an EAP

Topic: Comments to Draft EAP
From: DOE, April 23, 2007
Subject: Emergency Plan Draft

Acceptance of Emergency Plan.

# SECTION III

# INUNDATION MAPS

A. Flooding Dam Failure

B. Sunny Day Failure

C. Individual Residences

# INUNDATION MAPS

## Design Flood

# INUNDATION MAPS

## Sunny Day

# TELEPHONE CONTACT NUMBERS

## TOWN OF FRIDAY HARBOR

- Town Administrator, Mr. King Fitch (360) 378-2390
- Utilities Superintendent, Mr. Mike Wilks (360) 378-2154
- Lead Water Supervisor, Mr. Mike Deegan (360) 378-8353
- Public Works Department (360) 378-2154
- Fire Department 911 or (360) 378-4183

## SAN JUAN COUNTY/TOWN OF FRIDAY HARBOR EMERGENCY SERVICES

- Director Department of Emergency Management, Mr. Brendan Cowan (360) 378-9932

## SAN JUAN COUNTY FIRE

Fire Chief 911

## DOE DAM SAFETY OFFICE

- Dam Safety Office Emergency Phone Number (360) 407-6208
- Dam Safety Supervisor, Mr. Doug Johnson, (360) 407-6623 direct line, (360) 971-6347 pager, (360) 588-2797 home
- Geotechnical Engineer, Mr. Jerald LaVassar, (360) 407-6625 direct line, (360) 456-1370 home

## WASHINGTON STATE EMERGENCY MANAGEMENT DUTY OFFICER (360) 438-8639 or 1-(800) 258-5990