

2011 Legislature

TPS Report 56052v2

**Agency: Department of Natural Resources****Project Title:****Project Type:** Maintenance and Repairs

# Valdez Flooding Control Project

**State Funding Requested:** \$75,000  
One-Time Need**House District:** 12 / F**Brief Project Description:**

Valdez Flooding Control Project

**Funding Plan:**

Total Project Cost:	\$75,000
Funding Already Secured:	(\$0)
FY2012 State Funding Request:	(\$75,000)
Project Deficit:	\$0

*Funding Details:**No previous funding***Detailed Project Description and Justification:**

The ASWCD was asked, by another Soil and Water Conservation District, to investigate and assist if possible, a Valdez property owner experiencing significant flooding issues. Upon investigation, the ASWCD has found several contributing factors and a lack of infrastructure to adequately direct the significant drainage coming downhill, including malfunctioning culverts not under the ownership of the property most impacted.

The ASWCD would like to coordinate with all applicable agencies, property owners and others to address the issues, provide adequate drainage infrastructure, and repair malfunctioning culverts in this area to protect property owners, structures, septic systems, water quality and other concerns. Engineer's Report attached, redacted to protect privacy.

**Project Timeline:**

Project will be complete by June 30, 2015

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

Property Owner

**Grant Recipient Contact Information:**

Name: Ryan Stencil  
 Title: Operations Manager, ASWCD  
 Address: 550 W. 7th Avenue, Suite 1400  
 Anchorage, Alaska 99501  
 Phone Number: (907)677-7645  
 Email: aswcd@aswcd.org

Has this project been through a public review process at the local level and is it a community priority?  Yes  No*For use by Co-chair Staff Only:***\$75,000  
Approved**

10:28 AM 5/27/2011



# DOWL HKM

- 4041 B Street ■ Anchorage, Alaska 99503  
907-562-2000 ■ 907-563-3953 (fax)
- 5368 Commercial Boulevard ■ Juneau, Alaska 99801  
907-780-3533 ■ 907-780-3535 (fax)
- 104 Center Avenue, Suite 206 ■ Kodiak, Alaska 99615  
907-512-0519
- 809 S. Chugach Street, Unit 4 ■ Palmer, Alaska 99645  
907-746-7600 ■ 907-746-6705 (fax)
- 166 W. Alameda ■ Tucson, Arizona 85701  
520-882-6696 ■ 520-624-0384 (fax)
- 430 W Warner Road, Suite B101 ■ Tempe, Arizona 85284  
480-753-0800 ■ 480-753-0803 (fax)
- 8420 154th Avenue NE ■ Redmond, Washington 98052  
425-869-2670 ■ 425-869-2679 (fax)
- 222 N. 32nd Street, Suite 700 ■ Billings, Montana 59101  
406-656-6399 ■ 406-656-6398 (fax)
- 130 North Main Street, Suite 100 ■ Butte, Montana 59701-2839  
406-723-8213 ■ 406-723-8328 (fax)
- 920 Technology Boulevard, Suite A ■ Bozeman, Montana 59718  
406-586-8834 ■ 406-586-1730 (fax)
- 2701 16th Street NE ■ Black Eagle, Montana 59414  
406-453-4085 ■ 406-453-4288 (fax)
- 104 East Broadway, Suite G-1 ■ Helena, Montana 59601  
406-442-0370 ■ 406-442-0377 (fax)
- 713 Pleasant ■ Miles City, Montana 59301  
406-234-6666 ■ 406-234-7065 (fax)
- 319 S. Gillette Avenue, Suite 301 ■ Gillette, Wyoming 82717  
307-686-4181 ■ 307-686-4858 (fax)
- 906 Main Street ■ Lander, Wyoming 82520  
307-332-3285 ■ 307-332-5795 (fax)
- 1465 N. 4th Street ■ Laramie, Wyoming 82072  
307-742-3816 ■ 307-742-9741 (fax)
- 16 W. 8th Street ■ Sheridan, Wyoming 82801  
307-672-9006 ■ 307-672-5214 (fax)

Project #: <b>D59578</b>	Date: <b>December 2, 2010</b>
To: <b>Anchorage Soil and Water Conservation District</b> <b>P.O. Box 110309</b> <b>Anchorage, Alaska 99511</b> <b>ATTN: Ryan Stencel</b>	
Regarding: <b>Valdez Flooding Investigation</b> <b>[REDACTED]</b>	
We are sending you <input checked="" type="checkbox"/> Attached <input type="checkbox"/> Under Separate Cover	
Via <del>Courier Mail</del> the following items:	
<input type="checkbox"/> Shop drawings <input type="checkbox"/> Prints <input type="checkbox"/> Plans <input type="checkbox"/> Specifications <input type="checkbox"/> Copy of letter <input type="checkbox"/> Change order <input checked="" type="checkbox"/> Other <input type="checkbox"/> Samples	

Copies	Date	Description
1	12/02/2010	<b>Valdez Flooding Memo w/ Attachments</b>

These are transmitted as indicated below:

- |  |   |   |                               |
|--|---|---|-------------------------------|
| <input type="checkbox"/> For approval            | <input type="checkbox"/> Approved as submitted    | <input type="checkbox"/> Resubmit                         | _____ copies for approval     |
| <input checked="" type="checkbox"/> For your use | <input type="checkbox"/> Approved as noted        | <input type="checkbox"/> Submit                           | _____ copies for distribution |
| <input checked="" type="checkbox"/> As requested | <input type="checkbox"/> Returned for corrections | <input type="checkbox"/> Return                           | _____ corrected prints        |
| <input type="checkbox"/> For review & comment    |   | <input type="checkbox"/> Prints returned after loan to us |                               |
| <input type="checkbox"/> Bids due                | <input type="checkbox"/> Other:                   |   |                               |

Remarks:

Copy to:

Typed Name: **Bradley M. Melocik, P.E., P.H.**

Signature: *Bradley M. Melocik*



**DOWL HKM**

December 1, 2010  
W.O. 59578

Ms. Ryan Stencel  
Operation Manager  
Anchorage Soil and Water Conservation District  
P.O. Box 110309  
Anchorage, Alaska 99511

Subject: Valdez Flooding Investigation  
[REDACTED]

Dear Ms. Stencel:

This letter has been prepared to describe DOWL HKM's findings of a field investigation regarding flooding issues at [REDACTED] property on the Richardson Highway outside of Valdez, Alaska. Richard Pribyl and I traveled to Valdez on October 27, 2010, to meet with [REDACTED] at her property to investigate ongoing flooding problems. Ms. [REDACTED] led Rich and I on a walk-through of the property to show the existing drainage infrastructure and where flooding has been problematic.

The investigated property is in the Alpine Woods Subdivision at approximately Mile 9 on the Richardson Highway. The property includes Block [REDACTED] and Block [REDACTED]. See the attached property plats obtained from the City of Valdez. The property is located on the [REDACTED] side of the Richardson Highway and totals [REDACTED] acres. The current landowner, [REDACTED] moved to the property in [REDACTED]. Ms. [REDACTED] home is located on Block [REDACTED]. The existing well providing drinking water to the home is located approximately 30 feet to the east of the house. According to Ms. [REDACTED], groundwater is fairly shallow (less than 50 feet). The existing septic system is located approximately 40 feet to the northwest of the home. A gravel drive providing access from the highway is located to the west of the house. There is a large gravel driveway and parking area to the west of the house, with existing garage structures along the north side of the driveway.

The State of Alaska Department of Transportation and Public Facilities (DOT&PF) has a 300-foot right-of-way (ROW) centered along the Richardson Highway. The drinking water well for Block [REDACTED] is located within the DOT&PF ROW. A portion of Ms. [REDACTED] house, consisting of an addition on the south side of the structure, is also located on the DOT&PF ROW.

There are no existing structures on Block [REDACTED]. Discussions with Ms. [REDACTED] revealed that the previous owner of Lot [REDACTED] lived in a trailer that has since burned down. Ms. [REDACTED] showed us the approximate location of the trailer. An old drinking well is located in the southwest corner of the property. The existing gravel drive providing access to this lot runs north-south immediately to the east of the existing well. The location of any existing septic systems on this lot is unknown.

## OBSERVED HYDROLOGIC AND DRAINAGE FEATURES

A stream draining from the mountains to the north of the property drains approximately west through the west half of Block [REDACTED]. The stream is located to the north side of the driveway and roughly follows the northern property boundary. The stream flows roughly southwest off of the [REDACTED] property onto the DOT&PF ROW and crosses the Richardson Highway through a 48-inch corrugated steel pipe (CSP) culvert approximately 600 feet to the west of Ms. [REDACTED] home. Based on an assumed slope of 2 percent, the hydraulic capacity of the culvert is estimated to be 110 cubic feet per second (cfs). The observed rust line at the inlet of the culvert is at approximately 20 percent of the culvert rise. The observed rust line at the outlet is at approximately 50 percent of the culvert rise. This suggests that the culvert experiences significant backwatering effects during high flows from the downstream channel and Lowe River. The observed gradient of the stream flattens significantly on the south side of the Richardson Highway as the stream nears the Lowe River. Substantial standing water in the form of marshes and sloughs was observed to the south of the highway. These downstream conditions support that theory that the stream channel downstream of the 48-inch culvert results in backwatering conditions affecting the stream on the north side of the highway.

A natural drainage pathway, including a roughly defined channel, was observed on the Olson property and adjoining DOT&PF property. The drainage pathway follows the natural topographic low point between the Richardson Highway and the mountains to the north, draining west through Lot [REDACTED] and Lot [REDACTED] to the stream at the existing 48-inch culvert in the highway. The drainage pathway runs approximately east-west through Lot [REDACTED] approximately 20 feet to the south of the approximate location where the trailer burned down. Two seeps were observed on the natural steep hill slopes along the north side of Lot [REDACTED]. Ms. [REDACTED] explained that these seeps are waterfalls during storm events and contribute runoff to the drainage pathway. There is an old 36-inch CSP culvert in the gravel driveway to Lot [REDACTED]. This culvert was partially damaged by City of Valdez during efforts to remove debris following the 2006 flood, but the culvert still functions to some extent. The drainage pathway runs approximately 20 to 30 feet south of the existing house on Lot [REDACTED] and crosses the gravel drive at an existing low point. The crushed remnants of an 8-inch clay culvert were observed in the driveway at this location.

The DOT&PF installed 24-inch CSP culverts in the gravel drives to Lot [REDACTED] and Lot [REDACTED]. The 24-inch culverts are located at the approximate toe-of-slope where roadway fill from the Richardson Highway meets the existing ground. The elevation of the 24-inch culverts is noticeably higher than the elevation of the drainage pathway, and as a result the culverts do not typically convey any runoff. The elevation of the 24-inch culvert in Lot 8 is approximately equal to the elevation at the house, meaning floodwaters nearly reach the structure before any meaningful flow is conveyed through the culvert along the highway. The previous owner of Lot [REDACTED] had coordinated with DOT&PF to dig a ditch on the east side of the house that would intercept runoff and convey it south towards the Richardson Highway and the 24-inch culvert in the driveway. However, the elevation of the 24-inch culvert is higher than the natural ground elevation to the east of the house.

The existing hydrologic features are shown on Figure 1 (attached). The assumed direction of groundwater flow is from east to west, following the general direction of surface water flow. This is documented on the property plats obtained from the City of Valdez.

## PREVIOUS FLOODING EVENTS AND IMPACTS

We discussed with Ms. [REDACTED] past flooding events to understand the ongoing flooding issues, primary areas of concern, and Ms. [REDACTED] goals for developing the property (including managing drainage). The key items noted and discussed during the site investigation, including past flood events and subsequent property improvements, are summarized below.

- During the flood of October 2006, floodwaters (draining west from Lot [REDACTED]) were flowing beneath the existing house on Lot [REDACTED]. The entire structure was surrounded by water. During the flood, Ms. [REDACTED] investigated the downstream 48-inch CSP culvert crossing the Richardson Highway and found the hydraulic capacity to be insufficient. Observed debris at the culvert inlet, including a large rock and woody debris, may have affected flood conveyance.
- The existing septic system on Lot [REDACTED] failed during the October 2006 flood. As part of the ongoing Alpine Woods Septic System Replacement Program, initiated following the 2006 flood, Ms. [REDACTED] is in the process of coordinating for the replacement of the existing septic system. She has been informed by the City of Valdez that the new septic system needs to be installed in the same location as the existing septic system. The City of Valdez has been recommending the AdvanTex systems (manufactured by Orenco Systems, Incorporated) to residents of the Alpine Woods Subdivision for septic system replacement.
- The drinking water well on Lot [REDACTED] was contaminated during the October 2006 flood. This was due primarily from septic systems failing upstream (to the east) during the flood. It is unknown if contaminated water reached the well through the top of the well or if source groundwater was contaminated. The skirting of the house on Lot [REDACTED] was also contaminated during the 2006 flood.
- Ms. [REDACTED] also is concerned about floodwaters in the well house shorting out the electric system (providing power to the well pump and heater).
- The existing house on Lot [REDACTED] was raised in spring 2007. Since that time the house has not been flooded.
- Flood flows in October 2008 encroached upon the house (within 3 feet of the structure) but did not reach the house.
- High groundwater levels result in saturation of soils, reducing infiltration rates into the subsurface during storm events. Previously observed groundwater flow rates across the property are relatively high (in the range of 30 mph), with direction of flow from east to west.
- The 24-inch CSP culverts installed by DOT&PF at the drive accesses do not function to convey runoff during storm events.
- The ditch dug to the east of the house on Lot [REDACTED] does not function adequately to intercept and convey floodwaters southwest to the existing 24-inch DOT&PF culverts.

- Sandbags were used in fall 2009 to try and keep floodwaters out of the well house. Sand bags were piled around the base of the well house and along the west side of the ditch dug to convey runoff to the south (towards the Richardson Highway and DOT&PF 24-inch CSP culvert). The sandbags were ineffective in keep floodwaters out of the well house. Floodwaters ponded in the ditch to the west of the structure.
- Ms. ██████ would like to stop flooding on the property so that she has the option of developing the lots further, including the potential relocation of her house or the construction of a new structure. She would also like to replace the existing failed septic system with a new system, without the risk of the new system failing as a result of continued flooding.

## CONCLUSION AND RECOMMENDATIONS

It is our opinion that this drainage pathway is an ephemeral stream channel draining to the existing stream crossing the west side of Lot █ (and draining to the existing 48-inch culvert in the Richardson Highway). Ms. ██████ testimony that flooding occurs along this drainage pathway several times a year (during snow melt and precipitation storm events) supports this assertion. The drainage pathway is likely the natural collection corridor for runoff originating on the mountains to the north of the property. The two seeps/waterfall observed on the north side of Lot █ were identified as locations where surface runoff flows onto the property, but it is likely there are additional sources of runoff draining to the property. High groundwater levels also contribute to increase runoff levels during storm events.

During the October 2006 flood, it is likely that backwatering through the existing 48-inch culvert in the Richardson Highway to the west of Lot █ resulted in more extensive flooding upstream. The elevated water surface elevation of the Lowe River and the relatively flat channel south of the highway may have caused significant tailwater levels resulting in downstream control of flows through the 48-inch culvert and the upstream channel section located on Lot █. The observed elevation difference of the rust lines at the inlet and outlet of the 48-inch culvert suggests repeated backwatering of the culvert. These potential downstream impacts cannot be changed through improvements on the property.

Constructing a berm along the east and south side of the existing structures (house and well house) may reduce the likelihood and duration of floodwaters reaching the structures during storm events. Care must be taken in the design of any berms to ensure upstream runoff is not trapped by the berms, creating a new flooding problem. Constructing berms may require importing substantial volumes of fill to provide an elevation difference that will be effective at reducing flood impacts. Due to potential seepage through the fill of any constructed berms, floodwaters may still reach the existing structures during large storm events. Constructing berms may also be an option for controlling runoff on Lot █ to facilitate development of that lot. Constructing any new structures away from the drainage pathway and on the higher ground closer to the mountains will reduce the chance of future flooding. A site plan showing an approximate location for constructing a berm that may reduce flooding impacts is included as Figure 2 (attached). A topographic survey and further design would be necessary to determine the quantities and elevations of fill required for a berm.

It is recommended that Ms. [REDACTED] continue discussions with the City of Valdez and DEC about relocating the septic system away from the existing location and drainage pathway to reduce the risk of future failure due to flood events. This would also allow for increasing the separation between the drinking water well and septic system. The AdvanTex systems have been used previously in Alaska with typically favorable results.

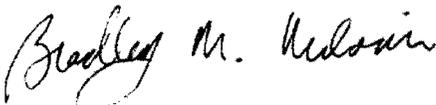
It is possible that the drinking water well on Lot [REDACTED] is intercepting surface water in addition to groundwater, which may have resulted in contamination during the October 2006 flood. The source of contamination in 2006 was failed septic systems upstream (east) of the [REDACTED] residence. Drilling a new well farther away from the natural drainage pathway may reduce the chance of future contamination resulting from surface water mixing with groundwater during storm events, if this is indeed occurring. This would also allow the well to be relocated out of the DOT&PF ROW onto Lot [REDACTED] and may allow for increased separation between the well and septic system.

The existing drinking well and a portion of the house on Lot [REDACTED] are currently located within the DOT&PF ROW. It is recommended that Ms. [REDACTED] contact DOT&PF to discuss grandfather rights for these structures to have them included as part of Lot [REDACTED]. This may require providing documentation that these structures were present at the existing locations prior to delineating ROW boundaries.

This field investigation was completed with the purpose of documenting the general hydrologic conditions at the [REDACTED] property, providing observations regarding actions that may reduce the impacts of future flooding, and identifying property improvements that may prove beneficial for the owner. The scope of this investigation is not sufficient to provide a basis for carrying out property improvements regarding flood mitigation. It is recommended that a comprehensive design, including a topographic survey, be completed before beginning any construction activities. All necessary environmental and construction permits will need to be secured before any substantial work on the property is initiated.

Please do not hesitate to contact me if you have any questions or need additional information.

Sincerely,  
DOWL HKM



Bradley M. Melocik, P.E., P.H.  
Hydrologic Engineer

Attachments:  
Property Plats  
Figure 1 - Hydrologic Features  
Figure 2 - Site Plan

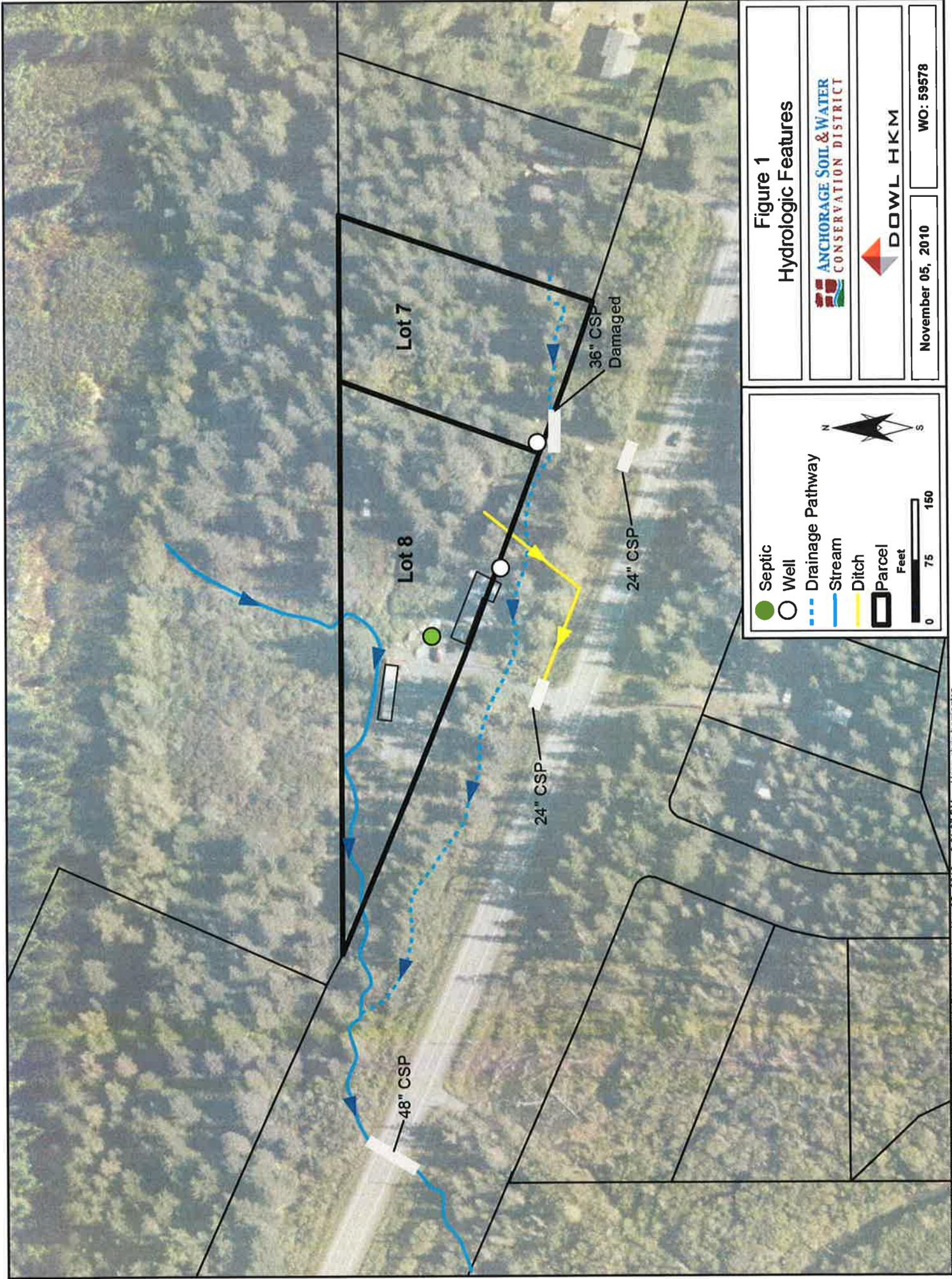


Figure 1  
Hydrologic Features



DOWL HKM

November 05, 2010

WO: 59578

● Septic  
○ Well  
--- Drainage Pathway  
— Stream  
— Ditch  
▭ Parcel  
 Feet  
 0 75 150

