

# **2017 Dry Weather Screening Report**

## **APDES Permit No. AKS052558**

### **FINAL REPORT**

November 2017

### **MUNICIPALITY OF ANCHORAGE**

### **WATERSHED MANAGEMENT SERVICES**

Prepared for: Municipality of Anchorage  
Project Management and Engineering Department  
Watershed Management Services

Prepared by: HDR Alaska, Inc.  
2525 C Street, Suite 500  
Anchorage, AK 99503

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## Table of Contents

1.0	Introduction .....	1
1.1	Background.....	1
1.2	Problem Definition.....	1
1.3	Screening Program .....	1
2.0	Project Summary.....	2
2.1	Watershed Prioritization.....	2
2.2	Outfall Sample Locations .....	3
2.3	Measured Parameters .....	6
2.4	Sampling Procedures.....	6
2.4.1	Field Preparation .....	6
2.4.2	Sampling Activities.....	11
2.4.3	Follow-Up Activities.....	11
2.5	Chain of Custody Records .....	12
2.6	Laboratory Sampling Procedures.....	12
3.0	Results .....	12
3.1	Field and Laboratory Results .....	12
3.2	Quality Assurance and Quality Control.....	14
3.3	Data Validation .....	14
4.0	Discussion.....	15
4.1	Threshold Exceedances .....	15
4.2	Observations from Reconnaissance Trips.....	17
4.2.1	Fish Creek .....	18
4.2.2	Rabbit Creek.....	18
4.3	Future DWS Sampling .....	19
5.0	References.....	20



## Tables

Table 1. Watershed Prioritization for the 2016-2020 MS4 Permit Cycle .....	2
Table 2. Outfalls Sampled During 2017 DWS Program .....	4
Table 3. Sampling Methods, Reporting Ranges, and Thresholds for Measured Parameters .....	6
Table 4. Sample Results for Field Parameters and Laboratory Analyses .....	13
Table 5. Replicate Sample Variance from Primary Sample .....	14
Table 6. Damaged, Clogged and Submerged Outfalls .....	18

## Figures

Figure 1. Monthly Precipitation in Anchorage, Summer 2017 .....	7
Figure 2. Daily Precipitation in Anchorage, Summer 2017 .....	9
Figure 3. MS4 Network 1104 Draining to Outfall 5-1 in Furrow Creek Watershed .....	16
Figure 4. MS4 Network 1294 Draining to Outfall 1335-1 in Eagle River Watershed .....	17

## Appendices

Appendix A	Watershed Maps
Appendix B	Field Notes
Appendix C	Field Data Forms
Appendix D	Outfall Sampling Photographs
Appendix E	Laboratory Analysis Reports



# 1.0 Introduction

## 1.1 Background

The U.S. Environmental Protection Agency (EPA) issued the Municipality of Anchorage (MOA) and the Alaska Department of Transportation and Public Facilities (ADOT&PF) a Municipal Separate Storm Sewer System (MS4) permit under the National Pollutant Discharge Elimination System (NPDES) in 1999. To meet the requirements of the permit, the MOA Watershed Management Services (WMS) initiated a Dry Weather Screening (DWS) program in 1999 to identify potential illicit discharges to the MS4. This program was conducted during the dry season (typically May through mid-July) each year through 2009.

The EPA re-issued the permit in 2009 prior to the State of Alaska receiving primacy to operate the NPDES program. The re-issued permit became effective February 1, 2010, under the administration of the Alaska Department of Environmental Conservation (ADEC) as an Alaska Pollutant Discharge Elimination System (APDES) MS4 permit. The permit expired on January 31, 2015, and ADEC re-issued the permit with revisions, effective August 1, 2015 (APDES Permit No. ASK052558). The expiration date of the current permit is July 31, 2020.

The APDES permit continues the requirement of DWS and subsequent follow-up actions to identify illicit discharges and associated pollutants to the MS4.

## 1.2 Problem Definition

The MS4 permit requires that the MOA implement an illicit discharge management program to reduce the unauthorized and illegal discharge of pollutants to the MS4 (Section 3.5). An illicit discharge is defined as any discharge to a MS4 that is not entirely composed of storm water.<sup>1</sup> Illicit discharges, such as those from industrial process wastewater, domestic wastewater, car wash water, and other sources, can inadvertently introduce pollutants both directly and indirectly to the storm sewer system. Flow from storm drain outfalls during dry weather is generally an indicator of illicit discharges to the MS4.

## 1.3 Screening Program

DWS is conducted to identify illicit discharges to the MS4 within the MOA. Identification is the first step to eliminating these illicit discharges. To identify potential illicit discharges, field screening and laboratory testing techniques are used to identify obvious pollutant concentrations in what is expected to be clean storm water. Guidance on illicit discharge screening identifies a list of 15 indicator parameters that can be used to confirm the presence of illicit discharges, noting that generally only 3 to 5 of these parameters need to be used to characterize the discharge for subsequent identification and elimination of the discharge (CWP and Pitt, 2004).

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<sup>1</sup> Excepting any discharges authorized under an NPDES permit and discharges resulting from fire-fighting activities (40 Code of Federal Regulations [CFR] §122.26(b)(2)).



The MS4 permit establishes minimum requirements for the DWS program (Section 3.5.4). The Quality Assurance Plan (QAP) for the MS4 permit monitoring programs includes the full DWS monitoring plan (MOA 2016a). The QAP, including the DWS methodology, was updated in 2016 to comply with the re-issued permit revisions.

The MS4 permit requires the MOA to sample dry weather flow from at least 15 storm water outfalls per year, and to have an additional 30 outfalls prioritized for sampling as alternates should a targeted outfall be dry. The permit also requires that sampled outfalls be geographically dispersed and represent all major land uses within the Municipality. The permit specifies screening for seven parameters: pH; total chlorine; detergents; total copper; phenols; fecal coliform bacteria; and turbidity. Benchmark or threshold exceedances are used to trigger MOA investigative action and provide information to support that action.

## 2.0 Project Summary

### 2.1 Watershed Prioritization

There are 12 watersheds within the area regulated by the MS4 permit. The DWS methodology established in the QAP includes a methodology to rank the 12 watersheds in order of priority for screening (MOA 2016a). Watersheds are prioritized at the beginning of each five-year permit cycle. The results of the watershed prioritization for the current permit cycle are described in the 2016 DWS Report (MOA 2016b) and summarized in Table 1.

**Table 1. Watershed Prioritization for the 2016-2020 MS4 Permit Cycle**

Rank	Watershed
1	Ship Creek
2	Chester Creek
3	Campbell Creek
4	<b>Fish Creek</b>
5	<b>Furrow Creek</b>
6	Rabbit Creek
7	<b>Eagle River</b>
8	Hood Creek
9	Peters Creek
10	Potter Creek
11	Mirror Creek
12	Glacier Creek

**Note:** Bold watersheds were sampled in 2017.

The Fish Creek, Furrow Creek, Rabbit Creek, and Eagle River watersheds were investigated in 2017. Only one potentially suitable outfall in the Rabbit Creek watershed was identified during reconnaissance (see Section 2.2 Outfall Sample Locations), so the next watershed in the

prioritized list, Eagle River, was also investigated. Maps of the investigated watersheds are provided in Appendix A.

## 2.2 Outfall Sample Locations

The following procedures are used to identify the 15 outfalls to be examined within the watersheds:

1. The DWS program will only evaluate samples from outfalls that both: 1) fit the definition of an outfall provided at 40 CFR 122.25(b)(9), and 2) are owned by the MOA or ADOT&PF. Outfalls fitting these criteria will be preliminarily identified from the MOA hydrography geodatabase (HGDB; MOA 2017a).<sup>2</sup> Samples from pipes or ditches that are privately owned or from pipes that convey streamflow will not be considered part of the DWS program. Additionally, sedimentation basin outfalls and outfalls emptying into them will not be considered for sampling in this program.
2. Prior to field reconnaissance each year, the list of complaints received by MOA that involve discharges into or from the MS4 will be consulted to identify any associated outfalls for potential sampling.<sup>3</sup>
3. Each of the three watersheds will be divided approximately in half (an upper watershed and a lower watershed). If there are not five “complaint” outfalls within the watershed, outfalls will be added beginning at the mouth of the lower half and the beginning of the upper half of the urbanized watershed until five sample sites have been identified. These are the primary sampling sites within that watershed. The same process will be used to identify ten alternate outfall sites in each watershed.
4. An alternate site will be selected for sampling when a primary site is dry or is completely submerged when the field team arrives to sample. Other reasons that require an alternate site to be sampled will be assessed on a case-by-case basis.
5. Unresolved complaint sites will have the highest priority for sampling, then sampling will begin at the furthest downstream outfall identified for sampling.

Using these procedures, sixteen outfalls within the Fish Creek, Furrow Creek, and Eagle River watersheds were selected for sampling in 2017. Prior to any field effort, potentially suitable outfalls were identified through a geographic information system (GIS) analysis using the HGDB. The field team performed reconnaissance trips to locate the targeted sites and ensure the outfalls were otherwise suitable for sampling (safe legal access, flowing water during dry weather conditions, etc.). To evenly distribute the sampled outfalls, five outfalls in each watershed were sampled (a sixth outfall in the Furrow Creek watershed that had been selected as an alternate site was also inadvertently sampled).

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<sup>2</sup> As of 2017, MOA Watershed Management Services updates the HGDB weekly. The most current version of the HGDB is available for download at <http://anchoragestormwater.com/datalibrary.html>. HDR downloaded the HGDB prior to reconnaissance activities on May 15, 2017 and following completion of sampling activities on October 6, 2017.

<sup>3</sup> No outfalls in the targeted watersheds were associated with a known or suspected illicit discharge between 2012 and 2016 (MOA 2017b).



The intent of the reconnaissance trips was also to identify 10 alternate outfalls within each watershed for a total of 30 alternates as required by the MS4 permit. The QAP allows for outfalls to be passed over for sample consideration if the team cannot access the outfall due to lack of safe access or private property concerns. Additionally, although the HGDB for the watersheds in the Anchorage bowl is fairly accurate, the precise location and nature of an outfall is not always provided in the GIS data. For example, many outfalls drain into a culvert passing under a road, or are open drainage ditches. Lack of safe legal access, poor outfall condition that precludes collection of an isolated sample of flow from the MS4, or lack of flow during reconnaissance, disqualify the outfall from sampling consideration. These conditions were recorded and the team moved to the next outfall. Notes recorded during reconnaissance were recorded in field log books (Appendix B).

Only 16 potential alternate outfalls were identified within the four watersheds (one on Rabbit Creek, 12 on Fish Creek, and three on Eagle River). The 41 alternate outfalls in the Ship Creek, Chester Creek, and Campbell Creek watersheds identified for the 2016 program were considered suitable alternates for the 2017 program.

In addition to the 16 outfalls sampled within the targeted watersheds, one outfall to Campbell Creek was sampled. Outfall 105-1 was sampled during the 2016 program, and the sample exceeded the program threshold for fecal coliform. The exceedance was not identified by project staff and no follow-up sampling was conducted in 2016. Outfall 105-1 was resampled for all parameters in 2017.

Table 2 lists the outfalls sampled in 2017. Outfall codes are numbers assigned to all nodes in the HGDB. All other outfalls investigated during reconnaissance and sampling activities are listed in Appendix B. All outfalls investigated are shown on the watershed maps presented in Appendix A.

**Table 2. Outfalls Sampled During 2017 DWS Program**

Outfall Code	Latitude	Longitude	Location Description and Notes
<b>Fish Creek</b>			
682-1	61.19586	-149.92836	West bank, north of LaHonda Dr. Outfall is in concrete headwall south of cross-culvert conveying creek below Forest Park Dr. Water in outfall level with creek, visibly flowing. Sample collected inside outfall to isolate outflow.
1287-994	61.19336	-149.92501	East bank, at Little Park on Willow St. Approximately 2 inches of sediment in bottom of pipe at outfall.
462-1	61.19069	-149.93133	West bank, on Fish Creek Trail at W. 33 <sup>rd</sup> Ave. Outfall flows into channel through wetland area to creek. Approximately 5 inches of water in channel, flowing slowly.
228-1	61.18615	-149.93433	West bank, at Fish Creek Park on E. Turnagain Blvd. Steady flow. Orange flocculent in outfall and flow path. Collar of outfall is corroded.
1287-1858-1	61.18471	-149.87800	Southeast corner of pond at Cuddy Family Midtown Park. Good condition. Not in HGDB, HDR assigned temporary ID in 2013.



Outfall Code	Latitude	Longitude	Location Description and Notes
<b>Furrow Creek</b>			
5-1	61.10603	-149.88295	North bank, at Johns Park. Outfall is at social trail off paved path south of Botanical Cir. Well-defined flow path to creek. Steady flow with some foam during reconnaissance visit.
1345-1	61.10855	-149.87100	North bank, at Division St. Outfall discharges into flow path approximately 175 feet north of creek. Outfall is in good condition. Flow path routed through culvert under trail along creek; culvert is slightly eroded. Steady flow, slight odor of laundry detergent during reconnaissance visit.
1359-1	61.10855	-149.86822	South bank, at Beachcomber Dr. Sod and grass are overhanging outfall. Outfall is in good condition. Steady flow, slight metallic odor during reconnaissance visit.
306-1	61.10813	-149.86435	South bank, at Huffman Rd. and Old Seward Hwy. Outfall is in concrete headwall below traffic circle. Flow path through wetland to creek. Trickle flow.
402-1	61.11274	-149.83145	Northwest corner of wetland at private park at Alderwood Loop and Woodway Dr. No outfall at location shown in HGDB. Sample collected from EOP 20 feet to west, mapped in HGDB as network node but not as outfall. Outfall in good condition.
332-1	61.11240	-149.83083	Southeast corner of wetland at private park at Alderwood Loop And Woodway Dr. No outfall at location shown in HGDB. Sample collected from EOP 30 feet to west, mapped in HGDB as network node but not as outfall. Outfall in good condition.
<b>Eagle River</b>			
<b><i>Eagle River Mainstem</i></b>			
1335-1	61.29961	-149.54223	North bank, at pedestrian tunnel below Eagle River Loop Rd. Outfall in concrete headwall, discharges to flow path constructed with rock gabions. Water flows for approximately 100 feet in flow path, then infiltrates into gabions. Outfall and flow path in good condition.
303-1	61.29799	-149.53480	North bank, outfall is along trail below Little Cape Cir. EOP is located at terminus of mapped closed conveyances and flow path conveys discharge to west and south (not to south as mapped in HGDB). High flow. Outfall in good condition.
1417-1	61.29864	-149.51362	North bank, south of Driftwood Bay Dr. at Meadow Park Cir. Well-defined flow path below EOP. Steady flow. Outfall in good condition.
<b>Eagle River</b>			
<b><i>Meadow Creek</i></b>			
646-71	61.31722	-149.55439	South bank, west of Chain of Rock St. Outfall is approximately 150 feet farther downstream than shown on HGDB. Good condition.
1375-99	61.31725	-149.55412	North bank, west of Chain of Rock St. Unnamed outfall discharging into Meadow Creek. High flow. No outfall or connected network shown on HGDB (as of October 6, 2017), HDR assigned temporary ID in 2013. No evidence of network observed up Chain of Rock St. to Kahiltna Dr.
<b>Campbell Creek</b>			
105-1	61.17242	-149.86760	South bank, east of Old Seward Hwy. across from the Peanut Farm. Outfall appears to have been reconstructed since last sampled in 2016. Good condition.



## 2.3 Measured Parameters

Table 3 lists the screening parameters required by the permit and the sampling methods, reporting ranges, and the program thresholds for each parameter. Appendix E, DWS Monitoring Plan, of the QAP (MOA 2016a) provides rationale for screening parameter thresholds. The thresholds for all parameters were maintained from the previous MS4 permit cycle (MOA 2012). Thresholds are established at concentrations sufficiently different from clean storm water to detect potential illicit discharges. In a guidance manual, the Center for Watershed Protection (CWP) and Robert Pitt (2004) recommend benchmarks (thresholds) orders of magnitude higher than ambient storm water quality to reduce the incidences of false positives. Thresholds in Table 3 were established based on available environmental data and field test kit specifications. Values below the threshold are considered to be within an acceptable range for background concentrations. Values at or above the threshold concentration for a parameter indicate that the parameter may be above background concentrations. Outfalls with results that exceeded the threshold (or are outside the pH range) for one or more of the pollutant indicators are targeted for follow-up action.

**Table 3. Sampling Methods, Reporting Ranges, and Thresholds for Measured Parameters**

Parameter	Method	Reporting Range	Threshold
pH	pH test strips, YSI 556 hand-held probe	0 - 14 STD	≤ 4 or ≥9 STD
Total Chlorine	LaMotte Total Chlorine Octa-Slide Bar kit (3314) (EPA 330.5)	0.1 - 6.0 mg/L	≥ 1.0 mg/L
Detergents	Hach model DE-1 Toluidine blue colorimetric (Analytical Chemistry Method #38-791)	0.05 – 5.0 mg/L	≥ 1.0 mg/L
Total Copper	LaMotte model EC-70 Cuprizone Color Chart	0.05 – 4.0 mg/L	≥ 1.0 mg/L
Total Phenols	LaMott 4 Amino Anti-Pyrene (4 AAP) colorimetric (SM 5530C)	0.1 - 1 mg/L	≥ 0.5 mg/L
Turbidity	Hach 2100P Turbidimeter	0.1 - 1,000 NTU	≥ 250 NTU
Fecal Coliform	Standard Methods 9222D	1 colony/100 mL – too numerous to count	≥ 400 colonies/100 mL

## 2.4 Sampling Procedures

Sampling procedures were carried out in accordance with the methodology outlined in the QAP. No changes from previous years' sampling procedures or deviations from the QAP were required in 2017.

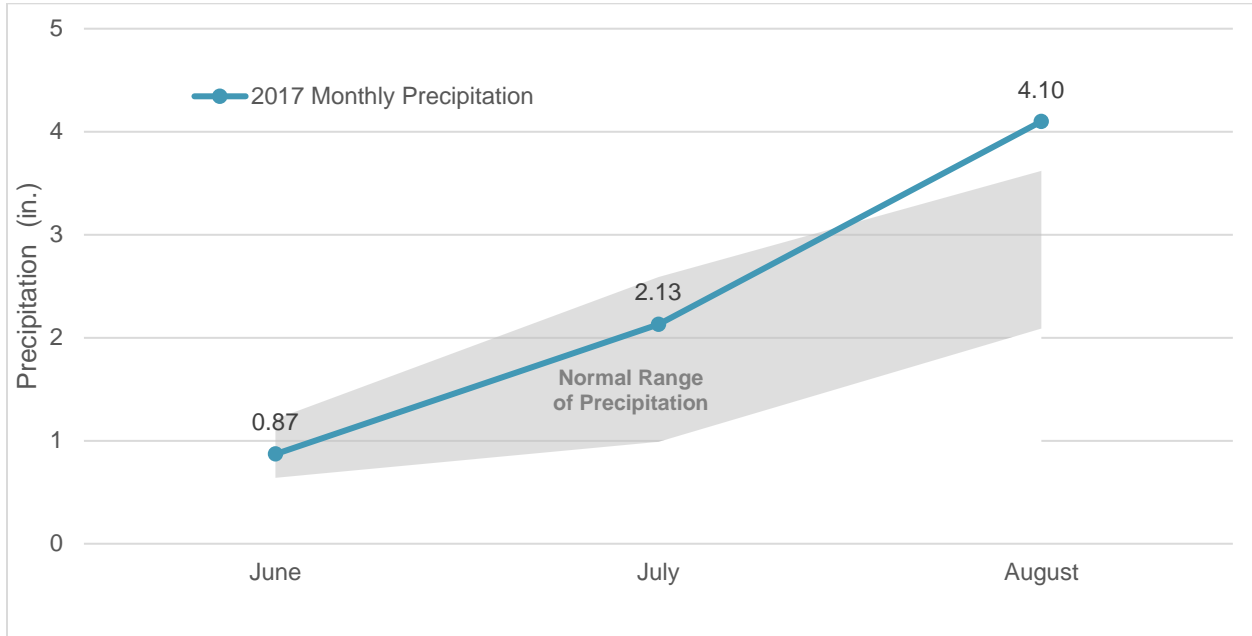
### 2.4.1 Field Preparation

The MS4 permit stipulates that DWS should be conducted between June 1 and August 30 of each year. Precipitation in the Anchorage area in summer 2017 was normal. The total precipitation that fell in June and July was within the normal range, and the total precipitation for August was higher than normal (Figure 1).

Field sampling was conducted after at least 48 hours of dry weather following a storm event that created runoff in the MS4. Recent precipitation recorded by the National Weather Service at the Ted Stevens Anchorage International Airport was consulted to determine appropriate sample

timing when necessary (NWS 2017a). Field sampling occurred on four days in June and August. Figure 2 shows the daily precipitation and 48 hour running total precipitation for summer 2017. The dates when field sampling occurred are indicated by the black arrows.

**Figure 1. Monthly Precipitation in Anchorage, Summer 2017**



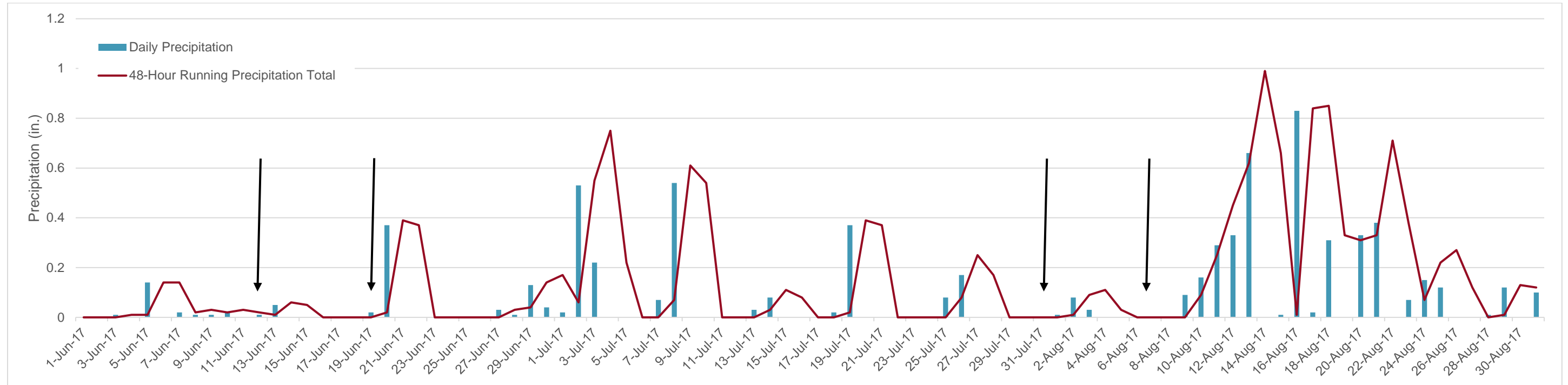
**Notes:** 2017 monthly precipitation data recorded at Ted Stevens International Airport. Source: NWS 2017b. Normal range of precipitation shown is the range between the 25<sup>th</sup> and 75<sup>th</sup> percentiles of monthly precipitation averages recorded at the Ted Stevens International Airport for the 30 year period from 1981 to 2010. Source: NOAA 2016.



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Figure 2. Daily Precipitation in Anchorage, Summer 2017



**Notes:** Daily precipitation data recorded at Ted Stevens International Airport. Source: NWS 2017b.  
Black arrows indicate sampling dates.



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The field team conducted calibration and equipment blank analyses at the beginning of each day of sampling prior to entering the field. This equipment blank analysis examined each test kit by testing deionized water provided by SGS North America, Inc (SGS), the laboratory conducting fecal coliform analysis. The calibration and field test kit equipment blank data were recorded on the field data forms and are provided in Appendix C.

Each day before departing for field sampling the field team conducted a safety briefing. The team took the following items into the field:

- List of targeted outfalls (primary and alternate sites)
- GPS-enabled iPad loaded with HGDB and aerial imagery
- Field forms with guidelines
- Water quality analysis protocols (included in the QAP)
- Field sampling supplies
- Personal protective equipment
- YSI 556 hand-held meter
- LaMotte and Hach water quality field test kits
- Laboratory-supplied fecal coliform bottles
- Hach turbidimeter
- pH test strips
- Job Hazard Analysis and Travel Safety Forms

#### **2.4.2 Sampling Activities**

Sampling activities conducted at each outfall consisted of recording visual observations about the condition of the outfall and the discharging water, taking photographs of the outfall, measuring or qualitatively describing the flow of the discharging water, and collecting a sample for laboratory analysis of fecal coliform and two grab samples to measure all other parameters using field test kits or water quality meters. Detailed sampling methodology, including instructions for the field test kits, is included in the QAP (MOA 2016a).

The sample bottle for laboratory analysis of fecal coliform and grab samples for field test kits were filled directly from the outfall flow. The two grab samples were collected using a clean 750-milliliter (mL) amber glass bottle (for the detergents test kit) and a clean 1-liter HDPE plastic bottle (for all other field test kits and measurements). Field test kits were recorded as soon as possible after sample collection, and field measurements were recorded and compared against the thresholds described in Table 3.

The field team conducted replicate sample analyses at a rate of at least 15 percent per day per parameter (minimum of one per day). The field team also collected replicate samples for the laboratory analysis of fecal coliform at a rate of 15 percent per day (minimum of one per day).

Completed data sheets are included as Appendix C, and photographs of sampled outfalls are included as Appendix D.

#### **2.4.3 Follow-Up Activities**

To avoid repeating the missed sample exceedance in 2017, HDR provided results of the field measurements to the MOA WMS immediately following every sampling day. SGS provided

results of the fecal coliform analysis to HDR as soon as the results were available (typically within 3 days), and HDR provided these results to the MOA WMS.

The QAP outlines notification procedures and follow-up activities to be performed when a sample exceeds the program threshold for any parameter (MOA 2016a). Samples from two outfalls exceeded the threshold for fecal coliform in 2017. Per the QAP, HDR notified the MOA WMS of the exceedances as soon as the results were available, and field teams collected follow-up samples for fecal coliform analysis on the next suitable day for sampling. The follow-up samples were within the acceptable range for fecal coliform, and no further follow-up activities were required.

## **2.5 Chain of Custody Records**

The field team leader completed a chain of custody record which included each sample collected during a single field day for sample tracking. The original form was delivered with the samples to SGS. Copies of the chain of custody records are included in the laboratory analysis reports provided in Appendix E.

## **2.6 Laboratory Sampling Procedures**

Fecal coliform samples were collected in laboratory-supplied sample bottles. The project name, sample ID, and sample date and time were clearly marked on the sample bottle labels. Samples were stored in a cooler with gel ice and a temperature blank while in the field. The samples were delivered to SGS within six hours to satisfy the short hold time of the fecal coliform samples. Fecal coliform was analyzed using standard method 9222D.

SGS provided results of the laboratory analysis to HDR via email or telephone immediately after the analysis was complete (approximately within 24 hours). The expedited turn-around time allowed for expedited follow-up sampling in the event of an exceedance of the fecal coliform threshold. SGS provided a full report of the analysis through Engage, an on-line document portal, within a week.

# **3.0 Results**

## **3.1 Field and Laboratory Results**

The results of the 2017 DWS sampling effort adds to the data set of previous years' sampling efforts (MOA 2008, 2009, 2011, 2012b, 2013, 2014, 2016c). The 2017 sample results program are provided in Table 4. Complete laboratory analysis reports are provided in Appendix E.

Two outfalls (Furrow Creek 5-1 and Eagle River 1335-1) exceeded the threshold for fecal coliform. Follow-up sampling at these outfalls was conducted on the next suitable day, and follow-up samples did not exceed the threshold for fecal coliform. The exceedances and follow-up sampling events are discussed further in Section 4.1. No parameter at any other outfall exceeded the assigned threshold (shown in Table 3).



**Table 4. Sample Results for Field Parameters and Laboratory Analyses**

Watershed	Outfall ID	Date	Flow	pH	Total Chlorine (mg/L)	Detergents (mg/L)	Total Phenols (mg/L)	Turbidity (NTU)	Total Copper (mg/L)	Fecal Coliform (colonies/100mL)
Fish Creek	682-1	6/12/2017	Low	7.0	<0.5	<0.05	<0.1	1.22	<0.05	1.0
Fish Creek	462-1	6/12/2017	Medium	7.0	<0.5	<0.05	<0.1	2.57	<0.05	4.0
Fish Creek	228-1	6/12/2017	Medium	7.0	<0.5	<0.05	<0.1	10.7	<0.05	ND
Fish Creek	1287-994	6/12/2017	Low	6.0 R = 6.0	<0.5 R <0.5	<0.05 R <0.05	<0.1 R <0.1	169 R = 160	<0.05 R <0.05	ND R = ND
Fish Creek	1287-1858-1	6/12/2017	High	7.0	<0.5	<0.05	<0.1	7.47	<0.05	5.0
Furrow Creek	5-1	6/12/2017	Low	7.0	<0.5	<0.05	<0.1	208	<0.05	<b>890</b>
		6/19/2017 (Resample)	-	-	-	-	-	-	-	4.9 R = 6.6
Furrow Creek	1345-1	6/12/2017	Medium	7.0	<0.5	<0.05	0.2	1.07	<0.05	169
Furrow Creek	1359-1	6/12/2017	High	7.0 R = 7.0	<0.5 R <0.5	<0.05 R <0.05	<0.1 R <0.1	7.74 R = 7.94	<0.05 R <0.05	65 R = 320
Furrow Creek	306-1	6/12/2017	Low	7.0	<0.5	0.45	0.3	29.1	<0.05	4.0
Furrow Creek	402-1	6/12/2017	Medium	8.0	<0.5	<0.05	<0.1	2.44	<0.05	ND
Furrow Creek	332-1	6/12/2017	Low	8.0	<0.5	<0.05	<0.1	2.72	<0.05	4.0
Campbell Creek	105-1	6/12/2017	Low	7.0 R = 7.0	<0.5 R <0.5	0.2 R = 0.15	<0.1 R <0.1	89.2 R = 113	<0.05 R <0.05	6.0 R = 5.0
Eagle River	303-1	8/1/2017	High	7.0	<0.5	<0.05	<0.1	0.25	<0.05	ND
Eagle River	1417-1	8/1/2017	Medium	7.0	<0.5	<0.05	<0.1	0.48	<0.05	ND
Eagle River	1375-99	8/1/2017	High	7.0	<0.5	<0.05	<0.1	0.49	<0.05	ND
Eagle River	646-71	8/1/2017	High	7.0	<0.5	<0.05	<0.1	0.40	<0.05	ND
Eagle River	1335-1	8/1/2017	Medium	7.0 R = 7.0	<0.5 R <0.5	0.05 R = 0.05	<0.1 R <0.1	1.45 R = 1.62	<0.05 R <0.05	<b>690</b> <b>R = 410</b>
		8/7/2017 (Resample)	-	-	-	-	-	-	-	19 R = 18

**Notes:** R = replicate sample; ND = not detectable

**Bold** results are exceedances. *Italicized* results are notably higher than other sites, but are not exceedances.



### 3.2 Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) procedures were followed according to the QAP (MOA 2016a). The procedures included analytical checks (field replicates, equipment blanks), instrument calibration, and procedures to assess data for precision, accuracy, representativeness, comparability, and completeness.

SGS is certified by the EPA and the Alaska Drinking Water Program and has an approved QA/QC program. Analytical methods and testing procedures were in adherence with the QAP (MOA 2016a) and standard methods (APHA 2005).

### 3.3 Data Validation

Verification analyses for laboratory parameters were conducted by SGS. The data review was focused on criteria for the following QA/QC parameters and their overall effects on the data:

- Data validation
- Sample handling (chain of custody)
- Holding time compliance
- Field replicate comparison

Samples were collected from the water flowing from the end of pipe at the outfall to avoid mixing with the stream water. Field analyses met the sensitivities prescribed in the QAP (MOA 2016a).

Replicate samples were collected at one outfall in each watershed to determine field precision and variability. Additionally, replicate fecal coliform analysis samples were collected at the two outfalls where follow-up sampling occurred following a threshold exceedance. For the field test kits, the QAP requires that percent difference between primary and replicate samples is calculated. The results need to be within the precision of the equipment used. For the fecal coliform samples analyzed at the laboratory, the QAP requires that relative percent difference (RPD) be calculated between the primary and replicate samples and be within 60%. The variance between the primary and replicate samples are presented in Table 5.

**Table 5. Replicate Sample Variance from Primary Sample**

Parameter	QAP standard	Fish Creek 1287-994	Furrow Creek 1359-1	Eagle River 1335-1	Campbell Creek 105-1	Furrow Creek 5-1 (Resample)	Eagle River 1335-1 (Resample)
pH	± 0.2 pH units	0 pH units	0 pH units	0 pH units	0 pH units	-	-
Total Chlorine	30%	0%	0%	0%	0%	-	-
Detergents	30%	0%	0%	0%	25%	-	-
Total Phenols	30%	0%	0%	0%	0%	-	-
Turbidity	± 1 NTU	<b>9 NTU</b>	0.20 NTU	0.17 NTU	<b>23.8 NTU</b>	-	-
Total Copper	30%	0%	0%	0%	0%	-	-



Parameter	QAP standard	Fish Creek 1287-994	Furrow Creek 1359-1	Eagle River 1335-1	Campbell Creek 105-1	Furrow Creek 5-1 (Resample)	Eagle River 1335-1 (Resample)
Fecal Coliform	60%	0%	<b>392%</b>	41%	17%	35%	5%

**Note:** Bold values indicate replicate variance that exceeds the QAP standard.

Most of the results fall within the QAP standards. Two QC sampling locations exceeded the variance threshold for turbidity, and one QC sampling location exceeded the variance threshold for fecal coliform.

Fish Creek 1287-994 and Campbell Creek 105-1 exceeded the variance threshold for turbidity. The QAP standard for turbidity is based on the precision of the turbidity meter. However, this does not take into consideration the natural variance of turbidity within storm water. Turbidity varies, to some degree, on a regular basis and more turbid water has the potential to vary more widely as the suspended particles continually move throughout the sample, resulting in different readings even when the sample is retested. The primary and replicate samples that exceeded the variance threshold for turbidity were more turbid than the primary and replicate samples that did not exceed the variance threshold. The primary and replicate samples at Fish Creek 1287-994 and Campbell Creek 105-1 were below the exceedance threshold for turbidity, and were not flagged for follow-up action.

Furrow Creek 1359-1 exceeded the variance threshold for fecal coliform. Fecal coliform is widely variable and large variations are expected. The primary and replicate samples were below the exceedance threshold for turbidity, and this result was not flagged for follow-up action.

Sample custody was adequately maintained for the samples. The coolers transporting the fecal coliform samples were held at temperatures of less than 10°C. The holding times were met for all samples.

## 4.0 Discussion

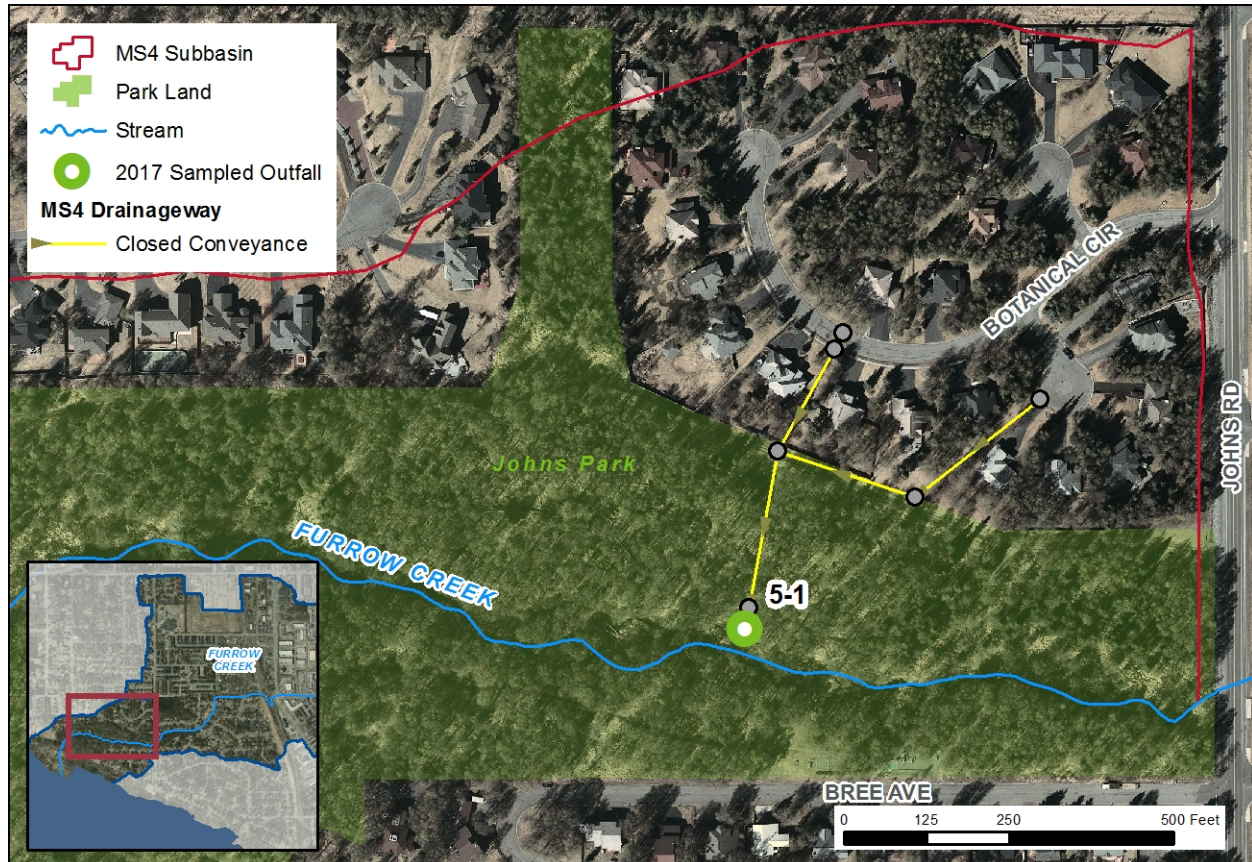
### 4.1 Threshold Exceedances

The result of the fecal coliform analysis of the sample collected on June 12, 2017 at Outfall 5-1 was 890 col/100 mL, an exceedance of 490 col/100 mL above the program threshold (400 col/100 mL). Outfall 5-1 is located on the north bank of Furrow Creek in Johns Park (Figure 3). SGS transmitted the results of the fecal coliform analysis to HDR on June 15. Per the QAP, a follow-up sample for fecal coliform analysis was collected from Outfall 5-1 on the next suitable day, June 19. The results of the laboratory analysis of the primary and replicate follow-up samples (4.9 col/100 mL and 6.6 col/100 mL) were below the program threshold and no further follow-up action was required.



Outfall 5-1 is connected to network 1104, which drains Botanical Circle and Hansa Rose Circle within the Botanical Garden neighborhood off Johns Road. A paved path along the north edge of Johns Park and many social trails through the woods on both sides of Furrow Creek are regularly used by pedestrians, cyclists, and dog walkers.

**Figure 3. MS4 Network 1104 Draining to Outfall 5-1 in Furrow Creek Watershed**



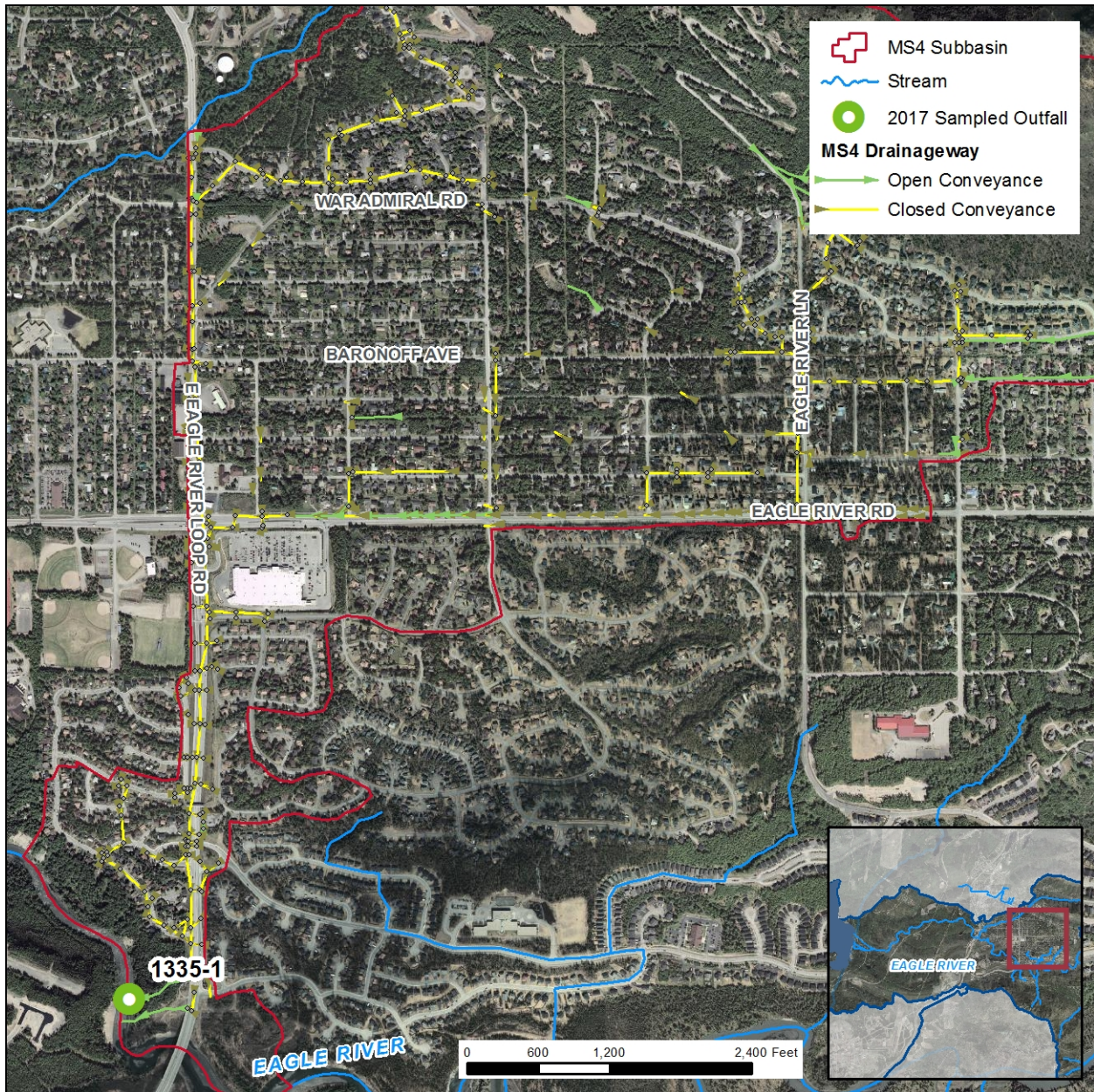
Both the primary and replicate samples collected at Outfall 1335-1 on August 1, 2017 exceeded the program threshold for fecal coliform. The result of the fecal coliform analysis of the primary sample was 690 col/100 mL, and the replicate was 410 col/100mL. Outfall 1335-1 drains to Eagle River west of Eagle River Loop Road (Figure 4). SGS transmitted preliminary results to HDR on August 3, and a follow-up sample for fecal coliform analysis was collected on August 7. The results of the laboratory analysis of the primary and replicate follow-up samples were below the program threshold (19 col/100 ml and 18 col/100 mL, respectively) and no further follow-up action was required.

Outfall 1335-1 is connected to network 1294, which drains subbasin 1294. At 999.7 acres, subbasin 1294 is the largest MS4 subbasin in the Eagle River watershed. Land use in the subbasin is predominantly residential, with one large commercial lot containing the Walmart Supercenter at the southeast corner of Eagle River Road and Eagle River Loop Road. The subbasin also includes the southern slopes of Mount Magnificent within Chugach State Park. Outfall 1335-1 discharges north of the pedestrian underpass below Eagle River Loop Road into



a flow path constructed with rock gabions. This storm water control feature was constructed and is maintained by the ADOT&PF Maintenance and Operations Division.

**Figure 4. MS4 Network 1294 Draining to Outfall 1335-1 in Eagle River Watershed**



## 4.2 Observations from Reconnaissance Trips

During reconnaissance trips prior to sampling, 60 outfalls to Fish, Furrow, Rabbit, and Campbell creeks and Eagle River were investigated. Of these, 20 were determined to be not suitable for sampling. Reasons that outfalls were deemed not suitable include that they were not flowing during dry weather conditions, that the network connected to the outfall conveys both storm water and a segment of piped creek, that they were outfalls to or from sedimentation basins, that they were damaged or submerged, and/or that access was limited due to unsafe conditions



or private property. Outfalls that were observed to be clogged, damaged, or submerged and may require maintenance are listed in Table 6. All outfalls investigated in 2017 are listed in Appendix B.

**Table 6. Damaged, Clogged and Submerged Outfalls**

Watershed	Outfall Number	Type of Issue	Notes
Fish Creek	684-1	Damaged	EOP is corroded and unravelling.
Fish Creek	298-1	Unknown – Damaged?	Could not locate outfall. May have been crushed below large mayflower tree?
Fish Creek	27-1	Damaged	Outfall is perched approximately 12 feet within extensive erosion below EOP. Further erosion may compromise outfall.
Fish Creek	32-1	Partially Buried	Outfall is partially buried behind a large willow. A flow path was observed incised through sediment, suggesting outfall flows during storm events, but potential exists for outfall to become completely buried.
Fish Creek	1259-1	Submerged	Partially submerged, cannot sample.
Fish Creek	1259-2	Submerged	Partially submerged, cannot sample.
Fish Creek	7-1	Submerged	Partially submerged, could not sample in 2017. Construction along W. 36 <sup>th</sup> will include replacement of outfall, may be resolved in future years.
Fish Creek	686-167	Submerged	Partially submerged, cannot sample.
Furrow Creek	407-2	Potentially Unauthorized Alteration	Outfall is located in backyard of private residence. Homeowner has constructed a large structure over outfall, inhibiting access to EOP and preventing investigation and sample collection.

Field teams also noted areas where recent construction may have resulted in changes to the storm system that are not reflected on the HGDB. The HGDB should be updated in these locations to ensure that DWS, as well as any other MS4 permit compliance activities, can be conducted in the future. These areas include:

**4.2.1 Fish Creek**

- Turnagain Boulevard Upgrade – 35<sup>th</sup> Avenue to Spenard Road. The HGDB may need to be updated to reflect any associated rerouting and/or changes to the MS4 network.
- Northwood Park. Extensive clearing of vegetation and recent ground disturbance was observed on the north portion of Northwood Park. Outfall 137-1 could not be accessed during reconnaissance due to an apparent homeless camp in the area. The HGDB may need to be updated if any future upgrades or maintenance includes modification to the MS4 network.

**4.2.2 Rabbit Creek**

- East 140<sup>th</sup> Avenue and Buffalo Street. Outfall 691-1 could not be located during reconnaissance. The date of the HGDB mapping (as of October 2017) is 2007. The



HGDB may need to be update to reflect any rerouting and/or changes to the MS4 network since 2007.

Outfalls in the Fish Creek watershed may be sampled again during the current permit cycle. By ensuring that the HGDB contains up-to-date and accurate information on the MS4, the MOA will facilitate prompt response to reports of illicit discharges and thorough dry weather screening in the future.

GIS analysis of the outfalls from the MS4 in the Rabbit Creek watershed shows few outfalls suitable for sampling for the DWS program, primarily due to a lack of closed conveyances from which an isolated sample of storm water can be collected. No outfalls in the Rabbit Creek watershed were sampled under the DWS program in 2017. The HGDB mapping of the MS4 network for the Rabbit Creek watershed has been referred to WMS for updating. Should updates to the HGDB show outfalls that may be suitable for sampling, those outfalls would be targeted for sampling within the current permit cycle.

### **4.3 Future DWS Sampling**

Outfalls in the Hood Creek, Peters Creek, and Potter Creek watersheds will be investigated and targeted for sampling in 2018. Outfalls in the Hood Creek and Potter Creek watersheds were last sampled in 2013, when only one outfall in each watershed was found to be suitable for sampling (MOA 2013). There are no outfalls in the Peters Creek watershed mapped in the HGDB.<sup>4</sup> It is not anticipated that 15 outfalls that are suitable for sampling will be identified between these three watersheds. As in prior years when additional outfalls are required, the next watersheds in the prioritized list will be investigated. There are no outfalls in the Mirror Creek or Glacier Creek watersheds mapped in the HGDB,<sup>5</sup> and thus outfalls in the Ship Creek and Chester Creek watersheds will be investigated again in 2018.

Field notes from previous years' reconnaissance and sampling activities in these watersheds will be reviewed prior to field activities in 2018 to guide selection of outfalls for sampling. Outfalls in the Ship Creek and Chester Creek watersheds that were sampled in 2016 will not be selected for sampling in 2018.

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<sup>4</sup> As of October 6, 2017.

<sup>5</sup> As of October 6, 2017.

## 5.0 References

- American Public Health Association (APHA). 2005. Standard methods for the examination of water and wastewater, 21st edition. Washington, D.C.
- CWP and Pitt, R. 2004. Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments. Prepared by the Center for Watershed Protection and Robert Pitt, University of Alabama. October, 2004.
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———. 2017b. Observed Weather Reports for Anchorage, Alaska, June, July and August 2017. Accessed at <http://w2.weather.gov/climate/index.php?wfo=pafc> on October 17, 2017.



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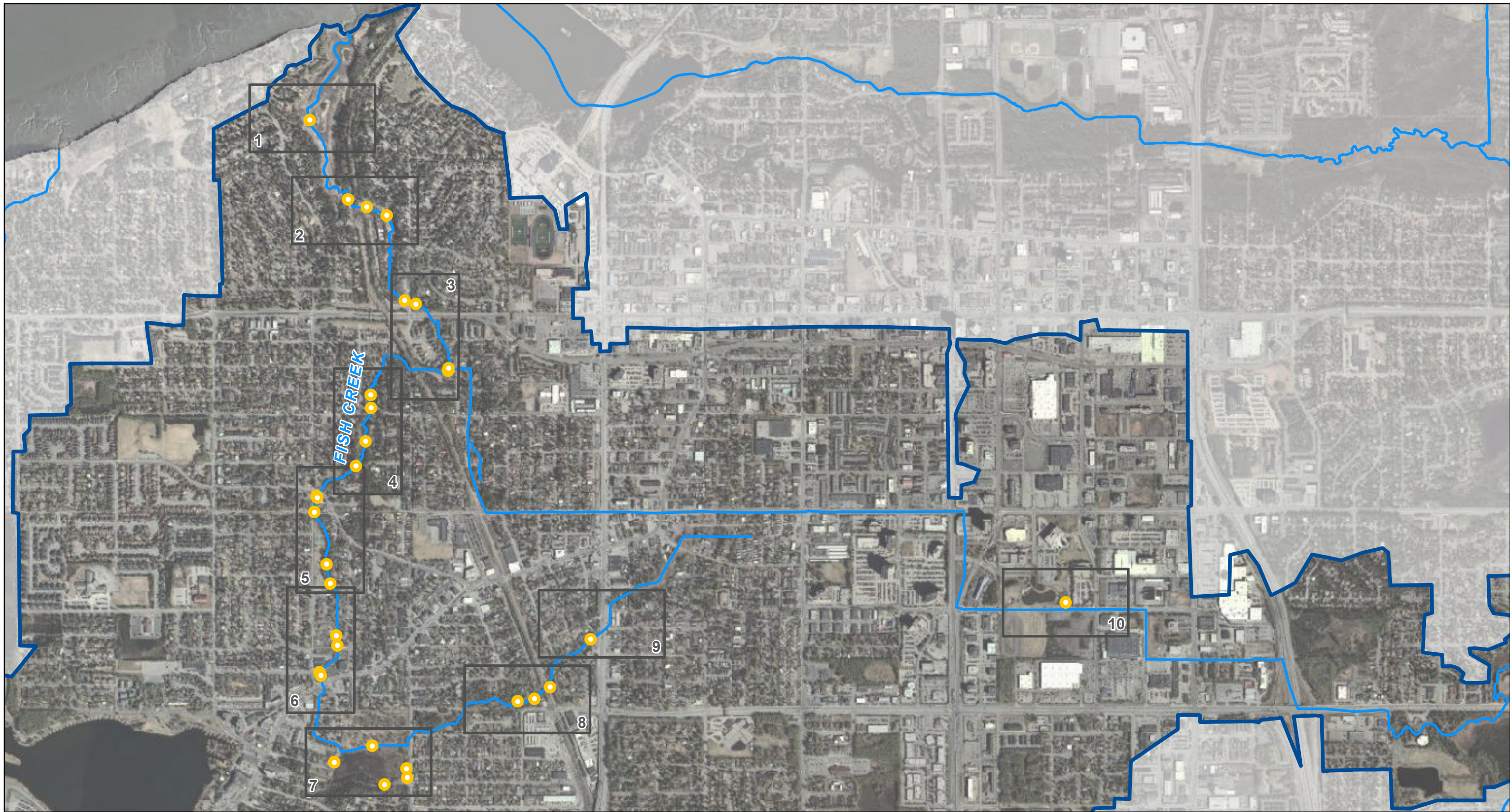
# **Appendix A**

## **Watershed Maps**







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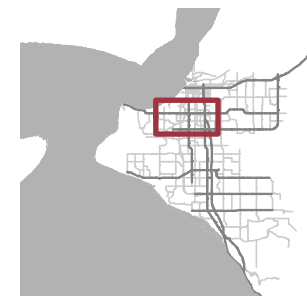
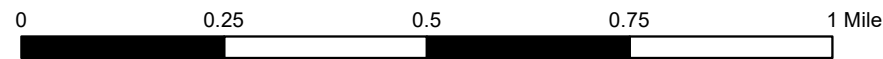




LEGEND

 2017 Investigated Outfall  
 Stream

 Map Page Index  
 Watershed Boundary



Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Map Index**



Source: MOA HGDB 2016  
 Imagery: MOA Pictometry 2015  
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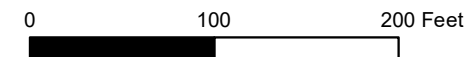


**LEGEND**

-  2017 Examined Outfall, Alternate
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel

- Drainage Way Nodes**
-  End of Pipe (EOP)
  -  Outfall Minor
  -  Outlet



Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 1**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
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


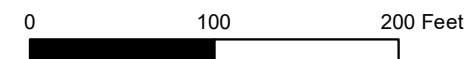


**LEGEND**

-  2017 Could Not Locate Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel

- Drainage Way Nodes**
-  Control Outlet
  -  End of Pipe (EOP)
  -  Outfall
  -  Outfall Major
  -  Outfall Minor

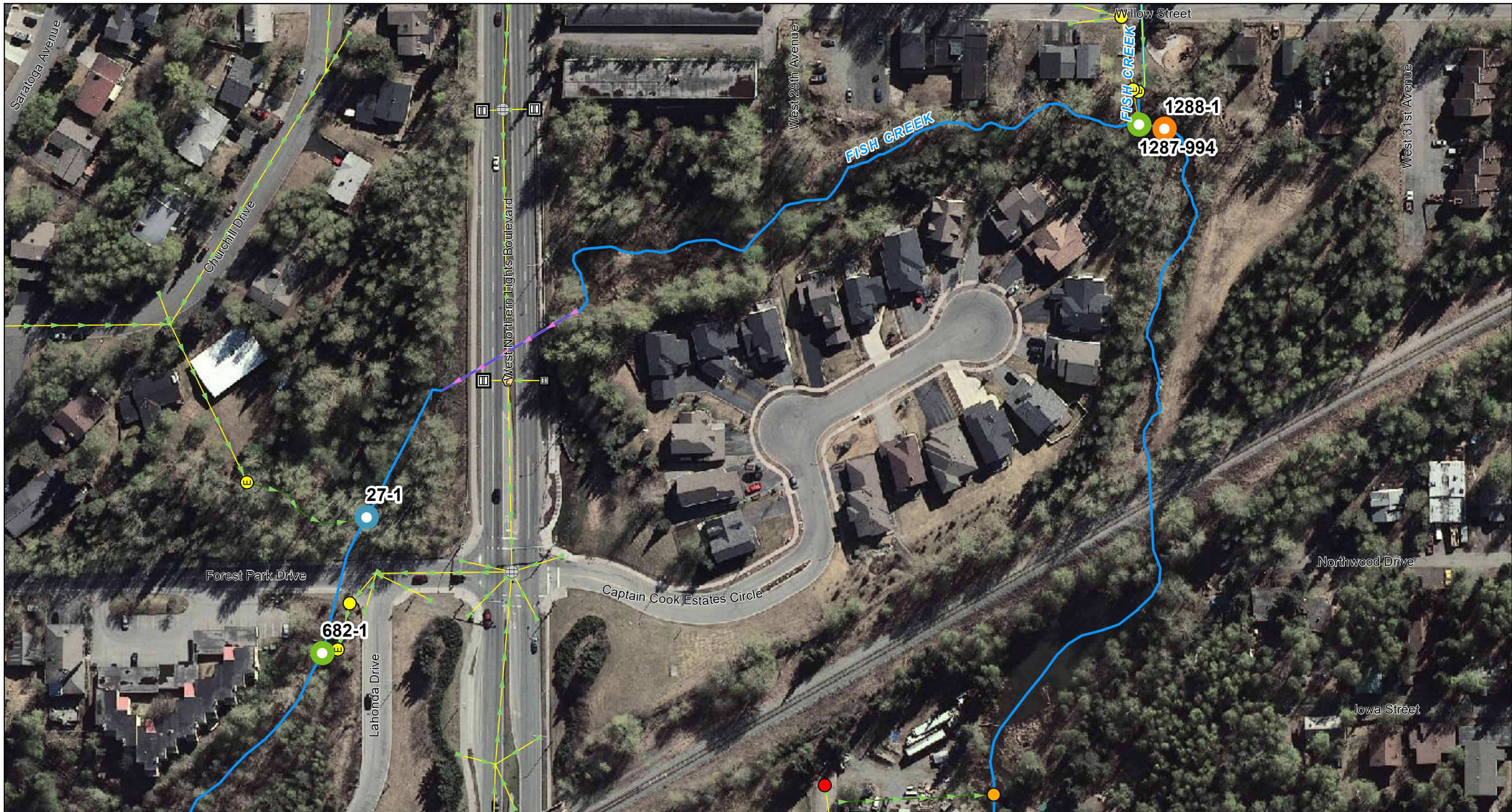


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 2**

Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
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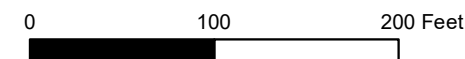
**LEGEND**

- 2017 Sampled Outfall
- 2017 Examined Outfall, Alternate
- 2017 Examined Outfall, Not Suitable
- Stream

- Drainage Ways**
- Pipe
  - Routing
  - Open Channel
  - Xing Culvert

- Drainage Way Nodes**
- Catch Basin
  - Curb Inlet
  - End of Pipe (EOP)
  - Manhole
  - OGS

- Outfall
- Outfall Major
- Outlet

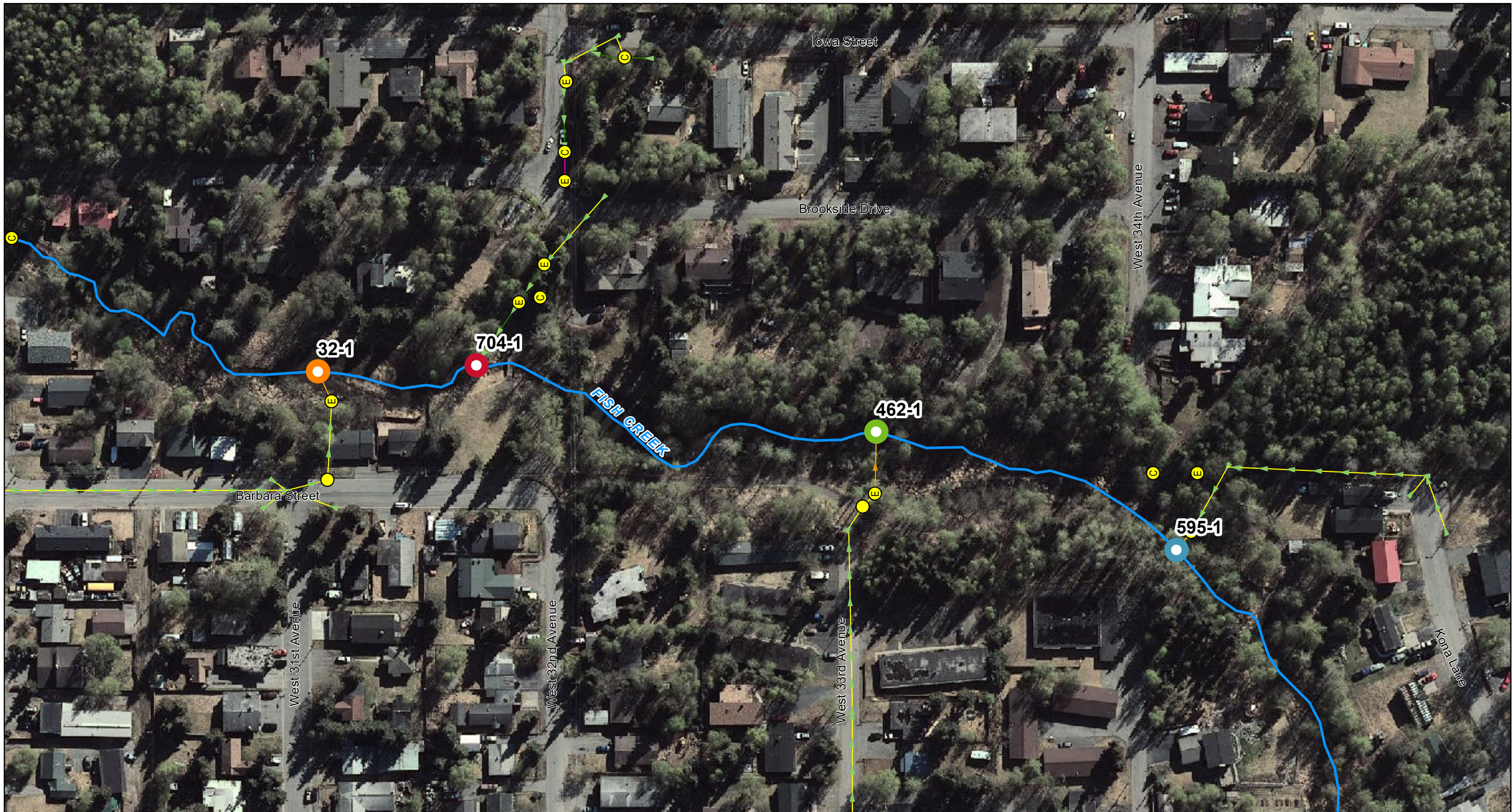


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 3**





Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
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**LEGEND**






-  2017 Sampled Outfall
-  2017 Examined Outfall, Alternate
-  2017 Examined Outfall, Not Suitable
-  2017 Could Not Locate Outfall

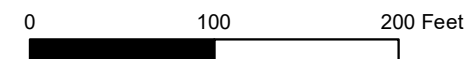
 Stream

**Drainage Ways**

-  Pipe
-  Routing
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Control Outlet
-  End of Pipe (EOP)
-  Outfall Major
-  Outfall Minor
-  Outlet

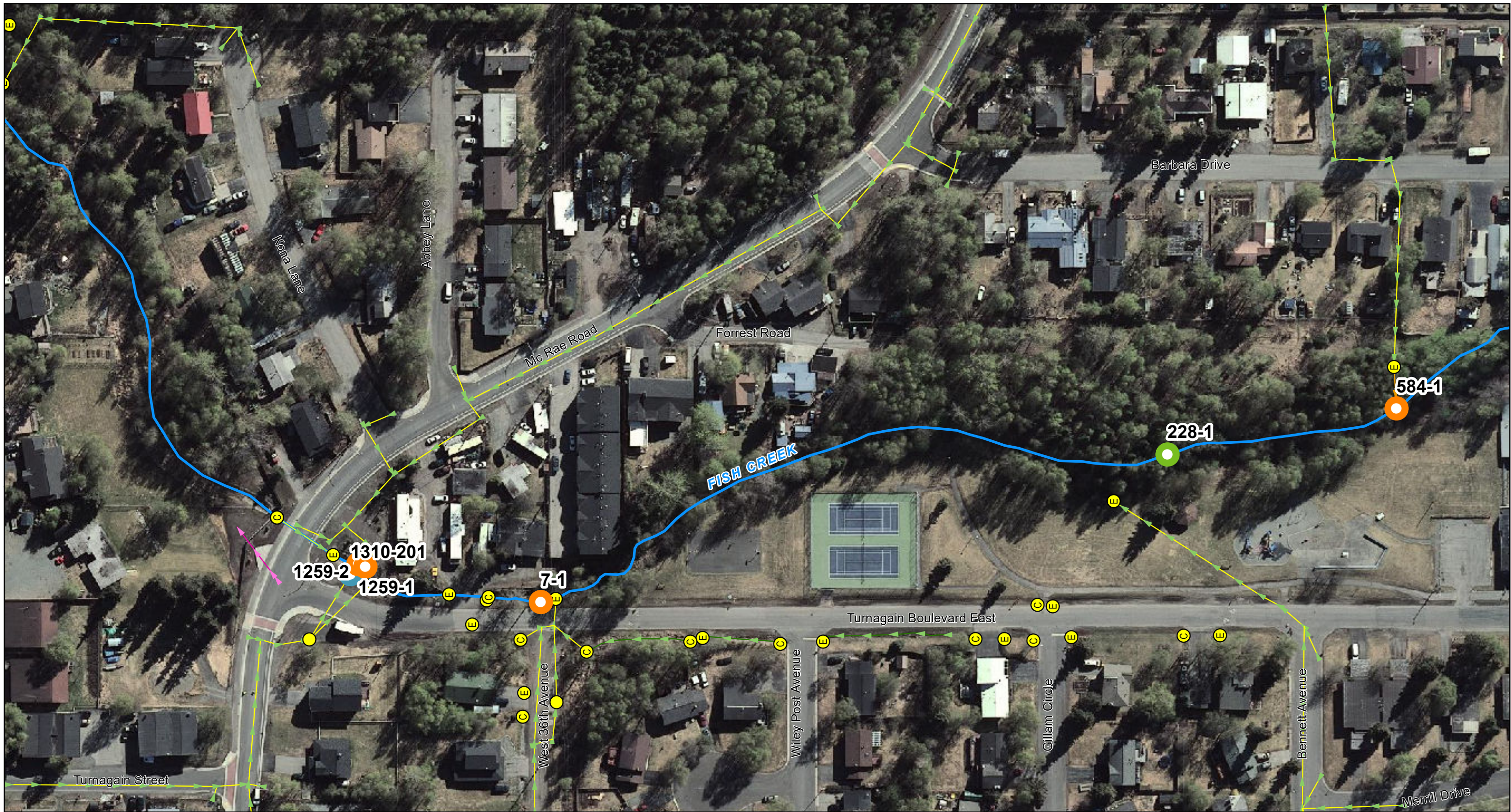


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 4**





Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
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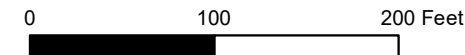
-  2017 Sampled Outfall
-  2017 Examined Outfall, Alternate
-  2017 Examined Outfall, Not Suitable
-  Stream

**Drainage Ways**

-  Pipe
-  Routing
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Control Outlet
-  End of Pipe (EOP)
-  Outfall
-  Outfall Major
-  Outfall Minor
-  Outlet

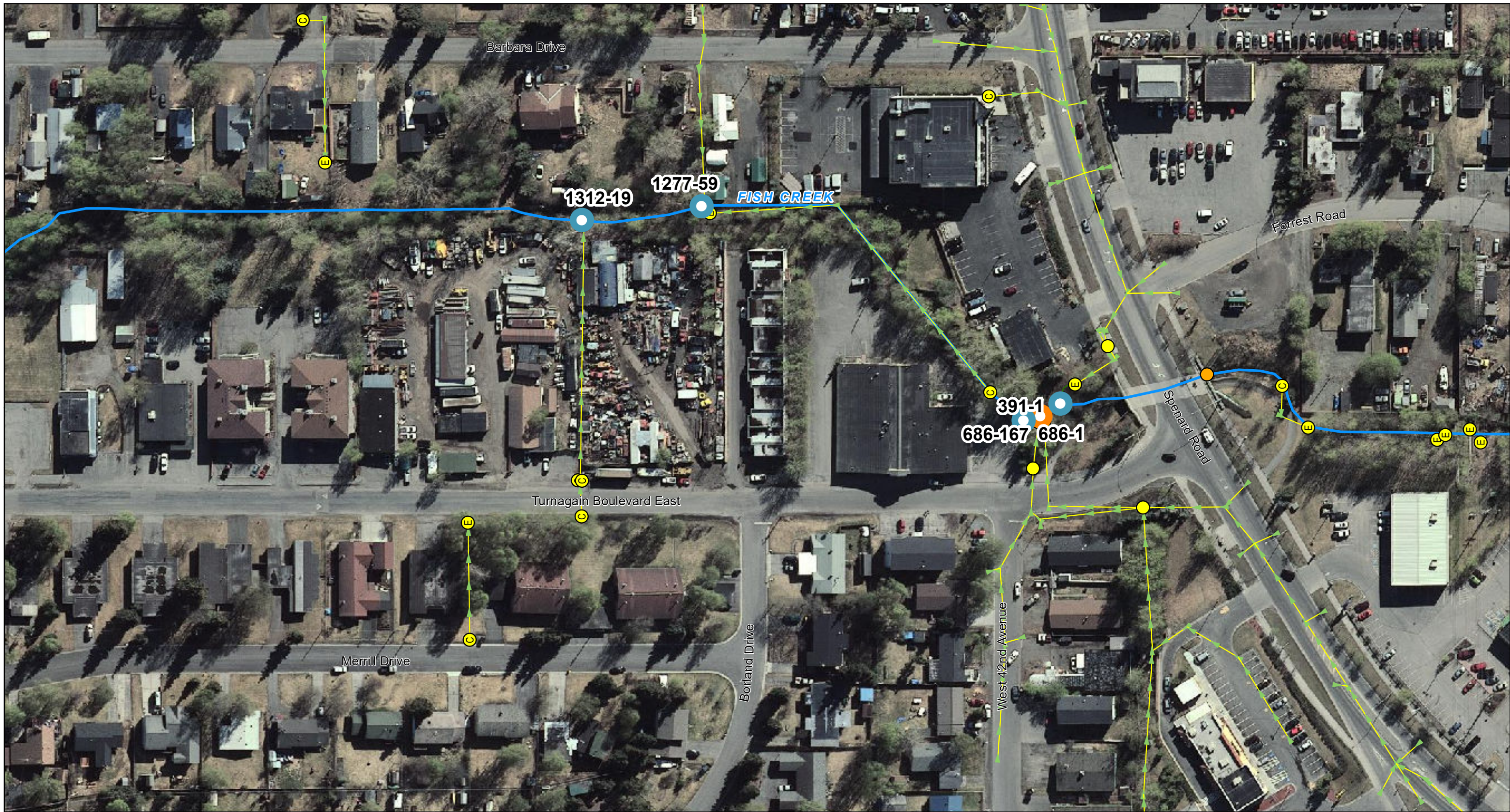


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 5**

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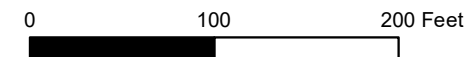


**LEGEND**

- 2017 Examined Outfall, Alternate
- 2017 Examined Outfall, Not Suitable
- ~ Stream

- Drainage Ways**
- Pipe
  - Routing
  - Open Channel

- Drainage Way Nodes**
- Bypass Outlet
  - Control Outlet
  - End of Pipe (EOP)
  - Outfall
  - Outfall Major
  - Outlet

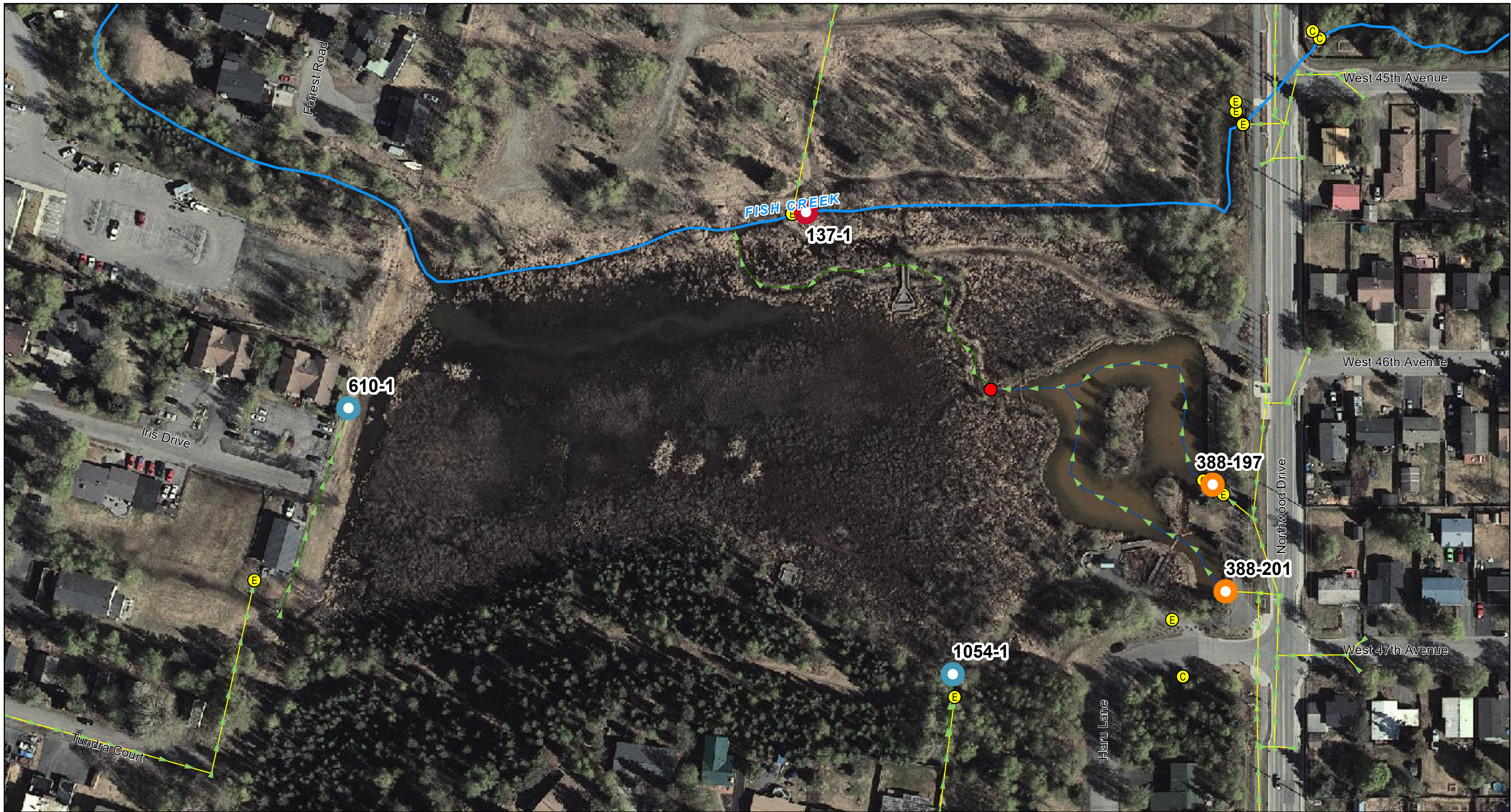


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 6**





Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
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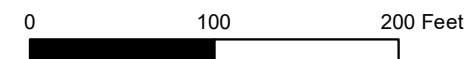


**LEGEND**

-  2017 Examined Outfall, Alternate
-  2017 Examined Outfall, Not Suitable
-  2017 Could Not Locate Outfall
-  Stream

- Drainage Ways**
-  Continuity
  -  Pipe
  -  Open Channel

- Drainage Way Nodes**
-  Control Outlet
  -  End of Pipe (EOP)
  -  Outfall
  -  Outfall Major
  -  Outfall Minor

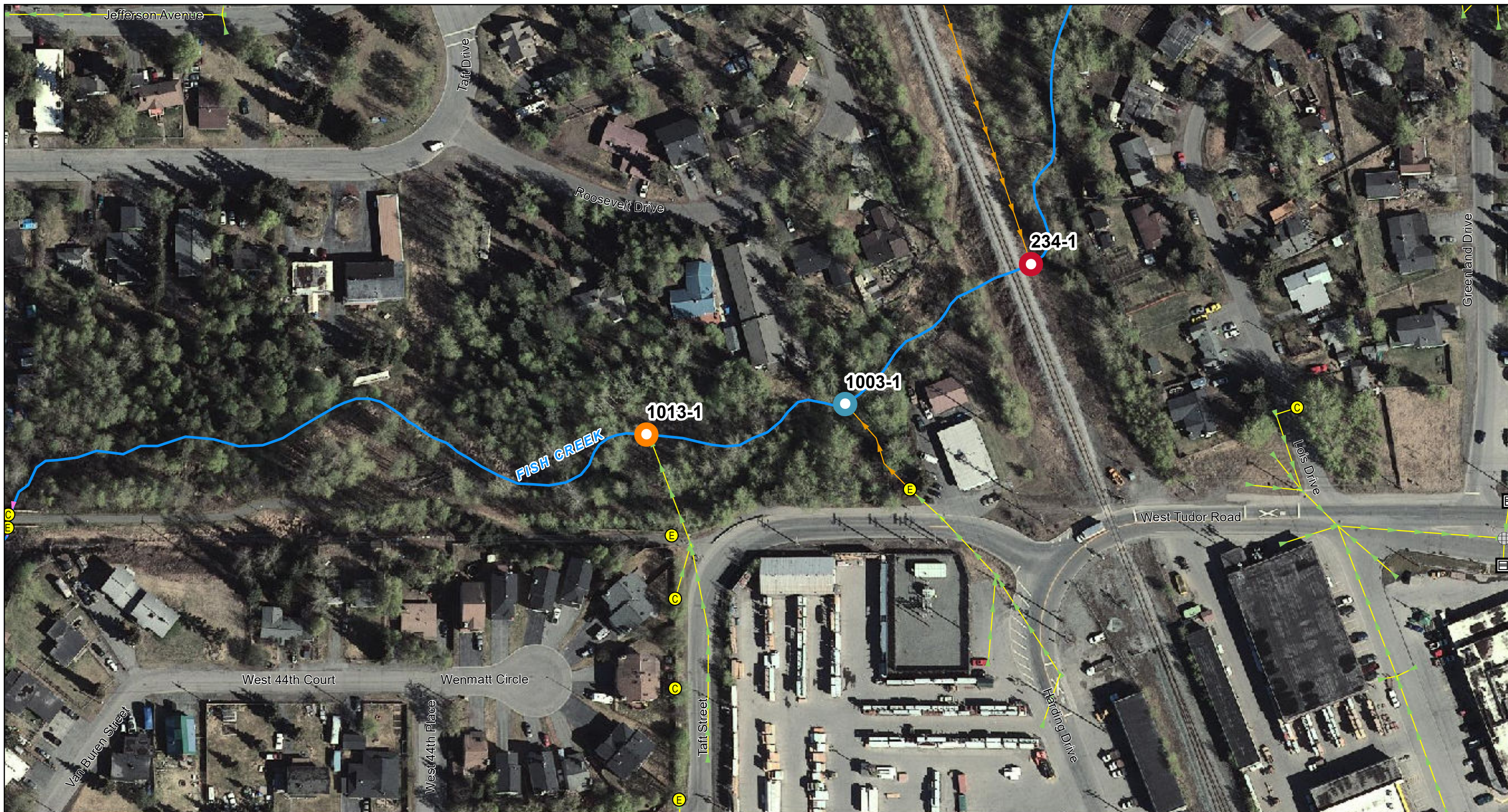


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 7**





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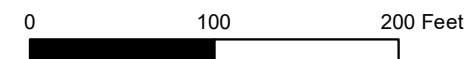


**LEGEND**

-  2017 Examined Outfall, Alternate
-  2017 Examined Outfall, Not Suitable
-  2017 Could Not Locate Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Control Outlet
  -  End of Pipe (EOP)
  -  Manhole
  -  Outfall
  -  Outfall Minor



Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 8**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
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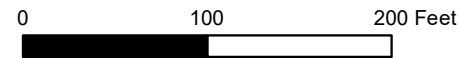
-  2017 Examined Outfall, Alternate
-  Stream

**Drainage Ways**

-  Pipe
-  Inlet
-  Routing
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Control Outlet
-  End of Pipe (EOP)
-  Manhole
-  OGS
-  Outfall
-  Outfall Major
-  Outfall Minor
-  Outlet

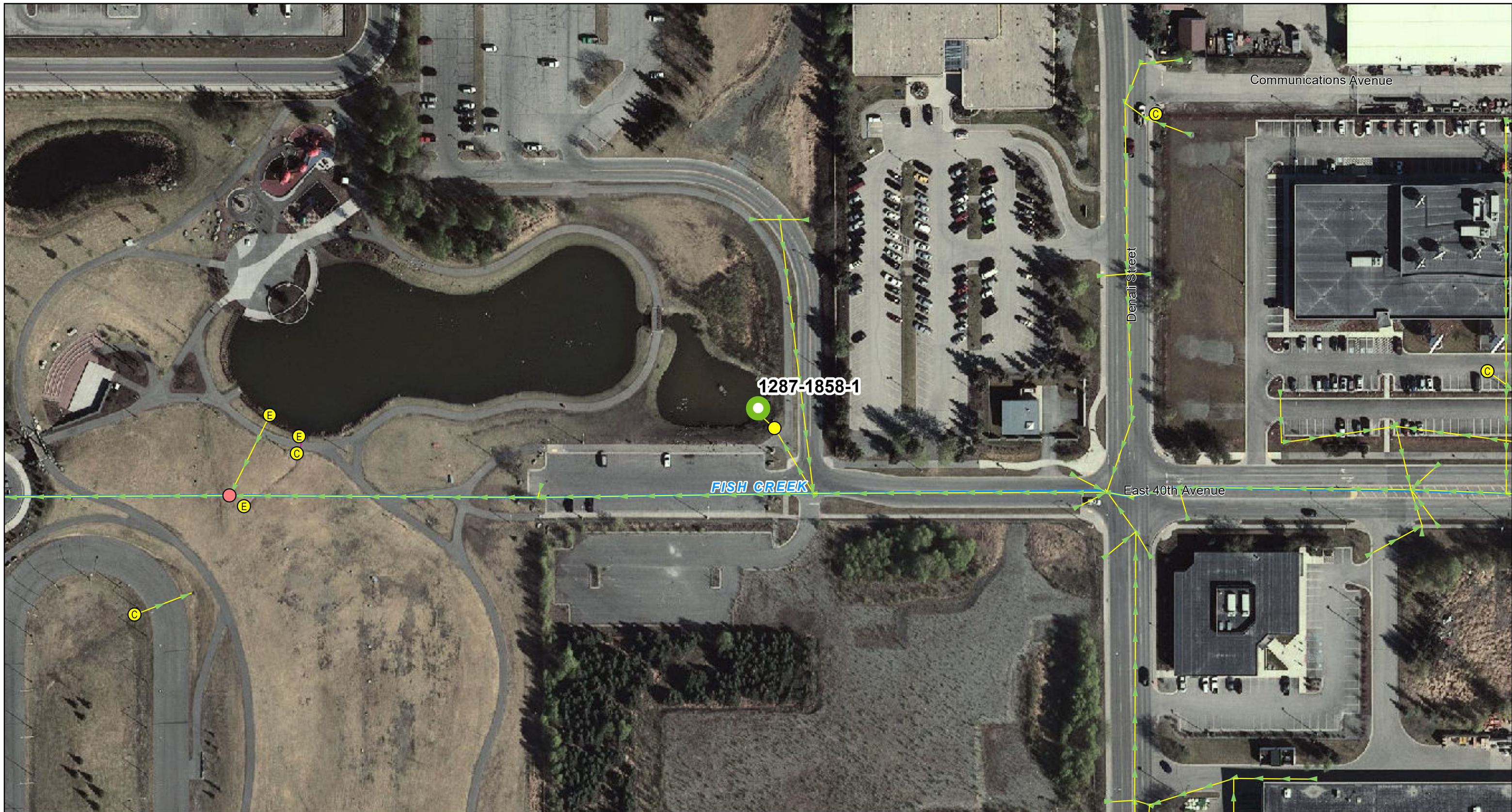


Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 9**



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 10/25/2017









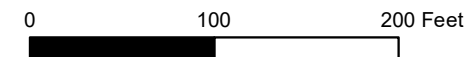


**LEGEND**

-  2017 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Xing Culvert

- Drainage Way Nodes**
-  Control Outlet
  -  End of Pipe (EOP)
  -  Outfall Minor
  -  Outlet



Dry Weather Screening 2017  
**Fish Creek**  
 Examined and Sampled Outfalls  
**Page 10**



Source: MOA HGDB 2017  
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 10/25/2017





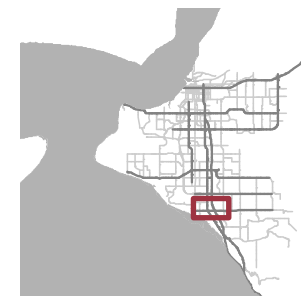
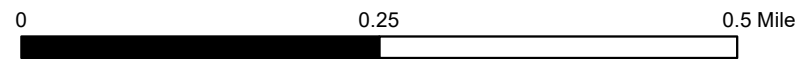




LEGEND

-  2017 Investigated Outfall
-  Stream

-  Map Page Index
-  Watershed Boundary

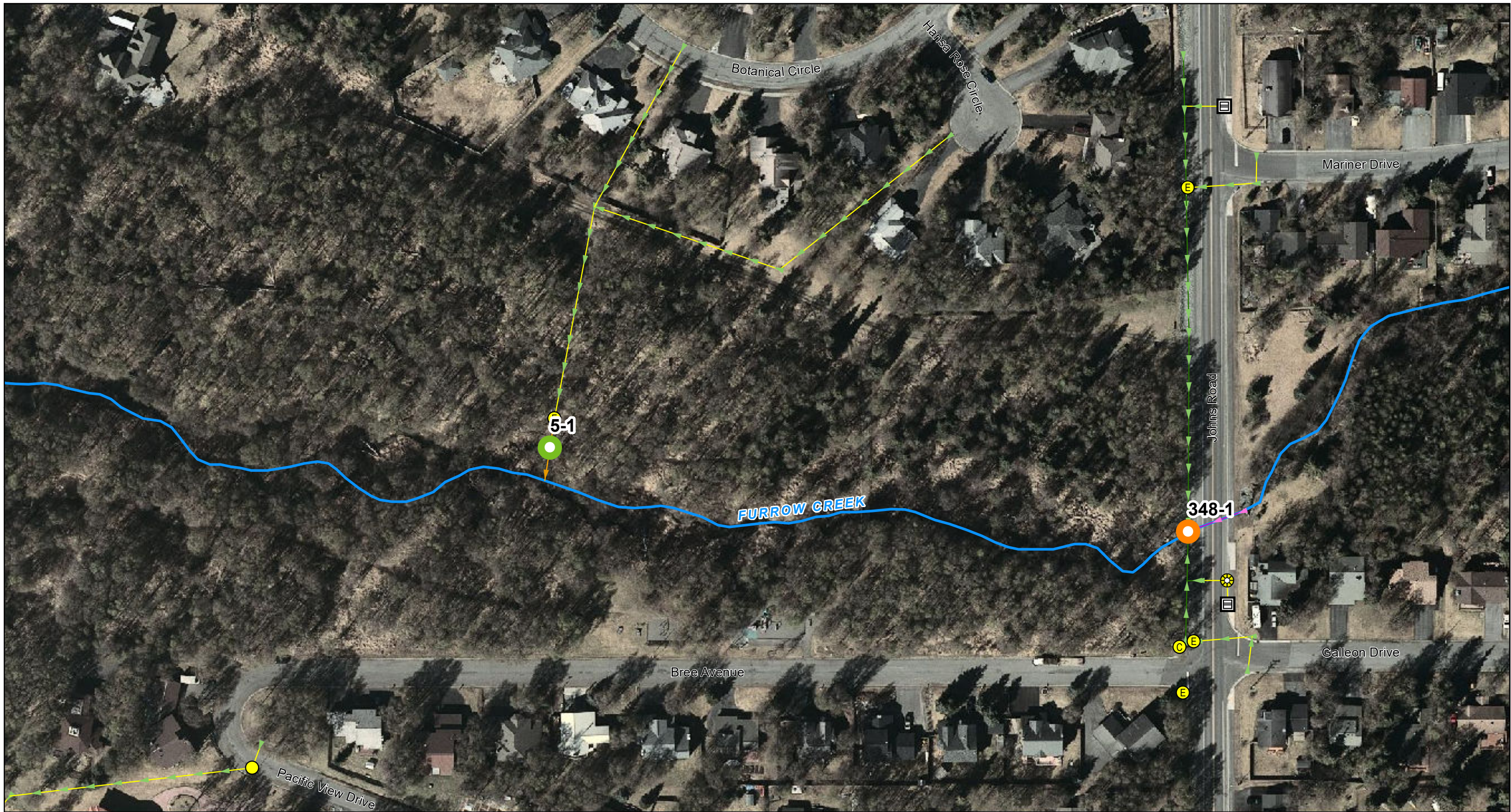


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Map Index**




Source: MOA HGDB 2016  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017











**LEGEND**

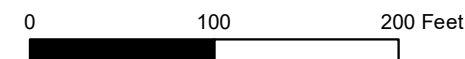
-  2017 Sampled Outfall
-  2017 Examined Outfall, Not Suitable
-  Stream

**Drainage Ways**

-  Pipe
-  Routing
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Control Outlet
-  End of Pipe (EOP)
-  Outfall
-  Outfall Major
-  Outlet

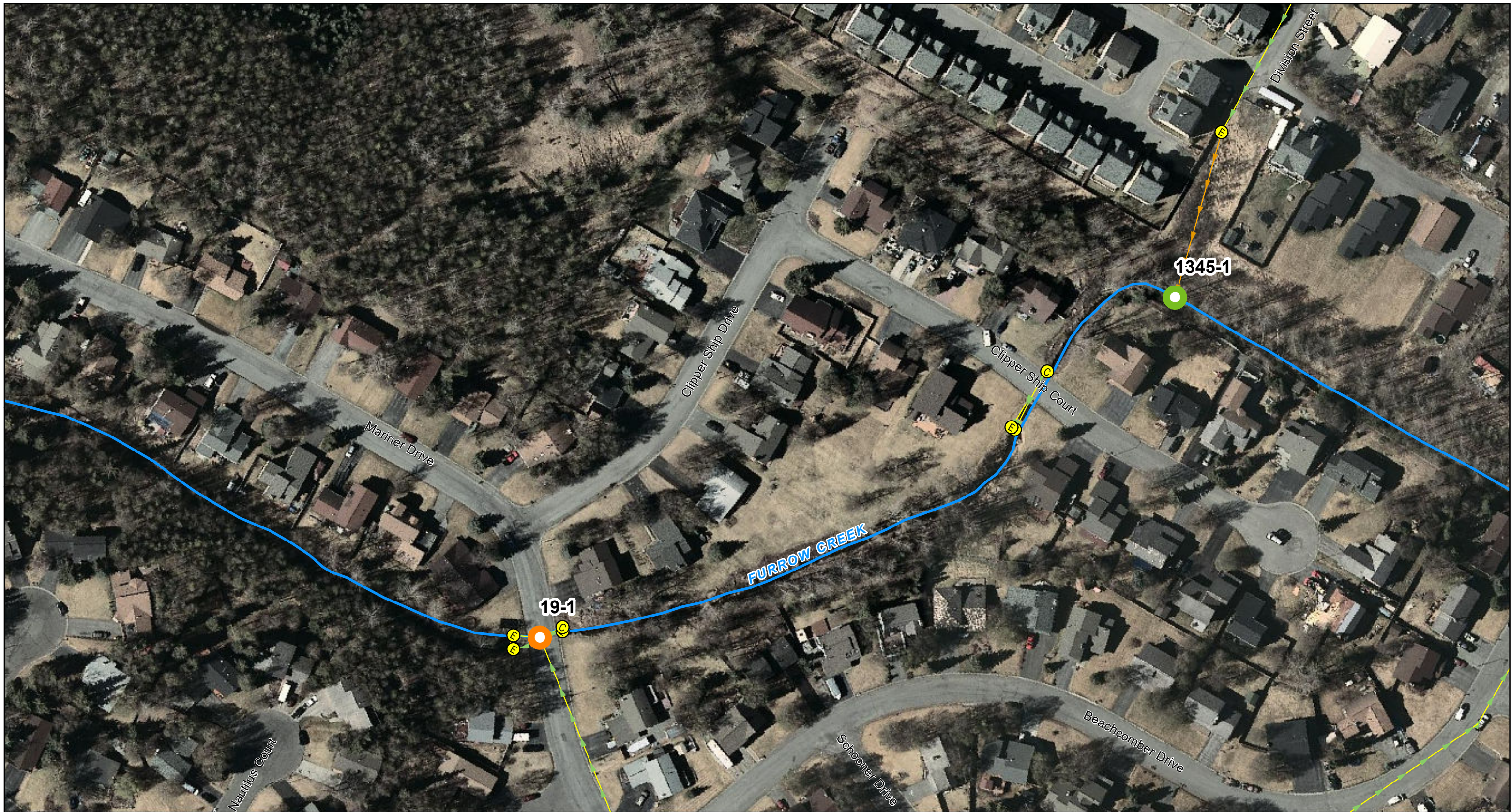


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Page 1**




Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017











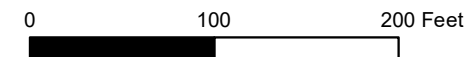


**LEGEND**

-  2017 Sampled Outfall
-  2017 Examined Outfall, Not Suitable
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing

- Drainage Way Nodes**
-  Control Outlet
  -  End of Pipe (EOP)
  -  Outfall Major
  -  Outfall Minor

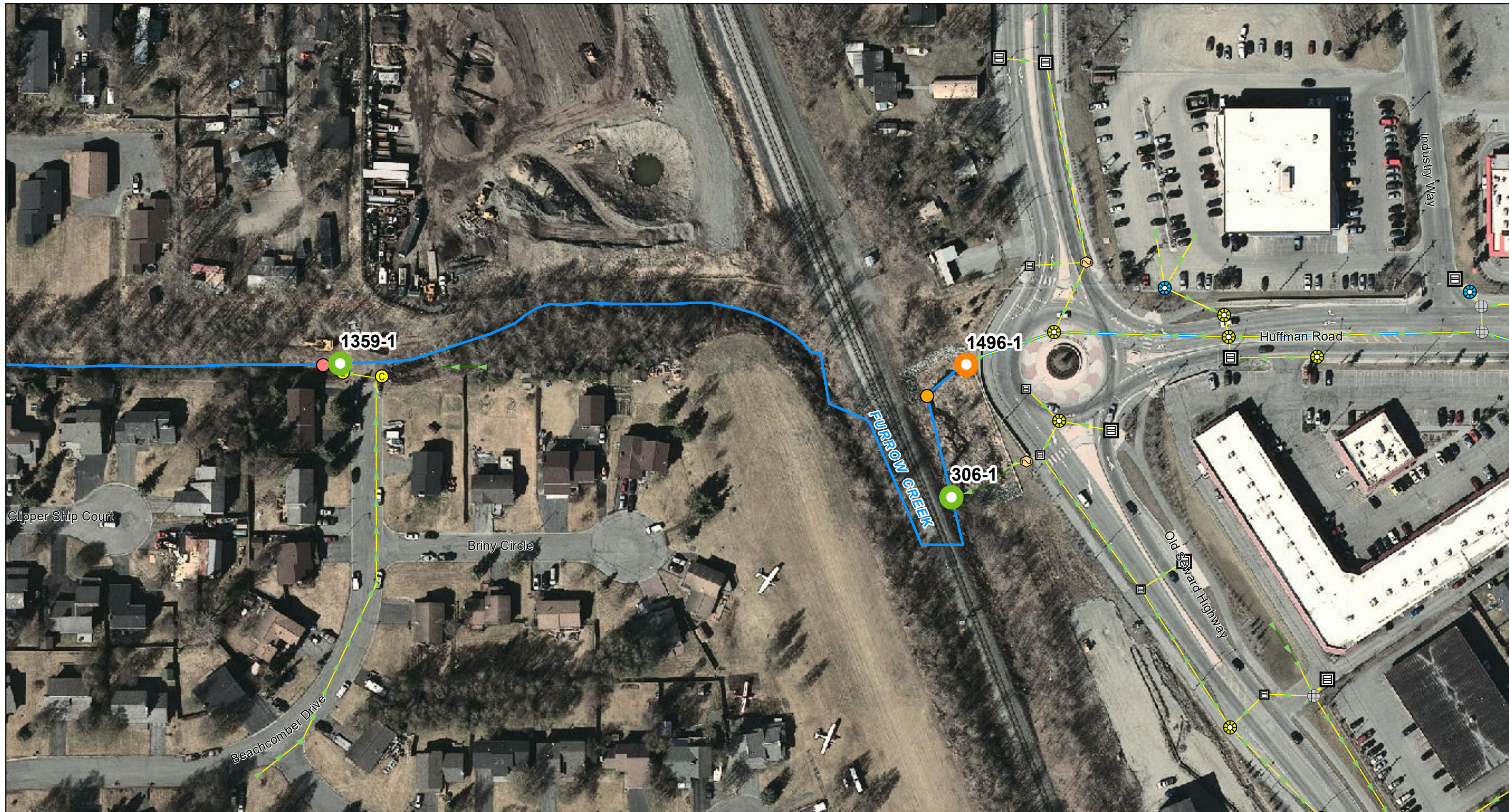


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Page 2**




Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017




















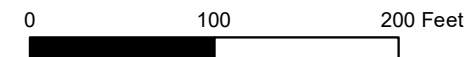
**LEGEND**

-  2017 Sampled Outfall
-  2017 Examined Outfall, Not Suitable
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Control Outlet
  -  Curb Inlet
  -  End of Pipe (EOP)

-  Manhole
-  OGS
-  Outfall
-  Outfall Minor
-  Top Intake Manhole

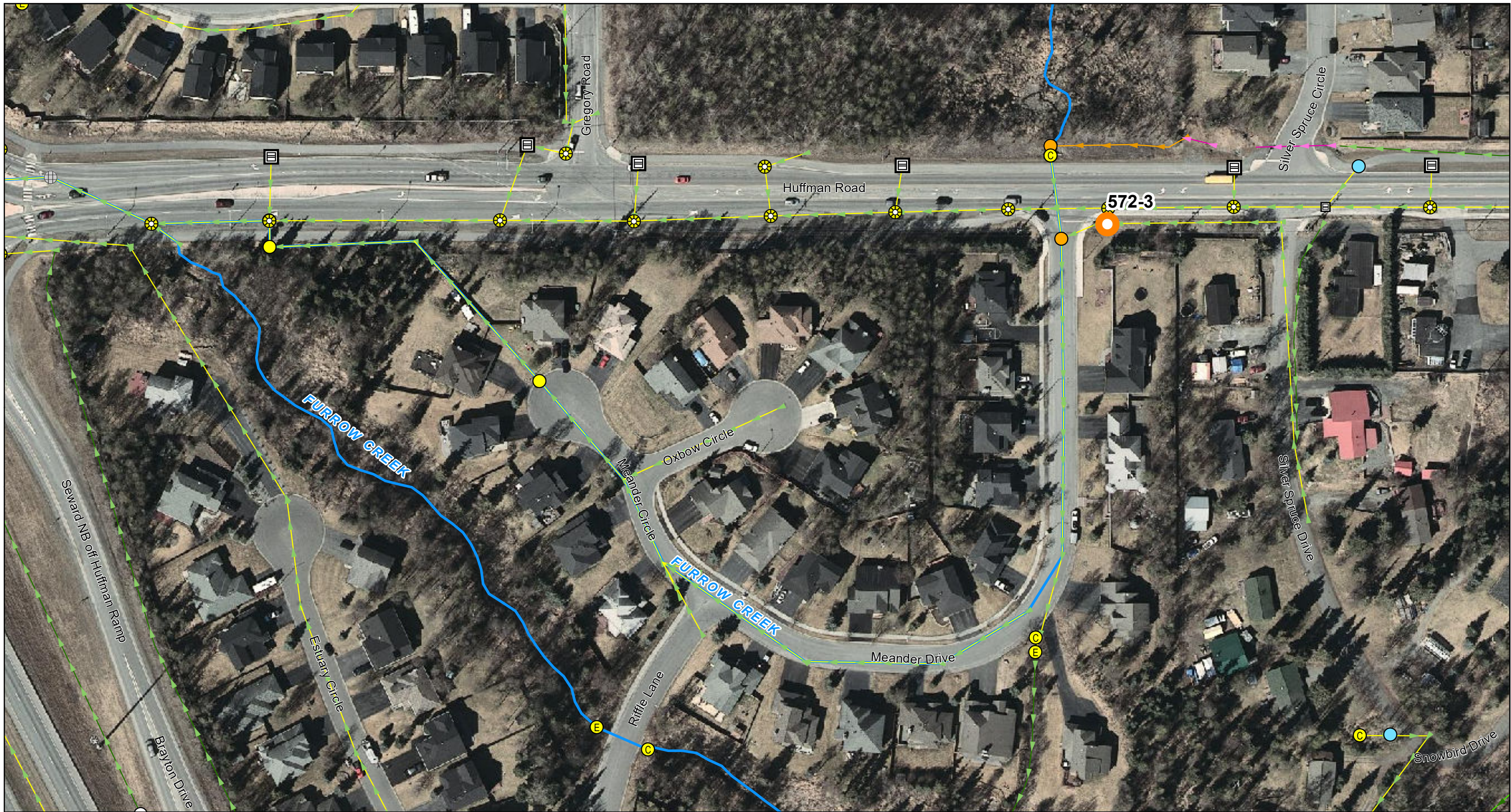


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Page 3**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017

















**LEGEND**


-  2017 Examined Outfall, Not Suitable
-  Stream

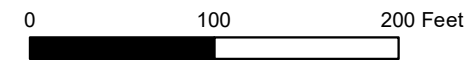
**Drainage Ways**

-  Pipe
-  Routing
-  Open Channel
-  Vegetated Drainage Way
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Control Outlet
-  Curb Inlet
-  End of Pipe (EOP)

-  Feature Start
-  Inlet
-  Manhole
-  Outfall
-  Outlet

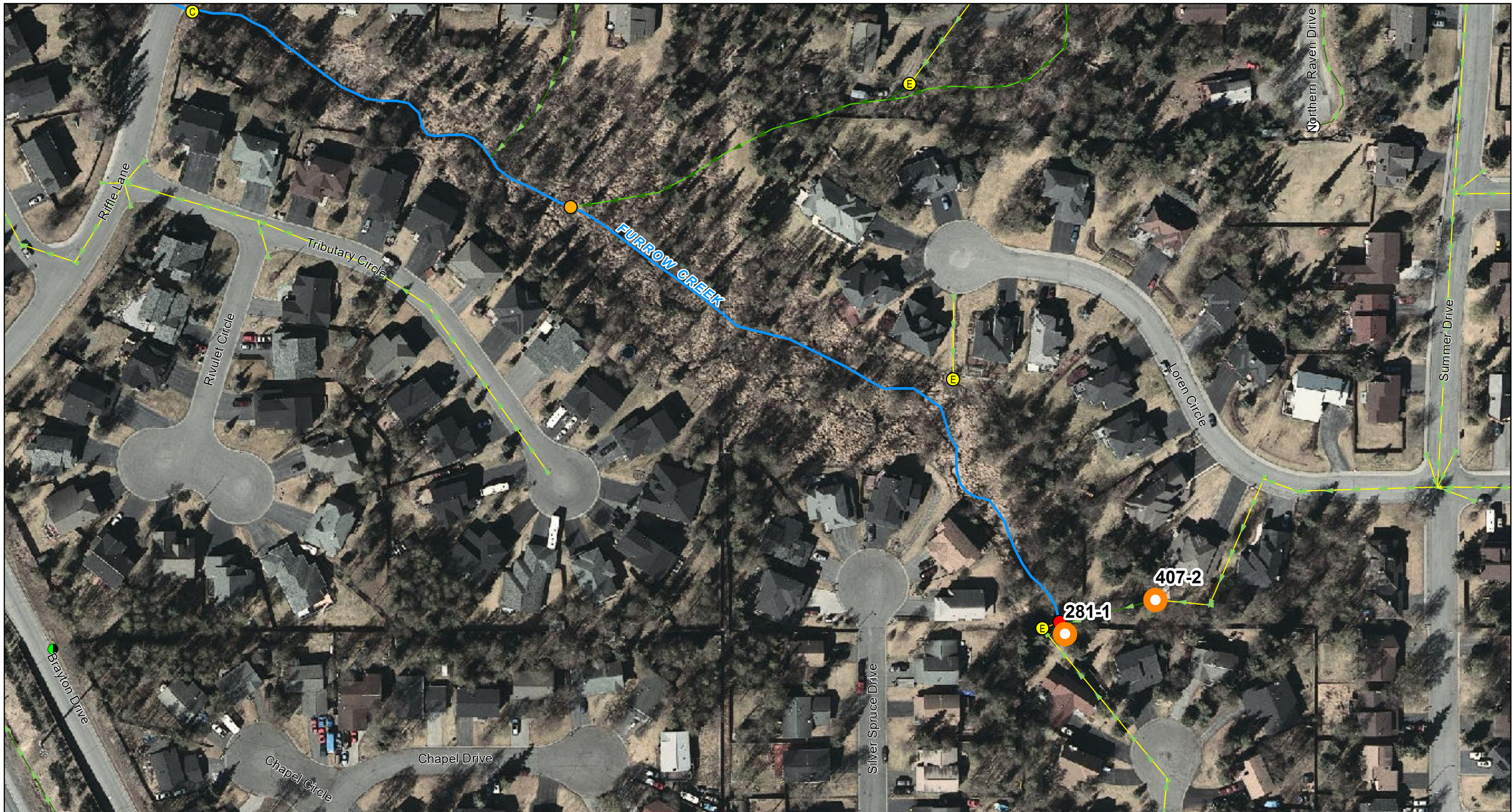


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Page 4**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017















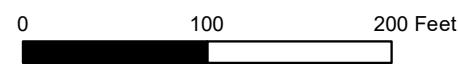


**LEGEND**

-  2017 Examined Outfall, Not Suitable
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel
  -  Vegetated Drainage Way

- Drainage Way Nodes**
-  Control Outlet
  -  Divide
  -  End of Pipe (EOP)
  -  Feature Start
  -  Outfall
  -  Outfall Major

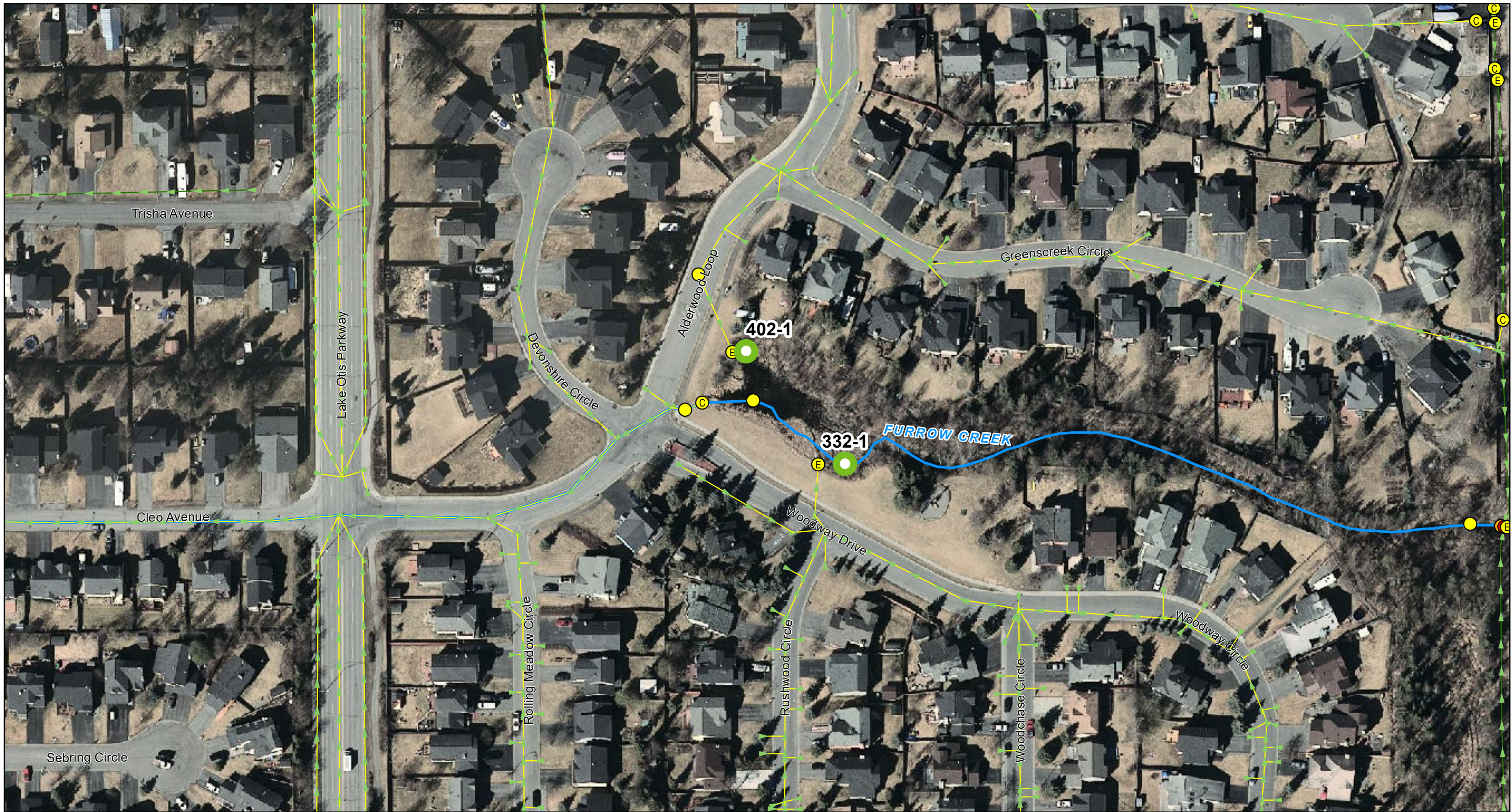


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Page 5**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017












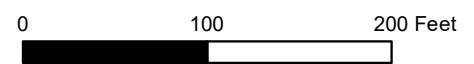


**LEGEND**

-  2017 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel

- Drainage Way Nodes**
-  Control Outlet
  -  End of Pipe (EOP)
  -  Outfall
  -  Outfall Major
  -  Outlet

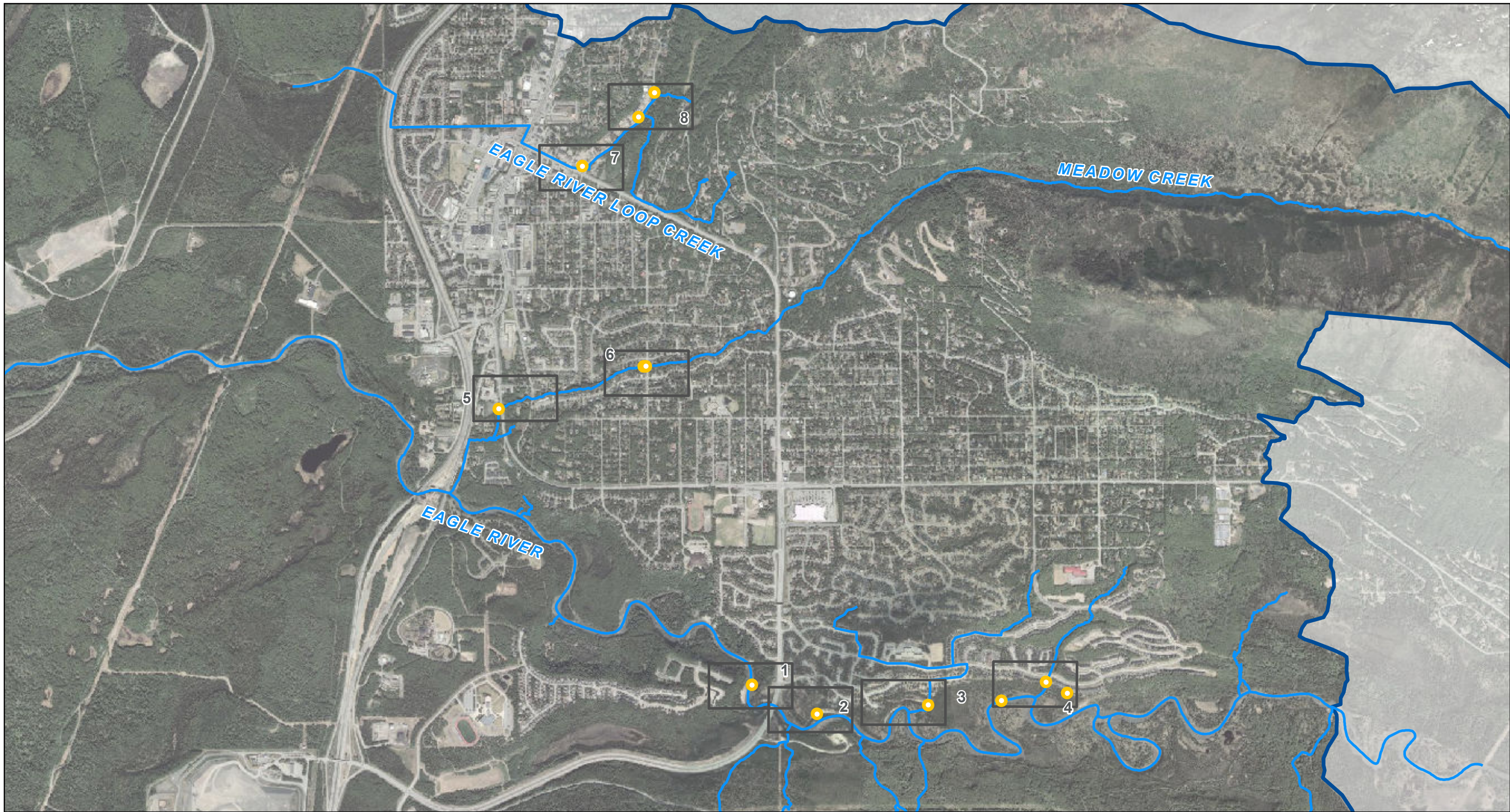


Dry Weather Screening 2017  
**Furrow Creek**  
 Examined and Sampled Outfalls  
**Page 6**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017





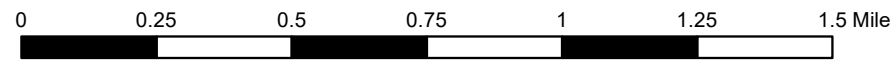




LEGEND

 2017 Investigated Outfall  
 Stream

 Map Page Index  
 Watershed Boundary



Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Map Index**



Source: MOA HGDB 2016  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017















**LEGEND**

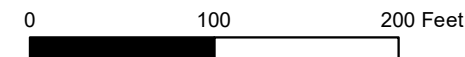
-  2017 Sampled Outfall
-  Stream

**Drainage Ways**

-  Pipe
-  Routing
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  OGS
-  Outfall Major



Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 1**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017













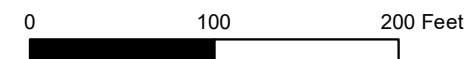


**LEGEND**

-  2017 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall Major

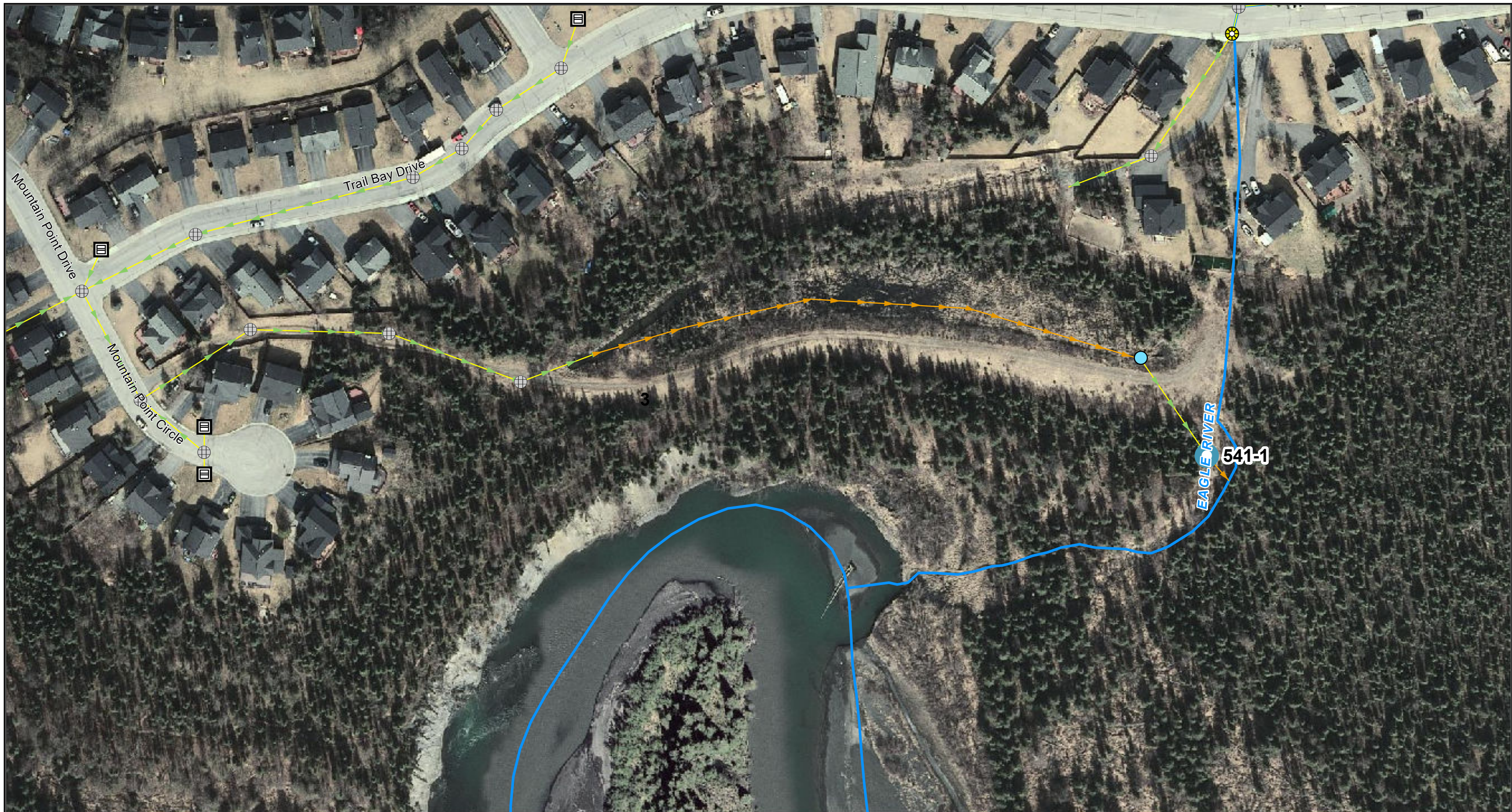


Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 2**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017












**LEGEND**

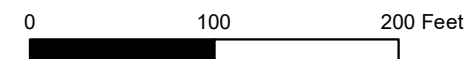
-  2017 Examined Outfall, Alternate
-  Stream

**Drainage Ways**

-  Pipe
-  Routing

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Inlet
-  Manhole
-  Outfall Major



Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 3**




Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017














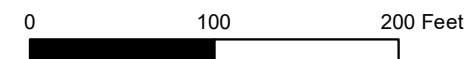


**LEGEND**

-  2017 Sampled Outfall
-  2017 Examined Outfall, Alternate
-  Stream

- Drainage Ways**
-  Pipe
  -  Inlet
  -  Routing
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Clean-out
  -  Manhole
  -  Outfall Major

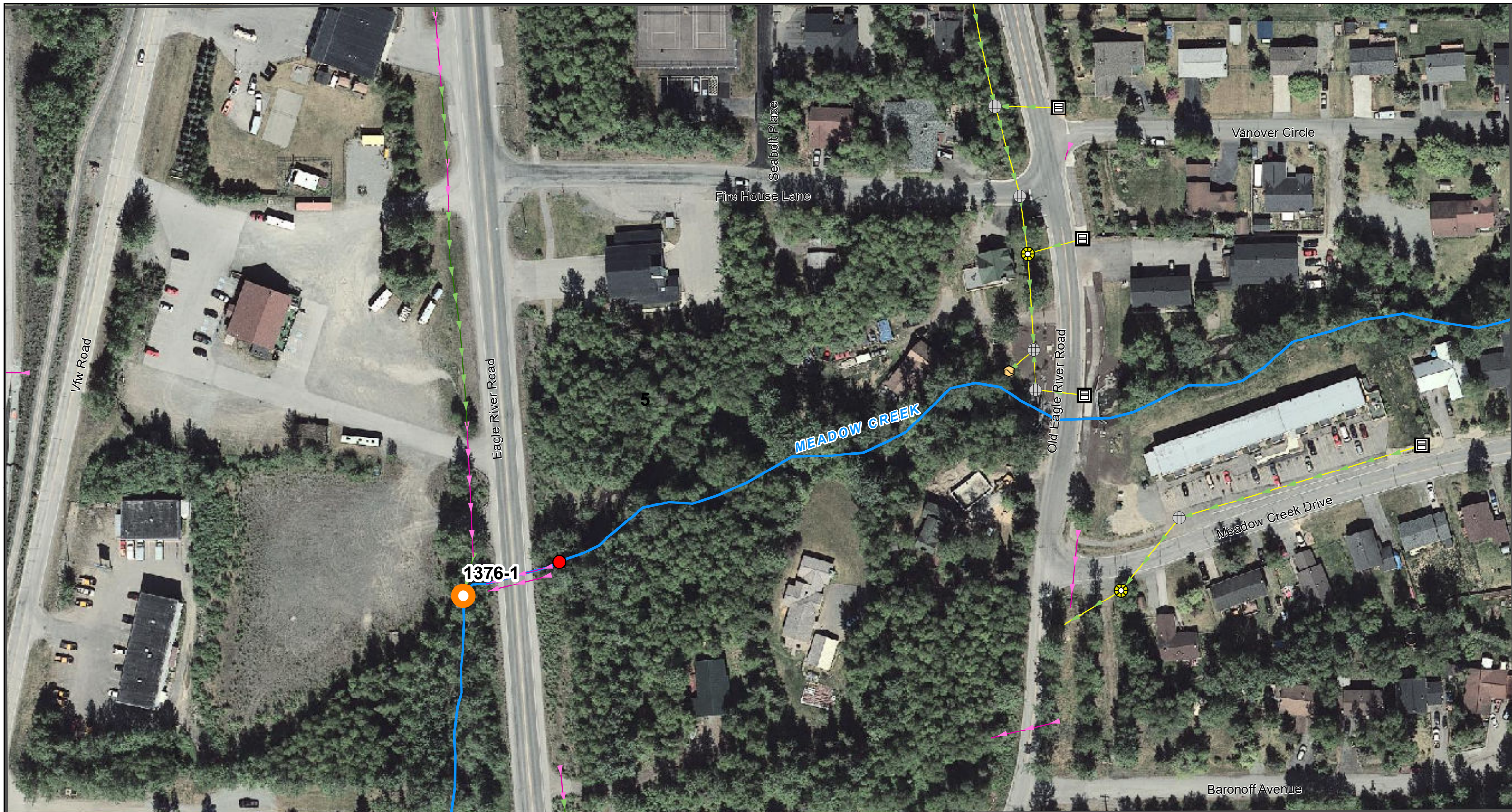


Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 4**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017
















**LEGEND**

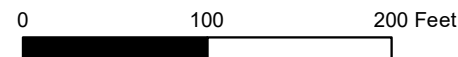
-  2017 Examined Outfall, Not Suitable
-  Stream

**Drainage Ways**

-  Pipe
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Manhole
-  OGS
-  Outfall
-  Outfall Major

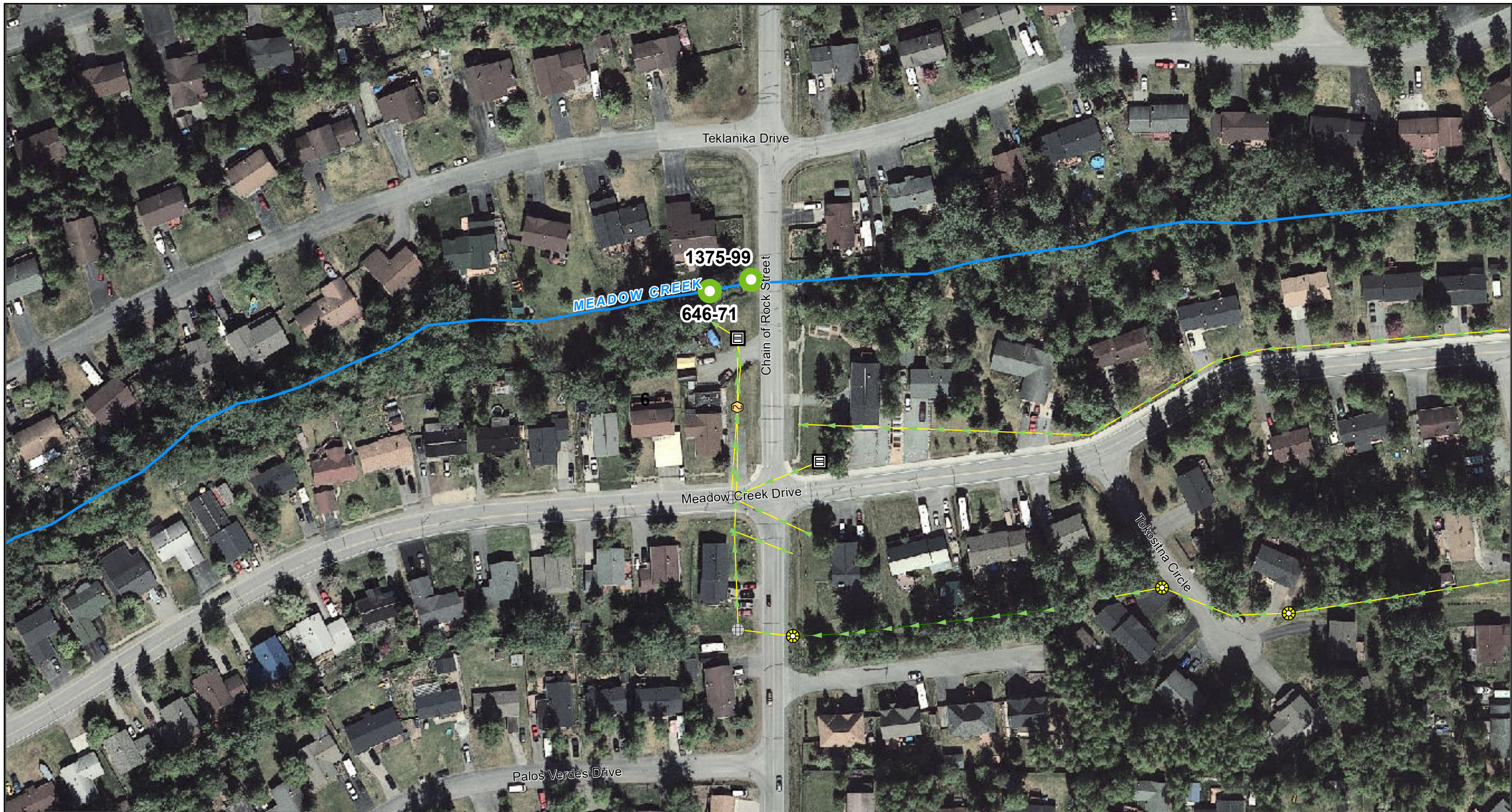


Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 5**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017







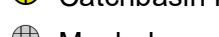
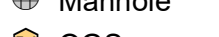
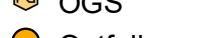


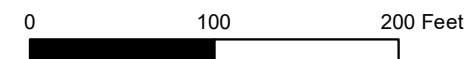


LEGEND

-  2017 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  OGS
  -  Outfall

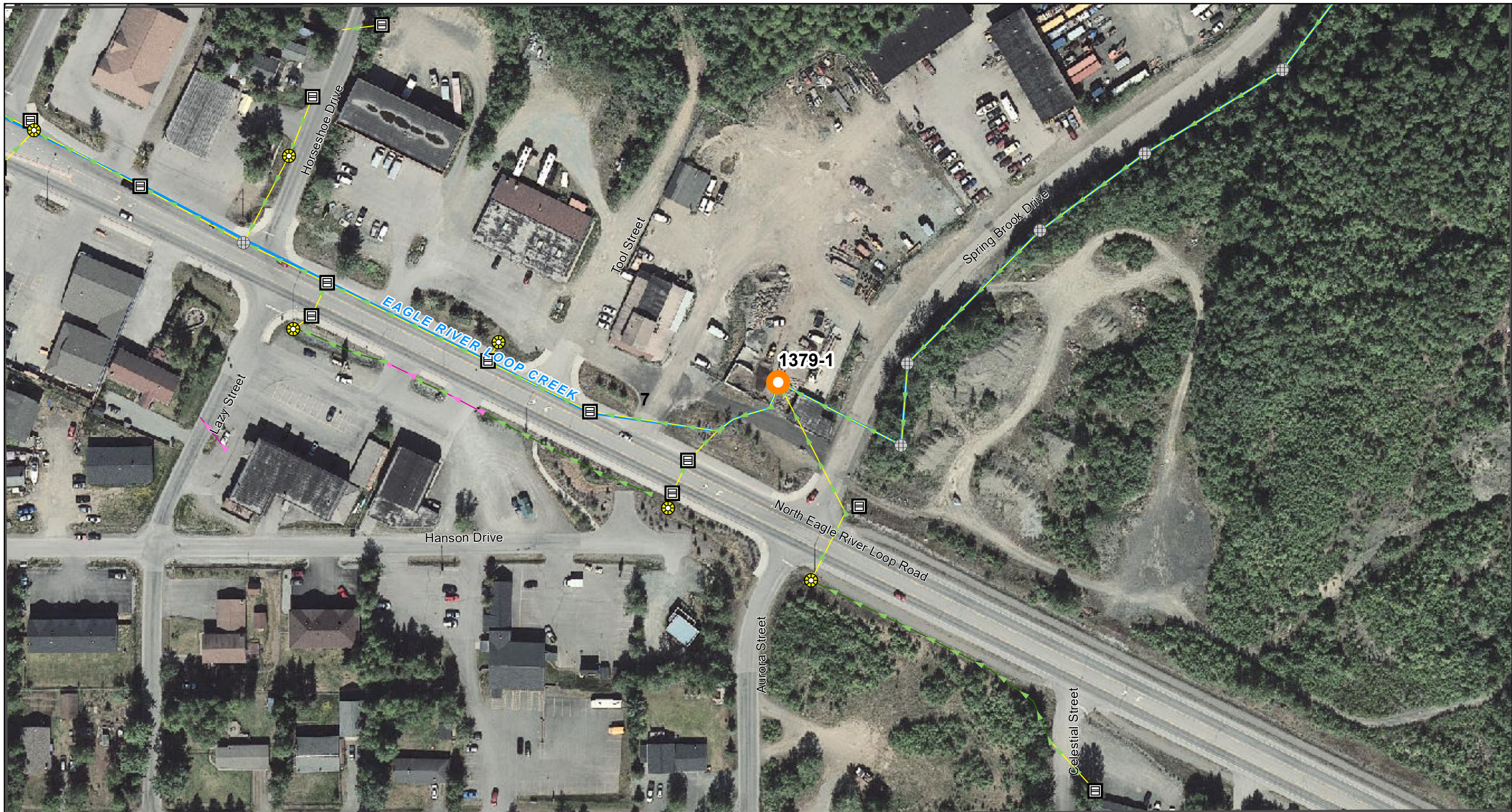


Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 6**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017














**LEGEND**

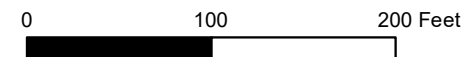
-  2017 Examined Outfall, Not Suitable
-  Stream

**Drainage Ways**

-  Pipe
-  Open Channel
-  Xing Culvert

**Drainage Way Nodes**

-  Catch Basin
-  Catchbasin Manhole
-  Manhole
-  Outfall

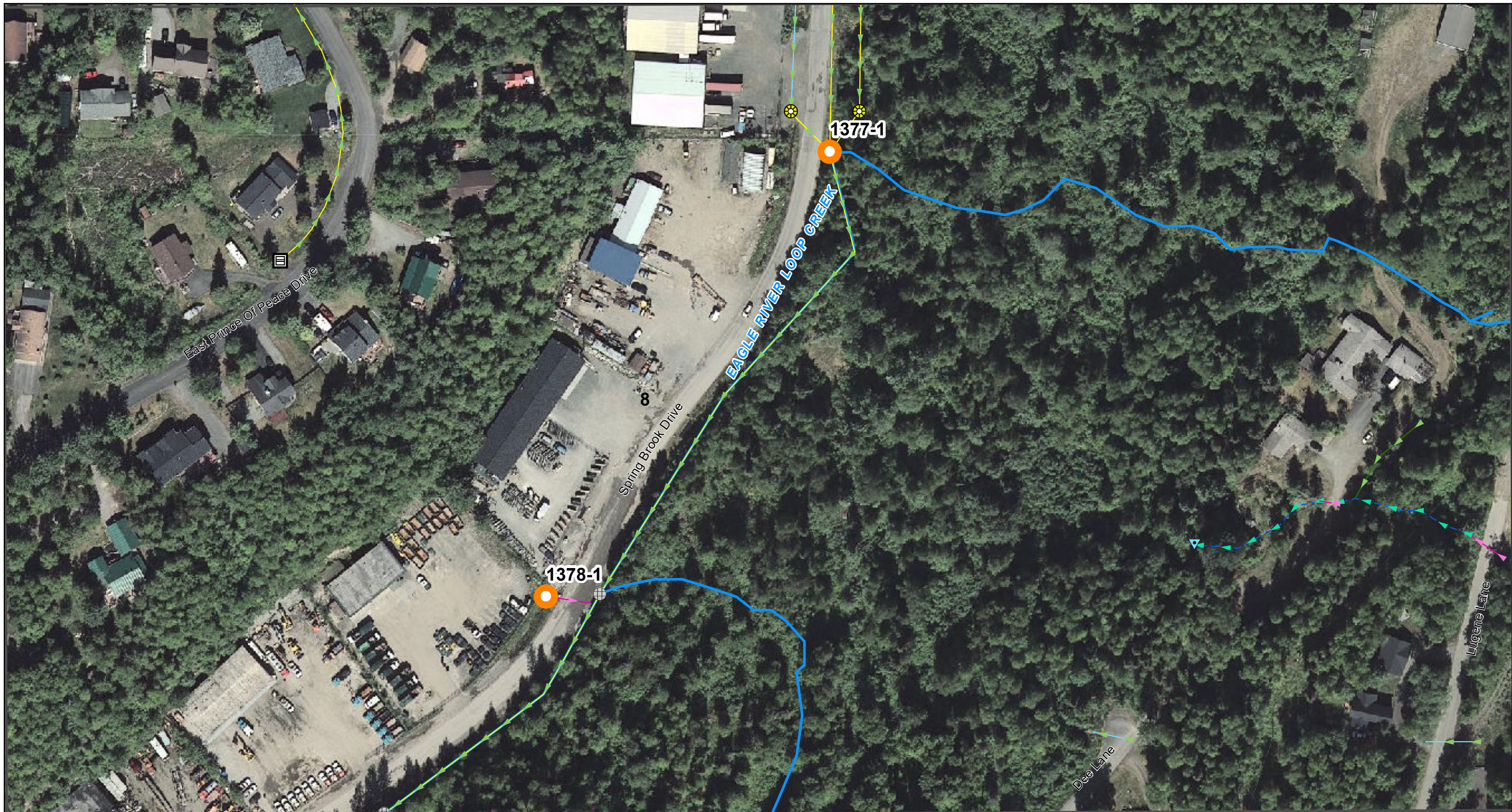


Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 7**



Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017
















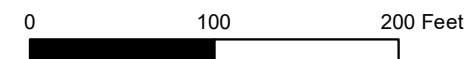


**LEGEND**

-  2017 Examined Outfall, Not Suitable
-  Stream

- Drainage Ways**
-  Pipe
  -  Inlet
  -  Ephemeral Channel
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Manhole
  -  Outfall Major
  -  Outlet
  -  Sink

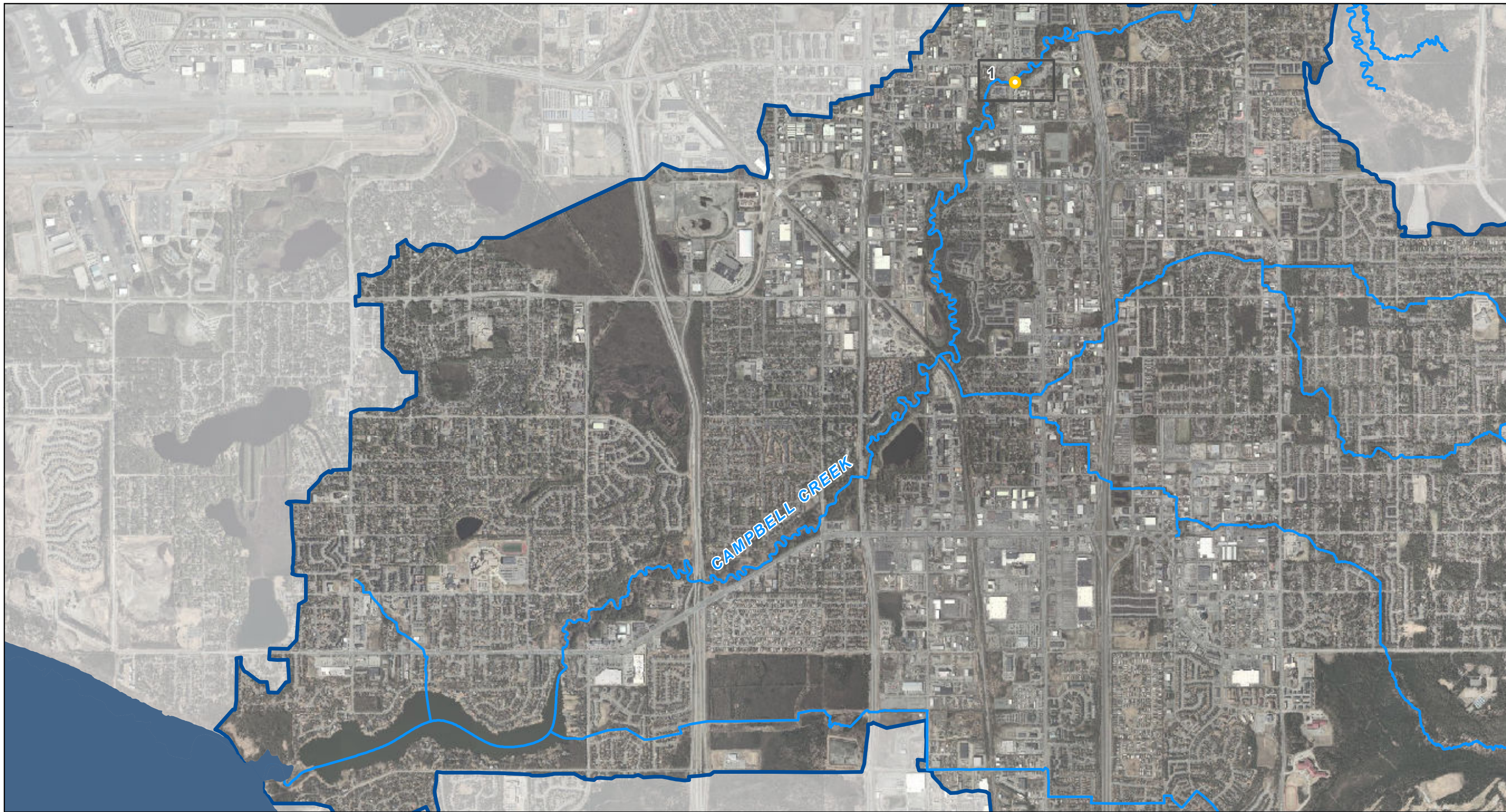


Dry Weather Screening 2017  
**Eagle River**  
 Examined and Sampled Outfalls  
**Page 8**

Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017



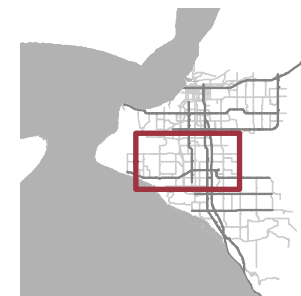
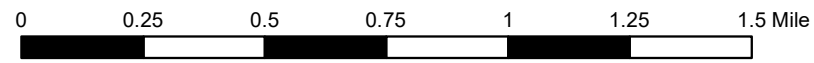




LEGEND

● 2017 Investigated Outfall  
 ~ Stream

☐ Map Page Index  
 ⊕ Watershed Boundary



Dry Weather Screening 2017  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Map Index**



Source: MOA HGDB 2016  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017




















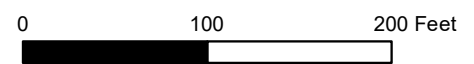
**LEGEND**

-  2017 Sampled Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Routing
  -  Xing Culvert

- Drainage Way Nodes**
-  Catch Basin
  -  Catchbasin Manhole
  -  Control Outlet
  -  End of Pipe (EOP)
  -  Manhole

-  OGS
-  Outfall
-  Outfall Major
-  Outfall Minor
-  Outlet

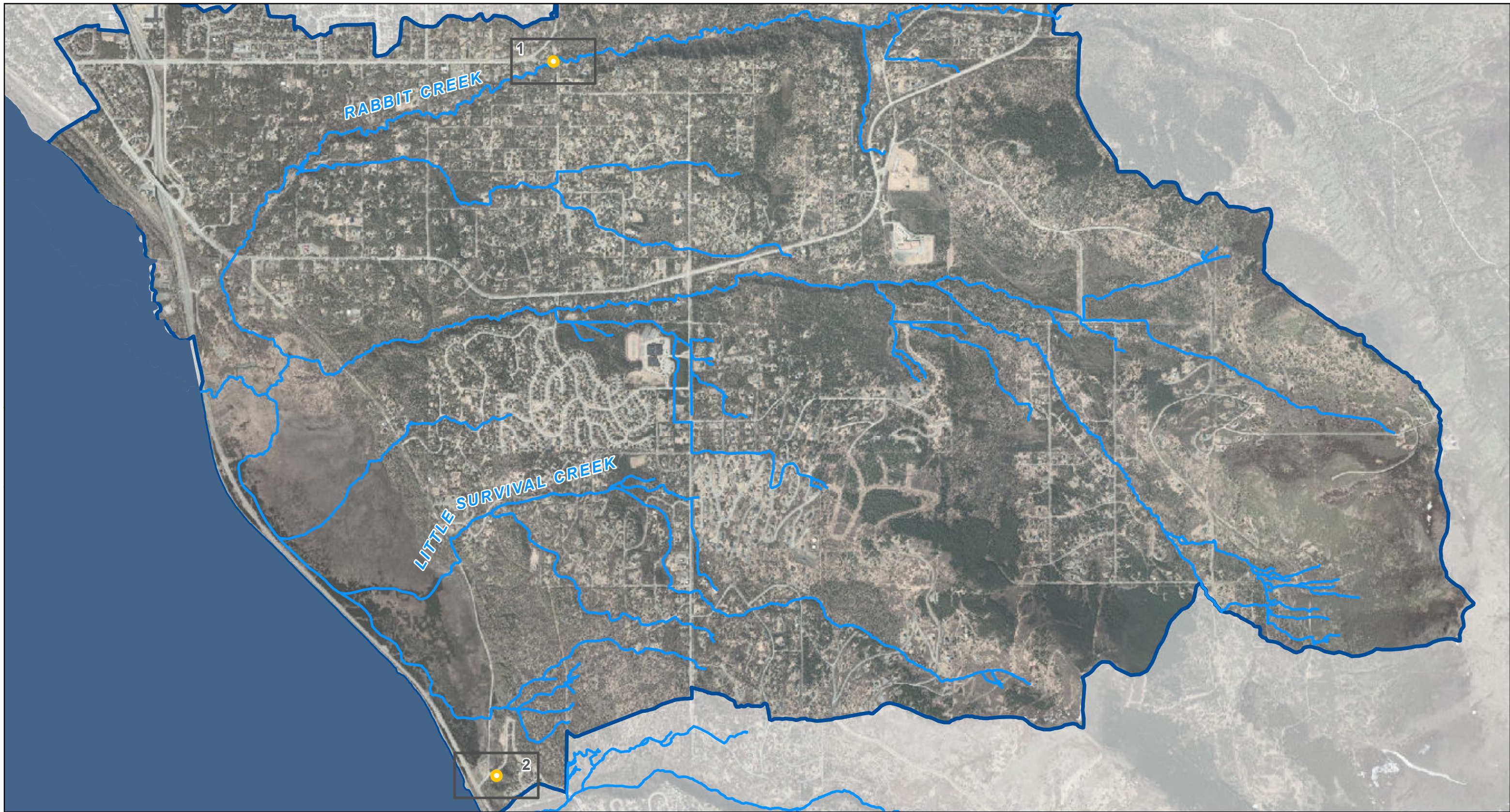


Dry Weather Screening 2017  
**Campbell Creek**  
 Examined and Sampled Outfalls  
**Page 1**

Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017

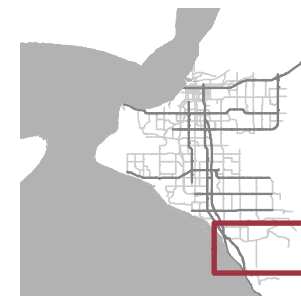
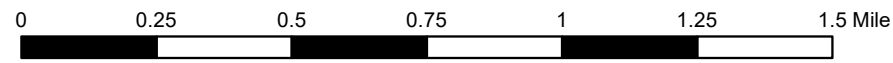






LEGEND

- 2017 Investigated Outfall
- Map Page Index
- ~ Stream

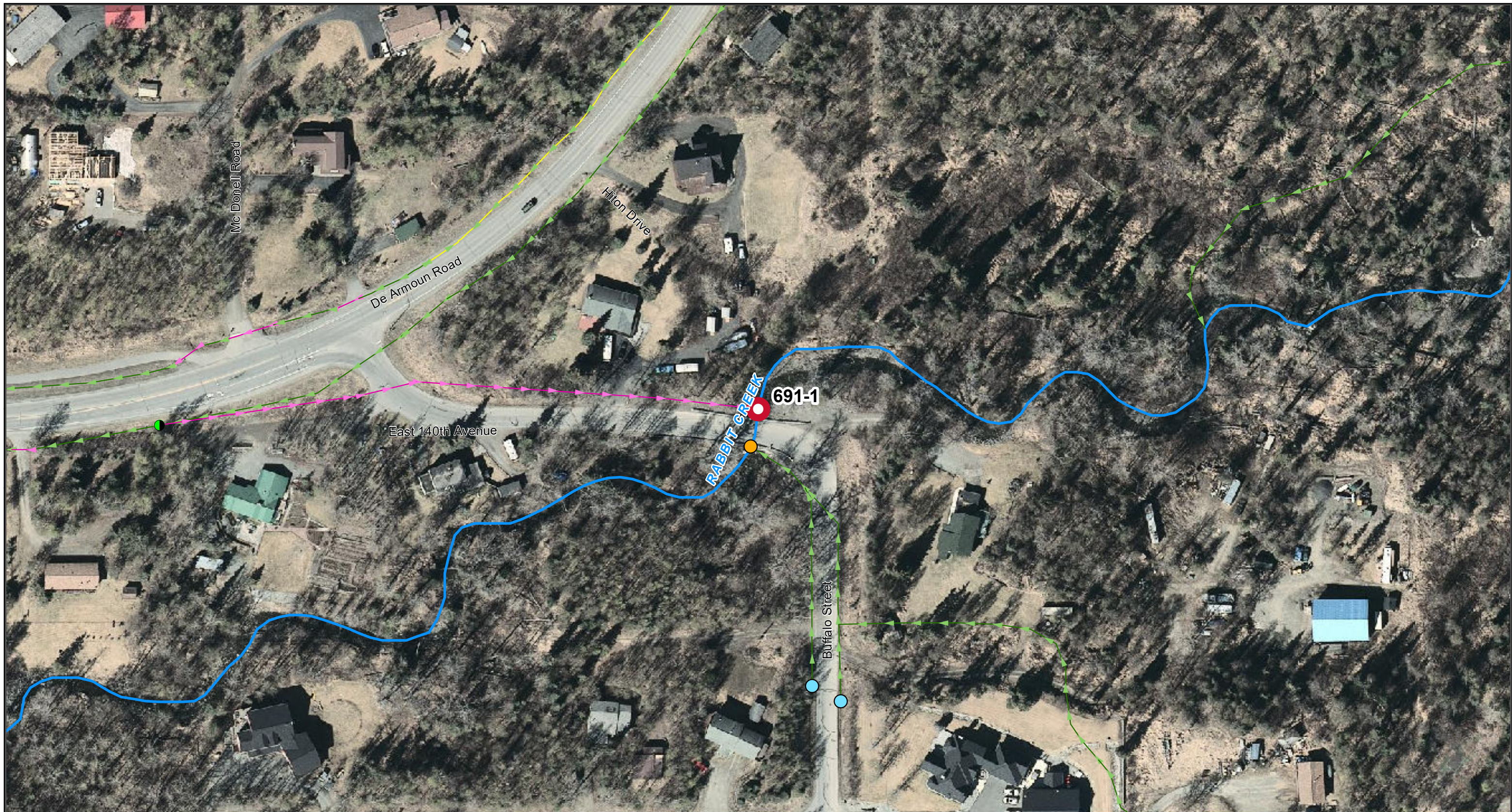


Dry Weather Screening 2017  
**Rabbit Creek**  
 Examined and Sampled Outfalls  
**Map Index**



Source: MOA HGDB 2016  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017












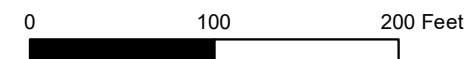


LEGEND

-  2017 Could Not Locate Outfall
-  Stream

- Drainage Ways**
-  Pipe
  -  Open Channel
  -  Xing Culvert

- Drainage Way Nodes**
-  Divide
  -  Inlet
  -  Outfall
  -  Outfall Major

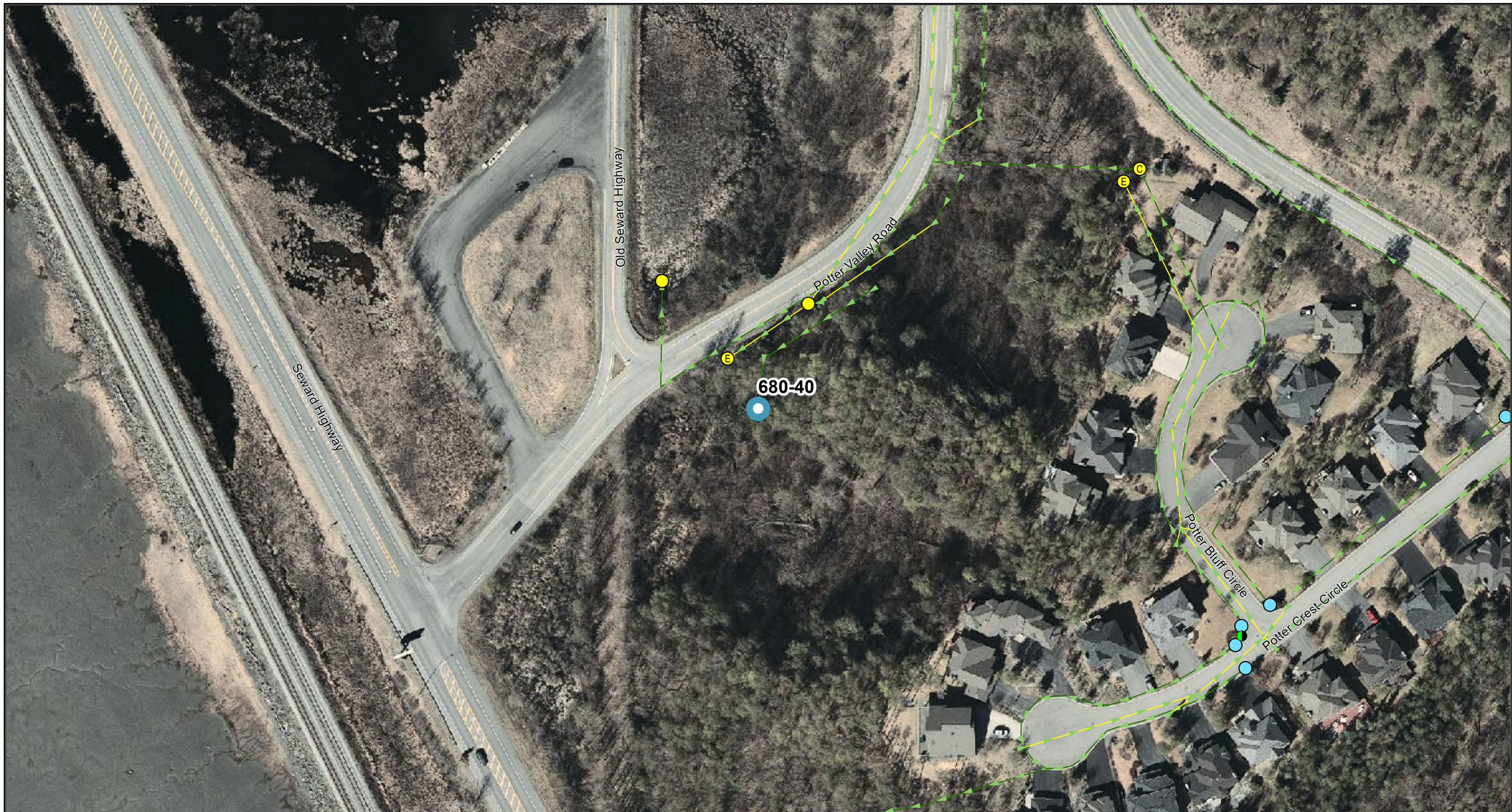


Dry Weather Screening 2017  
**Rabbit Creek**  
 Examined and Sampled Outfalls  
**Page 1**

Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017















**LEGEND**

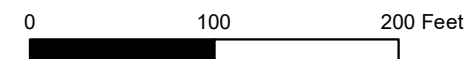
 2017 Examined Outfall, Alternate

**Drainage Ways**

-  Pipe
-  Open Channel

**Drainage Way Nodes**

-  Control Outlet
-  End of Pipe (EOP)
-  Inlet
-  Outfall Major
-  Outlet
-  Divide



Dry Weather Screening 2017  
**Rabbit Creek**  
 Examined and Sampled Outfalls  
**Page 2**

Source: MOA HGDB 2017  
 Imagery: MOA Pictometry 2015  
 HDR Alaska, Inc.  
 10/25/2017







# **Appendix B**

## **Field Notes**





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**Table B-1. Outfalls Investigated During 2017 DWS Program**

Outfall Code	Activity; Category	Latitude	Longitude	Location Description and Notes
<b>Fish Creek</b>				
684-1	Examined; Alternate	61.20251	-149.93555	West bank, within Fish Creek Estuary. Standing water in pipe, flowing water in flow path to creek; may be groundwater discharge. End of Pipe (EOP) is corroded and unravelling.
494-1	Could not locate	61.19959	-149.93266	West bank, below Loussac Dr. No access due to private property and Alaska Railroad tracks.
429-1	Could not locate	61.19931	-149.93122	East bank, below Arcadia Dr. No access due to private property and Alaska Railroad tracks.
298-1	Could not locate	61.19900	-149.92970	East bank, below Forest Park Dr. Surface runoff from road has incised small channel and eroded a flow path. Could not locate EOP; may be crushed below large mayflower tree. Cold, clear water discharging at base of tree, likely groundwater.
27-1	Examined; Alternate	61.19572	-149.92750	East bank, east of Forest Park Dr. at Northern Lights Blvd. Outfall is perched approximately 12 feet above ground with extensive scour erosion below. Water flowing from outfall and down flow path to creek.
1288-1	Examined; Not Suitable	61.19328	-149.92504	East bank, at Little Park on Willow St. Piped branch of Fish Creek co-routed with MS4. Cannot isolate outflow.
32-1	Examined; Not Suitable	61.19240	-149.93094	West bank, at Barbara St. Park on Barbara St. No flow, EOP is buried behind a large willow. Storm flow from outfall has incised a flow path through shrubs and diffuses into wetland area.
704-1	Could not locate	61.19191	-149.93090	East bank, at Barbara St. Park on W. 32 <sup>nd</sup> Ave. No evidence of outfall or storm network.
595-1	Examined; Alternate	61.18977	-149.93208	East bank, on Fish Creek Trail at W. 34 <sup>th</sup> Ave. Outfall discharges approximately 30 feet from creek, no defined flow path to creek. Trickle flow.
1310-201	Examined; Alternate	61.18866	-149.93508	West bank, south of McRae Rd. Two EOPs, slight flow from south EOP.
1259-1	Examined; Not Suitable	61.18864	-149.93502	East bank, south of McRae Rd. Not coded as outfall in HGDB (as of October 6, 2017), given temporary ID. Creek water is backwashing into outfall. Cannot collect isolated sample of outflow.
1259-2	Examined; Not Suitable	61.18861	-149.93504	East bank, south of McRae Rd. Not coded as outfall in HGDB (as of October 6, 2017), given temporary ID. Creek water is backwashing into outfall. Cannot collect isolated sample of outflow.
7-1	Examined; Not Suitable	61.18808	-149.93526	West bank, at W. 36 <sup>th</sup> Ave. EOP is half-submerged, creek water is backwashing into outfall. Cannot collect isolated sample of outflow. Construction along W. 36 <sup>th</sup> Ave. will include replacement of outfall, may be able to sample in future years.





Outfall Code	Activity; Category	Latitude	Longitude	Location Description and Notes
<b>Fish Creek</b>				
584-1	Examined; Not Suitable	61.18545	-149.93404	East bank, at Fish Creek Park on E. Turnagain Blvd. Outfall is below Barbara Dr. Not flowing. Defined flow path below EOP with some standing water; likely flows during storm events.
1312-19	Examined; Alternate	61.18353	-149.93358	West bank, behind junkyard on E. Turnagain Blvd. Flowing. Outfall in good condition.
1277-59	Examined; Alternate	61.18317	-149.93349	East bank, at Borland Dr. Outfall is below Barbara Dr. Approximately 8 inches of sediment in outfall. Flowing steadily, some flow may be from brief rain shower 20 minutes prior to reconnaissance.
686-1	Examined; Alternate	61.18218	-149.93486	West bank, on Fish Creek Trail at Spenard Rd. Water in outfall level with creek, visibly flowing. Sample could be collected inside outfall to isolate outflow.
686-167	Examined; Not Suitable	61.18213	-149.93483	West bank, on Fish Creek Trail at Spenard Rd. Creek water is backwashing into outfall. Cannot collect isolated sample of outflow.
391-1	Examined; Alternate	61.18207	-149.93475	East bank, on Fish Creek Trail at Spenard Rd. Flowing steadily during reconnaissance, outflow very cloudy, foamy. Targeted for sampling, but outfall was not flowing during sampling event.
610-1	Examined; Alternate	61.17887	-149.93375	West shore of pond at Northwood Park. Outfall is at Iris Dr. Flow path obstructed by debris causing water in flow path to back up and submerging outfall. Sample could be collected if flow path were cleared.
1054-1	Examined; Alternate	61.17805	-149.92991	South shore of pond at Northwood Park. Outfall is below Melvin Ave. Approximately 5 inches of sediment in outfall. Water flowing through channel incised through sediment and into flow path to wetland area adjacent to pond.
388-201	Examined; Not Suitable	61.17831	-149.92818	At Northwood Park on Northwood St. Steady flow. Outfall into east side of sedimentation basin, not considered suitable for sampling.
388-197	Examined; Not Suitable	61.17863	-149.92826	At Northwood Park on Northwood St. High flow. Outfall into east side of sedimentation basin, not considered suitable for sampling based on program requirements.
137-1	Could not locate	61.17947	-149.93084	North bank, at Northwood Park. Could not access outfall due to apparent homeless camp in area.
1013-1	Examined; Not Suitable	61.18110	-149.91976	South bank, at W. Tudor Rd and Taft St. Outfall is behind fence below Fish Creek Trail. Not flowing. Outfall is perched approximately 2 feet. Scour below EOP; likely flows during storm events.
1003-1	Examined; Alternate	61.18119	-149.91849	South bank, at W. Tudor Rd. and Harding Dr. Flow path below EOP down ravine and to creek. Trickle flow.
234-1	Could not locate	61.18162	-149.91732	North bank, at Jefferson Ave. and Lois Dr. Could not locate. No evidence of flow path to creek.





Outfall Code	Activity; Category	Latitude	Longitude	Location Description and Notes
<b>Fish Creek</b>				
191-1	Examined; Alternate	61.18338	-149.91422	North bank, south of Jefferson Ave. Flowing. Sediment and debris in flow path to creek.
<b>Furrow Creek</b>				
348-1	Examined; Not Suitable	61.10577	-149.87891	North bank, at Johns Rd. EOP is at Botanical Cir., roadside ditch conveys flow approximately 600 to creek. Not flowing.
19-1	Examined; Not Suitable	61.10667	-149.87342	North bank, at Mariner Dr. Not flowing. Outfall discharges into pool with standing water. No evidence of flow to creek; flow path has upslope gradient.
1496-1	Examined; Not Suitable	61.10854	-149.86426	South bank, at Huffman Rd. and Old Seward Hwy. Piped branch of Furrow Creek co-routed with MS4. Cannot isolate outflow.
281-1	Examined; Not Suitable	61.10499	-149.83929	Outfall is below Huffman Cir. Piped branch of Furrow Creek co-routed with MS4. Cannot isolate outflow.
407-2	Examined; Not Suitable	61.10510	-149.83872	Outfall is below Loren Cir. in backyard of private residence. Homeowner has constructed a large structure over outfall, inhibiting access to EOP. Well-defined flow path conveys water to creek.
572-3	Examined; Not Suitable	61.10851	-149.84189	Huffman Rd. and Meander Dr. Outfall discharges to piped creek below road. Cannot sample.
<b>Eagle River</b>				
<b><i>Eagle River Mainstem</i></b>				
541-1	Examined; Alternate	61.29843	-149.52203	North bank, on utility easement from Mountain Point Cir. EOP is in concrete headwall, discharges into swale above trail. Outlet from swale not flowing, no evidence of flow below outlet culvert to creek. Water in swale likely being absorbed into wetland and infiltrating.
1451-1	Examined; Alternate	61.29965	-149.50851	North bank, south of Driftwood Bay Dr. west of Riverside Dr. Outfall discharges to creek that flows to Eagle River.
1451-2	Examined; Alternate	61.29902	-149.50609	North bank, outfall is below Riverside Dr. Not coded as outfall in HGDB (as of October 6, 2017), given temporary ID. Outfall discharges from drainage way 1451-6-1 into swale that flows to southeast toward Eagle River.
<b><i>Meadow Creek</i></b>				
1376-1	Examined; Not Suitable	61.31495	-149.57107	North bank, west of Eagle River Rd. at VFW Post 9785. Network consists of roadside ditches with cross-culverts below driveways. Not flowing.
<b><i>Eagle River Loop Creek</i></b>				
1379-1	Examined; Not Suitable	61.32831	-149.56130	North Eagle River Loop Rd. and Spring Brook Dr. Outfall discharges into piped branch of creek below north of intersection. Cannot sample.





Outfall Code	Activity; Category	Latitude	Longitude	Location Description and Notes
<b>Eagle River</b>				
<b>Eagle River Loop Creek</b>				
1378-1	Examined; Not Suitable	61.33100	-149.55479	West side of Spring Brook Dr. Eagle River Loop Creek is piped below road. Drainage ditches on the west side of the road flow into the piped creek through a storm drain at the outfall. Cannot sample.
1377-1	Examined; Not Suitable	61.33235	-149.55296	East side of Spring Brook Dr. Outfall discharges into piped branch of creek below road. Cannot sample.
<b>Rabbit Creek</b>				
<b>Rabbit Creek Mainstem</b>				
691-1	Could not locate	61.09419	-149.78967	North bank, at E. 140 <sup>th</sup> Ave. and Buffalo St. Could not locate outfall. Map date in HGDB is 2007; road and/or MS4 network construction may have occurred since map date.
<b>Potter Marsh</b>				
680-40	Examined; Alternate	61.05477	-149.79641	South of Potter Valley Rd. at Old Seward Hwy. Outfall is below Potter Creek sign. Steady flow. Discharges to gully and flows north through culvert under Potter Valley Rd. to Potter Marsh. Low priority alternate, uncertain extent of network upstream. Discharge may be mostly conveyed from roadside ditches.

**Note:** EOP = end of pipe



Dry Weather Screening 19 May 2017  
Fish Creek Recon - AG, LS

1684-1

standing water in pipe -  $\frac{1}{2}$ "

flow in drainage path - may be GW discharge

iron sheen, no odor  
foam at EOP

pipe is corroded + unraveling

298-1

W of Forest Park Drive

EOP not found

surface runoff from road has incised small  
channel (4" wide, 4" deep) + eroded a

drainage path (no flow at time of visit)

cold, clear water flowing from the base of

a large mayflower tree - no odor,  
particulates, turbidity - likely GW

steady flow in path to creek - not  
storm water

catch basin on E side of Forest Park has

water but not enough to flow into pipe



Fish Creek Reach AG, LS 19 May 17  
692-D

~~Completely clogged w/ gravel + dirt  
water in basin above outfall  
cannot locate EOP~~

~~channel (1/2 corrugated pipe) filled w/  
leaves + gravel no evidence of recent  
flow~~ Erased channel

2" pipe in concrete headwall

1" water in pipe. 1" sediment

1 sec/1ft flow = 15ft/min

w eddy from creek in out fall

reek water brown + cloudy, some foam  
0" fish jumped in creek below cut

7-1

2" PVC pipe

eroded 12", eroded below EOP

concrete headwall eroded out

10 oz in 2.2 sec. flow = 1 gal/14 sec = 4 gal/min

steady flow in channel - 1-2' wide,

incised ~6' near outfall, 1' near creek

clear clear water - no smell/stress

lots of concrete chunks in channel

bed = clay, sand, gravel



Fish Creek Recon Aerials 19 May 17  
32-1

- not flowing  
EOP is buried, large willow right below outfall
- flow has incised channel around shrubs, diffuses into flood plain  
some standing water in channel, organic
- sheen

701-1

could not locate

4/62-1 ⊕

33<sup>rd</sup> at Fish Creek path

flowing into channel to creek

- 20 oz in 8 sec = 1 gal / 50 sec = 1.2 gal/min  
4-5" water in flowpath, water level even w/ creek
- storm network along 33<sup>rd</sup> will be redone next summer, including outfall clear water, no odor / sheen / debris

595-1 alt.

floculen - in pipe, water slightly tea colored  
flows into flood plain, no defined flow path  
20 oz / 22 sec = 1 gal / 110 sec = .45 gal/min



Fish Creek Recon AGLS 19 May 17

310-20D alt

2 culverts on W side of creek

N - not flowing, sed in pipe

S - slight flow, water level even w/ creek - could sample in pipe (aet.)

2 named outfalls - across from 1310-201

2 culverts on E side of creek

both are ponded w/ back flow from creek  
not flowing

7-1

6" pipe, 20" water in pipe - level w/ creek - back flow from creek, no flow

work on Turnagain Blvd this summer, outfall + network will be replaced

128-1

steady flow

orange pipe in outfall + flowpath

collar of pipe is corroded

water clear, no silt - slight metal smell

384-1

slow defined flowpath w/ some standing water - debris + leaves  
- may flow during storms

2025

11.1.2025

No. 692



(1277-59)

12" pipe - 8" sediment, 1 1/2" water

flowing - 3 sec/ft = 20 ft/min

slightly murky - no odor/sheen/debris

brief rain shower ~ 20 min prior

(1312-19) alt

12" pipe - &lt; 1/4" water

flowing, could sample w/ pipe

water clear, no odor/sheen/debris

outfall in good condition

(686-1) alt

18" pipe - 14" water, level w/ creek

flowing - 2 sec/ft = 30 ft/min

can sample inside pipe

water murky, no sheen/odor

686-167

36" pipe, more than half full of water

not flowing, likely back flow from creek

water murky, no sheen/odor

(391-1) alt

flowing - 2" water in pipe - 1 ft/sec = 60 ft/min

very cloudy, foam, no odor/sheen

24" pipe, collar damaged



Fish Creek Reconn AG, LS 19 May 17

610-D alt.

completely submerged - flowpath obstructed  
by debris & backed up. could sample if  
flowpath drains - flowing.

24" pipe, 14" water + 12" sediment  
standing water above sed. basin on  
lawns - surface drainage from road/  
rifleway to N?

154-D alt.? outfall into sed basin

8" pipe, 5" sediment in pipe

water flowing in 2" wide channel thru  
sediment, 2" deep

flows into wetlands adjacent to sed pond

300-201

outfall into sed basin

36" pipe, 5" water in pipe

2 sec/ft = 30 ft/min flow

run staining, cloudiness, foam, floc

metallic / trash odor

collar is rusted & water flowing out through  
cracks



Fish Creek Recon AS, LS  
388-197

19 May 17

outfall into sed basin

36" pipe, 4" water in pipe  
1 sec / ft = 60 g / mm

iron staining, floc, cloudiness

metallic odor not as strong as 388-201

1003-1 alt.

10" pipe inside 24" collar  
trickle flow

slightly cloudy, no odor / sheen - urban debris  
in hillside above ravine - water flows into  
ravine + into creek. Standing water in  
ravine, not flowing. No defined flow path

1013-1

24" pipe in hill below Tudor + bike path  
dry, perched

scout below EOP - likely flows in storms

1411-1 alt

access along easement from Jefferson

12" pipe, 7" water in pipe

flow path to creek gully, sed w/ sed + debris  
water cloudy, tea colored, no odor / sheen



Fish Creek Recon AG, LS 19 May 17

288-1 - branch of Fish Creek + outfalls

18" pipe w/ grate CANNOT SAMPLE

high flow, murky - 1 ft deep thru notch were  
some urban debris in grate - trash smell

flow from outfall flowing upstream in  
neek channel -

288-944 alt

18" pipe, sediment in most of pipe  
water flowing in 2" channel through  
sediment, 2" deep

ran floc, tea stained water, iron odor



Furrow Creek Recon AB, LS 31 May 17

(5-1) \*

EOP approx. 50 ft N of creek

- flows through well-defined channel to creek flowing, about 1" deep, ~1 ft/sec
- stream at outlet, no odor/color/shreen
- outfall in good condition

348-1

- not an outfall - no entry to MS4
- drainage ditch along W side of John's Road
- overflow culvert under John's Road for creek - standing water at outlet

19-1

not flowing

- LID swale to creek - standing water in pool at outlet, no evidence of flow to creek - channel has upslope gradient

(1359-1) \*

- overhanging sod
- 12" pipe overgrown w/ grass - black PVC
- flowing - non flow on substrate + in pipe
- slight metallic smell, no shreen/color
- water in pipe approx 1" deep, ~1/2 ft/sec
- outfall in good condition



Furrow Creek Recon AG, LS 31 May 77

345-1 (2)

24" pipe inside plastic collar - good condition  
outfall at end of Division St. channel  
flows ~ 50 ft to creek. Culvert under path  
1 of creek eroded slightly  
water in pipe 1/2" deep, 8 1/2" wide <sup>flow</sup> 1 ft/sec  
clear, no color/sheen  
distinct odor - similar to laundry softener  
or slight chlorine smell?

496-1

outfall from MS4 and piped stream connected  
cannot sample

506-D alt

36" pipe in concrete headwa below highway  
trickle flow - could sample  
no odor, slight cloudiness, no sheen  
water ~ 1/2" deep in pipe, 4 sec/1 ft  
flows through wetland swale to creek

572-3

flows creek under road - no outfall

701-1

outfall from MS4 and piped stream  
cannot sample

NO. 692

11 DIVISION ST.  
SEASIDE, WA 98138

No. 692



Furrow Creek Recon Abi, LS 31 May 17  
407-2

access from Silver Spruce Cr. walk up creek

- outfall is in backyard - homeowner has constructed large structure over outfall, cannot access end of pipe
- water clear, slight odor - metallic

332-1

- 18" black PVC pipe w/ grate - good condition flows through wetland to creek flowing - 4" water in pipe - 3 sec/ft =  $\frac{20}{\text{min}}$  12" across in pipe
- no color / sheen, slight organic smell / plant

402-1?

- location of outfall shown on ~~map~~ <sup>HGDB</sup> is covered by debris - could not locate
- approximately 20 ft south is an EOP, but w/ no network shown on HGDB
- 12" metal pipe, drains into wetland to creek flowing 2 sec/ft = 30 ft/min
- water 3" deep, 10" wide
- no odor / color / sheen

1376-1

dry - connected to ditches along Exile? we rd  
no evidence of flow DS to River - but object



Rabbit Creek Pecon AG, LS 31 May 17

280-40 alt

below Potter Creek sign

forming 1 1/2" deep, 8" wide, 1 ft/sec = 609 ft/min

clear, no odor/color/sheen

8" metal pipe, 1/2 full of gravel

flows down hill into gully & then through

valley to Potter Marsh

uncertain extent of network upstream -

may be mostly drainage ditches

9/11

could not locate - budget network redone

in 2012

ALL OF RABBIT CREEK -  
NEED UPDATED AGDB

STRAIGHT

11 DORRIS COPE  
1280 W. 1st St  
17000

No. 692



(303-1) ⊗

EOP to west of where drainage is shown

- on HGDB - look for storm manhole  
24" pipe, water 2' deep, 0' across, 2 ft/sec = 30 ft/min  
water clear, no odor/scum/sheen
- flows down defined channel to River <sup>waterfall</sup>  
not flowpath shown on HGDB

(541-1) alt.

18" PVC in concrete headwall  
discharges to swale on US side of trail,  
~~flowing thru culvert to tank to river~~  
backwatered - pipe more than 1/2 full of water  
~ 3" of sediment + 11" of water in pipe  
slight cloudiness - organic  
no scum/sheen

flowing ~ 10 sec/ft = 6 ft/min  
outlet def - no defined channel below  
outlet. discharge is likely being absorbed  
into wetland + infiltrating

(1417-1) ⊗

12" PVC pipe w/ plastic collar  
2" water in pipe - 1 ft/2 sec = 30 ft/min <sup>water in pipe</sup>  
water clear, no sheen/scum/odor, cold-GW?  
flows into defined channel ~1' wide  
algae in pipe + flowpath



Eagle River Recon

AGHS 31 May 17

unnamed outfall alt.

drainage network 1451-C-1

6" PVC pipe w/ collar + grate - flowing

2" deep, 10" across, flow 2 ft/sec = 30 ft/min

flows into swale - slightly ruckled up

water clear, no odor/sheen/foam

water cold - GW infiltration?

unnamed outfall ⊕

2" metal pipe - outfalls into River on N side to

S of Chain of Rock St. (near of 646-70)

flowing - 3" deep, 7" across - high flow ~ 20 ft/sec

no network shown on HGDB

walked up chain of rock to Kahitan - no

evidence of network

1377-1 and 1378-1

Eagle River Loop Creek is piped under

Spring Brook Rd. Natural drainage from

slope to S flows into creek thru

culverts on S side of road, drainage

ditches along N side of road flow

into creek under road thru grates.

cannot sample

1379-1

MSL joins piped creek under Eagle River Loop Rd.  
cannot sample



Eagle River Reach A6, LS 3/ May 17

(1385-1) (\*)

60" metal pipe in concrete headwall + grate

N of tunnel under Eagle River Loop Rd  
grate - some trash.

flowing - 2" deep, 10" across 2 sec/ft = 30 gpm

water clear, no odor/sheen/scum

drainage way - flow path incised thru  
vegetation (1 1/2' wide, 2' deep) for first

100', then flow path is bare gabions  
rock gabions on either side of flow path.  
good condition

lots of trash stuck in wire mesh of  
gabions





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# **Appendix C**

## **Field Data Forms**





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# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FSH 082-1

### Part 1. General Information

- 1. Date 6/12/17 Time 1110
- 2. Field Crew A. Erick, A. Moxness Water quality analyses conducted by: A. Erick, L. Spencer, S. Gonsenick
- 3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- 4. Size of last rain event 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- 5. End-of-pipe diameter: 2 feet \_\_\_\_\_ inches
- 6. Depth of water in end-of-pipe: \_\_\_\_\_ feet 2.5 inches

### Part 2. Visual Observations

- 7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
- 8. Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- 9. Odors:  No  Yes *If yes, describe in comment section.*
- 10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- 11. Vegetation: none
- 12. Structural Condition: good
- 13. Biology none

### Part 3. Field Analyses

- 14. Flow: \_\_\_\_\_ gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- 15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- 16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- 17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank [1 each before sampling event]	Duplicate Sample [1 each sampling event]
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	20.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.03	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	20.05 ppm
Total copper	20.05 ppm
Total phenols	20.1 ppm
Turbidity (outfall)	1.22 n/a
Turbidity (upstream)	
Fecal Coliform	

*Creek level < 1.5*

Part 4. Comments:  
water level in creek, flowing slowly





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FSH 462-1

## Part 1. General Information

1. Date 6/12/17 Time 1125
2. Field Crew A. Gerdek, A. Moxness Water quality analyses conducted by: A. Gerdek, L. Spencer, S. Grosse
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event, 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 0 inches
6. Depth of water in end-of-pipe: 1 feet 1 inches

## Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: none 12. Structural Condition: good
13. Biology: none

## Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.03	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	2.57 ntu
Turbidity (upstream)	
Fecal Coliform	

free AV. <.5

## Part 4. Comments:

flow ~ 8sec / 1L  
pipe pecked ~ 4 inches

water in flowpath level w/ creek  
some sheen in flowpath - iron





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FST 228-1

### Part 1. General Information

- 1. Date 6/12/17 Time 1140
- 2. Field Crew A. Geruk, A. Mosses Water quality analyses conducted by: A. Geruk, L. Spencer, S. Grosseville
- 3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- 4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- 5. End-of-pipe diameter: 2 feet 0 inches
- 6. Depth of water in end-of-pipe: \_\_\_\_\_ feet 1 inches + 1 inch sediment in pipe

### Part 2. Visual Observations

- 7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
- 8. Water flowing from end-of-pipe?  No  Yes  
*If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.*
- 9. Odors:  No  Yes *If yes, describe in comment section.*
- 10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
- 11. Vegetation: none
- 12. Structural Condition: poor - bottom of pipe rusted out + collar
- 13. Biology: orange flac

### Part 3. Field Analyses

- 14. Flow: \_\_\_\_\_ gal/min; OR  
 Low; Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
- 15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- 16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
- 17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<u>20.5</u> ppm	ppm
Detergents	<u>20.05</u> ppm	ppm
Total copper	<u>20.05</u> ppm	ppm
Total phenols	<u>20.1</u> ppm	ppm
Turbidity (outfall)	<u>0.03</u>	<u>10.7 ntu</u>
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	<u>7</u> pH units
Total chlorine	<u>20.5</u> ppm
Detergents	<u>20.05</u> ppm
Total copper	<u>20.05</u> ppm
Total phenols	<u>20.1</u> ppm
Turbidity (outfall)	<u>10.7 ntu</u>
Turbidity (upstream)	
Fecal Coliform	

free avail. 20.5

### Part 4. Comments:

non flac in creek ~ 15 ft downstream of OF





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FSH ~~391~~ 1287-994

## Part 1. General Information

- Date 6/12/17 Time 1220
- Field Crew A. Gerlach, A. Moyness Water quality analyses conducted by: A. Gerlach, L. Spencer, S. Greenhill
- How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
- Size of last rain event: 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
- End-of-pipe diameter: 1 feet 0 inches
- Depth of water in end-of-pipe:          feet          inches

## Part 2. Visual Observations

- Photograph Log: Camera # and frame number (s)
- Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
- Odors:  No  Yes If yes, describe in comment section.
- Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other floc
- Vegetation: none
- Structural Condition: good
- Biology: iron floc

## Part 3. Field Analyses

- Flow:          gal/min; OR  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
- Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
- Color of water flowing from end-of-pipe:  Clear  Colored orange
- Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	<u>6</u> pH units
Total chlorine	<u>&lt;0.5</u> ppm	<u>&lt;0.5</u> ppm
Detergents	<u>&lt;0.05</u> ppm	<u>&lt;0.05</u> ppm
Total copper	<u>&lt;0.05</u> ppm	<u>&lt;0.05</u> ppm
Total phenols	<u>&lt;0.1</u> ppm	<u>&lt;0.1</u> ppm
Turbidity (outfall)	<u>0.03</u>	<u>160 ntu</u>
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	<u>6</u> pH units
Total chlorine	<u>&lt;0.5</u> ppm
Detergents	<u>&lt;0.05</u> ppm
Total copper	<u>&lt;0.05</u> ppm
Total phenols	<u>&lt;0.1</u> ppm
Turbidity (outfall)	<u>169 ntu</u>
Turbidity (upstream)	
Fecal Coliform	

*Spec avail. <0.5*

## Part 4. Comments:

iron floc in pipe + flowpath to creek  
collected duplicate sample





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FSH 1287-1858-1

### Part 1. General Information

1. Date 10/12/17 Time 1245
2. Field Crew A. Gercek, A. Moxness Water quality analyses conducted by: A. Gercek, L. Spencer, S. Grynwald
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 2 feet 0 inches
6. Depth of water in end-of-pipe: 1 feet 0 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: none 12. Structural Condition: good
13. Biology iron floc

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each, before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.03	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	20.1 ppm
Turbidity (outfall)	7.47 ntu
Turbidity (upstream)	
Fecal Coliform	

Free avail. <0.5

### Part 4. Comments:

some trash stuck in grate (plastic)  
iron floc + staining on rocks below OF





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FUR 5-1

## Part 1. General Information

1. Date 06/12/2017 Time 11:28 AM
2. Field Crew Lynn<sup>9</sup>, Sam G Water quality analyses conducted by: Lynn Spencer  
A. Gerlach S. Gensertuk
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe:          feet 1 inches

## Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) IPAD
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: None 12. Structural Condition: Tilted collar, esch pipe in good condition
13. Biology

2 ft/sec  
1" deep  
4" wide

## Part 3. Field Analyses

14. Flow:          gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored Slightly pinked, tra colored
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.03	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	208 ntu
Turbidity (upstream)	
Fecal Coliform	

free available <0.1

## Part 4. Comments:

Flow: 2 ft/sec  
1" deep

Remember flow being clear @ recon - check notes





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FUR 1345-1

## Part 1. General Information

1. Date 06/12/2017 Time 12:04 PM
2. Field Crew Lynn Spencer, Sean Giosenick Water quality analyses conducted by: Lynn Spencer, A. Geruk, S. Giosenick
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe: 3/4 feet 3/4 inches

## Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: None 12. Structural Condition: The water has undercut the pipe, water is not passing through pipe.
13. Biology \_\_\_\_\_

## Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.03 <del>0.0</del>	<del>0.04</del>
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.2 ppm
Turbidity (outfall)	1.07 ntu
Turbidity (upstream)	
Fecal Coliform	

Free available <0.5

## Part 4. Comments:

Structural Cond: water is passing underneath pipe  
 Flow: 3/4" Deep  
 3/4 ft/sec  
 6" wide





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FUR 1357-1

### Part 1. General Information

1. Date 06/12/2017 Time 12:35 PM
2. Field Crew Lynn Spencer, Sam Grosenick Water quality analyses conducted by: Lynn Spencer, A. Geruk, S. Grosenick
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe: 5 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: little bit of Algae 12. Structural Condition: Excellent
13. Biology \_\_\_\_\_

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy very slightly
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	7 pH units
Total chlorine	20.5 ppm	20.5 ppm
Detergents	20.05 ppm	20.05 ppm
Total copper	20.05 ppm	20.05 ppm
Total phenols	20.1 ppm	20.1 ppm
Turbidity (outfall)	0.03	7.94 ntu
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	20.5 ppm
Detergents	20.05 ppm
Total copper	20.05 ppm
Total phenols	20.1 ppm
Turbidity (outfall)	7.74 ntu
Turbidity (upstream)	
Fecal Coliform	

Free avail. 20.5

### Part 4. Comments:

Flow: 1 ft/sec  
5" deep  
18" wide

Duplicate Samples taken





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FUR 306-1

### Part 1. General Information

1. Date 06/12/17 Time 1:20 PM
2. Field Crew Lynn Spencer, Sam Grosenick Water quality analyses conducted by: A. Gerold, L. Spencer, S. Grosenick  
 unknown
3. How long since last rainfall?  raining now  less than 3 days  3 or more days
4. Size of last rain event 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 3 feet \_\_\_\_\_ inches
6. Depth of water in end-of-pipe: \_\_\_\_\_ feet \_\_\_\_\_ inches 1 cm

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: None 12. Structural Condition: Perfect
13. Biology \_\_\_\_\_

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored Very light Orange
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank [1 each before sampling event]	Duplicate Sample [1 each sampling event]
pH	N/A	pH units
Total chlorine	<u>20.5</u> ppm	ppm
Detergents	<u>20.05</u> ppm	ppm
Total copper	<u>20.05</u> ppm	ppm
Total phenols	<u>20.1</u> ppm	ppm
Turbidity (outfall)	<u>0.23</u>	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	<u>7</u> pH units
Total chlorine	<u>20.5</u> ppm
Detergents	<u>0.45</u> ppm
Total copper	<u>20.05</u> ppm
Total phenols	<u>0.3</u> ppm
Turbidity (outfall)	<u>29.1</u> ntu
Turbidity (upstream)	
Fecal Coliform	

Spec avail. <0.5

### Part 4. Comments:

Flow: too minimal to measure, 2 min to fill 250 ml weather: 57° Cloudy  
 odors: rusty  
 floatables: organic sheen





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FUR 402-1

### Part 1. General Information

1. Date 06/12/17 Time 1:49 PM
2. Field Crew Lynn Spencer, Sam Grosnick Water quality analyses conducted by: Lynn Spencer, A. Spadek, S. Grosnick
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet          inches
6. Depth of water in end-of-pipe:          feet 2.5 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s)
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: Horsetails 12. Structural Condition: Good
13. Biology

### Part 3. Field Analyses

14. Flow:          gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	0.5 ppm	ppm
Detergents	0.05 ppm	ppm
Total copper	0.05 ppm	ppm
Total phenols	0.1 ppm	ppm
Turbidity (outfall)	0.03	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	6 pH units
Total chlorine	<0.5 ppm
Detergents	0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	2.4/ntu
Turbidity (upstream)	
Fecal Coliform	

free avail. 20.5

### Part 4. Comments:

Flow: 25" deep  
4" wide  
15 ft/sec

Weather: 57°, Cloudy





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: FUR 332-1

## Part 1. General Information

1. Date 06/12/17 Time 2:00 PM
2. Field Crew Lynn Spencer, Sam Grosewick Water quality analyses conducted by: Lynn Spencer, A. G. W. W. S. Grosewick
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe: 4.5 inches

## Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) \_\_\_\_\_
8. Water flowing from end-of-pipe?  No  Yes sub surface flow  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: veg floating on surface, algae covered rocks on bottom
12. Structural Condition: Black PVC, collar cracked, has grate in good condition
13. Biology: Macro Invertebrates

## Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	20.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.03	
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	8 pH units
Total chlorine	20.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	2.72 ntu
Turbidity (upstream)	
Fecal Coliform	

free avail. <0.5

## Part 4. Comments:

Flow: 12.5" wide  
4.5" deep  
minimal flow 2"/sec  
surface, not flowing

Floatables: Biological floating scum, leafage  
Odor: slight organic/musty smell, almost metallic  
Weather: 59° sun starting to come out cloudy





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: CAM 105-1

### Part 1. General Information

1. Date 6/12/11 Time 1500, 1510 P.m., 1515 P.m.  
 2. Field Crew L. Spencer Water quality analyses conducted by L. Spencer  
S. Grosnick  
 3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown  
 4. Size of last rain event. 0.14 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)  
 5. End-of-pipe diameter: 2 feet \_\_\_\_\_ inches  
 6. Depth of water in end-of-pipe: \_\_\_\_\_ feet 1.5 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) IPad  
 8. Water flowing from end-of-pipe?  No  Yes  
 If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.  
 9. Odors:  No  Yes If yes, describe in comment section.  
 10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other  
 11. Vegetation: none 12. Structural Condition: good  
 13. Biology orange scum

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR low flow  
 Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly  
 15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy orangish  
 16. Color of water flowing from end-of-pipe:  Clear  Colored "  
 17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	<u>7</u> pH units
Total chlorine	<u>&lt;0.5</u> ppm	<u>&lt;0.5</u> ppm
Detergents	<u>10.05</u> ppm	<u>0.15</u> ppm
Total copper	<u>&lt;0.05</u> ppm	<u>0.05</u> ppm
Total phenols	<u>&lt;0.1</u> ppm	<u>0.1</u> ppm
Turbidity (outfall)	<u>0.3</u>	<u>113</u> ntu
Turbidity (upstream)		
Fecal Coliform		

Water Quality Samples	
Parameter	Primary Sample
pH	<u>7</u> pH units
Total chlorine	<u>&lt;0.5</u> ppm
Detergents	<u>0.2</u> ppm
Total copper	<u>&lt;0.05</u> ppm
Total phenols	<u>&lt;0.1</u> ppm
Turbidity (outfall)	<u>89.2</u> ntu
Turbidity (upstream)	
Fecal Coliform	

free avail. 205

### Part 4. Comments:





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: ER 303-1

### Part 1. General Information

1. Date 8/1/17 Time 1025
2. Field Crew A. Gelekh, L. Spencer Water quality analyses conducted by: A. Gelekh, L. Spencer
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event 0.17 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 2 feet 0 inches 26 July
6. Depth of water in end-of-pipe: 0 feet 0.5 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) outfall, flowpath, storm network manhole
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: Prunus padus along flowpath 12. Structural Condition: good
13. Biology \_\_\_\_\_

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	/
Detergents	<0.05 ppm	/
Total copper	<0.05 ppm	/
Total phenols	<0.1 ppm	/
Turbidity (outfall)	0.13	/
Turbidity (upstream)	-	/
Fecal Coliform	-	/

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	0.25
Turbidity (upstream)	-
Fecal Coliform	-

Free <0.5

### Part 4. Comments:

flow path - cobbles, water ~ 1-4" deep, flows steeply to S.





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: ER 1417-1

### Part 1. General Information

1. Date 8/1/17 Time 1045
2. Field Crew A. Gerlek, L. Spencer Water quality analyses conducted by: A. Gerlek, L. Spencer
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.17 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 0 inches L 26 July
6. Depth of water in end-of-pipe: 0 feet 1.25 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) outfall flow path
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other organic
11. Vegetation: \_\_\_\_\_ 12. Structural Condition: good
13. Biology \_\_\_\_\_

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.13	
Turbidity (upstream)	-	
Fecal Coliform	-	

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm <u>free &lt;0.5</u>
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	0.48
Turbidity (upstream)	-
Fecal Coliform	-

### Part 4. Comments:

some urban debris on flow path below outfall - plastic bags  
 flowpath - cobbles w/ horsetail + Epilobium ciliatum, Salix herbacea  
 2% slope to S





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: ER 1375-99

## Part 1. General Information

1. Date 8/1/17 Time 1105
2. Field Crew A. Gerlek, L. Spencer Water quality analyses conducted by: A. Gerlek, L. Spencer
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.17 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 0 inches like July
6. Depth of water in end-of-pipe: 0 feet 2 inches

## Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) outfall, downstream
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: - 12. Structural Condition: good - perched 6"
13. Biology algae in bottom of outfall

## Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.13	/
Turbidity (upstream)	-	
Fecal Coliform	-	

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	0.49
Turbidity (upstream)	-
Fecal Coliform	-

Free <0.5

## Part 4. Comments:

no network shown in HGIS. Given temporary ID by HDR in \_\_\_\_\_





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: ER 046-71

### Part 1. General Information

1. Date 8/1/17 Time 1120
2. Field Crew A. Gelek, L. Spencer Water quality analyses conducted by: A. Gelek, L. Spencer
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.17 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 1 feet 6 inches 626 July
6. Depth of water in end-of-pipe: \_\_\_\_\_ feet 3 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) outfall, downstream
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: Moss in pipe. 12. Structural Condition: good - some cracking of pipe
13. Biology: dead silver salmon at EPP.

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High; Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.05 ppm	ppm
Total copper	<0.05 ppm	ppm
Total phenols	<0.1 ppm	ppm
Turbidity (outfall)	0.13	
Turbidity (upstream)	-	
Fecal Coliform	-	

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	<0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	0.40
Turbidity (upstream)	-
Fecal Coliform	-

Free < 0.5

### Part 4. Comments:

high flow. outfall perched 6"





# DRY WEATHER SCREENING FIELD DATA FORM



Outfall Number: ER 1335-1

⊕ duplicate collected

### Part 1. General Information

1. Date 8/1/17 Time 1205
2. Field Crew A. Gerlek, L. Spencer Water quality analyses conducted by: A. Gerlek, L. Spencer
3. How long since last rainfall?  raining now  less than 3 days  3 or more days  unknown
4. Size of last rain event. 0.17 inches (Attach data from Anchorage International Airport or Girdwood. Websites provided on back of form.)
5. End-of-pipe diameter: 4 feet 0 inches late July
6. Depth of water in end-of-pipe: 0 feet 1 inches

### Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) outfall #2, flowpath x5
8. Water flowing from end-of-pipe?  No  Yes  
If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. If YES, continue.
9. Odors:  No  Yes If yes, describe in comment section.
10. Floatables in water flowing from end-of-pipe:  None  Moving oily sheen  Surface scum  Soapy suds  Debris  Other
11. Vegetation: - 12. Structural Condition: moderate - grate off.
13. Biology Phalaris arundinacea in flow path Gabions along flow path - good

### Part 3. Field Analyses

14. Flow: \_\_\_\_\_ gal/min; OR
- Low: Not intense, water moving very slowly  Medium: Water moving at a moderate rate  High: Intense water moving very quickly
15. Appearance of water flowing from end-of-pipe:  Clear  Cloudy/Muddy
16. Color of water flowing from end-of-pipe:  Clear  Colored \_\_\_\_\_
17. Water Quality Analyses:

Quality Control Samples		
Parameter	Equipment Blank (1 each before sampling event)	Duplicate Sample (1 each sampling event)
pH	N/A	7 pH units
Total chlorine	<0.5 ppm	<0.5 ppm
Detergents	<0.05 ppm	0.05 ppm
Total copper	<0.05 ppm	<0.05 ppm
Total phenols	<0.1 ppm	<0.1 ppm
Turbidity (outfall)	0.13	1.62
Turbidity (upstream)	-	-
Fecal Coliform	-	-

Water Quality Samples	
Parameter	Primary Sample
pH	7 pH units
Total chlorine	<0.5 ppm
Detergents	0.05 ppm
Total copper	<0.05 ppm
Total phenols	<0.1 ppm
Turbidity (outfall)	1.45
Turbidity (upstream)	-
Fecal Coliform	-

### Part 4. Comments:

grate has fallen off. Lots of urban debris in grate + flow path.  
 Water not flowing directly to river. Infiltrates in to gabions ~ 20 ft below EOP.  
 Trash in flow path, evidence of flow during high water.  
 Flow path vegetated w/ Rebet + Cal can to ~ 100 ft below EOP.





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# **Appendix D**

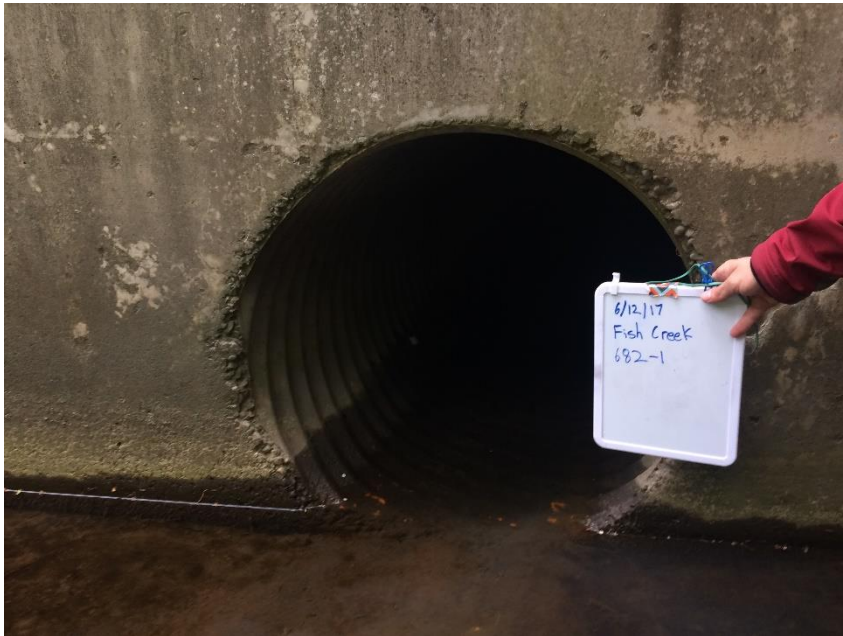
## **Outfall Sampling Photographs**





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Fish Creek 162-1. June 12, 2017.



Fish Creek 462-1. June 12, 2017.





Fish Creek 228-1. June 12, 2017.



Fish Creek 1287-994. June 12, 2017.





Fish Creek 1287-1858-1. June 12, 2017.



Furrow Creek 5-1. June 12, 2017.





Furrow Creek 1345-1. June 12, 2017.



Furrow Creek 1359-1. June 12, 2017.





Furrow Creek 306-1. June 12, 2017.



Furrow Creek 402-1. June 12, 2017.



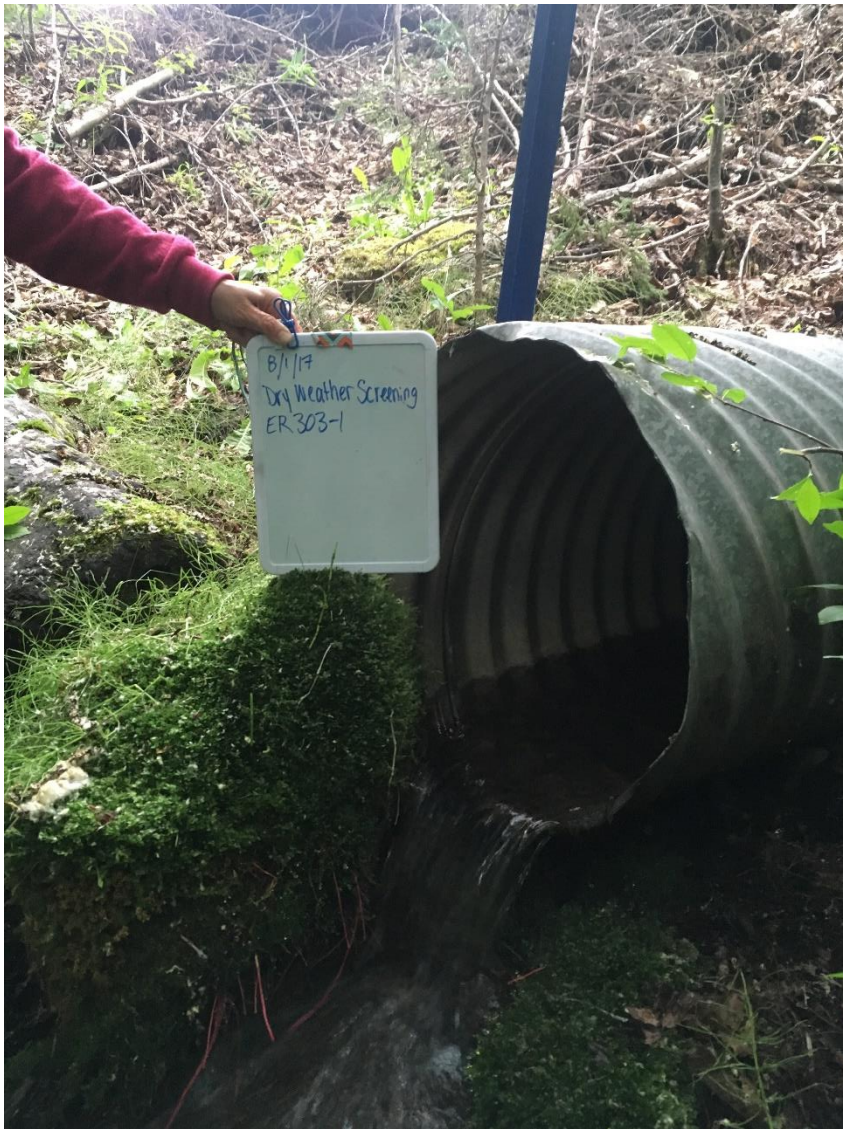


Furrow Creek 332-1. June 12, 2017.



Campbell Creek 105-1. June 12, 2017.





Eagle River 303-1. August 1, 2017.



Eagle River 1417-1. August 1, 2017.





Eagle River 1375-99. August 1, 2017.



Eagle River 646-71. August 1, 2017.





Eagle River 1335-1. August 1, 2017.





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# **Appendix E**

## **Laboratory Analysis Reports**





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## Laboratory Report of Analysis

To: MOA-Project Mnmt/Engr  
PO Box 196650  
Anchorage, AK 99519  
907-343-8058

Report Number: **1173239**

Client Project: **Dry Weather Screening**

Dear Kristi Bischofberger,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Forest Taylor  
Project Manager  
Forest.Taylor@sgs.com

Date

Print Date: 06/14/2017 1:35:50PM

SGS North America Inc. | 200 West Potter Drive, Anchorage, AK 99518  
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Member of SGS Group



## Case Narrative

SGS Client: **MOA-Project Mnmt/Engr**  
SGS Project: **1173239**  
Project Name/Site: **Dry Weather Screening**  
Project Contact: **Kristi Bischofberger**

Refer to sample receipt form for information on sample condition.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 06/14/2017 1:35:55PM



## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

**Note:** Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
FSH 1287-994	1173239001	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FSH 1287-994 DUP	1173239002	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FSH 682-1	1173239003	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FSH 462-1	1173239004	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FSH 228-1	1173239005	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FSH 1287-1858-1	1173239006	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
SM21 9222D	Fecal Coliform (MF)

Print Date: 06/14/2017 1:35:57PM



## Detectable Results Summary

Client Sample ID: **FSH 682-1**

Lab Sample ID: 1173239003

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

1.0

Units

col/100mL

Client Sample ID: **FSH 462-1**

Lab Sample ID: 1173239004

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

4.0

Units

col/100mL

Client Sample ID: **FSH 1287-1858-1**

Lab Sample ID: 1173239006

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

5.0

Units

col/100mL



## Results of FSH 1287-994

Client Sample ID: **FSH 1287-994**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173239001  
 Lab Project ID: 1173239

Collection Date: 06/12/17 12:20  
 Received Date: 06/12/17 13:05  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		06/12/17 14:47

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 14:47  
 Container ID: 1173239001-A

Print Date: 06/14/2017 1:35:59PM



## Results of FSH 1287-994 DUP

Client Sample ID: **FSH 1287-994 DUP**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173239002  
 Lab Project ID: 1173239

Collection Date: 06/12/17 12:20  
 Received Date: 06/12/17 13:05  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		06/12/17 14:47

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 14:47  
 Container ID: 1173239002-A

Print Date: 06/14/2017 1:35:59PM





**Results of FSH 682-1**

Client Sample ID: **FSH 682-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1173239003  
Lab Project ID: 1173239

Collection Date: 06/12/17 11:10  
Received Date: 06/12/17 13:05  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.0	1.00	1.00	col/100mL	1		06/12/17 14:47

**Batch Information**

Analytical Batch: BTF15665  
Analytical Method: SM21 9222D  
Analyst: K.W  
Analytical Date/Time: 06/12/17 14:47  
Container ID: 1173239003-A

Print Date: 06/14/2017 1:35:59PM



## Results of FSH 462-1

Client Sample ID: **FSH 462-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173239004  
 Lab Project ID: 1173239

Collection Date: 06/12/17 11:25  
 Received Date: 06/12/17 13:05  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	4.0	1.00	1.00	col/100mL	1		06/12/17 14:47

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 14:47  
 Container ID: 1173239004-A

Print Date: 06/14/2017 1:35:59PM



## Results of FSH 228-1

Client Sample ID: **FSH 228-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173239005  
 Lab Project ID: 1173239

Collection Date: 06/12/17 11:40  
 Received Date: 06/12/17 13:05  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		06/12/17 14:47

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 14:47  
 Container ID: 1173239005-A

Print Date: 06/14/2017 1:35:59PM



## Results of FSH 1287-1858-1

Client Sample ID: **FSH 1287-1858-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173239006  
 Lab Project ID: 1173239

Collection Date: 06/12/17 12:45  
 Received Date: 06/12/17 13:05  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	5.0	1.00	1.00	col/100mL	1		06/12/17 14:47

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 14:47  
 Container ID: 1173239006-A

Print Date: 06/14/2017 1:35:59PM



## Method Blank

Blank ID: MB for HBN 1760990 [BTF/15665]  
Blank Lab ID: 1390537

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1173239001, 1173239002, 1173239003, 1173239004, 1173239005, 1173239006

## Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

## Batch Information

Analytical Batch: BTF15665  
Analytical Method: SM21 9222D  
Instrument:  
Analyst: K.W  
Analytical Date/Time: 6/12/2017 2:47:00PM

Print Date: 06/14/2017 1:36:00PM



## Method Blank

Blank ID: MB for HBN 1760990 [BTF/15665]

Blank Lab ID: 1390588

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1173239001, 1173239002, 1173239003, 1173239004, 1173239005, 1173239006

## Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

## Batch Information

Analytical Batch: BTF15665

Analytical Method: SM21 9222D

Instrument:

Analyst: K.W

Analytical Date/Time: 6/12/2017 5:31:00PM

Print Date: 06/14/2017 1:36:00PM





SGS North America Inc.  
CHAIN OF CUSTODY RECORD

1173239



Locations Nationwide  
 Alaska  
 New Jersey  
 North Carolina  
 West Virginia  
 Maryland  
 New York  
 Indiana  
 Kentucky  
[www.us.sgs.com](http://www.us.sgs.com)

**Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.**

Page \_\_\_ of \_\_\_

**Section 1**

CLIENT: HDR Inc

CONTACT: Arena Gerlek PHONE NO: 907.310.907.644 0397

PROJECT/ PWSID/ PERMIT#: \_\_\_\_\_

REPORTS TO: \_\_\_\_\_ E-MAIL: arena.gerlek@hdrinc.com

INVOICE TO: \_\_\_\_\_ QUOTE #: \_\_\_\_\_

MDA PAVE K. Bisdorfberg P.O. #: Dry Weather Screening

**Section 2**

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB M = Multi Incr- mental Soils	REMARKS/ LOC ID
①	FSH 1287-944	06/12/17	12:20	H20	1	G	
②	FSH 1287-944 DUP	06/12/17	12:20	H20	1	G	
③	FSH 682-1	06/12/17	11:10	H20	1	G	
④	FSH 462-1	06/12/17	11:25	H20	1	G	
⑤	FSH 228-1	06/12/17	11:40	H20	1	G	
⑥	FSH 1287-1858-1	06/12/17	12:45	H20	1	G	

**Section 3**

Preservative

**Section 4**

DOD Project? Yes No

Cooler ID: \_\_\_\_\_

Requested Turnaround Time and/or Special Instructions:  
PLEASE CONTACT Arena Gerlek by phone w/ preliminary results w/in 24 hrs

Temp Blank °C: 7.0 #018 or Ambient [ ]

Chain of Custody Seal: (Circle) INTACT **BROKEN** **ABSENT**

(See attached Sample Receipt Form) (See attached Sample Receipt Form)

**Section 5**

Relinquished By: (1) Arena Gerlek Date 6/12/17 Time 13:05 Received By: \_\_\_\_\_

Relinquished By: (2) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (3) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (4) \_\_\_\_\_ Date 6/12/17 Time 13:05 Received For Laboratory By: [Signature]

14 of 16

Hand Delivered

<http://www.sgs.com/terms-and-conditions>

[ ] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301  
 [ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557





e-Sample Receipt Form

SGS Workorder #:

1173239



1 1 7 3 2 3 9

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
<b>Chain of Custody / Temperature Requirements</b>	<input checked="" type="checkbox"/>	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> n/a	ABSENT
COC accompanied samples?	<input checked="" type="checkbox"/> yes	
<input checked="" type="checkbox"/> **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input type="checkbox"/> no	Cooler ID: 1 @ 7.0 °C Therm. ID: D12
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/> n/a	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input checked="" type="checkbox"/> yes	
If <0°C, were sample containers ice free?	<input type="checkbox"/> n/a	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
<b>Holding Time / Documentation / Sample Condition Requirements</b>		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	<input checked="" type="checkbox"/> yes	
Do samples <b>match COC</b> ** (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/> yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/> yes	
Were proper containers (type/mass/volume/preservative***) used?	<input checked="" type="checkbox"/> yes	<input type="checkbox"/> n/a ***Exemption permitted for metals (e.g.200.8/6020A).
<b>Volatile / LL-Hg Requirements</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input type="checkbox"/> n/a	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> n/a	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> n/a	
<b>Note to Client:</b> Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		





### Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1173239001-A	Na2S2O3 for Chlorine Redu	OK			
1173239002-A	Na2S2O3 for Chlorine Redu	OK			
1173239003-A	Na2S2O3 for Chlorine Redu	OK			
1173239004-A	Na2S2O3 for Chlorine Redu	OK			
1173239005-A	Na2S2O3 for Chlorine Redu	OK			
1173239006-A	Na2S2O3 for Chlorine Redu	OK			

#### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM- The container was received damaged.

FR- The container was received frozen and not usable for Bacteria or BOD analyses.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.



## Laboratory Report of Analysis

To: MOA-Project Mnmt/Engr  
PO Box 196650  
Anchorage, AK 99519  
907-343-8058

Report Number: **1173247**

Client Project: **Dry Weather Screening**

Dear Kristi Bischofberger,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Forest Taylor  
Project Manager  
Forest.Taylor@sgs.com

Date



## Case Narrative

SGS Client: **MOA-Project Mnmt/Engr**  
SGS Project: **1173247**  
Project Name/Site: **Dry Weather Screening**  
Project Contact: **Kristi Bischofberger**

Refer to sample receipt form for information on sample condition.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 06/15/2017 4:43:37PM



## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

**Note:** Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
FUR 402-1	1173247001	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FUR 332-1	1173247002	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FUR 306-1	1173247003	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FUR 1359-1	1173247004	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FUR 1345-1	1173247005	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FUR 5-1	1173247006	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
CAM 105-1	1173247007	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
CAM 105-1 DUP	1173247008	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)
FUR 1359-1 DUP	1173247009	06/12/2017	06/12/2017	Water (Surface, Eff., Ground)

Method

SM21 9222D

Method Description

Fecal Coliform (MF)

Print Date: 06/15/2017 4:43:42PM



### Detectable Results Summary

Client Sample ID: <b>FUR 332-1</b> Lab Sample ID: 1173247002 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 4.0	<u>Units</u> col/100mL
Client Sample ID: <b>FUR 306-1</b> Lab Sample ID: 1173247003 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 4.0	<u>Units</u> col/100mL
Client Sample ID: <b>FUR 1359-1</b> Lab Sample ID: 1173247004 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 65	<u>Units</u> col/100mL
Client Sample ID: <b>FUR 1345-1</b> Lab Sample ID: 1173247005 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 169	<u>Units</u> col/100mL
Client Sample ID: <b>FUR 5-1</b> Lab Sample ID: 1173247006 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 890	<u>Units</u> col/100mL
Client Sample ID: <b>CAM 105-1</b> Lab Sample ID: 1173247007 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 6.0	<u>Units</u> col/100mL
Client Sample ID: <b>CAM 105-1 DUP</b> Lab Sample ID: 1173247008 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 5.0	<u>Units</u> col/100mL
Client Sample ID: <b>FUR 1359-1 DUP</b> Lab Sample ID: 1173247009 <b>Microbiology Laboratory</b>	<u>Parameter</u> Fecal Coliform	<u>Result</u> 320	<u>Units</u> col/100mL

Print Date: 06/15/2017 4:43:43PM

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## Results of FUR 402-1

Client Sample ID: **FUR 402-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247001  
 Lab Project ID: 1173247

Collection Date: 06/12/17 13:49  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247001-A

Print Date: 06/15/2017 4:43:44PM



## Results of FUR 332-1

Client Sample ID: **FUR 332-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247002  
 Lab Project ID: 1173247

Collection Date: 06/12/17 14:00  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	4.0	1.00	1.00	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247002-A

Print Date: 06/15/2017 4:43:44PM



## Results of FUR 306-1

Client Sample ID: **FUR 306-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247003  
 Lab Project ID: 1173247

Collection Date: 06/12/17 13:20  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	4.0	1.00	1.00	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247003-A

Print Date: 06/15/2017 4:43:44PM



## Results of FUR 1359-1

Client Sample ID: **FUR 1359-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247004  
 Lab Project ID: 1173247

Collection Date: 06/12/17 12:55  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	65	1.00	1.00	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247004-A

Print Date: 06/15/2017 4:43:44PM





**Results of FUR 1345-1**

Client Sample ID: **FUR 1345-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1173247005  
Lab Project ID: 1173247

Collection Date: 06/12/17 12:04  
Received Date: 06/12/17 16:06  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	169	1.00	1.00	col/100mL	1		06/12/17 17:31

**Batch Information**

Analytical Batch: BTF15665  
Analytical Method: SM21 9222D  
Analyst: K.W  
Analytical Date/Time: 06/12/17 17:31  
Container ID: 1173247005-A

Print Date: 06/15/2017 4:43:44PM

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## Results of **FUR 5-1**

Client Sample ID: **FUR 5-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247006  
 Lab Project ID: 1173247

Collection Date: 06/12/17 11:28  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	890	10.0	10.0	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247006-A

Print Date: 06/15/2017 4:43:44PM





**Results of CAM 105-1**

Client Sample ID: **CAM 105-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1173247007  
Lab Project ID: 1173247

Collection Date: 06/12/17 15:10  
Received Date: 06/12/17 16:06  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	6.0	1.00	1.00	col/100mL	1		06/12/17 17:31

**Batch Information**

Analytical Batch: BTF15665  
Analytical Method: SM21 9222D  
Analyst: K.W  
Analytical Date/Time: 06/12/17 17:31  
Container ID: 1173247007-A

Print Date: 06/15/2017 4:43:44PM

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## Results of CAM 105-1 DUP

Client Sample ID: **CAM 105-1 DUP**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247008  
 Lab Project ID: 1173247

Collection Date: 06/12/17 15:15  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	5.0	1.00	1.00	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247008-A

Print Date: 06/15/2017 4:43:44PM



## Results of FUR 1359-1 DUP

Client Sample ID: **FUR 1359-1 DUP**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1173247009  
 Lab Project ID: 1173247

Collection Date: 06/12/17 13:00  
 Received Date: 06/12/17 16:06  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	320	1.00	1.00	col/100mL	1		06/12/17 17:31

## Batch Information

Analytical Batch: BTF15665  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 06/12/17 17:31  
 Container ID: 1173247009-A

Print Date: 06/15/2017 4:43:44PM



## Method Blank

Blank ID: MB for HBN 1760990 [BTF/15665]

Blank Lab ID: 1390588

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1173247001, 1173247002, 1173247003, 1173247004, 1173247005, 1173247006, 1173247007, 1173247008, 1173247009

## Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

## Batch Information

Analytical Batch: BTF15665

Analytical Method: SM21 9222D

Instrument:

Analyst: K.W

Analytical Date/Time: 6/12/2017 5:31:00PM

Print Date: 06/15/2017 4:44:13PM





SGS North America Inc.  
CHAIN OF CUSTODY RECORD

1173247



**Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.**

Page 1 of 1

Section 1		Section 3		Section 4		Section 5	
CLIENT:	PROJECT/ PWSID/ PERMIT#:	Type	CONTAINERS	Section 4	DOD Project? Yes No	Section 5	Chain of Custody Seal: (Circle)
Alana Gerlet, HDR	PHONE NO: 907 310-0387	C = COMP G = GRAB M = Multi I = Ince- mental S = Soils	1	Temp Blank °C: 11.8 #012		Temp Blank °C: 11.8 #012	INTACT
CONTACT: K. Bischoffberger	PROJECT: MOA USM		1	or Ambient [ ]		or Ambient [ ]	BROKEN
PROJECT NAME: MOA USM	E-MAIL: alana.gerlet@hdrinc.com		1	(See attached Sample Receipt Form)		(See attached Sample Receipt Form)	ABSENT
REPORTS TO: Dry Weather Sampling	QUOTE #: MOA USM		1				
INVOICE TO: K. Bischoffberger	QUOTE #: MOA USM		1				
RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Received By:	Received By:	Received By:
①A	FUR 402-1	6/12/17	1349	H2O			
②A	FUR 332-1		1400	H2O			
③A	FUR 306-1		1320	H2O			
④A	FUR 1359-1		1255	H2O			
⑤A	FUR 1345-1		1204	H2O			
⑥A	FUR 5-1		1128	H2O			
⑦A	CAM 105-1		1510	H2O			
⑧A	CAM 105-1 dup		1515	H2O			
⑨A	FUR 1359-1 dup		1300	H2O			
Relinquished By: (1)		Date	Time		Received By:	Received By:	Received By:
SS		6/12/17	1602				
Relinquished By: (2)		Date	Time		Received By:	Received By:	Received By:
Relinquished By: (3)		Date	Time		Received By:	Received By:	Received By:
Relinquished By: (4)		Date	Time		Received For Laboratory By:	Received For Laboratory By:	Received For Laboratory By:
		6/12/17	10:00		Jamie Blue	Jamie Blue	Jamie Blue





e-Sample Receipt Form

SGS Workorder #:

1173247



1 1 7 3 2 4 7

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
<b>Chain of Custody / Temperature Requirements</b>	<input checked="" type="checkbox"/> Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> N/A	Absent
COC accompanied samples?	<input checked="" type="checkbox"/> Yes	
<input checked="" type="checkbox"/> Yes **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input type="checkbox"/> No	Cooler ID: 1 @ 11.8 °C Therm. ID: D12
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input checked="" type="checkbox"/> Yes	
If <0°C, were sample containers ice free?	<input type="checkbox"/> N/A	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
<b>Holding Time / Documentation / Sample Condition Requirements</b>		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	<input checked="" type="checkbox"/> Yes	
Do samples <b>match COC**</b> (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/> Yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/> Yes	
Were proper containers (type/mass/volume/preservative***) used?	<input type="checkbox"/> N/A	***Exemption permitted for metals (e.g.200.8/6020A).
<b>Volatile / LL-Hg Requirements</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input type="checkbox"/> N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> N/A	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> N/A	
<b>Note to Client:</b> Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		





## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1173247001-A	Na2S2O3 for Chlorine Redu	OK			
1173247002-A	Na2S2O3 for Chlorine Redu	OK			
1173247003-A	Na2S2O3 for Chlorine Redu	OK			
1173247004-A	Na2S2O3 for Chlorine Redu	OK			
1173247005-A	Na2S2O3 for Chlorine Redu	OK			
1173247006-A	Na2S2O3 for Chlorine Redu	OK			
1173247007-A	Na2S2O3 for Chlorine Redu	OK			
1173247008-A	Na2S2O3 for Chlorine Redu	OK			
1173247009-A	Na2S2O3 for Chlorine Redu	OK			

### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM- The container was received damaged.

FR- The container was received frozen and not usable for Bacteria or BOD analyses.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

## Laboratory Report of Analysis

To: MOA-Project Mnmt/Engr  
PO Box 196650  
Anchorage, AK 99519  
907-343-8058

Report Number: **1173511**

Client Project: **PM&E WSM DRY Weather Screening**

Dear Kristi Bischofberger,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Forest at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Forest Taylor  
Project Manager  
Forest.Taylor@sgs.com

Date



## Case Narrative

SGS Client: **MOA-Project Mnmt/Engr**  
SGS Project: **1173511**  
Project Name/Site: **PM&E WSM DRY Weather Screening**  
Project Contact: **Kristi Bischofberger**

Refer to sample receipt form for information on sample condition.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 06/20/2017 5:16:03PM

### Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



## Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
FUR 5-1	1173511001	06/19/2017	06/19/2017	Water (Surface, Eff., Ground)
FUR 5-1 DUP	1173511002	06/19/2017	06/19/2017	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
SM21 9222D	Fecal Coliform (MF)

Print Date: 06/20/2017 5:16:06PM

## Detectable Results Summary

Client Sample ID: **FUR 5-1**  
 Lab Sample ID: 1173511001

**Microbiology Laboratory**

<u>Parameter</u>
Fecal Coliform

<u>Result</u>
4.9

<u>Units</u>
col/100mL

Client Sample ID: **FUR 5-1 DUP**  
 Lab Sample ID: 1173511002

**Microbiology Laboratory**

<u>Parameter</u>
Fecal Coliform

<u>Result</u>
6.6

<u>Units</u>
col/100mL



## Results of FUR 5-1

Client Sample ID: **FUR 5-1**  
 Client Project ID: **PM&E WSM DRY Weather**  
**Screening**  
 Lab Sample ID: 1173511001

Collection Date: 06/19/17 16:00  
 Received Date: 06/19/17 16:58  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	4.9	1.64	1.64	col/100mL	1		06/19/17 18:30

## Batch Information

Analytical Batch: BTF15689  
 Analytical Method: SM21 9222D  
 Analyst: ACF  
 Analytical Date/Time: 06/19/17 18:30  
 Container ID: 1173511001-A

Print Date: 06/20/2017 5:16:09PM

**Results of FUR 5-1 DUP**

Client Sample ID: **FUR 5-1 DUP**  
 Client Project ID: **PM&E WSM DRY Weather**  
**Screening**  
 Lab Sample ID: 1173511002

Collection Date: 06/19/17 16:00  
 Received Date: 06/19/17 16:58  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	6.6	1.64	1.64	col/100mL	1		06/19/17 18:30

**Batch Information**

Analytical Batch: BTF15689  
 Analytical Method: SM21 9222D  
 Analyst: ACF  
 Analytical Date/Time: 06/19/17 18:30  
 Container ID: 1173511002-A

Print Date: 06/20/2017 5:16:09PM



## Method Blank

Blank ID: MB for HBN 1761601 [BTF/15689]

Blank Lab ID: 1392039

QC for Samples:

1173511001, 1173511002

Matrix: Water (Surface, Eff., Ground)

## Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

## Batch Information

Analytical Batch: BTF15689

Analytical Method: SM21 9222D

Instrument:

Analyst: ACF

Analytical Date/Time: 6/19/2017 6:30:00PM

Print Date: 06/20/2017 5:16:10PM



\*PM+F WSM DRY WEATHER SCREENING

Instructions: Sections 1 - 5 must be  
Omissions may delay the onset of analysis.

Section 3		Section 4				Section 5	
#	CONTAINERS	Type C = COMP G = GRAB M = Multi I = Incremental S = Soils	DOD Project?	Yes	No	Requested Turnaround Time and/or Special Instructions:	Data Deliverable Requirements:
1	1	G				Pls. call Alena & hrs if expedance	Chain of Custody Seal: (Circle) INTACT <input type="checkbox"/> BROKEN <input checked="" type="checkbox"/> <b>ABSENT</b>
2	1	G					
RESERVED for lab use		MATRIX CODE	DATE mm/dd/yy	TIME HH:MM	RECEIVED BY:	DATE	TIME
1A	FUR 5-1	H2O	06/19/17	1600	Spencer	6/19/17	1655
2A	FUR 5-1 DUP	H2O	06/19/17	1600			
REPORTS TO: See special		E-MAIL: Alena.gerlet@hdrinc.com		INVOICE TO: Kristi Bischoff@hdrinc.com		P.O.#: MOA WSM	
CLIENT: HDR Inc.		PROJECT: HDR Finc 310-		CONTACT: Alena Gerlet		PHONE NO: 907-0387	

thank you!





### Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1173511001-A	Na2S2O3 for Chlorine Redu	OK			
1173511002-A	Na2S2O3 for Chlorine Redu	OK			

#### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM- The container was received damaged.

FR- The container was received frozen and not usable for Bacteria or BOD analyses.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.



## Laboratory Report of Analysis

To: HDR Alaska, Inc.  
2000 W Intl Airport Rd # C-6  
Anchorage, AK 99501  
(907)222-9350

Report Number: **1175056**

Client Project: **Dry Weather Screening**

Dear Lynn Spencer,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Justin Nelson  
Project Manager  
Justin.Nelson@sgs.com

Date

Print Date: 08/04/2017 10:11:35AM

SGS North America Inc. | 200 West Potter Drive, Anchorage, AK 99518  
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Member of SGS Group



## Case Narrative

SGS Client: **HDR Alaska, Inc.**  
SGS Project: **1175056**  
Project Name/Site: **Dry Weather Screening**  
Project Contact: **Lynn Spencer**

Refer to sample receipt form for information on sample condition.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 08/04/2017 10:11:36AM

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

**Note:** Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
ER1335-1 DUP	1175056001	08/01/2017	08/01/2017	Water (Surface, Eff., Ground)
ER1335-1	1175056002	08/01/2017	08/01/2017	Water (Surface, Eff., Ground)
ER1375-99	1175056003	08/01/2017	08/01/2017	Water (Surface, Eff., Ground)
ER1417-1	1175056004	08/01/2017	08/01/2017	Water (Surface, Eff., Ground)
ER303-1	1175056005	08/01/2017	08/01/2017	Water (Surface, Eff., Ground)
ER646-71	1175056006	08/01/2017	08/01/2017	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
SM21 9222D	Fecal Coliform (MF)

Print Date: 08/04/2017 10:11:39AM

## Detectable Results Summary

Client Sample ID: **ER1335-1 DUP**

Lab Sample ID: 1175056001

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

410

Units

col/100mL

Client Sample ID: **ER1335-1**

Lab Sample ID: 1175056002

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

690

Units

col/100mL

Print Date: 08/04/2017 10:11:40AM

SGS North America Inc.

200 West Potter Drive, Anchorage, AK 99518  
 t 907.562.2343 f 907.561.5301 www.us.sgs.com

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**Results of ER1335-1 DUP**

Client Sample ID: **ER1335-1 DUP**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1175056001  
Lab Project ID: 1175056

Collection Date: 08/01/17 12:05  
Received Date: 08/01/17 12:57  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	410	10.0	10.0	col/100mL	1		08/01/17 14:35

**Batch Information**

Analytical Batch: BTF15842  
Analytical Method: SM21 9222D  
Analyst: K.W  
Analytical Date/Time: 08/01/17 14:35  
Container ID: 1175056001-A

Print Date: 08/04/2017 10:11:41AM



Results of **ER1335-1**

Client Sample ID: **ER1335-1**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1175056002  
Lab Project ID: 1175056

Collection Date: 08/01/17 12:05  
Received Date: 08/01/17 12:57  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

Results by **Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	690	10.0	10.0	col/100mL	1		08/01/17 14:35

**Batch Information**

Analytical Batch: BTF15842  
Analytical Method: SM21 9222D  
Analyst: K.W  
Analytical Date/Time: 08/01/17 14:35  
Container ID: 1175056002-A

Print Date: 08/04/2017 10:11:41AM



## Results of ER1375-99

Client Sample ID: **ER1375-99**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1175056003  
 Lab Project ID: 1175056

Collection Date: 08/01/17 11:05  
 Received Date: 08/01/17 12:57  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		08/01/17 14:35

## Batch Information

Analytical Batch: BTF15842  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 08/01/17 14:35  
 Container ID: 1175056003-A

Print Date: 08/04/2017 10:11:41AM

## Results of ER1417-1

Client Sample ID: **ER1417-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1175056004  
 Lab Project ID: 1175056

Collection Date: 08/01/17 10:45  
 Received Date: 08/01/17 12:57  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		08/01/17 14:35

## Batch Information

Analytical Batch: BTF15842  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 08/01/17 14:35  
 Container ID: 1175056004-A

Print Date: 08/04/2017 10:11:41AM



## Results of ER303-1

Client Sample ID: **ER303-1**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1175056005  
 Lab Project ID: 1175056

Collection Date: 08/01/17 10:25  
 Received Date: 08/01/17 12:57  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		08/01/17 14:35

## Batch Information

Analytical Batch: BTF15842  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 08/01/17 14:35  
 Container ID: 1175056005-A

Print Date: 08/04/2017 10:11:41AM

## Results of ER646-71

Client Sample ID: **ER646-71**  
 Client Project ID: **Dry Weather Screening**  
 Lab Sample ID: 1175056006  
 Lab Project ID: 1175056

Collection Date: 08/01/17 11:20  
 Received Date: 08/01/17 12:57  
 Matrix: Water (Surface, Eff., Ground)  
 Solids (%):  
 Location:

## Results by Microbiology Laboratory

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	1.00 U	1.00	1.00	col/100mL	1		08/01/17 14:35

## Batch Information

Analytical Batch: BTF15842  
 Analytical Method: SM21 9222D  
 Analyst: K.W  
 Analytical Date/Time: 08/01/17 14:35  
 Container ID: 1175056006-A

Print Date: 08/04/2017 10:11:41AM





### Method Blank

Blank ID: MB for HBN 1765107 [BTF/15842]  
Blank Lab ID: 1402056

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1175056001, 1175056002, 1175056003, 1175056004, 1175056005, 1175056006

### Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

### Batch Information

Analytical Batch: BTF15842  
Analytical Method: SM21 9222D  
Instrument:  
Analyst: K.W  
Analytical Date/Time: 8/1/2017 2:35:00PM

Print Date: 08/04/2017 10:11:43AM

## Method Blank

Blank ID: MB for HBN 1765107 [BTF/15842]

Matrix: Water (Surface, Eff., Ground)

Blank Lab ID: 1402340

QC for Samples:

1175056001, 1175056002, 1175056003, 1175056004, 1175056005, 1175056006

## Results by SM21 9222D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

## Batch Information

Analytical Batch: BTF15842

Analytical Method: SM21 9222D

Instrument:

Analyst: K.W

Analytical Date/Time: 8/1/2017 6:27:00PM

Print Date: 08/04/2017 10:11:43AM







e-Sample Receipt Form

SGS Workorder #:

1175056



1 1 7 5 0 5 6

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
<b>Chain of Custody / Temperature Requirements</b>	<input checked="" type="checkbox"/> Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> N/A	Hand Delivered
COC accompanied samples?	<input checked="" type="checkbox"/> Yes	
<input checked="" type="checkbox"/> Yes **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input type="checkbox"/> No	Cooler ID: 1 @ Ambient °C Therm. ID: D35
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input type="checkbox"/> N/A	
If <0°C, were sample containers ice free?	<input type="checkbox"/> N/A	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
<b>Holding Time / Documentation / Sample Condition Requirements</b>		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	<input checked="" type="checkbox"/> Yes	
Do samples <b>match COC**</b> (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/> Yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/> Yes	
Were proper containers (type/mass/volume/preservative***) used?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> N/A ***Exemption permitted for metals (e.g.200.8/6020A).
<b>Volatile / LL-Hg Requirements</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input type="checkbox"/> N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> N/A	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> N/A	
<b>Note to Client:</b> Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		





### Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1175056001-A	Na2S2O3 for Chlorine Redu	OK			
1175056002-A	Na2S2O3 for Chlorine Redu	OK			
1175056003-A	Na2S2O3 for Chlorine Redu	OK			
1175056004-A	Na2S2O3 for Chlorine Redu	OK			
1175056005-A	Na2S2O3 for Chlorine Redu	OK			
1175056006-A	Na2S2O3 for Chlorine Redu	OK			

#### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM- The container was received damaged.

FR- The container was received frozen and not usable for Bacteria or BOD analyses.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.



## Laboratory Report of Analysis

To: HDR Alaska, Inc.  
2000 W Intl Airport Rd # C-6  
Anchorage, AK 99501  
(907)222-9350

Report Number: **1175278**

Client Project: **Dry Weather Screening**

Dear Lynn Spencer,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Justin Nelson  
Project Manager  
Justin.Nelson@sgs.com

Date

Print Date: 08/09/2017 2:19:06PM

SGS North America Inc. | 200 West Potter Drive, Anchorage, AK 99518  
t 907.562.2343 f 907.561.5301 www.us.sgs.com

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## Case Narrative

SGS Client: **HDR Alaska, Inc.**  
SGS Project: **1175278**  
Project Name/Site: **Dry Weather Screening**  
Project Contact: **Lynn Spencer**

Refer to sample receipt form for information on sample condition.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 08/09/2017 2:19:08PM

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

**Note:** Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



## Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
ER 13357	1175278001	08/07/2017	08/07/2017	Water (Surface, Eff., Ground)
ER 13357 Dup	1175278002	08/07/2017	08/07/2017	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
SM21 9222D	Fecal Coliform (MF)

Print Date: 08/09/2017 2:19:10PM

## Detectable Results Summary

Client Sample ID: **ER 13357**

Lab Sample ID: 1175278001

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

19

Units

col/100mL

Client Sample ID: **ER 13357 Dup**

Lab Sample ID: 1175278002

**Microbiology Laboratory**

Parameter

Fecal Coliform

Result

18

Units

col/100mL

Print Date: 08/09/2017 2:19:12PM

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200 West Potter Drive, Anchorage, AK 99518  
 t 907.562.2343 f 907.561.5301 www.us.sgs.com

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**Results of ER 13357**

Client Sample ID: **ER 13357**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1175278001  
Lab Project ID: 1175278

Collection Date: 08/07/17 12:40  
Received Date: 08/07/17 13:46  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	19	1.00	1.00	col/100mL	1		08/07/17 15:10

**Batch Information**

Analytical Batch: BTF15861  
Analytical Method: SM21 9222D  
Analyst: ACF  
Analytical Date/Time: 08/07/17 15:10  
Container ID: 1175278001-A

Print Date: 08/09/2017 2:19:13PM



**Results of ER 13357 Dup**

Client Sample ID: **ER 13357 Dup**  
Client Project ID: **Dry Weather Screening**  
Lab Sample ID: 1175278002  
Lab Project ID: 1175278

Collection Date: 08/07/17 12:40  
Received Date: 08/07/17 13:46  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

**Results by Microbiology Laboratory**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Fecal Coliform	18	1.00	1.00	col/100mL	1		08/07/17 15:10

**Batch Information**

Analytical Batch: BTF15861  
Analytical Method: SM21 9222D  
Analyst: ACF  
Analytical Date/Time: 08/07/17 15:10  
Container ID: 1175278002-A

Print Date: 08/09/2017 2:19:13PM





**Method Blank**

Blank ID: MB for HBN 1765660 [BTF/15861]  
Blank Lab ID: 1403621

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1175278001, 1175278002

**Results by SM21 9222D**

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

**Batch Information**

Analytical Batch: BTF15861  
Analytical Method: SM21 9222D  
Instrument:  
Analyst: ACF  
Analytical Date/Time: 8/7/2017 3:10:00PM

Print Date: 08/09/2017 2:19:15PM



**Method Blank**

Blank ID: MB for HBN 1765660 [BTF/15861]  
Blank Lab ID: 1403623

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1175278001, 1175278002

**Results by SM21 9222D**

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Fecal Coliform	1.00U	1.00	1.00	col/100mL

**Batch Information**

Analytical Batch: BTF15861  
Analytical Method: SM21 9222D  
Instrument:  
Analyst: ACF  
Analytical Date/Time: 8/7/2017 6:04:00PM

Print Date: 08/09/2017 2:19:15PM







e-Sample Receipt Form

SGS Workorder #:

1175278



1 1 7 5 2 7 8

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
<b>Chain of Custody / Temperature Requirements</b>	<input checked="" type="checkbox"/> Yes	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	<input type="checkbox"/> N/A	Absent
COC accompanied samples?	<input checked="" type="checkbox"/> Yes	
<input checked="" type="checkbox"/> Yes **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	<input type="checkbox"/> No	Cooler ID: 1 @ 10.3 °C Therm. ID: D07
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
	<input type="checkbox"/>	Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	<input checked="" type="checkbox"/> Yes	
If <0°C, were sample containers ice free?	<input type="checkbox"/> N/A	
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
<b>Holding Time / Documentation / Sample Condition Requirements</b>		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	<input checked="" type="checkbox"/> Yes	
Do samples <b>match COC**</b> (i.e., sample IDs, dates/times collected)?	<input checked="" type="checkbox"/> Yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	<input checked="" type="checkbox"/> Yes	
Were proper containers (type/mass/volume/preservative***) used?	<input type="checkbox"/> N/A	***Exemption permitted for metals (e.g.200.8/6020A).
<b>Volatile / LL-Hg Requirements</b>		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	<input type="checkbox"/> N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	<input type="checkbox"/> N/A	
Were all soil VOAs field extracted with MeOH+BFB?	<input type="checkbox"/> N/A	
<b>Note to Client:</b> Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		
Additional notes (if applicable):		





### Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1175278001-A	Na2S2O3 for Chlorine Redu	OK			
1175278002-A	Na2S2O3 for Chlorine Redu	OK			

#### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

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