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2013 Dry Weather Screening Report
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WATERSHED MANAGEMENT

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1 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. The permit is now administered under the Alaska Pollutant Discharge Elimination System (APDES). To meet the requirements of the permit, MOA initiated a dry weather screening program in 1999 to identify the potential illicit discharges to the MS4 and conducted this program during the dry season (typically May through mid July) each year through 2009.

EPA re-issued the permit prior to the state receiving primacy to operate the NPDES program. The state soon took over operation of the re-issued permit, now an APDES MS4 permit. The permit became effective February 1, 2010. The permit continues the requirement of dry weather screening and subsequent follow-up actions to identify illicit discharges and associated pollutants from the MS4.

1.2 Program Definition

Dry weather screening is conducted to identify illicit discharges to the MS4 within the MOA. Illicit discharges to the MS4 can introduce pollutants from industrial process wastewater, domestic wastewater, or car wash wastewater inadvertently directly and indirectly connected to the storm sewer system. Identification is the first step to eliminating these illicit discharges. Flow from storm drain outfalls during dry weather is generally an indicator of improper discharges to the MS4. 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 stormwater. 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).

1.3 Screening Program

The MS4 permit (Section II part B.5.d) requires MOA to sample flow from at least 15 stormwater outfalls and to have an additional 30 outfalls prioritized each year for sampling as alternate sites, should an outfall be dry. The permit also requires that outfalls be geographically dispersed and represent all major land uses with in the municipality. The permit specifies screening for seven parameters including: pH, total chlorine, detergents, total copper, total phenol, fecal coliform, and turbidity. Benchmark or threshold exceedances are used to trigger further action and provide information to support that action.

2 Project Summary

2.1 Sampling Location Selection

Dry weather screening sampling locations were selected in a semi-systematic way. Twelve watersheds were identified for inclusion in this study (MOA, 2011). Over the duration of the permit, qualifying outfalls representing a variety of land uses in all 12 watersheds will be sampled. The method established for ranking these watersheds takes into consideration many attributes of the watershed. These include;

- outfalls that discharge to an impaired water body
- evidence of contamination in the three years prior to ranking
- percentage of impervious cover
- the proportion of commercial/industrial land uses (including schools and parks)

To prioritize the target watersheds for this permit cycle, the 12 watersheds were ranked using the criteria and scoring system provided below. Three watersheds are selected for sampling during a single year. The ranking system will be used for the duration of the permit cycle to determine which watersheds are examined during a given year. During the first year (2011) of the sampling effort the top three watersheds were studied; during the second year (2012), those ranked 3-6 were studied; and so on throughout the permit cycle.

The criteria used for ranking watersheds are described in the following six-step process:

1. Does the watershed drain to a Category 4 water body (water body with a Total Maximum Daily Load (TMDL) in place, an active pollution control program, or impaired by something other than a pollutant (i.e. channelization)) or a 303(d) listed Category 5 water body (polluted water body that has no TMDL in place, but requires TMDLs or pollution control plan) for one of the pollutants of concern (POCs)?
   a. If no, assign 1 point to the watershed.
   b. If yes, assign 5 points to the watershed.
2. Calculate the number of outfalls with threshold exceedances over the 2007 to 2009 period divided by the number of outfalls sampled in that watershed over the three year period, and compare to table below for point assignments. If an outfall had exceedances for 2 or more POCs on the same date, count each exceedance.

% of outfalls sampled with threshold exceedances	Points
>90	20
80-89	18
70-99	16
60-69	14
50-59	12
40-49	10
30-39	8
20-29	6
10-19	4
1-9	2
0	0

3. Assign points to the watersheds based on the relative impervious area within the Anchorage bowl, Eagle River, and Girdwood areas as listed in the table below:

% Impervious Area	Points
>90	5
70-89	4
50-69	3
<50	1

4. Assign points to the watersheds based on the percentage of commercial and industrial land uses within the Anchorage bowl, Eagle River, and Girdwood areas as listed in the table below:

C/I%	Points
>80	6
60-79	5
40-59	4
20-39	3
<20	2

5. Add the points for each watershed.
6. Rank the watersheds from highest to lowest.

Using the above criteria, the 12 watersheds were scored and ranked as shown in Table 1.

Table 1. Criteria scores and ranking of watersheds.

Rank	Watershed	Category 4 or 5 Water Body	Percent Exceedances	Impervious Area	Commercial Industrial	Total Score
1	**Fish Cr.**	5	20	3	2	30
2	**Campbell Cr.**	5	18	1	2	26
3	Eagle River	5	16	1	2	24
4	Ship Cr.	5	14	1	2	22
5	Chester Cr.	5	12	1	2	20
6	Furrow Cr.	5	0	1	2	8
6	**Rabbit Cr.**	5	0	1	2	8
8	*Mirror Cr.*	1	0	1	2	4
8	*Peters Cr.*	1	0	1	2	4
8	**Hood Cr.**	1	0	1	2	4
8	**Potter Cr.**	1	0	1	2	4
8	*Glacier Cr.*	1	0	1	2	4

Bold indicates watersheds sampled in 2013. *Italics* indicate watersheds examined, but no outfalls with flowing water were identified.

To identify the five outfalls within each of the three watersheds, the following procedures were used:

1. Outfalls that did not both 1) fit the definition of outfall provided at 40 CFR 122.25(b)(9) and 2) are owned by the Municipality of Anchorage or ADOT & PF were eliminated from consideration. Outfalls fitting these criteria were preliminarily identified from the MOA and ADOT's storm sewer inventory and mapping before field mobilization. Samples from privately owned pipes or ditches were not considered part of the dry weather screening program. Pipes that convey streamflow were also not considered except when these pipes function as storm sewers.
2. The list of complaints received by MOA in the previous year that involve discharges from the MS4 was examined. Within each watershed to be sampled, outfalls directly associated with these complaints were targeted for sampling. No complaints were identified for the watersheds examined during the 2013 sampling effort.
3. Each watershed was divided approximately in half (an upper watershed and a lower watershed). Since no complaint outfalls could be targeted, outfalls were added beginning at the mouth of the lower half of the watershed and at the beginning of the upper half of the watershed with the goal of identifying five sample sites in the watershed. These were to be the primary sampling sites within that watershed. An additional ten alternate outfall sites were also to be identified (five in the lower and five in the upper watershed). An alternate site was sampled when a primary site could not be sampled.

In Table 1, the watersheds listed from Rabbit Creek on had not been examined as of the beginning of the 2013 field effort. The goal of the dry weather screening program is to sample five outfalls in each watershed; however, the remaining watersheds yet to be tested had 6 or fewer outfalls that could be identified. Most of the identified outfalls in these watersheds were not flowing during dry periods. Outfalls on Mirror Creek, Peter's Creek and Glacier Creek could not be sampled due to dry conditions. Fewer than 5 outfalls were identified for sampling on

Hood Creek and Potter Creek. Rabbit Creek had only 6 outfalls identified, but most were dry during the sampling effort. Additional outfalls were selected in the Fish Creek and Campbell Creek watersheds to bring the total to 15 outfalls sampled in 2013. The team divided the remaining sampling sites evenly between Fish Creek and Campbell Creek.

2.2 Outfall Sample Locations

Prior to any field effort sampling sites were identified through a GIS analysis using the 2013 hydrography geodatabase (HGDB). The field team performed reconnaissance trips to verify the data and to ensure the outfalls were otherwise suitable for sampling (safe access, flowing water, etc.). Notes recorded during the reconnaissance trip were recorded in a field log book (Appendix B).

Table 2 lists the outfalls that were investigated in each of the watersheds. Outfall codes (numbers assigned to all nodes in the HGDB MS4 network) in parenthesis are those selected as primary outfalls for sampling. The bold outfall codes in the table indicate outfalls that were sampled. Outfall codes that are underlined are sites that were visited, but had no flowing water. Maps of the watersheds and the outfalls investigated are presented in Appendix A.

Table 2. Sampling Site Locations

Watershed	Outfall Code	Latitude	Longitude	Location Description and Notes
Hood Creek	(142-1)	61.20159	-149.95396	Near Pete's Place park on coastal trail
Hood Creek	**(609-218)**	61.19770	-149.95920	On Clay Products Dr. btw Telequana Dr & Tazlina Ave.
Potter Creek	**(101-1)**	61.05344	-149.78796	South of Potter Valley Rd, east of bridge over creek
Potter Creek	(24-1)	61.04588	-149.77589	Village Scenic Parkway
Rabbit Creek	**(680-40)**	61.05477	-149.79641	Outfall near Potter Valley sign on Potter Valley Rd.
Rabbit Creek	(1418-1)	61.07771	-149.77181	North of property of 15910 Elizabeth Dr.
Rabbit Creek	**(289-23)**	61.07472	-149.79456	Adjacent to sidewalk near 16149 Essex Park Dr.
Rabbit Creek	511-1	61.08395	-149.76407	On Rabbit Creek Rd near Northfield Dr.
Rabbit Creek	(562-6)	61.08404	-149.76469	On Rabbit Creek Rd near Northfield Dr.
Rabbit Creek	(312-3)	61.09430	-149.75183	Intersection of Old Rabbit Creek Rd & E. 140th.
Fish Creek	**(1287-994)**	61.19335	-149.92483	Small culvert in Hermit Park on Willow Street
Fish Creek	**(1288-1)**	61.19327	-149.92498	Large culvert in Hermit Park. End of piped branch of creek which is used as a storm sewer.
Fish Creek	**(462-1)**	61.19076	-149.93135	Located at the end of 33rd Ave. between bike path and creek.

Watershed	Outfall Code	Latitude	Longitude	Location Description and Notes
Fish Creek	391-1	61.18207	-149.93475	Near Spenard Rd. bridge on north side
Fish Creek	480-1	61.17974	-149.92806	Near Haru Street and West 47th Avenue
Fish Creek	388-197	61.17863	-149.92826	North outfall into pond in Northwood Park between West 46th and West 47th Avenues.
Fish Creek	388-201	61.17831	-149.92818	South outfall into pond in Northwood Park between West 46th and West 47th Avenues.
Fish Creek	1013-1	61.18110	-149.91975	Near Taft Street and West Tudor Road bend.
Fish Creek	1003-1	61.18119	-149.91849	Near West Tudor Rd. btw Taft St. & Harding Dr.
Fish Creek	**341-1**	61.18341	-149.91405	West side of Minnesota Dr. across from West 41st Ave. Lab report labels this as 457-120, but site code was corrected during report mapping.
Fish Creek	37-1	61.18677	-149.90759	At stream crossing of Chugach Way.
Fish Creek	316-1	61.18716	-149.90484	Near Chugach Drive Trailer Court.
Fish Creek	**Cuddy Park 1287-1858-1**	61.18471	-149.87799	Inlet to pond at Cuddy Park. Not currently mapped as being connected to the MS4 network. Node code assigned based on location in the network.
Campbell Creek	(118-33)	61.12730	-149.84180	Drains next to Independence Drive from under the bike path running between Colony Loop and Valley Park Drive.
Campbell Creek	120-1-1	61.12681	-149.84086	Near corner of Valley Park Drive and Independence Drive. Node 120-1-1 added in HGDB to reflect that this outfall is on south side, not north side of Valley Park Drive.
Campbell Creek	120-13	61.12623	-149.84083	Near corner of Ridge Park Drive and Independence Drive. This outfall is mostly buried under sediment.
Campbell Creek	120-29	61.12542	-149.84113	Near corner of Ridgemont Drive and Independence Drive. Node code assigned based on location, but not currently in HGDB.
Campbell Creek	**120-22-1**	61.12540	-149.83642	South side of Ridgemont Drive near Spruce View Loop. Node code assigned based on location, but not currently in HGDB. Lab report labels this as 344-18-1. Code was updated to 120-22-1 during report mapping.
Campbell Creek	**(344-18)**	61.12546	-149.83456	Corner of Lake Otis Parkway and Ridgemont Drive

Watershed	Outfall Code	Latitude	Longitude	Location Description and Notes
Campbell Creek	642-1	61.13940	-149.92389	Between Banjo Circle and Sunny Circle
Campbell Creek	**651-1**	61.14243	-149.91548	Drains Greenhill Way into creek
Campbell Creek	**556-1**	61.14310	-149.90940	Outfall of settling pond near Minnesota Drive
Campbell Creek	**556-3**	61.14446	-149.90924	Outfall draining into north side of the settling pond near Minnesota. Lab report labels this as 556-1 (b). Code was corrected during report mapping.
Campbell Creek	556-2-1	61.14355	-149.90880	Outfall draining into the east side of the settling pond near Minnesota near the weir. Node code not in HGDB. Assigned during report mapping based on location.
Campbell Creek	**548-1**	61.14173	-149.90657	Near northeast corner of Minnesota Drive and Dimond Blvd.
Campbell Creek	500-1	61.14318	-149.90435	Outfall located at the end of drive spur off of Mentra Circle. Flows in open channel from that point to the creek. Node 500-1-1 added to indicate end of pipe.
Campbell Creek	1435-1	61.14269	-149.90157	End of access to bike path on Winner's Circle.
Campbell Creek	**495-1**	61.14429	-149.89938	End of Rovenna Street. Travels in open channel to creek. Node 495-1-1 marks the end of pipe where the sample was collected.
Campbell Creek	297-1	61.14522	-149.89607	End of access to bike path from Summerset Drive.
Campbell Creek	581-1	61.14640	-149.89273	West side of Arctic Blvd next to bike path

1) Sites in parenthesis ( ) are sites selected as primary sites.
2) **Bold** font indicates outfalls that were sampled.
3) Underlined font indicates outfalls that were dry at the time of sampling.
4) Standard font indicates sites that were selected as alternates, but were not visited because the sample quota had been met.

2.3 Measured Parameters

The 2013 dry weather screening sampling effort was conducted similar to the 2012 effort. A sample was collected for laboratory analysis of fecal coliform while all the other parameters were analyzed in the field using test kits or water quality meters.

Table 3 provides the screening parameters required by the permit and the thresholds that were used to compare outfall sample results. Appendix F, Dry Weather Screening Monitoring Plan, of the QAPP (2012) provides rationale for screening parameter thresholds. Thresholds are established at concentrations sufficiently different from clean stormwater to detect potential illicit discharges. Center for Watershed Protection and R. Pitt (2004) recommend benchmarks (thresholds) orders of magnitude higher than ambient stormwater 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 outside the pH range) for one or more of the pollutant indicators were targeted for follow-up action.

Table 3. List of parameters and the methods and thresholds.

Parameter	Method	Reporting Range	Threshold
pH	pH test strips, YSI 556	0 - 14 STD	≤ 4 or ≥9 STD
Total Chlorine	LaMott 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 - 1 mg/L	≥ 1.0 mg/L
Total Copper	Zincon colorimetric (LaMOTTE® EC-70 Code 3619)	0.05 – 1.0 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 col/100 mL – too numerous to count	≥ 400 col/100 mL

2.4 Sample Collection Procedures

2.4.1 Arrival at Sampling Site

Field sampling was conducted after at least 48 hours of dry weather following a storm event that created runoff in the MS4. The National Weather Service Forecast website (NWS, 2013) was consulted to determine appropriate sample timing when necessary. The field team conducted calibration and equipment blank analyses at the beginning of each day of dry weather sampling prior to entering the field. This equipment blank analysis examined each test kit by testing deionized water provided by the laboratory. The calibration and field test kit equipment blank data were recorded in the field data sheets and are provided in Appendix C. The team took the following items into the field:

- Outfall list
- Site maps
- YSI 556 water quality meter
- pH test strips
- Hach turbidity meter
- LaMotte and Hach water quality field test kits
- Laboratory supplied fecal coliform bottles
- Field sampling supplies
- Water analysis sampling protocols
- Digital camera
- GPS unit
- Field sheets with guidelines

Each day before departing for field sampling the team went through a safety briefing. Upon arriving at the site, the team completed the General Information data collection as described on the back of the field form (Appendix C). Completed forms are also provided in Appendix C. Additional information not included on data sheets was recorded in the field log book (Appendix B).

2.4.2 Flow Analyses

After the general site information was recorded, the field crew determined the outfall flow using one of the methods described below (determined by site conditions). Results of the flow analysis can be found in Table 4 in section 4.0.

Primary method: Measure the length of time required to fill 1 gallon of a calibrated bucket or a 1-liter bottle using a stop watch.

Secondary method (if the team member is unable to measure the flow): visually estimate the flow as one of the following:

- Low - flow of water is not intense and moving very slowly
- Medium - flow of water is moving at a moderate pace
- High - flow of water is intense and moving very quickly

The field team was able to measure all sites in 2013 with the primary method.

2.4.3 Water Quality Sampling

After measuring flow, pH was measured using a YSI 556 and verified using pH test strips. The probe was placed directly into flowing water where deep enough to submerge the probe. When the flow in the pipe was not deep enough to submerge the probe, a bucket was used to capture outfall water. The outfall water was permitted to continue to flow into and out of the bucket while the pH probe was submerged. The test strips were dipped directly into the flowing water.

A grab sample of the water flowing out of the end of pipe was then collected using a clean 1-liter HDPE plastic bottle. This water was used for all of the field test kits. Next, the sample bottle for laboratory analysis of fecal coliform was filled directly from the outfall flow.

After the water samples were collected, the field team recorded visual observations and measurements about the clarity of the water and its color.

Using the water from the 1-liter bottle, the field crew measured total chlorine, detergents, turbidity, total phenols, and total copper with field kits as described on the back of the field data form (Appendix C). Field measurements were recorded and compared against the thresholds described in Table 3.

The field crew conducted replicate sample analyses at a rate of at least 15% per day per parameter (once per day). The field crew also collected replicate samples for the laboratory fecal coliform analysis at a rate of 15% per day per parameter (once per day).

2.5 Chain of Custody

The field crew team leader completed chain of custody form at each site for sample tracking. The original form was delivered with the samples to SGS North America, Inc (SGS), the laboratory conducting fecal coliform analysis. Copies of the chain of custody are provided in Appendix D and maintained at the HDR offices.

2.6 Laboratory Sampling Parameters

Fecal coliform samples were transported to SGS for analysis. Fecal coliform was analyzed using standard method 9222D (Table 3). The samples were collected in laboratory-provided sample bottles. The project name, sample ID, sample date and time, and name of sampler were clearly marked on the sample container labels. Samples were stored in a cooler with gel ice and a temperature blank while in the field. The samples were delivered to the laboratory within six hours to satisfy the short hold time of the fecal coliform samples.

An expedited turn-around time was requested for results from SGS in order to expedite follow-up sampling in the event of sampling thresholds being exceeded. Follow-up tasks were planned to take place after the laboratory results were available to reduce the field effort. To expedite the receipt of results, SGS provided the results through LabView, an on-line document portal.

2.7 Deviation from the QAPP

No deviations from the QAPP were necessary.

The QAPP (MOA, 2012) allows for sites to be passed over for sample consideration if the team could not access the outfall due to lack of safe access or private property concerns. 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. Both of these conditions disqualify the outfall from sampling. These conditions were recorded and the team moved to the next outfall.

3 Results

3.1 Field and Laboratory Results

The results of 2013 dry weather screening are provided in Table 4. Complete laboratory results are provided in Appendix E. There was one exceedance recorded during the 2013 sampling effort. Fecal Coliform at Campbell Creek outfall 556-1 exceeded the threshold set at 400 colonies/100 mL (Table 4). See section 5.0 Discussion for follow-up actions and subsequent results. None of the remaining 14 sites sampled had more than 46 fecal coliform colonies with 8 of those resulting in no colonies detected. No site had an exceedance for any of the field parameters.

Table 4. Sample Results for Field Parameters and Laboratory Analyses

Watershed	Site ID	Date	Flow (gal/ min)	pH	Total Chlorine (mg/L)	Detergents (mg/L)	Total Phenols (mg/L)	Turbidity (NTU)	Total Copper (mg/L)	Fecal Coliform (colonies/ 100mL)
Hood Creek	609-218	7/11/13	5.0	6.50	<0.10	0.10	0.25	1.98	<0.05	ND
Potter Creek	101-1	6/25/13	> 10	6.00	<0.10	<0.05	0.25	0.90	<0.05	2
Rabbit Creek	680-40	6/25/13	0.2	6.00	<0.10	0.10	0.25	0.50	<0.05	ND
Rabbit Creek	289-23	6/25/13	1.5	6.50	<0.10	0.05	0.25	5.93	<0.05	ND
Fish Creek	1287-994	7/11/13	0.1	6.80	<0.10	<0.05	0.25	34.9	<0.05	6
Fish Creek	1288-1	7/11/13	20	6.80	<0.10	0.10	0.25	42.2	<0.05	46
Fish Creek	462-1	7/12/13	2.0	6.80	0.30	0.05	0.25	3.86	<0.05	ND
Fish Creek	457-120 *Corrected code is* ***341-1***	7/12/13	5.0	6.50	<0.10	<0.05	0.25	12.7	<0.05	ND
Fish Creek	FSH @Cuddy *Assigned code* ***1287-1858-1***	7/12/13	5.0	7.30	*0.40*	0.10	0.25	9.29	<0.05	30
Campbell Creek	344-18-1 *Updated code is* ***120-22-1***	7/16/13	0.1	7.80	<0.10	0.05	0.25	3.23	<0.05	ND
Campbell Creek	344-18	7/16/13	5.0	7.20	<0.10	<0.05	0.25	7.27	<0.05	42
Campbell Creek	651-1	7/15/13	2.0	6.80	<0.10	0.05	0.25	*81.9*	<0.05	3
Campbell Creek	495-1	7/15/13	0.1	7.10	<0.10	0.05	0.25	*164*	<0.05	ND
Campbell Creek	548-1	7/15/13	0.5	7.50	<0.10	0.05	0.25	3.86	<0.05	ND
Campbell Creek	556-1 556-1 (a) *Corrected code is* ***556-3***	7/15/13	5.0	6.80	<0.10	0.05	0.25	25.0	<0.05	**413**(*327*) (ND)

1) *Italicized* results are notably higher results than other sites, but are not exceedances.
2) **Bold** results are threshold exceedances.
3) Results in parenthesis are follow-up test results recorded on 7/24/13. The second follow-up result is for a sample collected from the outfall of the main storm drain flowing into the sedimentation basin (556-1 (a)).

3.2 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QA/QC) procedures were followed according to the Monitoring, Evaluation, and Quality Assurance Plan (MOA, 2012). The procedures included analytical checks (field replicates, equipment blanks), instrument calibration, and procedures to assess data for precision, accuracy, representativeness, comparability, and completeness.

3.3 Data Validation

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

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

Samples were taken from the water flowing from the storm drain outfall to avoid mixing with the stream water. Field analyses met the sensitivities prescribed in the QAPP (MOA, 2012).

Field replicate samples were taken at; Potter Creek 101-1, Fish Creek 1288-1 and 462-1, and Campbell Creek 495-1 and 344-18 to determine field precision and variability. Results of the field duplicate samples are presented in Table 5. For the field test kits, the QAPP requires that percent difference between primary and duplicate 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 QAPP requires that relative percent difference (RPD) be calculated between the primary and duplicate samples and be within 60%.

Table 5. Field Replicate Variance From Primary Sample

Parameter	QAPP standard	Potter Creek 101-1	Fish Creek 1288-1	Fish Creek 462-1	Campbell Creek 495-1	Campbell Creek 344-18
pH	± 0.2 pH units	0 pH units	0 pH units	0 pH units	0 pH units	0.10 pH units
Total Chlorine	30%	0%	0%	0%	0%	0%
Detergents	30%	0%	0%	0%	0%	0%
Total Copper*	30%	0%	0%	0%	0%	0%
Total Phenols	30%	0%	0%	0%	0%	0%
Turbidity	± 1 NTU	0.21 NTU	**3.00 NTU**	0.11 NTU	**7.00 NTU**	0.27 NTU
Fecal Coliform	60 RPD	-	11	-	-	0

* The QAPP does not define a standard for total copper analyzed with field test kits. Samples were previously analyzed in a laboratory. The precision of the field test kit matches the precision of the other field test kits so 30% was used for the total copper kit.

****Bold** font indicates replicate variance that exceeds the QAPP standard.

Most of the results fall within the QAPP standards. Two QC sampling locations did not fall within the range for turbidity. The results of the samples collected at Fish Creek 1288-1 (42.2 and 45.2 NTU) are in a similar range and it is unlikely that the difference could be discerned

with the naked eye. Therefore, the data is not flagged as invalid or suspect. The turbidity samples at Campbell Creek 495-1 also fell outside of the QAPP criteria. The primary sample reading was 164 NTU and the duplicate reading was171 NTU. The difference between these two samples is greater than the two collected from the Fish Creek 1288-1 outfall however the results were noticeably higher as well. The difference does not great enough to flag this data as invalid or suspect.

The QAPP standard is based on the precision of the turbidity meter. However, this does not take into consideration the natural variation of turbidity within storm water. The differences in the primary and duplicate samples from Fish Creek 1288-1 and Campbell Creek 495-1 are likely due to the nature of storm water being collected from the outfall. 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 same sample is retested. As noted in the USGS *National Field Manual* (Anderson, 2005), the USEPA guidelines established in 1990 suggest reporting NTU between 10-40 to the nearest 1 NTU; 40-100 NTU to the nearest 5 NTU and; 100-400 NTU to the nearest 10 NTU. All of the primary and duplicate readings are far below the thresholds for each parameter.

The laboratory performing the fecal coliform analyses, 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 QAPP (MOA, 2012), standard methods (APHA, AWWA 2005), and EPA-approved protocols and guidelines.

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

All results were determined to be valid.

4 Discussion

4.1 Threshold exceedances

The results of the 2013 dry weather screening sampling effort adds to the data set from previous years' sampling efforts (MOA 2008, 2009, 2011, 2012). Of the eight parameters tested at each of the 15 outfalls sampled, only one parameter at one outfall had a threshold exceedance. Fecal coliform at Campbell Creek 556-1 resulted in 413 colonies (fecal coliform threshold = 400 colonies) on July 15th.

Conveyance data indicates that Campbell Creek 556-1 is the outfall of a sedimentation pond just west of Minnesota Drive (See Appendix A for maps and Appendix F for photographs). The result of the fecal coliform sample was received on July 19th. The exceedance was immediately reported to the MOA with a description of the location; follow up procedures included collecting a new sample from the outfall, and then collecting a sample from the outfalls emptying into the sedimentation pond if they were flowing. The follow up sampling was conducted on July 24th. The field team located two outfalls which empty into the sedimentation basin that is tied to outfall 556-1. The larger of the two outfalls, 556-3, was the only one with flowing water. Lab results refer to this site as 556-1 (a) due to incomplete pre-mapping which did not have this outfall labeled. This outfall drains a residential area north and west of the sedimentation pond.

The team collected a water sample for fecal coliform analysis from that outfall as well as a sample from the outfall of the sedimentation basin where the initial sample was collected. The results from the follow-up sampling indicate that the sedimentation pond is likely the source of the fecal coliform (556-1 = 327 colonies) and not the storm drain outfall draining into the pond (556-3 = no colonies detected). No further action was taken. The second outfall which drains into the sedimentation basin near the weir does not have a code assigned in the HGDB. For mapping purposes this outfall has been labeled 556-2-1 based on its location.

No follow up action was necessary for any site except Campbell Creek 556-1. Fecal coliform has been the parameter that provides the most numerous notable results throughout this permit cycle (exceedances or significantly higher results than other sites).

4.2 Other observations

Mirror Creek, Glacier Creek and Potters Creek were listed as target watersheds for dry weather screening. GIS and on-the-ground investigation showed that there were no outfalls that could be sampled during the dry weather screening effort. Most of the outfalls are points where drainage ditches empty into these creeks. This can be discerned through the mapping effort.

The drainage of sedimentation basins are identified as storm drain outfalls. Sedimentation basins frequently receive water from multiple storm drain sources. In the case of Campbell Creek 556-1 the initial sample was collected from the outfall of the sedimentation basin while the follow-up effort sampled from both the initial location as well as from the primary outfall draining into the sedimentation basin. While creating maps for the 2013 report it was discovered that only one of the two storm drain outfalls contributing to the sedimentation basin has a node code in the HGDB. The unlabeled outfall is visible in the aerial photography and the HGDB storm drain network leads to this outfall.

Since the HGDB was last updated, storm drains have been added or relocated in the MS4 network. Some of these outfalls were sampled during the 2013 sampling effort. These outfalls were labeled according to their location within the network and were added to the maps for reporting purposes. Additionally, the GIS mapping effort discovered that there are broken connections and potentially missing nodes in the network within the 2013 version of the HGDB. This will prevent accurate modeling of storm water flow throughout the network.

4.3 2014 Dry Weather Screening

The QAPP should be updated to account for the change in total copper testing. A standard for QC testing of samples run through the total copper field test kit needs to be defined.

All of the identified watersheds have been examined during at least one season of dry weather screening during the current permit cycle. The 2014 dry weather screening effort will focus on Campbell Creek, Ship Creek and Chester Creek.

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Appendix A

Watershed Maps

Cook Inlet

1 312-3

562-6
2 511-1

Rabbit Creek Road

3 1418-1

289-23 4

LITTLE RABBIT CREEK

RABBIT CREEK

LITTLE SURVIVAL CREEK

Seward Highway

680-40 1

2 101-1

POTTER CREEK

3 24-1

LEGEND

- 2013 Examined Outfall
- 2013 Sampled Outfall
- Stream
- Watershed Boundry
- Map Page Index

0 2,000 4,000 6,000 8,000 Feet

Dry Weather Screening 2013

Rabbit and Potter Creeks

Examined and Sampled Outfalls

Map Index

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

LEGEND

- 2013 Examined Outfalls
- 2013 Sampled Outfalls
- Stream

Drainage Ways
- Open Channel

Drainage Way Nodes
- Inlet
- Outfall

0 100 200 Feet

Dry Weather Screening 2013

Rabbit Creek

Examined and Sampled Outfalls

Page 1

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

Andover Circle

Northfield Drive

Azalea Drive

562-6

ELMORE CREEK

511-1

Rabbit Creek Road

LEGEND

2013 Examined Outfalls

2013 Sampled Outfalls

Stream

Drainage Ways

Continuity

Open Channel

Xing Culvert

Drainage Way Nodes

Divide

Inlet

Outfall

0 100 200 Feet

Dry Weather Screening 2013

Rabbit Creek

Examined and Sampled Outfalls

Page 2

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska

LEGEND

2013 Examined Outfalls

2013 Sampled Outfalls

Stream

Drainage Ways

Open Channel

Drainage Way Nodes

Outfall

Outlet

0 100 200 Feet

Dry Weather Screening 2013

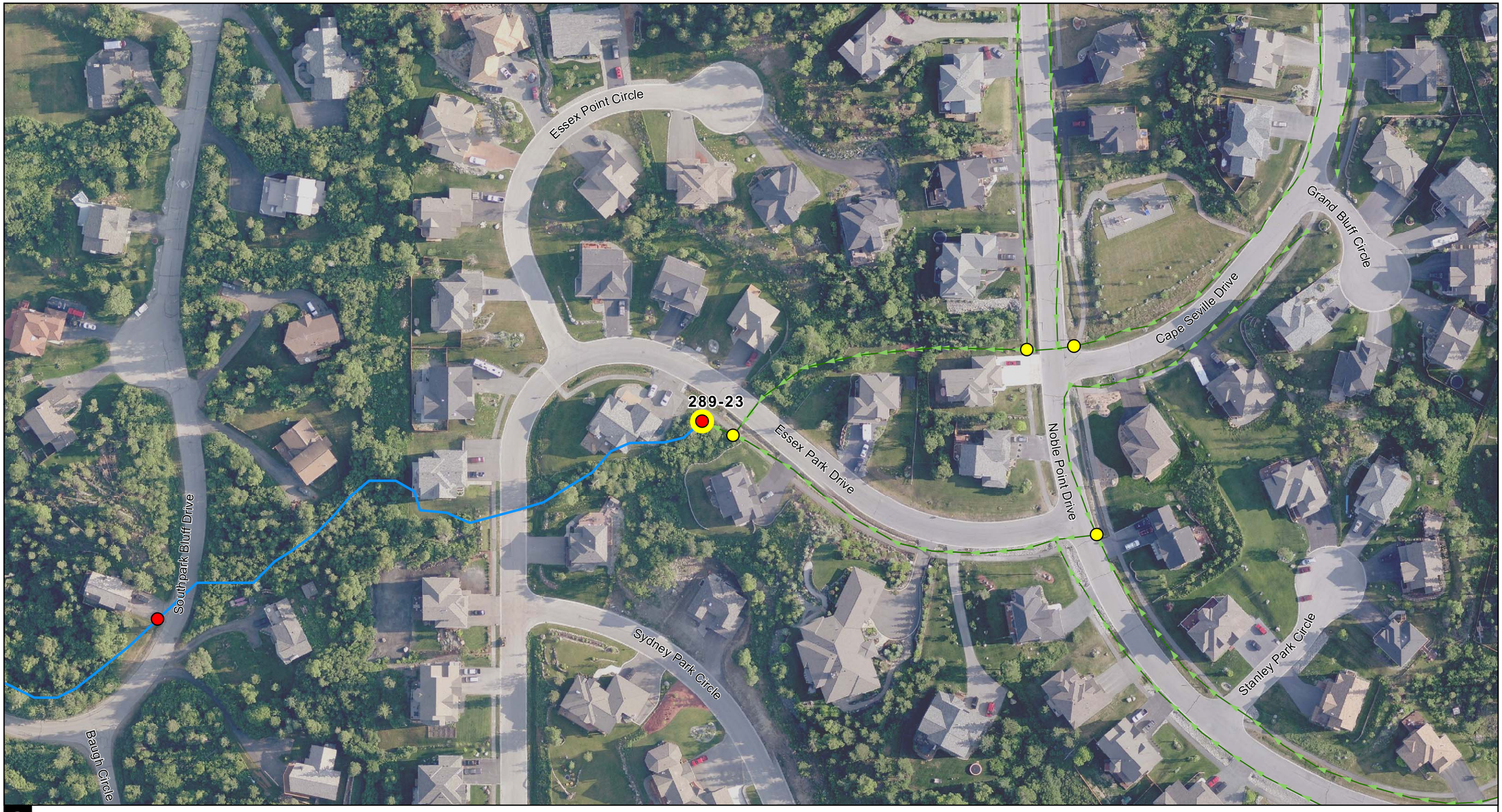
Rabbit Creek

Examined and Sampled Outfalls

Page 3

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska



LEGEND

- 2013 Examined Outfalls
- 2013 Sampled Outfalls
- Stream

Drainage Ways
- Open Channel

Drainage Way Nodes
- Outfall Major
- Outlet

0 100 200 Feet

Dry Weather Screening 2013

Rabbit Creek

Examined and Sampled Outfalls

Page 4

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

Old Seward Highway

Seward Highway

Potter Valley Road

680-40

Potter Crest Circle

Potter Bluff Circle

Cook Inlet

LEGEND

2013 Examined Outfalls

2013 Sampled Outfalls

Stream

Drainage Ways

Pipe

Inlet

Open Channel

Drainage Way Nodes

Catch Basin

Catchbasin Manhole

Control Outlet

Divide

Inlet

Manhole

OGS

Outfall

Outlet

0 100 200 Feet

Dry Weather Screening 2013

Potter Creek

Examined and Sampled Outfalls

Page 1

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska

Potter Valley Road

101-1

POTTER CREEK

Potter Glen Circle

LEGEND

2013 Examined Outfalls

2013 Sampled Outfalls

Stream

Drainage Ways

Continuity

Pipe

Inlet

Open Channel

Xing Culvert

Drainage Way Nodes

Catch Basin

Catchbasin Manhole

Inlet

Outfall Major

Outlet

0 100 200 Feet

Dry Weather Screening 2013

Potter Creek

Examined and Sampled Outfalls

Page 2

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska

LEGEND

- 2013 Examined Outfalls
- 2013 Sampled Outfalls
- Stream

Drainage Ways
- Ephemeral Channel
- Open Channel
- Xing Culvert

Drainage Way Nodes
- Inlet
- Outfall
- Outfall Major
- Outlet

0 100 200 Feet

Dry Weather Screening 2013

Potter Creek

Examined and Sampled Outfalls

Page 3

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

142-1
1
609-218
2
HOOD CREEK
West Northern Lights Boulevard
1287-994
1
1288-1
FISH CREEK
2
462-1
Minnesota Drive
316-1
7
37-1
Gambell Street
Ingra Street
East Northern Lights Boulevard
Seward Highway
1287-1858-1
8
341-1
6
391-1
3
5
1013-1
480-1
4
388-197
388-201
West Tudor Road
East Tudor Road

LEGEND

2013 Examined Outfall

2013 Sampled Outfall

Stream

Watershed Boundry

Map Page Index

0 1,000 2,000 3,000 4,000 Feet

Dry Weather Screening 2013

Hood and Flsh Creeks

Examined and Sampled Outfalls

Map Index

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska

LEGEND

2013 Examined Outfall

Stream

Drainage Ways
- Pipe
- Open Channel
- Xing Culvert

Drainage Way Nodes
- Blind Connect
- Catch Basin
- Catchbasin Manhole
- Clean-out
- Manhole
- Outfall Minor

0 100 200 Feet

Dry Weather Screening 2013

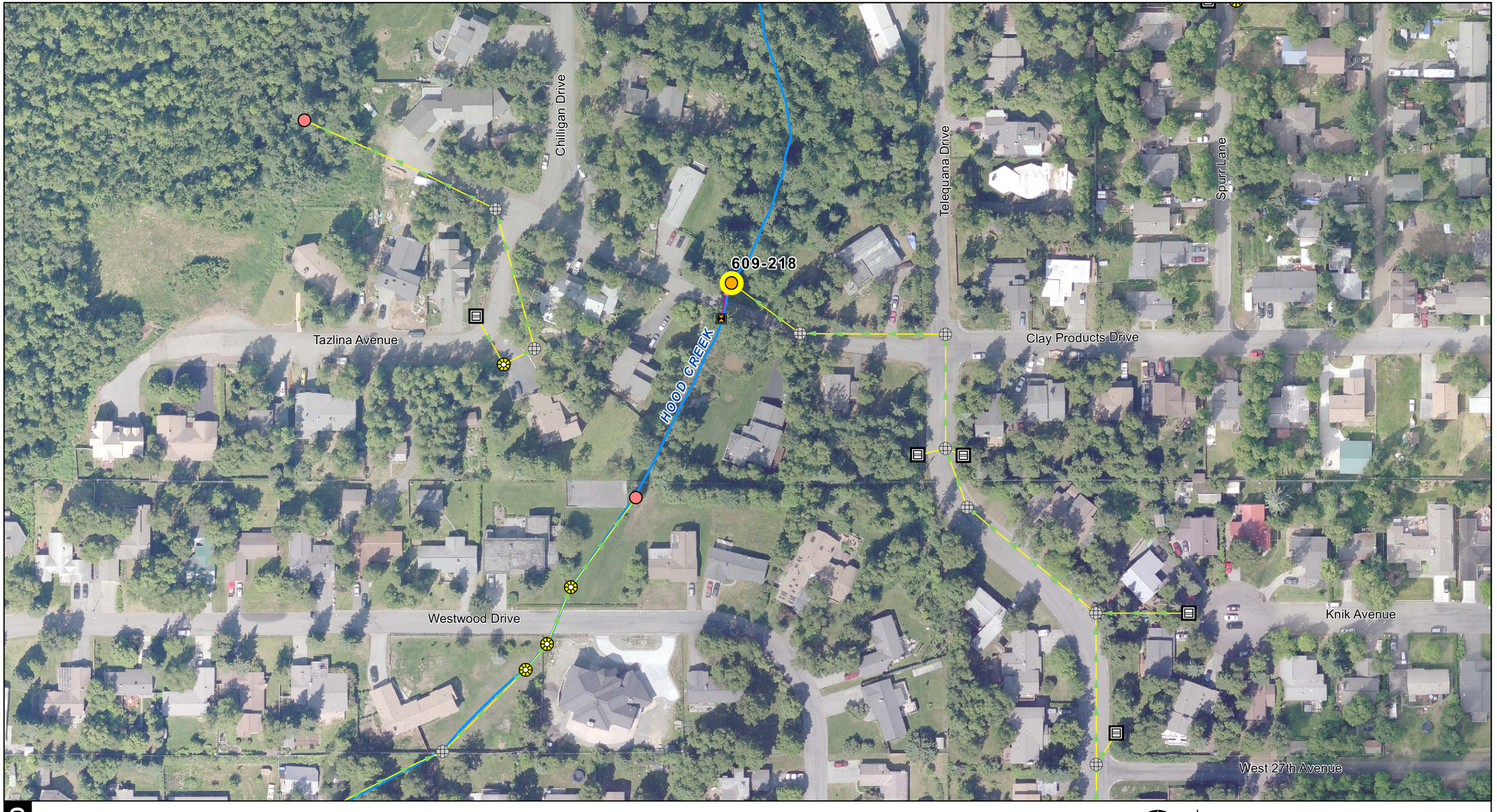
Hood Creek

Examined and Sampled Outfalls

Page 1

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska



LEGEND

2013 Sampled Outfall

Stream

Drainage Ways
- Pipe
- Xing Culvert

Drainage Way Nodes
- Catch Basin
- Catchbasin Manhole
- Manhole
- Outfall
- Outfall Minor
- Weir

0 100 200 Feet

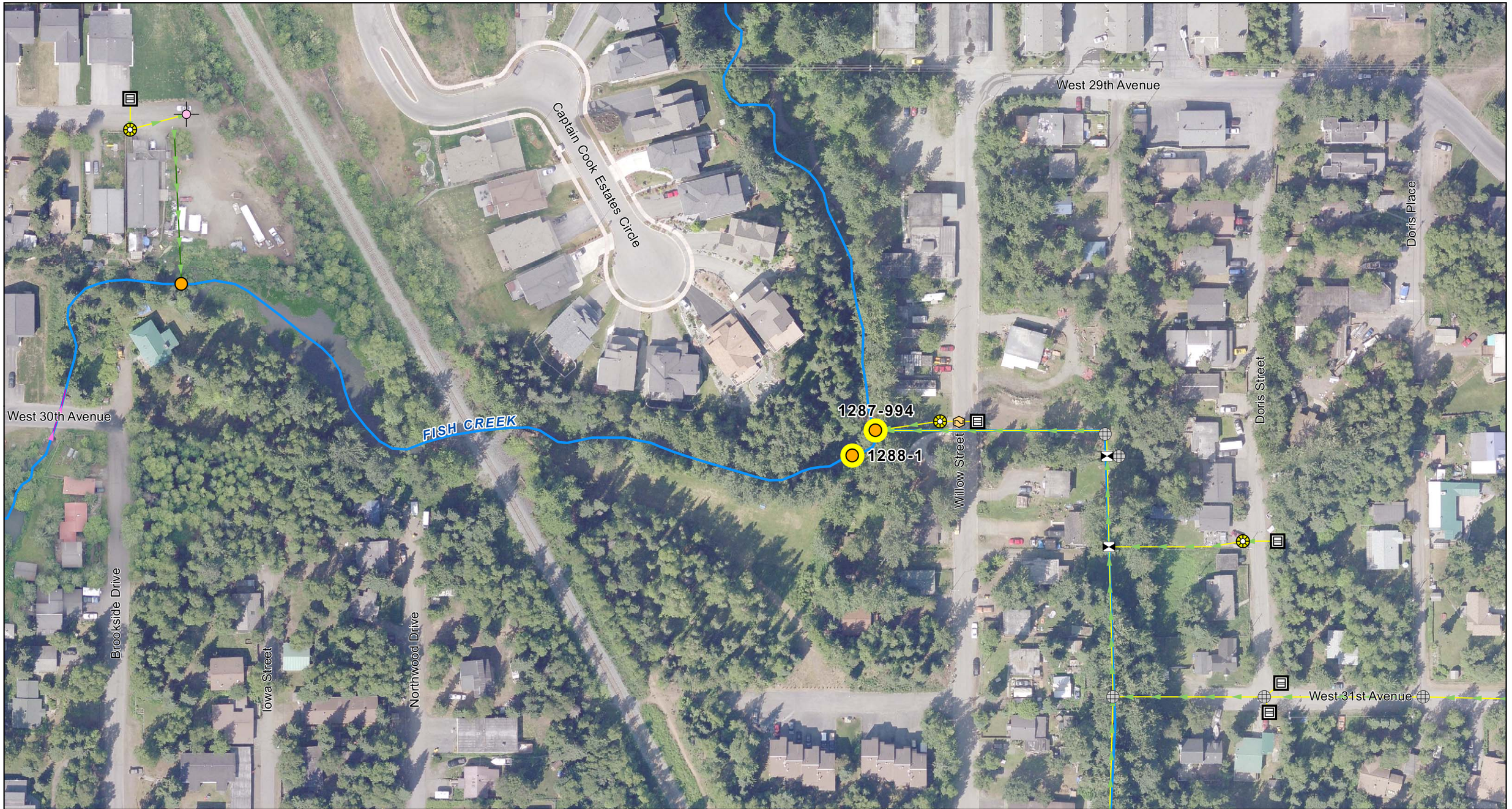
Dry Weather Screening 2013

Hood Creek

Examined and Sampled Outfalls

Page 2

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

2013 Sampled Outfall

Stream

Drainage Ways
- Pipe
- Open Channel
- Xing Culvert

Drainage Way Nodes
- Blind Connect
- Catch Basin
- Catchbasin Manhole
- Drywell
- Manhole
- OGS
- Outfall

0 100 200 Feet

Dry Weather Screening 2013

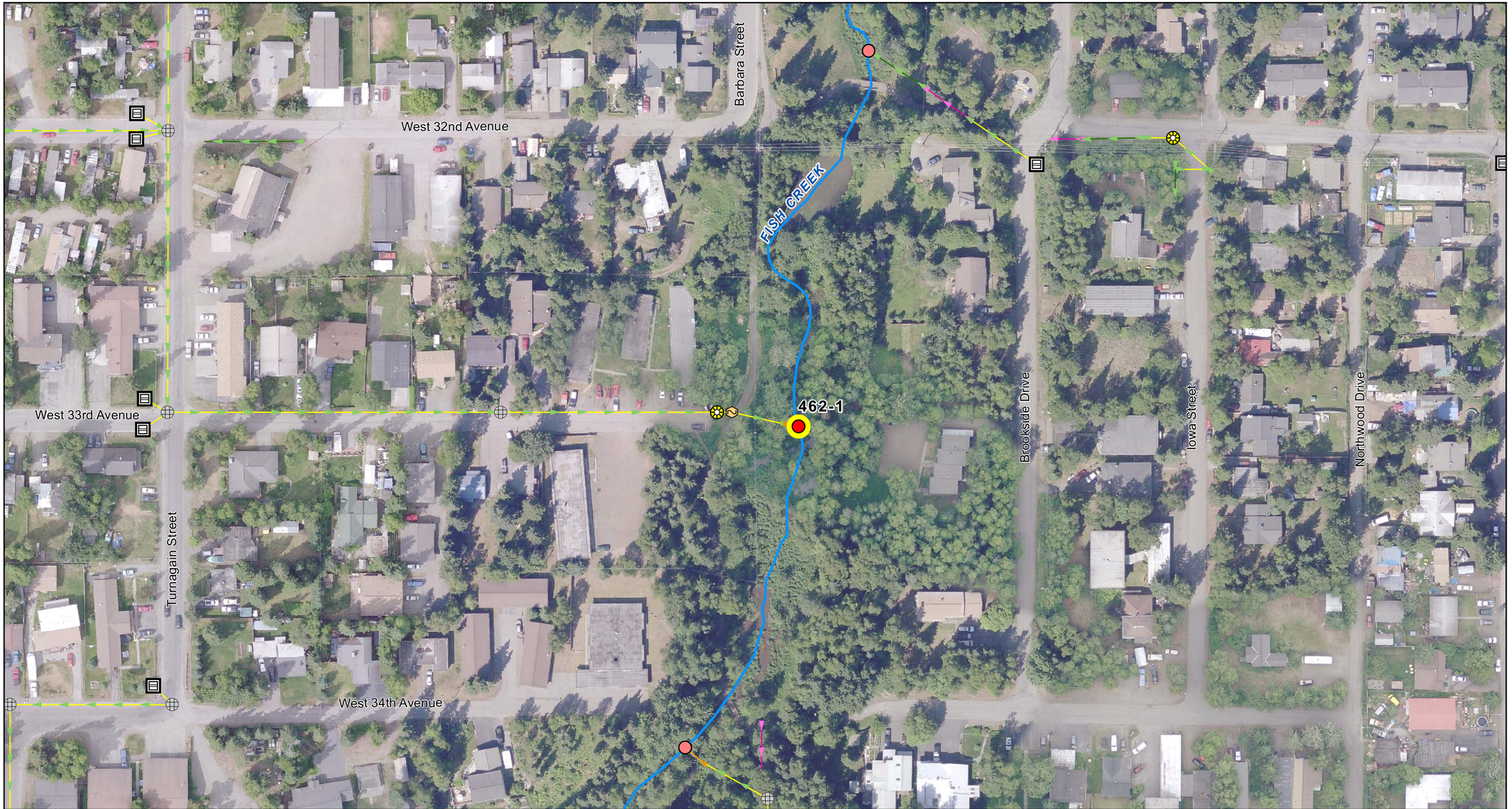
Fish Creek

Examined and Sampled Outfalls

Page 1

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska



LEGEND

2013 Sampled Outfall

Stream

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

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

0 100 200 Feet

Dry Weather Screening 2013

Fish Creek

Examined and Sampled Outfalls

Page 2

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

Will Rogers Place
Borland Drive
Turnagain Boulevard East
FISH CREEK
Barbara Drive
Grizzly Trailer Court
Arkansas Drive
West 42nd Avenue
391-1
Forrest Road
West 43rd Court
Lakeshore Drive

LEGEND

2013 Examined Outfall

Stream

Drainage Ways
- Pipe
- Open Channel

Drainage Way Nodes
- Bypass Outlet
- Catch Basin
- Catchbasin Manhole
- Manhole
- OGS
- Outfall
- Outfall Minor
- Weir

0 100 200 Feet

Dry Weather Screening 2013

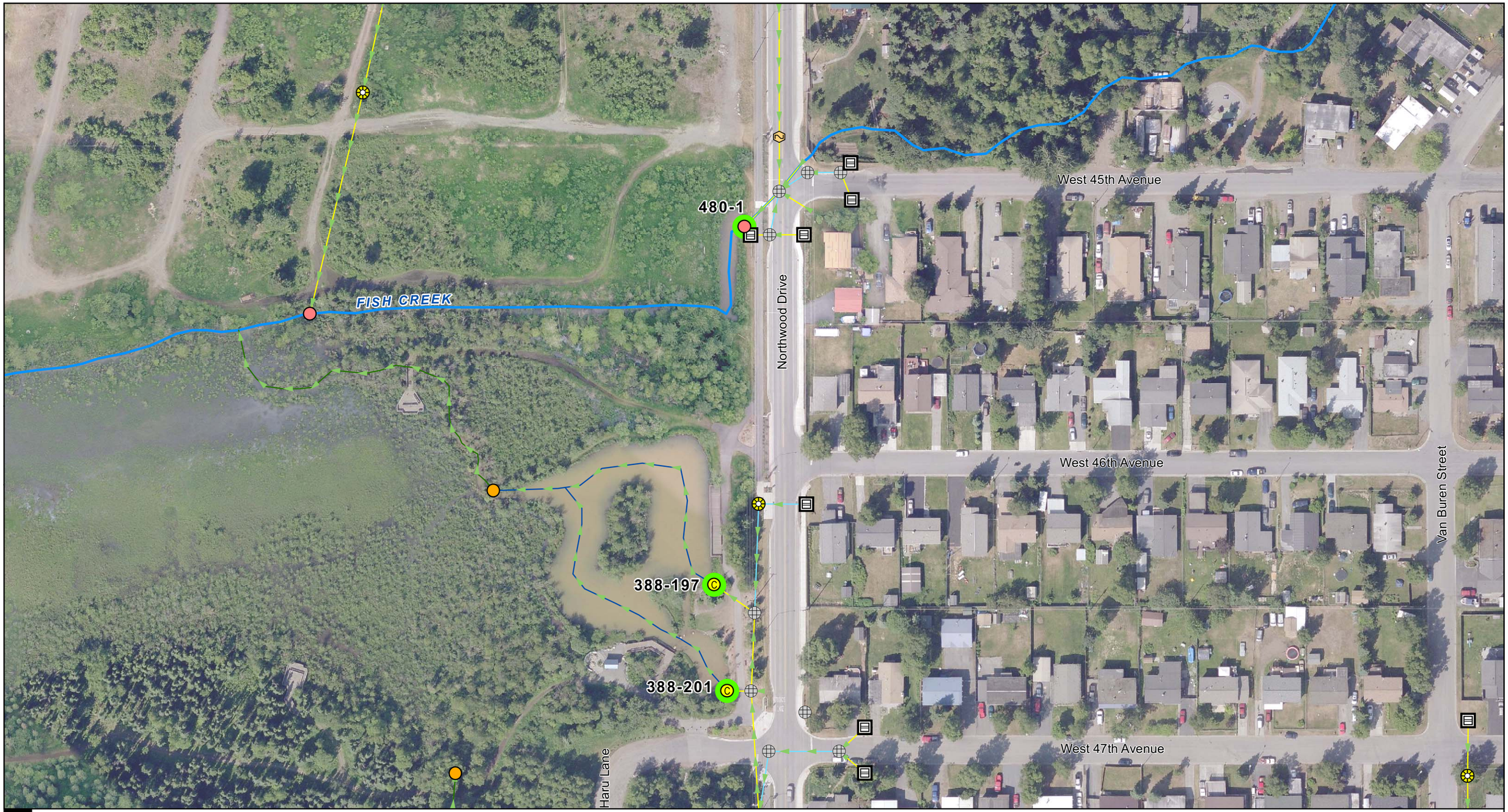
Fish Creek

Examined and Sampled Outfalls

Page 3

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska



LEGEND

2013 Examined Outfall

Stream

Drainage Ways
- Continuity
- Pipe
- Inlet
- Open Channel

Drainage Way Nodes
- Catch Basin
- Catchbasin Manhole
- Control Outlet
- Manhole
- OGS
- Outfall
- Outfall Minor

0 100 200 Feet

Dry Weather Screening 2013

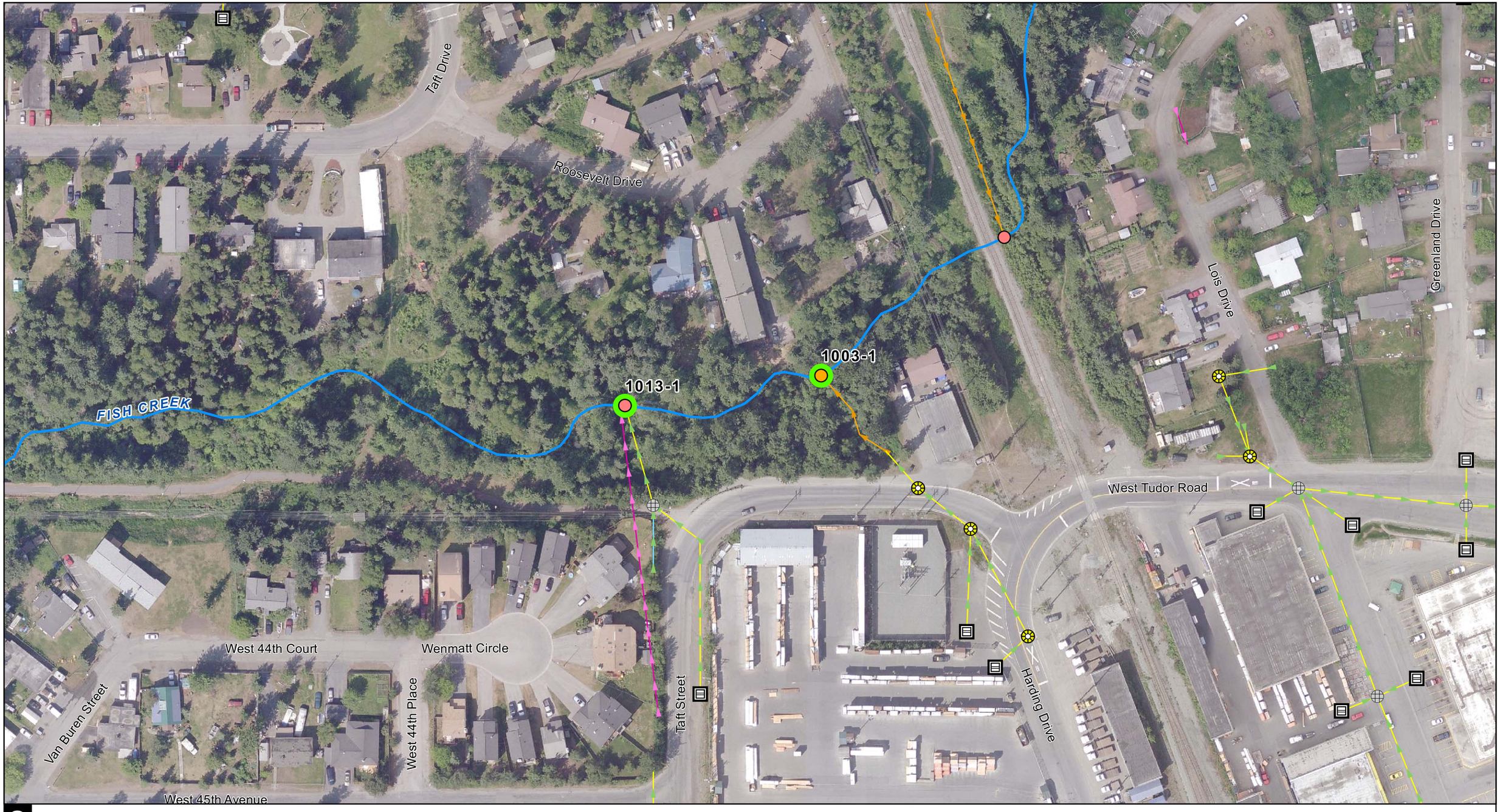
Fish Creek

Examined and Sampled Outfalls

Page 4

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska



LEGEND

2013 Examined Outfall

Stream

Drainage Ways
- Pipe
- Inlet
- Routing
- Xing Culvert

Drainage Way Nodes
- Catch Basin
- Catchbasin Manhole
- Manhole
- Outfall
- Outfall Minor

0 100 200 Feet

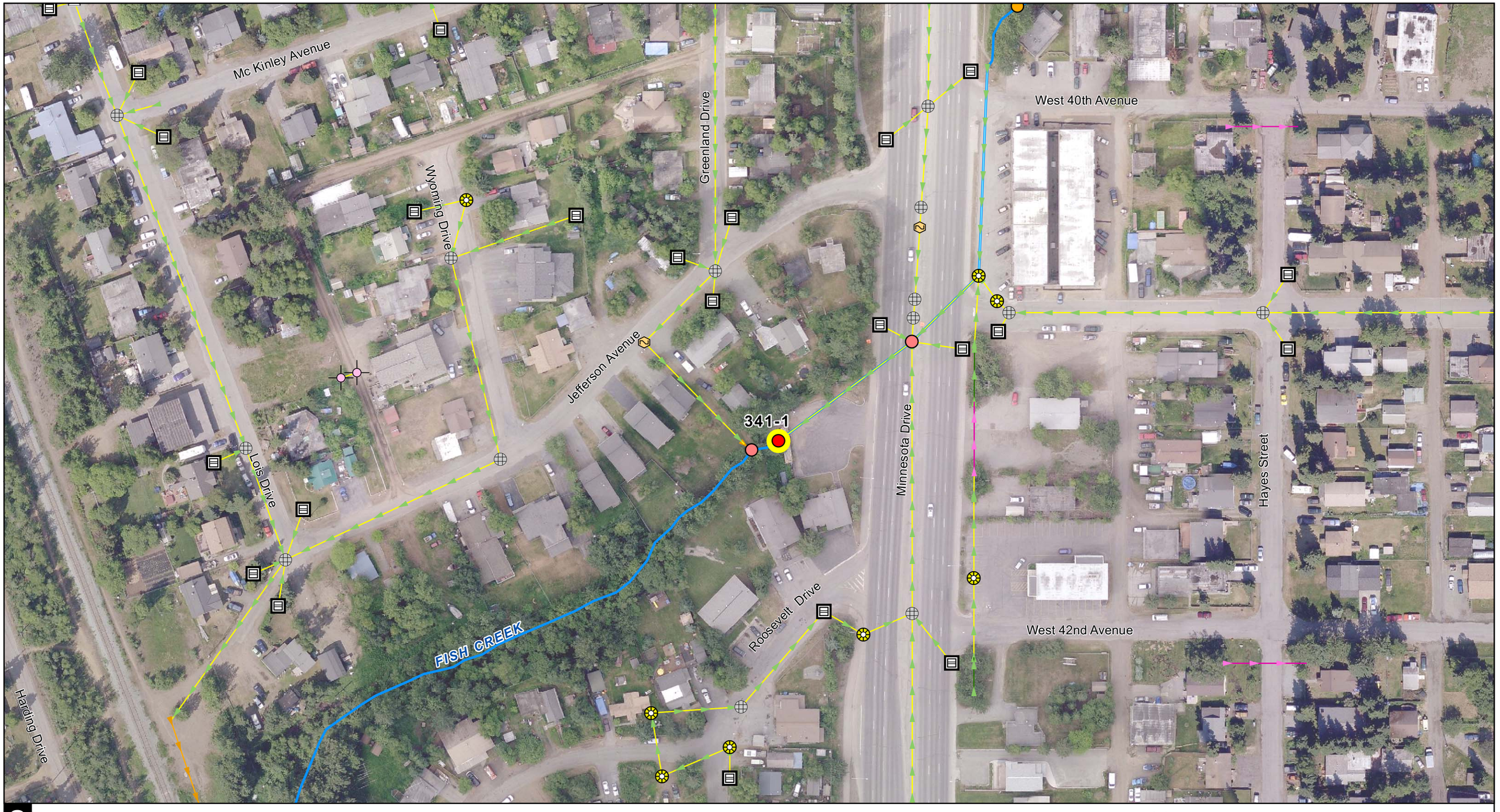
Dry Weather Screening 2013

Fish Creek

Examined and Sampled Outfalls

Page 5

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

2013 Sampled Outfall

Stream

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

Drainage Way Nodes
- Blind Connect
- Catch Basin
- Catchbasin Manhole
- Drywell
- Manhole
- OGS
- Outfall
- Outfall Major
- Outfall Minor

0 100 200 Feet

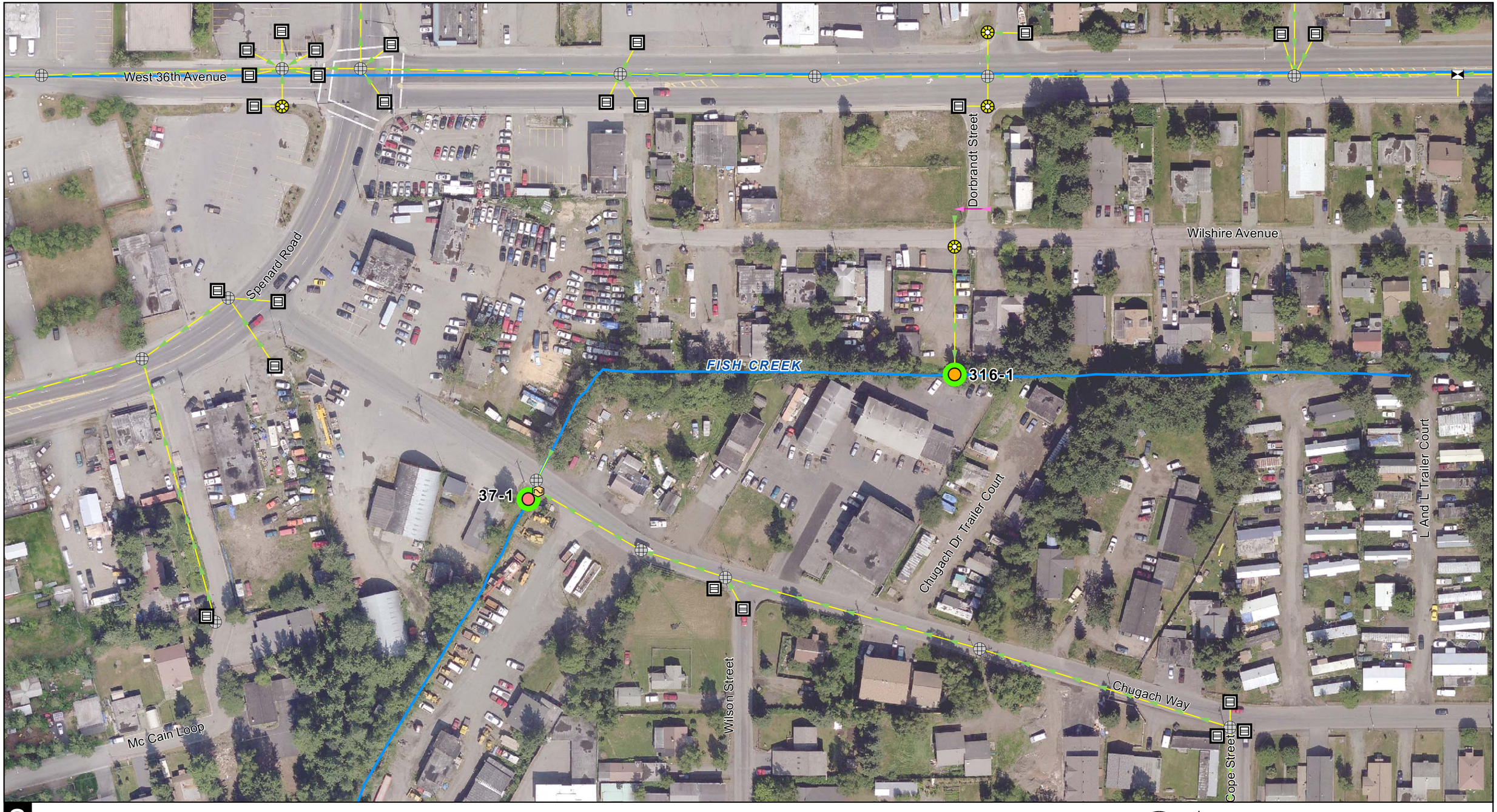
Dry Weather Screening 2013

Fish Creek

Examined and Sampled Outfalls

Page 6

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

2013 Examined Outfall

Stream

Drainage Ways
- Pipe
- Routing
- Xing Culvert

Drainage Way Nodes
- Blind Connect
- Catch Basin
- Catchbasin Manhole
- Manhole
- OGS
- Outfall
- Outfall Minor

0 100 200 Feet

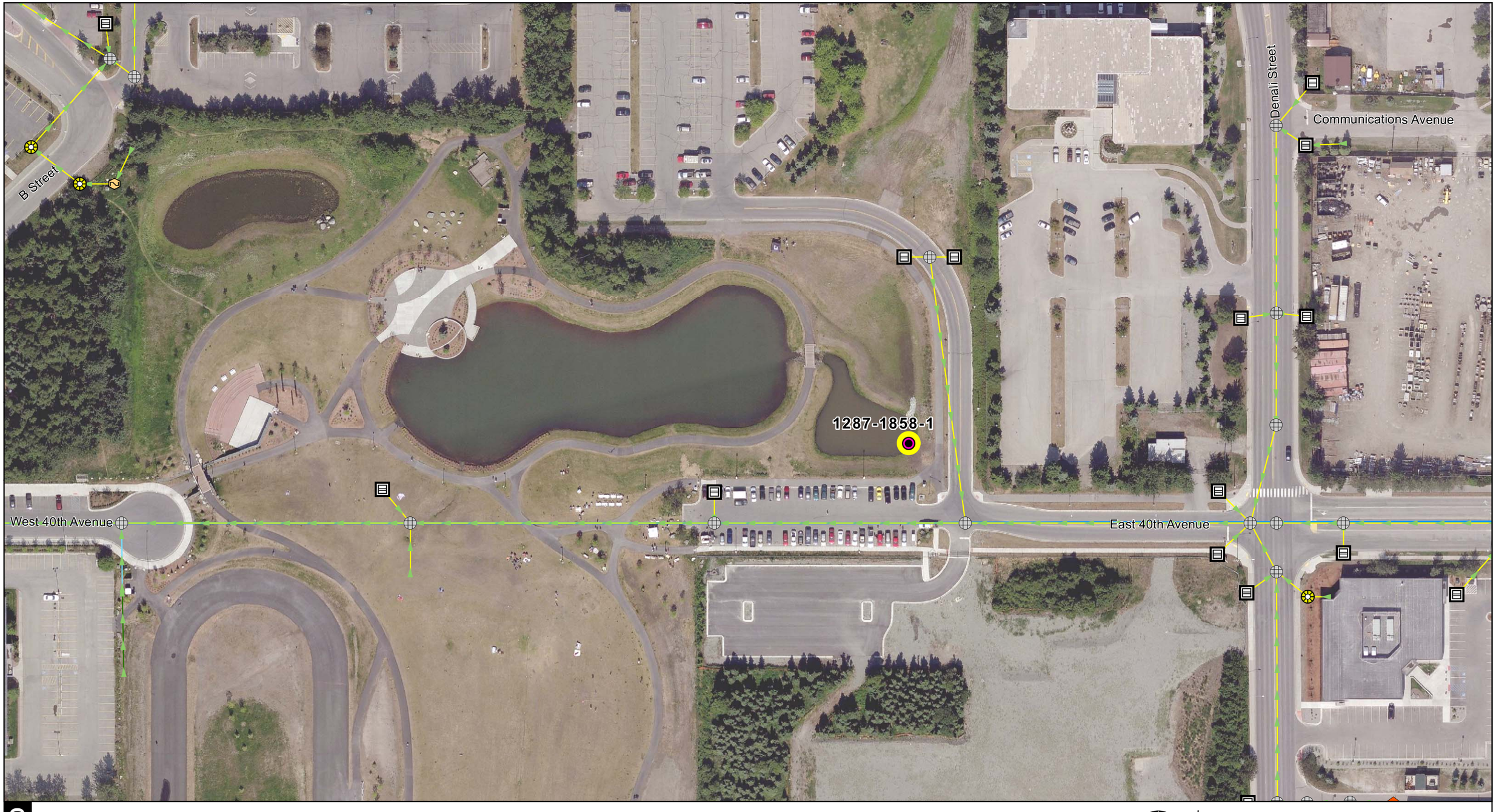
Dry Weather Screening 2013

Fish Creek

Examined and Sampled Outfalls

Page 7

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

- 2013 Sampled Outfall
- 2013 New Node
- Stream

Drainage Ways
- Pipe
- Inlet
- Open Channel

Drainage Way Nodes
- Catch Basin
- Catchbasin Manhole
- Clean-out
- Manhole
- OGS

0 100 200 Feet

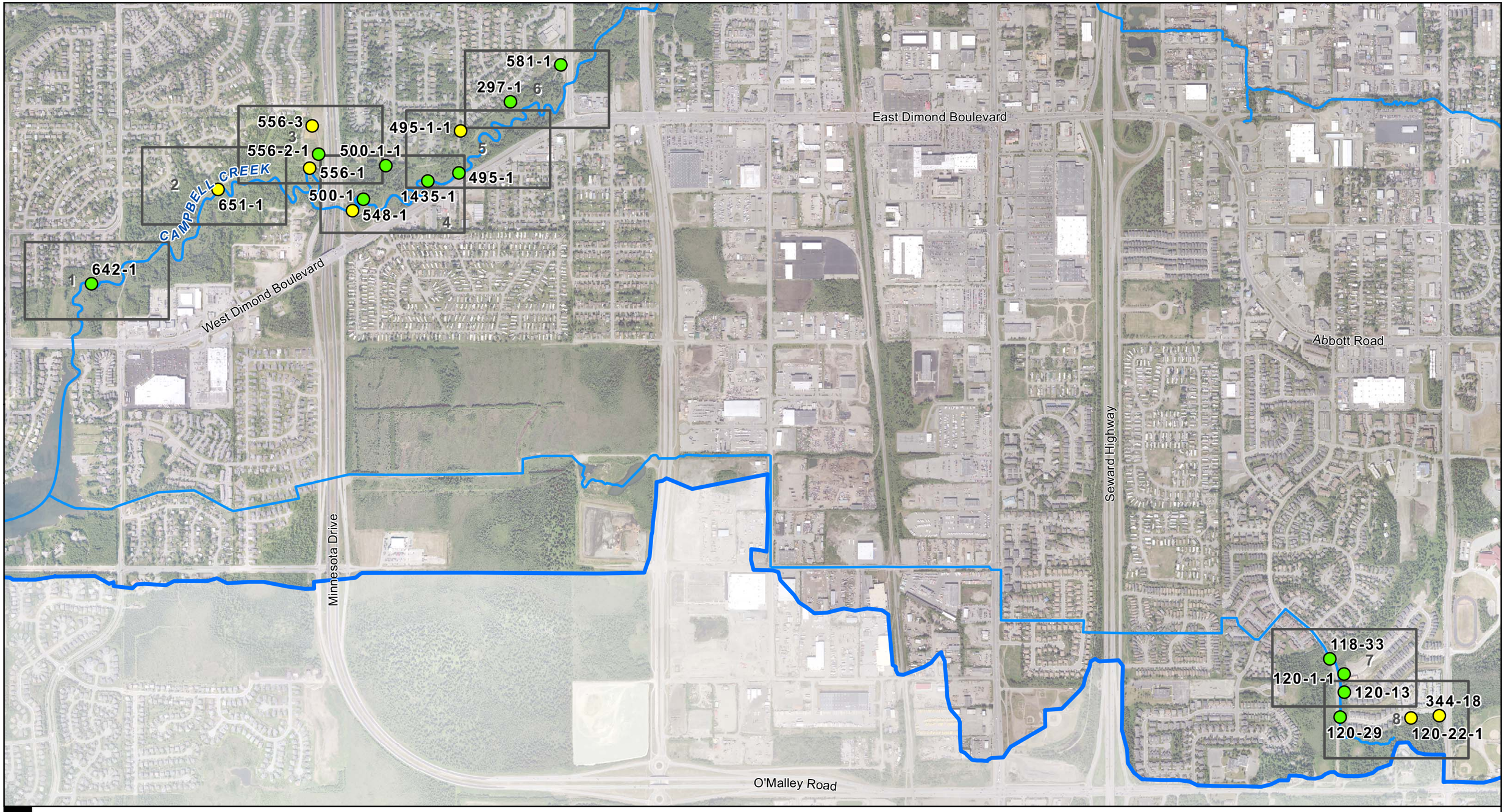
Dry Weather Screening 2013

Fish Creek

Examined and Sampled Outfalls

Page 8

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

- 2013 Examined Outfall
- Map Page Index
- 2013 Sampled Outfall
- Stream
- Watershed Boundry

0 1,000 2,000 3,000 4,000 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Map Index

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

LEGEND

2013 Examined Outfall

Stream

Drainage Ways

Pipe

Routing

Open Channel

Drainage Way Nodes

Catch Basin

Manhole

OGS

Outfall Major

Outfall Minor

0 100 200 Feet

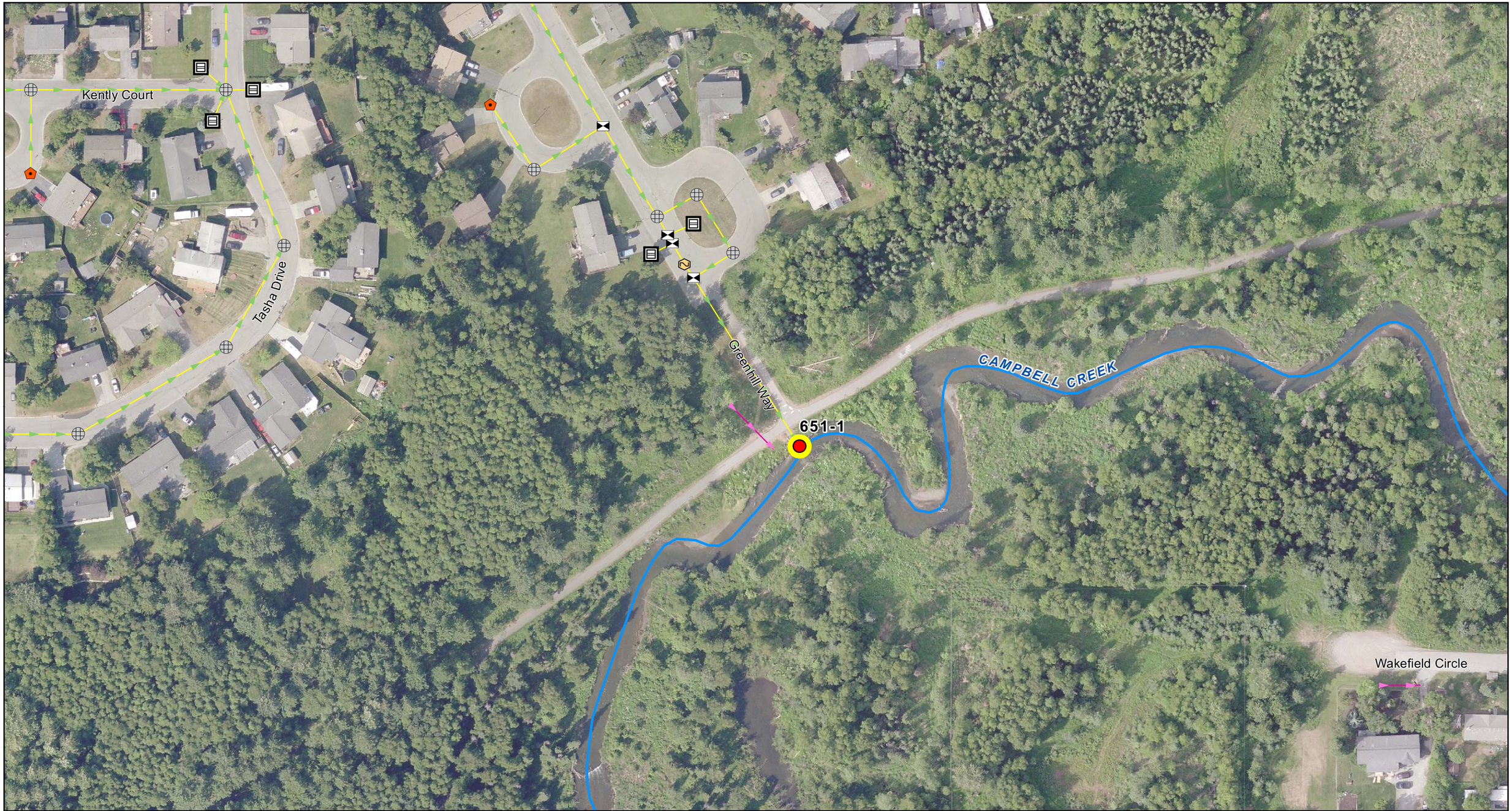
Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 1

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

2013 Sampled Outfall

Stream

Drainage Ways
- Pipe
- Routing
- Xing Culvert

Drainage Way Nodes
- Blind Connect
- Outfall Major
- Catch Basin
- Clean-out
- Manhole
- OGS

0 100 200 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 2

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

LEGEND

- 2013 Examined Outfall
- 2013 Sampled Outfall
- 2013 New Node
- Stream

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

Drainage Way Nodes
- Catch Basin
- Catchbasin Manhole
- Clean-out
- Control Outlet
- Inlet
- Manhole
- OGS
- Outfall Major
- Weir

0 100 200 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 3

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

LEGEND

- 2013 Examined Outfall
- 2013 Sampled Outfall
- 2013 New Node
- Stream

Drainage Ways

- Continuity
- Pipe
- 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

0 100 200 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 4

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

Summerset Drive
Rovenna Street
Winners Circle
495-1-1
West Dimond Boulevard
West 86th Avenue
Ange Street
El Paso Place
495-1
1435-1
CAMPBELL CREEK

LEGEND

- 2013 Examined Outfall
- 2013 Sampled Outfall
- 2013 New Node
- Stream

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

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

0 100 200 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 5

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

LEGEND

2013 Examined Outfall

Stream

Drainage Ways
- Continuity
- Pipe
- Inlet
- Routing

Drainage Way Nodes
- Catch Basin
- Catchbasin Manhole
- Curb Inlet
- Manhole
- OGS
- Outfall
- Outfall Minor
- Outlet

0 100 200 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 6

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

LEGEND

- 2013 Examined Outfall
- 2013 New Node
- Stream

Drainage Ways
- Pipe
- Routing
- Xing Culvert

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

0 100 200 Feet

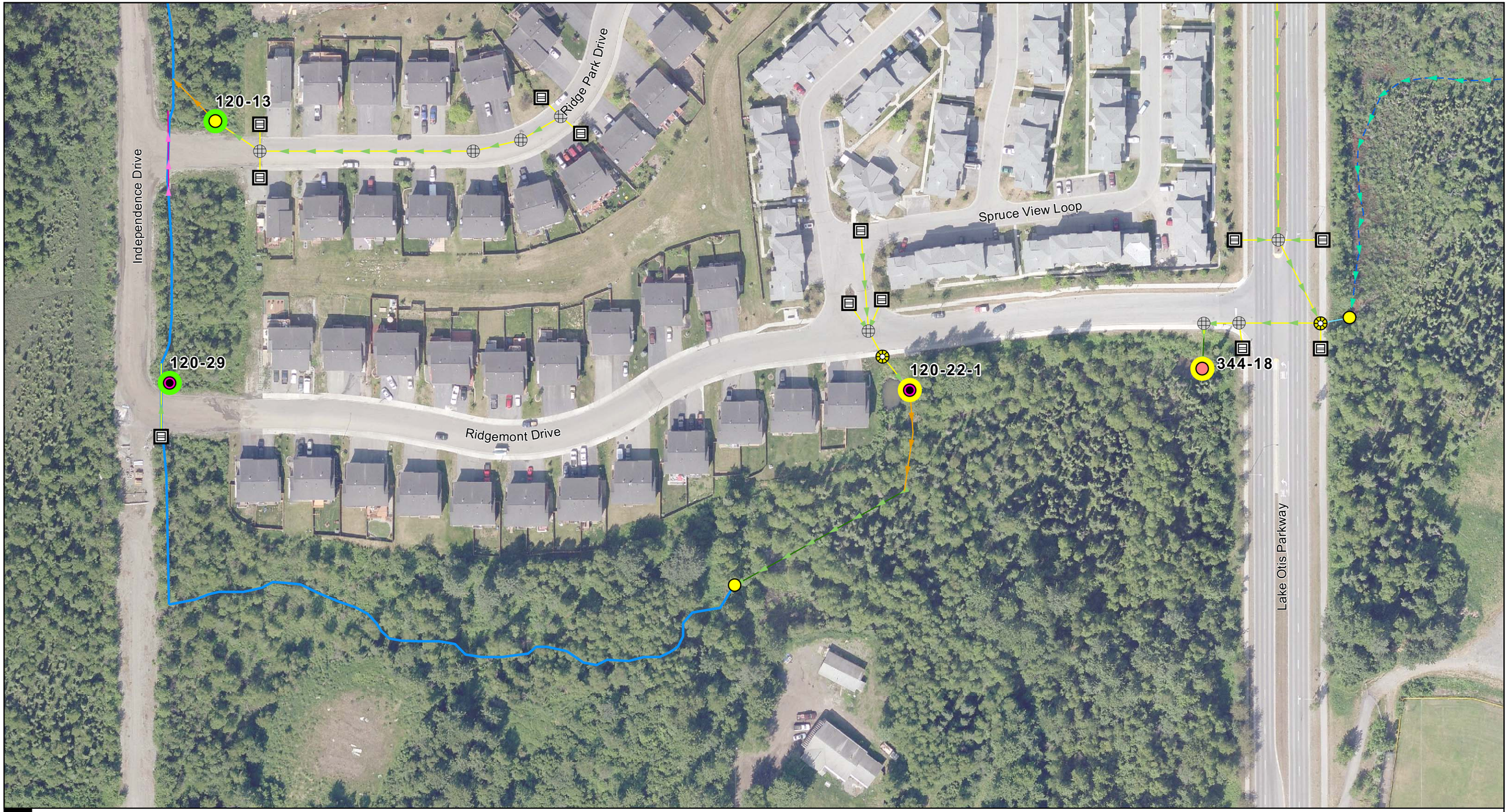
Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 7

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013



LEGEND

- 2013 Examined Outfall
- 2013 Sampled Outfall
- 2013 New Node
- Stream

Drainage Ways

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

Drainage Way Nodes

- Catch Basin
- Catchbasin Manhole
- Manhole
- Outfall Minor
- Outlet

0 100 200 Feet

Dry Weather Screening 2013

Campbell Creek

Examined and Sampled Outfalls

Page 8

Source: MOA HGDB
Imagery: MOA Pictometry 2009
HDR Alaska, Inc.
9/27/2013

HDR Alaska

Appendix B

Field Notebook

Rite in the Rain®
ALL-WEATHER
LEVEL
№ 313

MOA

Dry Weather Recon
Screening and monitoring
2013
June 5th – July 24th

Rite in the Rain®
ALL-WEATHER WRITING PAPER

Name HDR Alaska - Isaac Watkins

Address 2525 C Street
Anchorage AK 99503

Phone 907-644-2000

Project MOA Dry Weather Screening

Rite in the Rain — A patented, environmentally responsible, all-weather writing paper that sheds water and enables you to write anywhere, in any weather. Using a pencil or all-weather pen, *Rite in the Rain* ensures that your notes survive the rigors of the field, regardless of the conditions.

RiteintheRain.com

CONTENTS

PAGE	REFERENCE	DATE

Date	Driver	Start miles	End miles	Total miles	Notes
6/5/13	Alena	249	255	6	Submitted 6/13 AG
6/10/13	Alena	4375	4987	41.5	
6/14/13	Zoe	000		9.2	
6/17/13	Zoe			7.2	
6/18/13	Zoe			32	
6/19/13	Zoe			22	

Record 2:05

Hood Creek Alena Berlek Alyse Roberts 5/5/13

142-1

Access - Petes place (park)
Walk down to costal trail outfall directly across from trail Marker post

Sample - outfall dry not able to sample

715-1

Access Walk West on C.T. 50'
Drainage feature is outlet onto tidal flats from stream.
There is an unmarked culvert that drains ditch onto tidal flats (marked with green spray paint)

Sample Can't Sample because it is a creek not an outfall

Hood Creek Recon

*
609-218
Access ~~Feta~~ on Clay Products between Telequana Dr. and Tazlina Ave
Outfall is just east of Clay Products park by 3940 fence

Outfall
Sample Flowing and easy to sample

263-1 • not accessable due to private property, likely this is the end of pipe and not outfall
Sample • Not able to sample

110-1
Access On Northern Light west of Wavonzof. Storm drain in road.

Sample Not able to sample

Hood Creek Recon

352-1
Access — Buried pipe off west Northern lights

Sample — Not able to sample

294-1
Access — Bridal Lane SW. of Wendys Way. Storm drain not an outfall

Sample — Not able to sample

249-1
Access — Cul de sac at the end of Wendys Way. outfall appears to be near Jones Lake. which goes thru private property. not accessable

Sample — Can't sample outfall ppe may be submerged. low gradient from road to lake.

Potter Creek Recon Alera Creek Zoe Meade 6/19/13

101-1

Access - park on Snowy Plover ☆ outfall S of Potter Valley Rd, E of bridge over Potter Creek

Sample - flowing strong
easy to sample

681-1, 349-4

Access - intersection of Finland and England

Sample - ends of drainage ditches
cannot sample

607-1

Access - intersection of Finland and England

Sample - seep?
cannot sample

615-1

Access - Portugal Place over creek

Sample ~~- end of drainage ditch~~
cannot sample

4ZZ-1
Access- Portugal Place over creek

Sample- culvert draining ditch into creek
cannot sample

582-1, 7096
Access- Romania drive + Austria

Sample- drainage ditches
cannot sample

ZZ-1
Access- Bulgaria Drive

Sample- culvert where drainage ditch crosses road
large cottonwood downed on downstream culvert
not flowing, steep drop to creek
cannot sample →

9ZZ-1
Access- Potter valley Rd before Pullin
sample- steep drop to creek - unsafe to

Letters in the Rain.

894-1
Access- Villages Scenic Pkwy

sample- end of culvert where stream crosses road
cannot sample

614-1
Access- Villages Scenic Pkwy

Sample- where drainage ditch meets trib
cannot sample

24-1
Access- Villages Scenic Pkwy
driveway to 19405

not enough water to sample

sample- outfall merges w/ trib flowing down slope from alder
drainage looks burned upstream, not a ditch
back up sample site?

6/7/25

Access- Potter Valley Rd

Sample- drainage ditch +
steps to trib
confluence sample

Rabbit Creek Ridge
680-4h
Access - Potter Valley Rd
South side of road
outfall is directly below
Potter Valley sign

Sample - flowing
can sample

1323-1
Access - Tidewater Drive

Sample - culvert
cannot sample

73-1
Access - Virgo Drive

Sample - culvert under road
cannot sample

327-4
Access - Feodora Drive

Sample - Culvert
cannot sample

Rabbit Creek Recon

699-1
Access - end of Aster Court
Could not locate outfall

173-5
Access - Virga Drive
drainage ditch

134-1, 697-3
Access - Ransom Ridge, Stone Ridge

Sample - culverts from drainage ditches

1439-1
Access - Saint James Circle

Sample - culvert from drainage ditch

284-1
Access - Golden View + 164th

sample - storm drain
cannot sample

Rite in the Rain

Rabbit Creek Recon

1418-1
Access - N of property line at 1590 Elizabeth

outfall - not flowing
cannot sample

514-1
Access - Golden View Dr directly across from middle school

Outfall - culvert
cannot sample

1408-1
Access - Golden View Dr

Outfall - drainage ditch
cannot sample

471-11
Access - Golden View W of Rabbit Creek at 1st power pole

Outfall - culvert
cannot sample

Rabbit Creek Recon

635-2
Access- Golden View + Park Hills Dr

Outfall- culvert
cannot sample

291-8
Access- Park Hills Dr W of Golden View

Outfall- Culvert connecting drainage
ditch w/ stream
cannot sample

200-2
Access- Park Hills Dr

Outfall - culvert
cannot sample

123-4, 198-1, 603-1, 336-8
Access- Buffalo + 147th
Buffalo + Woodhaven

Outfalls - culverts + drainage ditches
cannot sample

Rabbit Creek Reach

658-1
Access - Mayfield Way Carnell

Outfall - culvert connecting drainage ditches
cannot sample

246-3
Access - Elmore btwn Mayfield & E 145th

Outfall - culvert
cannot sample

76-2
Access - W end of E 147th

Outfall - drainage ditch enters creek
cannot sample

688-2, 470-1
Access - where Elmore meets Rabbit Creek

Outfalls - could not locates buried?
cannot sample

Rabbit Creek Recon

targets

x page 1
558-2 ✓
Old Seward + Chenoweth

• page 2
472-5 ✓
De Armour → E140th + Riffle

x page 5
132-1

x off Southpark Bluff Drive
248-1 ✓
behind Golden View track
199-23
Essex Park Drive
1326-1
Southpark Bluff Drive before Bough Circle
extended culvert - Not an outfall
outfall = ditch

Rite in the Rain

Fish creek Recon

Zoe Meade 6/19/13

FSH429 Access — Take R ^ Forest Park Dr. from Northern Lights, First left on La Honda Park next to neighborhood watch sign & follow trail across RR tracks to dirt trail. followed trail and crossed fish creek near pipeline. Walked uplands but did not Find an outfall

Tried to access from Lovesac Dr. but could not see an easement

Sample — Not able to Sample

Fish Creek Recon 6/17/13

FSH 429 Could not locate
Access Parked at the end of LaHonda and walked North on little dirt trail behind cement blocks found culvert to fish creek but not outfall

Sample could not find outfall

FSH 684 at the intersection of
Access Loussac and McCallie Dr think storm drain is in road.

Sample Not able to sample

FSH 241 Walked down trail from
access LaHonda to Fish Creek wetlands walked along creek could not find outfall. Can't access from Marston Dr

Sample Not able to Sample

241-38 Primary Discharge ~~Outfall~~ ~~Downst~~ mine
Access Park @ LaHonda Walk on trail North

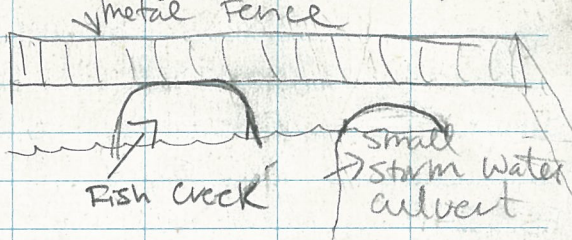
Fish creek Recon Zie Meade 6/17/13

Water is flowing from culvert

298-1 Walk upstream at Corner of
Access Gray Condos on Right bank you
will see ▭ and hear water

Sample Not able to Sample

682-1 Park at condo on corner
Access of Forestpark Dr. and
La Honda Walk South
to end of La Honda



Sample water is flowing slowly but it
mixes with fish creek
See Picture by Alyse i-phone

6/17/13

~~NO~~ YES

1287-994 Park car at park on Willow Access Street. outfall is next to Picnic table TO the R. of large culvert in weeds

Sample: water is flowing and ~~will~~ be a good place to sample

~~This is a very large culvert~~ ~~NO~~ YES Water Sample here

1288 Adjacent to culvert 15' ~~This is a Storm drain~~ 7/11/13 RR, IW

Access This is not an outfall

Sample ~~Not able~~ This is the large culvert Yes sampled

1309-34 parked in same location at Park walked to RR tracks and took trail near tracks till ~~end~~ coffin cook Estates circle was visable - crossed RR. fenced area prevented access to private property

Could not Locate

May need permission to enter via Brookside Dr. Looks like private

Rite in the Rain

Rabbit Creek Recon

6/18/13

248-1 Access — Park @ Goldenview Track / ~~Ice~~ arena or End of Rocky road and followed creek ~~down~~ past Track. could not find outfall.

Sample — Not able to Sample

289-23* — Park by 16149 Essex park Dr. There is a yellow ↦ on ~~the~~ sidewalk adjacent to outfall.

Sample — yes water is flowing

1326-1 Access — South Park Bluff Drive Park near intersection with Baugh circle.

?.ND — unable to access property lines

1326-1 access — Park on corner of South park Bluff drive and Baugh Cir.

Sample — Water is flowing - may be a culvert

★

S11-1
Access — park on Rabbit creek Rd by guard rail before Northfield drive

Sample — yes, took picture. very gross with lots of iron, but water is flowing enough to sample

★

S62-6
Access — JUST downstream of culvat Follow water and walk towards corner of red house. look for two down beetle kill spruce & lots of Devils club.

Sample — water was flowing, but access is tricky and will only get harder as Devils club grows. don't recommend

S12-3
Access — intersection of old Rabbit creek Rd and E 190th

Sample — Dry - Not able to sample

7/16-3 Not accessable on the other
Access Side of Rabbit creek Rd.

Sample Not able to sample Private property

252-2 Park on Old Rabbit creek bend
by blue Marker & where creek
crosses Road. Not able to
locate outfall. ~~1~~

Sample -Not able to Sample

6660-1 Park at Stark Park. Walk
Access West of NW Entrance to
Parking Lot. then Shrubs at
the corner of ~~Rupert~~ yard
Green Spray Painted Storm
drain

Sample Not an outfall - can't Sample
looks like Personal well or seep

288+2 along side of Rabbit
Access Creek Rd just past Stark
Park. Water flows into
culvert

Sample Maybe - Since you can't

558-2
946-1

primary drainage for Rabbit Creek = 2 large culverts pass under Rabbit Creek Rd.

Fish Creek Recon

6/19/13

R. Hook, Z. Meade

27-1 access - park at appartment lot next to Forest park & La Honda. Culvert located across street behend guard rail

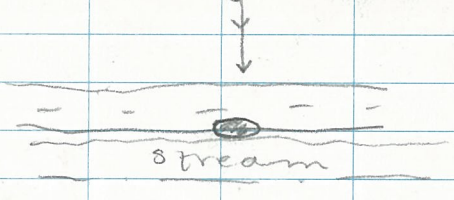
sample - no, culvert for stream, out fall located on other side of street.

,1310-201

1314-61 access - park on Turnagain Blvd E. @ intersection (3 Way stop)

sample - no, culvert, no out fall.

7-1? access corner of W 36th & Turnagain Blvd.



sample definite flow from culvert. Seems to be

draining from under W 36th Ave, not sure if outfall or stream trib.

32-1 access: park corner of W 32nd and Barbara St. @ park.
Sample: unable to access

462-1
access - park at Barbara St park walk south down bike path and turn east at corner of 33rd & Barbara

Sample - yes, steady flow into stream / wetland. water clear with no film or Fe residue.

595-1
access: W end of W 34th Ave
sample: unable to find

FSH 228 | 228-1

access at Fish Creek Park

sample: Maybe, only able to find one outfall not sure if its FSH 228 (sample 2011) or 228-1

photos: yes, Zoe's camera,

1312-19, 1277-59

property access issues

No samples

391-1 - Could not sample 7/12/13

sample: no flow, culvert 1/2 submerged w/ stream water

* probably not good to sample

686-167 } 4" diameter pipe
686-1 } protuding from stream bank, dry 0 flow

1276-2

access: park 42nd ave, walk under spenard bridge

sample: stream culvert, slow flow

1054-1 access: park @ corner of Haru & W 47th Ave.
sample: NO, unable to find outfall - wetland drainage prevalent.

480-1 park at Haru & W 47th ave walk along sidewalk to site.
sample: culvert 1/2 full of stagnant water. Should not sample here if possible.

7/12/13 SDD. inside fence on corner 45th & Northwood

137-1
sewer drain cover - no sample
park W Tudor Dr.

172-1
access park end of W Tudor Dr, culvert beneath bridge.
Culvert flows under brick bridge steady flow, water covers bottom of culvert.

1013-1 access W Tudor Road
walk E on bike path creek
on left
sample: no, small pipe 1/2
submerged in creek bed, no
flow

1003-1 continue on bike
path.
sample: culvert exits out
of W. Tudor Road. Dry
no sample

234-1 access: park at SBS
walk along tracks
sample: culvert under rail
tracks, Water in creek
but zero flow. Not a
candidate for testing. Scum
and debris ~~on~~ covering
nearly entire cross width
of stream.

191-1, 341-1

park in vacant lot near Roosevelt st.

sample: unable to access due to private property and sketchy property access.

610-1

access park at end of iris st.

sample: not this year. Area under sewer construction. Site impacted by beavers, severe flooding of site. Culvert covered and crushed (according to on site contractors)

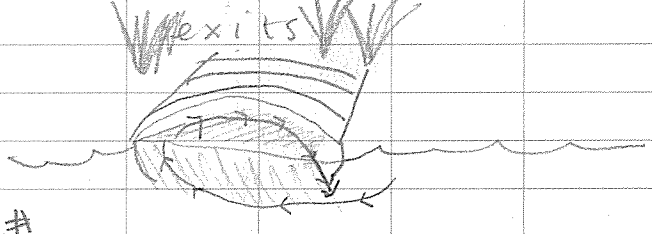
6/19/13

Campbell Creek Recon
Z Meade, R Hook

642-1 access: park at Chester creek Park, walk to back of park and follow creek to site,

* unable to get to site due to moose encounter.

651-1 access: green hill way
sample: yes, 4ft pipe 1/2 submerged. Sediment discharge, stream enters in culvert swirls and exits



~~556-1~~ access: green hill way continue E on bike path
sample: no.
stagnant water, high Fe presence and pipe 1/2

submerged.

556-1 access: greenway follow bike path E to wetland.
sample: yes
pipe flowing 8" of laminar flow.

1367-1 access: chester bike path.
outfall near southbound diamond off exit.
sample: no - dry

548-1 access: bike path
sample: Maybe, check at sampling
culvert nearly full of Fe scum and water. Easy to access and check later.
slow flow.

1367-26 access bike path
Y sample: definite flow and rapid flow into creek

1' culvert nearly blocked w/ moss and woody debris

457-120

Outfall underground however creek downstream is flowing, upstream is dry. All water in creek is storm water

Access: park on lot next to Minnesota dr. and Roosevelt drive

Fish Creek Recon 6-21-13
1 Watkins 2 Meade

37-1 Storm drain partially submerged and clogged. Culvert clogged. No flow

L and L Trailer Court, Chugach Way end of creek, channel exists but no water flowing. Where does water go?

316-1 unable to access but creek flows into stagnant ponds.

1275-1 dry

Campbell Creek 6/21/13
1 Watkins 2 meade

1356-1 outfall draino into creek, construction on Victor. no sampling

120-1 Creek runs parallel to Independence Drive, from Ridgemont to Ridge Park stream moves at slow flowing pace.

120-1-1 Ridge park dr and Independence dr. New construction. Storm drain over half submerged with little flow.

120-2 Ridgemont dr and Independence dr. Well

constructed stormdrain, with no current flow, site wet with Fe residue not able to sample. Site not on map.

344-18 Ridgemont and Lake Otis. Culvert w/ grates, grate clogged by leaf debris water is flowing rapidly out of about 2090 of culvert. Sample: Yes

344-18-1 drains Spruce View Loop. Park on Ridgemont near mail boxes. Not on map.

* known bear sitings in area

500-1

water present, can be sampled.

1435-1 unable to sample

495-1 park @ end of Rovenna St. Good to sample flowing water

297-1 trail sign and orange marker, enter on trail from Summerset Dr.

581-1 flowing w/ funk!

Isaac Watkins, Angie Eberly 6/25/13

Potter Creek Sampling

101-1 Completed test @ 14:15
No exceedences R, IW

24-1 Checked outfall - Appeared to be culvert under driveway, but could not ↑ gradient opening. Not enough flow to sample.

1680-90 Rabbit Creek near Potter Valley Sign
Completed test @ 15:40
- No exceedences
R & IW

1326-1 Near Baugh Cir on Rabbit Creek
Not an outfall - No sample

289-23 Essex Park Dr.
Collected sample and left to drop off @ lab. Completed field test at office picnic table

Isaac Watkins / Angie Roberts

Fish Creek DWS 7/11/13

12881 large culvert at old Hermit Park
- No hits

1287-994 little culvert at old Hermit Park
- No hits

Hood Creek
609-218 - Clay products outfall
- No Hits

I. Watkins, A. Roberts
Fish creek DWS 7/12/13

462-1 33rd on fish creek trail near cut Cottonwood trees that blew into powerline during wind storm

No hits

457-120 off Minnesota Southbound lane. Across the Street from 41st & 42nd Water here daylights for the first time since leaving Cuddy Park

Fish creek 7/12/13

There are two park benches near the road to walk on. Site is located behind vintage junk car.
No hits

Cuddy Park outlet

located next to parking lot in South East corner of Bird Pond.

No hits

Campbell Creek DWS 7/15/13

642-1 Parked @ Banjo walked on easement
Standing water not able to
sample

651-1 5' wide pipe partially
submerged. Due to visable
turbidity water was flowing
out of pipe. Sample collected
inside of pipe.

556-1 outfall draining ~~Basin~~ Settling
basin near Minnesota
- Sample taken before water
flows into old stream channel
of Campbell creek

500-1 Standing water
Did Not sample

548-1 Near bridge next to Dimond Blvd
and bike path

495-1 Rovena Dr. in weeds next to house on left side of Rd. when facing creek

7-16-13

CAM 120-1 not flowing outfall on South side, not North as indicated on map

CAM 118-33 - not flowing,

CAM 120-1-1 (Ridge Park Dr.) dry - mostly buried outfall - needs help!

CAM 120-1-2 dry (Ridgemont Dr.)

CAM 344-18-1 1150 } sampled - Very low flow

CAM 344-18 sampled 1205 strong flow

Rite in the Rain

Campbell Creek 7/24/13

556-1 outfall to creek from Minnesota Settling Pond.

follow-up visit to collect FC at the inlet and outlet of sediment basin due to a hit last week. There was 1 dry outfall on the South East end of the pond that could not be sampled.

Appendix C

Field Data Sheets

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: HC609 -218 (Hood)

Part 1. General Information

1. Date 7/11/13 Time 2:24
2. Field Crew Isaac Watkins, Alyse Roberts Water quality analyses conducted by: Isaac Watkins
3. How long since last rainfall? ☐ raining now ☒ less than 3 days ☐ 3 or more days ☐ unknown
4. Size of last rain event. <0.1 inches duration .5 hours
5. End-of-pipe diameter: 2 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 6 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) A.R.'s phone

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

Part 3. Field Analyses

11. Flow Velocity: 5 gal/min ☐ Low ☐ Medium ☒ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.5 pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	0.10 ppm	ppm
Turbidity	1.98 ntu	ntu
Total phenols	0.2 < 0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Department of Public Works — WATERSHED MANAGEMENT

Outfall Number: PC-1D1-1 (Potter Creek)

Part 1. General Information

1. Date 6/25/13 Time 1300 – 1415
2. Field Crew Isaac Watkins Alyse Roberts Water quality analyses conducted by: I. Watkins
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. 0.1 inches duration 2 hours
5. End-of-pipe diameter: 2 feet _____ inches
6. Depth of water in end-of-pipe: ~~4"~~ 0 feet 4" inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) A. Roberts I. phone

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 _____

Part 3. Field Analyses

11. Flow Velocity: > 10 gal/min ☐ Low ☐ Medium ☒ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored _____
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	6.3 pH units
Total chlorine	<0.10 ppm	<0.10 ppm
Detergents	<0.05 ppm	0.05 ppm
Turbidity	0.09 ntu	0.109 ntu
Total phenols	0.3 > 0.2 ppm	0.3 > 0.2 ppm
Total copper	<0.05 ppm	<0.05 ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.0 pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	0.90 ntu	ntu
Total phenols	0.3 > 0.2 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: RC 680-40

Part 1. General Information

1. Date 6-25-13 Time 1450
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 2 hours
5. End-of-pipe diameter: 1 feet 0 inches
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) A.R.'s phone
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

Part 3. Field Analyses

11. Flow Velocity: 0.20 gal/min ☒ Low ☐ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.0 pH units	pH units
Total chlorine	<0.1 ppm	ppm
Detergents	0.10 ppm	ppm
Turbidity	0.50 ntu	ntu
Total phenols	0.3 > 0.2 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: RC289-23 ~~RC~~

Part 1. General Information

1. Date 10/25/13 Time 15:55
2. Field Crew Isaac Watkins Alyse Roberts Water quality analyses conducted by: Isaac Watkins, IW
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. 0.1 inches duration 2 hours
5. End-of-pipe diameter: 0 feet 6" inches
6. Depth of water in end-of-pipe: 0 feet 1" inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) i-Phone
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

Part 3. Field Analyses

11. Flow Velocity: 1.5 (gal/min) ☐ Low ☐ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.5 pH units	pH units
Total chlorine	<0.1 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	5.93 ntu	ntu
Total phenols	0.3 ~~>0.2~~ ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: FSH 1287-994

Part 1. General Information

1. Date 7-11-13 Time 1330
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☒ less than 3 days ☐ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 1 feet 0 inches
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) _____

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 I&W *If yes, describe in comment section.* 7-11-13
10. Floatables in water flowing from end-of-pipe:
    ☐ None ☒ Moving oily sheen ☐ Surface scum ☐ Soapy suds ☒ Debris ☐ Other _____

Part 3. Field Analyses

11. Flow Velocity: 0.10 gal/min ☒ Low ☐ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored _____
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	<0.05 ppm	ppm
Turbidity	34.4 ntu	ntu
Total phenols	0.23 <0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

R 7/11/13

Outfall Number: ~~1287-994~~ FSH 1288-1

Part 1. General Information

1. Date 7/11/13 Time 12:30
2. Field Crew Isaac Watkins, Alyse Roberts Water quality analyses conducted by: I. Watkins, A.R.
3. How long since last rainfall? ☐ raining now ☒ less than 3 days ☐ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 4 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 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 _____

Part 3. Field Analyses

11. Flow Velocity: 20 gal/min ☐ Low ☐ Medium ☒ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☐ Clear ☒ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☐ Clear ☒ Colored light tan
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	<0.1 ppm	<0.1 ppm
Detergents	<0.05 ppm	0.1 ppm
Turbidity	0.33 ntu	45.2 ntu
Total phenols	0.2 & <0.3 ppm	0.2 & <0.3 ppm
Total copper	<0.05 ppm	<0.05 ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	~~4.2~~ 6.8 pH units	pH units
Total chlorine	<0.1 ppm	ppm
Detergents	~~X~~ 0.1 ppm	ppm
Turbidity	42.2 ntu	ntu
Total phenols	0.2 & <0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) / no	

Part 4. Comments: lt. sulfur / rotten egg smell

0.05>

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: FSH 462-1

Part 1. General Information

1. Date 7-12-13 Time 1200
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☒ less than 3 days ☐ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe: 0 feet 2 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) A.R.'s phone

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

Part 3. Field Analyses

11. Flow Velocity: 2 gal/min ☐ Low ☒ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	0.30 ppm
Detergents	ppm	0.05 ppm
Turbidity	ntu	3.97 ntu
Total phenols	ppm	0.2<0.3 ppm
Total copper	ppm	<0.05 ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.8 pH units	pH units
Total chlorine	0.30 ppm	0.30 ppm
Detergents	0.05 ppm	ppm
Turbidity	3.86 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: FSH ~~457-120~~ 341-1 corrected on 9-24-13 Based on GIS database I&W 9-24-13

Part 1. General Information

1. Date 7-12-13 Time 1430
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☒ less than 3 days ☐ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 3 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 6 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) A.R.'s phone
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

Part 3. Field Analyses

11. Flow Velocity: 5 gal/min ☐ Low ☒ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	<0.05 ppm	ppm
Turbidity	0.08 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.5 pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	<0.05 ppm	ppm
Turbidity	12.7 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

hydrocarbon smell

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: FSH@Cuddy 1287-1858-1 ← # assigned based on node location IEW 9-24-13 not official MOA node code

Part 1. General Information

1. Date 7-12-13 Time 1500
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☒ less than 3 days ☐ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 2 feet 6 inches
6. Depth of water in end-of-pipe: 0 feet 6 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) 005
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

Part 3. Field Analyses

11. Flow Velocity: 5+ gal/min ☐ Low ☒ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	7.3 pH units	pH units
Total chlorine	0.40 ppm	ppm
Detergents	0.10 ppm	ppm
Turbidity	9.79 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	20.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

CAM

Outfall Number: ~~344-18-1~~ 170-22-1 Node ID changed to reflect node location based on GIS DB IEW 9-24-13

Part 1. General Information

1. Date 07-16-13 Time 11:50
2. Field Crew I Watkins, Z Meade Water quality analyses conducted by: IW, ZM
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. IEW 7-16-13 ~~<1.0~~ <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe: 0 feet 2 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) 005
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

Part 3. Field Analyses

11. Flow Velocity: 0.1 gal/min ☒ Low ☐ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	<0.1 ppm	ppm
Detergents	0.00 ppm	ppm
Turbidity	0.16 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	7.80 pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	3.23 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) / no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: CAM 344-18

Part 1. General Information

1. Date 7-16-13 Time 1205
2. Field Crew I. Watkins, Z. Meade Water quality analyses conducted by: I.W., Z.M.
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 2 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 6 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) 005

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

Part 3. Field Analyses

11. Flow Velocity: 5 gal/min ☐ Low ☒ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☐ Clear ☒ Colored light Tan
14. Water Quality Analyses:

Quality Control Samples			
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]	
pH	N/A	7.3	pH units
Total chlorine		<0.1	ppm
Detergents	~~0.05~~	<0.05	ppm
Turbidity		7.54	ntu
Total phenols		0.2 <0.3	ppm
Total copper		<0.05	ppm
Fecal Coliform	n/a	n/a	

Water Quality Samples			
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]	
pH	7.2	pH units	pH units
Total chlorine	<0.1	ppm	ppm
Detergents	<0.05	ppm	ppm
Turbidity	7.27	ntu	ntu
Total phenols	0.2 <0.3	ppm	ppm
Total copper	<0.05	ppm	ppm
Fecal Coliform	(Yes) / no		

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: CAM 651-1

Part 1. General Information

1. Date 7-15-13 Time 1230
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 5 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) 005

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

Part 3. Field Analyses

11. Flow Velocity: 2 gal/min ☐ Low ☒ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☐ Clear ☒ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☐ Clear ☒ Colored tan tint
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.8 pH units	pH units
Total chlorine	<0.1 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	81.9 ntu	83.7 ntu
Total phenols	0.2 < 0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: CAM 556.1

Part 1. General Information

1. Date 7-15-13 Time 1245
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 5 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 6 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) 005

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

Part 3. Field Analyses

11. Flow Velocity: 5 gal/min ☐ Low ☐ Medium ☒ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☐ Clear ☒ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☐ Clear ☒ Colored Tan tint
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	ppm	ppm
Total copper	ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	6.8 pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	25.0 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: Cam 548-1

Part 1. General Information

1. Date 7-15-13 Time 1440
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 1 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 2 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) 005

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

Part 3. Field Analyses

11. Flow Velocity: 1/2 gal/min ☒ Low ☐ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]
pH	N/A	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	<0.05 ppm	ppm
Turbidity	0.08 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	n/a	n/a

Water Quality Samples		
Parameter	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	7.5 pH units	pH units
Total chlorine	<0.10 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	3.86 ntu	ntu
Total phenols	0.2<0.3 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	(Yes) no	

Part 4. Comments:

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Transportation & Public Facilities, State of Alaska | Department of Public Works | Watershed Management

Outfall Number: CAM 495-1

Part 1. General Information

1. Date 7-15-17 Time 1505
2. Field Crew I. Watkins, A. Roberts Water quality analyses conducted by: I.W., A.R.
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. <0.10 inches duration 1/2 hours
5. End-of-pipe diameter: 1 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 2 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) 005
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

Part 3. Field Analyses

11. Flow Velocity: 0.10 gal/min ☒ Low ☐ Medium ☐ High ☐ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☐ Clear ☒ Cloudy/Muddy
13. Color of water flowing from end-of-pipe: ☒ Clear ☐ Colored
14. Water Quality Analyses:

Quality Control Samples			Water Quality Samples		
Parameter	**Equipment Blank (DI H_2O)** [1 each before sampling event]	**Split Sample** [1 each sampling event]	**Parameter**	**Primary Sample**	**Confirmation Sample** [primary sample over threshold]
pH	N/A	7.1 pH units	pH	7.1 pH units	pH units
Total chlorine	ppm	<0.10 ppm	Total chlorine	<0.10 ppm	ppm
Detergents	ppm	0.05 ppm	Detergents	0.05 ppm	ppm
Turbidity	ntu	171 ntu	Turbidity	164 ntu	185 ntu
Total phenols	ppm	0.2<0.3 ppm	Total phenols	0.2<0.3 ppm	ppm
Total copper	ppm	<0.05 ppm	Total copper	<0.05 ppm	ppm
Fecal Coliform	n/a	n/a	Fecal Coliform	Yes / no	

Part 4. Comments:

GUIDELINE FOR DRY WEATHER SCREENING FIELD DATA FORM
A SEPARATE DATA FORM MUST BE FILLED OUT FOR EACH OUTFALL

"End-of-Pipe" *is the open end of* a *pipe discharging stormwater from the stormwater sewer system into the environment.*
Outfall Number: Write the outfall identification number on the field data form. The outfall identification number can be found on the location map. Verify the map guiding you to the outfall location is accurate. Make location corrections to the map and/or in the comment section. If the outfall cannot be found based on map information, make a note and return the uncompleted form and map to WMS representative.

Part 1 GENERAL INFORMATION

1. Date and Time: Record the date and time the outfall assessment begins.
2. Field Crew: Write in the names of the field crew and the name of the person conducting the water quality analyses.
3. How Long Since Last Rainfall? Check the box that best represents when the last rainfall occurred. "Rainfall" is defined as a rainstorm big enough to cause runoff from the streets to enter the local storm drains (approximately 0.1 inch or more).
4. Size of Last Rain Event: The amount of rain occurred and the duration of the storm. Attach printout of rain event from Anchorage International Airport http://www.srh.noaa.gov/data/obhistory/PANC.html or from Girdwood: http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=MGDWA2&day=31&year=2010&month=8
5. End-of-pipe diameter. Measure and record the diameter of the outfall using a measuring tape or stick.
6. Depth of water in end-of-pipe. Measure and record the depth of the water flowing from the end-of-pipe using a measuring tape or stick. If this cannot be safely done, make a note to that effect in the comment section.

PART 2 VISUAL OBSERVATIONS

7. Take a photograph(s) of the outfall. Write in the digital or disposable camera number and frame number(s).
8. Water Flowing from end-of-pipe? Check the NO box if there is no water flowing out of the end-of-pipe. Note: If you see standing water in the end-of-pipe or the end-of-pipe is partially submerged in water and you cannot determine if the water is actually flowing out of the pipe, also check the NO box. Check the YES box only if water is flowing out of the end-of-pipe.
If NO water is flowing from the end of the pipe, make sure a photograph(s) has been taken, write any pertinent information in the comment section, and go to the next outfall. If the pipe is submerged, make a note (#14).Do not sample this site.
If YES, water is flowing from the end-of-pipe continue with the assessment.
9. Odors: NEVER place your head inside of an outfall pipe or culvert. Note any odors detected in the general vicinity of the mouth of the outfall in the comment section.
10. Floatables in water flowing from the end-of-pipe:
Moving oily sheen: Imagine pouring new or used motor oil onto water. Do you see this effect in the water flowing from the end-of-pipe? Only check this box if you see floating globs or a moving sheen of oil in the water flowing from the end-of-pipe ..
Surface scum: Scum can be a layer of organic material or impurities floating on the surface of the water.
Soapy suds: Imagine what a bubble bath looks like.
Debris: Debris includes any trash, garbage, vegetative material, etc. If YES, or other briefly describe in the comment section.
11. Vegetation: Describe the presence and the condition of the vegetation around the outfall.
12. Structural Condition: Describe the condition of the outfall.
13. Biology: Describe the biology that is observed in and around the site including wildlife, fish, algae, macroinvertabrates, etc.

PART 3 FIELD ANALYSES

14. Flow. Flow refers to the volume of the water flowing out of the end-of-pipe per unit time.
Primary Method: Hold a calibrated 1- or a 5-gallon bucket under the flow from the end-of-pipe. Using a stop watch, time how long it takes to fill with the bucket. If the bucket fills in less than one-minute, record the number of seconds. Calculate the flow in gal/minute and record.
Secondary Method. *If you are unable to use the primary method, use the secondary method and visually estimate the flow by checking one of the boxes that best describes the observed flow.*

Use the grab sampler to collect a water sample. Note sample collection location in the comment section. Conduct the following two visual observations and water quality analyses using the water collected in the grab sampler.
15. Appearance of water flowing from end-of-pipe:
Clear: Imagine a glass of drinking water or tea, you can see through the liquid regardless of color.
Cloudy/Muddy: You cannot see through the water (it has a cloudy or muddy appearance).
16 . Color of water flowing from end-of-pipe:
Clear: Imagine a glass of drinking water, you can see through the water and the water is not colored.
Colored: Imagine a glass of tea, you can see through the water, but the water is colored. Color can range from light to dark. If the water is colored, check the "Colored" box and write a description of the color of the water on the line next to "Colored." If the water seems very lightly colored and you are in doubt, mark the "Clear" box.
17. Water Quality Analysis. Refer to the Water Quality Sampling Analysis Protocol sheet for instructions.

PART 4 COMMENTS

As needed, explain answers. Record unusual observations of the outfall site not covered by the questions on the form.

PARAMETER THRESHOLDS

Field: pH: < 4.0 or > 9.0; Total Chlorine and Detergents: ≥1 ppm; Total Phenol: ≥0.5 ppm; Turbidity ≥ 5 NTU

Laboratory: Fecal coliform ≥ 400 cfu/100 mL; Total copper ≥ 1 mg/L

Appendix D

Chains of Custody

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1132630

(1)

CLIENT: HDR Alaska Inc.

CONTACT: Isaac Watkins PHONE NO: 907-644-2088

PROJECT NAME: Dry Weather Screening PROJECT/ PWSID/ PERMIT# :

REPORTS TO: Isaac Watkins EMAIL: Isaac.Watkins@HDRInc.com

INVOICE TO: HDR Alaska 2525 C St. Ste 305 QUOTE #:

P.O. #:

SGS Reference #:

page 1 of 1

(2)

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	# CONTAINERS	SAMPLE TYPE C= COMP G= GRAB MI= Multi Incremental Samples	Preservatives Used	Analysis Required (3) Fecal Coliform								REMARKS/ LOC ID
(1) A	RC 289-23	6-25-13	1555	W	1	G		X								
(2) A	RC 680-40	6-25-13	1450	W	1	G		X								
(3) A	PC101-1	6-25-13	1300	W	1	G		X								

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
	6-25-13	1620	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:
	6/25/13	16:20	

(4)

DOD Project? YES NO

Cooler ID _____

Data Deliverable Requirements:

Requested Turnaround Time and-or Special Instructions:

Temperature Blank °C: _____

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

❑ 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

White - Retained by Lab
Pink - Retained by Client

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1133009

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

Page 1 of 1

Section 1

CLIENT: HDR Alaska, Inc

CONTACT: Isaac Watkins PHONE NO:

PROJECT NAME: Dry Weather Screening PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Isaac Watkins E-MAIL: Isaac.Watkins@HDRInc.com
HDR AK, Inc
2525 C St. Ste 305 99503

INVOICE TO: same QUOTE #:

P.O. #: MOA DWS

Section 3

# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: Field Filtered									

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type	Field Filtered	REMARKS/ LOC ID
1A	FSH 1287-994	07/11/13	1330	H_2O	1	G	X	
2A	FSH 1288-1 Dup	07/11/13	1230	H_2O	1	G	X	
3A	FSH 1288-1	07/11/13	1230	H_2O	1	G	X	
4A	HOOD 609-218	07/11/13	1424	H_2O	1	G	X	

Section 5

	Date	Time	
Relinquished By: (1)	7/11/13	1623	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	7/11/13	1623	Received For Laboratory By:

Section 4

DOD Project? Yes No

Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: 8.7 #205
or Ambient [ ]
(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)
INTACT BROKEN (ABSENT)
(See attached Sample Receipt Form)

[ ] 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

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1133033

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

Page ___ of ___

Section 1

CLIENT: HDR AK, Inc

CONTACT: Isaac Watkins PHONE NO: 907-644-2088

PROJECT NAME: Dry Weather Screening PROJECT/ PWSID/ PERMIT#:

REPORTS TO: I. Watkins HDR Inc 2525 C St. 99503 E-MAIL: Isaac.Watkins@HDRINC.com

INVOICE TO: SAME QUOTE #: P.O. #: MOA DWS

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	Section 3 # CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: Total Coliform	REMARKS/ LOC ID
1A	FSH 462-1	07-12-13	1700	H_2O	1	G		
2A	FSH 457-120	07-12-13	1430	H_2O	1	G		
3A	FSH@ Cuddy	07-12-13	1500	H_2O	1	G		

Section 5

	Date	Time	
Relinquished By: (1)	7-12-13	1545	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	7/12/13	1545	Received For Laboratory By:

Section 4 DOD Project? Yes No

Cooler ID: _____

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: 7.5 #242

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 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

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1133072

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

Page ___ of ___

Section 1

CLIENT: HDR Alaska Inc

CONTACT: Isaac Watkins PHONE NO: 907-644-2084

PROJECT NAME: Dry Weather Screening PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Isaac Watkins E-MAIL: Isaac.Watkins@HDRinc.com
HDR AK, Inc 2525 C St. ste 305

INVOICE TO: Same QUOTE #: P.O. #: MOA DWS

Section 3

Section 2 RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: Fecal Coliform									REMARKS/ LOC ID
(1) A	CAM651-1	7-15-13	1230	H_2O	1	G	X									
(2) A	CAM556-1	7-15-13	1245	H_2O	1	G	X									
(3) A	CAM548-1	7-15-13	1440	H_2O	1	G	X									
(4) A	CAM495-1	7-15-13	1505	H_2O	1	G	X									

Section 5

	Date	Time	
Relinquished By: (1)	7-15-13	1637	Received By:
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	7/15/13	16:37	Received For Laboratory By:

Section 4

DOD Project? Yes No

Cooler ID: _____

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: 4.9/2.2

or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

[ ] 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

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1133096

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

Section 1

CLIENT: HDR Alaska Inc

CONTACT: Isaac Watkins PHONE NO: 907-644-2084

PROJECT NAME: Dry Weather Screening PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Isaac Watkins E-MAIL: ISAAC.Watkins@HDRINC.com

HDR AK Inc, 2525 C St. Ste 305

INVOICE TO: Same QUOTE #: P.O. #: MOA DWS

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: Field Filtered									REMARKS/ LOC ID
(1) A	CAM 344-18-1	07-16-13	1150	H_2O	1	G	X									
(2) A	CAM 344-18	07-16-13	1205	H_2O	1	G	X									
(3) A	CAM 344-18-Dup	07-16-13	1205	H_2O	1	G	X									

Section 5

	Date	Time	Received By:
Relinquished By: (1)	7-16-13	1500	
Relinquished By: (2)			
Relinquished By: (3)			
Relinquished By: (4)	07/16/13	14:57	Received For Laboratory By:

Section 4

DOD Project? Yes No

Cooler ID:

Data Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Temp Blank °C: _____

or (Ambient) [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN (ABSENT)

(See attached Sample Receipt Form)

[ ] 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

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1133306

www.sgs.com

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

Page 1 of 1

Section 1

CLIENT: HDR Alaska Inc

CONTACT: I. Watkins (H) PHONE NO: 907-644-2088

PROJECT NAME: Dry Weather Screening

PROJECT/ PWSID/ PERMIT#:

REPORTS TO: Isaac Watkins E-MAIL:

2525 C St. Ste 305 99503

INVOICE TO: Same QUOTE #:

P.O. #: MOA DWS

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Type C = COMP G = GRAB MI = Multi Incremental Soils	Preservative: Field Filtered	Preservative: X	REMARKS/ LOC ID
1A	CAM 556-1 out	07/24/13	1430	H_2O	1	G		X	
2A	CAM 556-1 IN	07/24/13	1435	H_2O	1	G		X	

Section 3

Preservative

Section 4

DOD Project? Yes No

Data Deliverable Requirements:

Cooler ID: _____

Requested Turnaround Time and/or Special Instructions:

Section 5

	Date	Time	
Relinquished By: (1)	7-24-13	1453	Received By:
Relinquished By: (2)			Received By:
Relinquished By: (3)			Received By:
Relinquished By: (4)	7/24/13	1453	Received For Laboratory By: E Secrest

Temp Blank °C: _____

or Ambient (X)

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

[ ] 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

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

F083-Kit_Request_and_COC_Templates-Blank
Revised 2013-03-24

Appendix E

Data Package

Laboratory Analysis Report

Isaac Watkins
HDR Alaska, Inc.
2525 C Street #305
Anchorage, AK 99503

Work Order:	1133306
	Dry Weather Screening
Client:	HDR Alaska, Inc.
Report Date:	July 29, 2013

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. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is provided under SGS general terms and conditions (<http://www.sgs.com/terms_and_conditions.htm>), unless other written agreements have been accepted by both parties.

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/ISO 17025 (RCRA methods: 1020A, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035B, 6020, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040B, 9045C, 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	Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 2xDL)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
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.

SGS Ref.#	1133009004		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/19/2013 11:38
Project Name/#	Dry Weather Screening	**Collected Date/Time**	07/11/2013 14:24
Client Sample ID	HOOD 609-218	**Received Date/Time**	07/11/2013 16:23
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			07/11/13	SDP

SGS Ref.#	1132630003		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	06/28/2013 12:55
Project Name/#	Dry Weather Screening	**Collected Date/Time**	06/25/2013 13:00
Client Sample ID	PC101-1	**Received Date/Time**	06/25/2013 16:20
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	2	1	col/100mL	SM21 9222D	A			06/25/13	SDP

SGS Ref.#	1132630002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	06/28/2013 12:55
Project Name/#	Dry Weather Screening	**Collected Date/Time**	06/25/2013 14:50
Client Sample ID	RC680-40	**Received Date/Time**	06/25/2013 16:20
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			06/25/13	SDP

SGS Ref.#	1132630001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	06/28/2013 12:55
Project Name/#	Dry Weather Screening	**Collected Date/Time**	06/25/2013 15:55
Client Sample ID	RC289-23	**Received Date/Time**	06/25/2013 16:20
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			06/25/13	SDP

SGS Ref.#	1133009001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/19/2013 11:38
Project Name/#	Dry Weather Screening	**Collected Date/Time**	07/11/2013 13:30
Client Sample ID	FSH 1287-994	**Received Date/Time**	07/11/2013 16:23
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	6	1	col/100mL	SM21 9222D	A			07/11/13	SDP

SGS Ref.#	1133009003
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	FSH 1288-1
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 11:38
Collected Date/Time	07/11/2013 12:30
Received Date/Time	07/11/2013 16:23
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	46	1	col/100mL	SM21 9222D	A			07/11/13	SDP

SGS Ref.#	1133009002
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	FSH 1288-1 Dup
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 11:38
Collected Date/Time	07/11/2013 12:30
Received Date/Time	07/11/2013 16:23
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	30	1	col/100mL	SM21 9222D	A			07/11/13	SDP

SGS Ref.#	1133033001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/19/2013 11:39
Project Name/#	Dry weather screening	**Collected Date/Time**	07/12/2013 12:00
Client Sample ID	FSH 462-1	**Received Date/Time**	07/12/2013 15:45
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			07/12/13	SDP

SGS Ref.#	1133033002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/19/2013 11:39
Project Name/#	Dry weather screening	**Collected Date/Time**	07/12/2013 14:30
Client Sample ID	FSH 457-120	**Received Date/Time**	07/12/2013 15:45
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			07/12/13	SDP

SGS Ref.#	1133033003		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/19/2013 11:39
Project Name/#	Dry weather screening	**Collected Date/Time**	07/12/2013 15:00
Client Sample ID	FSH @ Cuddy	**Received Date/Time**	07/12/2013 15:45
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	30	1	col/100mL	SM21 9222D	A			07/12/13	SDP

SGS Ref.#	1133096001
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 344-18-1
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 14:36
Collected Date/Time	07/16/2013 11:50
Received Date/Time	07/16/2013 14:57
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			07/16/13	SDP

SGS Ref.#	1133096002
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 344-18
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 14:36
Collected Date/Time	07/16/2013 12:05
Received Date/Time	07/16/2013 14:57
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	42	1	col/100mL	SM21 9222D	A			07/16/13	SDP

SGS Ref.#	1133096003
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 344-18-DUP
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 14:36
Collected Date/Time	07/16/2013 12:05
Received Date/Time	07/16/2013 14:57
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	42	1	col/100mL	SM21 9222D	A			07/16/13	SDP

SGS Ref.#	1133072001
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 651-1
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 12:44
Collected Date/Time	07/15/2013 12:30
Received Date/Time	07/15/2013 16:37
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	3	1	col/100mL	SM21 9222D	A			07/15/13	SDP

SGS Ref.#	1133072002
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 556-1
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 12:44
Collected Date/Time	07/15/2013 12:45
Received Date/Time	07/15/2013 16:37
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	413	1	col/100mL	SM21 9222D	A			07/15/13	SDP

SGS Ref.#	1133306001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/29/2013 9:01
Project Name/#	Dry Weather Screening	**Collected Date/Time**	07/24/2013 14:30
Client Sample ID	CAM 556-1 OUT	**Received Date/Time**	07/24/2013 14:53
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	327	1.00	col/100mL	SM21 9222D	A			07/24/13	SDP

SGS Ref.#	1133306002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/29/2013 9:01
Project Name/#	Dry Weather Screening	**Collected Date/Time**	07/24/2013 14:35
Client Sample ID	CAM 556-1 IN	**Received Date/Time**	07/24/2013 14:53
Matrix	Water (Surface, Eff., Ground)	**Technical Director**	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1.00	col/100mL	SM21 9222D	A			07/24/13	SDP

SGS Ref.#	1133072003
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 548-1
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 12:44
Collected Date/Time	07/15/2013 14:40
Received Date/Time	07/15/2013 16:37
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			07/15/13	SDP

SGS Ref.#	1133072004
Client Name	HDR Alaska, Inc.
Project Name/#	Dry Weather Screening
Client Sample ID	CAM 495-1
Matrix	Water (Surface, Eff., Ground)

Printed Date/Time	07/19/2013 12:44
Collected Date/Time	07/15/2013 15:05
Received Date/Time	07/15/2013 16:37
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Microbiology Laboratory									
Fecal Coliform	ND	1	col/100mL	SM21 9222D	A			07/15/13	SDP

OutfallID	Date	SampleTime	FieldStaff1	FieldStaff2	TimeSinceLastRainfall	SizeOfLastRainfallEvent	EndOfPipeDiameterFeet	EndOfPipeDiameterInches	DepthOfWaterInEndOfPipeInches
609-218	7/11/13	14:24:00	Isaac Watkins	Alyse Roberts	less than 3 days	<0.10	2	0	6
101-1	6/25/13	13:00:00	Isaac Watkins	Alyse Roberts	3 or more days	0.1	2	0	4
680-40	6/25/13	14:50:00	Isaac Watkins	Alyse Roberts	3 or more days	<0.10	1	0	0.5
289-23	6/25/13	15:55:00	Isaac Watkins	Alyse Roberts	3 or more days	0.1	0	6	1
1287-994	7/11/13	13:30:00	Isaac Watkins	Alyse Roberts	less than 3 days	<0.10	1	0	0.5
1288-1	7/11/13	12:30:00	Isaac Watkins	Alyse Roberts	less than 3 days	<0.10	4	0	5
462-1	7/12/13	12:00:00	Isaac Watkins	Alyse Roberts	less than 3 days	<0.10	1	6	2
341-1	7/12/13	14:30:00	Isaac Watkins	Alyse Roberts	less than 3 days	<0.10	3	0	6
1287-1858-1	7/12/13	15:00:00	Isaac Watkins	Alyse Roberts	less than 3 days	<0.10	2	6	6
120-22-1	7/16/13	11:50:00	Isaac Watkins	Zoe Meade	3 or more days	<0.10	1	6	2
344-18	7/16/13	12:05:00	Isaac Watkins	Zoe Meade	3 or more days	<0.10	2	0	6
651-1	7/15/13	12:30:00	Isaac Watkins	Alyse Roberts	3 or more days	<0.10	5	0	12
556-1	7/15/13	12:45:00	Isaac Watkins	Alyse Roberts	3 or more days	<0.10	5	0	6
556-1 follow up	7/24/13	12:00:00	Isaac Watkins	Alyse Roberts					
556-3	7/24/13	12:00:00	Isaac Watkins	Alyse Roberts					
548-1	7/15/13	14:40:00	Isaac Watkins	Alyse Roberts	3 or more days	<0.10	1	0	2
495-1	7/15/13	15:05:00	Isaac Watkins	Alyse Roberts	3 or more days	<0.10	1	0	2

OutfallID	WaterFlowingFromPipe	Odors	NoFloatables	OilySheen	SurfaceScum	SoapySuds	Debris	Vegetation	StructuralC	Biology	FlowMeasurement Gal/Min	Clarity	Color	BlankChlorine
609-218	Yes	No	True	False	False	False	False	none	good	none	5	clear	clear	
101-1	Yes	No	True	False	False	False	False	none	good	none	>10	clear	clear	<0.10
680-40	Yes	No	False	False	True	False	False	none	good	none	0.2	clear	clear	
289-23	Yes	No	True	False	False	False	False	none	good	none	1.5	clear	clear	
1287-994	Yes	No	False	True	False	False	False	none	good	none	0.1	clear	clear	
1288-1	Yes	Yes	False	False	False	False	True	none	good	orange algae	20	cloudy/muddy	colored, light tan	<0.10
462-1	Yes	No	False	False	True	False	False	none	good	none	2	clear	clear	
341-1	Yes	Yes	False	False	True	False	True	none	good	none	5	clear	clear	<0.10
1287-1858-1	Yes	No	False	False	False	False	True	none	good	none	5+	clear	clear	
120-22-1	Yes	No	True	False	False	False	False	none	good	none	0.1	clear	clear	<0.10
344-18	Yes	No	False	False	False	False	True	none	good	none	5	clear	colored, light tint	
651-1	Yes	No	True	False	False	False	False	none	good	none	2	cloudy/muddy	colored, tan tint	
556-1	Yes	No	True	False	False	False	False	none	good	none	5	cloudy/muddy	colored, tan tint	
556-1 follow up			False	False	False	False	False							
556-3			False	False	False	False	False							
548-1	Yes	No	False	True	False	False	True	none	good	none	0.5	clear	clear	<0.10
495-1	Yes	No	False	False	True	False	True	none	good	none	0.1	cloudy/muddy	clear	

OutfallID	BlankDetergent	BlankPhenols	BlankTurbidity	BlankCopper	DupPH	DupChlorine	DupDetergent	DupPhenols	DupTurbidity	DupCopper	SamplePH	SampleChlorine	SampleDetergent	SamplePhenols
609-218											6.5	<0.10	0.10	0.25
101-1	<0.05	0.25	0.09	<0.05	6	<0.10	0.05	0.25	0.69	<0.05	6	<0.10	0.05	0.25
680-40											6	<0.1	0.10	0.25
289-23											6.5	<0.1	0.05	0.25
1287-994											6.8	<0.10	<0.05	0.25
1288-1	<0.05	0.25	0.33	<0.05	6.8	<0.10	0.10	0.25	45.2	<0.05	6.8	<0.10	0.10	0.25
462-1					6.8	0.30	0.05	0.25	3.97	<0.05	6.8	0.30	0.05	0.25
341-1	<0.05	0.25	0.08	<0.05							6.5	<0.10	<0.05	0.25
1287-1858-1											7.3	0.40	0.10	0.25
120-22-1	0.00	0.25	0.16	<0.05							7.8	<0.10	0.05	0.25
344-18					7.3	<0.10	<0.05	0.25	7.54	<0.05	7.2	<0.10	<0.05	0.25
651-1											6.8	<0.10	0.05	0.25
556-1											6.8	<0.10	0.05	0.25
556-1 follow up														
556-3														
548-1	<0.05	0.25	0.08	<0.05							7.5	<0.10	0.05	0.25
495-1					7.1	<0.10	0.05	0.25	171	<0.05	7.1	<0.10	0.05	0.25

OutfallID	SampleTurbidity	SampleCopper	LabFecalSampleID	LabFecalResult	LabFecalSampleID2	LabFecalResult2
609-218	1.98	<0.05	609-218	0		
101-1	0.9	<0.05	101-1	2		
680-40	0.5	<0.05	680-40	0		
289-23	5.93	<0.05	289-23	0		
1287-994	34.9	<0.05	1287-994	6		
1288-1	42.2	<0.05	1288-1	46	1288-1	30
462-1	3.86	<0.05	462-1	0		
341-1	12.7	0.05	457-120	0		
1287-1858-1	9.29	<0.05		0		
120-22-1	3.23	<0.05	344-18-1	0		
344-18	7.27	<0.05	344-18	42	344-18-DUP	42
651-1	81.9	<0.05	651-1	3		
556-1	25	<0.05	556-1	413		
556-1 follow up			556-1-IN	0		
556-3			556-1-OUT	327		
548-1	3.86	<0.05	548-1	0		
495-1	164	<0.05	495-1	0		

Appendix F

Outfall Sampling Site Photographs

Hood Creek **(609-218)** On Clay Products Dr. btw Telequana Dr & Tazlina Ave

Potter Creek **(101-1)** South of Potter Valley Rd, east of bridge over creek

Rabbit Creek **(680-40)** Outfall near Potter Valley sign on Potter Valley Rd.

Rabbit Creek **(289-23)** Adjacent to sidewalk near 16149 Essex Park Dr.

Fish Creek **(1287-994)** Small culvert in Hermit Park on Willow Street

Fish Creek **(1288-1)** Large culvert in Hermit Park. End of piped branch of creek which is used as a storm sewer.

Fish Creek **(462-1)** Located at the end of 33rd Ave. between bike path and creek.

Fish Creek **341-1**West side of Minnesota Dr. across from West 41st Ave. Lab report labels this as 457-120, but site code was corrected during report mapping.

Fish Creek **Cuddy Park 1287-1858-1** Inlet to pond at Cuddy Park. Not currently mapped as being connected to the MS4 network. Node code assigned based on location in the network.

Campbell Creek **120-22-1** South side of Ridgemont Drive near Spruce View Loop. Node code assigned based on location, but not currently in HGDB. Lab report labels this as 344-18-1. Code was updated to 120-22-1 during report mapping.

Campbell Creek **(344-18)** Corner of Lake Otis Parkway and Ridgemont

Campbell Creek **651-1** Drains Greenhill Way into creek

Campbell Creek **556-1** Outfall of settling pond near Minnesota Drive

Campbell Creek **556-3** Outfall draining into north side of the settling pond near Minnesota. Lab report labels this as 556-1 (b). Code was corrected during report mapping

Campbell Creek **548-1** Near northeast corner of Minnesota Drive and Dimond Blvd.

Campbell Creek **495-1** End of Rovenna Street. Travels in open channel to creek. Node 495-1-1 marks the end of pipe where the sample was collected.