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2012 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 each year through 2009.

EPA re-issued the permit prior to the state receiving delegation 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 connected to the system. The first step to eliminating these discharges is to identify them. Flow from storm drains during dry weather in most municipalities is an indicator of improper discharges to the MS4. To identify potential illicit discharges, screening techniques are used to ascertain gross differences in pollutant concentrations from those that would not normally be associated with 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 APDES permit 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. Thresholds are not necessarily based on exceedances of drinking water quality standards.

2 Explanation of Data Submittal Elements

This report is divided into the following elements:

- Summary information about the field phase of the project including a project summary, variations from the project design, notable field observations, and data validation summary.
- Tabular summaries of the data are presented with brief descriptions
- References
- Sample analysis results and other primary documentation are contained in appendices.

3 Project Summary

3.1 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). 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 past three years, percentage of impervious cover, and the proportion of commercial/industrial land uses (including schools and parks). Over the duration of the permit, qualifying outfalls representing a variety of land uses in all 12 watersheds will be sampled.

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 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 based on the 2003 GIS layers 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 watershed based on the percent of commercial and industrial land uses based on GIS zoning layers 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. Bold indicates watersheds sampled in 2012.

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

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 or from pipes that convey streamflow were not considered part of the dry weather screening program.

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 provided for the previous year for the watersheds examined during the 2012 sampling effort.

3. Each of the three watersheds 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 until five sample sites were identified in the watershed. These were the primary sampling sites within that watershed. Ten alternate outfall sites were identified (five in the lower and five in the upper watershed). An alternate site was sampled when a primary site could not be sampled.

The intent was to sample five outfalls in each watershed; however, the Furrow Creek watershed had only four flowing outfalls that could be identified. Additional alternate outfalls were

selected in the Chester Creek and Ship Creek watersheds and one of these additional outfalls was sampled in the Chester Creek watershed to bring the total to 15 outfalls sampled in 2012.

3.2 Outfall Sample Locations

Using GIS, sampling sites were identified before going into the field to collect data. The field team performed a watersheds reconnaissance trip to verify the GIS 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 three watersheds. Outfall numbers in parenthesis are those selected as primary outfalls for sampling. The bold outfall numbers in the table indicate outfalls that were sampled. Outfall numbers that are underlined are sites that were visited, but had no flowing water. Maps of the three watersheds and the outfalls investigated are found in Appendix A.

Table 2. Sampling Site Locations

Watershed	Outfall Number	Latitude	Longitude	Location Description
Chester Creek	CHS 419-6	N 61.20622	W 149.92585	Near Woodworth Circle and coastal trail
Chester Creek	**(CHS 117-1)**	N 61.20280	W 149.91663	Near Hillcrest Drive overlook
Chester Creek	CHS 244-2	N 61.20391	W 149.90611	Near parking lot on Spenard Rd. at Chester Creek
Chester Creek	CHS 489-1	N 61.20341	W 149.88641	Near West 20th along bike trail
Chester Creek	(CHS 489-2)	N 61.20343	W 149.88704	Near community garden just west of C St.
Chester Creek	(CHS 499-1)	N 61.20253	W 149.87583	Near SW corner of Sullivan Arena lot
Chester Creek	CHS 25-1	N 61.20145	W 149.86553	South of Juneau St. and East 20th
Chester Creek	(CHS 86-1)	N 61.20158	W 149.86848	West side of Glenn Hwy. across from Breckenridge Dr.
Chester Creek	(CHS 314-23)	N 61.20103	W 149.84574	Near end of Maplewood and 24th
Chester Creek	**(CHS 509-12)**	N 61.19965	W 149.84118	North of East 24th
Chester Creek	**(CHS 700-10)**	N 61.19096	W 149.82503	Near UAA Dr. across from Alumni Dr.
Chester Creek	CHS 323-1	N 61.18984	W 149.78626	Near Emmanuel Dr. between Newcomb Dr. and Checkmate Dr.
Chester Creek	CHS 98-2	N 61.19174	W 149.78169	Near end of parking lot on 32nd Ave.
Chester Creek	**(CHS 647-26)**	N 61.18300	W 149.77163	Near Defiance St. and bike trail
Chester Creek	**(CHS 236-1)**	N 61.18292	W 149.77221	Near Defiance St. and Jordan Circle
Chester Creek	(CHS 361-1)	N 61.19634	W 149.76480	Near Baxter Rd. and Camrose St.
Chester Creek	CHS 321-1	N 61.19506	W 149.76666	Near SW corner of Northern Light Blvd. and Baxter Rd.
Chester Creek	**CHS 484-1**	N 61.20158	W 149.86853	"Black Sabbath" above culvert under Seward Hwy
Furrow Creek	**(FUR 5)**	N 61.10596	W 149.88346	Near Mariner Dr and Johns Dr.
Furrow Creek	**(FUR 24235)**	N 61.10855	W 149.87100	Near Greg Ln. and Division St. bike path

Watershed	Outfall Number	Latitude	Longitude	Location Description
Furrow Creek	**(FUR 402)**	N 61.11274	W 149.83145	Near Alderwood Lp. And Woodway Dr.
Furrow Creek	**(FUR 332)**	N 61.11239	W 149.83083	Near Woodway Dr. and Rushwood Circle
Furrow Creek	FUR 114-1	N 61.11221	W 149.81964	Outfall above Wagner St. culvert
Ship Creek	**(SHP 81-79)**	N 61.22342	W 149.89125	West of Railroad Corp. building parking lot, south side of creek
Ship Creek	**(SHP 961)**	N 61.22357	W 149.88627	Near old Bridge restaurant
Ship Creek	SHP 550-2	N 61.22346	W 149.88545	Near Bridge restaurant under A St bridge
Ship Creek	(SHP 436-1)	N 61.22398	W 149.88725	Near Whitney Rd and C St overpass
Ship Creek	**(SHP 396-1)**	N 61.22359	W 149.88479	Near Bridge restaurant west of footbridge
Ship Creek	SHP 119-1	N 61.12970	W 149.95923	Near Ship Cr dam
Ship Creek	SHP 189-1	N 61.22305	W 149.85828	Near N. Post Rd and Viking Dr.
Ship Creek	**(SHP 96-2)**	N 61.22447	W 149.84553	Near N. Sitka St. and Viking Dr.
Ship Creek	**(SHP 245-1)**	N 61.22768	W 149.83267	Near Yakutat St at DiTamaso's
Ship Creek	SHP 690	N 61.22955	W 149.82800	East of N. Reeve Blvd.
Ship Creek	SHP 728-1	N 61.22988	W 149.82772	East of N. Reeve Blvd.

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.

Note: Additional Chester Creek sites were identified as primary targets to account for the lack of storm drains on Furrow Creek.

3.3 Measured Parameters

The 2011 QAPP called for laboratory testing of copper samples where previously copper was tested using a field test kit. This change was made because HDR field scientists questioned if the field test kit for coppers was giving accurate results since every sample collected in the years prior to 2011 provided non-detect results. The laboratory results for the 2011 field effort were all below the detection limit of the field test kits. These results suggested that the kits may have been working properly, but the results were simply lower than the kit was designed to detect.

Before field sampling began in 2012 HDR scientists submitted two deionized water samples spiked with a small amount of copper to SGS North America, Inc (SGS) in Anchorage. This spiked deionized water was also tested with the copper field test kit. The results from the laboratory samples were 78.8 µg/L (0.0788 ppm) and 75.8 µg/L (0.0758 ppm). The result of the field test kit was between 0.05 ppm and 0.1 ppm.

Similar concerns were raised about the accuracy of the phenols field test kit. Solution could not be obtained to spike a sample for laboratory analysis, but a sample of deionized water was submitted to Analytica Group laboratories for phenols analysis. The same deionized water was tested using the field test kit. The non-detect laboratory results (PQL of 0.061 mg/L) matched the non-detect results (<0.1 ppm) from the field test kit.

These results confirmed that the field test kits were providing accurate results although they are not as precise nor do they have detection limits as low as the laboratory analyses. Due to these results the decision was made to continue using the phenols field test kit and resume using the copper field test kit as was done prior to the 2011 field sampling effort.

Table 3 provides the screening parameters required by the permit and the thresholds that were used to compare outfall sample results. The MOA Dry Weather Sampling Plan (MOA, 1999) established rationale for screening parameter thresholds. Thresholds are established at concentrations sufficiently different from clean stormwater to detect potential illicit discharges. CWP and 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	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

3.4 Sample Collection Procedures

3.4.1 Arrival at Sampling Site

One two-person team conducted the field sampling no earlier than 48 hours after a storm event that created runoff in the MS4. The National Weather Service Forecast website (NWS, 2012) was consulted to determine appropriate sample timing. 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: an outfall list, site maps with outfall marked, calibrated pH meter, turbidity meter, field

sampling equipment, LaMOTTE® and Hach water analysis kits, laboratory sample bottles, water analysis sampling protocols, digital camera, GPS unit, and field data sheets with guidelines.

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 sheet was recorded in the field log book (Appendix B).

3.4.2 Flow Analyses

After the general site information was recorded, the field crew determined the outfall flow. From a position of safety, the field crew used one of the methods described below; the method used was 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

3.4.3 Water Quality Sampling

After measuring flow, pH was measured using the YSI 556. The probe was placed directly into the outfall where the water was deep enough. 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.

Once the pH measurement was collected, a grab sample of the water flowing out of the end of pipe was collected using a clean 1-liter HDPE plastic bottle. This water was used for all of the field test kits. After the field test kit sample was collected, 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 section 3.3.

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).

3.5 Chain of Custody

The chain of custody form was completed in the field by the field crew team leader for sample tracking. The original form was delivered with the samples to SGS. Copies of the chain of custody are provided in Appendix D and maintained at the HDR offices.

3.6 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, site ID, 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 frozen 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.

The field crew requested an expedited turn-around time for results from SGS. This was needed to conduct necessary follow up sampling where thresholds were 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.

3.7 Deviation from the QAPP

Private property, safe access and limitations with the GIS mapping were issues the 2011 field teams were faced with. The QAPP has been updated in 2012 to account for the unavoidable deviations to the previous version of the QAPP. The proposed revised version of the QAPP 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 GIS mapping for the watersheds in the Anchorage bowl tend to be more accurate than that for Eagle River there were still issues that the field team had to overcome. The precise location and nature of a mapped outfall is not always provided in the GIS mapping. For example, many outfalls drain into a culvert passing under a road, or are open drainage ditches. Both of these conditions prevent the outfall from being considered for sampling. The field team noted these conditions and moved to the next outfall. Because of these allowances in the proposed revised 2012 QAPP there were no deviations from the QAPP in 2012.

4 Results

4.1 Field and Laboratory Results

The results of 2012 dry weather screening in the three watersheds are provided in Table 4. Complete laboratory results are provided in Appendix E. There was only one exceedance recorded during the 2012 sampling effort. Fecal Coliform at Ship Creek outfall SHP 81-79 exceeded the threshold set at 400 colonies/100 mL. See section 5.0 Discussion for follow-up actions and results. No other site had an exceedance for any of the field or laboratory analytes.

Table 4. Sample Results for Field Parameters and Laboratory Analyses

Watershed	Site ID	Date	Flow[1] (gal/ min)	pH	Total Chlorine (mg/L)	Detergents (mg/L)	Total Phenols (mg/L)	Turbidity (NTU)	Total Copper (mg/L)	Fecal Coliform (colonies/ 100mL)
Furrow Creek	FUR 332	7/02/12	Low	8.00	<0.5	<0.05	<0.1	4.49	<0.05	10
Furrow Creek	FUR 402	7/02/12	3	7.00	<0.5	0.05	<0.1	2.79	<0.05	9
Furrow Creek	FUR 5	7/02/12	0.79	7.00	<0.5	<0.10	<0.1	5.88	<0.05	*116*
Furrow Creek	FUR 24235	7/02/12	0.75	7.00	<0.5	0.15	<0.1	2.28	<0.05	20
Ship Creek	SHP 96-2	7/18/12	11	7.00	<0.5	<0.05	<0.1	0.65	<0.05	0
Ship Creek	SHP 396-1	7/18/12	2.25	7.00	<0.5	0.125	<0.1	1.23	<0.05	0
Ship Creek	SHP 961	7/18/12	2.2	7.00	<0.5	*0.50*[2]	0.1	8.68	0.05	4
Ship Creek	SHP 81-79	7/18/12	1.58	7.00	<0.5	<0.05	<0.1	*23.6*	<0.05	**76,400**[3] (754)[4] (29)
Ship Creek	SHP 245-1	7/18/12	3.5	8.50	<0.5	<0.05	<0.1	1.15	<0.05	4
Chester Creek	CHS 484-1	7/18/12	6	7.00	<0.5	<0.05	<0.1	*42.6*	<0.05	0
Chester Creek	CHS 117-1	7/18/12	Low	8.00	<0.5	<0.05	<0.1	2.36	<0.05	4
Chester Creek	CHS 647-26	7/18/12	Low	7.00	<0.5	0.10	<0.1	1.71	<0.05	*143*
Chester Creek	CHS 509-12	7/18/12	Low	7.00	<0.5	*0.50*	<0.1	0.28	<0.05	0
Chester Creek	CHS 236-1	7/18/12	Med.	6.00	<0.5	*0.50*	<0.1	1.00	<0.05	0
Chester Creek	CHS 700-10	7/18/12	High	8.00	<0.5	<0.05	<0.1	1.23	<0.05	0

1) Flow measurements marked as "High", "Medium" or "Low" were estimated because of outfall location and configuration.
2) *Italicized* results are notably higher results than other sites, but are not exceedances.
3) **Bold** results are threshold exceedances.
4) Results in parenthesis are follow-up test results recorded on 7/25/12. The second follow-up results is from the nearest accessible up-gradient manhole.

4.2 Quality Control and Quality Assurance

Quality Control and Quality Assurance (QA/QC) procedures were followed according to the Monitoring, Evaluation, and Quality Assurance Plan (MOA, 2011). The procedures included analytical checks (field replicates, equipment blanks), instrument calibration, and procedures to assess data for precision, accuracy, representativeness, comparability, and completeness.

4.3 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
- Matrix spikes and matrix spike duplicates
- 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, 2011).

Field replicate samples were taken at FUR 332 and SHP 245-1 to determine field precision and variability. Results of the field duplicate samples are presented in Table 5. For the field test kits the QAPP calls for the actual difference between the primary and duplicate sample to be within the precision of the equipment used. For the fecal coliform samples analyzed at the lab the QAPP calls for a relative percent difference (RPD) between the primary and duplicate samples to be within 60%.

Table 5. Field Replicate Results.

Parameter	QAPP standard	7/02/12 FUR 332 actual difference	7/18/12 SHP 245-1 actual difference	7/02/12 FUR 332 RPD	7/18/12 SHP 245-1 RPD
pH	± 0.2 pH units	0 pH units	0 pH units		
Total Chlorine	30%	0%	0%		
Detergents	30%	50% (0.1 mg/L)	0%		
Total Copper	30%	0%	0%		
Total Phenols	30%	0%	500% (<0.4 mg/L)		
Turbidity	± 1 NTU	0.08 NTU	0.35 NTU		
Fecal Coliform	60 RPD			33% (4 colonies)	0%

* The QAPP does not define a standard for Total Copper because samples were analyzed in a laboratory in 2011. 30% was selected since the accuracy of the field test kit matches those of the other field test kits and 30 % was the precision for those kits.

Most of the results for the primary and duplicate samples fall well within the QAPP standard. Two primary and duplicate sets did not fall within the standard range. The actual percent difference for the FUR 332 detergents primary and duplicate samples is due to the very low results of the two samples; primary result of <0.1 (0.05 was used) and the duplicate sample

reading of 0.1. The actual percent difference between the primary and duplicate phenols samples at SHP 245-1 are also due to the very low results; primary sample reading of <0.1 (0.05 was used) and a duplicate reading of <0.5 (0.25 was used). These large differences can be attributed to the very low readings and the precision of the field test kits. 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, 2011), standard methods, 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 were determined to be valid.

5 Discussion

The results of the 2012 dry weather screening sampling effort support previous years' sampling efforts (MOA 2008, 2009, 2011). 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 SHP 81-79 was 76,400 colonies (fecal coliform threshold = 400 colonies) on July 18th.

On the July 18th visit, the SHP 81-79 outfall was far above the water level in the creek. The outfall is in a section of Ship Creek that is within the tidally influenced zone in a popular fishing area (See Appendix F for photographs). This outfall drains an area north of 4th avenue near the railroad depot. The results of the fecal coliform sample were received on July 23rd. The exceedance was immediately reported to the MOA with a description of the location and follow up action was determined. The follow up procedures decided upon included collecting a new sample from the outfall, and then collecting a sample from the first up-gradient manhole leading to the outfall. The follow up sampling was conducted on July 25th and when the team arrived on site, the outfall was found to be well under the water level due to a high tide. The field team decided to locate the up-gradient manhole and sample there first, thus allowing the tide to go out and expose the outfall. After the team successfully collected a sample from the manhole they returned to the outfall and were able to collect a sample. The stream bank material (glacial silt) around the outfall was thought to likely be the source of the fecal coliform and the high tide was thought to wash this material into the outfall. The results from the follow up visit supported the assumption that the high fecal coliform count is likely due to the interaction of the tide and location of the outfall (in a highly trafficked area for recreation and animals). The follow up sample from the outfall (754 colonies) was much lower than the initial sample (76,400 colonies), but was still well above the threshold (400 colonies). The result (29 colonies) from the manhole (located about 300 meters from the outfall near the railroad depot parking lot) was well below the threshold. No further action was taken.

Two other sampling locations had moderately high fecal coliform colony counts, but both were well below the threshold. FUR 5 had a result of 116 colonies while CHS 647-26 had a result of 143 colonies.

Three sites (SHP 961, CHS 509-12 and CHS 236-1) had higher than normal detergents results. Each site had a result of 0.50 mg/L of detergents which is only half of the threshold, but is much higher than most other sites. The next highest reading was 0.15 (FUR 24235) while most sites had non-detectable results (<0.05 mg/L).

No follow up action was necessary for any site except SHP 81-79. Fecal coliform continues to be the parameter that provides the most numerous notable results (exceedances or significantly higher results than other sites).

Rabbit Creek, Mirror Creek and Peters Creek are the next three watersheds on the list for 2013 dry weather screening. These watersheds are in less developed areas and may not provide five outfalls each for screening. The field team may have to move into Hood Creek, Potter Creek and/or Glacier Creek (the last three ranked watersheds) during the 2013 sampling effort in order to sample 15 outfalls. Aside of allowing the field team to sample from more than three watersheds no changes to the QAPP are recommended for the 2013 field sampling effort.

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CWP and Pitt, R. 2004. Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments. Prepared by the Center for Watershed Protection and Robert Pitt, University of Alabama. October, 2004.

MOA. 1999. Illicit Discharge Program, Dry Weather Screening Plan. Document No. WMP CPp99001. Municipality of Anchorage, Watershed Management Program. October, 1999.

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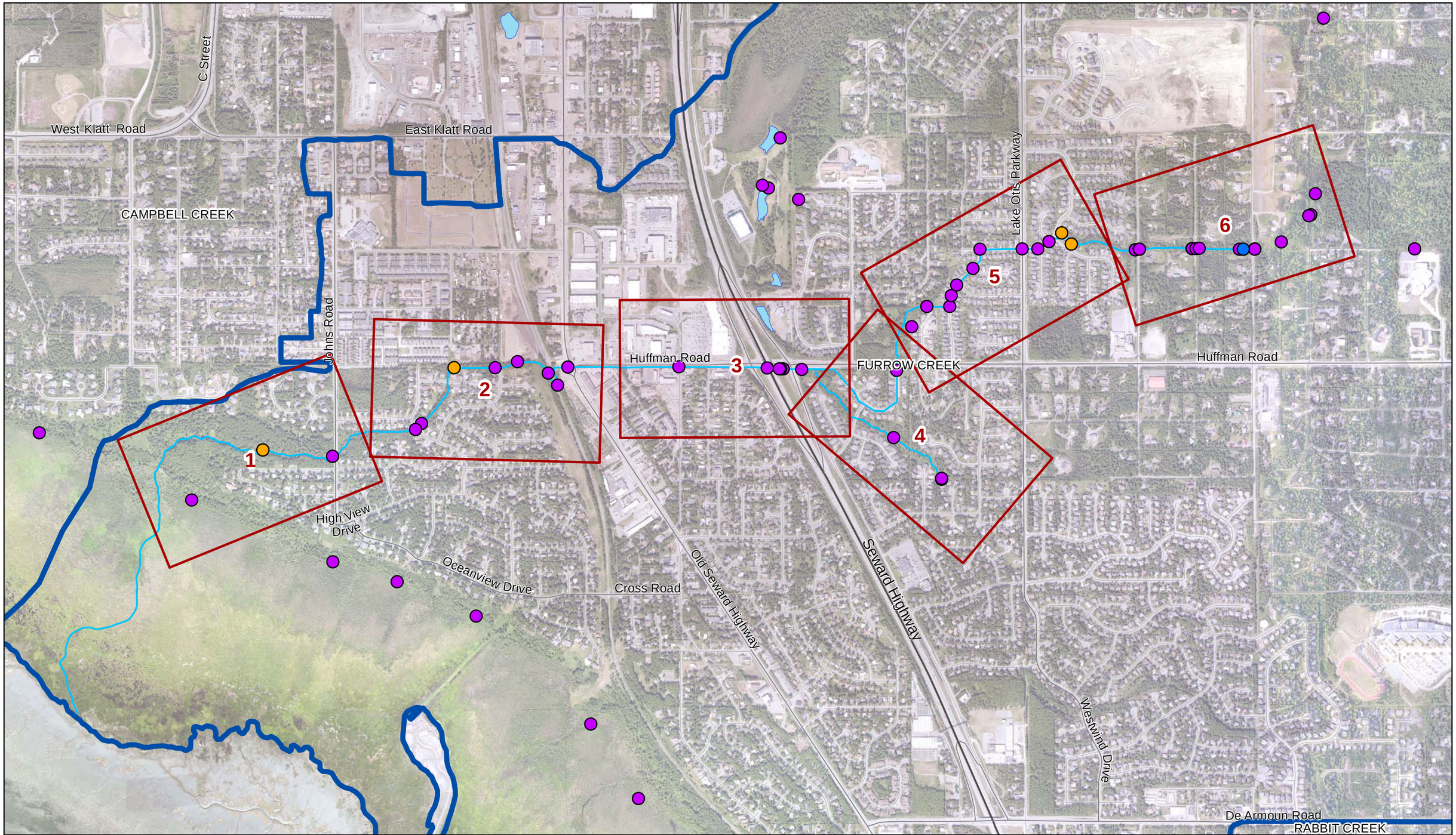
Appendix A

Watershed Maps



Alternate Outfall
Sampled Outfall
Other Outfalls
Drainageways
Streams
Watersheds
Furrow Index

0 0.25 0.5 0.75 1 Miles

FURROW CREEK

Dry Weather Screening 2012

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

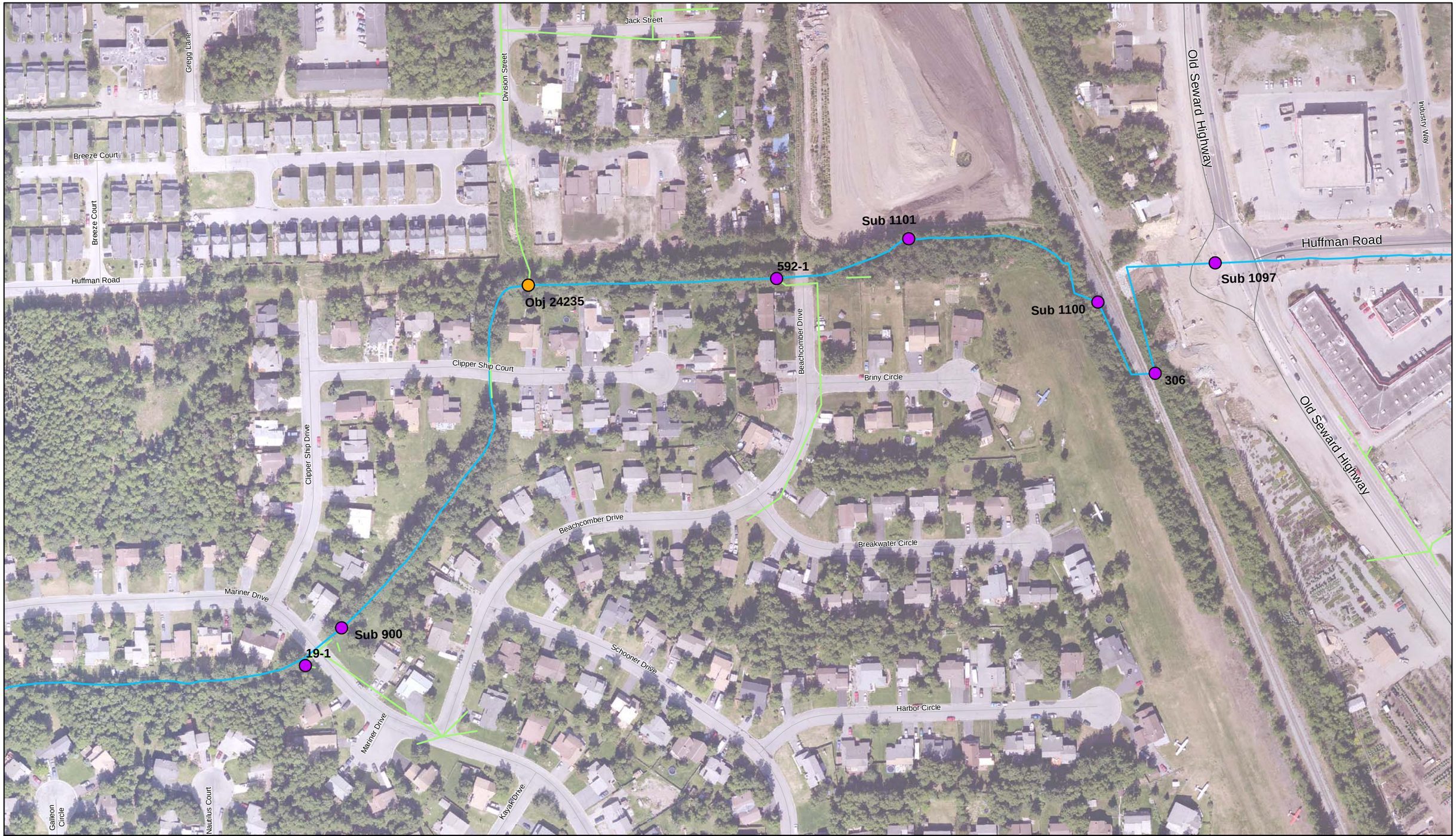
0 100 200 300 400 Feet

N W E S

FURROW CREEK

Dry Weather Screening 2012

Figure Number F - 1



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

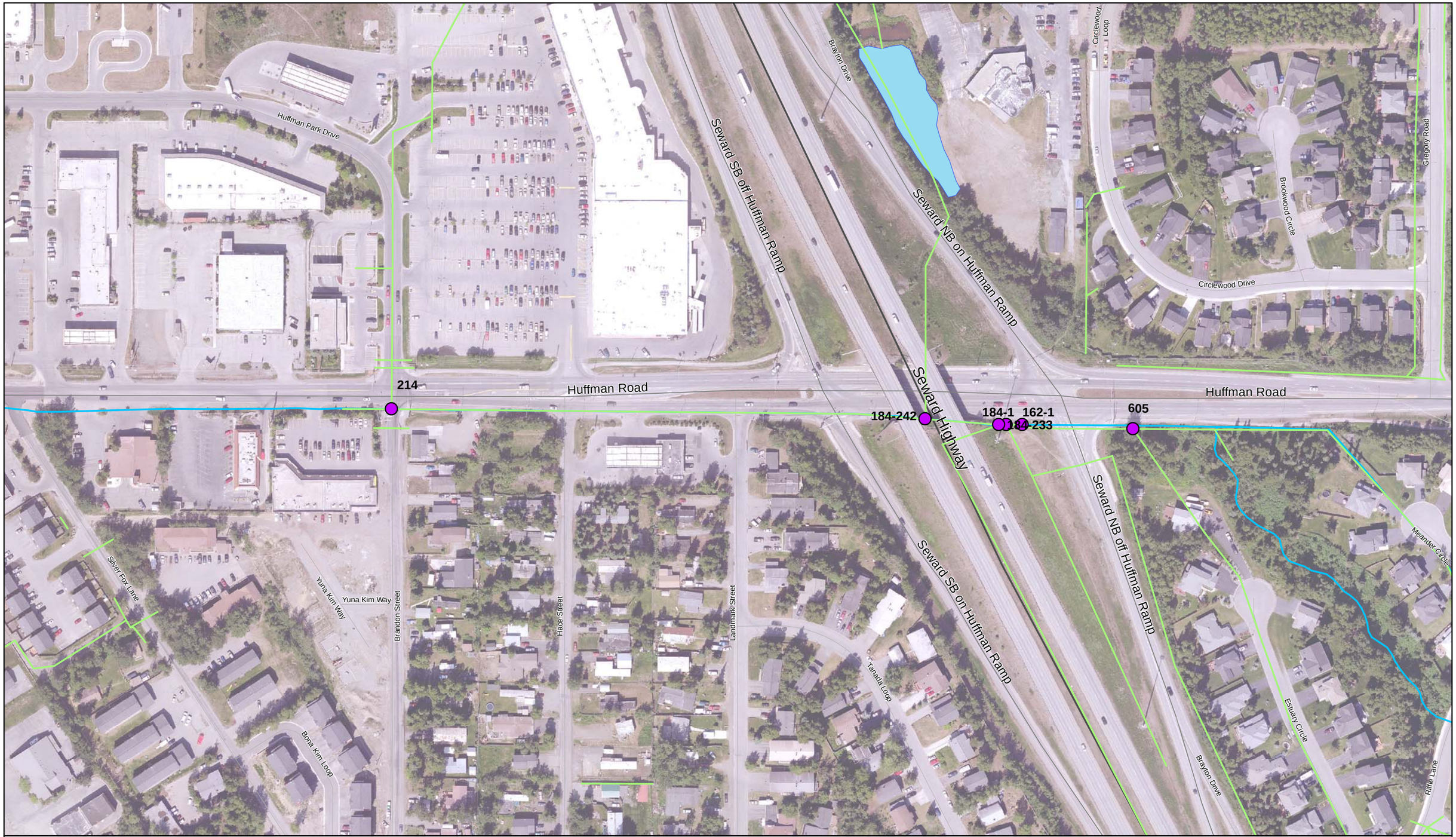
0 100 200 300 400 Feet

N W E S

FURROW CREEK

Dry Weather Screening 2012

Figure Number F - 2



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

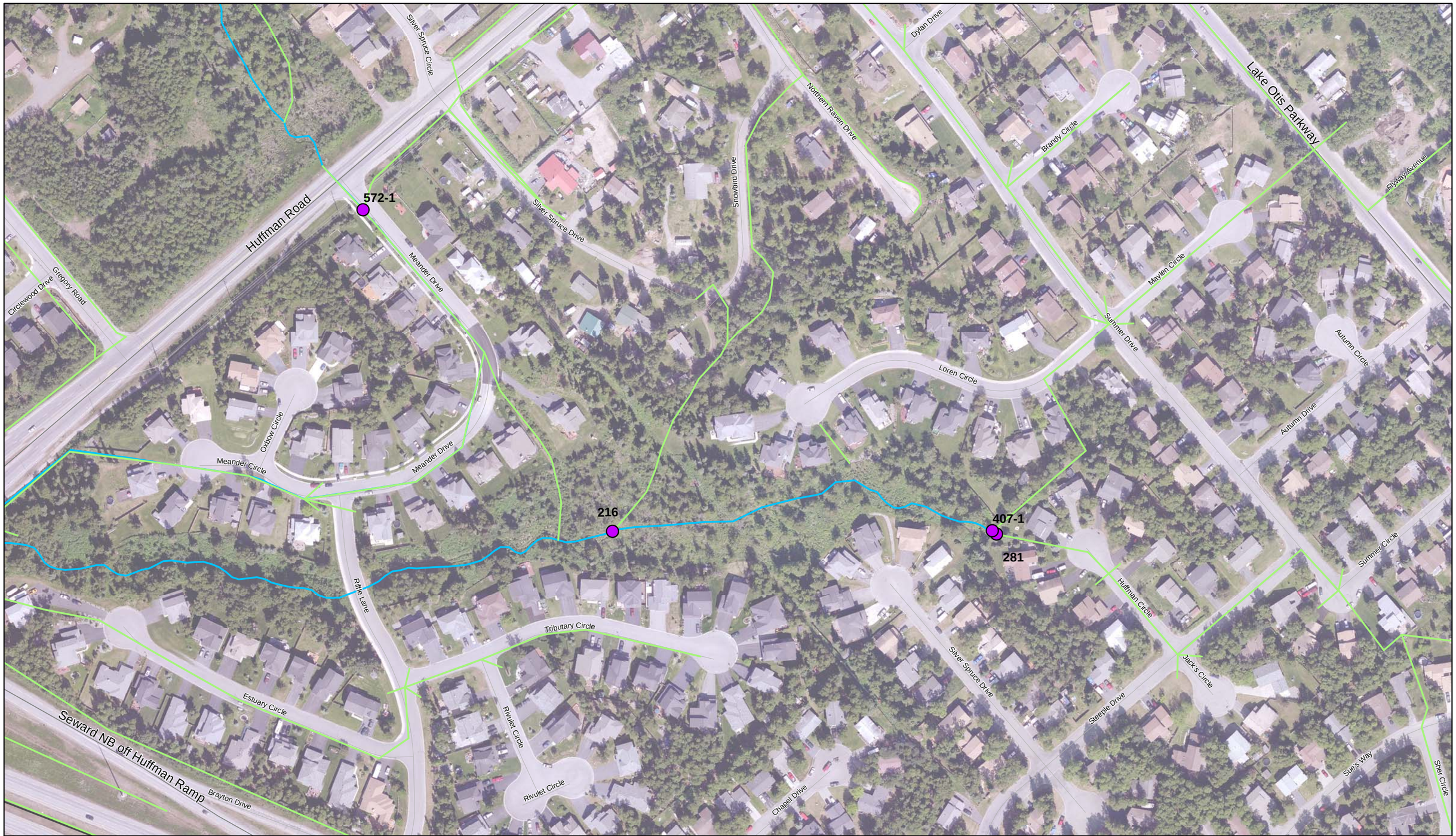
0 100 200 300 400 Feet

N W E S

FURROW CREEK

Dry Weather Screening 2012

Figure Number F - 3



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 100 200 300 400 Feet

FURROW CREEK

Dry Weather Screening 2012

Figure Number F - 4

406-1
275-1
239-1
293-1
639-1
331-13
331-1
143-1
413-1
413-14
153-1
402
402
332

Dolly Varden Avenue
Rainbow Avenue
Northern Raven Drive
Trisha Avenue
Chinook Avenue
Avalon Circle
Avalon Circle
Monarch Circle
Cleo Avenue
Devonshire Circle
Aldenwood Loop
Greenscreek Circle
Sebring Circle
Woodward Drive
Copperwood Drive
Lake Otis Parkway
Rolling Meadow Circle
Woodway Drive
Rushwood Circle
Woodway Circle
Woodchase Circle
Woodway Circle
Silver Spruce Circle
Wintercrest Circle
Huffman Road
Silver Spruce Drive
Winterchase Circle
Northern Raven Drive

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 100 200 300 400 Feet

FURROW CREEK

Dry Weather Screening 2012

Figure Number F - 5

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 100 200 300 400 Feet

N W E S

FURROW CREEK

Dry Weather Screening 2012

Figure Number F - 6

SIX MILE CREEK

SHIP CREEK

CHESTER CREEK

1

2

3

4

5

6

West 5th Avenue

East 5th Avenue

Glenn Highway

L Street

Gambell Street

Ingra Street

Boniface Parkway

Muldoon Road

Alternate Outfall

Sampled Outfall

Other Outfalls

Drainageways

Streams

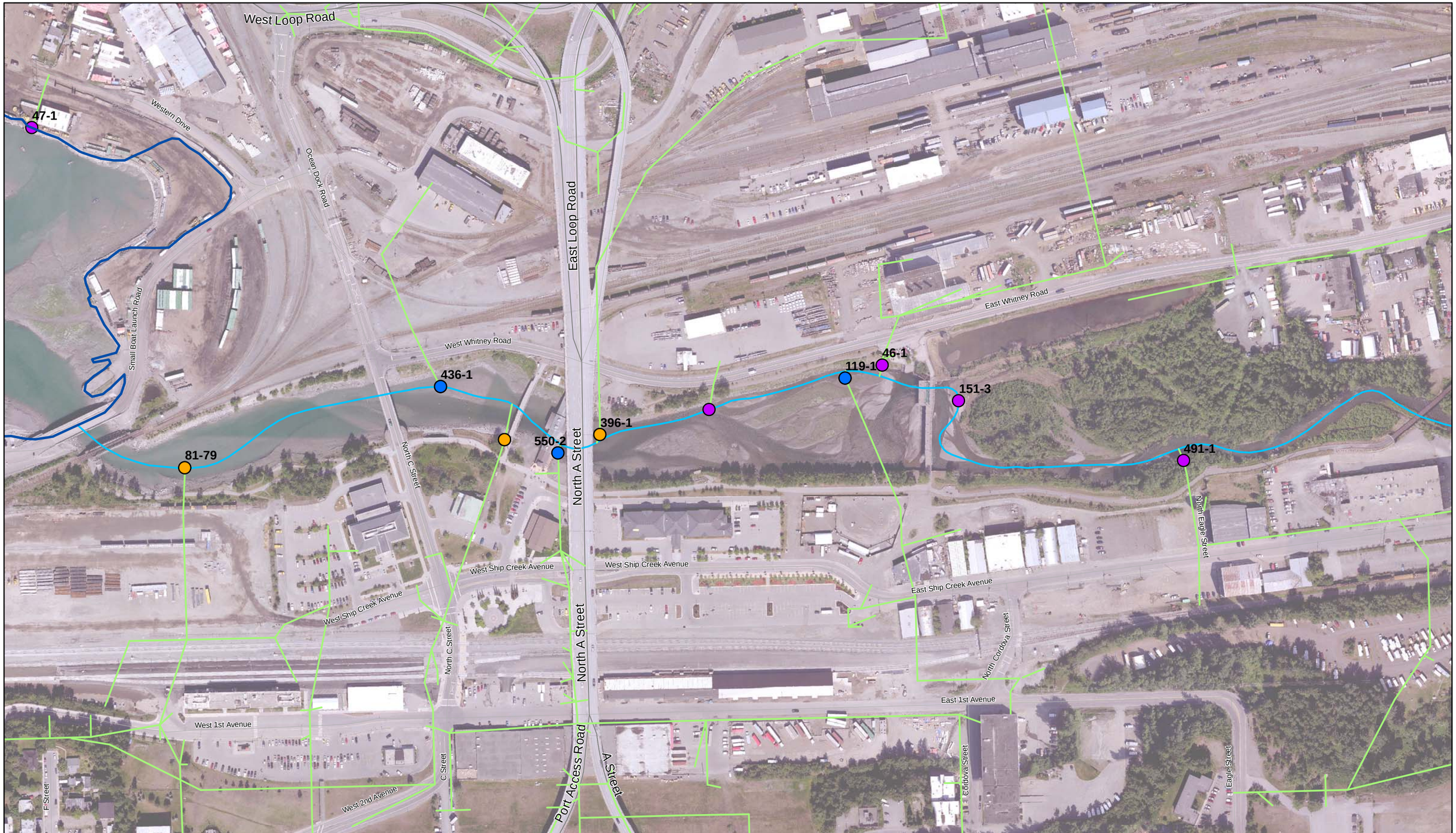
Watersheds

Furrow Index

0 0.25 0.5 0.75 1 Miles

SHIP CREEK

Dry Weather Screening 2012



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

N W E S

SHIP CREEK

Dry Weather Screening 2012

Figure Number S - 1

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

N W E S

SHIP CREEK

Dry Weather Screening 2012

Figure Number S - 2

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

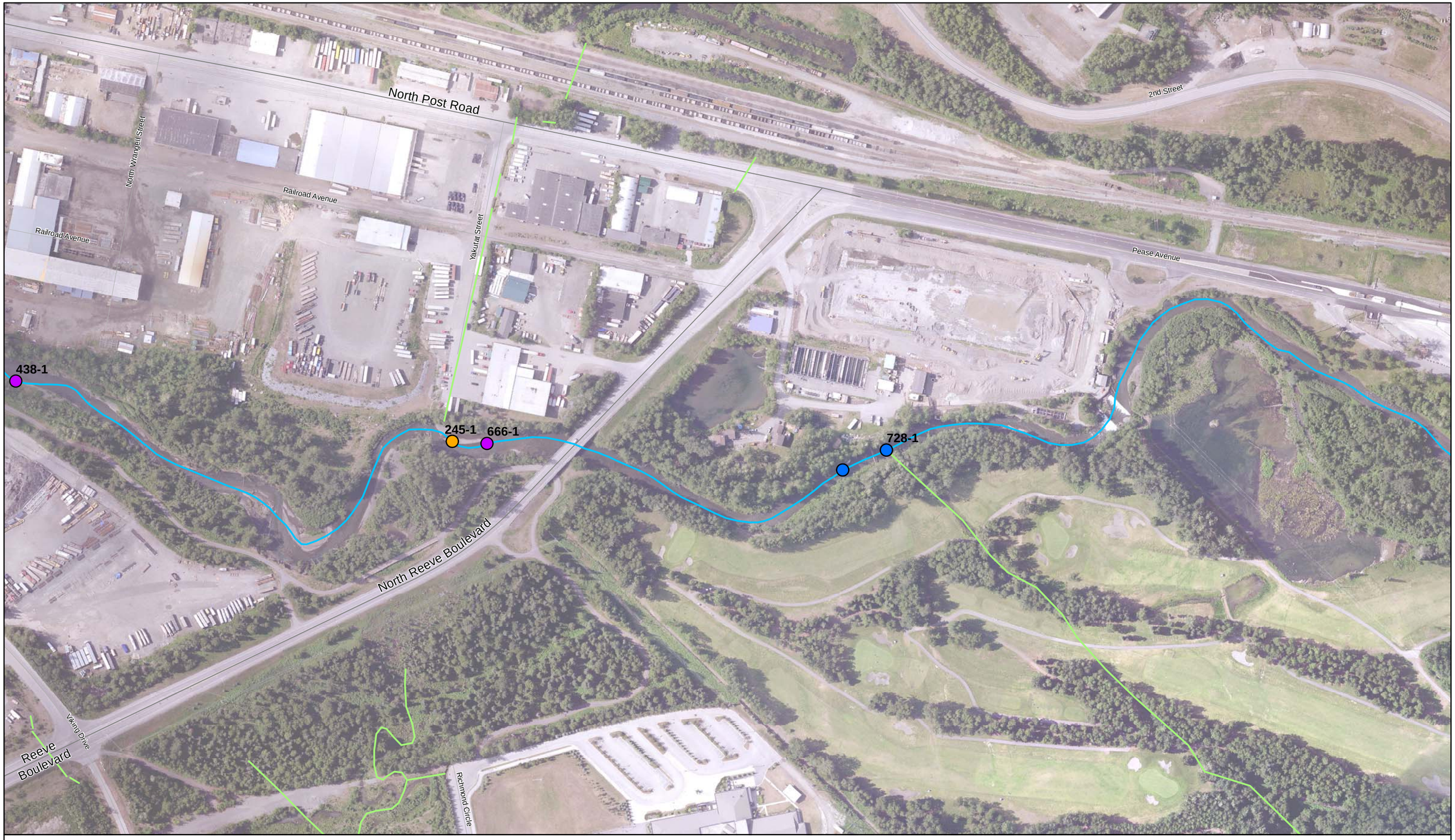
0 200 400 600 800 Feet

N W E S

SHIP CREEK

Dry Weather Screening 2012

Figure Number S - 3



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

SHIP CREEK

Dry Weather Screening 2012

Figure Number S - 4

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

N W E S

SHIP CREEK

Dry Weather Screening 2012

Figure Number S - 5

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

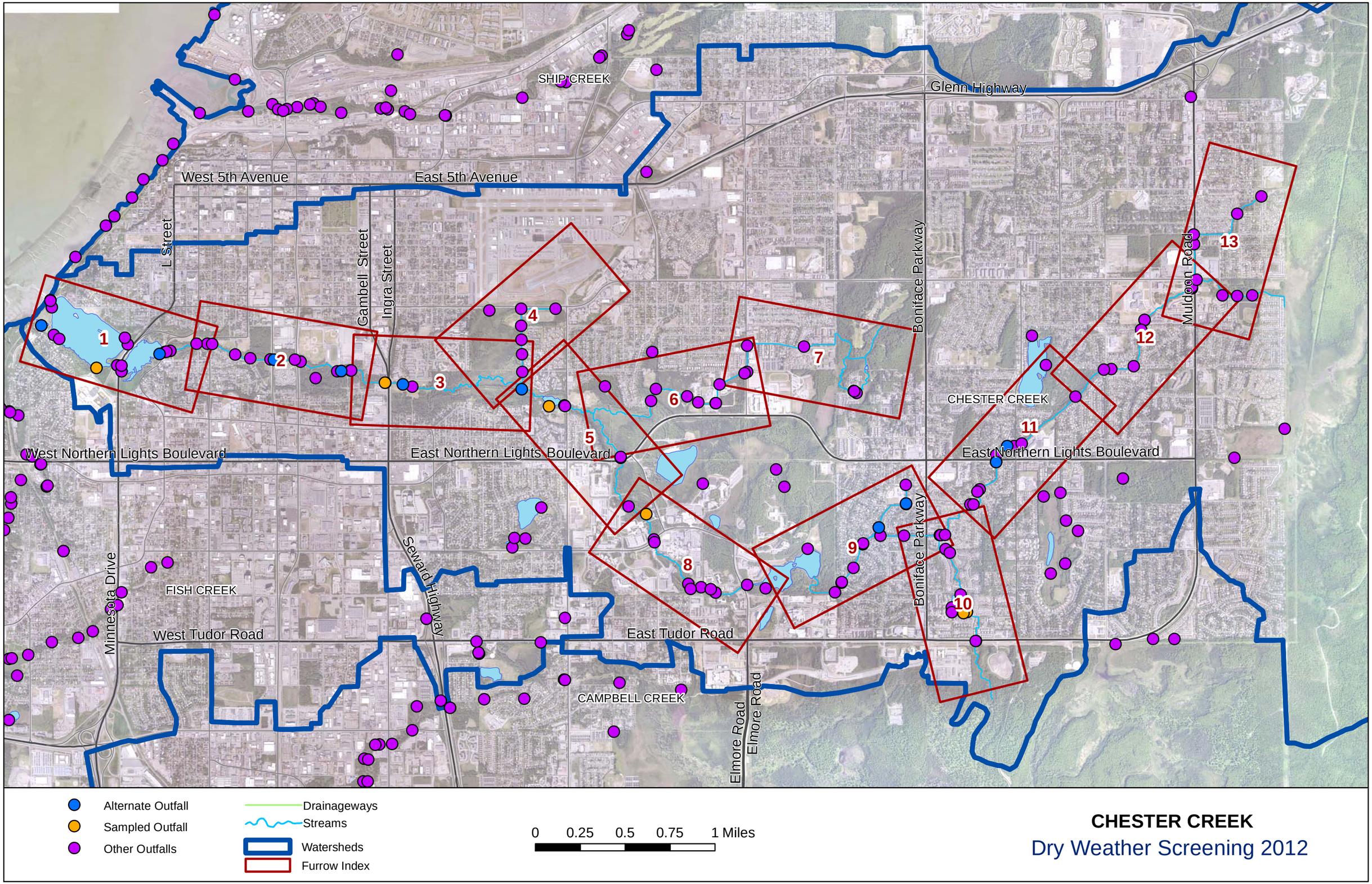
0 200 400 600 800 Feet

N W E S

SHIP CREEK

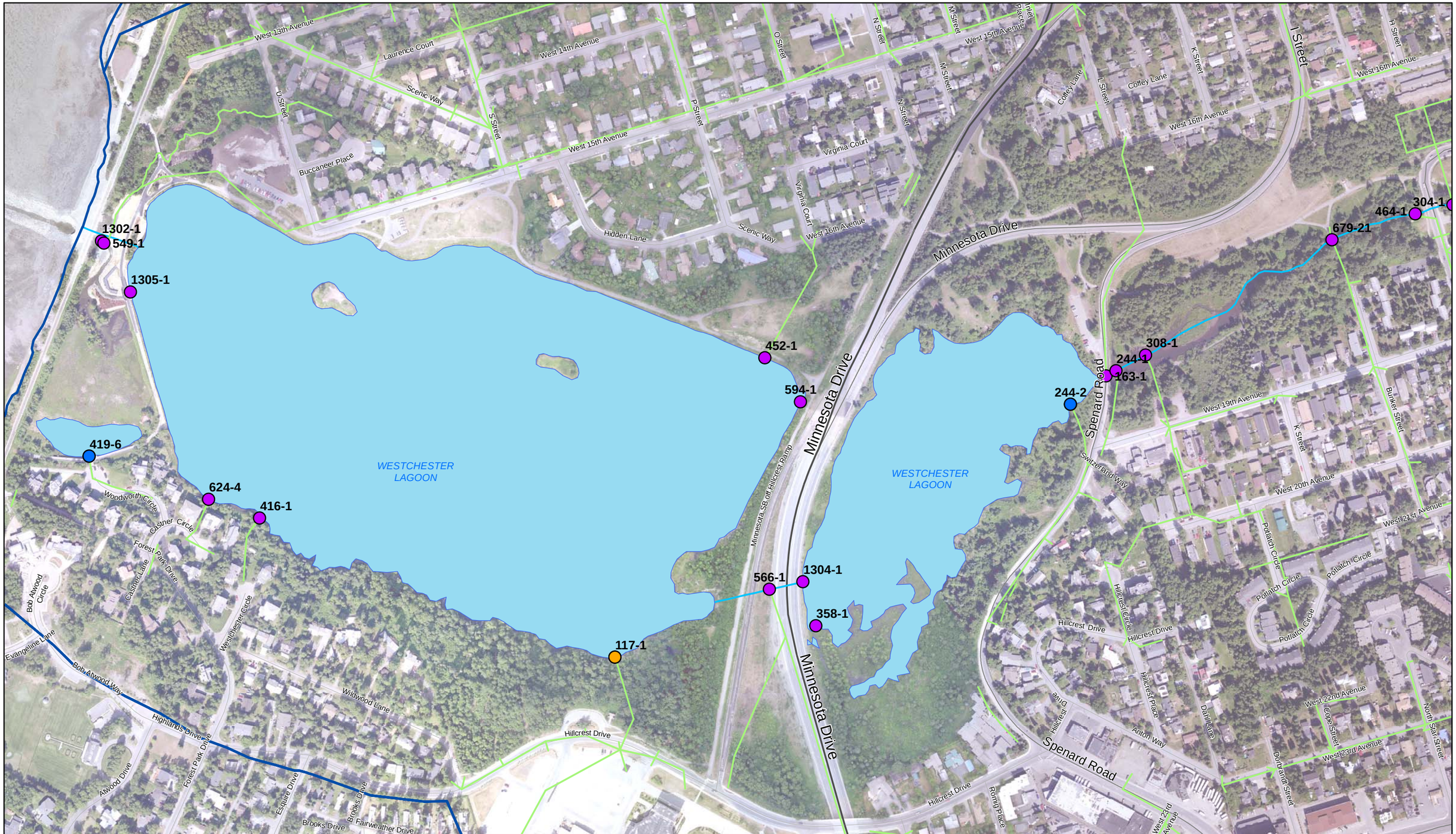
Dry Weather Screening 2012

Figure Number S - 6



CHESTER CREEK

Dry Weather Screening 2012



Legend

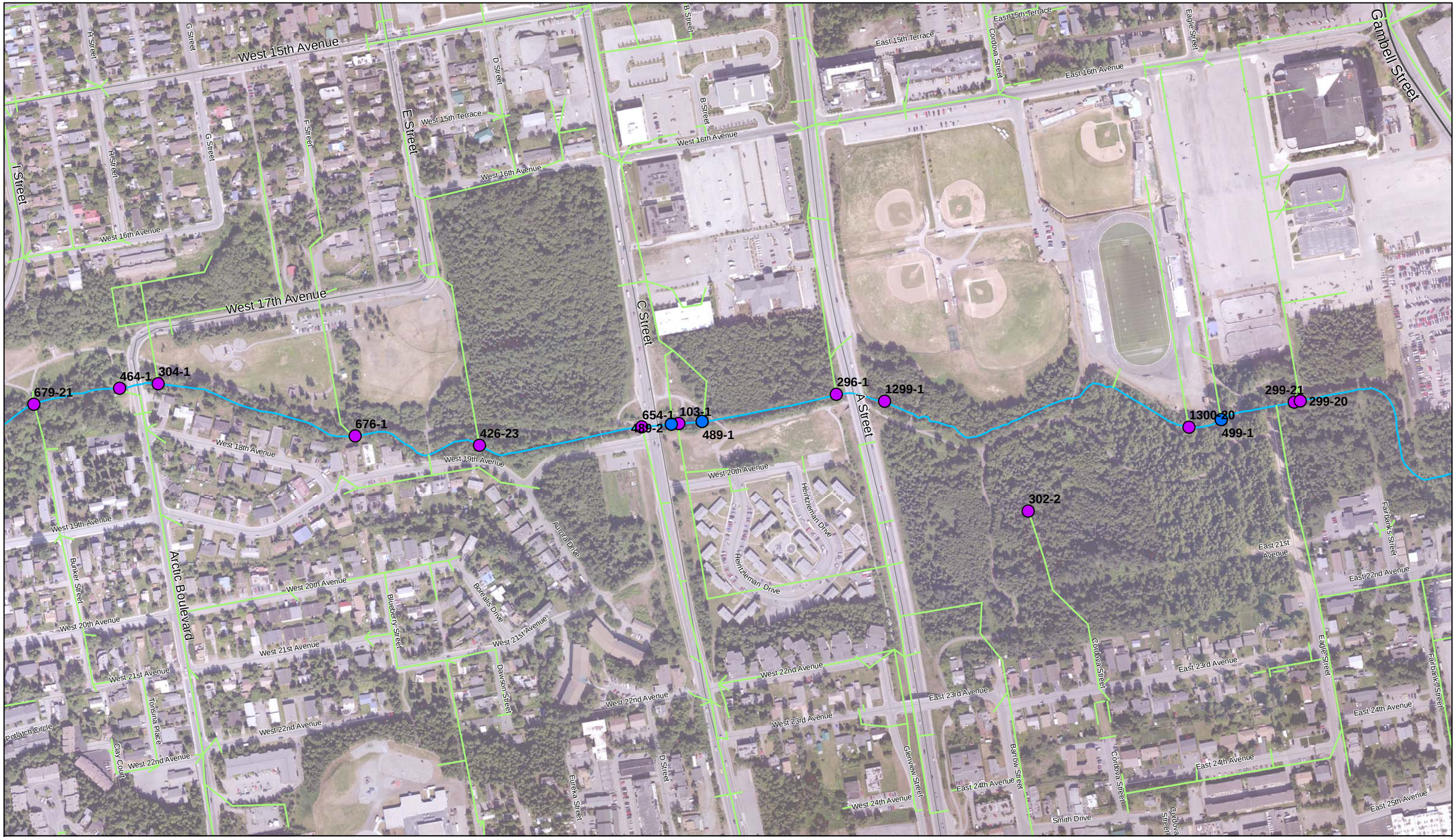
- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 1



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

N E S W

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 2

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

N W E S

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 3

Legend

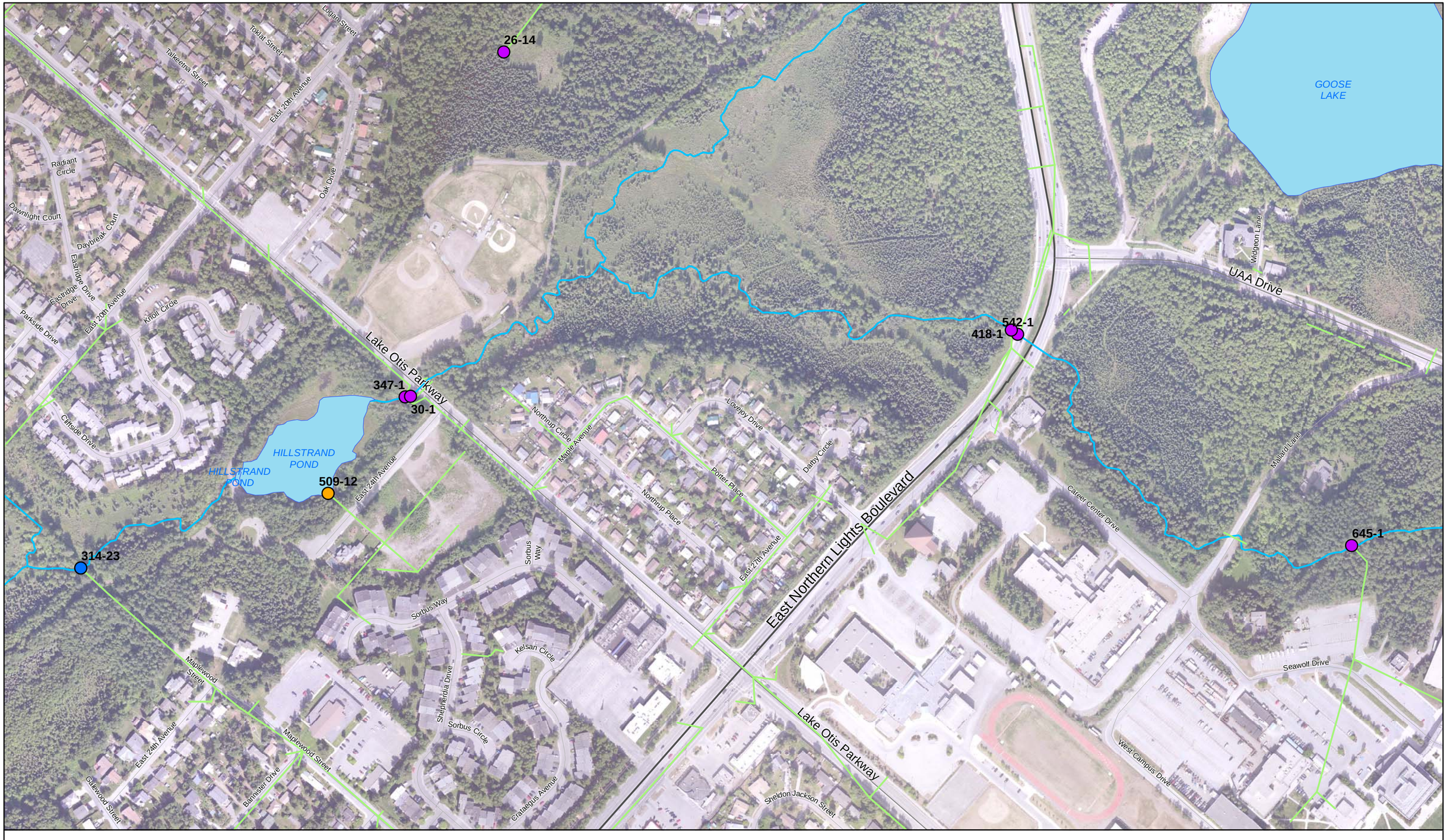
- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 4



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 5

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

N W E S

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 6

Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

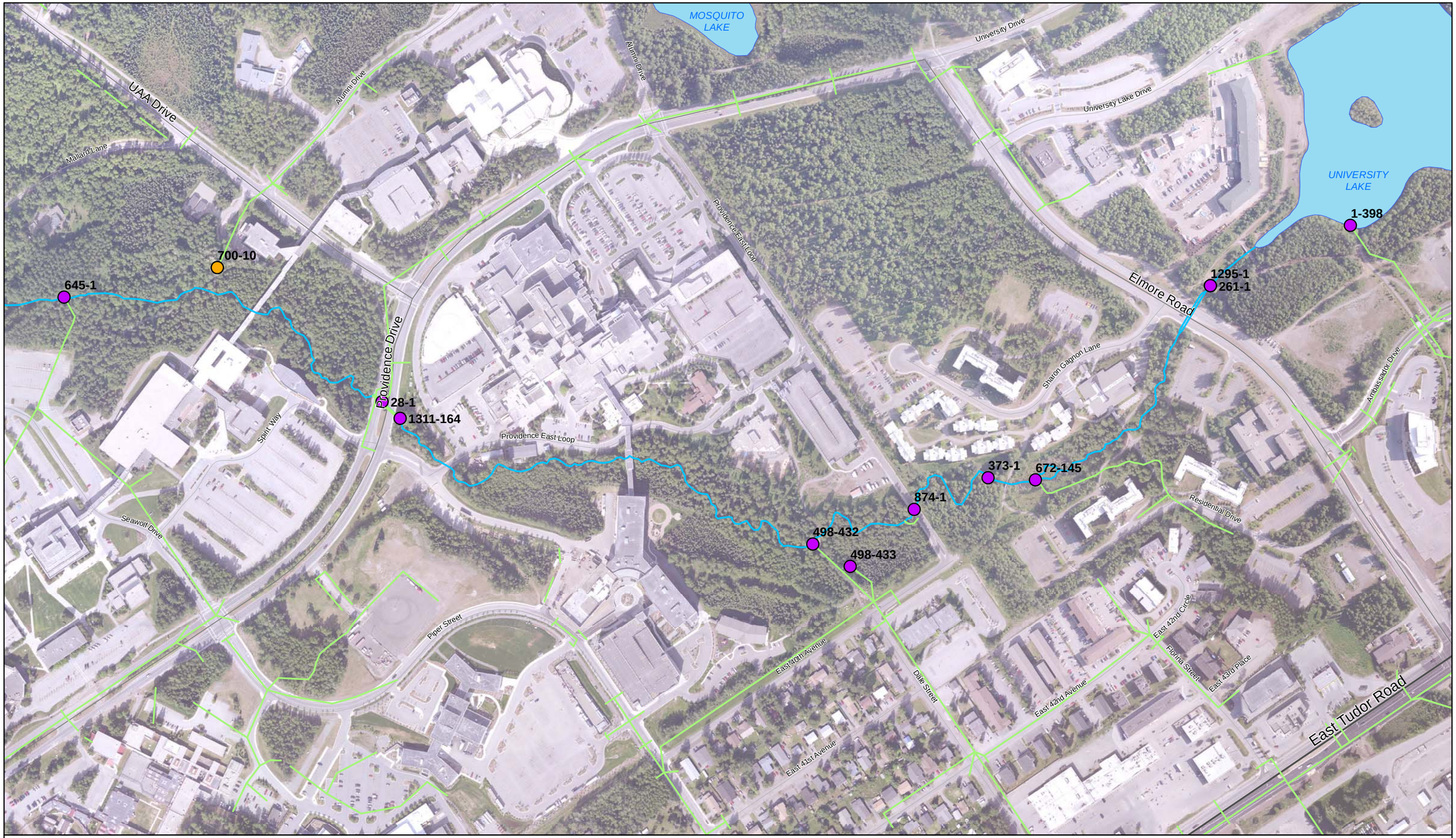
0 200 400 600 800 Feet

N E S W

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 7



Legend

- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 8

Legend

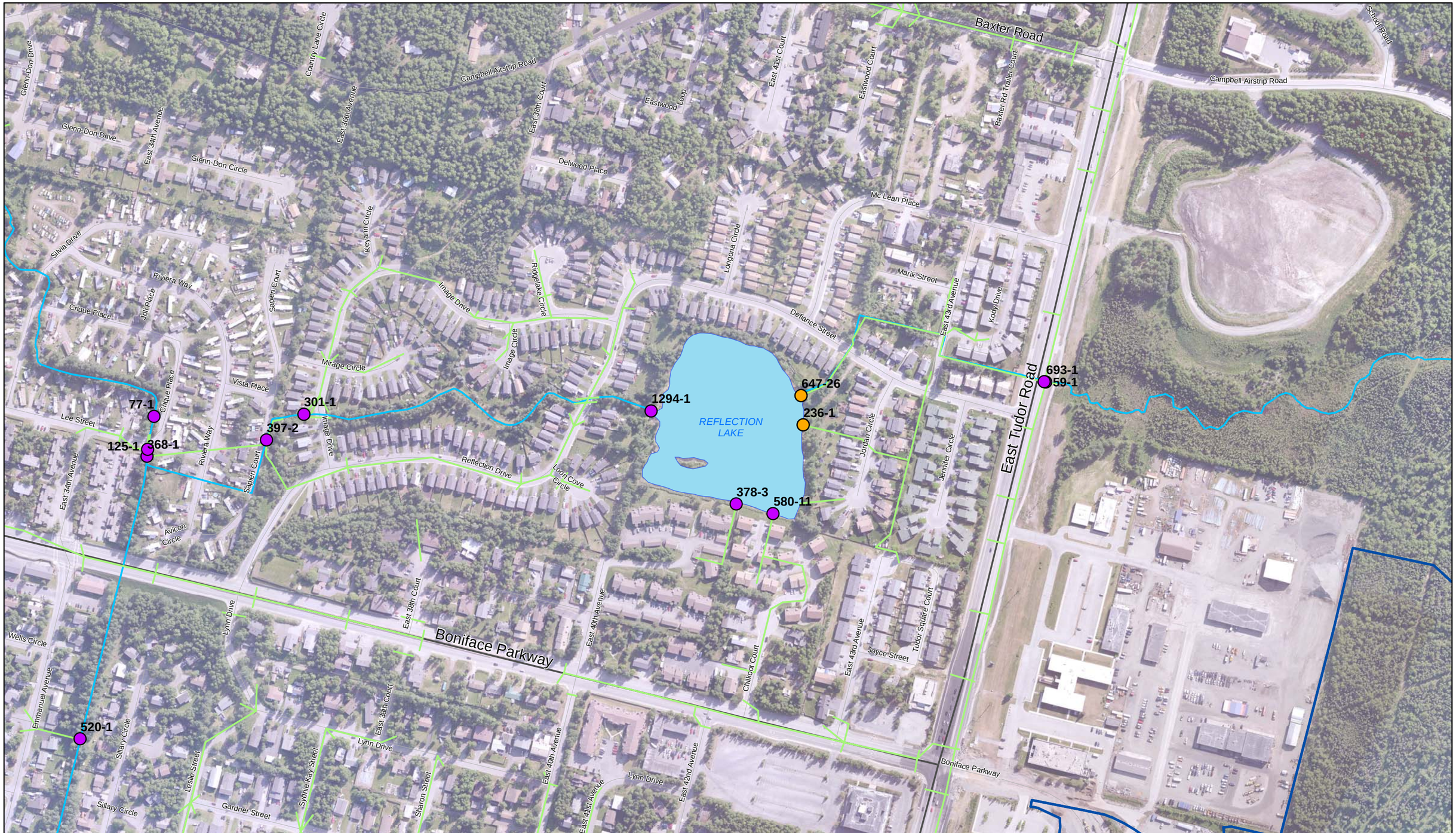
- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 9



Legend

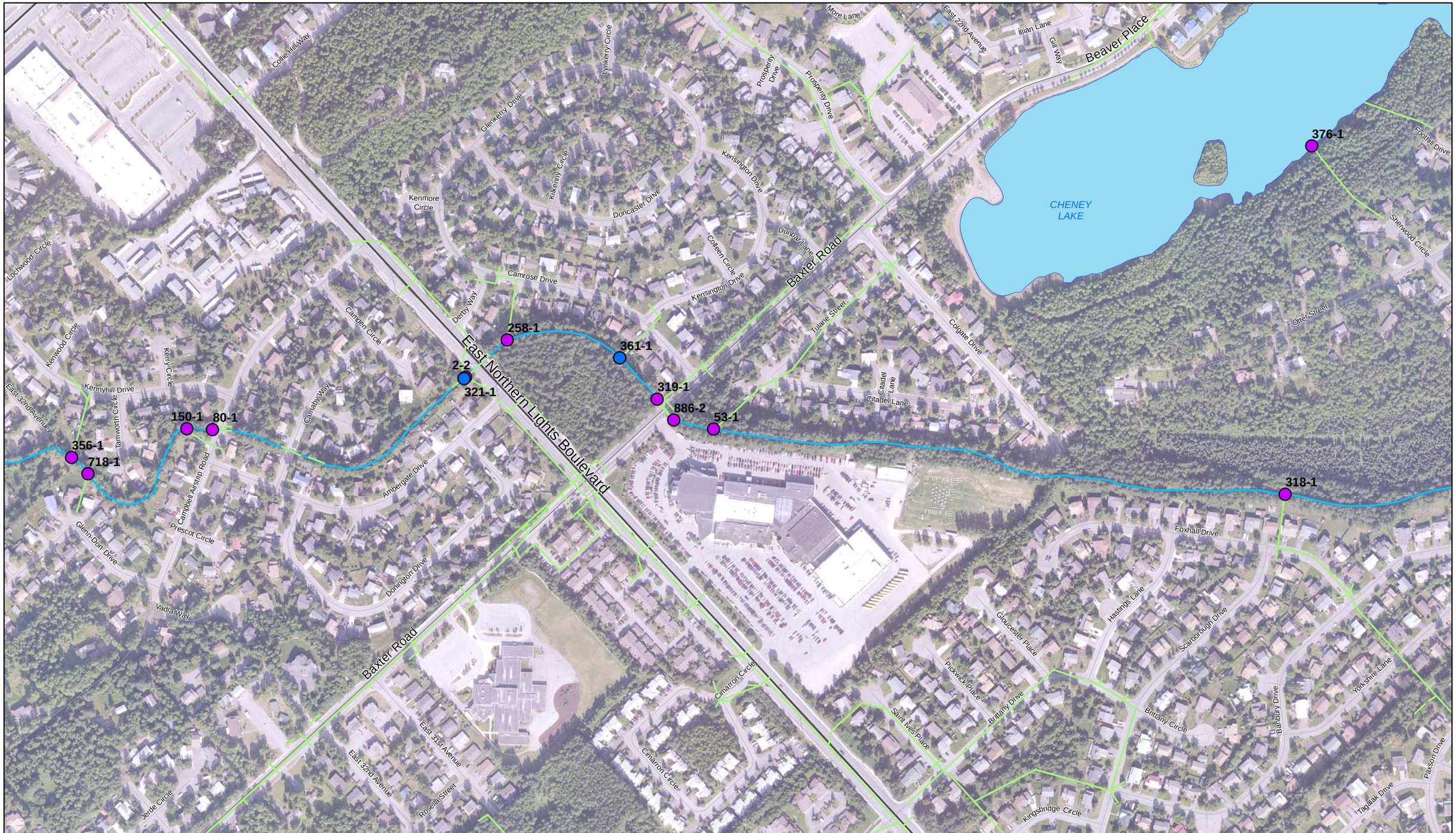
- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 10



Legend

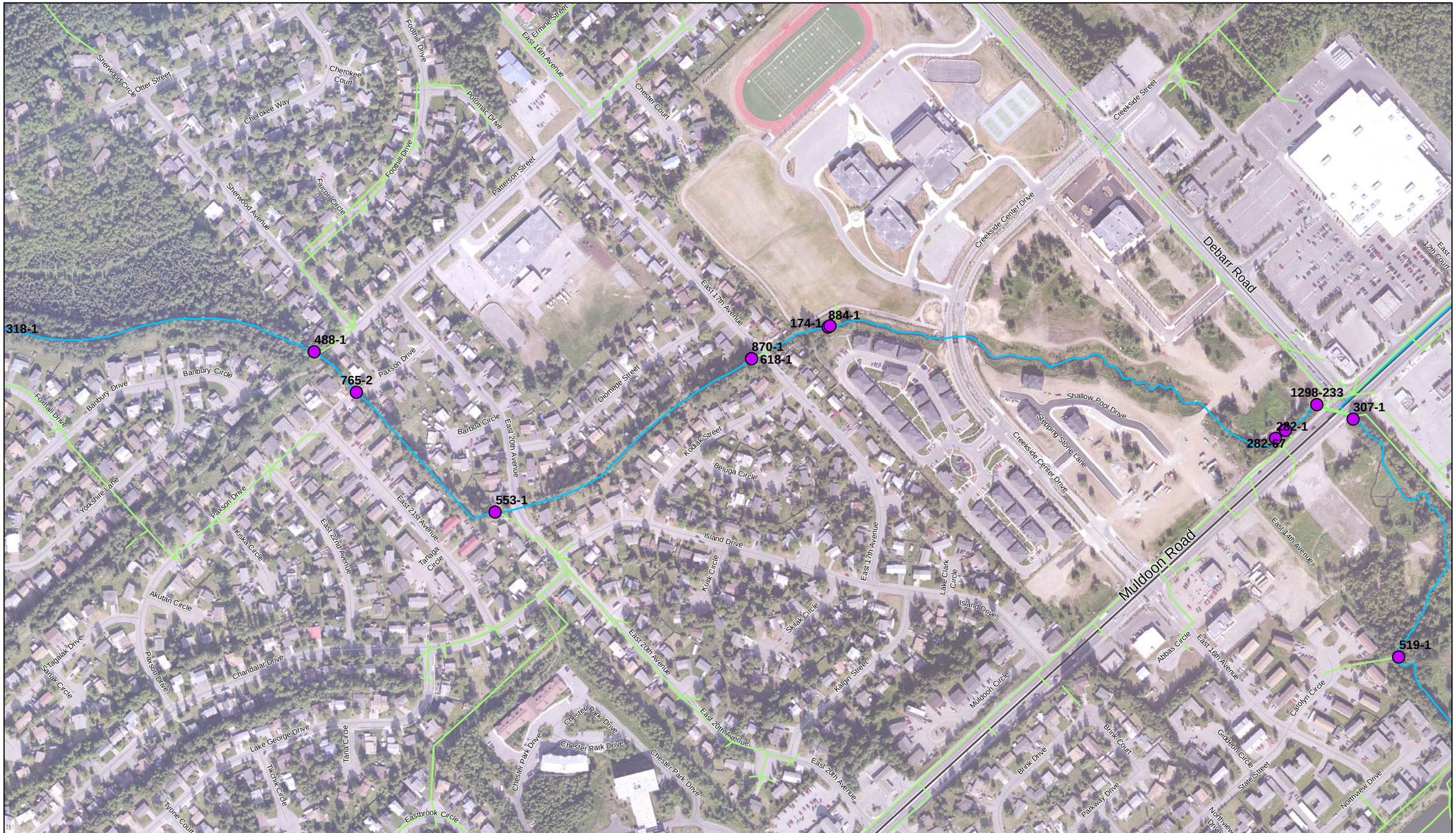
- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 11



Legend

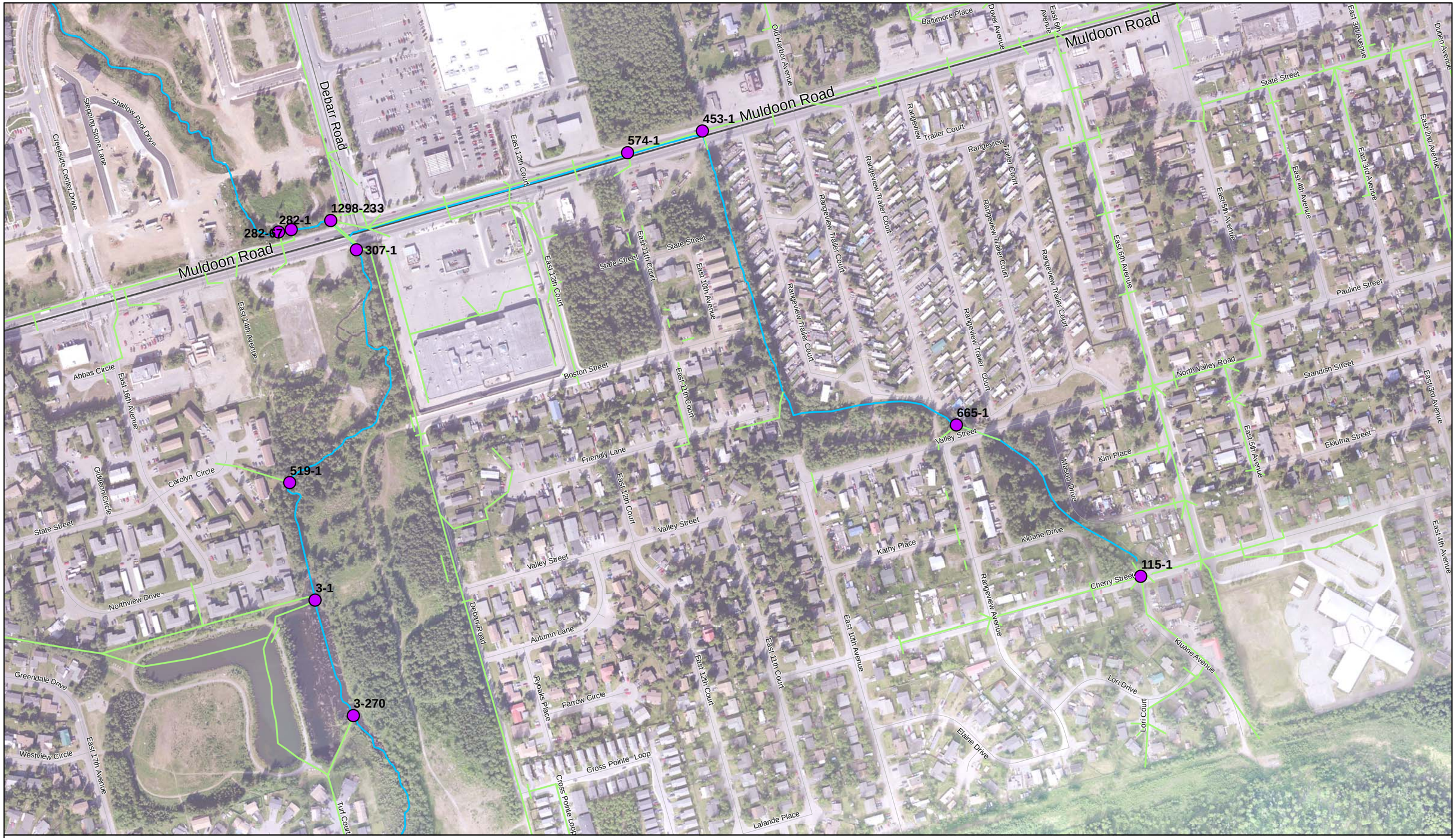
- Alternate Outfall
- Sampled Outfall
- Other Outfalls
- Drainageways
- Streams

0 200 400 600 800 Feet

CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 12



CHESTER CREEK

Dry Weather Screening 2012

Figure Number C - 13

Appendix B

Field Notebook

22 June 2012
Furrow Creek

Outfall 1 ← Good — Outfall 5
100 ft from creek on N side
pipe: ~1.5 ft in diameter
park on Mariner Drive
walk down bike trail from exercise equipt.
or Johns Drive
path to outfall begins at property line
where orange fence stops (~25 ft
past visible buried pipe on bike path)

Outfalls 3+6 ~~1 2 4 5~~
Outfall 2+3 ~~4 5~~
drain directly into culvert under road
cannot sample
on Mariner Dr btw Clipper Ship Dr
& Beachcomber Dr
1+1 and Sub 900

Outfall 4 ← Good — Outfall Obj 24235
park off Gregg Ln & Division
follow path to EOP
flow may be coming out through
rusted portion

pic: 1115 & 1116

Outfall 5 — Outfall 592-1
End of Beachcomber Drive
flows into culvert @ end of Beachcomber
Cannot sample

Outfall 6 — Outfall Sub 1101
Between Beachcomber Dr & Airstrip Behind 3rd House on Briny Circle
could not locate

Outfalls 7, 8, 11 — Outfalls Sub 1100 and 1101
On West & East side of tracks
not good

Outfall 9 — Outfall Sub 1097
on West side of Old Seward Hwy = no good @ Huffman

Outfall 10 — Outfall 214
Huffman & Brandon St. intersect = no good
Creek in pipe between RR track to Seward Hw NB off ramp to Huffman

Outfall 12 — Outfall 216
parked on Riffle Lane
encountered moose, did not reach outfall
would be difficult to access
undetermined whether sampling is possible

Outfalls 17+18 — Outfalls 407-1 and 281
unable to access - private property

Outfall 30 (Good) — Outfall 402
Park on Alderwood Loop past Woodway Drive
Outfall is directly across Alderwood from the first house on the L
On N side of seasonal pond/wetland
marked as OW on map
picture 100-1119

Outfall 31 (Good) — Outfall 332
Directly across Woodway Drive from the intersection with Richwood Circle
to the W of the middle clump of alders
pictures 100-1117 and 100-1118

Outfalls 497-1, 515-4, 515-1 and 497-6

Outfalls 32+33+34
drainage ditches along Gander St

Outfall 515-5

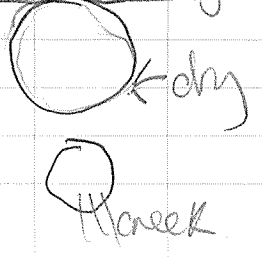
Outfall 35
drainage ditch piped through culvert underneath driveway on ~~Sage~~ creek, E side of Gander St
pipe ~8in diameter
uncertain whether sampling is possible?

Outfalls 497-7, 575-1 and 497-8

Outfall 36-39
drainage ditches along Wagner St.
along W side of Wagner drainage ditches already - water has rerouted down slope and gullies through the ground

Outfalls 114-1 and 609-1

Outfall 41+42
culvert above + the culvert in which the stream flows ~3ft diameter
dry
drains storm system?



Outfalls 217-1 and 980-1

Outfall 44+45
drainage ditches along road
no water
cannot sample

2 July 2012 11:30 AM
Dry Weather Screening
Furrow Creek
- Outfall 5 (off road numbering)
located near Bree Ave - opposite side of the creek.
temp - approx 60°F and overcast
foam noticed at culvert edge
turbidity meter broken - testing to be done in office
- outfall obj 24235 1:00 PM
located at the south end of division street
turbidity to be done in office - broken meter
outfall pipe rusted through -
- outfall 332
water flowing but w/ 4" depth in pipe - the small flow impossible to take
water had slight sheen

outfall 402
high, clear flow
cut alder branches covering outfall
temp 60° and overcast
completed testing and ☺
delivered FC samples to SGS @ 4:59

16 July 2012
Ship Creek
Outfall Reconnaissance

81-79 Good!
park on W. Ship Creek Ave. near Railroad Corp. bldng. walk through parking lot to footpath. Walk west along path, outfall is below large rocks 100m before bridge
~2 ft diameter, flowing along concrete channel, down mud into creek

Sub 961 Good!
Park at 30 min parking next to Bridge restraunt. Walk N., culvert located on left side of building.
~2 ft in diameter, flowing, culvert covered by concrete slabs.

550-2 Back-up site
Park at 30 min. Parking, next to Bridge building. Culvert

located on E side of building directly under A st. bridge.
Culvert 1.5 ft diameter, flow occuring but water equilibrated to ship creek water level.
* water flowing from culvert milky color.

436-1 Good
Park 30 min. parking @ Bridge building. Walk across foot bridge walk west along West Whitney Road. Culvert immediately E where C St crosses Ship creek.
Culvert ≈ 1 ft in diameter water flowing out of culvert, falling ≈ 1.5 ft to slope where emptied into creek.

396-1 Good
Park at Bridge building 30 min. zone, use foot bridge to cross ship creek. Imediately W of bridge, after bridge building.
two culverts found
Western most culvert, water ≈ 1 in flow, flows 1.5 ft to hit slope, drains.
Eastern culvert - metal, covered with grate filled with porous fabric to catch particulates. Good flow, 1 ft deep in culvert. Both sides of exit are rusted out

374
unable to find culvert

119-1
no flow

46-1
Inaccessable to dee to steep

bank | fences.

151-3
inaccessable - outfall on island.

82-2
drainage slough

189-1 back-up site
Park along N. Post road or Viking Drive. from trail hop fence outfall in SE corner of bridge where N. Post crosses ship creek.
Out fall submerged, culvert cracked where it enters creek. Sampleing can be conducted, water flows from culvert into creek. Water: cloudy brown. Culvert approx. 2ft. Culvert covered by multiple concrete slabs.

477-1
3 culverts flowing beneath N. Post road approximately 15 ft wide

213, 941-1, 154, 944-1
inaccessable due to vegetation, fences, proximity to Rail road, safety

96.2 Good
park at pull out across from AIH on Viking Drive. Walk West to NSitka Street. Listen for outfall.
Culvert 2.5' in diameter 2-3" in flow, water falls ≅ 6ft to slope, drains to Creek

438.1
Couldnt locate

~~930~~ 930-1
couldnt access

245-1 Good
Park at end of Yakutat st near DiTomaso's parking lot. Outfall immediately S. of Yakutat st.
Culvert ≅ 1.5 ft diameter flow 6 in. deep with rapid flow. Downed cottonwood tree atop culvert

666-1
Couldn't find / access on private land?

690 728-1
no sampling - salmon habitat

Sub 991 + 939-2
on Elmendorf, no access

Chester Creek
16 June 2012

549-1
drainage ditch

1302-1
culvert draining lagoon to inlet

1305-1
Lagoon drainage into esturine drainage

419-6 Park-up site
Park at bottom of woodworth circle, connects to coastal trail. Pipe beneith boardwalk
Culvert 1ft diameter, water ≅ 4in. deep. Water equilibrated with no directional flow.
* fish inside pipe
↳ smelt

624-4, 416-1
private property - no access

452-1
unable to locate

594-1
culvert that connects lagoons

566-1, 1304-1
culvert connecting lagoon

358-1
High traffic - no access

117-1 Good
Park at Hillcrest drive overlook, take trail located under lookout. Culvert on east side of trail 1.5 ft wide, slow steady flow, grate across entrance with rocks, water flows through small gully before entering lagoon.

244-2 back-up site
Park at lot at bottom of Spenard road @ Trolley lot. Head south on trail outfall on west side of trail.
Culvert ≈ 1 ft diameter w/ electrical box in shallow pond collecting outflow. water flows through rocks/ seeping into lagoon.

163-1
unable to locate, drains under road into creek?

244-1
Unable to locate, found stone lined drainage ditch. Line moved?

308-1

679-21 X
Outfall submerged

464-1 X
Chester Creek bike path goes under Arctic Blvd near intersection 17th and Arctic. Culvert 1ft diameter with 1/2 inch of standing water.

304-1
two culverts 2,5-3ft diameter, flood control? Located on E side of Arctic Blvd just after bike underpass

676-1 X
no significant flow

426-23
unable to find

489-1 back-up site
Park on W. 20th Street, walk cross walk bridge, head west. Outfall located S. of bike trail below green guard rails
Culvert 3ft diameter w/ grate. Grate clogged with trash steady outflow from culvert

489.2 Good
Park along community garden Street at bottom of C St.
Outfall located West of C.
3ft diameter, 10 in flow, water equilibrated with stream. Definite flow occurring.

103-1
manhole cover found but no outfall

654-1
suggestions of outfall
- guard rail

- filtration pillows
- standing water beginning at trail not originating from stream
  - orange coloration

296-1
no access - safety hazard.

499-1 [Good]
Park in SW Sullivan Arena Parking lot. Walk from parking lot straight over to creek.
Culvert - 2ft diameter with 2in flowing water

X 1300-20
1ft culvert directly S of E side of Sullivan track too submerged (90%), no positive flow.

299-21, 299-20
Located South between Ben Boeke & Sullivan Area buildings

X 299-20
had cracks in pipe from corrosion. ≈ 1ft wide

X 299-21
1.5 ft wide

CHESTER CREEK
17 JULY 2017

25-1
PARKED AT JUNEAU & EAST 20TH AND WALKED STRAIGHT SOUTH TO STRUCTURE
WATER LEVEL IS SAME IN OUTFALL AS CREEK. PIPE ∅ ≈ 3' (BACKUP)

86-1
WALKED ON CHESTER CREEK TRAIL THROUGH TUNNEL

WATER APPEARS TINTED. ~4' R.C.P. AND SITS ON TOP OF CULVERT. GOOD

484-1
SITS 20' NORTH OF PREVIOUS. 2' CMP WATER IN PIPE, BUT NOT FLOWING

552-105
DRAINAGE DITCH PASSING THROUGH PARK.

314-23
PARKED AT END OF MAPLEWOOD ABOUT 200-300' PAST 24TH 2' CMP 1/4" WATER IN PIPE. OILY SHEEN ON SURFACE FLOWS DOWN DITCH ~25' TO CREEK. GOOD

509-12
~2' Ø CMP 4" WATER FLOWING - LEVEL IS SAME AS POND, BUT POSITIVE DIRECTIONAL FLOW. ACCESS FROM EAST 24TH WALK NORTH @ GRATE JUST BEFORE BIG YELLOW HOUSE. GOOD

30-1
~2' CMP NO GOOD

1-398
DRAINS INTO UNIVERSITY LAKE. NO FLOW

1295-1 & 261-1
NOT FOUND

672-145
DRAINAGE DITCH

373-1
NOT FOUND

~~874-1~~ DSC

700-10
OFF UAA DR ACROSS FROM ALUMNI STRAIGHT WEST 100' FROM NW CORNER ~1' Ø 10" WATER IN PIPE. GOOD

645-1
NOT FOUND

1293-1
~12" Ø CMP XZ. DRY NO FLOW

323-1
PARKED AT EMMANUEL AVE BETWEEN NEWCOMB & CHECKMATE
~18" Ø FLOWING OUT W/ 4" WATER
WATER LEVEL IS LEVEL W/ CREEK
BACKUP

98-2
PARK @ END OF PARKING LOT OF 32ND
3' Ø GRATE CLOGGED W/ TRASH 6" WATER
@ SAME LEVEL AS CREEK BACKUP

554-2
PARKED @ 30TH & LILY @ COLLEGE GATE
ELEMENTRY. APPEARS TO BE BEGINNING OF STREAM.
4' RCP WATER IS 1.5' DEEP. APPEARS TO BE
FLOWING.

647-26
PARKED OFF DEFIANCE ST WHERE TRAIL
CUTS TO THE WEST
2' DIA. 1" WATER FLOWING QUICKLY
CMP. CAN HEAR RUNNING GOOD

236-1
2' DIA 1" WATER FLOWING QUICKLY.
DROPS THROUGH ROCK INTO LAKE. IS
LOCATED IN ALDER STAND. COUNT 6 HOUSES
BACK FROM DEFIANCE ON JORDAN CIRCLE
FOLLOW LINE FROM YELLOW HOUSE (6TH)
BACK TO LAKE. GOOD

361-1
PARKED @ BAXTER & CAMROSE WALKED
100 YDS +/- WEST. NORTH SIDE 18" CMP
3" WATER. GOOD

321-1
FOLLOWED TRAIL ACROSS NORTHERN
LIGHTS, ~3' DIA CMP W/ 6" WATER
BACKUP LOCATED TO EAST

26 October
Furrow creek - photos

FUR5
100 - 1801 culvert
100 - 1802 culvert
100 - 1803 incised stream
100 - 1804 outfall to creek

FUR Obj 24235
100 - 1805 culvert
100 - 1806 stream through swale
100 - 1807 " "
100 - 1808 2nd culvert
100 - 1809 rusted culvert
100 - 1810 outfall to creek

FUR332
100 - 1811 culvert
100 - 1812 culvert
100 - 1813 outfall to creek

FUR402
100 - 1814 culvert
100 - 1815 culvert

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: ~~FUR5~~ FUR5 AG

Part 1. General Information

1. Date 7/2/2012 Time 11:30
2. Field Crew A. Gerlek, T. Gill Water quality analyses conducted by: A. Gerlek, T. Gill
3. How long since last rainfall? ☐ raining now ☒ ~~less than 3 days~~ ☒ 3 or more days AG ☐ unknown
4. Size of last rain event. 1/4 inches duration _____ hours
5. End-of-pipe diameter: 1.5 feet _____ inches
6. Depth of water in end-of-pipe: _____ feet 1/4 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) camera 201 101-1120
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 small particles, orga

Part 3. Field Analyses 0.79 gal/min

11. Flow Velocity: 3 L/min 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	see turbidity form ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	<0.1 ppm	ppm
Turbidity	5.88 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

~~FUR5~~ 2 previous naming convention AG

free available Cl <0.5ppm

total residual Cl <0.5ppm

sample: FUR5 070212 relabeled sample

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: FUR ~~Obj~~ 24235

Part 1. General Information

1. Date 7/2/2012 Time 1230
2. Field Crew A. Gerek, T. Gill Water quality analyses conducted by: A. Gerek, T. Gill
3. How long since last rainfall? ☐ raining now ~~☐ less than 3 days~~ ☒ 3 or more days AG ☐ unknown
4. Size of last rain event. 1/4 inches duration _____ hours
5. End-of-pipe diameter: _____ feet 18 inches
6. Depth of water in end-of-pipe: _____ feet _____ inches N/A

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Camera 201
101-1121, 101-1122, 101-1123, 101-1124, 101-1125, 101-1126, 101-1127
8. Water flowing from end-of-pipe? ☐ No ☐ Yes pipe rusted out, water trickling through rocks
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: ~.75 gal/min 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	see turbidity form ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.15 ppm	ppm
Turbidity	2.28 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

sample FUROBJ24235
07 02 12
1230

free available chlorine < 0.5 ppm
total residual chlorine < 0.5 ppm

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: FUR 332

Part 1. General Information

1. Date 07/02/12 Time 1530
2. Field Crew A. Gorlek, T. Gill Water quality analyses conducted by: A. Gorlek, T. Gill
3. How long since last rainfall? ☐ raining now ~~☒ less than 3 days~~ ☒ 3 or more days ☐ unknown
4. Size of last rain event. 1/4 inches duration _____ hours
5. End-of-pipe diameter: _____ feet 18 inches
6. Depth of water in end-of-pipe: _____ feet 4 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Camera 207
   101-1128, 101-1129
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: _____ gal/min ☒ Low ☐ Medium ☐ High ☒ Outfall submerged
12. Appearance of water flowing from end-of-pipe: ☒ Clear ☐ Cloudy/Muddy
    outfall partially submerged - see note
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	8 pH units
Total chlorine	<0.5 ppm	<0.5 ppm
Detergents	0.0 ppm	0.1 ppm
Turbidity	~~4.57~~ see turbidity note ntu	4.57 ntu
Total phenols	<0.1 ppm	<0.1 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	8 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	4.49 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

water is visibly flowing from outfall, but water depth is equilibrated between outfall and discharge - cannot measure flow velocity - sampled water in pipe

samples: HDR FUR 332 070212 1530

HDR FUR 332 DUP 070212 1530

	primary	DUP
free available chlorine	<0.5 ppm	<0.5 ppm
total residual chlorine	<0.5 ppm	<0.5 ppm

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: FOR402

Part 1. General Information

1. Date 07/02/12 Time 1540
2. Field Crew A. Euclek, T. Gill Water quality analyses conducted by: _____
3. How long since last rainfall? ☐ raining now ~~☑ less than 3 days~~ ☒ 3 or more days ☐ unknown
4. Size of last rain event. .14 inches duration _____ hours
5. End-of-pipe diameter: 1 feet _____ inches
6. Depth of water in end-of-pipe: _____ feet 1 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) camera 201
   101-1128
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: 3gal/min 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	see turbidity form ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.05 ppm	ppm
Turbidity	2.79 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments: free available chlorine <0.5 ppm
total residual chlorine <0.5 ppm

$\frac{1\,qt}{5\,sec} \times \frac{60\,sec}{1\,min} = \frac{12\,qt}{1\,min} \times \frac{1\,gal}{4\,qt} = 3\,gal/1\,min$

sample: HDRFOR402 07D212 1540

DRY WEATHER SCREENING FIELD DATA FORM

Department of Public Works — WATERSHED MANAGEMENT

Outfall Number: ~~81-79 Ship Creek~~ SHP 81-79

Part 1. General Information

1. Date 18 July 2012 Time 15:00
2. Field Crew A. Gerlek, Z. meade Water quality analyses conducted by: C. Milligan
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: 3 feet 0 inches
6. Depth of water in end-of-pipe: _____ feet 1 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Alena's iphone 394, 395
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

1.58 gal/min

11. Flow Velocity: 6m/min. 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 yellow
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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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	7.0 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	23.6 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

Silt and mud observed inside of culvert due to high tide.

DRY WEATHER SCREENING FIELD DATA FORM

Department of Public Works — Watershed Management

Outfall Number: ~~Sub 961 Ship Creek~~ SHP 961

Part 1. General Information

1. Date 07/18-12 Time 15:15
2. Field Crew A. Gerlek, Z. Meade Water quality analyses conducted by: Z. meade
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: 3 feet 0 inches
6. Depth of water in end-of-pipe: 0 feet 1.5 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Alena's iphone 396, 397

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 8.33L/min 2.2gl/m

11. Flow Velocity: 8.33 L/min 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.5 ppm	ppm
Turbidity	8.68 ntu	ntu
Total phenols	0.1 ppm	ppm
Total copper	.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

Culvert covered by concrete slab. Inside culvert: rocks with iron residue and some mud

total R. Clorine = < 0.5 ppm
Free Available = <0.5 ppm
Combined Clorine = <0.5ppm

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: ~~396-1 Ship Creek~~ SHP 396-1

Part 1. General Information

1. Date 07-18-12 Time 15:20
2. Field Crew A. Gerlek, Z. Meade Water quality analyses conducted by: A. Gerlek, Z. Meade, D. Campbell
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: 3 feet 0 inches
6. Depth of water in end-of-pipe: _____ feet _____ inches - can't tell blocked by grate, water exiting about 1 ft, backed up

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Alena's iphone 398-400
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: 8.5 L/min 2.25 gpm 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	.125 ppm	ppm
Turbidity	1.23 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

Culvert covered by grate, pipe rusted out on both sides, water flowing out of cracks. Top of culvert unlatched

free available chlorine <0.5 ppm
total residual chlorine <0.5 ppm

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: 96-2 ~~Stump Creek~~ SHP 96-2

Part 1. General Information

1. Date 07-18-12 Time 15:45
2. Field Crew Z meade, A Gerlek Water quality analyses conducted by: D. CAMPBELL
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: 3 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) Alena's iphone 401, 402
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

10.6 gal/min

11. Flow Velocity: 40L/min 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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	7.0 pH units	~~7.0~~ pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.65 ntu	ntu
Total phenols	< 0.1 ppm	ppm
Total copper	~~<0.05~~ ppm	- ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

water exits culvert and falls 6ft to creek below

pH.

1ST CHLORINE < 0.5

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: ~~245-1 Stump Creek~~ SHP 245-1

Part 1. General Information

1. Date 07-18-12 Time 16:00
2. Field Crew Z.meade, a.gerlek Water quality analyses conducted by: A. GerLK
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: 1 feet 6 inches
6. Depth of water in end-of-pipe: _____ feet 4.5 inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Alena's iphone photo # 403, 404
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: 13.33 L/sec (3.5 gpm) 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	8.5 pH units
Total chlorine	<0.5 ppm	<0.5 ppm
Detergents	0.0 ppm	0.0 ppm
Turbidity	0.26 ntu	1.50 ntu
Total phenols	<0.1 ppm	<0.5 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	8.5 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	1.15 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

→ Fecal coliform duplicate: HDRSHP 245-1DUP

chlorine duplicate:
free available chlorine <0.5ppm
total available chlorine <0.5ppm
combined chlorine <0.5ppm

free available chlorine <0.5 ppm
total available chlorine <0.5 ppm
combined chlorine <0.5ppm

DRY WEATHER SCREENING FIELD DATA FORM

Municipality of Anchorage | Department of Public Works | Watershed Management

Outfall Number: ~~647-26 Chester Creek~~ CHS 647-36

Part 1. General Information

1. Date ~~TOM G / DAN. L~~ DJC 7/18/17 Time 15:00
2. Field Crew TOM G DAN L Water quality analyses conducted by: A. Keller, C. Milligan
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: _____ feet 24" inches
6. Depth of water in end-of-pipe: _____ feet 2" 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: _____ 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.1 ppm	ppm
Turbidity	1.71 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

OVER GROWN w/ ALDERS, FAST MOVING

free available chlorine <0.5ppm
total residual chlorine <0.5 ppm
combined chlorine <0.5 ppm

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: ~~236-1 Chester Creek~~ CHS 236-1

Part 1. General Information

1. Date 7/18/12 Time 15:06
2. Field Crew Tom G & Dan C. Water quality analyses conducted by: A. Gockel
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: _____ feet 18" inches
6. Depth of water in end-of-pipe: _____ feet 2" inches

Part 2. Visual Observations

7. Photograph Log: Camera # and frame number (s) Tom's 57587

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: _____ 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: DSC

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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.5 ppm	ppm
Turbidity	1.00 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

ROCKS BELOW ARE BRIGHT BROWN, FAST FLOW

free available chlorine <0.5
total residual chlorine <0.5
combined chlorine <0.5

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: 700-10 ~~Chester Creek~~ CHS 700-10

Part 1. General Information

1. Date 7/18/12 Time 1525
2. Field Crew Tom G. / Dan C. Water quality analyses conducted by: Tom G
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: _____ feet 12" inches
6. Depth of water in end-of-pipe: _____ feet 9" 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: _____ 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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	8.0 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	1.23 ntu	ntu
Total phenols	<0.1 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: ~~509-12 Chester Creek~~ CHS 509-12

Part 1. General Information

1. Date 7-18-12 Time 1547
2. Field Crew Tom G Dan C Water quality analyses conducted by: ~~Tom G~~ Dan C.
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: 1 feet _____ inches
6. Depth of water in end-of-pipe: _____ feet 4" inches

Part 2. Visual Observations

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

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: _____ 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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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	7.0 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.5 ppm	ppm
Turbidity	0.28 ntu	ntu
Total phenols	<0.1 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: ~~484-1~~ ~~Muster Creek~~ EHS 484-1

Part 1. General Information

1. Date 7/18/12 Time 16:10
2. Field Crew D. Campbell, T. Gill Water quality analyses conducted by: A. Gerlek, C. Milligan
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: _____ feet _____ inches
6. Depth of water in end-of-pipe: _____ feet _____ 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.* HYDROCARBON TYPE ODOR

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: 6 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 TEA
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	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	0.26 ntu	ntu
Total phenols	<0.1 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 pH units	pH units
Total chlorine	<0.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	42.6 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

free available chlorine <0.5 ppm
total residual chlorine <0.5 ppm
combined chlorine <0.5 ppm

DRY WEATHER SCREENING FIELD DATA FORM

Department of Public Works — WATERSHED MANAGEMENT

Outfall Number: 117-1 Chester Creek CHS 117-1

Part 1. General Information

1. Date 7-18-12 Time 1635
2. Field Crew Tom G Drew L. Water quality analyses conducted by: Tom G
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☒ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: _____ feet 24" inches
6. Depth of water in end-of-pipe: _____ feet 1" inches

Part 2. Visual Observations

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

8. Water flowing from end-of-pipe? ☐ No ☒ Yes

If NO, take and log photograph of outfall, record any pertinent information in comments, and go to next outfall. *If YES, continue.*

9. Odors: ☒ No ☐ Yes *If yes, describe in comment section.*

10. Floatables in water flowing from end-of-pipe:

☐ None ☐ Moving oily sheen ☐ Surface scum ☐ Soapy suds ☐ Debris ☐ Other _____

Part 3. Field Analyses

11. Flow Velocity: _____ 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	8.0 pH units	pH units
Total chlorine	20.5 ppm	ppm
Detergents	0.0 ppm	ppm
Turbidity	2.36 ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	<0.05 ppm	ppm
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

Analytica Chain of Custody Form

12189 Pennsylvania St
Thornton, CO 80241
(303) 469-8868
(303) 469-5254 fax

4307 Arctic Boulevard
Anchorage, AK 99503
(907) 258-2155
(907) 258-6634 fax

475 Hall St.
Fairbanks, AK 99701
(907) 456-3116
(907) 456 3125 fax

1203 W. Parks HWY
Wasilla, AK 99654
(907) 373-5440

Chain of Custody No: 083062

Client Name & Address:
HDR Alaska, Inc.
2525 C St. Ste 305
Anchorage, AK 99503

Public Water System (PWS) ID#:

Project Name: HDR Dry Weather

Section to be Completed by Analytica
Quote ID:
LGN: A12[illegible]351
Account #:
Check | Credit Card

Report to: Isaac Watkins
Phone No: 907-644-2088
Fax No:
E-mail: Isaac.Watkins@HDRINC.com

Turnaround Time for Results (TAT)
X Standard ___ Expedited (< 10 days, prior authorization required)
___ Routine ___ Non-Routine (please specify due date below, add'l charges may apply)
Requested Due Date for Results:

Invoice to Name & Address:

Special Instructions/Comments:
28 Day Hold time
received on ice

P.O. or Contract No:

Kit Prep/Shipping Charge: $

Requested Analysis/Method

Client Sample Identification / Location	Date Sampled	Time Sampled	Matrix (S-DW-WW-Other)	No. of Containers	Phenols Lot #: Pres:	Lot #: Pres:	Lot #: Pres:	Lot #: Pres:	Lot #: Pres:	Lot #: Pres:	Lot #: Pres:	Field Preserved	Field Filtered	MS/MSD ?
HDR DWS 3	6-26-12	1230	H_2O	2	X L2							Y	N	N

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	6.26.12	1300	[signature]	6/26/12	1300
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Name of Sampler: (printed)

Section to be completed by Analytica

	THO	ANC	FBKS	WAS
Condition of Custody Seal?		NA		
Initialed by:				
Temp/Loc:		10.6		
Thermo ID#:		30907		
Shipped Via:		Client		

Version 2.0

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
- Alaska
- New Jersey
- North Carolina
- West Virginia
- Maryland
- New York
- Indiana
- Kentucky

www.us.sgs.com

(1)
CLIENT: HDR Alaska, Inc.
CONTACT: Isaac Watkins PHONE NO: 907-644-2088
PROJECT NAME: MOA DWS PROJECT/ PWSID/ PERMIT#: Dry Weather Screening
REPORTS TO: Isaac Watkins EMAIL: Isaac.Watkins@HDRINC.com
INVOICE TO: HDR Alaska, Inc 2525 C St. Ste. 305 Anchorage, AK 99507 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: HNO3
(1) A	HDR DWS 1	6-26-12	1230	H_2O	1	G	X
(2) A	HDR DWS 2	6-26-12	1230	H_2O	1	G	X

Analysis Required (3): Total Copper

1122558

REMARKS/ LOC ID

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
[signature]	6-26-12	1311	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By: [signature] 6/26/12 1311

(4)
DOD Project? YES NO
Cooler ID _____
Data Deliverable Requirements:
Requested Turnaround Time and-or Special Instructions:

Temperature Blank °C: 5.0 #95
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

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
- Alaska
- New Jersey
- North Carolina
- West Virginia
- Maryland
- New York
- Indiana
- Kentucky

www.us.sgs.com

(1)

CLIENT: HDR Alaska, Inc

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

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

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

INVOICE TO: HDR Alaska, Inc. 2525 C St. Ste. 305 Anchorage, AK 99503 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
	FUR5	07/02/12	1130					✓	
	FUR OBS 24235	07/02/12	1230					✓	

1122729

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
Alexa Fedeler	07/02/12	1328	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:
	07/02/12	1328	

(4)

DOD Project? YES NO

Cooler ID _____

Data Deliverable Requirements:

Requested Turnaround Time and-or Special Instructions:

Temperature Blank °C: 6.7 or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
- Alaska
- New Jersey
- North Carolina
- West Virginia
- Maryland
- New York
- Indiana
- Kentucky

www.us.sgs.com

(1)

CLIENT: HDR Alaska, Inc.

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

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

REPORTS TO: Isaac Watkins EMAIL: Isaac.watkins@hdrinc.com

INVOICE TO: HDR Alaska, Inc. 2525 C St, Ste. 305 Anchorage, AK 99507 QUOTE #: P.O. #:

SGS Reference #: 1122740

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
	HDR FUR332	070212	1530					✓	
	HDR FUR332 DUP	070212	1530					✓	
	HDR FUR402	070212	1540					✓	

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
Alena Griffith	070212	1702	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 7/2/12	Time 17:02	Received For Laboratory By:

(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)

SGS North America Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide • Maryland

1123096

SGS Reference #: _____ of _____

1

CLIENT: HDR Alaska, inc.

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

PROJECT NAME: MOA DWS

PROJECT/ PWSID/ PERMIT#: Dry weather Screen

REPORTS TO: Isaac Watkins

EMAIL: Isaac.watkins@hdrinc.com

INVOICE TO: HDR Alaska, Inc 2525 C St. Ste. 305 Anchorage, AK 99507

QUOTE #:

P.O. #:

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
	HDR SHP 396-1	07/18/12	15:20					✓	
	HDR SHP Sub 961	07/18/12	15:15					✓	
	HDR SHP 81-79	07/18/12	15:00					✓	
	HDR SHP 245-1	07/18/12	16:00					✓	
	HDR SHP 96-2	07/18/12	15:45					✓	
	HDR SHP 245-1 DUP	07/18/12	16:00					✓	

5

Collected/Relinquished By:(1)	Date	Time	Received By:
[signature]	07/18/12	16:38	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 07/18/12	Time 16:38	Received For Laboratory By: [signature]

4

DOD Project? YES NO

Cooler ID _____

Data Deliverable Requirements:

Requested Turnaround Time and-or Special Instructions:

Temperature Blank °C: Chilled or Ambient [ ]

(See attached Sample Receipt Form)

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form)

SGS North America Inc.
CHAIN OF CUSTODY RECORD

WO# 1123096

Locations Nationwide
- Alaska
- New Jersey
- North Carolina
- West Virginia
- Maryland
- New York
- Indiana
- Kentucky

www.us.sgs.com

(1)

CLIENT: HDR ALASKA, INC

CONTACT: ISAAC WATKINS PHONE NO: (907) 644-2088

PROJECT NAME: MOA DWS PROJECT/ PWSID/ PERMIT# : DRY WEATHER SCREENING

REPORTS TO: ISAAC WATKINS EMAIL: ISAAC.WATKINS@HDRINC.COM

INVOICE TO: HDR ALASKA, INC. 2525 C ST., STE 305 ANCHORAGE, AK 99507 QUOTE #: P.O. #:

SGS Reference #:

page _____ of _____

(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
	HDR CHS 484-1	07/18/12	16:10					✓	
	HDR CHS 700-10		1525					✓	
	HDR CHS 236-1		1506					✓	
	HDR CHS 647-26		1500					✓	
	HDR CHS 509-12		1547					✓	
	HDR CHS 117-1		1635					✓	

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
Tom Gill	07/18/12	1700	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 07/18/12	Time 1700	Received For Laboratory By:

(4)

DOD Project? YES NO

Cooler ID _____

Data Deliverable Requirements:

Requested Turnaround Time and-or Special Instructions:

Temperature Blank °C: Chilled or Ambient [ ] (See attached Sample Receipt Form)

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

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1123251

(1)

CLIENT: HDR Alaska

CONTACT: Isaac Watkins PHONE NO: 907-644-2000

PROJECT NAME: MOA - DWS PROJECT/ PWSID/ PERMIT# :

REPORTS TO: Isaac Watkins EMAIL: Isaac.Watkins@HDR Inc.com

INVOICE TO: HDR AK QUOTE #:
2525 C St. Ste 305
Anch. AK 99503 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 coli.	REMARKS/ LOC ID
01A	SHP 81-79	7-25-12	1500	H_2O	1	G		X	
02A	SHP 81-79M	7-25-12	1525	H_2O	1	G		X	

(5)

Collected/Relinquished By:(1)	Date	Time	Received By:
[signature]	7-25-12	1547	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date 7/25/12	Time 1547	Received For Laboratory By: [signature]

(4)

DOD Project? YES NO

Cooler ID _____

Data Deliverable Requirements:

Requested Turnaround Time and-or Special Instructions:

Temperature Blank °C: 28 206

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

Appendix E

Data Package

SGS

SGS Ref.#	1122740001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/10/2012 16:04
Project Name/#	MOA Dry Water Screening	**Collected Date/Time**	07/02/2012 15:30
Client Sample ID	HDRFUR332	**Received Date/Time**	07/02/2012 17:02
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	10	1	col/100mL	SM21 9222D	A			07/02/12	MEM

SGS

SGS Ref.#	1122740002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/10/2012 16:04
Project Name/#	MOA Dry Water Screening	**Collected Date/Time**	07/02/2012 15:30
Client Sample ID	HDRFUR332DUP	**Received Date/Time**	07/02/2012 17:02
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	14	1	col/100mL	SM21 9222D	A			07/02/12	MEM

SGS

SGS Ref.#	1122740003		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/10/2012 16:04
Project Name/#	MOA Dry Water Screening	**Collected Date/Time**	07/02/2012 15:40
Client Sample ID	HDRFUR402	**Received Date/Time**	07/02/2012 17:02
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	9	1	col/100mL	SM21 9222D	A			07/02/12	MEM

SGS

SGS Ref.#	1122729002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/10/2012 16:04
Project Name/#	MOA DWS	**Collected Date/Time**	07/02/2012 12:30
Client Sample ID	FUROBS24235	**Received Date/Time**	07/02/2012 13:28
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	20	1	col/100mL	SM21 9222D	A			07/02/12	MEM

SGS

SGS Ref.#	1122729001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/10/2012 16:04
Project Name/#	MOA DWS	**Collected Date/Time**	07/02/2012 11:30
Client Sample ID	FUR5	**Received Date/Time**	07/02/2012 13:28
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	116	1	col/100mL	SM21 9222D	A			07/02/12	MEM

SGS North America Inc.
Alaska Division
Level II Laboratory Data Report

Project:	Dry Weather Screen - MOA DWS
Client:	HDR Alaska, Inc.
SGS Work Order:	1123096

Released by:

SGS North America
Environmental Services – Alaska Division
Project Manager

Steven Crupi
2012.07.23
18:24:39
-08'00'

Contents:

Client Name: HDR Alaska, Inc.
Project Name: Dry Weather Screen - MOA DWS
Workorder No.: 1123096

Sample Comments

Refer to the sample receipt form for information on sample condition.

Lab Sample ID	Sample Type	Client Sample ID
*		

There were no analytical anomalies associated with the data reported herein.

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

Laboratory Analytical Report

Client: **HDR Alaska, Inc.**
2525 C Street #305
Anchorage, AK 99503

Attn: **Isaac Watkins**
T: (907)644-2000 F:(907)644-2022
isaac.watkins@hdrinc.com

Project: **Dry Weather Screen - MOA DWS**

Workorder No.: **1123096**

Certification:

This data package is in compliance with the terms and conditions of the contract, both technically and for completeness, unless otherwise noted on the sample data sheet(s) and/or case narrative. This certification applies only to the tested parameters and the specific sample(s) received at the laboratory. If you have any questions regarding this report, or if we can be of further assistance, please contact your SGS Project Manager.

Steve Crupi

steven.crupi@sgs.com
Project Manager

Contents (Bookmarked in PDF):

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
RL	Reporting Limit
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.

Client Name: HDR Alaska, Inc.
Project Name: Dry Weather Screen - MOA DWS
Workorder No.: 1123096

Analytical Methods

Method Description	Analytical Method
Fecal Coliform (MF)	SM21 9222D

Sample ID Cross Reference

Lab Sample ID	Client Sample ID
1123096001	HDR SHP 396-1
1123096002	HDR SHP Sub 961
1123096003	HDR SHP 81-79
1123096004	HDR SHP 245-1
1123096005	HDR SHP 96-2
1123096006	HDR SHP 245-1 DUP
1123096007	HDR CHS 484-1
1123096008	HDR CHS 700-10
1123096009	HDR CHS 236-1
1123096010	HDR CHS 647-26
1123096011	HDR CHS 509-12
1123096012	HDR CHS 117-1

Detectable Results Summary

Print Date: 7/23/2012 6:23 pm

Client Sample ID: **HDR SHP 396-1**
SGS Ref. #: 1123096001
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	<2	col/100mL

Client Sample ID: **HDR SHP Sub 961**
SGS Ref. #: 1123096002
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	4	col/100mL

Client Sample ID: **HDR SHP 81-79**
SGS Ref. #: 1123096003
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	76400	col/100mL

Client Sample ID: **HDR SHP 245-1**
SGS Ref. #: 1123096004
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	4	col/100mL

Client Sample ID: **HDR SHP 96-2**
SGS Ref. #: 1123096005
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	<2	col/100mL

Client Sample ID: **HDR SHP 245-1 DUP**
SGS Ref. #: 1123096006
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	4	col/100mL

Client Sample ID: **HDR CHS 484-1**
SGS Ref. #: 1123096007
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	<2	col/100mL

Client Sample ID: **HDR CHS 700-10**
SGS Ref. #: 1123096008
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	<2	col/100mL

Detectable Results Summary

Print Date: 7/23/2012 6:23 pm

Client Sample ID: **HDR CHS 236-1**
SGS Ref. #: 1123096009
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	<2	col/100mL

Client Sample ID: **HDR CHS 647-26**
SGS Ref. #: 1123096010
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	143	col/100mL

Client Sample ID: **HDR CHS 509-12**
SGS Ref. #: 1123096011
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	<2	col/100mL

Client Sample ID: **HDR CHS 117-1**
SGS Ref. #: 1123096012
Microbiology Laboratory

Parameter	Result	Units
Fecal Coliform	4	col/100mL

Client Sample ID: **HDR SHP 396-1**
SGS Ref. #: 1123096001
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:20
Receipt Date/Time: 07/18/12 16:38

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	<2	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096001-A
Analyst: DLC

Client Sample ID: **HDR SHP Sub 961**
SGS Ref. #: 1123096002
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:15
Receipt Date/Time: 07/18/12 16:38

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	4	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096002-A
Analyst: DLC

SGS

HDR Alaska, Inc. Print Date: 7/23/2012 6:23 pm

Client Sample ID: **HDR SHP 81-79**
SGS Ref. #: 1123096003
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:00
Receipt Date/Time: 07/18/12 16:38

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	76400	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096003-A
Analyst: DLC

Find nearest manhole & collect sample

collect @ outfall as well

Client Sample ID: **HDR SHP 245-1**
SGS Ref. #: 1123096004
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 16:00
Receipt Date/Time: 07/18/12 16:38

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	4	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL
Container ID:1123096004-A
Analyst: DLC

Client Sample ID: **HDR SHP 96-2**
SGS Ref. #: 1123096005
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:45
Receipt Date/Time: 07/18/12 16:38

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	<2	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL
Container ID:1123096005-A
Analyst: DLC

Client Sample ID: **HDR SHP 245-1 DUP**
SGS Ref. #: 1123096006
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 16:00
Receipt Date/Time: 07/18/12 16:38

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	4	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096006-A
Analyst: DLC

Client Sample ID: **HDR CHS 484-1**
SGS Ref. #: 1123096007
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 16:10
Receipt Date/Time: 07/18/12 17:00

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	<2	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096007-A
Analyst: DLC

Client Sample ID: **HDR CHS 700-10**
SGS Ref. #: 1123096008
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:25
Receipt Date/Time: 07/18/12 17:00

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	<2	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096008-A
Analyst: DLC

Client Sample ID: **HDR CHS 236-1**
SGS Ref. #: 1123096009
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:06
Receipt Date/Time: 07/18/12 17:00

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	<2	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096009-A
Analyst: DLC

Client Sample ID: **HDR CHS 647-26**
SGS Ref. #: 1123096010
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:00
Receipt Date/Time: 07/18/12 17:00

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	143	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096010-A
Analyst: DLC

Client Sample ID: **HDR CHS 509-12**
SGS Ref. #: 1123096011
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 15:47
Receipt Date/Time: 07/18/12 17:00

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	<2	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL

Container ID:1123096011-A
Analyst: DLC

Client Sample ID: **HDR CHS 117-1**
SGS Ref. #: 1123096012
Project ID: Dry Weather Screen - MOA DWS
Matrix: Water (Surface, Eff., Ground)

Collection Date/Time: 07/18/12 16:35
Receipt Date/Time: 07/18/12 17:00

Microbiology Laboratory

Parameter	Result	LOQ/CL	Units	DF	Analytical Batch	Prep Batch	Qualifiers
Fecal Coliform	4	1	col/100mL	1	BTF12244		

Batch Information

Analytical Batch: BTF12244
Analytical Method: SM21 9222D
Analysis Date/Time: 07/18/12 17:30
Dilution Factor: 1

Initial Prep Wt./Vol.: 100 mL
Container ID:1123096012-A
Analyst: DLC

SGS Ref.#	1100969 Method Blank	**Printed Date/Time**	07/23/2012 18:23
Client Name	HDR Alaska, Inc.	**Prep Batch**	
Project Name/#	Dry Weather Screen - MOA DWS	**Method**	
Matrix	Water (Surface, Eff., Ground)	**Date**	

QC results affect the following production samples:

1123096001, 1123096002, 1123096003, 1123096004, 1123096005, 1123096006, 1123096007, 1123096008, 1123096009, 1123096010, 1123096011, 1123096012

Parameter	Results	LOQ/CL	DL	Units	Analysis Date
Microbiology Laboratory					
Fecal Coliform	1 U	1	1	col/100mL	07/18/12
Batch BTF12244					
Method SM21 9222D					
Instrument					

Laboratory Analysis Report

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

Work Order:	1123251
	MOA-DWS
Client:	HDR Alaska, Inc.
Report Date:	July 27, 2012

SGS North America
Environmental Services – Alaska Division
Project Manager

Steven Crupi
2012.07.27
11:26:44 -08'00'

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.

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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

SGS Ref.#	1123251001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/27/2012 11:25
Project Name/#	MOA-DWS	**Collected Date/Time**	07/25/2012 15:00
Client Sample ID	SHP 81-79	**Received Date/Time**	07/25/2012 15:47
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	754	1	col/100mL	SM21 9222D	A			07/25/12	DLC

SGS

SGS Ref.#	1123251002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/27/2012 11:25
Project Name/#	MOA-DWS	**Collected Date/Time**	07/25/2012 15:25
Client Sample ID	SHP 81-79M	**Received Date/Time**	07/25/2012 15:47
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	29	1	col/100mL	SM21 9222D	A			07/25/12	DLC

DRY WEATHER SCREENING FIELD DATA FORM

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

Outfall Number: Phenols kit & Copper kit vs. lab comparison

Part 1. General Information

1. Date 6/26/12 Time 1300
2. Field Crew T. Watkins Water quality analyses conducted by: _____
3. How long since last rainfall? ☐ raining now ☐ less than 3 days ☑ 3 or more days ☐ unknown
4. Size of last rain event. _____ inches duration _____ hours
5. End-of-pipe diameter: _____ feet _____ inches
6. Depth of water in end-of-pipe: _____ feet _____ 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: _____ 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	<0.1 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	pH units	pH units
Total chlorine	ppm	ppm
Detergents	ppm	ppm
Turbidity	ntu	ntu
Total phenols	<0.1 ppm	ppm
Total copper	~~0~~ ppm	0.1 > result > .05 ppm
Fecal Coliform	Yes / no	

Part 4. Comments:

Copper kit tested w/ D.I. water = <0.05

Copper kit test run w/ spiked sample → result ~0.1 - color between 0.05 & 0.10

2 samples submitted to SGS for lab comparison.

Laboratory Analysis Report

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

Work Order:	1122558
	MOA DWS
Client:	HDR Alaska, Inc.
Report Date:	July 02, 2012

Steven R. Crupi
SGS North America
Environmental Services - Alaska Division
Project Manager
Steven Crupi
2012.07.03
14:42:00
-08'00'

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

SGS Ref.#	1122558001		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/02/2012 16:52
Project Name/#	MOA DWS	**Collected Date/Time**	06/26/2012 12:30
Client Sample ID	HDR DWS1	**Received Date/Time**	06/26/2012 13:11
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
Metals by ICP/MS									
Copper	78.8	1.00	ug/L	EP200.8	A		06/28/12	07/02/12	NRB

Field Kit
Comparison test #1

SGS

SGS Ref.#	1122558002		
Client Name	HDR Alaska, Inc.	**Printed Date/Time**	07/02/2012 16:52
Project Name/#	MOA DWS	**Collected Date/Time**	06/26/2012 12:30
Client Sample ID	HDR DWS2	**Received Date/Time**	06/26/2012 13:11
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
Metals by ICP/MS									
Copper	75.8	1.00	ug/L	EP200.8	A		06/28/12	07/02/12	NRB

Field kit comparison test #2

ANALYTICA
Environmental Laboratories

Analytica Anchorage
4307 Arctic Boulevard
Anchorage, AK 99503
Phone: 907-258-2155
Fax: 907-258-6634

7/11/2012

HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, AK 99503
Attn: Isaac Watkins

Work Order #: A1206351
Date: 7/11/2012
Work ID: HDR Dry Weather
Date Received: 6/26/2012
Proj #: HDR Dry Weather

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
A1206351-01	HDR DWS 3		

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Claire Toon
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

Analytica Alaska Inc.
Work Order: A1206351

Samples were prepared and analyzed according to EPA or equivalent methods outlined in the following references:

Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998.

SAMPLE RECEIPT:
One (1) sample was received on 6/26/2012 1:00:00 PM, at a temperature of 10.6°C (direct from site), at Analytica-Anchorage. The sample was received in good condition and in order per chain of custody.

The sample was transferred for analysis to Analytica Environmental Laboratories (AEL), 12189 Pennsylvania St., Thornton, Colorado 80241, where it was received at a temperature of 2.1°C, in good condition and in order per chain of custody on 6/28/2012.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN
A summary of our review is shown below.

All analytical results contained in this report have been reviewed under Analytica's internal quality assurance and quality control program. Any deviations in quality control parameters for specific analyses are noted in the following text. A complete quality assurance report, including laboratory control, matrix spike, and sample duplicate recoveries is kept on file in our office and is available upon request.

All method specifications were met for the following tests, unless otherwise noted:

Test Method: Phenols by spectrometric analysis - Phenols - Water

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A1206351

Project: **HDR Dry Weather**

Client: **HDR Alaska, Inc.**

Client Project Number: **HDR Dry Weather**

Report Section: Client Sample Report

Client Sample Name: **HDR DWS 3**

Matrix: Water

Collection Date: 6/26/2012 12:30:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number:	A1206351-01A	Analysis Date:	7/5/2012 11:52:00AM
Prep Date:	7/4/2012	Instrument:	Hach 2500 Col
Analytical Method ID:	Phenols by spectrometric analysis - Phenols	File Name:	
Prep Method ID:	5530B	Dilution Factor:	1
Prep Batch Number:	T120705003		
Report Basis:	As Received	Analyst Initials:	TA
Sample prep wt./vol:	100.00 ml	Prep Extract Vol:	100.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	run #:
Phenols, Total Recoverable		ND		mg/L	0.061	0.031	1

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A1206351

Project: **HDR Dry Weather**

Client: **HDR Alaska, Inc.**

Client Project Number: **HDR Dry Weather**

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: **139,320** **Lab Project Number:** **A1206351**

Prep Date: 7/4/2012

Lab Method Blank Id: T120705003-MB

Prep Batch ID: T120705003

Method: Phenols by spectrometric analysis - Phenols

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

SampleNum	ClientSampleName	DataFile	AnalysisDate
A1206351-01A	HDR DWS 3		7/5/2012 11:52:00AM
T120705003-LCS	LCS		7/5/2012 11:52:00AM
A1206351-01A-DUP	DUP		7/5/2012 11:52:00AM
A1206351-01A-MS	MS		7/5/2012 11:52:00AM

Workorder (SDG): A1206351

Project: **HDR Dry Weather**

Client: **HDR Alaska, Inc.**

Client Project Number: **HDR Dry Weather**

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.
Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

ND = Not Detected at or above the Reporting Limit
NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Lower Control Limit
HIGH = Recovery , RPD, or other parameter is above Upper Control Limit
E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank
J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)
W = Post digestion spike did not meet criteria
S = Reported value determined by the Method of Standard Additions (MSA)

Several ways of defining the limit of detection and quantitation are prevalent in the laboratory industry and may appear in Analytica reports. These include the following:

MRL = "minimum reporting level", from the EPA Safe Drinking Water program (SDW)
PQL = "practical quantitation limit", from SW-846
EQL = "estimated quantitation limit", from SW-846
LOQ = "limit of quantitation", from a number of authoritative sources

In Analytica's work, all of these terms have the same meaning, equivalent to the EPA definition of the MRL. This reporting level is supported by a satisfactory calibration data point which is at that level or lower, and also is supported by a method detection limit (MDL) determined by the procedure in 40CFR. The MDL is lower than the MRL and represents an estimate of the level where positive detections have a 99% probability of being real, but where quantitation accuracy is unknown.

The MRL as defined by Analytica is the lowest demonstrated point of known quantitation accuracy.
The MRL should not be confused with the MCL, which is the EPA-defined "maximum contaminant level" allowed for certain regulated targets under specific regulations, such as the National Primary Drinking Water Regulations. Normally, the MRL is set at a level which is much lower than the MCL in order to ensure that levels are well below those limits. Not all target analytes have MCL levels established.

Other Flags may be applied. See Case Narrative for Description

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A1206351

Project: **HDR Dry Weather**

Client: **HDR Alaska, Inc.**

Client Project Number: **HDR Dry Weather**

REPORTING CONVENTIONS FOR THIS REPORT

A1206351

TestPkgName	Basis	# Sig Figs	Reporting Limit
5530D/5530B (Aqueous) - Phenols	As Received	2	Report to PQL

OutfallID	SampleTime	WaterQualityAnalysisBy	TimeSinceLastRainfall	SizeOfLastRainfallEvent	EndOfPipeDiameterFeet	EndOfPipeDiameterInches
FUR332	15:30:00	ALENA GERLEK	3 or more days	.25		18.00
FUR402	15:40:00	ALENA GERLECK	3 or more days	.25	1	
FUR5	11:30:00	ALENA GERLEK	3 or more days	.25		18.00
FUR24235	12:30:00	ALENA GERLEK	3 or more days	0.25		18.00
SHP96-2	15:45:00	D. CAMPBELL	3 or more days		3	
SHP396-1	15:20:00	ALENA GERLEK	3 or more days		3	
SHP961	15:15:00	ZOE MEADE	3 or more days		3	
SHP81-79	15:00:00	CINDY MILLIGAN	3 or more days		3	
CHS484-1	16:10:00	A. GERLEK	3 or more days			24.00
CHS117-1	16:35:00	TOM GILL	3 or more days			24.00
CHS647-26	15:00:00	A. GERLEK	3 or more days			24.00
CHS509-12	15:47:00	DAN CAMPBELL	3 or more days		2	
CHS236-1	15:06:00	ALENA GERLEK	3 or more days			18.00
CHS700-10	15:25:00	TOM GILL	3 or more days			12.00
SHP245-1	16:00:00	ALENA GERLEK	3 or more days			18.00

OutfallID	DepthOfWaterInEOPInches	WaterFlowingF	Odors	Floatables	OilySheen	SurfaceScum	SoapySuds	Debris
FUR332	4.00	Yes	No	False	True	False	False	False
FUR402	1.00	Yes	No	True	False	False	False	False
FUR5	0.25	Yes	No	False	False	False	False	True
FUR24235			No	True	False	False	False	False
SHP96-2	2.00	Yes		True	False	False	False	False
SHP396-1		Yes	No	True	False	False	False	False
SHP961	1.50	Yes	No	True	False	False	False	False
SHP81-79	1.00	Yes	No	True	False	False	False	False
CHS484-1	2.00	Yes	Yes	True	False	False	False	False
CHS117-1	1.00	Yes	No	False	False	False	True	False
CHS647-26	2.00	Yes	No	True	False	False	False	False
CHS509-12	4.00	Yes	No	True	False	False	False	False
CHS236-1	2.00	Yes	No	True	False	False	False	False
CHS700-10	9.00	Yes	No	True	False	False	False	False
SHP245-1	4.50	Yes	No	True	False	False	False	False

OutfallID	OtherFloatables	StructuralCondition	FlowMeasurement	FlowType	Clarity	BlankChlorine	BlankDetergen	BlankPhenols
FUR332				low/submerged		<0.5	0.0	<0.1
FUR402			3		TRANSLUCENT	<0.05	0.0	<0.1
FUR5	SMALL ORGANICS		0.79		TRANSLUCENT	<0.5	0.0	<0.1
FUR24235		RUSTED OUT AND WATER LEAKING AROUND IT	.75		TRANSLUCENT	<0.5	0.0	<0.1
SHP96-2			11		TRANSUCENT	<0.5	0.0	<0.1
SHP396-1		CULVERT BLOCKED BY METAL GRATE, WATER EXITS CULVERT ABOUT 1 FOOT BACK THROUGH RUSTED CRACKS	2.25		TRANSLUCENT	<0.5	0.0	<0.1
SHP961			2.2		TRANSLUCENT	<0.5	0.0	<0.1
SHP81-79			1.58	Medium	CLOUDY/MUDDY	<0.5	0.0	<0.1
CHS484-1			6	Medium	CLOUDY/MUDDY	<0.5	0.0	<0.1
CHS117-1				Low	TRANSLUCENT			
CHS647-26				Low	TRANSLUCENT	<0.5	0.0	<0.1
CHS509-12				Low	TRANSLUCENT	<0.5	0.0	<0.1
CHS236-1				Medium	TRANSLUCENT	<0.5	0.0	<0.1
CHS700-10				High	TRANSLUCENT	<0.5	0.0	<0.1
SHP245-1			3.5		TRANSLUCENT	<0.5	0.0	<0.1

OutfallID	BlankTurbidityO	DupTurbidityO	BlankCopper	DupCopper	SamplePH	SampleChlorine	SampleDetergent	SampleTurbidityOu	SampleCopper	LabFecalResult	LabFecalDup
FUR332	4.49	4.57	<0.05	<0.05	8.00	<0.5	0.0	4.49	<0.05	10	14
FUR402	2.79		<0.05		7.00	<0.5	0.05	2.79	<0.05	9	
FUR5	5.88		<0.05		7.00	<0.5	<0.1	5.88	<0.05	116	
FUR24235	2.28		<0.05		7.00	<0.5	0.15	2.28	<0.05	20	
SHP96-2	0.26		<0.05		7.00	<0.5	0.0	0.65	<0.05	0	
SHP396-1	0.26		<0.05		7.00	<0.5	.125	1.23	<0.05	0	
SHP961	0.26		<0.05		7.00	<0.5	0.5	8.68	.05	4	
SHP81-79	0.26		<0.05		7.00	<0.5	0.0	23.60	<0.05	76400	
CHS484-1	0.26		<0.05		7.00	<0.5	0.0	42.60	<0.05	0	
CHS117-1					8.00	<0.5	0.0	2.36	<0.05	4	
CHS647-26	0.26		<0.05		7.00	<0.5	0.1	1.71	<0.05	143	
CHS509-12	0.26		<0.05		7.00	<0.5	0.5	0.28	<0.05	0	
CHS236-1	0.26		<0.05		6.00	<0.5	0.5	1.00	<0.05	0	
CHS700-10	0.26		<0.05		8.00	<0.5	0.0	1.23	<0.05	0	
SHP245-1	0.26	1.50	<0.05	<0.05	8.50	<0.5	0.0	1.15	<0.05	4	4

Appendix F

Outfall Sampling Site Photographs

FUR 332 Outfall

FUR 332 Drainage

FUR 402 Outfall

FUR 402 Drainage

FUR 5 Outfall

FUR 5 Drainage

FUR 24235 Outfall

FUR 24235 Drainage

SHP 96-2 Outfall

SHP 396-1 Outfall

note: drain is rusted out and flowing through lower right corner

SHP 396-1 (right) Outfall

SHP 961 Outfall

SHP 961 Outfall

SHP 81-79 Outfall

Note: Heavy mud load from tidal zone

SHP 245-1 Outfall

SHP 245-1 Drainage

CHS 484-1 Outfall

CHS 117-1 Outfall

CHS 647-26 Outfall

CHS 509-12 Outfall

Note: Heavy rust in outfall

CHS 236-1 Outfall

Note: Bottom portion of outfall collar missing; Heavy orange flocculation

CHS 700-10 Outfall and drainage